Edition: July 2011
Revision: July 2011
Publication No. SM2E-1C11U0

NISSAN VERSA

MODEL C11 SERIES

QUICK REFERENCE INDEX

A	GENERAL INFORMATION	GI	General Information
B	ENGINE	EM	Engine Mechanical
		LU	Engine Lubrication System
		CO	Engine Cooling System
		EC	Engine Control System
		FL	Fuel System
		EX	Exhaust System
		ACC	Accelerator Control System
C	TRANSMISSION/ TRANSAXLE	CL	Clutch System
		MT	Manual Transaxle
		AT	Automatic Transaxle
		CVT	CVT
D	DRIVELINE/AXLE	FAX	Front Axle
		RAX	Rear Axle
E	SUSPENSION	FSU	Front Suspension
		RSU	Rear Suspension
		WT	Road Wheels & Tires
F	BRAKES	BR	Brake System
		PB	Parking Brake System
		BRC	Brake Control System
G	STEERING	PS	Power Steering System
		STC	Steering Control System
H	RESTRAINTS	SB	Seat Belts
		SRS	Supplemental Restraint System (SRS)
I	BODY	BL	Body, Lock & Security System
		GW	Glasses, Window System & Mirrors
		RF	Roof
		EI	Exterior & Interior
		IP	Instrument Panel
		SE	Seat
J	AIR CONDITIONER	MTC	Manual Air Conditioner
K	ELECTRICAL	SC	Starting & Charging System
		LT	Lighting System
		DI	Driver Information System
		WW	Wiper, Washer & Horn
		BCS	Body Control System
		LAN	LAN System
		AV	Audio Visual, Navigation & Telephone System
		ACS	Auto Cruise Control System
		PG	Power Supply, Ground & Circuit Elements
L	MAINTENANCE	MA	Maintenance

A B C D E F G H I J K L M

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FOREWORD

This manual contains maintenance and repair procedures for the 2012 NISSAN VERSA HATCHBACK.

In order to assure your safety and the efficient functioning of the vehicle, this manual should be read thoroughly. It is especially important that the PRECAUTIONS in the GI section be completely understood before starting any repair task.

All information in this manual is based on the latest product information at the time of publication. The right is reserved to make changes in specifications and methods at any time without notice.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the technician and the efficient functioning of the vehicle.
The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.
Service varies with the procedures used, the skills of the technician and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first be completely satisfied that neither personal safety nor the vehicle's safety will be jeopardized by the service method selected.

NISSAN NORTH AMERICA, INC.
Technical Publications Department

PLEASE HELP MAKE THIS SERVICE MANUAL BETTER!

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SERVICE MANUAL: Model: _____ **Year:** _____

PUBLICATION NO. (Refer to Quick Reference Index): _____

Please describe any Service Manual issues or problems in detail:

Page number(s) _____ *Note: Please include a copy of each page, marked with your comments.*

_____

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Are the trouble diagnosis procedures logical and easy to use? (circle your answer) YES NO

If no, what page number(s)?_____*Note: Please include a copy of each page, marked with your comments.*

Please describe the issue or problem in detail: _____

_____

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_____

Is the organization of the manual clear and easy to follow? (circle your answer) YES NO

Please comment: _____

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What information should be included in NISSAN Service Manuals to better support you in servicing or repairing customer vehicles?

_____

_____

_____

_____

DATE: _____ YOUR NAME: _____ POSITION: _____

DEALER: _____ DEALER NO.: _____ ADDRESS: _____

CITY:_____ STATE/PROV./COUNTRY: _____ ZIP/POSTAL CODE: _____

QUICK REFERENCE CHART: VERSA HATCHBACK

Engine Tune-up Data

INFOID:0000000007799262

GENERAL SPECIFICATIONS

Engine type		MR18DE
Cylinder arrangement		In-line 4
Displacement cm^3 (cu in)		1,797 (109.65)
Bore and stroke mm (in)		84.0 x 81.1 (3.307 x 3.192)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Compression ratio		9.9
Compression pressure kPa (kg/cm^2, psi) / 250 rpm	Standard	1,500 (15.3, 217.6)
	Minimum	1,200 (12.2, 174)
	Differential limit between cylinders	100 (1.0, 15)

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

SPARK PLUG

Unit: mm (in)

Make	DENSO
Standard type*	FXE20HR-11
Spark plug gap	Nominal: 1.1 (0.043)

*: Always check with the Parts Department for the latest parts information.

Front Wheel Alignment (Unladen*)

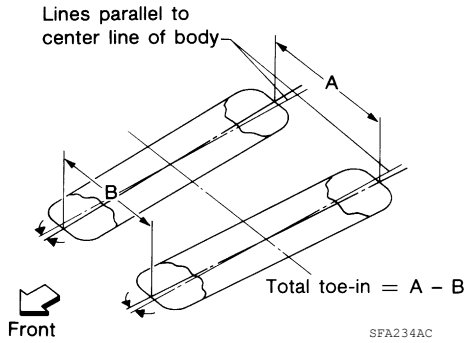
INFOID:0000000007799261

Market		United States and Canada	
Tire size		P185/65R15, P195/55R16	
Camber Degree minute (Decimal degree)	RH	Minimum	- 0° 55′ (- 0.92°)
		Nominal	- 0° 10′ (- 0.17°)
		Maximum	0° 35′ (0.58°)
	LH	Minimum	- 0° 55′ (- 0.92°)
		Nominal	- 0° 10′ (- 0.17°)
		Maximum	0° 35′ (0.58°)
	Left or right difference (LH - RH)	Minimum	-0° 33′ (-0.55°)
		Nominal	0° 0′ (0°)
		Maximum	0° 33′ (0.55°)

QUICK REFERENCE CHART: VERSA HATCHBACK

2012

Market			United States and Canada
Tire size			P185/65R15, P195/55R16
Caster Degree minute (Decimal degree)	RH	Minimum	4° 05′ (4.08°)
		Nominal	4° 50′ (4.83°)
		Maximum	5° 35′ (5.58°)
	LH	Minimum	3° 55′ (3.92°)
		Nominal	4° 40′ (4.67°)
		Maximum	5° 25′ (5.42°)
	Left or right difference (LH - RH)	Minimum	-0° 45′ (-0.75°)
		Nominal	-0° 12′ (-0.20°)
		Maximum	0° 21′ (0.35°)
Kingpin inclination Degree minute (Decimal degree)		Minimum	9° 10′ (9.17°)
		Nominal	9° 55′ (9.92°)
		Maximum	10° 40′ (10.67°)



Total toe-in	Distance (A - B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left or right, each side) Degree minute second (Decimal degree)	Minimum	0° 0′ 0" (0°)
		Nominal	0° 2′ 42" (0.05°)
		Maximum	0° 5′ 24" (0.09°)

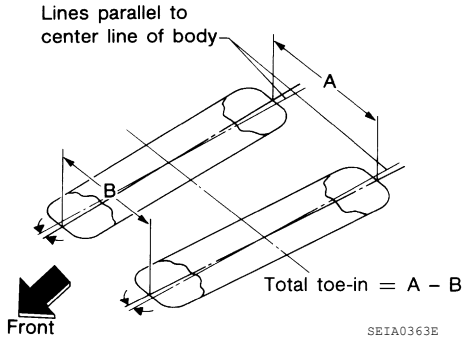
*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Rear Wheel Alignment (Unladen*)

INFOID:0000000007799259

Market		United States and Canada
Tire size		P185/65R15, P195/55R16
Camber Degree minute (Decimal degree)	Minimum	– 2° 0′ 30" (– 2.01°)
	Nominal	– 1° 30′ 30" (– 1.51°)
	Maximum	– 1° 0′ 30" (– 1.01°)

Market	United States and Canada
Tire size	P185/65R15, P195/55R16



Total toe-in	Distance (A - B)	Minimum	–1.0 mm (–0.039 in)
		Nominal	3.0 mm (0.118 in)
		Maximum	7.0 mm (0.276 in)
	Angle (left or right, each side) Degree minute (Decimal degree)	Minimum	–0° 2′ 30" (–0.04°)
		Nominal	0° 8′ 30" (0.14°)
		Maximum	0° 19′ 0" (0.32°)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Wheelarch Height (Unladen*)

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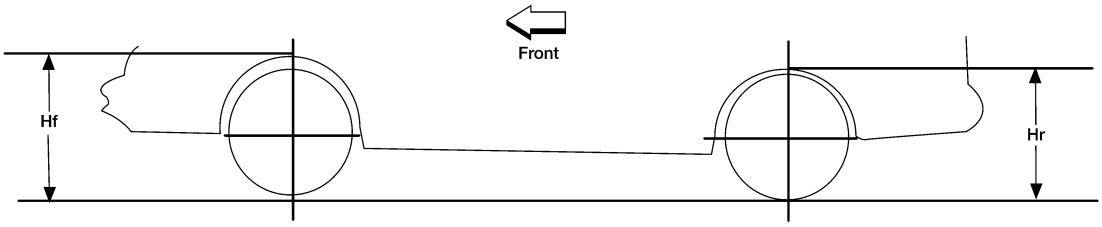
Unit: mm (in)



Tire size	P185/65R15		P195/55R16
Market	United States	Canada	United States
Front (Hf)	685 (26.97)	685 (26.97)	686 (27.01)
Rear (Hr)	682 (26.85)	683 (26.89)	683 (26.89)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Brake Specifications

INFOID:0000000007799256

MR18DE

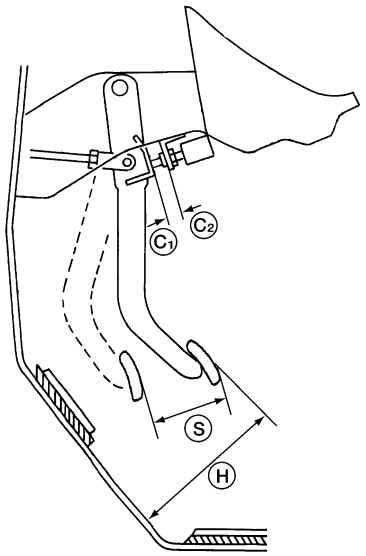
Front brake	Brake model	CLZ25VF
	Cylinder bore diameter	57.2 mm (2.252 in)
	Pad Length × width × thickness	125.6 mm × 48.0 mm × 9.5 mm (4.945 in × 1.890 in × 0.374 in)
	Rotor outer diameter × thickness	280 mm × 24.0 mm (11.02 in × 0.945 in)
Rear brake	Brake model	LT23
	Cylinder bore diameter	19.06 mm (0.750 in)
	Drum inner diameter	228.6 mm (9.000 in)

Master cylinder	Cylinder bore diameter	23.81 ± 0.015 mm (0.937 ± 0.001 in)
Brake booster	Booster model	C255
	Diaphragm diameter	255 mm (10.04 in)

Brake Pedal

INFOID:0000000007799255

Unit: mm (in)



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Brake pedal free height (H) (from dash panel top surface)	A/T, CVT model	172.4 +10/-0 (6.78 +0.39/-0)
	M/T model	162.3 +10/-0 (6.39 +0.39/-0)
Brake pedal full stroke (S)		133 (5.24)
Clearance between the pedal stopper and threaded end of stop lamp switch (C_1) and ASCD cancel switch (C_2), if equipped		0.74 - 1.96 (0.0291 - 0.0772)

Front Disc Brake

INFOID:0000000007799254

Unit: mm (in)

Brake model		CLZ25VF
Brake pad	Standard thickness (new)	9.5 (0.374)
	Minimum thickness	2.0 (0.079)
Disc rotor	Standard thickness (new)	24.0 (0.945)
	Repair limit thickness	22.0 (0.866)
	Runout limit (measured at 10.0 mm (0.394 in) inside the disc edge	0.07 (0.0028)
	Maximum uneven wear (measured at 8 positions)	0.02 mm (0.0008 in) or less

Rear Drum Brake

INFOID:0000000007799253

Unit: mm (in)

Brake model		LT23
Brake lining	Standard thickness (new)	4.0 (0.157)
	Minimum thickness	1.5 (0.059)

Drum	Standard inner diameter (new)	228.6 (9.000)
	Repair limit inner diameter	230.0 (9.055)

Fluids and Lubricants

INFOID:0000000007799252

Description			Capacity (Approximate)		
			Metric	US measure	Imp measure
Fuel			50.0 ℓ	13 1/4 gal	11 gal
Engine oil Drain and refill	With oil filter change		4.1 ℓ	4 3/8 qt	3 5/8 qt
	Without oil filter change		3.9 ℓ	4 1/8 qt	3 3/8 qt
Dry engine (engine overhaul)			4.9 ℓ	5 1/8 qt	4 3/8 qt
Cooling system (with reservoir at MAX level)			6.8 ℓ	7 1/4 qt	6 qt
Manual transaxle fluid (MTF)		RS6F949	2.0 ℓ	4 1/4 pt	3 1/2 pt
Automatic transaxle fluid (ATF)			7.9 ℓ	8 3/8 qt	7 qt
CVT fluid		RE0F08B	6.9 ℓ	7 1/4 qt	6 1/8 qt
Brake and clutch fluid			—	—	—
Multi-purpose grease			—	—	—
Windshield washer fluid			4.5 ℓ	4 3/4 qt	4 qt
Air conditioning system refrigerant			0.45 ± 0.05 kg	0.99 ± 0.11 lb	0.99 ± 0.11 lb
Air conditioning system oil		MR18DE - Type 1	120 mℓ	4.1 fl oz	4.2 fl oz
		MR18DE - Type 2	100 mℓ	3.4 fl oz	3.5 fl oz

SECTION GI
GENERAL INFORMATION

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SERVICE INFORMATION

PRECAUTIONS

Description

INFOID:0000000007330311

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section .

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330312

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330313

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

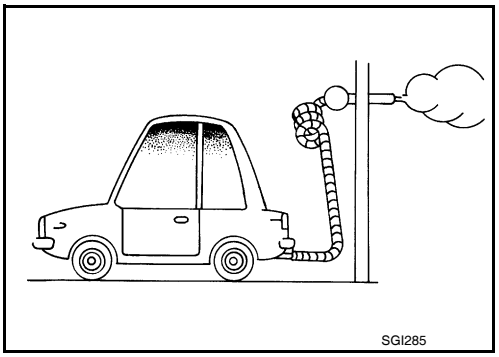
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

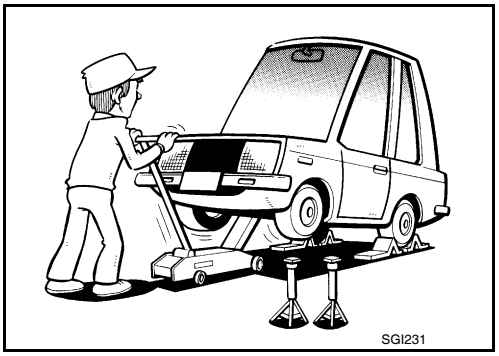
General Precaution

INFOID:0000000007330314

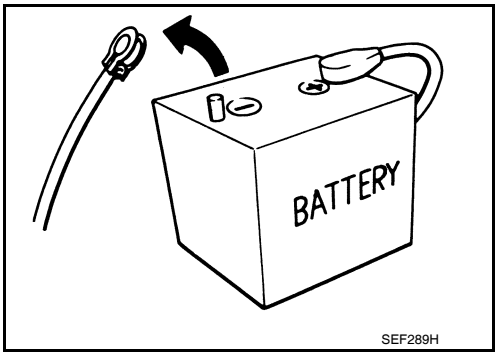
- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any flammable materials. Special care should be taken when handling any flammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.


SGI285

- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.

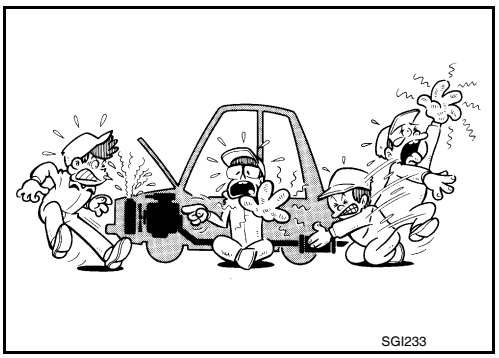

SGI231

- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.
- Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.

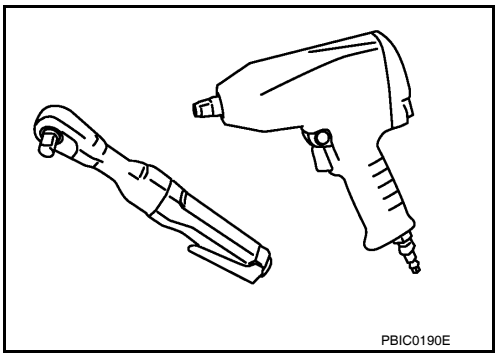


SEF289H

- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of or recycle drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.


SGI233

- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM). Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.
- Use approved bonding agent, sealants or their equivalents when required.
- Use hand tools, power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leaks.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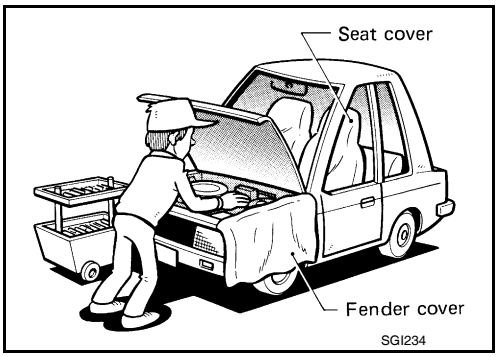
- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



SGI234

WARNING:
To prevent ECM from storing the diagnostic trouble codes, do not carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC, CVT, and AT sections.

Precaution for Three Way Catalyst

INFOID:0000000007330315

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.
- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Precaution for Fuel (Unleaded Regular Gasoline Recommended)

INFOID:0000000007330316

Use unleaded regular gasoline with an octane rating of at least 87 AKI (Anti-Knock Index) number (Research octane number 91). E-85 fuel (85% fuel ethanol, 15% unleaded gasoline) may only be used in vehicles specifically designed for E-85 fuel (i.e. Flexible Fuel Vehicle - FFV models).

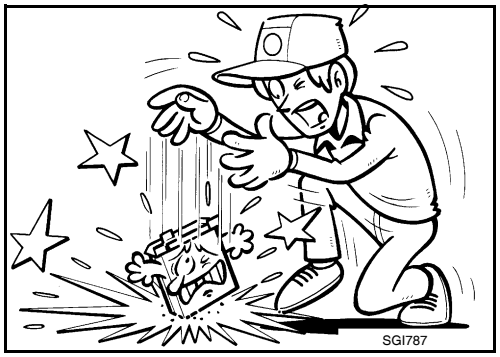
CAUTION:
Do not use leaded gasoline. Using leaded gasoline will damage the three way catalyst. Do not use E-85 fuel (85% fuel ethanol, 15% unleaded gasoline) unless the vehicle is specifically designed for E-85 fuel

(i.e. Flexible Fuel Vehicle - FFV models). Using a fuel other than that specified could adversely affect the emission control devices and systems, and could also affect the warranty coverage validity.

Precaution for Multiport Fuel Injection System or Engine Control System

INFOID:0000000007330317

- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

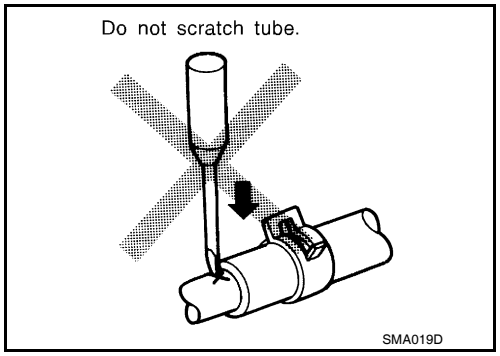


Precaution for Hoses

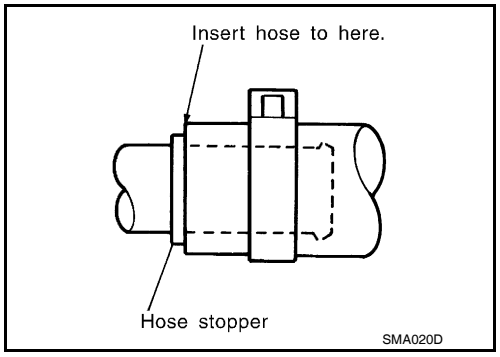
INFOID:0000000007330318

HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.

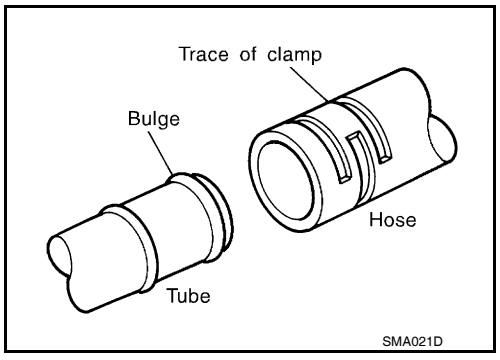


- To reinstall the rubber hose securely, make sure that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

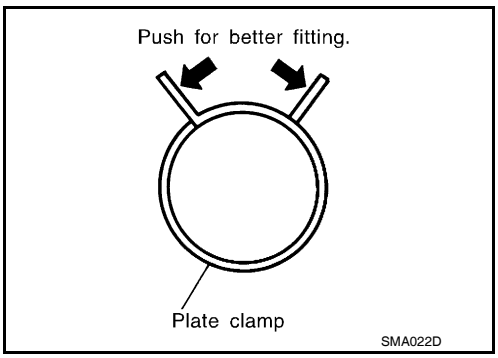


HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Precaution for Engine Oils

INFOID:0000000007330319

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

Precaution for Air Conditioning

INFOID:0000000007330320

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to MTC-75, "HFC-134a (R-134a) Service Procedure" for specific instructions.

HOW TO USE THIS MANUAL

Description

INFOID:0000000007330321

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

INFOID:0000000007330322

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value:Tolerance at inspection and adjustment.
  Limit value:The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

INFOID:0000000007330323

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  Also with regard to tightening torque of bolts and nuts, there are descriptions both about range and about the standard tightening torque.

“Example”

Range

Outer Socket Lock Nut : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

Standard

Drive Shaft Installation Bolt : 44.3 N·m (4.5 kg-m, 33 ft-lb)

Contents

INFOID:0000000007330324

- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

Relation between Illustrations and Descriptions

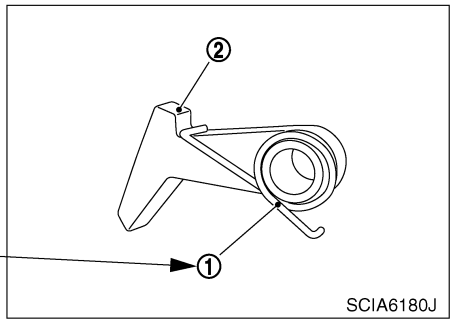
INFOID:0000000007330325

The following sample explains the relationship between the part description in an illustration, the part name in the text and the service procedures.

< Example 1 >

1. Remove return spring (1) from parking pawl (2).

The identifier number of the part name in the text is consistent with the identifier part number in the illustration.

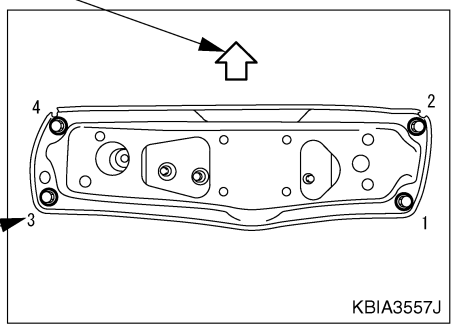


Direction mark

< Example 2 >

- ⇨ : Vehicle front
- Tighten rear member mounting bolts following the numerical order shown in the illustration.
- Note : View upward

The numbers in the illustration are consistent with the service operation instructions.



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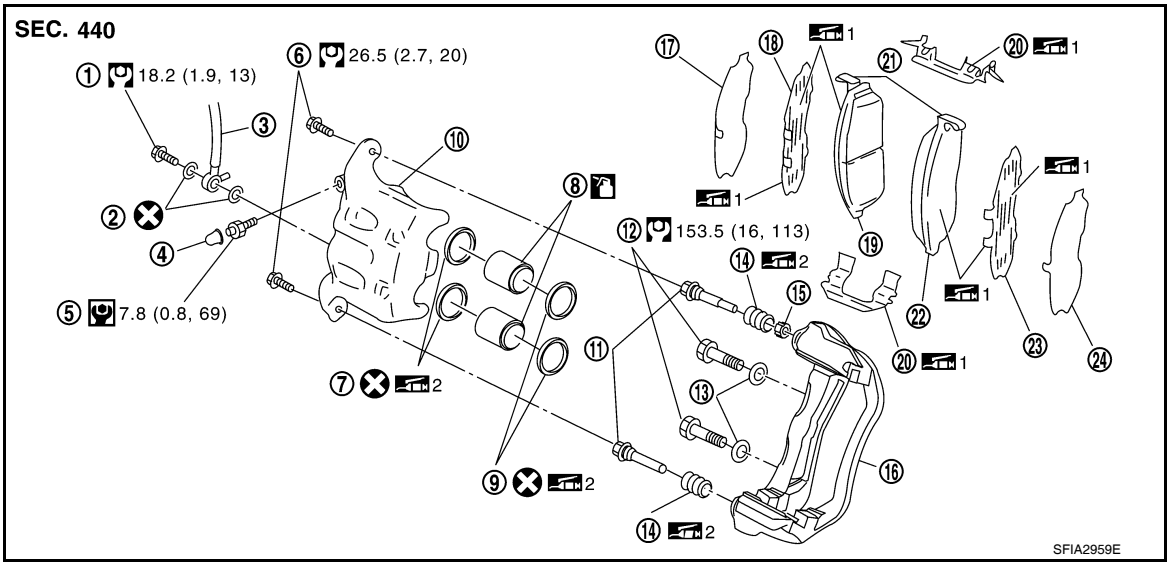
Component

INFOID:0000000007330326

- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG**.
  Always check with the **PARTS DEPARTMENT** for the latest parts information.
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



1. Union bolt
2. Copper washer
3. Brake hose
4. Cap
5. Bleed valve
6. Sliding pin bolt
7. Piston seal
8. Piston
9. Piston boot
10. Cylinder body
11. Sliding pin
12. Torque member mounting bolt
13. Washer
14. Sliding pin boot
15. Bushing
16. Torque member
17. Inner shim cover
18. Inner shim
19. Inner pad
20. Pad retainer
21. Pad wear sensor
22. Outer pad
23. Outer shim
24. Outer shim cover

1: PBC (Poly Butyl Cuprysil) grease or silicone-based grease
2: Rubber grease
: Brake fluid

Refer to GI section for additional symbol definitions.

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.	: N•m (kg-m, ft-lb)		Always replace after every disassembly.
		: N•m (kg-m, in-lb)	Ⓟ	Apply petroleum jelly.
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.		Ⓜ	Apply molybdenum added petroleum jelly.
	Should be lubricated with oil.		ATF	Apply ATF.
	Sealing point		★	Select with proper thickness.
Ⓛ	Sealing point with locking sealant.		☆	Adjustment is required.
	Checking point			

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How to Follow Trouble Diagnosis

INFOID:0000000007330327

DESCRIPTION

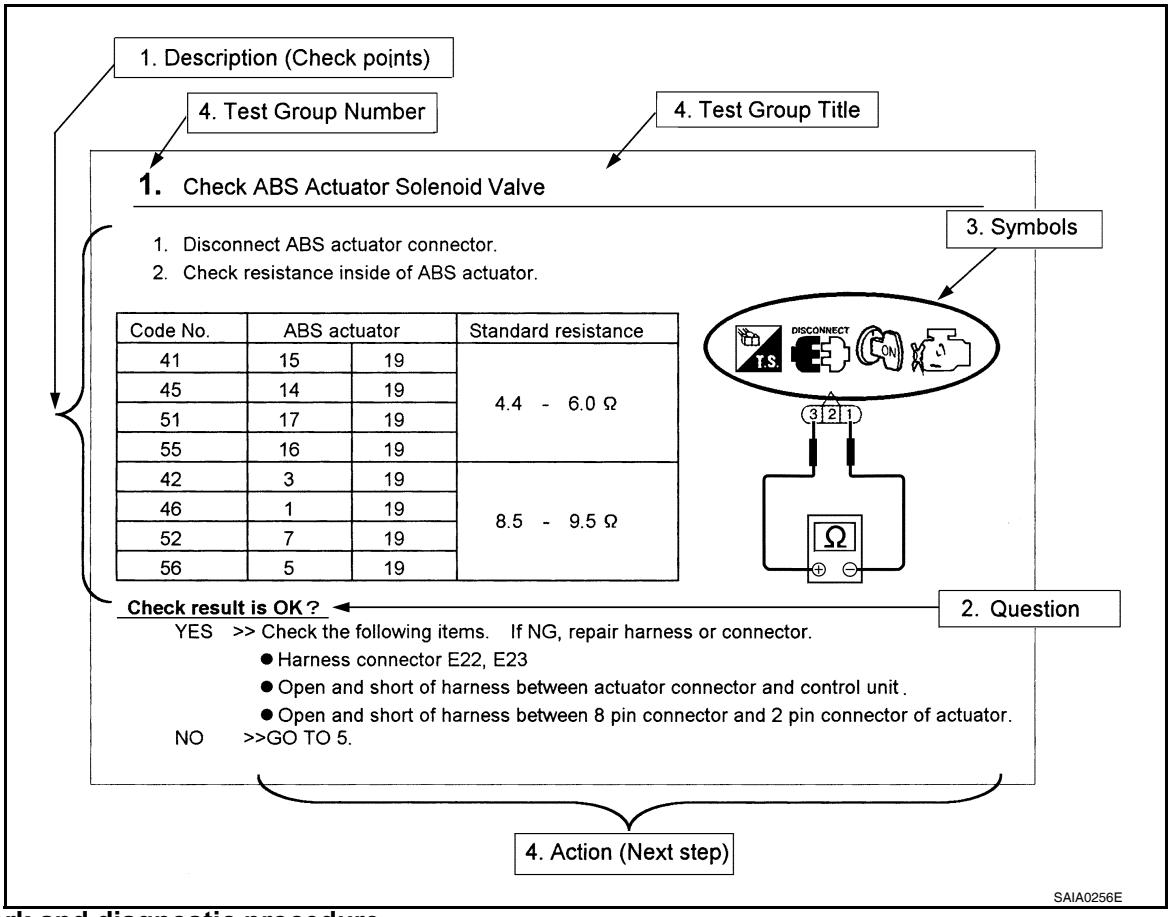
NOTICE:

Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

1. **Before performing trouble diagnoses, read the “Preliminary Check”, the “Symptom Chart” or the “Work Flow”.**
2. **After repairs, re-check that the problem has been completely eliminated.**

3. **Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.**
4. **Refer to the Circuit Diagram for quick pinpoint check.**
   If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
5. **When checking circuit continuity, ignition switch should be OFF.**
6. **Before checking voltage at connectors, check battery voltage.**
7. **After accomplishing the Diagnostic Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.**

HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES



1. **Work and diagnostic procedure**
   Start to diagnose a problem using procedures indicated in enclosed test groups.
2. **Questions and required results**
   Questions and required results are indicated in bold type in test group.
   The meaning of are as follows:

   a. Battery voltage → 11 - 14V or approximately 12V
   b. Voltage : Approximately 0V → Less than 1V

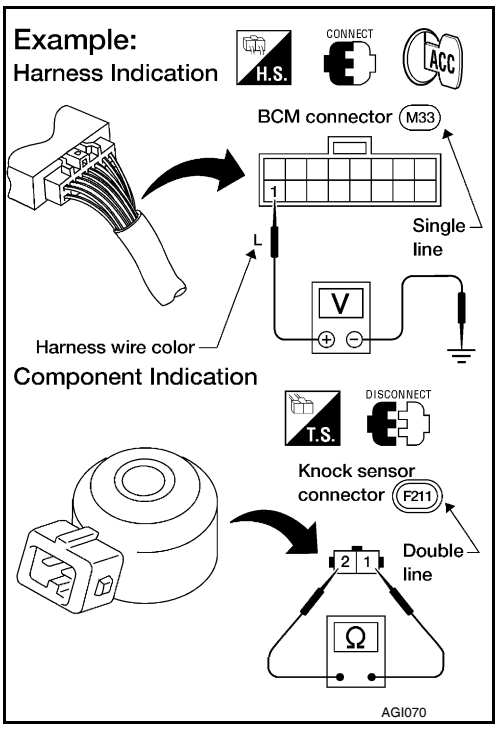
3. **Symbol used in illustration**
   Symbols included in illustrations refer to measurements or procedures. Before diagnosing a problem, familiarize yourself with each symbol. Refer to "Connector Symbols" in GI Section and "KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES" below.
4. **Action items**
   Next action for each test group is indicated based on result of each question. Test group number is shown in the left upper portion of each test group.

HARNESS WIRE COLOR AND CONNECTOR NUMBER INDICATION

There are two types of harness wire color and connector number indication.

TYPE 1: Harness Wire Color and Connector Number are Shown in Illustration

- Letter designations next to test meter probe indicate harness wire color.
- Connector numbers in a single circle (e.g. M33) indicate harness connectors.
- Connector numbers in a double circle (e.g. F211) indicate component connectors.

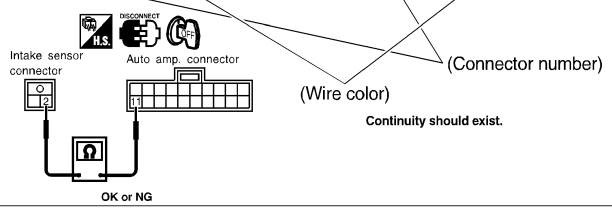


TYPE 2: Harness Wire Color and Connector Number are Shown in Text

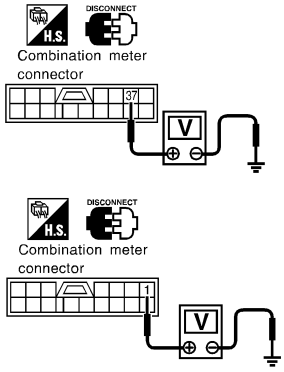
Example 1:

2	CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between intake sensor harness connector M59 terminal No. 2 (GW) and auto amp. (LCU) harness connector M56 terminal No. 11 (GW).



Example 2:



POWER SUPPLY AND GROUND CIRCUIT CHECK

Power Supply Circuit Check

=NCEL00-16S07
NCEL00-1680701

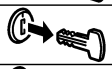
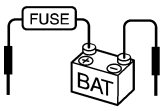
Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M40	37 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage
M41	1 (Y)	Ground	0V	0V	Battery voltage

If NG, check the follwing.
- 7.5A fuse [No. 5, located in fuse block (J/B)]
- 10A fuse [No. 11, located in fuse block (J/B)]
- Harness for open or short between fuse and combination meter

Connector number Wire color

SGI144A

KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Check after disconnecting the connector to be measured.		Procedure with Generic Scan Tool. (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.		Procedure without CONSULT, CONSULT-II or GST
	Insert key into ignition switch.		A/C switch is “OFF”.
	Remove key from ignition switch.		A/C switch is “ON”.
	Insert and remove key repeatedly.		REC switch is “ON”.
	Turn ignition switch to “OFF” position.		REC switch is “OFF”.
	Turn ignition switch to “ACC” position.		Fan switch is “ON”. (At any position except for “OFF” position)
	Turn ignition switch to “ON” position.		Fan switch is “OFF”.
	Turn ignition switch to “START” position.		Apply fuse.
	Turn ignition switch from “OFF” to “ACC” position.		Apply positive voltage from battery with fuse directly to components.
	Turn ignition switch from “ACC” to “ON” position.		
	Turn ignition switch from “ACC” to “OFF” position.		

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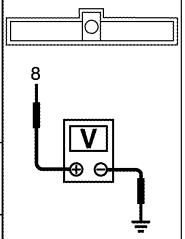
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Turn ignition switch from “OFF” to “ON” position.		Drive vehicle.
	Turn ignition switch from “ON” to “OFF” position.		
	Do not start engine, or check with engine stopped.		Disconnect battery negative cable.
	Start engine, or check with engine running.		Depress brake pedal.
	Apply parking brake.		Release brake pedal.
	Release parking brake.		Depress accelerator pedal.
	Check after engine is warmed up sufficiently.		Release accelerator pedal.
	Voltage should be measured with a voltmeter.		Pin terminal check for SMJ type ECM or TCM connectors. **For details regarding the terminal arrangement, refer to the “ELECTRICAL UNITS” electrical reference page at the end of the manual.**
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT		
	Procedure without CONSULT		
	Place selector lever in “P” position.		
	Place selector lever in “N” position.		
	Jack up front portion.		
	Jack up rear portion.		
	Inspect under engine room.		
	Inspect under floor.		
	Inspect rear under floor.		

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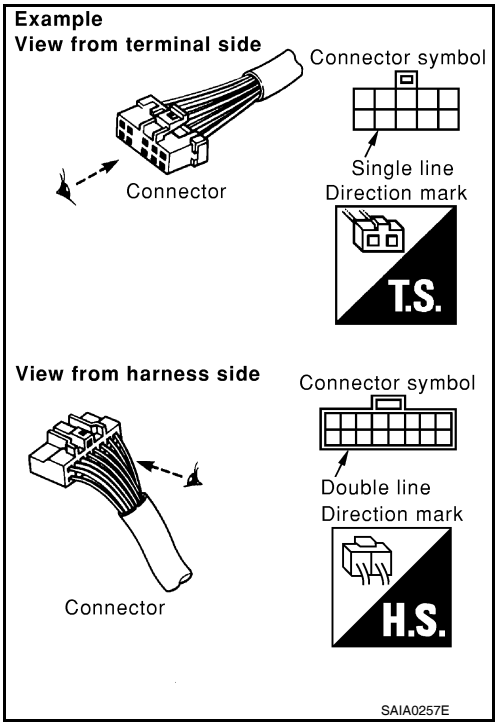
How to Read Wiring Diagram

INFOID:0000000007330328

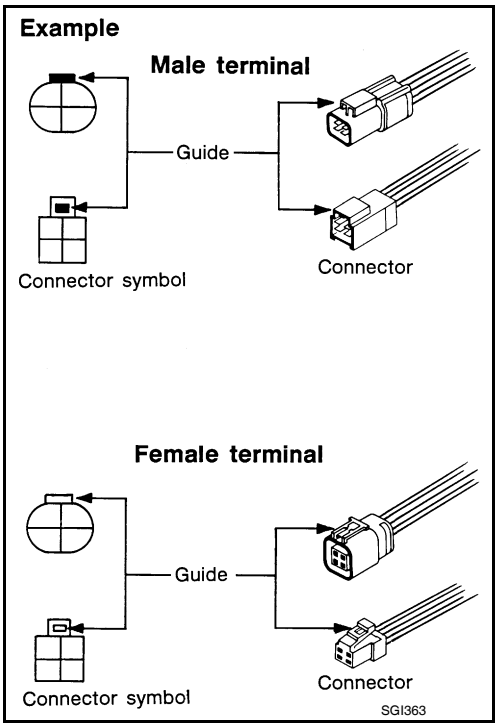
CONNECTOR SYMBOLS

Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, “Description”, “HARNESS CONNECTOR”.

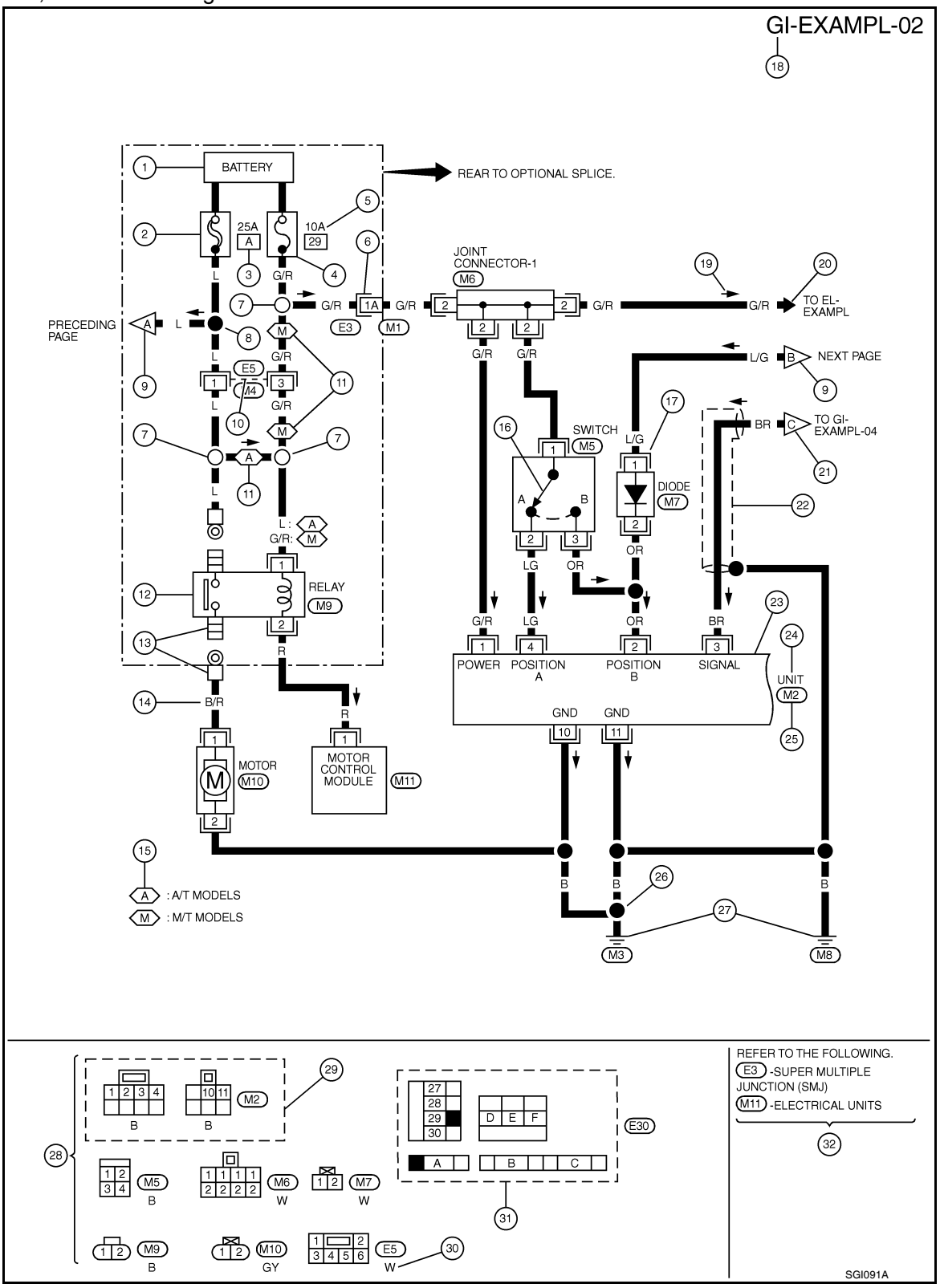


- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.

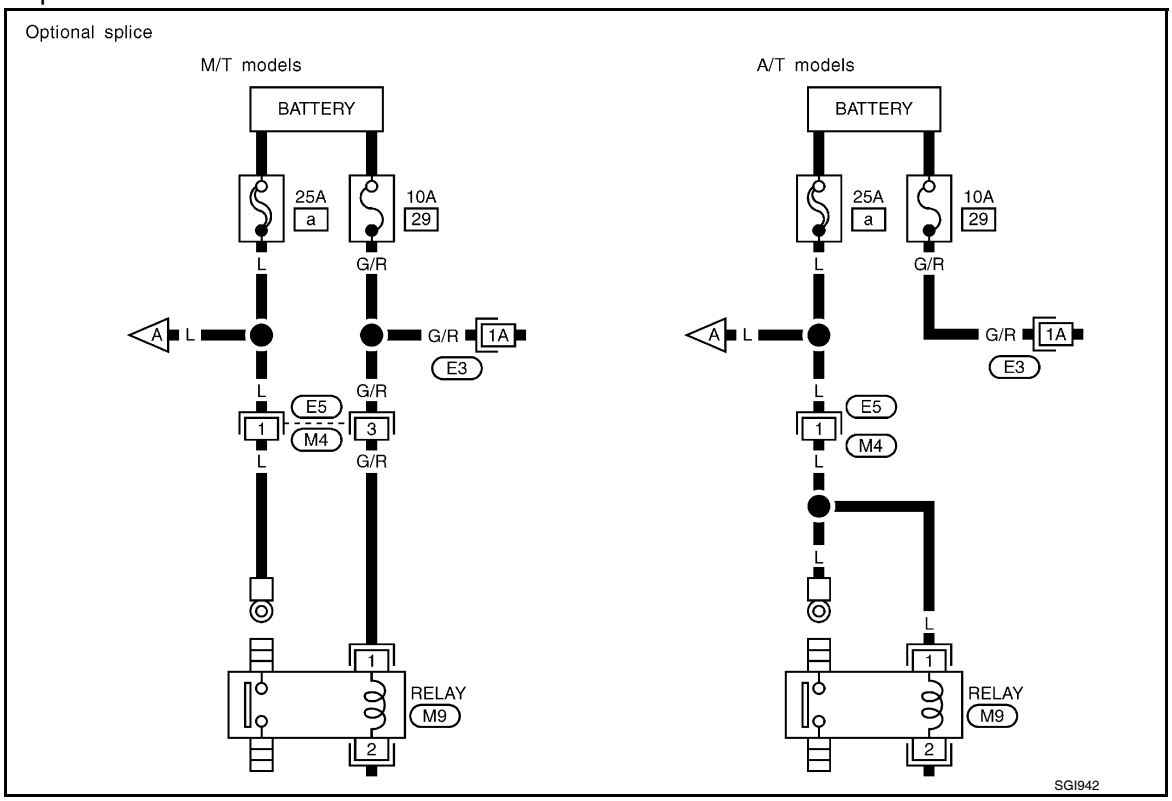


SAMPLE/WIRING DIAGRAM - EXAMPL -

- For detail, refer to following “DESCRIPTION”.



Optional Splice



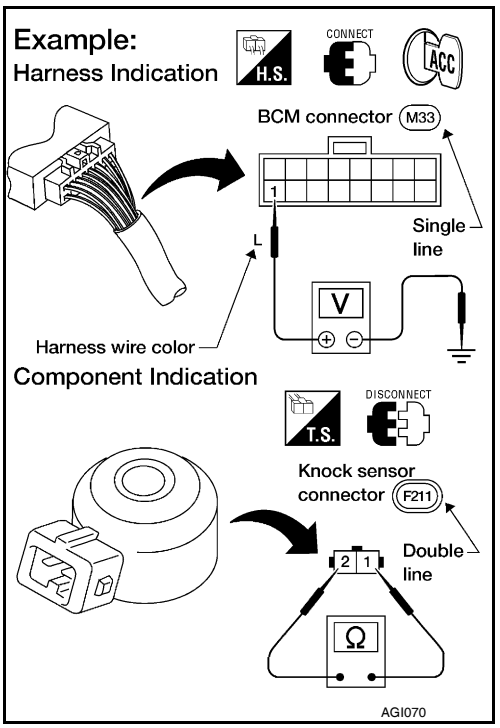
DESCRIPTION

Number	Item	Description
1	Power condition	• This shows the condition when the system receives battery positive voltage (can be operated).
2	Fusible link	• The double line shows that this is a fusible link. • The open circle shows current flow in, and the shaded circle shows current flow out.
3	Fusible link/fuse location	• This shows the location of the fusible link or fuse in the fusible link or fuse box. For arrangement, refer to PG section, POWER SUPPLY ROUTING.
4	Fuse	• The single line shows that this is a fuse. • The open circle shows current flow in, and the shaded circle shows current flow out.
5	Current rating	• This shows the current rating of the fusible link or fuse.
6	Connectors	• This shows that connector E3 is female and connector M1 is male. • The G/R wire is located in the 1A terminal of both connectors. • Terminal number with an alphabet (1A, 5B, etc.) indicates that the connector is SMJ connector. Refer to PG section, SMJ (SUPER MULTIPLE JUNCTION).
7	Optional splice	• The open circle shows that the splice is optional depending on vehicle application.
8	Splice	• The shaded circle shows that the splice is always on the vehicle.
9	Page crossing	• This arrow shows that the circuit continues to an adjacent page. • The A will match with the A on the preceding or next page.
10	Common connector	• The dotted lines between terminals show that these terminals are part of the same connector.
11	Option abbreviation	• This shows that the circuit is optional depending on vehicle application.
12	Relay	• This shows an internal representation of the relay. For details, refer to PG section, STANDARDIZED RELAY.
13	Connectors	• This shows that the connector is connected to the body or a terminal with bolt or nut.

Number	Item	Description
14	Wire color	• This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
15	Option description	• This shows a description of the option abbreviation used on the page.
16	Switch	• This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
17	Assembly parts	• Connector terminal in component shows that it is a harness incorporated assembly.
18	Cell code	• This identifies each page of the wiring diagram by section, system and wiring diagram page number.
19	Current flow arrow	• Arrow indicates electric current flow, especially where the direction of standard flow (vertically downward or horizontally from left to right) is difficult to follow. • A double arrow “ ↔ ” shows that current can flow in either direction depending on circuit operation.
20	System branch	• This shows that the system branches to another system identified by cell code (section and system).
21	Page crossing	• This arrow shows that the circuit continues to another page identified by cell code. • The C will match with the C on another page within the system other than the next or preceding pages.
22	Shielded line	• The line enclosed by broken line circle shows shield wire.
23	Component box in wave line	• This shows that another part of the component is also shown on another page (indicated by wave line) within the system.
24	Component name	• This shows the name of a component.
25	Connector number	• This shows the connector number. • The letter shows which harness the connector is located in. • Example: **M**: main harness. For detail and to locate the connector, refer to PG section "Main Harness", “Harness Layout”. A coordinate grid is included for complex harnesses to aid in locating connectors.
26	Ground (GND)	• The line spliced and grounded under wire color shows that ground line is spliced at the grounded connector.
27	Ground (GND)	• This shows the ground connection. For detailed ground distribution information, refer to "Ground Distribution" in PG section.
28	Connector views	• This area shows the connector faces of the components in the wiring diagram on the page.
29	Common component	• Connectors enclosed in broken line show that these connectors belong to the same component.
30	Connector color	• This shows a code for the color of the connector. For code meaning, refer to wire color codes, Number 14 of this chart.
31	Fusible link and fuse box	• This shows the arrangement of fusible link(s) and fuse(s), used for connector views of "POWER SUPPLY ROUTING" in PG section. The open square shows current flow in, and the shaded square shows current flow out.
32	Reference area	• This shows that more information on the Super Multiple Junction (SMJ) and Joint Connectors (J/C) exists on the PG section. Refer to "Reference Area" for details.

Harness Indication

- Letter designations next to test meter probe indicate harness (connector) wire color.
- Connector numbers in a single circle M33 indicate harness connectors.



Component Indication

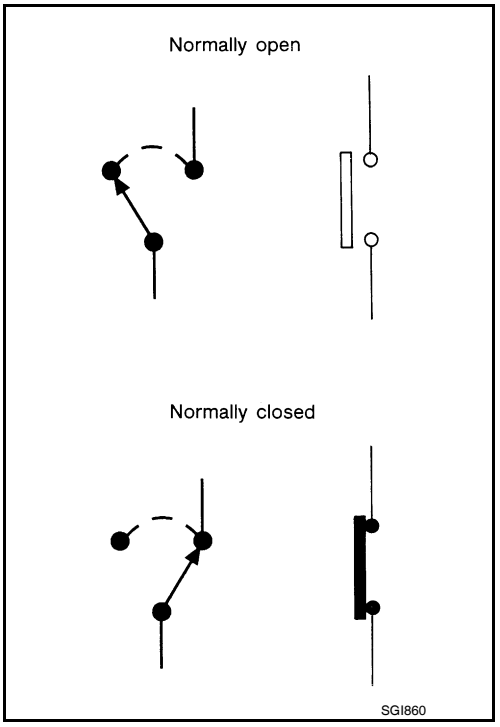
Connector numbers in a double circle F211 indicate component connectors.

Switch Positions

Switches are shown in wiring diagrams as if the vehicle is in the “normal” condition.

A vehicle is in the “normal” condition when:

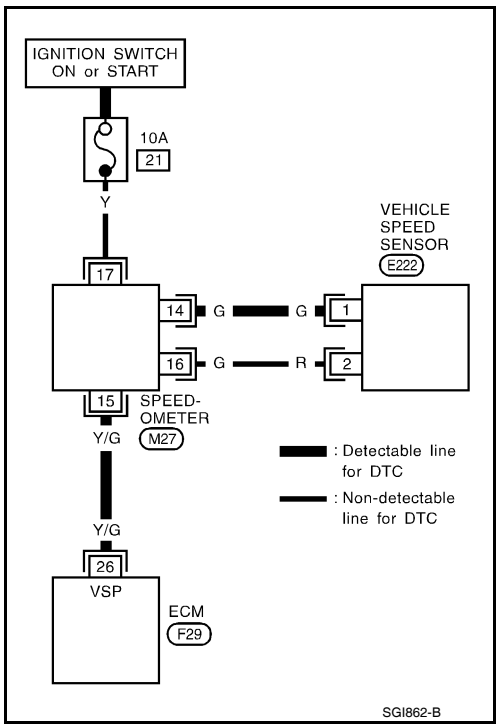
- ignition switch is “OFF”,
- doors, hood and trunk lid/back door are closed,
- pedals are not depressed, and
- parking brake is released.



Detectable Lines and Non-Detectable Lines

In some wiring diagrams, two kinds of lines, representing wires, with different weight are used.

- A line with regular weight (wider line) represents a “detectable line for DTC (Diagnostic Trouble Code)”. A “detectable line for DTC” is a circuit in which ECM can detect its malfunctions with the on board diagnostic system.
- A line with less weight (thinner line) represents a “non-detectable line for DTC”. A “non-detectable line for DTC” is a circuit in which ECM cannot detect its malfunctions with the on board diagnostic system.



Multiple Switch

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.
- The switch diagram is used in wiring diagrams.

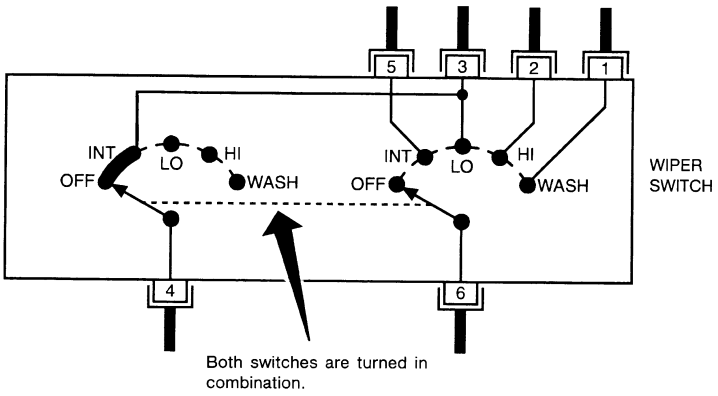
Example

(SWITCH CHART)

WIPER SWITCH

	OFF	INT	LO	HI	WASH
1					○
2				○	
3	○	○	○		
4	○	○			
5		○			
6		○	○	○	○

(SWITCH DIAGRAM)



Continuity circuit of wiper switch

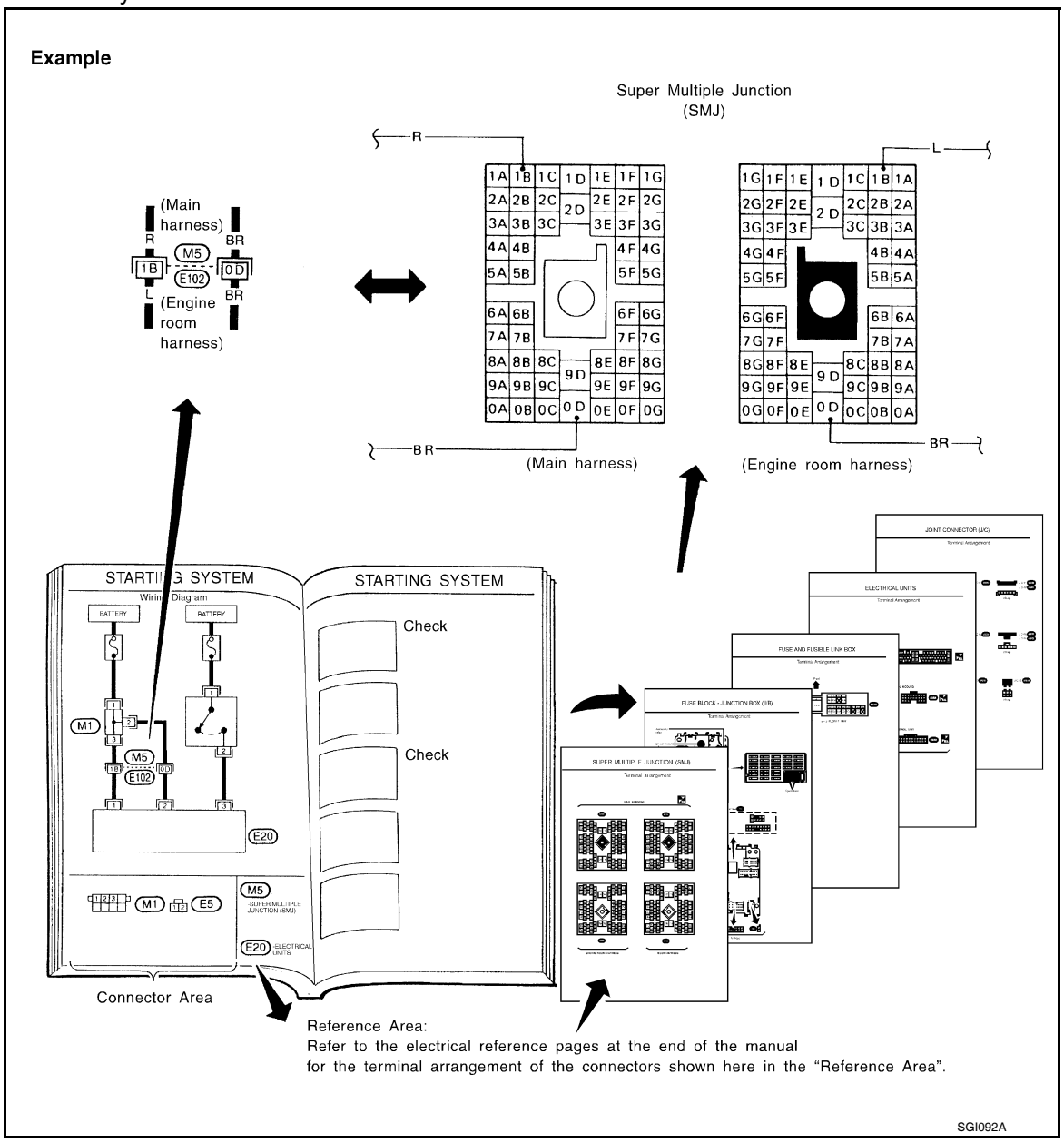
SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

SGI875

Reference Area

The Reference Area of the wiring diagram contains references to additional electrical reference pages at the end of the manual. If connector numbers and titles are shown in the Reference Area of the wiring diagram, these connector symbols are not shown in the Connector Area.

Example



Abbreviations

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The following **ABBREVIATIONS** are used:

ABBREVIATION	DESCRIPTION
A/C	Air Conditioner
A/T	Automatic Transaxle/Transmission
ATF	Automatic Transmission Fluid
CVT	Continuously Variable Transmission
D_1	Drive range [First Gear (1GR)]
D_2	Drive range [Second Gear (2GR)]
D_3	Drive range [Third Gear (3GR)]
D_4	Drive range [Fourth Gear(4GR)]

ABBREVIATION	DESCRIPTION
FR, RR	Front, Rear
LH, RH	Left-Hand, Right-Hand
M/T	Manual Transaxle/Transmission
OD	Overdrive
P/S	Power Steering
SAE	Society of Automotive Engineers, Inc.
SDS	Service Data and Specifications
SST	Special Service Tools
2WD	2-Wheel Drive
2_2	2nd range Second [Gear (2GR)]
2_1	2nd range First [Gear (1GR)]
1_2	1st range Second [Gear (2GR)]
1_1	1st range First [Gear (1GR)]

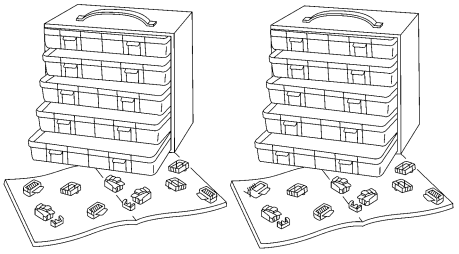
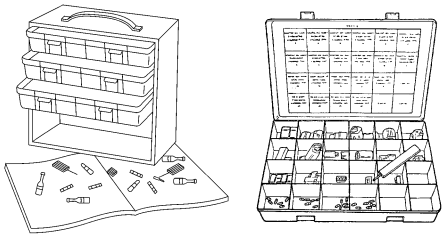
SERVICE INFORMATION FOR ELECTRICAL INCIDENT

How to Check Terminal

INFOID:0000000007330330

CONNECTOR AND TERMINAL PIN KIT

Use the connector and terminal pin kits listed below when replacing connectors or terminals.
The connector and terminal pin kits contain some of the most commonly used NISSAN/INFINITI connectors and terminals. For detailed connector and terminal pin replacement procedures, refer to the latest NISSAN/INFINITI CONNECTOR AND TERMINAL PIN SERVICE MANUAL.

Tool number (Kent-Moore No.) Tool name	Description
- (J38751-95NI) Connector and terminal pin kit (NISSAN) - (J38751-95INF) Connector and terminal pin kit (INFINITI) - (J42992-98KIT) OBD and terminal repair kit - (J42992-2000UPD) OBD-II Connector Kit Update	J38751-95NI J38751-95INF  WAIA0004E J42992-98KIT J42992-2000UPD  WAIA0005E

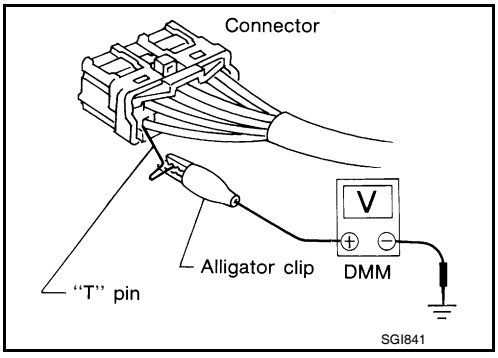
HOW TO PROBE CONNECTORS

Connector damage and an intermittent connection can result from improperly probing of the connector during circuit checks.
The probe of a digital multimeter (DMM) may not correctly fit the connector cavity. To correctly probe the connector, follow the procedures below using a “T” pin. For the best contact grasp the “T” pin using an alligator clip.

Probing from Harness Side

Standard type (not waterproof type) connector should be probed from harness side with “T” pin.

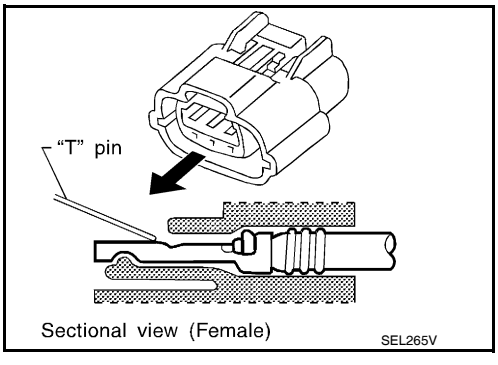
- If the connector has a rear cover such as a ECM connector, remove the rear cover before probing the terminal.
- Do not probe waterproof connector from harness side. Damage to the seal between wire and connector may result.



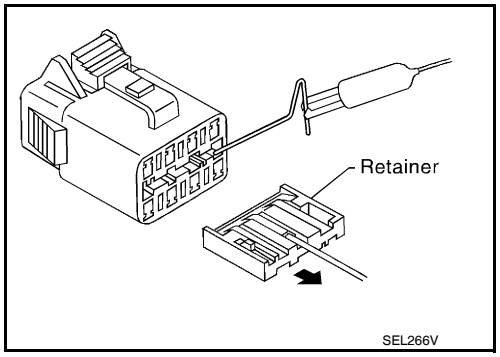
Probing from Terminal Side

FEMALE TERMINAL

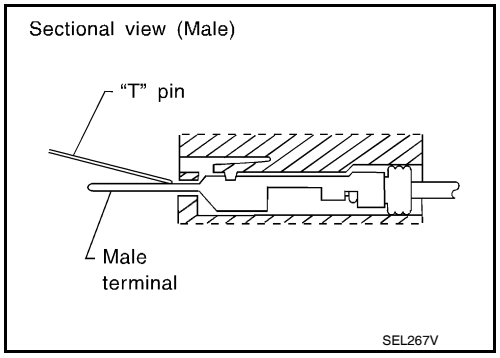
- There is a small notch above each female terminal. Probe each terminal with the “T” pin through the notch.
  Do not insert any object other than the same type male terminal into female terminal.



• Some connectors do not have a notch above each terminal. To probe each terminal, remove the connector retainer to make contact space for probing.

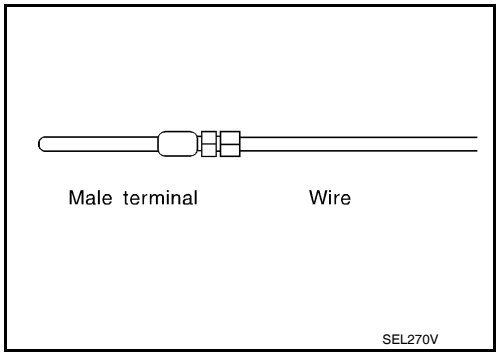


MALE TERMINAL
Carefully probe the contact surface of each terminal using a “T” pin.
Do not bend terminal.

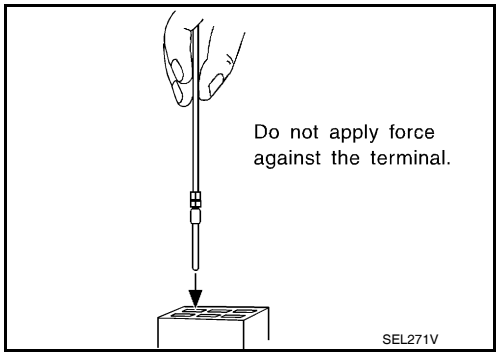


How to Check Enlarged Contact Spring of Terminal
An enlarged contact spring of a terminal may create intermittent signals in the circuit.
If the intermittent open circuit occurs, follow the procedure below to inspect for open wires and enlarged contact spring of female terminal.

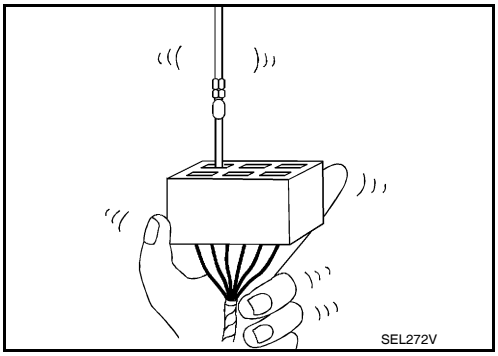
1. Assemble a male terminal and approx. 10 cm (3.9 in) of wire.
   Use a male terminal which matches the female terminal.
2. Disconnect the suspected faulty connector and hold it terminal side up.



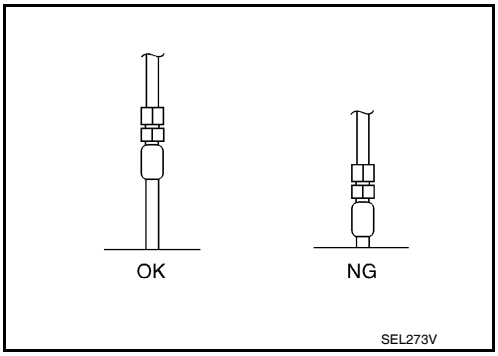
3. While holding the wire of the male terminal, try to insert the male terminal into the female terminal.
   Do not force the male terminal into the female terminal with your hands.



4. While moving the connector, check whether the male terminal can be easily inserted or not.



- If the male terminal can be easily inserted into the female terminal, replace the female terminal.

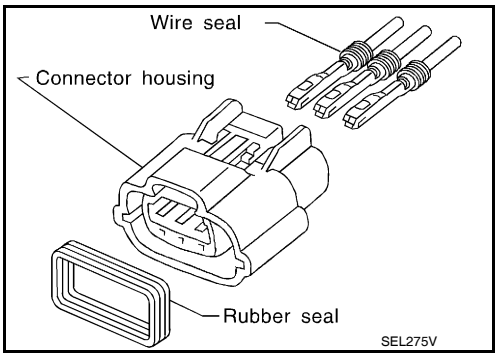


Waterproof Connector Inspection

If water enters the connector, it can short interior circuits. This may lead to intermittent problems. Check the following items to maintain the original waterproof characteristics.

RUBBER SEAL INSPECTION

- Most waterproof connectors are provided with a rubber seal between the male and female connectors. If the seal is missing, the waterproof performance may not meet specifications.
- The rubber seal may come off when connectors are disconnected. Whenever connectors are reconnected, make sure the rubber seal is properly installed on either side of male or female connector.

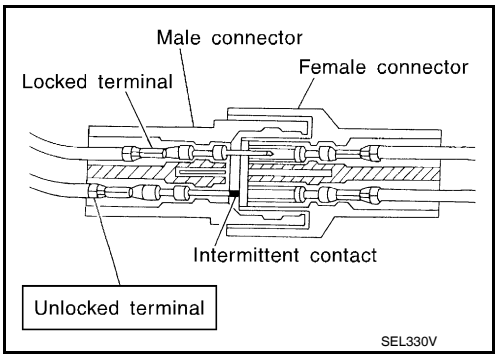


WIRE SEAL INSPECTION

The wire seal must be installed on the wire insertion area of a waterproof connector. Be sure that the seal is installed properly.

Terminal Lock Inspection

Check for unlocked terminals by pulling wire at the end of connector. An unlocked terminal may create intermittent signals in the circuit.



How to Perform Efficient Diagnosis for an Electrical Incident

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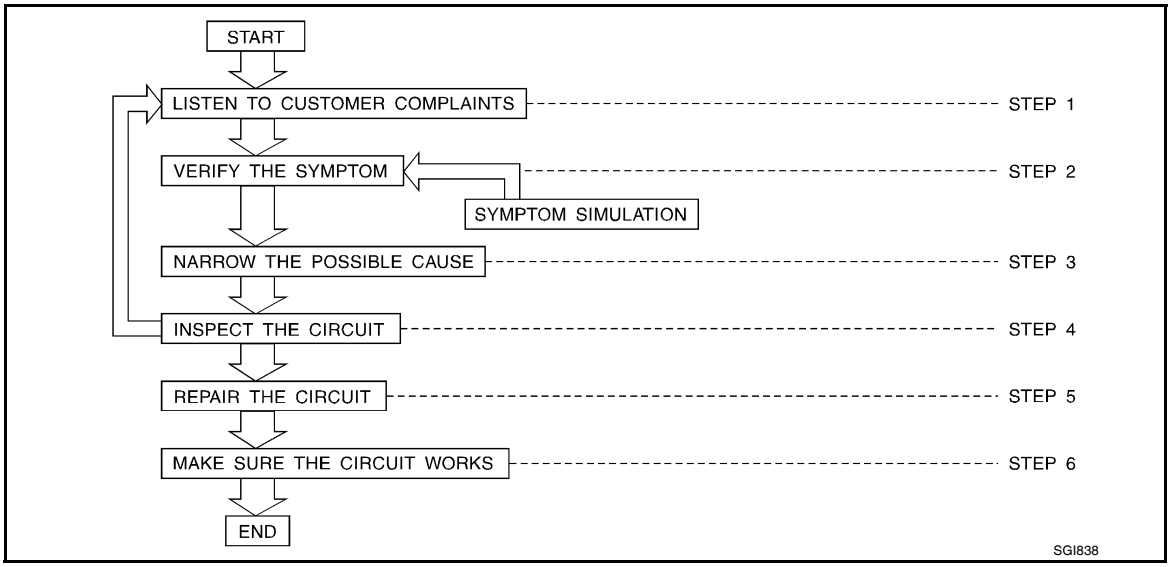
WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: • Power Supply Routing • System Operation Descriptions • Applicable Service Manual Sections • Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Layouts.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. Make sure you have not inadvertently created a new incident during your diagnosis or repair steps.	

INCIDENT SIMULATION TESTS

Introduction

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The following section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:

- Vehicle vibration
- Heat sensitive
- Freezing
- Water intrusion
- Electrical load

• Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

Vehicle Vibration

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

CONNECTORS & HARNESS

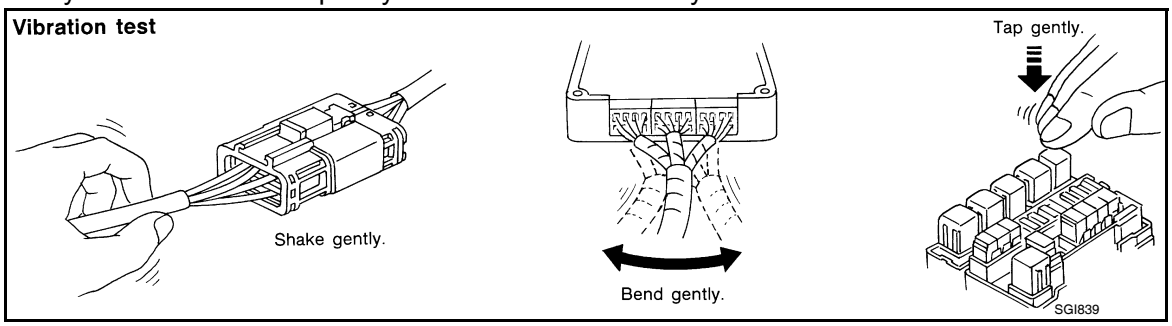
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

HINT

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

SENSORS & RELAYS

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



ENGINE COMPARTMENT

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

BEHIND THE INSTRUMENT PANEL

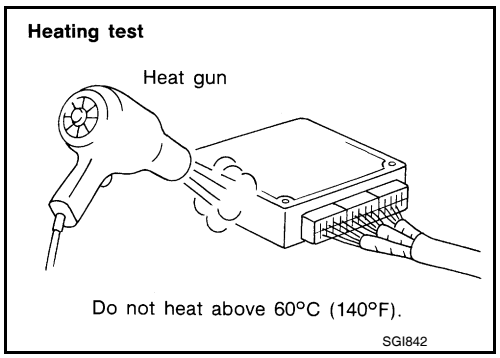
An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

UNDER SEATING AREAS

An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

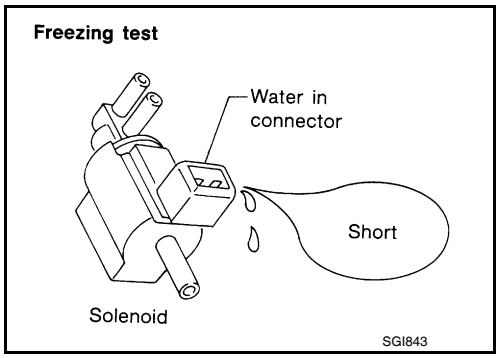
Heat Sensitive

The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.
To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.
Do not heat components above 60°C (140°F). If incident occurs while heating the unit, either replace or properly insulate the component.



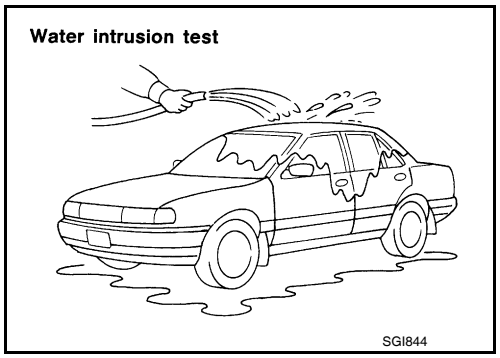
Freezing

The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.
There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Make sure it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.
The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.



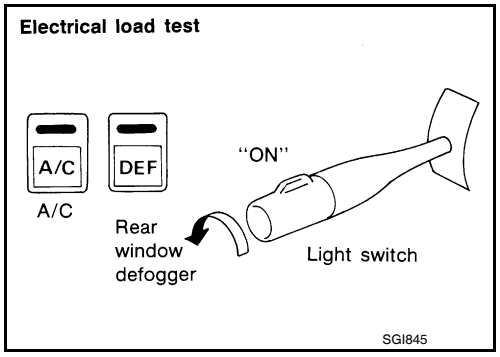
Water Intrusion

The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.
Do not spray water directly on any electrical components.



Electrical Load

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



Cold or Hot Start Up

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

CIRCUIT INSPECTION

Introduction

In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thor-

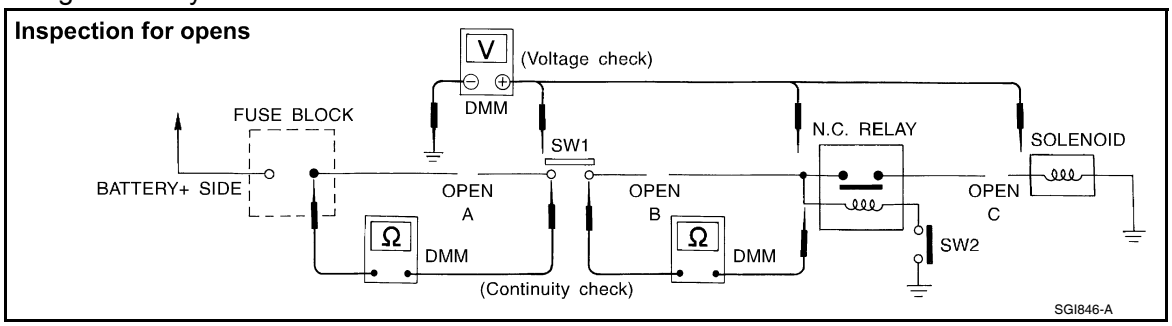
ough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	• SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	• SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

NOTE:
Refer to “How to Check Terminal” to probe or check terminal.

Testing for “Opens” in the Circuit
Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.

Inspection for opens



CONTINUITY CHECK METHOD
The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Make sure to always start with the DMM at the highest resistance level.
To help in understanding the diagnosis of open circuits, please refer to the previous schematic.
- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

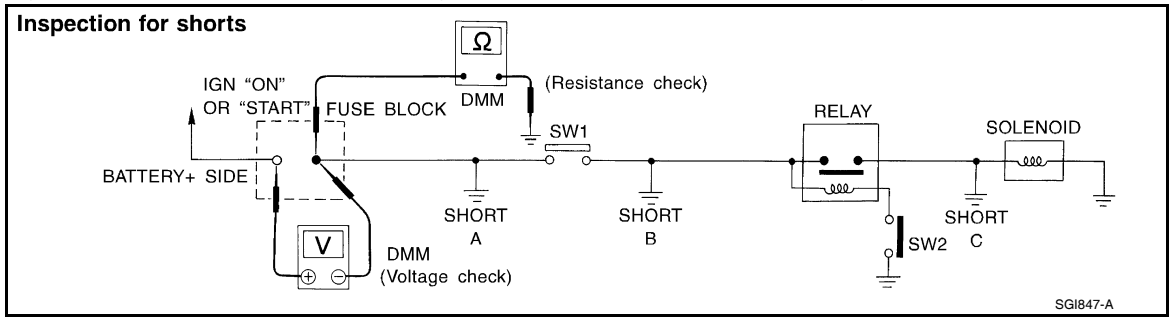
VOLTAGE CHECK METHOD
To help in understanding the diagnosis of open circuits please refer to the previous schematic.
In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.
- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage; open is further down the circuit than SW1.
  no voltage; open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage; open is further down the circuit than the relay.
  no voltage; open is between SW1 and relay (point B).

- Close the relay and probe at the solenoid.
  voltage; open is further down the circuit than the solenoid.
  no voltage; open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

Testing for “Shorts” in the Circuit

To simplify the discussion of shorts in the system, please refer to the following schematic.



RESISTANCE CHECK METHOD

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity; short is between fuse terminal and SW1 (point A).
  no continuity; short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between SW1 and the relay (point B).
  no continuity; short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between relay and solenoid (point C).
  no continuity; check solenoid, retrace steps.

VOLTAGE CHECK METHOD

- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition key to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between fuse block and SW1 (point A).
  no voltage; short is further down the circuit than SW1.
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between SW1 and the relay (point B).
  no voltage; short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage; short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage; retrace steps and check power to fuse block.

Ground Inspection

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

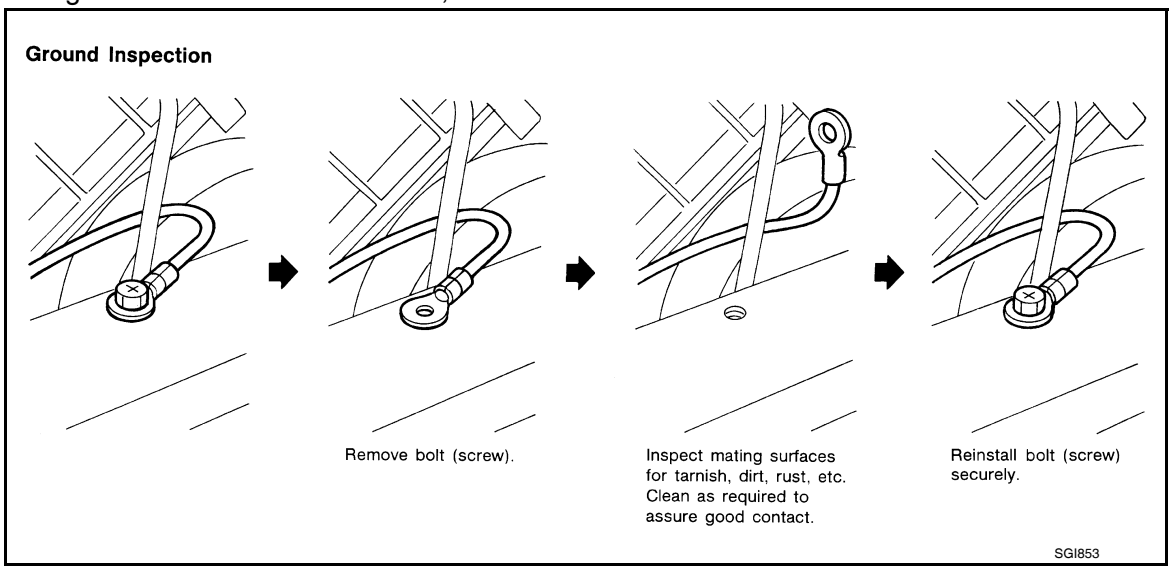
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.

- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to “Ground Distribution” in PG section.



Voltage Drop Tests

Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.

Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.

Unwanted resistance can be caused by many situations as follows:

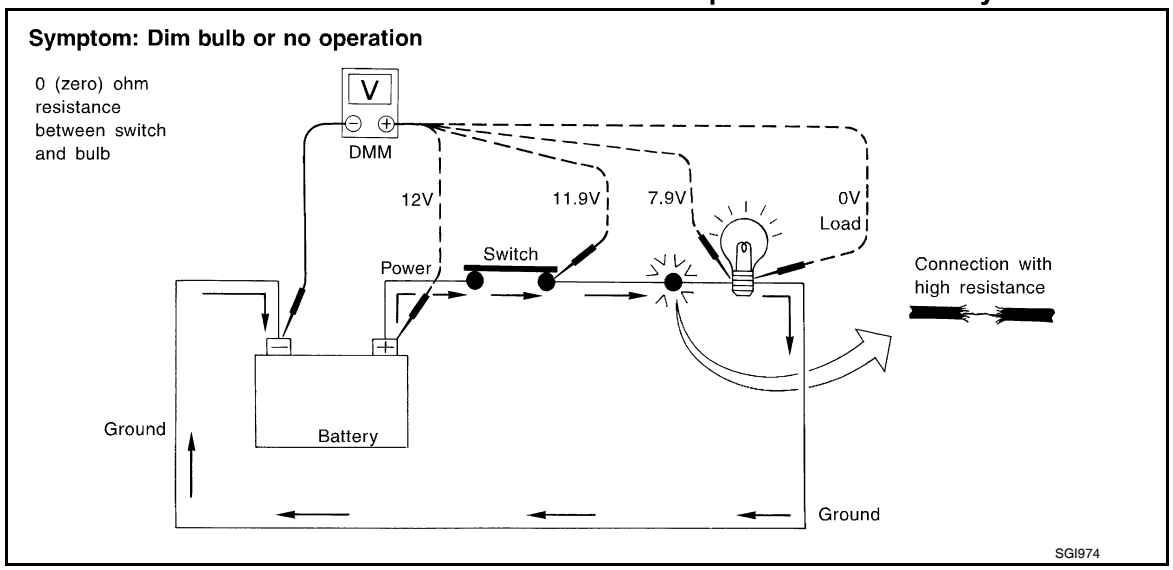
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.

If repairs are needed always use wire that is of the same or larger gauge.

MEASURING VOLTAGE DROP — ACCUMULATED METHOD

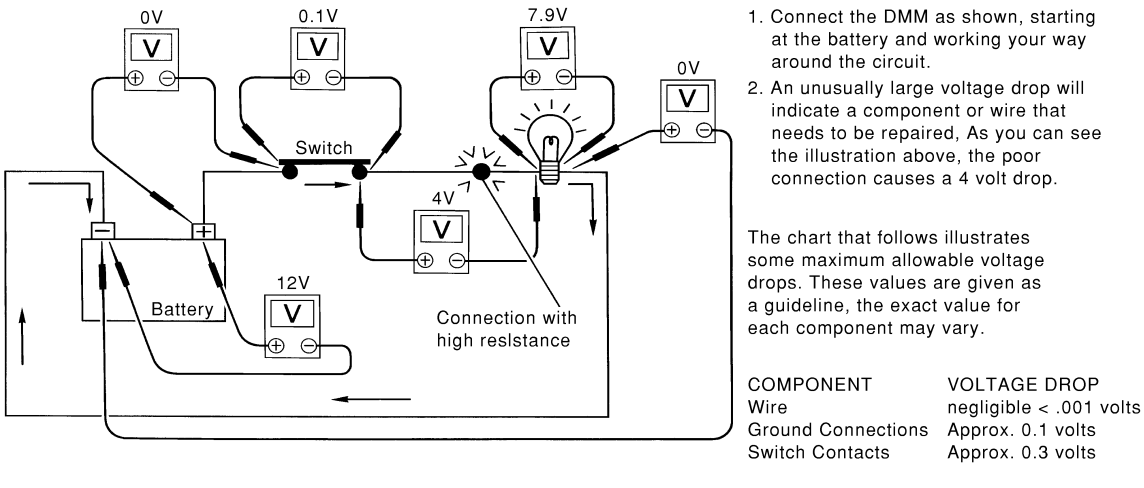
- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.

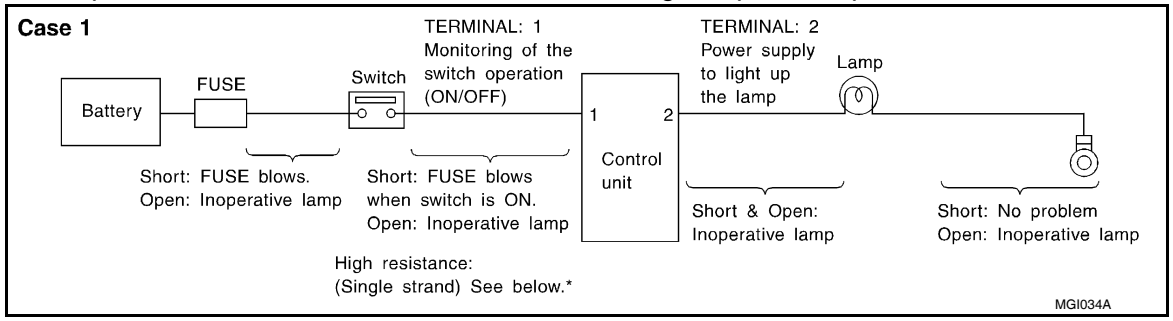


MEASURING VOLTAGE DROP — STEP-BY-STEP

The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
Circuits in the “Computer Controlled System” operate on very low amperage.
The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
The step by step voltage drop test can identify a component or wire with too much resistance.



Control Unit Circuit Test
System Description:When the switch is ON, the control unit lights up the lamp.

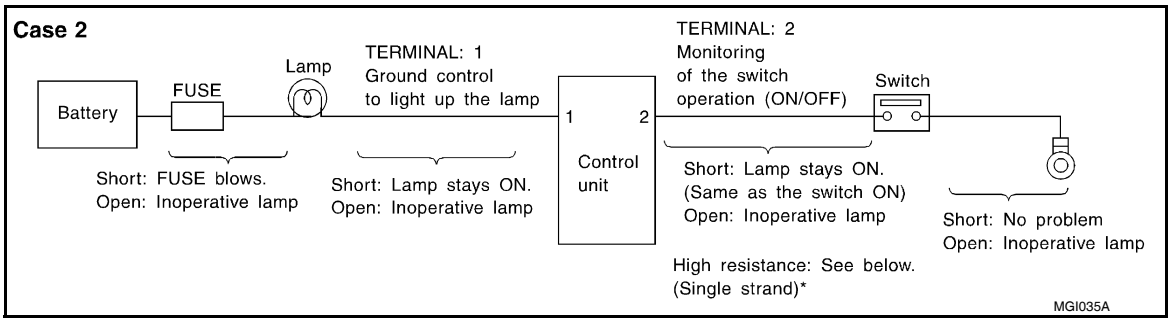


INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Switch	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
		Switch OFF	Approx. 0	Approx. 0
2	Lamp	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
		Switch OFF	Approx. 0	Approx. 0

The voltage value is based on the body ground.

*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.



INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Lamp	Switch ON	Approx. 0	Battery voltage (Inoperative lamp)
		Switch OFF	Battery voltage	Battery voltage
2	Switch	Switch ON	Approx. 0	Higher than 0 Approx. 4 (Example)
		Switch OFF	Approx. 5	Approx. 5

The voltage value is based on the body ground.

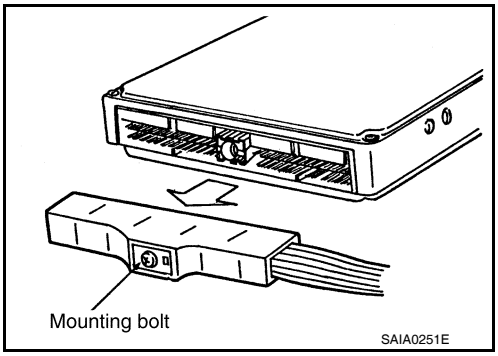
*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

Control Units and Electrical Parts

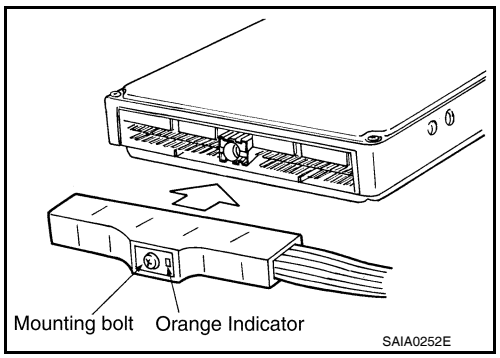
INFOID:0000000007330332

PRECAUTIONS

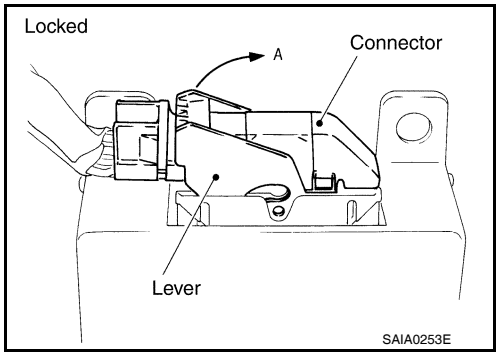
- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.
- If a connector is installed by tightening bolts, loosen bolt mounting it, then take it out by hand.



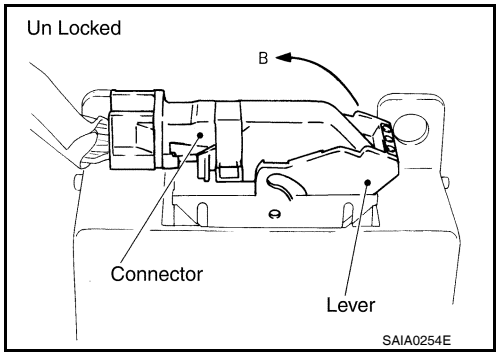
- Before installing a connector, make sure the terminal is not bent or damaged, and then correctly connect it.
  When installing a connector by tightening bolts, fix it by tightening the mounting bolt until the painted projection of the connector becomes even with the surface.



- For removal of the lever type connector, pull the lever up to the direction pointed to by the arrow A in the figure, and then remove the connector.

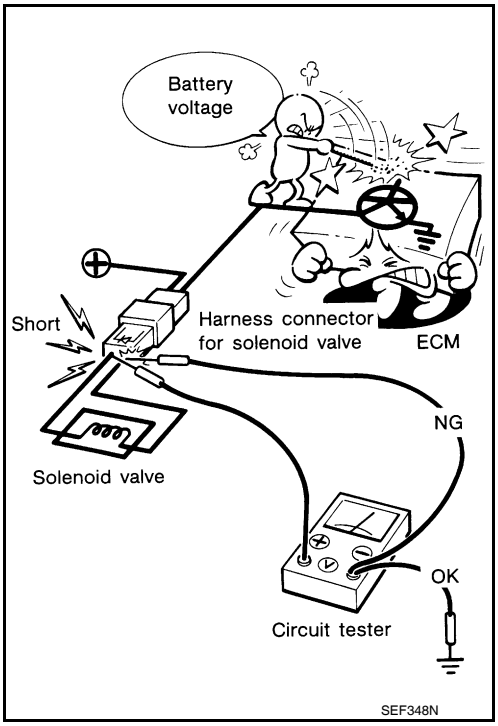


- For installation of the lever type connector, pull down the lever to the direction pointed by the arrow B in the figure, and then push the connector until a clicking noise is heard.



- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.

- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.



CONSULT CHECKING SYSTEM

Description

INFOID:0000000007330333

NOTE:
This vehicle is diagnosed using CONSULT-III plus.

- CONSULT is a hand-held type tester. When it is connected with a diagnostic connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.
- Refer to CONSULT-III plus Operator's Manual for more information.

Function and System Application

INFOID:0000000007330334

Diagnostic test mode	Function	ENGINE	ABS	AIR BAG	EPS	IPDM E/R	BCM	METER/M&A	INTELLIGENT KEY*1	TRANSMISSION*2	TRANSMISSION*3
Work Support	This mode enables a technician to adjust some devices faster and more accurately by following indications on CONSULT.	x	x	-	-	-	x	-	-	x	x
Self Diagnostic Result	Self-diagnostic results can be read and erased quickly.	x	x	x	x	x	x	x	x	x	x
Data Monitor	Input/Output data in the ECU can be read.	x	x	x	x	x	x	x	x	x	x
CAN Diagnostic Support Monitor	The communication condition of CAN communication line can be read.	x	x	-	x	x	x	x	x	x	x
Active Test	Diagnostic Test Mode in which CONSULT drives actuators apart from ECU shifting some parameters in a specified range.	x	x	-	-	x	x	-	x	-	-
Function Test	This mode can show results of self-diagnosis of ECU with either "OK" or "NG". For engines, more practical tests regarding sensors/ switches and/or actuators are available.	x	x	x	-	-	-	-	-	x	x
DTC & SRT Confirmation	The results of SRT (System Readiness Test) and the self-diagnosis status/result can be confirmed.	x	-	-	-	-	-	-	-	-	-
Ecu Identification	ECM/ECU part number can be read.	x	x	x	x	-	x	-	x	x	x
Configuration	Sets control module parameters to match vehicle options.	-	-	-	-	-	x	-	-	-	-
Special Function	Other results or histories, etc that are recorded in ECU are displayed.	-	-	x	-	-	-	-	-	x	x

x: Applicable.

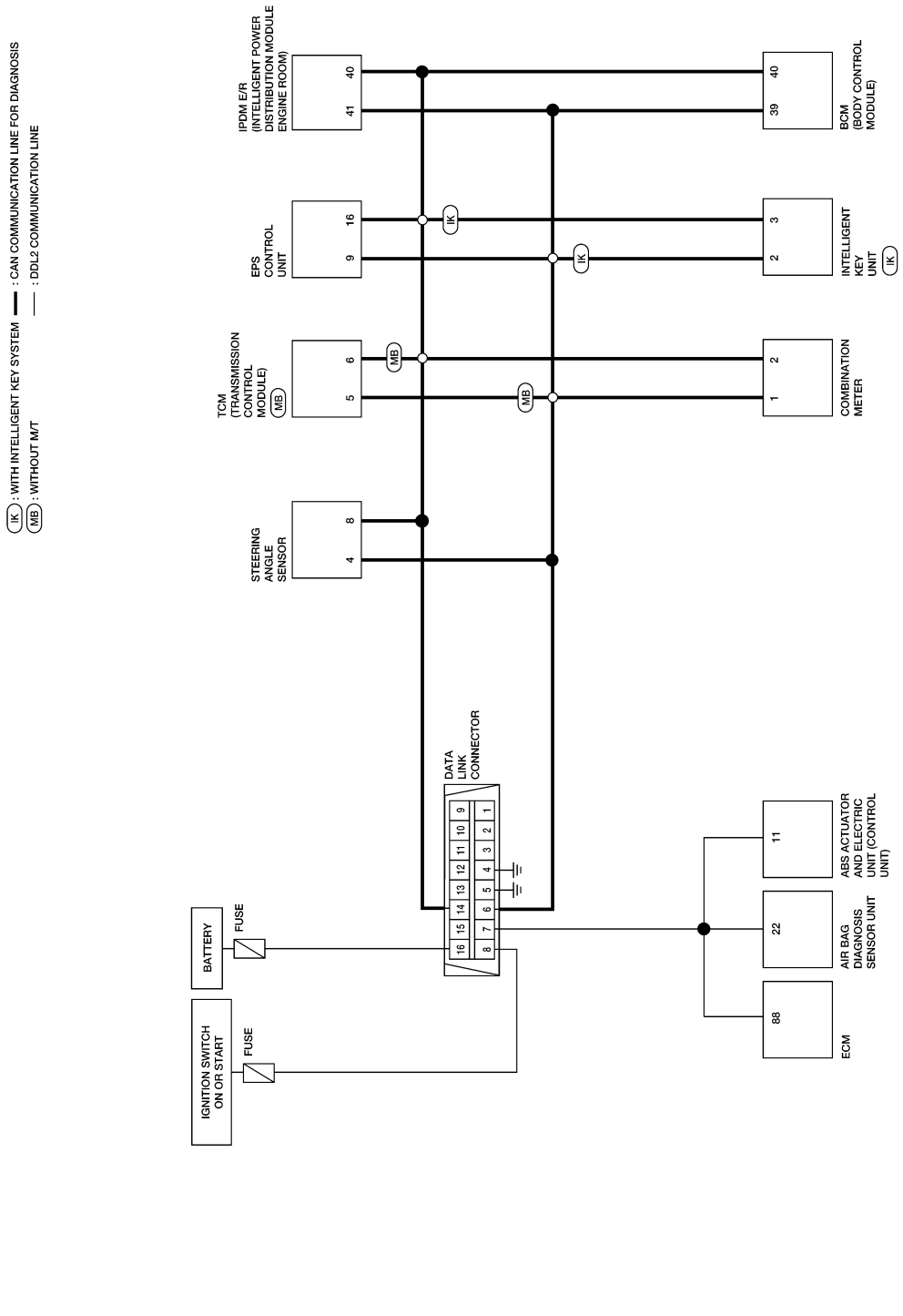
*1: If equipped.

*2: With automatic transmission (A/T).

*3: With continuously variable transmission (CVT).

CONSULT Data Link Connector (DLC) Circuit

INFOID:0000000007330335



AAAWA0020GB

INSPECTION PROCEDURE

If the CONSULT cannot diagnose the system properly, check the following items.

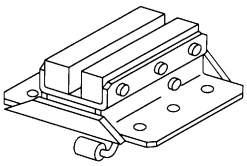
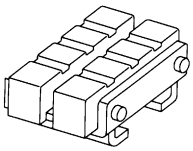
Symptom	Check item
CONSULT cannot access any system.	• CONSULT DLC power supply circuit (Terminal 8) and ground circuit (Terminal 4). For detailed circuit, refer to LAN-28, "Wiring Diagram - CAN -".
CONSULT cannot access individual system. (Other systems can be accessed.)	• Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system). • Open or short circuit between the system and CONSULT DLC (For detailed circuit, refer to wiring diagram for each system). • Open or short circuit CAN communication line. Refer to LAN-28, "Wiring Diagram - CAN -" .

NOTE:
The DDL1 and DDL2 circuits from DLC pins 6, 7 and 14 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT access to other systems.

LIFTING POINT

Special Service Tool

INFOID:0000000007330336

Tool number Tool name	Description
LM4086-0200 Board on attachment	 S-NT001
LM4519-0000 Safety stand attachment	 S-NT002

CAUTION:

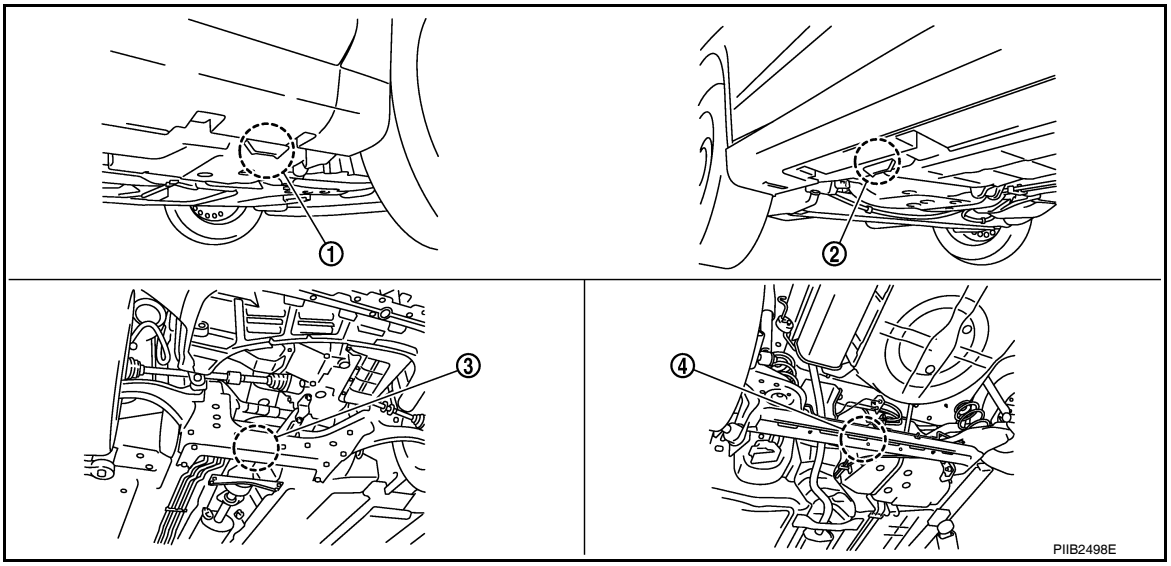
- **Every time the vehicle is lifted up, maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine, transmission, suspension etc.), support a jack up point on the rear side garage jack with a mission jack or equivalent.**
- **Since the vehicle's center of gravity changes when removing main parts on the rear side (rear axle, suspension, etc.), support a jack up point on the front side garage jack with a mission jack or equivalent.**
- **Be careful not to smash or do not do anything that would affect piping parts.**

Garage Jack and Safety Stand and 2-Pole Lift

INFOID:0000000007330337

WARNING:

- **Park the vehicle on a level surface when using the jack. Make sure to avoid damaging pipes, tubes, etc. under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands when you have to get under the vehicle.**
- **Place wheel chocks at both front and back of the wheels on the ground.**
- **When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.**
- **When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.**



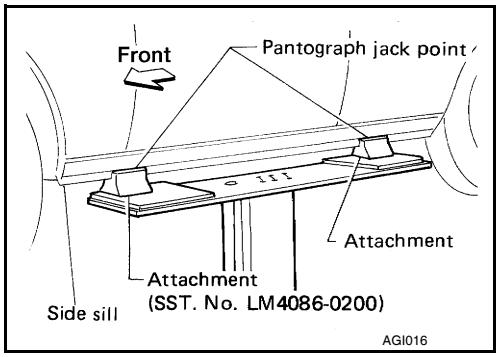
1. Safety stand point and lift up point (front)
2. Safety stand point and lift up point (rear)
3. Garage jack point (front)
4. Garage jack point (rear)

CAUTION:
There is canister just behind Garage jack point (rear). Jack up carefully.

Board-On Lift

INFOID:0000000007330338

CAUTION:
Make sure vehicle is empty when lifting.
- **The board-on lift attachment (LM4086-0200) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**



TOW TRUCK TOWING

Tow Truck Towing

INFOID:0000000007330339

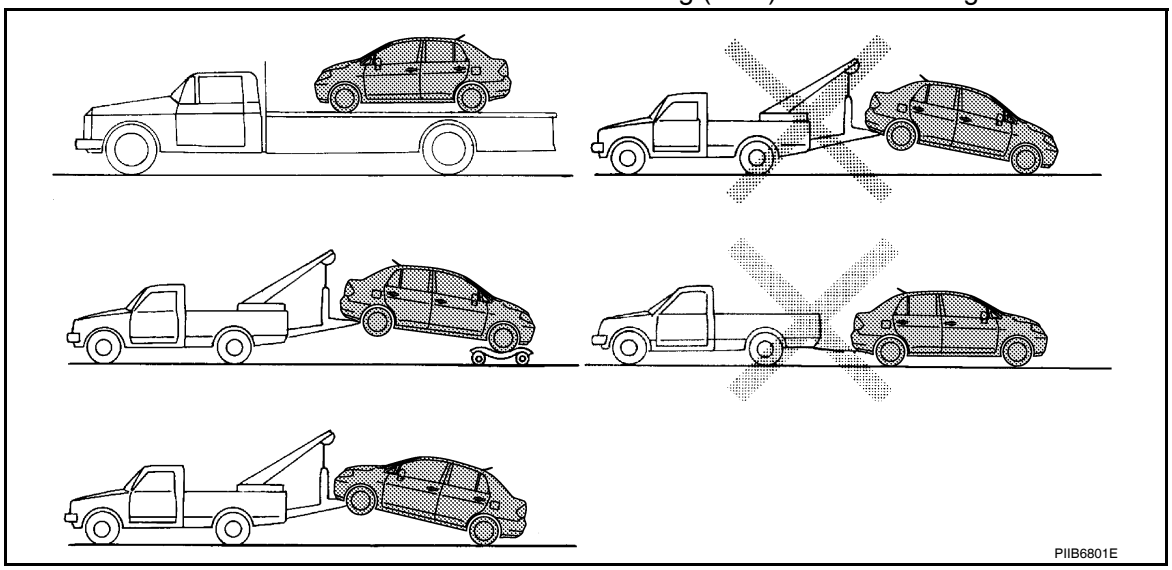
CAUTION:
- **Never tow a CVT or A/T model with the rear wheels raised and the front wheels on the ground. This may cause serious and expensive damage to the transaxle. If it is necessary to tow the vehicle with the rear wheels raised, always use towing dollies under the front wheels.**
- **Never tow a CVT or A/T model with four wheels on the ground. This may cause serious and expensive damage to the transaxle.**

NISSAN recommends that the vehicle be towed with the driving (front) wheels off the ground.

CAUTION:
- **Always release the parking brake when towing the vehicle with the front wheels raised with the rear wheels on the ground.**
- **When the battery of a vehicle equipped with the Intelligent Key system is discharged, the vehicle should be towed with the front wheels on the tow dollies or place the vehicle on a flat bed truck.**

CAUTION:
- **All applicable local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, make sure that the transmission, steering system and power train are in good order. If any unit is damaged, dollies must be used.**

NISSAN recommends that the vehicle be towed with the driving (front) wheels off the ground as illustrated.



Vehicle Recovery (Freeing a Stuck Vehicle)

INFOID:0000000007330340

- Tow chains or cables must be attached only to the main structural members of the vehicle.
- Pulling devices should be routed so they do not touch any part of the suspension, steering, brake or cooling systems.
- Always pull the cable straight out from the front or rear of the vehicle. Never pull on the vehicle at an angle.
- Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.

WARNING:
- **Do not spin the tires at high speed. This could cause them to explode and result in serious injury. Parts of the vehicle could also overheat and be damaged.**
- **Install removable recovery hook securely using wheel nut wrench.**

TIGHTENING TORQUE OF STANDARD BOLTS

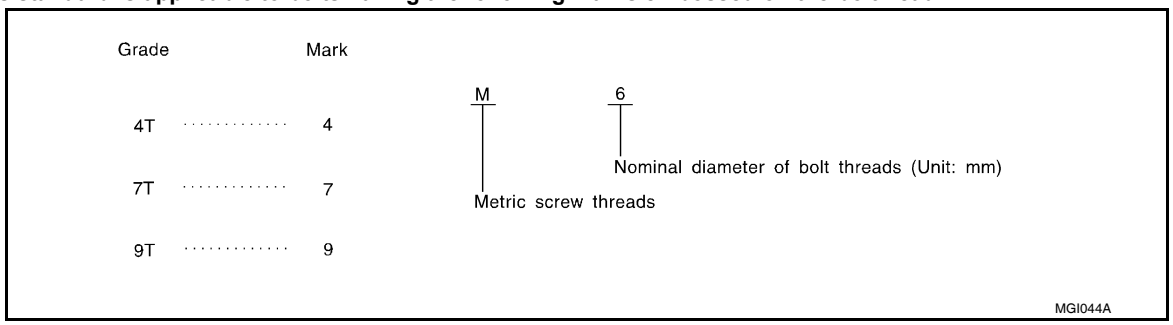
Tightening Torque Table

INFOID:0000000007330341

Grade	Bolt size	Bolt diameter * mm	Pitch mm	Tightening torque (Without lubricant)							
				Hexagon head bolt				Hexagon flange bolt			
				N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	1.25	13.5	1.4	10	—	17	1.7	13	—
			1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	1.5	28	2.9	21	—	35	3.6	26	—
			1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	1.75	45	4.6	33	—	55	5.6	41	—
			1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	1.25	22	2.2	16	—	28	2.9	21	—
			1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	1.5	45	4.6	33	—	55	5.6	41	—
			1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	1.75	80	8.2	59	—	100	10	74	—
			1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	1.25	28	2.9	21	—	35	3.6	26	—
			1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	1.5	55	5.6	41	—	80	8.2	59	—
			1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	1.75	100	10	74	—	130	13	96	—
			1.25	100	10	74	—	130	13	96	—
	M14	14.0	1.5	170	17	125	—	210	21	155	—

*: Nominal diameter

1. **Special parts are excluded.**
2. **This standard is applicable to bolts having the following marks embossed on the bolt head.**



RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS

Recommended Chemical Product and Sealant

INFOID:0000000007330342

Refer to the following chart for help in selecting the appropriate chemical product or sealant.

	Product Description	Purpose	Nissan North America Part No. (USA)	Nissan Canada Part No. (Canada)	Aftermarket Cross-reference Part Nos.
1	Rear View Mirror Adhesive	Used to permanently remount rear view mirrors to windows.	999MP-AM000P	99998-50505	Permatex 81844
2	Anaerobic Liquid Gasket	For metal-to-metal flange sealing. Can fill a 0.38 mm (0.015 inch) gap and provide instant sealing for most powertrain applications.	999MP-AM001P	99998-50503	Permatex 51813 and 51817
3	High Performance Thread Sealant	Provides instant sealing on any threaded straight or parallel threaded fitting. (Thread sealant only, no locking ability.) • Do not use on plastic.	999MP-AM002P	999MP-AM002P	Permatex 56521
4	Silicone RTV	Gasket Maker	999MP-AM003P (Ultra Grey)	99998-50506 (Ultra Grey)	Permatex Ultra Grey 82194; Three Bond 1207,1215, 1216, 1217F, 1217G and 1217H Nissan RTV Part No. 999MP-A7007
		Gasket Maker for Maxima/ Quest 5-speed automatic transmission (RE5F22A)	–	–	Three Bond 1281B or exact equivalent in its quality
5	High Temperature, High Strength Thread Locking Sealant (Red)	Threadlocker	999MP-AM004P	999MP-AM004P	Permatex 27200; Three Bond 1360, 1360N, 1305 N&P, 1307N, 1335, 1335B, 1363B, 1377C, 1386B, D&E and 1388 Loctite 648
6	Medium Strength Thread Locking Sealant (Blue)	Threadlocker (service tool removable)	999MP-AM005P	999MP-AM005P	Permatex 24200, 24206, 24240, 24283 and 09178; Three Bond 1322, 1322N, 1324 D&N, 1333D, 1361C, 1364D, 1370C and 1374

IDENTIFICATION INFORMATION

Model Variation

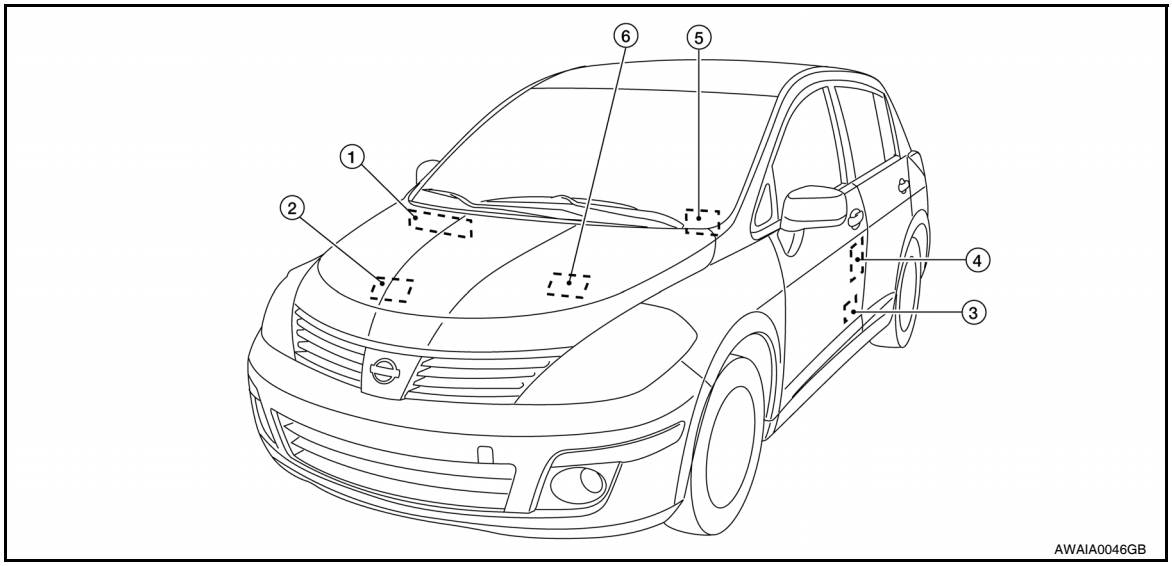
INFOID:0000000007330343

Body	Engine	Transmission	Grade	Destination	
				USA	Canada
Hatchback	MR18DE	6 M/T	S	FDSALDY-EUA	FDSALDY-ENA
		4 A/T		FDSALDA-EUA	FDSALDA-ENA
		6 M/T	SL	—	FDSALGY-ENA
		CVT		FDSALGZ-EUA	FDSALGZ-ENA

Model code designations:

Position (Left to Right)	Character	Qualifier	Definition
1	F	Body type	F: Hatchback
2	DS	Engine	DS: MR18DE (1.8L)
3			
4	A	Axle	A: 2WD model
5	L	Handle	L: LH drive
6	D	Grade	D: 1.8 S G: 1.8 SL
7	Y	Transmission	A: 4 A/T Y: 6 M/T Z: CVT
8	C11	Model	C11: Versa
9			
10			
11	E	Intake	E: EGI
12	U	Zone	N: Canada U: USA
13	A	Equipment	A: Standard
14	xxxxx	Option Codes	Option Codes
15			
16			
17			
18			

IDENTIFICATION NUMBER

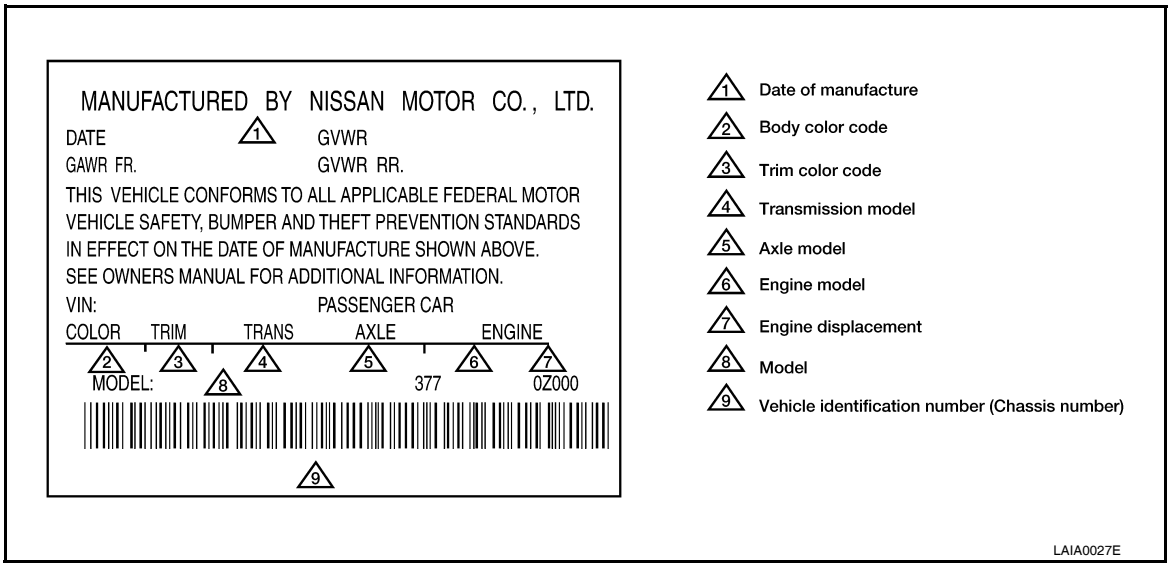


1. Vehicle identification number (chassis number)
2. Air conditioner specification label (if equipped)
3. F.M.V.S.S./C.M.V.S.S. certification label
4. Tire placard label
5. Vehicle identification number (VIN) Plate
6. Emission control information label

VEHICLE IDENTIFICATION NUMBER ARRANGEMENT

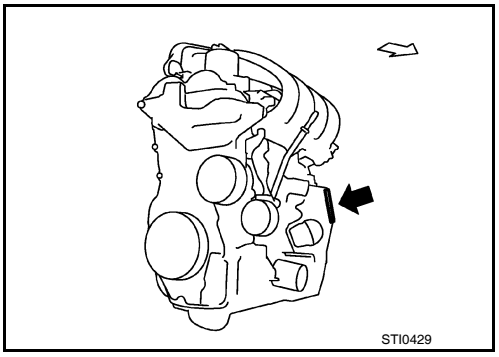
VIN Position (Left to Right)	Character	Qualifier	Definition
1	3N1	Country code and vehicle manufacturer	3N1: Mexico
2			
3			
4	B	Engine	B: MR18DE
5	C1	Vehicle type	C1: NISSAN Versa
6			
7	C	Body type	C: 4-door hatchback
8	P	Restraint system	P: Driver and front passenger SRS air bag, SRS side air bags, SRS side curtain air bags and 3 point manual seat belts
9	*	Check digit	0 to 9 or X
10	C	Model year	C: 2012 Model year
11	L	Manufacturing Plant	L: Aguascalientes, Mexico
12	XXXXXX	Vehicle serial number	Chassis number
13			
14			
15			
16			
17			

IDENTIFICATION PLATE

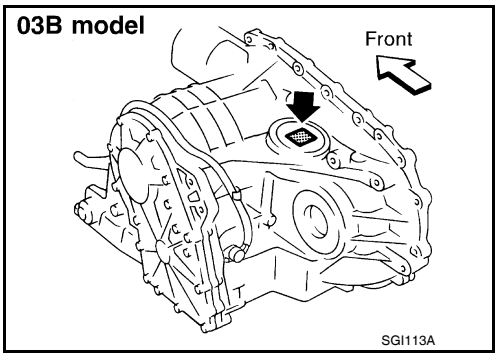


ENGINE SERIAL NUMBER

⇦ : Vehicle front

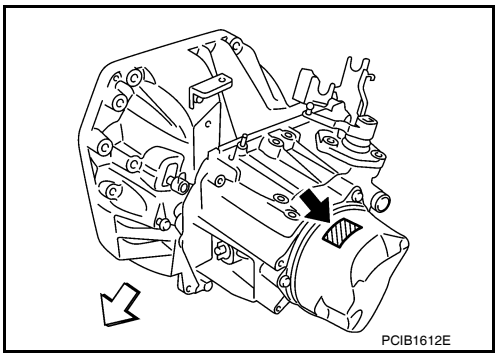


AUTOMATIC TRANSAXLE NUMBER

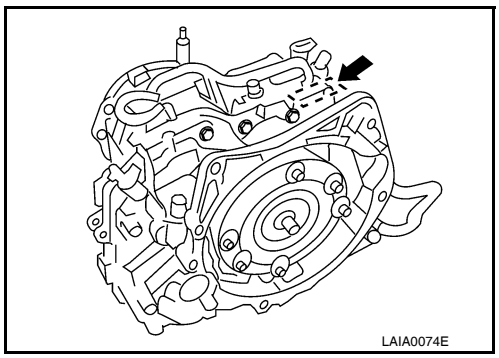


MANUAL TRANSAXLE NUMBER

⇦ : Vehicle front



CVT NUMBER



Dimensions

INFOID:0000000007330344

Unit: mm (in)

Overall length	4,295 (169.1)
Overall width	1,695 (66.7)
Overall height	1,535 (60.4)
Front tread	1,480 (58.3)
Rear tread	1,485 (58.5)
Wheelbase	2,600 (102.4)

Wheels & Tires

INFOID:0000000007330345

Road wheel		Steel
Size		15 x 5.5 JJ
Offset	mm (in)	25 (1.00)
Road wheel		Aluminum
Size		15 x 5.5 JJ
Offset	mm (in)	23 (0.91)
Road wheel		Aluminum
Size		16 X 5.5 JJ
Offset	mm (in)	40 (1.57)
Tire size		
Conventional		P185/65R15 P195/55R16
Spare		T125/70D15

TERMINOLOGY

SAE J1930 Terminology List

INFOID:0000000007330346

All emission related terms used in this publication in accordance with SAE J1930 are listed. Accordingly, new terms, new acronyms/abbreviations and old terms are listed in the following chart.

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Air cleaner	ACL	Air cleaner
Barometric pressure	BARO	***
Barometric pressure sensor-BCDD	BAROS-BCDD	BCDD
Camshaft position	CMP	***
Camshaft position sensor	CMPS	Crank angle sensor
Canister	***	Canister
Carburetor	CARB	Carburetor
Charge air cooler	CAC	Intercooler
Closed loop	CL	Closed loop
Closed throttle position switch	CTP switch	Idle switch
Clutch pedal position switch	CPP switch	Clutch switch
Continuous fuel injection system	CFI system	***
Continuous trap oxidizer system	CTOX system	***
Crankshaft position	CKP	***
Crankshaft position sensor	CKPS	***
Data link connector	DLC	***
Data link connector for CONSULT	DLC for CONSULT	Diagnostic connector for CONSULT
Diagnostic test mode	DTM	Diagnostic mode
Diagnostic test mode selector	DTM selector	Diagnostic mode selector
Diagnostic test mode I	DTM I	Mode I
Diagnostic test mode II	DTM II	Mode II
Diagnostic trouble code	DTC	Malfunction code
Direct fuel injection system	DFI system	***
Distributor ignition system	DI system	Ignition timing control
Early fuel evaporation-mixture heater	EFE-mixture heater	Mixture heater
Early fuel evaporation system	EFE system	Mixture heater control
Electrically erasable programmable read only memory	EEPROM	***
Electronic ignition system	EI system	Ignition timing control
Engine control	EC	***
Engine control module	ECM	ECCS control unit
Engine coolant temperature	ECT	Engine temperature
Engine coolant temperature sensor	ECTS	Engine temperature sensor
Engine modification	EM	***
Engine speed	RPM	Engine speed
Erasable programmable read only memory	EPROM	***
Evaporative emission canister	EVAP canister	Canister
Evaporative emission system	EVAP system	Canister control solenoid valve
Exhaust gas recirculation valve	EGR valve	EGR valve

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Exhaust gas recirculation control-BPT valve	EGRC-BPT valve	BPT valve
Exhaust gas recirculation control-solenoid valve	EGRC-solenoid valve	EGR control solenoid valve
Exhaust gas recirculation temperature sensor	EGRT sensor	Exhaust gas temperature sensor
EGR temperature sensor		
Flash electrically erasable programmable read only memory	FEEPROM	***
Flash erasable programmable read only memory	FEPROM	***
Flexible fuel sensor	FFS	***
Flexible fuel system	FF system	***
Fuel pressure regulator	***	Pressure regulator
Fuel pressure regulator control solenoid valve	***	PRVR control solenoid valve
Fuel trim	FT	***
Heated Oxygen sensor	HO2S	Exhaust gas sensor
Idle air control system	IAC system	Idle speed control
Idle air control valve-air regulator	IACV-air regulator	Air regulator
Idle air control valve-auxiliary air control valve	IACV-AAC valve	Auxiliary air control (AAC) valve
Idle air control valve-FICD solenoid valve	IACV-FICD solenoid valve	FICD solenoid valve
Idle air control valve-idle up control solenoid valve	IACV-idle up control solenoid valve	Idle up control solenoid valve
Idle speed control-FI pot	ISC-FI pot	FI pot
Idle speed control system	ISC system	***
Ignition control	IC	***
Ignition control module	ICM	***
Indirect fuel injection system	IFI system	***
Intake air	IA	Air
Intake air temperature sensor	IAT sensor	Air temperature sensor
Knock	***	Detonation
Knock sensor	KS	Detonation sensor
Malfunction indicator lamp	MIL	Check engine light
Manifold absolute pressure	MAP	***
Manifold absolute pressure sensor	MAPS	***
Manifold differential pressure	MDP	***
Manifold differential pressure sensor	MDPS	***
Manifold surface temperature	MST	***
Manifold surface temperature sensor	MSTS	***
Manifold vacuum zone	MVZ	***
Manifold vacuum zone sensor	MVZS	***
Mass air flow sensor	MAFS	Air flow meter
Mixture control solenoid valve	MC solenoid valve	Air-fuel ratio control solenoid valve
Multiport fuel injection System	MFI system	Fuel injection control

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Nonvolatile random access memory	NVRAM	***
On board diagnostic system	OBD system	Self-diagnosis
Open loop	OL	Open loop
Oxidation catalyst	OC	Catalyst
Oxidation catalytic converter system	OC system	***
Oxygen sensor	O2S	Exhaust gas sensor
Park position switch	***	Park switch
Park/neutral position switch	PNP switch	Park/neutral switch Inhibitor switch Neutral position switch
Periodic trap oxidizer system	PTOX system	***
Positive crankcase ventilation	PCV	Positive crankcase ventilation
Positive crankcase ventilation valve	PCV valve	PCV valve
Powertrain control module	PCM	***
Programmable read only memory	PROM	***
Pulsed secondary air injection control solenoid valve	PAIRC solenoid valve	AIV control solenoid valve
Pulsed secondary air injection system	PAIR system	Air induction valve (AIV) control
Pulsed secondary air injection valve	PAIR valve	Air induction valve
Random access memory	RAM	***
Read only memory	ROM	***
Scan tool	ST	***
Secondary air injection pump	AIR pump	***
Secondary air injection system	AIR system	***
Sequential multiport fuel injection system	SFI system	Sequential fuel injection
Service reminder indicator	SRI	***
Simultaneous multiport fuel injection system	***	Simultaneous fuel injection
Smoke puff limiter system	SPL system	***
Supercharger	SC	***
Supercharger bypass	SCB	***
System readiness test	SRT	***
Thermal vacuum valve	TVV	Thermal vacuum valve
Three way catalyst	TWC	Catalyst
Three way catalytic converter system	TWC system	***
Three way + oxidation catalyst	TWC + OC	Catalyst
Three way + oxidation catalytic converter system	TWC + OC system	***
Throttle body	TB	Throttle chamber SPI body
Throttle body fuel injection system	TBI system	Fuel injection control
Throttle position	TP	Throttle position
Throttle position sensor	TPS	Throttle sensor
Throttle position switch	TP switch	Throttle switch
Torque converter clutch solenoid valve	TCC solenoid valve	Lock-up cancel solenoid Lock-up solenoid

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Transmission range switch	***	Park/neutral position switch
Transmission control module	TCM	A/T control unit
Turbocharger	TC	Turbocharger
Vehicle speed sensor	VSS	Vehicle speed sensor
Volume air flow sensor	VAFS	Air flow meter
Warm up oxidation catalyst	WU-OC	Catalyst
Warm up oxidation catalytic converter system	WU-OC system	***
Warm up three way catalyst	WU-TWC	Catalyst
Warm up three way catalytic converter system	WU-TWC system	***
Wide open throttle position switch	WOTP switch	Full switch

***: Not applicable

SECTION EM
ENGINE MECHANICAL

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330472

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330473

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

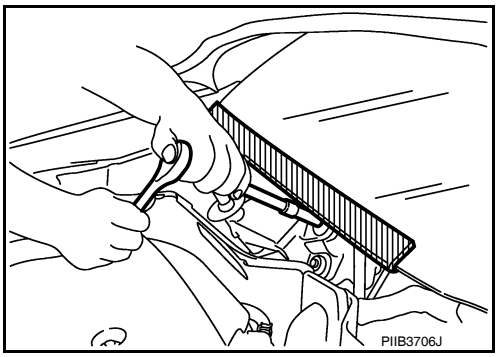
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007330474

When performing the procedure after removing cowl top cover, cover the lower end of windshield.



Precaution for Drain Coolant

INFOID:0000000007330475

- Drain coolant when engine is cooled.

Precaution for Disconnecting Fuel Piping

INFOID:0000000007330476

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precaution for Removal and Disassembly

INFOID:0000000007330477

- When instructed to use special service tools, use the specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with tape or the equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used where noted in the step.

Precaution for Inspection, Repair and Replacement

INFOID:0000000007330478

- Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precaution for Assembly and Installation

INFOID:0000000007330479

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check oil or coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route after draining coolant.
- Before starting engine, apply fuel pressure to fuel lines with turning ignition switch ON (with engine stopped). Then make sure that there are no leaks at fuel line connections.
- After repairing, start engine and increase engine speed to check coolant, fuel, oil, and exhaust systems for leakage.

Parts Requiring Angular Tightening

INFOID:0000000007330480

- Use an angle wrench for the final tightening of the following engine parts:
- Cylinder head bolts
- Camshaft sprocket (INT)
- Main bearing cap bolts
- Connecting rod cap nuts
- Crankshaft pulley bolt (No angle wrench is required as the bolt flange is provided with notches for angular tightening)

Tool number : KV10112100 (BT-8653-A)

- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Precaution for Liquid Gasket

INFOID:0000000007330481

REMOVAL OF LIQUID GASKET

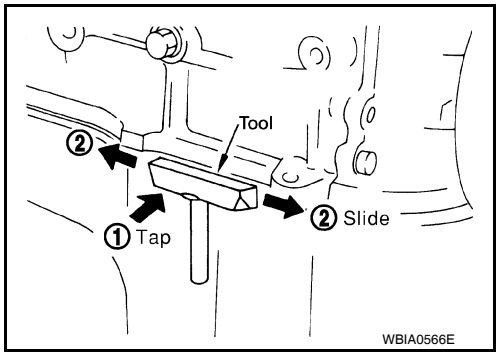
- After removing the bolts and nuts, separate the mating surface and remove the sealant using Tool.

Tool number : KV10111100 (J-37228)

CAUTION:
Be careful not to damage the mating surfaces.

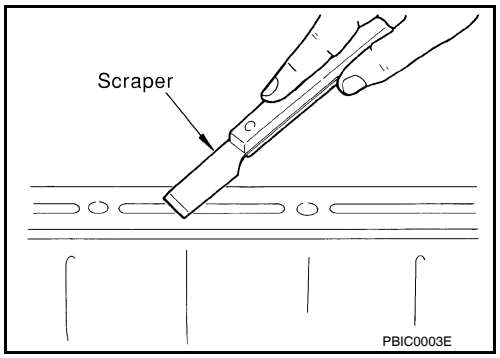
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap (1) the cutter where the RTV Silicone Sealant is applied. Use a plastic hammer to slide the cutter (2) by tapping on the side.

CAUTION:
If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.



LIQUID GASKET APPLICATION PROCEDURE

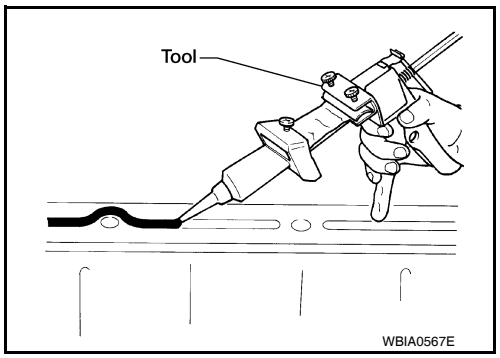
1. Using a scraper, remove the old Silicone RTV Sealant adhering to the gasket application surface and the mating surface.
   - Remove the sealant completely from the groove of the gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the gasket application surface and the mating surface and remove adhering moisture, grease and foreign materials.
3. Attach the sealant tube to the tube presser.
   Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".



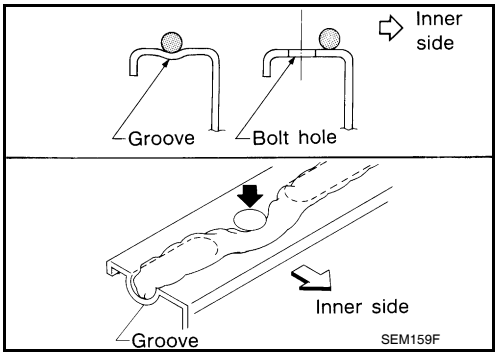
4. Apply the sealant without breaks to the specified location using Tool.

Tool number WS39930000 (–)

   - If there is a groove for the sealant application, apply the sealant to the groove.
   - As for the bolt holes, normally apply the sealant inside the holes. If specified, it should be applied outside the holes. Make sure to read the text of this manual.
   - Within five minutes of the sealant application, install the mating component.
   - If the sealant protrudes, wipe it off immediately.
   - Do not retighten after the installation.



- After 30 minutes or more have passed from the installation, fill the engine with the specified oil and coolant. Refer to MA-13, "Fluids and Lubricants".



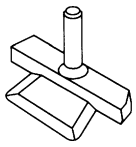
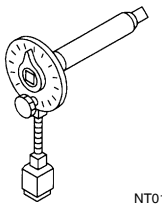
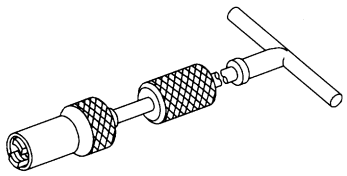
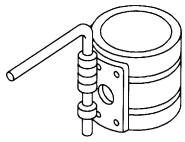
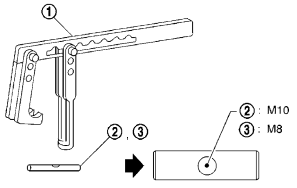
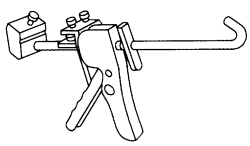
CAUTION:
Carefully follow all of the Warnings, Cautions, Notes, and procedures contained in this manual.

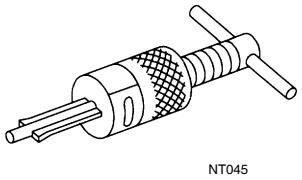
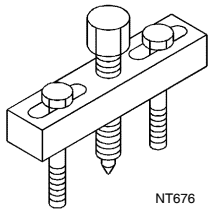
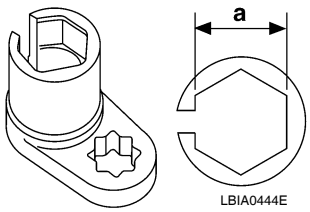
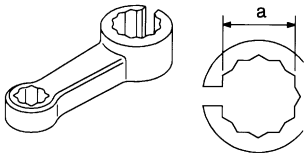
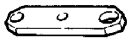
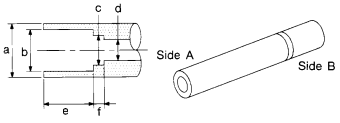
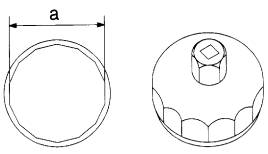
PREPARATION

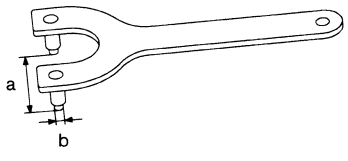
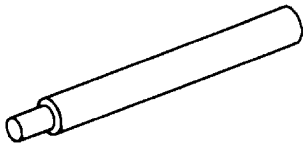
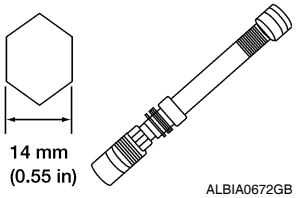
Special Service Tool

INFOID:0000000007330482

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

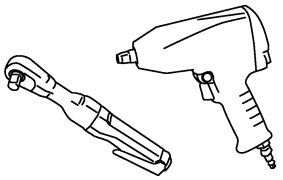
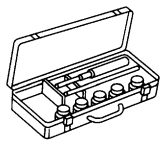
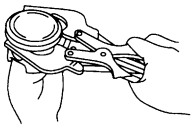
Tool number (Kent-Moore No.) Tool name		Description
KV10111100 (J-37228) Seal cutter	 NT046	Removing steel oil pan and rear timing chain case
KV10112100 (BT-8653-A) Angle wrench	 NT014	Tightening bolts for bearing cap, cylinder head, etc.
KV10107902 (J-38959) Valve oil seal puller	 S-NT011	Removing valve oil seal
EM03470000 (J-8037) Piston ring compressor	 NT044	Installing piston assembly into cylinder bore
KV101092S0 (J-26336-B) Valve spring compressor 1. KV10109210 (J-26336-B and J-26336-20) Compressor 2. KV10109220 (—) Adapter (M10) 3. KV10109230 (—) Adapter (M8)	 NT718	Disassembling and assembling valve mechanism
WS39930000 (—) Tube presser	 NT052	Pressing the tube of liquid gasket

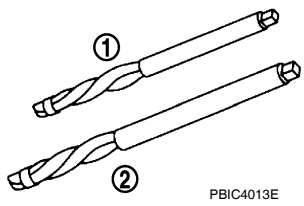
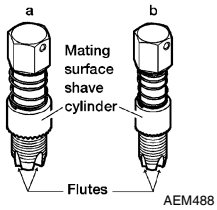
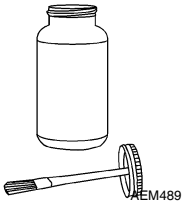
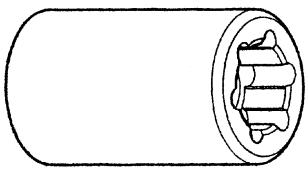
Tool number (Kent-Moore No.) Tool name	Description
ST16610001 (J-23907) Pilot bushing puller  NT045	Removing crankshaft pilot bushing
KV11103000 (—) Pulley puller  NT676	Removing crankshaft pulley
KV991J0050 (J-44626) Air fuel sensor Socket  LBIA0444E	Loosening or tightening air fuel ratio sensor **a: 22 mm (0.87 in)**
KV10114400 (J-38365) Heated oxygen sensor wrench  NT636	Loosening or tightening rear heated oxygen sensor **a: 22 mm (0.87 in)**
KV11105210 (J-44716) Stopper plate  ZZA0009D	Securing drive plate and flywheel
KV10115600 (J-38958) Valve oil seal drift  S-NT603	Installing valve oil seal **Use side A.** **a: 20 mm (0.79 in) dia**. **b: 13 mm (0.51 in) dia.** **c: 10.3 mm (0.406 in) dia**. **d: 8 mm (0.31 in) dia.** **e: 10.7 mm (0.421 in)** **f: 5 mm (0.20 in)**
KV10115801 (—) Oil filter wrench  S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**

Tool number (Kent-Moore No.) Tool name	Description
KV10109300 (—) Pulley holder  NT628	Removing and installing crankshaft pulley
KV10111800 (—) Valve guide drift  PBIC4012E	Removing and installing valve guide
— (J-48891) Spark plug socket  ALBIA0672GB	Removing and installing spark plug

Commercial Service Tool

INFOID:0000000007330483

(Kent-Moore No.) Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Valve seat cutter set  NT048	Finishing valve seat dimensions
Piston ring expander  NT030	Removing and installing piston ring

(Kent-Moore No.) Tool name	Description
Valve guide reamer  PBIC4013E	(1): Reaming valve guide inner hole (2): Reaming hole for oversize valve guide
(J-43897-18) (J-43897-12) Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor (Use with anti-seize lubricant shown below.) **a: J-43897-18 (18 mm dia.) for zirconia oxygen sensor** **b: J-43897-12 (12 mm dia.) for titania oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads
E20 Torx® Socket (J-45816)  LBIA0285E	Removing and installing drive plate and flywheel bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting - Engine Noise

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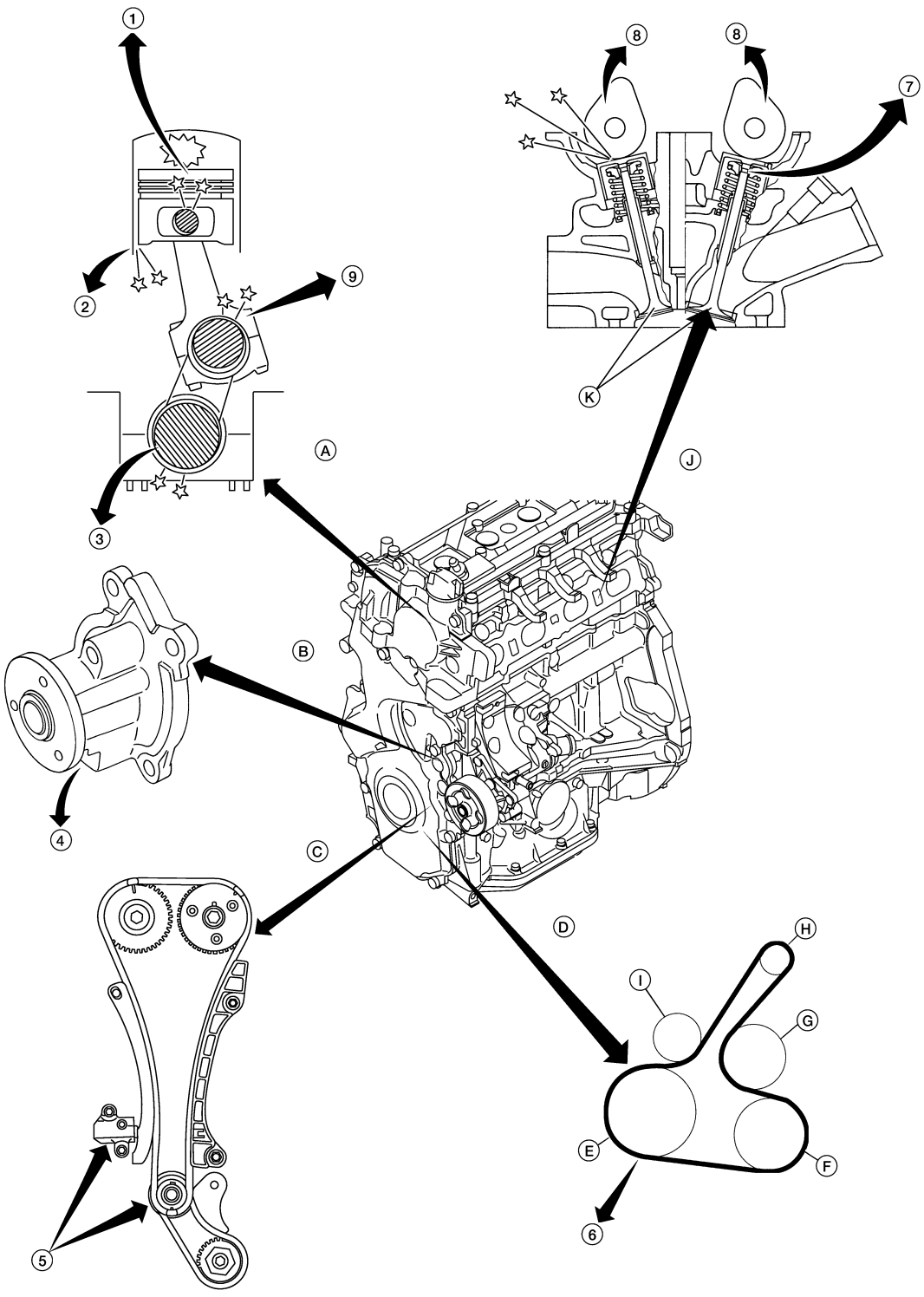


WBIA0769E

1. Piston pin noise
2. Piston slap noise
3. Main bearing noise
4. Water pump noise
5. Timing chain and tensioner noise
6. Drive belt noise (stick/slipping)
7. Tappet noise
8. Camshaft bearing noise
9. Connecting rod noise
A. Rotational mechanism
B. Water pump
C. Timing chain

D. Drive belt
E. Crankshaft pulley
F. A/C compressor
G. Water pump
H. Generator
I. Tension pulley
J. Valve mechanism
K. Valves

Use the Chart Below to Help You Find the Cause of the Symptom

INFOID:0000000007330485

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

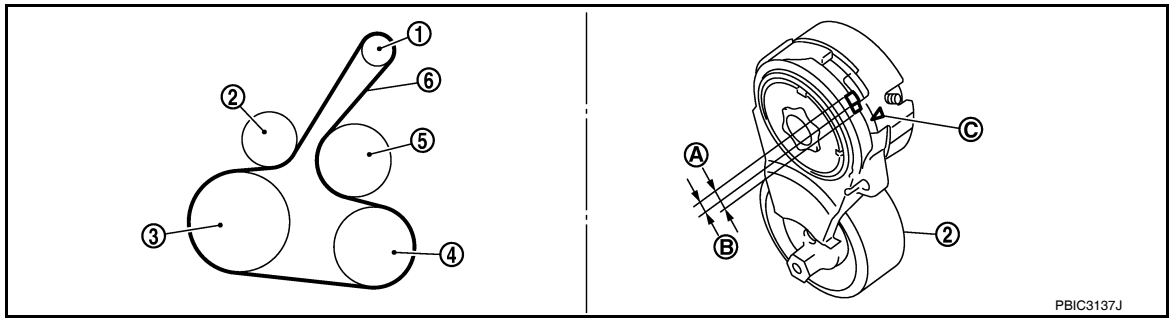
Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-111
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal oil clearance Camshaft runout	EM-51 EM-51
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston to piston pin oil clearance Connecting rod bushing oil clearance	EM-100 EM-100
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston to cylinder bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-100 EM-100 EM-100 EM-100
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing oil clearance Connecting rod bearing oil clearance	EM-100 EM-100
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-100 EM-100
Front of engine Front cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	Timing chain cracks and wear Timing chain tensioner operation	EM-41
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belt (Sticking or slipping)	Drive belt deflection	EM-13
	Creaking	A	B	A	B	A	B	Drive belt (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-20

A: Closely related B: Related C: Sometimes related —: Not related

DRIVE BELTS

Component

INFOID:0000000007330486



1.	Generator	2.	Drive belt auto-tensioner	3.	Crankshaft pulley
4.	A/C compressor (models with A/C) Idler pulley (models without A/C)	5.	Water pump	6.	Drive belt
A.	Possible use range	B.	Range when new drive belt is installed	C.	Indicator

Checking Drive Belts

INFOID:0000000007330487

WARNING:
Be sure to perform this step when the engine is stopped.
NOTE:
On vehicles not equipped with A/C, there is an idler pulley in the position for the drive belt routing.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range.

  NOTE:
  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range.
  - Visually check entire drive belt for wear, damage or cracks.
  - If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

Tension Adjustment

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Belt tension adjustment is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

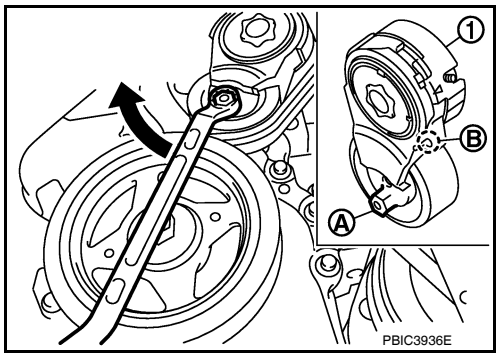
Removal and Installation

INFOID:0000000007330489

REMOVAL

1. Remove fender protector (RH). Refer to EI-24, "Removal and Installation".
2. Hold the hexagonal part (A) of drive belt auto-tensioner (1) with a wrench securely. Then move the wrench handle in the direction of arrow (loosening direction of tensioner).

   WARNING:
   Do not place hand in a location where pinching may occur if the holding tool accidentally comes off.
   CAUTION:
   Do not loosen the auto-tensioner pulley bolt. (Do not turn it counterclockwise.) If turned counterclockwise, the complete auto-tensioner must be replaced as a unit, including pulley.



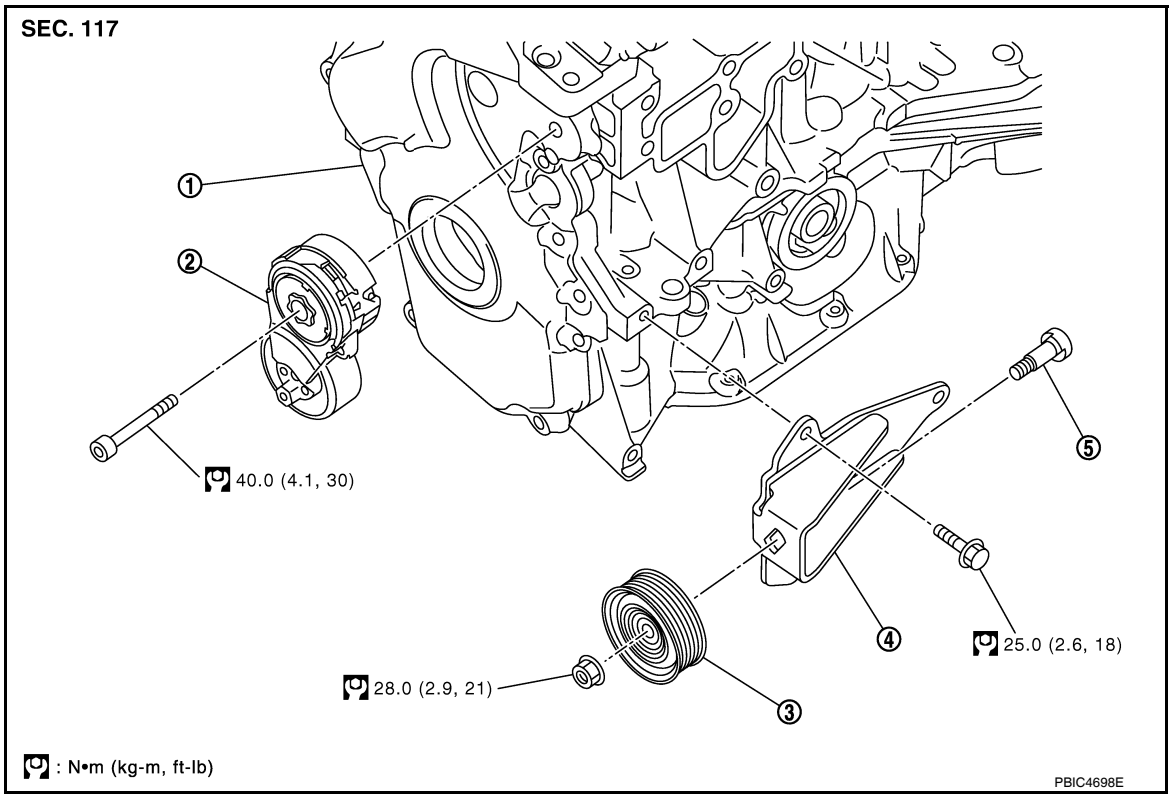
3. Insert a rod such as short-length screwdriver approximately 6 mm (0.24 in) in diameter into the hole (B) of the retaining boss to fix drive belt auto-tensioner.
   - Leave tensioner pulley arm locked until belt is installed again.
4. Remove drive belt.

INSTALLATION

1. Install drive belt.
   CAUTION:
   Confirm drive belt is completely set to pulleys.
2. Release drive belt auto-tensioner, and apply tension to drive belt.
   WARNING:
   Do not place hand in a location where pinching may occur if the holding tool accidentally comes off.
   CAUTION:
   Make sure no oil/fluid including engine oil and engine coolant drips onto the belt or pulley.
3. Turn crankshaft pulley clockwise several times to equalize tension between each pulley.
4. Confirm tension of drive belt at indicator (notch on fixed side) is within the possible use range. Refer to EM-13, "Checking Drive Belts".
5. Install fender protector (RH). Refer to EI-24, "Removal and Installation".

Component

INFOID:0000000007330490



1. Front cover
2. Drive belt auto-tensioner
3. Idler pulley (models without A/C)
4. Bracket (models without A/C)
5. Shaft (models without A/C)

Removal and Installation of Drive Belt Auto-Tensioner

INFOID:0000000007330491

REMOVAL

CAUTION:
The complete auto-tensioner must be replaced as a unit, including the pulley.

1. Remove drive belt. Refer to EM-13, "Removal and Installation".
2. Support the engine and remove the torque rod (RH), engine mounting insulator (RH) and engine mounting bracket (RH). Refer to EM-78, "Component".
3. Release the fixed drive belt auto-tensioner pulley.
4. Loosen bolt and remove drive belt auto-tensioner.
   NOTE:
   Use TORX socket (size T50).

5. Remove idler pulley and bracket (models without A/C).
   CAUTION:
   Do not loosen the auto-tensioner pulley bolt. (Do not turn it counterclockwise). If turned counterclockwise, the complete auto-tensioner must be replaced as a unit, including pulley.

INSTALLATION

Installation is in the reverse order of removal.

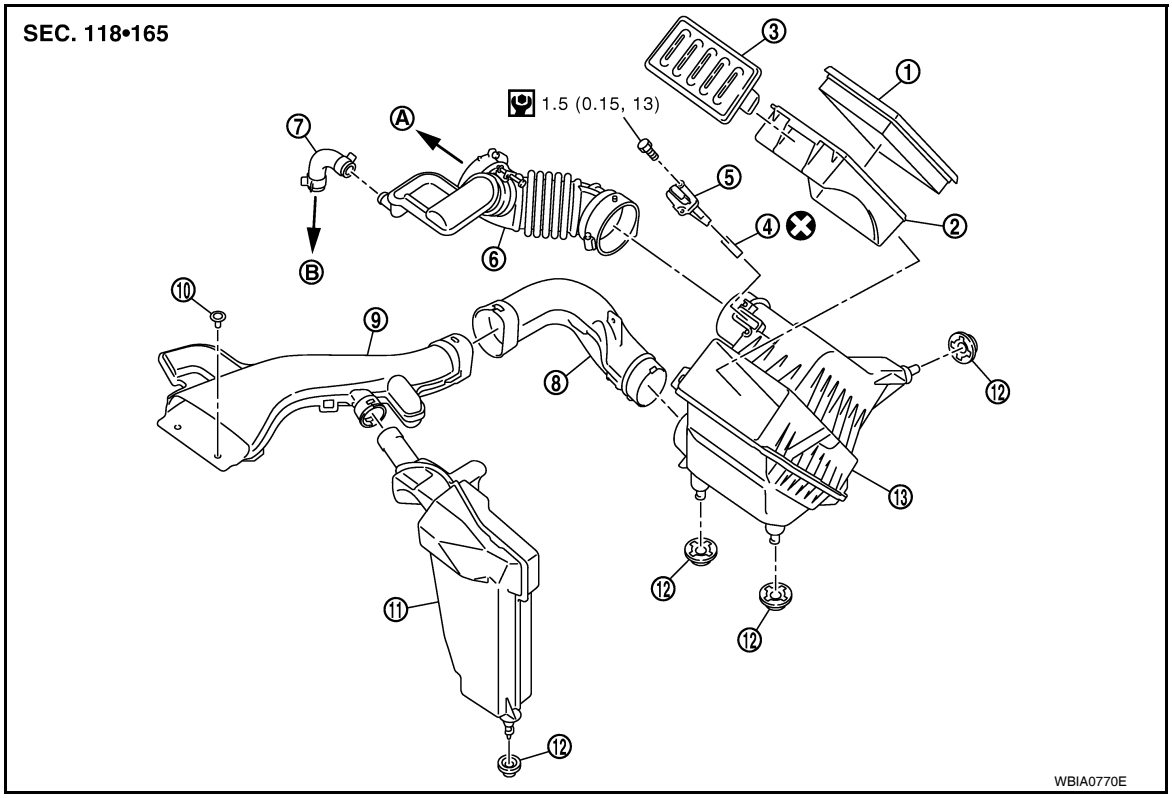
CAUTION:

- **When installing drive belt auto-tensioner, be careful not to interfere with water pump pulley.**
- **If there is damage greater than peeled paint, replace drive belt auto-tensioner and/or idler pulley (if equipped).**
- **Install the drive belt auto-tensioner carefully so not to damage the water pump pulley.**
- **Do not swap the pulley between the new and old auto-tensioner units**

AIR CLEANER AND AIR DUCT

Component

INFOID:0000000007330492



1. Air cleaner filter
2. Holder
3. Air cleaner cover
4. Seal
5. Mass air flow sensor
6. Air duct
7. PCV hose
8. Air duct (Inlet)
9. Air duct (Front)
10. Clip
11. Resonator
12. Grommet
13. Air cleaner case
A. To electric throttle control actuator
B. To rocker cover

Removal and Installation

INFOID:0000000007330493

REMOVAL

1. Remove the air duct (front).
2. Remove the air cleaner filter from the air cleaner case. Refer to EM-17, "Changing Air Cleaner Filter".
3. Remove the air duct (inlet) from the air cleaner case.
4. Remove the PCV hose.
5. Remove the air duct.
   - Add marks as necessary for easier installation.
6. Remove air cleaner case with the following procedure.

a. Remove battery. Refer to SC-7, "Removal and Installation".
b. Disconnect harness connector from mass air flow sensor.
c. Remove the air cleaner case.

7. Remove the mass air flow sensor from the air cleaner case, if necessary.

CAUTION:
- **Handle it carefully and avoid impacts.**
- **Do not touch sensor part.**

INSTALLATION

Installation is in the reverse order of removal.

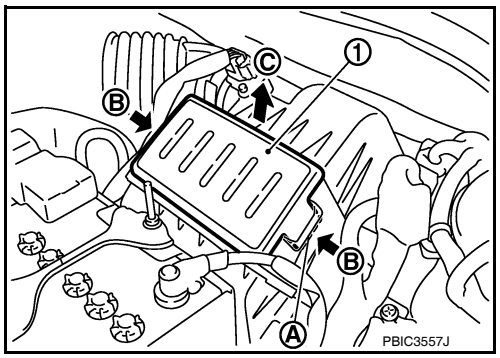
- Align marks.
- Attach each joint securely.
- Screw clamps firmly.

Changing Air Cleaner Filter

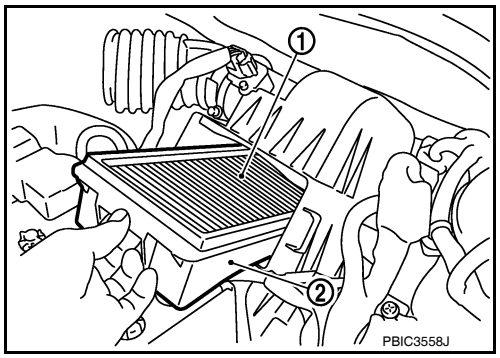
INFOID:0000000007330494

REMOVAL

1. Push the tabs (A) of both ends of the air cleaner cover (1) into the inside (B).
2. Pull up the air cleaner cover (1) and remove it (C).



3. Remove the air cleaner filter (1) and holder (2) assembly from the air cleaner case.
4. Remove the air cleaner filter (1) from the holder (2).



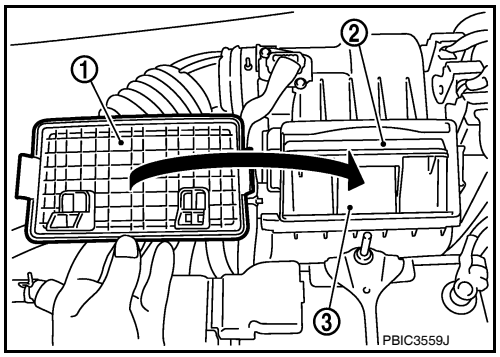
INSPECTION AFTER REMOVAL

It is necessary to replace the air cleaner filter at the recommended intervals, more often under dusty driving conditions. Refer to MA-8, "Introduction of Periodic Maintenance".

INSTALLATION

Installation is in the reverse order of removal.

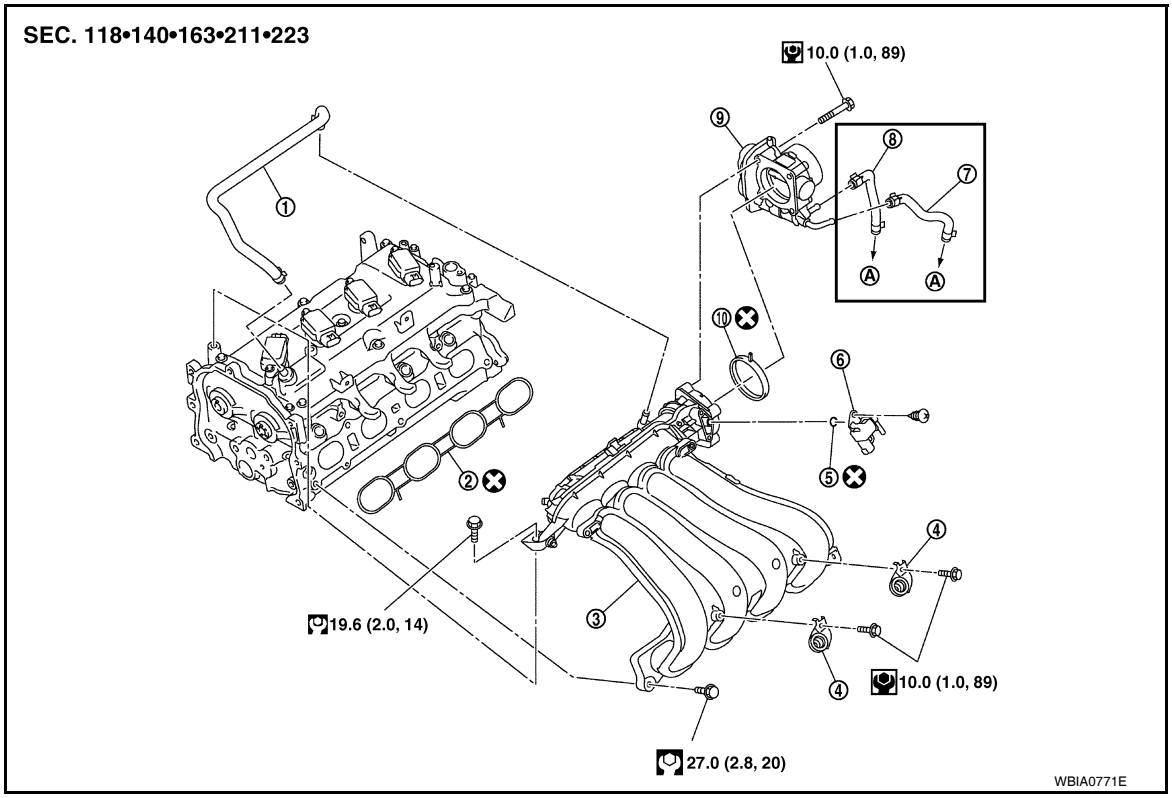
- Install the air cleaner cover (1) in the direction shown.
- Air cleaner filter (2)
- Holder (3)



INTAKE MANIFOLD

Component

INFOID:0000000007330495



1. PCV hose
2. Gasket
3. Intake manifold
4. Bracket
5. O-ring
6. EVAP canister purge volume control solenoid valve
7. Water hose
8. Water hose
9. Electric throttle control actuator
10. Gasket
A. To water outlet

Removal and Installation

INFOID:0000000007330496

WARNING:
To avoid the danger of being scalded, do not drain the coolant when the engine is hot.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

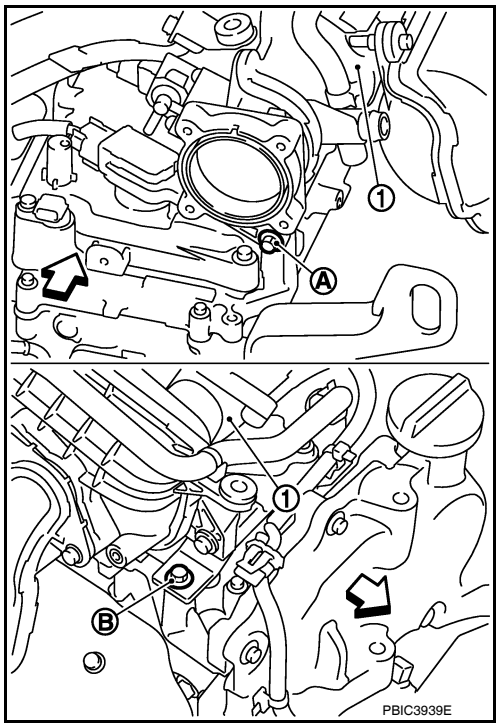
1. Remove air duct, air duct (inlet) and air duct (front). Refer to EM-16, "Component".
2. Disconnect the EVAP canister purge volume control solenoid valve.
3. Partially drain engine coolant. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   Perform this step when engine is cold.
   NOTE:
   This step is unnecessary when putting plugs to water hoses (to electric throttle control actuator).

a. Disconnect water hoses from electric throttle control actuator.

b. Remove electric throttle control actuator.
   CAUTION:
   - **Handle electric throttle control actuator carefully and avoid impacts.**
   - **Do not disassemble or adjust electric throttle control actuator.**

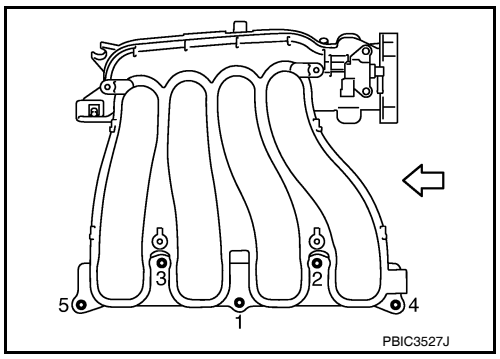
4. Remove the PCV hose and the vacuum hose.
5. Remove oil level gauge.
   CAUTION:
   Cover the oil level gauge guide openings to avoid entry of foreign materials.
6. Loosen and remove intake manifold (1) bolts (A) (B).

⇦ : Engine front



7. Loosen remaining intake manifold bolts in the reverse order as shown.

⇦ : Engine front

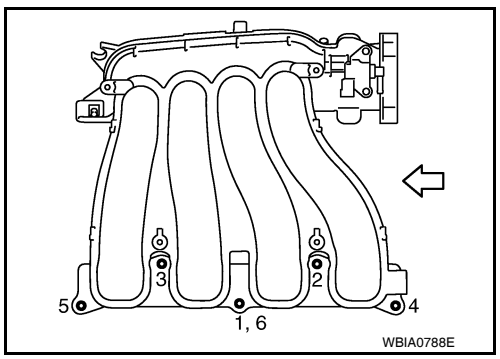


   CAUTION:
   Cover engine openings to avoid entry of foreign materials.
8. Remove EVAP canister purge volume control solenoid valve from intake manifold, if necessary.
   CAUTION:
   Handle EVAP canister purge volume control solenoid valve carefully and avoid impacts.
9. Remove intake manifold.

INSTALLATION

1. Install intake manifold.
   NOTE:
   Be sure the intake manifold gasket is seated correctly in groove of intake manifold.
2. Tighten bolts in numerical order as shown.

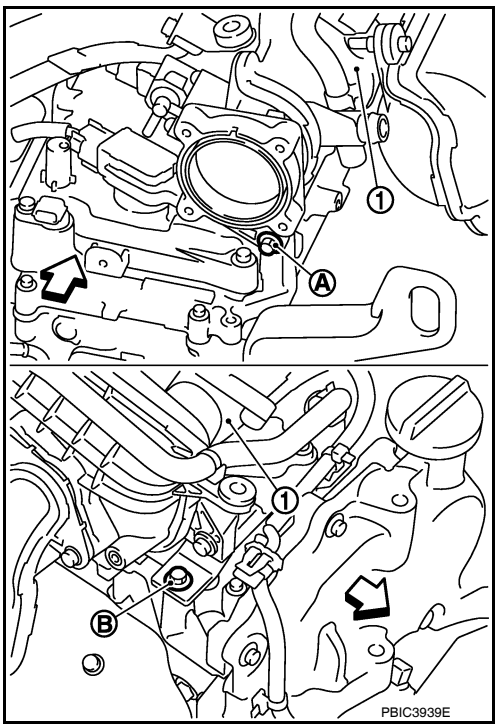
⇦ : Engine front



3. Tighten intake manifold bolt (A). Then tighten intake manifold bolt (B).

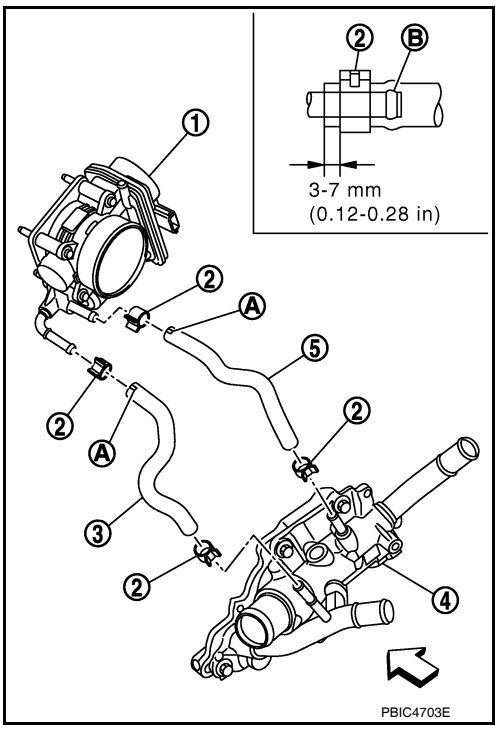
(1) : Intake manifold
⇦ : Engine front

Intake manifold bolt (A) : 19.6 N·m (2.0 kg-m, 14 ft-lb)
Intake manifold bolt (B) : 19.6 N·m (2.0 kg-m, 14 ft-lb)



4. Install electric throttle control actuator.
5. Install water hoses (3), (5) to electric throttle control actuator as shown.

(1) : Electric throttle control actuator
(2) : Clamp
(4) : Water outlet
(A) : Paint Mark
(B) : The clamp shall not interfere with the bulged section.



6. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330497

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.

- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
  NOTE:
  If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

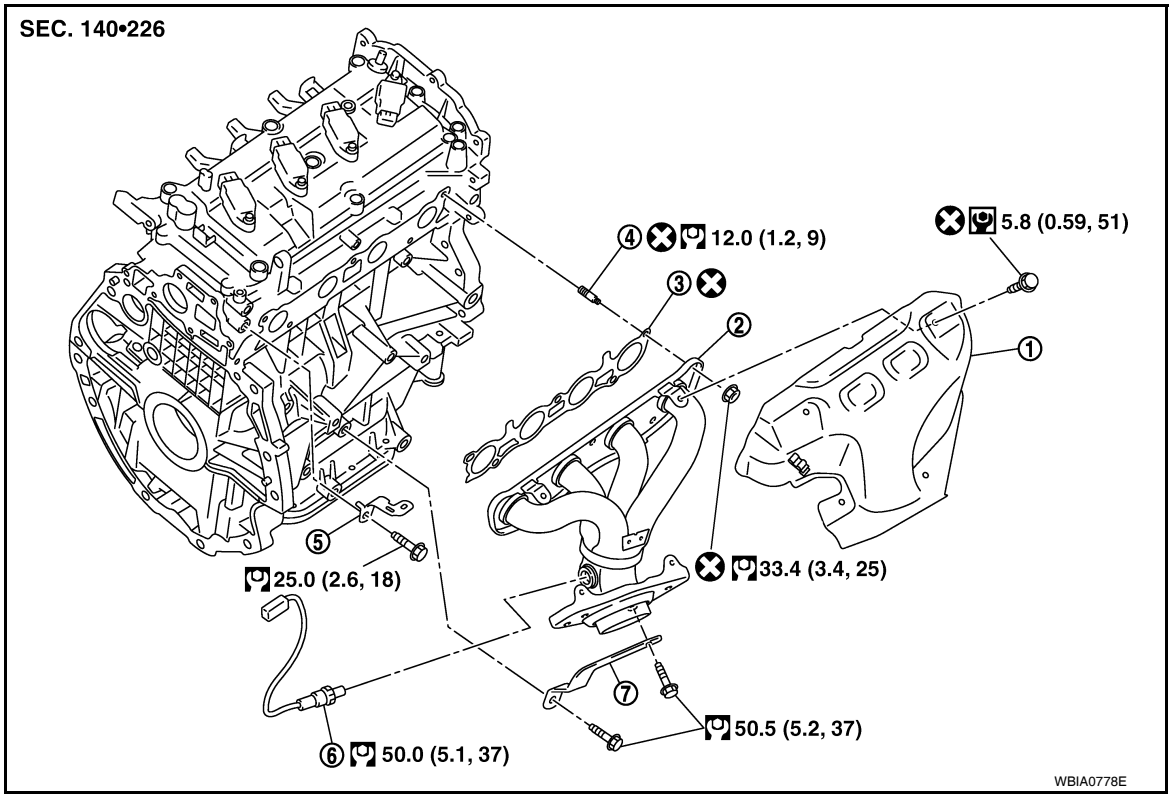
Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

EXHAUST MANIFOLD

Component

INFOID:0000000007330498



1. Exhaust manifold cover
2. Exhaust manifold
3. Gasket
4. Stud bolt
5. Bracket
6. Air fuel ratio sensor 1
7. Exhaust manifold stay

⇦ Engine front

Removal and Installation

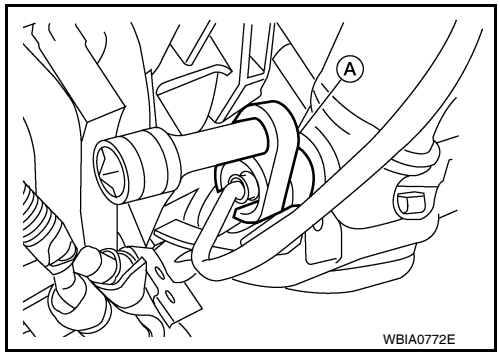
INFOID:0000000007330499

REMOVAL

1. Remove cowl top. Refer to EI-22, "Removal and Installation".
2. Remove exhaust front tube. Refer to EX-5, "Component".
3. Remove exhaust manifold cover.
4. Remove the air fuel ratio sensor 1, using Tool (A).

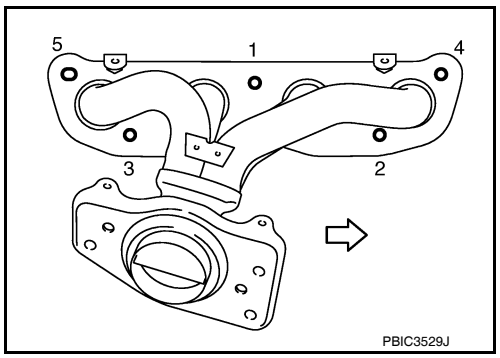
Tool number : KV991J0050 (J-44626)

CAUTION:
Handle it carefully and avoid impacts.



5. Remove exhaust manifold side bolt of exhaust manifold stay.

6. Loosen nuts in reverse order as shown and remove exhaust manifold.



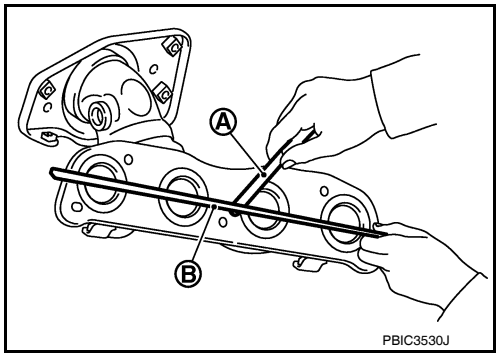
⇦ : Engine front

CAUTION:
Cover engine openings to avoid entry of foreign materials.

INSPECTION AFTER REMOVAL

Surface Distortion

- Using straightedge (B) and feeler gauge (A), check the surface distortion of exhaust manifold mating surface in each exhaust port and entire part.



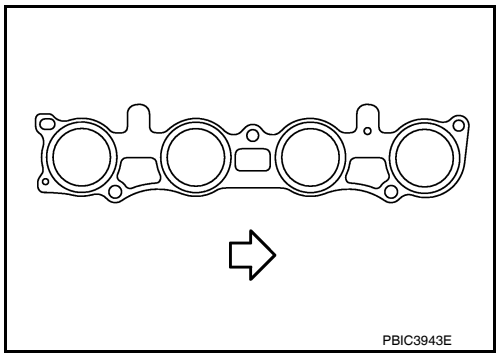
Limit:

Each exhaust port	**: 0.3 mm (0.012 in)**
Entire part	**: 0.7 mm (0.028 in)**

- If it exceeds the limit, replace exhaust manifold.

INSTALLATION

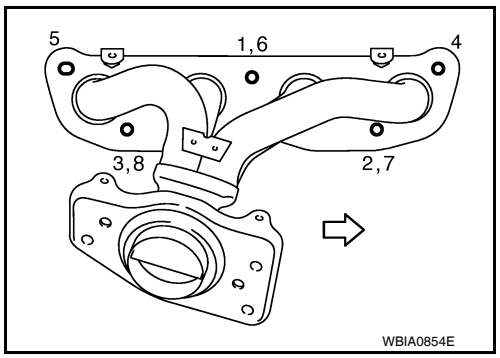
1. Install exhaust manifold gasket to cylinder head as shown.



CAUTION:
Do not reuse gasket.

⇦ : Engine front

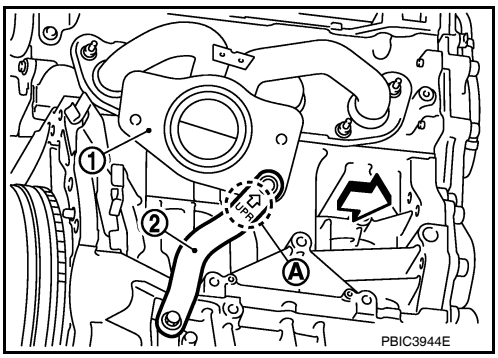
2. Tighten exhaust manifold nuts to specification in two stages in the numerical order shown.



⇦ : Engine front

3. Install exhaust manifold stay (2) in the direction as shown.

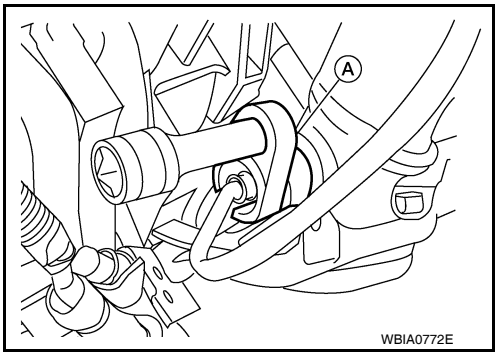
(1) : Exhaust manifold
(A) : Upper mark
⇦ : Engine front



4. Install the air fuel ratio sensor 1, using Tool (A).

Tool number : KV991J0050 (J-44626)

CAUTION:
- **Handle it carefully and avoid impacts.**
- **Before installing a new air fuel ratio sensor, clean the exhaust tube threads using suitable tool and approved anti-seize lubricant.**
- **Do not over-tighten the air fuel ratio sensor. Doing so may damage the air fuel ratio sensor, resulting in the MIL coming on.**



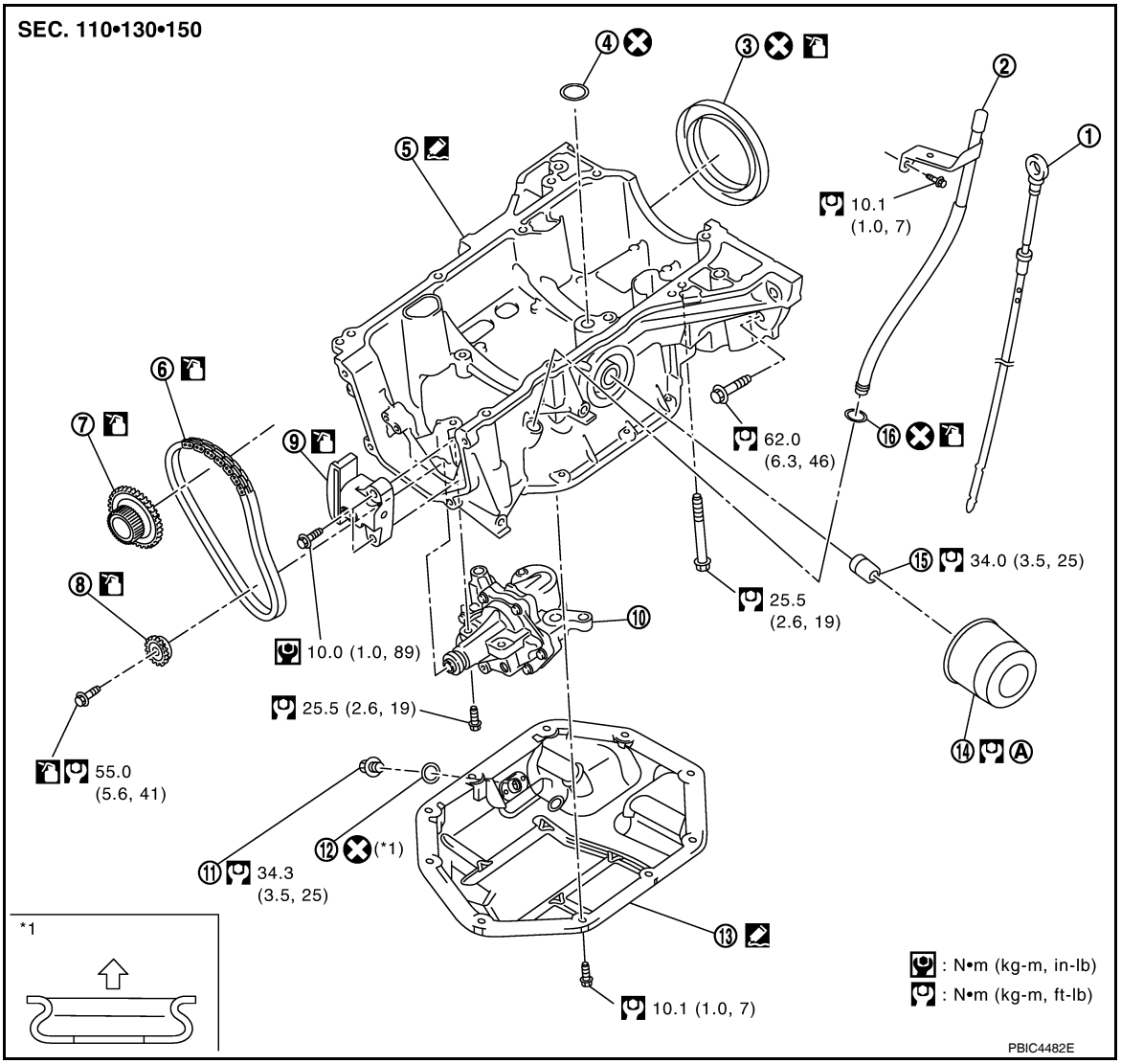
Oxygen sensor thread cleaner : (J-43897-12)
Oxygen sensor thread cleaner : (J-43897-18)

5. Installation of the remaining parts is in the reverse order of removal.

OIL PAN

Component

INFOID:0000000007330500



1. Oil level gauge
2. Oil level gauge guide
3. Rear oil seal
4. O-ring
5. Oil pan (upper)
6. Oil pump drive chain
7. Crankshaft sprocket
8. Oil pump sprocket
9. Timing chain tensioner (for oil pump)
10. Oil pump
11. Drain plug
12. Drain plug washer
13. Oil pan (lower)
14. Oil filter
15. Connector bolt
16. O-ring
A. Refer to EM-25
⇦ Oil pan side

Removal and Installation

INFOID:0000000007330501

REMOVAL

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer; try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Drain engine oil. Refer to LU-8.
2. Remove engine and transaxle assembly. Refer to EM-78.

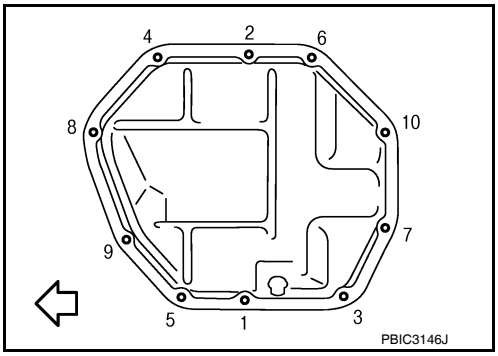
3. Remove flywheel (M/T models) or drive plate (CVT or A/T models). Refer to EM-83, "Component".
4. Remove oil filter using Tool.

Tool number : KV10115801 (—)

CAUTION:
When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.

5. Remove oil pan (lower) bolts in reverse order as shown.

⇦ : Engine front

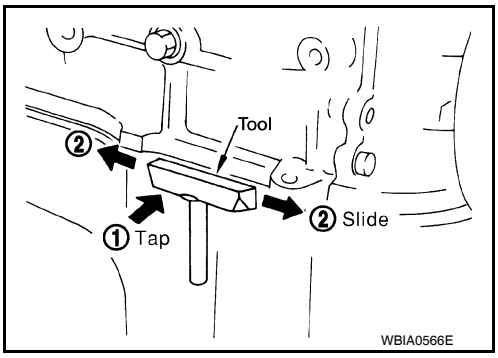


6. After removing the bolts and nuts, separate the mating surface and remove the sealant using Tool.

Tool number : KV10111100 (J-37228)

- Slide (2) the Tool by tapping (1) its side with a hammer to remove the oil pan (lower) from the oil pan (upper).

CAUTION:
Be careful not to damage the mating surfaces.

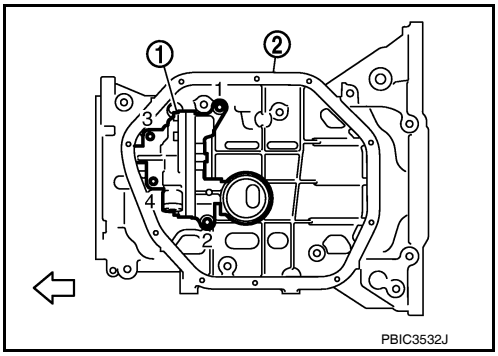


7. Remove the following parts:
- Front cover, timing chain, oil pump drive chain. Refer to EM-40.

CAUTION:
Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.

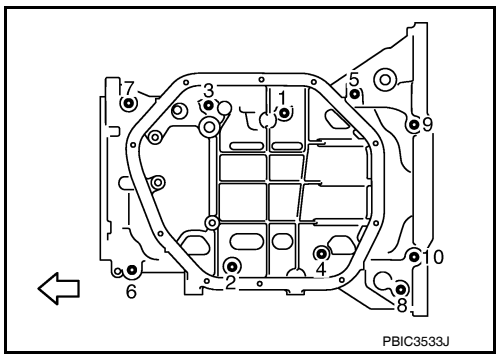
8. Remove oil pump.
- Loosen bolts in reverse order as shown.

(1) : Oil pump
(2) : Oil pan (upper)
⇦ : Engine front



9. Remove oil pan (upper) bolts in reverse order as shown.

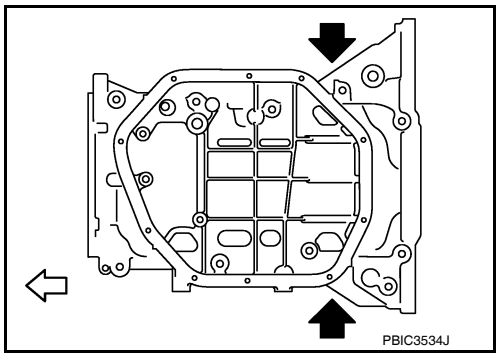
⇦ : Engine front



10. Insert a screwdriver shown by the arrow (⬅) and open up a crack between oil pan (upper) and cylinder block.

⇦ : Engine front

CAUTION:
A more adhesive liquid gasket is applied during initial assembly. Pry only at positions shown.

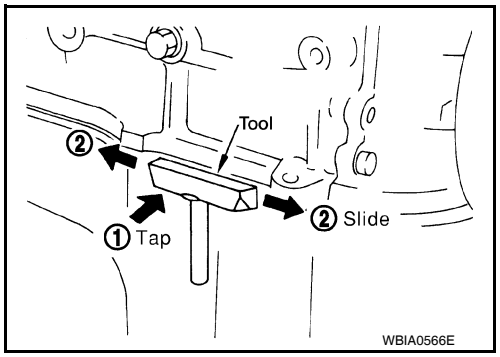


11. After removing the bolts, separate the mating surface and remove the sealant using Tool.

Tool number : KV10111100 (J-37228)

- Slide (1) the Tool by tapping (2) its side with a hammer to remove the oil pan (upper) from the cylinder block.

CAUTION:
Be careful not to damage the mating surfaces.



12. Remove O-ring between cylinder block and oil pan (upper).

INSPECTION AFTER REMOVAL

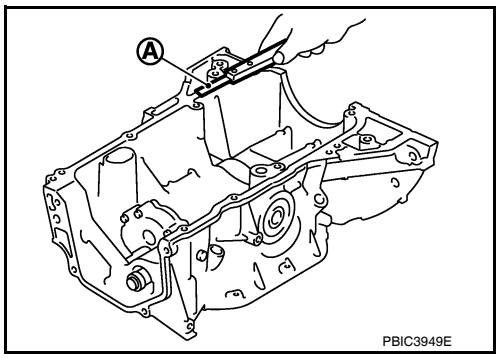
Oil Filter

Clean oil strainer portion (part of the oil pump) if any object attached.

INSTALLATION

1. Use a scraper (A) to remove old liquid gasket from mating surfaces of oil pan (upper).
   - Remove the old liquid gasket from mating surface of cylinder block.
   - Remove old liquid gasket from the bolt holes and threads.

CAUTION:
Do not scratch or damage the mating surfaces when cleaning off old liquid gasket.

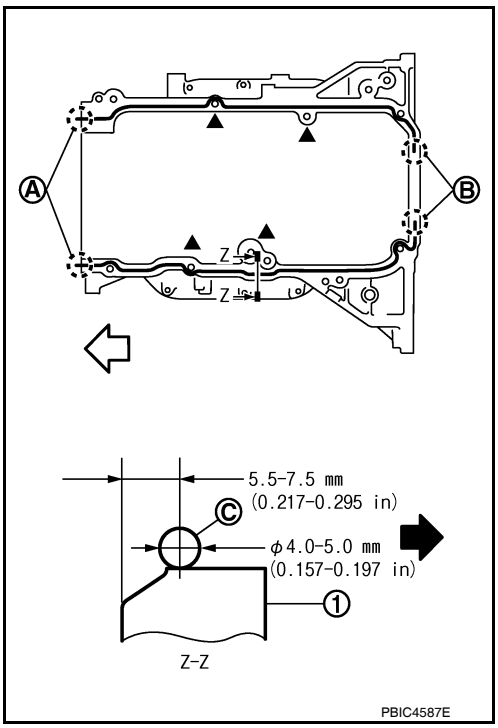


2. Apply the sealant without breaks to the specified location using Tool.
Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

Tool number WS39930000 (–)

(1) : Oil pan (upper)
(A) : 2 mm protruded to outside
(B) : 2 mm protruded to rear oil seal mounting side
(C) : Liquid gasket
⇦ : Engine front
⬅ : Engine outside

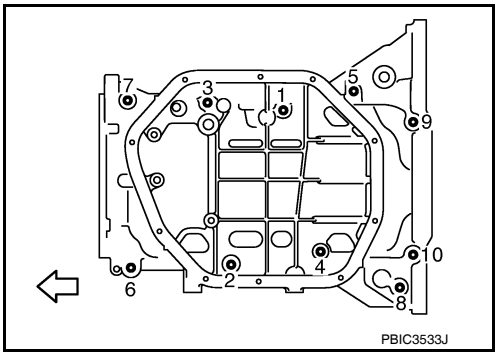
CAUTION:
Apply liquid gasket to outside of bolt hole for the positions shown by ▲ marks.



3. Install new O-ring at cylinder block side.
CAUTION:
- **Do not reuse O-ring.**
- **Install avoiding misalignment of O-ring.**

4. Tighten bolts in numerical order as shown.

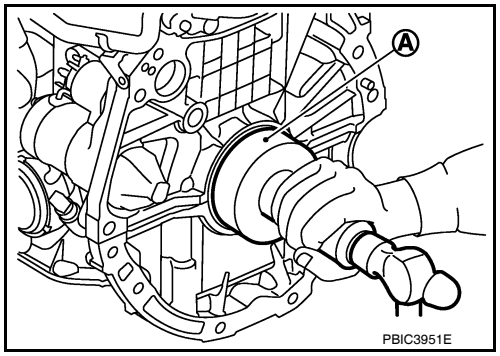
⇦ : Engine front



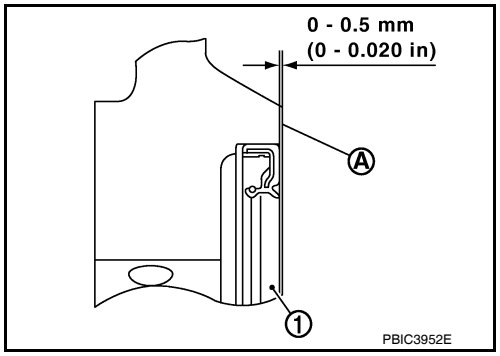
5. Install rear oil seal with the following procedure.
CAUTION:
- **The installation of rear oil seal should be completed within 5 minutes after installing oil pan (upper).**
- **Always replace rear oil seal with new one.**
- **Do not touch oil seal lip.**

a. Wipe off liquid gasket protruding to the rear oil seal mating part of oil pan (upper) and cylinder block using a scraper.
b. Apply engine oil to entire outside area of rear oil seal.

c. Press-fit the rear oil seal using a drift with outer diameter 115 mm (4.53 in) and inner diameter 90 mm (3.54 in) (A).



- Press-fit to the specified dimensions as shown.

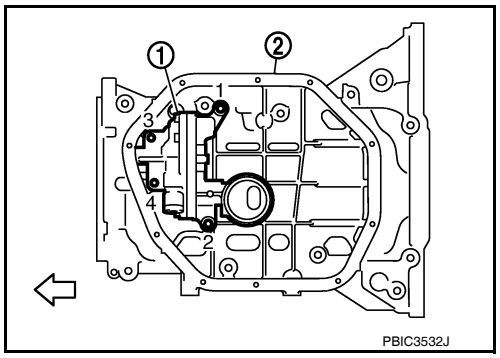


(1) : Rear oil seal
(A) : Cylinder block rear end surface

CAUTION:
- **Do not reuse rear oil seal.**
- **Do not touch the grease applied to the oil seal lip.**
- **Be careful not to damage the rear oil seal mounting part of oil pan (upper) and cylinder block or the crankshaft.**
- **Press-fit straight, making sure that rear oil seal does not curl or tilt.**

NOTE:
The standard surface of the dimension is the rear end surface of cylinder block.

6. Install oil pump.
- Tighten bolts in numerical order as shown.

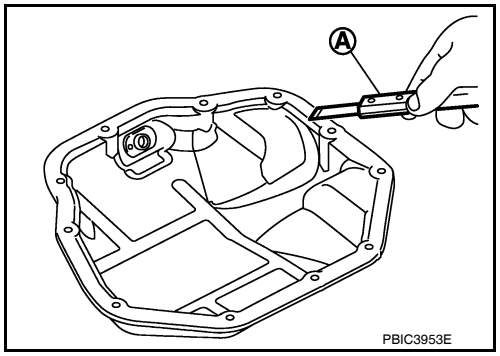


(1) : Oil pump
(2) : Oil pan (upper)
⇦ : Engine front

7. Install oil pump sprocket, oil pump drive chain and other related parts if removed.

CAUTION:
Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.

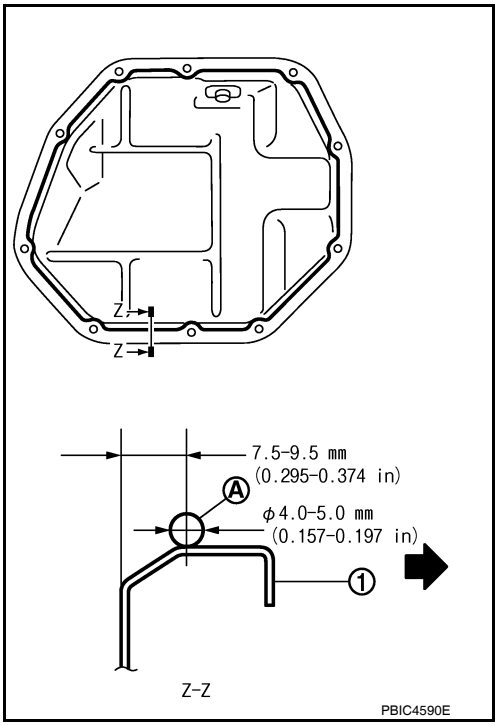
8. Use a scraper (A) to remove old liquid gasket from mating surfaces of oil pan (lower).
- Also remove old liquid gasket from mating surface of oil pan (upper).
- Remove old liquid gasket from the bolt holes and threads.



9. Apply the sealant without breaks to the specified location using Tool.
Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

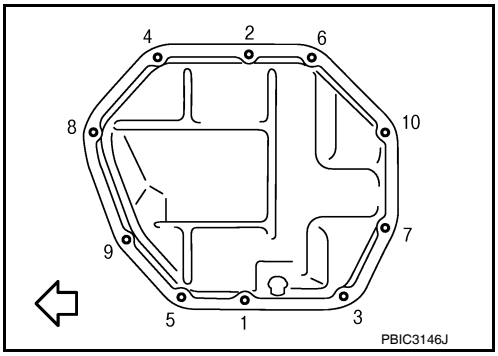
Tool number WS39930000 (–)

(1) : Oil pan (lower)
(A) : Liquid gasket
⬅ : Engine outside



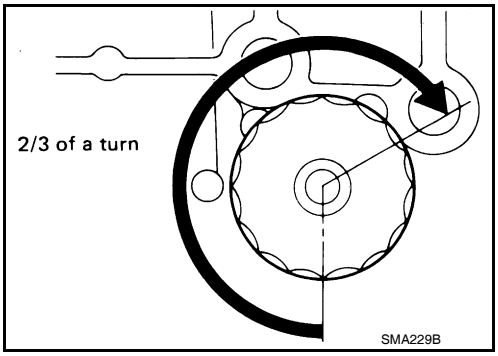
10. Tighten bolts in numerical order as shown.

⇦ : Engine front



11. Install oil filter with the following procedure:
a. Remove foreign materials adhering to the oil filter installation surface.
b. Apply new engine oil to the oil seal contact surface of new oil filter.
c. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.

Oil filter: : 17.7 N·m (1.8 kg-m, 13 ft-lb)



12. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330502

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

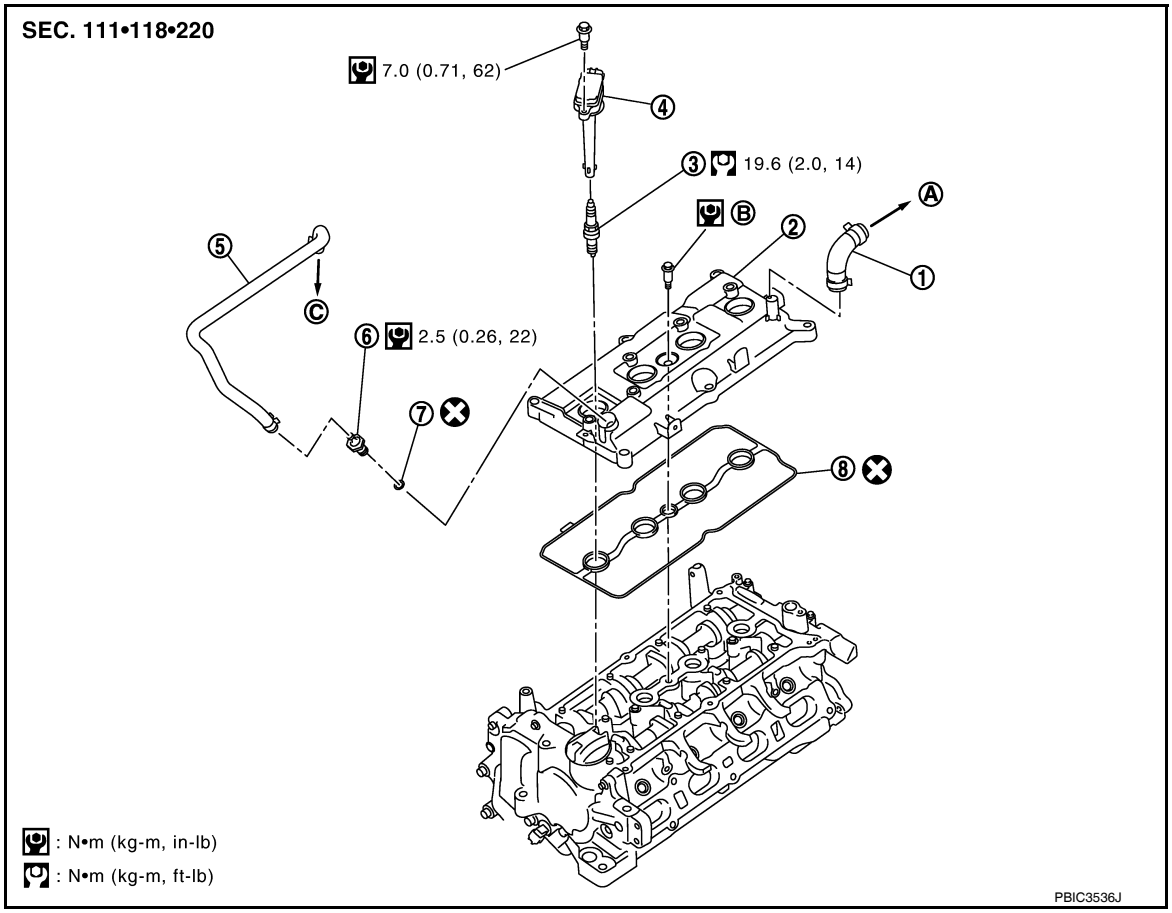
Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

IGNITION COIL, SPARK PLUG AND ROCKER COVER

Component

INFOID:0000000007330503



1. PCV hose
2. Rocker cover
3. Spark plug
4. Ignition coil
5. PCV hose
6. PCV valve
7. O-ring
8. Gasket
A. To air duct
B. Refer to EM-32.
C. To intake manifold

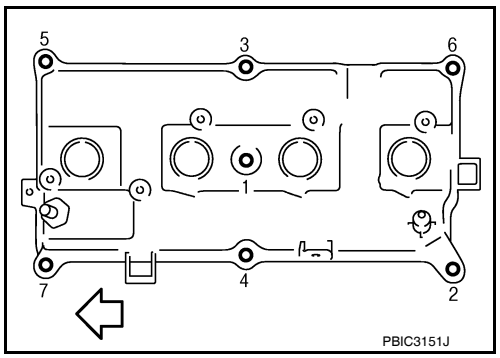
Removal and Installation

INFOID:0000000007330504

REMOVAL

1. Remove intake manifold. Refer to EM-18.
2. Remove ignition coil.
   CAUTION:
   - **Handle ignition coil carefully and avoid impacts.**
   - **Do not disassemble.**
3. Remove spark plug using suitable tool.
   CAUTION:
   Do not drop or shock it.

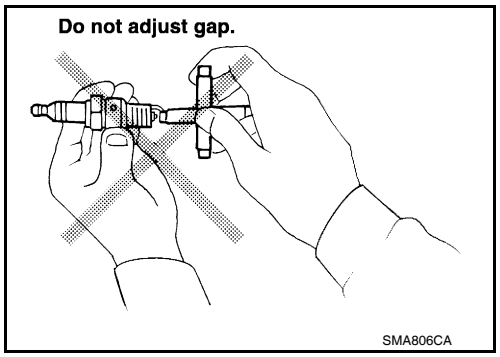
4. Remove rocker cover.
   - Loosen bolts in reverse order as shown.
   - ⇦ Engine front



INSPECTION AFTER REMOVAL

CAUTION:

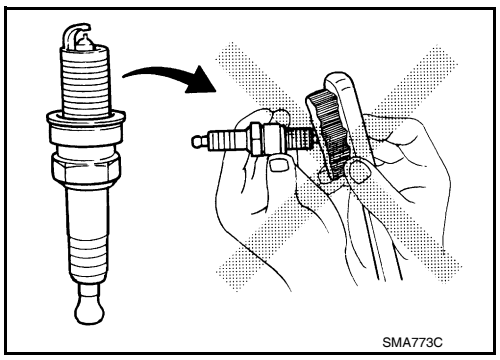
- **Do not drop or shock spark plug.**
- **Checking and adjusting spark plug gap is not required between change intervals.**



- **If spark plug tip is covered with carbon, a spark plug cleaner may be used.**

Cleaner air pressure	**: Less than 588 kPa (5.88 bar, 6 kg/cm^2, 85 psi)**
Cleaning time	**: Less than 20 seconds**

- **Do not use wire brush for cleaning spark plug.**



INSTALLATION

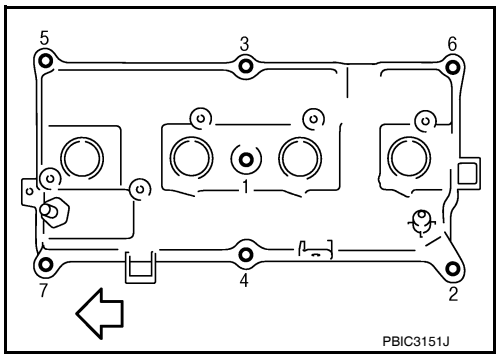
1. Install the rocker cover gasket to the rocker cover.
2. Install rocker cover.
   - Tighten bolts in two steps separately in numerical order as shown.

1st step	**: 1.96 N·m (0.20 kg-m, 17 in-lb)**
2nd step	**: 8.33 N·m (0.85 kg-m, 73 in-lb)**

   - ⇦ Engine front

CAUTION:

Check if rocker cover gasket is not dropped from the installation groove of rocker cover.



3. Install spark plug using suitable tool.

Make	**: DENSO**
Part number*	**: FXE20HR-11**
Gap (nominal)	**: 1.1 mm (0.043 in)**

*: Always check with the Parts Department for the latest parts information.

CAUTION:
Do not drop or shock it.

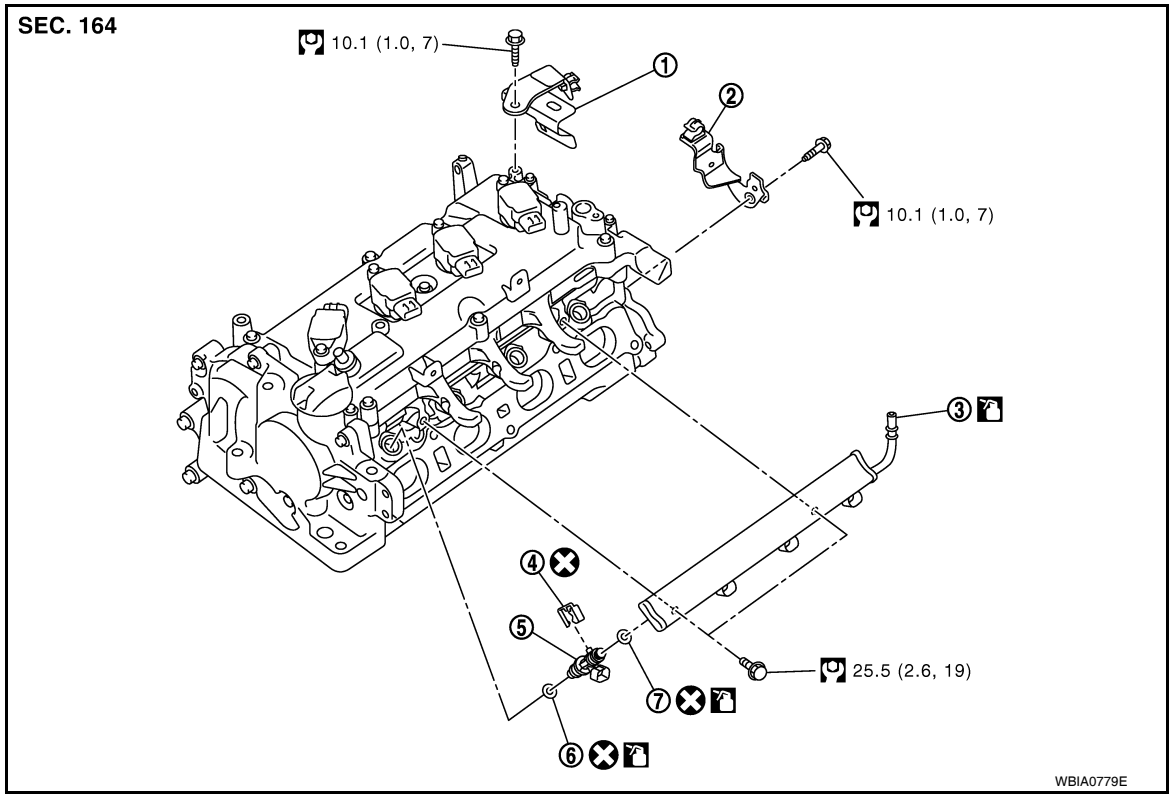
4. Install ignition coil.
CAUTION:
- **Handle it carefully and avoid impacts.**
- **Do not disassemble.**

5. Install intake manifold. Refer to EM-18.

FUEL INJECTOR AND FUEL TUBE

Component

INFOID:0000000007330505



1. Bracket
2. Bracket
3. Fuel tube
4. Clip
5. Fuel injector
6. O-ring (green)
7. O-ring (black)

Removal and Installation

INFOID:0000000007330506

WARNING:
- **Put a "CAUTION: FLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

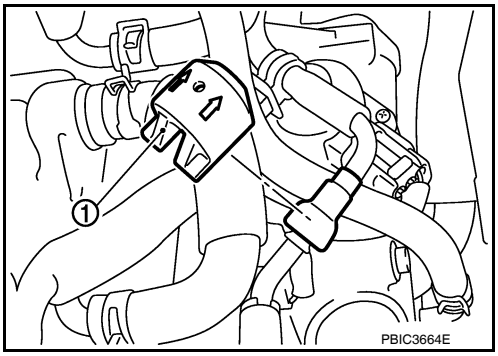
CAUTION:
- **Apply new engine oil to parts before installing the parts, as shown above.**
- **Do not remove or disassemble parts unless instructed as shown.**

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Release the fuel pressure. Refer to EC-89, "Fuel Pressure Check".
2. Disconnect the battery negative terminal. Refer to SC-7, "Removal and Installation".

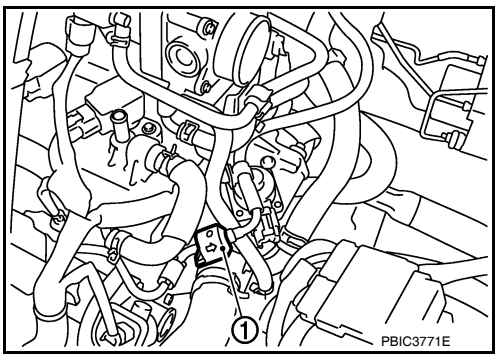
3. Remove quick connector cap (1) from quick connector connection.



4. Disconnect fuel feed hose from hose clamp.

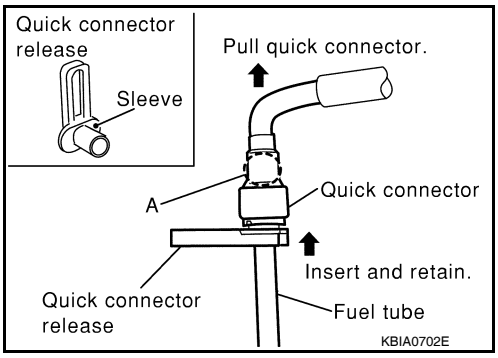
(1) : Quick connector cap

NOTE:
There is no fuel return path.



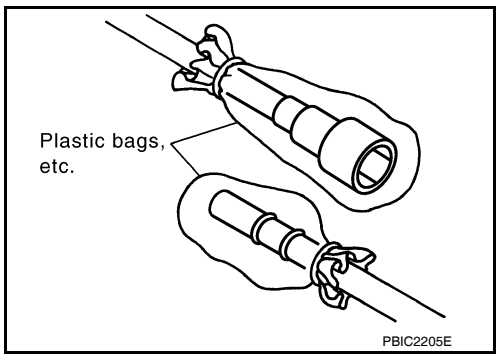
5. With the sleeve side of quick connector release facing quick connector, install quick connector release onto fuel tube.

6. Insert quick connector release into quick connector until sleeve contacts and goes no further. Hold quick connector release on that position.
CAUTION:
Inserting quick connector release hard will not disconnect quick connector. Hold quick connector release where it contacts and goes no further.



7. Draw and pull out quick connector straight from fuel tube.
CAUTION:
- **Pull quick connector holding (A) position.**
- **Do not pull with lateral force applied. O-ring inside quick connector may be damaged.**
- **Prepare container and cloth beforehand as fuel will leak out.**
- **Avoid fire and sparks.**
- **Keep parts away from heat source. Especially, be careful when welding is performed around them.**
- **Do not expose parts to battery electrolyte or other acids.**
- **Do not bend or twist connection between quick connector and fuel feed hose during installation/ removal.**

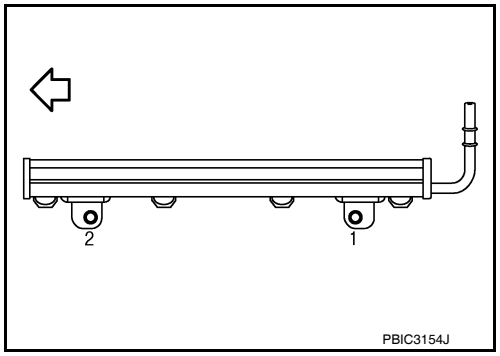
- **To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**



8. Remove intake manifold. Refer to EM-18.

9. Remove fuel tube bolts.
   - Loosen bolts in reverse order as shown.

   ⇦ : Engine front



10. Remove the fuel tube and fuel injector assembly.
    CAUTION:
    - **When removing, be careful to avoid any interference with fuel injector.**
    - **Use a shop cloth to absorb any fuel leaks from fuel tube.**
11. Remove fuel injector from the fuel tube with the following procedure:

a. Open and remove the clip.

b. Remove fuel injector from the fuel tube by pulling straight.
   CAUTION:
   - **Be careful about spilling fuel remaining in fuel tube.**
   - **Be careful not to damage the fuel injector nozzle during removal.**
   - **Do not bump or drop fuel injector.**
   - **Do not disassemble fuel injector.**

INSTALLATION

1. Install new O-rings to the fuel injector.
   CAUTION:
   - **Do not reuse O-rings.**
   - **The upper and lower O-rings are different. Be careful not to confuse them.**

Fuel tube side	: Black
Nozzle side	: Green

   - **Handle O-ring with bare hands. Do not wear gloves.**
   - **Lubricate O-ring with new engine oil.**
   - **Do not clean O-ring with solvent.**
   - **Make sure that the O-ring and its mating part are free of foreign material.**
   - **Be careful not to scratch O-ring with tool or fingernails when installing.**
   - **Do not twist or stretch O-ring. If O-ring was stretched while installing, do not insert it into fuel tube immediately.**
   - **Insert O-ring straight into fuel tube. Do not angle or twist it.**

2. Install fuel injector (4) to fuel tube (1) with the following procedure:

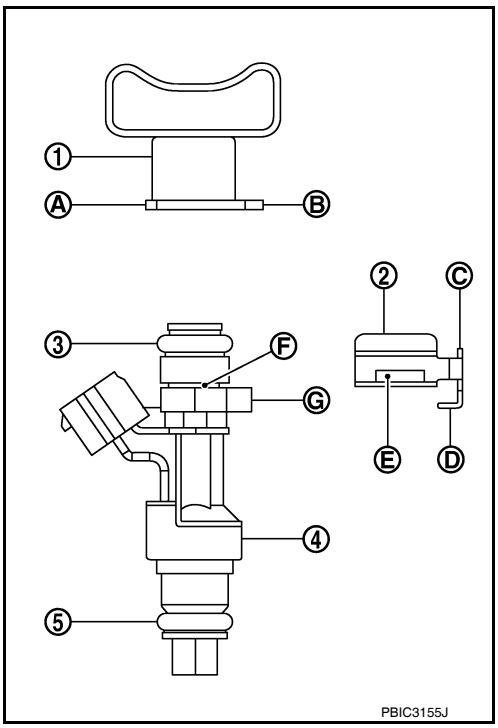
(3) : O–ring (black)
(5) : O–ring (green)

a. Insert clip (2) into clip groove (F) on fuel injector.
- Insert clip so that protrusion (G) of fuel injector matches cut-out (D) of clip.

CAUTION:
- **Do not reuse clip. Replace it with a new one.**
- **Be careful to keep clip from interfering with O-ring. If interference occurs, replace O-ring.**

b. Insert fuel injector into fuel tube with clip attached.
- Insert it while matching it to the axial center.
- Insert fuel injector so that protrusion (B) of fuel tube matches cut-out (C) of clip.
- Make sure that fuel tube flange (A) is securely fixed in flange fixing groove (E) on clip.

c. Make sure that installation is complete by making sure that fuel injector does not rotate or come off.

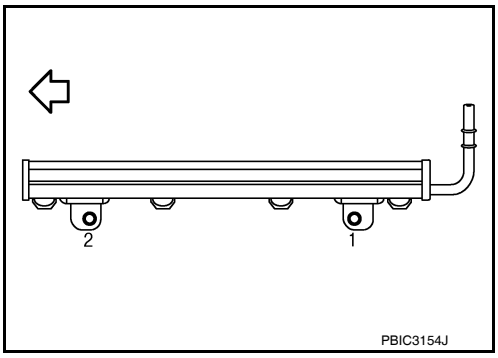


3. Set fuel tube and fuel injector assembly at its position for installation on cylinder head.

CAUTION:
Be careful not to let tip of injector nozzle interfere with other parts.

4. Tighten bolts in numerical order as shown.

⇦ : Engine front



5. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330507

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.

• Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

WARNING:
Do not touch the engine immediately after it is stopped, as the engine becomes extremely hot.
NOTE:
Use mirrors for checking at points out of clear sight.

TIMING CHAIN

Component

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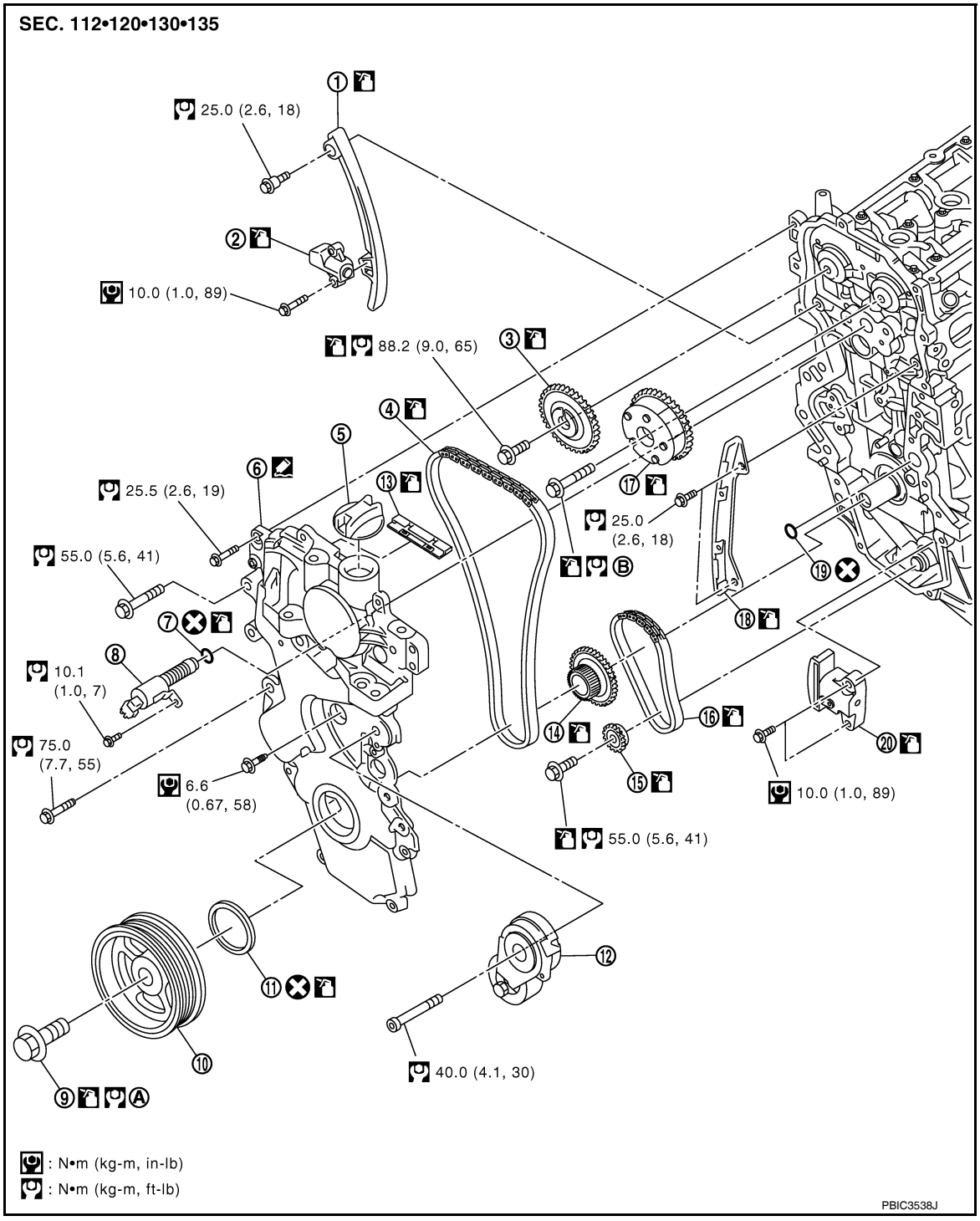


1.	Timing chain slack guide	2.	Timing chain tensioner	3.	Camshaft sprocket (EXH)
4.	Timing chain	5.	Oil filler cap	6.	Front cover
7.	O-ring	8.	Intake valve timing control solenoid valve	9.	Crankshaft pulley bolt
10.	Crankshaft pulley	11.	Front oil seal	12.	Drive belt auto-tensioner
13.	Timing chain tension guide (front cover side)	14.	Crankshaft sprocket	15.	Oil pump sprocket

16. Oil pump drive chain
17. Camshaft sprocket (INT)
18. Timing chain tension guide
19. O-ring
20. Chain tensioner (for oil pump)
A. Refer to EM-41
B. Refer to EM-51

Removal and Installation

INFOID:0000000007330509

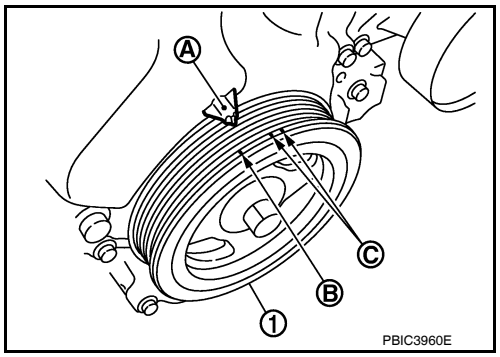
CAUTION:
The rotating direction indicated in the text indicates all directions seen from the engine front.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Disconnect the battery negative terminal. Refer to SC-7, "Removal and Installation".
2. Drain engine oil. Refer to LU-9, "Changing Engine Oil".
   CAUTION:
   Perform this step when engine is cold.
3. Partially drain engine coolant from the radiator. Refer to CO-11, "Changing Engine Coolant".
4. Remove front RH wheel. Refer to WT-7, "Adjustment".
5. Remove front fender protector (RH). Refer to EI-24, "Removal and Installation".
6. Remove the following parts.
   - Rocker cover: Refer to EM-32, "Component".
   - Drive belt: Refer to EM-13, "Removal and Installation".
   - Water pump pulley: Refer to CO-20, "Component".
   - Ground cable (between engine bracket (RH) and radiator core support)
7. Support the bottom surface of engine using a transmission jack, and then remove the engine bracket and insulator (RH). Refer to EM-78, "Component".
8. Set No. 1 cylinder at TDC on its compression stroke with the following procedure:

a. Rotate crankshaft pulley (1) clockwise and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

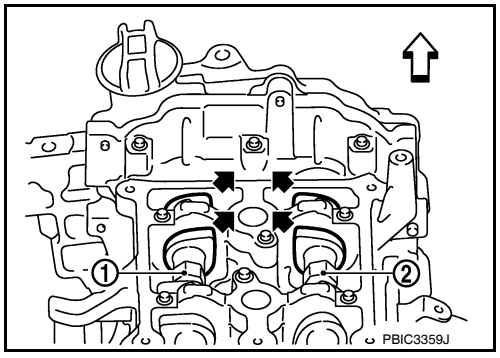
(C) : White paint mark (Not use for service)



b. At the same time, make sure that the cam noses of the No.1 cylinder are located (⬅) as shown.

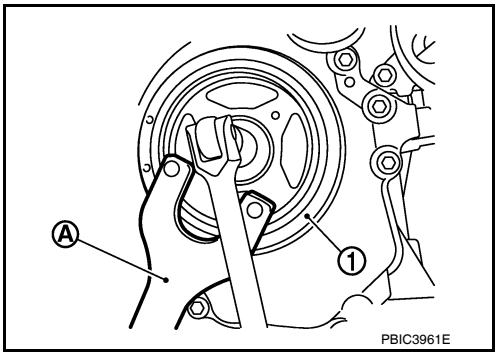
(1) : Camshaft (INT)
(2) : Camshaft (EXH)
⇦ : Engine front

- If not, rotate crankshaft pulley one revolution (360 degrees) and align as shown.



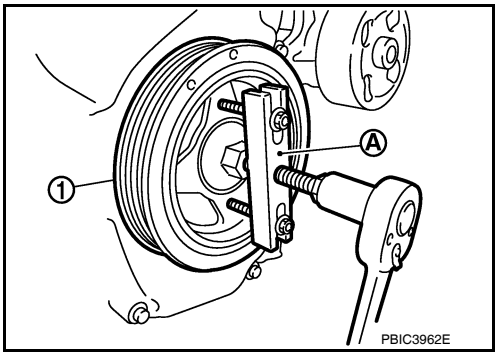
9. Hold crankshaft pulley (1) using Tool (A), while loosening crankshaft pulley bolt using suitable tool, and locate bolt seating surface at 10 mm (0.39 in) from its original position.
CAUTION:
Do not remove the crankshaft pulley bolt as it will be used as a supporting point for the pulley puller.

Tool number : KV10109300 (—)

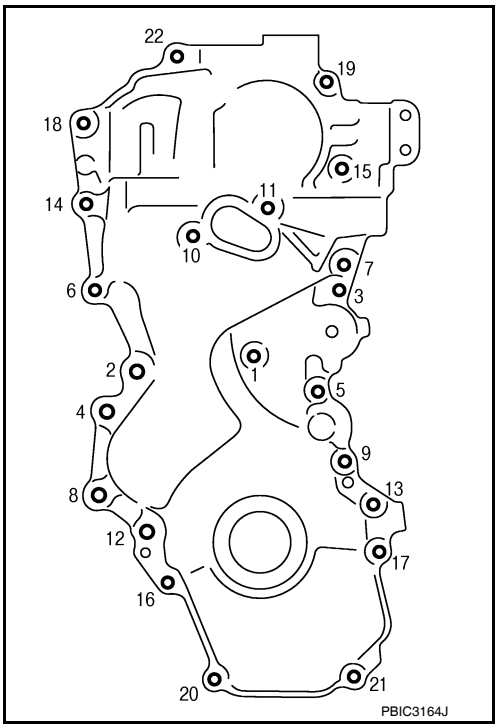


10. Attach Tool (A) in the M6 thread hole on crankshaft pulley (1), and remove crankshaft pulley.

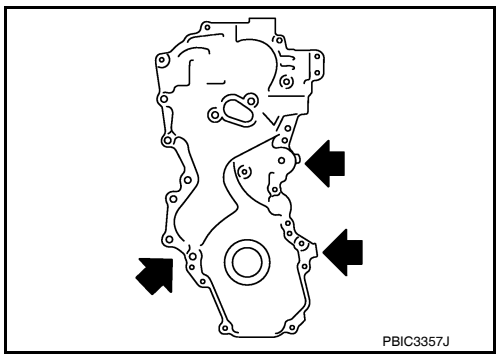
Tool number : KV11103000 (—)



11. Remove oil pan (lower). Refer to EM-25, "Component".
CAUTION:
Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.
NOTE:
When crankshaft sprocket, oil pump sprocket and other related parts are not removed, this step is unnecessary.
12. Remove intake valve timing control solenoid valve.
13. Remove drive belt auto-tensioner.
14. Loosen bolts in reverse order as shown.



15. Cut liquid gasket by prying the position (⬅) shown, and then remove the front cover.
CAUTION:
- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied compared to previous types when shipped, so it should not be forced off the position not specified.**

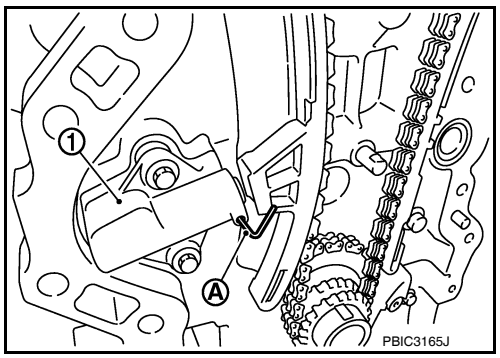


16. Remove front oil seal from front cover.
- Lift up front oil seal using a suitable tool.

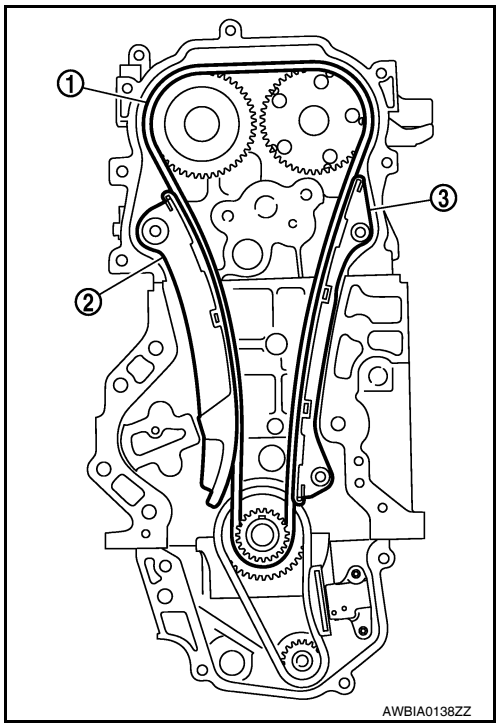
CAUTION:
Be careful not to damage front cover.

17. Push in timing chain tensioner plunger.
18. Insert a stopper pin (A) into the body hole to retain the plunger in collapsed position.
NOTE:
Use approximately 1.5 mm (0.059 in) diameter hard metal pin as a stopper pin.

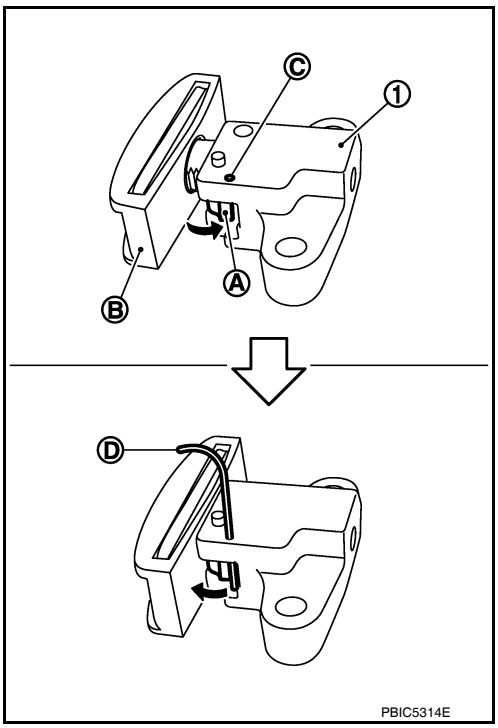
19. Remove timing chain tensioner (1).



20. Remove timing chain slack guide (2), timing chain tension guide (3) and timing chain (1).
CAUTION:
Do not rotate each crankshaft and camshaft individually while timing chain is removed. It causes interference between valve and piston.



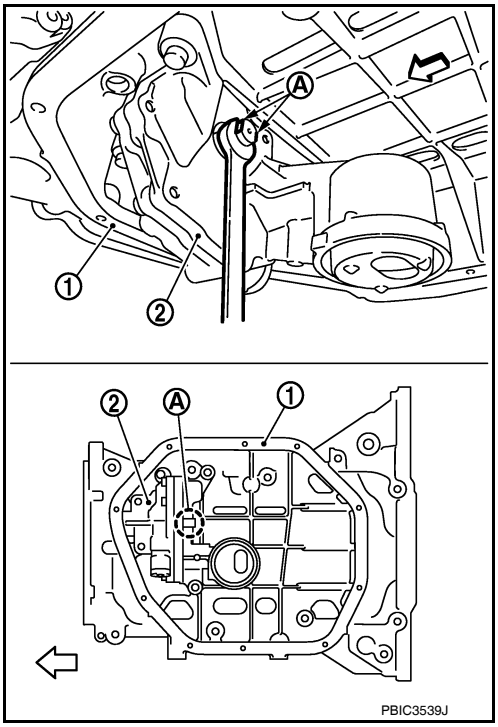
21. Press stopper tab (A) in the direction shown to push the timing chain slack guide (B) toward timing chain tensioner (for oil pump) (1).
    - The slack guide (B) is released by pressing the stopper tab (A). As a result, the slack guide (B) can be moved.
22. Insert stopper pin (D) into tensioner body hole (C) to secure timing chain slack guide (B).
    NOTE:
    Use a hard metal pin with a diameter of approximately 1.2 mm (0.047 in) as a stopper pin.
23. Remove timing chain tensioner (for oil pump), if necessary.



24. Hold the WAF part of oil pump shaft (A), and then loosen the oil pump sprocket bolt and remove them.

    (1) : Oil pan (upper)
    (2) : Oil pump
    ⇦ : Engine front

    CAUTION:
    - **Secure the oil pump shaft with the WAF part (A).**
    - **Do not loosen the oil pump sprocket bolt by tightening the oil pump drive chain.**
    - **Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.**

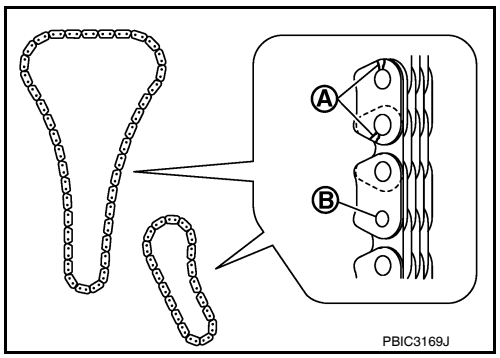


25. Remove crankshaft sprocket, oil pump sprocket and oil pump drive chain as a set, if necessary.
26. Remove timing chain tension guide (front cover side) from front cover, if necessary.

INSPECTION AFTER REMOVAL

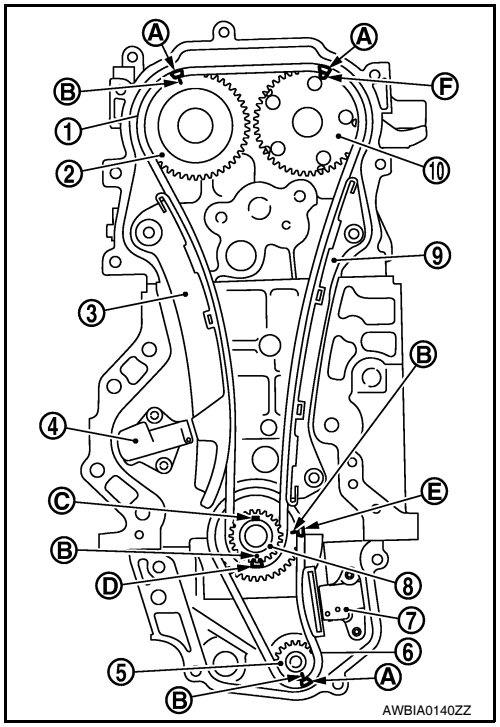
Timing Chain

- Check timing chain and oil pump drive chain for cracks (A) and any excessive wear (B) at the roller links of timing chain.
- Replace timing chain and/or oil pump drive chain, if necessary.



INSTALLATION

NOTE:
The figure shows the relationship between the matching mark on each timing chain and that on the corresponding sprocket, with the components installed.



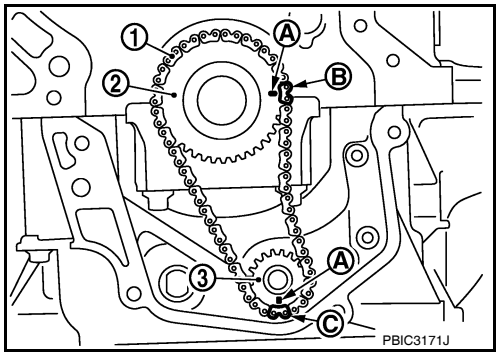
1. Make sure that crankshaft key points are aligned.

(1) : Timing chain
(2) : Camshaft sprocket (EXH)
(3) : Timing chain slack guide
(4) : Timing chain tensioner
(5) : Oil pump sprocket
(6) : Oil pump drive chain
(7) : Chain tensioner (for oil pump)
(8) : Crankshaft sprocket
(9) : Timing chain tension guide
(10) : Camshaft sprocket (INT)
(A) : Matching mark (dark blue link)
(B) : Matching mark (stamping)
(C) : Crankshaft key position (straight up)
(D) : Matching mark (copper link)
(E) : Matching mark (orange link)
(F) : Matching mark (outer groove*)

NOTE:
*: There are two outer grooves in camshaft sprocket (INT). The wider one is a matching mark.

2. If the timing chain tension guide (front cover side) is removed, install it to the front cover.
CAUTION:
Check the joint condition by sound or feeling.

3. Install crankshaft sprocket (2), oil pump sprocket (3) and oil pump drive chain (1).



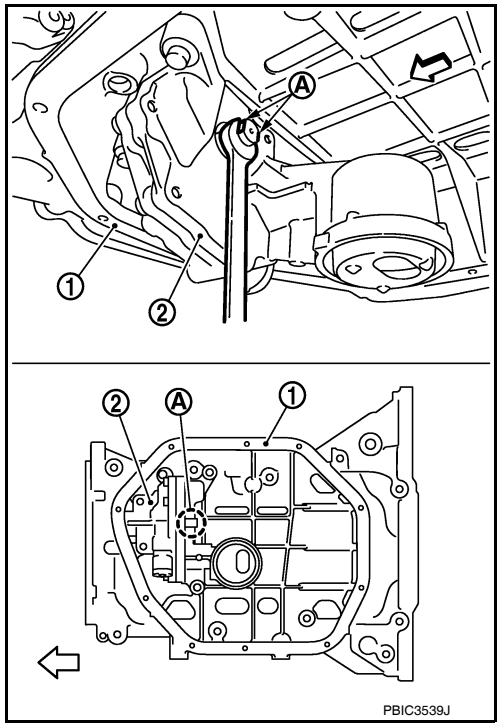
(A) : Matching mark (stamping)
(B) : Matching mark (orange link)
(C) : Matching mark (dark blue link)

- Install it by aligning matching marks on each sprocket and oil pump drive chain.
- If these matching marks are not aligned, rotate the oil pump shaft slightly to correct the position.

CAUTION:
Check matching mark position of each sprocket after installing the oil pump drive chain.
CAUTION:

Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.

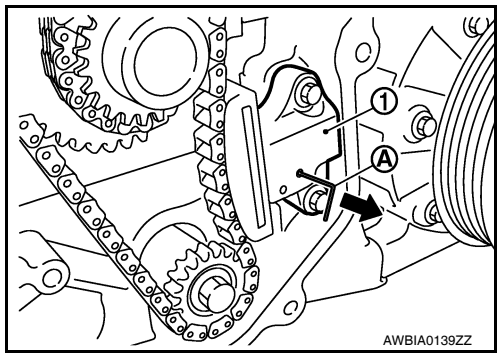
4. Hold the WAF part of oil pump shaft (A), and then tighten the oil pump sprocket bolt.



(1) : Oil pan (upper)
(2) : Oil pump
⇦ : Engine front

CAUTION:
- **Secure the oil pump shaft with the WAF part (A).**
- **Do not loosen the oil pump sprocket bolt by tightening the oil pump drive chain.**
- **Do not use an impact or other power tool to remove the engine oil pump sprocket bolt. If an impact or other power tool is used to remove the engine oil pump sprocket bolt, the crankshaft sprocket may break.**

5. Install chain tensioner (for oil pump) (1).
   1. Secure the plunger at the most compressed position using a stopper pin (A), and then install it.
   2. Securely pull out (⬅) the stopper pin after installing the chain tensioner (for oil pump).
   3. Check matching mark position of oil pump drive chain and each sprocket again.

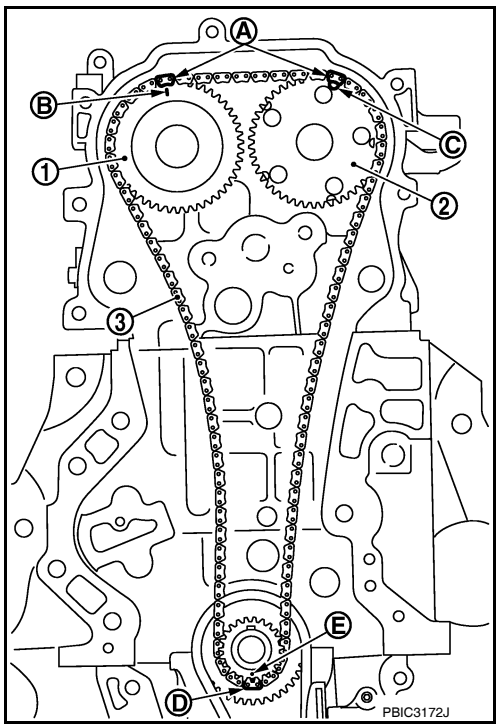


6. Align the matching marks of each sprocket with the matching marks of timing chain.

(1) : Camshaft sprocket (EXH)
(2) : Camshaft sprocket (INT)
(3) : Timing chain
(A) : Matching mark (dark blue link)
(B) : Matching mark (stamping)
(C) : Matching mark (outer groove*)
(D) : Matching mark (copper link)
(E) : Matching mark (stamping)

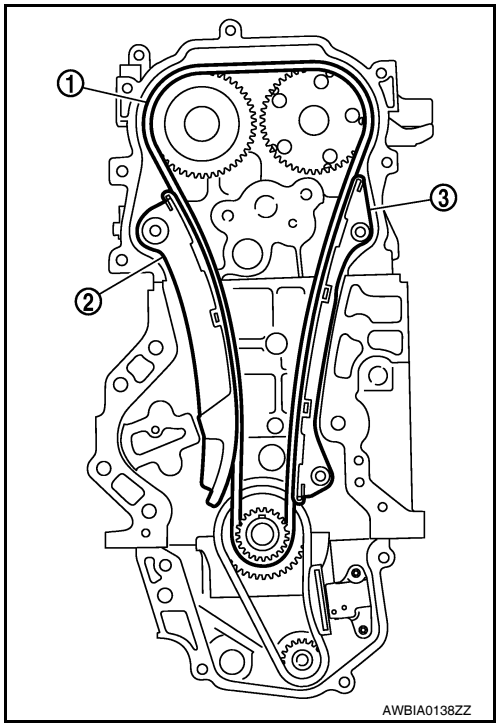
NOTE:
*: There are 2 outer grooves in camshaft sprocket (INT). The wider one is a matching mark.
- If these matching marks are not aligned, rotate the camshaft slightly by holding the hexagonal portion to correct the position.

CAUTION:
Check matching mark position of each sprocket and timing chain again after installing the timing chain.

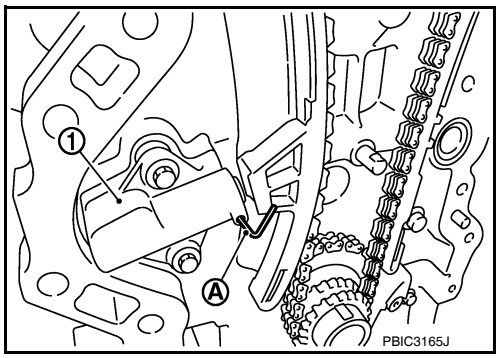


7. Install the timing chain tension guide (3) and the timing chain slack guide (2).

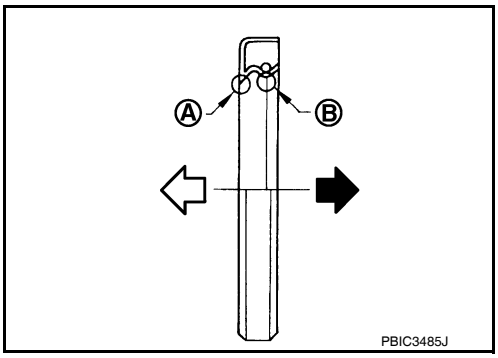
(1) : Timing chain



8. Install timing chain tensioner (1).
   1. Fix the plunger at the most compressed position using a stopper pin (A), and then install it.
   2. Securely pull out the stopper pin after installing the timing chain tensioner.

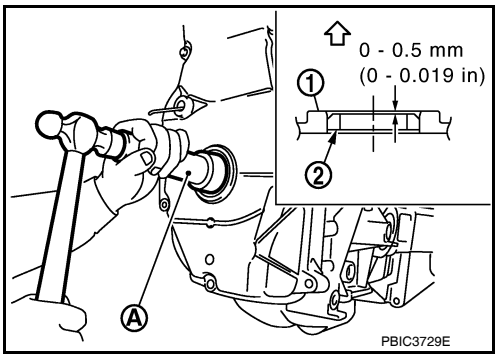


9. Check matching mark position of timing chain and each sprocket again.
10. Apply new engine oil to new front oil seal joint surface.
11. Install front oil seal so that each seal lip is oriented as shown.



(A) : Dust seal lip
(B) : Oil seal lip
⇦ : Engine front
⬅ : Engine rear

- Install front oil seal (2) using a suitable tool with outer diameter 57 mm (2.24 in) and inner diameter 45 mm (1.77 in) (A) to the dimension shown.



(1) : Front cover
⇦ : Engine front

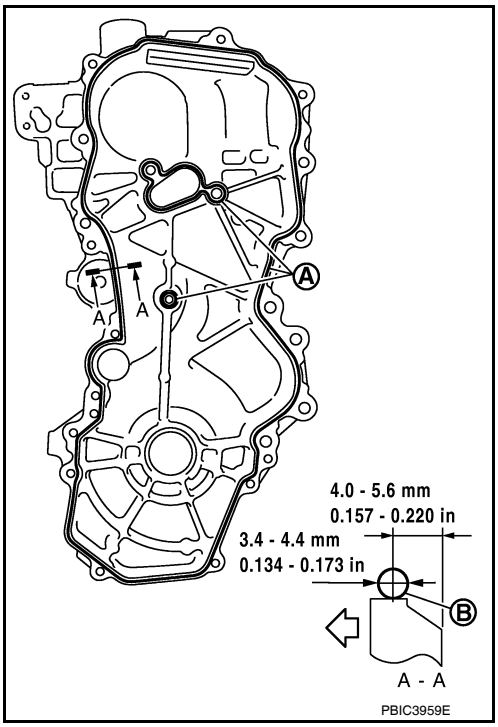
Within 0.3 mm (0.012 in) toward engine front
Within 0.5 mm (0.020 in) toward engine rear

CAUTION:
- **Do not reuse front oil seal.**
- **Be careful not to damage front cover and crankshaft.**
- **Press-fit oil seal straight to avoid causing burrs or tilting.**
- **Do not touch grease applied onto oil seal lip.**

12. Install new O-ring to cylinder block.
CAUTION:
- **Do not reuse O-ring.**
- **Be sure O-rings are aligned properly.**

13. Apply the sealant without breaks to the specified location using Tool.
Use Genuine Silicone RTV Sealant or equivalent. Refer to **GI-42, "Recommended Chemical Product and Sealant"****.**

Tool number WS39930000 (–)



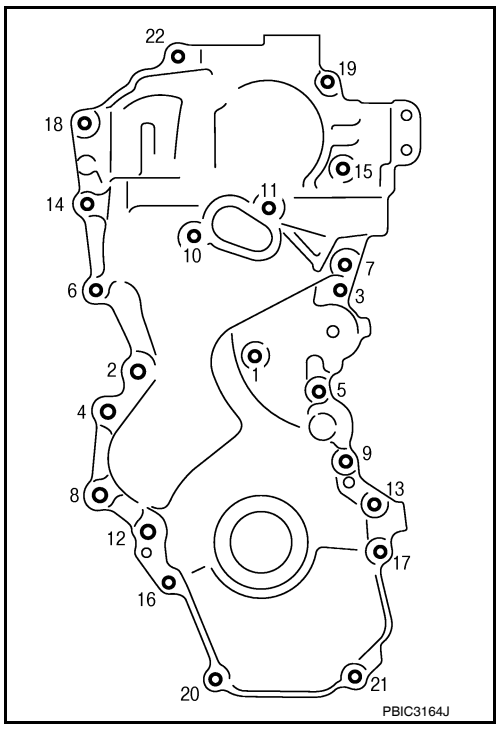
(A) : Liquid gasket application area
(B) : Liquid gasket
⇦ : Engine outside

14. Make sure that matching marks of timing chain and each sprocket are still aligned.
CAUTION:
- **Make sure O-ring on cylinder block is correctly installed.**
- **Be careful not to damage front oil seal by interference with front end of crankshaft.**

15. Install front cover, and tighten bolts in two stages to specified torque in numerical order as shown.
CAUTION:
- **Installation should be done within 5 minutes after liquid gasket application.**
- **Be sure to wipe off any excessive liquid gasket leaking.**

NOTE:
Installation position of bolts is as shown.

M6 bolts	:	No. 1
M10 bolts	:	No. 6, 7, 10, 11, 14
M12 bolts	:	No. 2, 4, 8, 12
M8 bolts	:	Except the above



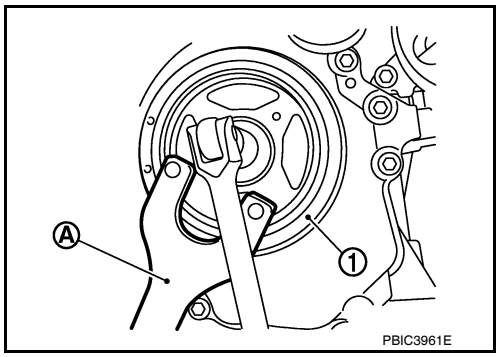
16. Install crankshaft pulley using the following procedure.

a. Install crankshaft pulley.
CAUTION:
- **Do not damage front oil seal lip section.**
- **If needed use a plastic hammer, tap on its center portion (not circumference) to seat crankshaft pulley.**

b. Apply new engine oil to thread and seat surfaces of crankshaft pulley bolt.

c. Secure crankshaft pulley (1) using Tool (A).

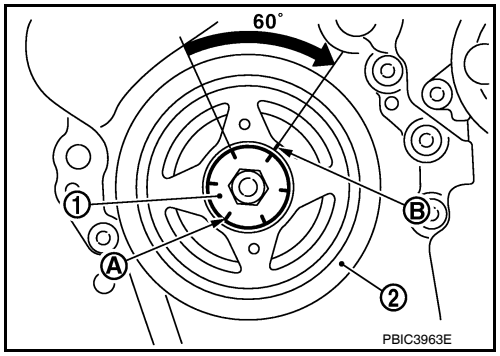
Tool Number : KV10109300 (—)



d. Tighten crankshaft pulley bolt in two steps.

Step 1 : 29.4 N·m (3.0 kg-m, 22 ft-lb)
Step 2 : 60° clockwise

- For angle tightening, put a paint mark (B) on crankshaft pulley (2), matching with any one of six easy to recognize angle marks (A) on crankshaft pulley bolt flange (1).
- Turn 60 degrees clockwise (angle tightening).
- Check the tightening angle with movement of one angle mark.



e. Make sure that crankshaft rotates clockwise smoothly.

17. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330510

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

  NOTE:

  If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

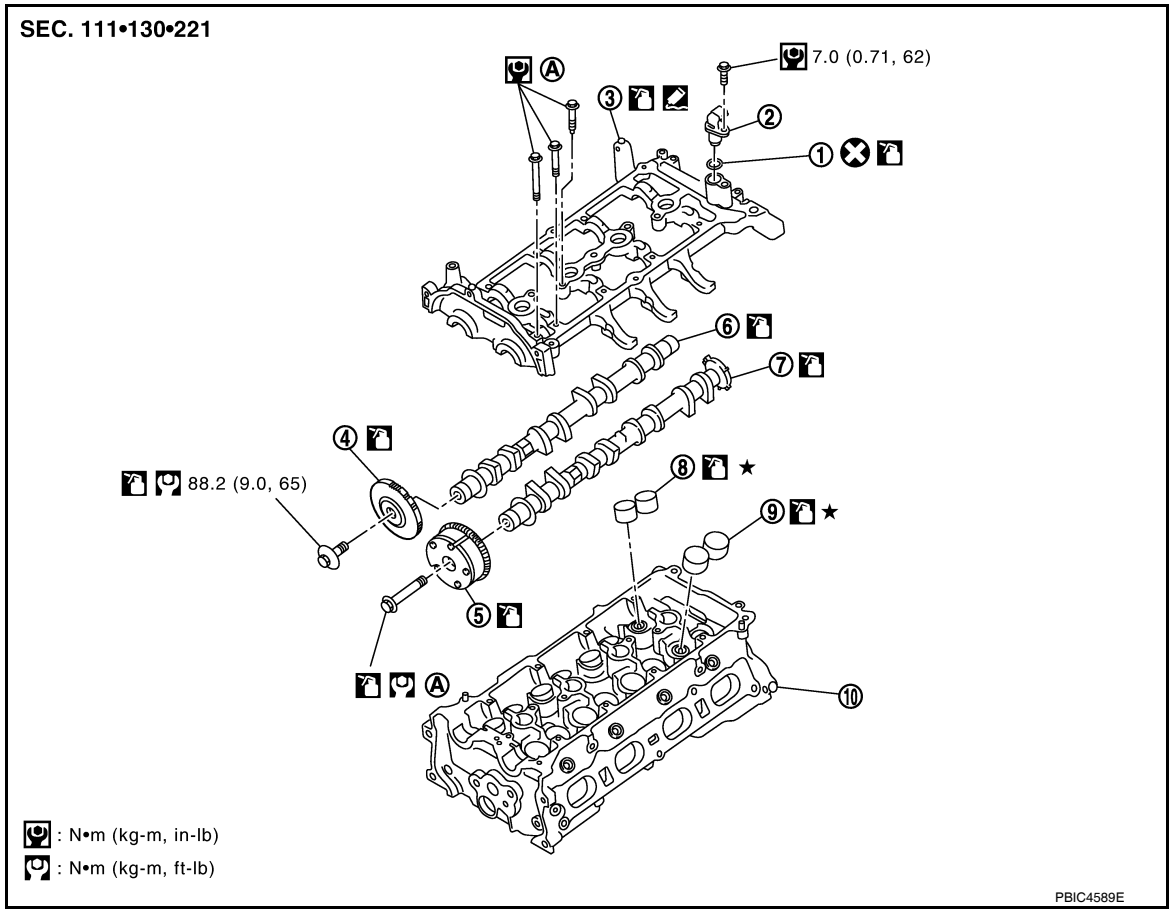
Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

CAMSHAFT

Component

INFOID:0000000007330511



1. O-ring
2. Camshaft position sensor (PHASE)
3. Camshaft bracket
4. Camshaft sprocket (EXH)
5. Camshaft sprocket (INT)
6. Camshaft (EXH)
7. Camshaft (INT)
8. Valve lifter (EXH)
9. Valve lifter (INT)
10. Cylinder head

A. Refer to EM-51.

Removal and Installation

INFOID:0000000007330512

WARNING:

- **Put a "CAUTION: FLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

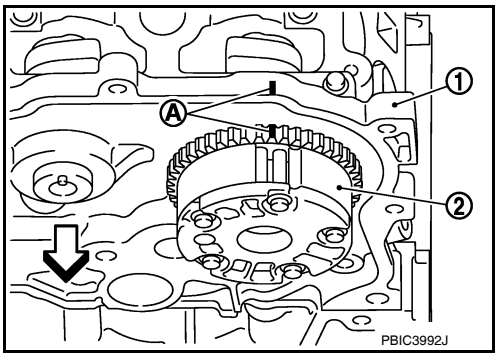
REMOVAL

1. Release the fuel pressure. Refer to EC-89, "Fuel Pressure Check".
2. Disconnect negative battery terminal. Refer to SC-7, "Removal and Installation".
3. Remove front RH wheel. Refer to WT-7, "Adjustment".
4. Remove front fender protector (RH). Refer to EI-24.
5. Drain engine coolant. Refer to CO-11.
   NOTE:
   Perform this step when engine is cold.

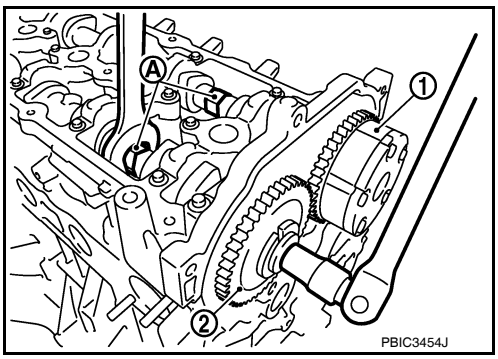
6. Remove the following parts.
   - Intake manifold. Refer to EM-18.
   - Rocker cover. Refer to EM-32.
   - Fuel tube and fuel injector assembly. Refer to EM-35.
   - Front cover, timing chain and related parts. Refer to EM-40.
   - Generator. Refer to SC-25, "Removal and Installation".
7. Remove camshaft position sensor (PHASE) from camshaft bracket.
   CAUTION:
   - **Handle carefully to avoid dropping and shocks.**
   - **Do not disassemble.**
   - **Do not allow metal powder to adhere to magnetic part at sensor tip.**
   - **Do not place sensor in a location where it is exposed to magnetism.**
8. Put matching marks (A) on the camshaft sprocket (INT) (2) and the camshaft bracket (1) as shown.

   ⇦ : Engine front

   NOTE:
   It prevents the knock pin of the camshaft (INT) from engaging with the incorrect pin hole when installing the camshaft sprocket (INT).

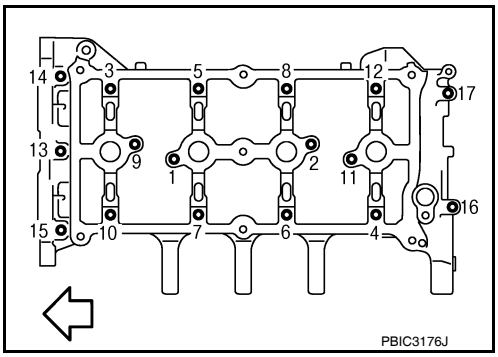


9. Remove camshaft sprockets (INT) (1) and (EXH) (2).
   - Secure hexagonal part (A) of camshaft with a wrench. Loosen camshaft sprocket bolts and remove camshaft sprocket.
     CAUTION:
     - **Do not rotate crankshaft or camshaft while timing chain is removed. It causes interference between valve and piston.**
     - **Do not loosen the bolts with securing anything other than the camshaft hexagonal part or with tensioning the timing chain.**

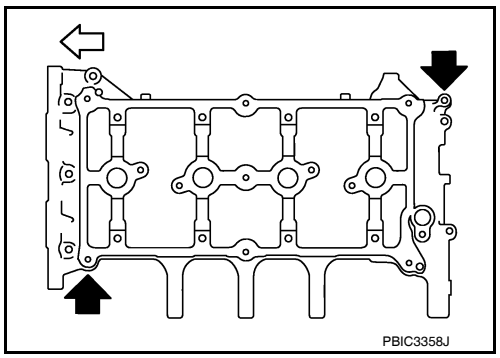


10. Loosen bolts in reverse order as shown.

    ⇦ : Engine front



11. Cut liquid gasket by prying the position (⬅) shown, and then remove the camshaft bracket.



⇦ : Engine front

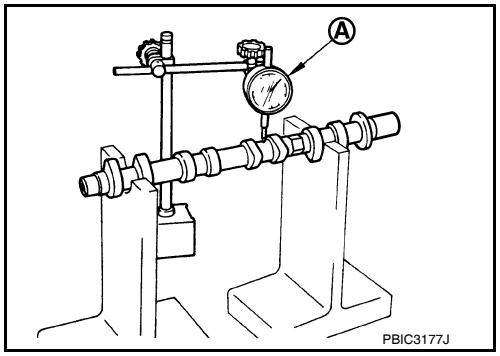
CAUTION:
- **Be careful not to damage the mating surface.**
- **A more adhesive liquid gasket is applied during initial assembly. Pry only at positions shown.**

12. Remove camshafts.
13. Remove valve lifters, if necessary.
NOTE:
Identify installed positions, and store them without mixing them up.

INSPECTION AFTER REMOVAL

Camshaft Runout

1. Put V-block on a precise flat table, and support No. 2 and 5 journal of camshaft.
CAUTION:
Do not support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Set dial indicator (A) vertically to No. 3 journal.
3. Turn camshaft to one direction with hands, and measure the camshaft runout on dial indicator. (Total indicator reading)

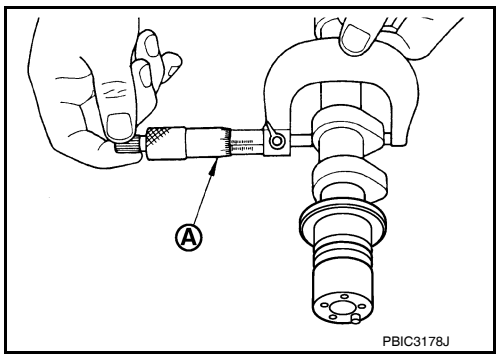


Standard : Less than 0.02 mm (0.0008 in).
Limit : 0.05 mm (0.0020 in)

4. If it exceeds the limit, replace camshaft.

Camshaft Cam Height

1. Measure the camshaft cam height with a micrometer (A).



Standard:
Intake : 44.605 - 44.795 mm (1.7560 - 1.7635 in)
Exhaust : 43.175 - 43.365 mm (1.6997 - 1.7072 in)

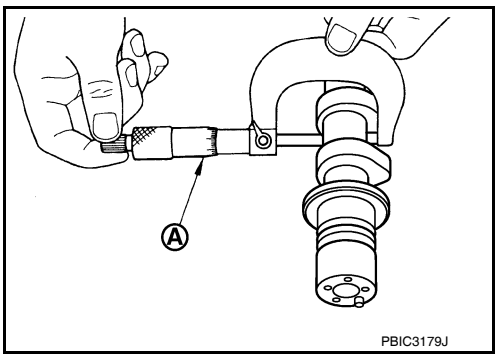
Limit:
Intake : 44.405 mm (1.7482 in)
Exhaust : 42.975 mm (1.6919 in)

2. If it exceeds the limit, replace camshaft.

Camshaft Journal Oil Clearance

CAMSHAFT JOURNAL OUTER DIAMETER

Measure the outer diameter of camshaft journal with a micrometer (A).



Standard:

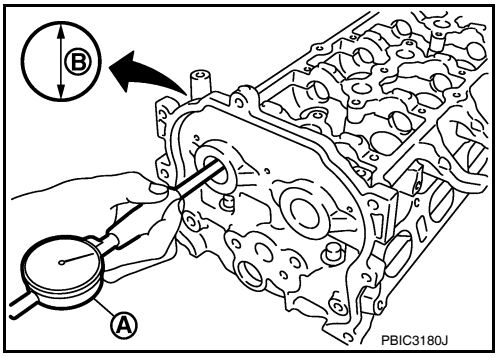
No. 1 : 27.935 - 27.955 mm (1.0998 - 1.1006 in)

No. 2, 3, 4, 5 : 24.950 - 24.970 mm (0.9823 - 0.9831 in)

CAMSHAFT BRACKET INNER DIAMETER

- Tighten camshaft bracket bolts with specified torque.
- Measure the inner diameter of camshaft bracket with a bore gauge (A).

(B) : Measuring direction of inner diameter



Standard:

No. 1 : 28.000 - 28.021 mm (1.1024 - 1.1032 in)

No. 2, 3, 4, 5 : 25.000 - 25.021 mm (0.9843 - 0.9851 in)

CAMSHAFT JOURNAL OIL CLEARANCE

- (Oil clearance) = (Camshaft bracket inner diameter) – (Camshaft journal diameter)

Standard:

No. 1 : 0.045 - 0.086 mm (0.0018 - 0.0034 in)

No. 2, 3, 4, 5 : 0.030 - 0.071 mm (0.0012 - 0.0028 in)

Limit:

: 0.15 mm (0.0059 in)

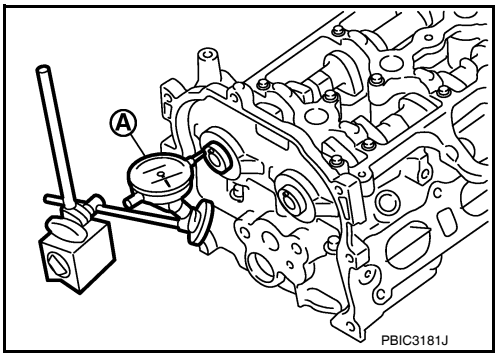
- If it exceeds the limit, replace camshaft or cylinder head, or both.

NOTE:

Camshaft bracket cannot be replaced as a single part, because it is machined together with cylinder head. Replace whole cylinder head assembly.

Camshaft End Play

1. Install camshaft in cylinder head.
2. Install dial indicator in thrust direction on front end of camshaft. Read the end play of dial indicator (A) when camshaft is moved forward/backward (in direction to axis).



Standard : 0.075 - 0.153 mm (0.0030 - 0.0060 in)

Limit : 0.24 mm (0.0094 in)

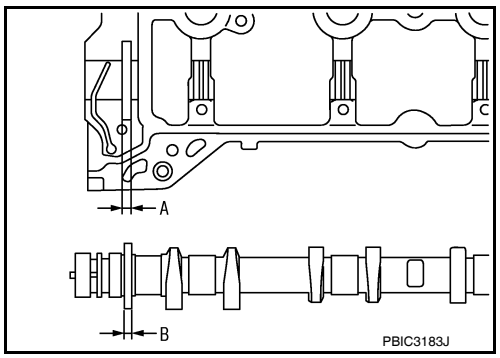
- Measure the following parts if out of the standard.
- Dimension (A) for groove of cylinder head No. 1 journal

Standard : 4.000 - 4.030 mm (0.1575 - 0.1587 in)

- Dimension (B) for camshaft flange

Standard : 3.877 - 3.925 mm (0.1526 - 0.1545 in)

- Apply the standards above, and then replace camshaft and/or cylinder head, if necessary.

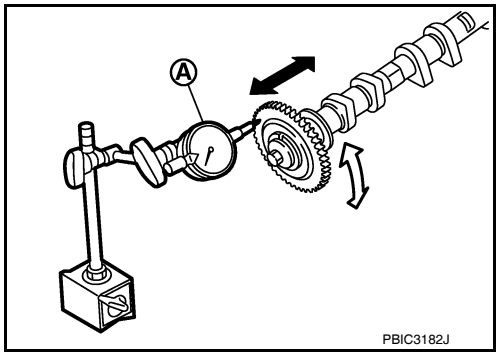


Camshaft Sprocket Runout

1. Put V-block on precise flat table, and support No. 2 and 5 journals of camshaft.
   CAUTION:
   Do not support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.
2. Measure the camshaft sprocket runout with a dial indicator (A). (Total indicator reading)

Limit : 0.15 mm (0.0059 in)

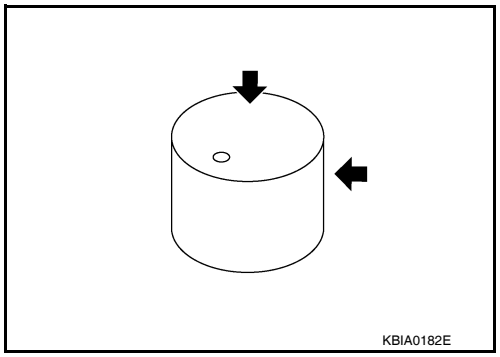
- If it exceeds the limit, replace camshaft sprocket.



Valve Lifter

Check if surface of valve lifter has any wear or cracks.

- If anything above is found, replace valve lifter. Refer to EM-59, "Valve Clearance".



Valve Lifter Clearance

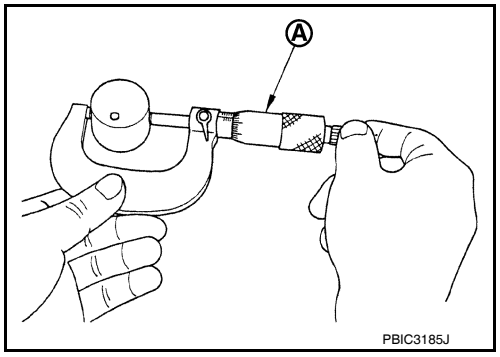
VALVE LIFTER OUTER DIAMETER

- Measure the outer diameter of valve lifter with a micrometer (A).

Standard:

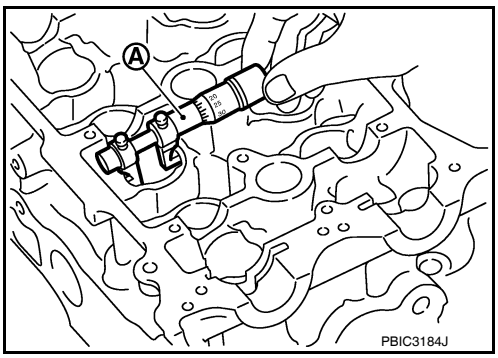
Intake : 33.977 - 33.987 mm (1.3377 - 1.3381 in)

Exhaust : 29.977 - 29.987 mm (1.1802 - 1.1806 in)



VALVE LIFTER HOLE DIAMETER

Measure the diameter of valve lifter hole of cylinder head with an inside micrometer (A).



Standard:

Intake : 34.000 - 34.021 mm (1.3386 - 1.3394 in)

Exhaust : 30.000 - 30.021 mm (1.1811 - 1.1819 in)

VALVE LIFTER CLEARANCE

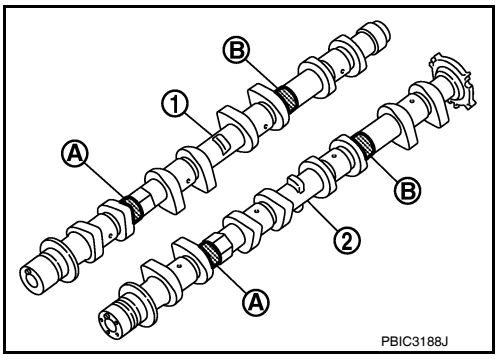
- (Valve lifter clearance) = (Valve lifter hole diameter) – (Valve lifter outer diameter)

Standard: 0.013 - 0.044 mm (0.0005 - 0.0017 in)

- If out of the standard, referring to the each standard of valve lifter outer diameter and valve lifter hole diameter, replace either or both valve lifter and cylinder head.

INSTALLATION

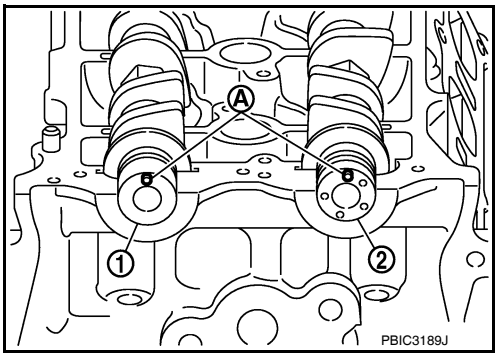
1. Install valve lifters.
   - Install them in the original positions.
2. Install camshafts.
   - Clean camshaft journal to remove any foreign material.
   - Distinguish between the intake and the exhaust by looking at the different shapes of the front and rear ends of the camshaft or using the identification colors (A) and (B).



(1) : Camshaft (EXH)
(2) : Camshaft (INT)

Identification color	A	B
Camshaft (EXH)	—	Yellow
Camshaft (INT)	Yellow	—

- Install camshafts so that camshaft dowel pins (A) on the front side are positioned as shown.



(1) : Camshaft (EXH)
(2) : Camshaft (INT)

NOTE:
Though camshaft does not stop at the positions as shown, for the placement of cam nose, it is generally accepted camshaft is placed for the same direction as shown.

3. Remove foreign material completely from camshaft bracket backside and from cylinder head installation face.
4. Apply liquid gasket (A) to camshaft bracket as shown.

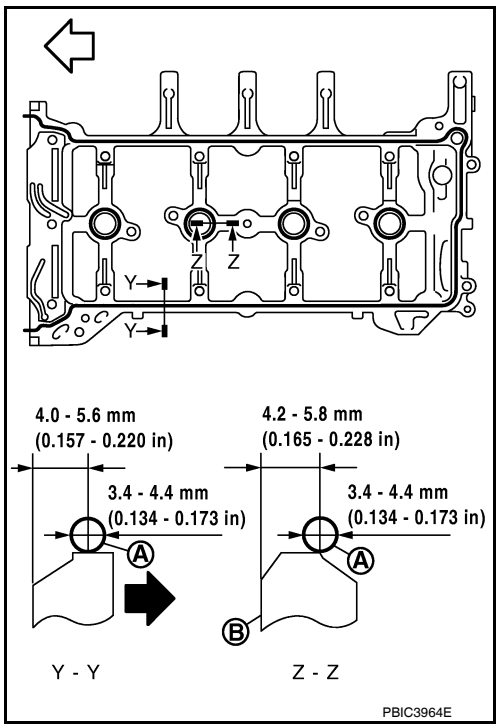
Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

Tool number WS39930000 (–)

(B) : Plug hole inner wall

⇦ : Engine front

⬅ : Engine outside

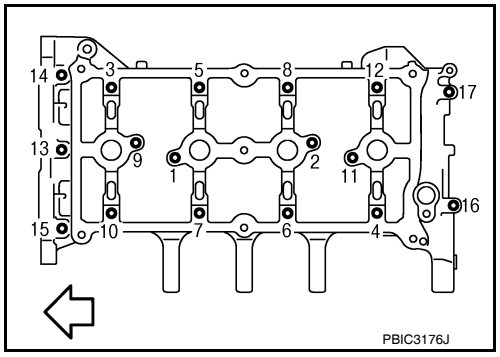


5. Install camshaft bracket bolts in three stages in numerical order as shown.

⇦ : Engine front

- There are two types of bolts. Locate the bolts as shown.

M6 bolts [thread length: 57.5 mm (2.264 in)]
: 13, 14 and 15
M6 bolts [thread length: 35.00 mm (1.378 in)]
: Except the above



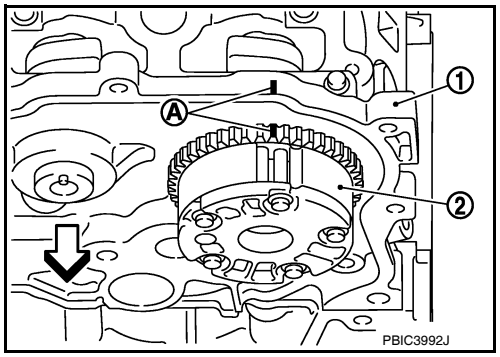
6. Tighten all bolts in numerical order in three steps.

Step 1 : 1.96 N·m (0.20 kg-m, 17 in-lb)
Step 2 : 5.88 N·m (0.60 kg-m, 52 in-lb)
Step 3 : 9.5 N·m (0.97 kg-m, 84 in-lb)

7. Install the camshaft sprocket (INT) (2) to the camshaft (INT).
NOTE:
Align the matching mark (A) applied during removal. Securely align the knock pin and the pin hole, and then install them.

(1) : Camshaft bracket

⇦ : Engine front

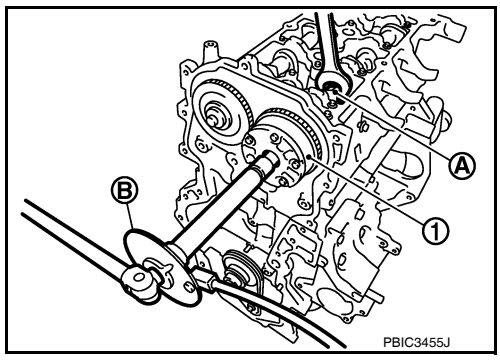


8. Tighten camshaft (INT) sprocket bolt.

Camshaft sprocket bolt (INT) : 35.0 N·m (3.6 kg-m, 26 ft-lb)

NOTE:
Secure the hexagonal part of camshaft (INT) using wrench to tighten bolt.

9. Turn 67 degrees clockwise (angle tightening) using Tool (B).

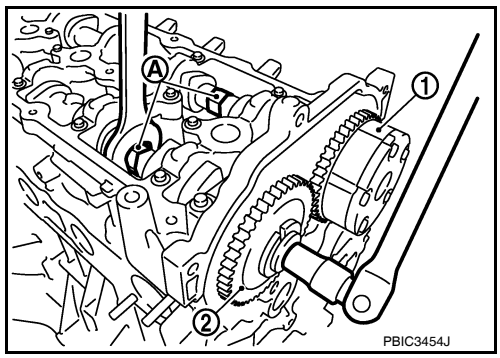


(1) : Camshaft sprocket (INT)
(A) : Camshaft (INT) hexagonal part

CAUTION:
Do not judge by visual inspection without an angle wrench.

Tool number : KV10112100 (BT-8653-A)

10. Install camshaft sprocket (EXH) (2).



(1) : Camshaft sprocket (INT)

Camshaft sprocket bolt (EXH) : 88.2 N·m (9.0 kg-m, 65 ft-lb)

NOTE:
Secure the hexagonal part (A) of camshaft (EXH) using wrench to tighten bolt.

11. Install timing chain and related parts. Refer to EM-40.
12. Inspect and adjust valve clearance. Refer to EM-59, "Valve Clearance".
13. Installation of the remaining components is in the reverse order of removal.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
  NOTE:
  If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

Inspection of Camshaft Sprocket (INT) Oil Groove

CAUTION:

- **Perform this inspection only when DTC P0011 is detected in self-diagnostic results of CONSULT and it is directed according to inspection procedure of EC section. Refer to EC-153, "Diagnosis Procedure".**
- **Check when engine is cold so as to prevent burns from the splashing engine oil.**

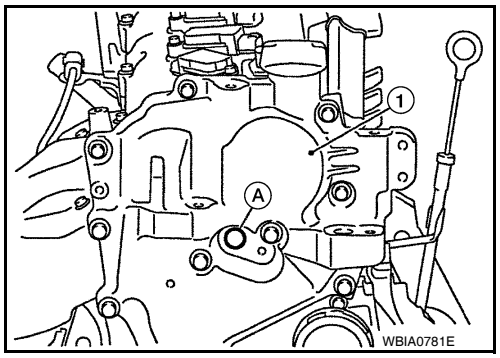
1. Check engine oil level. Refer to LU-8, "Inspection".
2. Perform the following procedure so as to prevent the engine from being unintentionally started while checking.

a. Remove intake manifold. Refer to EM-18, "Component".

b. Disconnect ignition coil and injector harness connectors.

3. Remove intake valve timing control solenoid valve. Refer to EM-40, "Component".
4. Clean the mating area of intake valve timing control solenoid valve. Insert a clean shop cloth (with no oil adhesion) into the oil hole (A) of the cylinder head.

(1) : Front cover



5. Install engine mounting bracket (RH), engine mounting insulator, and torque rod (RH) under the Step 4 condition. (With intake valve timing control solenoid valve removed, and a shop cloth inserted into the oil hole.) Refer to EM-78, "Component".
6. Crank engine, and then make sure that engine oil comes out from intake valve timing control solenoid valve hole (A). End cranking after checking.
   - Check engine oil leakage by oil amount adhered to the shop cloth inserted into the oil hole.

   WARNING:
   - **Be careful not to touch rotating parts (drive belts, idler pulley, and crankshaft pulley, etc.).**
   - **Prevent splashing by using a shop cloth so as to prevent the worker from injury from engine oil and so as to prevent engine oil contamination.**

   CAUTION:
   - **Do not perform cranking without installing right engine mount bracket, right engine mount insulator, and right torque rod.**
   - **Prevent splashing by using a shop cloth so as to prevent engine oil from being splashed to engine and vehicle. Especially, be careful not to apply engine oil to rubber parts of drive belts, engine mounting insulator, etc. Wipe engine oil off immediately if it is splashed.**
7. Perform the following inspection if engine oil does not come out from intake valve timing control solenoid valve oil hole of the cylinder head.
   - Remove oil filter (for intake valve timing control), and then clean it. Refer to EM-51, "Component".
   - Clean oil groove between oil strainer and intake valve timing control solenoid valve. Refer to LU-7, "Lubrication Circuit".
8. Remove components between intake valve timing control solenoid valve and camshaft sprocket (INT), and then check each oil groove for clogging.
   - Clean oil groove if necessary. Refer to LU-7, "Lubrication Circuit".
9. Installation of the remaining components is in the reverse order of removal

Valve Clearance

INFOID:0000000007330513

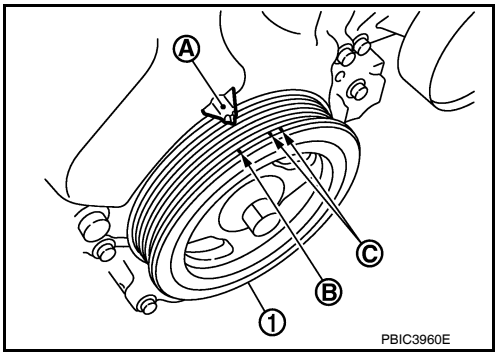
INSPECTION

Perform inspection as follows after removal, installation or replacement of camshaft or valve-related parts, or if there is unusual engine conditions regarding valve clearance.

1. Remove rocker cover. Refer to EM-32.
2. Measure the valve clearance with the following procedure:

a. Set No. 1 cylinder at TDC of its compression stroke.
   - Rotate crankshaft pulley (1) clockwise and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

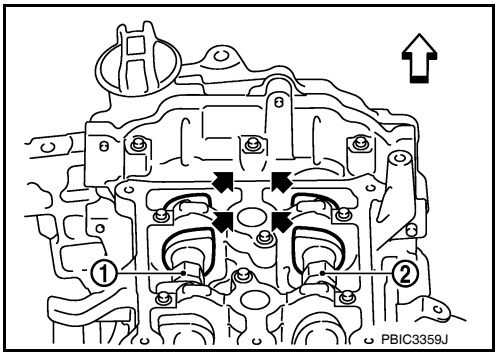
(C) : White paint mark (Not use for service)



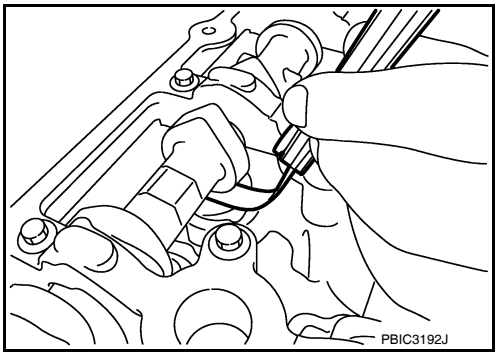
- At the same time, make sure that both intake and exhaust cam noses of No. 1 cylinder face inside (⬅) as shown.

(1) : Camshaft (INT)
(2) : Camshaft (EXH)
⇦ : Engine front

- If they do not face inside, rotate crankshaft pulley once more (360 degrees) and align as shown.



b. Use a feeler gauge, measure the clearance between valve lifter and camshaft.



Valve clearance:

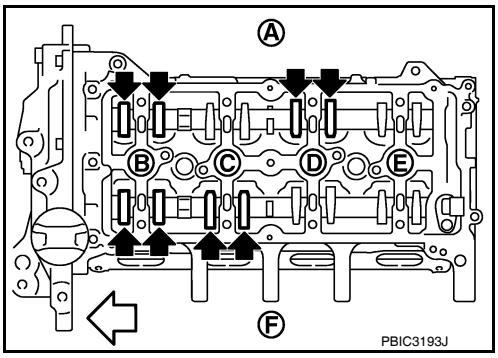
Unit: mm (in)

	Cold	Hot * (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

- By referring to the figure, measure the valve clearances at locations marked × as shown in the table below [locations indicated with black arrow (⬅)] with a feeler gauge.
- No. 1 cylinder compression TDC

Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 1 cylinder at compression TDC	EXH	×		×	
	INT	×	×		



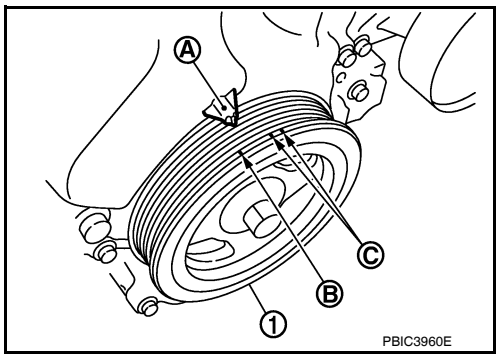
(A) : Exhaust side
(B) : No.1 cylinder
(C) : No.2 cylinder
(D) : No.3 cylinder
(E) : No.4 cylinder

(F) : Intake side

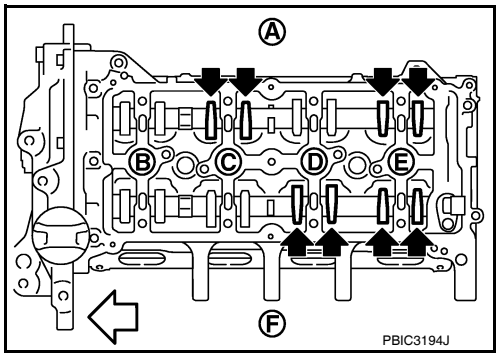
⇦ : Engine front

c. Set No.4 cylinder at TDC of its compression stroke.
- Rotate crankshaft pulley (1) one revolution (360 degrees) and align TDC mark (no paint) (B) to timing indicator (A) on front cover.

(C) : White paint mark (Not use for service)



- By referring to the figure, measure the valve clearance at locations marked × as shown in the table below [locations indicated with black arrow (⬅)] with a feeler gauge.
- No. 4 cylinder compression TDC



Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 4 cylinder at compression TDC	EXH		×		×
	INT			×	×

(A) : Exhaust side

(B) : No.1 cylinder

(C) : No.2 cylinder

(D) : No.3 cylinder

(E) : No.4 cylinder

(F) : Intake side

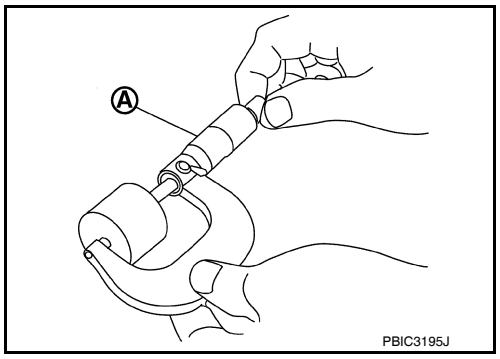
⇦ : Engine front

3. If out of standard, perform adjustment.

ADJUSTMENT

- Perform adjustment depending on selected head thickness of valve lifter.

1. Remove camshaft. Refer to EM-51, "Removal and Installation".
2. Remove valve lifters at the locations that are out of the standard.
3. Measure the center thickness of the removed valve lifters with a micrometer (A).



4. Use the equation below to calculate valve lifter thickness for replacement.

Valve lifter thickness calculation: $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

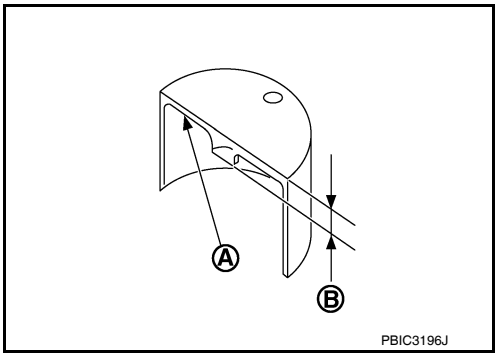
C_1 = Measured valve clearance

C_2 = Standard valve clearance:

Intake : 0.30 mm (0.012 in)

Exhaust : 0.33 mm (0.013 in)

- Thickness of new valve lifter (B) can be identified by stamp mark (A) on the reverse side (inside the cylinder).
  Stamp mark “302” indicates 3.02 mm (0.1189 in) in thickness.



NOTE:
Available thickness of valve lifter: 26 sizes range 3.00 to 3.50 mm (0.1181 to 0.1378 in) in steps of 0.02 mm (0.0008 in) (when manufactured at factory). Refer to EM-111, "Standard and Limit".

5. Install the selected valve lifter.
6. Install camshaft. Refer to EM-51, "Removal and Installation".
7. Install timing chain and related parts. Refer to EM-40.
8. Manually rotate crankshaft pulley a few rotations.
9. Make sure that the valve clearances is within the standard.
10. Installation of the remaining components is in the reverse order of removal.

OIL SEAL

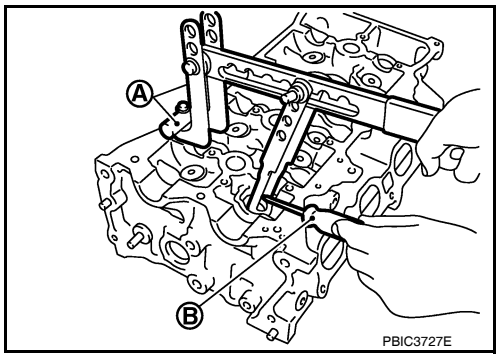
Removal and Installation of Valve Oil Seal

INFOID:0000000007330514

REMOVAL

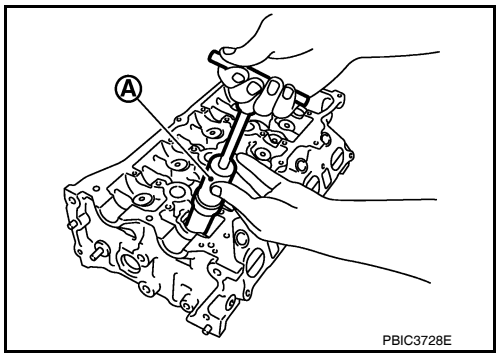
1. Remove camshafts. Refer to EM-51, "Component".
2. Remove valve lifters. Refer to EM-51.
3. Rotate crankshaft, and set piston whose valve oil seal is to be removed to TDC. This will prevent valve from dropping into cylinder.
   CAUTION:
   When rotating crankshaft, be careful to avoid scarring front cover with timing chain.
4. Remove valve collet.
   • Compress valve spring using Tool, the attachment and the adapter (A). Remove valve collet with a suitable magnet hand (B).
   CAUTION:
   When working, be careful not to damage valve lifter holes.

   Tool number : KV101092S0 (J-26336-B)



5. Remove valve spring retainer, valve spring and valve spring seat.
6. Remove valve oil seal using Tool (A).

   Tool number :KV10107902 (J-38959)

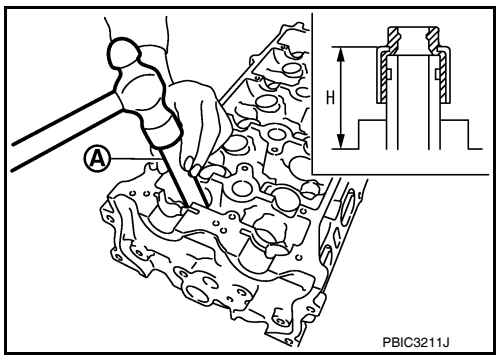


INSTALLATION

1. Apply new engine oil to valve oil seal joint surface and seal lip.
2. Press in valve oil seal to the height (H) shown using Tool (A).
   CAUTION:
   Do not reuse valve oil seal.

   Height (H) : 15.1 - 15.7 mm (0.594 - 0.618 in)

   Tool number : KV10115600 (J-38958)



3. Installation of the remaining components is in the reverse order of removal.

Removal and Installation of Front Oil Seal

INFOID:0000000007330515

REMOVAL

1. Remove the following parts.
   • RH front wheel and tire. Refer to WT-7, "Adjustment".

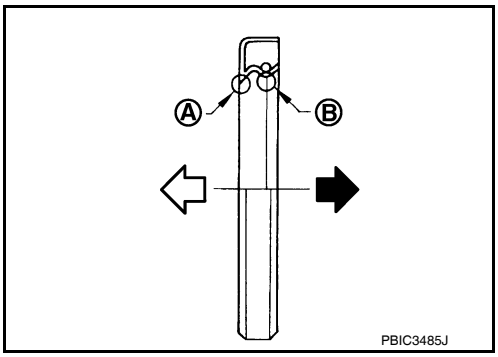
- Front fender protector (RH). Refer to EI-24.
- Drive belt. Refer to EM-13, "Component".
- Crankshaft pulley. Refer to EM-40, "Component".

2. Remove front oil seal using a suitable tool.
CAUTION:
Be careful not to damage front cover and crankshaft.

INSTALLATION

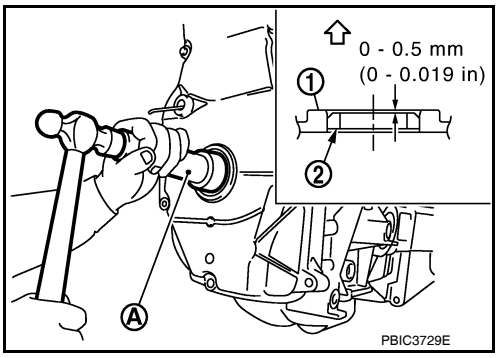
1. Apply new engine oil to new front oil seal joint surface and seal lip.
2. Install front oil seal so that each seal lip is oriented as shown.

(A) : Dust seal lip
(B) : Oil seal lip
⇦ : Engine front
⬅ : Engine rear



- Install front oil seal (2) using a suitable tool with outer diameter 57 mm (2.24 in) and inner diameter 45 mm (1.77 in) (A) to the dimension as shown.

(1) : Front cover
⇦ : Engine front



Within 0.3 mm (0.012 in) toward engine front
Within 0.5 mm (0.020 in) toward engine rear

CAUTION:
- **Do not reuse front oil seal.**
- **Be careful not to damage front cover and crankshaft.**
- **Press-fit oil seal straight to avoid causing burrs or tilting.**
- **Do not touch grease applied on oil seal lip.**

3. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330516

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

Removal and Installation of Rear Oil Seal

INFOID:0000000007330517

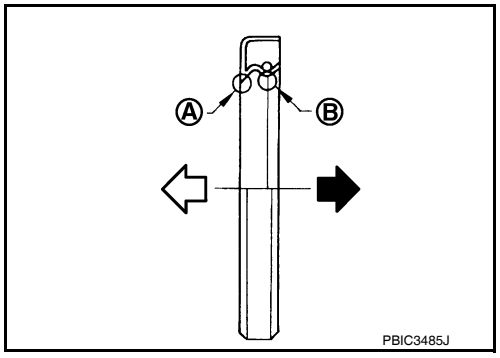
REMOVAL

1. Remove transaxle assembly. Refer to MT-18, "Removal and Installation" (M/T models), AT-230 (A/T models), CVT-184, "Removal and Installation" (CVT models).
2. Remove clutch cover and clutch disc (M/T models). Refer to CL-14.
3. Remove drive plate (A/T or CVT models) or flywheel (M/T models). Refer to EM-83, "Component".
4. Remove rear oil seal with a suitable tool.
   CAUTION:
   Be careful not to damage crankshaft and cylinder block.

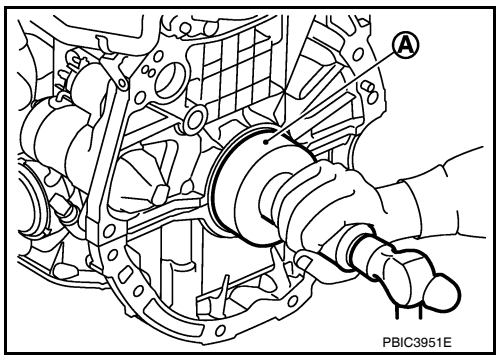
INSTALLATION

1. Apply the liquid gasket lightly to entire outside area of new rear oil seal.
   Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".
2. Install rear oil seal so that each seal lip is oriented as shown.

(A) : Dust seal lip
(B) : Oil seal lip
⇦ : Engine outside
⬅ : Engine inside



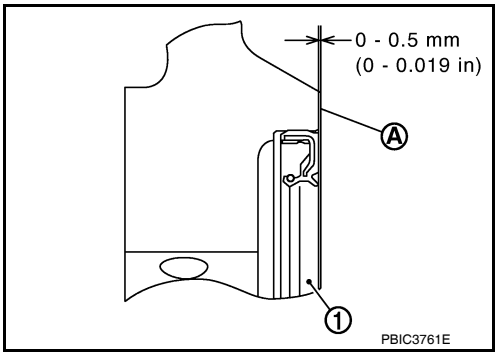
- Install rear oil seal with a suitable tool with an outer diameter 115 mm (4.53 in) and inner diameter 90 mm (3.54 in) (A).
  CAUTION:
  - **Do not reuse rear oil seal.**
  - **Be careful not to damage crankshaft and cylinder block.**
  - **Press-fit oil seal straight to avoid causing burrs or tilting.**
  - **Do not touch grease applied onto oil seal lip.**



- Install rear oil seal (1) to the position as shown.

(A) : Rear end surface of cylinder block

NOTE:
The standard surface of the dimension is the rear end surface of cylinder block.



3. Installation of the remaining components is in the reverse order of removal.

Inspection

INFOID:0000000007330518

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
  NOTE:
  If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

CYLINDER HEAD

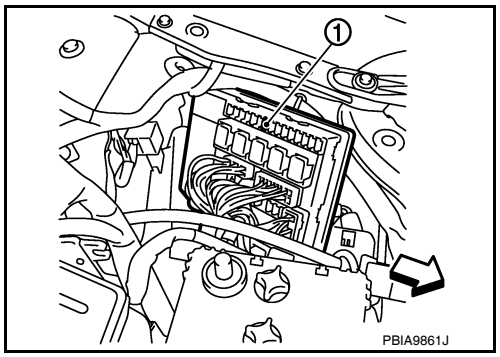
On-Vehicle Service

INFOID:0000000007330519

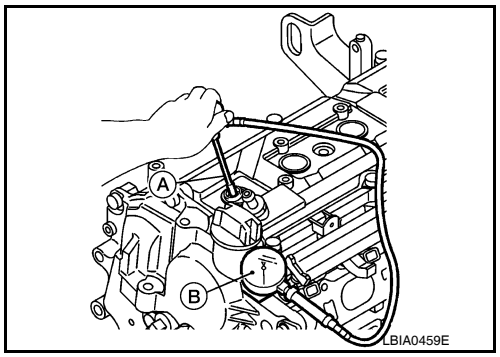
CHECKING COMPRESSION PRESSURE

1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure. Refer to EC-89, "Fuel Pressure Check".
3. Disconnect fuel pump fuse (1) to avoid fuel injection during measurement.

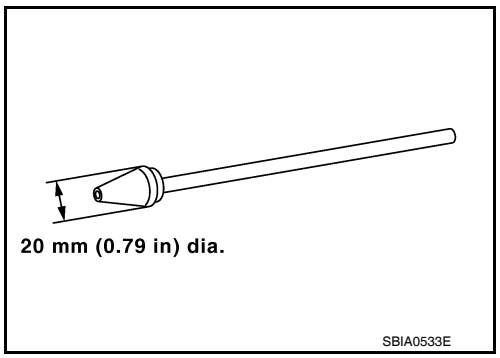
⇦ : Vehicle front



4. Remove ignition coil and spark plug from each cylinder. Refer to EM-32.
5. Connect an engine tachometer (not required in use of CONSULT).
6. Install a suitable compression tester (B) with an adapter (A) onto spark plug hole.



- Use the adapter whose picking up end inserted to spark plug hole is smaller than 20 mm (0.79 in) in diameter. Otherwise, it may be caught by cylinder head during removal.



7. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression pressure:

Unit: kPa (kg/cm^2 psi) /rpm

Standard	Minimum	Differential limit between cylinders
1,500 (15.3, 217.6) / 250	1,200 (12.2, 174) / 250	100 (1.0, 15) / 250

CAUTION:

Always use a fully charged battery to obtain the specified engine speed.

- If the engine speed is out of the specified range, check battery liquid for proper gravity. Check engine speed again with normal battery gravity.

- If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (Valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure the compression pressure again.
- If one cylinder has low compression pressure, pour small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary.
  - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly.
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, cylinder head gasket is leaking. In such a case, replace cylinder head gasket.

8. After inspection is completed, install removed parts.
9. Start the engine, and confirm that the engine runs smoothly.
10. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-92, "Trouble Diagnosis Introduction".

Inspection

INFOID:0000000007330520

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

  NOTE:

  If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

Component

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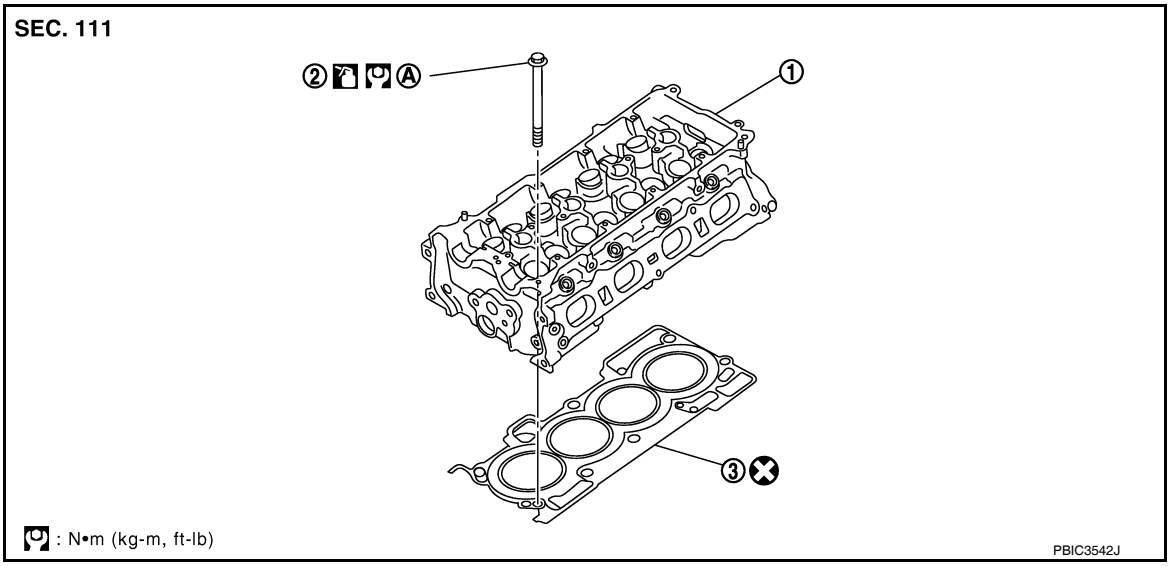


1. Cylinder head assembly
2. Cylinder head bolt
3. Cylinder head gasket

A. Refer to EM-69

Removal and Installation

INFOID:0000000007330522

WARNING:
- **Put a "CAUTION: FLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

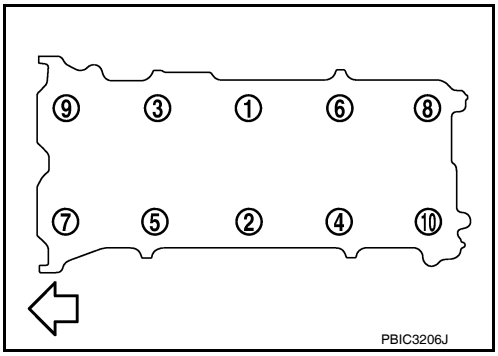
REMOVAL

1. Release the fuel pressure. Refer to EC-89, "Fuel Pressure Check".
2. Drain engine coolant and engine oil. Refer to CO-11 and LU-8.
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant and engine oil on drive belt.**
3. Remove front fender protector (RH). Refer to EI-24.
4. Remove drive belt. Refer to EM-13, "Removal and Installation".
5. Remove the following components and related parts.
   - Exhaust manifold. Refer to EM-22.
   - Intake manifold. Refer to EM-18.
   - Fuel tube and fuel injector assembly. Refer to EM-35.
   - Water outlet. Refer to CO-25.
   - Rocker cover. Refer to EM-32.
   - Front cover, timing chain. Refer to EM-40.
   - Camshaft. Refer to EM-51.

6. Remove cylinder head.
   - Loosen bolts in reverse order as shown.

     ⇦ : Engine front

   - Using TORX socket (size E18), loosen cylinder head bolts.
7. Remove cylinder head gasket.



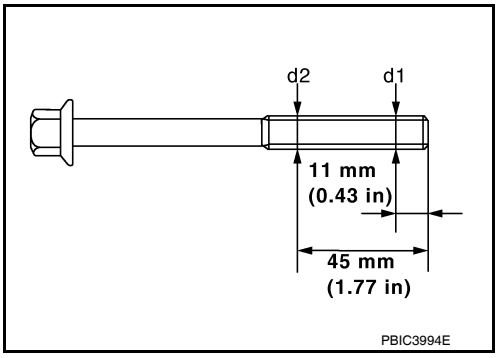
INSPECTION AFTER REMOVAL

Cylinder Head Bolts Outer Diameter

- Cylinder head bolts are tightened by plastic zone tightening method. Whenever the size difference between (d1) and (d2) exceeds the limit, replace them with a new one.

  Limit [(d1) – (d2)]: 0.15 mm (0.0059 in)

- If reduction of outer diameter appears in a position other than (d2), use it as (d2) point.



Cylinder Head Distortion

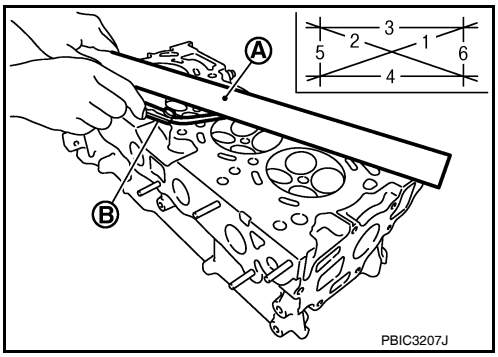
NOTE:

When performing this inspection, cylinder block distortion should be also checked. Refer to EM-100, "Inspection After Disassembly".

1. Wipe off engine oil and remove water scale (like deposit), gasket, sealant, carbon, etc. with a scraper.
   CAUTION:
   Do not allow gasket debris to enter passages for engine oil or engine coolant.
2. At each of several locations on bottom surface of cylinder head, measure the distortion in six directions using straightedge (A) and feeler gauge (B).

   Limit: 0.1 mm (0.004 in)

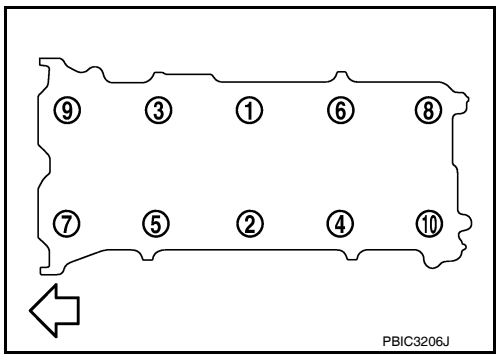
   - If it exceeds the limit, replace cylinder head.



INSTALLATION

1. Install cylinder head gasket.
2. Apply new engine oil to threads and seating surface of bolts.
   CAUTION:
   If cylinder head bolts re-used, check their outer diameters before installation. Follow the "Cylinder Head Bolts Outer Diameter" procedure.

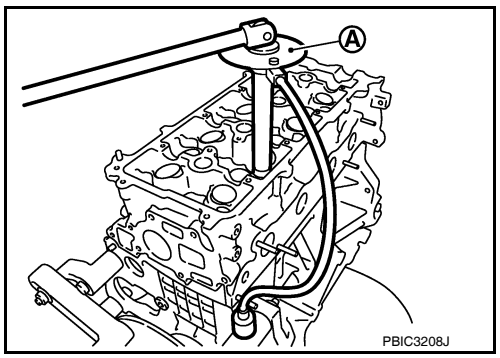
3. Install cylinder head, follow the steps below to tighten cylinder head bolts in numerical order as shown.
⇦: Engine front



Step a : 40 N·m (4.1 kg-m, 30 ft-lb)
Step b : 100° clockwise
Step c : Loosen to 0 N·m in the reverse order of tightening.
Step d : 40 N·m (4.1 kg-m, 30 ft-lb)
Step e : 100° clockwise
Step f : 100° clockwise

CAUTION:
Check and confirm the tightening angle by using Tool (A) or protractor. Do not judge by visual inspection without the tool.

Tool number : KV10112100 (BT-8653-A)



4. Installation of the remaining components is in the reverse order of removal.

Component

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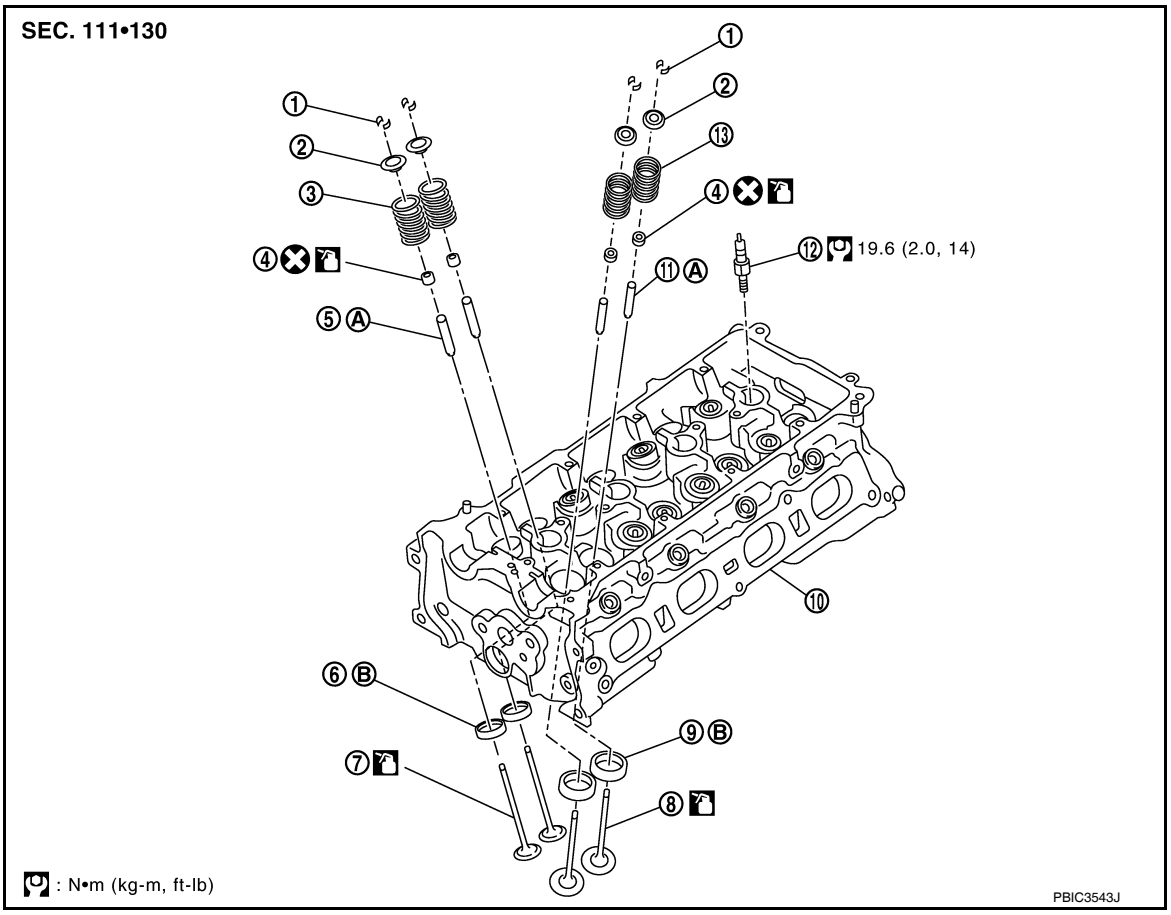


1. Valve collet
2. Valve spring retainer
3. Valve spring (EXH) (with valve spring seat)
4. Valve oil seal
5. Valve guide (EXH)
6. Valve seat (EXH)
7. Valve (EXH)
8. Valve (INT)
9. Valve seat (INT)
10. Cylinder head
11. Valve guide (INT)
12. Spark plug
13. Valve spring (INT) (with valve spring seat)

A. Refer to EM-73
B. Refer to EM-73

Disassembly and Assembly

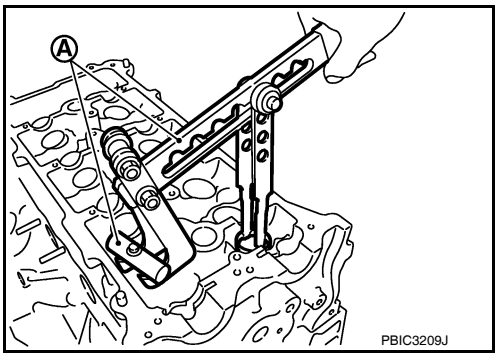
INFOID:0000000007330524

DISASSEMBLY

1. Remove spark plug using suitable tool.
2. Remove valve lifter.
   • Identify installation positions, and store them without mixing them up.
3. Remove valve collet.
   • Compress valve spring using Tool, attachment and adapter (A). Remove valve collet using a suitable magnet hand.

   CAUTION:
   When working, be careful not to damage valve lifter holes.

   Tool number : KV101092S0 (J-26336-B)

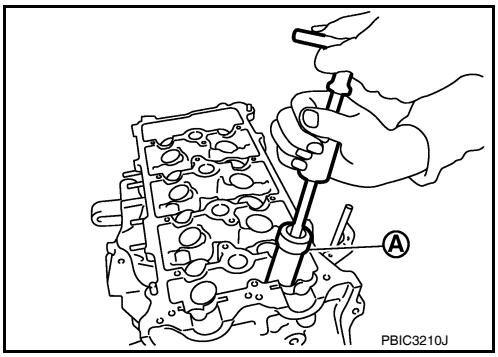


4. Remove valve spring retainer and valve spring (with valve spring seat).

   CAUTION:
   Do not remove valve spring seat from valve spring.
5. Push valve stem to combustion chamber side, and remove valve.

   NOTE:
   Identify installed positions, and store them without mixing them up.
6. Remove valve oil seal using Tool (A).

   Tool number : KV10107902 (J-38959)



7. When valve seat must be replaced, refer to EM-73, "Inspection After Disassembly".
8. When valve guide must be replaced, refer to EM-73, "Inspection After Disassembly".

ASSEMBLY

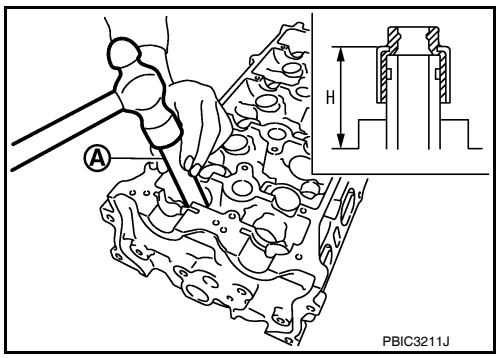
1. Install valve guide if removed. Refer to EM-73, "Inspection After Disassembly".
2. Install valve seat if removed. Refer to EM-73, "Inspection After Disassembly".

3. Install valve oil seal.
   - Install with a valve oil seal using Tool (A) to match dimension as shown.

   Tool number : KV10115600 (J-38958)

   NOTE:
   Dimension (H) is height that measured before installing valve spring (with valve spring seat).

   Height (H) : 15.1 - 15.7 mm (0.594 - 0.618 in)

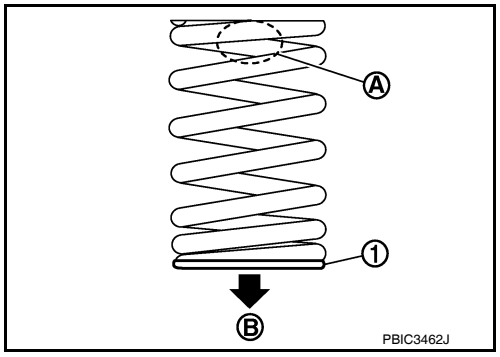


4. Install valve.
   - Install larger diameter to intake side.

5. Install valve spring (with valve spring seat).
   - Install smaller pitch (valve spring seat side) to cylinder head side (B).
   - Confirm identification color (A) of valve spring.

   (1) : Valve spring seat (Do not remove from valve spring.)

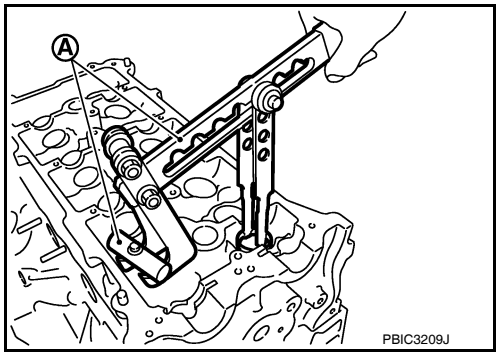
   Intake : White
   Exhaust : Orange



6. Install valve spring retainer.
7. Install valve collet.
   - Compress valve spring using Tool, attachment and adapter (A). Install valve collet with a magnet hand.

   Tool number : KV101092S0 (J-26336 B)

   CAUTION:
   When working, be careful not to damage valve lifter holes.
   - Tap valve stem edge lightly with a plastic hammer after installation to check its installed condition.



8. Install valve lifter.
   - Install it in the original position.
9. Install spark plug using suitable tool. Refer to EM-32, "Component".

Inspection After Disassembly

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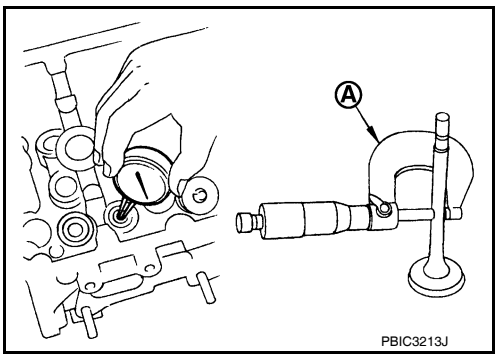
VALVE DIMENSIONS

- Check dimensions of each valve. For dimensions, refer to EM-111, "Standard and Limit".
- If dimensions are out of the standard, replace valve.

VALVE GUIDE CLEARANCE

Valve Stem Diameter

Measure the diameter of valve stem with a micrometer (A).



Standard

Intake : 5.465 - 5.480 mm (0.2152 - 0.2157 in)

Exhaust : 5.455 - 5.470 mm (0.2148 - 0.2154 in)

Valve Guide Inner Diameter

Measure the inner diameter of valve guide with a bore gauge.

Standard

: 5.500 - 5.518 mm (0.2165 - 0.2172 in)

Valve Guide Clearance

(Valve guide clearance) = (Valve guide inner diameter) – (Valve stem diameter).

Valve guide clearance:

Standard

Intake : 0.020 - 0.053 mm (0.0008 - 0.0021 in)

Exhaust : 0.030 - 0.063 mm (0.0012 - 0.0025 in)

Limit

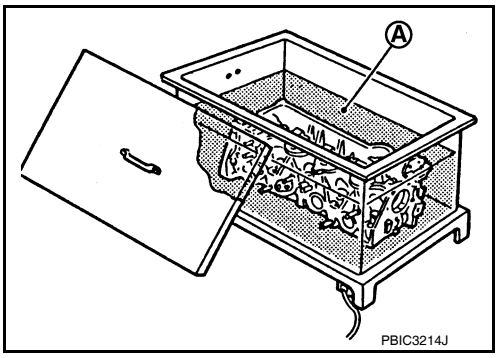
: 0.1 mm (0.004 in)

- If it exceeds the limit, replace valve guide and/or valve.

VALVE GUIDE REPLACEMENT

When valve guide is removed, replace with oversized [0.2 mm (0.008 in)] valve guide.

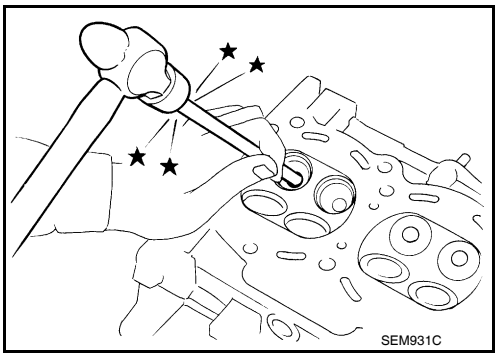
1. To remove valve guide, heat cylinder head to 110° to 130°C (230° to 266°F) by soaking in heated oil (A).



2. Drive out valve guide using suitable tools.

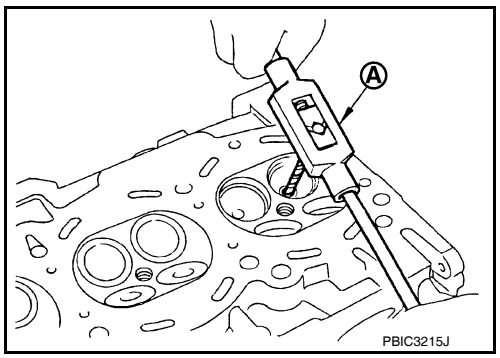
WARNING:

Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.

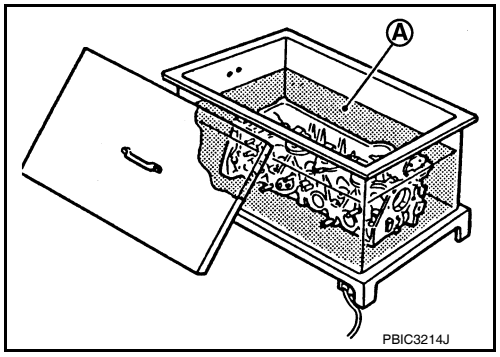


3. Ream cylinder head valve guide hole using suitable tool (A).

Valve guide hole diameter (for service parts):
: 9.675 - 9.696 mm (0.3809 - 0.3817 in)



4. Heat cylinder head to 110° to 130°C (230° to 266°F) by soaking in heated oil (A).

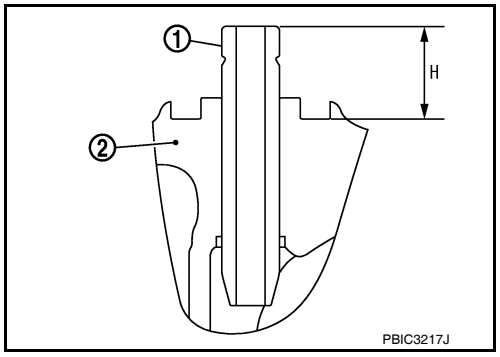


5. Press valve guide (1) from camshaft side to dimensions as shown.

(2) : Cylinder head

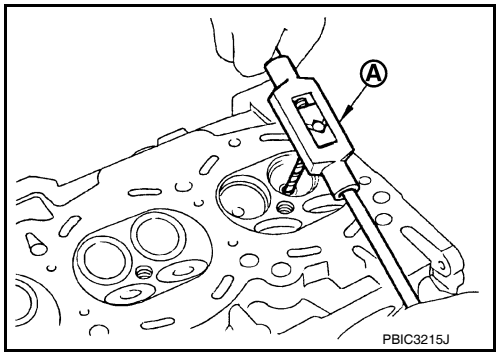
Projection (H) : 13.35 - 13.65 mm (0.526 - 0.537 in)

WARNING:
Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.



6. Apply reamer finish to valve guide using suitable tool (A).

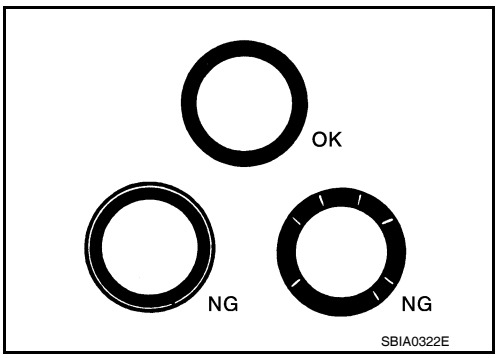
Standard : 5.500 - 5.518 mm (0.2165 - 0.2172 in)



VALVE SEAT CONTACT

- After confirming that the dimensions of valve guides and valves are within specifications, perform this procedure.
- Apply prussian blue (or white lead) onto contacting surface of valve seat to check the condition of the valve contact on the surface.

- Check if the contact area band is continuous all around the circumference.
- If not, grind to adjust valve fitting and check again. If the contacting surface still has NG conditions even after the re-check, replace valve seat.



VALVE SEAT REPLACEMENT

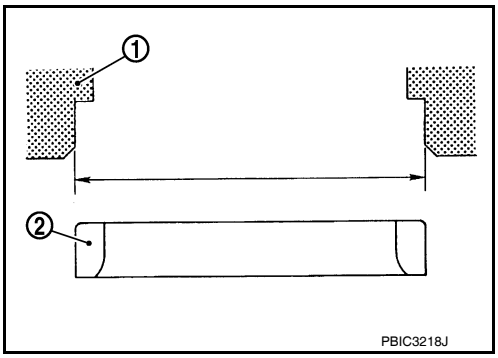
When valve seat is removed, replace with oversized [0.5 mm (0.020 in)] valve seat.

1. Bore out old seat until it collapses. Boring should not continue beyond the bottom face of the seat recess in cylinder head. Set the machine depth stop to ensure this. Refer to EM-111, "Standard and Limit".
2. Ream cylinder head (1) recess diameter for service valve seat.

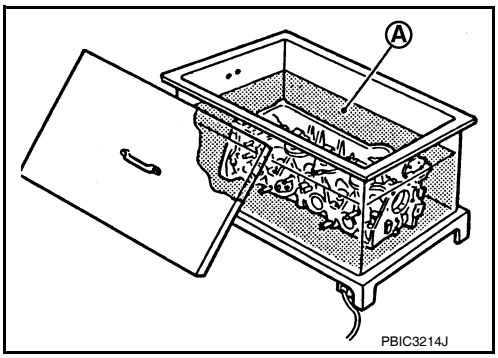
   (2) : Valve seat

   Oversize [0.5 mm (0.020 in)]
   Intake : 35.200 - 35.227 mm (1.3858 - 1.3869 in)
   Exhaust : 29.200 - 29.227 mm (1.1496 - 1.1507 in)

   - Be sure to ream in circles concentric to the valve guide center. This will enable valve seat to fit correctly.



3. Heat cylinder head to 110° to 130°C (230° to 266°F) by soaking in heated oil (A).

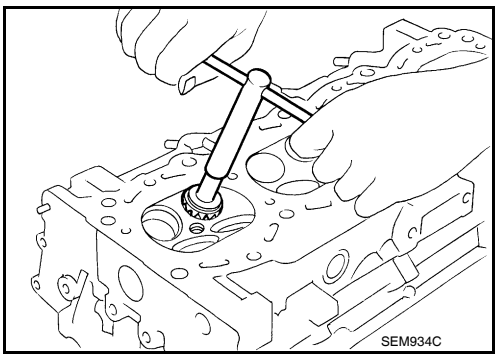


4. Use dry ice to thoroughly cool valve seats. Press-fit valve seat into cylinder head.

   WARNING:
   - **Do not touch cold valve seats directly.**
   - **Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.**

5. Using valve seat cutter set or valve seat grinder, finish valve seat to the specified dimensions. For dimensions, refer to EM-111, "Standard and Limit".

   CAUTION:
   When using valve seat cutter, firmly grip the cutter handle with both hands. Then, press on the contacting surface all around the circumference to cut in a single drive. Improper pressure on the cutter or cutting many different times may result in staged valve seat.

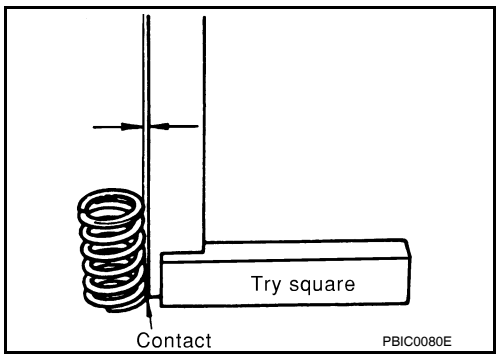


6. Using compound, grind to adjust valve fitting.
7. Check again for normal contact.

VALVE SPRING SQUARENESS

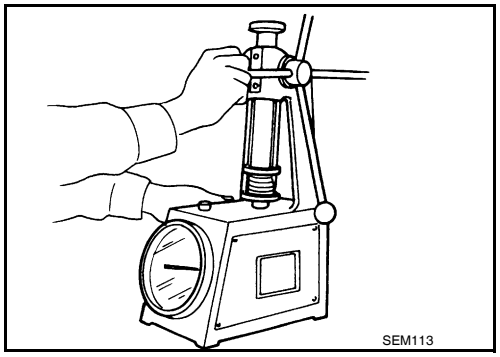
- Set try square along the side of valve spring and rotate the spring. Measure the maximum clearance between the top of valve spring and try square.
  CAUTION:
  Do not remove valve spring seat from valve spring.

  Limit: 1.9 mm (0.075 in)
- If it exceeds the limit, replace valve spring (with valve spring seat).



VALVE SPRING DIMENSIONS AND VALVE SPRING PRESSURE LOAD

- Check valve spring pressure with valve spring seat installed at the specified spring height.
  CAUTION:
  Do not remove valve spring seat from valve spring.



Standard:

Items	Intake	Exhaust
Free height	44.90 - 45.10 mm (1.7677 - 1.7755 in)	45.74 - 45.94 mm (1.8007 - 1.8086 in)
Installation height	35.30 mm (1.390 in)	35.30 mm (1.390 in)
Installation load	153 - 173 N (15.6 - 17.6 kg, 34 - 39 lb)	139 - 157 N (14.2 - 16 kg, 31 - 35 lb)
Height during valve open	26.36 mm (1.0377 in)	27.80 mm (1.0944 in)
Load with valve open	335 - 377 N (34.2 - 38.5 kg, 75 - 85 lb)	266 - 297 N (27.1 - 30.3 kg, 60 - 67 lb)
Identification color	White	Orange

- If the installation load or load with valve open is out of the standard, replace valve spring (with valve spring seat).

ENGINE ASSEMBLY

Component

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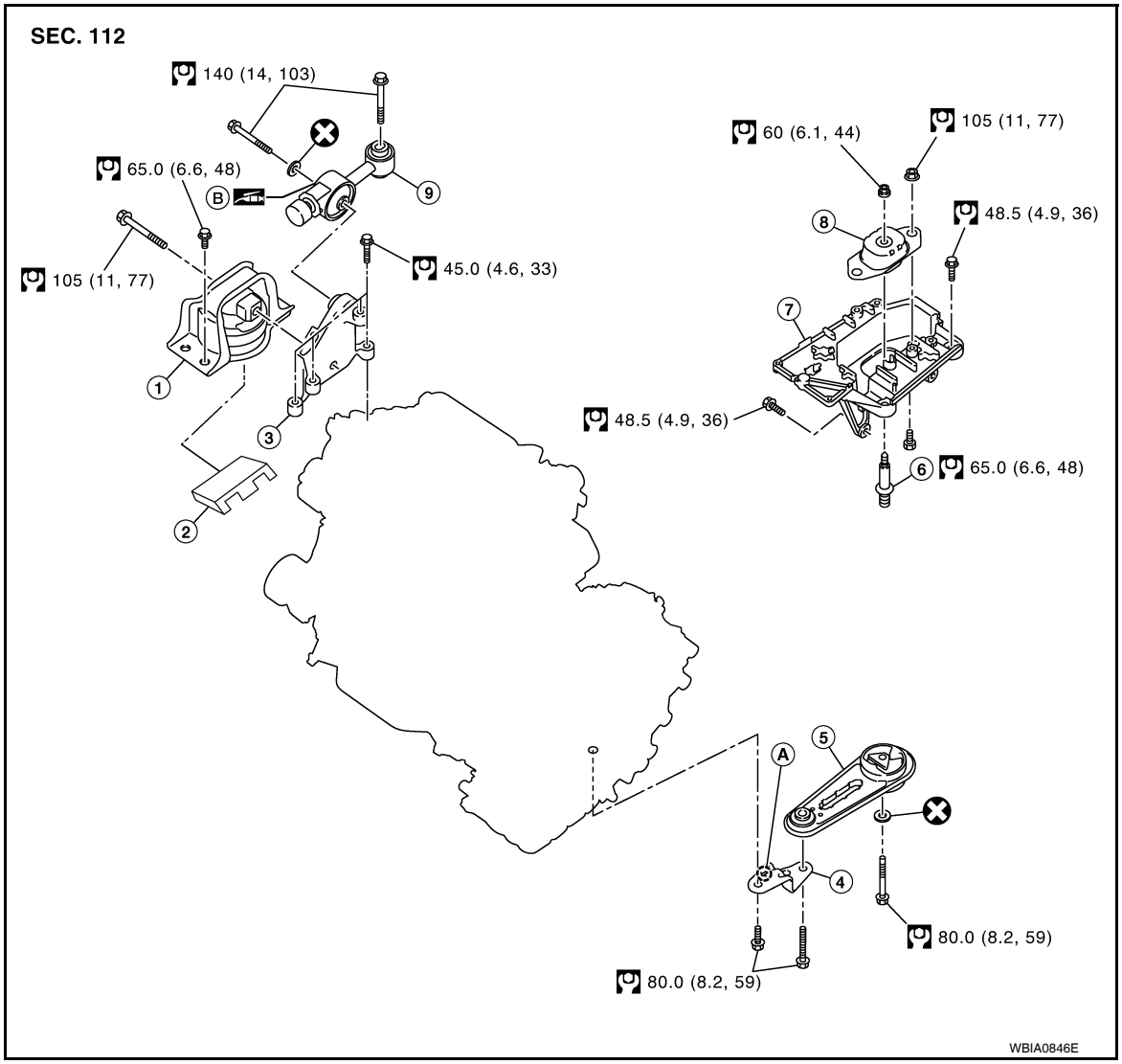


1. Engine mounting Insulator (RH)
2. Engine mounting shim (RH) (if equipped)
3. Engine mounting bracket (RH)
4. Bracket
5. Rear torque rod
6. Engine through bolt
7. Engine mounting bracket (LH)
8. Engine mounting insulator (LH)
9. Torque rod (RH)

A. Front mark
B. Silicone lubricant

Removal and Installation

INFOID:0000000007330527

WARNING:
- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:
- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine section, follow the applicable procedures.**
- **Always use the support point specified for lifting.**

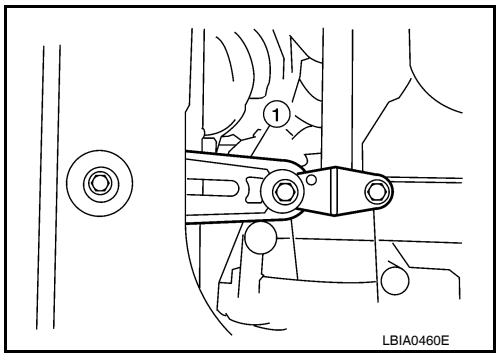
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-38, "Garage Jack and Safety Stand and 2-Pole Lift".**

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

Remove the engine and the transaxle assembly from the vehicle downward. Separate the engine and the transaxle.

1. Remove engine undercover. Refer to EI-15, "Removal and Installation".
2. Drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
3. Drain clutch fluid (M/T models). Refer to CL-9, "Air Bleeding Procedure".
4. Remove front fender protector (RH and LH). Refer to EI-24.
5. Remove exhaust front tube. Refer to EX-5, "Component".
6. Remove drive shafts (LH and RH) from steering knuckle. Refer to FAX-9.
7. Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to AT-230 (A/T models), CVT-184, "Removal and Installation" (CVT models) or MT-18, "Removal and Installation" (M/T models).
8. Remove rear torque rod (1).
   NOTE:
   A/T model shown CVT and M/T models similar.

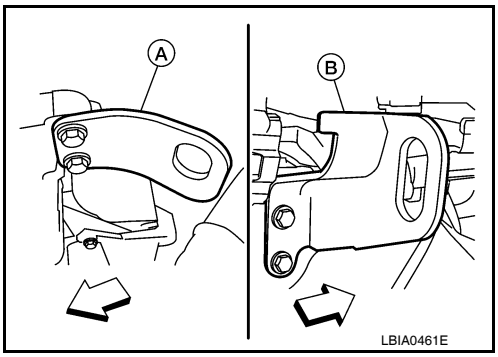


9. Remove hood assembly. Refer to BL-14.
10. Remove cowl top cover and cowl top extension assembly. Refer to EI-22.
11. Release fuel pressure. Refer to EC-89, "Fuel Pressure Check".
12. Remove battery and battery tray. Refer to SC-7, "Removal and Installation".
13. Remove drive belt. Refer to EM-13, "Component".
14. Remove air duct and air cleaner case assembly. Refer to EM-16.
15. Remove cooling fan assembly. Refer to CO-19, "Removal and Installation".
16. Remove radiator hose (upper and lower). Refer to CO-15.
17. Disconnect A/T fluid cooler hoses or CVT water hoses. Refer to CO-15, "Component" (A/T) or CVT-173, "WATER HOSE : Exploded View" (CVT).
18. Disconnect all connections of engine harness around the engine mounting insulator (LH), and then temporarily secure the engine harness into the engine side.
    CAUTION:
    Protect connectors using a resin bag to protect against foreign materials during the operation.
19. Disconnect fuel feed hose at engine side. Refer to EM-35, "Component".
20. Disconnect heater hoses. Refer to CO-25, "Component".
21. Disconnect control cable from transaxle. Refer to CVT-184, "Removal and Installation" (CVT models), AT-210 (A/T models) or MT-18, "Removal and Installation" (M/T models).
22. Remove ground cable at transaxle side.
23. Remove ground cable between front cover and vehicle.

24. Remove generator. Refer to SC-21.
25. Remove A/C compressor with piping connected from the engine. Temporarily secure it on the vehicle side with a rope to avoid putting load on it. Refer to MTC-79, "Removal and Installation of Compressor".
26. Remove the intake manifold to prevent the hanging chain from interfering. Refer to EM-18, "Component".
27. Install engine slinger to cylinder head front left side (A) and rear right side (B) and support the engine position with a hoist.

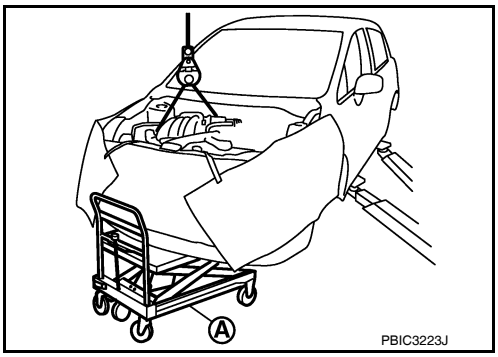
    ⇦ : Engine front

    Slinger bolts : 25.5 N·m (2.6 kg-m, 19 ft-lb)



28. Support engine and transaxle assembly with a hoist and secure the engine in appropriate position.
29. Use a manual lift table caddy (A) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle, and simultaneously adjust hoist tension.

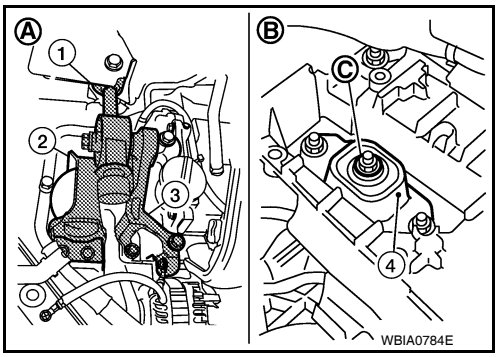
    CAUTION:
    Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.



30. Remove torque rod (RH) (1), engine insulator (RH) (2) and engine bracket (RH) (3).

    (4) : Engine insulator (LH)
    (A) : Engine front side
    (B) : Transaxle side

31. Remove engine through bolt-securing nut (C).



32. Remove the engine and the transaxle assembly from the vehicle downward by carefully operating supporting tools.

    CAUTION:
    - **During the operation, make sure that no part interferes with the vehicle side.**
    - **Before and during this lifting, always check if any harnesses are left connected.**
    - **During the removal operation, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
    - **If necessary, support the vehicle by setting jack or suitable tool at the rear.**
    - **During operation, securely support the engine by placing a piece of wood under the engine oil pan and transaxle oil pan. Securely support the engine slingers with a hoist.**

33. Remove starter motor. Refer to SC-9.
34. Separate the engine and the transaxle and mount the engine on a suitable engine stand. Refer to AT-230 (A/T models), CVT-184, "Removal and Installation" (CVT models) or MT-18, "Removal and Installation" (M/T models).

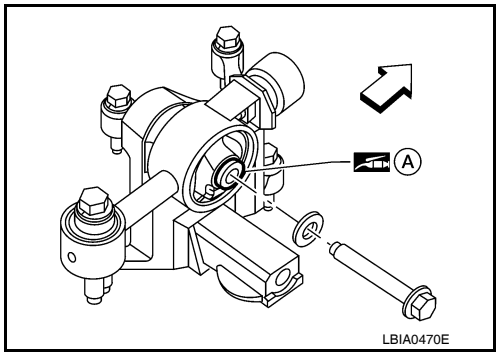
INSTALLATION

Installation is in the reverse order of removal.
Note the following during installation:

- When installation directions are specified, install parts according to the directions. Refer to EM-78, "Component".
- Do not allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.
- Prior to installing the upper torque rod, apply a light coat of silicone lubricant (A) to the washer facing side of the bushing inner tube as shown.

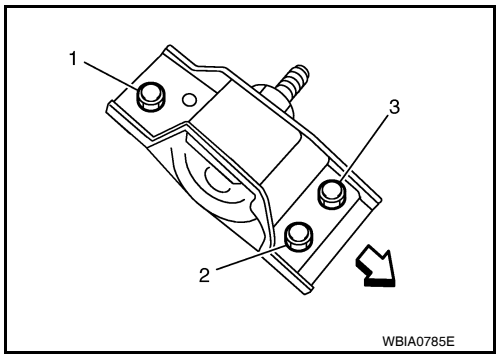
NOTE:
- Apply silicone lubricant (A) by dabbing the outward facing tube surface with a sponge or suitable tool.
- Do not apply excess lubricant.

⇦ : Vehicle front



- Make sure that each mounting insulator is seated properly, and tighten nuts and bolts.
- Tighten engine mounting insulator (RH) bolts in the numerical order shown.

⇦ : Vehicle front



INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal and installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level

Item	Before starting engine	Engine running	After engine stopped
Fuel	Leakage	Leakage	Leakage
Exhaust gas	—	Leakage	—

*Power steering fluid, brake fluid, etc.

CYLINDER BLOCK

Component

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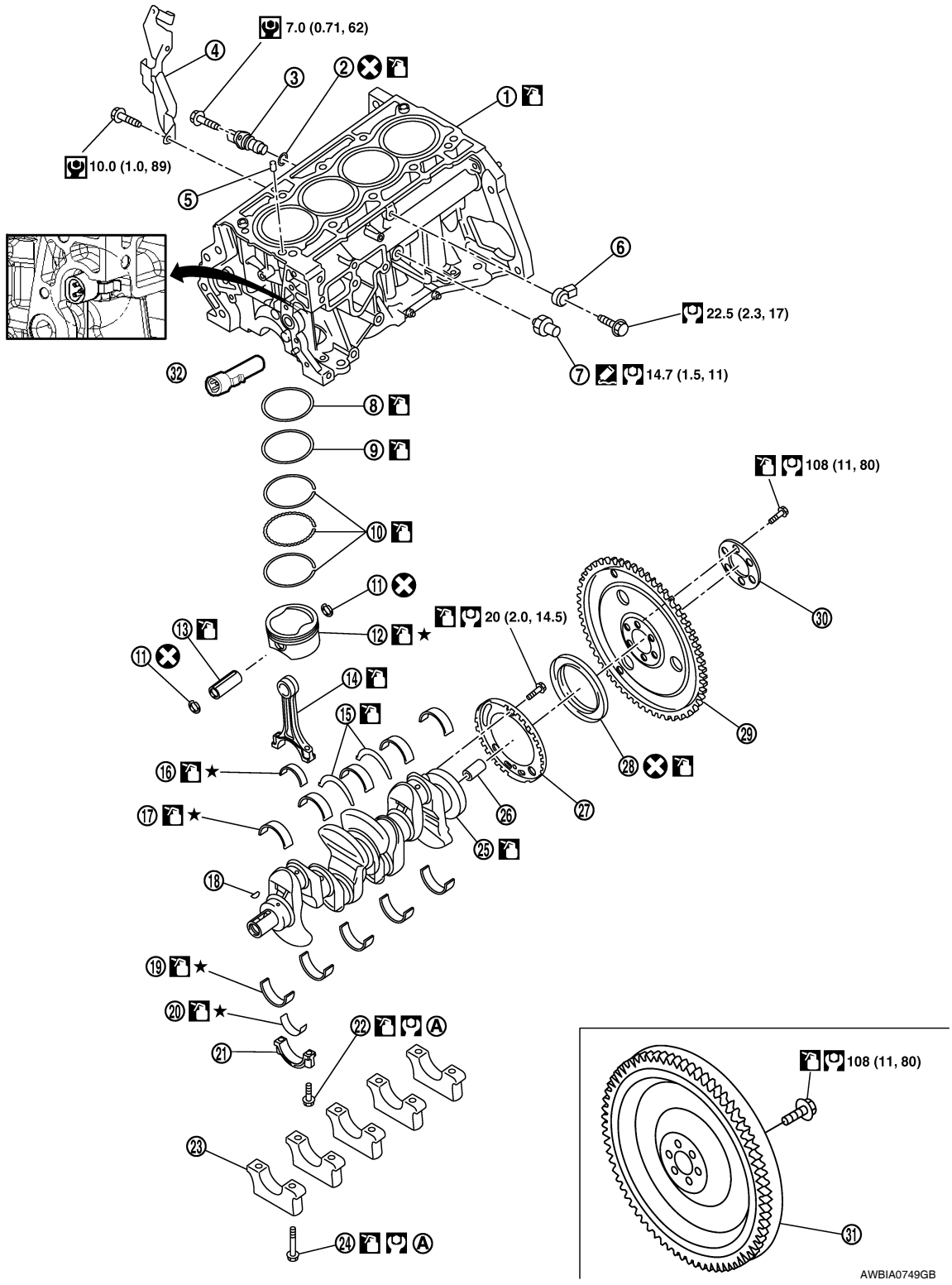

1. Cylinder block
2. O-ring
3. Crankshaft position sensor (POS)
4. Crankshaft position sensor (POS) cover
5. Oil filter (for intake valve timing control)
6. Knock sensor

7. Oil pressure switch	8. Top ring	9. Second ring
10. Oil ring	11. Snap ring	12. Piston
13. Piston pin	14. Connecting rod	15. Thrust bearing
16. Connecting rod bearing upper	17. Main bearing upper	18. Crankshaft key
19. Main bearing lower	20. Connecting rod bearing lower	21. Connecting rod bearing cap
22. Connecting rod bolt	23. Main bearing cap	24. Main bearing cap bolt
25. Crankshaft	26. Pilot converter (A/T or CVT models)	27. Signal plate
28. Rear oil seal	29. Drive plate (A/T or CVT models)	30. Reinforcement plate (A/T or CVT models)
31. Flywheel (M/T models)	32. Block heater (Canada only)	A. Refer to EM-84

Disassembly and Assembly

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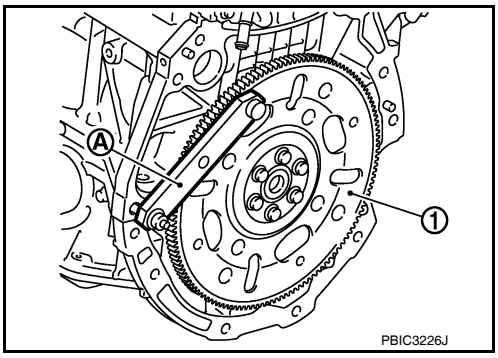
DISASSEMBLY

1. Remove engine and transaxle assembly from vehicle, separate transaxle from engine. Refer to EM-78.
2. Install engine to engine stand as follows;

a. Remove flywheel (M/T models) or drive plate (1) (A/T or CVT models).
- Secure flywheel (M/T models) or drive plate (A/T or CVT models) using Tool (A), and remove bolts.

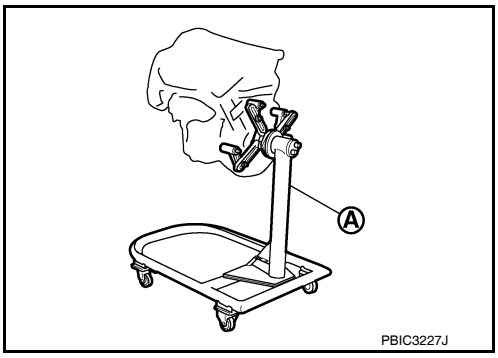
Tool number : KV 11105210 (J-44716)

CAUTION:
Be careful not to damage or scratch drive plate (A/T or CVT models) and contact surface for clutch disc of flywheel (M/T models).
NOTE:
Figure shows drive plate (1) (A/T or CVT models)



b. Lift the engine with a hoist to install it onto widely use engine stand.
CAUTION:
- **Use the engine stand that has a load capacity [approximately 135 kg (298 lb) or more] large enough for supporting the engine weight.**
- If the load capacity of stand is not adequate, remove the following parts beforehand to reduce the potential risk of overturning stand.
- Exhaust manifold; Refer to EM-22.
- Rocker cover; Refer to EM-32.

NOTE:
The figure shows an example of widely used engine stand (A) that can support mating surface of transaxle with flywheel (M/T models) or drive plate (A/T or CVT models) removed.
CAUTION:
Before removing the hanging chains, make sure the engine stand is stable and there is no risk of overturning.



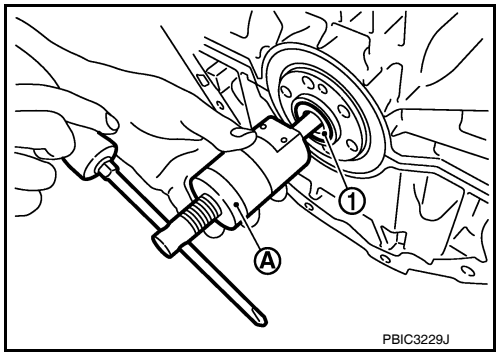
3. Remove oil pan (upper and lower). Refer to EM-25.
4. Remove cylinder head. Refer to EM-67.
5. Remove thermostat housing. Refer to CO-22.
6. Remove block heater (if equipped).
7. Remove knock sensor.
CAUTION:
Carefully handle knock sensor avoiding shocks.

8. Remove crankshaft position sensor (POS) cover and crankshaft position sensor (POS).
CAUTION:
- **Avoid impacts such as a dropping.**
- **Do not disassemble.**
- **Keep it away from metal particles.**
- **Do not place sensor in a location where it is exposed to magnetism.**

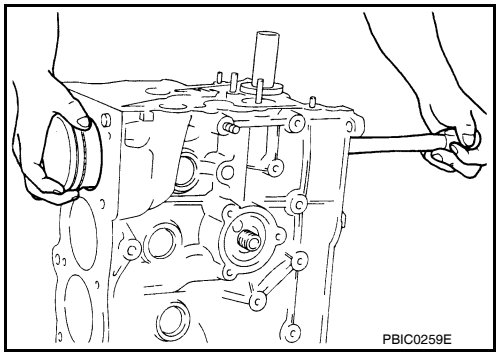
9. Remove oil filter (for intake valve timing control).
10. Remove pilot converter (1) using Tool (A). (A/T or CVT models)

Tool number :ST16610001 (J-23907)

NOTE:
M/T models have no pilot converter.

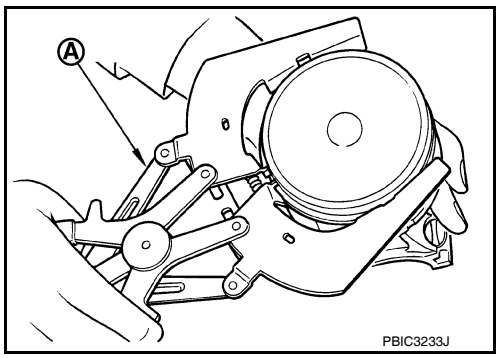


11. Position crankshaft pin corresponding to connecting rod to be removed onto the bottom dead center.
NOTE:
Before removing piston and connecting rod assembly, check the connecting rod side clearance. Refer to EM-100, "Inspection After Disassembly".
12. Remove connecting rod cap.
13. Using a suitable tool, push piston and connecting rod assembly out to the cylinder head side.
CAUTION:
- **Be careful not to damage matching surface with connecting rod cap.**
- **Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.**

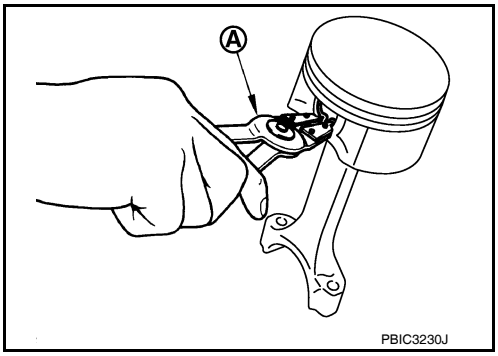


14. Remove connecting rod bearings.
CAUTION:
When removing them, note the installation position. Keep them in the correct order.
15. Remove piston rings from piston.
- Before removing piston rings, check the piston ring side clearance. Refer to EM-100, "Inspection After Disassembly".

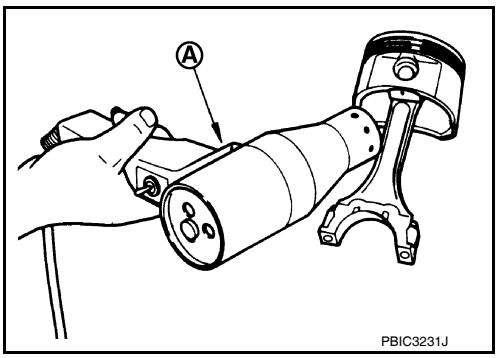
16. Using a suitable tool (A) remove piston rings.
CAUTION:
- **When removing piston rings, be careful not to damage the piston.**
- **Be careful not to damage piston rings by expanding them excessively.**



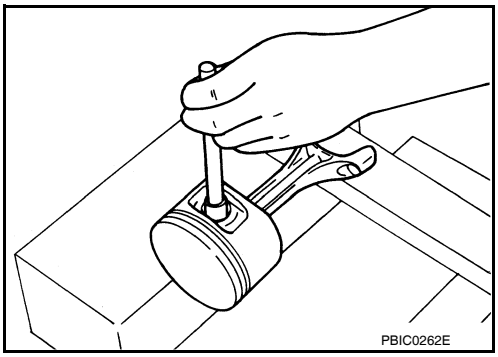
17. Using snap ring pliers (A), remove snap rings.



18. Heat piston to 60° to 70°C (140° to 158°F) using a suitable tool (A).

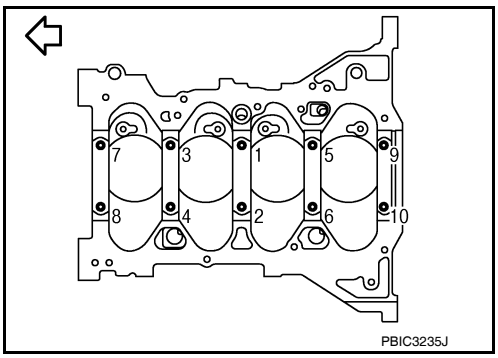


19. Push out piston pin using a suitable tool of an outer diameter approximately 18 mm (0.71 in).



20. Loosen main bearing cap bolts in reverse order as shown, and remove them.
NOTE:
Before loosening main bearing cap bolts, measure crankshaft end play. Refer to EM-100, "Inspection After Disassembly".

⇦ : Engine front

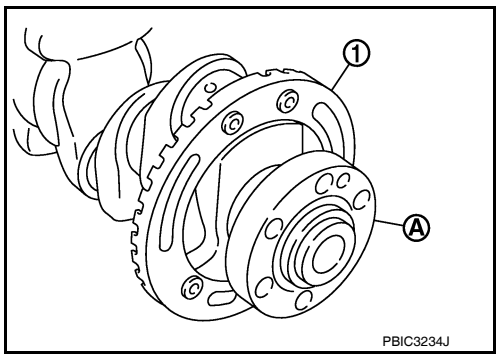


21. Remove main bearing caps.
- Tap main bearing caps lightly using a suitable tool for removal.

CAUTION:
Be careful not to damage the mounting surface.

22. Remove crankshaft.
CAUTION:

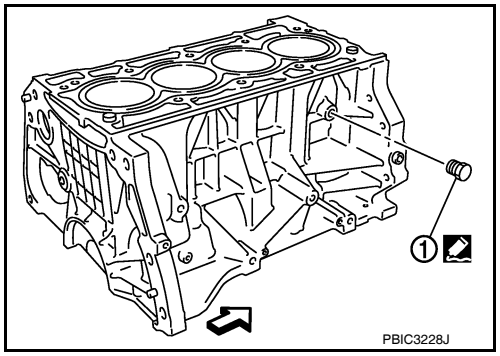
- **Be careful not to damage or deform signal plate (1) mounted on rear end of crankshaft (A).**
- **When setting crankshaft on a flat floor surface, use a block of wood to avoid interference between signal plate and the floor surface.**
- **Do not remove signal plate unless it is necessary to do so.**



23. Pull rear oil seal out from rear end of crankshaft.
24. Remove main bearings and thrust bearings from cylinder block and main bearing caps.
    CAUTION:
    Identify installation positions, and store them without mixing them up.

ASSEMBLY

1. Fully air-blow engine coolant and engine oil passages in cylinder block, cylinder bore and crankcase to remove any foreign material.
   WARNING:
   Use goggles to protect your eyes.
2. Install water drain plug (1) to cylinder block.



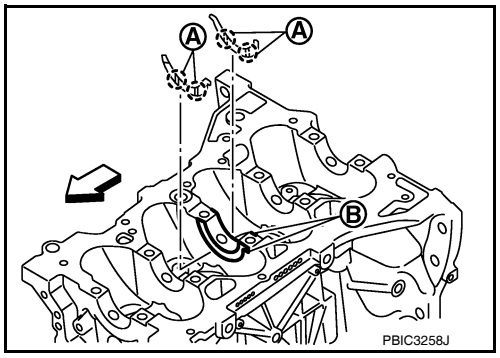
   ⇦ : Engine front

   - Apply liquid gasket to the drain plug thread.

   Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

   9.8 N·m (1.0 kg-m, 87 in-lb)

3. Remove dust, dirt, and engine oil on the bearing mating surfaces of cylinder block and main bearing cap.
4. Install thrust bearings to both sides of the No. 3 journal housing (B) on cylinder block.



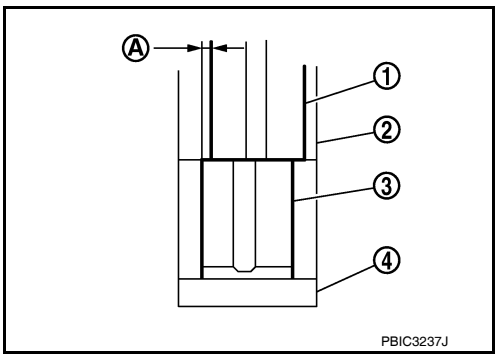
   ⇦ : Engine front

   - Install thrust bearings with the oil groove (A) facing crankshaft arm (outside).

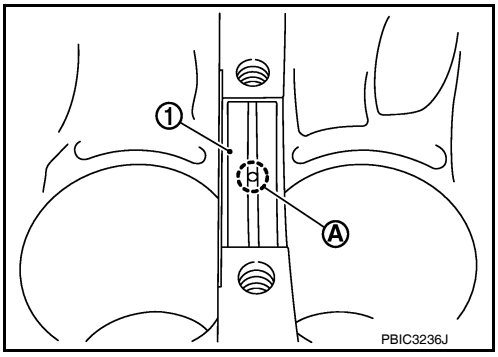
5. Install the main bearings paying attention to the direction.
   CAUTION:
   - **Before installing main bearings, apply new engine oil to the bearing surface (inside). Do not apply new engine oil to the back surface, but thoroughly clean it.**
   - **When installing, align main bearing to the center position of cylinder block and main bearing cap.**

- **The difference (A) between main bearing upper (1) and main bearing lower (3) should be 0.85 mm (0.033 in) or less when installing.**

(2) : Cylinder block
(4) : Main bearing cap



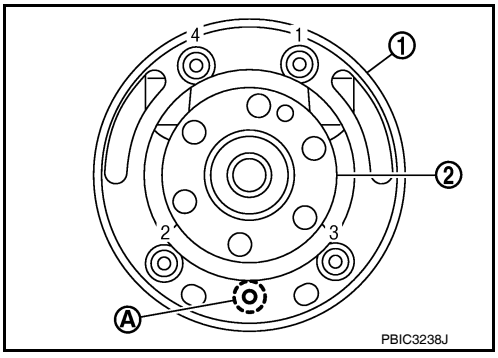
- **Ensure the oil holes on cylinder block and oil holes (A) on the main bearings (1) are aligned.**



6. Install signal plate to crankshaft if removed.
7. Set the signal plate with the flange facing toward the counter weight side (engine front side) to the crankshaft rear surface.
8. Apply new engine oil to threads and seat surfaces of bolts.
9. Position crankshaft (2) and signal plate (1) using a dowel pin (service part), and tighten bolts in numerical order as shown.

(A) : Dowel pin hole

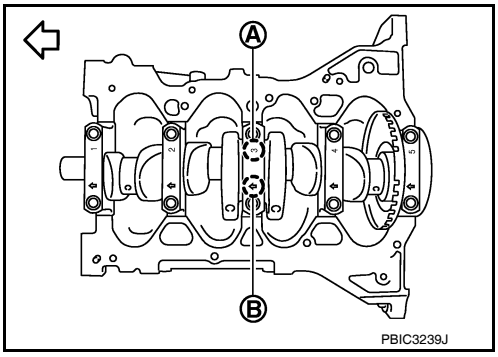
NOTE:
Dowel pin of crankshaft and signal plate is provided as a set for each.



10. Tighten bolts in numerical order as shown.
11. Remove dowel pin. (service parts)
CAUTION:
Be sure to remove dowel pin.
12. Install crankshaft to cylinder block.
• While turning crankshaft by hand, make sure that it turns smoothly.
13. Install main bearing caps referring to the journal No. stamp (A) and front mark (B) as shown.

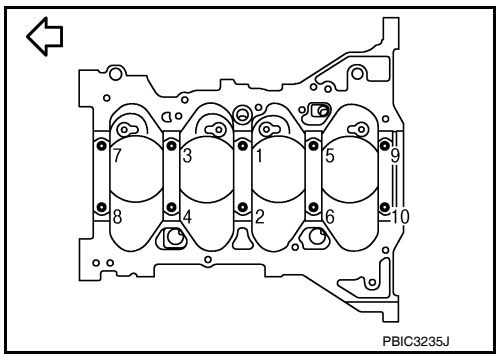
⇦ : Engine front

NOTE:
Main bearing cap cannot be replaced as a single part, because it is machined together with cylinder block.



14. Apply new engine oil to threads and seat surfaces of bolts.

15. Tighten main bearing cap bolts in two steps in numerical order as shown.

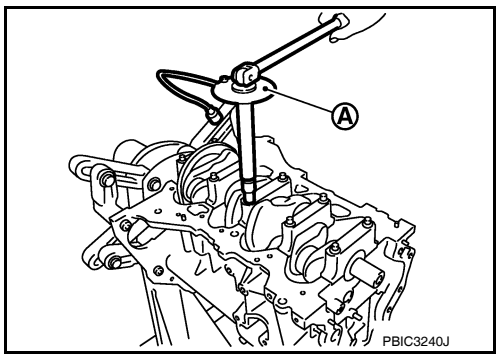


⇦ : Engine front

CAUTION:
Measure the angle in step 2 using Tool (A). Do not measure visually.

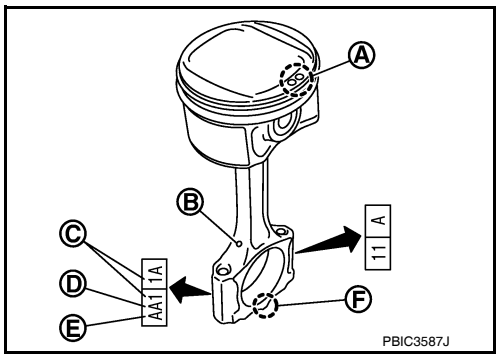
Step 1 : 34.3 N·m (3.5 kg-m, 25 ft-lb)
Step 2 : 60° clockwise

Tool number : KV10112100 (BT-8653-A)



- After installing bolts, make sure that crankshaft can be rotated smoothly by hand.
- Check crankshaft end play. Refer to EM-100, "Inspection After Disassembly".

16. Using snap ring pliers, install new snap ring to the groove of the piston rear side.
    - Insert it fully into groove to install.
17. Assemble piston to connecting rod.
    - Using a suitable tool, heat the piston until the piston pin can be pushed in by hand without excess force [approximately 60° to 70 °C (140° to 158 °F)]. From the front to the rear, insert piston pin into piston and connecting rod.
    - Assemble so that the front mark (A) on the piston head and the oil hole (B) and the cylinder number (C) on connecting rod are positioned as shown.

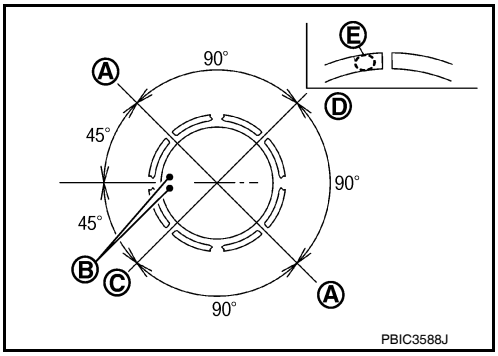


(D) : Big end diameter grade
(E) : Small end diameter grade
(F) : Front mark (connecting rod bearing cap)

18. Install new snap ring to the groove of the piston front side.
    - Insert it fully into groove to install.
    - After installing, make sure that connecting rod moves smoothly.
19. Using a suitable tool, install piston rings.
    CAUTION:
    - **Be careful not to damage piston.**
    - **Be careful not to damage piston rings by expanding them excessively.**

- Position each ring with the gap as shown referring to the piston front mark.

(A) : Oil ring upper or lower rail gap
(B) : Front mark
(C) : Second ring and oil ring spacer gap
(D) : Top ring gap
(E) : Stamped mark



CAUTION:
Do not contact the rail end gap under the oil ring with the oil drain cast groove of piston.

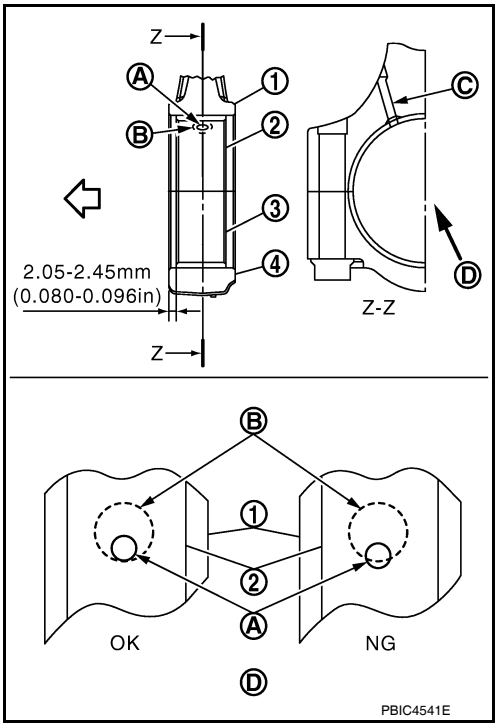
- Install second ring with the stamped surface facing upward.

20. Install connecting rod bearing upper (2) and lower (3) to connecting rod (1) and connecting rod cap (4).

(C) : Oil hole (connecting rod)
(D) : Arrow view
⇦ : Engine front

- Install the connecting rod in the dimension shown.
- Make sure that connecting rod bearing oil hole (A) is completely in the inside of connecting rod oil hole chamfered area (B).
- When installing connecting rod bearings, apply new engine oil to the bearing surface (inside). Do not apply new engine oil to the back surface, but thoroughly clean it.

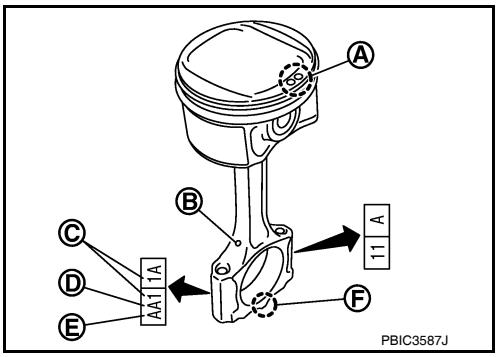
NOTE:
- There is no positioning tab.
- Install the connecting rod bearings in the center of connecting rod and connecting rod bearing cap as shown. For service operation, the center position can be checked, visually.



21. Install piston and connecting rod assembly to crankshaft.
- Position crankshaft pin corresponding to connecting rod to be installed onto the bottom dead center.
- Apply new engine oil sufficiently to the cylinder bore, piston and crankshaft pin.
- Match the cylinder position with the cylinder number (C) on connecting rod to install.

(B) : Oil hole
(D) : Big end diameter grade
(E) : Small end diameter grade
(F) : Front mark (connecting rod bearing cap)

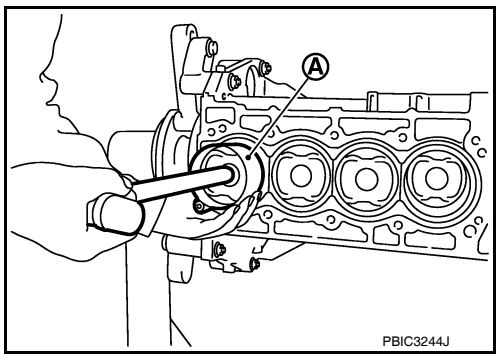
- Install so that front mark (A) on the piston head faces the front of engine.



- Using Tool (A), install piston with the front mark on the piston head facing the front of the engine.

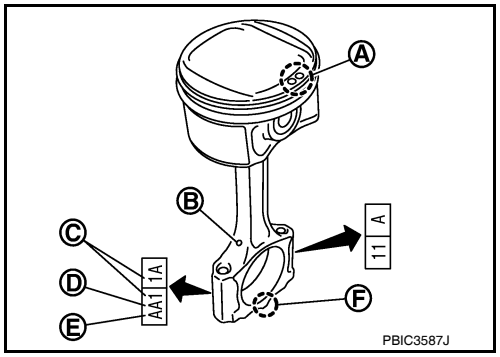
CAUTION:
Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.

Tool number : EM03470000 (J-8037)



22. Install connecting rod cap.
- Match the stamped cylinder number marks (C) on connecting rod with those on connecting rod cap to install.

(A) : Front mark (piston)
(B) : Oil hole
(D) : Big end diameter grade
(E) : Small end diameter grade
(F) : Front mark (connecting rod bearing cap)

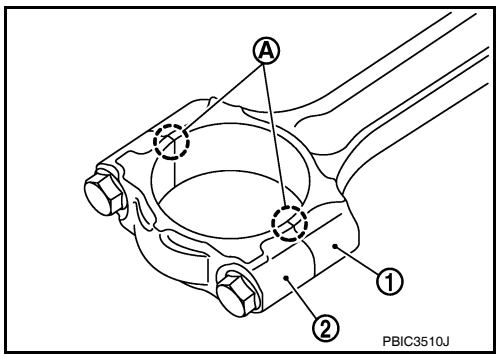


23. Tighten connecting rod bolt with the following procedure:

CAUTION:
- **Make sure that there is no gap in the thrust surface (A) of the joint between connecting rod (1) and connecting rod bearing cap (2) and that these parts are in the correct position. And then, tighten the connecting rod bolts.**
- **If the connecting rod bolts are reused, measure the outer diameter. Refer to EM-100, "Inspection After Disassembly".**

a. Apply new engine oil to the threads and seats of connecting rod bolts.

b. Tighten connecting rod bolts in two steps using Tool.



Step 1 : 19.6 N·m (2.0 kg-m, 14 ft-lb)
Step 2 : 60° clockwise

Tool number : KV10112100 (BT-8653-A)

- After tightening connecting rod bolt, make sure that crankshaft rotates smoothly.
- Check the connecting rod side clearance. Refer to EM-100, "Inspection After Disassembly".

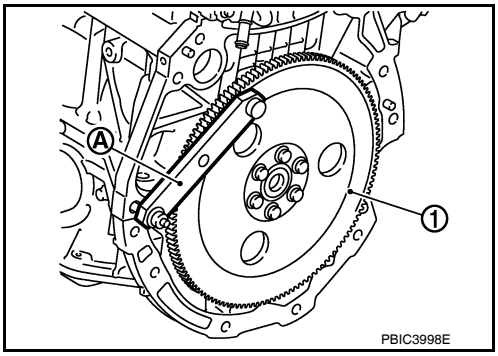
24. Install oil pan (upper). Refer to EM-25.
NOTE:
Install the rear oil seal after installing the oil pan (upper).

25. Install rear oil seal. Refer to EM-25.

26. Install flywheel (M/T models) or drive plate (1) (A/T or CVT models).
    - Secure crankshaft using Tool (A), and tighten bolts crosswise over several times.

    Tool number : KV11105210 (J-44716)

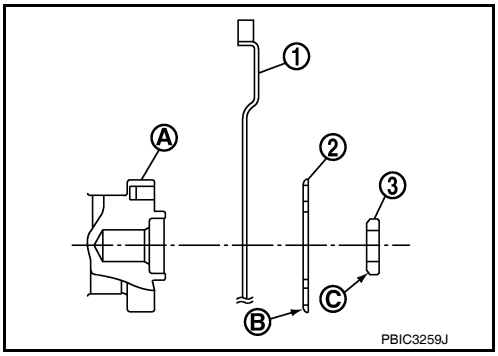
    NOTE:
    A/T model shown CVT and M/T similar.



    - Install pilot converter (3), drive plate (1) and reinforcement plate (2) as shown (A/T or CVT models).

      (A) : Crankshaft rear end
      (B) : Rounded
      (C) : Chamfered

    - Using a suitable tool of 33 mm (1.30 in) in diameter, press-fit pilot converter into the end of crankshaft until it stops (A/T or CVT models).
      NOTE:
      M/T models have no pilot converter and reinforcement plate.

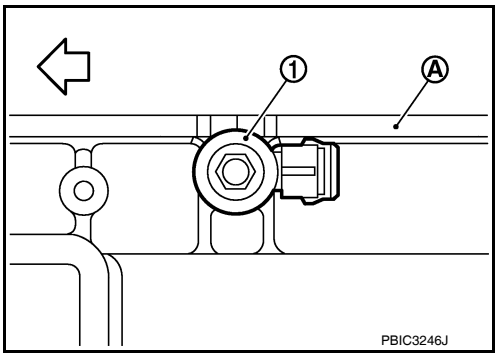


27. Install knock sensor (1) with connector facing toward the rear of engine.

      (A) : Cylinder block left side
      ⇦ : Engine front

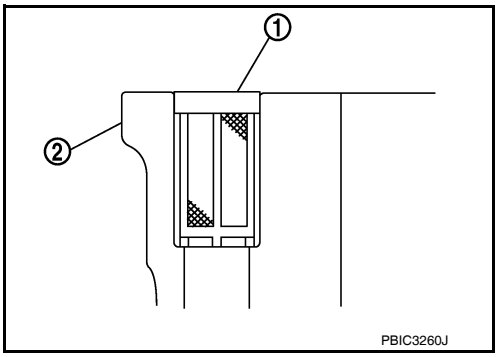
    CAUTION:
    - **Do not tighten bolts while holding the connector.**
    - **If any impact by dropping is applied to knock sensor, replace it with a new one.**

    NOTE:
    - Make sure that there is no foreign material on the cylinder block mating surface and the back surface of knock sensor.
    - Make sure that knock sensor does not interfere with other parts.



28. Install crankshaft position sensor (POS) and crankshaft position sensor (POS) cover.
    CAUTION:
    - **Avoid impacts such as a dropping.**
    - **Keep it away from metal particles.**
    - **Do not place sensor in a location where it is exposed to magnetism.**

29. Install oil filter (for intake valve timing control) (1) in the direction shown.
    - Make sure that the oil filter does not protrude from the upper surface of cylinder block (2) after installation.



30. Assembly is in the reverse order of disassembly.

How to Select Piston and Bearing

INFOID:0000000007330530

DESCRIPTION

Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (bearing thickness)	Determined by match of cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal)
Between crankshaft and connecting rod	Connecting rod bearing	Connecting rod bearing grade (bearing thickness)	Combining service grades for connecting rod big end diameter and crankshaft pin outer diameter determine connecting rod bearing selection.
Between cylinder block and piston	Piston and piston pin assembly (piston is available together with piston pin as an assembly.)	Piston grade (piston outer diameter)	Piston grade = cylinder bore grade (inner diameter of bore)

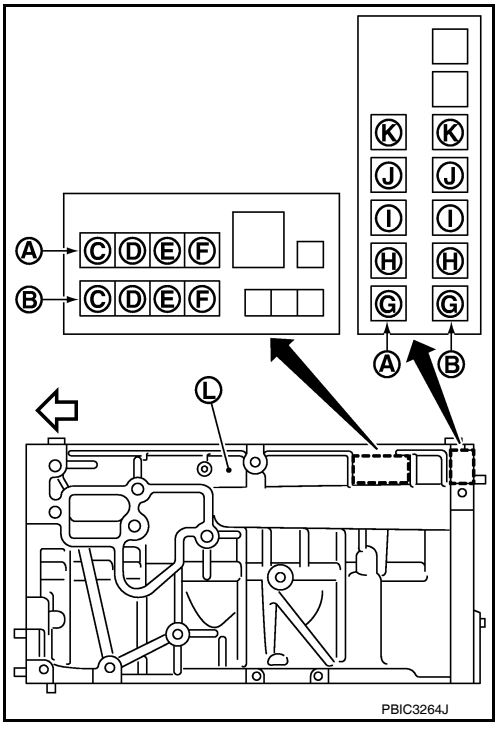
- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, follow the applicable procedures.

HOW TO SELECT PISTON

When New Cylinder Block is Used

- Check the cylinder bore grade on rear left side of cylinder block (L), and select piston of the same grade.

(A) : Correction stamp
(B) : Standard stamp
(C) : Cylinder No. 1 bore grade
(D) : Cylinder No. 2 bore grade
(E) : Cylinder No. 3 bore grade
(F) : Cylinder No. 4 bore grade
(G) : No. 1 main bearing housing grade
(H) : No. 2 main bearing housing grade
(I) : No. 3 main bearing housing grade
(J) : No. 4 main bearing housing grade
(K) : No. 5 main bearing housing grade
⇦ : Engine front

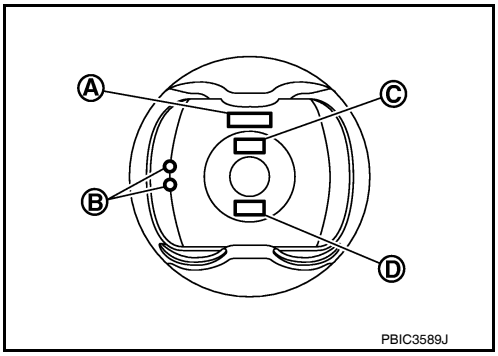


- If there is a correction stamp mark on the cylinder block, use it as a correct reference.

When Cylinder Block is Reused

1. Measure the cylinder bore inner diameter. Refer to EM-100, "Inspection After Disassembly".
2. Determine the bore grade by comparing the measurement with the values under the cylinder bore inner diameter of the “Piston Selection Table”.

3. Select piston of the same grade.



(A) : Identification code
(B) : Front mark
(C) : Piston grade number
(D) : Sub grade number

Piston Selection Table

Unit: mm (in)

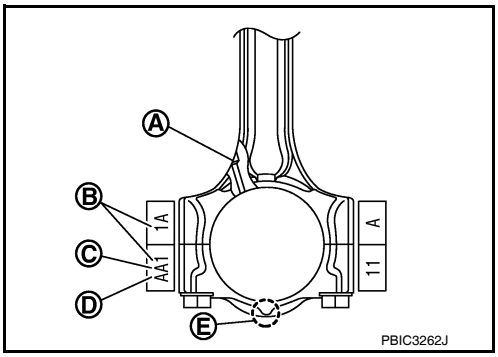
Grade number (Mark)	1	2 [or no mark (piston only)]
Cylinder bore Inner diameter	84.000 - 84.010 (3.3071 - 3.3075)	84.010 - 84.020 (3.3075 - 3.3079)
Piston skirt diameter	83.970 - 83.980 (3.3059 - 3.3063)	83.980 - 83.990 (3.3063 - 3.3067)

NOTE:
- Piston is available together with piston pin as an assembly.
- There is no piston pin (piston pin hole) grade.

HOW TO SELECT CONNECTING ROD BEARING

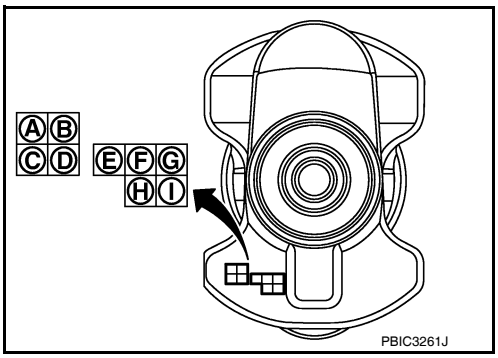
When New Connecting Rod and Crankshaft are Used

1. Apply connecting rod big end diameter grade stamped (C) on connecting rod side face to the row in the “Connecting Rod Bearing Selection Table”.



(A) : Oil hole
(B) : Cylinder number
(D) : Small end diameter grade
(E) : Front mark

2. Apply crankshaft pin journal diameter grade stamped on crankshaft front side to the column in the “Connecting Rod Bearing Selection Table”.



(A) : No. 1 pin journal diameter grade
(B) : No. 2 pin journal diameter grade
(C) : No. 3 pin journal diameter grade
(D) : No. 4 pin journal diameter grade
(E) : No. 1 main journal diameter grade
(F) : No. 2 main journal diameter grade
(G) : No. 3 main journal diameter grade
(H) : No. 4 main journal diameter grade
(I) : No. 5 main journal diameter grade

3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

When Crankshaft and Connecting Rod are Reused

1. Measure the dimensions of the connecting rod big end diameter and crankshaft pin journal diameter individually. Refer to EM-100, "Inspection After Disassembly" and EM-100, "Inspection After Disassembly".

2. Apply the measured dimension to the “Connecting Rod Bearing Selection Table”.
3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

Connecting Rod Bearing Selection Table

Crankshaft pin journal diameter Unit: mm (in) / Connecting rod big end diameter Unit: mm (in)		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N
Mark	Axle diameter	Hole diameter	47.000 - 47.001 (1.8504 - 1.8504)	47.001 - 47.002 (1.8504 - 1.8505)	47.002 - 47.003 (1.8505 - 1.8505)	47.003 - 47.004 (1.8505 - 1.8505)	47.004 - 47.005 (1.8505 - 1.8506)	47.005 - 47.006 (1.8506 - 1.8506)	47.006 - 47.007 (1.8506 - 1.8507)	47.007 - 47.008 (1.8507 - 1.8507)	47.008 - 47.009 (1.8507 - 1.8507)	47.009 - 47.010 (1.8507 - 1.8508)	47.010 - 47.011 (1.8508 - 1.8508)	47.011 - 47.012 (1.8508 - 1.8509)	47.012 - 47.013 (1.8509 - 1.8509)
A	43.970 - 43.971 (1.7311 - 1.7311)		0	0	0	0	0	01	01	01	1	1	1	12	12
B	43.969 - 43.970 (1.7311 - 1.7311)		0	0	0	0	01	01	01	1	1	1	12	12	12
C	43.968 - 43.969 (1.7310 - 1.7311)		0	0	0	01	01	01	1	1	1	12	12	12	2
D	43.967 - 43.968 (1.7310 - 1.7310)		0	0	01	01	01	1	1	1	12	12	12	2	2
E	43.966 - 43.967 (1.7309 - 1.7310)		0	01	01	01	1	1	1	12	12	12	2	2	2
F	43.965 - 43.966 (1.7309 - 1.7309)		01	01	01	1	1	1	12	12	12	2	2	2	23
G	43.964 - 43.965 (1.7309 - 1.7309)		01	01	1	1	1	12	12	12	2	2	2	23	23
H	43.963 - 43.964 (1.7308 - 1.7309)		01	1	1	1	12	12	12	2	2	2	23	23	23
J	43.962 - 43.963 (1.7308 - 1.7308)		1	1	1	12	12	12	2	2	2	23	23	23	3
K	43.961 - 43.962 (1.7307 - 1.7308)		1	1	12	12	12	2	2	2	23	23	23	3	3
L	43.960 - 43.961 (1.7307 - 1.7307)		1	12	12	12	2	2	2	23	23	23	3	3	3
M	43.959 - 43.960 (1.7307 - 1.7307)		12	12	12	2	2	2	23	23	23	3	3	3	34
N	43.958 - 43.959 (1.7306 - 1.7307)		12	12	2	2	2	23	23	23	3	3	3	34	34
P	43.957 - 43.958 (1.7306 - 1.7306)		12	2	2	2	23	23	23	3	3	3	34	34	34
R	43.956 - 43.957 (1.7305 - 1.7306)		2	2	2	23	23	23	3	3	3	34	34	34	4
S	43.955 - 43.956 (1.7305 - 1.7305)		2	2	23	23	23	3	3	3	34	34	34	4	4
T	43.954 - 43.955 (1.7305 - 1.7305)		2	23	23	23	3	3	3	34	34	34	4	4	4
U	43.953 - 43.954 (1.7304 - 1.7305)		23	23	23	3	3	3	34	34	34	4	4	4	4

PBIC4077E

Connecting Rod Bearing Grade Table

Unit: mm (in)

Grade number	Thickness	Identification color	Remarks
0	1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are the same for upper and lower bearings.
1	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
2	1.500 - 1.503 (0.0591- 0.0592)	Green	
3	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
4	1.506 - 1.509 (0.0593 - 0.0594)	Blue	

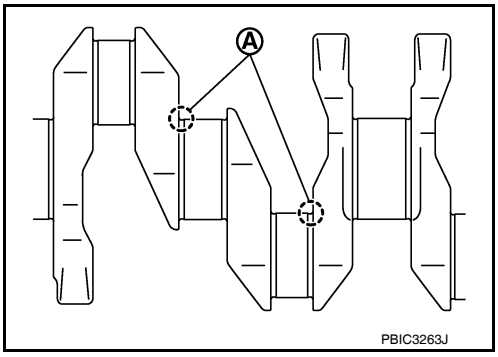
Grade number		Thickness	Identification color	Remarks
01	UPR	1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
12	UPR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
	LWR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
23	UPR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
	LWR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
34	UPR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
	LWR	1.506 - 1.509 (0.0593 - 0.0594)	Blue	

Undersize Bearings Usage Guide

- When the specified connecting rod bearing oil clearance is not obtained with standard size connecting rod bearings, use undersize (US) bearings.
- When using undersize (US) bearing, measure the connecting rod bearing inner diameter with bearing installed, and grind the crankshaft pin so that the connecting rod bearing oil clearance satisfies the standard.

CAUTION:

In grinding crankshaft pin to use undersize bearings, keep the fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)] (A).



Bearing undersize table

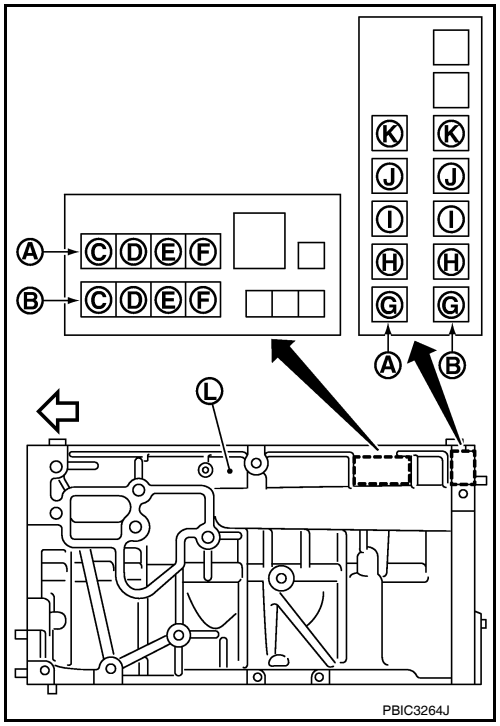
Unit: mm (in)

Size	Thickness
US 0.25 (0.0098)	1.623 - 1.631 (0.0639 - 0.0642)

HOW TO SELECT MAIN BEARING

When New Cylinder Block and Crankshaft are Used

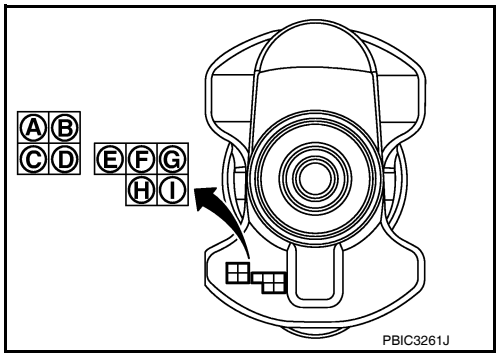
1. "Main Bearing Selection Table" rows correspond to main bearing housing grade on rear left side of cylinder block (L).



(A) : Correction stamp
(B) : Standard stamp
(C) : Cylinder No. 1 bore grade
(D) : Cylinder No. 2 bore grade
(E) : Cylinder No. 3 bore grade
(F) : Cylinder No. 4 bore grade
(G) : No. 1 main bearing housing grade
(H) : No. 2 main bearing housing grade
(I) : No. 3 main bearing housing grade
(J) : No. 4 main bearing housing grade
(K) : No. 5 main bearing housing grade
⇦ : Engine front

- If there is a correction stamp mark on cylinder block, use it as a correct reference.

2. Apply main journal diameter grade stamped on crankshaft front side to column in the "Main Bearing Selection Table".



(A) : No. 1 pin journal diameter grade
(B) : No. 2 pin journal diameter grade
(C) : No. 3 pin journal diameter grade
(D) : No. 4 pin journal diameter grade
(E) : No. 1 main journal diameter grade
(F) : No. 2 main journal diameter grade
(G) : No. 3 main journal diameter grade
(H) : No. 4 main journal diameter grade
(I) : No. 5 main journal diameter grade

3. Read the symbol at the cross point of selected row and column in the "Main Bearing Selection Table".
CAUTION:
There are two main bearing selection tables. One is for No. 1, 4 and 5 journals and the other is for No. 2 and 3 journals. Make certain to use the appropriate table. This is due to differences in the specified clearances.
4. Apply the symbol obtained to the "Main Bearing Grade Table" to select main bearing.
NOTE:
Service part is available as a set of both upper and lower.

When Cylinder Block and Crankshaft are Reused

1. Measure the dimensions of the cylinder block main bearing housing inner diameter and crankshaft main journal diameter individually. Refer to EM-100, "Inspection After Disassembly" and EM-100, "Inspection After Disassembly".
2. Apply the measured dimension to the "Main Bearing Selection Table".
3. Read the symbol at the cross point of selected row and column in the "Main Bearing Selection Table".
CAUTION:
There are two main bearing selection tables. One is for No. 1, 4 and 5 journals and the other is for No. 2 and 3 journals. Make certain to use the appropriate table. This is due to differences in the specified clearances.
4. Apply the symbol obtained to the "Main Bearing Grade Table" to select main bearing.
NOTE:

Service part is available as a set of both upper and lower.

Main Bearing Selection Table (No. 1, 4 and 5 journals)

Crankshaft main journal diameter Unit: mm (in) / Cylinder block main bearing housing inner diameter Unit: mm (in)		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
		Hole diameter	55.997 - 55.998 (2.2046 - 2.2046)	55.998 - 55.999 (2.2046 - 2.2047)	55.999 - 56.000 (2.2047 - 2.2047)	56.000 - 56.001 (2.2047 - 2.2048)	56.001 - 56.002 (2.2048 - 2.2048)	56.002 - 56.003 (2.2048 - 2.2048)	56.003 - 56.004 (2.2048 - 2.2049)	56.004 - 56.005 (2.2049 - 2.2049)	56.005 - 56.006 (2.2049 - 2.2050)	56.006 - 56.007 (2.2050 - 2.2050)	56.007 - 56.008 (2.2050 - 2.2050)	56.008 - 56.009 (2.2050 - 2.2051)	56.009 - 56.010 (2.2051 - 2.2051)	56.010 - 56.011 (2.2051 - 2.2052)	56.011 - 56.012 (2.2052 - 2.2052)	56.012 - 56.013 (2.2052 - 2.2052)	56.013 - 56.014 (2.2052 - 2.2053)	56.014 - 56.015 (2.2053 - 2.2053)	56.015 - 56.016 (2.2053 - 2.2053)	56.016 - 56.017 (2.2053 - 2.2054)
Mark	Axle diameter																					
A	51.978 - 51.979 (2.0464 - 2.0464)		0	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23
B	51.977 - 51.978 (2.0463 - 2.0464)		0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23
C	51.976 - 51.977 (2.0463 - 2.0463)		0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23
D	51.975 - 51.976 (2.0463 - 2.0463)		0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3
E	51.974 - 51.975 (2.0462 - 2.0463)		0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3
F	51.973 - 51.974 (2.0462 - 2.0462)		0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3
G	51.972 - 51.973 (2.0461 - 2.0462)		0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34
H	51.971 - 51.972 (2.0461 - 2.0461)		01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34
J	51.970 - 51.971 (2.0461 - 2.0461)		01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34
K	51.969 - 51.970 (2.0460 - 2.0461)		01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
L	51.968 - 51.969 (2.0460 - 2.0460)		1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
M	51.967 - 51.968 (2.0459 - 2.0460)		1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
N	51.966 - 51.967 (2.0459 - 2.0459)		1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
P	51.965 - 51.966 (2.0459 - 2.0459)		12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
R	51.964 - 51.965 (2.0458 - 2.0459)		12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
S	51.963 - 51.964 (2.0458 - 2.0458)		12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
T	51.962 - 51.963 (2.0457 - 2.0458)		2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
U	51.961 - 51.962 (2.0457 - 2.0457)		2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
V	51.960 - 51.961 (2.0457 - 2.0457)		2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5
W	51.959 - 51.960 (2.0456 - 2.0457)		23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	5	5

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Main Bearing Selection Table (No. 2 and 3 journals)

Crankshaft main journal diameter Unit: mm (in) / Mark	Axle diameter	Cylinder block main bearing housing inner diameter Unit: mm (in) / Hole diameter	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
		Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
		Hole diameter	55.997 - 55.998 (2.2046 - 2.2046)	55.998 - 55.999 (2.2046 - 2.2047)	55.999 - 56.000 (2.2047 - 2.2047)	56.000 - 56.001 (2.2047 - 2.2048)	56.001 - 56.002 (2.2048 - 2.2048)	56.002 - 56.003 (2.2048 - 2.2048)	56.003 - 56.004 (2.2048 - 2.2049)	56.004 - 56.005 (2.2049 - 2.2049)	56.005 - 56.006 (2.2049 - 2.2050)	56.006 - 56.007 (2.2050 - 2.2050)	56.007 - 56.008 (2.2050 - 2.2050)	56.008 - 56.009 (2.2050 - 2.2051)	56.009 - 56.010 (2.2051 - 2.2051)	56.010 - 56.011 (2.2051 - 2.2052)	56.011 - 56.012 (2.2052 - 2.2052)	56.012 - 56.013 (2.2052 - 2.2052)	56.013 - 56.014 (2.2052 - 2.2053)	56.014 - 56.015 (2.2053 - 2.2053)	56.015 - 56.016 (2.2053 - 2.2053)	56.016 - 56.017 (2.2053 - 2.2054)
A	51.978 - 51.979 (2.0464 - 2.0464)		1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
B	51.977 - 51.978 (2.0463 - 2.0464)		12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
C	51.976 - 51.977 (2.0463 - 2.0463)		12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
D	51.975 - 51.976 (2.0463 - 2.0463)		12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
E	51.974 - 51.975 (2.0462 - 2.0463)		2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
F	51.973 - 51.974 (2.0462 - 2.0462)		2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
G	51.972 - 51.973 (2.0461 - 2.0462)		2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56
H	51.971 - 51.972 (2.0461 - 2.0461)		23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56
J	51.970 - 51.971 (2.0461 - 2.0461)		23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56
K	51.969 - 51.970 (2.0460 - 2.0461)		23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6
L	51.968 - 51.969 (2.0460 - 2.0460)		3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6
M	51.967 - 51.968 (2.0459 - 2.0460)		3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6
N	51.966 - 51.967 (2.0459 - 2.0459)		3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67
P	51.965 - 51.966 (2.0459 - 2.0459)		34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67
R	51.964 - 51.965 (2.0458 - 2.0459)		34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67
S	51.963 - 51.964 (2.0458 - 2.0458)		34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7
T	51.962 - 51.963 (2.0457 - 2.0458)		4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7
U	51.961 - 51.962 (2.0457 - 2.0457)		4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7
V	51.960 - 51.961 (2.0457 - 2.0457)		4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7
W	51.959 - 51.960 (2.0456 - 2.0457)		45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7	7

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Main Bearing Grade Table (All Journals)

Unit: mm (in)

Grade number	Thickness	Identification color	Remarks
0	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are the same for upper and lower bearings.
1	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
2	2.002 - 2.005 (0.0788- 0.0789)	Green	
3	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
4	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
5	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
6	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
7	2.017 - 2.020 (0.0794 - 0.0795)	White	

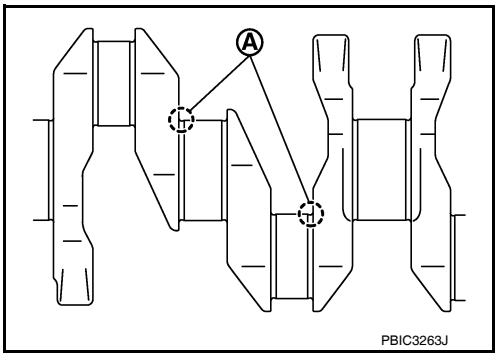
Grade number		Thickness	Identification color	Remarks
01	UPR	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
12	UPR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
	LWR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
23	UPR	2.002 - 2.005 (0.0788- 0.0789)	Green	
	LWR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
34	UPR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
	LWR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
45	UPR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
	LWR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
56	UPR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
	LWR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
67	UPR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
	LWR	2.017 - 2.020 (0.0794 - 0.0795)	White	

Use Undersize Bearing Usage Guide

- When the specified main bearing oil clearance is not obtained with standard size main bearings, use undersize (US) bearing.
- When using undersize (US) bearing, measure the main bearing inner diameter with bearing installed, and grind main journal so that the main bearing oil clearance satisfies the standard.

CAUTION:

In grinding crankshaft main journal to use undersize bearings, keep the fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)] (A).



Bearing undersize table

Unit: mm (in)

Size	Thickness
US 0.25 (0.0098)	2.126 - 2.134 (0.0837 - 0.0840)

Inspection After Disassembly

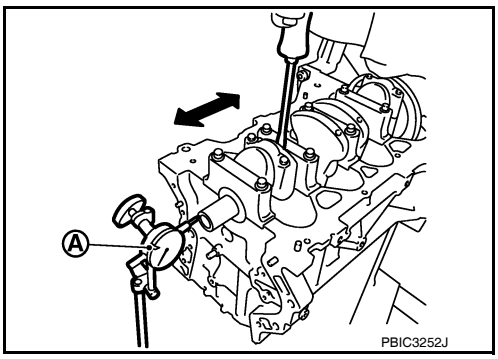
INFOID:0000000007330531

CRANKSHAFT END PLAY

- Measure the clearance between thrust bearings and crankshaft arm when crankshaft is moved fully forward or backward with a dial indicator (A).

Standard : 0.10 - 0.26 mm (0.0039 - 0.0102 in)
Limit : 0.30 mm (0.012 in)

- If the measured value exceeds the limit, replace thrust bearings, and measure again. If it still exceeds the limit, replace crankshaft also.

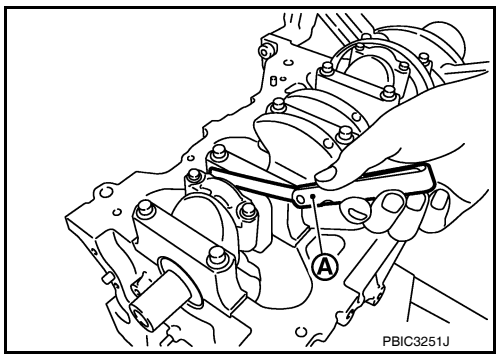


CONNECTING ROD SIDE CLEARANCE

- Measure the side clearance between connecting rod and crankshaft arm with a feeler gauge (A).

Standard : 0.20 - 0.35 mm (0.0079 - 0.0138 in)
Limit : 0.40 mm (0.0157 in)

- If the measured value exceeds the limit, replace connecting rod, and measure again. If it still exceeds the limit, replace crankshaft also.

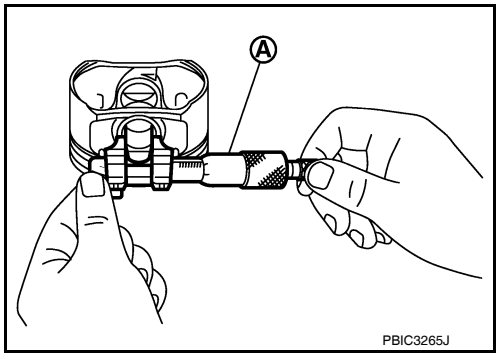


PISTON TO PISTON PIN OIL CLEARANCE

Piston Pin Hole Diameter

Measure the inner diameter of piston pin hole with an inside micrometer (A).

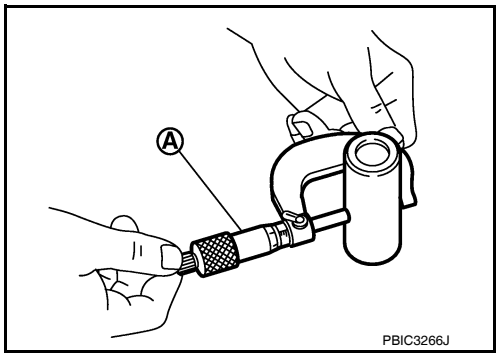
Standard: 19.993 - 19.999 mm (0.7871 - 0.7874 in)



Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer (A).

Standard: 19.989 - 19.995 mm (0.7870 - 0.7872 in)



Piston to Piston Pin Oil Clearance

(Piston to piston pin oil clearance) = (Piston pin hole diameter) – (Piston pin outer diameter)

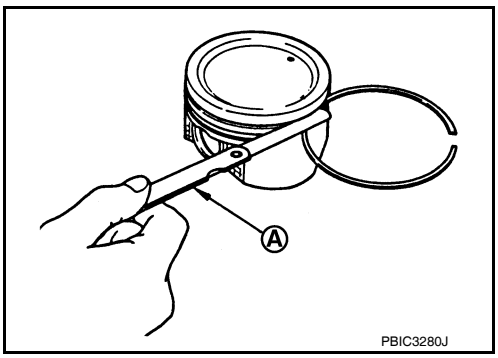
Standard: 0.002 - 0.006 mm (0.0001 - 0.0002 in)

- If oil clearance is out of the standard, replace piston and piston pin assembly.
- When replacing piston and piston pin assembly, follow the "Piston to Cylinder Bore Clearance" procedure.

NOTE:
- Piston is available together with piston pin as assembly.
- Piston pin (piston pin hole) grade is provided only for the parts installed at the plant. For service parts, no grades can be selected. (Only grade “0” is available.)

PISTON RING SIDE CLEARANCE

- Measure the side clearance of piston ring and piston ring groove with a feeler gauge (A).



Standard:

Top ring	**: 0.04 - 0.08 mm (0.002 - 0.003 in)**
2nd ring	**: 0.03 - 0.07 mm (0.001 - 0.003 in)**
Oil ring	**: 0.015 - 0.185 mm (0.001 - 0.007 in)**

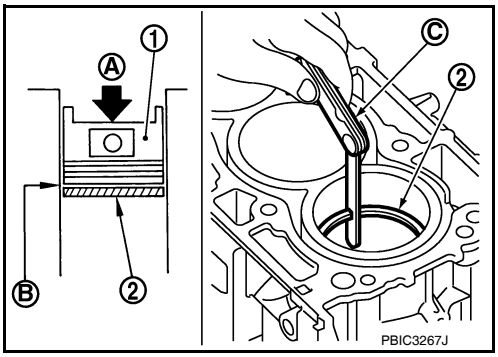
Limit:

Top ring	**: 0.11 mm (0.0043 in)**
2nd ring	**: 0.10 mm (0.0039 in)**

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace piston also.

PISTON RING END GAP

- Make sure that cylinder bore inner diameter is within specification. Follow the "Cylinder Bore Inner Diameter" procedure.
- Lubricate with new engine oil to piston (1) and piston ring (2), and then insert (A) piston ring until middle of cylinder (B) with piston, and measure piston ring end gap with a feeler gauge (C).



Standard:

Top ring	**: 0.20 - 0.25 mm (0.008 - 0.010 in)**
2nd ring	**: 0.50 - 0.65 mm (0.020 - 0.026 in)**
Oil ring (rail ring)	**: 0.15 - 0.45 mm (0.006 - 0.018 in)**

Limit:

Top ring	**: 0.51 mm (0.020 in)**
2nd ring	**: 0.83 mm (0.033 in)**
Oil ring (rail ring)	**: 0.78 mm (0.031 in)**

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace the cylinder block.

CONNECTING ROD BEND AND TORSION

- Check with a connecting rod aligner.

(C) : Feeler gauge

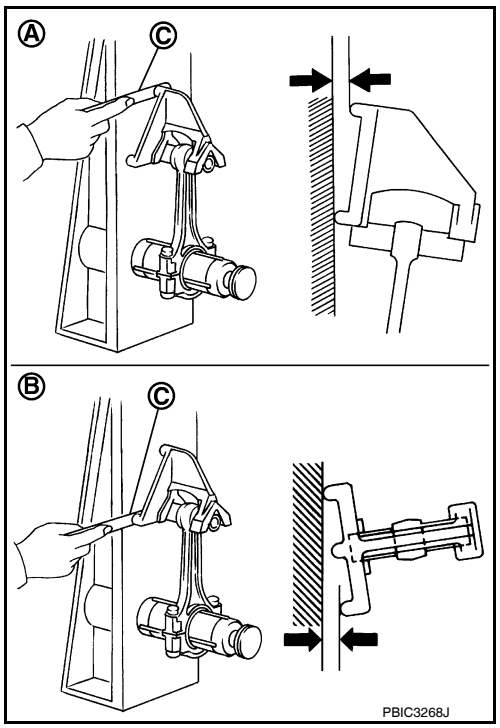
Bend (A):

Limit: 0.15 mm (0.0059 in) per 100 mm (3.94 in) length

Torsion (B):

Limit: 0.30 mm (0.0118 in) per 100 mm (3.94 in) length

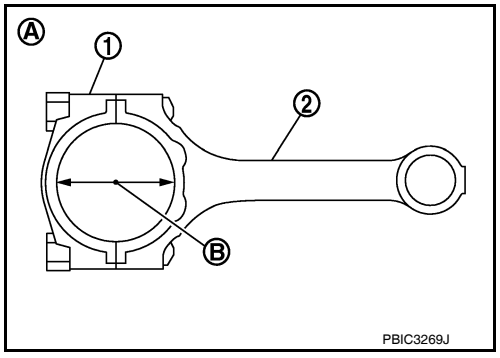
- If it exceeds the limit, replace connecting rod assembly.



CONNECTING ROD BIG END DIAMETER

- Install connecting rod cap (1) without connecting rod bearing installed, and tightening connecting rod bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.

(2) : Connecting rod
(A) : Example
(B) : Measuring direction of inner diameter



- Measure the inner diameter of connecting rod big end with an inside micrometer.

Standard: 47.000 - 47.013 mm (1.8504 - 1.8509 in)

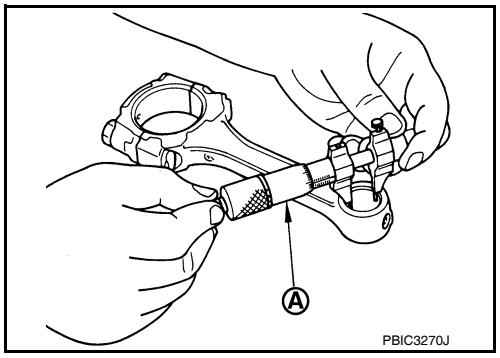
- If out of the standard, replace connecting rod assembly.

CONNECTING ROD BUSHING OIL CLEARANCE

Connecting Rod Bushing Inner Diameter

Measure the inner diameter of connecting rod bushing with an inside micrometer (A).

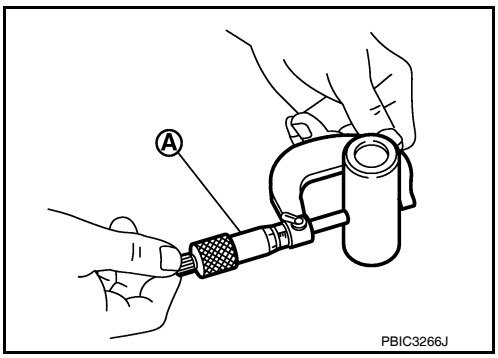
Standard: 20.000 - 20.012 mm (0.7874 - 0.7879 in)



Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer (A).

Standard: 19.989 - 19.995 mm (0.7870 - 0.7872 in)



Connecting Rod Bushing Oil Clearance

(Connecting rod bushing oil clearance) = (Connecting rod bushing inner diameter) – (Piston pin outer diameter)

Standard : 0.005 - 0.023 mm (0.0002 - 0.0009 in)

Limit : 0.03 mm (0.0012 in)

- If the measured value is out of the standard, replace connecting rod assembly and/or piston and piston pin assembly.
- If replacing piston and piston pin assembly, follow the "PISTON TO PISTON PIN OIL CLEARANCE" procedure.
- If replacing connecting rod assembly, follow the "Connecting Rod Bushing Oil Clearance" procedure to select connecting rod bearing.

CYLINDER BLOCK TOP SURFACE DISTORTION

- Using a scraper, remove gasket on the cylinder block surface, and also remove engine oil, scale, carbon, or other contamination.

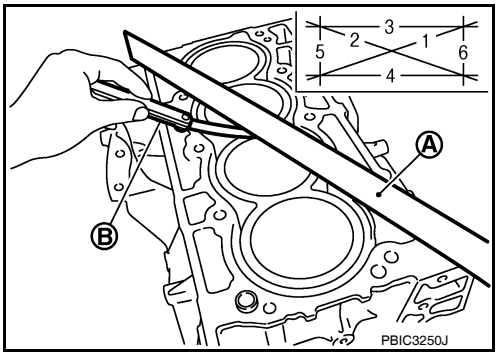
CAUTION:

Be careful not to allow gasket flakes to enter engine oil or engine coolant passages.

- Measure the distortion on the cylinder block upper face at some different points in six directions with a straight edge (A) and feeler gauge (B).

Limit: 0.1 mm (0.004 in)

- If it exceeds the limit, replace cylinder block.



MAIN BEARING HOUSING INNER DIAMETER

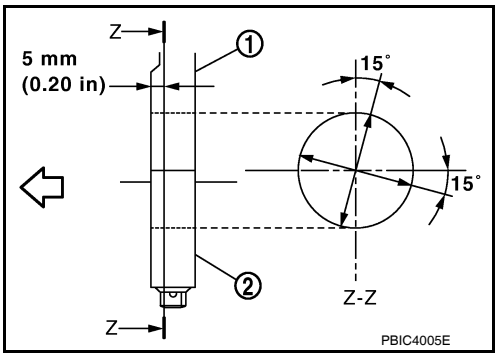
- Install main bearing cap without main bearings installed, and tighten main bearing cap bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.
- Measure the inner diameter of main bearing housing with a bore gauge.
- Measure the position shown [5 mm (0.20 in)] backward from main bearing housing front side in the 2 directions as shown. The smaller one is the measured value.

(1) : Cylinder block

(2) : Main bearing cap

⇦ : Engine front

Standard: 55.997 - 56.017 mm (2.2046 - 2.2054 in)



- If out of the standard, replace cylinder block and main bearing caps assembly.

NOTE:

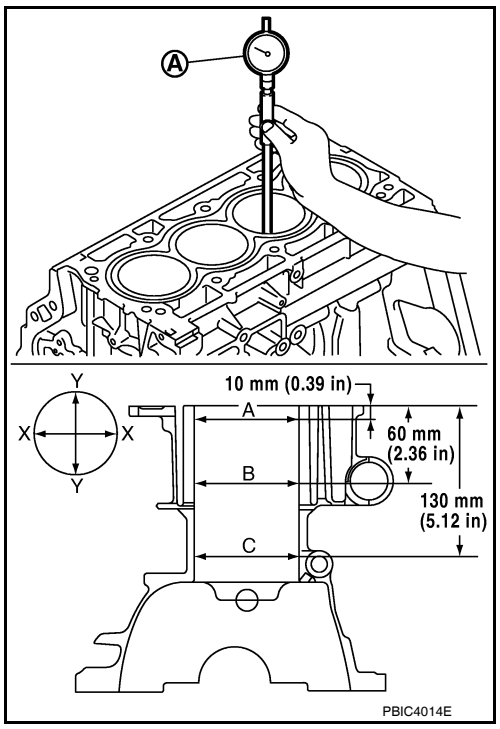
Main bearing caps cannot be replaced as a single part, because it is machined together with cylinder block.

PISTON TO CYLINDER BORE CLEARANCE

Cylinder Bore Inner Diameter

- Using a bore gauge (A), measure the cylinder bore for wear, out-of-round and taper at six different points on each cylinder. [(X) and (Y) directions at (A), (B) and (C)] [(Y) is in longitudinal direction of engine].
  NOTE:
  When determining cylinder bore grade, measure the cylinder bore (X) direction at (B) position.

Standard inner diameter:
84.000 - 84.020 mm (3.3071 - 3.3079 in)
Out-of-round [Difference between (X) and (Y)]:
0.015 mm (0.0006 in)
Taper limit [Difference between (A) and (C)]:
0.01 mm (0.0004 in)

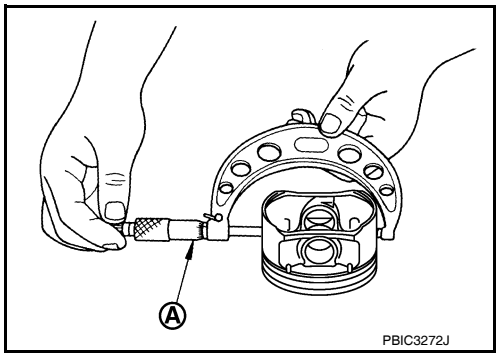


- If the measured value exceeds the limit, or if there are scratches and/or seizure on the cylinder inner wall, replace cylinder block.
  NOTE:
  Oversize piston is not provided.

Piston Skirt Diameter

Measure the outer diameter of piston skirt with a micrometer (A).

Measure point
: Distance from the top 39.9 mm (1.571 in)
Standard
: 83.970 - 83.990 mm (3.3059 - 3.3067 in)



Piston to Cylinder Bore Clearance

Calculate by piston skirt diameter and cylinder bore inner diameter [direction (X), position (B)].
(Clearance) = (Cylinder bore inner diameter) – (Piston skirt diameter)

Standard : 0.020 - 0.040 mm (0.0008 - 0.0016 in)
Limit : 0.08 mm (0.0031 in)

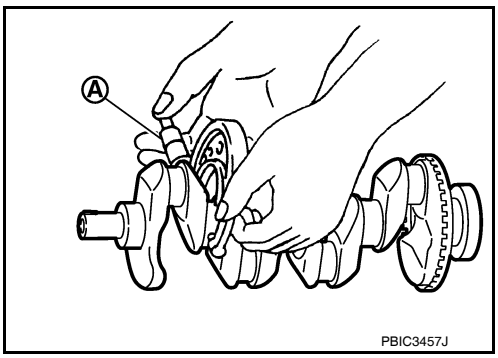
- If it exceeds the limit, replace piston and piston pin assembly and/or cylinder block. Refer to EM-93, "How to Select Piston and Bearing".

CRANKSHAFT MAIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft main journals with a micrometer (A).

Standard: 51.959 - 51.979 mm (2.0456 - 2.0464 in) dia.

- If out of the standard, measure the main bearing oil clearance. Then use undersize bearing. Follow the "MAIN BEARING OIL CLEARANCE" procedure.

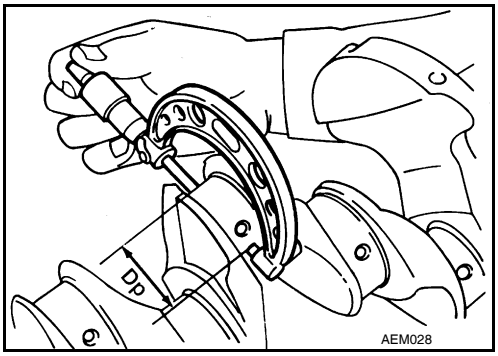


CRANKSHAFT PIN JOURNAL DIAMETER

- Measure the outer diameter (Dp) of crankshaft pin journal with a micrometer.

Standard: 43.953 - 43.971 mm (1.7304-1.7311 in) dia.

- If out of the standard, measure the connecting rod bearing oil clearance. Then use undersize bearing. Follow the "CONNECTING ROD BEARING OIL CLEARANCE" procedure.



OUT-OF-ROUND AND TAPER OF CRANKSHAFT

- Measure the dimensions at four different points as shown on each main journal and pin journal with a micrometer.
- Out-of-round is indicated by the difference in dimensions between (X) and (Y) at (A) and (B).
- Taper is indicated by the difference in dimension between (A) and (B) at (X) and (Y).

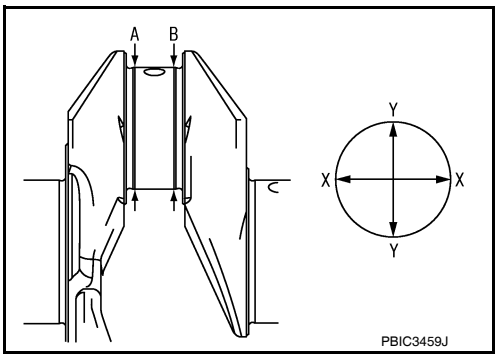
Limit:

Out-of-round [Difference between (X) and (Y)]

: 0.0035 mm (0.0001 in)

Taper [Difference between (A) and (B)]

: 0.0035 mm (0.0001 in)



- If the measured value exceeds the limit, correct or replace crankshaft.
- If corrected, measure the bearing oil clearance of the corrected main journal and/or pin journal. Then select main bearing and/or connecting rod bearing. Follow the "MAIN BEARING OIL CLEARANCE" and/or "CONNECTING ROD BEARING OIL CLEARANCE" procedures.

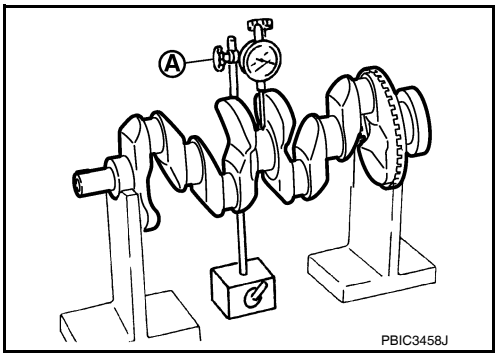
CRANKSHAFT RUNOUT

- Place a V-block on a precise flat table to support the journals on the both end of the crankshaft.
- Place a dial indicator (A) straight up on the No. 3 journal.
- While rotating crankshaft, read the movement of the pointer on the dial indicator. (Total indicator reading)

Standard : 0.05 mm (0.0020 in)

Limit : 0.10 mm (0.0040 in)

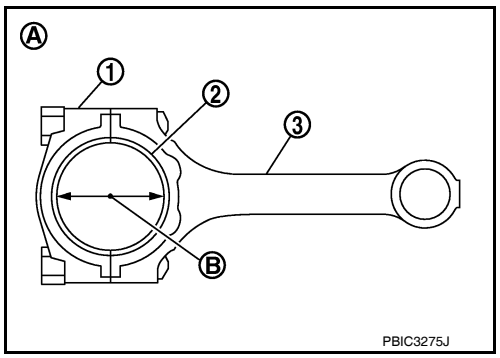
- If it exceeds the limit, replace crankshaft.



CONNECTING ROD BEARING OIL CLEARANCE

Method by Calculation

- Install connecting rod bearings (2) to connecting rod (3) and connecting rod bearing cap (1), and tighten connecting rod bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for tightening procedure.



(A) : Example
(B) : Inner diameter measuring direction

- Measure the inner diameter of connecting rod bearing with an inside micrometer.
(Bearing oil clearance) = (Connecting rod bearing inner diameter) – (Crankshaft pin journal diameter)

Standard : 0.037 - 0.047 mm (0.0015 - 0.0019 in)
Limit : 0.07 mm (0.0028 in)

- If clearance exceeds the limit, select proper connecting rod bearing according to connecting rod big end diameter and crankshaft pin journal diameter to obtain specified bearing oil clearance. Refer to EM-93, "How to Select Piston and Bearing".

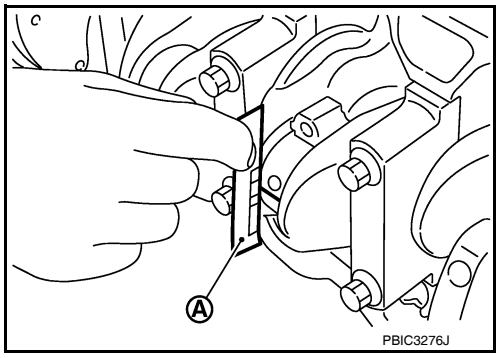
Method of Using Plastigage

- Remove engine oil and dust on crankshaft pin and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.

CAUTION:
Do not rotate crankshaft.

- Remove connecting rod cap and bearing, and using the scale (A) on the plastigage bag, measure the plastigage width.

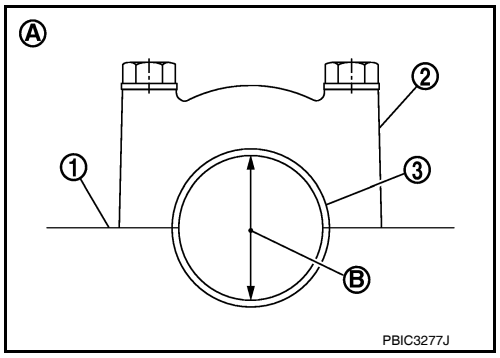
NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



MAIN BEARING OIL CLEARANCE

Method by Calculation

- Install main bearings (3) to cylinder block (1) and main bearing cap (2), and tighten main bearing cap bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.



(A) : Example
(B) : Inner diameter measuring direction

- Measure the inner diameter of main bearing with a bore gauge.

(Bearing oil clearance) = (Main bearing inner diameter) – (Crankshaft main journal diameter)

Standard:
No. 1, 4 and 5 journals
: 0.024 - 0.034 mm (0.0009 - 0.0013 in)
No. 2 and 3 journals
: 0.012 - 0.022 mm (0.0005 - 0.0009 in)
Limit : 0.065 mm (0.0026 in)

- If clearance exceeds the limit, select proper main bearing according to main bearing inner diameter and crankshaft main journal diameter to obtain specified bearing oil clearance. Refer to EM-93, "How to Select Piston and Bearing".

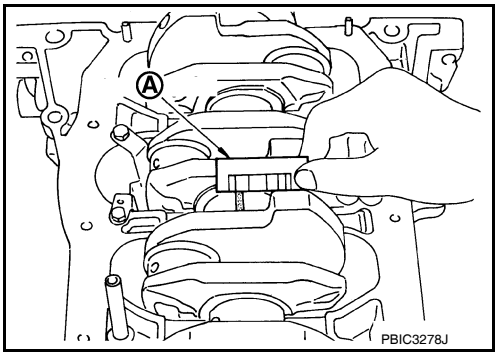
Method of Using Plastigage

- Remove engine oil and dust on crankshaft main journal and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install main bearings to cylinder block and main bearing cap, and tighten main bearing cap bolts to the specified torque. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.

CAUTION:
Do not rotate crankshaft.

- Remove main bearing cap and bearings, and using the scale (A) on the plastigage bag, measure the plastigage width.

NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method by Calculation”.



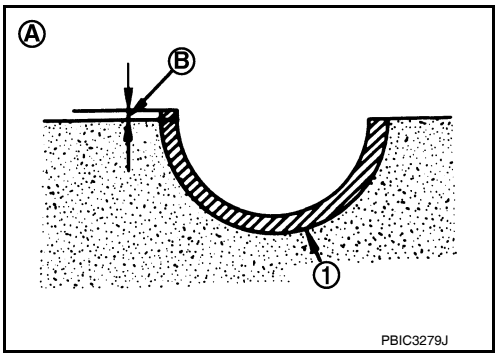
MAIN BEARING CRUSH HEIGHT

- When main bearing cap is removed after being tightened to the specified torque with main bearings (1) installed, the tip end of bearing must protrude (B). Refer to EM-84, "Disassembly and Assembly" for the tightening procedure.

(A) : Example

Standard : There must be crush height.

- If the standard is not met, replace main bearings.



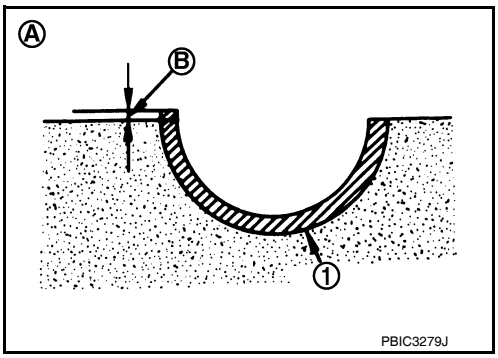
CONNECTING ROD BEARING CRUSH HEIGHT

- When connecting rod bearing cap is removed after being tightened to the specified torque with connecting rod bearings (1) installed, the tip end of bearing must protrude. Refer to EM-84, "Disassembly and Assembly" for the tightening procedure (B).

(A) : Example

Standard : There must be crush height.

- If the standard is not met, replace connecting rod bearings.



MAIN BEARING CAP BOLT OUTER DIAMETER

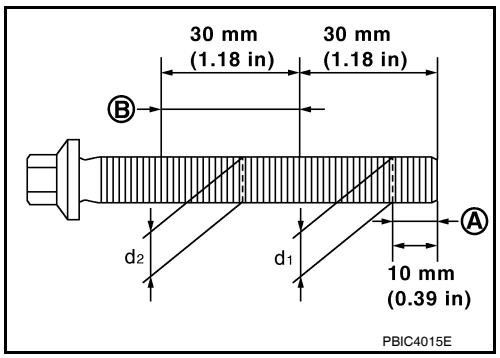
- Measure the outer diameters [(d_1), (d_2)] at two positions as shown.

(A) : (d1) measuring position
(B) : (d2) measuring position

- If reduction appears in places other than (B) range, regard it as (d_2).

Limit [(d_1)– (d_2)]: 0.15 mm (0.0059 in)

- If it exceeds the limit (a large difference in dimensions), replace main bearing cap bolt with a new one.

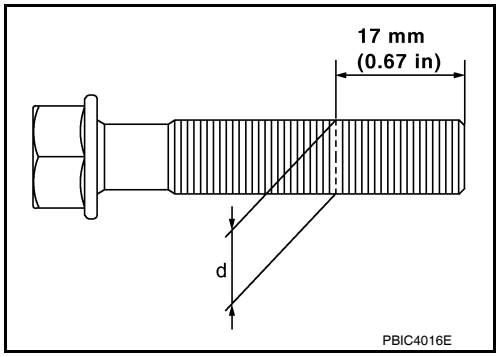


CONNECTING ROD BOLT OUTER DIAMETER

- Measure the outer diameter (d) at position as shown.
- If reduction appears in a position other than (d), regard it as (d).

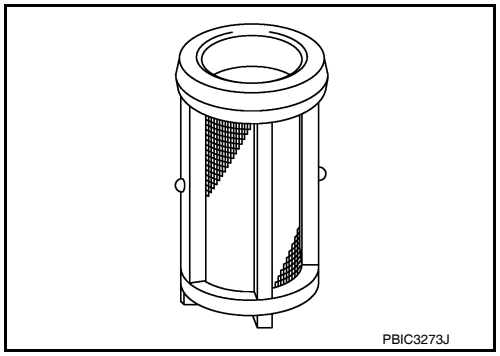
Limit: 7.75 mm (0.3051 in)

- When (d) exceeds the limit (when it becomes thinner), replace connecting rod bolt with a new one.



CLOGGED OR DAMAGED OIL FILTER (FOR INTAKE VALVE TIMING CONTROL)

- Make sure that there is no foreign material on the oil filter and check it for clogging.
- Clean it if necessary.
- Check the oil filter for damage.
- Replace it if necessary.



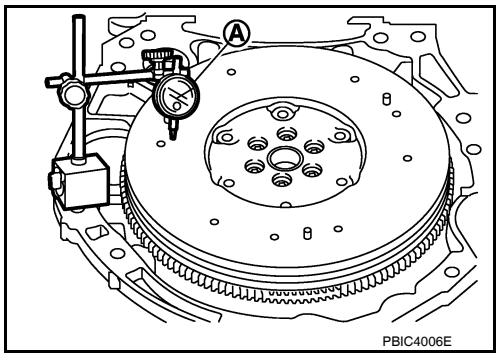
FLYWHEEL DEFLECTION (M/T MODELS)

- Measure the deflection of flywheel contact surface to clutch with a dial indicator (A).
- Measure the deflection at 210 mm (8.27 in) diameter.

Limit : 0.45 mm (0.0177 in) or less.

- If measured value is out of the standard, replace flywheel.
- If a trace of burn or discoloration is found on the surface, repair it with sandpaper.

CAUTION:
When measuring, keep magnetic fields (such as dial indicator stand) away from signal plate of the rear end of crankshaft.



MOVEMENT AMOUNT OF FLYWHEEL (M/T MODELS)

CAUTION:
Do not disassemble double mass flywheel.

Movement Amount of Thrust (Fore-and-Aft) Direction

- Measure the movement amount of thrust (fore-and-aft) direction when 100 N (10.2 kg, 22 lb) force is added at the portion of 125 mm (4.92 in) radius from the center of flywheel.

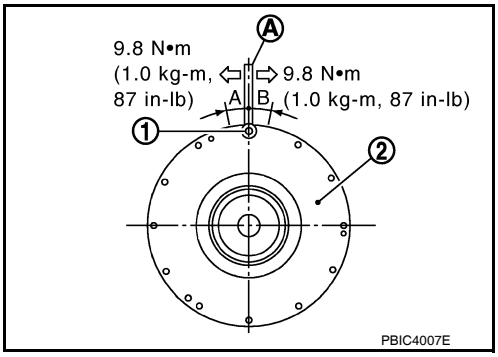
Standard : 1.8 mm (0.071 in) or less

• If measured value is out of the standard, replace flywheel.

Movement Amount in Radial (Rotation) Direction

Check the movement amount of radial (rotation) direction with the following procedure:

1. Install clutch cover bolt (1) to clutch cover mating hole, and place a torque wrench (A) on the extended line of the flywheel (2) center line.
   • Tighten bolt at a force of 9.8 N·m (1.0 kg-m, 87 in-lb) to keep it from loosening.
2. Put a mating mark on circumferences of the two flywheel masses without applying any load (Measurement standard points).
3. Apply a force of 9.8 N·m (1.0 kg-m, 87 in-lb) in each direction, and mark the movement amount on the mass on the transaxle side.
4. Measure the dimensions of movement amounts (A) and (B) on circumference of the flywheel on the transaxle side.



Limit: 33.2 mm (1.307 in) or less.

• If measured value is out of the standard, replace flywheel.

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:0000000007330532

GENERAL SPECIFICATIONS

Engine type		MR18DE
Cylinder arrangement		In-line 4
Displacement cm^3 (cu in)		1,797 (109.65)
Bore and stroke mm (in)		84.0 x 81.1 (3.307 x 3.192)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Compression ratio		9.9
Compression pressure kPa (kg/cm^2, psi) / 250 rpm	Standard	1,500 (15.3, 217.6)
	Minimum	1,200 (12.2, 174)
	Differential limit between cylinders	100 (1.0, 15)

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

WATER CONTROL VALVE

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Full-open valve lift amount	8 mm/ 108°C (0.315 in/ 226°F)
Valve closing temperature	More than 90°C (194°F)

EXHAUST MANIFOLD

Unit: mm (in)

Items		Limit
Surface distortion	Each exhaust port	0.3 (0.012)
	Entire part	0.7 (0.028)

THERMOSTAT

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Full-open valve lift amount	8 mm/ 95°C (0.315 in/ 203°F)
Valve closing temperature	More than 77°C (171°F)

SPARK PLUG

Unit: mm (in)

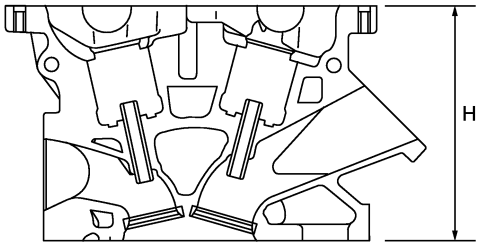
Make	DENSO
Standard type*	FXE20HR-11
Spark plug gap	Nominal: 1.1 (0.043)

*: Always check with the Parts Department for the latest parts information.

CYLINDER HEAD

Unit: mm (in)

Items	Standard	Limit
Head surface distortion	—	0.1 (0.004)
Normal cylinder head height (H)	130.9 (5.15)	—
Groove of No. 1 journal	4.000 - 4.300 (0.1575 - 0.1587)	—



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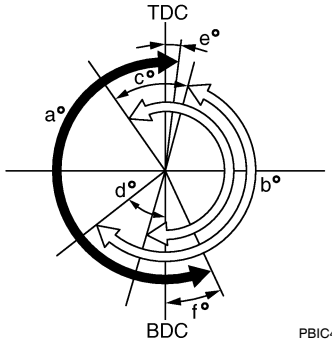
VALVE

Valve Timing

Unit: degree

Valve timing



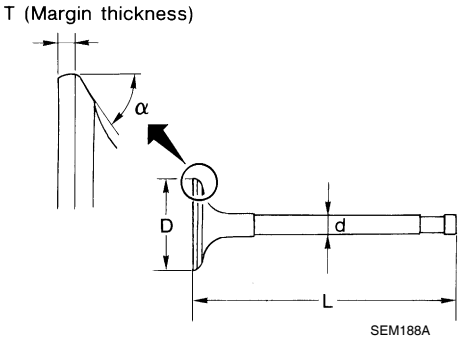
PBIC4542E

a	b	c	d	e	f
212	224	-8 (32)	52 (12)	7	25

( ): Valve timing control “ON”

Valve Dimensions

Unit: mm (in)



SEM188A

Valve head diameter (D)	Intake	33.8 - 34.1 (1.331 - 1.343)
	Exhaust	27.6 - 27.9 (1.087 - 1.098)
Valve length (L)	Intake	106.27 (4.184)
	Exhaust	105.26 (4.144)

Valve stem diameter (d)	Intake	5.465 - 5.480 (0.2152 - 0.2157)
	Exhaust	5.455 - 5.470 (0.2148 - 0.2154)
Valve seat angle (α		45°15′ - 45°45′
Valve margin (T)	Intake	1.1 (0.043)
	Exhaust	1.2 (0.047)

Valve Clearance

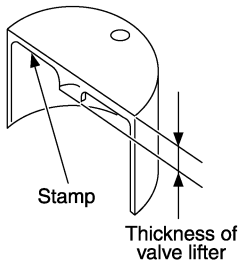
Unit: mm (in)

Items	Cold	Hot* (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

Available Valve Lifter

Thickness mm (in)	Identification mark*



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3.00 (0.1181)	300
3.02 (0.1189)	302
3.04 (0.1197)	304
3.06 (0.1205)	306
3.08 (0.1213)	308
3.10 (0.1220)	310
3.12 (0.1228)	312
3.14 (0.1236)	314
3.16 (0.1244)	316
3.18 (0.1252)	318
3.20 (0.1260)	320
3.22 (0.1268)	322
3.24 (0.1276)	324
3.26 (0.1283)	326
3.28 (0.1291)	328
3.30 (0.1299)	330
3.32 (0.1307)	332
3.34 (0.1315)	334
3.36 (0.1323)	336
3.38 (0.1331)	338
3.40 (0.1339)	340
3.42 (0.1346)	342

Thickness mm (in)	Identification mark*
3.44 (0.1354)	344
3.46 (0.1362)	346
3.48 (0.1370)	348
3.50 (0.1378)	350

*: Always check with the Parts Department for the latest parts information.

Valve Spring

Items	Intake	Exhaust
Free height	44.90 - 45.10 mm (1.7677 - 1.7755 in)	45.74 - 45.94 mm (1.8007 - 1.8086 in)
Installation height	35.30 mm (1.390 in)	35.30 mm (1.390 in)
Installation load	153 - 173 N (15.6 - 17.6 kg, 34 - 39 lb)	139 - 157 N (14.2 - 16.0 kg, 31 - 35 lb)
Height during valve open	26.36 mm (1.0377 in)	27.80 mm (1.0944 in)
Load with valve open	335 - 377 N (34.2 - 38.5 kg, 75 - 85 lb)	266 - 297 N (27.1 - 30.3 kg, 60 - 67 lb)
Identification color	White	Orange
Squareness [Limit]	1.9 mm (0.075 in)	

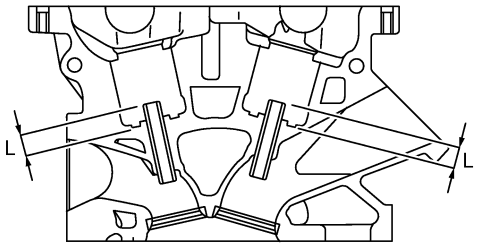
Valve Lifter

Unit: mm (in)

Items		Standard
Valve lifter outer diameter	Intake	33.977 - 33.987 (1.3377 - 1.3381)
	Exhaust	29.977 - 29.987 (1.1802 - 1.1806)
Valve lifter hole diameter	Intake	34.000 - 34.021 (1.3386 - 1.3394)
	Exhaust	30.000 - 30.021 (1.1811 - 1.1819)
Valve lifter clearance		0.013 - 0.044 (0.0005 - 0.0017)

Valve Guide

Unit: mm (in)



PBIC0184E

Items		Standard part	Service part
Valve guide	Outer diameter	9.523 - 9.534 (0.3749 - 0.3754)	9.723 - 9.734 (0.3828 - 0.3832)
	Inner diameter (Finished size)	5.500 - 5.518 (0.2165 - 0.2172)	
Cylinder head valve guide hole diameter		9.475 - 9.496 (0.3730 - 0.3739)	9.675 - 9.696 (0.3809 - 0.3817)
Interference fit of valve guide		0.027 - 0.059 (0.0011 - 0.0023)	

Items		Standard	Limit
Valve guide clearance	Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.1 (0.004)
	Exhaust	0.030 - 0.063 (0.0012 - 0.0025)	
Projection length (L)		13.35 - 13.65 (0.526 - 0.537)	

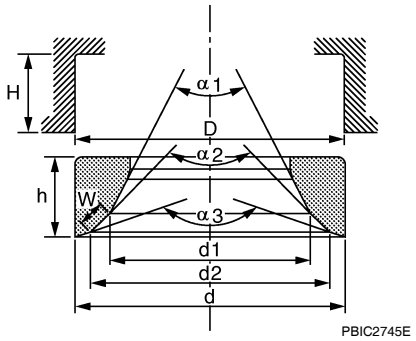
Valve Seal

Unit: mm (in)

Items	Standard	Limit
Valve seal installed height	15.1 - 15.7 (0.594 - 0.618)	—

Valve Seat

Unit: mm (in)



Items		Standard	Oversize [0.5 (0.02)] (Service)
Cylinder head seat recess diameter (D)	Intake	34.700 - 34.727 (1.3661 - 1.3672)	35.200 - 35.227 (1.3858 - 1.3869)
	Exhaust	28.700 - 28.727 (1.1299 - 1.1310)	29.200 - 29.227 (1.1496 - 1.1507)
Valve seat outer diameter (d)	Intake	34.808 - 34.824 (1.3704 - 1.3710)	35.308 - 35.324 (1.3901 - 1.3907)
	Exhaust	28.808 - 28.824 (1.1342 - 1.1348)	29.308 - 29.324 (1.1539 - 1.1545)
Valve seat interference fit		0.081 - 0.124 (0.0032 - 0.0049)	
Diameter (d1)*1	Intake	31.8 (1.252)	
	Exhaust	25.3 (0.996)	
Diameter (d2)*2	Intake	33.1 - 33.6 (1.303 - 1.323)	
	Exhaust	26.9 - 27.4 (1.059 - 1.079)	
Angle (α1)	Intake	60°	
	Exhaust	45°	
Angle (α2)		88°45′ - 90°15′	
Angle (α3)		120°	
Contacting width (W)*3	Intake	1.0 - 1.4 (0.039 - 0.055)	
	Exhaust	1.2 - 1.6 (0.047 - 0.063)	
Height (h)	Intake	5.9 - 6.0 (0.232 - 0.236)	5.03 - 5.13 (0.1980 - 0.2020)
	Exhaust	5.9 - 6.0 (0.232 - 0.236)	4.95 - 5.05 (0.1949 - 0.1988)
Depth (H)	Intake	6.04 (0.2378)	
	Exhaust	6.05 (0.2382)	

*1 : Diameter made by intersection point of conic angles (α1) and (α2)

*2 : Diameter made by intersection point of conic angles (α2) and α3)

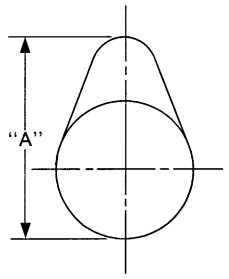
*3 : Machining data

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

Items		Standard	Limit
Camshaft journal oil clearance	No. 1	0.045 - 0.086 (0.0018 - 0.0034)	0.15 (0.0059)
	No. 2, 3, 4, 5	0.030 - 0.071 (0.0012 - 0.0028)	
Camshaft bracket inner diameter	No. 1	28.000 - 28.021 (1.1024 - 1.1032)	—
	No. 2, 3, 4, 5	25.000 - 25.021 (0.9843 - 0.9851)	—

Camshaft journal diameter	No. 1	27.935 - 27.955 (1.0998 - 1.1006)	—
	No. 2, 3, 4, 5	24.950 - 24.970 (0.9823 - 0.9381)	—
Camshaft end play		0.075 - 0.153 (0.0030 - 0.0060)	0.24 (0.0094)
Camshaft cam height (A)	Intake	44.605 - 44.795 (1.7560 - 1.7635)	44.405 (1.7482)
	Exhaust	43.175 - 43.365 (1.6997 - 1.7072)	42.975 (1.6919)
Camshaft flange		3.877 - 3.925 (0.1526 - 0.1545)	—
Camshaft runout [TIR*]		Less than 0.02 (0.0008)	0.05 (0.0020)
Camshaft sprocket runout [TIR*]		—	0.15 (0.0059)



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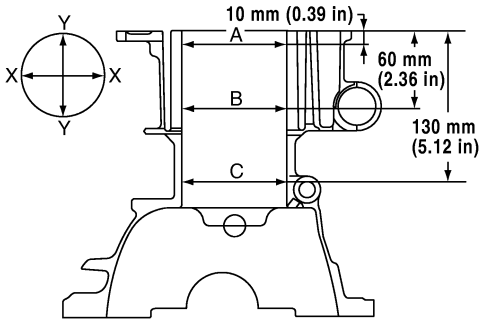
*: Total indicator reading

CYLINDER BLOCK

Unit: mm (in)



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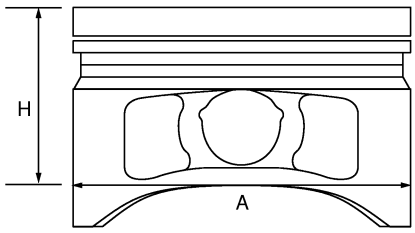
Top surface distortion		Limit		0.1 (0.004)
Cylinder bore	Inner diameter	Standard	Grade No. 1	84.000 - 84.010 (3.3071 - 3.3075)
			Grade No. 2	84.010 - 84.020 (3.3075 - 3.3079)

Out-of-round [Difference between (X) and (Y)]	Limit	0.015 (0.0006)
Taper [Difference between (A) and (C)]		0.01 (0.0004)
Main bearing housing inner diameter grade	Grade No. A	55.997 - 55.998 (2.2046 - 2.2046)
	Grade No. B	55.998 - 55.999 (2.2046 - 2.2047)
	Grade No. C	55.999 - 56.000 (2.2047 - 2.2047)
	Grade No. D	56.000 - 56.001 (2.2047 - 2.2048)
	Grade No. E	56.001 - 56.002 (2.2048 - 2.2048)
	Grade No. F	56.002 - 56.003 (2.2048 - 2.2048)
	Grade No. G	56.003 - 56.004 (2.2048 - 2.2049)
	Grade No. H	56.004 - 56.005 (2.2049 - 2.2049)
	Grade No. J	56.005 - 56.006 (2.2049 - 2.2050)
	Grade No. K	56.006 - 56.007 (2.2050 - 2.2050)
	Grade No. L	56.007 - 56.008 (2.2050 - 2.2050)
	Grade No. M	56.008 - 56.009 (2.2050 - 2.2051)
	Grade No. N	56.009 - 56.010 (2.2051 - 2.2051)
	Grade No. P	56.010 - 56.011 (2.2051 - 2.2052)
	Grade No. R	56.011 - 56.012 (2.2052 - 2.2052)
	Grade No. S	56.012 - 56.013 (2.2052 - 2.2052)
	Grade No. T	56.013 - 56.014 (2.2052 - 2.2053)
	Grade No. U	56.014 - 56.015 (2.2053 - 2.2053)
	Grade No. V	56.015 - 56.016 (2.2053 - 2.2053)
	Grade No. W	56.016 - 56.017 (2.2053 - 2.2054)

PISTON, PISTON RING AND PISTON PIN

Available Piston

Unit: mm (in)



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		Grade*	Dimension
Piston skirt diameter (A)	Standard	Grade No. 1	83.970 - 83.980 (3.3059 - 3.3063)
		Grade No. 2	83.980 - 83.990 (3.3063 - 3.3067)
Piston height (H) dimension			39.9 (1.571)
Piston pin hole diameter			19.993 - 19.999 (0.7871 - 0.7874)
Piston to cylinder bore clearance		Standard	0.020 - 0.040 (0.0008 - 0.0016)
		Limit	0.08 (0.0031)

*: Always check with the Parts Department for the latest parts information.

Piston Ring

Unit: mm (in)

Items		Standard	Limit
Side clearance	Top	0.04 - 0.08 (0.002 - 0.003)	0.11 (0.0043)
	2nd	0.03 - 0.07 (0.001 - 0.003)	0.10 (0.0039)
	Oil ring	0.015 - 0.185 (0.001 - 0.007)	—
End gap	Top	0.20 - 0.25 (0.008 - 0.010)	0.51 (0.020)
	2nd	0.50 - 0.65 (0.020 - 0.026)	0.83 (0.033)
	Oil (rail ring)	0.15 - 0.45 (0.006 - 0.018)	0.78 (0.031)

Piston Pin

Unit: mm (in)

Items	Standard	Limit
Piston pin outer diameter	19.989 - 19.995 (0.7870 - 0.7872)	—
Piston to piston pin oil clearance	0.002 - 0.006 (0.0001 - 0.0002)	—
Connecting rod bushing oil clearance	0.005 - 0.023 (0.0002 - 0.0009)	0.03 (0.0012)

CONNECTING ROD

Unit: mm (in)

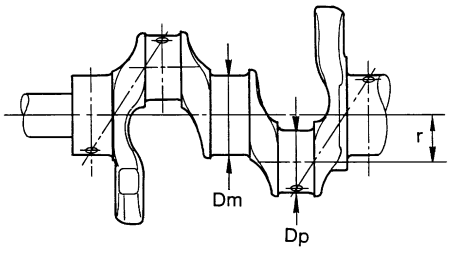
Center distance		143.44 - 143.54 (5.647 - 5.650)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)
Connecting rod bushing inner diameter[1]		20.000 - 20.012 (0.7874 - 0.7879)
Side clearance	Standard	0.20 - 0.35 (0.0079 - 0.0138)
	Limit	0.40 (0.0157)
Connecting rod big end diameter	Grade[2]	Dimension
	Grade No. A	47.000 - 47.001 (1.8504 - 1.8504)
	Grade No. B	47.001 - 47.002 (1.8504 - 1.8505)
	Grade No. C	47.002 - 47.003 (1.8505 - 1.8505)
	Grade No. D	47.003 - 47.004 (1.8505 - 1.8505)
	Grade No. E	47.004 - 47.005 (1.8505 - 1.8506)
	Grade No. F	47.005 - 47.006 (1.8506 - 1.8506)
	Grade No. G	47.006 - 47.007 (1.8506 - 1.8507)
	Grade No. H	47.007 - 47.008 (1.8507 - 1.8507)
	Grade No. J	47.008 - 47.009 (1.8507- 1.8507)
	Grade No. K	47.009 - 47.010 (1.8507- 1.8508)
	Grade No. L	47.010 - 47.011 (1.8508 - 1.8508)
	Grade No. M	47.011 - 47.012 (1.8508 - 1.8509)
	Grade No. N	47.012 - 47.013 (1.8509 - 1.8509)

[1]: After installing in connecting rod

[2]: Always check with the Parts Department for the latest parts information.

CRANKSHAFT

Unit: mm (in)



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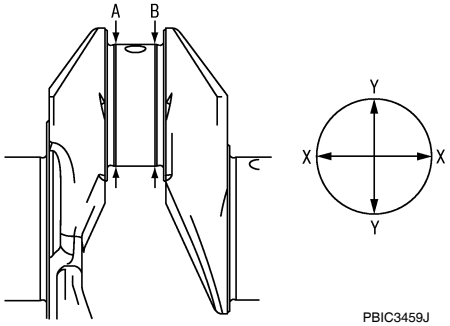

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Center distance (r)		40.41 - 40.49 (1.5909 - 1.5940)
Out-of-round [Difference between (X) and (Y)]	Limit	0.0035 (0.0001)
Taper [Difference between (A) and (B)]	Limit	0.0035 (0.0001)
Runout [TIR[1]]	Standard	0.05 (0.0020)
	Limit	0.10 (0.0040)
Crankshaft end play	Standard	0.10 - 0.26 (0.0039 - 0.0102)
	Limit	0.30 (0.012)

	Grade[2]	Dimension
Pin journal diameter grade. (Dp)	Grade No. A	43.970 - 43.971 (1.7311 - 1.7311)
	Grade No. B	43.969 - 43.970 (1.7311 - 1.7311)
	Grade No. C	43.968 - 43.969 (1.7310 - 1.7311)
	Grade No. D	43.967 - 43.968 (1.7310 - 1.7310)
	Grade No. E	43.966 - 43.967 (1.7309 - 1.7310)
	Grade No. F	43.965 - 43.966 (1.7309 - 1.7309)
	Grade No. G	43.964 - 43.965 (1.7309 - 1.7309)
	Grade No. H	43.963 - 43.964 (1.7308 - 1.7309)
	Grade No. J	43.962 - 43.963 (1.7308 - 1.7308)
	Grade No. K	43.961 - 43.962 (1.7307 - 1.7308)
	Grade No. L	43.960 - 43.961 (1.7307 - 1.7307)
	Grade No. M	43.959 - 43.960 (1.7307 - 1.7307)
	Grade No. N	43.958 - 43.959 (1.7306 - 1.7307)
	Grade No. P	43.957 - 43.958 (1.7306 - 1.7306)
	Grade No. R	43.956 - 43.957 (1.7305 - 1.7306)
	Grade No. S	43.955 - 43.956 (1.7305 - 1.7305)
	Grade No. T	43.954 - 43.955 (1.7305 - 1.7305)
	Grade No. U	43.953 - 43.954 (1.7304 - 1.7305)
Main journal diameter grade. (Dm)	Grade No. A	51.978 - 51.979 (2.0464 - 2.0464)
	Grade No. B	51.977 - 51.978 (2.0463 - 2.0464)
	Grade No. C	51.976 - 51.977 (2.0463 - 2.0463)
	Grade No. D	51.975 - 51.976 (2.0463 - 2.0463)
	Grade No. E	51.974 - 51.975 (2.0462 - 2.0463)
	Grade No. F	51.973 - 51.974 (2.0462 - 2.0462)
	Grade No. G	51.972 - 51.973 (2.0461 - 2.0462)
	Grade No. H	51.971 - 51.972 (2.0461 - 2.0461)
	Grade No. J	51.970 - 51.971 (2.0461 - 2.0461)
	Grade No. K	51.969 - 51.970 (2.0460 - 2.0461)
	Grade No. L	51.968 - 51.969 (2.0460 - 2.0460)
	Grade No. M	51.967 - 51.968 (2.0459 - 2.0460)
	Grade No. N	51.966 - 51.967 (2.0459 - 2.0459)
	Grade No. P	51.965 - 51.966 (2.0459 - 2.0459)
	Grade No. R	51.964 - 51.965 (2.0458 - 2.0459)
	Grade No. S	51.963 - 51.964 (2.0458 - 2.0458)
	Grade No. T	51.962 - 51.963 (2.0457 - 2.0458)
	Grade No. U	51.961 - 51.962 (2.0457 - 2.0457)
	Grade No. V	51.960 - 51.961 (2.0457 - 2.0457)
	Grade No. W	51.959 - 51.960 (2.0456 - 2.0457)

[1]: Total indicator reading

[2]: Always check with the Parts Department for the latest parts information.

MAIN BEARING

Unit: mm (in)

Grade number*	Thickness	Identification color	Remarks
0	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are the same for upper and lower bearings.
1	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
2	2.002 - 2.005 (0.0788 - 0.0789)	Green	
3	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
4	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
5	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
6	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
7	2.017 - 2.020 (0.0794 - 0.0795)	White	

01	UPR	1.996 - 1.999 (0.0786 - 0.0787)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
12	UPR	1.999 - 2.002 (0.0787 - 0.0788)	Brown	
	LWR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
23	UPR	2.002 - 2.005 (0.0788 - 0.0789)	Green	
	LWR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
34	UPR	2.005 - 2.008 (0.0789 - 0.0791)	Yellow	
	LWR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
45	UPR	2.008 - 2.011 (0.0791 - 0.0792)	Blue	
	LWR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
56	UPR	2.011 - 2.014 (0.0792 - 0.0793)	Pink	
	LWR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
67	UPR	2.014 - 2.017 (0.0793 - 0.0794)	Purple	
	LWR	2.017 - 2.020 (0.0794 - 0.0795)	White	

*: Always check with the Parts Department for the latest parts information.

Undersize

Unit: mm (in)

Item	Thickness	Main journal diameter
US 0.25 (0.0098)	2.126 - 2.134 (0.0837 - 0.0840)	Grind so that bearing clearance is the specified value.

Bearing Oil Clearance

Unit: mm (in)

Main bearing oil clearance	Standard	No. 1, 4 and 5	0.024 - 0.034 (0.0009 - 0.0013)
		No. 2 and 3	0.012 - 0.022 (0.0005 - 0.0009)
	Limit		0.065 (0.0026)

CONNECTING ROD BEARING

Grade number*		Thickness mm (in)	Identification color	Remarks
0		1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are the same for upper and lower bearings.
1		1.497 - 1.500 (0.0589 - 0.0591)	Brown	
2		1.500 - 1.503 (0.0591 - 0.0592)	Green	
3		1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
4		1.506 - 1.509 (0.0593 - 0.0594)	Blue	
01	UPR	1.494 - 1.497 (0.0588 - 0.0589)	Black	Grade and color are different between upper and lower bearings.
	LWR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
12	UPR	1.497 - 1.500 (0.0589 - 0.0591)	Brown	
	LWR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
23	UPR	1.500 - 1.503 (0.0591 - 0.0592)	Green	
	LWR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
34	UPR	1.503 - 1.506 (0.0592 - 0.0593)	Yellow	
	LWR	1.506 - 1.509 (0.0593 - 0.0594)	Blue	

*: Always check with the Parts Department for the latest parts information.

Undersize

Unit: mm (in)

Item	Thickness	Crank pin journal diameter
US 0.25 (0.0098)	1.623 - 1.631 (0.0639 - 0.0642)	Grind so that bearing clearance is the specified value.

Bearing Oil Clearance

Unit: mm (in)

Connecting rod bearing oil clearance	Standard	0.037 - 0.047 (0.0015 - 0.0019)
	Limit	0.07 (0.0028)

FLYWHEEL

Unit: mm (in)

Items	Standard	Limit
Flywheel deflection	—	0.45 (0.0177) or less
Movement amount in thrust direction	1.8 (0.071) or less	—
Movement amount in radial direction	—	33.2 (1.307) or less

SECTION LU
ENGINE LUBRICATION SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330887

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330888

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Liquid Gasket

INFOID:0000000007330889

REMOVAL OF LIQUID GASKET SEALING

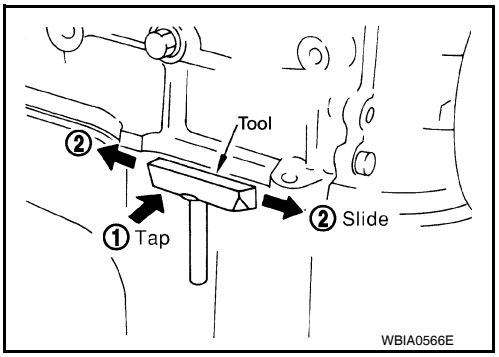
- After removing nuts and bolts, separate the mating surface, using Tool and remove old liquid gasket sealing.

Tool number : KV10111100 (J-37228)

CAUTION:
Be careful not to damage the mating surfaces.

- Tap Tool to insert it (1), and then slide it by tapping on the side (2) as shown.
- In areas where Tool is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

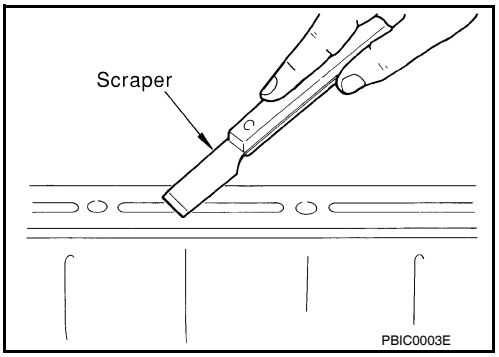
CAUTION:
If for some unavoidable reason suitable tool such as screwdriver is used, be careful not to damage the mating surfaces.

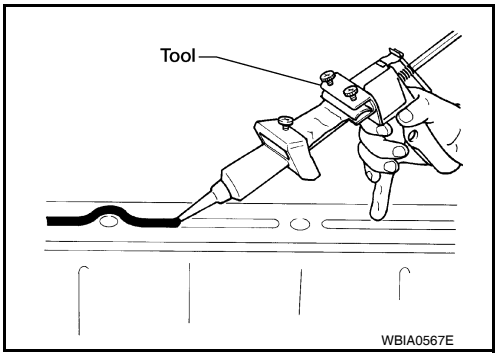


LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface, using scraper.
   - Remove liquid gasket completely from the groove of the liquid gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.
3. Attach liquid gasket tube to Tool.

Tool number : WS39930000 (—)

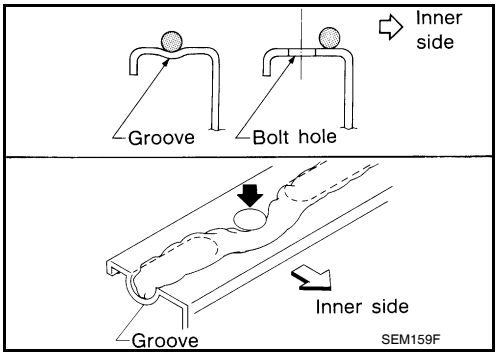




Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply liquid gasket to the groove.
   - As for the bolt holes, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of service manual.
   - Within five minutes of liquid gasket application, install the mating component.
   - If liquid gasket protrudes, wipe it off immediately.
   - Do not retighten nuts or bolts after the installation.
   - After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

CAUTION:



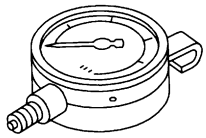
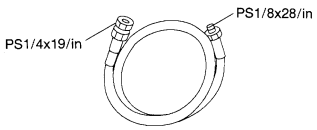
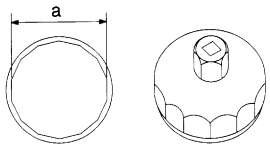
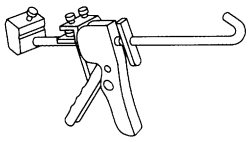
Carefully follow all of the warnings, cautions, notes, and procedures contained in this manual.

PREPARATION

Special Service Tool

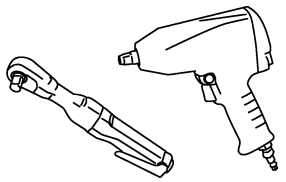
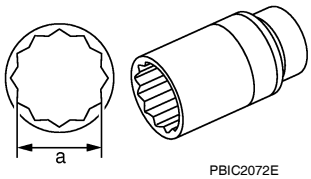
INFOID:0000000007330890

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST25051001 (J-25695-1) Oil pressure gauge  NT050	Measuring oil pressure **Maximum measuring range: 2,452 kPa (25 kg/cm^2, 356 psi)**
ST25052000 (J-25695-2) Hose  S-NT559	Adapting oil pressure gauge to oil pan (upper)
KV10115801 (J-38956) Oil filter wrench  S-NT375	Removing oil filter **a: 64.3 mm (2.531 in)**
WS39930000 (—) Tube presser  NT052	Pressing the tube of liquid gasket

Commercial Service Tool

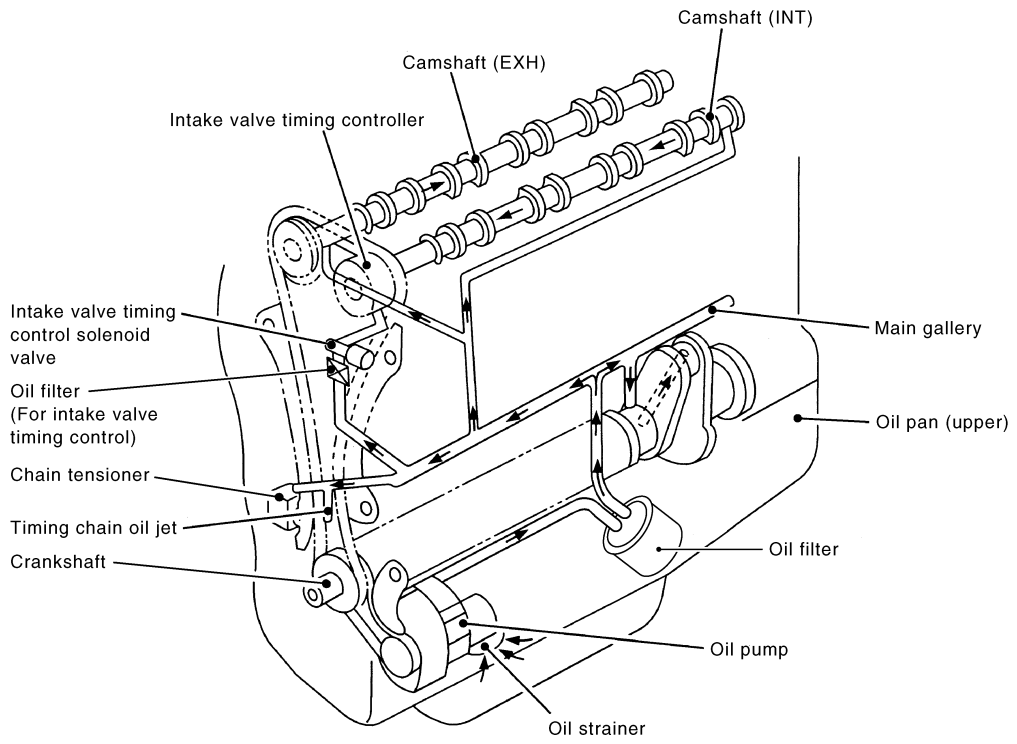
INFOID:0000000007330891

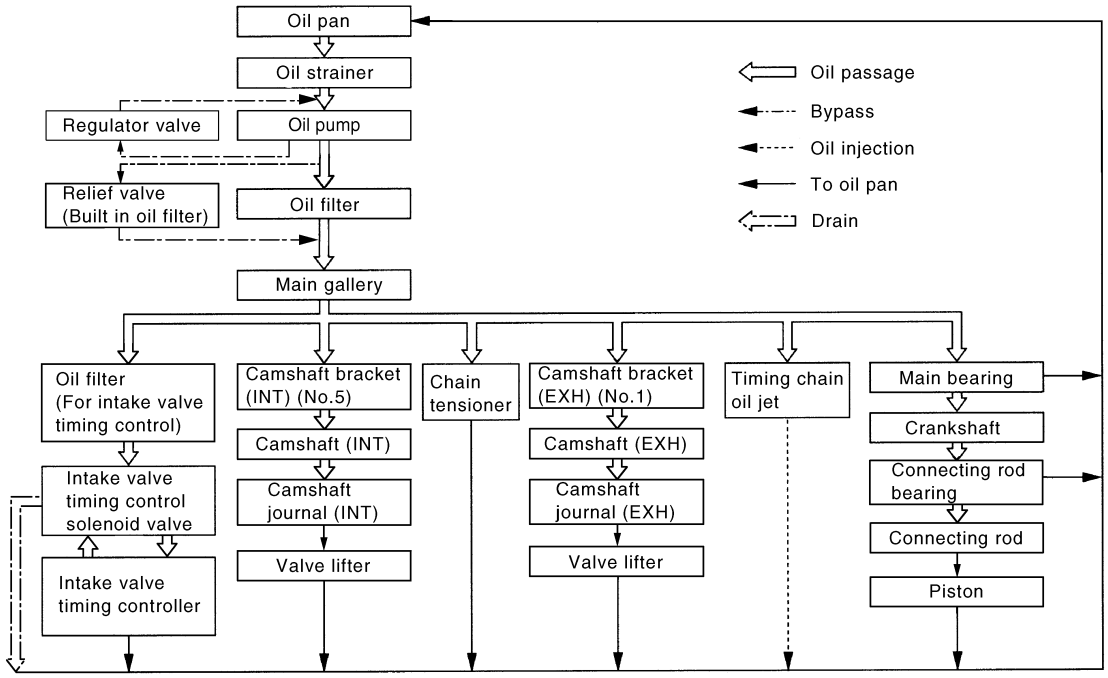
Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts
Deep socket  PBIC2072E	Removing and installing oil pressure switch **a: 26 mm (1.02 in)**

LUBRICATION SYSTEM

Lubrication Circuit

INFOID:0000000007330892





PBIC4575E

ENGINE OIL

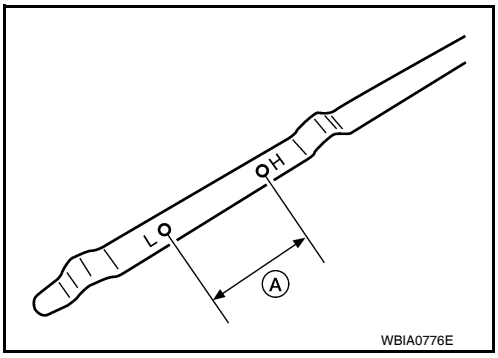
Inspection

INFOID:0000000007330893

ENGINE OIL LEVEL

NOTE:
Park vehicle on a level surface, wait 10 minutes and check the engine oil level.

1. Pull out oil level gauge and wipe it clean.
2. Insert oil level gauge and make sure the engine oil level is within the range (A) as shown.
3. If it is out of range, adjust it.



ENGINE OIL APPEARANCE

- Check engine oil for white milky appearance or excessive contamination.
- If engine oil becomes white, it is highly probable that it is contaminated with engine coolant. Repair or replace damaged parts.

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following areas:

- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- Intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seals (front and rear)
- Oil filter (for intake valve timing control)

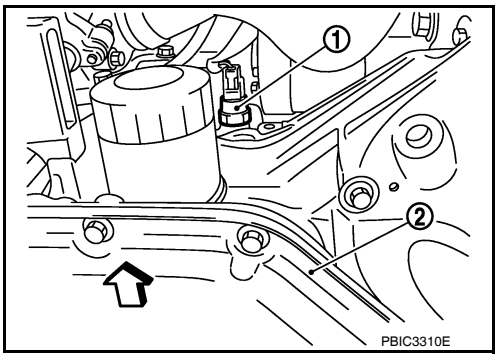
OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as engine oil may be hot.**
- **For engine oil pressure check the transaxle should be in " Park position" (A/T models) and (CVT models) or "Neutral position" (M/T models), and apply the parking brake securely.**

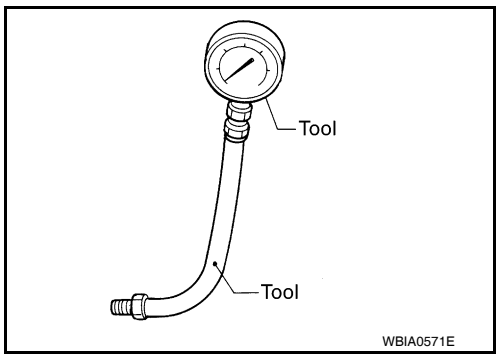
1. Check engine oil level.
2. Remove engine undercover. Refer to EI-15, "Removal and Installation".
3. Disconnect harness connector at oil pressure switch (1), and remove oil pressure switch (1) from the cylinder block using suitable tool.
   - Oil pan (lower) (2)
   - ⇦: Front

   CAUTION:
   Do not drop or shock oil pressure switch.



4. Install oil pressure gauge and hose.

Tool number : ST25051001 (J-25695-1)
: ST25052000 (J-25695-2)



5. Start engine and warm it up to normal operating temperature.
6. Check oil pressure with engine running under no-load. Refer to LU-14, "Standard and Limit".
If the difference between the readings and the specifications is extreme, check oil passage and oil pump for oil leaks.
NOTE:
When engine oil temperature is low, engine oil pressure is higher.
7. After the inspections, install oil pressure switch as follows:

a. Remove old liquid gasket adhering to oil pressure switch and engine.
b. Apply liquid gasket and tighten oil pressure switch to specification.
Use Genuine Silicone RTV Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

Oil pressure switch : 14.7 N·m (1.5 kg-m, 11 ft-lb)

c. Check engine oil level.
d. After warming up engine, make sure there are no engine oil leaks. Repair as necessary.

8. Install engine undercover. Refer to EI-15, "Removal and Installation".

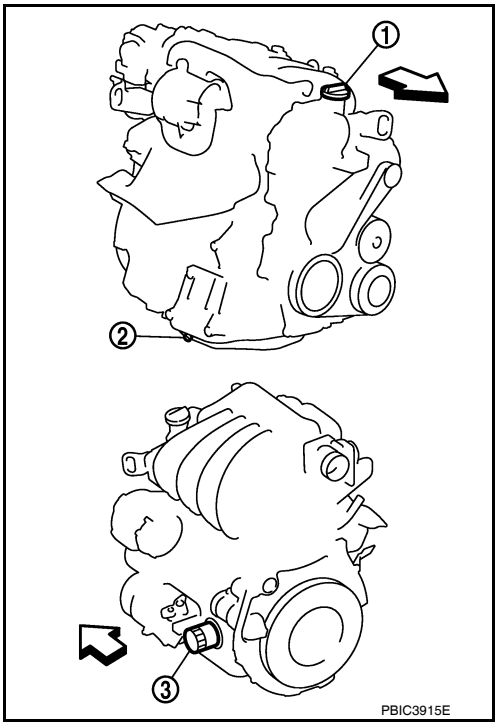
Changing Engine Oil

INFOID:0000000007330894

WARNING:
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, park vehicle on a level surface and check for engine oil leaks. Repair as necessary. Refer to LU-8, "Inspection".
2. Stop the engine and wait for 10 minutes.

3. Loosen oil filler cap (1) and then remove drain plug (2).
   - Oil filter (3)
   - ⇦: Engine front
4. Drain engine oil.
5. Install drain plug (2) with new washer. Refer to EM-25, "Component".
   CAUTION:
   Do not reuse sealing washers.
   CAUTION:
   Be sure to clean drain plug (2) and install with new washer.
6. Refill with new engine oil.
   Refer to MA-13.
   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
   - **Always use oil level gauge to determine the proper amount of engine oil in the engine.**
7. Warm up engine and check area around drain plug (2) and oil filter (3) for engine oil leaks.
8. Stop engine and wait for 10 minutes.
9. Check the engine oil level and adjust as necessary. Refer to LU-8, "Inspection".



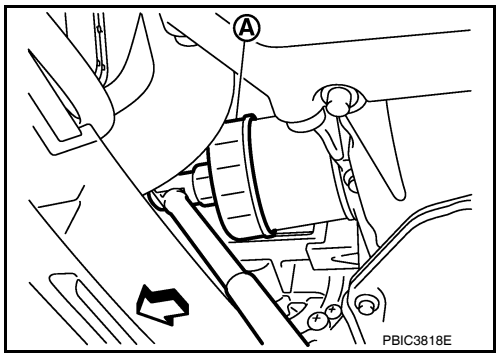
OIL FILTER

Removal and Installation

INFOID:0000000007330895

REMOVAL

1. Remove engine undercover. Refer to EI-15, "Removal and Installation".
2. Drain engine oil. Refer to LU-9, "Changing Engine Oil".
3. Remove oil filter using Tool (A).
   - ⇦: Front



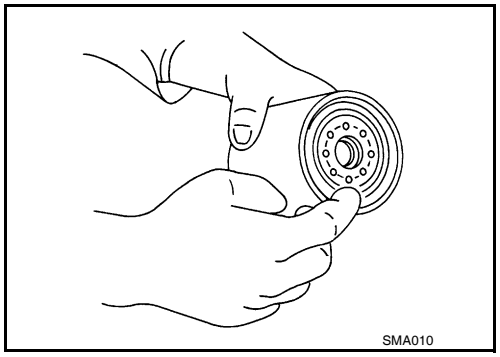
Tool number : KV10115801 (J-38956)

WARNING:
- **Be careful not to get burned; engine and engine oil may be hot.**

CAUTION:
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Do not spill engine oil on drive belt.**
- **Completely wipe off any engine oil that spills on engine and vehicle.**

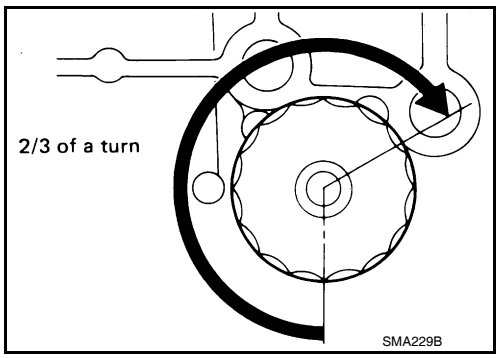
INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn, or to specification.

Oil filter: : 17.7 N·m (1.8 kg-m, 13 ft-lb)



4. Refill engine with new engine oil. Refer to LU-9, "Changing Engine Oil".
5. Install engine undercover. Refer to EI-15, "Removal and Installation".

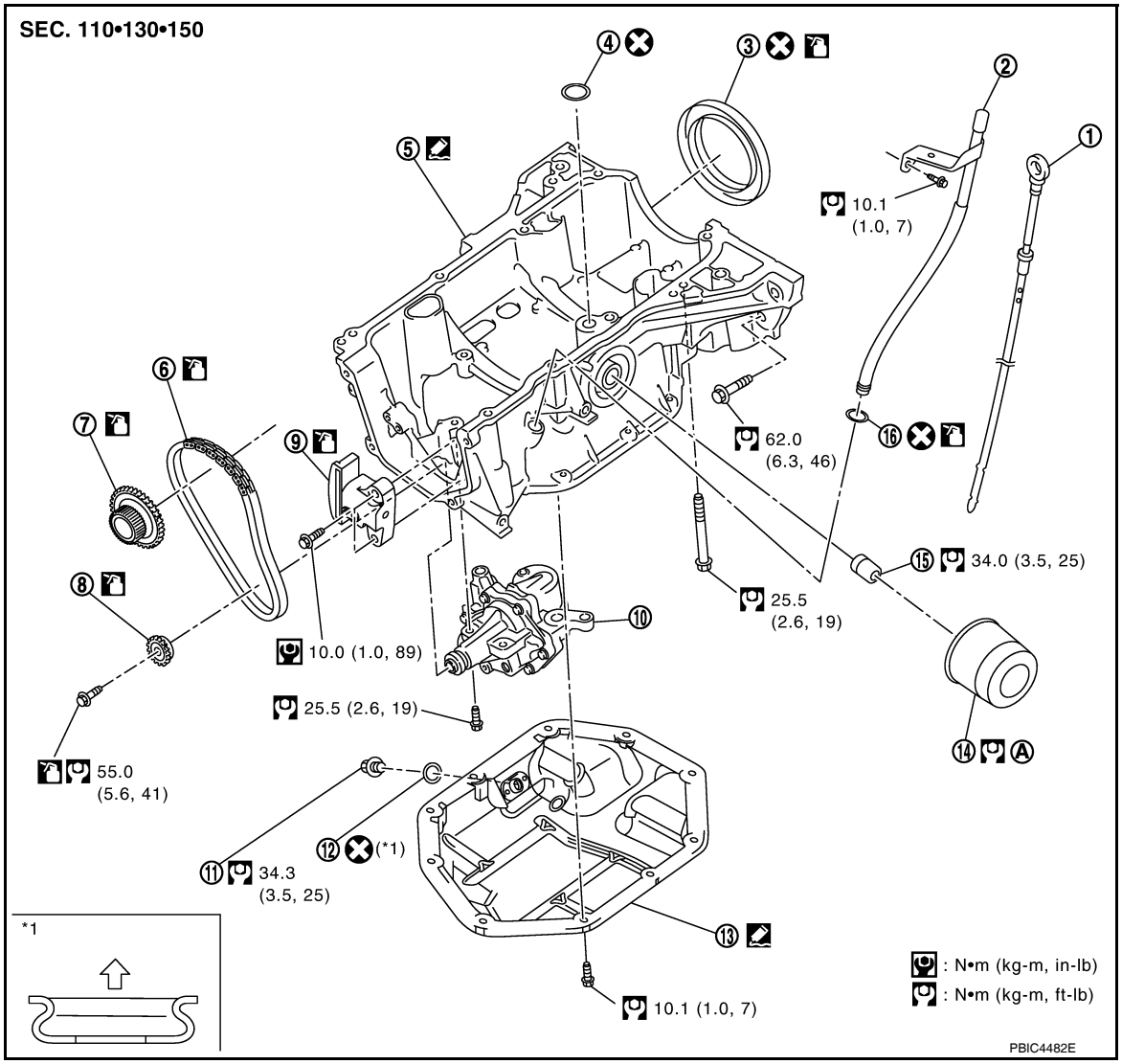
INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-8, "Inspection".
2. Start engine, and make sure there are no engine oil leaks.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level and adjust as necessary. Refer to LU-8, "Inspection".

OIL PUMP

Component

INFOID:0000000007330896



1. Oil level gauge
2. Oil level gauge guide
3. Rear oil seal
4. O-ring
5. Oil pan (upper)
6. Oil pump drive chain
7. Crankshaft sprocket
8. Oil pump sprocket
9. Timing chain tensioner (for oil pump)
10. Oil pump
11. Drain plug
12. Drain plug washer
13. Oil pan (lower)
14. Oil filter
15. Connector bolt
16. O-ring
A. Refer to LU-12
⇦ Oil pan side

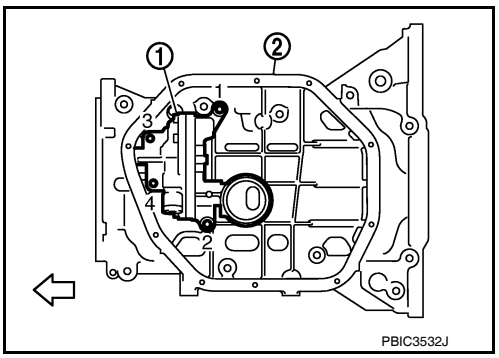
Removal and Installation

INFOID:0000000007330897

REMOVAL

1. Remove the timing chain and oil pump drive chain. Refer to EM-41, "Removal and Installation".

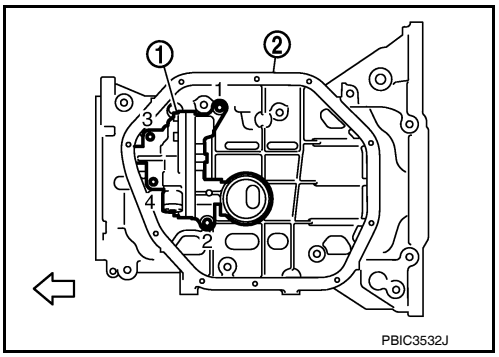
2. Remove oil pump.
   • Loosen bolts in reverse order as shown.



1 : Oil pump
2 : Oil pan (upper)
⇦ : Engine front

INSTALLATION

1. Install oil pump.
   • Tighten bolts in numerical order as shown.



1 : Oil pump
2 : Oil pan (upper)
⇦ : Engine front

2. Install the timing chain and oil pump drive chain. Refer to EM-41, "Removal and Installation".

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:0000000007330898

ENGINE OIL PRESSURE

Unit: kPa (kg/cm^2, psi)

Engine speed	Approximate discharge oil pressure
Idle speed	60 (0.61, 9)
2,000 rpm	200 (2.0, 29)

ENGINE OIL CAPACITY

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	Approximately 4.1 (4 3/8, 3 5/8)
	Without oil filter change	Approximately 3.9 (4 1/8, 3 3/8)
Dry engine (engine overhaul)		Approximately 4.9 (5 1/8, 4 3/8)

SECTION CO
ENGINE COOLING SYSTEM

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MR18DE

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007332013

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007332014

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Liquid Gasket

INFOID:0000000007332015

REMOVAL OF LIQUID GASKET

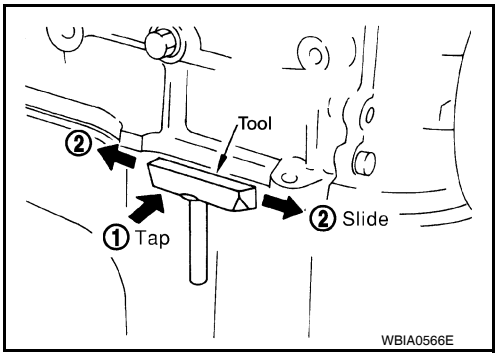
- After removing nuts and bolts, separate the mating surface, using Tool and remove old liquid gasket.

Tool number : KV10111100 (J-37228)

CAUTION:
Be careful not to damage the mating surfaces.

- Tap Tool to insert it (1), and then slide it by tapping on the side (2) as shown.
- In areas where Tool is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

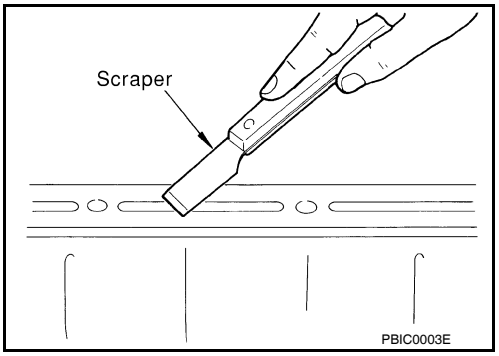
CAUTION:
Do not damage the mating surfaces.

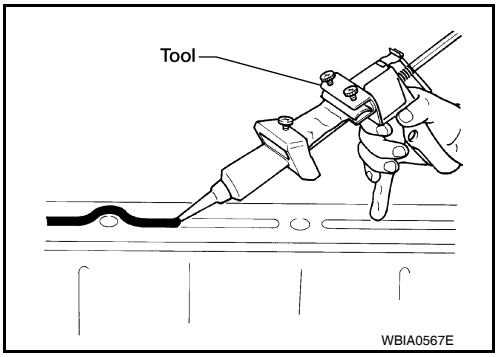


LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface, using scraper.
   - Remove liquid gasket completely from the groove of the liquid gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.
3. Attach liquid gasket tube to Tool.

Tool number : WS39930000 (—)

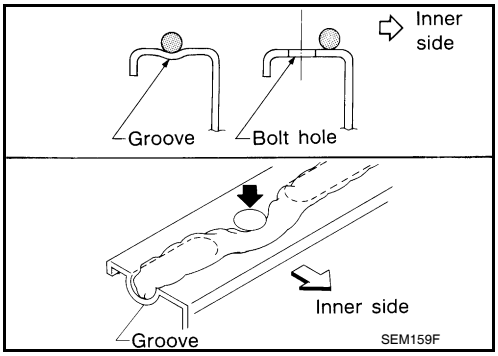




Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply liquid gasket to the groove.

- Apply the liquid gasket to the inner side of the bolt holes unless the procedure instructions indicate to apply to the outer side of the bolt holes.
- Install the mating component within five minutes of the liquid gasket application.
- Then allow 30 minutes for the liquid gasket to set before filling the engine with oil or coolant.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten nuts or bolts after the five minutes have elapsed.



CAUTION:

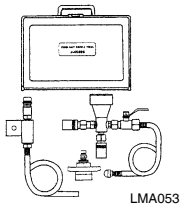
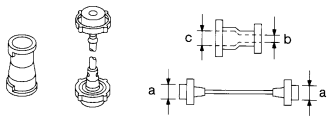
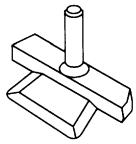
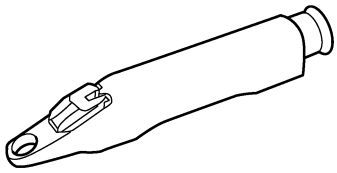
Carefully follow all of the warnings, cautions, notes, and procedures contained in this manual.

PREPARATION

Special Service Tool

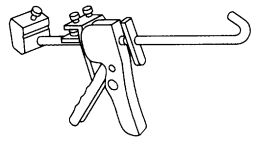
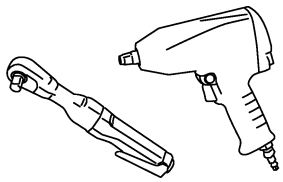
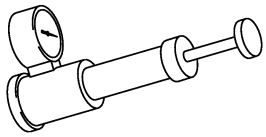
INFOID:0000000007332016

The actual shapes of Kent-Moore tools may from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV991J0070 (J-45695) Coolant Refill Tool  LMA053	Refilling engine cooling system
EG17650301 (J-33984-A) Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator cap and radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV10111100 (J-37228) Seal cutter  NT046	Removing chain tensioner cover and water pump cover
— (J-23688) Engine coolant refractometer  WBIA0539E	Checking concentration of ethylene glycol in engine coolant

Commercial Service Tool

INFOID:0000000007332017

Tool name	Description
WS39930000 (—) Tube presser  S-NT052	Pressing the tube of liquid gasket
Power tool  PBIC0190E	Loosening bolts and nuts
Radiator cap tester  PBIC1982E	Checking radiator and radiator cap

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000007332018

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat stuck closed	Thermostat	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—		—
	Improper engine coolant mixture ratio	—	Engine coolant viscosity	—
	Poor engine coolant quality	—		—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Radiator cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

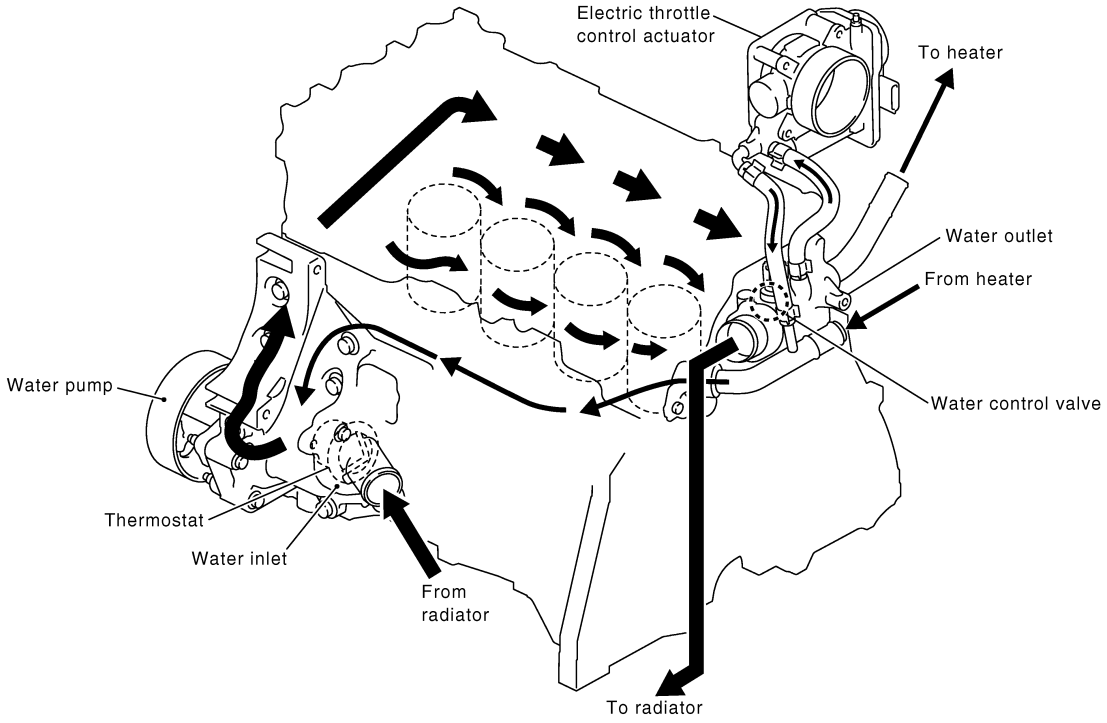
<table>
<tr><th></th><th colspan="2">Symptom</th><th colspan="2">Check items</th></tr>
<tr><td rowspan="8">Except cooling system parts malfunction</td><td rowspan="6">—</td><td rowspan="6">Overload on engine</td><td rowspan="3">Abusive driving</td><td>High engine rpm under no load</td></tr>
<tr><td>Driving in low gear for extended time</td></tr>
<tr><td>Driving at extremely high speed</td></tr>
<tr><td>Power train system malfunction</td><td rowspan="4">—</td></tr>
<tr><td>Installed improper size wheels and tires</td></tr>
<tr><td>Dragging brakes</td></tr>
<tr><td>Improper ignition timing</td></tr>
<tr><td rowspan="5">Blocked or restricted air flow</td><td>Blocked bumper</td><td>Installed front bumper fascia cover</td><td rowspan="5">—</td></tr>
<tr><td rowspan="2">Blocked radiator grille</td><td>Mud contamination or paper clogging</td></tr>
<tr><td>Blocked radiator</td><td rowspan="3">Blocked air flow</td></tr>
<tr><td>Blocked condenser</td></tr>
<tr><td>Installed large fog lamp</td></tr>
</table>

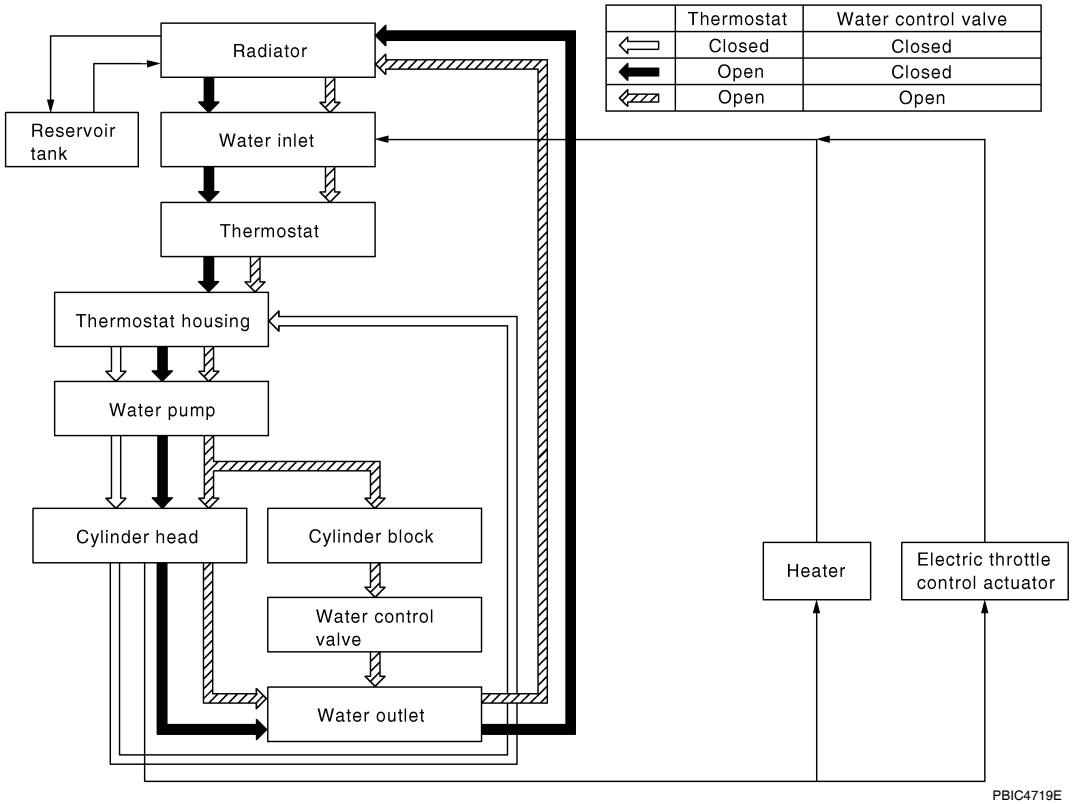
COOLING SYSTEM

Cooling Circuit

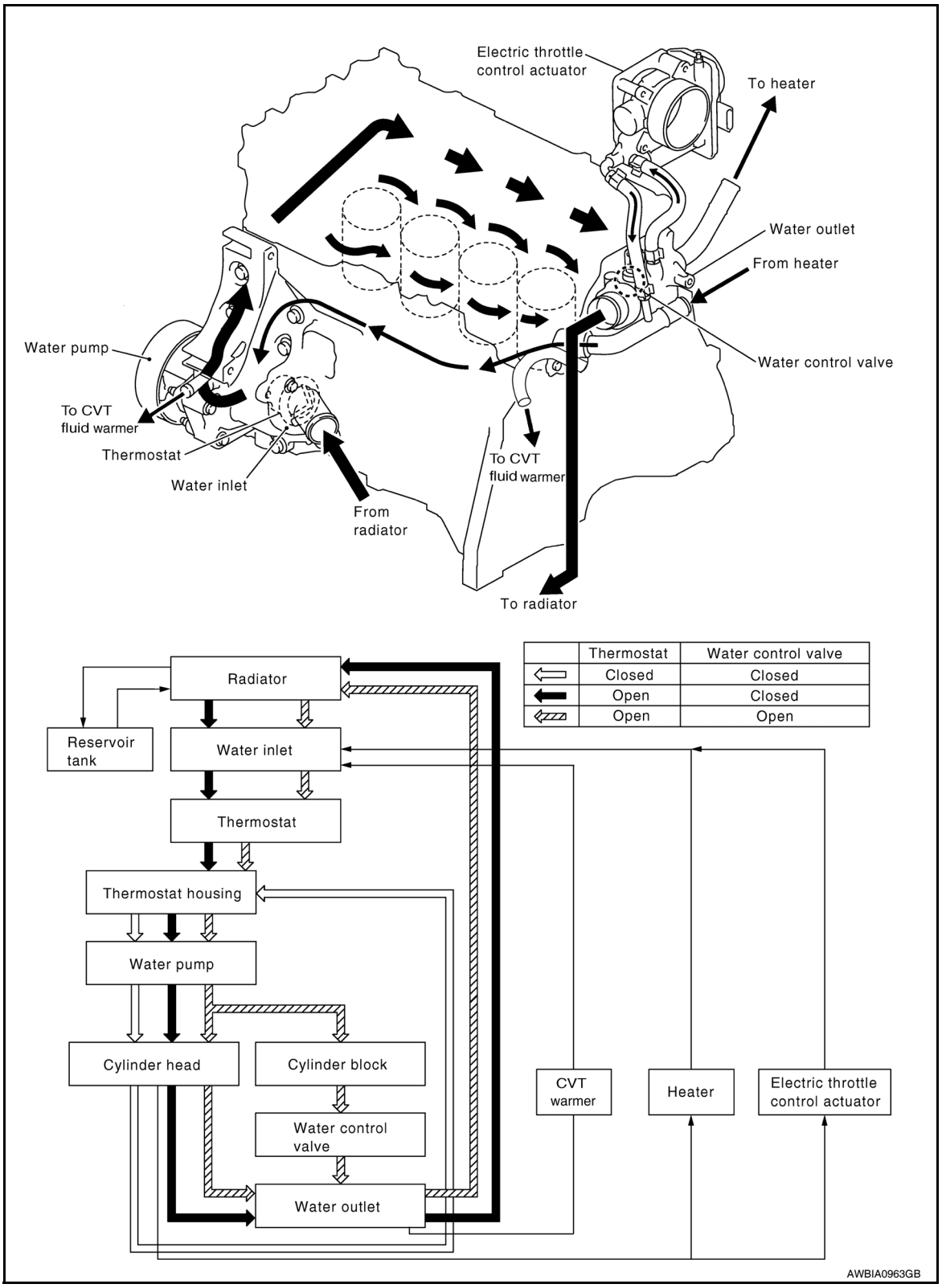
INFOID:0000000007332019

A/T MODELS





CVT MODELS


Electric throttle control actuator
To heater
Water outlet
From heater
Water control valve
Water pump
To CVT fluid warmer
Thermostat
Water inlet
From radiator
To CVT fluid warmer
To radiator
Thermostat
Water control valve
Closed
Closed
Open
Closed
Open
Open
Radiator
Reservoir tank
Water inlet
Thermostat
Thermostat housing
Water pump
Cylinder head
Cylinder block
Water control valve
Water outlet
CVT warmer
Heater
Electric throttle control actuator
AWBIA0963GB

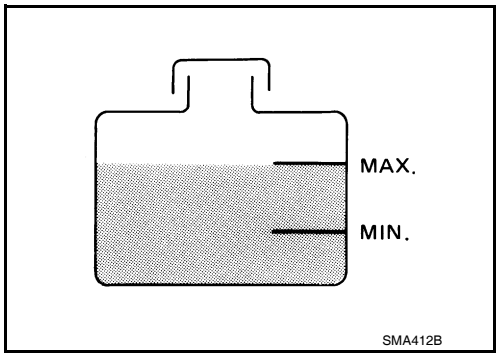
ENGINE COOLANT

Inspection

INFOID:0000000007332020

LEVEL CHECK

- Check that the reservoir tank level is within the “MIN” to “MAX” range when engine is cool.
- Adjust the engine coolant level as necessary.

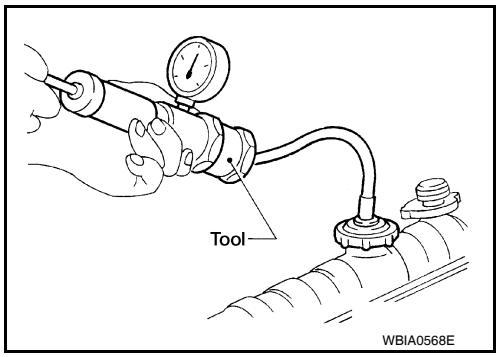


CHECKING COOLING SYSTEM FOR LEAKS

To check for leaks, apply pressure to the cooling system using suitable tool and Tool.

Tool number : EG17650301 (J-33984-A)

Testing pressure : 157 kPa (1.6 kg/cm^2, 23 psi)



WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

CAUTION:

Higher pressure than specified may cause radiator damage.

Changing Engine Coolant

INFOID:0000000007332021

WARNING:

- **To avoid being scalded, do not change engine coolant when engine is hot.**
- **Wrap a thick cloth around radiator cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

CAUTION:

- **Do not spill engine coolant on drive belt.**

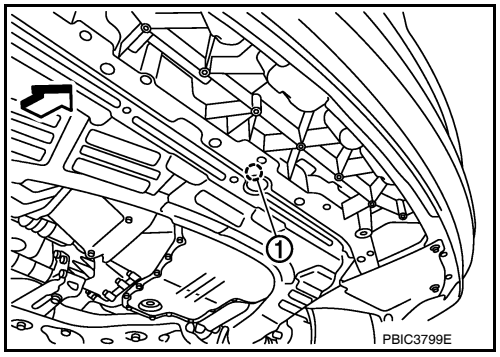
DRAINING ENGINE COOLANT

1. Open radiator drain plug (1) at the bottom of radiator, and then remove radiator cap.
   - ⇦ Front

   When draining all of engine coolant in the system, open water drain plug on cylinder block. Refer to EM-84.

   CAUTION:

   - **Perform this step when engine is cold.**
   - **Do not spill engine coolant on drive belt.**



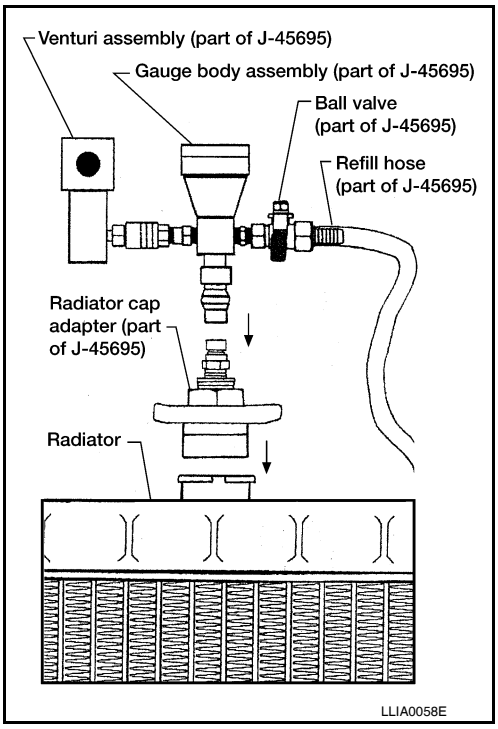
2. Remove reservoir tank as necessary. Clean reservoir tank before installing. Refer to CO-15, "Component".
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush the engine cooling system.

REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug, (if removed).
   - **The radiator must be completely empty of coolant and water.**
   - **Apply sealant to the threads of the cylinder block drain plugs. Use Genuine High Performance Thread Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

   Radiator drain plug : Refer to CO-15, "Component".
   Cylinder block drain plug : 9.8 N·m (1.0 kg-m, 87 in-lb)
2. Reconnect the upper radiator hose, if disconnected.
3. Set the vehicle heater controls to the full HOT and heater ON position. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.
4. Install the Tool by installing the radiator cap adapter onto the radiator neck opening. Then attach the gauge body assembly with the refill tube and the venturi assembly to the radiator cap adapter.

   Tool number : KV991J0070 (J-45695)

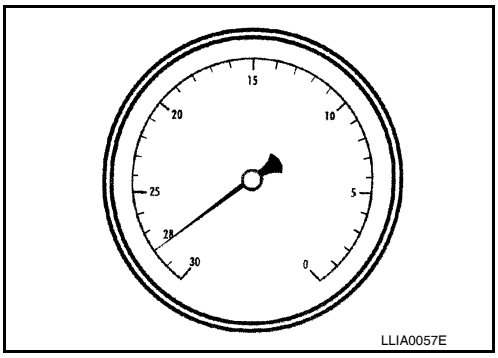


5. Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.
   - **Use recommended coolant or equivalent. Refer to MA-13, "Fluids and Lubricants".**

   Engine coolant capacity (with reservoir tank) : Refer to MA-13, "Fluids and Lubricants".
6. Install an air hose to the venturi assembly, the air pressure must be within specification.

   Compressed air supply pressure : 549 - 824 kPa (5.6 - 8.4 kg/cm^2, 80 - 119 psi)

   CAUTION:
   The compressed air supply must be equipped with an air dryer.
7. The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve on the refill hose slightly. Coolant will be visible rising in the refill hose. Once the refill hose is full of coolant, close the ball valve. This will purge any air trapped in the refill hose.
8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, use the vacuum specifications based on the altitude above sea level.



Altitude above sea level	Vacuum gauge reading
0 - 100 m (328 ft)	: 28 inches of vacuum
300 m (984 ft)	: 27 inches of vacuum
500 m (1,641 ft)	: 26 inches of vacuum
1,000 m (3,281 ft)	: 24 - 25 inches of vacuum

9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
10. Place the coolant container (with the refill hose inserted) at the same level as the top of the radiator. Then open the ball valve on the refill hose so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.

CAUTION:
Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.

11. Remove the Tool from the radiator neck opening.
12. Fill the cooling system reservoir tank to the specified level and install the radiator cap. Run the engine to warm up the cooling system and top up the system as necessary.

FLUSHING COOLING SYSTEM

1. Install reservoir tank if removed. Refer to CO-15, "Component".
2. Install radiator drain plug.
   - **Install the water drain plug on cylinder block if removed. Refer to EM-84, "Disassembly and Assembly".**

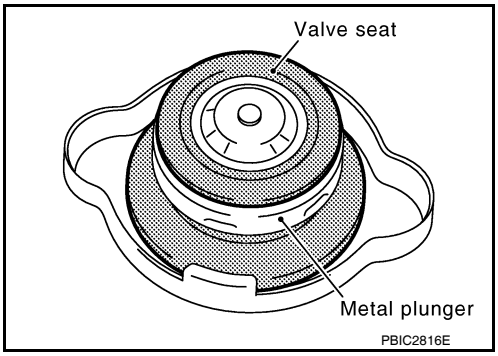
   CAUTION:
   - **Be sure to clean radiator drain plug and use a new O-ring. Refer to CO-15, "Component".**
   - **Do not reuse O-ring.**
3. Fill radiator and reservoir tank with water and reinstall radiator cap.
4. Run engine and warm it up to normal operating temperature.
5. Rev engine two or three times under no-load.
6. Stop engine and wait until it cools down.
7. Drain water from the cooling system.
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

RADIATOR

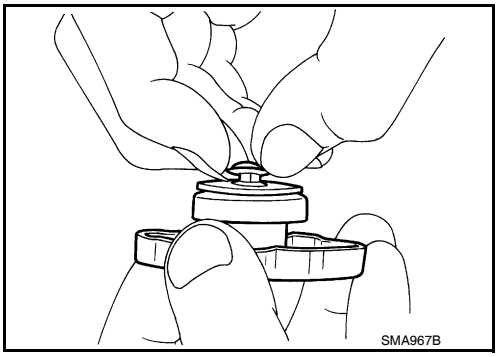
Checking Radiator Cap

INFOID:0000000007332022

- Check valve seat of radiator cap.
- Check if valve seat is swollen to the extent that the edge of the plunger cannot be seen when watching it vertically from the top.
- Check if valve seat has no soil and damage.



- Pull negative-pressure valve to open it, and make sure that it is completely closed when released.
- Make sure that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Make sure that the valve operates properly in the opening and closing conditions.



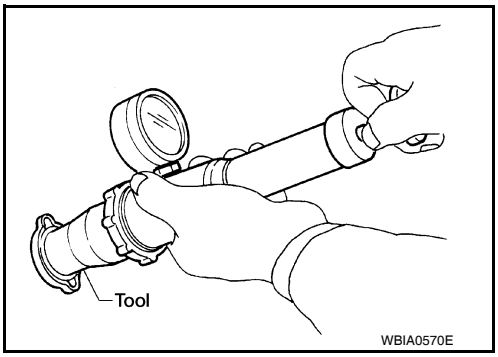
- Check radiator cap relief pressure using suitable tool and Tool.

Tool number : EG17650301 (J-33984-A)

Standard: 78 – 98 kPa (0.8 – 1.0 kg/cm^2, 11 – 14 psi)

Limit: 59 kPa (0.6 kg/cm^2, 9 psi)

- When connecting the radiator cap to the tester, apply water or coolant to the cap seal surface.
- Replace the radiator cap if there is an abnormality in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.
- Replace radiator cap if it is not within specifications.



CAUTION:

When installing radiator cap, thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.

Checking Radiator

INFOID:0000000007332023

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

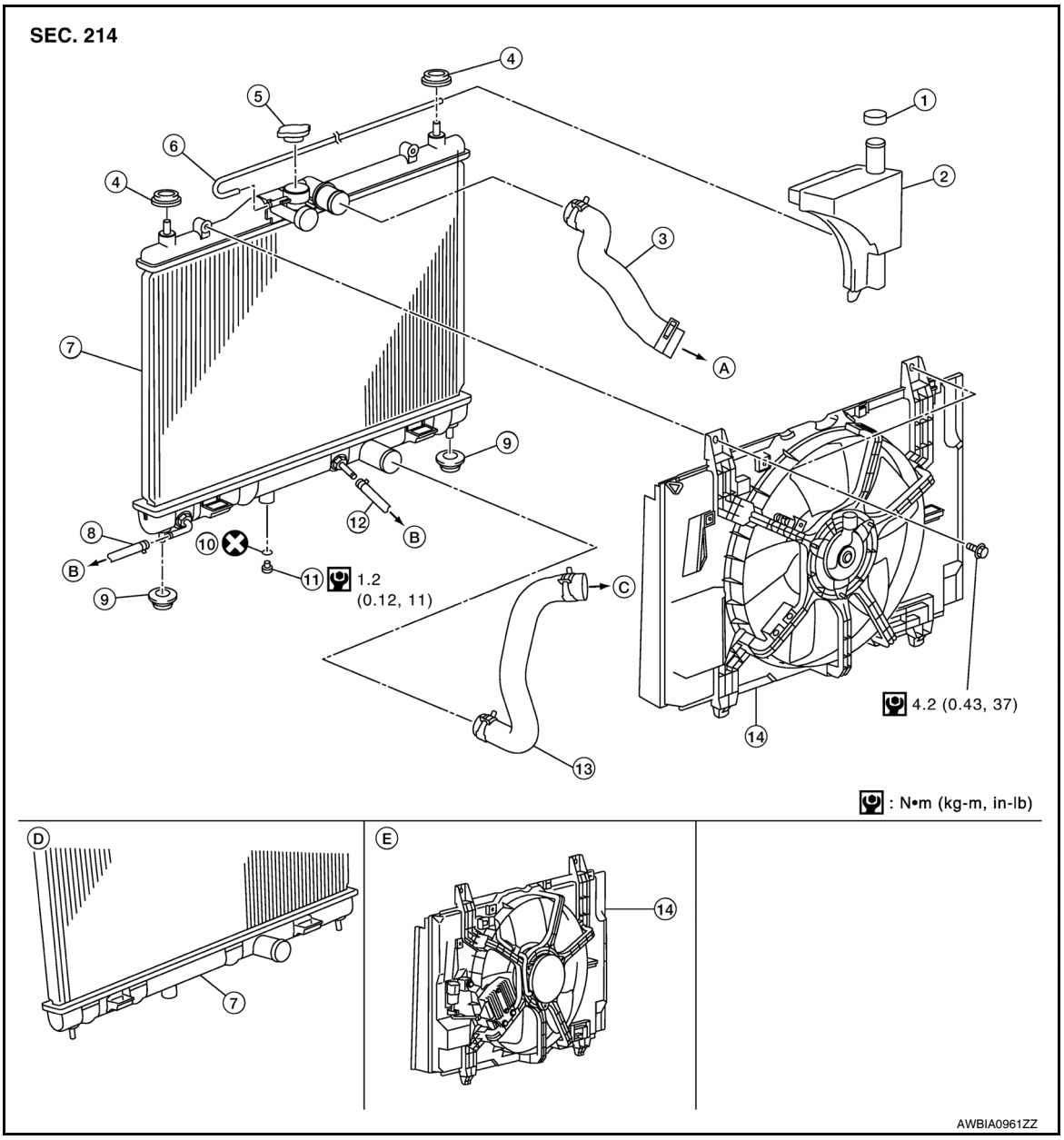
- **Be careful not to bend or damage radiator fins.**
- **When the radiator is cleaned on-vehicle, remove the surrounding parts in order to access the radiator core.**
- **Then tape the harness and electrical connectors to prevent water from entering.**

1. Spray water to the back side of the radiator core using a side-to-side motion from the top down.
2. Stop spraying when debris no longer flows from radiator core.
3. Blow air into the back side of radiator core using a side-to-side motion from the top down.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.81 in).

4. Continue to blow air until no water sprays out.
5. Check for coolant leaks. Repair as necessary.

Component

INFOID:0000000007332024



1. Reservoir tank cap
2. Reservoir tank
3. Radiator hose (upper)
4. Mounting rubber (upper)
5. Radiator cap
6. Reservoir tank hose
7. Radiator
8. A/T fluid cooler hose
9. Mounting rubber (lower)
10. O-ring
11. Radiator drain plug
12. A/T fluid cooler hose
13. Radiator hose (lower)
14. Cooling fan assembly
A. To water outlet
B. To A/T
C. To water inlet
D. M/T models
E. Models with A/C

Removal and Installation

INFOID:0000000007332025

WARNING:

Do not remove radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

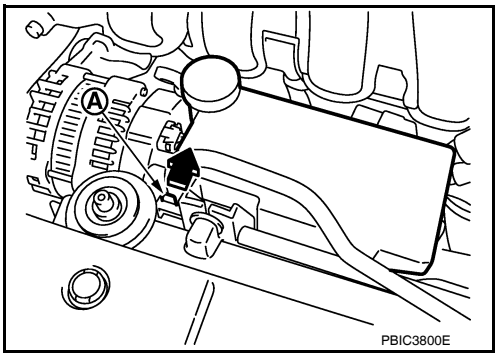
REMOVAL

1. Remove engine undercover. Refer to EI-15, "Removal and Installation".
2. Drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Do not spill engine coolant on drive belt.**
3. Remove air duct (inlet). Refer to EM-16.
4. Remove reservoir tank as follows:

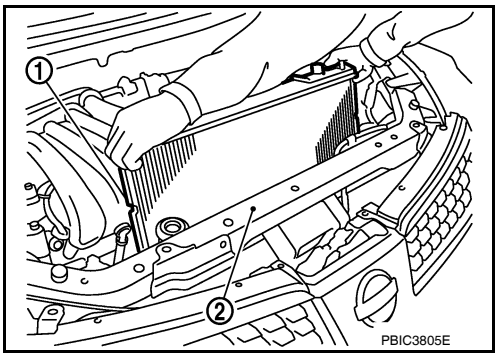
a. Disconnect reservoir tank hose.

b. Release the tab (A) in the direction shown by the arrow (⬅).

c. Lift up while removing the reservoir tank hose, and remove it.



5. Disconnect harness connector from fan motor, and move harness aside.
6. Disconnect CVT or A/T fluid cooler hoses if equipped.
   - Install plug to avoid leakage of CVT or A/T fluid, (if equipped).
7. Remove radiator hoses (upper and lower).
8. Remove radiator core support cover. Refer to BL-20.
9. Remove cooling fan assembly.
10. Remove radiator core support (upper) bolts, bolts of stationary part on the radiator core support side and clip. Lift radiator from radiator (upper) mount part of radiator core support (upper) (2).
11. Move radiator assembly (1) to the rearward direction of vehicle, and then lift it upward to remove.
    CAUTION:
    When removing do not damage or scratch radiator core or A/C condenser (if equipped).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

When removing do not damage or scratch radiator core or A/C condenser (if equipped).

Inspection

INFOID:0000000007332026

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.

- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

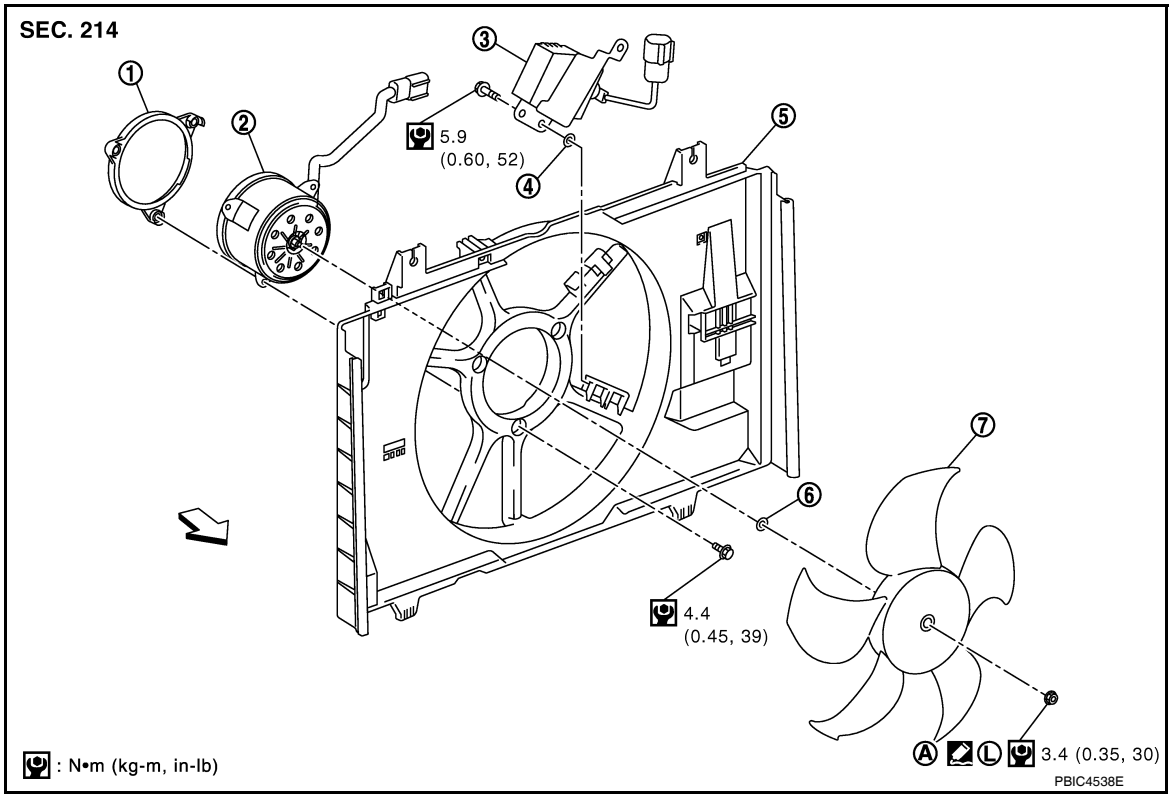
Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

COOLING FAN

Component (Models with A/C)

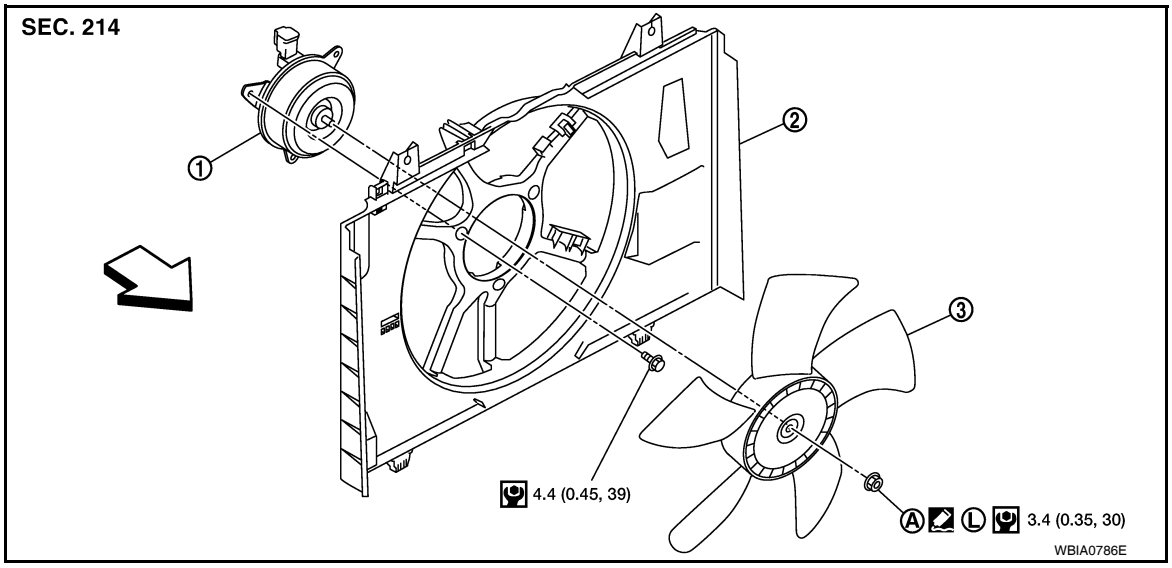
INFOID:0000000007332027



1. Fan motor cover
2. Fan motor
3. Cooling fan control module
4. Washer
5. Fan shroud
6. Washer
7. Cooling fan
A. Apply on fan motor shaft
⇦ Front

Component (Models without A/C)

INFOID:0000000007332028



1. Fan motor
2. Fan shroud
3. Cooling fan
A. Apply on fan motor shaft
⇦ Front

Removal and Installation

INFOID:0000000007332029

REMOVAL

CAUTION:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Partially drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Do not spill engine coolant on drive belt.**
2. Remove air duct (inlet). Refer to EM-16, "Component".
3. Remove reservoir tank. Refer to CO-15, "Component".
4. Disconnect radiator hose (upper) at radiator side. Refer to CO-15, "Component".
5. Disconnect harness connectors from fan motor, and move harness aside.
6. Remove cooling fan assembly.
   CAUTION:
   When removing do not damage or scratch radiator core or A/C condenser (if equipped).

INSTALLATION

Installation is in the reverse order of removal.
- Cooling fans are controlled by ECM. For details, refer to EC-407, "On Board Diagnosis Logic".

CAUTION:
When installing do not damage or scratch radiator core or A/C condenser (if equipped).

Disassembly and Assembly

INFOID:0000000007332030

DISASSEMBLY

1. Remove cooling fan from fan motor.
2. Remove fan motor from fan shroud.

INSPECTION AFTER DISASSEMBLY

Inspect cooling fan for cracks or warps.
- Replace cooling fan as necessary.

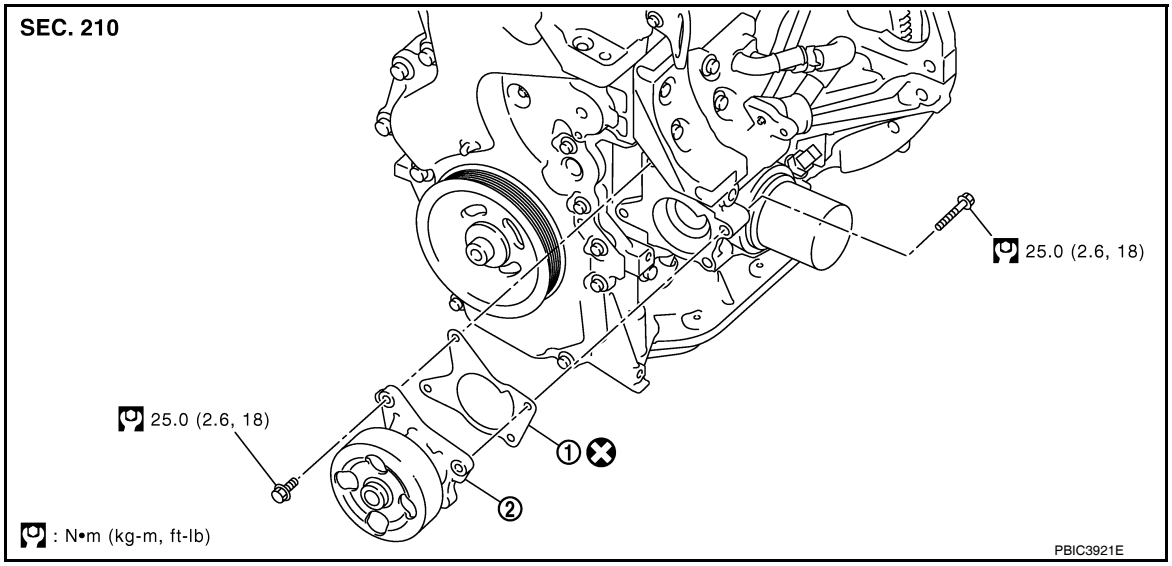
ASSEMBLY

Assembly is in the reverse order of disassembly.

WATER PUMP

Component

INFOID:0000000007332031



1. Gasket
2. Water pump

Removal and Installation

INFOID:0000000007332032

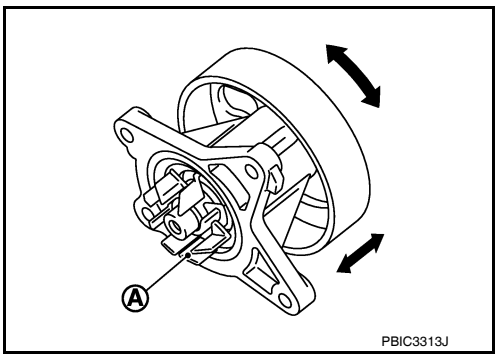
WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Disconnect battery negative terminal. Refer to SC-7, "Removal and Installation".
2. Remove reservoir tank. Refer to CO-15, "Component".
3. Drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   Perform this step when the engine is cold.
4. Remove front fender protector (RH). Refer to EI-24, "Removal and Installation".
5. Remove drive belt. Refer to EM-13, "Removal and Installation".
6. Remove generator. Refer to SC-25, "Removal and Installation".
7. Remove radiator hose (lower). Refer to CO-15, "Component".
8. Remove water pump.
   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and must be replaced as a unit.**

INSPECTION AFTER REMOVAL

- Visually check for significant dirt or rust on the water pump body and vane (A).
- Check that the vane shaft turns smoothly by hand and is not excessively loose.
- Replace the water pump assembly if the water pump does not perform properly.



INSTALLATION

Installation is in the reverse order of removal.

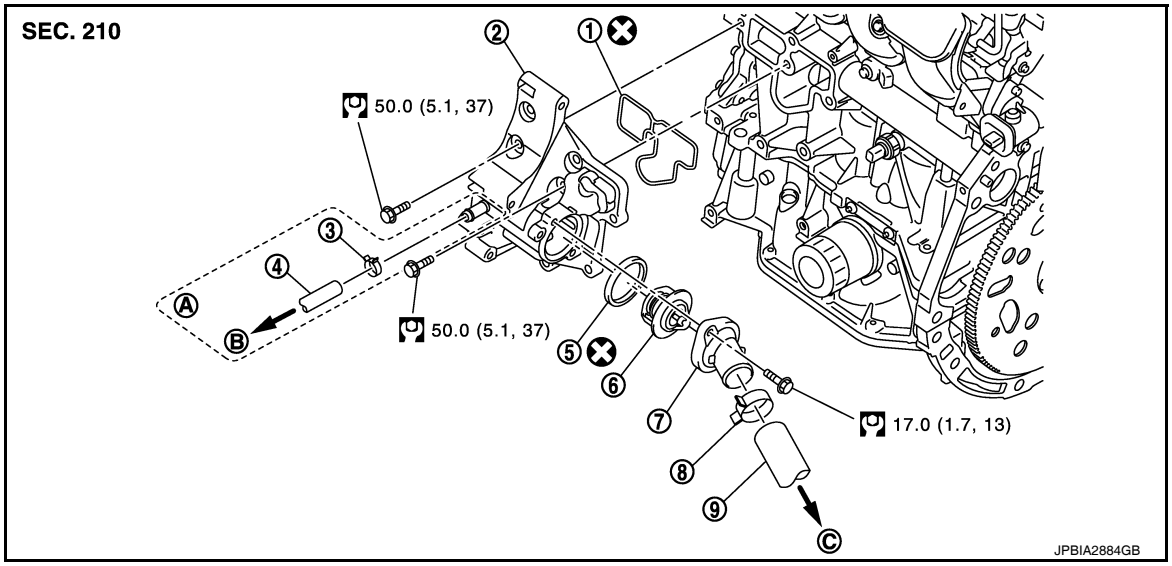
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for engine coolant leaks. Refer to CO-11, "Inspection".
- Start and warm up the engine.
- Visually check for engine coolant leaks.

THERMOSTAT

Component

INFOID:0000000007332033



1. Gasket	2. Thermostat housing	3. Clamp
4. Water hose	5. O-ring	6. Thermostat
7. Water inlet	8. Clamp	9. Radiator hose (lower)
A. CVT models	B. To CVT fluid warmer	C. To radiator

Removal and Installation

INFOID:0000000007332034

REMOVAL

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

NOTE:

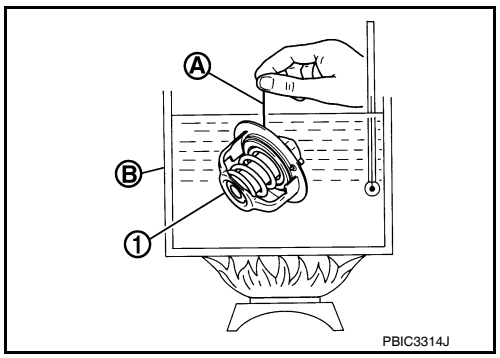
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove the air duct (inlet). Refer to EM-16, "Component".
3. Remove the radiator hose (lower) from the engine. Refer to CO-15, "Component".
4. Remove water inlet.
5. Remove thermostat.
6. Remove water pump, if necessary. Refer to CO-20.
7. Remove thermostat housing, if necessary.

INSPECTION AFTER REMOVAL

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open valve lift amount.
- After checking the full-open valve lift amount, lower the water temperature and check the valve closing temperature.

Standard : Refer to CO-30, "Standard and Limit"



- Replace thermostat if it is out of the specification range.

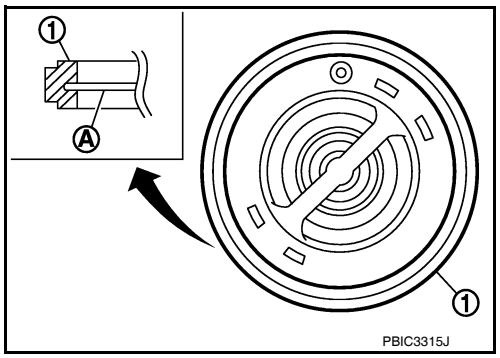
INSTALLATION

Installation is in the reverse order of removal.

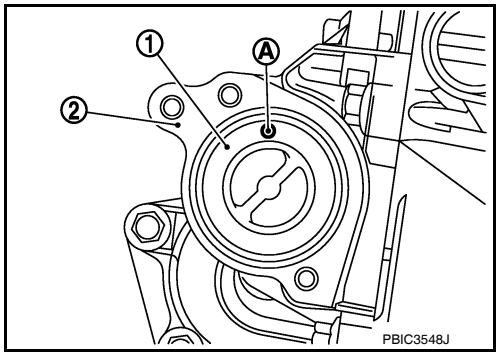
- Use the following procedure to install the thermostat.

- Install thermostat making sure O-ring (1) groove fits securely to thermostat flange (A).

CAUTION:
Replace the O-ring with a new one.



- Install thermostat (1) into the thermostat housing (2) with jiggle valve (A) facing upward.



- Use the following procedure to install the thermostat housing.

- Securely insert the O-ring into the mating groove of thermostat housing and install it.

CAUTION:
- **Replace the O-ring with a new one.**
- **Do not reuse O-ring.**

- Install the thermostat housing to the cylinder block without displacing the gasket from the gasket position.

Inspection

INFOID:0000000007332035

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.

- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

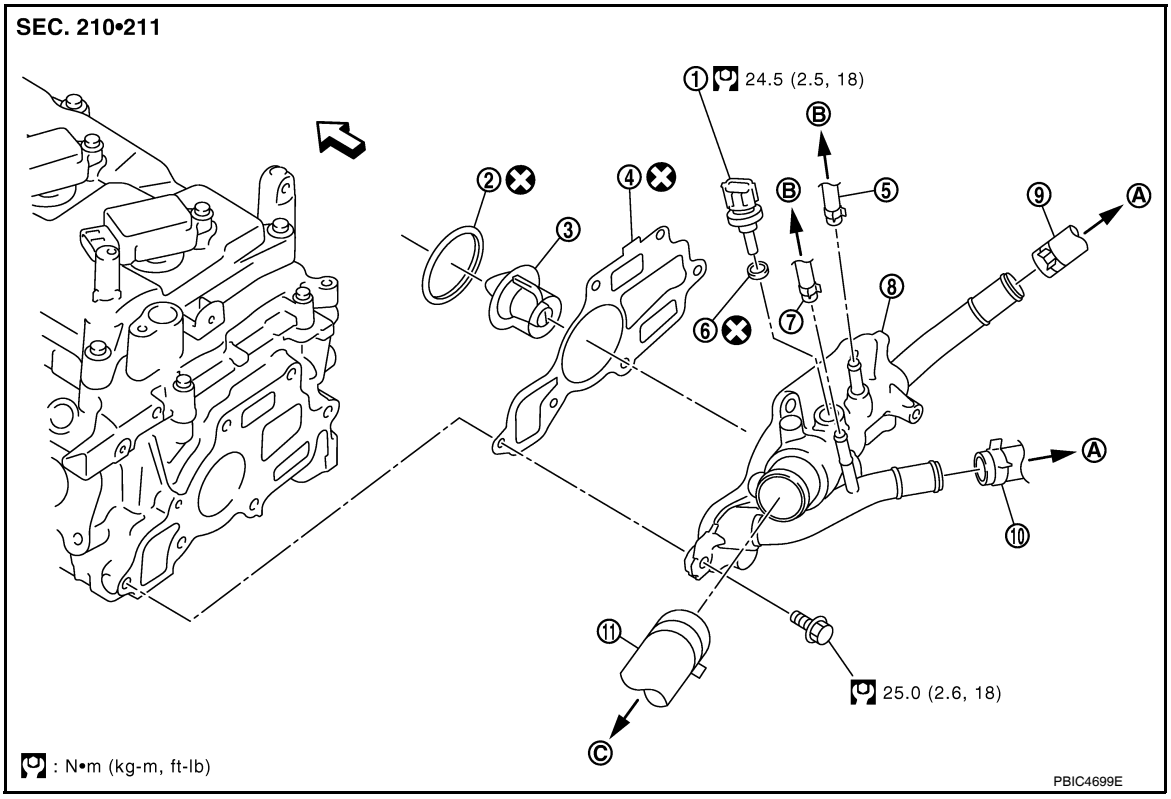
*Power steering fluid, brake fluid, etc.

WATER OUTLET AND WATER CONTROL VALVE

Component

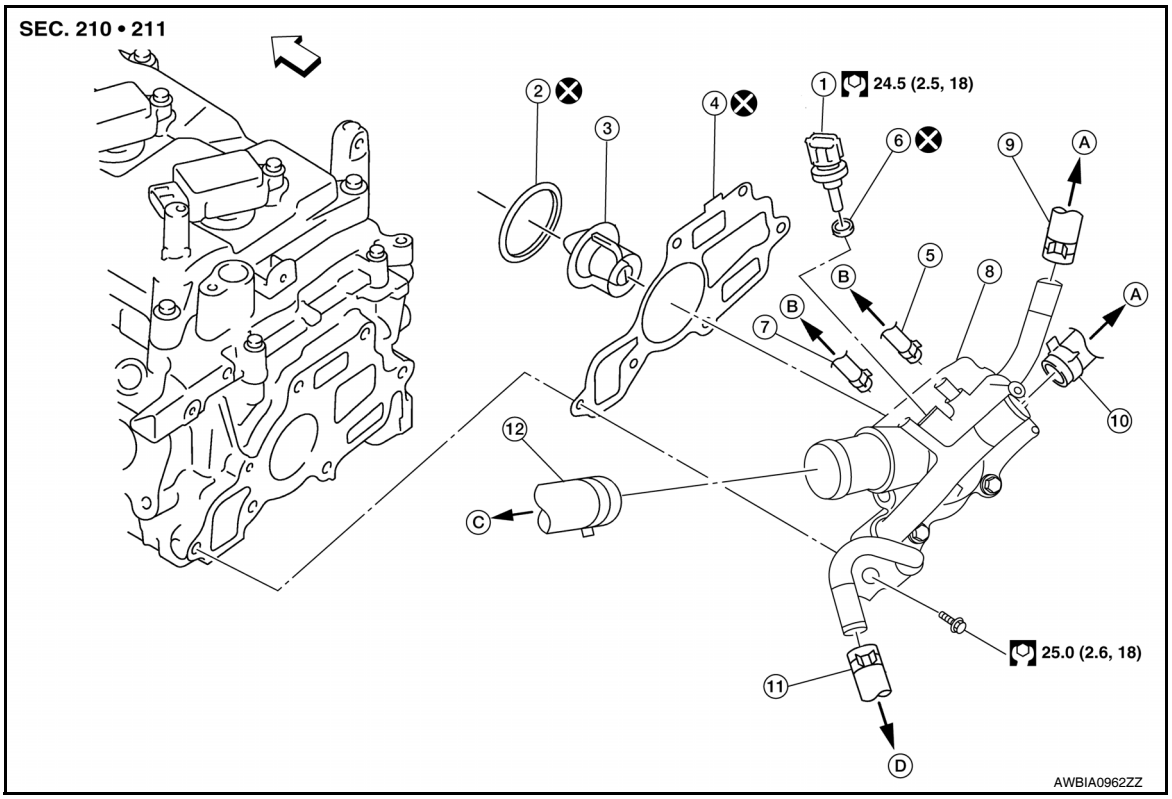
INFOID:0000000007332036

A/T and M/T MODELS



1.	Engine coolant temperature sensor	2.	O-ring	3.	Water control valve
4.	Gasket	5.	Water hose	6.	Gasket
7.	Water hose	8.	Water outlet	9.	Heater hose
10.	Heater hose	11.	Radiator hose (upper)	⇦	Front
A.	To heater	B.	To electric throttle control actuator	C.	To radiator

CVT MODELS



1.	Engine coolant temperature sensor	2.	O-ring	3.	Water control valve
4.	Gasket	5.	Water hose	6.	Gasket
7.	Water hose	8.	Water outlet	9.	Heater hose
10.	Heater hose	11.	CVT warmer hose	12.	Radiator hose (upper)
⇦	Front	A.	To heater	B.	To electric throttle control actuator
C.	To radiator	D.	To CVT fluid warmer		

Removal and Installation

INFOID:0000000007332037

REMOVAL

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from the radiator. Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

NOTE:

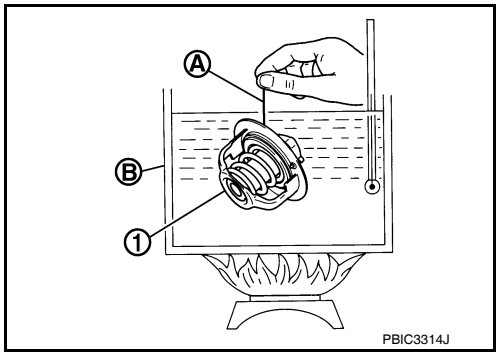
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Drain engine coolant from radiator. Refer to CO-11, "Changing Engine Coolant".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove battery and battery tray. Refer to SC-7, "Removal and Installation".
3. Remove air cleaner and air duct. Refer to EM-16, "Component".
4. Remove radiator hose (lower) from engine. Refer to CO-15, "Component".
5. Remove heater hoses and water hoses.
6. Remove CVT warmer hose (CVT models only).
7. Remove water outlet.
8. Remove water control valve.
9. Remove engine coolant temperature sensor from the water outlet, if necessary.

CAUTION:
- **Be careful not to damage engine coolant temperature sensor.**
- **Replace the gasket with a new one.**

INSPECTION AFTER REMOVAL

- Place a thread (A) so that it is caught in the valves of water control valve (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open valve lift amount.
- After checking the full-open valve lift amount, lower the water temperature and check the valve closing temperature.



Standard : Refer to CO-30, "Standard and Limit"

- Replace the water control valve if it is out of the specification range.

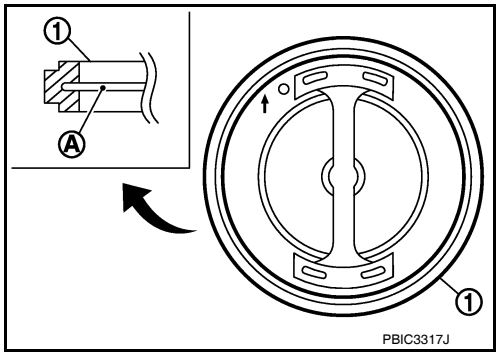
INSTALLATION

Installation is in the reverse order of removal.

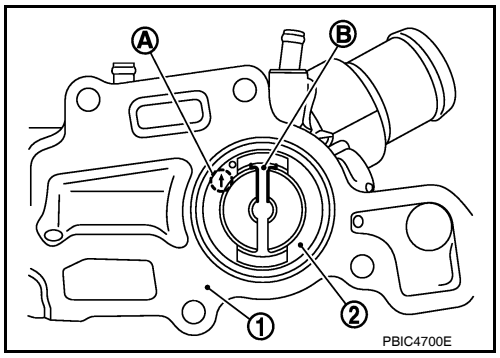
- Use the following procedure to install the water control valve.

- Install water control valve making sure O-ring (1) groove fits securely to water control valve flange (A).

CAUTION:
- **Replace the O-ring with a new one.**
- **Do not reuse O-ring.**



- While the mark (A) points to up, install water control valve (2) with frame center (B) facing straight upward into water outlet (1).

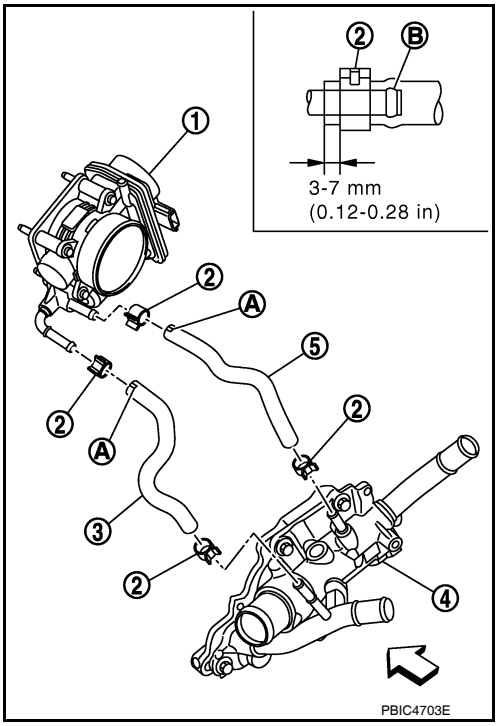


- Use the following procedure to install the water outlet.

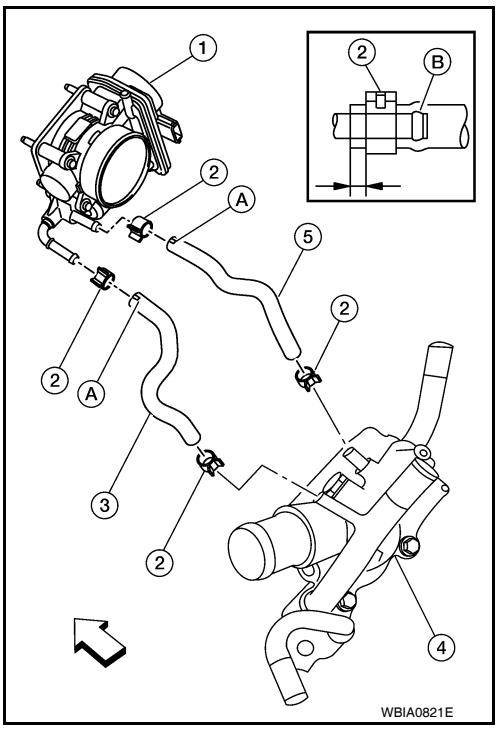
- Install the water outlet to the cylinder head without displacing the water control valve from the valve position.

- Use the following procedure to install the water hoses.

- Install water hoses (3),(5) as shown.
• Electric throttle control actuator (1)
• Clamp (2)
• Water outlet (4)
• Paint mark (A)
• Clamp shall not interfere with the bulged area (B)
• ⇦: Engine front



- Water Hoses (CVT Models)
- Install water hoses (3),(5) as shown.
• Electric throttle control actuator (1)
• Clamp (2)
• Water outlet (4)
• Paint mark (A)
• Clamp shall not interfere with the bulged area (B)
• ⇦: Engine front



Inspection

INFOID:0000000007332038

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-13, "Fluids and Lubricants".
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to specified level, if necessary.
- Summary of the inspection items:

Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level
Fuel		Leakage	Leakage	Leakage
Exhaust gas		—	Leakage	—

*Power steering fluid, brake fluid, etc.

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:0000000007332039

CAPACITY

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (with reservoir tank at “MAX” level)	Approx. 6.8 (7 1/4, 6)

THERMOSTAT

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Full-open valve lift amount	8 mm/ 95°C (0.315 in/ 203°F)
Valve closing temperature	77°C (171°F)

WATER CONTROL VALVE

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Full-open valve lift amount	8 mm/ 108°C (0.315 in/ 226°F)
Valve closing temperature	90°C (194°F)

RADIATOR

Unit: kPa (kg/cm^2, psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11- 14)
	Limit	59 (0.6, 9)
Leakage test pressure		157 (1.6, 23)

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ENGINE CONTROL SYSTEM

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SERVICE INFORMATION

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U0101-U1001

INFOID:0000000007699655

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
U0101	0101*4	LOST COMM (TCM)	EC-147
U1001	1001*4	CAN COMM CIRCUIT	EC-149

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012/ISO 15031-6.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: The troubleshooting for this DTC needs CONSULT.

P0011-P0075

INFOID:0000000007699656

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0011	0011	INT/V TIM CONT-B1	EC-151
P0031	0031	A/F SEN1 HTR (B1)	EC-155
P0032	0032	A/F SEN1 HTR (B1)	EC-155
P0037	0037	HO2S2 HTR (B1)	EC-160
P0038	0038	HO2S2 HTR (B1)	EC-160
P0075	0075	INT/V TIM V/CIR-B1	EC-165

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012/ISO 15031-6.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0101-P0128

INFOID:0000000007699657

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0101	0101	MAF SEN/CIRCUIT-B1	EC-170
P0102	0102	MAF SEN/CIRCUIT-B1	EC-177
P0103	0103	MAF SEN/CIRCUIT-B1	EC-177
P0111	0111	IAT SENSOR 1 B1	EC-184
P0112	0112	IAT SEN/CIRCUIT-B1	EC-188
P0113	0113	IAT SEN/CIRCUIT-B1	EC-188
P0116	0116	ECT SEN/CIRC	EC-192
P0117	0117	ECT SEN/CIRC	EC-196
P0118	0118	ECT SEN/CIRC	EC-196
P0122	0122	TP SEN 2/CIRC-B1	EC-201
P0123	0123	TP SEN 2/CIRC-B1	EC-201
P0125	0125	ECT SENSOR	EC-206

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0127	0127	IAT SENSOR-B1	EC-209
P0128	0128	THERMSTAT FNCTN	EC-212

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0130-P0183

INFOID:0000000007699658

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0130	0130	A/F SENSOR1 (B1)	EC-214
P0131	0131	A/F SENSOR1 (B1)	EC-219
P0132	0132	A/F SENSOR1 (B1)	EC-224
P0137	0137	HO2S2 (B1)	EC-229
P0138	0138	HO2S2 (B1)	EC-238
P0139	0139	HO2S2 (B1)	EC-248
P014C	014C	A/F SENSOR1 (B1)	EC-257
P014D	014D	A/F SENSOR1 (B1)	EC-257
P0171	0171	FUEL SYS-LEAN-B1	EC-265
P0172	0172	FUEL SYS-RICH-B1	EC-271
P0181	0181	FTT SENSOR	EC-277
P0182	0182	FTT SEN/CIRCUIT	EC-283
P0183	0183	FTT SEN/CIRCUIT	EC-283

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0222-P0420

INFOID:0000000007699659

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0222	0222	TP SEN 1/CIRC-B1	EC-287
P0223	0223	TP SEN 1/CIRC-B1	EC-287
P0300	0300	MULTI CYL MISFIRE	EC-292
P0301	0301	CYL 1 MISFIRE	EC-292
P0302	0302	CYL 2 MISFIRE	EC-292
P0303	0303	CYL 3 MISFIRE	EC-292
P0304	0304	CYL 4 MISFIRE	EC-292
P0327	0327	KNOCK SEN/CIRC-B1	EC-298
P0328	0328	KNOCK SEN/CIRC-B1	EC-298
P0335	0335	CKP SEN/CIRCUIT	EC-302

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0340	0340	CMP SEN/CIRC-B1	EC-308
P0420	0420	TW CATALYST SYS-B1	EC-314

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012/ISO 15031-6.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0441-P0463

INFOID:0000000007699660

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0441	0441	EVAP PURG FLOW/MON	EC-319
P0442	0442	EVAP SMALL LEAK	EC-324
P0443	0443	PURG VOLUME CONT/V	EC-332
P0444	0444	PURG VOLUME CONT/V	EC-340
P0445	0445	PURG VOLUME CONT/V	EC-340
P0447	0447	VENT CONTROL VALVE	EC-345
P0448	0448	VENT CONTROL VALVE	EC-351
P0451	0451	EVAP SYS PRES SEN	EC-357
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P0453	0453	EVAP SYS PRES SEN	EC-369
P0455	0455	EVAP GROSS LEAK	EC-376
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P0460	0460	FUEL LEV SEN SLOSH	EC-391
P0461	0461	FUEL LEVEL SENSOR	EC-393
P0462	0462	FUEL LEVL SEN/CIRC	EC-395
P0463	0463	FUEL LEVL SEN/CIRC	EC-395

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012/ISO 15031-6.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0500-P0643

INFOID:0000000007699661

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0500	0500	VEH SPEED SEN/CIRC	EC-397 (M/T) EC-398 (CVT, A/T)
P0506	0506	ISC SYSTEM	EC-401
P0507	0507	ISC SYSTEM	EC-403
P050A	050A	COLD START CONTROL	EC-405
P050E	050E	COLD START CONTROL	EC-405
P0605	0605	ECM	EC-407
P0607	0607	ECM	EC-409
P0643	0643	SENSOR POWER/CIRC	EC-410

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0705-P0734

INFOID:0000000007699662

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0705	0705	T/M RANGE SENSOR A	AT-87 (A/T) CVT-62 (CVT)
P0710	0710	FLUID TEMP SENSOR A*4	AT-92 (A/T) CVT-67 (CVT)
P0715	0715	INPUT SPEED SENSOR AC	CVT-72
P0720	0720	OUTPUT SPEED SENSOR	AT-97 (A/T) CVT-76 (CVT)
P0725	0725	ENGINE SPEED	AT-102
P0731	0731	1GR INCORRECT RATIO*4	AT-106
P0732	0732	2GR INCORRECT RATIO*4	AT-109
P0733	0733	3GR INCORRECT RATIO*4	AT-112
P0734	0734	4GR INCORRECT RATIO*4	AT-115

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*3: When erasing this DTC, always use CONSULT or GST.

P0740-P0840

INFOID:0000000007699663

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0740	0740	TORQUE CONVERTERC	AT-120 (A/T) CVT-84 (CVT)
P0744	0744	TORQUE CONVERTER	AT-125 (A/T) CVT-89 (CVT)
P0745	0745	PC SOLENOID A	AT-130 (A/T) CVT-91 (CVT)
P0746	0746	PC SOLENOID A	CVT-96
P0750	0750	SHIFT SOLENOID A	AT-135
P0755	0755	SHIFT SOLENOID B	AT-140
P0776	0776	PC SOLENOID B	CVT-98
P0778	0778	PC SOLENOID B	CVT-100
P0840	0840	FLUID PRESS SEN/SW A	CVT-105

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P0850-P1574

INFOID:0000000007699664

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P0850	0850	P-N POS SW/CIRCUIT	EC-415
P1148	1148	CLOSED LOOP-B1	EC-421
P1211	1211	TCS C/U FUNCTN	EC-422
P1212	1212	TCS/CIRC	EC-423
P1217	1217	ENG OVER TEMP	EC-425
P1225	1225	CTP LEARNING-B1	EC-433
P1226	1226	CTP LEARNING-B1	EC-434
P1564	1564	ASCD SW	EC-436
P1572	1572	ASCD BRAKE SW	EC-442
P1574	1574	ASCD VHL SPD SEN	EC-451

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P1610-P1615

INFOID:0000000007699665

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P1610	1610	LOCK MODE	BL-221
P1611	1611	ID DISCORD,IMMU-ECM	BL-221
P1612	1612	CHAIN OF ECM-IMMU	BL-221
P1614	1614	CHAIN OF IMMU-KEY	BL-221
P1615	1615	DIFFERENCE OF KEY	BL-221

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P1715-P1805

INFOID:0000000007699666

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P1715	1715	IN PULY SPEED	EC-453 (A/T) EC-454 (CVT)
P1740	1740	SLCT SOLENOID	CVT-124
P1760	1760	OVER CLUTCH SOLENOID	AT-145
P1777	1777	STEP MOTOR	CVT-129
P1778	1778	STEP MOTOR	CVT-133
P1805	1805	BRAKE SW/CIRCUIT	EC-455

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

P2100-P2A00

INFOID:0000000007699667

DTC*1		Items (CONSULT screen terms)	Reference
CONSULT GST*2	ECM*3		
P2100	2100	ETC MOT PWR-B1	EC-459
P2101	2101	ETC FNCTN/CIRC-B1	EC-463
P2103	2103	ETC MOT PWR	EC-459
P2118	2118	ETC MOT-B1	EC-469
P2119	2119	ETC ACTR-B1	EC-473
P2122	2122	APP SEN 1/CIRC	EC-475
P2123	2123	APP SEN 1/CIRC	EC-475
P2127	2127	APP SEN 2/CIRC	EC-480
P2128	2128	APP SEN 2/CIRC	EC-480
P2135	2135	TP SENSOR-B1	EC-487
P2138	2138	APP SENSOR	EC-492
P2A00	2A00	A/F SENSOR1 (B1)	EC-499

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007699668

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007699669

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

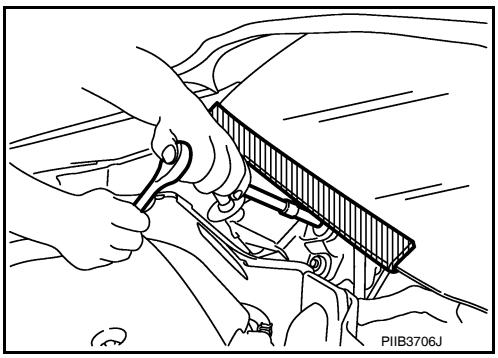
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007699670

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



On Board Diagnosis (OBD) System of Engine and A/T, CVT

INFOID:0000000007699671

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

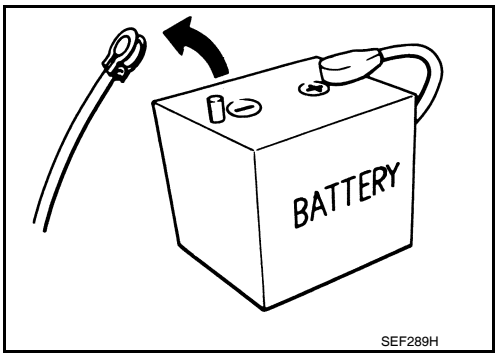
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-62.**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

Precaution

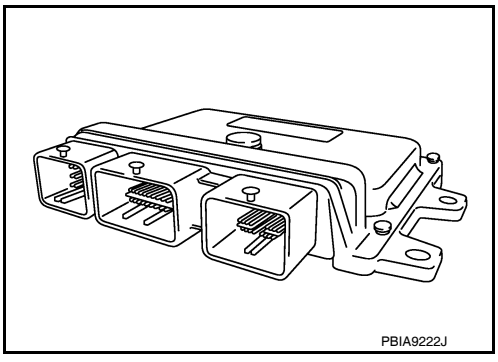
INFOID:0000000007699672

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect negative battery cable.**



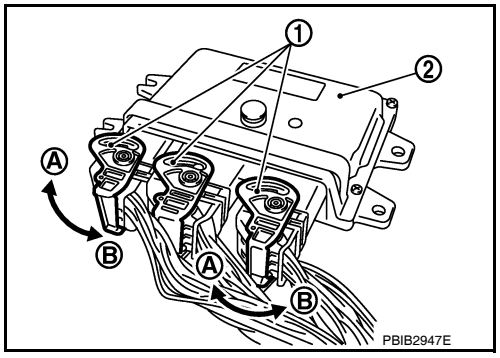
- **Do not disassemble ECM.**
- **If battery cable is disconnected, the memory will return to the initial ECM values.**
  The ECM will now start to self-control at its initial values. Engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.
- **If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.**

- **Diagnostic trouble codes**
- **1st trip diagnostic trouble codes**

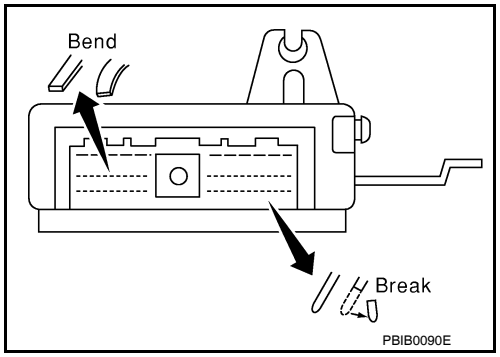


- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

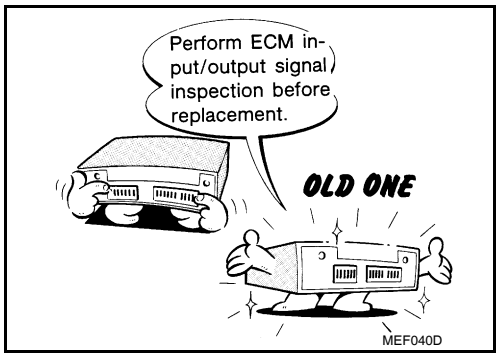
- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.
- ECM (2)
- Loosen (A)



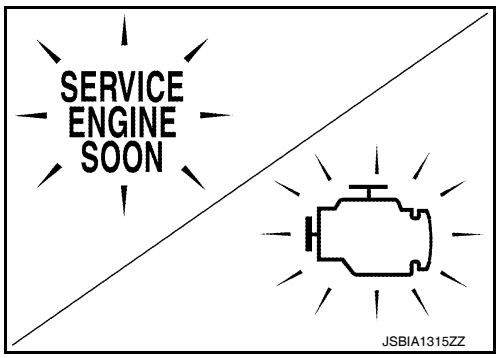
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors.
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.



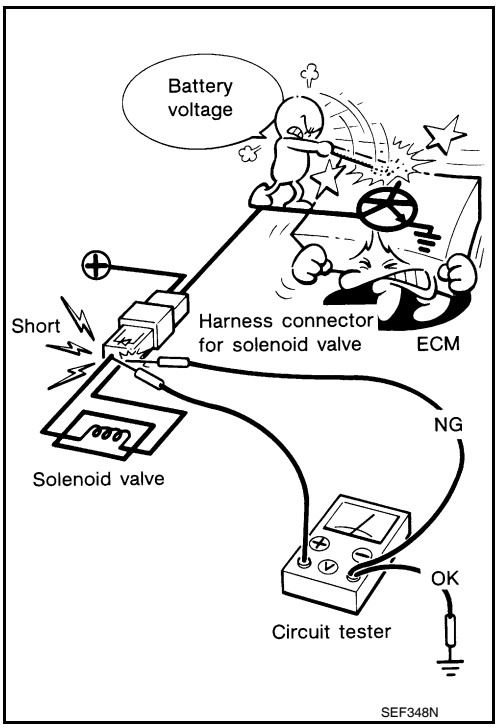
- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and make sure ECM functions properly. Refer to EC-112, "ECM Terminal and Reference Value".
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



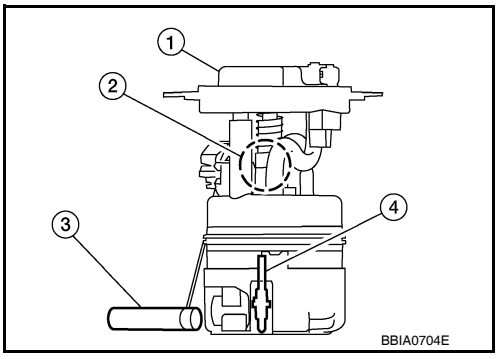
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check.
  The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



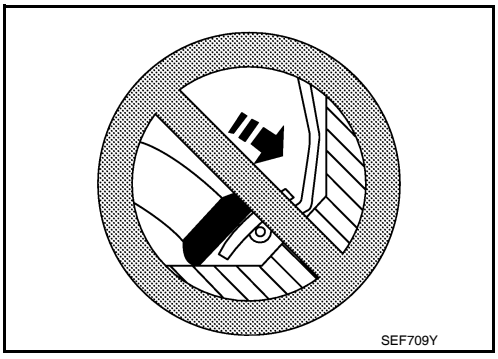
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



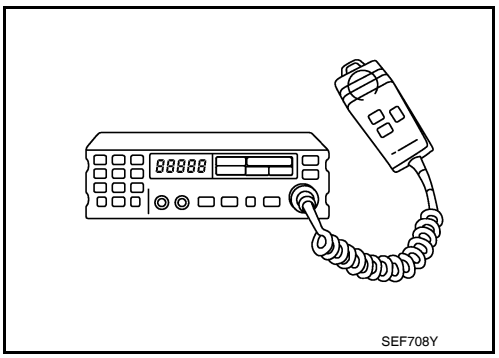
- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**
- **Fuel level sensor unit and fuel pump (1)**
- **Fuel pressure regulator (2)**
- **Fuel level sensor (3)**
- **Fuel tank temperature sensor (4)**



- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
  - **Keep the antenna as far as possible from the electronic control units.**
  - **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
    Do not let them run parallel for a long distance.
  - **Adjust the antenna and feeder line so that the standing-wave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**

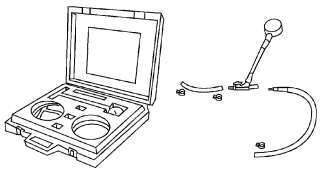
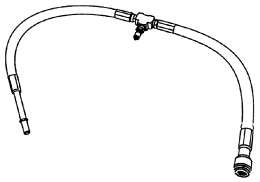
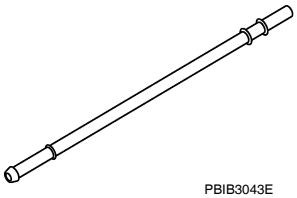


PREPARATION

Special Service Tool

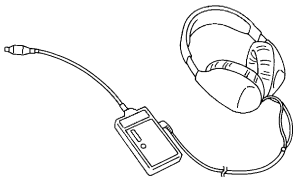
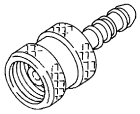
INFOID:0000000007699673

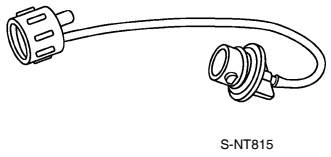
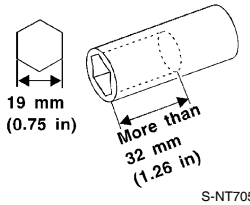
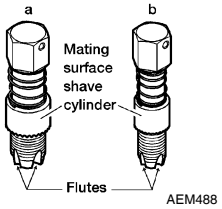
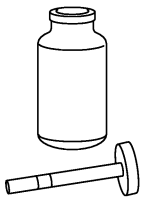
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge Kit  LEC642	Checking fuel pressure
(J-44321-6) Fuel pressure adapter  LBIA0376E	Connecting fuel pressure gauge to quick connector type fuel lines.
KV10118400 Fuel tube adapter  PBIB3043E	Measuring fuel pressure

Commercial Service Tool

INFOID:0000000007699674

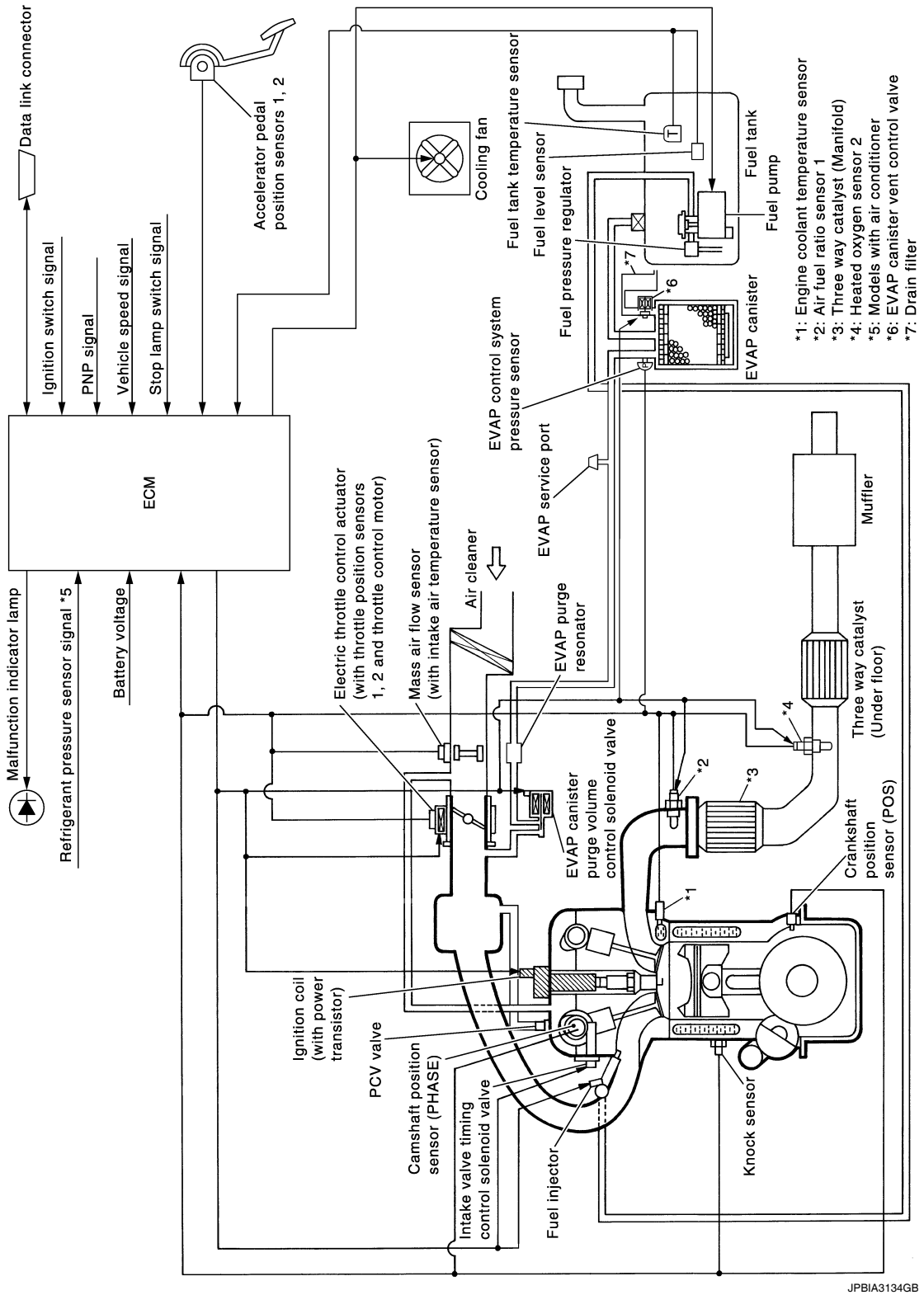
Tool number (Kent-Moore No.) Tool name	Description
Leak detector i.e.: (J-41416)  S-NT703	Locating the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD)  S-NT704	Applying positive pressure through EVAP service port

Tool number (Kent-Moore No.) Tool name	Description
Fuel filler cap adapter i.e.: (MLR-8382)  S-NT815	Checking fuel tank vacuum relief valve opening pressure
Socket wrench  S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)  AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)  S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE CONTROL SYSTEM

Schematic

INFOID:0000000007699675



Multiport Fuel Injection (MFI) System

INFOID:0000000007699676

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) signal	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation*2		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Air conditioner switch	Air conditioner operation*2		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

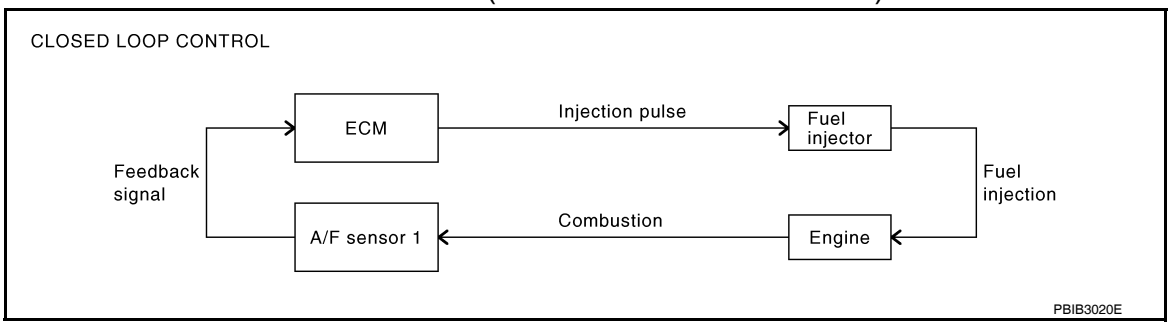
VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (A/T and CVT models)
- High-load, high-speed operation

<Fuel decrease>
- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



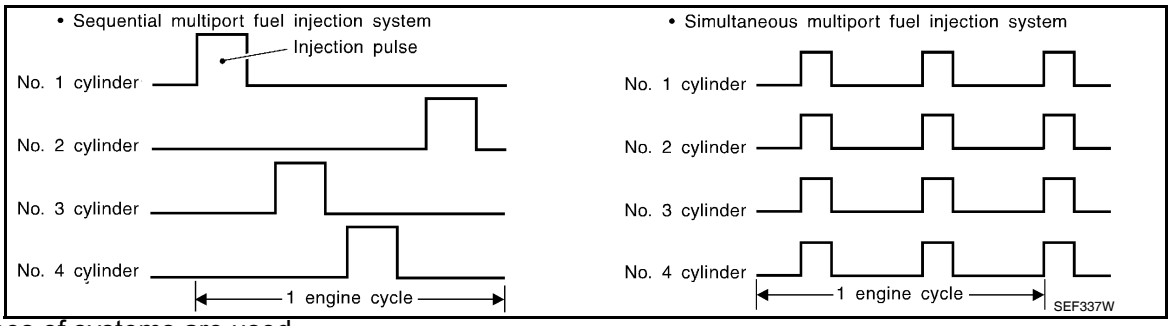
The mixture ratio feedback system provides the best air/fuel mixture ratio for drivability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses air fuel ratio (A/F) sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about air fuel ratio (A/F) sensor 1, refer to EC-214. This maintains the mixture ratio within the range of stoichiometric (ideal air/fuel mixture).
This stage is referred to as the closed loop control condition.
Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of air fuel ratio (A/F) sensor 1 shift, the air/fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control
The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.
- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of air fuel ratio (A/F) sensor 1 or its circuit
- Insufficient activation of air fuel ratio (A/F) sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (A/T and CVT models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from air fuel ratio (A/F) sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from air fuel ratio (A/F) sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System
Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System
Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The four fuel injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

Electronic Ignition (EI) System

INFOID:0000000007699677

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) signal	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Fuel Cut Control (at No Load and High Engine Speed)

INFOID:0000000007699678

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) signal	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			

*: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

If the engine speed is above 2,400 rpm under no load [for example, the selector lever position is P or N (A/T, CVT), Neutral (M/T) and engine speed is over 2,400 rpm] fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.
Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:
This function is different from deceleration control listed under EC-22, "Multiport Fuel Injection (MFI) System".

AIR CONDITIONING CUT CONTROL

Input/Output Signal Chart

INFOID:0000000007699679

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner ON signal*1	Air conditioner cut control	Air conditioner relay
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit	Power steering operation*1		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

System Description

INFOID:0000000007699680

This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.
- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Description

INFOID:0000000007699681

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) signal	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			
TCM	Powertrain revolution*		

*: This signal is sent to the ECM through CAN communication line.

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.
NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE indicator in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET/COAST switch. (Then SET indicator in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.
- CANCEL switch is pressed
- More than two switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever is changed to N, P, R position (A/T and CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.
- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

RESUME OPERATION

When the RESUME/ACCELERATE switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (A/T and CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

Component Description

INFOID:0000000007699682

ASCD STEERING SWITCH

Refer to EC-436.

ASCD BRAKE SWITCH

Refer to EC-442 and EC-506.

ASCD CLUTCH SWITCH

Refer to EC-442 and EC-506.

STOP LAMP SWITCH

Refer to EC-442, EC-455 and EC-506.

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EC-459, EC-463, EC-469 and EC-473.

ASCD INDICATOR

Refer to EC-514.

CAN COMMUNICATION

System Description

INFOID:0000000007699683

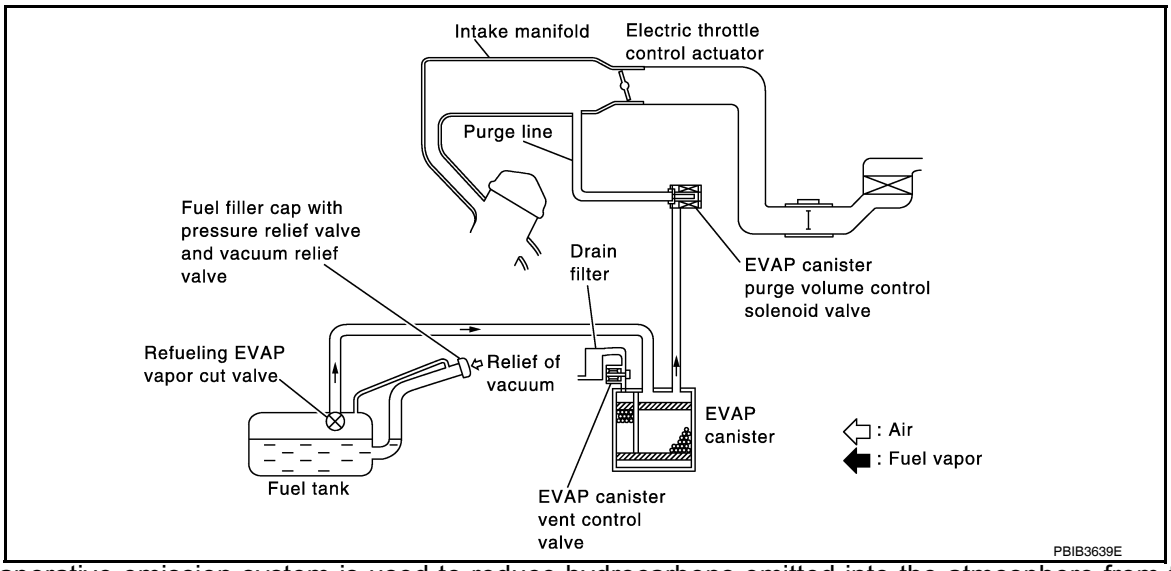
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-23, "CAN Communication Signal Chart", about CAN communication for detail.

EVAPORATIVE EMISSION SYSTEM

Description

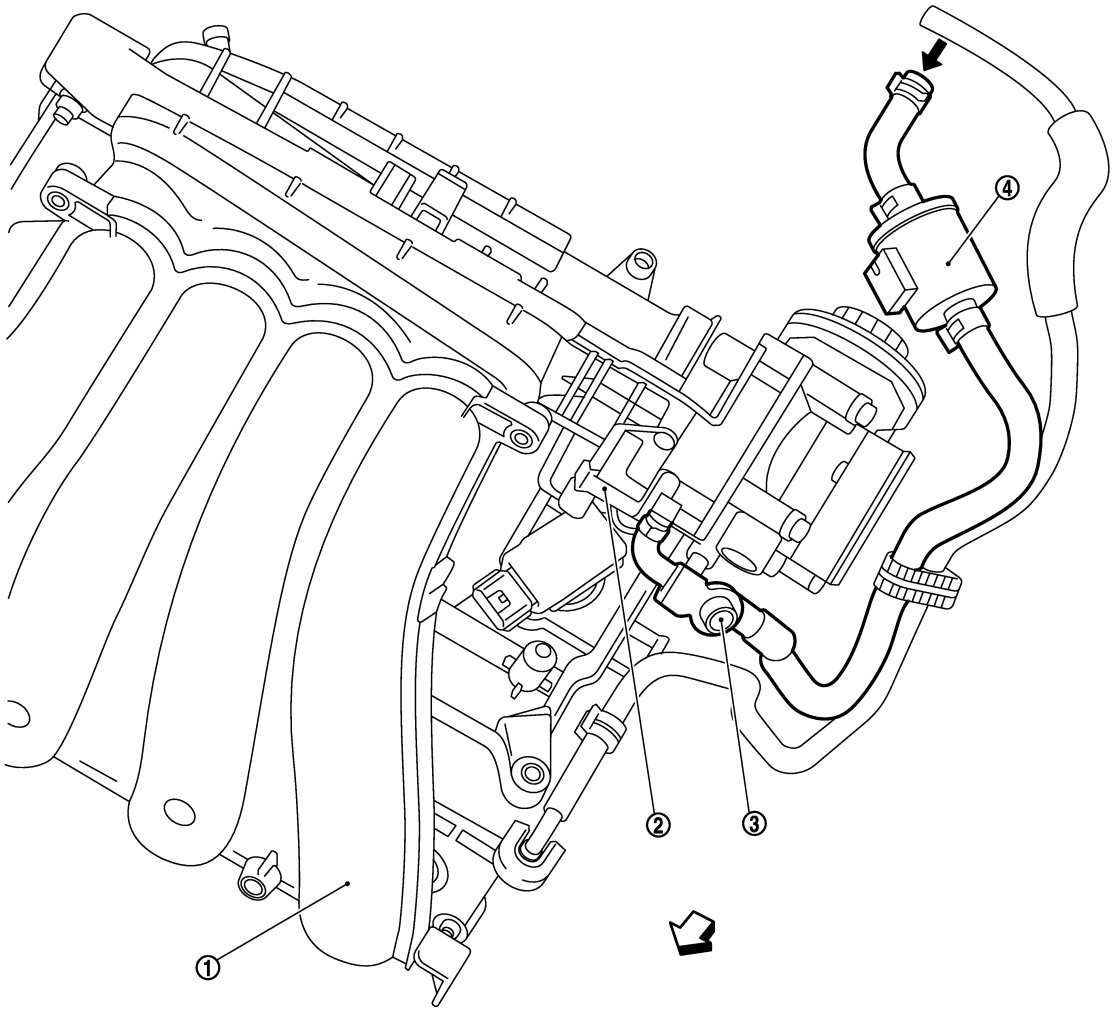
INFOID:0000000007699684

SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

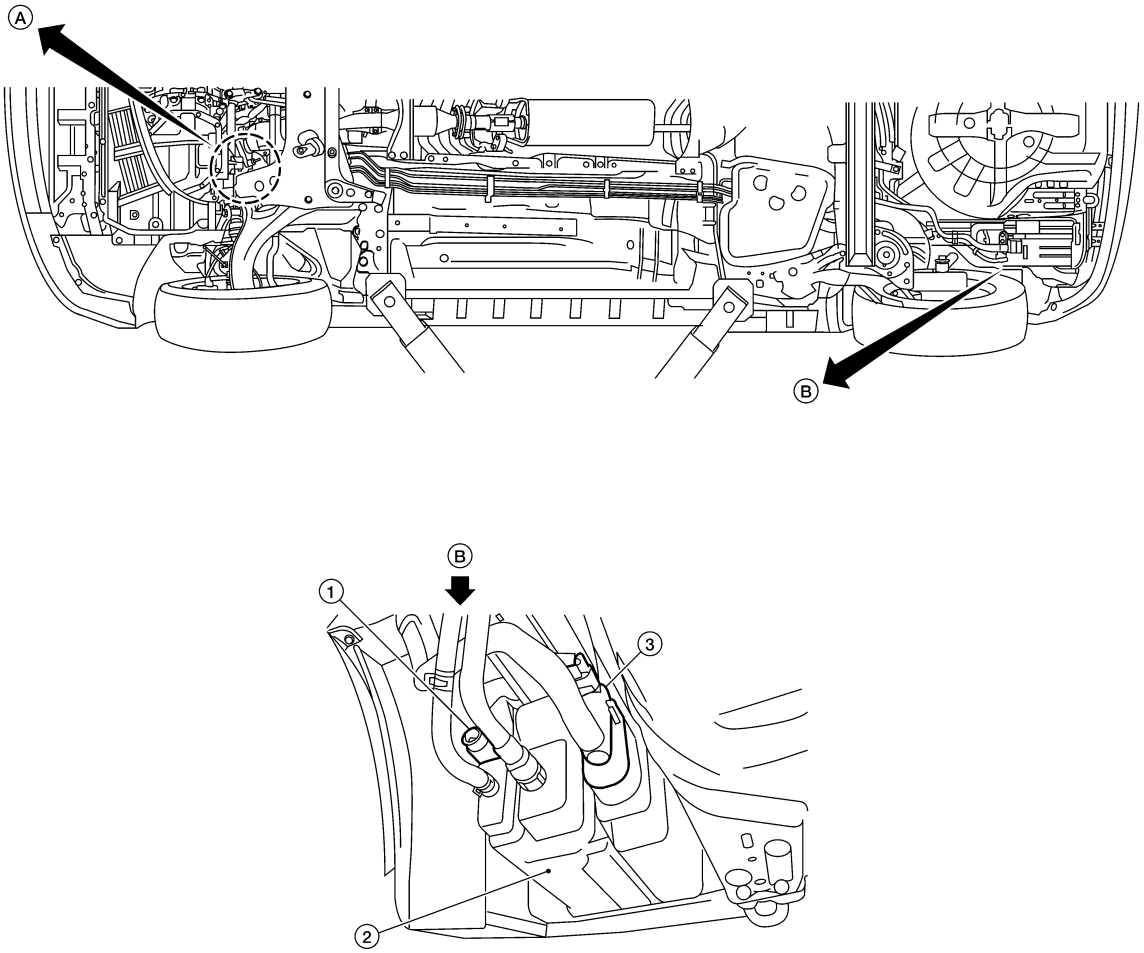
EVAPORATIVE EMISSION LINE DRAWING



PBIB3330E

1. Intake manifold collector
2. EVAP canister purge volume control solenoid valve
3. EVAP service port
4. EVAP purge resonator
⇦: Vehicle front
⬅: From next figure

NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.



BBIA0692E

1. EVAP control system pressure sensor 2. EVAP canister 3. EVAP canister vent control valve
A. To previous figure

NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

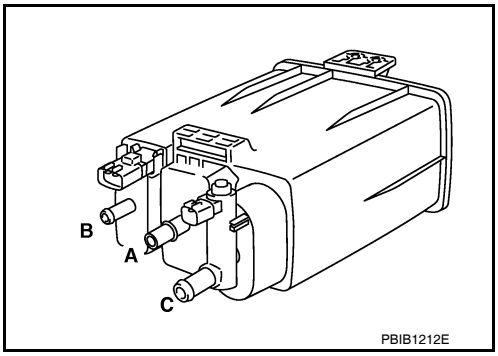
Component Inspection

INFOID:0000000007699685

EVAP CANISTER

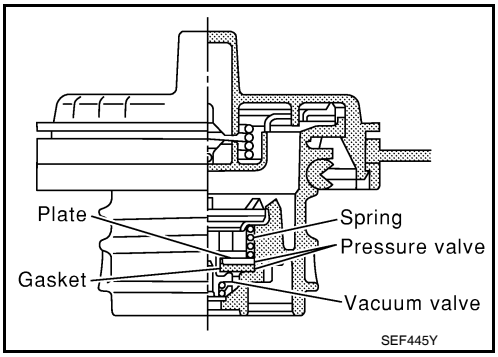
Check EVAP canister as follows:

1. Block port (B).
2. Blow air into port (A) and confirm that it flows freely out of port (C).
3. Release blocked port (B).
4. Apply vacuum pressure to port (B) and confirm that vacuum pressure exists at the ports (A) and (C).
5. Block port (A) and (B).
6. Apply pressure to port (C) and check that there is no leakage.



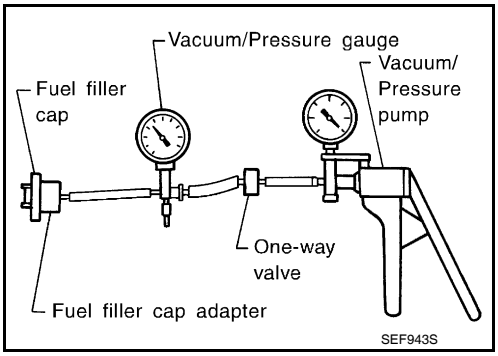
FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa
(0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum: −6.0 to −3.4 kPa
(−0.061 to −0.035 kg/cm^2, −0.87 to −0.48 psi)



3. If out of specification, replace fuel filler cap as an assembly. Refer to FL-10, "Component".

CAUTION:
Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Refer to EC-338, "Component Inspection".

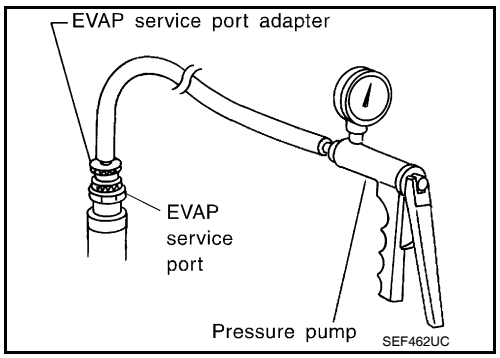
FUEL TANK TEMPERATURE SENSOR
Refer to EC-282, "Component Inspection".

EVAP CANISTER VENT CONTROL VALVE
Refer to EC-349, "Component Inspection".

EVAP CONTROL SYSTEM PRESSURE SENSOR
Refer to EC-360, "Component Inspection".

EVAP SERVICE PORT

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



How to Detect Fuel Vapor Leakage

INFOID:0000000007699686

CAUTION:

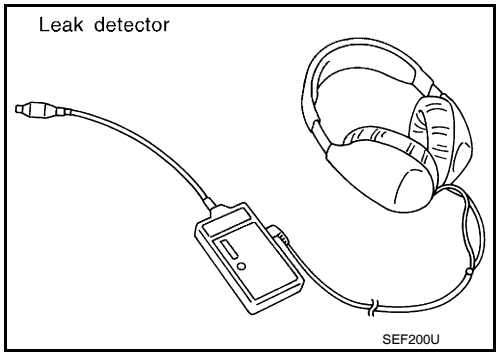
- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in EVAP system.**

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

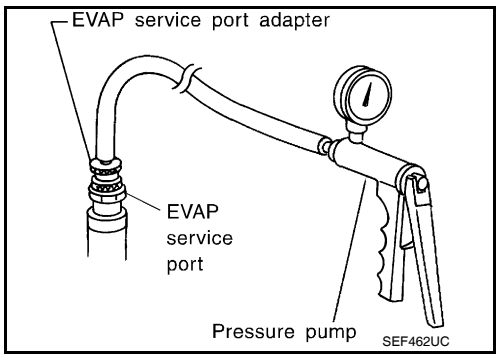
WITH CONSULT

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch ON.
4. Select the “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT.
5. Touch “START”. A bar graph (Pressure indicating display) will appear on the screen.
6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.
8. Locate the leak using a leak detector. Refer to EC-31, "Description".



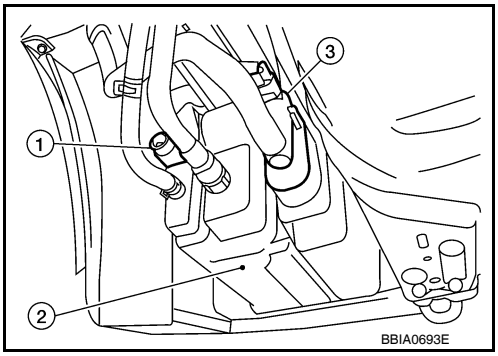
WITHOUT CONSULT

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



3. Apply battery voltage to the terminal of EVAP canister vent control valve (3) to make a closed EVAP system.

1. EVAP control system pressure sensor
2. EVAP canister

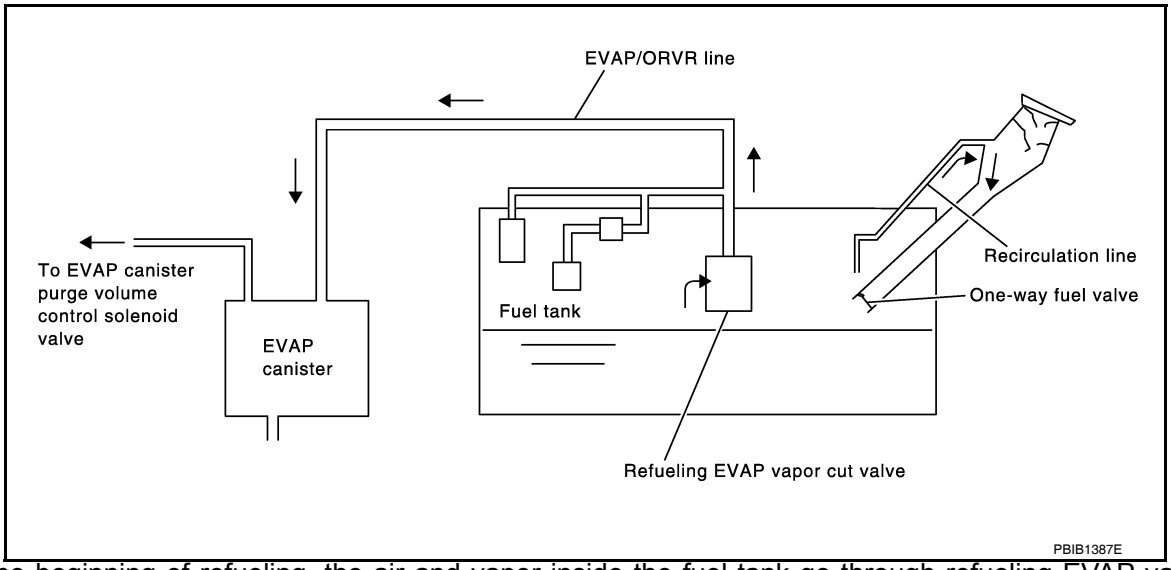


4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm^2, 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to EC-31, "Description".

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

System Description

INFOID:0000000007699687



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.
When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

WARNING:
When conducting inspections below, be sure to observe the following:
- **Put a "CAUTION: FLAMMABLE" sign in workshop.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.**
- **Be sure to furnish the workshop with a CO_2 fire extinguisher.**

CAUTION:
- **Before removing fuel line parts, carry out the following procedures:**
  - **Put drained fuel in an explosion-proof container and put lid on securely.**
  - **Release fuel pressure from fuel line. Refer to EC-89, "Fuel Pressure Check".**
  - **Disconnect negative battery cable.**
- **Always replace O-ring when the fuel gauge retainer is removed.**
- **Do not kink or twist hose and tube when they are installed.**
- **Do not tighten hose and clamps excessively to avoid damaging hoses.**
- **After installation, run engine and check for fuel leaks at connection.**
- **Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.**

Diagnosis Procedure

INFOID:0000000007699688

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-15, "Exploded View".
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
   The weight should be less than 1.9 kg (4.2 lb).

OK or NG

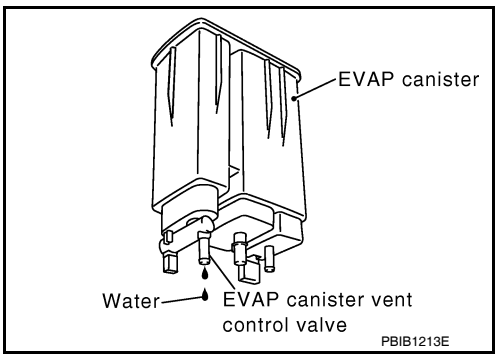
OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.
No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to FL-15, "Exploded View".

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-40, "Component Inspection".

OK or NG

OK >> **INSPECTION END**
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-10, "Component".

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-15, "Exploded View".
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
   The weight should be less than 1.9 kg (4.2 lb).

OK or NG

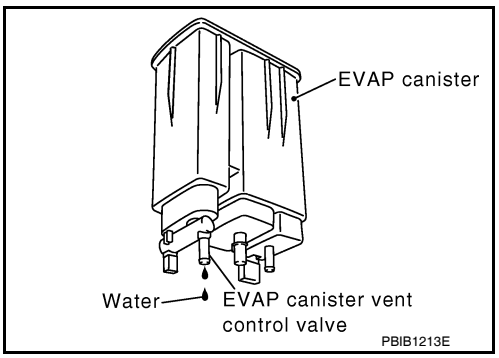
OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.
No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to FL-15, "Exploded View".

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling EVAP vapor cut valve for clogging, kink, looseness and improper connection.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace hoses and tubes.

7. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

OK >> GO TO 8.
NG >> Replace filler neck tube.

8. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-10, "Component".

9. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 10.
NG >> Replace fuel filler tube.

10. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

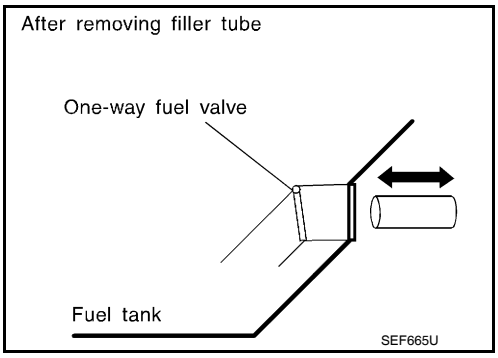
OK or NG

OK >> GO TO 11.

NG >> Repair or replace one-way fuel valve with fuel tank. Refer to FL-10, "Component".

11. CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose. Refer to FL-10, "Component".
3. Check one-way fuel valve for operation as follows.
   When a stick is inserted, the valve should open, when removing stick it should close.
   Do not drop any material into the tank.



OK or NG

OK >> **INSPECTION END**
NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to FL-10, "Component".

Component Inspection

INFOID:0000000007699689

REFUELING EVAP VAPOR CUT VALVE

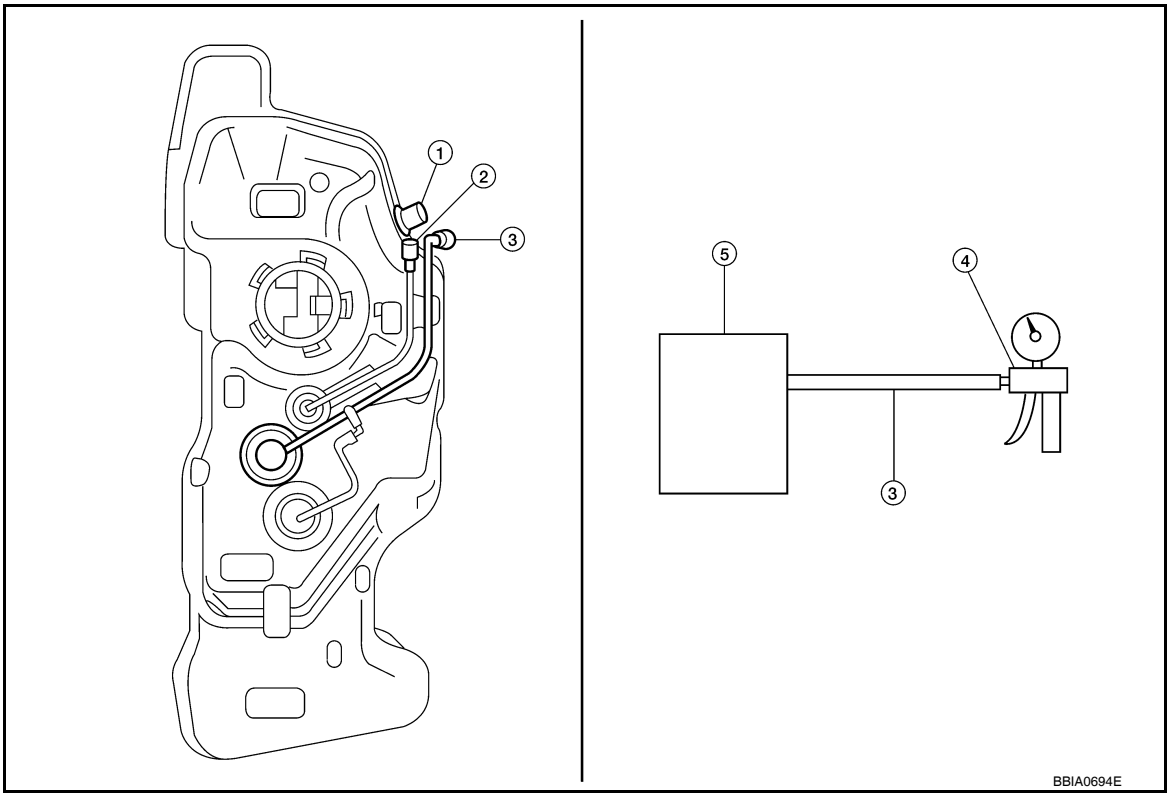
With CONSULT

1. Remove fuel tank. Refer to FL-10, "Removal and Installation".
2. Drain fuel from the tank as follows:

a. Remove fuel feed hose located on the fuel gauge retainer.
b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
c. Drain fuel using “FUEL PUMP RELAY” in “ACTIVE TEST” mode with CONSULT.

3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
   Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.

a. Connect vacuum pump to hose end.
b. Remove fuel gauge retainer with fuel gauge unit.
   Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to hose end [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



1. Filler tube
2. Recirculation line
3. EVAP/ORVR line
4. Vacuum/pressure handy pump
5. Fuel tank

Without CONSULT

1. Remove fuel tank. Refer to FL-10, "Removal and Installation".
2. Drain fuel from the tank as follows:

a. Remove fuel gauge retainer.

b. Drain fuel from the tank using a handy pump into a fuel container.

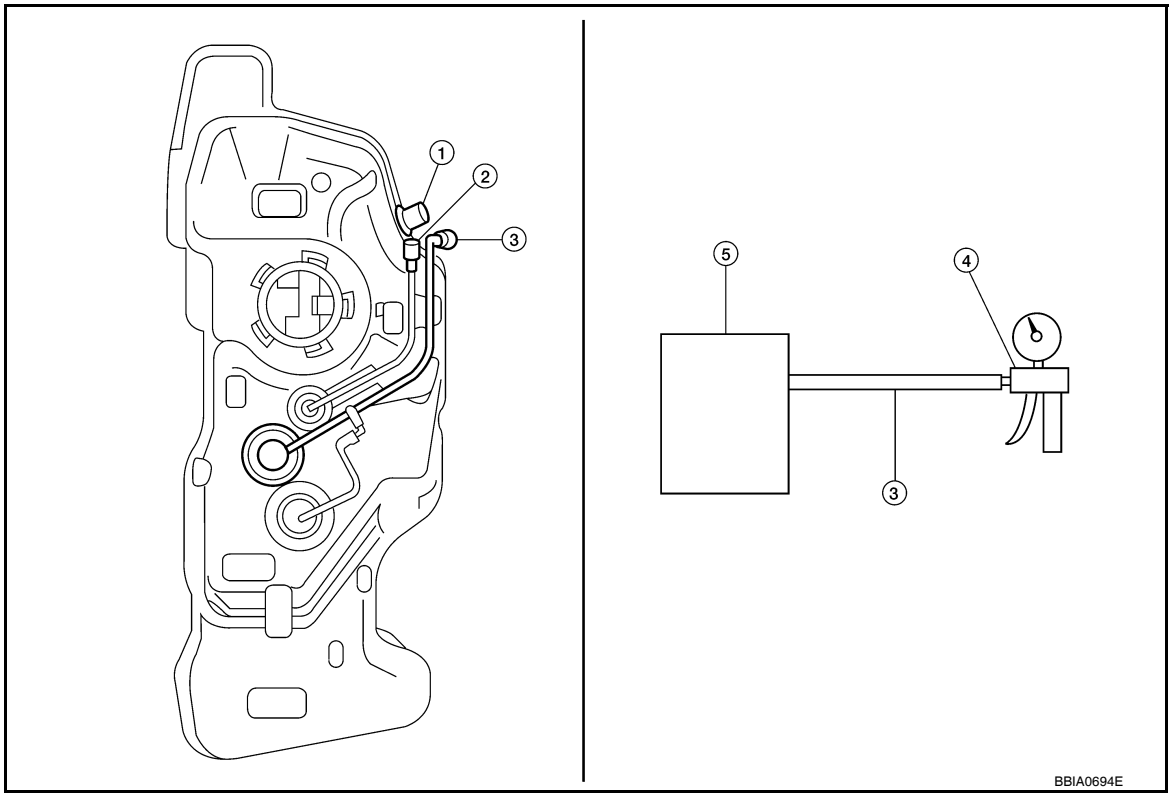
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.

a. Connect vacuum pump to hose end.

b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.

c. Put fuel tank upside down.

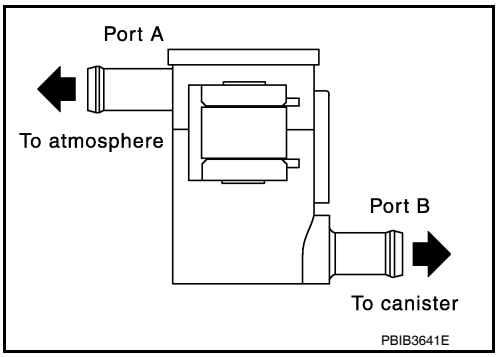
d. Apply vacuum pressure to hose end [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



1. Filler tube
2. Recirculation line
3. EVAP/ORVR line
4. Vacuum/pressure handy pump
5. Fuel tank

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to FL-10, "Component".

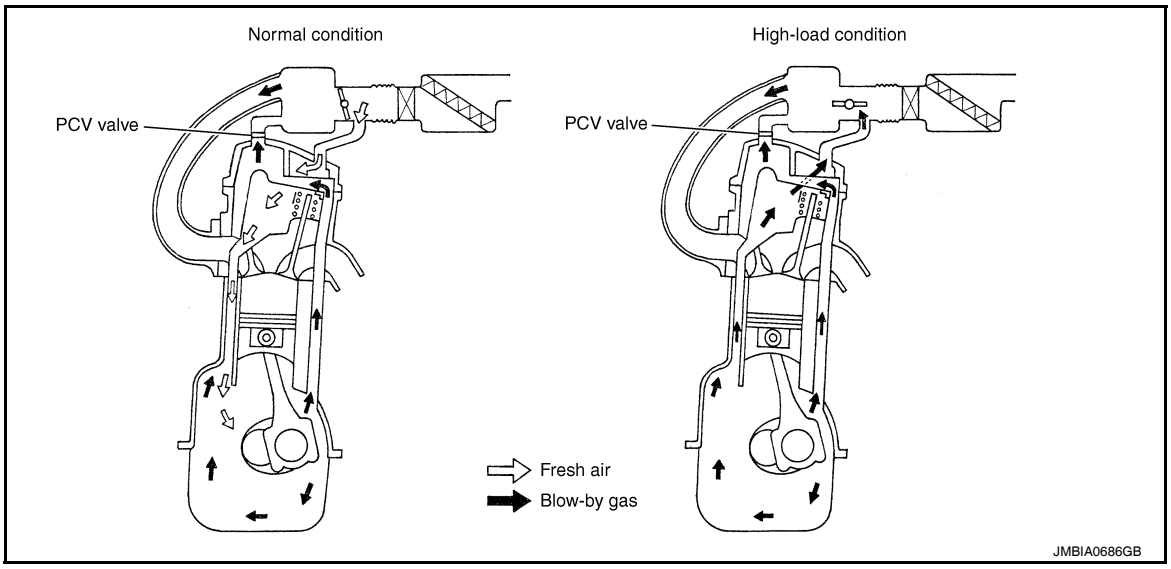


POSITIVE CRANKCASE VENTILATION

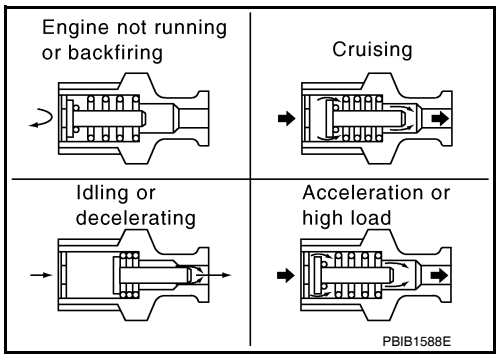
Description

INFOID:0000000007699690

SYSTEM DESCRIPTION



This system returns blow-by gas to the intake manifold.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

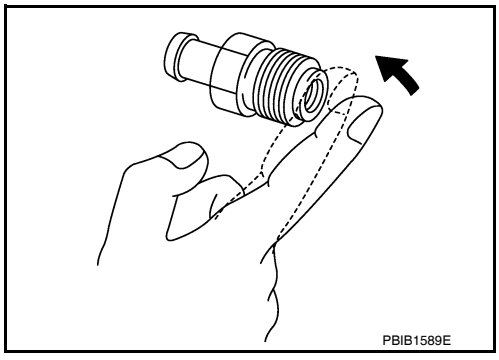


Component Inspection

INFOID:0000000007699691

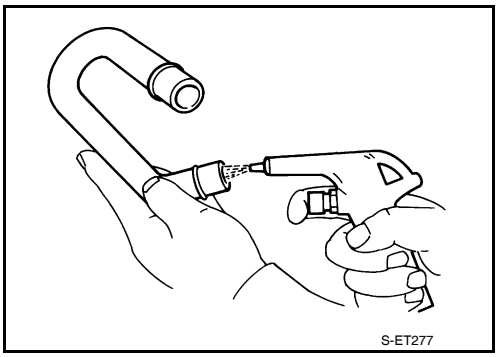
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace. Refer to EM-32, "Component".



NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

Description

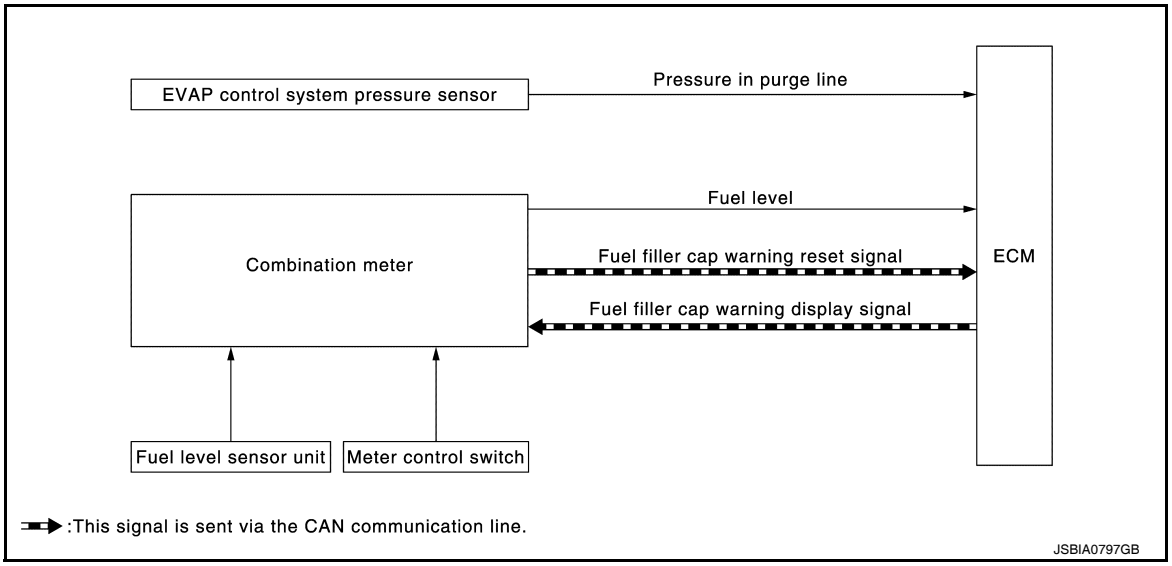
INFOID:0000000007699692

- **If the security indicator illuminates with the ignition switch ON or DTC P1610 - P1615 is displayed in "SELF DIAGNOSTIC RESULT" mode, perform the trouble diagnosis for corresponding to the detected DTC. Refer to EC-9, "U0101-U1001".**
- **Check that no DTC is displayed in "SELF DIAGNOSIS RESULT" mode of "BCM" before erasing the detected DTC in "ENGINE" mode with CONSULT.**
- **When replacing ECM, refer to EC-86, "Procedure After Replacing ECM".**

FUEL FILLER CAP WARNING SYSTEM

System Diagram

INFOID:0000000007747735



System Description

INFOID:0000000007747736

INPUT/OUTPUT SIGNAL CHART

Input

Unit/Sensor	Input signal to ECM	ECM function
EVAP control system pressure sensor	Pressure in purge line	Fuel filler cap warning control
Combination meter	Fuel level	
	Fuel filler cap warning reset signal*	

*: This signal is sent to the ECM via the CAN communication line.

Output

Unit	Output signal	Actuator
ECM	Fuel filler cap warning display signal*	Combination meter

*: This signal is sent to the combination meter via the CAN communication line.

SYSTEM DESCRIPTION

The fuel filler cap warning system alerts the driver to the prevention of the fuel filler being left uncapped and malfunction occurrences after refueling, by turning ON the fuel filler cap warning display on the combination meter.
ECM judges a refueled state, based on a fuel level signal transmitted from the combination meter.
When a very small leak is detected through the EVAP leak diagnosis performed after judging the refueled state, ECM transmits a fuel filler cap warning display signal (request for display ON) to the combination meter via CAN communication.
When receiving the signal, the combination meter turns ON the fuel filler cap warning display.

CAUTION:

Check fuel filler cap installation condition when the fuel filler cap warning display turns ON.

Reset Operation

The fuel filler cap warning lamp tunes OFF, according to any condition listed below:

- Reset operation is performed by operating the odo/trip meter switch on the combination meter.
- When the reset operation is performed, the combination meter transmits a fuel filler cap warning reset signal to ECM via CAN communication. ECM transmits a fuel filler cap warning display signal (request for display OFF) to the combination meter via CAN communication. When receiving the signal, the combination meter turns OFF the fuel filler cap warning display.
- EVAP leak diagnosis result is normal.
- Fuel refilled.

• DTC erased by using CONSULT.

NOTE:

MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel filler cap warning display turns ON/OFF.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000007699693

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service $03 of SAE J1979/ISO 15031-5
Freeze Frame data	Service $02 of SAE J1979/ISO 15031-5
System Readiness Test (SRT) code	Service $01 of SAE J1979/ISO 15031-5
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Service $07 of SAE J1979/ISO 15031-5
1st Trip Freeze Frame data	—
Test values and Test limits	Service $06 of SAE J1979/ISO 15031-5
Calibration ID	Service $09 of SAE J1979/ISO 15031-5
Permanent Diagnostic Trouble Code (Permanent DTC)	Service $0A* of SAE J1979/ISO 15031-5

*: Service $0A is not applied for regions where it is not mandated.

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	SRT status	Test value	Permanent DTC status
CONSULT	×	×	×	×	×	×	—	×
GST	×	×	×	—	×	×	×	×
ECM	×	×*	—	—	—	×	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode.
(Refer to EC-97, "Fail-Safe Chart".)

Two Trip Detection Logic

INFOID:0000000007699694

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>
If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-49, "Emission-related Diagnostic Information".)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Emission-related Diagnostic Information

INFOID:0000000007699695

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

×: Applicable —: Not applicable

Items (CONSULT screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT GST*2	ECM*3					
LOST COMM (TCM)	U0101	0101*5	—	1	×	B	EC-147
CAN COMM CIRCUIT	U1001	1001*5	—	2	—	—	EC-149
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	—	—	**Flashing***6	—	EC-72
INT/V TIM CONT-B1	P0011	0011	×	2	×	B	EC-151
A/F SEN1 HTR (B1)	P0031	0031	—	2	×	B	EC-155
A/F SEN1 HTR (B1)	P0032	0032	—	2	×	B	EC-155
HO2S2 HTR (B1)	P0037	0037	—	2	×	B	EC-160
HO2S2 HTR (B1)	P0038	0038	—	2	×	B	EC-160
INT/V TIM V/CIR-B1	P0075	0075	—	2	×	B	EC-165
MAF SEN/CIRCUIT-B1	P0101	0101	—	2	×	B	EC-170
MAF SEN/CIRCUIT-B1	P0102	0102	—	1	×	B	EC-177
MAF SEN/CIRCUIT-B1	P0103	0103	—	1	×	B	EC-177
IAT SENSOR 1 B1	P0111	0111	—	2	×	A	EC-184
IAT SEN/CIRCUIT-B1	P0112	0112	—	2	×	B	EC-188
IAT SEN/CIRCUIT-B1	P0113	0113	—	2	×	B	EC-188
ECT SEN/CIRC	P0116	0116	—	2	×	A	EC-192
ECT SEN/CIRC	P0117	0117	—	1	×	B	EC-196
ECT SEN/CIRC	P0118	0118	—	1	×	B	EC-196
TP SEN 2/CIRC-B1	P0122	0122	—	1	×	B	EC-201
TP SEN 2/CIRC-B1	P0123	0123	—	1	×	B	EC-201
ECT SENSOR	P0125	0125	—	2	×	B	EC-206
IAT SENSOR-B1	P0127	0127	—	2	×	B	EC-209
THERMSTAT FNCTN	P0128	0128	—	2	×	B	EC-212
A/F SENSOR1 (B1)	P0130	0130	—	2	×	A	EC-214
A/F SENSOR1 (B1)	P0131	0131	—	2	×	B	EC-219
A/F SENSOR1 (B1)	P0132	0132	—	2	×	B	EC-224
HO2S2 (B1)	P0137	0137	×	2	×	A	EC-229
HO2S2 (B1)	P0138	0138	×	2	×	A	EC-238
HO2S2 (B1)	P0139	0139	×	2	×	A	EC-248
A/F SENSOR1 (B1)	P014C	014C	—	2	×	A	EC-257

Items (CONSULT screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT GST*2	ECM*3					
A/F SENSOR1 (B1)	P014D	014D	—	2	×	A	EC-257
FUEL SYS-LEAN-B1	P0171	0171	—	2	×	B	EC-265
FUEL SYS-RICH-B1	P0172	0172	—	2	×	B	EC-271
FTT SENSOR	P0181	0181	—	2	×	A and B	EC-277
FTT SEN/CIRCUIT	P0182	0182	—	2	×	B	EC-283
FTT SEN/CIRCUIT	P0183	0183	—	2	×	B	EC-283
TP SEN 1/CIRC-B1	P0222	0222	—	1	×	B	EC-287
TP SEN 1/CIRC-B1	P0223	0223	—	1	×	B	EC-287
MULTI CYL MISFIRE	P0300	0300	—	1 or 2	×	B	EC-292
CYL 1 MISFIRE	P0301	0301	—	1 or 2	×	B	EC-292
CYL 2 MISFIRE	P0302	0302	—	1 or 2	×	B	EC-292
CYL 3 MISFIRE	P0303	0303	—	1 or 2	×	B	EC-292
CYL 4 MISFIRE	P0304	0304	—	1 or 2	×	B	EC-292
KNOCK SEN/CIRC-B1	P0327	0327	—	2	—	—	EC-298
KNOCK SEN/CIRC-B1	P0328	0328	—	2	—	—	EC-298
CKP SEN/CIRCUIT	P0335	0335	—	2	×	B	EC-302
CMP SEN/CIRC-B1	P0340	0340	—	2	×	B	EC-308
TW CATALYST SYS-B1	P0420	0420	×	2	×	A	EC-314
EVAP PURG FLOW/MON	P0441	0441	×	2	×	A	EC-319
EVAP SMALL LEAK	P0442	0442	×	2	×	A	EC-324
PURG VOLUME CONT/V	P0443	0443	—	2	×	A	EC-332
PURG VOLUME CONT/V	P0444	0444	—	2	×	B	EC-340
PURG VOLUME CONT/V	P0445	0445	—	2	×	B	EC-340
VENT CONTROL VALVE	P0447	0447	—	2	×	B	EC-345
VENT CONTROL VALVE	P0448	0448	—	2	×	B	EC-351
EVAP SYS PRES SEN	P0451	0451	—	2	×	A	EC-357
EVAP SYS PRES SEN	P0452	0452	—	2	×	B	EC-361
EVAP SYS PRES SEN	P0453	0453	—	2	×	B	EC-369
EVAP GROSS LEAK	P0455	0455	—	2	×	A	EC-376
EVAP VERY SML LEAK	P0456	0456	×*7	2	×	A	EC-383
FUEL LEV SEN SLOSH	P0460	0460	—	2	×	A	EC-391
FUEL LEVEL SENSOR	P0461	0461	—	2	×	B	EC-393
FUEL LEVL SEN/CIRC	P0462	0462	—	2	×	B	EC-395
FUEL LEVL SEN/CIRC	P0463	0463	—	2	×	B	EC-395
VEH SPEED SEN/CIRC*8	P0500	0500	—	2	×	B	EC-397 (M/T) EC-398 (CVT, A/T)
ISC SYSTEM	P0506	0506	—	2	×	B	EC-401
ISC SYSTEM	P0507	0507	—	2	×	B	EC-403
COLD START CONTROL	P050A	050A	—	2	×	A	EC-405
COLD START CONTROL	P050E	050E	—	2	×	A	EC-405
ECM	P0605	0605	—	1 or 2	— or ×	B	EC-407

Items (CONSULT screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT GST*2	ECM*3					
ECM	P0607	0607	—	1 (CVT) 1 (A/T) 2 (M/T)	× (CVT) × (A/T) — (M/T)	B	EC-409
SENSOR POWER/CIRC	P0643	0643	—	1	×	B	EC-410
T/M RANGE SENSOR A	P0705	0705	—	2	×	B	AT-87 (A/T) CVT-62 (CVT)
FLUID TEMP SENSOR A*9	P0710	0710	—	2 (A/T) 1 (CVT)	×	B	AT-92 (A/T) CVT-67 (CVT)
INPUT SPEED SENSOR A	P0715	0715	—	2	×	B	CVT-72
OUTPUT SPEED SENSOR*8	P0720	0720	—	2	×	B	AT-97 (A/T) CVT-76 (CVT)
ENGINE SPEED	P0725	0725	—	2	×	B	AT-102
1GR INCORRECT RATIO*9	P0731	0731	—	2	×	B	AT-106
2GR INCORRECT RATIO*9	P0732	0732	—	2	×	B	AT-109
3GR INCORRECT RATIO*9	P0733	0733	—	2	×	B	AT-112
4GR INCORRECT RATIO*9	P0734	0734	—	2	×	B	AT-115
TORQUE CONVERTER	P0740	0740	—	2	×	B	AT-120 (A/T) CVT-84 (CVT)
TORQUE CONVERTER	P0744	0744	—	2	×	B	AT-125 (A/T) CVT-89 (CVT)
PC SOLENOID A	P0745	0745	—	2	×	B	AT-130 (A/T) CVT-91 (CVT)
PC SOLENOID A	P0746	0746	—	1	×	B	CVT-96
SHIFT SOLENOID A	P0750	0750	—	1	×	B	AT-135
SHIFT SOLENOID B	P0755	0755	—	1	×	B	AT-140
PC SOLENOID B	P0776	0776	—	2	×	B	CVT-98
PC SOLENOID B	P0778	0778	—	2	×	B	CVT-100
FLUID PRESS SEN/SW A	P0840	0840	—	2	×	B	CVT-105
P-N POS SW/CIRCUIT	P0850	0850	—	2	×	B	EC-415
CLOSED LOOP-B1	P1148	1148	—	1	×	A	EC-421
TCS C/U FUNCTN	P1211	1211	—	2	—	—	EC-422
TCS/CIRC	P1212	1212	—	2	—	—	EC-423
ENG OVER TEMP	P1217	1217	—	1	×	B	EC-425
CTP LEARNING-B1	P1225	1225	—	2	—	—	EC-433
CTP LEARNING-B1	P1226	1226	—	2	—	—	EC-434
ASCD SW	P1564	1564	—	1	—	—	EC-436
ASCD BRAKE SW	P1572	1572	—	1	—	—	EC-442
ASCD VHL SPD SEN	P1574	1574	—	1	—	—	EC-451
LOCK MODE	P1610	1610	—	2	—	—	BL-221
ID DISCORD,IMMU-ECM	P1611	1611	—	2	—	—	BL-221

Items (CONSULT screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT GST*2	ECM*3					
CHAIN OF ECM-IMMU	P1612	1612	—	2	—	—	BL-221
CHAIN OF IMMU-KEY	P1614	1614	—	2	—	—	BL-221
DIFFERENCE OF KEY	P1615	1615	—	2	—	—	BL-221
IN PULY SPEED	P1715	1715	—	2	—	—	EC-453 (A/T) EC-454 (CVT)
SLCT SOLENOID	P1740	1740	—	2	×	B	CVT-124
OVER CLUTCH SOLENOID	P1760	1760	—	2	×	B	AT-145
STEP MOTOR	P1777	1777	—	1	×	B	CVT-129
STEP MOTOR	P1778	1778	—	2	×	B	CVT-133
BRAKE SW/CIRCUIT	P1805	1805	—	2	—	—	EC-455
ETC MOT PWR-B1	P2100	2100	—	1	×	B	EC-459
ETC FNCTN/CIRC-B1	P2101	2101	—	1	×	B	EC-463
ETC MOT PWR	P2103	2103	—	1	×	B	EC-459
ETC MOT-B1	P2118	2118	—	1	×	B	EC-469
ETC ACTR-B1	P2119	2119	—	1	×	B	EC-473
APP SEN 1/CIRC	P2122	2122	—	1	×	B	EC-475
APP SEN 1/CIRC	P2123	2123	—	1	×	B	EC-475
APP SEN 2/CIRC	P2127	2127	—	1	×	B	EC-480
APP SEN 2/CIRC	P2128	2128	—	1	×	B	EC-480
TP SENSOR-B1	P2135	2135	—	1	×	B	EC-487
APP SENSOR	P2138	2138	—	1	×	B	EC-492
A/F SENSOR1 (B1)	P2A00	2A00	—	2	×	A	EC-499

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J2012/ISO 15031-6.

*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*4: Refer to EC-49, "Emission-related Diagnostic Information", “PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)”.

*5: The troubleshooting for this DTC needs CONSULT.

*6: When the ECM in the mode of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

*7: SRT code will not be set if the self-diagnostic result is NG.

*8: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

*9: When erasing this DTC, always use CONSULT or GST.

DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not recur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION".

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT.
1st trip DTC is specified in Service $07 of SAE J1979/ISO 15031-5. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-92, "Trouble Diagnosis Introduction". Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC
DTC and 1st trip DTC can be read by the following methods.

WITH CONSULT

WITH GST

CONSULT or GST (Generic Scan Tool) Examples: P0340, P0850, P1148, etc.
These DTCs are prescribed by SAE J2012/ISO 15031-6.
(CONSULT also displays the malfunctioning component or system.)

NO TOOLS

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 0850, 1148, etc.
These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST and the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT can identify malfunction status as shown below. Therefore, using CONSULT (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen, not on the GST. For details, see EC-119, "CONSULT Function (ENGINE)".
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T or CVT related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service $01 of SAE J1979/ISO 15031-5.
As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.
If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.
In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.
Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:
The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.
If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:
If permanent DTC is stored or MIL illuminates during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”), DTC (No DTCs) and permanent DTC (No permanent DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to “CMPLT”.

SRT item (CONSULT indication)	Performance Priority*	Required self-diagnostic items to set the SRT to “CMPLT”	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0442
	2	EVAP control system	P0456
HO2S	2	Air fuel ratio (A/F) sensor 1	—
		Heated oxygen sensor 2	P0137
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
EGR/VVT SYSTEM	3	Intake value timing control function	P0011

*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT.

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result	Example	
	Diagnosis	Ignition cycle ← ON → OFF ← ON → OFF ← ON → OFF ← ON →

All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)
		P0402	OK (1)	— (1)	— (1)	OK (2)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)
		P0402	— (0)	— (0)	OK (1)	— (1)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”
NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL “ON”)
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above

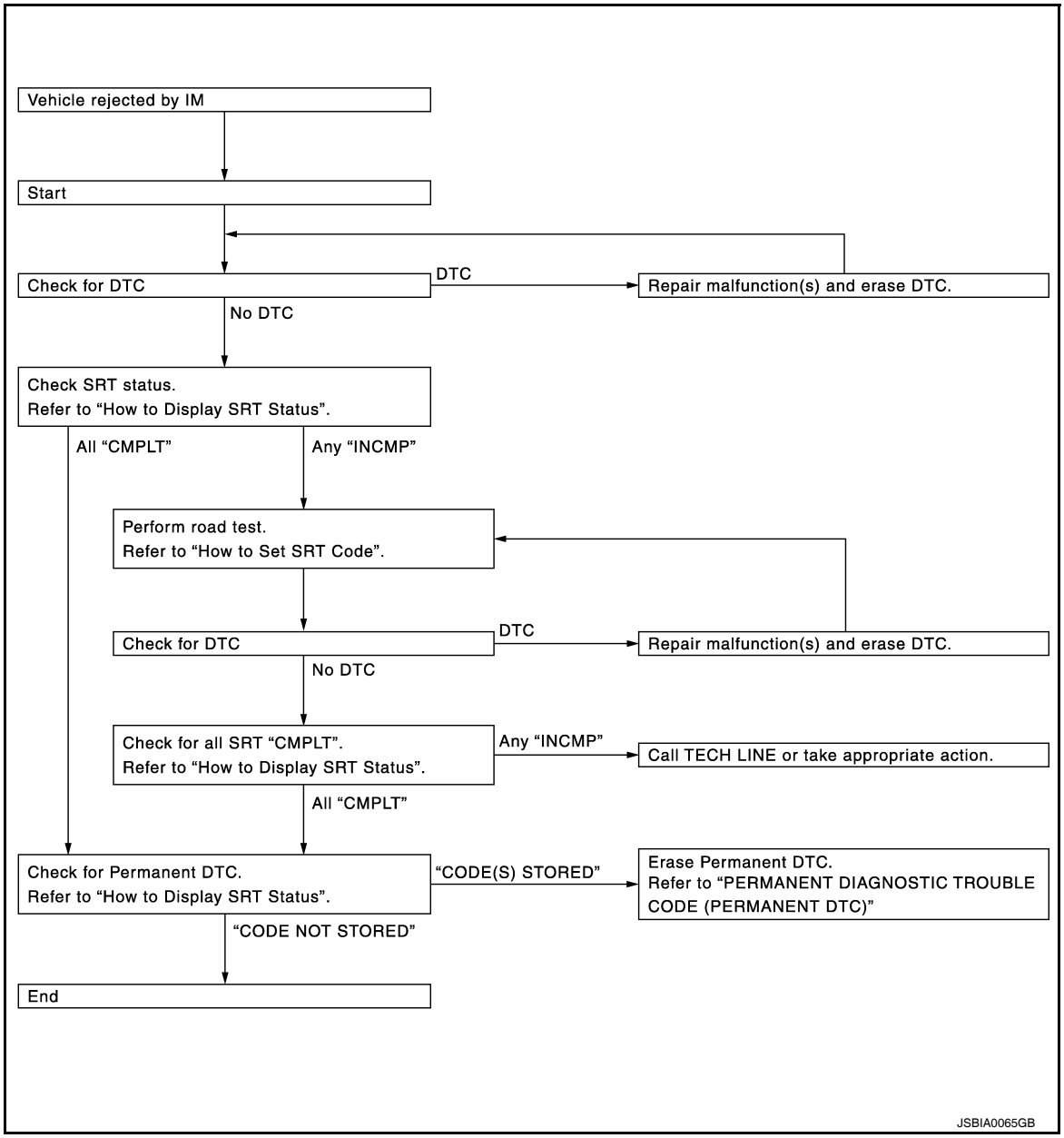
The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

NOTE:
SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.



How to Display SRT Status

WITH CONSULT

Selecting “SRT STATUS” in “DTC CONFIRMATION” mode with CONSULT.

For items whose SRT codes are set, “CMPLT” is displayed on the CONSULT screen; for items whose SRT codes are not set, “INCMP” is displayed.

NOTE:

- Though displayed on the CONSULT screen, “HO2S HTR” is not SRT item.
- “SRT STATUS” provides the presence or absence of permanent DTCs stored in ECM memory.

WITH GST

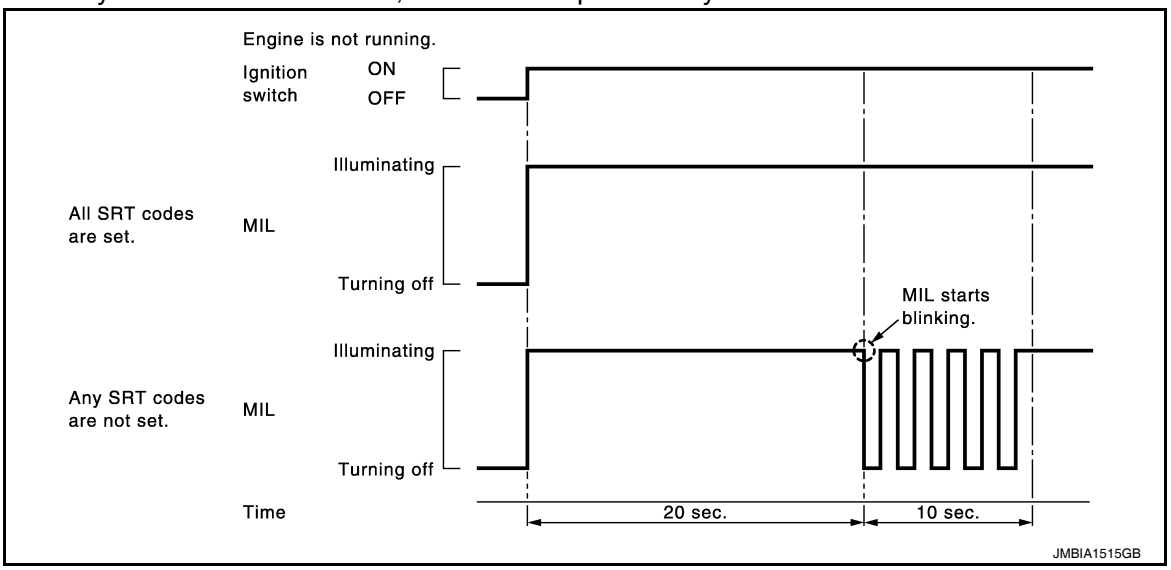
Selecting Service $01 with GST (Generic Scan Tool)

NO TOOLS

A SRT code itself cannot be displayed, however SRT status can.

1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
   - When all SRT codes are set, MIL illuminates continuously.

- When any SRT codes are not set, MIL will blink periodically for 10 seconds.



How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

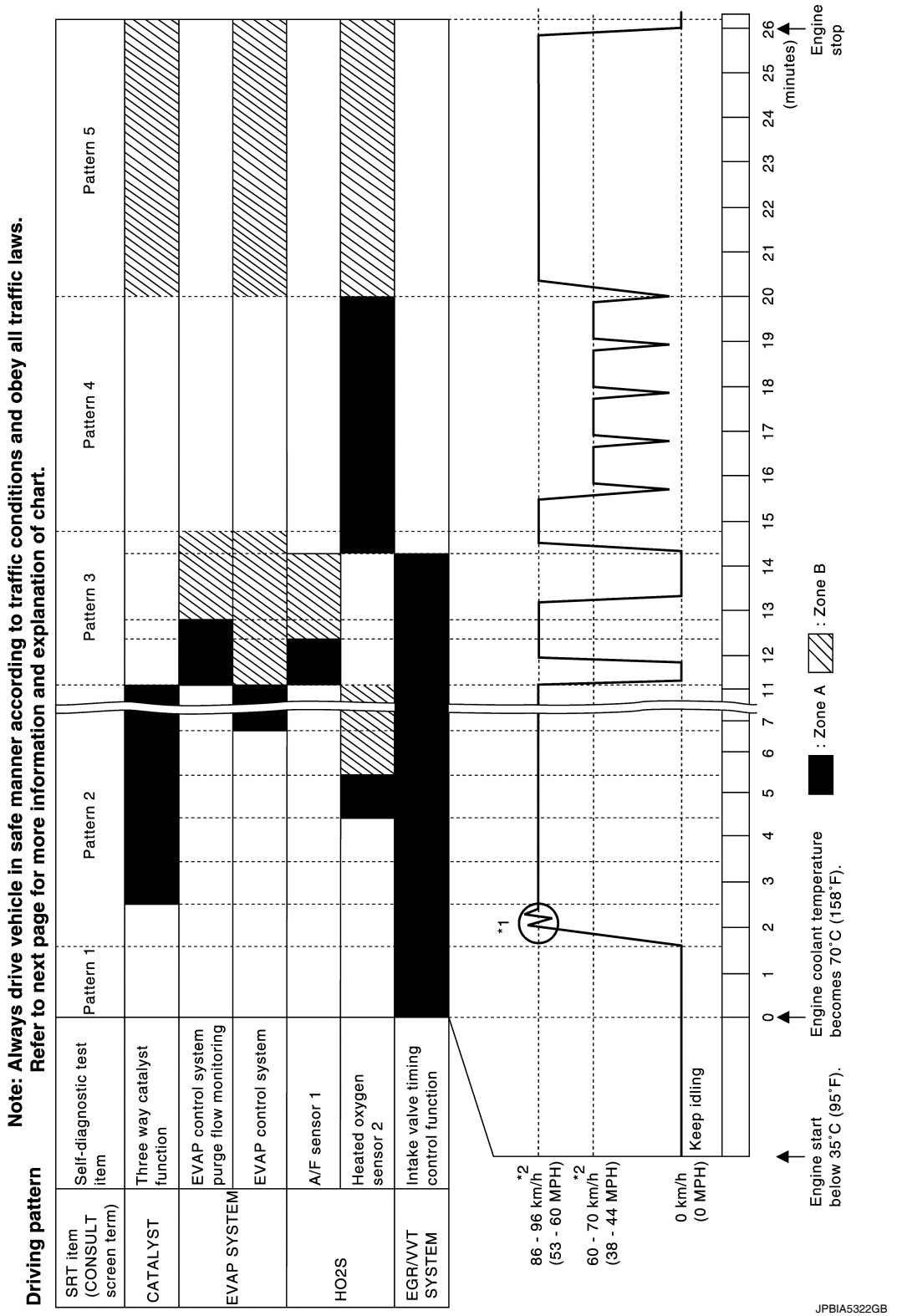
WITH CONSULT

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on "SRT Item".

WITHOUT CONSULT

The most efficient driving pattern in which SRT codes can be properly set is explained below. The driving pattern should be performed one or more times to set all SRT codes.

Driving Pattern



- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
  Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
  Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
  Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

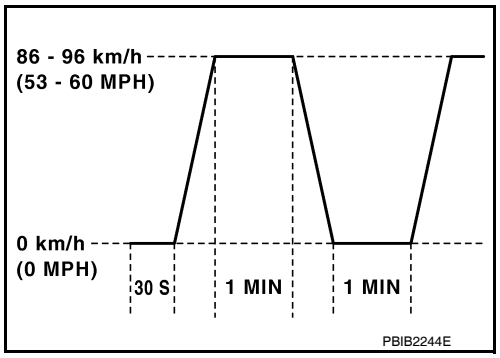
- **The engine is started at the engine coolant temperature of −10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 38 and ground is 3.0 - 4.3 V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 38 and ground is lower than 1.4 V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 43 and ground is less than 4.1 V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

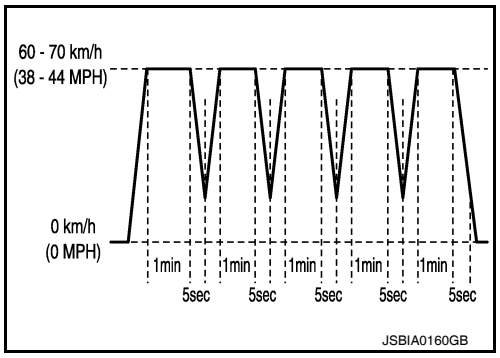
Pattern 3:

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during decelerating vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).



Pattern 4:

- Operate vehicle, following the driving pattern shown in the figure.
- Drive the vehicle in a proper gear at 60 km/h (38 MPH) and maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.



Pattern 5:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.
*2: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for A/T and CVT Models
Set the selector lever in the D position.
Suggested upshift speeds for M/T models
Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas	For high attitude areas [over 1,219m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)	km/h (MPH)
1st to 2nd	13 (8)	24 (15)	24 (15)
2nd to 3rd	27 (17)	40 (25)	40 (25)
3rd to 4th	40 (25)	53 (33)	65 (40)
4th to 5th	58 (36)	71 (44)	72 (45)
5th to 6th	82 (51)	82 (51)	82 (51)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	50 (30)
2nd	90 (55)
3rd	—
4th	—
5th	—
6th	—

PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)

Permanent DTC is defined in SAE J1979/ISO 15031-5 Service $0A.

ECM stores a DTC issuing a command of turning on MIL as a permanent DTC and keeps storing the DTC as a permanent DTC until ECM judges that there is no presence of malfunction.

Permanent DTCs cannot be erased by using the Erase function of CONSULT or Generic Scan Tool (GST) and by disconnecting the battery to shut off power to ECM. This prevents a vehicle from passing the state emission inspection without repairing a malfunctioning part.

When not passing the state emission inspection due to more than one permanent DTC, permanent DTCs should be erased, referring to this manual.

NOTE:

- The important items in state emission inspection are that MIL is not ON, SRT test items are set, and permanent DTCs are not included.
- Permanent DTCs do not apply for regions that permanent DTCs are not regulated by law.

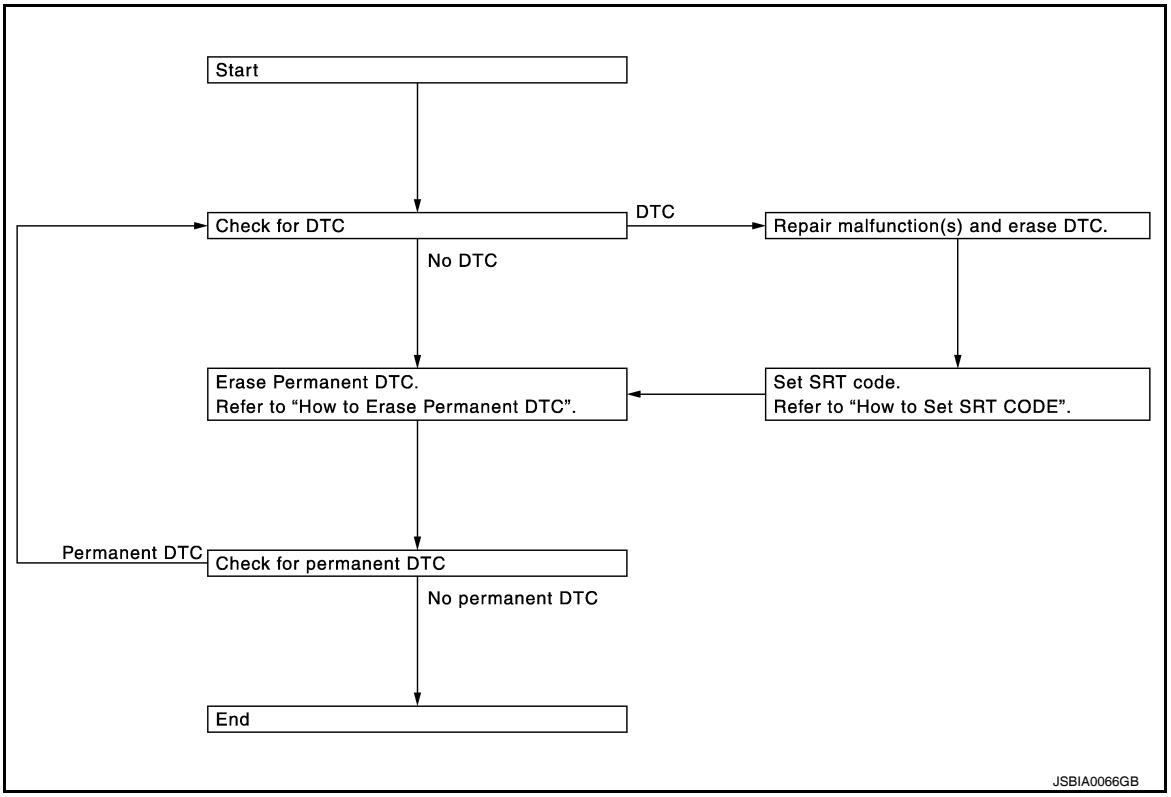
Permanent DTC Item

For permanent DTC items, MIL turns ON. Refer to EC-49, "Emission-related Diagnostic Information", “EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS”.

Permanent DTC Set Timing

The setting timing of permanent DTC is stored in ECM with the lighting of MIL when a DTC is confirmed.

Permanent DTC Service Procedure



How to Display Permanent DTC Status

WITH CONSULT

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select “PERMANENT DTC STATUS” in “DTC & SRT CONFIRMATION” mode with CONSULT.

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

Since the “PERMANENT DTC STATUS” screen displays the previous trip information, repeat the following twice to update the information: “Ignition switch OFF”, “Wait for more than 10 seconds” and “Ignition switch ON”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS

CAUTION:
Turn ignition switch from ON to OFF twice to update the information on the status screen.

PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP

The previous trip information is displayed.

JSBIA0062GB

WITH GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service $0A with GST (Generic Scan Tool).

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT)

The following is the information specified in Service $06 of SAE J1979/ISO 15031-5.

The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

These data (test value and test limit) are specified by On Board Monitor ID (OBDMID), Test ID (TID), Unit and Scaling ID and can be displayed on the GST screen.

The items of the test value and test limit will be displayed with GST screen which items are provided by the ECM. (e.g., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	P0131	83H	0BH	Minimum sensor output voltage for test cycle
			P0131	84H	0BH	Maximum sensor output voltage for test cycle
			P0130	85H	0BH	Minimum sensor output voltage for test cycle
			P0130	86H	0BH	Maximum sensor output voltage for test cycle
			P0133	87H	04H	Response rate: Response ratio (lean to rich)
			P0133	88H	04H	Response rate: Response ratio (rich to lean)
			P2A00	89H	84H	The amount of shift in air fuel ratio
			P2A00	8AH	84H	The amount of shift in air fuel ratio
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
			P014C	8DH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014C	8EH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014D	8FH	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P014D	90H	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P015A	91H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1
			P015A	92H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1
			P015B	93H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
			P015B	94H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
	02H	Heated oxygen sensor 2 (Bank 1)	P0138	07H	0CH	Minimum sensor output voltage for test cycle
			P0137	08H	0CH	Maximum sensor output voltage for test cycle
			P0138	80H	0CH	Sensor output voltage
			P0139	81H	0CH	Difference in sensor output voltage
			P0139	82H	11H	Rear O2 sensor delay response diagnosis
	03H	Heated oxygen sensor 3 (Bank 1)	P0143	07H	0CH	Minimum sensor output voltage for test cycle
			P0144	08H	0CH	Maximum sensor output voltage for test cycle
			P0146	80H	0CH	Sensor output voltage
			P0145	81H	0CH	Difference in sensor output voltage

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	P0151	83H	0BH	Minimum sensor output voltage for test cycle
			P0151	84H	0BH	Maximum sensor output voltage for test cycle
			P0150	85H	0BH	Minimum sensor output voltage for test cycle
			P0150	86H	0BH	Maximum sensor output voltage for test cycle
			P0153	87H	04H	Response rate: Response ratio (lean to rich)
			P0153	88H	04H	Response rate: Response ratio (rich to lean)
			P2A03	89H	84H	The amount of shift in air fuel ratio
			P2A03	8AH	84H	The amount of shift in air fuel ratio
			P0150	8BH	0BH	Difference in sensor output voltage
			P0153	8CH	83H	Response gain at the limited frequency
			P014E	8DH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014E	8EH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014F	8FH	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P014F	90H	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P015C	91H	01H	O2 sensor delayed response - Rich to lean bank 2 sensor 1
			P015C	92H	01H	O2 sensor delayed response - Rich to lean bank 2 sensor 1
			P015D	93H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
			P015D	94H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
	06H	Heated oxygen sensor 2 (Bank 2)	P0158	07H	0CH	Minimum sensor output voltage for test cycle
			P0157	08H	0CH	Maximum sensor output voltage for test cycle
			P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
			P0159	82H	11H	Rear O2 sensor delay response diagnosis
	07H	Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
			P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATALYST	21H	Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
			P0420	82H	01H	Switching time lag engine exhaust index value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2423	84H	84H	O2 storage index in HC trap catalyst
	22H	Three way catalyst function (Bank2)	P0430	80H	01H	O2 storage index
			P0430	82H	01H	Switching time lag engine exhaust index value
			P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
EGR SYSTEM	31H	EGR function	P0400	80H	96H	Low flow faults: EGR temp change rate (short term)
			P0400	81H	96H	Low flow faults: EGR temp change rate (long term)
			P0400	82H	96H	Low flow faults: Difference between max EGR temp and EGR temp under idling condition
			P0400	83H	96H	Low flow faults: Max EGR temp
			P1402	84H	96H	High Flow Faults: EGR temp increase rate
VVT SYSTEM	35H	VVT Monitor (Bank1)	P0011	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0014	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0011	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
			P100A	84H	10H	VEL slow response diagnosis
			P1090	85H	10H	VEL servo system diagnosis
	36H	VVT Monitor (Bank2)	P0021	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0024	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0021	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
			P100B	84H	10H	VEL slow response diagnosis
			P1093	85H	10H	VEL servo system diagnosis

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EVAP SYSTEM	39H	EVAP control system leak (Cap Off)	P0455	80H	0CH	Difference in pressure sensor output voltage before and after pull down
	3BH	EVAP control system leak (Small leak)	P0442	80H	05H	Leak area index (for more than 0.04 inch)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			P0456	81H	FDH	Maximum internal pressure of EVAP system during monitoring
			P0456	82H	FDH	Internal pressure of EVAP system at the end of monitoring
	3DH	Purge flow system	P0441	83H	0CH	Difference in pressure sensor output voltage before and after vent control valve close
O2 SENSOR HEATER	41H	A/F sensor 1 heater (Bank 1)	Low Input: P0031 High Input: P0032	81H	0BH	Converted value of heater electric current to voltage
	42H	Heated oxygen sensor 2 heater (Bank 1)	Low Input: P0037 High Input: P0038	80H	0CH	Converted value of heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (Bank 1)	P0043	80H	0CH	Converted value of heater electric current to voltage
	45H	A/F sensor 1 heater (Bank 2)	Low Input: P0051 High Input: P0052	81H	0BH	Converted value of heater electric current to voltage
	46H	Heated oxygen sensor 2 heater (Bank 2)	Low Input: P0057 High Input: P0058	80H	0CH	Converted value of heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (Bank 2)	P0063	80H	0CH	Converted value of heater electric current to voltage
SECONDARY AIR	71H	Secondary air system	P0411	80H	01H	Secondary air injection system incorrect flow detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary air injection system insufficient flow
			P2445	82H	01H	Secondary air injection system pump stuck off
			P2448	83H	01H	Secondary air injection system high airflow
			Bank1: P2440 Bank2: P2442	84H	01H	Secondary air injection system switching valve stuck open
			P2440	85H	01H	Secondary air injection system switching valve stuck open
			P2444	86H	01H	Secondary air injection system pump stuck on
FUEL SYSTEM	81H	Fuel injection system function (Bank 1)	P0171 or P0172	80H	2FH	Long term fuel trim
			P0171 or P0172	81H	24H	The number of lambda control clamped
			P117A	82H	03H	Cylinder A/F imbalance monitoring
	82H	Fuel injection system function (Bank 2)	P0174 or P0175	80H	2FH	Long term fuel trim
			P0174 or P0175	81H	24H	The number of lambda control clamped
			P117B	82H	03H	Cylinder A/F imbalance monitoring

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple cylinder misfires	P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder
			P0305	84H	24H	Misfiring counter at 1000 revolution of the fifth cylinder
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder
			P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			P0302	8AH	24H	Misfiring counter at 200 revolution of the second cylinder
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder
			P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A2H	No. 1 cylinder misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0301	0CH	24H	Misfire counts for last/current driving cycles
	A3H	No. 2 cylinder misfire	P0302	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0302	0CH	24H	Misfire counts for last/current driving cycles
	A4H	No. 3 cylinder misfire	P0303	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0303	0CH	24H	Misfire counts for last/current driving cycles
	A5H	No. 4 cylinder misfire	P0304	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0304	0CH	24H	Misfire counts for last/current driving cycles
	A6H	No. 5 cylinder misfire	P0305	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0305	0CH	24H	Misfire counts for last/current driving cycles
	A7H	No. 6 cylinder misfire	P0306	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0306	0CH	24H	Misfire counts for last/current driving cycles
	A8H	No. 7 cylinder misfire	P0307	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0307	0CH	24H	Misfire counts for last/current driving cycles
	A9H	No. 8 cylinder misfire	P0308	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

With CONSULT

NOTE:

- If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- If the DTC is not for A/T or CVT related items (see EC-9), skip step 1.

1. Erase DTC in TCM.
2. Select "ENGINE" with CONSULT.
3. Select "SELF-DIAG RESULTS".

4. Touch "ERASE". (The DTC in the ECM will be erased.)

With GST

NOTE:

If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

1. Select Service $04 with GST.

No Tools

NOTE:

If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

1. Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).

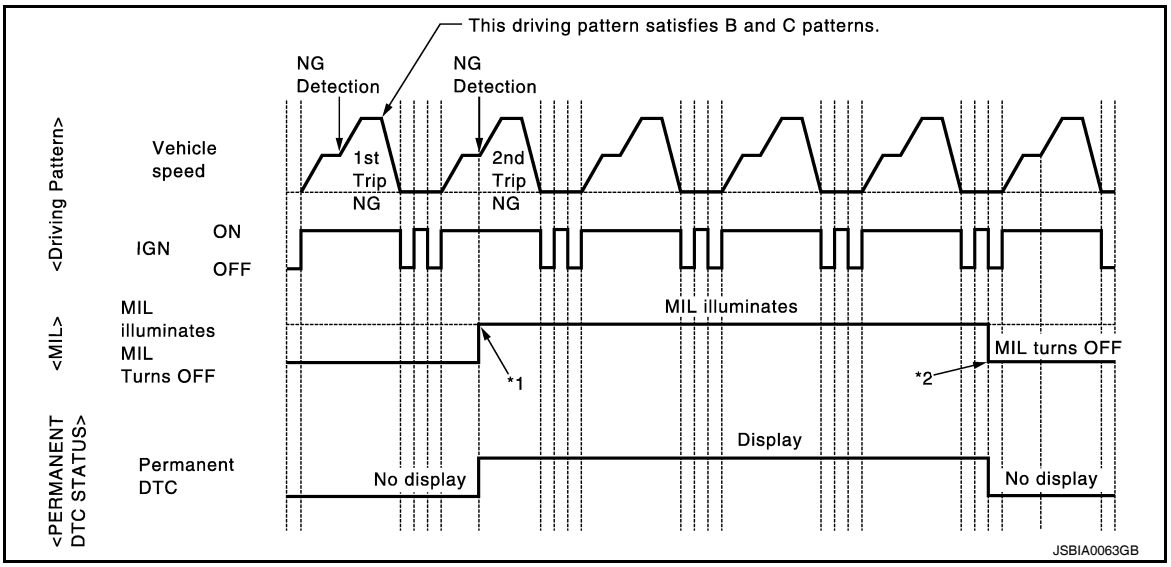
- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

How to Erase Permanent DTC

When a DTC is stored in ECM

- When a DTC is stored in ECM and MIL is ON, a permanent DTC is erased with MIL shutoff if the same malfunction is not detected after performing the driving pattern for MIL shutoff three times in a raw.



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

*2: MIL will turn off after vehicle is driven 3 times (pattern B) without any malfunctions.

When a DTC is not stored in ECM

- The erasing method depends on a permanent DTC stored in ECM. Refer to the following table.

NOTE:

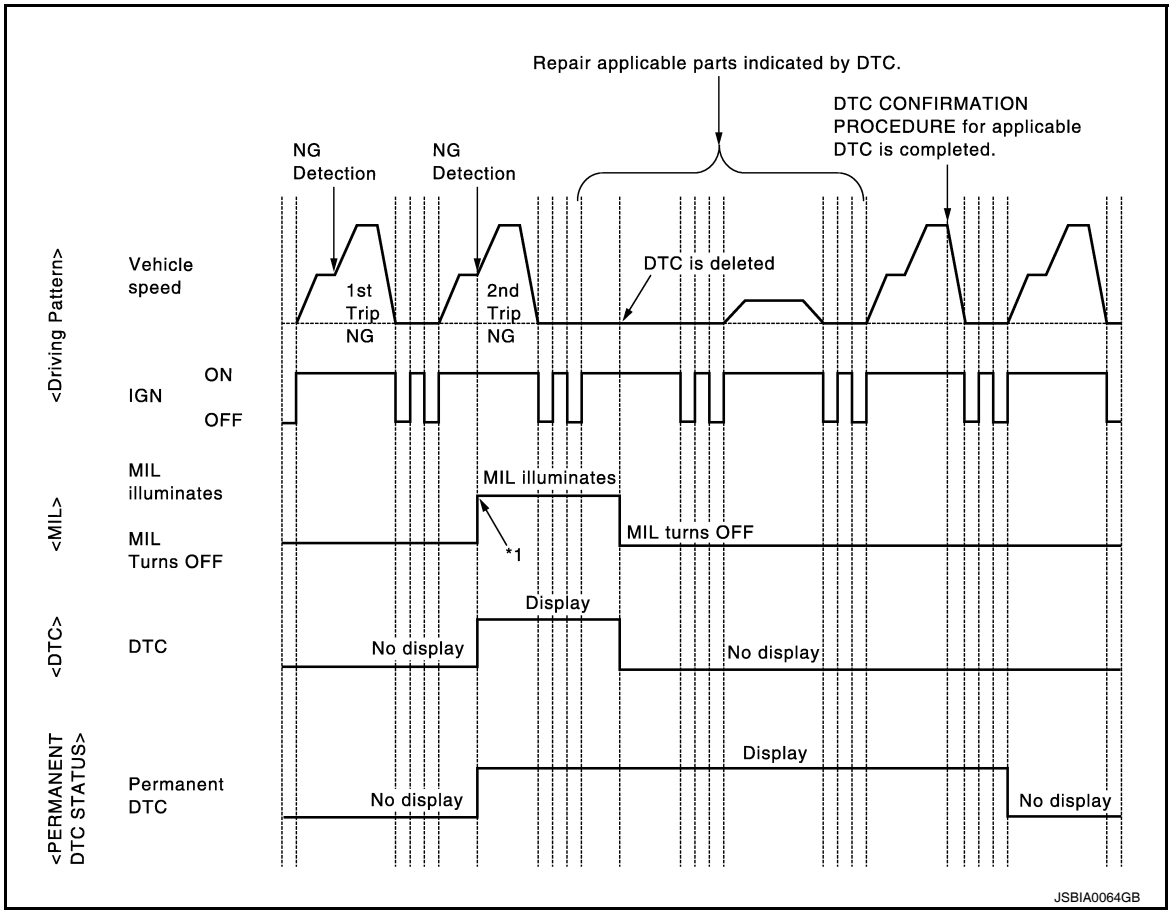
If the applicable permanent DTC includes multiple groups, perform the procedure of Group B first. If the permanent DTC is not erased, perform the procedure of Group A.

×: Applicable —: Not applicable

Group*	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	×	—	—
B	—	×	×

*: For group, refer to EC-49, "Emission-related Diagnostic Information", “EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS”.

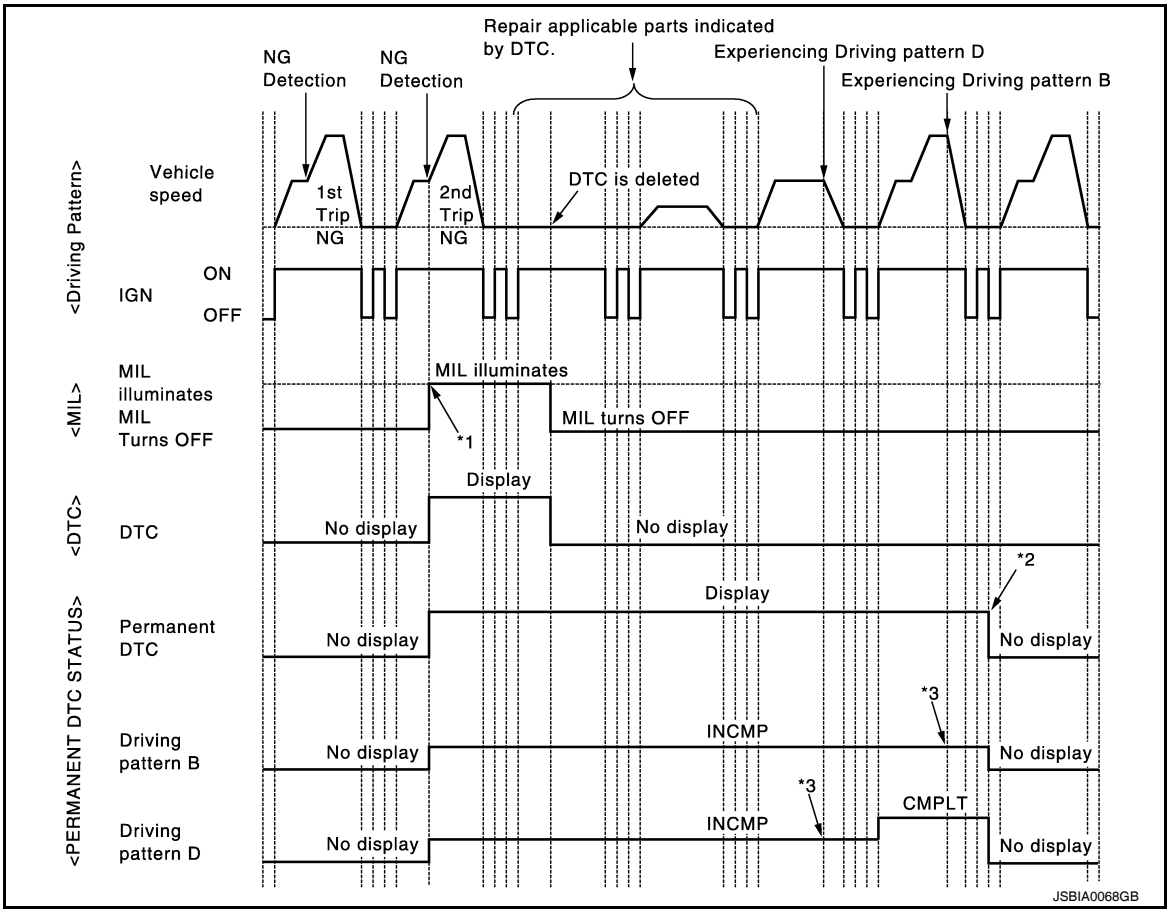
Group A



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Check permanent DTC. Refer to EC-49, "Emission-related Diagnostic Information", “How to Display Permanent DTC Status”.
6. Perform “DTC CONFIRMATION PROCEDURE” for DTCs which are the same as permanent DTCs stored in ECM.
7. Turn ignition switch OFF and wait at least 10 seconds.
8. Turn ignition switch ON.
9. Turn ignition switch OFF and wait at least 10 seconds.
10. Turn ignition switch ON.
11. Check permanent DTC. Refer to EC-49, "Emission-related Diagnostic Information", “How to Display Permanent DTC Status”.
12. Check that the permanent DTCs have been erased.

Group B



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

*2: After experiencing Driving pattern B and D, permanent DTC is erased.

*3: Indication does not change unless the ignition switch is turned from ON to OFF twice even after experiencing Driving pattern B or D.

NOTE:

- Drive the vehicle according to only driving patterns indicating “INCMP” in driving patterns B and D on the “PERMANENT DTC STATUS” screen.
- When experiencing both driving pattern B and D during the same trip, the experience of driving pattern D is counted by priority.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Check permanent DTC. Refer to EC-49, "Emission-related Diagnostic Information", “How to Display Permanent DTC Status”.
6. Start engine and warm it up to normal operating temperature.
7. Drive the vehicle according to driving pattern D.

   CAUTION:

   - **Always drive at a safe speed.**
   - **Never erase self-diagnosis results.**
   - **If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.**
   - **If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.**
8. Turn ignition switch OFF and wait at least 10 seconds.
9. Turn ignition switch ON.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Turn ignition switch ON.
12. Use “PERMANENT DTC WORK SUPPORT” to drive the vehicle according to driving pattern B.

CAUTION:
- **Always drive at a safe speed.**
- **Never erase self-diagnosis results.**
- **If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.**
- **If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.**

13. Turn ignition switch OFF and wait at least 10 seconds.
14. Turn ignition switch ON.
15. Turn ignition switch OFF and wait at least 10 seconds.
16. Turn ignition switch ON.
17. Check permanent DTC. Refer to EC-49, "Emission-related Diagnostic Information", “How to Display Permanent DTC Status”.
18. Check that the permanent DTCs have been erased.

DRIVING PATTERN

Driving Pattern B
- Driving pattern B means a trip satisfying the following conditions.
- Engine speed reaches 400 rpm or more.
- Water temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- Under the closed loop control condition, the following state reaches 12 seconds or more in total: Vehicle speed of 4 km/h (2 MPH) or less with idling condition.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

CAUTION:
Always drive at a safe speed.
NOTE:
- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

Driving Pattern D
- Driving pattern D means operating vehicle as per the following.
- The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.
- Idle speed lasts 30 seconds or more.
- A lapse of 600 seconds or more after engine start.

CAUTION:
Always drive at a safe speed.
NOTE:
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern D.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern D.

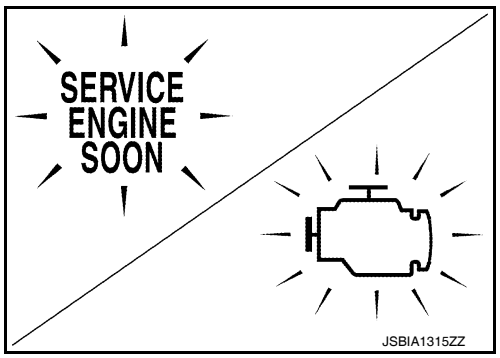
Malfunction Indicator Lamp (MIL)

INFOID:0000000007699696

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MIL does not light up, refer to EC-543, "Wiring Diagram".
2. When the engine is started, the MIL should go off.
   If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

MIL Flashing Without DTC

When any SRT codes are not set, MIL may flash without DTC. For the details, refer to EC-49, "Emission-related Diagnostic Information".

HOW TO SWITCH DIAGNOSTIC TEST MODE

NOTE:

- **It is better to count the time accurately with a clock.**

- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

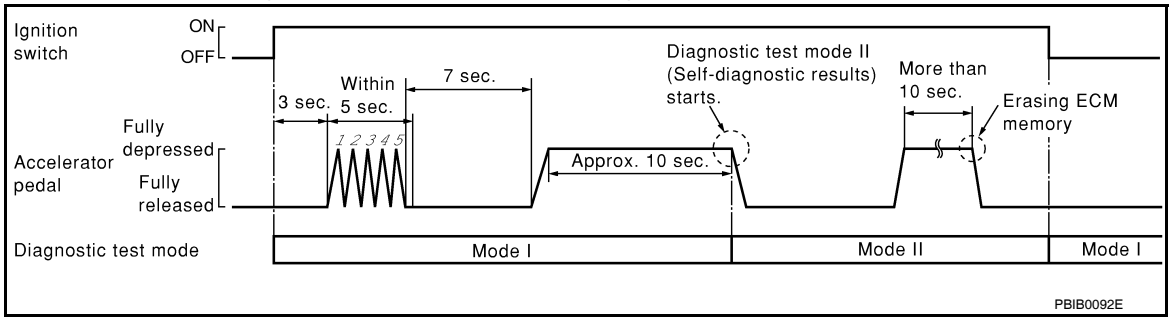
How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.

b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.
   ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results).
   Refer to "How to Set Diagnostic Test Mode II (Self-diagnostic Results)".
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb.
Refer to DI-37 or EC-543.

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

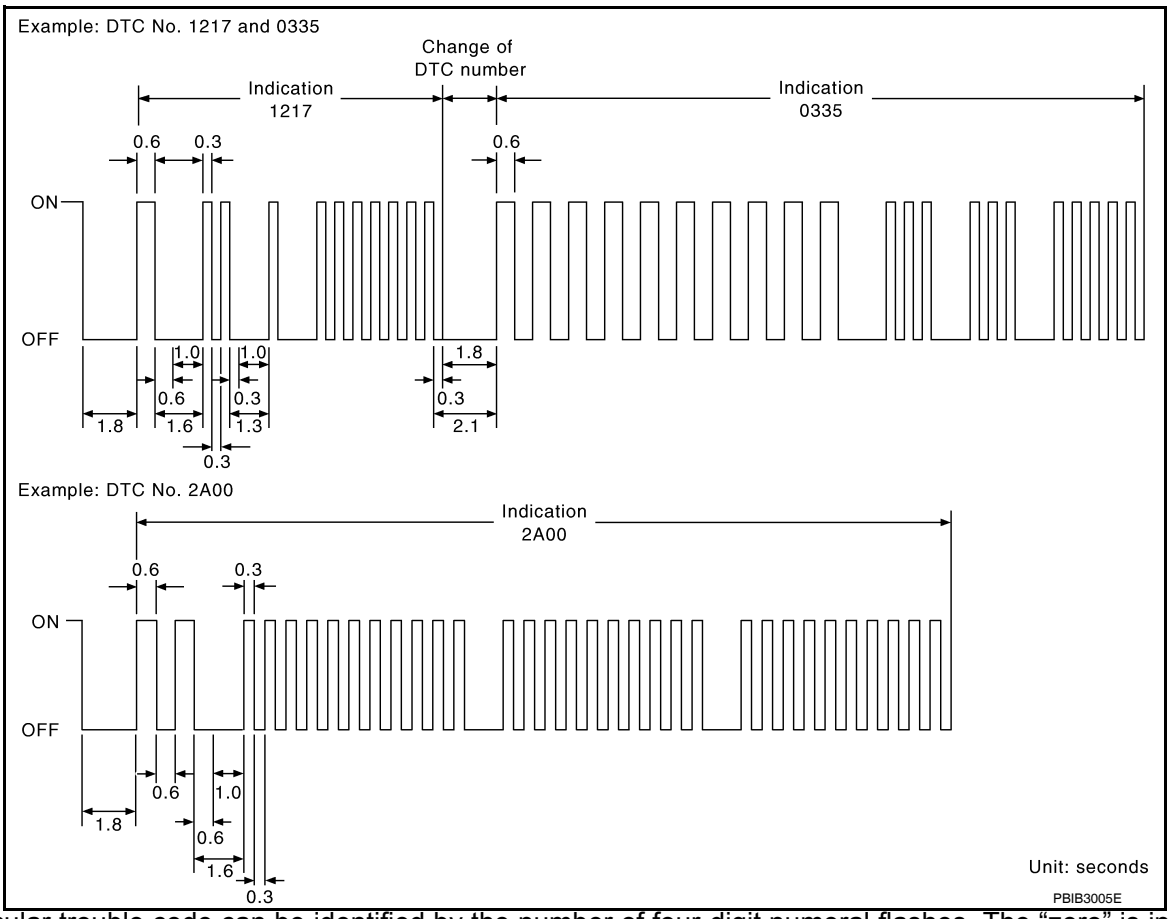
MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These uniden-

tified codes can be identified by using the CONSULT or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The “A” is indicated by the number of eleven flash. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle. The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle. A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-9)

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)
The DTC can be erased from the back-up memory in the ECM by depressing accelerator pedal.
Refer to "How to Erase Diagnostic Test Mode II (Self-diagnostic Results)".
- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

OBD System Operation Chart

INFOID:0000000007699697

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to EC-48, "Two Trip Detection Logic".
- The MIL will go off after the vehicle is driven 3 times (driving pattern B) with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern

C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT will count the number of times the vehicle is driven.

- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

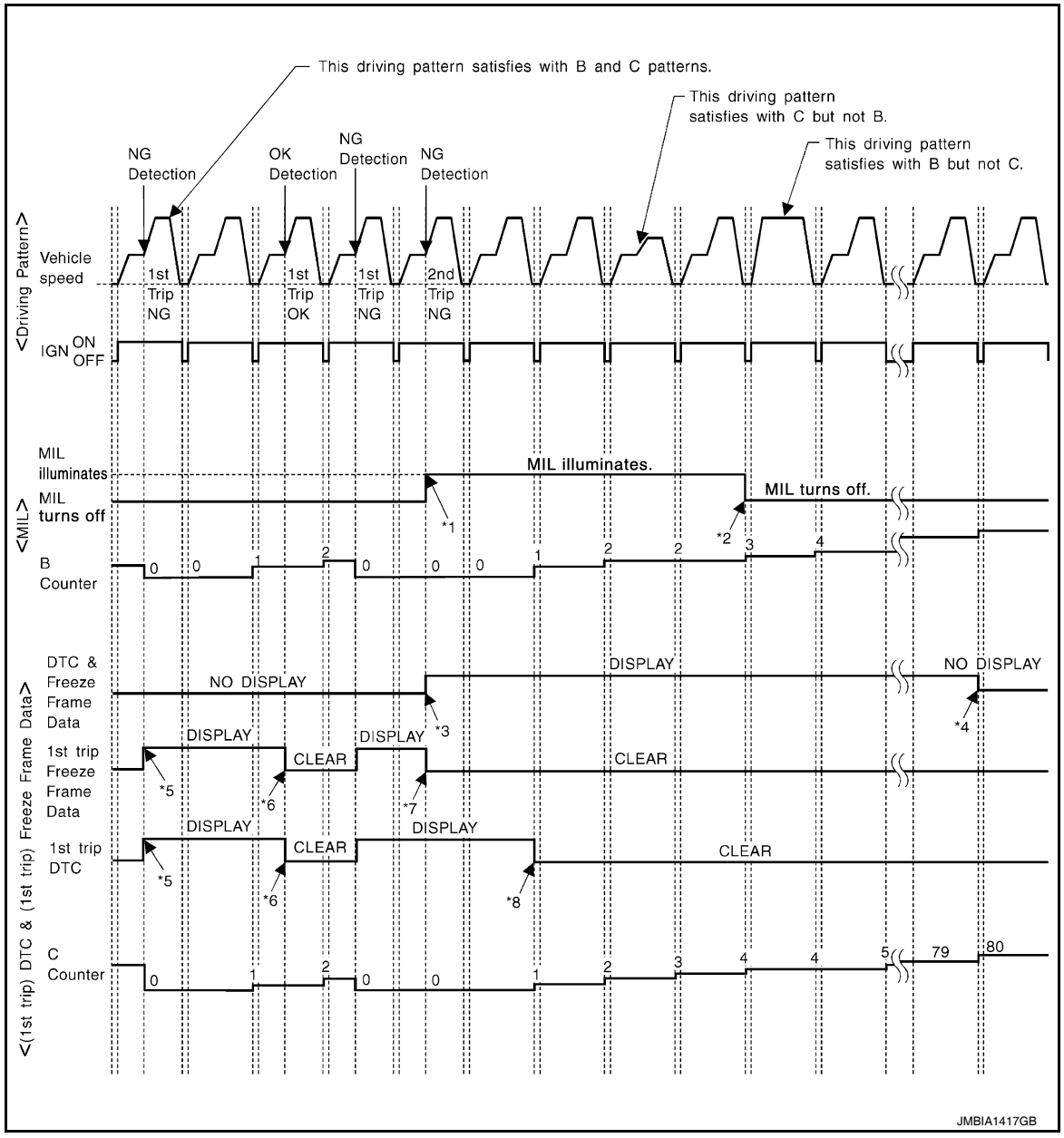
For details about patterns B and C under “Fuel Injection System” and “Misfire”, see "EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”".

For details about patterns A and B under “Other”, see "EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”".

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

*2: MIL will turn off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern B>

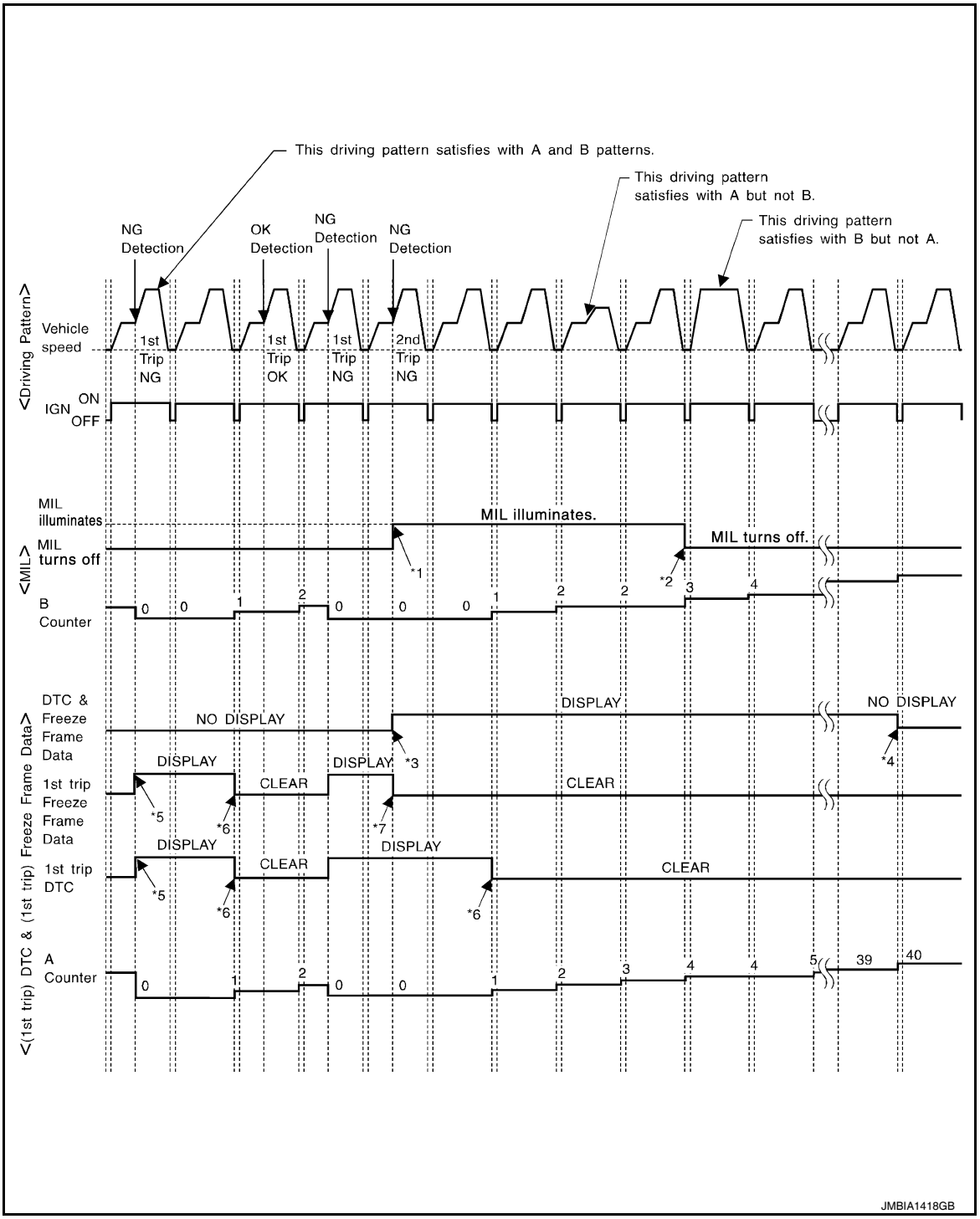
Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.
- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in “OBD SYSTEM OPERATION CHART”)

<Driving Pattern C>
Driving pattern C means the vehicle operation as follows:
The following conditions should be satisfied at the same time:
Engine speed: (Engine speed in the freeze frame data) ±375 rpm
Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]
Engine coolant temperature (T) condition:
- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:
If the stored freeze frame data is as follows:
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)
To be satisfied with driving pattern C, the vehicle should run under the following conditions:
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)
- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

*2: MIL will turn off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

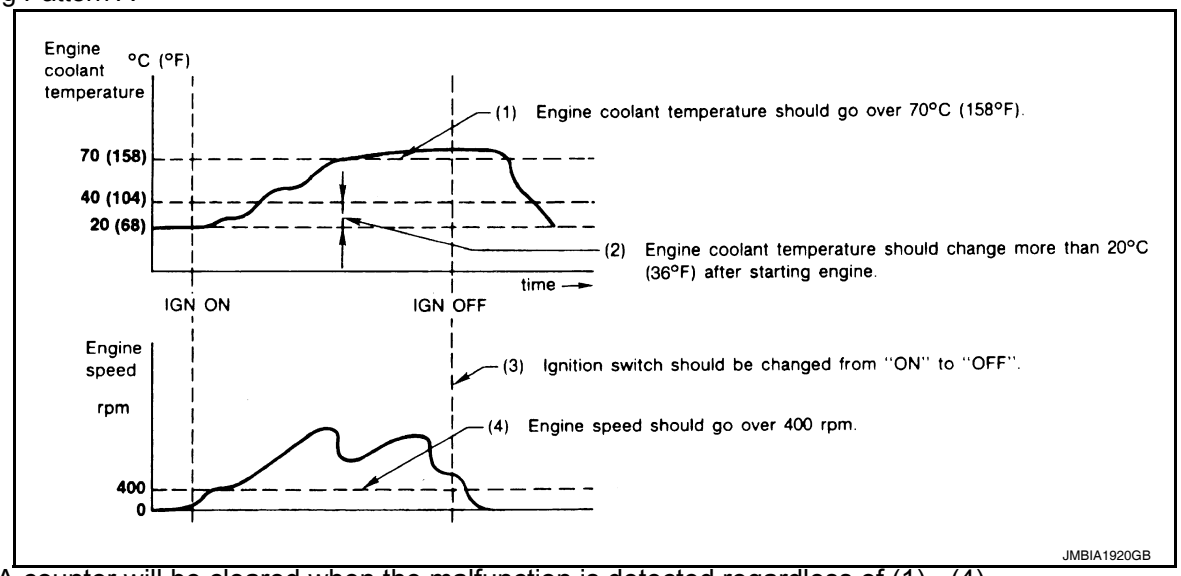
*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in “OBD SYSTEM OPERATION CHART”).

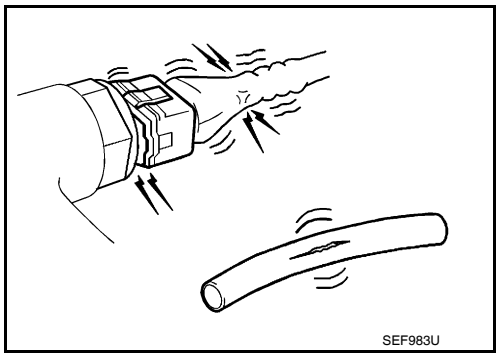
BASIC SERVICE PROCEDURE

Basic Inspection

INFOID:0000000007699698

1.INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket
3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.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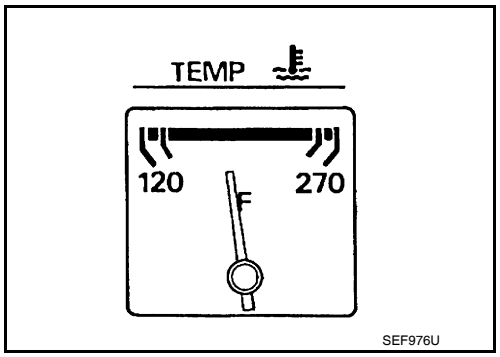
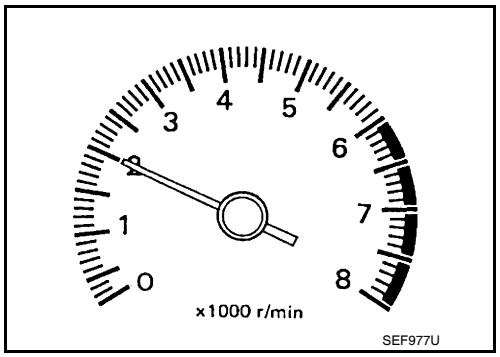


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT or GST.

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



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2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3.

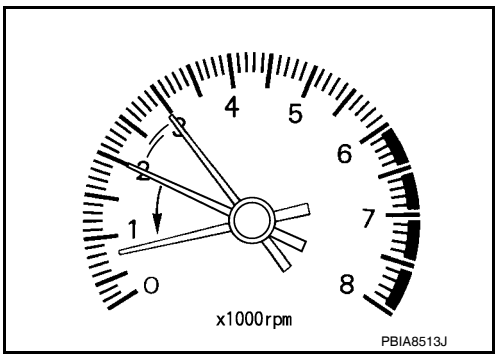
3.CHECK TARGET IDLE SPEED

With CONSULT

1. Run engine at about 2,000 rpm for about 2 minutes under no load.

2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Read idle speed in “DATA MONITOR” mode with CONSULT. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)



Without CONSULT
1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-87, "Accelerator Pedal Released Position Learning".

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-87, "Throttle Valve Closed Position Learning".

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-87, "Idle Air Volume Learning".
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

With CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)

Without CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Check crankshaft position sensor (POS) and circuit.
  Refer to EC-302.
- Check camshaft position sensor (PHASE) and circuit.
  Refer to EC-308.

OK or NG

OK >> GO TO 9.
NG >> 1. Repair or replace.
2. GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to BL-212, "ECM Re-communicating Function".

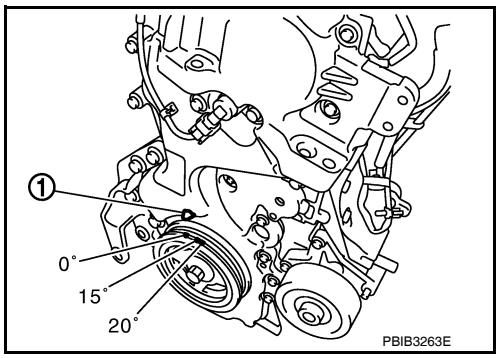
>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.
   Refer to EC-85, "Idle Speed and Ignition Timing Check".

- Timing indicator (1)

M/T: 13 ± 5° BTDC (in Neutral position)
A/T: 13 ± 5° BTDC (in P or N position)
CVT: 13 ± 5° BTDC (in P or N position)



OK or NG

OK >> GO TO 19.
NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-87, "Accelerator Pedal Released Position Learning".

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-87, "Throttle Valve Closed Position Learning".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-87, "Idle Air Volume Learning".
Is Idle Air Volume Learning carried out successfully?
Yes or No

Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to EC-85, "Idle Speed and Ignition Timing Check".

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)
CVT: 700 ± 50 rpm (in P or N position)

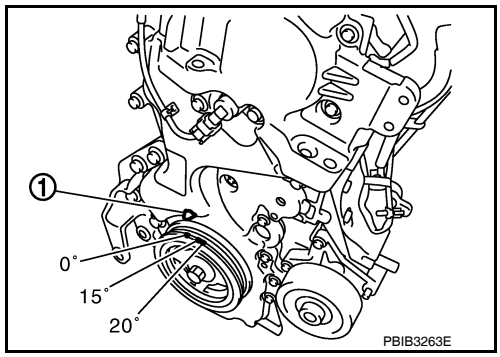
OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
   Refer to EC-85, "Idle Speed and Ignition Timing Check".

- Timing indicator (1)



M/T: 13 ± 5° BTDC (in Neutral position)
A/T: 13 ± 5° BTDC (in P or N position)
CVT: 13 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19
NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-40, "Component".

OK or NG

OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
  Refer to EC-302.
- Check camshaft position sensor (PHASE) and circuit.
  Refer to EC-308.

OK or NG

OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-212, "ECM Re-communicating Function".

>> GO TO 4.

19. INSPECTION END

Did you replace ECM, referring this Basic Inspection procedure?

Yes or No

Yes >> 1. Perform EC-86, "VIN Registration".
2. **INSPECTION END**

No >> **INSPECTION END**

Idle Speed and Ignition Timing Check

INFOID:0000000007699699

IDLE SPEED

With CONSULT

Check idle speed in “DATA MONITOR” mode with CONSULT.

With GST

Check idle speed in Service $01 with GST.

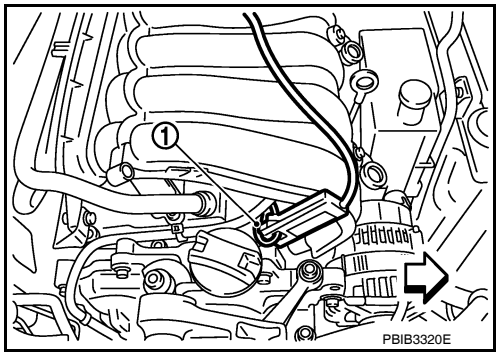
IGNITION TIMING

Any of following two methods may be used.

Method A

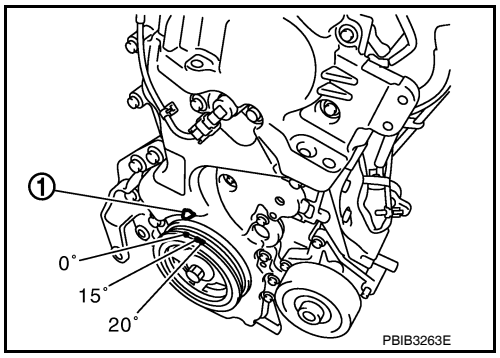
1. Attach timing light to loop wire (1) as shown.

⇦ : Vehicle front



2. Check ignition timing.

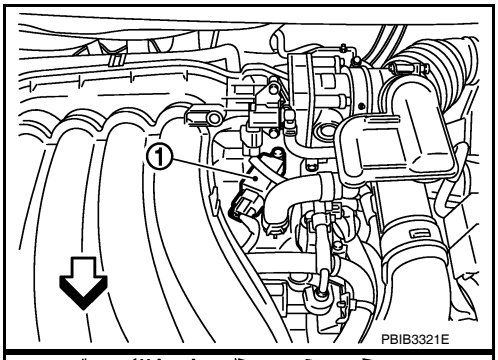
1. Timing indicator



Method B

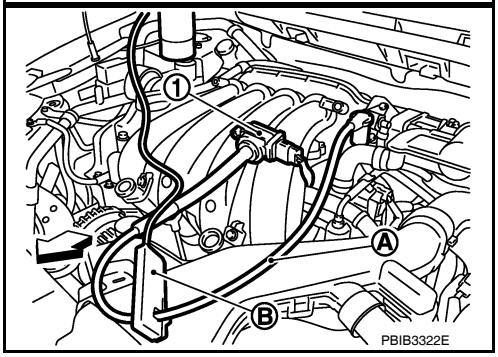
1. Remove No. 4 ignition coil (1).

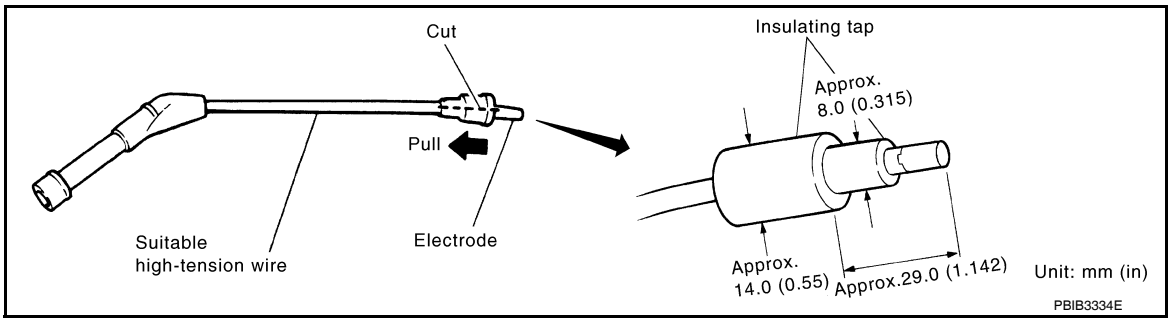
⇦ : Vehicle front



2. Connect No. 4 ignition coil (1) and No. 4 spark plug with suitable high-tension wire (A) as shown, and attach timing light clamp (B) to this wire.

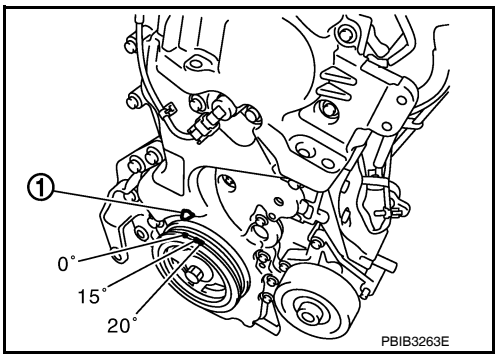
⇦ : Vehicle front





3. Check ignition timing.

1. Timing indicator



Procedure After Replacing ECM

INFOID:0000000007699700

When replacing ECM, the following procedure must be performed.

1. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-212, "ECM Re-communicating Function".
2. Perform EC-86, "VIN Registration".
3. Perform EC-87, "Accelerator Pedal Released Position Learning".
4. Perform EC-87, "Throttle Valve Closed Position Learning".
5. Perform EC-87, "Idle Air Volume Learning".

VIN Registration

INFOID:0000000007699701

DESCRIPTION

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced.

NOTE:
Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

OPERATION PROCEDURE

With CONSULT

1. Check the VIN of the vehicle and note it. Refer to GI-43, "Model Variation".
2. Turn ignition switch ON and engine stopped.
3. Select “VIN REGISTRATION” in “WORK SUPPORT” mode.
4. Follow the instruction of CONSULT display.

Accelerator Pedal Released Position Learning

INFOID:0000000007699702

DESCRIPTION

Accelerator Pedal Released Position Learning is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

Throttle Valve Closed Position Learning

INFOID:0000000007699703

DESCRIPTION

Throttle Valve Closed Position Learning is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

INFOID:0000000007699704

DESCRIPTION

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9 V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- Park/neutral position (PNP) switch (M/T): ON
  Selector lever (A/T and CVT): P or N
- Electric load switch: OFF
  [Air conditioner, headlamp, rear window defogger]
  On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped

• Transmission: Warmed-up
- Models with CONSULT (A/T and CVT models)
• Drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” or “CVT” system indicates less than 0.9 V.
- Models without CONSULT (A/T and CVT models) and M/T models
• Drive vehicle for 10 minutes.

OPERATION PROCEDURE

With CONSULT

1. Perform EC-87, "Accelerator Pedal Released Position Learning".
2. Perform EC-87, "Throttle Valve Closed Position Learning".
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
6. Touch “START” and wait 20 seconds.
7. Make sure that “CMPLT” is displayed on CONSULT screen. If “CMPLT” is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.
   Refer to EC-81, "Basic Inspection".

Item	Specification
Idle speed	M/T: 700 ± 50 rpm (in Neutral position) A/T: 700 ± 50 rpm (in P or N position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 13 ± 5° BTDC (in Neutral position) A/T: 13 ± 5° BTDC (in P or N position) CVT: 13 ± 5° BTDC (in P or N position)

Without CONSULT

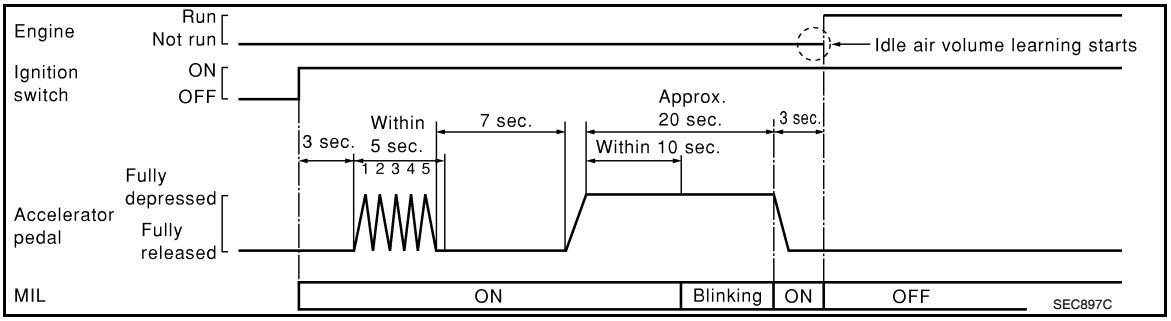
NOTE:
• It is better to count the time accurately with a clock.
• It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.

1. Perform EC-87, "Accelerator Pedal Released Position Learning".
2. Perform EC-87, "Throttle Valve Closed Position Learning".
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.

8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.

11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications. Refer to EC-81, "Basic Inspection".

Item	Specification
Idle speed	M/T: 700 ± 50 rpm (in Neutral position) A/T: 700 ± 50 rpm (in P or N position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 13 ± 5° BTDC (in Neutral position) A/T: 13 ± 5° BTDC (in P or N position) CVT: 13 ± 5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. **Check that throttle valve is fully closed.**
2. **Check PCV valve operation.**
3. **Check that downstream of throttle valve is free from air leakage.**
4. **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.**
   It is useful to perform EC-132.
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:**

- **Engine stalls.**
- **Erroneous idle.**

Fuel Pressure Check

INFOID:0000000007699705

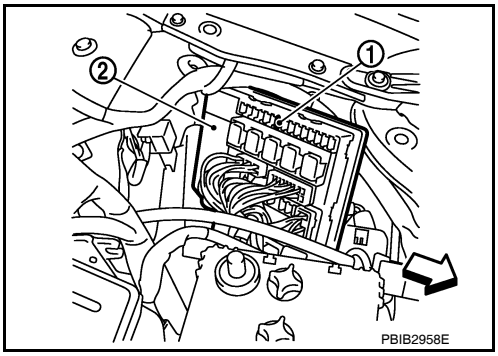
FUEL PRESSURE RELEASE

With CONSULT

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

Without CONSULT

1. Remove fuel pump fuse (1) located in IPDM E/R (2).



⇦ : Vehicle front

2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

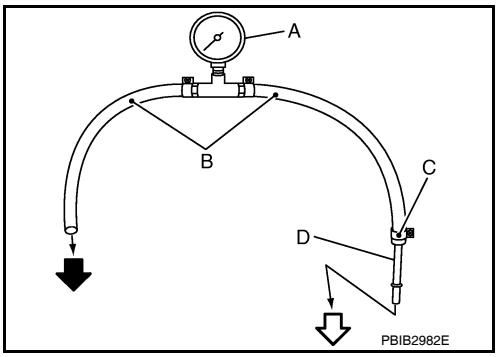
CAUTION:

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

NOTE:

- **Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because C11 models do not have fuel return system.**
- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains seal ability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

1. Release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".
2. Prepare fuel hose for fuel pressure check (B) and fuel tube adapter [SST: KV10118400] (D), then connect fuel pressure gauge (A).



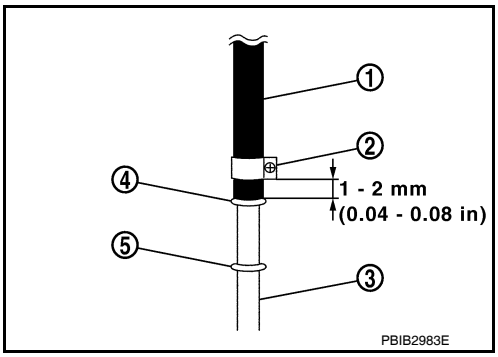
⇦ : To quick connector

⬅ : To fuel tube (engine side)

C. Clamp

- Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
- To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
- Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
- Use Pressure Gauge to check fuel pressure.

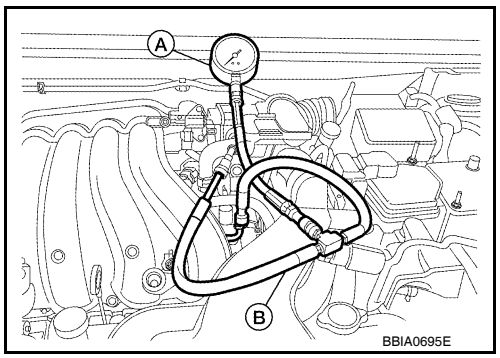
3. Remove fuel hose. Refer to EM-35, "Component".
   - Do not twist or kink fuel hose because it is plastic hose.
4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
   - No.2 spool (5)
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

- Make sure that clamp screw does not contact adjacent parts.

5. Connect fuel tube adapter to quick connector.



A. Fuel pressure gauge
B. Fuel hose for fuel pressure check

6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
7. Turn ignition switch ON and check for fuel leakage.
8. Start engine and check for fuel leakage.
9. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.
12. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.
13. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

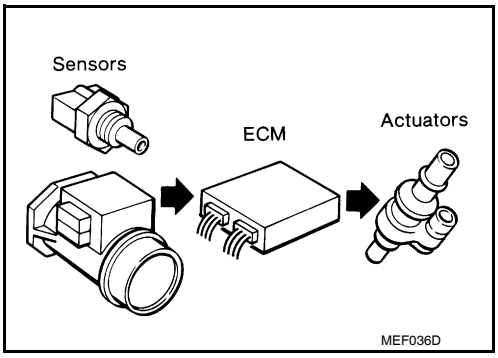
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction

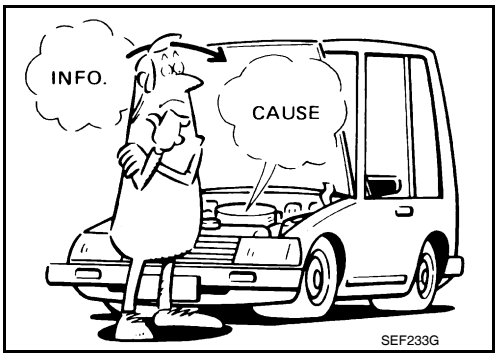
INFOID:0000000007699706

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



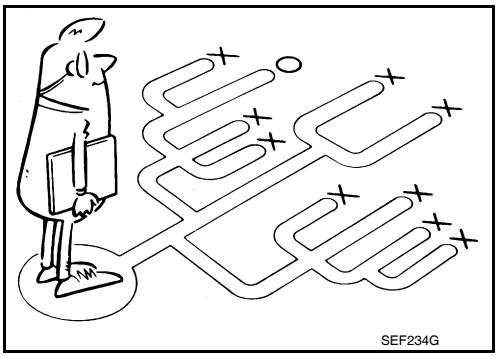
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT (or GST) or a circuit tester connected should be performed. Follow the Work Flow on "WORK FLOW".

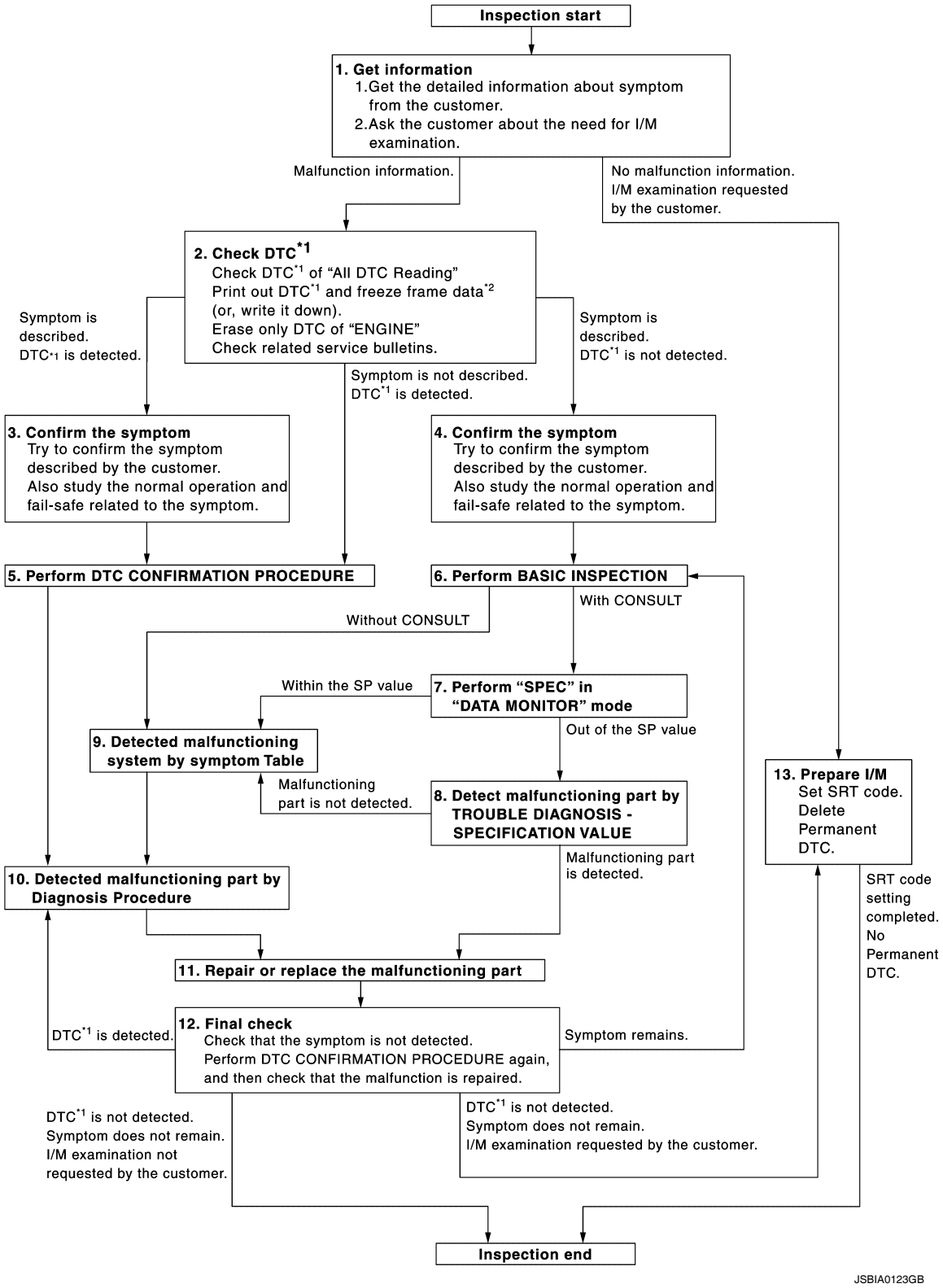
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on "Worksheet Sample" should be used.

Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot drivability malfunctions on an electronically controlled engine vehicle.



WORK FLOW

Overall Sequence



*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

Detailed Flow

1.GET INFORMATION FOR SYMPTOM

1. Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the “Diagnostic Work Sheet”.
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.
No malfunction information, but a request for I/M examination>>GO TO 13.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
- Record DTC and freeze frame data. (Print them out with CONSULT or GST.)
- Erase DTC. (Refer to EC-49, "Emission-related Diagnostic Information".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to EC-99, "Symptom Matrix Chart".)
3. Check related service bulletins for information.

Are any symptoms described and any DTCs detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON).
Also study the normal operation and fail-safe related to the symptom.
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom.
Diagnosis Work Sheet is useful to verify the incident.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.
If two or more DTCs are detected, refer to EC-97, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.
NO >> Check according to EC-132, "Description".

6.PERFORM BASIC INSPECTION

Perform EC-81, "Basic Inspection".

Do you have CONSULT?

YES >> GO TO 7.
NO >> GO TO 9.

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT

Make sure that “MAS A/F SE-B1”, “MAS A/F SE-B2”, “B/FUEL SCHDL”, “A/F ALPHA-B1”, and “A/F ALPHA-B2” are within the SP value using CONSULT “SPEC” in “DATA MONITOR” mode. Refer to EC-132, "Inspection Procedure".

Is the measurement value within the SP value?

YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-132, "Diagnosis Procedure".

Is a malfunctioning part detected?

YES >> GO TO 11.
NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EC-99, "Symptom Matrix Chart" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident".

Is a malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT. Refer to EC-112, "ECM Terminal and Reference Value", EC-128, "CONSULT Reference Value in Data Monitor Mode".

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to EC-49, "Emission-related Diagnostic Information".

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been completely repaired.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 10.
YES-2 >> Symptom remains: GO TO 6.
NO-1 >> No request for I/M examination from the customer: Before returning the vehicle to the customer, always erase unnecessary DTC in ECM and TCM (Transmission Control Module). Refer to EC-49, "Emission-related Diagnostic Information".
NO-2 >> I/M examination, requested from the customer: GO TO 13.

13. PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to EC-49, "Emission-related Diagnostic Information".
2. Erase permanent DTCs. Refer to EC-49, "Emission-related Diagnostic Information".

>> INSPECTION END

DIAGNOSTIC WORKSHEET

Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet as shown in the following "Worksheet Sample" in order to organize all the information for troubleshooting.

Some conditions may cause the MIL to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

Worksheet Sample

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date
Fuel and fuel filler cap	☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms — ☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
Symptoms — ☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
Symptoms — ☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
Symptoms — ☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions	☐ Not affected	
Weather conditions — Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
Weather conditions — Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions	☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions	☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp	☐ Turned on ☐ Not turned on	

MTBL0017

DTC Inspection Priority Chart

INFOID:0000000007699707

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U0101 U1001 CAN communication line • P0101 P0102 P0103 Mass air flow sensor • P0111 P0112 P0113 P0127 Intake air temperature sensor • P0116 P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0605 P0607 ECM • P0643 Sensor power supply • P0705 Transmission range switch • P0850 Park/neutral position (PNP) switch • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	• P0031 P0032 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 Heated oxygen sensor 2 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P014C P014D P2A00 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P2100 P2103 Throttle control motor relay • P2101 Electric throttle control function • P2118 Throttle control motor
3	• P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P050A P050E Cold start control • P0710 P0715 P0720 P0725 P0731 P0732 P0733 P0734 P0740 P0744 P0745 P0746 P0750 P0755 P0776 P0778 P0840 P0845 P1705 P1740 P1760 P1777 P1778 A/T or CVT related sensors, solenoid valves and switches • P1148 Closed loop control • P1211 TCS control unit • P1212 TCS communication line • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Input speed sensor • P2119 Electric throttle control actuator

Fail-Safe Chart

INFOID:0000000007699708

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

<table>
<tr><th>DTC No.</th><th>Detected items</th><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td>P0101
P0102
P0103</td><td>Mass air flow sensor circuit</td><td colspan="2">Engine speed will not rise more than 2,400 rpm due to the fuel cut.</td></tr>
<tr><td rowspan="6">P0117
P0118</td><td rowspan="6">Engine coolant temperature sensor circuit</td><td colspan="2">Engine coolant temperature will be determined by ECM based on the following condition.
CONSULT displays the engine coolant temperature decided by ECM.</td></tr>
<tr><td>Condition</td><td>Engine coolant temperature decided
(CONSULT display)</td></tr>
<tr><td>Just as ignition switch is turned ON or START</td><td>40°C (104°F)</td></tr>
<tr><td>Approx. 4 minutes or more after engine starting.</td><td>80°C (176°F)</td></tr>
<tr><td>Except as shown above</td><td>40 - 80°C (104 - 176°F)
(Depends on the time)</td></tr>
<tr><td colspan="2">When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</td></tr>
<tr><td>P0122
P0123
P0222
P0223
P2135</td><td>Throttle position sensor</td><td colspan="2">The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.
So, the acceleration will be poor.</td></tr>
<tr><td>P0500</td><td>Vehicle speed sensor</td><td colspan="2">When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running.</td></tr>
<tr><td>P0643</td><td>Sensor power supply</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P2100
P2103</td><td>Throttle control relay</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P2101</td><td>Electric throttle control function</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P2118</td><td>Throttle control motor</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td rowspan="3">P2119</td><td rowspan="3">Electric throttle control actuator</td><td colspan="2">(When electric throttle control actuator does not function properly due to the return spring malfunction:)
ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.</td></tr>
<tr><td colspan="2">(When throttle valve opening angle in fail-safe mode is not in specified range:)
ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.</td></tr>
<tr><td colspan="2">(When ECM detects the throttle valve is stuck open:)
While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls.
The engine can restart in N or P (A/T, CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</td></tr>
<tr><td>P2122
P2123
P2127
P2128
P2138</td><td>Accelerator pedal position sensor</td><td colspan="2">The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.
So, the acceleration will be poor.</td></tr>
</table>

- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up MIL when there is malfunction on engine control system.
  Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
  The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Symptom Matrix Chart

INFOID:0000000007699709

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-524
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-89
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-519
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-31
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-43
	Incorrect idle speed adjustment						1	1	1	1		1			EC-81
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-463, EC-473
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-81
	Ignition circuit	1	1	2	2	2		2	2			2			EC-529
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-141
Mass air flow sensor circuit		1	1	2	2	2		2	2			2			EC-170, EC-177
Engine coolant temperature sensor circuit							3			3					EC-192, EC-196, EC-206
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			EC-214, EC-219, EC-224, EC-257, EC-499
Throttle position sensor circuit							2			2					EC-201, EC-287, EC-433, EC-434, EC-487
Accelerator pedal position sensor circuit				3	2	1									EC-410, EC-475, EC-480, EC-492

	SYMPTOM													Reference
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Knock sensor circuit			2								3			EC-298
Crankshaft position sensor (POS) circuit	2	2												EC-302
Camshaft position sensor (PHASE) circuit	3	2												EC-308
Vehicle speed signal circuit		2	3		3						3			EC-397
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-407
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-165
Park/neutral position (PNP) signal circuit			3		3		3	3			3			EC-415
Refrigerant pressure sensor circuit		2				3			3		4			EC-538
Electrical load signal circuit							3							EC-517
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-23
ABS actuator and electric unit (control unit)			4											BRC-11

1 - 6: The numbers refer to the order of inspection.

(continued on next table)

SYSTEM — ENGINE MECHANICAL & OTHER

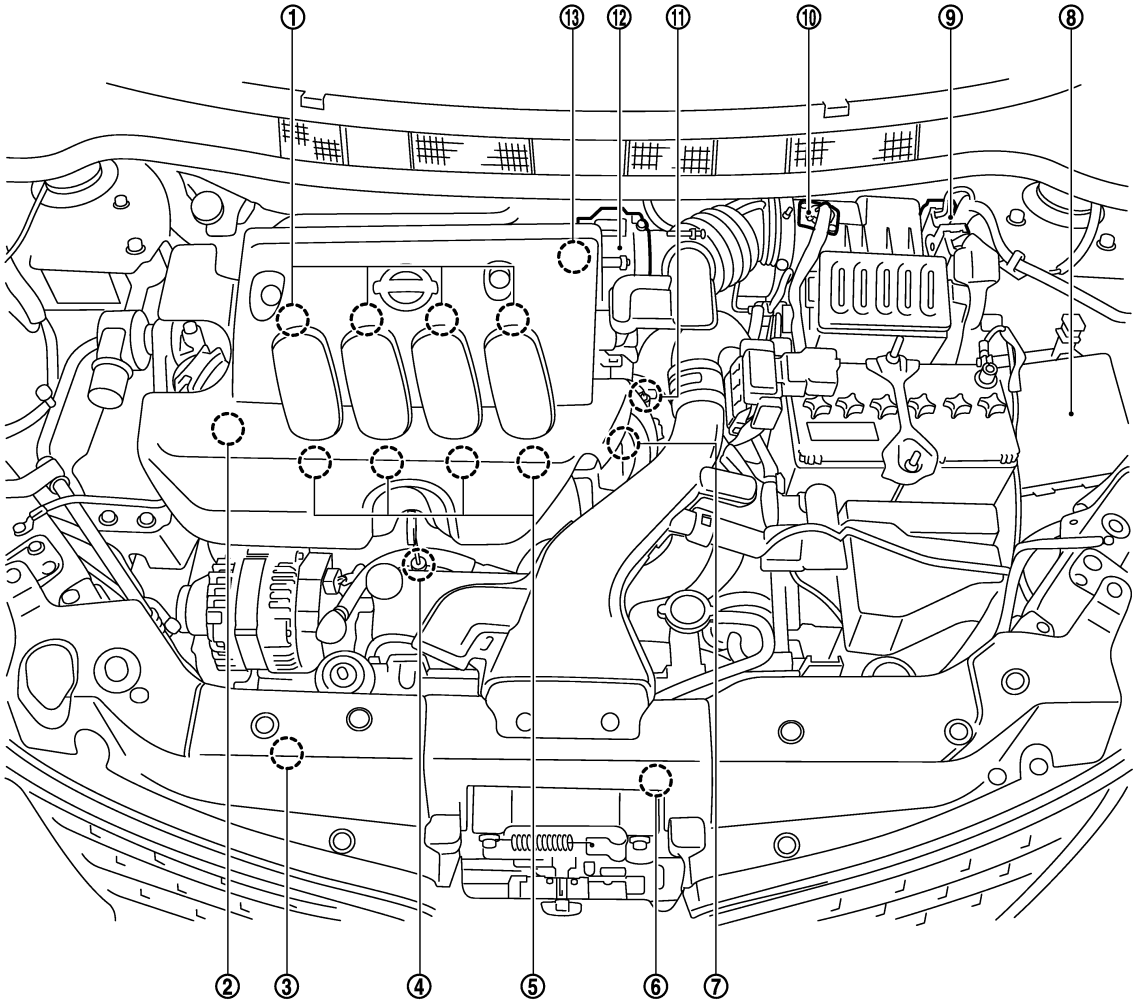
		SYMPTOM													Reference
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5	5												FL-10
	Fuel piping			5	5	5		5	5			5			EM-35
	Vapor lock														—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—
Air	Air duct	5	5	5	5	5	5	5	5	5		5			EM-16
	Air cleaner														EM-17
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)														EM-17
	Electric throttle control actuator														EM-18
	Air leakage from intake manifold/ Collector/Gasket														EM-20
Cranking	Battery	1	1	1		1		1	1			1		1	SC-5
	Generator circuit														SC-22
	Starter circuit	3													SC-16
	Signal plate	6													EM-83
	Park/neutral position (PNP) switch (M/T) Transmission range switch (A/T or CVT)	4													AT-230, CVT-184, MT-14
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-68
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-83
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														

		SYMPTOM													Reference
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			EM-50
	Camshaft														EM-51
	Intake valve timing control														EM-40
	Intake valve												3		EM-51
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-22, EX-5
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			EM-30, LU-11 LU-12
	Oil level (Low)/Filthy oil														LU-8
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			CO-14 CO-14
	Thermostat									5					CO-23
	Water control valve														CO-28
	Water pump														CO-20
	Water gallery														CO-25
	Cooling fan									5					CO-19
	Coolant level (Low)/Contaminated coolant														CO-11
NVIS (NISSAN Vehicle Immobilizer System-NATS)		1	1												BL-219

1 - 6: The numbers refer to the order of inspection.

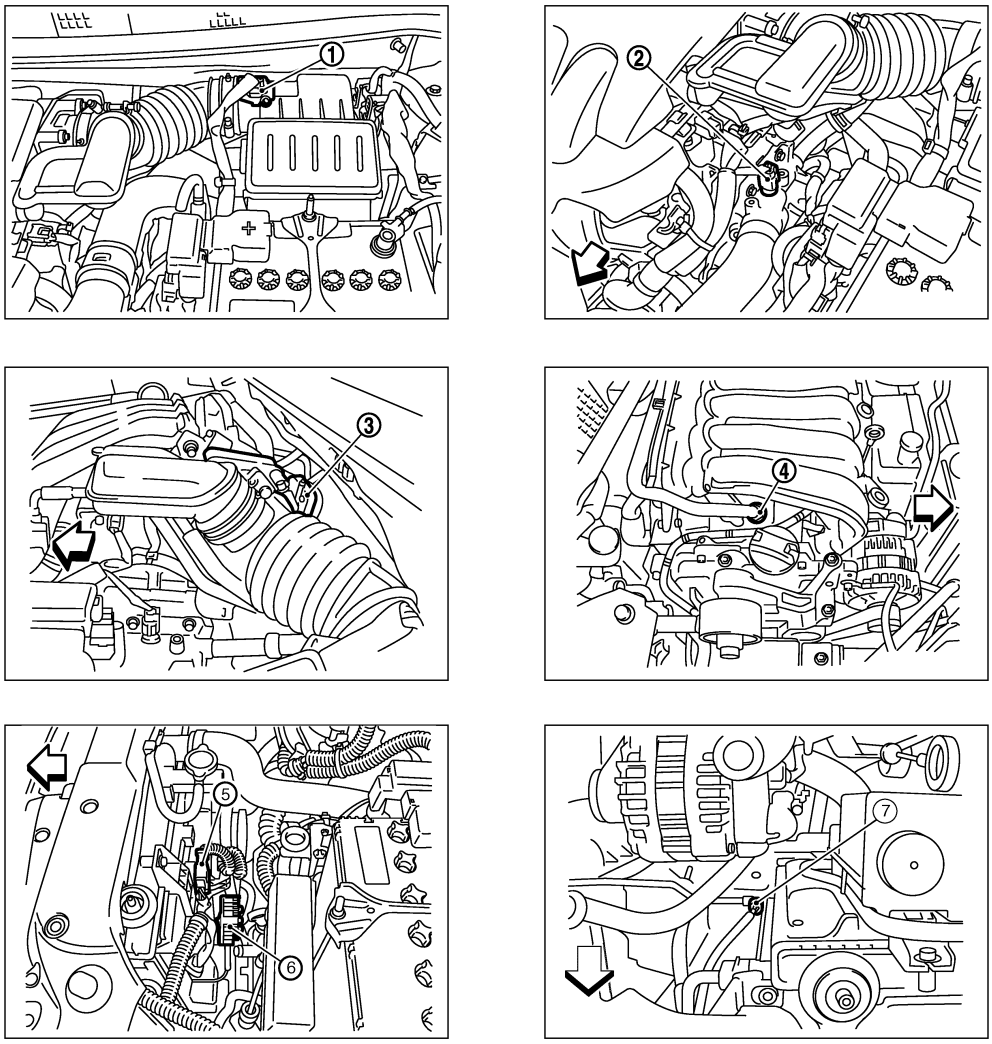
Engine Control Component Parts Location

INFOID:0000000007699710



PBIB3261E

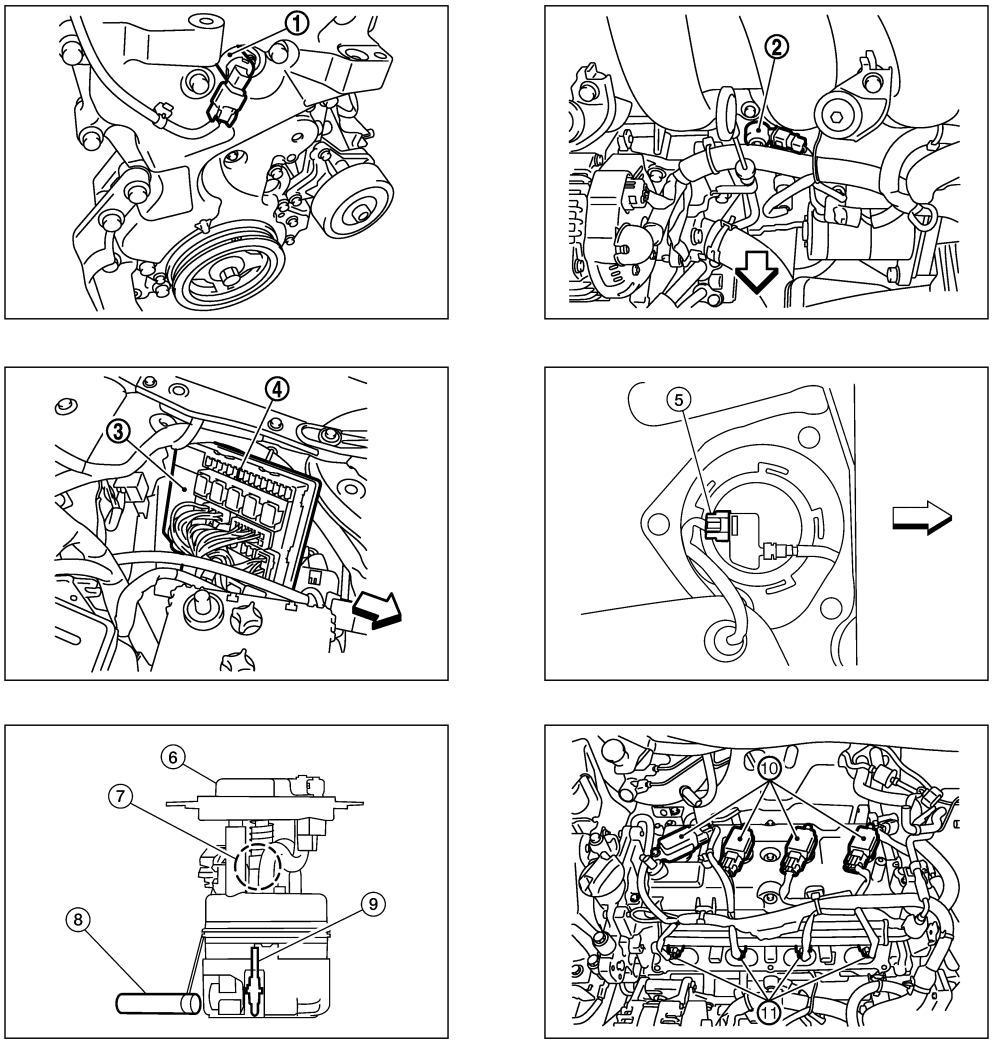
1. Ignition coil (with power transistor) and spark plug
2. Intake valve timing control solenoid valve
3. Refrigerant pressure sensor
4. Knock sensor
5. Fuel injector
6. Cooling fan motor
7. Camshaft position sensor (PHASE)
8. IPDM E/R
9. ECM
10. Mass air flow sensor (with intake air temperature sensor)
11. Engine coolant temperature sensor
12. Electric throttle control actuator (with built-in throttle position sensor, throttle control motor)
13. EVAP canister purge volume control solenoid valve



BBIA0724E

1. Mass air flow sensor (with intake air temperature sensor)
2. Engine coolant temperature sensor
3. Electric throttle control actuator (with built in throttle position sensor, throttle control motor)
4. PCV valve
5. Cooling fan motor
6. Resistor
7. Refrigerant pressure sensor

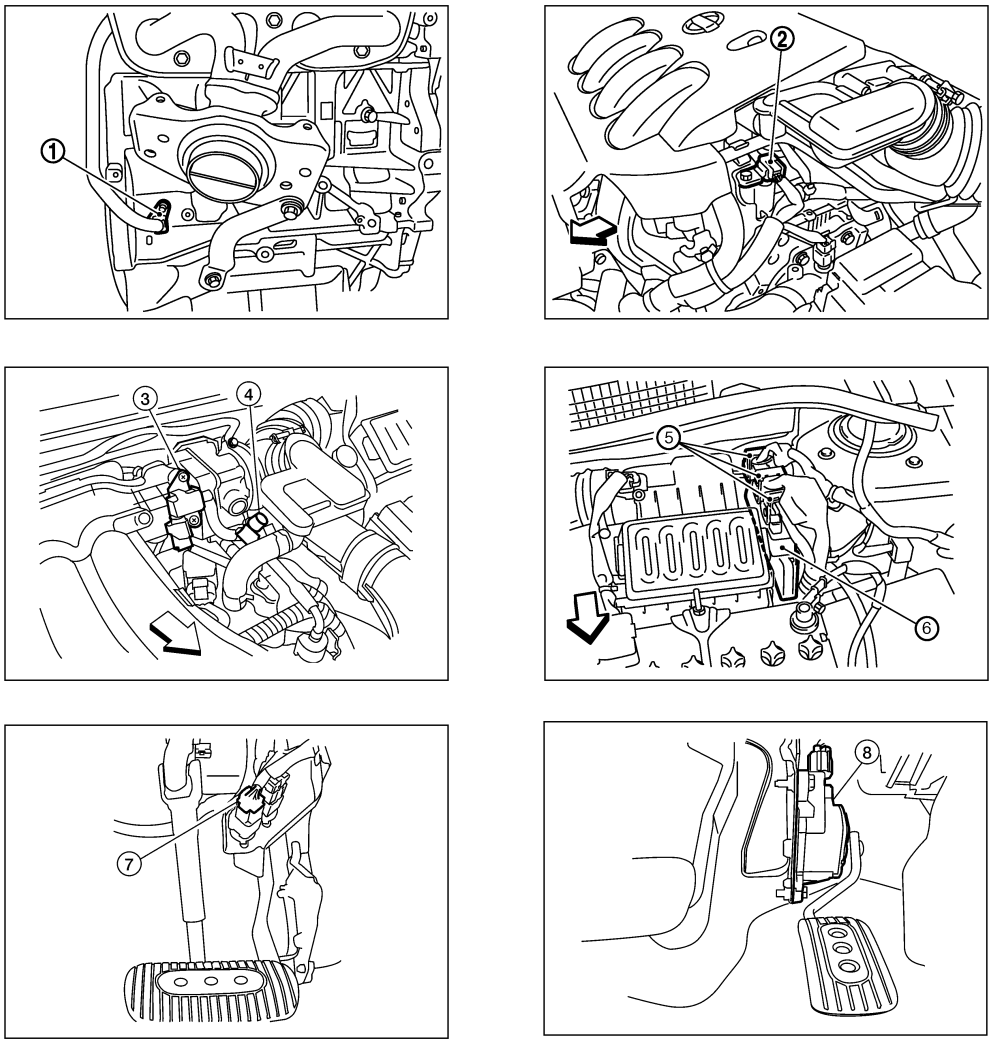
⇦ : Vehicle front



BBIA0725E

1. Intake valve timing control solenoid valve
2. Knock sensor
3. IPDM E/R
4. Fuel pump fuse (15 A)
5. Fuel level sensor unit and fuel pump harness connector (view with inspection hole cover removed)
6. Fuel level sensor unit and fuel pump
7. Fuel pressure regulator
8. Fuel level sensor
9. Fuel tank temperature sensor
10. Ignition coil (with power transistor) and spark plug
11. Fuel injector

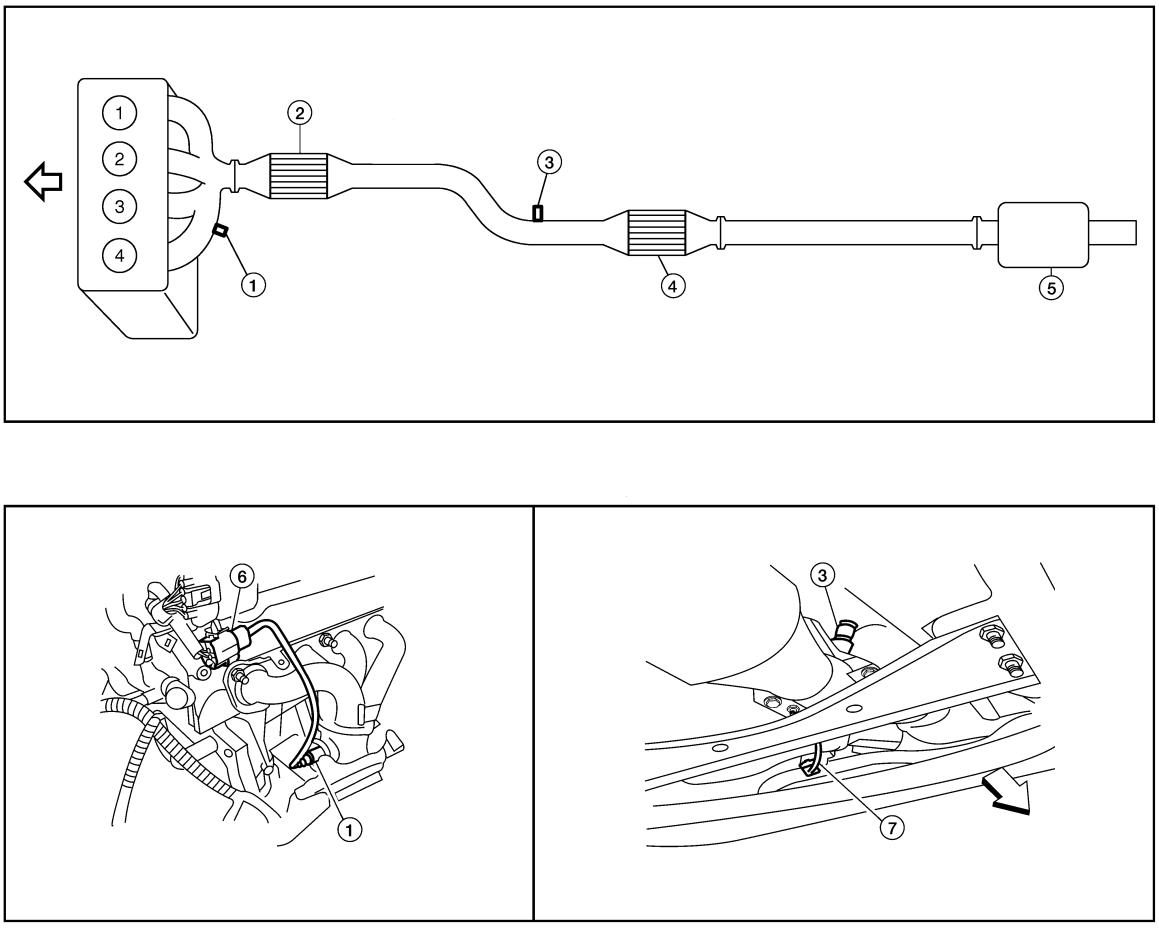
⇦ : Vehicle front



BBIA0727E

1. Crankshaft position sensor (POS)
2. Camshaft position sensor (PHASE)
3. EVAP canister purge volume control solenoid valve
4. EVAP service port
5. ECM harness connector
6. ECM
7. Stop lamp switch
8. Accelerator pedal position sensor

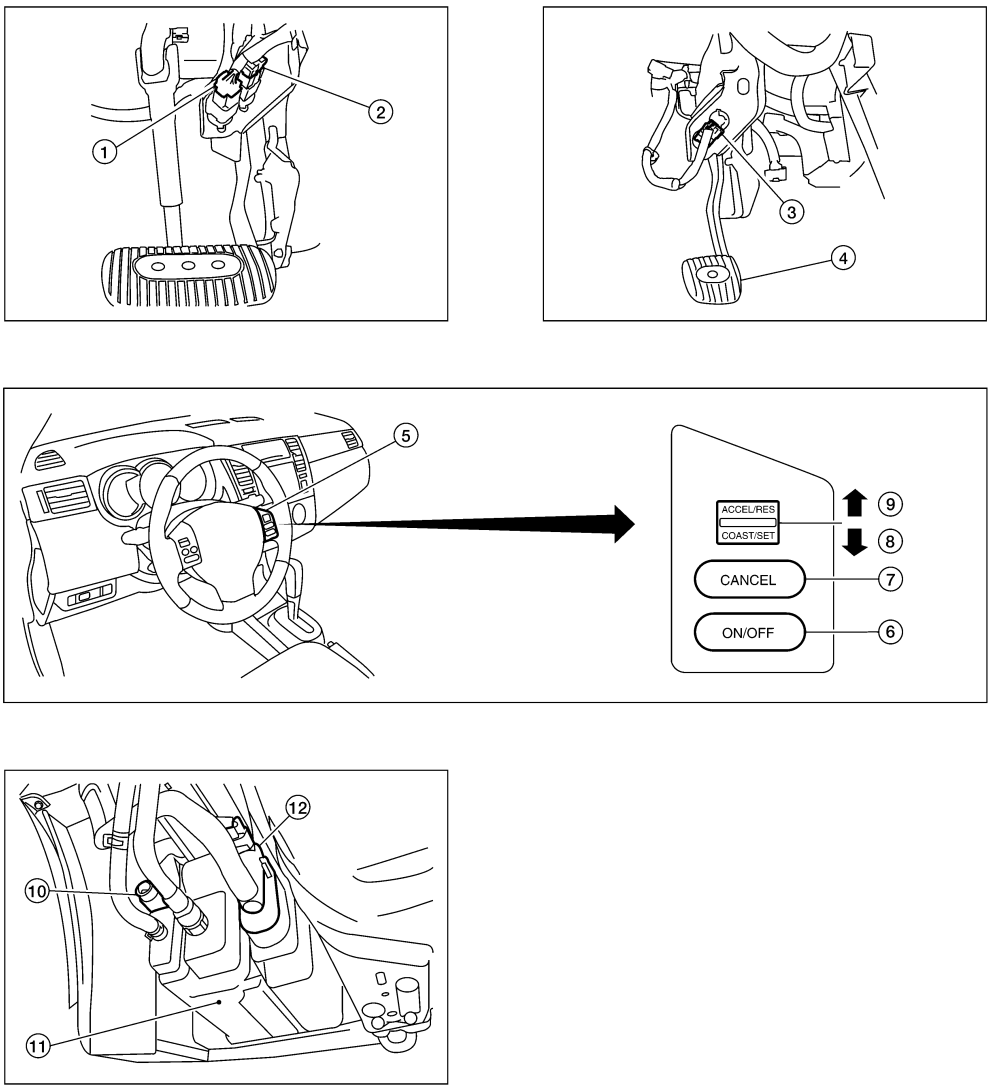
⇦: Vehicle front



BBIA0726E

1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (Under floor)
5. Muffler
6. Air fuel ratio (A/F) sensor 1 harness connector
7. Heated oxygen sensor 2 harness connector

⇦ : Vehicle front

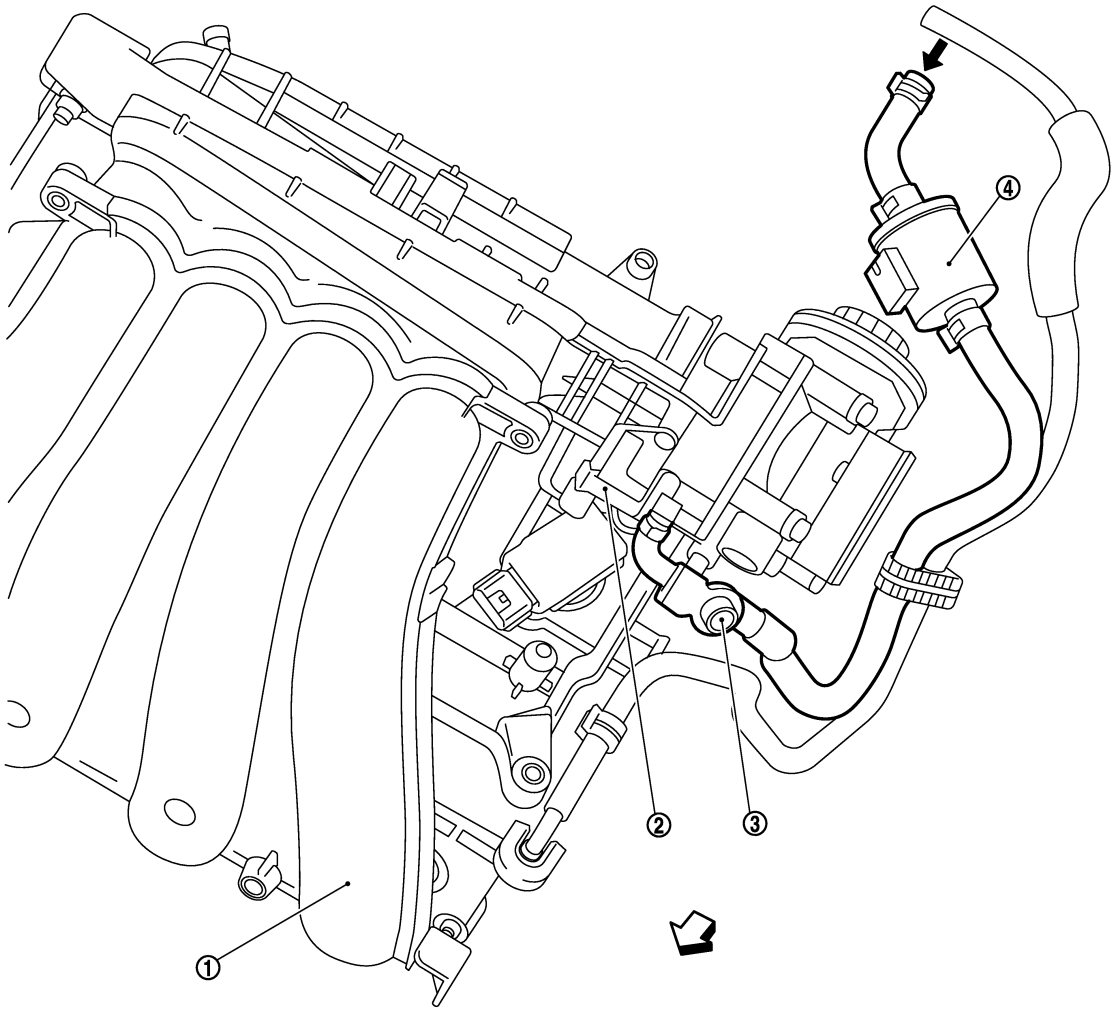


BBIA0728E

1. Stop lamp switch
2. ASCD brake switch
3. ASCD clutch switch
4. Clutch pedal
5. ASCD steering switch
6. MAIN switch
7. CANCEL switch
8. SET/COAST switch
9. RESUME/ACCELERATOR switch
10. EVAP control system pressure sensor
11. EVAP canister
12. EVAP canister vent control valve

Vacuum Hose Drawing

INFOID:0000000007699711



PBIB3330E

1. Intake manifold
2. EVAP canister purge volume control solenoid valve
3. EVAP service port
4. EVAP purge resonator

⇦ : Vehicle front

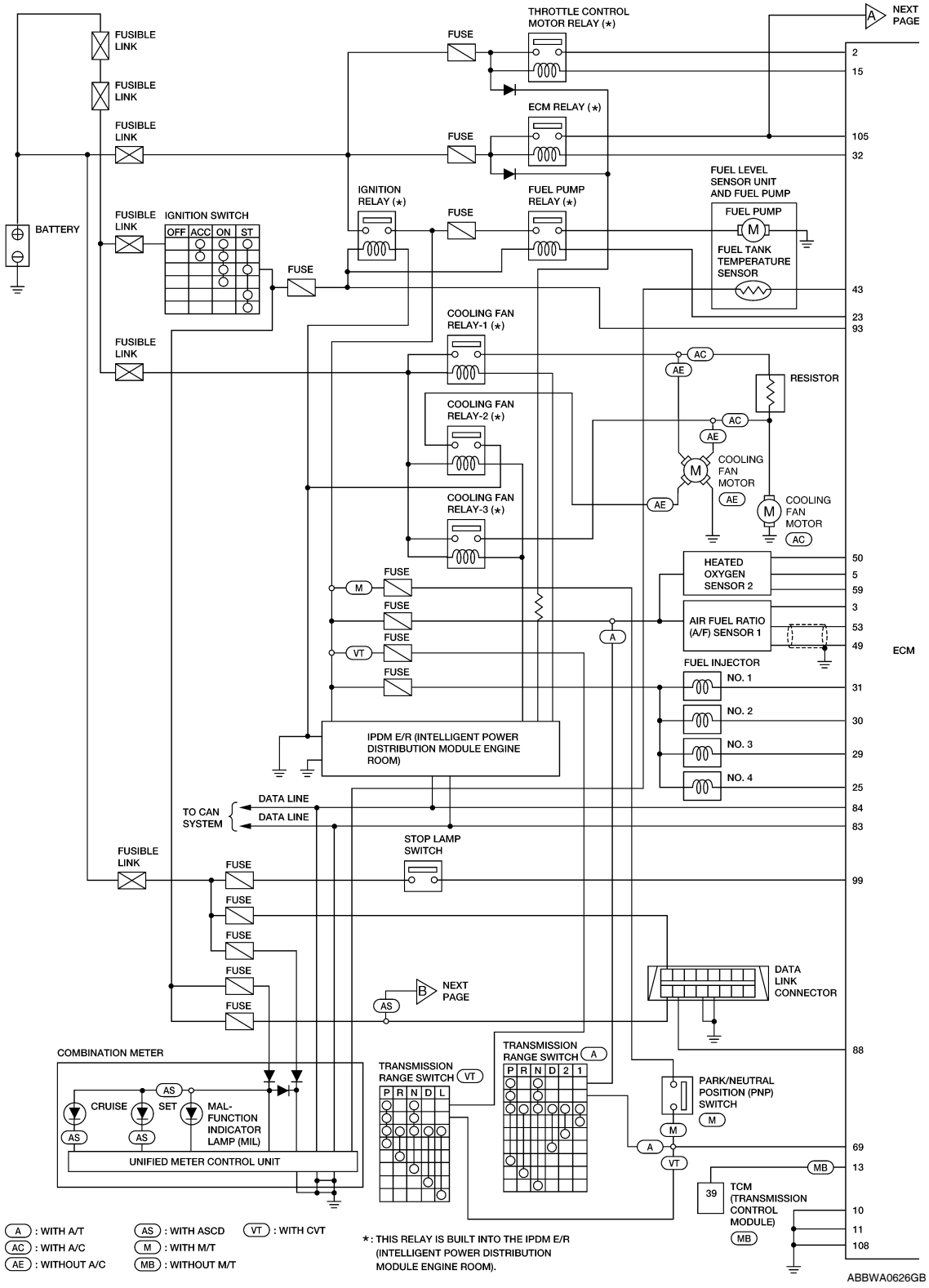
⬅ : From EVAP canister

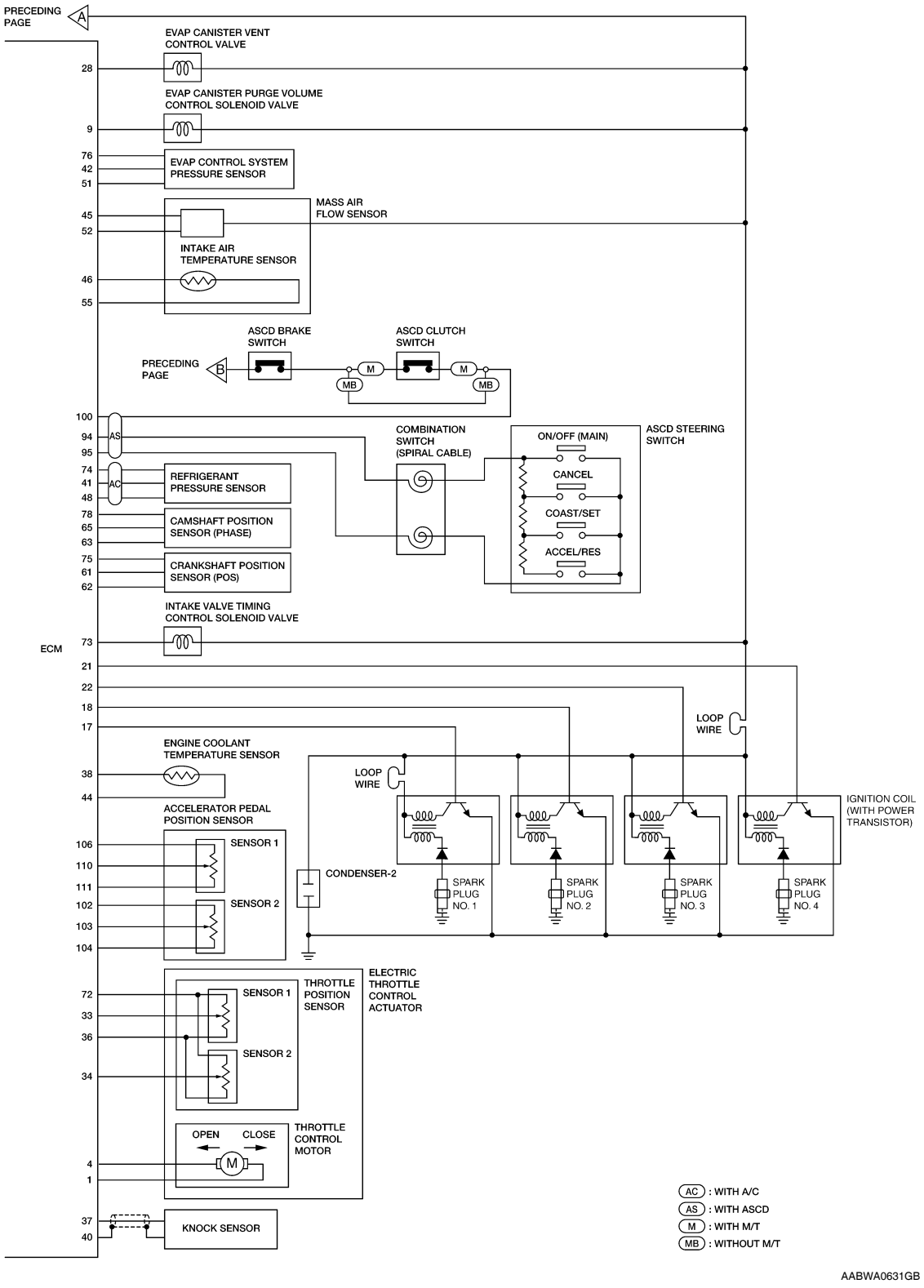
NOTE:
Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

Refer to EC-22, "Schematic" for Vacuum Control System.

Circuit Diagram

INFOID:0000000007699712

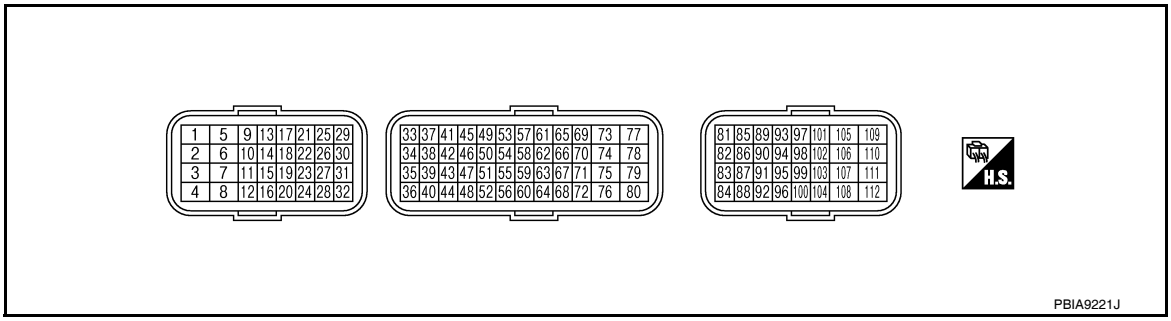




AABWA0631GB

ECM Harness Connector Terminal Layout

INFOID:0000000007699713



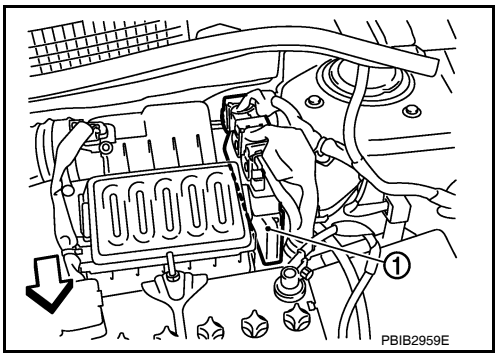
ECM Terminal and Reference Value

INFOID:0000000007699714

PREPARATION

1. ECM (1) is located in the engine room left side near battery.

⇦ : Vehicle front

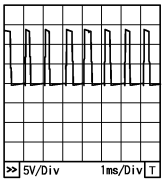
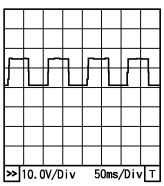


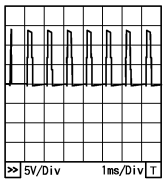
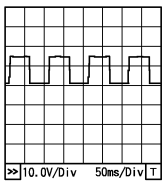
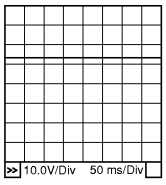
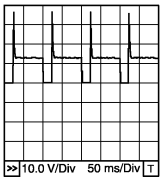
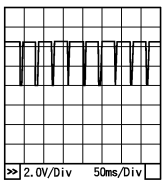
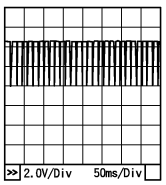
ECM INSPECTION TABLE

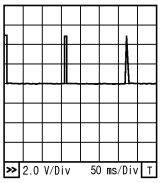
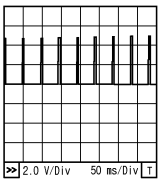
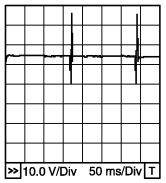
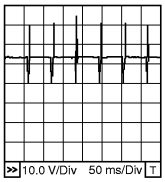
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

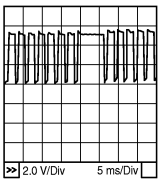
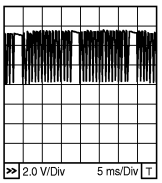
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

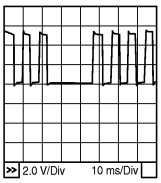
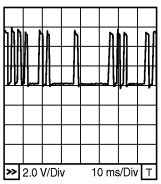
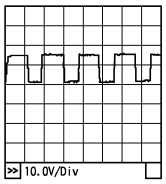
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
1	L	Throttle control motor (Open)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIA8150J
2	SB	Throttle control motor power supply	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
4	P	Throttle control motor (Close)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIA8149J
5	G	Heated oxygen sensor 2 heater	**[Engine is running]** • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Approximately 10 V★  PBIA8148J
			[Ignition switch: ON] • Engine stopped **[Engine is running]** • Engine speed: Above 3,600 rpm.	Battery voltage (11 - 14 V)
9	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting.	Battery voltage (11 - 14 V)★  PBIB0050E
			[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10 V★  PBIB0520E
10 11	B B	ECM ground	**[Engine is running]** • Idle speed	Body ground
13	L	Tachometer signal	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	3.0 - 5.0 V★  PBIA8164J
			[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm.	3.0 - 5.0 V★  PBIA8165J

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
15	Y	Throttle control motor relay	**[Ignition switch: OFF]**	Battery voltage (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V
17 18 21 22	R LG G SB	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.3 V★  PBIA9265J
			[Engine is running] • **Warm-up condition** • Engine speed: 2,500 rpm.	0.2 - 0.5 V★  PBIA9266J
23	GR	Fuel pump relay	**[Ignition switch: ON]** • For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0 V
			[Ignition switch: ON] • More than 1 second after turning ignition switch ON	Battery voltage (11 - 14 V)
25 29 30 31	V Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Battery voltage (11 - 14 V)★  PBIB0529E
			[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	Battery voltage (11 - 14 V)★  PBIA4943J
28	W	EVAP canister vent control valve	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
33	LG	Throttle position sensor 1	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	O	Throttle position sensor 2	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	Y	Sensor ground (Throttle position sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
37	W	Knock sensor	**[Engine is running]** • Idle speed	Approximately 2.5 V
38	P	Engine coolant temperature sensor	**[Engine is running]**	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature.
40	—	Sensor ground (Knock sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
41	GR	Refrigerant pressure sensor	**[Engine is running]** • **Warm-up condition** • Both A/C switch and blower fan switch: ON (Compressor operates.)	1.0 - 4.0 V
42	V	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8 V
43	P	Fuel tank temperature sensor	**[Engine is running]**	Approximately 0 - 4.8 V Output voltage varies with fuel tank temperature
44	B	Sensor ground (Engine coolant temperature sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
45	G	Mass air flow sensor	**[Engine is running]** • **Warm-up condition** • Idle speed	0.9 - 1.2 V
			[Engine is running] • **Warm-up condition** • Engine speed: 2,500 rpm	1.5 - 1.8 V
46	V	Intake air temperature sensor	**[Engine is running]**	Approximately 0 - 4.8 V Output voltage varies with intake air temperature.
48	BR	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
50	W	Heated oxygen sensor 2	**[Engine is running]** • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V
51	O	Sensor ground (EVAP control system pressure sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
52	LG	Sensor ground (Mass air flow sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V
55	O	Sensor ground (Intake air temperature sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
59	O	Sensor ground (Heated oxygen sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
61	W	Crankshaft position sensor (POS)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 4.0 V★  PBIB2998E
			[Engine is running] • Engine speed: 2,000 rpm	Approximately 4.0 V★  PBIB2999E
62	R	Sensor ground [Crankshaft position sensor (POS)]	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
63	BR	Sensor ground [Camshaft position sensor (PHASE)]	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
65	G	Camshaft position sensor (PHASE)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 2.0 V★  PBIB2986E
			[Engine is running] • Engine speed: 2,000 rpm.	1.0 - 2.0 V★  PBIB2987E
69	L	PNP signal	**[Ignition switch: ON]** • Selector lever: P or N (A/T, CVT), Neutral (M/T)	Battery voltage (11 - 14 V)
			[Ignition switch: ON] • Except above	Approximately 0 V
72	V	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
73	P	Intake valve timing control solenoid valve	**[Engine is running]** • **Warm-up condition** • Idle speed	Battery voltage (11 - 14 V)
			[Engine is running] • **Warm-up condition** • When revving engine up to 2,000 rpm quickly	7.0 - 10 V★  PBIA4937J
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
78	O	Sensor power supply [Camshaft position sensor (PHASE)]	**[Ignition switch: ON]**	Approximately 5.0 V
83	P	CAN communication line	—	—
84	L	CAN communication line	—	—
88	LG	DATA link connector	—	—
93	O	Ignition switch	**[Ignition switch: OFF]**	0 V
			[Ignition switch: ON]	Battery voltage (11 - 14 V)

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
94	R	ASCD steering switch	**[Ignition switch: ON]** • ASCD steering switch: OFF	Approximately 4.0 V
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1.0 V
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3.0 V
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2.0 V
95	B	Sensor ground (ASCD steering switch)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
99	R	Stop lamp switch	**[Ignition switch: OFF]** • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	Battery voltage (11 - 14 V)
100	G	ASCD brake switch	**[Ignition switch: ON]** • Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	Battery voltage (11 - 14 V)
102	SB	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V
103	GR	Accelerator pedal position sensor 2	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	Y	Sensor ground (Accelerator pedal position sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
106	P	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5.0 V
108	B	ECM ground	**[Engine is running]** • Idle speed	Body ground
110	G	Accelerator pedal position sensor 1	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	R	Sensor ground (Accelerator pedal position sensor 1)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT Function (ENGINE)

INFOID:0000000007699715

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT unit.
Self Diagnostic Result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the ECM can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT Confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECU Identification	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

WORK SUPPORT MODE

Work Item

Work item	Condition	Usage
FUEL PRESSURE RELEASE	Fuel pump will stop by touching “START” during idling. Crank a few times after engine stalls.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	The idle air volume that keeps the engine within the specified range is memorized in ECM.	When learning the idle air volume
SELF-LEARNING CONT	The coefficient of self-learning control mixture ratio returns to the original coefficient.	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. • Ignition switch “ON” • Engine not running • Ambient temperature is above 0°C (32°F). • No vacuum and no high pressure in EVAP system • Fuel tank temp. is more than 0°C (32°F). • Within 10 minutes after starting “EVAP SYSTEM CLOSE” • When trying to execute “EVAP SYSTEM CLOSE” under the condition except above, CONSULT will discontinue it and display appropriate instruction. **NOTE:** **When starting engine, consult may display “BATTERY VOLTAGE IS LOW. CHARGE BATTERY”, even in using charged battery.**	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition timing
VIN REGISTRATION	In this mode, VIN is registered in ECM.	When registering VIN in ECM

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to EC-49, "Emission-related Diagnostic Information".

How to Read DTC and 1st Trip DTC

DTCs and 1st trip DTCs related to the malfunction are displayed in “SELF-DIAG RESULTS”.

- When ECM detects a 1st trip DTC, “1t” is displayed for “TIME”.
- When ECM has detected a current DTC, “0” is displayed for “TIME”.
- If “TIME” is neither “0” nor “1t”, the DTC occurred in the past and ECM shows the number of times the vehicle has been driven since the last detection of the DTC.

How to Erase DTC and 1st Trip DTC

NOTE:

- If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- If the DTC is not for A/T or CVT related items (see EC-49, "Emission-related Diagnostic Information"), skip step 1.

1. Erase DTC in TCM. Refer to AT-37, "OBD-II Diagnostic Trouble Code (DTC)" (A/T), CVT-27, "OBD-II Diagnostic Trouble Code (DTC)" (CVT).
2. Select “ENGINE” with CONSULT.
3. Select “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (DTC in ECM will be erased.)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	(Refer to EC-9)
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One mode in the following is displayed. - Mode2: Open loop due to detected system malfunction - Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) - Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control - Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [ms]	The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	The intake air temperature at the moment a malfunction is detected is displayed.
FUEL SYS-B2	These items are displayed but are not applicable to this model.
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	
INT MANI PRES [kPa]	
COMBUST CONDITION	

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

Monitored Item

Monitored item [Unit]	Description	Remarks
ENG SPEED [rpm]	Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	• Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is indicated. • When engine is running, specification range is indicated in "SPEC".
B/FUEL SCHDL [ms]	“Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	When engine is running, specification range is indicated in "SPEC".
A/F ALPHA-B1 [%]	The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	• When the engine is stopped, a certain value is indicated. • This data also includes the data for the air/fuel ratio learning control. • When engine is running, specification range is indicated in "SPEC".
COOLAN TEMP/S [°C] or [°F]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
A/F SEN1 (B1) [V]	The A/F signal computed from the input signal of the A/F sensor 1 is displayed.	
HO2S2 (B1) [V]	The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S2 MNTR(B1) [RICH/LEAN]	Display of heated oxygen sensor 2 signal: • RICH: means the amount of oxygen after three way catalyst is relatively small. • LEAN: means the amount of oxygen after three way catalyst is relatively large.	When the engine is stopped, a certain value is indicated.
VHCL SPEED SE [km/h] or [mph]	The vehicle speed computed from the vehicle speed signal is displayed.	
BATTERY VOLT [V]	The power supply voltage of ECM is displayed.	
ACCEL SEN 1 [V]	The accelerator pedal position sensor signal voltage is displayed.	ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2 [V]		
TP SEN 1-B1 [V]	The throttle position sensor signal voltage is displayed.	TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 2-B1 [V]		
FUEL T/TMP SE [°C] or [°F]	The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
INT/A TEMP SE [°C] or [°F]	The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
EVAP SYS PRES [V]	The signal voltage of EVAP control system pressure sensor is displayed.	
FUEL LEVEL SE [V]	The signal voltage of the fuel level sensor is displayed.	
START SIGNAL [ON/OFF]	Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal.	

Monitored item [Unit]	Description	Remarks
AIR COND SIG [ON/OFF]	Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]	Indicates [ON/OFF] condition from the park/neutral position (PNP) signal.	
PW/ST SIGNAL [ON/OFF]	[ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated.	
LOAD SIGNAL [ON/OFF]	Indicates [ON/OFF] condition from the electrical load signal. • ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. • OFF: Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW [ON/OFF]	Indicates [ON/OFF] condition from ignition switch.	
HEATER FAN SW [ON/OFF]	Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW [ON/OFF]	Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]	Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	When the engine is stopped, a certain computed value is indicated.
IGN TIMING [BTDC]	Indicates the ignition timing computed by ECM according to the input signals.	When the engine is stopped, a certain value is indicated.
CAL/LD VALUE [%]	“Calculated load value” indicates the value of the current airflow divided by peak airflow.	
MASS AIRFLOW [g/s]	Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor.	
PURG VOL C/V [%]	• Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases.	
INT/V TIM(B1) [°CA]	Indicates [°CA] of intake camshaft advanced angle.	
INT/V SOL(B1) [%]	• The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signal) is indicated. • The advance angle becomes larger as the value increases	
AIR COND RLY [ON/OFF]	The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY [ON/OFF]	Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
VENT CONT/V [ON/OFF]	The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. • ON: Closed • OFF: Open	
THRTL RELAY [ON/OFF]	Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN [HI/LOW/OFF]	Indicates the condition of the cooling fan (determined by ECM according to the input signals). • HI: High speed operation • LOW: Low speed operation • OFF: Stop	
HO2S2 HTR (B1) [ON/OFF]	Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
I/P PULLY SPD [rpm]	Indicates the engine speed computed from the input speed sensor signal.	

Monitored item [Unit]	Description	Remarks
VEHICLE SPEED [km/h] or [MPH]	The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
IDL A/V LEARN [YET/CMPLT]	Display the condition of idle air volume learning • YET: Idle Air Volume Learning has not been performed yet. • CMPLT: Idle Air Volume Learning has already been performed successfully.	
TRVL AFTER MIL [km] or [mile]	Distance traveled while MIL is activated.	
A/F S1 HTR(B1) [%]	• Indicates A/F sensor 1 heater control value computed by ECM according to the input signals. • The current flow to the heater becomes larger as the value increases.	
AC PRESS SEN [V]	The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE [km/h] or [MPH]	The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
SET VHCL SPD [km/h] or [MPH]	The preset vehicle speed is displayed.	
MAIN SW [ON/OFF]	Indicates [ON/OFF] condition from MAIN switch signal.	
CANCEL SW [ON/OFF]	Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW [ON/OFF]	Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal.	
SET SW [ON/OFF]	Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1 [ON/OFF]	Indicates [ON/OFF] condition from ASCD brake switch signal.	
BRAKE SW2 [ON/OFF]	Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT [NON/CUT]	Indicates the vehicle cruise condition. • NON: Vehicle speed is maintained at the ASCD set speed. • CUT: Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT [NON/CUT]	Indicates the vehicle cruise condition. • NON: Vehicle speed is maintained at the ASCD set speed. • CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
AT OD MONITOR [ON/OFF]	Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.	For M/T models always “OFF” is displayed
AT OD CANCEL [ON/OFF]	Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM.	For M/T models always “OFF” is displayed
CRUISE LAMP [ON/OFF]	Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP [ON/OFF]	Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
A/F ADJ-B1	Indicates the correction factor stored in ECM. The factor is calculated from the difference between the target air/fuel ratio stored in ECM and the air/fuel ratio calculated from air fuel ratio (A/F) sensor 1 signal.	
EVAP LEAK DIAG [YET/CMPLT]	Indicates the condition of EVAP leak diagnosis. • YET: EVAP leak diagnosis has not been performed yet. • CMPLT: EVAP leak diagnosis has been performed successfully.	

Monitored item [Unit]	Description	Remarks
EVAP DIAG READY [ON/OFF]	Indicates the ready condition of EVAP leak diagnosis. • ON: Diagnosis has been ready condition. • OFF: Diagnosis has not been ready condition.	
HO2 S2 DIAG1 (B1) [INCMP/CMPLT]	Indicates DTC P0139 self-diagnosis (delayed response) condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
HO2 S2 DIAG2 (B1) [INCMP/CMPLT]	Indicates DTC P0139 self-diagnosis (slow response) condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
A/F SEN1 DIAG1(B1) [INCMP/CMPLT]	Indicates DTC P015A or P015B self-diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
A/F SEN1 DIAG2(B1) [INCMP/CMPLT]	Indicates DTC P014C or P014D self-diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
A/F SEN1 DIAG3(B1) [ABSNT/PRSNT]	Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. • ABSNT: The vehicle condition is not within the diagnosis range. • PRSNT: The vehicle condition is within the diagnosis range.	

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

Test item	Condition	Judgment	Check item (Remedy)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Air fuel ratio (A/F) sensor 1
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Cut off each fuel injector signal one at a time using CONSULT.	Engine runs rough or dies.	• Harness and connectors • Compression • Fuel injector • Power transistor • Spark plug • Ignition coil
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan “LOW”, “HI” and “OFF” with CONSULT.	Cooling fan moves and stops.	• Harness and connectors • Cooling fan relay • Cooling fan motor
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay ON and OFF using CONSULT and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connectors • Fuel pump relay

Test item	Condition	Judgment	Check item (Remedy)
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT.	Engine speed changes according to the opening percent.	• Harness and connectors • EVAP canister purge volume control solenoid valve
FUEL/T TEMP SEN	Change the fuel tank temperature using CONSULT.		
VENT CONTROL/V	• Ignition switch: ON (Engine stopped) • Turn solenoid valve “ON” and “OFF” with the CONSULT and listen to operating sound.	Solenoid valve makes an operating sound.	• Harness and connectors • EVAP canister vent control valve
V/T ASSIGN ANGLE	• Engine: Return to the original trouble condition • Change intake valve timing using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

- For items whose SRT codes are set, “CMPLT” is displayed on the CONSULT screen; for items whose SRT codes are not set, “INCMP” is displayed.
- “SRT STATUS” provides the presence or absence of permanent DTCs stored in ECM memory.

PERMANENT DTC STATUS Mode

How to display permanent DTC status

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select “PERMANENT DTC STATUS” in “DTC & SRT CONFIRMATION” mode with CONSULT.

NOTE:
Permanent DTCs stored in ECM memory are displayed on the CONSULT screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:
Since the “PERMANENT DTC STATUS” screen displays the previous trip information, repeat the following twice to update the information: “Ignition switch OFF”, “Wait for more than 10 seconds” and “Ignition switch ON”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS

CAUTION:
Turn ignition switch from ON to OFF twice to update the information on the status screen.

PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP

The previous trip information is displayed.

JSBIA0062GB

NOTE:
This mode is not used in regions that permanent DTCs are not regulated by law.

SRT WORK SUPPORT Mode
This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

PERMANENT DTC WORK SUPPORT Mode
This mode enables a technician to drive a vehicle to complete the driving pattern that is required for erasing permanent DTC.
NOTE:
This mode is not used in regions that permanent DTCs are not regulated by law.

DTC WORK SUPPORT Mode

Test mode	Test item	Corresponding DTC No.	Reference
EVAPORATIVE SYSTEM	PURG FLOW P0441	P0441	EC-319
	EVP SML LEAK P0442/P1442*	P0455	EC-376
	EVP V/S LEAK P0456/P1456*	P0442	EC-324
		P0456	EC-383
	PURG VOL CN/V P1444	P0443	EC-331
A/F SEN1	A/F SEN1 (B1) P1276	P0130	EC-214
	A/F SEN1 (B1) P1278/P1279	—	—
HO2S2	HO2S2 (B1) P0139	P0139	EC-248
	HO2S2 (B1) P1146	P0138	EC-238
	HO2S2 (B1) P1147	P0137	EC-229

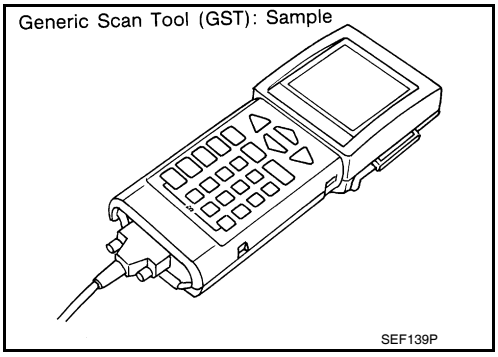
*: DTC P1442 and P1456 does not apply to C11 models but appears in DTC Work Support Mode screens.

Generic Scan Tool (GST) Function

INFOID:0000000007699716

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978/ISO 15031-4 has 8 different functions explained below.
ISO 15765-4 is used as the protocol.
The name GST or Generic Scan Tool is used in this service manual.



FUNCTION

Diagnostic test mode		Function
Service $01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service $02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-119, "CONSULT Function (ENGINE)".
Service $03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service $04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: • Clear number of diagnostic trouble codes (Service $01) • Clear diagnostic trouble codes (Service $03) • Clear trouble code for freeze frame data (Service $01) • Clear freeze frame data (Service $02) • Reset status of system monitoring test (Service $01) • Clear on board monitoring test results (Service $06 and $07)

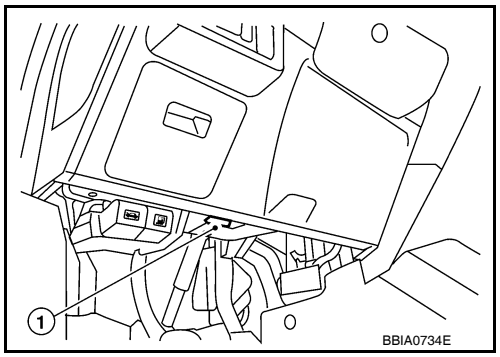
Diagnostic test mode		Function
Service $06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service $07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service $08	—	This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed. In the following conditions, this diagnostic service cannot function. • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system
Service $09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.
Service $0A*	PERMANENT DTCs	This diagnostic service gains access to permanent DTCs which were stored by ECM.

NOTE:

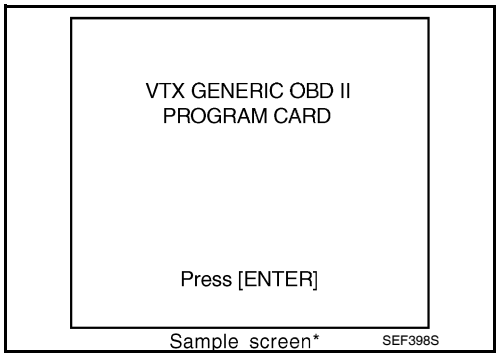
*: Service $0A is not applied for regions where it is not mandated.

INSPECTION PROCEDURE

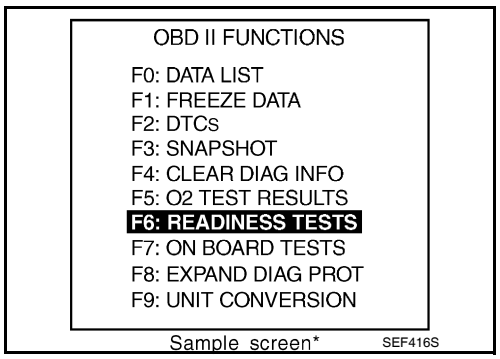
1. Turn ignition switch OFF.
2. Connect GST to data link connector (1), which is located under LH dash panel.



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.
   (*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic service according to each service procedure.
   For further information, see the GST Operation Manual of the tool maker.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699717

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor item	Condition		Specification
ENG SPEED	Run engine and compare CONSULT value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-132.		
B/FUEL SCHDL	See EC-132.		
A/F ALPHA-B1	See EC-132.		
COOLAN TEMP/S	Engine: After warming up		More than 70°C (158°F)
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	Revving engine from idle to 3,000 rpm quickly after the following conditions are met • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)			LEAN ←→ RICH
VHCL SPEED SE	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication.
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14 V
ACCEL SEN 1	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
EVAP SYS PRES	Ignition switch: ON		Approx. 1.8 - 4.8 V
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Selector lever: D (A/T, CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
START SIGNAL	Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	Ignition switch: ON	Selector lever: P or N (A/T, CVT), Neutral (M/T)	ON
		Selector lever: Except above	OFF
PW/ST SIGNAL	Engine: After warming up, idle the engine	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	Ignition switch: ON → OFF → ON		ON → OFF → ON

Monitor item	Condition		Specification
HEATER FAN SW	Ignition switch: ON	Heater fan: Operating	ON
		Heater fan: Not operating	OFF
BRAKE SW	Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	8° - 18° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	1.0 - 4.0 g/s
		2,500 rpm	2.0 - 10.0 g/s
PURG VOL C/V	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle (Accelerator pedal is not depressed even slightly, after engine starting)	0%
		2,000 rpm	0 - 50%
INT/V TIM (B1)	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	–5° - 5°CA
		When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°CA
INT/V SOL (B1)	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%
AIR COND RLY	Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	• For 1 second after turning ignition switch ON • Engine running or cranking		ON
	Except above conditions		OFF
VENT CONT/V	Ignition switch: ON		OFF
THRTL RELAY	Ignition switch: ON		ON
COOLING FAN	• Engine: After warming up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature: 97°C (207°F) or less	OFF
		Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature: 100°C (212°F) or more	HIGH

Monitor item	Condition		Specification
HO2S2 HTR (B1)	Below 3,600 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		ON
	Engine speed: Above 3,600 rpm		OFF
I/P PULLY SPD	Vehicle speed: More than 20 km/h (12 MPH)		Almost the same speed as the tachometer indication
VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
A/F S1 HTR (B1)	Engine: After warming up, idle the engine (More than 140 seconds after starting engine.)		4 - 100%
AC PRESS SEN	• Engine: Idle • Air conditioner switch: ON (Compressor operates)		1.0 - 4.0 V
VHCL SPEED SE	Turn drive wheels and compare speedometer indication with the CONSULT value.		Almost the same speed as the speedometer indication
SET VHCL SPD	Engine: Running	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1	Ignition switch: ON	• Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ACSD: Operating	ON
		ASCD: Not operating	OFF
EVAP LEAK DIAG	Ignition switch: ON		Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON		Indicates the ready condition of EVAP leak diagnosis.
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.		INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.		CMPLT

Monitor item	Condition	Specification
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis is incomplete.	INCMP
	DTC P015A and P015B self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.	INCMP
	DTC P014C and P014D self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.	ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.	PRSNT
THRTL STK CNT B1	**NOTE:** The item is indicated, but not used.	—

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:0000000007699718

The specification (SP) value indicates the tolerance of the value that is displayed in “SPEC” of “DATA MONITOR” mode of CONSULT during normal operation of the Engine Control System. When the value in “SPEC” of “DATA MONITOR” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “SPEC” of “DATA MONITOR” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.
The SP value will be displayed for the following three items:
- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Testing Condition

INFOID:0000000007699719

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm^2, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
  - A/T and CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T or CVT) fluid temperature sensor signal) indicates more than 60°C (140°F).
  - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied
  - Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

Inspection Procedure

INFOID:0000000007699720

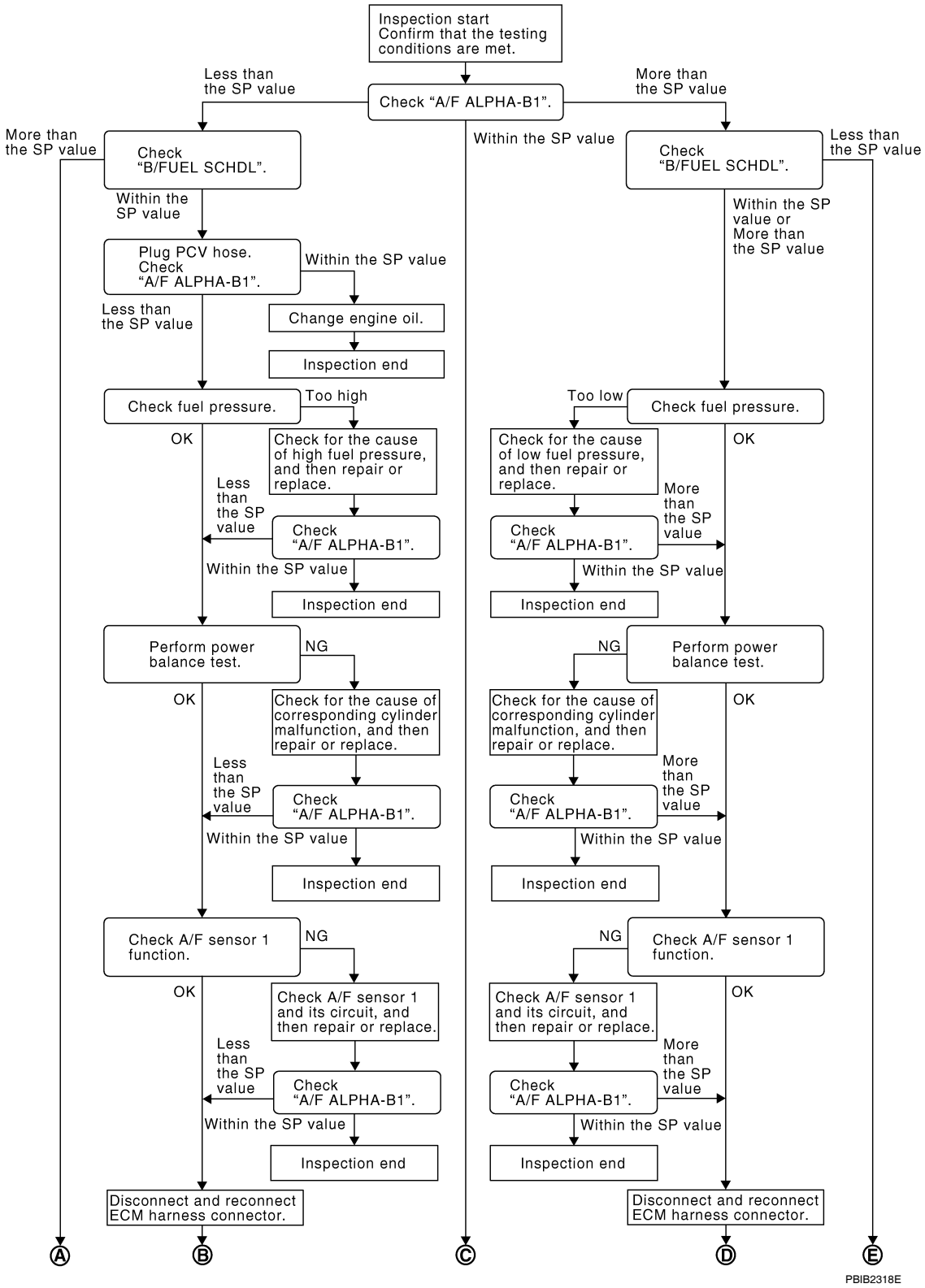
NOTE:
Perform “SPEC” of “DATA MONITOR” mode in maximum scale display.

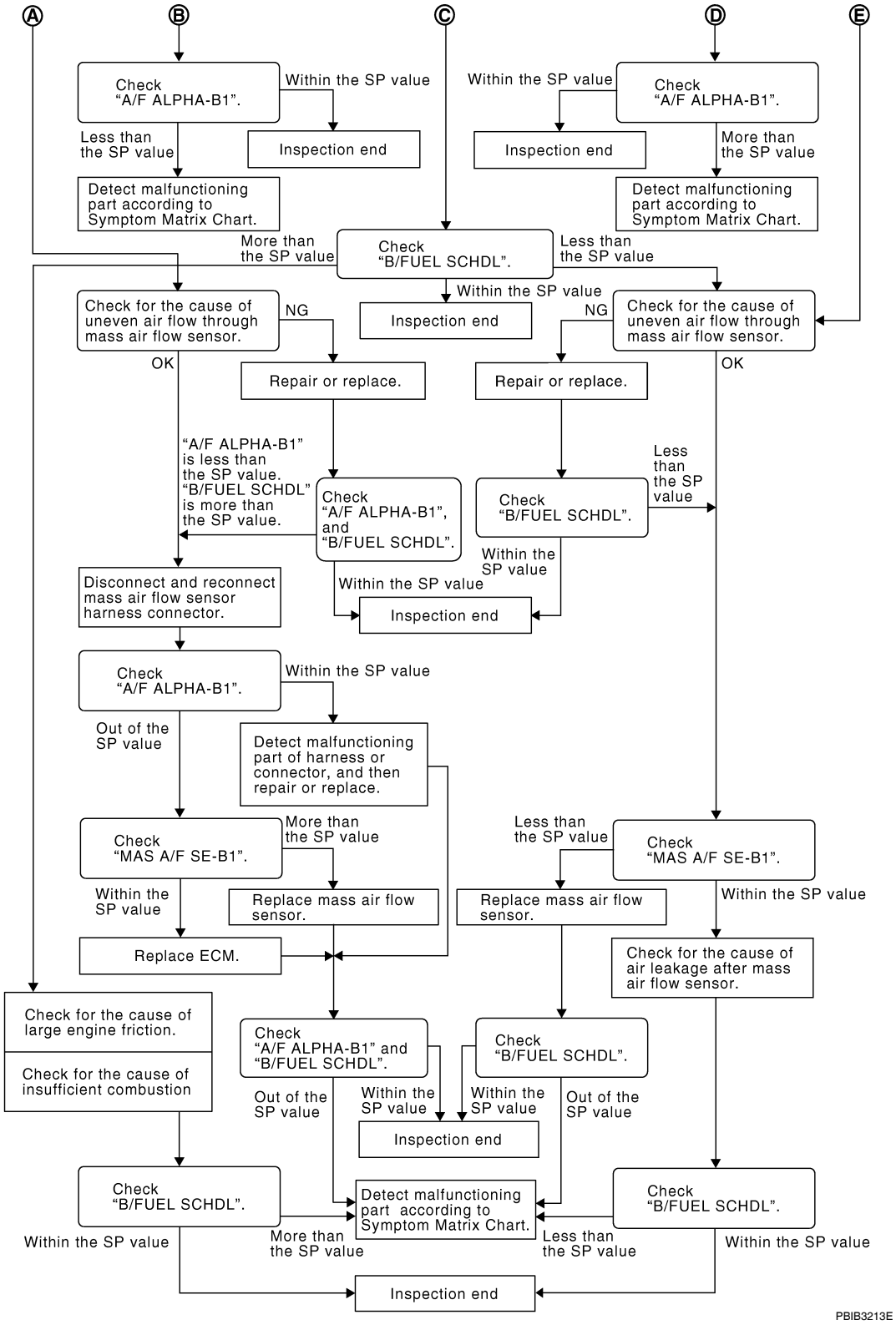
1. Perform EC-81, "Basic Inspection".
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode with CONSULT.
4. Make sure that monitor items are within the SP value.
5. If NG, go to EC-132, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007699721

OVERALL SEQUENCE


Inspection start
Confirm that the testing conditions are met.
Check “A/F ALPHA-B1”.
Less than the SP value
More than the SP value
Within the SP value
Check “B/FUEL SCHDL”.
More than the SP value
Within the SP value
Less than the SP value
Within the SP value or More than the SP value
Plug PCV hose. Check “A/F ALPHA-B1”.
Within the SP value
Change engine oil.
Inspection end
Less than the SP value
Check fuel pressure.
Too high
Too low
OK
Check for the cause of high fuel pressure, and then repair or replace.
Check for the cause of low fuel pressure, and then repair or replace.
Less than the SP value
More than the SP value
Check “A/F ALPHA-B1”.
Within the SP value
Inspection end
Perform power balance test.
NG
OK
Check for the cause of corresponding cylinder malfunction, and then repair or replace.
Check A/F sensor 1 function.
Check A/F sensor 1 and its circuit, and then repair or replace.
Disconnect and reconnect ECM harness connector.
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
PBIB2318E



DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-132, "Testing Condition".
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

NOTE:

Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

OK or NG

OK >> GO TO 17.
NG (Less than the SP value)>>GO TO 2.
NG (More than the SP value)>>GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 4.
NG (More than the SP value)>>GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 6.
NG (More than the SP value)>>GO TO 6.
NG (Less than the SP value)>>GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil. Refer to LU-9, "Changing Engine Oil".

NOTE:
This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-89, "Fuel Pressure Check".)

OK or NG

OK >> GO TO 9.
NG (Fuel pressure is too high)>>Replace fuel pressure regulator, refer to EC-89, "Fuel Pressure Check". GO TO 8.
NG (Fuel pressure is too low)>>GO TO 7.

7. DETECT MALFUNCTIONING PART

1. Check the following.
- Clogged and bent fuel hose and fuel tube
- Clogged fuel filter
- Fuel pump and its circuit (Refer to EC-524.)
2. If NG, repair or replace the malfunctioning part. (Refer to EC-89, "Fuel Pressure Check".)
If OK, replace fuel pressure regulator.

>> GO TO 8.

8.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

OK or NG

OK >> GO TO 12.
NG >> GO TO 10.

10.DETECT MALFUNCTIONING PART

1. Check the following.
- Ignition coil and its circuit (Refer to EC-529.)
- Fuel injector and its circuit (Refer to EC-519.)
- Intake air leakage
- Low compression pressure (Refer to EM-67.)
2. If NG, repair or replace the malfunctioning part.
   If OK, replace fuel injector. Refer to EM-35, "Component". (It may be caused by leakage from fuel injector or clogging.)

>> GO TO 11.

11.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 12.

12.CHECK A/F SENSOR 1 FUNCTION

Perform all DTC Confirmation Procedure related with A/F sensor 1.
- For DTC P0130, refer to EC-214, "DTC Confirmation Procedure".
- For DTC P0131, refer to EC-219, "DTC Confirmation Procedure".
- For DTC P0132, refer to EC-224, "DTC Confirmation Procedure".
- For DTC P014C, P014D refer to EC-257, "DTC Confirmation Procedure".
- For DTC P2A00, refer to EC-499, "DTC Confirmation Procedure".

OK or NG

OK >> GO TO 15.
NG >> GO TO 13.

13.CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

14.CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-99, "Symptom Matrix Chart".

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG (More than the SP value)>>GO TO 18.
NG (Less than the SP value)>>GO TO 25.

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

OK or NG

OK >> GO TO 21.
NG >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG (“B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value)>>GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> 1. Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-170.
2. GO TO 29.

NG >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 24.

NG (More than the SP value)>>Replace mass air flow sensor, refer to EM-16, "Component", and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-212, "ECM Re-communicating Function".
3. Perform EC-86, "VIN Registration".
4. Perform EC-87, "Accelerator Pedal Released Position Learning".
5. Perform EC-87, "Throttle Valve Closed Position Learning".
6. Perform EC-87, "Idle Air Volume Learning".

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

OK or NG

OK >> GO TO 27.

NG >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**

NG (Less than the SP value)>>GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “SPEC” of “DATA MONITOR” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 28.

NG (Less than the SP value)>>Replace mass air flow sensor, refer to EM-16, "Component", and then GO TO 30.

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.
- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and make sure that the each indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-99, "Symptom Matrix Chart".

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “SPEC” of “DATA MONITOR” mode, and then make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-99, "Symptom Matrix Chart".

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

INFOID:0000000007699722

Intermittent incidents may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of Intermittent Incidents occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common Intermittent Incidents Report Situations

Step in Work Flow	Situation
2	The CONSULT is used. The SELF-DIAG RESULTS screen shows time data other than 0 or [1t].
3 or 4	The symptom described by the customer does not recur.
5	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
10	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnosis Procedure

INFOID:0000000007699723

1.INSPECTION START

Erase (1st trip) DTCs.
Refer to EC-49, "Emission-related Diagnostic Information".

>> GO TO 2.

2.CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.
Refer to EC-146, "Ground Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3.SEARCH FOR ELECTRICAL INCIDENT

Perform GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident", “INCIDENT SIMULATION TESTS”.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4.CHECK CONNECTOR TERMINALS

Refer to GI-22, "How to Check Terminal", “HOW TO PROBE CONNECTORS”, “How to Check Enlarged Contact Spring of Terminal”.

OK or NG

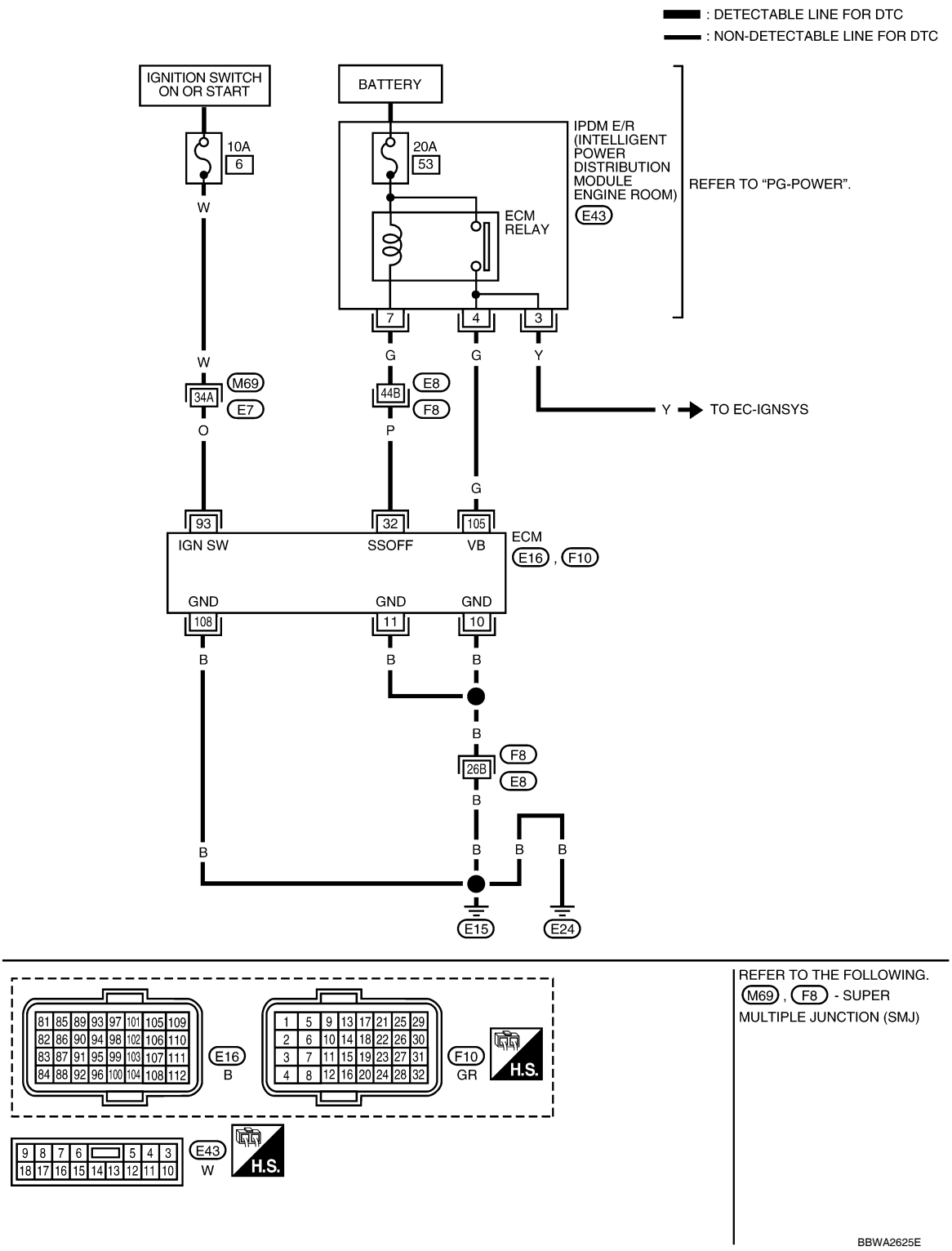
OK >> **INSPECTION END**
NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

Wiring Diagram

INFOID:0000000007699724

EC-MAIN-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
10 11	B B	ECM ground	**[Engine is running]** • Idle speed	Body ground
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
93	O	Ignition switch	**[Ignition switch: OFF]**	0 V
			[Ignition switch: ON]	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
108	B	ECM ground	**[Engine is running]** • Idle speed	Body ground

Diagnosis Procedure

INFOID:0000000007699725

1.INSPECTION START

Start engine.
Is engine running?

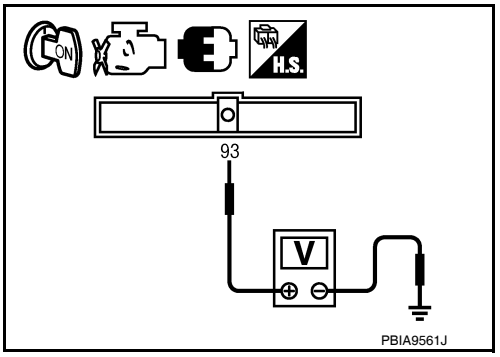
Yes or No

Yes >> GO TO 8.
No >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminal 93 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

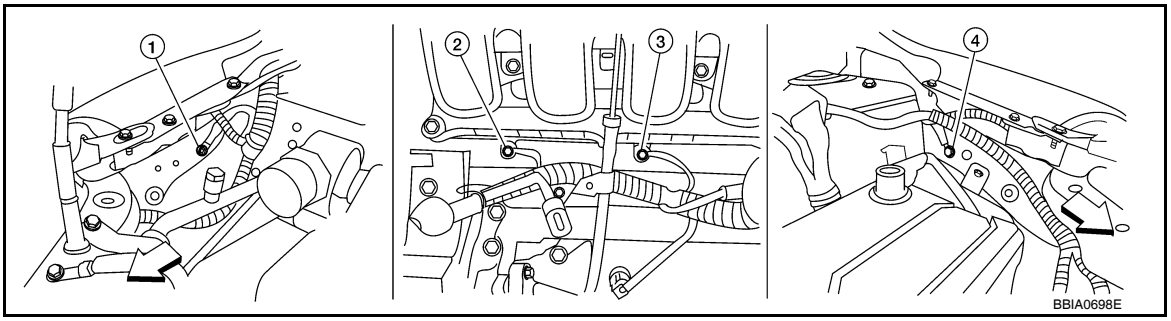
3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- 10 A fuse
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 5.
NG >> Repair or replace ground connections.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 10, 11, 108 and ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING PART

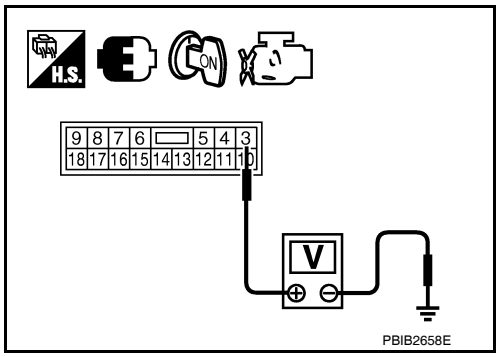
Check the following.
- Harness connectors F8, E8
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

7.CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check voltage between IPDM E/R terminal 3 and ground with CONSULT or tester.

Voltage: Battery voltage



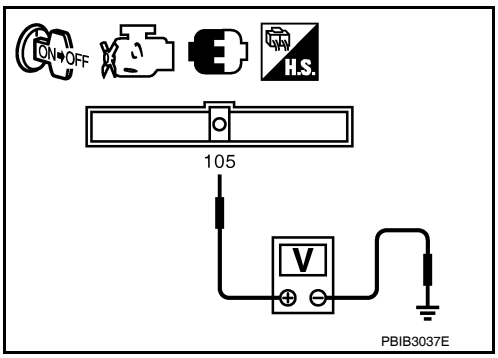
OK or NG

OK >> Proceed to EC-529, "Component Description".
NG >> GO TO 8.

8.CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and then OFF.

3. Check voltage between ECM terminal 105 and ground with CONSULT or tester.



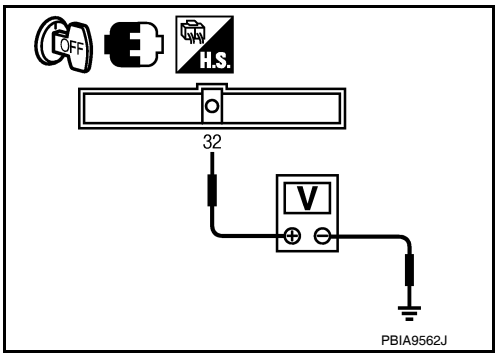
Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

OK or NG

OK >> GO TO 14.
NG (Battery voltage does not exist.)>>GO TO 9.
NG (Battery voltage exists for more than a few seconds.)>>GO TO 11.

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check voltage between ECM terminal 32 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 10.
NG >> GO TO 11.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 105 and IPDM E/R terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 17.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 32 and IPDM E/R terminal 7. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20 A FUSE

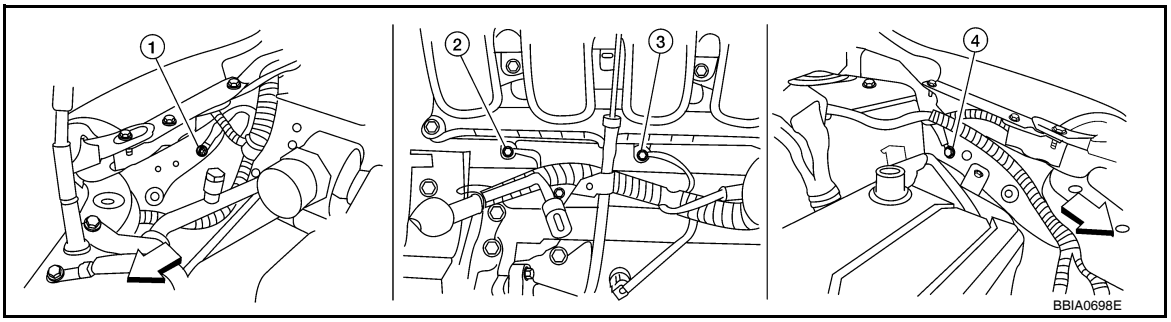
1. Disconnect 20 A fuse from IPDM E/R.
2. Check 20 A fuse.

OK or NG

OK >> GO TO 17.
NG >> Replace 20 A fuse.

14. CHECK GROUND CONNECTIONS

1. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 15.
NG >> Repair or replace ground connections.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 10, 11, 108 and ground.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 17.
NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F8, E8
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

17. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair open circuit or short to power in harness or connectors.

Ground Inspection

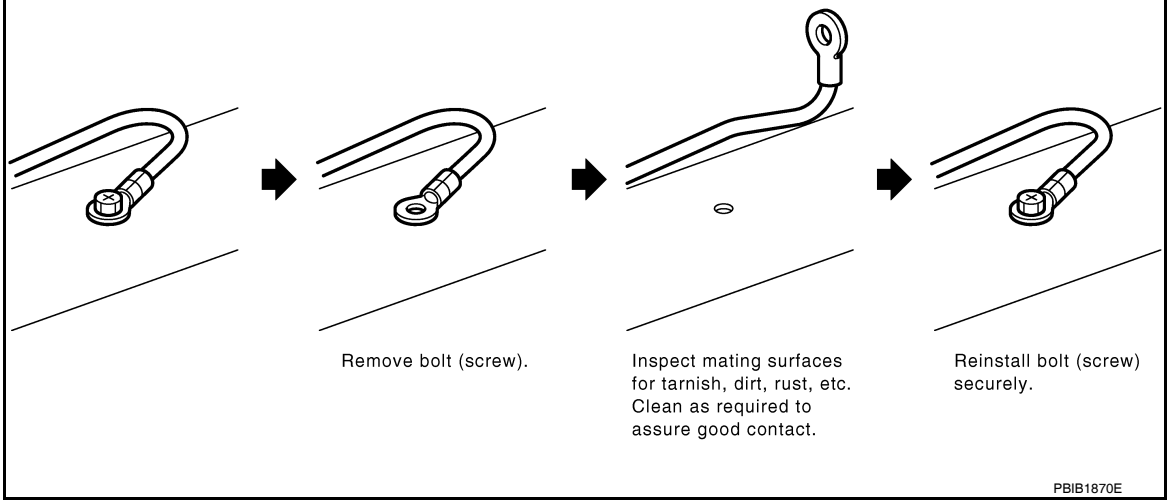
INFOID:0000000007699726

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to PG-29, "Ground Distribution".

Ground Inspection



DTC U0101 CAN COMMUNICATION LINE

Description

INFOID:0000000007699727

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007699728

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101 0101	Lost communication with TCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.	• CAN communication line between TCM and ECM • CAN communication line is open or shorted.

DTC Confirmation Procedure

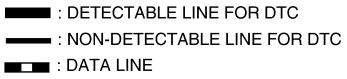
INFOID:0000000007699729

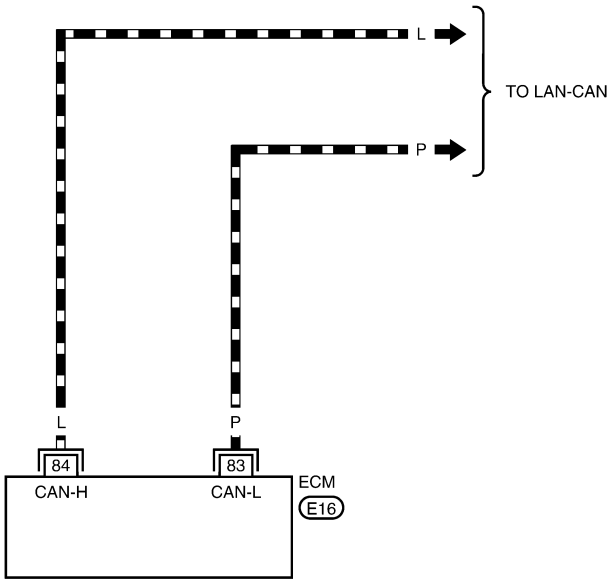
1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to EC-148, "Diagnosis Procedure".

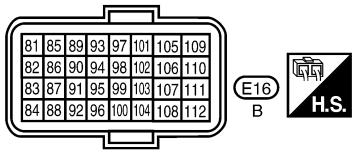
Wiring Diagram

INFOID:0000000007699730

EC-CAN-01







BBWA2626E

Diagnosis Procedure

INFOID:0000000007699731

Perform the trouble diagnosis for CAN communication system. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

DTC U1001 CAN COMMUNICATION LINE

Description

INFOID:0000000007699737

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007699738

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001 1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.	Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

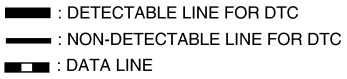
INFOID:0000000007699739

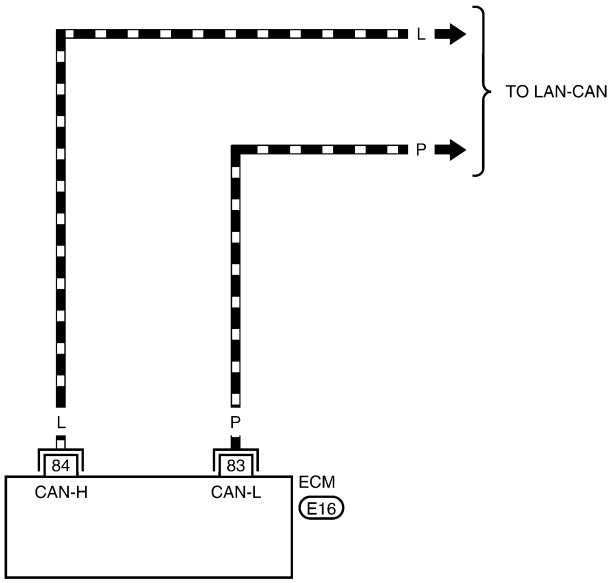
1. Turn ignition switch ON and wait at least 3 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-150, "Diagnosis Procedure".

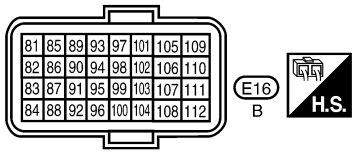
Wiring Diagram

INFOID:0000000007699740

EC-CAN-01







BBWA2626E

Diagnosis Procedure

INFOID:0000000007699741

Perform the trouble diagnosis for CAN communication system. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

DTC P0011 IVT CONTROL

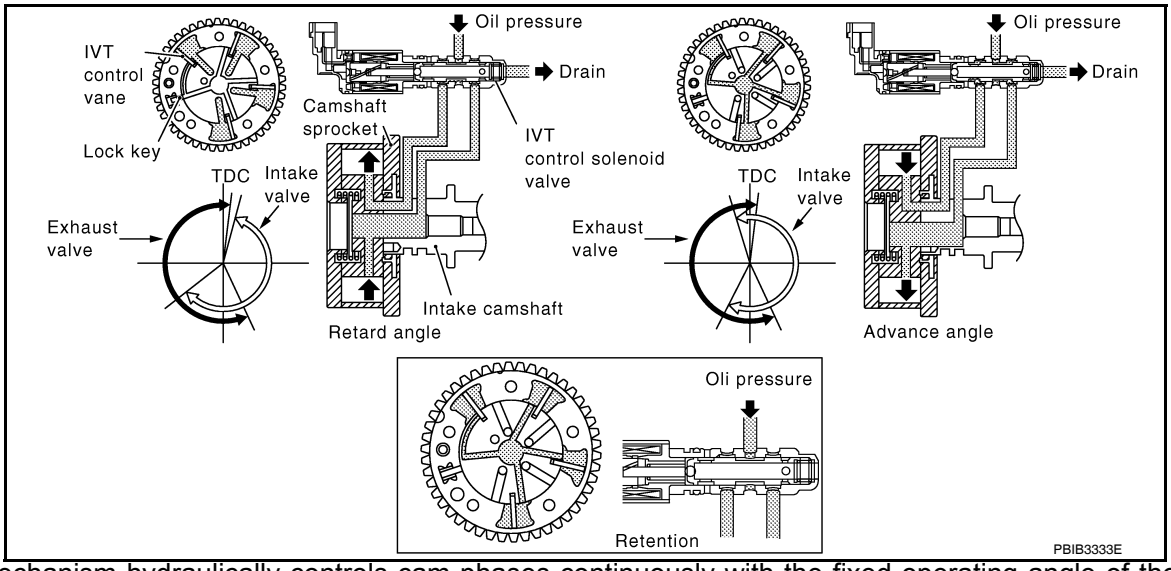
Description

INFOID:0000000007699742

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Engine coolant temperature sensor	Engine coolant temperature		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			

*: This signal is sent to the ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve. The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699743

Specification data are reference values.

Monitor item	Condition		Specification
INT/V TIM (B1)	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	–5° - 5°CA
		When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°CA
INT/V SOL (B1)	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

On Board Diagnosis Logic

INFOID:0000000007699744

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve timing control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

ECM enters in fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

INFOID:0000000007699745

CAUTION:
Always drive at a safe speed.
NOTE:
- **If DTC P0011 is displayed with DTC P0075, first perform trouble diagnosis for DTC P0075. See EC-165.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V at idle.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds.
   Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.87 msec
Selector lever	P or N position (A/T, CVT) Neutral position (M/T)

4. Let engine idle for 10 seconds.
5. If 1st trip DTC is detected, go to EC-153, "Diagnosis Procedure".
   If 1st trip DTC is not detected, go to next step.
6. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)
Selector lever	D position (A/T, CVT) 1st or 2nd position (M/T)
Driving location	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

7. If 1st trip DTC is detected, go to EC-153, "Diagnosis Procedure".

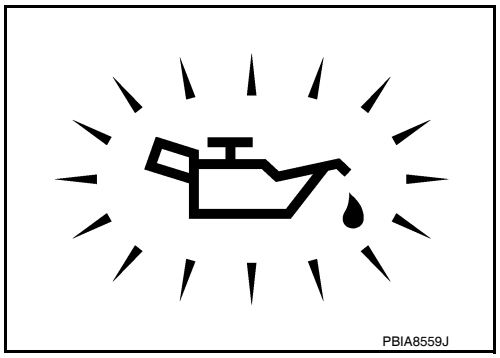
WITH GST
Follow the procedure “WITH CONSULT” above.

Diagnosis Procedure

INFOID:0000000007699746

1.CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



OK or NG

OK >> GO TO 2.
NG >> Go to LU-8, "Inspection".

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-154, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace intake valve timing control solenoid valve. Refer to EM-40, "Component".

3.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-307, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Replace crankshaft position sensor (POS). Refer to EM-83, "Component".

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

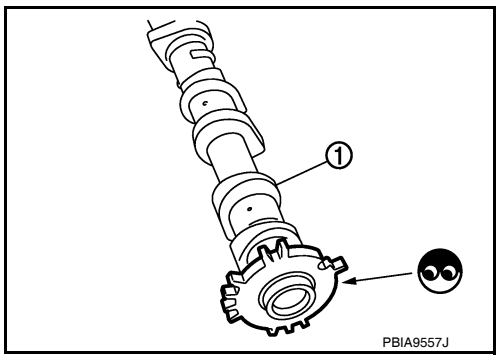
Refer to EC-312, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to EM-51, "Component".

5.CHECK CAMSHAFT (INTAKE)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end



OK or NG

OK >> GO TO 6.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to EM-51, "Component".

6.CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.
Are there any service records that may cause timing chain misaligned?

Yes or No

Yes >> Check timing chain installation. Refer to EM-41, "Removal and Installation".
No >> GO TO 7.

7.CHECK LUBRICATION CIRCUIT

Refer to LU-7, "Lubrication Circuit".

OK or NG

OK >> GO TO 8.
NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-140.
For Wiring Diagram, refer to EC-303, "Wiring Diagram" for CKP sensor (POS) and EC-309, "Wiring Diagram" for CMP sensor (PHASE).

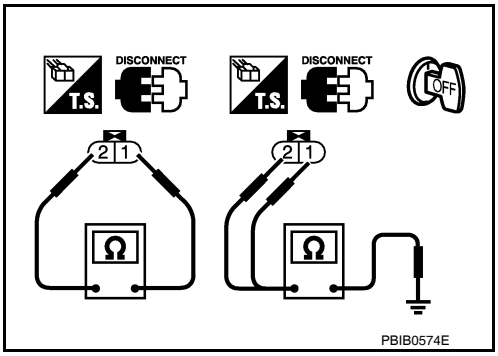
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699747

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

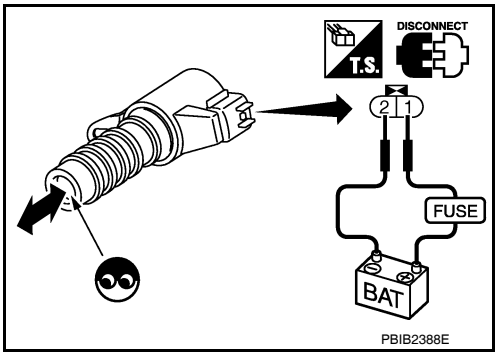


Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	∞ Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve. Refer to EM-40, "Component".
If OK, go to next step.

3. Remove intake valve timing control solenoid valve. Refer to EM-40, "Component".

4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.



CAUTION:
Do not apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
If NG, replace intake valve timing control solenoid valve. Refer to EM-40, "Component".
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.

DTC P0031, P0032 A/F SENSOR 1 HEATER

Description

INFOID:0000000007699749

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element at the specified range.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699750

Specification data are reference values.

Monitor item	Condition	Specification
A/F S1 HTR (B1)	Engine: After warming up, idle the engine (More than 140 seconds after starting engine.)	4 - 100%

On Board Diagnosis Logic

INFOID:0000000007699751

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively low voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 heater
P0032 0032	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively high voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is shorted.] • Air fuel ratio (A/F) sensor 1 heater

DTC Confirmation Procedure

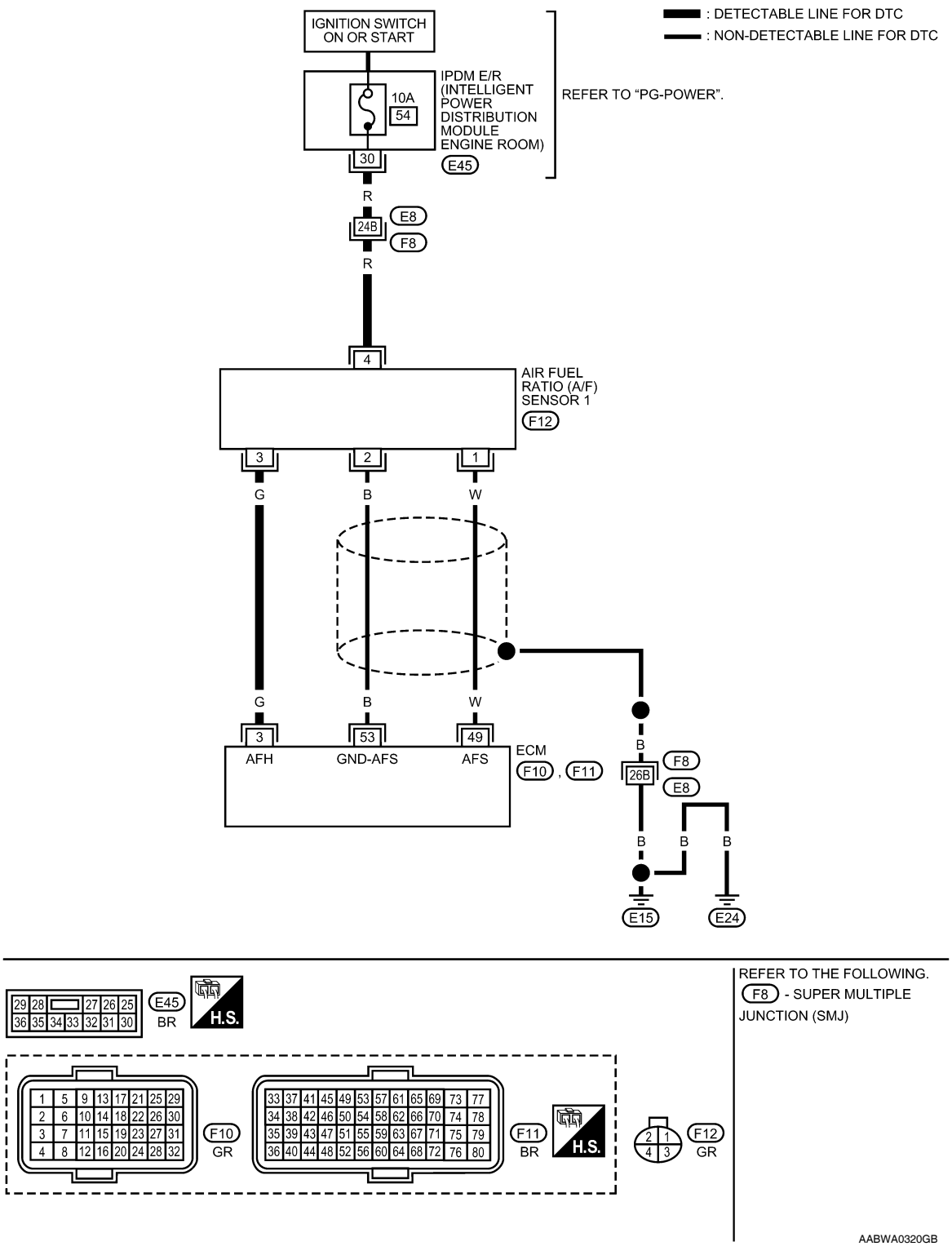
INFOID:0000000007699752

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5 V and 16 V at idle.
1. Start engine and run it for at least 10 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-157, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699753

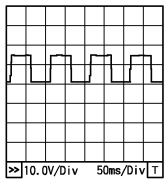
EC-A/FH-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

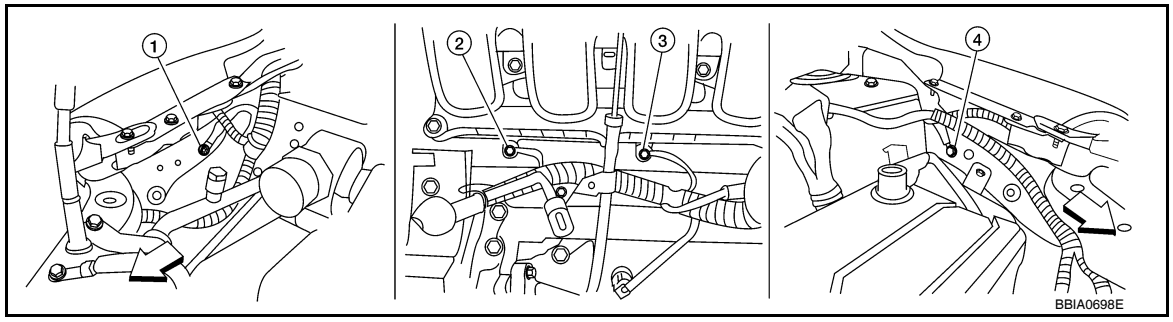
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699754

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

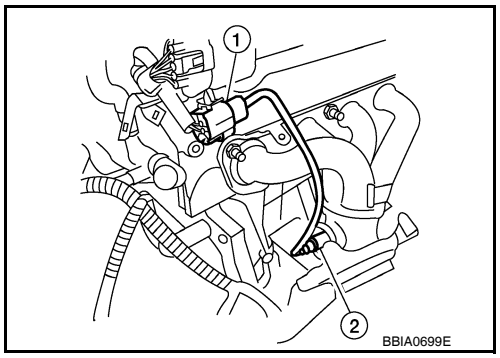
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

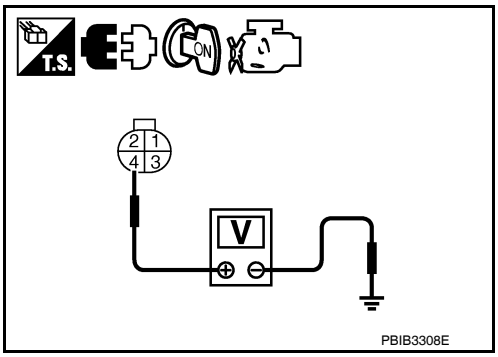
2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).

2. Air fuel ratio (A/F) sensor 1



2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 3 and A/F sensor 1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to EC-158, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

6. CHECK INTERMITTENT INCIDENT

Perform EC-140.

>> **INSPECTION END**

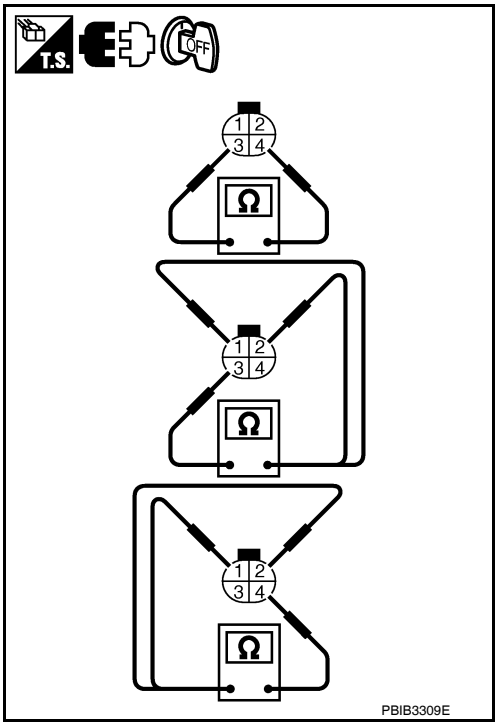
Component Inspection

INFOID:0000000007699755

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

1. Check resistance between A/F sensor 1 terminals as follows.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	∞ Ω (Continuity should not exist)
4 and 1, 2	



2. If NG, replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:

- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

DTC P0037, P0038 HO2S2 HEATER

Description

INFOID:0000000007699757

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
• Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699758

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 HTR (B1)	Engine speed: Below 3,600 rpm after the following conditions are met • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	ON
	Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

INFOID:0000000007699759

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	• Harness or connectors (Heated oxygen sensor 2 heater circuit is open or shorted.) • Heated oxygen sensor 2 heater
P0038 0038	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	• Harness or connectors (Heated oxygen sensor 2 heater circuit is shorted.) • Heated oxygen sensor 2 heater

DTC Confirmation Procedure

INFOID:0000000007699760

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5 V and 16 V at idle.

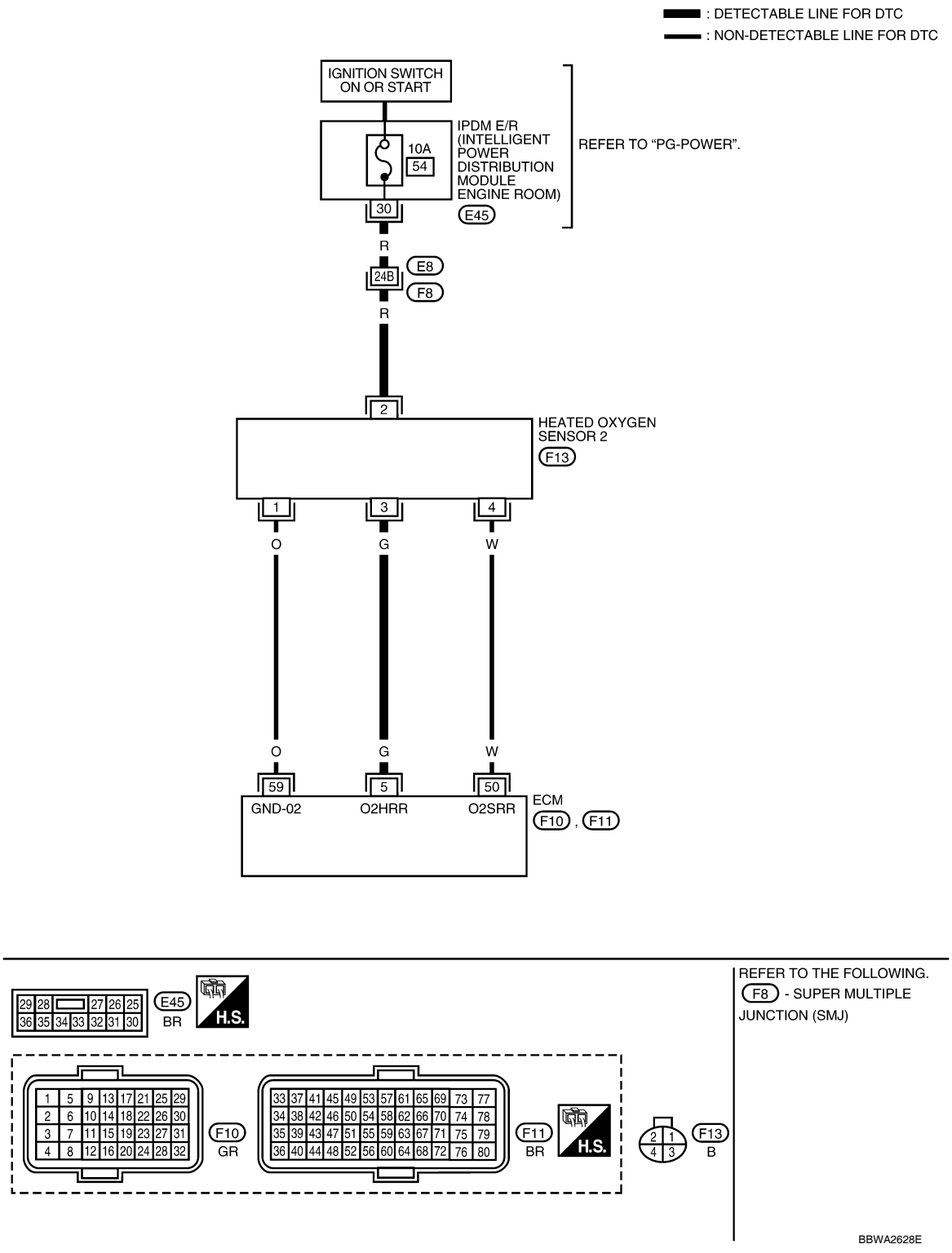
1. Start engine and warm it up to the normal operating temperature.

2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-162, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699761

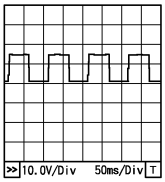
EC-HO2S2H-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
5	G	Heated oxygen sensor 2 heater	**[Engine is running]** • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Approximately 10 V★  PBIA8148J
			[Ignition switch: ON] • Engine stopped **[Engine is running]** • Engine speed: Above 3,600 rpm.	Battery voltage (11 - 14 V)
50	W	Heated oxygen sensor 2	**[Engine is running]** • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V
59	O	Sensor ground (Heated oxygen sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

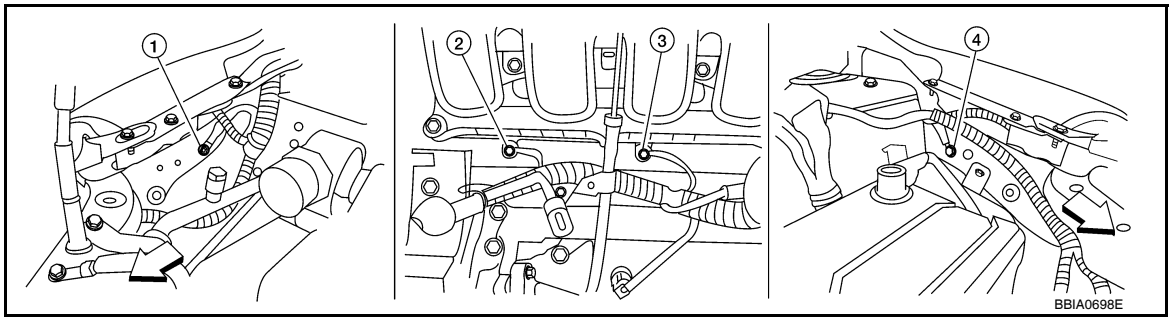
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699762

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

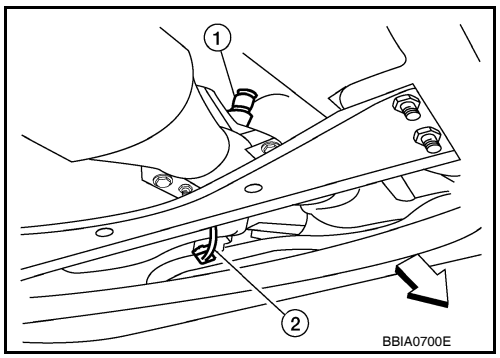
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

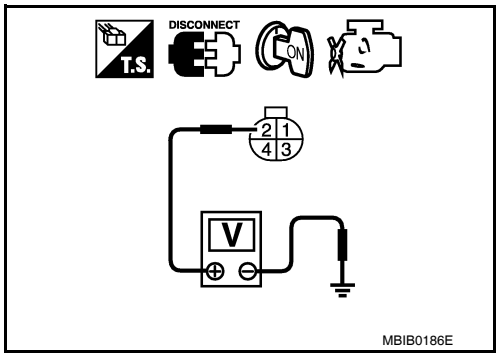
2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector (2).



1. Heated oxygen sensor 2
⇦ : Vehicle front

2. Turn ignition switch ON.
3. Check voltage between HO2S2 terminal 2 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 5 and HO2S2 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-164, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2. Refer to EX-5, "Component".

6.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

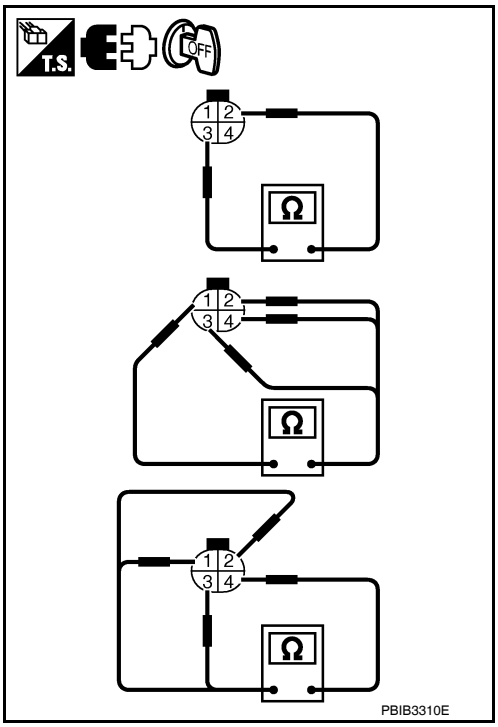
Component Inspection

INFOID:0000000007699763

HEATED OXYGEN SENSOR 2 HEATER

1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	3.4 - 4.4 Ω [at 25°C (77°F)]
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	



2. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".

CAUTION:

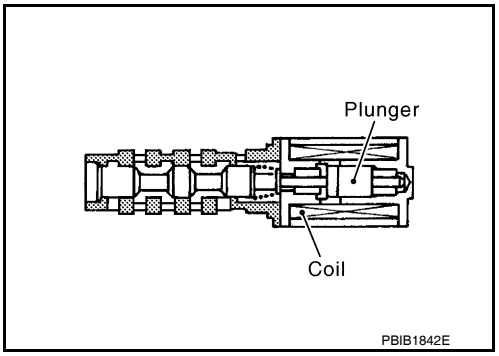
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

DTC P0075 IVT CONTROL SOLENOID VALVE

Component Description

INFOID:0000000007699765

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699766

Specification data are reference values.

Monitor item	Condition		Specification
INT/V SOL (B1)	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

On Board Diagnosis Logic

INFOID:0000000007699767

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0075 0075	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC Confirmation Procedure

INFOID:0000000007699768

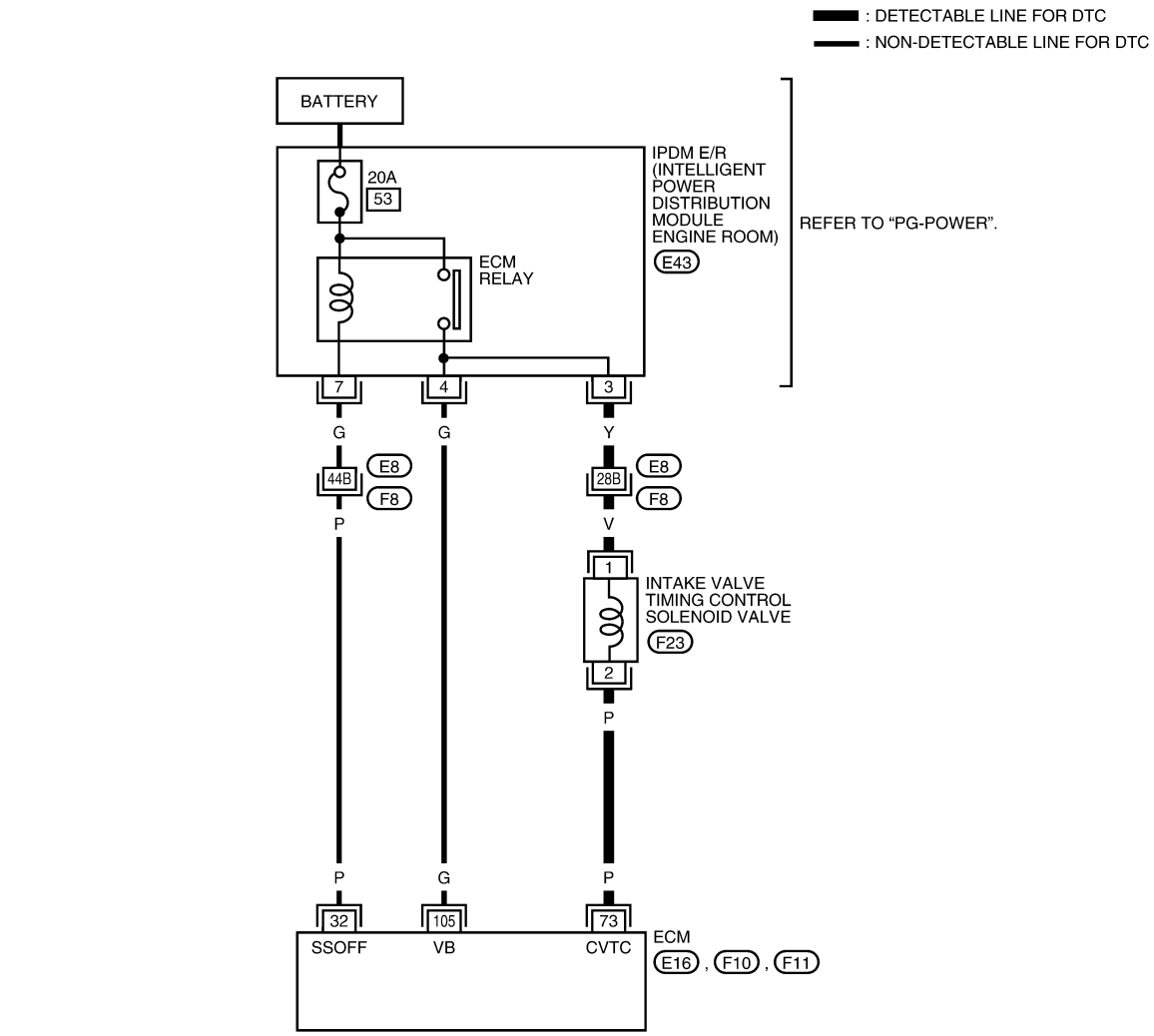
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

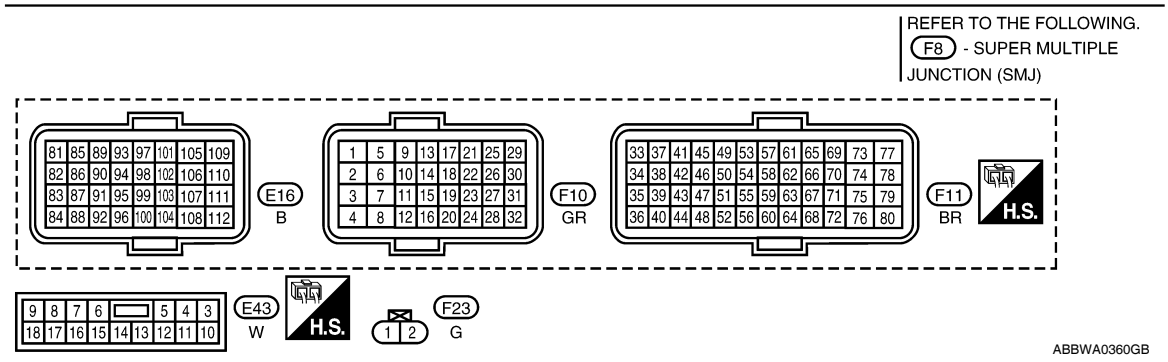
1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-167, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699769

EC-IVC-01

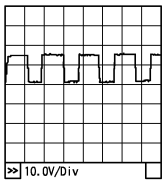




Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
73	P	Intake valve timing control solenoid valve	**[Engine is running]** • **Warm-up condition** • Idle speed	Battery voltage (11 - 14 V)
			[Engine is running] • **Warm-up condition** • When revving engine up to 2,000 rpm quickly	7 - 10 V★  PBIA4937J
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

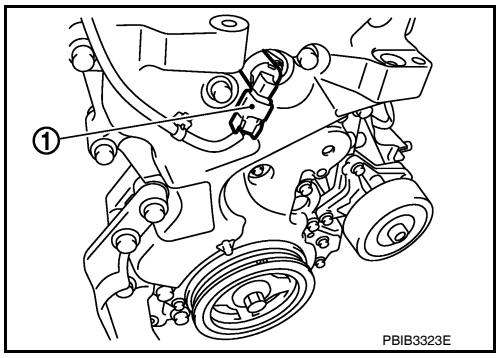
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699770

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve (1) harness connector.



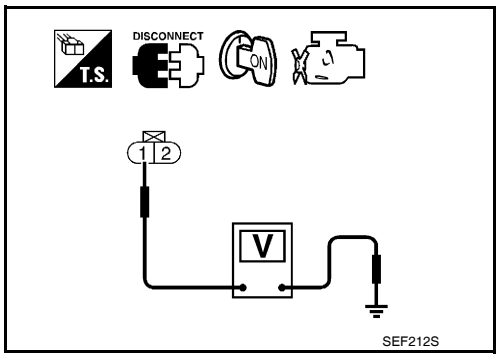
PBIB3323E

3. Turn ignition switch ON.
4. Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



SEF212S

2. DETECT MALFUNCTION PART

Check the following.

- Harness connectors E8, F8
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 73 and intake valve timing control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-168, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace intake valve timing control solenoid valve. Refer to EM-40, "Component".

5.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

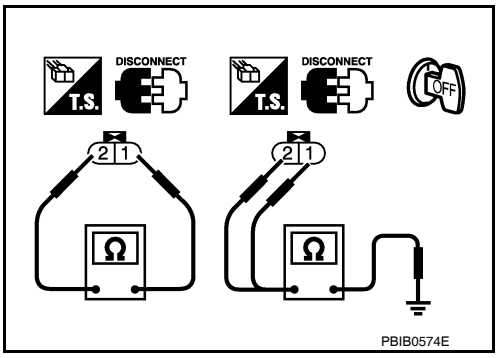
Component Inspection

INFOID:0000000007699771

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

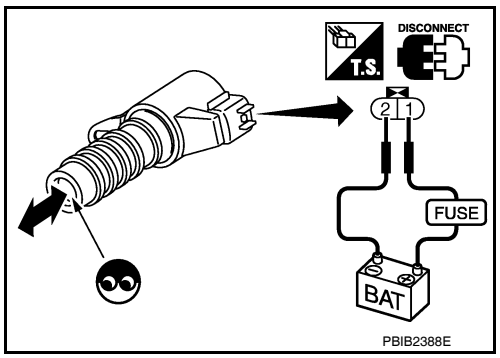
Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	∞ Ω (Continuity should not exist.)



If NG, replace intake valve timing control solenoid valve. Refer to EM-40, "Component".
If OK, go to next step.

3. Remove intake valve timing control solenoid valve. Refer to EM-40, "Component".

4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.



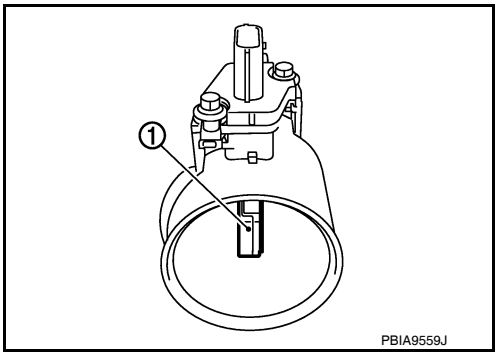
CAUTION:
Do not apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
If NG, replace intake valve timing control solenoid valve. Refer to EM-40, "Component".
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.

DTC P0101 MAF SENSOR

Component Description

INFOID:0000000007699773

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699774

Specification data are reference values.

Monitor item	Condition		Specification
MAS A/F SE-B1	See EC-132.		
CAL/LD VALUE	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s

On Board Diagnosis Logic

INFOID:0000000007699775

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0101 0101	Mass air flow sensor circuit range/performance	A)	A high voltage from the sensor is sent to ECM under light load driving condition.	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Mass air flow sensor • EVAP control system pressure sensor • Intake air temperature sensor
		B)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor • EVAP control system pressure sensor • Intake air temperature sensor

DTC Confirmation Procedure

INFOID:0000000007699776

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle for at least 5 seconds under the following conditions:
   CAUTION:
   Always drive vehicle at safe speed.

Selector lever	Suitable position
Vehicle speed	40 km/h (25 MPH) or more

   NOTE:
   - The gear must be fixed while driving the vehicle.
   - Keep the accelerator pedal as steady as possible during crusing.
3. Check 1st trip DTC.

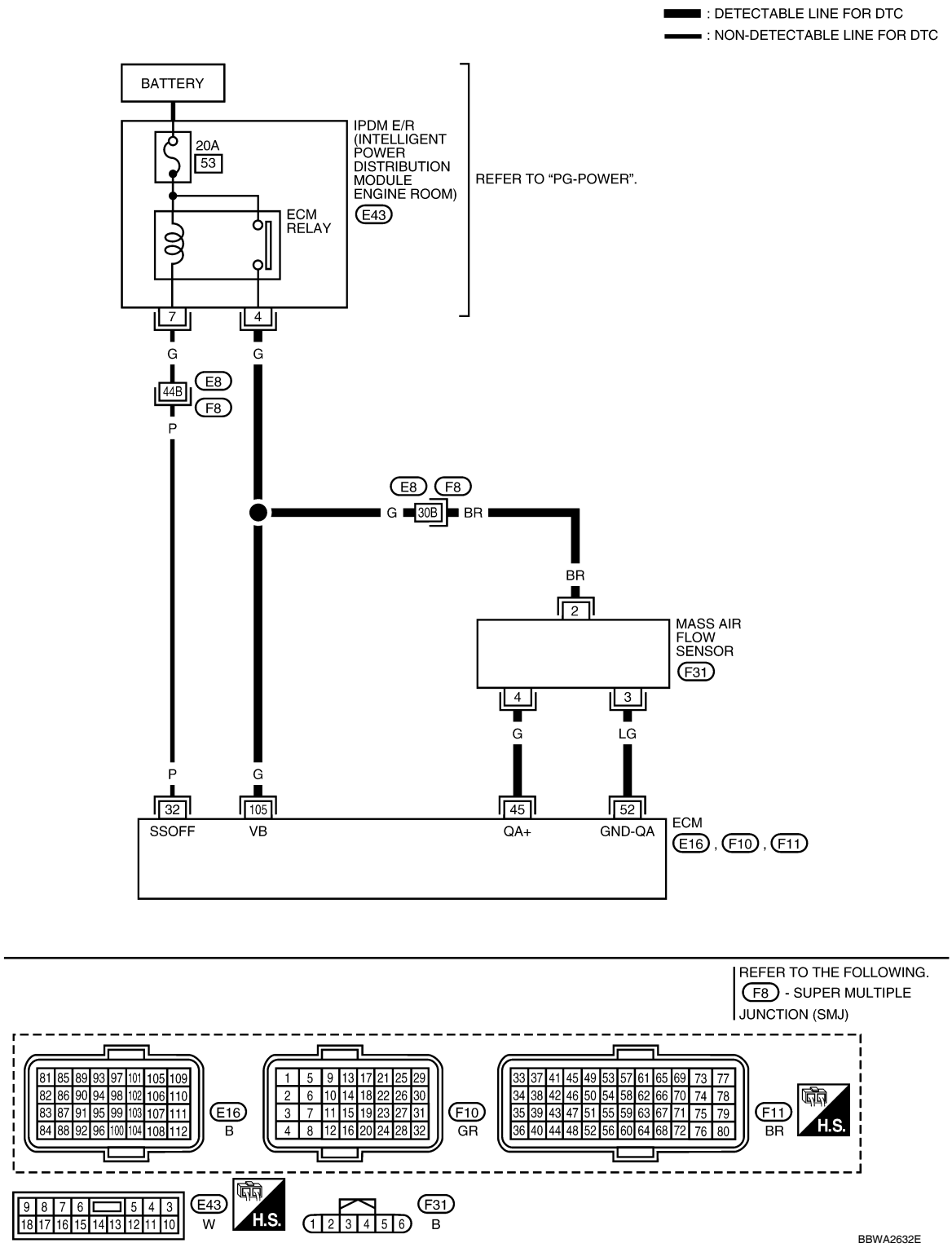
Is 1st DTC detected?

YES >> Proceed to EC-173, "Diagnosis Procedure".
NO >> INSPECTION END

Wiring Diagram

INFOID:0000000007699778

EC-MAFS-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
45	G	Mass air flow sensor	**[Engine is running]** • **Warm-up condition** • Idle speed	0.9 - 1.2 V
			[Engine is running] • **Warm-up condition** • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	LG	Sensor ground (Mass air flow sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007699779

1.CHECK INTAKE AIR LEAK

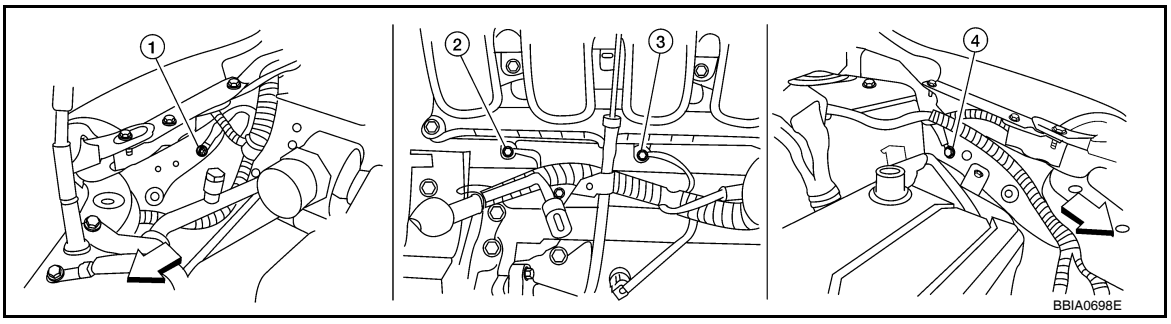
Check the following for connections.
- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

OK >> GO TO 2.
NG >> Reconnect the parts.

2.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



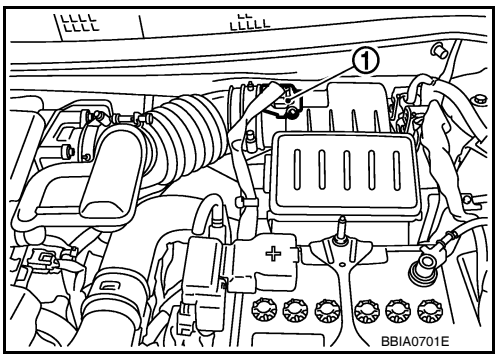
1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15
⇦: Vehicle front

OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

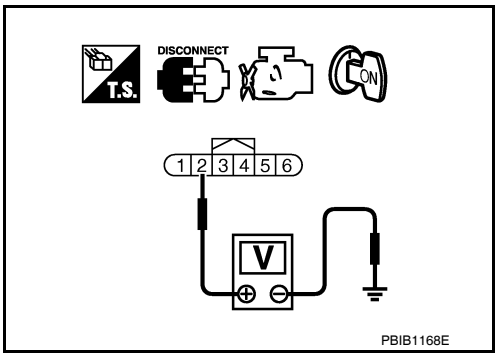
3.CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between MAF sensor terminal 2 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between mass air flow sensor and IPDM E/R
- Harness for open or short between mass air flow sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 52. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short or short to power in harness or connectors.

7. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-191, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

9.CHECK MASS AIR FLOW SENSOR

Refer to EC-175, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> Replace mass air flow sensor. Refer to EM-16, "Component".

10.CHECK INTERMITTENT INCIDENT

Perform EC-140.

>> **INSPECTION END**

Component Inspection

INFOID:0000000007699780

MASS AIR FLOW SENSOR

With CONSULT

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

5. If the voltage is out of specification, proceed the following.

a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts

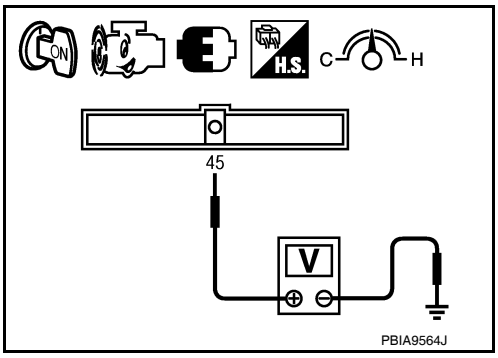
b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
   If OK, go to next step.

6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to EM-16, "Component".

Without CONSULT

1. Reconnect all harness connectors disconnected.

2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.



Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.

a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts

b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again.
   If OK, go to next step.

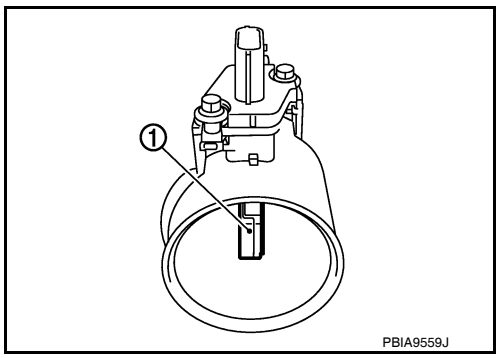
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to EM-16, "Component".

DTC P0102, P0103 MAF SENSOR

Component Description

INFOID:0000000007699782

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699783

Specification data are reference values.

Monitor item	Condition		Specification
MAS A/F SE-B1	See EC-132.		
CAL/LD VALUE	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s

On Board Diagnosis Logic

INFOID:0000000007699784

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

INFOID:0000000007699785

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to EC-180, "Diagnosis Procedure".

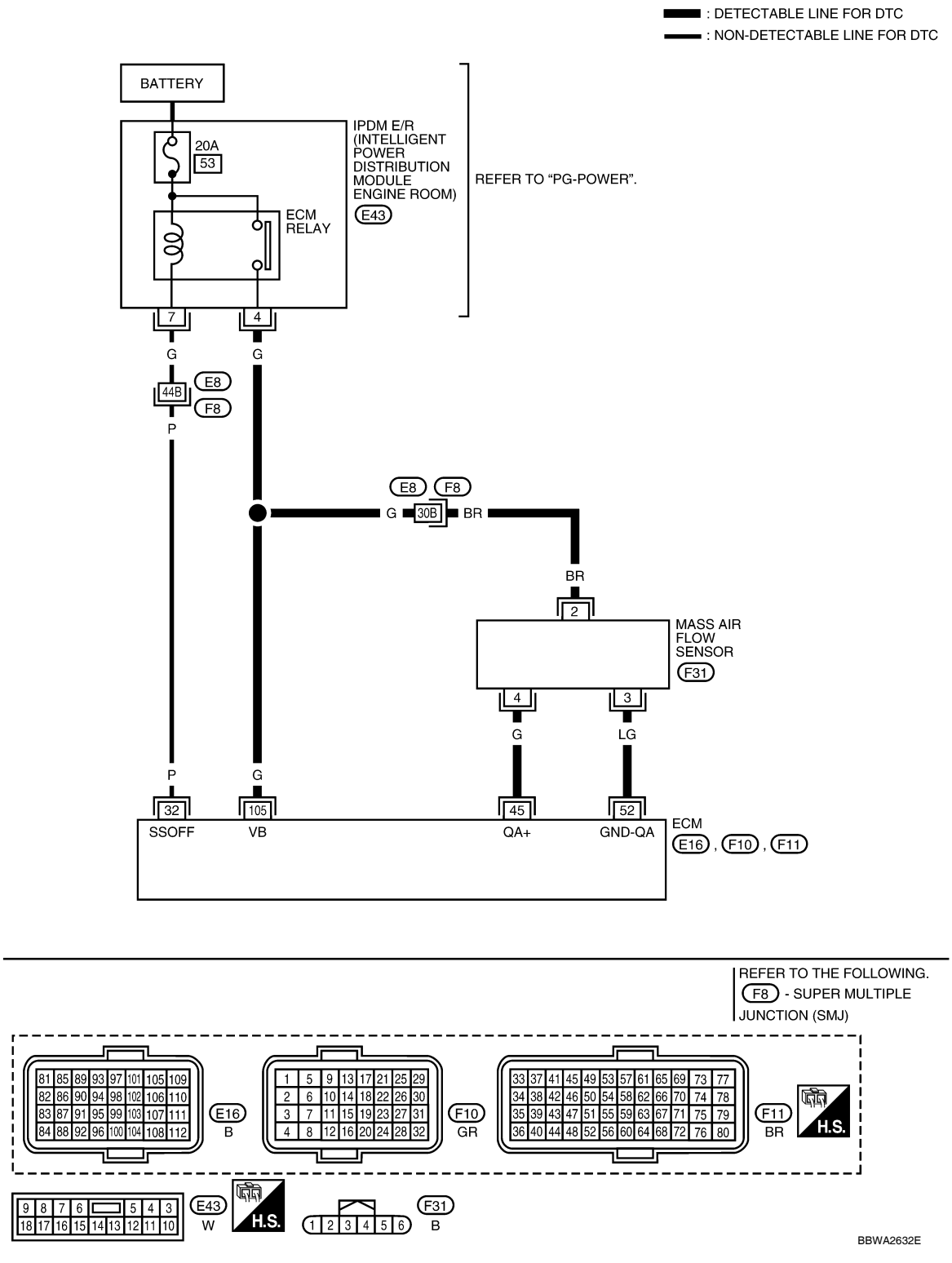
PROCEDURE FOR DTC P0103

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to EC-180, "Diagnosis Procedure".
   If DTC is not detected, go to next step.
4. Start engine and wait at least 5 seconds.
5. Check DTC.
6. If DTC is detected, go to EC-180, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699786

EC-MAFS-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
45	G	Mass air flow sensor	**[Engine is running]** • **Warm-up condition** • Idle speed	0.9 - 1.2 V
			[Engine is running] • **Warm-up condition** • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	LG	Sensor ground (Mass air flow sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007699787

1.INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

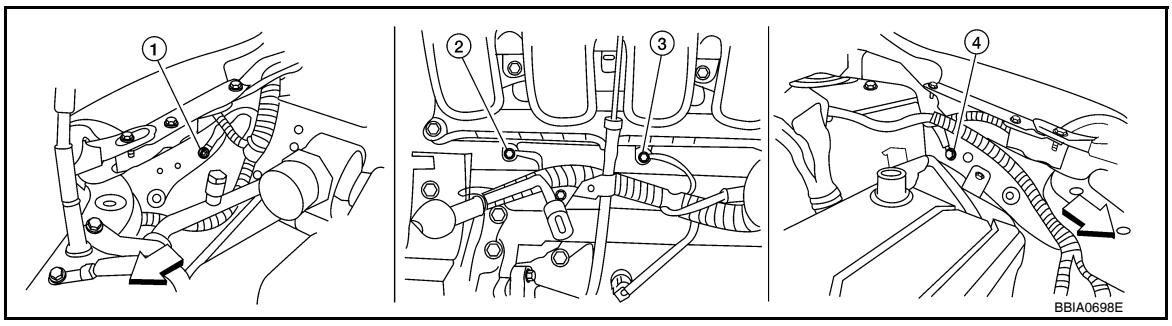
Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

OK >> GO TO 3.
NG >> Reconnect the parts.

3.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

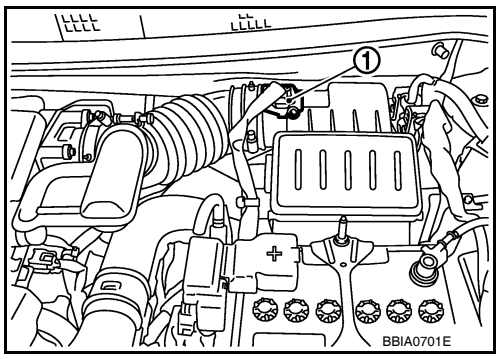
⇦: Vehicle front

OK or NG

OK >> GO TO 4.
NG >> Repair or replace ground connections.

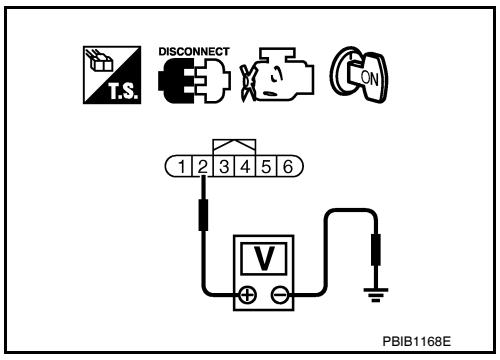
4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between MAF sensor terminal 2 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 52. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK MASS AIR FLOW SENSOR

Refer to EC-182, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace mass air flow sensor. Refer to EM-16, "Component".

9.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

INFOID:0000000007699788

MASS AIR FLOW SENSOR

With CONSULT

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

5. If the voltage is out of specification, proceed the following.

a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts

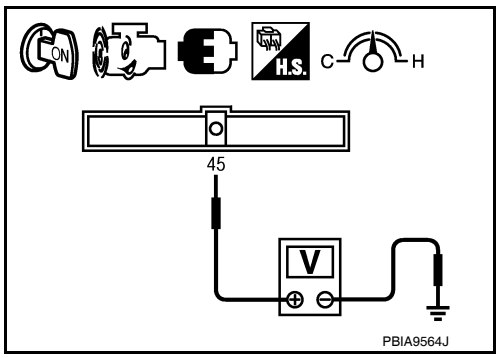
b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
   If OK, go to next step.

6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to EM-16, "Component".

Without CONSULT

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.

3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.



Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.

a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again.
If OK, go to next step.

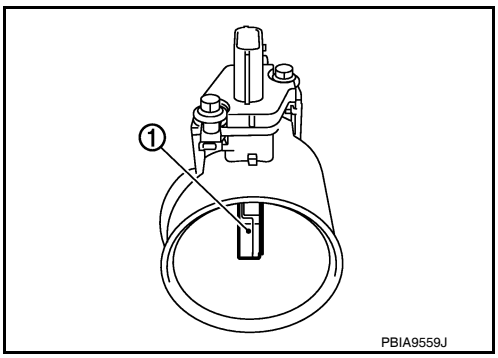
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to EM-16, "Component".

DTC P0111 IAT SENSOR

Component Description

INFOID:0000000007732159

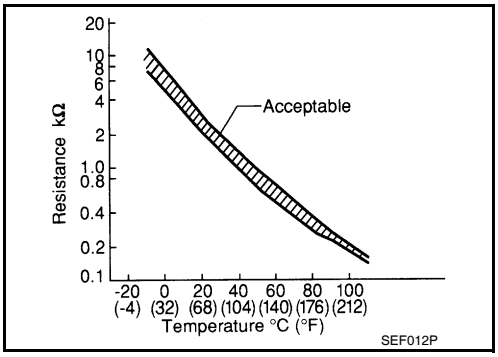
The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007732160

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0111 0111	Intake air temperature (IAT) sensor circuit range/performance	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	• Harness or connectors (High or low resistance in the IAT sensor circuit) • IAT sensor

DTC Confirmation Procedure

INFOID:0000000007732161

1.INSPECTION START

Is it necessary to erase permanent DTC?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM OVERALL FUNCTION CHECK

Perform overall function check. Refer to EC-185, "Overall Function Check".
NOTE:
Use the overall function check to check the overall function of the IAT sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EC-186, "Diagnosis Procedure".

3.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

- **Before performing the following procedure, do not add fuel.**
- **Before performing the following procedure, check that fuel level is between 1/4 and 4/4.**
- **Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.**

>> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.
   NOTE:
   Cool the vehicle in an environment of ambient air temperature between −10°C (14°F) and 35°C (95°F).
3. Turn ignition switch OFF and soak the vehicle for 12 hours.
   CAUTION:
   Never turn ignition switch ON during soaking.
   NOTE:
   The vehicle must be cooled with the food open.
4. Start engine and let it idle for 5 minutes or more.
   CAUTION:
   Never turn ignition switch OFF during idling.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-186, "Diagnosis Procedure".
NO >> INSPECTION END

Overall Function Check

INFOID:0000000007732162

1. CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance (kΩ)
5 and 6	Temperature [°C (°F)]	25 (77)	1.800 – 2.200

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to EC-186, "Diagnosis Procedure".

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to EC-140, "Diagnosis Procedure".

Is the inspection result normal?

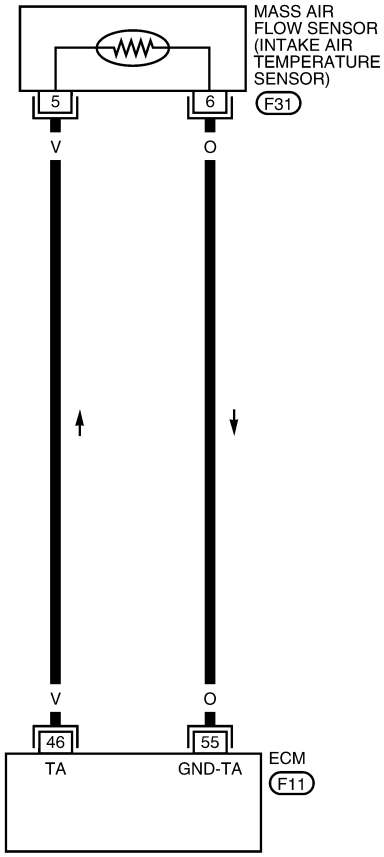
YES >> INSPECTION END
NO >> Proceed to EC-186, "Diagnosis Procedure".

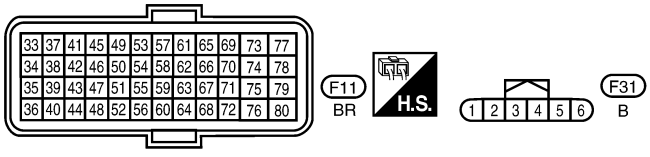
Wiring Diagram

INFOID:0000000007732167

EC-IATS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





BBWA2633E

Diagnosis Procedure

INFOID:0000000007732164

1. CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

Check intake air temperature sensor. Refer to EC-187, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".

2.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to EC-140, "Diagnosis Procedure".

>> INSPECTION END

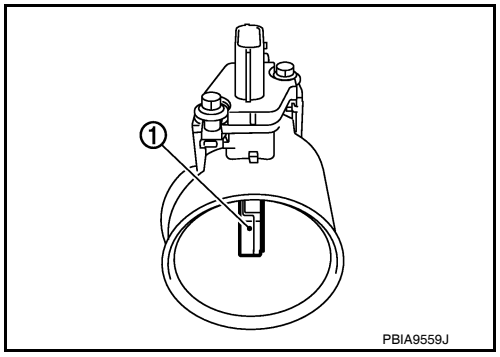
Component Inspection

INFOID:0000000007732166

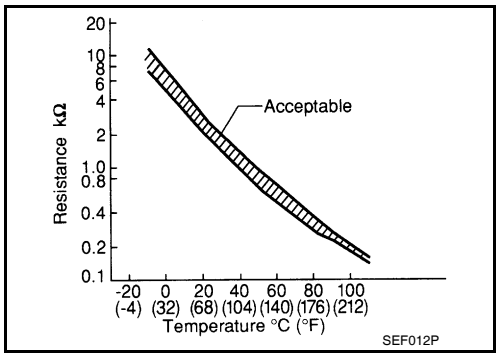
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200



2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".

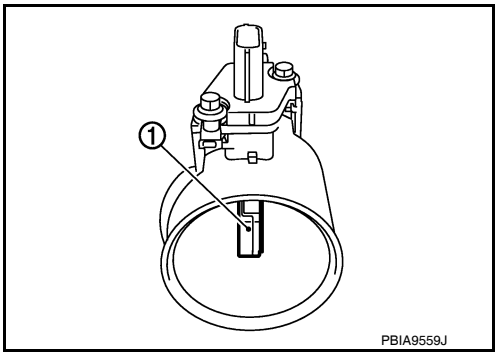


DTC P0112, P0113 IAT SENSOR

Component Description

INFOID:0000000007699790

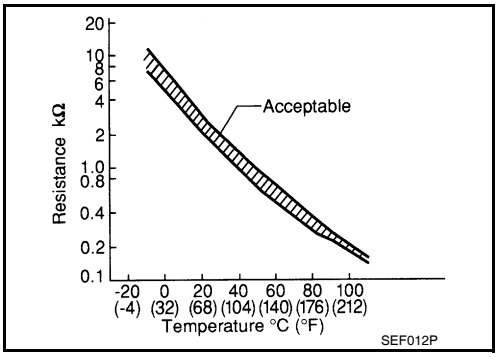
The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007699791

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (Intake air temperature sensor circuit is open or shorted.) • Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:0000000007699792

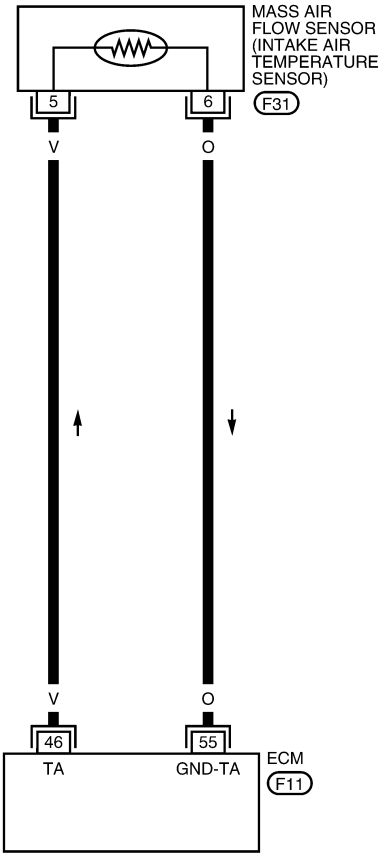
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-189, "Diagnosis Procedure".

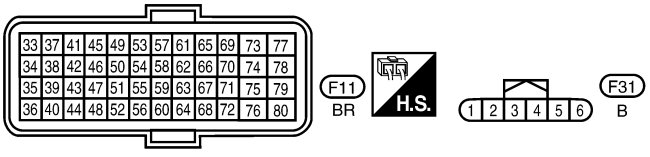
Wiring Diagram

INFOID:0000000007699793

EC-IATS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





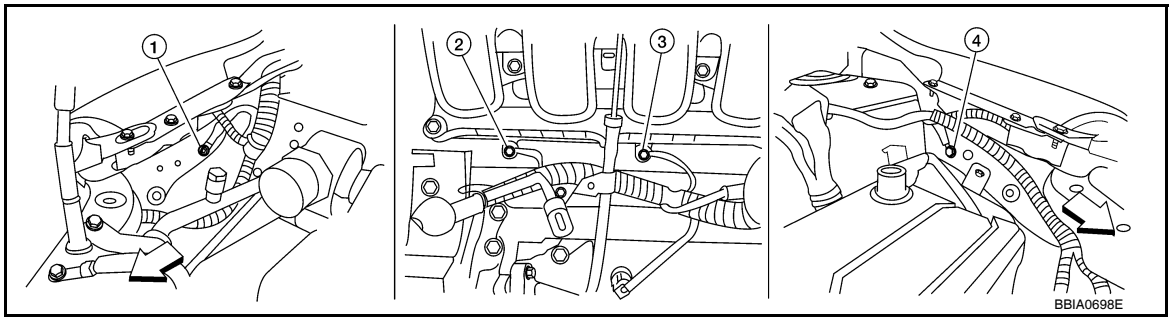
BBWA2633E

Diagnosis Procedure

INFOID:0000000007699794

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

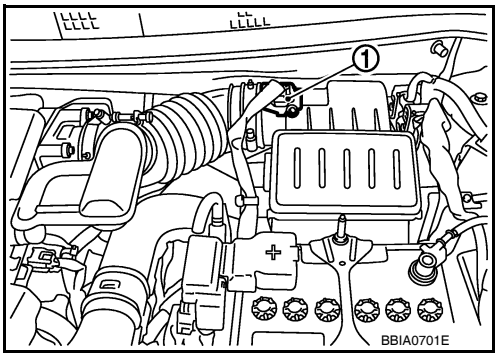
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

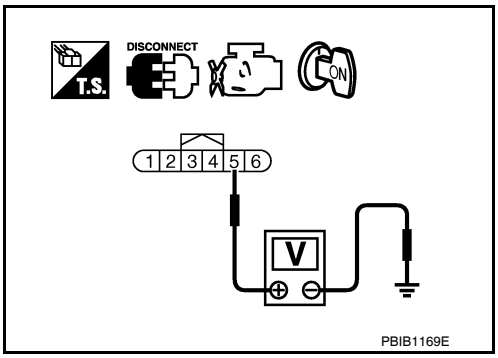
2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between mass air flow sensor terminal 5 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 6 and ECM terminal 55. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-191, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".

5. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

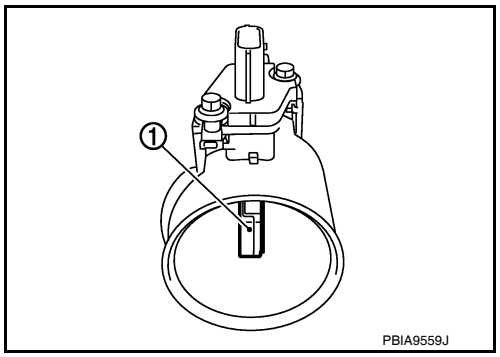
INFOID:0000000007699795

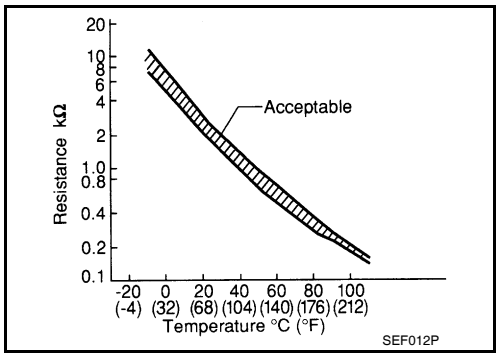
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".



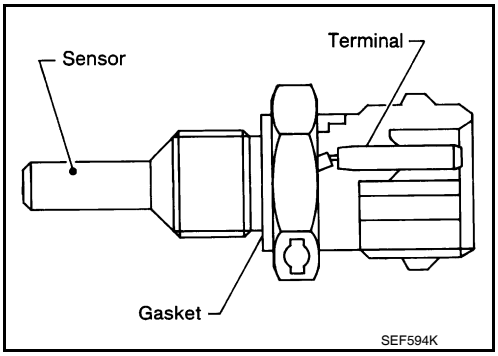


DTC P0116 ECT SENSOR

Component Description

INFOID:0000000007699797

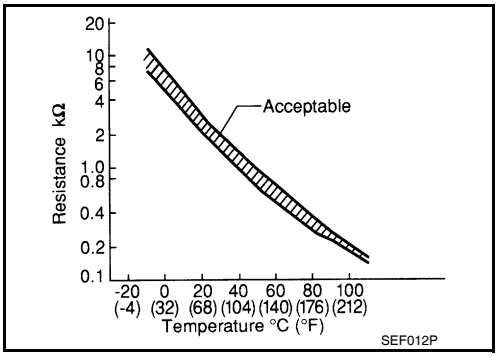
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.10 - 2.90
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007732205

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0116 0116	Engine coolant temperature (ECT) sensor circuit range/performance	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	• Harness or connectors (High or low resistance in the ECT sensor circuit) • ECT sensor

DTC Confirmation Procedure

INFOID:0000000007732206

1.INSPECTION START

Is it necessary to erase permanent DTC?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM OVERALL FUNCTION CHECK

Perform overall function check. Refer to EC-193, "Overall Function Check".

NOTE:
Use the overall function check to check the overall function of the ECT sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EC-193, "Diagnosis Procedure".

3.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

- **Before performing the following procedure, do not add fuel.**
- **Before performing the following procedure, check that fuel level is between 1/4 and 4/4.**
- **Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.**

>> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.
   NOTE:
   Cool the vehicle in an environment of ambient air temperature between −10°C (14°F) and 35°C (95°F).
3. Turn ignition switch OFF and soak the vehicle for 12 hours.
   CAUTION:
   Never turn ignition switch ON during soaking.
   NOTE:
   The vehicle must be cooled with the food open.
4. Start engine and let it idle for 5 minutes or more.
   CAUTION:
   Never turn ignition switch OFF during idling.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

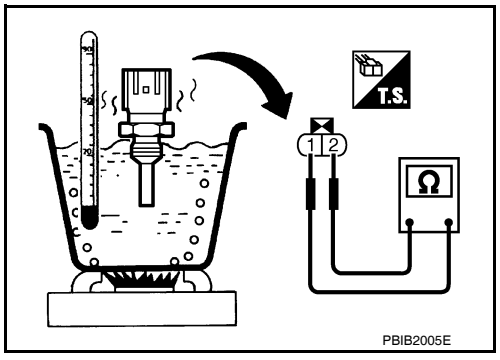
YES >> Proceed to EC-193, "Diagnosis Procedure".
NO >> INSPECTION END

Overall Function Check

INFOID:0000000007732207

1. CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect ECT sensor harness connector.
3. Remove ECT sensor. Refer to CO-25, "Component".
4. Check resistance between ECT sensor terminals by heating with hot water as shown in the figure.



PBIB2005E

Terminals	Condition		Resistance (kΩ)
1 and 2	Temperature [°C (°F)]	20 (68)	2.10 – 2.90
		50 (122)	0.68 – 1.00
		90 (194)	0.236 – 0.260

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to EC-193, "Diagnosis Procedure".

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to EC-140, "Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EC-193, "Diagnosis Procedure".

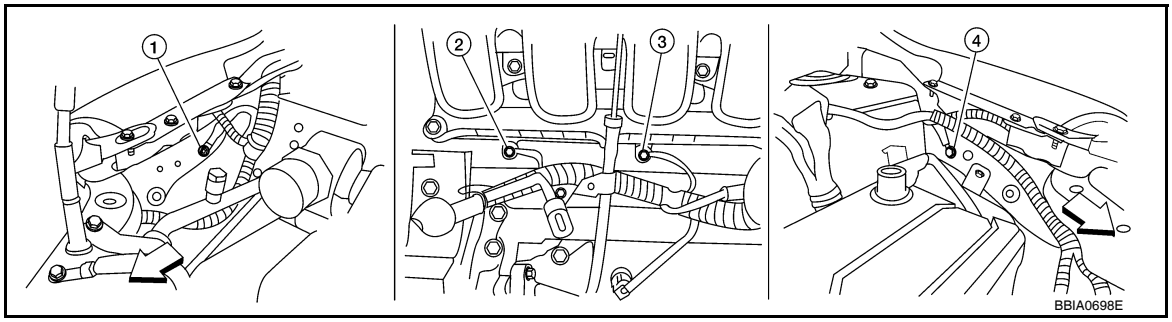
Diagnosis Procedure

INFOID:0000000007699800

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

2. Loosen and retighten ground screw on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-194, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace engine coolant temperature sensor. Refer to CO-25, "Component".

3.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

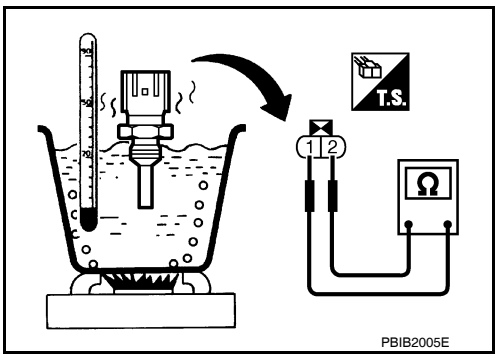
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699801

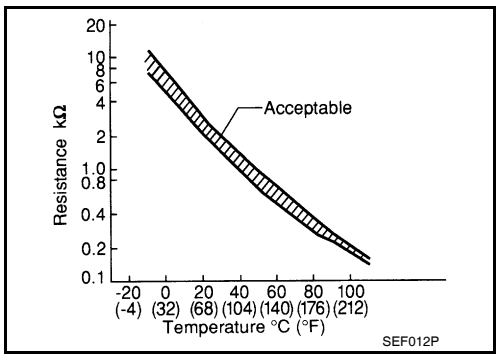
ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.10 - 2.90
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



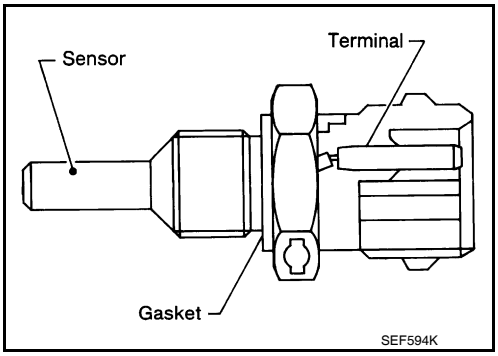
2. If NG, replace engine coolant temperature sensor. Refer to CO-25, "Component".

DTC P0117, P0118 ECT SENSOR

Component Description

INFOID:0000000007699803

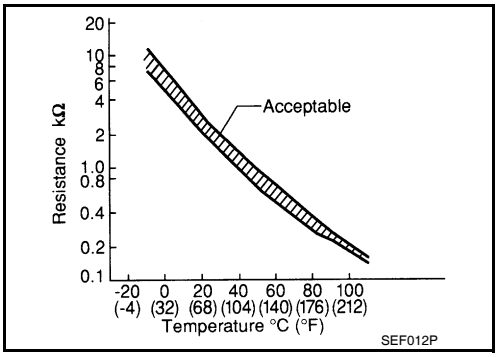
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.10 - 2.90
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007699804

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC detecting condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition. CONSULT displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT display)
	Just as ignition switch is turned ON or START	40°C (104°F)
	Approx. 4 minutes or more after engine starting.	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
	When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	

DTC Confirmation Procedure

INFOID:0000000007699805

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

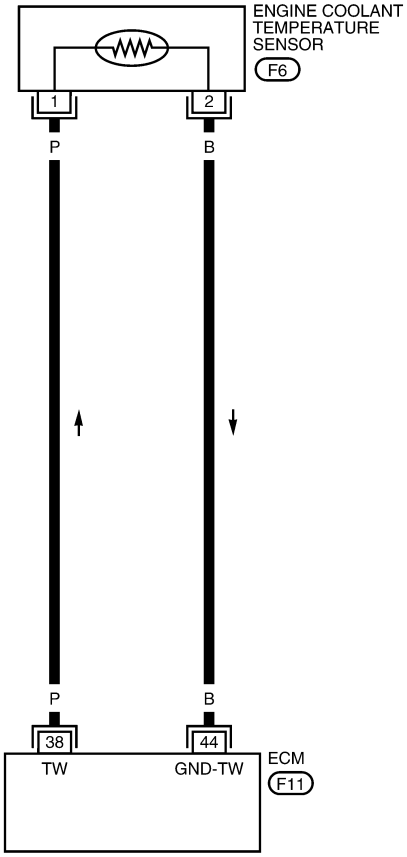
1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to EC-198, "Diagnosis Procedure".

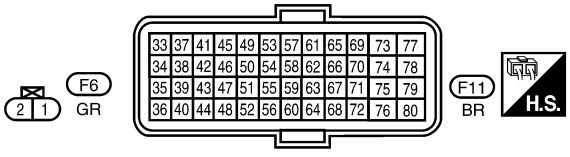
Wiring Diagram

INFOID:0000000007699806

EC-ECTS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





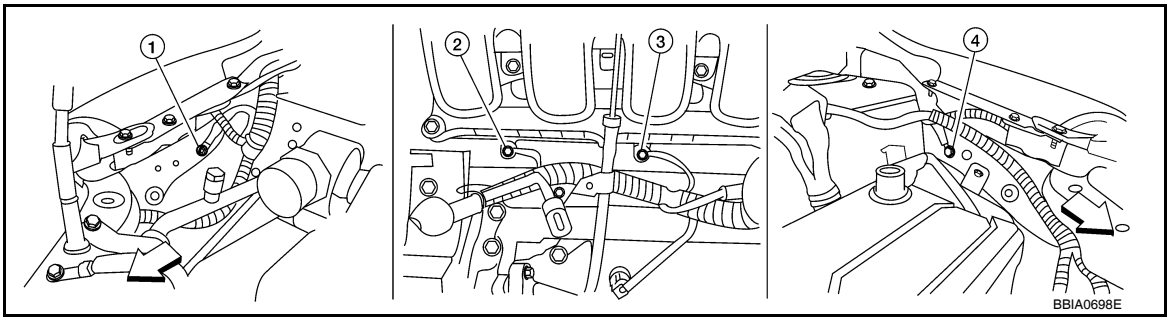
BBWA2634E

Diagnosis Procedure

INFOID:0000000007699807

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

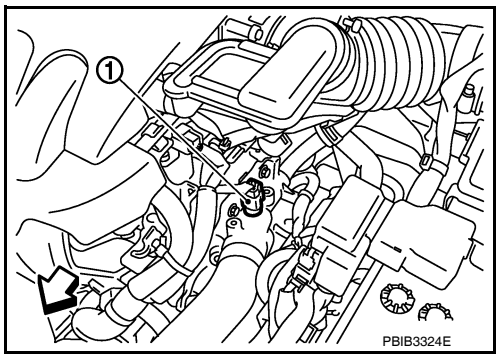
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

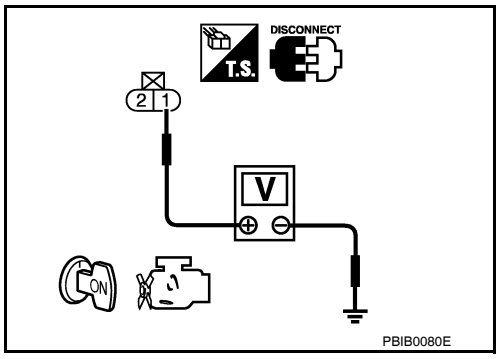
1. Disconnect engine coolant temperature (ECT) sensor (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between ECT sensor terminal 1 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 44 and ECT sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-194, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace engine coolant temperature sensor. Refer to CO-25, "Component".

5. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

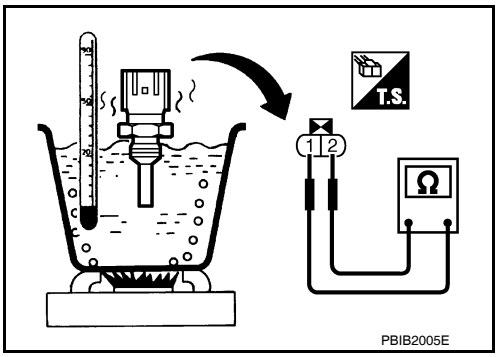
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699808

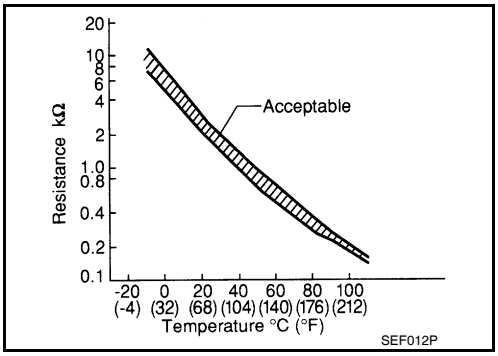
ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.10 - 2.90
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



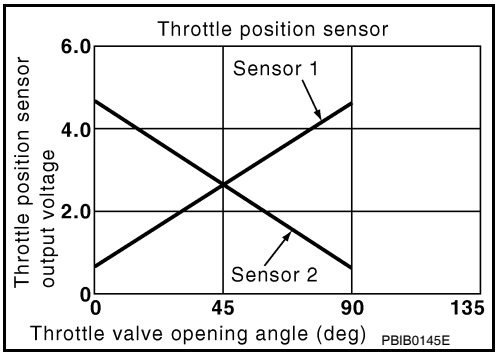
2. If NG, replace engine coolant temperature sensor. Refer to CO-25, "Component".

DTC P0122, P0123 TP SENSOR

Component Description

INFOID:0000000007699810

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699811

Specification data are reference values.

Monitor item	Condition		Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Selector lever: D (A/T, CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:0000000007699812

These self-diagnoses have the one trip detection logic.
NOTE:
If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007699813

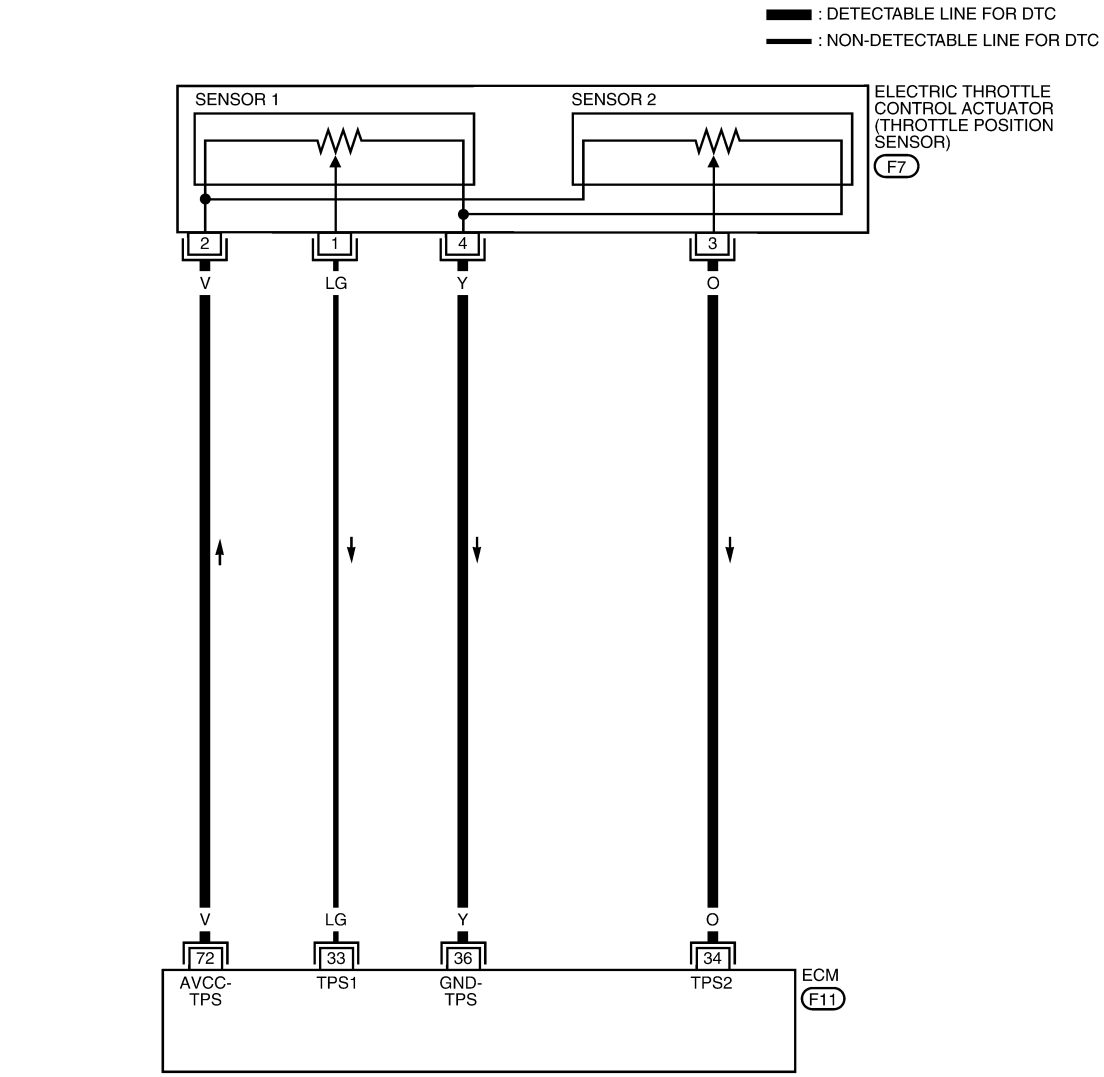
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

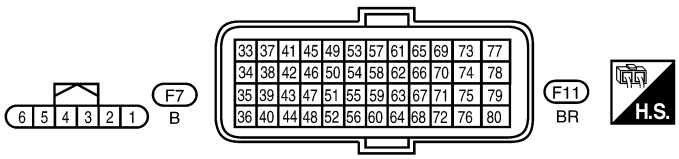
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to EC-203, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699814

EC-TPS2-01





BBWA2656E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

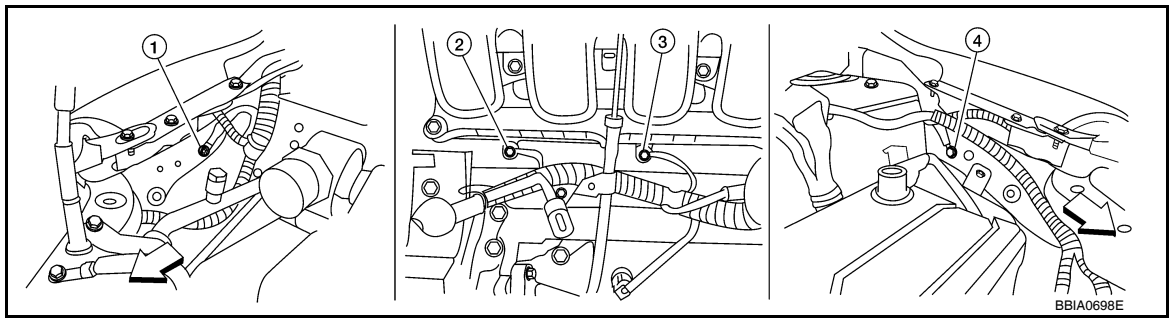
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
33	LG	Throttle position sensor 1	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	O	Throttle position sensor 2	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	Y	Sensor ground (Throttle position sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
72	V	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5.0 V

Diagnosis Procedure

INFOID:0000000007699815

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground E16
4. Body ground E15

⇦: Vehicle front

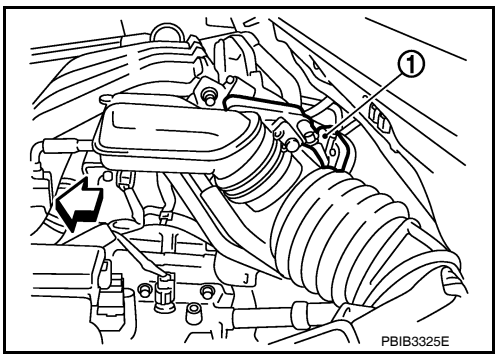
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

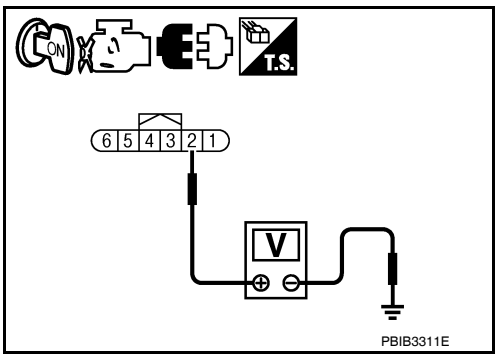
1. Disconnect electric throttle control actuator (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 34 and electric throttle control actuator terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-205, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

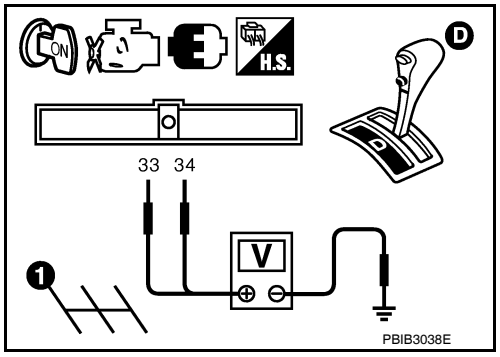
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699816

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-87, "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T, CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

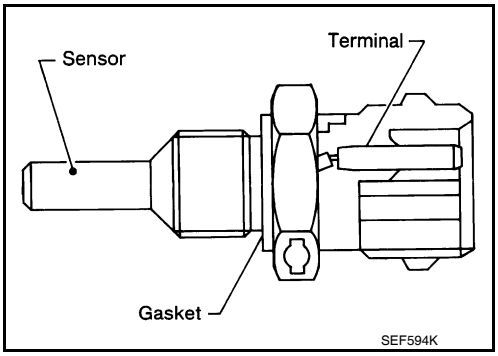
6. If NG, replace electric throttle control actuator. Refer to EM-18, "Component".

DTC P0125 ECT SENSOR

Component Description

INFOID:0000000007699818

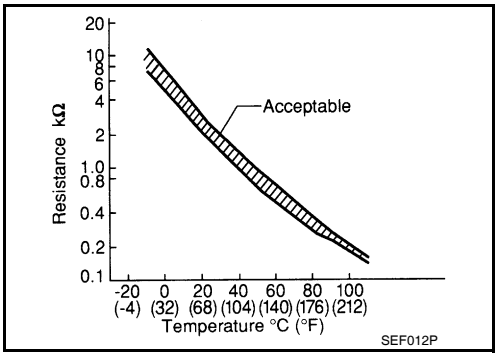
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.10 - 2.90
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007699819

NOTE:
- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to EC-197, "DTC Confirmation Procedure".
- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to EC-206, "DTC Confirmation Procedure".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	• Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control.	• Harness or connectors (High resistance in the circuit) • Engine coolant temperature sensor • Thermostat

DTC Confirmation Procedure

INFOID:0000000007699820

CAUTION:
Be careful not to overheat engine.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT.
3. Check that “COOLAN TEMP/S” is above 10°C (50°F).
   If it is above 10°C (50°F), the test result will be OK.
   If it is below 10°C (50°F), go to following step.
4. Start engine and run it for 65 minutes at idle speed.

If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.

5. Check DTC.
6. If DTC is detected, go to EC-207, "Diagnosis Procedure".

WITH GST

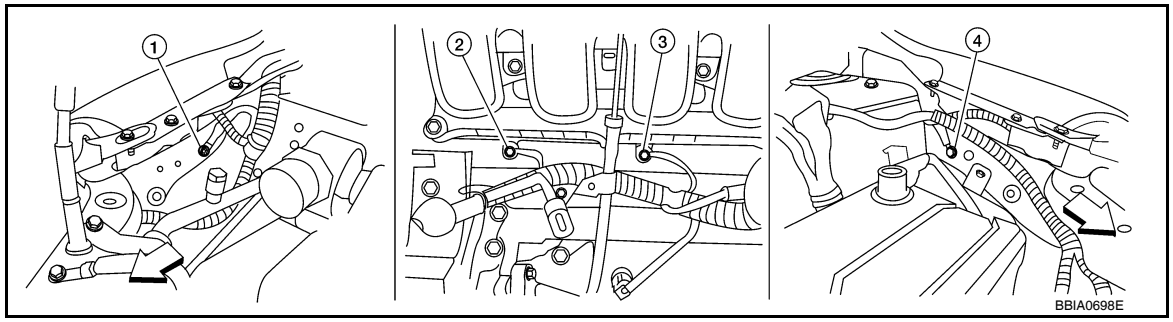
Follow the procedure "WITH CONSULT" above.

Diagnosis Procedure

INFOID:0000000007699821

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-207, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace engine coolant temperature sensor. Refer to CO-25, "Component".

3.CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace thermostat. Refer to CO-22, "Removal and Installation".

4.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

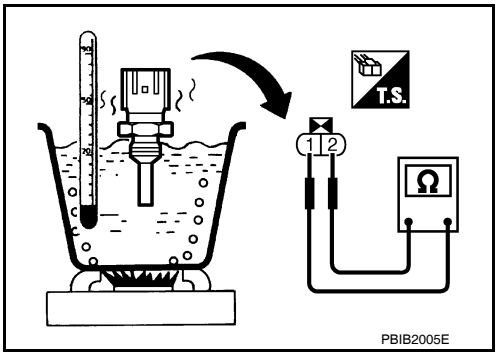
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699822

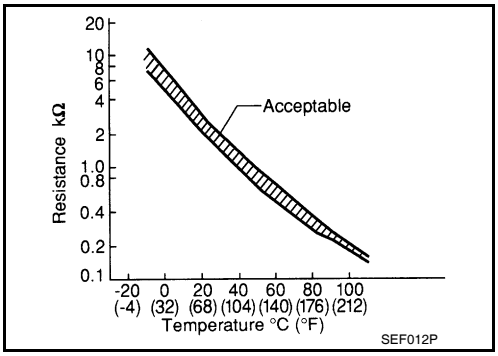
ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.10 - 2.90
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



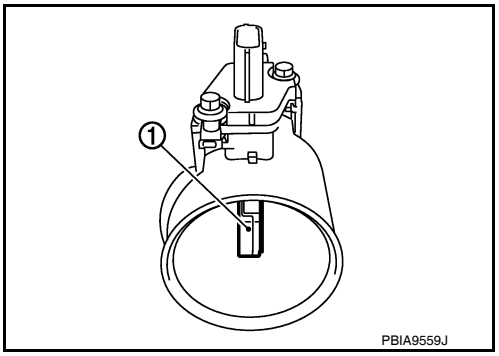
2. If NG, replace engine coolant temperature sensor. Refer to CO-25, "Component".

DTC P0127 IAT SENSOR

Component Description

INFOID:0000000007699824

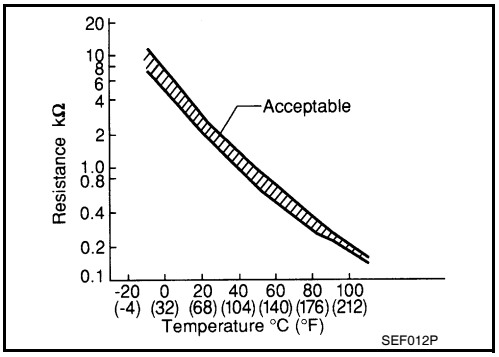
The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007699825

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	• Harness or connectors (Intake temperature sensor circuit is open or shorted) • Intake air temperature sensor

DTC Confirmation Procedure

INFOID:0000000007699826

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT

1. Wait until engine coolant temperature is less than 96°C (205°F)
a. Turn ignition switch ON.
b. Select “DATA MONITOR” mode with CONSULT.
c. Check the engine coolant temperature.
d. If the engine coolant temperature is not less than 96°C (205°F), turn ignition switch OFF and cool down engine.
   • Perform the following steps before engine coolant temperature is above 96°C (205°F).
2. Turn ignition switch ON.
3. Select “DATA MONITOR” mode with CONSULT.

4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to EC-210, "Diagnosis Procedure".

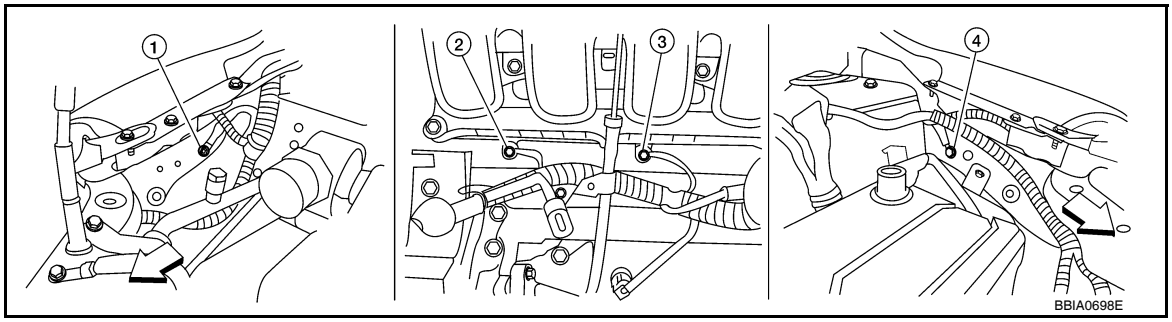
WITH GST
Follow the procedure “With CONSULT” above.

Diagnosis Procedure

INFOID:0000000007699827

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-210, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".

3.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

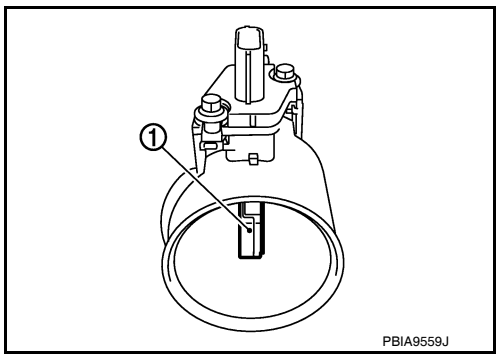
INFOID:0000000007699828

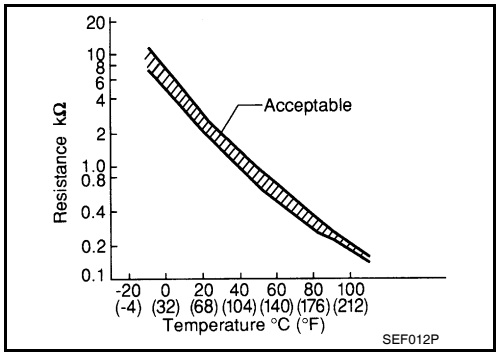
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to EM-16, "Component".





DTC P0128 THERMOSTAT FUNCTION

On Board Diagnosis Logic

INFOID:0000000007699830

NOTE:
If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to EC-292, "DTC Confirmation Procedure".
Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough. This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	• Thermostat • Leakage from sealing portion of thermostat • Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:0000000007699831

WITH CONSULT

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
- **For best results, perform at ambient temperature of –10°C (14°F) or higher.**
- **For best results, perform at engine coolant temperature of –10°C (14°F) to 53°C (127°F).**
- **Before performing the following procedure, do not fill with the fuel.**

1. Turn A/C switch OFF.
2. Turn blower fan switch OFF.
3. Turn ignition switch ON.
4. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT.
5. Check the indication of “COOLAN TEMP/S”.
   If it is below 53°C (127°F), go to following step.
   If it is above 53°C (127°F), cool down the engine to less than 53°C (127°F). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56 km/h (35 MPH)

   If “COOLAN TEMP/S” increases to more than 75°C (167°F) within 10 minutes, turn ignition switch OFF because the test result will be OK.
8. Check 1st trip DTC.
9. If 1st trip DTC is detected, go to EC-212, "Diagnosis Procedure".

WITH GST

Follow the procedure “With CONSULT” above.

Diagnosis Procedure

INFOID:0000000007699832

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-213, "Component Inspection".

OK or NG

OK >> GO TO 2.
NG >> Replace engine coolant temperature sensor. Refer to CO-25, "Component".

2.CHECK THERMOSTAT

Refer to CO-23, "Inspection".

OK or NG

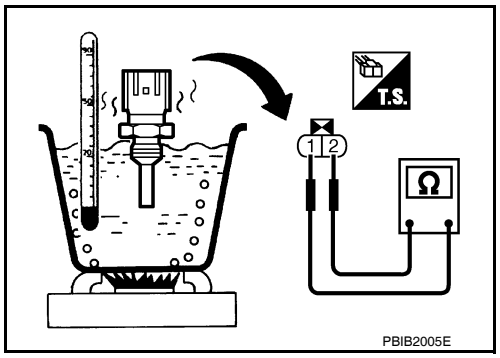
OK >> **INSPECTION END**
NG >> Replace thermostat. Refer to CO-22, "Removal and Installation".

Component Inspection

INFOID:0000000007699833

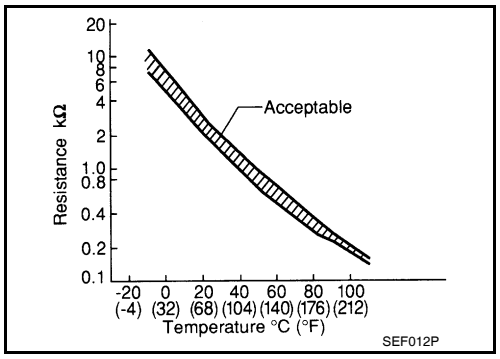
ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



2. If NG, replace engine coolant temperature sensor. Refer to CO-22, "Component".

DTC P0130 A/F SENSOR 1

Component Description

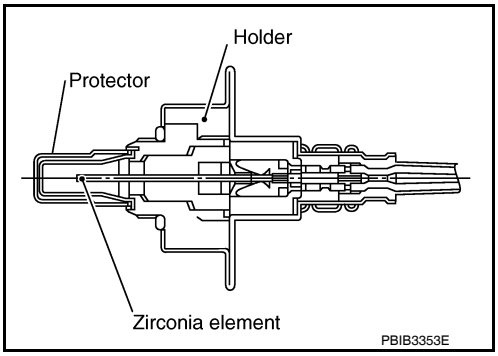
INFOID:0000000007699835

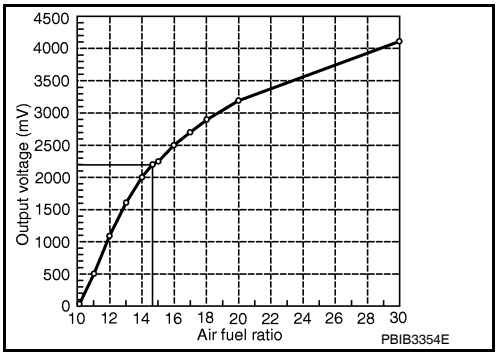
The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement λ = 1, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.

The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699836

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:0000000007699837

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible Cause
P0130 0130	Air fuel ratio (A/F) sensor 1 circuit	A)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2 V.	• Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1
		B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

DTC Confirmation Procedure

INFOID:0000000007699838

Perform PROCEDURE FOR MALFUNCTION A first.
If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

PROCEDURE FOR MALFUNCTION A

1. Start engine and warm it up to normal operating temperature.

2. Let engine idle for 2 minutes.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to EC-217, "Diagnosis Procedure".

PROCEDURE FOR MALFUNCTION B

CAUTION:
Always drive vehicle at a safe speed.

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Select “A/F SEN1 (B1)” in “DATA MONITOR” mode with CONSULT.
3. Check “A/F SEN1 (B1)” indication.
   If the indication is constantly approx. 2.2 V and does not fluctuates, go to EC-217, "Diagnosis Procedure".
   If the indication fluctuates around 2.2 V, go to next step.
4. Select “A/F SEN1 (B1) P1276” (for DTC P0130) of “A/F SEN1” in “DTC WORK SUPPORT” mode with CONSULT.
5. Touch “START”.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT screen.

ENG SPEED	1,000 - 3,200 rpm (A/T, CVT) 1,350 - 3,200 rpm (M/T)
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	D position with OD OFF (A/T) D position (CVT) 5th position (M/T)

   If “TESTING” is not displayed after 20 seconds, retry from step 2.
7. Release accelerator pedal fully.
   NOTE:
   Never apply brake during releasing the accelerator pedal.
8. Make sure that “TESTING” changes to “COMPLETED”.
   If “TESTING” changed to “OUT OF CONDITION”, retry from step 6.
9. Make sure that “OK” is displayed after touching “SELF-DIAG RESULT”.
   If “NG” is displayed, go to EC-217, "Diagnosis Procedure".

Overall Function Check

INFOID:0000000007699839

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

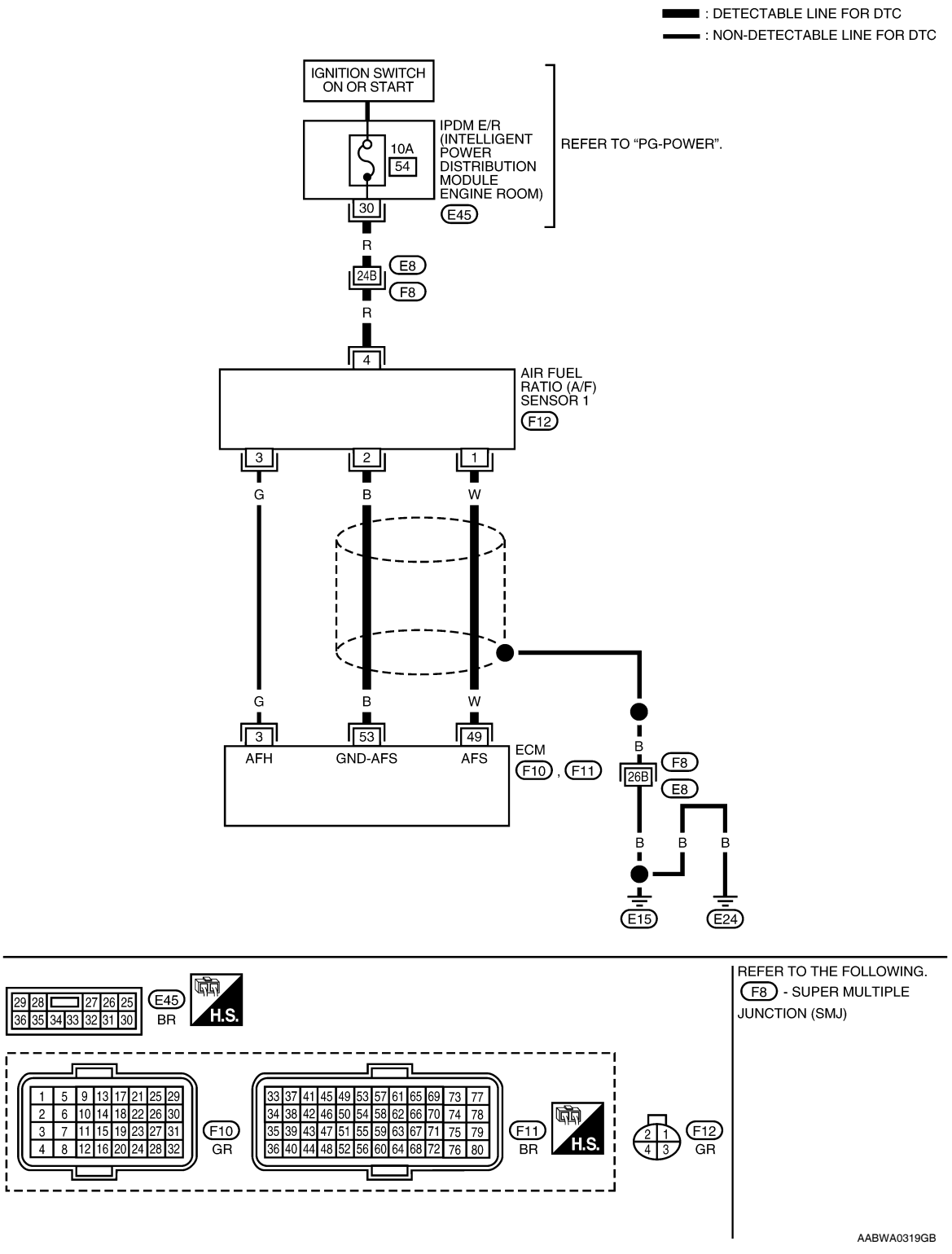
With GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set selector lever to D position with OD ON (A/T), D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).
   NOTE:
   Never apply brake during releasing the accelerator pedal.
4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no 1st trip DTC is displayed.
   If the 1st trip DTC is displayed, go to EC-217, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699840

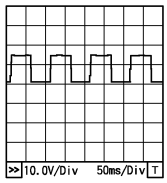
EC-A/F-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

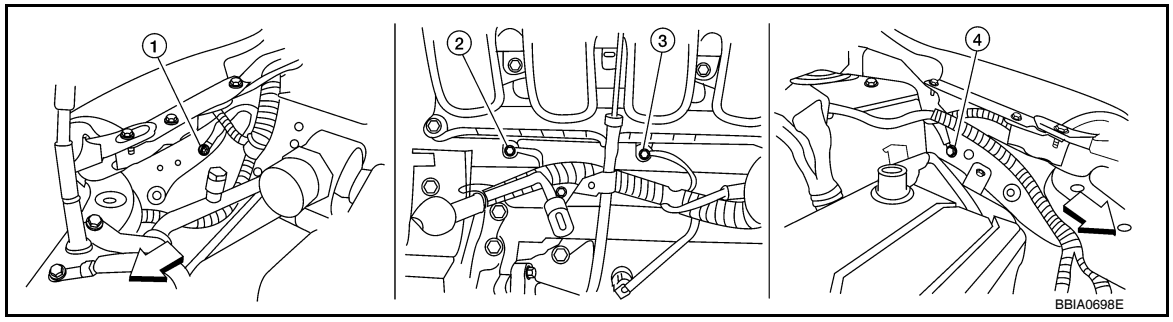
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699841

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

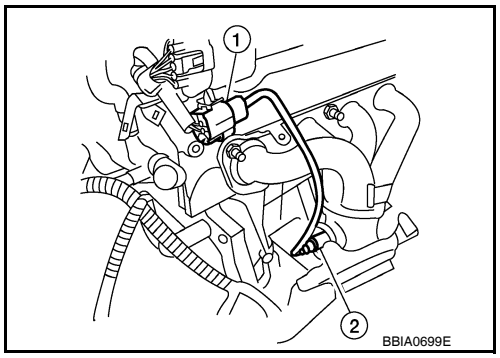
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

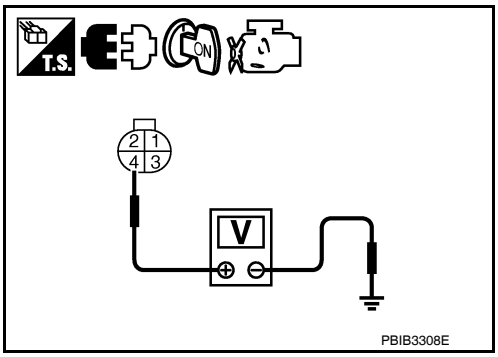
2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector (1).

2. Air fuel ratio (A/F) sensor 1



2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform EC-140.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:
- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

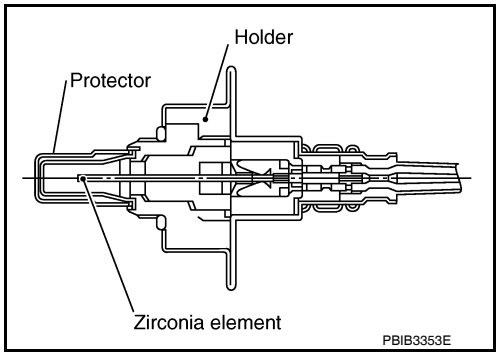
>> **INSPECTION END**

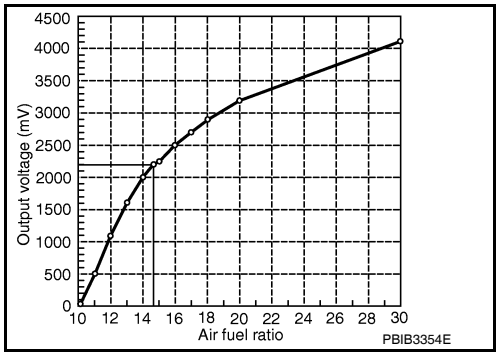
DTC P0131 A/F SENSOR 1

Component Description

INFOID:0000000007699843

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.
The sensor is capable of precise measurement λ = 1, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.
The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.
Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699844

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:0000000007699845

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0131 0131	Air fuel ratio (A/F) sensor 1 circuit low voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0 V.	• Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:0000000007699846

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

WITH CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Select “A/F SEN1 (B1)” in “DATA MONITOR” mode with CONSULT.
3. Check “A/F SEN1 (B1)” indication.
   If the indication is constantly approx. 0 V, go to EC-222, "Diagnosis Procedure".

If the indication is not constantly approx. 0 V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 MPH)
B/FUEL SCHDL	1.5 - 9.0 msec
Selector lever	Suitable position

NOTE:
- **Keep the accelerator pedal as steady as possible during the cruising.**
- **If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.**

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to EC-222, "Diagnosis Procedure".

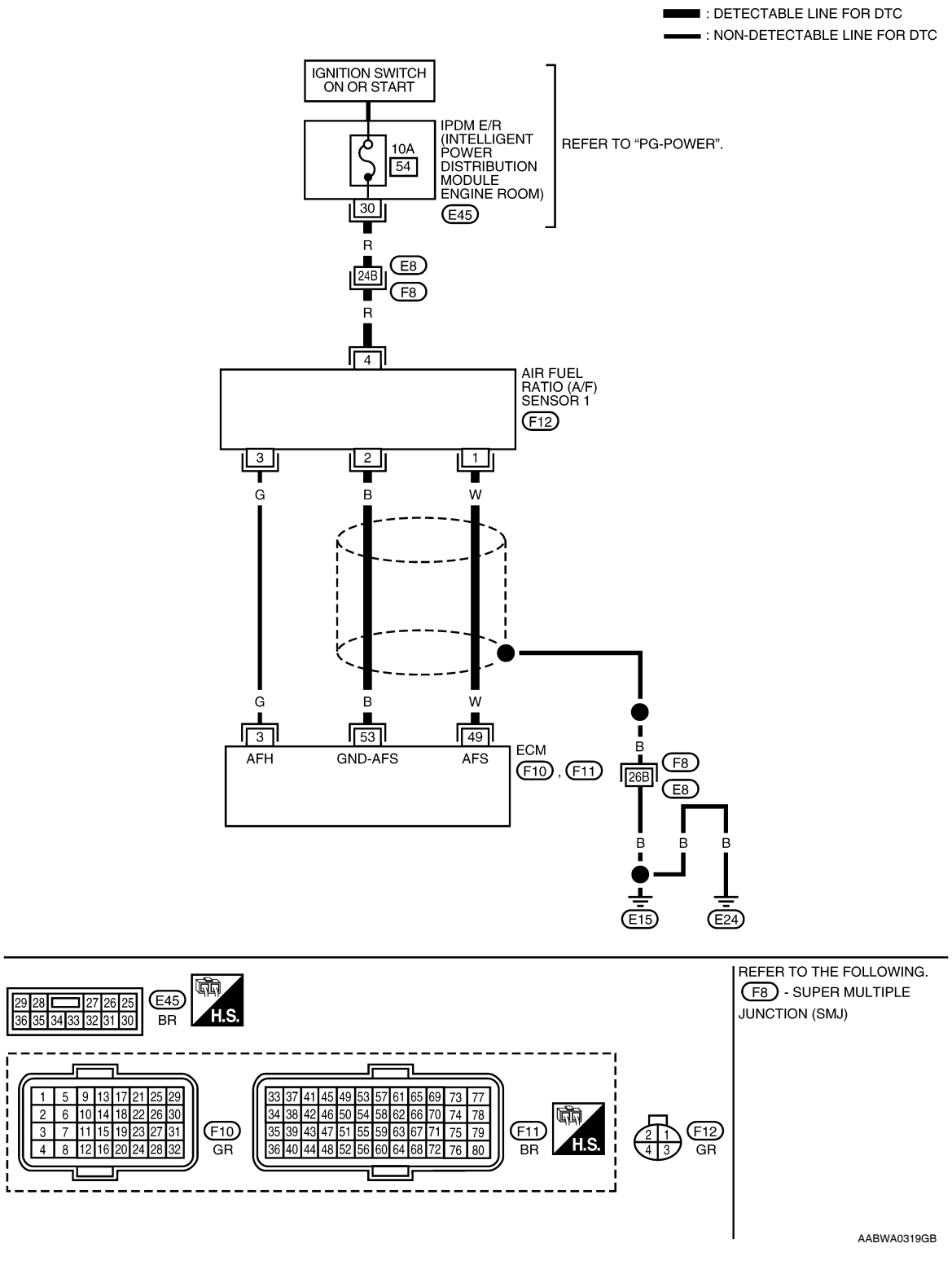
WITH GST

Follow the procedure “WITH CONSULT” above.

Wiring Diagram

INFOID:0000000007699847

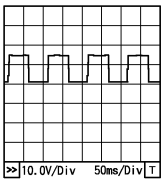
EC-A/F-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

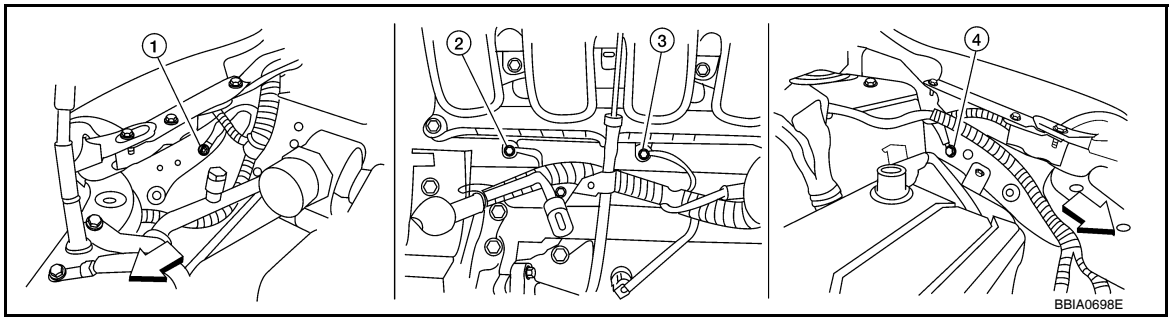
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699848

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

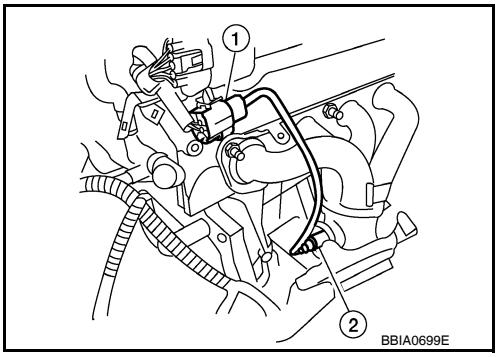
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

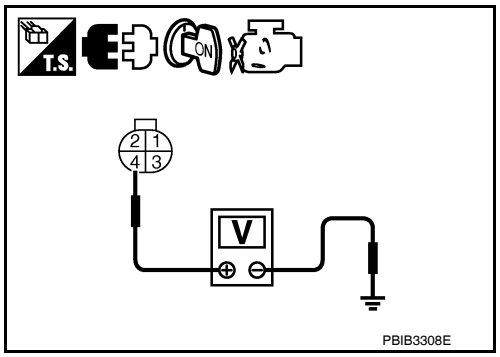
2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector (1).

2. Air fuel ratio (A/F) sensor 1



2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform EC-140.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:
- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

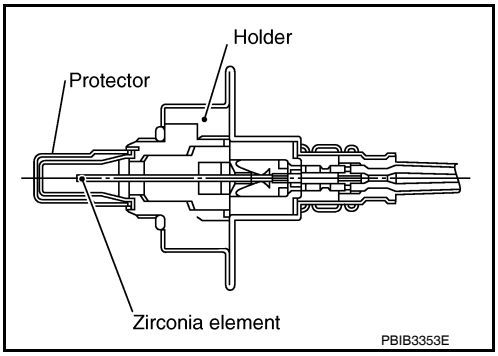
>> **INSPECTION END**

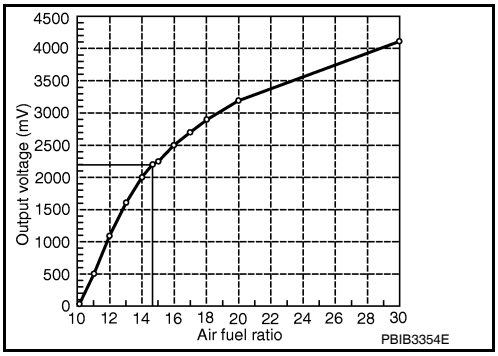
DTC P0132 A/F SENSOR 1

Component Description

INFOID:0000000007699850

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.
The sensor is capable of precise measurement λ = 1, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.
The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.
Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699851

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:0000000007699852

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132 0132	Air fuel ratio (A/F) sensor 1 circuit high voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5.0 V.	• Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:0000000007699853

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

WITH CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Select “A/F SEN1 (B1)” in “DATA MONITOR” mode with CONSULT.
3. Check “A/F SEN1 (B1)” indication.
   If the indication is constantly approx. 5.0 V, go to EC-227, "Diagnosis Procedure".

If the indication is not constantly approx. 5.0 V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 MPH)
B/FUEL SCHDL	1.5 - 9.0 msec
Selector lever	Suitable position

NOTE:
- **Keep the accelerator pedal as steady as possible during the cruising.**
- **If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.**

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to EC-227, "Diagnosis Procedure".

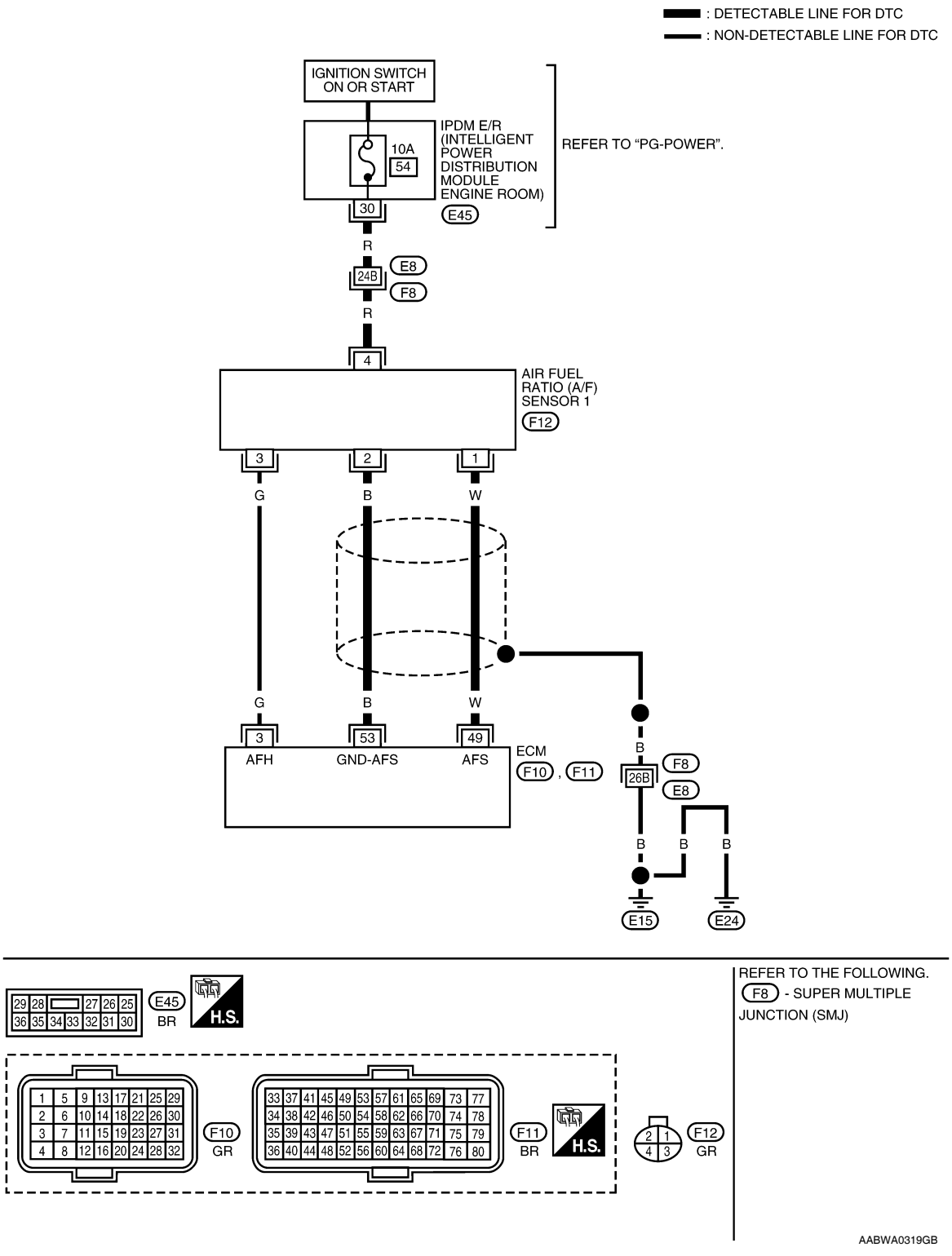
WITH GST

Follow the procedure “WITH CONSULT” above.

Wiring Diagram

INFOID:0000000007699854

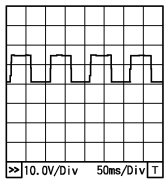
EC-A/F-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

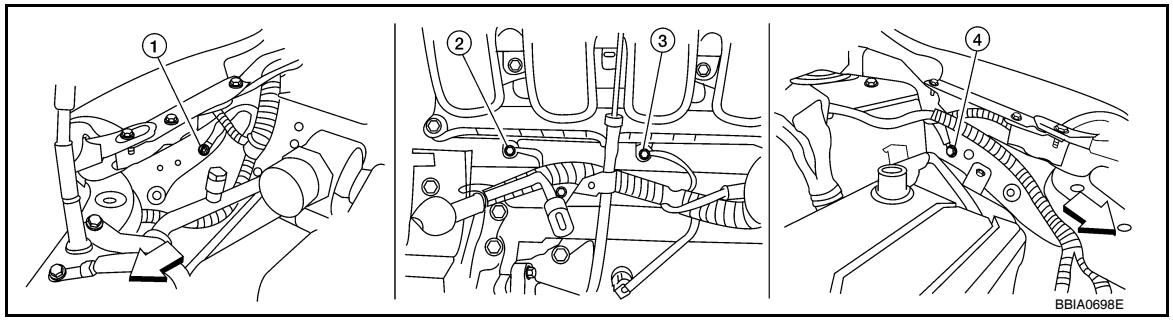
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699855

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

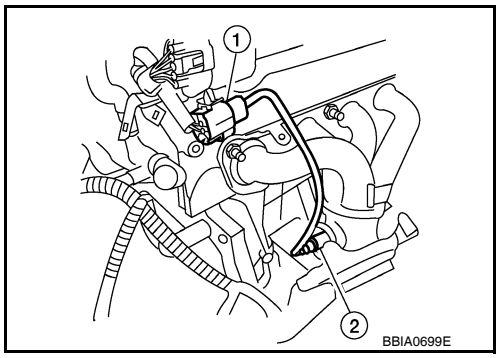
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

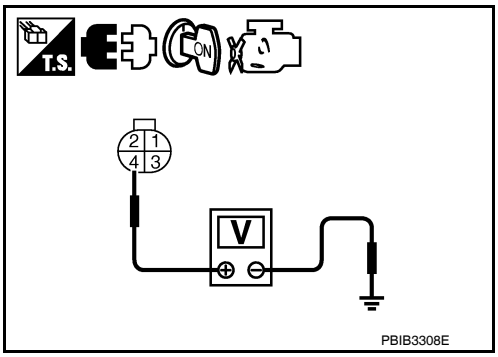
2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector (1).

2. Air fuel ratio (A/F) sensor 1



2. Turn ignition switch ON.
3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform EC-140.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:
- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

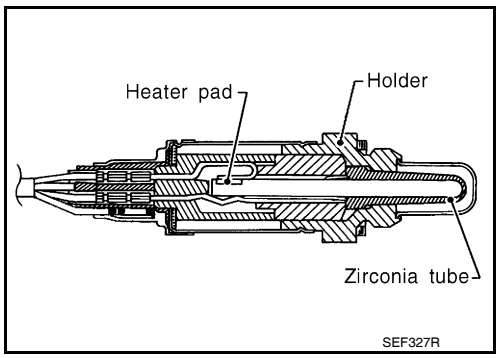
>> **INSPECTION END**

DTC P0137 HO2S2

Component Description

INFOID:0000000007699857

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air/fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1.0 V in richer conditions to 0 V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699858

Specification data are reference values.

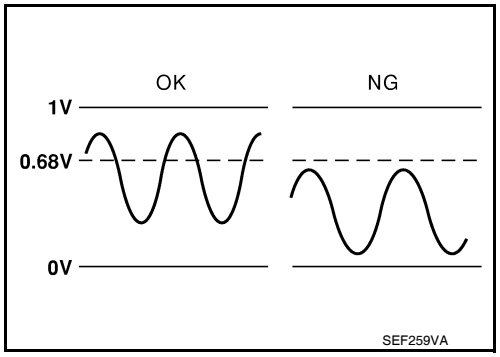
Monitor item	Condition	Specification
HO2S2 (B1)	Revving engine from idle to 3,000 rpm quickly after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ←→ RICH

On Board Diagnosis Logic

INFOID:0000000007699859

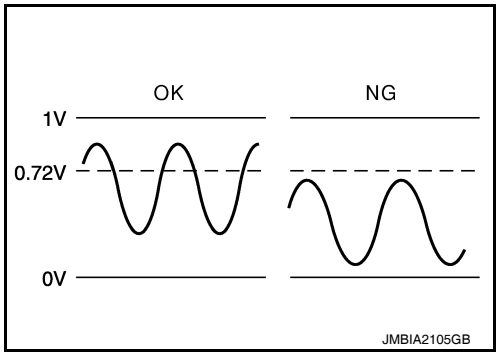
M/T MODELS AND A/T MODELS

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



CVT MODELS

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0137 0137	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	• Harness or connectors (Heated oxygen sensor 2 circuit open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC Confirmation Procedure

INFOID:0000000007699860

NOTE:
If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

TESTING CONDITION:
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “HO2S2 (B1) P1147” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT.
9. Following the instruction of CONSULT.
   NOTE:
   It will take at most 10 minutes until “COMPLETED” is displayed.
10. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
    If “NG” is displayed, refer to EC-233, "Diagnosis Procedure".
    If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Return to step 1.

Overall Function Check

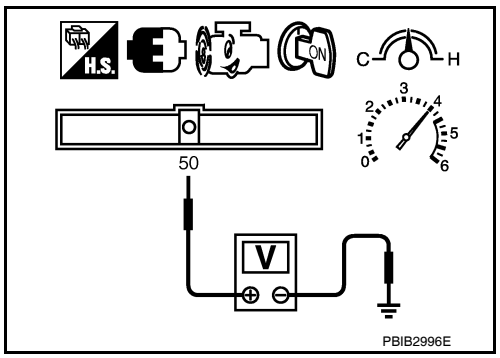
INFOID:0000000007699861

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

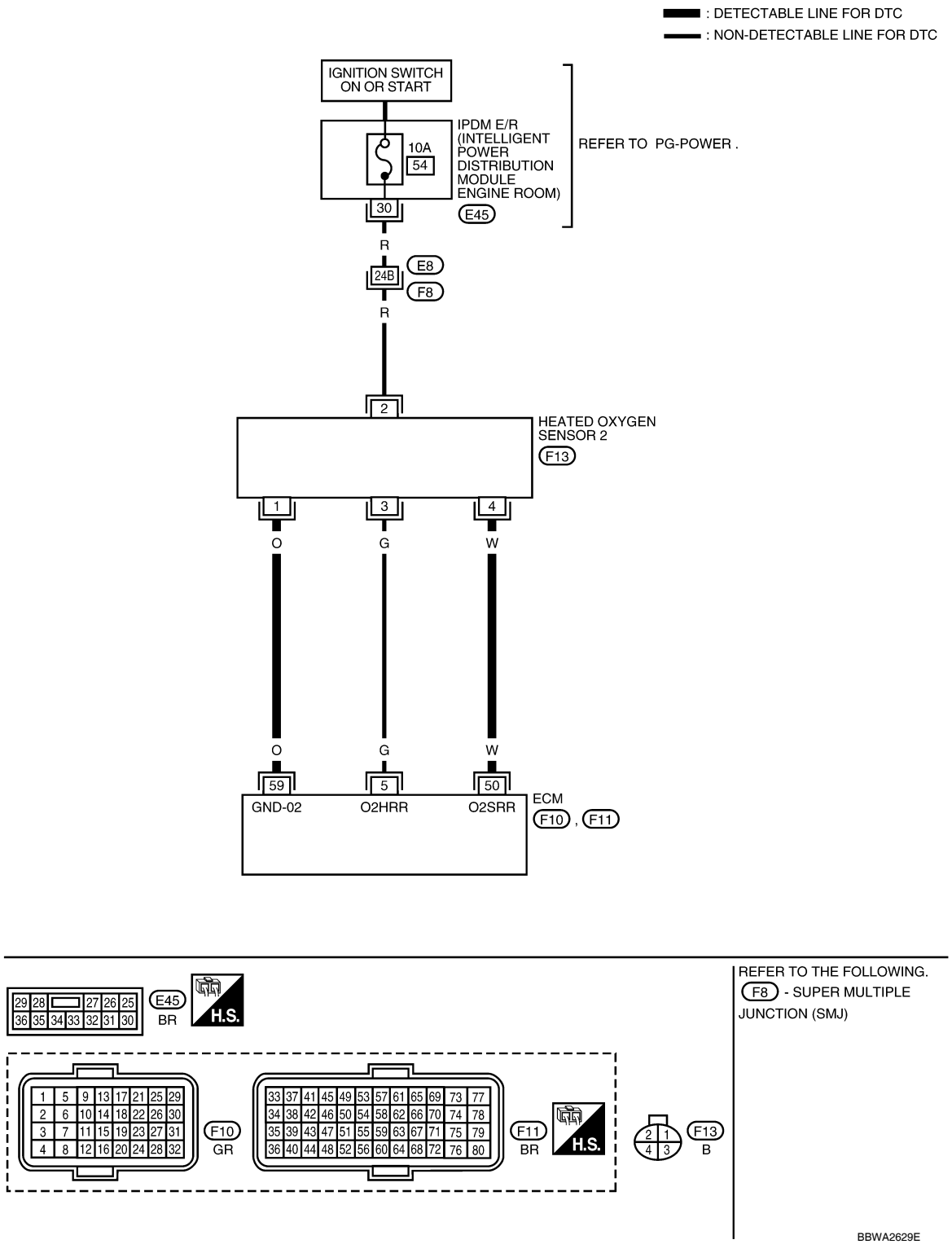
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V (M/T and A/T) or 0.72V (CVT) at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V (M/T and A/T) or 0.72V (CVT) at least once during this procedure.
8. If NG, go to EC-233, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007699862

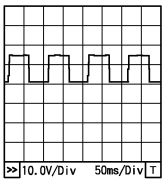
EC-HO2S2-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
5	G	Heated oxygen sensor 2 heater	**[Engine is running]** • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Approximately 10 V★  PBIA8148J
			[Ignition switch: ON] • Engine stopped **[Engine is running]** • Engine speed: Above 3,600 rpm.	Battery voltage (11 - 14 V)
50	W	Heated oxygen sensor 2	**[Engine is running]** • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V
59	O	Sensor ground (Heated oxygen sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

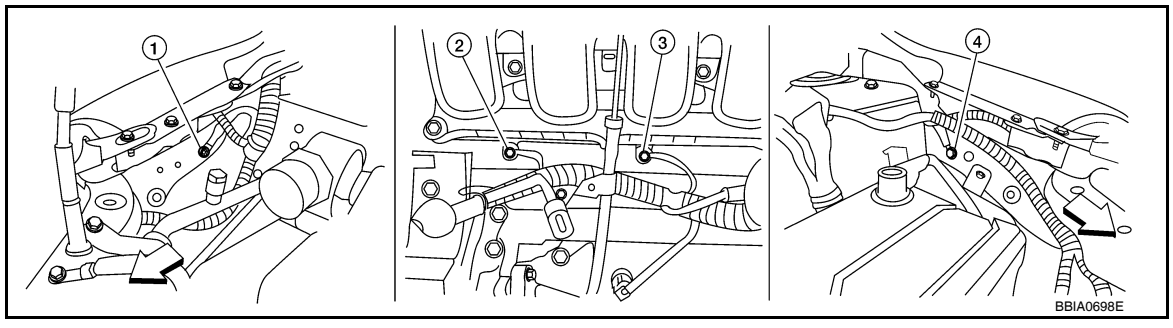
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699863

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CLEAR THE SELF-LEARNING DATA

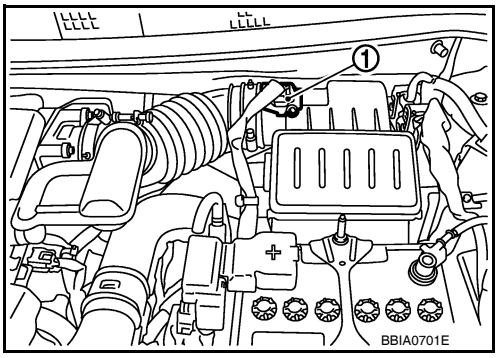
With CONSULT

1. Start engine and warm it up to normal operating temperature.

2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?

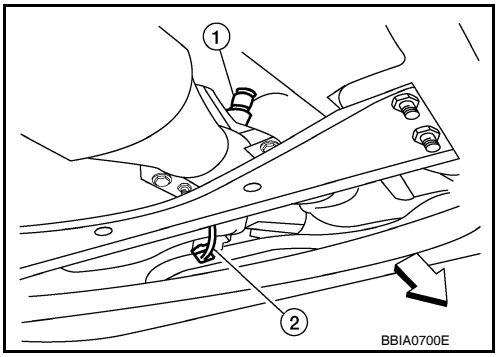


Yes or No

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-265.
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).



1. Heated oxygen sensor 2

⇦ : Vehicle front

3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4.
   Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground.
   Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-235, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2. Refer to EX-5, "Component".

6. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

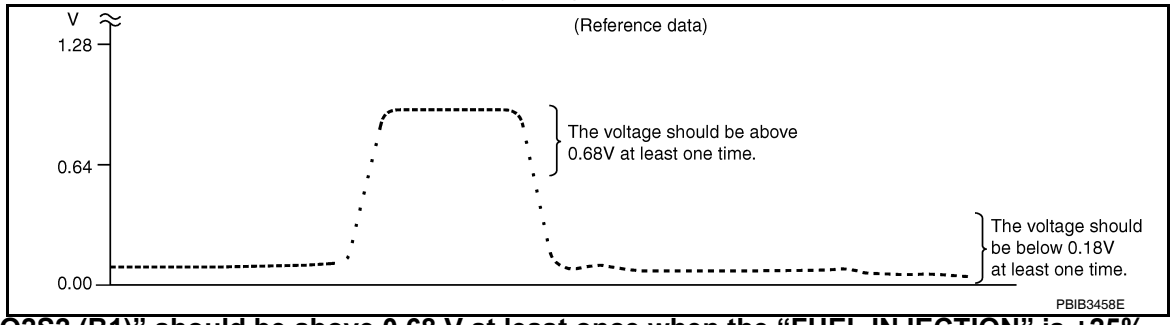
Component Inspection

INFOID:0000000007699864

HEATED OXYGEN SENSOR 2 (M/T AND A/T MODELS)

With CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.
6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



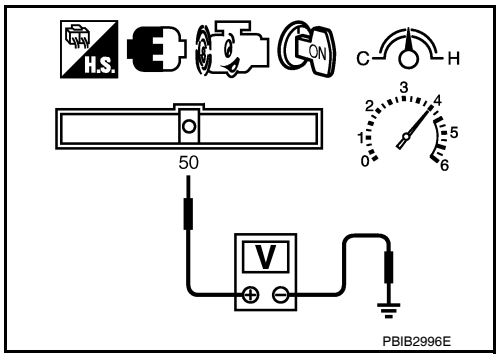
“HO2S2 (B1)” should be above 0.68 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
   If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T) or 3rd gear position (M/T).
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.

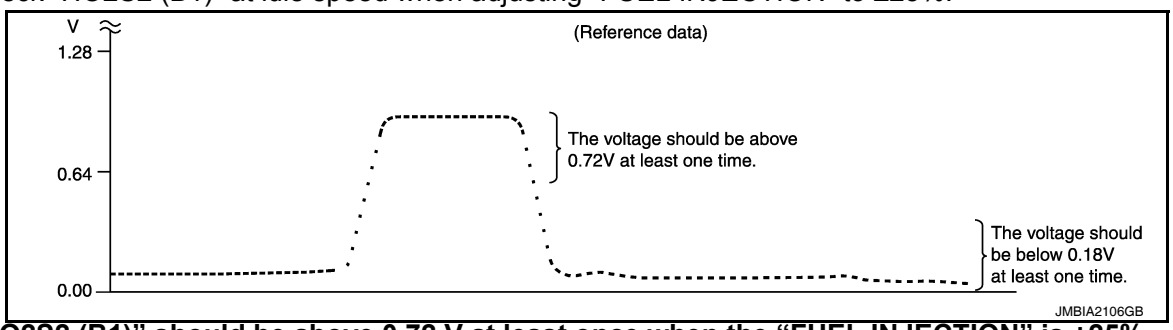


8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

HEATED OXYGEN SENSOR 2 (CVT MODELS)

With CONSULT

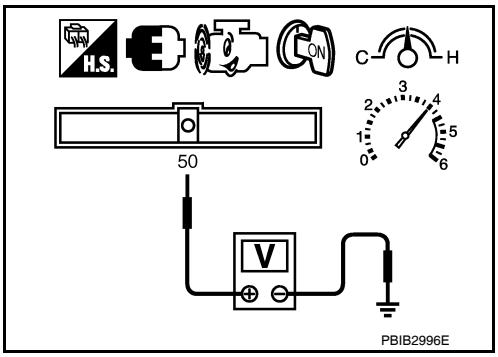
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.
6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.72 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**

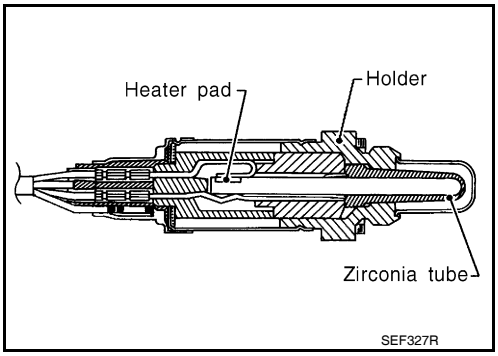
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

DTC P0138 HO2S2

Component Description

INFOID:0000000007699866

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air/fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1.0 V in richer conditions to 0 V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699867

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	Revving engine from idle to 3,000 rpm quickly after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ←→ RICH

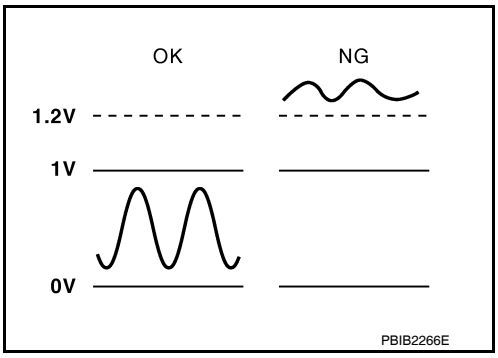
On Board Diagnosis Logic

INFOID:0000000007699868

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time.

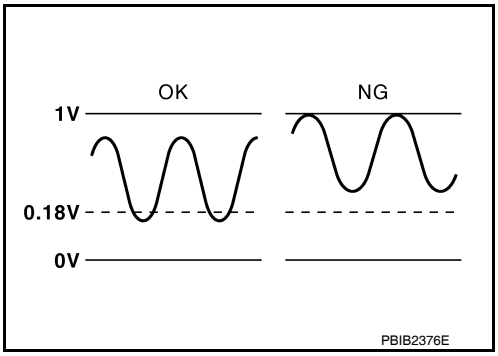
MALFUNCTION A

To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



MALFUNCTION B

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	A)	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (Heated oxygen sensor 2 circuit is open or shorted.) • Heated oxygen sensor 2
		B)	The minimum voltage from the sensor is not reached to the specified voltage.	• Harness or connectors (Heated oxygen sensor circuit is open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector

DTC Confirmation Procedure

INFOID:0000000007699869

Perform PROCEDURE FOR MALFUNCTION A first.
If DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-242, "Diagnosis Procedure".

PROCEDURE FOR MALFUNCTION B

With CONSULT
TESTING CONDITION:
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select “DATA MONITOR ” mode with CONSULT
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “HO2S2 (B1) P1146” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT.
9. Following the instruction of CONSULT.
   NOTE:
   It will take at most 10 minutes until “COMPLETED” is displayed.
10. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
    If “NG” is displayed, refer to EC-242, "Diagnosis Procedure".
    If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Return to step 1.

Overall Function Check

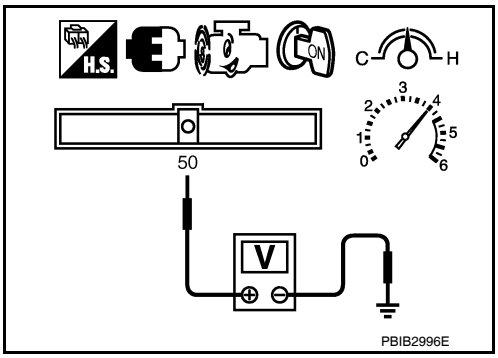
INFOID:0000000007699870

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

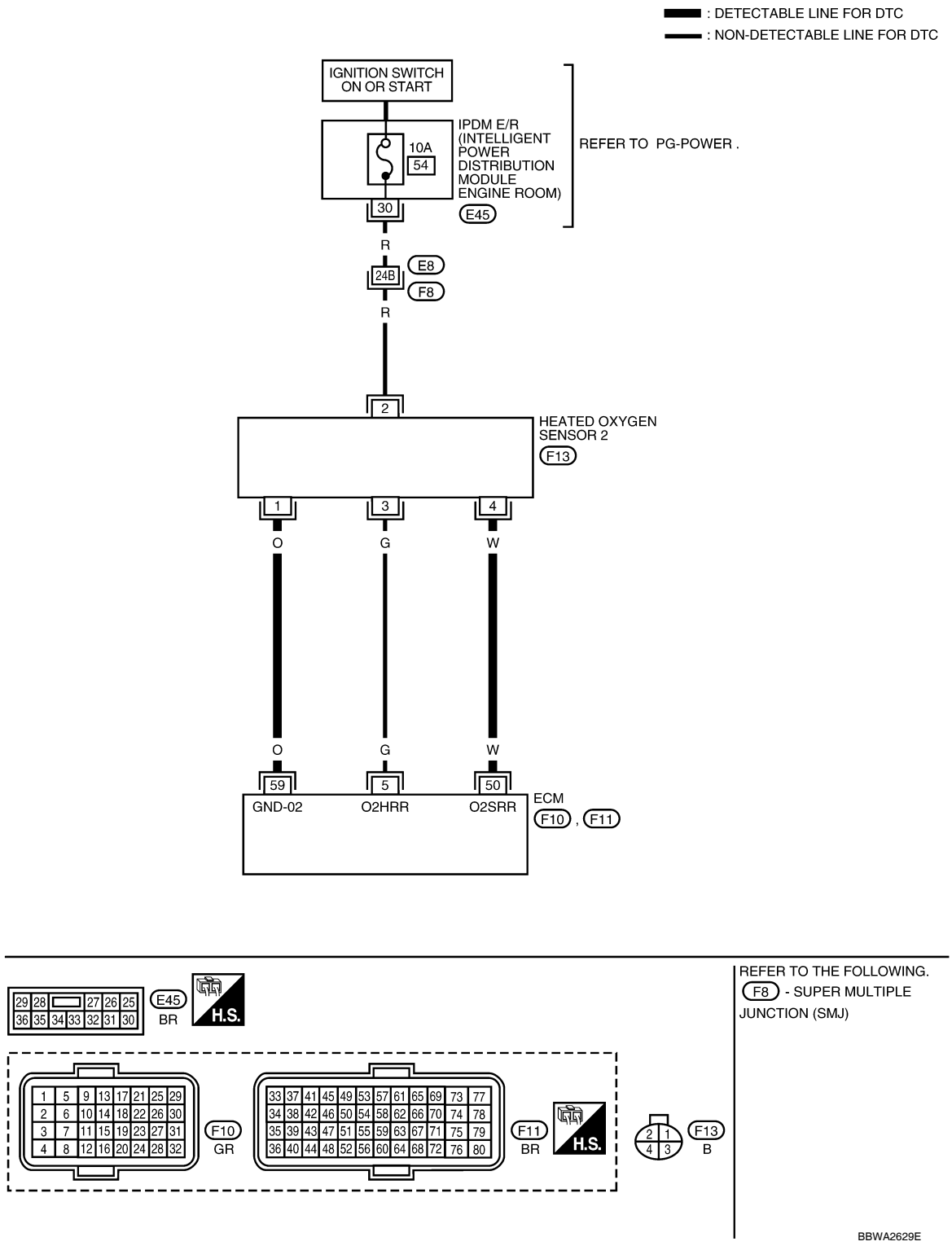
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be below 0.18 V at least once during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), D position (CVT) or 3rd gear position (M/T).
   The voltage should be below 0.18 V at least once during this procedure.
8. If NG, go to EC-242, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007699871

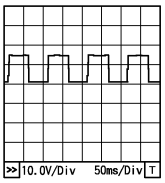
EC-HO2S2-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
5	G	Heated oxygen sensor 2 heater	**[Engine is running]** • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Approximately 10 V★  PBIA8148J
			[Ignition switch: ON] • Engine stopped **[Engine is running]** • Engine speed: Above 3,600 rpm.	Battery voltage (11 - 14 V)
50	W	Heated oxygen sensor 2	**[Engine is running]** • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V
59	O	Sensor ground (Heated oxygen sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

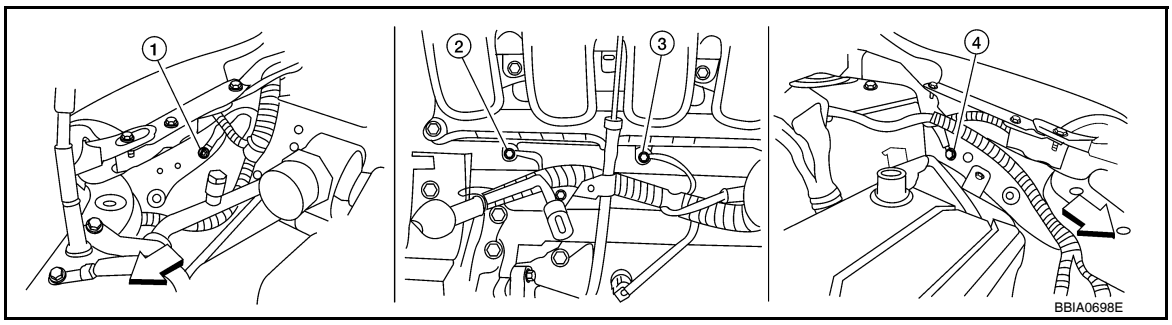
Diagnosis Procedure

INFOID:0000000007699872

PROCEDURE FOR MALFUNCTION A

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screw on the body.
   Refer to EC-146, "Ground Inspection".



1. body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

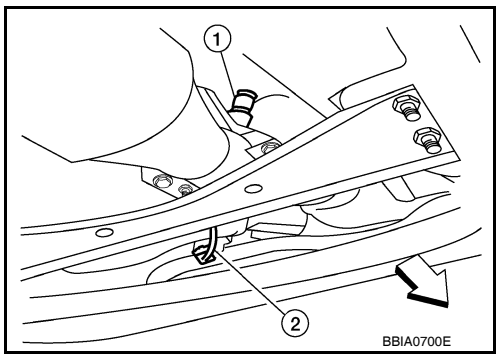
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector (2).



1. Heated oxygen sensor 2
⇦ : Vehicle front

2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-245, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2. Refer to EX-5, "Component".

6.CHECK INTERMITTENT INCIDENT

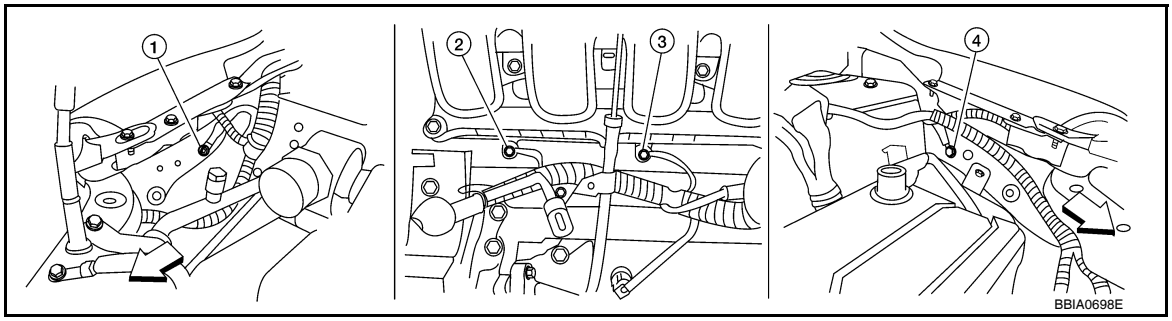
Refer to EC-140.

>> **INSPECTION END**

PROCEDURE FOR MALFUNCTION B

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screw on the body. Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

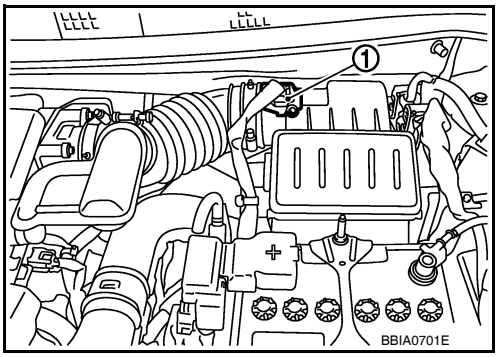
2.CLEAR THE SELF-LEARNING DATA

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



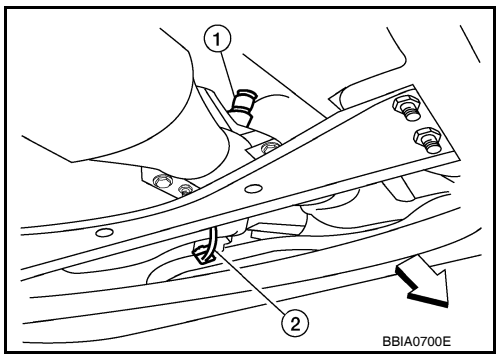
Yes or No

Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-271.
No >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect heated oxygen sensor 2 harness connector (2).



1. Heated oxygen sensor 2

⇦ : Vehicle front

3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-245, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2. Refer to EX-5, "Component".

6. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

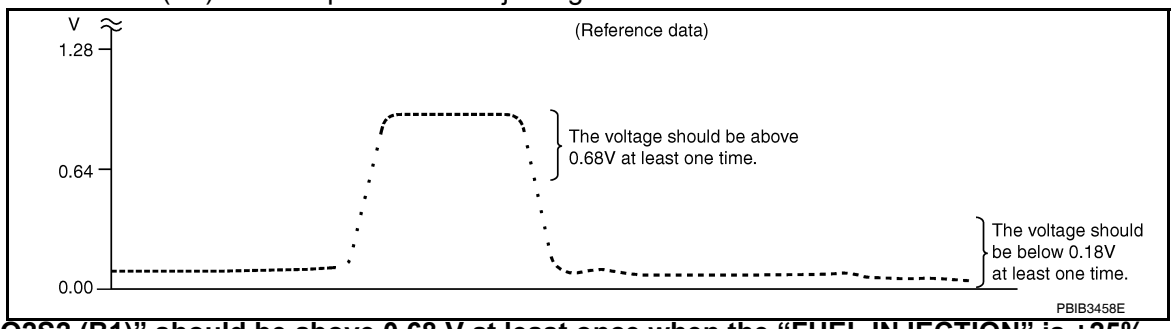
INFOID:0000000007699873

HEATED OXYGEN SENSOR 2 (M/T AND A/T MODELS)

With CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.

6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.

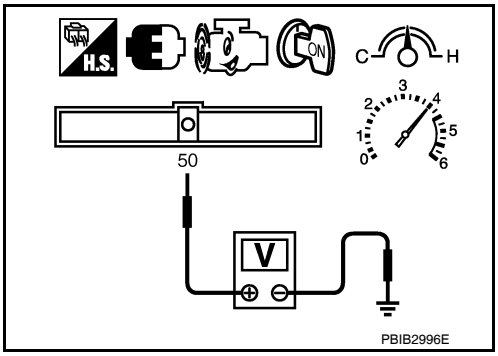


“HO2S2 (B1)” should be above 0.68 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.

CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
   If the voltage can be confirmed at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T) or 3rd gear position (M/T).
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".

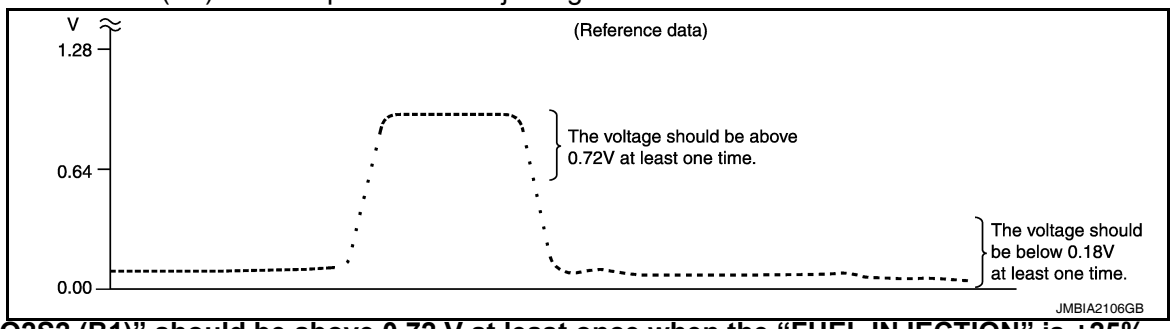
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

HEATED OXYGEN SENSOR 2 (CVT MODELS)

With CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.

6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



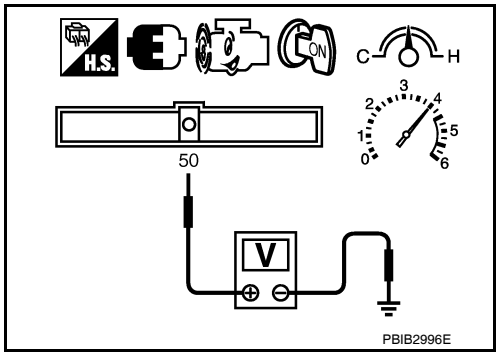
“HO2S2 (B1)” should be above 0.72 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
   If the voltage can be confirmed at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
   The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".

CAUTION:

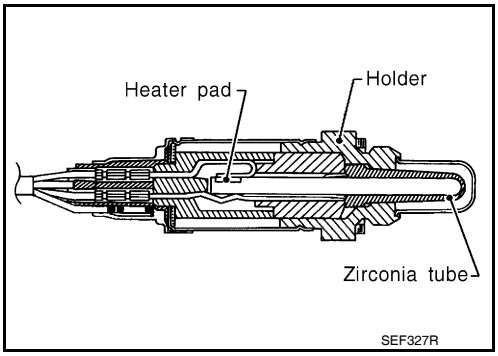
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

DTC P0139 HO2S2

Component Description

INFOID:0000000007699875

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air/fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1.0 V in richer conditions to 0 V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699876

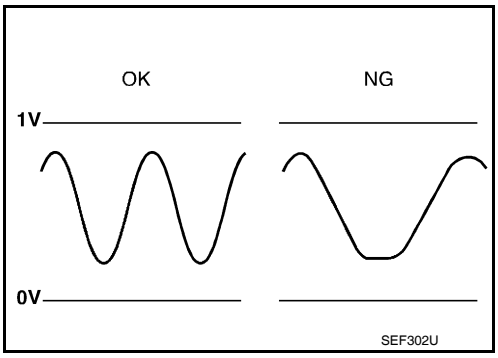
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	Revving engine from idle to 3,000 rpm quickly after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ←→ RICH
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT

On Board Diagnosis Logic

INFOID:0000000007699877

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst 1 causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 (bank 1) circuit slow response	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel system • EVAP system • Intake air system

DTC Confirmation Procedure

INFOID:0000000007699878

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES >> GO TO 2.
NO >> GO TO 7.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:
For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 1 minute.
8. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
9. Drive the vehicle in a proper at 60 km/h (38MPH) and maintain the speed.
   CAUTION:
   Always drive vehicle at a safe speed.
10. Release the accelerator pedal fully at least 5 seconds.
    CAUTION:
    - **Enable engine brake.**
    - **Always drive carefully.**
    - **Never apply brake when releasing the accelerator pedal.**
11. Repeat step 9 and 10 at least 8 times.
12. Check the following item of "DATA MONITOR".

DTC	Data monitor item	Status
P0139	HO2 S2 DIAG1 (B1)	CMPLT
	HO2 S2 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT screen?

YES >> GO TO 6.
NO-1: "CMPLT" is not displayed on DIAG 1>>Perform DTC confirmation procedure again.
NO-2: "CMPLT" is not displayed on DIAG 2>>GO TO 4.

4.PERFORM DTC WORK SUPPORT

1. Open engine hood.
2. Select "HO2S2 (B1) P0139" in "DTC WORK SUPPORT" mode with CONSULT.
3. Start engine and follow the instruction of CONSULT display.
   NOTE:
   It will take at most 10 minutes until "COMPLETED" is displayed.

Is "COMPLETED" displayed on CONSULT screen?

YES >> GO TO 6.
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
2. Perform DTC confirmation procedure again.

>> GO TO 3.

6. PERFORM SELF-DIAGNOSIS

With CONSULT
Perform ECM self-diagnosis.

Is DTC “P0139” detected?

YES >> Proceed to EC-252, "Diagnosis Procedure".
NO >> INSPECTION END

7. PERFORM OVERALL FUNCTION CHECK

Perform component function check. Refer to EC-250, "Overall Function Check".
NOTE:
Use overall function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EC-252, "Diagnosis Procedure".

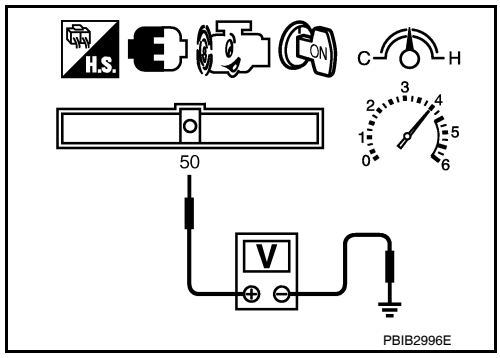
Overall Function Check

INFOID:0000000007699879

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

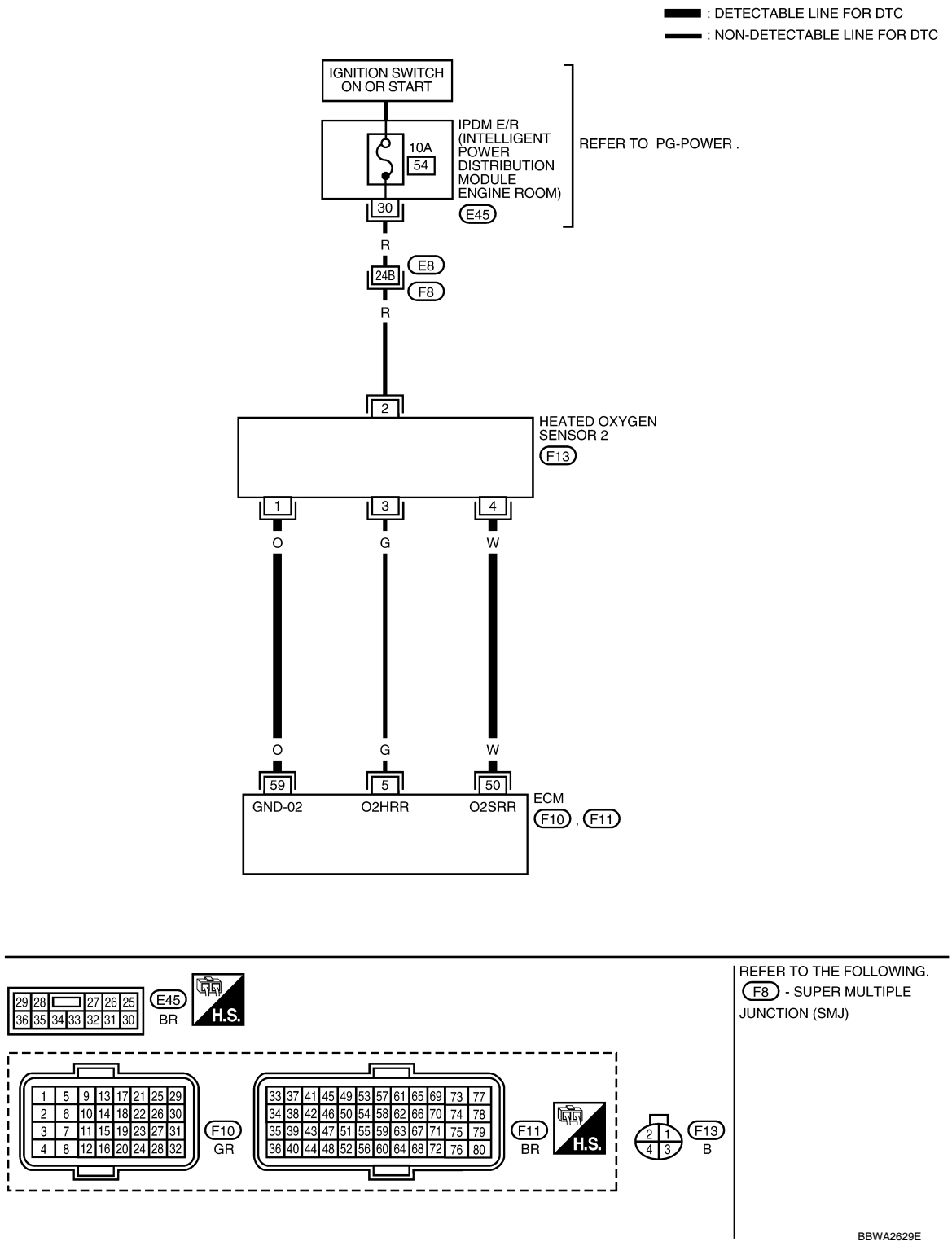
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   A change of voltage should be more than 0.8 V for 1 second during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), D position (CVT) or 3rd gear position (M/T).
   A change of voltage should be more than 0.8 V for 1 second during this procedure.
8. If NG, go to EC-252, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007699880

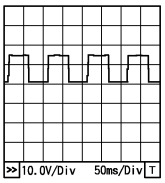
EC-HO2S2-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
5	G	Heated oxygen sensor 2 heater	**[Engine is running]** • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Approximately 10 V★  PBIA8148J
			[Ignition switch: ON] • Engine stopped **[Engine is running]** • Engine speed: Above 3,600 rpm.	Battery voltage (11 - 14 V)
50	W	Heated oxygen sensor 2	**[Engine is running]** • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V
59	O	Sensor ground (Heated oxygen sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

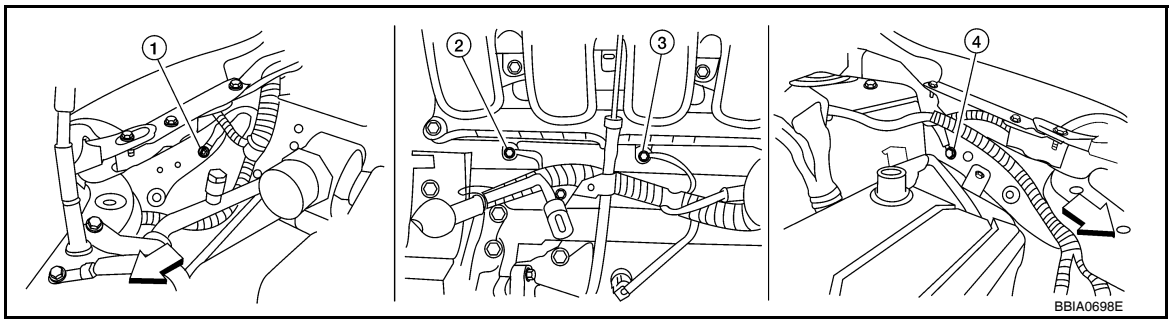
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699881

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CLEAR THE SELF-LEARNING DATA

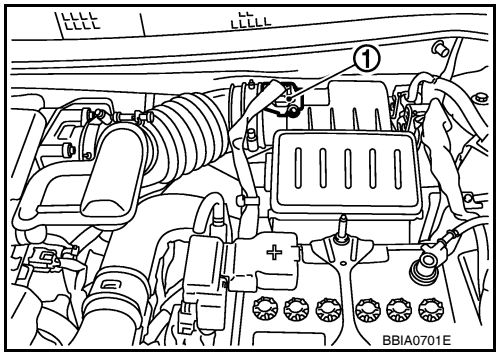
With CONSULT

1. Start engine and warm it up to normal operating temperature.

2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?

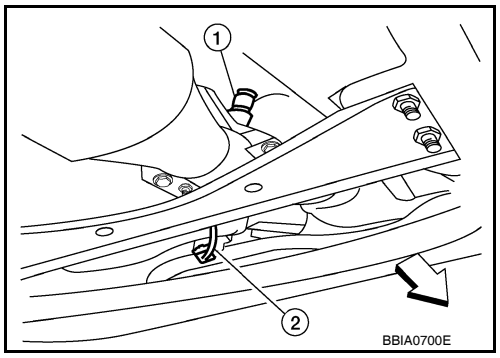


Yes or No

Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-265 or EC-271.
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).



1. Heated oxygen sensor 2
⇦ : Vehicle front

3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S2 terminal 1 and ECM terminal 59. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and ECM terminal 50. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-254, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2. Refer to EX-5, "Component".

6. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

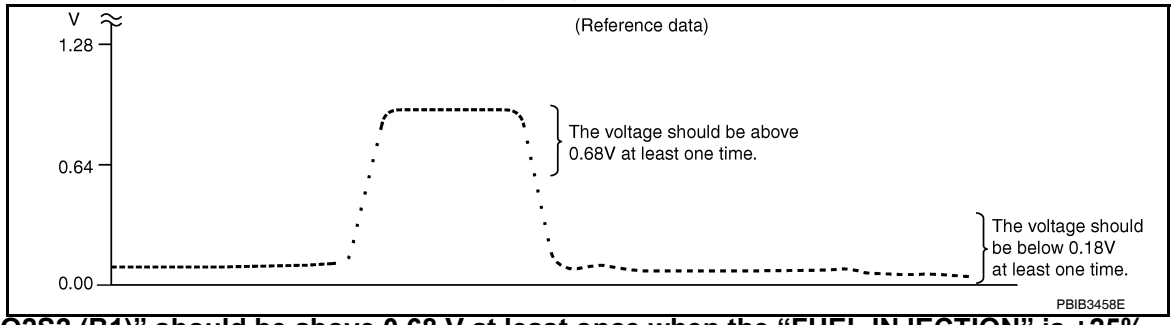
Component Inspection

INFOID:0000000007699882

HEATED OXYGEN SENSOR 2 (M/T AND A/T MODELS)

With CONSULT

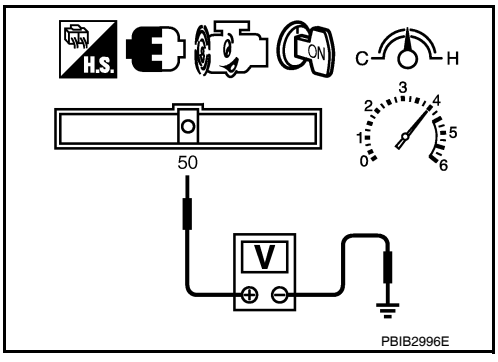
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.
6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.68 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
   If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T) or 3rd gear position (M/T).
   The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.

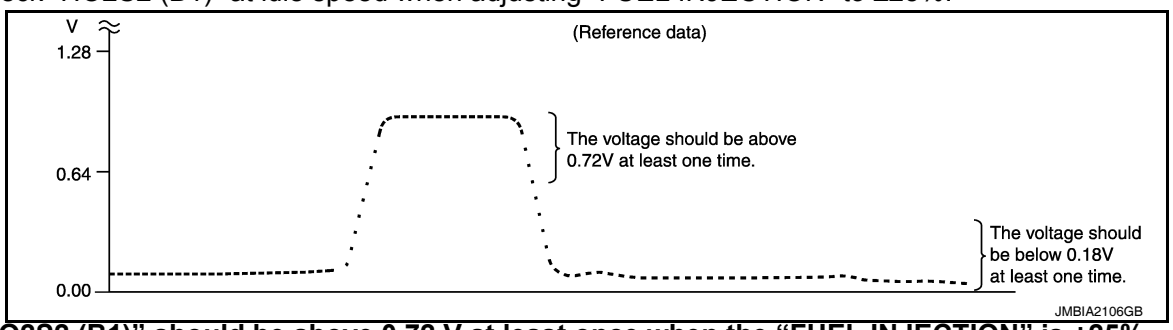


8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

HEATED OXYGEN SENSOR 2 (CVT MODELS)

With CONSULT

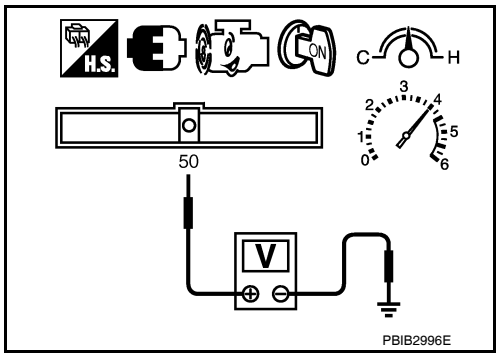
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT.
6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



“HO2S2 (B1)” should be above 0.72 V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.18 V at least once when the “FUEL INJECTION” is −25%.
CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position.
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to EX-5, "Component".



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**

- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

DTC P014C, P014D A/F SENSOR 1

Component Description

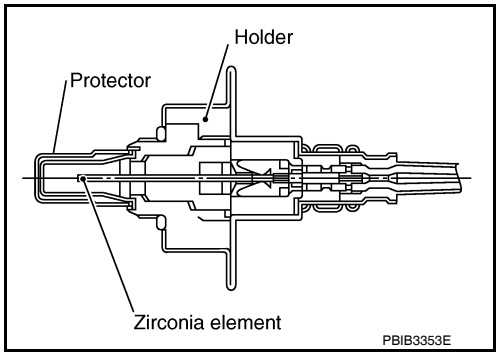
INFOID:0000000007699884

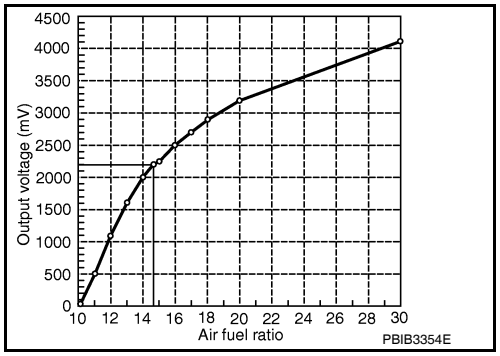
The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement λ = 1, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.

The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699885

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNT

On Board Diagnosis Logic

INFOID:0000000007699886

To judge malfunctions, this diagnosis measures response time of the A/F signal computed by ECM from the A/F sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the A/F sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P014C P014D	Air fuel ratio (A/F) sensor 1 (bank 1) circuit slow response	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.	• Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1

DTC Confirmation Procedure

INFOID:0000000007699887

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Do you have CONSULT?

YES >> GO TO 2.
NO >> GO TO 5.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1minute under no load.
6. Let engine idle for 1 minute.
7. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for about 1 minute.
9. Check the items status of “DATA MONITOR” as follows.

NOTE:

If “PRSNT” changed to “ABSNT”, refer to EC-215, "Overall Function Check".

Data monitor item	Status
A/F SEN1 DIAG3 (B1)	PRSNT

Is “PRSNT” displayed on CONSULT screen?

YES >> GO TO 4.
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

Perform DTC confirmation procedure-1 again.

Is “PRSNT” displayed on CONSULT screen?

YES >> GO TO 4.
NO >> Refer to EC-215, "Overall Function Check".

4. PERFORM DTC CONFIRMATION PROCEDURE-2

1. Wait for about 20 seconds at idle.
2. Check the items status of “DATA MONITOR” as follows.

NOTE:

If “CMPLT” changed to “INCMP”, refer to EC-215, "Overall Function Check".

Data monitor item	Status
A/F SEN1 DIAG2 (B1)	CMPLT

Is “CMPLT” displayed on CONSULT screen?

YES >> GO TO 5.
NO >> Refer to EC-215, "Overall Function Check".

5. PERFORM SELF-DIAGNOSIS

With CONSULT

Check the “SELF-DIAG RESULT”.

Is any DTC detected?

YES >> Proceed to EC-261, "Diagnosis Procedure".
NO >> INSPECTION END

6. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service $01 with GST.
3. Calculate the total value of “Short term fuel trim” and “Long term fuel trim” indications.

Is the total percentage within ±15%?

YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

8. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
7. Fully release accelerator pedal and then let engine idle for about 1 minute.
8. Check 1st trip DTC.

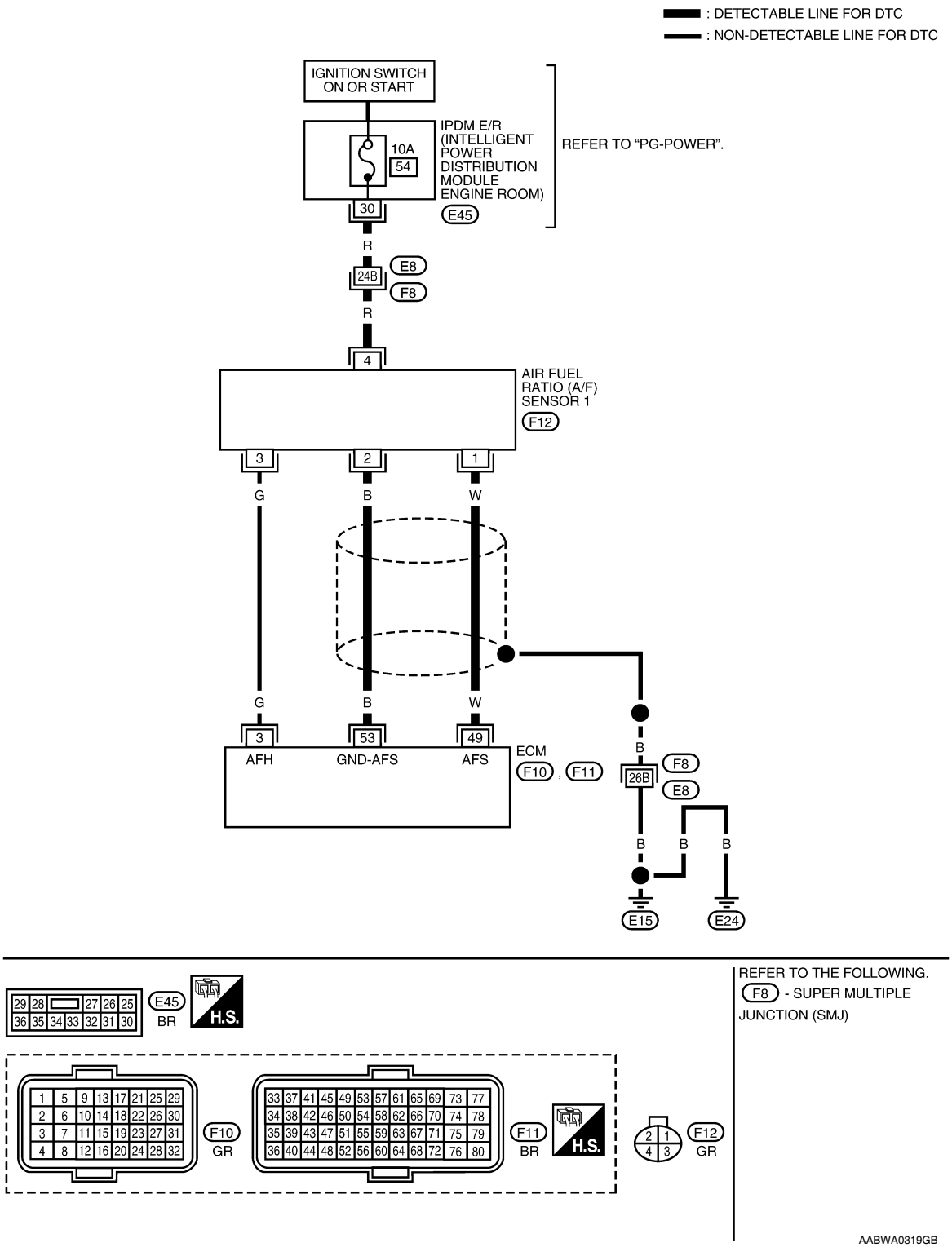
Is 1st trip DTC detected?

YES >> Proceed to EC-261, "Diagnosis Procedure".
NO >> INSPECTION END

Wiring Diagram

INFOID:0000000007699888

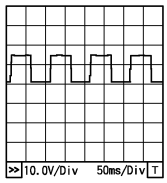
EC-A/F-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

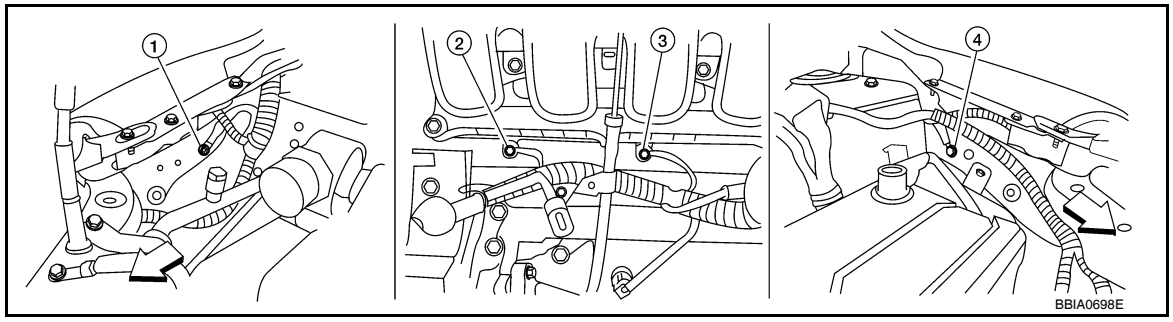
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699889

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

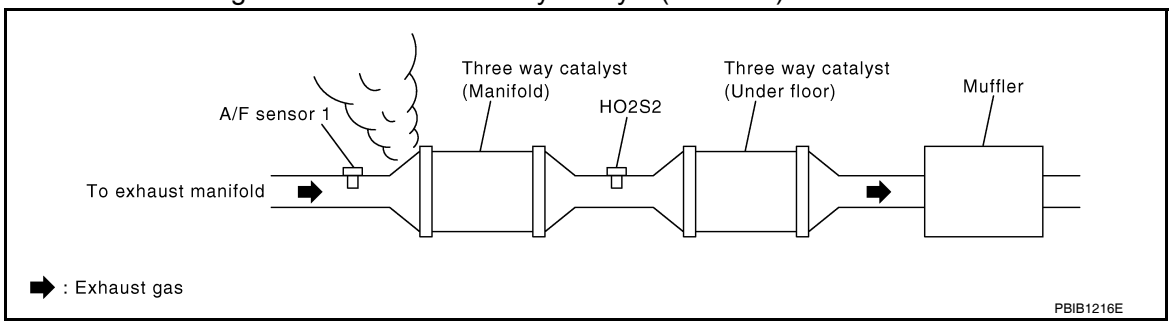
Loosen and retighten the air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

>> GO TO 3.

3.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.

2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace.

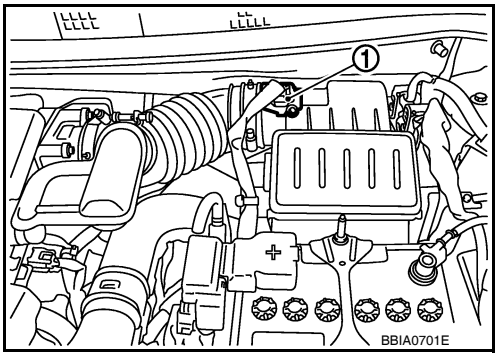
5. CLEAR THE SELF-LEARNING DATA

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR” or “START”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?



Yes or No

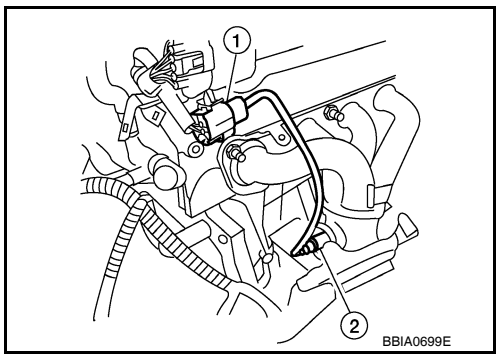
Yes >> Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-265 or EC-271.
No >> GO TO 6.

6. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

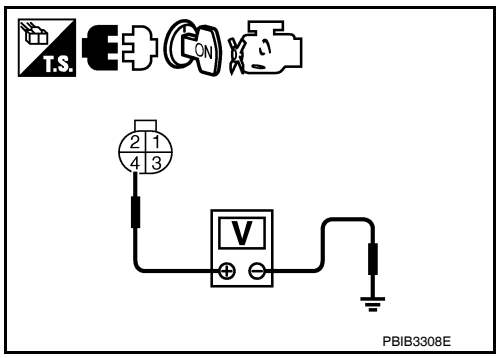
2. Disconnect A/F sensor 1 harness connector (1).

2. Air fuel ratio (A/F) sensor 1



3. Turn ignition switch ON.
4. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to EC-158, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Refer to EC-175, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> Replace mass air flow sensor. Refer to EM-16, "Component".

11. CHECK PCV VALVE

Refer to EC-43, "Component Inspection".

OK or NG

OK >> GO TO 12.
NG >> Repair or replace PCV valve. Refer to EM-32, "Component".

12. CHECK INTERMITTENT INCIDENT

Perform EC-140, "Description".

OK or NG

OK >> GO TO 13.
NG >> Repair or replace.

13. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:

- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

>> **INSPECTION END**

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:0000000007699891

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171 0171	Fuel injection system too lean	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	• Intake air leaks • Air fuel ratio (A/F) sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor • Incorrect PCV hose connection

DTC Confirmation Procedure

INFOID:0000000007699892

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Start engine.
   If it is difficult to start engine, the fuel injection system has a malfunction.
   Perform the following procedure is advised.

a. Crank engine while depressing accelerator pedal.
   NOTE:
   When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

b. If engine starts, go to EC-268, "Diagnosis Procedure".
   If engine does not start, check exhaust and intake air leak visually.

6. Keep engine at idle for at least 5 minutes.
7. Check 1st trip DTC.
   The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-268, "Diagnosis Procedure".
   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine.
c. Maintain the following conditions for at least 10 consecutive minutes.
   Hold the accelerator pedal as steady as possible.

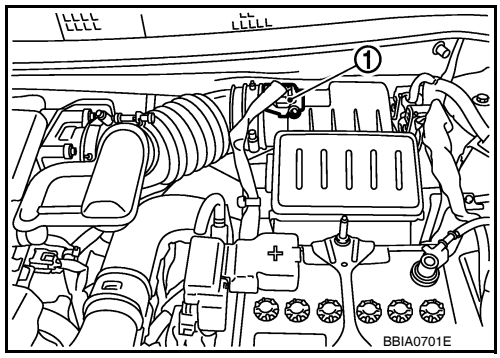
VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)

CAUTION:
Always drive vehicle at a safe speed.

d. Check 1st trip DTC.
e. If 1st trip DTC is detected, go to EC-268, "Diagnosis Procedure".

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor (1) harness connector.
6. Select Service $03 with GST. Make sure DTC P0102 is detected.
7. Select Service $04 with GST and erase the DTC P0102.
8. Start engine.
   If it is difficult to start engine, the fuel injection system has a malfunction.
   Perform the following procedure is advised.



a. Crank engine while depressing accelerator pedal.
   NOTE:
   When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.
b. If engine starts, go to EC-268, "Diagnosis Procedure".
   If engine does not start, check exhaust and intake air leak visually.

9. Keep engine at idle for at least 5 minutes.
10. Check 1st trip DTC.
    The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-268, "Diagnosis Procedure".
    NOTE:
    If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine.
c. Maintain the following conditions for at least 10 consecutive minutes.
   Hold the accelerator pedal as steady as possible.

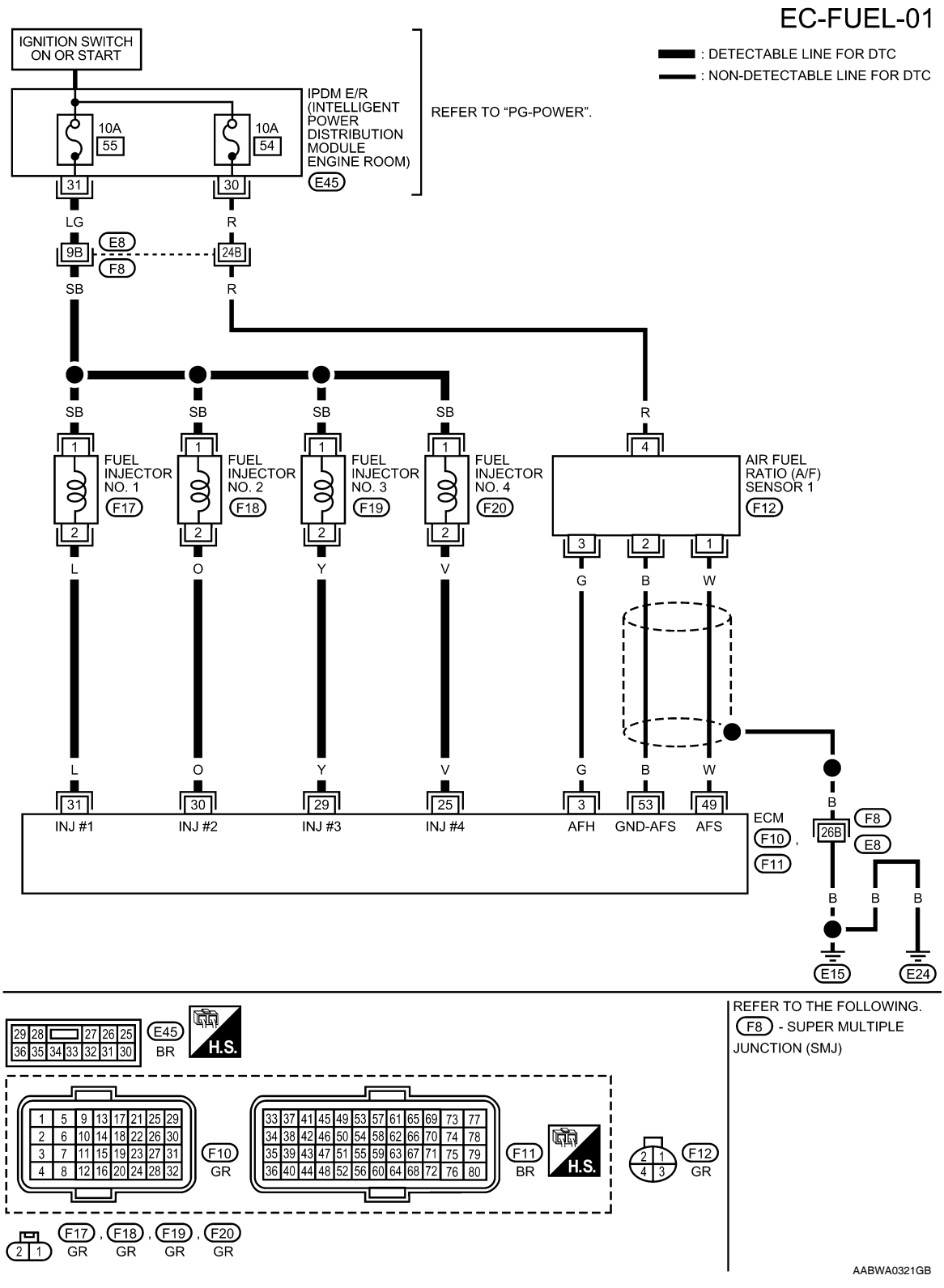
VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)

CAUTION:
Always drive vehicle at a safe speed.

d. Check 1st trip DTC.
e. If 1st trip DTC is detected, go to EC-268, "Diagnosis Procedure".

Wiring Diagram

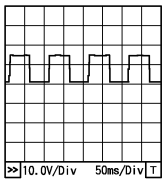
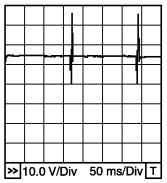
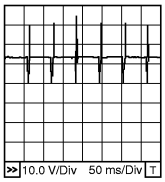
INFOID:0000000007699893



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
25 29 30 31	V Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	Battery voltage (11 - 14 V)★  PBIB0529E
			[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	Battery voltage (11 - 14 V)★  PBIA4943J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

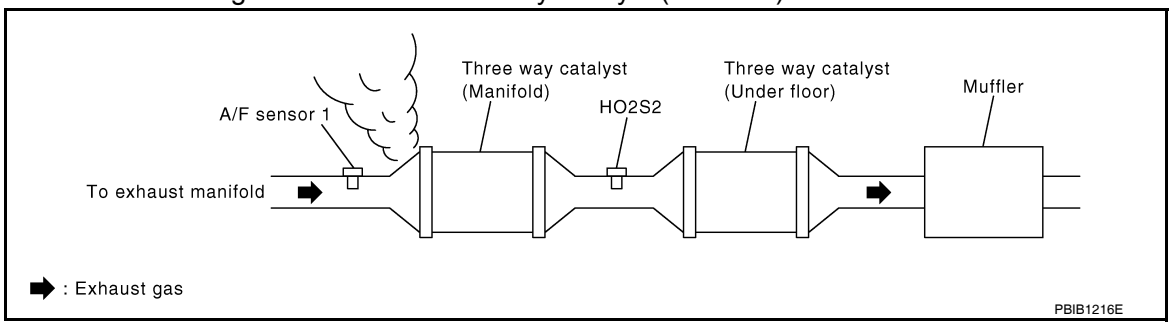
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699894

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



PBIB1216E

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.

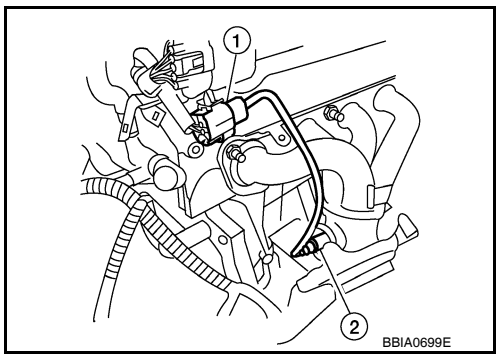
2. Check PCV hose connection.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).



2. Air fuel ratio (A/F) sensor 1

3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-89, "Fuel Pressure Check".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-89, "Fuel Pressure Check".

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Fuel pump and circuit (Refer to EC-524.)
- Fuel pressure regulator (Refer to EC-89, "Fuel Pressure Check".)
- Fuel lines (Refer to FL-5, "Checking Fuel Line".)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT.

At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

With GST
1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service $01 with GST.

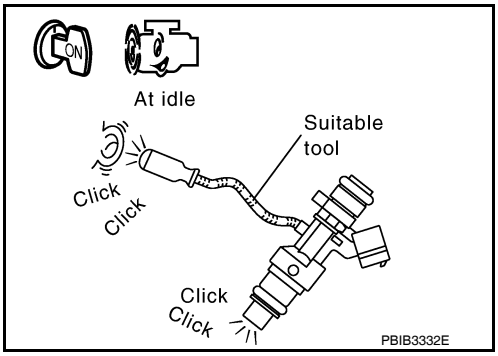
At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

OK or NG
OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-170.

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT
1. Let engine idle.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT
1. Let engine idle.
2. Listen to each fuel injector operating sound.

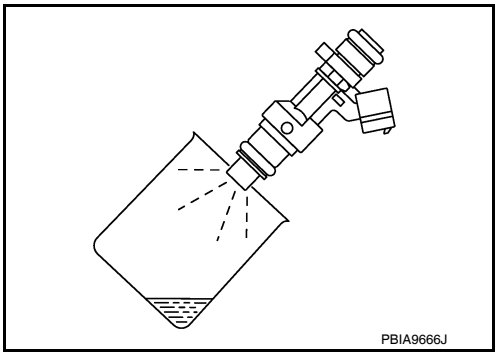


Clicking noise should be heard.

OK or NG
OK >> GO TO 8.
NG >> Perform trouble diagnosis for EC-519.

8. CHECK FUEL INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Reconnect all harness connectors disconnected.
4. Remove fuel tube assembly. Refer to EM-35.
   Keep fuel hose and all fuel injector connected to fuel tube.
   The fuel injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from fuel injectors.



Fuel should be sprayed evenly for each fuel injector.

OK or NG
OK >> GO TO 9.
NG >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones. Refer to EM-35, "Component".

9. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:0000000007699895

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172	Fuel injection system too rich	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	• Air fuel ratio (A/F) sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor

DTC Confirmation Procedure

INFOID:0000000007699896

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Start engine.
   If it is difficult to start engine, the fuel injection system has a malfunction.
   Perform the following procedure is advised.

a. Crank engine while depressing accelerator pedal.
   NOTE:
   When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

b. If engine starts, go to EC-274, "Diagnosis Procedure".
   If engine does not start, remove ignition plugs and check for fouling, etc.

6. Keep engine at idle for at least 5 minutes.
7. Check 1st trip DTC.
   The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-274, "Diagnosis Procedure".
   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine.
c. Maintain the following conditions for at least 10 consecutive minutes.
   Hold the accelerator pedal as steady as possible.

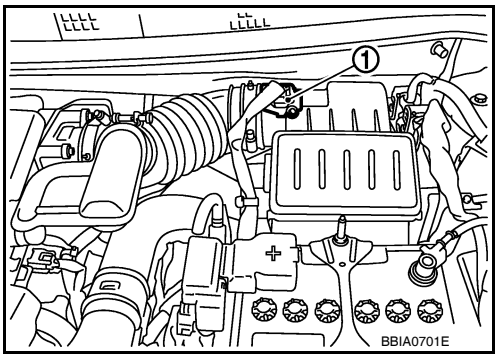
VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)

CAUTION:
Always drive vehicle at a safe speed.

d. Check 1st trip DTC.
e. If 1st trip DTC is detected, go to EC-274, "Diagnosis Procedure".

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service $03 with GST. Make sure DTC P0102 is detected.
7. Select Service $04 with GST and erase the DTC P0102.
8. Start engine.
   If it is difficult to start engine, the fuel injection system has a malfunction.
   Perform the following procedure is advised.



a. Crank engine while depressing accelerator pedal.
   NOTE:
   When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.
b. If engine starts, go to EC-274, "Diagnosis Procedure".
   If engine does not start, remove ignition plugs and check for fouling, etc.

9. Keep engine at idle for at least 5 minutes.
10. Check 1st trip DTC.
    The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-274, "Diagnosis Procedure".
    NOTE:
    If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine.
c. Maintain the following conditions for at least 10 consecutive minutes.
   Hold the accelerator pedal as steady as possible.

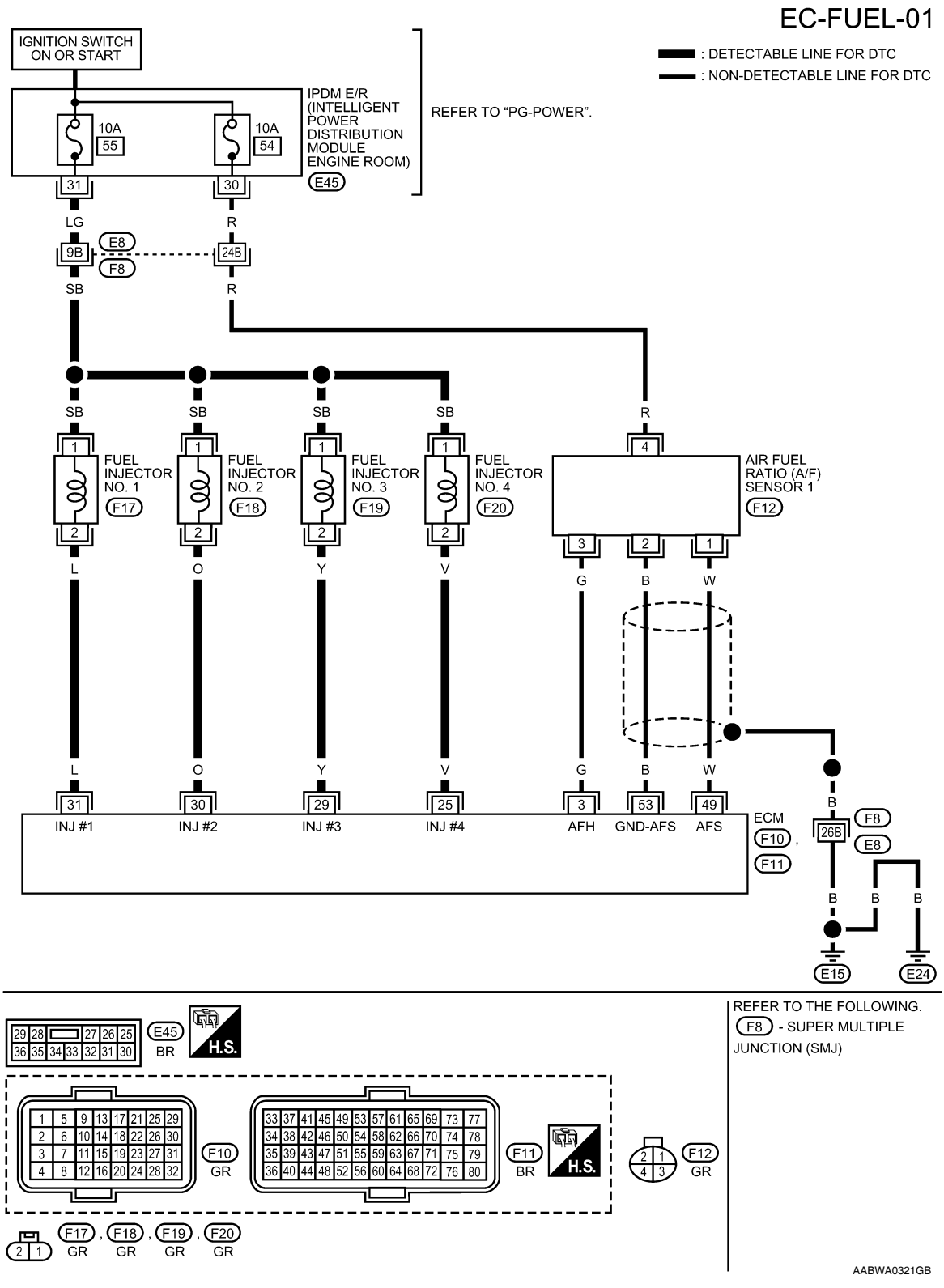
VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)

CAUTION:
Always drive vehicle at a safe speed.

d. Check 1st trip DTC.
e. If 1st trip DTC is detected, go to EC-274, "Diagnosis Procedure".

Wiring Diagram

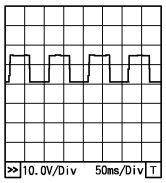
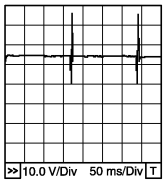
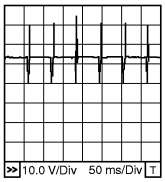
INFOID:0000000007699897



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
25 29 30 31	V Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	Battery voltage (11 - 14 V)★  PBIB0529E
			[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	Battery voltage (11 - 14 V)★  PBIA4943J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

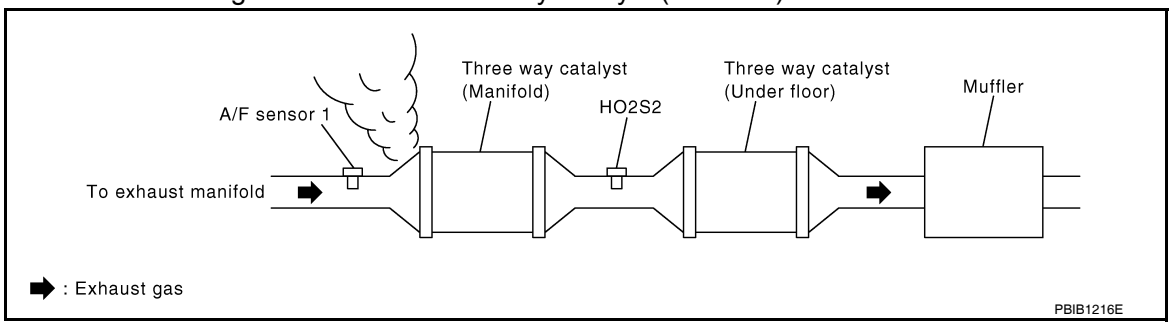
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699898

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



PBIB1216E

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

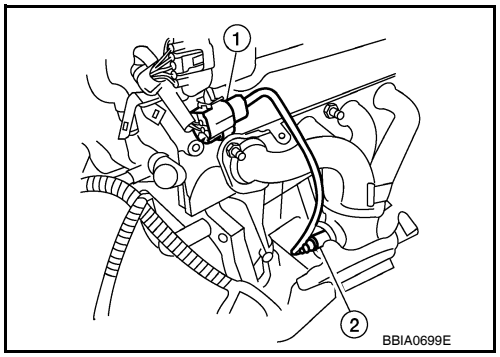
Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).



2. Air fuel ratio (A/F) sensor 1

3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-89, "Fuel Pressure Check".
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-89, "Fuel Pressure Check".

At idling: Approximately 350 kPa (3.57 kg/cm2, 51 psi)

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Fuel pump and circuit (Refer to EC-524.)
- Fuel pressure regulator (Refer to EC-89, "Fuel Pressure Check".)

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT.

At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

With GST

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service $01 with GST.

At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

OK or NG

OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-170.

7. CHECK FUNCTION OF FUEL INJECTORS

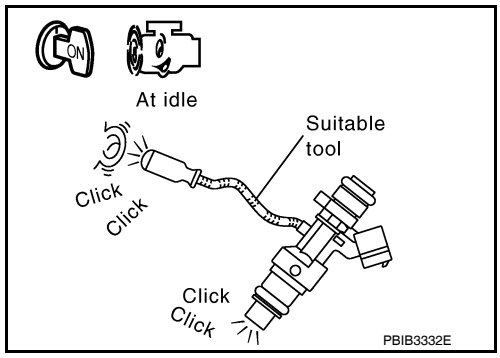
With CONSULT

1. Let engine idle.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> GO TO 8.
NG >> Perform trouble diagnosis for EC-519.

8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to EM-35.
   Keep fuel hose and all fuel injector connected to fuel tube.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Reconnect all harness connectors disconnected.
4. Disconnect all injector harness connectors.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds.
   Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip.)>>GO TO 9.
NG (Drips.)>>Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one. Refer to EM-35, "Component".

9. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

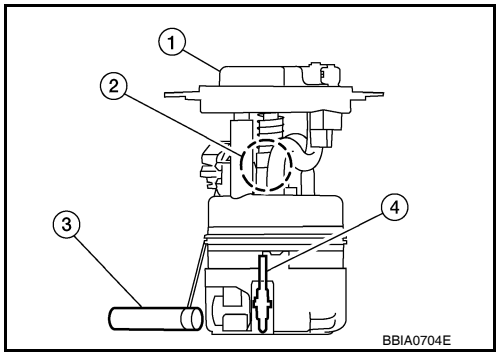
DTC P0181 FTT SENSOR

Component Description

INFOID:0000000007699899

The fuel tank temperature sensor (4) is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

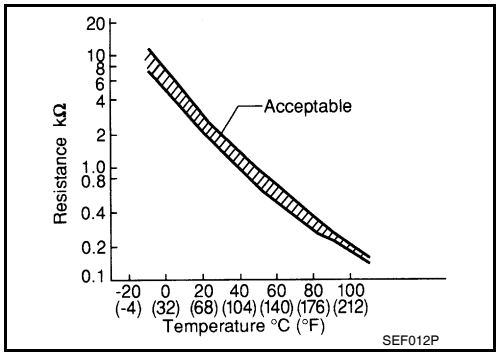
1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
3. Fuel level sensor



<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007732208

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0181 0181	Fuel tank temperature (FTT) sensor circuit range/performance	A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	• Harness or connectors (The sensor circuit is open or shorted) • Fuel tank temperature sensor
		B)	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	• Harness or connectors (High or low resistance in the FTT sensor circuit) • FTT sensor

DTC Confirmation Procedure

INFOID:0000000007732209

1.INSPECTION START

Is it necessary to erase permanent DTC?

YES >> GO TO 7.
NO >> GO TO 2.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-280, "Diagnosis Procedure".
NO >> GO TO 4.

4.CHECK ENGINE COOLANT TEMPERATURE

With CONSULT
1. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT.
2. Check “COOLAN TEMP/S” indication.

With GST
Follow the procedure “With CONSULT” above.

Is “COOLAN TEMP/S” indication less than 60°C (140°F)?

YES >> INSPECTION END
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT
1. Cool engine down until “COOLAN TEMP/S” indication is less than 60°C (140°F).
2. Wait at least 10 seconds.
3. Check 1st trip DTC.

With GST
Follow the procedure “With CONSULT” above.

Is 1st trip DTC detected?

YES >> Proceed to EC-280, "Diagnosis Procedure".
NO >> GO TO 6.

6.PERFORM OVERALL FUNCTION CHECK (FOR MALFUNCTION B)

Perform overall function check. Refer to EC-279, "Overall Function Check".

NOTE:
Use the overall function check to check the overall function of the FTT sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EC-280, "Diagnosis Procedure".

7.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:
- **Before performing the following procedure, do not add fuel.**
- **Before performing the following procedure, check that fuel level is between 1/4 and 4/4.**
- **Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.**

>> GO TO 8.

8.PERFORM DTC CONFIRMATION PROCEDURE B

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.
   NOTE:
   Cool the vehicle in an environment of ambient air temperature between −10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.
   CAUTION:
   Never turn ignition switch ON during soaking.
   NOTE:
   The vehicle must be cooled with the food open.
4. Start engine and let it idle for 5 minutes or more.
   CAUTION:
   Never turn ignition switch OFF during idling.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

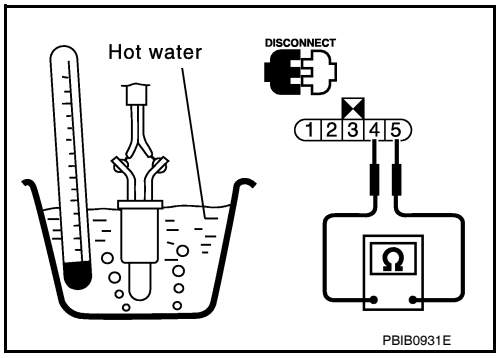
YES >> Proceed to EC-280, "Diagnosis Procedure".
NO >> INSPECTION END

Overall Function Check

INFOID:0000000007732210

1. CHECK FUEL TANK TEMPERATURE (FTT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Remove fuel level sensor unit. Refer to FL-6, "Removal and Installation".
4. Check resistance between fuel level sensor unit and fuel pump terminals by heating with hot water as shown in the figure.



Terminals	Condition		Resistance (kΩ)
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 – 2.7
		50 (122)	0.79 – 0.90

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to EC-280, "Diagnosis Procedure".

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to EC-140, "Diagnosis Procedure".

Is the inspection result normal?

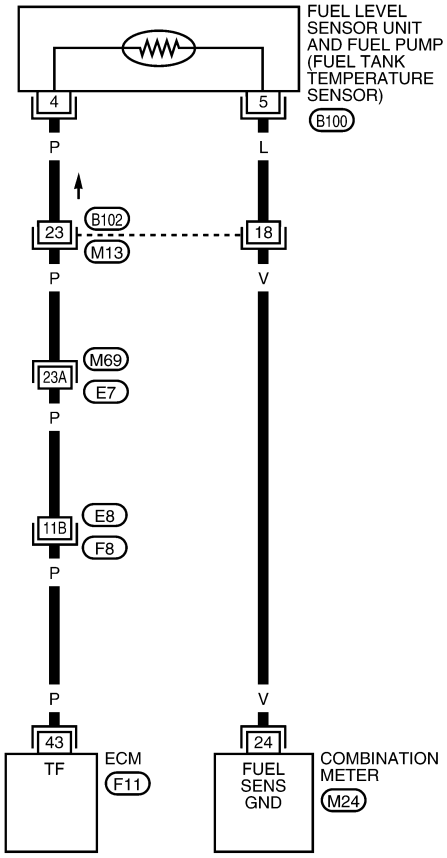
YES >> INSPECTION END
NO >> Proceed to EC-280, "Diagnosis Procedure".

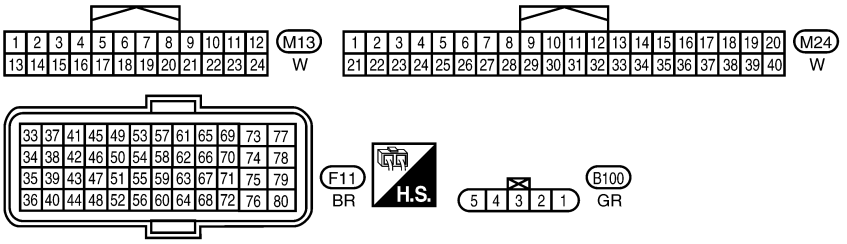
Wiring Diagram

INFOID:0000000007699902

EC-FTTS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
M69 , F8 - SUPER MULTIPLE JUNCTION (SMJ)

BBWA2636E

Diagnosis Procedure

INFOID:0000000007699903

1.INSPECTION START

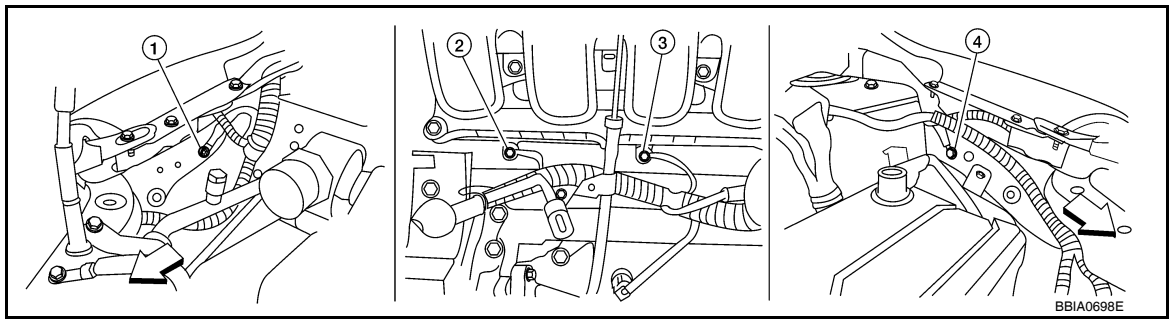
Confirm the detected malfunction (A or B). Refer to EC-277, "On Board Diagnosis Logic".

Which malfunction is detected?

A >> GO TO 2.
B >> GO TO 7.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

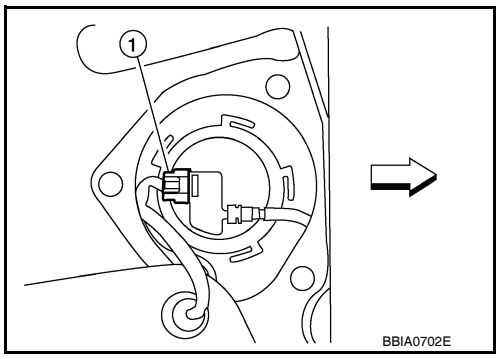
OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

3. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

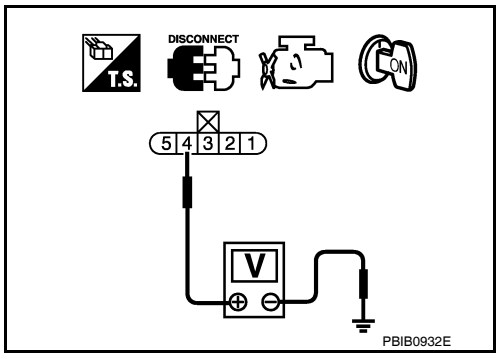
1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector (1).

⇦ : Vehicle front



3. Turn ignition switch ON.
4. Check voltage between “fuel level sensor unit and fuel pump” terminal 4 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 5 and combination meter terminal 24. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B102, M13
- Harness for open or short between “fuel level sensor unit and fuel pump” and ground.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, EC-282, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace “fuel level sensor unit and fuel pump”. Refer to FL-6, "Component".

8. CHECK INTERMITTENT INCIDENT

Perform EC-140.

>> **INSPECTION END**

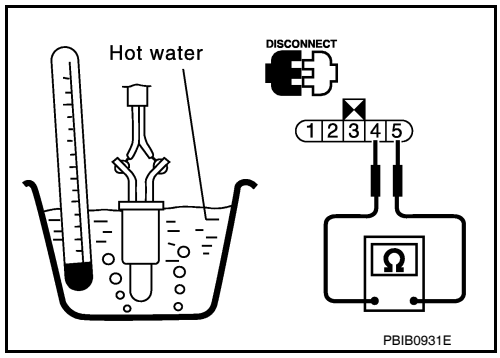
Component Inspection

INFOID:0000000007699904

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to FL-6, "Component".

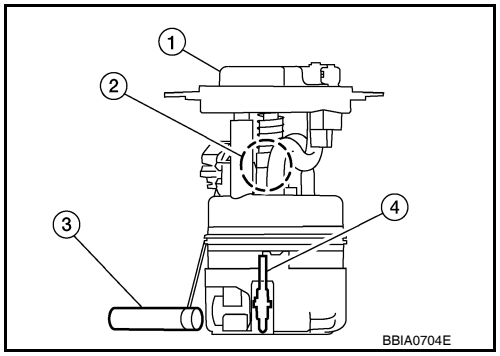
DTC P0182, P0183 FTT SENSOR

Component Description

INFOID:0000000007699906

The fuel tank temperature sensor (4) is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

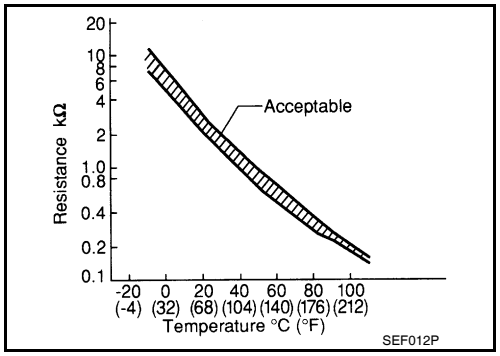
1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
3. Fuel level sensor



<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminals.



On Board Diagnosis Logic

INFOID:0000000007699907

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (Fuel tank temperature sensor circuit is open or shorted.) • Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:0000000007699908

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

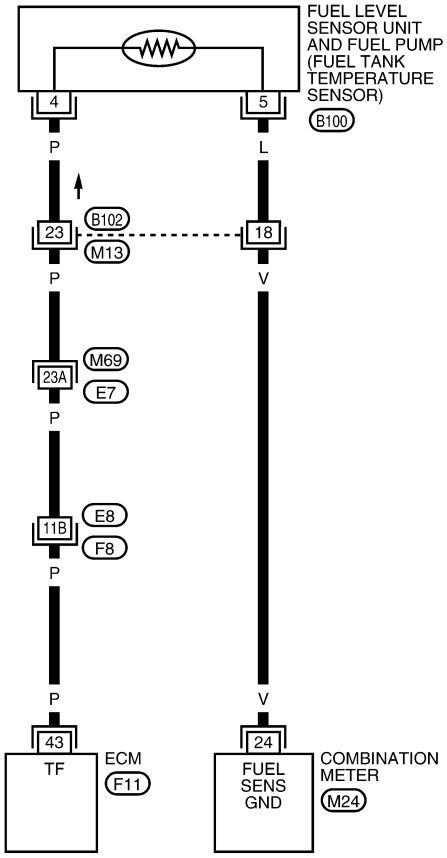
1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-284, "Diagnosis Procedure".

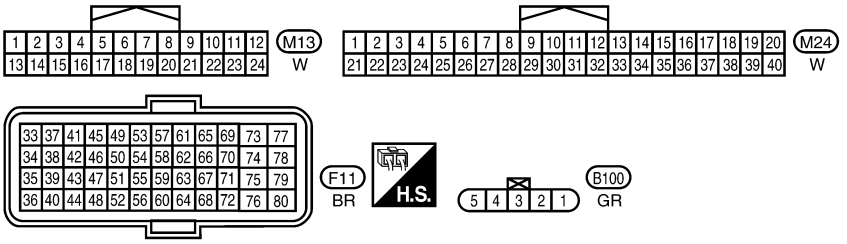
Wiring Diagram

INFOID:0000000007699909

EC-FTTS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
M69 , F8 - SUPER MULTIPLE JUNCTION (SMJ)

BBWA2636E

Diagnosis Procedure

INFOID:0000000007699910

1.INSPECTION START

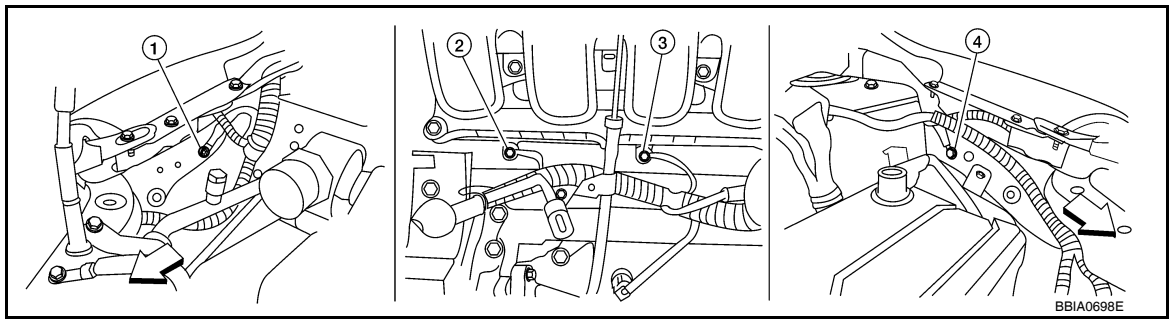
Confirm the detected malfunction (A or B). Refer to EC-277, "On Board Diagnosis Logic".

Which malfunction is detected?

A >> GO TO 2.
B >> GO TO 7.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

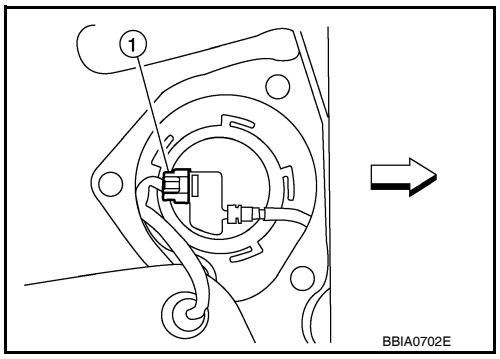
OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

3. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

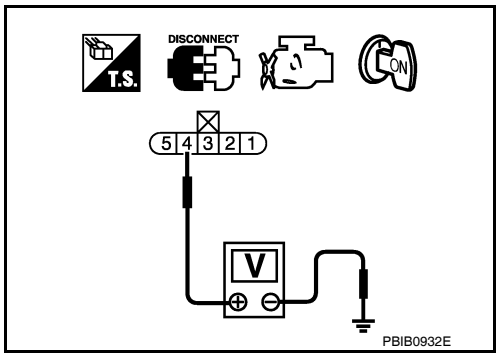
1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector (1).

⇦ : Vehicle front



3. Turn ignition switch ON.
4. Check voltage between “fuel level sensor unit and fuel pump” terminal 4 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 5 and combination meter terminal 24. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B102, M13
- Harness for open or short between “fuel level sensor unit and fuel pump” and ground.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, EC-286, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace “fuel level sensor unit and fuel pump”. Refer to FL-6, "Component".

8. CHECK INTERMITTENT INCIDENT

Perform EC-140.

>> **INSPECTION END**

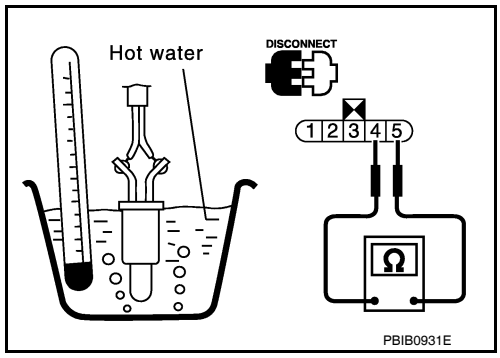
Component Inspection

INFOID:0000000007699911

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



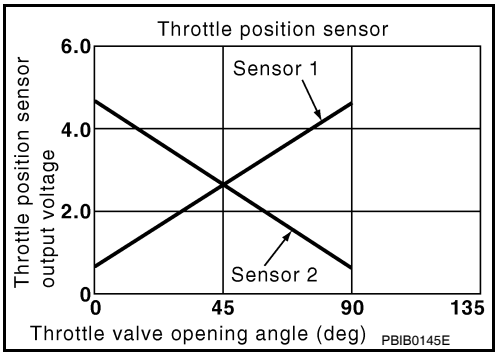
2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to FL-6, "Component".

DTC P0222, P0223 TP SENSOR

Component Description

INFOID:0000000007699913

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699914

Specification data are reference values.

Monitor item	Condition		Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Selector lever: D (A/T, CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:0000000007699915

These self-diagnoses have the one trip detection logic.
NOTE:
If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	• Harness or connectors (TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) • Electric throttle control actuator (TP sensor 1) • Accelerator pedal position sensor (APP sensor 2)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007699916

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

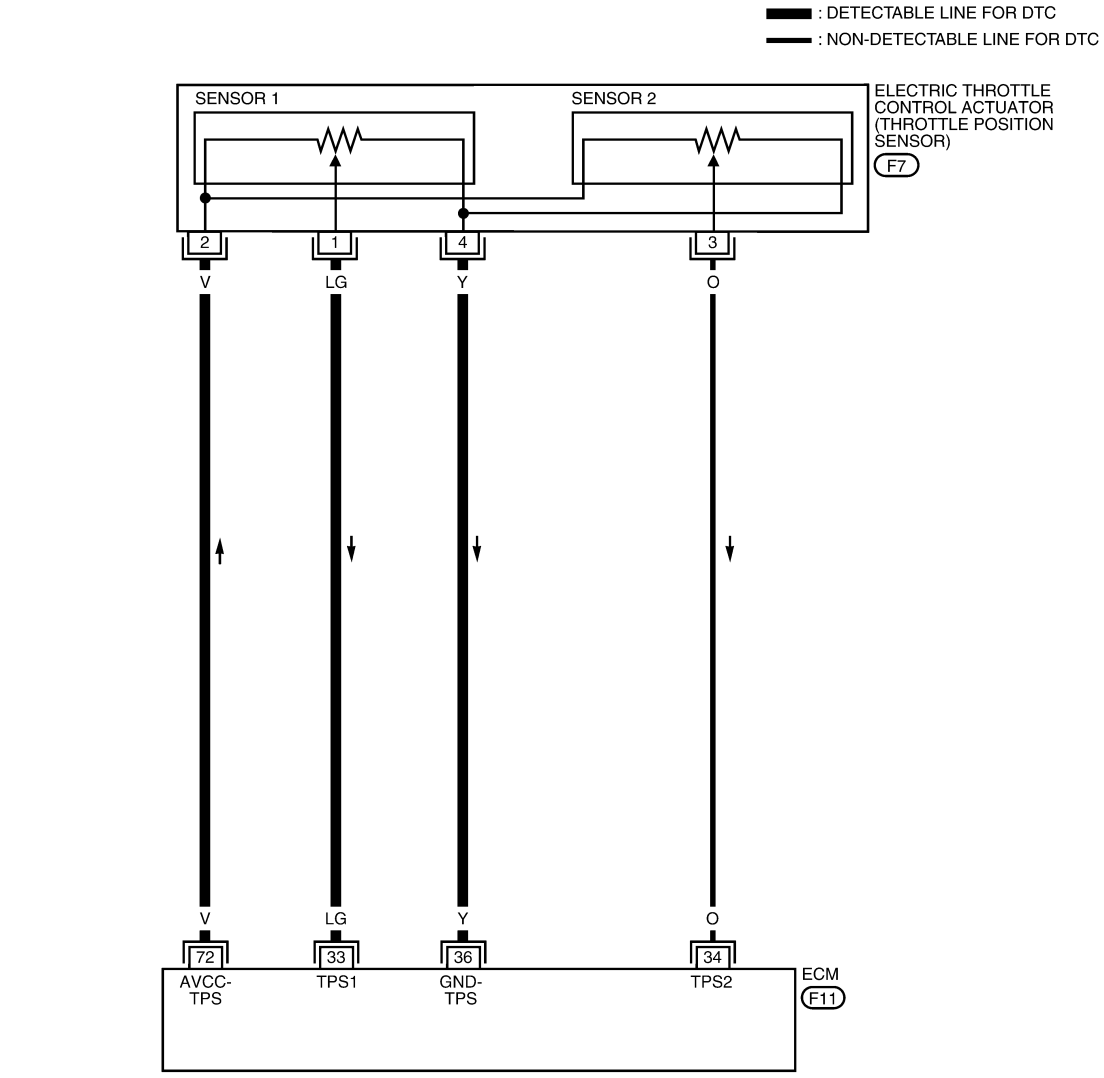
1. Start engine and let it idle for 1 second.

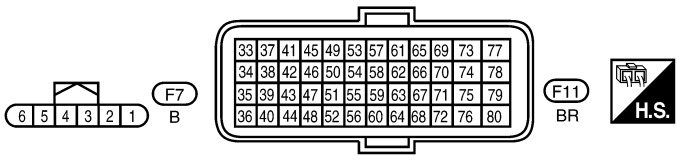
2. Check DTC.
3. If DTC is detected, go to EC-289, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699917

EC-TPS1-01





BBWA2655E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

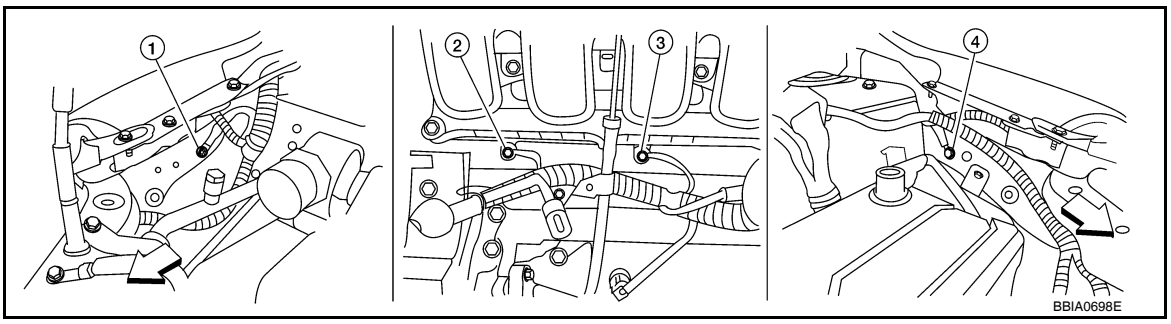
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
33	LG	Throttle position sensor 1	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	O	Throttle position sensor 2	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	Y	Sensor ground (Throttle position sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
72	V	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5.0 V

Diagnosis Procedure

INFOID:0000000007699918

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

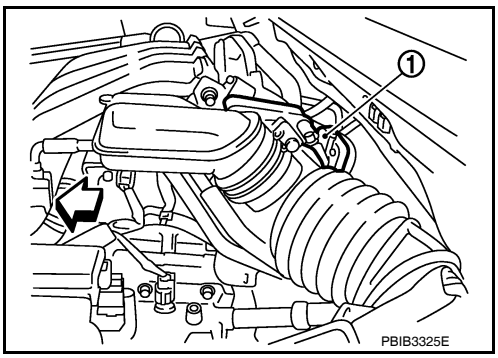
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

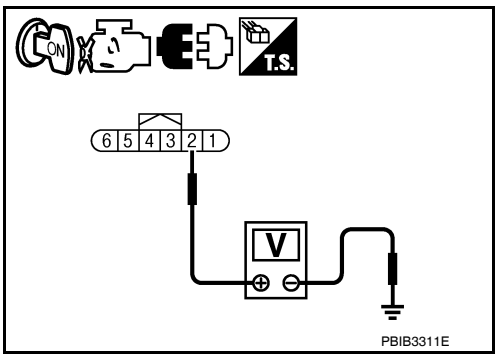
1. Disconnect electric throttle control actuator (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness connectors.

3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 36 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 33 and electric throttle control actuator terminal 1. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-291, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

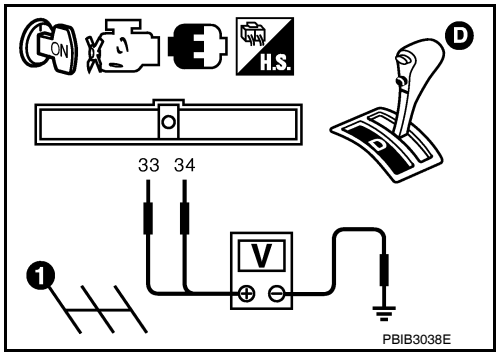
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699919

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-87, "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T, CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator. Refer to EM-18, "Component".

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

On Board Diagnosis Logic

INFOID:0000000007699921

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)
   On the 1st trip, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor (POS) signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.
   If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	• Improper spark plug • Insufficient compression • Incorrect fuel pressure • Fuel injector circuit is open or shorted • Fuel injector • Intake air leak • The ignition signal circuit is open or shorted • Lack of fuel • Drive plate or flywheel • Air fuel ratio (A/F) sensor 1 • Incorrect PCV hose connection
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

INFOID:0000000007699922

CAUTION:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-293, "Diagnosis Procedure".
   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following condition should be satisfied at the same time:

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Basic fuel schedule	Basic fuel schedule in the freeze frame data × (1 ± 0.1)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F)
	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F)

The time to driving varies according to the engine speed in the freeze frame data.
Refer to the following table.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

Diagnosis Procedure

INFOID:0000000007699923

1.CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

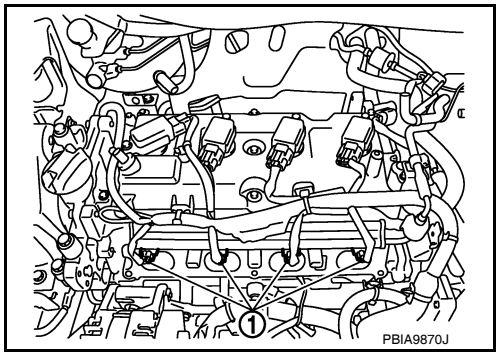
3.PERFORM POWER BALANCE TEST

With CONSULT

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

Without CONSULT

When disconnecting each fuel injector (1) harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

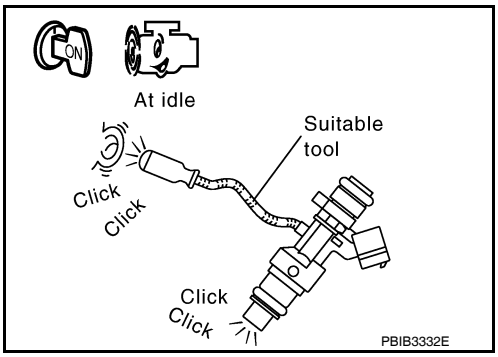
Yes >> GO TO 4.
No >> GO TO 9.

4. CHECK FUEL INJECTOR

Does each fuel injector make an operating sound at idle?

Yes or No

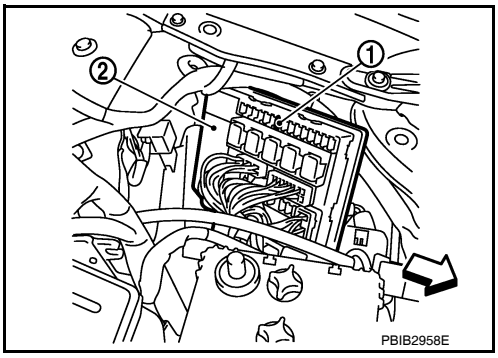
Yes >> GO TO 5.
No >> Check fuel injector(s) and circuit(s). Refer to EC-519.



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

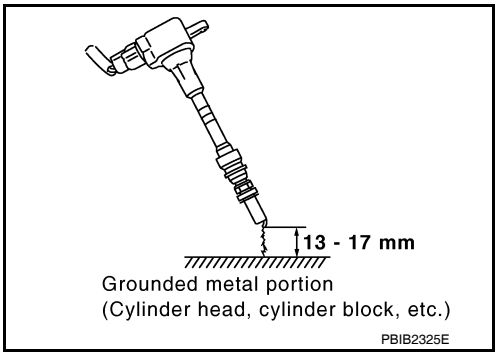
1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.



⇦ : Vehicle front

NOTE:
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked. Refer to EM-32, "Component".
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.

2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

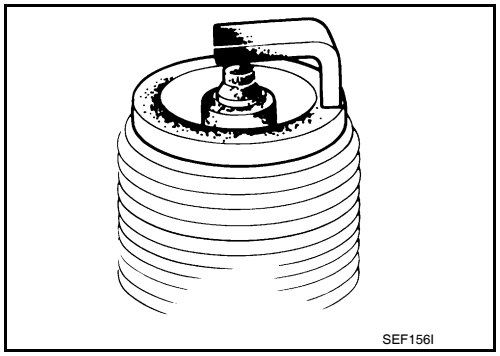
Spark should be generated.

OK or NG

OK >> GO TO 7.
NG >> Check ignition coil, power transistor and their circuits. Refer to EC-529.

7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.



OK or NG

OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-111, "Standard and Limit".
NG >> 1. Repair or clean spark plug. Refer to EM-32, "Component".
2. GO TO 8.

8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

OK >> **INSPECTION END**
NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-111, "Standard and Limit".

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-67, "On-Vehicle Service".

OK or NG

OK >> GO TO 10.
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to EC-89, "Fuel Pressure Check".
3. Install fuel pressure gauge and check fuel pressure. Refer to EC-89, "Fuel Pressure Check".

At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.
- Fuel pump and circuit (Refer to EC-524.)
- Fuel pressure regulator (Refer to EC-89, "Fuel Pressure Check".)
- Fuel lines (Refer to FL-5, "Checking Fuel Line".)
- Fuel filter for clogging

>> Repair or replace.

12. CHECK IGNITION TIMING

Check the following items. Refer to EC-81, "Basic Inspection".

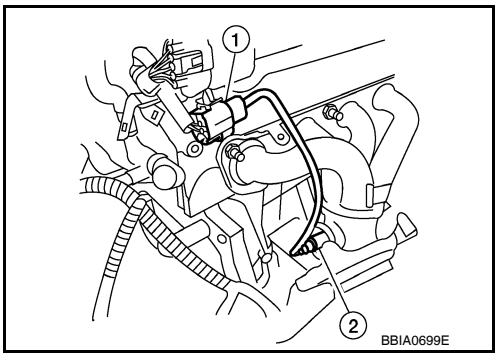
Items	Specifications
Target idle speed	A/T: 700 ± 50 rpm (in P or N position)
	CVT: 700 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	A/T: 13 ± 5° BTDC (in P or N position)
	CVT: 13 ± 5° BTDC (in Neutral position)
	M/T: 13 ± 5° BTDC (in Neutral position)

OK or NG

OK >> GO TO 13.
NG >> Follow the EC-81, "Basic Inspection".

13. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).



2. Air fuel ratio (A/F) sensor 1

3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 14.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to EC-158, "Component Inspection".

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

15. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:

- **Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

>> **INSPECTION END**

16. CHECK MASS AIR FLOW SENSOR

With CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in “DATA MONITOR” mode with CONSULT.

At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

With GST
1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in Service $01 with GST.

At idling : 1.0 - 4.0 g/s
At 2,500 rpm : 2.0 - 10.0 g/s

OK or NG

OK >> GO TO 17.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-170.

17. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in EC-99, "Symptom Matrix Chart".

OK or NG

OK >> GO TO 18.
NG >> Repair or replace.

18. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.
Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-49, "Emission-related Diagnostic Information".

>> GO TO 19.

19. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

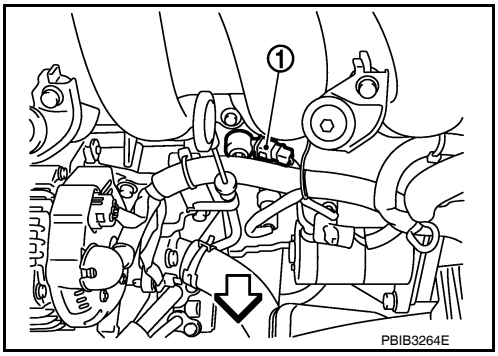
DTC P0327, P0328 KS

Component Description

INFOID:0000000007699924

The knock sensor (1) is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

⇦ : Vehicle front



On Board Diagnosis Logic

INFOID:0000000007699925

The MIL will not light up for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (Knock sensor circuit is open or shorted.) • Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:0000000007699926

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

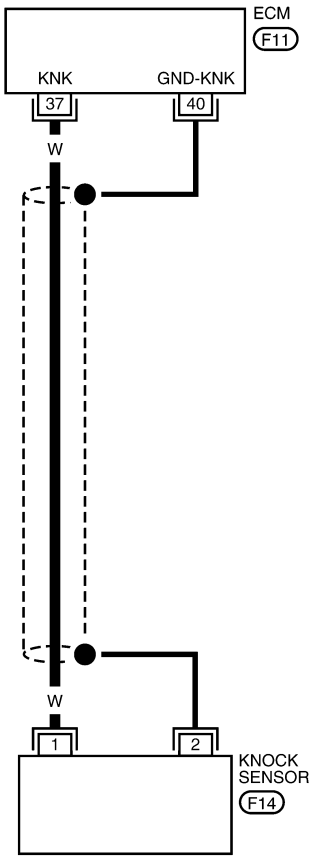
1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-300, "Diagnosis Procedure".

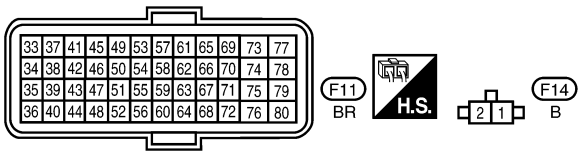
Wiring Diagram

INFOID:0000000007699927

EC-KS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





BBWA2637E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
37	W	Knock sensor	**[Engine is running]** • Idle speed	Approximately 2.5 V
40	—	Sensor ground (Knock sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007699928

1.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 37 and ground. Refer to Wiring Diagram.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

   Resistance: Approximately 532 - 588 kΩ [at 20°C (68°F)]

4. Also check harness for short to ground and short to power.

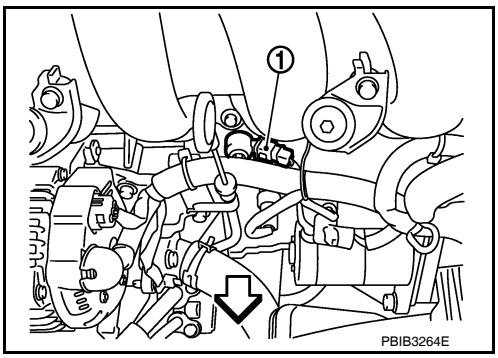
OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

1. Disconnect knock sensor (1) harness connector.

   ⇦ : Vehicle front



2. Check harness continuity between ECM terminal 37 and knock sensor terminal 1. Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK KNOCK SENSOR

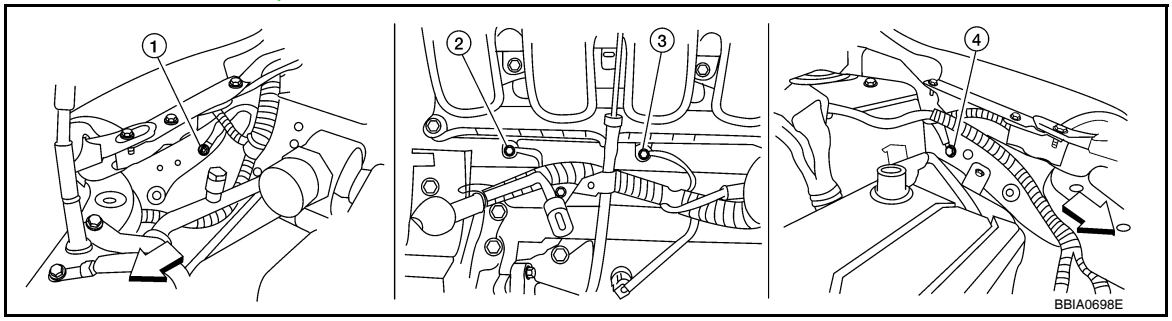
Refer to EC-301, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace knock sensor. Refer to EM-83, "Component".

4.CHECK GROUND CONNECTIONS

Loosen and retighten ground screws on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 5.
NG >> Repair or replace ground connections.

5. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Reconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 40 and knock sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

INFOID:0000000007699929

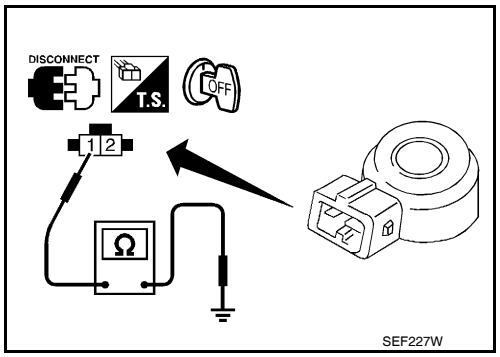
KNOCK SENSOR

1. Check resistance between knock sensor terminal 1 and ground.
NOTE:
It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 532 - 588 kΩ [at 20°C (68°F)]

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

2. If NG, replace knock sensor. Refer to EM-83, "Component".

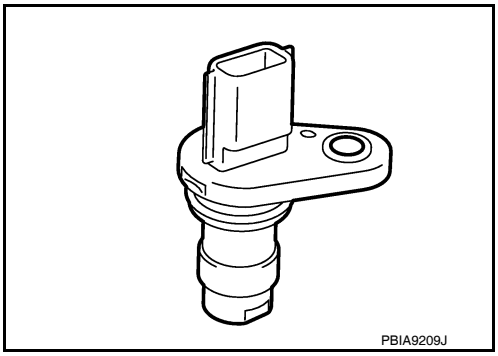


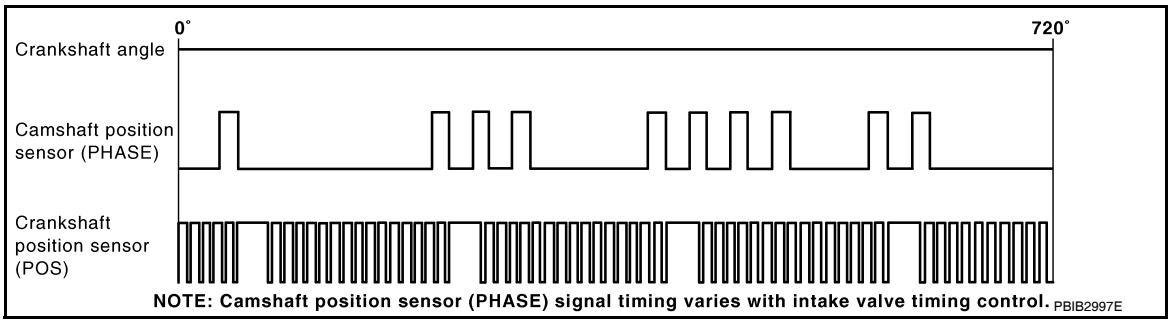
DTC P0335 CKP SENSOR (POS)

Component Description

INFOID:0000000007699931

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution. The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes. The ECM receives the voltage signal and detects the fluctuation of the engine revolution.
ECM receives the signals as shown in the figure.


PBIA9209J



NOTE: Camshaft position sensor (PHASE) signal timing varies with intake valve timing control. PBIB2997E

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699932

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	Run engine and compare CONSULT value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:0000000007699933

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP control system pressure sensor • Signal plate

DTC Confirmation Procedure

INFOID:0000000007699934

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:

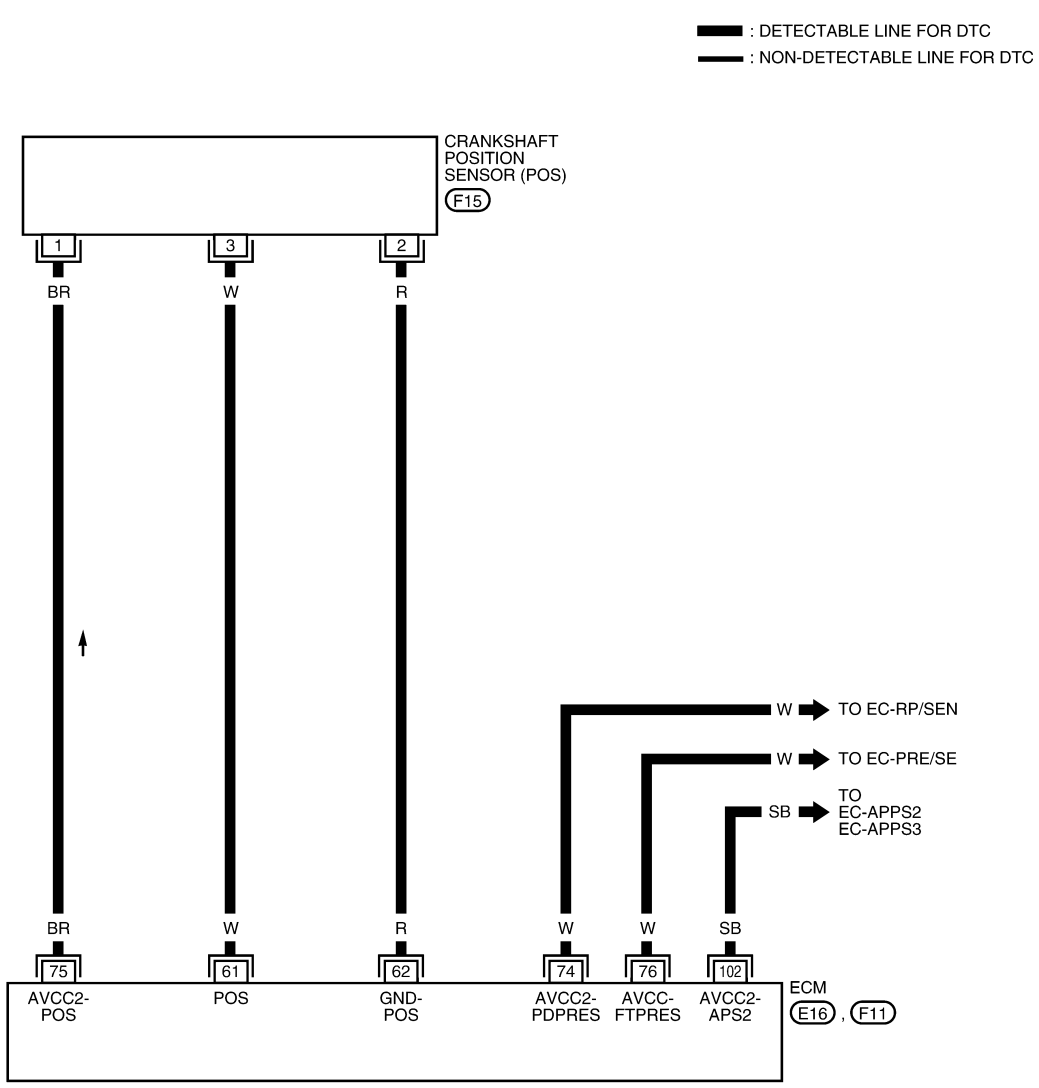
Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

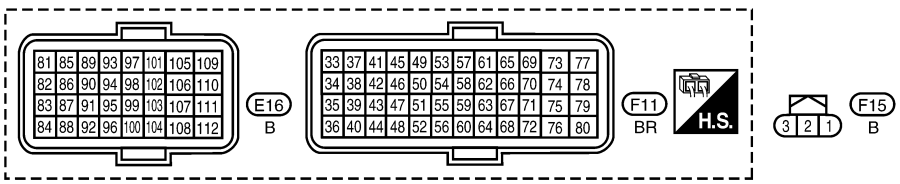
1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-304, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699935

EC-POS-01



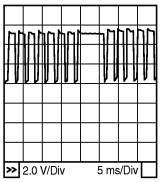
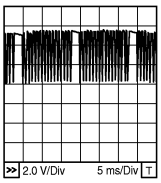


BBWA3071E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
61	W	Crankshaft position sensor (POS)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	Approximately 4.0 V★  PBIB2998E
			[Engine is running] • Engine speed: 2,000 rpm	Approximately 4.0 V★  PBIB2999E
62	R	Sensor ground [Crankshaft position sensor (POS)]	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (APP sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V

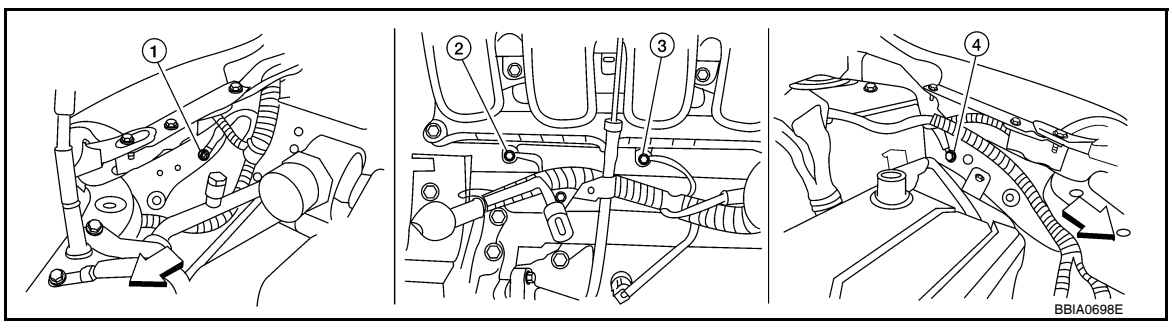
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699936

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



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1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

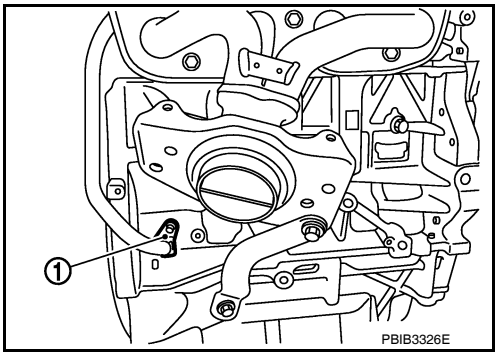
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

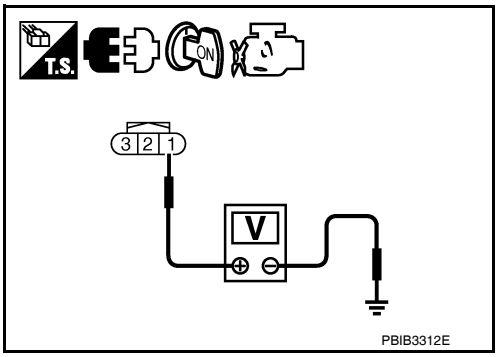
2.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3.CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 1 and ECM terminal 75. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit.

4.CHECK COMPONENTS POWER SUPPLY

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-482, "Wiring Diagram"

OK or NG

OK >> GO TO 5.

NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor. (Refer to EC-540.)
- EVAP control system pressure sensor. (Refer to EC-360.)

OK or NG

OK >> GO TO 6.
NG >> Replace malfunctioning components.

6.CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

8.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 2 and ECM terminal 62. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CKP sensor (POS) terminal 3 and ECM terminal 61. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-307, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> Replace crankshaft position sensor (POS). Refer to EM-83, "Component".

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 12.
NG >> Replace the signal plate. Refer to EM-83, "Component".

12.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

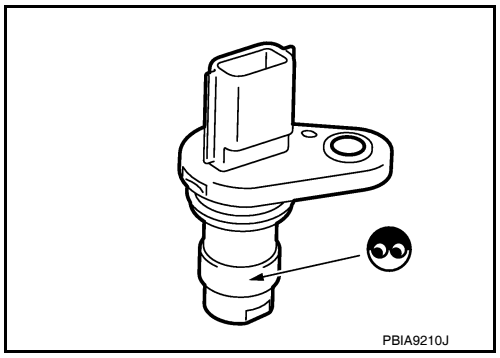
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699937

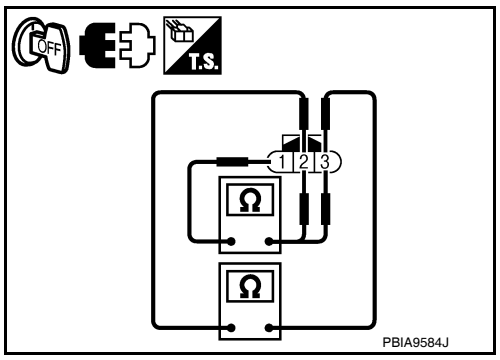
CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor. Refer to EM-83, "Component".
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	



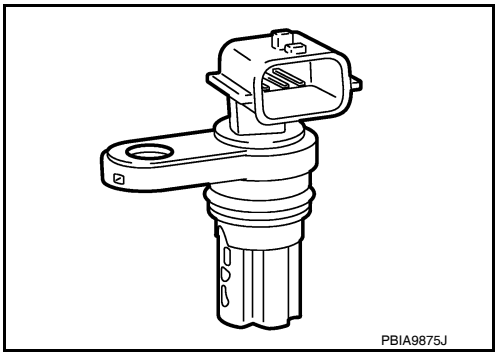
6. If NG, replace crankshaft position sensor (POS). Refer to EM-83, "Component".

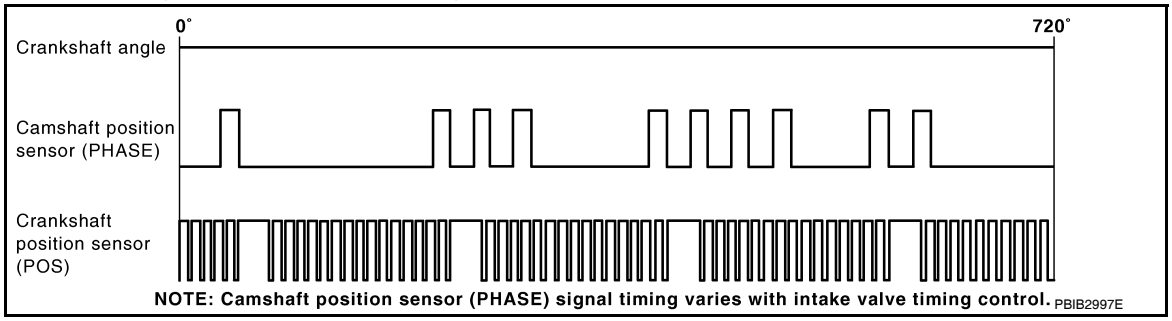
DTC P0340 CMP SENSOR (PHASE)

Component Description

INFOID:0000000007699939

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position. When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals. The sensor consists of a permanent magnet and Hall IC. When engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.


PBIA9875J



NOTE: Camshaft position sensor (PHASE) signal timing varies with intake valve timing control. PBIB2997E

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699940

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	Run engine and compare CONSULT value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:0000000007699941

NOTE:
If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.
Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not set to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors [Camshaft position sensor (PHASE) circuit is open or shorted.] • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor • Starting system circuit • Dead (Weak) battery

DTC Confirmation Procedure

INFOID:0000000007699942

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.

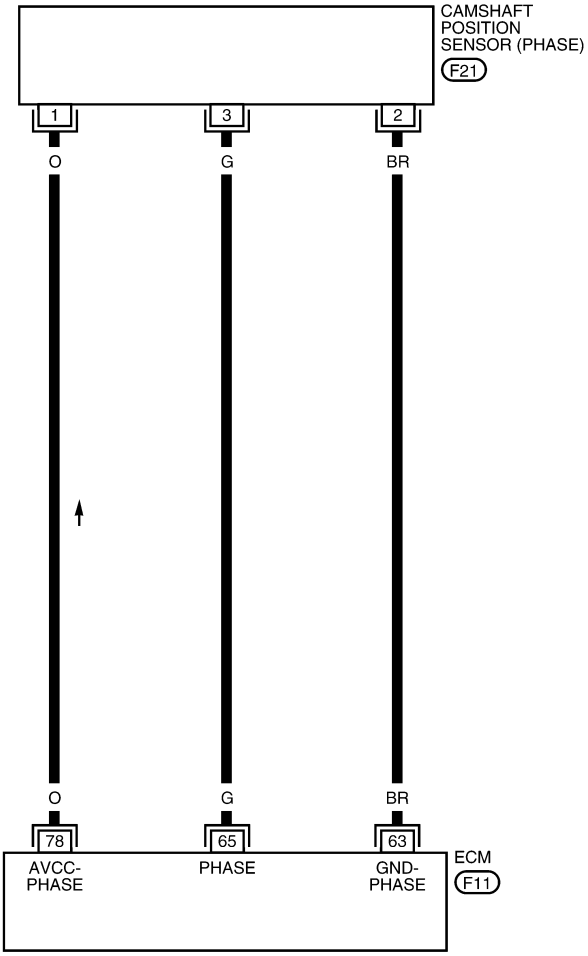
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-310, "Diagnosis Procedure".
   If 1st trip DTC is not detected, go to next step.
4. Maintain engine speed at more than 800 rpm for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-310, "Diagnosis Procedure".

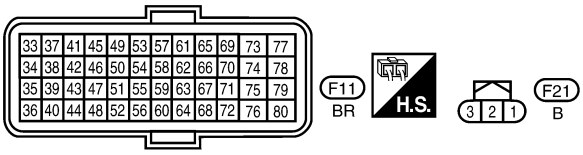
Wiring Diagram

INFOID:0000000007699943

EC-PHASE-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





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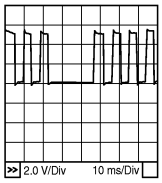
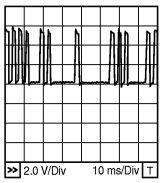
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
63	BR	Sensor ground [Camshaft position sensor (PHASE)]	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
65	G	Camshaft position sensor (PHASE)	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	1.0 - 2.0 V★  PBIB2986E
			[Engine is running] • Engine speed: 2,000 rpm	1.0 - 2.0 V★  PBIB2987E
78	O	Sensor power supply [Camshaft position sensor (PHASE)]	**[Ignition switch: ON]**	Approximately 5.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699944

1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

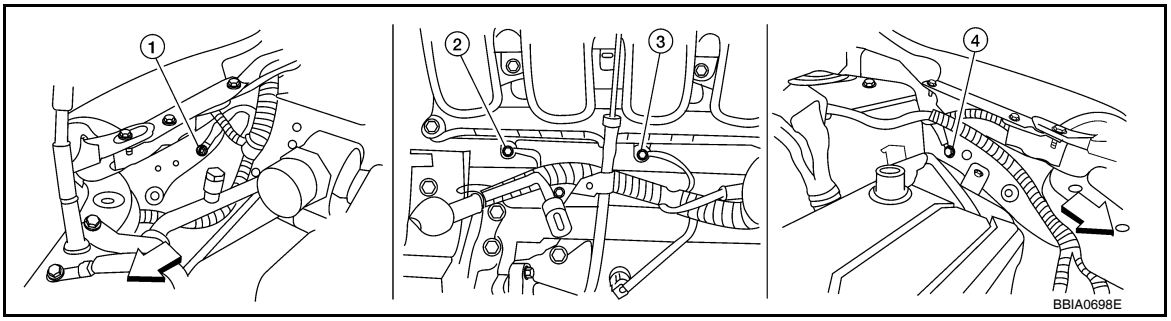
Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to SC-16, "Trouble Diagnosis with Multitasking Battery Diagnostic Station".)

2.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

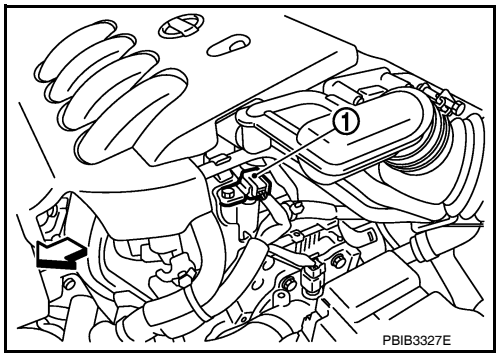
OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

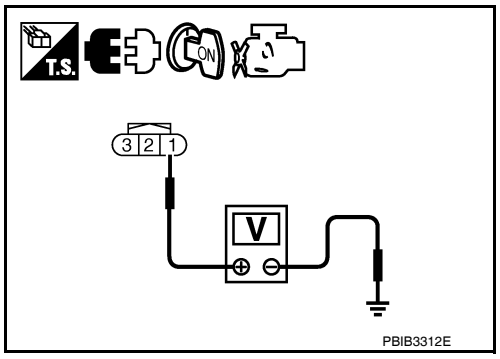
1. Disconnect camshaft position (CMP) sensor (PHASE) (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CMP sensor (PHASE) terminal 2 and ECM terminal 63. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CMP sensor (PHASE) terminal 3 and ECM terminal 65. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-312, "Component Inspection".

OK or NG

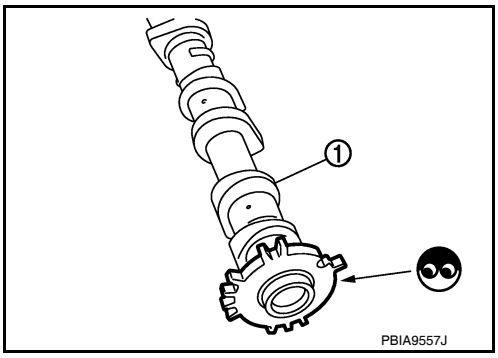
OK >> GO TO 7.
NG >> Replace camshaft position sensor (PHASE). Refer to EM-51, "Component".

7. CHECK CAMSHAFT (INTAKE)

Check the following.
- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 8.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to EM-51, "Component".



8. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

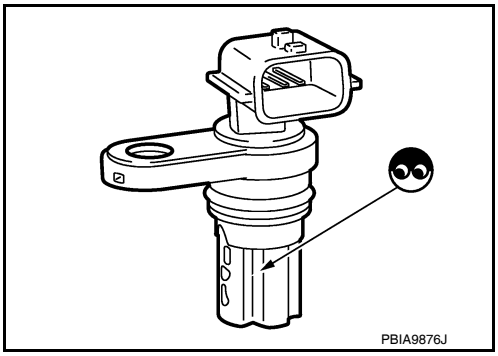
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699945

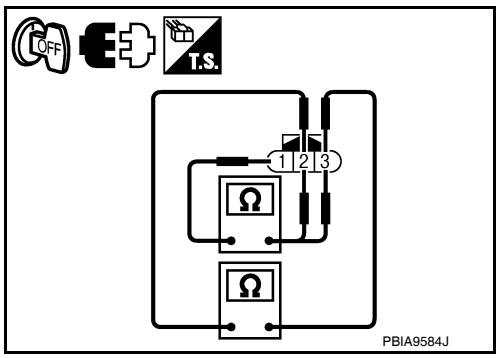
CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor. Refer to EM-51, "Component".
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	



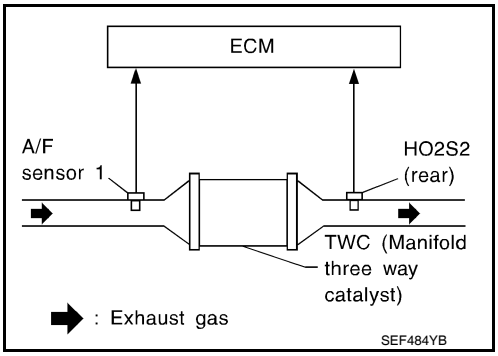
6. If NG, replace camshaft position sensor (PHASE). Refer to EM-51, "Component".

DTC P0420 THREE WAY CATALYST FUNCTION

On Board Diagnosis Logic

INFOID:0000000007699947

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.
A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.
When the frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	• Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity.	• Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing

DTC Confirmation Procedure

INFOID:0000000007699948

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT
TESTING CONDITION:
Do not hold engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “DTC & SRT CONFIRMATION” then “SRT WORK SUPPORT” mode with CONSULT.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
   If “INCMP” of “CATALYST” changed to “CMPLT”, go to step 12.
10. Wait 5 seconds at idle.
11. Rev engine up to 2,000 to 3,000 rpm and maintain it until “INCMP” of “CATALYST” changes to “CMPLT” (It will take approximately 5 minutes).
    If not “CMPLT”, stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
12. Check 1st trip DTC.
    If 1st trip DTC is detected, go to EC-315, "Diagnosis Procedure".

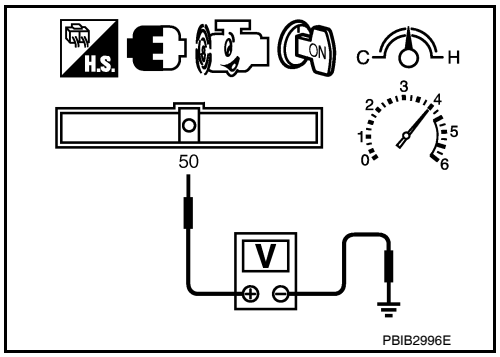
Overall Function Check

INFOID:0000000007699949

Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Open engine hood.
6. Set voltmeter probe between ECM terminals 50 (HO2S2 signal) and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Make sure that the voltage does not vary for more than 5 seconds.
   If the voltage fluctuation cycle takes less than 5 seconds, go to EC-315, "Diagnosis Procedure".
   • 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0



Diagnosis Procedure

INFOID:0000000007699950

1.CHECK EXHAUST SYSTEM

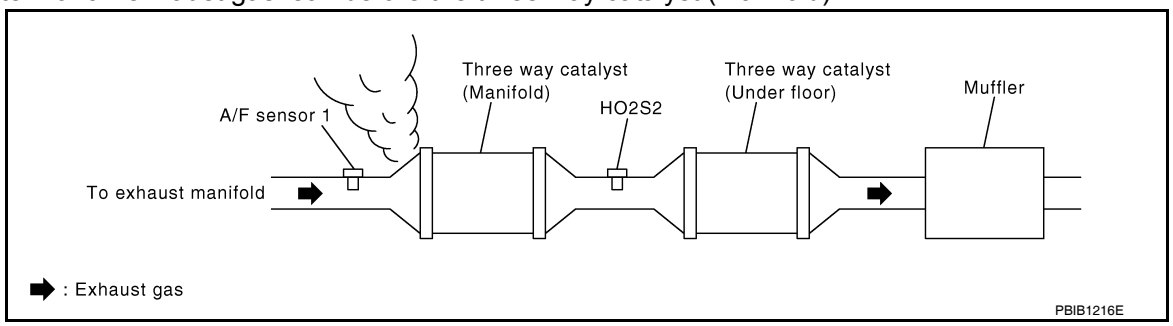
Visually check exhaust tubes and muffler for dent.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4.CHECK IGNITION TIMING

Check the following items. Refer to EC-81, "Basic Inspection".

Items	Specifications
Target idle speed	A/T: 700 ± 50 rpm (in P or N position)
	CVT: 700 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	A/T: 13 ± 5° BTDC (in P or N position)
	CVT: 13 ± 5° BTDC (in P or N position)
	M/T: 13 ± 5° BTDC (in Neutral position)

OK or NG

OK >> GO TO 5.
NG >> Follow the EC-81, "Basic Inspection".

5.CHECK FUEL INJECTOR

1. Stop engine and turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 25, 29, 30, 31 and ground with CONSULT or tester. Refer to Wiring Diagram for fuel injectors, EC-520, "Wiring Diagram".

Voltage: Battery voltage

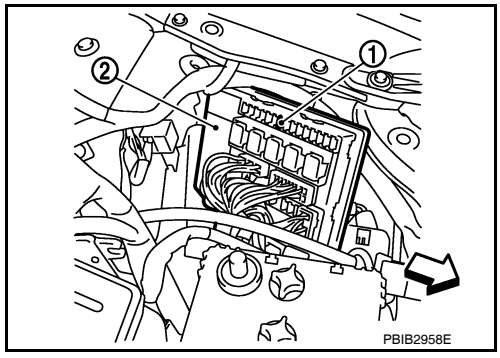
OK or NG

OK >> GO TO 6.
NG >> Perform EC-521, "Diagnosis Procedure".

6.CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

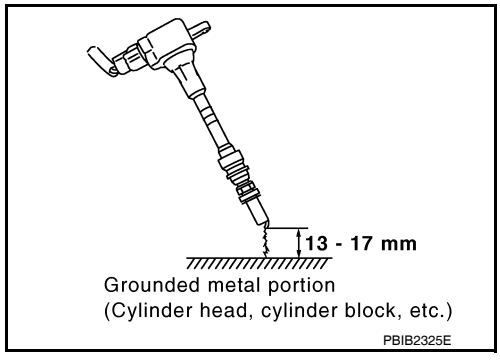
1. Turn ignition switch OFF.
2. Remove fuel pump (1) fuse in IPDM E/R (2) to release fuel pressure.



⇦ : Vehicle front

NOTE:
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils. Refer to EM-32, "Component".
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- **Do not approach to the spark plug and the ignition coil within 50 cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

OK or NG

OK >> GO TO 10.
NG >> GO TO 7.

7. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

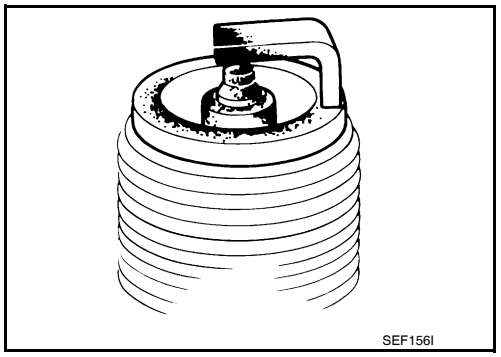
OK >> GO TO 8.
NG >> Check ignition coil, power transistor and their circuits. Refer to EC-529.

8. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-111, "Standard and Limit".
NG >> 1. Repair or clean spark plug. Refer to EM-32, "Component".
2. GO TO 9.



9. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

OK >> **INSPECTION END**
NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to EM-111, "Standard and Limit".

10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
   Refer to EM-35, "Removal and Installation".
   Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.
   Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip.)>>GO TO 11.
NG (Drips.)>>Replace the fuel injector(s) from which fuel is dripping. Refer to EM-35, "Component".

11. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

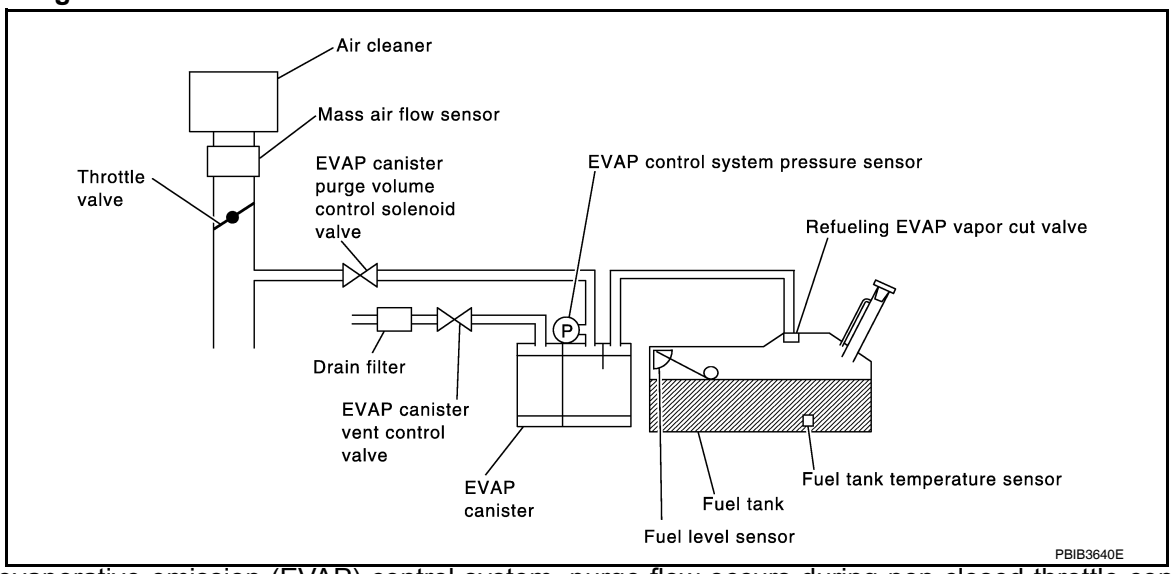
Trouble is fixed.>>**INSPECTION END**
Trouble is not fixed.>>Replace three way catalyst (manifold). Refer to EM-22, "Component".

DTC P0441 EVAP CONTROL SYSTEM

System Description

INFOID:0000000007699951

NOTE:
If DTC P0441 is displayed with other DTC such as P2122, P2123 P2127, P2128, P2138, first perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

INFOID:0000000007699952

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	• EVAP control system does not operate properly. • EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	• EVAP canister purge volume control solenoid valve stuck closed • EVAP control system pressure sensor and the circuit • Loose, disconnected or improper connection of rubber tube • Blocked rubber tube • Cracked EVAP canister • EVAP canister purge volume control solenoid valve circuit • Accelerator pedal position sensor • Blocked purge port • EVAP canister vent control valve • Drain filter

DTC Confirmation Procedure

INFOID:0000000007699953

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select “PURG FLOW P0441” of “EVAPORATIVE SYSTEM” in “DTC CONFIRMATION” mode with CONSULT.
5. Touch “START”.
   If “COMPLETED” is displayed, go to step 7.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take at least 35 seconds.)

Selector lever	Suitable position
VHCL SPEED SE	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
COOLAN TEMP/S	More than 0°C

If TESTING is not changed for a long time, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-320, "Diagnosis Procedure".

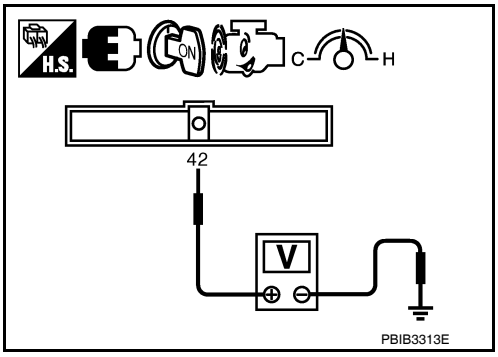
Overall Function Check

INFOID:0000000007699954

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 42 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.



Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Selector lever	Any position other than P, N or R

8. Verify that EVAP control system pressure sensor value stays 0.1 V less than the value at idle speed (measured at step 6) for at least 1 second.
9. If NG, go to EC-320, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007699955

1.CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

OK or NG

OK (With CONSULT)>>GO TO 2.
OK (Without CONSULT)>>GO TO 3.
NG >> Replace EVAP canister. Refer to FL-15, "Exploded View".

2.CHECK PURGE FLOW

With CONSULT

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to EC-31, "Description".
2. Start engine and let it idle.
3. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT.
4. Rev engine up to 2,000 rpm.
5. Touch “Qd” and “Qu” on CONSULT screen to adjust “PURG VOL CONT/V” opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100%	Should exist.
0%	should not exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

3. CHECK PURGE FLOW

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to EC-31, "Description".
4. Start engine and let it idle.
   Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds passed after starting engine.

   Vacuum should not exist.

6. Revving engine up to 2,000 rpm after 100 seconds passed after starting engine.

   Vacuum should exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

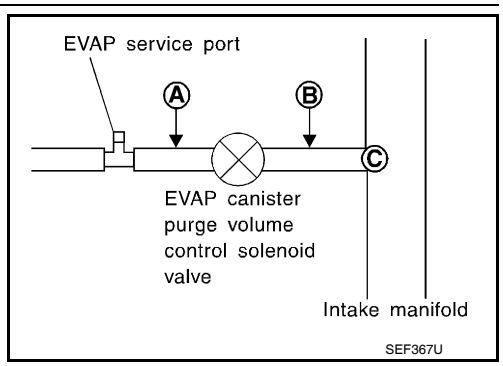
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection. Refer to EC-31, "Description".

OK or NG

OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

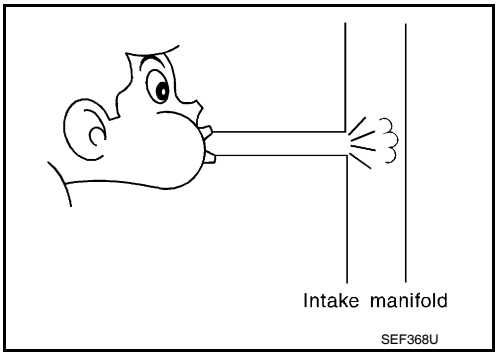
1. Disconnect purge hoses connected to EVAP service port (A) and EVAP canister purge volume control solenoid valve (B).
2. Blow air into each hose and EVAP purge port (C).



3. Check that air flows freely.

OK or NG

OK (With CONSULT)>>GO TO 6.
OK (Without CONSULT)>>GO TO 7.
NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT

1. Start engine.
2. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-343, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to EC-361 or DTC P0452 and EC-369 for DTC P0453.

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 11.
NG >> Clean the rubber tube using an air blower.

11. CHECK DRAIN FILTER

Refer to EC-323, "Component Inspection".

OK or NG

OK >> GO TO 12.
NG >> Replace Drain filter. Refer to FL-15, "Exploded View".

12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 13.
NG >> Replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.
Refer to EC-31, "Description".

OK or NG

OK >> GO TO 14.
NG >> Replace it.

14. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

15. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

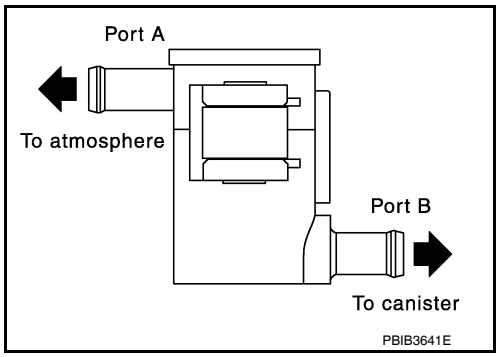
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699956

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to FL-15, "Exploded View".

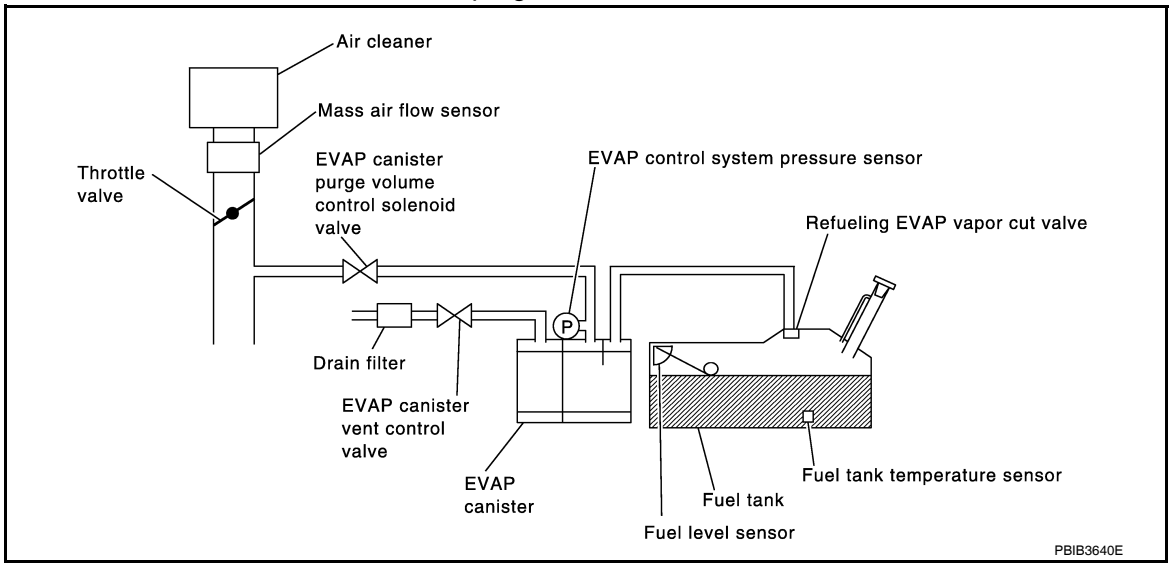


DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:0000000007699957

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.
If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following Vacuum test conditions.
The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	• Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • Drain filter • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks

CAUTION:
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

INFOID:0000000007699958

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.**
- **Always perform test at a temperature of 0 to 30°C (32 to 86°F).**
- **Open engine hood before conducting following procedure.**

WITH CONSULT

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
4. Check the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT.
   Follow the instruction displayed.
   NOTE:
   If the engine speed cannot be maintained within the range displayed on the CONSULT screen, go to EC-81, "Basic Inspection".
6. Make sure that "OK" is displayed.
   If "NG" is displayed, refer to EC-325, "Diagnosis Procedure".
   NOTE:
   Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.

WITH GST

NOTE:
Be sure to read the explanation of Driving Pattern on EC-49, "Emission-related Diagnostic Information" before driving vehicle.
1. Start engine.
2. Drive vehicle according to Driving Pattern, EC-49, "Emission-related Diagnostic Information".
3. Stop vehicle.
4. Turn ignition switch OFF and wait at least 10 seconds and then turn ignition switch ON.
5. Select Service $07 with GST.

- If P0442 is displayed on the screen, go to EC-325, "Diagnosis Procedure".
- If P0441 is displayed on the screen, go to EC-320, "Diagnosis Procedure" for DTC P0441.

Diagnosis Procedure

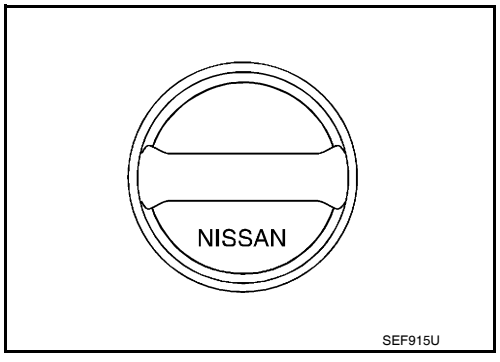
INFOID:0000000007699959

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap. Refer to FL-10, "Component".



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until reteaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-33, "Component Inspection".

OK or NG

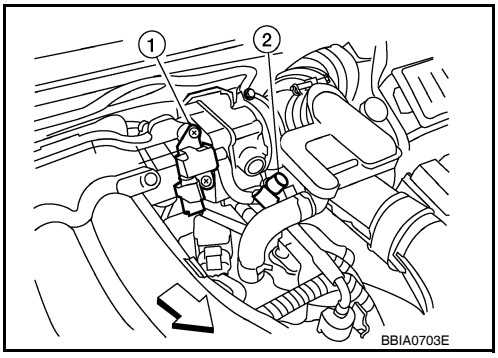
OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one. Refer to FL-10, "Component".

5. INSTALL THE PRESSURE PUMP

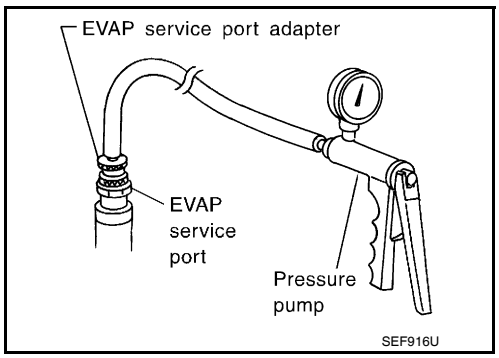
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.
For the location of EVAP service port (2), refer to EC-31, "Description".

1. EVAP canister purge volume control solenoid valve

⇦ : Vehicle front



NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT>>GO TO 6.
Without CONSULT>>GO TO 7.

6. CHECK FOR EVAP LEAK

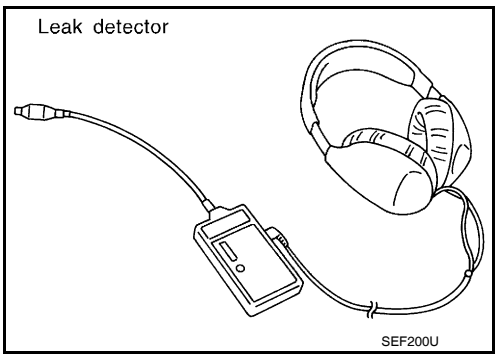
With CONSULT

1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "Description".



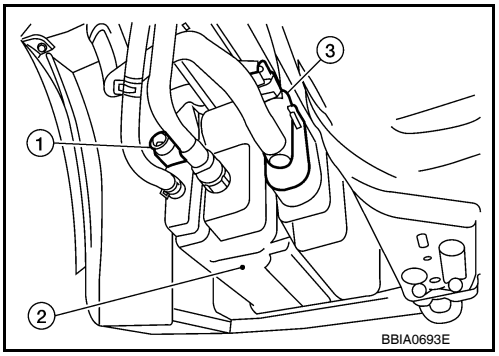
OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

7. CHECK FOR EVAP LEAK

Without CONSULT

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



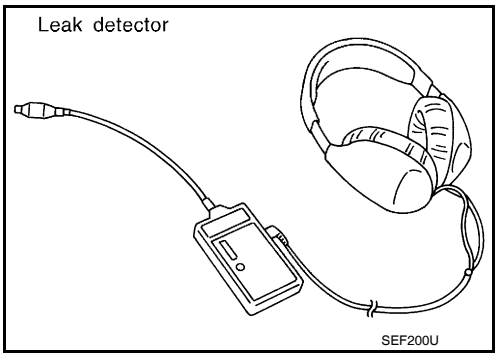
1. EVAP control system pressure sensor
2. EVAP canister
3. EVAP canister vent control valve

3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "Description".



OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

8. CHECK DRAIN FILTER

Refer to EC-330, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following,

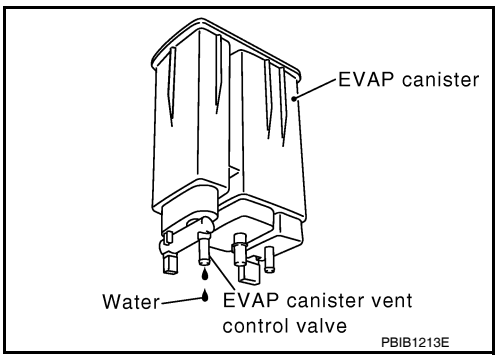
- EVAP canister vent control valve is installed properly.
  Refer to FL-15, "Removal and Installation".
- EVAP canister vent control valve.
  Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to FL-15, "Exploded View".

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-15, "Exploded View".
2. Does water drain from the EVAP canister?



Yes or No

Yes >> GO TO 11.
No (With CONSULT)>>GO TO 13.
No (Without CONSULT)>>GO TO 14.

11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensorattached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT)>>GO TO 13.
OK (Without CONSULT)>>GO TO 14.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Exploded View".

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-109, "Vacuum Hose Drawing".

OK or NG

OK >> GO TO 16.
NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-343, "Component Inspection".

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-282, "Component Inspection".

OK or NG

OK >> GO TO 18.
NG >> Replace fuel level sensor unit. Refer to FL-6, "Component".

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to EC-31.

OK or NG

OK >> GO TO 20.
NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37.

OK or NG

OK >> GO TO 22.
NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.
NG >> Repair or replace hoses, tubes or filler neck tube.

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 24.
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-10, "Component".

24. CHECK FUEL LEVEL SENSOR

Refer to DI-16.

OK or NG

OK >> GO TO 25.
NG >> Replace fuel level sensor unit. Refer to FL-6, "Component".

25. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

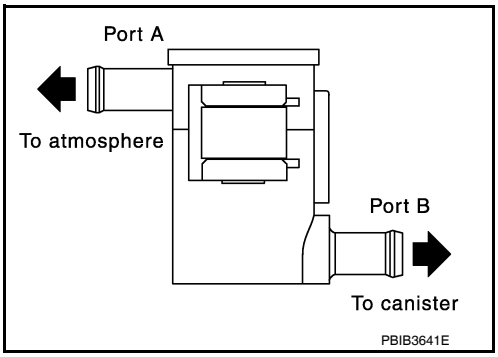
>> **INSPECTION END**

Component Inspection

INFOID:0000000007699960

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to FL-15, "Exploded View".



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000007699961

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

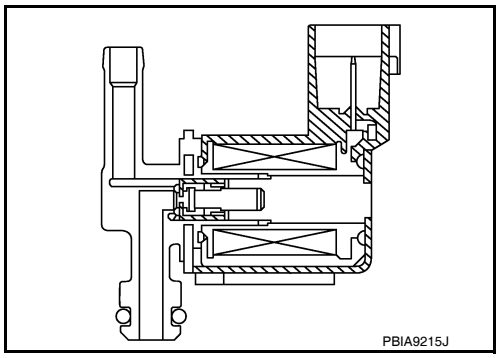
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM though CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699962

Specification data are reference values.

Monitor item	Condition		Specification
PURG VOL C/V	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle (Accelerator pedal is not depressed even slightly, after engine starting)	0%
		2,000 rpm	0 - 50%

On Board Diagnosis Logic

INFOID:0000000007699963

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0443 0443	EVAP canister purge volume control solenoid valve	A)	The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	• EVAP control system pressure sensor • EVAP canister purge volume control solenoid valve (EVAP canister purge volume control solenoid valve is stuck open.) • EVAP canister vent control valve • Drain filter • EVAP canister • Hoses (Hoses are connected incorrectly or clogged.)
		B)	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

DTC Confirmation Procedure

INFOID:0000000007699964

Perform PROCEDURE FOR MALFUNCTION A first.
If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

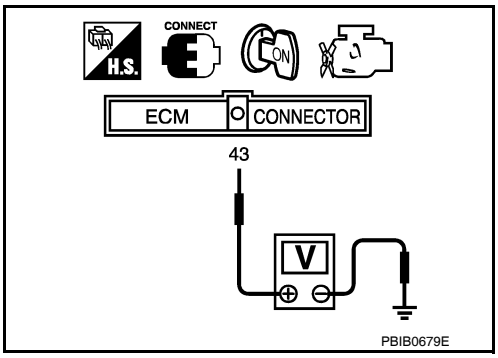
TESTING CONDITION:
- Perform "DTC Confirmation Procedure" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

With CONSULT

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
2. Check that the following condition are met.
   FUEL T/TMP SE: 0 – 35°C (32 – 95°F)
3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-335, "Diagnosis Procedure".

With GST

1. Turn ignition switch ON.
2. Set voltmeter probes to ECM terminal 43 (FTT sensor signal) and ground.
3. Check that the voltage is 3.1 – 4.2 V.
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-335, "Diagnosis Procedure".



PROCEDURE FOR MALFUNCTION B

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “PURG VOL CN/V P1444” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT.
5. Touch “START”.
6. Start engine and let it idle until “TESTING” on CONSULT changes to “COMPLETED”. (It will take approximately 10 seconds.)
   If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-335, "Diagnosis Procedure".

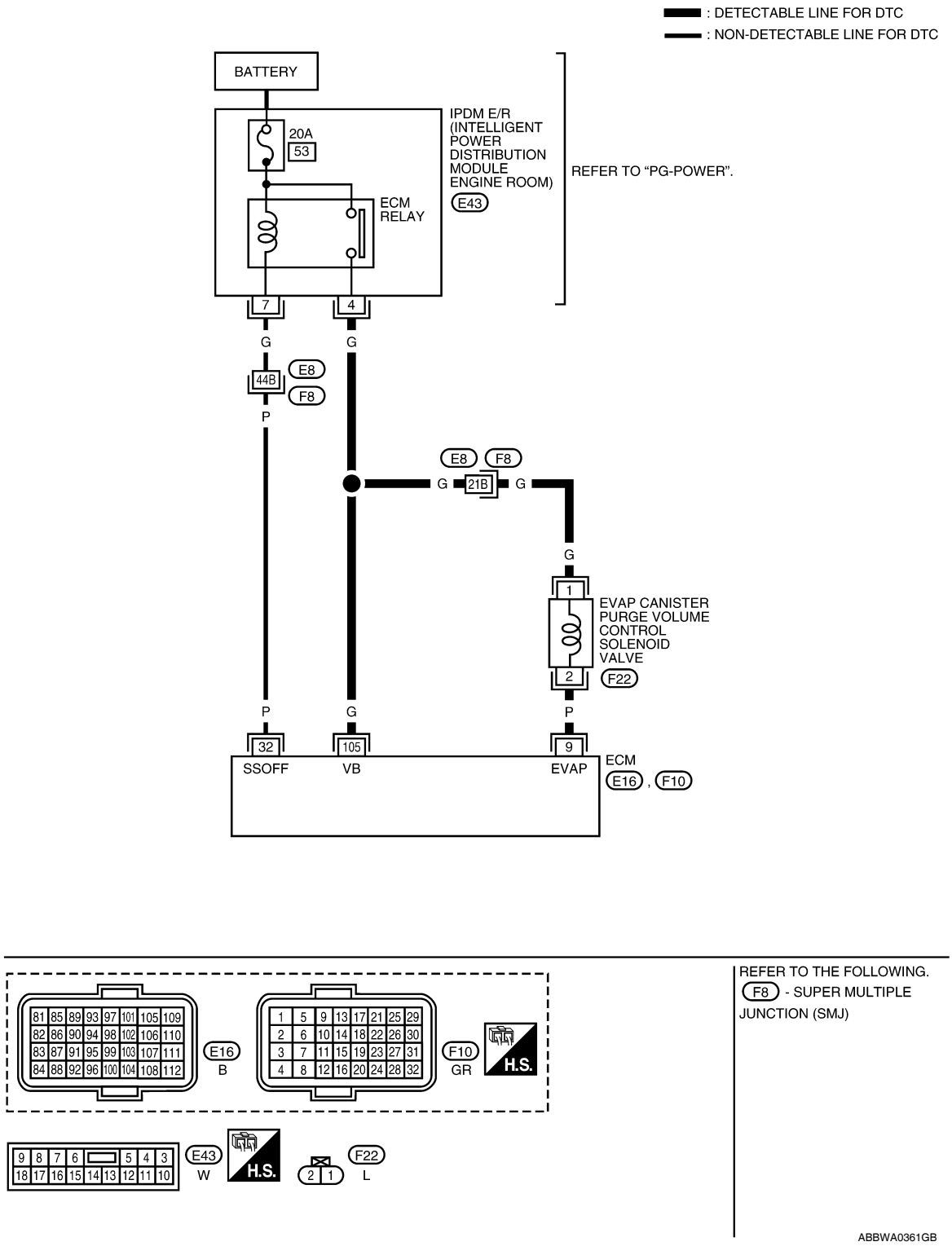
With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select Service $07 with GST.
5. If 1st trip DTC is detected, go to EC-335, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699965

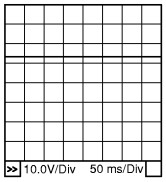
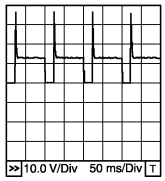
EC-PGC/V-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
9	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting.	Battery voltage (11 - 14 V)★  PBIB0050E
			[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10 V★  PBIB0520E
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

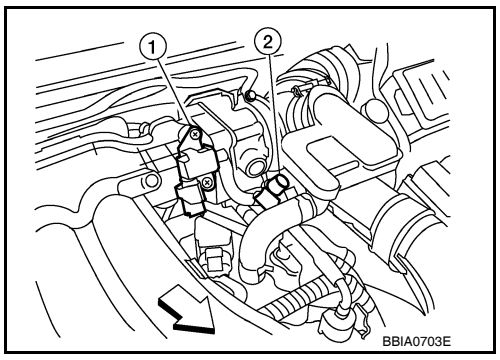
Diagnosis Procedure

INFOID:0000000007699966

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.

2. EVAP service port
⇦ : Vehicle front



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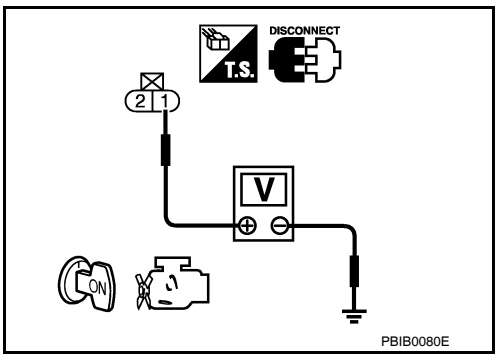
3. Turn ignition switch ON.

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

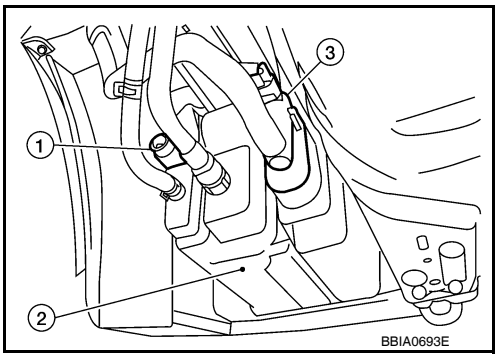
4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



1. EVAP control system pressure sensor
2. EVAP canister
3. EVAP canister vent control valve

2. Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK (With CONSULT)>>GO TO 6.
OK (Without CONSULT)>>GO TO 7.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT

1. Turn ignition switch OFF.

2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-338, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 9.
NG >> Clean the rubber tube using an air blower.

9. CHECK DRAIN FILTER

Refer to EC-323, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-349, "Component Inspection".

OK or NG

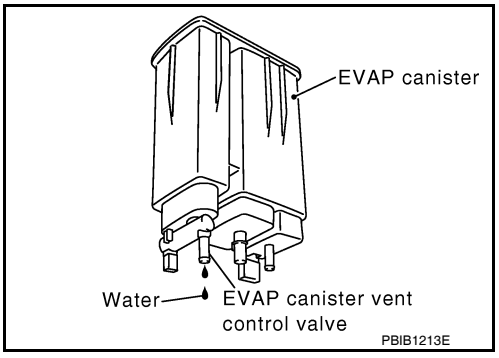
OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

11. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached. Refer to FL-15, "Exploded View".
2. Does water drain from the EVAP canister?

YES or NO

YES >> GO TO 12.
NO >> GO TO 14.



12. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.
- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Exploded View".

14. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

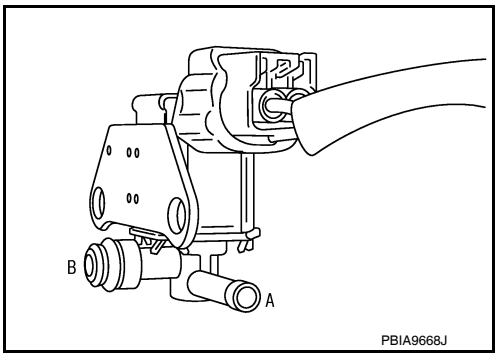
INFOID:0000000007699967

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

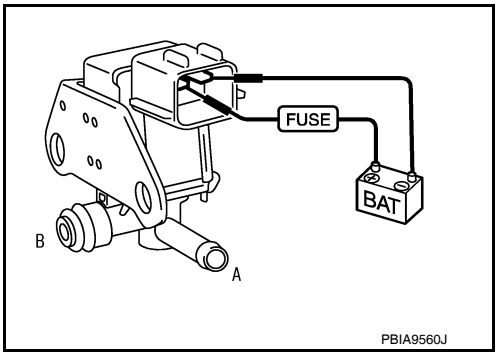
Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Yes
0%	No



Without CONSULT

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals 1 and 2	Yes
No supply	No



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000007699969

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

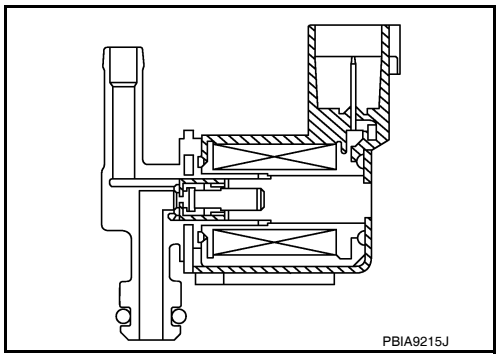
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM though CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699970

Specification data are reference values.

Monitor item	Condition		Specification
PURG VOL C/V	• Engine: After warming up • Selector lever: P or N (A/T, CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle (Accelerator pedal is not depressed even slightly, after engine starting)	0%
		2,000 rpm	0 - 50%

On Board Diagnosis Logic

INFOID:0000000007699971

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	• Harness or connectors (EVAP canister purge volume control solenoid valve circuit is open or shorted.) • EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	• Harness or connectors (EVAP canister purge volume control solenoid valve circuit is shorted.) • EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

INFOID:0000000007699972

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

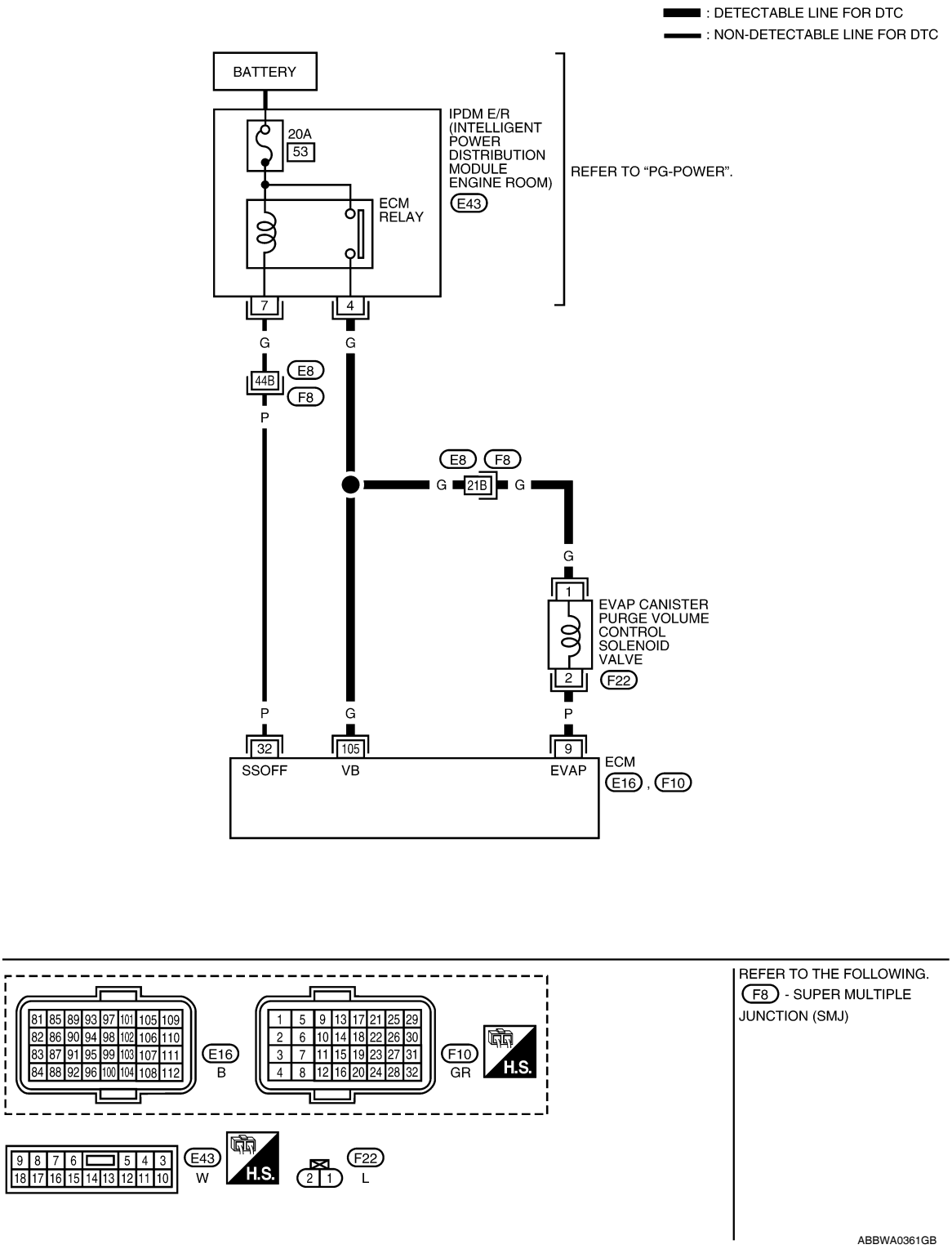
TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-342, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699973

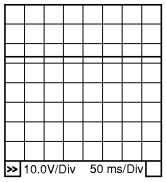
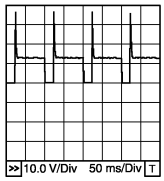
EC-PGC/V-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
9	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting.	Battery voltage (11 - 14 V)★  PBIB0050E
			[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10 V★  PBIB0520E
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

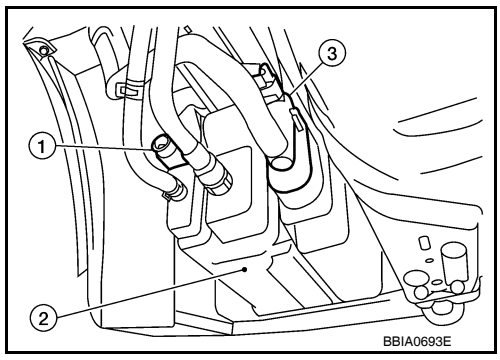
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007699974

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

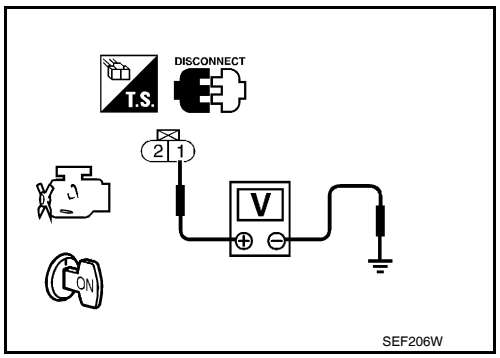
1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.



2. EVAP canister service port

3. Turn ignition switch ON.

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT)>>GO TO 4.
OK (Without CONSULT)>>GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-338, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

6.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

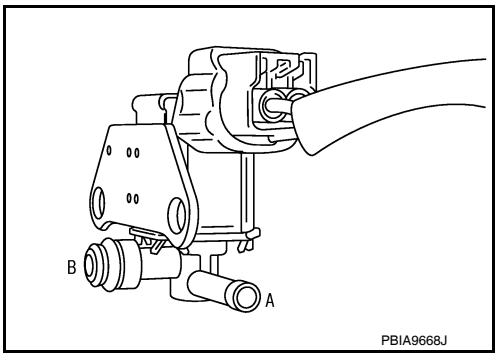
INFOID:0000000007699975

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

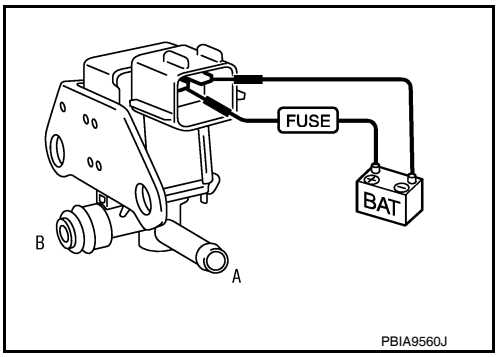
Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Yes
0%	No



Without CONSULT

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals 1 and 2	Yes
No supply	No



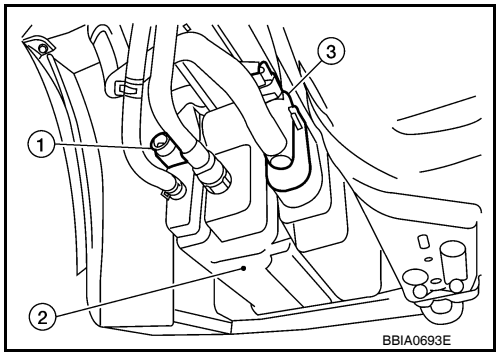
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Component Description

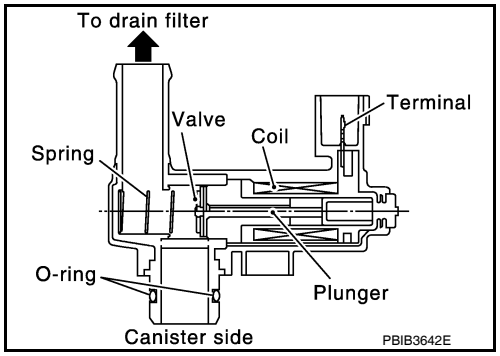
INFOID:0000000007699977

The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

1. EVAP control system pressure sensor



This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows EVAP control system diagnoses.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699978

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:0000000007699979

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	• Harness or connectors (EVAP canister vent control valve circuit is open or shorted.) • EVAP canister vent control valve • Drain filter

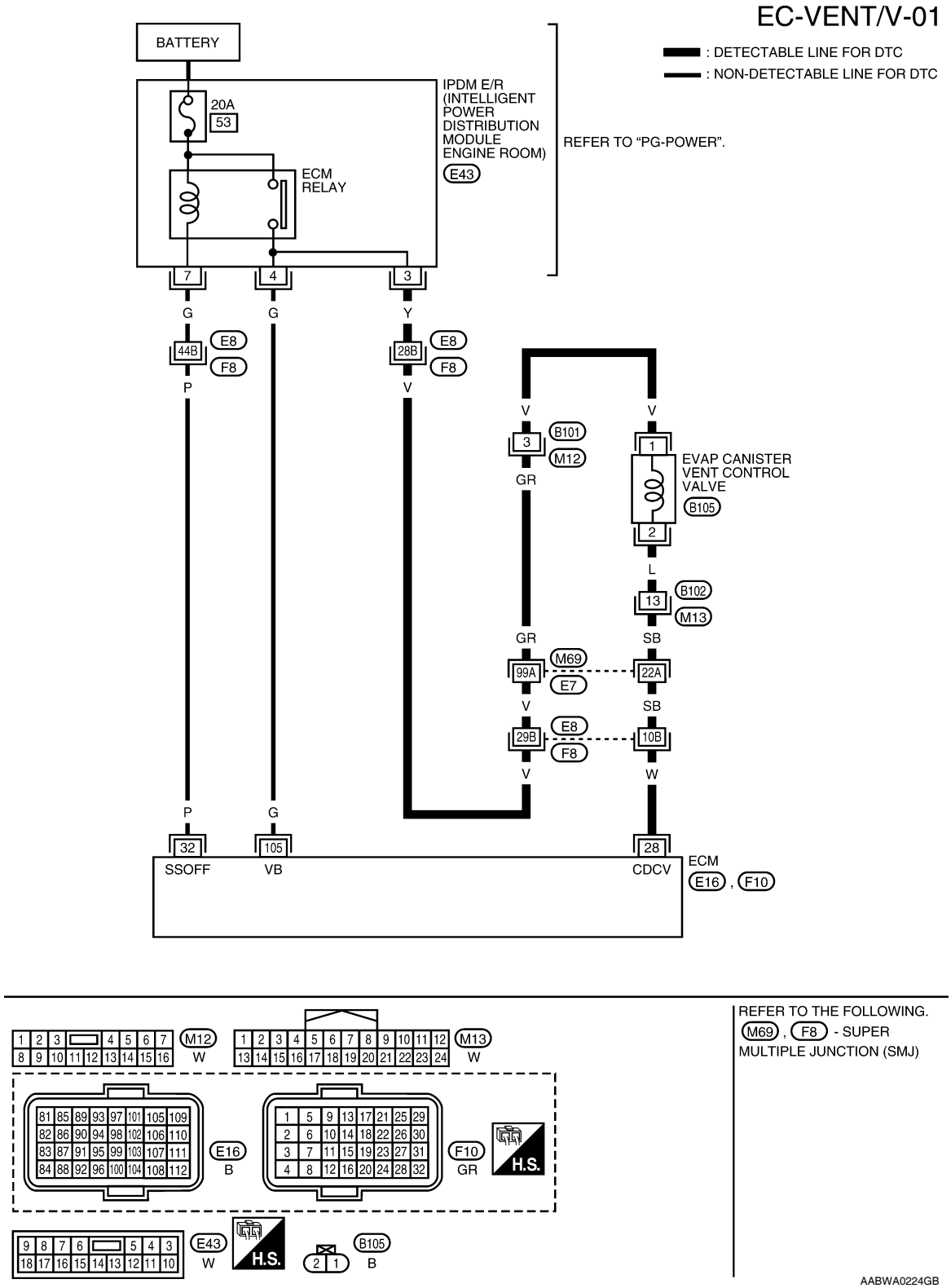
DTC Confirmation Procedure

INFOID:0000000007699980

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11 V at idle.
1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-347, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699981



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
28	W	EVAP canister vent control valve	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007699982

1.INSPECTION START

1. Do you have CONSULT?

Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2.CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT

1. Turn ignition switch OFF and then turn ON.
2. Select “VENT CONTROL/V” in “ACTIVE TEST” mode with CONSULT.
3. Touch “ON/OFF” on CONSULT screen.
4. Check for operating sound of the valve.

Clicking noise should be heard.

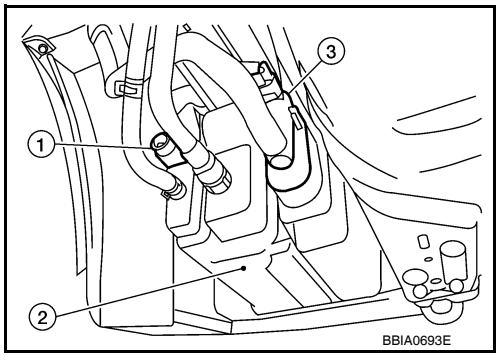
OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3.CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve (3) harness connector.

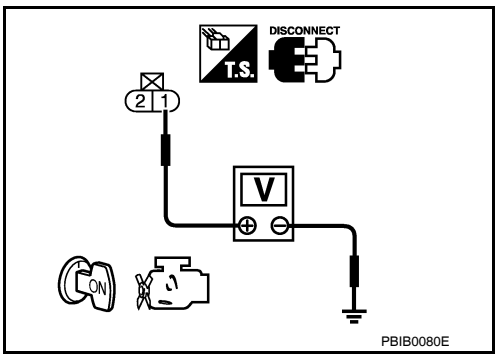
1. EVAP control system pressure sensor
2. EVAP canister



3. Turn ignition switch ON.

4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors E7, M69
- Harness connectors M12, B101
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 28 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors E7, M69
- Harness connectors M13, B102
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 8.
NG >> Clean the rubber tube using an air blower.

8. CHECK DRAIN FILTER

Refer to EC-323, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

10. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

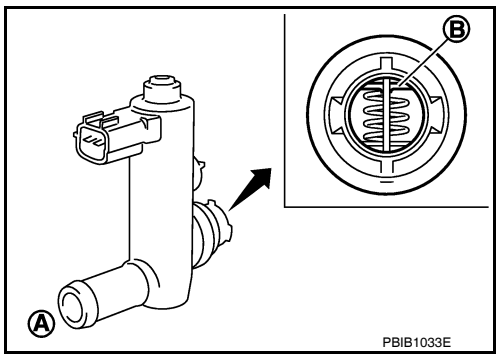
Component Inspection

INFOID:0000000007699983

EVAP CANISTER VENT CONTROL VALVE

With CONSULT

1. Remove EVAP canister vent control valve from EVAP canister. Refer to FL-15, "Exploded View".
2. Check portion (B) of EVAP canister vent control valve for being rusted.
   If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".
   If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform “VENT CONTROL/V” in “ACTIVE TEST” mode.
6. Check air passage continuity and operation delay time.
   Make sure new O-ring is installed properly.

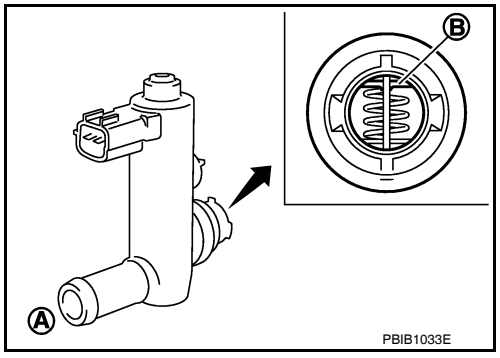
Condition (VENT CONTROL/V)	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.
If NG, go to next step.

7. Clean the air passage [Portion (A) to (B)] of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
   If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

Without CONSULT

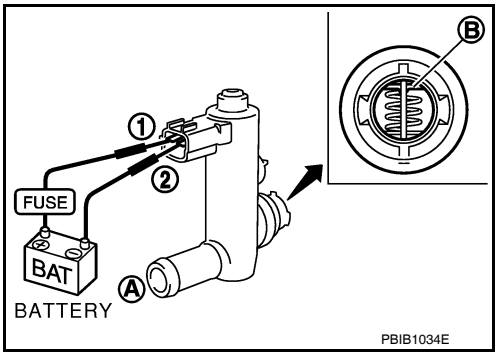
1. Remove EVAP canister vent control valve from EVAP canister. Refer to FL-15, "Exploded View".
2. Check portion (B) of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.
If NG, go to next step.



4. Clean the air passage [Portion (A) to (B)] of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

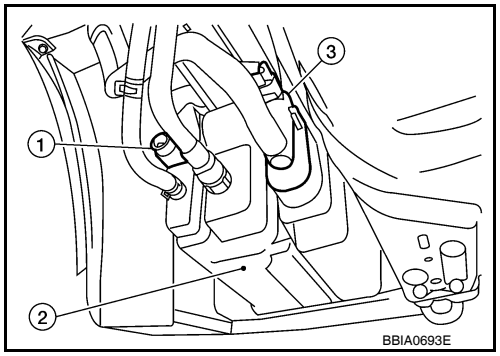
DTC P0448 EVAP CANISTER VENT CONTROL VALVE

Component Description

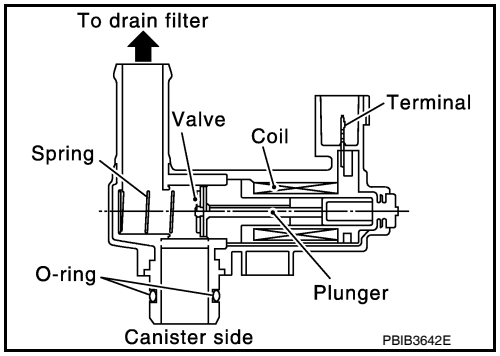
INFOID:0000000007699984

The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

1. EVAP control system pressure sensor



This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows EVAP control system diagnoses.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699985

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:0000000007699986

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448 0448	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	• EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • Drain filter • EVAP canister is saturated with water

DTC Confirmation Procedure

INFOID:0000000007699987

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 1 minute.
4. Repeat next procedures three times.

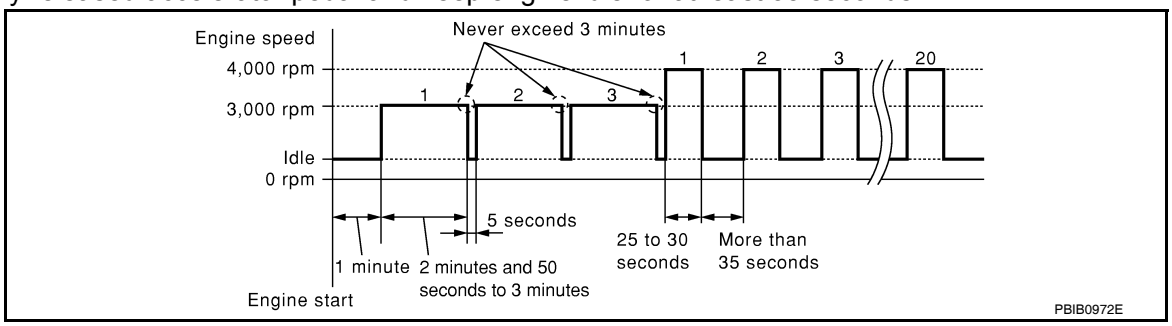
a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.
Never exceed 3 minutes.

b. Fully released accelerator pedal and keep engine idle for about 5 seconds.

5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-354, "Refer to .Diagnosis Procedure".
If 1st trip DTC is not detected, go to the next step.
7. Repeat next procedure 20 times.

a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

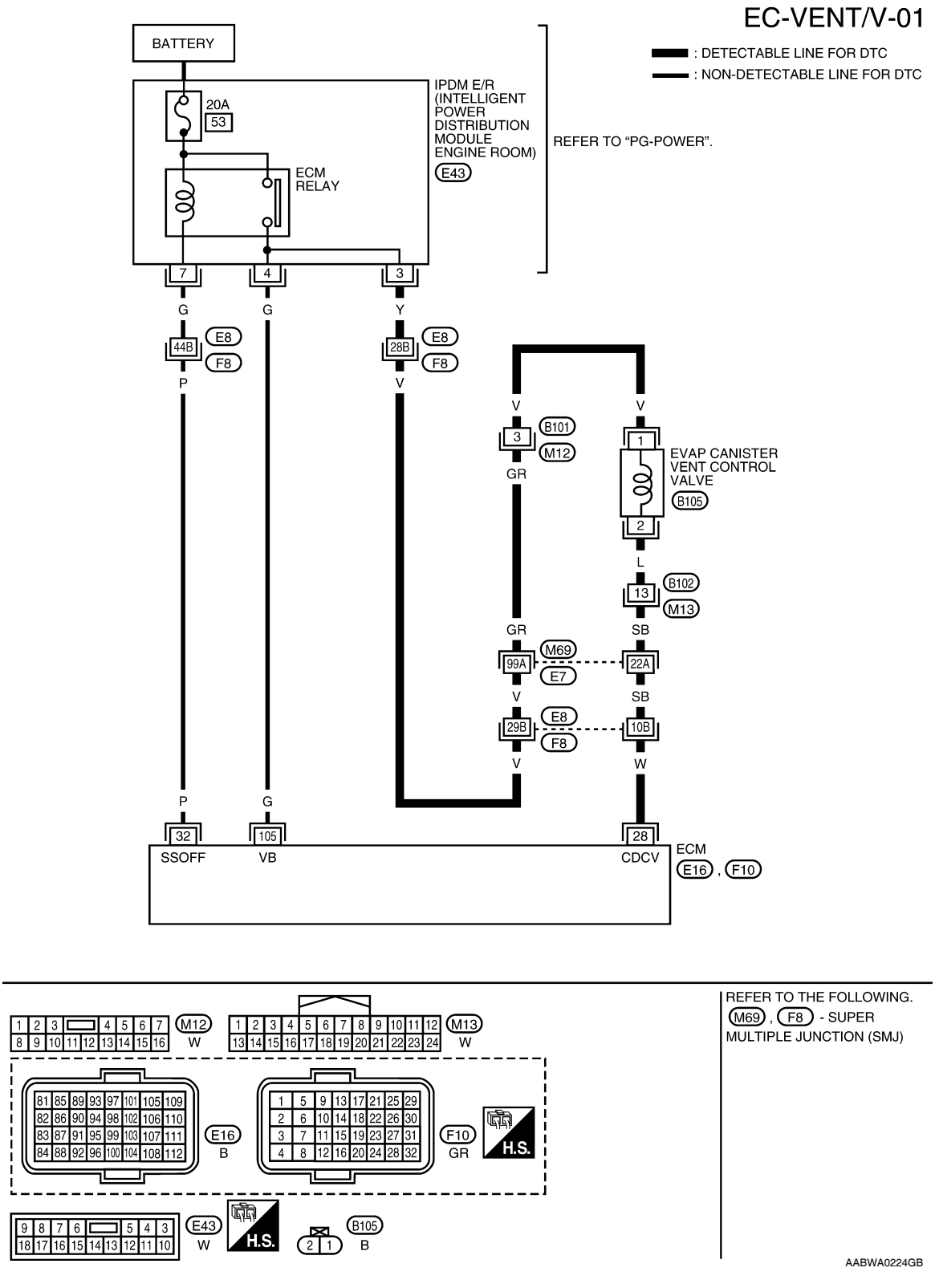
b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



8. Check 1st trip DTC.
9. If 1st trip DTC is detected, go to EC-354, "Refer to .Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007699988



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

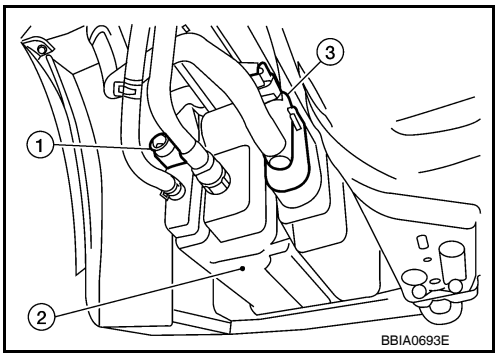
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
28	W	EVAP canister vent control valve	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

Refer to .Diagnosis Procedure

INFOID:0000000007699989

1.CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve (3).
3. Check the rubber tube for clogging.



1. EVAP control system pressure sensor
2. EVAP canister

OK or NG

OK >> GO TO 2.
NG >> Clean rubber tube using an air blower.

2.CHECK DRAIN FILTER

Refer to EC-323, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

3.CHECK EVAP CANISTER VENT CONTROL VALVE

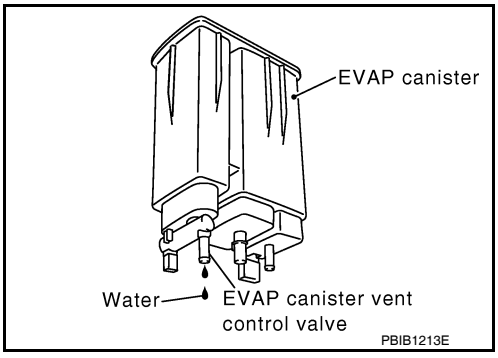
Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

4.CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached. Refer to FL-15, "Exploded View".
2. Does water drain from the EVAP canister.



Yes or No

Yes >> GO TO 5.
No >> GO TO 7.

5.CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING PART

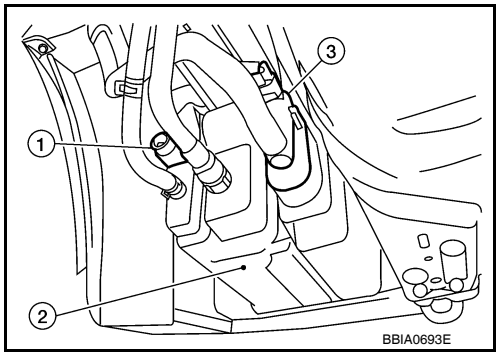
Check the following.
- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Exploded View".

7.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.

2. EVAP canister
3. EVAP canister vent control valve



2. Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

9.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

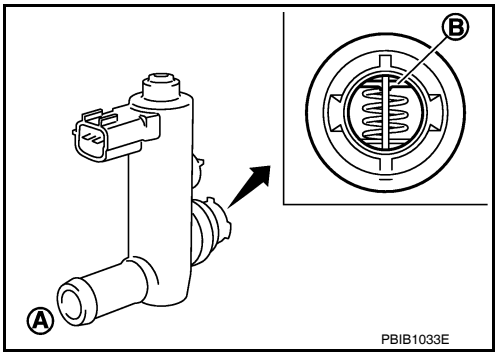
INFOID:0000000007699990

EVAP CANISTER VENT CONTROL VALVE

With CONSULT

1. Remove EVAP canister vent control valve from EVAP canister. Refer to FL-15, "Exploded View".

2. Check portion (B) of EVAP canister vent control valve for being rusted.
   If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".
   If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform “VENT CONTROL/V” in “ACTIVE TEST” mode.
6. Check air passage continuity and operation delay time.
   Make sure new O-ring is installed properly.

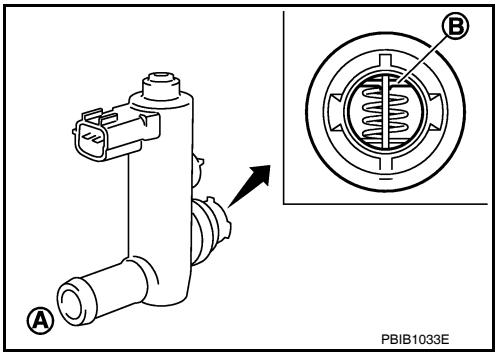
Condition (VENT CONTROL/V)	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.
If NG, go to next step.

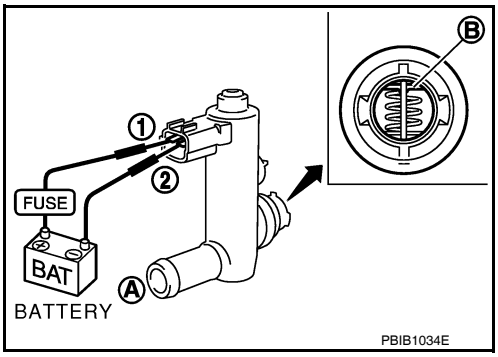
7. Clean the air passage [Portion (A) to (B)] of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
   If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

⊗ Without CONSULT

1. Remove EVAP canister vent control valve from EVAP canister. Refer to FL-15, "Exploded View".
2. Check portion (B) of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.
   Make sure new O-ring is installed properly.



Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.
If NG, go to next step.

4. Clean the air passage [Portion (A) to (B)] of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
   If NG, replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

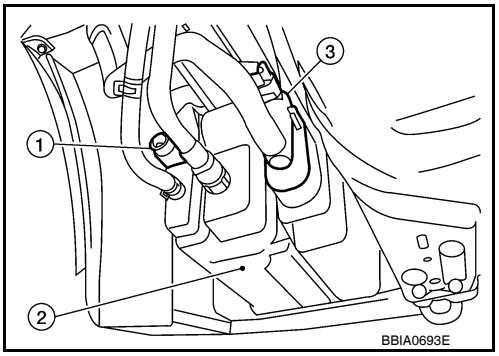
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

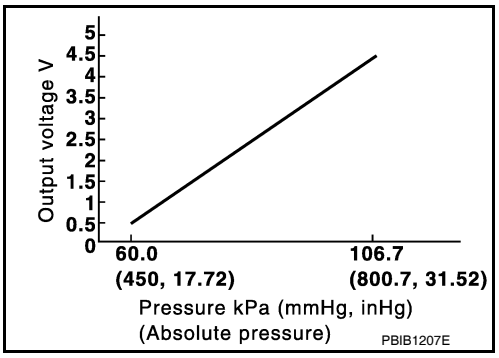
Component Description

INFOID:0000000007699991

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

2. EVAP canister
3. EVAP canister vent control valve





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699992

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	Ignition switch: ON	Approx. 1.8 - 4.8 V
EVAP LEAK DIAG	Ignition switch: ON	Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON	Indicates the ready condition of EVAP leak diagnosis.

On Board Diagnosis Logic

INFOID:0000000007699993

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	• Harness or connectors [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:0000000007699994

NOTE:
Never remove fuel filler cap during DTC confirmation procedure.

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.

With CONSULT>>GO TO 2.
Without CONSULT>>GO TO 5.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Start engine and let it idle for least 40 seconds.
   NOTE:
   Do not depress accelerator pedal even slightly.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-359, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Select “EVAP DIAG READY” in “DATA MONITOR” mode of “ENGINE”.
2. Let it idle until “OFF” of “EVAP DIAG READY” changes to “ON”.
   NOTE:
   It will take at most 2 hours until “OFF” of “EVAP DIAG READY” changes to “ON”.
3. Turn ignition switch OFF and wait at least 90 minutes.
   NOTE:
   Never turn ignition switch ON during 90 minutes.
4. Turn ignition switch ON.
5. Select “EVAP LEAK DIAG” in “DATA MONITOR” mode of “ENGINE”.
6. Check that “EVAP LEAK DIAG” indication.

Which is displayed on CONSULT?

CMPLT >> GO TO 4.
YET >> 1. Perform DTC CONFIRMATION PROCEDURE again.
2. GO TO 1.

4.PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-359, "Diagnosis Procedure".
NO >> INSPECTION END

5.PERFORM DTC CONFIRMATION PROCEDURE-4

With GST

1. Start engine and let it idle for least 40 seconds.
   NOTE:
   Do not depress accelerator pedal even slightly.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-359, "Diagnosis Procedure".
NO >> GO TO 6.

6.PERFORM DTC CONFIRMATION PROCEDURE-5

With GST

1. Let it idle for at least 2 hours.

2. Turn ignition switch OFF and wait at least 90 minutes.
NOTE:
Never turn ignition switch ON during 90 minutes.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

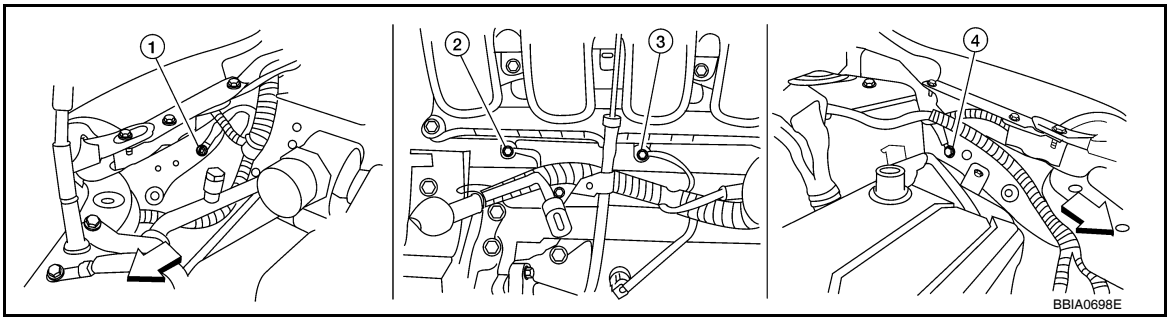
YES >> Proceed to EC-359, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007699995

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

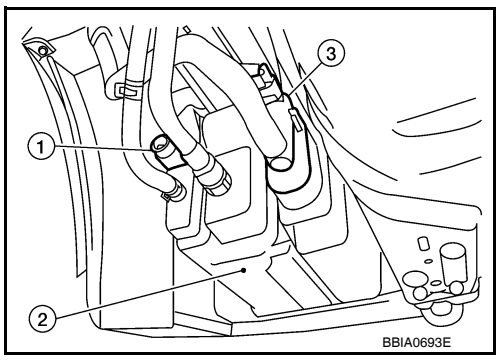
2.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor (1) harness connector.

2. EVAP canister
3. EVAP canister vent control valve

2. Check sensor harness connector for water.

Water should not exist.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness connector.

3.CHECK COMPONENTS POWER SUPPLY

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-482, "Wiring Diagram"

OK or NG

OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to MTC-38.)
- Crankshaft position sensor (POS) (Refer to EC-307, "Component Inspection".)

OK or NG

OK >> GO TO 5.
NG >> Replace malfunctioning components.

5. CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

8. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

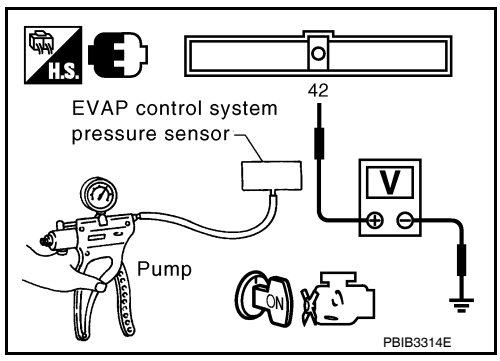
Component Inspection

INFOID:0000000007699996

EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to FL-15, "Exploded View".
   Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage (V)
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value



CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

4. If NG, replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

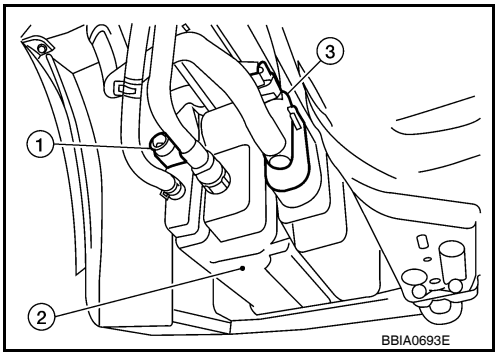
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

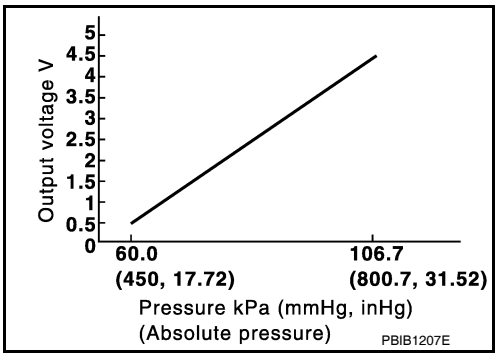
Component Description

INFOID:0000000007699997

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

2. EVAP canister
3. EVAP canister vent control valve





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007699998

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	Ignition switch: ON	Approx. 1.8 - 4.8 V
EVAP LEAK DIAG	Ignition switch: ON	Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON	Indicates the ready condition of EVAP leak diagnosis.

On Board Diagnosis Logic

INFOID:0000000007699999

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:0000000007700000

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

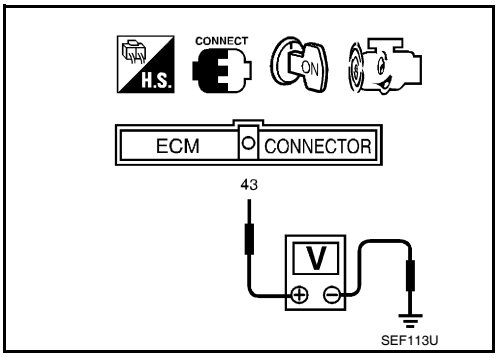
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT.
5. Make sure that “FUEL T/TMP SE” is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to EC-364, "Diagnosis Procedure".

WITH GST

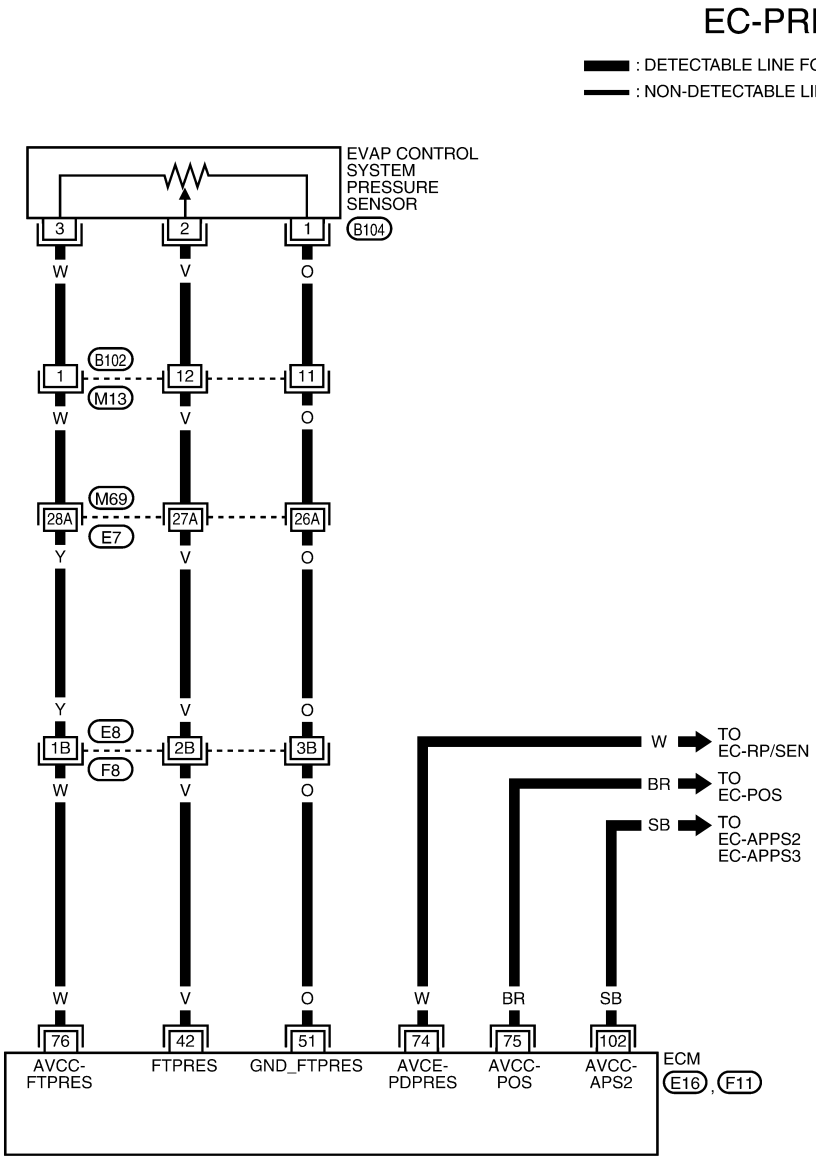
1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select Service $07 with GST.
   If 1st trip DTC is detected, go to EC-364, "Diagnosis Procedure".

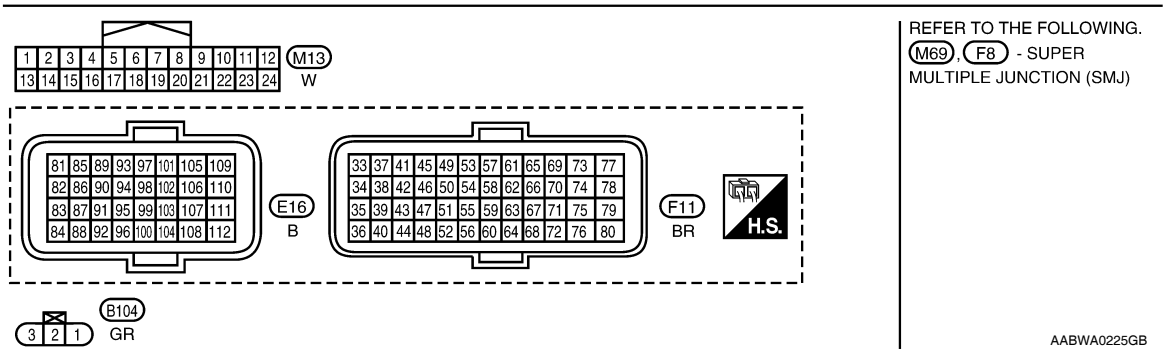


Wiring Diagram

INFOID:0000000007700001

EC-PRE/SE-01





Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

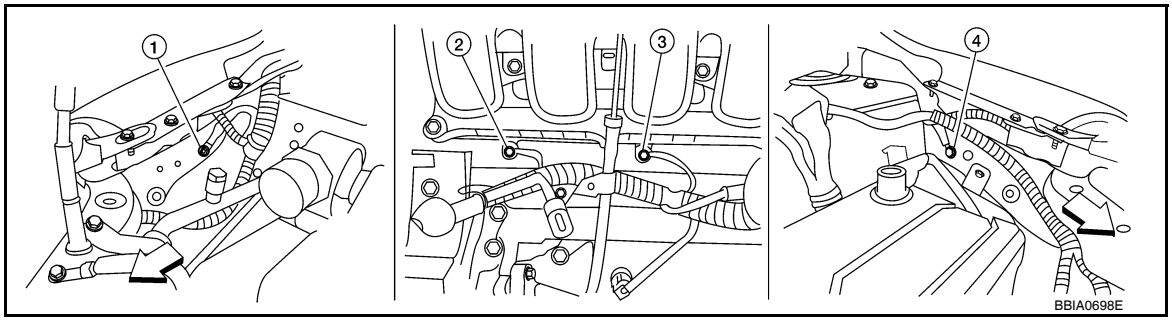
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
42	V	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8 V
51	O	Sensor ground (EVAP control system pressure sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V

Diagnosis Procedure

INFOID:0000000007700002

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

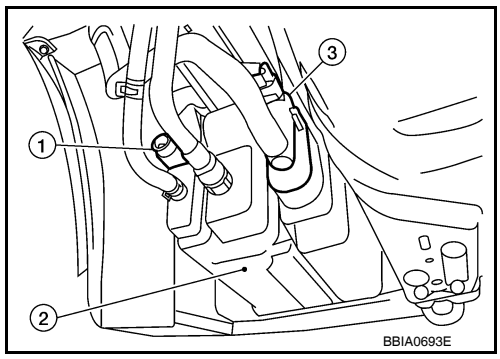
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.



2. EVAP canister
3. EVAP canister vent control valve

2. Check sensor harness connector for water.

Water should not exist.

OK or NG

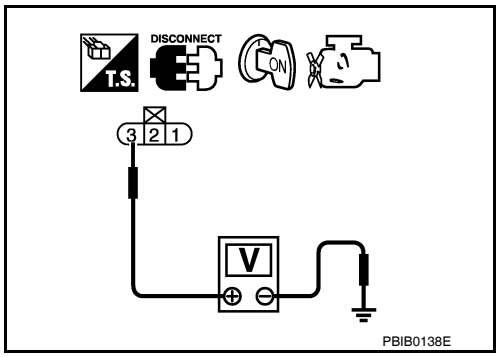
OK >> GO TO 3.

NG >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76.

Continuity should exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK COMPONENTS POWER SUPPLY

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-482, "Wiring Diagram"

OK or NG

OK >> GO TO 8.
NG >> Repair short to ground or short to power in harness or connectors.

8.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to MTC-38, "Magnet Clutch Circuit (If Equipped)".)
- Crankshaft position sensor (POS) (Refer to EC-307, "Component Inspection".)

OK or NG

OK >> GO TO 9.
NG >> Replace malfunctioning components.

9.CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

11.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> GO TO 14.

14.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13

- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 16.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

16. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

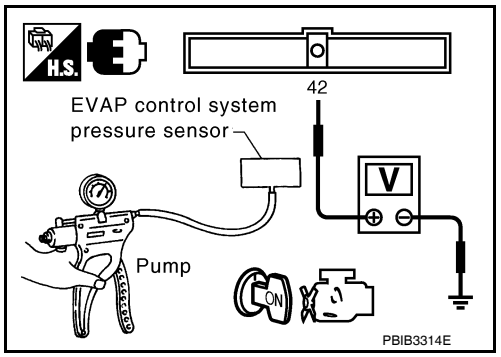
Component Inspection

INFOID:0000000007700003

EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to FL-15, "Exploded View".
   Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage (V)
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value



CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

4. If NG, replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

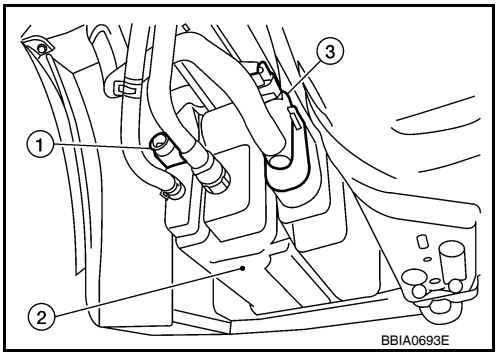
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

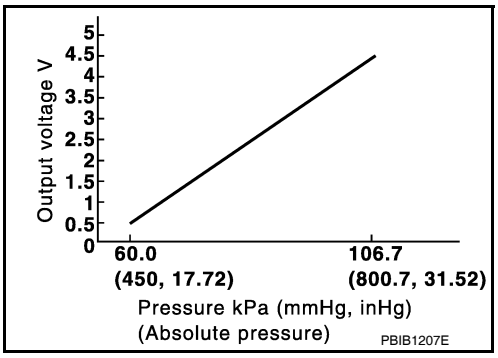
Component Description

INFOID:0000000007700004

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

2. EVAP canister
3. EVAP canister vent control valve





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700005

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	Ignition switch: ON	Approx. 1.8 - 4.8 V
EVAP LEAK DIAG	Ignition switch: ON	Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON	Indicates the ready condition of EVAP leak diagnosis.

On Board Diagnosis Logic

INFOID:0000000007700006

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Drain filter • Rubber hose to EVAP canister vent control valve

DTC Confirmation Procedure

INFOID:0000000007700007

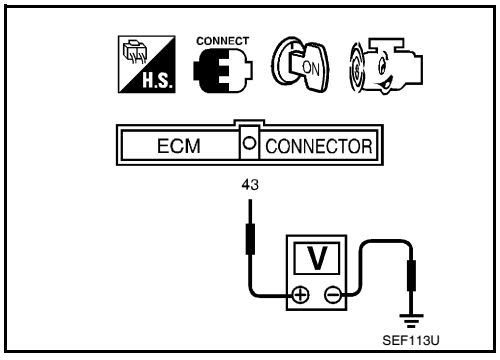
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT.
5. Make sure that “FUEL T/TMP SE” is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to EC-371, "Diagnosis Procedure".

WITH GST

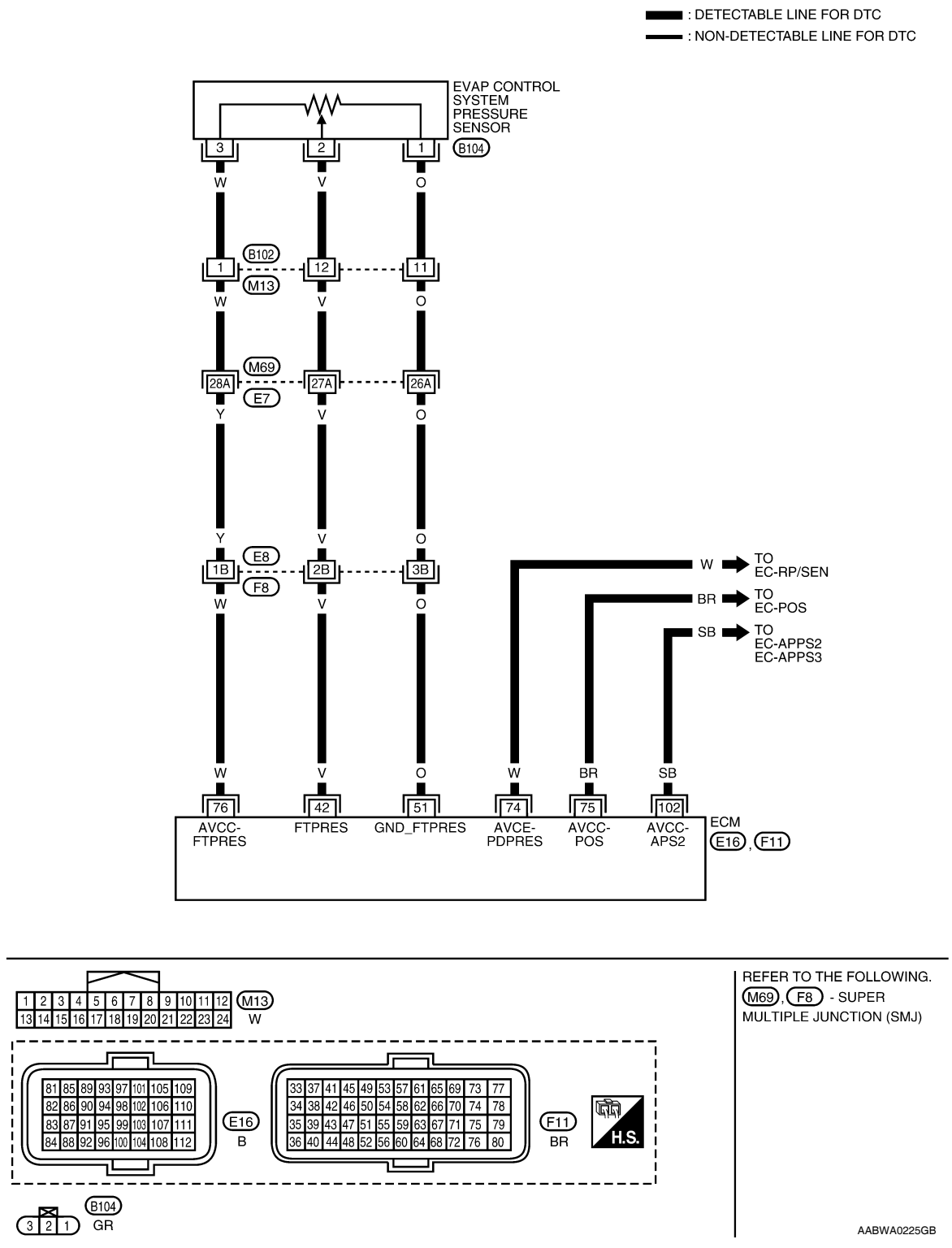
1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select Service $07 with GST.
   If 1st trip DTC is detected, go to EC-371, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007700008

EC-PRE/SE-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

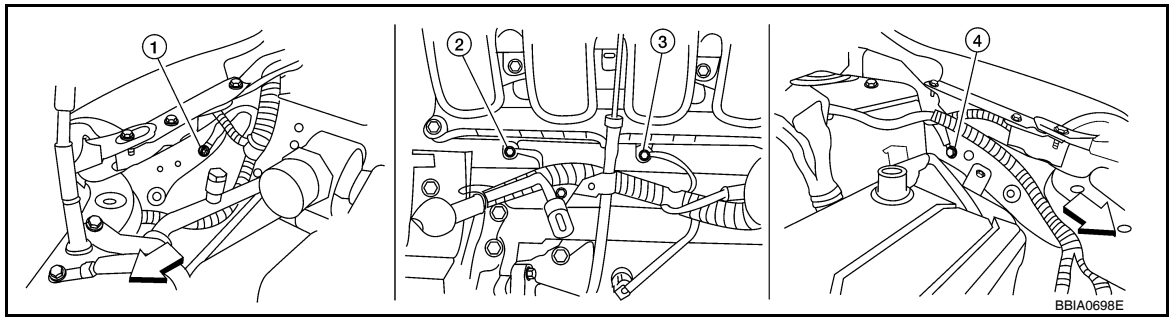
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
42	V	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8 V
51	O	Sensor ground (EVAP control system pressure sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V

Diagnosis Procedure

INFOID:0000000007700009

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Engine ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

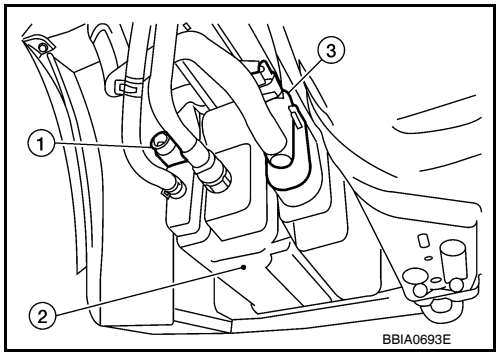
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.



2. EVAP canister
3. EVAP canister vent control valve

2. Check sensor harness connector for water.

Water should not exist.

OK or NG

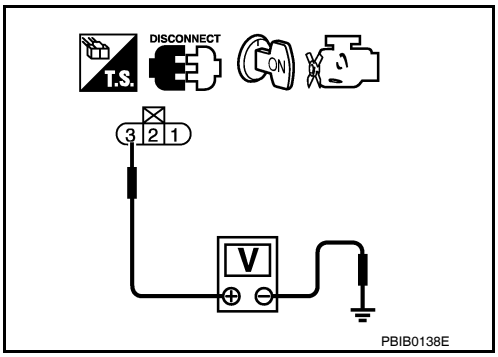
OK >> GO TO 3.

NG >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76.

Continuity should exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK COMPONENTS POWER SUPPLY

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-482, "Wiring Diagram"

OK or NG

OK >> GO TO 8.
NG >> Repair short to ground or short to power in harness or connectors.

8.CHECK COMPONENTS

Check the following.
- Refrigerant pressure sensor (Refer to MTC-38, "Magnet Clutch Circuit (If Equipped)".)
- Crankshaft position sensor (POS) (Refer to EC-307, "Component Inspection".)

OK or NG

OK >> GO TO 9.
NG >> Replace malfunctioning components.

9.CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

11.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E85, F8
- Harness connectors M69, E7
- Harness connectors B102, M13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> GO TO 14.

14.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness connectors M69, E7
- Harness connectors B102, M13

• Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent and kinked.

OK or NG

OK >> GO TO 16.
NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

16. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister vent control valve. Refer to FL-15, "Exploded View".

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 18.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

18. CHECK DRAIN FILTER

Refer to EC-323, "Component Inspection".

OK or NG

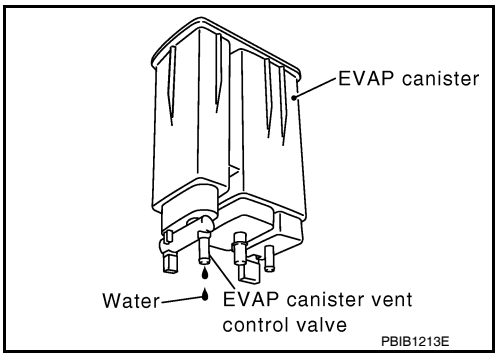
OK >> GO TO 19.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

19. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-15, "Exploded View".
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 20.
No >> GO TO 22.



20. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensorattached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 22.
NG >> GO TO 21.

21. DETECT MALFUNCTIONING PART

Check the following.

• EVAP canister for damage
• EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Exploded View".

22. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

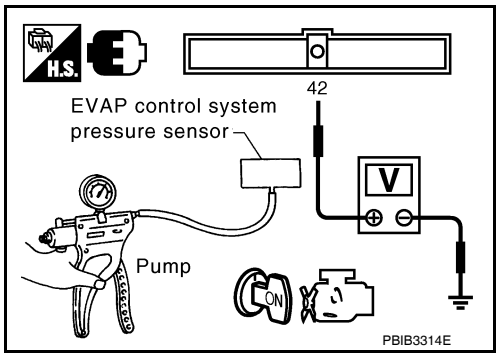
Component Inspection

INFOID:0000000007700010

EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to FL-15, "Exploded View".
   Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage (V)
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value



CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

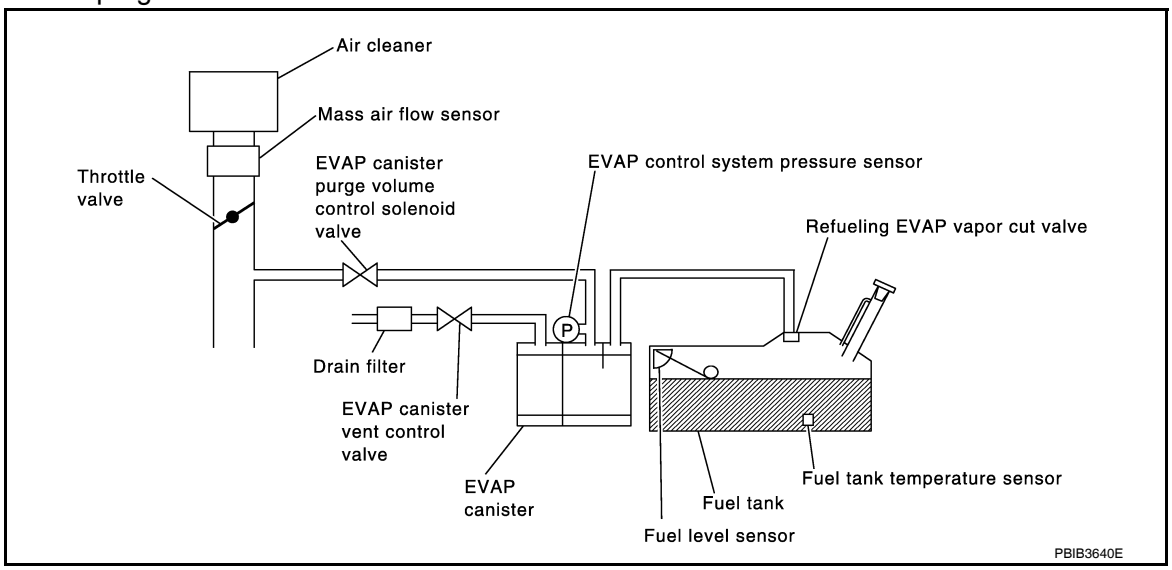
4. If NG, replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

DTC P0455 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:0000000007700011

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	• EVAP control system has a very large leak such as fuel filler cap fell off. • EVAP control system does not operate properly.	• Fuel filler cap remains open or fails to close. • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent. • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • Drain filter • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged. • EVAP control system pressure sensor • Refueling EVAP vapor cut valve • ORVR system leaks

CAUTION:

- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

INFOID:0000000007700012

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:
- **Make sure that EVAP hose are connected to EVAP canister purge volume control solenoid valve properly.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.**
- **Open engine hood before conducting the following procedure.**

WITH CONSULT

1. Tighten fuel filler cap securely until reteaching sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
5. Make sure that the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT.
   Follow the instruction displayed.
   NOTE:
   If the engine speed cannot be maintained within the range displayed on the CONSULT screen, go to EC-81, "Basic Inspection".
7. Make sure that "OK" is displayed.
   If "NG" is displayed, select "SELF-DIAG RESULTS" mode with CONSULT and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to EC-377, "Diagnosis Procedure".
   If P0442 is displayed, perform Diagnostic Procedure for DTC P0442, EC-325, "Diagnosis Procedure".

WITH GST

NOTE:
Be sure to read the explanation of Driving Pattern on EC-49, "Emission-related Diagnostic Information" before driving vehicle.

1. Start engine.
2. Drive vehicle according to Driving Pattern, EC-49, "Emission-related Diagnostic Information".
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
5. Select Service $07 with GST.

- If P0441 is displayed on the screen, go to EC-320, "Diagnosis Procedure" for DTC P0441.
- If P0442 is displayed on the screen, go to EC-325, "Diagnosis Procedure" for DTC P0442.
- If P0455 is displayed on the screen, go to EC-377, "Diagnosis Procedure".

Diagnosis Procedure

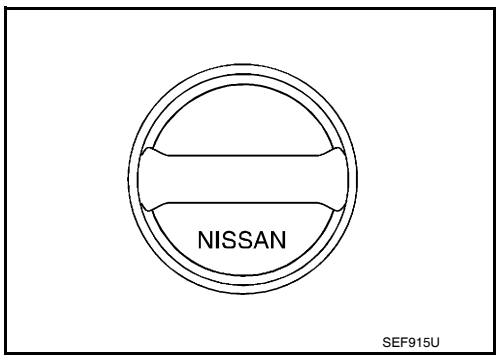
INFOID:0000000007700013

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap. Refer to FL-10, "Component".



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until reteaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-33, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one. Refer to FL-10, "Component".

5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.
Refer to EC-31.

OK or NG

OK >> GO TO 6.
NG >> Repair or reconnect the hose.

6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7. CHECK DRAIN FILTER

Refer to EC-381, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.
- EVAP canister vent control is installed properly.
  Refer to FL-15, "Removal and Installation".
- EVAP canister vent control valve.
  Refer to EC-349, "Component Inspection".

OK or NG

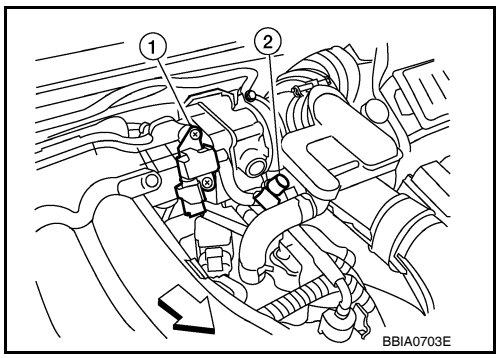
OK >> GO TO 9.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to FL-15, "Exploded View".

9. INSTALL THE PRESSURE PUMP

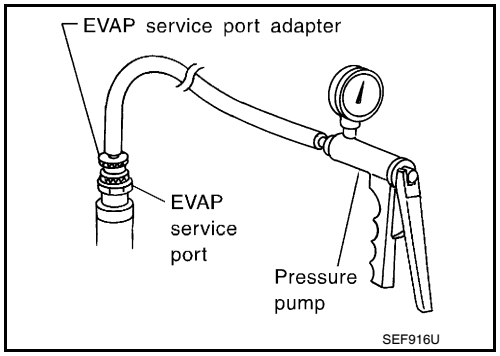
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to EC-31, "Description".

1. EVAP canister purge volume control solenoid valve

⇦ : Vehicle front



NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

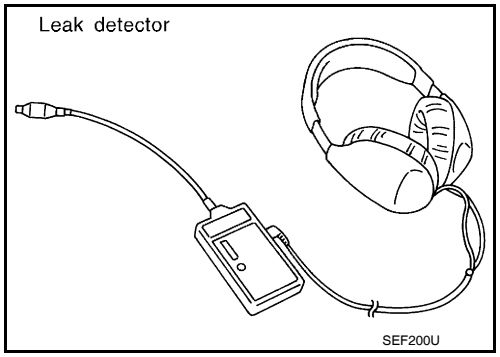


With CONSULT>>GO TO 10.
Without CONSULT>>GO TO 11.

10. CHECK FOR EVAP LEAK

With CONSULT

1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "Description".



OK or NG

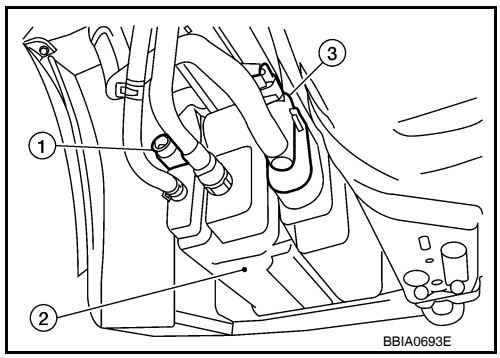
OK >> GO TO 12.
NG >> Repair or replace.

11. CHECK FOR EVAP LEAK

Without CONSULT

1. Turn ignition switch OFF.

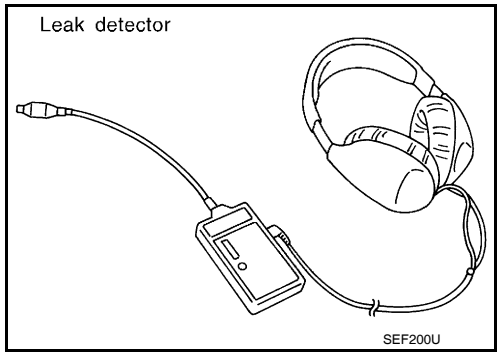
2. Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)



1. EVAP control system pressure sensor
2. EVAP canister

3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
CAUTION:
- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to EC-31, "Description".



OK or NG

OK >> GO TO 13.
NG >> Repair or replace.

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

OK >> GO TO 15.
NG >> GO TO 14.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.
NG >> GO TO 14.

14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-109, "Vacuum Hose Drawing".

OK or NG

OK (With CONSULT)>>GO TO 15.
OK (Without CONSULT)>>GO TO 16.

NG >> Repair or reconnect the hose.

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT

1. Start engine.
2. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 17.
NG >> GO TO 16.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-338, "Component Inspection".

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-282, "Component Inspection".

OK or NG

OK >> GO TO 18.
NG >> Replace fuel level sensor unit. Refer to FL-6, "Component".

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

19. CHECK EVAP/ORVR LINE

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37.

OK or NG

OK >> GO TO 20.
>> Repair or replace hoses and tubes.

20. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 21.
>> Repair or replace hoses, tubes or filler neck tube.

21. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 22.
>> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-10, "Component".

22. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

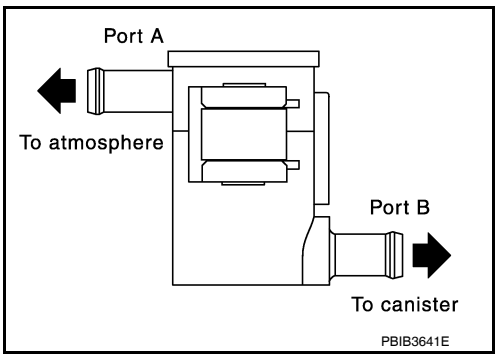
>> **INSPECTION END**

Component Inspection

INFOID:0000000007700014

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to FL-15, "Exploded View".

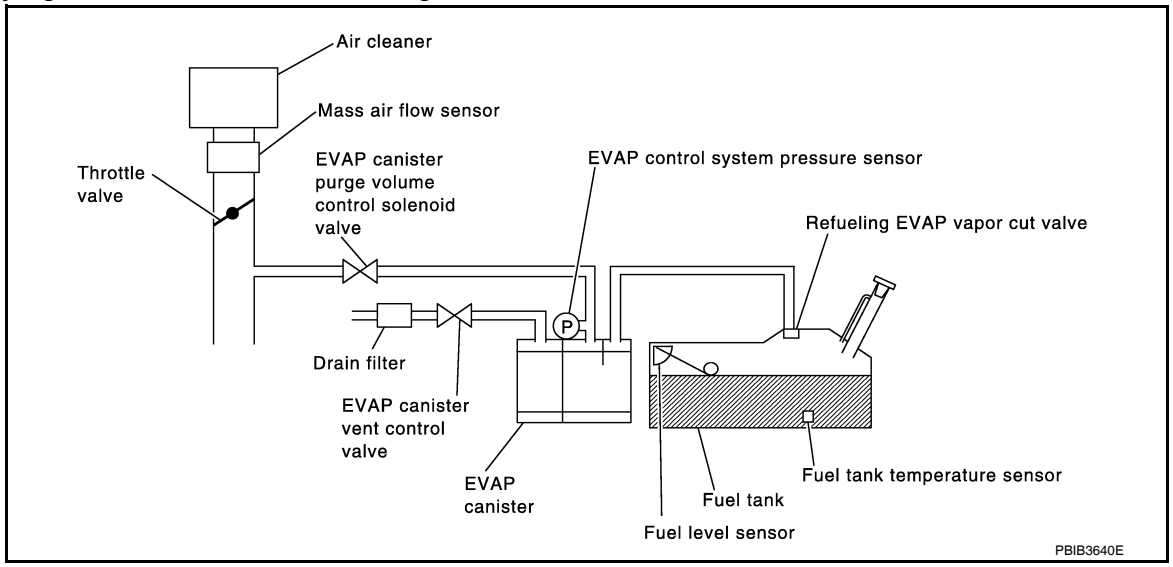


DTC P0456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:0000000007700015

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.
If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.
If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.
If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	• EVAP system has a very small leak. • EVAP system does not operate properly.	• Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • Drain filter • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Refueling EVAP vapor cut valve • ORVR system leaks • Fuel level sensor and the circuit • Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

INFOID:0000000007700016

NOTE:
- **If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.**
- **After repair, make sure that the hoses and clips are installed properly.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
- **Open engine hood before conducting following procedure.**
- **If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.**
  - **Fuel filler cap is removed.**
  - **Refilled or drained the fuel.**
  - **EVAP component parts is/are removed.**
- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT.
2. Make sure the following conditions are met.
   FUEL LEVEL SE: 0.25 - 1.4 V
   COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
   FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
   INT/A TEMP SE: More than 0°C (32°F)
   If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the “FUEL LEVEL SE” meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select “EVAP V/S LEAK P0456” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT.
   Follow the instruction displayed.
6. Make sure that “OK” is displayed.
   If “NG” is displayed, refer to EC-385, "Diagnosis Procedure".
   NOTE:
   - **If the engine speed cannot be maintained within the range displayed on CONSULT screen, go to EC-81, "Basic Inspection".**
   - **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**

Overall Function Check

INFOID:0000000007700017

WITH GST

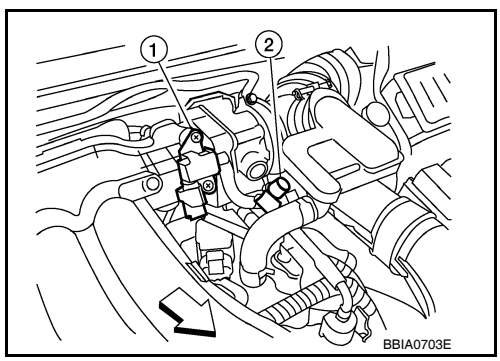
Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:
- **Never use compressed air, doing so may damage the EVAP system.**
- **Do not start engine.**
- **Do not exceeded 4.12 kPa (0.042 kg/cm^2, 0.6 psi).**

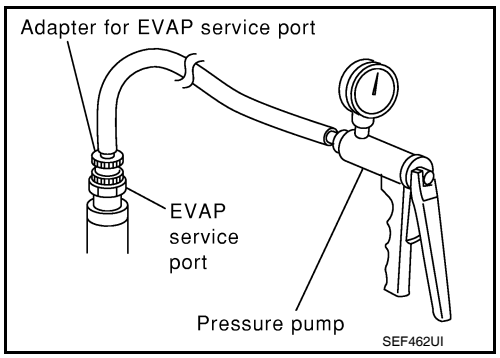
1. Attach the EVAP service port adapter securely to the EVAP service port (2).

1. EVAP canister purge volume control solenoid valve

⇦ : Vehicle front



2. Set the pressure pump and a hose.
3. Also set the pressure pump with pressure gauge to the EVAP service port adapter.
4. Turn ignition switch ON.
5. Connect GST and select Service $08.
6. Using Service $08 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.
   Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)
   Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).
   If NG, go to EC-385, "Diagnosis Procedure".
   If OK, go to next step.
8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.
    NOTE:
    For more information, refer to GST Instruction Manual.



Diagnosis Procedure

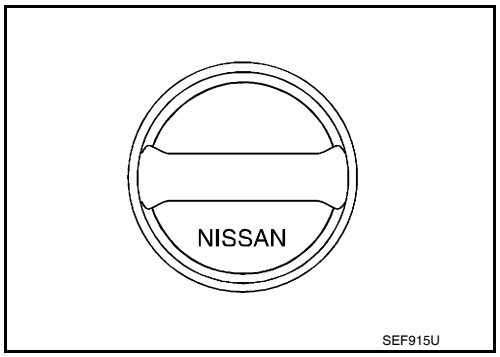
INFOID:0000000007700018

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap. Refer to FL-10, "Component".



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until reteaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-33, "Component Inspection".

OK or NG

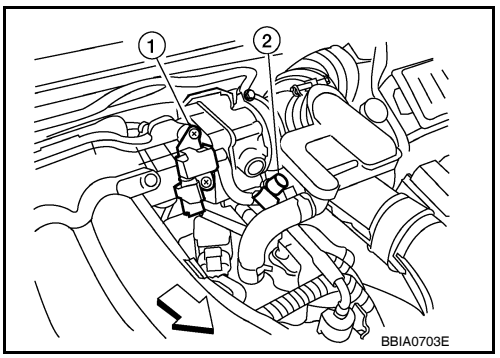
OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one. Refer to FL-10, "Component".

5. INSTALL THE PRESSURE PUMP

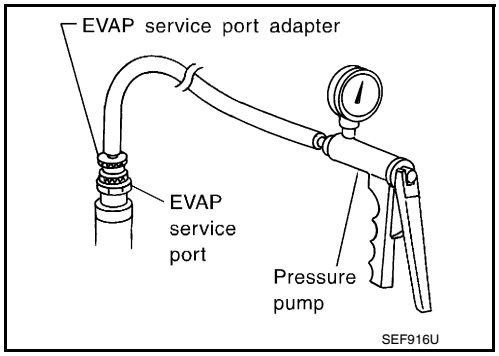
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to EC-31, "Description".

1. EVAP canister purge volume control solenoid valve

⇦ : Vehicle front



NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

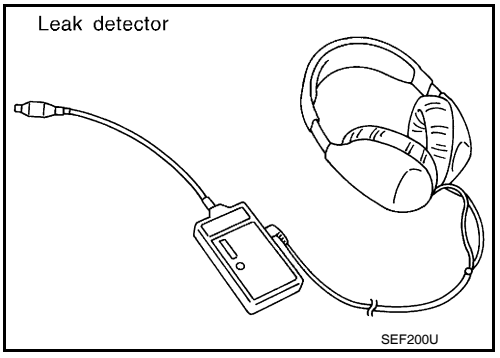


With CONSULT>>GO TO 6.
Without CONSULT>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT

1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
   Refer to EC-31, "Description".



OK or NG

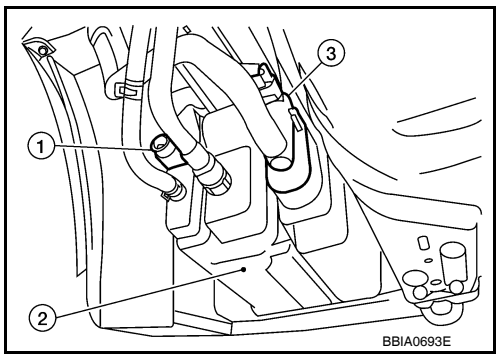
OK >> GO TO 8.
NG >> Repair or replace.

7. CHECK FOR EVAP LEAK

Without CONSULT

1. Turn ignition switch OFF.

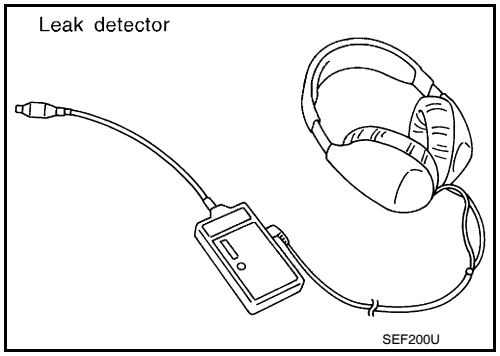
2. Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)



1. EVAP control system pressure sensor
2. EVAP canister

3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
CAUTION:
- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to EC-31, "Description".



OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

8. CHECK DRAIN FILTER

Refer to EC-389, "Component Inspection".

OK or NG

OK >> GO TO 9.
NG >> Replace drain filter. Refer to FL-15, "Exploded View".

9. CHECK EVAP CANISTER VENT CONTROL VALVE

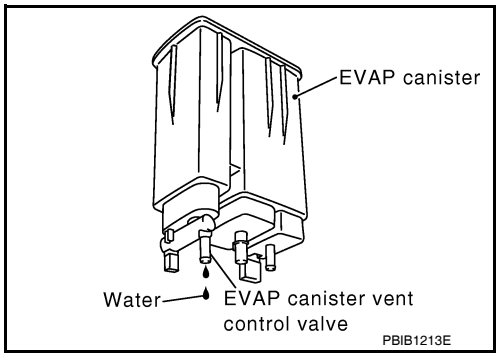
Check the following.
- EVAP canister vent control valve is installed properly.
  Refer to FL-15, "Removal and Installation".
- EVAP canister vent control valve.
  Refer to EC-349, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to FL-15, "Exploded View".

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-15, "Exploded View".
2. Does water drain from the EVAP canister?



Yes or No

Yes >> GO TO 11.
No (With CONSULT)>>GO TO 13.
No (Without CONSULT)>>GO TO 14.

11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT)>>GO TO 13.
OK (Without CONSULT)>>GO TO 14.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Exploded View".

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 17.
NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-109, "Vacuum Hose Drawing".

OK or NG

OK >> GO TO 16.
NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-338, "Component Inspection".

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to EM-18, "Component".

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-282, "Component Inspection".

OK or NG

OK >> GO TO 18.
NG >> Replace fuel level sensor unit. Refer to FL-6, "Component".

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-360, "Component Inspection".

OK or NG

OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor. Refer to FL-15, "Exploded View".

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to EC-31, "Description".

OK or NG

OK >> GO TO 20.
NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37.

OK or NG

OK >> GO TO 22.
NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.
NG >> Repair or replace hose, tube or filler neck tube.

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-40, "Component Inspection".

OK or NG

OK >> GO TO 24.
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-10, "Component".

24. CHECK FUEL LEVEL SENSOR

Refer to DI-16.

OK or NG

OK >> GO TO 25.
NG >> Replace fuel level sensor unit. Refer to FL-6, "Component".

25. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

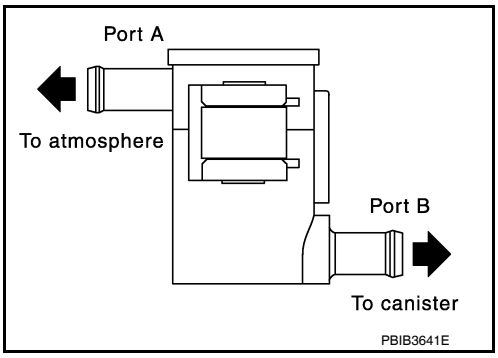
Component Inspection

INFOID:0000000007700019

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.

3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to FL-15, "Exploded View".

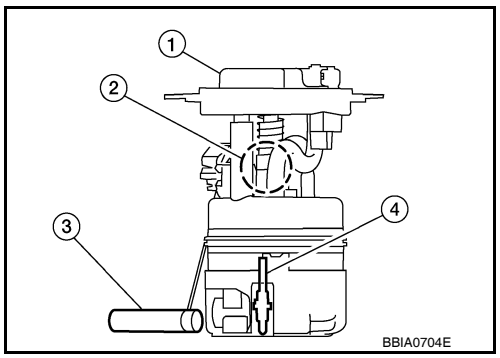


DTC P0460 FUEL LEVEL SENSOR

Component Description

INFOID:0000000007700020

The fuel level sensor (3) is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line.



1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
4. Fuel tank temperature sensor

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnosis Logic

INFOID:0000000007700021

NOTE:
- **If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	• Harness or connectors (CAN communication line is open or shorted) • Harness or connectors (Fuel level sensor circuit is open or shorted) • Combination meter • Fuel level sensor

DTC Confirmation Procedure

INFOID:0000000007700022

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-391, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700023

1.CHECK FUEL GAUGE OPERATION

Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-11, "Self-Diagnosis Mode of Combination Meter".

2.CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-16, "Fuel Level Sensor Signal Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

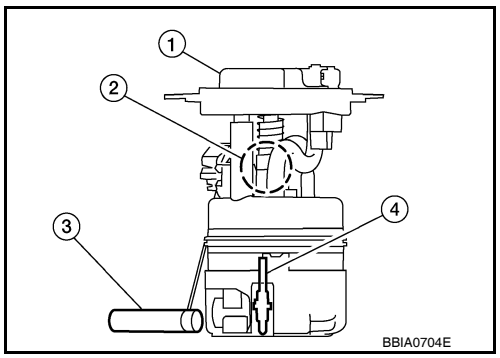
>> **INSPECTION END**

DTC P0461 FUEL LEVEL SENSOR

Component Description

INFOID:0000000007700025

The fuel level sensor (3) is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line.



1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
4. Fuel tank temperature sensor

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnosis Logic

INFOID:0000000007700026

NOTE:
- **If DTC P0461 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.Driving long distances naturally affect fuel gauge level.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	• Harness or connectors (CAN communication line is open or shorted) • Harness or connectors (Fuel level sensor circuit is open or shorted) • Combination meter • Fuel level sensor

Overall Function Check

INFOID:0000000007700027

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:
When performing following procedure, be sure to observe the handling of the fuel.
Refer to FL-5, "General Precaution".
TESTING CONDITION:
Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT

NOTE:
Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to EC-89, "Fuel Pressure Check".
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch OFF and wait at least 10 seconds then turn ON.
6. Select “FUEL LEVEL SE” in “DATA MONITOR” mode with CONSULT.
7. Check “FUEL LEVEL SE” output voltage and note it.
8. Select “FUEL PUMP RELAY” in “ACTIVE TEST” mode with CONSULT.
9. Touch “ON” and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Check “FUEL LEVEL SE” output voltage and note it.
11. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).

12. Check “FUEL LEVEL SE” output voltage and note it.
13. Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.
    If NG, go to EC-394, "Diagnosis Procedure".

WITH GST

NOTE:
Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to EC-89, "Fuel Pressure Check".
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch ON.
6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to EC-394, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700028

1.CHECK FUEL GAUGE OPERATION

Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-11, "Self-Diagnosis Mode of Combination Meter".

2.CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-16, "Fuel Level Sensor Signal Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

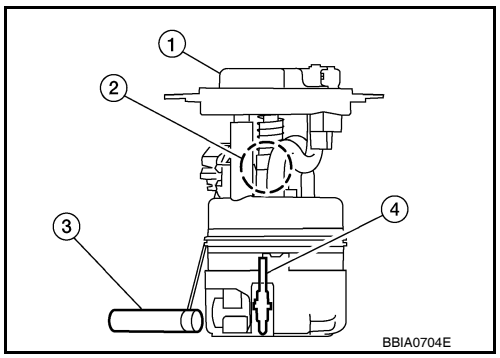
>> **INSPECTION END**

DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description

INFOID:0000000007700030

The fuel level sensor (3) is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line.



1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
4. Fuel tank temperature sensor

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnosis Logic

INFOID:0000000007700031

NOTE:
- **If DTC P0462 or P0463 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (CAN communication line is open or shorted) • Harness or connectors (Fuel level sensor circuit is open or shorted) • Combination meter • Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:0000000007700032

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at ignition switch ON.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-395, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700033

1.CHECK FUEL GAUGE OPERATION

Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-11, "Self-Diagnosis Mode of Combination Meter".

2.CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-16, "Fuel Level Sensor Signal Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

DTC P0500 VSS

M/T MODELS

M/T MODELS : Description

INFOID:0000000007700035

The vehicle speed signal is sent from “ABS actuator and electric unit (control unit)” or combination meter through CAN communication line

M/T MODELS : On Board Diagnosis Logic

INFOID:0000000007700036

NOTE:
- **If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The vehicle speed signal sent to ECM is almost km/h (0 MPH) even when vehicle is being driven.	• Harness or connectors (CAN communication line is open or shorted.) • Harness or connectors (Vehicle speed signal circuit is open or shorted) • ABS actuator and electric unit (control unit) • Combination meter

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode.

Detected item	Engine operating condition in fail-safe mode
Vehicle speed sensor	The cooling fan operates (High) while engine is running.

M/T MODELS : DTC Confirmation Procedure

INFOID:0000000007700037

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT. The vehicle speed on CONSULT should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
   If NG, go to EC-398, "M/T MODELS : Diagnosis Procedure".
   If OK, go to following step.
3. Select “DATA MONITOR” mode with CONSULT.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,600 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	5.5 - 31.8 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF

6. Check 1st trip DTC.

7. If 1st trip DTC is detected, go to EC-398, "M/T MODELS : Diagnosis Procedure".

M/T MODELS : Overall Function Check

INFOID:0000000007700038

Use this procedure to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed signal in Service $01 with GST.
   The vehicle speed signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
4. If NG, go to EC-398, "M/T MODELS : Diagnosis Procedure".

M/T MODELS : Diagnosis Procedure

INFOID:0000000007700039

1.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to BRC-11, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK COMBINATION METER

Refer to DI-14, "Trouble Diagnosis".

>> **INSPECTION END**

EXCEPT FOR M/T MODELS

EXCEPT FOR M/T MODELS : Description

INFOID:0000000007747927

ECM receives vehicle speed signals from two different paths via CAN communication line: One is from the ABS actuator and electric unit (control unit) via the combination unit and the other is from TCM.

EXCEPT FOR M/T MODELS : On Board Diagnosis Logic

INFOID:0000000007747928

NOTE:
- **If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409, "On Board Diagnosis Logic".**

DTC No.	Trouble diagnosis	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	• Harness or connector (The CAN communication line is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • TCM • Secondary speed sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode.

Detected item	Engine operating condition in fail-safe mode
Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (High) while engine is running.

EXCEPT FOR M/T MODELS : DTC Confirmation Procedure

INFOID:0000000007747929

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 10 V or more at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. Drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more.

   CAUTION:

   Always drive vehicle at a safe speed.

   NOTE:

   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-399, "EXCEPT FOR M/T MODELS : Diagnosis Procedure"

NO >> INSPECTION END

EXCEPT FOR M/T MODELS : Diagnosis Procedure

INFOID:0000000007747930

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to AT-79, "Diagnosis Procedure without CONSULT" (A/T) or CVT-55, "Diagnosis Procedure without CONSULT" (CVT).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

2.CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check DTC with ABS actuator and electric unit (control unit). Refer to BRC-25, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

3.CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to DI-12, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble shooting relevant to DTC indicated.

4.CHECK SECONDARY SPEED SENSOR

Check secondary speed sensor. Refer to AT-99, "Diagnosis Procedure" (A/T) or CVT-78, "Diagnosis Procedure" (CVT).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace or replace error-detected parts.

5.CHECK WHEEL SENSOR

Check wheel sensor. Refer to BRC-32, "Wheel Sensor System Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to EC-140, "Diagnosis Procedure".

NO >> Replace or replace error-detected parts.

DTC P0506 ISC SYSTEM

Description

INFOID:0000000007700040

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The ECM calculates the actual engine speed from signals of crankshaft position sensor (POS) and camshaft position sensor (PHASE).
The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

INFOID:0000000007700041

NOTE:
If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	• Electric throttle control actuator • Intake air leak

DTC Confirmation Procedure

INFOID:0000000007700042

NOTE:
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform EC-87, "Idle Air Volume Learning", before conducting DTC Confirmation Procedure. For the target idle speed, refer to the EC-545.**

TESTING CONDITION:
- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above −10°C (14°F).**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and run it for at least 1 minute at idle speed.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-401, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700043

1.CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 2.
NG >> Discover air leak location and repair.

2.REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-212, "ECM Re-communicating Function".
4. Perform EC-86, "VIN Registration".
5. Perform EC-87, "Accelerator Pedal Released Position Learning".
6. Perform EC-87, "Throttle Valve Closed Position Learning".

7. Perform EC-87, "Idle Air Volume Learning".

>> **INSPECTION END**

DTC P0507 ISC SYSTEM

Description

INFOID:0000000007700044

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The ECM calculates the actual engine speed from signals of camshaft position sensor (POS) and camshaft position sensor (PHASE).
The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

INFOID:0000000007700045

NOTE:
If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	• Electric throttle control actuator • Intake air leak • PCV system

DTC Confirmation Procedure

INFOID:0000000007700046

NOTE:
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform EC-87, "Idle Air Volume Learning", before conducting DTC Confirmation Procedure. For the target idle speed, refer to the EC-545.**

TESTING CONDITION:
- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above −10°C (14°F).**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and run it for at least 1 minute at idle speed.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-403, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700047

1.CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.
NG >> Discover air leak location and repair.

3.REPLACE ECM

1. Stop engine.

2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-212, "ECM Re-communicating Function".
4. Perform EC-86, "VIN Registration".
5. Perform EC-87, "Accelerator Pedal Released Position Learning".
6. Perform EC-87, "Throttle Valve Closed Position Learning".
7. Perform EC-87, "Idle Air Volume Learning".

>> **INSPECTION END**

DTC P050A, P050E COLD START CONTROL

Description

INFOID:0000000007700048

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

On Board Diagnosis Logic

INFOID:0000000007700049

NOTE:
If DTC P050A or P050E is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P050A 050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up condition.	• Lack of intake air volume • Fuel injection system • ECM
P050E 050E	Cold start engine exhaust temperature too low	The temperature of the catalyst inlet does not rise to the proper temperature when the engine is started with pre-warming up condition.	

DTC Confirmation Procedure

INFOID:0000000007700050

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

1.PERFORM DTC CONFIRMATION PROCEDURE-I

WITH CONSULT
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Select “DATA MONITOR” mode with CONSULT.
4. Check the indication of “COOLAN TEMP/S”.

WITH GST
Follow the procedure “WITH CONSULT” above.

Is the value of “COOLAN TEMP/S” between 20°C (68°F) and 36°C (97°F)?

YES >> GO TO 2.
NO-1 [If it is below 20°C (68°F)]>>Warm up the engine unit the value of “COOLAN TEMP/S” reaches 20°C (68°F) or more. Retry from step 1.
NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.

2.PERFORM DTC CONFIRMATION PROCEDURE-II

WITH CONSULT
1. Set the select lever in N range.
2. Start the engine and warm up in idle with the value of “COOLAN TEMP/S” between 20°C (68°F) and 40°C (104°F) for more than 15 seconds.
3. Check 1st trip DTC.

WITH GST
Follow the procedure “WITH CONSULT” above.

Is 1st trip DTC detected?

YES >> Proceed to EC-405, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007700051

1.PERFORM IDLE AIR VOLUME LEARNING

Perform EC-87, "Idle Air Volume Learning".
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 2.
No >> Follow the instruction of Idle Air Volume Learning.

2.CHECK INTAKE SYSTEM

Check for the cause of intake air volume lacking. Refer to the following.
- Crushed intake air passage
- Intake air passage clogging
- Clogging of throttle body

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning part

3.CHECK FUEL INJECTION SYSTEM FUNCTION

Perform EC-265, "DTC Confirmation Procedure" for DTC P0171.

OK or NG

OK >> GO TO 4.
NG >> Proceed to EC-268, "Diagnosis Procedure" for DTC P0171.

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
   See EC-405, "DTC Confirmation Procedure".
3. Is the 1st trip DTC P050A or P050E displayed again?

Yes or No

Yes >> GO TO 5.
No >> **INSPECTION END**

5.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to BL-212, "ECM Re-communicating Function".
3. Perform EC-86, "VIN Registration".
4. Perform EC-87, "Accelerator Pedal Released Position Learning".
5. Perform EC-87, "Throttle Valve Closed Position Learning".
6. Perform EC-87, "Idle Air Volume Learning".

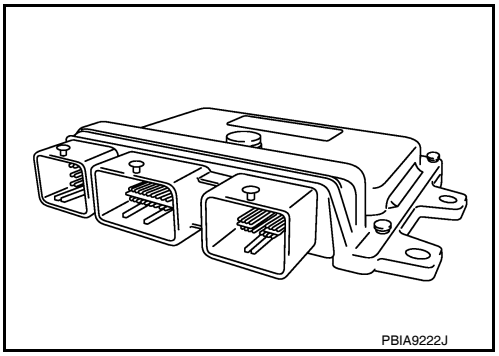
>> **INSPECTION END**

DTC P0605 ECM

Component Description

INFOID:0000000007700052

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.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On Board Diagnosis Logic

INFOID:0000000007700053

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	• ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. • ECM deactivates ASCD operation.

DTC Confirmation Procedure

INFOID:0000000007700054

Perform PROCEDURE FOR MALFUNCTION A first. If the 1st trip DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B. If there is no malfunction on PROCEDURE FOR MALFUNCTION B, perform PROCEDURE FOR MALFUNCTION C.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-408, "Diagnosis Procedure".

PROCEDURE FOR MALFUNCTION B

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to EC-408, "Diagnosis Procedure".

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Repeat step 2 for 32 times.

4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-408, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700055

1.INSPECTION START

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
   See EC-407, "DTC Confirmation Procedure".
3. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to BL-212, "ECM Re-communicating Function".
3. Perform EC-86, "VIN Registration".
4. Perform EC-87, "Accelerator Pedal Released Position Learning".
5. Perform EC-87, "Throttle Valve Closed Position Learning".
6. Perform EC-87, "Idle Air Volume Learning".

>> **INSPECTION END**

DTC P0607 ECM

Description

INFOID:0000000007700056

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007700057

This self-diagnosis has the one trip detection logic (A/T and CVT).
The MIL will not light up for this self-diagnosis (M/T).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607 0607	CAN communication bus	When detecting error during the initial diagnosis for CAN controller of each control unit.	ECM

DTC Confirmation Procedure

INFOID:0000000007700058

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-409, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700059

1.INSPECTION START

1. Erase DTC.
2. Perform DTC Confirmation Procedure.
   See EC-409, "DTC Confirmation Procedure".
3. Is the 1st trip DTC P0607 displayed again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to BL-212, "ECM Re-communicating Function".
3. Perform EC-86, "VIN Registration".
4. Perform EC-87, "Accelerator Pedal Released Position Learning".
5. Perform EC-87, "Throttle Valve Closed Position Learning".
6. Perform EC-87, "Idle Air Volume Learning".

>> **INSPECTION END**

DTC P0643 SENSOR POWER SUPPLY

On Board Diagnosis Logic

INFOID:0000000007700060

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643 0643	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	• Harness or connectors (APP sensor 1 circuit is shorted.) (Throttle position sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:0000000007700061

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

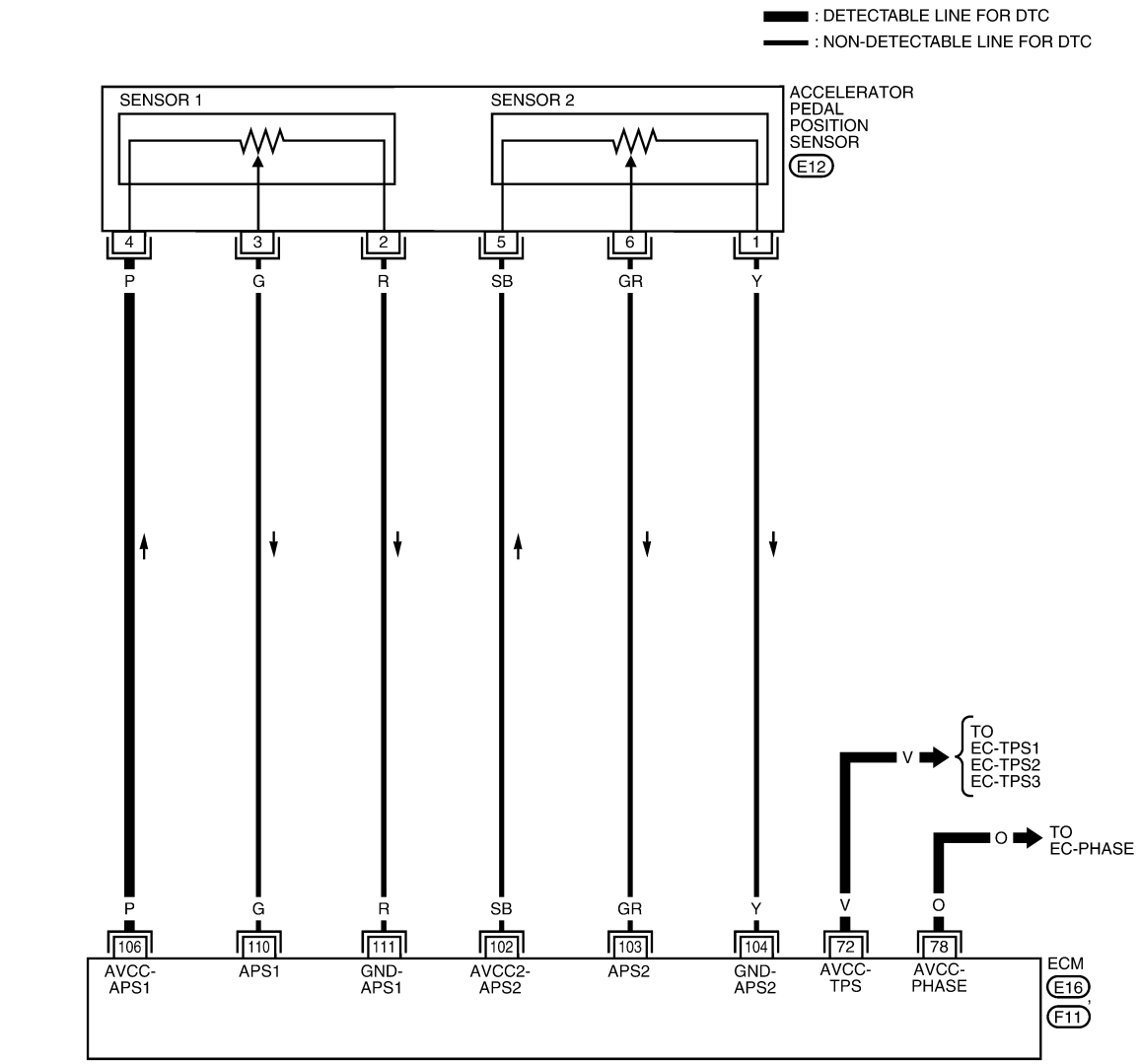
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

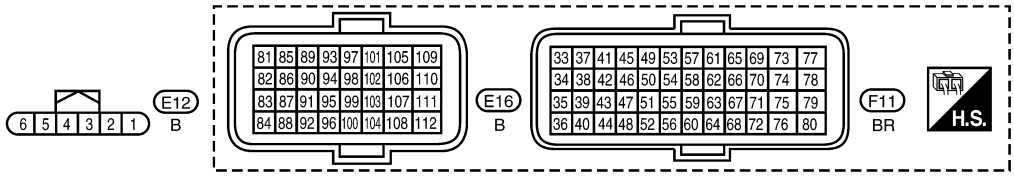
1. Start engine and let it idle for 1 second.
2. Check 1st trip DTC.
3. If DTC is detected, go to EC-412, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700062

EC-SEN/PW-01





BBWA2649E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

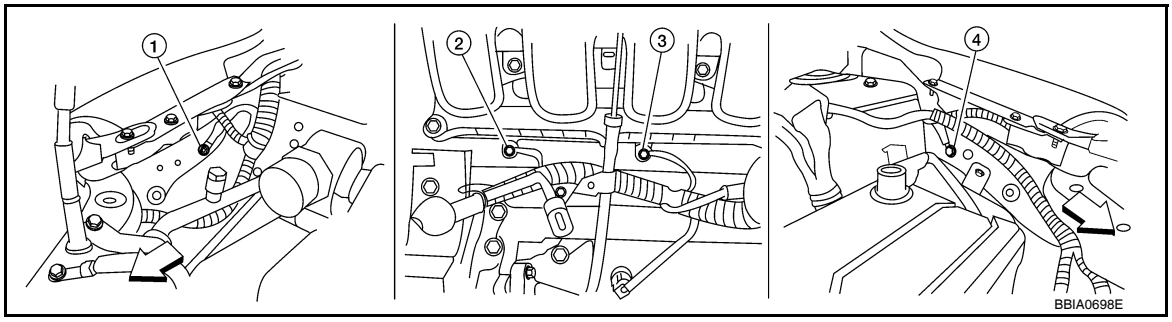
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
72	V	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
78	O	Sensor power supply [Camshaft position sensor (PHASE)]	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (APP sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V
103	GR	Accelerator pedal position sensor 2	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	Y	Sensor ground (APP sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
106	P	Sensor power supply (APP sensor 1)	**[Ignition switch: ON]**	Approximately 5.0 V
110	G	Accelerator pedal position sensor 1	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	R	Sensor ground (APP sensor 1)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007700063

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

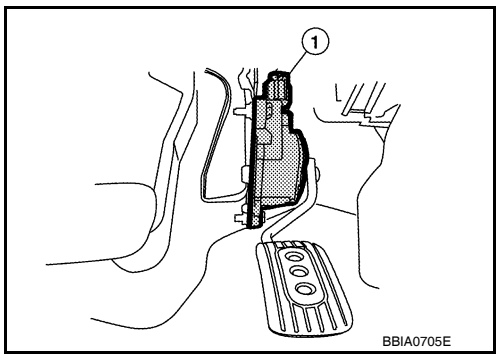
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

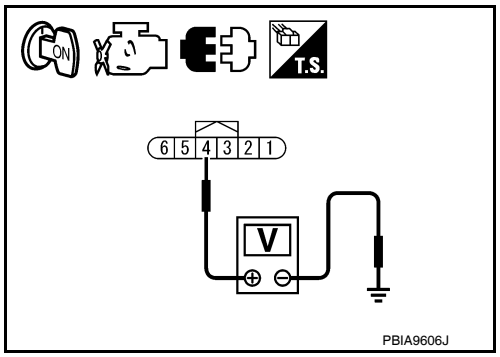
2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between APP sensor terminal 4 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 106. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Throttle position sensor terminal 1	EC-488, "Wiring Diagram"
78	Camshaft position sensor (PHASE) terminal 1	EC-309, "Wiring Diagram"
106	APP sensor terminal 4	EC-411, "Wiring Diagram"

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-312, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace camshaft position sensor (PHASE). Refer to EM-51, "Component".

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-205, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

8. CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

DTC P0850 PNP SWITCH

Component Description

INFOID:0000000007700064

When the selector lever position is Neutral, park/neutral position (PNP) switch is ON. (M/T)
When the selector lever position is P or N, transmission range switch is ON. (A/T and CVT)
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700065

Specification data are reference values.

Monitor item	Condition		Specification
P/N POSI SW	Ignition switch: ON	Selector lever: P or N (A/T, CVT), Neutral (M/T)	ON
		Selector lever: Except above	OFF

On Board Diagnosis Logic

INFOID:0000000007700066

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850 0850	Park/neutral position switch	The park/neutral position (PNP) signal is not changed in the process of engine starting and driving.	• Harness or connectors [Park/neutral position (PNP) signal circuit is open or shorted.] • Park/neutral position (PNP) switch (M/T) • Transmission range switch (A/T and CVT)

DTC Confirmation Procedure

INFOID:0000000007700067

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known-good signal
N or P position (A/T, CVT) Neutral position (M/T)	ON
Except above	OFF

If NG, go to EC-418, "Diagnosis Procedure".
If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,200 rpm (CVT) More than 1,450 rpm (A/T) More than 1,900 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)

B/FUEL SCHDL	2.4 - 31.8 msec (CVT) 1.4 - 31.8 msec (A/T) 1.7 - 31.8 msec (M/T)
VHCL SPEED SE	More than 64km/h (29 MPH)
Selector lever	Suitable position

6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to EC-418, "Diagnosis Procedure".

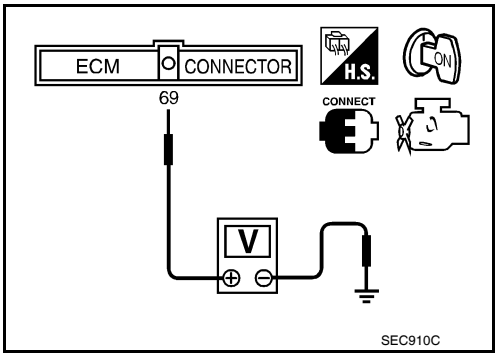
Overall Function Check

INFOID:0000000007700068

Use this procedure to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 69 (PNP signal) and ground under the following conditions.



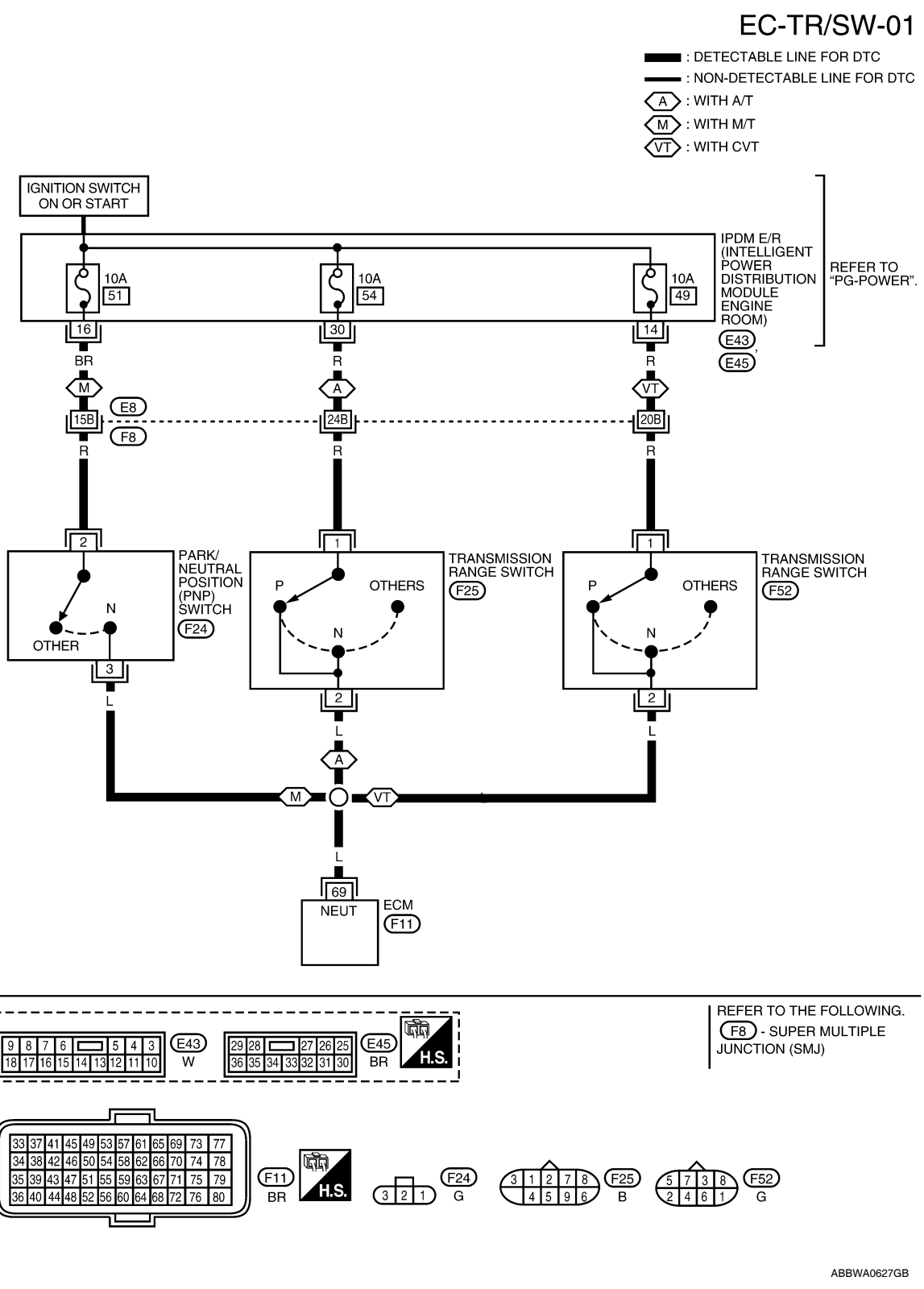
Condition (Selector lever)	Voltage (Known-good data)
P or N position (A/T, CVT) Neutral position (M/T)	Battery voltage (11 - 14 V)
Except above	Approx. 0 V

3. If NG, go to EC-418, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700069

EC-TR/SW-01



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
69	L	PNP signal	**[Ignition switch: ON]** • Selector lever: P or N (A/T, CVT), Neutral (M/T)	Battery voltage (11 - 14 V)
			[Ignition switch: ON] • Except above	Approximately 0 V

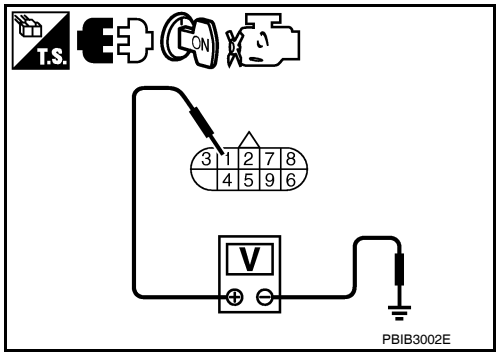
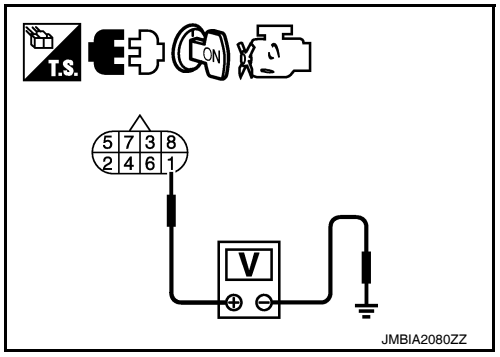
Diagnosis Procedure

INFOID:0000000007700070

A/T MODELS AND CVT MODELS

1.CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between transmission range switch terminal 1 and ground with CONSULT or tester.

A/T	CVT
	
PBIB3002E	JMBIA2080ZZ

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between transmission range switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between transmission range switch terminal 2 and ECM terminal 69. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TRANSMISSION RANGE SWITCH

Refer to AT-91, "Component Inspection" (A/T), CVT-65, "Component Inspection" (CVT).

OK or NG

OK >> GO TO 5.
NG >> Replace transmission range switch. Refer to AT-230, "Removal and Installation" (A/T), CVT-184, "Removal and Installation".

5.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

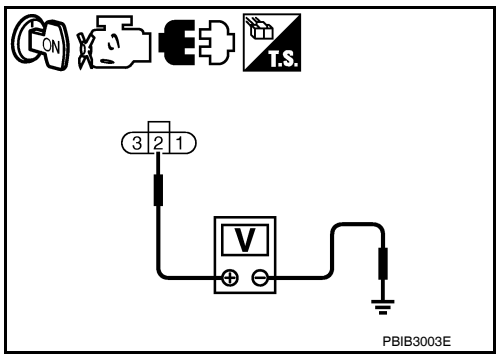
>> **INSPECTION END**

M/T MODELS

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between PNP switch terminal 2 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between PNP switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PNP switch terminal 3 and ECM terminal 69. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK PNP SWITCH

Refer to MT-14, "Checking".

OK or NG

OK >> GO TO 5.
NG >> Replace PNP switch. Refer to MT-18, "Component".

5.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

DTC P1148 CLOSED LOOP CONTROL

On Board Diagnosis Logic

INFOID:0000000007700071

NOTE:
DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1.
Perform the trouble diagnosis for the corresponding DTC.
This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	• Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 • Air fuel ratio (A/F) sensor 1 heater

Diagnosis Procedure

INFOID:0000000007715453

DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1.
Perform the trouble diagnosis for the corresponding DTC. Refer to EC-49, "Emission-related Diagnostic Information".

DTC P1211 TCS CONTROL UNIT

Description

INFOID:0000000007700072

The malfunction information related to TCS is transferred via the CAN communication line from “ABS actuator and electric unit (control unit)” to ECM.
Always erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

INFOID:0000000007700073

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	TCS control unit	ECM receives a malfunction information from “ABS actuator electric unit (control unit)”	• ABS actuator and electric unit (control unit) • TCS related parts

DTC Confirmation Procedure

INFOID:0000000007700074

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

1. Start engine and let it idle for at least 60 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-422, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700075

Perform trouble diagnosis for TCS. Refer to BRC-25, "CONSULT Function (ABS)".

DTC P1212 TCS COMMUNICATION LINE

Description

INFOID:0000000007700076

NOTE:
- **If DTC P1212 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

The CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.

Always erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

INFOID:0000000007700077

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM cannot receive the information from “ABS actuator and electric unit (control unit)” continuously.	• Harness or connectors (The CAN communication line is open or shorted.) • ABS actuator and electric unit (control unit) • Dead (Weak) battery

DTC Confirmation Procedure

INFOID:0000000007700078

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to EC-423, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700079

Perform trouble diagnosis for TCS. Refer to BRC-25, "CONSULT Function (ABS)".

DTC P1217 ENGINE OVER TEMPERATURE

System Description

INFOID:0000000007700080

SYSTEM DESCRIPTION

Cooling Fan Control

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R (Cooling fan relays)
Battery	Battery voltage*1		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

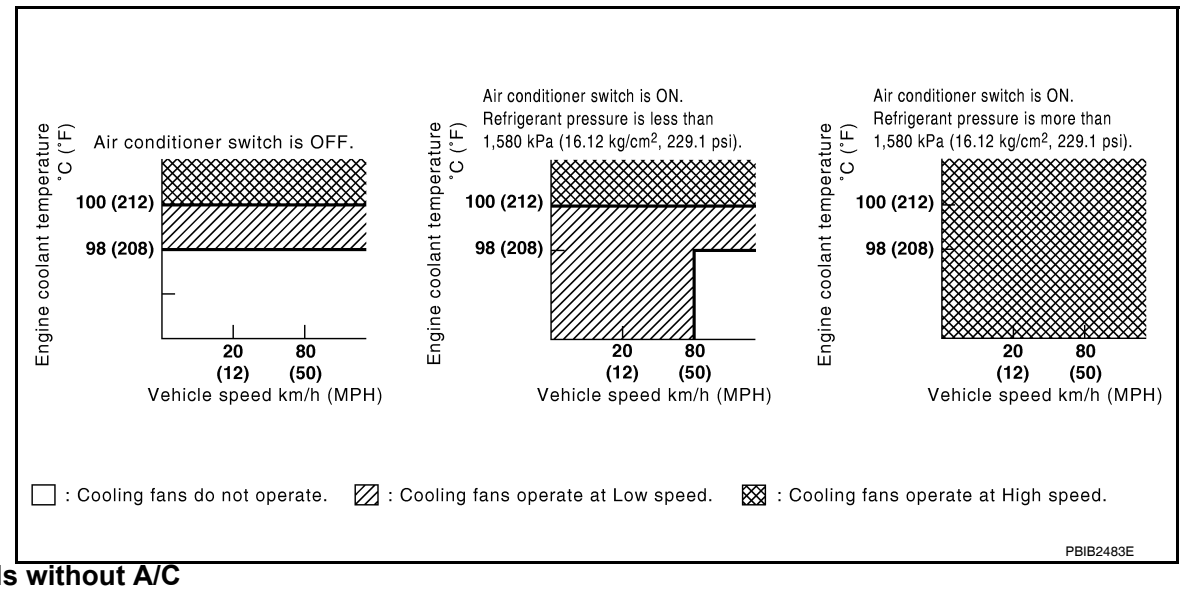
*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

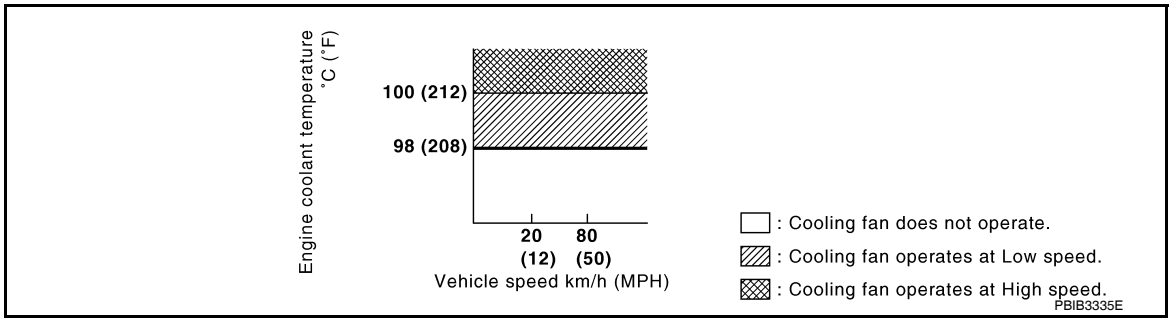
The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

Cooling Fan Operation

Models with A/C



Models without A/C



Cooling Fan Relay Operation

The ECM controls cooling fan relays in the IPDM E/R through CAN communication line.

Cooling fan speed	Cooling fan relay		
	1	2	3
Stop (OFF)	OFF	OFF	OFF
Low (LOW)	ON	OFF	OFF
High (HI)	ON	ON	ON

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700081

Specification data are reference values.

Monitor item	Condition		Specification
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	• Engine: After warming up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature: 97°C (207°F) or less	OFF
		Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature: 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

INFOID:0000000007700082

NOTE:
- **If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	• Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range.	• Harness or connectors (Cooling fan circuit is open or shorted.) • Cooling fan • IPDM E/R (Cooling fan relays) • Radiator hose • Radiator • Reservoir tank • Radiator cap • Water pump • Thermostat • Water control valve For more information, refer to EC-431, "Main 13 Causes of Overheating".

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-11, "Changing Engine Coolant". Also, replace the engine oil. Refer to LU-9, "Changing Engine Oil".

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-14, "Anti-freeze Coolant Mixture Ratio".**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

Overall Function Check

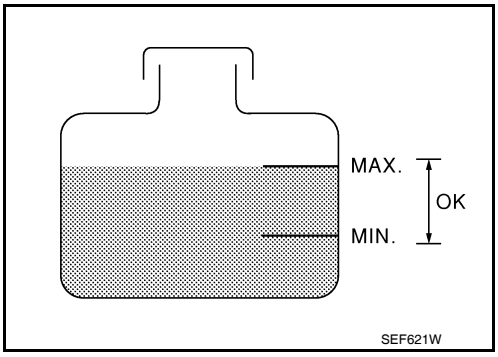
INFOID:0000000007700083

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the reservoir tank or the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

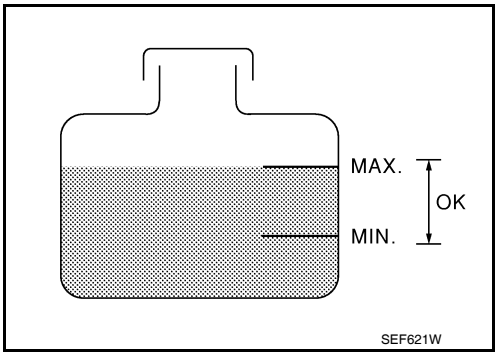
WITH CONSULT

1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-428, "Diagnosis Procedure" or EC-428, "Diagnosis Procedure".
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-428, "Diagnosis Procedure" or EC-428, "Diagnosis Procedure".
3. Turn ignition switch ON.
4. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT.
5. If the results are NG, go to EC-428, "Diagnosis Procedure" or EC-428, "Diagnosis Procedure".



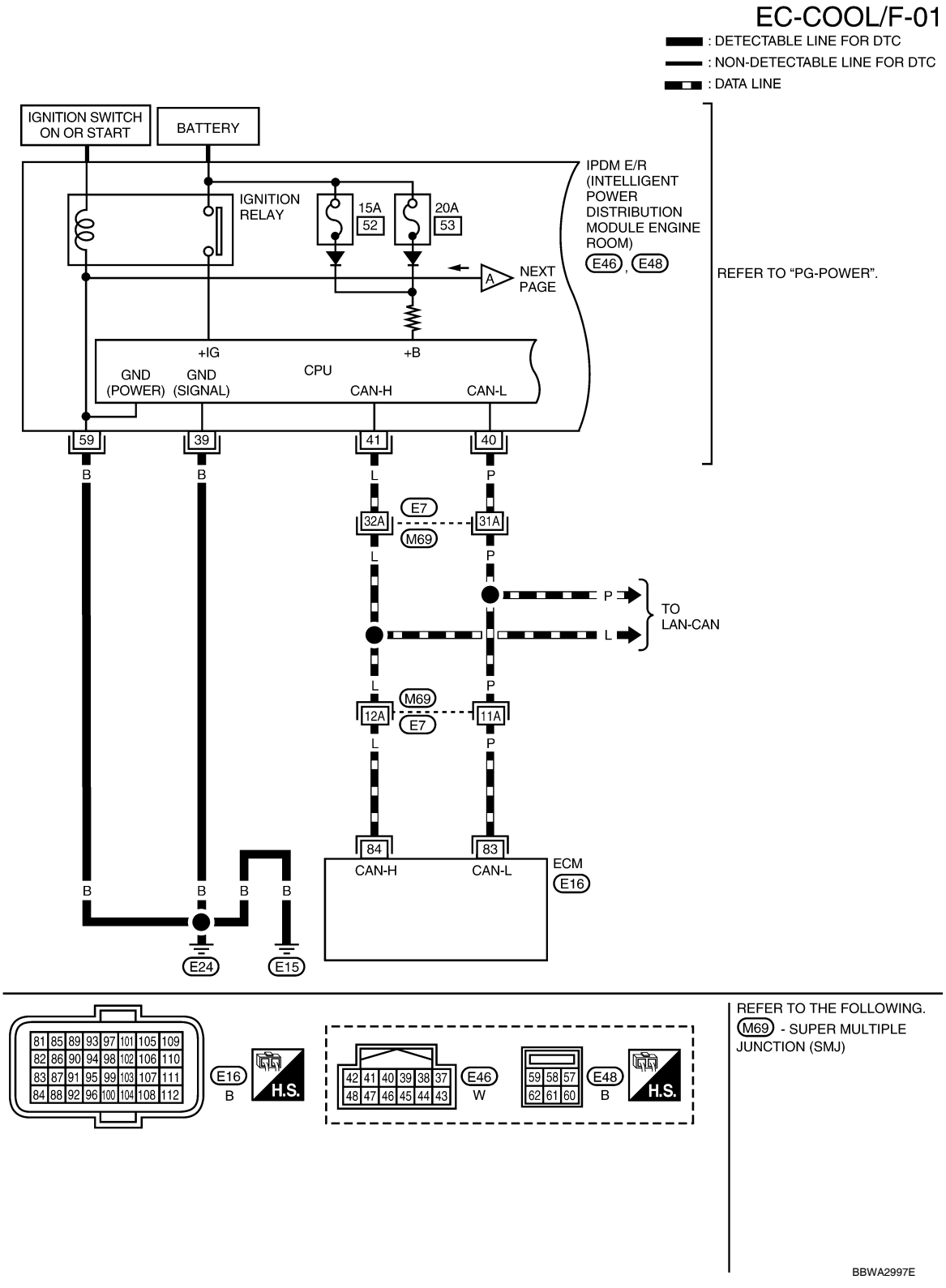
WITH GST

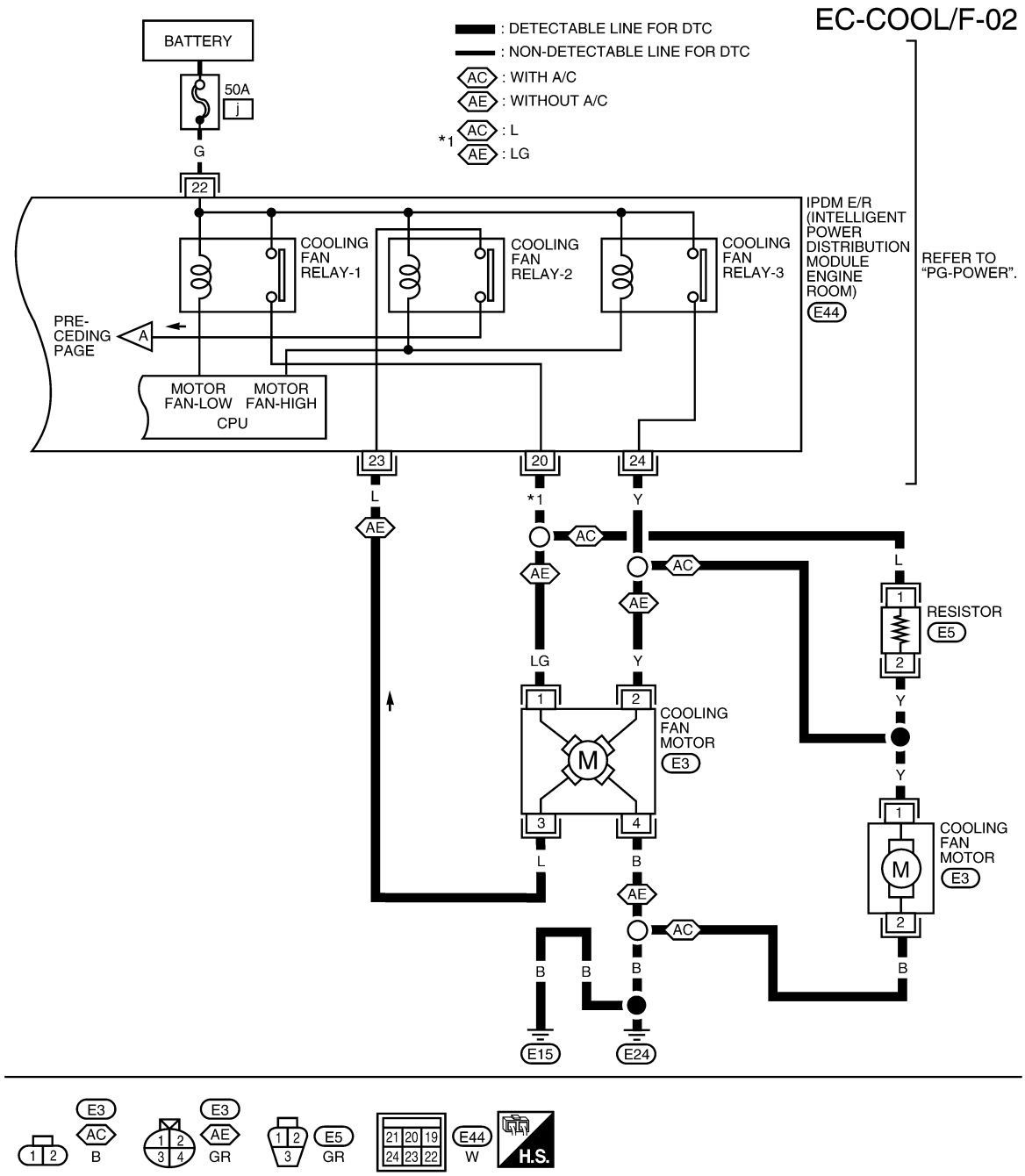
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-428, "Diagnosis Procedure".
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-428, "Diagnosis Procedure".
3. Activate IPDM/ER auto active test and check cooling fan motor operation. Refer to PG-20, "Auto Active Test".
4. If NG, go to EC-428, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007700084





BBWA3001E

Diagnosis Procedure

INFOID:0000000007700085

1.INSPECTION START

Do you have CONSULT?

Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2.CHECK COOLING FAN OPERATION

With CONSULT

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT.
3. Make sure that cooling fan operates at each speed.

OK or NG

OK >> GO TO 4.
NG >> GO TO 8.

3.CHECK COOLING FAN OPERATION

Without CONSULT

1. Activate IPDM E/R auto active test and check cooling fan operation.
   Refer to PG-20, "Auto Active Test".
2. Make sure that cooling fan operates at each speed.

OK or NG

OK >> GO TO 4.
NG >> GO TO 8.

4.CHECK COOLING SYSTEM FOR LEAK

Refer to CO-9, "Cooling Circuit".

OK or NG

OK >> GO TO 5.
NG >> Check the following for leak. Refer to CO-11, "Inspection".
- Hose
- Radiator
- Water pump

5.CHECK RADIATOR CAP

Refer to CO-14, "Checking Radiator Cap".

OK or NG

OK >> GO TO 6.
NG >> Replace radiator cap. Refer to CO-15, "Component".

6.CHECK COMPONENT PARTS

Check the following.
- Thermostat. (Refer to CO-23, "Inspection".)
- Water control valve. (Refer to CO-28, "Inspection".)
- Engine coolant temperature sensor. (Refer to EC-194, "Component Inspection".)

OK or NG

OK >> GO TO 7.
NG >> Replace malfunctioning component.

7.CHECK MAIN 13 CAUSES

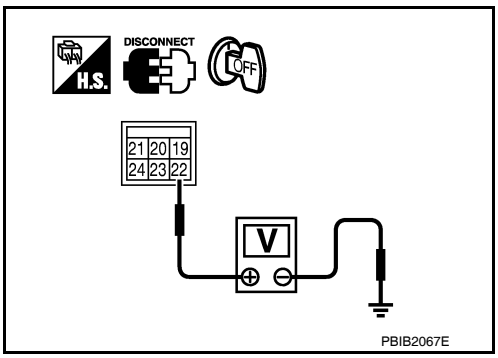
If the cause cannot be isolated, go to EC-431, "Main 13 Causes of Overheating".

>> **INSPECTION END**

8.CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E44.

3. Check voltage between IPDM E/R terminal 22 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.
- 50 A fusible link
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground in harness or connectors.

10. CHECK IPDM E/R GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connectors E46 and E48.
3. Check harness continuity between IPDM E/R terminals 59, 39 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK (Models with A/C)>>GO TO 11.
OK (Models without A/C)>>GO TO 13.
NG >> Repair open circuit or short to power in harness or connectors.

11. CHECK COOLING FAN MOTOR CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check harness continuity between the followings;
   Cooling fan motor terminal 1 and IPDM E/R terminals 20, 24.
   Cooling fan motor terminal 2 and ground.
   Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground
- Resistor E5

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK COOLING FAN MOTOR CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check harness continuity between the followings;
   Cooling fan motor terminal 1 and IPDM E/R terminal 20.

Cooling fan motor terminal 2 and IPDM E/R terminal 24.
Cooling fan motor terminal 3 and IPDM E/R terminal 23.
Cooling fan motor terminal 4 and ground.
Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK COOLING FAN MOTOR

Refer to EC-432, "Component Inspection".

OK or NG

OK >> GO TO 16.
NG >> Replace cooling fan motor. Refer to CO-19, "Removal and Installation".

16. CHECK INTERMITTENT INCIDENT

Perform EC-140.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair or replace harness or connector.

Main 13 Causes of Overheating

INFOID:0000000007700086

Engine	Step	Inspection item	Equipment	Standard	Reference
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	Visual	No blocking	—
	2	Coolant mixture	Coolant tester	See MA-14, "Anti-freeze Coolant Mixture Ratio".	
	3	Coolant level	Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-16, "Inspection".
	4	Radiator cap	Pressure tester	See CO-14, "Checking Radiator Cap".	
ON*2	5	Coolant leaks	Visual	No leaks	See CO-11, "Inspection".
ON*2	6	Thermostat	Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-22, and CO-25
ON*1	7	Cooling fan	CONSULT	Operating	See trouble diagnosis for DTC P1217 (EC-428, "Diagnosis Procedure").
OFF	8	Combustion gas leak	Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	Coolant temperature gauge	Visual	Gauge less than 3/4 when driving	—
		Coolant overflow to reservoir tank	Visual	No overflow during driving and idling	See CO-11.

Engine	Step	Inspection item	Equipment	Standard	Reference
OFF*4	10	Coolant return from reservoir tank to radiator	Visual	Should be initial level in reservoir tank	See CO-16.
OFF	11	Water control valve	Remove and inspect the valve	Within the specified value	See CO-28
OFF	12	Cylinder head	Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-67.
	13	Cylinder block and pistons	Visual	No scuffing on cylinder walls or piston	See EM-83.

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to CO-7, "Troubleshooting Chart".

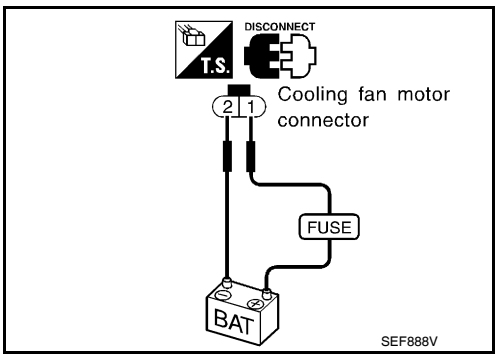
Component Inspection

INFOID:0000000007700087

COOLING FAN MOTOR

Model with A/C

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

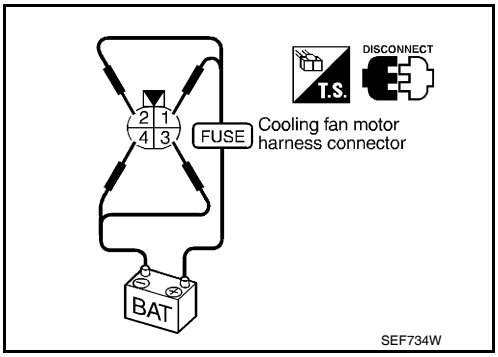


	Terminals	
Cooling fan motor	(+)	(-)
	1	2

Cooling fan motor should operate.
If NG, replace cooling fan motor. Refer to CO-19, "Removal and Installation".

Models without A/C

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.



	Speed	terminals	
		(+)	(–)
Cooling fan motor	Low	1	4
		2	3
	High	1 and 2	3 and 4

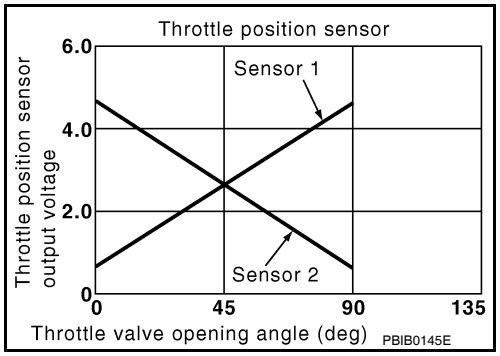
Cooling fan motor should operate.
If NG, replace cooling fan motor. Refer to CO-19, "Removal and Installation".

DTC P1225 TP SENSOR

Component Description

INFOID:0000000007700088

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

INFOID:0000000007700089

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:0000000007700090

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-433, "Diagnosis Procedure".

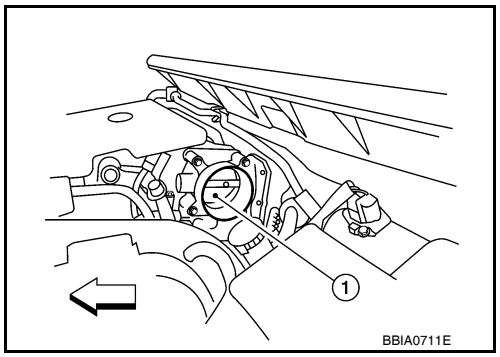
Diagnosis Procedure

INFOID:0000000007700091

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to EC-87, "Throttle Valve Closed Position Learning".

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

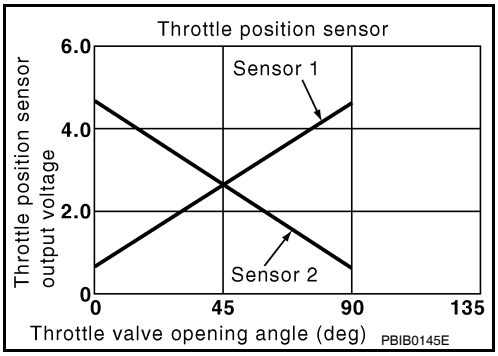
>> **INSPECTION END**

DTC P1226 TP SENSOR

Component Description

INFOID:0000000007700093

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

INFOID:0000000007700094

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:0000000007700095

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 3 and 4 for 32 times.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to EC-434, "Diagnosis Procedure".

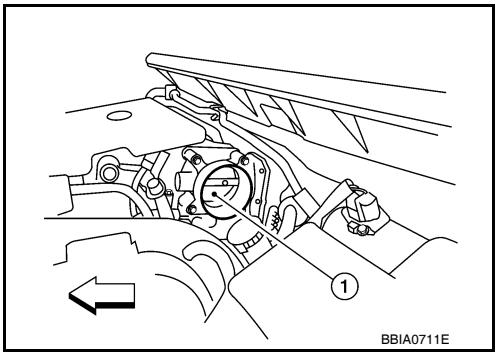
Diagnosis Procedure

INFOID:0000000007700096

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to EC-87, "Throttle Valve Closed Position Learning".

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

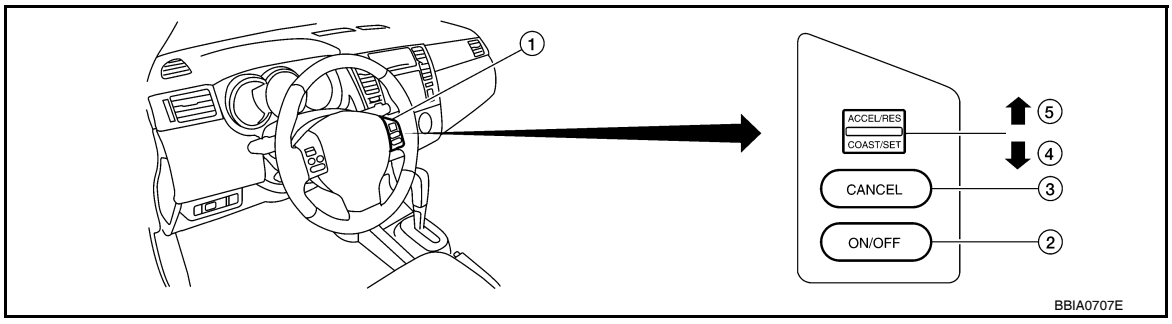
>> **INSPECTION END**

DTC P1564 ASCD STEERING SWITCH

Component Description

INFOID:0000000007700098

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.



1. ASCD steering switch
2. MAIN switch
3. CANCEL switch
4. RESUME/ACCELERATE switch
5. SET/COAST switch

Refer to EC-28 for the ASCD function.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700099

Specification data are reference values.

Monitor item	Condition		Specification
MAIN SW	Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF

On Board Diagnosis Logic

INFOID:0000000007700100

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.
NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605.
Refer to EC-407.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564 1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (ASCD switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC Confirmation Procedure

INFOID:0000000007700101

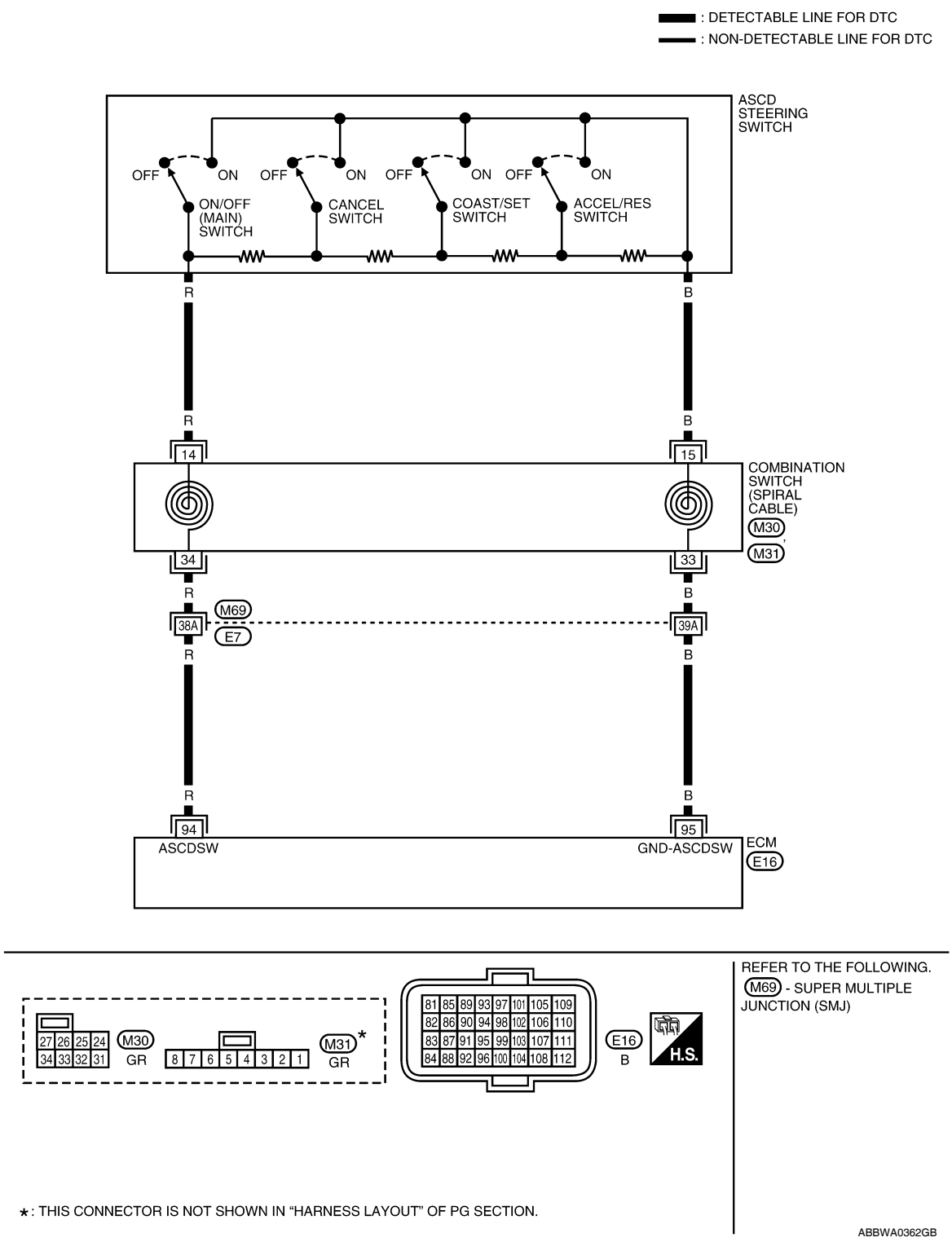
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 10 seconds.
2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Check DTC.
7. If DTC is detected, go to EC-439, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700102

EC-ASC/SW-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

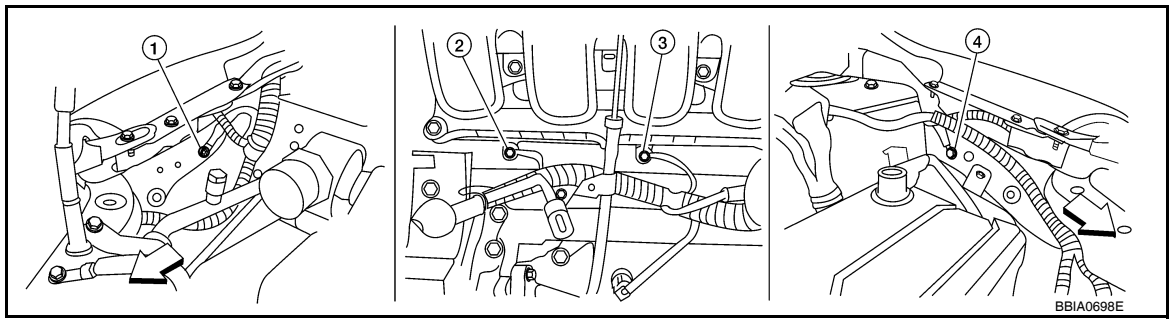
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
94	R	ASCD steering switch	**[Ignition switch: ON]** • ASCD steering switch: OFF	Approximately 4.0 V
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1.0 V
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3.0 V
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2.0 V
95	B	Sensor ground	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007700103

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT

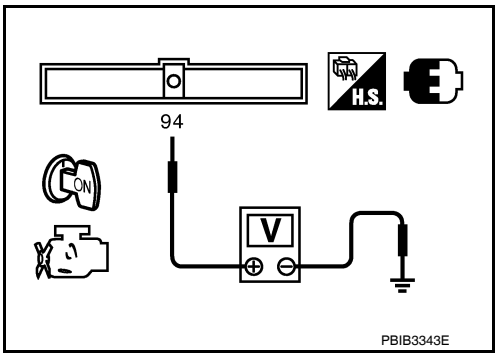
1. Turn ignition switch ON.
2. Select “MAIN SW”, “RESUME/ACC SW”, “SET SW and “CANCEL SW” in “DATA MONITOR” mode with CONSULT.
3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF

Switch	Monitor item	Condition	Indication
RESUME/ACCELERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

Without CONSULT

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 94 and ground with pressing each button.



Switch	Condition	Voltage (Approx.)
MAIN switch	Pressed	0 V
	Released	4.0 V
CANCEL switch	Pressed	1.0 V
	Released	4.0 V
RESUME/ACCELERATE switch	Pressed	3.0 V
	Released	4.0 V
SET/COAST switch	Pressed	2.0 V
	Released	4.0 V

OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination switch harness connector M31.
3. Disconnect ECM harness connector.
4. Check harness continuity between combination switch terminal 15 and ECM terminal 95. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 94 and combination switch terminal 14. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-441, "Component Inspection".

OK or NG

OK >> GO TO 8.
NG >> Replace ASCD steering switch. Refer to PS-7, "Removal and Installation".

8. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

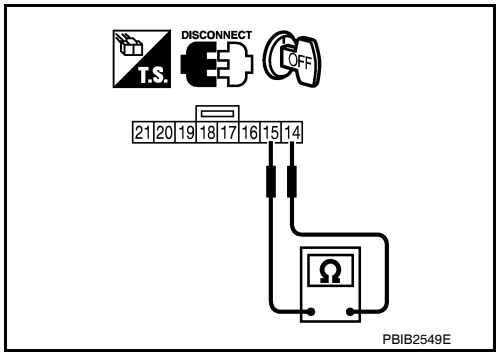
>> **INSPECTION END**

Component Inspection

INFOID:0000000007700104

ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M31.
2. Check continuity between combination switch (spiral cable) terminals 14 and 15 with pushing each switch.



Switch	Condition	Resistance (Approx.)
MAIN switch	Pressed	0 Ω
	Released	4,000 Ω
CANCEL switch	Pressed	250 Ω
	Released	4,000 Ω
RESUME/ACCELERATE switch	Pressed	1,480 Ω
	Released	4,000 Ω
SET/COAST switch	Pressed	660 Ω
	Released	4,000 Ω

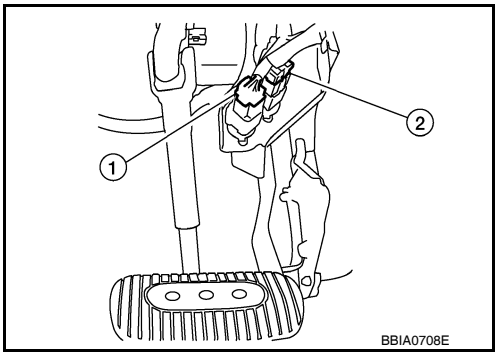
If NG, replace ASCD steering switch. Refer to PS-7, "Removal and Installation".

DTC P1572 ASCD BRAKE SWITCH

Component Description

INFOID:0000000007700105

When the brake pedal is depressed, ASCD brake switch (2) is turned OFF and stop lamp switch (1) is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal). Refer to EC-28 for the ASCD function.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700106

Specification data are reference values.

Monitor item	Condition		Specification
BRAKE SW1 (ASCD brake switch)	Ignition switch: ON	• Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:0000000007700107

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.
NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-407.**
- **This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1572 1572	ASCD brake switch	A)	When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	• Harness or connectors (Stop lamp switch circuit is shorted.) • Harness or connectors (ASCD brake switch circuit is shorted.) • Harness or connectors (ASCD clutch switch circuit is shorted.) (M/T) • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	

DTC Confirmation Procedure

INFOID:0000000007700108

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

TESTING CONDITION:
Steps 3 and 6 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator lights up.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Selector lever	Suitable position

4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-445, "Diagnosis Procedure".
   If 1st trip DTC is not detected, go to the following step.
6. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

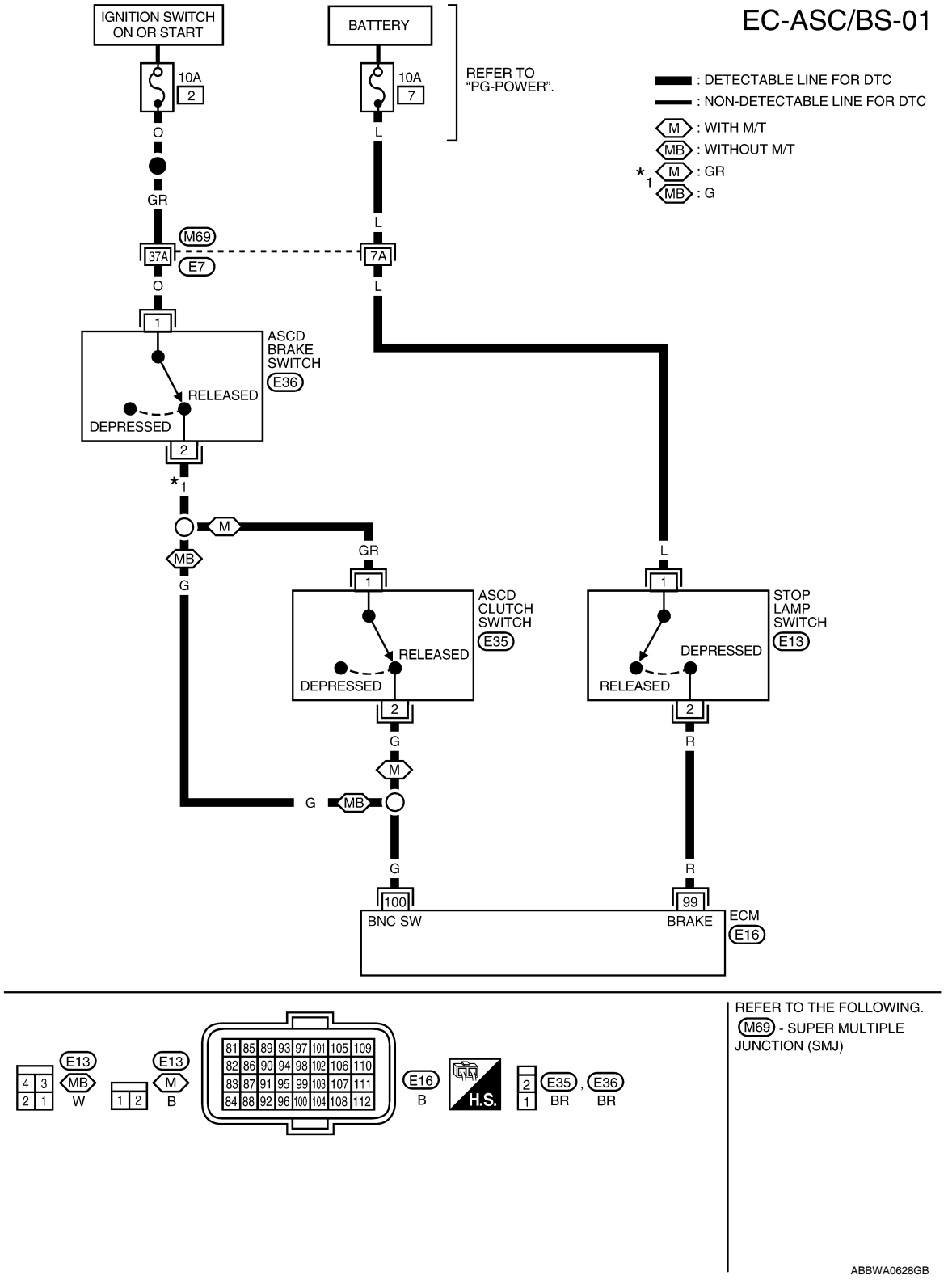
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to EC-445, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT” above.

Wiring Diagram

INFOID:0000000007700109



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
99	R	Stop lamp switch	**[Ignition switch: ON]** • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	Battery voltage (11 - 14 V)
100	G	ASCD brake switch	• Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			• Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007700110

1.CHECK OVERALL FUNCTION-I

With CONSULT

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT.
3. Check “BRAKE SW1” indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

A/T and CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

Without CONSULT

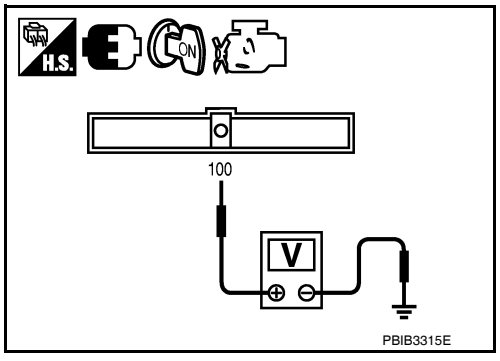
1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

A/T and CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

OK >> GO TO 2.
NG (M/T models) >>GO TO 3.
NG (A/T and CVT models) >>GO TO 4.

2.CHECK OVERALL FUNCTION-II

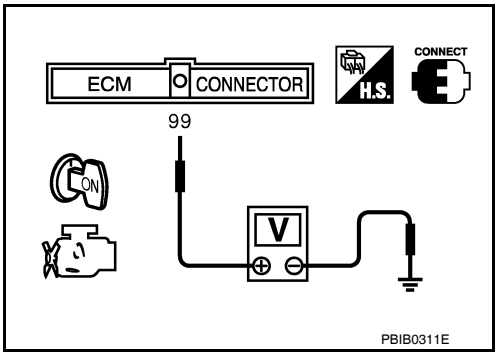
With CONSULT

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

Without CONSULT

Check voltage between ECM terminal 99 and ground under the following conditions.



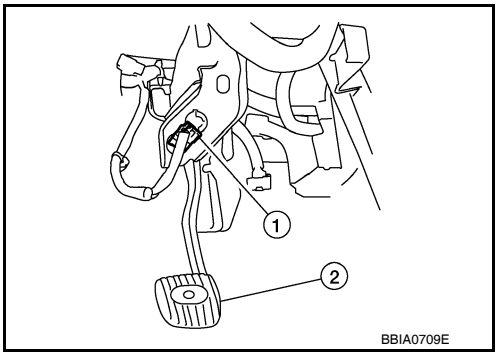
Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

OK or NG

OK >> GO TO 15.
NG >> GO TO 11.

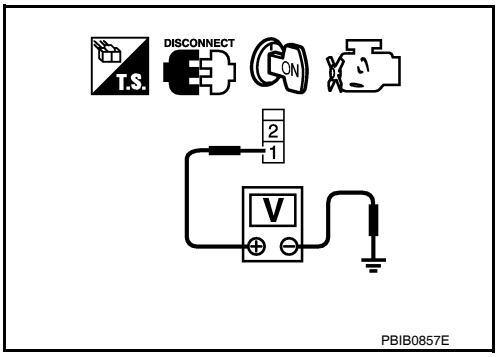
3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch (1) harness connector.



2. Clutch pedal

3. Turn ignition switch ON.
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT or tester.



Condition	Voltage
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approx. 0 V

OK or NG

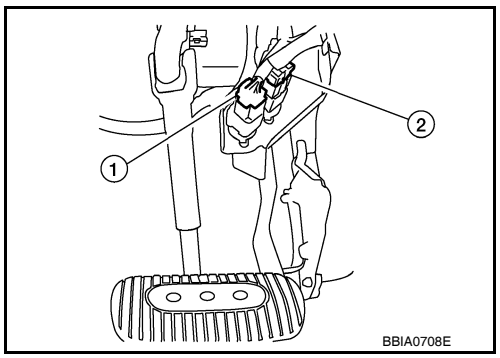
OK >> GO TO 9.
NG >> GO TO 4.

4. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.

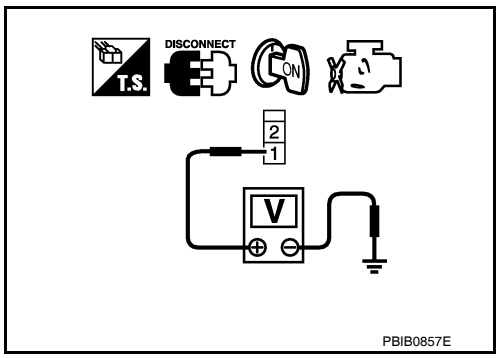
2. Disconnect ASCD brake switch (2) harness connector.

1. Stop lamp switch



3. Turn ignition switch ON.
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK (M/T models) >>GO TO 6.
OK (A/T and CVT models) >>GO TO 7.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH

Refer to EC-449, "Component Inspection".

OK or NG

OK >> GO TO 15.
NG >> Replace ASCD brake switch. Refer to BR-7, "Removal and Installation".

9.CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK ASCD CLUTCH SWITCH

Refer to EC-449, "Component Inspection"

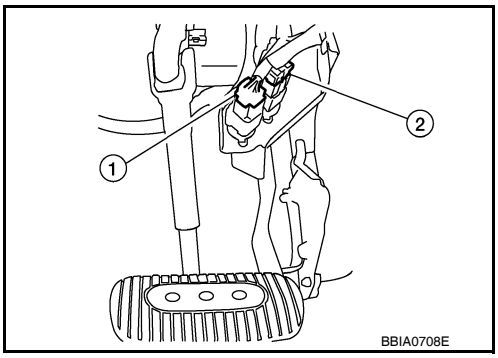
OK or NG

OK >> GO TO 15.
NG >> Replace ASCD clutch switch. Refer to CL-7, "Removal and Installation".

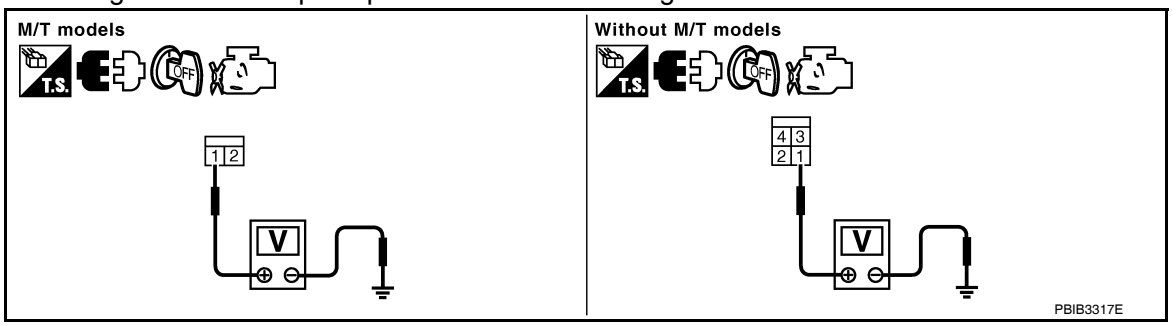
11.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (1) harness connector.

2. ASCD brake switch



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to EC-449, "Component Inspection"

OK or NG

OK >> GO TO 15.
NG >> Replace stop lamp switch. Refer to BR-7, "Removal and Installation".

15. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

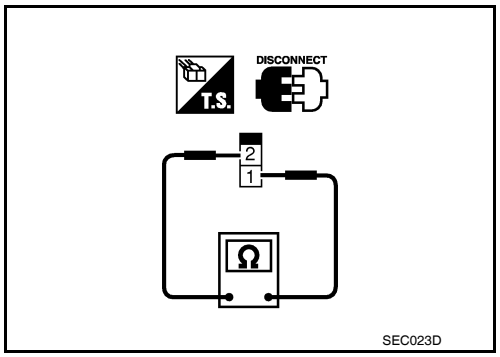
INFOID:0000000007700111

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to BR-6, and perform step 3 again.



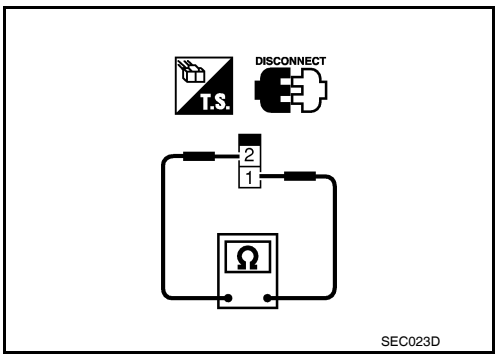
ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.

3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

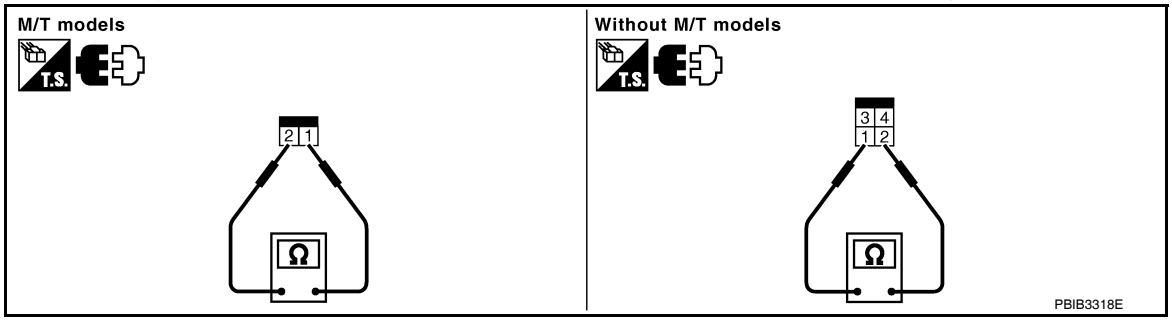
Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to CL-6, and perform step 3 again.



STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to BR-6, and perform step 3 again.

DTC P1574 ASCD VEHICLE SPEED SENSOR

Component Description

INFOID:0000000007700112

The ECM receives two vehicle speed signals via CAN communication line. One is sent from "ABS actuator and electric unit (control unit)" or combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-28 for ASCD functions.

On Board Diagnosis Logic

INFOID:0000000007700113

NOTE:
- **If DTC P1574 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-397.**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-407.**
- **If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (CAN communication line is open or shorted.) • Harness or connectors (Combination meter circuit is open or shorted.) • TCM • ABS actuator and electric unit (control unit) • Combination meter • ECM

DTC Confirmation Procedure

INFOID:0000000007700114

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

1. Start engine.
2. Drive the vehicle at more than 40 km/h (25MPH).
3. Check DTC.
4. If DTC is detected, go to EC-451, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007700115

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to AT-74, "CONSULT Function (TRANSMISSION)" (A/T) or CVT-48, "CONSULT Function (TRANSMISSION)" (CVT).

OK or NG

OK >> GO TO 2.
NG >> Perform trouble shooting relevant to DTC indicated.

2.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT”

Refer to BRC-25, "CONSULT Function (ABS)".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.
Refer to DI-12, "CONSULT Function (METER/M&A)".

>> **INSPECTION END**

DTC P1715 INPUT SPEED SENSOR

A/T

A/T : Description

INFOID:0000000007700116

ECM receives input speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

A/T : CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700117

Specification data are reference values.

Monitor item	Condition	Specification
I/P PULLY SPD	Vehicle speed: More than 20 km/h (12MPH)	Almost the same speed as the tachometer indication

A/T : On Board Diagnosis Logic

INFOID:0000000007700118

NOTE:
- **If DTC P1715 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to EC-302.**
- **If DTC P1715 is displayed with DTC P0340 first perform the trouble diagnosis for DTC P0340. Refer to EC-308.**
- **If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-407.**
- **If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

The MIL will not lights up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715 1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and engine rpm signal.	• Harness or connectors (CAN communication line is open or shorted) • Harness or connectors (Input speed sensor circuit is open or shorted) • TCM

A/T : Diagnosis Procedure

INFOID:0000000007700119

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to AT-74, "CONSULT Function (TRANSMISSION)".

OK or NG

OK >> GO TO 2.
NG >> Perform trouble shooting relevant to DTC indicated.

2.REPLACE TCM

Replace TCM. Refer to AT-209, "Removal and Installation".

>> **INSPECTION END**

CVT

CVT : Description

INFOID:0000000007700120

ECM receives input speed sensor signal from TCM through CAN communication line.

CVT : CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700121

Specification data are reference values.

Monitor item	Condition	Specification
I/P PULLY SPD	Vehicle speed: More than 20 km/h (12MPH)	Almost the same speed as the tachometer indication

CVT : On Board Diagnosis Logic

INFOID:0000000007700122

NOTE:
- **If DTC P1715 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.**
- **If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to EC-302.**
- **If DTC P1715 is displayed with DTC P0340 first perform the trouble diagnosis for DTC P0340. Refer to EC-308.**
- **If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-407.**
- **If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-409.**

The MIL will not lights up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715 1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and engine rpm signal.	• Harness or connectors (CAN communication line is open or shorted) • Harness or connectors (Input speed sensor circuit is open or shorted) • TCM

CVT : DTC Confirmation Procedure

INFOID:0000000007700123

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine.
2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to EC-454, "CVT : Diagnosis Procedure".

CVT : Diagnosis Procedure

INFOID:0000000007700124

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

OK or NG

OK >> GO TO 2.
NG >> Perform trouble shooting relevant to DTC indicated.

2.REPLACE TCM

Replace TCM. Refer to CVT-159, "Removal and Installation".

>> **INSPECTION END**

DTC P1805 BRAKE SWITCH

Description

INFOID:0000000007700125

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700126

Specification data are reference values.

Monitor item	Condition		Specification
BRAKE SW	Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:0000000007700127

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in fail-safe mode.

Engine operation condition in fail-fail safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
Vehicle condition	Driving condition
Engine: Idling	Normal
Accelerating	Poor acceleration

DTC Confirmation Procedure

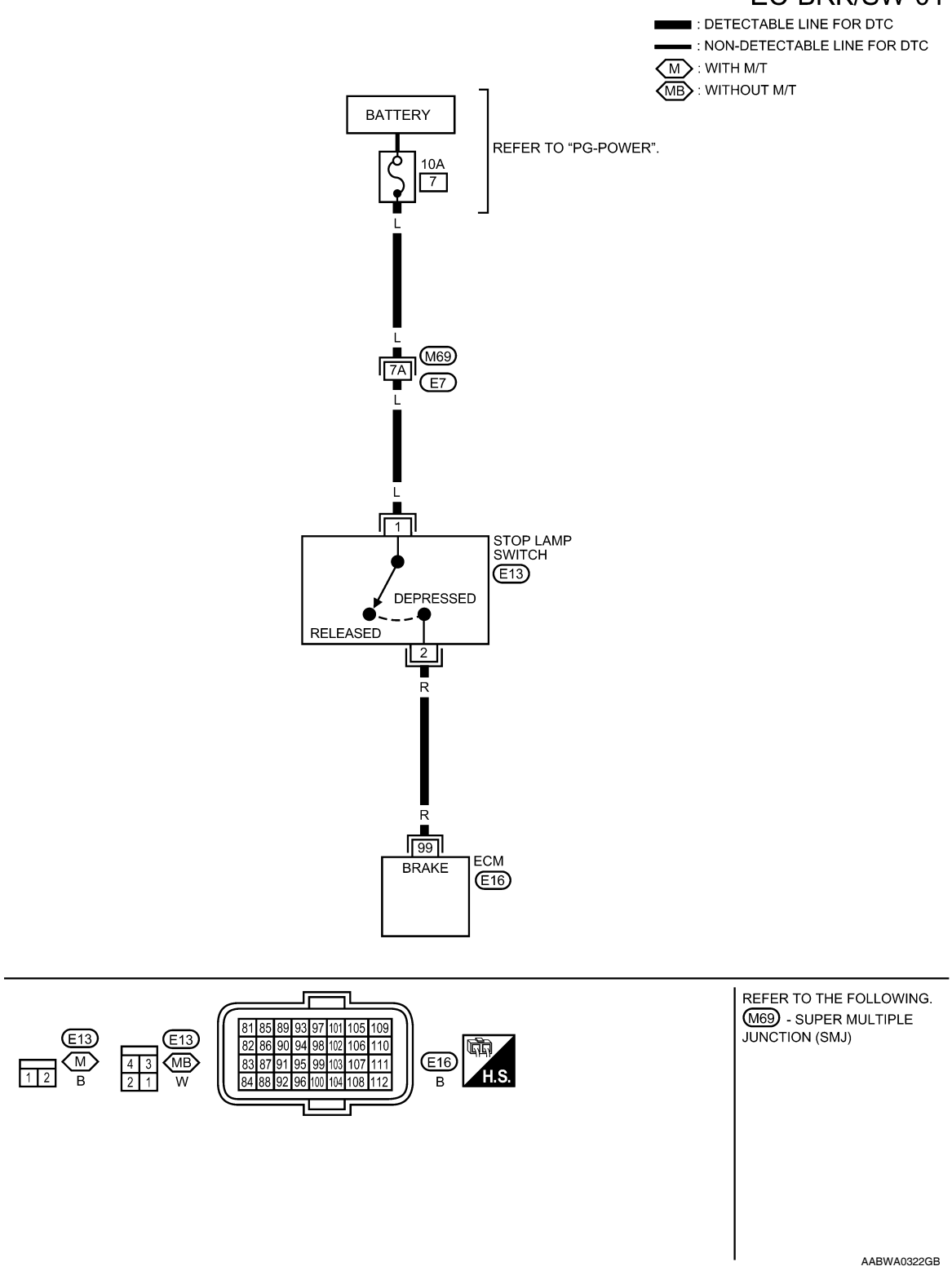
INFOID:0000000007700128

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to EC-457, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700129

EC-BRK/SW-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Termi-nal No.	Wire color	Item	Condition	Data (DC voltage)
99	R	Stop lamp switch	**[Ignition switch: OFF]** • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007700130

1.CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

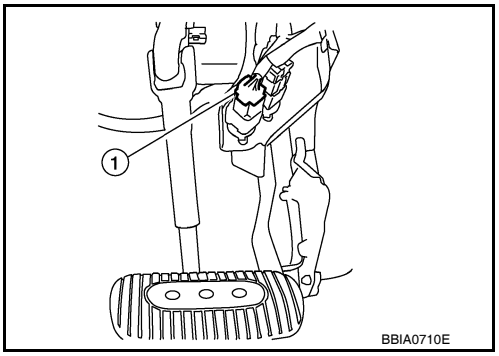
OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

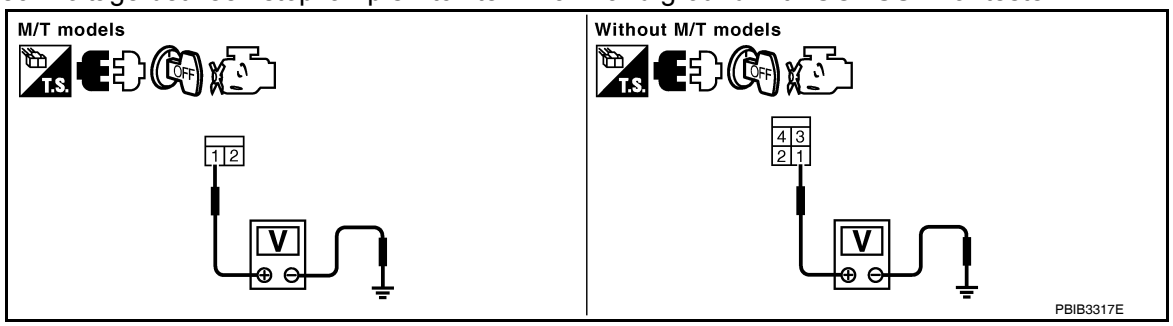
2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch (1) harness connector.

2. Brake pedal



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- 10 A fuse
- Harness for open and short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 99. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness connectors.

5. CHECK STOP LAMP SWITCH

Refer to EC-458, "Component Inspection".

OK or NG

OK >> GO TO 6.
NG >> Replace stop lamp switch. Refer to BR-7, "Removal and Installation".

6. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

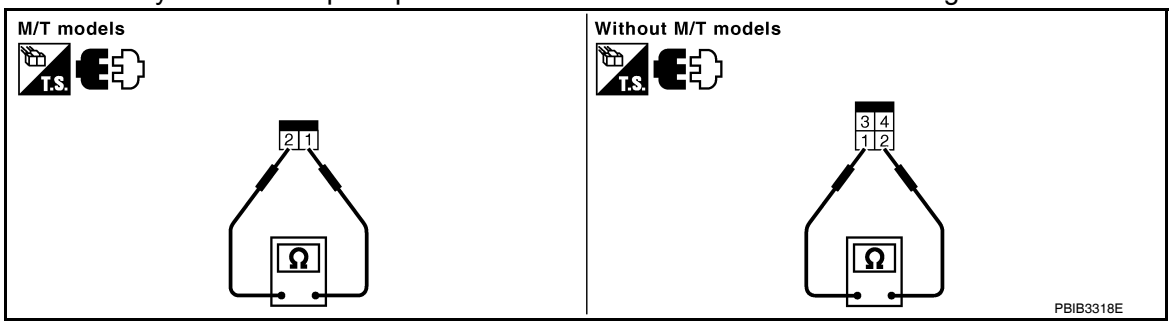
>> **INSPECTION END**

Component Inspection

INFOID:0000000007700131

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to BR-6, and perform step 3 again.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Component Description

INFOID:0000000007700132

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700133

Specification data are reference values.

Monitor item	Condition	Specification
THRTL RELAY	Ignition switch: ON	ON

On Board Diagnosis Logic

INFOID:0000000007700134

These self-diagnoses have one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100 2100	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	• Harness or connectors (Throttle control motor relay circuit is open) • Throttle control motor relay
P2103 2103	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	• Harness or connectors (Throttle control motor relay circuit is shorted) • Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:0000000007700135

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P2100

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check 1st trip DTC.
4. If DTC is detected, go to EC-461, "Diagnosis Procedure".

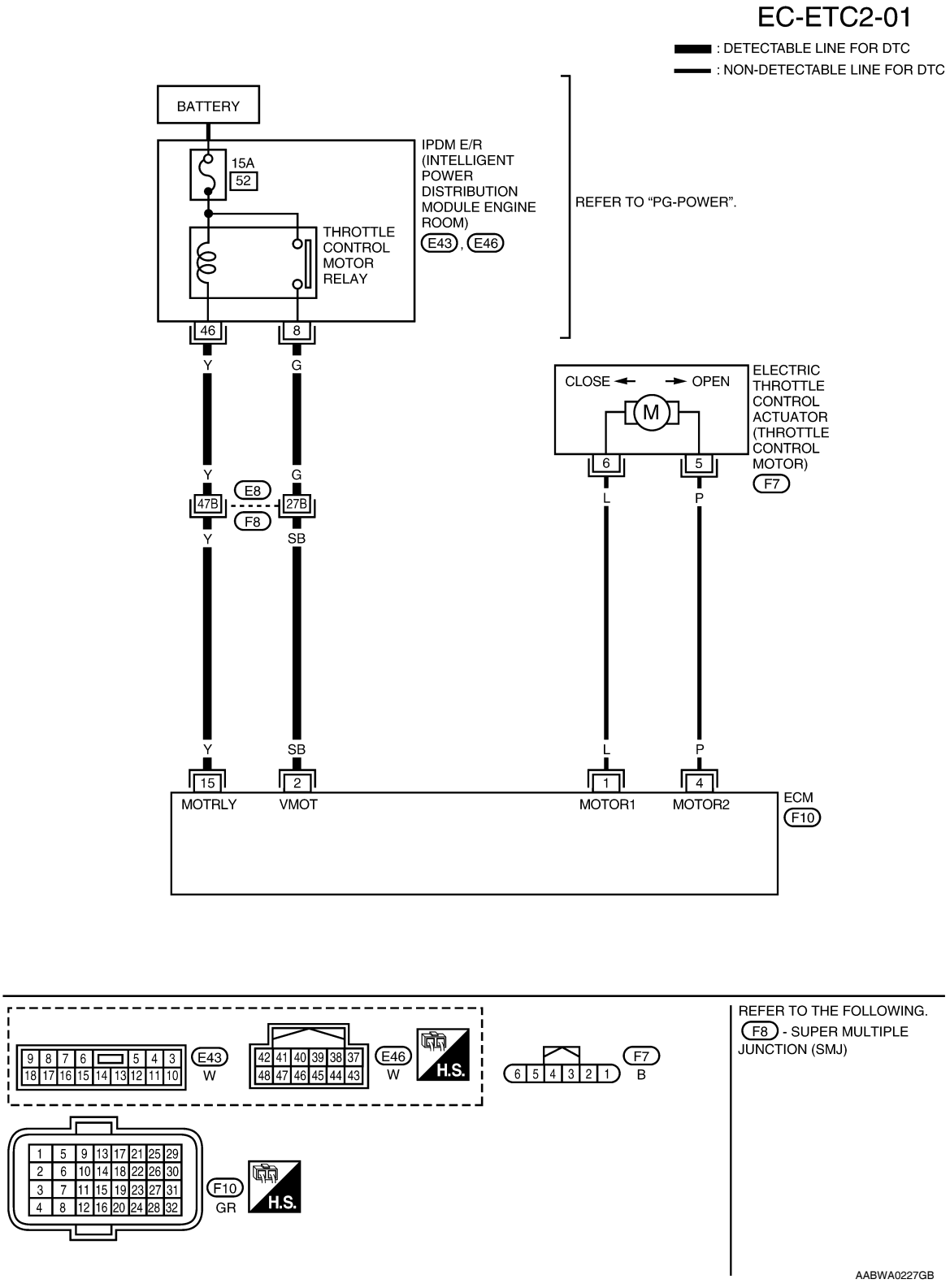
PROCEDURE FOR DTC P2103

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.
3. If DTC is detected, go to EC-461, "Diagnosis Procedure".

Wiring Diagram

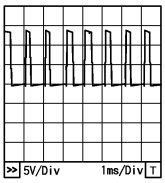
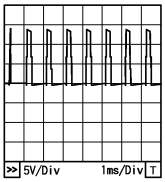
INFOID:0000000007700136



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
1	L	Throttle control motor (Open)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIA8150J
2	SB	Throttle control motor power supply	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
4	P	Throttle control motor (Close)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIA8149J
15	Y	Throttle control motor relay	**[Ignition switch: OFF]**	Battery voltage (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700137

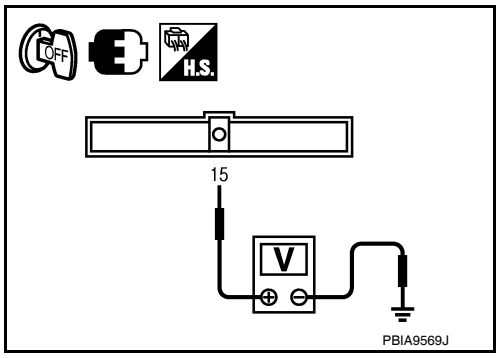
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 15 and ground with CONSULT or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.



PBIA9569J

2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

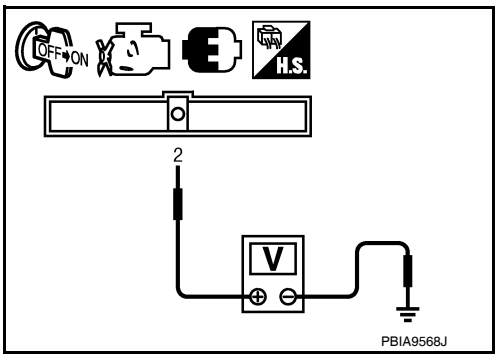
OK or NG

OK >> GO TO 8.
NG >> Replace 15 A fuse.

5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)



OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair or replace harness or connectors.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:0000000007700138

NOTE:
If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to EC-459 or EC-473.
Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

INFOID:0000000007700139

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2101 2101	Electric throttle control performance	Electric throttle control function does not operate properly.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:0000000007700140

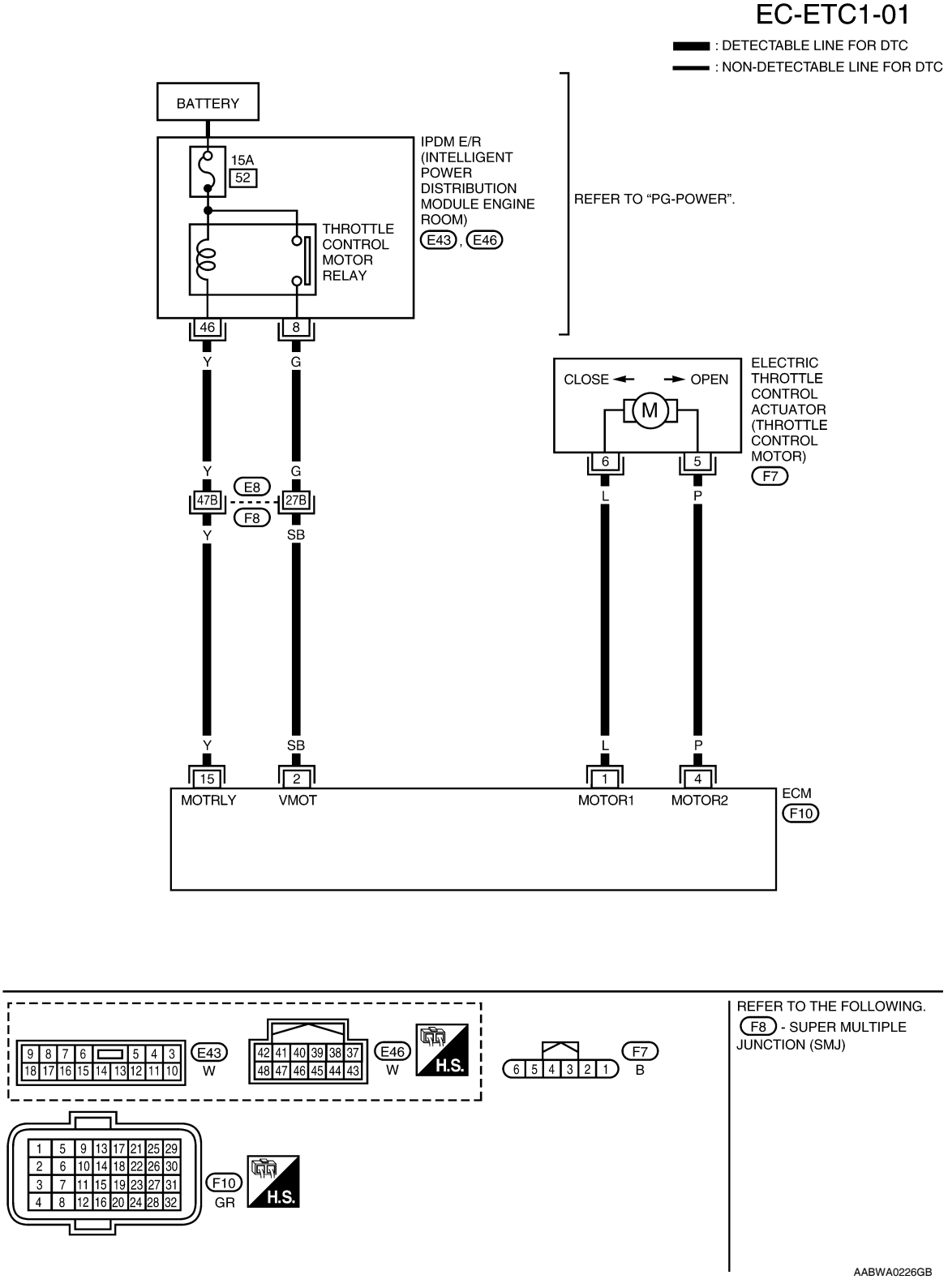
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to EC-465, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700141

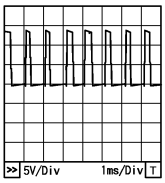
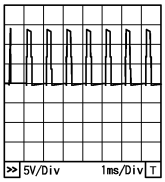
EC-ETC1-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
1	L	Throttle control motor (Open)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIA8150J
2	SB	Throttle control motor power supply	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
4	P	Throttle control motor (Close)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIA8149J
15	Y	Throttle control motor relay	**[Ignition switch: OFF]**	Battery voltage (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

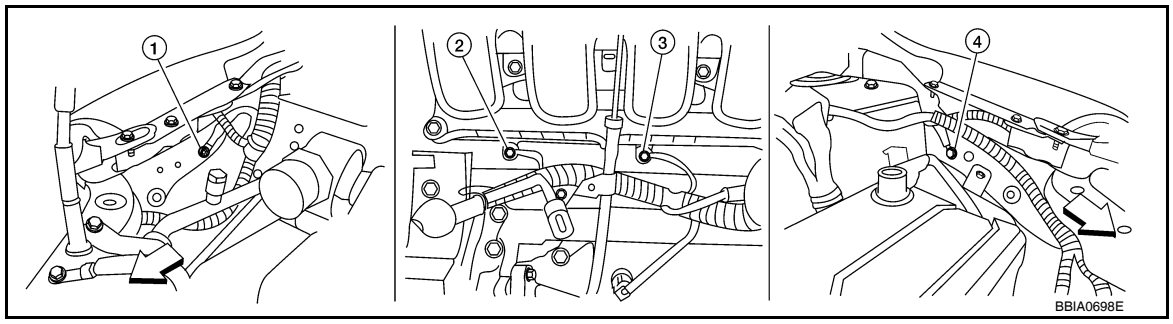
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700142

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

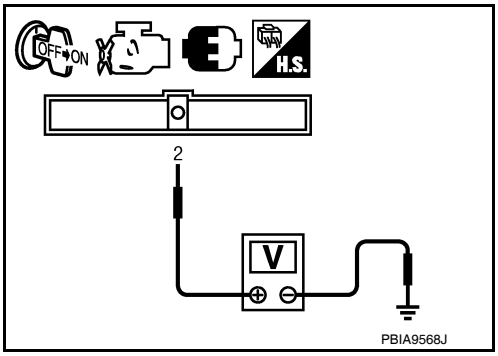
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)



OK or NG

OK >> GO TO 10.
NG >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

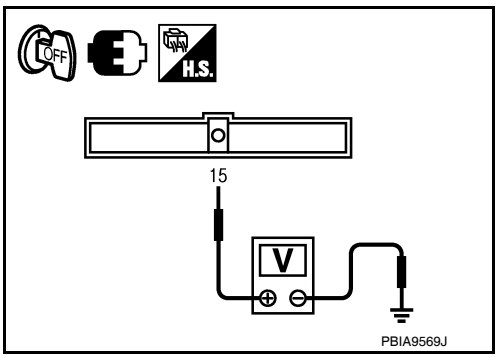
Check the following.
- Harness connectors E8, F8
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 15 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check harness continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

OK or NG

OK >> GO TO 9.
NG >> Replace 15 A fuse.

9.CHECK INTERMITTENT INCIDENT

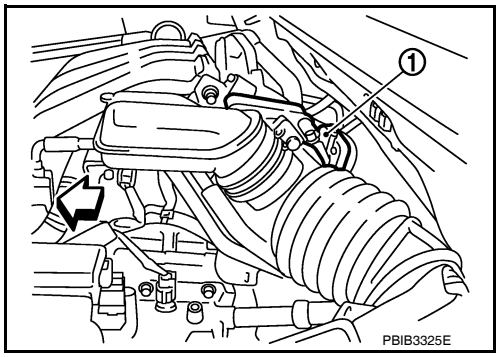
Refer to EC-140.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair or replace harness or connectors.

10.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator (1) harness connector.



⇦ : Vehicle front

3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.
6	1	Should exist.
	4	Should not exist.

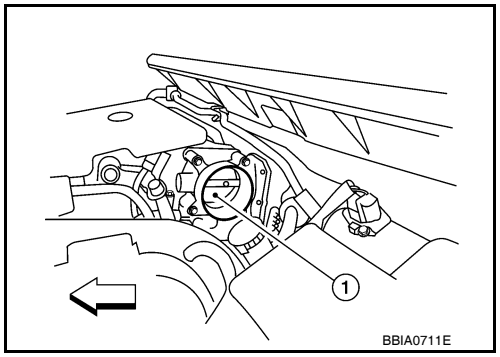
5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair or replace.

11.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct. Refer to EM-16, "Component".
2. Check if foreign matter is caught between the throttle valve (1) and the housing.



⇦ : Vehicle front

OK or NG

OK >> GO TO 12.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to EC-87, "Throttle Valve Closed Position Learning".

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-468, "Component Inspection".

OK or NG

OK >> GO TO 13.
NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

OK or NG

OK >> GO TO 14.
NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

Component Inspection

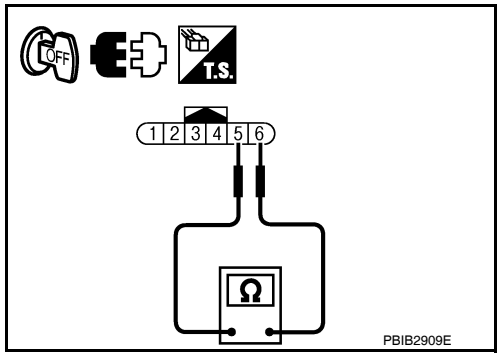
INFOID:0000000007700143

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step. Refer to EM-18, "Component".



DTC P2118 THROTTLE CONTROL MOTOR

Component Description

INFOID:0000000007700145

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

INFOID:0000000007700146

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2118 2118	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE
When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:0000000007700147

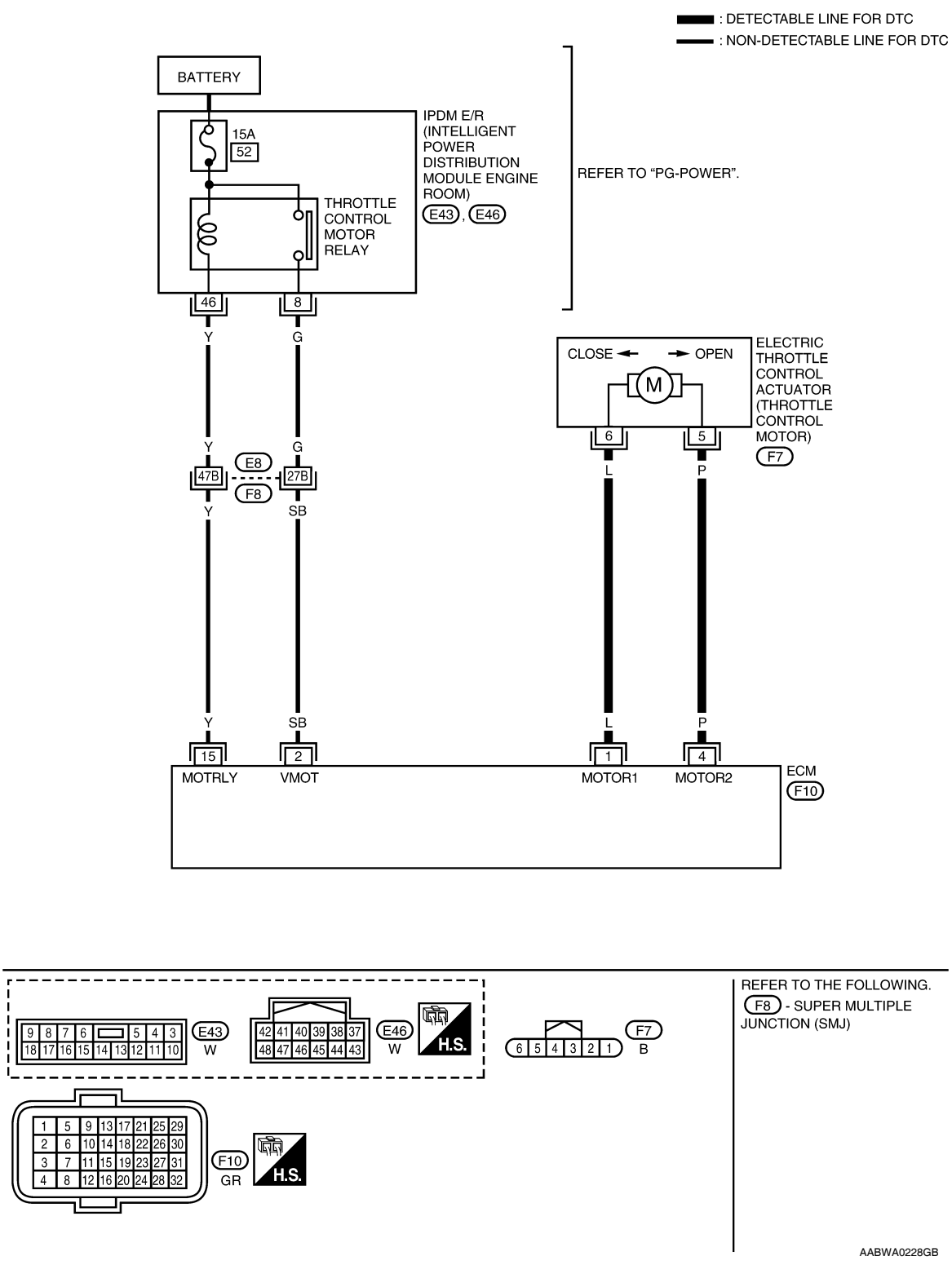
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to EC-471, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700148

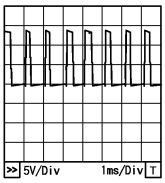
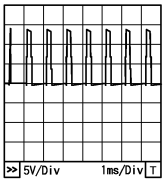
EC-ETC3-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
1	L	Throttle control motor (Open)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIA8150J
2	SB	Throttle control motor power supply	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)
4	P	Throttle control motor (Close)	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIA8149J
15	Y	Throttle control motor relay	**[Ignition switch: OFF]**	Battery voltage (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

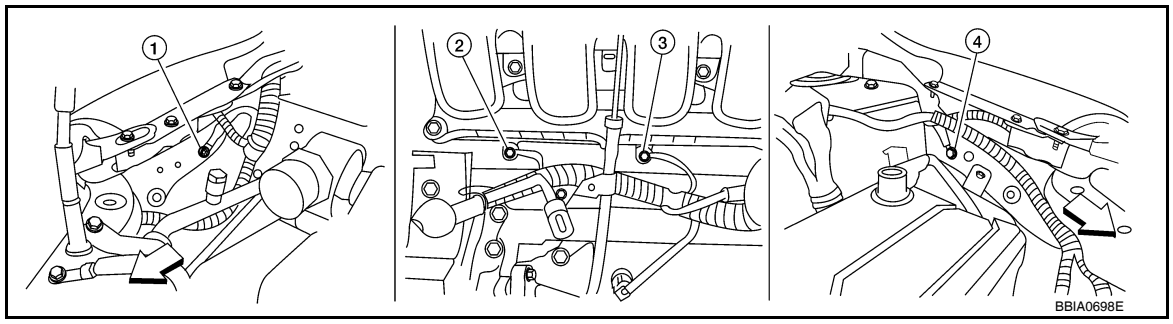
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700149

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

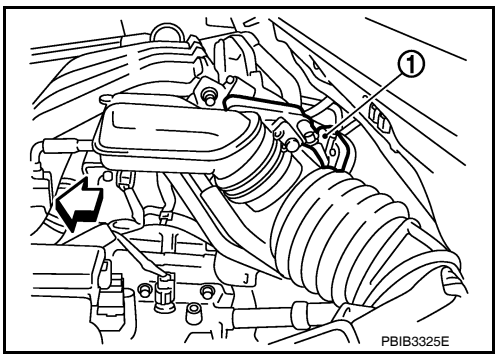
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect electric throttle control actuator (1) harness connector.



⇦ : Vehicle front

2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.
6	1	Should exist.
	4	Should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE CONTROL MOTOR

Refer to EC-472, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

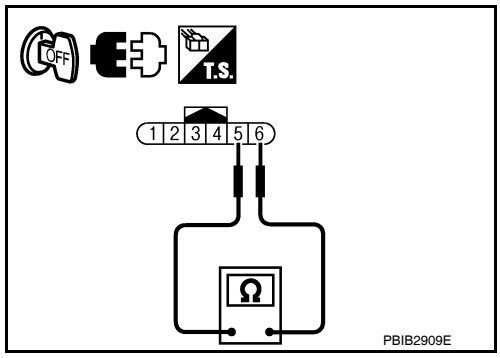
Component Inspection

INFOID:0000000007700150

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]



3. If NG, replace electric throttle control actuator and go to next step. Refer to EM-18, "Component".

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Component Description

INFOID:0000000007700152

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

INFOID:0000000007700153

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P2119 2119	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position (A/T, CVT), neutral (M/T), and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

INFOID:0000000007700154

NOTE:
- **Perform PROCEDURE FOR MALFUNCTION A AND B first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION C.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set selector lever to D position (A/T, CVT) or 1st position (M/T), and wait at least 3 seconds.
3. Set selector lever to P position (A/T, CVT) or Neutral position (M/T).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set selector lever to D position (A/T, CVT) or 1st position (M/T), and wait at least 3 seconds.
7. Set selector lever to P position (A/T, CVT) or Neutral position (M/T).
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.
10. If DTC is detected, go to EC-474, "Diagnosis Procedure".

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set selector lever to D position (A/T, CVT) or 1st position (M/T) and wait at least 3 seconds.

3. Set selector lever to N, P position (A/T, CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.
6. If DTC is detected, go to EC-474, "Diagnosis Procedure".

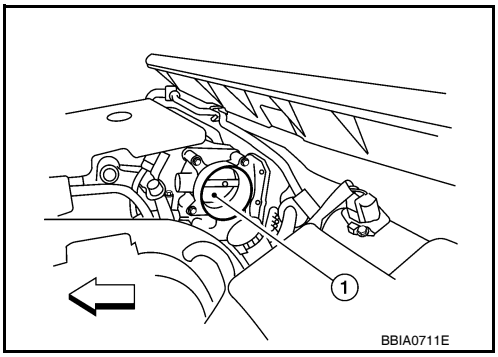
Diagnosis Procedure

INFOID:0000000007700155

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if a foreign matter is caught between the throttle valve (1) and the housing.

⇦ : Vehicle front



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to EC-87, "Throttle Valve Closed Position Learning".

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

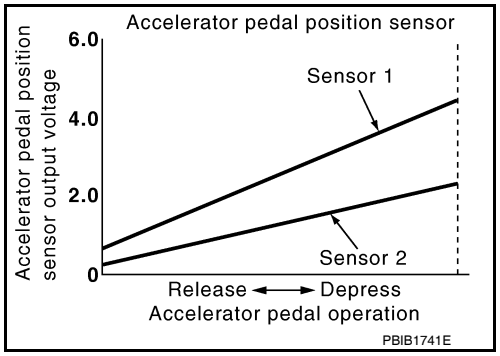
>> **INSPECTION END**

DTC P2122, P2123 APP SENSOR

Component Description

INFOID:0000000007700156

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700157

Specification data are reference values.

Monitor item	Condition		Specification
ACCEL SEN 1	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:0000000007700158

These self-diagnoses have the one trip detection logic.
NOTE:
If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007700159

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

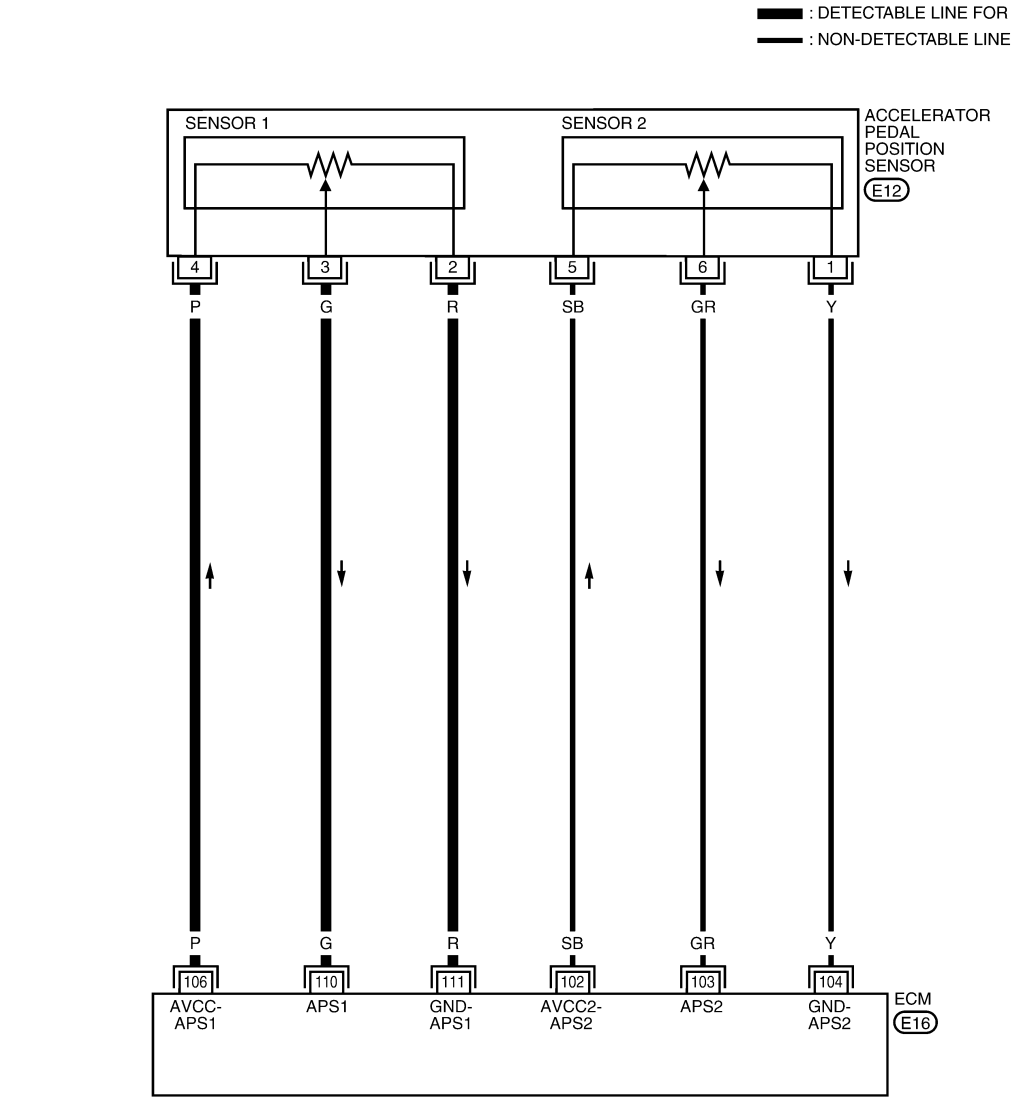
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

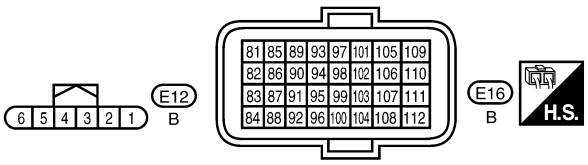
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to EC-477, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700160

EC-APPS1-01





BBWA2652E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

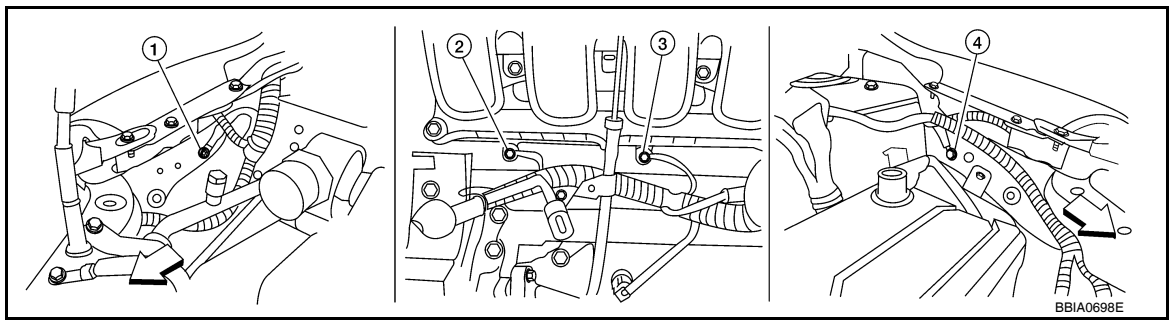
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
102	SB	Sensor power supply (APP sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V
103	GR	Accelerator pedal position sensor 2	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	Y	Sensor ground (APP sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
106	P	Sensor power supply (APP sensor 1)	**[Ignition switch: ON]**	Approximately 5.0 V
110	G	Accelerator pedal position sensor 1	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	R	Sensor ground (APP sensor 1)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007700161

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

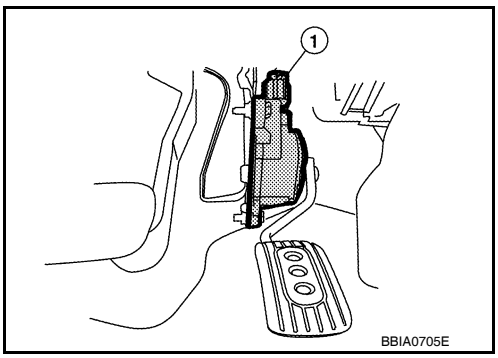
⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

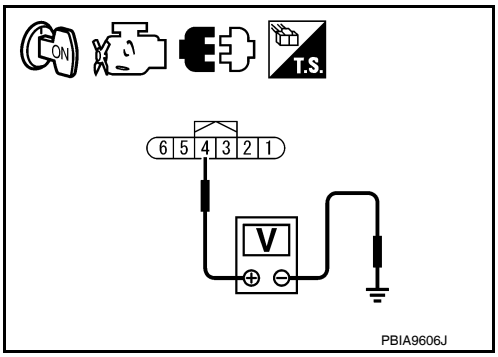
2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between APP sensor terminal 4 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 111 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 110 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to EC-479, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

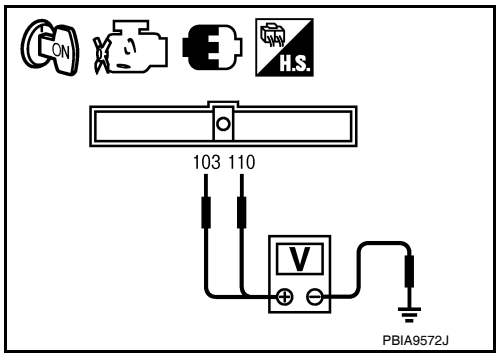
Component Inspection

INFOID:0000000007700162

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



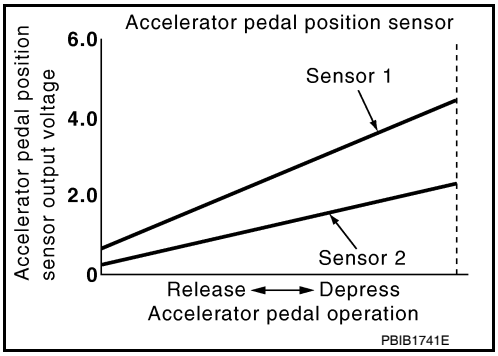
4. If NG, replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

DTC P2127, P2128 APP SENSOR

Component Description

INFOID:0000000007700164

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700165

Specification data are reference values.

Monitor item	Condition		Specification
ACCEL SEN 1	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:0000000007700166

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	• Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007700167

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

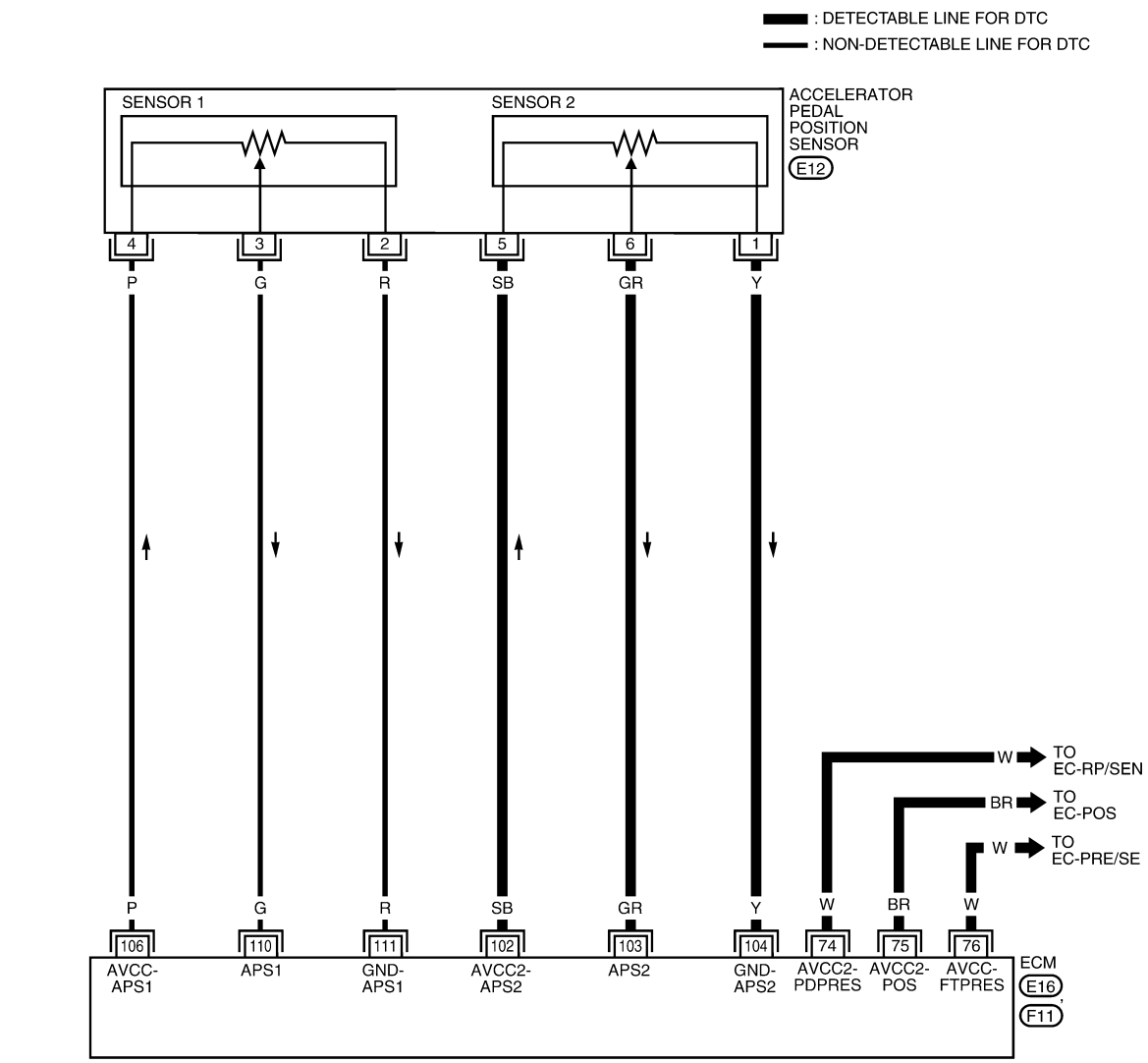
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

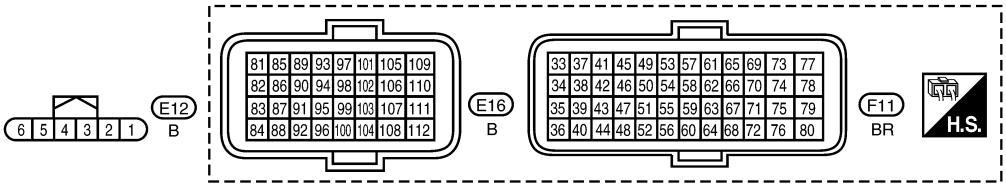
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to EC-483, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700168

EC-APPS2-01





BBWA3074E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

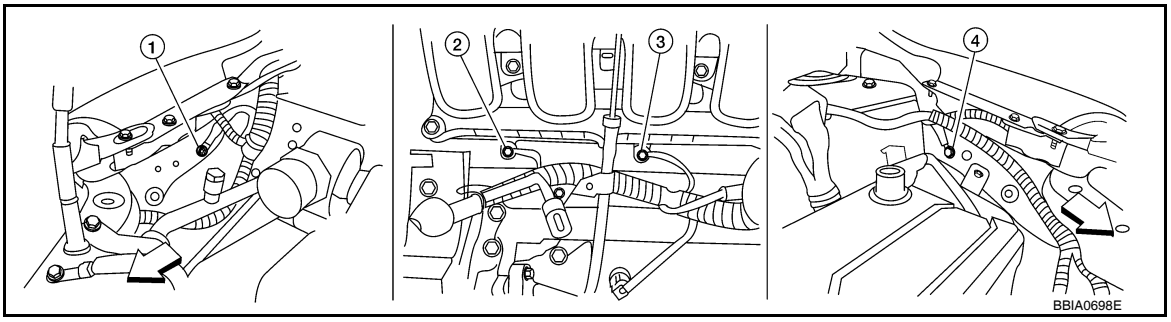
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (APP sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V
103	GR	Accelerator pedal position sensor 2	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	Y	Sensor ground (APP sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
106	P	Sensor power supply (APP sensor 1)	**[Ignition switch: ON]**	Approximately 5.0 V
110	G	Accelerator pedal position sensor 1	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	R	Sensor ground (APP sensor 1)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007700169

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

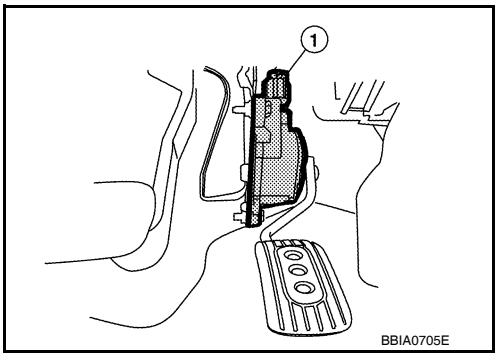
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

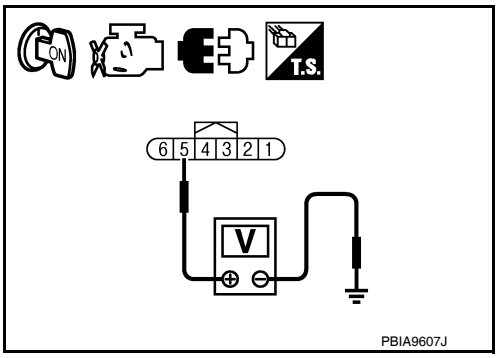
2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between APP sensor terminal 5 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 6.
NG >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK COMPONENTS POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-482, "Wiring Diagram"

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-307, "Component Inspection".)
- EVAP control system pressure sensor (Refer to EC-360, "Component Inspection".)
- Refrigerant pressure sensor (Refer to MTC-38, "Magnet Clutch Circuit (If Equipped)".)

OK or NG

OK >> GO TO 10.
NG >> Replace malfunctioning component.

6. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 104 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 103 and APP sensor terminal 6. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-485, "Component Inspection".

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

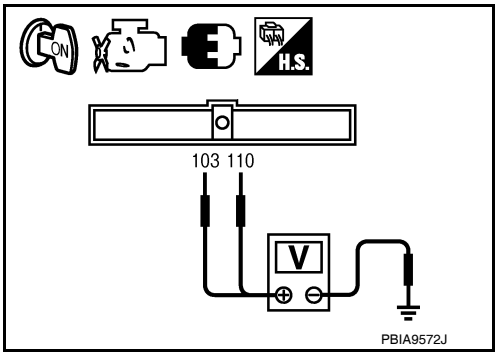
INFOID:0000000007700170

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



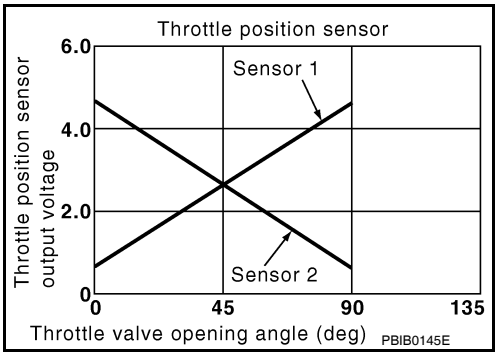
4. If NG, replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

DTC P2135 TP SENSOR

Component Description

INFOID:0000000007700172

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700173

Specification data are reference values.

Monitor item	Condition		Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Selector lever: D (A/T, CVT), 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:0000000007700174

This self-diagnosis has the one trip detection logic.
NOTE:
If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.
Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007700175

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

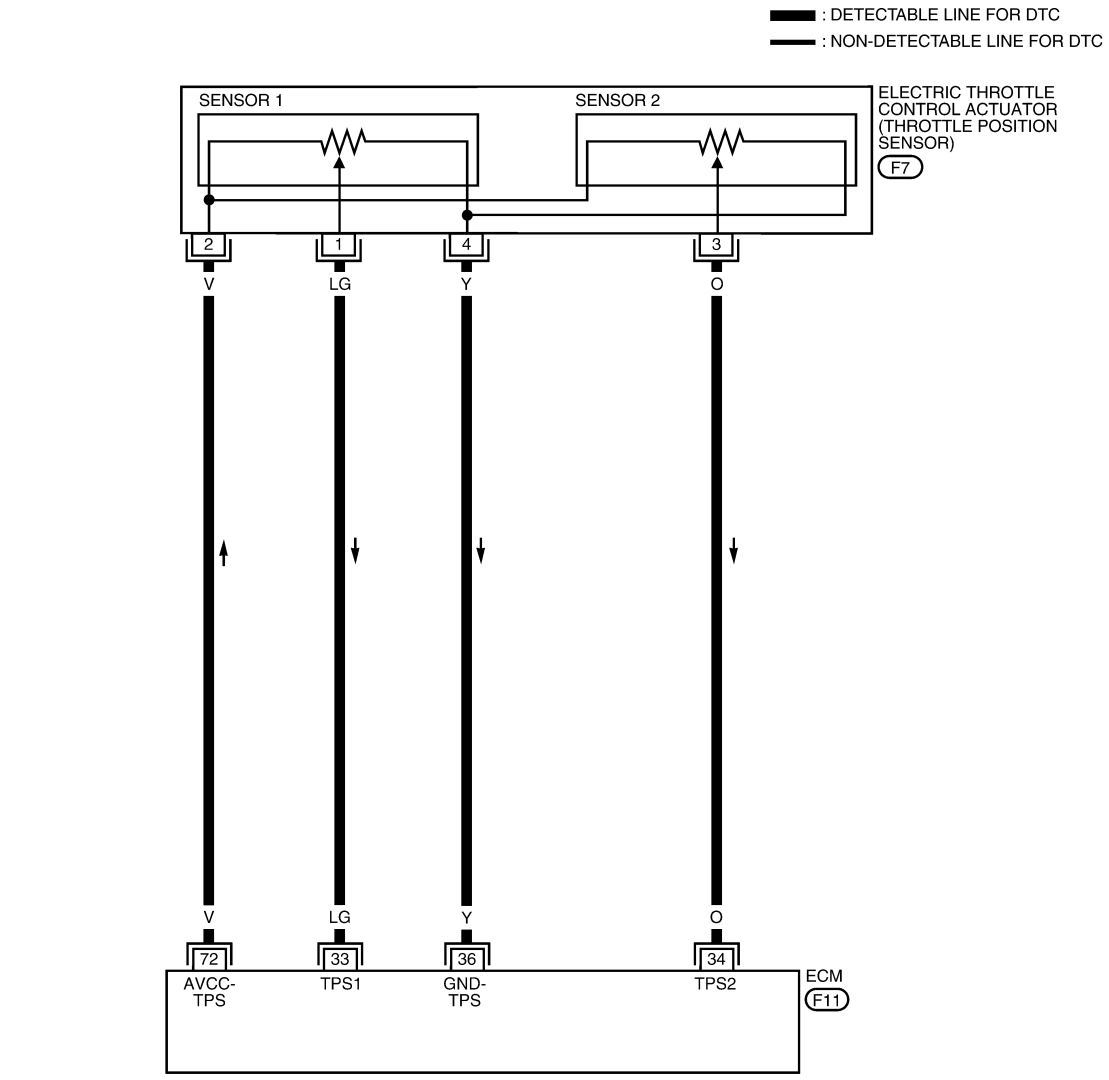
1. Start engine and let it idle for 1 second.
2. Check DTC.

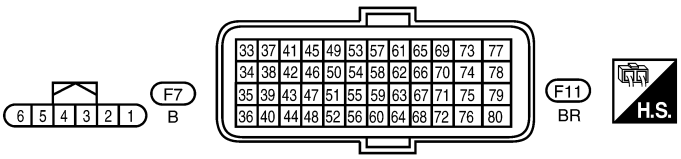
3. If DTC is detected, go to EC-489, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700176

EC-TPS3-01





BBWA2657E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

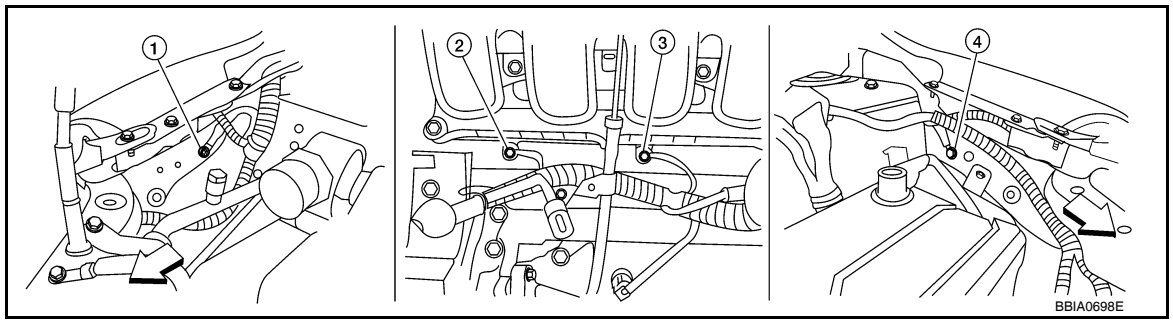
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
33	LG	Throttle position sensor 1	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	O	Throttle position sensor 2	**[Ignition switch: ON]** • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (A/T, CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	Y	Sensor ground (Throttle position sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
72	V	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5.0 V

Diagnosis Procedure

INFOID:0000000007700177

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

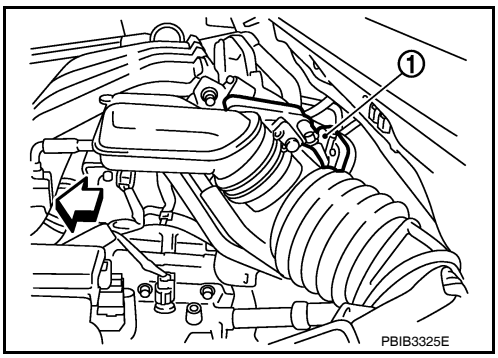
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

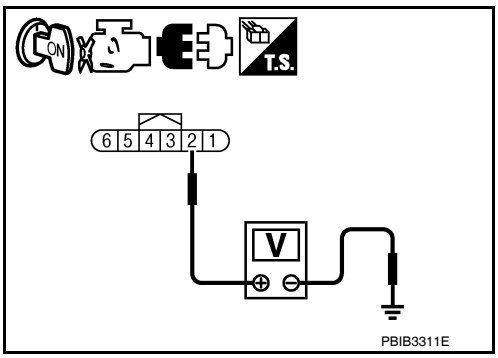
1. Disconnect electric throttle control actuator (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
Electric throttle control actuator terminal 1 and ECM terminal 33,
Electric throttle control actuator terminal 3 and ECM terminal 34.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-491, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to EM-18, "Component".

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

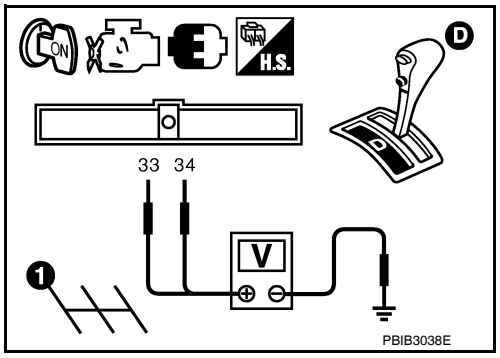
Component Inspection

INFOID:0000000007700178

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-87, "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T, CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V



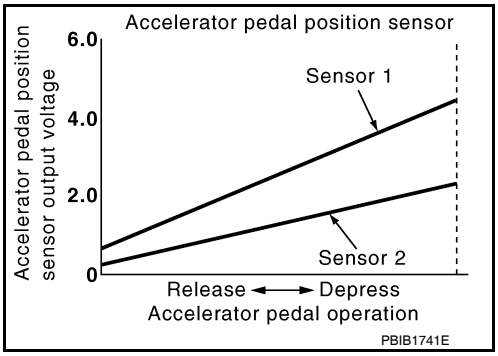
6. If NG, replace electric throttle control actuator. Refer to EM-18, "Component".

DTC P2138 APP SENSOR

Component Description

INFOID:0000000007700180

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700181

Specification data are reference values.

Monitor item	Condition		Specification
ACCEL SEN 1	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:0000000007700182

This self-diagnosis has the one trip detection logic.
NOTE:
If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.
Refer to EC-410.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	• Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • EVAP control system pressure sensor • Refrigerant pressure sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:0000000007700183

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

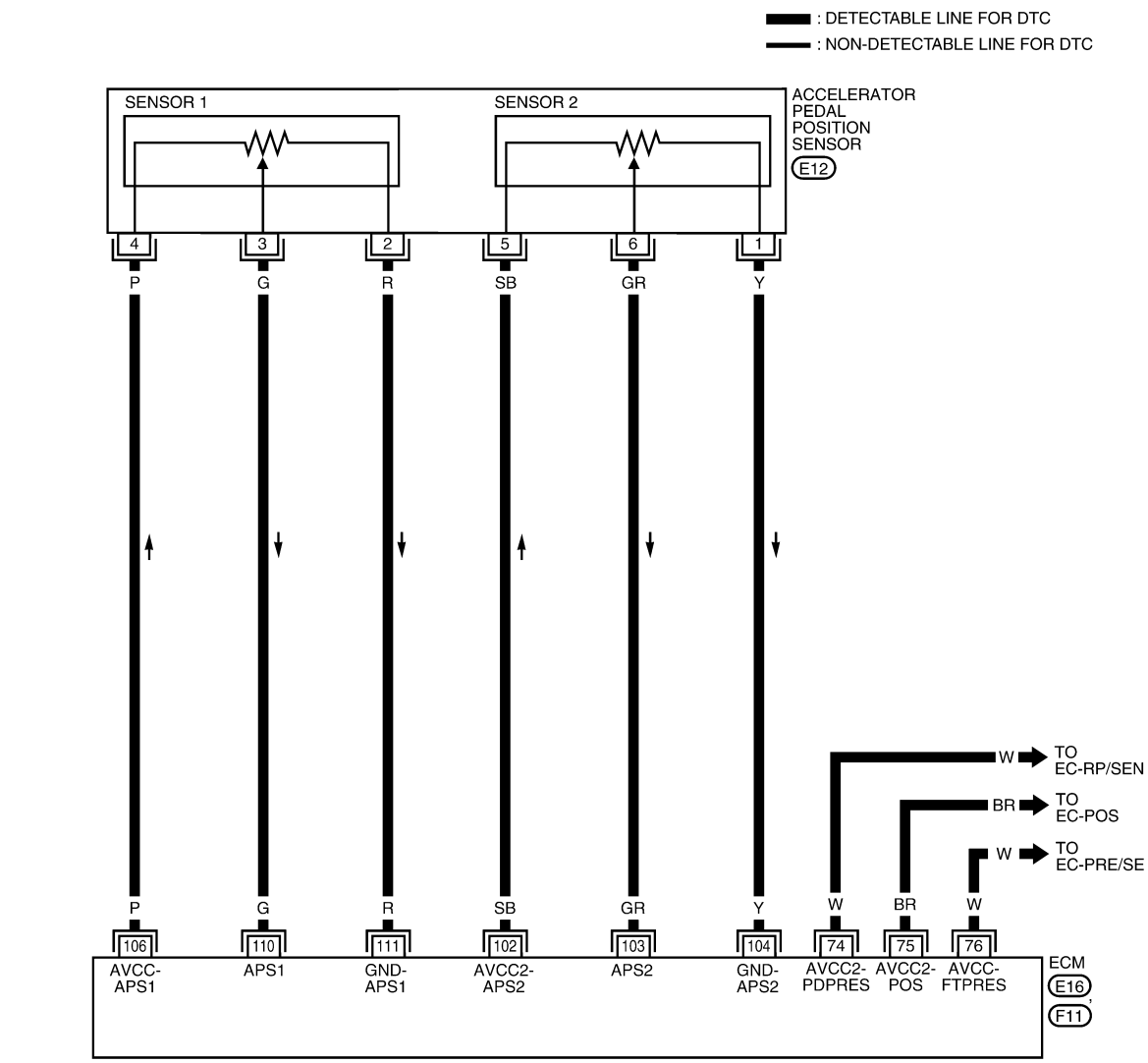
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

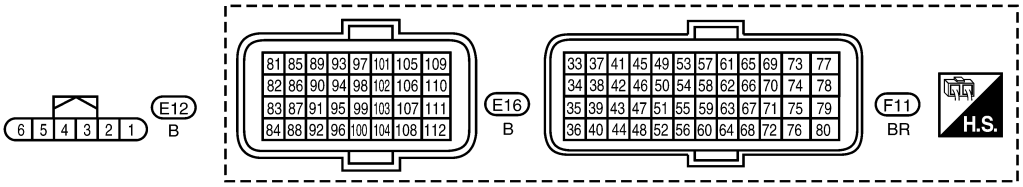
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to EC-495, "Diagnosis Procedure".

Wiring Diagram

INFOID:0000000007700184

EC-APPS3-01





BBWA3075E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

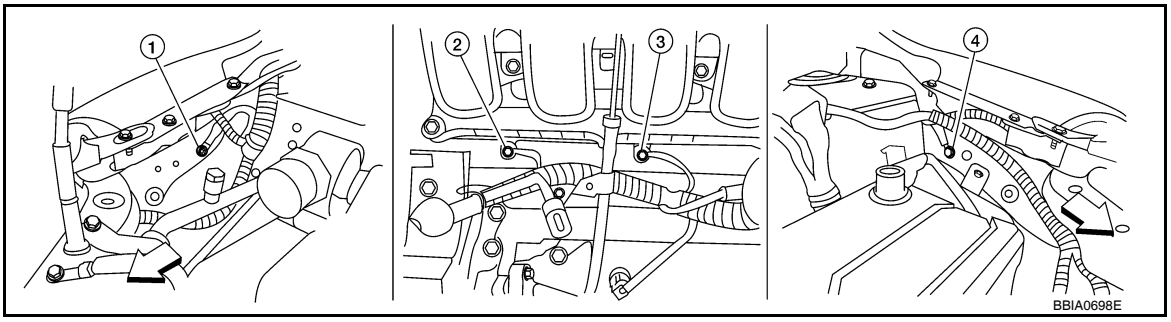
Terminal No.	Wire color	Item	Condition	Data (DC voltage)
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V
75	BR	Sensor power supply [Crankshaft position sensor (POS)]	**[Ignition switch: ON]**	Approximately 5.0 V
76	W	EVAP control system pressure sensor power supply	**[Ignition switch: ON]**	Approximately 5.0 V
102	SB	Sensor power supply (APP sensor 2)	**[Ignition switch: ON]**	Approximately 5.0 V
103	GR	Accelerator pedal position sensor 2	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	Y	Sensor ground (APP sensor 2)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
106	P	Sensor power supply (APP sensor 1)	**[Ignition switch: ON]**	Approximately 5.0 V
110	G	Accelerator pedal position sensor 1	**[Ignition switch: ON]** • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	R	Sensor ground (APP sensor 1)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:0000000007700185

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

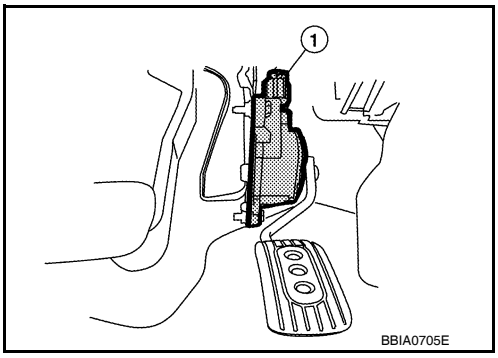
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

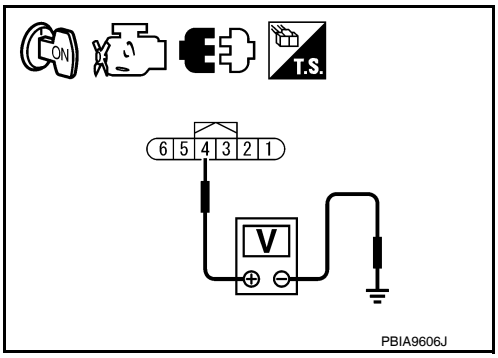
2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.



2. Turn ignition switch ON.
3. Check voltage between APP sensor terminal 4 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



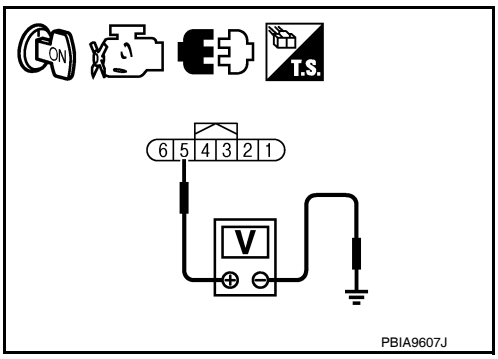
OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between APP sensor terminal 5 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-539, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-303, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-363, "Wiring Diagram"
102	APP sensor terminal 5	EC-494, "Wiring Diagram"

OK or NG

OK >> GO TO 6.
NG >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

Check the following.
- Crankshaft position sensor (POS) (Refer to EC-307, "Component Inspection".)
- EVAP control system pressure sensor (Refer to EC-360, "Component Inspection".)
- Refrigerant pressure sensor (Refer to MTC-38, "Magnet Clutch Circuit (If Equipped)".)

OK or NG

OK >> GO TO 11.
NG >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following;
   ECM terminal 111 and APP sensor terminal 2,
   ECM terminal 104 and APP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
   ECM terminal 110 and APP sensor terminal 3,
   ECM terminal 103 and APP sensor terminal 6.
   Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK APP SENSOR

Refer to EC-498, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

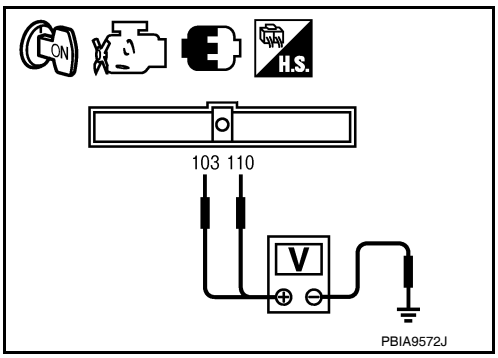
>> INSPECTION END

Component Inspection

INFOID:0000000007700186

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V

4. If NG, replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

DTC P2A00 A/F SENSOR 1

Component Description

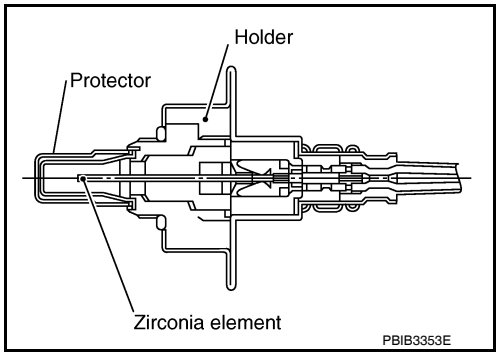
INFOID:0000000007700188

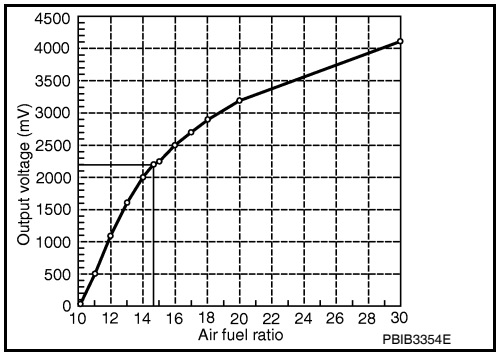
The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.

The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).





CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700189

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:0000000007700190

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P2A00 2A00	Air fuel ratio (A/F) sensor 1 circuit range/performance	• The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. • The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.	• Air fuel ratio (A/F) sensor 1 • Air fuel ratio (A/F) sensor 1 heater • Fuel pressure • Fuel injector • Intake air leaks • Exhaust gas leaks

DTC Confirmation Procedure

INFOID:0000000007700191

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

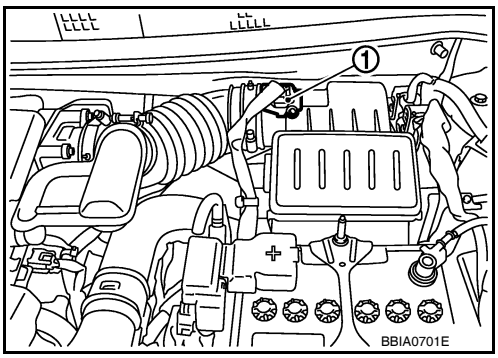
WITH CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.

3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
4. Clear the self-learning coefficient by touching “CLEAR”.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to EC-502, "Diagnosis Procedure".

WITH GST

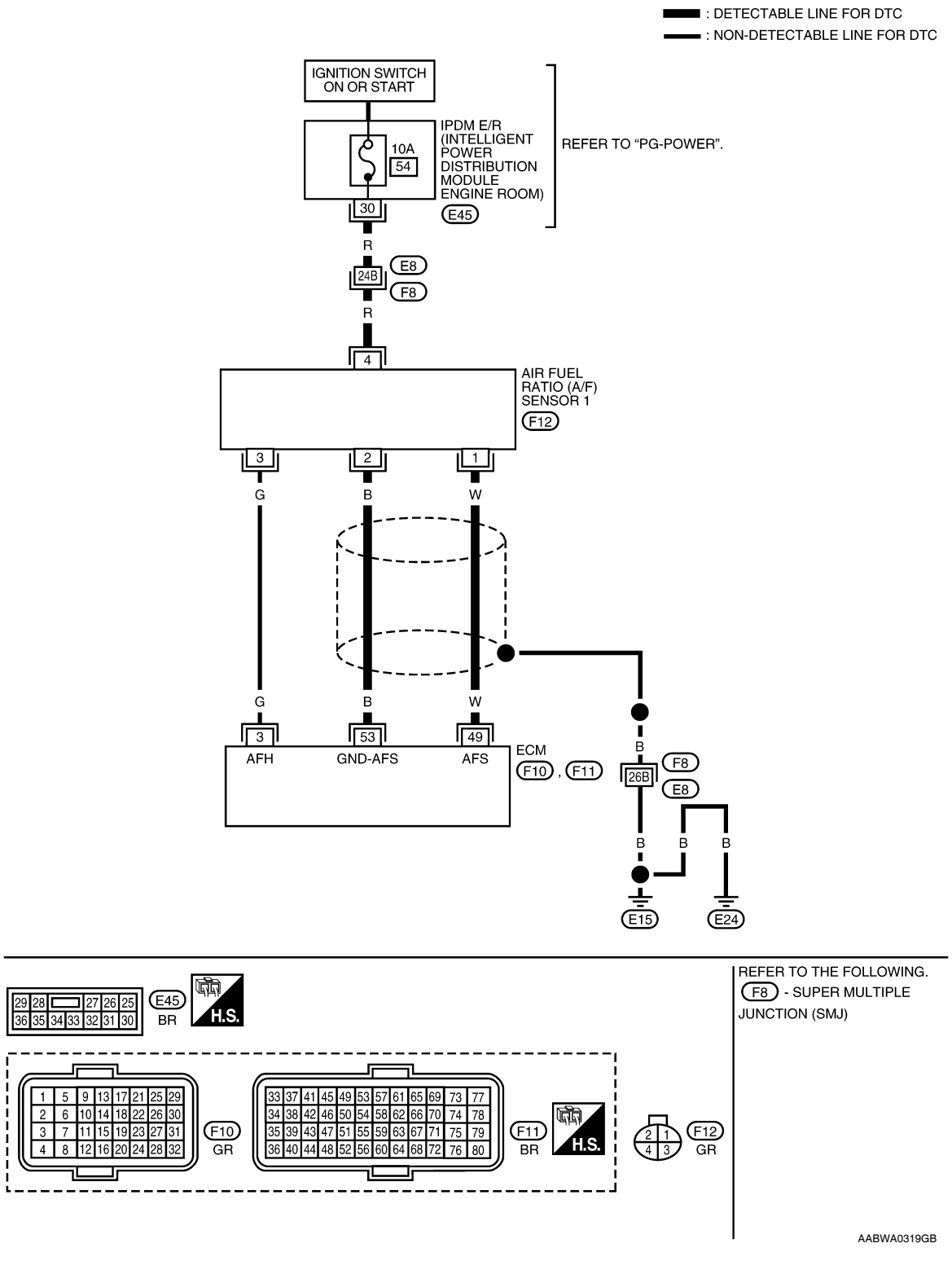
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector.
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor (1) harness connector.
6. Select Service $03 with GST and make sure that DTC P0102 is detected.
7. Select Service $04 with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select Service $07 with GST.
    If 1st trip DTC is detected, go to EC-502, "Diagnosis Procedure".



Wiring Diagram

INFOID:0000000007700192

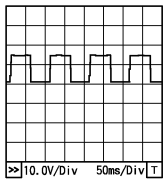
EC-A/F-01



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
3	G	A/F sensor 1 heater	**[Engine is running]** • **Warm-up condition** • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIA8148J
49	W	A/F sensor 1	**[Engine is running]** • **Warm-up condition** • Engine speed: 2,000 rpm	Approximately 2.2 V Output voltage varies with air fuel ratio.
53	B	A/F sensor 1	**[Ignition switch: ON]**	Approximately 2.2 V

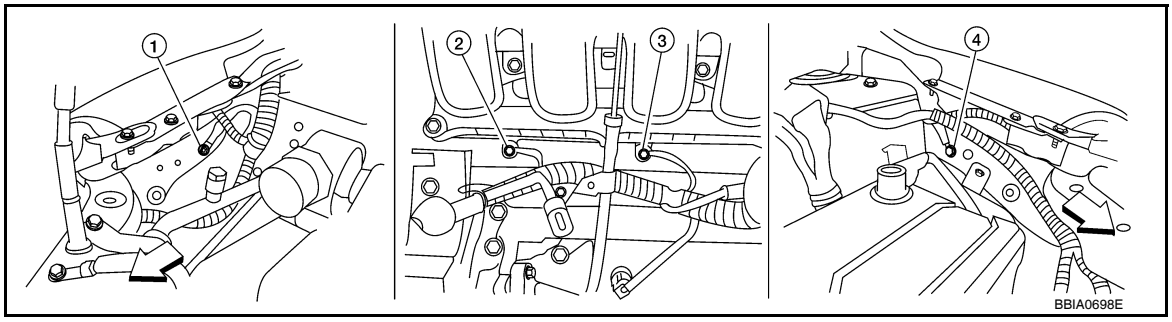
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700193

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1 AND HEATED OXYGEN SENSOR 2

Loosen and retighten the air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2. Refer to EM-22, "Component".

>> GO TO 3.

3.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an iexhaust gas leak before the three way catalyst.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace.

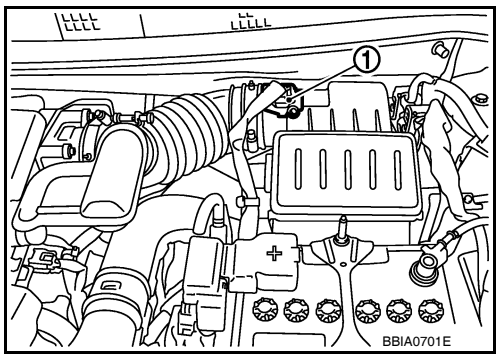
5. CLEAR THE SELF-LEARNING DATA

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 and P0172 detected?
   Is it difficult to start engine?

Without CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 and P0172 detected?
   Is it difficult to start engine?

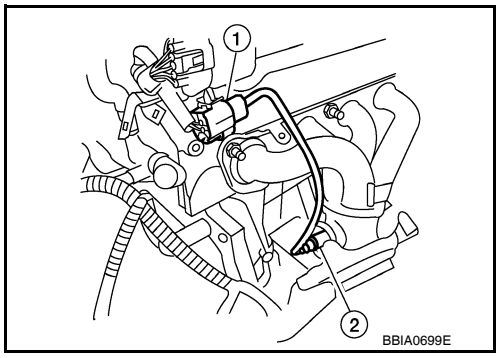


Yes or No

Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-265 or EC-271.
No >> GO TO 6.

6. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector (1).



2. Air fuel ratio (A/F) sensor 1

3. Check harness connector for water.

Water should no exist.

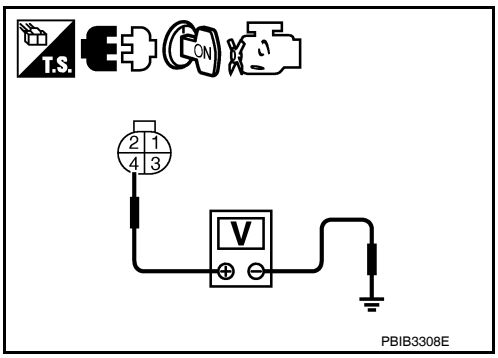
OK or NG

OK >> GO TO 7.
NG >> Repair or replace harness connector.

7. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.

2. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

9. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK A/F SENSOR 1 HEATER

Refer to EC-158, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> GO TO 12.

11. CHECK INTERMITTENT INCIDENT

Perform EC-140.

OK or NG

OK >> GO TO 12.
NG >> Repair or replace.

12. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to EM-22, "Component".

CAUTION:
- **Discard any air fuel ratio (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**

- **Before installing new air fuel ratio (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

>> GO TO 12.

13. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch ON.
2. Select “A/F ADJ-B1” in “DATA MONITOR” mode with CONSULT.
3. Make sure that “0.000” is displayed on CONSULT screen.

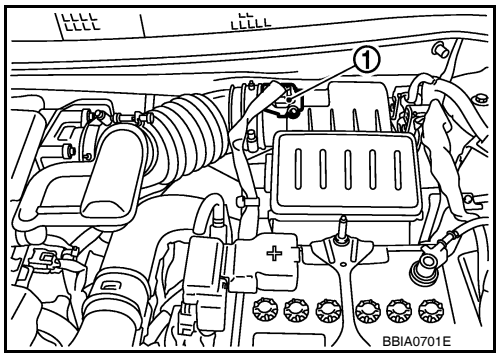
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 14.

14. CLEAR THE SELF-LEARNING DATA

With CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT.
3. Clear the self-learning control coefficient by touching “CLEAR”.

Without CONSULT
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness (1) connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to EC-49, "Emission-related Diagnostic Information".
8. Make sure DTC P0000 is displayed.



>> GO TO 15.

15. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch OFF and then ON.
2. Select “A/F ADJ-B1” in “DATA MONITOR” mode with CONSULT.
3. Make sure that “0.000” is displayed on CONSULT screen.

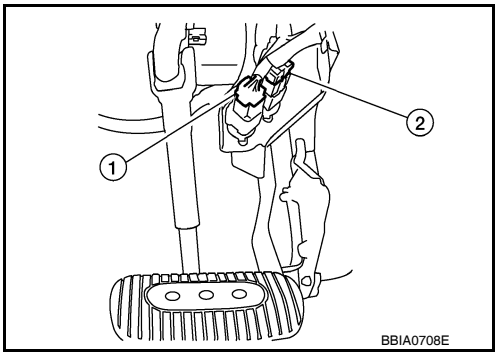
>> **INSPECTION END**

ASCD BRAKE SWITCH

Component Description

INFOID:0000000007700195

When depress on the brake pedal, ASCD brake switch (2) is turned OFF and stop lamp switch (1) is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)
Refer to EC-28 for the ASCD function.



CONSULT Reference Value in Data Monitor Mode

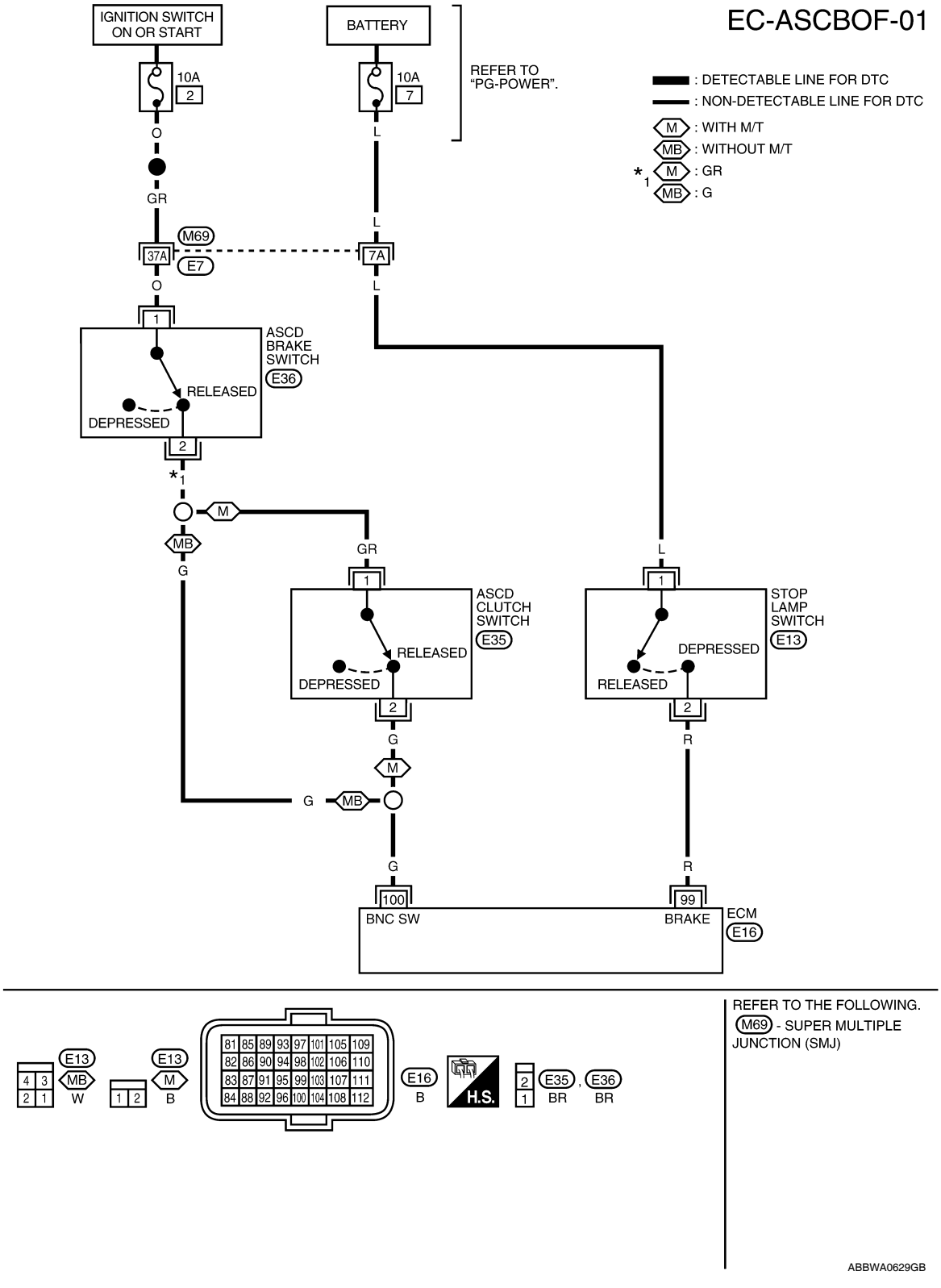
INFOID:0000000007700196

Specification data are reference values.

Monitor item	Condition		Specification
BRAKE SW1 (ASCD brake switch)	Ignition switch: ON	• Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

Wiring Diagram

INFOID:0000000007700197



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
99	R	Stop lamp switch	**[Ignition switch: ON]** • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	Battery voltage (11 - 14 V)
100	G	ASCD brake switch	**[Ignition switch: ON]** • Brake pedal: Slightly depressed (A/T, CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (A/T, CVT) • Brake pedal and clutch pedal: Fully released (M/T)	Battery voltage (11 - 14 V)

Diagnosis Procedure

INFOID:0000000007700198

1.CHECK OVERALL FUNCTION-I

With CONSULT

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT.
3. Check “BRAKE SW1” indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

A/T and CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

Without CONSULT

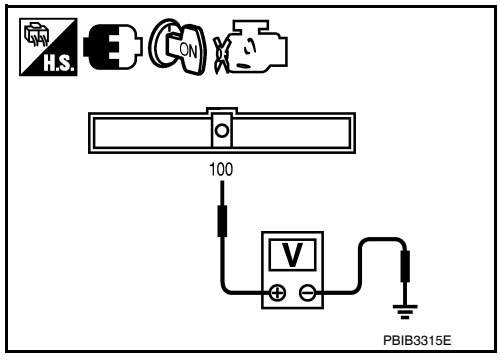
1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

A/T and CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

OK >> GO TO 2.
NG (M/T models) >>GO TO 3.
NG (A/T and CVT models) >>GO TO 4.

2.CHECK OVERALL FUNCTION-II

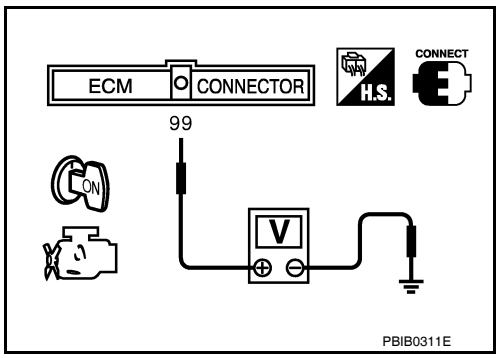
With CONSULT

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

Without CONSULT

Check voltage between ECM terminal 99 and ground under the following conditions.



Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

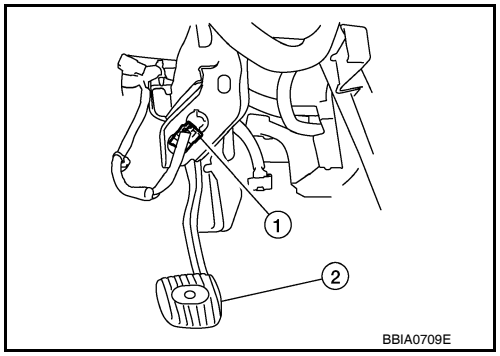
OK or NG

OK >> INSPECTION END.
NG >> GO TO 11.

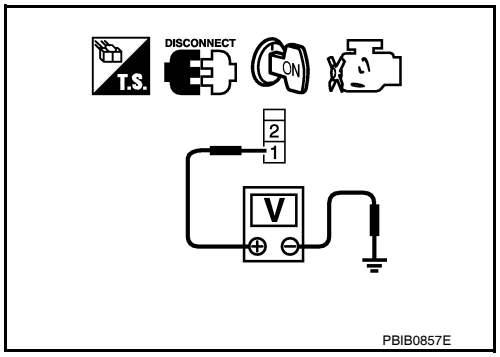
3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch (1) harness connector.

2. Clutch pedal



3. Turn ignition switch ON.
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT or tester.



Condition	Voltage
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approx. 0 V

OK or NG

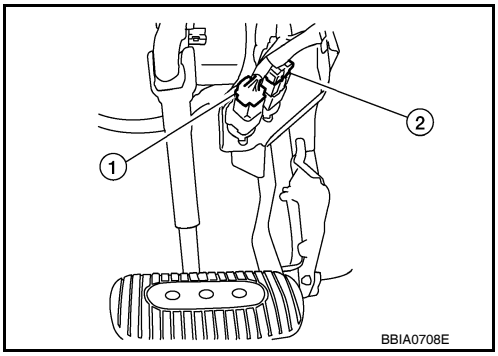
OK >> GO TO 9.
NG >> GO TO 4.

4. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.

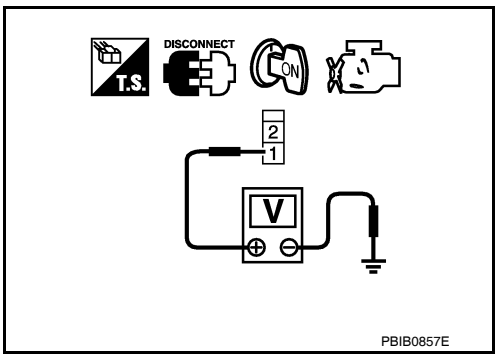
2. Disconnect ASCD brake switch (2) harness connector.

1. Stop lamp switch



3. Turn ignition switch ON.
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK (M/T models) >>GO TO 6.
OK (A/T and CVT models) >>GO TO 7.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH

Refer to EC-449, "Component Inspection".

OK or NG

OK >> GO TO 15.
NG >> Replace ASCD brake switch. Refer to BR-7, "Removal and Installation".

9. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ASCD CLUTCH SWITCH

Refer to EC-449, "Component Inspection"

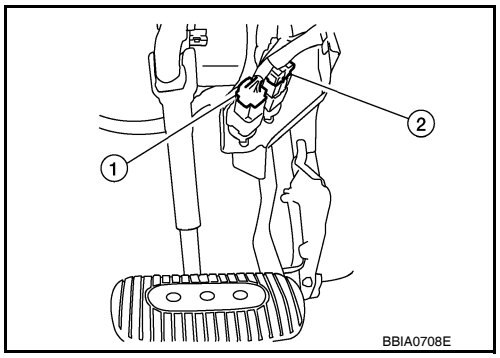
OK or NG

OK >> GO TO 15.
NG >> Replace ASCD clutch switch. Refer to CL-7, "Removal and Installation".

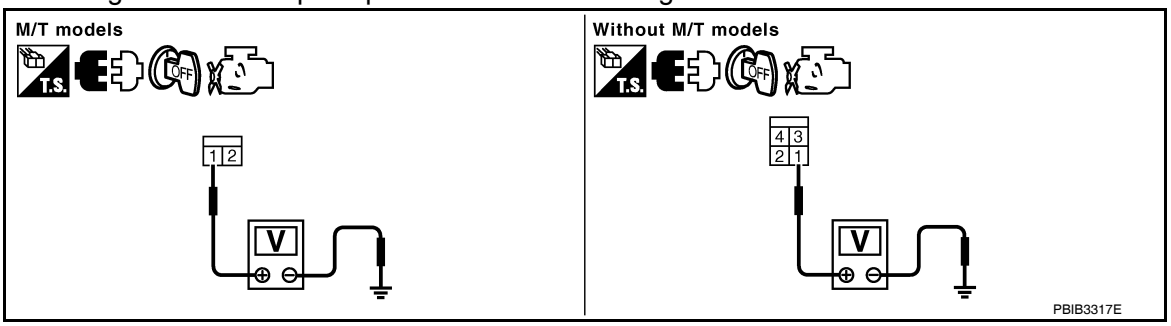
11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (1) harness connector.

2. ASCD brake switch



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to EC-449, "Component Inspection".

OK or NG

OK >> GO TO 15.
NG >> Replace stop lamp switch. Refer to BR-7, "Removal and Installation".

15. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

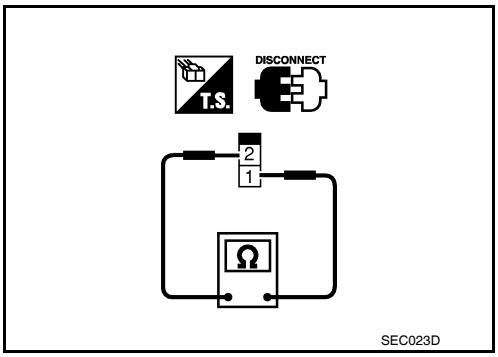
INFOID:0000000007700199

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to BR-6, and perform step 3 again.



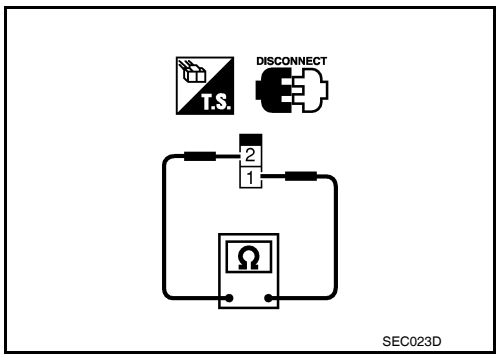
ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.

3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

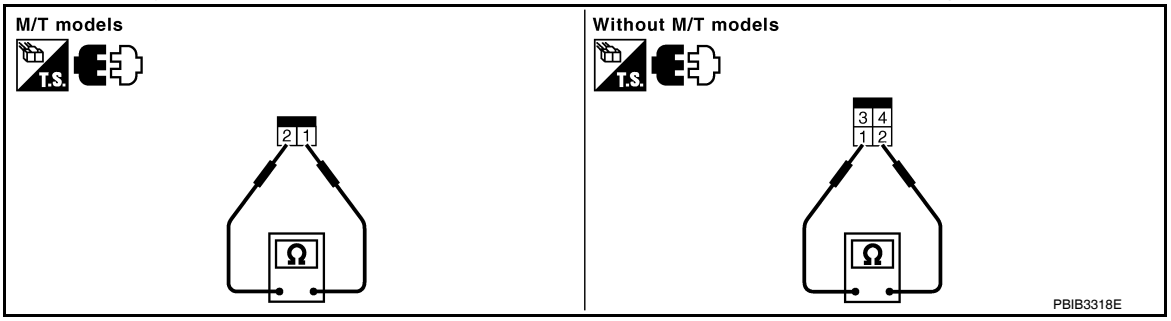
Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to CL-6, and perform step 3 again.



STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to BR-6, and perform step 3 again.

ASCD INDICATOR

Component Description

INFOID:0000000007700200

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE indicator illuminates when MAIN switch on ASCD steering switch is turned ON to indicate that ASCD system is ready for operation.
SET indicator illuminates when following conditions are met.
- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.
Refer to EC-28 for the ASCD function.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700201

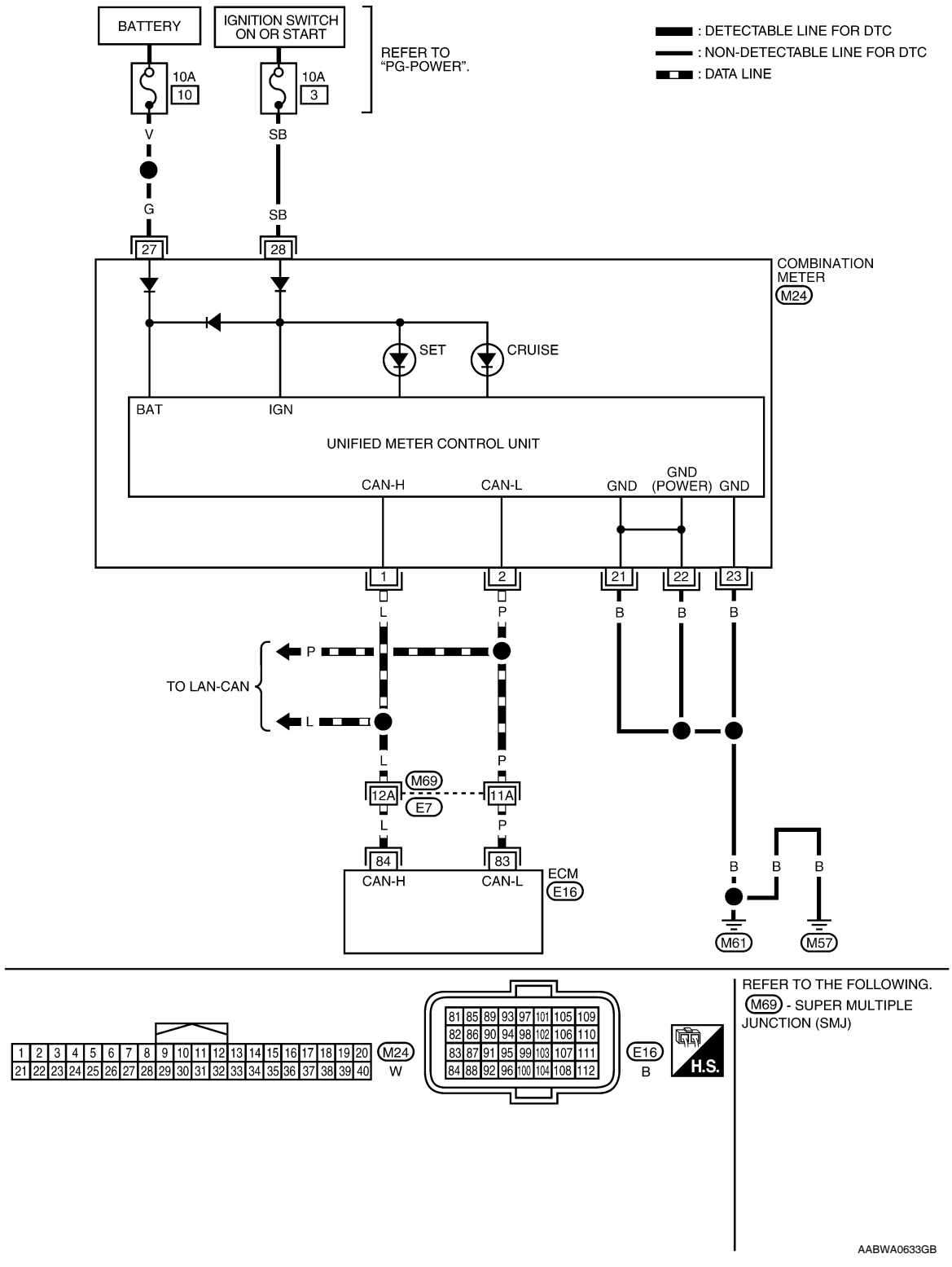
Specification data are reference value.

Monitor item	Condition		Specification
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

Wiring Diagram

INFOID:0000000007700202

EC-ASCIND-01



Diagnosis Procedure

INFOID:0000000007700203

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD Indicator	Condition		Specification
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2.CHECK DTC

Check that DTC UXXXX is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC UXXXX.
No >> GO TO 3.

3.CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.
No >> Check combination meter circuit. Refer to DI-14, "Trouble Diagnosis".

4.CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

ELECTRICAL LOAD SIGNAL

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007700204

Specification data are reference values.

Monitor item	Condition		Specification
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd position.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
HEATER FAN SW	Ignition switch: ON	Heater fan: Operating.	ON
		Heater fan: Not operating.	OFF

Diagnosis Procedure

INFOID:0000000007700205

1.CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT under the following conditions.

Condition	LOAD SIGNAL
Lighting switch: ON at 2nd position	ON
Lighting switch: OFF	OFF

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2.CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT under the following conditions.

Condition	LOAD SIGNAL
Rear window defogger switch: ON	ON
Rear window defogger switch: OFF	OFF

OK or NG

OK >> GO TO 3.
NG >> GO TO 5.

3.CHECK HEATER FAN SIGNAL CIRCUIT OVERALL FUNCTION

Check “HEATER FAN SW” in “DATA MONITOR” mode with CONSULT under the following conditions.

Condition	HEATER FAN SW
Heater fan control switch: ON	ON
Heater fan control switch: OFF	OFF

OK or NG

OK >> **INSPECTION END**.
NG >> GO TO 6.

4.CHECK HEADLAMP SYSTEM

Refer to LT-12 or LT-35.

>> **INSPECTION END**

5.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to GW-53.

>> **INSPECTION END**

6. CHECK HEATER FAN CONTROL SYSTEM

Refer to BCS-17.

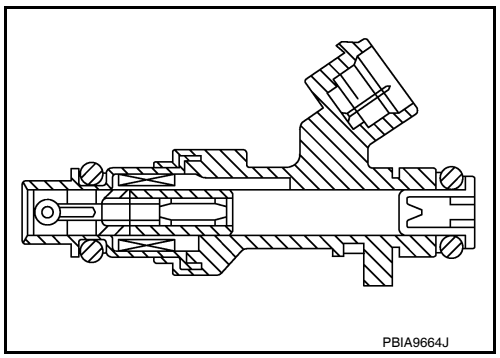
>> **INSPECTION END**

FUEL INJECTOR

Component Description

INFOID:0000000007700206

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT Reference Value in Data Monitor Mode

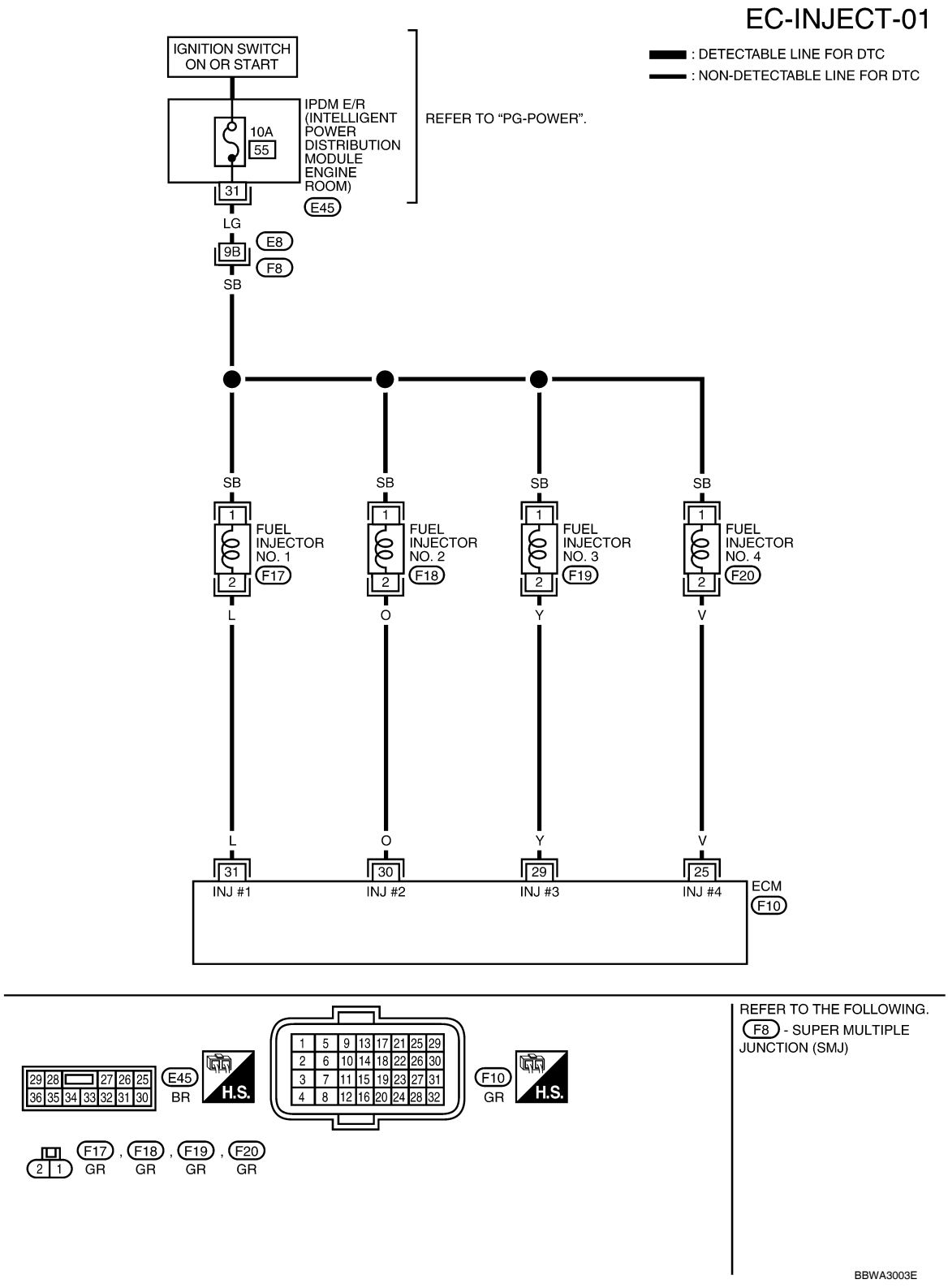
INFOID:0000000007700207

Specification data are reference values.

Monitor item	Condition		Specification
B/FUEL SCHDL	See EC-132.		
INJ PULSE-B1	• Engine: After warming up • Air conditioner switch: OFF • Selector lever: P or N (A/T, CVT), Neutral (M/T) • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

Wiring Diagram

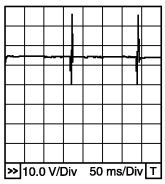
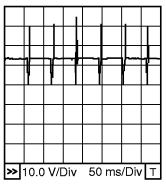
INFOID:0000000007700208



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
25 29 30 31	V Y O L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	Battery voltage (11 - 14 V)★  PBIB0529E
			[Engine is running] • **Warm-up condition** • Engine speed: 2,000 rpm	Battery voltage (11 - 14 V)★  PBIA4943J

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700209

1.INSPECTION START

Turn ignition switch to START.
Is any cylinder ignited?

Yes or No

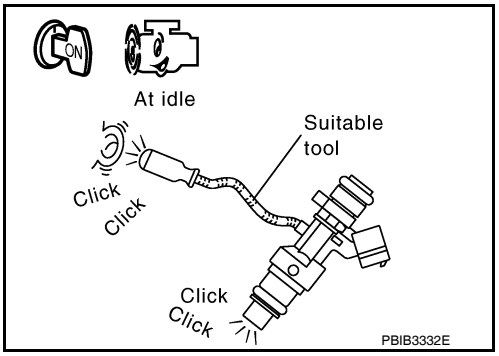
Yes >> GO TO 2.
No >> GO TO 3.

2.CHECK OVERALL FUNCTION

With CONSULT
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT
1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

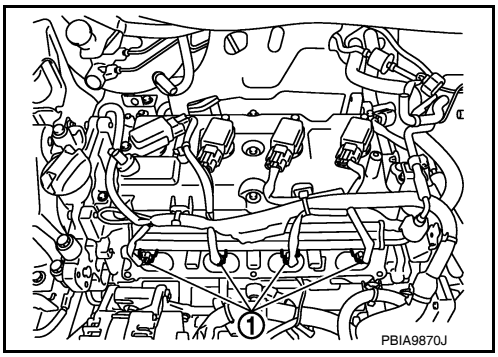


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

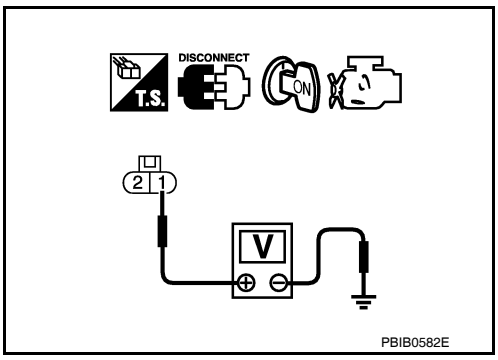
3.CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector (1) harness connector.



3. Turn ignition switch ON.
4. Check voltage between fuel injector terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- IPDM E/R harness connector E45
- 10 A fuse
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 2 and ECM terminals 25, 29, 30, 31. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK FUEL INJECTOR

Refer to EC-523, "Component Inspection".

OK or NG

OK >> GO TO 7.
NG >> Replace fuel injector. Refer to EM-35, "Component".

7. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

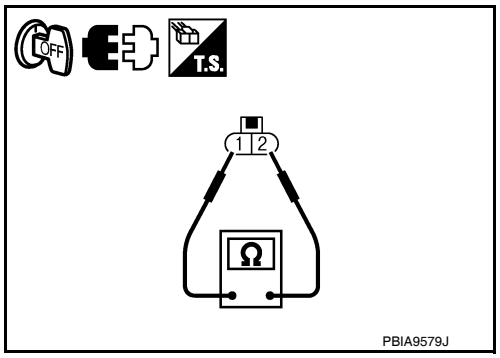
Component Inspection

INFOID:0000000007700210

FUEL INJECTOR

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)]



3. If NG, replace fuel injector. Refer to . Refer to EM-35, "Component".

FUEL PUMP

Description

INFOID:0000000007700212

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

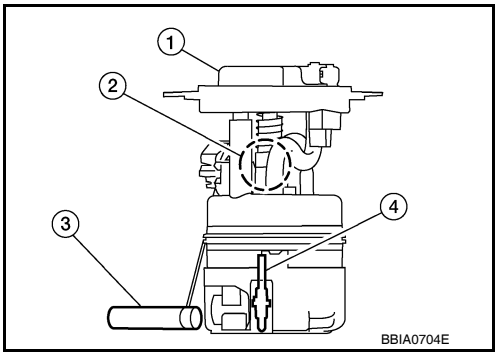
The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON	Operates for 1 second
Engine running and cranking	Operates
Engine: Stopped	Stops in 1.5 seconds
Except as shown above	Stops

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.

1. Fuel level sensor unit and fuel pump
2. Fuel pressure regulator
3. Fuel level sensor
4. Fuel tank temperature sensor



CONSULT Reference Value in Data Monitor Mode

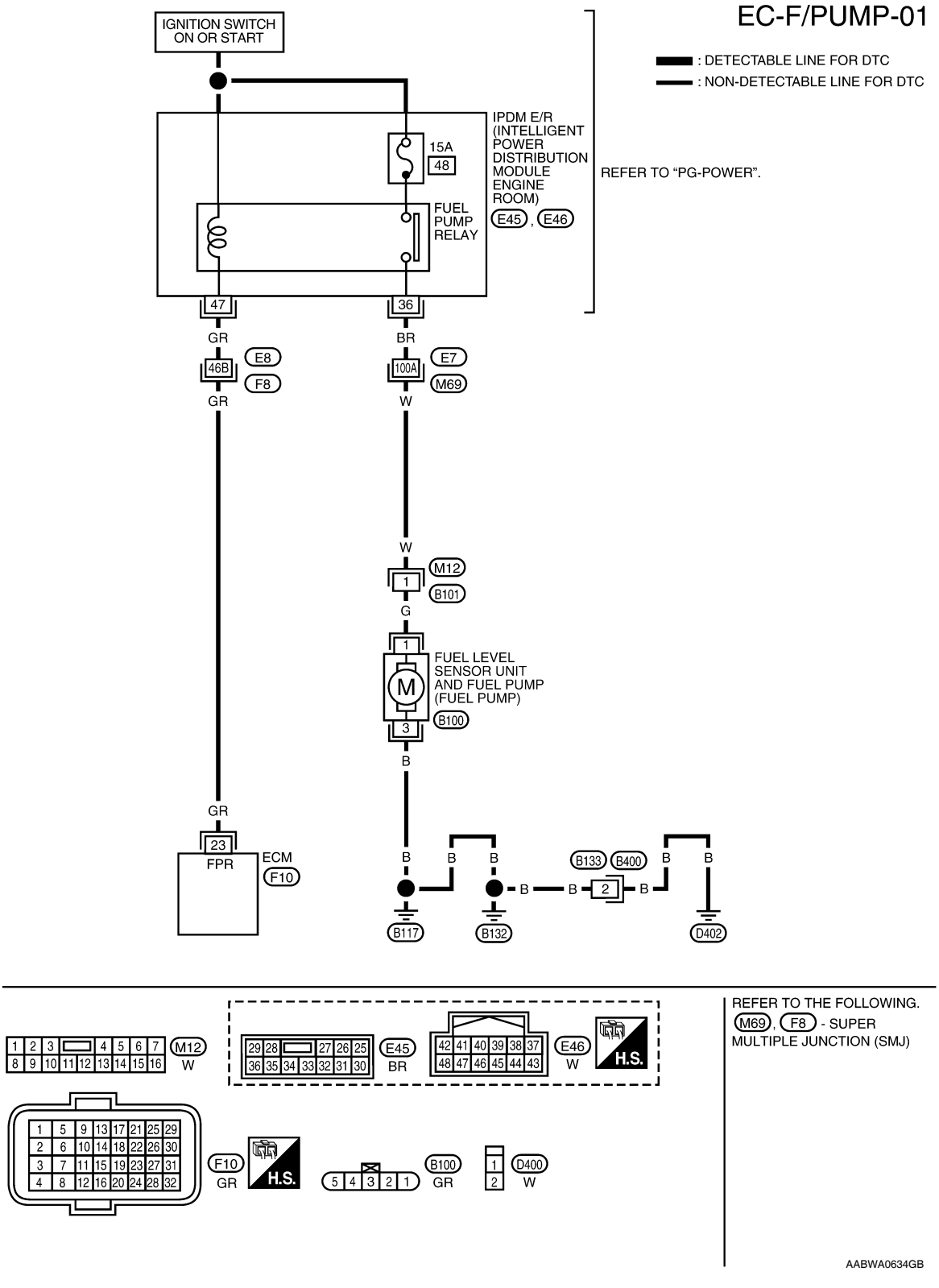
INFOID:0000000007700213

Specification data are reference values.

Monitor item	Condition	Specification
FUEL PUMP RLY	• For 1 second after turning ignition switch ON • Engine running or cranking	ON
	Except above conditions	OFF

Wiring Diagram

INFOID:0000000007700214



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
23	GR	Fuel pump relay	**[Ignition switch: ON]** • For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0 V
			[Ignition switch: ON] • More than 1 second after turning ignition switch ON	Battery voltage (11 - 14 V)

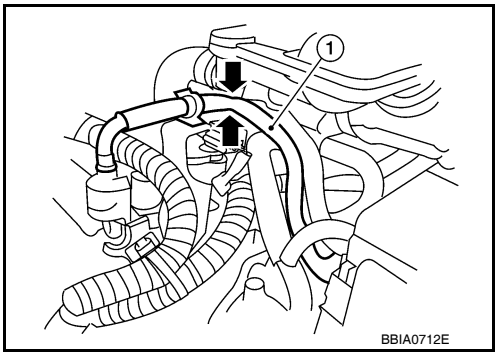
Diagnosis Procedure

INFOID:0000000007700215

1.CHECK OVERALL FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose (1) with two fingers.

- Illustration shows the view with intake air duct removed.



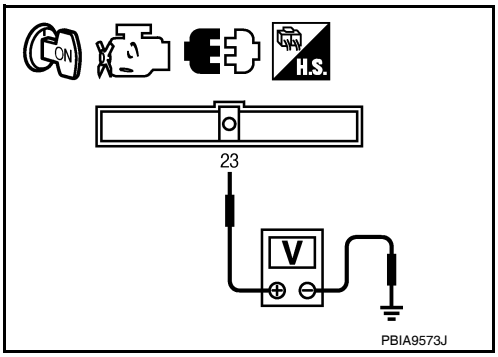
Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminal 23 and ground with CONSULT or tester.



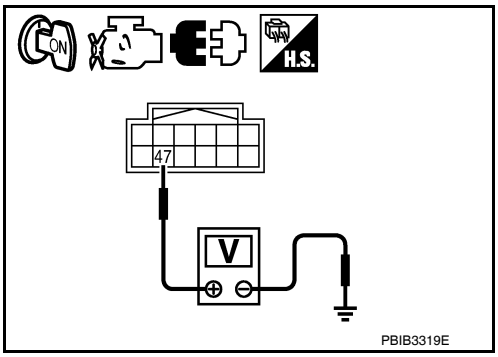
Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E46.
3. Turn ignition switch ON.
4. Check voltage between IPDM E/R terminal 47 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 11.

4.DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between IPDM E/R and ECM

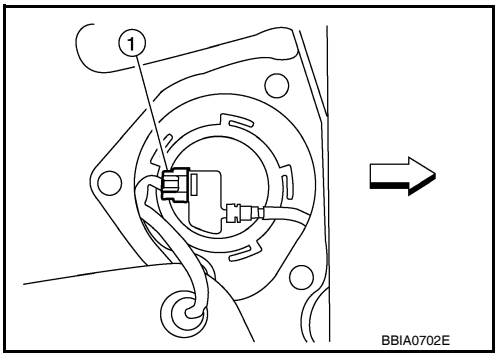
>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect “fuel level sensor unit and fuel pump” harness connector (1).

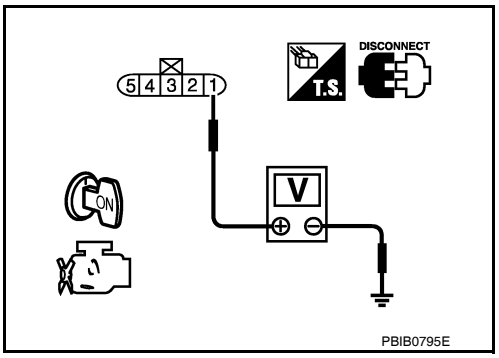
⇦ : Vehicle front

Illustration shows the view with inspection hole cover removed.



4. Turn ignition switch ON.
5. Check voltage between “fuel level sensor unit and fuel pump” terminal 1 and ground with CONSULT or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned ON.



OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK 15 A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15 A fuse.
3. Check 15 A fuse.

OK or NG

OK >> GO TO 7.
NG >> Replace fuse.

7. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E45.
2. Check harness continuity between IPDM E/R terminal 36 and “fuel level sensor unit and fuel pump” terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M69, E7
- Harness connectors M12, B101
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK FUEL PUMP GROUND CIRCUIT

1. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 3 and ground. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair or replace harness or connectors.

10. CHECK FUEL PUMP

Refer to EC-528, "Component Inspection".

OK or NG

OK >> GO TO 11.
NG >> Replace fuel pump. Refer to FL-6, "Component".

11. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair or replace harness or connectors.

Component Inspection

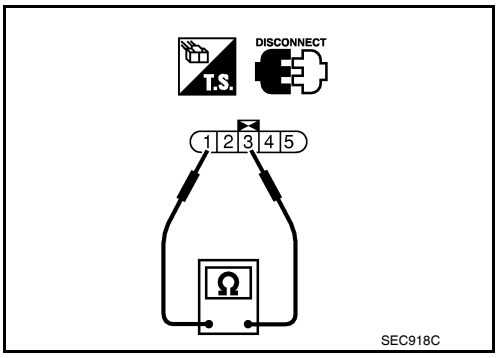
INFOID:0000000007700216

FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check resistance between “fuel level sensor unit and fuel pump” terminals 1 and 3.

Resistance: Approximately 0.2 - 5.0 Ω [at 25°C (77°F)]

3. If NG, replace “fuel level sensor unit and fuel pump”. Refer to FL-6, "Component".



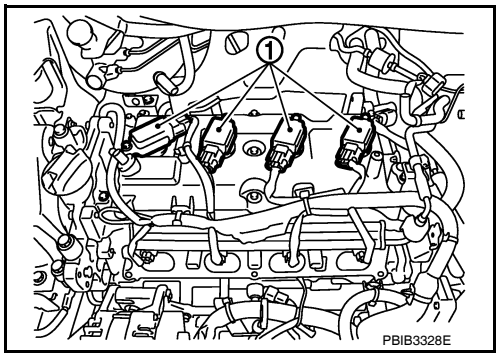
IGNITION SIGNAL

Component Description

INFOID:0000000007700218

IGNITION COIL & POWER TRANSISTOR

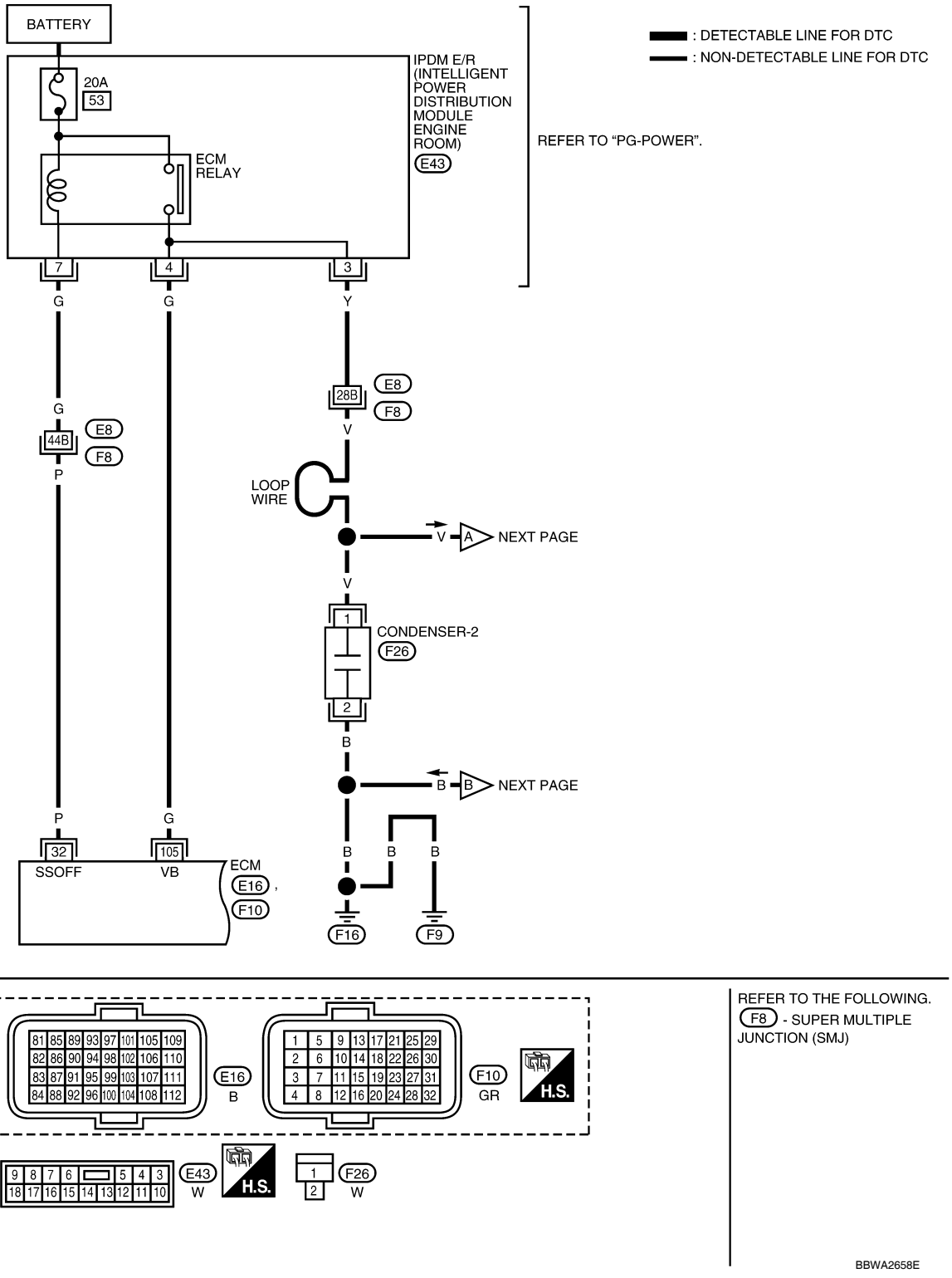
The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil (1) primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.



Wiring Diagram

INFOID:0000000007700219

EC-IGNSYS-01



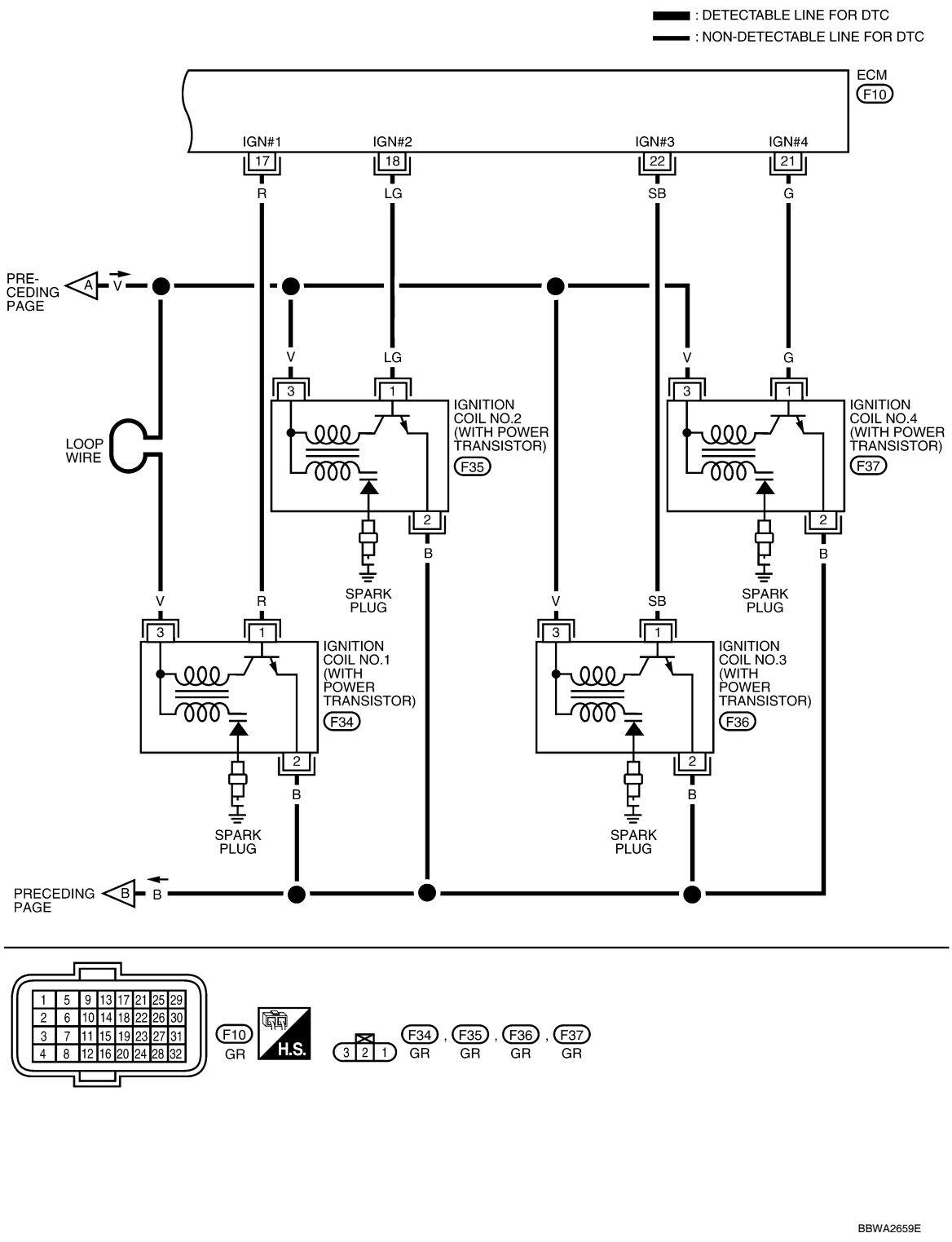
Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
32	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
105	G	Power supply for ECM	**[Ignition switch: ON]**	Battery voltage (11 - 14 V)

EC-IGNSYS-02



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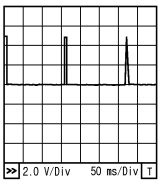
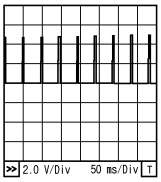
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
17 18 21 22	R LG G SB	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	**[Engine is running]** • **Warm-up condition** • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3 V★  PBIA9265J
			[Engine is running] • **Warm-up condition** • Engine speed: 2,500 rpm	0.2 - 0.5 V★  PBIA9266J

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:0000000007700220

1.CHECK ENGINE START

Turn ignition switch OFF, and restart engine.
Is engine running?

Yes or No

Yes (With CONSULT)>>GO TO 2.
Yes (Without CONSULT)>>GO TO 3.
No >> GO TO 4.

2.CHECK OVERALL FUNCTION

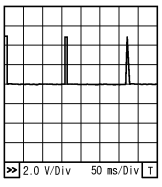
With CONSULT
1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT.
2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

3.CHECK OVERALL FUNCTION

Without CONSULT
1. Let engine idle.
2. Read the voltage signal between ECM terminals 17, 18, 21, 22 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.
   NOTE:
   The pulse cycle changes depending on rpm at idle.



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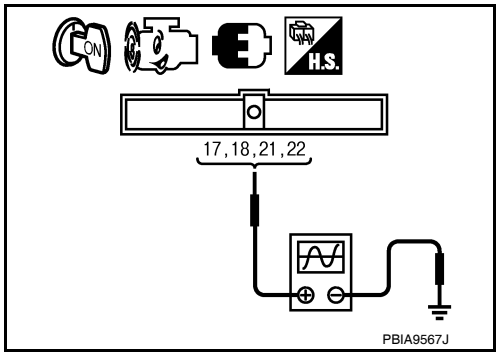


PBIA9567J

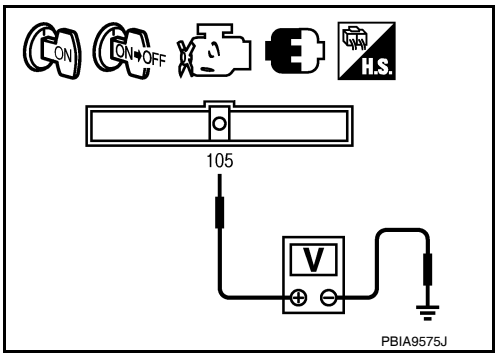
OK or NG

OK >> **INSPECTION END**

NG >> GO TO 10.

4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminal 105 and ground with CONSULT or tester.



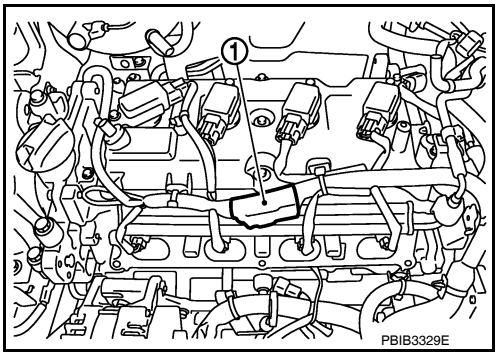
Voltage: Battery voltage

OK or NG

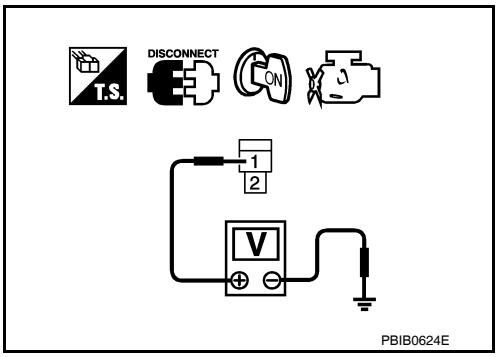
OK >> GO TO 5.
NG >> Proceed to EC-141.

5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 (1) harness connector.



3. Turn ignition switch ON.
4. Check voltage between condenser-2 terminal 1 and ground with CONSULT or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between IPDM E/R terminal 3 and condenser-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> Proceed to EC-141.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8

• Harness for open or short between IPDM E/R and condenser-2

>> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser-2 terminal 2 and ground.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to power in harness or connectors.

9.CHECK CONDENSER-2

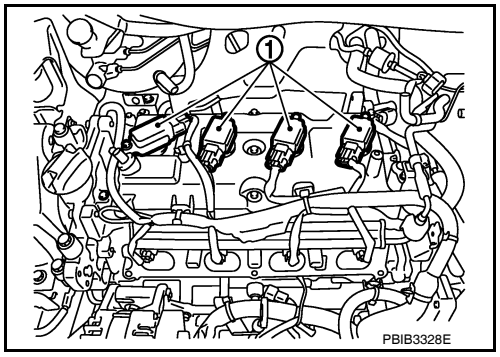
Refer to EC-536, "Component Inspection"

OK or NG

OK >> GO TO 10.
NG >> Replace condenser-2.

10.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil (1) harness connector.

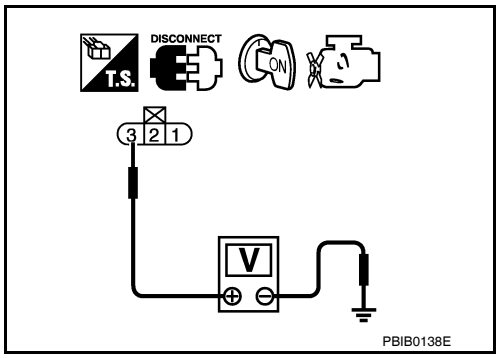


4. Turn ignition switch ON.
5. Check voltage between ignition coil terminal 3 and ground with CONSULT or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.



11.DETECT MALFUNCTIONING PART

Check the following.
• Harness connector F8
• Harness for open or short between ignition coil and harness connector F8

>> Repair or replace harness or connectors.

12.CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and ground.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 17, 18, 21, 22 and ignition coil terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-536, "Component Inspection".

OK or NG

OK >> GO TO 15.
NG >> Replace ignition coil with power transistor. Refer to EM-32, "Component".

15. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

>> **INSPECTION END**

Component Inspection

INFOID:0000000007700221

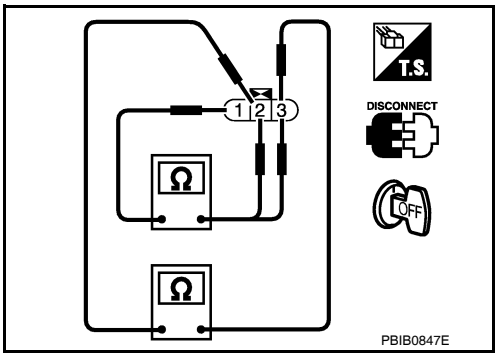
IGNITION COIL WITH POWER TRANSISTOR

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

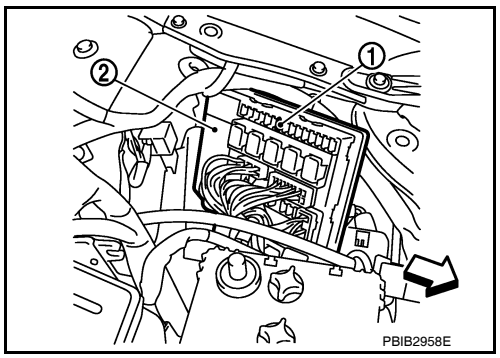
1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	



4. If NG, replace ignition coil with power transistor. Refer to EM-32, "Component".
   If OK, go to next step.
5. Turn ignition switch OFF.
6. Reconnect all harness connectors disconnected.

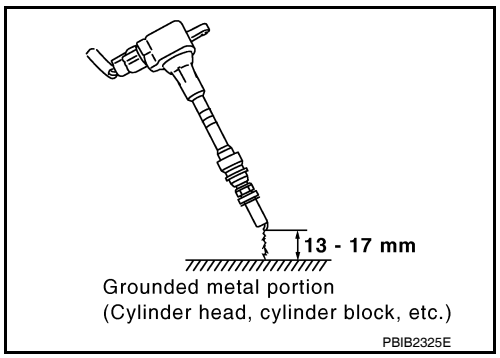
7. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.



⇦ : Vehicle front

NOTE:
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

8. Start engine.
9. After engine stalls, crank it two or three times to release all fuel pressure.
10. Turn ignition switch OFF.
11. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils. Refer to EM-32, "Component".
12. Remove ignition coil and spark plug of the cylinder to be checked.
13. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
14. Connect spark plug and harness connector to ignition coil.
15. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 - 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
16. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

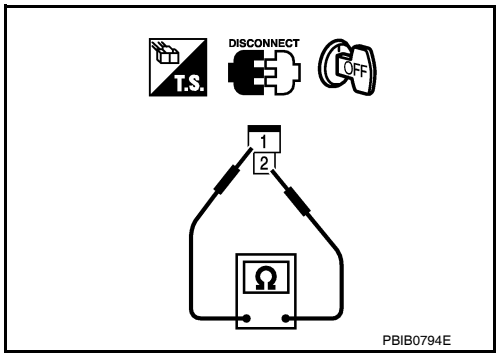
CAUTION:
- **Do not approach to the spark plug and the ignition coil within 50 cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

17. If NG, replace ignition coil with power transistor. Refer to EM-32, "Component".

CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Check resistance between condenser-2 terminals 1 and 2.



Resistance: Above 1 MΩ [at 25°C (77°F)]

4. If NG, replace condenser-2.

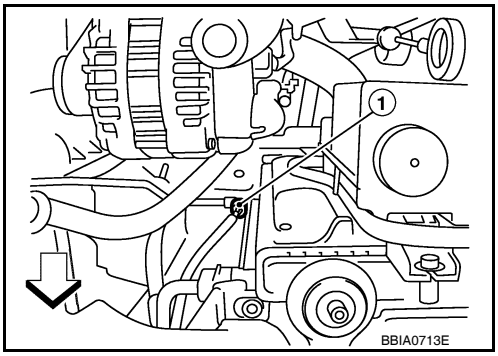
REFRIGERANT PRESSURE SENSOR

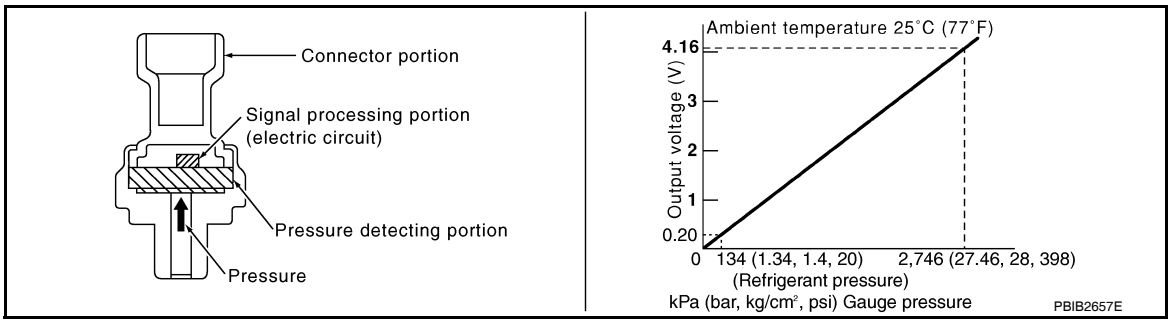
Component Description

INFOID:0000000007700223

The refrigerant pressure sensor (1) is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

⇦ : Vehicle front



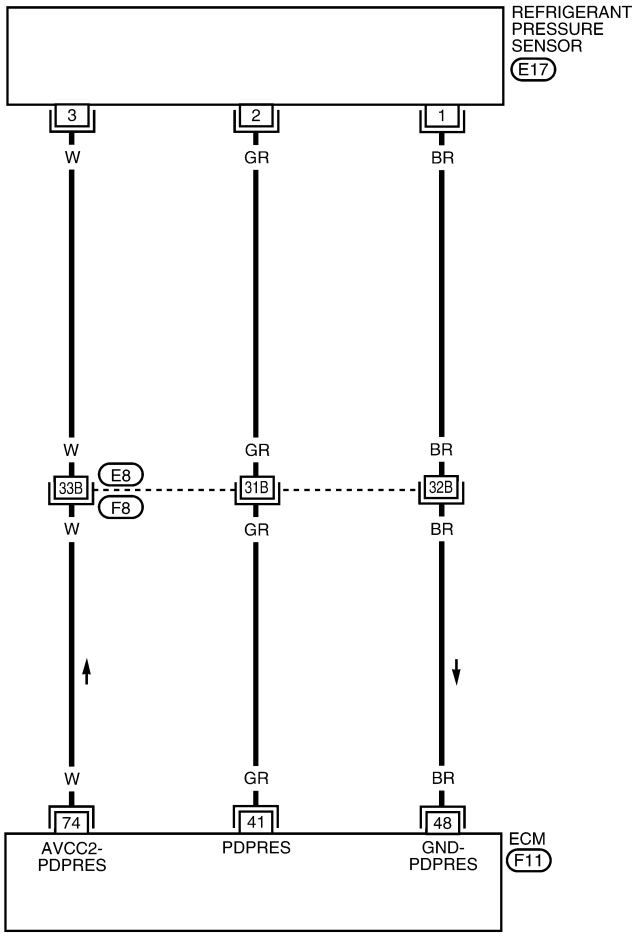


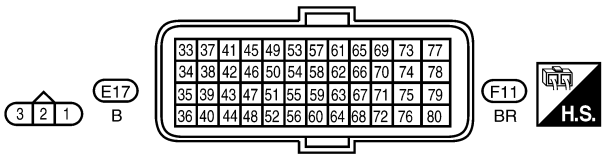
Wiring Diagram

INFOID:0000000007700224

EC-RP/SEN-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

BBWA2662E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Terminal No.	Wire color	Item	Condition	Data (DC voltage)
41	GR	Refrigerant pressure sensor	**[Engine is running]** • **Warm-up condition** • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V
48	BR	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** • **Warm-up condition** • Idle speed	Approximately 0 V
74	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5.0 V

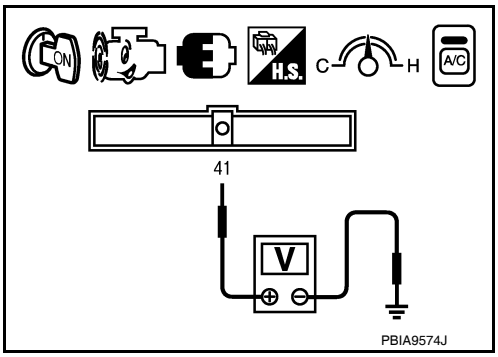
Diagnosis Procedure

INFOID:0000000007700225

1.CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check voltage between ECM terminal 41 and ground with CONSULT or tester.

Voltage: 1.0 - 4.0 V

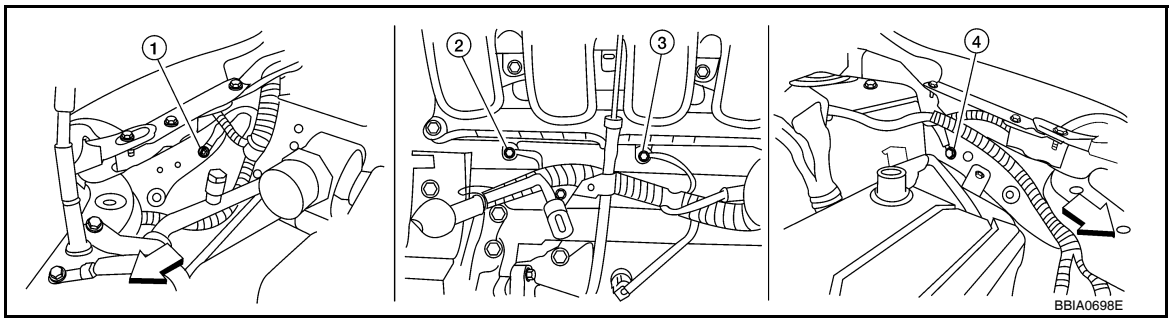


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2.CHECK GROUND CONNECTIONS

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine and turn ignition switch OFF.
3. Loosen and retighten ground screw on the body.
   Refer to EC-146, "Ground Inspection".



1. Body ground E24
2. Engine ground F9
3. Engine ground F16
4. Body ground E15

⇦: Vehicle front

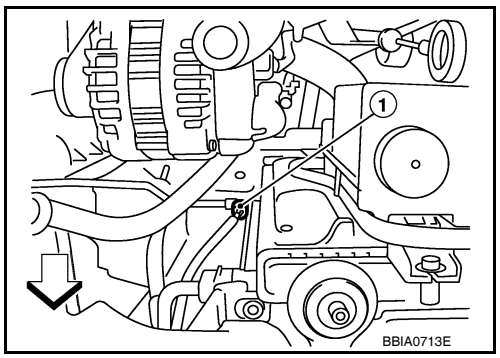
OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

3.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

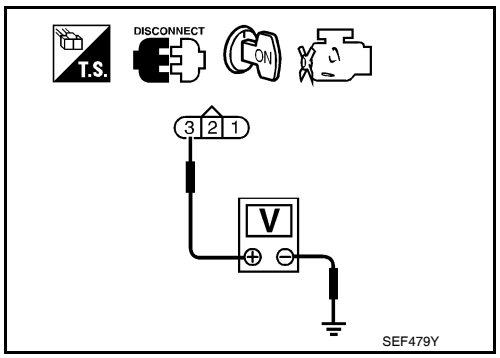
1. Disconnect refrigerant pressure sensor (1) harness connector.

⇦ : Vehicle front



2. Turn ignition switch ON.
3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT or tester.

Voltage: Approximately 5.0 V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 48. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between refrigerant pressure sensor terminal 2 and ECM terminal 41. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E8, F8
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-140.

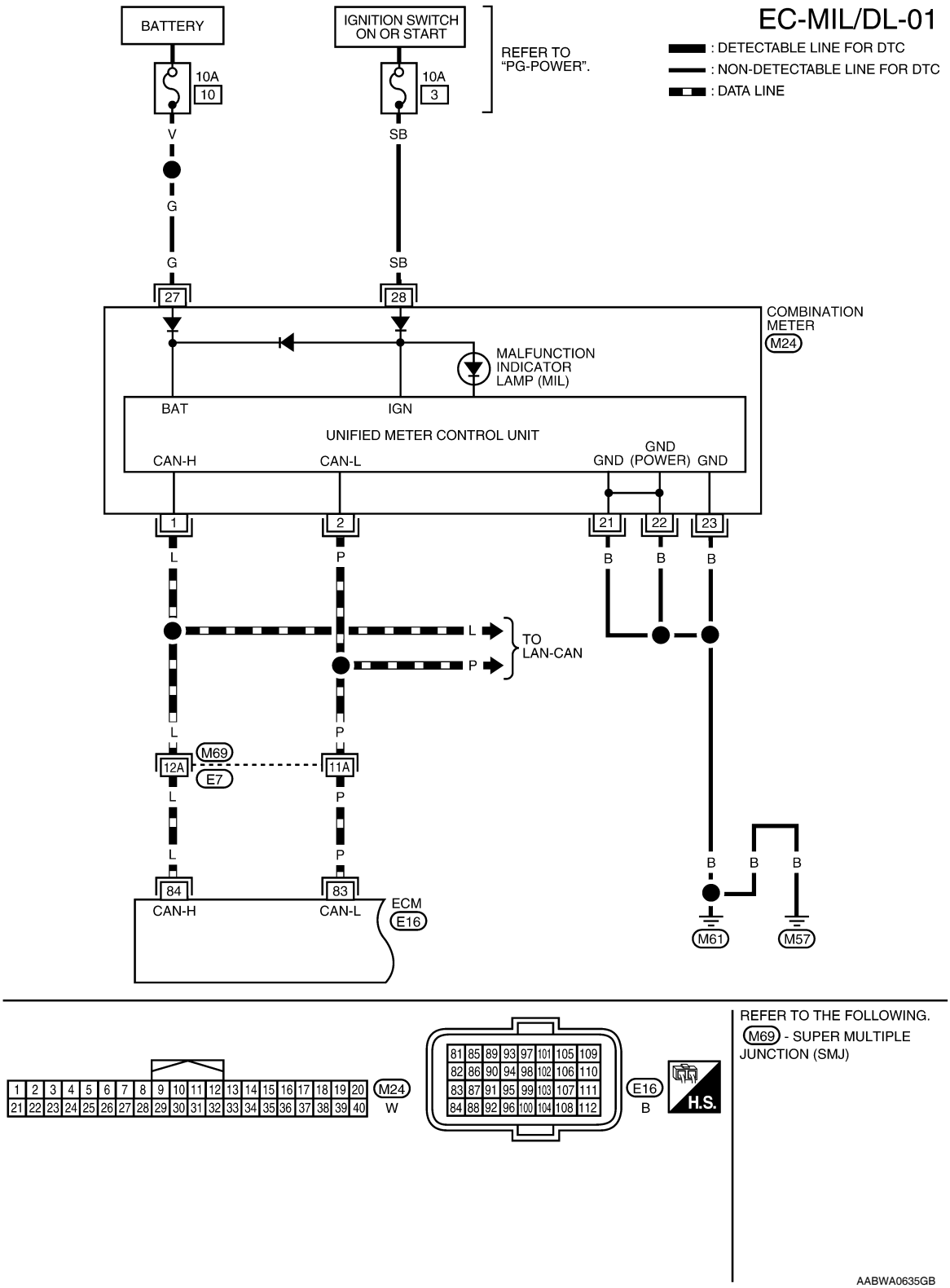
OK or NG

OK >> Replace refrigerant pressure sensor. Refer to MTC-86, "Removal and Installation of Refrigerant Pressure Sensor".
NG >> Repair or replace.

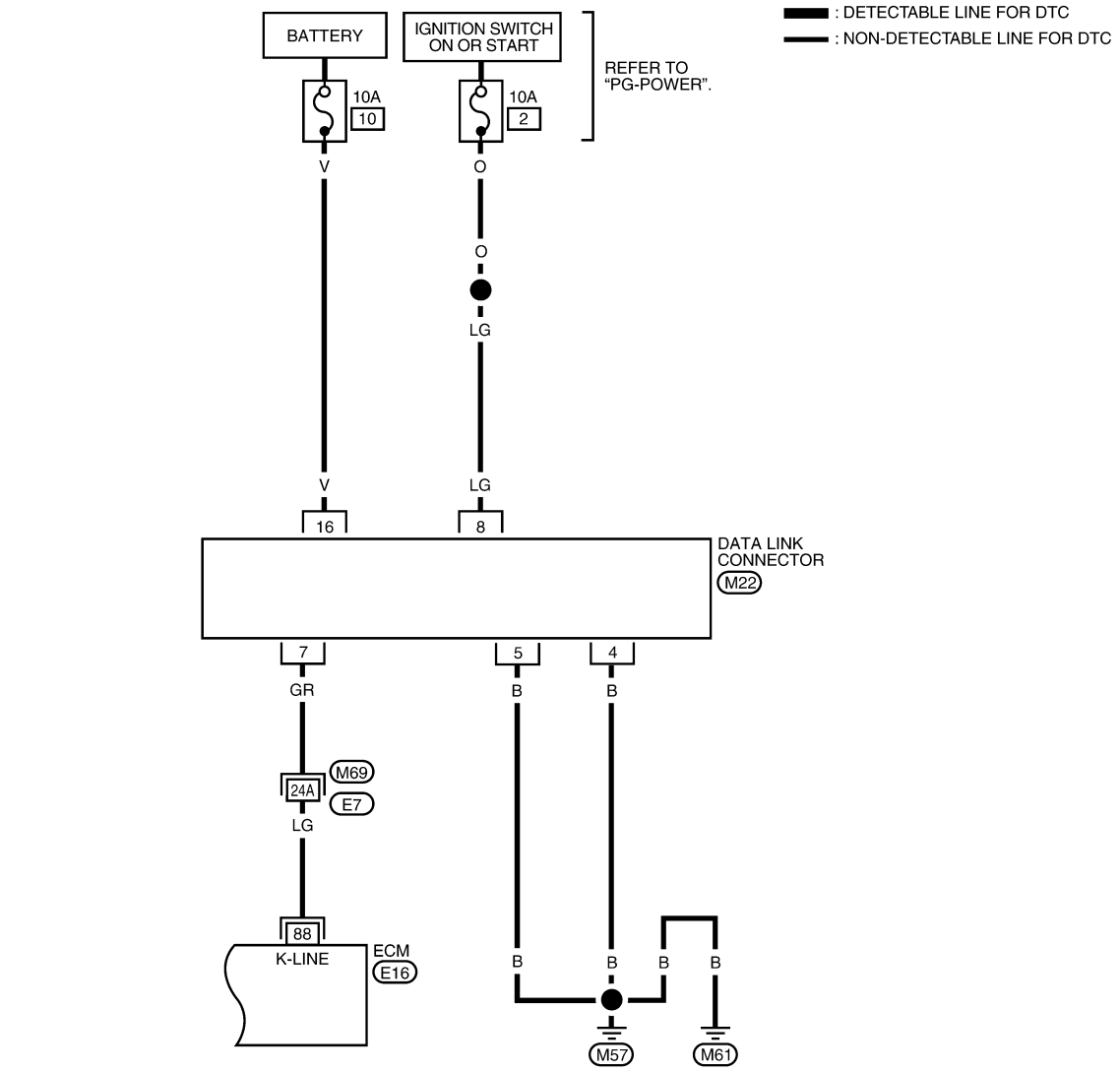
MIL AND DATA LINK CONNECTOR

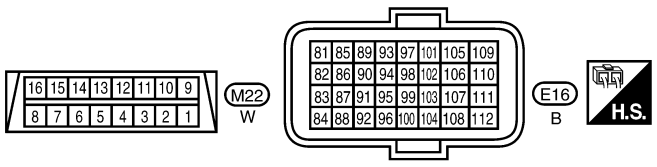
Wiring Diagram

INFOID:0000000007700227



EC-MIL/DL-02





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

AABWA0638GB

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure

INFOID:0000000007700228

Fuel pressure at idle	Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

Idle Speed and Ignition Timing

INFOID:0000000007700229

Target idle speed	A/T	No load* (in P or N position)	700 ± 50 rpm
	CVT	No load* (In P or N position)	
	M/T	No load* (in Neutral position)	
Air conditioner: ON	A/T	In P or N position	850 rpm or more
	CVT	In P or N position	
	M/T	In Neutral position	
Ignition timing	A/T	In P or N position	13 ± 5° BTDC
	CVT	In P or N position	
	M/T	In Neutral position	

*: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:0000000007700230

	Calculated load value (Using CONSULT or GST)
At idle	10 - 35 %
At 2,500 rpm	10 - 35 %

Mass Air Flow Sensor

INFOID:0000000007700231

Supply voltage	Battery voltage (11 - 14 V)
Output voltage at idle	1.0 - 1.3* V
Mass air flow (Using CONSULT or GST)	1.0 - 4.0 g/s at idle* 2.0 - 10.0 g/s at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Intake Air Temperature Sensor

INFOID:0000000007700232

Temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

Engine Coolant Temperature Sensor

INFOID:0000000007700233

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Air Fuel Ratio (A/F) Sensor 1 Heater

INFOID:0000000007700234

Resistance [at 25°C (77°F)]	1.8 - 2.44 Ω

Heated Oxygen sensor 2 Heater

INFOID:0000000007700235

Resistance [at 25°C (77°F)]	3.4 - 4.4 Ω

Crankshaft Position Sensor (POS)

INFOID:0000000007700236

Refer to EC-307, "Component Inspection".

Camshaft Position Sensor (PHASE)

INFOID:0000000007700237

Refer to EC-312, "Component Inspection".

Throttle Control Motor

INFOID:0000000007700238

Resistance [at 25°C (77°F)]	Approximately 1 - 15 Ω

Fuel Injector

INFOID:0000000007700239

Resistance [at 10 - 60°C (50 - 140°F)]	11.4 - 14.5 Ω

Fuel Pump

INFOID:0000000007700240

Resistance [at 25°C (77°F)]	Approximately 0.2 - 5.0 Ω

SECTION FL
FUEL SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007332040

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007332041

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

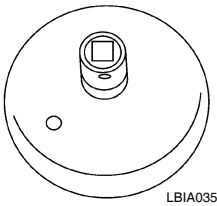
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Special Service Tool

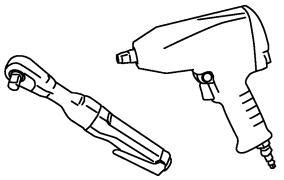
INFOID:0000000007332042

The actual shapes of the Kent-Moore tools may differ from those of the special tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV991J0090 (J-46214) Fuel tank lock ring tool  LBIA0353E	Removing and installing fuel tank lock ring

Commercial Service Tool

INFOID:0000000007332043

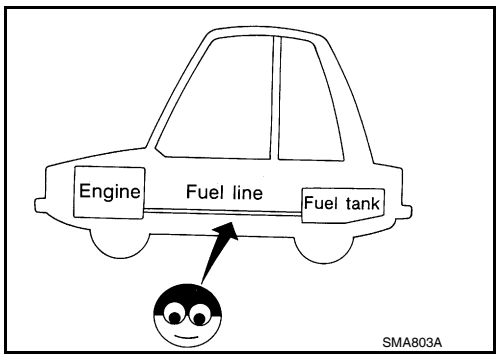
Tool name	Description
Power tools  PBIC0190E	Loosening bolts and nuts

FUEL SYSTEM

Checking Fuel Line

INFOID:0000000007332044

Inspect fuel lines, fuel filler cap and fuel tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



General Precaution

INFOID:0000000007332045

WARNING:

When replacing fuel line parts, be sure to observe the following.

- **Put a “CAUTION: FLAMMABLE” sign in the work area.**
- **Be sure to work in a well ventilated area and have a CO_2 fire extinguisher.**
- **Do not smoke while working on the fuel system. Keep open flames and sparks away from the work area.**
- **Put drained fuel in an explosion-proof container and put the lid on securely. Keep the container in safe area.**

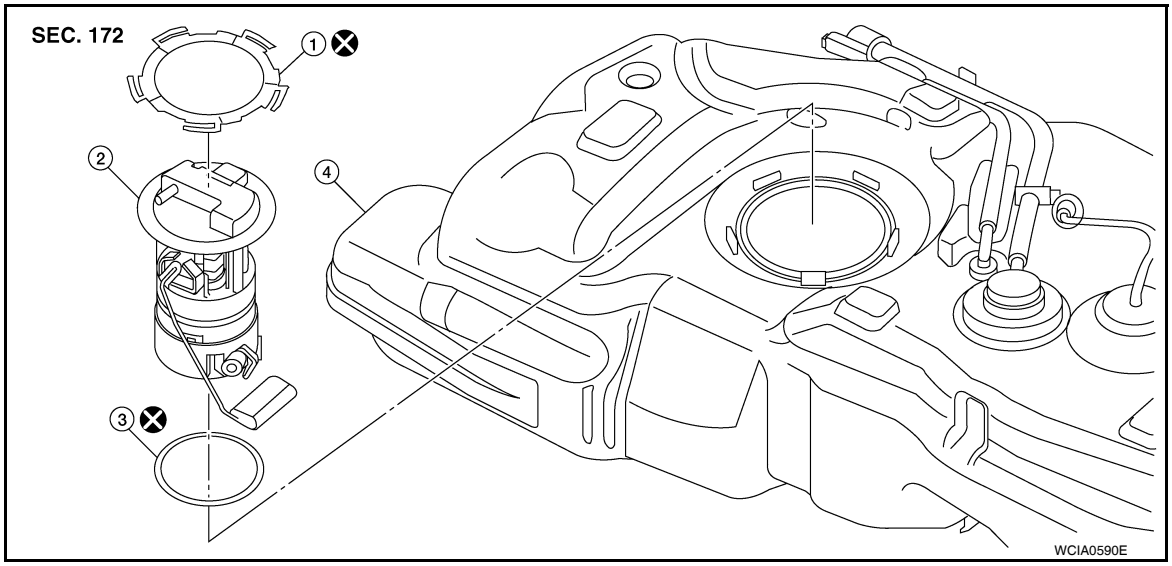
CAUTION:

- **Use gasoline required by the regulations for octane number. Refer to GI-4, "Precaution for Fuel (Unleaded Regular Gasoline Recommended)".**
- **Before removing fuel line parts, perform the following procedures:**
- **Release fuel pressure from the fuel lines. Refer to EC-89, "Fuel Pressure Check".**
- **Disconnect the battery ground cable.**
- **Always replace O-rings and clamps with new ones.**
- **Do not kink or twist tubes when they are being installed.**
- **Perform work on level surface.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
- **After connecting fuel tube quick connectors, make sure quick connectors are secure. Ensure that connector and resin tube do not contact any adjacent parts.**
- **After installing tubes, make sure there is no fuel leakage at connections in the following steps.**
- **Apply fuel pressure to fuel lines by turning ignition switch ON (without starting the engine). Then check for fuel leaks at the fuel tube connections.**
- **Start engine and rev it up and check for fuel leaks at connections.**
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **For servicing “Evaporative Emission System” parts, refer to FL-15, "Removal and Installation".**
- **For servicing "On Board Refueling Vapor Recovery (ORVR)" parts, refer to EC-40, "Component Inspection".**

FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY

Component

INFOID:0000000007332046



1. Lock ring
2. Fuel level sensor unit, fuel filter and fuel pump assembly
3. O-ring seal
4. Fuel tank

Removal and Installation

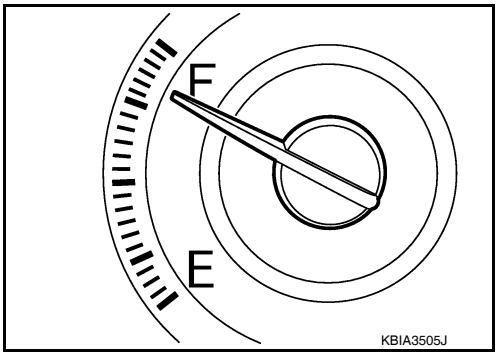
INFOID:0000000007332047

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

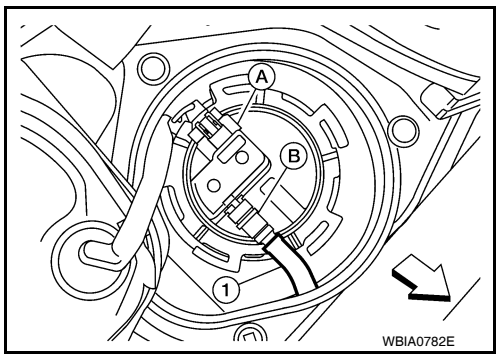
WARNING:
Be sure to read “General Precautions” before working on the fuel system. Refer to FL-5, "General Precaution".

1. Check fuel level with the vehicle on a level surface. If the fuel gauge indicates more than the level as shown (7/8 full), drain fuel from the fuel tank until the fuel gauge indicates level as shown (7/8 full).
   NOTE:
   Fuel will be spilled when removing fuel pump assembly if fuel level is above the fuel pump assembly installation surface.
   - As a guide, fuel level is at the level as shown or below when approximately 12 ℓ (3 1/8 US gal, 2 5/8 Imp gal) of fuel is drained from a full fuel tank.
   - In case fuel pump does not operate, perform the following procedure.



a. Insert fuel tubing of less than 25 mm (0.98 in) in diameter into fuel filler tube through fuel filler opening to drain fuel from fuel filler tube.
b. Disconnect fuel filler hose from fuel filler tube. Refer to FL-10.
c. Insert fuel tubing into fuel tank through fuel filler hose to drain fuel from fuel tank.
2. Open fuel door and unscrew the fuel filler cap to release the pressure inside the fuel tank.
3. Release the fuel pressure from the fuel lines. Refer to EC-89, "Fuel Pressure Check".
4. Disconnect the negative battery cable. Refer to SC-7, "Removal and Installation".
5. Remove rear seat bottom. Refer to SE-22, "Removal and Installation".
6. Turn the four retainers 90° in a clockwise direction and remove the fuel pump inspection hole cover.

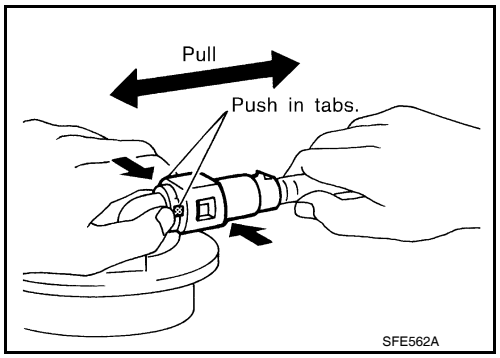
7. Disconnect electrical connector (A) and fuel feed hose quick connector (B).
   - Fuel feed hose (1)
   - ⇦ :Vehicle front

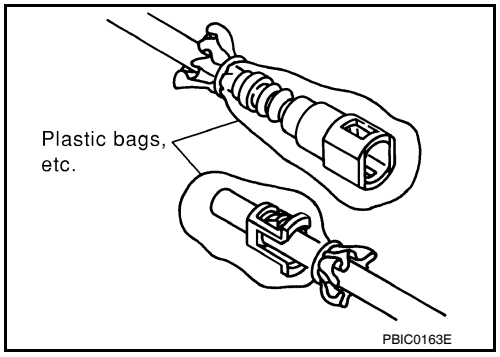


   - Disconnect the quick connector using the following procedure.

   - Hold the sides of the connector, push in tabs and pull out the tube.
   - If quick connector and tube on fuel pump assembly are stuck, push and pull several times until they move. Disconnect them by pulling.

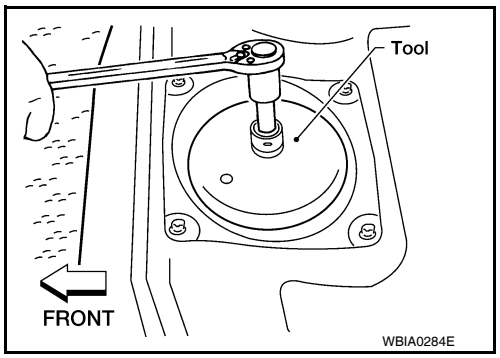
   CAUTION:
   - **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
   - **Do not use any tools to remove the quick connector.**
   - **Keep resin tube away from heat. Be especially careful when welding near the resin tube.**
   - **Prevent acid liquid such as battery electrolyte, from getting on resin tube.**
   - **Do not bend or twist resin tube during installation and removal.**
   - **To keep the connecting portion clean, free of foreign materials and to avoid damage, cover them completely with plastic bags or something similar.**
   - **Do not insert plug to prevent damage to O-ring seal in quick connector.**





8. Remove the lock ring using Tool as shown.

   Tool number : KV991J0090 (J-46214)



9. Remove fuel level sensor unit, fuel filter and fuel pump assembly.

   CAUTION:
   - **Discard the o-ring seal, do not reuse the O-ring seal.**
   - **Do not bend float arm during removal.**
   - **Do not allow foreign materials to fall into fuel tank. Use a lint free cloth when handling components.**
   - **Avoid impacts such as dropping when handling components.**

INSPECTION AFTER REMOVAL

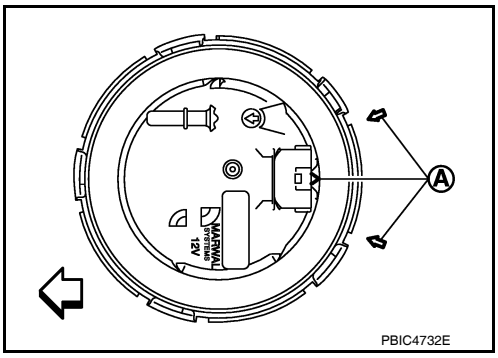
Make sure that the fuel level sensor unit, fuel filter and fuel pump is free from defects and foreign materials.

INSTALLATION

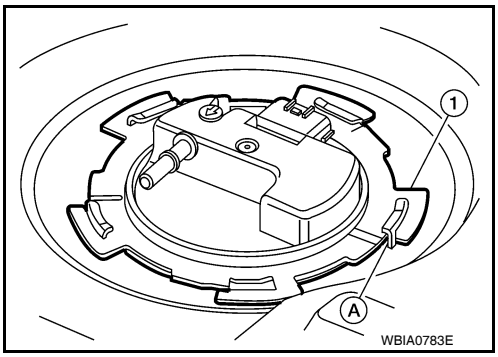
Installation is in the reverse order of removal.

Fuel Level Sensor Unit, Fuel Filter and Fuel Pump Assembly

1. Install O-ring seal to fuel tank without twisting.
2. Install fuel level sensor unit by aligning mating marks (A) on fuel tank and fuel level sensor unit as shown.
   - ⇦: Front



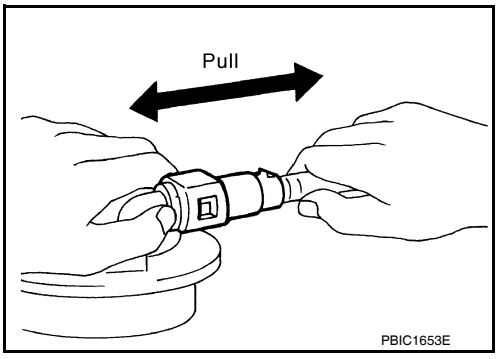
- Turn the lock ring (1) until the lock ring is fully rotated into the fuel tank lock tabs (A) as shown.



Quick Connector

Connect fuel feed tube quick connector using the following procedure.

1. Check the connection for damage or any foreign materials.
2. Align the connector with the tube, then insert the connector straight into the tube until a “click” sound is heard.
3. After connecting, make sure that the connection is secure using the following procedure.
   - Visually confirm that the two retainer tabs are secured to the connector.
   - Pull the tube and the connector to make sure they are securely connected.



4. Connect electrical harness connector.

Inspection Hole Cover

- Before installing inspection hole cover, confirm that there are no fuel leaks. Refer to "INSPECTION AFTER INSTALLATION".

1. Install inspection hole cover with the front mark (arrow) facing front of vehicle.
2. Lock clips by turning counterclockwise.

INSPECTION AFTER INSTALLATION

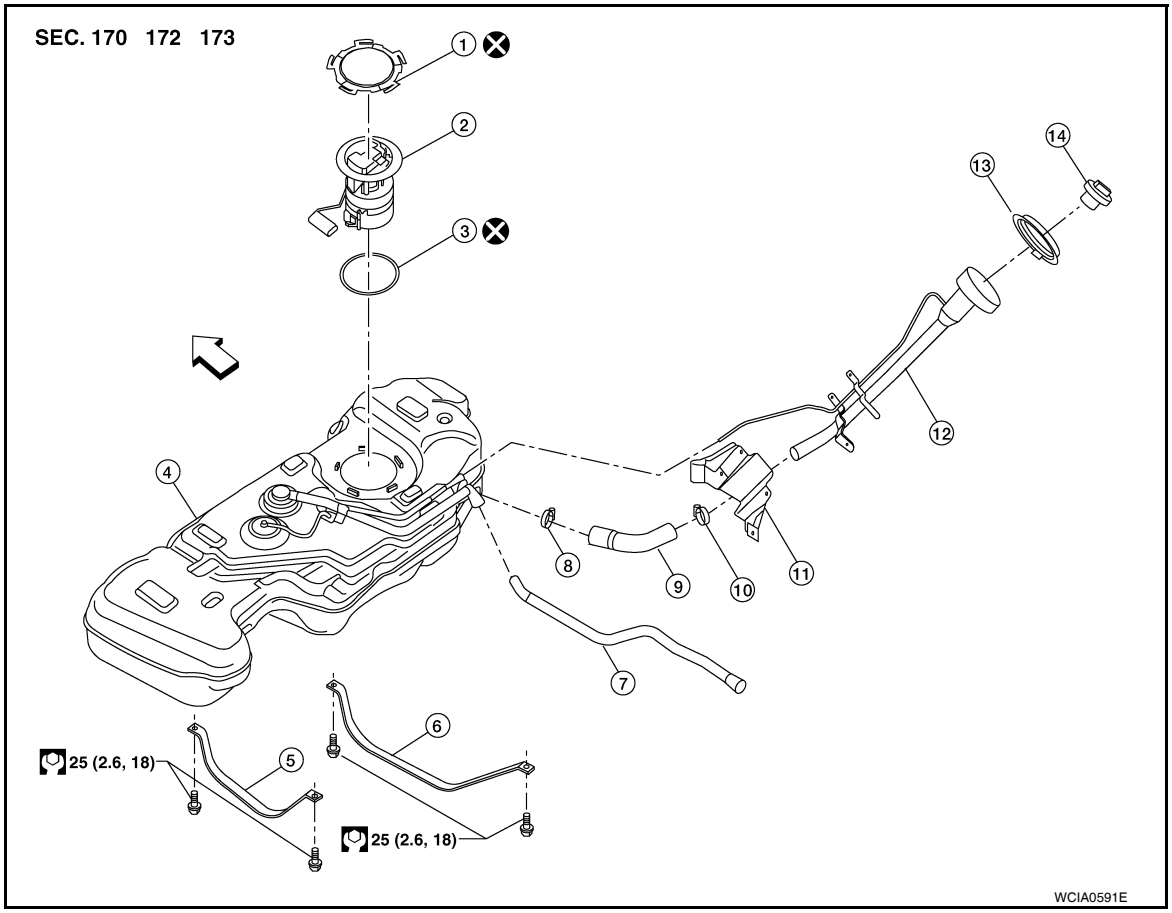
Use the following procedure to check for fuel leaks.

1. Turn ignition switch “ON” (without starting the engine), to check the connections for fuel leaks with the electric fuel pump applying pressure to the fuel piping.
2. Start the engine and let it idle to check that there are no fuel leaks at the fuel system connections.

FUEL TANK

Component

INFOID:0000000007332048



1. Lock ring	2. Fuel pump	3. O-ring seal
4. Fuel tank	5. Fuel tank band (LH)	6. Fuel tank band (RH)
7. EVAP hose	8. Hose clamp	9. Fuel filler hose
10. Hose clamp	11. Fuel filler pipe shield	12. Fuel filler tube
13. Grommet	14. Fuel filler cap	⇦ Front of vehicle

Removal and Installation

INFOID:0000000007332049

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

WARNING:
Be sure to read “General Precautions” when working on the fuel system. Refer to FL-5, "General Precaution".

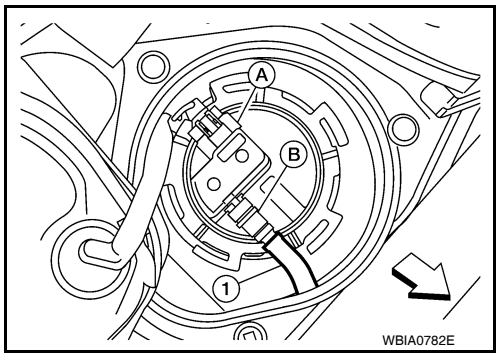
1. Drain fuel from fuel tank if necessary. Refer to FL-6, "Removal and Installation".
   CAUTION:
   - **Because fuel tank becomes unstable when installing/removing, fuel should be drained if the level exceeds specification FL-6, "Removal and Installation".**
   - **Situate vehicle on a flat and solid surface.**
2. Open fuel door and unscrew the fuel filler cap to release the pressure inside the fuel tank.
3. Release the fuel pressure from the fuel lines. Refer to EC-89, "Fuel Pressure Check".
4. Remove rear seat bottom. Refer to SE-22, "Removal and Installation".

5. Turn the three retainers 90° in a clockwise direction and remove the fuel pump inspection hole cover.

Disconnect electrical connector (A) and fuel feed hose quick connector (B).

- Fuel feed hose (1)
-

⇦ : Vehicle front

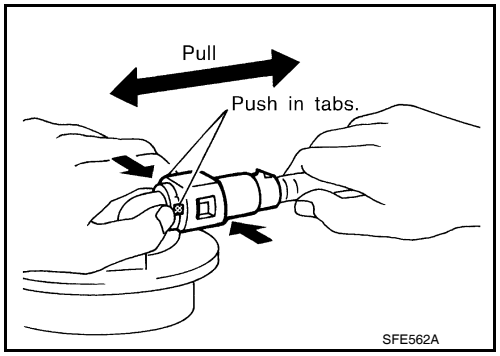


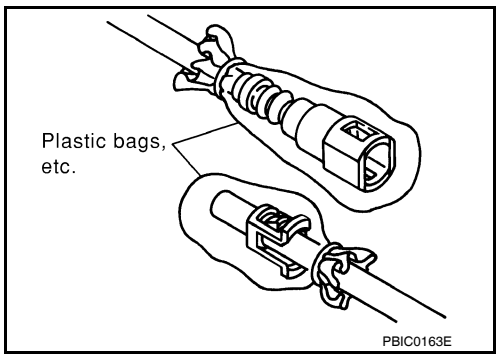
- Disconnect the quick connector using the following procedure.

- Hold the sides of the connector, push in tabs and pull out the tube.
- If quick connector and tube on fuel pump assembly are stuck, push and pull several times until they move. Disconnect them by pulling.

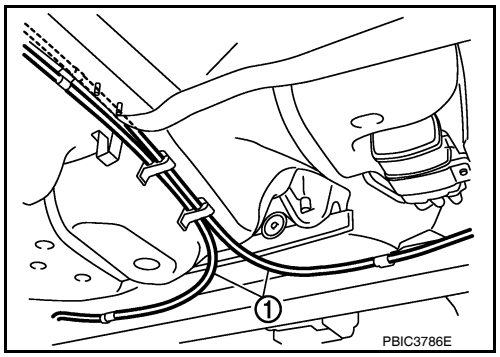
CAUTION:

- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep resin tube away from heat. Be especially careful when welding near the resin tube.**
- **Prevent acid liquid such as battery electrolyte, from getting on resin tube.**
- **Do not bend or twist resin tube during installation and removal.**
- **To keep the connecting portion clean, free of foreign materials and to avoid damage, cover them completely with plastic bags or something similar.**
- **Do not insert plug to prevent damage to O-ring seal in quick connector.**

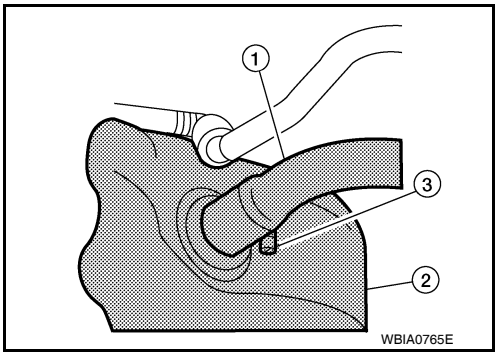




6. Remove center muffler. Refer to EX-5, "Component".
7. Remove exhaust heat shields.
8. Disconnect parking brake cables (1) from the lower surface of fuel tank and axle and position the parking brake cables (1) out of the way.



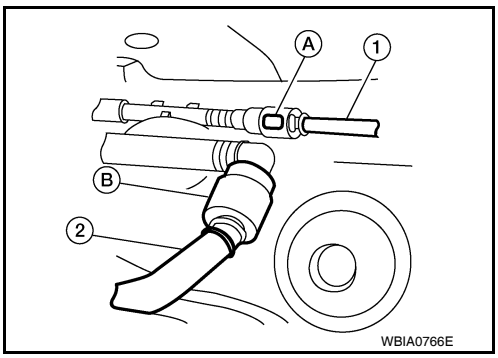
9. Loosen fuel filler hose clamp (3) and remove fuel filler hose (1) from fuel tank (2).
CAUTION:
When removing fuel filler hose (1) at the fuel filler tube, mark components for alignment.



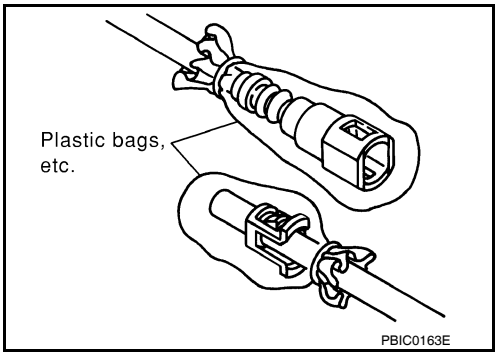
10. Remove vent hose (1) and EVAP hose (2) at rear of fuel tank.
• Disconnect vent hose and EVAP hose quick connectors using the following procedures.

a. Pinch retaining tabs (A) of vent hose quick connector and remove vent hose (1).

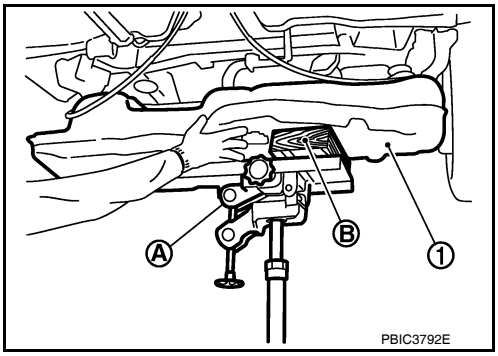
b. Slide sleeve (B) of EVAP hose quick connector and remove EVAP hose (2).
• If hoses are stuck, push and pull several times until they move freely, and disconnect.



CAUTION:
- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte, from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**
- **Do not insert plug that may cause damage to O-ring seal in quick connector.**
- **To keep the connecting portion clean and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**



11. Support center of fuel tank (1) with transmission jack (A).
CAUTION:
Securely support the fuel tank with a suitable tool (B).
12. Remove fuel tank bands (RH and LH).
13. Lower transmission jack carefully to remove fuel tank while supporting it by hand.
CAUTION:
Fuel tank may be in an unstable position because of the shape of fuel tank bottom. Be sure to support tank securely.



INSTALLATION

Installation is in the reverse order of removal.

EVAP Canister

1. Check the connection for damage or any foreign materials.
2. Align the connector with the tube, then insert the connector straight into the tube until a “click” sound is heard.
3. After connecting, make sure that the connection is secure.
   • Pull the tube and the connector to make sure they are securely connected.

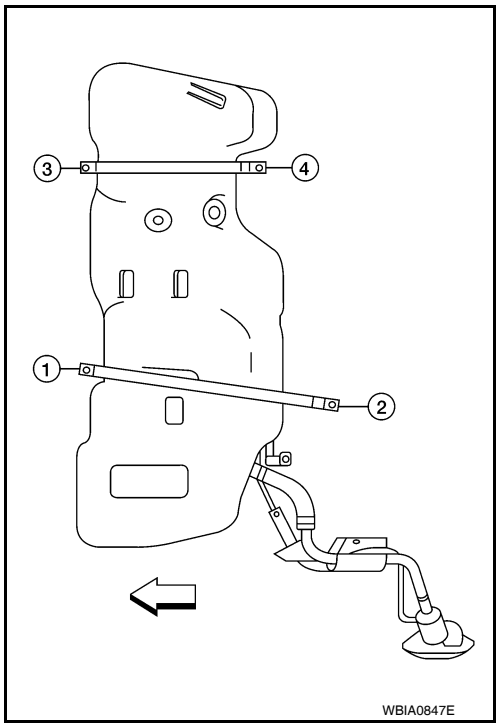
Fuel Tank Bands

Install the fuel tank bands in the proper position by referring to the identification stamp mark “R” and “L” on the end

1. While supporting the fuel tank, install bolts 1, 3 and 4 to support the tank, but do not fully tighten.

   ⇦ **: Front**

2. Install bolt 2 while positioning the fuel tank toward the front of the vehicle. Tighten bolt 2 to specified torque.
3. Tighten bolts 1, 3 and 4 to specified torque.



Fuel Filler Hose

CAUTION:

Do not allow fuel filler tube to contact the suspension during installation.

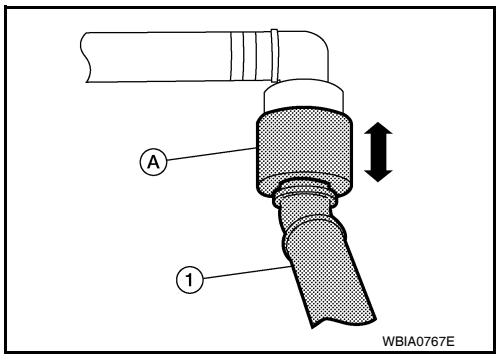
• Insert fuel filler hose to the length below.

Fuel filler install length : 35mm (1.38 in)

• Be sure hose clamp is not placed on swelled area of fuel filler tube.

EVAP Hose

1. Check connections for damage or foreign material.
2. Align the matching quick connector (A) with the center of EVAP hose (1), and insert quick connector (A) straight until it clicks.
3. After connecting, pull on quick connector (A) and EVAP hose (1) by hand. Make sure connections are secure.



INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

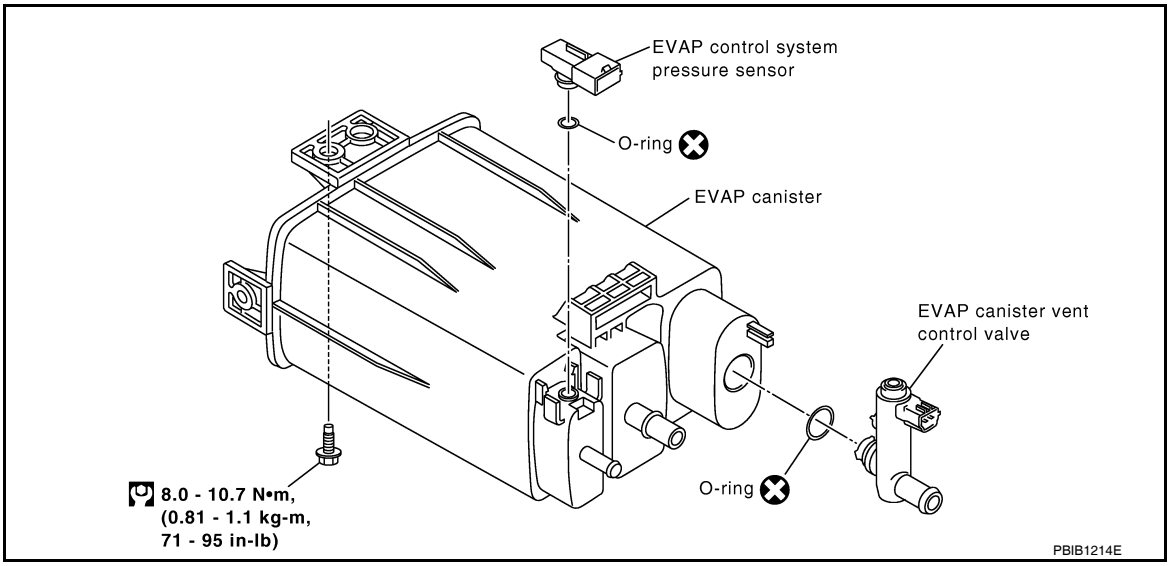
1. Turn ignition switch “ON” (without starting the engine), to check the connections for fuel leaks with the electric fuel pump applying pressure to the fuel piping.

2. Start the engine and let it idle to check that there are no fuel leaks at the fuel system connections.

EVAPORATIVE EMISSION SYSTEM

Exploded View

INFOID:0000000007332052



Removal and Installation

INFOID:0000000007332053

EVAP CANISTER

Removal

1. Remove EVAP canister cover.
2. Disconnect the EVAP control pressure sensor connector.
3. Disconnect EVAP canister purge hose, and drain the hose.
4. Remove the EVAP canister retaining bolt.
5. Disconnect fuel tank EVAP breather hose.
6. Disconnect EVAP canister vent control valve connector.
7. Disconnect the EVAP canister vent control valve hose.
8. Remove the EVAP canister.
9. Remove the EVAP vent control valve and O-ring, if necessary.

Installation

Installation is in the reverse order of removal.

CAUTION:

Do not reuse O-rings.

EVAP CANISTER CONTROL PRESSURE SENSOR

Removal

1. Remove EVAP canister cover.
2. Disconnect the EVAP control system pressure sensor connector.
3. Remove the EVAP control system pressure sensor and O-ring.

Installation

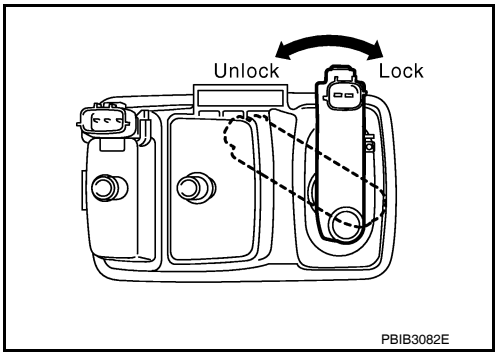
Installation is in the reverse order of removal.

CAUTION:

Do not reuse O-rings.

EVAP CANISTER VENT CONTROL VALVE

1. Remove EVAP canister cover.
2. Disconnect EVAP canister vent control valve connector.
3. Disconnect the EVAP canister purge hose, and drain the hose.
4. Turn EVAP canister vent control valve counterclockwise to unlock.
5. Remove the EVAP canister vent control valve.



Installation

Installation is in the reverse order of removal.

CAUTION:

Do not reuse O-rings.

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:0000000007332054

FUEL TANK

Unit: ℓ (US gal, Imp gal)

Fuel tank capacity	50.0 (13 1/4, 11)
Fuel recommendation	Refer to MA-13

SECTION EX
EXHAUST SYSTEM

CONTENTS

SERVICE INFORMATION 2

PRECAUTIONS 2
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 2
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 2

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Special Service Tool 4
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EXHAUST SYSTEM 5
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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007768423

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007768424

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

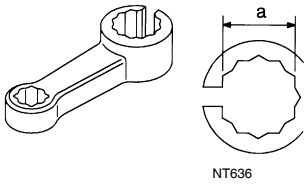
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Special Service Tool

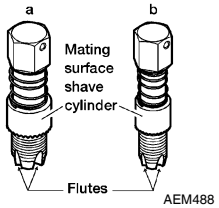
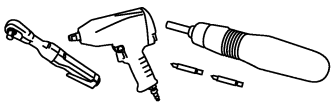
INFOID:0000000007768425

The actual shapes of the Kent-Moore tools may differ from those of the special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10114400 (J-38365) Heated oxygen sensor wrench  NT636	Loosening or tightening heated oxygen sensor **a: 22 mm (0.87 in)**

Commercial Service Tool

INFOID:0000000007768426

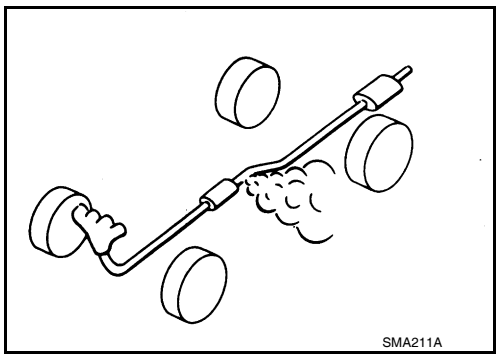
(Kent-Moore No.) Tool name	Description
(J-43897-18) (J-43897-12) Heated oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing new heated oxygen and Air fuel ratio sensors (Use with anti-seize lubricant shown below.) **a: 18 mm (0.71 in) diameter for zirconia heated oxygen sensor** **b: 12 mm (0.47 in) diameter for titania heated oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907) AEM489	Lubricating heated oxygen sensor thread cleaner when reconditioning exhaust system threads
Power tool  PIIB1407E	Loosening bolts, screws and nuts

EXHAUST SYSTEM

Checking Exhaust System

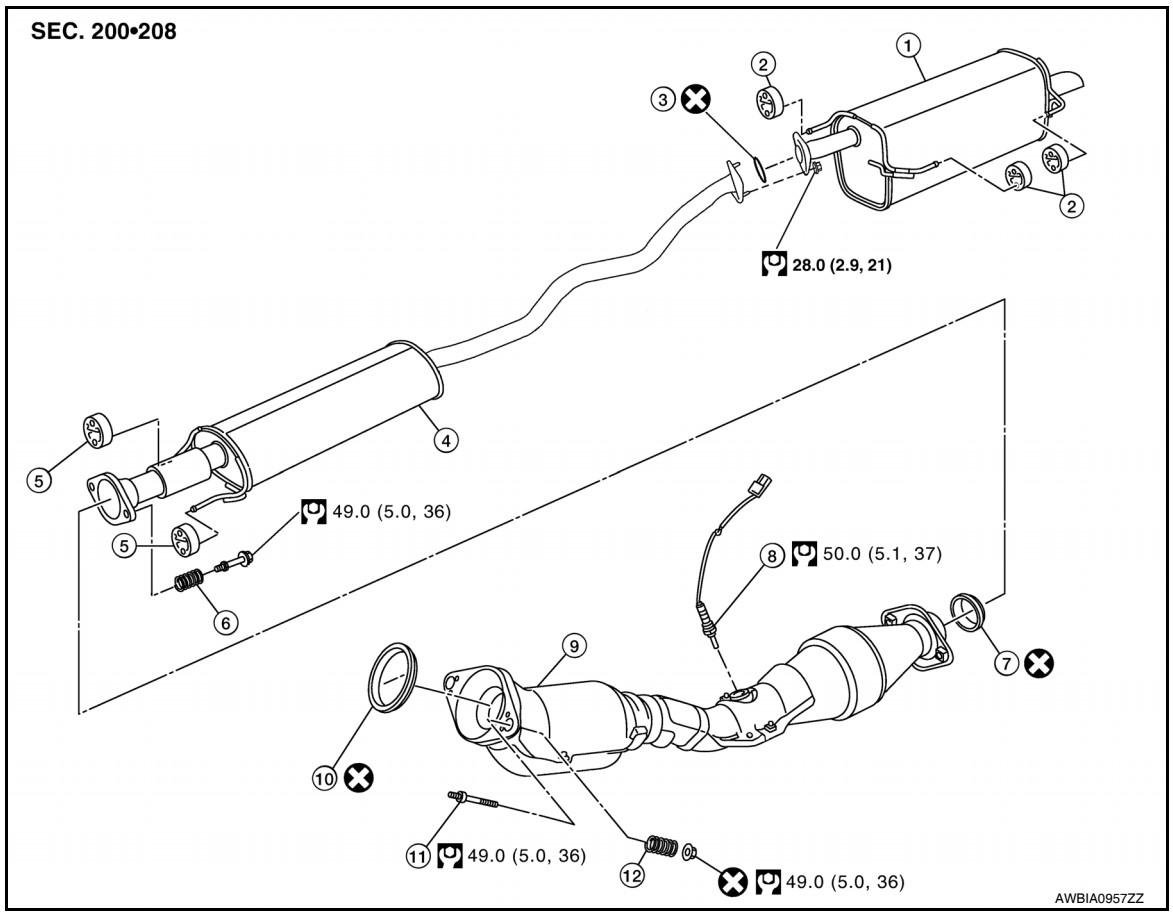
INFOID:0000000007768427

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration. If necessary, repair or replace damaged parts.



Component

INFOID:0000000007768428



1. Main muffler
2. Mounting rubber
3. Ring gasket
4. Center muffler
5. Mounting rubber
6. Spring
7. Seal bearing
8. Heated oxygen sensor 2
9. Exhaust front tube
10. Seal bearing
11. Stud bolt
12. Spring

Removal and Installation

INFOID:0000000007768429

WARNING:

- **Perform the procedure with the exhaust system fully cooled down because the system will be hot just after the engine is turned off.**
- **Be careful not to cut your hand on heat insulator edges.**

CAUTION:
- **Use genuine NISSAN exhaust system parts or equivalent, which are specially designed for heat resistance, corrosion resistance and shape.**

REMOVAL

Remove exhaust system components using power tools.
- Remove heated oxygen sensor using Tool as needed.

Tool number : KV10114400 (J-38365)

CAUTION:
Be careful not to damage heated oxygen sensor.

INSTALLATION

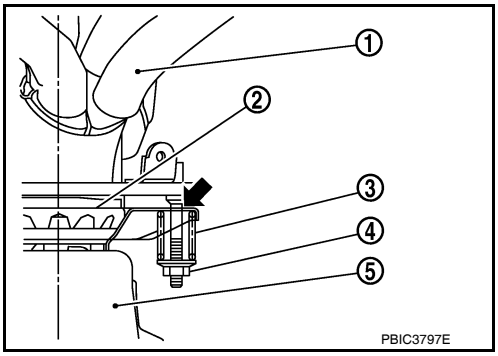
Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse the exhaust gaskets and seal bearings. Always use new ones for installation.**
- **Do not reuse the exhaust manifold to exhaust front tube nuts. Always use new ones for installation.**
- **Before installing a new heated oxygen sensor, clean and apply anti-seize lubricant to exhaust system threads using suitable tool.**

Oxygen sensor thread cleaner : — (J-43897-18)
Oxygen sensor thread cleaner : — (J-43897-12)

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; install a new one.**
- **Do not over-tighten the heated oxygen sensor. Doing so may damage the heated oxygen sensor, resulting in the MIL coming on.**
- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid exhaust leakage.**
- **Temporarily tighten nuts on the exhaust manifold side and bolts on the vehicle side. Check each part for unusual interference, and then tighten them to the specified torque.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**

Exhaust Manifold to Exhaust Front Tube

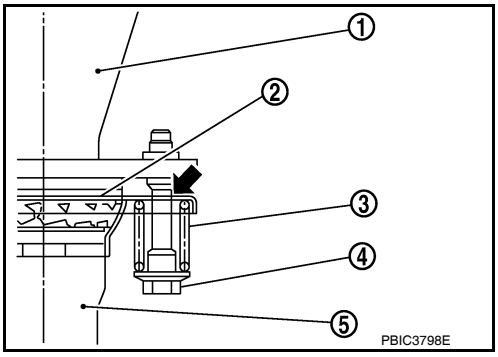


1. Securely insert seal bearing (2) into exhaust manifold (1) side in the direction shown.
   - Exhaust front tube (5)

   CAUTION:
   Be careful not to damage seal bearing surface when installing.
2. Install the spring (3), tighten the new nut (4).
   - Be careful that the stud bolt nut does not interfere with the flanged area (⬅).
   - Make sure the spring (3) sits properly on the flange surface by aligning it to the locator dimples.

   CAUTION:
   Do not reuse the exhaust manifold to exhaust front tube nuts.

Exhaust Front Tube to Center Muffler



1. Securely insert seal bearing (2) into exhaust front tube (1) side in the direction shown.
   - Center muffler (5)

   CAUTION:
   Be careful not to damage seal bearing surface when installing.
2. Install spring (3), tighten bolt (4).
   - Be careful that the stud bolt does not interfere with the flanged area (⬅).
   - Make sure the spring (3) sits properly on the flange surface by aligning it to the locator dimples.

INSPECTION AFTER INSTALLATION

- With the engine running, check exhaust tube joints for exhaust leakage and unusual noise.
- Check to ensure that brackets and mounting rubbers are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

SECTION ACC
ACCELERATOR CONTROL SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329578

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329579

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

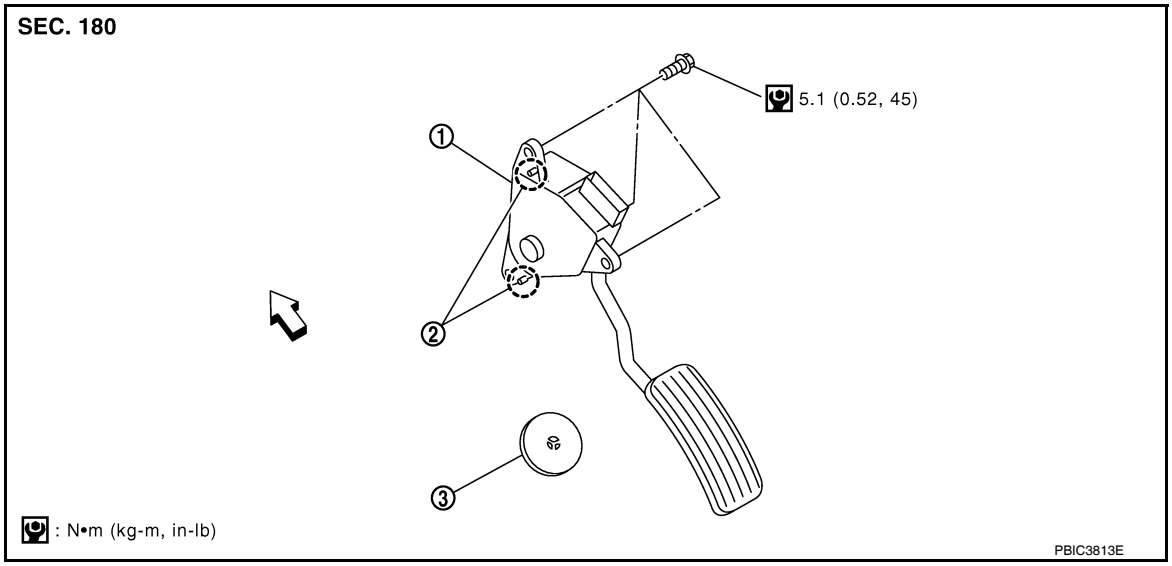
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

ACCELERATOR CONTROL SYSTEM

Component

INFOID:0000000007329580



1. Accelerator pedal assembly
2. Locating pin
3. Accelerator pedal stopper

⇦ : Vehicle front

Removal and Installation

INFOID:0000000007329581

CAUTION:

- **Do not disassemble accelerator pedal assembly. Do not remove accelerator pedal position sensor from accelerator pedal assembly.**
- **Avoid impact from dropping etc. during handling.**
- **Be careful to keep accelerator pedal assembly away from water.**

REMOVAL

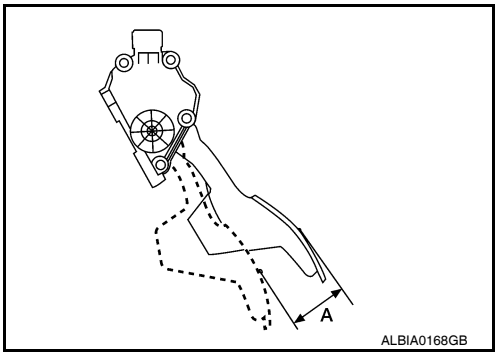
1. Disconnect the negative battery terminal.
2. Disconnect accelerator pedal position sensor harness connector.
3. Remove the bolts and the accelerator pedal assembly.

INSTALLATION

Installation is in the reverse order of removal.

- Insert locating pins into brake pedal bracket to position accelerator pedal assembly. Install bolts to accelerator pedal assembly.
- Align the accelerator pedal stopper to the stud bolt on the floor and insert until fully seated.
- Check that the accelerator pedal moves through the full specified distance of pedal travel.

Pedal travel (A) **: Refer to ACC-6, "Accelerator Control".**



INSPECTION AFTER INSTALLATION

- Make sure that the accelerator pedal moves smoothly within the whole operation range.

- Make sure that the accelerator pedal securely returns to the original position.
- Perform accelerator pedal released position learning. Refer to EC-87, "Accelerator Pedal Released Position Learning".

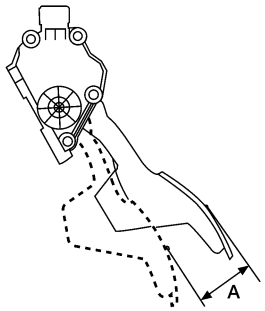
SERVICE DATA AND SPECIFICATIONS (SDS)

Accelerator Control

INFOID:0000000007768834

PEDAL TRAVEL

mm (in)



ALBIA0168GB

Accelerator pedal - total travel (A)	50 ± 3.6 (1.97 ± 0.14)

SECTION CL
CLUTCH

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329862

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329863

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

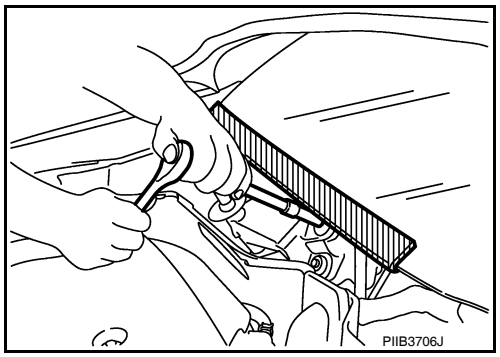
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007329864

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Service Notice or Precaution

INFOID:0000000007329865

- **Use recommended brake fluid when adding fluid to the clutch reservoir tank. Refer to MA-13.**
- **Do not reuse fluid drained from clutch system.**
- **Be careful not to splash brake fluid on painted areas.**
- **Use new brake fluid to clean or wash all parts of master cylinder and operating cylinder.**
- **Do not use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.**
- **If transaxle assembly is removed from the vehicle, always replace CSC (concentric slave cylinder). Return CSC to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal and may cause clutch fluid leakage.**
- **Do not disassemble clutch master cylinder and CSC.**

WARNING:

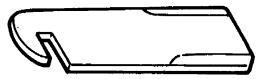
After cleaning clutch disc, clean it with a dust collector. Do not use compressed air.

PREPARATION

Special Service Tool

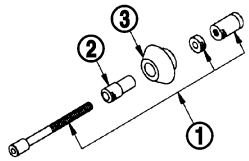
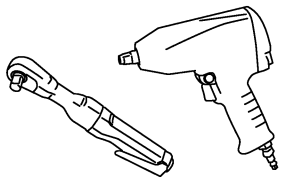
INFOID:0000000007329866

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST20050240 (—) Diaphragm spring adjusting wrench  ZZA0508D	Adjusting unevenness of diaphragm spring of clutch cover

Commercial Service Tool

INFOID:0000000007329867

Tool name	Description
Clutch aligning bar  PCIB0017E	Installing clutch cover and clutch disc **1: Assembly** **2: Sleeve** **3: Adapter**
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007329868

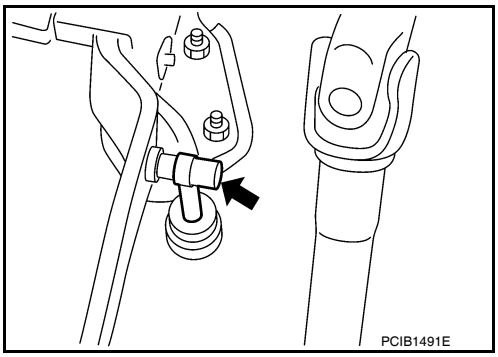
Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		CL-6	CL-9	EM-78	CL-12	CL-14											EM-100
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Inspection and adjustment)	CLUTCH LINE (Air in line)	ENGINE MOUNTING (Loose)	CSC (Concentric slave cylinder) (Worn, dirty or damaged)	CLUTCH DISC (Out of true)	CLUTCH DISC (Runout is excessive)	CLUTCH DISC (Lining broken)	CLUTCH DISC (Dirty or burned)	CLUTCH DISC (Oily)	CLUTCH DISC (Worn out)	CLUTCH DISC (Hardened)	CLUTCH DISC (Lack of spline grease)	DIAPHRAGM SPRING (Damaged)	DIAPHRAGM SPRING (Out of tip alignment)	PRESSURE PLATE (Distortion)	FLYWHEEL (Distortion)
Symptom	Clutch grabs/chatters			1			2			2	2	2			2		
	Clutch pedal spongy		1														
	Clutch noisy				1												
	Clutch slips	1								2	2			3		4	5
	Clutch does not disengage	1	2			5	5	5	5	5			5	6	6	7	

CLUTCH PEDAL

On-vehicle Inspection and Adjustment

INFOID:0000000007329869



1. Check to see if the master cylinder rod end moves freely. It should not be bound by the clutch pedal.

a. If the rod end does not move freely, check that the ASCD switch (if equipped) is not applying pressure to the clutch pedal causing the rod end to bind. To adjust, disconnect the ASCD switch electrical connector and turn the ASCD switch.

b. Connect the ASCD switch electrical connector (if equipped).

c. Verify that the master cylinder rod end moves freely. It should not be bound by the clutch pedal.

d. If the rod end does not move freely, remove the rod end and check for deformation or damage on the rod end. Leave the rod end removed for step 2.

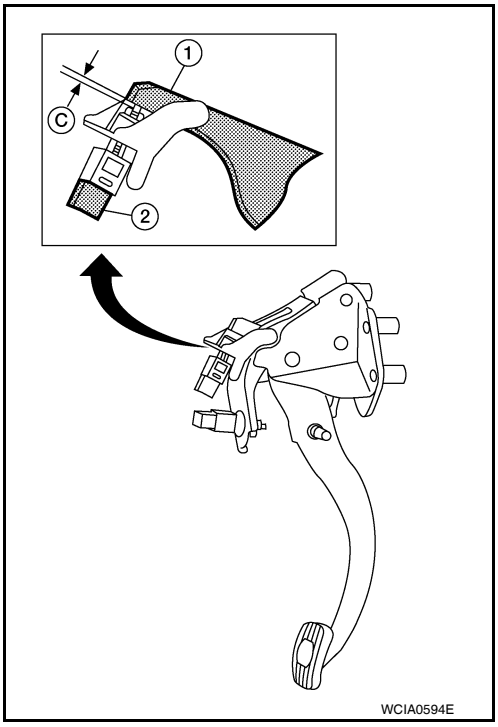
2. Check the clutch pedal stroke for free range of movement.

a. With the master cylinder rod end removed, manually move the pedal up and down to determine if it moves freely.

b. If any sticking is noted, replace the clutch pedal assembly. Re-verify that the master cylinder rod end moves freely.

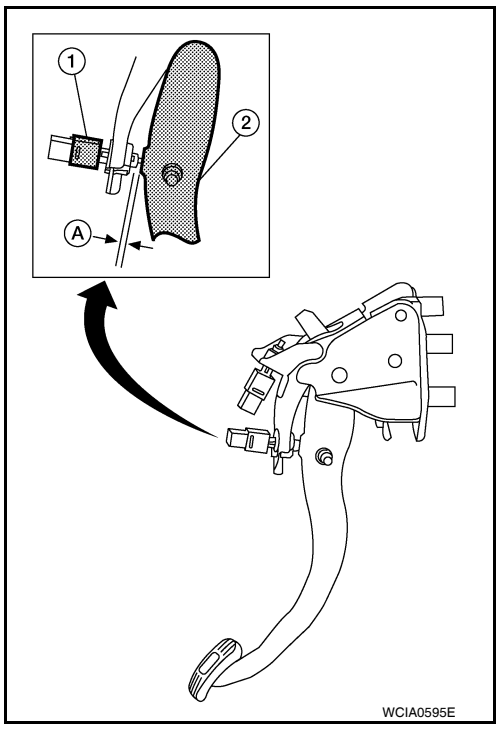
3. Adjust clutch interlock switch (2) position so that clearance between clutch pedal (1) and thread end of clutch interlock switch (2), with clutch pedal fully depressed, is within specification (C).

Clearance C : 0.74 - 1.96 mm (0.0291 - 0.0772 in)



4. Adjust ASCD clutch switch (1) (if equipped). Position so that clearance between clutch pedal (2) and thread end of ASCD clutch switch (1), with clutch pedal fully released, is within specification (A).

Clearance A : 0.74 - 1.96 mm (0.0291 - 0.0772 in)



5. Check the clutch hydraulic system components (clutch master cylinder, clutch operating cylinder, clutch withdrawal lever and clutch release bearing) for sticking or binding.

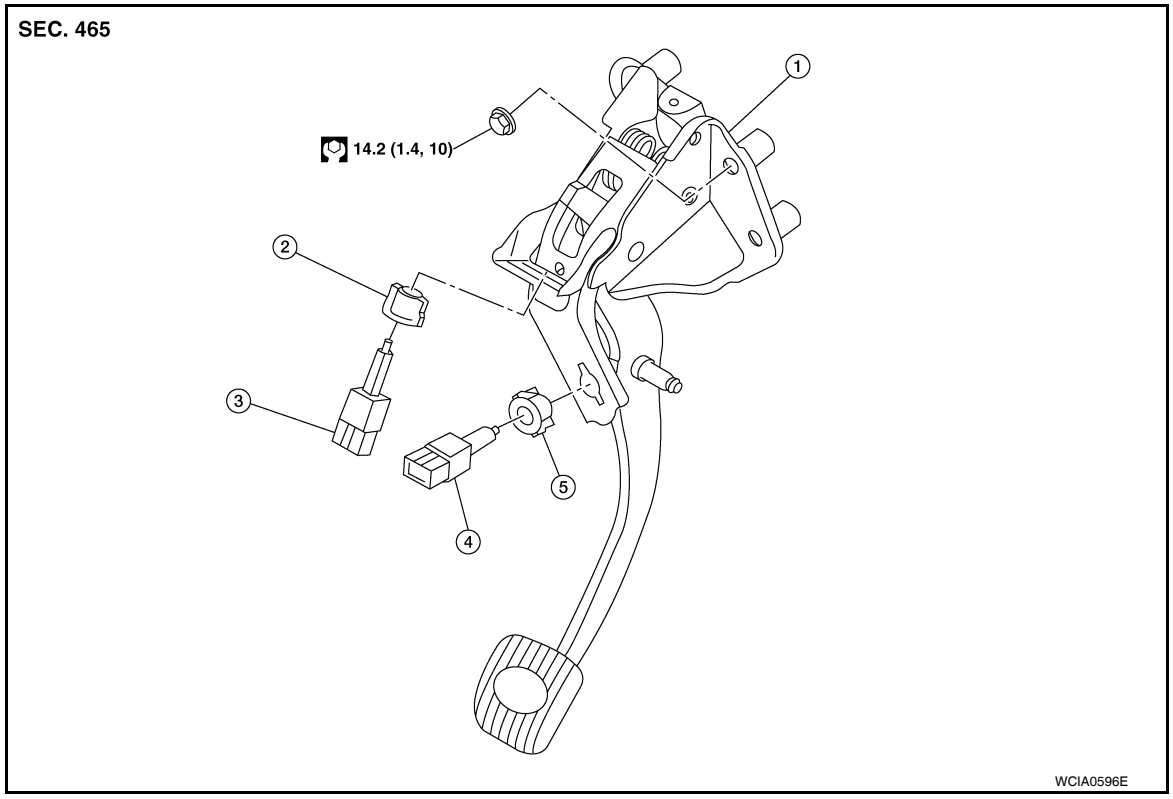
a. If any sticking or binding is noted, repair or replace the related parts as necessary.

b. If any hydraulic system repair was necessary, bleed the clutch hydraulic system. Refer to CL-9, "Air Bleeding Procedure".

Removal and Installation

INFOID:0000000007329870

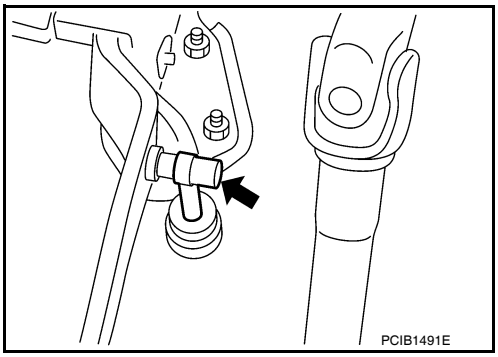
COMPONENTS



1. Clutch pedal assembly
2. Lock nut
3. Clutch interlock switch
4. ASCD clutch switch (if equipped)
5. Lock nut

REMOVAL

1. Remove instrument lower finisher. Refer to IP-12, "Removal and Installation".
2. Disconnect clutch interlock switch and ASCD clutch switch harness connectors (if equipped).
3. Remove clutch switch harness clamp from clutch pedal assembly.
4. Disconnect master cylinder rod end from clutch pedal lever.
5. Remove clutch pedal assembly nuts, and then remove clutch pedal assembly.



INSPECTION AFTER REMOVAL

Check clutch pedal for bend, damage or a cracked weld. If bend, damage or a cracked weld is found, replace clutch pedal assembly.

INSTALLATION

Installation is in the reverse order of removal.

- After installing the clutch switches, adjust the switch positions. Refer to CL-6, "On-vehicle Inspection and Adjustment".

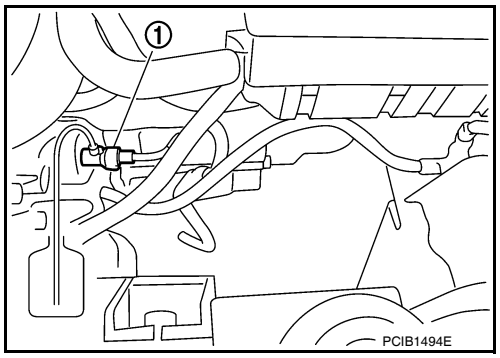
CLUTCH FLUID

Air Bleeding Procedure

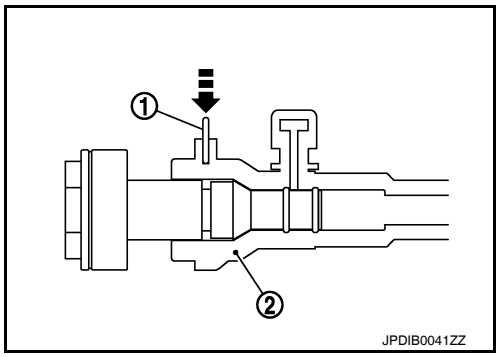
INFOID:0000000007329871

CAUTION:
Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
NOTE:
Carefully monitor fluid level in reservoir tank during bleeding operation.

1. Fill master cylinder reservoir tank with new clutch fluid.
2. Connect a transparent vinyl tube and container to the bleeding connector (1) on the CSC.
3. Depress and release the clutch pedal slowly and fully 15 times at an interval of two to three seconds and release the clutch pedal.

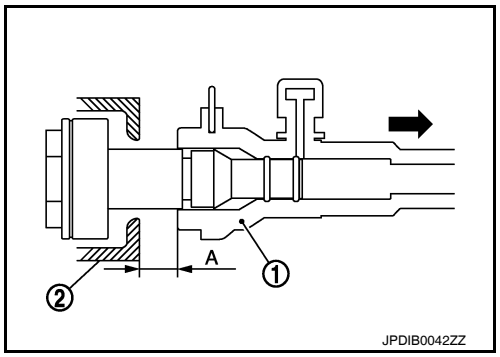


4. Push in the lock pin (1) of the bleeding connector (2), and maintain the position.
   CAUTION:
   Hold the lock pin in to prevent the bleeding connector from separating when fluid pressure is applied.



5. Slide bleeding connector (1) in the direction of the arrow as shown to the dimension (A).
   2: clutch housing

   Dimension (A) : 10 mm (0.39 in)



6. Depress the clutch pedal soon and hold it, and then bleed air from the piping. Wait for 5 seconds.
   CAUTION:
   Hold the clutch pedal down to prevent air from getting back into the clutch system.
7. Return the clutch tube and lock pin to their original positions.
8. Release clutch pedal and wait for 5 seconds.
9. Repeat steps 3 to 8 until no bubbles are observed in the clutch fluid.

CLUTCH MASTER CYLINDER

Removal and Installation

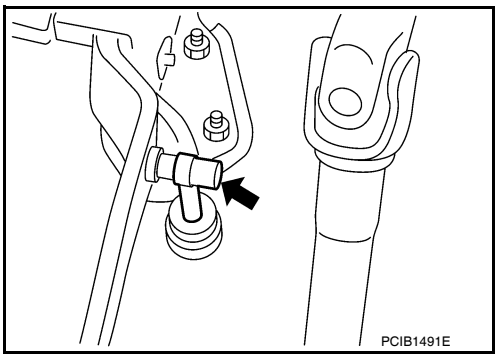
INFOID:0000000007329872

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

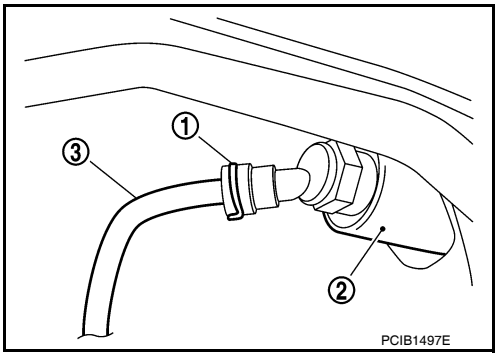
REMOVAL

1. Remove the battery, battery tray and brackets. Refer to SC-7, "Removal and Installation".
2. Remove the air cleaner and air duct. Refer to EM-16, "Removal and Installation".
3. Use one of the following methods to remove hose from master cylinder.
   - Drain clutch fluid from reservoir tank and remove hose.
   - Remove hose from master cylinder.

   CAUTION:
   Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
4. Remove master cylinder rod end from clutch pedal assembly.



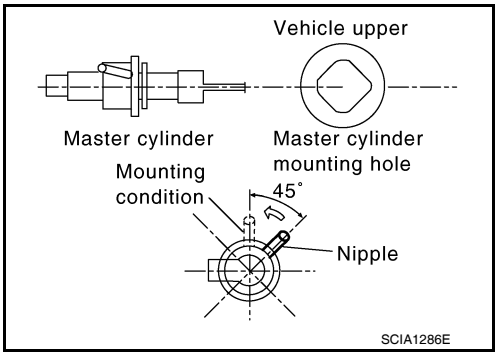
5. Remove lock pin (1) from connector of master cylinder (2) and separate clutch tube (3).



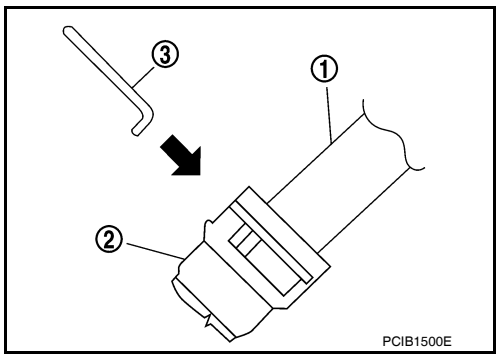
6. Rotate master cylinder clockwise by 45° and remove from the vehicle.

INSTALLATION

1. Tilt master cylinder clockwise by 45° and insert it in the mounting hole. Rotate counterclockwise to secure it. At this time, nipple is in the up position.
2. Install master cylinder rod end to clutch pedal.



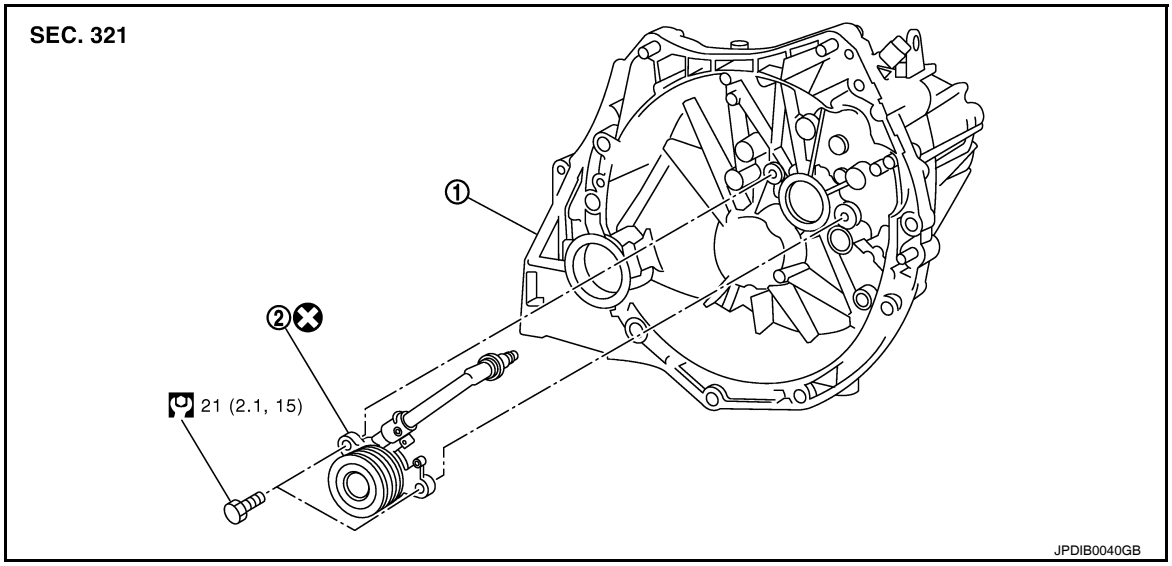
3. Install clutch tube (1) fully into connector of master cylinder (2).
4. Install lock pin (3) fully into connector of master cylinder (2).
5. Fill with new clutch fluid and bleed air from the system. Refer to CL-9.
6. After completing this procedure, inspect clutch pedal operation. Refer to CL-6, "On-vehicle Inspection and Adjustment".
7. Install the air cleaner and air duct. Refer to EM-16, "Removal and Installation".
8. Install the battery. Refer to SC-7, "Removal and Installation".



CSC (CONCENTRIC SLAVE CYLINDER)

Exploded View

INFOID:0000000007329873



1. Transaxle assembly
2. CSC (Concentric Slave Cylinder)

CAUTION:

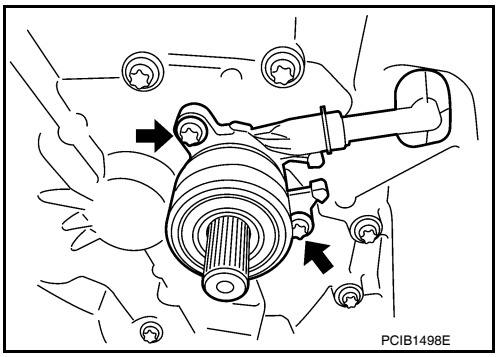
- **Do not reuse CSC (concentric slave cylinder). CSC slides back to the original position every time when removing transaxle assembly. Dust on the sliding parts may damage a seal of CSC and may cause clutch fluid leakage.**
- **Do not disassemble CSC.**
- **Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.**

Removal and Installation

INFOID:0000000007329874

REMOVAL

1. Remove transaxle assembly. Refer to EM-78, "Removal and Installation".
2. Remove CSC bolts and the CSC from clutch housing.



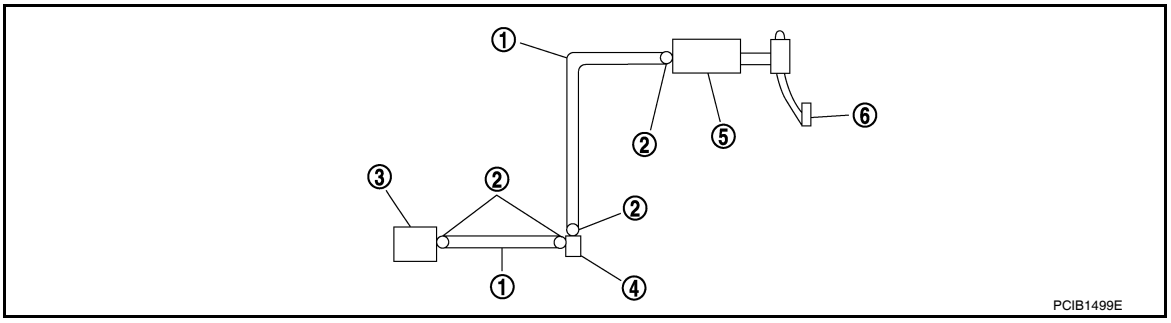
INSTALLATION

1. Install CSC to clutch housing and then tighten bolts to specification. Refer to CL-12, "Exploded View".
   CAUTION:
   - **Do not reuse CSC.**
   - **Do not insert and operate CSC because piston and stopper of CSC components may fall off.**
2. Install transaxle assembly. Refer to EM-78, "Removal and Installation".
3. Bleed the air from the clutch hydraulic system. Refer to CL-9, "Air Bleeding Procedure".

CLUTCH PIPING

Removal and Installation

INFOID:0000000007329875



1.	Clutch tube	2.	Clutch tube lock pin	3.	CSC
4.	Clutch damper	5.	Clutch master cylinder	6.	Clutch pedal

Carefully observe the following steps during clutch tube removal and installation.

CAUTION:

Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.

NOTE:

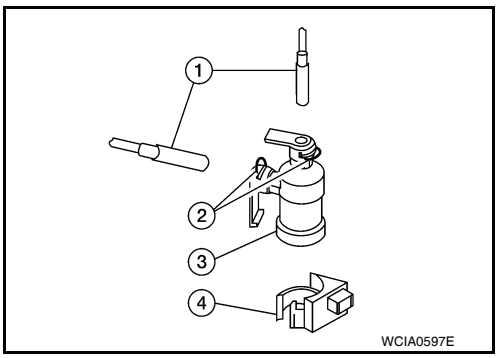
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Remove the battery, battery tray and brackets. Refer to SC-7, "Removal and Installation".
2. Remove the air cleaner and air duct. Refer to EM-16, "Removal and Installation".
3. Use one of the following methods to remove hose from clutch master cylinder.
   - Drain clutch fluid from reservoir tank and remove hose.
   - Remove hose from clutch master cylinder. Immediately plug hose and reservoir tank to prevent clutch fluid from dripping.

   CAUTION:

   Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
4. Remove clutch tube lock pin from clutch master cylinder.
5. Remove clutch tube lock pin at clutch housing.
6. Remove clutch tube lock pins (2) from clutch damper (3).
7. Remove clutch tube (1) from clutch damper (3).
8. Remove clutch damper (3) from bracket (4).



INSTALLATION

Installation is in the reverse order of removal.

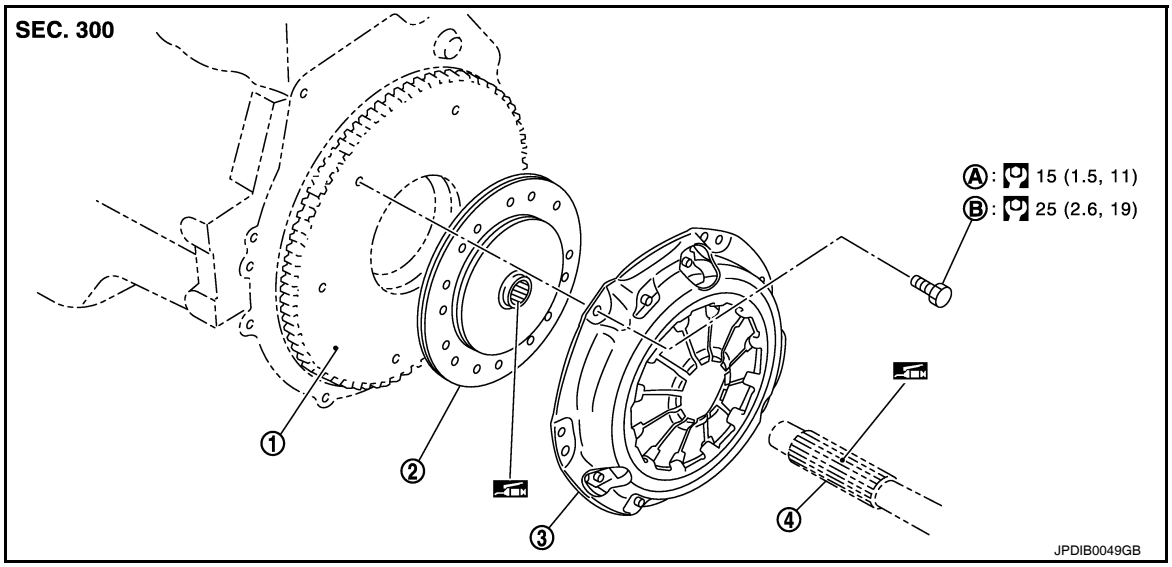
- **Make sure that all tubes are fully installed into connectors**.
- **Make sure that all connector lock pins are fully installed.**
- After installation, bleed the air from the clutch hydraulic system. Refer to CL-9, "Air Bleeding Procedure".

CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

Removal and Installation

INFOID:0000000007329876

COMPONENTS



1.	Flywheel	2.	Clutch disc	3.	Clutch cover
4.	Input shaft	A.	First step	B.	Final step

Apply lithium-based grease including molybdenum disulphide

CAUTION:

- **Do not reuse CSC (concentric slave cylinder). CSC slides back to the original position every time when removing transaxle assembly. Dust on the sliding parts may damage a seal of CSC and may cause clutch fluid leakage. Refer to CL-12, "Removal and Installation".**
- **Do not bring any grease to the clutch disc facing, pressure plate surface and flywheel surface.**
- **When installing, be careful that grease applied to input shaft does not adhere to clutch disc.**
- **Do not clean clutch disc using solvent.**

REMOVAL

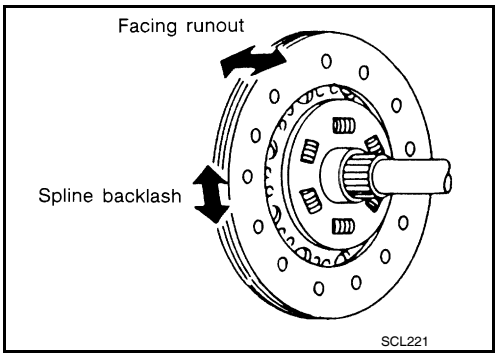
1. Remove transaxle assembly from the vehicle. Refer to MT-18, "Removal and Installation".
2. Loosen clutch cover bolts evenly. Then remove clutch cover and clutch disc.

INSPECTION AND ADJUSTMENT AFTER REMOVAL

Clutch Disc

- Measure clutch disc runout and spline backlash. If either measurement exceeds the specification, replace clutch disc.

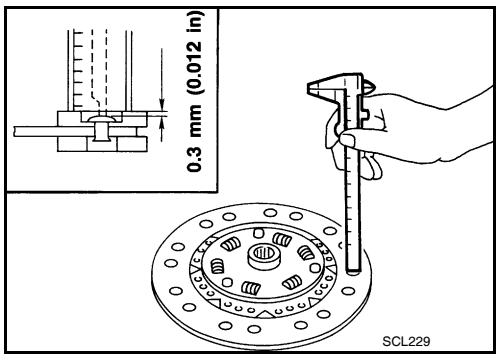
Runout and backlash : Refer to CL-17, "Clutch Disc".



- Check clutch disc for burns, discoloration or oil or grease leakage. Replace if necessary.

- Determine the wear limit of clutch facing (depth to the rivet head). If measurement exceeds specifications, replace clutch disc.

Clutch facing wear : Refer to CL-17, "Clutch Disc".

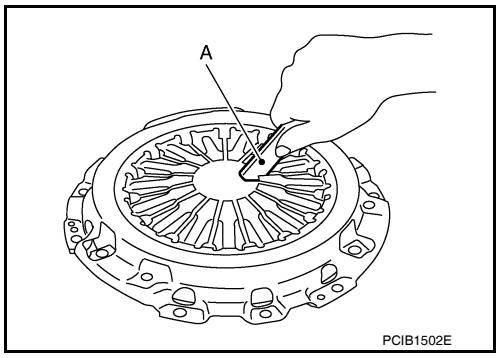


Clutch Cover

- With the check clutch cover installed on vehicle Check the diaphragm spring toe height. If unevenness exceeds specifications, adjust the height using Tool (A).

Uneven limit of diaphragm spring toe height : Refer to CL-17, "Clutch Cover".

Tool number A : ST20050240 (—)



- Check clutch cover thrust ring for wear or breakage. If wear or breakage is found, replace clutch cover assembly.

NOTE:

- Worn thrust ring will generate a beating noise when tapped at the rivet using suitable tool.
- Broken thrust ring will make a clinking sound when cover is shaken up and down.

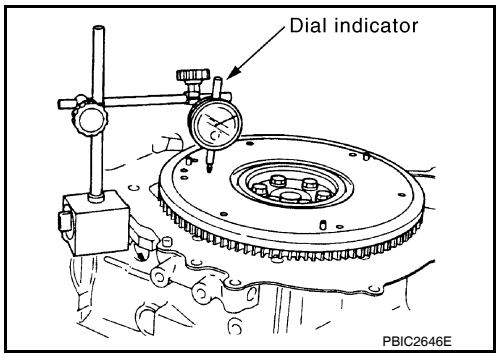
- If a trace of burn or discoloration is found on clutch cover pressure plate to clutch disc contact surface, repair the surface with sandpaper. If surface is damaged or distorted, replace the assembly.

Flywheel Runout

- Check contact surface of flywheel for slight burns or discoloration. Repair flywheel with emery paper.
- Check the flywheel runout. Refer to EM-100, "Inspection After Disassembly".

CAUTION:

Measure flywheel outer face (not on knock pin and clutch cover mounting hole).



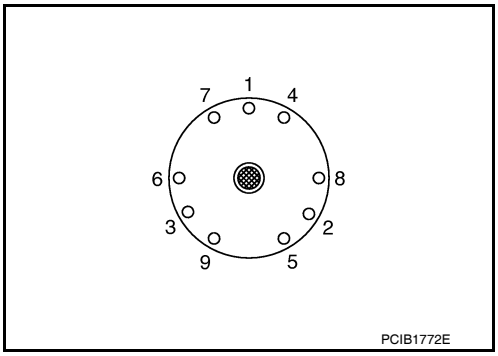
INSTALLATION

1. Clean clutch disc and input shaft splines to remove grease and dust caused by abrasion.
2. Apply recommended grease to clutch disc and input shaft splines.

CAUTION:

Be sure to apply grease to the points specified. Otherwise, noise, poor disengagement, or damage to the clutch may result. Excessive grease may cause slip or shudder. If it adheres to CSC seal, it will cause clutch fluid leakage. Wipe off excess grease.

3. Install clutch disc using suitable clutch aligner.
4. Install clutch cover. Pre-tighten clutch cover bolts.
5. Tighten clutch cover bolts evenly in two steps in the order shown.
6. Install transaxle assembly. Refer to MT-18, "Removal and Installation".



SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch Control System

INFOID:0000000007329877

Type of clutch control	Hydraulic

Clutch Pedal

INFOID:0000000007329878

Clearance between clutch pedal and ASCD switch threaded end while clutch pedal is fully released (if equipped).	0.74 - 1.96 mm (0.0291 - 0.0772 in)
Clearance between clutch pedal and clutch interlock switch threaded end while clutch pedal is fully depressed.	0.74 - 1.96 mm (0.0291 - 0.0772 in)

Clutch Disc

INFOID:0000000007329879

Engine type	MR18DE
Model	225
Facing size (outer dia. × inner dia. × thickness)	225 mm × 160 mm × 3.2 mm (8.86 in × 6.30 in × 0.126 in)
Thickness of disc assembly with load	7.2 - 7.6 mm (0.283 - 0.299 in) with 5,394 N (550 kg, 1,213 lb)
Runout limit/diameter of the area to be measured	1.0 mm (0.039 in) / 215 mm (8.46 in) dia.
Maximum spline backlash (at outer edge of disc)	0.9 mm (0.035 in)
Wear limit of facing (depth to the rivet head)	0.3 mm (0.012 in)

Clutch Cover

INFOID:0000000007329880

Engine type	MR18DE
Set-load	5,394 N (550 kg, 1,213 lb)
Diaphragm spring lever height	20 - 22 mm (0.79 - 0.87 in)
Uneven limit of diaphragm spring toe height	0.7 mm (0.028 in) or less

SECTION MT
MANUAL TRANSAXLE

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RS6F94R

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330286

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330287

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

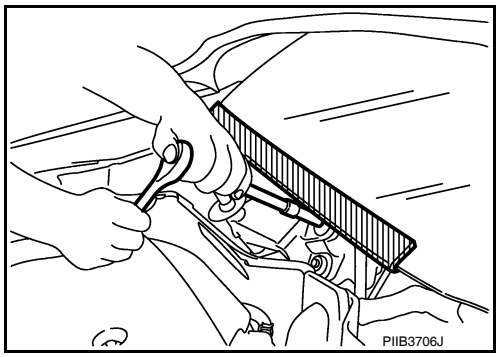
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007330288

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution

INFOID:0000000007330289

- If transaxle assembly is removed from the vehicle, always replace CSC (concentric slave cylinder). Installed CSC returns to the original position when removing transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal, and may cause clutch fluid leakage.
- Do not reuse transaxle oil.
- Drain, fill and check transaxle oil with the vehicle on level surface.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation orientation prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, follow it.
- Be careful not to damage the sliding surfaces and mating surfaces of parts.

Precaution for Work

INFOID:0000000007793165

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

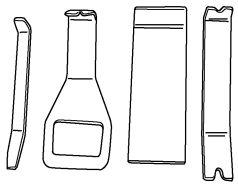
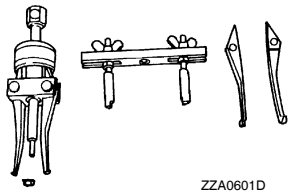
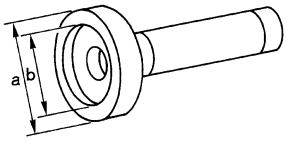
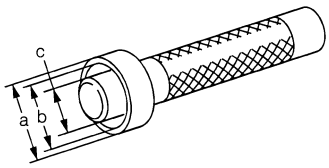
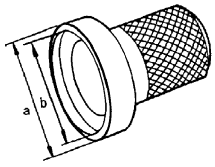
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

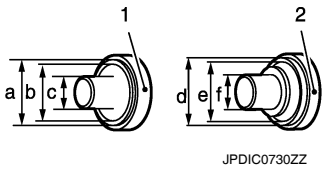
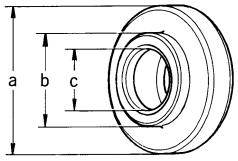
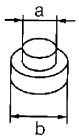
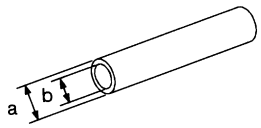
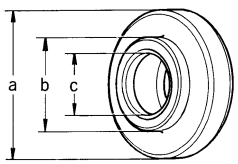
PREPARATION

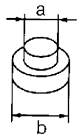
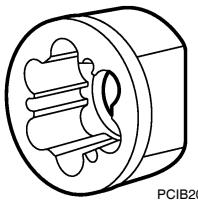
Special Service Tool

INFOID:0000000007330290

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

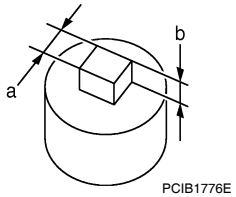
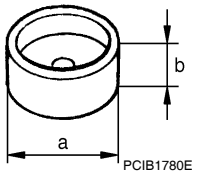
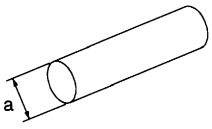
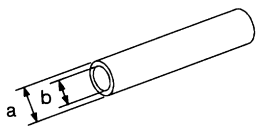
Tool number (Kent-Moore No.) Tool name	Description
— (J-46534) Trim tool set  AWJIA0483ZZ	For removing trim
KV381054S0 (J-34286) Puller  ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 (—) Drift  ZZA1143D	• Installing mainshaft front bearing outer race • Installing mainshaft rear bearing outer race • Installing differential side bearing outer race (clutch housing side) **a: 65 mm (2.56 in) dia.** **b: 49 mm (1.93 in) dia**.
ST33220000 (—) Drift  ZZA1046D	Installing input shaft oil seal **a: 37 mm (1.46 in) dia**. **b: 31 mm (1.22 in) dia.** **c: 22 mm (0.87 in) dia.**
ST33400001 (J-26082) Drift  ZZA0814D	Installing differential side bearing outer race (transaxle case side) **a: 60 mm (2.36 in) dia**. **b: 47 mm (1.85 in) dia.**

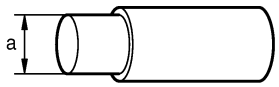
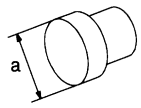
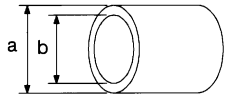
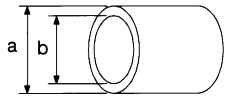
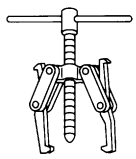
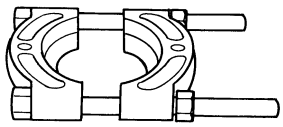
Tool number (Kent-Moore No.) Tool name	Description
KV32500QAA (Renault SST: B.vi 1666)) Drift set  JPDIC0730ZZ	Installing differential side oil seal 1. — (Stamping number: B.vi 1666-A) Drift **a: 54.3 mm (2.138 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 26.6 mm (1.047 in) dia.** 2. — (Stamping number: B.vi 1666-B) Drift **a: 54.3 mm (2.138 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 26.6 mm (1.047 in) dia.**
ST36720030 (—) Drift  ZZA0978D	• Installing input shaft rear bearing • Installing mainshaft front bearing inner race **a: 70 mm (2.76 in) dia.** **b: 40 mm (1.57 in) dia.** **c: 29 mm (1.14 in) dia.**
ST33052000 (—) Drift  ZZA0969D	• Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 5th main gear • Removing 4th main gear • Removing 1st main gear • Removing 1st-2nd synchronizer assembly • Removing 2nd main gear • Removing bushing • Removing 3rd main gear • Removing mainshaft front bearing inner race **a: 22 mm (0.87 in) dia.** **b: 28 mm (1.10 in) dia.**
KV32102700 (—) Drift  S-NT065	• Installing bushing • Installing 2nd main gear • Installing 3rd main gear • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear **a: 54 mm (2.13 in) dia.** **b: 32 mm (1.26 in) dia.**
ST30901000 (J-26010-01) Drift  ZZA0978D	Installing mainshaft rear bearing inner race **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35.2 mm (1.386 in) dia.**

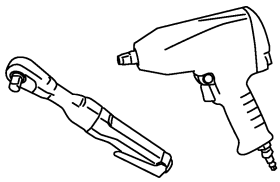
Tool number (Kent-Moore No.) Tool name	Description
ST33061000 (J-8107-2) Drift  ZZA0969D	Removing differential side bearing inner race (clutch housing side) **a: 28.5 mm (1.122 in) dia.** **b: 38 mm (1.50 in) dia.**
KV32300QAM (Renault SST: B.vi 1823) Drift  PCIB2078J	Removing and installing input shaft rear bearing bolt

Commercial Service Tool

INFOID:0000000007330291

Tool name	Description
Socket  PCIB1776E	Removing and installing drain plug **a: 8 mm (0.31 in)** **b: 5 mm (0.20 in)**
Spacer  PCIB1780E	Removing mainshaft front bearing outer race **a: 25 mm (0.98 in) dia.** **b: 25 mm (0.98 in)**
Drift  S-NT063	Installing bushing **a: 17 mm (0.67 in) dia.**
Drift  S-NT065	Installing input shaft front bearing **a: 35 mm (1.38 in) dia.** **b: 25 mm (0.98 in) dia.**

Tool name	Description
Drift  PCIB1779E	Removing input shaft rear bearing **a: 24 mm (0.94 in) dia.**
Drift  NT109	• Removing differential side bearing inner race (transaxle case side) • Installing input shaft rear bearing **a: 43 mm (1.69 in) dia**.
Drift  S-NT474	Installing differential side bearing inner race (clutch housing side) **a: 45 mm (1.77 in) dia.** **b: 39 mm (1.54 in) dia**.
Drift  S-NT474	Installing differential side bearing inner race (transaxle case side) **a: 52 mm (2.05 in) dia.** **b: 45 mm (1.77 in) dia.**
Puller  NT077	Removing differential side bearing inner race (clutch housing side) Removing differential side bearing inner race (transaxle case side)
Puller  ZZB0823D	• Removing differential side bearing inner race (clutch housing side) • Removing differential side bearing inner race (transaxle case side) • Removing input shaft rear bearing • Removing input shaft front bearing • Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 4th main gear • Removing 5th main gear • Removing 1st main gear • Removing 1st - 2nd synchronizer hub assembly • Removing 2nd main gear • Removing 3rd main gear • Removing mainshaft front bearing outer race

Tool name	Description
Remover S-NT134	• Removing bushing • Removing mainshaft rear bearing outer race
Power tool  PBIC0190E	• Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007330292

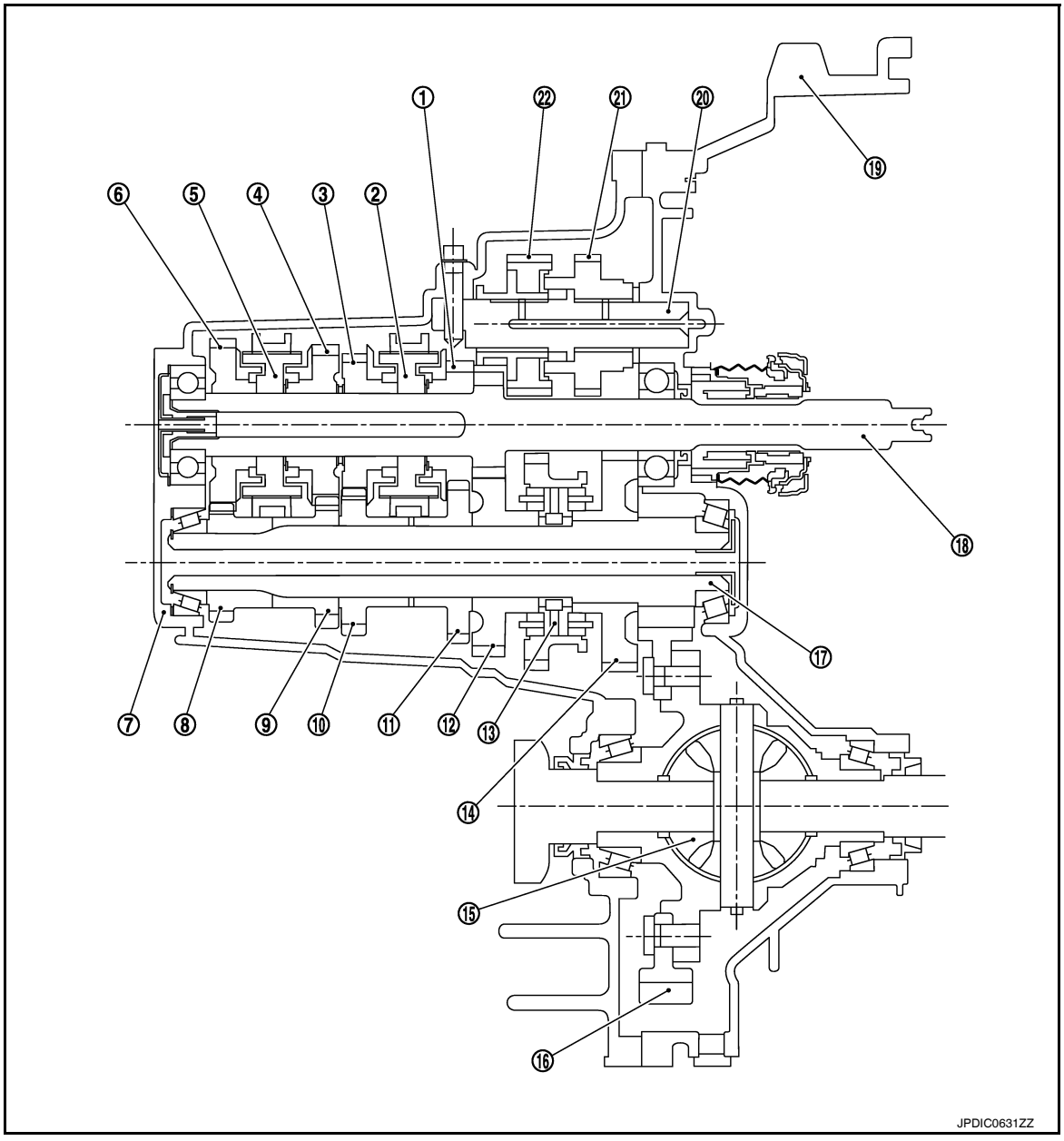
Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		MT-12			MT-18		MT-18	MT-15	MT-51	MT-18			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	3	3			

DESCRIPTION

Cross-Sectional View

INFOID:0000000007330293

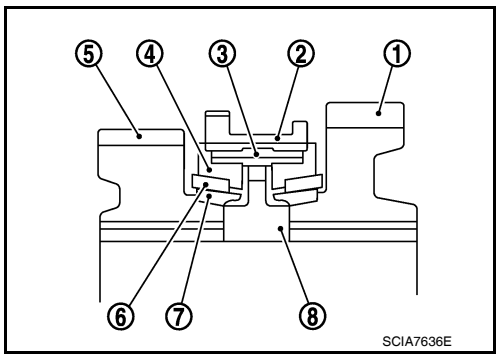


1. 3rd input gear
2. 3rd-4th synchronizer assembly
3. 4th input gear
4. 5th input gear
5. 5th-6th synchronizer assembly
6. 6th input gear
7. Transaxle case
8. 6th main gear
9. 5th main gear
10. 4th main gear
11. 3rd main gear
12. 2nd main gear
13. 1st-2nd synchronizer assembly
14. 1st main gear
15. Differential
16. Final gear
17. Mainshaft
18. Input shaft
19. Clutch housing
20. Reverse idler shaft
21. Reverse input gear
22. Reverse output gear

TRIPLE-CONE SYNCHRONIZER

Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the shift selector.

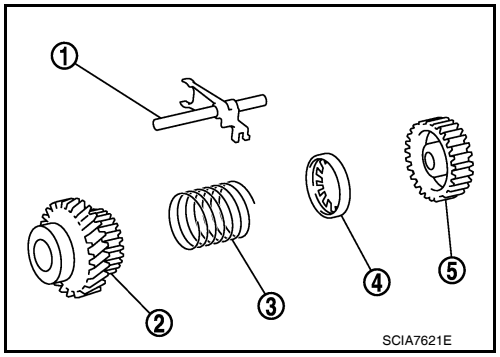
- 1st main gear (1)
- 1st-2nd coupling sleeve (2)
- Insert key (3)
- Outer baulk ring (4)
- 2nd main gear (5)
- Synchronizer cone (6)
- Inner baulk ring (7)
- 1st-2nd synchronizer hub (8)



REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear assembly consists of reverse input gear, return spring, reverse baulk ring and reverse output gear. When the shift selector is moved to the reverse position, the construction allows smooth shift operation by stopping the reverse idler shaft rotation by frictional force of synchronizer.

- Reverse fork rod (1)
- Reverse output gear (2)
- Return spring (3)
- Reverse baulk ring (4)
- Reverse input gear (5)



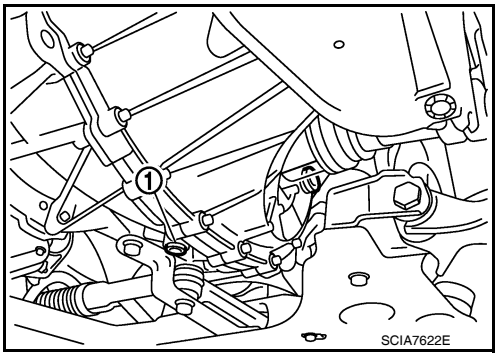
M/T OIL

Changing M/T Oil

INFOID:0000000007330294

DRAINING

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Install a new gasket onto drain plug (1) and install it into transaxle. Tighten drain plug to specification. Refer to MT-18, "Component".
   CAUTION:
   Do not reuse gasket.

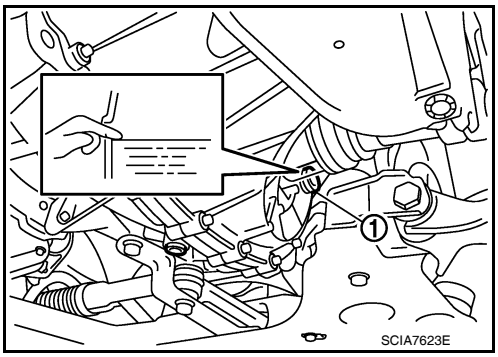


FILLING

1. Remove filler plug (1). Fill with new oil until oil level reaches the specified limit at filler plug hole as shown.

   Oil grade and capacity
   : Refer to MA-13, "Fluids and Lubricants"

2. After refilling oil, check oil level. Install a new gasket on filler plug (1), then install it into transaxle. Tighten filler plug to specification. Refer to MT-18, "Component".
   CAUTION:
   Do not reuse gasket.

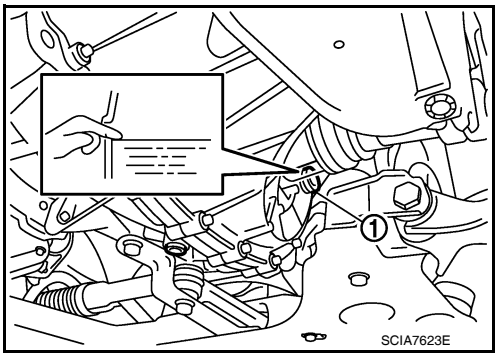


Checking M/T Oil

INFOID:0000000007330295

OIL LEAKAGE AND OIL LEVEL

1. Make sure that oil is not leaking from transaxle or around it.
2. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Do not start engine while checking oil level.
3. Install a new gasket onto filler plug (1) and install it into transaxle. Tighten filler plug to specification. Refer to MT-18, "Component".
   CAUTION:
   Do not reuse gasket.



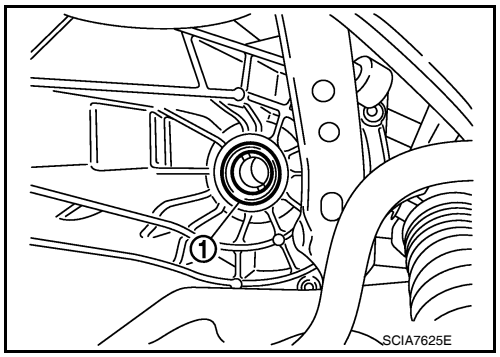
SIDE OIL SEAL

Removal and Installation

INFOID:0000000007330297

REMOVAL

1. Remove front drive shafts from transaxle assembly. Refer to FAX-9, "Removal and Installation (Left Side)" and FAX-10, "Removal and Installation (Right Side)".
2. Remove differential side oil seal (1) using a suitable tool.
   CAUTION:
   Be careful not to damage transaxle case and clutch housing.

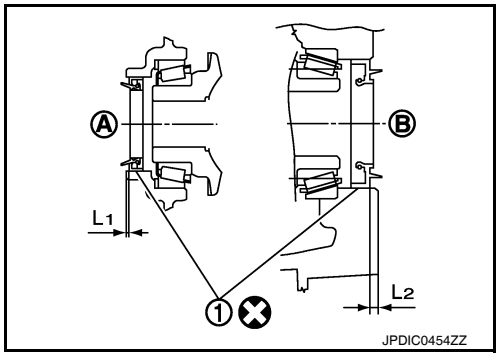


INSTALLATION

Installation is in the reverse order of removal.

- Install differential side oil seal (1) to clutch housing and transaxle case using Tool.
  CAUTION:
  Do not reuse oil seal.

Tool number : KV32500QAA (B.vi 1666-B)



- (A): Transaxle case side
- (B): Clutch housing side

Dimension (L_1) : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension (L_2) : 2.7 - 3.3 mm (0.106 - 0.130 in)

CAUTION:

- **Do not reuse differential oil seal**
- **Do not incline differential oil seal.**
- **Do not damage clutch housing and transaxle case.**
- Check oil level after installation. Refer to MT-12, "Checking M/T Oil".

POSITION SWITCH

Checking

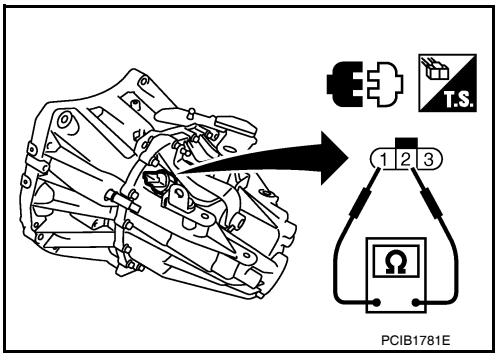
INFOID:0000000007330298

NOTE:
For removal and installation of the switches, refer to MT-19, "Disassembly and Assembly"

BACK-UP LAMP SWITCH

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

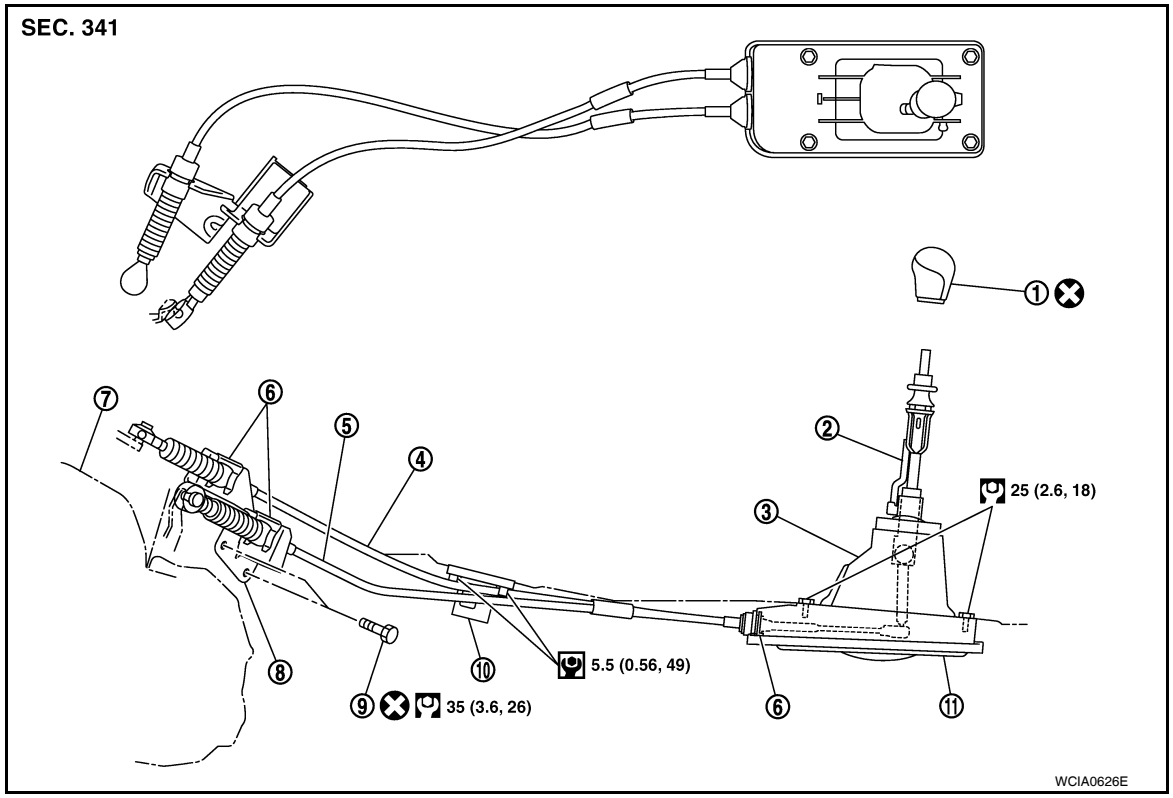
- Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No

CONTROL LINKAGE

Component of Shift Selector and Control Cable

INFOID:0000000007330299



1. Shift selector handle
2. Shift selector
3. M/T shift selector assembly
4. Select cable
5. Shift selector cable
6. Lock plate
7. Clutch housing
8. Cable bracket
9. Tapping bolt
10. Cable support bracket
11. Adapter plate

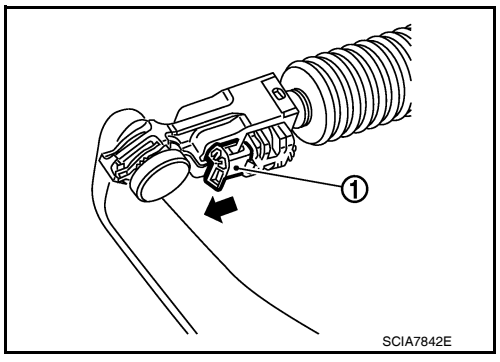
Removal and Installation

INFOID:0000000007330300

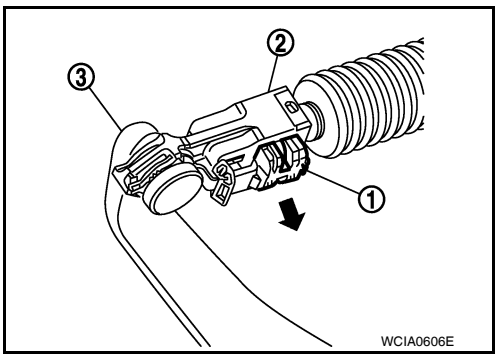
REMOVAL

1. Remove battery. Refer to SC-7, "Removal and Installation".
2. Remove air duct (front), air duct (Inlet) and air cleaner case. Refer to EM-16, "Removal and Installation".
3. Remove shift selector cable from control shaft shift lever.
4. Remove select cable according to the following.

a. Move stopper (1) to the unlocked position.



b. Pull the release button (1) of select cable (2) and then remove it from control shaft select lever (3).



5. Move shift selector to neutral position.
6. Remove shift selector handle.
7. Remove center console assembly. Refer to IP-12, "Removal and Installation".
8. Remove M/T shift selector assembly bolts.
9. Remove exhaust front tube, center muffler and heat plate. Refer to EX-5, "Removal and Installation".
10. Remove cable support bracket.
11. Remove select cable and shift selector cable from cable bracket.
12. Remove M/T shift selector assembly from the vehicle.

INSTALLATION

Installation is in the reverse order of removal.

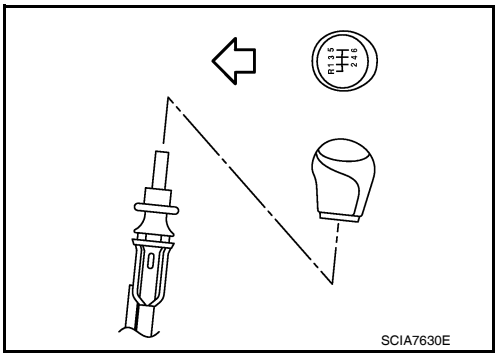
NOTE:

Self-tapping bolts are used to attach cables to the clutch housing.

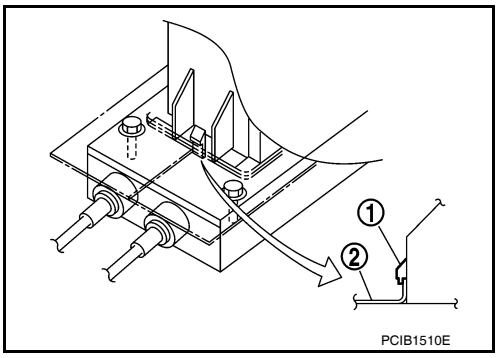
- Securely assemble each cable and lever of control shaft.
- Be careful about the installation direction, and push shift selector handle onto shift selector.

CAUTION:

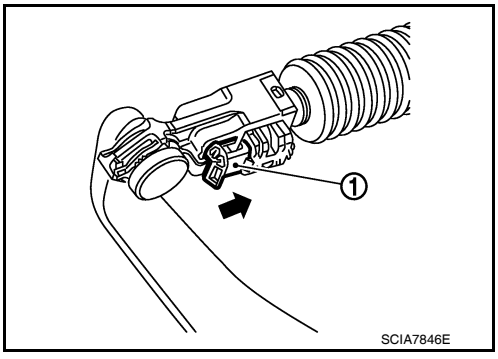
Do not reuse shift selector handle.



- Make sure that the front/rear pawls (1) of M/T shift selector assembly are in contact with flange of the floor (2).
- When shift selector is moved to 1st-2nd side and 5th-6th side, confirm shift selector returns to neutral position smoothly.
- When shift selector is moved to each position, make sure there is no binding or disconnection in each boot.



- Move stopper (1) to lock position when installing the shift cable onto the control shaft shift lever.

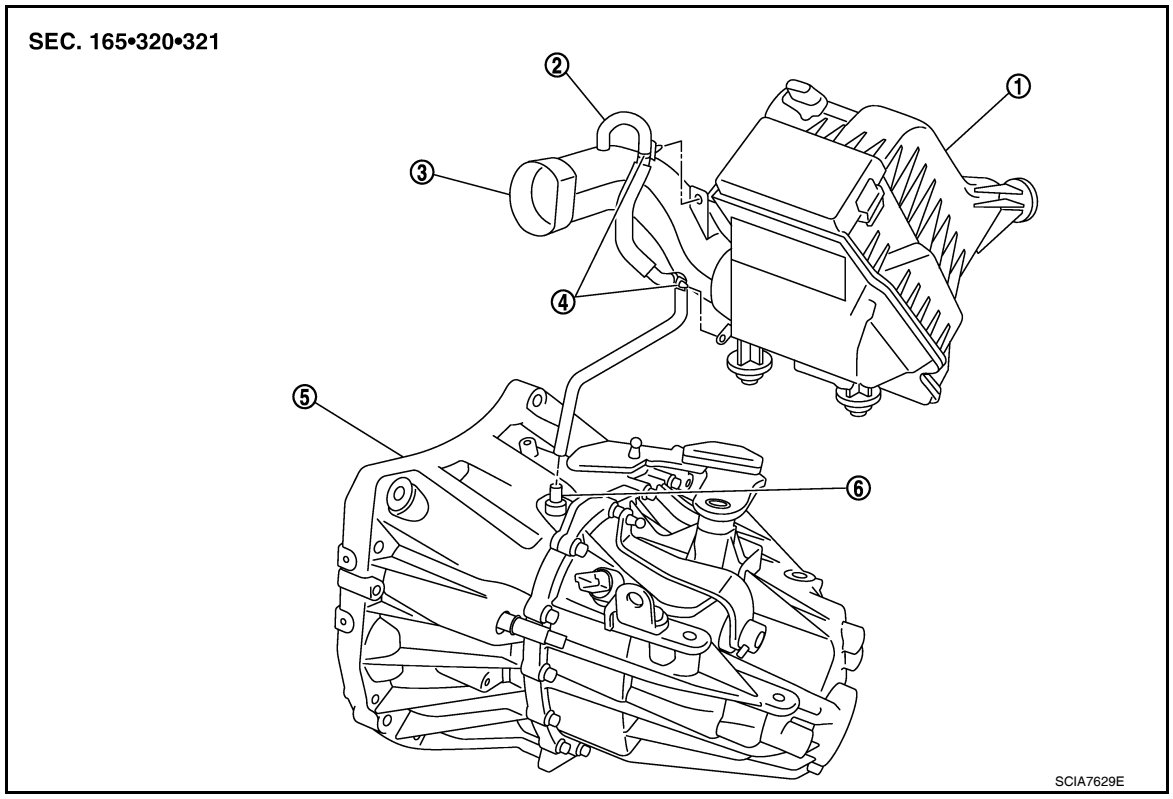


AIR BREATHER HOSE

Removal and Installation

INFOID:0000000007330301

COMPONENTS



1. Air cleaner case
2. Air breather hose
3. Air duct (inlet)
4. Clip
5. Transaxle assembly
6. Two way connector

REMOVAL

1. Remove battery. Refer to SC-7, "Removal and Installation".
2. Remove air duct (front), air duct (inlet) and air cleaner case. Refer to EM-16, "Removal and Installation".
3. Remove air breather hose.
   CAUTION:
   When air breather hose is removed, be sure to hold two way connector securely.

INSTALLATION

Installation is in the reverse order of removal.

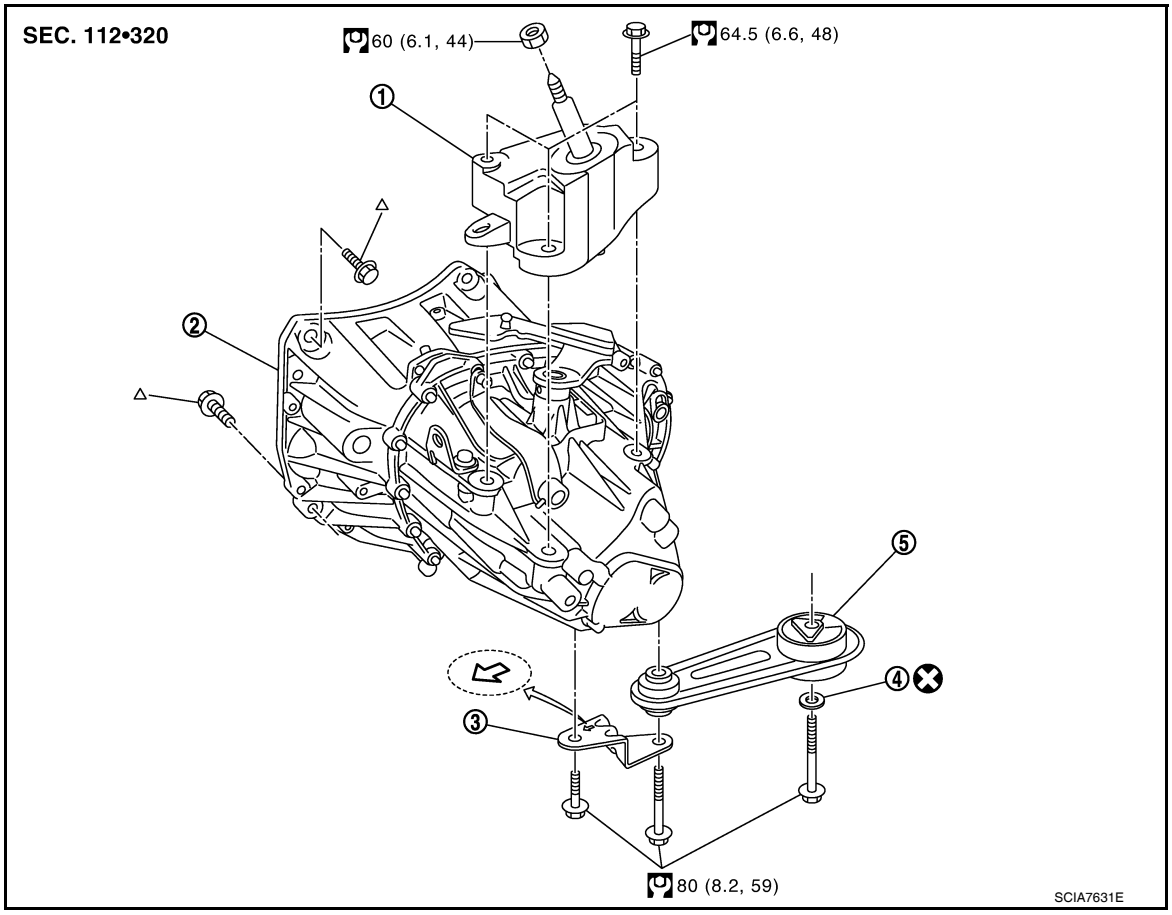
- When installing air breather hose on two way connector, aim paint mark face toward the vehicle front.
- When installing air breather hose on two way connector, push it until it hits transaxle case.
- When installing air breather hose to air duct and air cleaner case, make sure that clips are fully inserted.

CAUTION:
Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

TRANSAXLE ASSEMBLY

Component

INFOID:0000000007330302



1. LH engine mount bracket (transaxle side)
2. Transaxle assembly
3. Rear engine mount bracket
4. Washer
5. Rear torque rod
⇦ Front

△: Refer to MT-18, "Removal and Installation".

Removal and Installation

INFOID:0000000007330303

CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Inserted CSC returns to the original position when removing transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal, and may cause clutch fluid leakage.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Drain clutch fluid and remove clutch tube from CSC. Refer to CL-12, "Removal and Installation".
   CAUTION:
   Do not depress clutch pedal during removal procedure.
2. Remove engine and transaxle assembly. Refer to EM-78, "Removal and Installation".
3. Remove starter motor. Refer to SC-19, "Removal and Installation".
4. Remove transaxle assembly to engine bolts.
5. Separate transaxle assembly from engine.

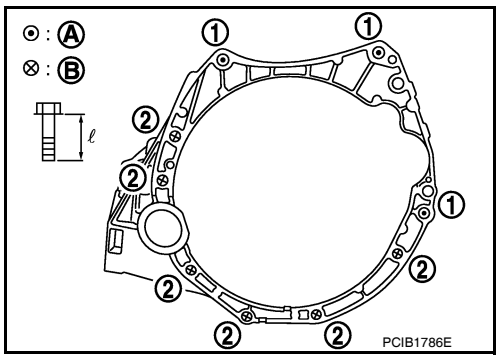
INSTALLATION

Installation is in the reverse order of removal.

- If transaxle is removed from the vehicle, always replace CSC. Refer to CL-12, "Removal and Installation".
- When installing the transaxle assembly to the engine, install the bolts as shown.

CAUTION:

When installing transaxle assembly, be careful not to bring transaxle input shaft into contact with clutch cover.



Bolt No.	1	2
Quantity	3	6
Bolt length " ℓ " mm (in)	60 (2.36)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62.0 (6.3, 46)	

(A): M/T to engine
(B): Engine to M/T

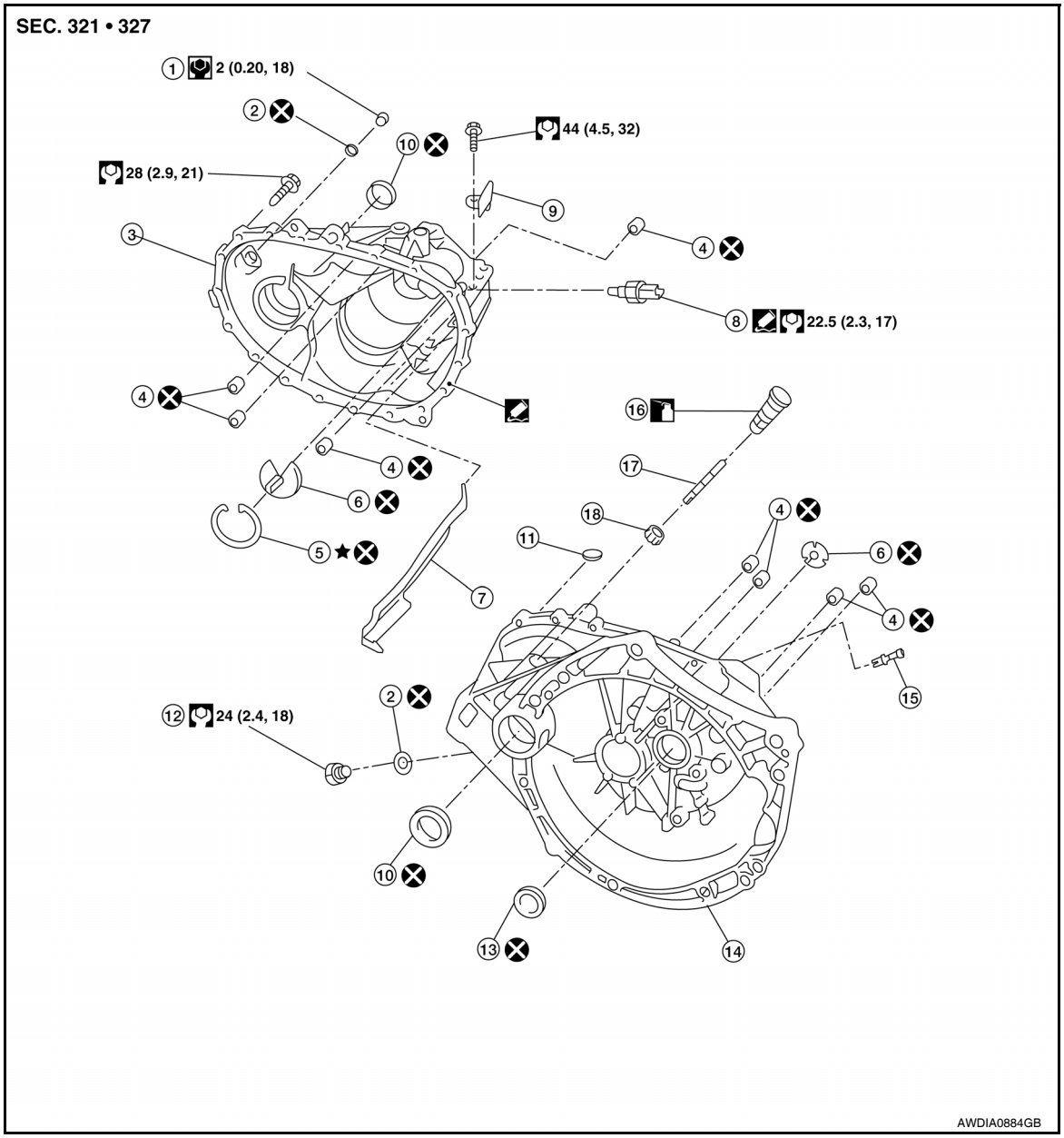
- Bleed the air from the clutch hydraulic system. Refer to CL-9, "Air Bleeding Procedure".
- After installation, check oil level, and check for leaks and loose mechanisms. Refer to MT-12, "Checking M/T Oil".

Disassembly and Assembly

INFOID:0000000007330304

COMPONENTS

Case and Housing Components

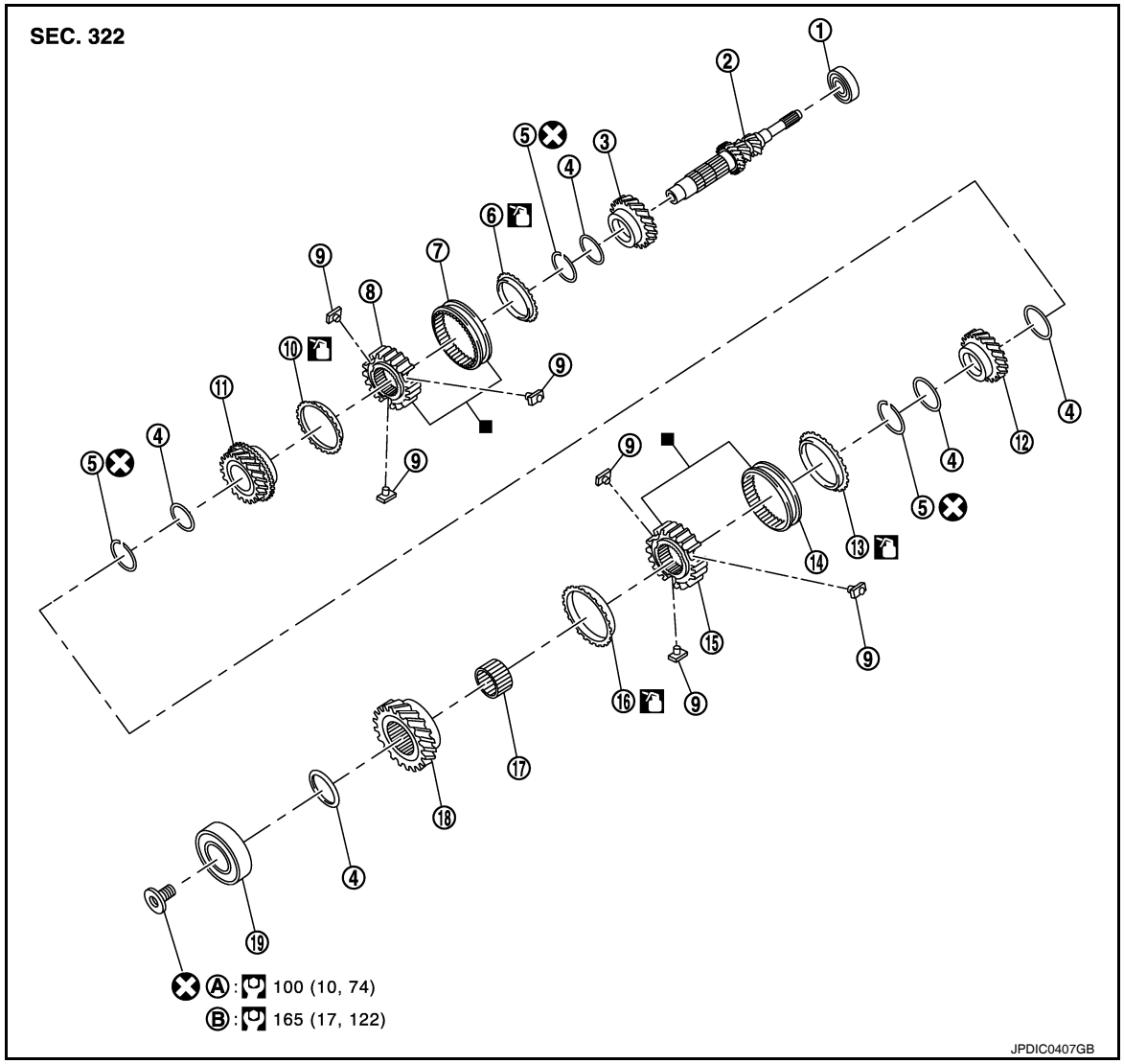


1. Filler plug	2. Gasket	3. Transaxle case
4. Bushing	5. Snap ring	6. Oil channel
7. Oil gutter	8. Position switch	9. Bracket
10. Differential side oil seal	11. Magnet	12. Drain plug
13. Input shaft oil seal	14. Clutch housing	15. Two way connector
16. Plug	17. Pinion shaft	18. Pinion gear

: Use specified transaxle fluid. Refer to MA-13, "Fluids and Lubricants"

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

Gear Components

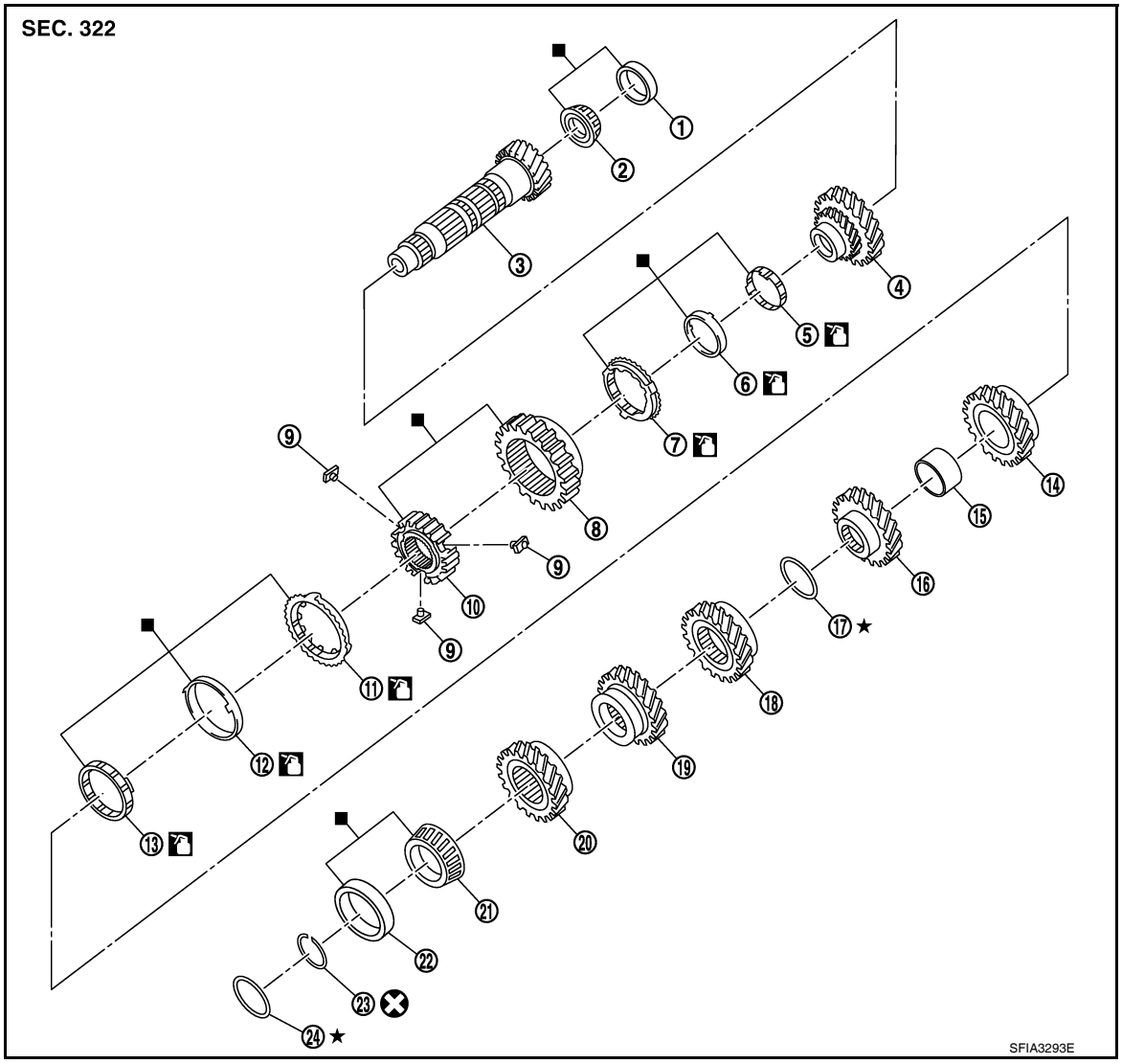


1. Input shaft front bearing
2. Input shaft
3. 3rd input gear
4. Spacer
5. Snap ring
6. 3rd baulk ring
7. 3rd-4th coupling sleeve
8. 3rd-4th synchronizer hub
9. Insert key
10. 4th baulk ring
11. 4th input gear
12. 5th input gear
13. 5th baulk ring
14. 5th-6th coupling sleeve
15. 5th-6th synchronizer hub
16. 6th baulk ring
17. Needle bearing
18. 6th input gear
19. Input shaft rear bearing

A: First step
B: Final step

: Apply gear oil.

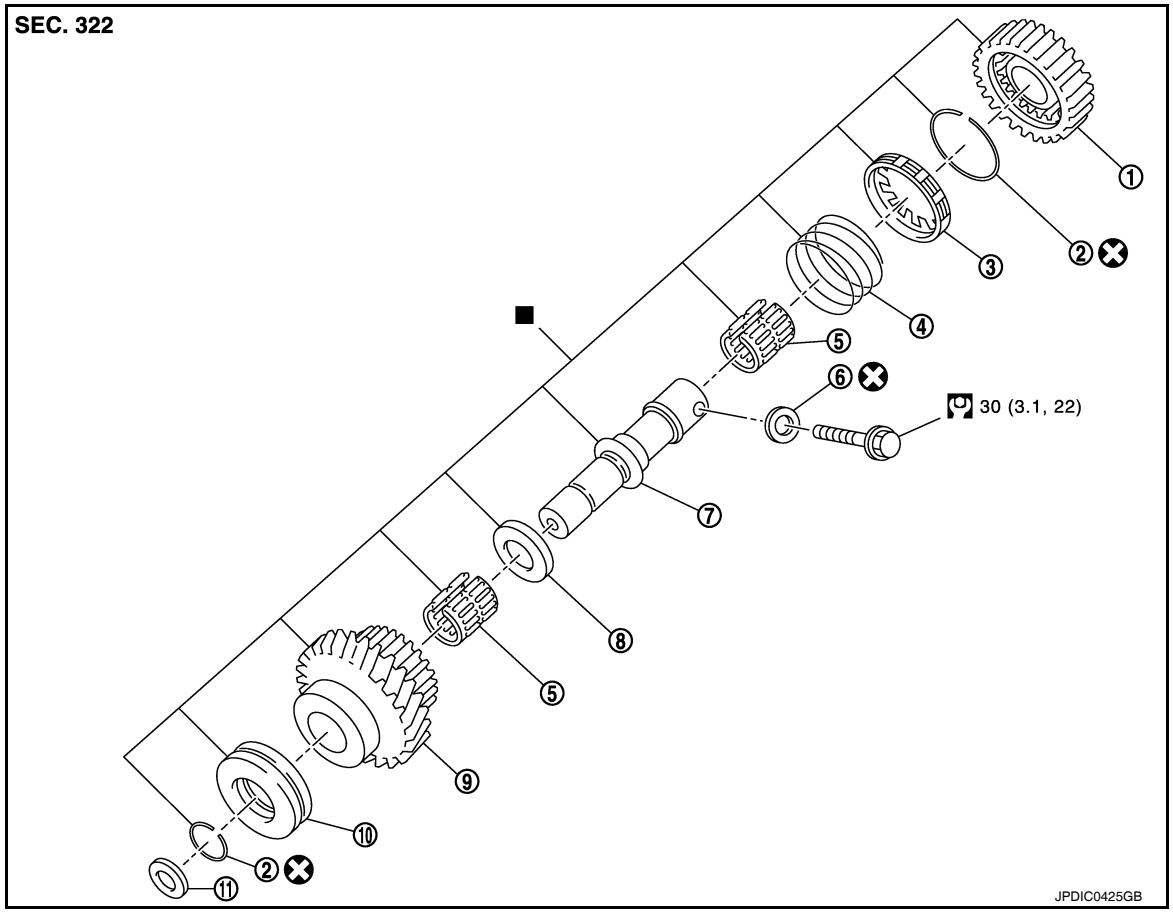
■: Replace the parts as a set.



1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. 1st-2nd coupling sleeve	9. Insert key
10. 1st-2nd synchronizer hub	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. 2nd main gear	15. Bushing
16. 3rd main gear	17. Mainshaft adjusting shim	18. 4th main gear
19. 5th main gear	20. 6th main gear	21. Mainshaft rear bearing inner race
22. Mainshaft rear bearing outer race	23. Snap ring	24. Mainshaft rear bearing adjusting shim

: Apply gear oil.

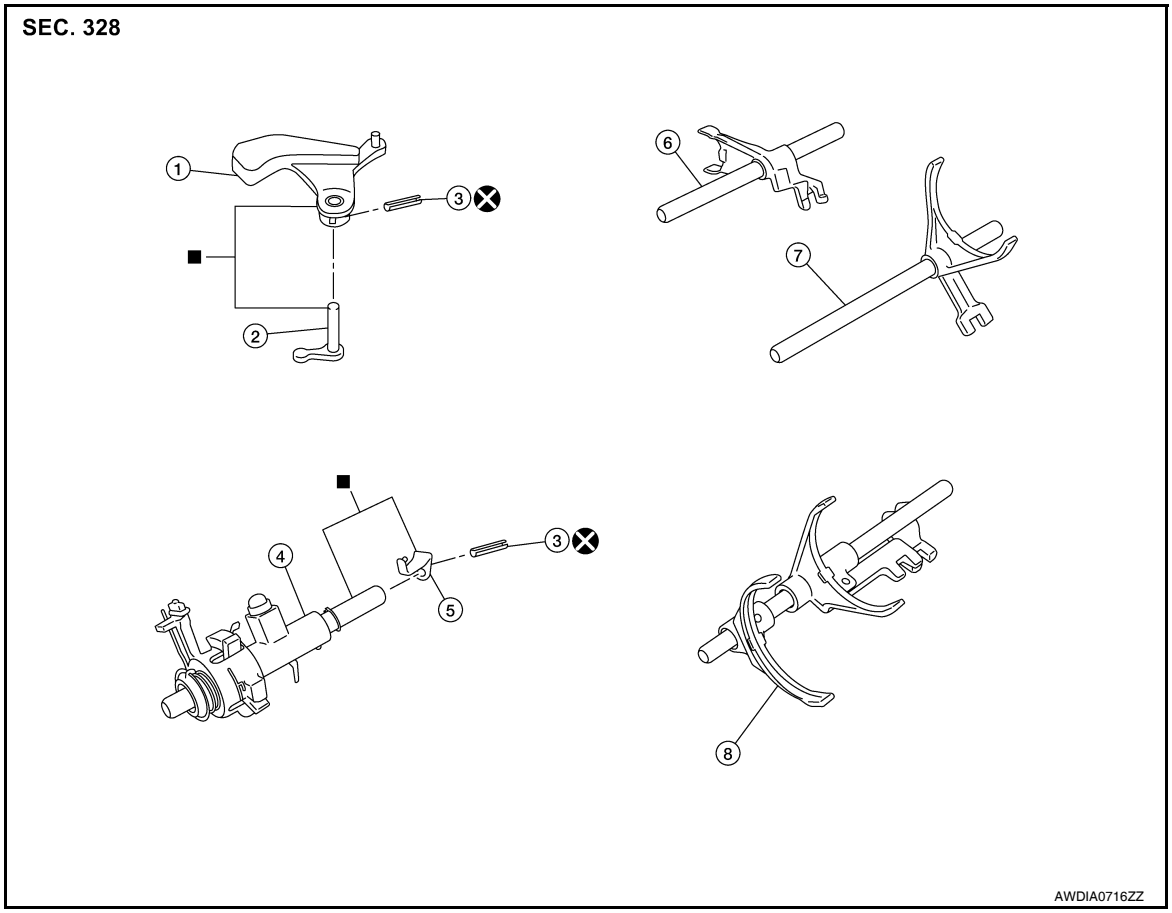
: Replace the parts as a set.



1. Reverse output gear
2. Snap ring
3. Reverse baulk ring
4. Return spring
5. Needle bearing
6. Seal washer
7. Reverse idler shaft
8. Spacer
9. Reverse input gear
10. Lock washer
11. Spring washer

■: Replace the parts as a set.

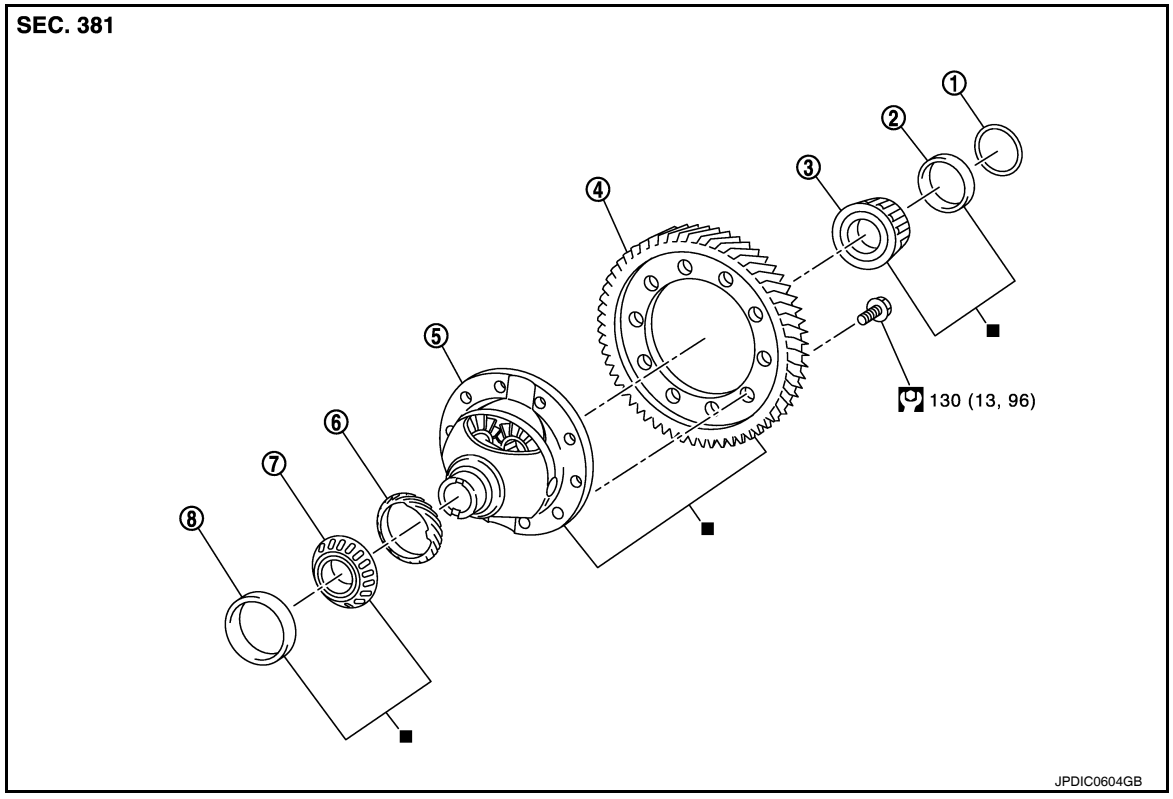
Shift Control Components



1. Shifter lever A
2. Shifter lever B
3. Retaining pin
4. Selector
5. Selector lever
6. Reverse fork rod
7. 1st-2nd fork rod
8. Fork rod

■: Replace the parts as a set.

Final Drive Components

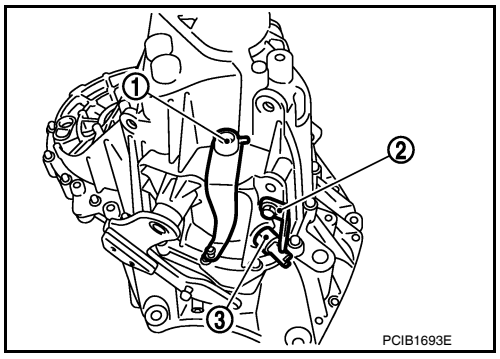


1. Shim
2. Differential side bearing outer race (transaxle case side)
3. Differential side bearing inner race (transaxle case side)
4. Final gear
5. Differential case
6. Speedometer drive gear
7. Differential side bearing inner race (clutch housing side)
8. Differential side bearing outer race (clutch housing side)

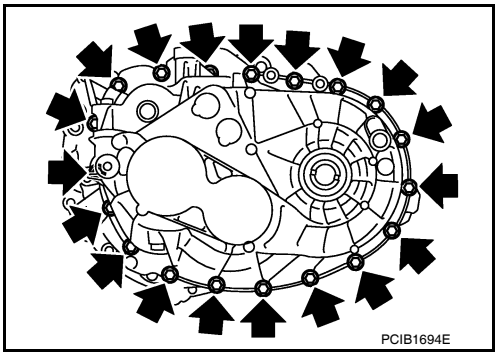
■: Replace the parts as a set.

DISASSEMBLY

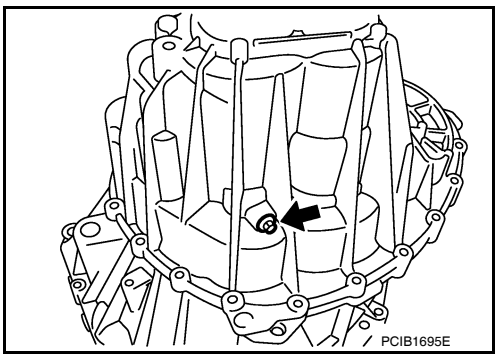
1. Remove drain plug and gasket from clutch housing, using a suitable tool and then drain gear oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove selector lever (1) retaining pin with a pin punch to remove selector lever.
4. Remove bracket (2) and position switch (3) from transaxle case.



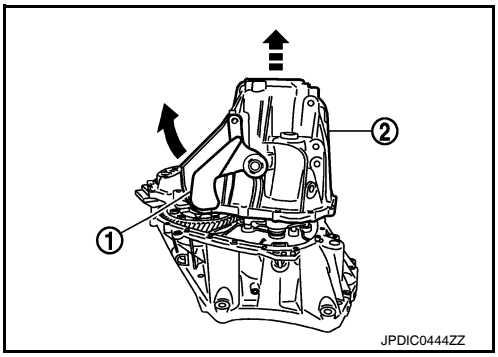
5. Remove transaxle case bolts (⬅).



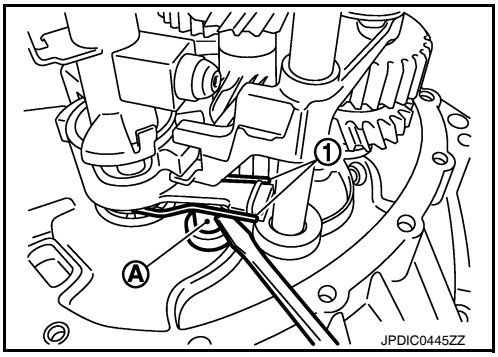
6. Remove reverse idler shaft bolt (⬅) and seal washer.



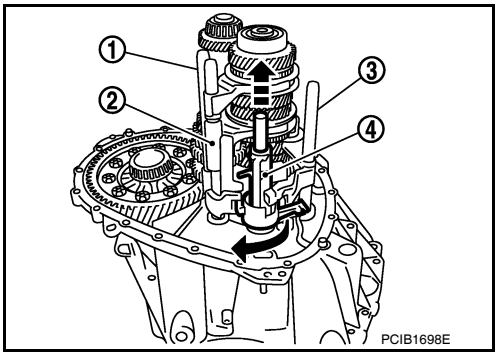
7. Remove transaxle case (2) while rotating shifter lever A (1) in the direction as shown.



8. Remove selector spring (1) from return bushing (A).



9. Shift 1st-2nd fork rod (1), fork rod (2), and reverse fork rod (3) to the neutral position.
10. Remove selector (4) from clutch housing.

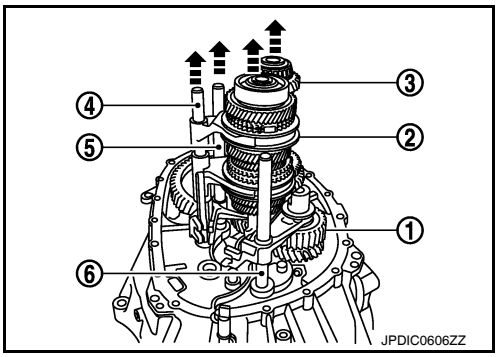


11. Remove reverse idler shaft assembly (1) according to the following procedures.

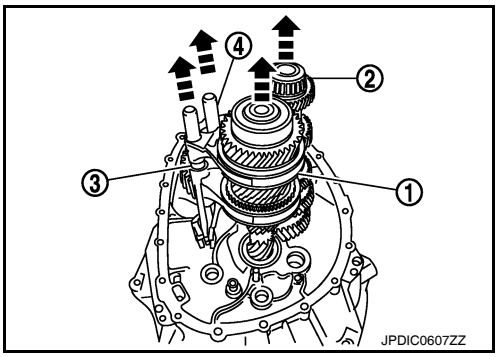
a. Pull up input shaft assembly (2), mainshaft assembly (3), fork rod (4), and 1st-2nd fork rod (5).
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.

b. Remove reverse idler shaft assembly and reverse fork rod (6) from clutch housing.

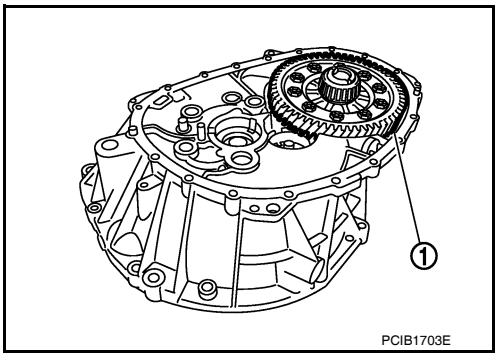
12. Remove spring washer from clutch housing.



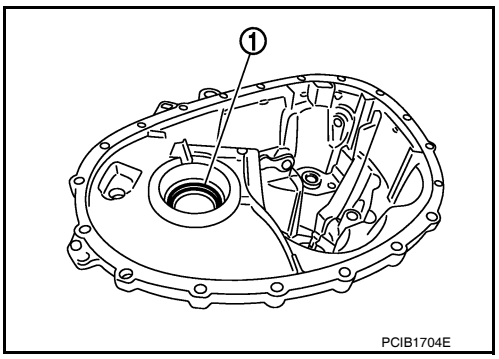
13. Pull up and remove input shaft assembly (1), mainshaft assembly (2), fork rod (3), and 1st-2nd fork rod (4) from clutch housing.
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.



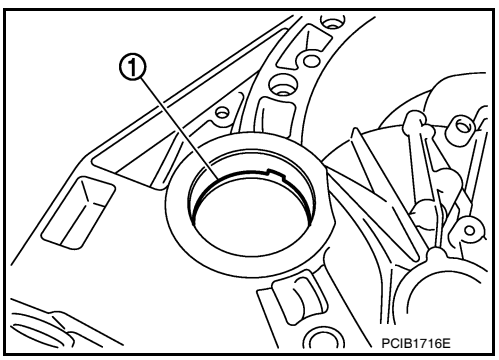
14. Remove final drive assembly (1) from clutch housing.
15. Remove magnet from clutch housing.



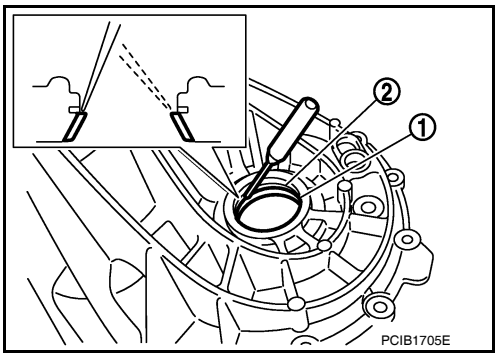
16. Remove differential side oil seals (1) from clutch housing and transaxle case.
CAUTION:
- **Do not damage clutch housing and transaxle case.**
- **Do not reuse differential side oil seals.**



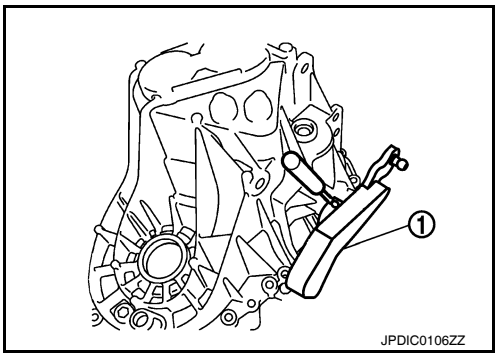
17. Remove differential side bearing outer race (1) from clutch housing, using a brass rod.
CAUTION:
Do not damage clutch housing.



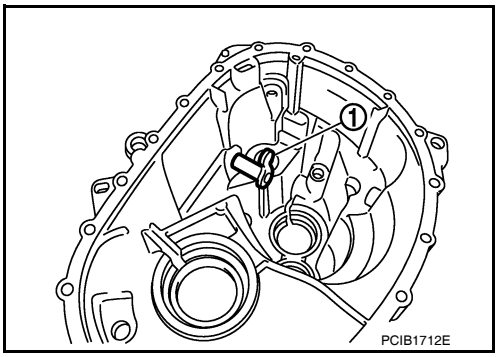
18. Remove differential side bearing outer race (1) from transaxle case, using a brass rod.
CAUTION:
Do not damage transaxle case.
19. Remove shim (2) from transaxle case.



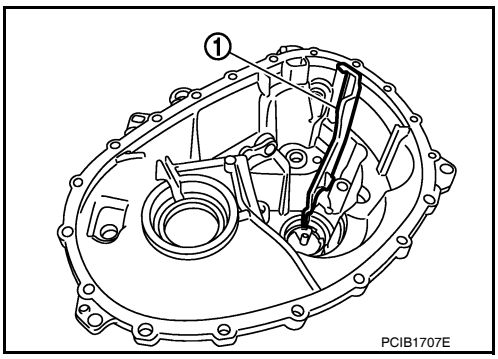
20. Remove shifter lever A (1) retaining pin, using a suitable tool.
21. Remove shifter lever A from transaxle case.



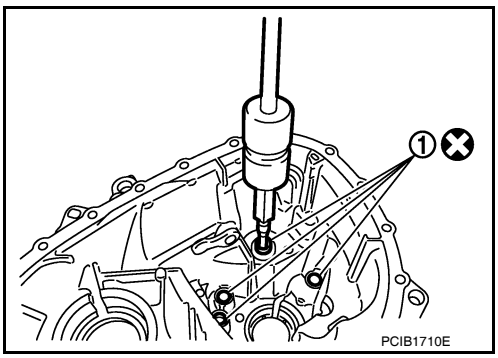
22. Remove shifter lever B (1) from transaxle case.



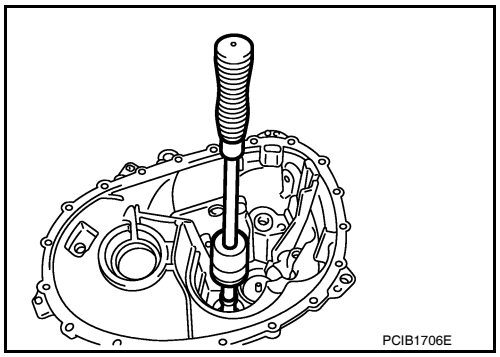
23. Remove oil gutter (1) from transaxle case.



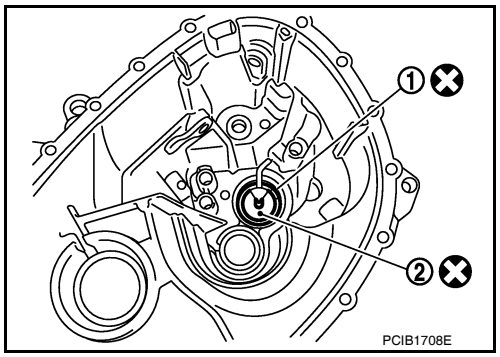
24. Remove bushings (1) from transaxle case, using a suitable tool.
CAUTION:
Do not reuse bushings.



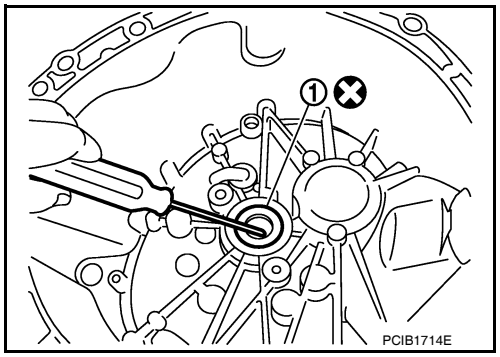
25. Remove mainshaft rear bearing outer race from transaxle case, using a suitable tool.
26. Remove mainshaft rear bearing adjusting shim from transaxle case.



27. Remove snap ring (1) and oil channel (2) from transaxle case.
CAUTION:
Do not reuse snap ring and oil channel.

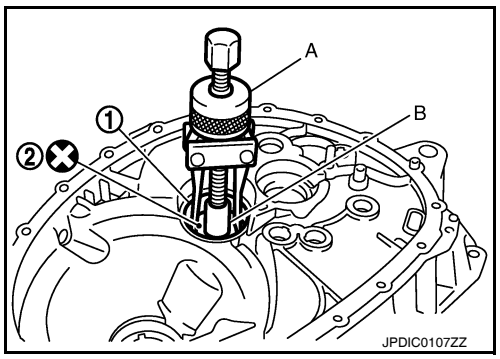


28. Remove input shaft oil seal (1) from clutch housing, using a suitable tool.
CAUTION:
- **Do not damage clutch housing.**
- **Do not reuse input shaft oil seal.**



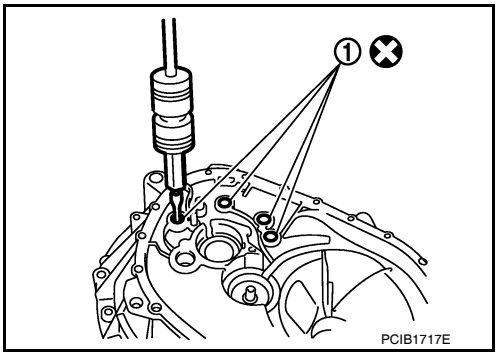
29. Remove mainshaft front bearing outer race (1) from clutch housing, using Tool (A) and a suitable tool (B).

Tool number : KV381054S0 (J-34286)

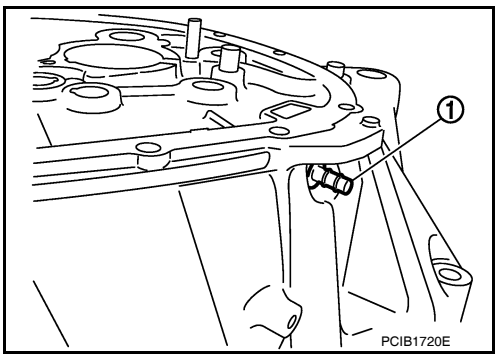


30. Remove oil channel (2) from clutch housing.

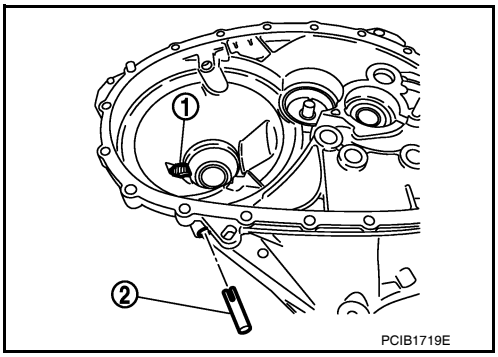
31. Remove bushing (1) from clutch housing, using suitable tool.
CAUTION:
Do not reuse bushing.



32. Remove two way connector (1) from clutch housing.
33. Remove plug from clutch housing.

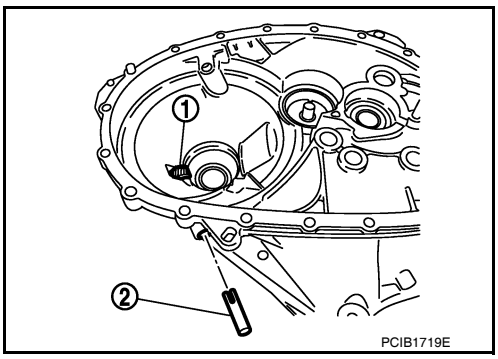


34. Remove pinion gear (1) and pinion shaft (2) from clutch housing.

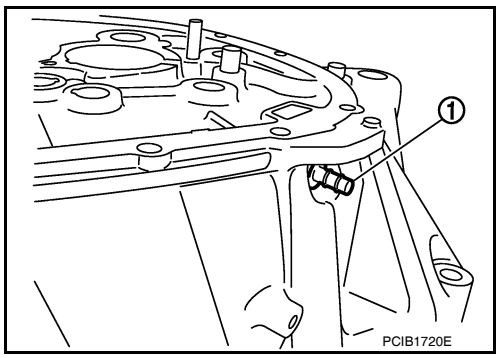


ASSEMBLY

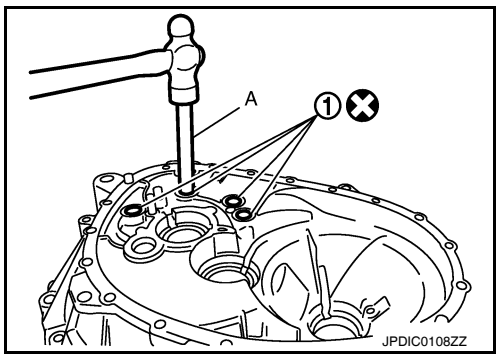
1. Install pinion gear (1) and pinion shaft (2) to clutch housing.
CAUTION:
Replace transaxle assembly when replacing clutch housing.
2. Install plug to clutch housing.



3. Install two way connector (1) to clutch housing.



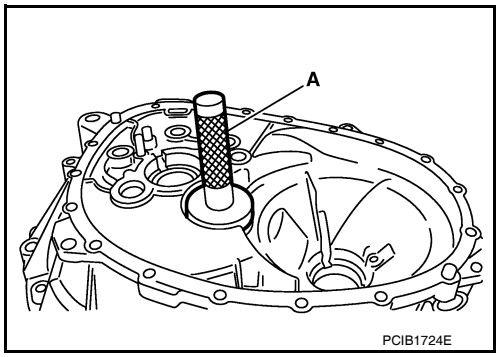
4. Install bushings (1) so that they becomes even to clutch housing edge surface, using a suitable tool (A).
CAUTION:
Do not reuse bushings.
5. Install oil channel to clutch housing.
CAUTION:
Do not reuse oil channel.



6. Install mainshaft front bearing outer race to clutch housing, using Tool (A).

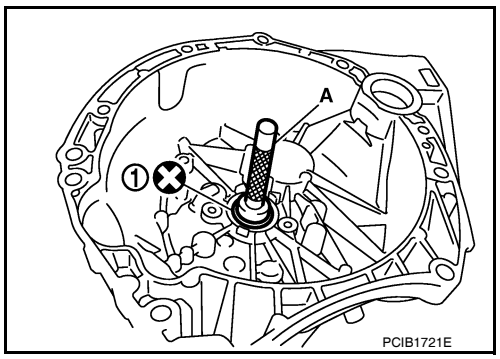
Tool number : KV38100200 (—)

CAUTION:
Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.



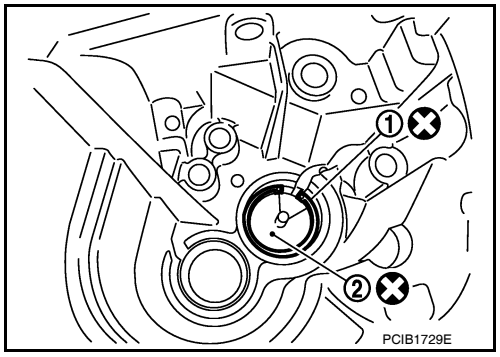
7. Install input shaft oil seal (1) to clutch housing, using Tool (A).
CAUTION:
Do not reuse input shaft oil seal.

Tool number : ST33220000 (—)



8. Install snap ring (1) and oil channel (2) to transaxle case.
CAUTION:
- **Do not reuse snap ring and oil channel.**
- **Select and install snap ring that has the same thickness as previous one.**
- **Replace transaxle assembly when replacing transaxle case.**

9. Install mainshaft rear bearing adjusting shim to transaxle case.
CAUTION:
Select mainshaft rear bearing adjusting shim according to the following procedures when replacing mainshaft adjusting shim, 6th main gear, 5th main gear, or 4th main gear.

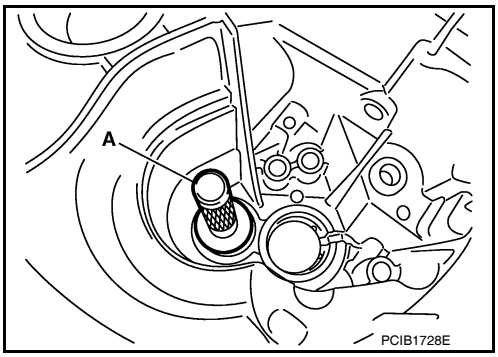


- **Do not reuse mainshaft adjusting shim.**
  - **If new mainshaft adjusting shim is thinner than previous one, offset the thickness difference by selecting thicker mainshaft rear bearing adjusting shim.**
  - **If new mainshaft adjusting shim is thicker than previous one, offset the thickness difference by selecting thinner mainshaft rear bearing adjusting shim.**
- **Replace 6th main gear, 5th main gear, or 4th main gear.**
  - **Measure the thickness of the main gear used before and the new main gear**
  - **Increase the thickness of the mainshaft rear bearing adjusting shim, if the difference is smaller than 0.025 mm (0.0010 in).**
  - **Decrease the thickness of the mainshaft rear bearing adjusting shim, if the difference is greater than 0.025 mm (0.0010 in).**

10. Install mainshaft rear bearing outer race to transaxle case, using Tool (A).

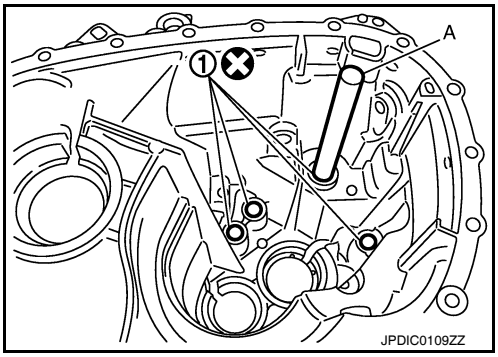
Tool number : KV38100200 (—)

CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.

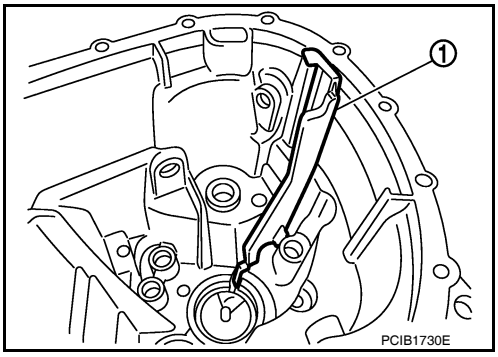


11. Install bushings (1) to transaxle case, using suitable (A).

CAUTION:
Do not reuse bushings.



12. Install oil gutter (1) to transaxle case.

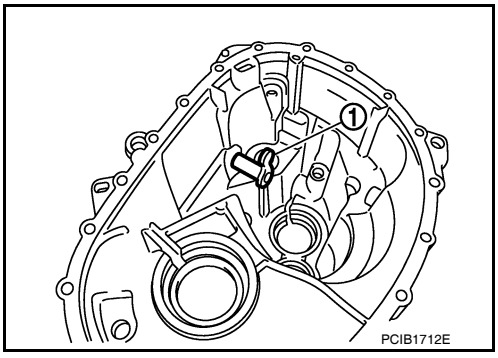


13. Install shifter lever B (1) to transaxle case.

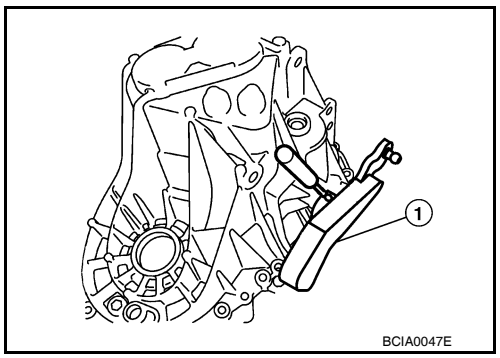
CAUTION:
Replace shifter lever A and shifter lever B as a set.

14. Install shifter lever A to transaxle case.

CAUTION:
Replace shifter lever A and shifter lever B as a set.



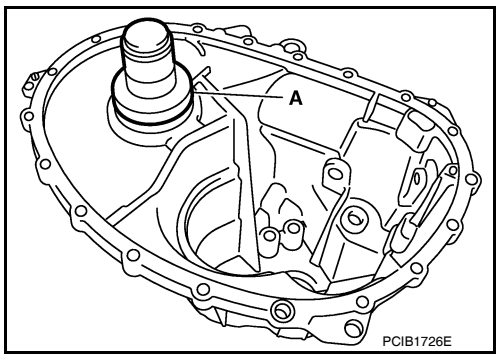
15. Install retaining pin to shifter lever A (1), using a pin punch.
CAUTION:
Do not reuse retaining pin.
16. Install shim to transaxle case.



17. Install differential side bearing outer race (transaxle case side) to transaxle case, using Tool (A).

Tool number : ST33400001 (J-26082)

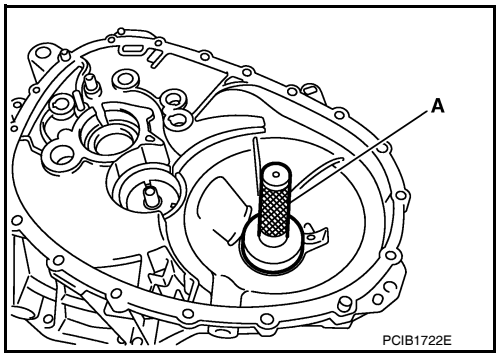
CAUTION:
Replace differential side bearing outer race (transaxle case side) and differential side bearing inner race (transaxle case side) as a set.



18. Install differential side bearing outer race (clutch housing side) to clutch housing, using Tool (A).

Tool number : KV38100200 (—)

CAUTION:
Replace differential side bearing outer race (clutch housing side) and differential side bearing inner race (clutch housing side) as a set.

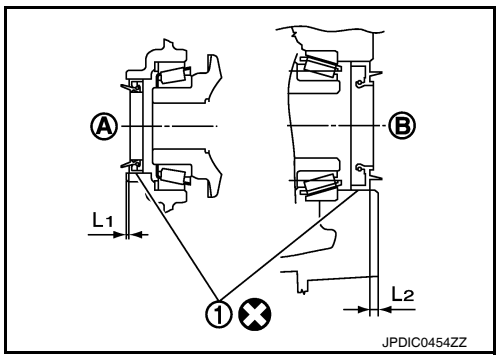


19. Install differential side oil seals (1) to clutch housing and transaxle case, using Tool.

Tool number : KV32500QAA (B.vi 1666-B)

(A) : Transaxle case side
(B) : Clutch housing side

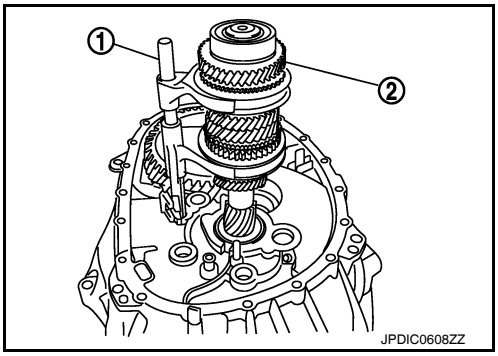
Dimension (L_1) : 1.2 – 1.8 mm (0.047 – 0.071 in)
Dimension (L_2) : 2.7 – 3.3 mm (0.106 – 0.130 in)



CAUTION:
- **Do not reuse differential side oil seal.**
- **Do not incline differential side oil seal.**
- **Do not damage clutch housing and transaxle case.**

20. Install magnet to clutch housing.
21. Install final drive assembly to clutch housing.

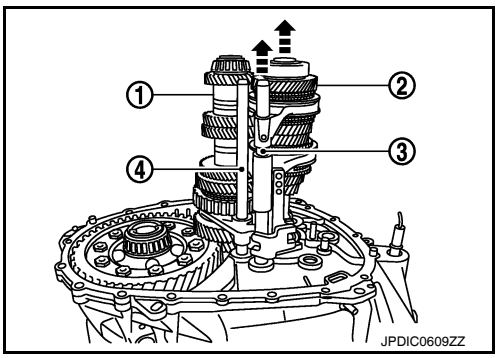
22. Set fork rod (1) to input shaft assembly (2), and then install them to clutch housing.



23. Install mainshaft assembly (1) according to the following procedures.

a. Pull up input shaft assembly (2) and fork rod (3).

b. Set 1st-2nd fork rod (4) to mainshaft assembly, and then install them to clutch housing.

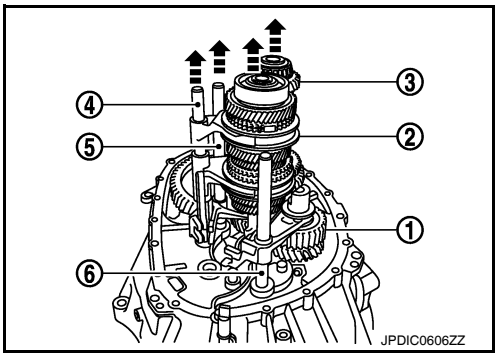


24. Install reverse idler shaft assembly (1) according to the following procedures.

a. Install spring washer to clutch housing.

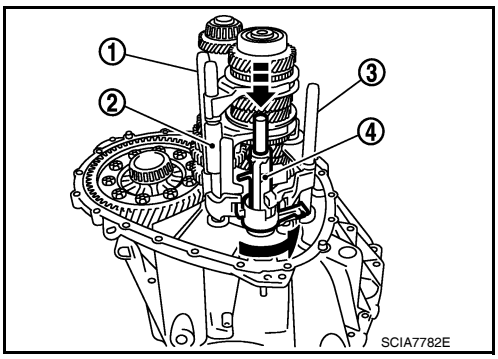
b. Pull up input shaft assembly (2), mainshaft assembly (3), fork rod (4), and 1st-2nd fork rod (5).
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.

c. Set reverse fork rod (6) to reverse idler shaft assembly, and then install them to clutch housing.



25. Shift 1st-2nd fork rod (1), fork rod (2), and reverse fork rod (3) to the neutral position.

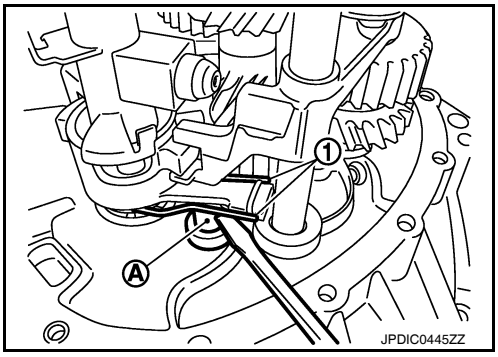
26. Install selector (4) to clutch housing.
CAUTION:
Replace selector lever and selector as a set.



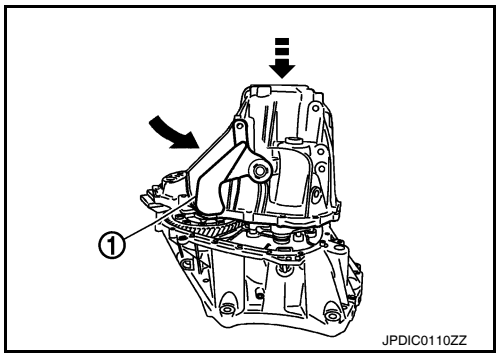
27. Install selector spring (1) to return bushing (A).

28. Apply recommended sealant to transaxle case mounting surface.
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

CAUTION:
- **Do not allow old liquid gasket, moisture, oil, or foreign matter to remain on mounting surface.**
- **Check that mounting surface is not damaged.**
- **Apply liquid gasket bead continuously.**



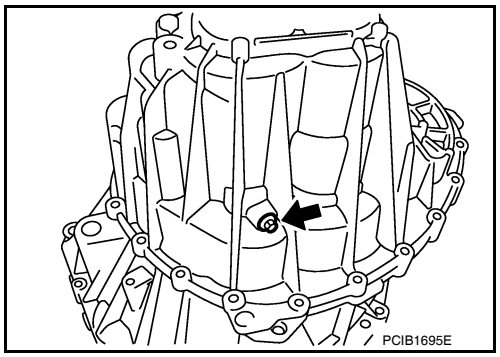
29. Install transaxle case to clutch housing while rotating shifter lever A (1) in the direction as shown.



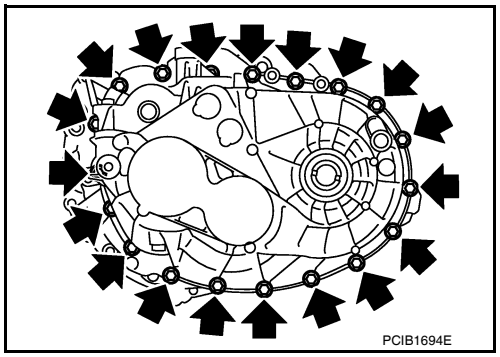
30. Install reverse idler shaft bolt (⬅) according to the following procedures.

a. Install seal washer to reverse idler shaft bolt, and install reverse idler shaft bolt to transaxle case.
CAUTION:
Do not reuse seal washer.

b. Tighten reverse idler shaft bolt to the specified torque. Refer to MT-19, "Disassembly and Assembly".



31. Tighten transaxle case bolts (⬅) to the specified torque. Refer to MT-19, "Disassembly and Assembly".



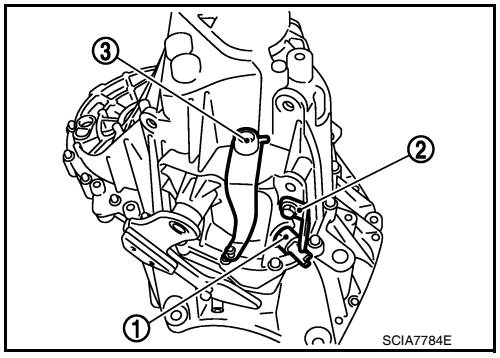
32. Install position switch (1) according to the following procedures.

a. Apply recommended sealant to position switch thread.
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

CAUTION:
Do not allow old liquid gasket, moisture, oil, or foreign matter to remain on thread.

b. Install position switch to transaxle case, and tighten it to the specified torque. Refer to MT-19, "Disassembly and Assembly".

33. Install bracket (2) to transaxle case, and tighten bolt to the specified torque. Refer to MT-19, "Disassembly and Assembly".



34. Install selector lever (3) according to following the procedures.

a. Install selector lever to transaxle case.
CAUTION:
Replace selector lever and selector as a set.

b. Install retaining pin to selector lever, using a suitable tool.
CAUTION:
Do not reuse retaining pin.

35. Install drain plug according to the following procedures.

a. Install gasket to drain plug.
CAUTION:
Do not reuse gasket.

b. Install drain plug to clutch housing, using a suitable tool.
c. Tighten drain plug to the specified torque. Refer to MT-19, "Disassembly and Assembly".
36. Install filler plug according to the following procedures.
a. Install gasket to filler plug, and then install filler plug to transaxle case.
CAUTION:
Do not reuse gasket.
b. Tighten filler plug to the specified torque. Refer to MT-19, "Disassembly and Assembly".
CAUTION:
Fill with gear oil before tightening filler plug to the specified torque.

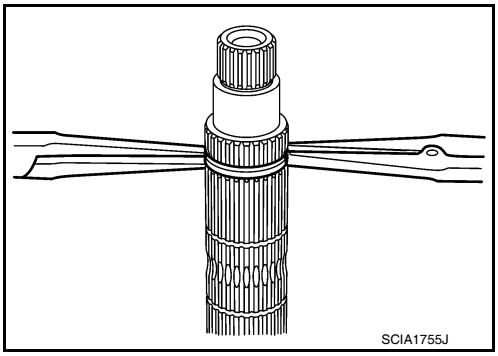
INPUT SHAFT AND GEARS

Disassembly and Assembly

INFOID:0000000007330305

GENERAL PRECAUTIONS

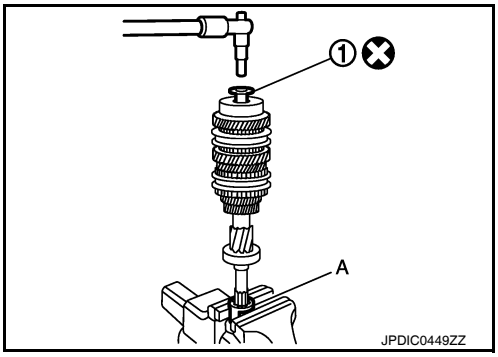
- Do not reuse snap ring.
- Secure input shaft in a vise with backplate, and then remove gears and snap rings.
- For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. While expanding snap ring with snap ring pliers, move snap ring with flat pliers.
- Disassemble gear components putting direction marks on the parts that do not affect any functions.


SCIA1755J

DISASSEMBLY

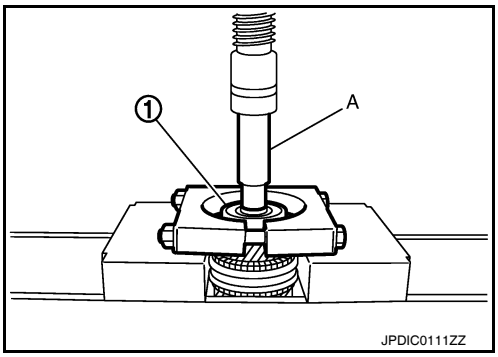
1. Remove input shaft rear bearing bolt (1) using Tool (A).
CAUTION:
Do not reuse input shaft rear bearing bolt.

Tool number (A): KV32300QAM (—)



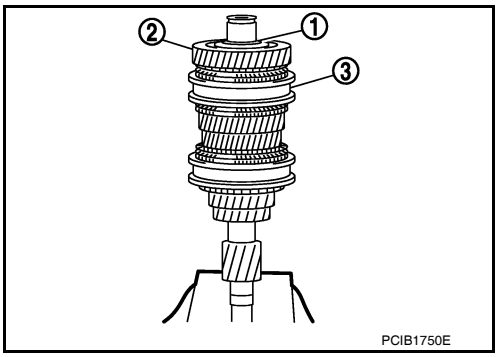
JPDIC0449ZZ

2. Remove input shaft rear bearing (1) according to the following procedures.
a. Set a suitable puller to input shaft rear bearing.
b. Remove input shaft rear bearing using a suitable drift (A).



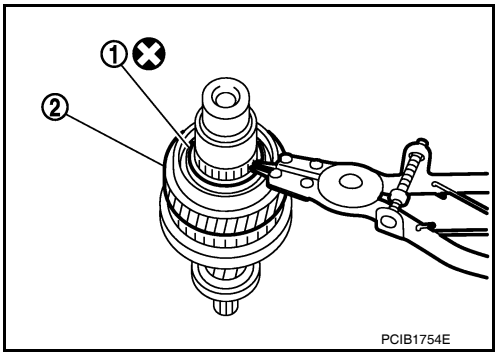
JPDIC0111ZZ

3. Remove spacer (1), 6th input gear (2), needle bearing, 6th baulk ring, and 5th-6th synchronizer hub assembly (3).
4. Remove insert keys and 5th-6th coupling sleeve from 5th-6th synchronizer hub.

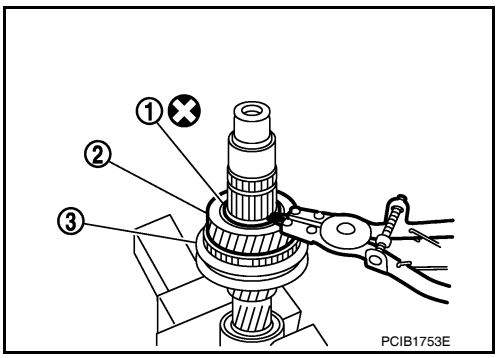


PCIB1750E

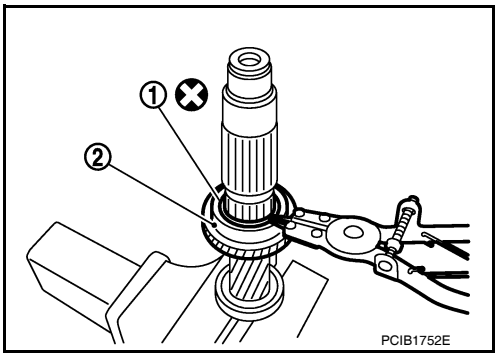
5. Remove snap ring (1) using suitable tool.
CAUTION:
Do not reuse snap ring.
6. Remove spacer, 5th baulk ring, 5th input gear (2), and spacer.



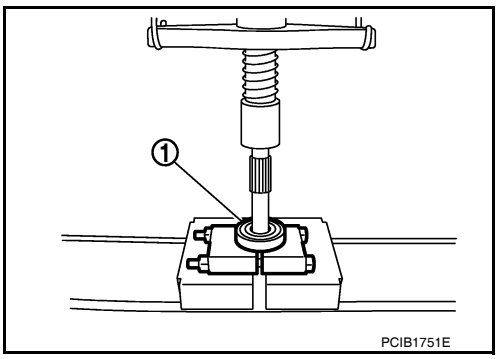
7. Remove snap ring (1) using suitable tool.
CAUTION:
Do not reuse snap ring.
8. Remove spacer, 4th input gear (2), 4th baulk ring, and 3rd-4th synchronizer hub assembly (3).
9. Remove insert keys and 3rd-4th coupling sleeve from 3rd-4th synchronizer hub.



10. Remove snap ring (1).
CAUTION:
Do not reuse snap ring.
11. Remove spacer, 3rd baulk ring, 3rd input gear (2).



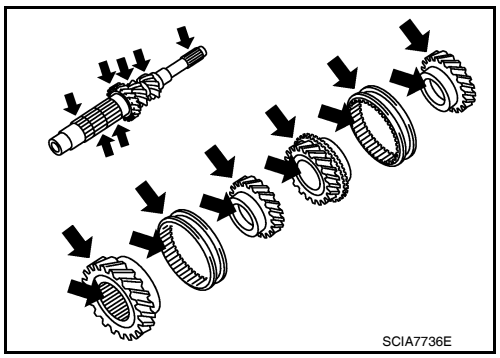
12. Set a suitable puller to input shaft front bearing (1), and then remove input shaft front bearing.



INSPECTION AFTER DISASSEMBLY

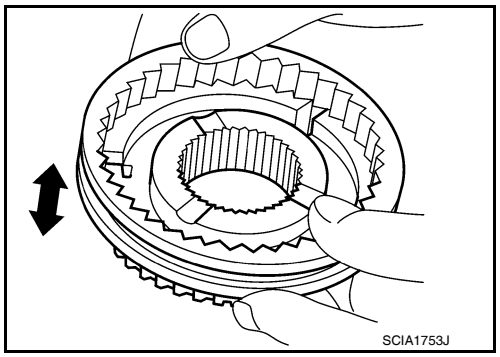
Input shaft and gear
Check the following items and replace if necessary.

- Damage, peeling, bend, uneven wear, and distortion of shaft.
- Excessive wear, damage, and peeling of gear.

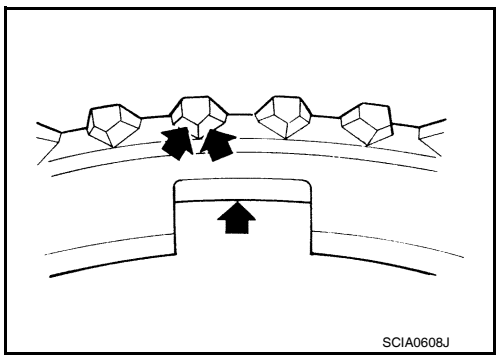

SCIA7736E

Synchronizer

- Synchronizer hub and coupling sleeve
  Check the following items and replace if necessary.
  - Breakage, damage, and unusual wear on contact surface of coupling sleeve, synchronizer hub, and insert key.
  - Coupling sleeve and synchronizer hub move smoothly.

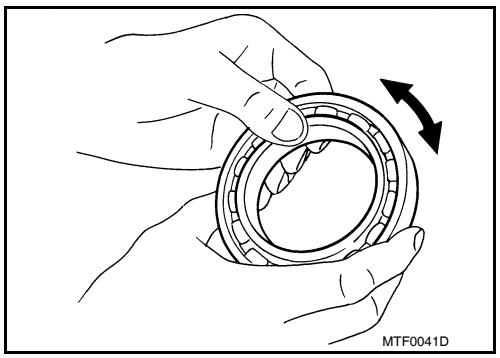

SCIA1753J

- Baulk ring
  Check contact surface of baulk ring cam and insert key for excessive wear, uneven wear, bend, and damage. Replace if necessary.


SCIA0608J

Bearing

Check bearing for damage and rough rotation. Replace if necessary.


MTF0041D

ASSEMBLY

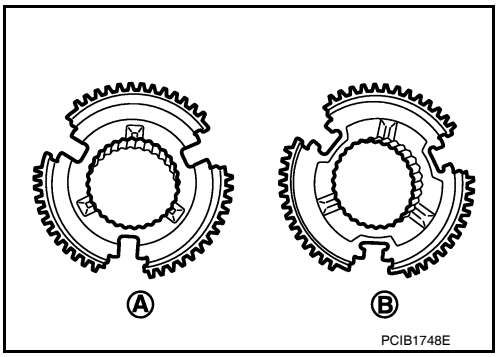
Note the following procedures, and assemble in the reverse order of disassembly.

CAUTION:

- **Replace transaxle assembly when replacing input shaft.**
- **Do not reuse snap ring.**
- **Check that snap ring is securely installed in a groove.**
- **Replace 3rd-4th coupling sleeve and 3rd-4th synchronizer hub as a set.**

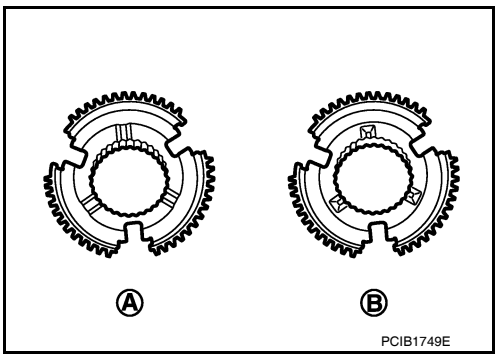
- **Replace 5th-6th coupling sleeve and 5th-6th synchronizer hub as a set.**
- **Be careful to install 3rd-4th synchronizer hub according to the specified direction.**

(A) : 3rd input gear side
(B) : 4th input gear side

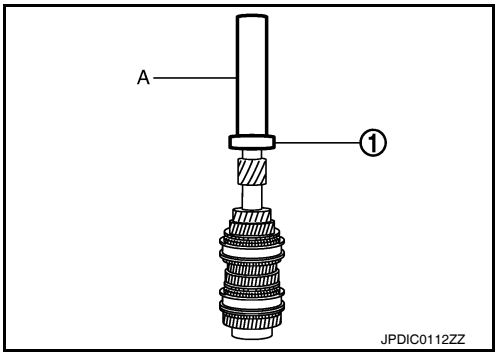


- **Be careful to install 5th-6th synchronizer hub according to the specified direction.**

(A) : 5th input gear side
(B) : 6th input gear side



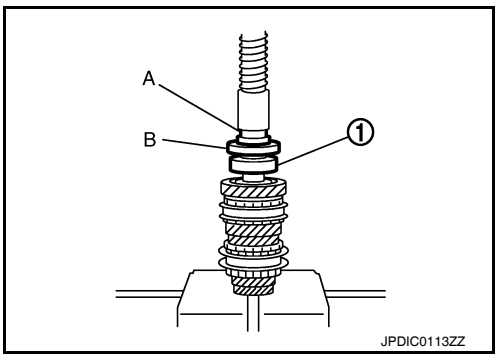
- Install input shaft front bearing (1) using a suitable drift (A).



- Install input shaft rear bearing (1) using a suitable drift (A) and the Tool (B).

Tool number (B): ST36720030 (—)

- Apply gear oil to 3rd baulk ring, 4th baulk ring, 5th baulk ring, and 6th baulk ring.



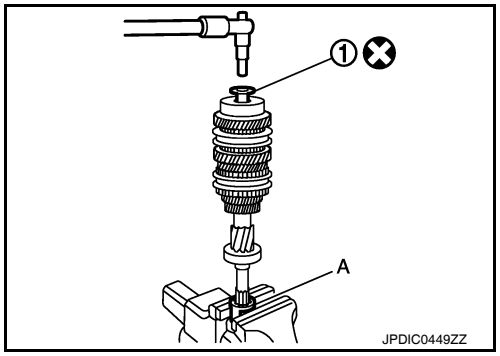
- Install input shaft rear bearing bolt (1) according to the following procedures.

CAUTION:

- **Do not reuse input shaft rear bearing bolt.**
- **Follow the procedures. Otherwise it may cause a transaxle malfunction.**

1. Secure the Tool (A) in a vise, and then set input shaft assembly.

Tool number (A): KV32300QAM (—)



2. Install input shaft rear bearing bolt, and then tighten it to the specified torque of the 1st step. Refer to MT-19, "Disassembly and Assembly".
3. Loosen input shaft rear bearing bolt by a half turn.
4. Tighten input shaft rear bearing bolt to the specified torque of the 2nd step. Refer to MT-19, "Disassembly and Assembly".

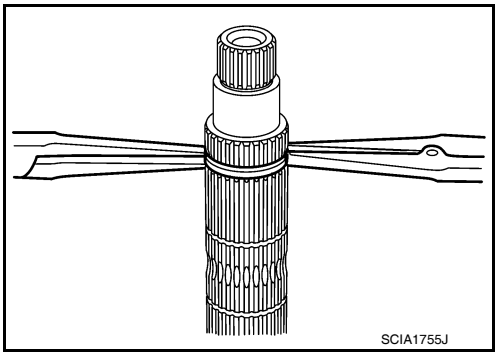
MAINSHAFT AND GEARS

Disassembly and Assembly

INFOID:0000000007330306

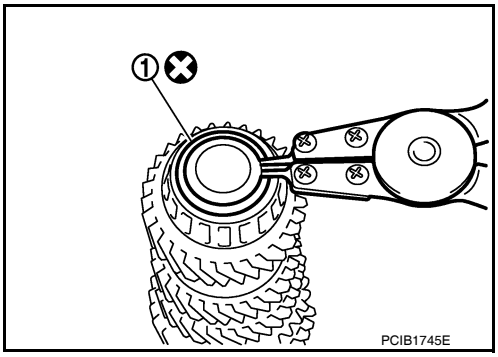
GENERAL PRECAUTIONS

- Do not reuse snap ring.
- Secure mainshaft in a vise with backplate, and then remove gears and snap rings.
- For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. While expanding snap ring with snap ring pliers, move snap ring with flat pliers.
- Disassemble gear components putting direction marks on the parts that do not affect any functions.



DISASSEMBLY

1. Remove snap ring (1) using suitable tool.
   CAUTION:
   Do not reuse snap ring.

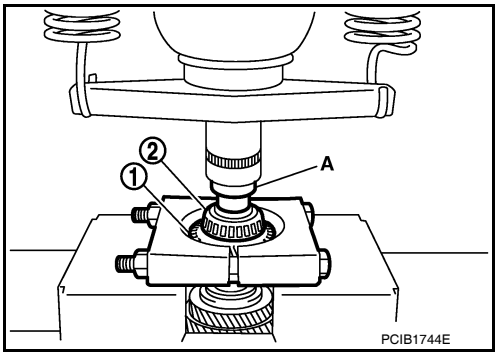


2. Remove 6th main gear (1) and mainshaft rear bearing inner race (2) according to the following procedures.

a. Set a suitable puller to 6th main gear.

b. Remove mainshaft rear bearing inner race and 6th main gear using the Tool (A).

Tool number (A): ST33052000 (—)



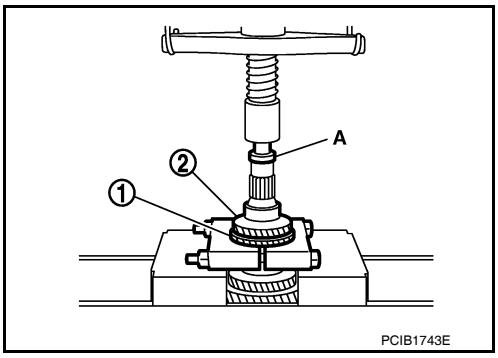
3. Remove 4th main gear (1) and 5th main gear (2) according to the following procedures.

a. Set a suitable tool to 4th main gear.

b. Remove 5th main gear and 4th main gear using Tool (A).

Tool number (A): ST33052000 (—)

4. Remove mainshaft adjusting shim.

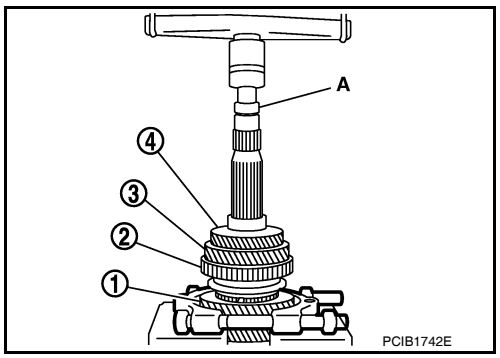


5. Remove 1st main gear (1), 1st-2nd synchronizer hub assembly (2), 2nd main gear (3), and 3rd main gear (4) according to the following procedures.

a. Set a suitable tool to 1st main gear.

b. Remove 3rd main gear, busing, 2nd main gear, 2nd inner baulk ring, 2nd synchronizer cone, 2nd outer baulk ring, 1st-2nd synchronizer hub assembly, 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, and 1st main gear using the Tool (A).

Tool number (A): ST33052000 (—)



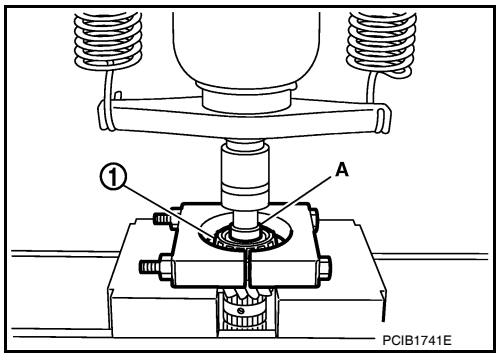
c. Remove insert keys and 1st-2nd coupling sleeve from 1st-2nd synchronizer hub.

6. Remove mainshaft front bearing inner race (1) according to the following procedures.

a. Set a suitable puller to mainshaft front bearing inner race.

b. Remove mainshaft front bearing inner race using the Tool (A).

Tool number (A): ST33052000 (—)

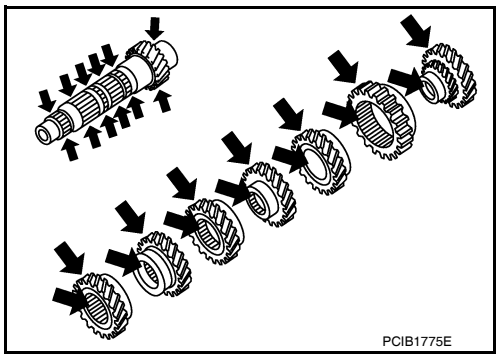


INSPECTION AFTER DISASSEMBLY

Mainshaft and Gear

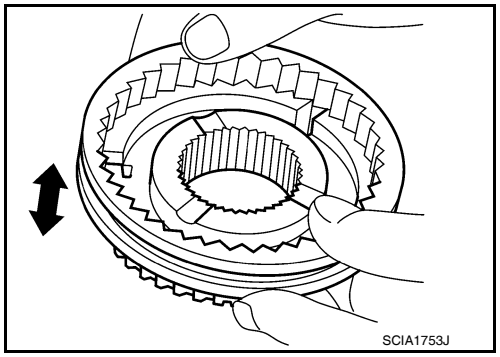
Check the following items and replace if necessary.

- Damage, peeling, bend, uneven wear, and distortion of shaft.
- Excessive wear, damage, and peeling of gear.



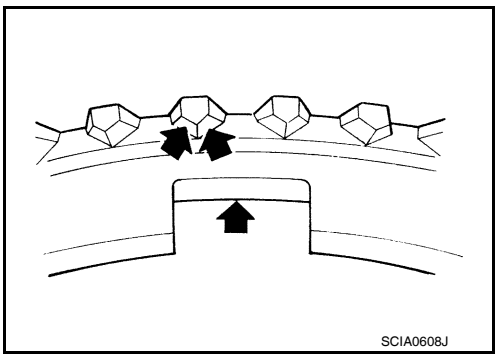
Synchronizer

- Synchronizer hub and coupling sleeve
  Check the following items and replace if necessary.
- Breakage, damage, and unusual wear on contact surface of coupling sleeve, synchronizer hub, and insert key.
- Coupling sleeve and synchronizer hub move smoothly.



- Baulk ring

Check contact surface of baulk ring cam and insert key for excessive wear, uneven wear, bend, and damage. Replace if necessary.

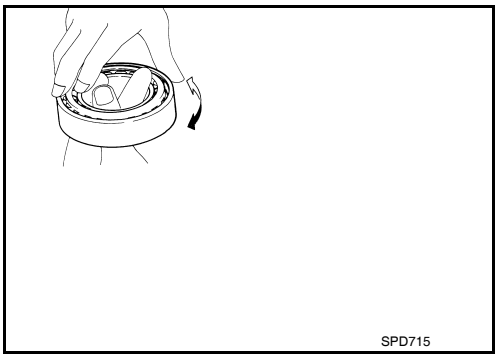

SCIA0608J

Bearing

Check bearing for damage and rough rotation. Replace if necessary.

CAUTION:

- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**
- **Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.**


SPD715

ASSEMBLY

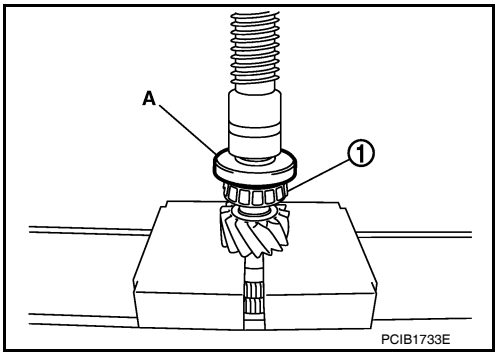
CAUTION:

- **Select mainshaft rear bearing adjusting shim according to the following procedures when replacing mainshaft adjusting shim, 6th main gear, 5th main gear, or 4th main gear.**
- **Do not reuse mainshaft adjusting shim.**
- **If new mainshaft adjusting shim is thinner than previous one, offset the thickness difference by selecting thicker mainshaft rear bearing adjusting shim.**
- **If new mainshaft adjusting shim is thicker than previous one, offset the thickness difference by selecting thinner mainshaft rear bearing adjusting shim.**
- **Replace 6th main gear, 5th main gear, or 4th main gear.**
- **Measure the thickness of the main gear used before and the new main gear**
- **Increase the thickness of the mainshaft rear bearing adjusting shim, if the difference is smaller than 0.025 mm (0.0010 in).**
- **Replace transaxle assembly when replacing mainshaft.**

1. Install mainshaft front bearing inner race (1) using the Tool (A).

   Tool number (A): ST36720030 (—)

   CAUTION:
   Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.



PCIB1733E

2. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.

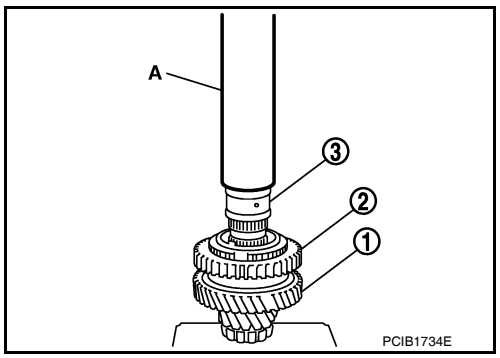
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring as a set.**

3. Install insert keys and 1st-2nd coupling sleeve to 1st-2nd synchronizer hub.

   CAUTION:
   Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.

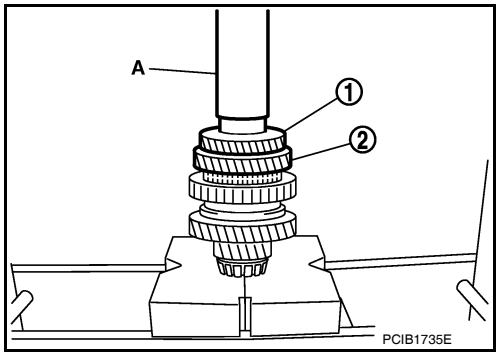
4. Install 1st main gear (1), 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 1st-2nd synchronizer hub assembly (2), 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.
5. Install bushing (3) using the Tool (A).

Tool number (A): KV32102700 (—)



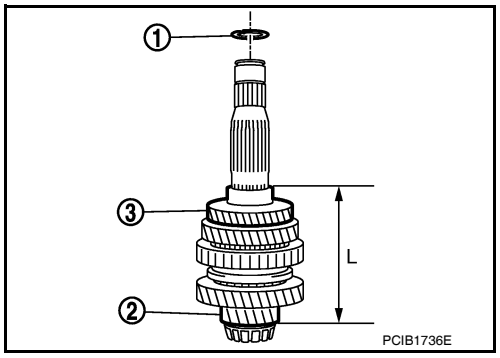
6. Install 3rd main gear (1) and 2nd main gear (2) using Tool (A).

Tool number (A): ST32102700 (—)



7. Measure dimension (L) as shown. Select mainshaft adjusting shim (1) according to the following list, and then install it to mainshaft.

2 : Mainshaft
3 : 3rd main gear

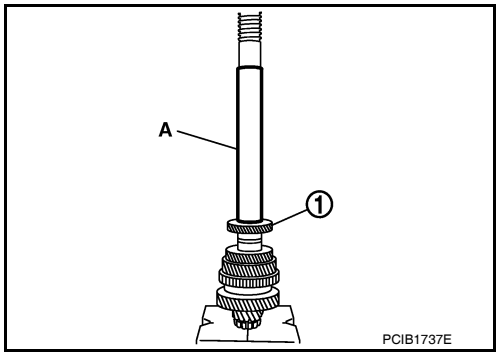


Unit: mm (in)

Dimension (L)	Mainshaft adjusting shim thickness
147.690 – 147.666 (5.8146 – 5.8136)	1.500 (0.0591)
147.665 – 147.641 (5.8136 – 5.8126)	1.525 (0.0600)
147.640 – 147.616 (5.8126 – 5.8116)	1.550 (0.0610)
147.615 – 147.591 (5.8116 – 5.8107)	1.575 (0.0620)
147.590 – 147.566 (5.8106 – 5.8097)	1.600 (0.0630)
147.565 – 147.541 (5.8096 – 5.8087)	1.625 (0.0640)
147.540 – 147.516 (5.8086 – 5.8077)	1.650 (0.0650)
147.515 – 147.491 (5.8077 – 5.8067)	1.675 (0.0659)
147.490 – 147.466 (5.8067 – 5.8057)	1.700 (0.0669)
147.465 – 147.441 (5.8057 – 5.8048)	1.725 (0.0679)
147.440 – 147.416 (5.8047 – 5.8038)	1.750 (0.0689)
147.415 – 147.391 (5.8037 – 5.8028)	1.775 (0.0699)

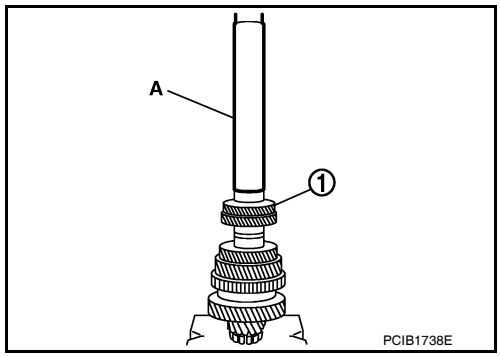
8. Install 4th main gear (1) using Tool (A).

Tool number (A): KV32102700 (—)



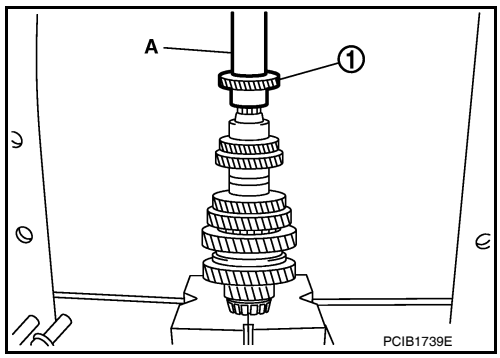
9. Install 5th main gear (1) using Tool (A).

Tool number (A): KV32102700 (—)



10. Install 6th main gear (1) using Tool (A).

Tool number (A): KV32102700 (—)



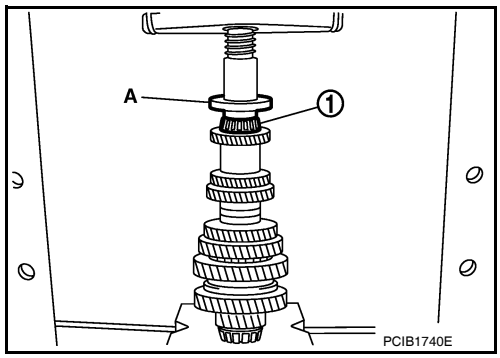
11. Install mainshaft rear bearing inner race (1) using Tool (A).

Tool number (A): ST30901000 (J-26010-01)

CAUTION:
Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.

12. Install snap ring.

CAUTION:
Do not reuse snap ring.



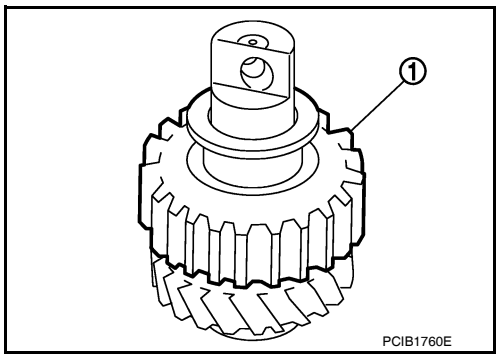
REVERSE IDLER SHAFT AND GEARS

Disassembly and Assembly

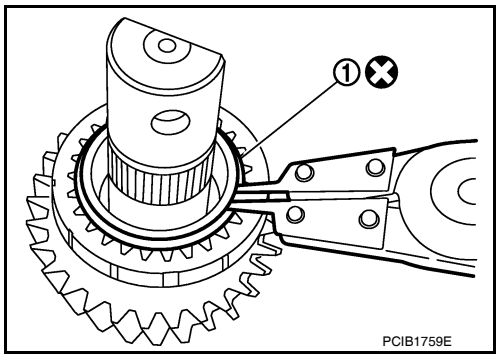
INFOID:0000000007330307

DISASSEMBLY

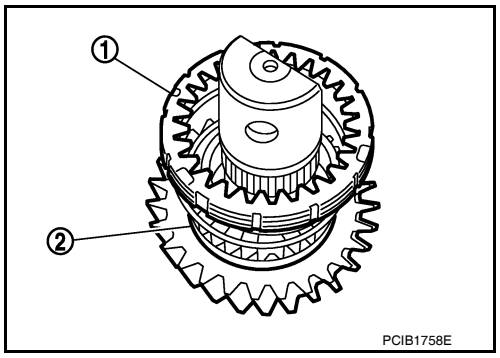
1. Remove reverse output gear (1).



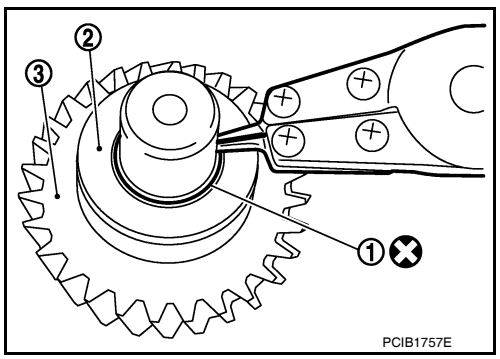
2. Remove snap ring (1) using suitable tool.
CAUTION:
Do not reuse snap ring.



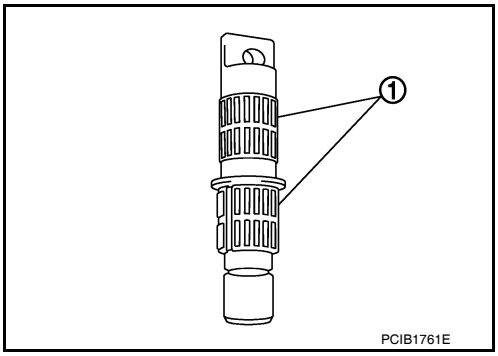
3. Remove reverse baulk ring (1) and return spring (2).



4. Remove snap ring (1), lock washer (2), and reverse input gear (3) using suitable tool.
CAUTION:
Do not reuse snap ring.



5. Remove needle bearings (1) and spacer.



INSPECTION AFTER DISASSEMBLY

Shaft and Gear

Check the following items. Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set, if necessary.

- Damage, peeling, bend, uneven wear, and distortion of shaft
- Excessive wear, damage, and peeling of gear

Bearing

Check damage and rotation of bearing. Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set, if necessary.

ASSEMBLY

Note the following procedures, and assemble in the reverse order of disassembly.

CAUTION:

- **Do not reuse snap ring.**
- **Check that snap ring is securely installed in a groove.**
- **Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set.**

FINAL DRIVE

Disassembly and Assembly

INFOID:0000000007330308

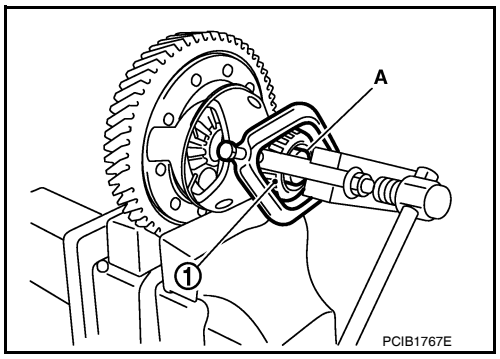
DISASSEMBLY

1. Remove differential side bearing inner race (clutch housing side) (1) according to the following procedures.

a. Set a suitable tool to differential side bearing inner race (clutch housing side).

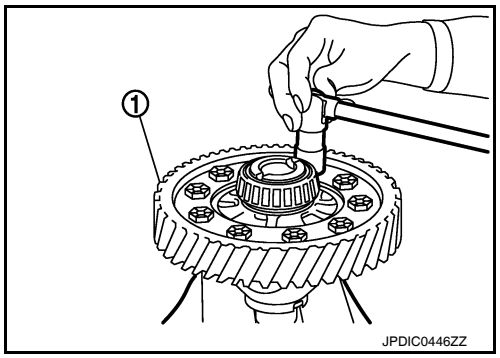
b. Remove differential side bearing inner race (clutch housing side) using Tool (A).

Tool number (A): ST33061000 (J-8107-2)



2. Remove speedometer drive gear.

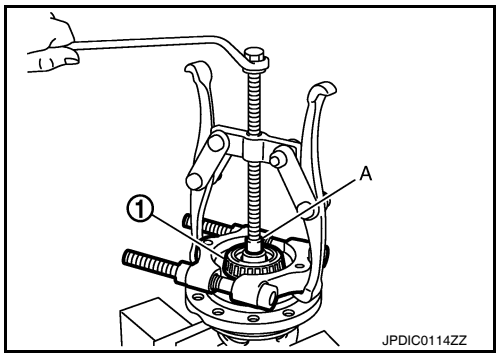
3. Remove final gear bolts, and then remove final gear (1).



4. Remove differential side bearing inner race (transaxle case side) (1) according to the following procedures.

a. Set a suitable tool to differential side bearing inner race (transaxle case side).

b. Remove differential side bearing inner race (transaxle case side) using a suitable tool (A).



INSPECTION AFTER DISASSEMBLY

Gear and Case

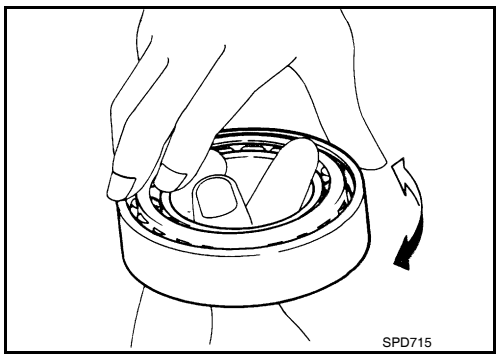
Check final gear and differential case. Replace if necessary.

Bearing

Check bearing for damage and rough rotation. Replace if necessary.

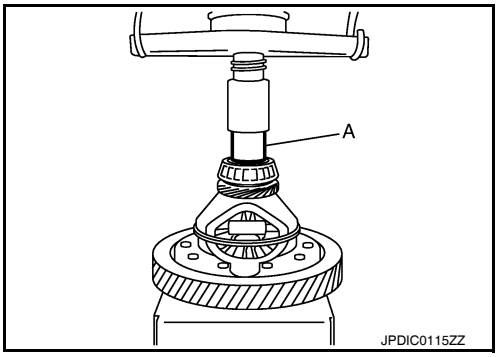
CAUTION:

- **Replace differential side bearing outer race (clutch housing side) and differential side bearing inner race (clutch housing side) as a set.**
- **Replace differential side bearing inner race (transaxle case side) and differential side bearing outer race (transaxle case side) as a set.**

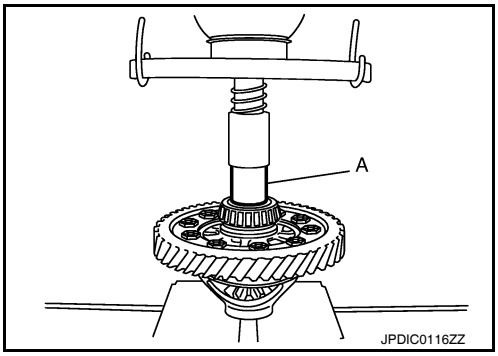


ASSEMBLY

1. Install final gear, and then tighten final gear bolts to the specified torque. Refer to MT-49, "Disassembly and Assembly".
   CAUTION:
   Replace final gear and differential case as a set.
2. Install speedometer drive gear.
3. Install differential side bearing inner race (clutch housing side) using a suitable tool (A).
   CAUTION:
   Replace differential side bearing inner race (clutch housing side) and differential side bearing outer race (clutch housing side) as a set.



4. Install differential side bearing inner race (transaxle case side) using a suitable tool (A).
   CAUTION:
   Replace differential side bearing inner race (transaxle case side) and differential side bearing outer race (transaxle case side) as a set.



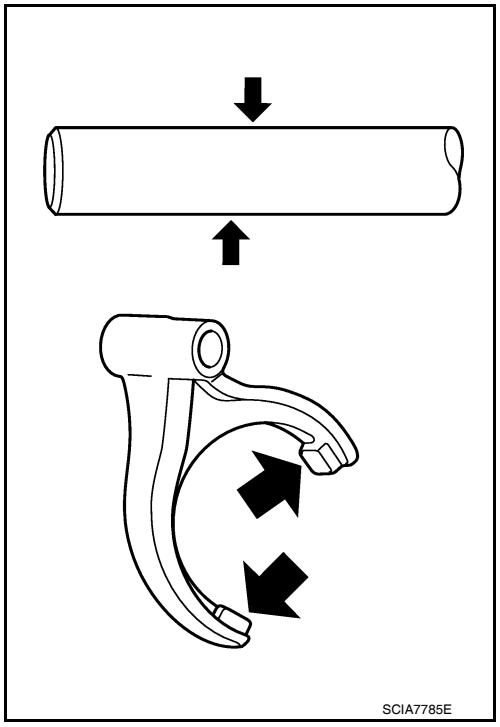
SHIFT CONTROL

Inspection

INFOID:0000000007330309

FORK ROD AND SHIFT FORK

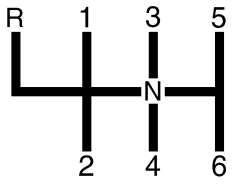
Check contact surface and sliding surface for excessive wear, uneven wear, bend, and damage. Replace if necessary.



SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007330310

Transaxle type			RS6F94R
Engine type			MR18DE
Number of speed			6
Synchromesh type			Warner
Shift pattern			 PCIB1769E
Gear ratio	1st		3.727
	2nd		2.105
	3rd		1.452
	4th		1.171
	5th		0.971
	6th		0.811
	Reverse		3.687
	Final gear		3.933
Number of teeth	Input gear	1st	11
		2nd	19
		3rd	31
		4th	35
		5th	35
		6th	37
		Reverse	11
	Main gear	1st	41
		2nd	40
		3rd	45
		4th	41
		5th	34
		6th	30
		Reverse	42
	Reverse idler gear	Input/Output	28/29
	Final gear	Final gear/Pinion	59/15
		Side gear/Pinion mate gear	21/18
Oil capacity (Reference)		ℓ (US pt, Imp pt)	Approx. 2.0 (4-1/4, 3-1/2)
Remarks	Reverse synchronizer		Installed
	Triple-cone synchronizer		1st and 2nd

SECTION AT
AUTOMATIC TRANSAXLE

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SERVICE INFORMATION

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INFOID:0000000007329254

NOTE:
If DTC "CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for DTC "CAN COMM CIRCUIT". Refer to AT-84.

Items (CONSULT screen terms)	DTC*1 CONSULT or GST	Reference page
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CAN COMM CIRCUIT	U1000	AT-84
CONTROL UNIT (RAM)	—	AT-164
CONTROL UNIT (ROM)	—	AT-164
ENGINE SPEED	P0725	AT-102
FLUID TEMP SENSOR A	P0710	AT-92
INPUT SPEED SENSOR A	—	AT-159
OUTPUT SPEED SENSOR*3	P0720	AT-97
OVER CLUTCH SOLENOID	P1760	AT-145
PC SOLENOID A	P0745	AT-130
SHIFT SOLENOID A*2	P0750	AT-135
SHIFT SOLENOID B*2	P0755	AT-140
TORQUE CONVERTER	P0740	AT-120
TORQUE CONVERTER	P0744	AT-125
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2GR INCORRECT RATIO	P0732	AT-109
3GR INCORRECT RATIO	P0733	AT-112
4GR INCORRECT RATIO	P0734	AT-115

*1: These numbers is prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the "Output speed sensor signal" and the "Vehicle speed signal" meet the fail-safe condition at the same time.

DTC No. Index

INFOID:0000000007329255

NOTE:
If DTC "CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for DTC "CAN COMM CIRCUIT". Refer to AT-84.

DTC*1 CONSULT or GST	Items (CONSULT screen terms)	Reference page
P0705	T/M RANGE SENSOR A	AT-87
P0710	FLUID TEMP SENSOR A	AT-92
P0720	OUTPUT SPEED SENSOR*3	AT-97
P0725	ENGINE SPEED	AT-102
P0731	1GR INCORRECT RATIO	AT-106

DTC*1 CONSULT or GST	Items (CONSULT screen terms)	Reference page
P0732	2GR INCORRECT RATIO	AT-109
P0733	3GR INCORRECT RATIO	AT-112
P0734	4GR INCORRECT RATIO	AT-115
P0740	TORQUE CONVERTER	AT-120
P0744	TORQUE CONVERTER	AT-125
P0745	PC SOLENOID A	AT-130
P0750	SHIFT SOLENOID A*2	AT-135
P0755	SHIFT SOLENOID B*2	AT-140
P1760	OVER CLUTCH SOLENOID	AT-145
U1000	CAN COMM CIRCUIT	AT-84
—	BATT/FLUID TEMP SEN	AT-153
—	CONTROL UNIT (RAM)	AT-164
—	CONTROL UNIT (ROM)	AT-164
—	INPUT SPEED SENSOR A	AT-159
—	VHCL SPEED SEN-MTR	AT-150

*1: These numbers is prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the “utput speed sensor signal” and the “Vehicle speed signal” meet the fail-safe condition at the same time.

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329256

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329257

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007795979

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precaution for On Board Diagnosis (OBD) System of A/T and Engine

INFOID:0000000007329258

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

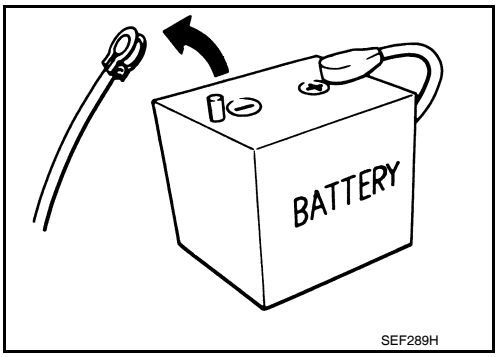
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect battery negative cable from battery negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connectors are free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

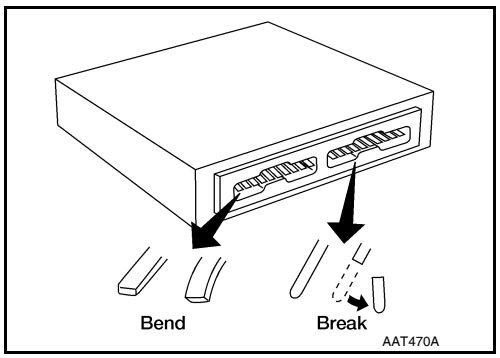
Precaution

INFOID:0000000007329259

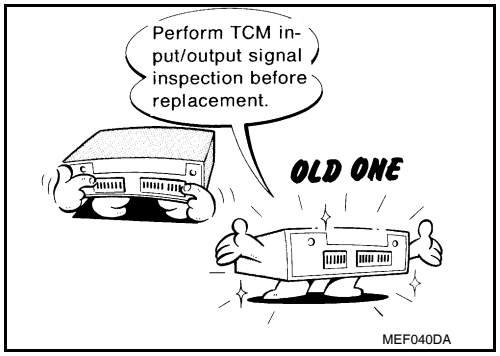
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect the battery cable from the negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**



- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-72, "TCM Terminal and Reference Value".)**
- **After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) Confirmation Procedure".**
  The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed.
- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the A/T.



- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the A/T is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to AT-17, "A/T Fluid Cooler Cleaning".
- After overhaul, refill the A/T with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
  Always follow the procedures under "Changing A/T Fluid" in the AT section when changing A/T fluid. Refer to AT-16, "Changing A/T Fluid", AT-16, "Checking A/T Fluid".

Service Notice or Precaution

INFOID:0000000007329260

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement, refer to CO-15, "Removal and Installation".

TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:
- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.

- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)
- Converter is contaminated with engine coolant containing antifreeze.
- Internal malfunction of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.

The torque converter should not be replaced if:

- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- A/T malfunction did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the OD OFF indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-79, "Diagnosis Procedure without CONSULT" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure “HOW TO ERASE DTC” on AT-37, "OBD-II Diagnostic Trouble Code (DTC)" to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the OD OFF indicator lamp does not indicate any malfunctions.

- Transmission range switch
- A/T 1GR, 2GR, 3GR, or 4GR function

*: For details of OBD-II, refer to AT-37.

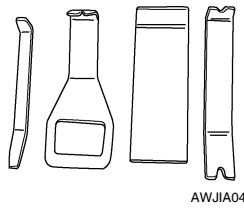
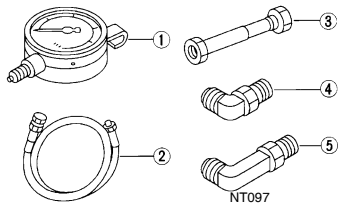
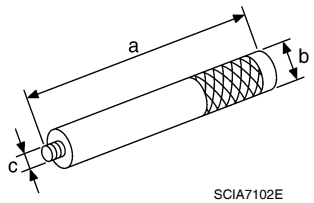
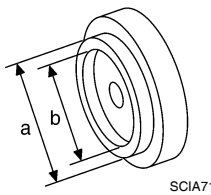
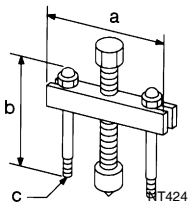
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**
  For description and how to disconnect, refer to PG-62.

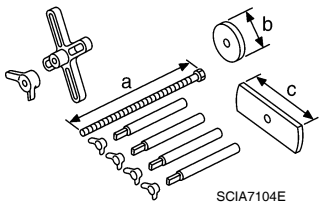
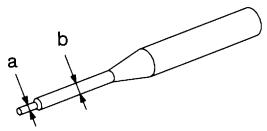
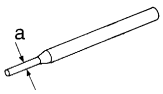
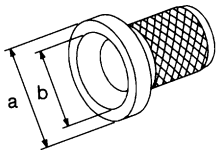
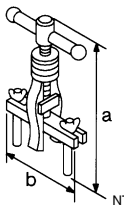
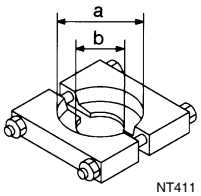
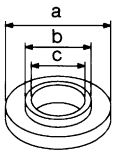
PREPARATION

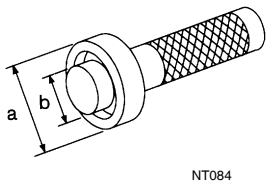
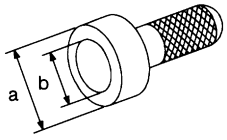
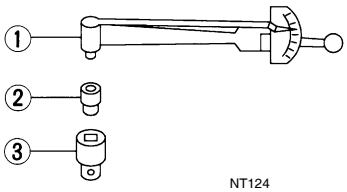
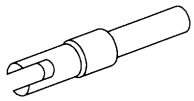
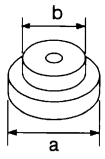
Special Service Tool

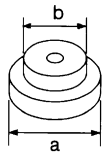
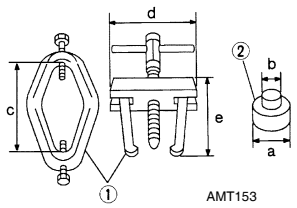
INFOID:0000000007329261

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
— (J-46534) Trim tool set	 AWJIA0483ZZ	For removing trim
ST2505S001 (J-34301) Oil pressure gauge set 1. ST25051001 (J-34301) Oil pressure gauge 2. ST25052000 (J-34301) Hose 3. ST25053000 (J-25695-3) Joint pipe 4. ST25054000 (J-25695-4) Adapter 5. ST25055000 (J-25695-5) Adapter	 NT097	Measuring line pressure
ST35325000 (—) Drift	 SCIA7102E	Installing LH differential side oil seal (Use with KV31103000) **a: 215 mm (8.46 in)** **b: 25 mm (0.98 in) dia.** **c: M12 X 1.5P**
KV31103000 (J-38982) Drift	 SCIA7103E	Installing LH differential side oil seal (Use with ST35325000) **a: 59 mm (2.32 in) dia.** **b: 49 mm (1.93 in) dia.**
ST27180001 (J-25726-A) Puller	 NT424	Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 X 1.25P**

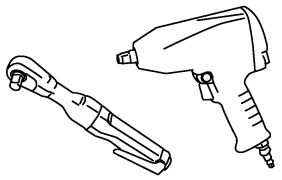
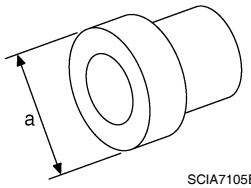
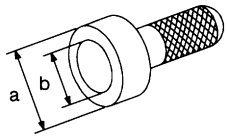
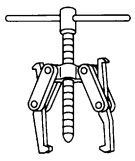
Tool number (Kent-Moore No.) Tool name	Description
KV31103200 (J-39186) Clutch spring compressor  SCIA7104E	• Removing and installing clutch spring retainer assembly • Removing and installing cancel cover **a: 179 mm (7.05 in)** **b: 76 mm (2.99 in) dia.** **c: 174 mm (6.85 in)**
ST23540000 (J-25689-A) Pin punch  NT442	• Removing and installing retaining pin of manual plate • Installing retaining pin of manual shaft • Installing retaining pin of parking rod plate **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**
KV32101000 (J-25689-A) Pin punch  NT410	Removing and installing lock pin of pinion mate shaft **a: 4 mm (0.16 in) dia.**
ST33400001 (J-26082) Drift  NT086	• Installing oil pump housing oil seal • Installing output gear bearing outer race (HR16DE engine models) **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
KV381054S0 (J-34286) Puller  NT414	• Removing radial needle bearing • Removal radial needle bearing • Removing differential side bearing outer races **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST30031000 (J-22912-01) Puller  NT411	Removing reduction pinion gear bearing inner race **a: 90 mm (3.54 in) dia.** **b: 50 mm (1.97 in) dia.**
ST35272000 (J-26092) Drift  NT107	• Installing reduction pinion gear bearing inner race • Installing idler gear bearing inner race **a: 72 mm (2.83 in) dia.** **b: 40 mm (1.57 in) dia.** **c: 35.5 mm (1.398 in) dia.**

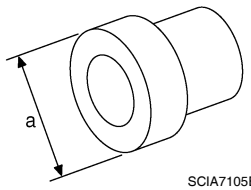
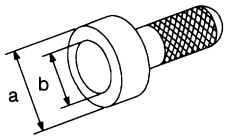
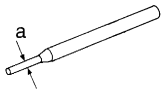
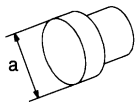
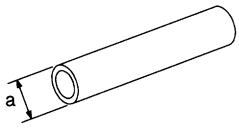
Tool number (Kent-Moore No.) Tool name	Description
ST37830000 (—) Drift  NT084	Installing idler gear bearing outer race **a: 61.9 mm (2.437 in) dia.** **b: 39 mm (1.54 in) dia.**
ST35271000 (J-26091) Drift  NT115	Installing idler gear a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.
ST3127S000 (J-25765-A) Preload gauge 1. GG9103000 (J-25765-A) Torque wrench 2. HT62940000 (—) Socket adapter 3. HT62900000 (—) Socket adapter  NT124	• Measuring turning torque of reduction pinion gear • Measuring turning torque of final drive assembly
KV38105710 (J-39026) Preload adapter  NT087	• Selecting differential side bearing adjusting shim • Measuring turning torque of final drive assembly
ST35321000 (—) Drift  NT073	Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
ST30633000 (—) Drift  NT073	Installing differential side bearing outer races **a: 67 mm (2.48 in) dia.** **b: 49 mm (1.93 in) dia.**
ST3306S001 (J-22888-D) Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter  AMT153	Removing differential side bearing inner race **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.** **c: 130 mm (5.12 in)** **d: 135 mm (5.31 in)** **e: 100 mm (3.94 in)**

Commercial Service Tool

INFOID:0000000007329262

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Drift  SCIA7105E	Installing manual shaft oil seal **a: 22 mm (0.87 in) dia.**
Drift  NT115	Installing RH differential side oil seal **a: 54 mm (2.13 in) dia.** **b: 47 mm (1.85 in) dia.**
Puller  NT077	• Removing idler gear bearing inner race • Removing and installing band servo piston snap ring

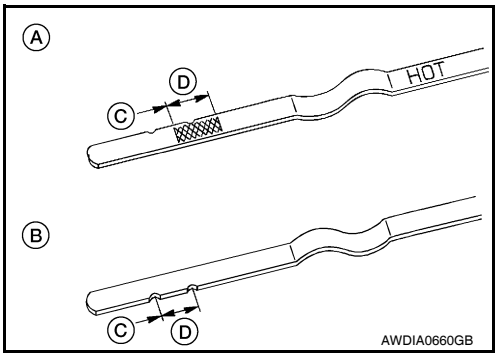
Tool name	Description
Drift  SCIA7105E	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift  NT115	Installing differential side bearings **a: 45 mm (1.77 in) dia.** **b: 41 mm (1.61 in) dia.**
Pin punch  NT410	Aligning groove of manual shaft and hole of transaxle case **a: 2 mm (0.08 in) dia.**
Drift  NT109	Removing idler gear bearing inner race **a: 34mm (1.34 in) dia.**
Drift  NT083	Installing radial needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**

A/T FLUID

Checking A/T Fluid

INFOID:0000000007329263

1. Warm up engine.
2. Check for A/T fluid leakage.
3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30° to 50°C (86° to 122°F) using the “COLD” range on A/T fluid level gauge.
   - A : Front side
   - B : Reverse side
   - C : Add
   - D : OK

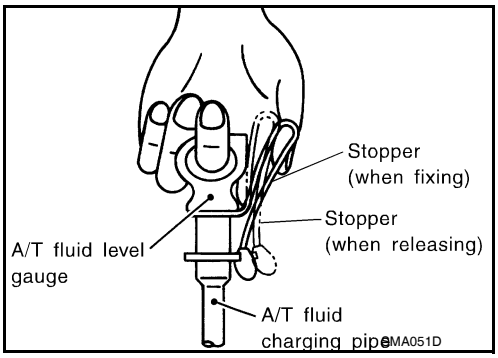


a. Park vehicle on level surface and set parking brake.

b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.

c. Check A/T fluid level with engine idling.

d. Remove A/T fluid level gauge and wipe clean with lint-free cloth.
CAUTION:
When wiping the A/T fluid level gauge, always use lint-free cloth.



e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.
CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.
CAUTION:
Do not overfill.

4. Drive vehicle for approximately 5 minutes.
5. Re-check A/T fluid level at A/T fluid temperatures of 50° to 80°C (122° to 176°F) using “HOT” range on A/T fluid level gauge.
CAUTION:
   - **When wiping the A/T fluid level gauge, always use lint-free cloth.**
   - **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.**
6. Check A/T fluid condition and make any necessary repairs. Refer to AT-49, "Inspections Before Trouble Diagnosis". If the A/T fluid contains frictional material (clutches, bands, etc.), or if the A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator. Refer to AT-17, "A/T Fluid Cooler Cleaning".
7. Install the removed A/T fluid level gauge into the A/T fluid charging pipe.
CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

Changing A/T Fluid

INFOID:0000000007329264

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid by removing the drain plug. Reinstall the drain plug to the specified torque.
CAUTION:
Do not reuse drain plug gasket.

Drain plug: **Refer to AT-234, "Component".**

4. Refill the transaxle with new specified A/T fluid through the A/T fluid charging pipe. Always refill the transaxle with the same volume of A/T fluid that was drained out.

Fluid grade and capacity: Refer to MA-13.

5. Run engine at idle speed for 5 minutes.
6. Check A/T fluid level and condition. Refer to AT-16, "Checking A/T Fluid".

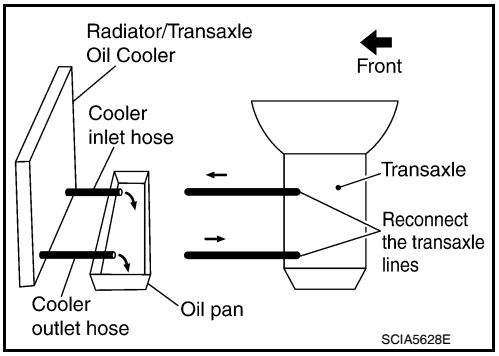
A/T Fluid Cooler Cleaning

INFOID:0000000007329265

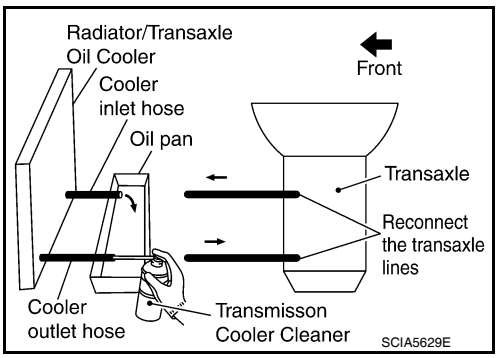
Whenever the A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

A/T FLUID COOLER CLEANING PROCEDURE

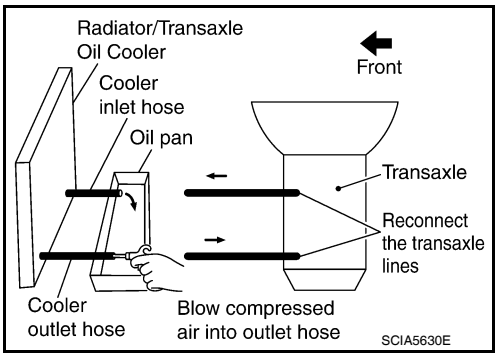
1. Identify the A/T inlet and outlet fluid cooler hoses.
2. Position an oil pan under the A/T inlet and outlet fluid cooler hoses.
3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray Transmission Cooler Cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not breathe vapors or spray mist.**
6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until A/T fluid flows out of the cooler inlet hose for 5 seconds.



7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and end of cooler outlet hose.



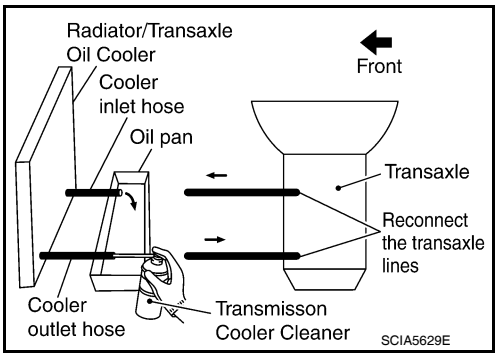
9. Blow compressed air regulated to 5 - 9 kg/cm^2 (490 - 883 kPa, 71 - 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining A/T fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
12. Remove the banjo bolts.

13. Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (490 - 883 kPa, 71 - 128 psi) through each steel line from the cooler side back toward the A/T for 10 seconds to force out any remaining A/T fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform "A/T FLUID COOLER DIAGNOSIS PROCEDURE".

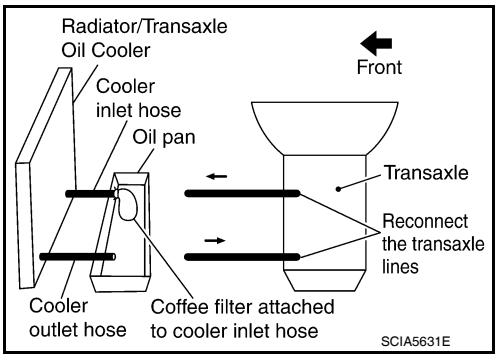
A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

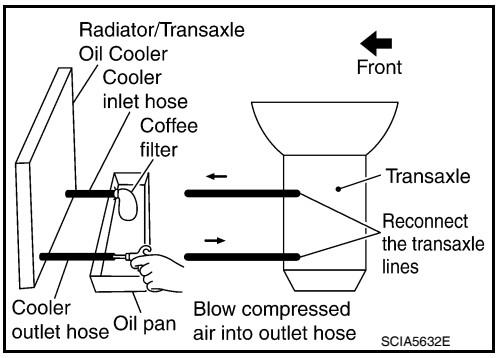
1. Position an oil pan under the A/T inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.
3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray Transmission Cooler Cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not breathe vapors or spray mist.**
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until A/T fluid flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



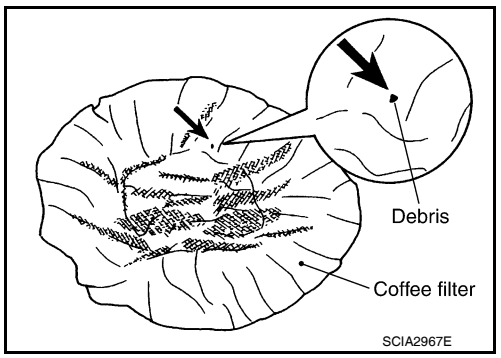
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (490 - 883 kPa, 71 - 128 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform "A/T FLUID COOLER INSPECTION PROCEDURE".



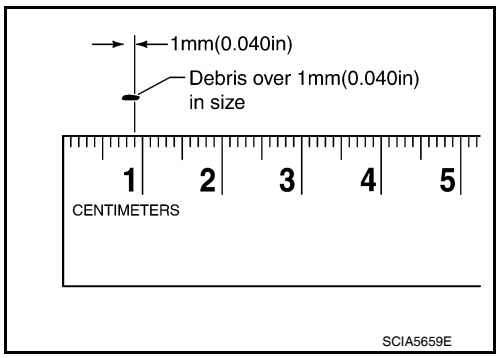
A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the A/T fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to CO-15, "Component".



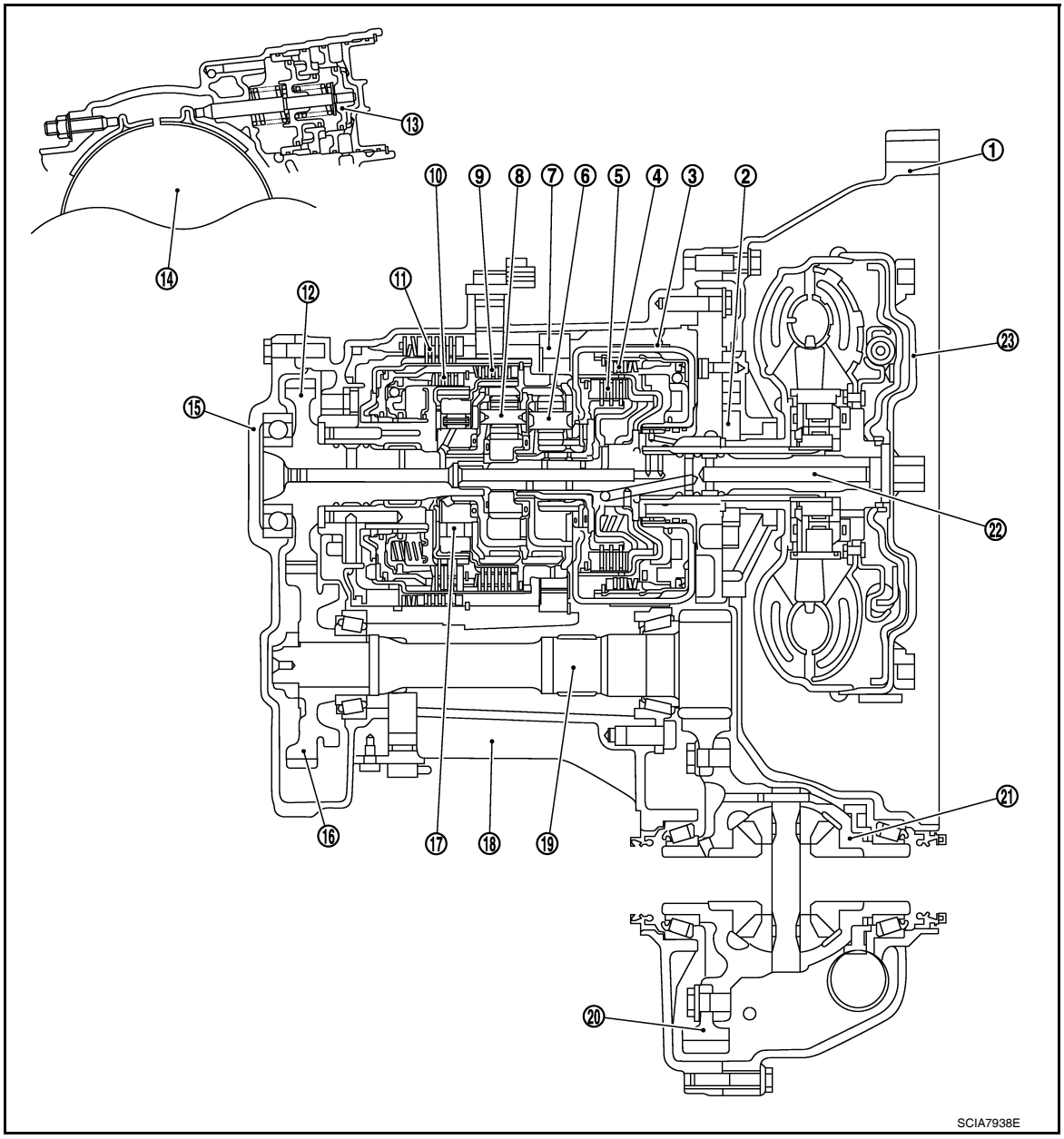
A/T FLUID COOLER FINAL INSPECTION

After performing all procedures, ensure that all remaining oil is cleaned from all components.

A/T CONTROL SYSTEM

Cross-Sectional View

INFOID:0000000007329266

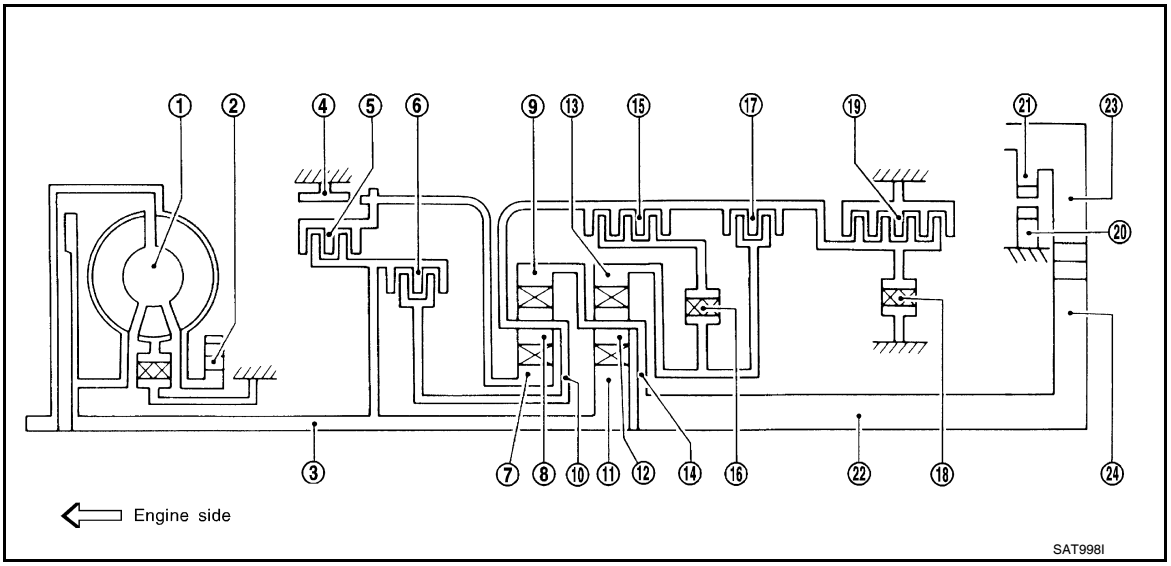


1. Converter housing
2. Oil pump
3. Brake band
4. Reverse clutch
5. High clutch
6. Front planetary gear
7. Low one-way clutch
8. Rear planetary gear
9. Forward clutch
10. Overrun clutch
11. Low & reverse brake
12. Output gear
13. Band servo piston
14. Reverse clutch drum
15. Side cover
16. Idler gear
17. Forward one-way clutch
18. Transaxle case
19. Reduction pinion gear
20. Final gear
21. Differential case
22. Input shaft
23. Torque converter

Shift Mechanism

INFOID:0000000007329267

CONSTRUCTION



1. Torque converter
2. Oil pump
3. Input shaft
4. Brake band
5. Reverse clutch
6. High clutch
7. Front sun gear
8. Front pinion gear
9. Front internal gear
10. Front planetary carrier
11. Rear sun gear
12. Rear pinion gear
13. Rear internal gear
14. Rear planetary carrier
15. Forward clutch
16. Forward one-way clutch
17. Overrun clutch
18. Low one-way clutch
19. Low & reverse brake
20. Parking pawl
21. Parking gear
22. Output shaft
23. Idle gear
24. Output gear

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
5 Reverse clutch	R/C	To transmit input power to front sun gear **7**.
6 High clutch	H/C	To transmit input power to front planetary carrier **10**.
15 Forward clutch	F/C	To connect front planetary carrier **10** with forward one-way clutch **16**.
17 Overrun clutch	O/C	To connect front planetary carrier **10** with rear internal gear **13**.
4 Brake band	B/B	To lock front sun gear **7**.
16 Forward one-way clutch	F/O.C	When forward clutch **15** is engaged, to stop rear internal gear **13** from rotating in opposite direction against engine revolution.
18 Low one-way clutch	L/O.C	To stop front planetary carrier **10** from rotating in opposite direction against engine revolution.
19 Low & reverse brake	L & R/B	To lock front planetary carrier **10**.

CLUTCH AND BAND CHART

Shift position	R/C **5**	H/C **6**	F/C **15**	O/C **17**	Band servo			F/O.C **16**	L/O.C **18**	L&R/B **19**	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		REVERSE POSITION
N												NEUTRAL POSITION
D*4 1st			○	*1D				B	B			

Shift position		R/C **5**	H/C **6**	F/C **15**	O/C **17**	Band servo			F/O.C **16**	L/O.C **18**	L&R/B **19**	Lock-up	Remarks
						2nd apply	3rd release	4th apply					
	2nd			○	*1A	○			B				Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	3rd		○	○	*1A	*2C	C		B			*1○	
	4th		○	C		*3C	C	○				○	
2	1st			○	○				B	B			Automatic shift 1 ⇔ 2 ⇐ 3
	2nd			○	○	○			B				
	3rd		○	○	○	*2C	C		B				
1	1st			○	○				B	B	○		Locks (held stationary) in 1st speed 1 ⇐ 2 ⇐ 3
	2nd			○	○	○			B				
	3rd		○	○	○	*2C	C		B				

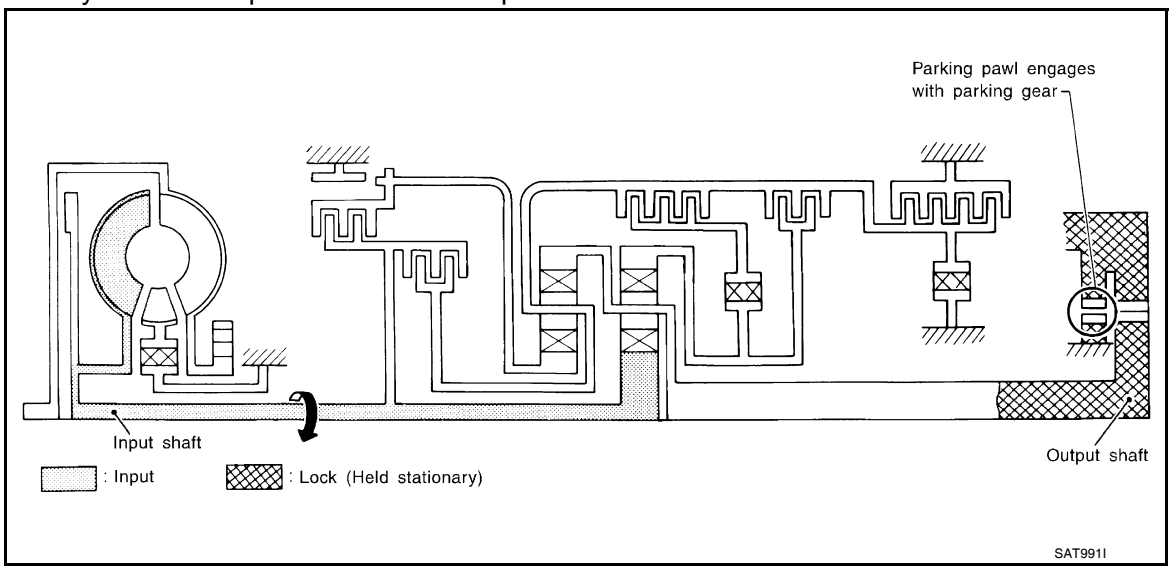
- *1: Operates when OD OFF. (OD OFF indicator lamp is on.)
- *2: Oil pressure is applied to both 2nd “apply” side and 3rd “release” side of band servo piston. However, brake band does not contract because oil pressure area on the “release” side is greater than that on the “apply” side.
- *3: Oil pressure is applied to 4th “apply” side on condition *2 above, and brake band contracts.
- *4: A/T will not shift to 4th when OD OFF. (OD OFF indicator lamp is on.)
- ○: Operates.
- A: Operates when throttle opening is less than specification**, activating engine brake.
- B: Operates during “progressive” acceleration.
- C: Operates but does not affect power transmission.
- D: Operates when throttle opening is less than specification**, but does not affect engine brake.

- **: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

POWER TRANSMISSION

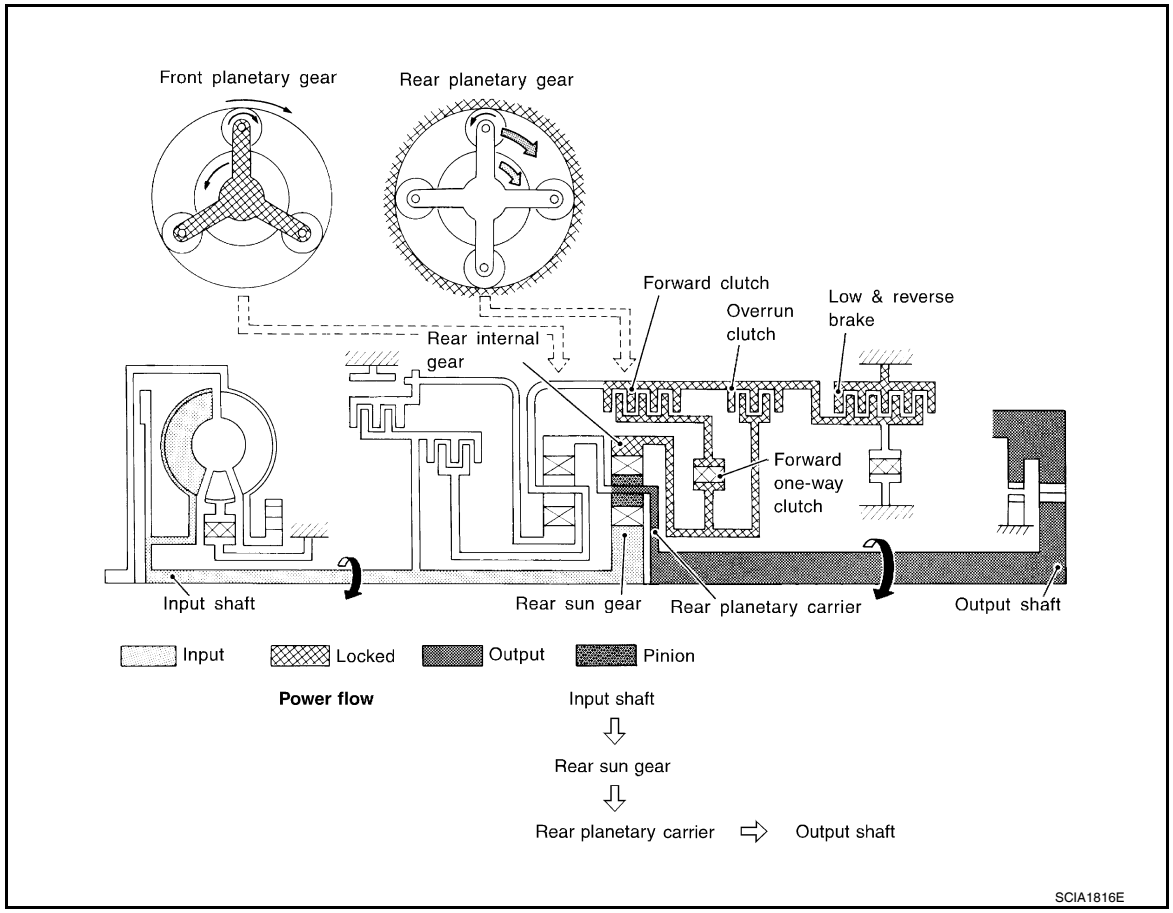
“N” and “P” Positions

- “N” position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position
  Similar to the “N” position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.



“11” Position

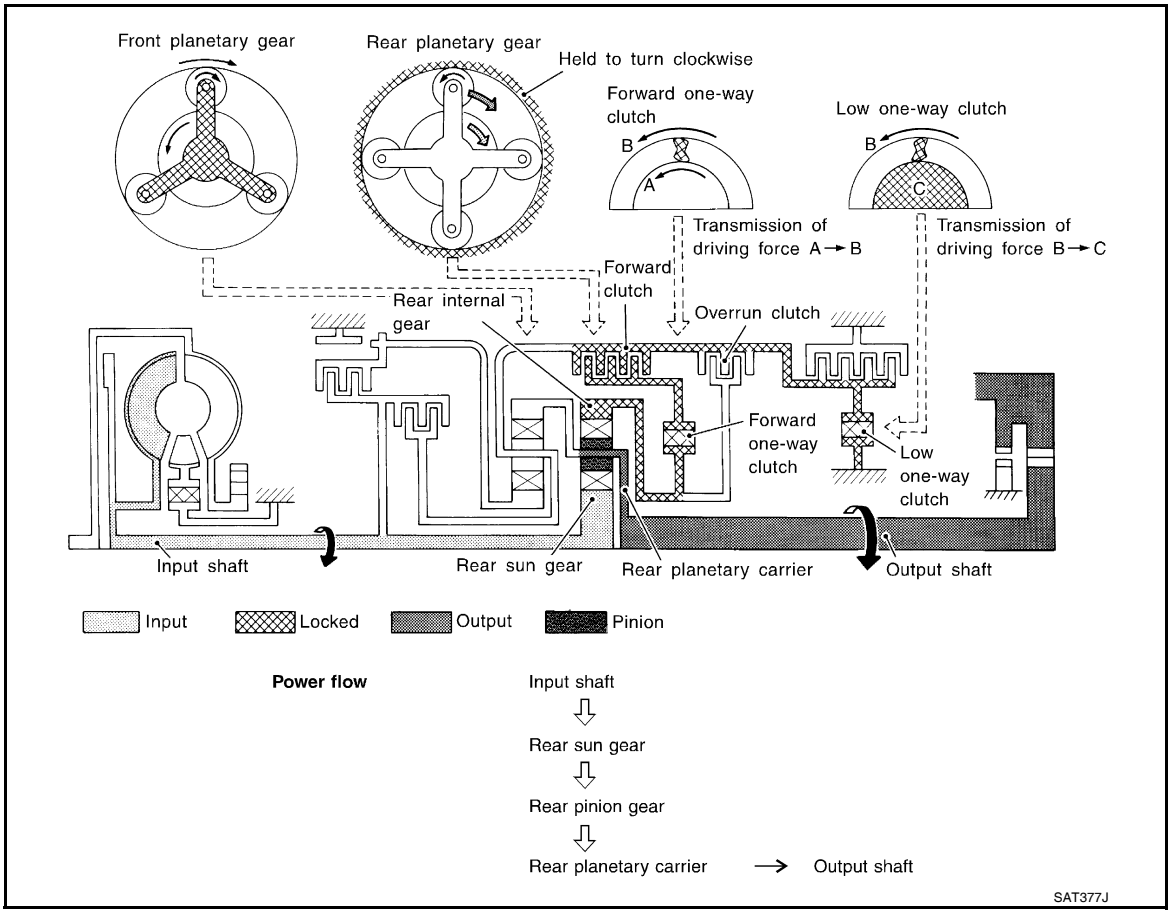
• **Forward clutch** • **Forward one-way clutch** • **Overrun clutch** • **Low & reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D_1 and 2_1.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



"D_1" and "2_1" Positions

• **Forward one-way clutch** • **Forward clutch** • **Low one-way clutch**	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D_1: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 2_1: Always engaged At D_1 and 2_1 positions, engine brake is not activated due to free turning of low one- way clutch.

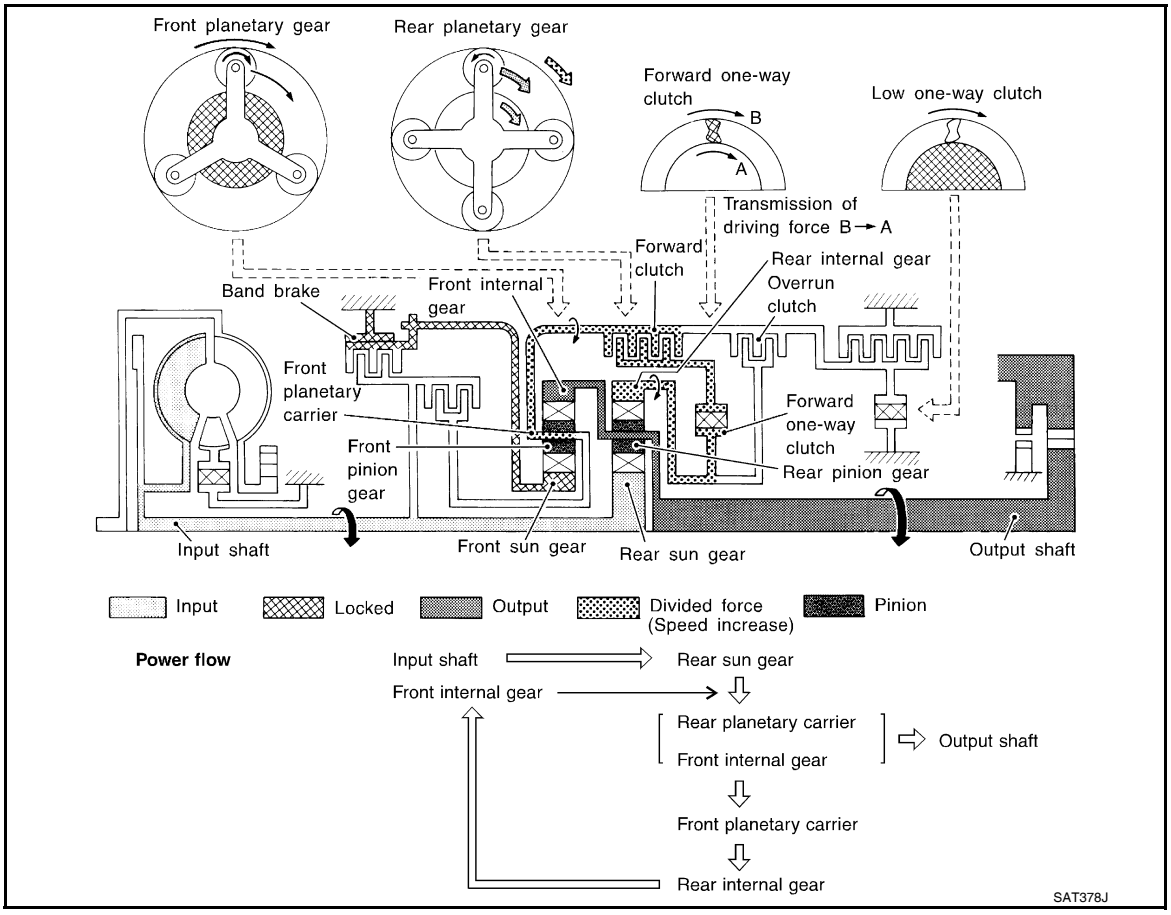
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



"D2", "22" and "12" Positions

• **Forward clutch** • **Forward one-way clutch** • **Brake band**	Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.
Overrun clutch engagement conditions	D2: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 22 and 12: Always engaged

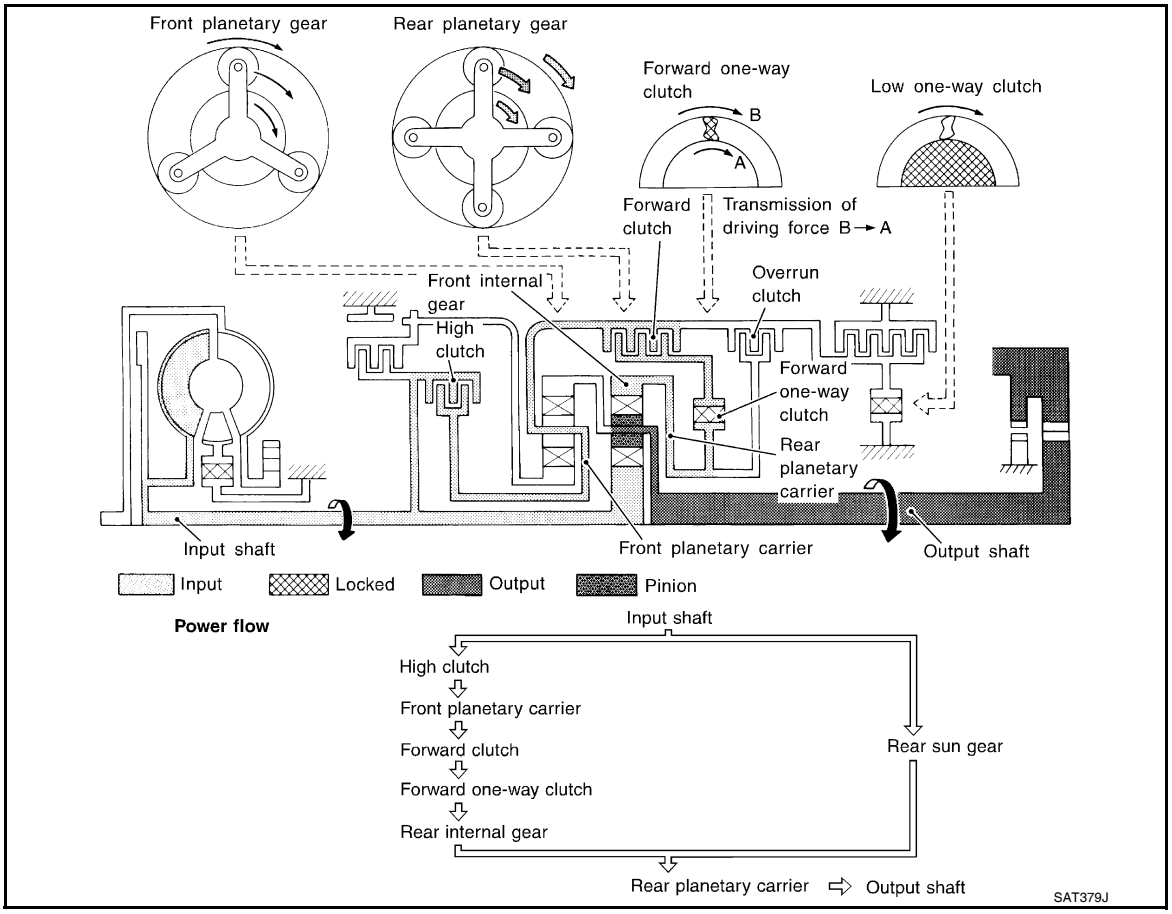
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



"D3", "23" and "13" Positions

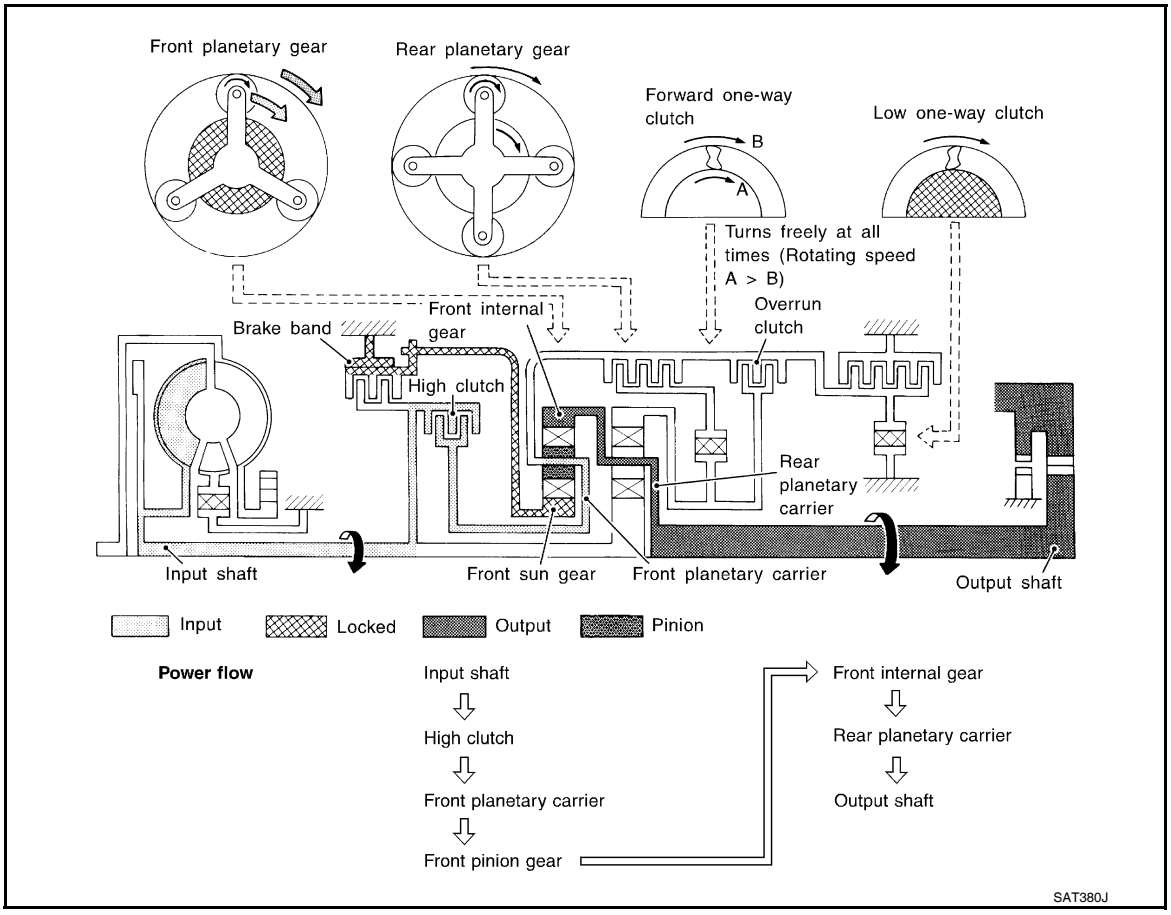
• **High clutch** • **Forward clutch** • **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 23 and 13: Always engaged

*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



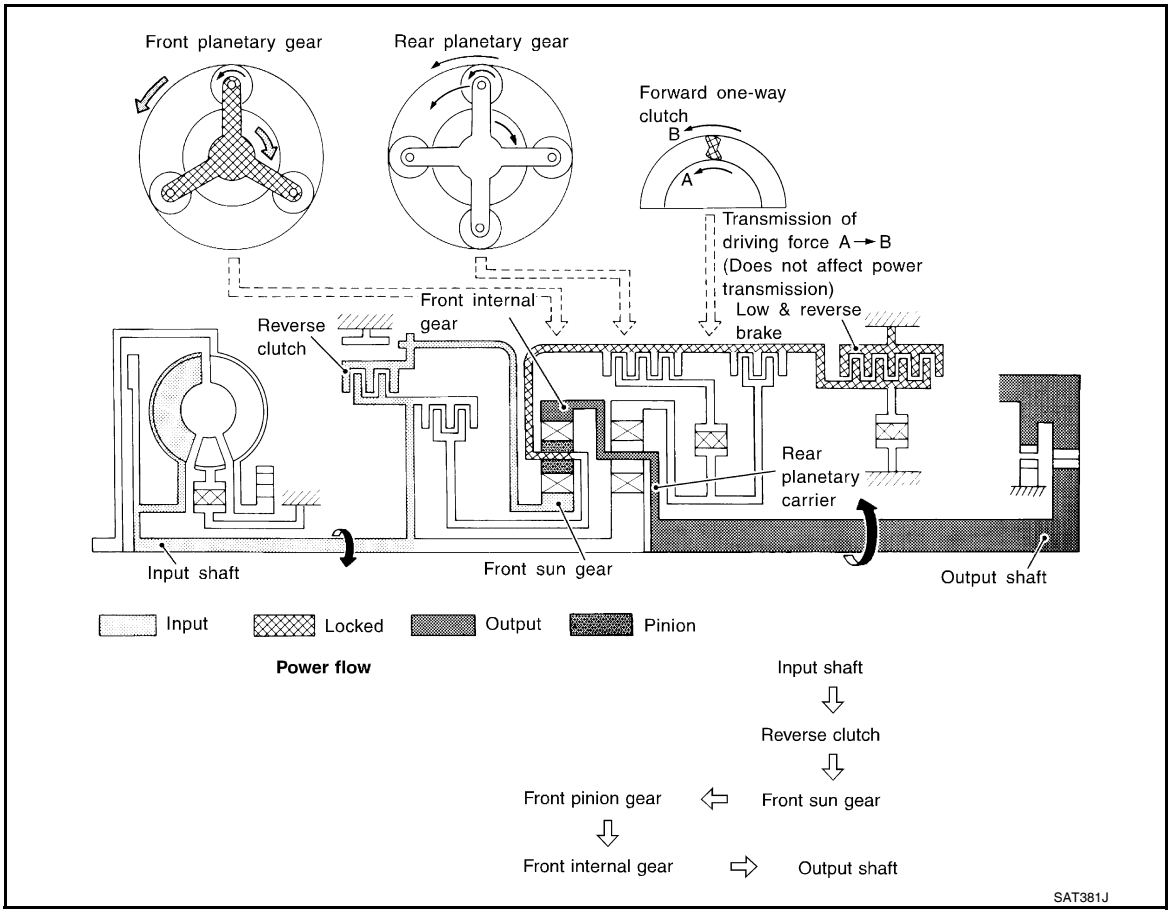
"D4" (OD) Position

• **High clutch** • **Brake band** • **Forward clutch** (Does not affect power transmission)	Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.
Engine brake	At D4 position, there is no one-way clutch in the power transaxle line and engine brake can be obtained when decelerating.



"R" Position

• **Reverse clutch** • **Low & reverse brake**	Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.
Engine brake	As there is no one-way clutch in the power transaxle line, engine brake can be obtained when decelerating.



TCM Function

INFOID:0000000007329268

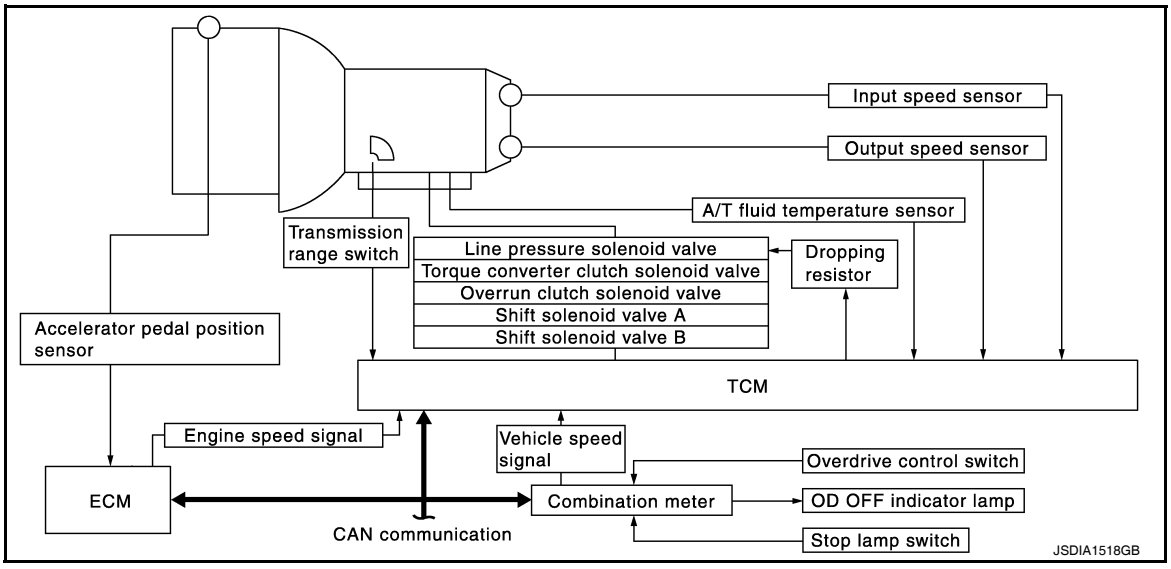
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE

The automatic transaxle senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SWITCHES & SENSORS		TCM		ACTUATORS
Transmission range switch Accelerator pedal position signal Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Output speed sensor Input speed sensor Vehicle speed signal Overdrive control switch signal Stop lamp switch signal	⇒	Shift control Line pressure control Lock-up control Overrun clutch control Fail-safe control Self-diagnosis CONSULT communication line control	⇒	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve OD OFF indicator lamp

CONTROL SYSTEM DIAGRAM



CAN Communication

INFOID:0000000007329269

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-5, "System Description".

Input/Output Signal of TCM

INFOID:0000000007329270

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function	Self-diagnostics function
Input	Accelerator pedal position signal(*5)	X	X	X	X	X	(*3) X	X
	Output speed sensor	X	X	X	X	X	(*3) X	X
	Vehicle speed signal	(*1) X	(*1) X	(*1) X	(*1) X			X
	Closed throttle position signal(*5)	(*2) X	(*2) X		X	X		(*4) X
	Wide open throttle position signal(*5)	(*2) X	(*2) X					(*4) X
	Input speed sensor	X	X		X		X	X
	Engine speed signal		X		X		X	X
	Transmission range switch	X	X	X	X	X	(*3) X	(*4) X
	Stop lamp switch signal(*5)		X		X			(*4) X
	A/T fluid temperature sensors(*5)	X	X	X	X		X	X
	Overdrive control switch signal(*5)		X	X	X	X		(*4) X
	TCM power supply voltage signal	X			X		X	X

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function	Self-diagnostics function
Output	Shift solenoid valve A/B		X				(*3) X	X
	Line pressure solenoid	X					(*3) X	X
	Torque converter clutch solenoid valve				X		(*3) X	X
	Overrun clutch solenoid valve		X			X	(*3) X	X
	OD OFF indicator lamp(*6)		X					X

*1: Output speed sensor

*2: Spare for accelerator pedal position signal

*3: If these input and output signals are different, the TCM triggers the fail-safe function.

*4: Used as a condition for starting self-diagnostics; if self-diagnosis are not started, it is judged that there is some kind of error.

*5: Input by CAN communications.

*6: Output by CAN communications.

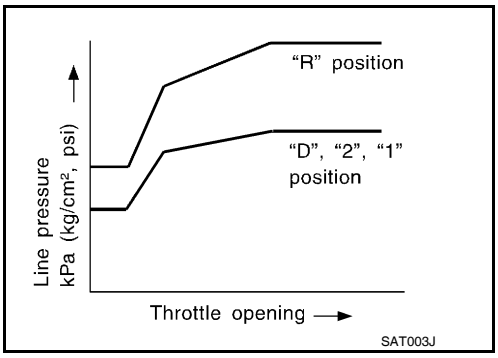
Line Pressure Control

INFOID:0000000007329271

- TCM has various line pressure control characteristics to match the driving conditions.
- An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
- Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.

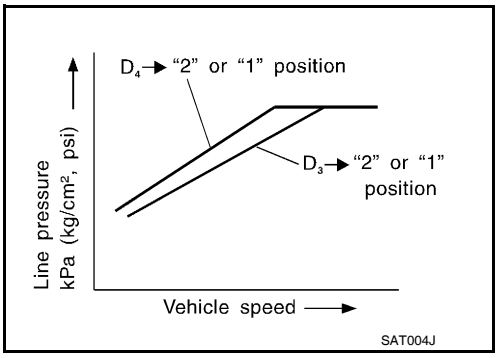
NORMAL CONTROL

The characteristic of the line pressure to the throttle opening is set for suitable clutch operation.



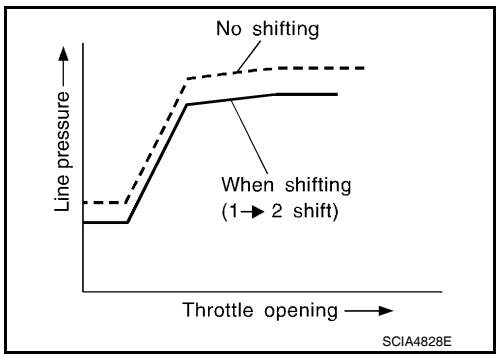
BACK-UP CONTROL (ENGINE BRAKE)

If the selector lever is shifted to "2" position while driving in D_4 or D_3, great driving force is applied to the clutch inside the transaxle. Clutch operating pressure (line pressure) must be increased to deal with this driving force.



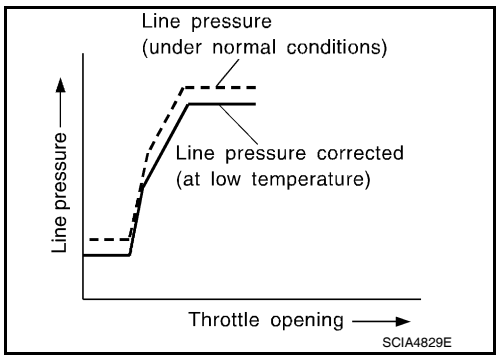
DURING SHIFT CHANGE

The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.

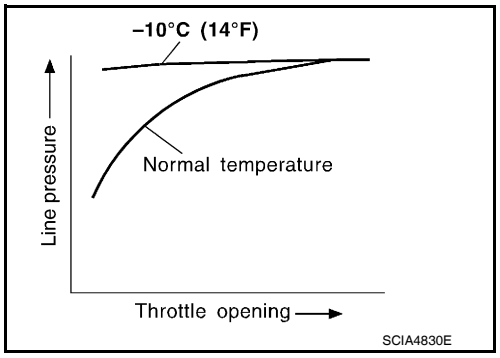


AT LOW FLUID TEMPERATURE

- A/T fluid viscosity and frictional characteristics of the clutch facing change with A/T fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to A/T fluid temperature, to stabilize shifting quality.
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to high viscosity of A/T fluid when temperature is low.



- Line pressure is increased to a maximum irrespective of the throttle opening when A/T fluid temperature drops to −10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of A/T fluid viscosity at low temperature.



Shift Control

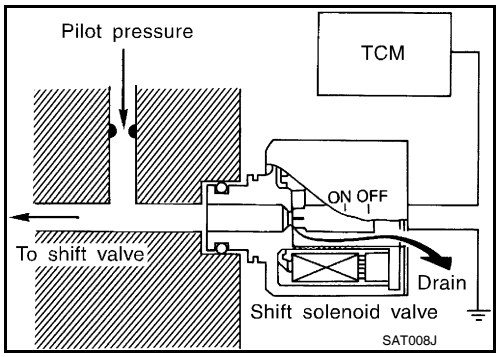
INFOID:0000000007329272

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the output speed sensor and the ECM (accelerator pedal position sensor). This results in improved acceleration performance and fuel economy.

CONTROL OF SHIFT SOLENOID VALVES A AND B

The TCM activates shift solenoid valves A and B according to signals from the accelerator pedal position sensor and output speed sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.

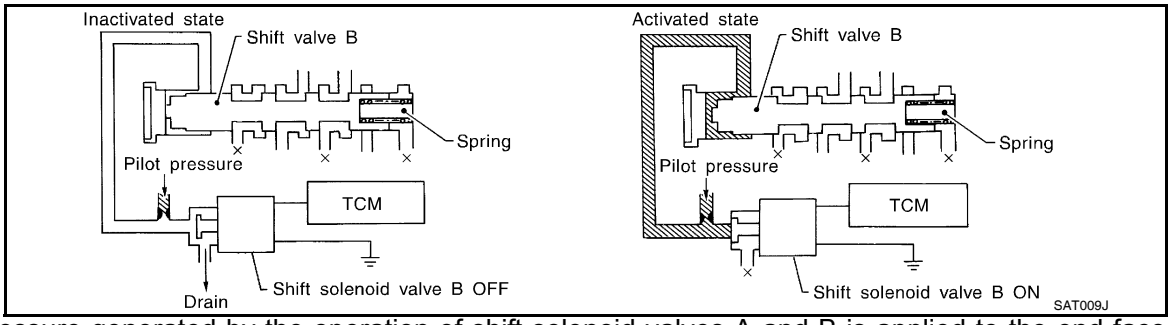
The shift solenoid valve performs simple ON-OFF operation. When set to “ON”, the drain circuit closes and pilot pressure is applied to the shift valve.



RELATION BETWEEN SHIFT SOLENOID VALVES A AND B AND GEAR POSITIONS

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONTROL OF SHIFT VALVES A AND B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.
The figure above shows the operation of shift valve B. When the shift solenoid valve is “ON”, pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

Lock-up Control

INFOID:0000000007329273

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip and to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the torque converter clutch piston.

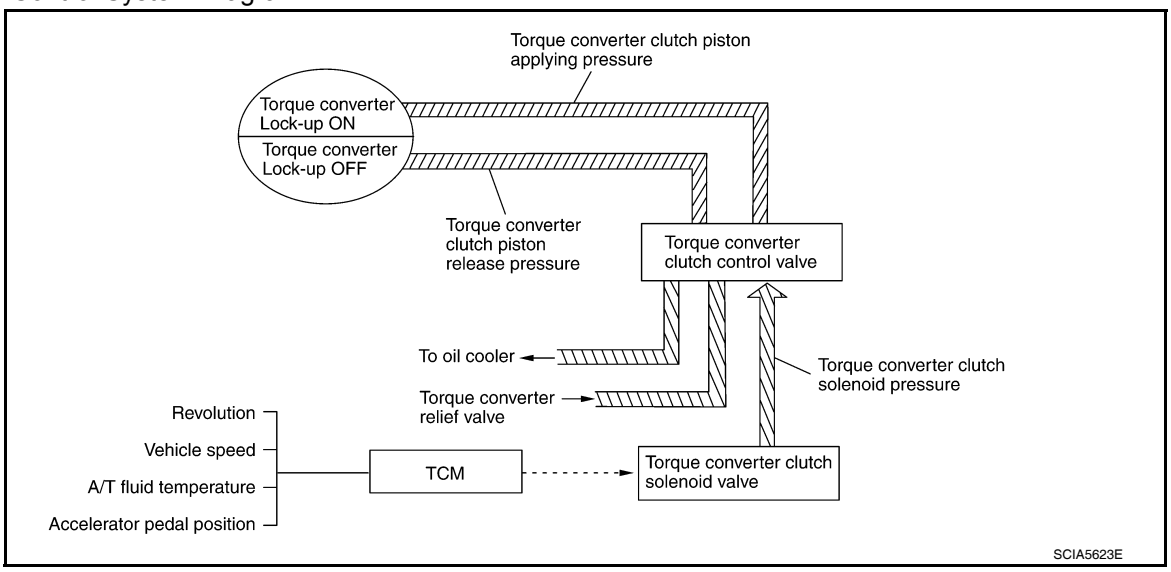
CONDITIONS FOR LOCK-UP OPERATION

When vehicle is driven in 3GR and 4GR positions, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

OD	ON	OFF
Selector lever	“D” position	
Gear position	D_4	D_3
Vehicle speed signal	More than set value	
Accelerator pedal position signal	Less than set opening	
Closed throttle position signal	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-up Control System Diagram



Lock-up Released

In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by draining the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is generated.
In this way, the torque converter clutch piston is not coupled.

Lock-up Applied

In the lock-up applied state, the torque converter clutch control valve is set into the locked state by generating the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is drained.
In this way, the torque converter clutch piston is pressed and coupled.

SMOOTH LOCK-UP CONTROL

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-clutched State

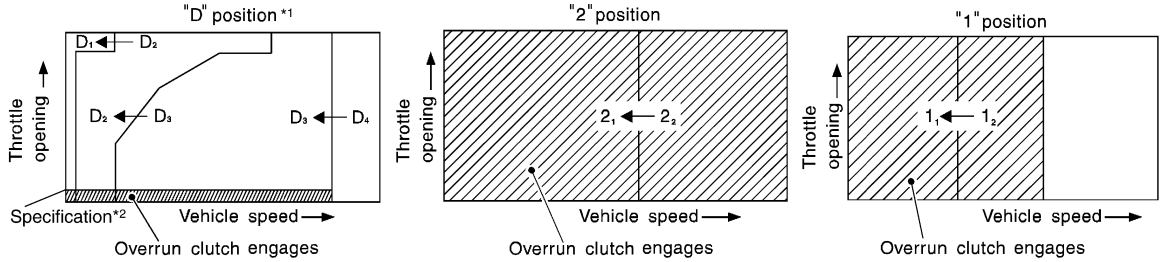
The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the torque converter clutch solenoid pressure.
In this way, the lock-up applying pressure gradually rises and while the torque converter clutch piston is put into half-clutched status, the torque converter clutch piston applying pressure is increased and the coupling is completed smoothly.

Engine Brake Control (Overrun Clutch Control)

INFOID:0000000007329274

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.
The overrun clutch operates when the engine brake is needed.

OVERRUN CLUTCH OPERATING CONDITIONS



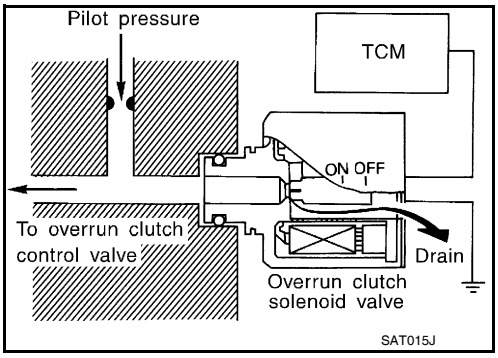
Selector lever position	Gear position	Throttle opening
"D" position *1	D1,D2,D3 gear position	Less than specification *2
"2" position	21,22 gear position	At any position
"1" position	11,12 gear position	

*1 : When OD OFF (OD OFF indicator lamp is on.)
*2 : Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

SCIA7186E

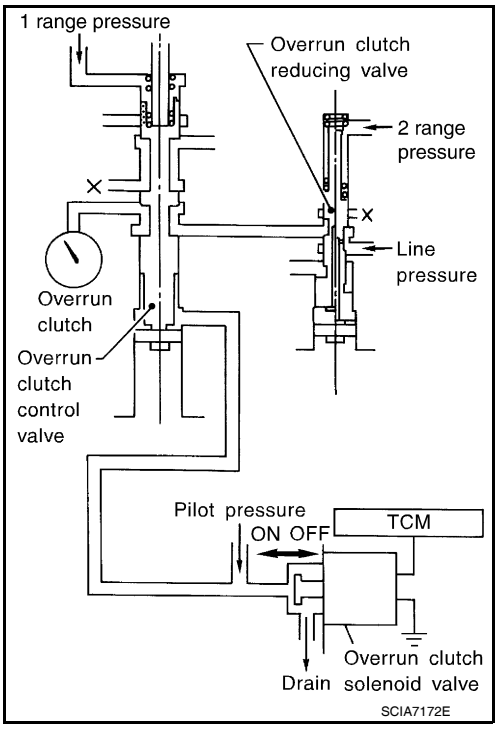
OVERRUN CLUTCH SOLENOID VALVE CONTROL

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).
When this solenoid valve is "ON", the pilot pressure drain port closes. When it is "OFF", the drain port opens.
During the solenoid valve "ON" pilot pressure is applied to the end face of the overrun clutch control valve.



OVERRUN CLUTCH CONTROL VALVE OPERATION

When the solenoid valve is "ON", pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage. Only in "1" position, however, 1 range pressure is applied to overrun clutch control valve, resulting in valve moving downward and clutch engaged.
When the solenoid valve is "OFF", pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. At overrun clutch reducing valve in "D" position, the hydraulic pressure is reduced to a level that balances the spring force. This is sent to overrun clutch control valve and becomes the operating pressure of overrun clutch which is engaged at all times. In "2" position and "1" position, overrun clutch reducing valve is pushed down by 2 range pressure. Line pressure is directly sent to overrun clutch control valve and becomes the operating pressure of overrun clutch which is engaged at all times.



Control Valve

INFOID:0000000007329275

FUNCTION OF CONTROL VALVES

Valve name	Function
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1GR → 2GR → 3GR → 4GR/4GR → 3GR → 2GR → 1GR) in combination with shift valve B.
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1GR → 2GR → 3GR → 4GR/4GR → 3GR → 2GR → 1GR) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4. (Interlocking occurs if the overrun clutch engages during D_4.)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1.
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In the 1st and 2nd positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Lessens the shock find when the 2GR band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft downshifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when a little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock-up.

Centrifugal Cancel Mechanism

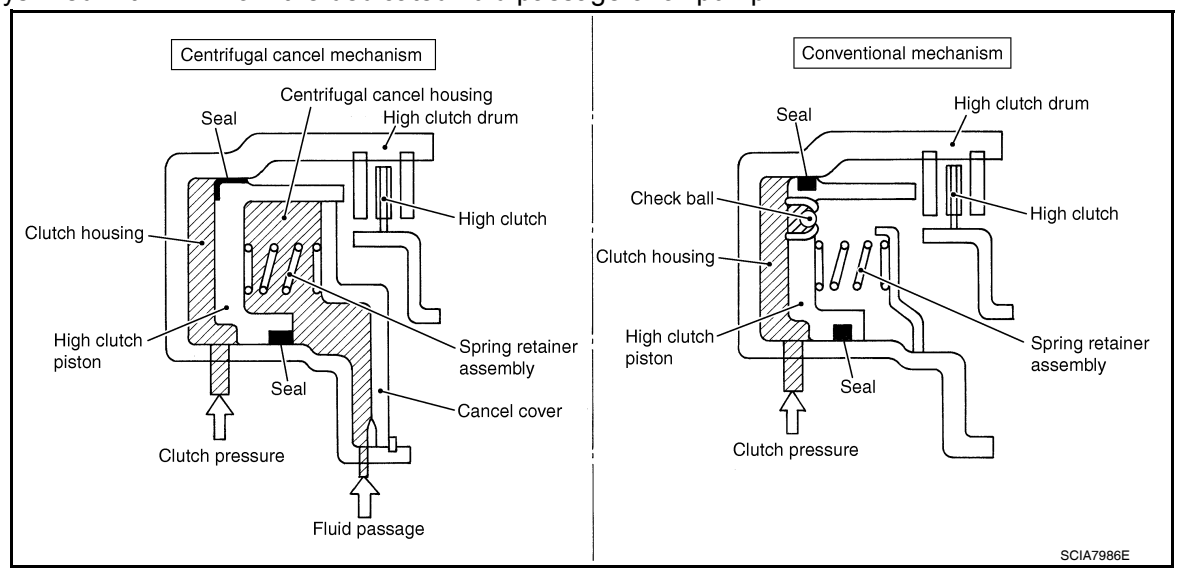
INFOID:0000000007329276

FUNCTION

The centrifugal cancel mechanism is a mechanism to cancel the centrifugal hydraulic pressure instead of the conventional check balls. It cancels the centrifugal hydraulic pressure which is generated as high clutch drum rotates, and it allows for preventing high clutch from dragging and for providing stable high clutch piston pressing force in all revolution speeds.

STRUCTURE/OPERATION

A centrifugal cancel housing is provided to cancel the clutch housing pressure. The centrifugal cancel housing is always filled with ATF from the dedicated fluid passage of oil pump.

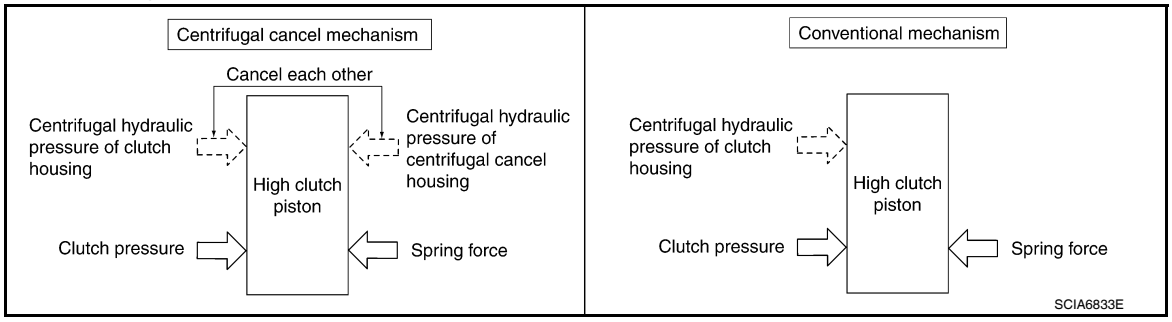


When Clutch Pressure Is Not Applied

As high clutch drum rotates, a centrifugal force applies to the remaining ATF in clutch housing to push high clutch piston. However, on the other hand, the centrifugal force also applies to ATF filled in centrifugal cancel housing, resulting in a force that pushes high clutch piston back. Consequently the high clutch piston does not move because both forces cancel each other, and thus high clutch is prevented from dragging.

When Clutch Pressure Is Applied

Clutch pressure that applies to clutch housing overcomes the fluid pressure and spring force of the opposing centrifugal housing to push high clutch piston, and high clutch is engaged. At this time, the centrifugal force caused by the revolution speed of high clutch drum has no impact any more since the centrifugal force that applies to the clutch pressure of clutch housing is canceled by the centrifugal force that applies to centrifugal cancel housing. As a result, high clutch piston pressing force is always stable in all revolution speeds, and thus smooth shifting characteristics are achieved.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000007329277

A/T system has two self-diagnostic systems.
The first is emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the OD OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-74, "CONSULT Function (TRANSMISSION)" .

OBD-II Function for A/T System

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The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of OBD-II

INFOID:0000000007329279

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — 1st trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd trip
The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

INFOID:0000000007329280

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT or GST) CONSULT or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT can identify them as shown below, therefore, CONSULT (if available) is recommended.

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be “0”.

If a 1st trip DTC is stored in the ECM, the time data will be “1t”.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen, not on the GST. For detail, refer to EC-119, "CONSULT Function (ENGINE)".
Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT, GST or ECM DIAGNOSTIC TEST MODE as described following.

- **If the battery cable is disconnected, the diagnostic trouble code will be cleared within 24 hours.**
- **When you erase the DTC, using CONSULT or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-49, "Emission-related Diagnostic Information".

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT)

- **If a DTC is displayed for both ECM and TCM, it is necessary to be erased for both ECM and TCM.**

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT “ON” and touch “TRANSMISSION”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the TCM will be erased.) Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)

HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)”. Refer to AT-79, "Diagnosis Procedure without CONSULT". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to EC-126, "Generic Scan Tool (GST) Function".

HOW TO ERASE DTC (NO TOOLS)

The OD OFF indicator lamp is located on the combination meter.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)”. Refer to AT-79, "Diagnosis Procedure without CONSULT". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform “OBD-II SELF-DIAGNOSTIC PROCEDURE (No tools)”. Refer to EC-49, "Emission-related Diagnostic Information".

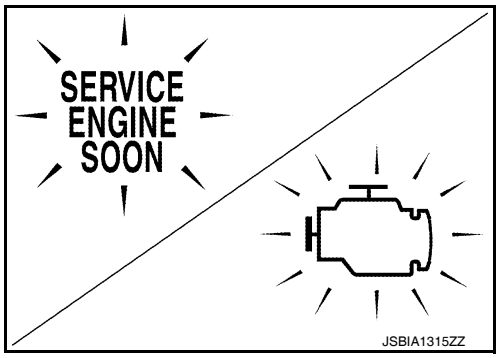
Malfunction Indicator Lamp (MIL)

INFOID:0000000007329281

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MIL does not light up, refer to EC-543, "Wiring Diagram".
2. When the engine is started, the MIL should go off.
   - If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



TROUBLE DIAGNOSIS

DTC Inspection Priority Chart

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If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC "CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for DTC "CAN COMM CIRCUIT". Refer to AT-84 .

Priority	Detected items
1	CAN communication line
2	Except above

Fail-Safe

INFOID:0000000007329283

The TCM has an electronic Fail-safe mode. This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.

Under Fail-Safe, the vehicle always runs in 3GR, even with a shift lever position of "1", "2" or "D". The customer may complain of sluggish or poor acceleration.

Always follow the "AT-41, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" ".

The SELF-DIAGNOSIS results will be as follows:

- The first SELF-DIAGNOSIS will indicate damage to the vehicle speed signal or the output speed sensor.
- During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

FAIL-SAFE FUNCTION

The following fail-safe functions allow vehicles to be driven even when sensor, switch or solenoid malfunction occurs.

Output Speed Sensor

Vehicle speed signal is input from combination meter.

Accelerator Pedal Position Signal and Throttle Position Signal

TCM controls the throttle opening angle to a predetermined fixed position to enable driving if a malfunctioning signal is input to TCM.

Transmission Range Switch

When the multiple transmission range switch signals are input to TCM, the priority of selector lever position becomes "D", "N", "R", "2" and "1" in order by internal TCM determination.

The use of 4GR is inhibited until normal operation resumes. Because the hydraulic circuit of the control valve is switched by manual valve according to the selector lever position, however, actual operating condition of vehicle becomes as follows.

Actual lever position	Transmission range switch input signal	Running status
"P"	"P" position and other position signals	P
"R"	"R" position and other position signals	R
"N"	"N" position and other position signals	N
"D"	"D" position and other position signals	$D_1 \Leftrightarrow D_2 \Leftrightarrow D_3 \Leftrightarrow D_4$
"2"	"2" position and other position signals (Except "1" position)	$2_1 \Leftrightarrow 2_2 \Leftrightarrow 2_3$
	"2" position and "1" position signals	$2_1 \Leftrightarrow 2_2$
"1"	"1" position and other position signals (Except "2" position)	$1_1 \Leftrightarrow 1_2 \Leftrightarrow 1_3$
	"1" position and "2" position signals	$1_1 \Leftrightarrow 1_2$

Shift Solenoid Valve A and B

If non-standard solenoid signal is sent to TCM, use of certain gears is limited. Refer to chart shown below.

Shift position	Normal			Malfunction in solenoid valve A			Malfunction in solenoid valve B			Malfunction in solenoid valves A and B		
	A	B	Gear	A	B	Gear	A	B	Gear	A	B	Gear
“D” position	●	●	1st	–	●→×	3rd	●→×	–	3rd	–	–	3rd
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
	●	×	4th	–	x		●→×	–		–	–	
“2” position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
“1” position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	

●: Solenoid ON

×: Solenoid OFF

–: Non-standard condition

Line Pressure Solenoid Valve

If non-standard solenoid signal is sent to TCM, line pressure solenoid valve is turned OFF to achieve maximum oil pressure.

Torque Converter Clutch Solenoid Valve

If non-standard solenoid signal is sent to TCM, torque converter clutch solenoid valve is turned OFF to release lock-up.

Overrun Clutch Solenoid Valve

If non-standard solenoid signal is sent to TCM, overrun clutch solenoid valve is turned OFF to engage overrun clutch. This will result in more effective engine brake during deceleration.

How to Perform Trouble Diagnosis for Quick and Accurate Repair

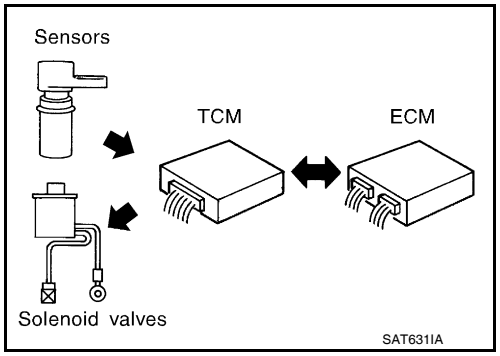
INFOID:0000000007329284

INTRODUCTION

The TCM receives a signal from the vehicle speed sensor, accelerator pedal position sensor or transmission range switch and provides shift control or lock-up control via A/T solenoid valves.

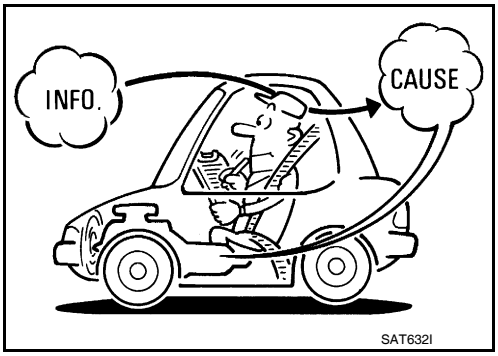
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only, may not find the cause of the malfunctions. A road test with CONSULT or a circuit tester connected should be performed. Follow the "WORK FLOW" .
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such malfunctions, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “DIAGNOSTIC WORKSHEET” like the example ("DIAGNOSTIC WORKSHEET") should be used.
Start your diagnosis by looking for “conventional” malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.
Also check related Service bulletins for information.



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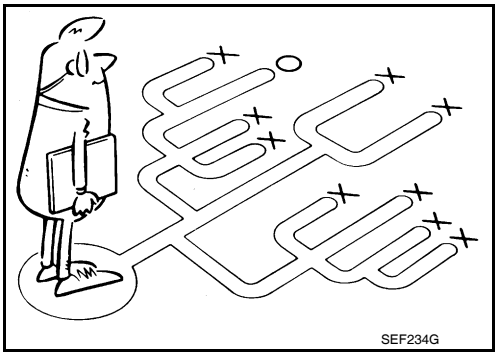
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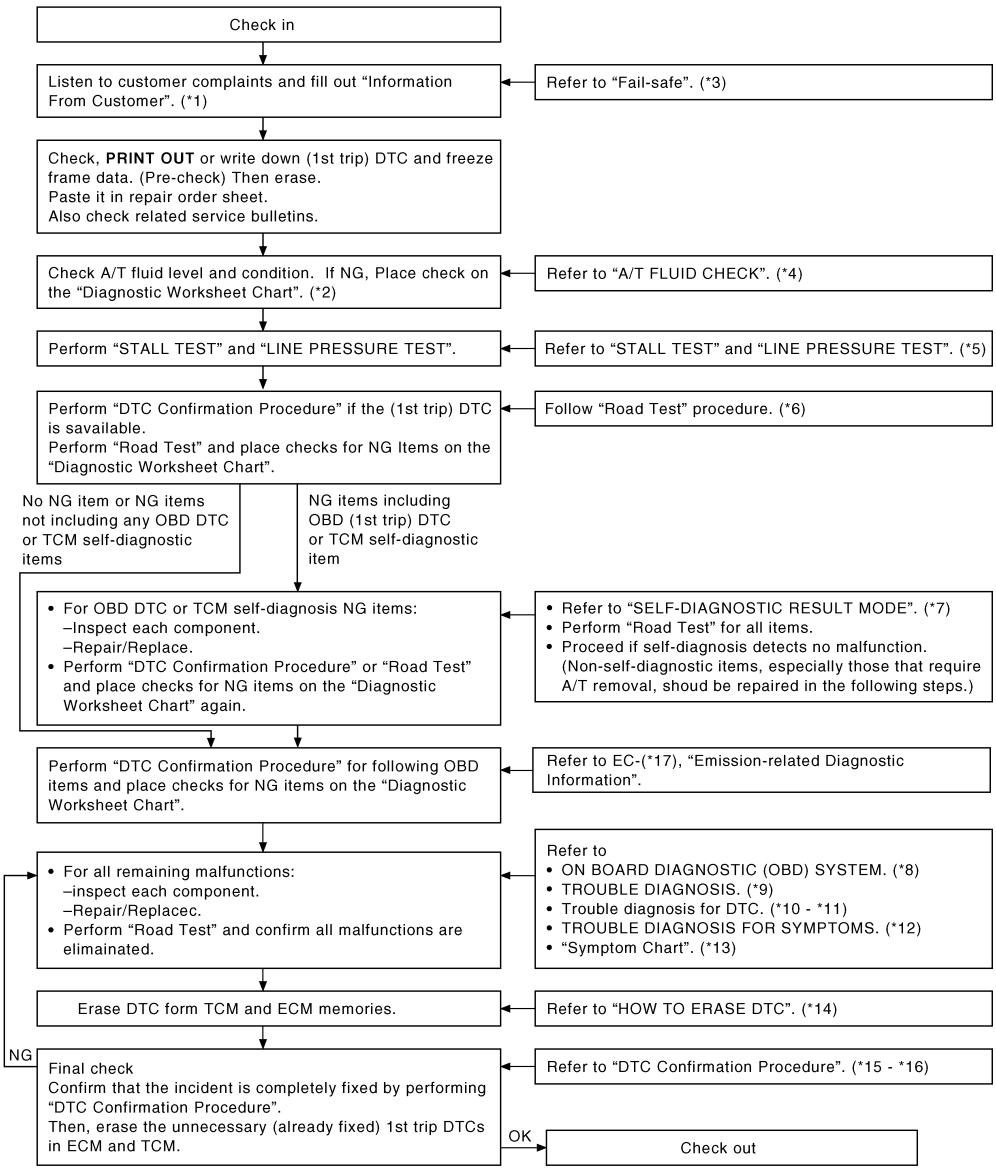
WORK FLOW
A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.
Make good use of the two sheets provided, "Information from customer" and "Diagnostic Worksheet Chart" , to perform the best troubleshooting possible.

Work Flow Chart



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*1	"Information from customer"	*2	"Diagnostic Worksheet Chart"	*3	AT-40
*4	AT-49	*5	AT-49, AT-49	*6	AT-53
*7	AT-74	*8	AT-37	*9	AT-40
*10	AT-97	*11	AT-164	*12	AT-174
*13	AT-62	*14	AT-37	*15	AT-84
*16	AT-164	*17	EC-49		

DIAGNOSTIC WORKSHEET

Information from Customer

KEY POINTS

- **WHAT**..... Vehicle & A/T model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR./MS	Model & Year	VIN
Trans. model	Engine	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	☐ Continuous ☐ Intermittent (times a day)	
Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → 4th)	
	☐ No down-shift (☐ 4th → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)	
	☐ Lock-up malfunction	
	☐ Shift point too high or too low.	
	☐ Shift shock or slip (☐ N → D ☐ Lock-up ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No kick down	
	☐ No pattern select	
	☐ Others ( )	
Malfunction indicator lamp (MIL)	☐ Continuously lit	☐ Not lit

Diagnostic Worksheet Chart

1.	☐ Read the Fail-safe and listen to customer complaints.		AT-40, "Information from customer"
2.	☐ Check A/T fluid		AT-16
	☐ Leakage (Follow specified procedure) ☐ Fluid condition ☐ Fluid level		
3.	☐ Perform “STALL TEST” and “LINE PRESSURE TEST”.		AT-49
	☐“STALL TEST”— Mark possible damaged components/others.		
	☐ Torque converter one-way clutch ☐ Reverse clutch ☐ Forward clutch ☐ Overrun clutch ☐ Forward one-way clutch	☐ Low & reverse brake ☐ Low one-way clutch ☐ Engine ☐ Line pressure is low ☐ Clutches and brakes except high clutch and brake band are OK	
	☐“LINE PRESSURE TEST”— Suspected parts:		

4.	☐ Perform “Road Test”.		AT-53
	4-1.	“Check Before Engine is Started”	AT-54
		☐AT-177, "OD OFF Indicator Lamp Does Not Come On" ☐ Perform self-diagnosis. Enter checks for detected items. AT-74 , AT-79 .	
		☐ CAN COMM CIRCUIT AT-84 . ☐ TRANSMISSION RANGE SWITCH A AT-87 . ☐ TRANSMISSION FLUID TEMPERATURE SENSOR A AT-92 . ☐ OUTPUT SPEED SENSOR AT-97 . ☐ ENGINE SPEED AT-102 . ☐ 1GR INCORRECT RATIO AT-106 ☐ 2GR INCORRECT RATIO AT-109 . ☐ 3GR INCORRECT RATIO AT-112 . ☐ 4GR INCORRECT RATIO AT-115 . ☐ TORQUE CONVERTER AT-120 . ☐ TORQUE CONVERTER AT-125 . ☐ PRESSURE CONTROL SOLENOID A AT-130 . ☐ SHIFT SOLENOID A AT-135 . ☐ SHIFT SOLENOID B AT-140 . ☐ OVERRUN CLUTCH SOLENOID AT-145 . ☐ VEHICLE SPEED SIGNAL AT-150 . ☐ BATT/FLUID TEMP SEN AT-153 . ☐ INPUT SPEED SENSOR A AT-159 . ☐ CONTROL UNIT (RAM), CONTROL UNIT (ROM) AT-164 . ☐ MAIN POWER SUPPLY AND GROUND CIRCUIT AT-165 .	
	4-2.	“Check at Idle”	AT-54
		☐AT-179, "Engine Cannot Be Started in "P" and "N" Position" . ☐AT-180, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" . ☐AT-180, "In "N" Position, Vehicle Moves" . ☐AT-181, "Large Shock "N" → "R" Position" . ☐AT-182, "Vehicle Does Not Creep Backward in "R" Position" . ☐AT-183, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" .	

4.	4-3.	“Cruise Test”	AT-56
		Part 1	
		☐AT-184, "Vehicle Cannot Be Started from D_1" . ☐AT-186, "A/T Does Not Shift: $D_1 \rightarrow D_2$or Does Not Kickdown: $D_4 \rightarrow D_2$" . ☐AT-187, "A/T Does Not Shift: $D_2 \rightarrow D_3$" . ☐AT-189, "A/T Does Not Shift: $D_3 \rightarrow D_4$" . ☐AT-190, "A/T Does Not Perform Lock-up" . ☐AT-191, "A/T Does Not Hold Lock-up Condition" . ☐AT-192, "Lock-up Is Not Released" . ☐AT-193, "Engine Speed Does Not Return to Idle (Light Braking $D_4 \rightarrow D_3$)" .	
		Part 2	AT-59
		☐AT-184, "Vehicle Cannot Be Started from D_1" . ☐AT-186, "A/T Does Not Shift: $D_1 \rightarrow D_2$or Does Not Kickdown: $D_4 \rightarrow D_2$" . ☐AT-187, "A/T Does Not Shift: $D_2 \rightarrow D_3$" . ☐AT-189, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .	
		Part 3	AT-60
		☐AT-194, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF" . ☐AT-194, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position" . ☐AT-196, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position" . ☐AT-198, "Vehicle Does Not Decelerate by Engine Brake" . ☐ Perform self-diagnosis. Enter checks for detected items. AT-74 , AT-79 .	
		☐ CAN COMM CIRCUIT AT-84 . ☐ TRANSMISSION RANGE SWITCH A AT-87 . ☐ TRANSMISSION FLUID TEMPERATURE SENSOR A AT-92 . ☐ OUTPUT SPEED SENSOR AT-97 . ☐ ENGINE SPEED AT-102 . ☐ 1GR INCORRECT RATIO AT-106 ☐ 2GR INCORRECT RATIO AT-109 . ☐ 3GR INCORRECT RATIO AT-112 . ☐ 4GR INCORRECT RATIO AT-115 . ☐ TORQUE CONVERTER AT-120 . ☐ TORQUE CONVERTER AT-125 . ☐ PRESSURE CONTROL SOLENOID A AT-130 . ☐ SHIFT SOLENOID A AT-135 . ☐ SHIFT SOLENOID B AT-140 . ☐ OVERRUN CLUTCH SOLENOID AT-145 . ☐ VEHICLE SPEED SIGNAL AT-150 . ☐ BATT/FLUID TEMP SEN AT-153 . ☐ INPUT SPEED SENSOR A AT-159 . ☐ CONTROL UNIT (RAM), CONTROL UNIT (ROM) AT-164 . ☐ MAIN POWER SUPPLY AND GROUND CIRCUIT AT-165 .	
5.	☐ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-74, AT-79
6.	☐ Perform “Road Test”.		AT-53
7.	☐ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)		AT-62
8.	☐ Erase DTC from TCM and ECM memories.		AT-37, AT-79

A/T Electrical Parts Location

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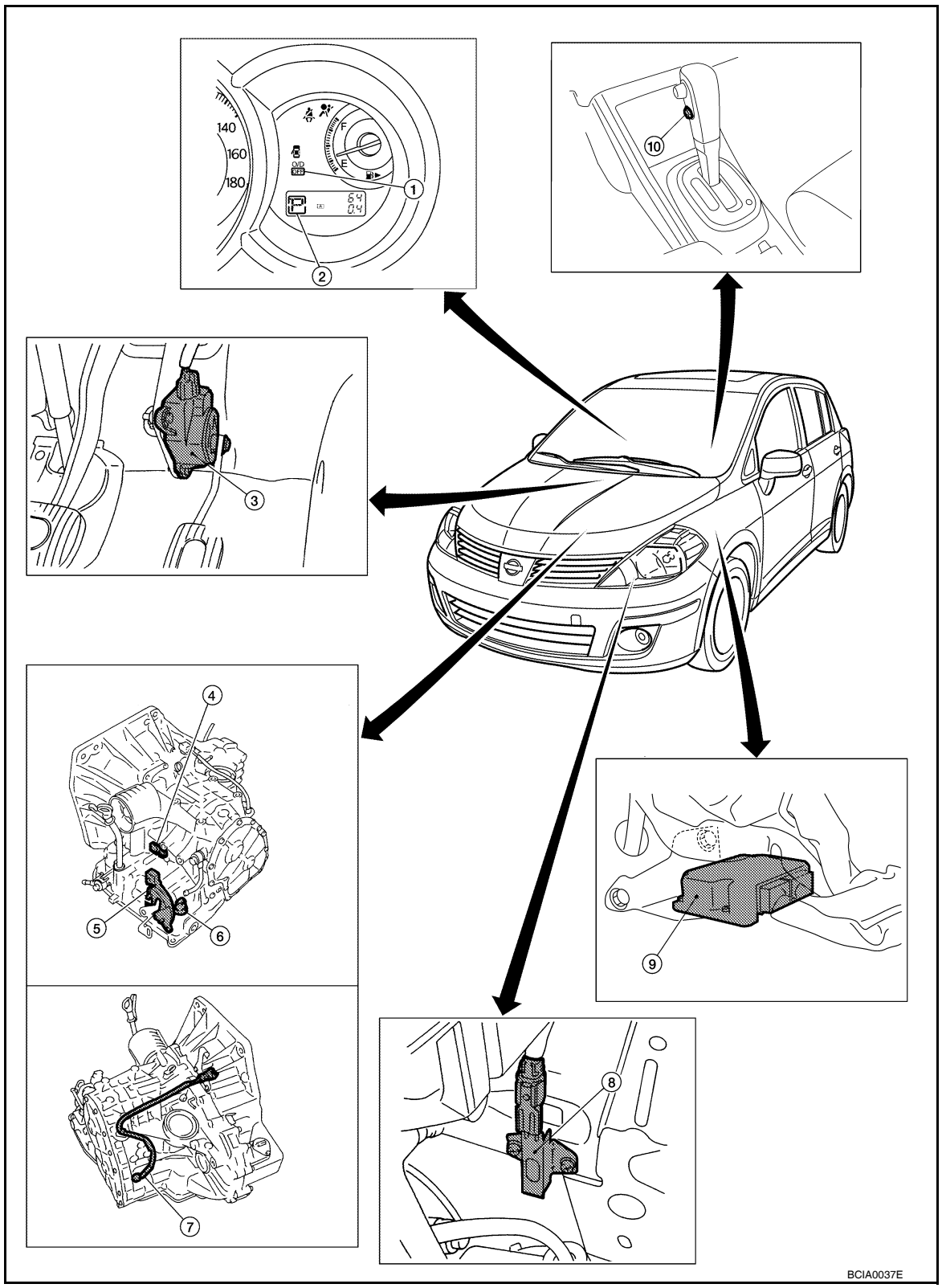

1. OD OFF indicator lamp
2. Shift position indicator
3. Accelerator pedal position (APP) sensor
4. Input speed sensor
5. Transmission range switch
6. Terminal body (Terminal cord assembly connector)

7. Output speed sensor
8. Dropping resistor
9. TCM
10. Overdrive control switch

Circuit Diagram

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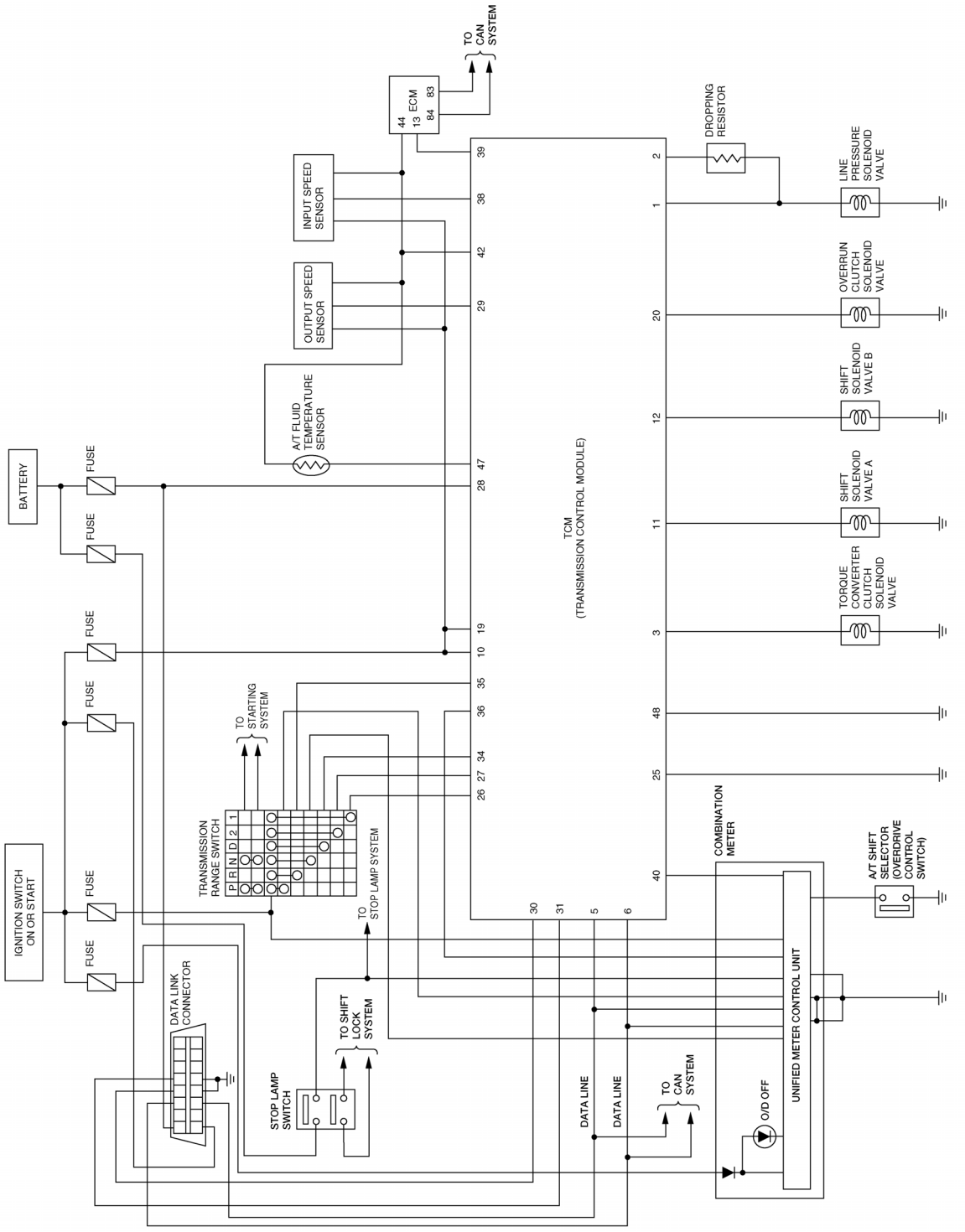

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Inspections Before Trouble Diagnosis

INFOID:0000000007329287

A/T FLUID CHECK

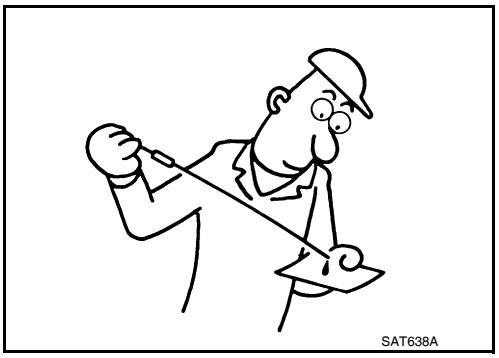
Fluid Leakage and Fluid Level Check

Check fluid leakage and check the fluid level. Refer to AT-16, "Checking A/T Fluid".

Fluid Condition Check

Check the A/T fluid condition.

Fluid status	Conceivable Cause	Required Operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the ATF and check the A/T main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the ATF	Replace the ATF and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within A/T	Replace the ATF and check for improper operation of the A/T.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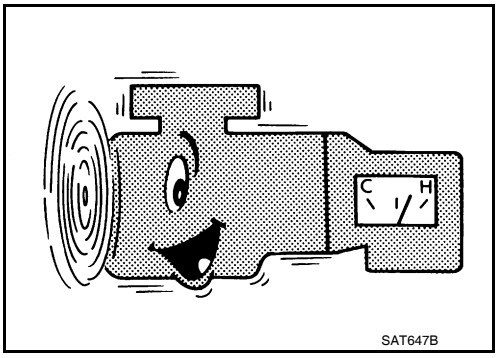
STALL TEST

Stall Test Procedure

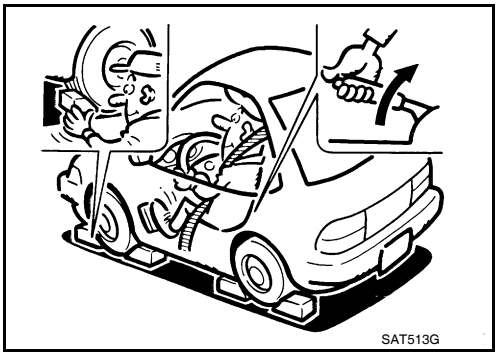
1. Check ATF and engine oil levels. If necessary, add ATF and engine oil.
2. Drive vehicle for approximately 10 minutes or until ATF and engine oil reach operating temperature.

ATF operating temperature: 50 - 80°C (122 - 176°F)

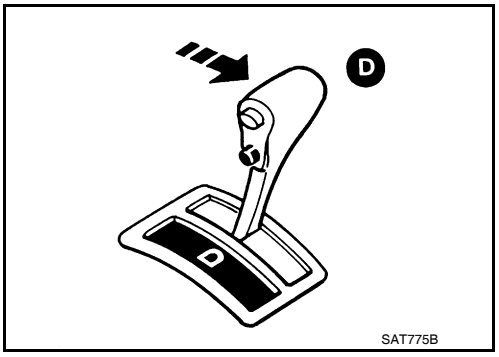


SAT647B

3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
   - **It is good practice to mark the point of specified engine rpm on indicator.**


SAT513G

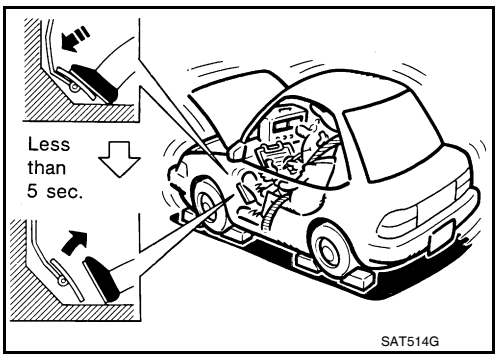
5. Start engine, apply foot brake, and place selector lever in “D” position.



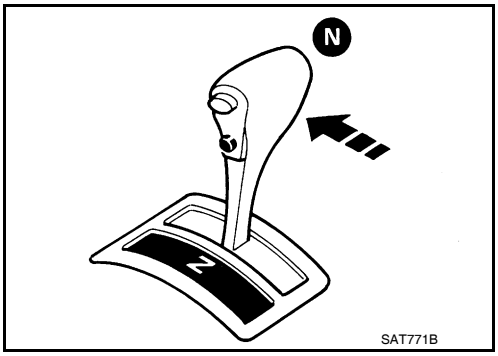
SAT775B

6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   CAUTION:
   Do not hold down the accelerator pedal for more than 5 seconds during this test.

   Stall revolution: AT-346, "Stall Speed"



8. Move selector lever to “N” position.
9. Cool off ATF.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. Repeat steps 6 through 9 with selector lever in “2”, “1” and “R” positions.



Judgement of Stall Test

The test result and possible damaged components relating to each result are shown in the illustrations on next page.

In order to pinpoint the possible damaged components, refer to AT-41, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".

NOTE:

Stall revolution is too high in “D”, “2”, or “1” position:

- Slippage occurs in 1GR but not in 2GR and 3GR. ..... Low one-way clutch slippage
- Slippage occurs in the following gears:
  1GR through 3GR in “D” position and engine brake functions with OD OFF. (OD OFF indicator lamp is on.)
  1GR and 2GR in “2” position and engine brake functions with accelerator pedal released (fully closed throttle)..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in “R” position:

- Engine brake does not function in “1” position. ..... Low & reverse brake slippage
- Engine brake functions in “1” position. ..... Reverse clutch slippage

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50 MPH). ..... One-way clutch seizure in torque converter housing

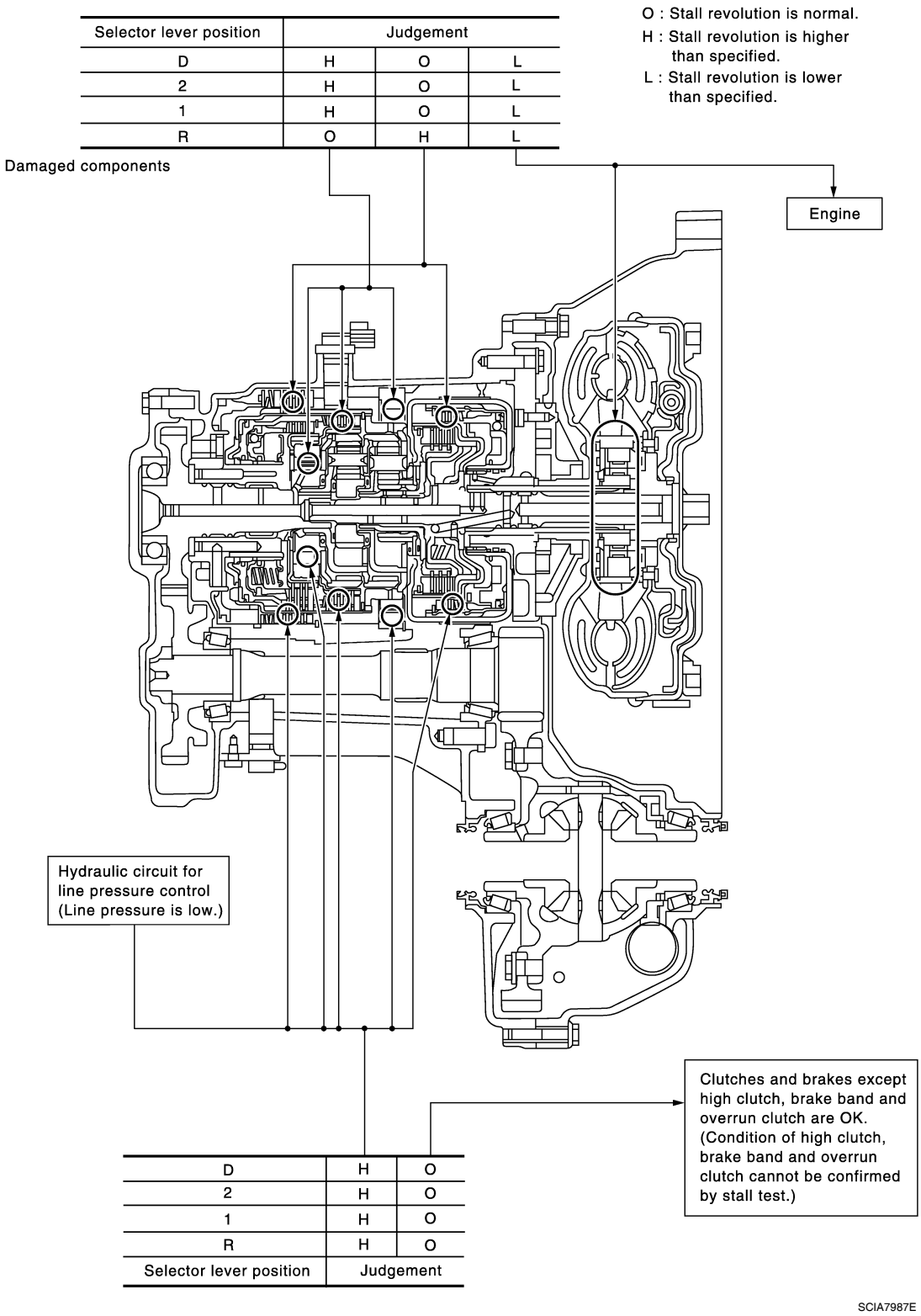
CAUTION:

Be careful because automatic fluid temperature increases abnormally:

- Slippage occurs in 3GR and 4GR in “D” position. ..... High clutch slippage
- Slippage occurs in 2GR and 4GR in “D” position. ..... Brake band slippage
- Engine brake does not function in 2GR and 3GR in “D” position, 2GR in “2” position, and 1GR in “1” position with OD OFF. (OD OFF indicator lamp is on.) ..... Overrun clutch slippage

Stall revolution less than specifications:

- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

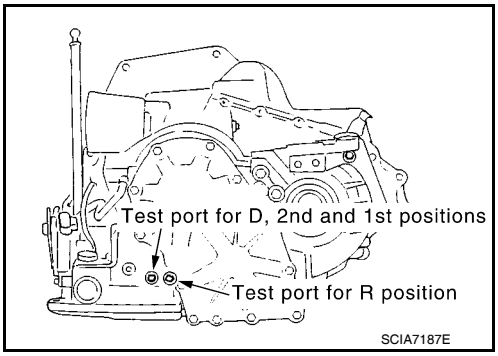


LINE PRESSURE TEST

Line Pressure Test Ports

Location of line pressure test ports are shown in the figure.

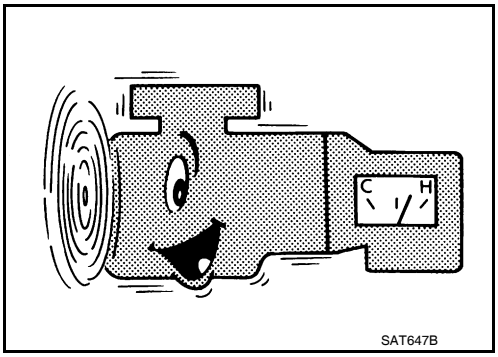
- **Always replace pressure plugs as they are self-sealing bolts.**



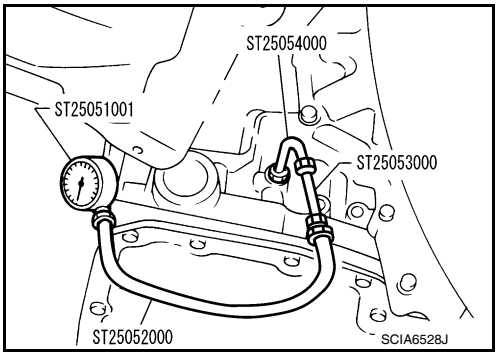
Line Pressure Test Procedure

1. Check ATF and engine oil levels. If necessary, add ATF or engine oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

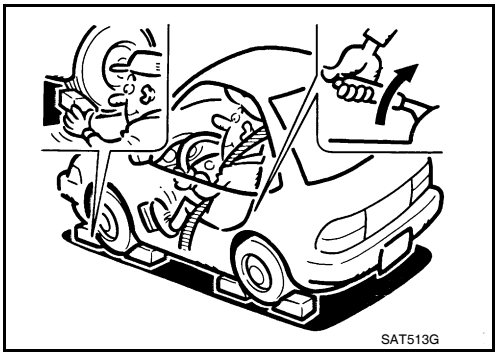
ATF operating temperature: 50 - 80°C (122 -176°F)



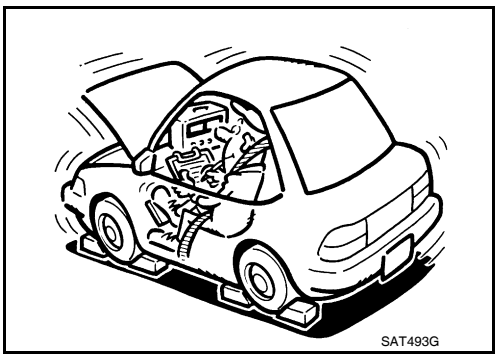
3. Install oil pressure gauge to corresponding line pressure test port.



4. Set parking brake and block wheels.



5. Start engine and measure line pressure at idle and stall speed.
   CAUTION:
   - **Keep the brake pedal pressed all the way down during measurement.**
   - **When measuring the line pressure at the stall speed, refer to "STALL TEST".**



Line Pressure

Engine speed	Line pressure [kPa (kg/cm^2 , psi)]	
	D, 2nd and 1st positions	R position
Idle speed	AT-346, "Line Pressure"	
Stall speed		

Judgement of Line Pressure Test

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	• Oil pump wear • Control piston damage • Pressure regulator valve or plug sticking • Spring for pressure regulator valve damaged • Fluid pressure leakage between oil strainer and pressure regulator valve • Clogged strainer
	Line pressure is low in particular position.	• Fluid pressure leakage between manual valve and particular clutch • For example, line pressure is: – Low in “R” and “1” positions, but – Normal in “D”, and “2” positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-20, "Shift Mechanism".
	Line pressure is high.	• Accelerator pedal position signal malfunction • A/T fluid temperature sensor damaged • Line pressure solenoid valve sticking • Short circuit of line pressure solenoid valve circuit • Pressure modifier valve sticking • Pressure regulator valve or plug sticking • Open in dropping resistor circuit
At stall speed	Line pressure is low.	• Accelerator pedal position signal malfunction • Line pressure solenoid valve sticking • Short circuit of line pressure solenoid valve circuit • Pressure regulator valve or plug sticking • Pressure modifier valve sticking • Pilot valve sticking

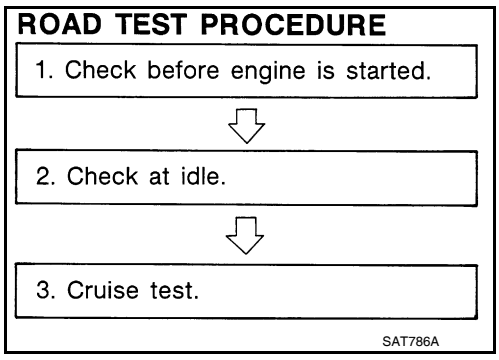
Road Test

INFOID:0000000007329288

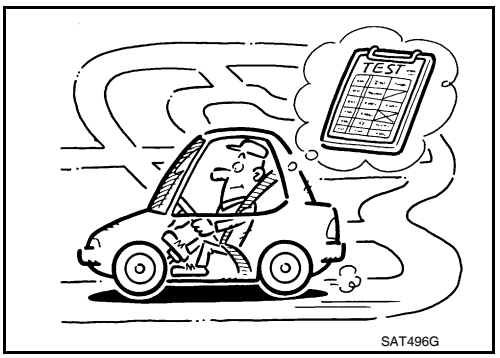
DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of malfunctions.
- The road test consists of the following three parts:

1. Check before engine is started. Refer to AT-54 .
2. Check at idle. Refer to AT-54 .
3. Cruise test
   - Inspection all the item from Part 1 to Part 3. Refer to AT-56 , AT-59 and AT-60 .



- Before road test, familiarize yourself with all test procedures and items to check.
- Test all inspection items until the symptom is uncovered. Include NG items in “Diagnostic Worksheet Chart”(Refer to AT-41). Perform a diagnosis of the NG items after the completion of all the road tests.



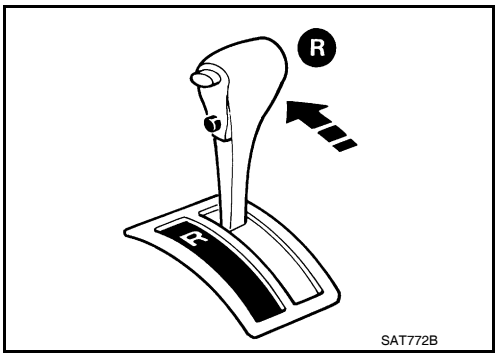
SAT496G

Check Before Engine Is Started

INFOID:0000000007329289

1.CHECK OD OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



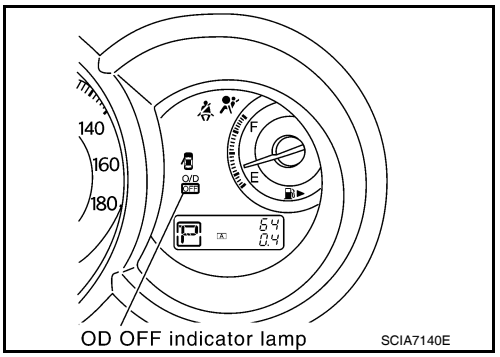
SAT772B

4. Turn ignition switch ON. (Do not start engine.)

Does OD OFF indicator lamp come on for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items. Refer to AT-74, "CONSULT Function (TRANSMISSION)" , AT-79, "Diagnosis Procedure without CONSULT" .
3. Go to AT-54, "Check at Idle" .

NO >> Stop “Road Test”. Go to AT-177, "OD OFF Indicator Lamp Does Not Come On" .



OD OFF indicator lamp SCIA7140E

Check at Idle

INFOID:0000000007329290

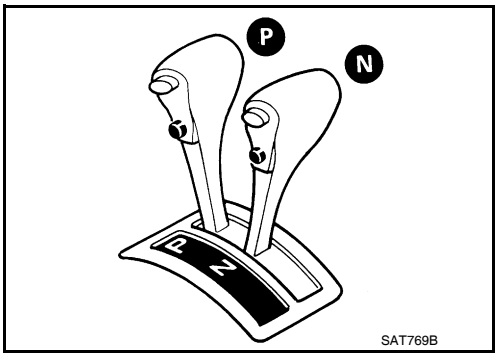
1.CHECK ENGINE START

1. Park vehicle on flat surface.
2. Turn ignition switch ON. (Do not start engine.)
3. Move selector lever to “P” or “N” position.
4. Turn ignition switch to “START” position.

Is engine started?

YES >> GO TO 2.

NO >> • Stop “Road Test”. Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-179, "Engine Cannot Be Started in "P" and "N" Position" .



SAT769B

2.CHECK ENGINE START

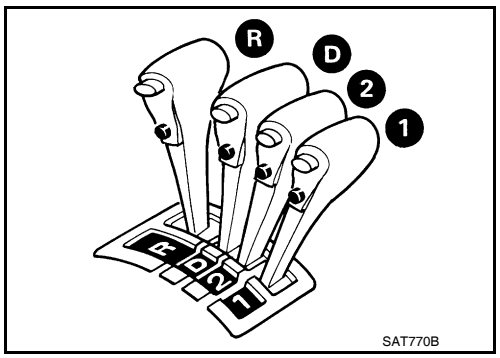
1. Turn ignition switch ON. (Do not start engine.)

2. Move selector lever to “R”, “D”, “2” or “1” position.
3. Turn ignition switch to “START” position.

Is engine started?

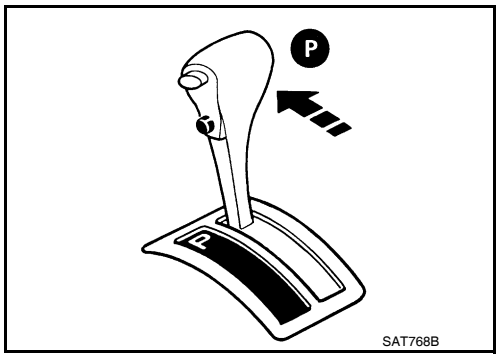
YES >> • Stop “Road Test”. Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-179, "Engine Cannot Be Started in "P" and "N" Position" .
• Continue “Road Test”.

NO >> GO TO 3.



3. CHECK VEHICLE MOVE

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.

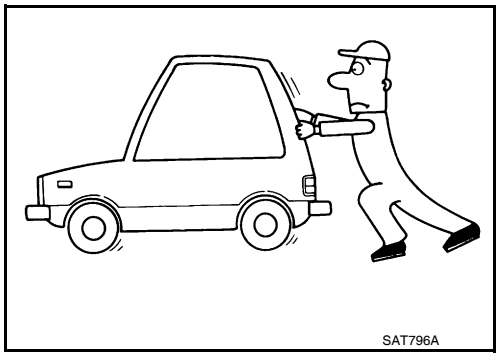


4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

YES >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-180, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" .
• Continue “Road Test”.

NO >> GO TO 4.



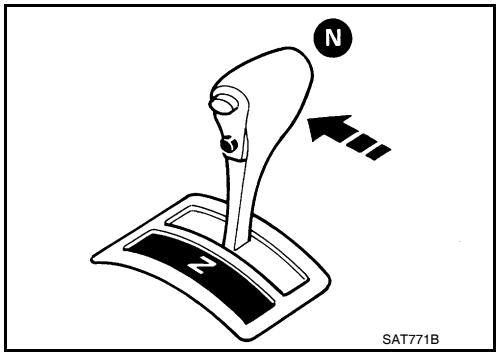
4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Start engine.
3. Move selector lever to “N” position.
4. Release parking brake.

Does vehicle move forward or backward?

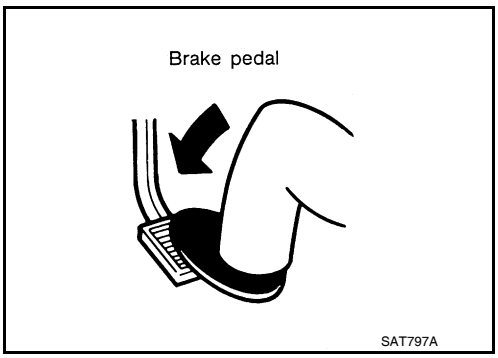
YES >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-180, "In "N" Position, Vehicle Moves" .
• Continue “Road Test”.

NO >> GO TO 5.



5. CHECK SHIFT SHOCK

1. Apply foot brake.

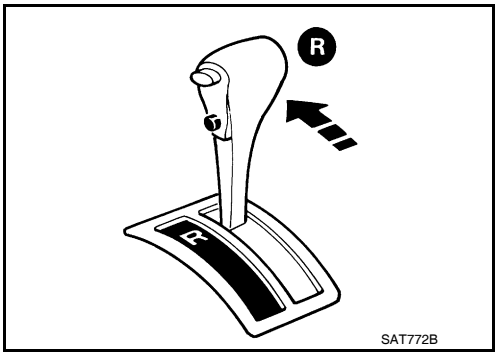


2. Move selector lever to “R” position.

Is there large shock when changing from “N” to “R” position?

YES >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-181, "Large Shock "N" → "R" Position" .
• Continue “Road Test”.

NO >> GO TO 6.



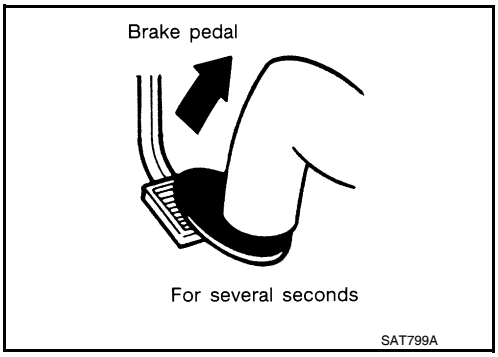
6. CHECK VEHICLE MOVE

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.

NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-182, "Vehicle Does Not Creep Backward in "R" Position" .
• Continue “Road Test”.



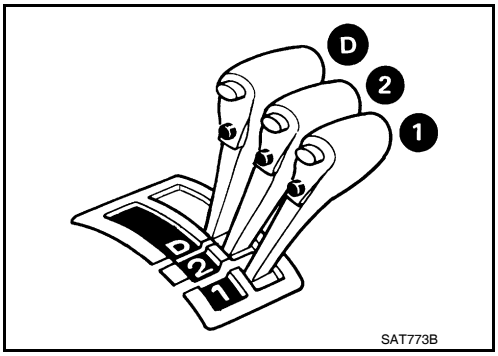
7. CHECK VEHICLE MOVE

Move selector lever to “D”, “2” and “1” positions and check if vehicle creeps forward.

Does vehicle creep forward in all three positions?

YES >> Go to AT-56, "Cruise Test - Part 1" .

NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-183, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" .
• Continue “Road Test”.



Cruise Test - Part 1

INFOID:0000000007329291

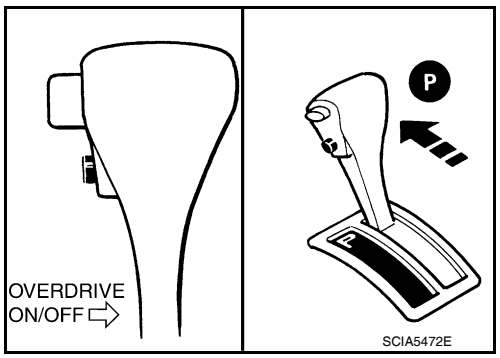
1. CHECK STARTING GEAR (D_1) POSITION

1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

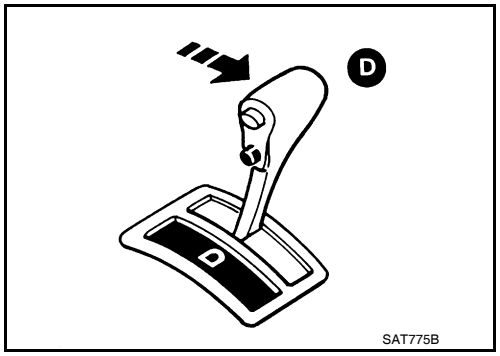
ATF operating temperature: 50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.

3. Push overdrive control switch. (OD OFF indicator lamp is off.)
4. Move selector lever to “P” position.
5. Start engine.



6. Move selector lever to “D” position.

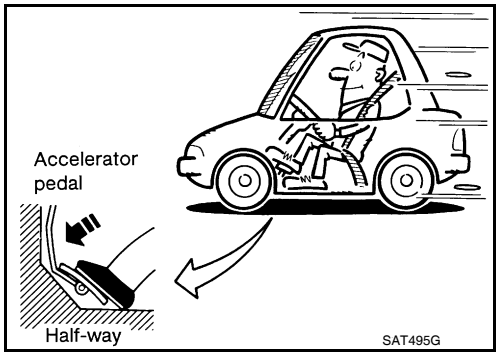


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

Read gear position. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does vehicle start from D_1 ?

YES >> GO TO 2.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-184, "Vehicle Cannot Be Started from D_1" .
• Continue “Road Test”.



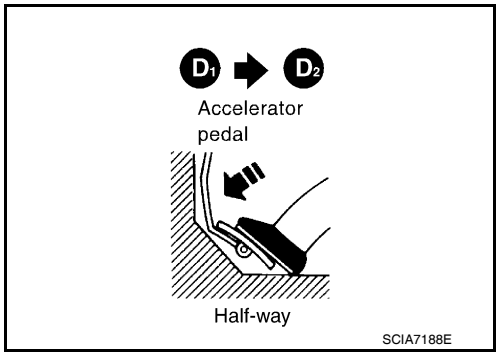
2. CHECK SHIFT-UP (D_1 TO D_2)

Check shift-up (D_1 to D_2).
Specified speed when shifting from D_1 to D_2. Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs" .

Read gear position, throttle opening and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_1 to D_2 at the specified speed?

YES >> GO TO 3.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-186, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .
• Continue “Road Test”.



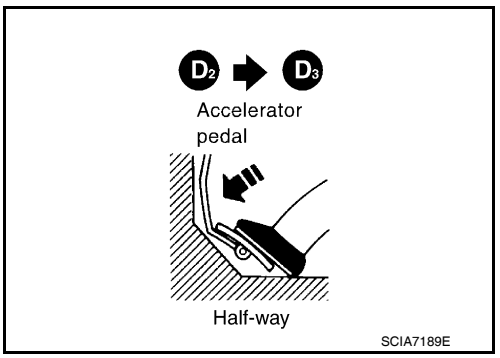
3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs" .

Read gear position, throttle opening and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_2 to D_3 at the specified speed?

YES >> GO TO 4.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-187, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
• Continue “Road Test”.



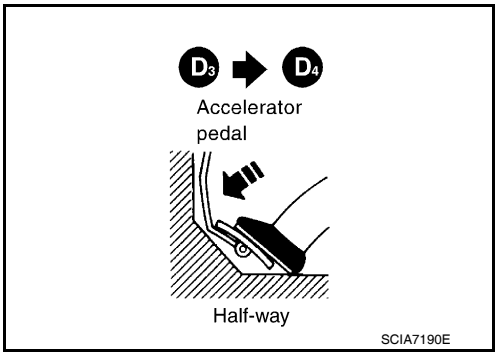
4. CHECK SHIFT-UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs" .

Read gear position, throttle opening and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 5.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-189, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
• Continue “Road Test”.



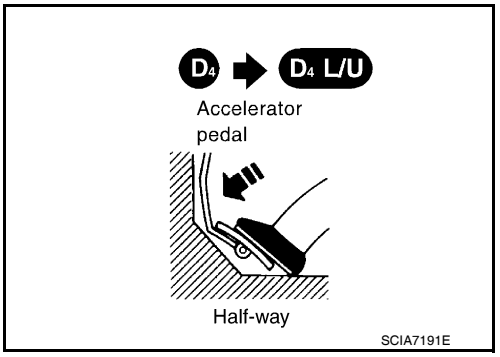
5. CHECK LOCK-UP (D_4 TO D_4 L/U)

Check lock-up (D_4 to D_4 L/U).
Specified speed when lock-up occurs. Refer to AT-62, "Vehicle Speed at Which Lock-up Occurs/Releases" .

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T perform lock-up at the specified speed?

YES >> GO TO 6.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-190, "A/T Does Not Perform Lock-up" .
• Continue “Road Test”.



6. CHECK LOCK-UP HOLD

Check lock-up hold.

When lock-up duty becomes 94%. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T hold lock-up condition for more than 30 seconds?

YES >> GO TO 7.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-191, "A/T Does Not Hold Lock-up Condition" .
• Continue “Road Test”.

7. CHECK SHIFT-DOWN (D_4 L/U TO D_4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-192, "Lock-up Is Not Released" .

• Continue “Road Test”.

8. CHECK SHIFT-DOWN (D_4 TO D_3)

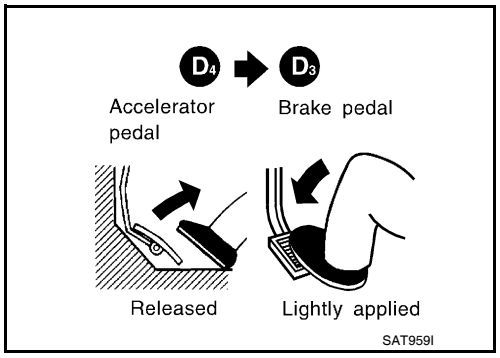
Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does engine speed return to idle smoothly when A/T is shifted from D_4 to D_3 ?

YES >> 1. Stop vehicle.
2. Go to AT-59, "Cruise Test - Part 2" .

NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-193, "Engine Speed Does Not Return to Idle (Light Braking $D_4 \rightarrow D_3$)" .
• Continue “Road Test”.



Cruise Test - Part 2

INFOID:0000000007329292

1. CHECK STARTING GEAR (D_1) POSITION

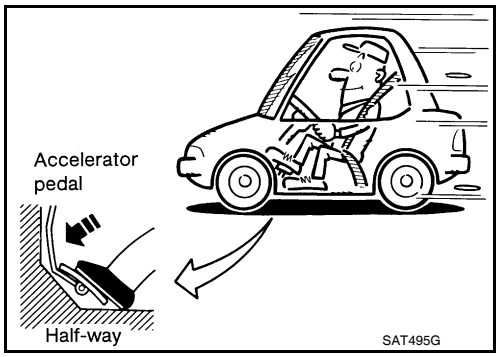
1. Push overdrive control switch. (OD OFF indicator lamp is off.)
2. Move selector lever to “D” position.
3. Accelerate vehicle by half throttle again.

Read gear position. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does vehicle start from D_1 ?

YES >> GO TO 2.

NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-184, "Vehicle Cannot Be Started from D_1" .
• Continue “Road Test”.



2. CHECK SHIFT-UP AND SHIFT-DOWN (D_3 TO D_4 TO D_2)

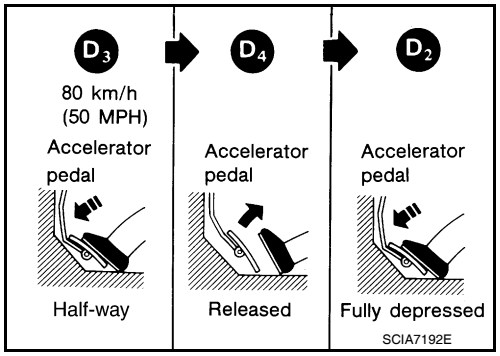
1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.
2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle opening. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

YES >> GO TO 3.

NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-186, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .
• Continue “Road Test”.



3. CHECK SHIFT-UP (D_2 TO D_3)

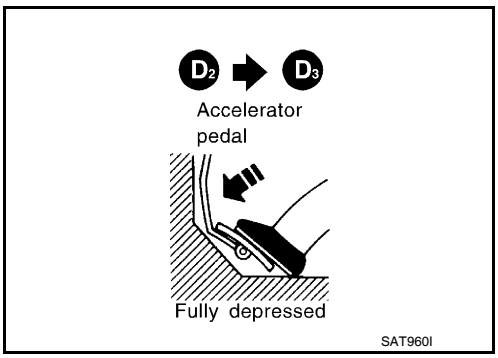
Check shift-up (D_2 to D_3)
Specified speed when shifting from D_2 to D_3 . Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs" .

Read gear position, throttle opening and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_2 to D_3 at the specified speed?

YES >> GO TO 4.

NO >>
- Mark the box on the “Diagnostic Worksheet Chart”.
- Go to AT-187, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.



4. CHECK SHIFT-UP (D_3 TO D_4) AND ENGINE BRAKE

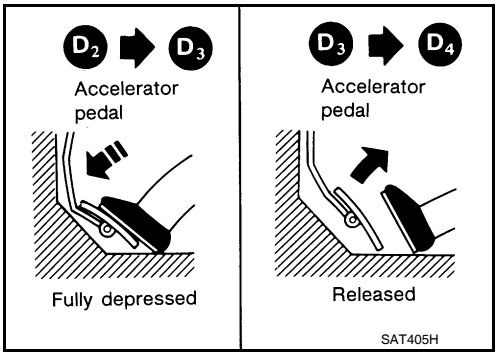
Release accelerator pedal after shifting from D_2 to D_3 .

Read gear position, throttle opening and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

YES >>
1. Stop vehicle.
2. Go to AT-60, "Cruise Test - Part 3" .

NO >>
- Mark the box on the “Diagnostic Worksheet Chart”.
- Go to AT-189, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue “Road Test”.

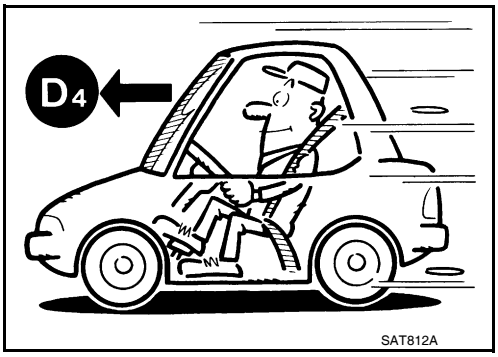


Cruise Test - Part 3

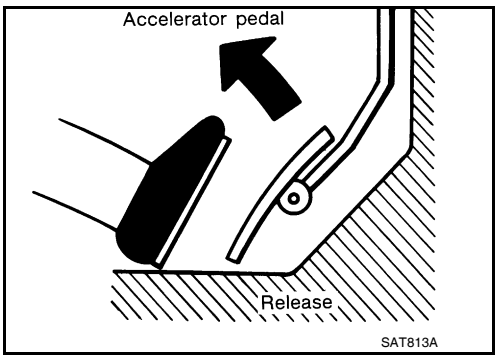
INFOID:0000000007329293

1. CHECK SHIFT-DOWN (D_4 TO D_3)

1. Push overdrive control switch. (OD OFF indicator lamp is off.)
2. Move selector lever to “D” position.
3. Accelerate vehicle using half throttle to D_4 .



4. Release accelerator pedal.

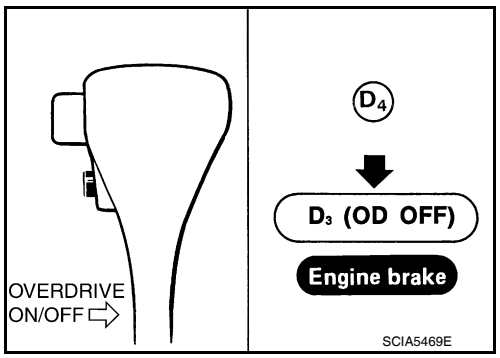


5. Push overdrive control switch. (OD OFF indicator lamp is on.)

Read gear position and vehicle speed. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_4 to D_3 (OD OFF)?

YES >> GO TO 2.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-194, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF" .
• Continue “Road Test”.

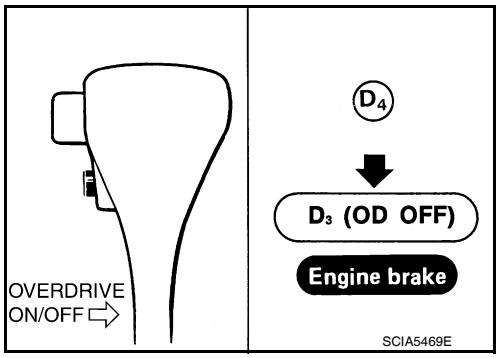


2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-198, "Vehicle Does Not Decelerate by Engine Brake" .
• Continue “Road Test”.



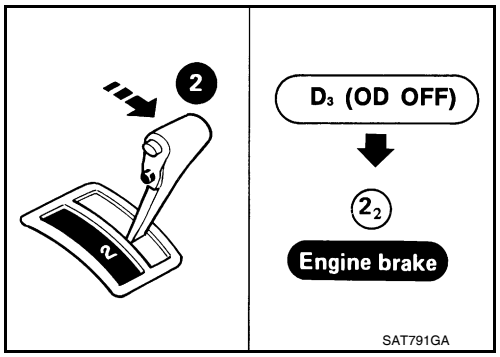
3. CHECK SHIFT-DOWN (D_3 TO 2_2)

Move selector lever from “D” to “2” position while driving in D_3 (OD OFF).

Read gear position. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from D_3 (OD OFF) to 2_2 ?

YES >> GO TO 4.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-194, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position" .
• Continue “Road Test”.

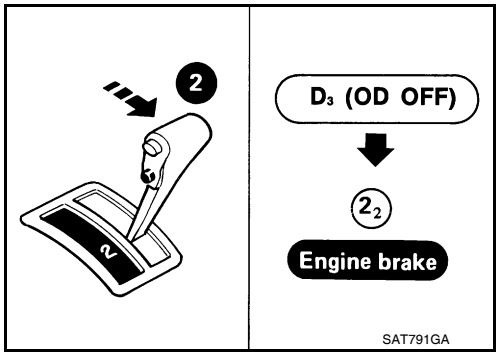


4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.
NO >> • Mark the box on the “Diagnostic Worksheet Chart”.
• Go to AT-198, "Vehicle Does Not Decelerate by Engine Brake" .
• Continue “Road Test”.



5. CHECK SHIFT-DOWN (2_2 TO 1_1)

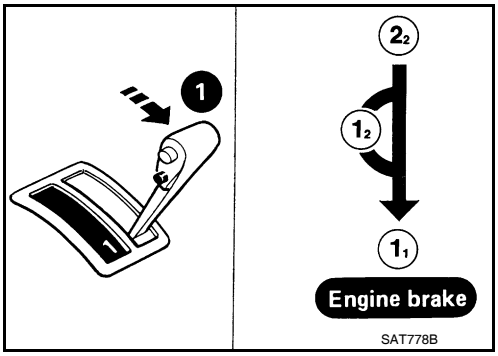
Move selector lever from “2” to “1” position while driving in 2$_2$.

Read gear position. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

Does A/T shift from 2$_2$ to 1$_1$ position?

YES >> GO TO 6.

NO >>
- Mark the box on the “Diagnostic Worksheet Chart”.
- Go to AT-196, "A/T Does Not Shift: 2$_2$→ 1$_1$, When Selector Lever "2" →"1" Position" .
- Continue “Road Test”.



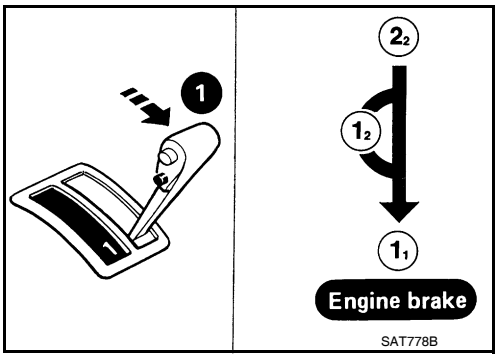
6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >>
1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" , AT-79, "Diagnosis Procedure without CONSULT" .

NO >>
- Mark the box on the “Diagnostic Worksheet Chart”.
- Go to AT-198, "Vehicle Does Not Decelerate by Engine Brake" .
- Stop “Road Test”.



Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000007329294

Throttle position	Vehicle speed km/h (MPH)					
	D1→ D2	D2→ D3	D3→ D4	D4→ D3	D3→ D2	D2→ D1
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	40 - 48 (25 - 30)
Half throttle	34 - 42 (21 - 26)	62 - 70 (39 - 43)	124 - 132 (77 - 82)	69 - 77 (43 - 48)	36 - 44 (22 - 27)	19 - 27 (12 - 17)

- At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

INFOID:0000000007329295

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	“D” position	86 - 94 (53 - 58)	59 - 67 (37 - 42)
	“D” position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Symptom Chart

INFOID:0000000007329296

Numbers are arranged in order of inspection.

Perform inspections starting with number one and work up.

Items	Symptom	Condition	Diagnostic item	Reference page
No Lock-up Engagement/TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
			3. Engine speed signal	AT-102
			4. A/T fluid temperature sensor	AT-92
			5. Line pressure test	AT-49
			6. Torque converter clutch solenoid valve	AT-120
			7. Control valve assembly	AT-219
		OFF vehicle	8. Torque converter	AT-244
	Torque converter clutch piston slip.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Torque converter clutch solenoid valve	AT-120
			5. Line pressure solenoid valve	AT-130
			6. Control valve assembly	AT-219
		OFF vehicle	7. Torque converter	AT-244
	Lock-up point is extremely high or low.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
			3. Torque converter clutch solenoid valve	AT-120
			4. Control valve assembly	AT-219
Shift Shock	Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling speed	EC-85
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. A/T fluid temperature sensor	AT-92
			5. Engine speed signal	AT-102
			6. Line pressure solenoid valve	AT-130
			7. Control valve assembly	AT-219
			8. Accumulator N-D	AT-219
		OFF vehicle	9. Forward clutch	AT-292
	Too sharp a shock in changing from D_1 to D_2 .	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Line pressure test	AT-49
			3. Accumulator servo release	AT-219
			4. Control valve assembly	AT-219
			5. A/T fluid temperature sensor	AT-92
		OFF vehicle	6. Brake band	AT-312

Items	Symptom	Condition	Diagnostic item	Reference page
Shift Shock	Too sharp a shock in changing from D_2 to D_3.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Line pressure test	AT-49
			3. Control valve assembly	AT-219
		OFF vehicle	4. High clutch	AT-288
			5. Brake band	AT-312
	Too sharp a shock in changing from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Line pressure test	AT-49
			3. Control valve assembly	AT-219
		OFF vehicle	4. Brake band	AT-312
			5. Overrun clutch	AT-292
			6. Forward one-way clutch	AT-303
	Gear change shock during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Line pressure test	AT-49
			3. Overrun clutch solenoid valve	AT-145
			4. Control valve assembly	AT-219
	Large shock in changing from 1_2 to 1_1 in “1” position.	ON vehicle	1. Control valve assembly	AT-219
		OFF vehicle	2. Low & reverse brake	AT-299
Improper Shift Timing	Too high a gear change point from D_1 to D_2, from D_2 to D_3, from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
			3. Shift solenoid valve A	AT-135
			4. Shift solenoid valve B	AT-140
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. A/T fluid level	AT-16
			2. Accumulator servo release	AT-219
		OFF vehicle	3. Brake band	AT-312
	Too high a change point from D_4 to D_3, from D_3 to D_2, from D_2 to D_1.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
	Kickdown does not operate when depressing accelerator pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
			3. Shift solenoid valve A	AT-135
			4. Shift solenoid valve B	AT-140
	Kickdown operates or engine overruns when depressing accelerator pedal in D_4 beyond kickdown vehicle speed limit.	ON vehicle	1. Output speed sensor and vehicle speed signal	AT-97, AT-150
			2. Accelerator pedal position sensor	EC-475
			3. Shift solenoid valve A	AT-135
			4. Shift solenoid valve B	AT-140
	Gear change from 2_2 to 2_3 in “2” position.	ON vehicle	1. Transmission range switch adjustment	AT-222
			2. Control cable adjustment	AT-214
	Gear change from 1_1 to 1_2 in “1” position.	ON vehicle	1. Transmission range switch adjustment	AT-222
			2. Control cable adjustment	AT-214

Items	Symptom	Condition	Diagnostic item	Reference page
No Down Shift	Failure to change gear from D_4 to D_3.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Overrun clutch solenoid valve	AT-145
			4. Shift solenoid valve A	AT-135
			5. Line pressure solenoid valve	AT-130
			6. Control valve assembly	AT-219
		OFF vehicle	7. Brake band	AT-312
			8. Overrun clutch	AT-292
	Failure to change gear from D_3 to D_2 or from D_4 to D_2.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Shift solenoid valve A	AT-135
			4. Shift solenoid valve B	AT-140
			5. Control valve assembly	AT-219
		OFF vehicle	6. High clutch	AT-288
			7. Brake band	AT-312
	Failure to change gear from D_2 to D_1 or from D_3 to D_1.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Shift solenoid valve A	AT-135
			4. Shift solenoid valve B	AT-140
			5. Control valve assembly	AT-219
		OFF vehicle	6. Low one-way clutch	AT-244
			7. High clutch	AT-288
			8. Brake band	AT-312
	Failure to change from D_3 to 2_2 when shifting selector lever into “2” position. AT-194	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Shift solenoid valve B	AT-140
			3. Control valve assembly	AT-219
			4. Control cable adjustment	AT-214
		OFF vehicle	5. Brake band	AT-312
	Does not change from 1_2 to 1_1 in 1st position.	ON vehicle	1. Transmission range switch adjustment	AT-222
			2. Output speed sensor and vehicle speed signal	AT-97, AT-150
			3. Shift solenoid valve A	AT-135
			4. Control valve assembly	AT-219
			5. Overrun clutch solenoid valve	AT-145
		OFF vehicle	6. Overrun clutch	AT-292
			7. Low & reverse brake	AT-299

Items	Symptom	Condition	Diagnostic item	Reference page
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Control cable adjustment	AT-214
			2. Shift solenoid valve A	AT-135
			3. Control valve assembly	AT-219
			4. Output speed sensor and vehicle speed signal	AT-97, AT-150
			5. Accelerator pedal position sensor	EC-475
		OFF vehicle	6. Brake band	AT-312
	Failure to change gear from D_2 to D_3.	ON vehicle	1. Control cable adjustment	AT-214
			2. Shift solenoid valve B	AT-140
			3. Control valve assembly	AT-219
			4. Output speed sensor and vehicle speed signal	AT-97, AT-150
			5. Accelerator pedal position sensor	EC-475
		OFF vehicle	6. High clutch	AT-288
			7. Brake band	AT-312
	Failure to change gear from D_3 to D_4.	ON vehicle	1. Transmission range switch adjustment	AT-222
			2. Overdrive control switch	AT-168
			3. Control cable adjustment	AT-214
			4. Shift solenoid valve A	AT-135
			5. Output speed sensor and vehicle speed signal	AT-97, AT-150
			6. A/T fluid temperature sensor	AT-92
		OFF vehicle	7. Brake band	AT-312
	A/T does not shift to D_4 when driving with OD ON. (OD OFF indicator lamp is off.)	ON vehicle	1. Accelerator pedal position sensor	EC-475
			2. Transmission range switch adjustment	AT-222
			3. Overdrive control switch	AT-168
			4. Output speed sensor and vehicle speed signal	AT-97, AT-150
			5. Shift solenoid valve A	AT-135
			6. Overrun clutch solenoid valve	AT-145
			7. Control valve assembly	AT-219
			8. A/T fluid temperature sensor	AT-92
			9. Line pressure solenoid valve	AT-130
		OFF vehicle	10. Brake band	AT-312
			11. Overrun clutch	AT-292

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration.	ON vehicle	1. Control cable adjustment	AT-214
			2. Stall test	AT-49
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Control valve assembly	AT-219
		OFF vehicle	6. Reverse clutch	AT-283
			7. High clutch	AT-288
			8. Forward clutch	AT-292
			9. Overrun clutch	AT-292
			10. Low & reverse brake	AT-299
	Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-214
		OFF vehicle	2. Low one-way clutch	AT-244
	Vehicle will not run in “D”, “1”, “2” positions (but runs in R position). Clutch slips. Very poor acceleration.	ON vehicle	1. A/T fluid level	AT-16
			2. Stall test	AT-49
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Control valve assembly	AT-219
			6. Accumulator N-D	AT-219
		OFF vehicle	7. Reverse clutch	AT-283
			8. High clutch	AT-288
			9. Forward clutch	AT-292
			10. Forward one-way clutch	AT-303
			11. Low one-way clutch	AT-244
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. A/T fluid level	AT-16
			2. Control cable adjustment	AT-214
			3. Accelerator pedal position sensor	EC-475
			4. Line pressure test	AT-49
			5. Line pressure solenoid valve	AT-130
			6. Control valve assembly	AT-219
			7. Accumulator N-D	AT-219
		OFF vehicle	8. Forward clutch	AT-292
			9. Reverse clutch	AT-283
			10. Low & reverse brake	AT-299
			11. Oil pump	AT-264
			12. Torque converter	AT-244

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	No creep at all. AT-182, AT-183	ON vehicle	1. A/T fluid level	AT-16
			2. Line pressure test	AT-49
			3. Control valve assembly	AT-219
		OFF vehicle	4. Forward clutch	AT-292
			5. Oil pump	AT-264
			6. Torque converter	AT-244
	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Accumulator servo release	AT-219
			5. Control valve assembly	AT-219
		OFF vehicle	6. Brake band	AT-312
	Almost no shock or slipping in changing from D_2 to D_3.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Control valve assembly	AT-219
		OFF vehicle	5. High clutch	AT-288
			6. Forward clutch	AT-292
	Almost no shock or slipping in changing from D_3 to D_4.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Control valve assembly	AT-219
		OFF vehicle	5. Brake band	AT-312
	Races extremely fast or slips in changing from D_4 to D_3 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Shift solenoid valve A	AT-135
			6. Control valve assembly	AT-219
		OFF vehicle	7. Brake band	AT-312
			8. Forward clutch	AT-292

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Races extremely fast or slips in changing from D_4 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Shift solenoid valve A	AT-135
			6. Shift solenoid valve B	AT-140
			7. Control valve assembly	AT-219
		OFF vehicle	8. Brake band	AT-312
			9. Forward clutch	AT-292
	Races extremely fast or slips in changing from D_3 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Shift solenoid valve B	AT-140
			6. Control valve assembly	AT-219
		OFF vehicle	7. Brake band	AT-312
			8. High clutch	AT-288
	Races extremely fast or slips in changing from D_4 or D_3 to D_1 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	AT-16
			2. Accelerator pedal position sensor	EC-475
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Shift solenoid valve A	AT-135
			6. Shift solenoid valve B	AT-140
			7. Control valve assembly	AT-219
		OFF vehicle	8. Forward clutch	AT-292
			9. Forward one-way clutch	AT-303
			10. Low one-way clutch	AT-244
	Vehicle will not run in any position.	ON vehicle	1. A/T fluid level	AT-16
			2. Control cable adjustment	AT-214
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
		OFF vehicle	5. Oil pump	AT-264
			6. High clutch	AT-288
			7. Brake band	AT-312
			8. Low & reverse brake	AT-299
			9. Torque converter	AT-244
			10. Parking components	AT-234

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Engine cannot be started in “P” and “N” positions. AT-179	ON vehicle	1. Ignition switch and starter	PG-4, SC-9
			2. Control cable adjustment	AT-214
			3. Transmission range switch adjustment	AT-222
	Engine starts in positions other than “P” and “N”.	ON vehicle	1. Control cable adjustment	AT-214
			2. Transmission range switch adjustment	AT-222
	Transaxle noise in“ P” and “N” positions.	ON vehicle	1. A/T fluid level	AT-16
			2. Line pressure test	AT-49
			3. Accelerator pedal position sensor	EC-475
			4. Output speed sensor and vehicle speed signal	AT-97, AT-150
		OFF vehicle	5. Oil pump	AT-264
			6. Torque converter	AT-244
	Vehicle moves when changing into “P” position or parking gear does not disengage when shifted out of “P” position.	ON vehicle	1. Control cable adjustment	AT-214
		OFF vehicle	2. Parking components	AT-234
	Vehicle runs in “N” position. AT-180	ON vehicle	1. Control cable adjustment	AT-214
		OFF vehicle	2. Forward clutch	AT-292
			3. Reverse clutch	AT-283
			4. Overrun clutch	AT-292
	Vehicle braked when shifting into “R” position.	ON vehicle	1. A/T fluid level	AT-16
			2. Control cable adjustment	AT-214
			3. Line pressure test	AT-49
			4. Line pressure solenoid valve	AT-130
			5. Control valve assembly	AT-219
		OFF vehicle	6. High clutch	AT-288
			7. Brake band	AT-312
			8. Forward clutch	AT-292
			9. Overrun clutch	AT-292
	Excessive creep.	ON vehicle	1. Engine idling speed	EC-85
	Engine stops when shifting lever into “R”, “D”, “2” and “1” positions.	ON vehicle	1. Engine idling speed	EC-85
			2. A/T fluid level	AT-16
			3. Torque converter clutch solenoid valve	AT-120
			4. Control valve assembly	AT-219
		OFF vehicle	5. Torque converter	AT-244

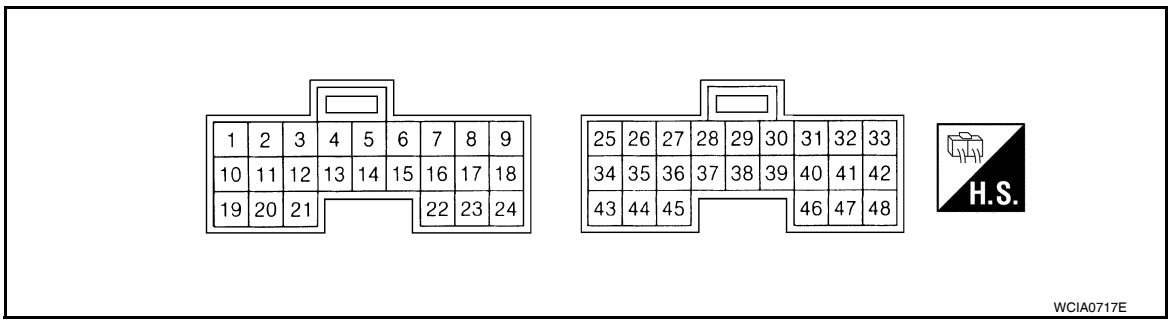
Items	Symptom	Condition	Diagnostic item	Reference page
Others	Vehicle braked by gear change from D_1 to D_2 .	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Reverse clutch	AT-283
			3. Low & reverse brake	AT-299
			4. High clutch	AT-288
			5. Low one-way clutch	AT-244
	Vehicle braked by gear change from D_2 to D_3 .	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Brake band	AT-312
	Vehicle braked by gear change from D_3 to D_4 .	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Overrun clutch	AT-292
			3. Forward one-way clutch	AT-303
			4. Reverse clutch	AT-283
	Maximum speed not attained. Poor acceleration.	ON vehicle	1. A/T fluid level	AT-16
			2. Transmission range switch adjustment	AT-222
			3. Overdrive control switch	AT-168
			4. Accelerator pedal position sensor	EC-475
			5. Output speed sensor and vehicle speed signal	AT-97, AT-150
			6. Shift solenoid valve A	AT-135
			7. Shift solenoid valve B	AT-140
			8. Control valve assembly	AT-219
		OFF vehicle	9. Reverse clutch	AT-283
			10. High clutch	AT-288
			11. Brake band	AT-312
			12. Low & reverse brake	AT-299
			13. Oil pump	AT-264
			14. Torque converter	AT-244
	Transaxle noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Torque converter	AT-244
	Engine brake does not operate in “1” position.	ON vehicle	1. Transmission range switch adjustment	AT-222
			2. Control cable adjustment	AT-214
			3. Output speed sensor and vehicle speed signal	AT-97, AT-150
			4. Control valve assembly	AT-219
			5. Overrun clutch solenoid valve	AT-145
		OFF vehicle	6. Overrun clutch	AT-292
			7. Low & reverse brake	AT-299

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Transaxle overheats.	ON vehicle	1. A/T fluid level	AT-16
			2. Engine idling speed	EC-85
			3. Accelerator pedal position sensor	EC-475
			4. Line pressure test	AT-49
			5. Line pressure solenoid valve	AT-130
			6. Control valve assembly	AT-219
		OFF vehicle	7. Oil pump	AT-264
			8. Reverse clutch	AT-283
			9. High clutch	AT-288
			10. Brake band	AT-312
			11. Forward clutch	AT-292
			12. Overrun clutch	AT-292
			13. Low & reverse brake	AT-299
			14. Torque converter	AT-244
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Reverse clutch	AT-283
			3. High clutch	AT-288
			4. Brake band	AT-312
			5. Forward clutch	AT-292
			6. Overrun clutch	AT-292
			7. Low & reverse brake	AT-299
	Unusual smell at A/T fluid charging pipe.	ON vehicle	1. A/T fluid level	AT-16
		OFF vehicle	2. Torque converter	AT-244
			3. Oil pump	AT-264
			4. Reverse clutch	AT-283
			5. High clutch	AT-288
			6. Brake band	AT-312
			7. Forward clutch	AT-292
			8. Overrun clutch	AT-292
			9. Low & reverse brake	AT-299

TCM Terminal and Reference Value

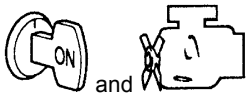
INFOID:0000000007329297

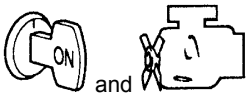
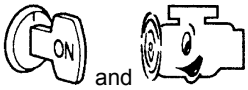
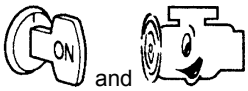
TCM HARNESS CONNECTOR TERMINAL LAYOUT



Terminals and Reference Values for TCM

TCM terminal data are reference values, measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0 V
				When depressing accelerator pedal fully after warming up engine.	0 V
2	P	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14 V
				When depressing accelerator pedal fully after warming up engine.	0 V
3	GR	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15 V
				When A/T does not perform lock-up.	0 V
5	L	CAN H	—		—
6	P	CAN L	—		—
10	R	Power supply	When turning ignition switch to “ON”.		Battery voltage
			When turning ignition switch to “OFF”.		0 V
11	O	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1” or “D4”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2” or “D3”.)	0 V
12	G	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D1” or “D2”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D3” or “D4”.)	0 V
19	R	Power supply	When turning ignition switch to “ON”.		Battery voltage
			When turning ignition switch to “OFF”.		0 V
20	V	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-20 .)	Battery voltage
				When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-20 .)	0 V
25	B	Ground	Always		0 V
26	Y	Transmission range switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0 V
27	G	Transmission range switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0 V
28	GR	Power supply (memory back-up)	Always		Battery voltage
29	V	Output speed sensor		When driving at 20 km/h (12 MPH)	150 Hz
30*1	BR	CONSULT (RX)	—		—
31*1	Y	CONSULT (TX)	—		—

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
34	LG	Transmission range switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0 V
35	SB	Transmission range switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0 V
36	R	Transmission range switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0 V
38	G	Input speed sensor		When driving at 20 km/h (12 MPH)	360 Hz
39[*2]	L	Engine speed signal		Refer to EC-112.	
40	O	Vehicle speed signal		When driving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0 V and more than 4.5 V
42	B	Sensor ground	Always		0 V
47	BR	A/T fluid temperature sensor		When A/T fluid temperature is 20°C (68°F).	1.5 V
				When A/T fluid temperature is 80°C (176°F).	0.5 V
48	B	Ground	Always		0 V

[*1]: These terminals are connected to the data link connector.

[*2]: These terminals are connected to the ECM.

CONSULT Function (TRANSMISSION)

INFOID:0000000007329298

CONSULT can display each diagnostic item using the diagnostic test models shown following.

FUNCTION

Diagnostic test mode	Function
Work Support	This mode enables a technician to adjust some devices faster and more accuratelyl.
Self Diagnostic Results	Retrieve DTC from ECU and display diagnostic items.
Data Monitor	Monitor the input/output signal of the control unit in real time.
CAN Diagnosis Support Monitor	It monitors the status of CAN communication.
Function Test	This mode can show results of self-diagnosis of ECU with either “OK” or “NG”. For engine, more practical tests regarding sensors/switches and/or actuators are available.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.

CONSULT REFERENCE VALUE

NOTICE:

1. The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).

Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.

2. Shift schedule (which implies gear position) displayed on CONSULT and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT indicates the point where shifts are completed.

3. Shift solenoid valve “A” or “B” is displayed on CONSULT at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).

Item name	Condition	Display value (Approx.)
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.
VHCL/S SE-MTR		
THROTTLE POSI	Released accelerator pedal.	0.0/8
	Fully depressed accelerator pedal.	8.0/8
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V
BATTERY VOLT	When turning ignition switch to “ON”.	Battery voltage
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.
INPUT SPEED	During driving (lock-up ON)	Approximately matches the engine speed.
OVERDRIVE SW	When overdrive control switch is depressed.	ON
	When overdrive control switch is released.	OFF
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF
CLOSED THL/SW	Released accelerator pedal.	ON
	Depressed accelerator pedal.	OFF
W/O THRL/P-SW	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D_1” or “D_4”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D_2” or “D_3”.)	OFF
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D_1” or “D_2”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D_3” or “D_4”.)	OFF

Item name	Condition	Display value (Approx.)
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-20 .)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-20 .)	OFF
BRAKE SW	Depressed brake pedal.	ON
	Released brake pedal.	OFF
GEAR	During driving	1, 2, 3, 4
SLCT LVR POSI	When setting selector lever to “N” or “P” positions.	N · P
	When setting selector lever to “R” position.	R
	When setting selector lever to “D” position.	D
	When setting selector lever to “2” position.	2
	When setting selector lever to “1” position.	1
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
LINE PRES DTY	Line pressure low ⇔ Line pressure high	0 % ⇔ 94 %
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4 % ⇔ 94 %

SELF-DIAGNOSTIC RESULT MODE

Display Items List

Items (CONSULT screen terms)	Malfunction is detected when...	OBD-II (DTC)	Reference page
		MIL indicator lamp*1, “ENGINE” with CONSULT or GST	
CAN COMM CIRCUIT	• When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	AT-84
T/M RANGE SENSOR A	• TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705	AT-87
FLUID TEMP SENSOR A	• TCM receives an excessively low or high voltage from the sensor.	P0710	AT-92
OUTPUT SPEED SENSOR	• TCM does not receive the proper voltage signal from the sensor.	P0720	AT-97
ENGINE SPEED	• TCM does not receive the proper voltage signal from the ECM.	P0725	AT-102
1GR INCORRECT RATIO	• A/T cannot be shifted to the 1GR position even if electrical circuit is good.	P0731*2	AT-106
2GR INCORRECT RATIO	• A/T cannot be shifted to the 2GR position even if electrical circuit is good.	P0732*2	AT-109
3GR INCORRECT RATIO	• A/T cannot be shifted to the 3GR position even if electrical circuit is good.	P0733*2	AT-112
4GR INCORRECT RATIO	• A/T cannot be shifted to the 4GR position even if electrical circuit is good.	P0734*2	AT-115
TORQUE CONVERTER	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0740	AT-120
TORQUE CONVERTER	• A/T cannot perform lock-up even if electrical circuit is good.	P0744*2	AT-125
PC SOLENOID A	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0745	AT-130

Items (CONSULT screen terms)	Malfunction is detected when...	OBD-II (DTC) MIL indicator lamp*1, "ENGINE" with CONSULT or GST	Reference page
SHIFT SOLENOID A	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0750	AT-135
SHIFT SOLENOID B	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0755	AT-140
OVER CLUTCH SOLENOID	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P1760	AT-145
VHCL SPEED SENMTR	• TCM does not receive the proper voltage signal from the sensor.	—	AT-150
BATT/FLUID TEMP SEN	• TCM receives an excessively low or high voltage from the sensor.	—	AT-153
INPUT SPEED SENSOR A	• TCM does not receive proper voltage signal from sensor.	—	AT-159
CONTROL UNIT (RAM)	• TCM memory (RAM) is malfunctioning.	—	AT-164
CONTROL UNIT (ROM)	• TCM memory (ROM) is malfunctioning.	—	AT-164
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	• No failure has been detected.	—	—

*1: Refer to AT-39, "Malfunction Indicator Lamp (MIL)" .

*2: These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

DATA MONITOR MODE

Display Items List

X: Standard, —: Not applicable, ▼: Option

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE-A/T (km/h)	X	—	▼	Output speed sensor
VHCL/S SE-MTR (km/h)	X	—	▼	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
THRTL POS SEN (V)	X	—	▼	
FLUID TEMP SE (V)	X	—	▼	
BATTERY VOLT (V)	X	—	▼	
ENGINE SPEED (rpm)	X	X	▼	
INPUT SPEED (rpm)	X	—	▼	
OVERDRIVE SW (ON/OFF)	X	—	▼	
PN POSI SW (ON/OFF)	X	—	▼	
R POSITION SW (ON/OFF)	X	—	▼	
D POSITION SW (ON/OFF)	X	—	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
2 POSITION SW (ON/OFF)	X	—	▼	
1 POSITION SW (ON/OFF)	X	—	▼	
ASCD-CRUISE (ON/OFF)	X	—	▼	Signal input with CAN communication.
ASCD-OD CUT (ON/OFF)	X	—	▼	
KICKDOWN SW (ON/OFF)	X	—	▼	Not mounted but displayed.
POWERSHIFT SW (ON/OFF)	X	—	▼	
CLOSED THL/SW (ON/OFF)	X	—	▼	Signal input with CAN communication.
W/O THRL/P-SW (ON/OFF)	X	—	▼	
*SHIFT S/V A (ON/OFF)	—	—	▼	Displays status of check signal (reinput signal) for TCM control signal output. Remains unchanged when solenoid valves are open or shorted.
*SHIFT S/V B (ON/OFF)	—	—	▼	
*OVRRUN/C S/V (ON/OFF)	—	—	▼	
HOLD SW (ON/OFF)	X	—	▼	Not mounted but displayed.
BRAKE SW (ON/OFF)	X	—	▼	Stop lamp switch (Signal input with CAN communication)
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting
SLCT LVR POSI	—	X	▼	Selector lever position is recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
THROTTLE POSI (0.0/8)	—	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.
LINE PRES DTY (%)	—	X	▼	
TCC S/V DUTY (%)	—	X	▼	
SHIFT S/V A (ON/OFF)	—	X	▼	
SHIFT S/V B (ON/OFF)	—	X	▼	
OVERRUN/C S/V (ON/OFF)	—	X	▼	
SELF-D DP LMP (ON/OFF)	—	X	▼	
TC SLIP RATIO (0.000)	—	—	▼	
TC SLIP SPEED (rpm)	—	—	▼	Difference between engine speed and torque converter input shaft speed

CAN DIAGNOSTIC SUPPORT MONITOR MODE

Refer to LAN-11, "CAN Diagnostic Support Monitor".

DTC & SRT CONFIRMATION

Display Items List

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for “1GR incorrect ratio (P0731)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve A • Shift solenoid valve B • Each clutch • Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “2GR incorrect ratio (P0732)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve B • Each clutch • Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “3GR incorrect ratio (P0733)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve A • Each clutch • Hydraulic control circuit
4TH GR FNCTN P0734	Following items for “4GR incorrect ratio (P0734)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve A • Shift solenoid valve B • Overrun clutch solenoid valve • Line pressure solenoid valve • Each clutch • Hydraulic control circuit
TCC S/V FNCTN P0744	Following items for “Torque converter (P0744)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Torque converter clutch solenoid valve • Each clutch • Hydraulic control circuit

Diagnosis Procedure without CONSULT

INFOID:0000000007329299

TCM SELF-DIAGNOSTIC PROCEDURE

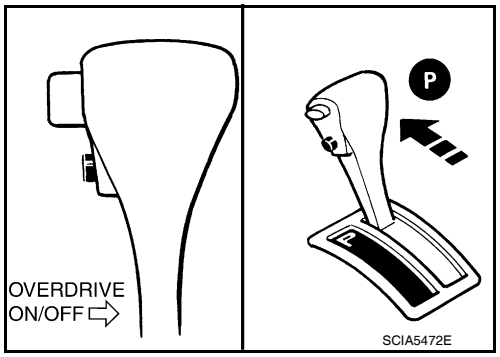
Description

If a malfunction occurs in electrical system, turning ignition switch ON will illuminate OD OFF indicator lamp for 2 seconds. To detect a malfunction, entering a self-diagnosis start signal retrieves information on malfunctions from memory and indicates malfunction by blinking OD OFF indicator lamp.

Diagnostic Procedure

1.CHECK OD OFF INDICATOR LAMP

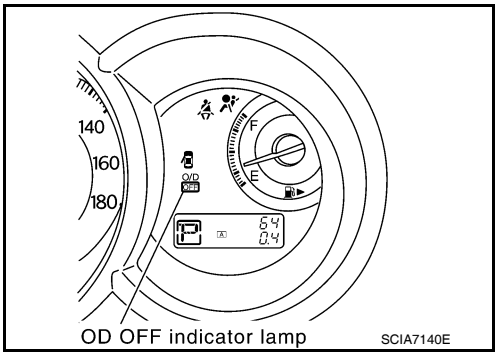
1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



4. Turn ignition switch ON. (Do not start engine.)

Does OD OFF indicator lamp come on about 2 seconds?

YES >> GO TO 2.
NO >> Stop procedure. Perform AT-177, "OD OFF Indicator Lamp Does Not Come On" before proceeding.



2.JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch OFF.
2. Keep pressing shift lock release button.
3. Move selector lever from “P” to “D” position.
4. Turn ignition switch ON. (Do not start engine.)
5. Keep pressing overdrive control switch while OD OFF indicator lamp is lighting up for 2 seconds. (OD OFF indicator lamp is on.)
6. Keep pressing overdrive control switch and shift selector lever to the “2” position. (OD OFF indicator lamp is on.)
7. Stop pressing overdrive control switch. (OD OFF indicator lamp is on.)
8. Shift selector lever to the “1” position. (OD OFF indicator lamp is on.)
9. Keep pressing overdrive control switch. (OD OFF indicator lamp is off.)
10. Depress accelerator pedal fully while pressing overdrive control switch.

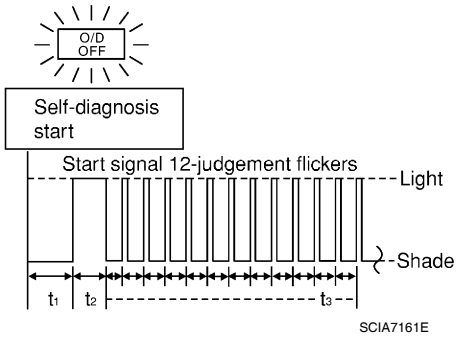
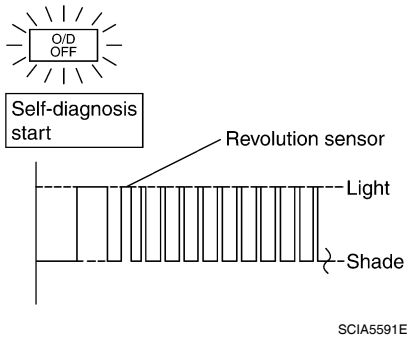
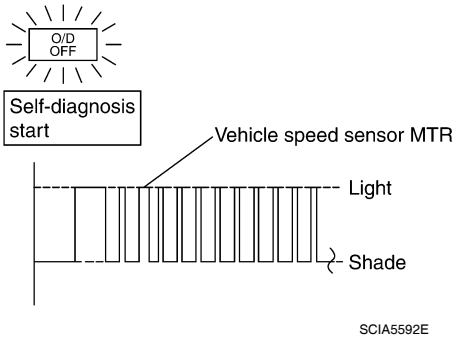
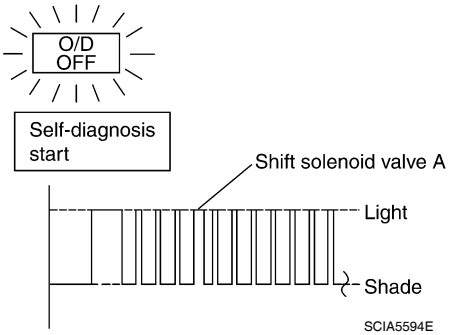
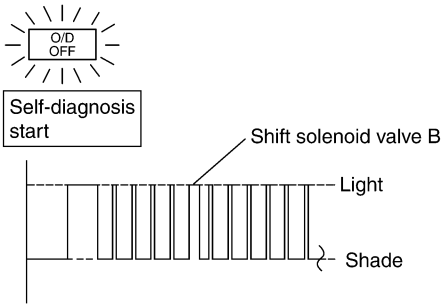
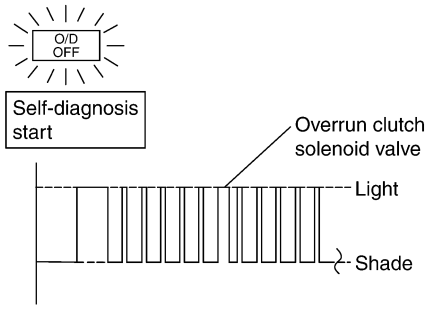
>> GO TO 3.

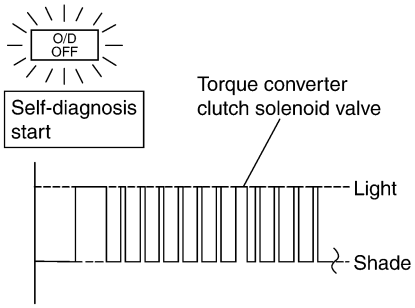
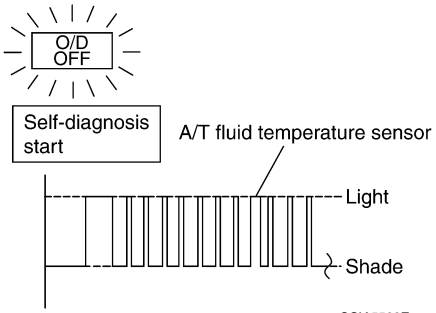
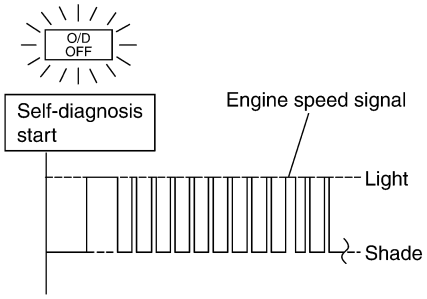
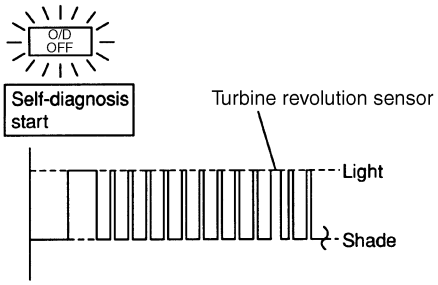
3.CHECK SELF-DIAGNOSIS CODE

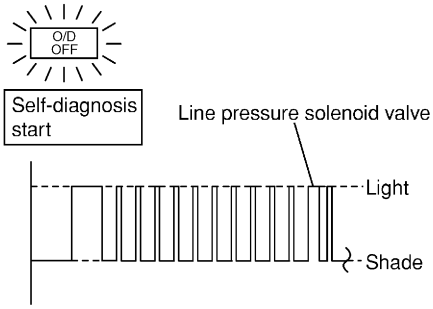
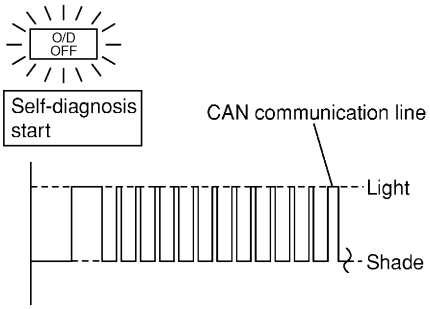
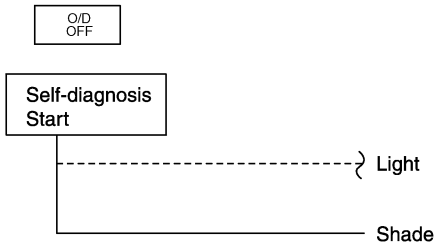
Check OD OFF indicator lamp. Refer to "Judgement of Self-diagnosis Code" .

>> **DIAGNOSIS END**

Judgement of Self-diagnosis Code

OD OFF indicator lamp	
All judgement flickers are the same.  SCIA7161E All circuits that can be confirmed by self-diagnosis are OK.	1st judgement flicker is longer than others.  SCIA5591E Output speed sensor circuit is short-circuited or disconnected. ⇒ **Go to AT-97 .**
2nd judgement flicker is longer than others.  SCIA5592E Vehicle speed signal circuit is short-circuited or disconnected. ⇒ **Go to AT-150 .**	4th judgement flicker is longer than others.  SCIA5594E Shift solenoid valve A circuit is short-circuited or disconnected. ⇒ **Go to AT-135 .**
5th judgement flicker is longer than others.  SCIA5595E Shift solenoid valve B circuit is short-circuited or disconnected. ⇒ **Go to AT-140 .**	6th judgement flicker is longer than others.  SCIA5596E Overrun clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to AT-145 .**

OD OFF indicator lamp	
7th judgement flicker is longer than others.  SCIA5597E Torque converter clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to AT-120 .**	8th judgement flicker is longer than others.  SCIA5598E A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged. ⇒ **Go to AT-153 .**
9th judgement flicker is longer than others.  SCIA5599E Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to AT-102 .**	10th judgement flicker is longer than others.  SCIA7082E Input speed sensor circuit is short-circuited or disconnected. ⇒ **Go to AT-159 .**

OD OFF indicator lamp	
11th judgement flicker is longer than others.  SCIA7083E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to AT-130 .**	12th judgement flicker is longer than others.  SCIA7085E CAN communication line is damaged. ⇒ **Go to AT-84 .**
Lamp turns off.  SCIA4674E Transmission range switch, overdrive control switch, closed throttle position signal or wide open throttle position signal circuit is disconnected or TCM is damaged. (Because overdrive control switch signal, closed throttle position signal and wide open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.) ⇒ **Go to AT-201, "TCM Self-Diagnosis Does Not Activate" .**	

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second

How to Erase Self-diagnostic Results

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait for at least 5 seconds and then turn it ON again.
2. Perform "Diagnostic Procedure Without CONSULT" .
3. Turn ignition switch OFF. (The self-diagnostic results will be erased.)

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007329300

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007329301

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “U1000 CAN COMM CIRCUIT” with CONSULT or 12th judgement flicker without CONSULT is detected when TCM cannot communicate to other control units.

Possible Cause

INFOID:0000000007329302

Harness or connector
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329303

CAUTION:
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Touch “START”.
4. Wait at least 6 seconds or start engine and wait for at least 6 seconds.
5. If DTC is detected, go to AT-86, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

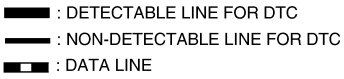
WITHOUT CONSULT

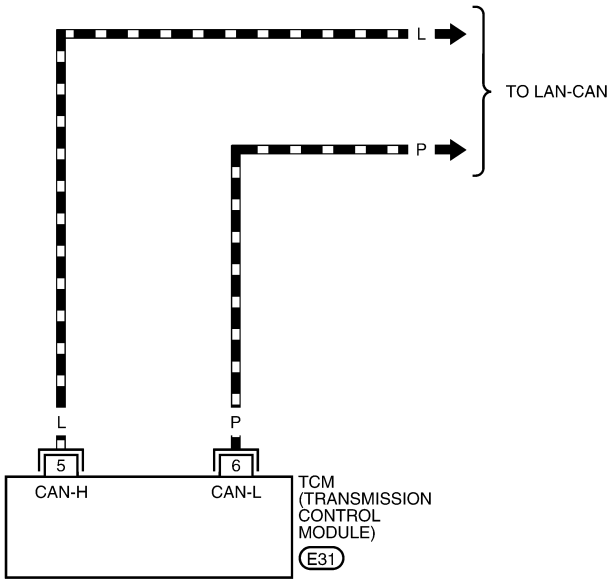
1. Turn ignition switch ON.
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT".
4. If DTC is detected, go to AT-86, "Diagnosis Procedure".

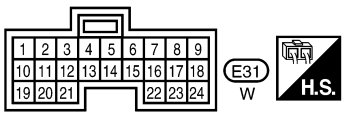
Wiring Diagram - AT - CAN

INFOID:0000000007329304

AT-CAN-01







BCWA0648E

TCM TERMINALS AND REFERENCE VALUES
Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329305

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT

1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.

Is any malfunction of the “U1000 CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT screen, Go to LAN section. Refer to LAN-23, "CAN System Specification Chart".

NO >> **INSPECTION END**

P0705 TRANSMISSION RANGE SWITCH A

Description

INFOID:0000000007329306

- The transmission range switch detects the selector lever position and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329307

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

On Board Diagnosis Logic

INFOID:0000000007329308

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0705 T/M RANGE SWITCH A” with CONSULT is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

INFOID:0000000007329309

- Harness or connectors
  [The transmission range switch circuit is open or shorted.]
- Transmission range switch

DTC Confirmation Procedure

INFOID:0000000007329310

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

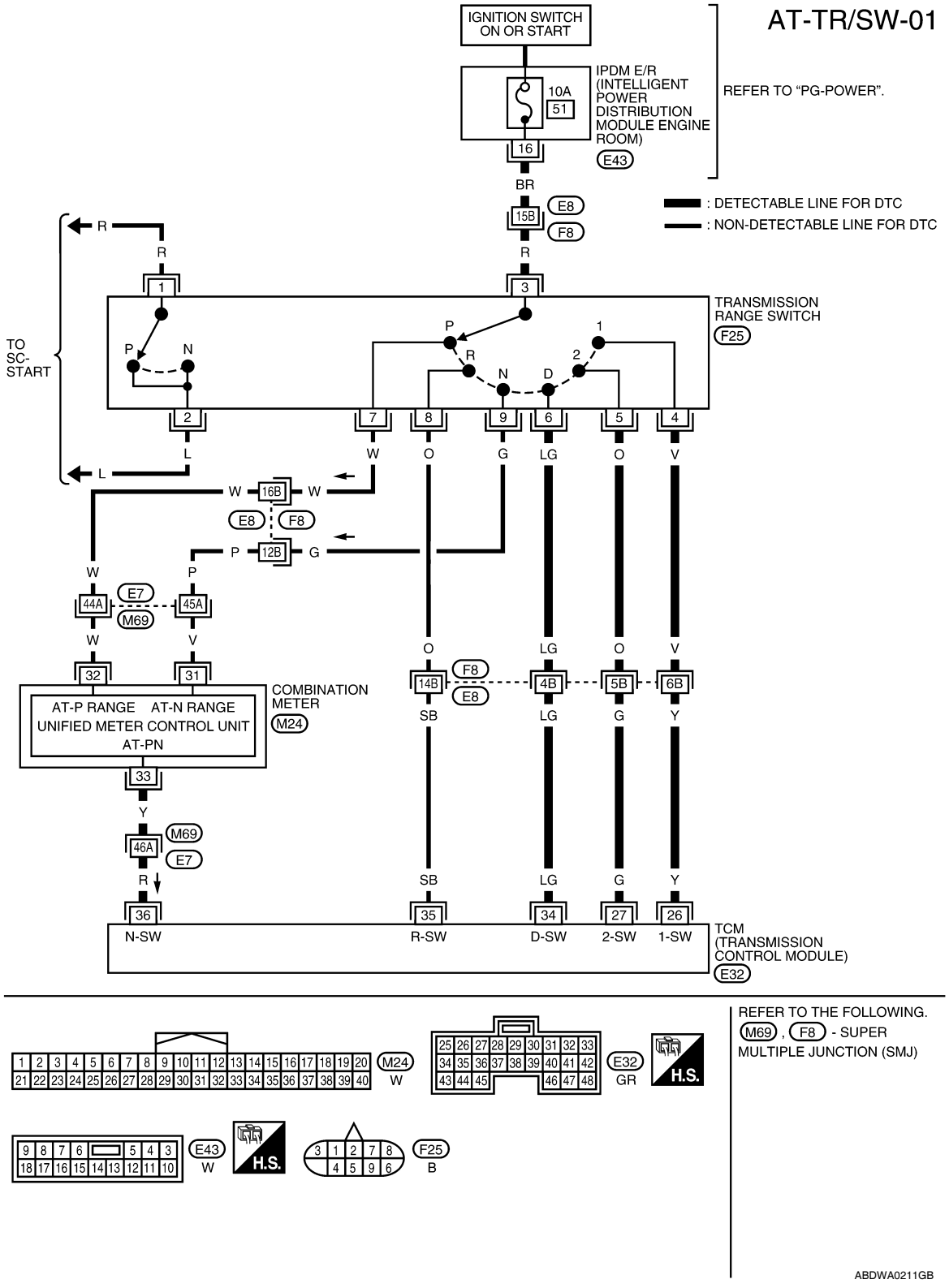
1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Touch “START”.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THROTTLE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
5. If the check result is NG, go to AT-89, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

Wiring Diagram - AT - TR/SW

INFOID:0000000007329311



TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329312

1.CHECK INPUT SIGNAL

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 6.
NG >> GO TO 3.

2.CHECK INPUT SIGNAL

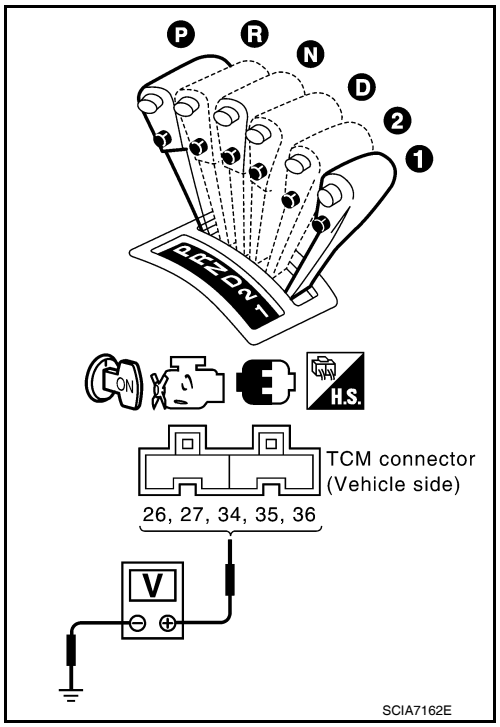
Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

Selector lever position	Terminal				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

B: Battery voltage

0: 0V



OK or NG

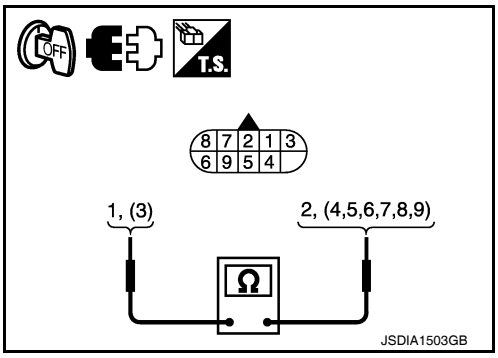
OK >> GO TO 6.

NG >> GO TO 3.

3. CHECK TRANSMISSION RANGE SWITCH

1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Check continuity between transmission range switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
P	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
R		3 - 8	
N		1 - 2, 3 - 9	
D		3 - 6	
2		3 - 5	
1		3 - 4	



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK CONTROL CABLE ADJUSTMENT

Check transmission range switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 3.

OK or NG

OK >> Adjust control cable. Refer to AT-214, "Adjustment of A/T Position" .
NG >> Check transmission range switch (Refer to test group 1) again after adjusting transmission range switch (Refer to AT-222).
- If OK, **INSPECTION END**
- If NG, repair or replace transmission range switch. Refer to AT-222, "Transmission Range Switch" .

5. DETECT MALFUNCTIONING ITEM

Check the following items:
- Harness for short or open between ignition switch and transmission range switch.
- Harness for short or open between transmission range switch and TCM.
- Harness for short or open between combination meter and transmission range switch.
- Harness for short or open between combination meter and TCM.
- 10A fuse (No.51, located in the IPDM E/R)
- Combination meter. Refer to DI-4 .
- Ignition switch. Refer to PG-4 .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform AT-87, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

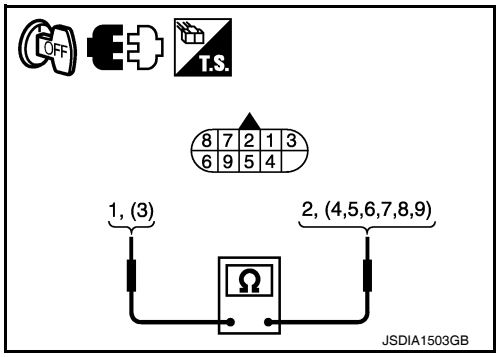
Component Inspection

INFOID:0000000007329313

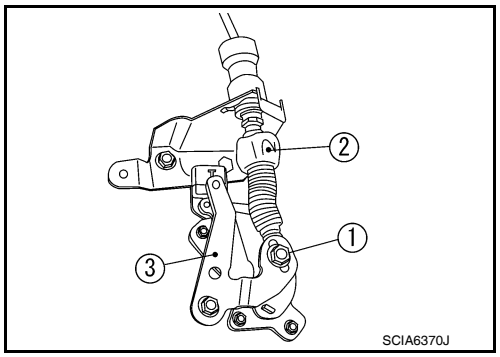
TRANSMISSION RANGE SWITCH

1. Check continuity between transmission range switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
“P”	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
“R”		3 - 8	
“N”		1 - 2, 3 - 9	
“D”		3 - 6	
“2”		3 - 5	
“1”		3 - 4	



2. If NG, check again with control cable (2) disconnected from manual shaft of A/T assembly. Refer to step 1.
   (1): Lock nut
   (3): Manual shaft
3. If OK on step 2, adjust control cable (2). Refer to AT-214, "Adjustment of A/T Position" .
4. If NG on step 2, remove transmission range switch from A/T and check continuity of transmission range switch terminals. Refer to step 1.
5. If OK on step 4, adjust transmission range switch. Refer to AT-222, "Transmission Range Switch" .
6. If NG on step 4, replace transmission range switch. Refer to AT-222, "Transmission Range Switch" .



P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

Description

INFOID:0000000007329314

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329315

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

On Board Diagnosis Logic

INFOID:0000000007329316

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0710 FLUID TEMP SENSOR A” with CONSULT is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000007329317

- Harness or connector
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

INFOID:0000000007329318

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
   ENGINE SPEED: 450 rpm or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THROTTLE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
4. If the check result is NG, go to AT-93, "Diagnosis Procedure".

WITH GST

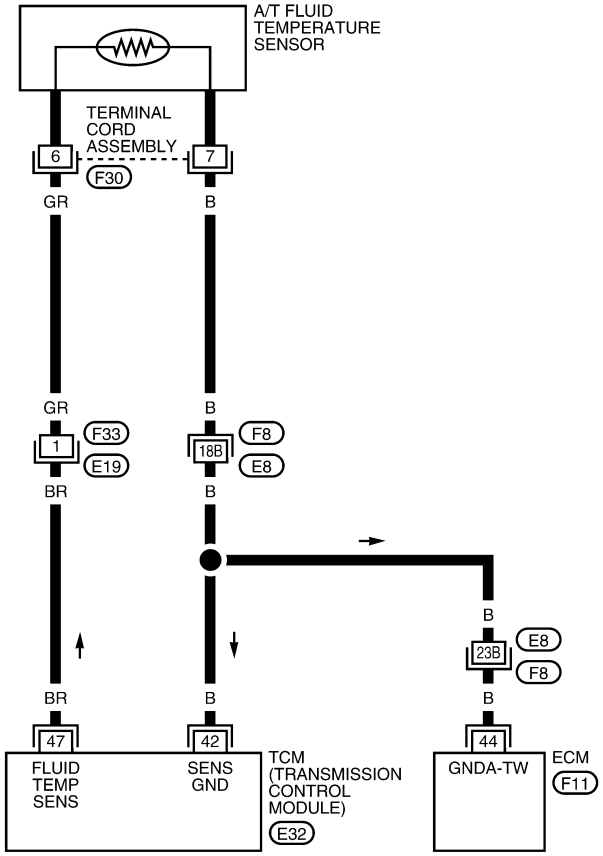
Follow the procedure “With CONSULT”.

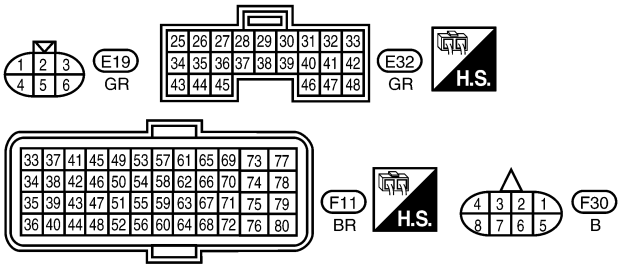
Wiring Diagram - AT - FTS

INFOID:0000000007329319

AT-FTS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

ABDWA0212GB

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329320

1.CHECK INPUT SIGNAL

With CONSULT

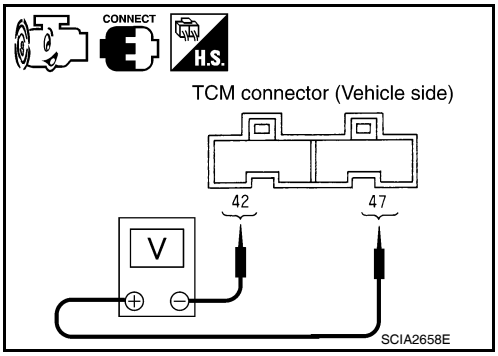
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “FLUID TEMP SE”.

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

Without CONSULT

1. Start engine.
2. Check voltage TCM connector terminals while warming up A/T.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
A/T fluid temperature sensor	E32	47 - 42	When A/T fluid temperature is 20°C (68°F).	1.5 V
			When A/T fluid temperature is 80°C (176°F).	0.5 V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEMS

Check the following.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM, Refer to EC-141.

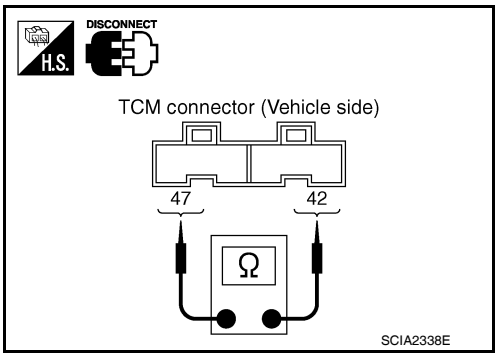
OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	E32	47 - 42	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ



OK or NG

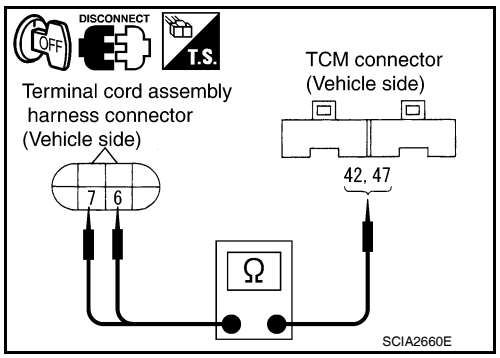
OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.

3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Terminal cord assembly harness connector	F30	7	
TCM	E32	47	Yes
Terminal cord assembly harness connector	F30	6	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

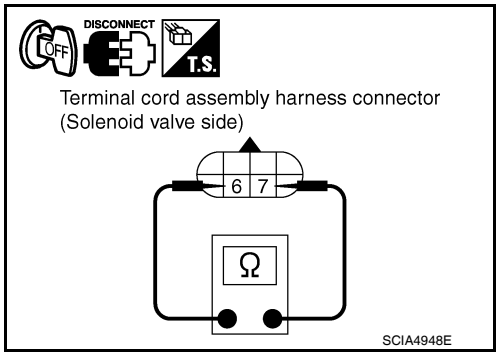
OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminals.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ



4. Reinstall any part removed.

OK or NG

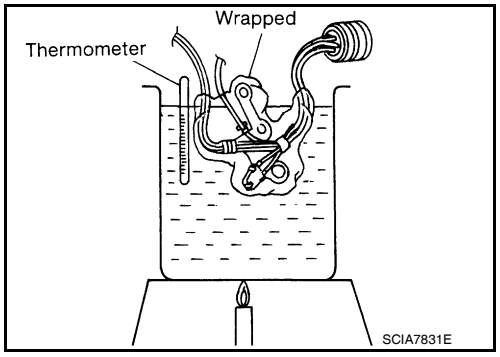
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-219, "Control Valve Assembly and Accumulators".
2. Check the following.

- A/T fluid temperature sensor
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ



- Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK DTC

Perform AT-92, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value".
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

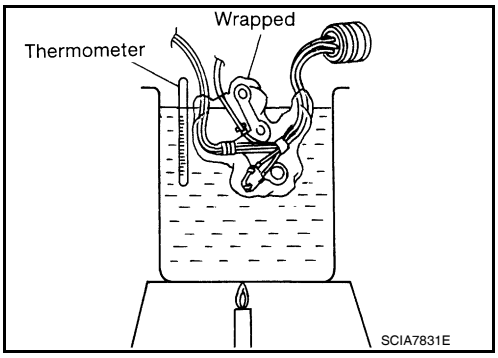
Component Inspection

INFOID:0000000007329321

A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	AT-352, "A/T Fluid Temperature Sensor"	



P0720 OUTPUT SPEED SENSOR

Description

INFOID:0000000007329322

The output speed sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329323

Remarks: Specification data are reference values.

Item name	Condition	Display value
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

INFOID:0000000007329324

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0720 OUTPUT SPEED SENSOR” with CONSULT or 1st judgement flicker without CONSULT is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000007329325

- Harness or connector
  (The sensor circuit is open or shorted.)
- Output speed sensor

DTC Confirmation Procedure

INFOID:0000000007329326

CAUTION:
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Drive vehicle and check for an increase of “VHCL/S SE-MTR” value.
   If the check result is NG, go to AT-99, "Diagnosis Procedure" .
   If the check result is OK, go to following step.
4. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
5. Touch “START”.
6. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED: 30 km/h (19 MPH) or more
   THROTTLE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to AT-99, "Diagnosis Procedure" .
   If the check result is OK, go to following step.
7. Maintain the following conditions for at least 5 consecutive seconds.
   ENGINE SPEED: 3,500 rpm or more
   THROTTLE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

WITH GST

Follow the procedure “WITH CONSULT”.

WITHOUT CONSULT

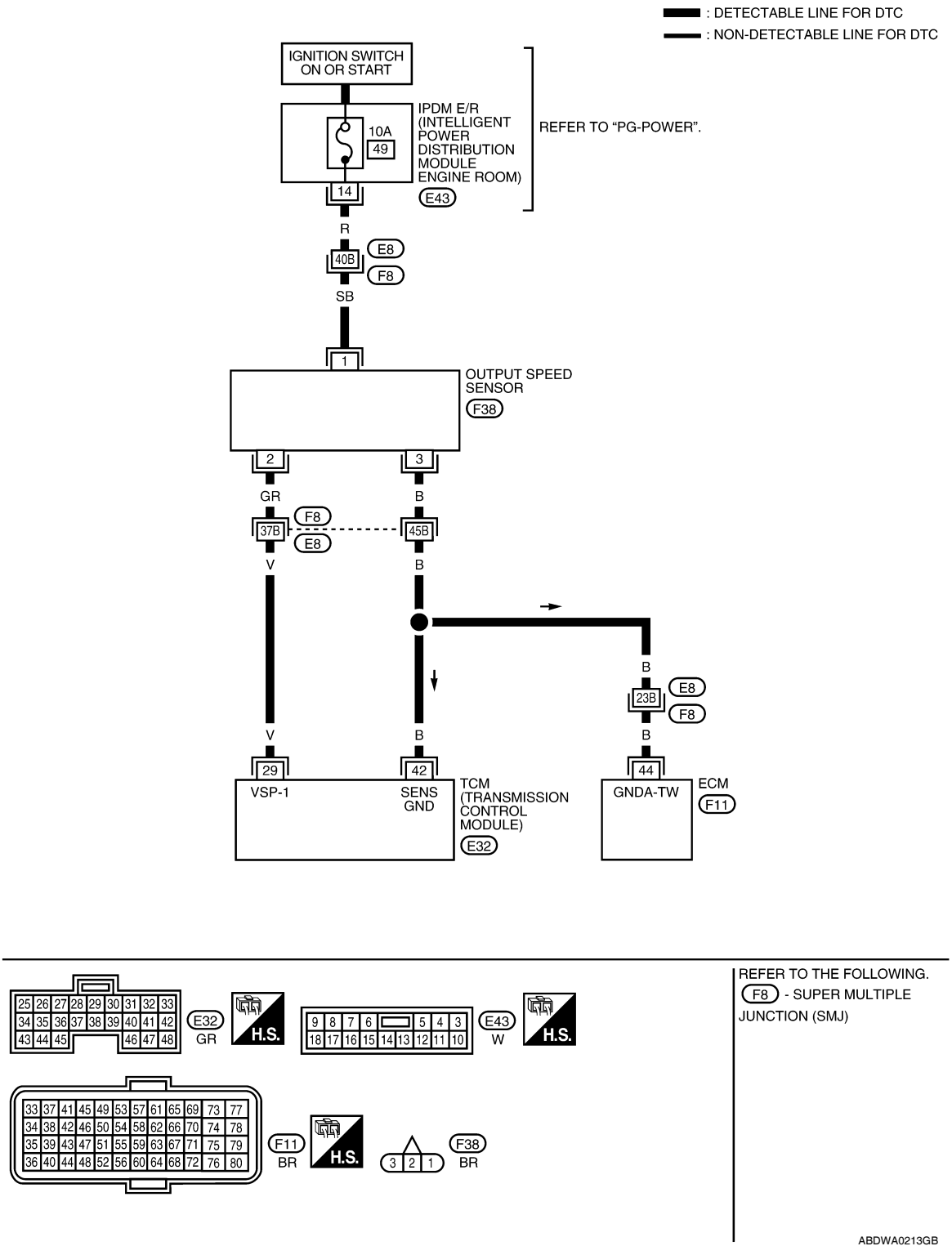
1. Start engine.

2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever position: “D” position
   Vehicle speed: 30 km/h (19 MPH) or more
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-99, "Diagnosis Procedure" .

Wiring Diagram - AT - VSSA/T

INFOID:0000000007329327

AT-VSSA/T-01



ABDWA0213GB

TCM TERMINALS AND REFERENCE VALUES
Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329328

1. CHECK INPUT SIGNAL

With CONSULT
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “VHCL/S SE-A/T” while driving.
   Check the value changes according to driving speed.

OK or NG

OK >> GO TO 8.
NG >> GO TO 2.

2. CHECK OUTPUT SPEED SENSOR

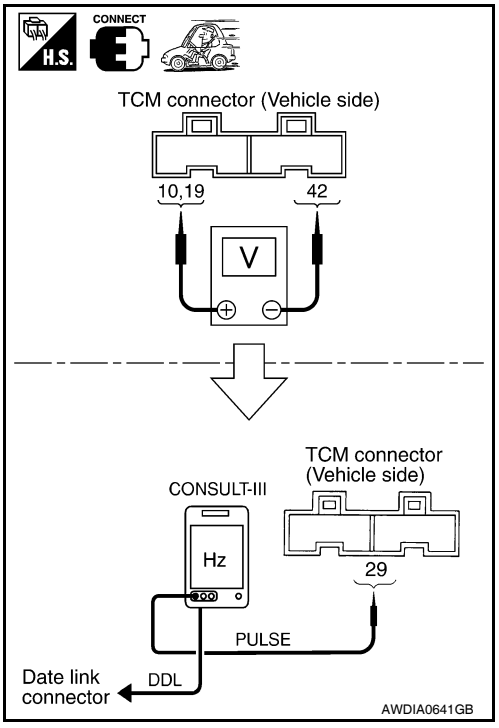
With CONSULT
1. Start engine.
2. Check power supply to output speed sensor by voltage between TCM connector terminals. Refer to AT-165, "Wiring Diagram - AT - MAIN" and AT-98, "Wiring Diagram - AT - VSSA/T" .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM	E31, E32	10 - 42	Battery voltage
		19 - 42	

3. If OK, check the pulse when vehicle cruises.

Item	Condition
Output speed sensor	When driving at 20 km/h (12 MPH), use the CONSULT pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the data link connector.** *1: A circuit tester cannot be used to test this item.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
TCM	E32	29	When driving at 20 km/h (12 MPH)	150 Hz



OK or NG

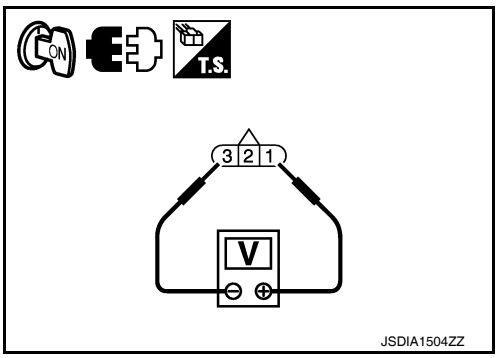
OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the output speed sensor harness connector.
3. Turn ignition switch ON. (Do not start engine.)

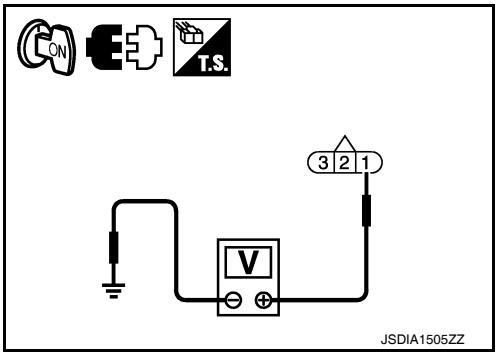
4. Check voltage between output speed sensor harness connector terminals.

Item	Connector	Terminal	Judgement standard (Approx.)
Output speed sensor	F38	1 - 3	Battery voltage



5. Check voltage between output speed sensor harness connector terminal and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Output speed sensor	F38	1 - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

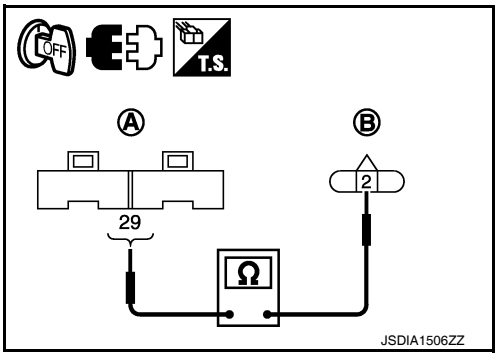
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground: GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and output speed sensor harness connector.
3. Check continuity between TCM connector (A) terminal and output speed sensor harness connector (B) terminal.

Item	Connector	Terminal	Continuity
TCM	E32	29	Yes
Output speed sensor	F38	2	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

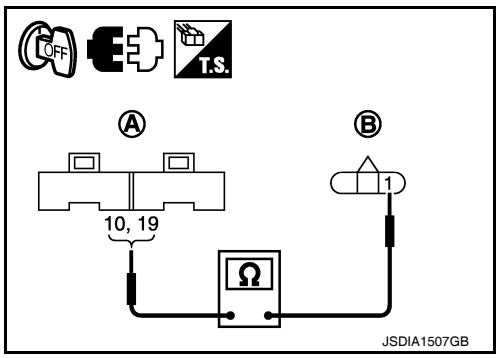
OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and output speed sensor harness connector.

3. Check continuity between TCM connector (A) terminals and output speed sensor harness connector (B) terminal. Refer to AT-48, "Circuit Diagram" and AT-165, "Wiring Diagram - AT - MAIN" .



Item	Connector	Terminal	Continuity
TCM	E31	10	Yes
Output speed sensor	F38	1	
TCM	E31	19	Yes
Output speed sensor	F38	1	

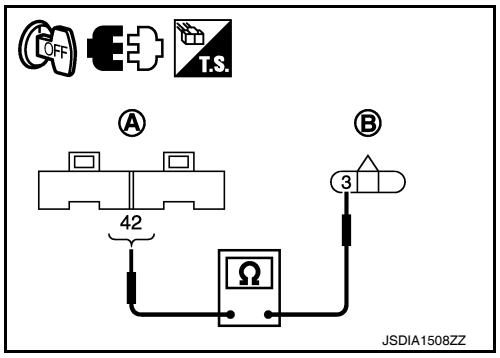
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> 10A fuse (No.49, located in the IPDM E/R) or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and output speed sensor harness connector.
3. Check continuity between TCM connector (A) terminal and output speed sensor harness connector (B) terminal.



Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Output speed sensor	F38	3	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform AT-97, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

P0725 ENGINE SPEED

Description

INFOID:0000000007329329

The engine speed signal is sent from the ECM to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329330

Remarks: Specification data are reference values.

Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

On Board Diagnosis Logic

INFOID:0000000007329331

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0725 ENGINE SPEED” with CONSULT or 9th judgement flicker without CONSULT is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

INFOID:0000000007329332

Harness or connector
(Circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329333

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THROTTLE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
4. If the check result is NG, go to AT-104, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

WITHOUT CONSULT

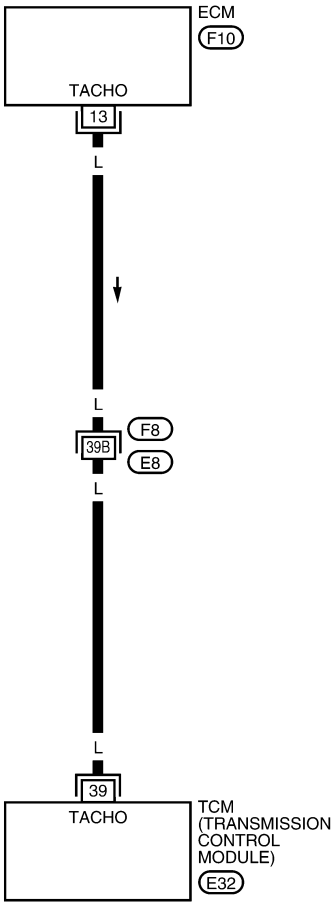
1. Start engine.
2. Drive vehicle under the following conditions for more than 10 seconds.
   Selector lever position: “D” position
   Vehicle speed: Higher than 10 km/h (6 MPH)
   Throttle position: Greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-104, "Diagnosis Procedure" .

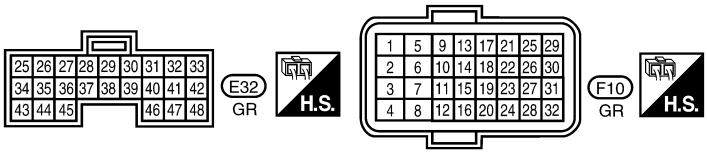
Wiring Diagram - AT - ENGSS

INFOID:0000000007329334

AT-ENGSS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0652E

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329335

1.CHECK DTC WITH ECM

Check DTC with CONSULT “ENGINE”.
Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT. Refer to EC-119, "CONSULT Function (ENGINE)".

OK or NG

OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to EC-529, "Component Description".

2.CHECK INPUT SIGNAL

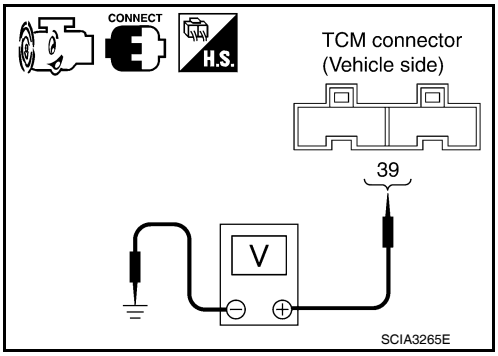
With CONSULT

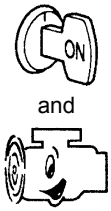
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “ENGINE SPEED”. Check engine speed changes according to throttle position.

Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

Without CONSULT

1. Start engine.
2. Check voltage between TCM harness connector terminal and ground.



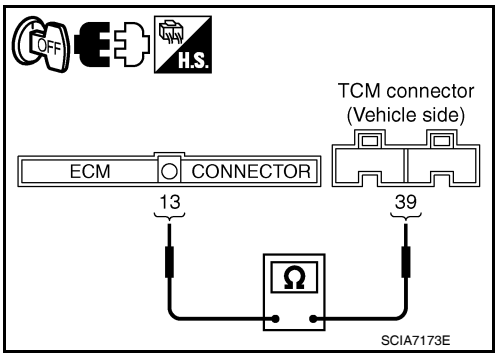
item	Connector	Terminal	Condition	Judgement standard (Approx.)
Engine speed signal	E32	39 - Ground		Refer to EC-112.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND ECM

1. Turn ignition switch OFF.
2. Disconnect ECM connector and TCM connector.
3. Check continuity between ECM connector and TCM connector.



Item	Connector	Terminal	Continuity
TCM	E32	39	Yes
ECM	F10	13	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK DTC

Perform AT-102, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value".
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P0731 1GR INCORRECT RATIO

Description

INFOID:0000000007329336

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

INFOID:0000000007329337

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0731 1GR INCORRECT RATIO” with CONSULT is detected when A/T cannot be shifted to the 1GR position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from output speed sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows:
  In case of gear position with no malfunctions: **1**, 2, 3 and 4 positions
  In case of gear position with shift solenoid valve A stuck open: **2***, 2, 3 and 3 positions
  In case of gear position with shift solenoid valve B stuck open: **4***, 3, 3 and 4 positions to each gear position above
  *: “P0731 1GR INCORRECT RATIO” is detected.

Possible Cause

INFOID:0000000007329338

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329339

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
4. Select “1ST GR FNCTN P0731” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT and touch “START”.

5. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following conditions and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   SLCT LVR POSI: "D" position
- **Make sure that "GEAR" shows "2" after releasing pedal.**
6. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT screen, go to AT-107, "Diagnosis Procedure".
   If "STOP VEHICLE" appears on CONSULT screen, go to the following step.
- **Make sure that "GEAR" shows "1" when depressing accelerator pedal to WOT.**
- **If "TESTING" does not appear on CONSULT for a long time, select "SELF-DIAG RESULTS" for "TRANSMISSION". In case a DTC other than "P0731 1GR INCORRECT RATIO" is shown, refer to AT-74, "CONSULT Function (TRANSMISSION)".**
7. Stop vehicle.
8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for "1GR INCORRECT RATIO " exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

9. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)
   Refer to AT-107, "Diagnosis Procedure".
   Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST
Follow the procedure "WITH CONSULT".

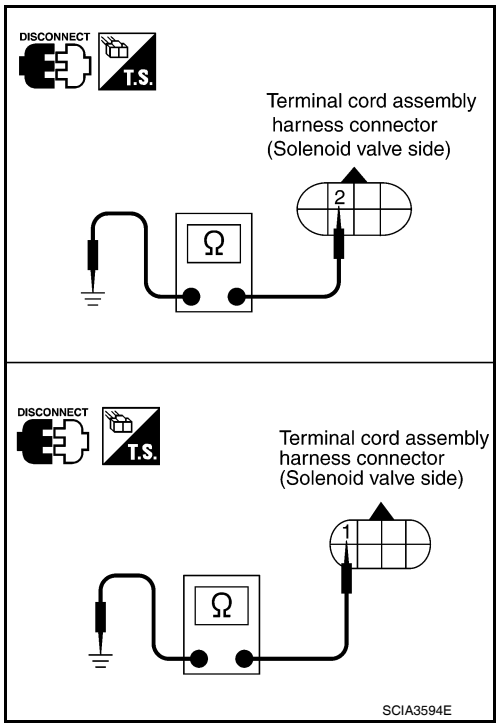
Diagnosis Procedure

INFOID:0000000007329340

1.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω



OK or NG

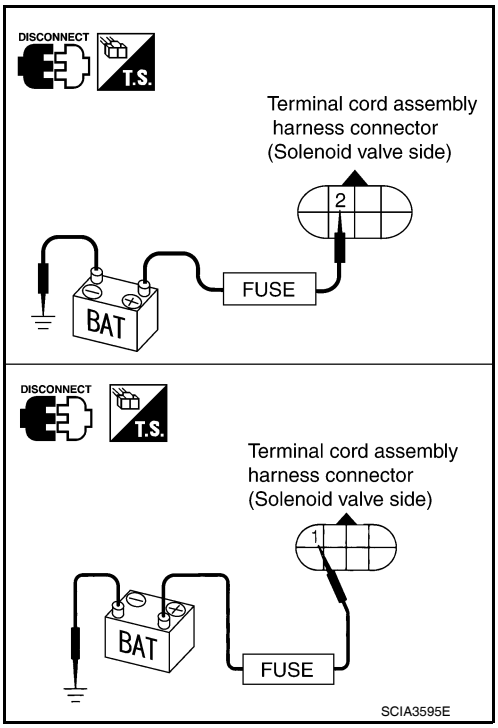
OK >> GO TO 2.
NG >> Repair or replace damaged parts.

2.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.



3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-106, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. If NG, repair or replace control valve assembly.

P0732 2GR INCORRECT RATIO

Description

INFOID:0000000007329341

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

INFOID:0000000007329342

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0732 2GR INCORRECT RATIO” with CONSULT is detected when A/T cannot be shifted to the 2GR position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from output speed sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows:
  In case of gear position with no malfunctions: 1, **2**, 3 and 4 positions
  In case of gear position with shift solenoid valve B stuck open: 4, **3***, 3 and 4 positions to each gear position above
  *: “P0732 2GR INCORRECT RATIO” is detected.

Possible Cause

INFOID:0000000007329343

- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329344

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
4. Select “2ND GR FNCTN P0732” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT and touch “START”.
5. Accelerate vehicle to 45 to 50 km/h (28 to 31 MPH) under the following conditions and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8
   SLCT LVR POSI: “D” position

- **Make sure that “GEAR” shows “3” or “4” after releasing pedal.**

6. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 45 to 50 km/h (28 to 31 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETE”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT screen, go to AT-110, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT screen, go to following step.

- **Make sure that “GEAR” shows “2” when depressing accelerator pedal to WOT.**
- **If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS” for “TRANSMISSION”. In case a DTC other than “P0732 2GR INCORRECT RATIO” is shown, refer to AT-74, "CONSULT Function (TRANSMISSION)".**

7. Stop vehicle.
8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for “2GR INCORRECT RATIO” exists.	4 → 3 → 3 → 4

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to AT-110, "Diagnosis Procedure".
   Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs".

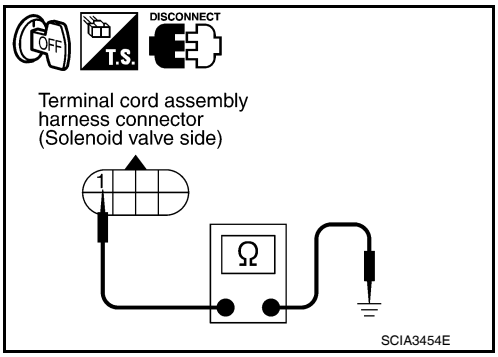
WITH GST
Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329345

1.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to AT-141, "Wiring Diagram - AT - SSV/B".



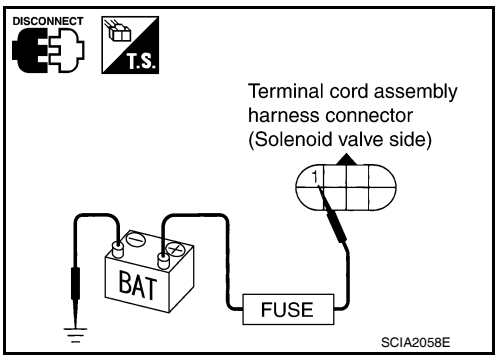
Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

2.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to AT-141, "Wiring Diagram - AT - SSV/B".



OK or NG

OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.

3.CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-109, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. If NG, repair or replace control valve assembly.

P0733 3GR INCORRECT RATIO

Description

INFOID:0000000007329346

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

INFOID:0000000007329347

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0733 3GR INCORRECT RATIO” with CONSULT is detected when A/T cannot be shifted to the 3GR position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from output speed sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve A is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, **3** and 4 positions
  In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4*** and 4 positions to each gear position above
  *: “P0733 3GR INCORRECT RATIO” is detected.

Possible Cause

INFOID:0000000007329348

- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329349

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
4. Select “3RD GR FNCTN P0733” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT and touch “START”.
5. Accelerate vehicle to 60 to 75 km/h (37 to 47 MPH) under the following conditions and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   SLCT LVR POSI: “D” position

- **Make sure that “GEAR” shows “4” after releasing pedal.**

6. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 60 to 75 km/h (37 to 47 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT screen, go to AT-113, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT screen, go to following step.

- **Make sure that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.**
- **If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS” for “TRANSMISSION”. In case a DTC other than “P0733 3GR INCORRECT RATIO” is shown, refer to AT-74, "CONSULT Function (TRANSMISSION)".**

7. Stop vehicle.
8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for “3GR INCORRECT RATIO” exists.	1 → 1 → 4 → 4

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to AT-113, "Diagnosis Procedure".
   Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST
Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

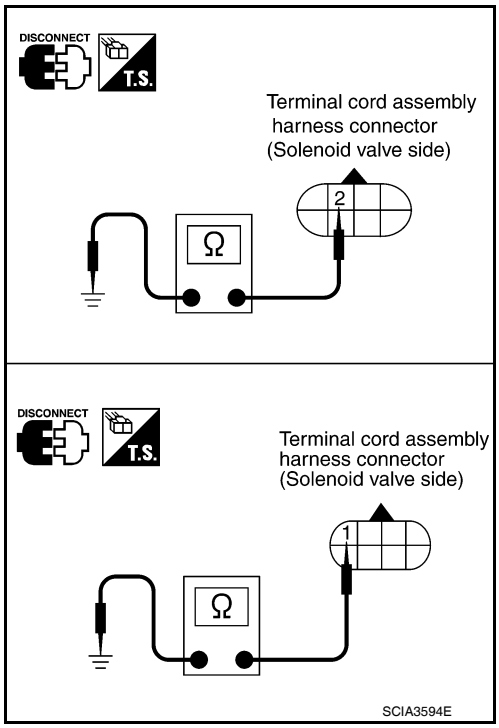
INFOID:0000000007329350

1.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between terminal cord assembly harness connector terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω



OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

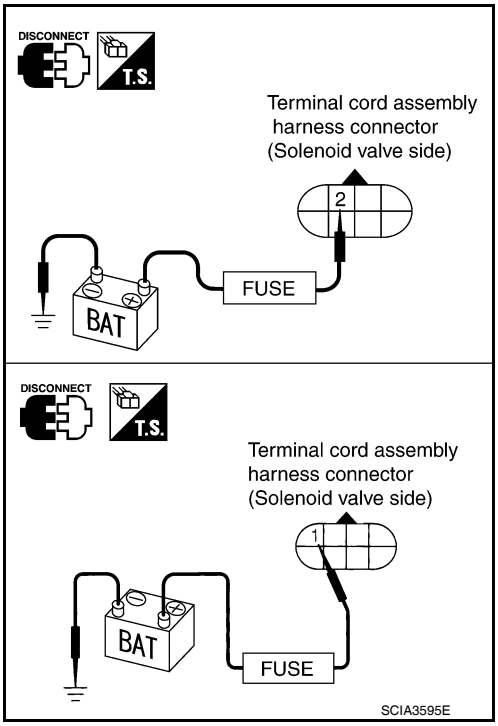
2.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.



3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-112, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. If NG, repair or replace control valve assembly.

P0734 4GR INCORRECT RATIO

Description

INFOID:0000000007329351

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329352

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 94%

On Board Diagnosis Logic

INFOID:0000000007329353

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0734 4GR INCORRECT RATIO” with CONSULT is detected when A/T cannot be shifted to the 4GR position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from output speed sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve A is stuck open or shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, 3 and **4** positions
  In case of gear position with shift solenoid valve A stuck open: 2, 2, 3 and **3*** positions
  In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and **1*** positions to each gear position above
  *: “P0734 4GR INCORRECT RATIO” is detected.

Possible Cause

INFOID:0000000007329354

- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329355

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
4. Select “4TH GR FNCTN P0734” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT and touch “START”.
5. Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following conditions and release the accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   SLCT LVR POSI: “D” position

- **Make sure that “GEAR” shows “3” after releasing pedal.**

6. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 55 to 65 km/h (34 to 40 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT screen, go to AT-116, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT screen, go to following step.

- **Make sure that “GEAR” shows “4” when depressing accelerator pedal with 1.0/8 - 2.0/8 of “THROTTLE POSI”.**
- **If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS” for “TRANSMISSION”. In case a DTC other than “P0734 4GR INCORRECT RATIO” is shown, refer to AT-74, "CONSULT Function (TRANSMISSION)".**

7. Stop vehicle.
8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for “4GR INCORRECT RATIO” exists.	2 → 2 → 3 → 3
	1 → 2 → 2 → 1

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to AT-116, "Diagnosis Procedure".
   Refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

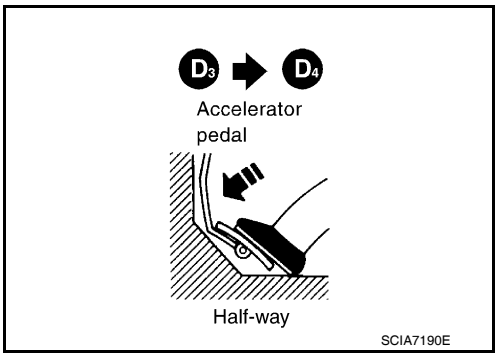
INFOID:0000000007329356

1.CHECK SHIFT-UP (D3 TO D4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D3 to D4 at the specified speed?

YES >> GO TO 11.
NO >> GO TO 2.



2.CHECK LINE PRESSURE

Perform line pressure test. Refer to AT-49, "Inspections Before Trouble Diagnosis".

OK or NG

OK >> GO TO 3.
NG >> GO TO 7.

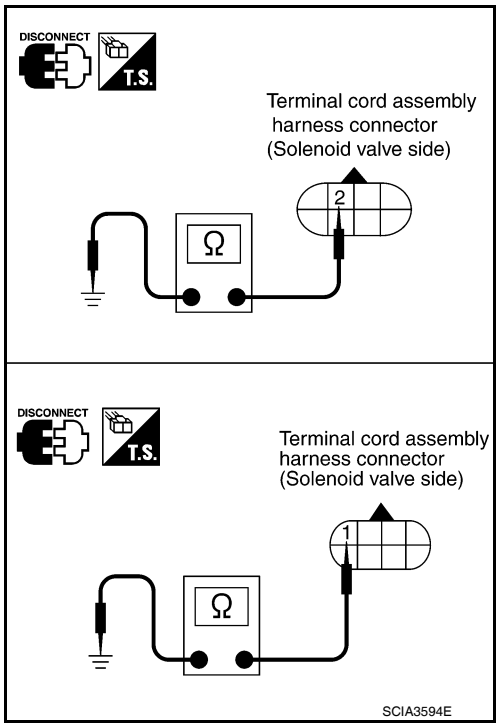
3. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω

OK or NG

OK >> GO TO 4.
NG >> Replace solenoid valve assembly.

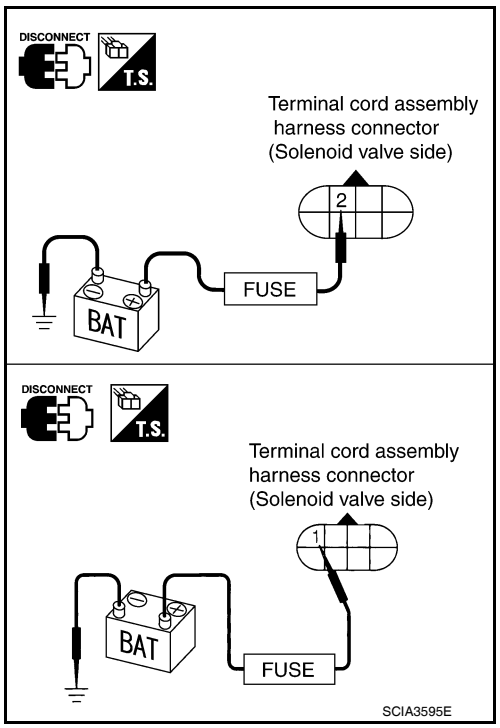


4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to AT-136, "Wiring Diagram - AT - SSV/A" and AT-141, "Wiring Diagram - AT - SSV/B".

OK or NG

OK >> GO TO 5.
NG >> Replace solenoid valve assembly.



5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

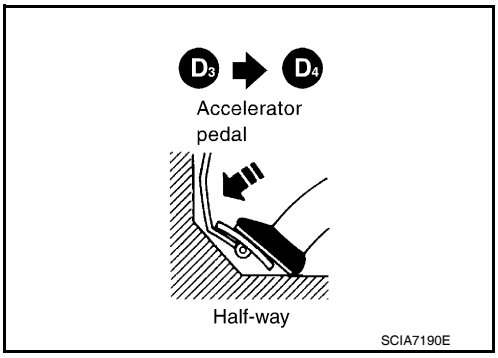
OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT-UP (D3 TO D4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D3 to D4 at the specified speed?

YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



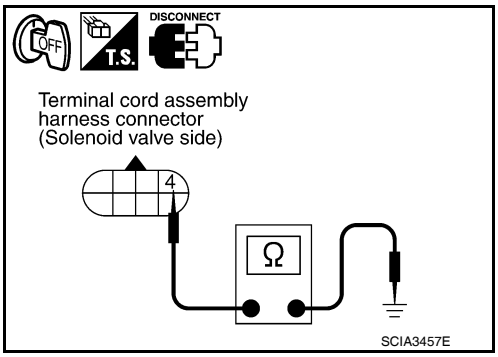
7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valves
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to AT-131, "Wiring Diagram - AT - LPSV".

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω

OK or NG

OK >> GO TO 8.
NG >> Replace solenoid valve assembly.

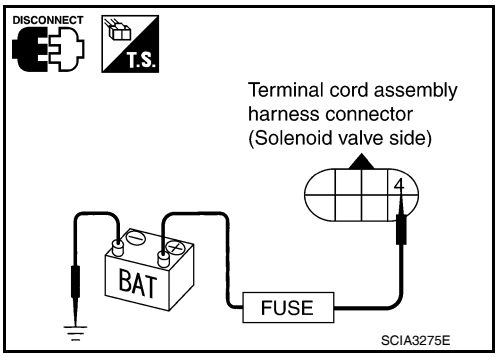


8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to AT-131, "Wiring Diagram - AT - LPSV".

OK or NG

OK >> GO TO 9.
NG >> Replace solenoid valve assembly.



9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check line pressure circuit valves for sticking.
- Pilot valve
- Shift solenoid valve A
- Shift solenoid valve B

OK or NG

OK >> GO TO 10.

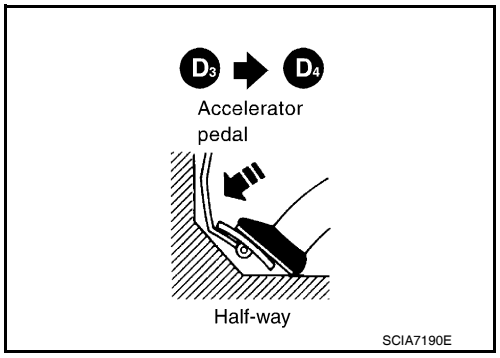
NG >> Repair control valve.

10. CHECK SHIFT-UP (D_3 TO D_4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



11. CHECK DTC

Perform AT-115, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Perform AT-56, "Cruise Test - Part 1" again and return to the start point of this test group.

P0740 TORQUE CONVERTER

Description

INFOID:0000000007329357

- The torque converter clutch solenoid valve is activated, with the gear in D4 and D3, by the TCM in response to signals sent from the output speed sensor and the ECM (throttle opening). Lock-up piston operation will then be controlled.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 2/8) on lock-up condition, the engine speed should not change abruptly. If there is an abrupt change in engine speed, there is no lock-up.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329358

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

On Board Diagnosis Logic

INFOID:0000000007329359

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0740 T/C CLUTCH SOL” with CONSULT or 7th judgement flicker without CONSULT is detected when TCM detects an improper voltage drop while it tries to operate solenoid valve.

Possible Cause

INFOID:0000000007329360

- Torque converter clutch solenoid valve
- Harness or connector
  (The solenoid circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329361

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT and wait at least 1 second.
3. Touch “START”.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED: 80 km/h (50 MPH) or more
   THROTTLE POSI: 0.5/8 - 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If the check result is NG, go to AT-122, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

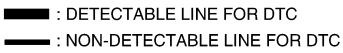
WITHOUT CONSULT

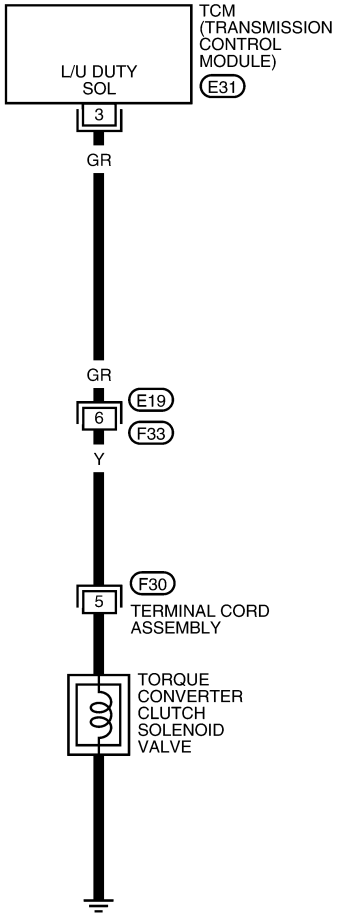
1. Start engine.
2. Drive vehicle in D1→ D2→ D3→ D4→ D4 lock-up position.
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-122, "Diagnosis Procedure" .

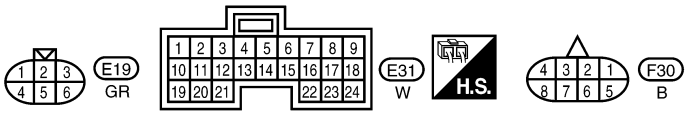
Wiring Diagram - AT - TCV

INFOID:0000000007329362

AT-TCV-01







BCWA0653E

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329363

1.CHECK INPUT SIGNAL

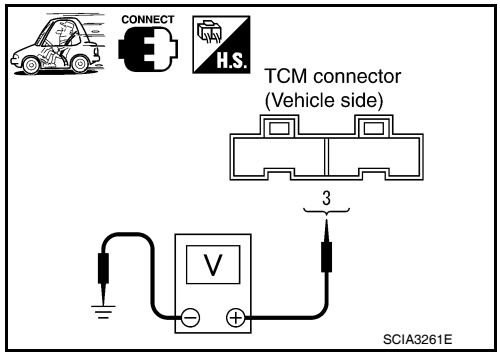
With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “TCC S/V DUTY” while driving. Check the value changes according to driving speed.

Monitor item	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4 % ⇔ 94 %

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.



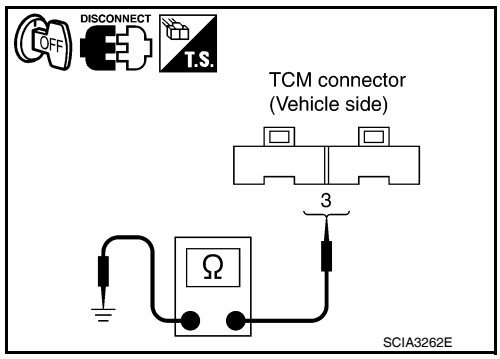
Name	Connector	Terminal	Condition	Judgement standard (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	When A/T performs lock-up.	8 - 15 V
			When A/T does not perform lock-up.	0 V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	5 - 20 Ω

OK or NG

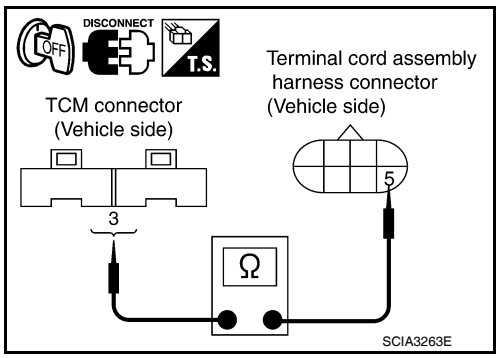
OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.

3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	3	Yes
Terminal cord assembly harness connector	F30	5	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

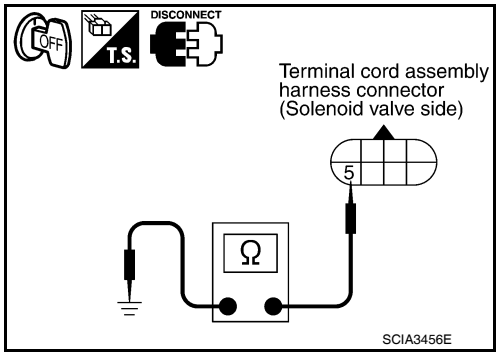
OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω



OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-120, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329364

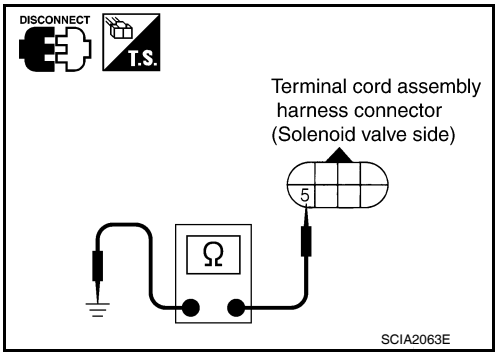
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-219, "Control Valve Assembly and Accumulators" .

Resistance Check

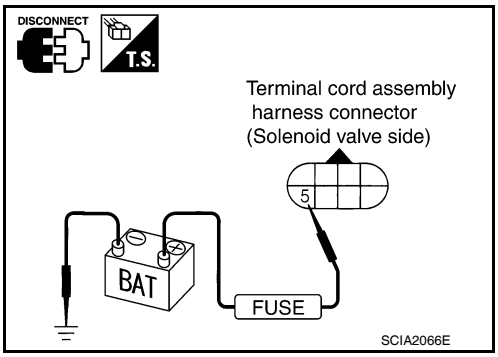
• Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



P0744 TORQUE CONVERTER

Description

INFOID:0000000007329365

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock-up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329366

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

On Board Diagnosis Logic

INFOID:0000000007329367

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0744 T/C CLUTCH FNCTN” with CONSULT is detected when A/T cannot perform lock-up even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from output speed sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
  In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
  *: “P0744 T/C CLUTCH FNCTN” is detected.

Possible Cause

INFOID:0000000007329368

- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329369

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5 V
   If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).
4. Select “TCC S/V FNCTN P0744” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT and touch “START”.

5. Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following conditions continuously until “TESTING” has turned to “COMPLETE”. (It will take approximately 30 seconds after “TESTING” shows.)
   THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)
   SLCT LVR POSI: “D” position
   TCC S/V DUTY: More than 94%
   VEHICLE SPEED: Constant speed of more than 80 km/h (50 MPH)
- **Make sure that “GEAR” shows “4”.**
- **For shift schedule, refer to AT-62, "Vehicle Speed at Which Gear Shifting Occurs".**
- **If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a DTC other than “P0744 T/C CLUTCH FNCTN” is shown, refer to AT-74, "CONSULT Function (TRANSMISSION)".**

6. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-126, "Diagnosis Procedure".
   Refer to AT-62, "Vehicle Speed at Which Lock-up Occurs/Releases".

WITH GST
Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

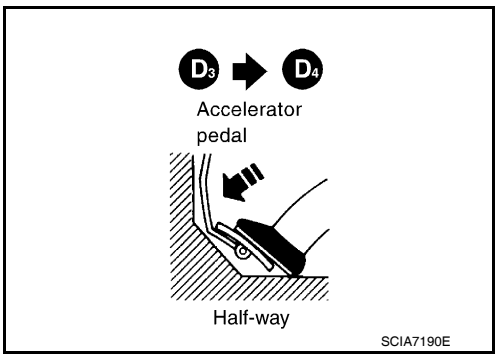
INFOID:0000000007329370

1.CHECK SHIFT-UP (D3 TO D4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D3 to D4 at the specified speed?

YES >> GO TO 11.
NO >> GO TO 2.



2.CHECK LINE PRESSURE

Perform line pressure test. Refer to AT-49, "Inspections Before Trouble Diagnosis".

OK or NG

OK >> GO TO 3.
NG >> GO TO 6.

3.CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

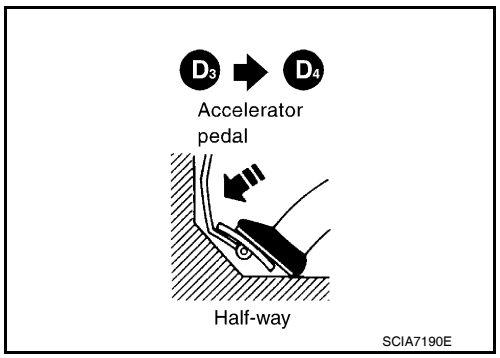
OK >> GO TO 4.
NG >> Repair control valve.

4.CHECK SHIFT-UP (D3 TO D4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D3 to D4 at the specified speed?

YES >> GO TO 5.
NO >> Check control valve again. Repair or replace control valve assembly.



5. CHECK DTC

Perform AT-125, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11. Check for proper lock-up.

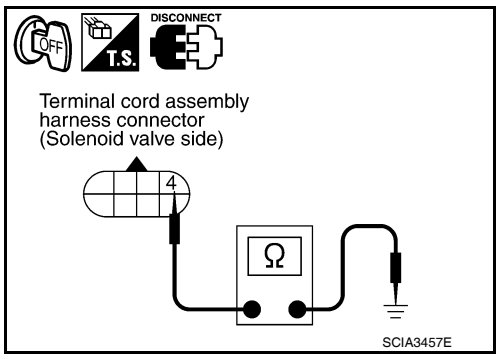
6. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to AT-131, "Wiring Diagram - AT - LPSV".

Solenoid valve	Connectror	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω

OK or NG

OK >> GO TO 7.
NG >> Replace solenoid valve assembly.

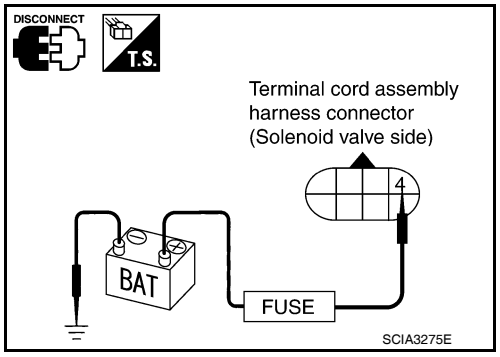


7. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to AT-131, "Wiring Diagram - AT - LPSV".

OK or NG

OK >> GO TO 8.
NG >> Replace solenoid valve assembly.



8. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

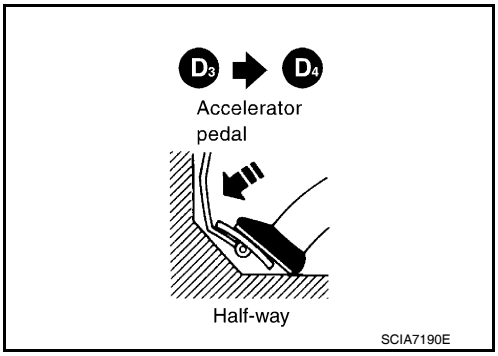
OK >> GO TO 9.
NG >> Repair control valve.

9. CHECK SHIFT-UP (D3 TO D4)

During AT-56, "Cruise Test - Part 1".

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 10.
NO >> Check control valve again. Repair or replace control valve assembly.



10. CHECK DTC

Perform AT-125, "DTC Confirmation Procedure".

OK or NG

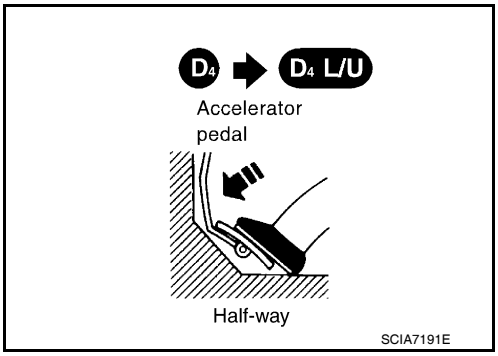
OK >> **INSPECTION END**
NG >> GO TO 11. Check for proper lock-up.

11. CHECK LOCK-UP

During AT-56, "Cruise Test - Part 1".

A/T perform lock-up at the specified speed?

YES >> Perform “Cruise test — Part 1” again and return to the start point of this test group.
NO >> GO TO 12.



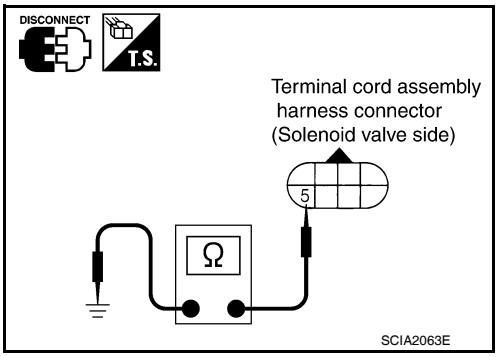
12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to AT-121, "Wiring Diagram - AT - TCV".

Solenoid valve	Connectror	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω

OK or NG

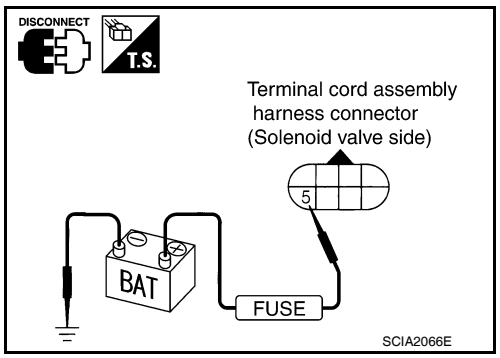
OK >> GO TO 13.
NG >> Replace solenoid valve assembly.



13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators".
- Torque converter clutch solenoid valve

2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to AT-121, "Wiring Diagram - AT - TCV".



OK or NG

OK >> GO TO 14.
NG >> Replace solenoid valve assembly.

14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-267, "Control Valve Assembly".
2. Check control valves for sticking.

- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

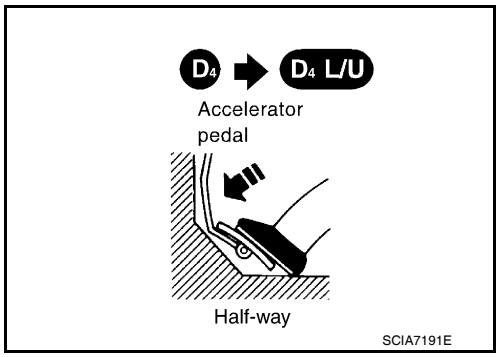
OK >> GO TO 15.
NG >> Repair control valve.

15. CHECK LOCK-UP

During AT-56, "Cruise Test - Part 1".

A/T perform lock-up at the specified speed?

YES >> GO TO 16.
NO >> Check control valve again. Repair or replace control valve assembly.



16. CHECK DTC

Perform AT-125, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Perform “Cruise test — Part 1” again and return to the start point of this test group.

P0745 PRESSURE CONTROL SOLENOID A

Description

INFOID:0000000007329371

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to signals sent from the TCM.
The line pressure duty cycle value is not constant when the closed throttle position switch is ON. To confirm the line pressure duty cycle at low-pressure, the accelerator (throttle) should be open until the closed throttle position switch is OFF.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329372

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 94%

On Board Diagnosis Logic

INFOID:0000000007329373

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0745 PC SOLENOID A” with CONSULT or 11th judgement flicker without CONSULT is detected when TCM detects an improper voltage drop while it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000007329374

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Line pressure solenoid valve

DTC Confirmation Procedure

INFOID:0000000007329375

CAUTION:
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Depress accelerator pedal completely and wait at least 1 second.
4. If the check result is NG, go to AT-132, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

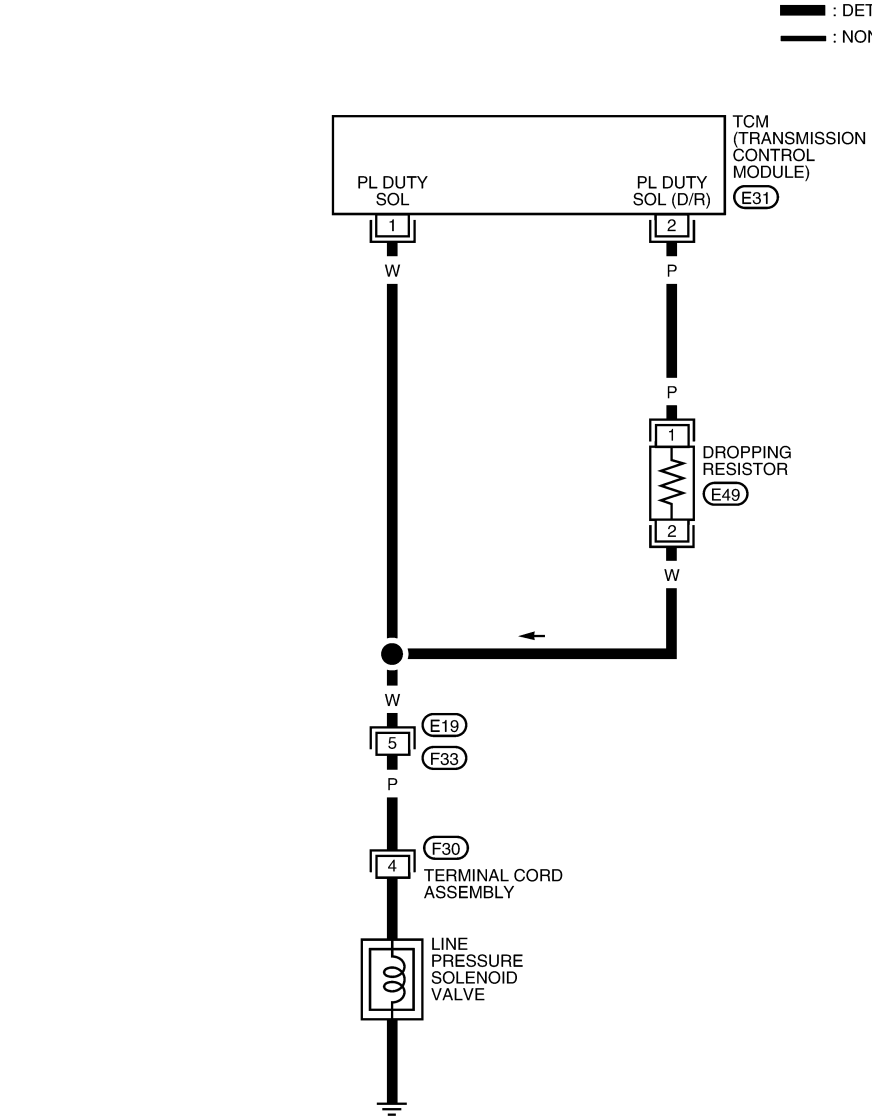
WITHOUT CONSULT

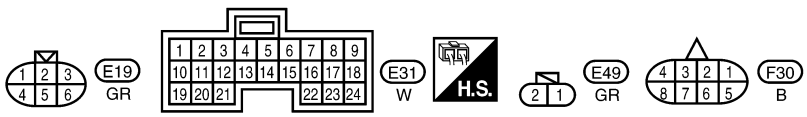
1. Start engine.
2. With brake pedal depressed, shift the lever from “P”→“N”→“D”→“N”→“P” positions.
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-132, "Diagnosis Procedure" .

Wiring Diagram - AT - LPSV

INFOID:0000000007329376

AT-LPSV-01





BCWA0654E

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329377

1.CHECK INPUT SIGNAL

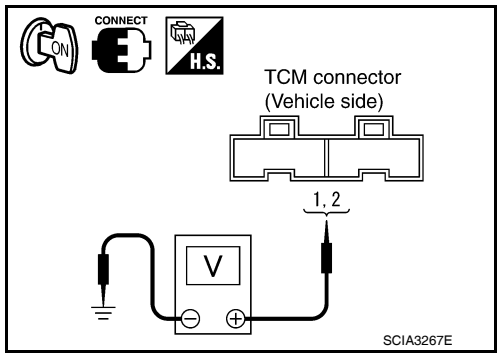
With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “LINE PRES DTY” while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0 % ⇔ 94 %

Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



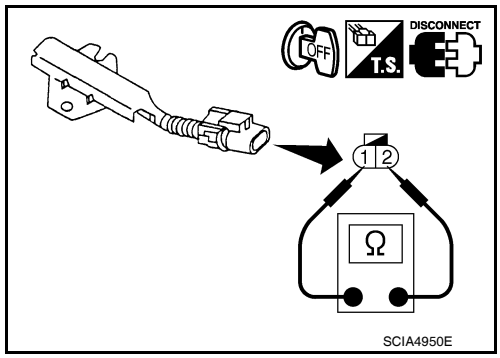
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Line pressure solenoid valve	E31	1 - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0 V
			When depressing accelerator pedal fully after warming up engine.	0 V
Line pressure solenoid valve (with dropping resistor)	E31	2 - Ground	When releasing accelerator pedal after warming up engine.	4 - 14 V
			When depressing accelerator pedal fully after warming up engine.	0 V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK DROPPING RESISTOR

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector in engine room.
3. Check resistance between terminals.



Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E49	1 - 2	12 Ω

OK or NG

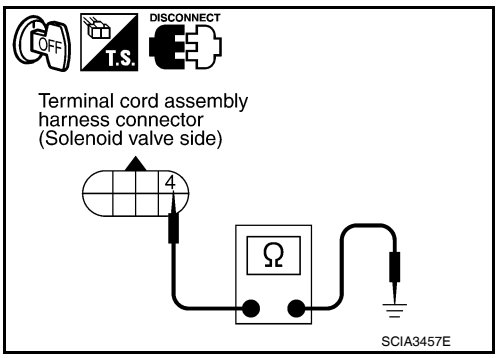
OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.

3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5.0 Ω



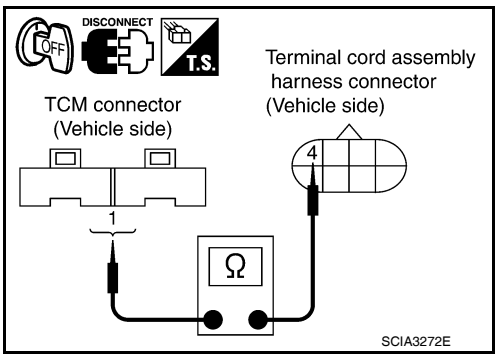
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

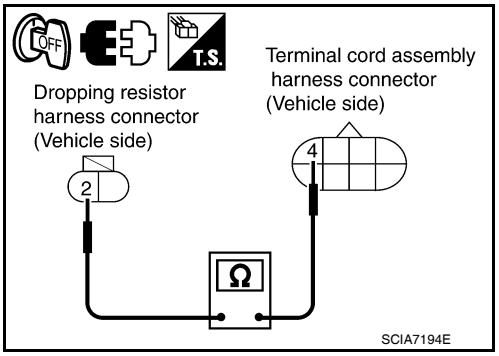
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	1	Yes
Terminal cord assembly harness connector	F30	4	



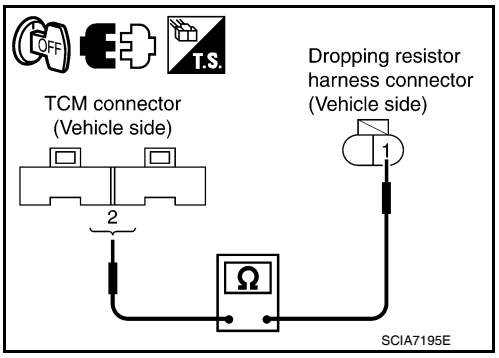
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

Item	Connector	Terminal	Continuity
Dropping resistor harness connector	E49	2	Yes
Terminal cord assembly harness connector	F30	4	



5. Check continuity between dropping resistor harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	2	Yes
Dropping resistor harness connector	E49	1	



6. If OK, check harness for short to ground and short to power.
7. If OK, check continuity between ground and transaxle assembly.
8. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform AT-130, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329378

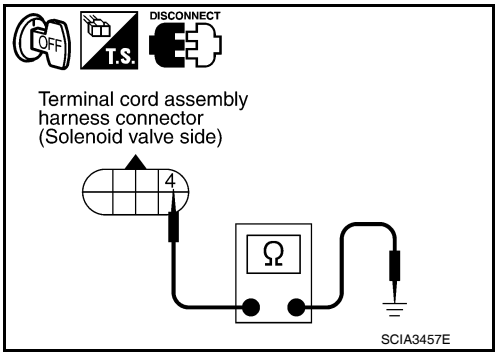
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-219, "Control Valve Assembly and Accumulators" .

Resistance Check

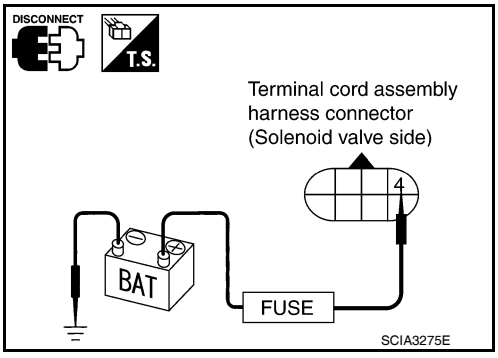
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω



Operation Check

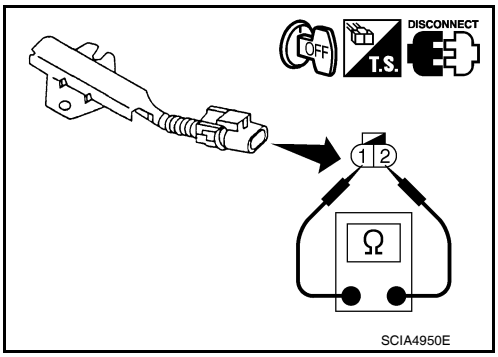
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E49	1 - 2	12 Ω



P0750 SHIFT SOLENOID A

Description

INFOID:0000000007329379

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the transmission range switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329380

Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	OFF

On Board Diagnosis Logic

INFOID:0000000007329381

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0750 SHIFT SOLENOID A” with CONSULT or 4th judgement flicker without CONSULT is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000007329382

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve A

DTC Confirmation Procedure

INFOID:0000000007329383

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine.
4. Drive vehicle in “D” position and allow the transaxle to shift 1 → 2 (“GEAR”).
5. If the check result is NG, go to AT-137, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

WITHOUT CONSULT

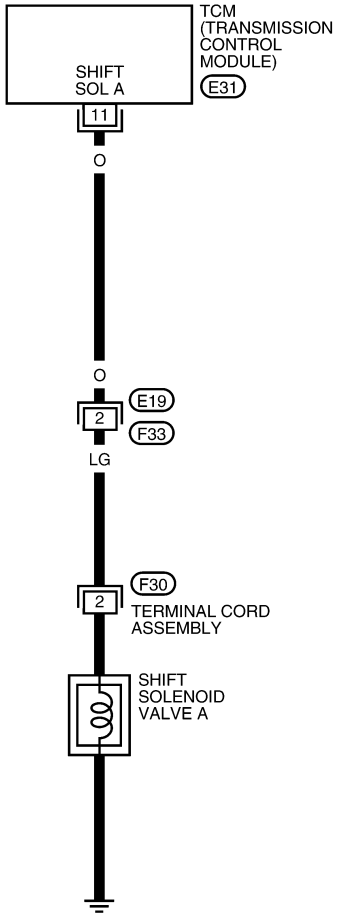
1. Start engine.
2. Drive vehicle in D1→ D2 position.
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-137, "Diagnosis Procedure" .

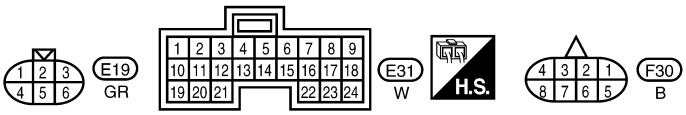
Wiring Diagram - AT - SSV/A

INFOID:0000000007329384

AT-SSV/A-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





BCWA0655E

TCM TERMINALS AND REFERENCE VALUES
Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329385

1.CHECK INPUT SIGNAL

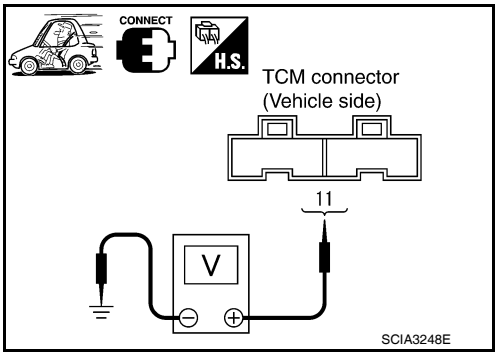
With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “SHIFT S/V A” while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D1” or “D4”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D2” or “D3”.)	OFF

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.



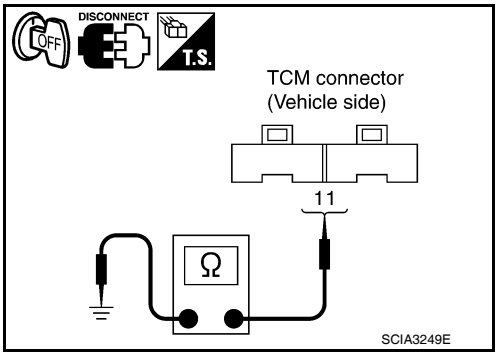
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve A	E31	11 - Ground	When shift solenoid valve A operates. (When driving in “D1” or “D4”.)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in “D2” or “D3”.)	0 V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	E31	11 - Ground	20 - 30 Ω

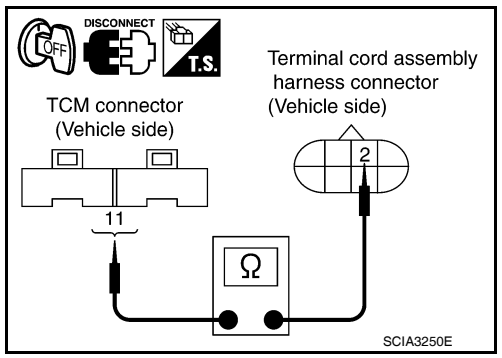
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.

3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal	Continuity
TCM	E31	11	Yes
Terminal cord assembly harness connector	F30	2	

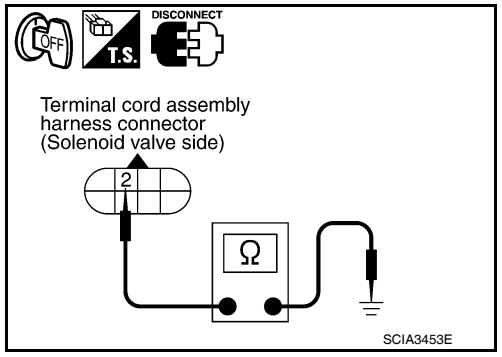
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-135, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329386

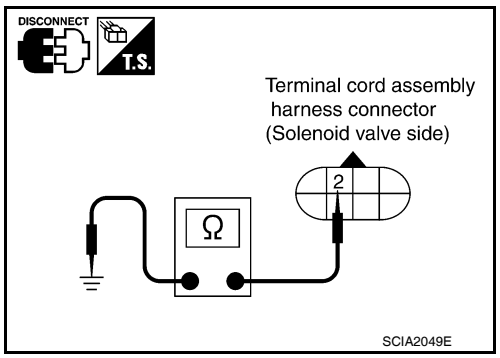
SHIFT SOLENOID VALVE A

- For removal, refer to AT-219, "Control Valve Assembly and Accumulators" .

Resistance Check

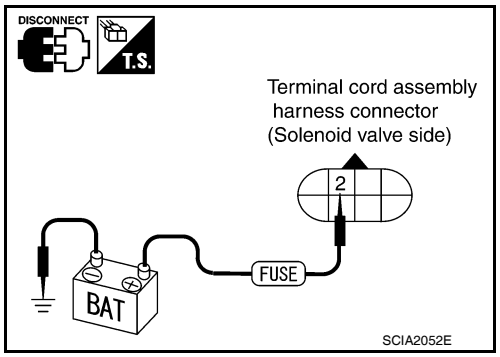
• Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



P0755 SHIFT SOLENOID B

Description

INFOID:0000000007329387

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the transmission range switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329388

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	OFF

On Board Diagnosis Logic

INFOID:0000000007329389

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0755 SHIFT SOLENOID B” with CONSULT or 5th judgement flicker without CONSULT is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000007329390

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve B

DTC Confirmation Procedure

INFOID:0000000007329391

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine.
4. Drive vehicle in D position and allow the transaxle to shift 1 → 2 → 3 (“GEAR”).
5. If the check result is NG, go to AT-142, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

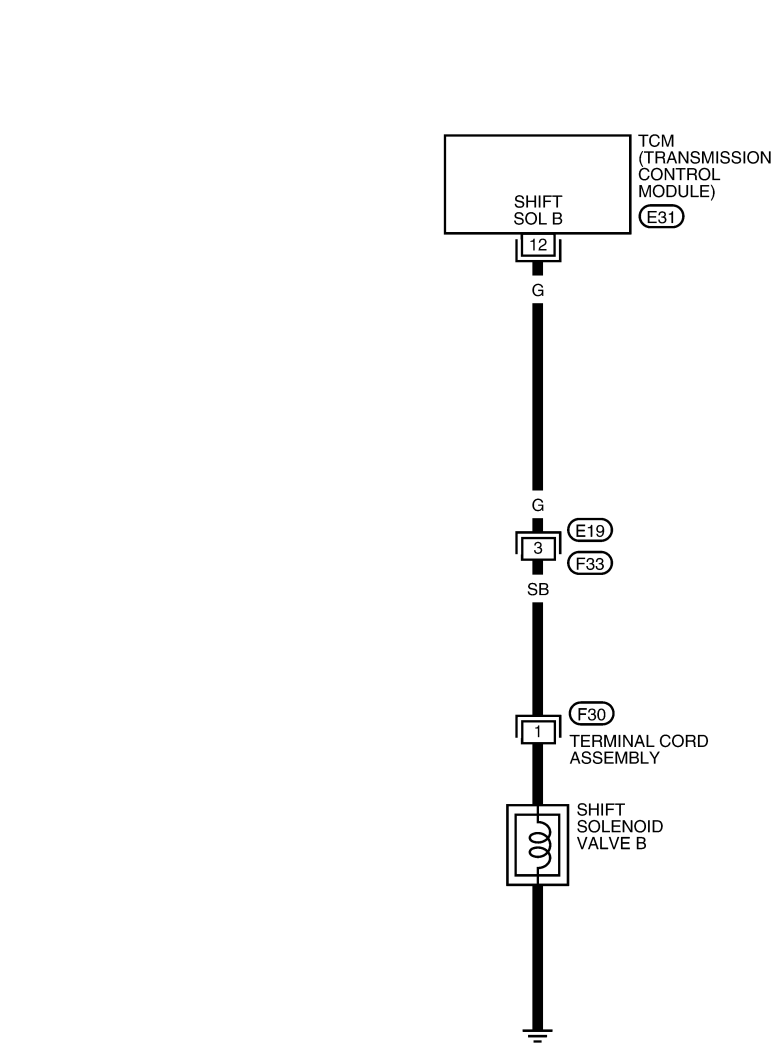
WITHOUT CONSULT

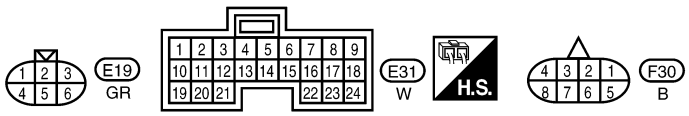
1. Start engine.
2. Drive vehicle in D1→ D2→ D3 position.
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-142, "Diagnosis Procedure" .

Wiring Diagram - AT - SSV/B

INFOID:0000000007329392

AT-SSV/B-01





BCWA0656E

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329393

1.CHECK INPUT SIGNAL

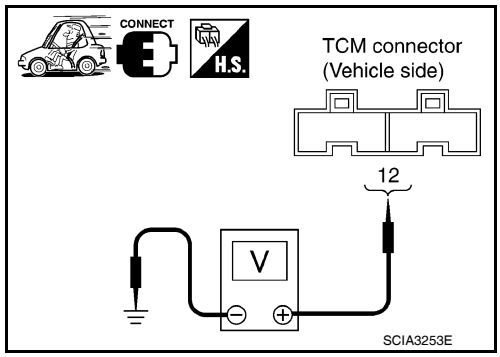
With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “SHIFT S/V B” while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D1” or “D2”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D3” or “D4”.)	OFF

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.



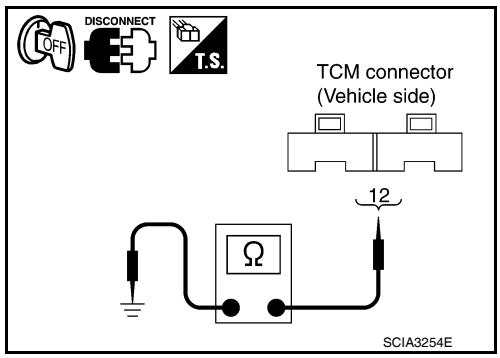
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve B	E31	12 - Ground	When shift solenoid valve B operates. (When driving in “D1” or “D2”.)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in “D3” or “D4”.)	0 V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	E31	12 - Ground	5 - 20 Ω

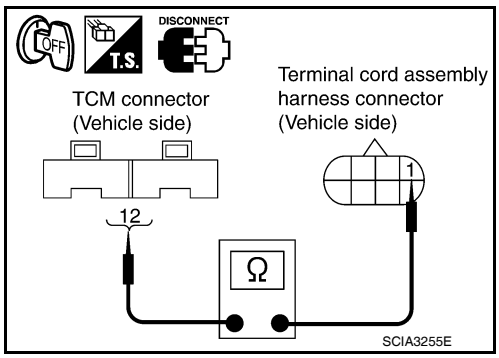
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.

3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal	Continuity
TCM	E31	12	Yes
Terminal cord assembly harness connector	F30	1	

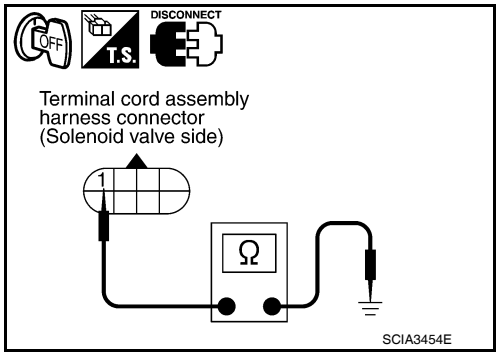
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.CHECK DTC

Perform AT-140, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329394

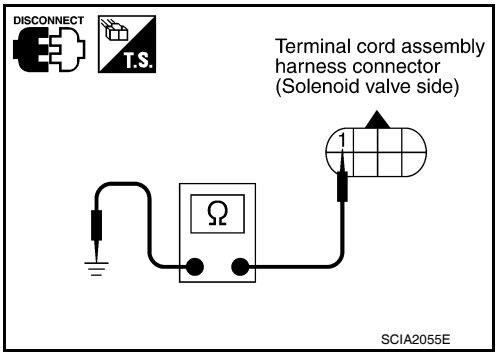
SHIFT SOLENOID VALVE B

- For removal, refer to AT-219, "Control Valve Assembly and Accumulators" .

Resistance Check

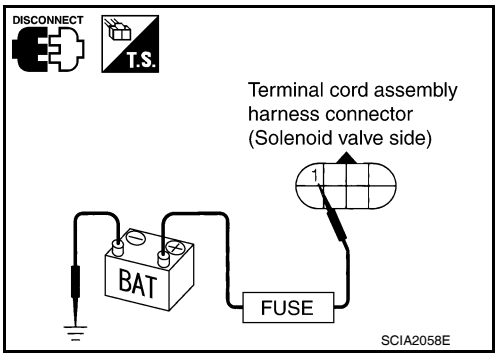
• Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



P1760 OVERRUN CLUTCH SOLENOID

Description

INFOID:0000000007329395

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the transmission range switch, overdrive control switch, vehicle speed and ECM (throttle opening). The overrun clutch operation will then be controlled.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329396

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-20 .)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-20 .)	OFF

On Board Diagnosis Logic

INFOID:0000000007329397

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1760 OVER CLUTCH SOLENOID” with CONSULT or 6th judgement flicker without CONSULT is detected when TCM detects an improper voltage drop when it tries to operate solenoid valve.

Possible Cause

INFOID:0000000007329398

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

DTC Confirmation Procedure

INFOID:0000000007329399

CAUTION:
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine.
4. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with “D” position (OD ON).
5. Release accelerator pedal completely with “D” position (OD OFF).
6. If the check result is NG, go to AT-147, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

WITHOUT CONSULT

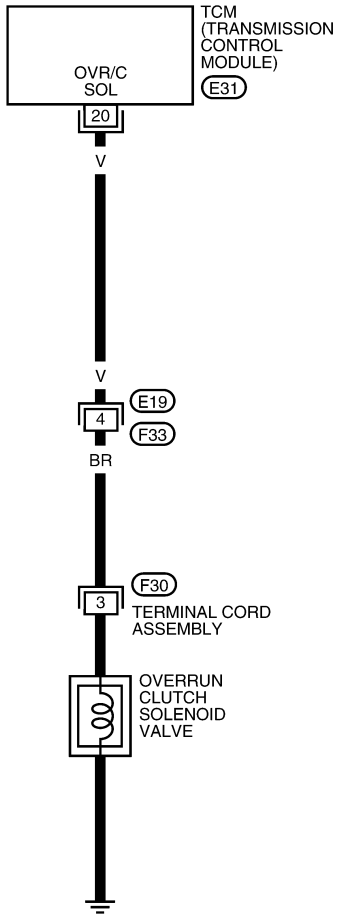
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever position: “D” position (OD ON)
   Vehicle speed: Higher than 10 km/h (6 MPH)
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-147, "Diagnosis Procedure" .

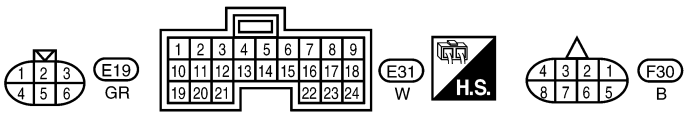
Wiring Diagram - AT - OVRCSV

INFOID:0000000007329400

AT-OVRCSV-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





BCWA0657E

TCM TERMINALS AND REFERENCE VALUES
Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329401

1.CHECK INPUT SIGNAL

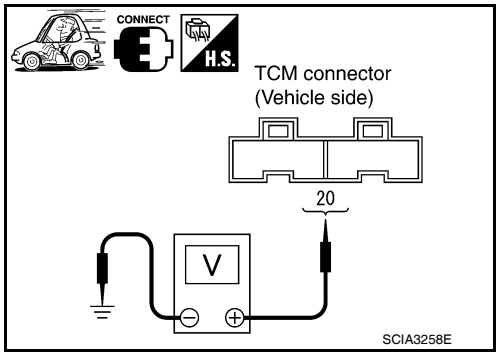
With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “OVERRUN/C S/V” while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-20 .)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-20 .)	OFF

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.



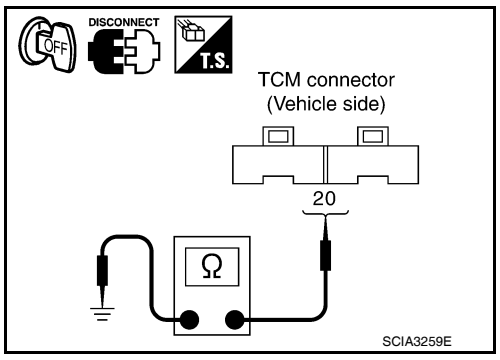
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-20 .)	Battery voltage
			When overrun clutch solenoid valve dose not operate. (When overrun clutch engaged. Refer to AT-20 .)	0 V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK OVERRUN CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	20 - 30 Ω

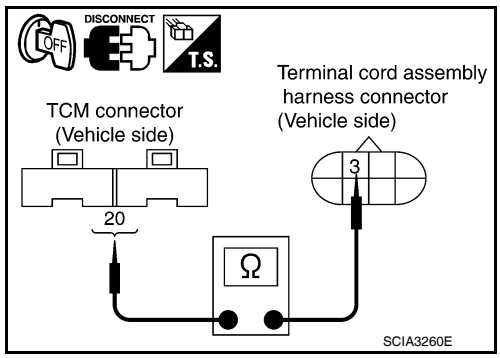
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.

3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal	Continuity
TCM	E31	20	Yes
Terminal cord assembly harness connector	F30	3	

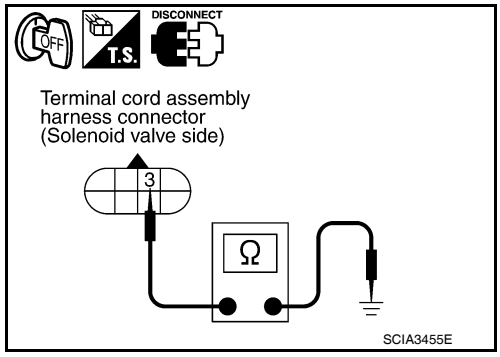
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	F30	3 - Ground	20 - 30 Ω

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-145, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value".
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329402

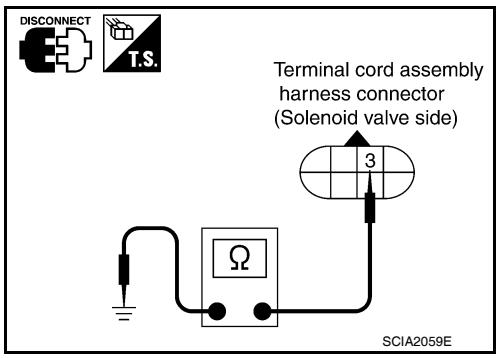
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to AT-219, "Control Valve Assembly and Accumulators".

Resistance Check

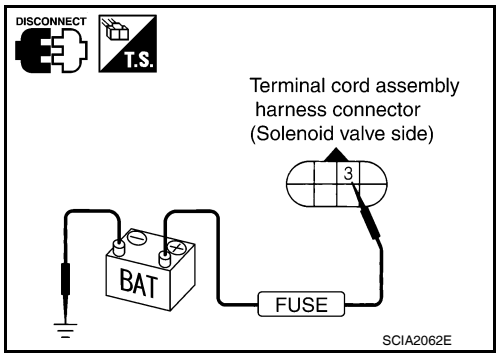
• Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	F30	3 - Ground	20 - 30 Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



VEHICLE SPEED SIGNAL

Description

INFOID:0000000007329403

The vehicle speed signal is built into the speedometer assembly. The sensor functions as an auxiliary device to the output speed sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed signal.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329404

Remarks: Specification data are reference values.

Item name	Condition	Display value
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

INFOID:0000000007329405

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “VEHECLE SPEED SIGNAL” with CONSULT or 2nd judgement flicker without CONSULT is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000007329406

- Harness or connector
  (The sensor circuit is open or shorted.)
- Vehicle speed signal

DTC Confirmation Procedure

INFOID:0000000007329407

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).
4. If the check result is NG, go to AT-152, "Diagnosis Procedure" .

WITHOUT CONSULT

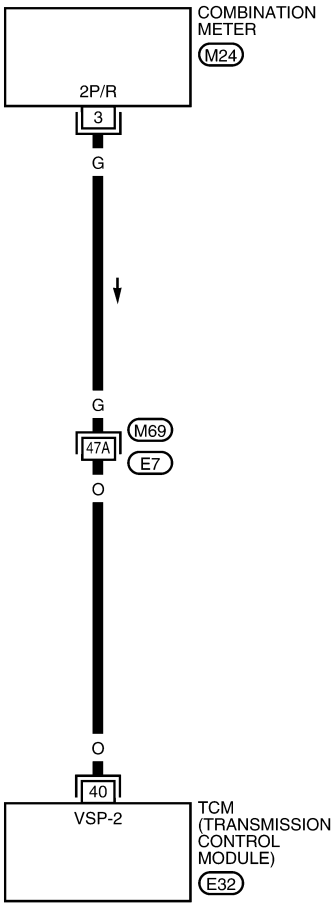
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever position: “D” position
   Vehicle speed: Higher than 25 km/h (16 MPH)
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-152, "Diagnosis Procedure" .

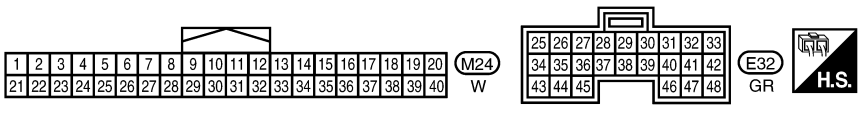
Wiring Diagram - AT - VSSMTR

INFOID:0000000007329408

AT-VSSMTR-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0658E

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329409

1.CHECK INPUT SIGNAL

With CONSULT

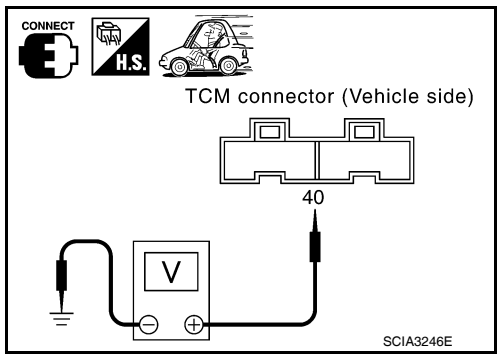
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “VHCL/S SE-MTR” while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Vehicle speed signal	E32	40 - Ground	When driving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0 V and more than 4.5 V



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meter. Refer to DI-4 .
- Harness for short or open between TCM and combination meter.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK DTC

Perform AT-150, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4.CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

BATT/FLUID TEMP SEN

Description

INFOID:0000000007329410

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329411

Remarks: Specification data are reference values.

Item name	Condition	Display value
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

On Board Diagnosis Logic

INFOID:0000000007329412

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “BATT/FLUID TEMP SEN” with CONSULT or 8th judgement flicker without CONSULT is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000007329413

- Harness or connector
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

INFOID:0000000007329414

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

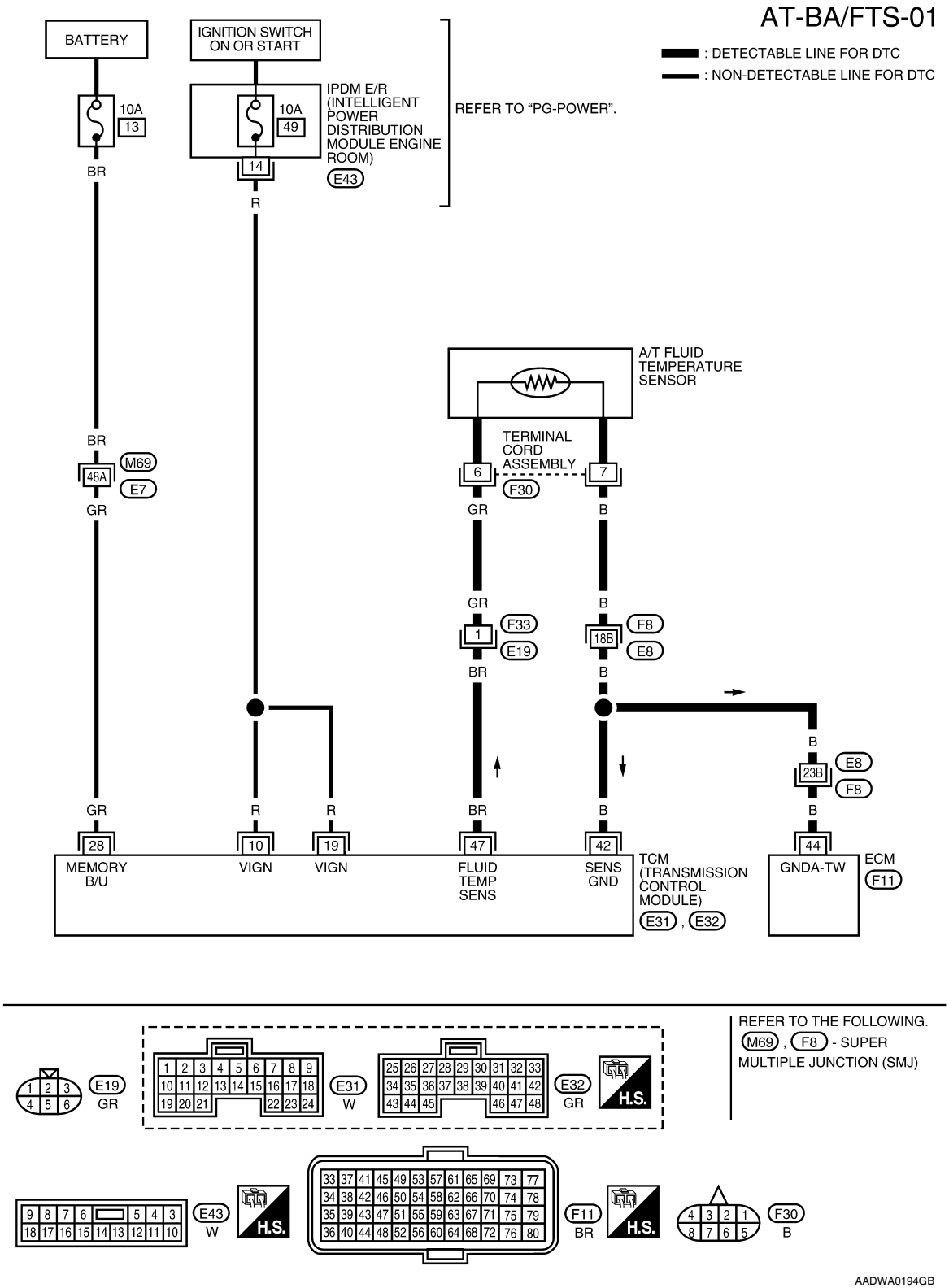
1. Start engine.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Touch “START”.
4. Drive vehicle under the following conditions.
   SLCT LVR POSI: “D” position
   VEHICLE SPEED: Higher than 20 km/h (12 MPH)
5. If the check result is NG, go to AT-155, "Diagnosis Procedure" .

WITHOUT CONSULT

1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever position: D position
   Vehicle speed: higher than 20 km/h (12 MPH)
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-155, "Diagnosis Procedure" .

Wiring Diagram - AT - BA/FTS

INFOID:0000000007329415



AADWA0194GB

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

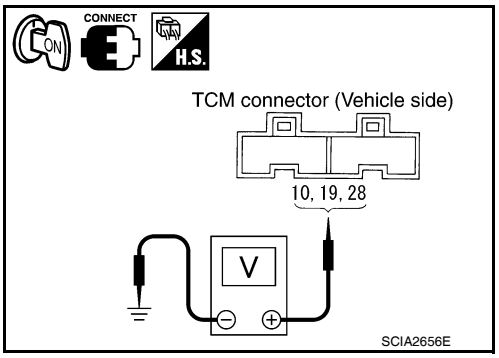
Diagnosis Procedure

INFOID:0000000007329416

1.CHECK TCM POWER SOURCE

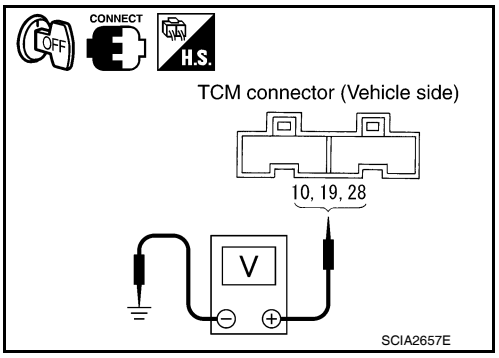
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	Battery voltage
		19	Battery voltage
Power supply (memory back-up)	E32	28	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0 V
		19	0 V
Power supply (memory back-up)	E32	28	Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19
- Harness for short or open between battery and TCM terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch. Refer to PG-4 .

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3.CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “FLUID TEMP SE”.

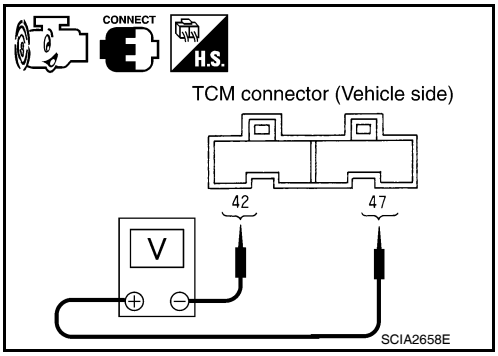
Item name	Condition	Display value
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

Without CONSULT

1. Start engine.

2. Check voltage TCM connector terminals while warming up A/T.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
A/T fluid temperature sensor	E32	47 - 42	When A/T fluid temperature is 20°C (68°F).	1.5 V
			When A/T fluid temperature is 80°C (176°F).	0.5 V



OK or NG

OK >> GO TO 9.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

Check the following items:
- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to EC-141, "Wiring Diagram".

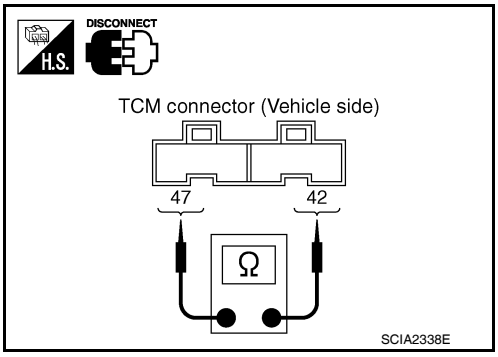
OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between terminals.

Item	Connector	Terminal	Temperature °C (°F)	Resistance (Approx.)
A/T fluid temperature sensor	E32	47 - 42	AT-352, "A/T Fluid Temperature Sensor"	



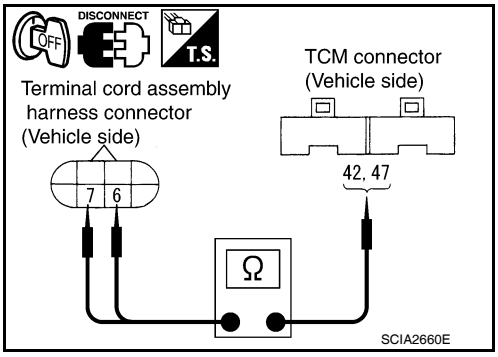
OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Terminal cord assembly harness connector	F30	7	
TCM	E32	47	Yes
Terminal cord assembly harness connector	F30	6	



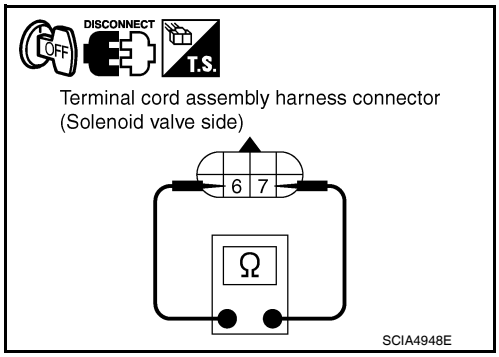
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly terminals.



Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	AT-352, "A/T Fluid Temperature Sensor"	

4. Reinstall any part removed.

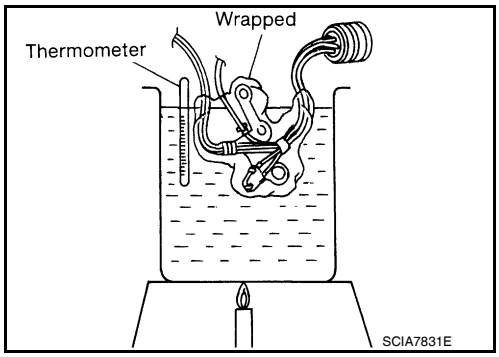
OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- A/T fluid temperature sensor
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.



Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	AT-352, "A/T Fluid Temperature Sensor"	

- Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. CHECK DTC

Perform AT-153, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

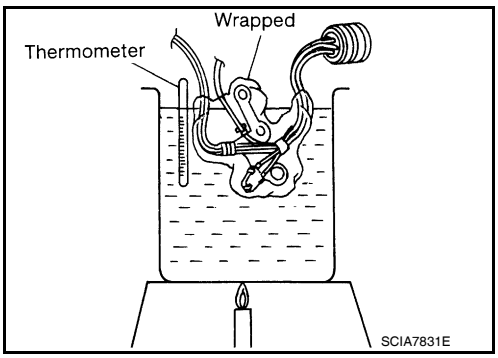
Component Inspection

INFOID:0000000007329417

A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to AT-219, "Control Valve Assembly and Accumulators" .
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	AT-352, "A/T Fluid Temperature Sensor"	



INPUT SPEED SENSOR A

Description

INFOID:0000000007329418

The input speed sensor detects forward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transaxle. The output speed sensor is located on the output side of the automatic transaxle. With the two sensors, input and output rpms are accurately detected. As a result, optimal shift timing during deceleration and shift quality can be improved.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329419

Remarks: Specification data are reference values.

Item name	Condition	Display value
INPUT SPEED	During driving (lock-up ON)	Approximately matches the engine speed.

On Board Diagnosis Logic

INFOID:0000000007329420

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “INPUT SPEED SENSOR A” with CONSULT or 10th judgement flicker without CONSULT is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000007329421

- Harness or connector
  (The sensor circuit is open or shorted.)
- Input speed sensor

DTC Confirmation Procedure

INFOID:0000000007329422

CAUTION:
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Start engine.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Touch “START”.
4. Drive vehicle under the following conditions for more than 5 seconds.
   SLCT LVR POSI: “D” position
   VEHICLE SPEED: Higher than 40 km/h (25 MPH)
   ENGINE SPEED: Higher than 1,500 rpm
   THROTTLE POSI: Greater than 1.0/8 of the full throttle position
5. If the check result is NG, go to AT-161, "Diagnosis Procedure" .

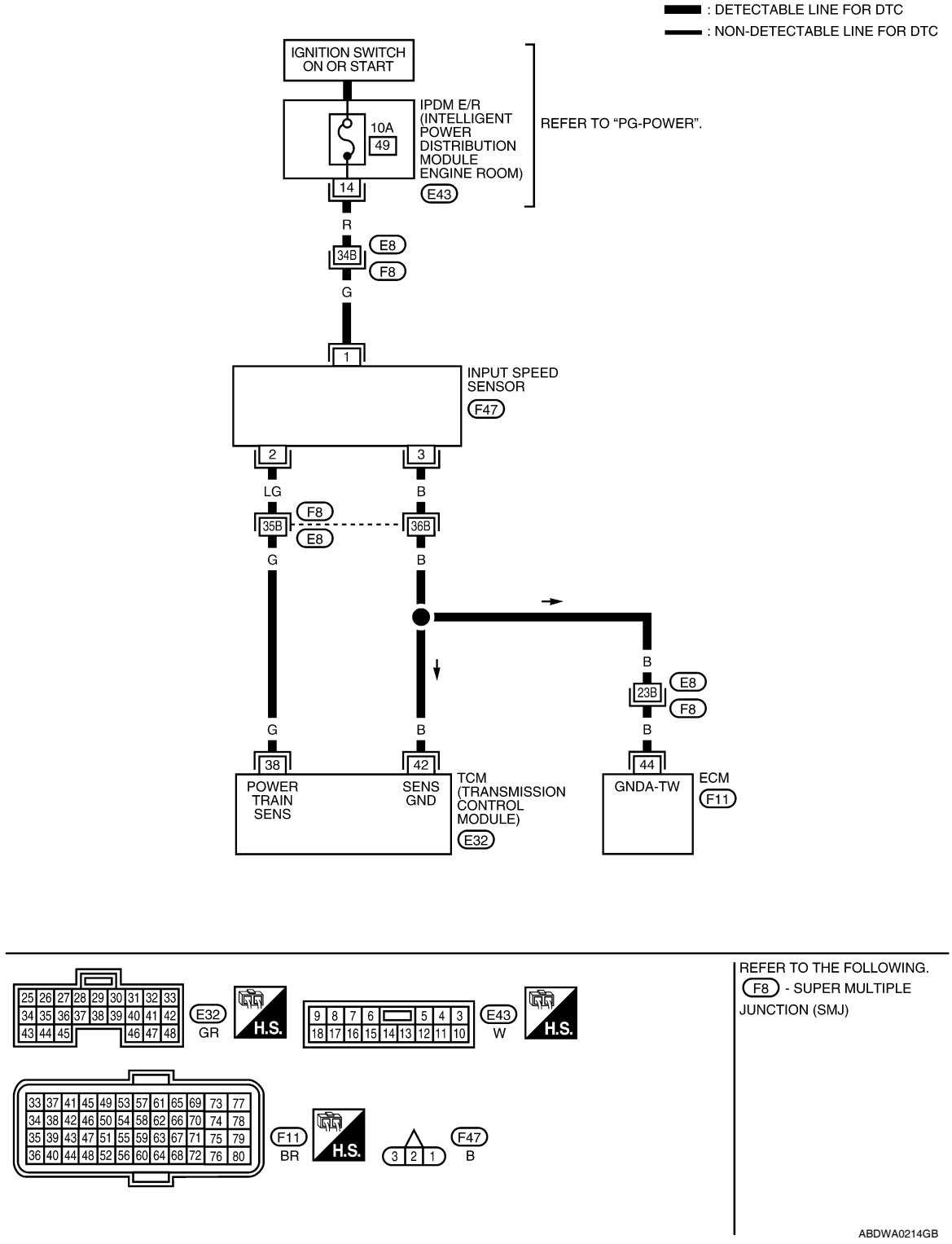
WITHOUT CONSULT

1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever position: “D” position
   Vehicle speed: Higher than 40 km/h (25 MPH)
   Engine speed: Higher than 1,500 rpm
   Throttle position: 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT" .
4. If the check result is NG, go to AT-161, "Diagnosis Procedure" .

Wiring Diagram - AT - PT/SEN

INFOID:0000000007329423

AT-PT/SEN-01



TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329424

1. CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “INPUT SPEED” while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
INPUT SPEED	During driving (lock-up ON)	Approximately matches the engine speed.

OK or NG

OK >> GO TO 8.
NG >> GO TO 2.

2. CHECK INPUT SPEED SENSOR

With CONSULT

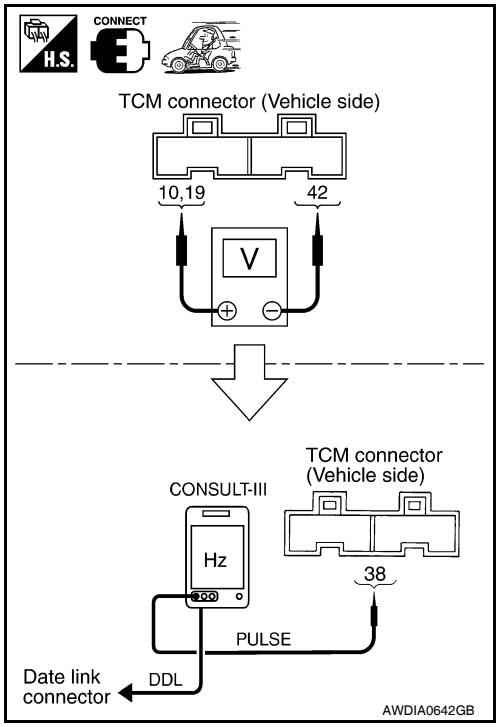
1. Start engine.
2. Check power supply to input speed sensor by voltage between TCM connector terminals. Refer to AT-165, "Wiring Diagram - AT - MAIN" and AT-160, "Wiring Diagram - AT - PT/SEN" .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM	E31, E32	10 - 42	Battery voltage
		19 - 42	

3. If OK, check the pulse when vehicle cruises.

Name	Condition
Input speed sensor	When driving at 20 km/h (12 MPH), use the CONSULT pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.

Item	Connector	Terminal	Name	Judgement standard (Approx.)
TCM	E32	38	Input speed sensor	360 Hz



OK or NG

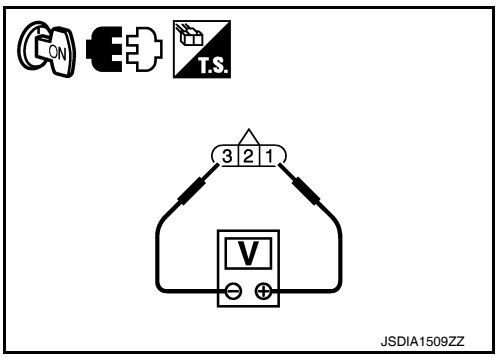
OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor harness connector.
3. Turn ignition switch ON.

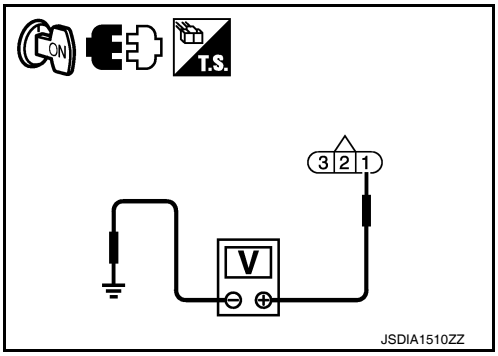
4. Check voltage between input speed sensor harness connector terminals.

Item	Connector	Terminal	Judgement standard (Approx.)
Input speed sensor	F47	1 - 3	Battery voltage



5. Check voltage between input speed sensor harness connector terminal and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Input speed sensor	F47	1 - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

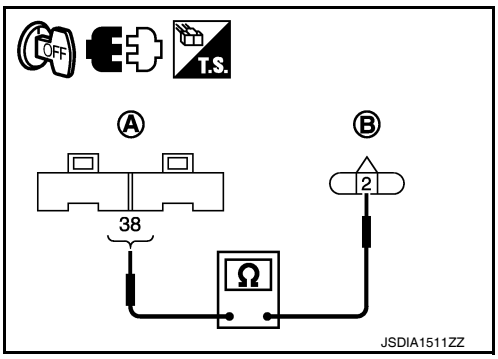
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground: GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor harness connector.
3. Check continuity between TCM connector (A) terminal and input speed sensor harness connector (B) terminal.

Item	Connector	Terminal	Continuity
TCM	E32	38	Yes
Input speed sensor	F47	2	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

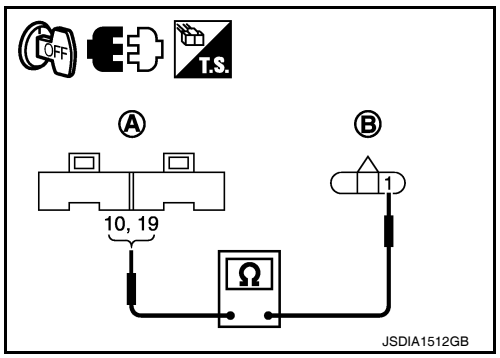
OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor harness connector.

3. Check continuity between TCM connector (A) terminals and input speed sensor harness connector (B) terminal. Refer to AT-48, "Circuit Diagram" and AT-165, "Wiring Diagram - AT - MAIN" .



Item	Connector	Terminal	Continuity
TCM	E31	10	Yes
Input speed sensor	F47	1	
TCM	E31	19	Yes
Input speed sensor	F47	1	

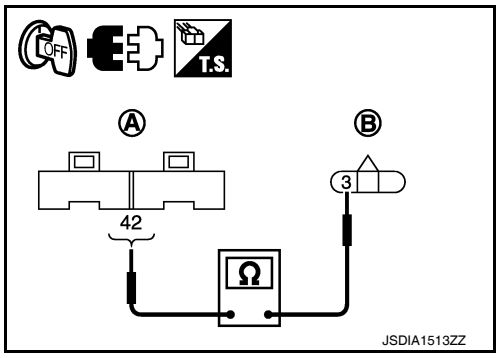
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> 10A fuse (No.49, located in the IPDM E/R) or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (GROUND)

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor harness connector.
3. Check continuity between TCM connector (A) terminal and input speed sensor harness connector (B) terminal.



Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Input speed sensor	F47	3	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform AT-159, "DTC Confirmation Procedure" .

OK or NG

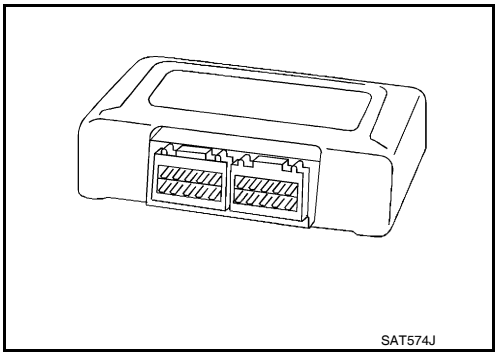
OK >> **INSPECTION END**
NG >> GO TO 5.

CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description

INFOID:0000000007329425

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



On Board Diagnosis Logic

INFOID:0000000007329426

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “CONTROL UNIT (RAM)”, “CONTROL UNIT (ROM)” with CONSULT is detected when TCM memory (RAM) or (ROM) is malfunctioning.

Possible Cause

INFOID:0000000007329427

TCM.

DTC Confirmation Procedure

INFOID:0000000007329428

CAUTION:
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT
1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Touch “START”.
3. Start engine.
4. Run engine for at least 2 seconds at idle speed.
5. If the check result is NG, go to AT-164, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329429

1.CHECK DTC

With CONSULT
1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.
2. Touch “ERASE”.
3. Perform AT-164, "DTC Confirmation Procedure".

Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

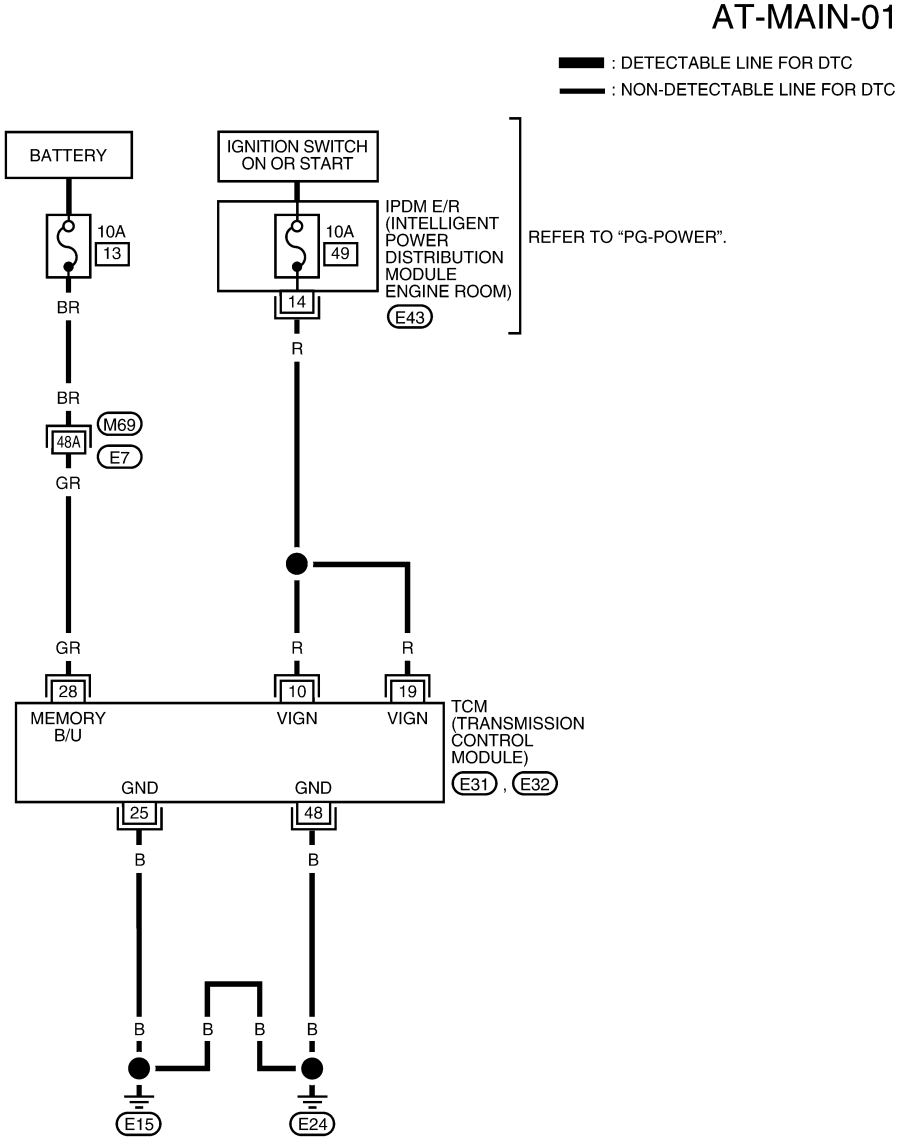
YES >> Replace TCM. Refer to AT-209, "Removal and Installation".
NO >> **INSPECTION END**

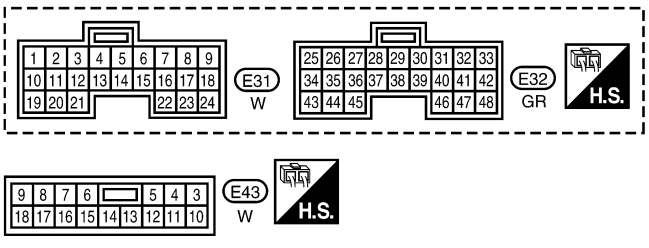
MAIN POWER SUPPLY AND GROUND CIRCUIT

Wiring Diagram - AT - MAIN

INFOID:0000000007329430

AT-MAIN-01





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

AADWA0195GB

TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value" .

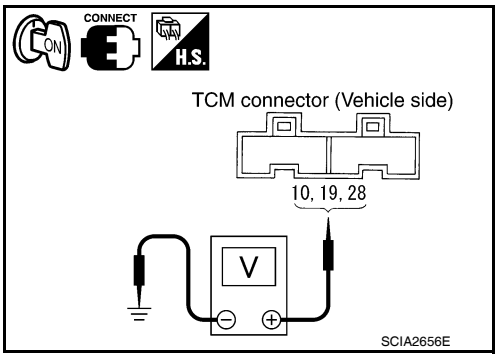
Diagnosis Procedure

INFOID:0000000007329431

1.CHECK TCM POWER SOURCE

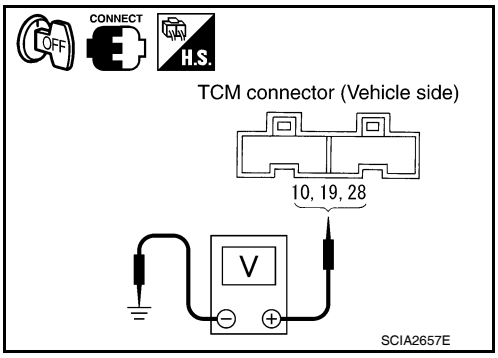
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	Battery voltage
		19	Battery voltage
Power supply (memory back-up)	E32	28	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0 V
		19	0 V
Power supply (memory back-up)	E32	28	Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2.DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19
- Harness for short or open between battery and TCM terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch. Refer to PG-4 .

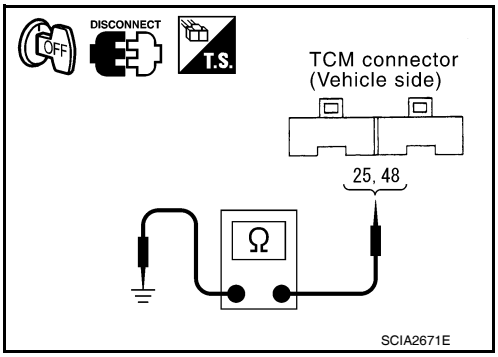
OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between TCM connector terminals and ground.

Item	Connector	Terminal	Continuity
Ground	E32	25, 48 - Ground	Yes



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK SYMPTOM

Drive for a while to check that there is no malfunction.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TR SW, OD SW AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

CONSULT Reference Value in Data Monitor Mode

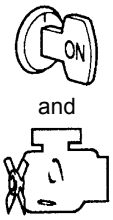
INFOID:0000000007329432

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF
OVERDRIVE SW	When overdrive control switch is depressed.	ON
	When overdrive control switch is released.	OFF
CLOSED THL/SW	Released accelerator pedal.	ON
	Depressed accelerator pedal.	OFF
W/O THRL/P-SW	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF

TCM Terminal and Reference Value

INFOID:0000000007329433

TCM terminal data are reference values, measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
26	Y	Transmission range switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0 V
27	G	Transmission range switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0 V
34	LG	Transmission range switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0 V
35	SB	Transmission range switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0 V
36	R	Transmission range switch “N” or “P” position		When setting selector lever to “N” or “P” positions.	Battery voltage
				When setting selector lever to other positions.	0 V

Diagnosis Procedure

INFOID:0000000007329434

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-84.
NO (With CONSULT) >>GO TO 2.
NO (Without CONSULT) >>GO TO 3.

2. CHECK TRANSMISSION RANGE SWITCH CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 4.
NG >> Check transmission range switch circuit. Refer to AT-87.

3. CHECK TRANSMISSION RANGE SWITCH CIRCUIT

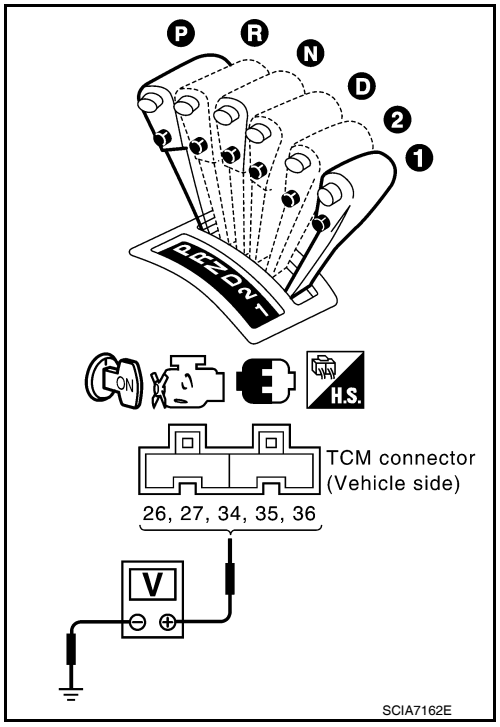
Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-88, "Wiring Diagram - AT - TR/SW".

Selector lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

B: Battery voltage

0: 0V

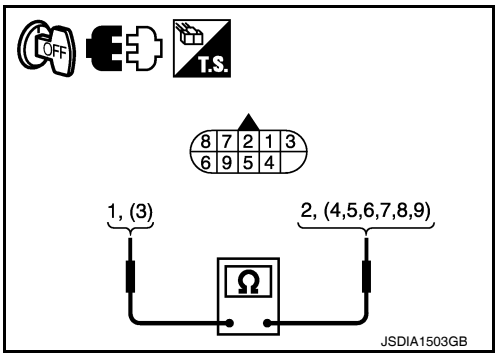


OK or NG

OK >> GO TO 4.
NG >> Check transmission range switch circuit. Refer to AT-87.

4. CHECK TRANSMISSION RANGE SWITCH

1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Check continuity between transmission range switch harness connector terminals.



Selector lever position	Connector	Terminal	Continuity
"P"	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. CHECK CONTROL CABLE ADJUSTMENT

Check transmission range switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 4.

OK or NG

OK >> Adjust control cable. Refer to AT-214, "Adjustment of A/T Position".
NG >> Check transmission range switch (Refer to test group 1) again after adjusting transmission range switch (Refer to AT-222).
- If OK, **INSPECTION END**
- If NG, repair or replace transmission range switch. Refer to AT-222, "Transmission Range Switch".

6. DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between ignition switch and transmission range switch
- Harness for short or open between transmission range switch and TCM
- Harness for short or open between transmission range switch and combination meter
- Harness for short or open between combination meter and TCM
- 10A fuse (No.51, located in the IPDM E/R)
- Combination meter. Refer to DI-4.
- Ignition switch. Refer to PG-4.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT

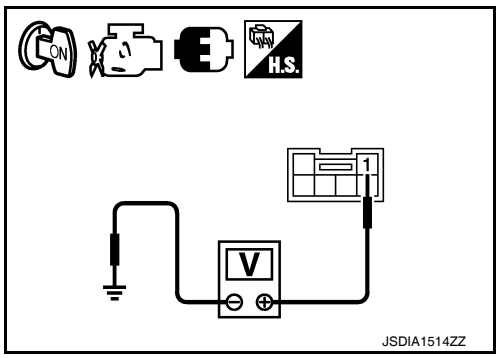
1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "TRANSMISSION" with CONSULT.
3. Read out "OVERDRIVE SW". Check the signal of overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between A/T shift selector harness connector terminal and ground. Refer to AT-174, "Wiring Diagram - AT - NON-DTC".



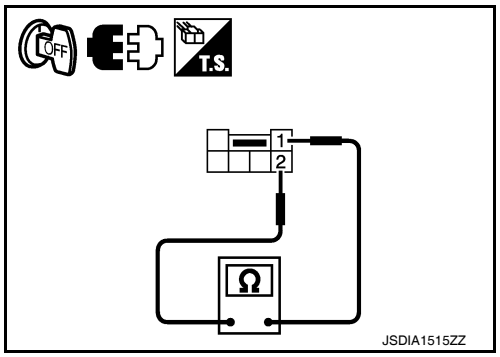
Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T shift selector harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0 V

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. CHECK OVERDRIVE CONTROL SWITCH

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector harness connector.
3. Check continuity between A/T shift selector harness connector terminals. Refer to AT-174, "Wiring Diagram - AT - NONDTC".



Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T shift selector harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between combination meter and A/T shift selector harness connector
- Harness for short or open between A/T shift selector harness connector and ground
- Combination meter. Refer to DI-4.

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for TRANSMISSION with CONSULT.
3. Read out “CLOSED THL/SW” and “W/O THRL/P-SW” depressing and releasing accelerator pedal. Check that the signals of throttle position are indicated properly.

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

OK >> GO TO 11.
NG >> Check the following. If any items are damaged, repair or replace damaged parts.
- Accelerator pedal position sensor. Refer to EC-475, "Component Description".

11. PERFORM SELF-DIAGNOSIS

Without CONSULT

Perform self-diagnosis. Refer to AT-79, "Diagnosis Procedure without CONSULT".

OK or NG

OK >> **INSPECTION END**
NG – 1 >> Self-diagnosis does not activate: GO TO 12.
NG – 2 >> DTC is displayed: Check the malfunctioning system. Refer to AT-79, "Diagnosis Procedure without CONSULT".

12. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value".
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

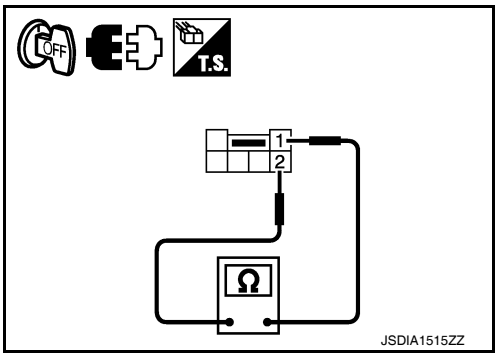
Component Inspection

INFOID:0000000007329435

OVERDRIVE CONTROL SWITCH

- Check continuity between A/T shift selector harness connector terminals.

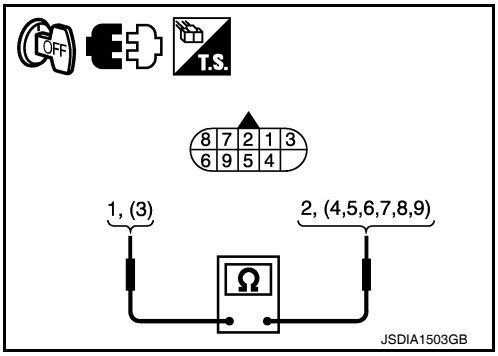
Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T shift selector harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes



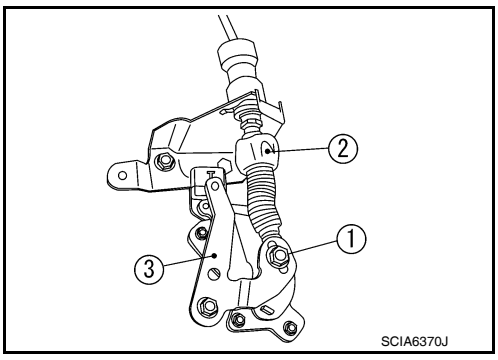
TRANSMISSION RANGE SWITCH

1. Check continuity between transmission range switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
"P"	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	



2. If NG, check again with control cable (2) disconnected from manual shaft (3) of A/T assembly. Refer to step 1.
   (1): Lock nut
3. If OK on step 2, adjust control cable (2). Refer to AT-214, "Adjustment of A/T Position".
4. If NG on step 2, remove transmission range switch from A/T assembly and check continuity of transmission range switch terminals. Refer to step 1.
5. If OK on step 4, adjust transmission range switch. Refer to AT-222, "Transmission Range Switch".
6. If NG on step 4, replace transmission range switch. Refer to AT-222, "Transmission Range Switch".



SHIFT POSITION INDICATOR CIRCUIT

Description

INFOID:0000000007329436

TCM sends the switch signals to combination meter via CAN communication line. Then selector lever position is indicated on the shift position indicator.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329437

Item name	Condition	Display value
SLCT LVR POSI	When setting selector lever to “N” or “P” positions.	N · P
	When setting selector lever to “R” position.	R
	When setting selector lever to “D” position.	D
	When setting selector lever to “2” position.	2
	When setting selector lever to “1” position.	1

Diagnosis Procedure

INFOID:0000000007329438

1.CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT and read out the value of “SLCT LVR POSI”.
3. Check that the following three positions or indicators are same.

- Actual position of the selector lever
- “SLCT LVR POSI” on CONSULT screen
- Shift position indicator in the combination meter

OK or NG

OK >> **INSPECTION END**
NG >> Check the following.

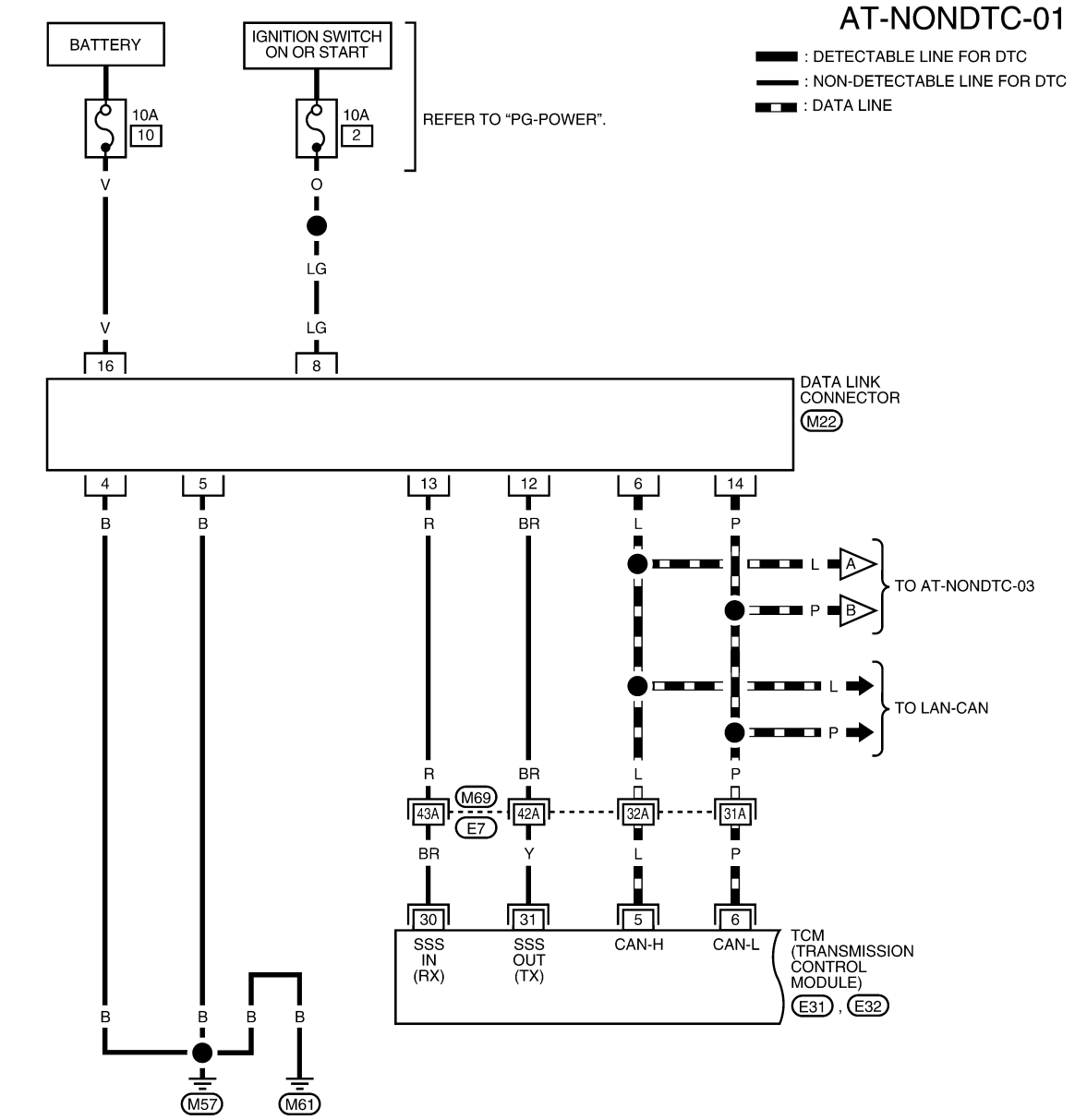
SHIFT POSITION INDICATOR SYMPTOM CHART

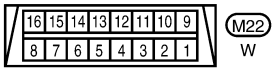
Items	Presumed location of trouble
Actual position does not change.	Transmission range switch • Refer to AT-87. A/T main system (Fail-safe function actuated) • Refer to AT-74, "CONSULT Function (TRANSMISSION)" and AT-79, "Diagnosis Procedure without CONSULT".
Shift position indicator in the combination meter does not indicate any position.	Perform the self-diagnosis for A/T and the combination meter. • Refer to AT-74, "CONSULT Function (TRANSMISSION)" and DI-4.
Actual position changes, but the shift position indicator in the combination meter does not change.	
Actual position differs from the shift position indicator in the combination meter.	
Shift position indicator in the combination meter does not indicate specific position only.	Check the combination meter. • Refer to DI-4.

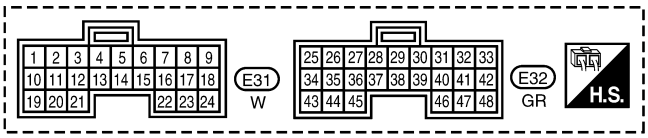
TROUBLE DIAGNOSIS FOR SYMPTOMS

Wiring Diagram - AT - NONDTC

INFOID:0000000007329439

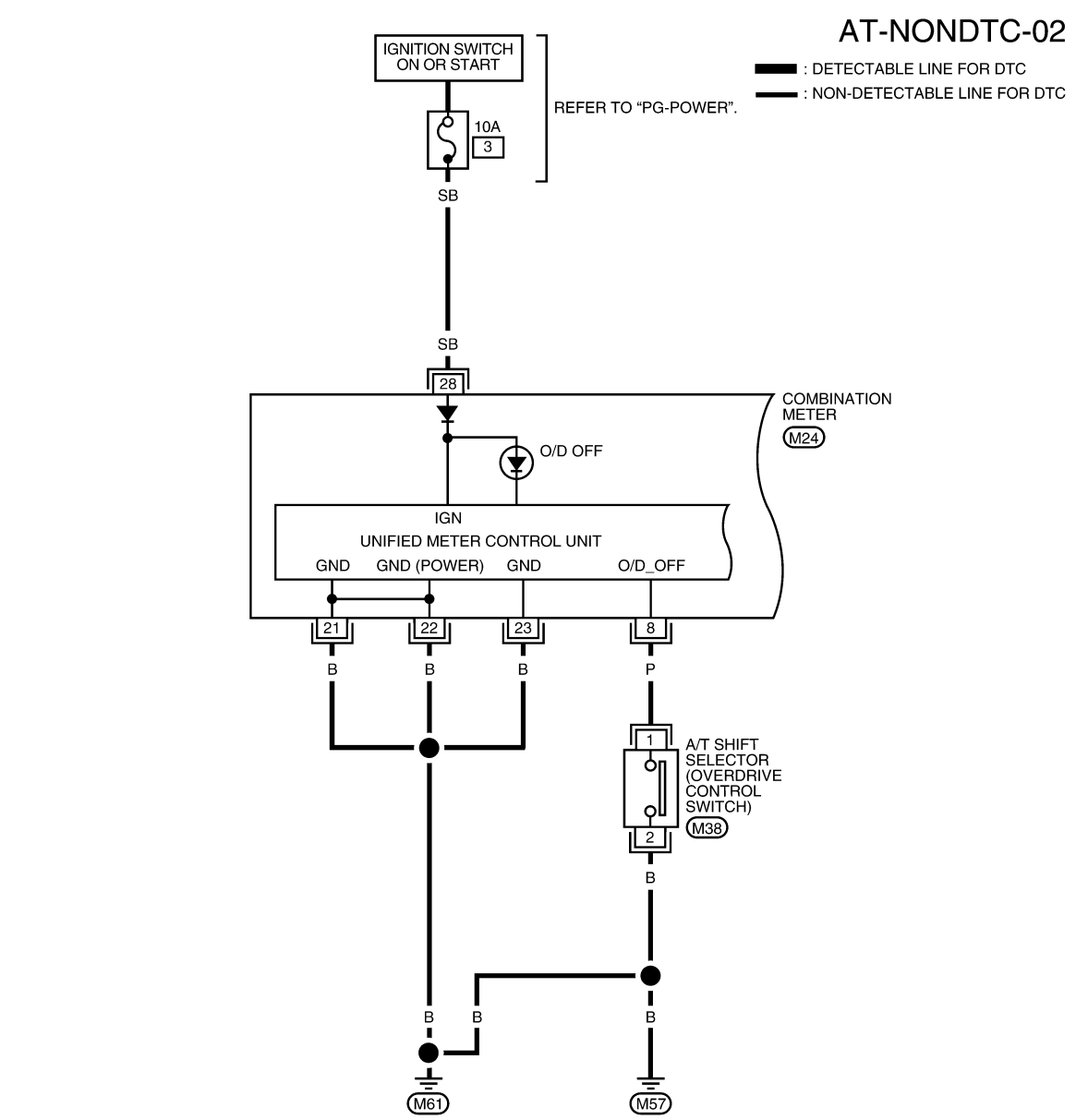






REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

AADWA0196GB



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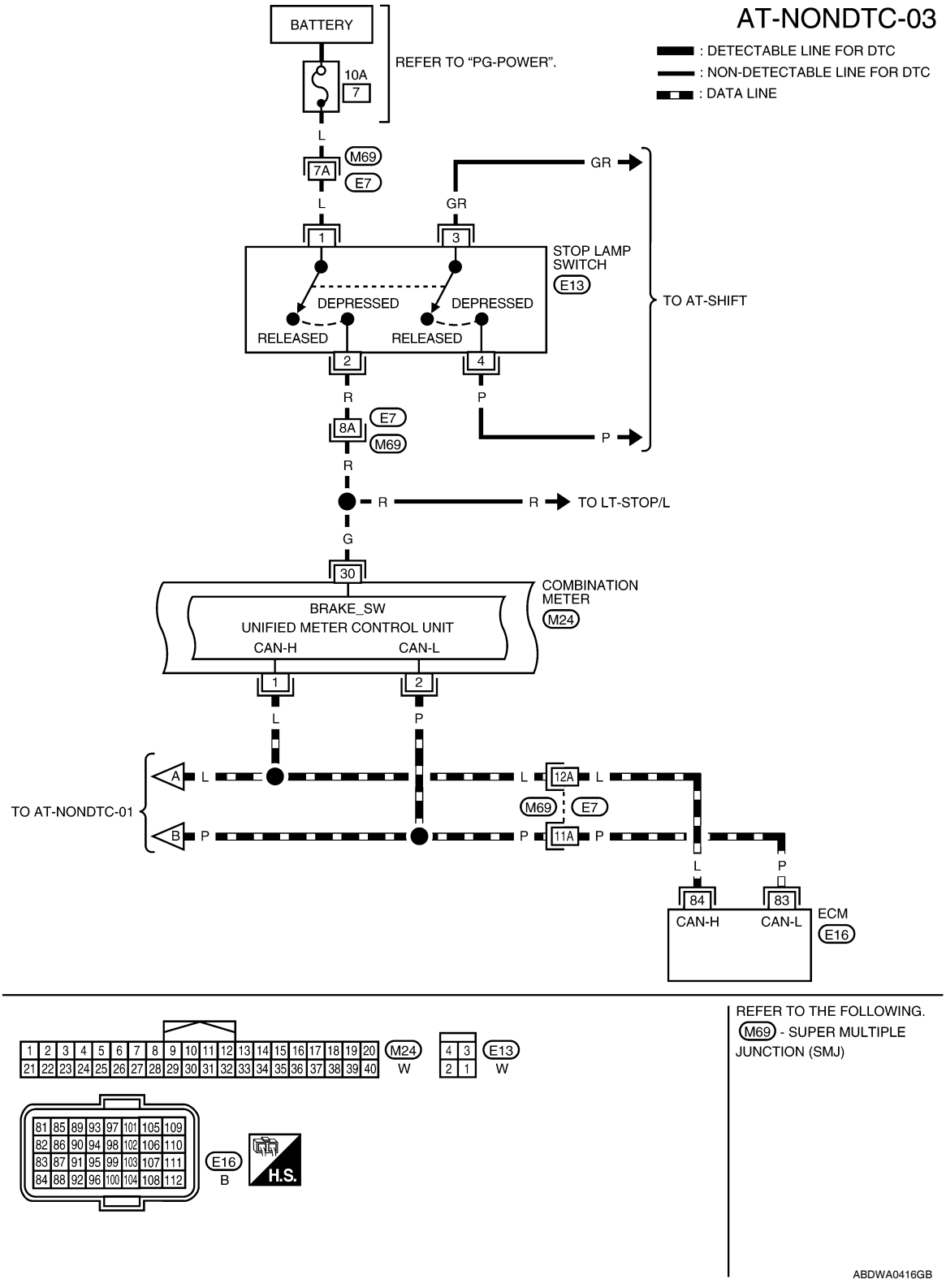
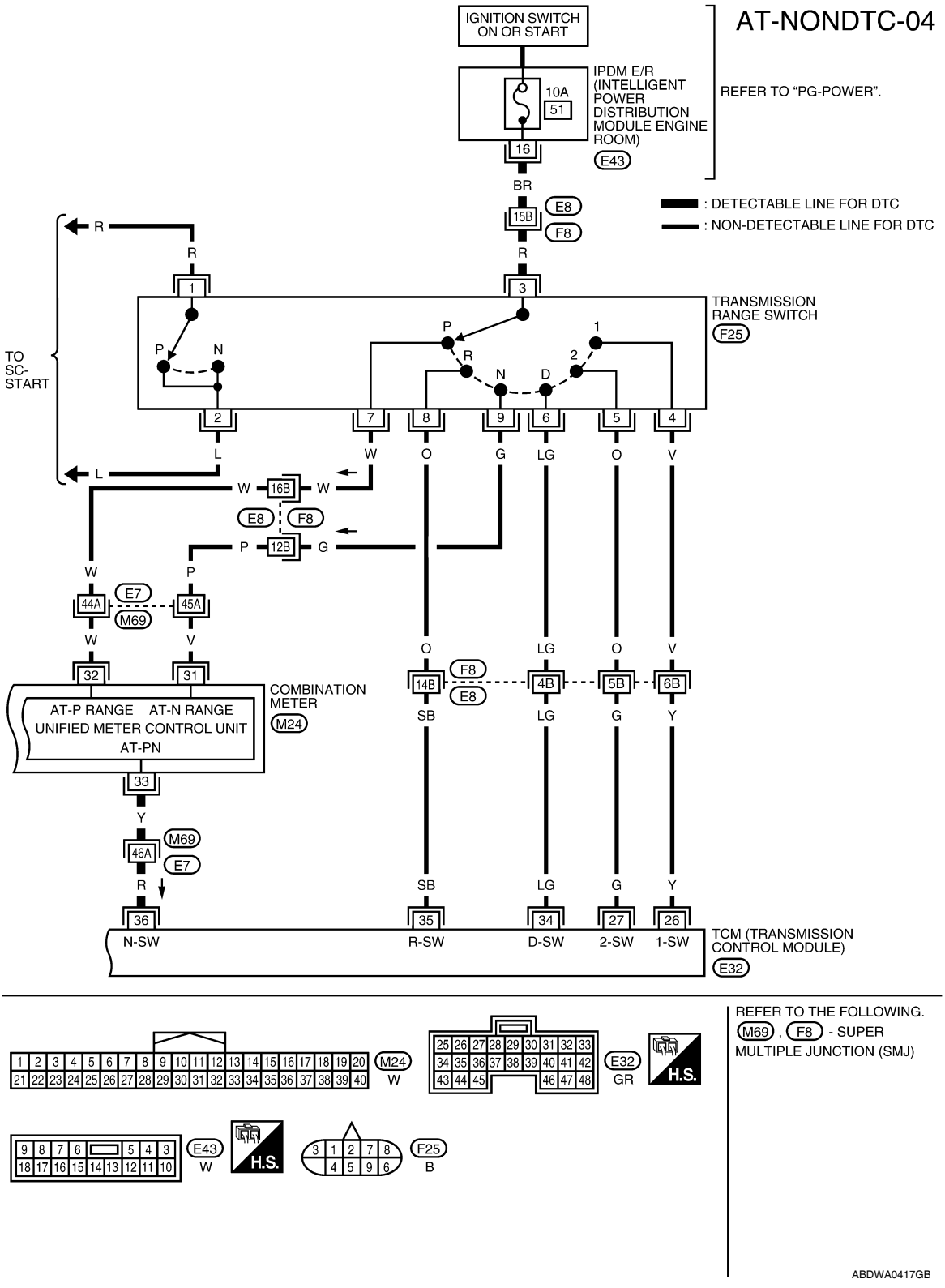

AT-NONDTC-03
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE
BATTERY
REFER TO "PG-POWER".
10A
7
L
M69
7A
E7
L
GR
GR
1
3
STOP LAMP SWITCH
E13
DEPRESSED
DEPRESSED
RELEASED
RELEASED
TO AT-SHIFT
2
4
R
P
E7
8A
M69
P
R
R
R
TO LT-STOP/L
G
30
COMBINATION METER
M24
BRAKE_SW
UNIFIED METER CONTROL UNIT
CAN-H
CAN-L
1
2
L
P
TO AT-NONDTC-01
A
B
L
P
L
P
12A
11A
M69
E7
L
P
84
83
CAN-H
CAN-L
ECM
E16
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
M24
W
4 3
2 1
E13
W
81 85 89 93 97 101 105 109
82 86 90 94 98 102 106 110
83 87 91 95 99 103 107 111
84 88 92 96 100 104 108 112
E16
B
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABDWA0416GB



TCM TERMINALS AND REFERENCE VALUES

Refer to AT-72, "TCM Terminal and Reference Value" .

OD OFF Indicator Lamp Does Not Come On

INFOID:0000000007329440

SYMPTOM:

OD OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

DIAGNOSTIC PROCEDURE

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" .

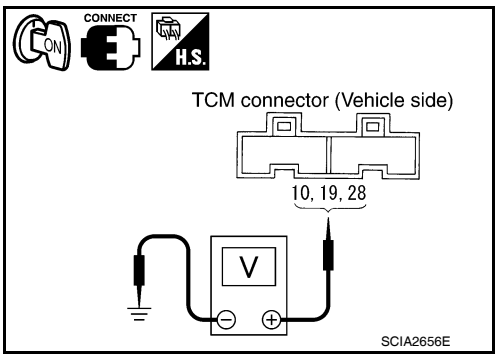
Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-84 .
NO >> GO TO 2.

2.CHECK TCM POWER SOURCE

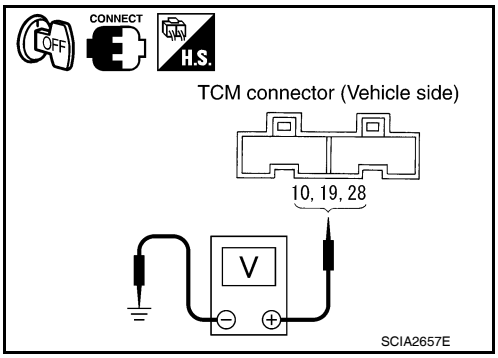
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground. Refer to AT-165, "Wiring Diagram - AT - MAIN" .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10 - Ground	Battery voltage
		19 - Ground	
	E32	28 - Ground	



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10 - Ground	0V
		19 - Ground	0V
	E32	28 - Ground	Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and TCM connector terminals 10, 19. Refer to AT-165, "Wiring Diagram - AT - MAIN" .
- Harness for short or open between battery and TCM connector terminal 28. Refer to AT-165, "Wiring Diagram - AT - MAIN" .
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R). Refer to AT-165, "Wiring Diagram - AT - MAIN" .
- Ignition switch. Refer to PG-4 .

OK or NG

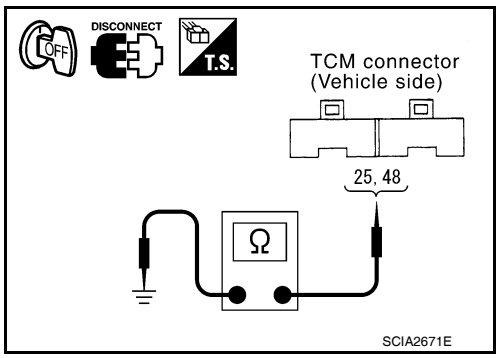
OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.

3. Check continuity between TCM connector terminals and ground. Refer to AT-165, "Wiring Diagram - AT - MAIN" .

Item	Connector	Terminal	Continuity
TCM connector	E32	25, 48 - Ground	Yes



OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between ignition switch and combination meter
- Combination meter. Refer to DI-4 .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-54, "Check Before Engine Is Started" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Engine Cannot Be Started in "P" and "N" Position

INFOID:0000000007329441

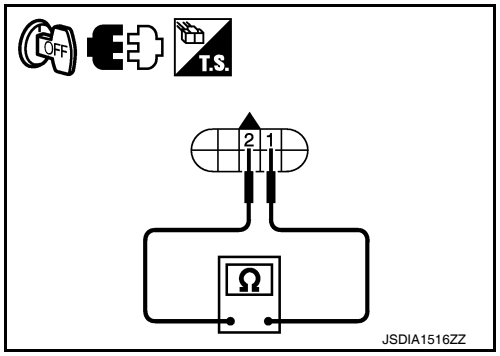
SYMPTOM:
- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”, “2”, “1” or “R” position.**

DIAGNOSTIC PROCEDURE

1. CHECK TRANSMISSION RANGE SWITCH

Check continuity between transmission range switch harness connector terminals. Refer to AT-88, "Wiring Diagram - AT - TR/SW" .

Selector lever position	Connector	terminal	Continuity
“P”, “N”	F25	1 - 2	Yes
Other positions			No



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK TRANSMISSION RANGE SWITCH

Check transmission range switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.

OK or NG

OK >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

NG >> 1. Check transmission range switch (Refer to test group 1.) again after adjusting transmission range switch (Refer to AT-222).
- If OK, **INSPECTION END**
- If NG, repair or replace transmission range switch. Refer to AT-222, "Transmission Range Switch" .

3.CHECK STARTING SYSTEM

Check starting system. Refer to SC-9 .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

In "P" Position, Vehicle Moves Forward or Backward When Pushed

INFOID:0000000007329442

SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

DIAGNOSTIC PROCEDURE

1.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

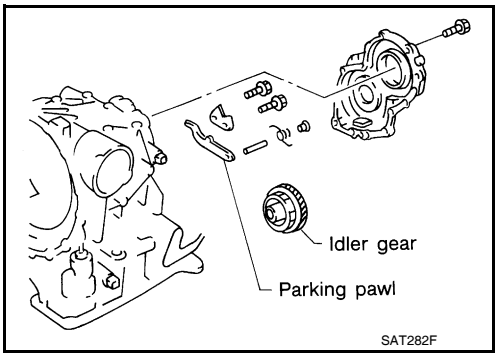
OK >> GO TO 2.
NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

2.CHECK PARKING COMPONENTS

Check parking components. Refer to AT-234, "Component" and AT-244 .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.



In "N" Position, Vehicle Moves

INFOID:0000000007329443

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

DIAGNOSTIC PROCEDURE

1.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 2.
NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

2.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

3.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .

2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-244, "Disassembly" .
2. Check the following items:

- Forward clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Reverse clutch assembly. Refer to AT-283, "Reverse Clutch" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again. Refer to AT-54, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Large Shock "N" → "R" Position

INFOID:0000000007329444

SYMPTOM:

There is a large shock when changing from “N” to “R” position.

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 2.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to AT-54, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Backward in "R" Position

INFOID:0000000007329445

SYMPTOM:

Vehicle does not creep backward when selecting “R” position.

DIAGNOSTIC PROCEDURE

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.

2.CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “R” position. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following item:

- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK STALL REVOLUTION

Check stall revolution with selector lever in “1” and “R” positions. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
OK in “1” position, NG in “R” position>>GO TO 5.
NG in both “1” and “R” positions>>GO TO 7.

5.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-244, "Disassembly" .
2. Check the following items:
- Low & reverse brake assembly. Refer to AT-299, "Low & Reverse Brake" .
- Reverse clutch assembly. Refer to AT-283, "Reverse Clutch" .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-244, "Disassembly" .
2. Check the following items:
- Reverse clutch assembly. Refer to AT-283, "Reverse Clutch" .
- High clutch assembly. Refer to AT-288, "High Clutch" .
- Low & reverse brake assembly. Refer to AT-299, "Low & Reverse Brake" .
- Forward clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8.CHECK SYMPTOM

Check again. Refer to AT-54, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Forward in "D", "2" or "1" Position

INFOID:0000000007329446

SYMPTOM:

Vehicle does not creep forward when selecting “D”, “2” or “1” position.

DIAGNOSTIC PROCEDURE

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.

2.CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following item:
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK STALL REVOLUTION

Check stall revolution with selector lever in “D” position. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-244, "Disassembly" .
2. Check the following items:
- Oil pump assembly. Refer to AT-264, "Oil Pump" .
- Forward clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Forward one-way clutch. Refer to AT-303, "Rear Internal Gear and Forward Clutch Hub" .
- Low one-way clutch. Refer to AT-244, "Disassembly" .
- Torque converter. Refer to AT-244, "Disassembly" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7. CHECK SYMPTOM

Check again. Refer to AT-54, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Cannot Be Started from D1

INFOID:0000000007329447

SYMPTOM:

Vehicle cannot be started from D1 on “Cruise Test — Part 1”.

DIAGNOSTIC PROCEDURE

1.CHECK SYMPTOM

Check symptom. Refer to AT-54, "Check at Idle" .

Is “Vehicle Dose Not Creep Backward in “R” Position” OK?

OK >> GO TO 2.
NG >> Go to AT-182, "Vehicle Does Not Creep Backward in "R" Position" .

2.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 3.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position sensor.

4.CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Forward clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Low one-way clutch. Refer to AT-244, "Disassembly" .
- Forward one-way clutch. Refer to AT-303, "Rear Internal Gear and Forward Clutch Hub" .
- High clutch assembly. Refer to AT-288, "High Clutch" .
- Torque converter. Refer to AT-244, "Disassembly" .
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damage parts.

8.CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

INFOID:0000000007329448

SYMPTOM:

- **A/T does not shift from D_1 to D_2 at the specified speed on "Cruise Test — Part 1".**
- **A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed on "Cruise Test — Part 2".**

DIAGNOSTIC PROCEDURE

1.CHECK SYMPTOM

Check symptom . Refer to AT-54, "Check at Idle" and AT-56, "Cruise Test - Part 1" .

Are "Vehicle Dose Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D_1" OK?

YES >> GO TO 2.
NO >> Go to AT-183, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and AT-184, "Vehicle Cannot Be Started from D_1" .

2.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

3.CHECK OUTPUT SPEED SENSOR AND VEHICLE SPEED SIGNAL CIRCUIT

Check output speed sensor and vehicle speed signal circuit. Refer to AT-97 and AT-150 .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace output speed sensor and vehicle speed signal circuits.

4.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position sensor.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" and AT-59, "Cruise Test - Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_2 \rightarrow D_3$

INFOID:0000000007329449

SYMPTOM:

A/T does not shift from D_2 to D_3 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.

DIAGNOSTIC PROCEDURE

1.CHECK SYMPTOM

Check symptom. Refer to AT-54, "Check at Idle" and AT-56, "Cruise Test - Part 1" .

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D_1” OK?

YES >> GO TO 2.
NO >> Go to AT-183, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and AT-184, "Vehicle Cannot Be Started from D_1" .

2.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

3.CHECK OUTPUT SPEED SENSOR AND VEHICLE SPEED SIGNAL CIRCUIT

Check output speed sensor and vehicle speed signal circuit. Refer to AT-97 and AT-150 .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace output speed sensor and vehicle speed signal circuits.

4.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position sensor.

5.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- High clutch assembly. Refer to AT-288, "High Clutch" .
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" and AT-59, "Cruise Test - Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signal. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D3→ D4

INFOID:0000000007329450

SYMPTOM:

- **A/T does not shift from D3 to D4 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.**
- **A/T must be warm before D3 to D4 shift will occur.**

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom. Refer to AT-54, "Check at Idle" and AT-56, "Cruise Test - Part 1" .

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D1” OK?

YES >> GO TO 2.
NO >> Go to AT-183, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and AT-184, "Vehicle Cannot Be Started from D1" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position sensor.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A

- Overrun clutch solenoid valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Brake band
- Torque converter. Refer to AT-244, "Disassembly" .
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7.CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" and AT-59, "Cruise Test - Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Perform Lock-up

INFOID:0000000007329451

SYMPTOM:

A/T does not perform lock-up at the specified speed on “Cruise Test — Part 1”.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 2.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position sensor.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Torque converter relief valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Torque converter. Refer to AT-244, "Disassembly" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Hold Lock-up Condition

INFOID:0000000007329452

SYMPTOM:

A/T does not hold lock-up condition for more than 30 seconds on “Cruise Test — Part 1”.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 2.

2.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-244, "Disassembly" .

4. Check the following items:
- Torque converter. Refer to AT-244, "Disassembly" .
- Oil pump assembly. Refer to AT-264, "Oil Pump" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:
- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Lock-up Is Not Released

INFOID:0000000007329453

SYMPTOM:

Lock-up is not released when accelerator pedal is released on “Cruise Test — Part 1”.

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .
NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Engine Speed Does Not Return to Idle (Light Braking D4→ D3)

INFOID:0000000007329454

SYMPTOM:

Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

NO >> GO TO 2.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position sensor.

3.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

- Overrun clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

5.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

6.CHECK SYMPTOM

Check again. Refer to AT-56, "Cruise Test - Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D4→ D3, When OD OFF

INFOID:0000000007329455

SYMPTOM:

A/T does not shift from D4 to D3 when OD OFF (OD OFF indicator lamp is on) on “Cruise Test — Part 3”.

DIAGNOSTIC PROCEDURE

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-84 .
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT

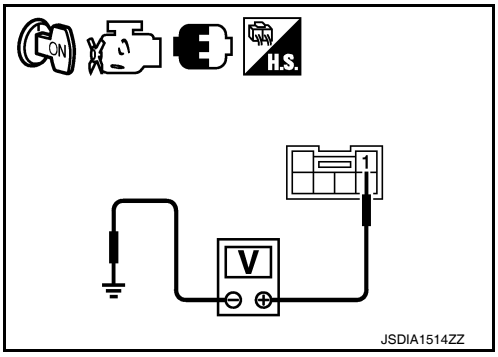
1. Turn ignition switch ON. (Do not start engine)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out “OVERDRIVE SW”.
   Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T shift selector harness connector terminal and ground. Refer toAT-174, "Wiring Diagram - AT - NON-DTC" .

Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T shift selector harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



OK or NG

OK >> Go to AT-187, "A/T Does Not Shift: D2→ D3" .
NG >> Check overdrive control switch. Refer to AT-172, "Component Inspection" .

A/T Does Not Shift: D3→ 22, When Selector Lever "D" → "2" Position

INFOID:0000000007329456

SYMPTOM:

A/T does not shift from D_3 to 2_2 when changing selector lever from "D" to "2" position on "Cruise Test — Part 3".

DIAGNOSTIC PROCEDURE

1.CHECK SYMPTOM

Check symptom. Refer to AT-56, "Cruise Test - Part 1" or AT-59, "Cruise Test - Part 2" .

Is "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" OK?

YES (With CONSULT) >>GO TO 2.
YES (Without CONSULT) >>GO TO 3.
NO >> Go to AT-186, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .

2.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "TRANSMISSION" with CONSULT.
3. Read out "P·N", "R", "D", "2" and "1" position switches moving selector lever to each position.

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> **INSPECTION END**
NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

3.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

Without CONSULT

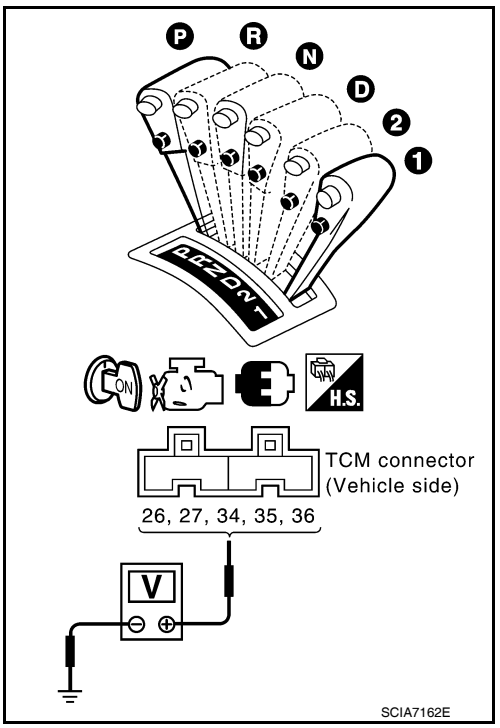
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-88, "Wiring Diagram - AT - TR/SW" .

Selector lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

B: Battery voltage

0: 0V



OK or NG

OK >> **INSPECTION END**

NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

A/T Does Not Shift: 2$_2$→ 1$_1$, When Selector Lever "2" → "1" Position

INFOID:0000000007329457

SYMPTOM:

A/T does not shift from 2$_2$ to 1$_1$ when changing selector lever from “2” to “1” position on “Cruise Test — Part 3”.

DIAGNOSTIC PROCEDURE

1.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 3
NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

2.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

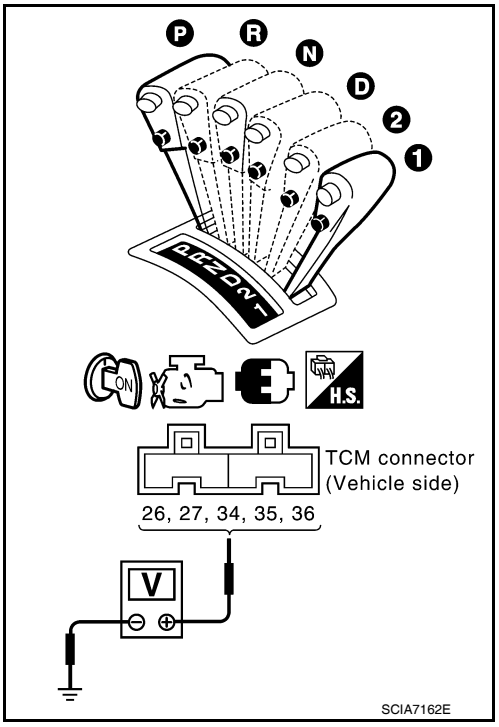
Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-88, "Wiring Diagram - AT - TR/SW" .

Selector lever position	Terminal				
	36	35	34	27	26
"P", "N"	B	0	0	0	0
"R"	0	B	0	0	0
"D"	0	0	B	0	0
"2"	0	0	0	B	0
"1"	0	0	0	0	B

B: Battery voltage

0: 0V



OK or NG

OK >> GO TO 3
NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

3.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 4.
NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

4.CHECK OUTPUT SPEED SENSOR AND VEHICLE SPEED SIGNAL CIRCUIT

Check output speed sensor and vehicle speed signal circuit. Refer to AT-97 and/or AT-150 .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace output speed sensor and/or vehicle speed signal circuits.

5.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift solenoid valve A

- Overrun clutch control valve
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following items:

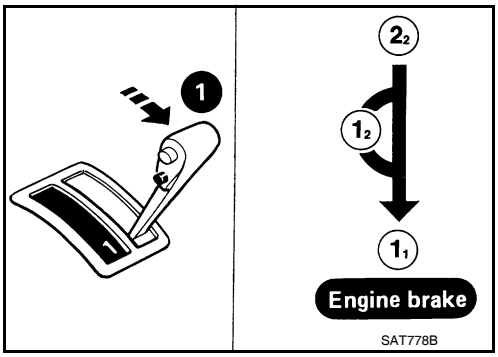
- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7.CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test - Part 3" .



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8.CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Decelerate by Engine Brake

INFOID:0000000007329458

SYMPTOM:

- **Vehicle does not decelerate by engine brake when shifting from 2₂ (1₂) to 1₁"Cruise Test — Part 3".**
- **Vehicle does not decelerate by engine brake when OD OFF (OD OFF indicator lamp is on) on "Cruise Test — Part 3".**
- **Vehicle does not decelerate by engine brake when shifting A/T from "D" to "2" position on "Cruise Test — Part 3".**

DIAGNOSTIC PROCEDURE

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to AT-74, "CONSULT Function (TRANSMISSION)" or AT-79, "Diagnosis Procedure without CONSULT" .

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-84 .
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

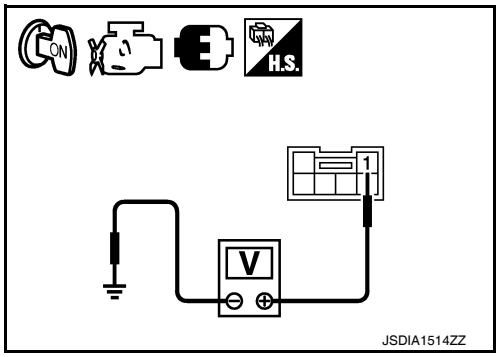
With CONSULT

1. Turn ignition switch ON. (Do not start engine)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "TRANSMISSION" with CONSULT.
3. Read out "OVERDRIVE SW".
   Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T shift selector harness connector terminal and ground. Refer to AT-174, "Wiring Diagram - AT - NON-DTC" .



Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T shift selector harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V

OK or NG

OK (With CONSULT)>>GO TO 3.
OK (Without CONSULT)>>GO TO 4.
NG >> Check overdrive control switch. Refer to AT-172, "Component Inspection" .

3.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 5
NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

4.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

Without CONSULT

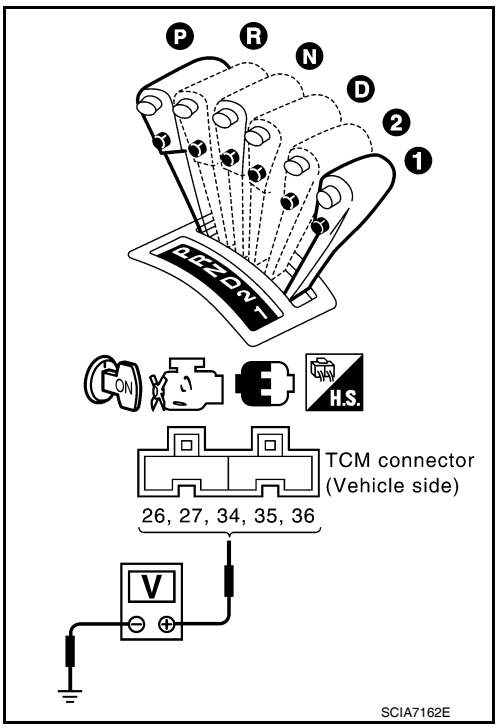
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-88, "Wiring Diagram - AT - TR/SW" .

Selector lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

B: Battery voltage

0: 0V



OK or NG

OK >> GO TO 5

NG >> Check transmission range switch. Refer to AT-172, "Component Inspection" .

5.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 6.

NG >> Adjust A/T position. Refer to AT-214, "Adjustment of A/T Position" .

6.CHECK OUTPUT SPEED SENSOR AND VEHICLE SPEED SIGNAL CIRCUIT

Check output speed sensor and vehicle speed signal circuit. Refer to AT-97 and/or AT-150 .

OK or NG

OK >> GO TO 7.

NG >> Repair or replace output speed sensor and/or vehicle speed signal circuits.

7.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-475, "Component Description".

OK or NG

OK >> GO TO 8.

NG >> Repair or replace accelerator pedal position sensor.

8.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-234, "Component" .
2. Check A/T fluid condition. Refer to AT-49, "Inspections Before Trouble Diagnosis" .

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-219, "Control Valve Assembly and Accumulators" .
2. Check the following.

- Shift valve A
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to AT-244, "Disassembly" .
4. Check the following.

- Overrun clutch assembly. Refer to AT-292, "Forward and Overrun Clutches" .
- Low & reverse brake assembly. Refer to AT-299, "Low & Reverse Brake" .

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test - Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK TCM

1. Check TCM input/output signals. Refer to AT-72, "TCM Terminal and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TCM Self-Diagnosis Does Not Activate

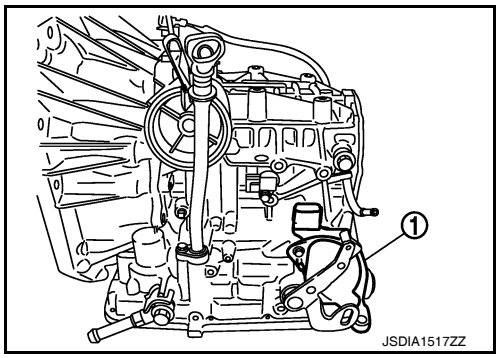
INFOID:0000000007329459

SYMPTOM:

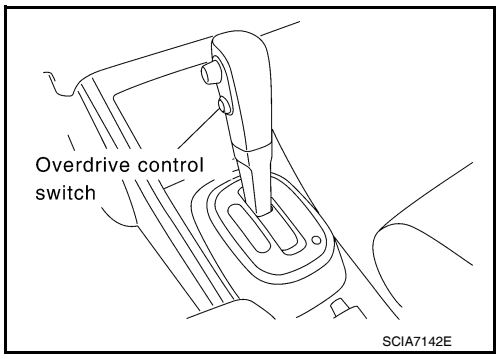
OD OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

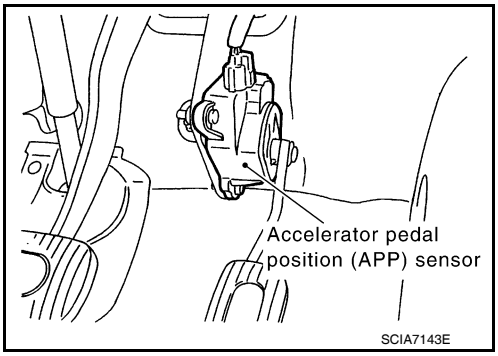
- Transmission range switch (1)
  Transmission range switch assembly includes a transaxle position switch. The transaxle position switch detects the selector lever position and sends a signal to the TCM.



- Overdrive control switch
  Overdrive control switch detects the switch position (ON or OFF) and sends the signal via CAN communication to the TCM.



- Closed throttle position signal and wide open throttle position signal
  ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to the TCM.



DIAGNOSTIC PROCEDURE

NOTE:

The diagnostic procedure includes inspection for the transmission range stitch, overdrive control switch, closed throttle position signal and wide open throttle position signal circuit. Refer to AT-168 .

A/T SHIFT LOCK SYSTEM

Description

INFOID:0000000007329460

WITH INTELLIGENT KEY

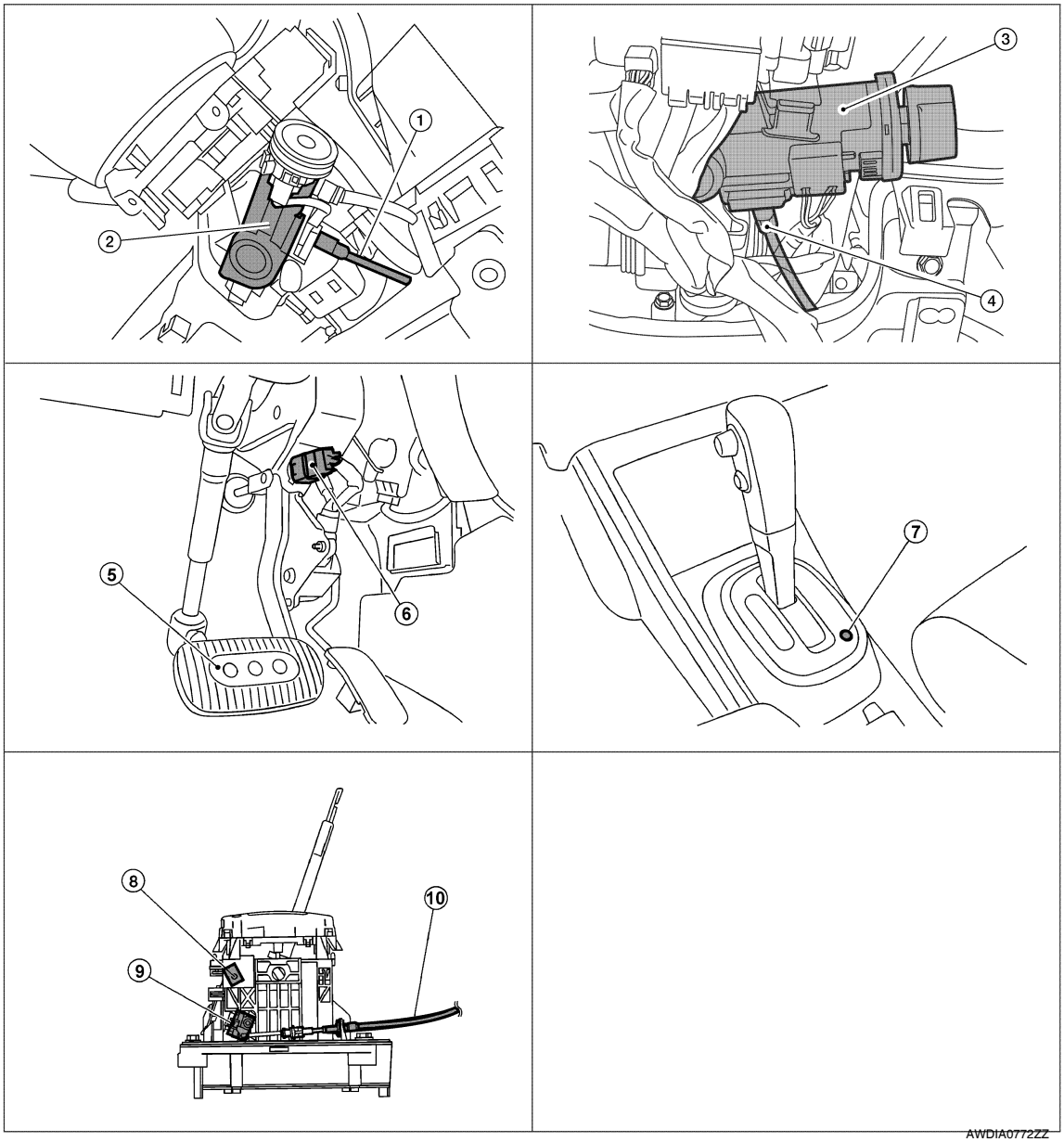
- The mechanical key interlock mechanism also operates as a shift lock:
  With the ignition knob switch turned to ON, selector lever cannot be shifted from “P” position to any other position unless brake pedal is depressed.
  With the ignition knob switch turned to OFF, selector lever cannot be shifted from “P” position to any other position.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the ignition knob switch, respectively.

WITHOUT INTELLIGENT KEY

- The mechanical key interlock mechanism also operates as a shift lock:
  With the ignition switch turned to ON, selector lever cannot be shifted from “P” position to any other position unless brake pedal is depressed.
  With the key removed, selector lever cannot be shifted from “P” position to any other position.
  The key cannot be removed unless selector lever is placed in “P” position.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside key cylinder, respectively.

Shift Lock System Parts Location

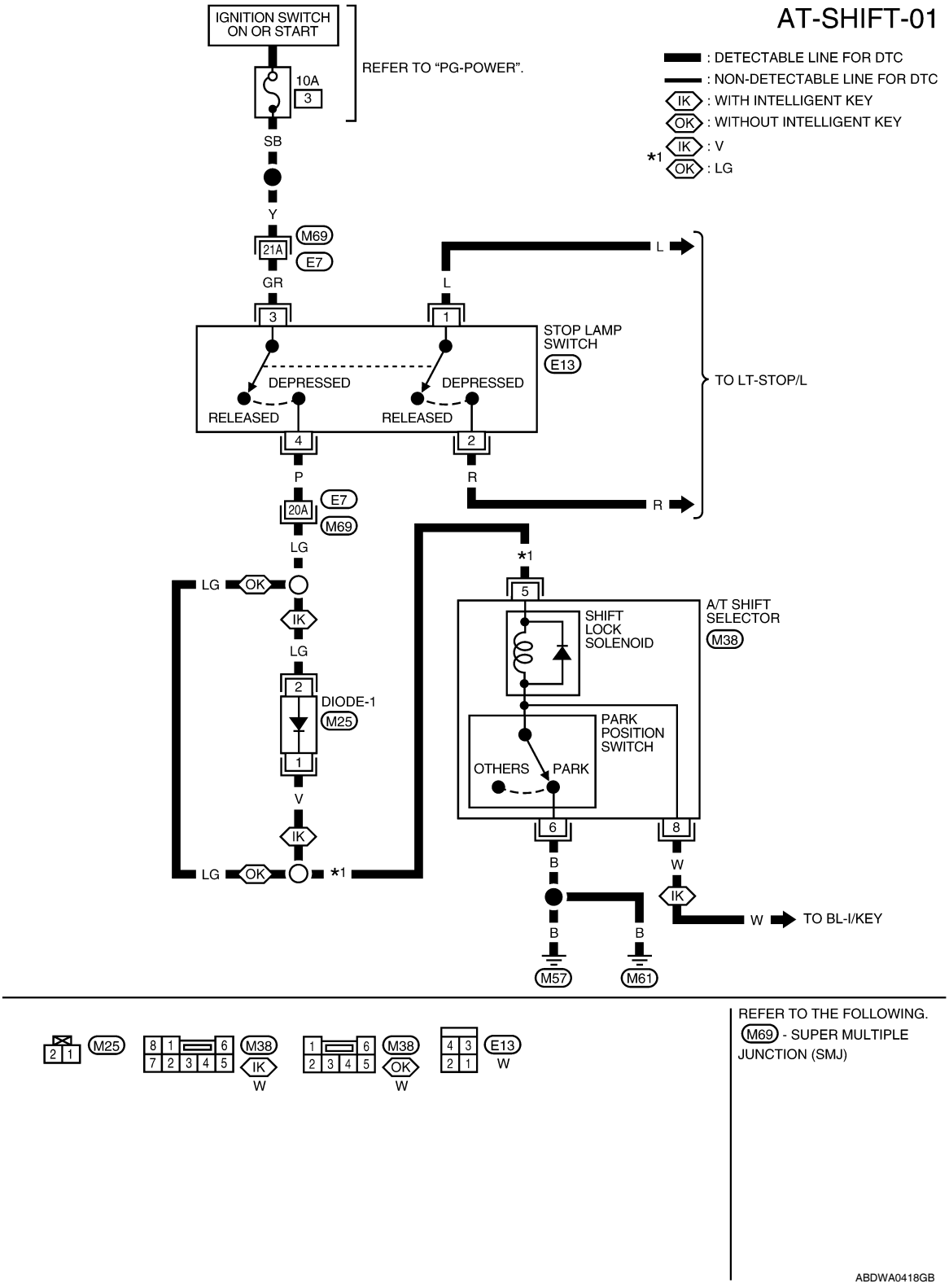
INFOID:0000000007329461



1. Key interlock cable (Without Intelligent Key)
2. Key cylinder (Without Intelligent Key)
3. Ignition knob switch (With Intelligent Key)
4. Key interlock cable (With Intelligent Key)
5. Brake pedal
6. Stop lamp switch
7. Shift lock release button
8. Park position switch
9. Shift lock solenoid
10. Key interlock cable

Wiring Diagram - AT - SHIFT

INFOID:0000000007329462



Diagnosis Procedure

INFOID:0000000007329463

SYMPTOM 1:

- **Selector lever cannot be moved from "P" position with ignition switch in ON position and brake pedal depressed.**

- **Selector lever can be moved from “P” position with ignition key in ON position and brake pedal released.**
- **Selector lever can be moved from “P” position when ignition switch is removed from key cylinder.**

SYMPTOM 2:

- **Ignition key cannot be removed when selector lever is set to “P” position.**
- **Ignition key can be removed when selector lever is set to any position except “P” position.**

1.CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.
NG >> Repair key interlock cable. Refer to AT-216, "Removal and Installation" .

2.CHECK A/T POSITION

Check A/T position. Refer to AT-214, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-214, "Adjustment of A/T Position" .

3.CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Turn ignition switch ON. (Do not start engine.)
2. Selector lever is set in “P” position.
3. Check operation sound.

Condition	Brake pedal	Operation sound
When ignition switch is turned to ON position and selector lever is set in “P” position.	Depressed	Yes
	Released	

OK or NG

OK >> **INSPECTION END**
NG - 1 >> With Intelligent Key: GO TO 4.
NG - 2 >> Without Intelligent Key: GO TO 5.

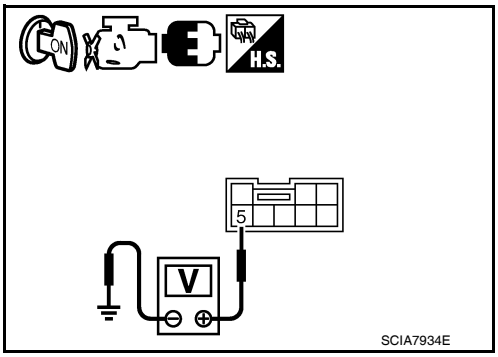
4.CHECK POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between A/T shift selector harness connector terminal 5 and ground.

Voltage:

Brake pedal depressed: Battery voltage

Brake pedal released: 0V



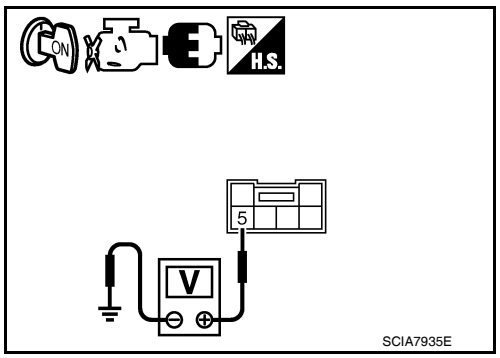
OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

5.CHECK POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between A/T shift selector harness connector terminal 5 and ground.



Voltage:

Brake pedal depressed: Battery voltage

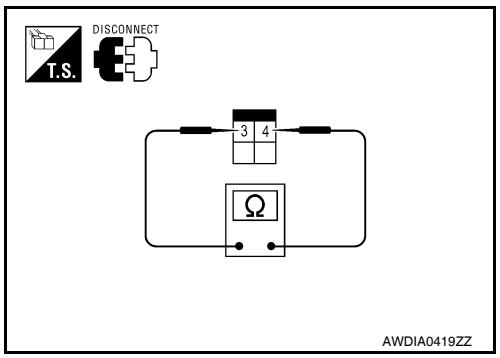
Brake pedal released: 0V

OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 3 and 4.



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal. Refer to BR-6 .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.

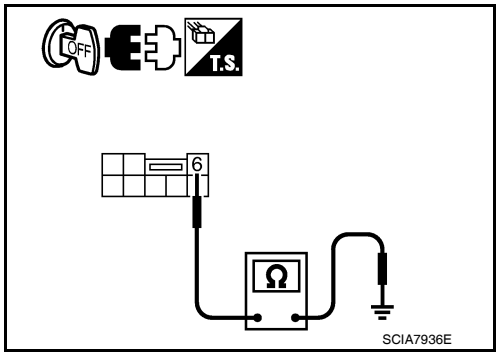
- Harness for short or open between ignition switch and stop lamp switch harness connector
- Harness for short or open between stop lamp switch harness connector and A/T shift selector harness connector
- 10A fuse [No.3, located in the fuse block (J/B)]
- Ignition switch, Refer to PG-4 .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

8. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector harness connector.
3. Check continuity between A/T shift selector harness connector terminal 6 and ground.



Continuity should exist.

4. Connect A/T shift selector harness connector.

OK or NG

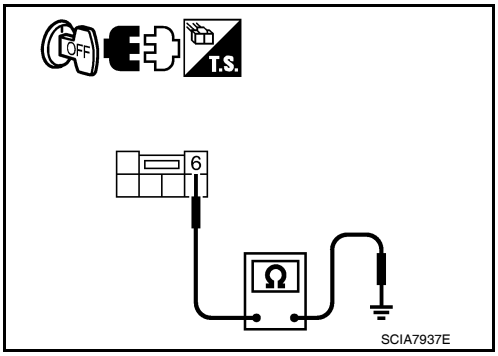
OK >> Replace shift lock solenoid and park position switch assembly. Refer to AT-213, "A/T Shift Selector Disassembly and Assembly".
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector harness connector.

3. Check continuity between A/T shift selector harness connector terminal 6 and ground.

Continuity should exist.



4. Connect A/T shift selector harness connector.

OK or NG

OK >> Replace shift lock solenoid and park position switch assembly. Refer to AT-213, "A/T Shift Selector Disassembly and Assembly".

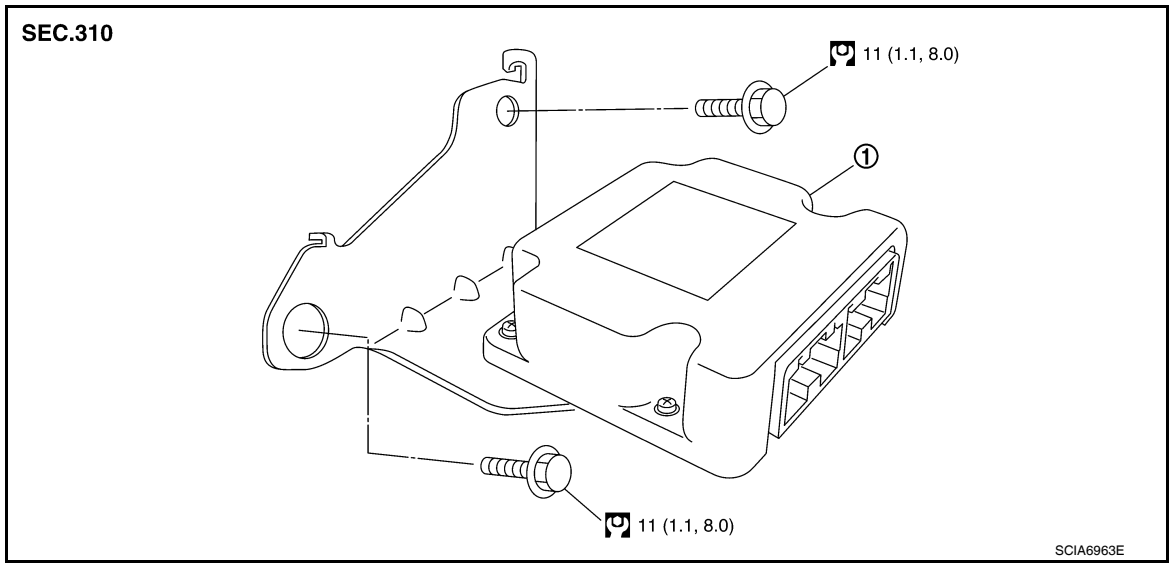
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

TRANSMISSION CONTROL MODULE

Removal and Installation

INFOID:0000000007329464

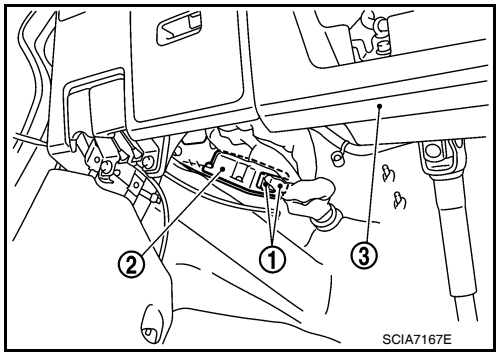
COMPONENTS



1. TCM

REMOVAL

1. Disconnect the battery negative terminal.
2. Disconnect TCM harness connectors (1) from TCM (2).
   - Instrument lower finisher (3)
3. Remove TCM (2).



INSTALLATION

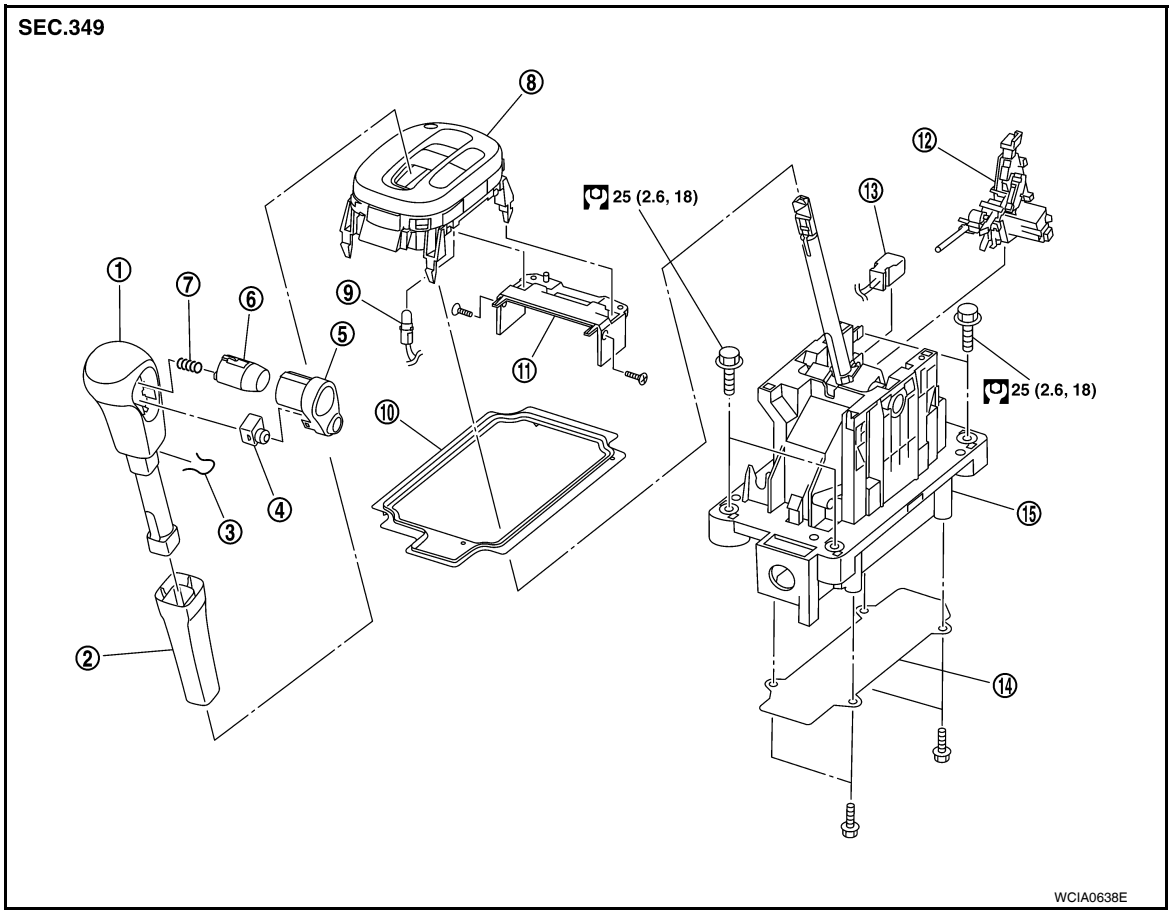
Installation is in the reverse order of removal.

SHIFT CONTROL SYSTEM

A/T Shift Selector Removal and Installation

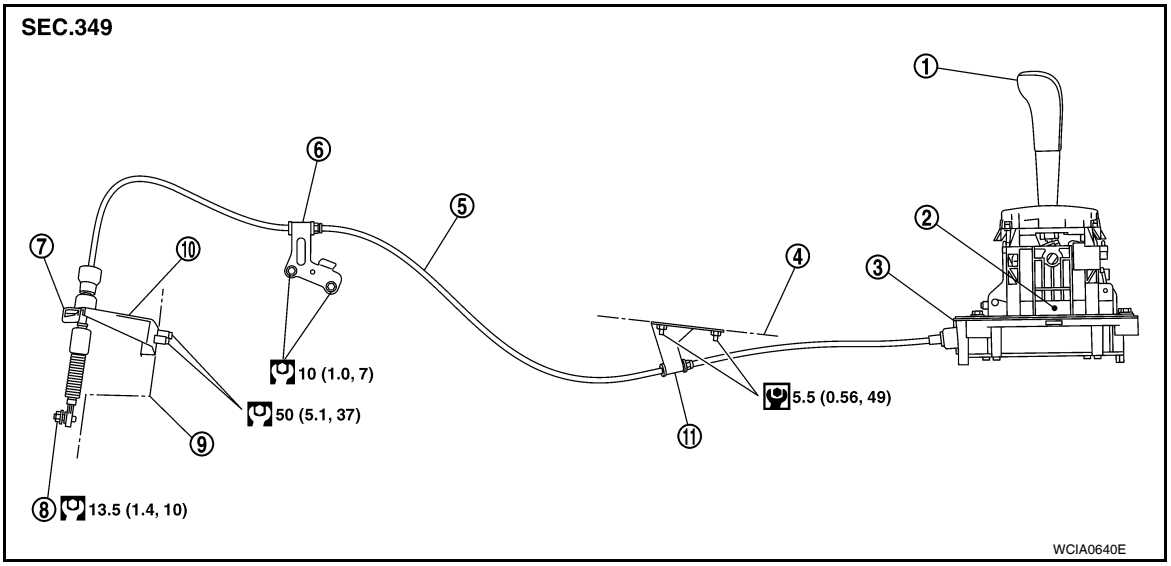
INFOID:0000000007329465

A/T SHIFT SELECTOR COMPONENTS



1. Shift selector handle	2. Shift selector handle cover	3. Shift selector handle clip
4. Overdrive control switch	5. Shift selector handle finisher	6. Shift selector handle button
7. Shift selector handle spring	8. Position indicator plate	9. Position lamp
10. Dust cover	11. Bracket	12. Shift lock solenoid and park position switch assembly
13. A/T shift selector harness connector	14. Plate	15. A/T shift selector assembly

CONTROL CABLE COMPONENTS



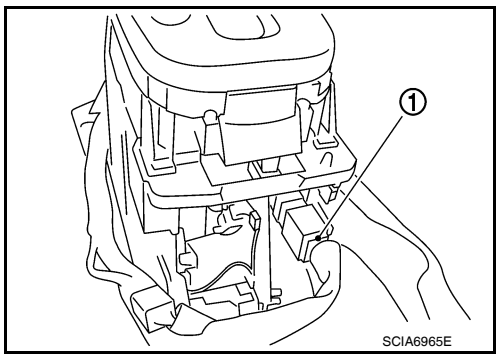
1. Shift selector handle	2. A/T shift selector assembly	3. Lock plate
4. Floor panel	5. Shift selector control cable	6. Bracket
7. Lock plate	8. Lock nut	9. A/T assembly
10. Bracket	11. Bracket	

REMOVAL

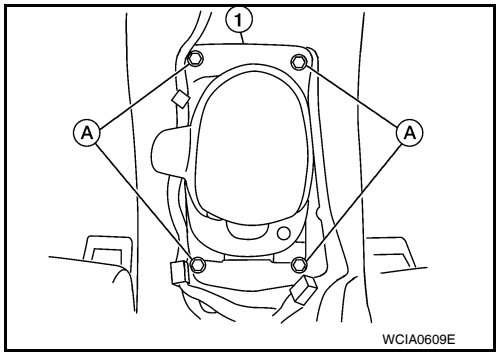
CAUTION:

Make sure that parking brake is applied before removal/installation.

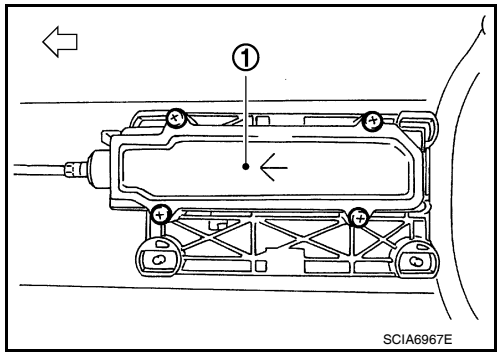
1. Place the shift selector in the “N” position.
2. Remove the center console assembly. Refer to IP-11.
3. Disconnect the A/T shift selector harness connector (1).
4. Remove the key interlock cable from the A/T shift selector assembly. Refer to AT-216, "Removal and Installation".



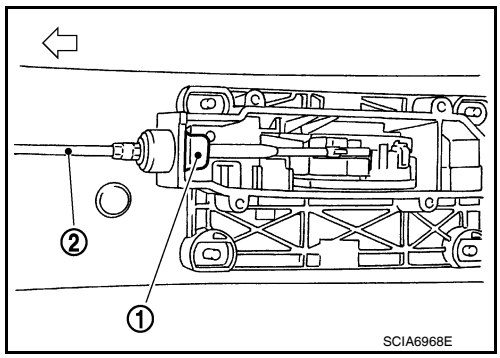
5. Remove the bolts (A) from the A/T shift selector assembly (1).
6. Remove exhaust front tube, center muffler and heat plates. Refer to EM-22.



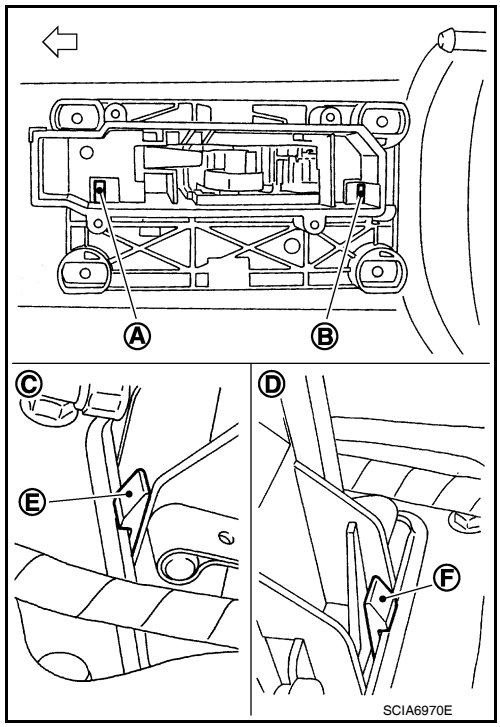
7. Remove the plate (1) from the A/T shift selector assembly.
   ⇦: Vehicle front



8. Remove the lock plate (1) from the shift selector control cable (2).
   ⇦: Vehicle front
9. Remove the shift selector control cable (2) from the A/T shift selector assembly.



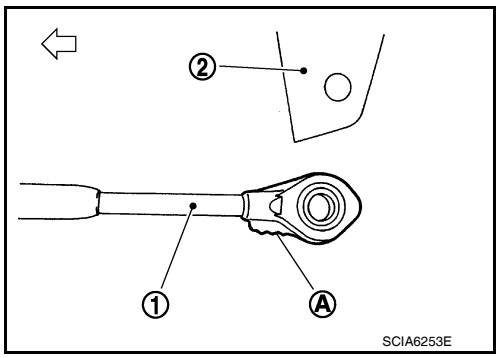
10. Insert suitable tool at points (A) and (B) as shown, and press both tabs (E) and (F) at the front (C) and rear (D) slightly toward the center of the A/T shift selector assembly to remove the A/T shift selector assembly from the underside of the vehicle.
    ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.

- When installing the shift selector control cable (1) to the A/T shift selector assembly (2), make sure that the shift selector control cable (1) is fully pressed in with the ribbed surface (A) facing downward from the vehicle.
  ⇦: Vehicle front
- After installation is completed, adjust and check the A/T position. Refer to AT-214, "Adjustment of A/T Position" and AT-214, "Checking of A/T Position".



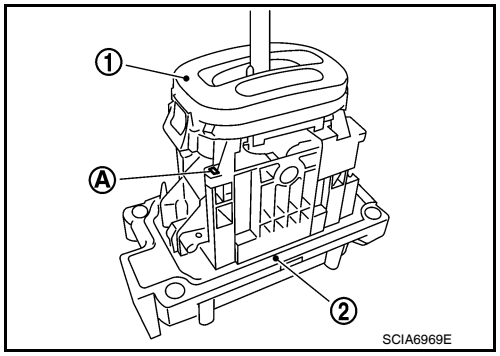
A/T Shift Selector Disassembly and Assembly

INFOID:0000000007329466

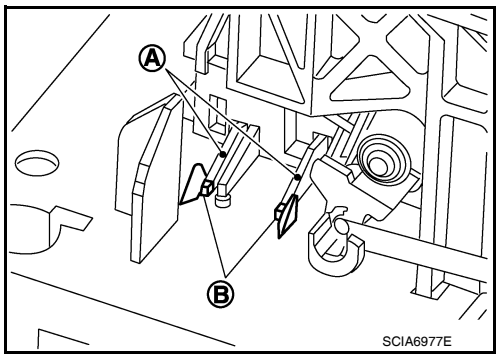
DISASSEMBLY

NOTE:
Refer to AT-210, "A/T Shift Selector Removal and Installation" to disassemble.

1. Remove shift selector handle from A/T shift selector assembly. Refer to AT-213, "Shift Selector Handle Removal and Installation".
2. Remove position lamp from position indicator plate (1).
3. Insert a suitable tool to (A) (at 4 locations) as shown, and bend each hook slightly to raise position indicator plate (1) and remove from A/T shift selector assembly (2).
4. Remove bracket from A/T shift selector assembly (2).
5. Remove A/T shift selector harness connector from A/T shift selector assembly (2).



6. Release tabs (A) on shift lock solenoid and park position switch assembly from hooks (B) on A/T shift selector assembly to shift lock solenoid and park position switch assembly.



ASSEMBLY

Assembly is in the reverse order of disassembly.

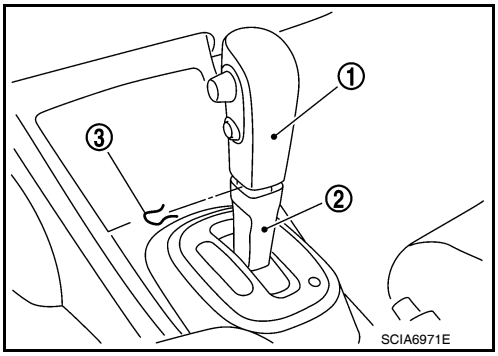
Shift Selector Handle Removal and Installation

INFOID:0000000007329467

REMOVAL

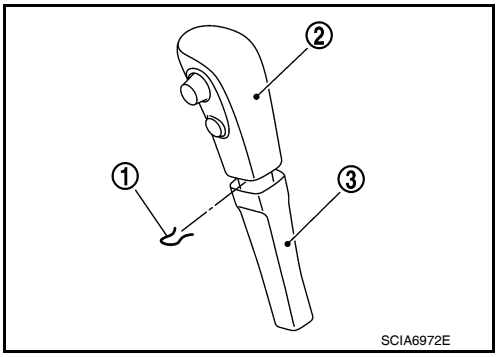
CAUTION:
Make sure that parking brake is applied before removal/installation.

1. Place the shift selector handle (1) in “N” position.
2. Slide shift selector handle cover (2) downward.
3. Pull out shift selector handle clip (3) from shift selector handle (1).
4. Remove shift selector handle (1) and shift selector handle cover (2) as a set from shift selector.
   CAUTION:
   Do not push shift selector handle button.



INSTALLATION

1. Insert shift selector handle clip (1) to shift selector handle (2).
2. Install shift selector handle cover (3) to shift selector handle (2).
3. Place the shift selector in “N” position.
4. Install shift selector handle over shift selector until a click is felt.
   CAUTION:
   - **Do not tilt shift selector handle when installing. Install it straight, and do not tap or apply any shock to install it.**
   - **Do not push shift selector handle button.**



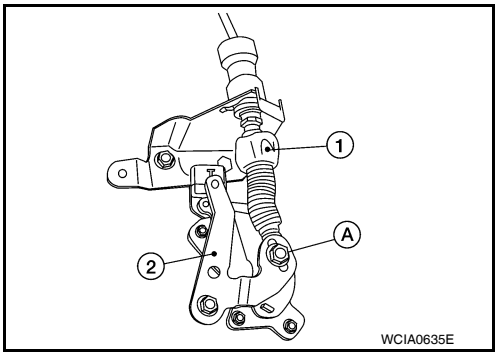
Adjustment of A/T Position

INFOID:0000000007329468

Move shift selector from “P” position to “1” position. You should be able to feel the detents in each position. If the detents cannot be felt or if the position indicator is improperly aligned, the shift selector control cable needs adjustment.

CAUTION:
Make sure that parking brake is applied before adjustment.

1. Remove the air duct assembly. Refer to EM-16.
2. Remove the shift selector control cable nut (A) and shift selector control cable (1) and place the manual lever (2) in the "P" position.
3. Place shift selector in “P” position.
4. Hold shift selector control cable (1) at the end and pull it with a force of 9.8 N (approximately 1 kg, 2.2 lb). Release the shift selector control cable and temporarily tighten shift selector control cable nut (A).
5. Tighten shift selector control cable nut (A) to the specified torque.



Shift selector control cable nut	**: Refer to AT-210, "A/T Shift Selector Removal and Installation".**

CAUTION:
Secure manual lever when tightening nut.

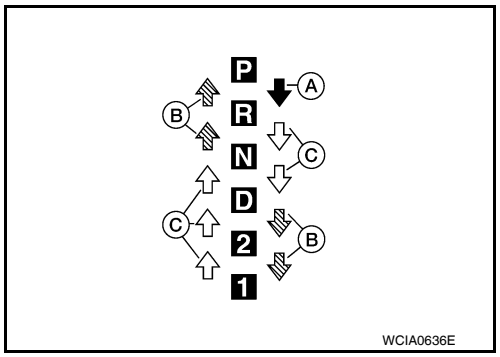
6. Move shift selector from “P” to "1" position again. Make sure that shift selector moves smoothly.
7. Check A/T position. Refer to AT-214, "Checking of A/T Position".
8. Install air duct assembly. Refer to EM-16.

Checking of A/T Position

INFOID:0000000007329469

1. Place shift selector in “P” position, and turn ignition switch ON (Do not start engine).
2. Make sure shift selector can be moved to other than “P” position when brake pedal is depressed. Also make sure shift selector can be moved from “P” position only when brake pedal is depressed.

3. Move shift selector and check for excessive effort, sticking, noise or rattle.
4. Confirm shift selector stops at each position with the feel of engagement when it is moved through all the positions. Check whether or not the actual position shift selector is in matches the position shown by the position indicator and the transaxle.
5. The method of operating shift selector to individual positions correctly should be as shown.
   - (A): Press shift selector handle button to operate shift selector, while depressing the brake pedal.
   - (B): Press shift selector handle button to operate shift selector.
   - (C): Shift selector can be operated without pressing shift selector handle button.
6. Confirm back-up lamps illuminate only when shift selector is placed in “R” position. Confirm back-up lamps do not illuminate when shift selector is in “P” or “N” position even if it is pushed toward “R” position without pressing shift selector handle button.
7. Confirm engine can only be started with shift selector in “P” and “N” positions.
8. Make sure A/T is locked completely when shift selector is in “P” position.



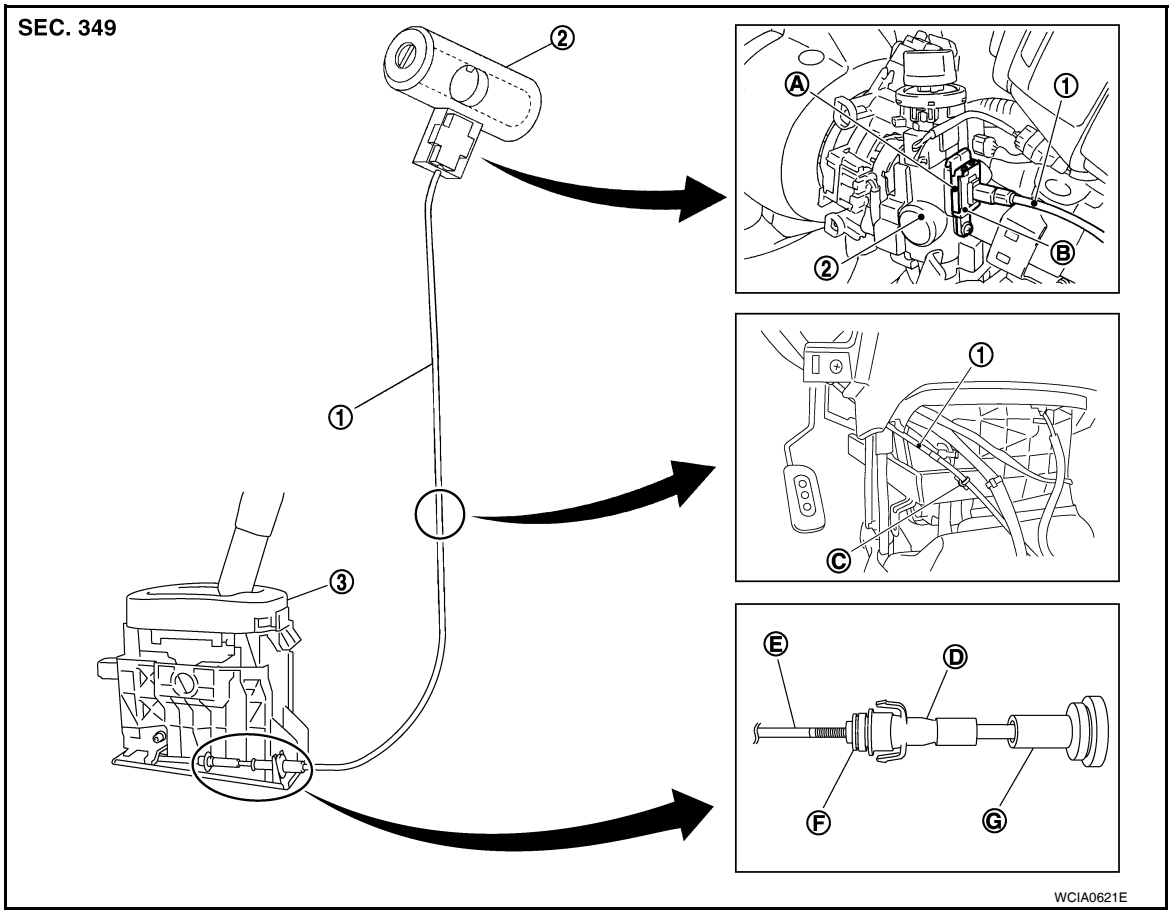
WCIA0636E

KEY INTERLOCK CABLE

Removal and Installation

INFOID:0000000007329470

COMPONENTS



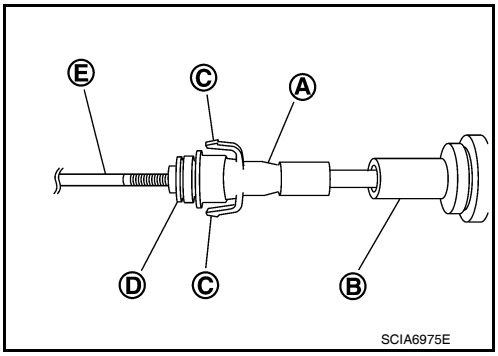
1. Key interlock cable
2. Key cylinder
3. A/T shift selector assembly
A. Lock plate
B. Holder
C. Clip
D. Slider
E. Key interlock rod
F. Adjust holder
G. Casing cap

REMOVAL

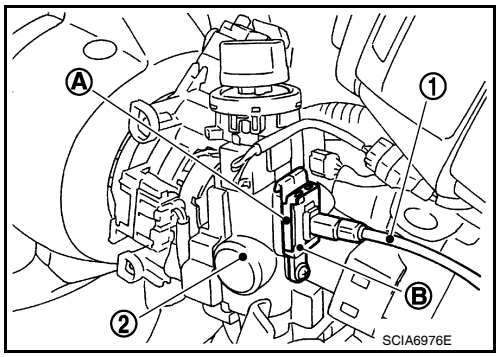
CAUTION:

Make sure that parking brake is applied before removal and installation.

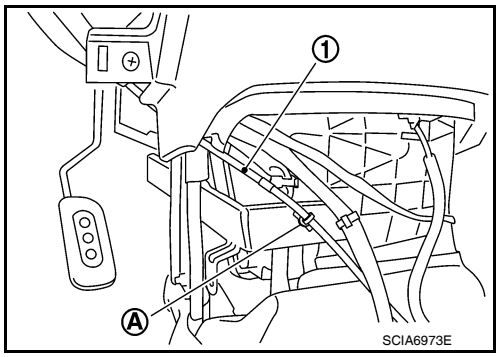
1. Place the shift selector in the “N” position.
2. Remove the shift selector handle. Refer to AT-213, "Shift Selector Handle Removal and Installation".
3. Remove the center console assembly. Refer to IP-11.
4. Slide the slider (A) toward the casing cap (B) while pressing tabs (C) on the slider to separate the slider (A) from the adjust holder (D).
5. Remove the casing cap (B) from the cable bracket on the A/T shift selector assembly.
6. Remove the key interlock cable from the key interlock rod (E).



7. Remove steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11.
8. Pull out the lock plate (A) from the holder (B).
9. Remove the key interlock cable (1) from the key cylinder (2).



10. Remove the clip (A), and then remove the key interlock cable (1).

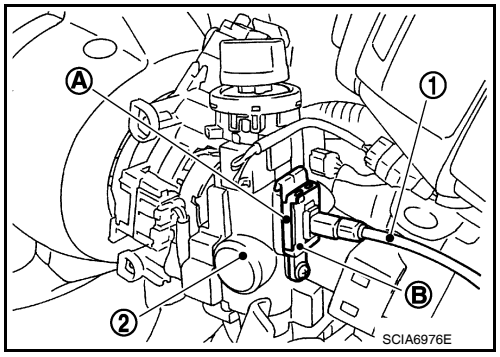


INSTALLATION

CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to A/T shift selector assembly, make sure that casing cap and bracket are firmly secured in their positions.**

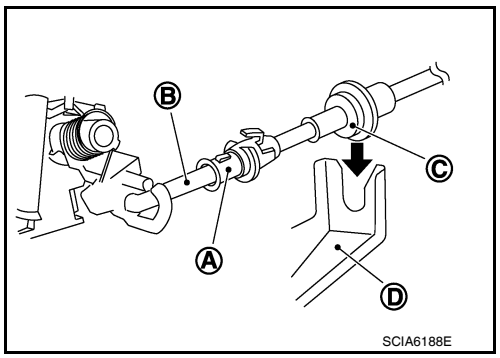
1. Place the shift selector in the “P” position.
2. Turn ignition switch to “ACC” or “ON” position.
3. Set the key interlock cable (1) to the key cylinder (2).
4. Install the lock plate (A) to the holder (B).
5. Turn ignition switch to “LOCK” position.



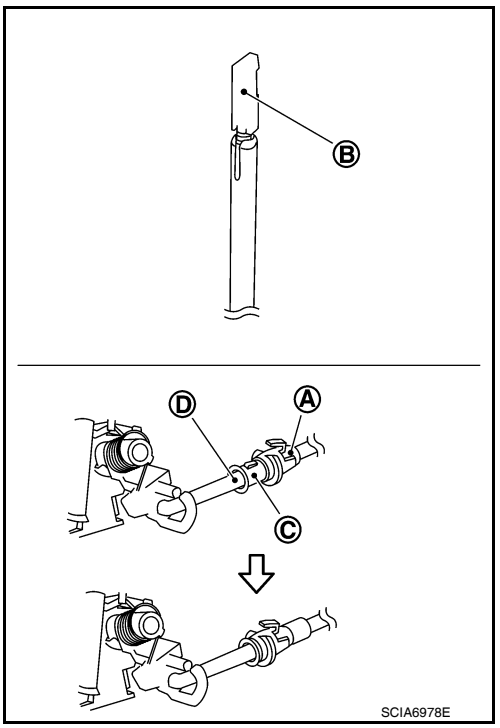
6. Temporarily install the adjust holder (A) to the key interlock rod (B).
7. Install the casing cap (C) to the cable bracket (D) on the A/T shift selector assembly.

   CAUTION:

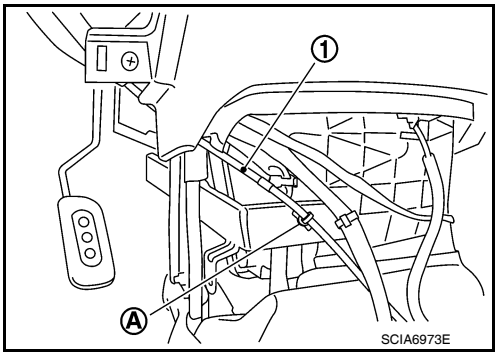
   - **Do not bend or twist key interlock cable excessively when installing.**
   - **After installing key interlock cable to cable bracket (D) on A/T shift selector assembly, make sure casing cap (C) is firmly secured in cable bracket (D) on A/T shift selector assembly.**
   - **If casing cap (C) is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**



8. Slide the slider (A) toward the key interlock rod (D) while pressing the pull lock (B) down to securely connect the adjust holder (C) with the key interlock rod (D).
   CAUTION:
   - **Do not press tabs when holding slider (A).**
   - **Do not apply any side to side force to key interlock rod (D) when sliding slider (A).**



9. Secure the key interlock cable (1) with the clip (A).
10. Install steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11.
11. Install the center console assembly. Refer to IP-11.
12. Install the shift selector handle. Refer to AT-213, "Shift Selector Handle Removal and Installation".
13. Check shift lock system. Refer to AT-203, "Description".

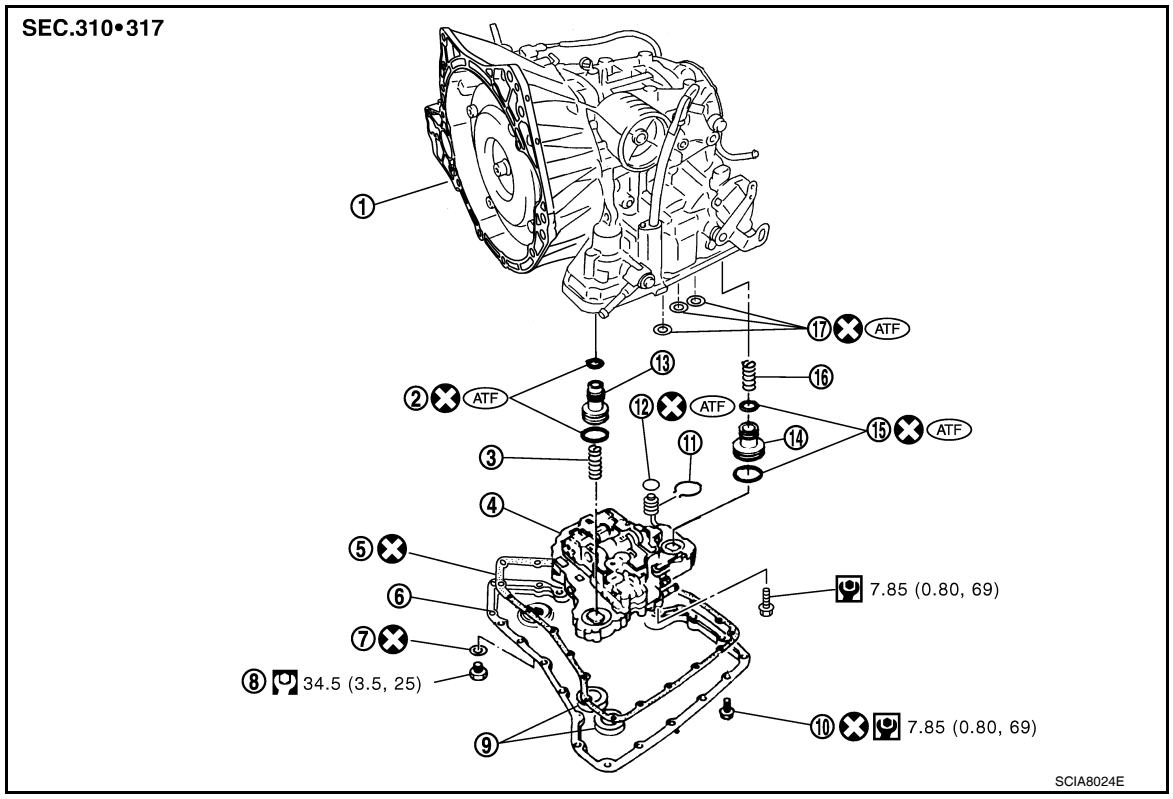


ON-VEHICLE SERVICE

Control Valve Assembly and Accumulators

INFOID:0000000007329471

COMPONENTS



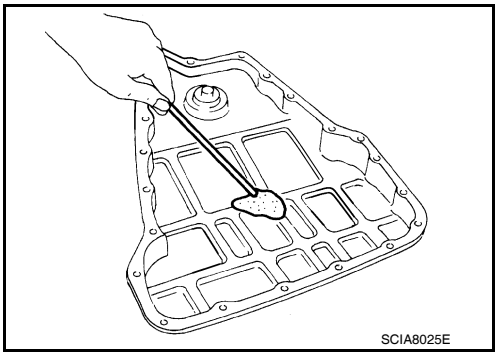
1. A/T	2. O-ring	3. Return spring
4. Control valve assembly	5. Oil pan gasket	6. Oil pan
7. Drain plug gasket	8. Drain plug	9. Magnet
10. Oil pan bolt	11. Snap ring	12. O-ring
13. Servo release accumulator piston	14. N-D accumulator piston	15. O-ring
16. Return spring	17. Lip seal	

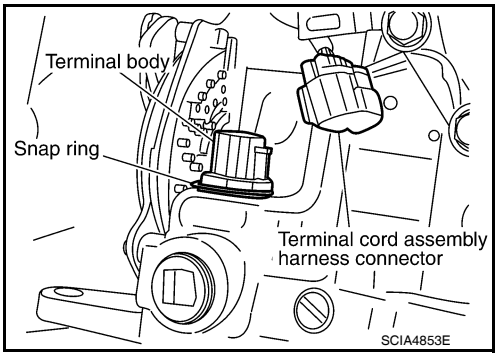
REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove engine undercover. Refer to EI-15, "Removal and Installation".
3. Remove fender protector (LH). Refer to EI-24, "Removal and Installation".
4. Drain the A/T fluid. Refer to AT-16, "Checking A/T Fluid".
5. Remove oil pan and oil pan gasket.
   CAUTION:
   Do not reuse oil pan gasket.

6. Check for foreign materials in oil pan to help determine cause of malfunction. If the ATF is very dark, smell burned or contains foreign particles, friction material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
   - **If ATF contains frictional material (clutch, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-15.**
7. Remove magnets from oil pan.
8. Disconnect terminal cord assembly harness connector.
9. Remove snap ring from terminal body.
10. Remove terminal cord assembly by pushing terminal body into transaxle case.

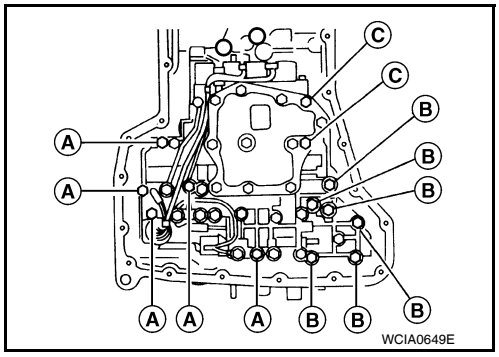




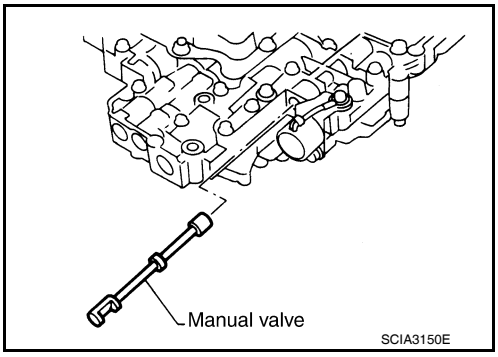
11. Remove control valve assembly bolts (A), (B) and (C).

Bolt length, number and location:

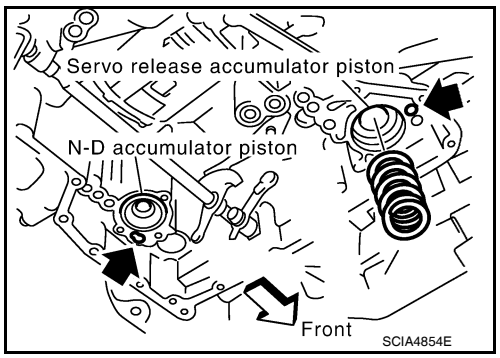
Bolt symbol	A	B	C
Bolt length " ℓ " mm (in)	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



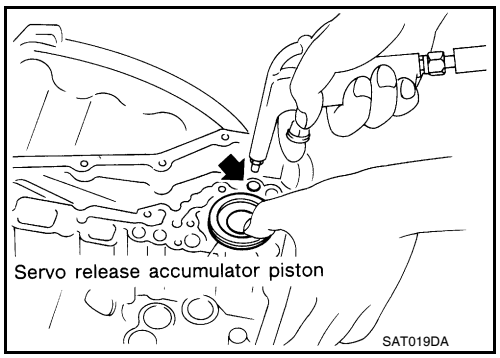
12. Remove control valve assembly from transaxle case.
    CAUTION:
    Be careful not to drop manual valve and servo release accumulator return spring.
13. Remove manual valve from control valve assembly.
    CAUTION:
    Be careful not to drop manual valve.
14. Remove O-ring from terminal body.
    CAUTION:
    Do not reuse O-ring.
15. Disassemble and inspect control valve assembly if necessary. Refer to AT-267, "Control Valve Assembly", AT-276, "Control Valve Upper Body" and AT-280, "Control Valve Lower Body".



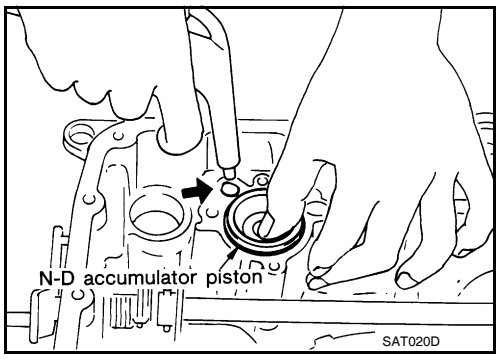
16. Remove servo release accumulator piston and N-D accumulator piston by applying compressed air if necessary.
CAUTION:
Hold each piston with lint-free cloth.



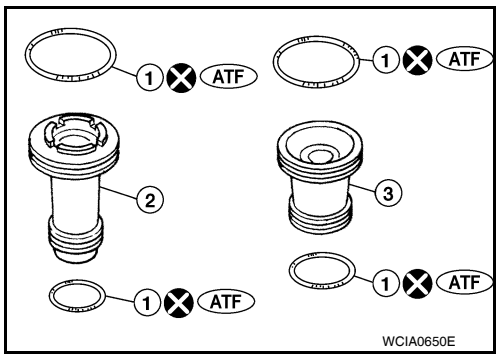
a. Apply compressed air to the oil hole as shown, and remove servo release accumulator piston from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. To avoid this cover the area with lint-free cloth and blow air little by little.



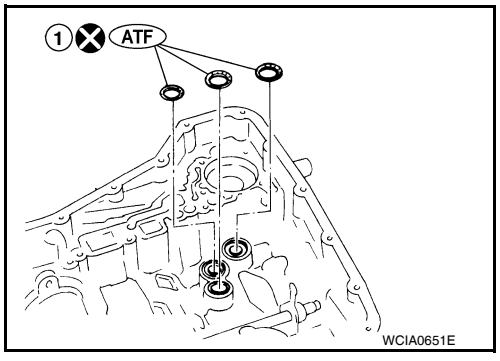
b. Apply compressed air to the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. To avoid this cover the area with lint-free cloth and blow air little by little.



c. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).
CAUTION:
- **Do not reuse O-rings.**
- **Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.**

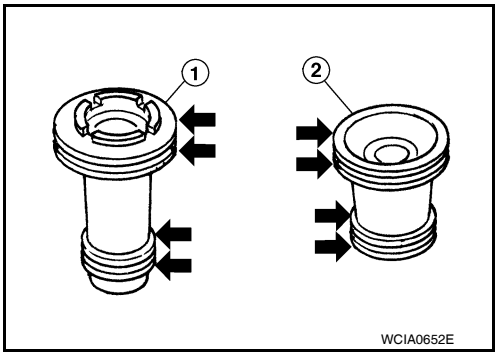


17. Remove lip seals (1) from transaxle case.
CAUTION:
Do not reuse lip seals.

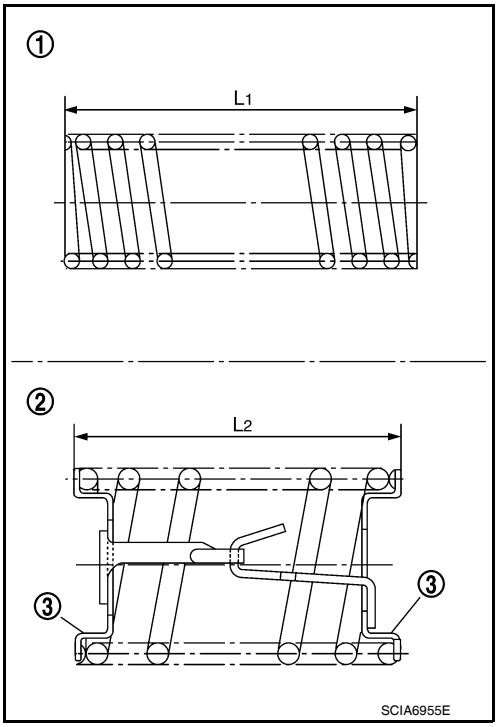


Inspection

- Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.
  (1): Servo release accumulator piston
  (2): N-D accumulator piston
- Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.



- Inspect each return spring, and replace if damaged, deformed or worn. Refer to AT-348, "Accumulator" for free length (L_1) and length (L_2).
  (1): Return spring (Servo release accumulator)
  (2): Return spring (N-D accumulator)
  CAUTION:
  Do not remove spring retainer (3).



Installation

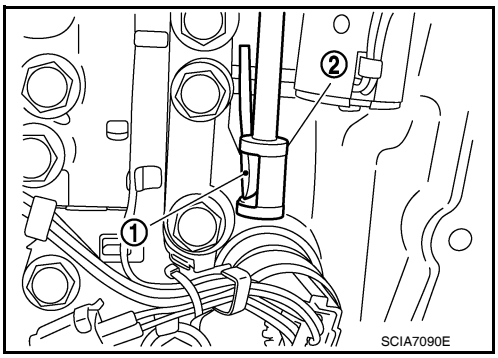
Installation is in the reverse order of removal.

CAUTION:

- **Completely remove all moisture, oil and old gasket from the oil pan gasket mounting surface of transaxle case and oil pan.**
- **Do not reuse O-rings, lip seals, oil pan gasket and oil pan bolts.**
- **Apply ATF to manual valve, O-rings, lip seals and sliding surfaces of the transaxle case.**

NOTE:

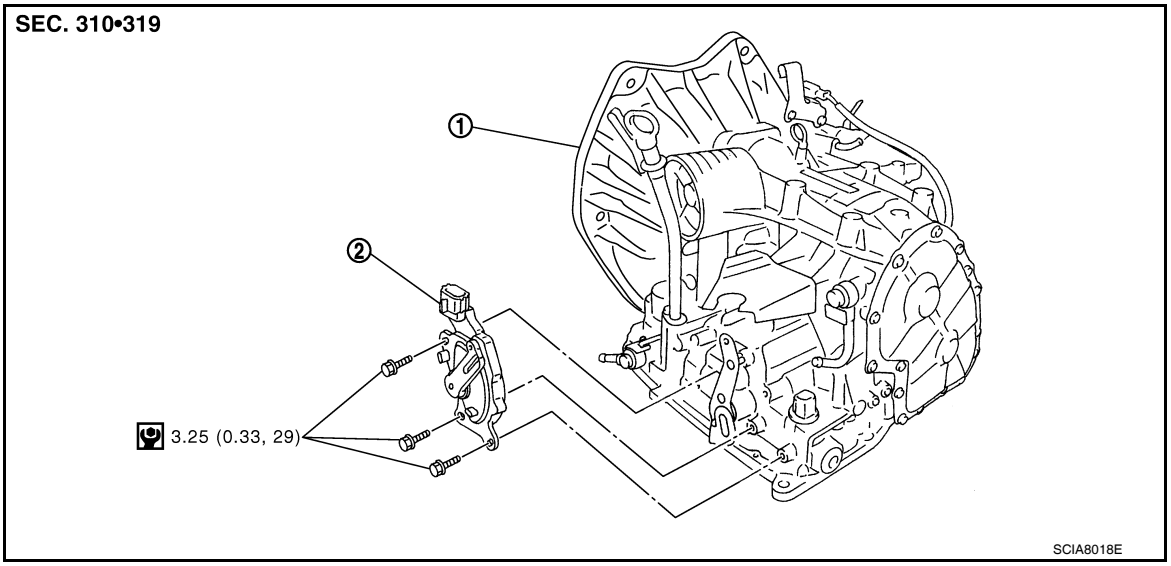
- Set manual shaft in “N” position, then align manual plate (1) with groove in manual valve (2).
- After installing control valve assembly to transaxle case, make sure that shift selector can be moved to all positions.
- After completing installation, check for A/T fluid leakage and A/T fluid level. Refer to AT-16, "Checking A/T Fluid".



Transmission Range Switch

INFOID:0000000007329472

COMPONENTS

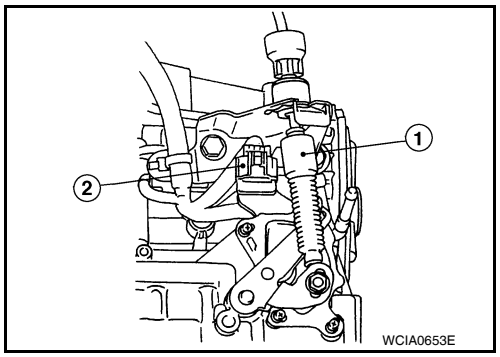


1. A/T
2. Transmission range switch

REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet). Refer to EM-16.
3. Remove shift selector control cable (1) from manual lever. Refer to AT-210, "A/T Shift Selector Removal and Installation".
4. Disconnect transmission range switch harness connector (2).
5. Remove transmission range switch bolts.
6. Set manual lever in “P” position.
7. Remove transmission range switch from A/T.



Installation

Installation is in the reverse order of removal.

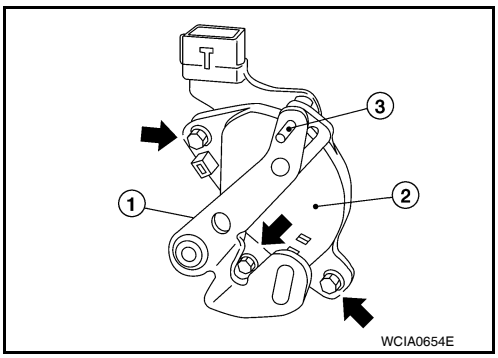
NOTE:

- Align transmission range switch position when installing.
- After installation is completed, adjust and check the transmission range switch and A/T position. Refer to "TRANSMISSION RANGE SWITCH ADJUSTMENT", AT-214, "Adjustment of A/T Position" and AT-214, "Checking of A/T Position".
- After installation is completed, check continuity of transmission range switch. Refer to AT-172, "Component Inspection".

TRANSMISSION RANGE SWITCH ADJUSTMENT

1. Remove air duct (inlet). Refer to EM-16.

2. Set shift selector and manual lever (1) in “N” position.
3. Remove shift selector control cable from manual lever (1). Refer to AT-210, "A/T Shift Selector Removal and Installation".
4. Loosen transmission range switch bolts.
   ⬅:Bolt
5. Insert the pin (3) [4 mm (0.16 in) dia.] straight into manual shaft (1) adjustment hole.
6. Rotate transmission range switch (2) until the pin (3) can also be inserted straight into hole in transmission range switch (2).
7. Tighten transmission range switch bolts to the specified torque. Refer to "COMPONENTS".

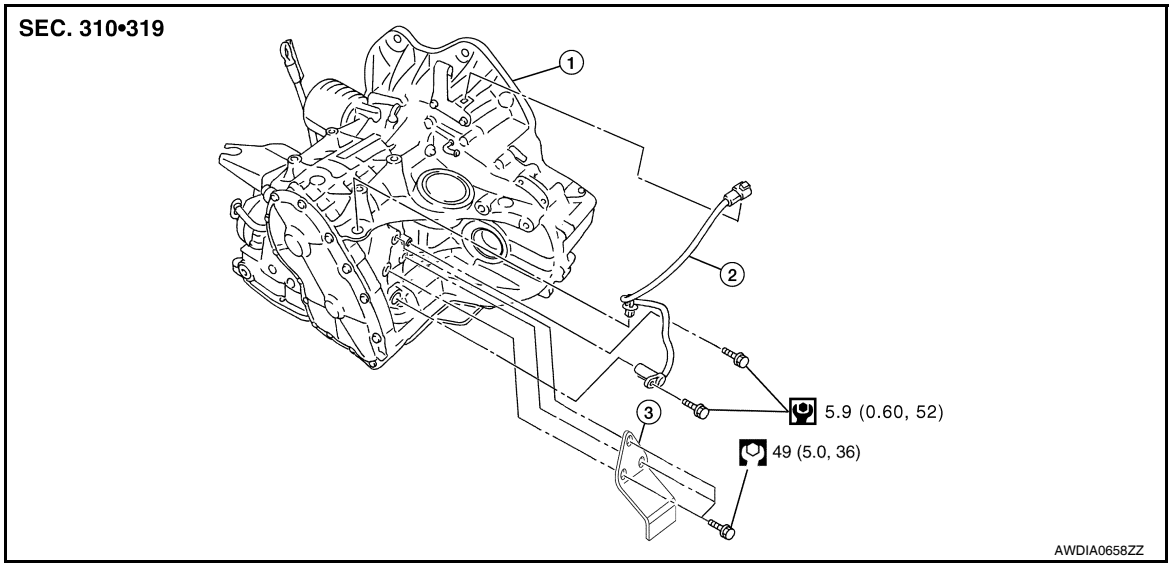


8. Remove the pin (3) from adjustment hole after adjusting transmission range switch (2).
9. Install the shift selector control cable. Refer to AT-210, "A/T Shift Selector Removal and Installation".
10. Adjust and check A/T position. Refer to AT-214, "Adjustment of A/T Position" and AT-214, "Checking of A/T Position".
11. Check continuity of transmission range switch (2). Refer to AT-172, "Component Inspection".
12. Install the air duct (inlet). Refer to EM-16.

Output Speed Sensor

INFOID:0000000007329473

COMPONENTS



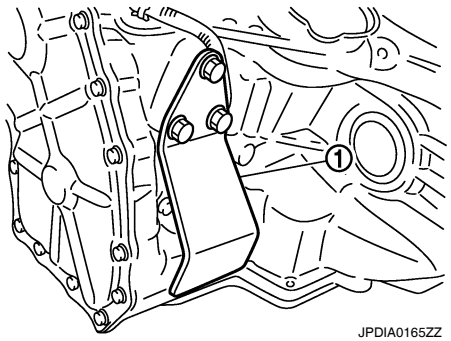
1. A/T
2. Output speed sensor
3. Gusset

REMOVAL AND INSTALLATION

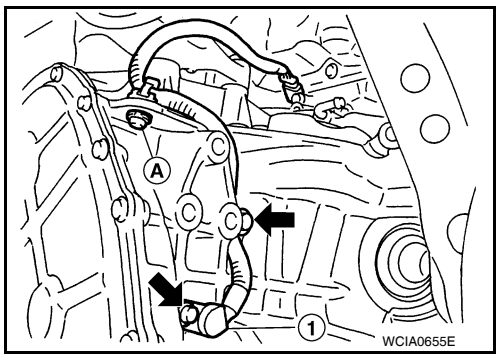
Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet), air duct and air cleaner case. Refer to EM-16, "Component".

3. Remove gusset (1).



4. Disconnect output speed sensor harness connector.
5. Remove clip (A).
6. Remove output speed sensor (1) from A/T.
   ⬅: Bolt
7. Remove O-ring from output speed sensor (1)

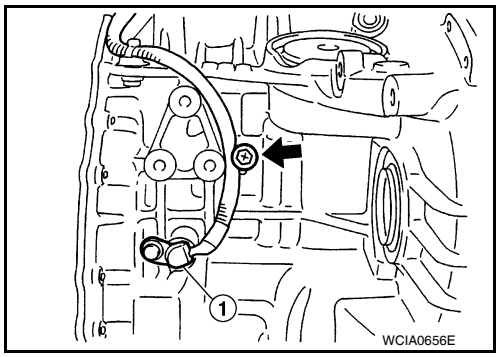


Installation

Installation is in the reverse order of removal.

CAUTION:

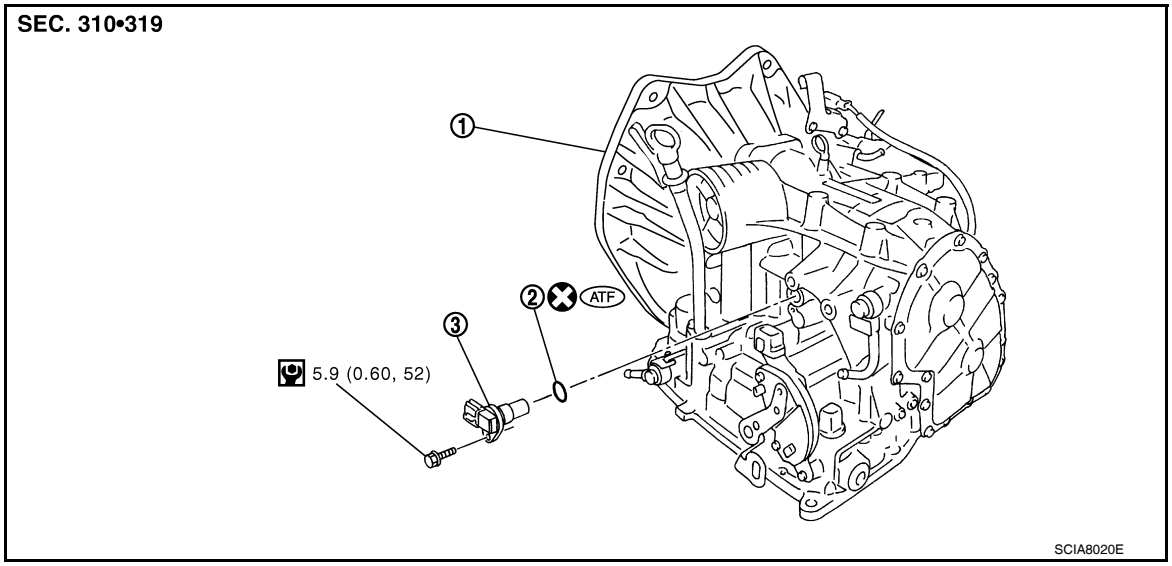
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
- **Ensure output speed sensor harness is firmly secured with bolt.**
  (1): Output speed sensor
  ⬅: Bolt



Input Speed Sensor

INFOID:0000000007329474

COMPONENTS

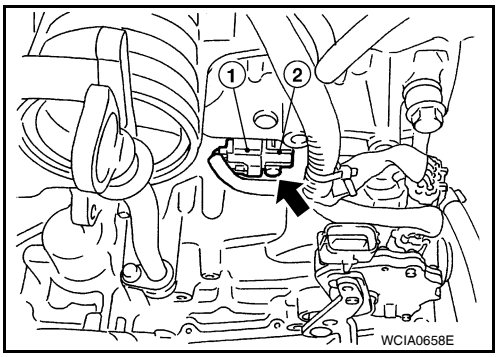


1. A/T
2. O-ring
3. Input speed sensor

REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet). Refer to EM-16.
3. Disconnect input speed sensor harness connector (1).
4. Remove input speed sensor bolt.
   ⬅: Bolt
5. Remove input speed sensor (2) from A/T.
6. Remove O-ring from input speed sensor (2).



Installation

Installation is in the reverse order of removal.

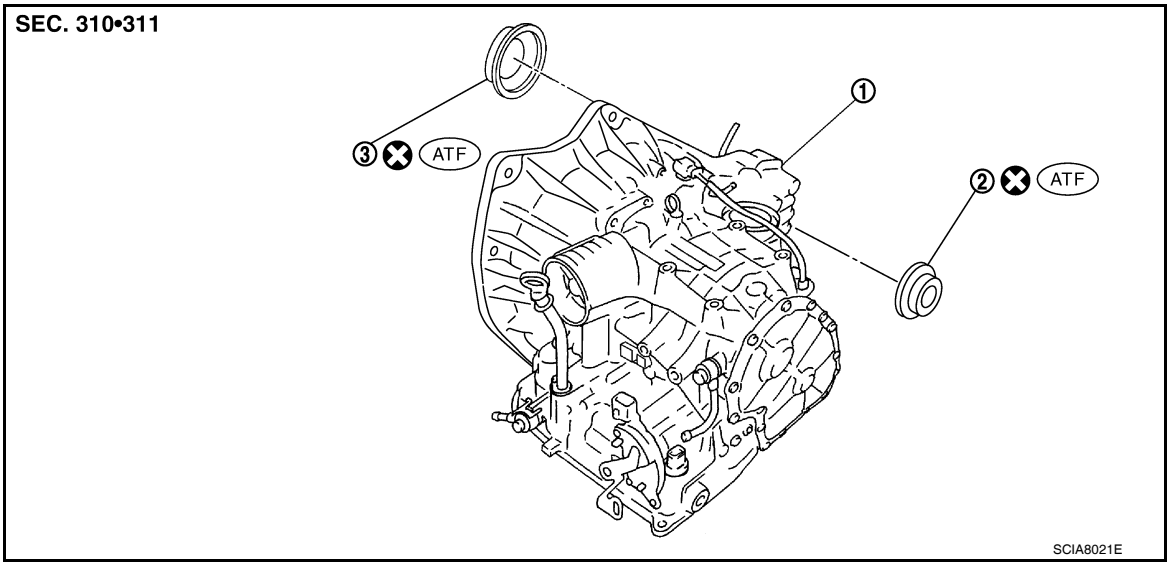
CAUTION:

- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

Differential Side Oil Seal

INFOID:0000000007329475

COMPONENTS

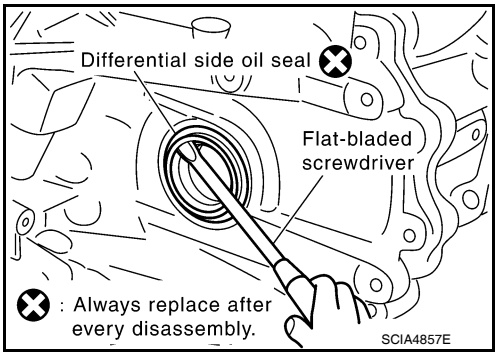


1. A/T
2. LH differential side oil seal
3. RH differential side oil seal

REMOVAL AND INSTALLATION

Removal

1. Remove front drive shaft. Refer to FAX-9.
2. Remove differential side oil seals using a suitable tool.
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.



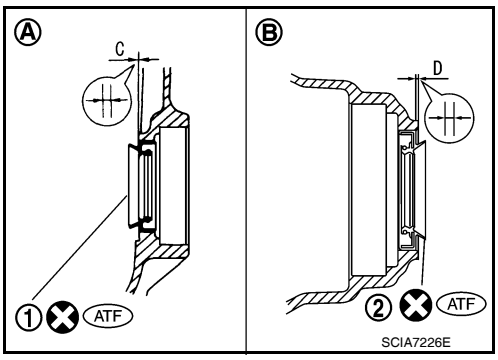
Installation

Installation is in the reverse order of removal.

NOTE:

- Drive each differential side oil seal evenly using Tools (Transaxle case side only) and suitable tool (Convertor housing side only) so that differential side oil seal protrudes by the dimension (C) or (D) respectively.
  (1): LH differential side oil seal
  (2): RH differential side oil seal
  (A): Transaxle case side
  (B): Converter housing side

Tool number : ST35325000 (—)
: KV31103000 (J-38982)



Unit: mm (in)

Dimension “C”	0 ± 0.5 (0 ± 0.020)
Dimension “D”	6 ± 0.5 (0.24 ± 0.020)

NOTE:

- Differential side oil seal removal direction is used as the reference.

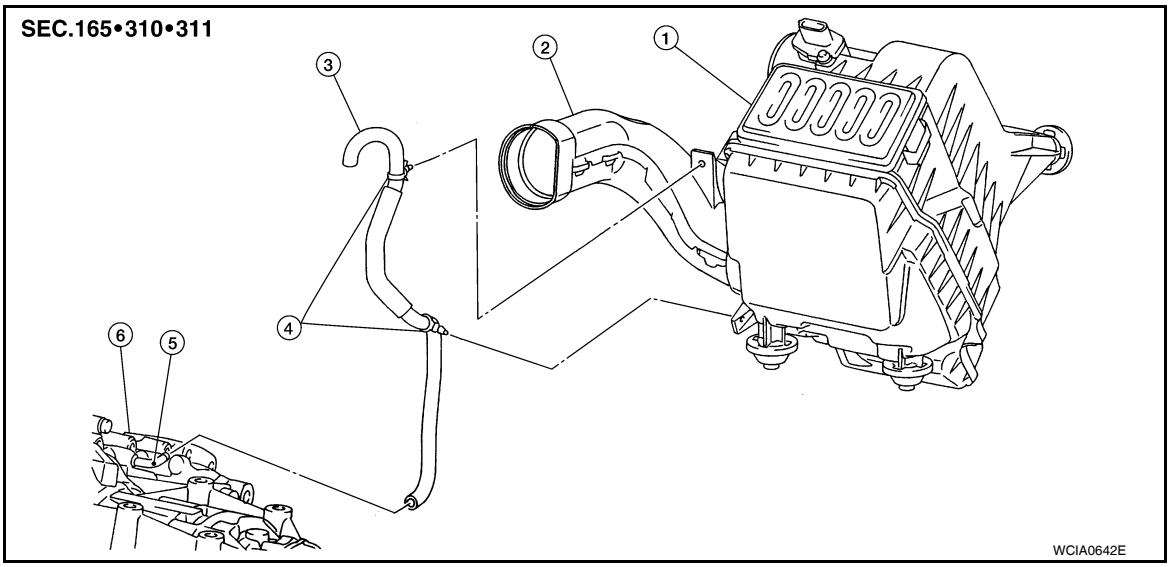
- After installing differential side oil seal, check A/T fluid leakage and A/T fluid level. Refer to AT-16, "Checking A/T Fluid".

AIR BREATHER HOSE

Removal and Installation

INFOID:0000000007329476

COMPONENTS



1.	Air cleaner case	2.	Air duct (inlet)	3.	Air breather hose
4.	Clip	5.	Air breather tube	6.	A/T

REMOVAL

1. Remove air duct (front), air duct (inlet) and air cleaner case. Refer to EM-16.
2. Remove air breather hose.

INSTALLATION

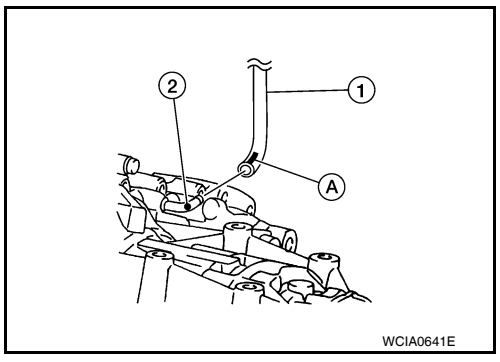
Installation is in the reverse order of removal.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

NOTE:

- Install the air breather hose (1) to the air breather tube (2) so that the paint mark (A) faces upward. Also make sure the air breather hose end overlaps air breather tube 17 mm (0.67 in) or more.
- When installing air breather hose (1) to air duct and air cleaner case, make sure to fully insert the hose clips.

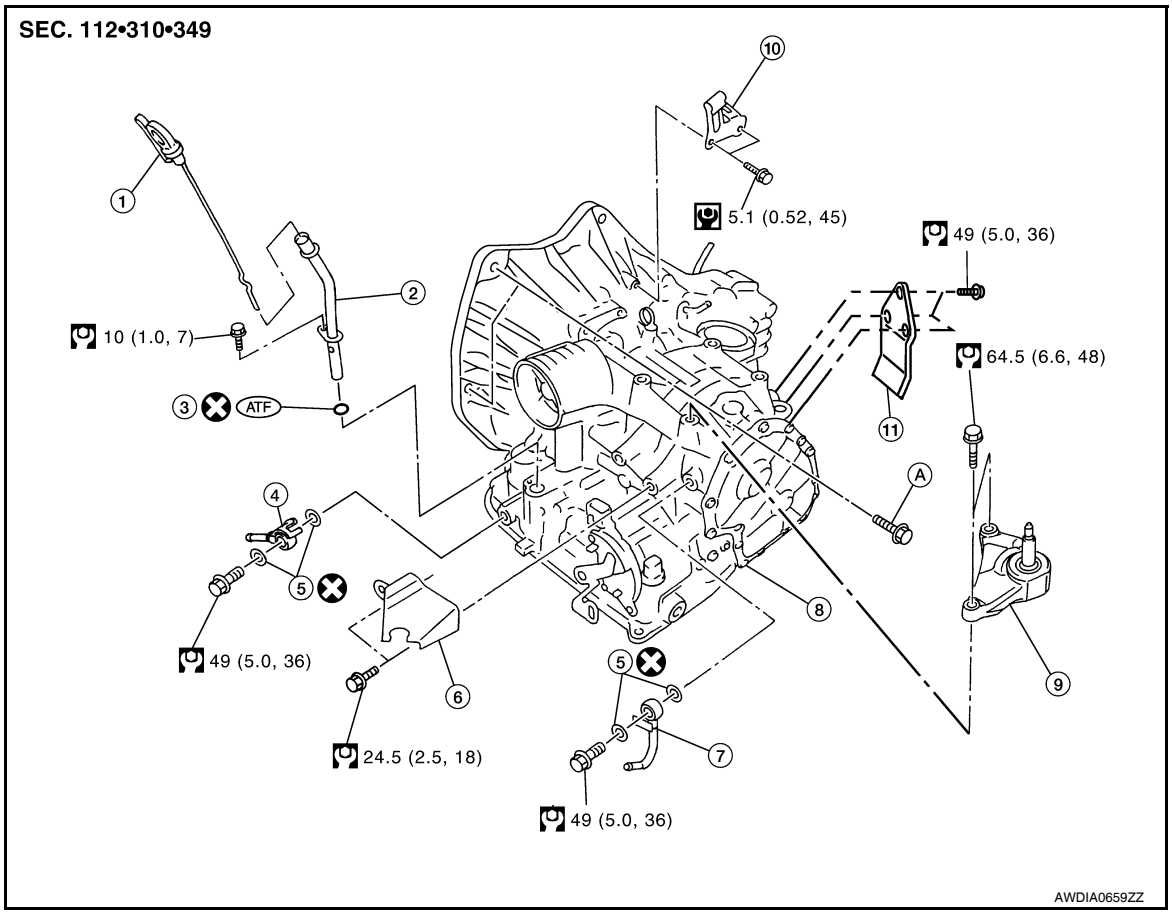


TRANSAXLE ASSEMBLY

Removal and Installation

INFOID:0000000007329477

COMPONENTS

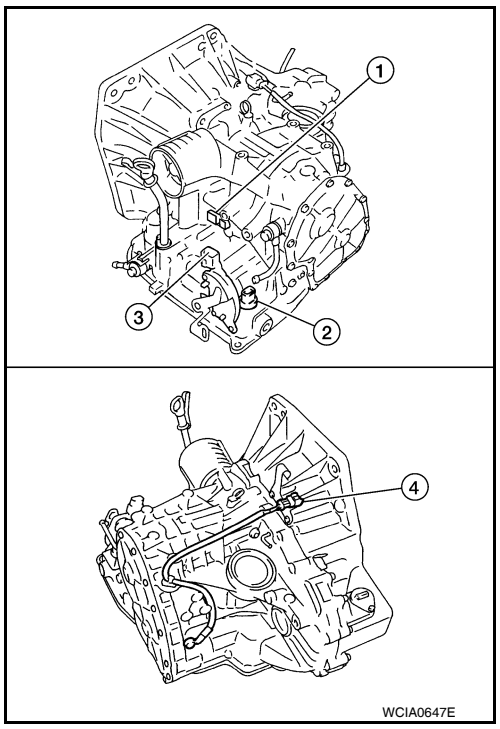


1. A/T fluid level gauge	2. A/T fluid charging pipe	3. O-ring
4. Fluid cooler tube	5. Copper washer	6. Bracket
7. Fluid cooler tube	8. A/T assembly	9. Engine mounting bracket (LH)
10. Bracket	11. Gusset	A. Refer to "INSTALLATION".

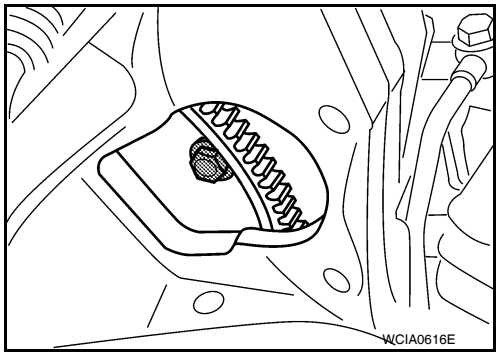
REMOVAL

1. Remove the engine and transaxle as an assembly. Refer to EM-78, "Removal and Installation".

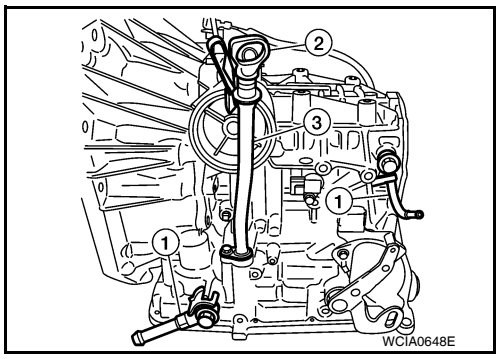
2. Disconnect the following connectors and remove the wire harness.
   - Input speed sensor harness connector (1)
   - Terminal cord assembly harness connector (2)
   - Transmission range switch connector (3)
   - Output speed sensor harness connector (4)



3. Remove the four drive plate to torque converter bolts.
   NOTE:
   Rotate the crankshaft clockwise as viewed from front of engine for access to drive plate to torque converter bolts.



4. Put matching marks on the drive plate and torque converter.
   CAUTION:
   For matching marks, use paint. Do not damage the drive plate or torque converter.
5. Remove the transaxle to engine and engine to transaxle bolts.
6. Separate the transaxle from the engine.
   CAUTION:
   Secure torque converter to prevent it from dropping.
7. If necessary, remove the following from the transaxle:
   - Output speed sensor
   - Input speed sensor
   - Fluid cooler tubes (1) and copper sealing washers
   - A/T fluid level gauge (2) and charging pipe (3)
   - Transmission range switch
   - Air breather hose
   - Engine mounting bracket (LH)
   - Any necessary brackets



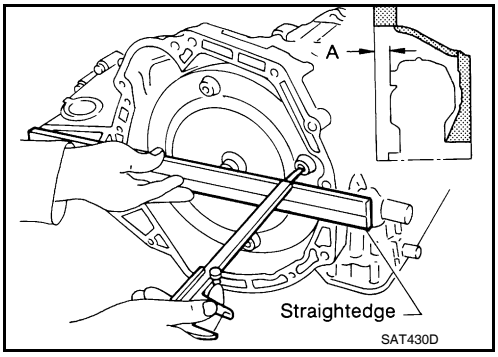
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

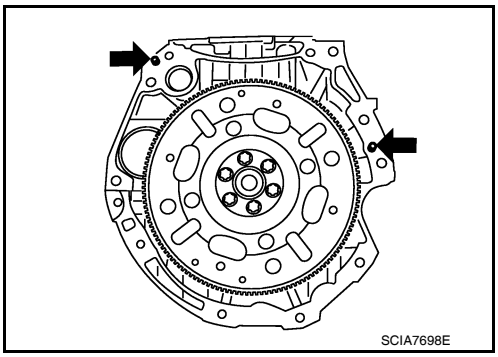
- **When replacing an engine or transmission you must make sure any dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.**
- **Do not reuse O-rings and copper sealing washers. Refer to "COMPONENTS".**
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the bolts for the torque converter while securing the crankshaft pulley bolt, be sure to confirm the tightening torque of the crankshaft pulley bolt. Refer to EM-40.**
- **After converter is installed to drive plate, rotate crankshaft several turns to check that transaxle rotates freely without binding.**
- When installing the torque converter to the transaxle measure distance A.

Dimension A: 14.4 mm (0.567 in) or more



- Check the fitting of the dowel pins when installing the transaxle assembly and the engine assembly.

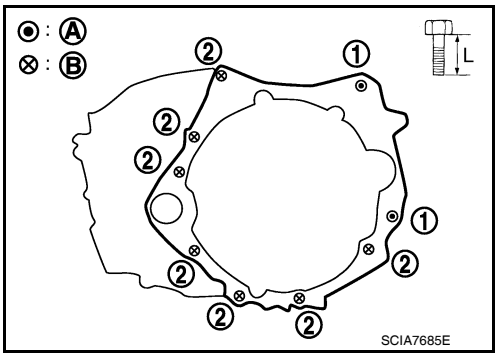
⬅: Dowel pin



- When installing the transaxle to the engine, align the matching mark on the drive plate with the matching mark on the torque converter.
- When securing the transaxle to the engine, attach the bolts in accordance with the following standard.

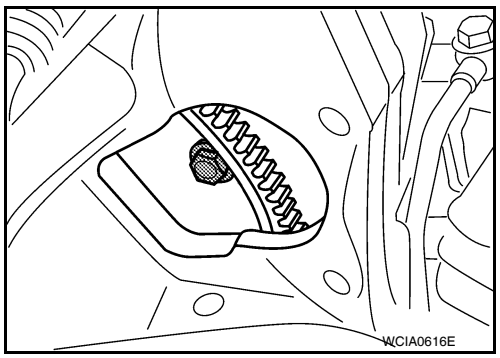
Bolt No.	1	2
Number of bolts	2	7
Bolt length “L” [mm (in)]	55 (2.17)	50 (1.97)
Tightening torque [N·m (kg-m, ft-lb)]	62 (6.3, 46)	

(A): A/T to engine
(B): Engine to A/T



- Align the positions for the bolts on drive plate with those of the torque converter, and temporarily tighten bolts. Then, tighten bolts to the specified torque.

Converter bolts : 51 N·m (5.2 kg-m, 38 ft-lb)



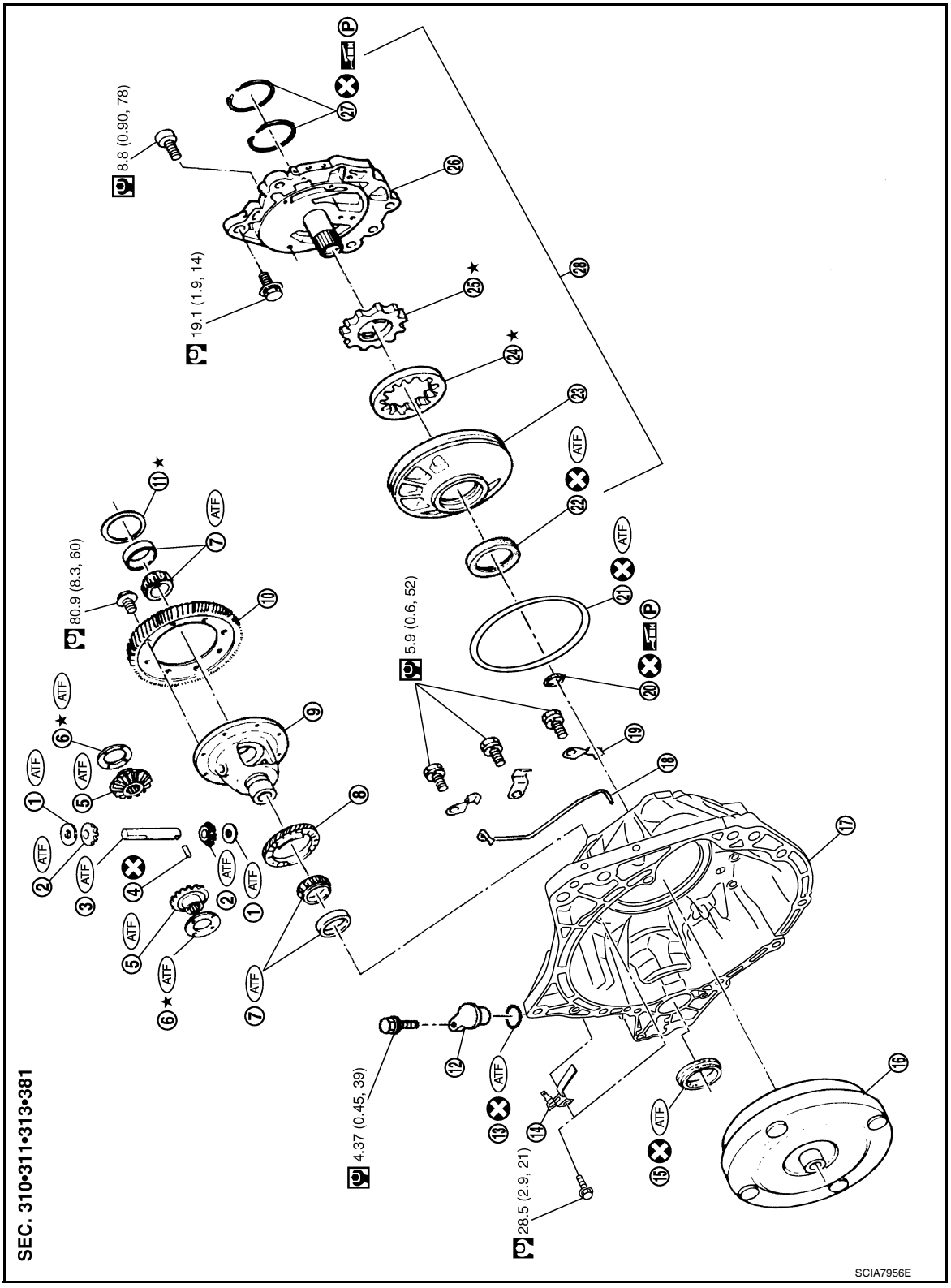
- After completing installation, check for A/T fluid leakage, A/T fluid level and A/T positions. Refer to AT-16, "Checking A/T Fluid" and AT-214, "Checking of A/T Position".

OVERHAUL

Component

INFOID:0000000007329478

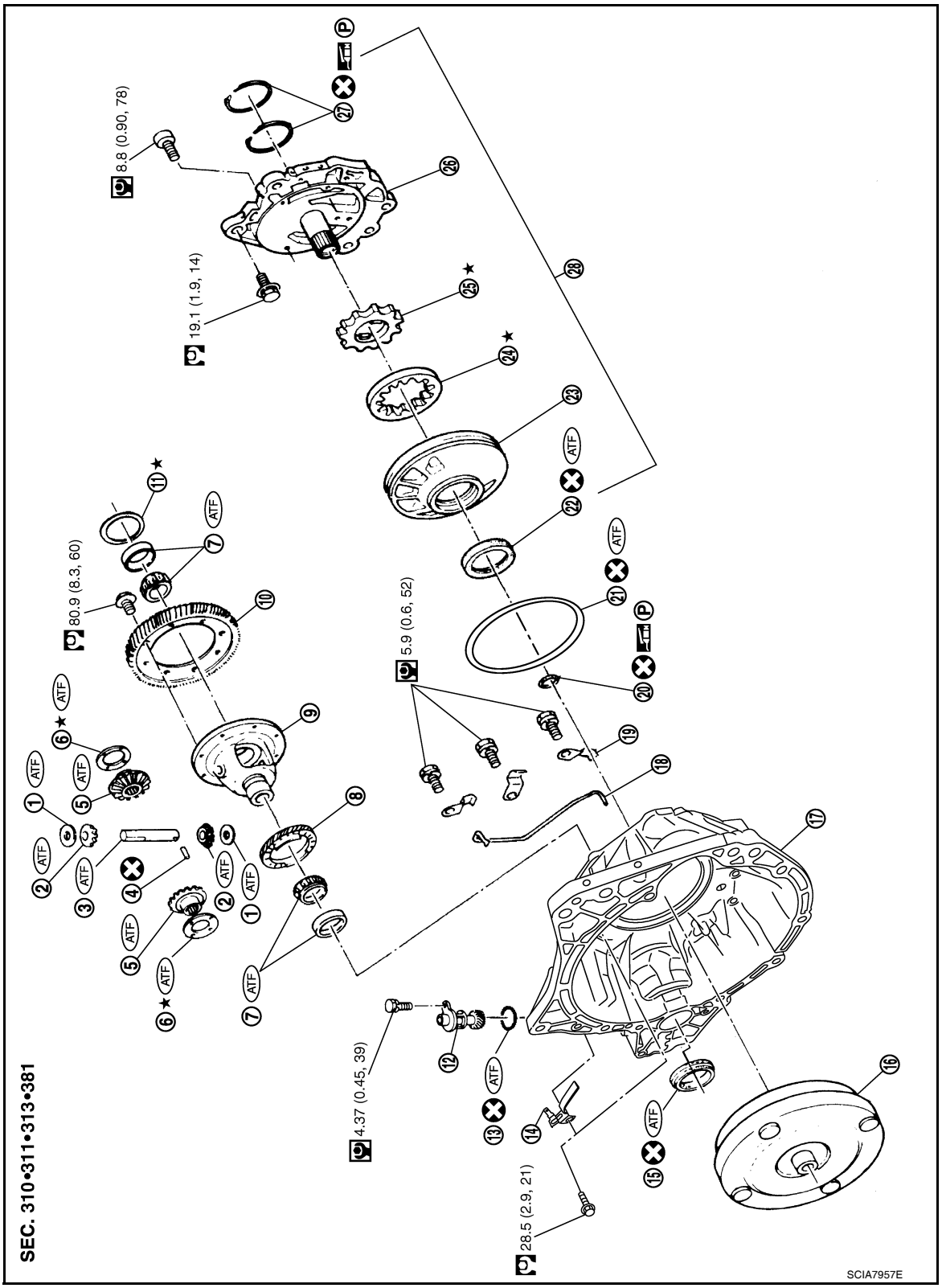
With ABS



1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Speedometer drive gear
9. Differential case

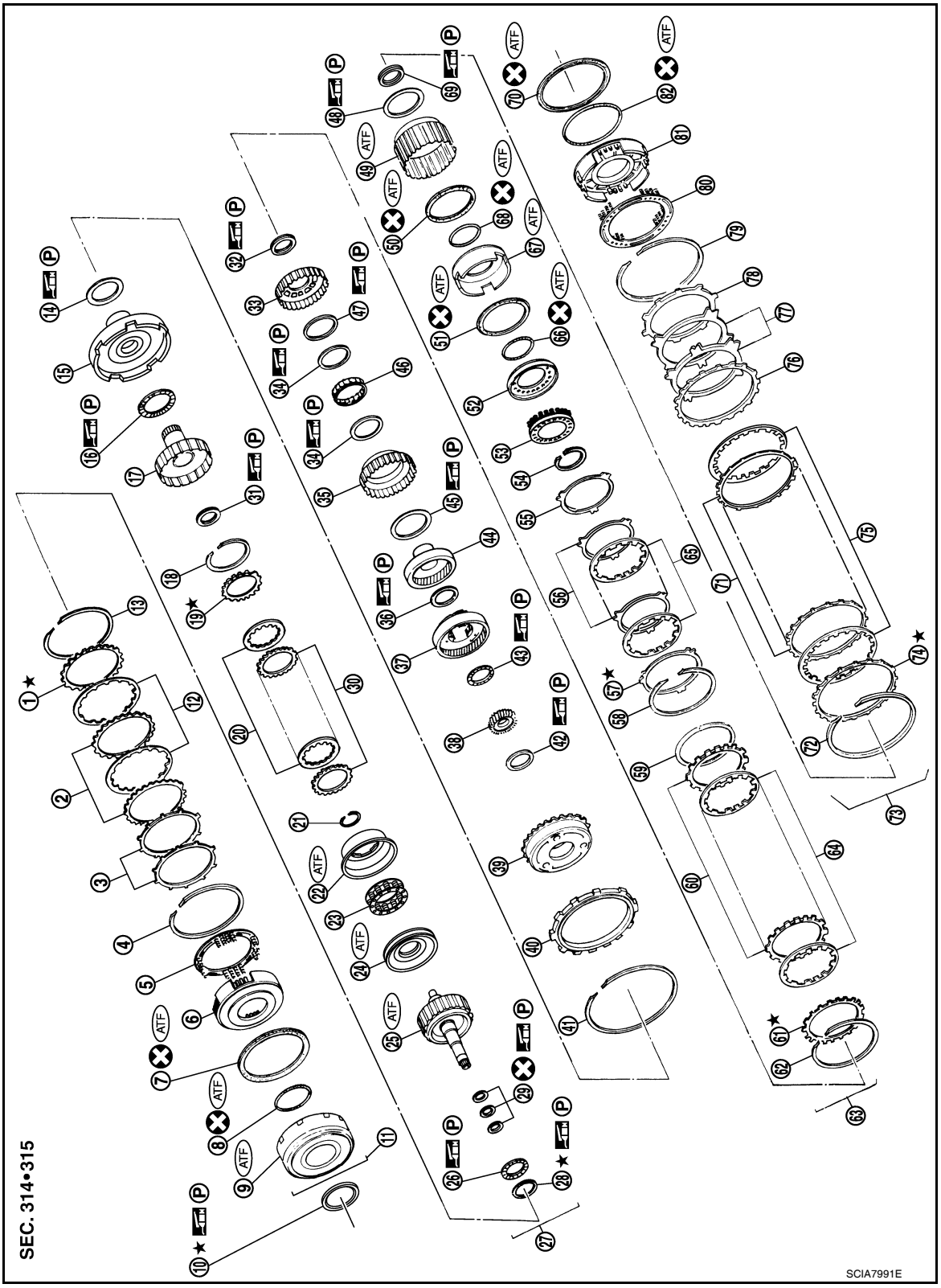
10. Final gear
11. Differential side bearing adjusting shim
12. Plug
13. O-ring
14. Bracket
15. RH differential side oil seal
16. Torque converter
17. Converter housing
18. Differential lubricant tube
19. Clip
20. O-ring
21. O-ring
22. Oil pump housing oil seal
23. Oil pump housing
24. Outer gear
25. Inner gear
26. Oil pump cover
27. Seal ring
28. Oil pump assembly

Without ABS

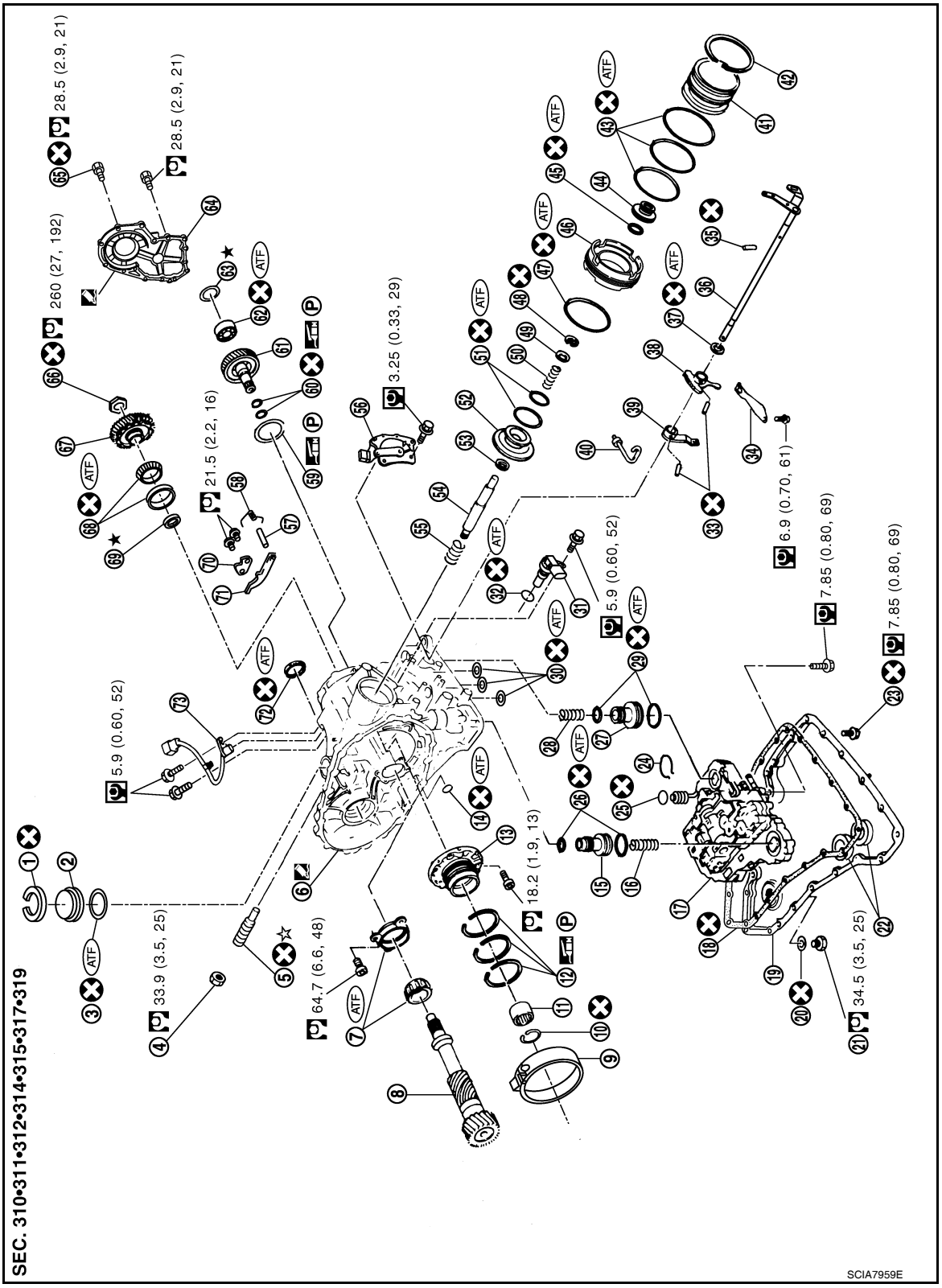


1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Speedometer drive gear
9. Differential case
10. Final gear
11. Differential side bearing adjusting shim
12. Speedometer pinion
13. O-ring
14. Bracket
15. RH differential side oil seal

16. Torque converter
17. Converter housing
18. Differential lubricant tube
19. Clip
20. O-ring
21. O-ring
22. Oil pump housing oil seal
23. Oil pump housing
24. Outer gear
25. Inner gear
26. Oil pump cover
27. Seal ring
28. Oil pump assembly



1. Retaining plate
2. Driven plate
3. Dish plate
4. Snap ring
5. Spring retainer assembly
6. Reverse clutch piston
7. Seal lip
8. D-ring
9. Reverse clutch drum
10. Thrust washer
11. Reverse clutch assembly
12. Drive plate
13. Snap ring
14. Needle bearing
15. Front sun gear
16. Needle bearing
17. High clutch hub
18. Snap ring
19. Retaining plate
20. Drive plate
21. Snap ring
22. Cancel cover
23. Spring retainer assembly
24. High clutch piston
25. Input shaft assembly (high clutch drum)
26. Needle bearing
27. High clutch assembly
28. Bearing race
29. Seal ring
30. Driven plate
31. Needle bearing
32. Needle bearing
33. Overrun clutch hub
34. End bearing
35. Forward clutch hub
36. Needle bearing
37. Rear planetary carrier
38. Rear sun gear
39. Front planetary carrier
40. Low one-way clutch
41. Snap ring
42. Needle bearing
43. Needle bearing
44. Rear internal gear
45. Thrust washer
46. Forward one-way clutch
47. Thrust washer
48. Thrust washer
49. Forward clutch drum
50. Seal lip
51. Seal lip
52. Overrun clutch piston
53. Spring retainer assembly
54. Snap ring
55. Dish plate
56. Driven plate
57. Retaining plate
58. Snap ring
59. Dish plate
60. Driven plate
61. Retaining plate
62. Snap ring
63. Forward clutch assembly and overrun clutch assembly
64. Drive plate
65. Drive plate
66. D-ring
67. Forward clutch piston
68. D-ring
69. Needle bearing
70. Seal lip
71. Driven plate
72. Snap ring
73. Low & reverse brake assembly
74. Retaining plate
75. Drive plate
76. Retaining plate
77. Dish plate
78. Driven plate
79. Snap ring
80. Spring retainer assembly
81. Low & reverse brake piston
82. D-ring



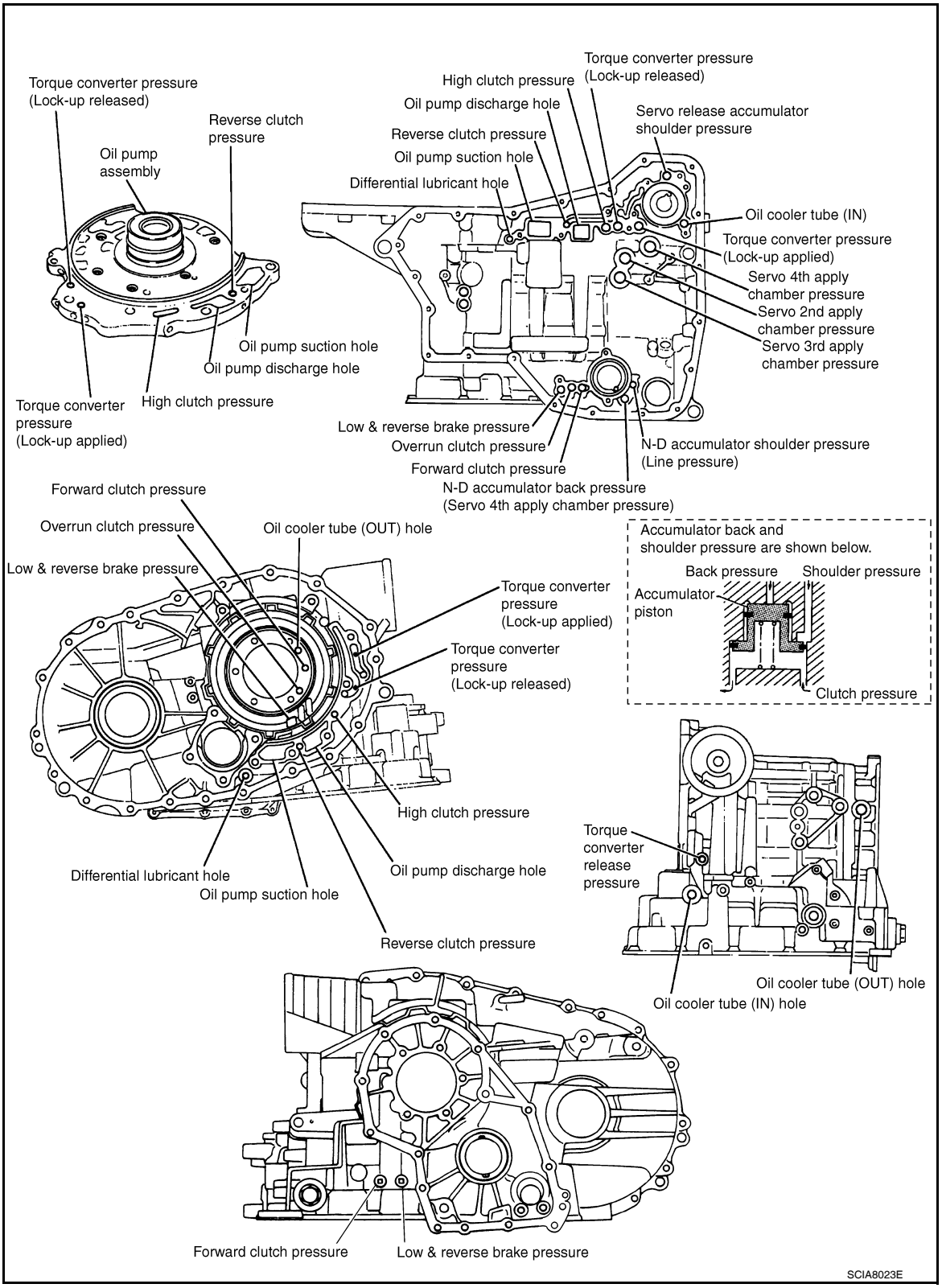
1. Snap ring
2. Governor cap
3. O-ring
4. Lock nut
5. Anchor end pin
6. Transaxle case
7. Reduction pinion gear bearing
8. Reduction pinion gear
9. Brake band
10. Snap ring
11. Radial needle bearing
12. Seal ring
13. Bearing retainer
14. O-ring
15. Servo release accumulator piston
16. Return spring
17. Control valve assembly
18. Oil pan gasket

19. Oil pan
20. Drain plug gasket
21. Drain plug
22. Magnet
23. Oil pan bolt
24. Snap ring
25. O-ring
26. O-ring
27. N-D accumulator piston
28. Return spring
29. O-ring
30. Lip seal
31. Input speed sensor
32. O-ring
33. Retaining pin
34. Detent spring
35. Retaining pin
36. Manual shaft
37. Manual shaft oil seal
38. Manual plate
39. Parking rod plate
40. Parking rod
41. OD servo piston retainer
42. Snap ring
43. O-ring
44. OD servo piston
45. D-ring
46. Servo piston retainer
47. O-ring
48. E-ring
49. Spring retainer
50. OD servo return spring
51. D-ring
52. Band servo piston
53. Band servo thrust washer
54. Band servo piston stem
55. 2nd servo return spring
56. Transmission range switch
57. Parking shaft
58. Return spring
59. Thrust needle bearing
60. Seal ring
61. Output shaft
62. Output shaft bearing
63. Output shaft adjusting shim
64. Side cover
65. Side cover bolt
66. Lock nut
67. Idler gear
68. Idler gear bearing
69. Reduction pinion gear adjusting shim
70. Parking actuator support
71. Parking pawl
72. LH differential side oil seal
73. Output speed sensor

: Apply Genuine Anaerobic Liquid Gasket or equivalent.

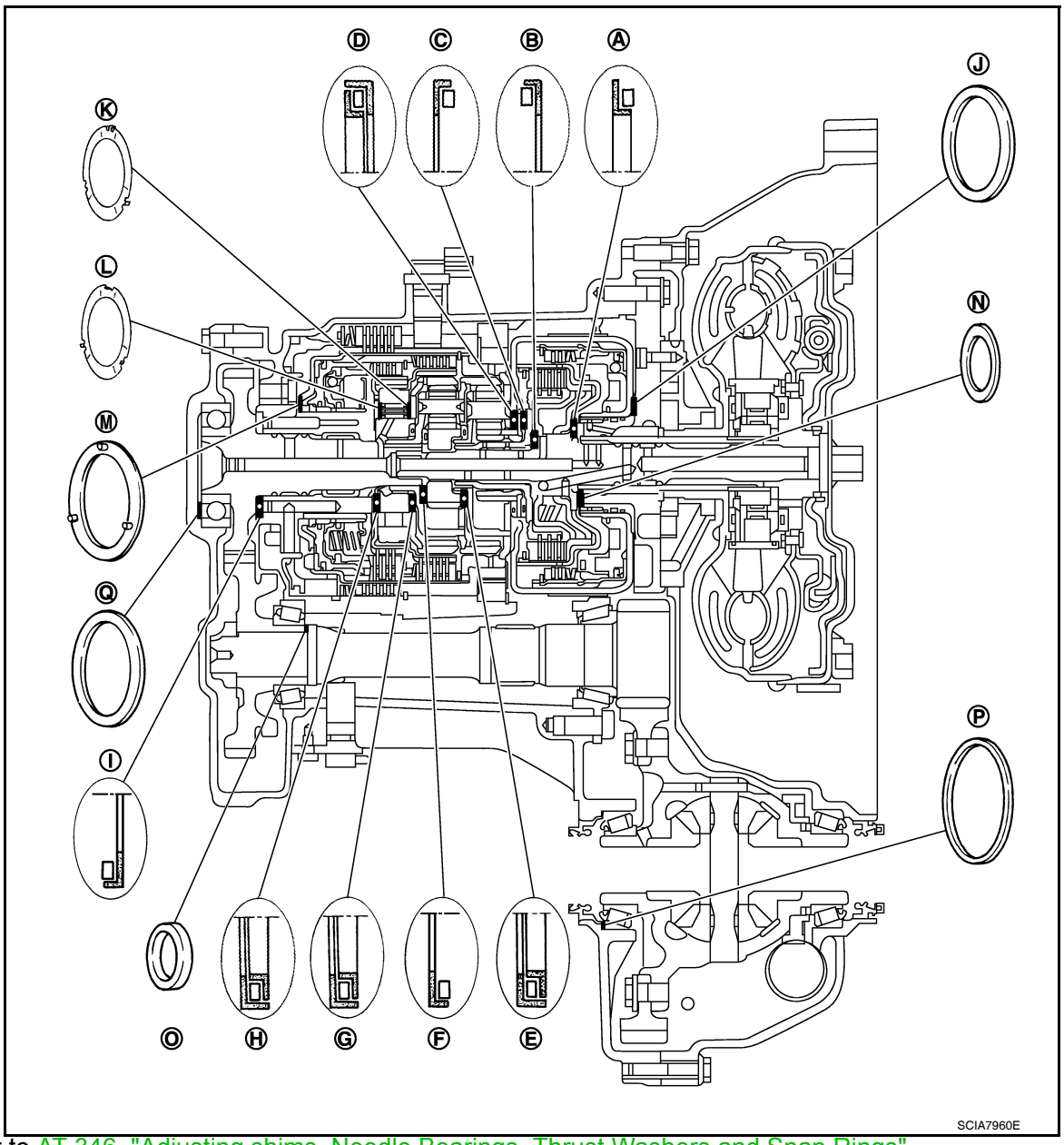
Oil Channel

INFOID:0000000007329479



Location of Adjusting Shims, Needle Bearings and Thrust Washers

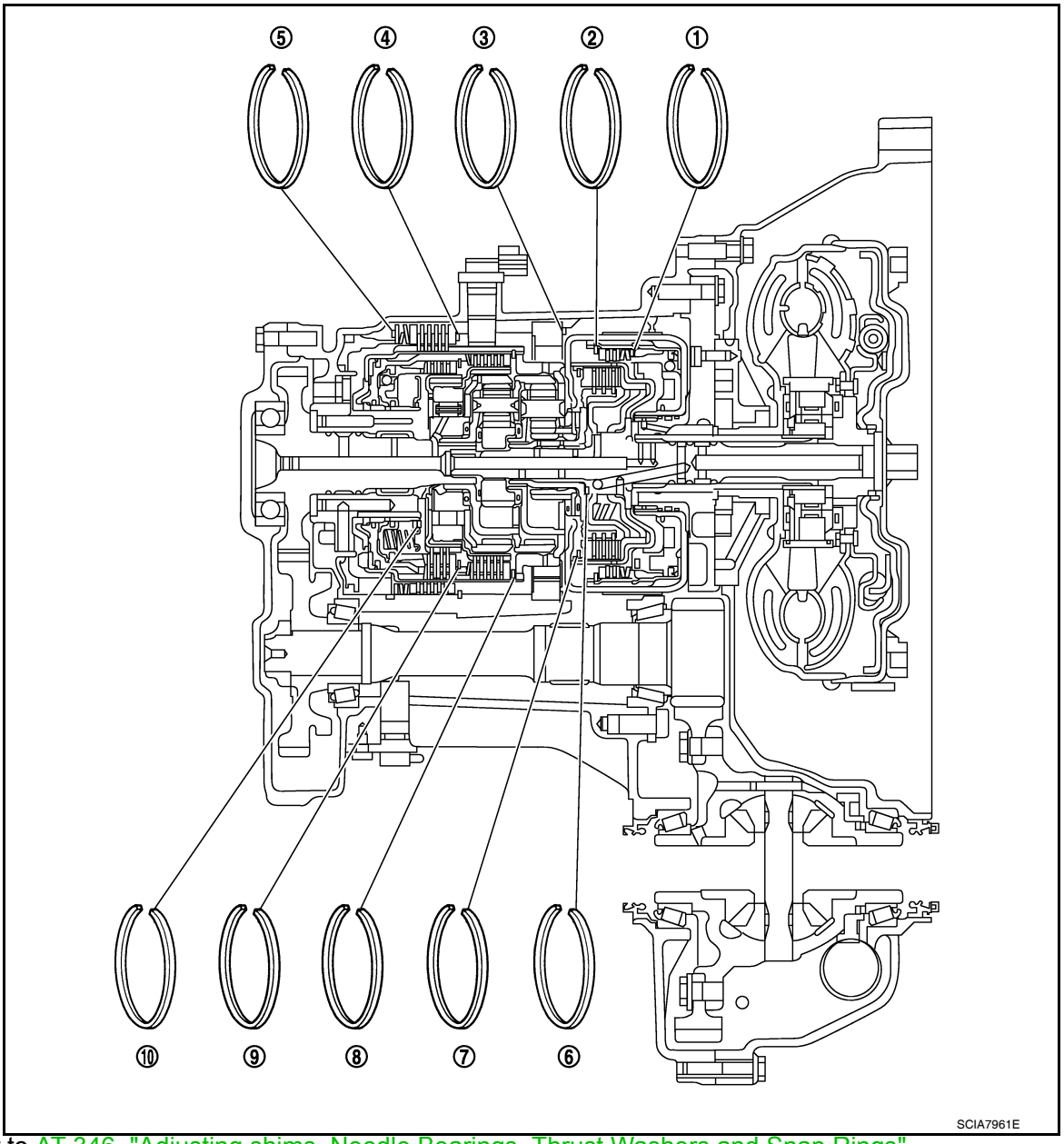
INFOID:0000000007329480



- Refer to AT-346, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

Location of Snap Rings

INFOID:0000000007329481



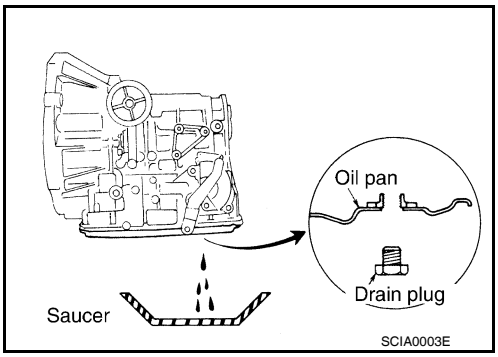
- Refer to AT-346, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

DISASSEMBLY

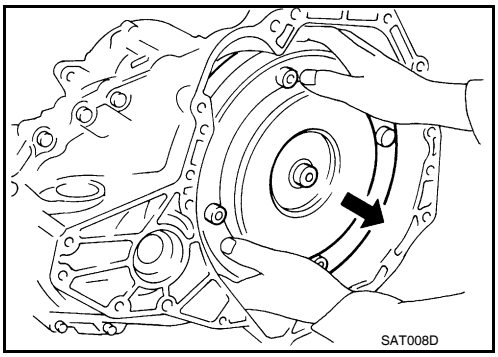
Disassembly

INFOID:0000000007329482

1. Drain ATF through drain hole.
2. Remove drain plug gasket from drain plug.



3. Remove torque converter.

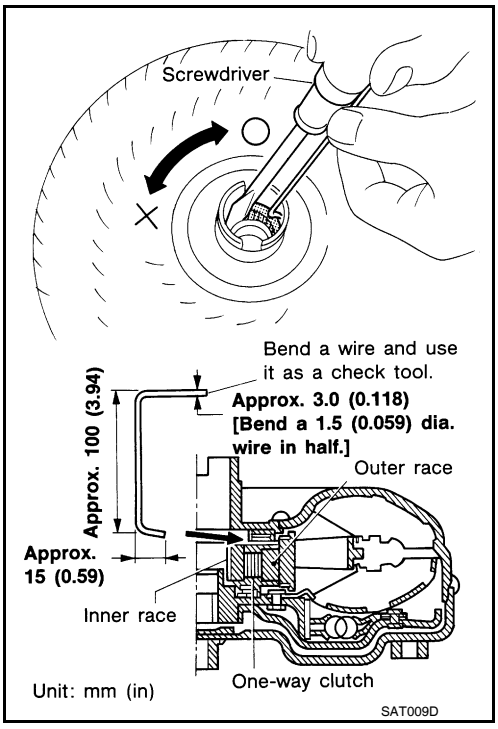


4. Check torque converter one-way clutch using check tool as shown.

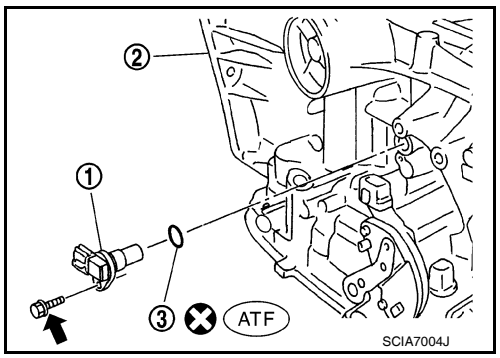
a. Insert check tool into groove of bearing support built into one-way clutch outer race.

b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.

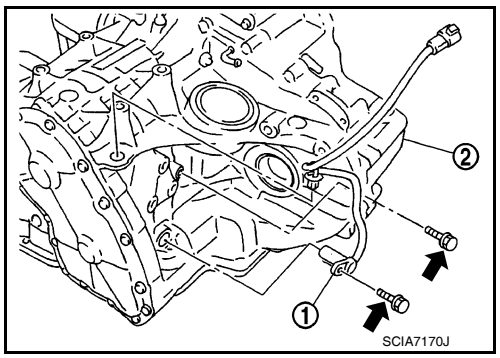
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



5. Remove input speed sensor (1) from transaxle case (2).
   ⬅: Bolt
6. Remove O-ring (3) from input speed sensor (1).



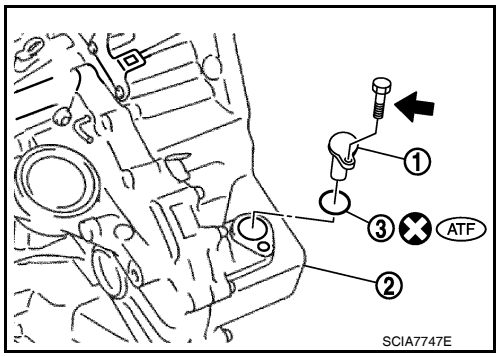
7. Remove output speed sensor (1) from transaxle case (2).
   ⬅: Bolt



8. Remove plug or speedometer pinion according to the following procedures.

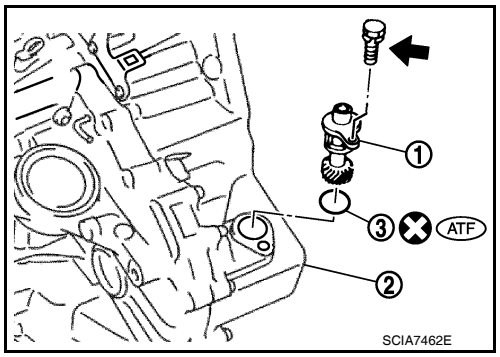
a. With ABS

i. Remove plug (1) from converter housing (2).
   ⬅: Bolt
ii. Remove O-ring (3) from plug (1).

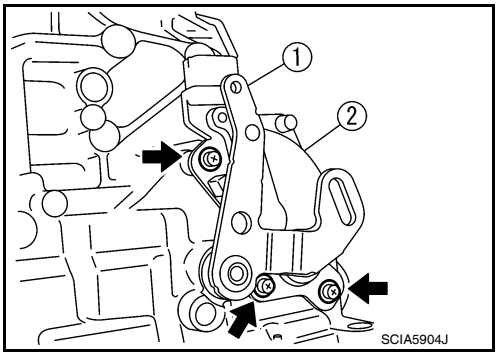


b. Without ABS

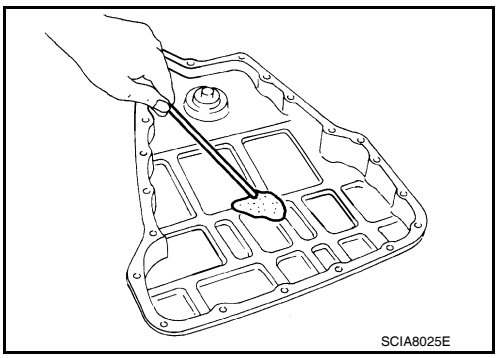
i. Remove speedometer pinion (1) from converter housing (2).
   ⬅: Bolt
ii. Remove O-ring (3) from speedometer pinion (1).



9. Set manual shaft (1) in “P” position.
10. Remove transmission range switch (2) from transaxle case.
    ⬅: Bolt
11. Remove oil pan bolts.
12. Remove oil pan and oil pan gasket.

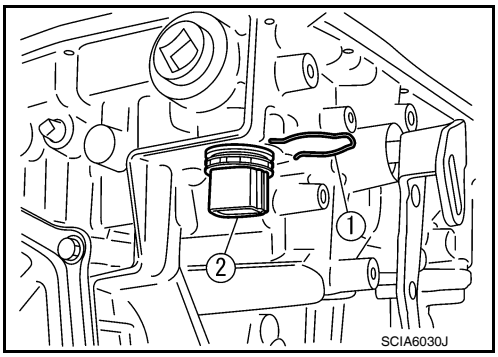


13. Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
    - **If frictional material is detected, replace radiator after repair of A/T. Refer to CO-15.**
14. Remove magnets from oil pan.



15. Remove control valve assembly according to the following procedures.

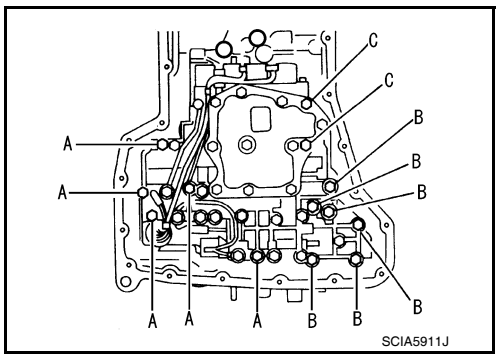
a. Remove snap ring (1) from terminal body (2).
   CAUTION:
   Do not expand snap ring (1) excessively.
b. Push terminal body (2) into transaxle case.



c. Remove control valve assembly fitting bolts **(A)**, (**B**) and (**C**).

Bolt length, number and location:

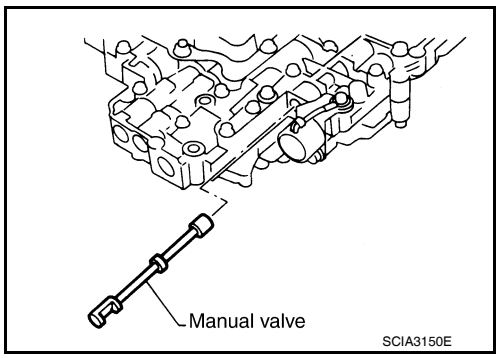
Bolt symbol	A	B	C
Bolt length “ℓ” [mm (in)]	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



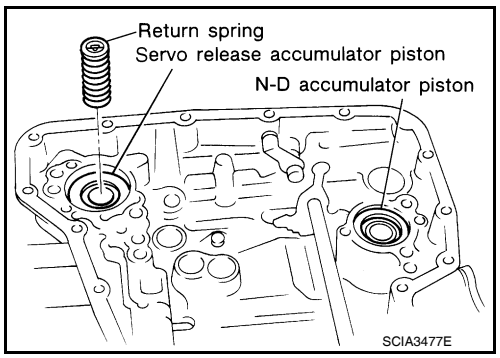
d. Remove control valve assembly from transaxle case.
   CAUTION:
   Be careful not to drop manual valve.

16. Remove manual valve from control valve assembly.
    - **Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.**

    CAUTION:
    Be careful not to drop manual valve.
17. Remove O-ring from terminal body.

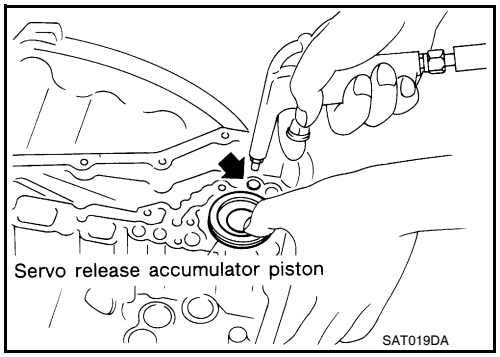


18. Remove return spring from servo release accumulator piston.



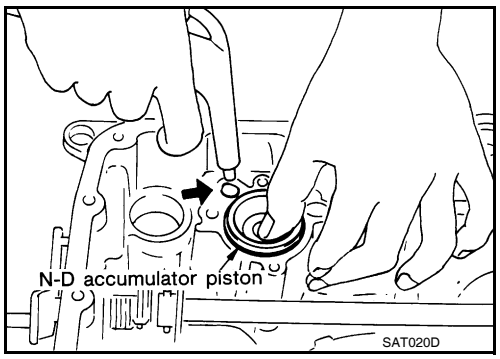
19. Apply compressed air into the oil hole as shown, and remove servo release accumulator piston from transaxle case.

    CAUTION:
    Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint-free cloth and blow air little by little to avoid this.



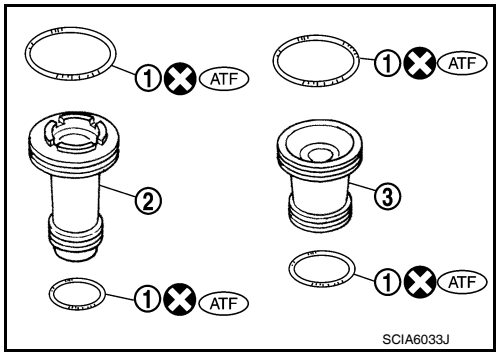
20. Apply compressed air into the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.

    CAUTION:
    Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint free-cloth and blow air little by little to avoid this.

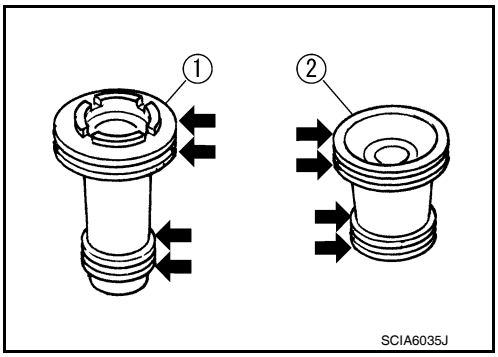


21. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).

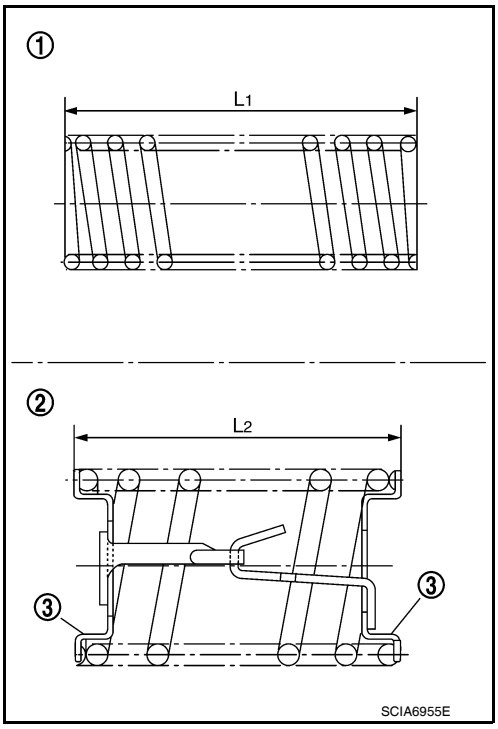
    CAUTION:
    Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.



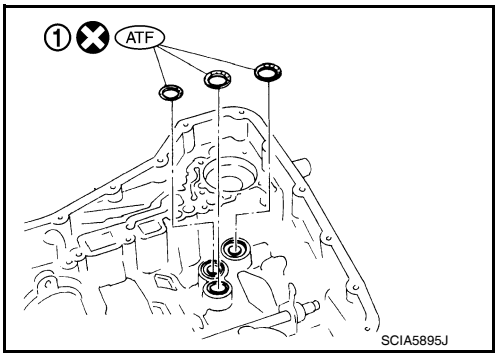
- **Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.**
  (1): Servo release accumulator piston
  (2): N-D accumulator piston



- Inspect each return spring, and replace if deformed or worn. Refer to **AT-348, "Accumulator"** **for free length (L_1) and length (L_2).**
  (1): Return spring (Servo release accumulator)
  (2): Return spring (N-D accumulator)
  CAUTION:
  Do not remove spring retainer (3).

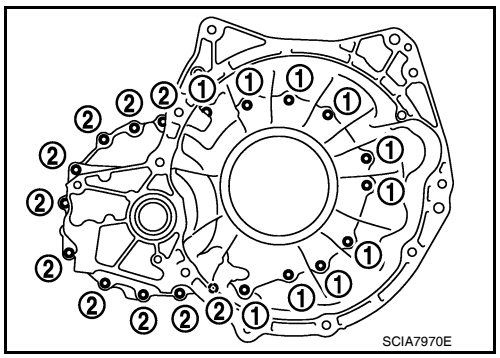


22. Remove lip seals (1) from transaxle case.

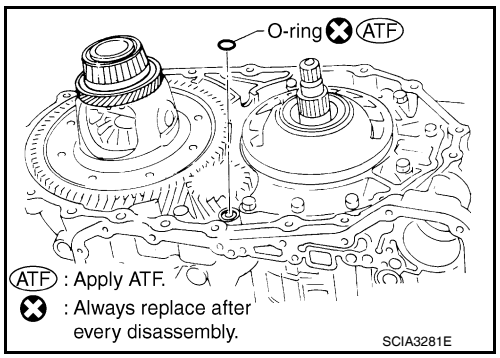


23. Remove converter housing according to the following procedures.

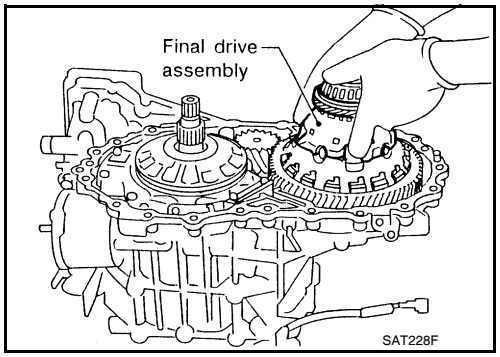
a. Remove converter housing bolts (1) and (2) using a power tool.
b. Remove bracket from converter housing
c. Remove converter housing by tapping it lightly.



d. Remove O-ring from differential lubricant hole.

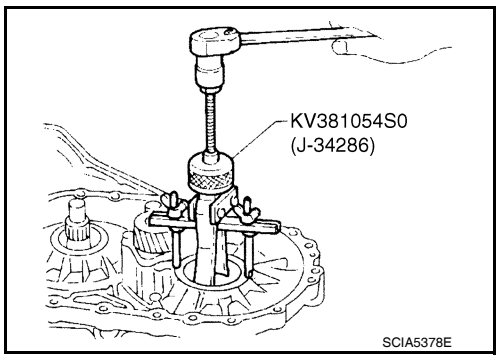


24. Remove final drive assembly from transaxle case.

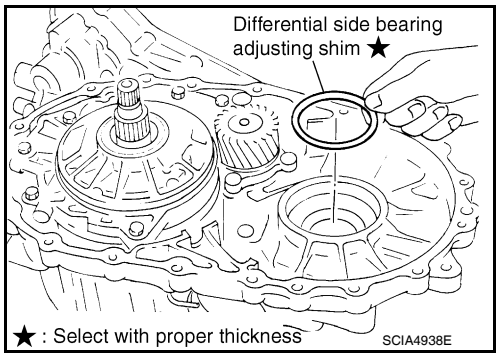


25. Remove differential side bearing outer race from transaxle case and converter housing.

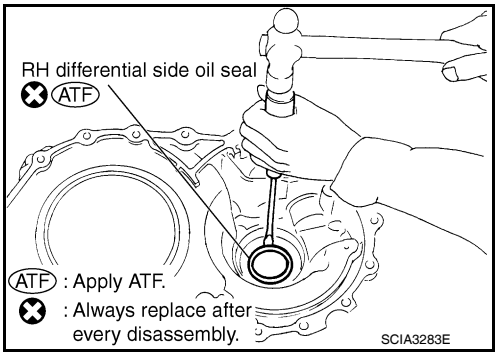
Tool number : KV381054S0 (J-34286)



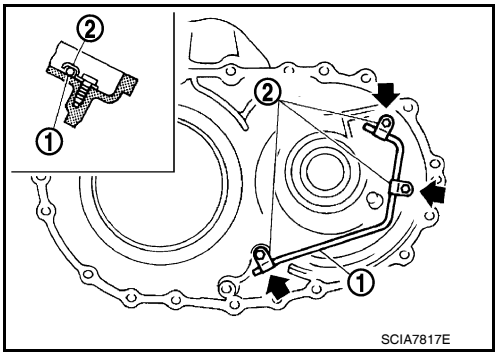
26. Remove differential side bearing adjusting shim from transaxle case.



27. Remove RH differential side oil seal from converter housing using a suitable tool.
CAUTION:
Be careful not to scratch converter housing.

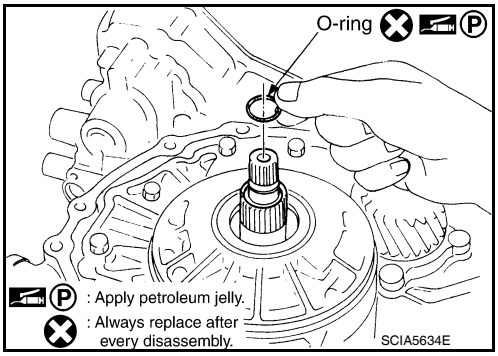


28. Remove differential lubricant tube (1) and clips (2) from converter housing.
⬅: Bolt



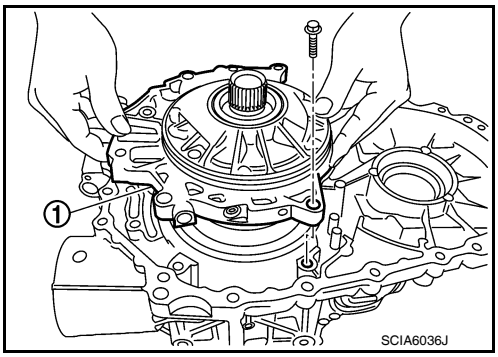
29. Remove oil pump assembly according to the following procedures.

a. Remove O-ring from input shaft assembly (high clutch drum).

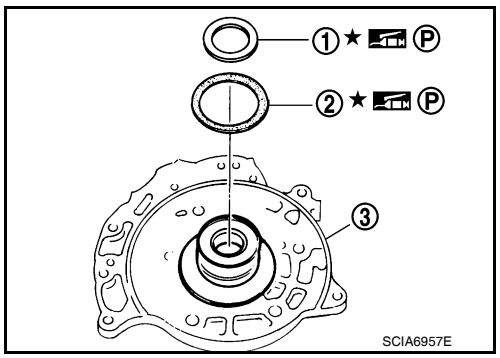


b. Remove oil pump assembly bolts, and then remove oil pump assembly (1) from transaxle case.

c. Remove O-ring from oil pump assembly (1).

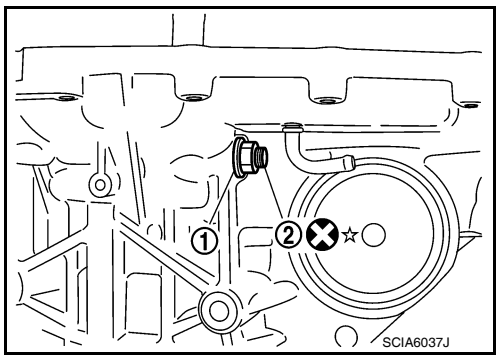


d. Remove bearing race (1) and thrust washer (2) from oil pump assembly (3).

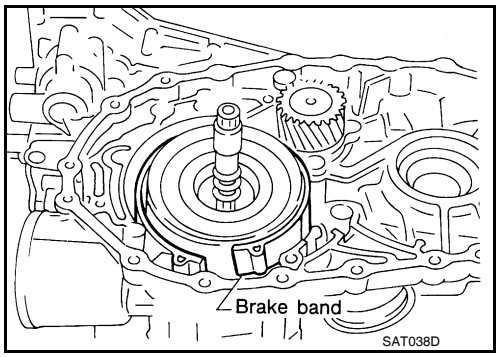


30. Remove brake band according to the following procedures.

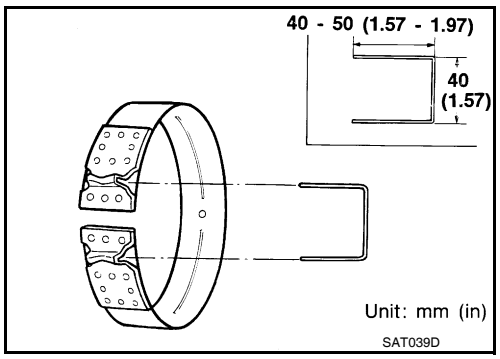
a. Loosen lock nut (1), and then remove anchor end pin (2) and lock nut (1) as a set from transaxle case.



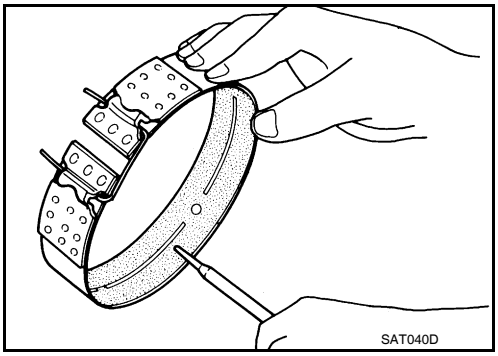
b. Remove brake band from transaxle case.



- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing brake band, always secure it with a clip as shown in the figure.**
  Leave the clip in position after removing brake band.

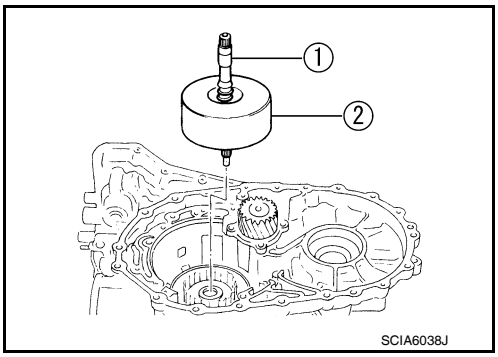


c. Check brake band facing for damage, cracks, wear or burns.

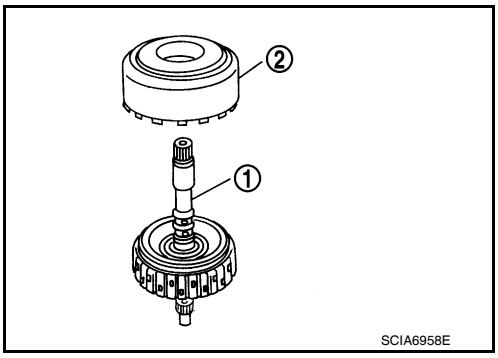


31. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

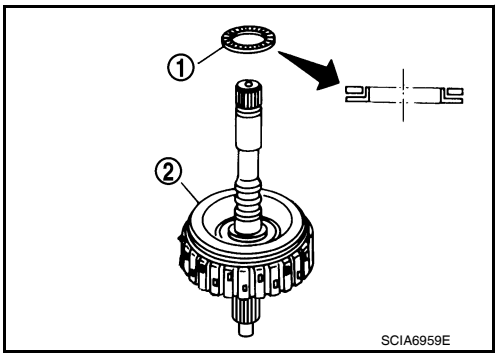
a. Remove input shaft assembly (high clutch assembly) (1) with reverse clutch assembly (2).



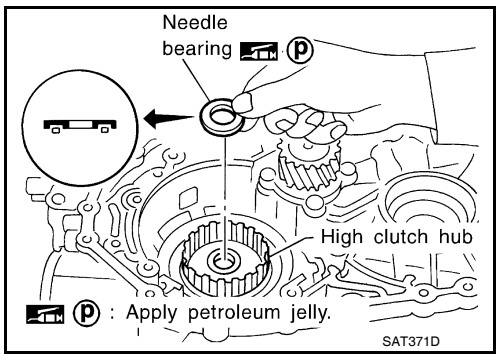
b. Remove input shaft assembly (high clutch assembly) (1) from reverse clutch assembly (2).



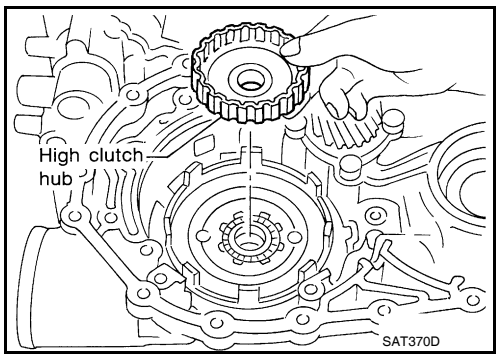
c. Remove needle bearing (1) from input shaft assembly (high clutch drum) (2).
   - **Inspect needle bearing (1) and input shaft assembly (high clutch drum) (2), and replace if damaged or worn.**



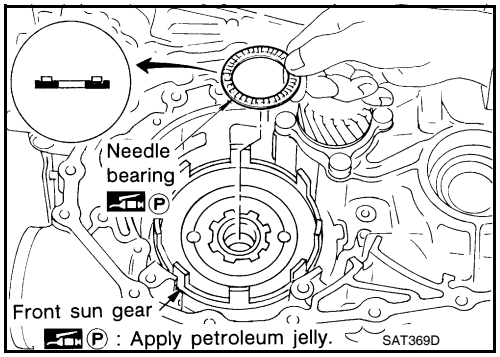
32. Remove needle bearing from high clutch hub.
    - **Inspect needle bearing, and replace if damaged or worn.**



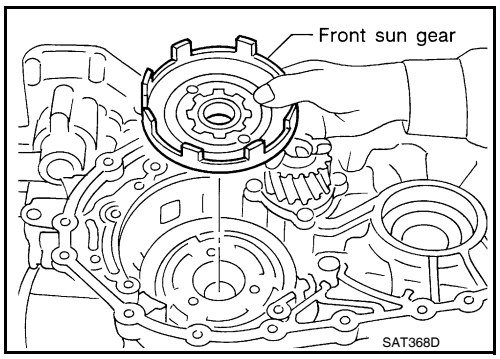
33. Remove high clutch hub from front sun gear.
    - **Inspect high clutch hub, and replace if damaged or worn.**



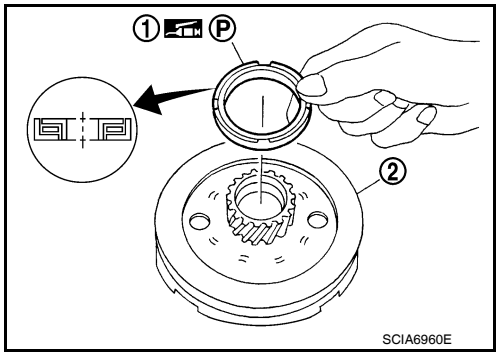
34. Remove needle bearing from front sun gear.
    - **Inspect needle bearing, and replace if damaged or worn.**



35. Remove front sun gear from front planetary carrier.

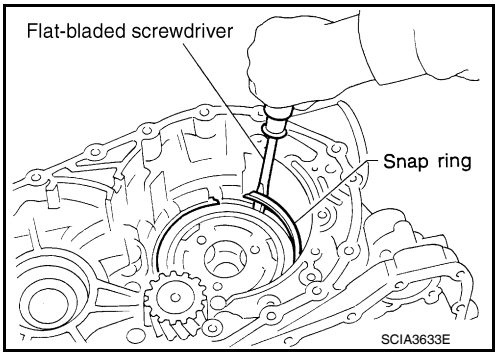


36. Remove needle bearing (1) from front sun gear (2).
    - **Inspect needle bearing (1) and front sun gear (2), and replace if damaged or worn.**

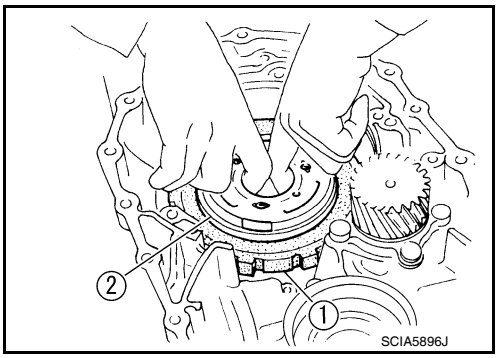


37. Remove front planetary carrier and low one-way clutch according to the following procedures.

a. Remove snap ring using a flat-bladed screwdriver.

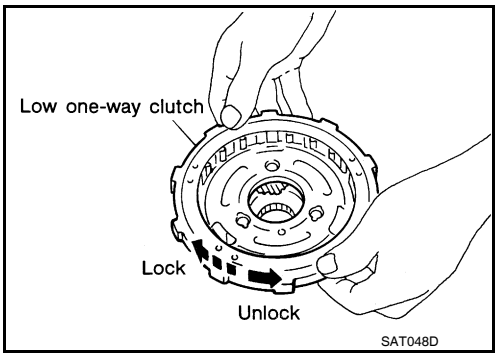


b. Remove low one-way clutch (1) and front planetary carrier (2) as a set from transaxle case.

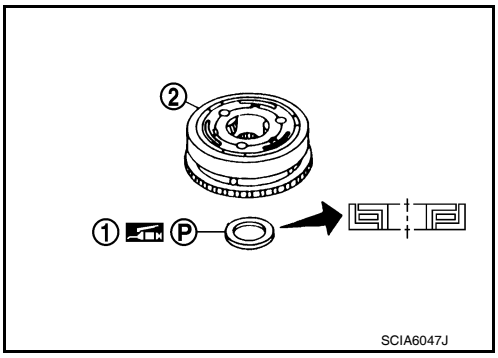


c. Check that low one-way clutch rotates counter-clockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.
   - **Replace low one-way clutch if necessary.**

d. Remove low one-way clutch from front planetary carrier by turning it in the direction of unlock.
   - **Inspect low one-way clutch, and replace if damaged or worn.**



e. Remove needle bearing (1) from front planetary carrier (2).
   - **Inspect needle bearing (1) and front planetary carrier (2), and replace if damaged or worn.**

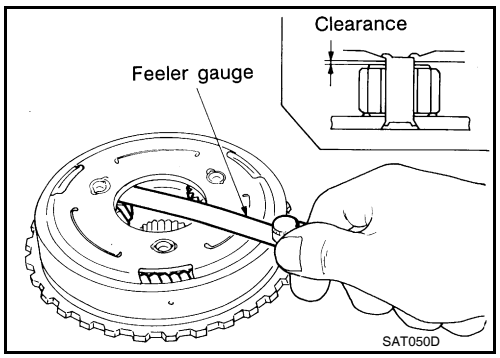


f. Check clearance between pinion washer and front planetary carrier using feeler gauge.

Standard clearance and allowable limit:

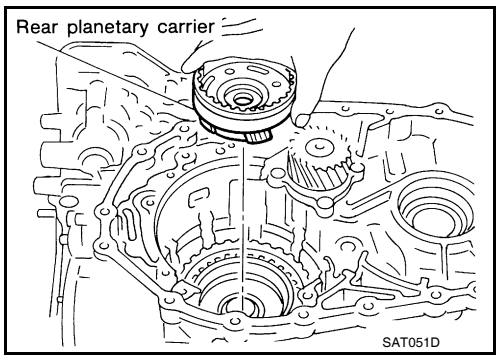
Refer to AT-350, "Planetary Carrier".

- **Replace front planetary carrier if the clearance exceeds allowable limit.**

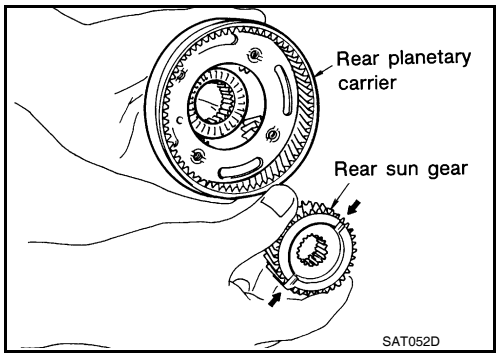


38. Remove rear planetary carrier and rear sun gear according to the following procedures.

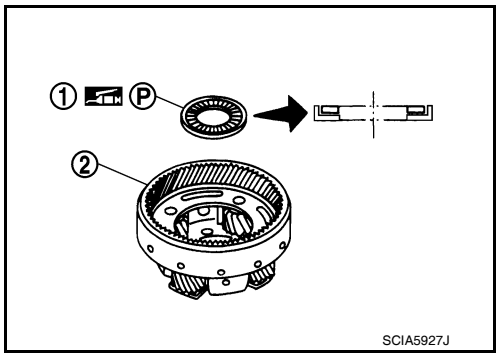
a. Remove rear planetary carrier (with rear sun gear) from transaxle case.



b. Remove rear sun gear from rear planetary carrier.
- **Inspect rear sun gear, and replace if damaged or worn.**



c. Remove needle bearing (1) from rear planetary carrier (2).
- **Inspect needle bearing (1) and rear planetary carrier (2), and replace if damaged or worn.**

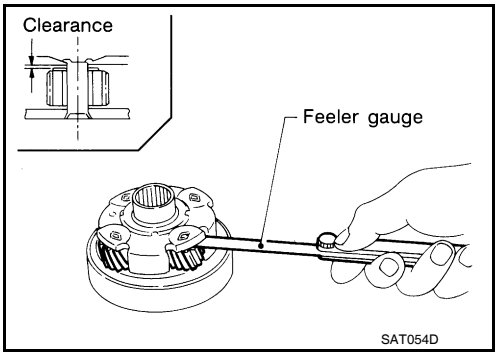


d. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

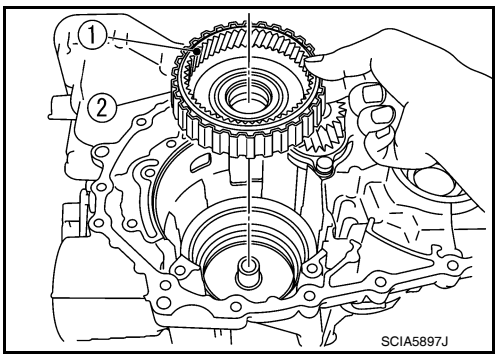
Standard clearance and allowable limit:

Refer to AT-350, "Planetary Carrier".

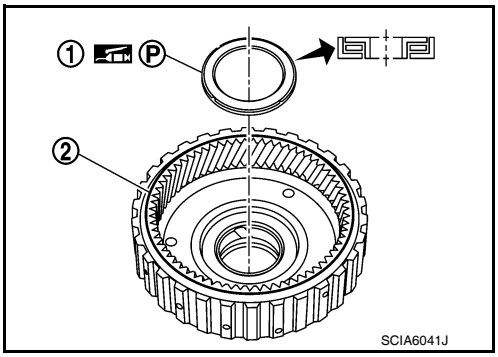
- **Replace rear planetary carrier if the clearance exceeds allowable limit.**



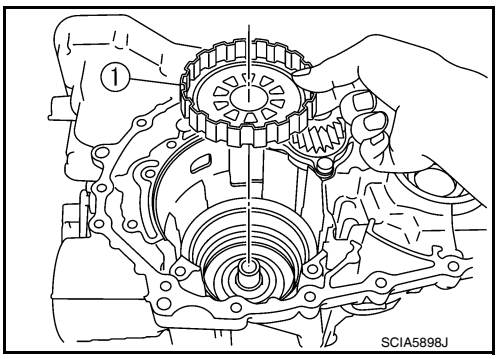
39. Remove rear internal gear (1) and forward clutch hub (2) as a set from forward clutch drum.



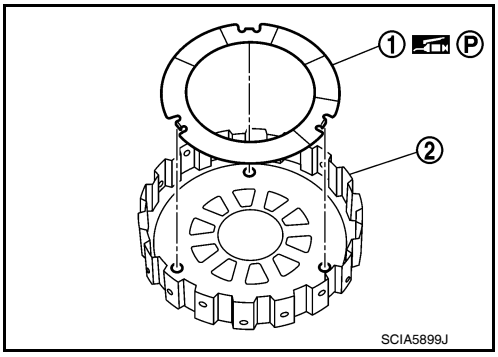
40. Remove needle bearing (1) from rear internal gear (2).
    - **Inspect needle bearing (1), and replace if damaged or worn.**



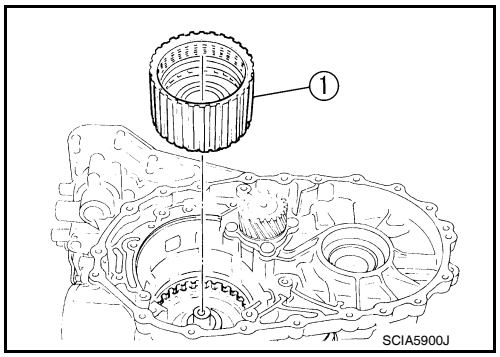
41. Remove overrun clutch hub (1) from forward clutch drum.



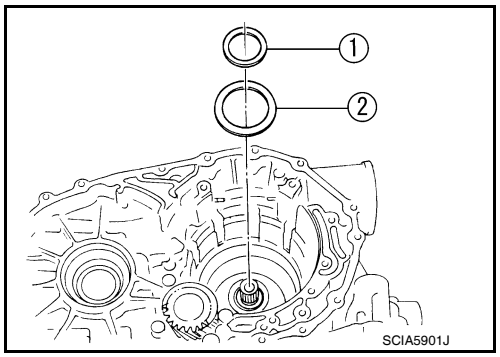
42. Remove thrust washer (1) from overrun clutch hub (2).
    - **Inspect thrust washer (1) and overrun clutch hub (2), and replace if damaged or worn.**



43. Remove forward clutch assembly and overrun clutch assembly (1) from transaxle case.

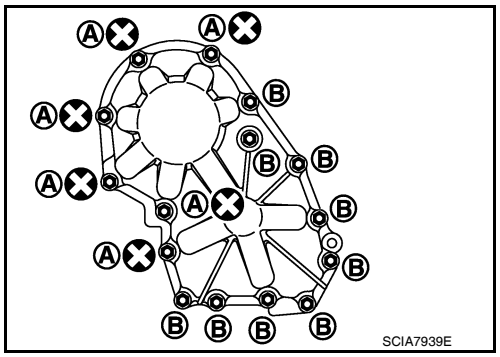


44. Remove needle bearing (1) and thrust washer (2) from bearing retainer.
    - **Inspect needle bearing (1) and thrust washer (2), and replace damaged or worn.**

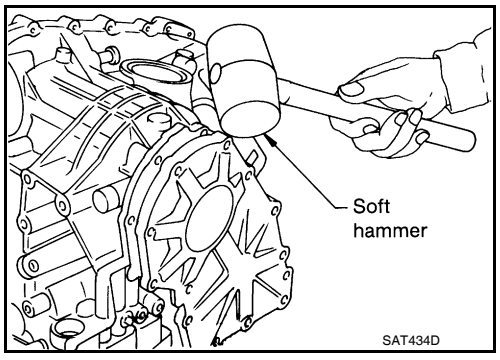


45. Remove output shaft assembly according to the following procedures.

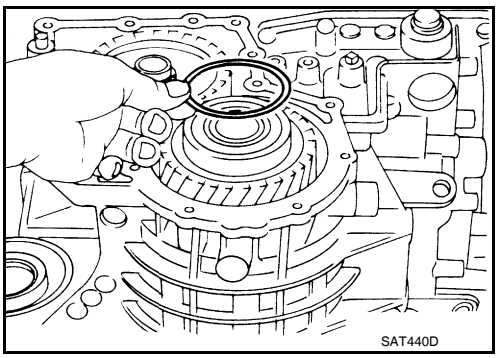
a. Remove side cover bolts (A) and (B).
   CAUTION:
   - **Do not mix bolts (A) and (B).**
   - **Always replace bolts (A) as they are self-sealing bolts.**



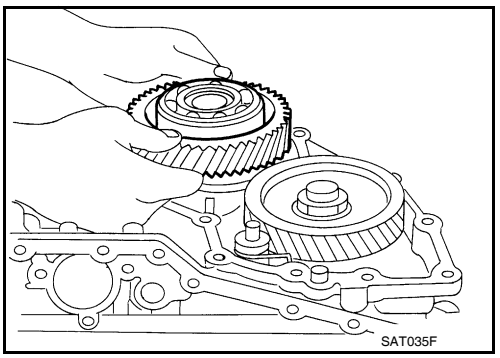
b. Remove side cover by lightly tapping it using a soft hammer.
   CAUTION:
   - **Be careful not to drop output shaft assembly. It might come out when removing side cover.**
   - **Be careful not to damage side cover.**



c. Remove output shaft adjusting shim.

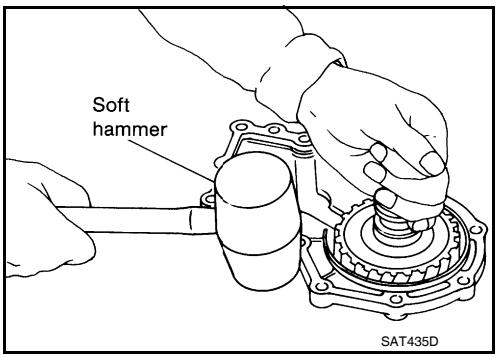


d. Remove output shaft assembly.

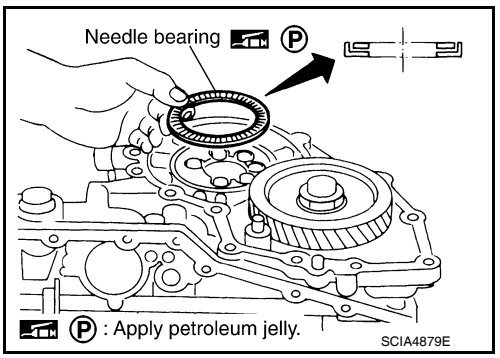


- If output shaft assembly came off with side cover, tap side-cover with a soft hammer to separate.

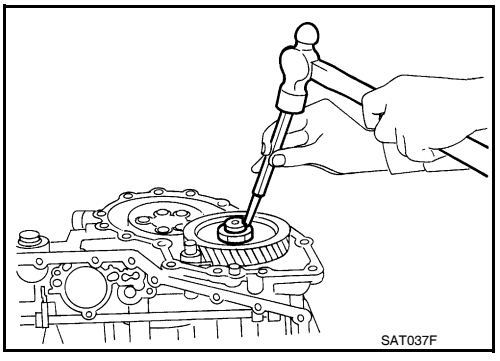
CAUTION:
Be careful not to damage side cover.



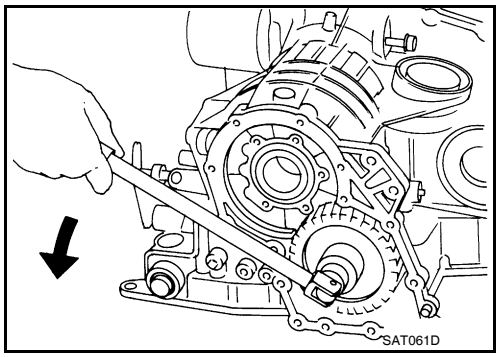
e. Remove needle bearing.
- **Check needle bearing, and replace if damaged or worn.**



f. Set manual shaft to “P” position to lock idler gear.
g. Unlock idler gear lock nut with pin punch.



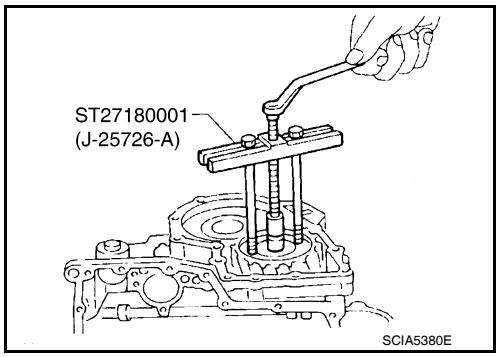
h. Remove idler gear lock nut.



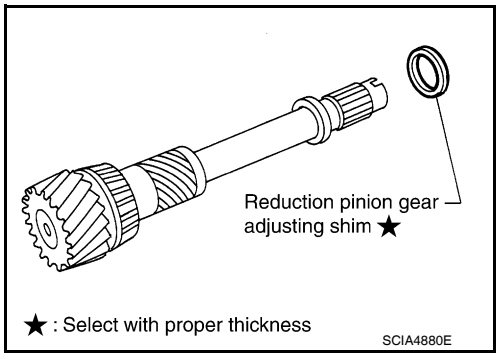
i. Remove idler gear using Tool.

Tool number : ST27180001 (J-25726-A)

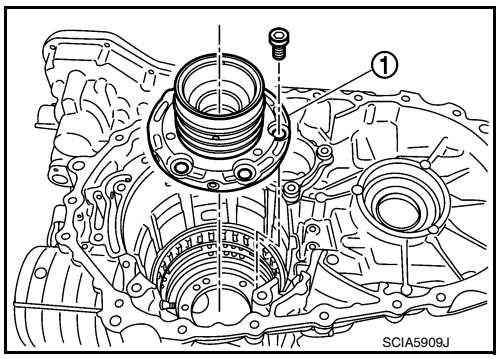
j. Remove reduction pinion gear.



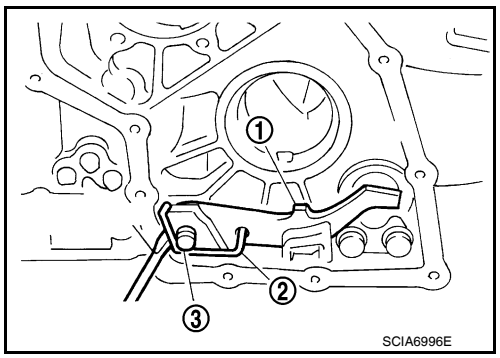
k. Remove reduction pinion gear adjusting shim from reduction pinion gear.



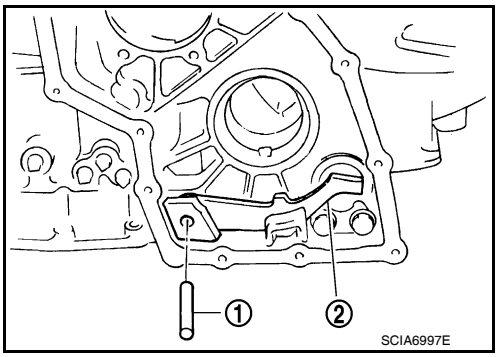
46. Remove bearing retainer bolts, and then remove bearing retainer (1) from transaxle case.



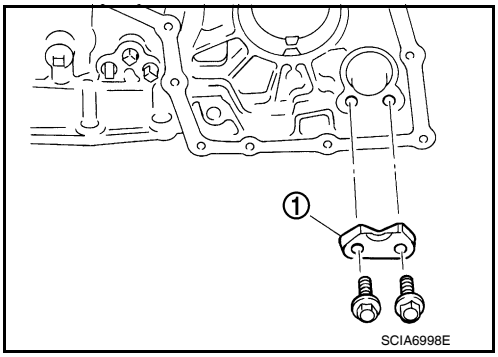
47. Remove return spring (2) from parking shaft (3) using a suitable tool.
(1): Parking pawl
- **Inspect return spring (2), and replace if damaged or worn.**



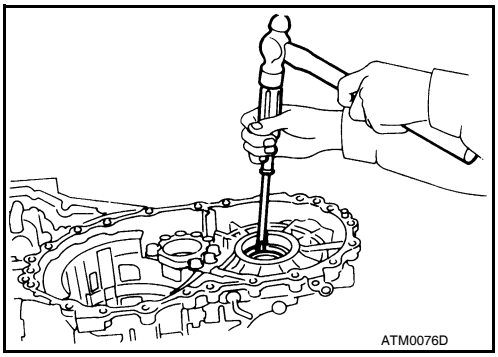
48. Draw out parking shaft (1), and then remove parking pawl (2) from transaxle case.
    - **Inspect parking shaft (1) and parking pawl (2), and replace if damaged or worn.**



49. Remove parking actuator support (1) from transaxle case.
    - **Inspect parking actuator support (1), and replace if damaged or worn.**
50. Remove snap ring from transaxle case using a suitable tool.
51. Remove governor cap from transaxle case.
52. Remove O-ring from governor cap.



53. Remove LH differential side oil seal from transaxle case using a suitable tool.
    CAUTION:
    Be careful not to scratch transaxle case.

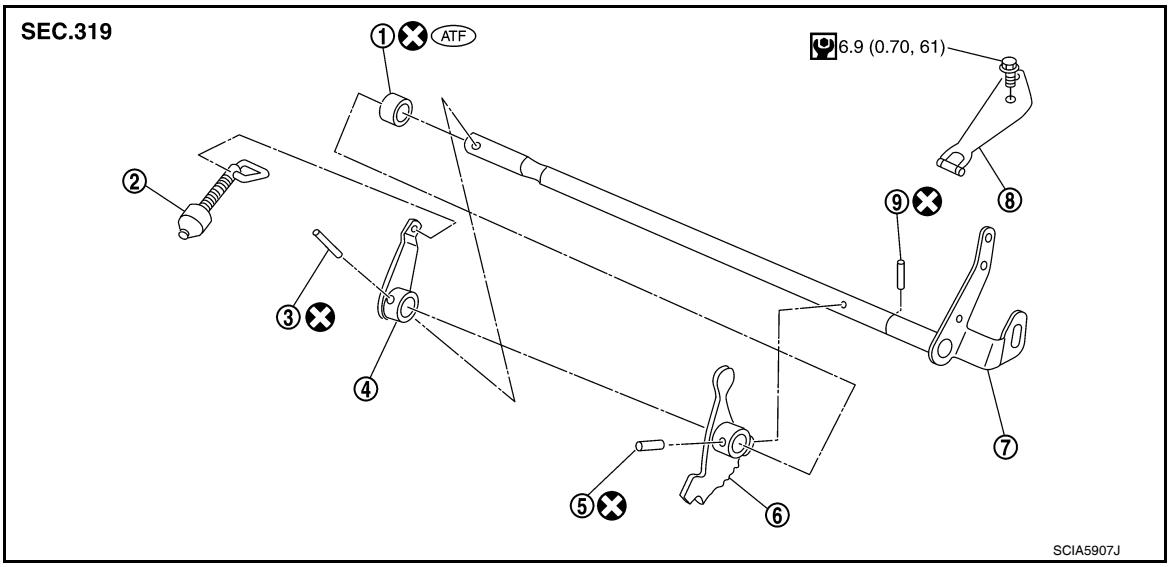


REPAIR FOR COMPONENT PARTS

Manual Shaft

INFOID:0000000007329483

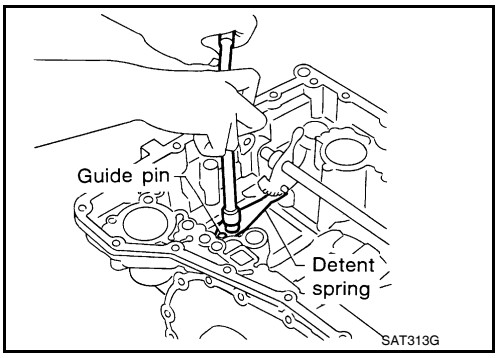
COMPONENTS



1. Manual shaft oil seal	2. Parking rod	3. Retaining pin
4. Parking rod plate	5. Retaining pin	6. Manual plate
7. Manual shaft	8. Detent spring	9. Retaining pin

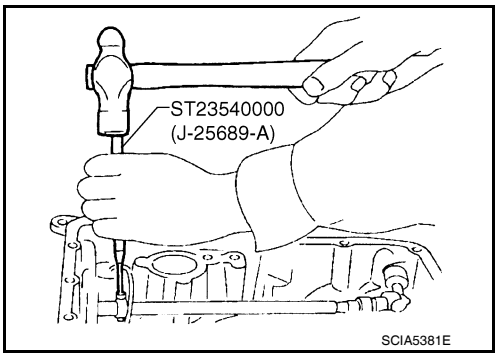
REMOVAL

1. Remove detent spring from transaxle case.

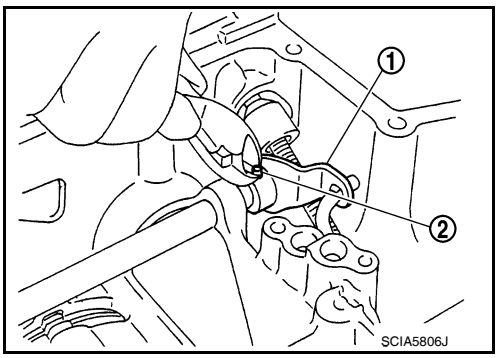


2. Drive out retaining pin of manual plate using Tool.

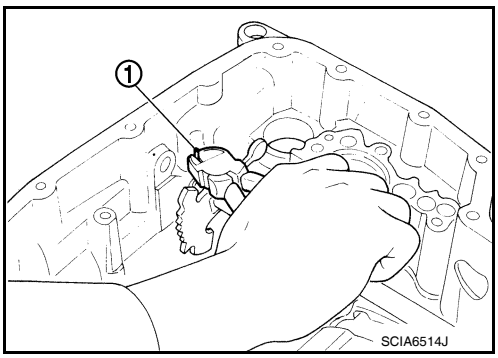
Tool number : ST23540000 (J-25689-A)



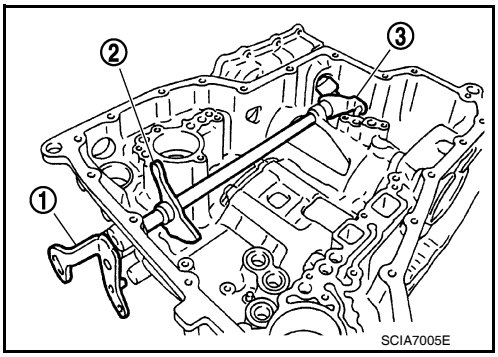
3. Pull out retaining pin (2) of parking rod plate (1) using suitable tool.



4. Pull out retaining pin (1) of manual shaft using suitable tool.



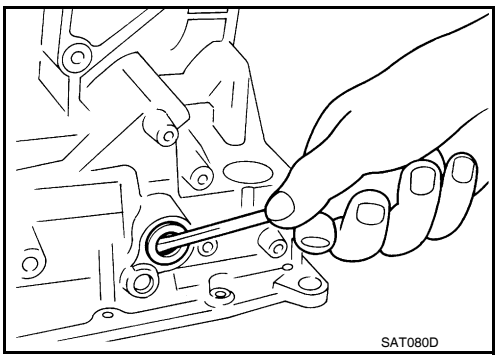
5. Remove parking rod plate (with parking rod) (3) from manual shaft (1).
6. Remove parking rod from parking rod plate (3).
7. Remove manual plate (2) from manual shaft (1).
8. Draw out manual shaft (1) from transaxle case.



9. Remove manual shaft oil seal from transaxle case using a suitable tool.

CAUTION:

Be careful not to scratch transaxle case.



INSPECTION

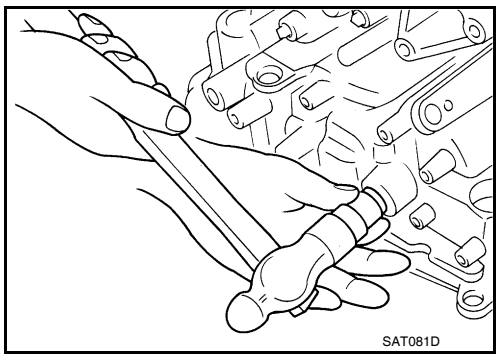
Check component parts, and replace if damaged or worn.

INSTALLATION

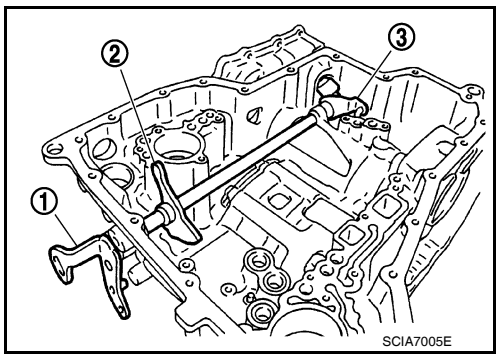
1. Drive manual shaft oil seal into transaxle case using a drift [commercial service tool: 22 mm (0.87 in) dia.].

CAUTION:
- **Do not reuse manual shaft oil seal.**
- **Apply ATF to outer surface of manual shaft oil seal.**

2. Install parking rod to parking rod plate.



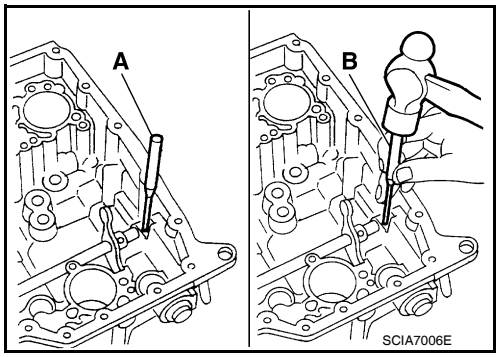
3. Insert manual shaft (1) to transaxle case, and install manual plate (2) to manual shaft (1).
4. Install parking rod plate (with parking rod) (3) to manual shaft (1).



5. Align groove of manual shaft and hole of transaxle case using a pin punch (A) [commercial service tool: 2 mm (0.08 in) dia.].
6. Drive retaining pin of manual shaft into transaxle case using Tool (B).

Tool number: ST23540000 (J-25689-A)

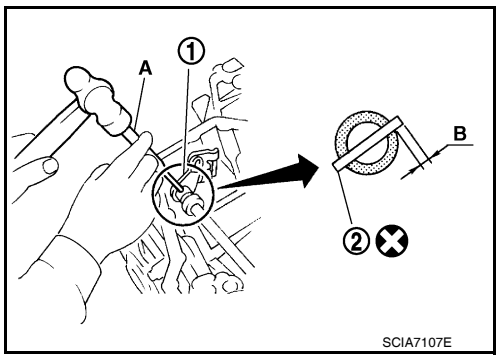
CAUTION:
Do not reuse retaining pin.



7. Set parking rod plate (1) onto manual shaft, and drive retaining pin (2) of parking rod plate (1) using tool (A).

Tool number: ST23540000 (J-25689-A)

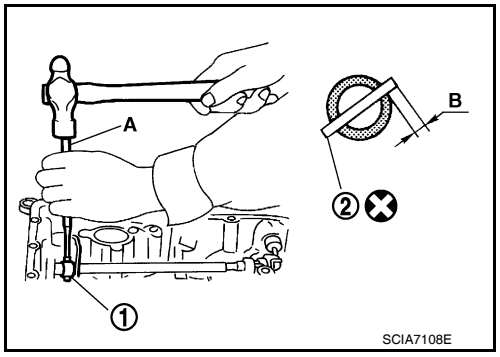
CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of parking rod plate (1).



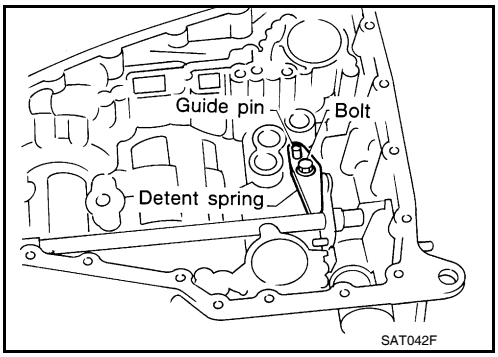
8. Set manual plate (1) onto manual shaft, and drive retaining pin (2) of manual plate (1) using tool (A).

Tool number: ST23540000 (J-25698-A)

CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of manual plate (1).



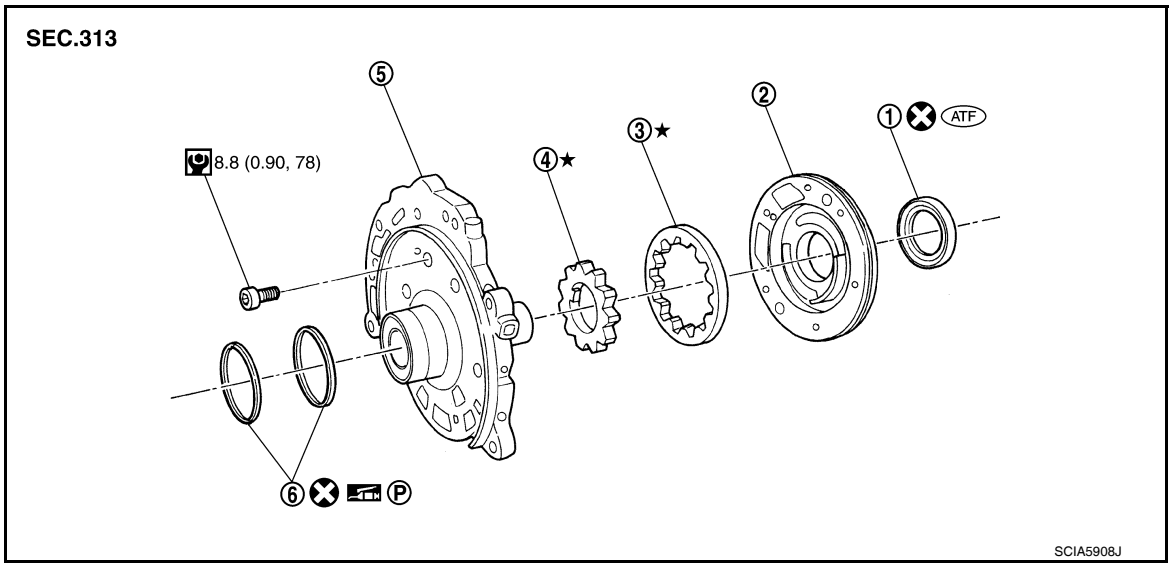
9. Install detent spring on transaxle case.
10. Tighten detent spring bolt to the specified torque. Refer to AT-261, "Manual Shaft".



Oil Pump

INFOID:0000000007329484

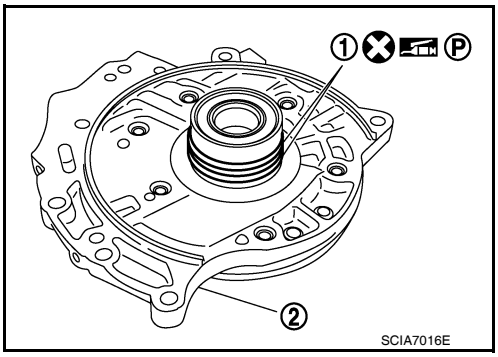
COMPONENTS



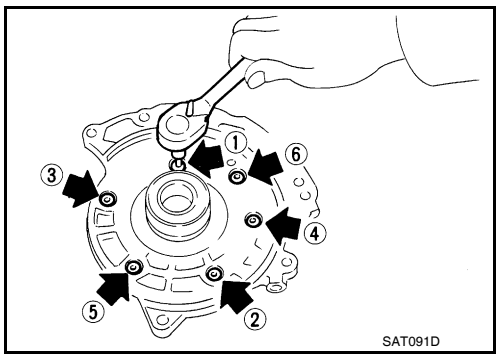
1. Oil pump housing oil seal
2. Oil pump housing
3. Outer gear
4. Inner gear
5. Oil pump cover
6. Seal ring

DISASSEMBLY

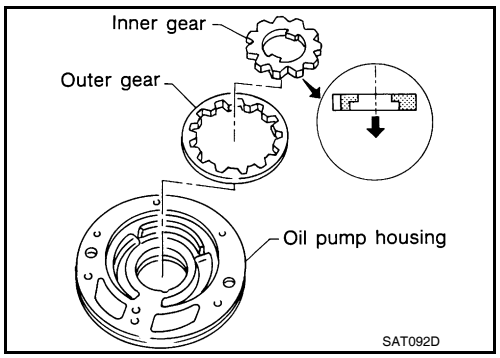
1. Remove seal rings (1) from oil pump assembly (2).



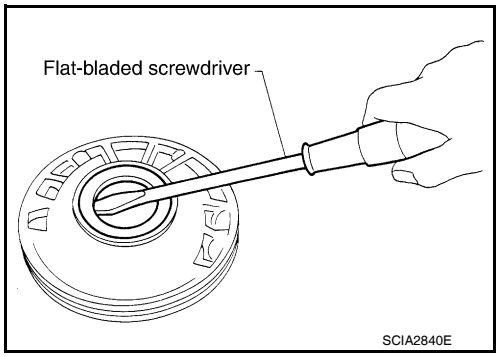
2. Remove bolts in the order as shown, and remove oil pump cover.



3. Remove inner gear and outer gear from oil pump housing.



4. Remove oil pump housing oil seal using a flat-bladed screwdriver.
CAUTION:
Be careful not to scratch oil pump housing.



INSPECTION

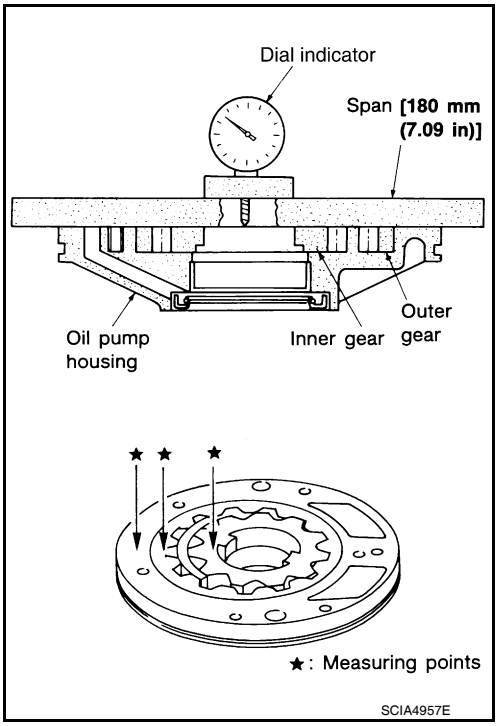
Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear
Check for wear or damage. Replace if necessary.

Side Clearances

- Measure side clearance of inner gear and outer gear in at least four places around each outside edge. Clearances measured values should be within the specified clearance.

Standard clearance: Refer to AT-350, "Oil Pump".

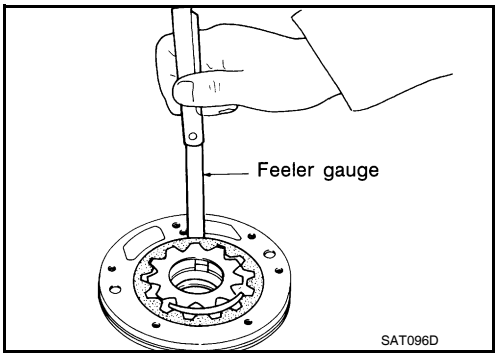
- If clearance is less than standard, select inner gear and outer gear as a set so that clearance is within specifications. Refer to “Parts Information” for the inner gear and outer gear selection.
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



- Measure clearance between outer gear and oil pump housing.

Standard clearance and allowable limit:
Refer to AT-350, "Oil Pump".

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

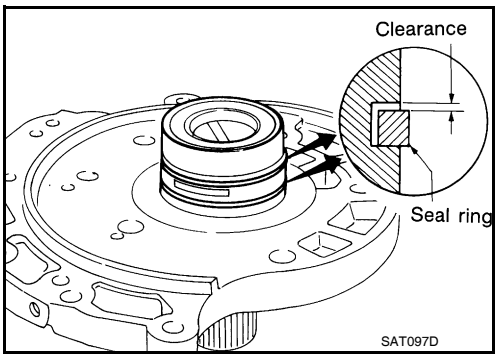


Seal Ring Clearance

- Measure clearance between seal ring and ring groove.

Standard clearance and allowable limit:
Refer to AT-350, "Oil Pump".

- If not within allowable limit, replace oil pump cover assembly.

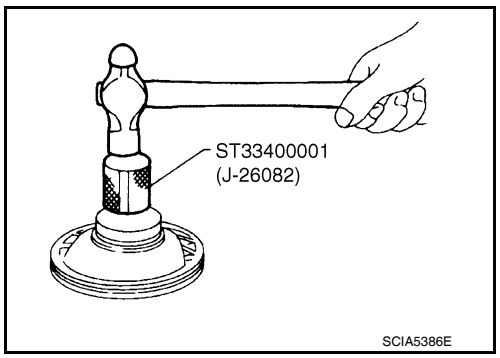


ASSEMBLY

1. Install oil pump housing oil seal on oil pump housing.

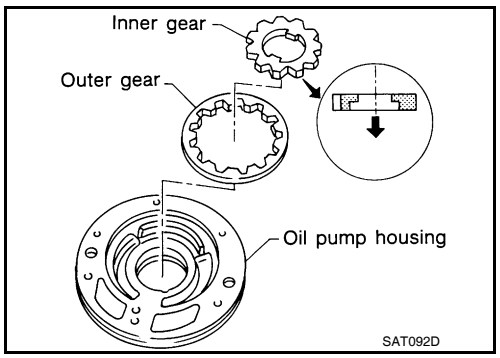
Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse oil pump housing oil seal.**
- **Apply ATF to outer surface of oil pump housing oil seal.**



2. Install inner gear and outer gear on oil pump housing.

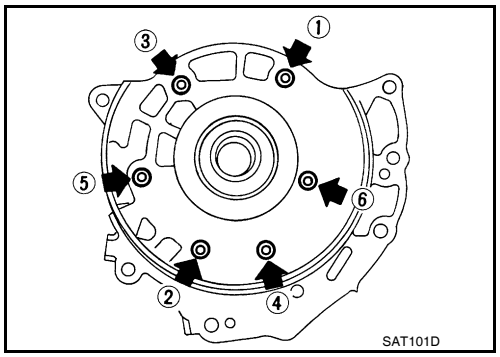
CAUTION:
Be careful with the direction of inner gear.



3. Install oil pump cover on oil pump housing.

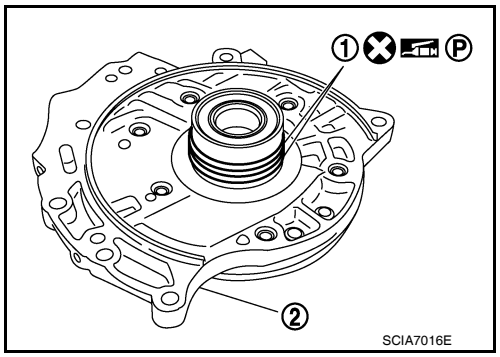
a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

b. Tighten oil pump cover bolts in the order as shown, and then tighten them to the specified torque in the same order. Refer to AT-264, "Oil Pump".



4. Install seal rings (1) to oil pump assembly (2) carefully after packing ring groove with petroleum jelly.

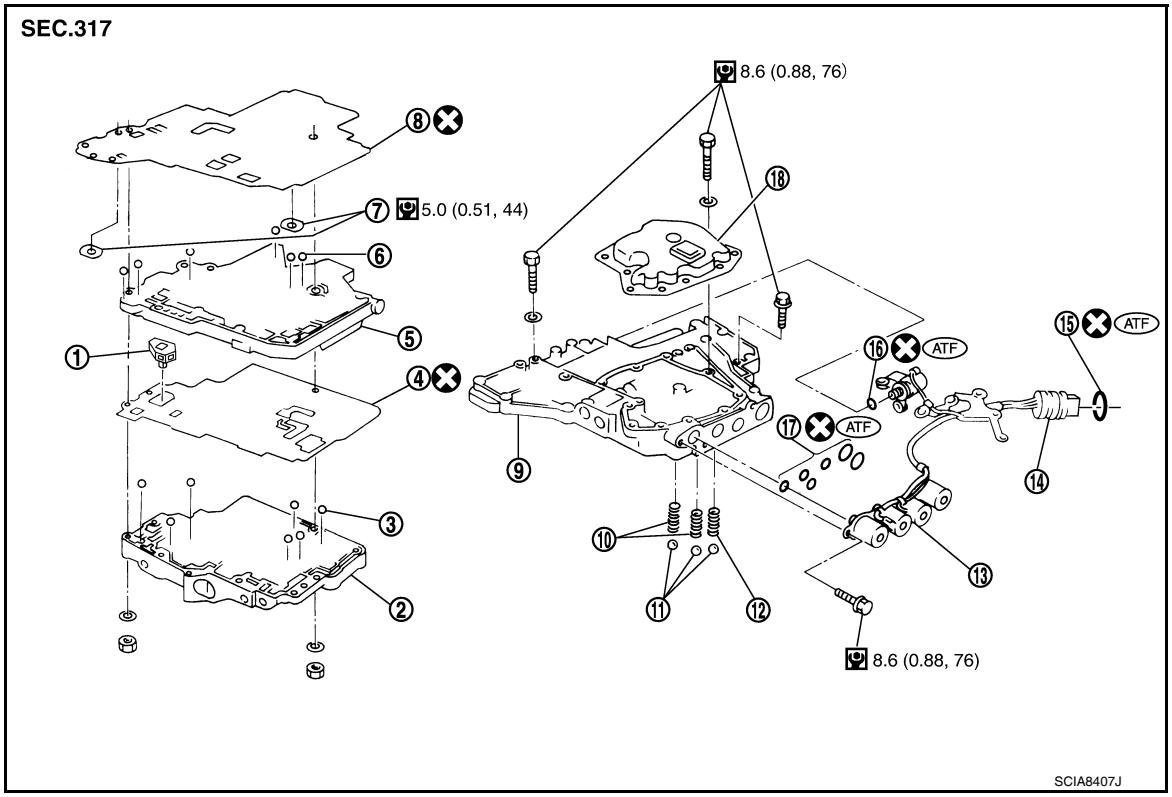
CAUTION:
Do not spread gap of seal rings (1) excessively while installing. The seal rings (1) may be deformed.



Control Valve Assembly

INFOID:0000000007329485

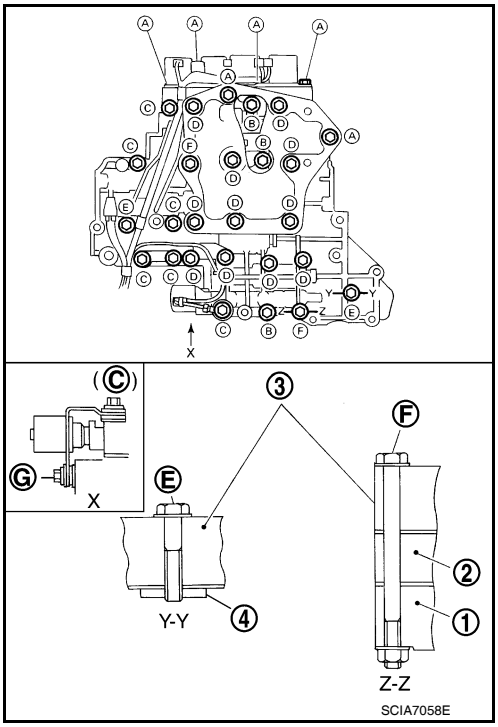
COMPONENTS



1. Pilot filter	2. Control valve upper body	3. Steel ball
4. Separating plate	5. Control valve inter body	6. Steel ball
7. Support plate	8. Separating plate	9. Control valve lower body
10. Line pressure relief valve spring	11. Check ball	12. Torque converter pressure holding spring
13. Solenoid valve assembly	14. Terminal body	15. O-ring
16. O-ring	17. O-ring	18. Oil strainer

DISASSEMBLY

Place control valve assembly with control valve upper body (1) side down. Remove bolts (A) to (G), reamer bolts (F), nuts and support plates (4) according to the following procedures. Separate control valve upper body (1), control valve inter body (2) and control valve lower body (3).

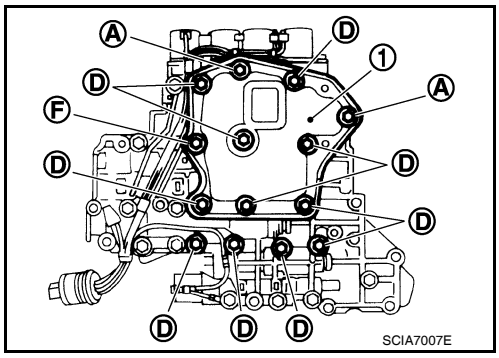


Bolt length, number and location:

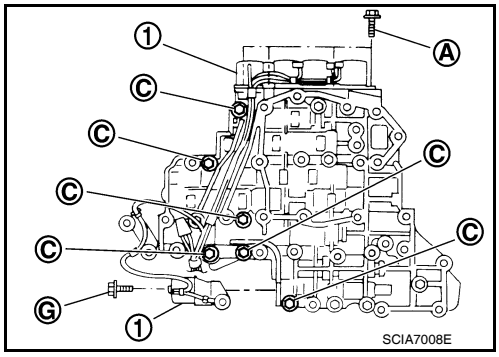
Bolt symbol	A	B	C	D	E	F*	G
Bolt length "ℓ" [mm (in)]	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

*: Reamer bolt and nut.

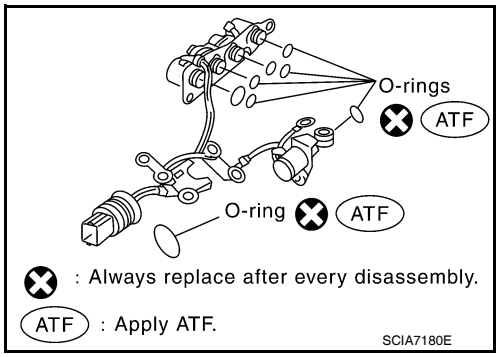
1. Remove bolts (A), (D), reamer bolt (F) and nut, and remove oil strainer (1) from control valve assembly.



2. Remove bolts (A), (C) and (G), and then remove solenoid valve assembly (1) from control valve assembly.



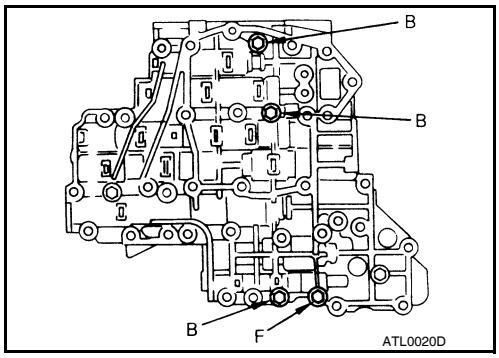
3. Remove O-rings from solenoid valves and terminal body.



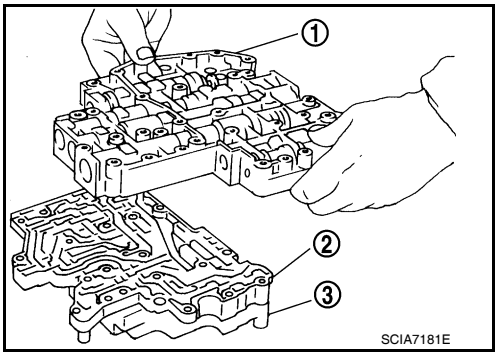
4. Place control valve upper body face down, and remove bolts (B), reamer bolt (F) and nut.

CAUTION:

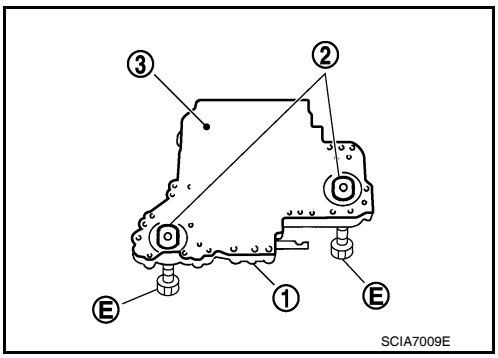
Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



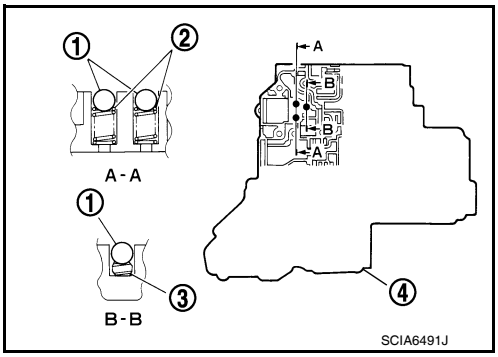
5. Remove control valve lower body (1) from control valve inter body (2).
(3): Control valve upper body



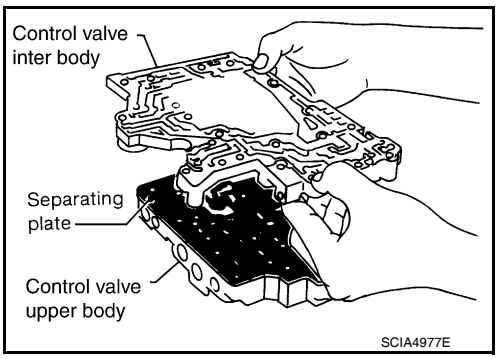
6. Turn over control valve lower body (1).
7. Remove bolts (E), support plates (2) and separating plate (3) from control valve lower body (1).



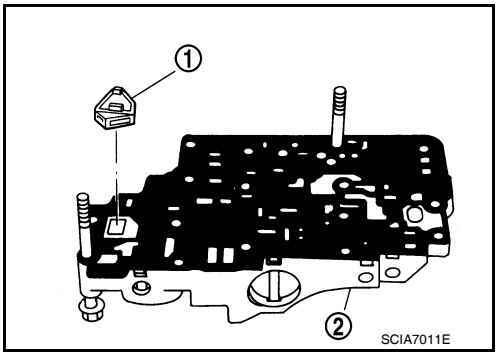
8. Remove check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) from control valve lower body (4).
CAUTION:
Be careful not to lose check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3).



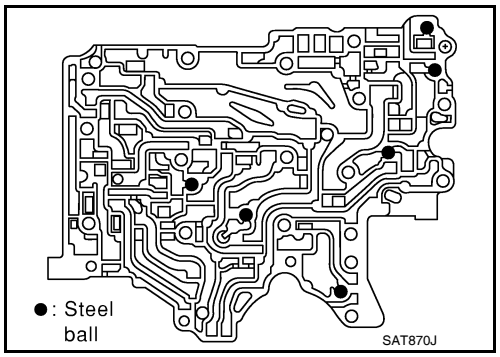
9. Remove control valve inter body from control valve upper body.



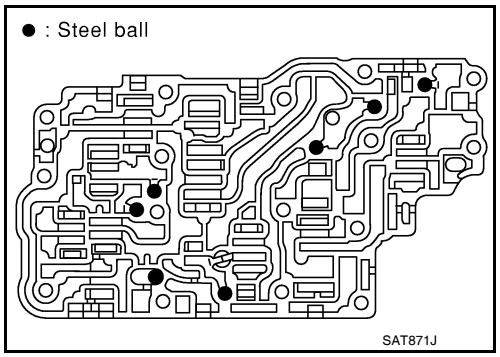
10. Remove pilot filter (1) from control valve upper body (2).
11. Remove separating plate from control valve upper body (2).



12. Check to see that steel balls are properly positioned in control valve inter body and then remove them.
CAUTION:
Be careful not to lose steel balls.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.
CAUTION:
Be careful not to lose steel balls.

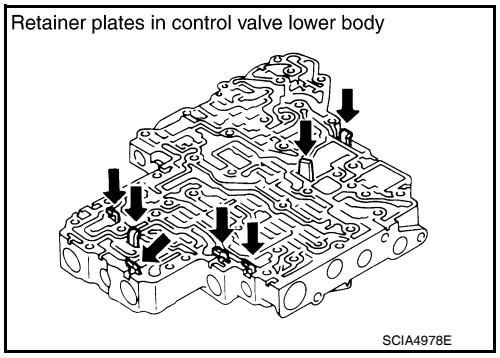


INSPECTION

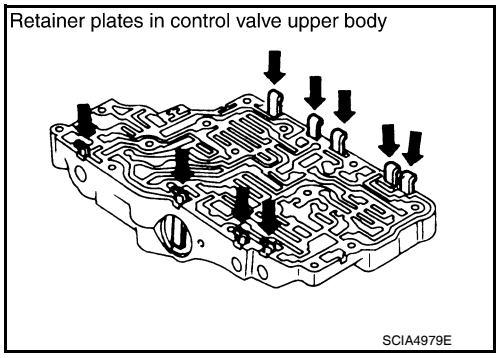
Control Valve Lower and Upper Bodies

CAUTION:
Be careful not to lose these parts.

- Check to see that retainer plates are properly positioned in control valve lower body.

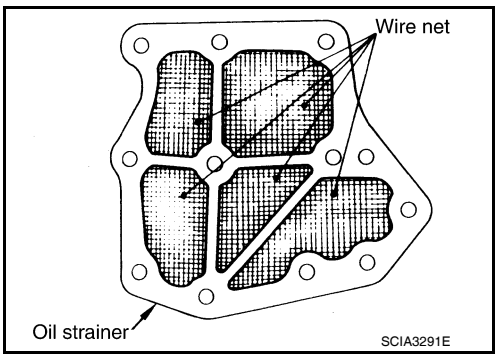


- Check to see that retainer plates are properly positioned in control valve upper body.



Oil Strainer

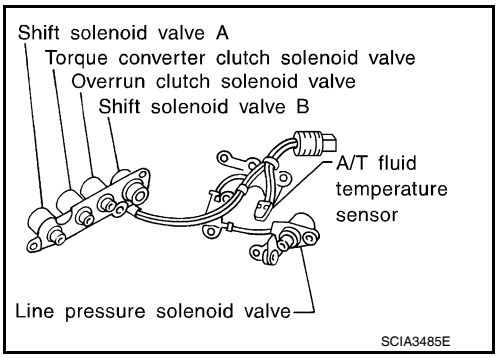
Check wire netting of oil strainer for damage. Replace if necessary.



Shift Solenoid Valves “A and B”, Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

Measure resistance.

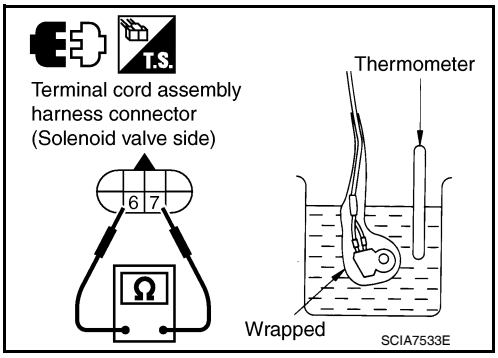
- For shift solenoid valve A, refer to AT-138, "Component Inspection".
- For shift solenoid valve B, refer to AT-143, "Component Inspection".
- For line pressure solenoid valve, refer to AT-134, "Component Inspection".
- For torque converter clutch solenoid valve, refer to AT-123, "Component Inspection".
- For overrun clutch solenoid valve, refer to AT-148, "Component Inspection".



A/T Fluid Temperature Sensor

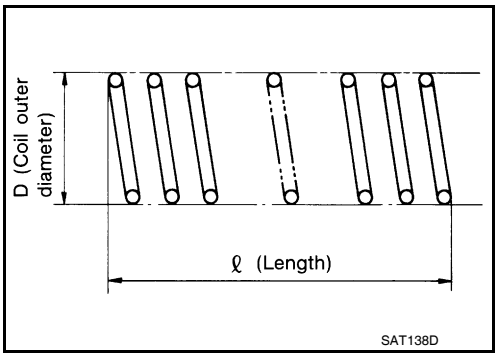
Measure resistance.

- For A/T fluid temperature sensor, refer to AT-157, "Component Inspection".



Line Pressure Relief Valve Springs and Torque Converter Pressure Holding Spring

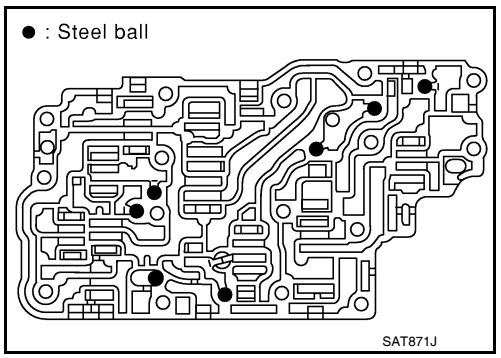
- Check each spring for damage or deformation. Also measure free length and outer diameter. Refer to AT-347, "Control Valves".
- Replace springs if deformed or fatigued.



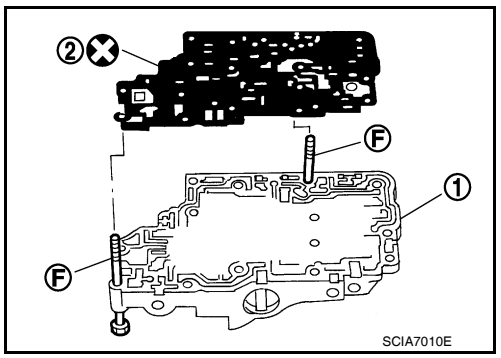
ASSEMBLY

1. Install control valve upper, inter and lower body.

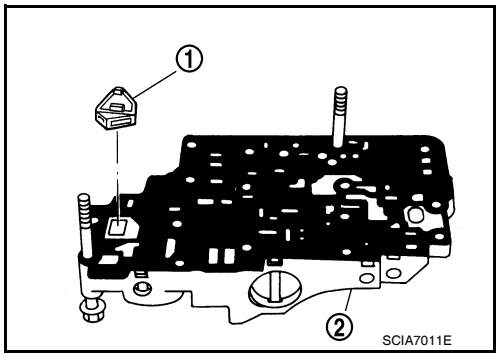
a. Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.



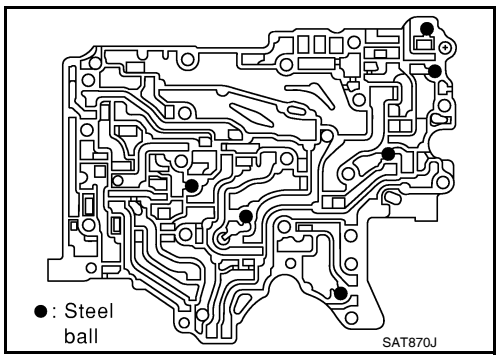
b. Install reamer bolts (F) from bottom of control valve upper body (1). Using reamer bolts (F) as guides, install separating plate (2) as a set.



c. Install pilot filter (1) on control valve upper body (2).



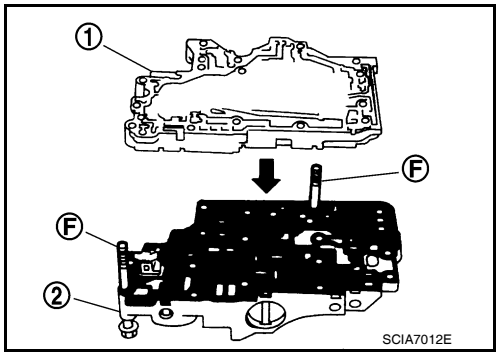
d. Place control valve inter body as shown (side of control valve lower body face up). Install steel balls in their proper positions.



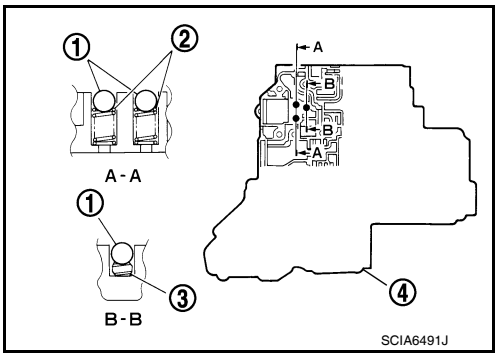
e. Install control valve inter body (1) on control valve upper body (2) using reamer bolts (F) as guides.

CAUTION:

Be careful not to dislocate or drop steel balls.

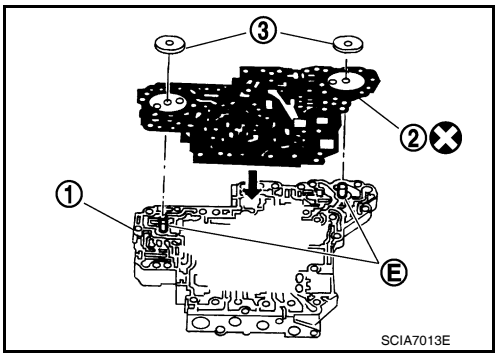


f. Install check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) in their proper positions in control valve lower body (4).

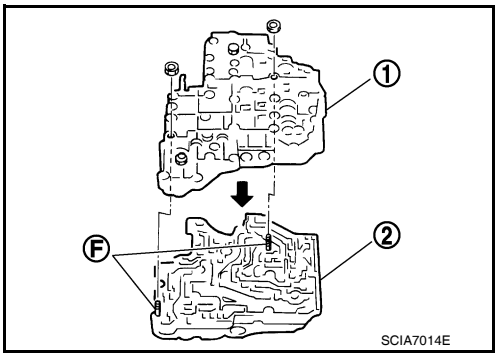


g. Install bolts (E) from bottom of control valve lower body (1). Using bolts (E) as guides, install separating plate (2) as a set.

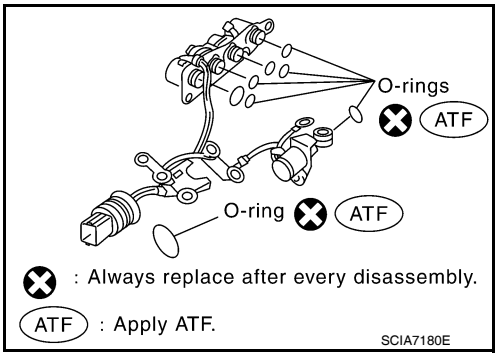
h. Install support plates (3) on control valve lower body (1).



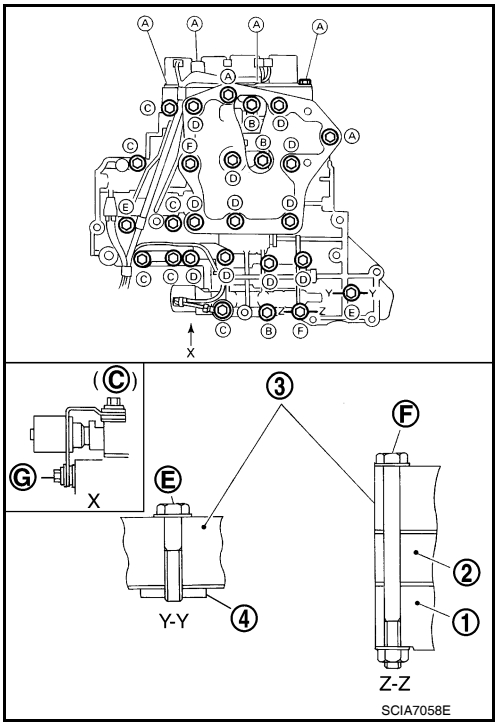
i. Install control valve lower body (1) on control valve inter body (2) using reamer bolts (F) as guides, and tighten reamer bolts (F) slightly.



2. Install O-rings on solenoid valves and terminal body.



3. Install and tighten bolts.
   (1): Control valve upper body
   (2): Control valve inter body
   (3): Control valve lower body
   (4): Support plate

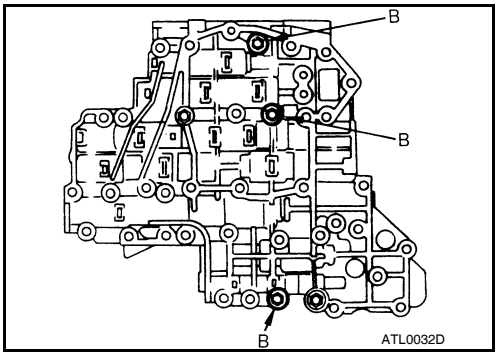


Bolt length, number and location:

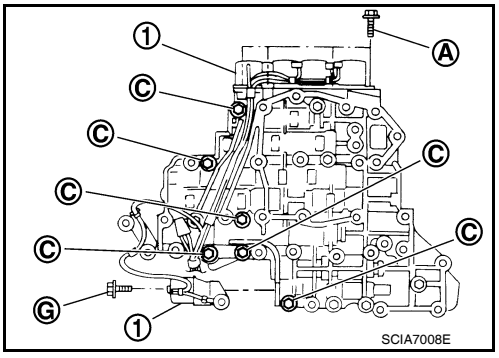
Bolt symbol	A	B	C	D	E	F*	G
Bolt length " ℓ " [mm (in)]	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1
Tightening torque [N·m (kg-m, in-lb)]	8.6 (0.88, 76)				5.0 (0.51, 44)	8.6 (0.88, 76)	

*: Reamer bolt and nut.

a. Install and tighten bolts (B) to the specified torque.

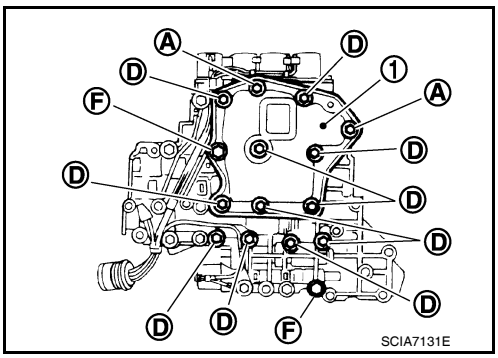


b. Install solenoid valve assembly (1) on control valve assembly.
c. Tighten bolts (A), (C) and (G) to the specified torque.

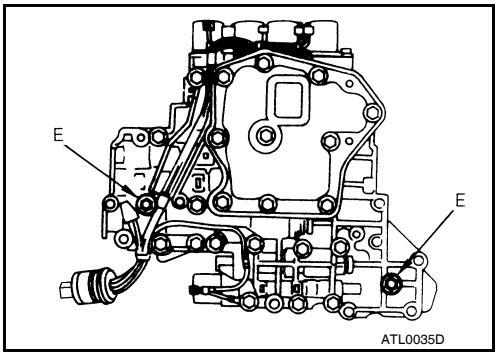


d. Remove reamer bolts (F), and then set oil strainer (1) on control valve assembly

e. Install and tighten bolts (A), (D), reamer bolts (F) and nuts to the specified torque.



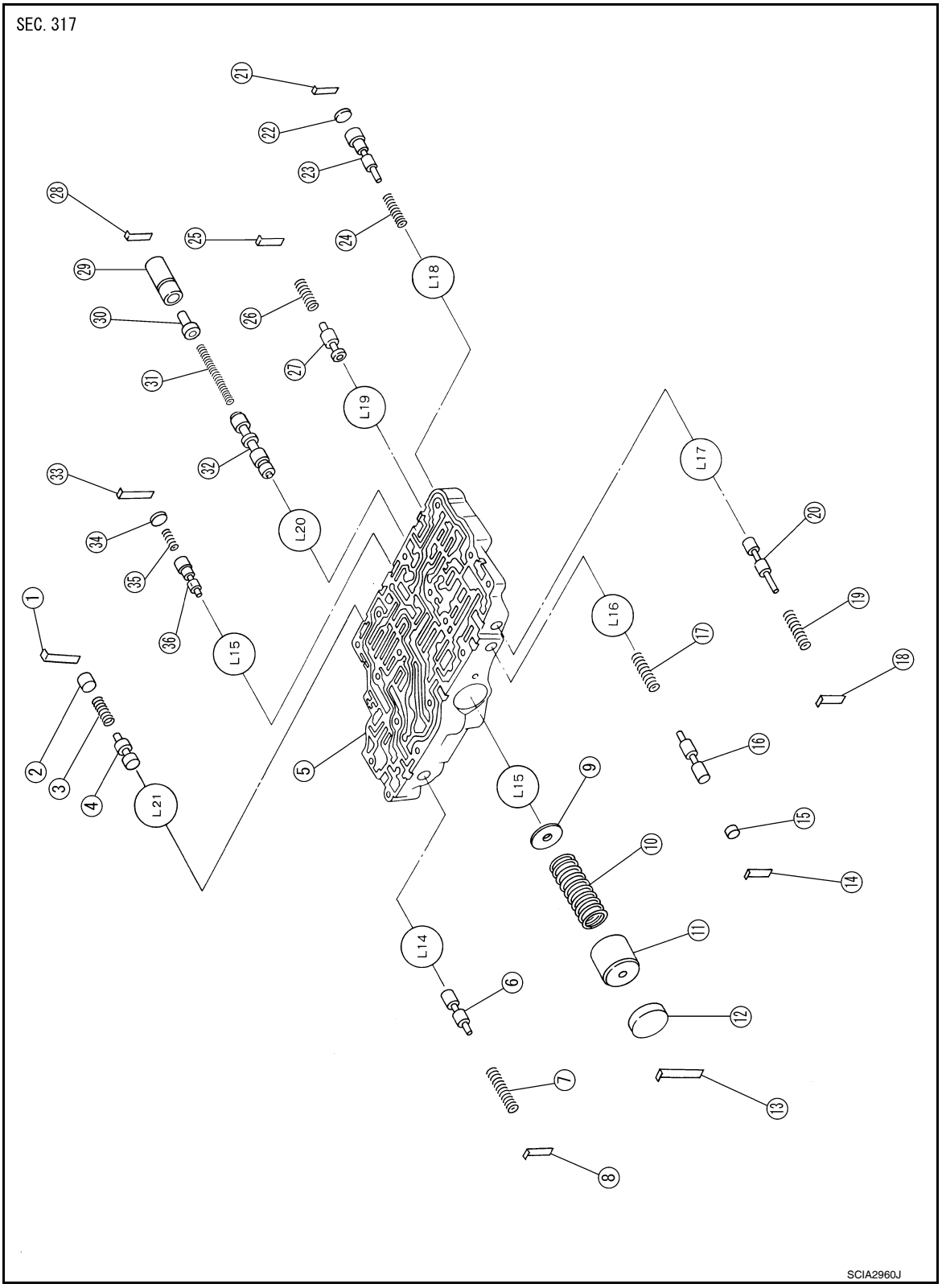
f. Tighten bolts (E) to the specified torque.



Control Valve Upper Body

INFOID:0000000007329486

COMPONENTS

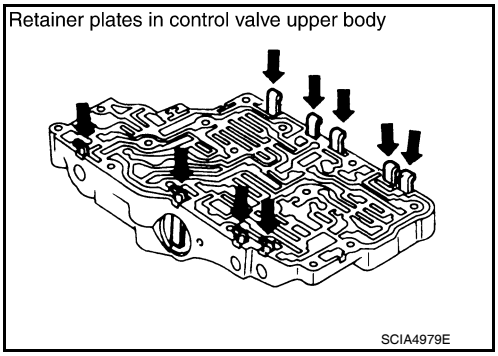


1. Retainer plate
2. Plug
3. Cooler check valve spring
4. Cooler check valve
5. Control valve upper body
6. Pilot valve
7. Pilot valve spring
8. Retainer plate
9. 1-2 accumulator retainer plate
10. 1-2 accumulator piston spring
11. 1-2 accumulator piston
12. Plug
13. Retainer plate
14. Retainer plate
15. Plug
16. 1st reducing valve
17. 1st reducing valve spring
18. Retainer plate

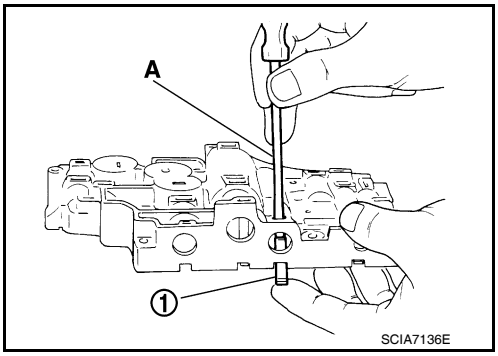
19. 3-2 timing valve spring
20. 3-2 timing valve
21. Retainer plate
22. Plug
23. Overrun clutch reducing valve
24. Overrun clutch reducing valve spring
25. Retainer plate
26. Torque converter relief valve spring
27. Torque converter relief valve
28. Retainer plate
29. Sleeve
30. Plug
31. Torque converter clutch control valve spring
32. Torque converter clutch control valve
33. Retainer plate
34. Plug
35. 1-2 accumulator valve spring
36. 1-2 accumulator valve

DISASSEMBLY

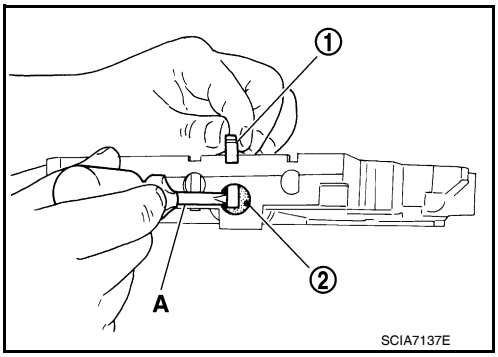
1. Remove valves at retainer plates.
CAUTION:
Do not use a magnetic pick-up tool.



a. Use a suitable tool (A) to remove retainer plates (1).



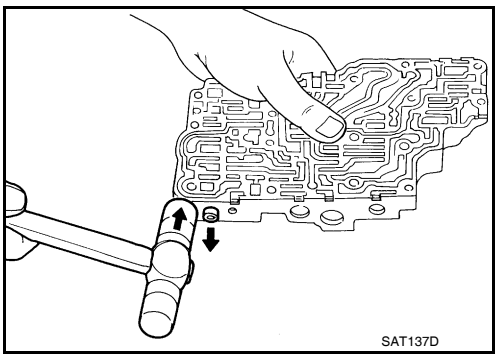
b. Remove retainer plates (1) while holding spring, plugs (2) or sleeves using a suitable tool (A).
CAUTION:
Remove plugs (2) slowly to prevent internal parts from jumping out.



c. Place mating surface of valve body face down, and remove internal parts.

CAUTION:

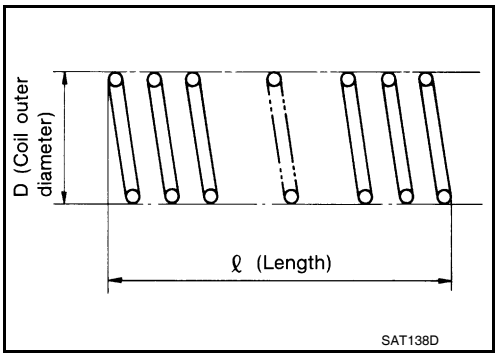
- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to AT-347, "Control Valves".
- Replace valve springs if deformed or fatigued.



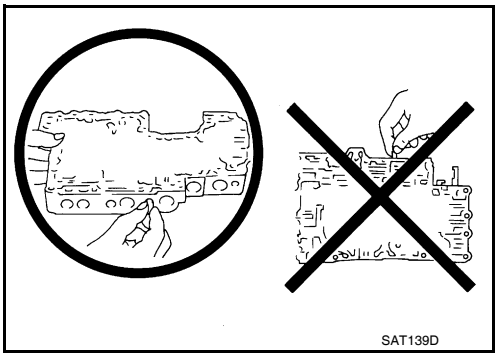
Control Valves

Check sliding surfaces of valves, sleeves and plugs. Replace if necessary.

ASSEMBLY

CAUTION:

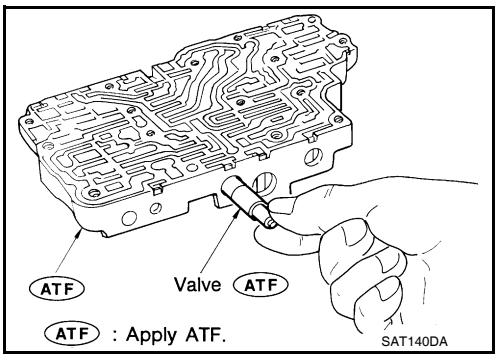
- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



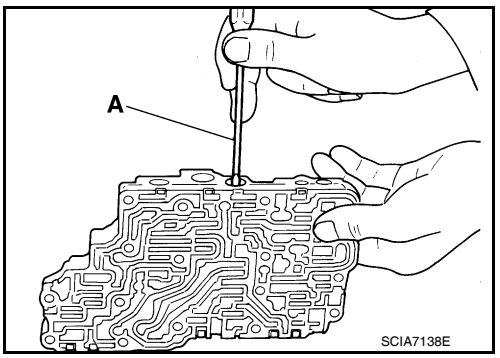
Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

CAUTION:

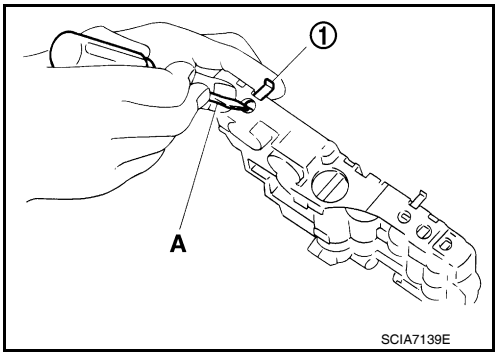
- **Install each control valve one by one.**
- **Install control valves after checking, because some of them are similar.**
- **Be careful not to scratch or damage valve body.**



- Wrap a small suitable tool (A) with vinyl tape and use it to insert valves into their proper positions.

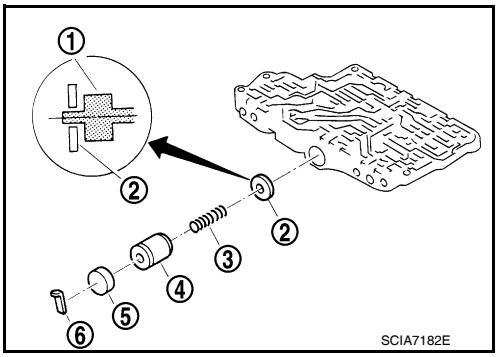


- Install retainer plates (1).
- While pushing plug or return spring, install retainer plate (1) using a suitable tool (A).



1-2 Accumulator Valve

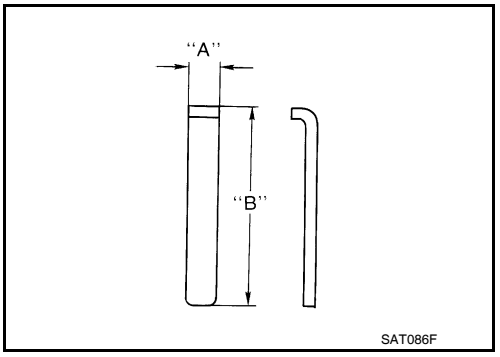
- Install 1-2 accumulator valve (1), 1-2 accumulator valve spring and plug. Align 1-2 accumulator retainer plate (2) from opposite side of control valve body.
- Install 1-2 accumulator valve piston spring (3), 1-2 accumulator piston (4), plug (5) and retainer plate (6).



Retainer Plate (Control Valve Upper Body)
Install proper retainer plates.

Unit: mm (in)

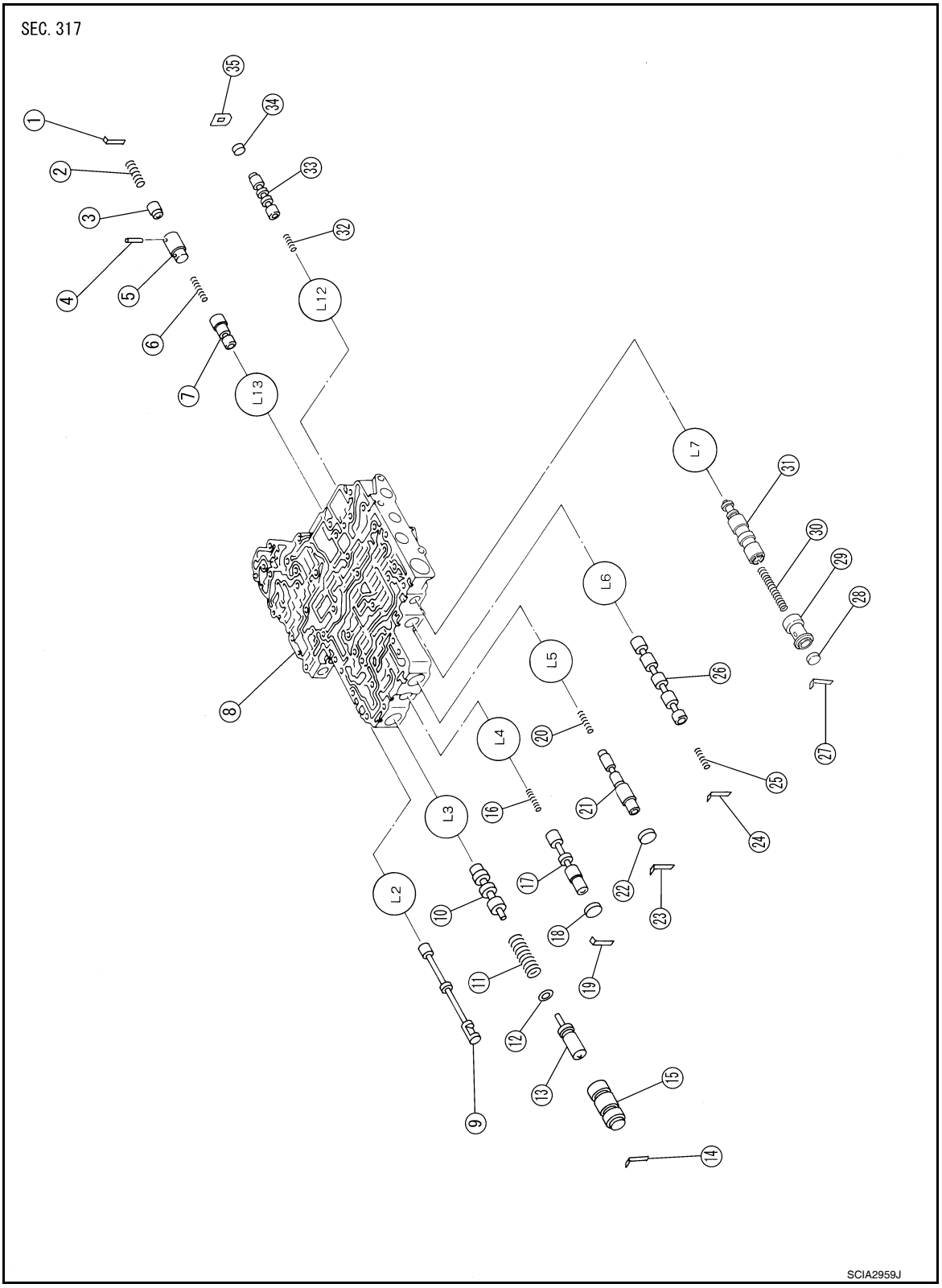
Location	Retainer plate designation	Width "A"	Length "B"
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L16	1st reducing valve		21.5 (0.846)
L17	3-2 timing valve		
L18	Overrun clutch reducing valve		24.0 (0.945)
L19	Torque converter relief valve		21.5 (0.846)
L20	Torque converter clutch control valve		28.0 (1.102)
L21	Cooler check valve		24.0 (0.945)



Control Valve Lower Body

INFOID:0000000007329487

COMPONENTS

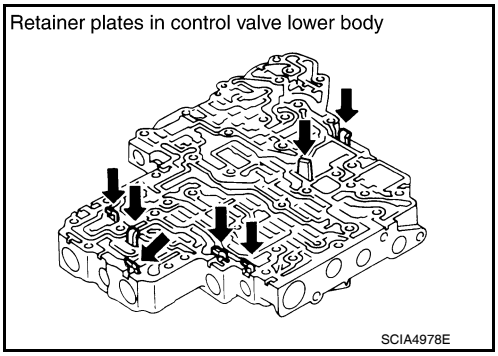


1. Retainer plate
2. Pressure modifier piston spring
3. Pressure modifier piston
4. Parallel pin
5. Sleeve
6. Pressure modifier valve spring
7. Pressure modifier valve
8. Control valve lower body
9. Manual valve
10. Pressure regulator valve
11. Pressure regulator valve spring
12. Spring seat
13. Plug
14. Retainer plate
15. Sleeve
16. Overrun clutch control valve spring
17. Overrun clutch control valve
18. Plug

19. Retainer plate
20. Accumulator control valve spring
21. Accumulator control valve
22. Plug
23. Retainer plate
24. Retainer plate
25. Shift valve A spring
26. Shift valve A
27. Retainer plate
28. Plug
29. Shuttle plug
30. Shuttle valve spring
31. Shuttle valve
32. Shift valve B spring
33. Shift valve B
34. Plug
35. Retainer plate

DISASSEMBLY

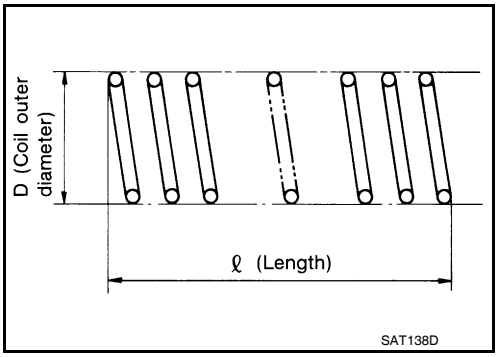
Remove valves at retainer plate.
For removal procedures, refer to AT-276, "Control Valve Upper Body".



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to AT-347, "Control Valves".
- Replace valve springs if deformed or fatigued.



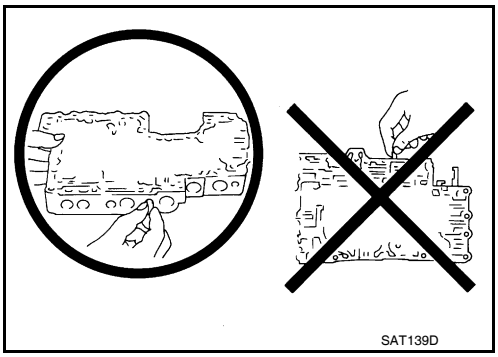
Control Valves

Check sliding surfaces of control valves, sleeves and plugs for damage. Replace if necessary.

ASSEMBLY

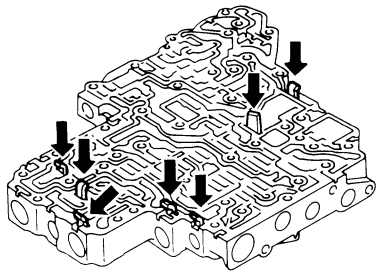
CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



Install control valves.
For installation procedures, refer to AT-276, "Control Valve Upper Body".

Retainer plates in control valve lower body

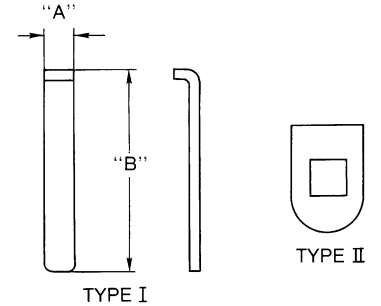


SCIA4978E

Retainer Plate (Control Valve Lower Body)
Install proper retainer plates.

Unit: mm (in)

Location	Retainer plate designation	Width "A"	Length "B"	Type
L3	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
L4	Overrun clutch control valve			
L5	Accumulator control valve			
L6	Shift valve A			
L7	Shuttle valve			
L12	Shift valve B	17.0 (0.669)	24.0 (0.945)	II
L13	Pressure modifier valve	6.0 (0.236)	28.0 (1.102)	I

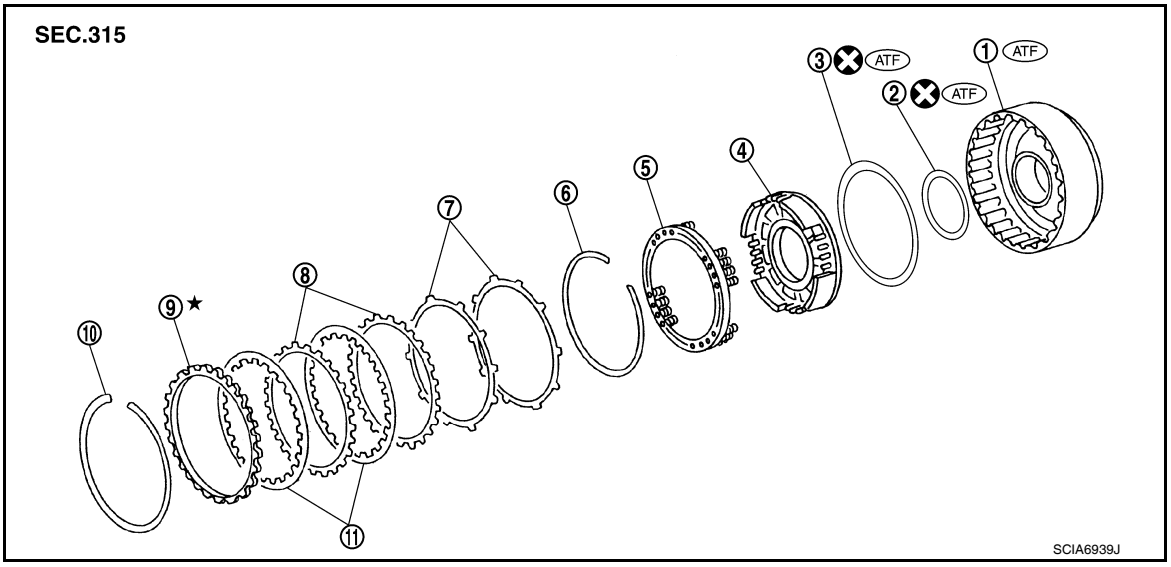


SAT089F

Reverse Clutch

INFOID:0000000007329488

COMPONENTS



SCIA6939J

1. Reverse clutch drum
2. D-ring
3. Seal lip
4. Reverse clutch piston
5. Spring retainer assembly
6. Snap ring
7. Dish plate
8. Driven plate
9. Retaining plate
10. Snap ring
11. Drive plate

DISASSEMBLY

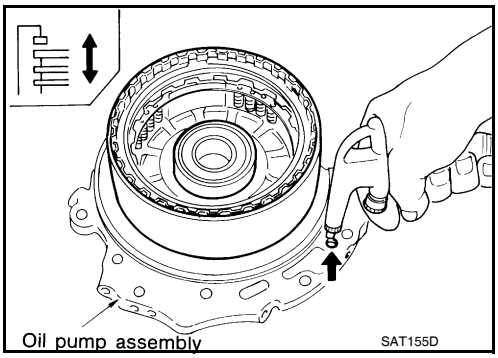
1. Check operation of reverse clutch

a. Install seal rings to drum support of oil pump assembly, and set reverse clutch assembly.

b. Apply compressed air into the oil hole at the location as shown.

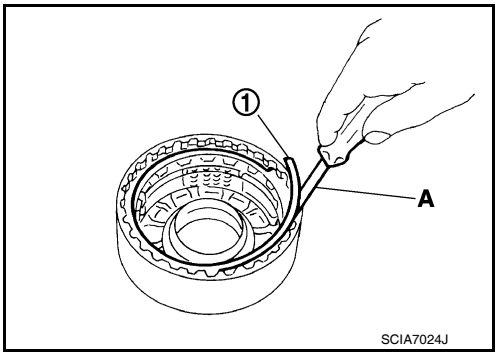
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Seal lip might be damaged.
   - Fluid might be leaking past piston check ball.



2. Remove snap ring (1) using a suitable tool (A).

3. Remove retaining plate, drive plates, driven plates and dish plates.

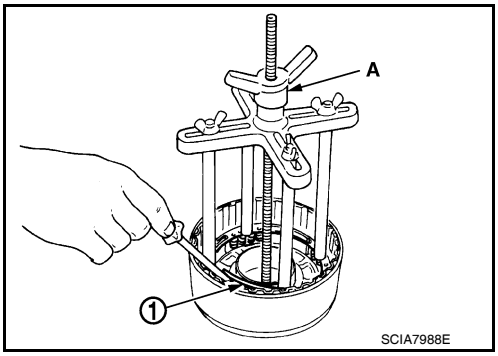


4. Set Tool (A) on spring retainer assembly, and remove snap ring (1) from reverse clutch drum while compressing spring retainer assembly.

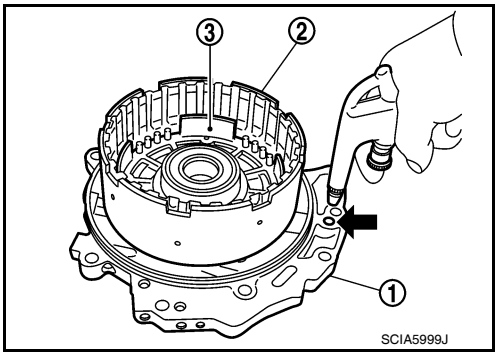
   Tool number: KV31103200 (J-39186)

   CAUTION:
   Set SST directly over return springs.

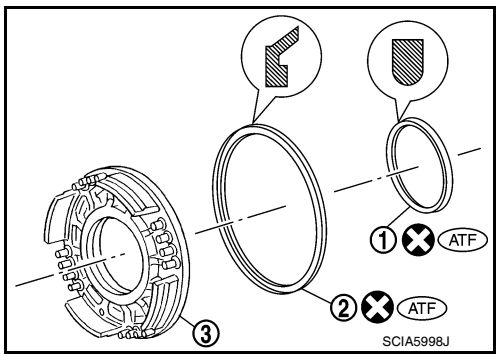
5. Remove spring retainer assembly from reverse clutch drum.
   CAUTION:
   Do not remove return springs from spring retainer.



6. Install seal rings to drum support of oil pump assembly (1), and set reverse clutch drum (2). Then apply compressed air into the oil hole at the location as shown in the figure to remove reverse clutch piston (3) from reverse clutch drum (2).
   CAUTION:
   Do not flow air in too quickly or reverse clutch piston (3) and ATF could jump out. Carefully flow air in little by little while protecting with lint-free cloth.



7. Remove D-ring (1) and seal lip (2) from reverse clutch piston (3).



INSPECTION

Reverse Clutch Snap Ring

Check for deformation, fatigue or damage. Replace if necessary.

Reverse Clutch Drive Plates

- Check facing for burns, cracks or damage. Replace if necessary.
- Measure thickness of facing.

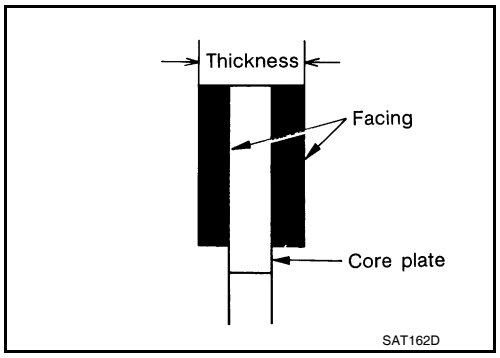
Thickness of drive plate

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

CAUTION:

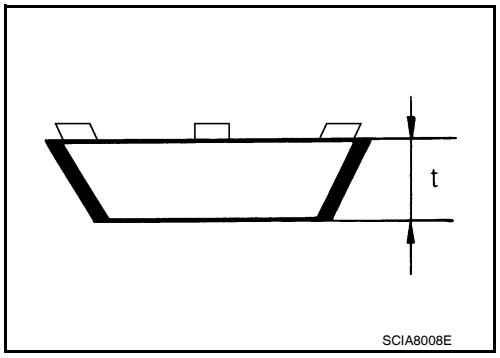
- **Measure the thickness at 3 locations and find the average.**
- **Inspect all drive plates.**
- **Replace if the thickness is below the allowable limit.**



Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.

Thickness of dish plate (t): 2.87 mm (0.1130 in)



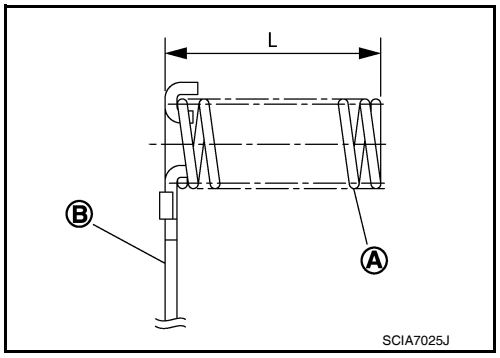
Reverse Clutch Spring Retainer Assembly

Measure length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L) : 20.1 mm (0.791 in)

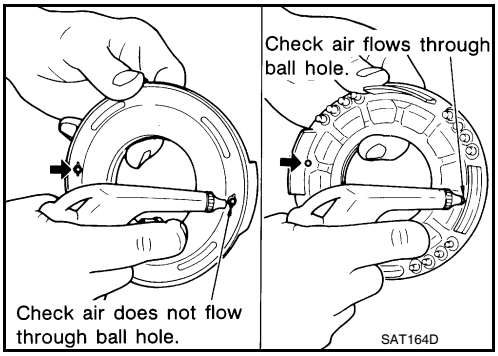
CAUTION:

Do not remove return springs (A) from spring retainer (B)



Reverse Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite from return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

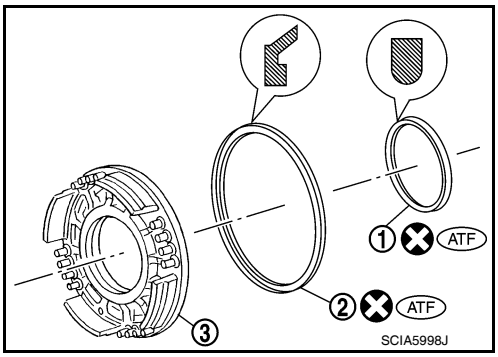


Reverse Clutch Drum

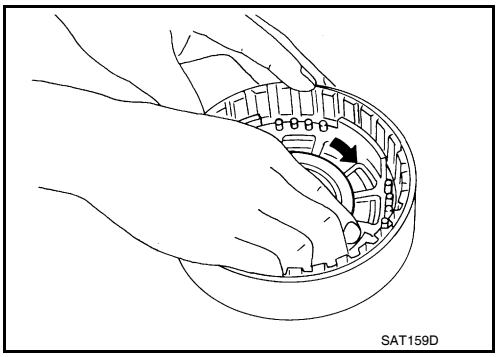
Check for deformation or damage. Replace if necessary.

ASSEMBLY

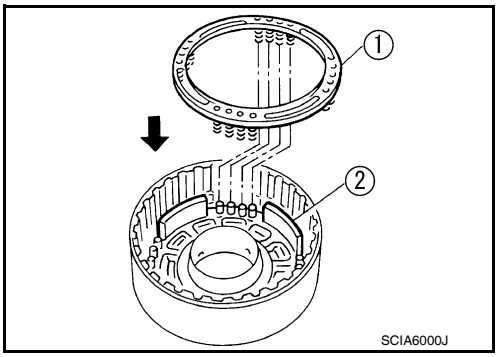
1. Install D-ring (1) and seal lip (2) on reverse clutch piston (3).
   CAUTION:
   Be careful with the direction of seal lip (2).



2. Install reverse clutch piston by turning it slowly.
   CAUTION:
   Apply ATF to inner surface of reverse clutch drum.



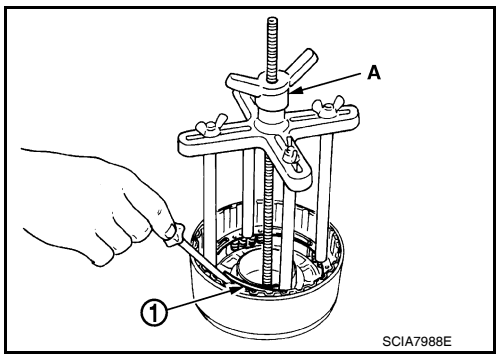
3. Install spring retainer assembly (1) to reverse clutch piston (2).



4. Set Tool (A) on spring retainer assembly, and install snap ring (1) while compressing spring retainer assembly.

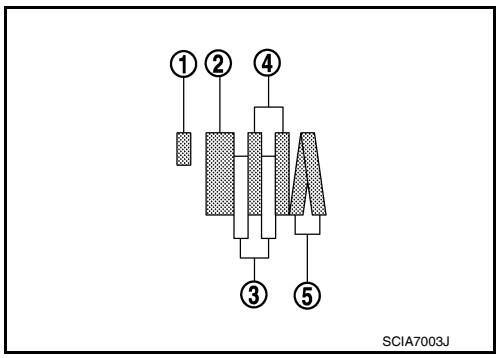
Tool number: KV31103200 (J-39186)

CAUTION:
Set SST directly over return springs.

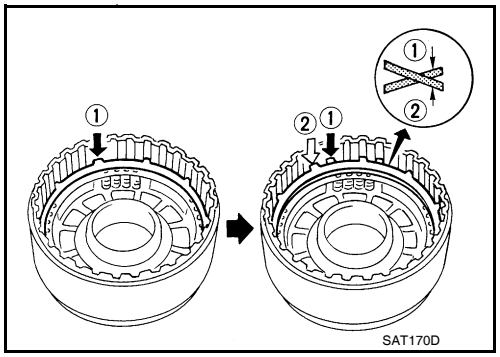


5. Install dish plates, driven plates, drive plates and retaining plate.
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Dish plate
Drive plate/Driven plate: 2/2

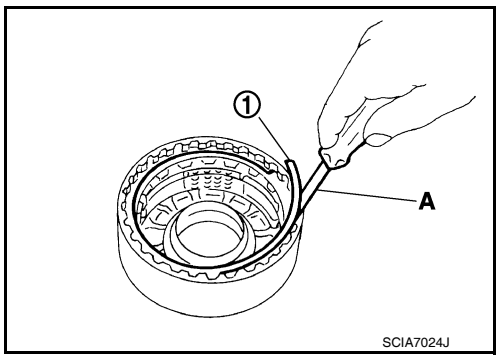
CAUTION:
Be careful with the order of plates.



NOTE:
Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



6. Install snap ring (1) using a suitable tool (A).

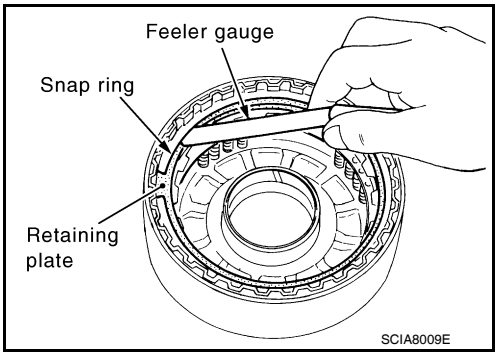


7. Measure clearance between retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to “Parts Information” for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

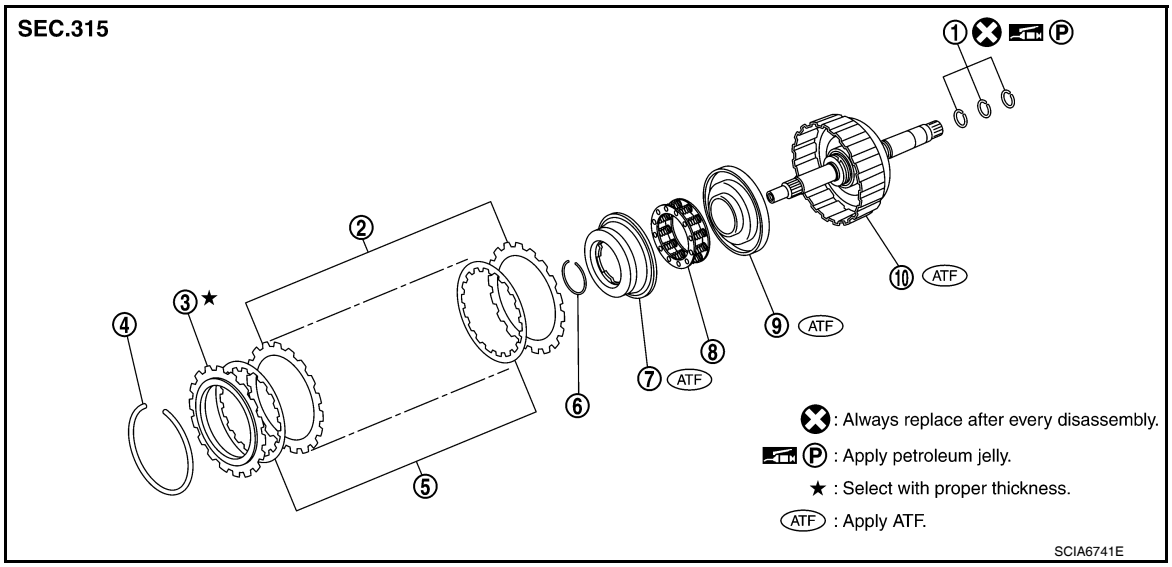


8. Check operation of reverse clutch.

High Clutch

INFOID:0000000007329489

COMPONENTS

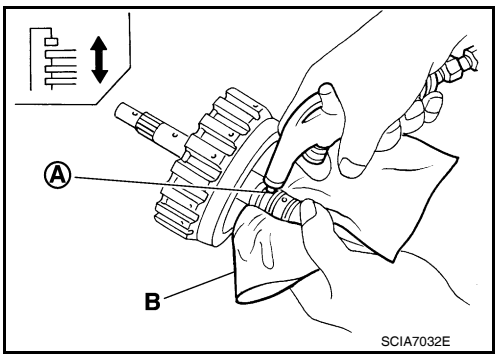


1. Seal ring
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate
6. Snap ring
7. Cancel cover
8. Spring retainer assembly
9. High clutch Piston
10. Input shaft assembly (high clutch drum)

DISASSEMBLY

1. Check operation of high clutch.

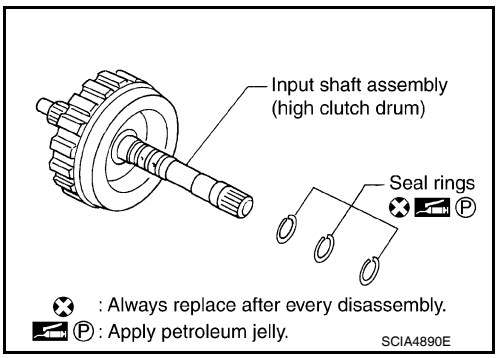
a. Apply compressed air into the oil hole (A) of input shaft assembly (high clutch drum) at the location as shown.
CAUTION:
Block the oil hole (A) on the opposite side with lint-free cloth (B).



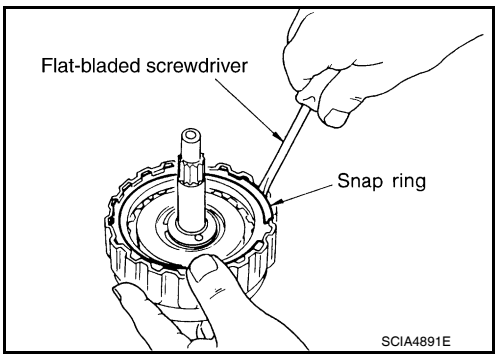
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:
- High clutch piston seal might be damaged.

2. Remove seal rings from input shaft assembly (high clutch drum).



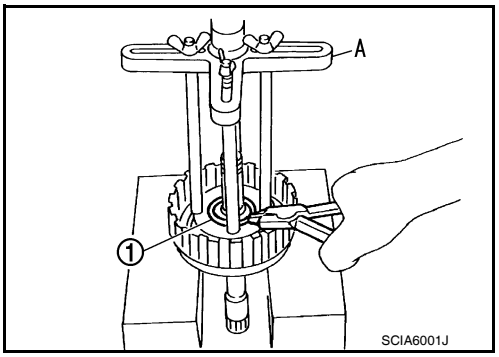
3. Remove snap ring using a flat-bladed screwdriver.
4. Remove retaining plate, drive plates and driven plates.



5. Set Tool (A) on cancel cover, and remove snap ring (1) from input shaft assembly (high clutch drum) while compressing spring retainer assembly.

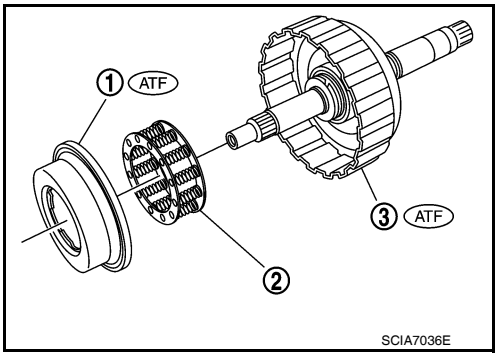
Tool number **A: KV31103200 (J-39186)**

CAUTION:
Do not expand snap ring (1) excessively.



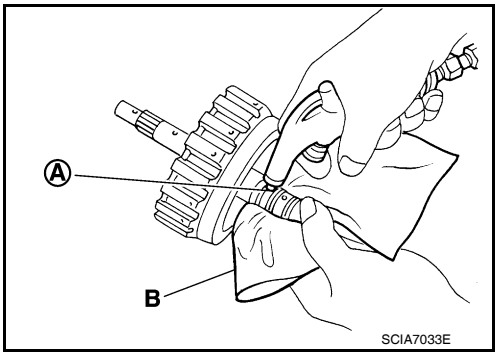
6. Remove cancel cover (1) and spring retainer assembly (2) from input shaft assembly (high clutch drum) (3).

CAUTION:
Do not remove return springs from spring retainers.



7. Apply compressed air into the oil hole (A) at the location as shown to remove high clutch piston from input shaft assembly (high clutch drum).

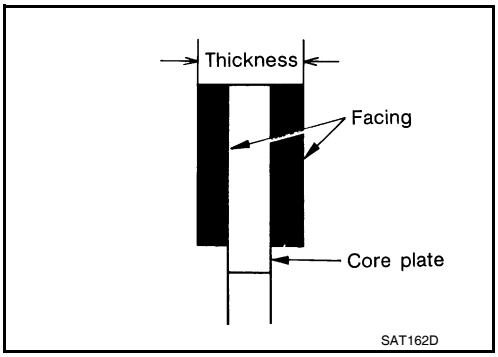
CAUTION:
- **Do not blow air in too quickly, or high clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth (B).**
- **Block the oil hole on the opposite side with lint-free cloth (B).**



INSPECTION

High Clutch Snap Ring
Check for deformation, fatigue or damage. Replace if necessary.

High Clutch Drive Plates
- Check facing for burns, cracks or damage. Replace if necessary.
- Measure thickness of facing.



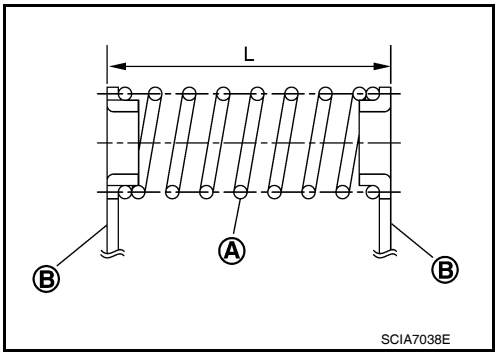
Thickness of drive plate

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

CAUTION:
- **Measure the thickness at 3 locations and find the average.**
- **Inspect all drive plates.**
- **Replace if the thickness is below the allowable limit.**

High Clutch Spring Retainer Assembly
Check length (L) of springs retainer assembly. Replace if damaged, deformed or worn.



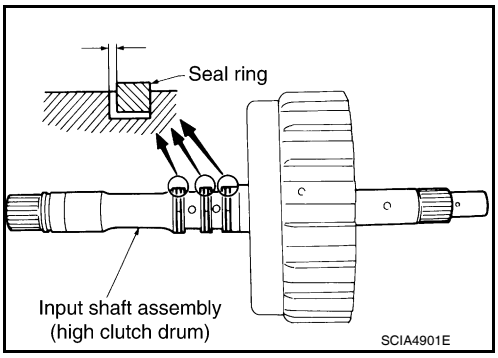
Length (L) : 20.6 mm (0.811 in)

CAUTION:
Do not remove return springs (A) from spring retainers (B).

High Clutch Piston and Cancel Cover
Check for deformation or damage. Replace if necessary.

Input Shaft Assembly (High Clutch Drum)
Check for deformation or damage. Replace if necessary.

Seal Ring Clearance
- Install new seal rings onto input shaft assembly (high clutch drum).
- Measure clearance between seal ring and ring groove.



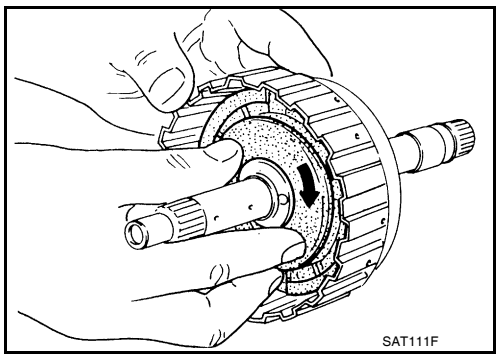
Standard clearance and allowable limit:

Refer to AT-350, "Input Shaft".

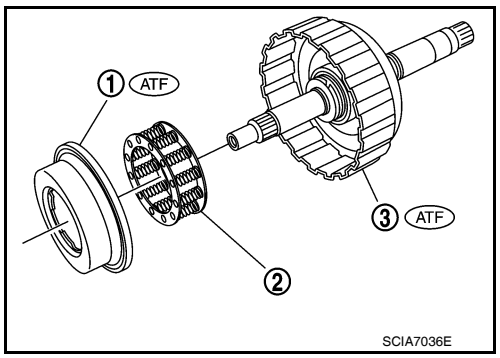
- If not within allowable limit, replace input shaft assembly (high clutch drum).

ASSEMBLY

1. Install high clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of input shaft assembly (high clutch drum) and high clutch piston.



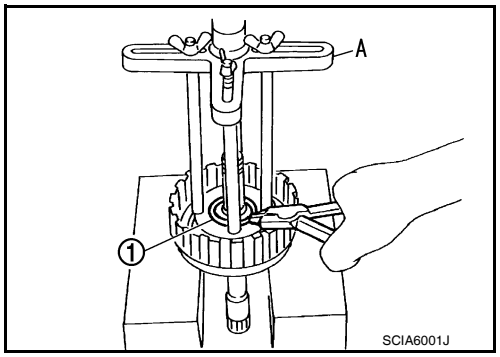
2. Install spring retainer assembly (2) and cancel cover (1) on input shaft assembly (high clutch drum) (3).



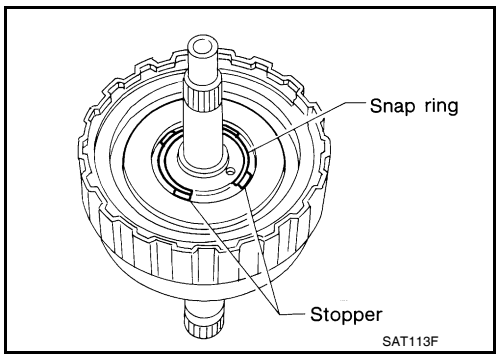
3. Set Tool (A) on cancel cover, and install snap ring (1) to input shaft assembly (high clutch drum) while slowly compressing spring retainer assembly.

Tool number **A: KV31103200 (J-39186)**

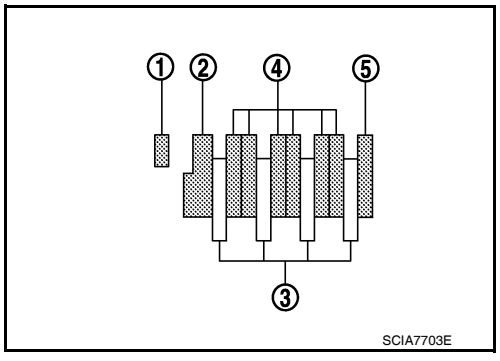
CAUTION:
- **Do not expand snap ring (1) excessively.**
- **Install spring retainer assembly without tilting.**



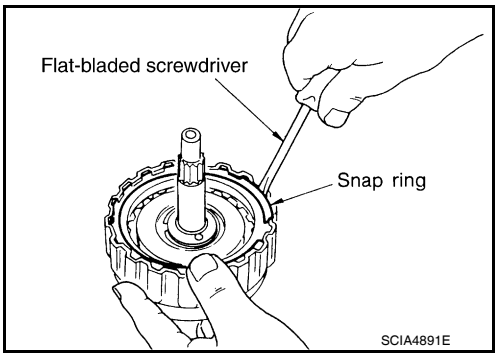
- **Do not align snap ring gap with cancel cover stopper.**



4. Install driven plates, drive plates and retaining plate.
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Driven plate
Drive plate/Driven plate: 4/7 (1+6)
CAUTION:
Be careful with the order and direction of plates.



5. Install snap ring using a flat-bladed screwdriver.

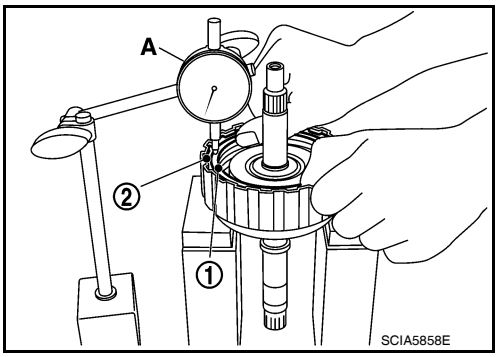


6. Set dial indicator (A) on retaining plate (1), and measure clearance between retaining plate (1) and snap ring (2). If not within allowable limit, select proper retaining plate (1). Refer to “Parts Information” for retaining plate selection.

Specified clearance

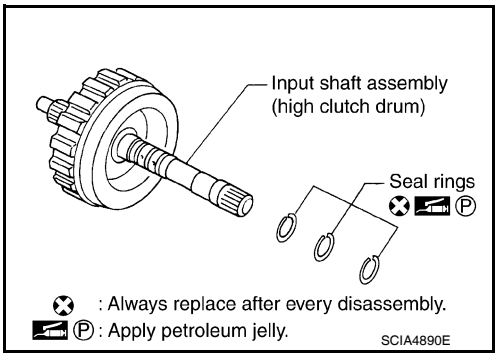
Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".



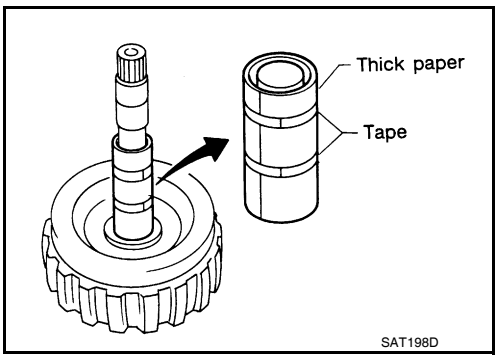
7. Check operation of high clutch.

8. Install seal rings to input shaft assembly (high clutch drum).



CAUTION:

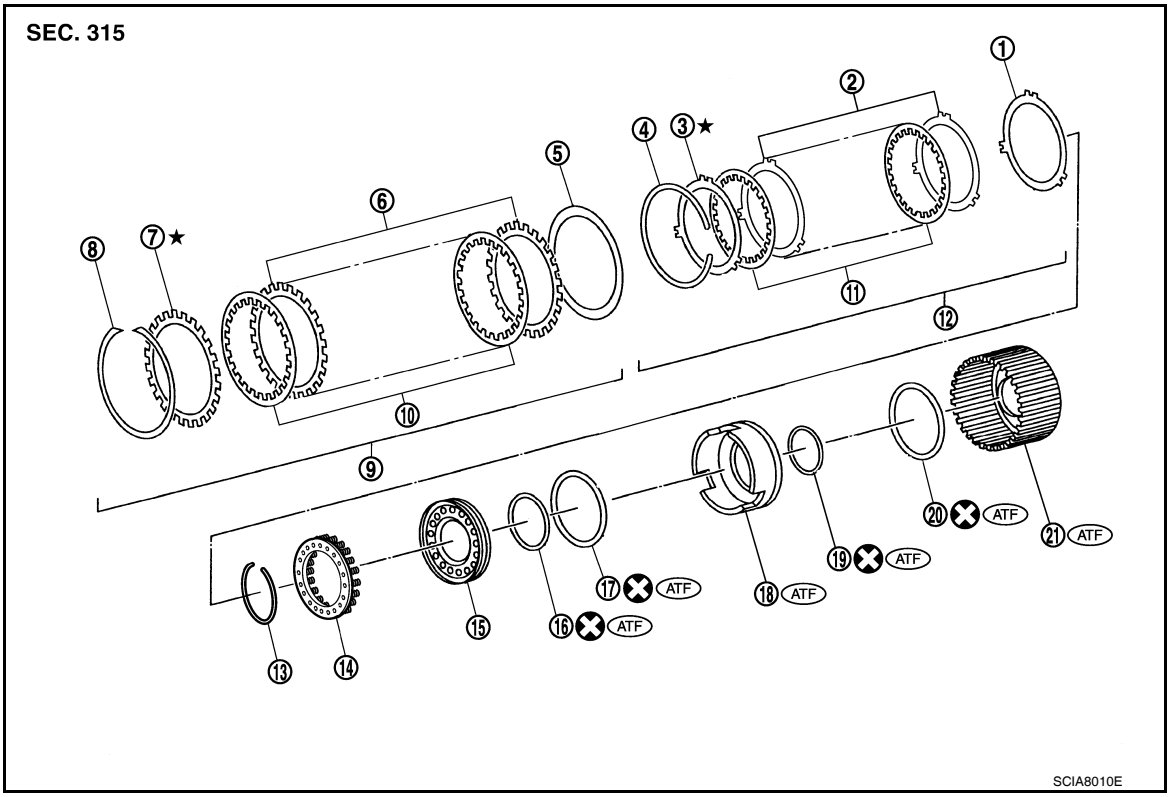
Roll paper around seal rings to prevent seal rings from spreading.



Forward and Overrun Clutches

INFOID:0000000007329490

COMPONENTS



1. Dish plate
2. Driven plate
3. Retaining plate
4. Snap ring
5. Dish plate
6. Driven plate
7. Retaining plate
8. Snap ring
9. Forward clutch
10. Drive plate
11. Drive plate
12. Overrun clutch
13. Snap ring
14. Spring retainer assembly
15. Overrun clutch piston
16. D-ring
17. Seal lip
18. Forward clutch piston
19. D-ring
20. Seal lip
21. Forward clutch drum

DISASSEMBLY

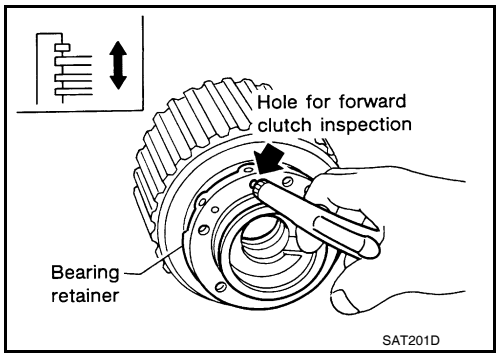
1. Check operation of forward clutch.

a. Install seal rings to bearing retainer, and set forward clutch drum.

b. Apply compressed air into oil hole of bearing retainer at the location as shown.

c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Seal lip might be damaged.
   - Fluid might be leaking past piston check ball.



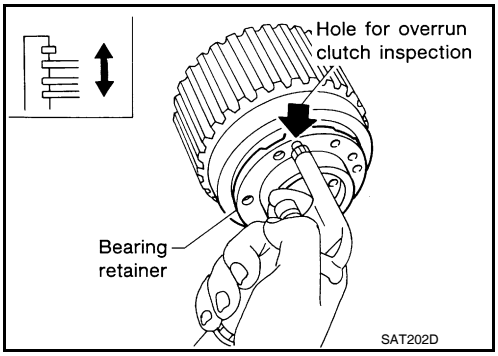
2. Check operation of overrun clutch.

a. Install seal rings to bearing retainer, and set forward clutch drum.

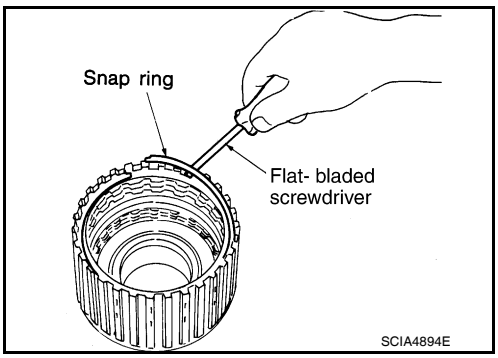
b. Apply compressed air into oil hole of bearing retainer at the location as shown.

c. Check to see that retaining plate moves to snap ring.

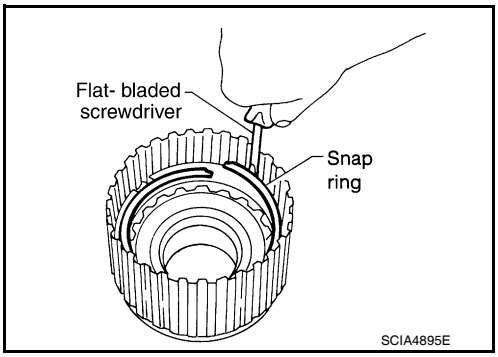
d. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Seal lip might be damaged.
   - Fluid might be leaking past piston check ball.



3. Remove snap ring for forward clutch from forward clutch drum using a flat-bladed screwdriver.
4. Remove retaining plate, drive plates, driven plates and dish plate for forward clutch.



5. Remove snap ring for overrun clutch from forward clutch drum using a flat-bladed screwdriver.
6. Remove retaining plate, drive plates, driven plates and dish plate for overrun clutch.

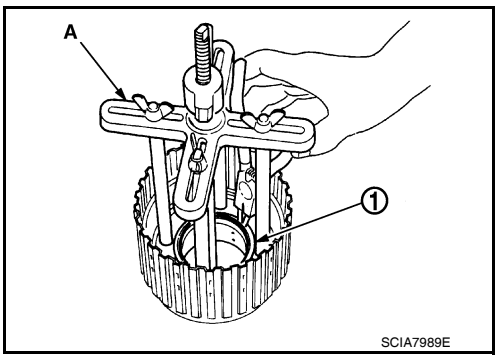


7. Set Tool (A) on spring retainer assembly, and remove snap ring (1) from forward clutch drum while compressing spring retainer assembly.

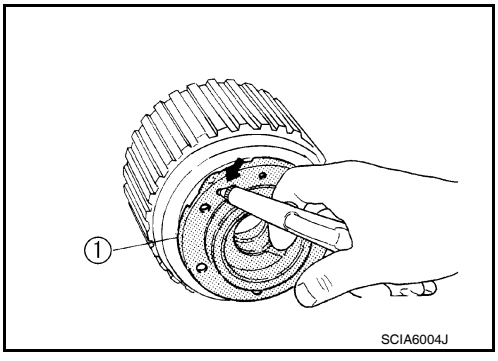
   Tool number : KV31103200 (J-39186)

   CAUTION:
   - **Set Tool directly over return springs.**
   - **Do not expand snap ring excessively.**

8. Remove spring retainer assembly from forward clutch drum.
   CAUTION:
   Do not remove return springs from spring retainer.



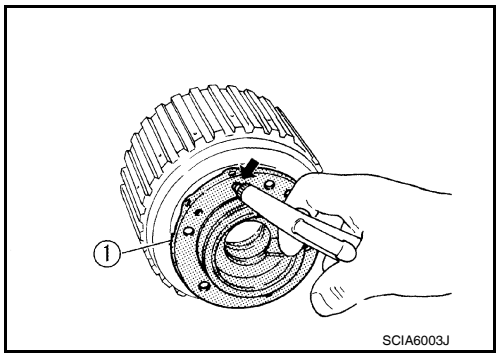
9. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown to remove overrun clutch piston from forward clutch piston.
   CAUTION:
   Do not blow air in too quickly, or overrun clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth.



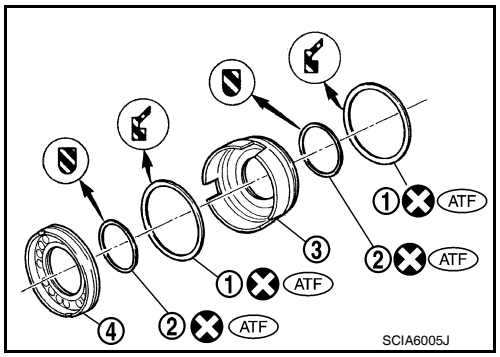
10. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown to remove forward clutch piston from forward clutch drum.

CAUTION:

Do not blow air in too quickly, or forward clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth.



11. Remove seal lips (1) and D-rings (2) from forward clutch piston (3) and overrun clutch piston (4).



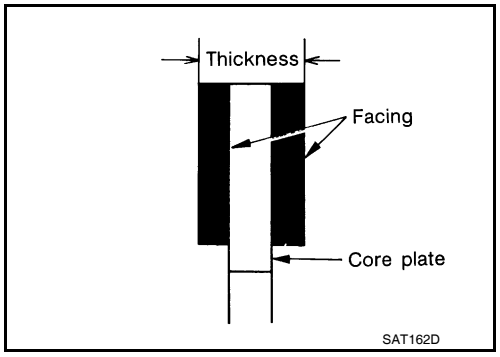
INSPECTION

Forward Clutch and Overrun Clutch Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

Forward Clutch and Overrun Clutch Drive Plates

- Check facing for burns, cracks or damage. Replace if necessary.
- Measure thickness of facing.



Thickness of drive plate

Forward clutch

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

Overrun clutch

Standard and allowable limit:

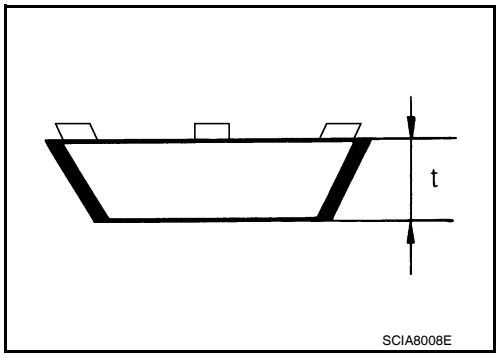
Refer to AT-348, "Clutches and Brakes".

CAUTION:

- **Measure the thickness at 3 locations and find the average.**
- **Inspect all drive plates.**
- **Replace if the thickness is below the allowable limit.**

Forward Clutch and Overrun Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.



Thickness of dish plate (t)

Forward clutch : 2.5 mm (0.098 in)

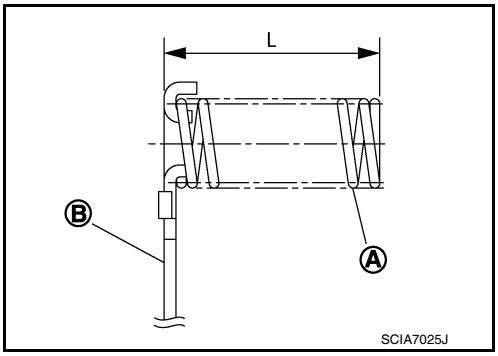
Overrun clutch : 2.15 mm (0.0846 in)

Forward Clutch and Overrun Clutch Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

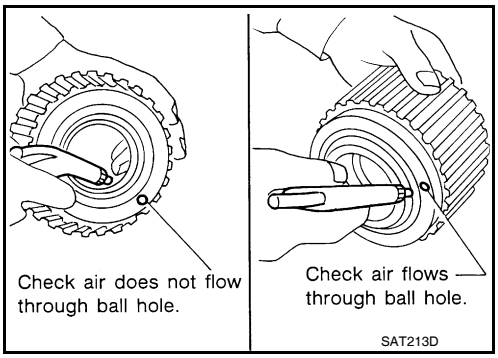
Length (L) : 27.7 mm (1.091 in)

CAUTION:
Do not remove return springs (A) from spring retainer (B)



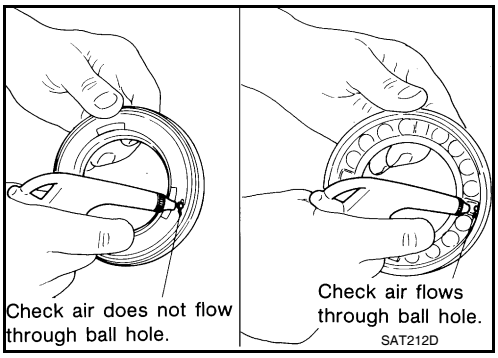
Forward Clutch Drum

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



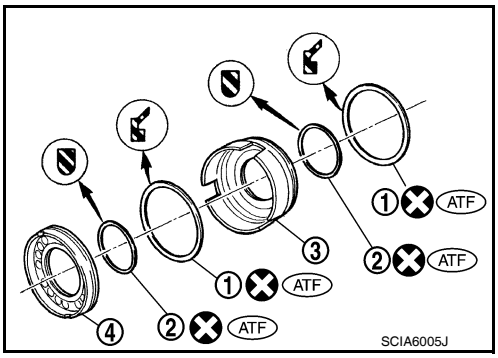
Overrun Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks through ball hole.

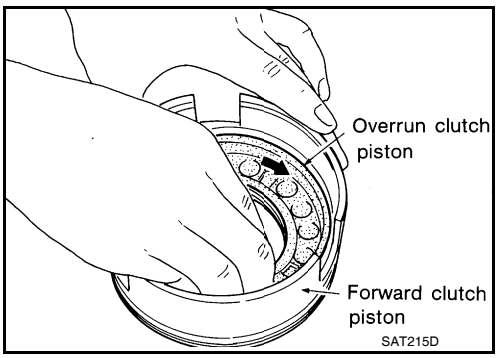


ASSEMBLY

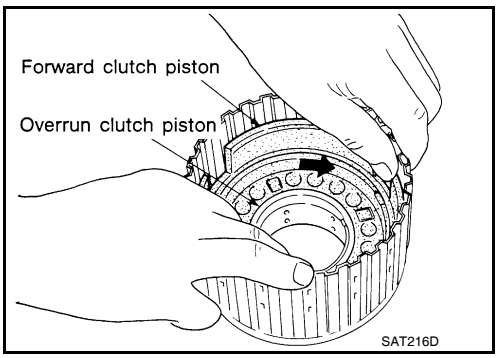
1. Install seal lips (1) and D-rings (2) on forward clutch piston (3) and overrun clutch piston (4).
   CAUTION:
   Be careful with the direction of seal lips (1).



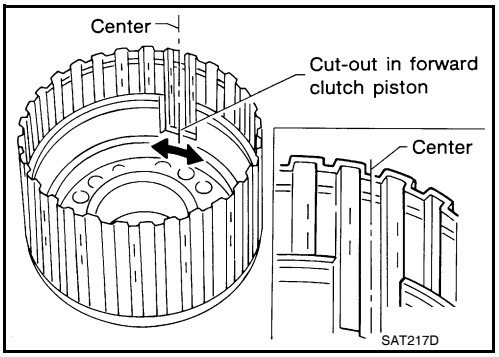
2. Install overrun clutch piston on forward clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch piston.



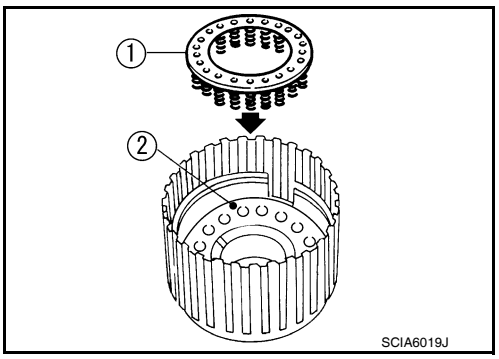
3. Install forward clutch piston with overrun clutch piston on forward clutch drum by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch drum.



4. Align notch in forward clutch piston with groove in forward clutch drum.



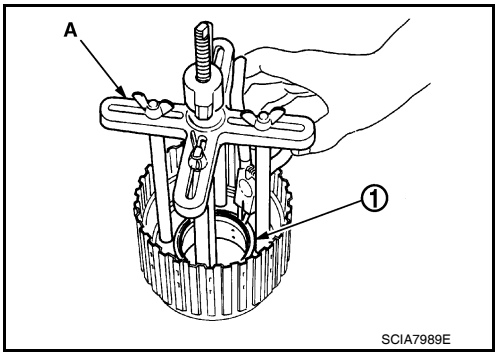
5. Install spring retainer assembly (1) on overrun clutch piston (2).



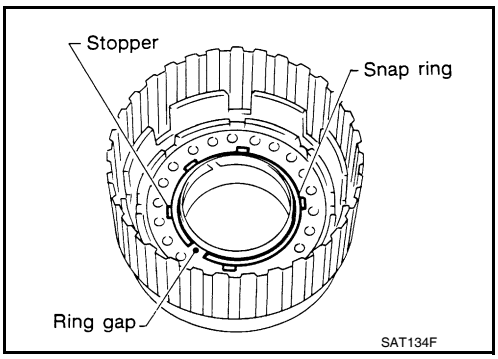
6. Set Tool (A) on spring retainer assembly, and install snap ring (1) while compressing spring retainer assembly.

Tool number : KV31103200 (J-39186)

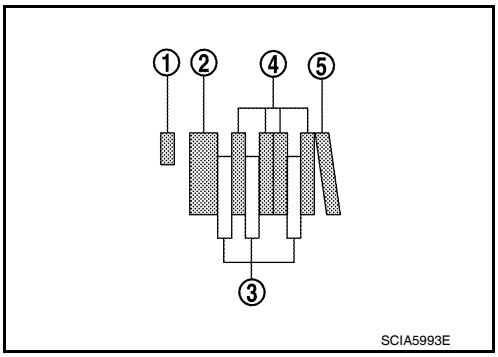
CAUTION:
- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**



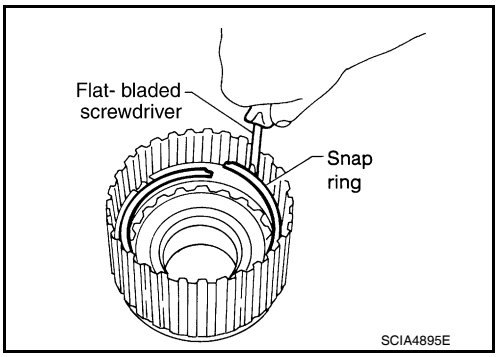
- **Do not align snap ring gap with spring retainer assembly stopper.**



7. Install dish plate, driven plates, drive plates and retaining plate for overrun clutch.
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Dish plate
Drive plate/Driven plate: 3/4
CAUTION:
Be careful with the order of plates.



8. Install snap ring for overrun clutch using a flat-bladed screwdriver.

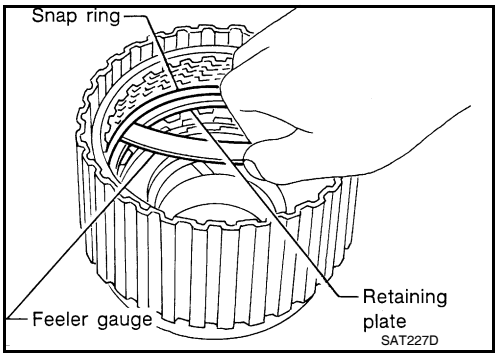


9. Measure clearance between overrun clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to “Parts Information” for retaining plate selection.

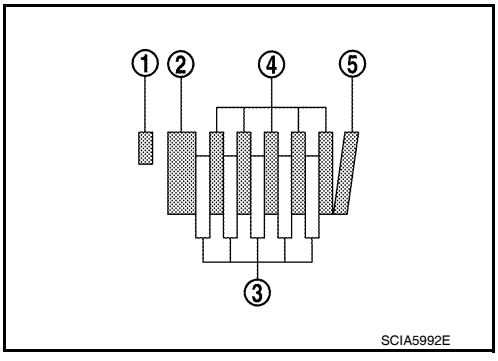
Specified clearance

Standard and allowable limit:

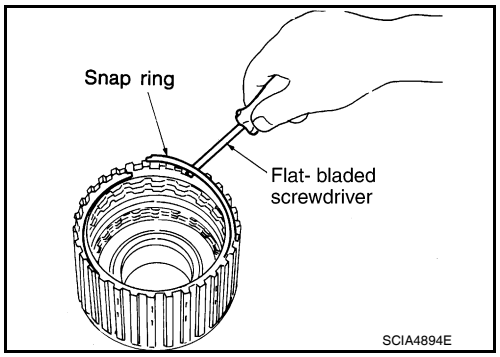
Refer to AT-348, "Clutches and Brakes".



10. Install dish plate, driven plates, drive plates and retaining plate for forward clutch.
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Dish plate
Drive plate/Driven plate: 5/5
CAUTION:
Be careful with the order of plates.



11. Install snap ring for forward clutch using a flat-bladed screwdriver.

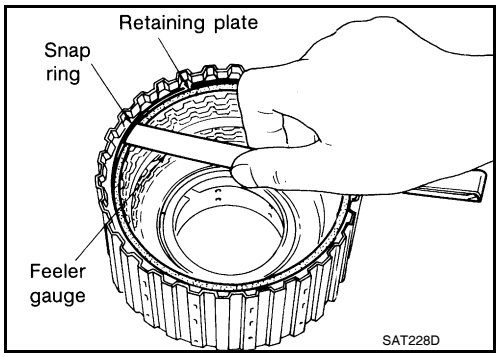


12. Measure clearance between forward clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to “Parts Information” for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

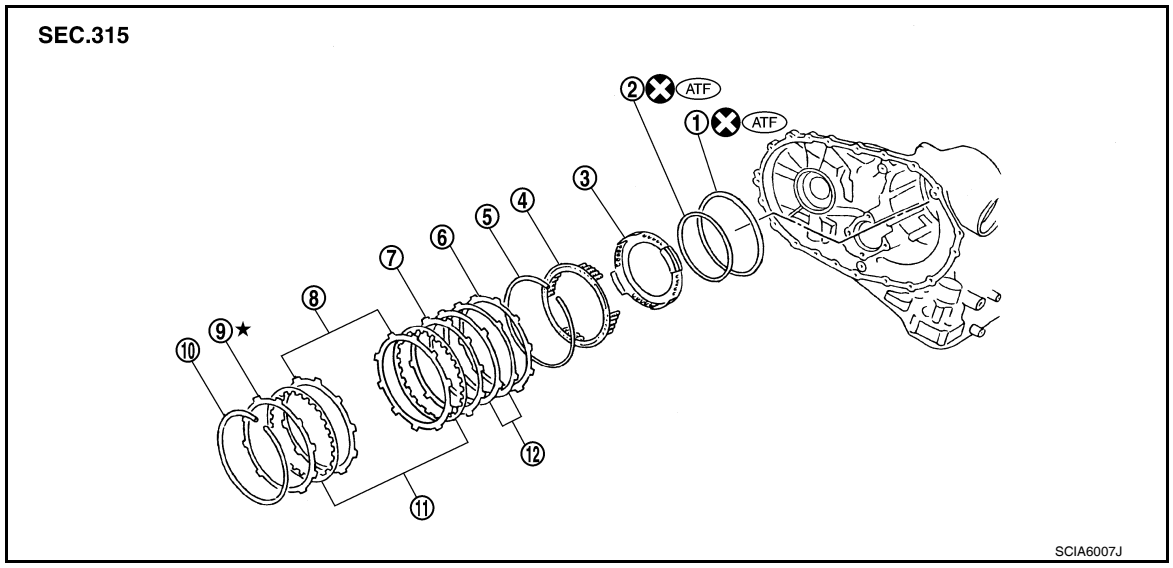


13. Check operation of forward clutch and overrun clutch. Refer to "DISASSEMBLY".

Low & Reverse Brake

INFOID:0000000007329491

COMPONENTS

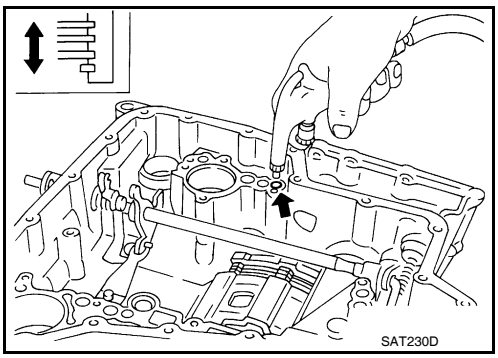


1. Seal lip	2. D-ring	3. Low & reverse brake piston
4. Spring retainer assembly	5. Snap ring	6. Driven plate
7. Retaining plate	8. Driven plate	9. Retaining plate
10. Snap ring	11. Drive plate	12. Dish plate

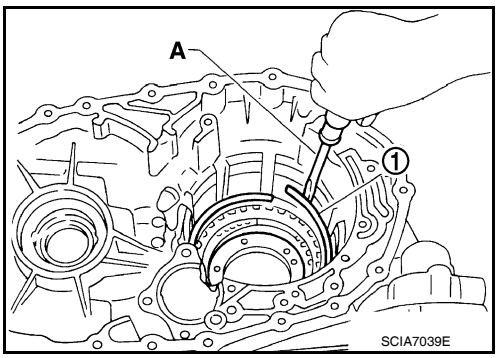
DISASSEMBLY

1. Check operation of low & reverse brake.

a. Apply compressed air into oil hole of transaxle case at the location as shown.
b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not contact snap ring:
   • D-ring might be damaged.
   • Seal lip might be damaged.



2. Remove snap ring (1) using a suitable tool (A).
3. Remove retaining plates, drive plates, driven plates, dish plates.



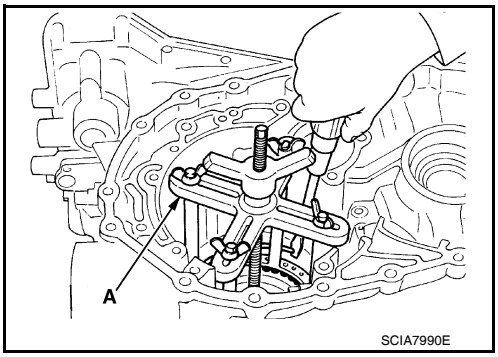
4. Set Tool (A) on spring retainer assembly, and remove snap ring from transaxle case while compressing spring retainer assembly.

Tool number **A: KV31103200 (J-39186)**

CAUTION:
Set Tool directly over return springs.

5. Remove spring retainer assembly from transaxle case.

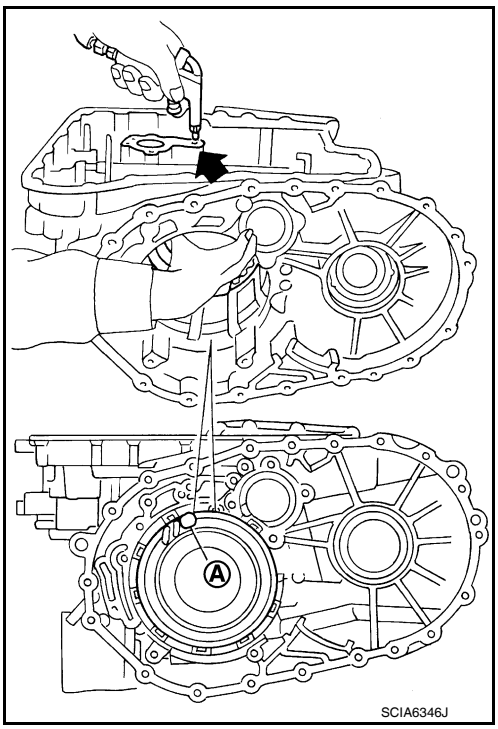
CAUTION:
Do not remove return springs from spring retainer.



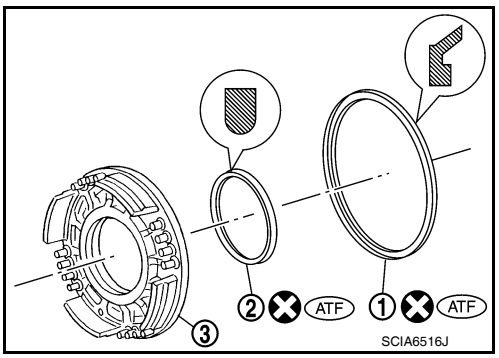
6. Apply compressed air into the oil hole on transaxle case as shown in the figure to raise piston while strongly pressing the whole low & reverse brake piston by hand. When applying compressed air, strongly press the whole piston and adjust the pressure so that it is raised evenly. Portion (A) (low & reverse brake pressure) especially tends to tilt.

CAUTION:
Apply air gradually and allow low & reverse brake piston to come out evenly.

7. Remove low & reverse brake piston from transaxle case by turning it.
8. Inspect transaxle case. Replace if damaged or worn.



9. Remove seal lip (1) and D-ring (2) from low & reverse brake piston (3).



INSPECTION

Low & Reverse Brake Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

Low & Reverse Brake Drive Plates

- Check facing for burns, cracks or damage. Replace if necessary.
- Measure thickness of facing.

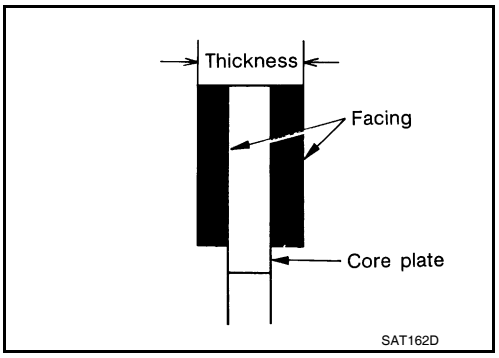
Thickness of drive plate

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

CAUTION:

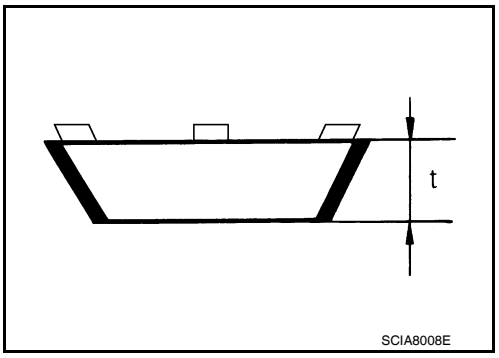
- **Measure the thickness at 3 locations and find the average.**
- **Inspect all drive plates.**
- **Replace if the thickness is below the allowable limit.**



Low & Reverse Brake Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.

Thickness of dish plate (t) : 2.93 mm (0.1154 in)



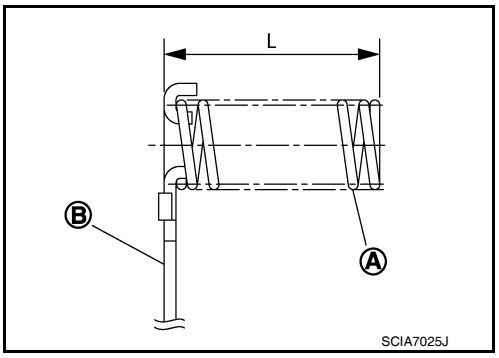
Low & Reverse Brake Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L) : 26.3 mm (1.035 in)

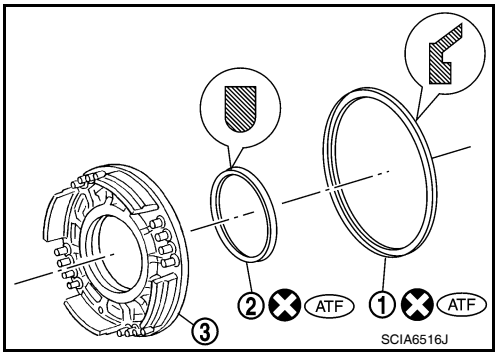
CAUTION:

Do not remove return springs (A) from spring retainer (B)



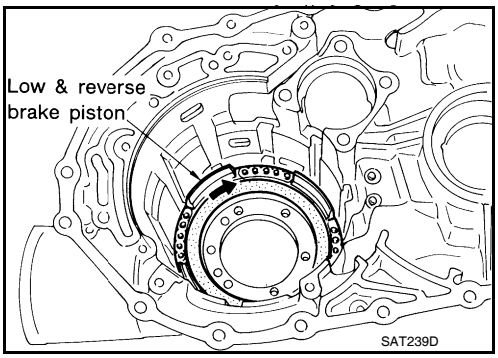
ASSEMBLY

1. Install seal lip (1) and D-ring (2) on low & reverse brake piston (3).

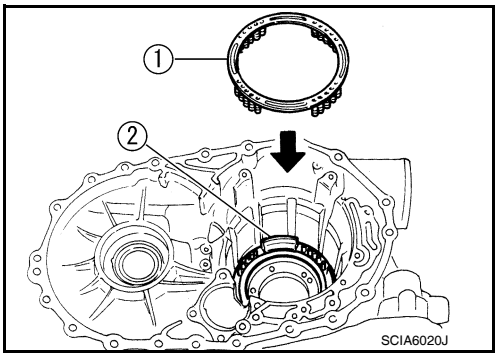


2. Install low & reverse brake piston in transaxle case while turning it.

CAUTION:
Apply ATF to inner surface of transaxle case.



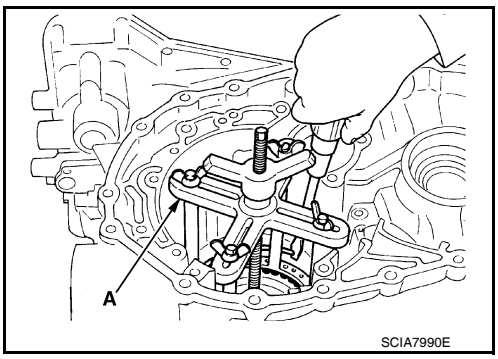
3. Install spring retainer assembly (1) on low & reverse brake piston (2).



4. Set Tool (A) on spring retainer assembly, and install snap ring while compressing spring retainer assembly.

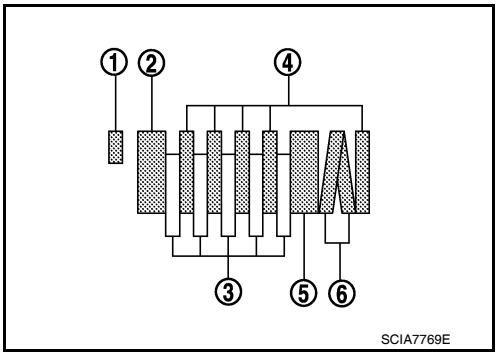
Tool number **A: KV31103200 (J-39186)**

CAUTION:
Set SST directly over return springs.

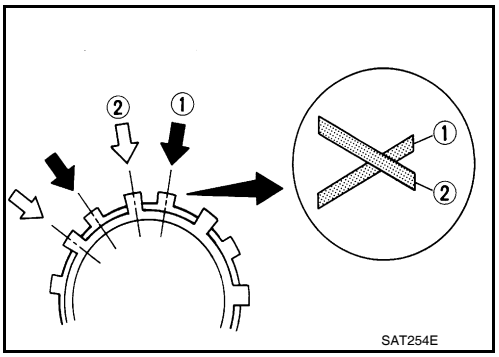


5. Install driven plates, dish plates, retaining plates and drive plates.
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Retaining plate
(6): Dish plate
Drive plate/Driven plate: 5/5

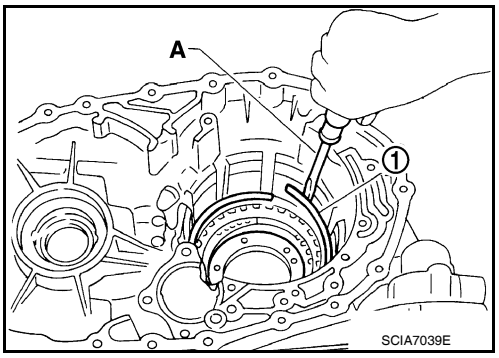
CAUTION:
Be careful with the order of plates



NOTE:
Install two dish plates fitting each installation direction with groove displaced slightly.



6. Install snap ring (1) using a suitable tool (A).



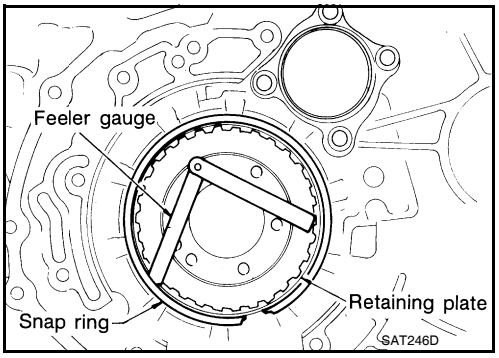
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side). Refer to “Parts Information” for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to AT-348, "Clutches and Brakes".

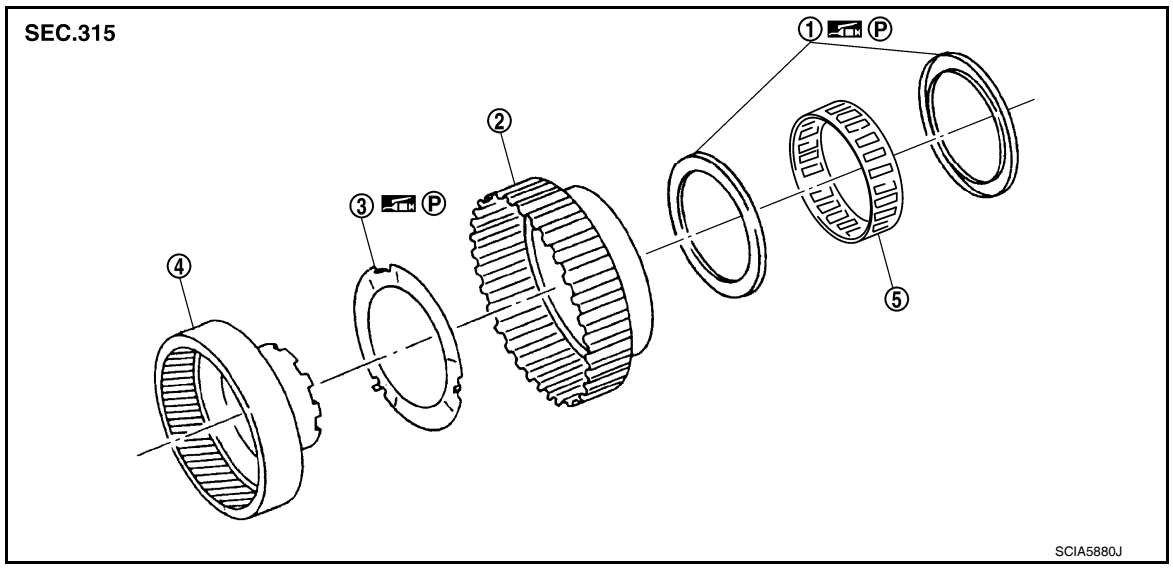
8. Check operation of low & reverse brake. Refer to "DISASSEMBLY".



Rear Internal Gear and Forward Clutch Hub

INFOID:0000000007329492

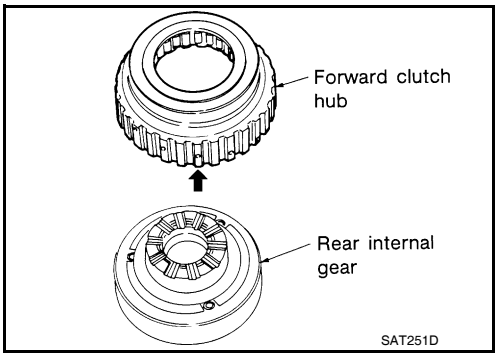
COMPONENTS



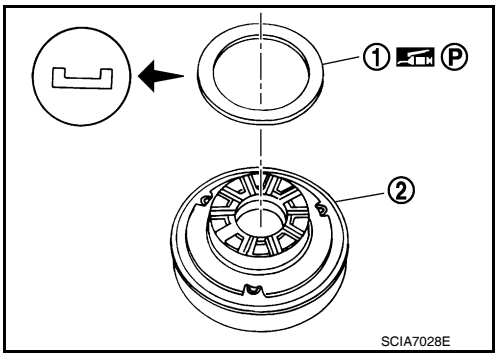
1. End bearing
2. Forward clutch hub
3. Thrust washer
4. Rear internal gear
5. Forward one-way clutch

DISASSEMBLY

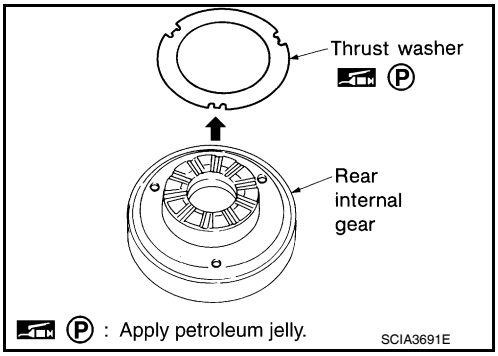
1. Remove forward clutch hub from rear internal gear.



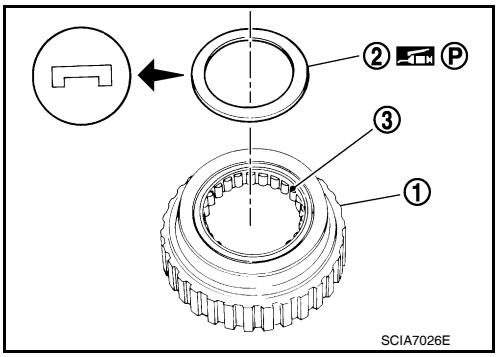
2. Remove end bearing (1) from rear internal gear (2).



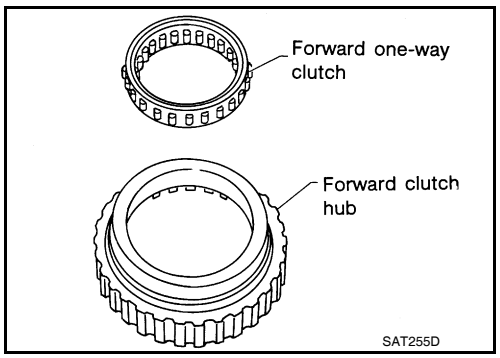
3. Remove thrust washer from rear internal gear.



4. Remove end bearing (2) from forward one-way clutch (3).
(1): Forward clutch hub



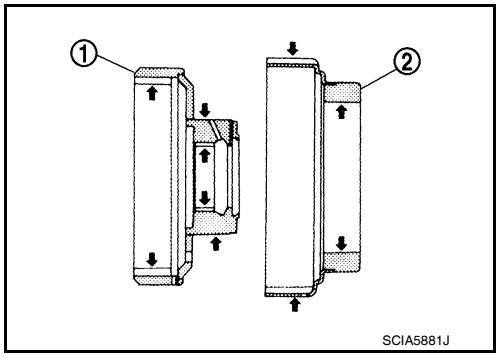
5. Remove forward one-way clutch from forward clutch hub.



INSPECTION

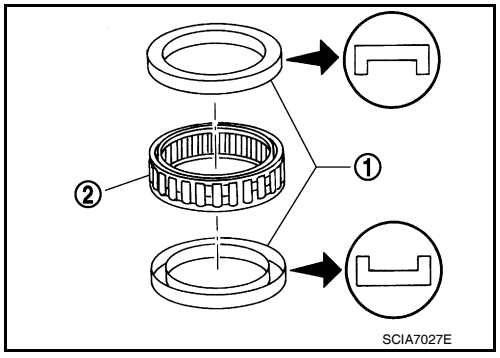
Rear Internal Gear and Forward Clutch Hub

Check rubbing surfaces for wear or damage. Replace if necessary.
(1): Rear internal gear
(2): Forward clutch hub



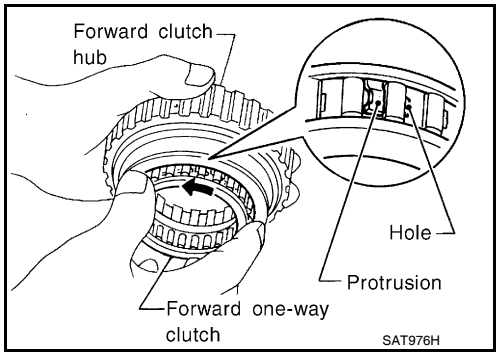
End Bearings and Forward One-way Clutch

- Check end bearings (1) for deformation and damage. Replace if necessary.
- Check forward one-way clutch (2) for wear and damage. Replace if necessary.

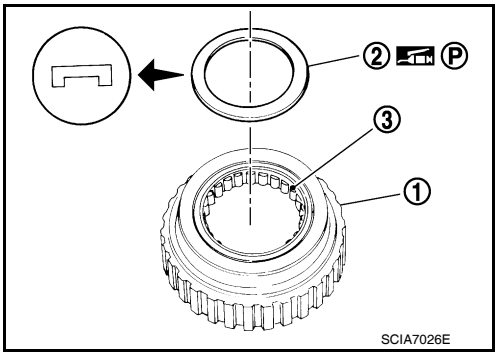


ASSEMBLY

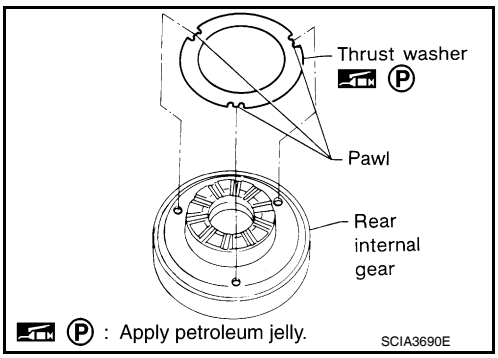
1. Install forward one-way clutch on forward clutch hub.
   CAUTION:
   Be careful with the direction of forward one-way clutch.



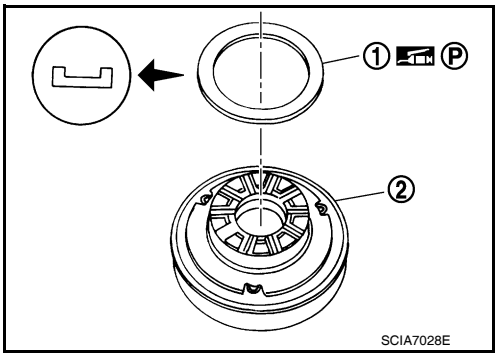
2. Install end bearing (2) on forward one-way clutch (3).
(1): Forward clutch hub



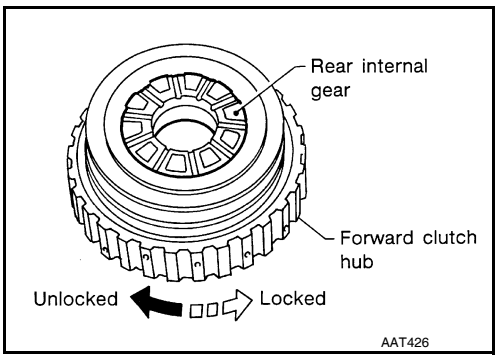
3. Install thrust washer on rear internal gear.
CAUTION:
Align pawls of thrust washer with holes of rear internal gear.



4. Install end bearing (1) on rear internal gear (2).



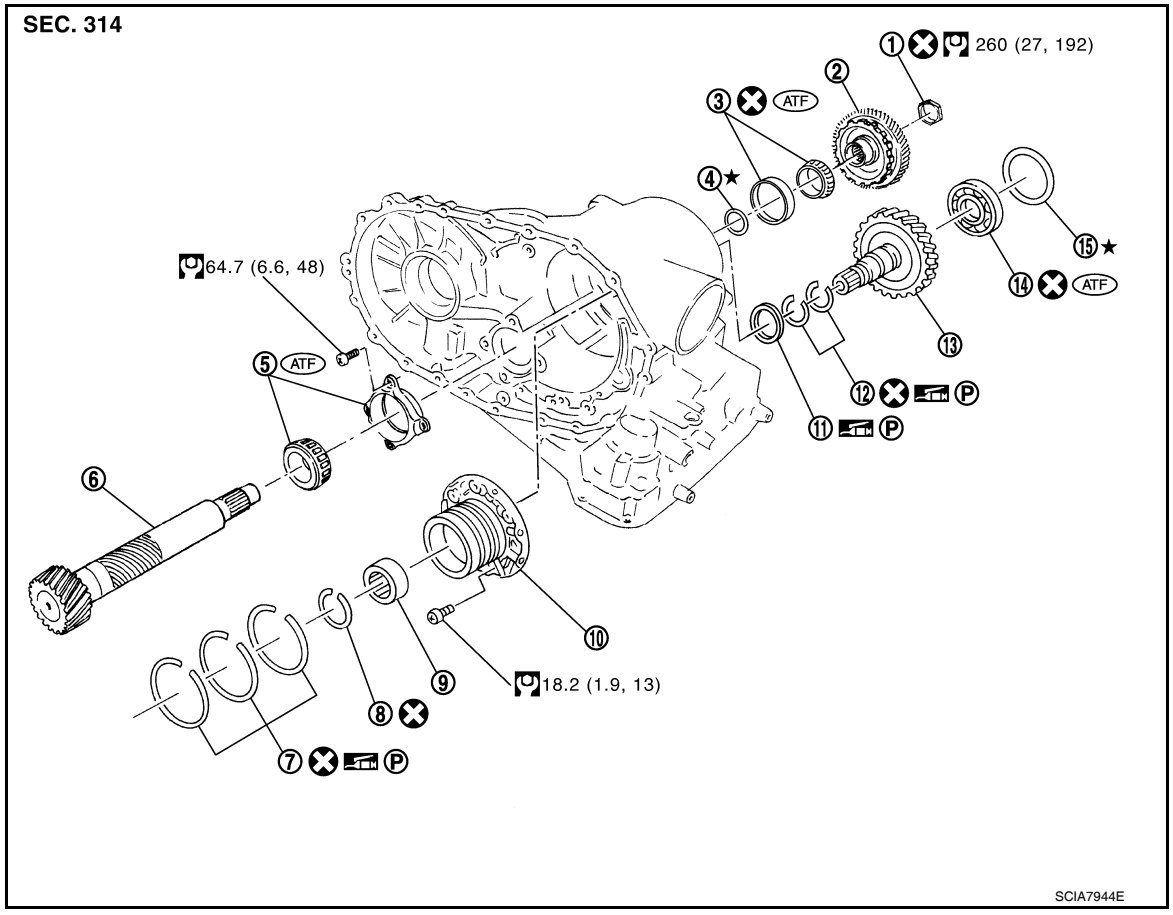
5. Install forward clutch hub on rear internal gear.
CAUTION:
- **Check operation of forward one-way clutch.**
  Hold rear internal gear and turn forward clutch hub.
  Check forward clutch hub for correct locking and unlocking directions.
- **If not as shown, check the installation direction of forward one-way clutch.**



Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer

INFOID:0000000007329493

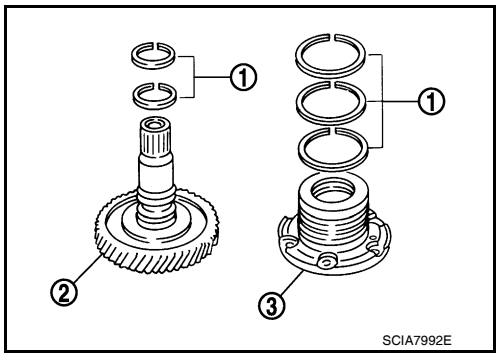
COMPONENTS



1. Lock nut	2. Idler gear	3. Idler gear bearing
4. Reduction pinion gear adjusting shim	5. Reduction pinion gear bearing	6. Reduction pinion gear
7. Seal ring	8. Snap ring	9. Radial needle bearing
10. Bearing retainer	11. Thrust needle bearing	12. Seal ring
13. Output shaft	14. Output shaft bearing	15. Output shaft adjusting shim

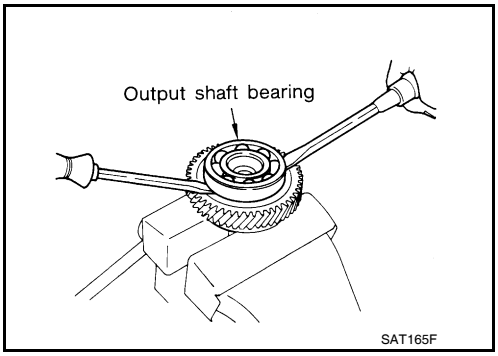
DISASSEMBLY

1. Remove seal rings (1) from output shaft (2) and bearing retainer (3).



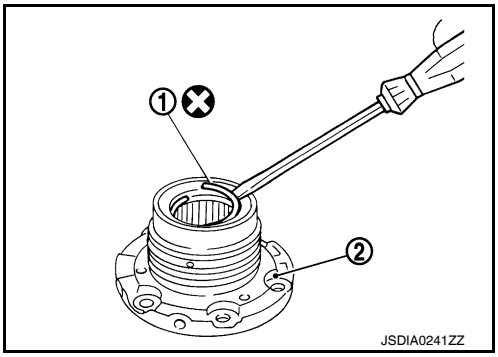
2. Remove output shaft bearing from output shaft with suitable tools.

CAUTION:
- **Always replace bearing with a new one when removed**
- **Do not damage output shaft.**



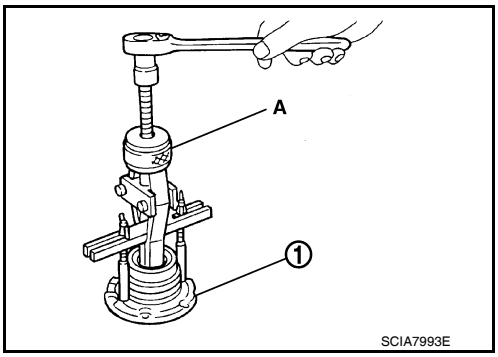
3. Remove radial needle bearing according to the following procedures.

a. Remove snap ring (1) using suitable tool from bearing retainer (2).



b. Remove radial needle bearing from bearing retainer (1) using Tool (A).

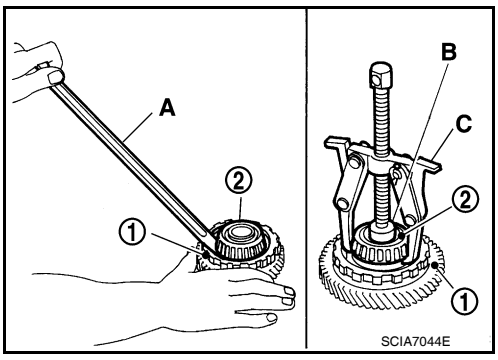
Tool number **A: KV381054S0 (J-34286)**



4. Insert a suitable tool (A) between the mating surfaces of idler gear (1) and idler gear bearing inner race (2), and enlarge the gap.

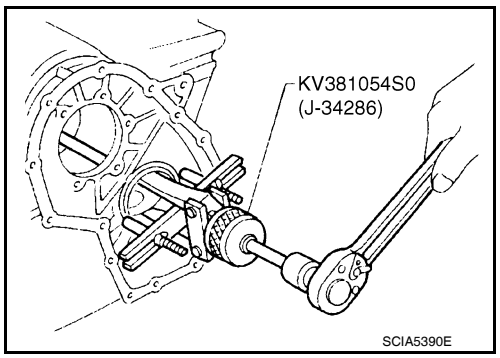
CAUTION:
Be careful not to damage idler gear (1).

5. Set suitable tool (B) on idler gear (1), and remove idler gear bearing inner race (2) with a suitable tool (C) as shown.



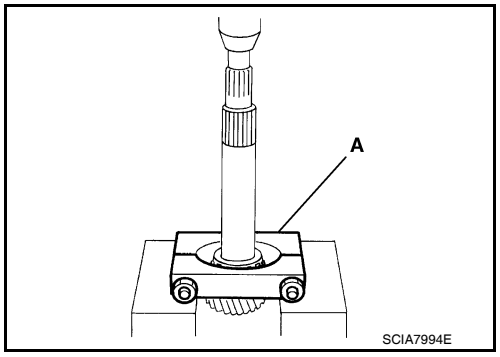
6. Remove idler gear bearing outer race from transaxle case using Tool.

Tool number : KV381054S0 (J-34286)

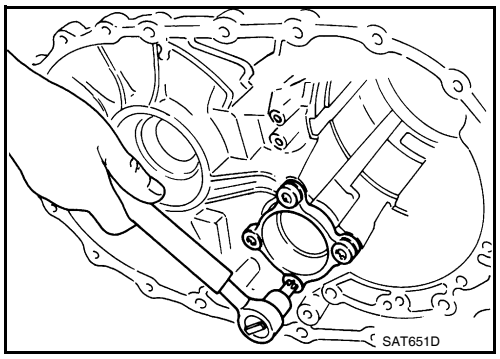


7. Set Tool (A) to reduction pinion gear bearing inner race, press out reduction pinion gear bearing inner race from reduction pinion gear.

Tool number A: ST30031000 (J-22912-01)



8. Remove reduction pinion gear bearing outer race from transaxle case.



INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

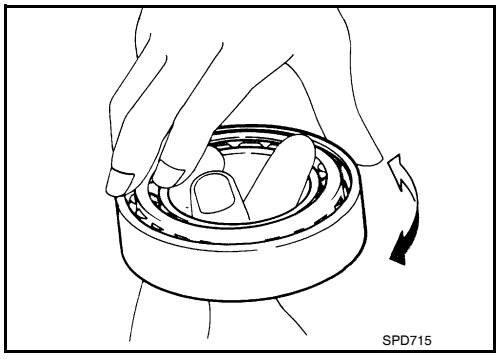
Check for wear, damage or crack. Replace if necessary.

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.

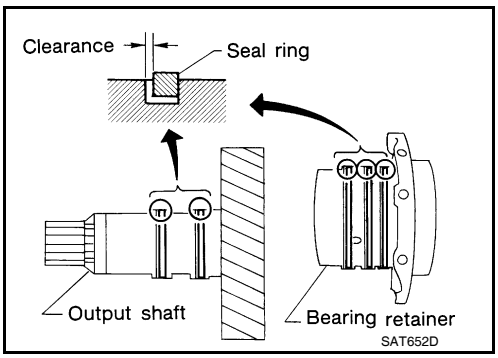
CAUTION:

When replacing taper roller bearing, replace outer and inner race as a set.



Seal Ring Clearance

- Install new seal rings to output shaft and bearing retainer.



- Measure clearance (A) between each seal ring and ring groove of output shaft. If not within allowable limit, replace output shaft.

Standard clearance and allowable limit:

Refer to AT-351, "Output Shaft".

- Measure clearance (A) between seal ring and ring groove of bearing retainer. If not within allowable limit, replace bearing retainer.

Standard clearance and allowable limit:

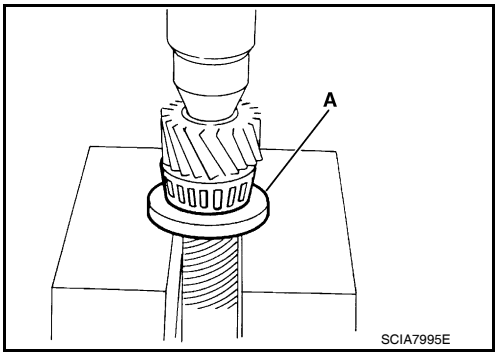
Refer to AT-351, "Bearing Retainer".

ASSEMBLY

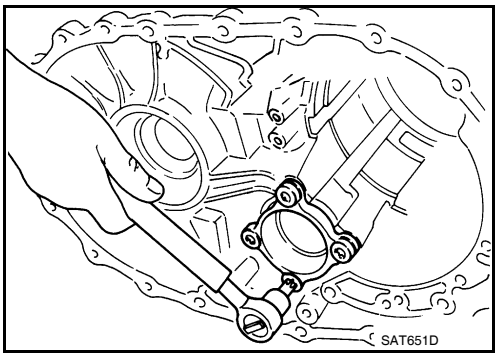
1. Set Tool (A) on reduction pinion gear bearing inner race, and press reduction pinion gear to reduction pinion gear bearing inner race.

Tool number : ST35272000 (J-26092)

CAUTION:
Apply ATF to reduction pinion gear bearing inner race.



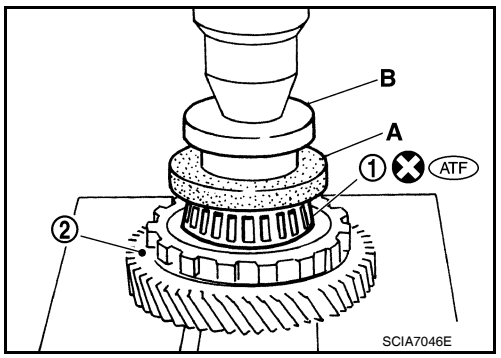
2. Install reduction pinion gear bearing outer race on transaxle case. Refer to "COMPONENTS" .
   - **Check reduction pinion gear bearing preload. Refer to AT-324, "Adjustment (1)"**



3. Set Tool (A) and a suitable tool (B) on idler gear bearing inner race (1), and press idler gear bearing inner race (1) to idler gear (2).

Tool number : ST35272000 (J-26092)

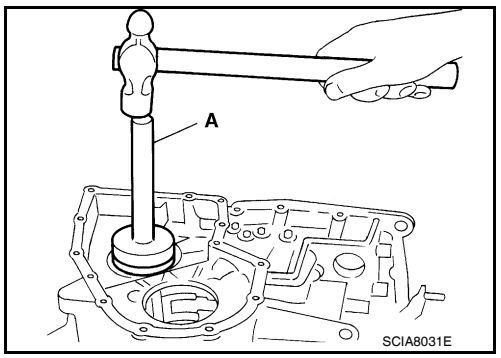
CAUTION:
- **Do not reuse idler gear bearing.**
- **Apply ATF to idler gear bearing.**



4. Set Tool (A) on idler gear bearing outer race, and drive idler gear bearing outer race into transaxle case.

Tool number : ST37830000 (—)

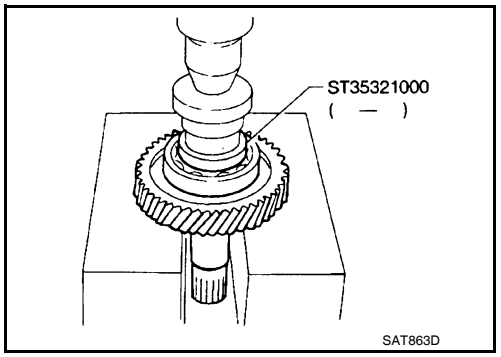
CAUTION:
- **Do not reuse idler gear bearing.**
- **Apply ATF to idler gear bearing.**



5. Set Tool on output shaft bearing, and press output shaft bearing to output shaft.

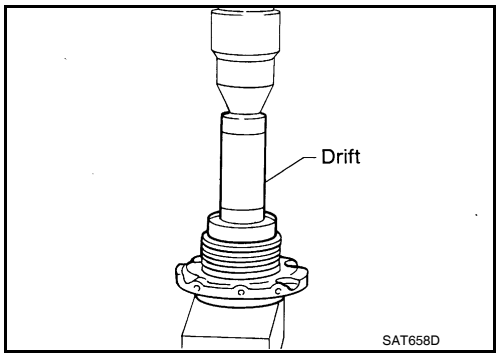
Tool number : ST35321000 (—)

CAUTION:
- **Set Tool on output shaft bearing inner race.**
- **Do not reuse output shaft bearing.**
- **Apply ATF to output shaft bearing.**

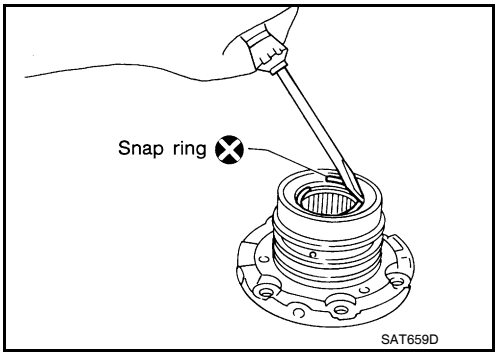


6. Install radial needle bearing according to the following procedures.

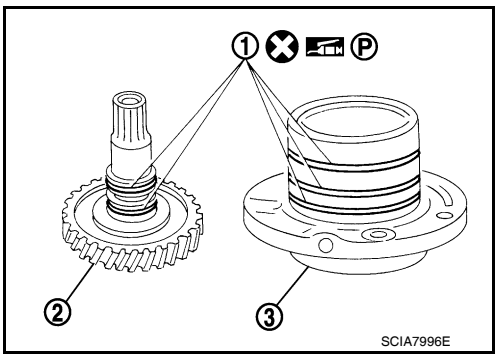
a. Set drift [commercial service tool] on radial needle bearing, and press radial needle bearing into bearing retainer.



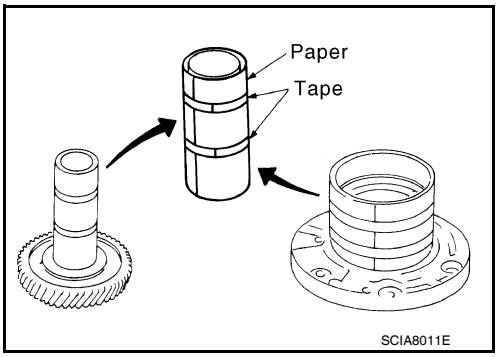
b. Install snap ring to bearing retainer using suitable tool.



7. After packing ring grooves with petroleum jelly, carefully install new seal rings (1) on output shaft (2) and bearing retainer (3).



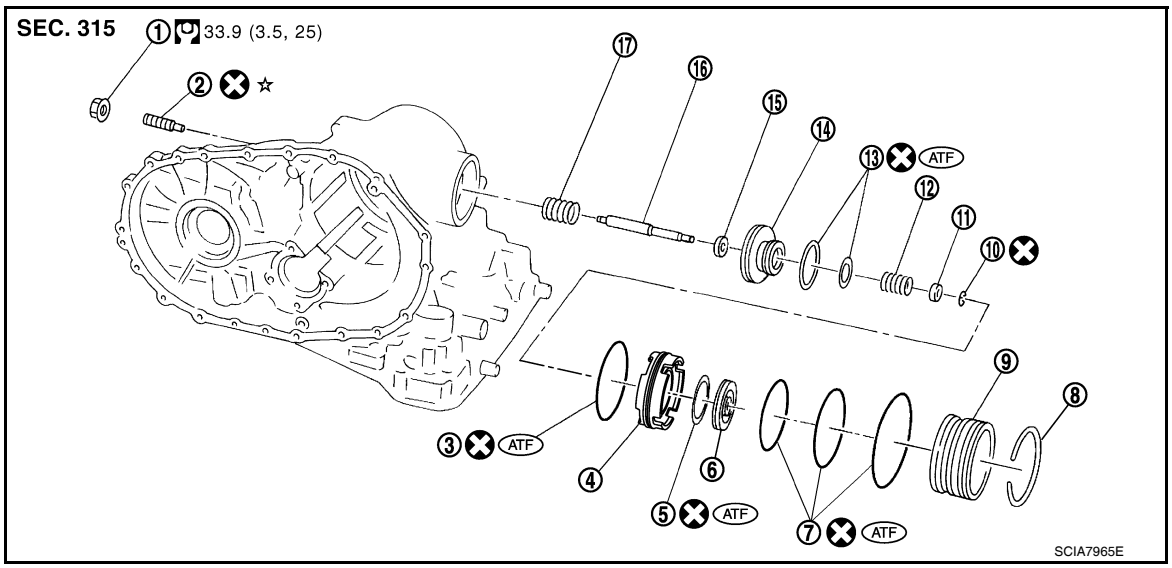
CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



Band Servo Piston Assembly

INFOID:0000000007329494

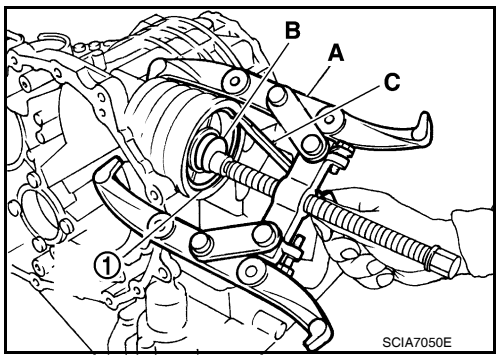
COMPONENTS



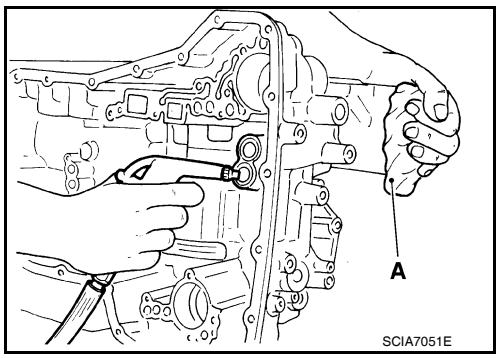
1. Lock nut
2. Anchor end pin
3. O-ring
4. Servo piston retainer
5. D-ring
6. OD servo piston
7. O-ring
8. Snap ring
9. OD servo piston retainer
10. E-ring
11. Spring retainer
12. OD servo return spring
13. D-ring
14. Band servo piston
15. Band servo thrust washer
16. Band servo piston stem
17. 2nd servo return spring

DISASSEMBLY

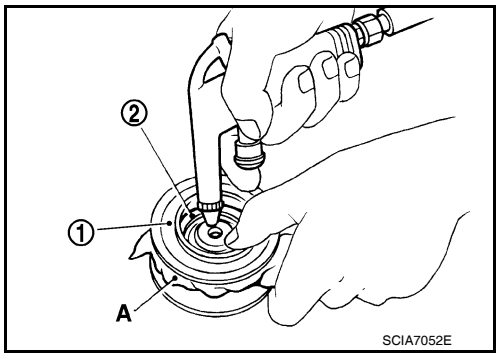
1. Push in OD servo piston assembly using a suitable tool (A) and a suitable tool (B), and then remove snap ring (1) from transaxle case using a suitable tool (C).



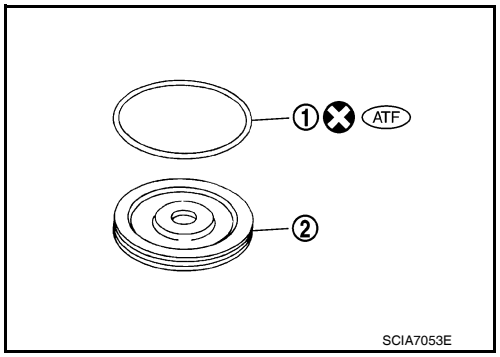
2. Apply compressed air into the oil hole as shown to remove OD servo piston assembly and band servo piston assembly.
CAUTION:
Do not blow air in too quickly, or OD servo piston assembly, band servo piston assembly and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth (A).
3. Remove 2nd servo return spring from transaxle case.



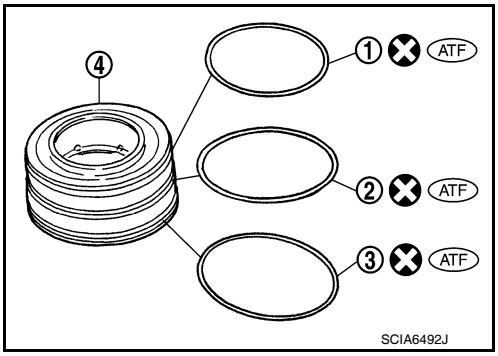
4. Wrap OD servo piston retainer (1) using lint-free cloth (A), and then apply compressed air into the band servo piston stem hole on OD servo piston (2) to remove OD servo piston (2) from OD servo piston retainer (1).
CAUTION:
Do not blow air in too quickly, or OD servo piston (2) and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth (A).



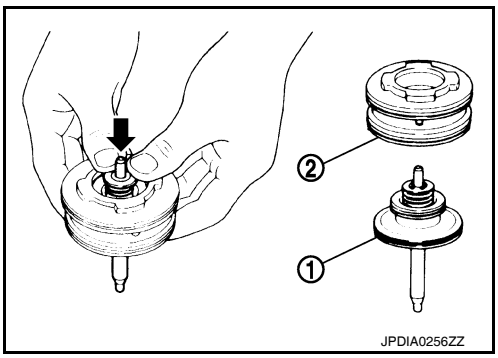
5. Remove D-ring (1) from OD servo piston (2).



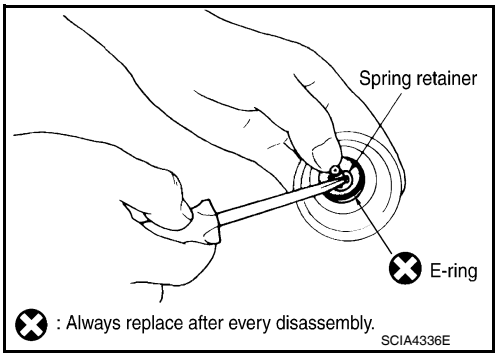
6. Remove O-rings from OD servo piston retainer.
   (1): O-ring (small diameter)
   (2): O-ring (medium diameter)
   (3): O-ring (large diameter)
   (4): OD servo piston retainer



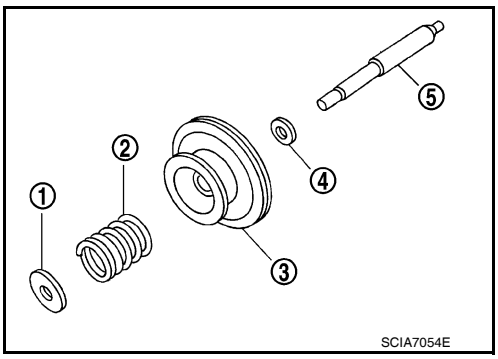
7. Remove band servo piston assembly (1) from servo piston retainer (2).



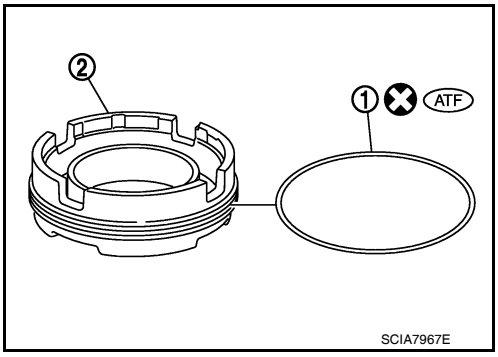
8. Place band servo piston stem on a wooden block, and remove E-ring from band servo piston stem using a suitable tool while pressing spring retainer downward.



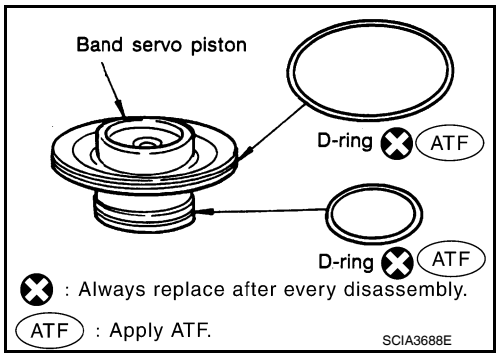
9. Remove spring retainer (1), OD servo return spring (2), band servo piston (3) and band servo thrust washer (4) from band servo piston stem (5).



10. Remove O-ring from servo piston retainer.
    (1): O-ring
    (2): Servo piston retainer



11. Remove D-rings from band servo piston.



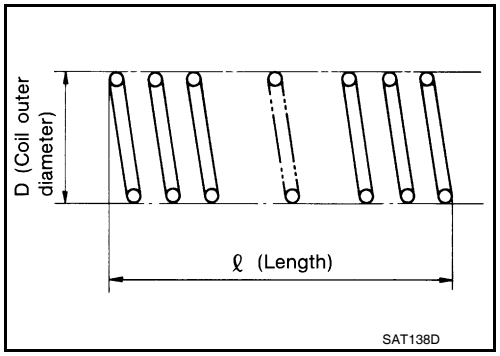
INSPECTION

Pistons, Retainers and Piston Stem

Check the sliding surfaces for damage or excessive wear. Replace if necessary.

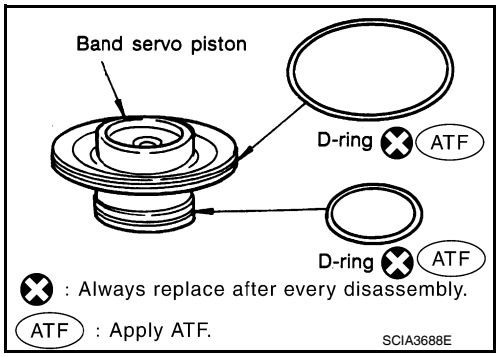
Return Springs

- Check each return spring for damage or deformation. Also measure free length. Refer to AT-350, "Band Servo".
- Replace springs if deformed or fatigued.

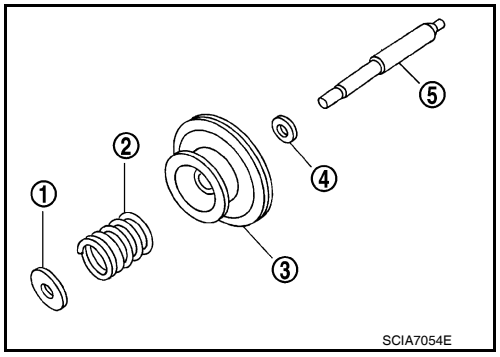


ASSEMBLY

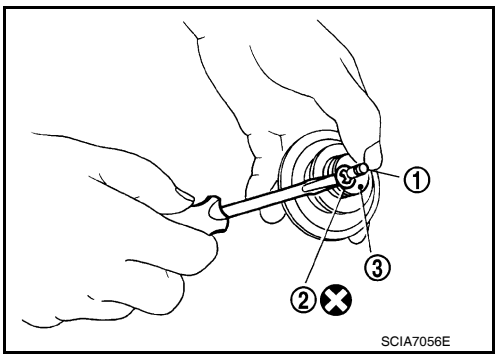
1. Install D-rings to band servo piston.



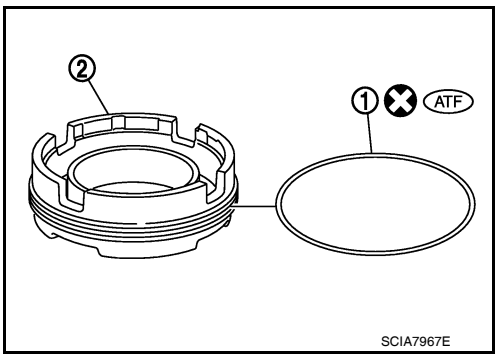
2. Install band servo thrust washer (4), band servo piston (3), OD servo return spring (2) and spring retainer (1) to band servo piston stem (5).



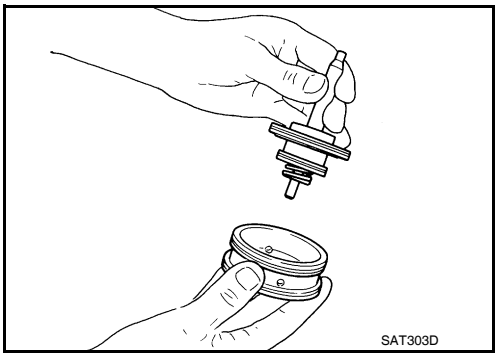
3. Place band servo piston stem (1) on a wooden block, and install E-ring (2) to band servo piston stem (1) while pressing spring retainer (3) downward.



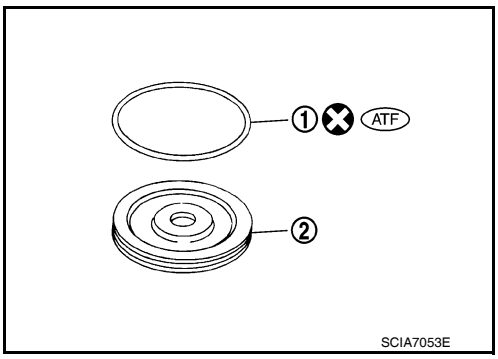
4. Install O-ring to servo piston retainer.
   (1): O-ring
   (2): Servo piston retainer



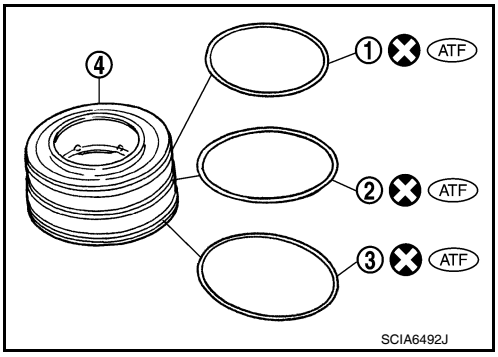
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



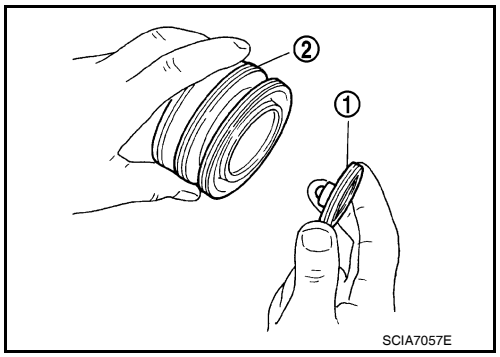
6. Install D-ring (1) to OD servo piston (2).



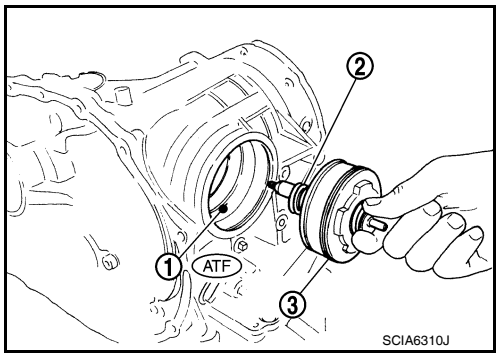
7. Install O-rings and to OD servo piston retainer.
   (1): O-ring (small diameter)
   (2): O-ring (medium diameter)
   (3): O-ring (large diameter)
   (4): OD servo piston retainer



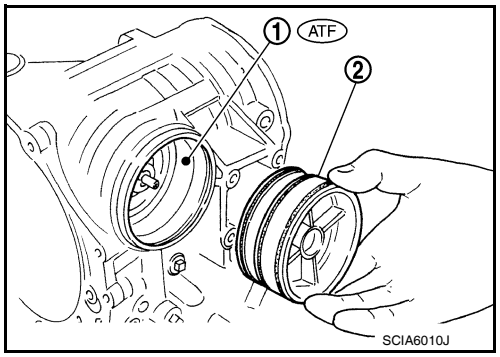
8. Install OD servo piston (1) to OD servo piston retainer (2) in the direction shown.



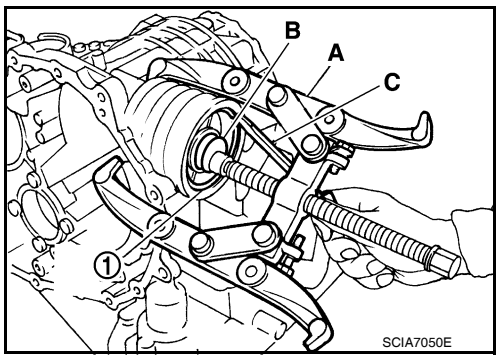
9. Install 2nd servo return spring (2) and band servo piston assembly (3) to transaxle case (1).



10. Install OD servo piston assembly (2) to transaxle case (1).



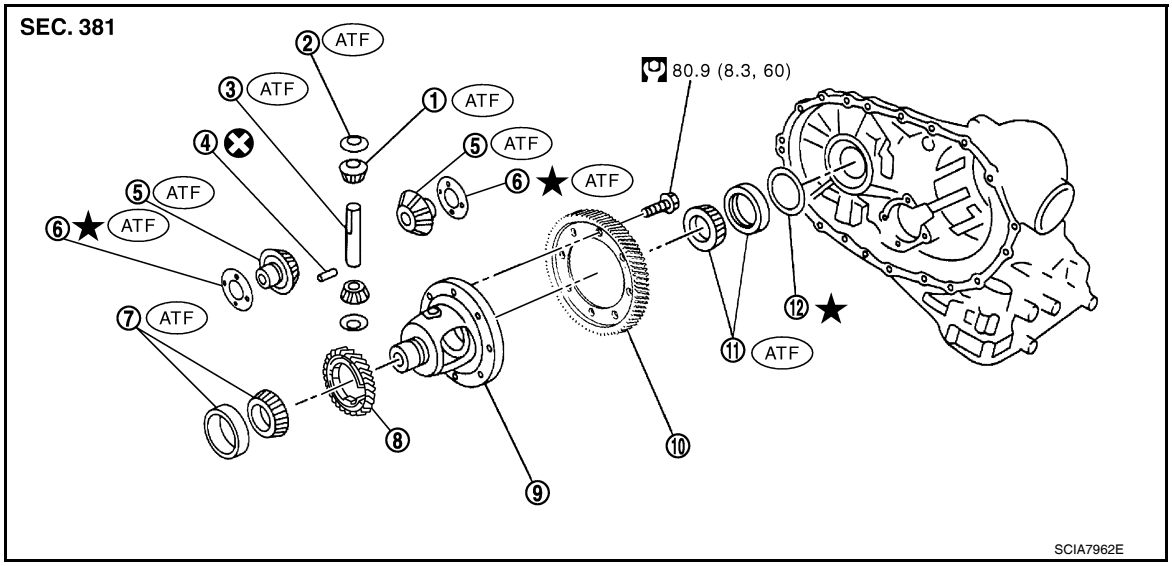
11. Push in OD servo piston assembly using a suitable tool (A) and a suitable tool (B), and install snap ring (1) to transaxle case using a suitable tool (C).



Final Drive

INFOID:0000000007329495

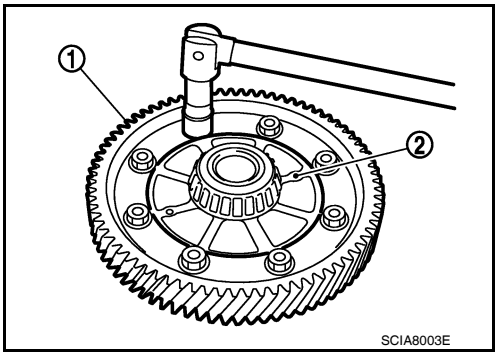
COMPONENTS



1. Pinion mate gear	2. Pinion mate gear thrust washer	3. Pinion mate shaft
4. Lock pin	5. Side gear	6. Side gear thrust washer
7. Differential side bearing	8. Speedometer drive gear	9. Differential case
10. Final gear	11. Differential side bearing	12. Differential side bearing adjusting shim

DISASSEMBLY

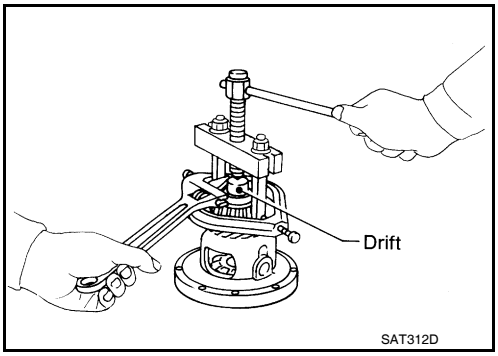
1. Remove final gear (1) from differential case (2).



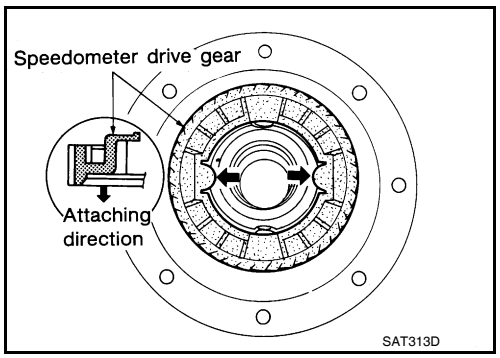
2. Set Tool on differential case, and remove differential side bearings from differential case using a suitable tool.

Tool number : ST3306S001 (J-22888-D)

CAUTION:
Be careful not to mix up the right and left bearings.

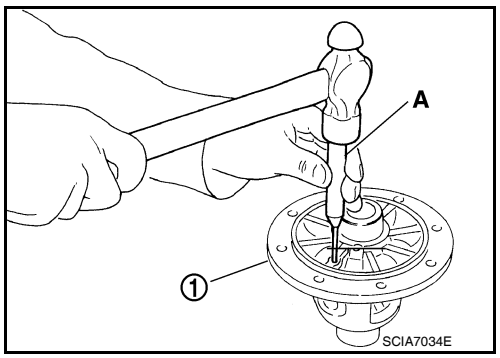


3. Remove speedometer drive gear from differential case.

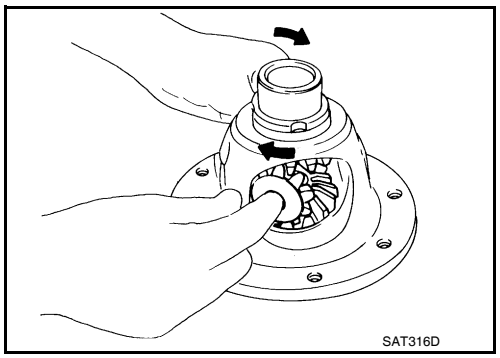


4. Drive out lock pin from differential case (1) using Tool (A).

Tool number : KV32101000 (J-25689-A)



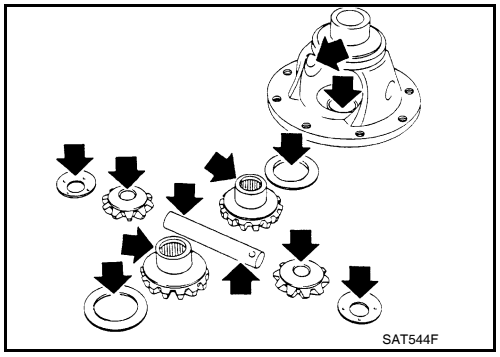
5. Draw out pinion mate shaft.
6. Remove pinion mate gears, pinion mate gear thrust washers, side gears and side gear thrust washers.



INSPECTION

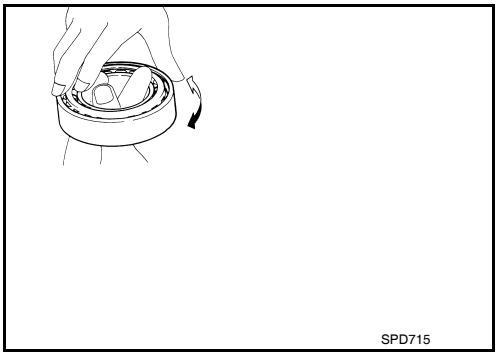
Gears, Washers, Pinion Mate Shaft and Differential Case

- Check mating surfaces of differential case, side gears, pinion mate gears and pinion mate shaft. Replace if necessary.
- Check washers for wear. Replace if necessary.



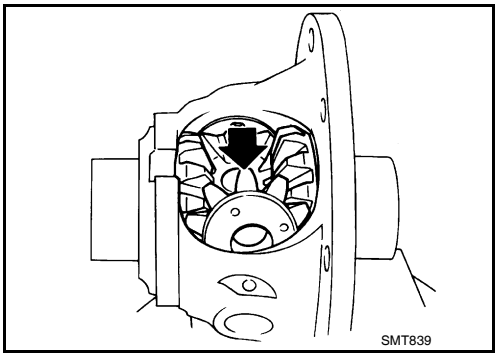
Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.
  CAUTION:
  When replacing taper roller bearing, replace outer and inner race as a set.

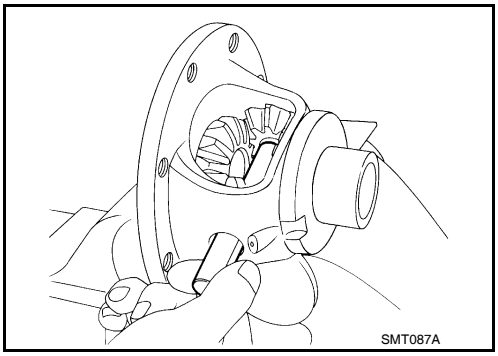

SPD715

ASSEMBLY

1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.
   CAUTION:
   Apply ATF to any parts.


SMT839

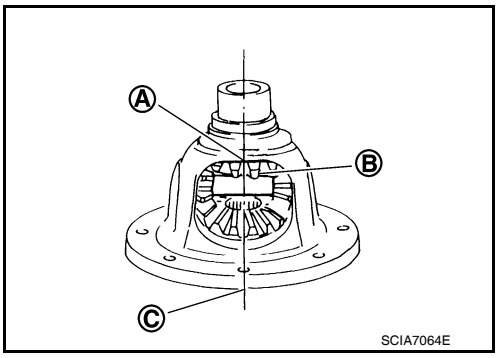
2. Insert pinion mate shaft.
   CAUTION:
   - **When inserting, be careful not to damage pinion mate gear thrust washers.**
   - **Apply ATF to pinion mate shaft.**


SMT087A

3. Select side gear thrust washers according to the following procedures.

a. Place differential case in the upright position so that the side gear to be measured is at the top.
   (A): Location for inserting feeler gauge
   (B): Side gear tooth
   (C): The center line of differential case

b. In order to maximize the back clearance, rotate side gears so that a tooth on side gears at the top and bottom will align at the same position as shown.



SCIA7064E

c. Adjust the back clearance of side gear according to the following procedures.

i. Insert feeler gauges (A) of the same thickness to the back of side gear from both sides, preventing side gear from falling, to measure the clearance.
- Measure clearance 3 times by rotating side gears and take the average.

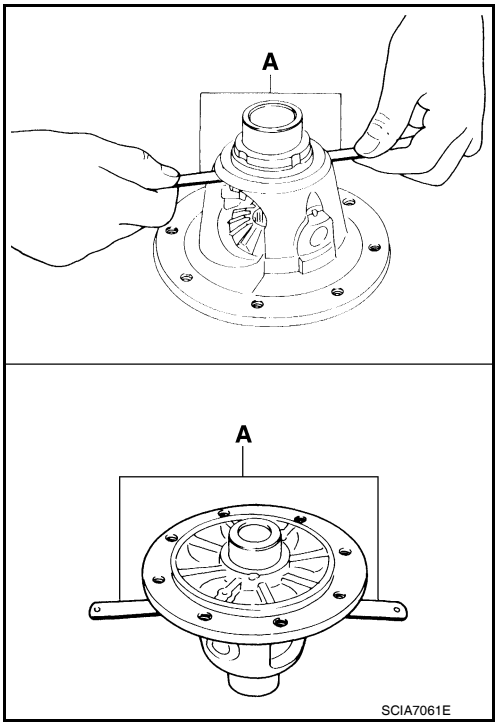
CAUTION:
In all 3 measurements, maximize the clearance by aligning teeth on side gears at the top and bottom at the same position.

ii. Select side gear thrust washer so that the clearance will fall within the standard.

Differential side gear clearance:

Refer to AT-349, "Final Drive".

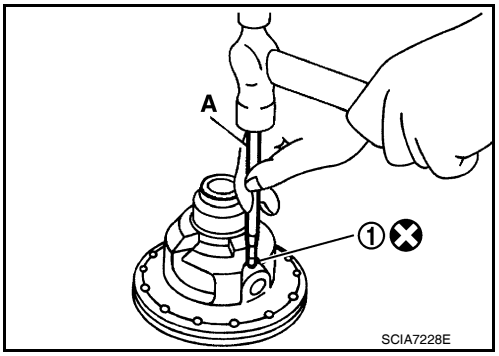
iii. Turn differential case upside down, and measure the back clearance of the other side gear in the same manner.
NOTE:
Adjust the clearance to approx. 0.1 mm (0.004 in) for used differential [driven approx. 3,000 km (1864 mile) or more].



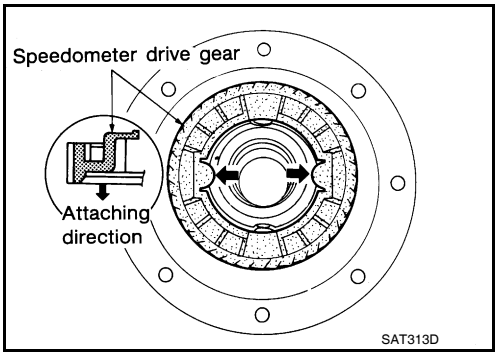
4. Install lock pin (1) to pinion mate shaft using suitable tool (A).

Tool number A: KV32101000 (J-25689-A)

CAUTION:
- **Do not reuse lock pin.**
- **Make sure that lock pin is flush with differential case.**

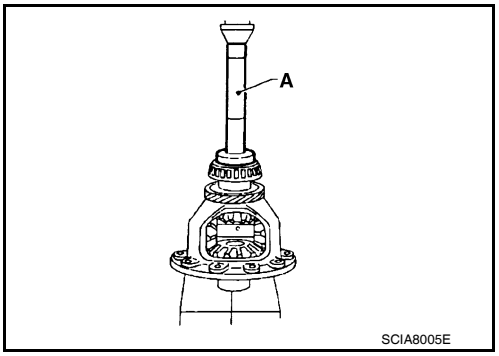


5. Install speedometer drive gear on differential case.

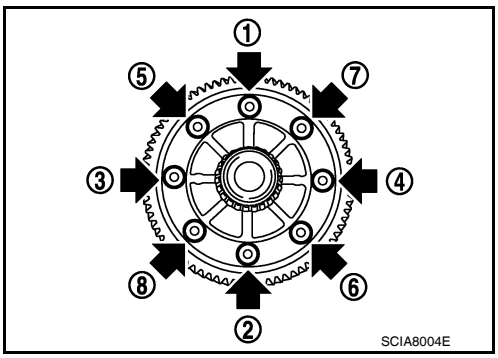


6. Set suitable tool (A) on differential side bearing inner race, and press differential side bearing inner race into differential case.

CAUTION:
Set Tool on differential side bearing inner race.
Apply ATF to differential side bearings.



7. Install final gear and tighten bolts to the specified torque in numerical order as shown after temporarily tightening them. Refer to AT-349, "Final Drive".



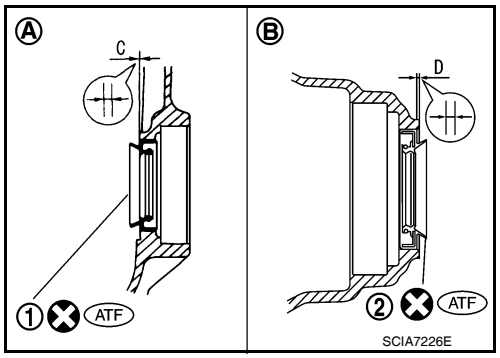
ASSEMBLY

Assembly (1)

INFOID:0000000007329496

1. Drive each differential side oil seal evenly using Tools (Transaxle case side) and suitable tool (Convertor housing side) so that differential side oil seal protrudes by the dimension (C) or (D) respectively.
(1): LH differential side oil seal
(2): RH differential side oil seal
(A): Transaxle case side
(B): Converter housing side

Tool numbers **: ST35325000 (—)**
: KV31103000 (J-38982)

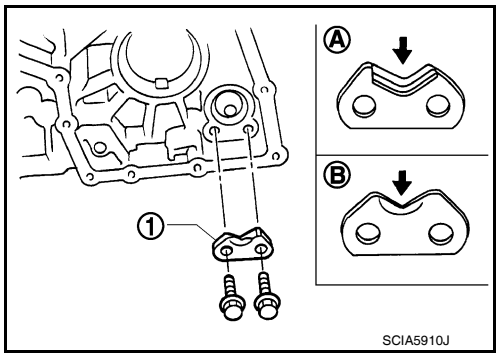


Unit: mm (in)

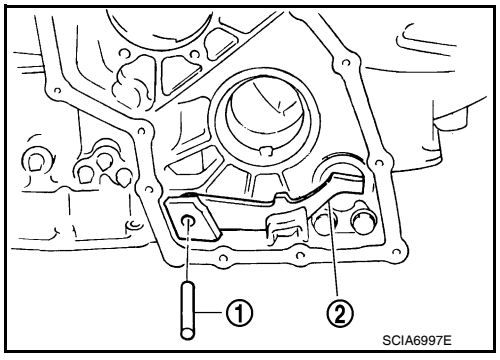
Dimension (C)	0 ± 0.5 (0 ± 0.020)
Dimension (D)	6 ± 0.5 (0.24 ± 0.020)

NOTE:
Differential side oil seal pulling direction is used as the reference.

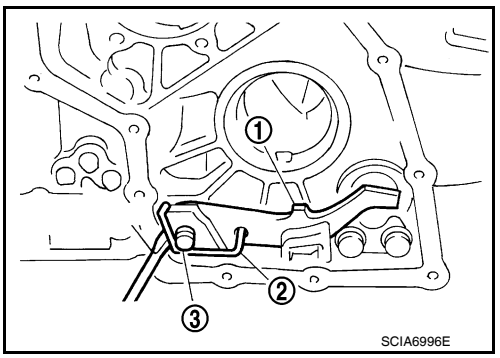
2. Install O-ring on governor cap.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
3. Install governor cap in transaxle case.
4. Install snap ring in transaxle case.
5. Install parking actuator support (1) on transaxle case.
(A): Inside
(B): Outside
CAUTION:
Be careful with the direction of parking actuator support (1).
6. Tighten parking actuator support bolts to the specified torque. Refer to AT-234, "Component".



7. Install parking pawl (2) on transaxle case, and fix it with parking shaft (1).



8. Install return spring (2) on parking shaft (3) and parking pawl (1) using a suitable tool.



Adjustment (1)

INFOID:0000000007329498

DIFFERENTIAL SIDE BEARING PRELOAD

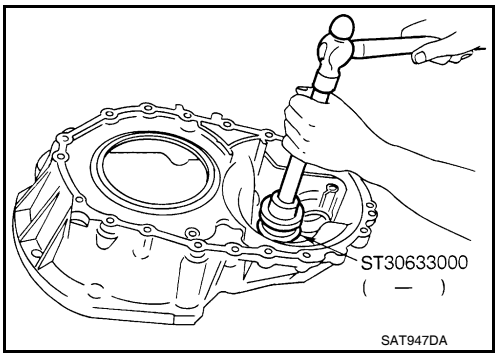
1. Select proper thickness of differential side bearing adjusting shim using the following procedures.

a. Install differential side bearing outer race without differential side bearing adjusting shim on transaxle case.
CAUTION:
Apply ATF to differential side bearing outer race.

b. Install differential side bearing outer race on converter housing.

Tool number : ST30633000 (—)

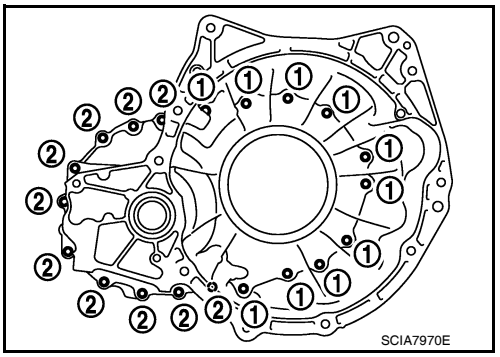
CAUTION:
Apply ATF to differential side bearing outer race.



c. Place final drive assembly on transaxle case.

d. Tighten converter housing bolts (1) and (2) to the specified torque. Refer to AT-317, "Final Drive".

Bolt	1	2
Bolt length [mm (in)]	32.8 (1.291)	40 (1.57)
Number of bolts	10	10



e. Attach dial indicator on differential case at converter housing side.

f. Insert Tool into differential side gear from transaxle case side.

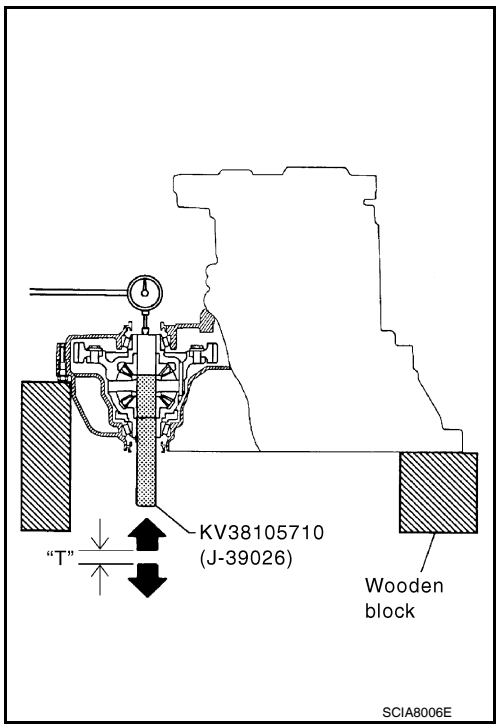
Tool number : KV38105710 (J-39026)

g. Move Tool up and down and measure dial indicator deflection.

h. Select proper thickness of differential side bearing adjusting shim. Refer to “Parts Information” for differential side bearing adjusting shim selection. Refer to AT-346, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Bearing preload: Refer to AT-349, "Final Drive".



i. Remove converter housing from transaxle case.

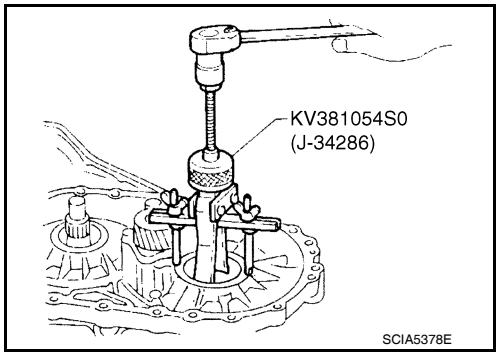
j. Remove final drive assembly from transaxle case.

k. Remove differential side bearing outer race from transaxle case using Tool.

Tool number : KV381054S0 (J-34286)

l. Reinstall differential side bearing outer race and differential side bearing adjusting shim selected from “Parts Information” on transaxle case.

m. Reinstall converter housing on transaxle case and tighten converter housing bolts to the specified torque. Refer to AT-234, "Component".



n. Insert Tool and measure turning torque of final drive assembly.

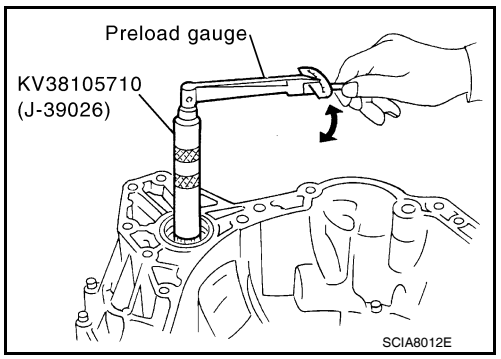
Tool number : KV38105710 (J-39026)

- **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**

Turning torque of final drive assembly (New bearing):

Refer to AT-349, "Final Drive".

- **When old bearing is used again, turning torque will be slightly less than the above.**
- **Make sure torque is close to the specified range.**

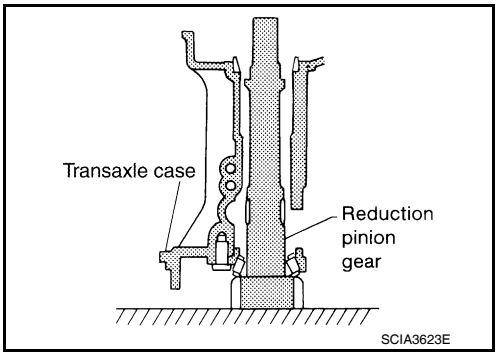


REDUCTION PINION GEAR BEARING PRELOAD

1. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.

a. Place reduction pinion gear on transaxle case as shown in the figure.

b. Install idler gear bearing outer race on transaxle case. Refer to AT-306, "Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer".

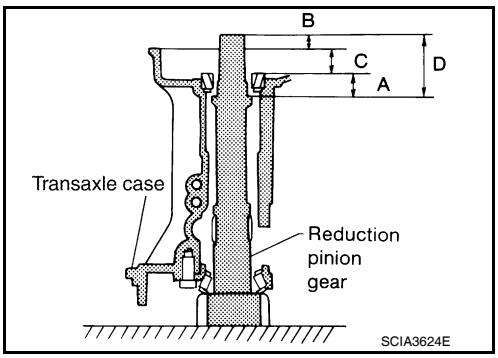


c. Place idler gear bearing inner race on outer race.

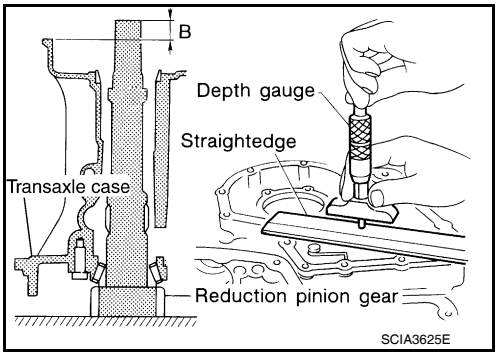
d. Measure dimensions (B), (C) and (D), and calculate dimension (A).

(A) : Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

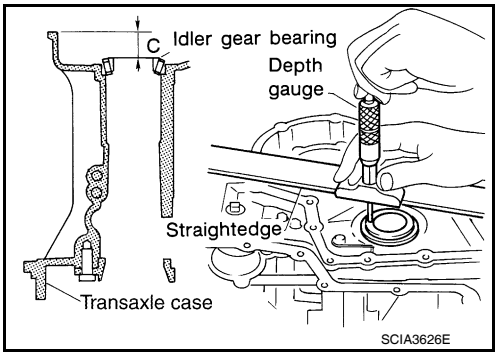
A = D – (B + C)



- Measure dimension (B) between the end of reduction pinion gear and the surface of transaxle case.
- **Measure dimension (B) in at least two places, and take the average.**

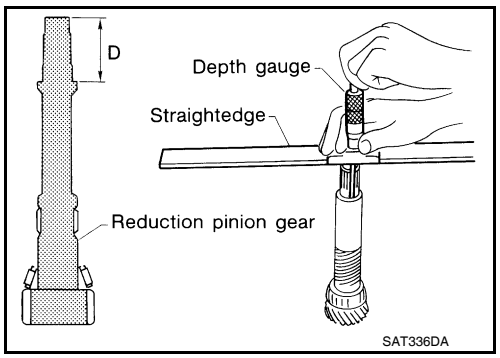


- Measure dimension (C) between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure dimension (C) in at least two places, and take the average.**



- Remove reduction pinion gear from transaxle case.
- Measure dimension (D) between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure dimension (D) in at least two places, and take the average.**
- Calculate dimension (A).

A = D – (B + C)

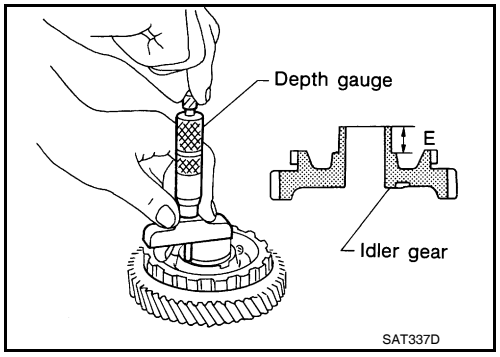


e. Measure dimension (E) between the end of idler gear and idler gear bearing inner race mating surface of idler gear.
- **Measure dimension (E) in at least two places, and take the average.**

f. Select proper thickness of reduction pinion gear adjusting shim. Refer to “Parts Information” for reduction pinion gear adjusting shim selection.

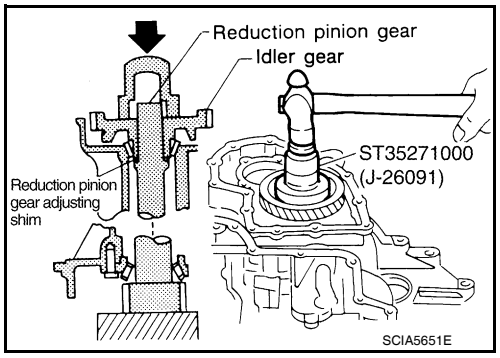
Proper shim thickness = A – E – 0.05 mm (0.0020 in)*

(*: Bearing preload)



2. Install reduction pinion gear and reduction pinion gear adjusting shim selected in step 1-f on transaxle case.
CAUTION:
Apply ATF to reduction pinion gear bearing.
3. Press idler gear bearing inner race on idler gear. Refer to AT-306, "Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer".
4. Press idler gear on reduction pinion gear using Tool.

Tool number : ST35271000 (J-26091)



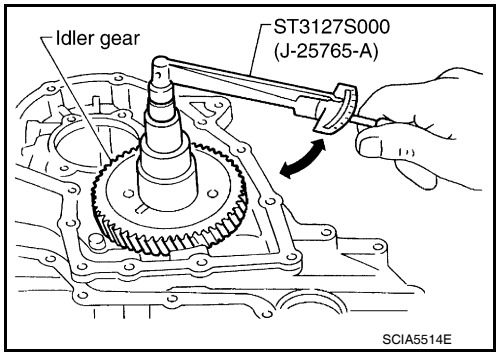
CAUTION:
- **Apply ATF to idler gear bearing.**
- **Press idler gear until idler gear fully contacts reduction pinion gear bearing adjusting shim.**

5. Set manual shaft in “P” position to fix idler gear.
6. Tighten lock nut of idler gear to the specified torque. Refer to AT-234, "Component".
CAUTION:
Lock idler gear with parking pawl when tightening lock nut.
7. Measure turning torque of reduction pinion gear using Tool.

Tool number : ST3127S000 (J-25765-A)

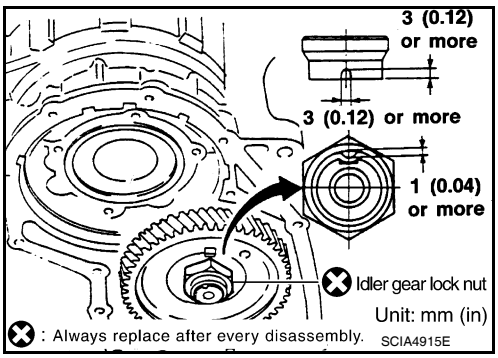
Turning torque of reduction pinion gear:

Refer to AT-350, "Reduction Pinion Gear".



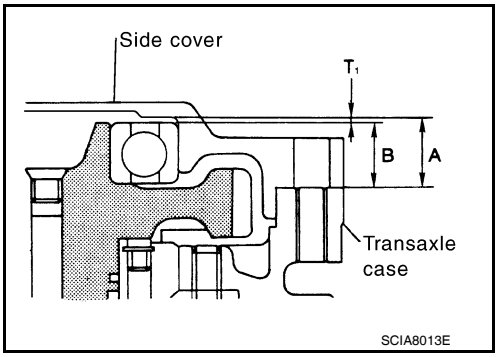
- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**
- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear adjusting shim.**

8. After properly adjusting turning torque, clinch idler gear lock nut as shown.
CAUTION:
Do not reuse idler gear lock nut.

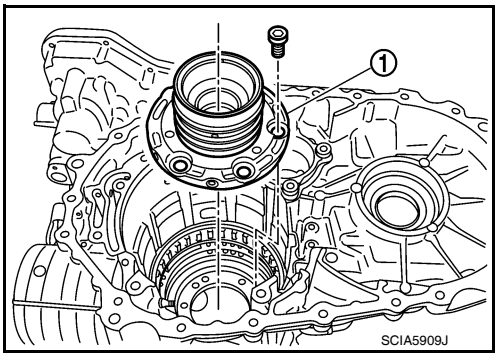


OUTPUT SHAFT END PLAY

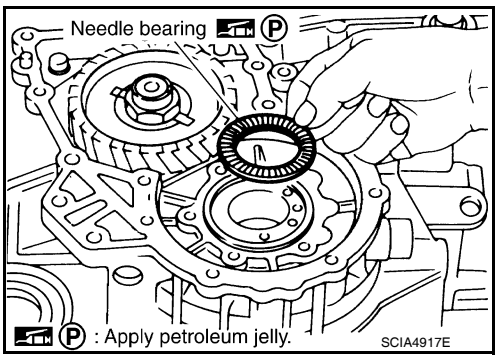
1. Select proper thickness of output shaft adjusting shim using the following procedures.



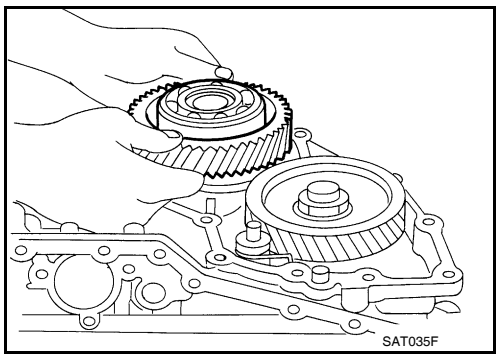
a. Install bearing retainer (1) in transaxle case. Refer to AT-306, "Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer".



b. Install needle bearing on bearing retainer.
CAUTION:
Be careful to direction of needle bearing.



c. Install output shaft on transaxle case.

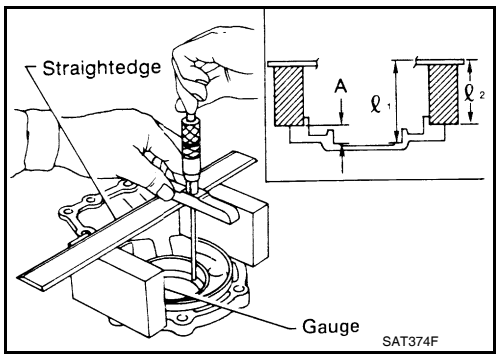


d. Measure dimensions ($\ell 1$) and ($\ell 2$) at side cover and then calculate dimension (A).
- **Measure dimension ($\ell 1$) and ($\ell 2$) in at least two places.**

(A) : Distance between transaxle case fitting surface and adjusting shim mating surface.

A = $\ell 1$ – $\ell 2$

$\ell 2$: Height of gauge

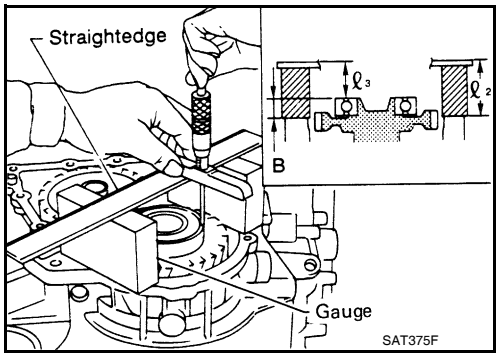


e. Measure dimensions ($\ell 2$) and ($\ell 3$) and then calculate dimension (B).
- **Measure dimension ($\ell 2$)and ($\ell 3$) in at least two places.**

(B) : Distance between the end of output shaft bearing outer race and the side cover fitting surface of transaxle case.

B = $\ell 2$ – $\ell 3$

$\ell 2$: Height of gauge

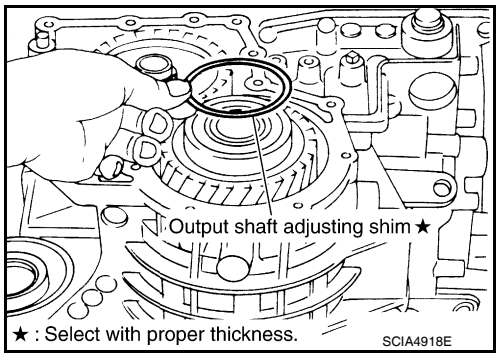


f. Select proper thickness of output shaft adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications. Refer to “Parts Information” for output shaft adjusting shim selection.

Output shaft end play (A – B):

Refer to AT-351, "Output Shaft".

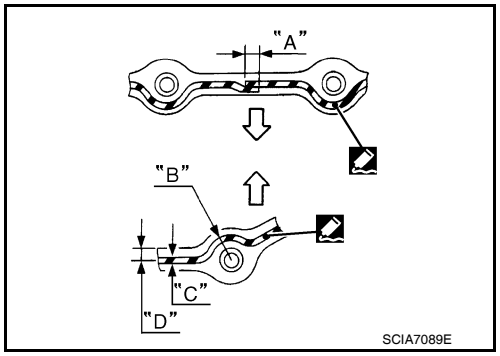
g. Install output shaft adjusting shim on output shaft bearing.



2. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent.) to transaxle case as shown.
⇦: Inside of side cover

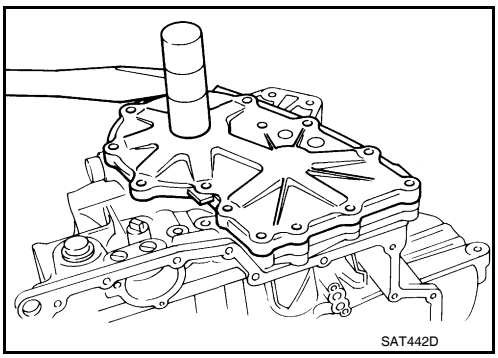
(A) : 3 - 5 mm (0.12 - 0.20 in)
(B) : 8 mm (0.31 in) R
(C) : 1.5 mm (0.059 in) dia.
(D) : 4 mm (0.16 in)

CAUTION:
- **Apply the sealant on the center between the bolt holes.**

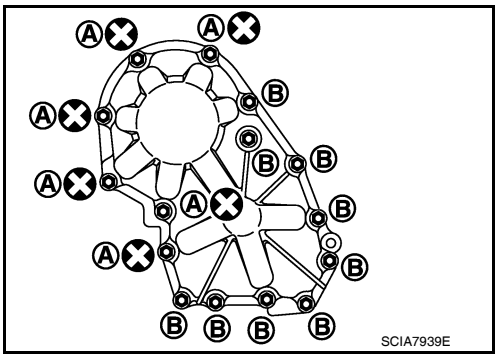


- **Completely remove all moisture, oil and old sealant, etc. from the transaxle case and side cover mounting surfaces.**

3. Fit mounting part of output shaft bearing on side cover to output shaft bearing, and after adjusting knock pin position, install it with light taps of a soft hammer and things like that.
CAUTION:
When installing, to avoid getting damaged and deformed, set mounting part straight to parallel with the mounting surface.



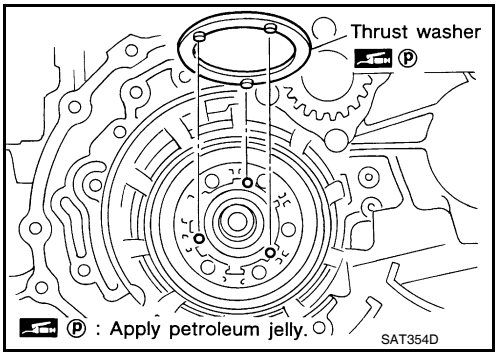
4. Tighten side cover bolts to specified torque. Refer to AT-234, "Component".
CAUTION:
- **Do not mix bolts (A) and (B).**
- **Always replace bolts (A) as they are self-sealing bolts.**



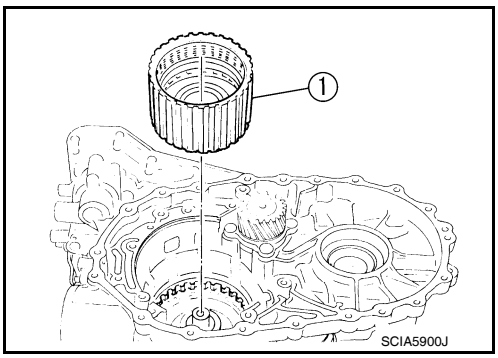
Assembly (2)

INFOID:0000000007329499

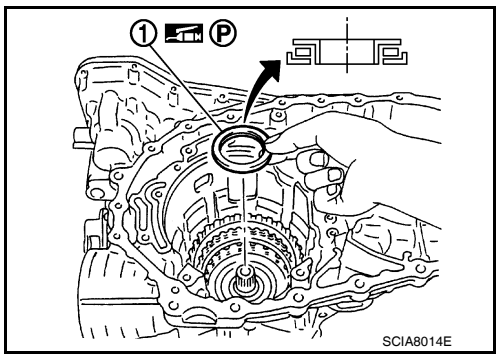
1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
CAUTION:
Align pawls of thrust washer with holes of bearing retainer.



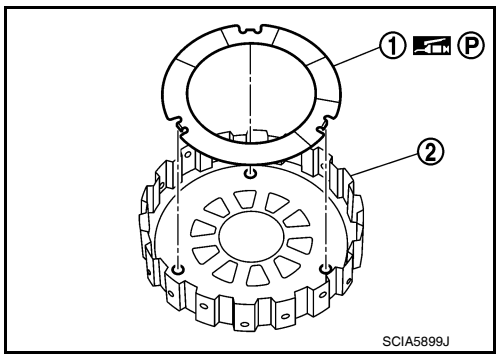
3. Install forward clutch assembly and overrun clutch assembly (1) into transaxle case.
CAUTION:
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**



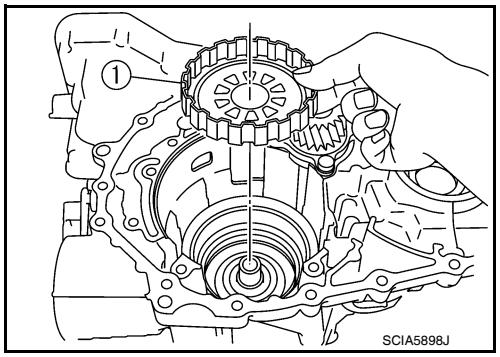
4. Install needle bearing (1) on bearing retainer.
CAUTION:
Be careful with the direction of needle bearing.



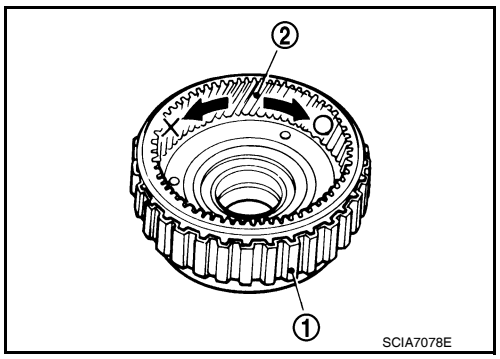
5. Install thrust washer (1) on overrun clutch hub (2).
CAUTION:
Align pawls of thrust washer (1) with holes of overrun clutch hub (2).



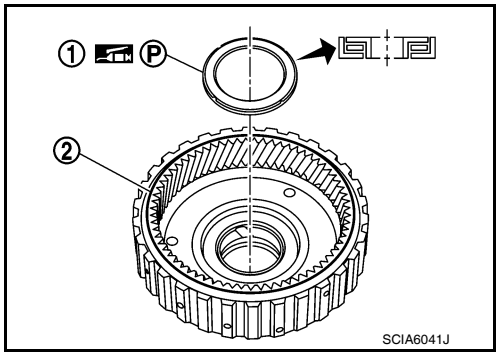
6. Install overrun clutch hub (1) into forward clutch drum.
CAUTION:
Align teeth of overrun clutch drive plates before installing.



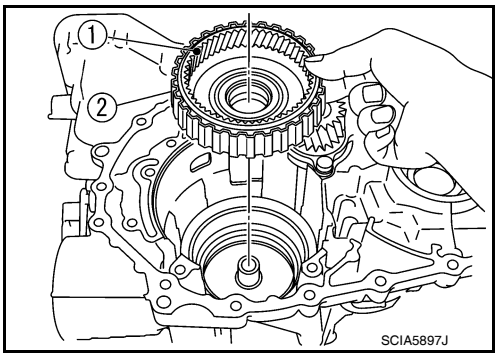
7. Hold forward clutch hub, and check that rear internal gear locks when tried to rotate counterclockwise.
CAUTION:
If rear internal gear rotates counterclockwise, check installation direction of forward one-way clutch.



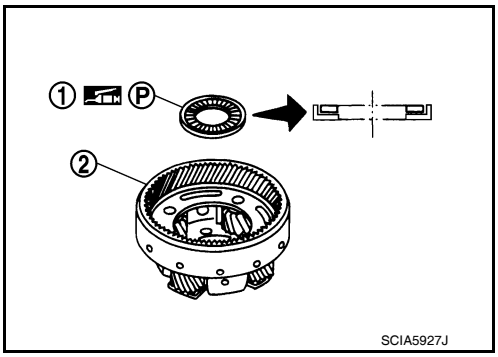
8. Install needle bearing (1) on rear internal gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



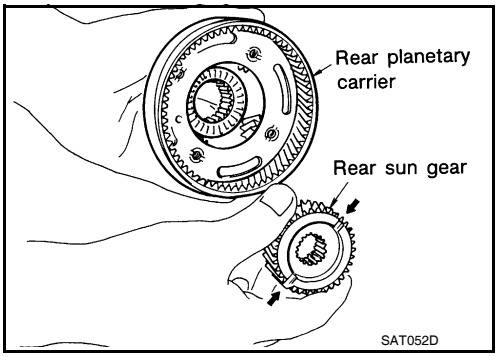
9. Install rear internal gear (1) and forward clutch hub (2) as a set into forward clutch drum.
CAUTION:
Align teeth of forward clutch drive plates before installing.



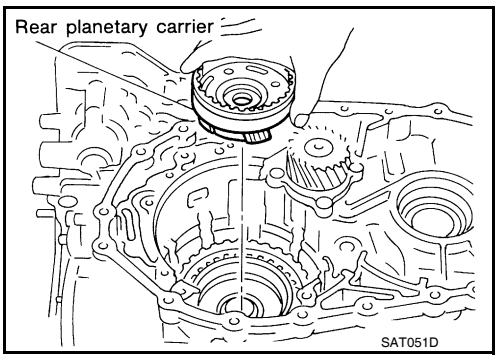
10. Install needle bearing (1) on rear planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



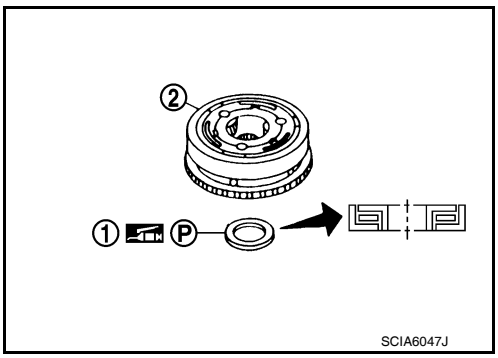
11. Install rear sun gear on rear planetary carrier.
CAUTION:
Be careful with the direction of rear sun gear.



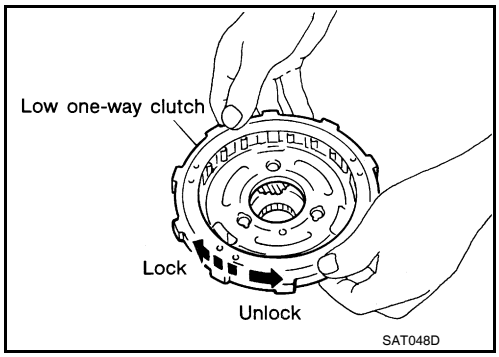
12. Install rear planetary carrier in transaxle case.



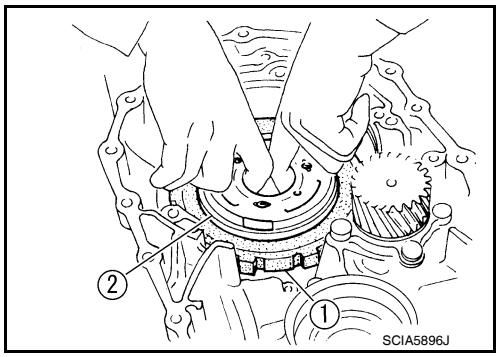
13. Install needle bearing (1) on front planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



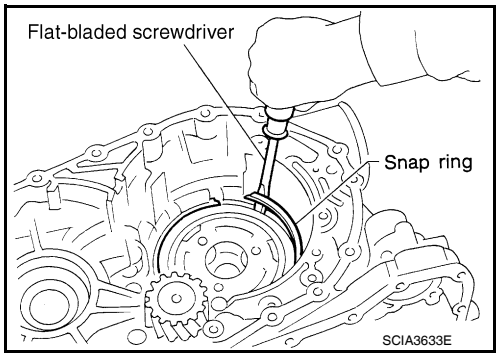
14. Install low one-way clutch to front planetary carrier by turning it in the direction of unlock.
15. Check that low one-way clutch rotates counterclockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.



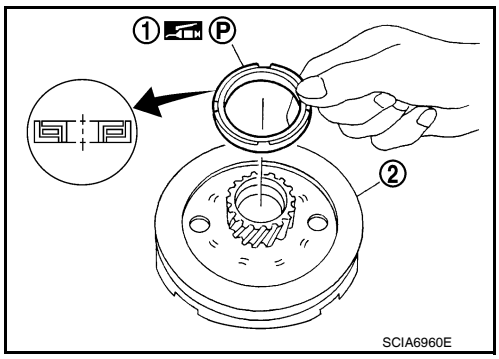
16. Install front planetary carrier (2) and low one-way clutch (1) as a set into transaxle case.



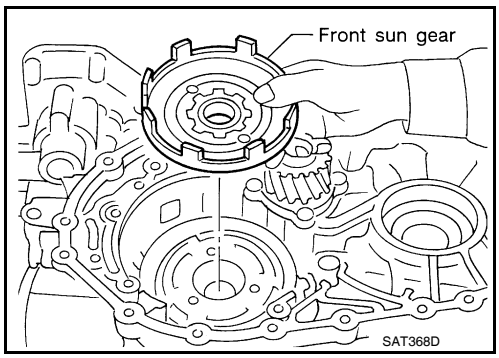
17. Install snap ring into transaxle case using a flat-bladed screwdriver.



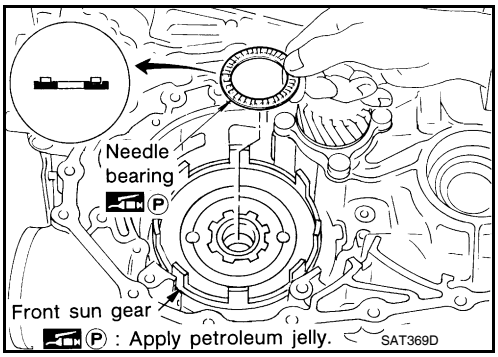
18. Install needle bearing (1) on front sun gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



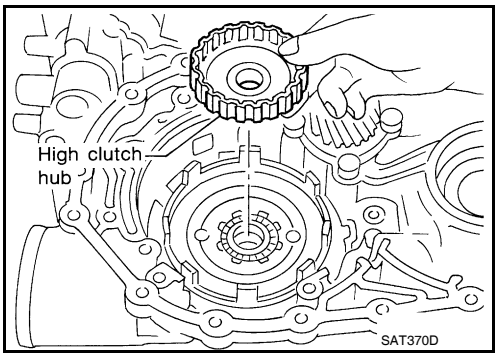
19. Install front sun gear on front planetary carrier.



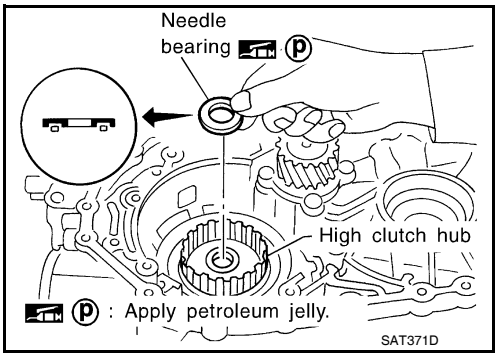
20. Install needle bearing on front sun gear.
CAUTION:
Be careful with the direction of needle bearing.



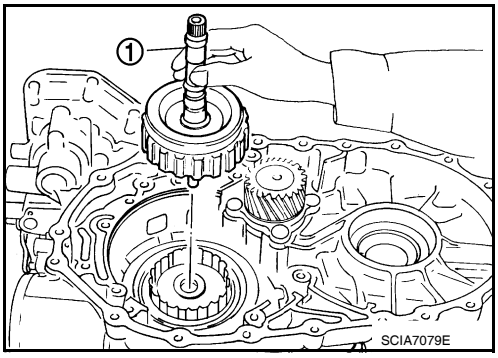
21. Install high clutch hub on front sun gear.



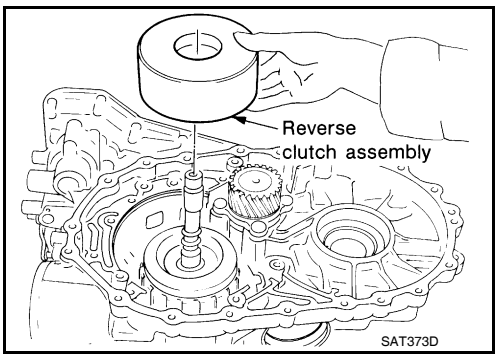
22. Install needle bearing on high clutch hub.
CAUTION:
Be careful with the direction of needle bearing.
23. Remove paper rolled around input shaft assembly (high clutch drum).



24. Install input shaft assembly (high clutch assembly) (1).
CAUTION:
Align teeth of high clutch drive plates before installing.



25. Install reverse clutch assembly.
CAUTION:
Align teeth of reverse clutch drive plates before installing.



Adjustment (2)

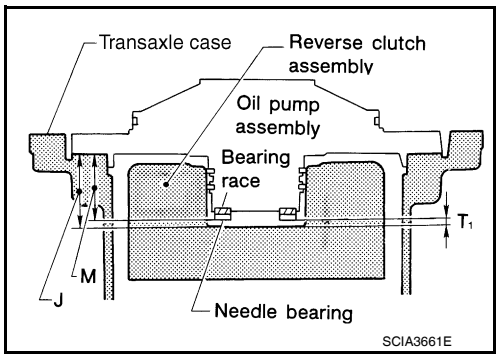
INFOID:0000000007329500

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

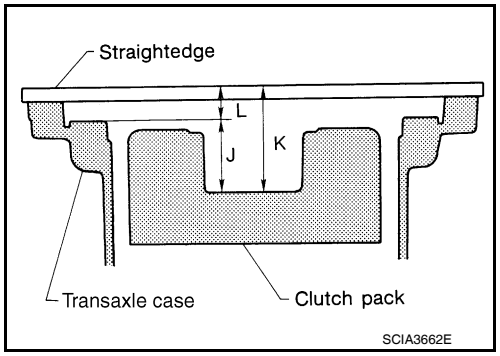
Part name	Total end play	Reverse clutch end play
Transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
Input shaft assembly (high clutch drum)	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

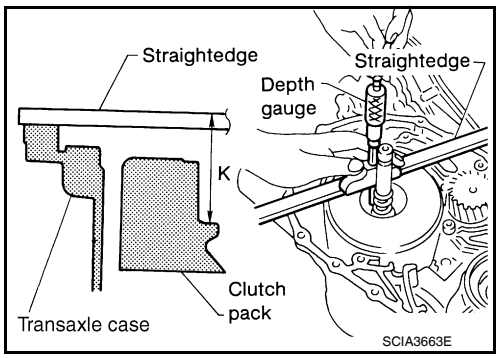
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions (K) and (L), and then calculate dimension (J).



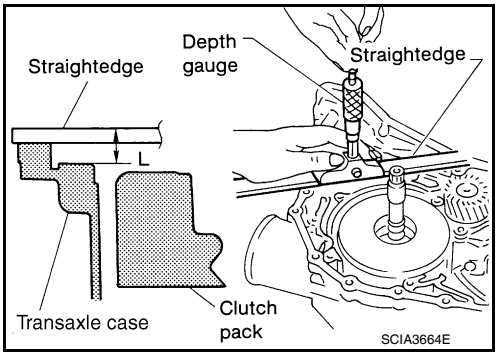
a. Measure dimension (K).



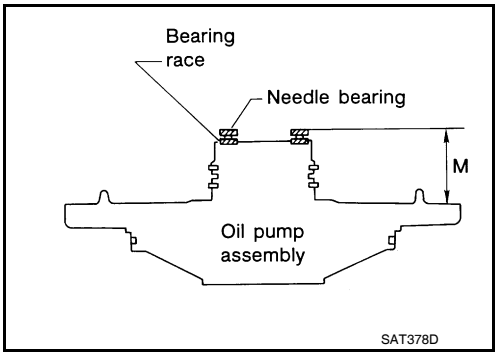
b. Measure dimension (L).
c. Calculate dimension (J).

(J) : Distance between oil pump fitting surface of transaxle case and needle bearing mating surface of input shaft assembly (high clutch drum).

J = K – L



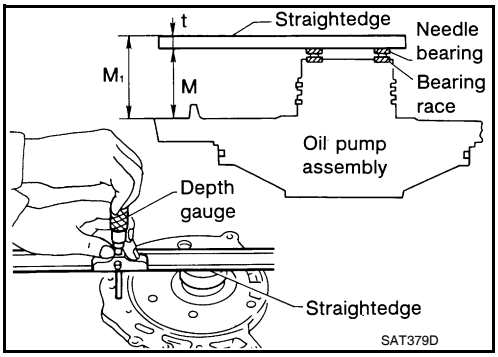
2. Measure dimension (M).
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension (M).

(M) : Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

(M_1) : Indication of gauge



c. Measure thickness of straightedge (t).

$M = M_1 – t$

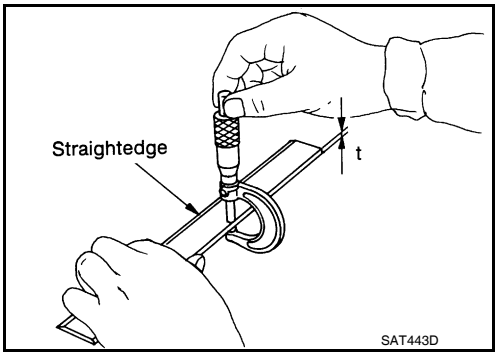
3. Adjust total end play (T_1).

$T_1 = J – M$

Total end play (T_1):

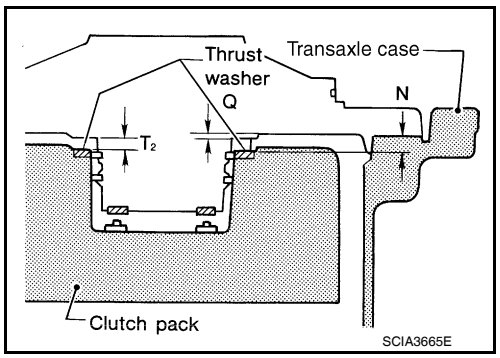
Refer to AT-351, "Total End Play".

- Select proper thickness of bearing race so that total end play is within specifications. Refer to “Parts Information” for bearing race selection.

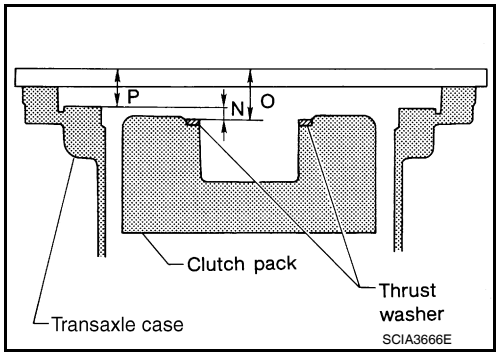


REVERSE CLUTCH END PLAY

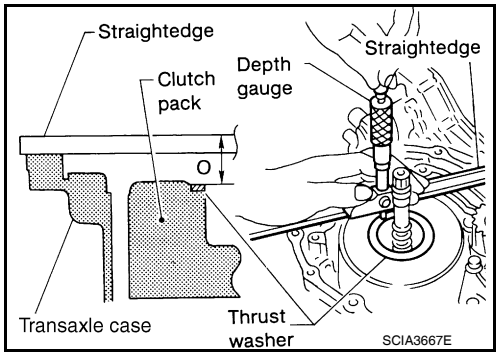
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions O and P), and then calculate dimension N).



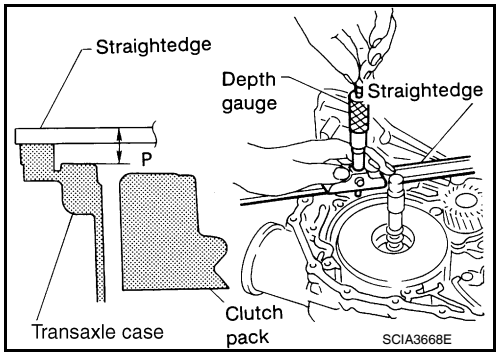
a. Place thrust washer on reverse clutch drum.
b. Measure dimension (O).



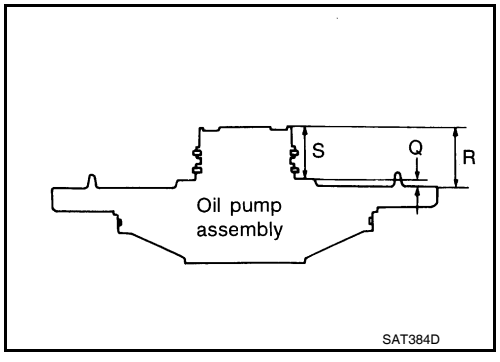
c. Measure dimension (P).
d. Calculate dimension (N).

(N) : Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

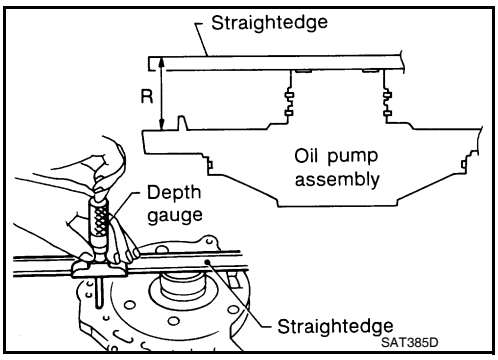
N = O – P



2. Measure dimensions (R) and (S), and then calculate dimension (Q).



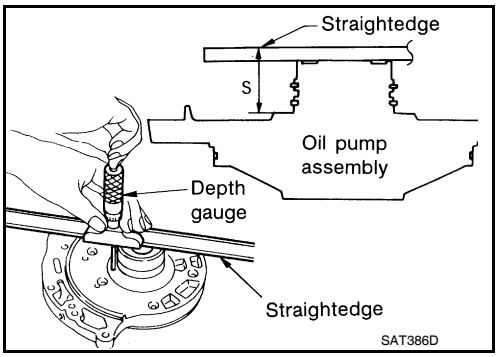
a. Measure dimension (R).



b. Measure dimension (S).
c. Calculate dimension (Q).

(Q) : Distance between transaxle case fitting surface and thrust washer mating surface.

Q = R – S



3. Adjust reverse clutch end play (T_2).

T_2 = N – Q

Reverse clutch end play:

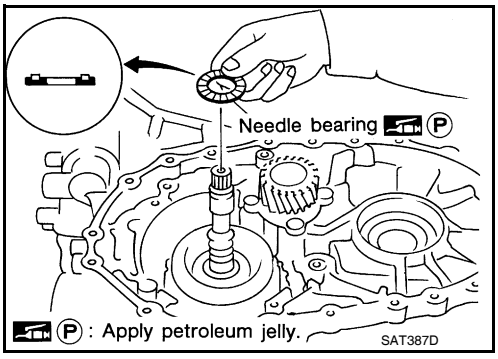
Refer to AT-351, "Reverse Clutch End Play".

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications. Refer to “Parts Information” for thrust washer selection.

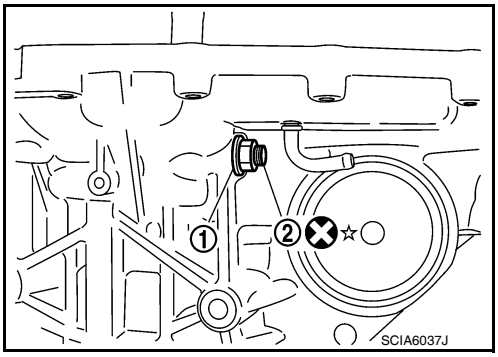
Assembly (3)

INFOID:0000000007329501

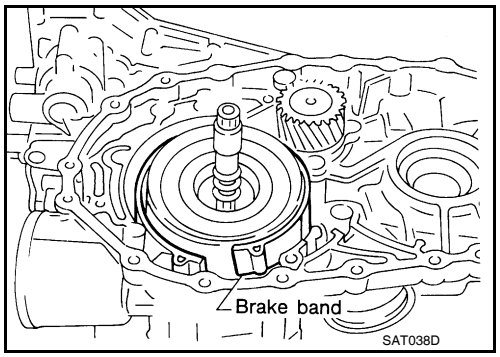
1. Remove reverse clutch assembly.
2. Install needle bearing on input shaft assembly (high clutch drum).
   CAUTION:
   Be careful with the direction of needle bearing.
3. Install reverse clutch assembly.
   CAUTION:
   Align teeth of reverse clutch drive plates before installing.



4. Install anchor end pin (2) and lock nut (1) on transaxle case.

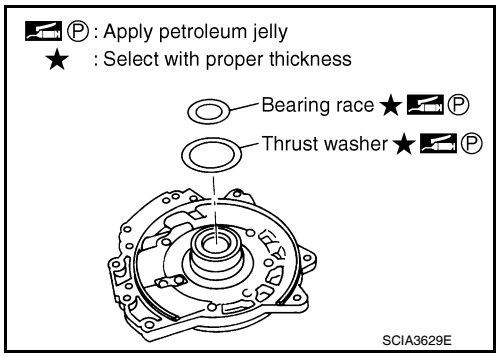


5. Place brake band on outside of reverse clutch drum.
6. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

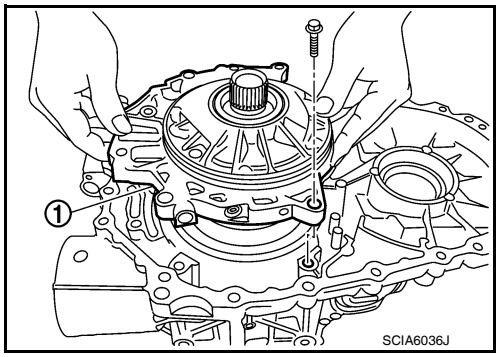


7. Install bearing race selected in total end play adjustment step on oil pump cover.
8. Install thrust washer selected in reverse clutch end play adjustment step on oil pump cover.
9. Install O-ring to oil pump assembly.

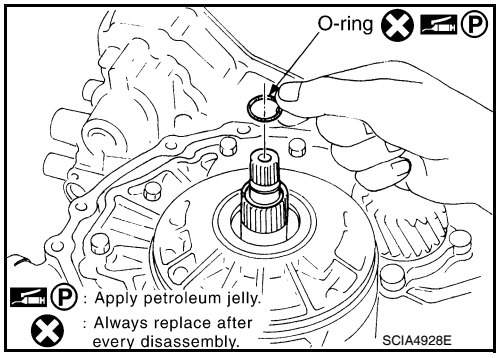
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



10. Install oil pump assembly (1) on transaxle case.
11. Tighten oil pump bolts to the specified torque. Refer to AT-234, "Component".



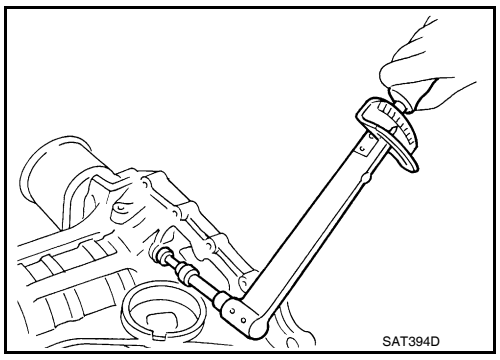
12. Install O-ring to input shaft assembly (high clutch drum).



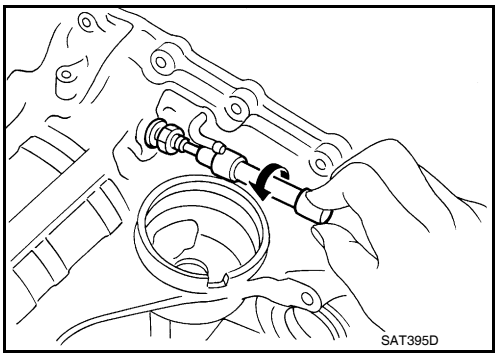
13. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

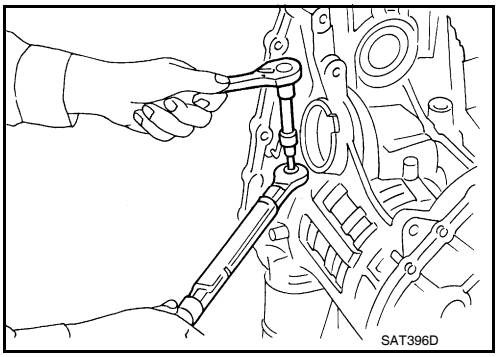
Anchor end pin bolt : 4.9 N·m (0.50 kg-m, 43 in-lb)



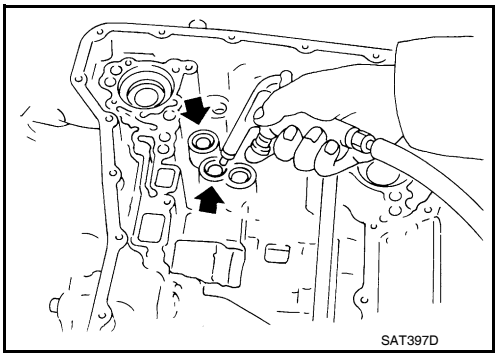
b. Back off anchor end pin two and a half turns.



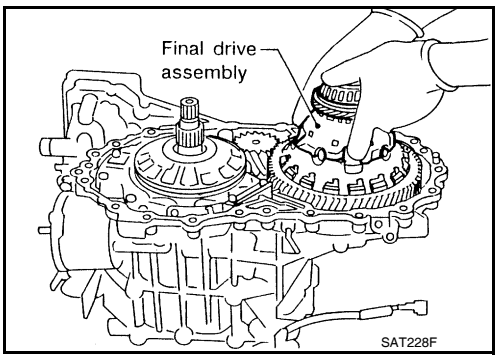
c. Tighten lock nut while holding anchor end pin. Refer to AT-234, "Component".



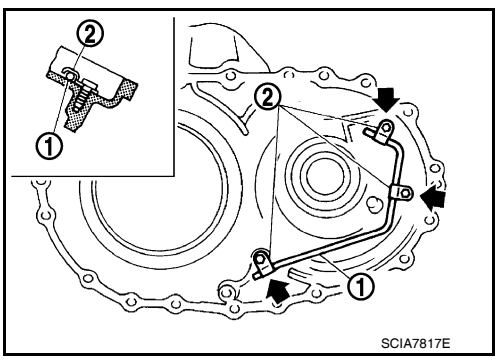
14. Apply compressed air into oil holes of transaxle case and check operation of brake band.



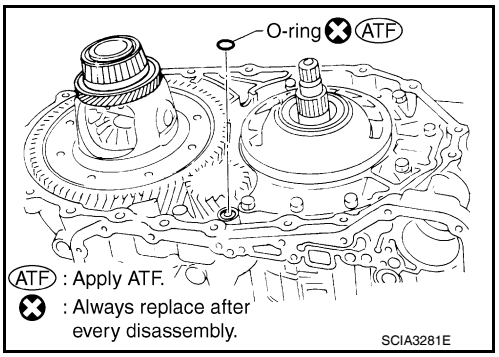
15. Install final drive assembly on transaxle case.



16. Install differential lubricant tube (1) and clips (2) on converter housing.
    ⬅: Bolt
17. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-234, "Component".

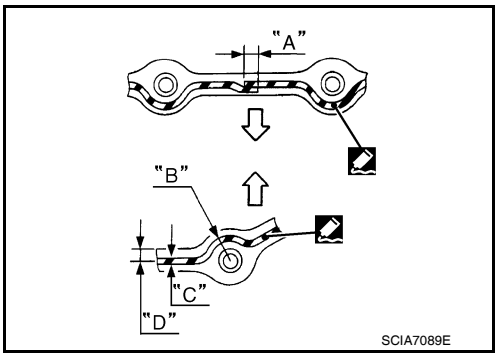


18. Install O-ring on differential oil port of transaxle case.



19. Apply recommended (Genuine Anaerobic Liquid Gasket or equivalent) to transaxle case as shown.
⇦: Inside of transaxle case

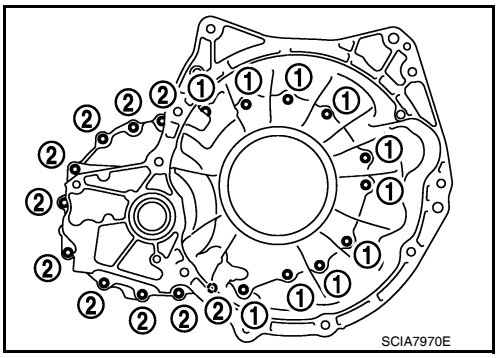
(A) : 3 - 5 mm (0.12 - 0.20 in)
(B) : 8 mm (0.31 in) R
(C) : 1.5 mm (0.059 in) dia.
(D) : 4 mm (0.16 in)



CAUTION:
Completely remove all moisture, oil and old sealant, etc. from the transaxle case and converter housing mating surfaces.

20. Install converter housing on transaxle case.
21. Install bracket on converter housing.
22. Tighten converter housing bolts (1) and (2) to the specified torque. Refer to AT-234, "Component".

Bolt	1	2
Bolt length [mm (in)]	32.8 (1.291)	40 (1.57)
Number of bolts	10	10

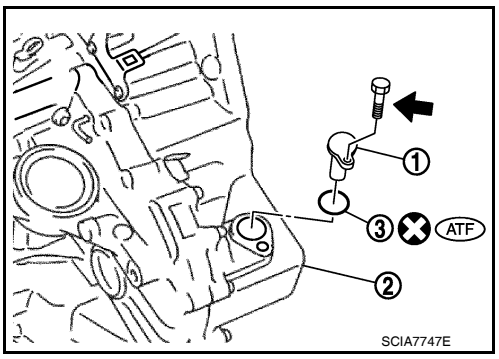


23. Install plug or speedometer pinion according to the following procedures.

a. With ABS

i. Install O-ring (3) to plug (1).

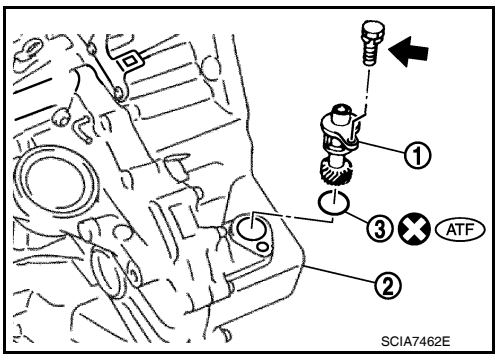
ii. Install plug (1) to converter housing (2).
⬅: Bolt



b. Without ABS

i. Install O-ring (3) to speedometer pinion (1).

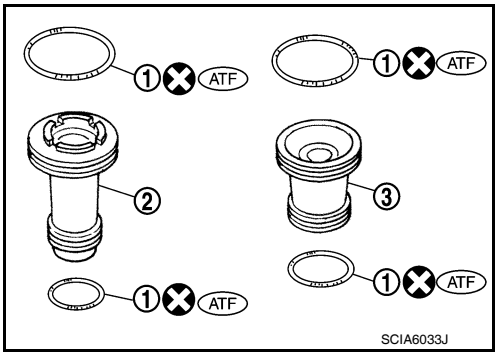
ii. Install speedometer pinion (1) to converter housing (2).
⬅: Bolt



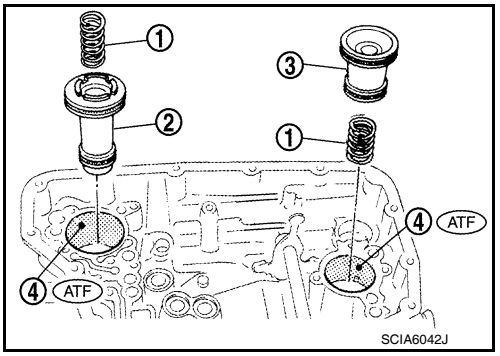
24. Tighten plug or speedometer pinion bolt to the specified torque. Refer to AT-234, "Component".

25. Install accumulator pistons.

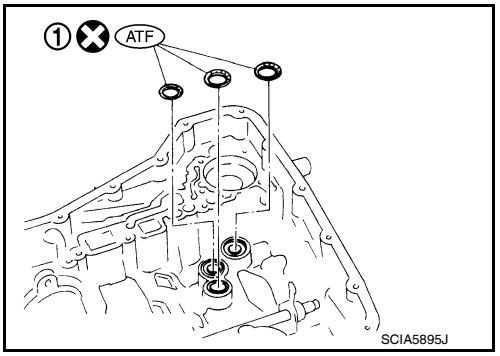
a. Install O-rings (1) on servo release accumulator piston (2) and N-D accumulator piston (3). Refer to AT-348, "Accumulator".



b. Install return springs (1), servo release accumulator piston (2) and N-D accumulator piston (3) into transaxle case (4). Refer to AT-348, "Accumulator".



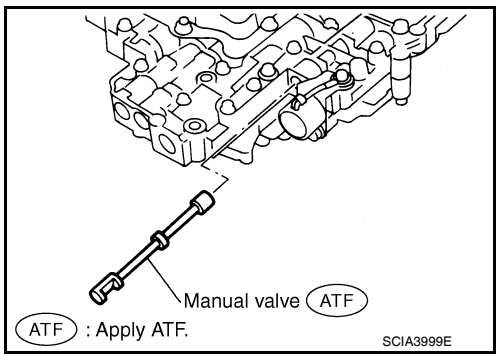
26. Install lip seals (1) for band servo oil holes on transaxle case.



27. Install control valve assembly on transaxle case.

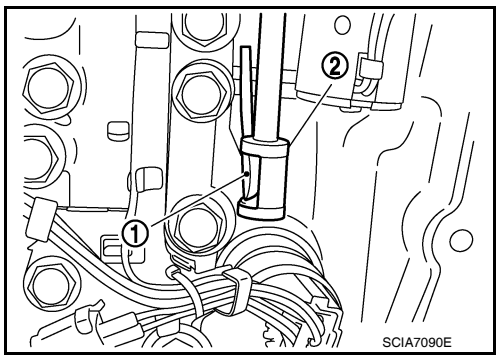
a. Install O-ring on terminal body.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

b. Insert manual valve into control valve assembly.
CAUTION:
Be careful not to drop manual valve.



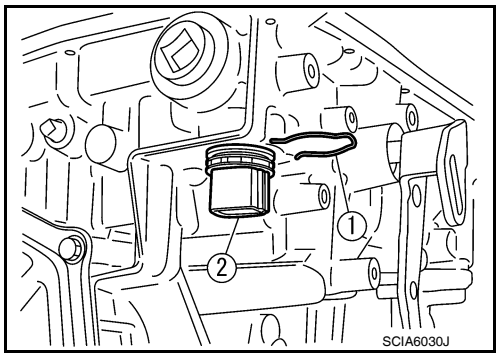
c. Set manual shaft in “N” position.

d. Install control valve assembly on transaxle case while aligning manual valve (2) with manual plate (1).



e. Install terminal body (2) into transaxle case by pushing it.

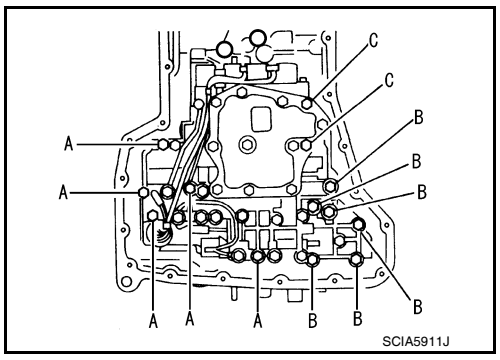
f. Install snap ring (1) to terminal body (2).



g. Tighten bolts **(A)**, **(B)** and **(C)** to the specified torque. Refer to AT-234, "Component".

Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length “ℓ” [mm (in)]	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



28. Install oil pan.

a. Attach magnets on oil pan.

b. Install oil pan gasket on transaxle case.
CAUTION:
- **Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mating surface of transaxle case.**
- **Do not reuse oil pan gasket.**

c. Install oil pan on transaxle case.
CAUTION:

Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mating surface of oil pan.

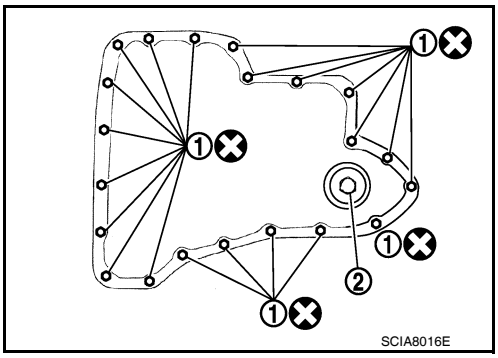
d. Tighten oil pan bolts (1) to the specified torque. Refer to AT-234, "Component".

CAUTION:
- **Always replace oil pan bolts (1) as they are self-sealing bolts.**
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

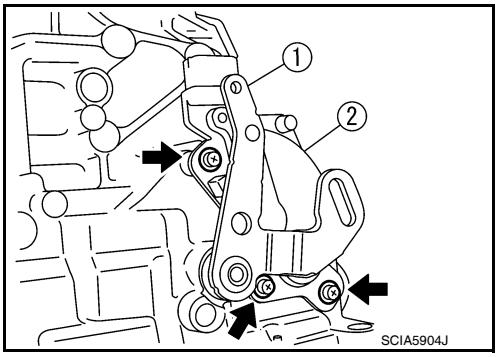
e. Install drain plug gasket and drain plug (2) to oil pan.

CAUTION:
Do not reuse drain plug gasket.

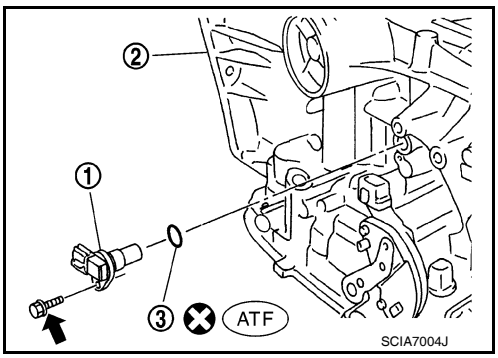
f. Tighten drain plug to the specified torque. Refer to AT-234, "Component".



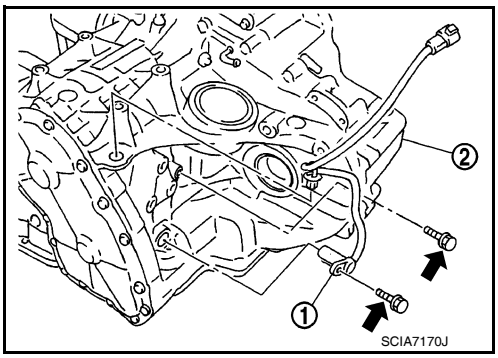
29. Install transmission range switch (2) on transaxle case.
    ⬅: Bolt
a. Set manual shaft (1) in “P” position.
b. Temporarily install transmission range switch (2) on manual shaft (1).
c. Set manual shaft (1) in “N” position.
d. Use a 4 mm (0.16 in) dia. pin for this adjustment.
i. Insert the pin straight into the manual shaft (1) adjustment hole.
ii. Rotate transmission range switch (2) until the pin can also be inserted straight into hole in transmission range switch (2).
e. Tighten transmission range switch bolts to the specified torque. Refer to AT-234, "Component".
f. Remove pin from adjustment hole after adjusting transmission range switch (2).



30. Install O-ring (3) to input speed sensor (1).
31. Install input speed sensor (1) to transaxle case (2).
    ⬅: Bolt
32. Tighten input speed sensor bolt to the specified torque. Refer to AT-234, "Component".

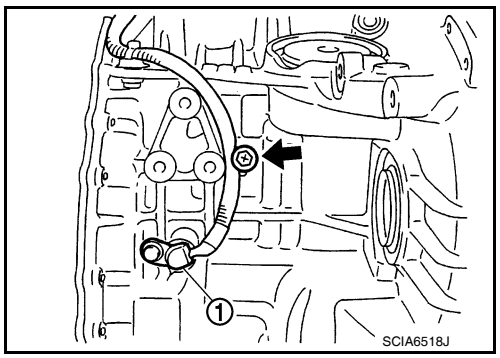


33. Install output speed sensor (1) to transaxle case (2).
34. Tighten output speed sensor bolts to the specified torque. Refer to AT-234, "Component".
    ⬅: Bolt



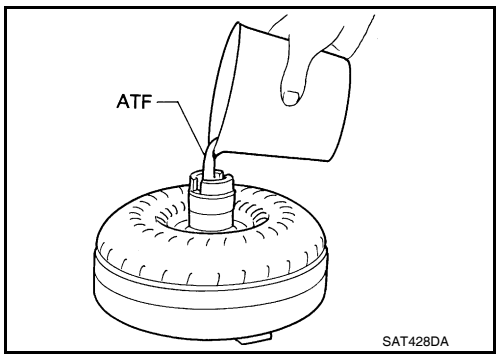
CAUTION:

Ensure output speed sensor harness is firmly secured with bolt.
(1): Output speed sensor
⬅: Bolt

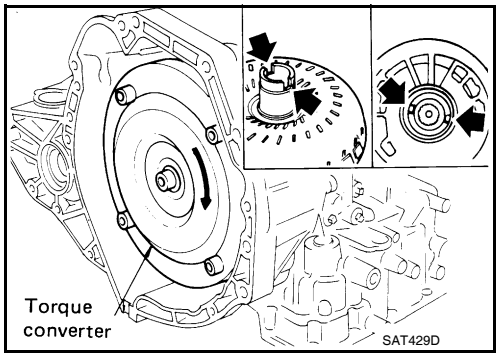


35. Install torque converter.

a. Pour ATF into torque converter.
- **Approximately 1 liter (1 US qt, 7/8 lmp pt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of ATF as was drained.**

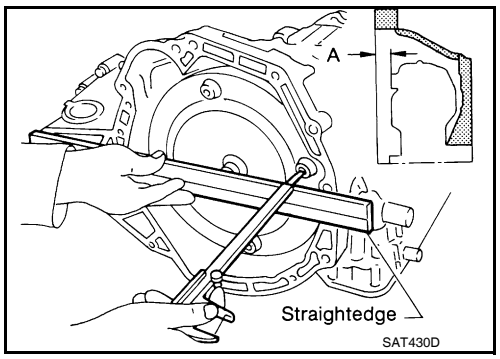


b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance (A) to make sure that torque converter is in proper position.

Distance (A) : 16.2 mm (0.638 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007329502

Engine		MR18DE
Automatic transaxle model		RE4F03B
Automatic transaxle assembly	Model code number	3CX0D
Transaxle gear ratio	1st	2.861
	2nd	1.562
	3rd	1.000
	4th	0.697
	Reverse	2.310
	Final drive	4.072
Recommended fluid		Genuine NISSAN Matic S ATF (Continental U.S. and Alaska) or Canada NISSAN Automatic Transmission Fluid*
Fluid capacity [ℓ (US qt, Imp qt)]		7.9 (8-3/8, 7)

*: Refer to MA-13.

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000007329503

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	40 - 48 (25 - 30)
Half throttle	34 - 42 (21 - 26)	62 - 70 (39 - 43)	124 - 132 (77 - 82)	69 - 77 (43 - 48)	36 - 44 (22 - 27)	19 - 27 (12 - 17)

- At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at When Lock-up Occurs/Releases

INFOID:0000000007329504

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	“D” position	86 - 94 (53 - 58)	59 - 67 (37 - 42)
	“D” position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Speed

INFOID:0000000007329505

Stall revolution (rpm)	2,310 - 2,770

Line Pressure

INFOID:0000000007329506

Engine speed	Line pressure kPa (kg/cm^2, psi)	
	“D”, “2” and “1” positions	“R” position
Idle speed	500 (5.1, 73)	778 (7.9, 113)
Stall speed	1,173 (12.0, 170)	1,825 (18.6, 265)

Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings

INFOID:0000000007329507

OUTER DIAMETER AND INNER DIAMETER OF NEEDLE BEARINGS

Unit: mm (in)

Location	Outer diameter	Inner diameter
A	47.0 (1.850)	32.0 (1.260)
B	35.0 (1.378)	20.1 (0.791)
C	60.0 (2.362)	42.0 (1.654)
D	60.0 (2.362)	45.0 (1.772)
E	47.0 (1.850)	30.0 (1.181)
F	42.6 (1.677)	26.1 (1.028)
G	48.0 (1.890)	33.5 (1.319)
H	55.0 (2.165)	40.5 (1.594)
I	60.0 (2.362)	40.0 (1.575)

OUTER DIAMETER AND INNER DIAMETER OF THRUST WASHERS

Unit: mm (in)

Location	Outer diameter	Inner diameter
J	72.0 (2.835)	55.5 (2.185)
K, L	82.0 (3.228)	59.0 (2.323)
M	78.5 (3.091)	62.4 (2.457)

OUTER DIAMETER AND INNER DIAMETER OF BEARING RACES AND ADJUSTING SHIMS

Unit: mm (in)

Location	Outer diameter	Inner diameter
N	48.0 (1.890)	33.0 (1.299)
O	34.3 (1.350)	26.1 (1.028)
P	68.0 (2.677)	60.0 (2.632)
Q	72.0 (2.835)	61.0 (2.402)

OUTER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Outer diameter
1	142.0 (5.59)
2	
3	162.3 (6.39)
4	
5	
7	113.0 (4.45)
8	135.4 (5.33)
9	126.0 (4.96)

INNER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Inner diameter
6	32.0 (1.260)
10	63.5 (2.500)

Control Valves

INFOID:0000000007329508

CONTROL VALVE SPRINGS

Unit: mm (in)

Location		spring designation	Free length (l)	Outer diameter (D)
Upper body	L14	Pilot valve spring	38.98 (1.5346)	8.9 (0.350)
	L15	1–2 accumulator valve spring	20.5 (0.807)	6.95 (0.2736)
		1–2 accumulator piston spring	55.66 (2.1913)	19.5 (0.768)
	L16	1st reducing valve spring	27.0 (1.063)	7.0 (0.276)
	L17	3–2 timing valve spring	23.0 (0.906)	6.65 (0.2618)
	L18	Overrun clutch reducing valve spring	37.5 (1.476)	7.0 (0.276)
	L19	Torque converter relief valve spring	33.3 (1.311)	9.0 (0.354)
	L20	Torque converter clutch control valve spring	53.01 (2.0870)	6.5 (0.256)
	L21	Cooler check valve spring	28.04 (1.1039)	7.15 (0.2815)
Lower body	L3	Pressure regulator valve spring	45.0 (1.772)	15.0 (0.591)
	L4	Overrun clutch control valve spring	21.7 (0.854)	7.0 (0.276)
	L5	Accumulator control valve spring	22.0 (0.866)	6.5 (0.256)
	L6	Shift valve A spring	21.7 (0.854)	7.0 (0.276)
	L7	Shuttle valve spring	51.0 (2.008)	5.65 (0.2224)
	L12	Shift valve B spring	21.7 (0.854)	7.0 (0.276)
	L13	Pressure modifier valve spring	32.0 (1.260)	6.9 (0.272)
		Pressure modifier piston spring	30.5 (1.201)	9.8 (0.386)
	—	Line pressure relief valve spring	17.02 (0.6701)	8.0 (0.315)
	—	Torque converter pressure holding spring	9.0 (0.354)	7.3 (0.287)

Accumulator

INFOID:0000000007329509

RETURN SPRINGS

Unit: mm (in)

Location	Free length (L_1)
Servo release accumulator	62.8 (2.472)

Unit: mm (in)

Location	Length (L_2)
N-D accumulator	46.5 (1.831)

O-RINGS

Unit: mm (in)

Location	Inner diameter (Small)	Inner diameter (Large)
Servo release accumulator	26.9 (1.059)	44.2 (1.740)
N-D accumulator	34.6 (1.362)	39.4 (1.551)

Clutches and Brakes

INFOID:0000000007329510

REVERSE CLUTCH

Number of drive plates		2
Number of driven plates		2
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.071)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	0.5 - 0.8 (0.020 - 0.031)
	Allowable limit	1.2 (0.047)

HIGH CLUTCH

Number of drive plates		4	
Number of driven plates		7 (1*1 + 6*2)	
Drive plate thickness [mm (in)]	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness [mm (in)]	Standard	*1	*2
		2.0 (0.079)	1.5 (0.059)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.071)	
	Allowable limit	2.6 (0.102)	

FORWARD CLUTCH

Number of drive plates		5
Number of driven plates		5
Drive plate thickness [mm (in)]	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	0.45 - 0.85 (0.0177 - 0.0335)
	Allowable limit	1.85 (0.0728)

OVERRUN CLUTCH

Number of drive plates		3
Number of driven plates		4
Drive plate thickness [mm (in)]	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	1.0 - 1.4 (0.039 - 0.055)
	Allowable limit	2.0 (0.079)

LOW & REVERSE BRAKE

Number of drive plates		5
Number of driven plates		5
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.071)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.071)
	Allowable limit	2.8 (0.110)

BRAKE BAND

Anchor end pin tightening torque [N·m (kg-m, in-lb)]	4.9 (0.50, 43)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque [N·m (kg-m, ft-lb)]	33.9 (3.5, 25)

Final Drive

INFOID:0000000007329511

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer [mm (in)]	0.1 - 0.2 (0.004 - 0.008)

DIFFERENTIAL SIDE BEARING END PLAY (FOR HR16DE ENGINE MODELS)

Differential side bearing end play mm (in)	0 - 0.15 (0 - 0.0059)

BEARING PRELOAD (FOR MR18DE ENGINE MODELS)

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)

TURNING TORQUE (FOR MR18DE ENGINE MODELS)

Turning torque of final drive assembly N-m (kg-cm, in-lb)	0.68 - 1.26 (7.0 - 13.0, 6.0 - 11.0)

Planetary Carrier

INFOID:0000000007329512

Clearance between planetary carrier and pinion washer [mm (in)]	Standard	0.15 - 0.70 (0.0059 - 0.0276)
	Allowable limit	0.80 (0.0315)

Oil Pump

INFOID:0000000007329513

Oil pump side clearance		0.02 - 0.04 (0.0008 - 0.0016)
Clearance between oil pump housing and outer gear [mm (in)]	Standard	0.08 - 0.15 (0.0031 - 0.0059)
	Allowable limit	0.15 (0.0059)
Oil pump cover seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

Input Shaft

INFOID:0000000007329514

SEAL RING CLEARANCE

Input shaft seal ring clearance [mm (in)]	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.091)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
24 (0.94)	20.4 (0.803)	1.97 (0.0776)

Reduction Pinion Gear

INFOID:0000000007329515

TURNING TORQUE

Turning torque of reduction pinion gear [N·m (kg-m, in-lb)]	0.11 - 0.69 (0.01 - 0.07, 1 - 6)

Band Servo

INFOID:0000000007329516

RETURN SPRINGS

Unit: mm (in)

Return spring	Free length
2nd servo return spring	32.5 (1.280)
OD servo return spring	38.52 (1.5165)

Output Shaft

INFOID:0000000007329517

SEAL RING CLEARANCE

Output shaft seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
29.5 (1.161)	26.2 (1.031)	1.95 (0.0768)

TURNING TORQUE (FOR HR16DE ENGINE MODELS)

Turning torque of output shaft ·m (kg-m, in-lb)	0.25 - 0.88 (0.03 - 0.08, 3 - 7)

END PLAY (FOR MR18DE ENGINE MODELS)

Output shaft end play mm (in)	0 - 0.5 (0 - 0.020)

Bearing Retainer

INFOID:0000000007329518

SEAL RING CLEARANCE

Bearing retainer seal ring clearance [mm (in)]	Standard	0.10 - 0.27 (0.0039 - 0.0106)
	Allowable limit	0.27 (0.0106)

Total End Play

INFOID:0000000007329519

Total end play [mm (in)]	0.25 - 0.55 (0.0098 - 0.0217)

Reverse Clutch End Play

INFOID:0000000007329520

Reverse clutch end play [mm (in)]	0.65 - 1.0 (0.0256 - 0.039)

Removal and Installation

INFOID:0000000007329521

Distance between end of converter housing and torque converter [mm (in)]	14.4 (0.567)

Shift Solenoid Valves

INFOID:0000000007329522

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

Solenoid Valves

INFOID:0000000007329523

Solenoid valve designation	Resistance (Approx.)	Terminal
Shift solenoid valve A	20 - 30 Ω	2
Shift solenoid valve B	5 - 20 Ω	1
Overrun clutch solenoid valve	20 - 30 Ω	3

Line pressure solenoid valve	2.5 - 5.0 Ω	4
Torque converter clutch solenoid valve	5 - 20 Ω	5

A/T Fluid Temperature Sensor

INFOID:0000000007329524

Remarks: Specification data are reference values.

Condition	Specification (Approx.)	
Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

Output Speed Sensor

INFOID:0000000007329525

Condition	Judgment standard
When driving at 20 km/h (12 MPH)	150 Hz (Approx.)

Dropping Resistor

INFOID:0000000007329526

Resistance	12Ω (Approx.)

Input Speed Sensor

INFOID:0000000007329527

Condition	Judgment standard
When driving at 20 km/h (12 MPH)	360 Hz (Approx.)

SECTION CVT

CVT

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SERVICE INFORMATION

INDEX FOR DTC

Alphabetical Index

INFOID:0000000007329582

NOTE:
If DTC "U1000" is displayed with other DTCs, first perform the trouble diagnosis for DTC "U1000". Refer to CVT-56.

Items (CONSULT screen terms)	DTC		Reference page
	OBD-II	Except OBD-II	
	CONSULT GST*1	CONSULT only "TRANSMISSION"	
BRAKE SWITCH B	—	P0703	CVT-60
CAN COMM CIRCUIT	U1000	U1000	CVT-56
CONTROL UNIT (CAN)	—	U1010	CVT-59
ENGINE SPEED	—	P0725	CVT-81
FLUID PRESS LOW	—	P0868	CVT-111
FLUID PRESS SEN/SW A	P0840	P0840	CVT-105
FLUID PRESS SEN/SW A	—	P0841	CVT-109
FLUID TEMP SENSOR A	P0710	P0710	CVT-67
INCORRECT GR RATIO	—	P0730	CVT-83
INPUT SPEED SENSOR A	P0715	P0715	CVT-72
LINE PRESS CONTROL	—	P1745	CVT-128
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PC SOLENOID A	P0745	P0745	CVT-91
PC SOLENOID A	P0746	P0746	CVT-96
PC SOLENOID B	P0776	P0776	CVT-98
PC SOLENOID B	P0778	P0778	CVT-100
SLCT SOLENOID	P1740	P1740	CVT-124
SPEED SENSOR	—	P1723	CVT-121
STEP MOTOR	P1777	P1777	CVT-129
STEP MOTOR	P1778	P1778	CVT-133
TCM	—	P1701	CVT-113
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TORQUE CONVERTER	P0744	P0744	CVT-89
TP SENSOR	—	P1705	CVT-117
VEHICLE SPEED*2	—	P1722	CVT-119

*1: These numbers are prescribed by SAE J2012.
*2: Models without ABS does not indicate.

DTC No. Index

INFOID:0000000007329583

NOTE:
If DTC "U1000" is displayed with other DTCs, first perform the trouble diagnosis for DTC "U1000". Refer to CVT-56.

DTC		Items (CONSULT screen terms)	Reference page
OBD-II	Except OBD-II		
CONSULT GST*1	CONSULT only "TRANSMISSION"		
—	P0703	BRAKE SWITCH B	CVT-60
P0705	P0705	T/M RANGE SENSOR A	CVT-62
P0710	P0710	FLUID TEMP SENSOR A	CVT-67
P0715	P0715	INPUT SPEED SENSOR A	CVT-72
P0720	P0720	OUTPUT SPEED SENSOR	CVT-76
—	P0725	ENGINE SPEED	CVT-81
—	P0730	INCORRECT GR RATIO	CVT-83
P0740	P0740	TORQUE CONVERTER	CVT-84
P0744	P0744	TORQUE CONVERTER	CVT-89
P0745	P0745	PC SOLENOID A	CVT-91
P0746	P0746	PC SOLENOID A	CVT-96
P0776	P0776	PC SOLENOID B	CVT-98
P0778	P0778	PC SOLENOID B	CVT-100
P0840	P0840	FLUID PRESS SEN/SW A	CVT-105
—	P0841	FLUID PRESS SEN/SW A	CVT-109
—	P0868	FLUID PRESS LOW	CVT-111
—	P1701	TCM	CVT-113
—	P1705	TP SENSOR	CVT-117
—	P1722	VEHICLE SPEED*2	CVT-119
—	P1723	SPEED SENSOR	CVT-121
—	P1726	THROTTLE CONTROL SIG	CVT-123
P1740	P1740	SLCT SOLENOID	CVT-124
—	P1745	LINE PRESS CONTROL	CVT-128
P1777	P1777	STEP MOTOR	CVT-129
P1778	P1778	STEP MOTOR	CVT-133
U1000	U1000	CAN COMM CIRCUIT	CVT-56
—	U1010	CONTROL UNIT(CAN)	CVT-59

*1: These numbers are prescribed by SAE J2012.
*2: Models without ABS does not indicate.

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329584

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329585

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007795980

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precaution for On Board Diagnosis (OBD) System of CVT and Engine

INFOID:0000000007329586

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery cable from the negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

Service After Replacing TCM, Control Valve and Transaxle Assembly

INFOID:0000000007329587

SERVICE AFTER REPLACING TCM AND TRANSAXLE ASSEMBLY

Perform the applicable service according to the following table when replacing TCM, control valve or transaxle assembly.

CAUTION:

- **Never start the engine until the service is completed.**
- **"DTC P1701" may be indicated soon after replacing TCM, control valve or transaxle assembly (after erasing the memory in the pattern B). Restart the self-diagnosis after erasing the self-diagnosis result using CONSULT. Check that no error is detected.**

TCM	Control valve or Transaxle assembly	Service pattern
Replaced with new unit	Not replaced the unit	"PATTERN A"
Not replaced the unit	Replaced with new or old unit	"PATTERN B"
Replaced with old unit	Not replaced the unit	
	Replaced with new or old unit	
Replaced with new unit	Replaced with new or old unit	"PATTERN C"

NOTE:

Old unit means that the unit has been already used for another vehicle.

PATTERN A

1. Shift the selector lever to “P” position after replacing TCM.
2. Turn ignition switch ON.
3. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after turning ignition switch ON.)
   - Check the following items if shift position indicator does not turn ON. Repair or replace accordingly as necessary.
   - The harness between TCM and ROM ASSY in transaxle assembly is open or shorted.
   - Terminals disconnected, loose, or bent from connector housing.

PATTERN B

1. Turn ignition switch ON after replacing each part.
2. Connect the vehicle with CONSULT.
3. Start engine.
   CAUTION:
   Never start driving.
4. Select “Data monitor” in “TRANSMISSION”.
5. Warm up transaxle assembly until “ATFTEMP COUNT” indicates 47 [approximately 20°C (68°F)] or more, and then turn ignition switch OFF.
6. Turn ignition switch ON.
   CAUTION:
   Never start engine.
7. Select “Self Diagnostic Results” in “TRANSMISSION”.
8. Shift the selector lever to “R” position.
9. Depress slightly the accelerator pedal (Pedal angle: 2/8) while depressing the brake pedal.
10. Select “Erase” with step 9.
11. Release brake pedal and accelerator pedal.
12. Turn ignition switch OFF while keeping the selector lever in “R” position.
13. Wait approximately 10 seconds.
14. Turn ignition switch ON while keeping the selector lever in “R” position.
15. Select “Special function” in “TRANSMISSION”.
16. Check that the value on “CALIB DATA” in CONSULT is the same as the data listed in the table below.
    - Restart the procedure from step 3 if the values are not the same.

CALIB DATA

Item name	Display value
UNIT CLB ID 1	00
UNIT CLB ID 2	00
UNIT CLB ID 3	00
UNIT CLB ID 4	00
UNIT CLB ID 5	00
UNIT CLB ID 6	00

17. Shift the selector lever to “P” position.
18. Check that the shift position indicator in combination meter turns ON. (It indicates approximately 1 or 2 seconds after shifting the selector lever to “P” position.)
    - Check the following items if shift position indicator does not turn ON. Repair or replace accordingly as necessary.
    - The harness between TCM and ROM ASSY in transaxle assembly is open or shorted.
    - Terminals disconnected, loose, or bent from connector housing.
    - Power supply and ground of TCM. Refer to CVT-113, "Description".

PATTERN C

1. Replace transaxle assembly first, and then replace TCM.

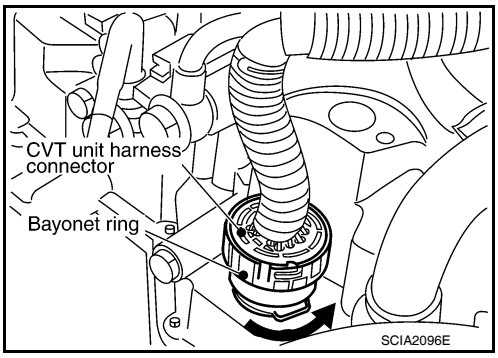
2. Perform the service of “PATTERN A”.
(Perform the service of “PATTERN B” if TCM is replaced first.)

Removal and Installation Procedure for CVT Unit Connector

INFOID:0000000007329588

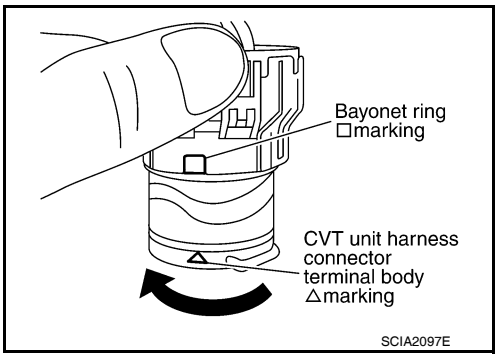
REMOVAL

Rotate bayonet ring counterclockwise, pull out CVT unit harness connector upward and disconnect it.

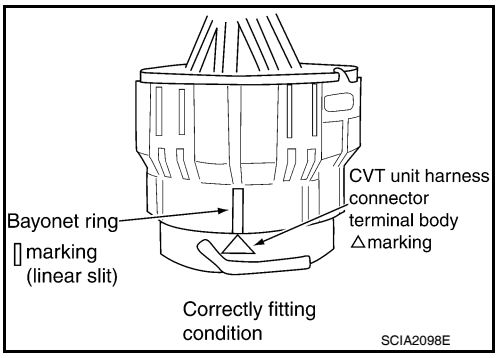


INSTALLATION

1. Align CVT unit harness connector terminal body marking with bayonet ring marking, insert CVT unit harness connector, and then rotate bayonet ring clockwise.

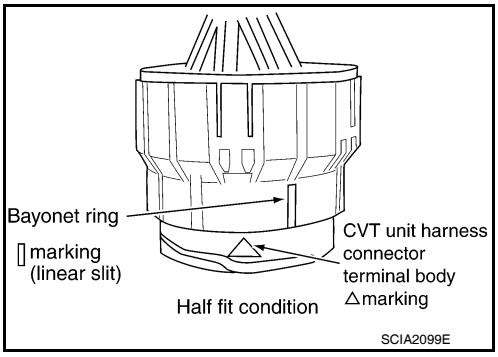


2. Rotate bayonet ring clockwise until CVT unit harness connector terminal body marking is aligned with the bayonet ring marking (linear slit) as shown.



CAUTION:

- **Securely align CVT unit harness connector terminal body marking with bayonet ring marking (linear slit). Do not make a half fit condition as shown.**
- **Do not mistake the bayonet ring marking (linear slit) for other dent portion.**



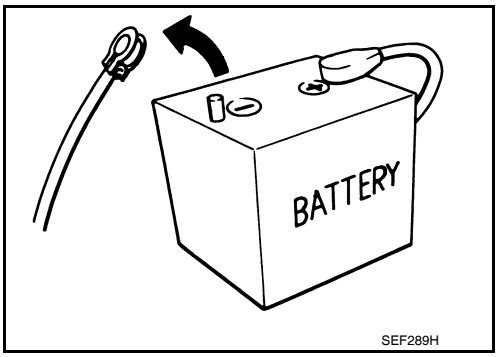
Precaution

INFOID:0000000007329589

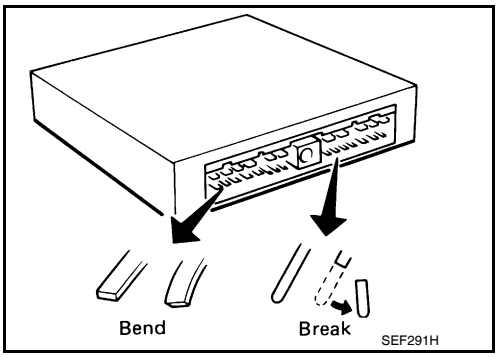
NOTE:

If any malfunction occurs in the RE0F08B model transaxle, replace the entire transaxle assembly.

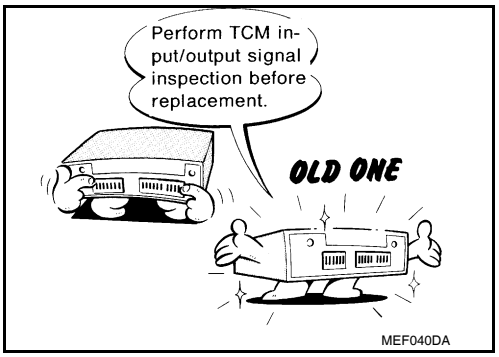
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery cable. Because battery voltage is applied to TCM even if ignition switch is turned OFF.**



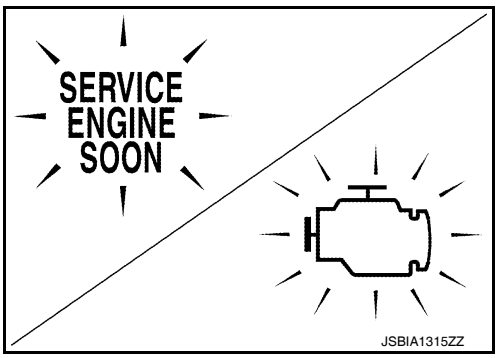
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors make sure that there are not any bends or breaks on TCM pin terminal.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. CVT-46, "TCM Terminal and Reference Value"**.



- **After performing each TROUBLE DIAGNOSIS, perform "DTC Confirmation Procedure".**
  If the repair is completed the DTC should not be displayed in the "DTC Confirmation Procedure".
- Always use the specified brand of CVT fluid. Refer to MA-13, "Fluids and Lubricants".
- Use lint-free paper, not cloth rags, during work.
- After replacing the CVT fluid, dispose of the waste oil using the methods prescribed by law, ordinance, etc.



Service Notice or Precaution

INFOID:0000000007329590

CVT FLUID COOLER SERVICE

If CVT fluid contains friction material (clutches, brakes, etc.), or if an CVT is replaced, inspect and clean the CVT fluid cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. For CVT fluid cooler cleaning procedure, refer to CVT-15, "CVT Fluid Cooler Cleaning". For radiator replacement, refer to CO-15.

OBD-II SELF-DIAGNOSIS

- CVT self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the malfunction indicator lamp (MIL). Refer to the table on CVT-48, "CONSULT Function (TRANSMISSION)" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure on CVT-27, "OBD-II Diagnostic Trouble Code (DTC)" to complete the repair and avoid unnecessary blinking of the MIL.

For details of OBD-II, refer to EC-48, "Introduction".

- **Certain systems and components, especially those related to OBD, may use the new style slide-locking type harness connector. For description and how to disconnect, refer to PG-62.**

ATFTEMP COUNT Conversion Table

INFOID:0000000007329591

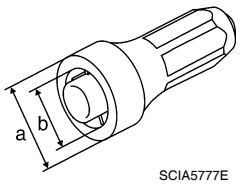
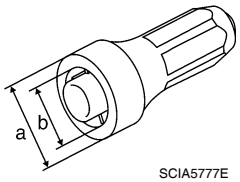
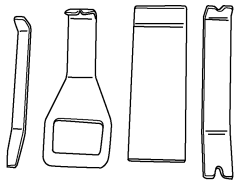
ATFTEMP COUNT	Temperature °C (°F)	ATFTEMP COUNT	Temperature °C (°F)
4	–30 (–22)	177	90 (194)
8	–20 (–4)	183	95 (203)
13	–10 (14)	190	100 (212)
17	–5 (23)	196	105 (221)
21	0 (32)	201	110 (230)
27	5 (41)	206	115 (239)
32	10 (50)	210	120 (248)
39	15 (59)	214	125 (257)
47	20 (68)	218	130 (266)
55	25 (77)	221	135 (275)
64	30 (86)	224	140 (284)
73	35 (95)	227	145 (293)
83	40 (104)	229	150 (302)
93	45 (113)	231	155 (311)
104	50 (122)	233	160 (320)
114	55 (131)	235	165 (329)
124	60 (140)	236	170 (338)
134	65 (149)	238	175 (347)
143	70 (158)	239	180 (356)
152	75 (167)	241	190 (374)
161	80 (176)	243	200 (392)
169	85 (185)	—	—

PREPARATION

Special Service Tool

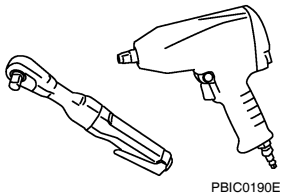
INFOID:0000000007329592

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (OTC3492) Oil pressure gauge set SCIA7531E	Measuring line pressure
— (J-47244) Drift  SCIA5777E	Installing differential side oil seal • Transaxle case side (left) **a: 65.83 mm (2.59 in) dia.** **b: 53.85 mm (2.12 in) dia.**
ST33400001 (J-47005) Drift  SCIA5777E	Installing differential side oil seal • Converter housing side (right) **a: 69.85 mm (2.75 in) dia.** **b: 49.53 mm (1.95 in) dia.**
— (J-46534) Trim tool set  AWJIA0483ZZ	For removing trim

Commercial Service Tool

INFOID:0000000007329593

Tool number Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts

CVT FLUID

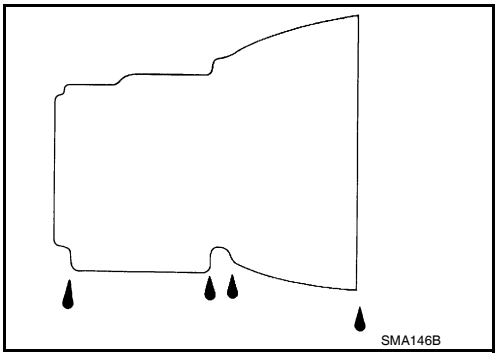
Checking CVT Fluid

INFOID:0000000007329594

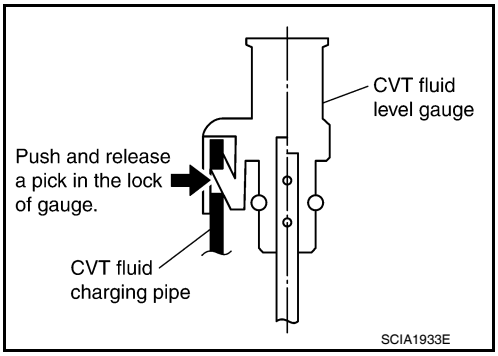
FLUID LEVEL CHECK

Fluid level should be checked with the fluid warmed up to 50° to 80°C (122° to 176°F).

1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle to warm up the CVT fluid. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50° to 80°C (122° to 176°F).
3. Park the vehicle on a level surface and set the parking brake.
4. With engine at idle, while depressing brake pedal, move the selector lever throughout the entire shift range and return it to the “P” position.



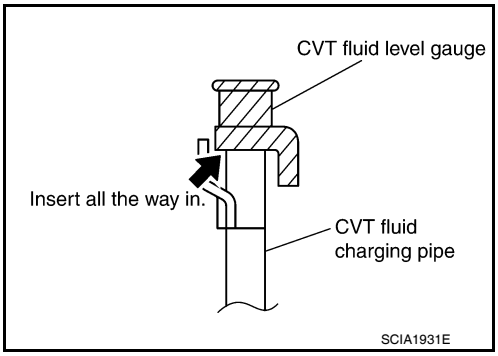
5. Press the tab on the CVT fluid level gauge to release the lock and pull out the CVT fluid level gauge from the CVT fluid charging pipe.



6. Wipe fluid off the CVT fluid level gauge. Then rotate the CVT fluid level gauge 180° and re-insert it into the CVT charging pipe as far as it will go.

CAUTION:

Always use lint free paper towels to wipe fluid off the CVT fluid level gauge.

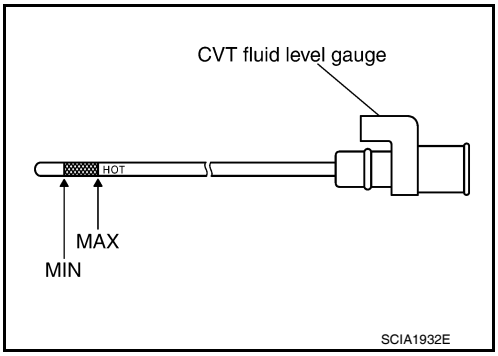


7. Remove the CVT fluid level gauge and check that the fluid level is within the specified range as shown. If the fluid level is at or below the low side of the range, add the necessary specified NISSAN CVT fluid through the CVT charging pipe.

Fluid grade: **Refer to MA-13, "Fluids and Lubricants".**

CAUTION:

- **Only use specified NISSAN CVT fluid.**
- **Do not overfill the CVT.**



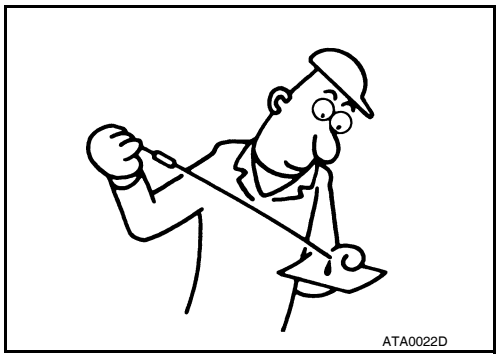
8. Install the CVT fluid level gauge to the CVT fluid charging pipe until it locks.

CAUTION:

When CVT fluid level gauge is installed into the CVT fluid charging pipe, make sure that the CVT fluid level gauge is securely locked in place.

FLUID CONDITION CHECK

Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harness, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in fluid	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

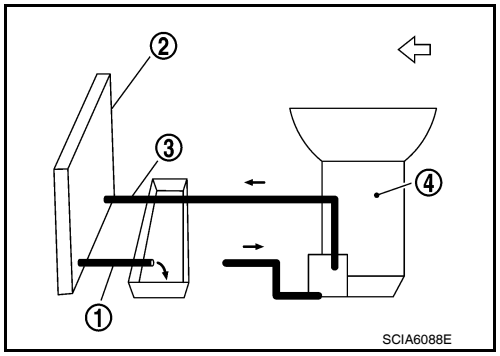


Changing CVT Fluid

INFOID:0000000007329595

1. Warm up CVT fluid by driving the vehicle for 10 minutes.

- ⇦: Vehicle front
- Radiator (2)
- CVT fluid cooler hose [inlet side (3)]
- Transaxle assembly (4)



2. Drain CVT fluid from CVT fluid cooler hose [outlet side (1)] and refill with new specified NISSAN CVT fluid in the CVT fluid charging pipe with the engine running at idle speed.

Fluid capacity and grade: **Refer to MA-13, "Fluids and Lubricants".**

CAUTION:
Only use the specified NISSAN CVT fluid.

3. Refill until new CVT fluid comes out from CVT fluid cooler hose [outlet side (1)].
NOTE:
About 30 to 50% extra fluid will be required for this procedure.
4. Check fluid level and condition. Refer to CVT-14, "Checking CVT Fluid".
CAUTION:
Delete CVT fluid deterioration date with CONSULT after changing CVT fluid. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

CVT Fluid Cooler Cleaning

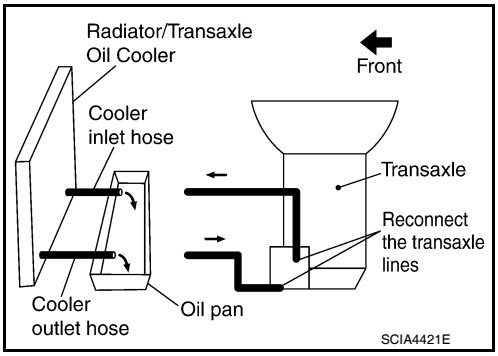
INFOID:0000000007329596

Whenever a CVT is repaired, overhauled, or replaced, the CVT fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can be trapped or become deposit in the CVT fluid cooler. This debris can contaminate the newly serviced CVT or, in severe cases, can block or restrict the flow of CVT fluid. In either case, malfunction of the newly serviced CVT may occur.
Debris, if present, may deposit as CVT fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

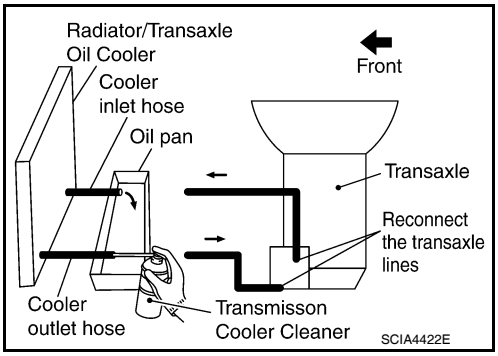
CVT FLUID COOLER CLEANING PROCEDURE

1. Identify the CVT inlet and outlet fluid cooler hoses.
2. Position an oil pan under the inlet and outlet cooler hoses.

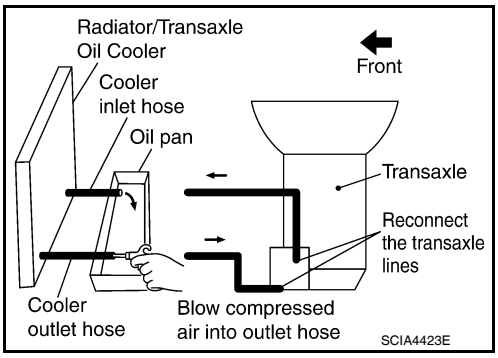
3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes.
NOTE:
Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Allow any CVT fluid that remains in the cooler hoses to drain into the oil pan.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
CAUTION:
- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray Transmission Cooler Cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**
6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until CVT fluid flows out of the cooler inlet hose for 5 seconds.



7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.
9. Blow compressed air regulated to 490 to 883 kPa (5 to 9 kg/cm^2, 71 to 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining CVT fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the CVT fluid cooler steel lines to the transaxle.
12. Remove the banjo bolts.



13. Flush each steel line from the cooler side back toward the transaxle by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 490 to 883 kPa (5 to 9 kg/cm^2, 71 to 128 psi) through each steel line from the cooler side back toward the transaxle for 10 seconds to force out any remaining CVT fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform "CVT FLUID COOLER DIAGNOSIS PROCEDURE".

CVT FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

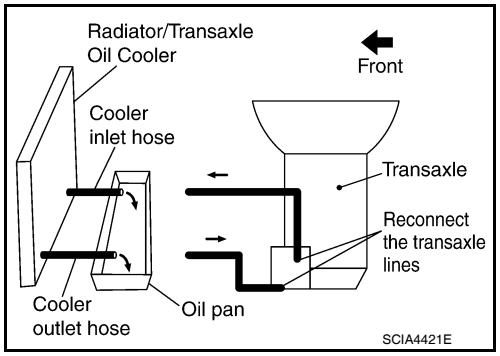
1. Position an oil pan under the transaxle's inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.

3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

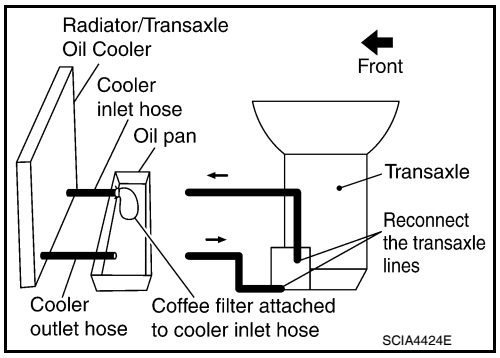
CAUTION:

- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray Transmission Cooler Cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

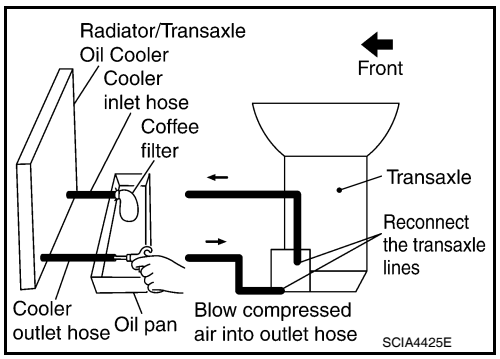
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until CVT fluid flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



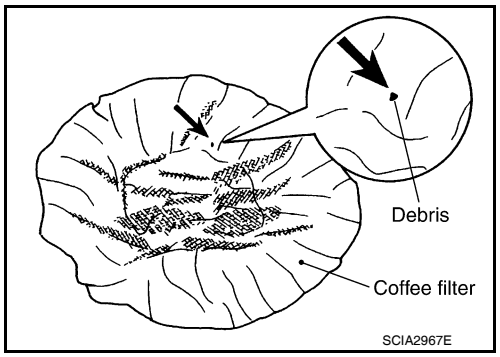
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 490 to 883 kPa (5 to 9 kg/cm^2, 71 to 128 psi) through the cooler outlet hose to force any remaining CVT fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform "CVT FLUID COOLER INSPECTION PROCEDURE".



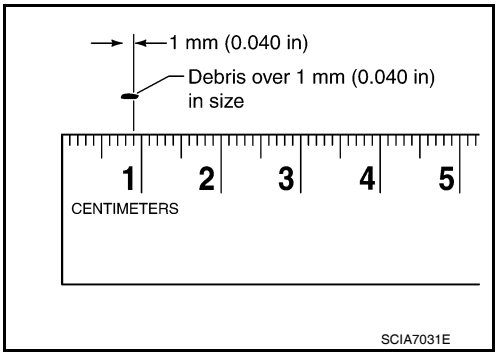
CVT FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1 mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the CVT fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1 mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The radiator/ fluid cooler must be replaced and the inspection procedure is ended.



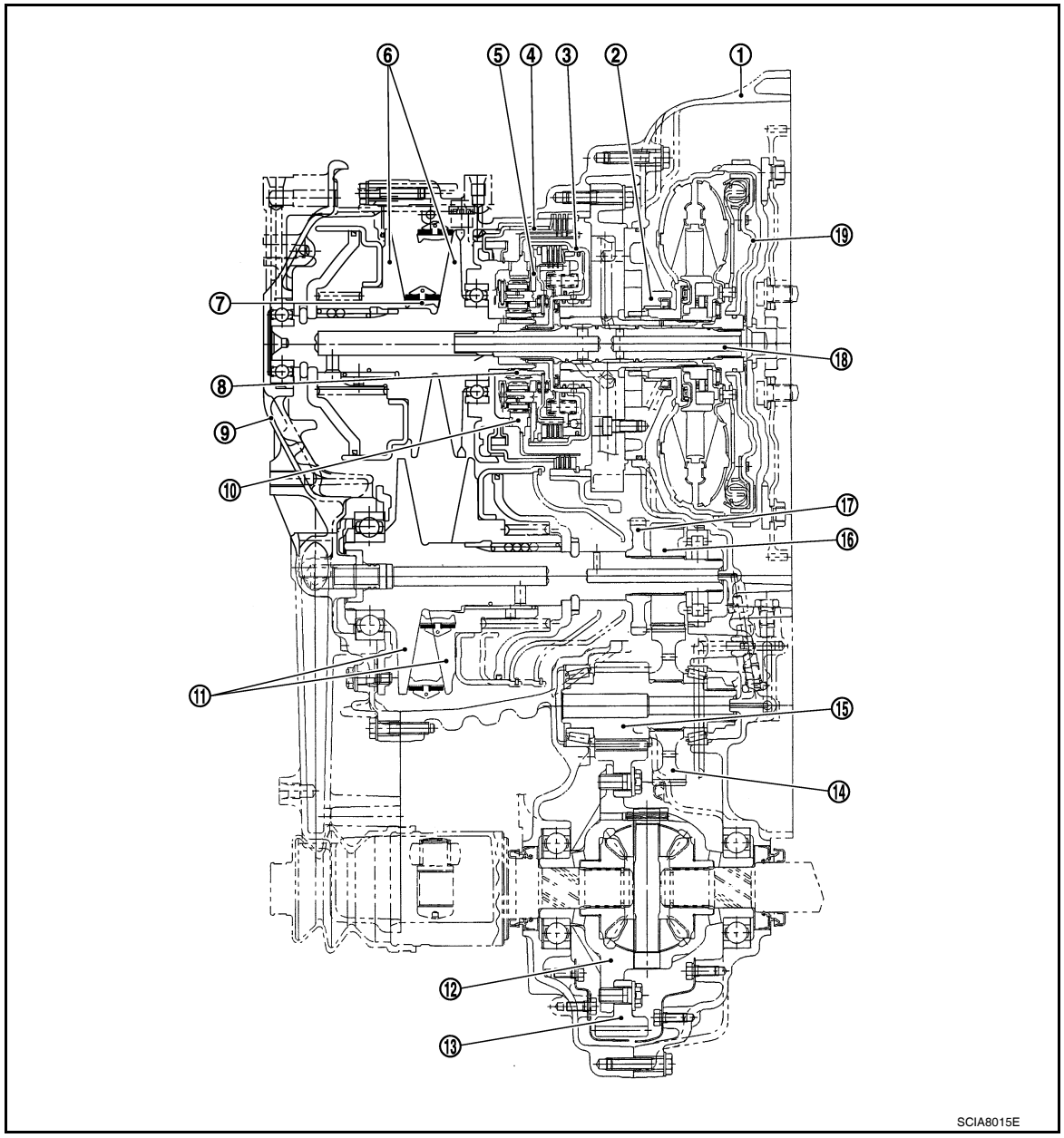
CVT FLUID COOLER FINAL INSPECTION

After performing all procedures, ensure that all remaining oil is cleaned from all components.

CVT SYSTEM

Cross-Sectional View - RE0F08B

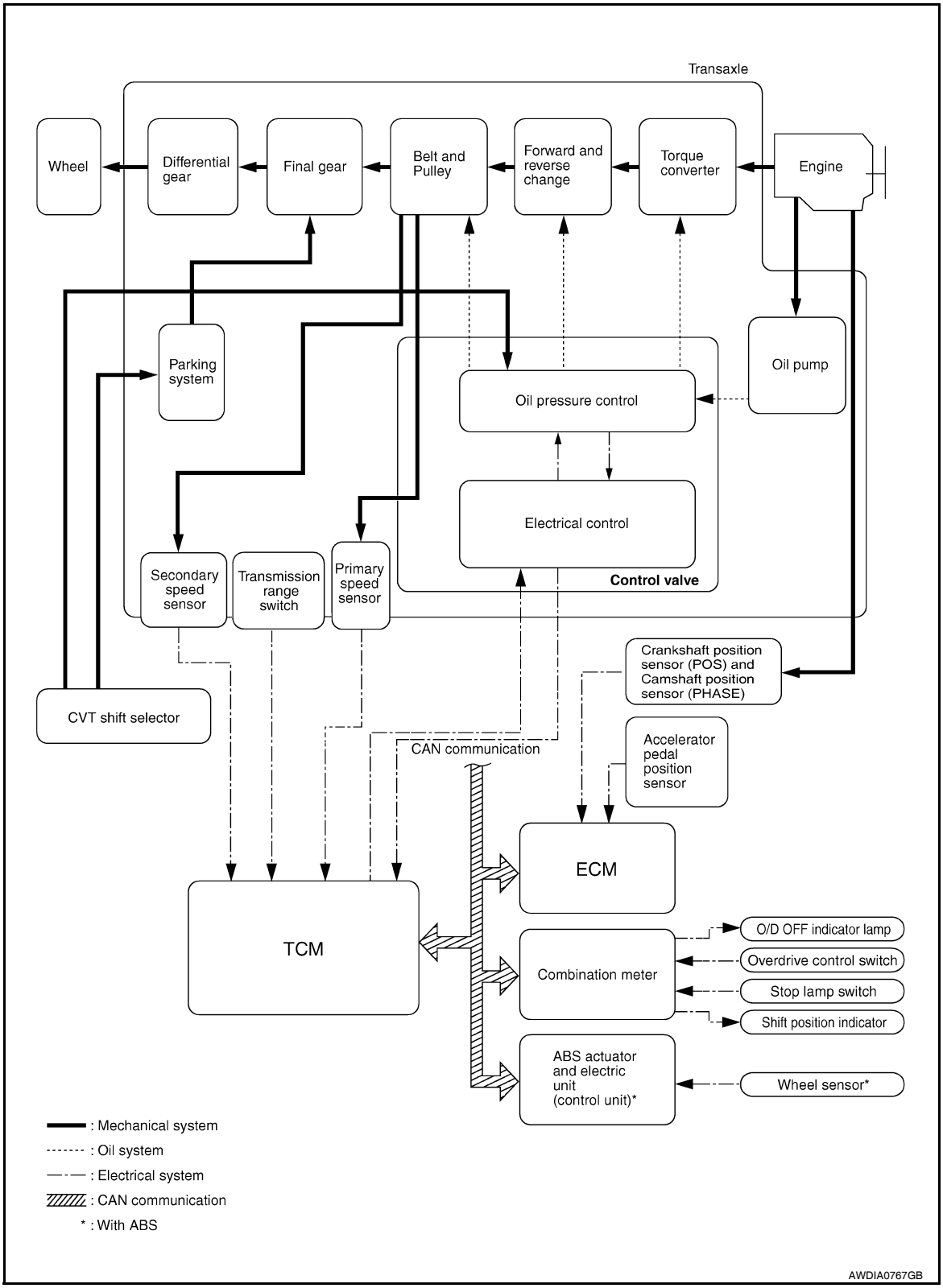
INFOID:0000000007329597



1. Converter housing
2. Oil pump
3. Forward clutch
4. Reverse brake
5. Planetary carrier
6. Primary pulley
7. Steel belt
8. Sun gear
9. Side cover
10. Internal gear
11. Secondary pulley
12. Differential case
13. Final gear
14. Idler gear
15. Reduction gear
16. Output gear
17. Parking gear
18. Input shaft
19. Torque converter

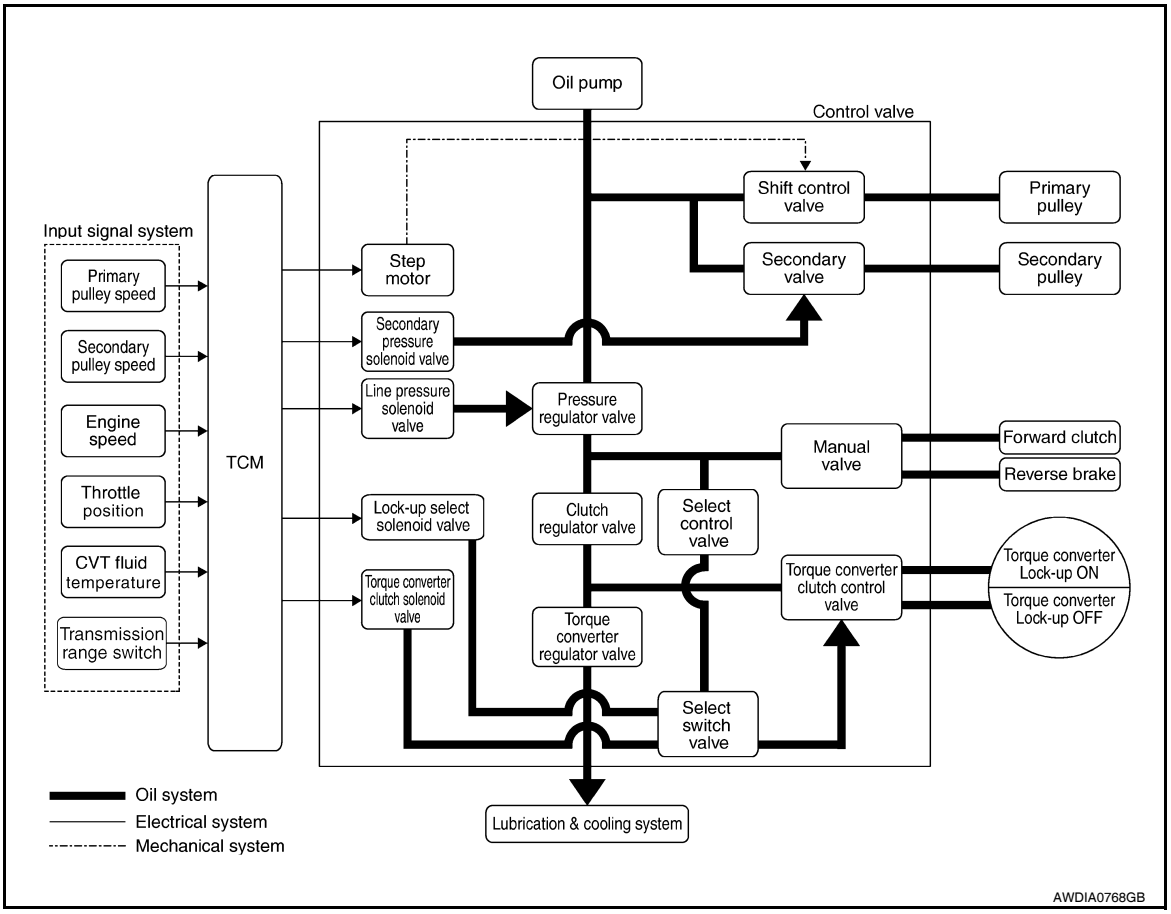
Control System

INFOID:0000000007329598



Hydraulic Control System

INFOID:0000000007329599



TCM Function

INFOID:0000000007329600

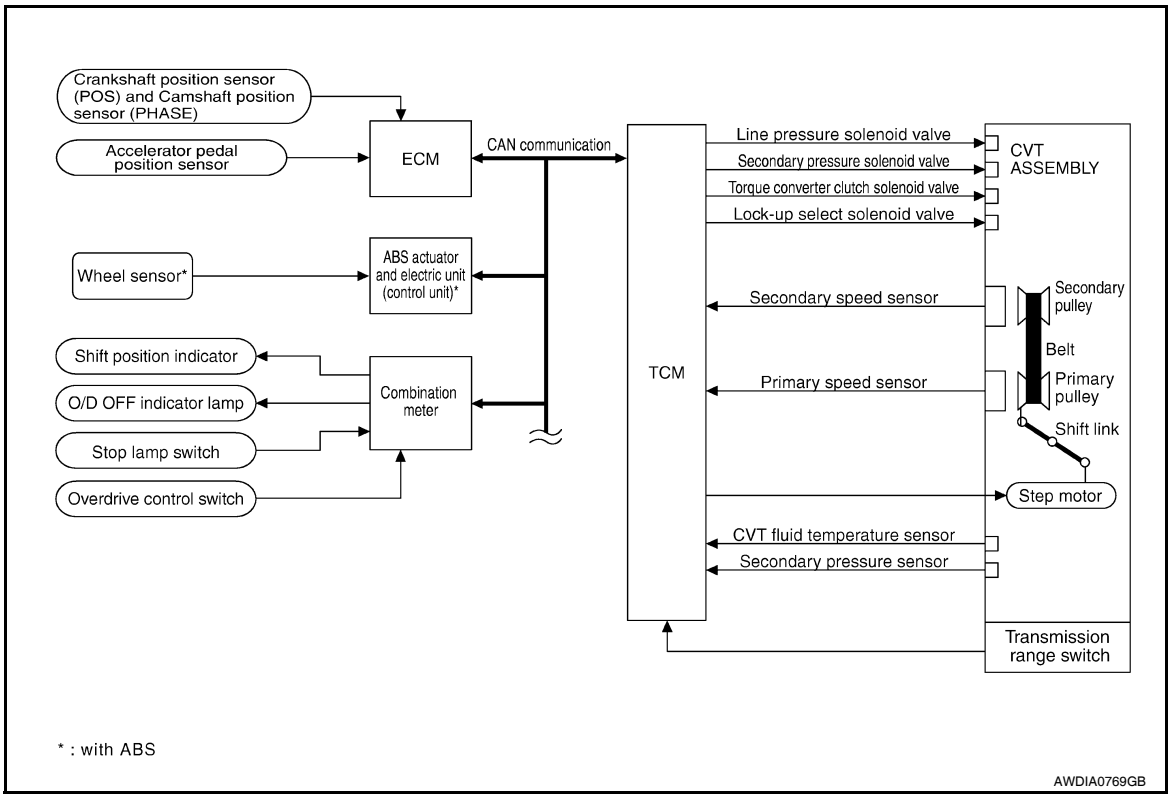
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, and lock-up operation.
- Send required output signals to the step motor and the respective solenoids.

CONTROL SYSTEM OUTLINE

The CVT senses vehicle operating conditions through various sensors. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SENSORS (or SIGNAL)		TCM		ACTUATORS
Transmission range switch Accelerator pedal position signal Closed throttle position signal Engine speed signal CVT fluid temperature sensor Vehicle speed signal Overdrive control signal Stop lamp switch signal Primary speed sensor Secondary speed sensor Secondary pressure sensor	⇒	Shift control Line pressure control Primary pressure control Secondary pressure control Lock-up control Engine brake control Vehicle speed control Fail-safe control Self-diagnosis CONSULT communication line Duet-EA control CAN system On board diagnosis	⇒	Step motor Torque converter clutch solenoid valve Lock-up select solenoid valve Line pressure solenoid valve Secondary pressure solenoid valve Shift position indicator O/D OFF indicator lamp Starter relay

CONTROL SYSTEM DIAGRAM



CAN Communication

INFOID:0000000007329601

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-5, "System Description".

Input/Output Signal of TCM

INFOID:0000000007329602

	Control item	Fluid pressure control	Select control	Shift control	Lock-up control	CAN communication control	Fail-safe function (*3)
Input	Transmission range switch	X	X	X	X	X	X
	Accelerator pedal position signal (*1)	X	X	X	X	X	X
	Closed throttle position signal(*1)	X		X	X	X	
	Engine speed signal(*1)	X	X		X	X	X
	CVT fluid temperature sensor	X	X	X	X		X
	Stop lamp switch signal(*1)	X		X	X	X	
	Overdrive control signal(*1)			X		X	
	Primary speed sensor	X		X	X	X	X
	Secondary speed sensor	X	X	X	X	X	X
	Secondary pressure sensor	X		X			X
	TCM power supply voltage signal	X	X	X	X	X	X

Control item		Fluid pressure control	Select control	Shift control	Lock-up control	CAN communication control	Fail-safe function (*3)
Output	Step motor			X			X
	TCC solenoid valve		X		X		X
	Lock-up select solenoid valve		X		X		X
	Line pressure solenoid valve	X	X	X			X
	Secondary pressure solenoid valve	X		X			X
	O/D OFF indicator signal(*2)			X		X	

*1: Input by CAN communications.

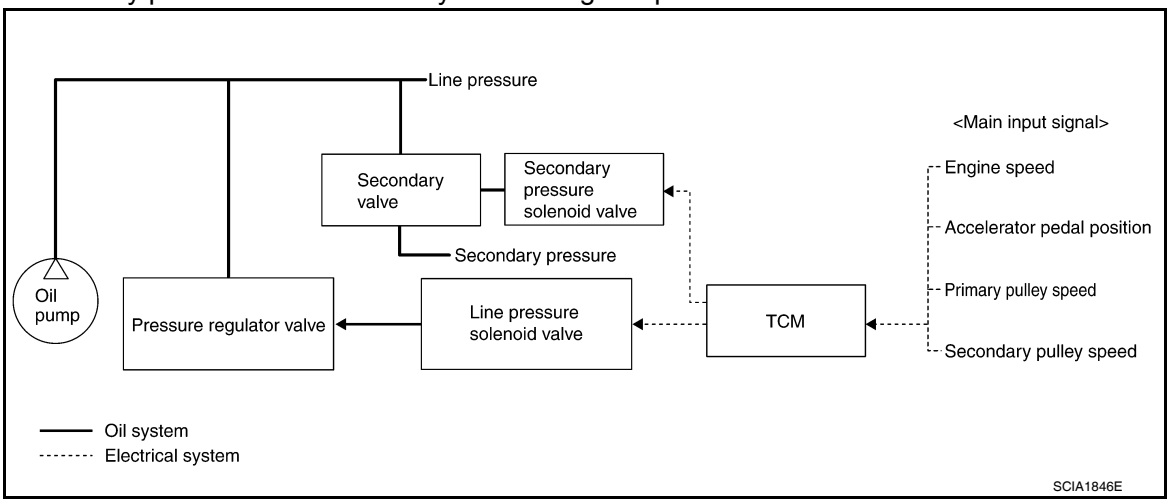
*2: Output by CAN communications.

*3: If these input and output signals are different, the TCM triggers the fail-safe function.

Line Pressure and Secondary Pressure Control

INFOID:0000000007329603

- When an input torque signal equivalent to the engine drive force is sent from the ECM to the TCM, the TCM controls the line pressure solenoid valve and secondary pressure solenoid valve.
- This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pressure of the operating oil discharged from the oil pump to the line pressure most appropriate to the driving state. Secondary pressure is controlled by decreasing line pressure.



NORMAL CONTROL

Optimize the line pressure and secondary pressure, depending on driving conditions, on the basis of the throttle position, the engine speed, the primary pulley (input) revolution speed, the secondary pulley (output) revolution speed, the brake signal, the transmission range switch signal, the lock-up signal, the voltage, the target gear ratio, the fluid temperature, and the fluid pressure.

FEEDBACK CONTROL

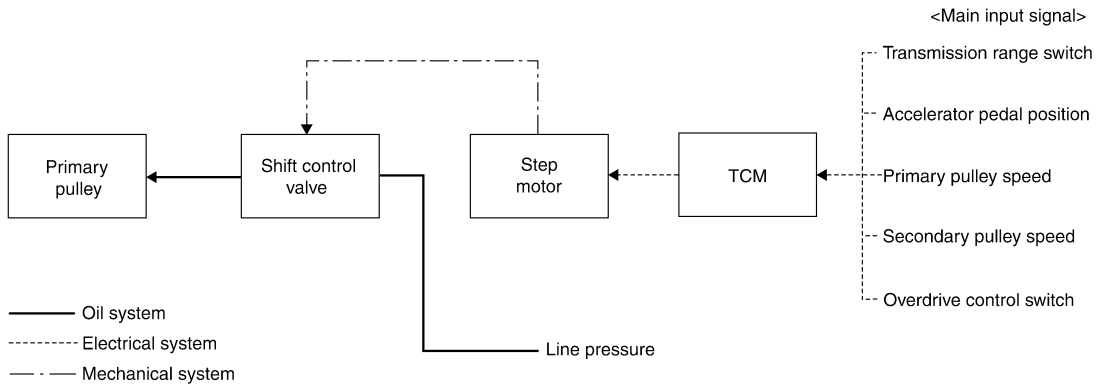
When controlling the normal fluid pressure or the selected fluid pressure, the secondary pressure can be set more accurately by using the fluid pressure sensor to detect the secondary pressure and controlling the feedback.

Shift Control

INFOID:0000000007329604

In order to select the gear ratio which can obtain the driving force in accordance with driver's intention and the vehicle condition, TCM monitors the driving conditions, such as the vehicle speed and the throttle position and selects the optimum gear ratio, and determines the gear change steps to the gear ratio. Then send the com-

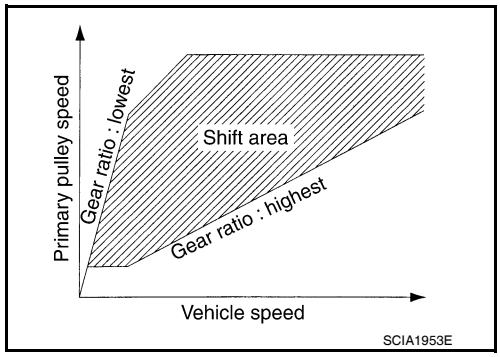
mand to the step motor, and control the flow-in/flow-out of line pressure from the primary pulley to determine the position of the moving-pulley and control the gear ratio.



NOTE:
The gear ratio is set for every position separately.

“D” POSITION

Shifting over all the ranges of gear ratios from the lowest to the highest.

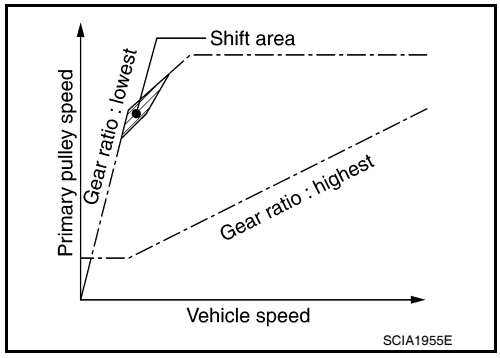


OVERDRIVE-OFF MODE

Use this position for the improved engine braking.

“L” POSITION

By limiting the gear range to the lowest position, the strong driving force and the engine brake can be secured.



DOWNHILL ENGINE BRAKE CONTROL (AUTO ENGINE BRAKE CONTROL)

When downhill is detected with the accelerator pedal released, the engine brake will be strengthened up by downshifting so as not to accelerate the vehicle more than necessary.

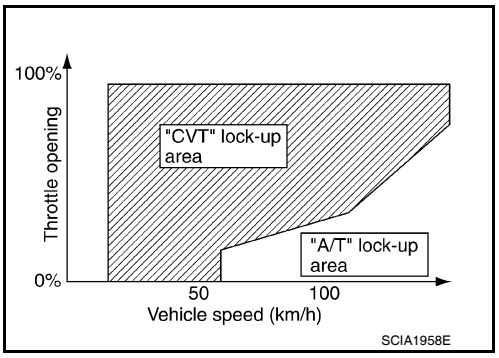
ACCELERATION CONTROL

According to vehicle speed and a change of accelerator pedal angle, driver's request for acceleration and driving scene are judged. This function assists improvement in acceleration feeling by making the engine speed proportionate to the vehicle speed. And a shift map which can gain a larger driving force is available for compatibility of mileage with driveability.

Lock-up and Select Control

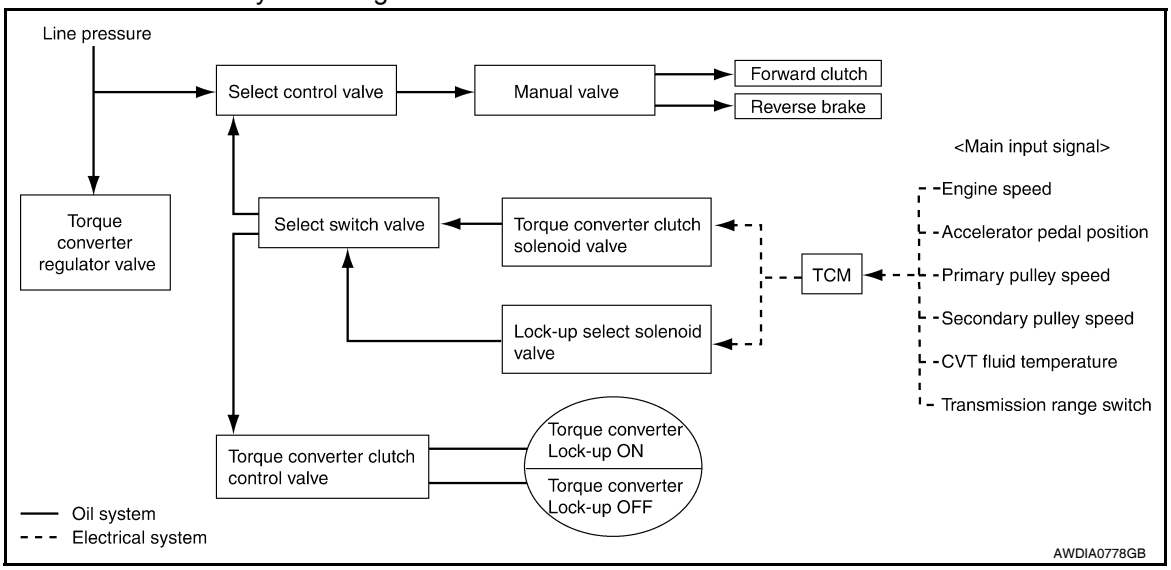
INFOID:0000000007329605

- The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
- The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM. The torque converter clutch control valve engages or releases the torque converter clutch piston.
- When shifting between “N” (“P”) ⇒“D” (“R”), torque converter clutch solenoid controls engagement power of forward clutch and reverse brake.
- The lock-up applied gear range was expanded by locking up the torque converter at a lower vehicle speed than conventional CVT models.



TORQUE CONVERTER CLUTCH AND SELECT CONTROL VALVE CONTROL

Lock-up and Select Control System Diagram



Lock-up Released

In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid and the lock-up apply pressure is drained.
In this way, the torque converter clutch piston is not coupled.

Lock-up Applied

In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid and lock-up apply pressure is generated.
In this way, the torque converter clutch piston is pressed and coupled.

Select Control

When shifting between “N” (“P”) ⇒“D” (“R”), optimize the operating pressure on the basis of the throttle position, the engine speed, and the secondary pulley (output) revolution speed to lessen the shift shock.

Control Valve

INFOID:0000000007329606

FUNCTION OF CONTROL VALVE

Name	Function
Torque converter regulator valve	Optimizes the supply pressure for the torque converter depending on driving conditions.
Pressure regulator valve	Optimizes the discharge pressure from the oil pump depending on driving conditions.
TCC control valve	• Activates or deactivate the lock-up. • Lock-up smoothly by opening lock-up operation excessively.
TCC solenoid valve	Controls the TCC control valve or select control valve.
Shift control valve	Controls flow-in/out of line pressure from the primary pulley depending on the stroke difference between the stepping motor and the primary pulley.
Secondary valve	Controls the line pressure from the secondary pulley depending on operating conditions.
Clutch regulator valve	Adjusts the clutch operating pressure depending on operating conditions.
Secondary pressure solenoid valve	Controls the secondary valve.
Line pressure solenoid valve	Controls the line pressure control valve.
Step motor	Controls the pulley ratio.
Manual valve	Transmits the clutch operating pressure to each circuit in accordance with the selected position.
Select control valve	Engages forward clutch, reverse brake smoothly depending on select operation.
Select switch valve	Switches torque converter clutch solenoid valve control pressure use to torque converter clutch control valve or select control valve.
Lock-up select solenoid valve	Controls the select switch valve.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000007329607

The CVT system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory, and the TCM memory.
The second is the TCM original self-diagnosis performed by the TCM. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to CVT-48, "CONSULT Function (TRANSMISSION)".

OBD-II Function for CVT System

INFOID:0000000007329608

The ECM provides emission-related on board diagnostic (OBD-II) functions for the CVT system. One function is to receive a signal from the TCM used with OBD-related parts of the CVT system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to CVT system parts.

One or Two Trip Detection Logic of OBD-II

INFOID:0000000007329609

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — 1st trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd trip
The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

INFOID:0000000007329610

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT or GST) CONSULT or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT can identify them as shown below, therefore, CONSULT (if available) is recommended.

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be “0”.

If a 1st trip DTC is stored in the ECM, the time data will be “1t”.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen, not on the GST. For details, refer to EC-119, "CONSULT Function (ENGINE)".
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data, and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes CVT related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT, GST or ECM DIAGNOSTIC TEST MODE as described following.

- **If the battery cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-49, "Emission-related Diagnostic Information".

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT)

- **If a DTC is displayed for both ECM and TCM, it is necessary to be erased for both ECM and TCM.**

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT ON and touch “TRANSMISSION”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the TCM will be erased.) Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)

HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Select Mode 4 with GST (Generic Scan Tool). For details, refer to EC-126, "Generic Scan Tool (GST) Function".

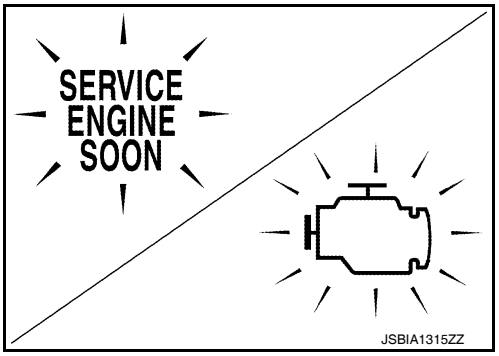
Malfunction Indicator Lamp (MIL)

INFOID:0000000007329611

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   • If the MIL does not light up, refer to DI-20, "Schematic", or see EC-543, "Wiring Diagram".
2. When the engine is started, the MIL should go off.
   If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



TROUBLE DIAGNOSIS

DTC Inspection Priority Chart

INFOID:0000000007329612

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC “U1000” is displayed with other DTCs, first perform the trouble diagnosis for DTC “U1000”. Refer to CVT-56 .

Priority	Detected items (DTC)
1	U1000
2	Except above

Fail-Safe

INFOID:0000000007329613

The TCM has an electrical fail-safe mode. This mode makes it possible to operate even if there is an error in a main electronic control input/output signal circuit.

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the CVT to make driving possible.

Secondary Speed Sensor

The shift pattern is changed in accordance with throttle position when an unexpected signal is sent from the secondary speed sensor to the TCM. The overdrive-off mode is inhibited, and the transaxle is put in “D”.

Primary Speed Sensor

The shift pattern is changed in accordance with throttle position and secondary speed (vehicle speed) when an unexpected signal is sent from the primary speed sensor to the TCM. The overdrive-off mode is inhibited, and the transaxle is put in “D”.

Transmission Range Switch

If an unexpected signal is sent from the transmission range switch to the TCM, the transaxle is put in “D”.

CVT Fluid Temperature Sensor

If an unexpected signal is sent from the CVT fluid temperature sensor to the TCM, the gear ratio in use before receiving the unexpected signal is maintained or the gear ratio is controlled to keep engine speed under 3500 rpm.

Secondary Pressure Sensor

- If an unexpected signal is sent from the secondary pressure sensor to the TCM, the secondary pressure feedback control is stopped and the offset value obtained before the non-standard condition occurs is used to control line pressure.
- If secondary pressure sensor error signal is input to TCM, secondary pressure feedback control stops, but line pressure is controlled normally.

Line Pressure Solenoid

If an unexpected signal is sent from the solenoid to the TCM, the line pressure solenoid is turned OFF to achieve the maximum fluid pressure.

Secondary Pressure Solenoid

If an unexpected signal is sent from the solenoid to the TCM, the secondary pressure solenoid is turned OFF to achieve the maximum fluid pressure.

Torque Converter Clutch Solenoid

If an unexpected signal is sent from the solenoid to the TCM, the torque converter clutch solenoid is turned OFF to cancel the lock-up.

Step Motor

If an unexpected signal is sent from the step motor to the TCM, the step motor coil phases “A” through “D” are all turned OFF to hold the gear ratio used right before the non-standard condition occurred.

CVT Lock-up Select Solenoid

If an unexpected signal is sent from the solenoid to the TCM, the CVT lock-up select solenoid is turned OFF to cancel the lock-up.

TCM Power Supply (Memory Back-up)

Transaxle assembly is protected by limiting the engine torque when the memory back-up power supply (for controlling) from the battery is not supplied to TCM. Normal statues is restored when turning the ignition switch OFF to ON after the normal power supply.

How to Perform Trouble Diagnosis for Quick and Accurate Repair

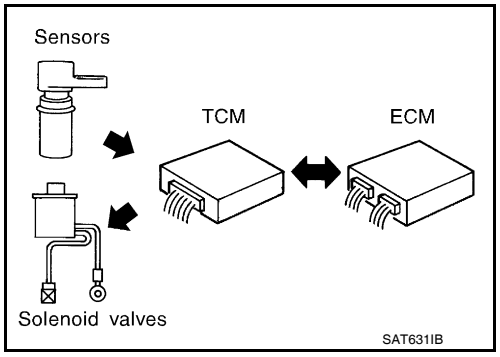
INFOID:0000000007329614

INTRODUCTION

The TCM receives a signal from the vehicle speed sensor, transmission range switch and provides shift control or lock-up control via CVT solenoid valves.

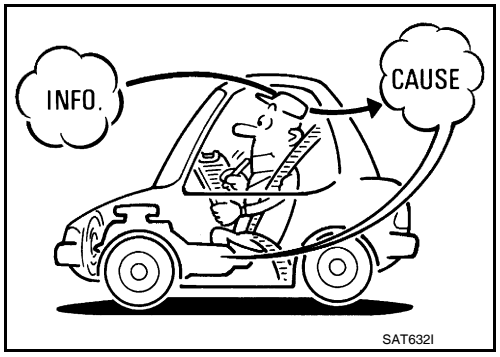
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the CVT system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

Input and output signals must always be correct and stable in the operation of the CVT system. The CVT system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose an error that occurs intermittently rather than continuously. Most intermittent errors are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

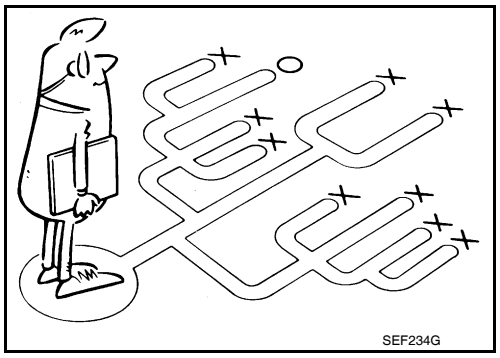
A visual check only may not find the cause of the errors. A road test with CONSULT (or GST) or a circuit tester connected should be performed. Follow the "WORK FLOW" .



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “DIAGNOSTIC WORKSHEET” as shown on the example (Refer to "Diagnostic Worksheet Chart") should be used.

Start your diagnosis by looking for “conventional” errors first. This will help troubleshoot driveability errors on an electronically controlled engine vehicle.

Also check related Service bulletins.



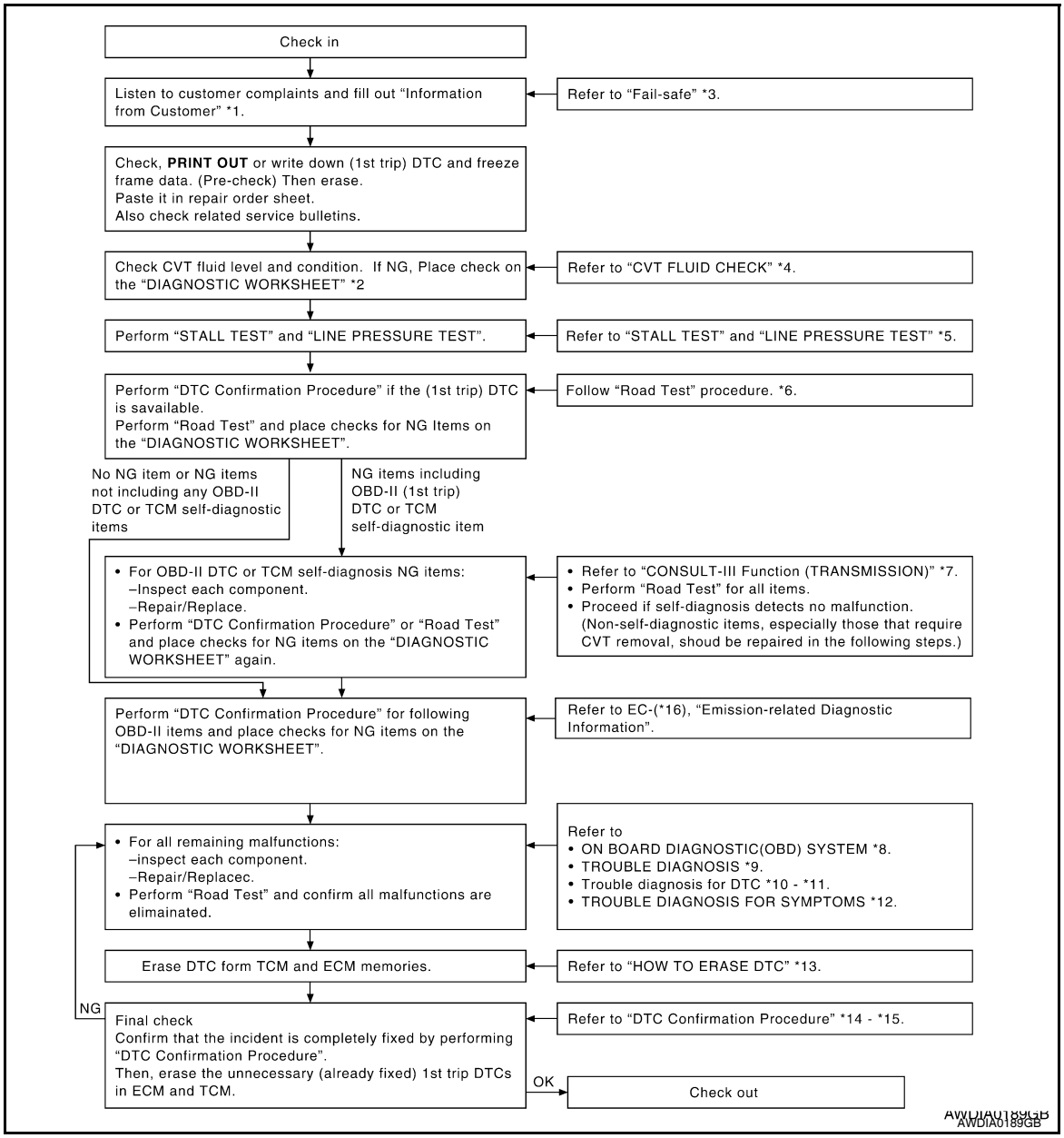
WORK FLOW

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, "Information From Customer" and "Diagnostic Worksheet Chart" , to perform the best troubleshooting possible.

Work Flow Chart



*1. "Information From Customer" *2. "DIAGNOSTIC WORKSHEET" *3. CVT-30
*4. CVT-37 *5. CVT-37, CVT-37 *6. CVT-41
*7. CVT-48 *8. CVT-27 *9. CVT-30
*10. CVT-56 *11. CVT-133 *12. CVT-141
*13. CVT-27 *14. CVT-56 *15. CVT-133
*16. EC-49

DIAGNOSTIC WORKSHEET

Information From Customer

KEY POINTS
- **WHAT**..... Vehicle & CVT model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. Model	Engine	Mileage
malfunction Date	Manuf. Date	In Service Date
Frequency	☐ Continuous ☐ Intermittent (times a day)	
Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No shift	
	☐ Lock-up malfunction	
	☐ Shift shock or slip (☐ N → D ☐ N → R ☐ Lock-up ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No pattern select	
	☐ Others ( )	
Malfunction indicator lamp (MIL)	☐ Continuously lit	☐ Not lit

Diagnostic Worksheet Chart

1	☐ Read the item on cautions concerning fail-safe and understand the customer's complaint.			CVT-30
2	☐ CVT fluid inspection			CVT-37
		☐ Leak (Repair leak location.) ☐ State ☐ Amount		
3	☐ Stall test and line pressure test			CVT-37, CVT-37
		☐ Stall test		
			☐ Torque converter one-way clutch ☐ Reverse brake ☐ Forward clutch ☐ Steel belt	☐ Engine ☐ Line pressure low ☐ Primary pulley ☐ Secondary pulley
		☐ Line pressure inspection - Suspected part:		

4	☐ Perform road test.			CVT-41
	4-1.	Check before engine is started		CVT-42
		☐CVT-143, "O/D OFF Indicator Lamp Does Not Come On" ☐ Perform self-diagnosis. Enter checks for detected items. CVT-48		
			☐CVT-56 ☐CVT-60 ☐CVT-62 ☐CVT-67 ☐CVT-72 ☐CVT-76 ☐CVT-81 ☐CVT-83 ☐CVT-84 ☐CVT-89 ☐CVT-91 ☐CVT-96 ☐CVT-98 ☐CVT-100 ☐CVT-105 ☐CVT-109 ☐CVT-111 ☐CVT-113 ☐CVT-117 ☐CVT-119 ☐CVT-121 ☐CVT-123 ☐CVT-124 ☐CVT-129 ☐CVT-133	
	4-2.	Check at idle		CVT-42
		☐CVT-145, "Engine Cannot Be Started in "P" and "N" Position" ☐CVT-145, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" ☐CVT-146, "In "N" Position, Vehicle Moves" ☐CVT-146, "Large Shock "N" → "R" Position" ☐CVT-147, "Vehicle Does Not Creep Backward in "R" Position" ☐CVT-148, "Vehicle Does Not Creep Forward in "D" or "L" Position"		

4	4-3.	Cruise test		CVT-43
		☐CVT-149, "Vehicle Speed Does Not Change in "L" Position" ☐CVT-150, "Vehicle Speed Does Not Change in overdrive-off mode" ☐CVT-151, "Vehicle Speed Does Not Change in "D" Position" ☐CVT-151, "Vehicle Does Not Decelerate by Engine Brake" ☐ perform self-diagnosis. Enter checks for detected items. CVT-48		
			☐CVT-56 ☐CVT-60 ☐CVT-62 ☐CVT-67 ☐CVT-72 ☐CVT-76 ☐CVT-81 ☐CVT-83 ☐CVT-84 ☐CVT-89 ☐CVT-91 ☐CVT-96 ☐CVT-98 ☐CVT-100 ☐CVT-105 ☐CVT-109 ☐CVT-111 ☐CVT-113 ☐CVT-117 ☐CVT-119 ☐CVT-121 ☐CVT-123 ☐CVT-124 ☐CVT-129 ☐CVT-133	
5	☐ Inspect each system for items found to be NG in the self-diagnosis and repair or replace the malfunctioning parts.			
6	☐ Perform all road tests and enter the checks again for the required items.			CVT-41
7	☐ For any remaining NG items, perform the “diagnosis procedure” and repair or replace the malfunctioning parts.			
8	☐ Erase the results of the self-diagnosis from the TCM.			CVT-27, CVT-27

CVT Electrical Parts Location

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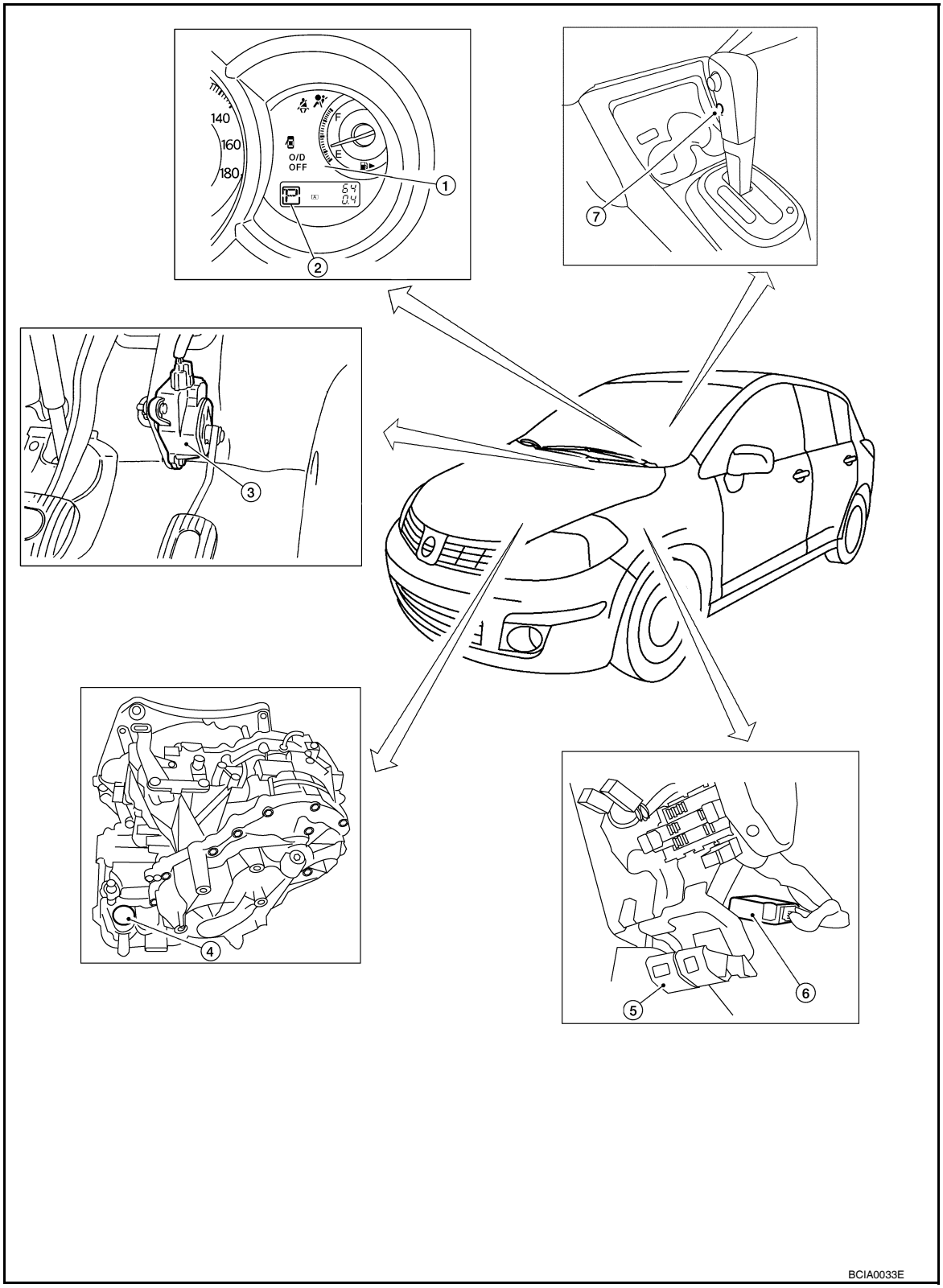

1. O/D OFF indicator lamp
2. Shift position indicator
3. Accelerator pedal position sensor
4. CVT unit harness connector
5. Fuel door release
6. TCM
7. Overdrive control switch

Circuit Diagram

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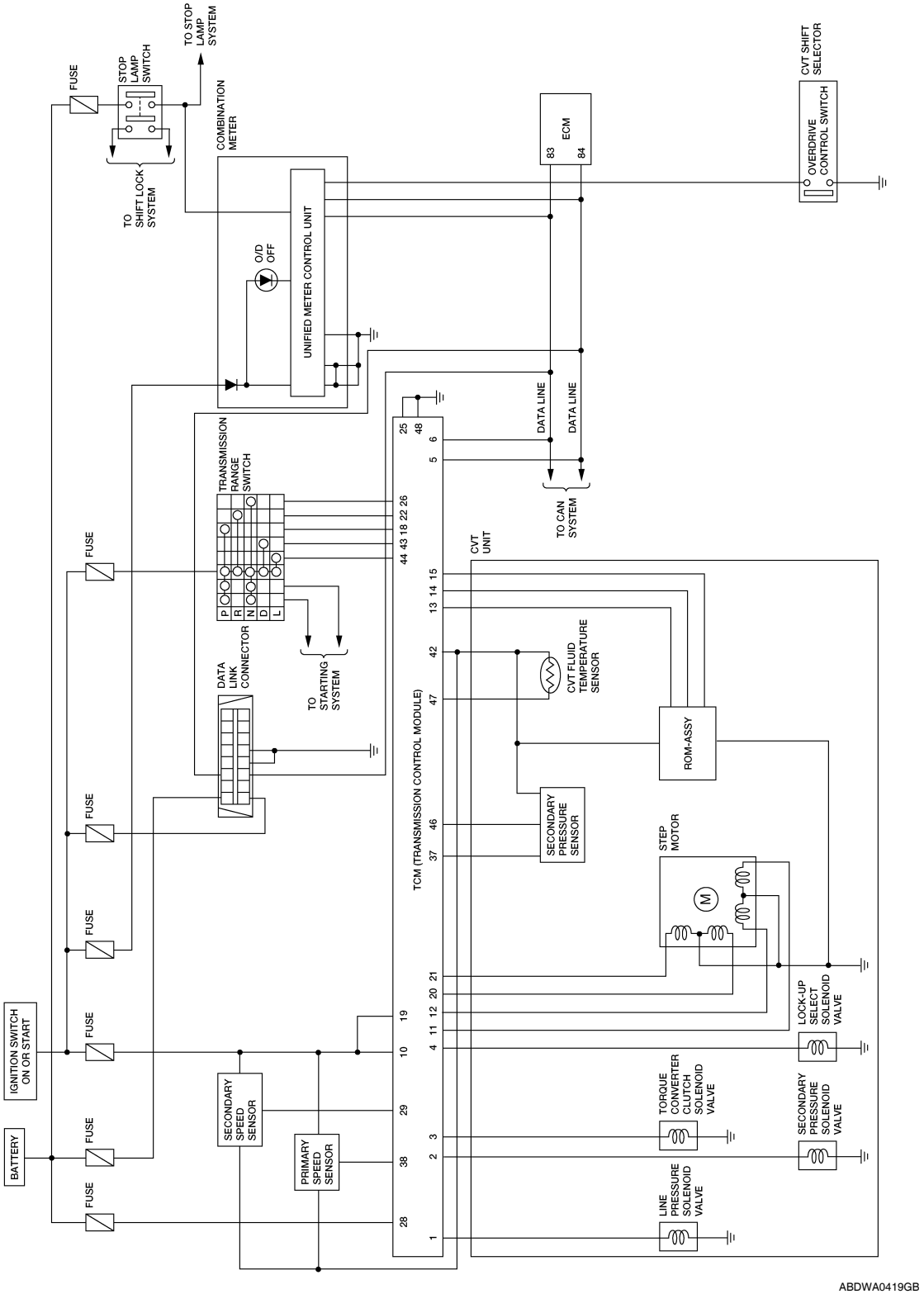

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Inspections before Trouble Diagnosis

INFOID:0000000007329617

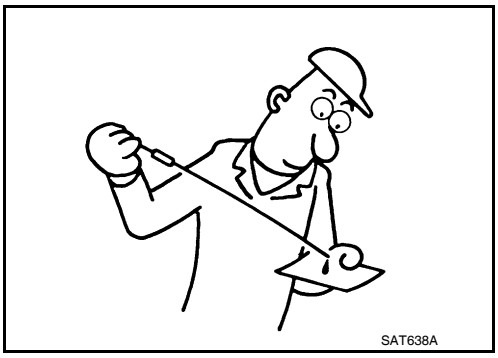
CVT FLUID CHECK

Fluid Leakage and Fluid Level Check

• Inspect for fluid leakage and check the fluid level. Refer to CVT-14, "Checking CVT Fluid" .

Fluid Condition Check
Inspect the fluid condition.

Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.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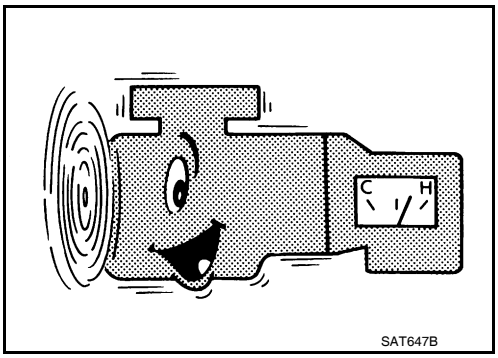
STALL TEST

Stall Test Procedure

1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the CVT fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of CVT fluid. Replenish if necessary.



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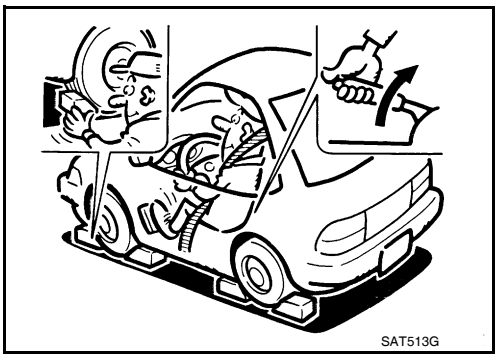
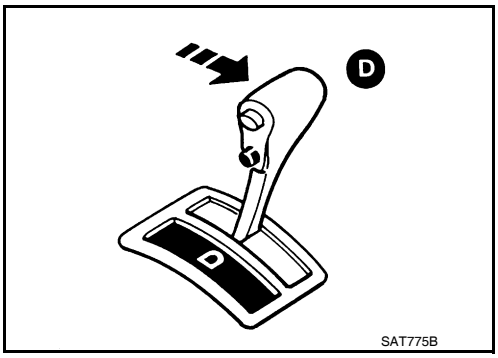
3. Securely engage the parking brake so that the tires do not turn.
4. Install a tachometer where it can be seen by driver during test.
   • **It is good practice to mark the point of specified engine rpm on indicator.**


SAT513G

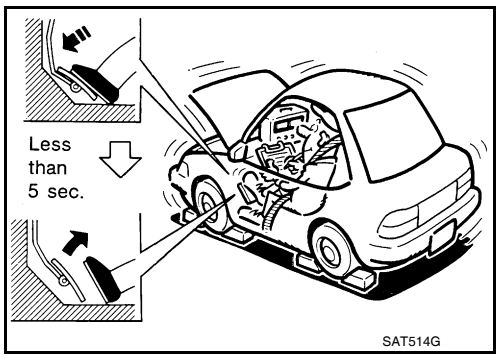
5. Start engine, apply foot brake, and place selector lever in “D” position.



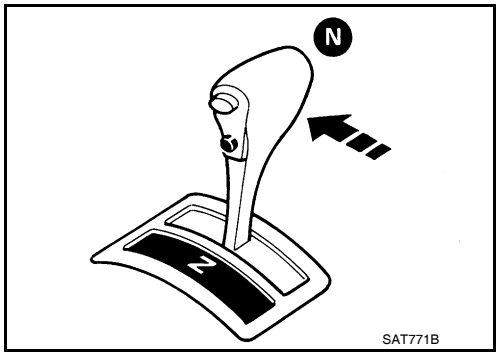
SAT775B

6. While holding down the foot brake, gradually press down the accelerator pedal.
7. Quickly read off the stall speed, and then quickly remove your foot from the accelerator pedal.
   CAUTION:
   Do not hold down the accelerator pedal for more than 5 seconds during this test.

   Stall speed: CVT-187, "Stall Speed"



8. Move the selector lever to the “N” position.
9. Cool down the CVT fluid.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. Repeat steps 6 through 9 with selector lever in “R” position.



Judgement Stall Test

	Selector lever position		Expected problem location
	“D”	“R”	
Stall rotation	H	O	• Forward clutch
	O	H	• Reverse brake
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low • Primary pulley • Secondary pulley • Steel belt

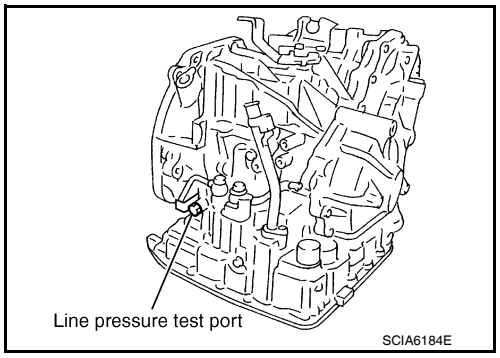
O: Stall speed within standard value position.

H: Stall speed is higher than standard value.

L: Stall speed is lower than standard value.

LINE PRESSURE TEST

Line Pressure Test Port



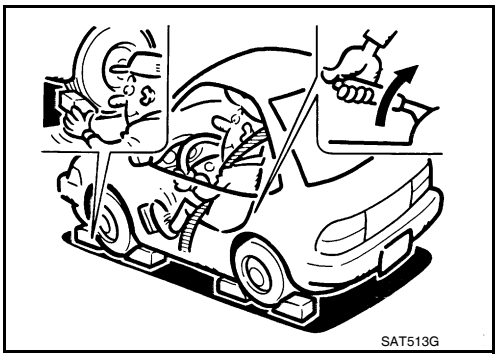
Line Pressure Test Procedure

1. Inspect the amount of engine oil and replenish if necessary.
2. Drive the car for about 10 minutes to warm it up so that the CVT fluid reaches in the range of 50 to 80°C (122 to 176°F), then inspect the amount of CVT fluid and replenish if necessary.
   NOTE:

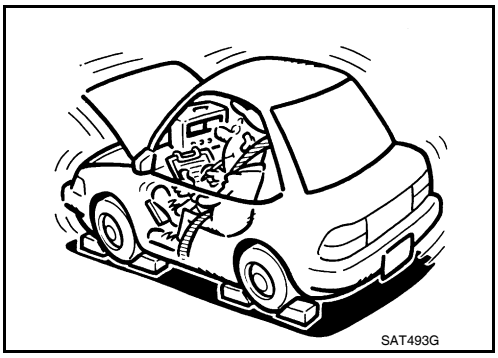
The CVT fluid temperature rises in the range of 50 - 80°C (122 - 176°F) during 10 minutes of driving.

3. After warming up CVT, remove the oil pressure detection plug and install the oil pressure gauge [special service tool: - (OTC3492)].
   CAUTION:
   When using the oil pressure gauge, be sure to use the O-ring attached to the oil pressure detection plug.

4. Securely engage the parking brake so that the tires do not turn.


SAT513G

5. Start the engine, and then measure the line pressure at both idle and the stall speed.
   CAUTION:
   - **Keep the brake pedal pressed all the way down during measurement.**
   - **When measuring the line pressure at the stall speed, refer to "STALL TEST" .**
6. After the measurements are complete, install the oil pressure detection plug and tighten to the specified torque below.


SAT493G

: 7.5 N·m (0.77 kg-m, 66 in-lb)

CAUTION:
- **Do not reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Line Pressure

Engine speed	Line pressure kPa (kg/cm^2 , psi)
	"R", "D" and "L" positions
At idle	CVT-187, "Line Pressure"
At stall	

Judgement of Line Pressure Test

Judgement		Possible cause
Idle speed	Low for all positions (“P”, “R”, “N”, “D”, “L”)	Possible causes include malfunctions in the pressure supply system and low oil pump output. For example • Oil pump wear • Pressure regulator valve or plug sticking or spring fatigue • Oil strainer ⇒ oil pump ⇒ pressure regulator valve passage oil leak • Engine idle speed too low
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.
	High	Possible causes include a sensor malfunction or malfunction in the line pressure adjustment function. For example • Accelerator pedal position signal malfunction • CVT fluid temperature sensor malfunction • Line pressure solenoid) malfunction (sticking in OFF state, filter clog, cut line) • Pressure regulator valve or plug sticking
Stall speed	Line pressure does not rise higher than the line pressure for idle.	Possible causes include a sensor malfunction or malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • TCM malfunction • Line pressure solenoid) malfunction (shorting, sticking in ON state) • Pressure regulator valve or plug sticking
	The pressure rises, but does not enter the standard position.	Possible causes include malfunctions in the pressure supply system and malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • Line pressure solenoid) malfunction (sticking, filter clog) • Pressure regulator valve or plug sticking
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.

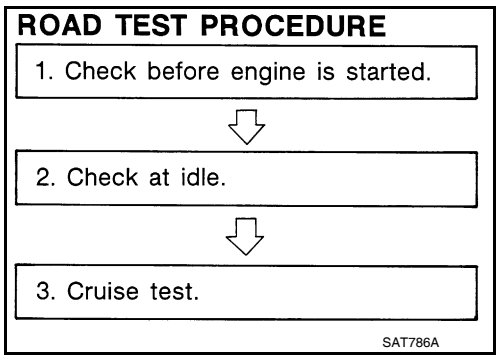
Road Test

INFOID:0000000007329618

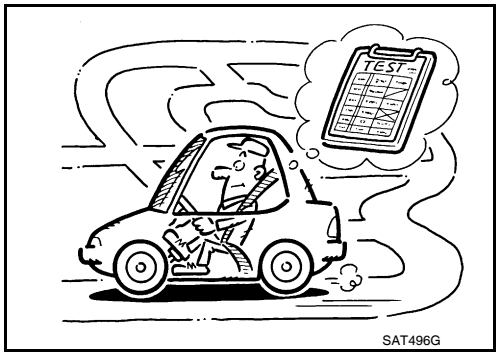
DESCRIPTION

- The purpose of the test is to determine overall performance of CVT and analyze causes of problems.
- The road test consists of the following three parts:

1. “Check Before Engine Is Started”CVT-42 .
2. “Check at Idle”CVT-42 .
3. “Cruise Test”CVT-43 .



- Before road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test.



CONSULT START PROCEDURE

- Using CONSULT, perform a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

1. Touch “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Touch “MAIN SIGNALS” to set recording condition.
3. See “Numerical Display”, “Barchart Display” or “Line Graph Display”.
4. Touch “START”.
5. When performing cruise test. Refer to CVT-43, "Cruise Test" .
6. After finishing cruise test part, touch “RECORD”.
7. Touch “STORE”.
8. Touch “BACK”.
9. Touch “DISPLAY”.
10. Touch “PRINT”.
11. Check the monitor data printed out.

Check before Engine Is Started

INFOID:0000000007329619

1.CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Does O/D OFF indicator lamp come on for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items.
Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
3. Go to CVT-42, "Check at Idle" .

NO >> Stop “Road Test”. Go to CVT-143, "O/D OFF Indicator Lamp Does Not Come On" .

Check at Idle

INFOID:0000000007329620

1.CHECK STARTING THE ENGINE

1. Park vehicle on flat surface.
2. Move selector lever to “P” or “N” position.
3. Turn ignition switch OFF.
4. Turn ignition switch START.

Is engine started?

YES >> GO TO 2.

NO >> Stop “Road Test”. Mark the box on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Go to CVT-145, "Engine Cannot Be Started in "P" and "N" Position" .

2.CHECK STARTING THE ENGINE

1. Turn ignition switch ON.
2. Move selector lever to “D”, “L” or “R” position.
3. Turn ignition switch START.

Is engine started?

YES >> Stop “Road Test”. Mark the box on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Go to CVT-145, "Engine Cannot Be Started in "P" and "N" Position" .

NO >> GO TO 3.

3.CHECK “P” POSITION FUNCTION

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.
4. Push vehicle forward or backward.
5. Apply parking brake.

Does vehicle move when it is pushed forward or backward?

YES >> Mark the box CVT-145, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.
NO >> GO TO 4.

4.CHECK “N” POSITION FUNCTION

1. Start engine.
2. Move selector lever to “N” position.
3. Release parking brake.

Does vehicle move forward or backward?

YES >> Mark the box CVT-146, "In "N" Position, Vehicle Moves" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.
NO >> GO TO 5.

5.CHECK SHIFT SHOCK

1. Apply foot brake.
2. Move selector lever to “R” position.

Is there large shock when changing from “N” to “R” position?

YES >> Mark the box CVT-146, "Large Shock "N" → "R" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.
NO >> GO TO 6.

6.CHECK “R” POSITION FUNCTION

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.
NO >> Mark the box CVT-147, "Vehicle Does Not Creep Backward in "R" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

7.CHECK “D”, “L” POSITIONS FUNCTION

Move selector lever to “D” and “L” positions and check if vehicle creeps forward.

Does vehicle creep forward in all positions?

YES >> Go to CVT-43, "Cruise Test" .
NO >> Stop “Road Test”. Mark the box on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Go to CVT-148, "Vehicle Does Not Creep Forward in "D" or "L" Position" .

Cruise Test

INFOID:0000000007329621

1.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 1

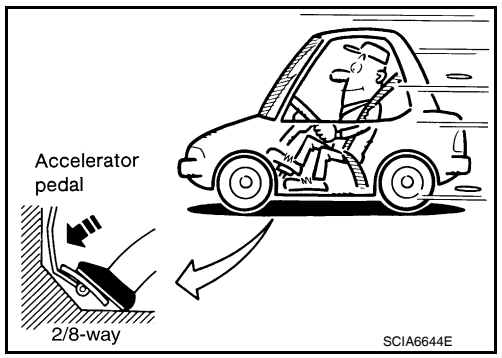
1. Drive vehicle for approximately 10 minutes to warm engine oil and CVT fluid up to operating temperature.

CVT fluid operating temperature: 50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.
3. Move selector lever to “P” position.
4. Start engine.
5. Move selector lever to “L” position.

6. Accelerate vehicle to 2/8-way throttle depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



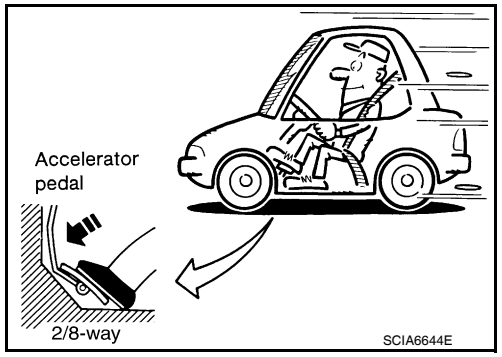
OK or NG

OK >> GO TO 2.
NG >> Mark the box of CVT-149, "Vehicle Speed Does Not Change in "L" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

2.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 2

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Push overdrive control switch. (O/D OFF indicator lamp is on.)
4. Accelerate vehicle to 2/8-way throttle depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



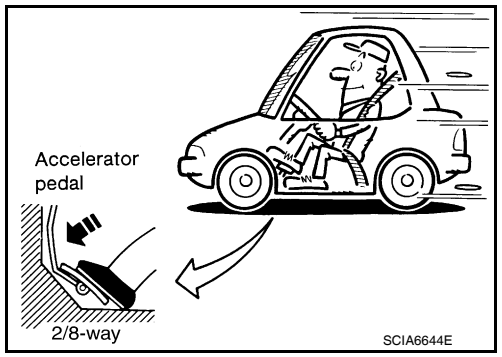
OK or NG

OK >> GO TO 3.
NG >> Mark the box of CVT-150, "Vehicle Speed Does Not Change in overdrive-off mode" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

3.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 3

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Push overdrive control switch. (O/D OFF indicator lamp is off.)
4. Accelerate vehicle to 2/8-way throttle depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



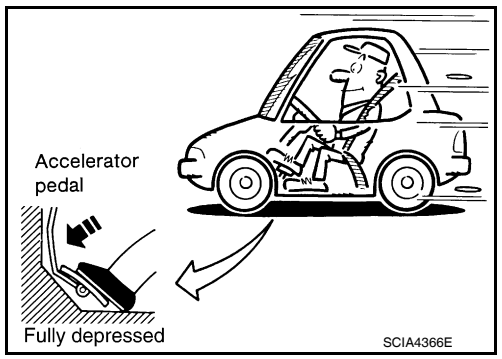
OK or NG

OK >> GO TO 4.
NG >> Mark the box of CVT-151, "Vehicle Speed Does Not Change in "D" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

4.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 4

1. Park vehicle on flat surface.
2. Move selector lever to “L” position.
3. Accelerate vehicle to full depression depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



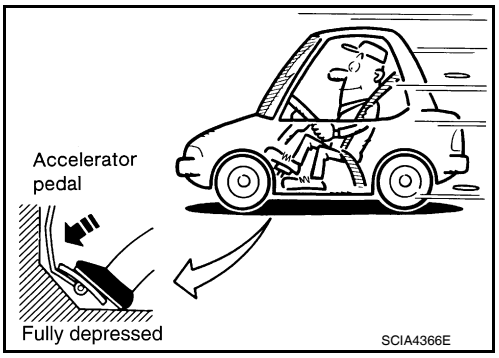
OK or NG

OK >> GO TO 5.
NG >> Mark the box of CVT-149, "Vehicle Speed Does Not Change in "L" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

5.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 5

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Push overdrive control switch. (O/D OFF indicator lamp is on.)
4. Accelerate vehicle to full depressing depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



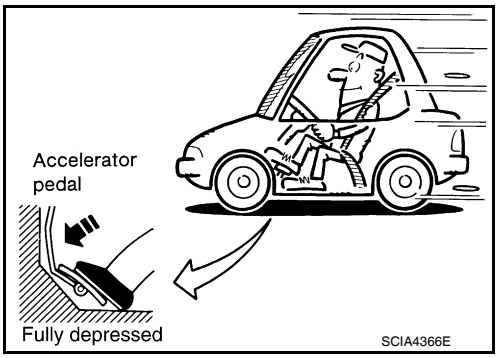
OK or NG

OK >> GO TO 6.
NG >> Mark the box of CVT-150, "Vehicle Speed Does Not Change in overdrive-off mode" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

6. CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 6

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Push overdrive control switch. (O/D OFF indicator lamp is off.)
4. Accelerate vehicle to full depression depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to CVT-45, "Vehicle Speed When Shifting Gears" .



OK or NG

OK >> GO TO 7.
NG >> Mark the box of CVT-151, "Vehicle Speed Does Not Change in "D" Position" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

7. CHECK ENGINE BRAKE FUNCTION — PART 1

1. Release accelerator pedal.
2. Check engine brake. (O/D OFF indicator lamp is off.)

Does engine braking effectively reduce speed in “D” position?

YES >> GO TO 8.
NO >> Mark the box of CVT-151, "Vehicle Does Not Decelerate by Engine Brake" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

8. CHECK ENGINE BRAKE FUNCTION — PART 2

1. Push overdrive control switch. (O/D OFF indicator lamp is on.)
2. Check engine brake.

Does engine braking effectively reduce speed in “D” position?

YES >> GO TO 9.
NO >> Mark the box of CVT-151, "Vehicle Does Not Decelerate by Engine Brake" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Continue “Road Test”.

9. CHECK ENGINE BRAKE FUNCTION — PART 3

1. Move selector lever to “L” position.
2. Check engine brake.

Does engine braking effectively reduce speed in “L” position?

YES >> 1. Stop the vehicle.
2. Perform self-diagnosis. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> Mark the box of CVT-151, "Vehicle Does Not Decelerate by Engine Brake" on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Then continue trouble diagnosis.

Vehicle Speed When Shifting Gears

INFOID:0000000007329622

Numerical value data are reference values.

Engine type	Throttle position	Shift pattern	Engine speed (rpm)	
			At 40 km/h (25 MPH)	At 60 km/h (37 MPH)
MR18DE	8/8	"D" position Overdrive-off mode "L" position	3,600 - 4,500	4,400 - 5,300
	2/8	"D" position	1,300 - 3,100	1,400 - 3,500
		Overdrive-off mode	2,200 - 3,000	2,800 - 3,600
		"L" position	3,100 - 4,000	3,800 - 4,700

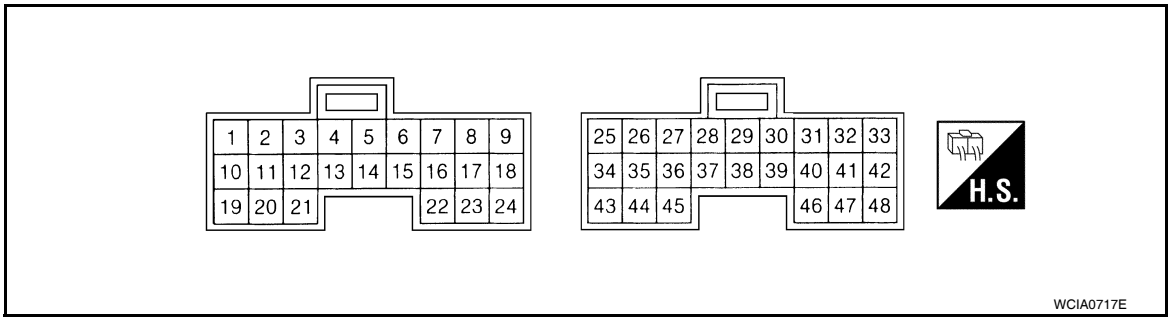
CAUTION:

Lock-up clutch is engaged when vehicle speed is approximately 18 km/h (11 MPH) to 90 km/h (56 MPH).

TCM Terminal and Reference Value

INFOID:0000000007329623

TCM HARNESS CONNECTOR TERMINAL LAYOUT



TERMINALS AND REFERENCE VALUES FOR TCM

Data are reference values and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
1	GR	Line pressure solenoid valve	and	Release your foot from the accelerator pedal.	5.0 - 7.0 V
				Press the accelerator pedal all the way down.	1.0 - 3.0 V
2	LG	Secondary pressure solenoid valve		Release your foot from the accelerator pedal.	5.0 - 7.0 V
				Press the accelerator pedal all the way down.	3.0 - 4.0 V
3	SB	Torque converter clutch solenoid valve		When vehicle cruises in "D" position. — When CVT performs lock-up.	6.0 V
				When vehicle cruises in "D" position. — When CVT does not perform lock-up.	1.0 V
4	BR	Lock-up select solenoid valve		Selector lever in "P" and "N" positions	Battery voltage
				Wait at least for 5 seconds with the selector lever in "R", "D" and "L" positions	0 V
5	L	CAN-H	—		—
6	P	CAN-L	—		—
10	R	Power supply		—	Battery voltage
				—	0 V
11	L	Step motor A	Within 2 seconds after ignition switch ON, the time measurement by using the pulse width measurement function (Hi level) of CONSULT.*1 *1: A circuit tester cannot be used to test this item.		30.0 msec
12	Y	Step motor B			10.0 msec
13	G	ROM assembly	—		—

Terminal	Wire color	Item	Condition		Data (Approx.)
14	Y	ROM assembly	—		—
15	G	ROM assembly	—		—
18	GR	P RANGE SW		Selector lever in “P” position.	Battery voltage
				Other than above position.	0 V
19	R	Power supply		—	Battery voltage
				—	0 V
20	W	Step motor C	Within 2 seconds after ignition switch ON, the time measurement by using the pulse width measurement function (Hi level) of CONSULT.*1 *1: A circuit tester cannot be used to test this item.		30.0 msec
21	P	Step motor D			10.0 msec
22	BR	R RANGE SW		Selector lever in “R” position.	Battery voltage
				Other than above position.	0 V
25	B	Ground	Always		0 V
26	W	N RANGE SW		Selector lever in “N” position.	Battery voltage
				Other than above position.	0 V
28	Y	Power supply (memory back-up)	Always		Battery voltage
29	R	Secondary speed sensor		When driving [“D” position, 20 km/h (12 MPH)].	570 Hz
30	Y	Power supply (memory back-up)	Always		Battery voltage
31	LG	K-LINE	—		—
37	L	Secondary pressure sensor	and	“N” position idle	1.0 V
38	V	Primary speed sensor		When driving [“L” position, 20 km/h (12 MPH)].	1250 Hz
41*	—	—	—	—	—
42	LG	Sensor ground	Always		0 V
43	SB	D RANGE SW		Selector lever in “D” position.	Battery voltage
				Other than above position.	0 V
44	W	L RANGE SW		Selector lever in “” position.	Battery voltage
				Other than above position.	0 V

Terminal	Wire color	Item	Condition		Data (Approx.)
46	O	Sensor power		—	5.0 V
				—	0 V
47	G	CVT fluid temperature sensor		When CVT fluid temperature is 20°C (68°F)	2.0 V
				When CVT fluid temperature is 80°C (176°F)	1.0 V
48	B	Ground	Always		0 V

*: This harness is not used.

CONSULT Function (TRANSMISSION)

INFOID:0000000007329624

CONSULT can display each diagnostic item using the diagnostic test modes shown below.

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the TCM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
CALIB data	Characteristic information for TCM and CVT assembly can be read.
Function test	Performed by CONSULT instead of a technician to determine whether each system is “OK” or “NG”.
ECU part number	TCM part number can be read.

CONSULT REFERENCE VALUE

Item name	Condition	Display value (Approx.)
VSP SENSOR	During driving	Approximately matches the speedometer reading.
ESTM VSP SIG*		
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
SEC HYDR SEN	“N” position idle	1.0 V
ATF TEMP SEN	When CVT fluid temperature is 20°C (68°F).	2.0 V
	When CVT fluid temperature is 80°C (176°F).	1.0 V
VIGN SEN	Ignition switch: ON	Battery voltage
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
PRI SPEED	During driving (lock-up ON)	Approximately matches the engine speed.
SEC SPEED	During driving	50 X Approximately matches the speedometer reading.
ENG SPEED	Engine running	Closely matches the tachometer reading.
GEAR RATIO	During driving	2.56 - 0.43
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8
SEC PRESS	“N” position idle	0.8 MPa

Item name	Condition	Display value (Approx.)
STM STEP	During driving	(−20) - (+180) step
ISOLT1	Lock-up OFF	0.0 A
	Lock-up ON	0.7 A
ISOLT2	Release your foot from the accelerator pedal.	0.8 A
	Press the accelerator pedal all the way down.	0.0 A
ISOLT3	Secondary pressure low - Secondary pressure high.	0.8 - 0.0 A
SOLMON1	Lock-up OFF	0.0 A
	Lock-up ON	0.7 A
SOLMON2	“N” position idle	0.8 A
	When stalled	0.3 - 0.6 A
SOLMON3	“N” position idle	0.6 - 0.7 A
	When stalled	0.4 - 0.6 A
P POSITION SW	Selector lever in “P” position	on
	Other than the above position	off
R POSITION SW	Selector lever in “R” position	on
	Other than the above position	off
N POSITION SW	Selector lever in “N” position	on
	Other than the above position	off
D POSITION SW	Selector lever in “D” position	on
	Other than the above position	off
L POSITION SW	Selector lever in “L” position	on
	Other than the above position	off
BRAKE SW	Depressed brake pedal	on
	Released brake pedal	off
FULL SW	Fully depressed accelerator pedal	on
	Released accelerator pedal	off
IDLE SW	Released accelerator pedal	on
	Fully depressed accelerator pedal	off
SPORT MODE SW	While pushing overdrive cancel switch	on
	Other conditions	off
INDDRNG	Selector lever in “D” position	on
	Selector lever in other positions	off
INDLRNG	Selector lever in “L” position	on
	Selector lever in other positions	off
INDNRNG	Selector lever in “N” position	on
	Selector lever in other positions	off
INDRRNG	Selector lever in “R” position	on
	Selector lever in other positions	off
INDPRNG	Selector lever in “P” position	on
	Selector lever in other positions	off
SMCOIL D	During driving	Changes on ⇔ off.
SMCOIL C		
SMCOIL B		
SMCOIL A		

Item name	Condition	Display value (Approx.)
LUSEL SOL OUT	Selector lever in “P” and “N” positions	on
	Wait at least for 5 seconds with the selector lever in “R”, “D” and “L” positions	off
RANGE	Selector lever in “N” or “P” position.	N·P
	Selector lever in “R” position.	R
	Selector lever in “D” position.	D
	Selector lever in “L” position.	L

*: Models without ABS does not indicate.

WORK SUPPORT MODE

Display Item List

Item name	Description
ENGINE BRAKE ADJ.	The engine brake level setting can be canceled.
CONFORM CVTF DETERIORTN	The CVT fluid deterioration level can be checked.

Engine Brake Adjustment

“ENGINE BRAKE LEVEL”

0: Initial set value (Engine brake level control is activated)

OFF: Engine brake level control is deactivated.

CAUTION:

Mode of “+1”“0”“-1”“-2”“OFF” can be selected by pressing the “UP”“DOWN” on CONSULT screen. However, do not select mode other than “0” and “OFF”. If the “+1” or “-1” or “-2” is selected, that might cause the irregular driveability.

Check CVT Fluid Deterioration Date

“CVTF DETERIORATION DATE”

More than 210000:

It is necessary to change CVT fluid.

Less than 210000:

It is not necessary to change CVT fluid.

CAUTION:

Touch “CLEAR” after changing CVT fluid, and then erase “CVTF DETERIORATION DATE”.

SELF-DIAGNOSTIC RESULT MODE

After performing self-diagnosis, place check marks for results on the CVT-31, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" . Reference pages are provided following the items.

Display Items List

X: Applicable —: Not applicable

Items (CONSULT screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-III (DTC)	Reference page
		“TRANSMISSION” with CONSULT	MIL indicator lamp*1, “ENGINE” with CONSULT or GST	
CAN COMM CIRCUIT	When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more	U1000	U1000	CVT-56
CONTROL UNIT(CAN)	When detecting error during the initial diagnosis of CAN controller of TCM	U1010	U1010	CVT-59

Items (CONSULT screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-III (DTC)	Reference page
		"TRANSMISSION" with CONSULT	MIL indicator lamp*1, "ENGINE" with CONSULT or GST	
BRAKE SWITCH B	When the brake switch does not switch to ON or OFF	P0703	—	CVT-60
T/M RANGE SENSOR A	When TCM does not receive the the correct voltage signal (based on the gear position) from the switch	P0705	P0705	CVT-62
FLUID TEMP SENSOR A	During running, the CVT fluid temperature sensor signal voltage is excessively high or low	P0710	P0710	CVT-67
INPUT SPEED SENSOR A	• Primary speed sensor signal is not input due to an open circuit • An unexpected signal is input when vehicle is being driven	P0715	P0715	CVT-72
OUTPUT SPEED SENSOR	• Signal from secondary speed sensor not input due to open or short circuit • Unexpected signal input during running	P0720	P0720	CVT-76
ENGINE SPEED	• TCM does not receive the CAN communication signal from the ECM • Engine speed is too low while driving	P0725	—	CVT-81
INCORRECT GR RATIO	Unexpected gear ratio detected	P0730	—	CVT-83
TORQUE CONVERTER	Normal voltage not applied to solenoid due to open or short circuit	P0740	P0740	CVT-84
TORQUE CONVERTER	• CVT cannot perform lock-up even if electrical circuit is good • TCM detects as irregular by comparing difference value with slip rotation • There is big difference engine speed and primary speed when TCM lock-up signal is on	P0744	P0744	CVT-89
PC SOLENOID A	• Normal voltage not applied to solenoid due to open or short circuit • TCM detects as irregular by comparing target value with monitor value	P0745	P0745	CVT-91
PC SOLENOID A	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure	P0746	P0746	CVT-96
PC SOLENOID B	Secondary pressure is too high or too low compared with the commanded value while driving	P0776	P0776	CVT-98
PC SOLENOID B	• Normal voltage not applied to solenoid due to cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value	P0778	P0778	CVT-100
FLUID PRESS SEN/SW A	Signal voltage of the secondary pressure sensor is too high or too low while driving	P0840	P0840	CVT-105
FLUID PRESS SEN/SW A	Secondary fluid pressure is too high compared with the commanded value while driving	P0841	—	CVT-109
FLUID PRESS LOW	Secondary fluid pressure is too low compared with the commanded value while driving	P0868	—	CVT-111
TCM	• When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops • This is not a malfunction message (Whenever shutting OFF a power supply to the TCM, this message appears on the screen)	P1701	—	CVT-113
TP SENSOR	TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM	P1705	—	CVT-117

Items (CONSULT screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-III (DTC)	Reference page
		"TRANSMISSION" with CONSULT	MIL indicator lamp*1, "ENGINE" with CONSULT or GST	
VEHICLE SPEED*2	• CAN communication with the ABS actuator and the electric unit (control unit) is malfunctioning • There is a great difference between the vehicle speed signal from the ABS actuator and the electric unit (control unit), and the vehicle speed sensor signal	P1722	—	CVT-119
SPEED SENSOR	A rotation sensor error is detected because the gear does not change in accordance with the position of the stepping motor **CAUTION:** **One of the "P0720", the "P0715" or the "P0725" is displayed with the DTC at the same time**	P1723	—	CVT-121
THROTTLE CONTROL SIG	The electronically controlled throttle for ECM is malfunctioning	P1726	—	CVT-123
SLCT SOLENOID	• Normal voltage not applied to solenoid due to cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value	P1740	P1740	CVT-124
LINE PRESS CONTROL	TCM detects the unexpected line pressure	P1745	—	CVT-128
STEP MOTOR	Each coil of the step motor is not energized properly due to an open or a short	P1777	P1777	CVT-129
STEP MOTOR	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio	P1778	P1778	CVT-133
NO DTC IS DETECTED: FURTHER TESTING MAY BE REQUIRED	No NG item has been detected	X	X	—

*1: Refer to CVT-28, "Malfunction Indicator Lamp (MIL)" .

*2: Models without ABS does not indicate.

DATA MONITOR MODE

Display Items List

X: Standard, —: Not applicable, ▼: Option

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VSP SENSOR (km/h or mph)	X	—	▼	
ESTM VSP SIG (km/h or mph)	X	—	▼	Models without ABS does not indicate.
PRI SPEED SEN (rpm)	X	—	▼	
ENG SPEED SIG (rpm)	X	—	▼	
SEC HYDR SEN (V)	X	—	▼	
PRI HYDR SEN (V)	X	—	▼	
ATF TEMP SEN (V)	X	—	▼	CVT fluid temperature sensor
VIGN SEN (V)	X	—	▼	

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VEHICLE SPEED (km/h or mph)	—	X	▼	Vehicle speed recognized by the TCM.
PRI SPEED (rpm)	—	X	▼	Primary pulley speed.
SEC SPEED (rpm)	—	—	▼	Secondary pulley speed.
ENG SPEED (rpm)	—	X	▼	
SLIP REV (rpm)	—	X	▼	Difference between engine speed and primary pulley speed
GEAR RATIO	—	X	▼	
G SPEED (G)	—	—	▼	
ACC PEDAL OPEN (0.0/8)	X	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.
TRQ RTO	—	—	▼	
SEC PRESS (MPa)	—	X	▼	
PRI PRESS (MPa)	—	X	▼	
ATFTEMP COUNT	—	X	▼	Means CVT fluid temperature. Actual oil temperature (°C) cannot be checked unless a numeric value is converted. Refer to CVT-12.
DSR REV (rpm)	—	—	▼	
DGEAR RATIO	—	—	▼	
DSTM STEP (step)	—	—	▼	
STM STEP (step)	—	X	▼	
LU PRS (MPa)	—	—	▼	
LINE PRS (MPa)	—	—	▼	
TGT SEC PRESS (MPa)	—	—	▼	
ISOLT1 (A)	—	X	▼	Torque converter clutch solenoid valve output current
ISOLT2 (A)	—	X	▼	Line pressure solenoid valve output current
ISOLT3 (A)	—	X	▼	Secondary pressure solenoid valve output current
SOLMON1 (A)	X	X	▼	Torque converter clutch solenoid valve monitor current
SOLMON2 (A)	X	X	▼	Line pressure solenoid valve monitor current
SOLMON3 (A)	X	X	▼	Secondary pressure solenoid valve monitor current
P POSITION SW (on/off)	X	—	▼	
R POSITION SW (on/off)	X	—	▼	
N POSITION SW (on/off)	X	—	▼	
D POSITION SW (on/off)	X	—	▼	
L POSITION SW (on/off)	X	—	▼	

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
BRAKE SW (on/off)	X	X	▼	Stop lamp switch (Signal input with CAN comunication)
FULL SW (on/off)	X	X	▼	Signal input with CAN communications
IDLE SW (on/off)	X	X	▼	
SPORT MODE SW (on/off)	X	X	▼	Overdrive control switch (Signal input with CAN comunication)
STRDWNSW (on/off)	X	—	▼	Not mounted but displayed.
STRUPSW (on/off)	X	—	▼	
DOWNLVR (on/off)	X	—	▼	
UPLVR (on/off)	X	—	▼	
NONMMODE (on/off)	X	—	▼	
MMODE (on/off)	X	—	▼	
INDLRNG (on/off)	—	—	▼	“L” position indicator output
INDDRNG (on/off)	—	—	▼	“D” position indicator output
INDNRNG (on/off)	—	—	▼	“N” position indicator output
INDRRNG (on/off)	—	—	▼	“R” position indicator output
INDPRNG (on/off)	—	—	▼	“P” position indicator output
CVT LAMP (on/off)	—	—	▼	
SPORT MODE IND (on/off)	—	—	▼	
MMODE IND (on/off)	—	—	▼	Not mounted but displayed.
SMCOIL D (on/off)	—	—	▼	Step motor coil “D” energizing status
SMCOIL C (on/off)	—	—	▼	Step motor coil “C” energizing status
SMCOIL B (on/off)	—	—	▼	Step motor coil “B” energizing status
SMCOIL A (on/off)	—	—	▼	Step motor coil “A” energizing status
LUSEL SOL OUT (on/off)	—	—	▼	
REV LAMP (on/off)	—	X	▼	
STRTR RLY OUT (on/off)	—	—	▼	Starter relay
LUSEL SOL MON (on/off)	—	—	▼	
STRTR RLY MON (on/off)	—	—	▼	Starter relay
VDC ON (on/off)	X	—	▼	Not mounted but displayed.
TCS ON (on/off)	X	—	▼	
ABS ON (on/off)	X	—	▼	
ACC ON (on/off)	X	—	▼	Not mounted but displayed.
RANGE	—	X	▼	Indicates position is recognized by TCM. Indicates a specific value required for control when fail-safe function is activated.
M GEAR POS	—	X	▼	

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY-HI (high) (%)	—	—	▼	
DUTY-LOW (low) (%)	—	—	▼	
PLS WIDTH-HI (ms)	—	—	▼	
PLS WIDTH-LOW (ms)	—	—	▼	

Diagnosis Procedure without CONSULT

INFOID:0000000007329625

OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-126, "Generic Scan Tool (GST) Function".

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007329626

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007329627

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “U1000” with CONSULT is detected when TCM cannot communicate to other control units.

Possible Cause

INFOID:0000000007329628

Harness or connectors
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329629

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to CVT-58, "Diagnosis Procedure" .

WITH GST

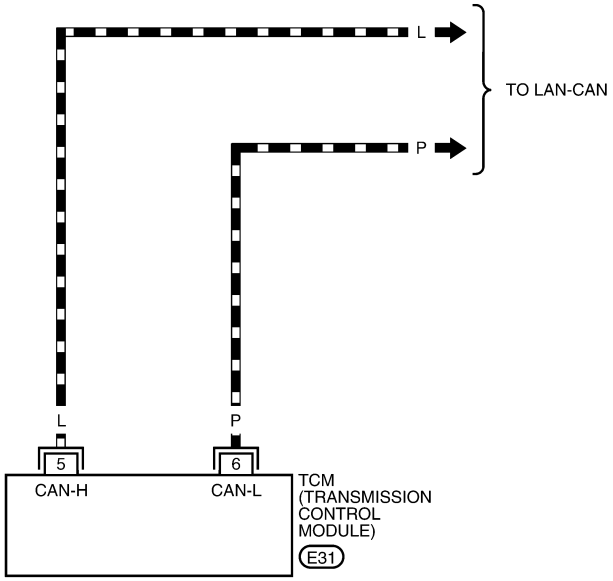
Follow the procedure “WITH CONSULT”.

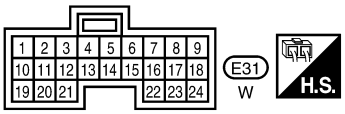
Wiring Diagram - CVT - CAN

INFOID:0000000007329630

CVT-CAN-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE





BCWA0668E

TCM TERMINALS AND REFERENCE VALUES
Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329631

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT

1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.

Is any malfunction of the “U1000” indicated?

YES >> Print out CONSULT screen, go to LAN section. Refer to LAN-23, "CAN System Specification Chart" .

NO >> **INSPECTION END**

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000007329632

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000007329633

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “U1010” with CONSULT is detected when TCM cannot communicate to other control units.

Possible Cause

INFOID:0000000007329634

Harness or connectors
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329635

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to CVT-59, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329636

1.CHECK DTC

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.
3. Touch “ERASE”.
4. Turn ignition switch OFF and wait for at least 10 seconds.
5. Perform “DTC confirmation procedure”. Refer to CVT-59, "DTC Confirmation Procedure".

Is any malfunction of the “U1010” indicated?

YES >> Replace the TCM. Refer to CVT-159, "Removal and Installation".
NO >> **INSPECTION END**

P0703 BRAKE SWITCH B

Description

INFOID:0000000007329637

ON, OFF status of the stop lamp switch is sent via the CAN communication from the combination meter to TCM using the signal.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329638

Item name	Condition	Display value
BRAKE SW	Depressed brake pedal	on
	Released brake pedal	off

On Board Diagnosis Logic

INFOID:0000000007329639

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0703” with CONSULT is detected when the stop lamp switch does not switch to ON and OFF.

- The stop lamp switch does not switch to ON, OFF.

Possible Cause

INFOID:0000000007329640

- Harness or connectors
  (Stop lamp switch, and combination meter circuit are open or shorted.)
  (CAN communication line is open or shorted.)
- Stop lamp switch

DTC Confirmation Procedure

INFOID:0000000007329641

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine.
4. Start vehicle for at least 3 consecutive seconds.
5. If DTC is detected, go to CVT-60, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329642

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated?

YES >> Check CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH CIRCUIT

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out ON/OFF switching action of the “BRAKE SW”.

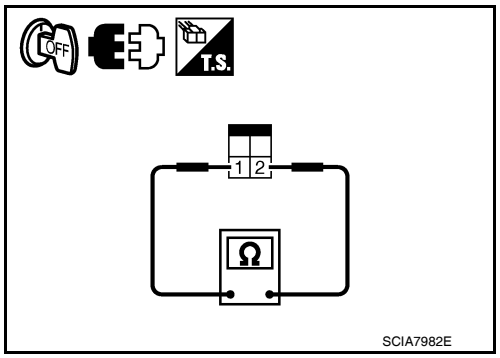
Item name	Condition	Display value
BRAKE SW	Depressed brake pedal	on
	Released brake pedal	off

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch harness connector E13 terminals 1 and 2. Refer to CVT-141, "Wiring Diagram - CVT - NON-DTC".



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal — refer to BR-6.

OK or NG

OK >> Check the following. If NG, repair or replace damaged parts.
- Harness for short or open between battery and stop lamp switch.
- Harness for short or open between stop lamp switch and combination meter.

NG >> Repair or replace the stop lamp switch.

P0705 TRANSMISSION RANGE SWITCH A

Description

INFOID:0000000007329643

- The transmission range switch assembly includes a transaxle case.
- The transaxle range switch detects the selector lever position and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329644

Item name	Condition	Display value
P POSITION SW	Selector lever in “P” position	on
	Other than the above position	off
R POSITION SW	Selector lever in “R” position	on
	Other than the above position	off
N POSITION SW	Selector lever in “N” position	on
	Other than the above position	off
D POSITION SW	Selector lever in “D” position	on
	Other than the above position	off
L POSITION SW	Selector lever in “L” position	on
	Other than the above position	off

On Board Diagnosis Logic

INFOID:0000000007329645

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0705” with CONSULT is detected when TCM does not receive the correct voltage signal (based on the gear position) from the switch.

Possible Cause

INFOID:0000000007329646

- Harness or connectors
  (transmission range switches circuit is open or shorted.)
- transmission range switch

DTC Confirmation Procedure

INFOID:0000000007329647

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

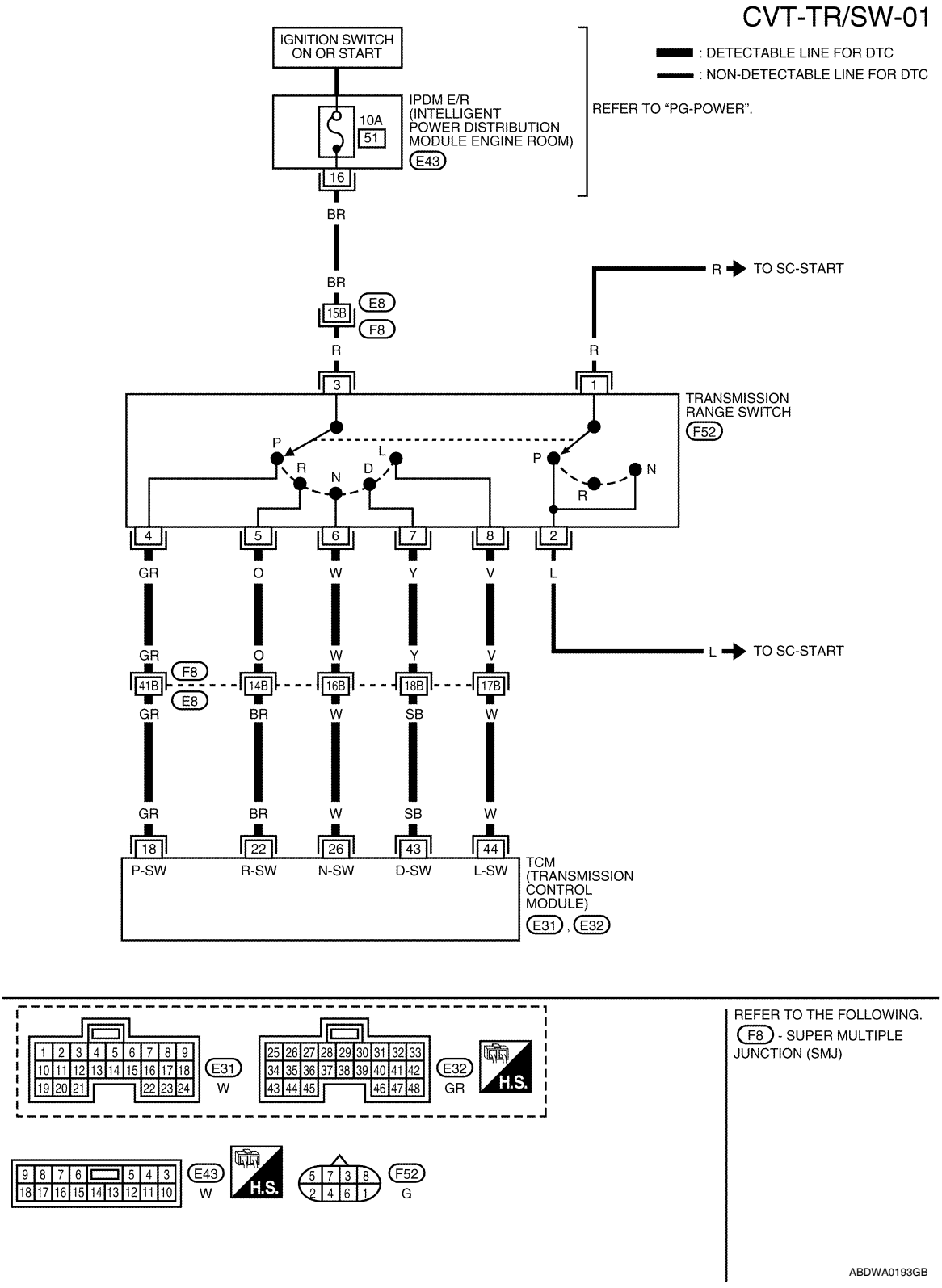
1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.
   VEHICLE SPEED: More than 10 km/h (6 MPH)
   ENG SPEED: More than 450 rpm
   ACC PEDAL OPEN: More than 1.0/8
5. If DTC is detected, go to CVT-64, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

Wiring Diagram - CVT - TR/SW

INFOID:0000000007329648



TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value" .

Diagnosis Procedure

INFOID:0000000007329649

1. CHECK TRANSMISSION RANGE SWITCH SIGNALS

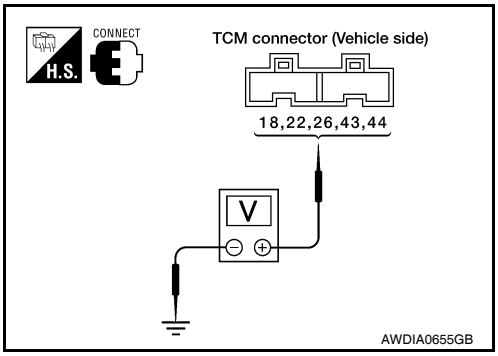
With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION”.
3. Change selector lever to “P”, “R”, “N”, “D” and “L” positions to check the value of “P RANGE SW”, “R RANGE SW”, “N RANGE SW”, “D RANGE SW” and “L RANGE SW”. Refer to CVT-62, "CONSULT Reference Value in Data Monitor Mode".

Shift position	“P RANGE SW”	“R RANGE SW”	“N RANGE SW”	“D RANGE SW”	“L RANGE SW”
P	ON	OFF	OFF	OFF	OFF
R	OFF	ON	OFF	OFF	OFF
N	OFF	OFF	ON	OFF	OFF
D	OFF	OFF	OFF	ON	OFF
L	OFF	OFF	OFF	OFF	ON

Without CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Change selector lever to “P“, “R”, “N”, “D” and “L” positions to check voltage between the CVT unit harness connector terminals and ground.



Shift position	Connector	E31, E32			
	Terminal				
	18 - Ground	22 - Ground	26 - Ground	43 - Ground	44 - Ground
P	Battery voltage	0 V	0 V	0 V	0 V
R	0 V	Battery voltage	0 V	0 V	0 V
N	0 V	0 V	Battery voltage	0 V	0 V
D	0 V	0 V	0 V	Battery voltage	0 V
L	0 V	0 V	0 V	0 V	Battery voltage

OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2. CHECK TRANSMISSION RANGE SWITCH CIRCUIT

Check the following. If NG, repair or replace damaged parts.

- Harness for short or open between ignition switch and transmission range switch.
- 10A fuse (NO. 51, IPDM E/R)

OK or NG

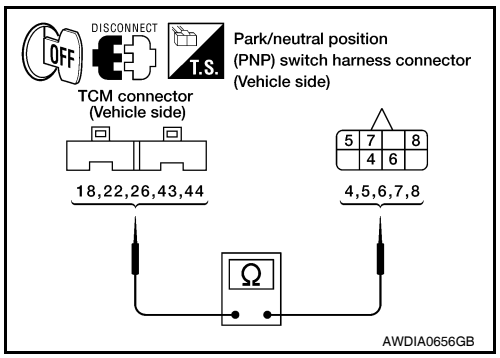
OK >> GO TO 6.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TRANSMISSION RANGE SWITCH

1. Turn ignition switch OFF.
2. Disconnect TCM connector and transmission range switch connector.

3. Check continuity between TCM connector terminals and transmission range switch connector terminals.

Item	Connector	Terminal	Continuity
TCM	E31	18	Yes
transmission range switch connector	F52	4	
TCM	E31	22	Yes
transmission range switch connector	F52	5	
TCM	E32	26	Yes
transmission range switch connector	F52	6	
TCM	E32	43	Yes
transmission range switch connector	F52	7	
TCM	E32	44	Yes
transmission range switch connector	F52	8	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

Check transmission range switch. Refer to CVT-65, "Component Inspection".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. ADJUSTMENT OF CONTROL CABLE

Adjustment of control cable. Refer to CVT-164, "Adjustment of CVT Position". Check the step 4 after adjusting control cable.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform CVT-62, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

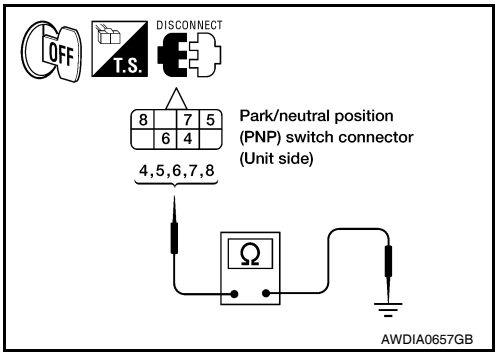
OK >> **INSPECTION END**
NG >> 1. Repair or replace damaged parts.
2. Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

Component Inspection

INFOID:0000000007329650

TRANSMISSION RANGE SWITCH

1. Change selector lever to various positions to check the continuity between terminals on the transmission range switch and ground.



Shift position	Connector	Terminal	Continuity
“P”	F52	4 - Ground	Yes
other positions			No
“R”		5 - Ground	Yes
other positions			No
“N”		6 - Ground	Yes
other positions			No
“D”		7 - Ground	Yes
other positions			No
“L”		8 - Ground	Yes
other positions			No

2. If NG, check continuity with control cable disconnected. (Refer to step 1 above.)
3. If OK, with the control cable disconnected, adjust the control cable. Refer to CVT-164, "Adjustment of CVT Position" .
4. If NG, even when the control cable is disconnected, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

Description

INFOID:0000000007329651

- The CVT fluid temperature sensor is included in the control valve assembly.
- The CVT fluid temperature sensor detects the CVT fluid temperature and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329652

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
ATF TEMP SEN	When CVT fluid temperature is 20°C (68°F).	2.0 V
	When CVT fluid temperature is 80°C (176°F).	1.0 V

On Board Diagnosis Logic

INFOID:0000000007329653

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0710” with CONSULT is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000007329654

- Harness or connectors
  (Sensor circuit is open or shorted.)
- CVT fluid temperature sensor

DTC Confirmation Procedure

INFOID:0000000007329655

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 14 minutes (Total).
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   RANGE: “D” position
4. If DTC is detected, go to CVT-69, "Diagnosis Procedure".

WITH GST

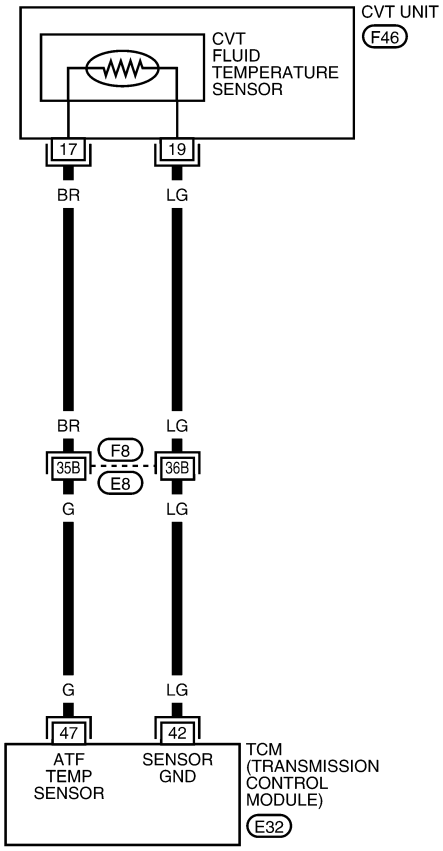
Follow the procedure “WITH CONSULT”.

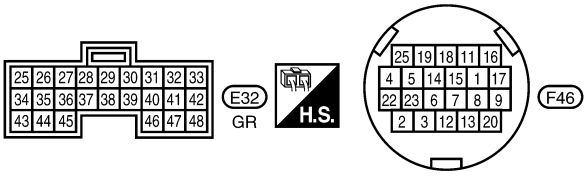
Wiring Diagram - CVT - FTS

INFOID:0000000007329656

CVT-FTS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

AADWA0018GB

TCM TERMINALS AND REFERENCE VALUES
Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329657

1. CHECK CVT FLUID TEMPERATURE SENSOR SIGNAL

With CONSULT

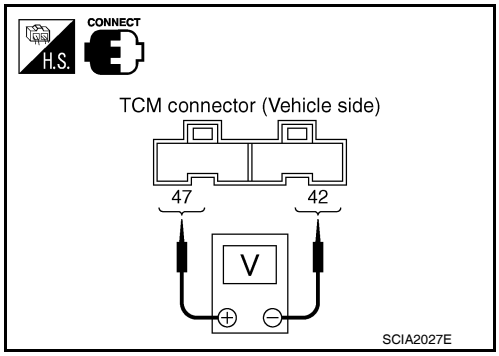
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “ATF TEMP SEN”.

Item name	Condition	Display value (Approx.)
ATF TEMP SEN	When CVT fluid temperature is 20°C (68°F).	2.0 V
	When CVT fluid temperature is 80°C (176°F).	1.0 V

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminals.

Name	Connector	Terminal	Temperature °C (°F)	Voltage (Approx.)
CVT fluid temperature sensor	E32	47 - 42	20 (68)	2.0 V
			80 (176)	1.0 V



3. Turn ignition switch OFF.
4. Disconnect TCM connector.
5. Check if there is continuity between connector terminal and ground.

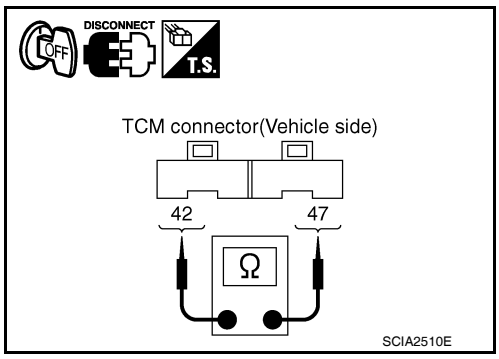
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK CVT FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

Name	Connector	Terminal	Temperature °C (°F)	Resistance (Approx.)
CVT fluid temperature sensor	E32	47 - 42	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ



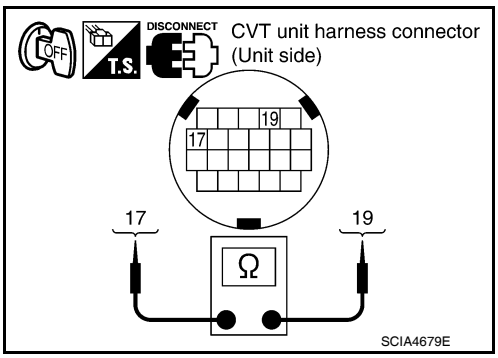
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK CVT FLUID TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminals.



Name	Connector	Terminal	Temperature °C (°F)	Resistance (Approx.)
CVT fluid temperature sensor	F46	17 - 19	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

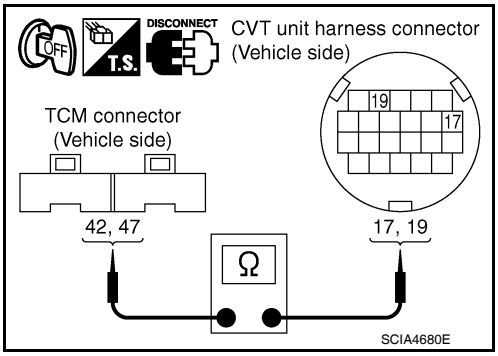
4. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

4. CHECK HARNESS BETWEEN TCM AND CVT FLUID TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.



Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
CVT unit harness connector	F46	19	
TCM	E32	47	Yes
CVT unit harness connector	F46	17	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-67, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

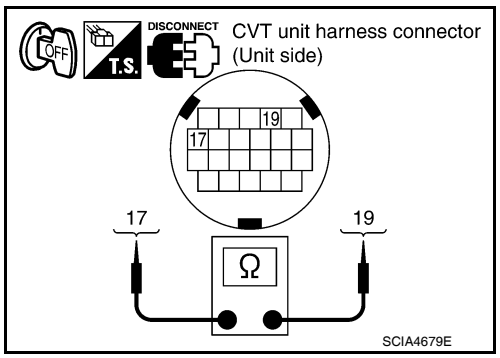
Component Inspection

INFOID:0000000007329658

CVT FLUID TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminals.



Name	Connector	Terminal	Temperature °C (°F)	Resistance (Approx.)
CVT fluid temperature sensor	F46	17 - 19	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P0715 INPUT SPEED SENSOR A

Description

INFOID:0000000007329659

The primary speed sensor detects the primary pulley revolution speed and sends a signal to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329660

Remarks: Specification data are reference values.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.

On Board Diagnosis Logic

INFOID:0000000007329661

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0715” with CONSULT is detected when TCM does not receive the proper signal from the sensor.

Possible Cause

INFOID:0000000007329662

- Harness or connectors
  (Sensor circuit is open or shorted.)
- Primary speed sensor

DTC Confirmation Procedure

INFOID:0000000007329663

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

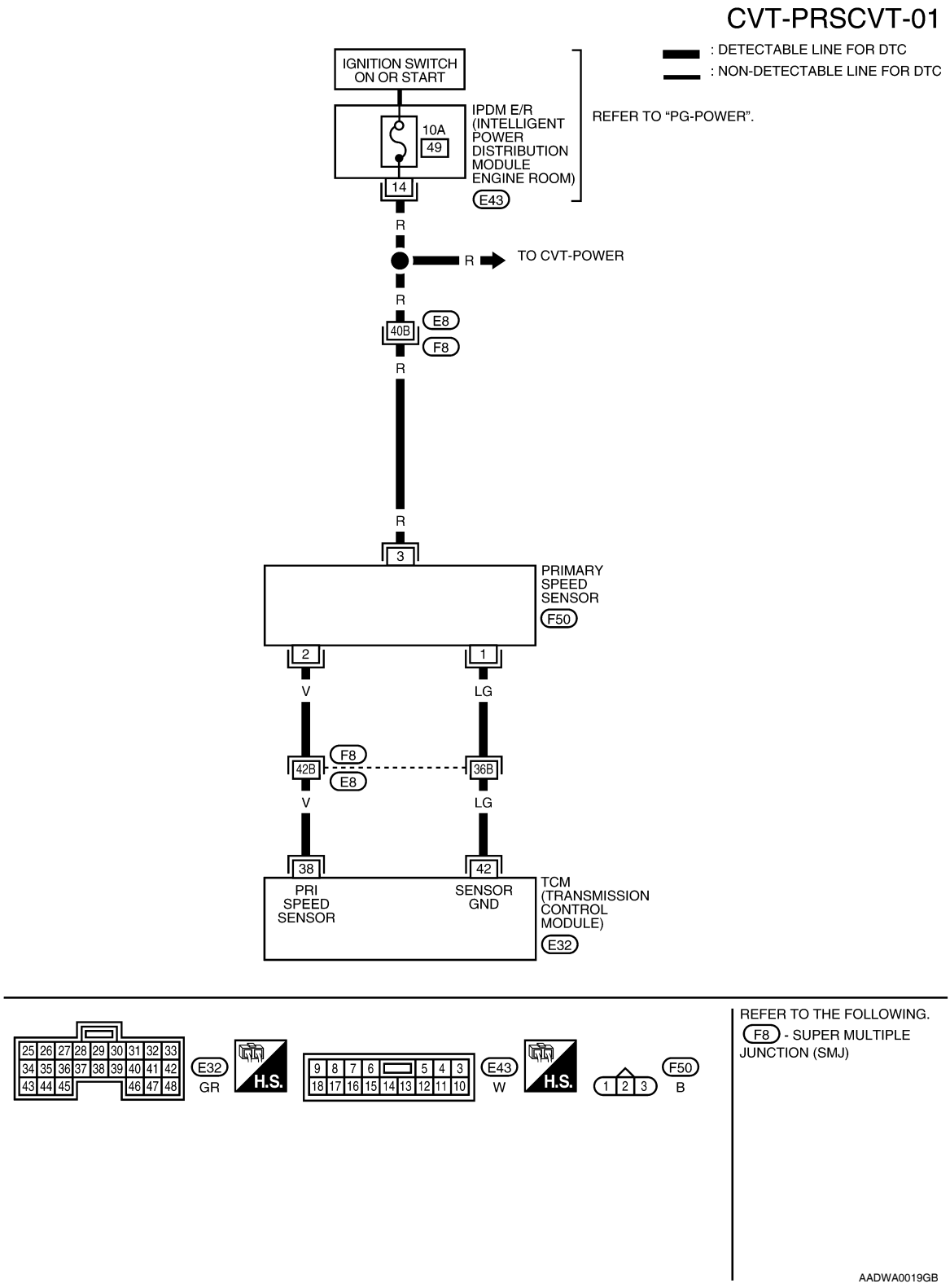
1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   ENG SPEED: 450 rpm or more
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
3. If DTC is detected, go to CVT-74, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

Wiring Diagram - CVT - PRSCVT

INFOID:0000000007329664



TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329665

1. CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “PRI SPEED SEN”.

Item name	Condition	Display value
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.

OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2. CHECK PRIMARY SPEED SENSOR

1. Start engine.
2. Check voltage between TCM connector terminals.

Item	Connector	Terminal	Data (Approx.)
TCM	E32	10, 19 - 42	Battery voltage

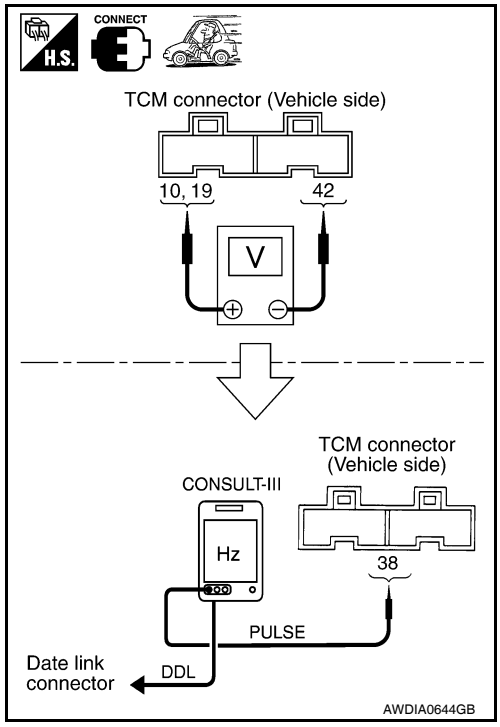
3. Check the pulse with CONSULT or oscilloscope, when vehicle cruises.

Name	Condition
Primary speed sensor	When running at 20 km/h (12 MPH) in “L” position with the closed throttle position signal OFF, use the CONSULT pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**

Item	Connector	Terminal	Name	Data (Approx.)
TCM	E32	38	Primary speed sensor	1250 Hz

OK or NG

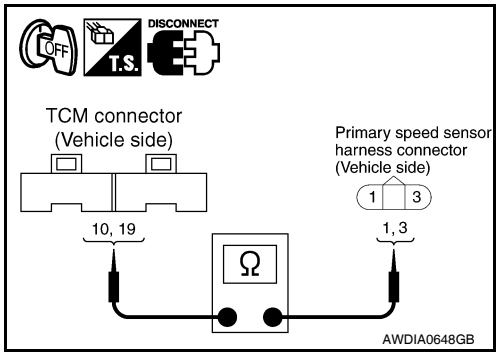
OK >> GO TO 6.
NG - 1 >> Battery voltage is not supplied: GO TO 3.
NG - 2 >> Battery voltage is supplied, but there is a malfunction in the frequency: GO TO 4.



3. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and primary speed sensor harness connector.

3. Check continuity between TCM connector terminals and primary speed sensor harness connector terminals.



Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Primary speed sensor	F50	1	
TCM	E32	10, 19	Yes
Primary speed sensor	F50	3	

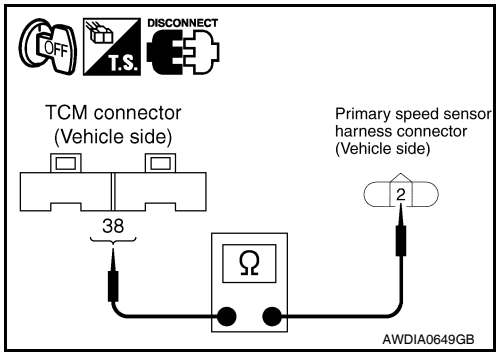
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (PRIMARY SPEED SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and primary speed sensor harness connector.
3. Check continuity between TCM connector terminal and primary speed sensor harness connector terminal.



Item	Connector	Terminal	Continuity
TCM	E32	38	Yes
Primary speed sensor	F50	2	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then drive the vehicle [10 km/h (6 MPH) or more], perform self-diagnosis check. Refer to CVT-72, "DTC Confirmation Procedure".

Is the “P0715” detected again?

YES >> Replace the primary speed sensor. Refer to CVT-169, "Removal and Installation".
NO >> Replace TCM. Refer to CVT-159, "Removal and Installation".

6. CHECK DTC

Perform CVT-72, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P0720 OUTPUT SPEED SENSOR

Description

INFOID:0000000007329666

The secondary speed sensor detects the revolution of the CVT output shaft and emits a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329667

Remarks: Specification data are reference values.

Item name	Condition	Display value
VSP SENSOR	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

INFOID:0000000007329668

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0720” with CONSULT is detected TCM does not receive the proper signal from the sensor.

Possible Cause

INFOID:0000000007329669

- Harness or connectors
  (Sensor circuit is open or shorted.)
- Secondary speed sensor

DTC Confirmation Procedure

INFOID:0000000007329670

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

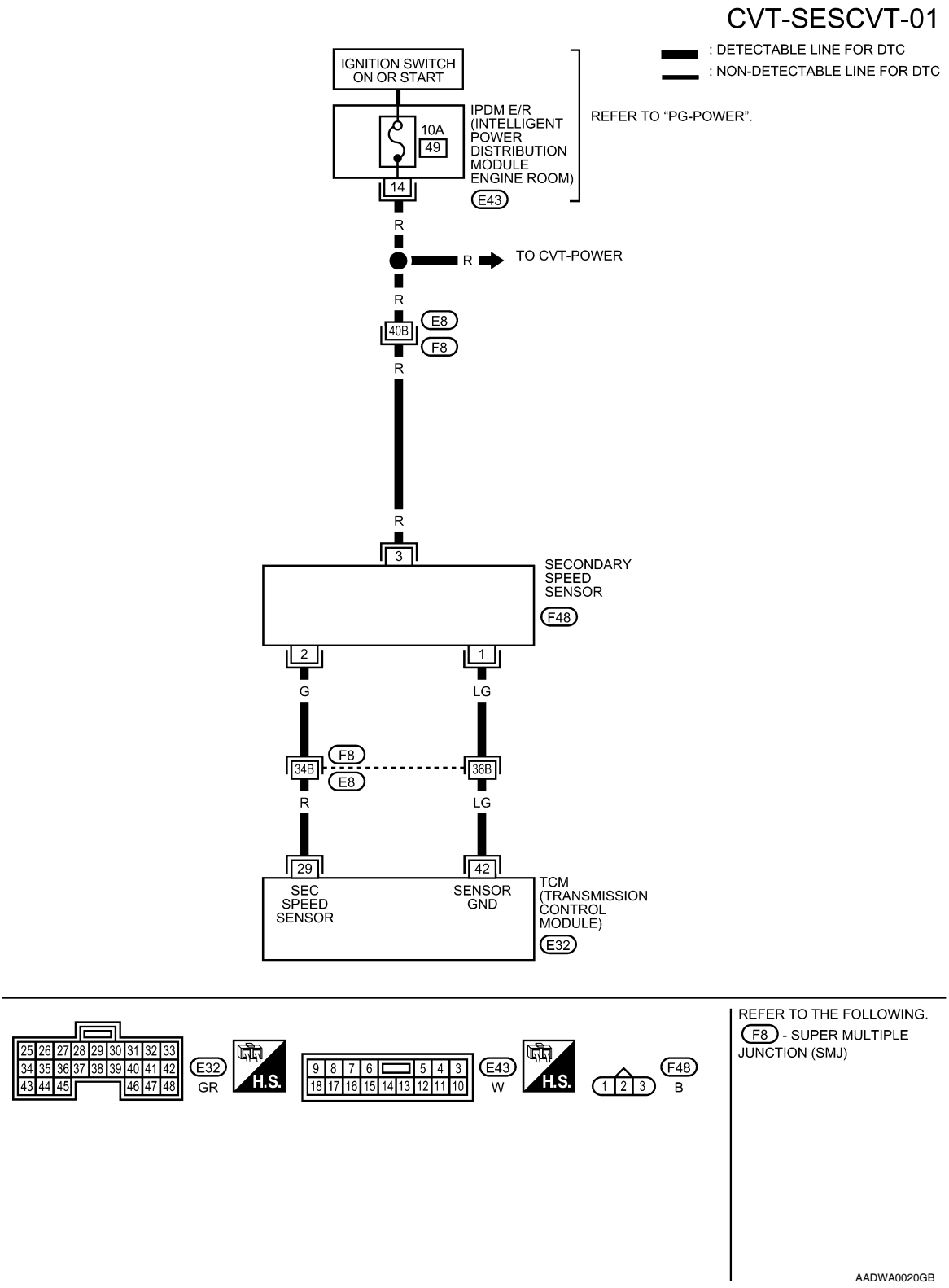
1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 12 consecutive seconds.
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
3. If DTC is detected, go to CVT-78, "Diagnosis Procedure" .

WITH GST

Follow the procedure “WITH CONSULT”.

Wiring Diagram - CVT - SESCVT

INFOID:0000000007329671



TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value" .

Diagnosis Procedure

INFOID:0000000007329672

1. CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “VSP SENSOR”.

Item name	Condition	Display value
VSP SENSOR	During driving	Approximately matches the speedometer reading.

OK or NG

OK >> GO TO 8.
NG >> GO TO 2.

2. CHECK SECONDARY SPEED SENSOR

With CONSULT

1. Start engine.
2. Check power supply to secondary speed sensor by voltage between TCM connector terminals 10, 19 and 42. Refer to CVT-37, "Circuit Diagram" .

Item	Connector	Terminal	Data (Approx.)
TCM	E31, E32	10 - 42	Battery voltage
		19 - 42	

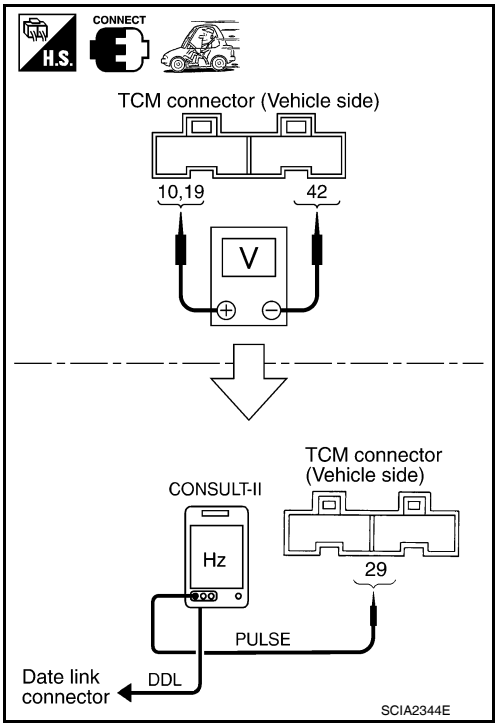
3. If OK, check the pulse when vehicle cruises.

Name	Condition
Secondary speed sensor	When running at 20 km/h (12 MPH) in “D” position, use the CONSULT pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**

Item	Connector	Terminal	Name	Data (Approx.)
TCM	E32	29	Secondary speed sensor	570 Hz

OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

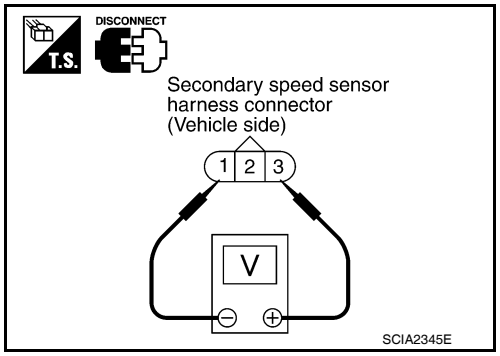


3. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the secondary speed sensor harness connector.
3. Turn ignition switch ON.

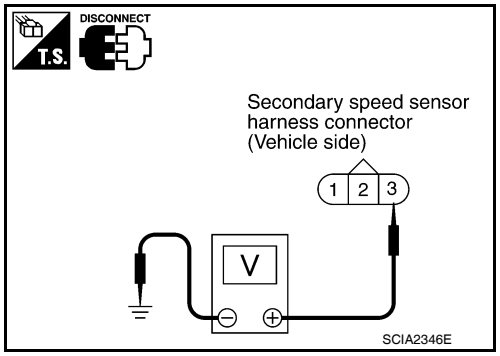
4. Check voltage between secondary speed sensor harness connector terminals.

Item	Connector	Terminal	Data (Approx.)
Secondary speed sensor	F48	3 - 1	Battery voltage



5. Check voltage between secondary speed sensor harness connector terminal and ground.

Item	Connector	Terminal	Data (Approx.)
Secondary speed sensor	F48	3 - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

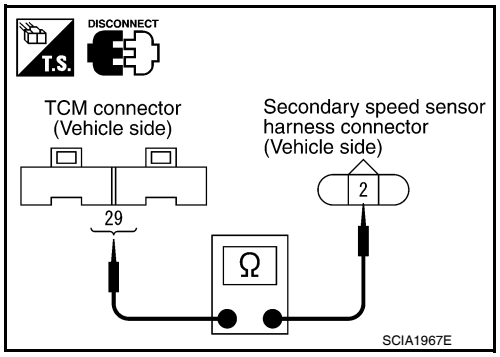
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground.: GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only.: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND SECONDARY SPEED SENSOR

1. Turn ignition switch OFF.
2. Disconnect TCM connector and secondary speed sensor harness connector.
3. Check continuity between TCM connector terminal and secondary speed sensor harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	29	Yes
Secondary speed sensor	F48	2	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and them drive the vehicle [more than 40 km/h (25 MPH)], perform self-diagnosis check. Refer to CVT-76, "DTC Confirmation Procedure" .

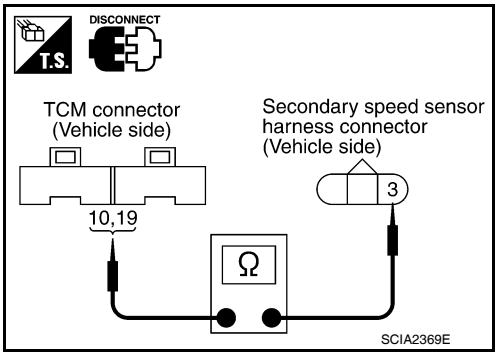
Is “P0720” detected again?

YES >> Replace the secondary speed sensor. Refer to CVT-170, "Removal and Installation".
NO >> Replace TCM. Refer to CVT-159, "Removal and Installation".

6. CHECK HARNESS BETWEEN TCM AND SECONDARY SPEED SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and secondary speed sensor harness connector.

3. Check continuity between TCM connector terminals and secondary speed sensor harness connector terminal. Refer to CVT-37, "Circuit Diagram" .



Item	Connector	Terminal	Continuity
TCM	E31	10	Yes
Secondary speed sensor	F48	3	
TCM	E31	19	Yes
Secondary speed sensor	F48	3	

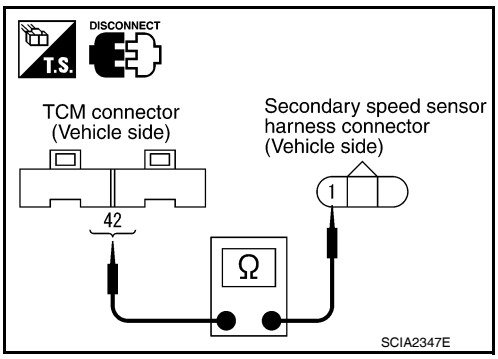
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> 10 A fuse (No. 49, located in the IPDM E/R) or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND SECONDARY SPEED SENSOR (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and secondary speed sensor harness connector.
3. Check continuity between TCM connector terminal and secondary speed sensor harness connector terminal.



Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Secondary speed sensor	F48	1	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform CVT-76, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P0725 ENGINE SPEED

Description

INFOID:0000000007329673

The engine speed signal is sent from the ECM to the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329674

Remarks: Specification data are reference values.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8

On Board Diagnosis Logic

INFOID:0000000007329675

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0725” with CONSULT is detected when TCM does not receive the engine speed signal (input by CAN communication) from ECM.

Possible Cause

INFOID:0000000007329676

Harness or connectors
(The ECM to the TCM circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329677

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   PRI SPEED SEN: More than 1000 rpm
3. If DTC is detected, go to CVT-81, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329678

1. CHECK DTC WITH ECM

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT. Refer to EC-119, "CONSULT Function (ENGINE)".

OK or NG

OK >> GO TO 2.
NG >> Check the DTC detected item. Refer to EC-119, "CONSULT Function (ENGINE)".

2. CHECK DTC WITH TCM

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

OK or NG

OK >> GO TO 3.
NG >> Check the DTC detected item. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

- If DTC of CAN communication line is detected, go to CVT-56.

3. CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. While monitoring “ENG SPEED SIG”, check for engine speed change corresponding to “ACC PEDAL OPEN”.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8

OK or NG

OK >> GO TO 4.
NG >> Check ignition signal circuit. Refer to EC-529, "Component Description".

4. CHECK DTC

Perform CVT-81, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P0730 INCORRECT GEAR RATIO

Description

INFOID:0000000007329679

TCM selects the gear ratio using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal. Then it changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329680

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
GEAR RATIO	During driving	2.56 - 0.43

On Board Diagnosis Logic

INFOID:0000000007329681

- This is not an OBD-II self-diagnostic item.
- TCM calculates the actual gear ratio with primary speed sensor and secondary speed sensor.
- Diagnostic trouble code “P0730” with CONSULT is detected, when TCM receives an unexpected gear ratio signal.

Possible Cause

INFOID:0000000007329682

Transaxle assembly

DTC Confirmation Procedure

INFOID:0000000007329683

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that output voltage of CVT fluid temperature sensor is within the range below.
   ATF TEMP SEN: 1.0 - 2.0 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)
3. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
4. Start engine and maintain the following conditions for at least 30 consecutive seconds.
   TEST START FROM 0 km/h (0 MPH)
   CONSTANT ACCELERATION: Keep 30 sec or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   ENG SPEED: 450 rpm or more
5. If DTC is detected, go to CVT-83, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329684

1.CHECK DTC

Perform CVT-83, "DTC Confirmation Procedure".

Are any DTC displayed?

YES - 1>> DTC except for “P0730” is displayed: Go to Check the DTC detected item. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".
YES - 2>> DTC for “P0730” is displayed: Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".
NO >> **INSPECTION END**

P0740 TORQUE CONVERTER

Description

INFOID:0000000007329685

- The torque converter clutch solenoid valve is included in the control valve assembly.
- The torque converter clutch solenoid valve is activated by the TCM in response to signals sent from the vehicle speed and accelerator pedal position sensors. Lock-up piston operation will then be controlled.
- Lock-up operation, however, is prohibited when CVT fluid temperature is too low.
- When the accelerator pedal is depressed (less than 2.0/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329686

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
ISOLT1	Lock-up OFF	0.0 A
	Lock-up ON	0.7 A

On Board Diagnosis Logic

INFOID:0000000007329687

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0740” with CONSULT is detected under the following conditions.

- TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000007329688

- Torque converter clutch solenoid valve
- Harness or connectors
  (Solenoid circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329689

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT and wait at least 10 consecutive seconds.
3. If DTC is detected, go to CVT-86, "Diagnosis Procedure" .

WITH GST

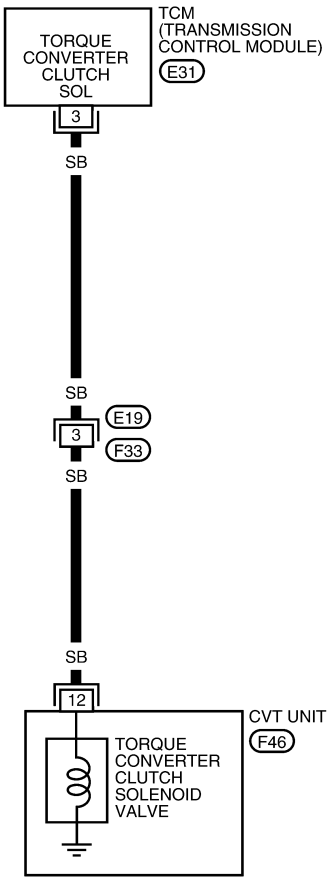
Follow the procedure “WITH CONSULT”.

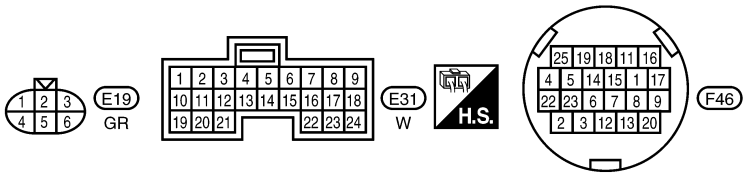
Wiring Diagram - CVT - TCV

INFOID:0000000007329690

CVT-TCV-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





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TCM TERMINALS AND REFERENCE VALUES
Refer to CVT-46, "TCM Terminal and Reference Value" .

Diagnosis Procedure

INFOID:0000000007329691

1. CHECK INPUT SIGNAL

With CONSULT

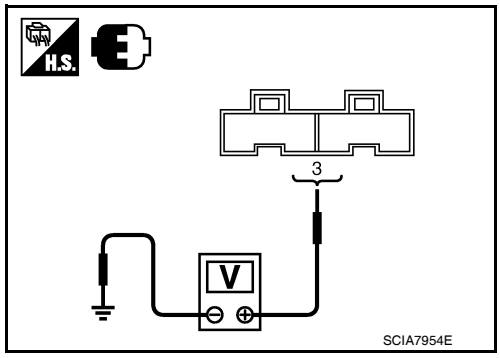
1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “ISOLT1”.

Item name	Condition	Display value (Approx.)
ISOLT1	Lock-up OFF	0.0 A
	Lock-up ON	0.7 A

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition		Voltage (Approx.)
Torque converter clutch solenoid valve	E31	3 - ground	When vehicle cruises in “D” position	Lock-up ON	6.0 V
				Lock-up OFF	1.0 V



3. Turn ignition switch OFF.
4. Disconnect TCM connector.
5. Check if there is continuity between the connector terminal and ground.

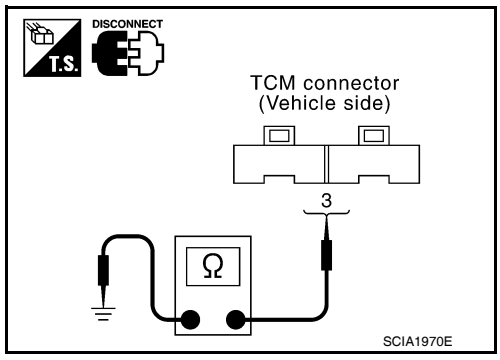
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	3 - 9 Ω



OK or NG

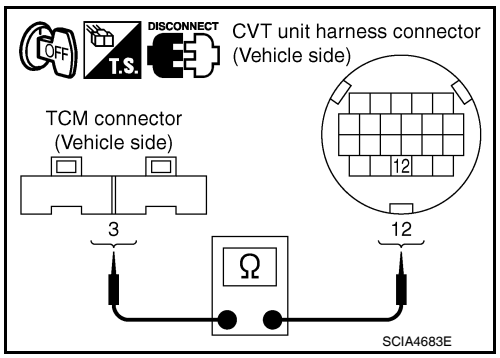
OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.

3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	3	Yes
CVT unit harness connector	F46	12	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and CVT assembly.
6. Reinstall any part removed.

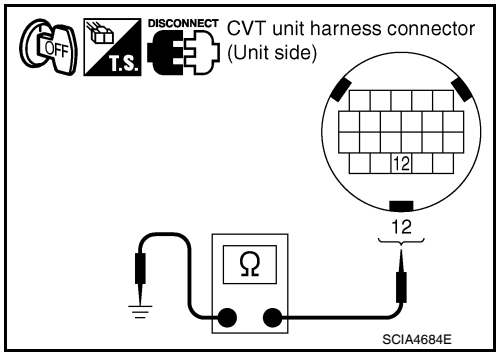
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F46	12 - Ground	3 - 9 Ω



OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-84, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

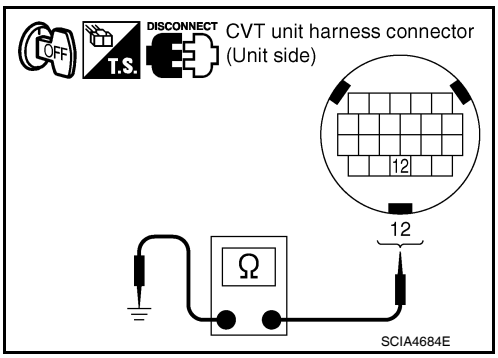
Component Inspection

INFOID:0000000007329692

TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F46	12 - Ground	3 - 9 Ω

4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P0744 TORQUE CONVERTER

Description

INFOID:0000000007329693

- The torque converter clutch solenoid valve is included in the control valve assembly.
- This malfunction is detected when the torque converter clutch does not lock-up as instructed by the TCM. This is not only caused by electrical malfunction (circuits open or shorted), but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329694

Remarks: Specification data are reference values.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.

On Board Diagnosis Logic

INFOID:0000000007329695

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0744” with CONSULT is detected under the following conditions.

- When CVT cannot perform lock-up even if electrical circuit is good.
- When TCM compares difference value with slip revolution and detects an irregularity.

Possible Cause

INFOID:0000000007329696

- Torque converter clutch solenoid valve
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000007329697

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following condition for at least 30 seconds.
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   [Vehicle speed: Constant speed of more than 40 km/h (25 MPH)]
4. If DTC is detected go to CVT-89, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329698

1.CHECK INPUT SIGNALS

With CONSULT
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle.
4. Check if there is a great difference between “ENG SPEED SIG” and “PRI SPEED SEN”. (Lock-up ON.)

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK LINE PRESSURE

Perform line pressure test. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts. Refer to CVT-37, "Inspections before Trouble Diagnosis".

3.DETECT MALFUNCTIONING ITEM

Check the following:
- Torque converter clutch solenoid valve. Refer to CVT-87, "Component Inspection".
- Lock-up select solenoid valve. Refer to CVT-127, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SECONDARY SPEED SENSOR SYSTEM AND PRIMARY SPEED SENSOR SYSTEM

Check secondary speed sensor system and primary speed sensor system. Refer to CVT-76, CVT-72.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.CHECK DTC

Perform CVT-89, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Repair or replace damaged parts.
2. Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

P0745 PRESSURE CONTROL SOLENOID A

Description

INFOID:0000000007329699

- The line pressure solenoid valve is included in the control valve assembly.
- The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329700

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
ISOLT2	Release your foot from the accelerator pedal.	0.8 A
	Press the accelerator pedal all the way down.	0.0 A

On Board Diagnosis Logic

INFOID:0000000007329701

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0745” with CONSULT is detected under the following conditions.
- TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM compares target value with monitor value and detects an irregularity.

Possible Cause

INFOID:0000000007329702

- Harness or connectors
  (Solenoid circuit is open or shorted.)
- Line pressure solenoid valve

DTC Confirmation Procedure

INFOID:0000000007329703

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and wait at least 5 seconds.
3. If DTC is detected, go to CVT-93, "Diagnosis Procedure".

WITH GST

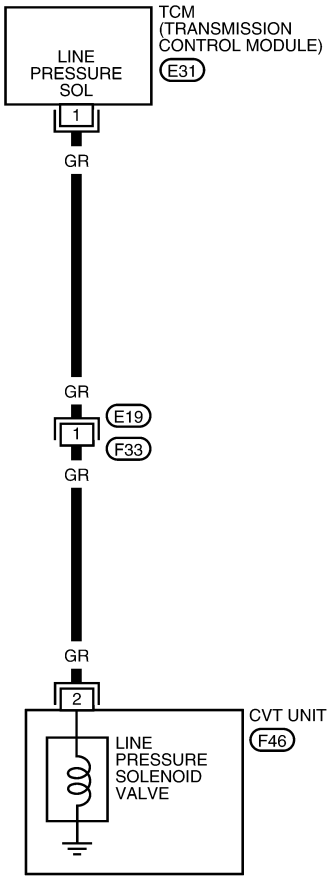
Follow the procedure “WITH CONSULT”.

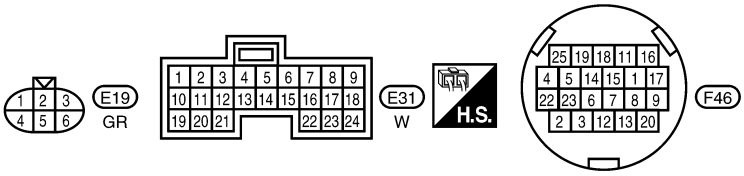
Wiring Diagram - CVT - LPSV

INFOID:0000000007329704

CVT-LPSV-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





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TCM TERMINALS AND REFERENCE VALUES
Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329705

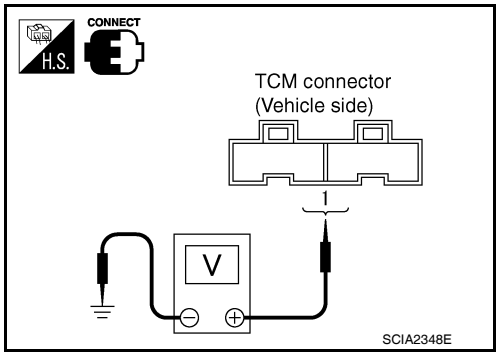
1. CHECK INPUT SIGNAL

With CONSULT
1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “ISOLT2”.

Item name	Condition	Display value (Approx.)
ISOLT2	Release your foot from the accelerator pedal.	0.8 A
	Press the accelerator pedal all the way down.	0.0 A

Without CONSULT
1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition	Voltage (Approx.)
Line pressure solenoid valve	E31	1 - ground	Release your foot from the accelerator pedal.	5.0 - 7.0 V
			Press the accelerator pedal all the way down.	1.0 - 3.0 V



3. Turn ignition switch OFF.
4. Disconnect TCM connector.
5. Check if there is continuity between connector terminal and ground.

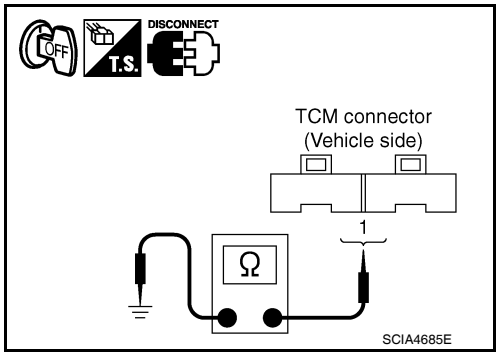
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK LINE PRESSURE SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	E31	1 - ground	3 - 9 Ω



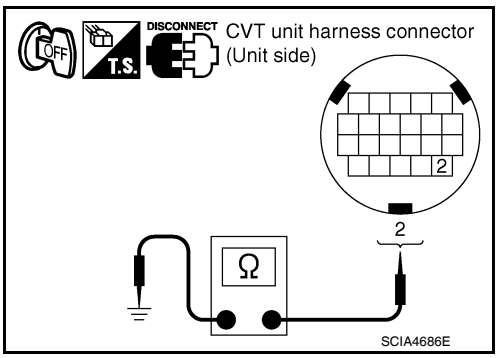
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.



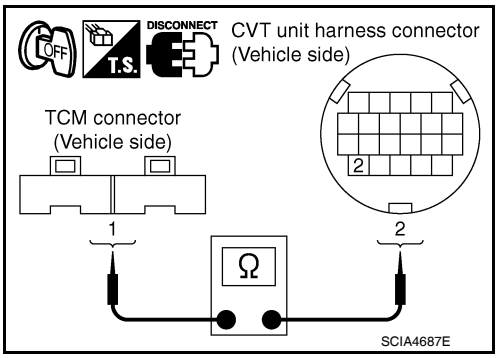
Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F46	2 - Ground	3 - 9 Ω

OK or NG

OK >> GO TO 4.
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

4. CHECK HARNESS BETWEEN TCM AND LINE PRESSURE SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector and TCM connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.



Item	Connector	Terminal	Continuity
TCM	E31	1	Yes
CVT unit harness connector	F46	2	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and CVT assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform CVT-91, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM terminals and reference values. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Repair or replace damaged parts.
2. Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

Component Inspection

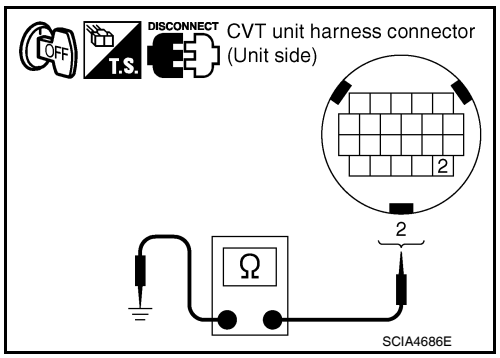
INFOID:0000000007329706

LINE PRESSURE SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F46	2 - Ground	3 - 9 Ω



4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

P0746 PRESSURE CONTROL SOLENOID A

Description

INFOID:0000000007329707

- The line pressure solenoid valve is included in the control valve assembly.
- The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329708

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
PRI PRESS	“N” position idle	0.4 MPa

On Board Diagnosis Logic

INFOID:0000000007329709

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0746” with CONSULT is detected under the following conditions.

- Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.

Possible Cause

INFOID:0000000007329710

- Line pressure control system
- Secondary speed sensor
- Primary speed sensor

DTC Confirmation Procedure

INFOID:0000000007329711

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds. Test start from 0 km/h (0 MPH).
   ATF TEMP SEN: 1.0 - 2.0 V
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   VEHICLE SPEED: 10 km/h (6 MPH) More than
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
3. If DTC is detected, go to CVT-96, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329712

1.CHECK LINE PRESSURE

Perform line pressure test. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 2.
NG >> Repair or replace damaged parts. Refer to CVT-37, "Inspections before Trouble Diagnosis".

2.DETECT MALFUNCTIONING ITEM

Check line pressure solenoid valve. Refer to CVT-94, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK SECONDARY SPEED SENSOR SYSTEM AND PRIMARY SPEED SENSOR SYSTEM

Check secondary speed sensor system and primary speed sensor system. Refer to CVT-76, CVT-72.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

Check the following:
- Power supply and ground circuit for TCM. Refer to CVT-114, "Wiring Diagram - CVT - POWER".
- The TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-96, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the transaxle assembly or TCM. Refer to CVT-184, "Removal and Installation".

P0776 PRESSURE CONTROL SOLENOID B

Description

INFOID:0000000007329713

- The secondary pressure solenoid valve is included in the control valve assembly.
- The secondary pressure solenoid valve regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329714

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
SEC PRESS	“N” position idle	0.8 MPa

On Board Diagnosis Logic

INFOID:0000000007329715

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0776” with CONSULT is detected when secondary pressure is too high or too low compared with the commanded value while driving.

Possible Cause

INFOID:0000000007329716

- Harness or connectors
  (Solenoid circuit is open or shorted.)
- Secondary pressure solenoid valve system
- Secondary pressure sensor
- Line pressure control system

DTC Confirmation Procedure

INFOID:0000000007329717

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 30 consecutive seconds.
   ATF TEMP SEN: 1.0 - 2.0 V
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   VEHICLE SPEED: 10 km/h (6 MPH) More than
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
3. If DTC is detected, go to CVT-98, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329718

1.CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “SEC PRESS”.

Item name	Condition	Display value (Approx.)
SEC PRESS	“N” position idle	0.8 MPa

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK LINE PRESSURE

Perform line pressure test. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts. Refer to CVT-37, "Inspections before Trouble Diagnosis".

3. DETECT MALFUNCTIONING ITEM

Check the following:
- Secondary pressure solenoid valve. Refer to CVT-103, "Component Inspection".
- Line pressure solenoid valve. Refer to CVT-94, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SECONDARY PRESSURE SENSOR SYSTEM

Check secondary pressure sensor system. Refer to CVT-105.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

Check the following:
- Power supply and ground circuit for TCM. Refer to CVT-114, "Wiring Diagram - CVT - POWER".
- The TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform CVT-98, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

P0778 PRESSURE CONTROL SOLENOID B

Description

INFOID:0000000007329719

- The secondary pressure solenoid valve is included in the control valve assembly.
- The secondary pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329720

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
ISOLT3	Secondary pressure low - Secondary pressure high	0.8 - 0.0 A
SOLMON3	“N” position idle	0.6 - 0.7 A
	When stalled	0.4 - 0.6 A

On Board Diagnosis Logic

INFOID:0000000007329721

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0778” with CONSULT is detected under the following conditions.
- TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM compares target value with monitor value and detects an irregularity.

Possible Cause

INFOID:0000000007329722

- Harness or connectors
  (Solenoid circuit is open or shorted.)
- Secondary pressure solenoid valve

DTC Confirmation Procedure

INFOID:0000000007329723

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to CVT-102, "Diagnosis Procedure" .

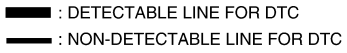
WITH GST

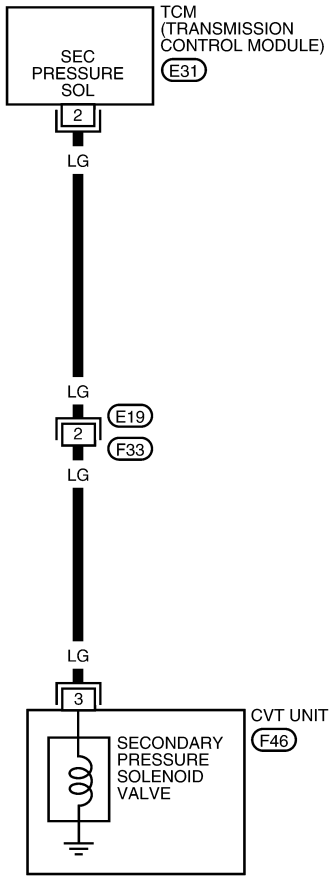
Follow the procedure “WITH CONSULT”.

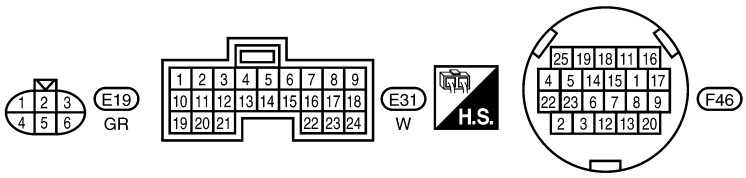
Wiring Diagram - CVT - SECPSV

INFOID:0000000007329724

CVT-SECPSV-01







BCWA0676E

TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value" .

Diagnosis Procedure

INFOID:0000000007329725

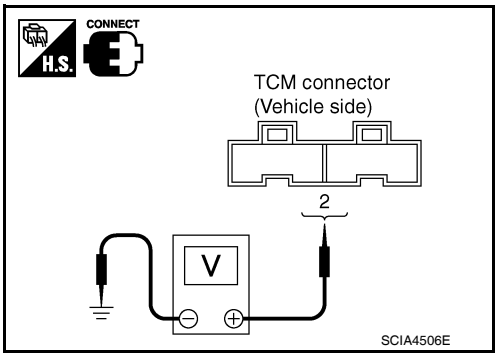
1. CHECK INPUT SIGNAL

With CONSULT
1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “ISOLT3”.

Item name	Condition	Display value (Approx.)
ISOLT3	Secondary pressure low - Secondary pressure high	0.8 - 0.0 A

Without CONSULT
1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition	Voltage (Approx.)
Secondary pressure solenoid valve	E31	2 - ground	Release your foot from the accelerator pedal.	5.0 - 7.0 V
			Press the accelerator pedal all the way down.	3.0 - 4.0 V



3. Turn ignition switch OFF.
4. Disconnect TCM connector.
5. Check if there is continuity between connector terminal and ground.

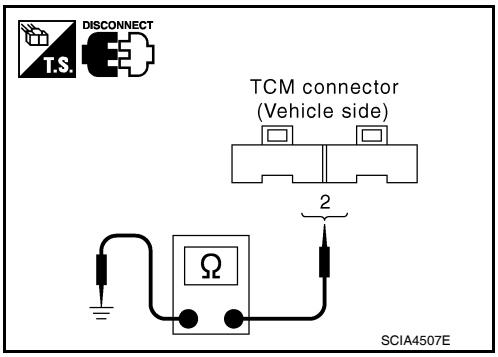
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK SECONDARY PRESSURE SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Secondary pressure solenoid valve	E31	2 - Ground	3 - 9 Ω



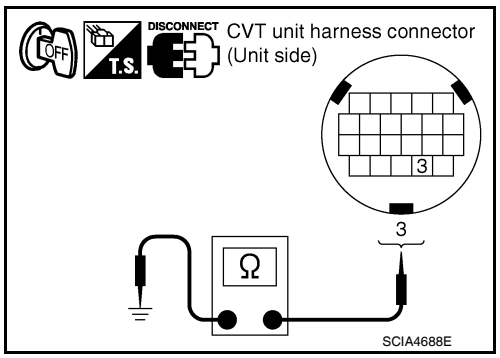
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.



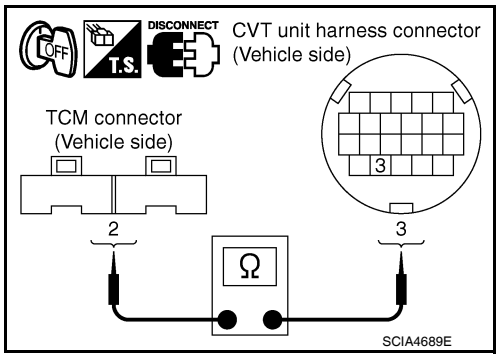
Solenoid valve	Connector	Terminal	Resistance (Approx.)
Secondary pressure solenoid valve	F46	3 - Ground	3 - 9 Ω

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN TCM AND SECONDARY PRESSURE SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.



Item	Connector	Terminal	Continuity
TCM connector	E31	2	Yes
CVT unit harness connector	F46	3	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-100, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Repair or replace damaged parts.
2. Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

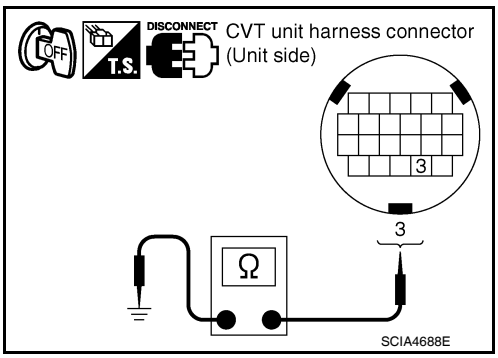
Component Inspection

INFOID:0000000007329726

SECONDARY PRESSURE SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.



Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Secondary pressure solenoid valve	F46	3 - Ground	3 - 9 Ω

4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P0840 TRANSMISSION FLUID PRESSURE SEN/SW A

Description

INFOID:0000000007329727

- The secondary pressure sensor is included in the control valve assembly.
- The secondary pressure sensor detects secondary pressure of CVT and sends TCM the signal.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329728

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
SEC HYDR SEN	“N” position idle	1.0 V
SEC PRESS		0.8 MPa

On Board Diagnosis Logic

INFOID:0000000007329729

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0840” with CONSULT is detected when TCM detects an improper voltage drop when it receives the sensor signal.

Possible Cause

INFOID:0000000007329730

- Secondary pressure sensor
- Harness or connectors
  (Switch circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329731

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that output voltage of line temperature sensor is within the range below.
   ATF TEMP SEN: 1.0 - 2.0 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)
3. Start engine and wait for at least 5 consecutive seconds.
4. If DTC is detected, go to CVT-107, "Diagnosis Procedure" .

WITH GST

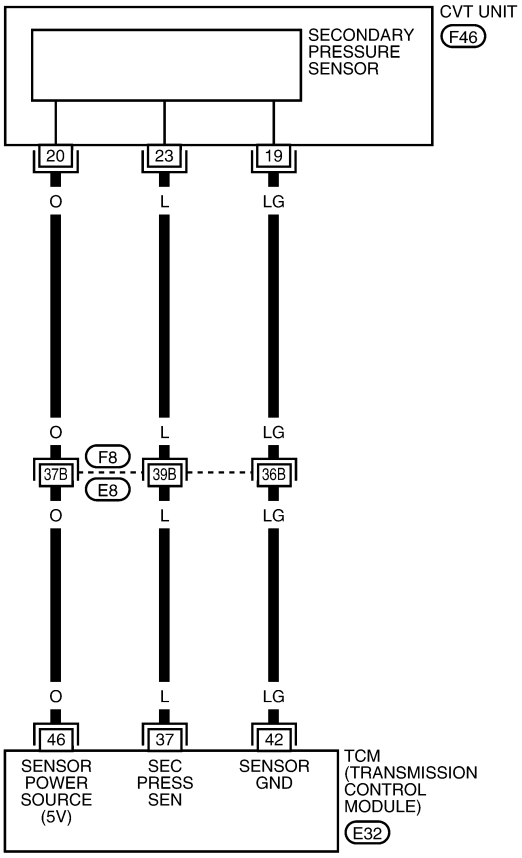
Follow the procedure “WITH CONSULT”.

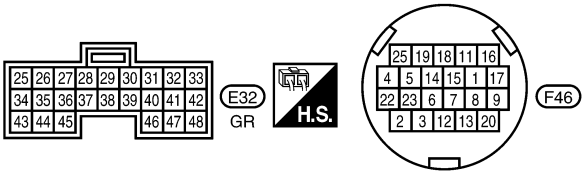
Wiring Diagram - CVT - SECPS

INFOID:0000000007329732

CVT-SECPS-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

AADWA0021GB

TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329733

1. CHECK INPUT SIGNAL

With CONSULT

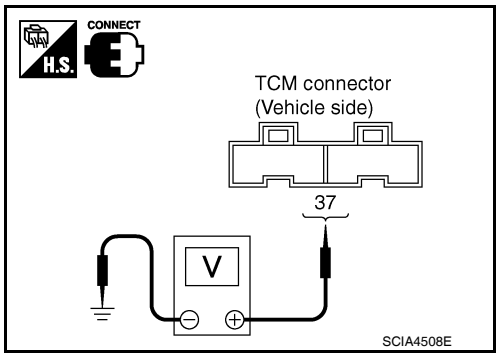
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “SEC HYDR SEN”.

Item name	Condition	Display value (Approx.)
SEC HYDR SEN	“N” position idle	1.0 V

Without CONSULT

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition	Voltage (Approx.)
Secondary pressure sensor	E32	37 - Ground	“N” position idle	1.0 V



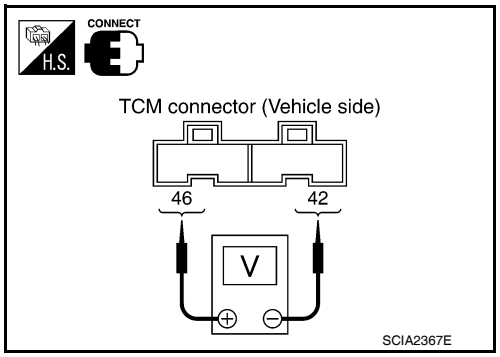
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK SENSOR POWER AND SENSOR GROUND

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between TCM connector terminals.

Item	Connector	Terminal	Data (Approx.)
TCM connector	E32	46 - 42	5.0 V



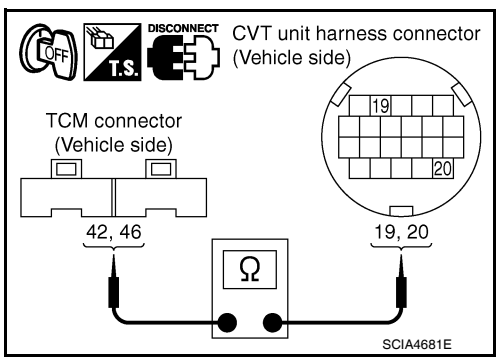
OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
CVT unit harness connector	F46	19	
TCM	E32	46	Yes
CVT unit harness connector	F46	20	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

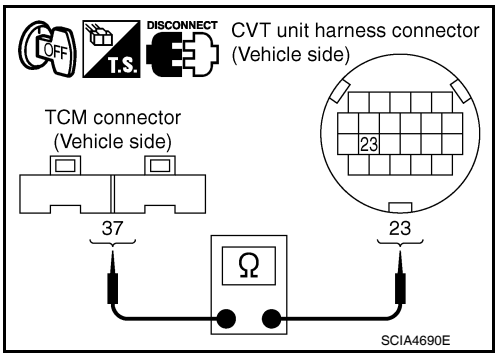
OK >> Replace TCM. Refer to CVT-159, "Removal and Installation" .

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND SECONDARY PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	37	Yes
CVT unit harness connector	F46	23	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform CVT-105, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

P0841 TRANSMISSION FLUID PRESSURE SEN/SW A

Description

INFOID:0000000007329734

Using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal, TCM changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley to control the gear ratio.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329735

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
PRI HYDR SEN	“N” position idle	0.7 V
SEC HYDR SEN		1.0 V

On Board Diagnosis Logic

INFOID:0000000007329736

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0841” with CONSULT is detected when secondary fluid pressure is too high compared with the commanded value while driving.

Possible Cause

INFOID:0000000007329737

- Secondary pressure sensor
- Harness or connectors
  (Sensor circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329738

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 12 consecutive seconds.
   VEHICLE SPEED: 40 km/h (25 MPH) More than
   RANGE: “D” position
3. If DTC is detected, go to CVT-109, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329739

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated?

YES >> Check CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

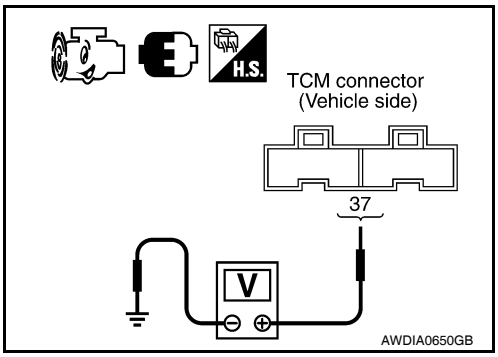
2.CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “SEC HYDR SEN” and “PRI HYDR SEN”.

Item name	Condition	Display value (Approx.)
PRI HYDR SEN	“N” position idle	0.7 V
SEC HYDR SEN		1.0 V

Without CONSULT
1. Start engine.
2. Check voltage between TCM connector terminals and ground.



Name	Connector	Terminal	Condition	Voltage (Approx.)
Secondary pressure sensor	E32	37 - Ground	“N” position idle	1.0 V

OK or NG
OK >> GO TO 6.
NG >> GO TO 3.

3. CHECK LINE PRESSURE

Perform line pressure test. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG
OK >> GO TO 4.
NG >> Repair or replace damaged parts. Refer to CVT-37, "Inspections before Trouble Diagnosis".

4. CHECK SECONDARY PRESSURE SENSOR SYSTEM

Check secondary pressure sensor system. Refer to CVT-105.

OK or NG
OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

Check the following:
- Line pressure solenoid valve. Refer to CVT-94, "Component Inspection".
- Step motor. Refer to CVT-132, "Component Inspection".

OK or NG6
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform CVT-109, "DTC Confirmation Procedure".

OK or NG
OK >> **INSPECTION END**
NG >> Replace TCM or transaxle assembly. Refer to CVT-184, "Removal and Installation".

P0868 TRANSMISSION FLUID PRESSURE

Description

INFOID:0000000007329740

- The secondary pressure solenoid valve is included in the control valve assembly.
- The secondary pressure solenoid valve regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329741

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
SEC PRESS	“N” position idle	0.8 MPa

On Board Diagnosis Logic

INFOID:0000000007329742

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0868” with CONSULT is detected when secondary fluid pressure is too low compared with the commanded value while driving.

Possible Cause

INFOID:0000000007329743

- Harness or connectors
  (Solenoid circuit is open or shorted.)
- Secondary pressure solenoid valve system
- Secondary pressure sensor
- Line pressure control system

DTC Confirmation Procedure

INFOID:0000000007329744

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that output voltage of CVT fluid temperature sensor is within the range below.
   ATF TEMP SEN: 1.0 - 2.0 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)
3. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VEHICLE SPEED (accelerate slowly): 0 → 50 km/h (31 MPH)
   ACC PEDAL OPEN: 0.5/8 - 1.0/8
   RANGE: “D” position
4. If DTC is detected, go to CVT-111, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329745

1.CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “SEC PRESS”.

Item name	Condition	Display value (Approx.)
SEC PRESS	“N” position idle	0.8 MPa

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK LINE PRESSURE

Perform line pressure test. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts. Refer to CVT-37, "Inspections before Trouble Diagnosis".

3.DETECT MALFUNCTIONING ITEM

Check the following:
- Secondary pressure solenoid valve. Refer to CVT-103, "Component Inspection".
- Line pressure solenoid valve. Refer to CVT-94, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SECONDARY PRESSURE SENSOR SYSTEM

Check secondary pressure sensor system. Refer to CVT-105.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.DETECT MALFUNCTIONING ITEM

Check the following:
- Power supply and ground circuit for TCM. Refer to CVT-114, "Wiring Diagram - CVT - POWER".
- The TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6.CHECK DTC

Perform CVT-111, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

P1701 TCM

Description

INFOID:0000000007329746

When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops, malfunction is detected.

NOTE:
Since “P1701” will be indicated when replacing TCM, perform diagnosis after erasing “SELF-DIAG RESULTS”

On Board Diagnosis Logic

INFOID:0000000007329747

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1701” with CONSULT is detected when TCM does not receive the voltage signal from the battery power supply.
- This is not a malfunction message. (Whenever shutting OFF a power supply to the TCM, this message appears on the screen.)

Possible Cause

INFOID:0000000007329748

Harness or connectors
(Battery or ignition switch and TCM circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329749

NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

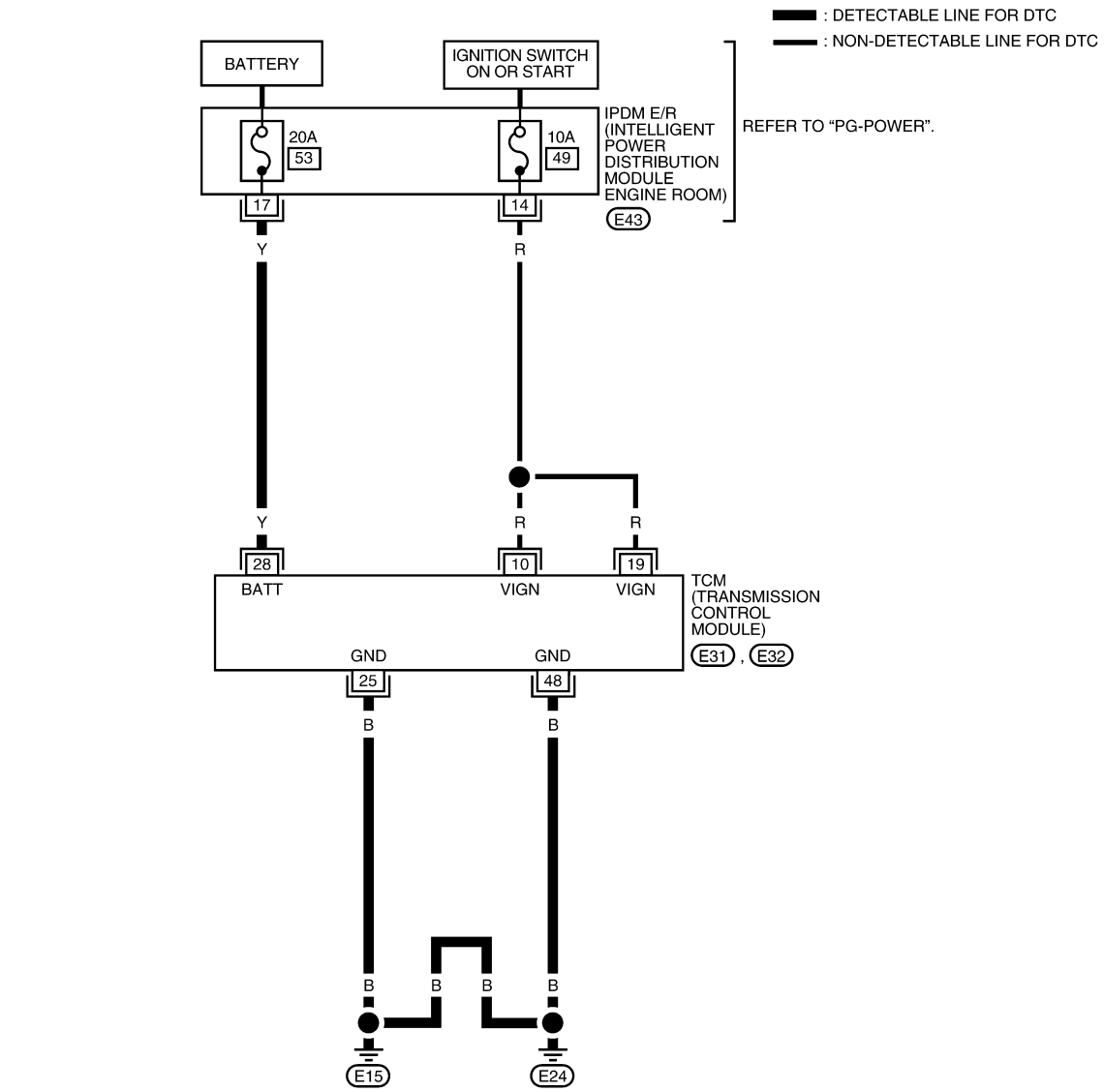
WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Wait for at least 2 consecutive seconds.
4. If DTC is detected, go to CVT-115, "Diagnosis Procedure" .

Wiring Diagram - CVT - POWER

INFOID:0000000007329750

CVT-POWER-01



ABDWA0420GB

TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value" .

Diagnosis Procedure

INFOID:0000000007329751

1.CHECK DTC

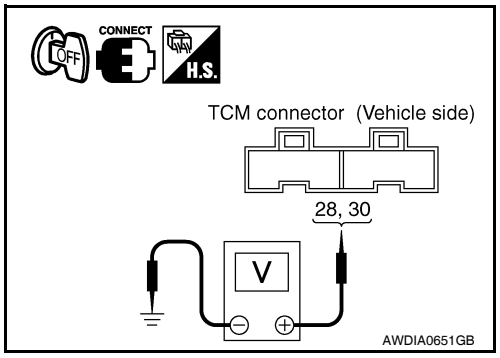
1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.
3. Erase self-diagnostic results. Refer to CVT-27, "OBD-II Diagnostic Trouble Code (DTC)" .
4. Turn ignition switch OFF, and wait for 5 seconds or more.
5. Start engine.
6. Confirm self-diagnostic results again. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is the “P1701” displayed?

YES >> GO TO 2.
NO >> **INSPECTION END**

2.CHECK TCM POWER SOURCE, STEP 1

1. Turn ignition switch OFF.
2. Check voltage between TCM connector terminal and ground.



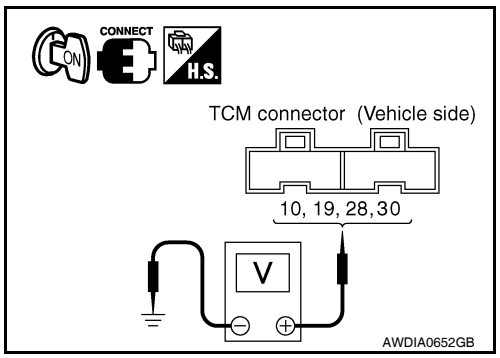
Name	Connector	Terminal	Condition	Voltage (Approx.)
Power supply (memory back-up)	E32	28, 30 - Ground	Always	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK TCM POWER SOURCE, STEP 2

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



Name	Connector	Terminal	Condition	Voltage (Approx.)
Power supply	E31	10 - Ground	ON	Battery voltage
			OFF	0 V
Power supply		19 - Ground	ON	Battery voltage
			OFF	0 V
Power supply (memory back-up)	E32	28, 30 - Ground	Always	Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between battery and TCM connector terminal 28
- Harness for short or open between ignition switch and TCM connector terminal 10, 19

- 10 A fuse (No.49, located in the IPDM E/R)
- 20 A fuse (No.53, located in the IPDM E/R)
- Ignition switch. Refer to PG-4 .

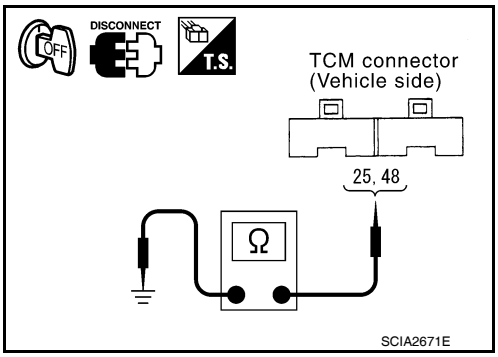
OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground.

Name	Connector	Terminal	Continuity
Ground	E32	25	Yes
		48	



OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK DTC

Perform CVT-113, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P1705 TP SENSOR

Description

INFOID:0000000007329752

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor etc. The actuator sends a signal to the ECM, and ECM sends the signal to TCM with CAN communication.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329753

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8

On Board Diagnosis Logic

INFOID:0000000007329754

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1705” with CONSULT is detected when TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.

Possible Cause

INFOID:0000000007329755

- ECM
- Harness or connectors
  (CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329756

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT
1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Depress accelerator pedal fully and release it, then wait for 5 seconds.
4. If DTC is detected, go to CVT-117, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329757

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated?

YES >> Check the CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

2.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “ACC PEDAL OPEN”.

Item name	Condition	Display value (Approx.)
ACC PEDAL OPEN	Release accelerator pedal. ↓ Fully depressed accelerator pedal	0.0/8 ↓ 8.0/8

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK DTC WITH ECM

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT. Refer to EC-119, "CONSULT Function (ENGINE)".

OK or NG

OK >> GO TO 4.
NG >> Check the DTC Detected Item. Go to EC-119, "CONSULT Function (ENGINE)".

4. CHECK DTC

Perform CVT-117, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

P1722 VEHICLE SPEED

Description

INFOID:0000000007329758

The vehicle speed signal is transmitted from ABS actuator and electric unit (control unit) to TCM by CAN communication line.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329759

Remarks: Specification data are reference values.

Item name	Condition	Display value
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
VEHICLE SPEED		

On Board Diagnosis Logic

INFOID:0000000007329760

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1722” with CONSULT is detected when TCM does not receive the proper vehicle speed signal (input by CAN communication) from ABS actuator and electric unit (control unit).

Possible Cause

INFOID:0000000007329761

- Harness or connectors
  (Sensor circuit is open or shorted.)
- ABS actuator and electric unit (control unit)

DTC Confirmation Procedure

INFOID:0000000007329762

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   ACC PEDAL OPEN: 1.0/8 or less
   VEHICLE SPEED SE: 30 km/h (17 MPH) or more
4. If DTC is detected, go to CVT-119, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329763

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated?

YES >> Check CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform ABS actuator and electric unit (control unit) self-diagnosis check. Refer to BRC-25, "CONSULT Function (ABS)".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Drive vehicle and read out the value of “VEHICLE SPEED” and “ESTM VSP SIG”.

Item name	Condition	Display value
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
VEHICLE SPEED		

4. Check if there is a great difference between the two values.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK TCM

Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-119, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1723 SPEED SENSOR

Description

INFOID:0000000007329764

- The primary speed sensor is included in the control valve assembly.
- The secondary speed sensor detects the revolution of the idler gear and generates a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.
- The primary speed sensor detects the primary pulley revolution speed and sends a signal to the TCM.

On Board Diagnosis Logic

INFOID:0000000007329765

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1723” with CONSULT is detected when there is a great difference between the vehicle speed signal and the secondary speed sensor signal.

CAUTION:
One of the “P0720”, the “P0715” or the “P0725“ is displayed with the DTC at the same time.

Possible Cause

INFOID:0000000007329766

- Harness or connectors
  (Sensor circuit is open or shorted.)
- Secondary speed sensor
- Primary speed sensor
- Engine speed signal system

DTC Confirmation Procedure

INFOID:0000000007329767

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED SE: 10 km/h (6 MPH) or more
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   ENG SPEED: 450 rpm or more
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
3. If DTC is detected, go to CVT-121, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329768

1.CHECK STEP MOTOR FUNCTION

Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is a malfunction in the step motor function indicated in the results?

YES >> Repair or replace damaged parts. (Check the step motor function. Refer to CVT-133.)
NO >> GO TO 2.

2.CHECK SECONDARY SPEED SENSOR SYSTEM AND PRIMARY SPEED SENSOR SYSTEM

Check secondary speed sensor system and primary speed sensor system. Refer to CVT-76, CVT-72.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK ENGINE SPEED SIGNAL SYSTEM

Check engine speed signal system. Refer to CVT-81.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

Check the following:
- Power supply and ground circuit for TCM. Refer to CVT-113.
- The TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform CVT-121, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace TCM or transaxle assembly. Refer to CVT-159, "Removal and Installation", CVT-184, "Removal and Installation".

P1726 THROTTLE CONTROL SIGNAL

Description

INFOID:0000000007329769

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor etc. The actuator sends a signal to the ECM, and ECM sends the signal to TCM with CAN communication.

On Board Diagnosis Logic

INFOID:0000000007329770

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1726” with CONSULT is detected when the electronically controlled throttle for ECM is malfunctioning.

Possible Cause

INFOID:0000000007329771

Harness or connectors
(Sensor circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329772

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and let it idle for 5 second.
4. If DTC is detected, go to CVT-123, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329773

1.CHECK DTC WITH ECM

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT. Refer to EC-119, "CONSULT Function (ENGINE)".

OK or NG

OK >> GO TO 2.
NG >> Check the DTC Detected Item. Refer to EC-119, "CONSULT Function (ENGINE)".
- If CAN communication line is detected, go to CVT-56.

2.CHECK DTC

Perform CVT-123, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

Check the following:
- The TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace TCM. Refer to CVT-159, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1740 SELECT SOLENOID

Description

INFOID:0000000007329774

- The lock-up select solenoid valve is included in the control valve assembly.
- The lock-up select solenoid valve controls lock-up clutch pressure or forward clutch pressure (reverse brake pressure).
- When controlling lock-up clutch, the valve is turned OFF. When controlling forward clutch, it is turned ON.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329775

Item name	Condition	Display value
LUSEL SOL OUT	Selector lever in “P” and “N” positions	on
	Wait at least for 5 seconds with the selector lever in “R”, “D” and “L” positions	off

On Board Diagnosis Logic

INFOID:0000000007329776

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1740” with CONSULT is detected under the following conditions.

- When TCM compares target value with monitor value and detects an irregularity.

Possible Cause

INFOID:0000000007329777

- Lock-up select solenoid valve
- Harness or connectors
  (Solenoid circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329778

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   RANGE: “D” position and “N” position
   (At each time, wait for 5 seconds.)
4. If DTC is detected, go to CVT-126, "Diagnosis Procedure" .

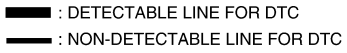
WITH GST

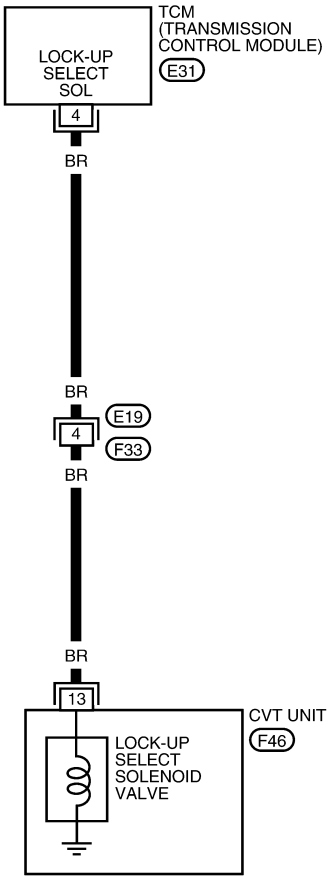
Follow the procedure “WITH CONSULT”.

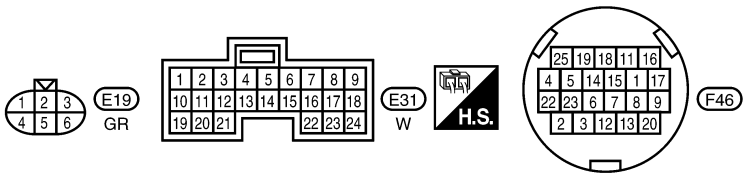
Wiring Diagram - CVT - L/USSV

INFOID:0000000007329779

CVT-L/USSV-01







BCWA0680E

TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329780

1. CHECK INPUT SIGNAL

With CONSULT

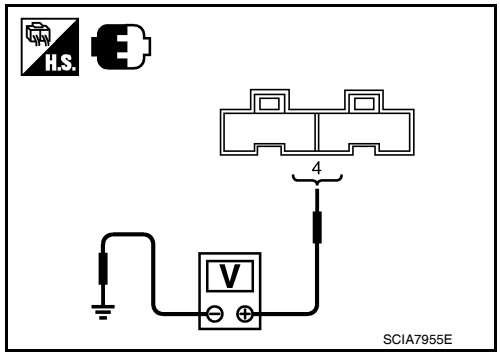
1. Turn ignition switch ON.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out the value of “LUSEL SOL OUT”.

Item name	Condition	Display value
LUSEL SOL OUT	Selector lever in “P” and “N” positions	on
	Wait at least for 5 seconds with the selector lever in “R”, “D” and “L” positions	off

Without CONSULT

1. Turn ignition switch ON.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition	Voltage (Approx.)
Lock-up select solenoid valve	E31	4 - Ground	Selector lever in “P” and “N” positions	Battery voltage
			Wait at least for 5 seconds with the selector lever in “R”, “D” and “L” positions	0 V



3. Turn ignition switch OFF.
4. Disconnect the TCM connector.
5. Check if there is continuity between connector terminal and ground.

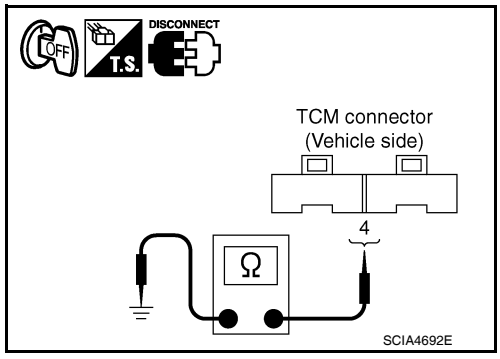
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK LOCK-UP SELECT SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Lock-up select solenoid valve	E31	4 - Ground	6 - 19 Ω



OK or NG

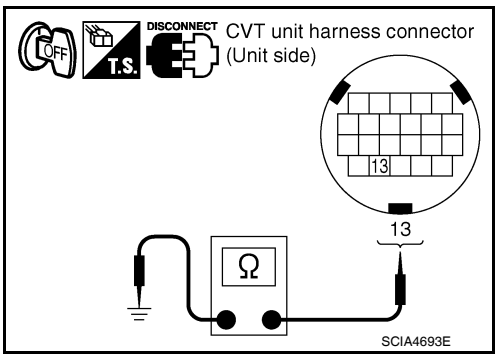
OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.

3. Check resistance between CVT unit harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Lock-up select solenoid valve	F46	13 - Ground	6 - 19 Ω



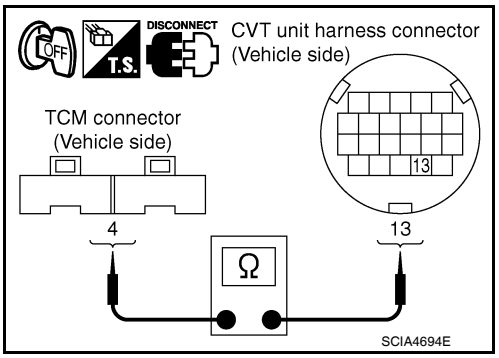
OK or NG

OK >> GO TO 4.
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

4. CHECK HARNESS BETWEEN TCM AND LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	4	Yes
CVT unit harness connector	F46	13	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform CVT-124, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Repair or replace damaged parts.
2. Replace TCM. Refer to CVT-159, "Removal and Installation" .

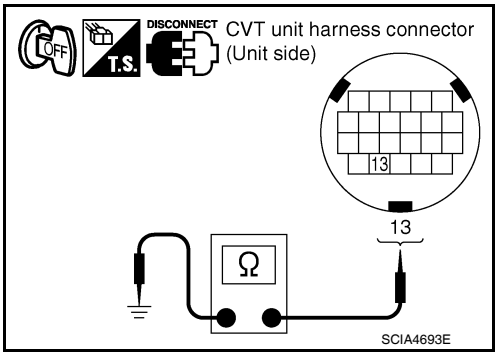
Component Inspection

INFOID:0000000007329781

LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Lock-up select solenoid valve	F46	13 - Ground	6 - 19 Ω



4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P1745 LINE PRESSURE CONTROL

Description

INFOID:0000000007329782

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

On Board Diagnosis Logic

INFOID:0000000007329783

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1745” with CONSULT is detected when TCM detects the unexpected line pressure.

Possible Cause

INFOID:0000000007329784

TCM

DTC Confirmation Procedure

INFOID:0000000007329785

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that output voltage of CVT fluid temperature sensor is within the range below.
   ATF TEMP SEN: 1.0 - 2.0 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)
3. If DTC is detected, go to CVT-128, "Diagnosis Procedure" .

Diagnosis Procedure

INFOID:0000000007329786

1.CHECK DTC

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.
3. Erase self-diagnostic results. Refer to CVT-27, "OBD-II Diagnostic Trouble Code (DTC)".
4. Turn ignition switch OFF, and wait for 10 seconds or more.
5. Start engine.
6. Confirm self-diagnostic results again. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is the “P1745” displayed?

YES >> Replace TCM. Refer to CVT-159, "Removal and Installation" .
NO >> **INSPECTION END**

P1777 STEP MOTOR

Description

INFOID:0000000007329787

- The step motor is included in the control valve assembly.
- The step motor changes the step with turning 4 coils ON/OFF according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329788

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
STM STEP	During driving	(–20) - (+180) step
SMCOIL A		Changes on⇔off.
SMCOIL B		
SMCOIL C		
SMCOIL D		

On Board Diagnosis Logic

INFOID:0000000007329789

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1777” with CONSULT is detected under the following conditions.

- When operating step motor ON and OFF, there is no proper change in the voltage of TCM terminal which corresponds to it.

Possible Cause

INFOID:0000000007329790

- Step motor
- Harness or connectors
  (Step motor circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000007329791

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Drive vehicle for at least 5 consecutive seconds.
3. If DTC is detected, go to CVT-131, "Diagnosis Procedure" .

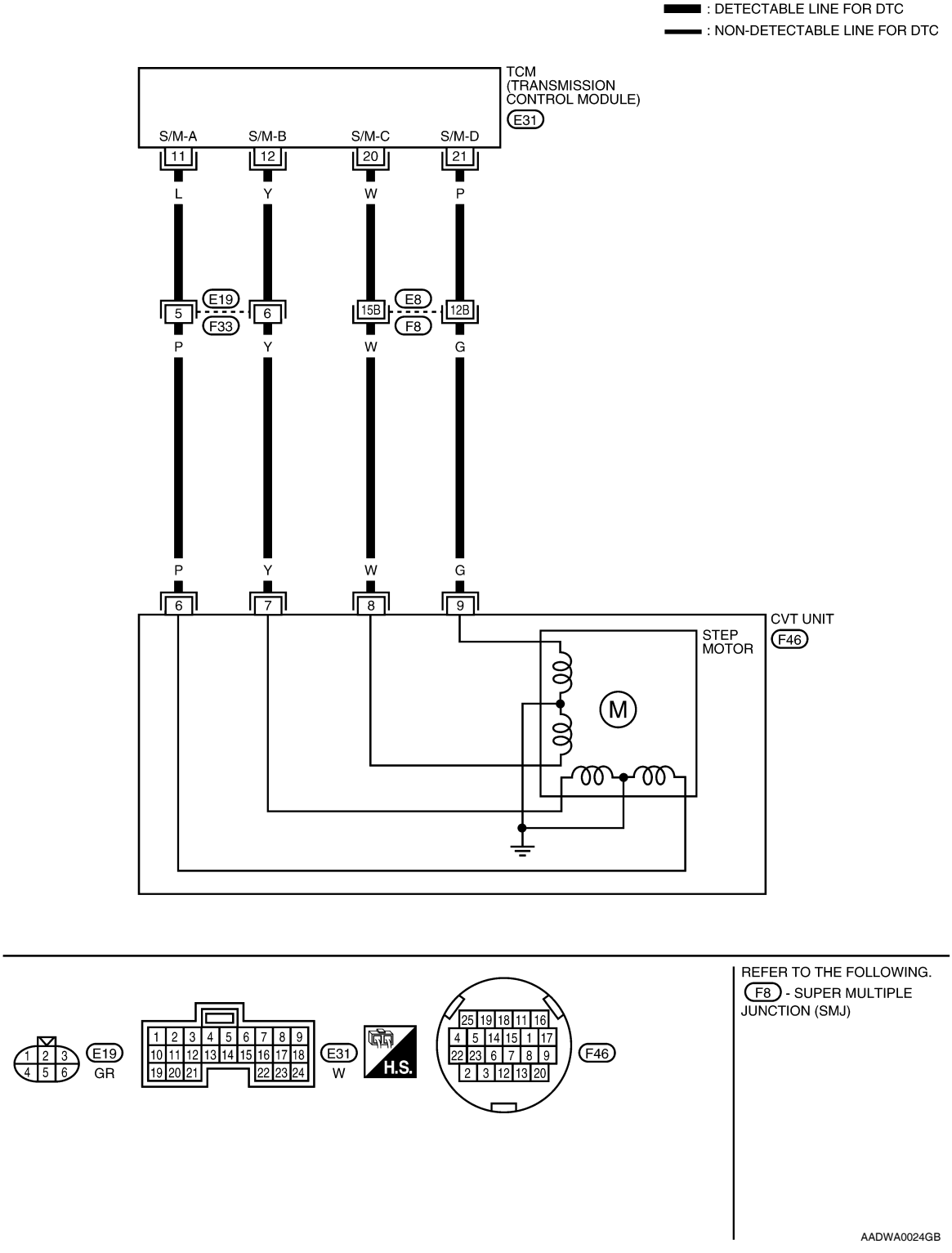
WITH GST

Follow the procedure “WITH CONSULT”.

Wiring Diagram - CVT - STM

INFOID:0000000007329792

CVT-STM-01



TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329793

1.CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start vehicle and read out the value of “STM STEP”, “SMCOIL A”, “SMCOIL B”, “SMCOIL C”, and “SMCOIL D”.

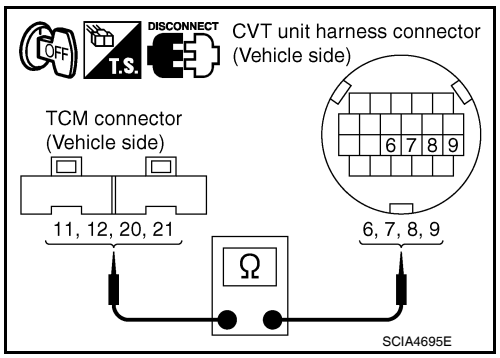
Item name	Condition	Display value (Approx.)
STM STEP	During driving	(–20) - (+180) step
SMCOIL A		Changes on⇔off.
SMCOIL B		
SMCOIL C		
SMCOIL D		

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK HARNESS BETWEEN TCM AND STEP MOTOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit connector and TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.



Item	Connector	Terminal	Continuity
TCM	E31	11	Yes
CVT unit harness connector	F46	6	
TCM	E31	12	Yes
CVT unit harness connector	F46	7	
TCM	E31	20	Yes
CVT unit harness connector	F46	8	
TCM	E31	21	Yes
CVT unit harness connector	F46	9	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and CVT assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK STEP MOTOR

Check step motor. Refer to CVT-132, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform CVT-129, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

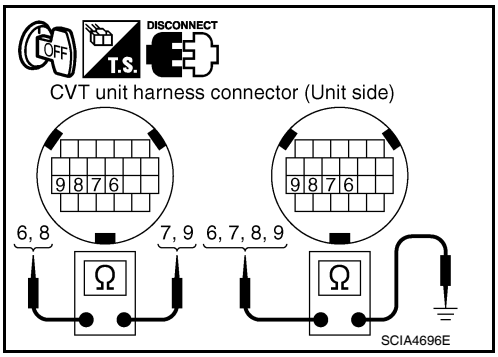
OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000007329794

STEP MOTOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminals and ground.



Name	Connector	Terminal	Resistance (Approx.)
Step motor	F46	6 - 7	30 Ω
		8 - 9	
		6 - Ground	15 Ω
		7 - Ground	
		8 - Ground	
		9 - Ground	

4. If NG, replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .

P1778 STEP MOTOR

Description

INFOID:0000000007329795

- The step motor is included in the control valve assembly.
- The step motor's 4 aspects of ON/OFF change according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.
- This diagnosis item is detected when electrical system is OK, but mechanical system is NG.
- This diagnosis item is detected when the state of the changing the speed mechanism in unit does not operate normally.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329796

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
STM STEP	During driving	(–20) - (+180) step
GEAR RATIO		2.56 - 0.43

On Board Diagnosis Logic

INFOID:0000000007329797

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1778” with CONSULT is detected under the following conditions.

- When not changing the pulley ratio according to the instruction of TCM.

Possible Cause

INFOID:0000000007329798

Step motor

DTC Confirmation Procedure

INFOID:0000000007329799

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Before starting “DTC Confirmation Procedure”, confirm “Hi” or “Mid” or “Low” fixation by “PRI SPEED” and “VEHICLE SPEED” on “DATA MONITOR MODE”.**
- **If hi-geared fixation occurred, go to CVT-134, "Diagnosis Procedure".**

NOTE:

If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

After the repair, touch “ERASE” on “SELF-DIAG RESULTS” and then perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that output voltage of CVT fluid temperature sensor is within the range below.
   ATF TEMP SEN: 1.0 - 2.0 V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)
3. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
4. Start engine and maintain the following conditions for at least 30 consecutive seconds.
   TEST START FROM 0 km/h (0 MPH)
   CONSTANT ACCELERATION: Keep 30 sec or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ACC PEDAL OPEN: More than 1.0/8
   RANGE: “D” position
   ENG SPEED: 450 rpm or more
5. If DTC is detected, go to CVT-134, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007329800

1.CHECK STEP MOTOR

With CONSULT
It is monitoring whether “GEAR RATIO: 2.56 - 0.43” changes similarly to “STM STEP: (–20) - (+180)” by DATA MONITOR mode. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Without CONSULT
Inspect the engine speed (rise and descend), vehicle speed, throttle position, and check shift change. Refer to CVT-187, "Vehicle Speed When Shifting Gears".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

OVERDRIVE CONTROL SWITCH

Description

INFOID:0000000007329801

- Overdrive control switch is installed to the selector lever.
- O/D OFF indicator turns ON, and overdrive driving activates when pressing the overdrive control switch while driving in “D” position. O/D OFF indicator turns OFF, and “D” position driving starts when pressing the overdrive control switch while driving in the overdrive-off mode. Shifting the selector lever in any position other than “D” releases the overdrive-off mode.

CONSULT Reference Value in Data Monitor Mode

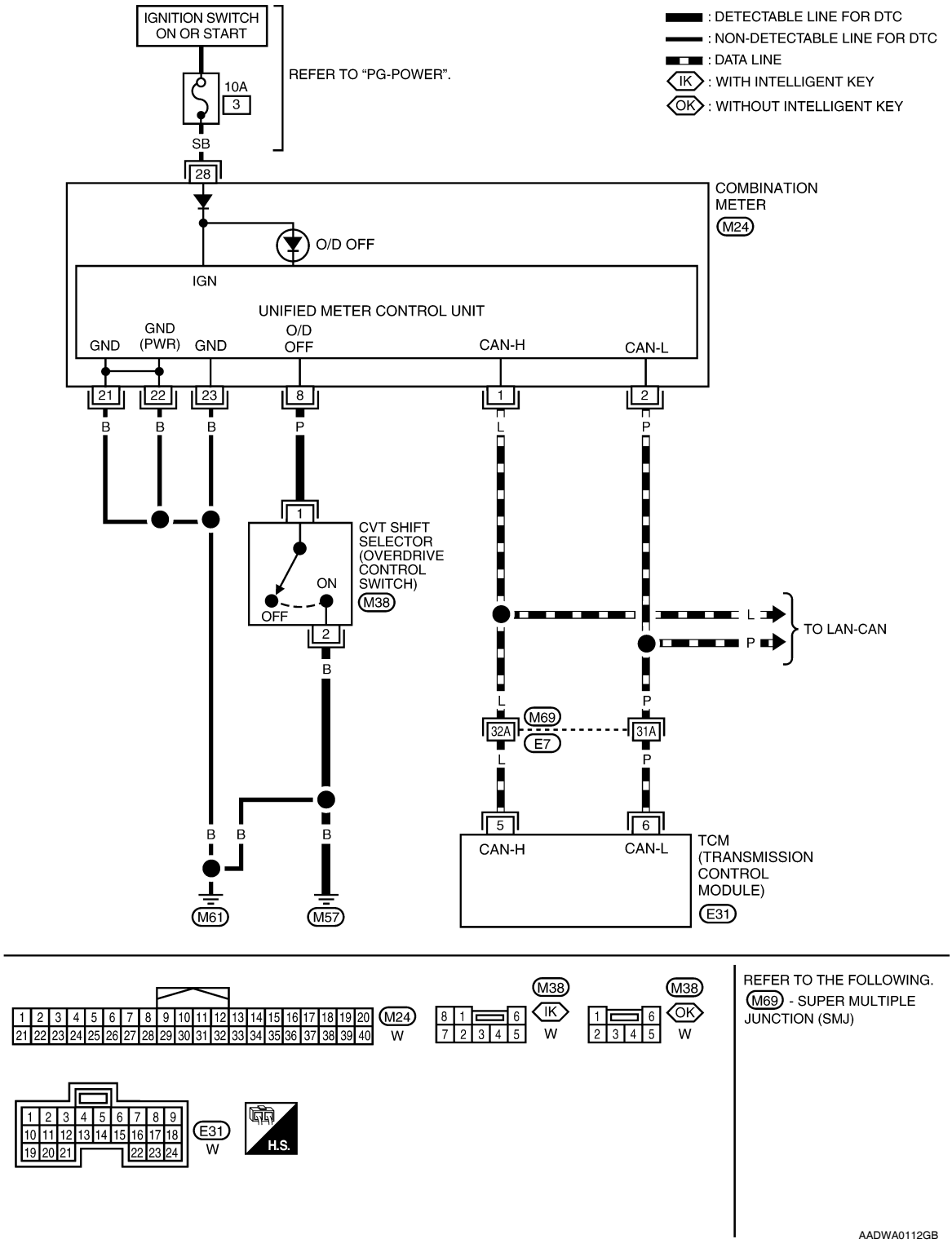
INFOID:0000000007329802

Item name	Condition	Display value
SPORT MODE SW	While pushing overdrive cancel switch	on
	Other conditions	off

Wiring Diagram - CVT - ODSW

INFOID:0000000007329803

CVT-ODSW-01



TCM TERMINALS AND REFERENCE VALUES

Refer to CVT-46, "TCM Terminal and Reference Value".

Diagnosis Procedure

INFOID:0000000007329804

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated in the results?

YES >> Check CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out ON/OFF switching action of the “SPORT MODE SW”.

Item name	Condition	Display value
SPORT MODE SW	While pushing overdrive control switch	on
	Other conditions	off

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3.CHECK OVERDRIVE CONTROL SWITCH

Check overdrive control switch. Refer to CVT-138, "Component Inspection"

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SELF-DIAGNOSTIC RESULTS (COMBINATION METER)

Perform self-diagnosis check. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

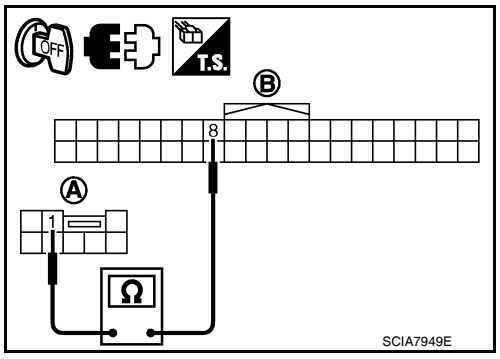
Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO - 1 >> With Intelligent Key: GO TO 5.
NO - 2 >> Without Intelligent Key: GO TO 6.

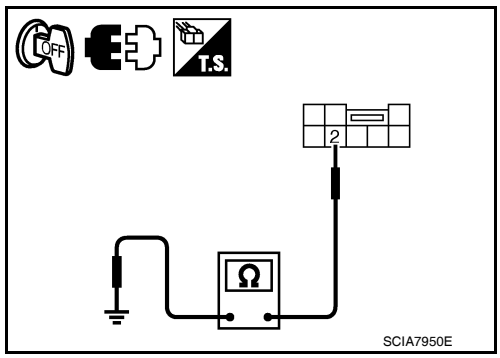
5.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect CVT shift selector connector and combination meter connector.
3. Check continuity between CVT shift selector harness connector (A) terminal and combination meter harness connector (B) terminal.

Item	Connector	Terminal	Continuity
CVT shift selector harness connector	M38	1	Yes
Combination meter harness connector	M24	8	



4. Check continuity between CVT shift selector harness connector terminal and ground.



Item	Connector	Terminal	Continuity
CVT shift selector harness connector	M38	2 - ground	Yes

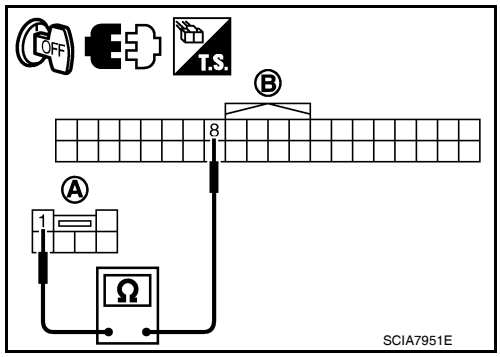
5. If OK, check harness for short to ground and short to power.
6. Reinstall any part removed.

OK or NG

OK >> **INSPECTION END**
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

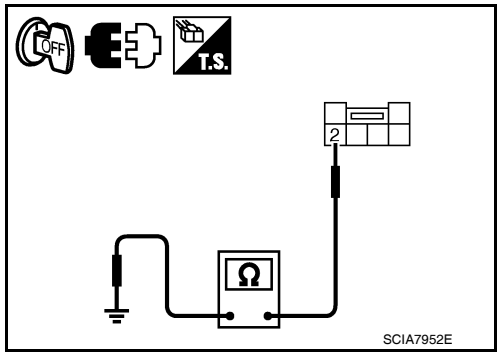
6. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect CVT shift selector connector and combination meter connector.
3. Check continuity between CVT shift selector harness connector (A) terminal and combination meter harness connector (B) terminal.



Item	Connector	Terminal	Continuity
CVT shift selector harness connector	M38	1	Yes
Combination meter harness connector	M24	8	

4. Check continuity between CVT shift selector harness connector terminal and ground.



Item	Connector	Terminal	Continuity
CVT shift selector harness connector	M38	2 - ground	Yes

5. If OK, check harness for short to ground and short to power.
6. Reinstall any part removed.

OK or NG

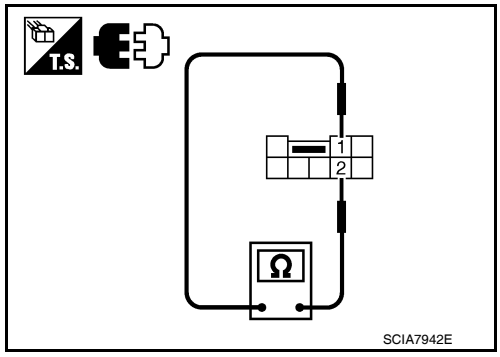
OK >> **INSPECTION END**
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:0000000007329805

OVERDRIVE CONTROL SWITCH

With Intelligent Key
Check continuity between CVT shift selector terminals.

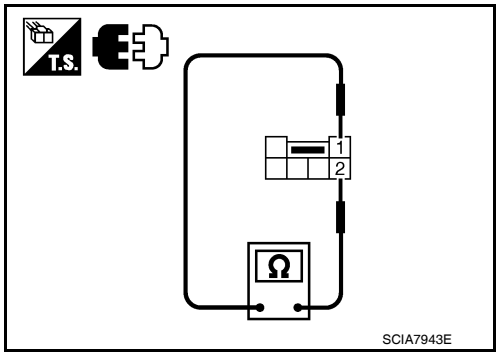


Item	Condition	Terminal	Continuity
Overdrive control switch	While pushing overdrive control switch	1 - 2	Yes
	Other conditions		No

Without Intelligent Key

Check continuity between CVT shift selector terminals.

Item	Condition	Terminal	Continuity
Overdrive control switch	While pushing overdrive control switch	1 - 2	Yes
	Other conditions		No



SHIFT POSITION INDICATOR CIRCUIT

Description

INFOID:0000000007329806

TCM sends the switch signals to combination meter via CAN communication line. Then selector lever position is indicated on the shift position indicator.

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007329807

Item name	Condition	Display value
RANGE	Selector lever in “N” or “P” position.	N·P
	Selector lever in “R” position.	R
	Selector lever in “D” position.	D
	Selector lever in “L” position.	L

Diagnosis Procedure

INFOID:0000000007329808

1.CHECK INPUT SIGNALS

With CONSULT

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT and read out the value of “RANGE”.
3. Check that the following three positions or indicators are same.

- Actual position of the selector lever
- “RANGE” on CONSULT screen
- Shift position indicator in the combination meter

OK or NG

OK >> **INSPECTION END**
NG >> Check the following.

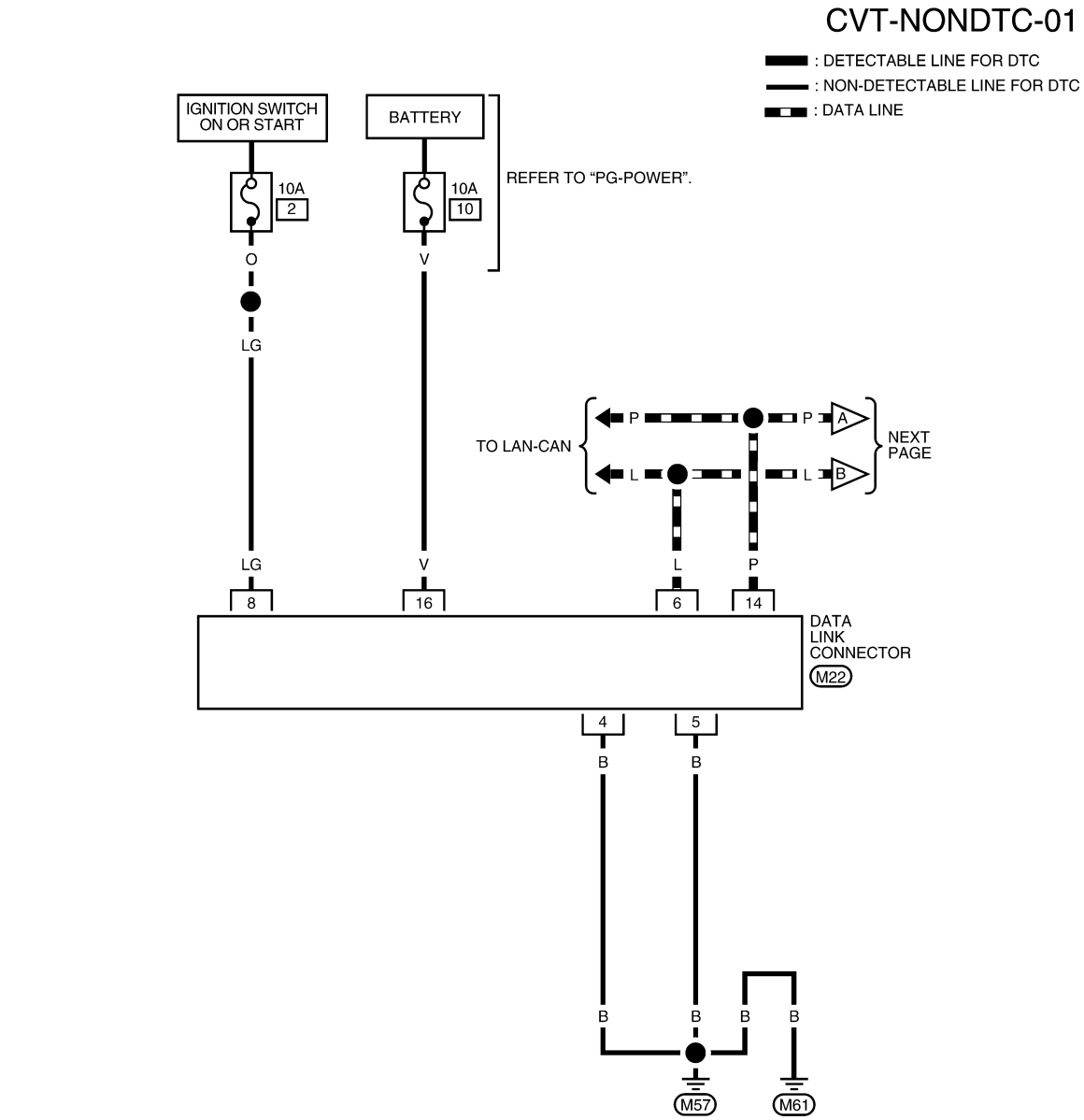
SHIFT POSITION INDICATOR SYMPTOM CHART

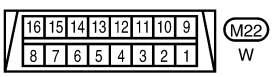
Items	Presumed location of trouble
Actual position does not change.	Transmission range switch • Refer to CVT-62. CVT main system (Fail-safe function actuated) • Refer to CVT-48, "CONSULT Function (TRANSMISSION)".
Shift position indicator in the combination meter does not indicate any position.	Perform the self-diagnosis for CVT and the combination meter. • Refer to CVT-48, "CONSULT Function (TRANSMISSION)" and DI-4.
Actual position changes, but the shift position indicator in the combination meter does not change.	
Actual position differs from the shift position indicator in the combination meter.	
Shift position indicator in the combination meter does not indicate specific position only.	Check the combination meter. • Refer to DI-4.

TROUBLE DIAGNOSIS FOR SYMPTOMS

Wiring Diagram - CVT - NONDTC

INFOID:0000000007329809





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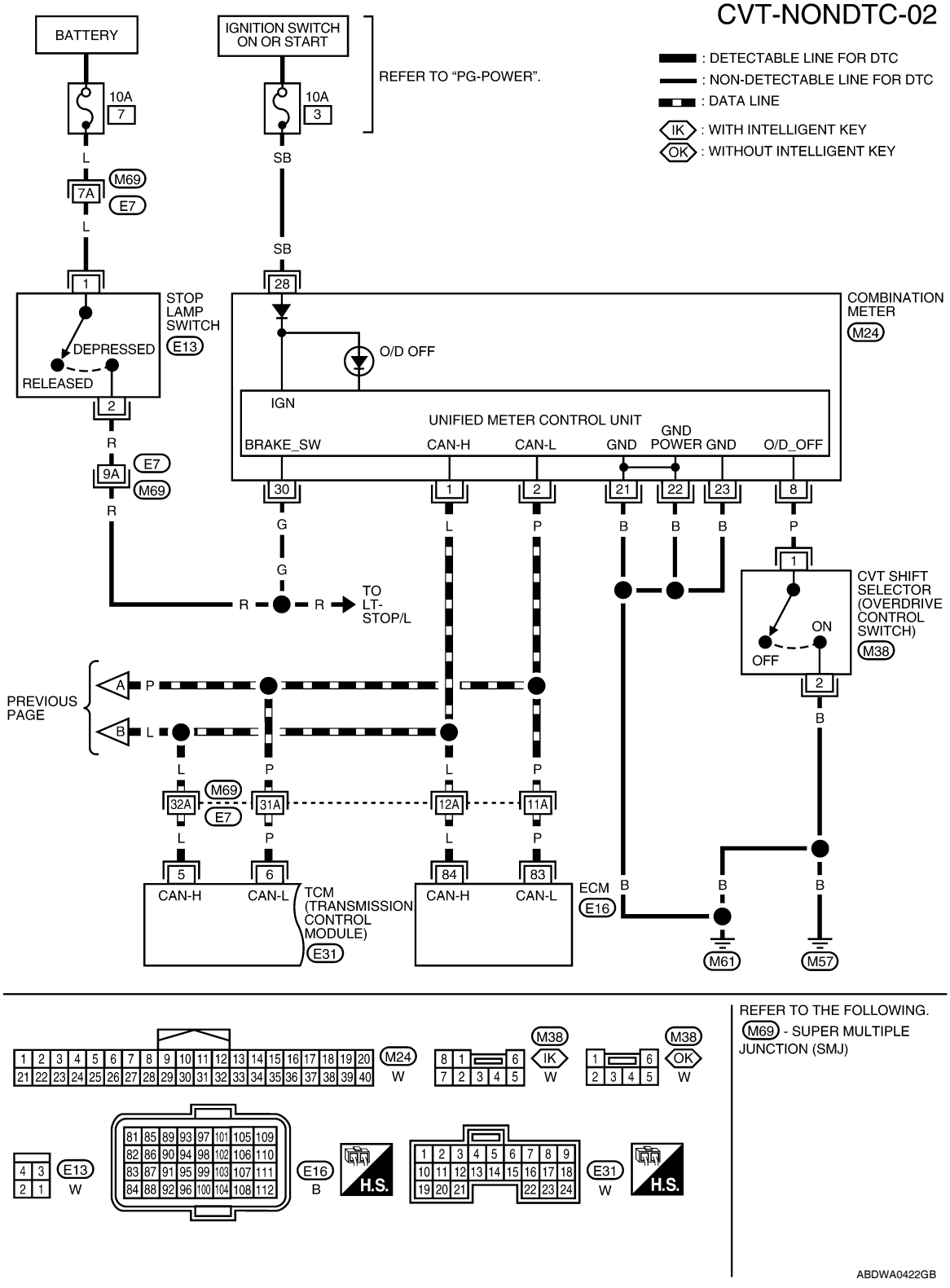
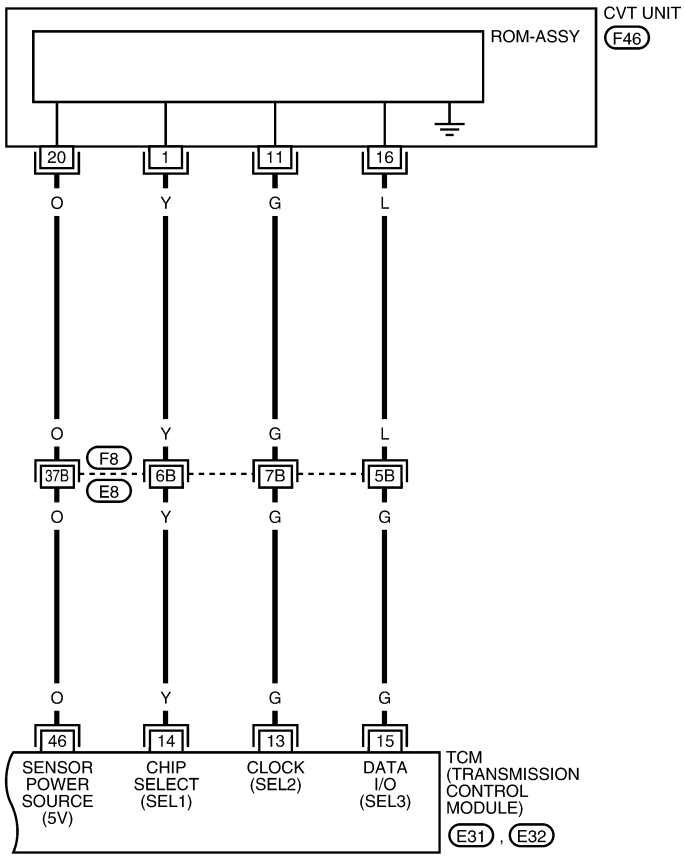
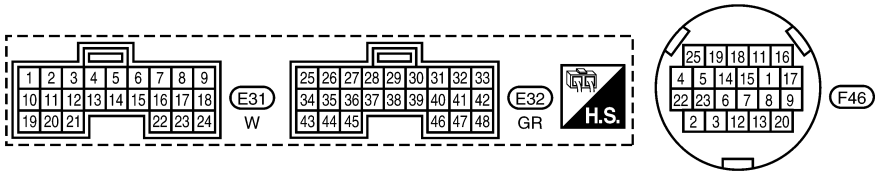

CVT-NONDTC-02
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE
IK : WITH INTELLIGENT KEY
OK : WITHOUT INTELLIGENT KEY
BATTERY
IGNITION SWITCH ON OR START
REFER TO "PG-POWER".
10A 7
10A 3
L
SB
M69
7A
E7
1
28
STOP LAMP SWITCH
E13
DEPRESSED
RELEASED
2
R
9A
COMBINATION METER
M24
O/D OFF
IGN
UNIFIED METER CONTROL UNIT
BRAKE_SW
CAN-H
CAN-L
GND
GND POWER GND
O/D_OFF
30
1
2
21
22
23
8
G
L
P
B
TO LT-STOP/L
CVT SHIFT SELECTOR (OVERDRIVE CONTROL SWITCH)
M38
ON
OFF
PREVIOUS PAGE
A
B
32A
31A
12A
11A
5
6
84
83
CAN-H
CAN-L
TCM (TRANSMISSION CONTROL MODULE)
E31
ECM
E16
M61
M57
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
M24
W
IK
OK
E13
E16
B
H.S.
ABDWA0422GB

CVT-NONDTC-03

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

AADWA0028GB

TCM TERMINALS AND REFERENCE VALUES
Refer to CVT-46, "TCM Terminal and Reference Value".

O/D OFF Indicator Lamp Does Not Come On

INFOID:0000000007329810

SYMPTOM:

O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch ON.

DIAGNOSTIC PROCEDURE

1.CHECK CAN COMMUNICATION LINE

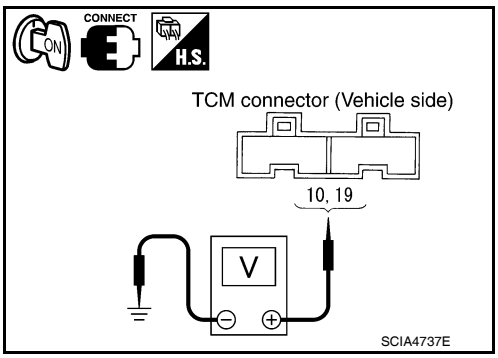
Perform the self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction of the “U1000” indicated in the results?

YES >> Check CAN communication line. Refer to CVT-56.
NO >> GO TO 2.

2.CHECK TCM POWER SOURCE

1. Turn ignition switch ON.
2. Check voltage between TCM connector terminals and ground. Refer to CVT-114, "Wiring Diagram - CVT - POWER".



Name	Connector	Terminal	Voltage (Approx.)
Power supply	E31	10	Battery voltage
		19	Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

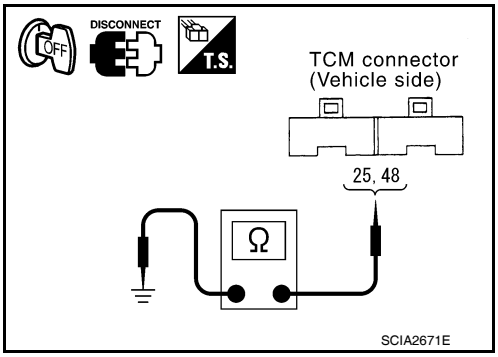
Check the following.
- Harness for short or open between ignition switch and TCM connector terminal 10, 19 Refer to CVT-114, "Wiring Diagram - CVT - POWER".
- 10 A fuse (No.49, located in the IPDM E/R). Refer to CVT-114, "Wiring Diagram - CVT - POWER".
- Ignition switch. Refer to PG-4.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground. Refer to CVT-114, "Wiring Diagram - CVT - POWER".



Name	Connector	Terminal	Continuity
Ground	E32	25	Yes
		48	

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp Refer to PG-4.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6.CHECK SYMPTOM

Check again. Refer to CVT-42, "Check before Engine Is Started".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK COMBINATION METERS

Check combination meters. Refer to DI-4

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Engine Cannot Be Started in "P" and "N" Position

INFOID:0000000007329811

SYMPTOM:

- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”, “L” or “R” position.**

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Do the self-diagnostic results indicate transmission range switch circuit?

YES >> Check transmission range switch circuit. Refer to CVT-62 .
NO >> GO TO 2.

2. CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position".

3. CHECK STARTING SYSTEM

Check starting system. Refer to SC-9.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

In "P" Position, Vehicle Moves Forward or Backward When Pushed

INFOID:0000000007329812

SYMPTOM:

Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Do the self-diagnostic results indicate transmission range switch circuit?

YES >> Check transmission range switch circuit. Refer to CVT-62.
NO >> GO TO 2.

2. CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position".

3. CHECK SYMPTOM

Check again. Refer to CVT-42, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".

In "N" Position, Vehicle Moves

INFOID:0000000007329813

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Do the self-diagnostic results indicate transmission range switch circuit?

YES >> Check transmission range switch circuit. Refer to CVT-62.
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position".

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK SYMPTOM

Check again. Refer to CVT-42, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".
NG >> Repair or replace damaged parts.

Large Shock "N" → "R" Position

INFOID:0000000007329814

SYMPTOM:
There is large shock when shifting from “N” to “R” position.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".
NO >> GO TO 2.

2.CHECK ENGINE IDLE SPEED

Check the engine idle speed. Refer to EC-85, "Idle Speed and Ignition Timing Check".

OK or NG

OK >> GO TO 3.
NG >> Repair.

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis".

5.SYMPTOM CHECK

Check again. Refer to CVT-42, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Backward in "R" Position

INFOID:0000000007329815

SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

Is any malfunction detected by self-diagnosis

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position".

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 5.

NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis".

5.CHECK STALL REVOLUTION

Check stall revolution. Refer to CVT-37, "Inspections before Trouble Diagnosis".

OK or NG

OK >> GO TO 6.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis".

6.CHECK SYMPTOM

Check again. Refer to CVT-42, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation".
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Forward in "D" or "L" Position

INFOID:0000000007329816

SYMPTOM:

Vehicle does not creep forward when selecting “D” or “L” position.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position" .

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid" .

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

5.CHECK STALL REVOLUTION

Check stall revolution. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

6.CHECK SYMPTOM

Check again. Refer to CVT-42, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

Vehicle Speed Does Not Change in "L" Position

INFOID:0000000007329817

SYMPTOM:

Vehicle speed does not change in “L” position while the cruise test.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position" .

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid" .

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

5.CHECK STALL REVOLUTION

Check stall revolution. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

6.CHECK SYMPTOM

Check again. Refer to CVT-43, "Cruise Test" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

Vehicle Speed Does Not Change in overdrive-off mode

INFOID:0000000007329818

SYMPTOM:

Vehicle speed does not change in overdrive-off mode while the cruise test.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH

Check overdrive control switch. Refer to CVT-135 .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid" .

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

5.CHECK STALL REVOLUTION

Check stall revolution. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

6.CHECK SYMPTOM

Check again. Refer to CVT-43, "Cruise Test" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

Vehicle Speed Does Not Change in "D" Position

INFOID:0000000007329819

SYMPTOM:

Vehicle speed does not change in “D” position while the cruise test.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position" .

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid" .

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

5.CHECK STALL REVOLUTION

Check stall revolution. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 6.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

6.CHECK SYMPTOM

Check again. Refer to CVT-43, "Cruise Test" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

Vehicle Does Not Decelerate by Engine Brake

INFOID:0000000007329820

SYMPTOM:

Engine brake does not operate when releasing the accelerator pedal while the cruise test.

DIAGNOSTIC PROCEDURE

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis check. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system. Refer to CVT-48, "CONSULT Function (TRANSMISSION)" .
NO >> GO TO 2.

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position"

OK or NG

OK >> GO TO 3.
NG >> Adjust CVT position. Refer to CVT-164, "Adjustment of CVT Position" .

3.CHECK CVT FLUID LEVEL

Check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid" .

OK or NG

OK >> GO TO 4.
NG >> Refill CVT fluid.

4.CHECK LINE PRESSURE

Check line pressure at idle. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

OK or NG

OK >> GO TO 5.
NG >> Check the malfunctioning item. Refer to CVT-37, "Inspections before Trouble Diagnosis" .

5.CHECK SYMPTOM

Check again. Refer to CVT-43, "Cruise Test" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to CVT-46, "TCM Terminal and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the transaxle assembly. Refer to CVT-184, "Removal and Installation" .
NG >> Repair or replace damaged parts.

CVT SHIFT LOCK SYSTEM

Description

INFOID:0000000007329821

WITH INTELLIGENT KEY

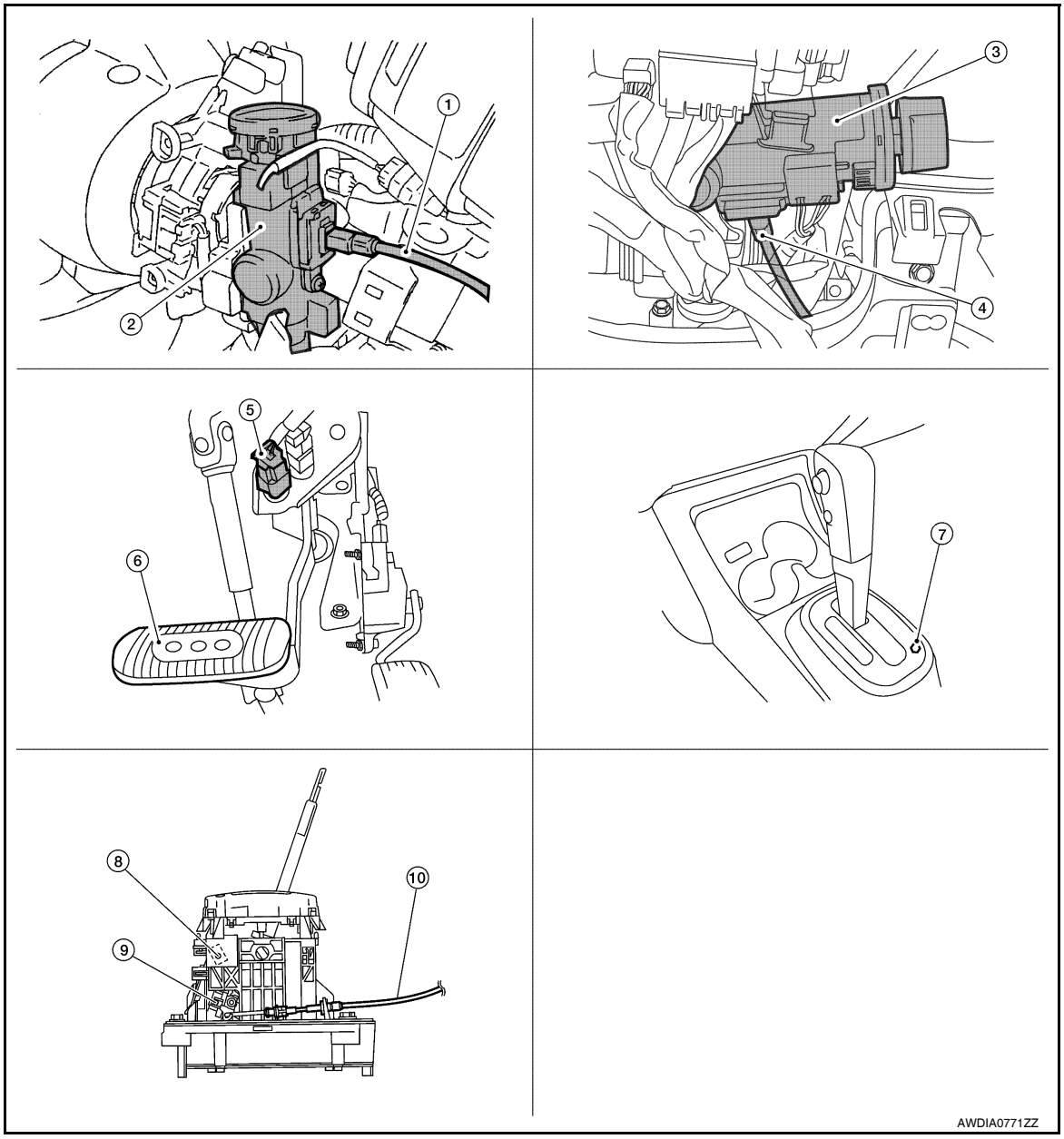
- The mechanical key interlock mechanism also operates as a shift lock:
  With the ignition knob switch turned to ON, selector lever cannot be shifted from “P” position to any other position unless brake pedal is depressed.
  With the ignition knob switch turned to OFF, selector lever cannot be shifted from “P” position to any other position.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the ignition knob switch, respectively.

WITHOUT INTELLIGENT KEY

- The mechanical key interlock mechanism also operates as a shift lock:
  With the ignition switch turned to ON, selector lever cannot be shifted from “P” position to any other position unless brake pedal is depressed.
  With the key removed, selector lever cannot be shifted from “P” position to any other position.
  The key cannot be removed unless selector lever is placed in “P” position.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside key cylinder, respectively.

Shift Lock System Electrical Parts Location

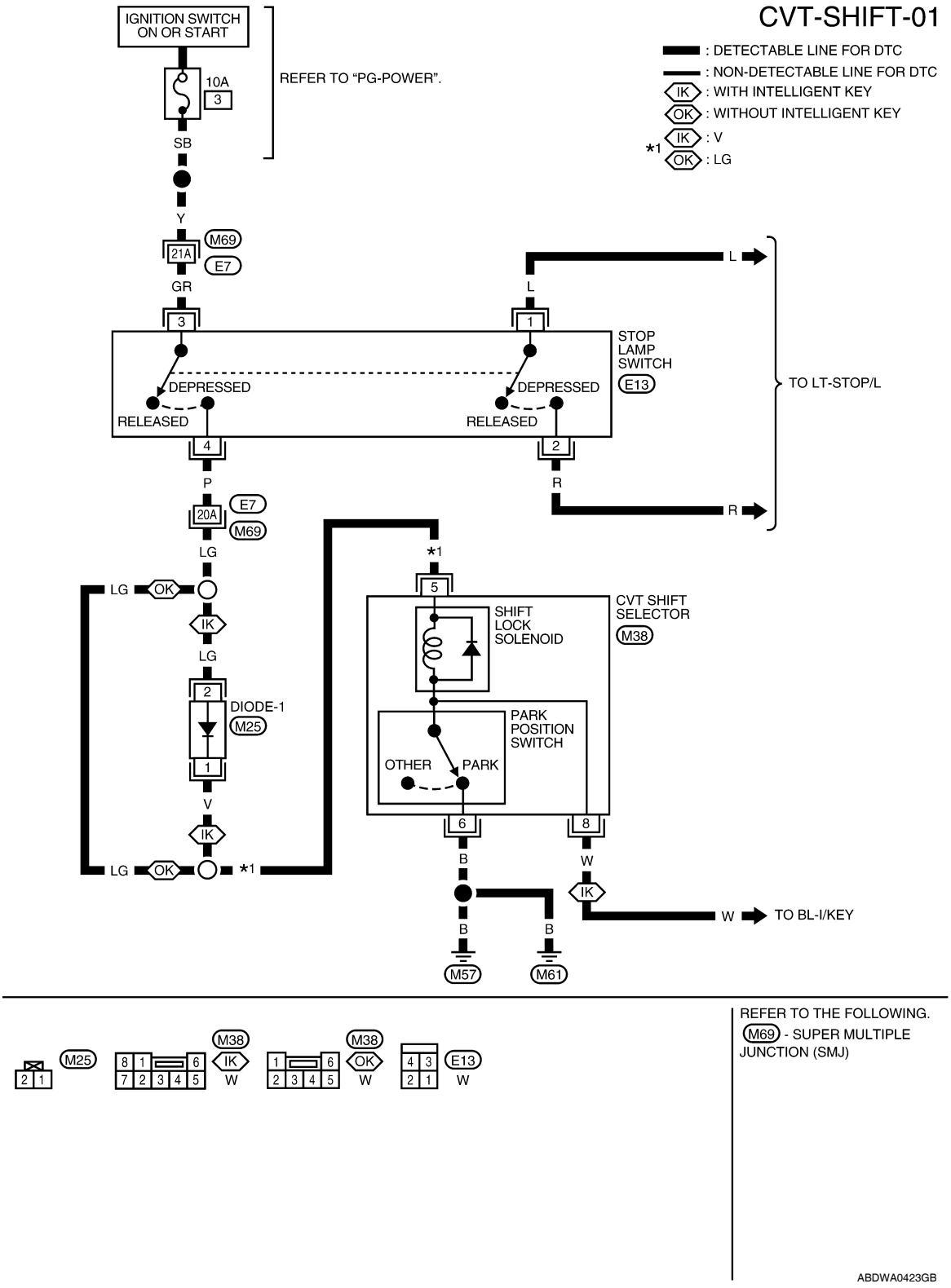
INFOID:0000000007329822



1. Key interlock cable (Without Intelligent Key)
2. Key cylinder (Without Intelligent Key)
3. Ignition knob switch (With Intelligent Key)
4. Key interlock cable (With Intelligent Key)
5. Stop lamp switch
6. Brake pedal
7. Shift lock release button
8. Park position switch
9. Shift lock solenoid
10. Key interlock cable

Wiring Diagram - CVT - SHIFT

INFOID:0000000007329823



Diagnosis Procedure

INFOID:0000000007329824

SYMPTOM 1:

- **Selector lever cannot be moved from "P" position with ignition switch in ON position and brake pedal depressed.**

- **Selector lever can be moved from “P” position with ignition key in ON position and brake pedal released.**
- **Selector lever can be moved from “P” position when ignition switch is removed from key cylinder.**

SYMPTOM 2:

- **Ignition key cannot be removed when selector lever is set to “P” position.**
- **Ignition key can be removed when selector lever is set to any position except “P” position.**

1.CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.
NG >> Repair key interlock cable. Refer to CVT-166, "Removal and Installation".

2.CHECK CVT POSITION

Check CVT position. Refer to CVT-164, "Checking of CVT Position".

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to CVT-164, "Adjustment of CVT Position".

3.CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Turn ignition switch ON. (Do not start engine.)
2. Selector lever is set in “P” position.
3. Check operation sound.

Condition	Brake pedal	Operation sound
When ignition switch is turned to ON position and selector lever is set in “P” position.	Depressed	Yes
	Released	

OK or NG

OK >> **INSPECTION END**
NG - 1 >> With Intelligent Key: GO TO 4.
NG - 2 >> Without Intelligent Key: GO TO 5.

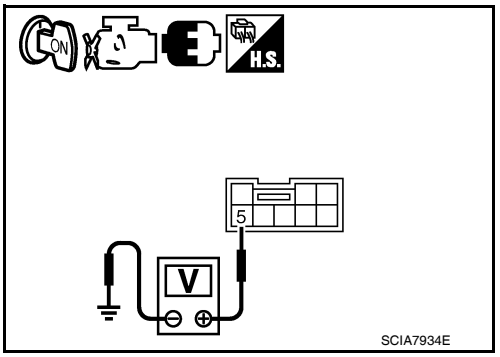
4.CHECK POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between CVT shift selector harness connector terminal 5 and ground.

Voltage:

Brake pedal depressed: Battery voltage

Brake pedal released: 0V



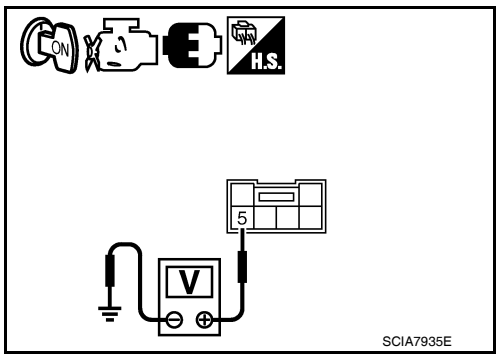
OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

5.CHECK POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between CVT shift selector harness connector terminal 5 and ground.



Voltage:

Brake pedal depressed: Battery voltage

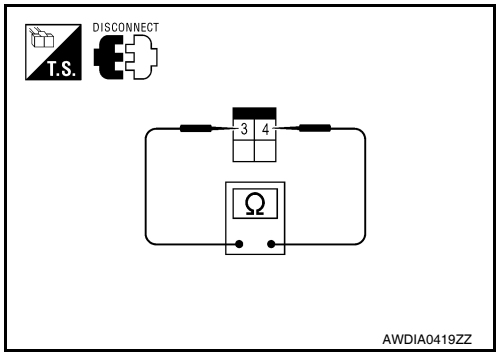
Brake pedal released: 0V

OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 3 and 4.



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal. Refer to BR-6.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.

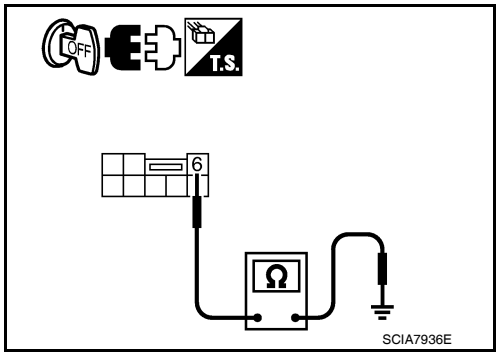
- Harness for short or open between ignition switch and stop lamp switch harness connector
- Harness for short or open between stop lamp switch harness connector and CVT shift selector harness connector
- 10A fuse [No.3, located in the fuse block (J/B)]
- Ignition switch, Refer to PG-4.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

8. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect CVT shift selector harness connector.
3. Check continuity between CVT shift selector harness connector terminal 6 and ground.



Continuity should exist.

4. Connect CVT shift selector harness connector.

OK or NG

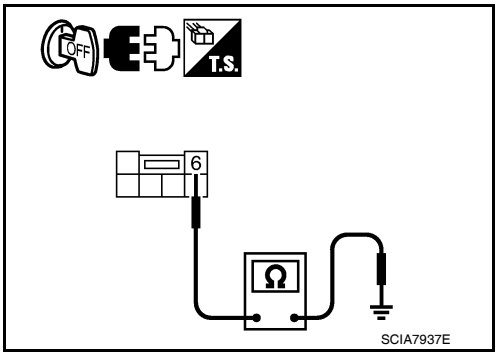
OK >> Replace shift lock solenoid and park position switch assembly. Refer to CVT-163, "CVT Shift Selector Disassembly and Assembly".
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect CVT shift selector harness connector.

3. Check continuity between CVT shift selector harness connector terminal 6 and ground.

Continuity should exist.



4. Connect CVT shift selector harness connector.

OK or NG

OK >> Replace shift lock solenoid and park position switch assembly. Refer to CVT-163, "CVT Shift Selector Disassembly and Assembly".

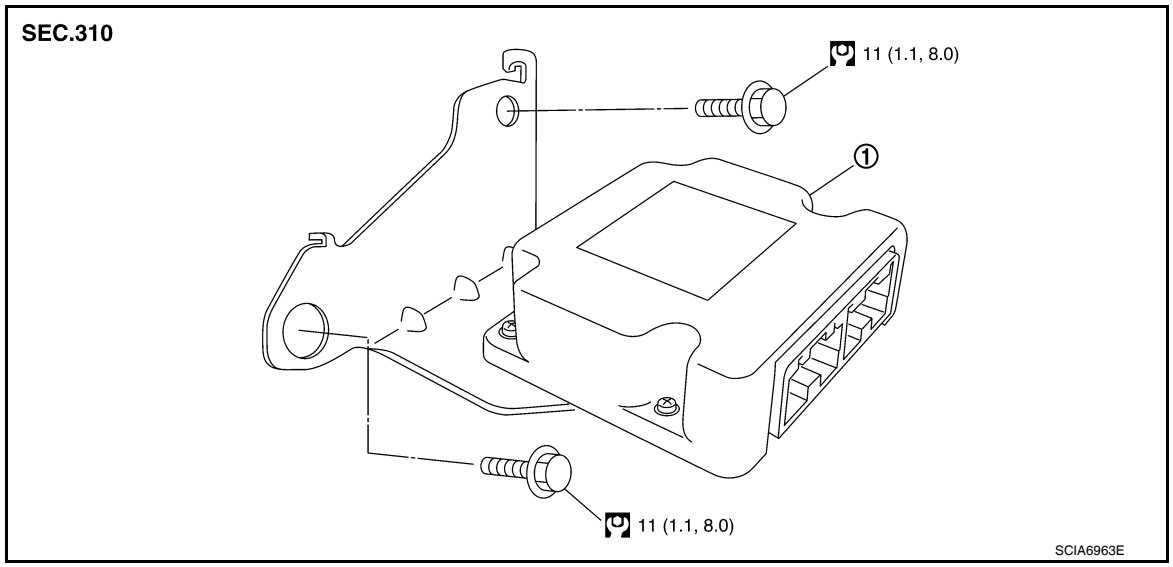
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

TCM

Removal and Installation

INFOID:0000000007329825

COMPONENTS



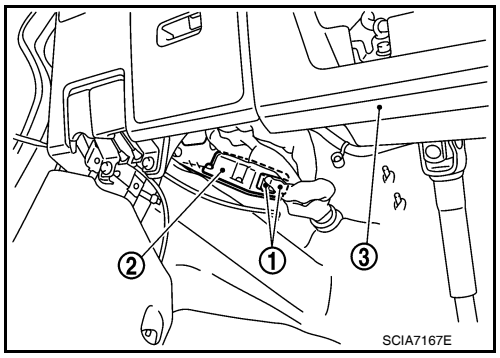
1. TCM

REMOVAL

CAUTION:

When replacing TCM and transaxle assembly as a set, replace transaxle assembly first and then replace TCM. Refer to CVT-8, "Service After Replacing TCM, Control Valve and Transaxle Assembly".

1. Disconnect the battery negative terminal.
2. Disconnect the TCM harness connector (1) from the TCM (2).
   - Instrument lower finisher (3)
3. Remove the TCM (2).



INSTALLATION

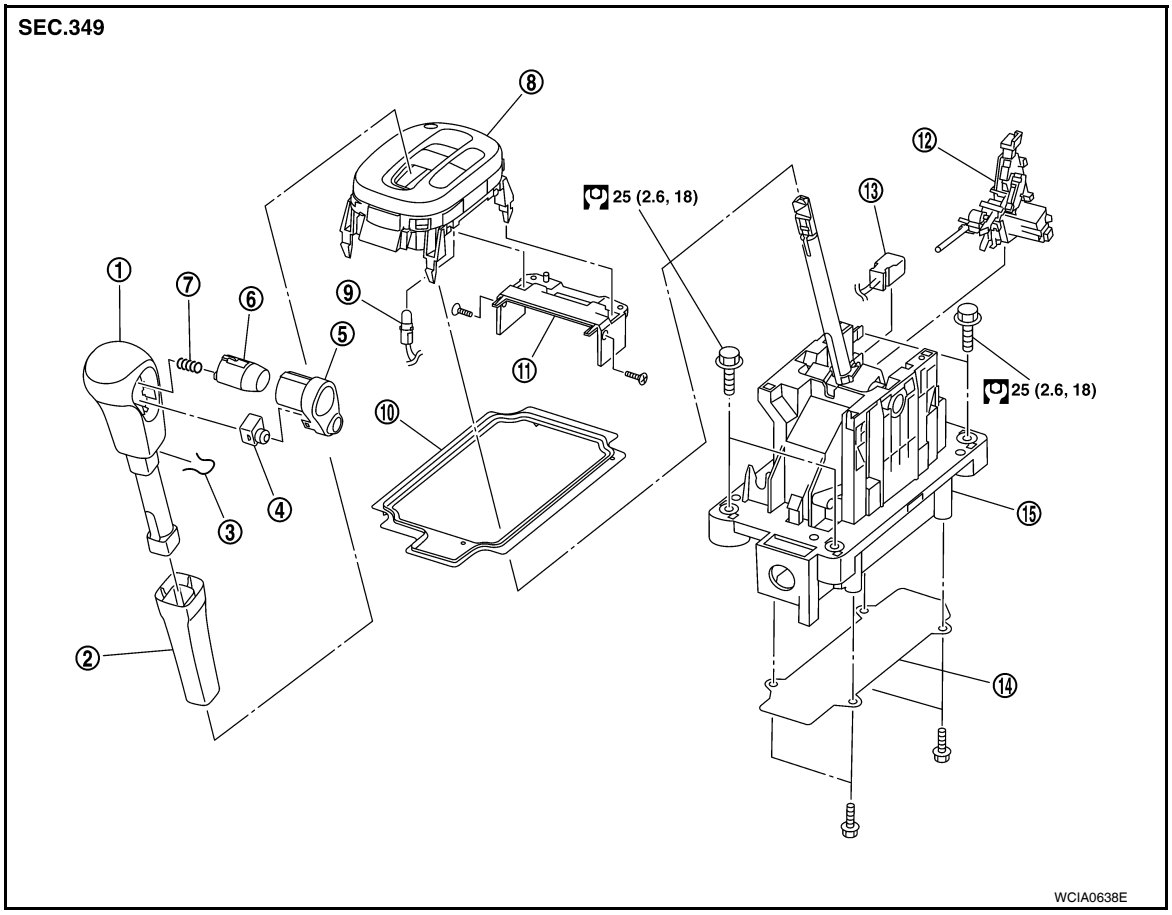
Installation is in the reverse order of removal.

SHIFT CONTROL SYSTEM

Removal and Installation

INFOID:0000000007329826

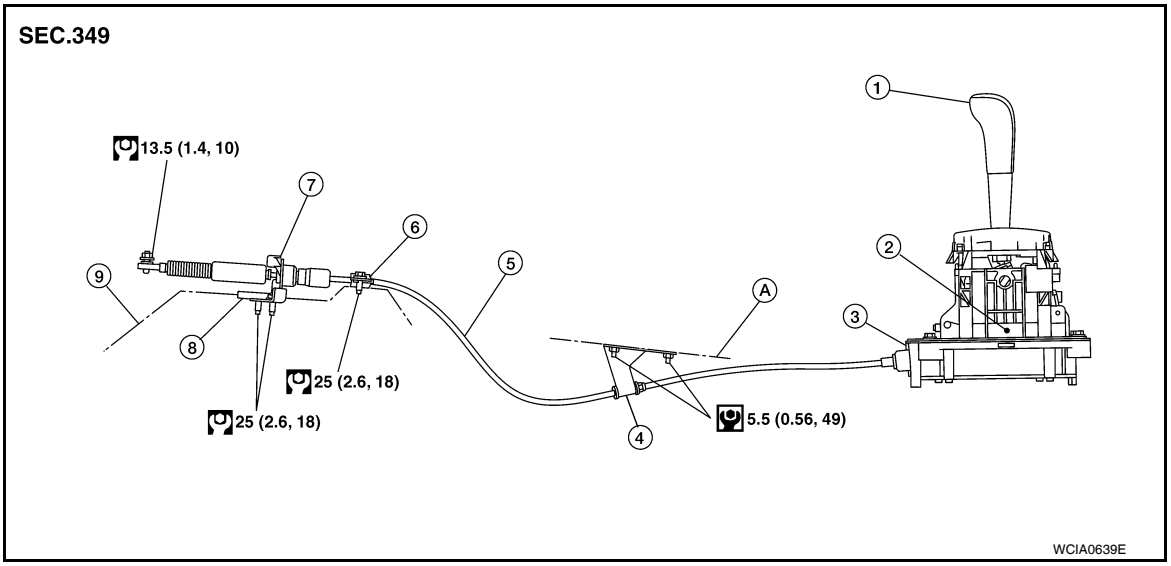
CVT SHIFT SELECTOR COMPONENTS



1.	Shift selector handle	2.	Shift selector handle cover	3.	Shift selector handle clip
4.	Overdrive control switch	5.	Shift selector handle finisher	6.	Shift selector handle button
7.	Shift selector button spring	8.	Position indicator plate	9.	Position lamp
10.	Dust cover	11.	Bracket	12.	Shift lock solenoid and park position switch assembly
13.	CVT shift selector harness connector	14.	Plate	15.	CVT shift selector assembly

CONTROL CABLE COMPONENTS

Refer to the figure below for shift selector control cable removal and installation procedure.



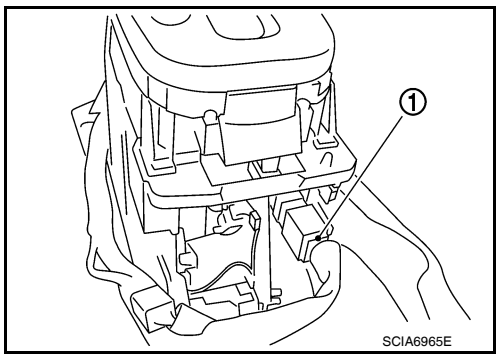
1. Shift selector handle
2. CVT shift selector assembly
3. Lock plate
4. Bracket
5. Control cable
6. Bracket
7. Lock plate
8. Bracket
9. Transaxle assembly
A. Floor

REMOVAL

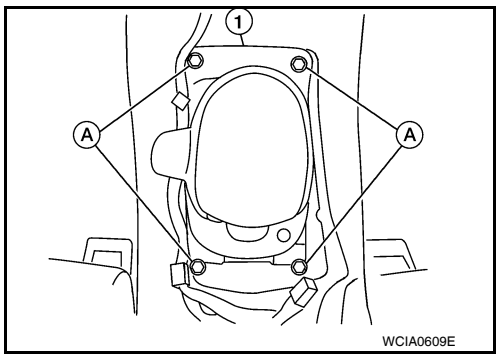
CAUTION:

Make sure that parking brake is applied before removal and installation.

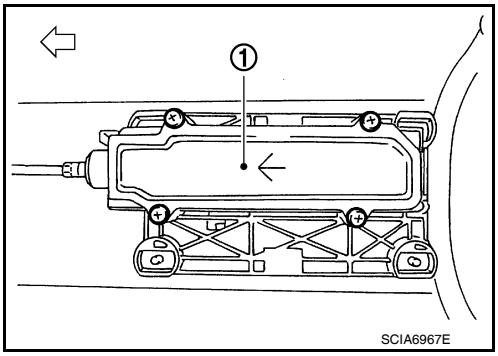
1. Place the shift selector in the “N” position.
2. Remove the center console assembly. Refer to IP-11.
3. Disconnect the CVT shift selector harness connector (1).
4. Remove the key interlock cable from the CVT shift selector assembly. Refer to CVT-166, "Removal and Installation".



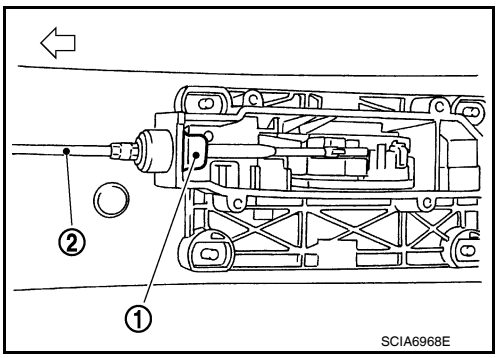
5. Remove the bolts (A) from the CVT shift selector assembly (1).
6. Remove exhaust front tube, center muffler and heat plates. Refer to EM-22.



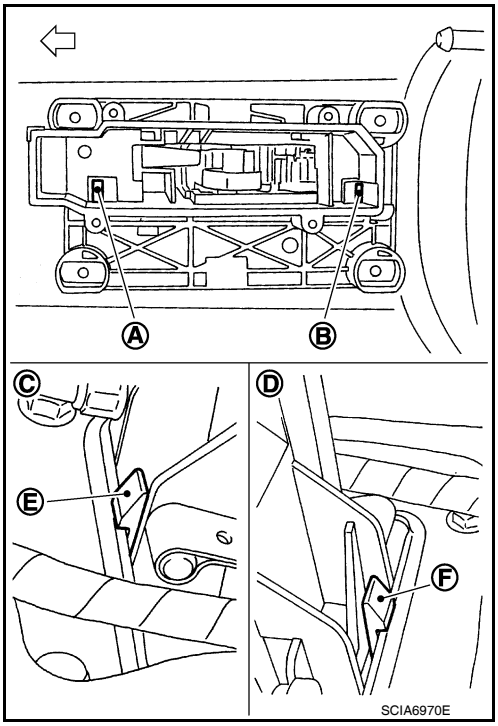
7. Remove the plate (1) from the CVT shift selector assembly.
   ⇦: Vehicle front



8. Remove the lock plate (1) from the control cable (2).
   ⇦: Vehicle front
9. Remove the control cable (2) from the CVT shift selector assembly.



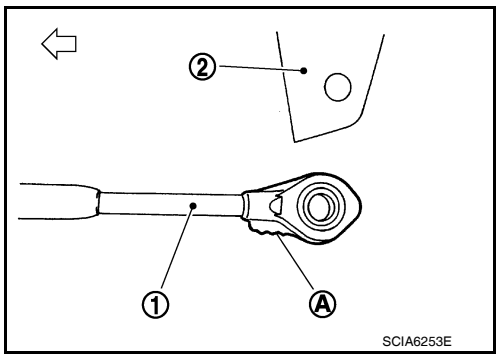
10. Insert suitable tool at points (A) and (B) as shown, and press both tabs (E) and (F) at the front (C) and rear (D) slightly toward the center of the CVT shift selector assembly to remove the CVT shift selector assembly from the underside of the vehicle.
    ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.

- When installing the control cable (1) to the CVT shift selector assembly (2), make sure that the control cable (1) is fully pressed in with the ribbed surface (A) facing downward from the vehicle.
  ⇦: Vehicle front
- After installation is completed, adjust and check the CVT position. Refer to CVT-164, "Adjustment of CVT Position" and CVT-164, "Checking of CVT Position".



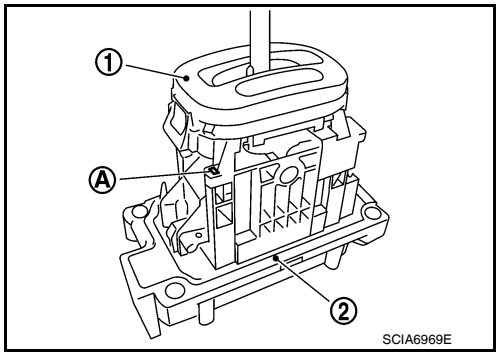
CVT Shift Selector Disassembly and Assembly

INFOID:0000000007329827

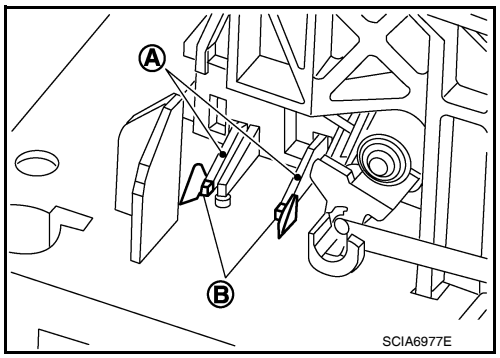
DISASSEMBLY

NOTE:
Refer to CVT-160, "Removal and Installation" to disassemble.

1. Remove shift selector handle from CVT shift selector assembly. Refer to CVT-163, "Shift Selector Handle Removal and Installation".
2. Remove position lamp from position indicator plate (1).
3. Insert a suitable tool to (A) (at 4 locations) as shown, and bend each hook slightly to raise position indicator plate (1) and remove from CVT shift selector assembly (2).
4. Remove bracket from CVT shift selector assembly (2).
5. Remove CVT shift selector harness connector from CVT shift selector assembly (2).



6. Release tabs (A) on shift lock solenoid and park position switch assembly from hooks (B) on CVT shift selector assembly to shift lock solenoid and park position switch assembly.



ASSEMBLY

Assembly is in the reverse order of disassembly.

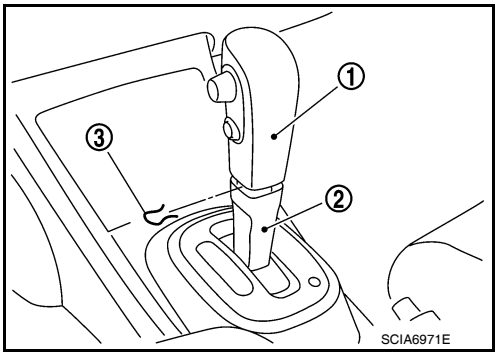
Shift Selector Handle Removal and Installation

INFOID:0000000007329828

REMOVAL

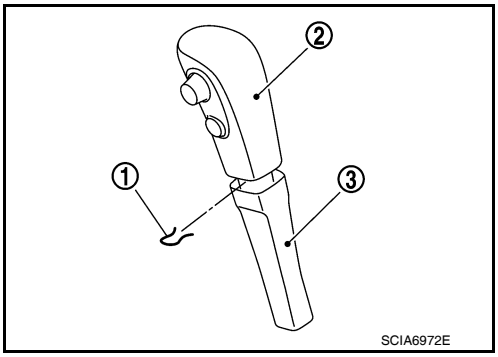
CAUTION:
Make sure that parking brake is applied before removal/installation.

1. Place shift selector handle (1) in “N” position.
2. Slide shift selector handle cover (2) downward.
3. Pull out shift selector handle clip (3) from shift selector handle (1).
4. Remove shift selector handle (1) and shift selector handle cover (2) as a set from shift selector.
   CAUTION:
   Do not push shift selector button.



INSTALLATION

1. Insert shift selector handle clip (1) to shift selector handle (2).
2. Install shift selector handle cover (3) to shift selector handle (2).
3. Place shift selector in “N” position.
4. Install shift selector handle onto shift selector until a click is felt.
   CAUTION:
   - **Do not tilt shift selector handle when installing. Install it straight, and do not tap or apply any shock to install it.**
   - **Do not push shift selector handle button.**

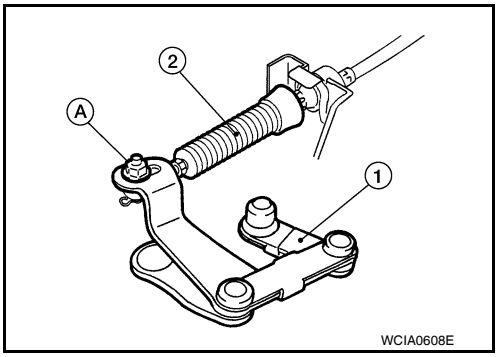


Adjustment of CVT Position

INFOID:0000000007329829

CAUTION:
Make sure that parking brake is applied before adjustment.

1. Loosen the control cable nut (A) and place the manual lever (1) in “P” position.
2. Place shift selector in “P” position.
3. Push the control cable (2) in with a load of 9.8 N (approximately 1 kg, 2.2 lb). Release the shift selector control cable and temporarily tighten the shift selector control cable nut.
   NOTE:
   Do not move the manual lever. Make sure the manual lever stays in the “P” position.
4. Tighten the control cable nut.
   CAUTION:
   Secure the manual lever when tightening control cable nut.



Control cable nut: **Refer to CVT-160, "Removal and Installation".**

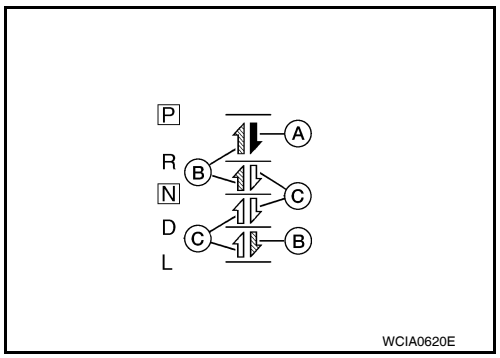
5. Check the operation of the CVT. Refer to CVT-164, "Checking of CVT Position".

Checking of CVT Position

INFOID:0000000007329830

1. Place shift selector in “P” position, and turn ignition switch ON. (Do not start engine.)
2. Make sure shift selector can be moved to other than “P” position when brake pedal is depressed. Also make sure shift selector can be moved from “P” position only when brake pedal is depressed.
3. Move the shift selector and check for excessive effort, sticking, noise or rattle.
4. Confirm the shift selector stops at each position with the feel of engagement when it is moved through all the positions. Check that the actual position of the shift selector matches the position shown by the position indicator and the manual lever on the transaxle.

5. The method of operating the shift selector to individual positions correctly should be as shown.
   - (A): Press shift selector handle button to operate shift selector, while depressing the brake pedal.
   - (B): Press shift selector handle button to operate shift selector.
   - (C): Shift selector can be operated without pressing shift selector handle button.
6. Confirm the back-up lamps illuminate only when shift selector is placed in the “R” position. Confirm the back-up lamps do not illuminate when the shift selector is pushed toward the “R” position side with the gear position remaining in the “P” or “N” position.
7. Confirm the engine can only be started with the shift selector in the “P” and “N” positions.
8. Make sure transaxle is locked completely when shift selector is in “P” position.

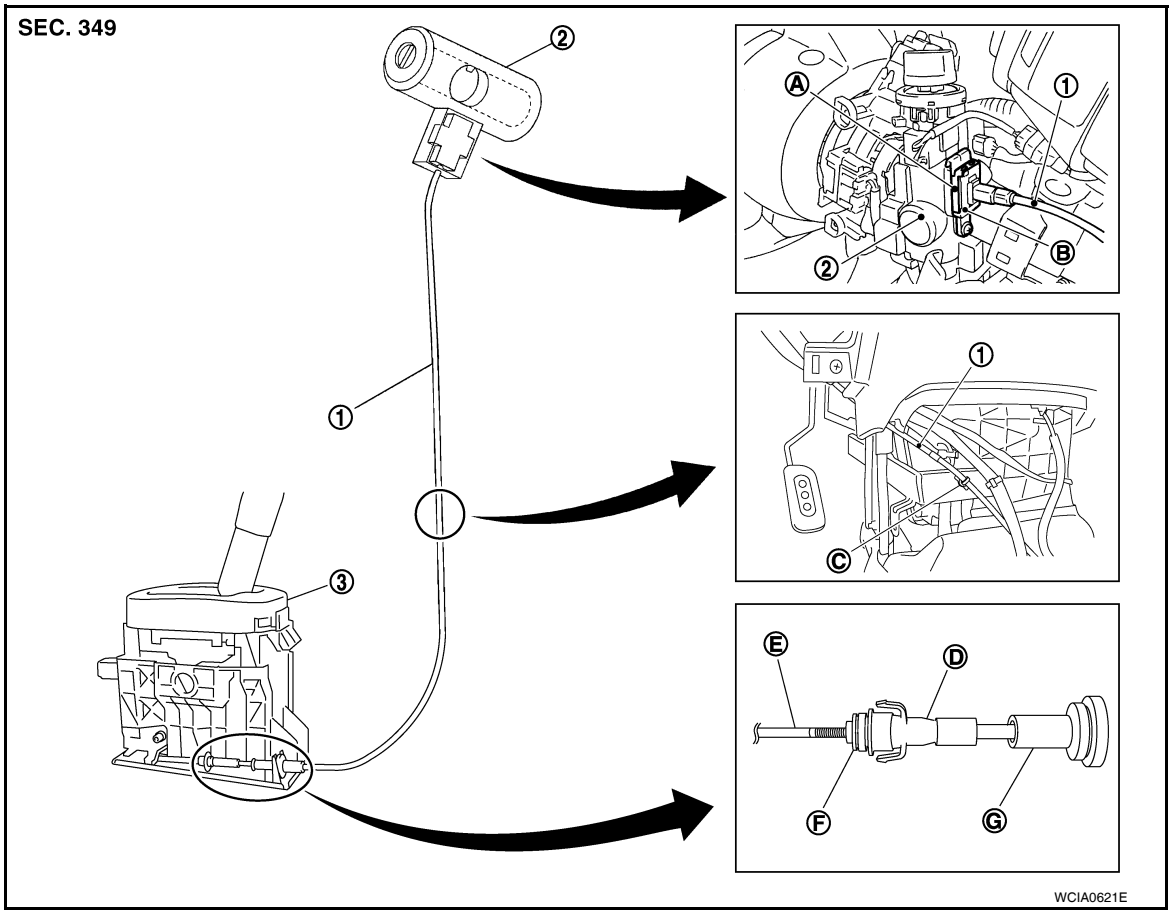


KEY INTERLOCK CABLE

Removal and Installation

INFOID:0000000007329831

COMPONENTS



1. Key interlock cable
2. Key cylinder
3. CVT shift selector assembly
A. Lock plate
B. Holder
C. Clip
D. Slider
E. Key interlock rod
F. Adjust holder
G. Casing cap

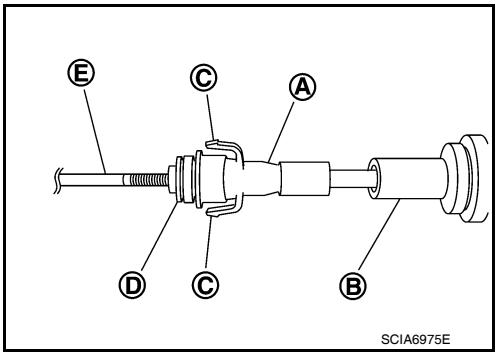
REMOVAL

Refer to the figure for key interlock cable removal procedure.

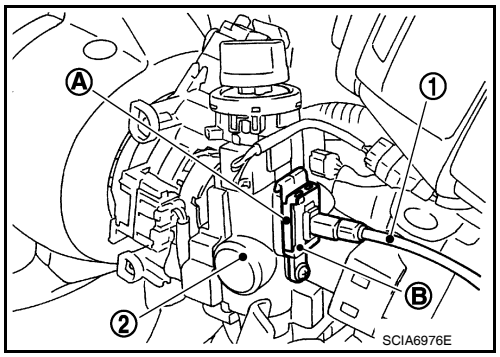
CAUTION:

Make sure that parking brake is applied before removal/installation.

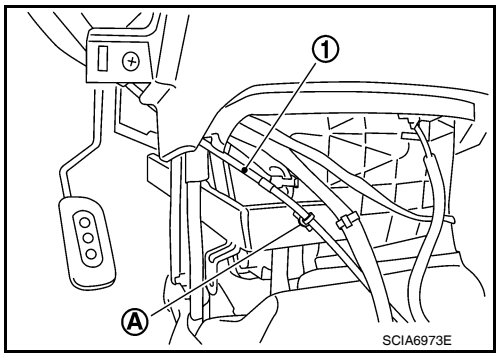
1. Place the shift selector in the "N" position.
2. Remove the center console assembly. Refer to IP-11.
3. Slide the slider (A) toward the casing cap (B) while pressing tabs (C) on the slider to separate the slider (A) from the adjust holder (D).
4. Remove the casing cap (B) from the cable bracket on the CVT shift selector assembly.
5. Remove the key interlock cable from the key interlock rod (E).



6. Remove steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11.
7. Pull out the lock plate (A) from the holder (B).
8. Remove the key interlock cable (1) from the key cylinder (2).



9. Remove the clip (A), and then remove the key interlock cable (1).

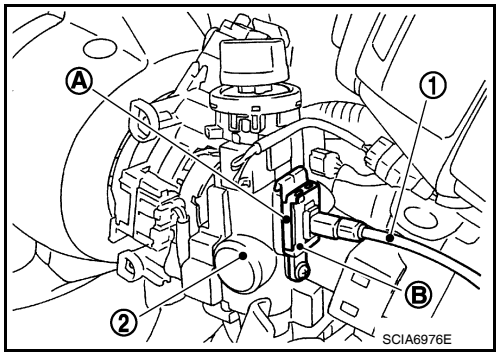


INSTALLATION

CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to CVT shift selector assembly, make sure that casing cap and bracket are firmly secured in their positions.**

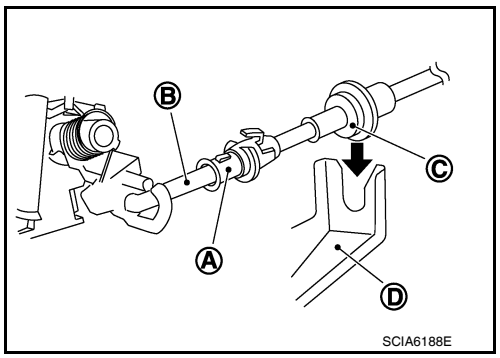
1. Place the shift selector in the “P” position.
2. Turn ignition switch to “ACC” or “ON” position.
3. Set the key interlock cable (1) to the key cylinder (2).
4. Install the lock plate (A) to the holder (B).
5. Turn ignition switch to “LOCK” position.



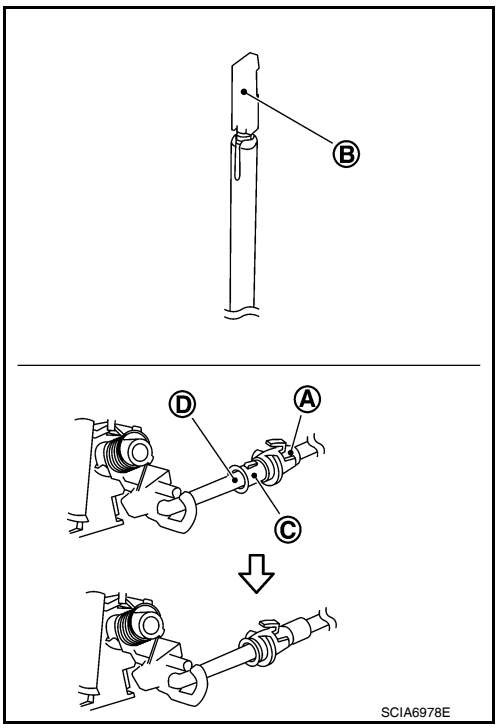
6. Temporarily install the adjust holder (A) to the key interlock rod (B).
7. Install the casing cap (C) to the cable bracket (D) on the CVT shift selector assembly.

   CAUTION:

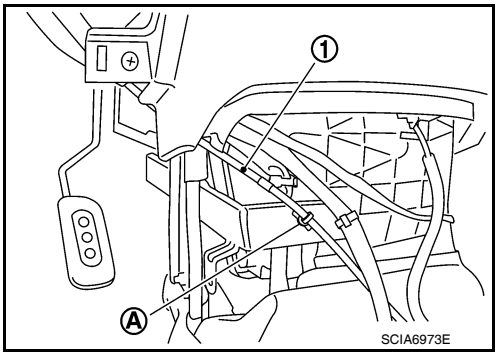
   - **Do not bend or twist key interlock cable excessively when installing.**
   - **After installing key interlock cable to cable bracket (D) on CVT shift selector assembly, make sure casing caps (C) is firmly secured in cable bracket (D) on CVT shift selector assembly.**
   - **If casing cap (C) is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**



8. Slide the slider (A) toward the key interlock rod (D) while pressing the pull lock (B) down to securely connect the adjust holder (C) with the key interlock rod (D).
CAUTION:
- **Do not press tabs when holding slider (A).**
- **Do not apply any side to side force to key interlock rod (D) when sliding slider (A).**



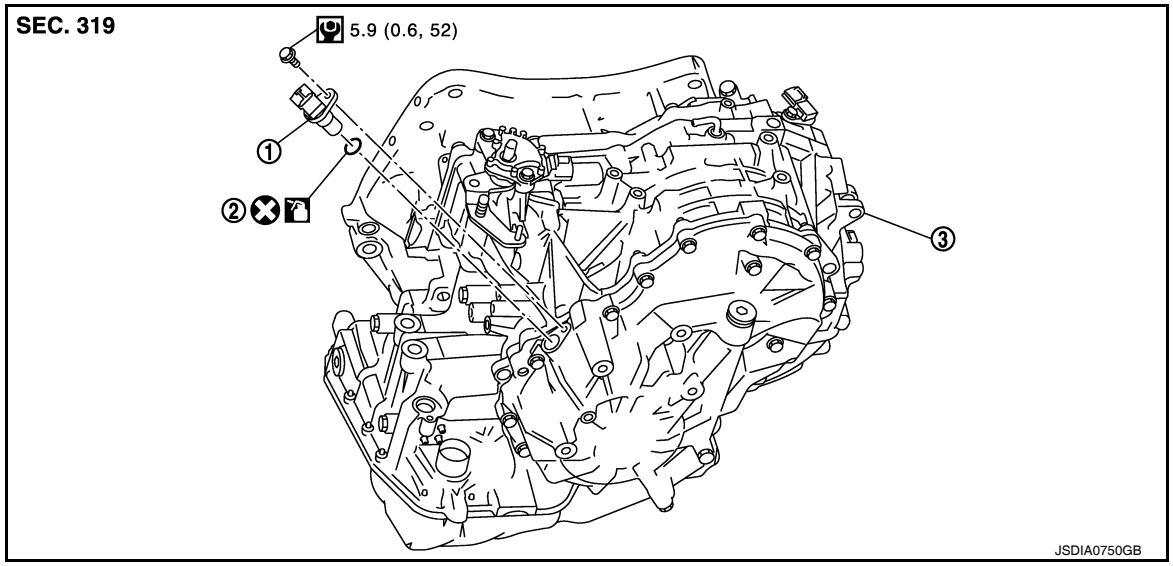
9. Secure the key interlock cable (1) with the clip (A).
10. Install steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11.
11. Install the center console assembly. Refer to IP-11.
12. Install the shift selector handle. Refer to CVT-163, "Shift Selector Handle Removal and Installation".
13. Check shift lock system. Refer to CVT-153, "Description".



PRIMARY SPEED SENSOR

Exploded View

INFOID:0000000007329832



1. Primary speed sensor
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

Removal and Installation

INFOID:0000000007329833

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air duct (inlet) and air cleaner case. Refer to EM-16, "Component".
3. Disconnect primary speed sensor connector.
4. Remove primary speed sensor.
5. Remove O-ring from primary speed sensor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Inspection

INFOID:0000000007329834

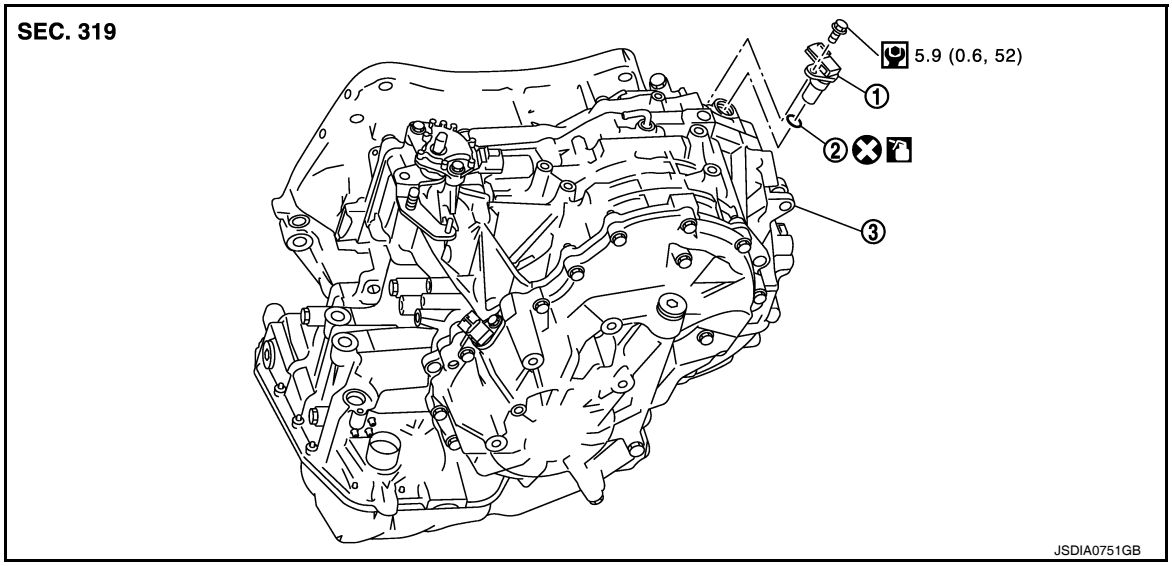
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

SECONDARY SPEED SENSOR

Exploded View

INFOID:0000000007329835



1. Secondary speed sensor
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

Removal and Installation

INFOID:0000000007329836

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air duct (inlet) and air cleaner case. Refer to EM-16, "Component".
3. Disconnect secondary speed sensor connector.
4. Remove secondary speed sensor.
5. Remove O-ring from secondary speed sensor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Inspection

INFOID:0000000007329837

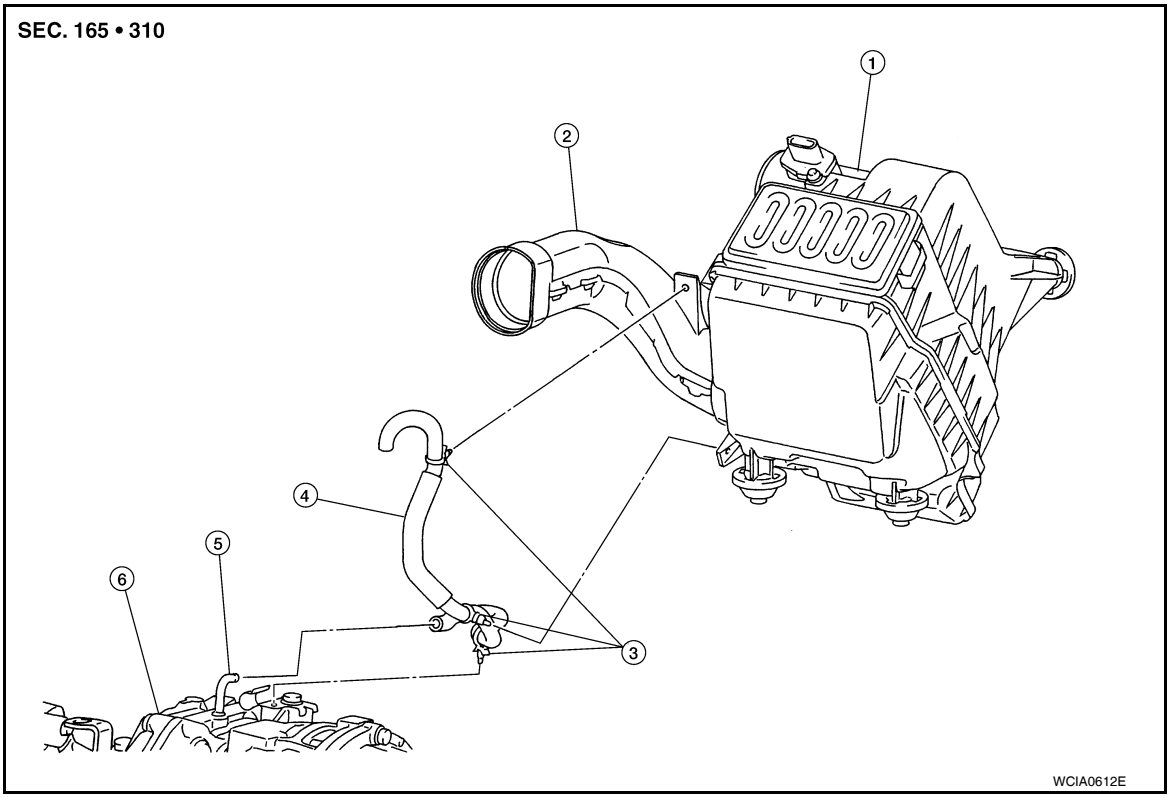
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

AIR BREATHER HOSE

Removal and Installation

INFOID:0000000007329838



1. Air cleaner case	2. Air duct	3. Clip
4. Air breather hose	5. Air breather tube	6. CVT

REMOVAL

1. Remove air duct (front), air duct (inlet) and air cleaner case. Refer to EM-16.
2. Remove air breather hose.

INSTALLATION

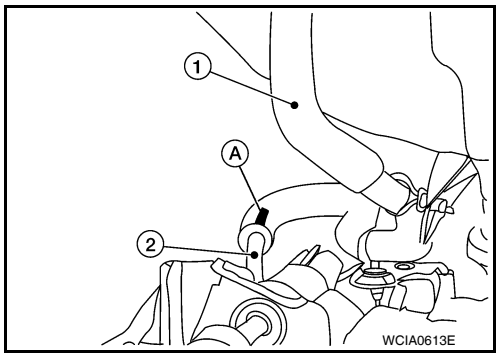
Installation is in the reverse order of removal.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

NOTE:

- Install the air breather hose (1) to the air breather tube (2) so that the paint mark (A) faces upward. Also make sure the air breather hose end is pushed up to the tube bend portion.
- When installing air breather hose (1) to air duct and air cleaner case, make sure to fully insert the hose clips.

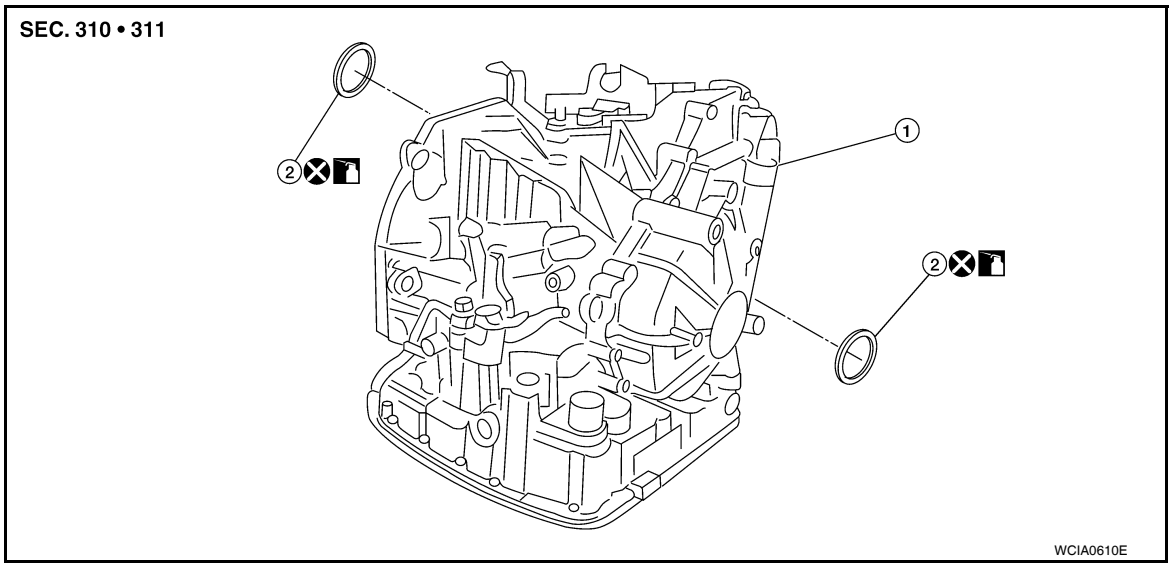


DIFFERENTIAL SIDE OIL SEAL

Removal and Installation

INFOID:0000000007329842

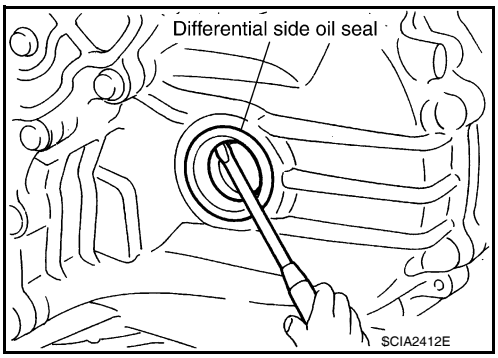
COMPONENTS



1. CVT
2. Differential side oil seal
: Apply CVT Fluid NS-2.

REMOVAL

1. Remove drive shaft assembly. Refer to FAX-9.
2. Remove differential side oil seal using a suitable tool.
CAUTION:
Do not scratch transaxle case or converter housing.



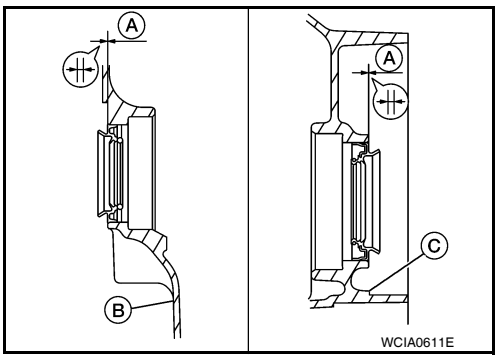
INSTALLATION

1. Drive the new differential side oil seal into the transaxle case side (B) and converter housing side (C) until it is flush using Tool.

Tool number : — (J-47244)
: ST33400001 (J-47005)

Unit: mm (in)

Dimensions (A)	0±0.5 (0±0.020)



CAUTION:
- **Do not reuse differential side oil seals.**
- **Apply specified NISSAN CVT fluid to side oil seals.**

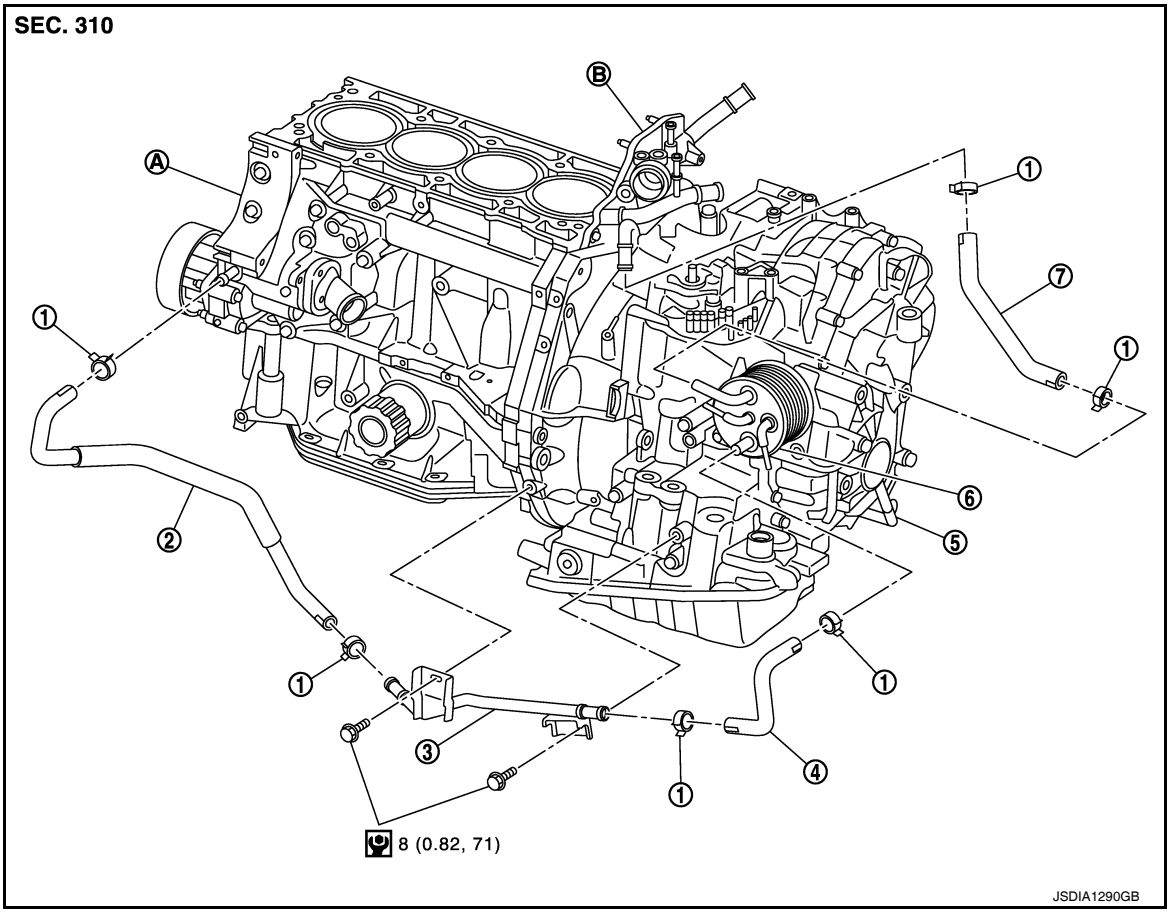
2. Install drive shaft assembly. Refer to FAX-9.
3. Check for CVT fluid leakage and check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

CVT OIL WARMER SYSTEM

WATER HOSE

WATER HOSE : Exploded View

INFOID:0000000007329843



1. Hose clamp
2. CVT water hose C
3. CVT water tube
4. CVT water hose B
5. Transaxle assembly
6. CVT oil warmer
7. CVT water hose A
- A. Water pump
- B. Water inlet-outlet

Refer to GI-8, "Component" for symbols in the figure.

WATER HOSE : Removal and Installation

INFOID:0000000007329844

WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.
CAUTION:
Perform this procedure when engine is cold.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Remove air duct (inlet). Refer to EM-16, "Component".
2. Remove hose clamps, and remove CVT water hose A.
3. Remove hose clamps, and remove CVT water hose B.
4. Remove hose clamps, and remove CVT water hose C.

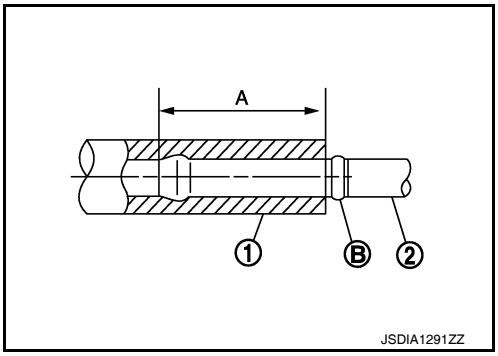
5. Remove CVT water tube.

INSTALLATION

Installation is in the reverse order of removal.
When installing water hoses, install them according to the following:

- Insert CVT water hose according to dimension “A” described below.

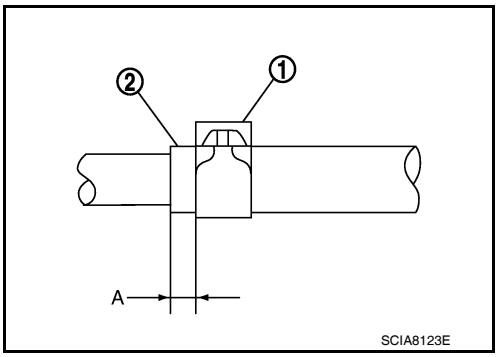
CVT water hose (1)	Insert side tube (2)	Dimension “A”
CVT water hose A	Water inlet-outlet	End reaches the spool portion (B)
	CVT oil warmer	
CVT water hose B	CVT oil warmer	
	CVT water tube	
CVT water hose C	CVT water tube	
	Water pump	



- Set hose clamps (1) at the both ends of fluid cooler hose (2) with dimension (A) from the hose edge.

Dimension (A) : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.



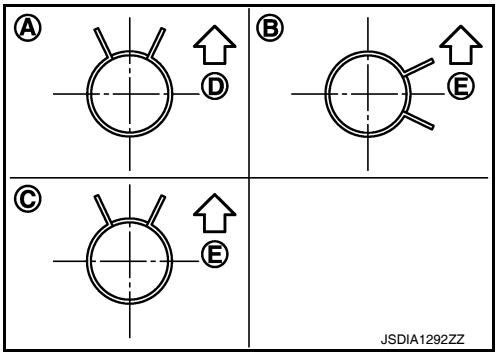
CVT water hose	Hose end	Paint mark	Position of hose clamp*
CVT water hose A	Water inlet-outlet side	Facing forward	A
	CVT oil warmer side	Facing forward	A
CVT water hose B	CVT oil warmer side	Facing to the right of the vehicle	B
	CVT water tube side	Facing forward	A
CVT water hose C	CVT water tube side	Facing forward	A
	Water pump side	Facing upward	C

*: Refer to the illustrations for the specific position of each hose clamp tab.

- The illustrations indicate the view from the hose ends.

⇦D : Vehicle front
⇦E : Vehicle upper

- When installing hose clamps the center line of each clamp tab should be positioned as shown.



WATER HOSE : Inspection

INFOID:0000000007329845

INSPECTION AFTER INSTALLATION

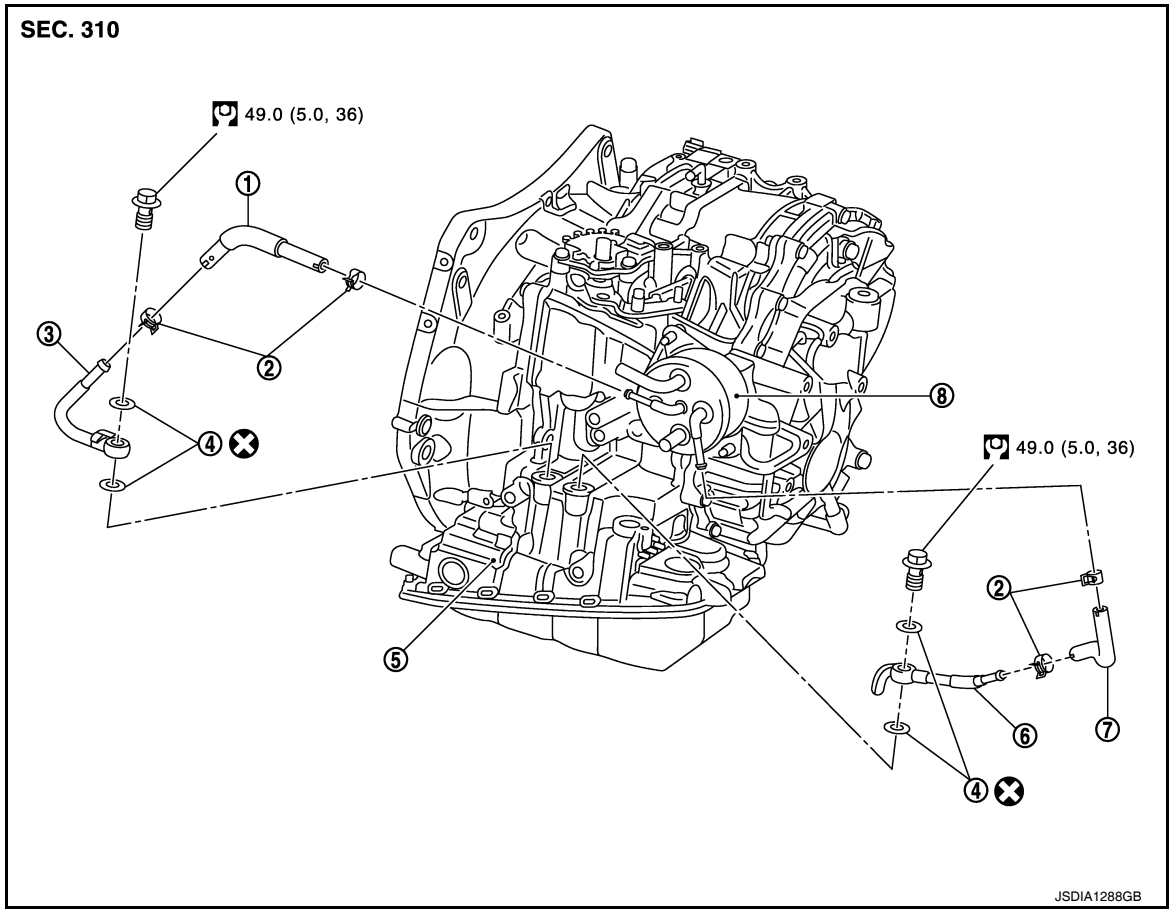
Start and warm up the engine. Visually check that there is no leakage of engine coolant and CVT fluid.

CVT FLUID COOLER HOSE

CVT FLUID COOLER HOSE : Exploded View

INFOID:0000000007329846

COMPONENT PARTS LOCATION



1. CVT fluid cooler hose A
2. Hose clamp
3. CVT fluid cooler tube A
4. Gasket
5. Transaxle assembly
6. CVT fluid cooler tube B
7. CVT fluid cooler hose B
8. CVT oil warmer

Refer to GI-8, "Component" for symbols in the figure.

CVT FLUID COOLER HOSE : Removal and Installation

INFOID:0000000007329847

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

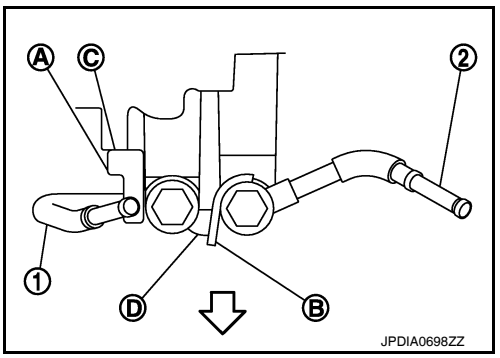
1. Remove air duct (inlet). Refer to EM-16, "Component".
2. Remove hose clamps, and remove CVT fluid cooler hose A.
3. Remove hose clamps, and remove CVT fluid cooler hose B.
4. Remove CVT fluid cooler tube A and CVT fluid cooler tube B.

INSTALLATION

Installation is in the reverse order of removal.

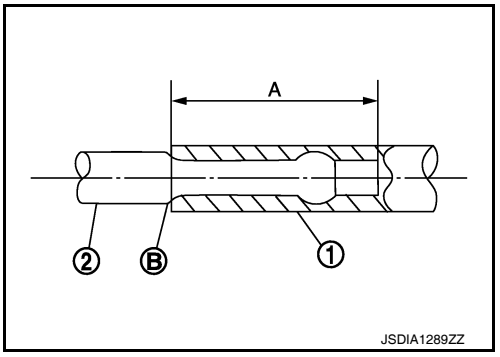
- When installing CVT fluid cooler tube (1) and (2) to transaxle assembly, install them so that CVT fluid cooler tube rotation stopper (A) and (B) touch to transaxle case (C) and (D).

⇦ : Vehicle front



- Insert CVT fluid cooler hose according to dimension (A) described below.

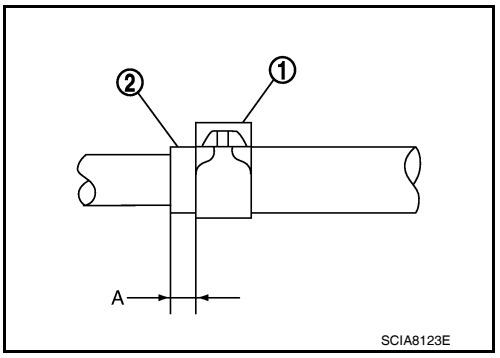
CVT fluid cooler hose (1)	Insert side tube (2)	Dimension (A)
CVT fluid cooler hose A	CVT fluid cooler tube	End reaches the 2-stage bulge (B)
	CVT oil warmer	
CVT fluid cooler hose B	CVT oil warmer	
	CVT fluid cooler tube	



- Set hose clamps (1) at the both ends of fluid cooler hose (2) with dimension (A) from the hose edge.

Dimension (A) : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.



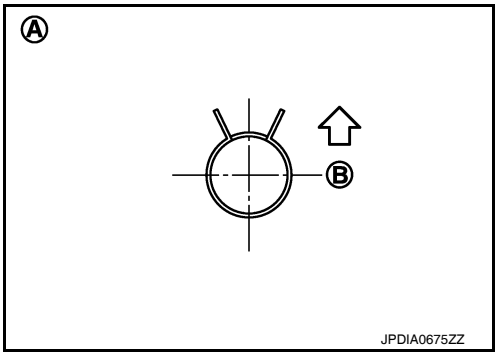
CVT fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
CVT fluid cooler hose A	CVT fluid cooler tube side	Vehicle front	A
	CVT oil warmer side	Vehicle front	A
CVT fluid cooler hose B	CVT oil warmer side	Vehicle front	A
	CVT fluid cooler tube side	Vehicle front	A

*: Refer to the illustrations for the specific position of each hose clamp tab.

- The illustrations indicate the view from the hose ends.

⇦B : Vehicle front

- When installing hose clamps the center line of each clamp tab should be positioned as shown.



CVT FLUID COOLER HOSE : Inspection

INFOID:0000000007329848

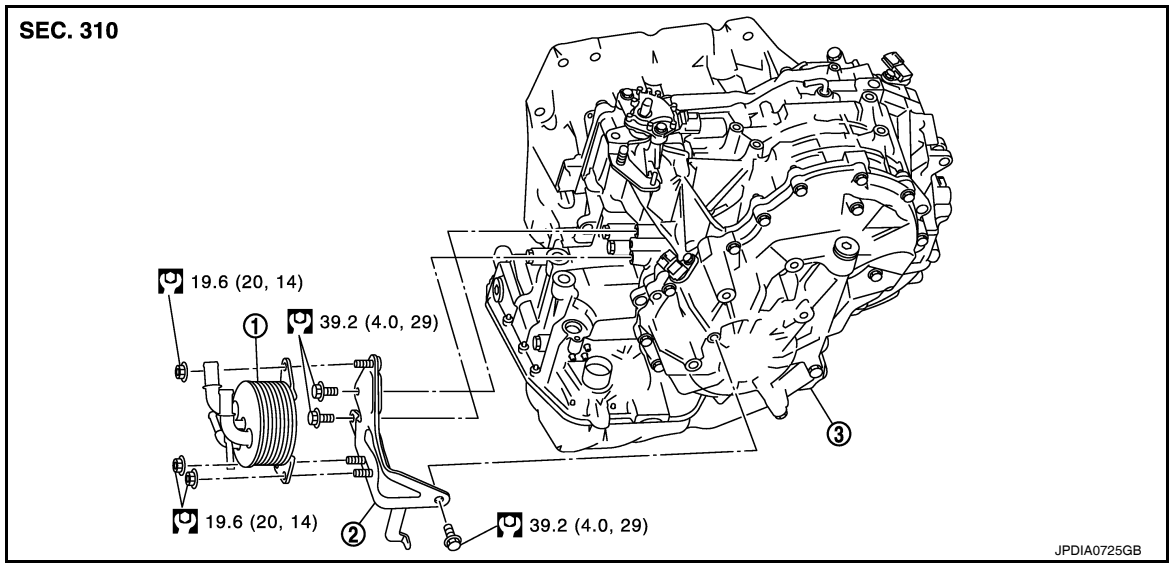
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".

CVT OIL WARMER

CVT OIL WARMER : Exploded View

INFOID:0000000007329849



1. CVT oil warmer
2. Bracket
3. Transaxle assembly

Refer to GI-8, "Component" for symbols in the figure.

CVT OIL WARMER : Removal and Installation

INFOID:0000000007329850

WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.
CAUTION:
Perform this procedure when engine is cold.
NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Remove CVT water hose from CVT oil warmer. Refer to CVT-173, "WATER HOSE : Exploded View".
2. Remove CVT fluid cooler hose from CVT oil warmer. Refer to CVT-175, "CVT FLUID COOLER HOSE : Exploded View".
3. Remove CVT oil warmer.
4. Remove bracket.

INSTALLATION

Installation is in the reverse order of removal.

CVT OIL WARMER : Inspection

INFOID:0000000007329851

INSPECTION AFTER INSTALLATION

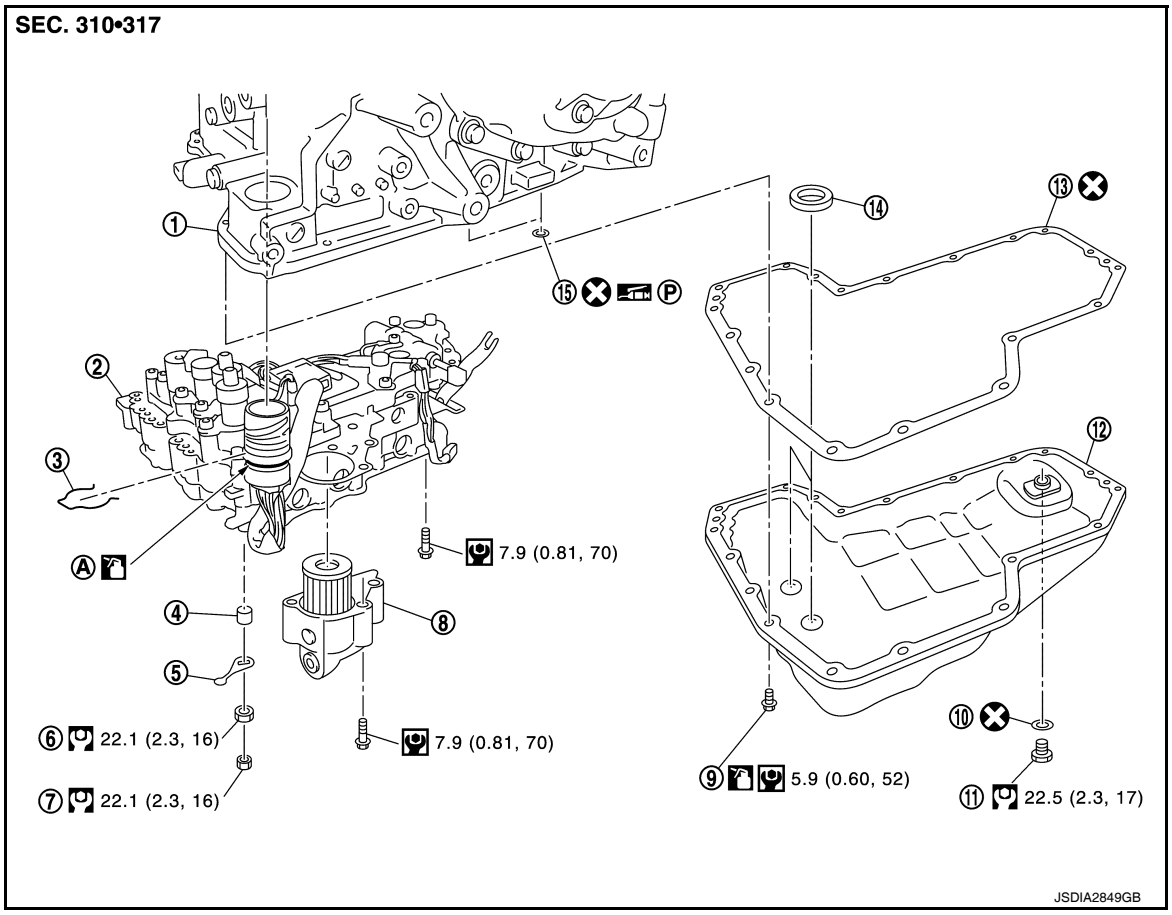
- Check for CVT fluid leakage and check CVT fluid level. Refer to CVT-14, "Checking CVT Fluid".
- Start and warm up the engine. Visually check that there is no leakage of engine coolant and CVT fluid.

CONTROL VALVE

Removal and Installation

INFOID:0000000007395565

COMPONENT PARTS LOCATION



1. Transaxle assembly
2. Control valve
3. Snap ring
4. Collar
5. Manual plate
6. Lock nut
7. Lock nut
8. Oil strainer assembly
9. Oil pan mounting bolt
10. Drain plug gasket
11. Drain plug
12. Oil pan
13. Oil pan gasket
14. Magnet
15. Lip seal

A. O-ring

Refer to GI-8, "Component" for symbols in the figure.

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

: NISSAN CVT Fluid NS-2

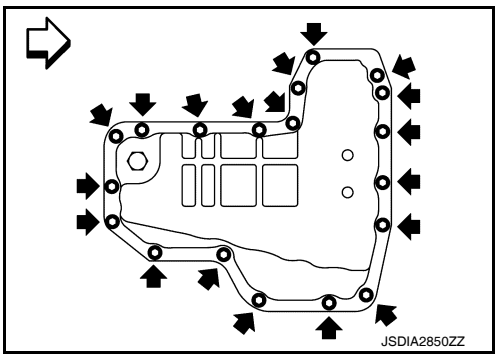
REMOVAL

1. Disconnect battery cable from negative terminal.
2. Remove engine undercover.
3. Disconnect the CVT unit connector. Refer to CVT-10, "Removal and Installation Procedure for CVT Unit Connector".
4. Remove drain plug from oil pan, and then drain the CVT fluid.
5. Remove drain plug gasket from drain plug.

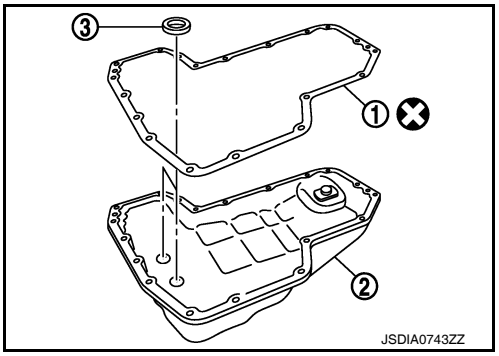
6. Remove the oil pan mounting bolts, and then remove the oil pan and oil pan gasket.

⇦ : Vehicle front

⬅ : Oil pan mounting bolt

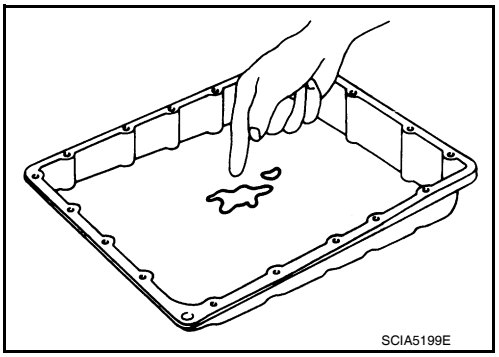


7. Remove oil pan gasket (1) from oil pan (2).
8. Remove the magnets (3) from the oil pan.



9. Check inside of oil pan for foreign material.
   - If large amount of worn material is found, wear of clutch and brake plate is suspected.
   - If iron powder is found, wear of bearings, gears, clutch, and gear plate is suspected.
   - If aluminum powder is found, bush wear and incorporation of turning or burr of aluminum casting part are suspected.

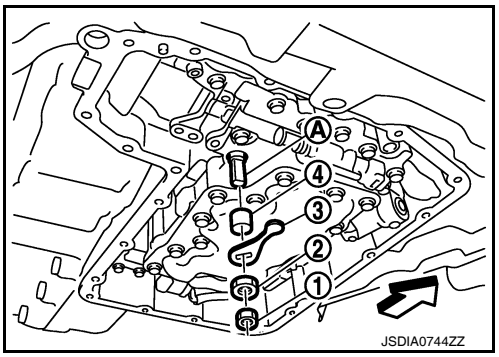
   In any case, check parts where the wear is seen.



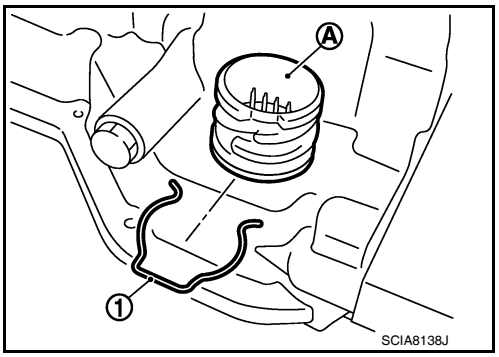
10. Remove the lock nut (1) and (2), and then remove the manual plate (3).

⇦ : Vehicle front

11. Remove the collar (4) from the manual shaft (A).
    CAUTION:
    Never drop the collar.



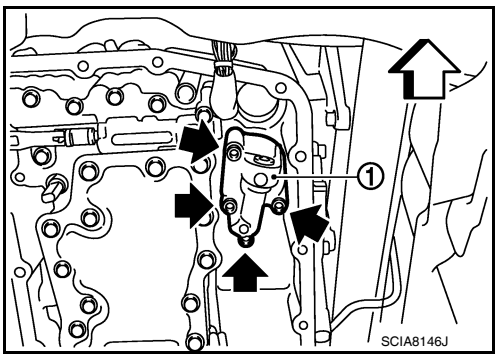
12. Remove the snap ring (1) from the CVT unit connector (A).
13. Press the CVT unit connector (A) into the transaxle case.
    CAUTION:
    Never damage the CVT unit connector.



14. Remove the oil strainer assembly mounting bolts, and then remove the oil strainer assembly (1).

⇦ : Vehicle front

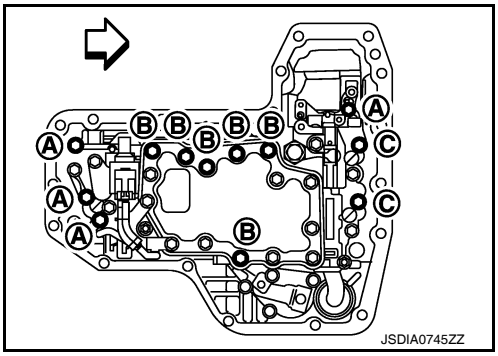
⬅ : Bolt



15. Remove the control valve mounting bolts (A), (B) and (C), and then remove the control valve from the transaxle case.

⇦ : Vehicle front

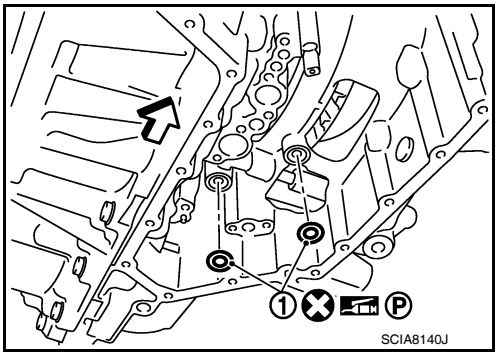
CAUTION:
Never drop the control valve.



Bolt symbol	Length (mm)	Number of bolts
A	30	4
B	70	6
C	53	2

16. Remove the lip seals (1) from the transaxle case.

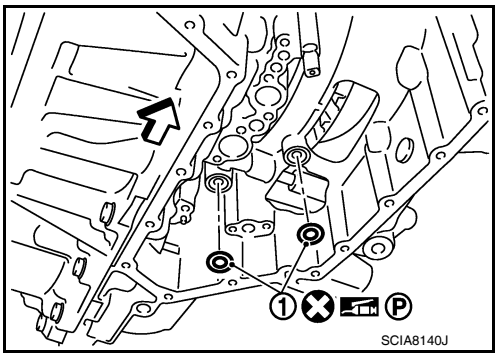
⇦ : Vehicle front



INSTALLATION

1. Install the lip seals (1) to the transaxle case.

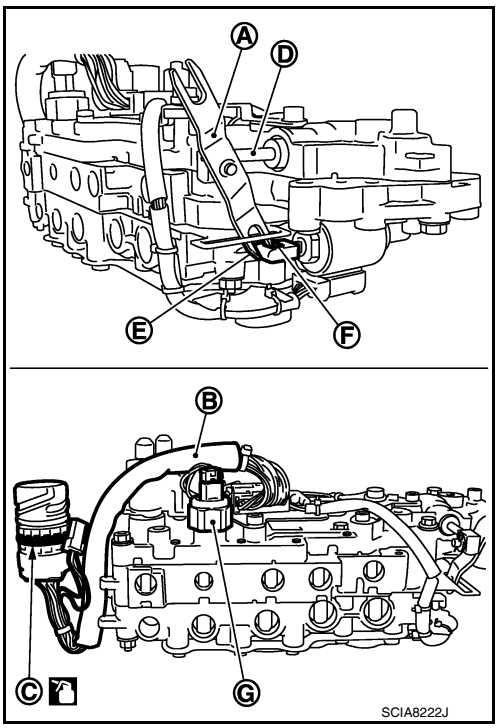
⇦ : Vehicle front



2. Confirm the direction of control valve linkage(A), operability of harness (B) , and fluid application to O-ring (C).

CAUTION:

- **Never touch or wipe the installation surface of control valve.**
- **Never drop a return spring included in ratio control valve (D).**
- **Never install linkage in the opposite direction.**
- **Confirm that linkage groove (E) is fit to step motor groove (F).**
- **Cable routing of harness (B) must be done above the sensor (G).**

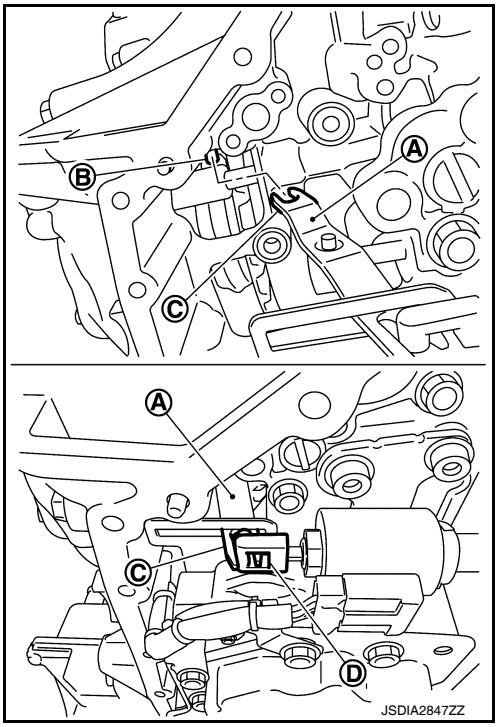


3. Adjust linkage (A) to engage linkage groove (C) into pulley sensor pin (B), temporarily tighten control valve ASSY using two control valve ASSY tightening bolts.

D : Step motor groove

CAUTION:

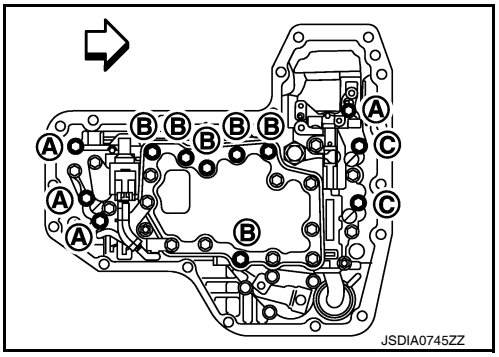
- **Never pinch the harness into between the control valve and the transaxle case.**
- **When installing control valve ASSY, pay attention not to bump it.**



4. Fix the control valve using the control valve mounting bolts (A), (B) and (C).

⇦ : Vehicle front

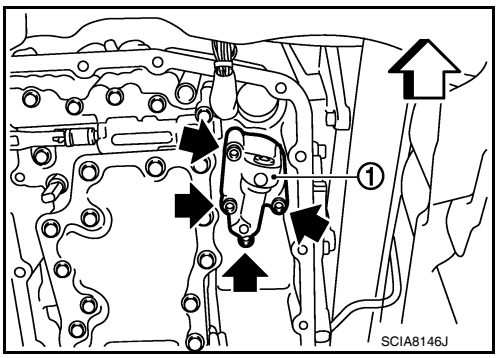
Bolt symbol	Length (mm)	Number of bolts
A	30	4
B	70	6
C	53	2



5. Install the oil strainer assembly (1) using the oil strainer assembly mounting bolts.

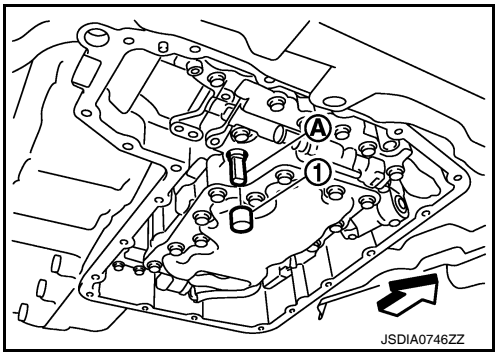
⇦ : Vehicle front

⬅ : Bolt



6. Install the collar (1) to the manual shaft (A).

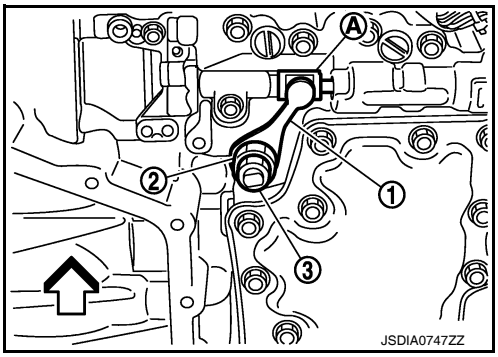
⇦ : Vehicle front



7. Install the manual plate (1) while aligning with the groove (A) of the manual valve. Install the lock-nut (2), and then tighten to the specified torque.

⇦ : Vehicle front

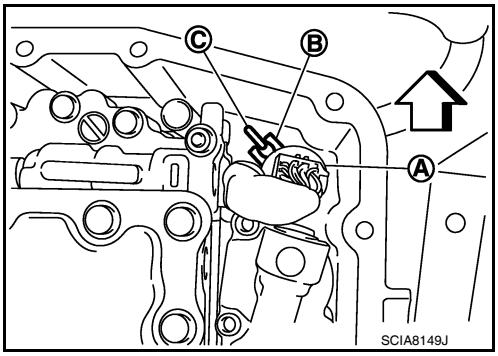
8. Install the lock-nut (3), and then tighten to the specified torque.



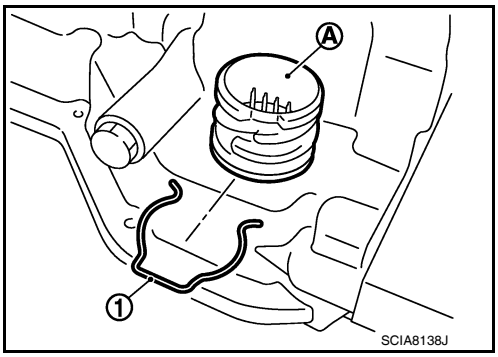
9. Install the CVT unit connector (A) to the transaxle case.

⇦ : Vehicle front

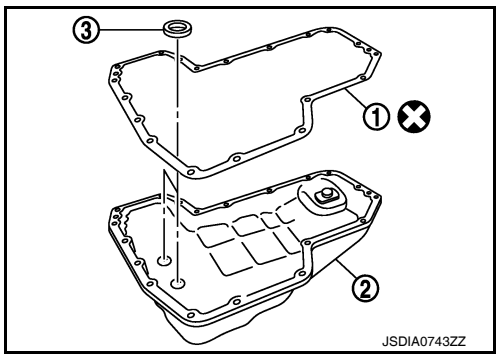
CAUTION:
Engage CVT unit connector groove (B) and the convex portion (C) of transaxle case.



10. Install the snap ring (1) to the CVT unit connector (A).



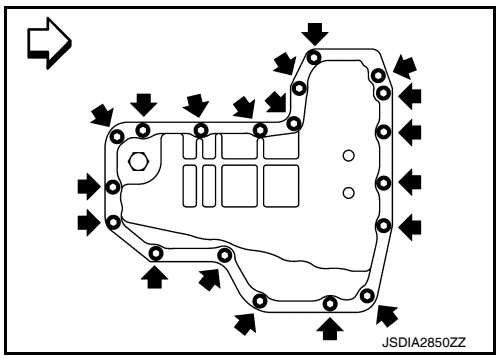
11. Install the magnets (3) while aligning it with the convex side of oil pan.
CAUTION:
Completely eliminate the iron powder from the magnet mounting area of oil pan and the magnet.
12. Install the oil pan gasket (1) to the oil pan (2).
CAUTION:
Completely wipe out any moisture, oil, and old gasket from the oil pan gasket mounting surface and bolt mounting hole of oil pan and transaxle case.



13. Install the oil pan to the transaxle case with the following procedure.

a. Install the oil pan assembly to the transaxle case, and then temporarily tighten the oil pan mounting bolt (⬅).

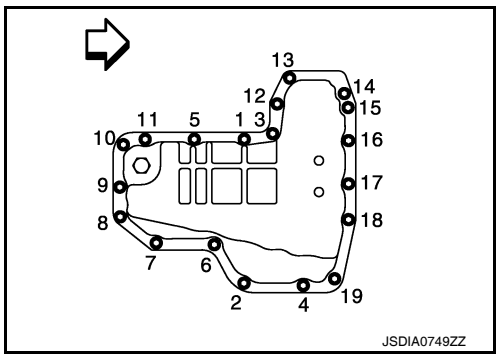
⇦ : Vehicle front



b. Tighten the oil pan mounting bolts in the order shown in the figure to the specified torque.

⇦ : Vehicle front

c. Tighten the oil pan mounting bolts again clockwise from (1) shown in the figure to the specified torque.



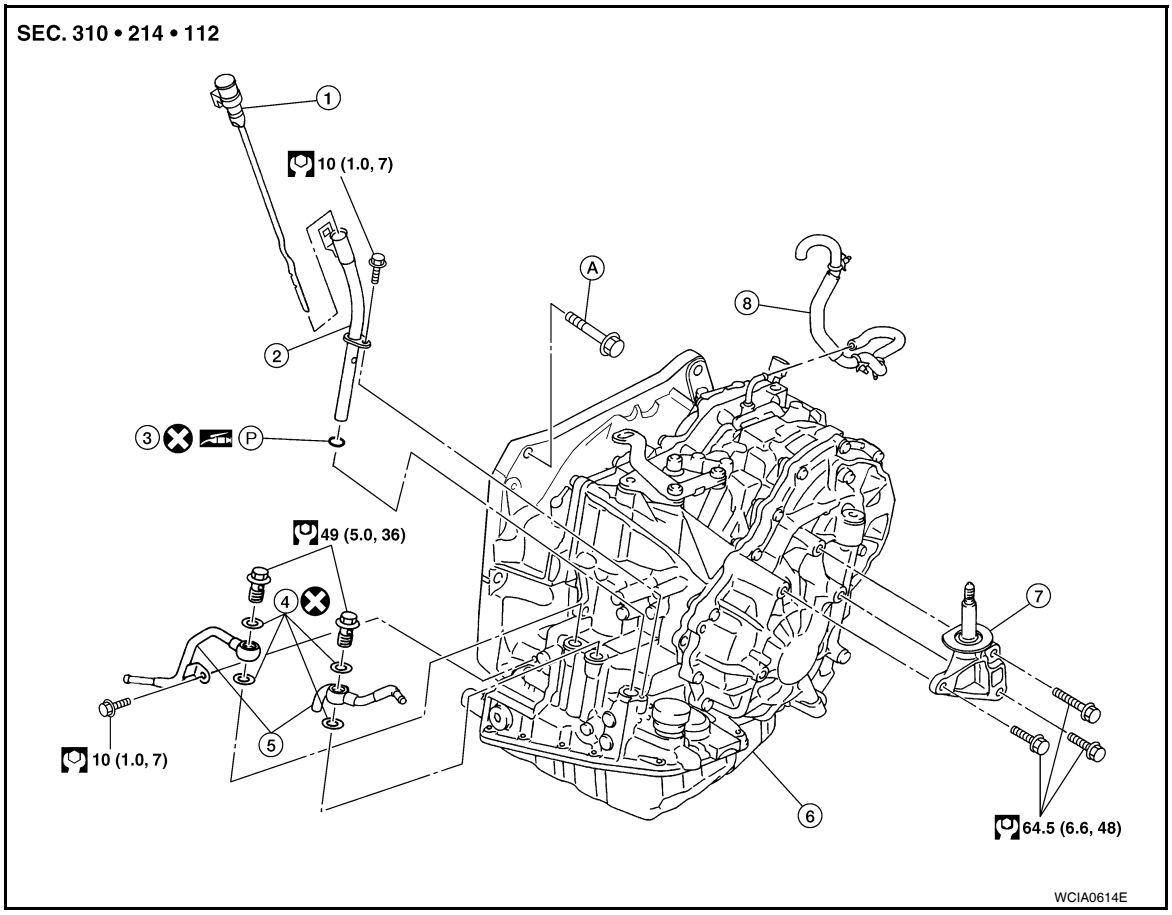
14. Install drain plug gasket to drain plug.
CAUTION:
Never reuse drain plug gasket.
15. Install drain plug to oil pan.
16. Connect the CVT unit connector. Refer to CVT-10, "Removal and Installation Procedure for CVT Unit Connector".
17. Install engine undercover.
18. Connect battery cable to negative terminal.
19. Fill CVT fluid from CVT fluid charging pipe to the specified level.
20. Check CVT fluid level and condition. Refer to CVT-14, "Checking CVT Fluid".
21. Erase the CVT fluid degradation data. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".
22. When replacing the control valve, erase EEP ROM in TCM. Refer to CVT-8, "Service After Replacing TCM, Control Valve and Transaxle Assembly".

TRANSAXLE ASSEMBLY

Removal and Installation

INFOID:0000000007329852

COMPONENTS



1. CVT fluid level gauge	2. CVT fluid charging pipe	3. O-ring
4. Copper washer	5. Fluid cooler tube	6. Transaxle assembly
7. Engine mounting bracket (LH)	8. Air breather hose	A. Refer to "INSTALLATION".

REMOVAL

WARNING:

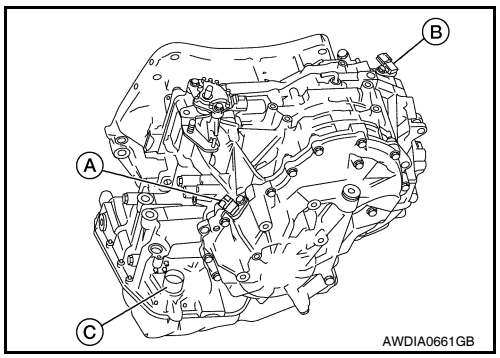
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

CAUTION:

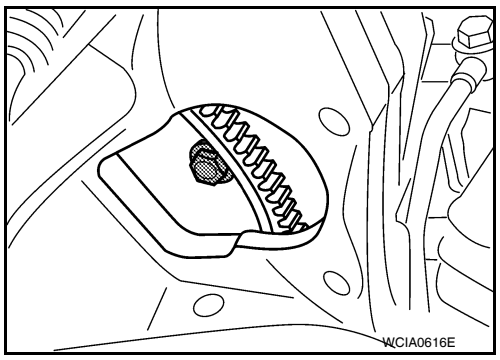
- **Perform this step engine is cold.**
- **When replacing TCM and transaxle assembly as a set, replace transaxle assembly first and then replace TCM. Refer to CVT-8, "Service After Replacing TCM, Control Valve and Transaxle Assembly".**

1. Remove the engine and transaxle as an assembly. Refer to EM-78, "Removal and Installation".

2. Disconnect the primary speed sensor (A) and the secondary speed sensor connector (B) and CVT unit connector (C). Refer to CVT-10, "Removal and Installation Procedure for CVT Unit Connector".



3. Remove the harness from the transaxle.
4. Remove the four drive plate to torque converter nuts.
   NOTE:
   Rotate the crankshaft clockwise as viewed from front of engine for access to drive plate to torque converter nuts.



5. Put matching marks on the drive plate and torque converter alignment stud.
   CAUTION:
   For matching marks, use paint. Never damage the drive plate or torque converter.
6. Remove the transaxle to engine and engine to transaxle bolts.
7. Separate the transaxle from the engine.
8. If necessary, remove the following from the transaxle:
   - CVT fluid charging pipe
   - Engine mounting bracket (LH)
   - Fluid cooler tubes
   - Air breather hose
   - Any necessary brackets

INSTALLATION

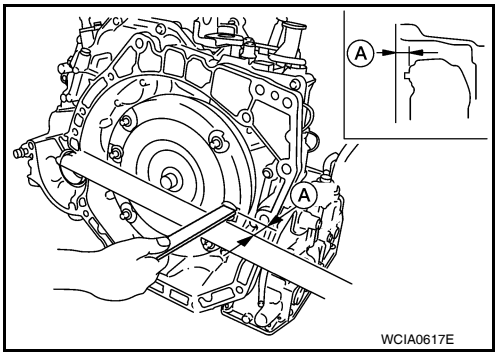
Installation is in the reverse order of removal.

CAUTION:

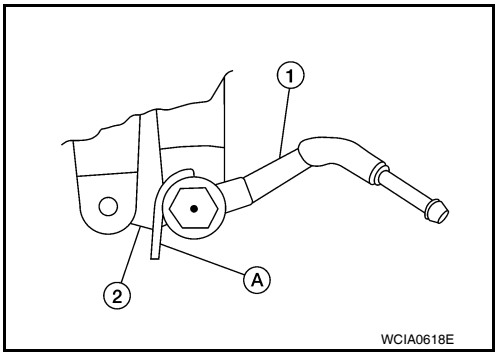
- **When replacing an engine or transmission you must make sure any dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.**
- **Do not reuse O-rings and copper sealing washers.**
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the nuts for the torque converter while securing the crankshaft pulley bolt, be sure to confirm the tightening torque of the crankshaft pulley bolt. Refer to EM-40.**
- **After converter is installed to drive plate, rotate crankshaft several turns to check that transaxle rotates freely without binding.**

- When installing the torque converter to the transaxle measure distance A.

Distance A: 14.4 mm (0.57 in) or more

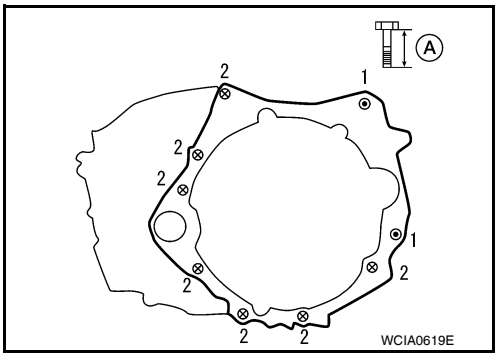


- When installing the cooler outlet tube (1) to the transaxle assembly (2), align the cooler tube bracket (A) against the transaxle as shown.



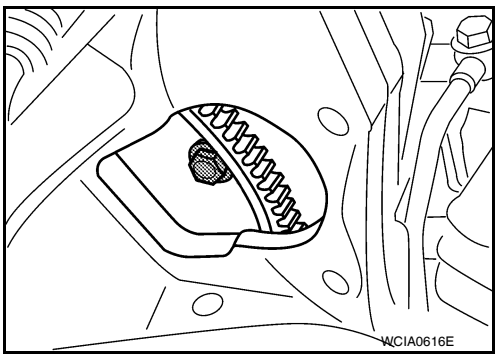
- When installing the transaxle to the engine, align the matching mark on the drive plate with the matching mark on the torque converter alignment stud.
- When securing the transaxle to the engine, attach the bolts in accordance with the following standard.

Bolt No.	1 (Transaxle to engine)	2 (Engine to transaxle)
Number of bolts	2	7
Bolt length “A” mm (in)	55 (2.17)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62 (6.3, 46)	



- When installing the drive plate to torque converter nuts, tighten them temporarily. Then tighten the nuts to the specified torque.

Converter nuts: : 51 N·m (5.2 kg-m, 38 ft-lb)



- After completing installation check for fluid level, fluid leakage, and the positions of CVT. Refer to CVT-14, "Checking CVT Fluid", CVT-164, "Adjustment of CVT Position" and CVT-164, "Checking of CVT Position".
- When replacing the CVT assembly, erase EEP ROM in TCM. Refer to CVT-8, "Service After Replacing TCM, Control Valve and Transaxle Assembly".

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007329853

Applied model		MR18DE engine
CVT model		RE0F08B
CVT assembly	Model code number	1XC6B
Transmission gear ratio	"D" position	Variable
	Reverse	2.689
	Final drive	5.473
Recommended fluid		NISSAN CVT Fluid NS-2
Fluid capacity		6.9 liter (7-1/4 US qt, 6-1/8 Imp qt)*

CAUTION:
- **Use only Genuine NISSAN CVT Fluid NS-2. Do not mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**

*: The fluid capacity is the reference value. Check the fluid level with CVT fluid level gauge.

Vehicle Speed When Shifting Gears

INFOID:0000000007329854

Numerical value data are reference values.

Engine type	Throttle position	Shift pattern	Engine speed (rpm)	
			At 40 km/h (25 MPH)	At 60 km/h (37 MPH)
MR18DE	8/8	"D" position Overdrive-off mode "L" position	3,600 - 4,500	4,400 - 5,300
	2/8	"D" position	1,300 - 3,100	1,400 - 3,500
		Overdrive-off mode	2,200 - 3,000	2,800 - 3,600
		"L" position	3,100 - 4,000	3,800 - 4,700

CAUTION:

Lock-up clutch is engaged when vehicle speed is approximately 18 km/h (11 MPH) to 90 km/h (56 MPH).

Stall Speed

INFOID:0000000007329855

Stall speed	2,600 - 3,150 rpm

Line Pressure

INFOID:0000000007329856

Engine speed	Line pressure kPa (kg/cm^2 , psi)
	"R", "D" and "L" positions
At idle	650 (6.63, 94.3)
At stall	4,250 (43.35, 616.3)

Solenoid Valves

INFOID:0000000007329857

Name	Resistance (Approx.)	Terminal
secondary pressure solenoid valve	3 - 9 Ω	3
Line pressure solenoid valve		2
Torque converter clutch solenoid valve		12
Lock-up select solenoid valve	6 - 19Ω	13

CVT Fluid Temperature Sensor

INFOID:0000000007329858

Name	Condition	CONSULT “DATA MONITOR” (Approx.)	Resistance (Approx.)
ATF TEMP SEN	20°C (68°F)	2.0 V	6.5 kΩ
	80°C (176°F)	1.0 V	0.9 kΩ

Primary Speed Sensor

INFOID:0000000007329859

Name	Condition	Data (Approx.)
Primary speed sensor	When driving [“L” position, 20 km/h (12 MPH)].	1250 Hz

Secondary Speed Sensor

INFOID:0000000007329860

Name	Condition	Data (Approx.)
Secondary speed sensor	When driving [“D” position, 20 km/h (12 MPH)].	570 Hz

Removal and Installation

INFOID:0000000007329861

Distance between end of converter housing and torque converter	14.4 mm (0.57 in)

SECTION FAX
FRONT AXLE

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007332055

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007332056

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

General Precautions

INFOID:0000000007332057

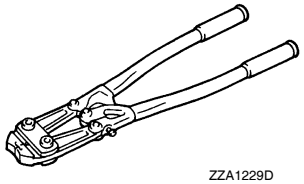
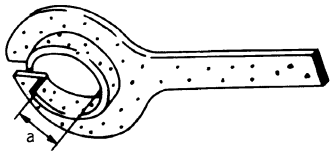
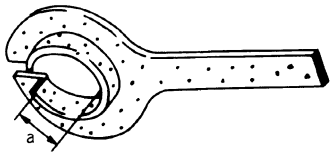
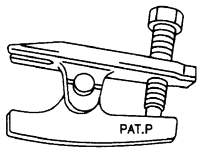
Observe the following precautions when disassembling and assembling drive shaft.
- Joint sub-assembly does not disassemble because it is non-overhaul parts.
- Perform work in a location which is as dust-free as possible.
- Before disassembling and assembling, clean the outside of parts.
- Prevention of the entry of foreign objects must be taken into account during disassembly of the service location.
- Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.
- Paper shop cloths must be used. Fabric shop cloths must not be used because of danger of lint adhering to parts.
- Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.

PREPARATION

Special Service Tool

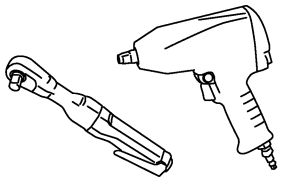
INFOID:0000000007332058

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV40107300 (—) Boot Band crimping tool  ZZA1229D	Installing boot bands
KV38105500 (J-33904) Differential side oil seal protector  ZZA0835D	Installing drive shaft LH **a: 40 mm (1.57 in) dia.**
KV38106700 (J-34296) Differential side oil seal protector  ZZA0835D	Installing drive shaft RH **a: 36 mm (1.42 in) dia.**
HT72520000 (J-25730-A) Ball joint remover  NT146	Removing steering outer socket

Commercial Service Tool

INFOID:0000000007332059

Tool name	Description
Power tool  PBIC0190E	• Removing wheel nuts • Removing torque member bolts • Removing hub lock nut

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007332060

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	—	—	FAX-6	—	FAX-6	FSU-6, "NVH Troubleshooting Chart"	Refer to FRONT AXLE in this chart.	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	Refer to DRIVE SHAFT in this chart.	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	Wheel bearing damage	FRONT SUSPENSION	FRONT AXLE	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise	×	×				×	×	×	×	×		×	×
		Shake	×		×			×	×	×	×	×		×	×
	FRONT AXLE	Noise				×	×	×	×		×	×	×	×	×
		Shake				×	×	×	×		×	×	×	×	×
		Vibration				×	×	×	×		×		×		×
		Shimmy				×	×		×		×	×		×	×
		Shudder				×			×		×	×		×	×
		Poor quality ride or handling				×	×		×		×	×			

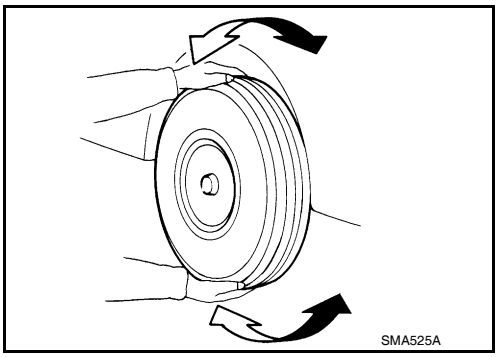
×: Applicable

FRONT WHEEL HUB AND KNUCKLE

On-Vehicle Inspection and Service

INFOID:0000000007332061

- Check the axle and suspension parts for excessive play, wear, or damage.
- Shake each front wheel to check for excessive play as shown.



FRONT WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure the axial end play is within specification.

Axial end play : **Refer to** **FAX-25, "Wheel Bearing (Front)"**

- Check that the wheel hub bearing operates smoothly.
- Replace the wheel hub assembly if the axial end play exceeds specification, or if the wheel bearing does not turn smoothly. Refer to RAX-6, "Removal and Installation".

CAUTION:

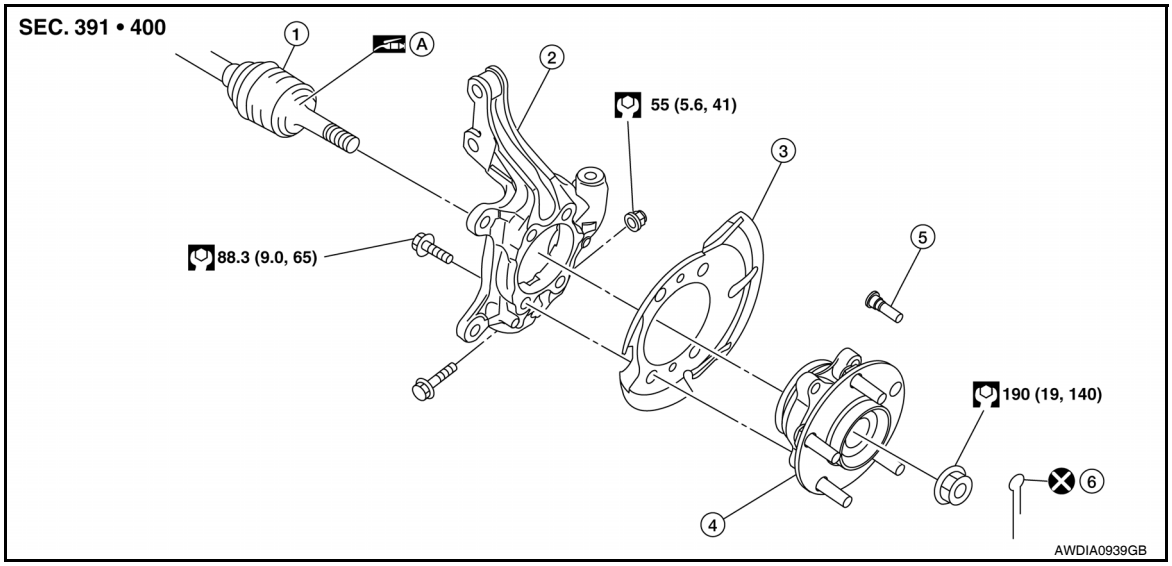
The wheel hub assembly does not require maintenance. If any of the following symptoms are noted, replace the wheel hub assembly.

- **Growling noise is emitted from the wheel hub bearing during operation.**
- **Wheel hub bearing drags or turns roughly.**

Removal and Installation

INFOID:0000000007332062

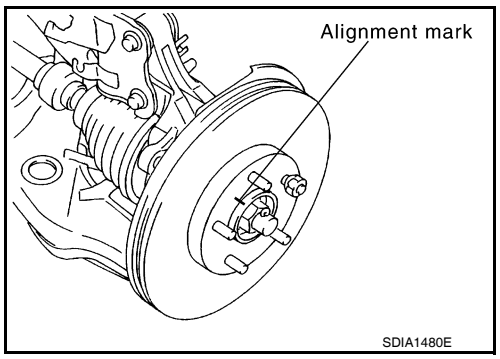
COMPONENT



1. Drive shaft
2. Steering knuckle
3. Splash guard
4. Wheel hub and bearing assembly
5. Stud
6. Cotter pin
A. Molykote M77

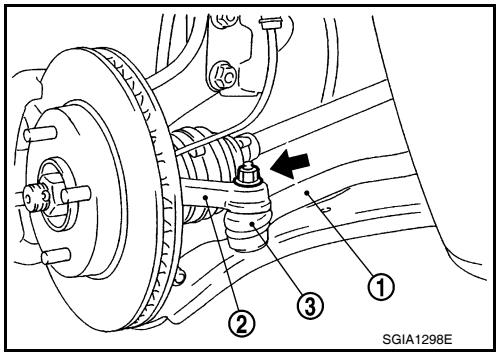
REMOVAL

1. Remove wheel and tire using power tool. Refer to WT-7, "Adjustment".
2. Without disassembling the hydraulic lines, remove the torque member bolts using power tool. Then reposition the torque member and brake caliper assembly aside with wire. Refer to BR-25.
   CAUTION:
   Do not depress brake pedal while brake caliper is removed.
3. Put alignment marks on disc rotor and wheel hub and bearing assembly, then remove disc rotor.

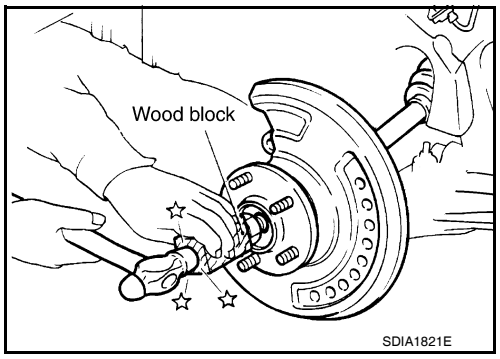


4. Remove wheel sensor from steering knuckle. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
5. Loosen steering outer socket (1) nut.
6. Remove steering outer socket (1) from steering knuckle (2) so as not to damage ball joint (3) boot using Tool.
   CAUTION:
   Temporarily leave the outer socket nut installed to prevent damage to threads and to prevent the ball joint remover or suitable tool from suddenly coming off.

   Tool number : HT72520000 (J-25730-A)

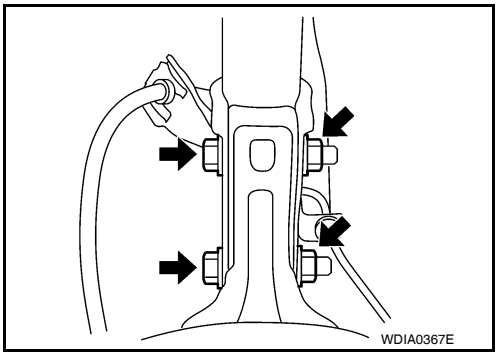


7. Remove transverse link ball joint nut and bolt. Then, remove transverse link from steering knuckle.
8. Remove cotter pin, then loosen hub lock nut using power tool.
   CAUTION:
   Temporarily leave the hub lock nut installed to prevent damage to threads.
9. Separate the drive shaft from the wheel hub and bearing assembly by lightly tapping the end of the drive shaft using a hammer or suitable tool, and then remove hub lock nut.
   NOTE:
   Use a suitable puller if wheel hub and bearing assembly and drive shaft cannot be separated after performing the above procedure.



10. Remove the drive shaft from the wheel hub and bearing assembly and support the drive shaft.
    CAUTION:
    - **Do not apply an excessive angle to drive shaft joint when removing from the wheel hub and bearing assembly,**
    - **Do not excessively extend slide joint.**
    - **Do not allow drive shaft to hang down. Support the entire drive shaft.**
11. Remove wheel hub and bearing assembly bolts, and then remove splash guard and wheel hub and bearing assembly from steering knuckle.

12. Remove nuts and bolts, and then remove steering knuckle from strut assembly. Refer to FSU-10, "Component".



INSPECTION AFTER REMOVAL

Wheel Hub and Knuckle Inspection

Check for any deformity, cracks, or other damage on the wheel hub assembly and knuckle, replace if necessary.

CAUTION:

The wheel hub assembly does not require maintenance. If any of the following symptoms are noted, replace the wheel hub assembly.

- **Growling noise is emitted from the wheel hub bearing during operation.**
- **Wheel hub bearing drags or turns roughly.**

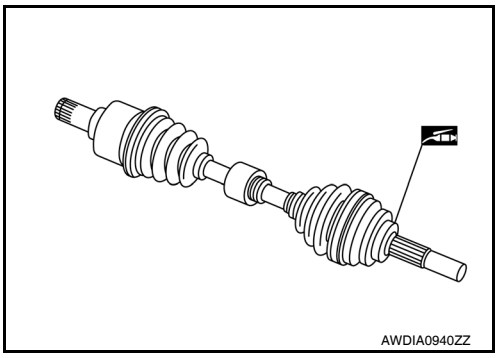
Ball Joint Inspection

Check boots of transverse link and steering outer socket ball joint for breakage, axial play, and torque. Refer to FSU-15, "Removal and Installation" transverse link and PS-15, "Disassembly and Assembly" steering outer socket ball joint.

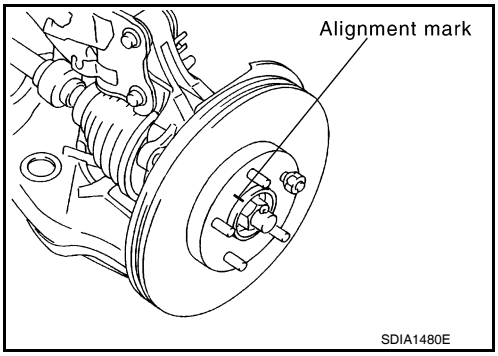
INSTALLATION

Installation is the reverse order of removal.

- Apply grease Molykote M77 to contact surface between wheel hub and driveshaft. Use sufficient grease to completely coat contact area.



- Perform the final tightening of each of parts under unladen conditions, which were removed when removing wheel hub and bearing assembly and steering knuckle. Check the wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- When installing disc rotor on wheel hub and bearing assembly, align the marks.
  (When not using the alignment mark, refer to BR-29, "Disassembly and Assembly of Brake Caliper Assembly").



FRONT DRIVE SHAFT

On-Vehicle Inspection and Service

INFOID:0000000007332063

- Check drive shaft mounting point and joint for looseness and other damage.
- Check boot for cracks and other damage.

Replace or repair components as necessary. Refer to FAX-9, "Removal and Installation (Left Side)", FAX-10, "Removal and Installation (Right Side)", FAX-13, "Disassembly and Assembly (Left Side)", or FAX-18, "Disassembly and Assembly (Right Side)".

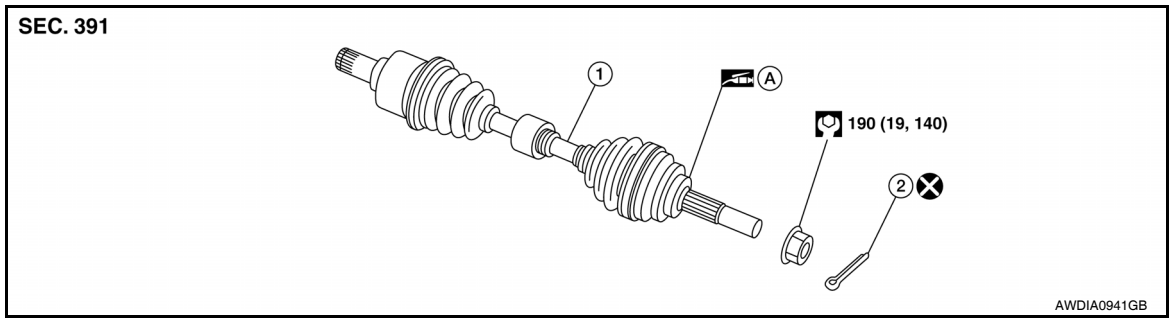
CAUTION:

Replace entire drive shaft assembly when noise or vibration occur from drive shaft.

Removal and Installation (Left Side)

INFOID:0000000007332064

COMPONENTS



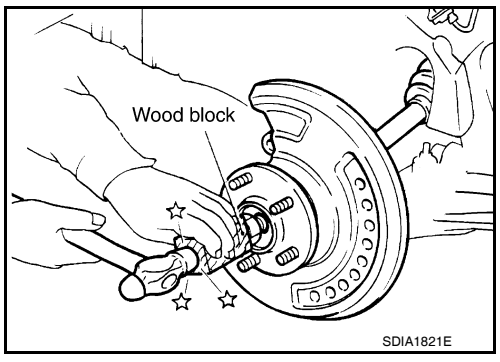
1. Drive shaft
2. Cotter pin
A. Molykote M77

NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

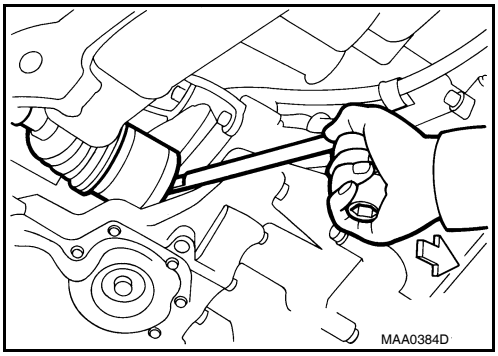
REMOVAL

1. Remove wheel and tire using power tool. Refer to WT-7, "Adjustment".
2. Remove wheel sensor from steering knuckle. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove cotter pin, then loosen hub lock nut using power tool.
   CAUTION:
   Temporarily leave the hub lock nut installed to prevent damage to threads.
4. Remove transverse link ball joint nut and bolt. Then, remove transverse link from steering knuckle.
5. Separate the drive shaft from the wheel hub and bearing assembly by lightly tapping the end of the drive shaft using a hammer or suitable tool and wood block, and then remove hub lock nut.
   NOTE:
   Use a suitable puller if wheel hub and bearing assembly and drive shaft cannot be separated after performing the above procedure.



6. Remove the drive shaft from the wheel hub and bearing assembly.
   CAUTION:
   - **Do not apply an excessive angle to drive shaft joint when removing from the wheel hub and bearing assembly,**
   - **Do not excessively extend slide joint.**
   - **Do not allow drive shaft to hang down. Support the entire drive shaft.**

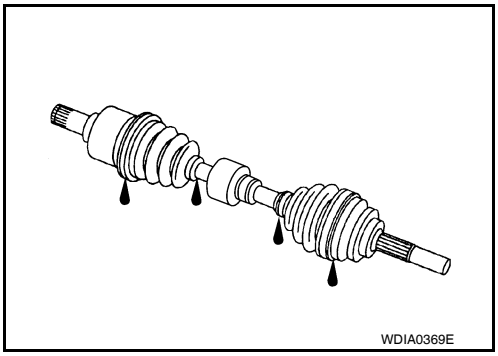
7. Remove drive shaft from transaxle assembly side using suitable tool as shown.
   • Make sure that circlip is attached on the edge.



CAUTION:
- **Do not apply an excessive angle to drive shaft joint when removing from the transaxle.**
- **Do not excessively extend slide joint.**
- **Do not allow drive shaft to hang down. Support the entire drive shaft.**

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in axial direction. Check for any rough movement or significant looseness.
- Check boot for cracks or other damage, and for grease leakage.
- If damaged, disassemble drive shaft to verify damage, and repair or replace as necessary.



INSTALLATION

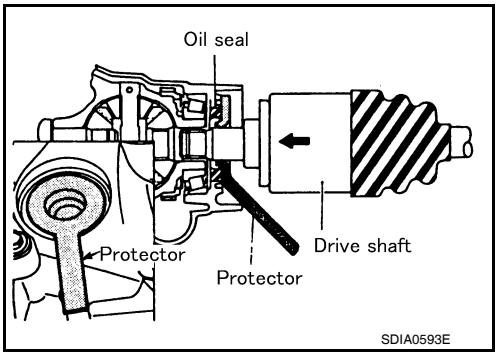
Installation is in the reverse order of removal.

- Install new circlip on drive shaft in the circlip groove on transaxle side. Refer to FAX-13, "Disassembly and Assembly (Left Side)".

CAUTION:
Make sure the new circlip on the drive shaft is securely fastened.

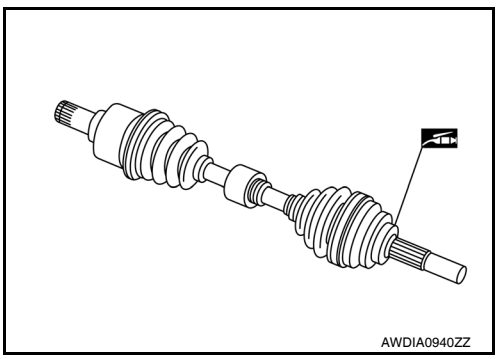
- In order to prevent damage to differential side oil seal, place Tool onto oil seal before inserting drive shaft as shown. Slide drive shaft into slide joint and tap with a hammer to install securely.

Tool number : KV38105500 (J-33904)



- After inserting driveshaft, try to pull the driveshaft out of the transaxle by hand. If it pulls out, the circlip is not properly meshed with the transaxle side gear.

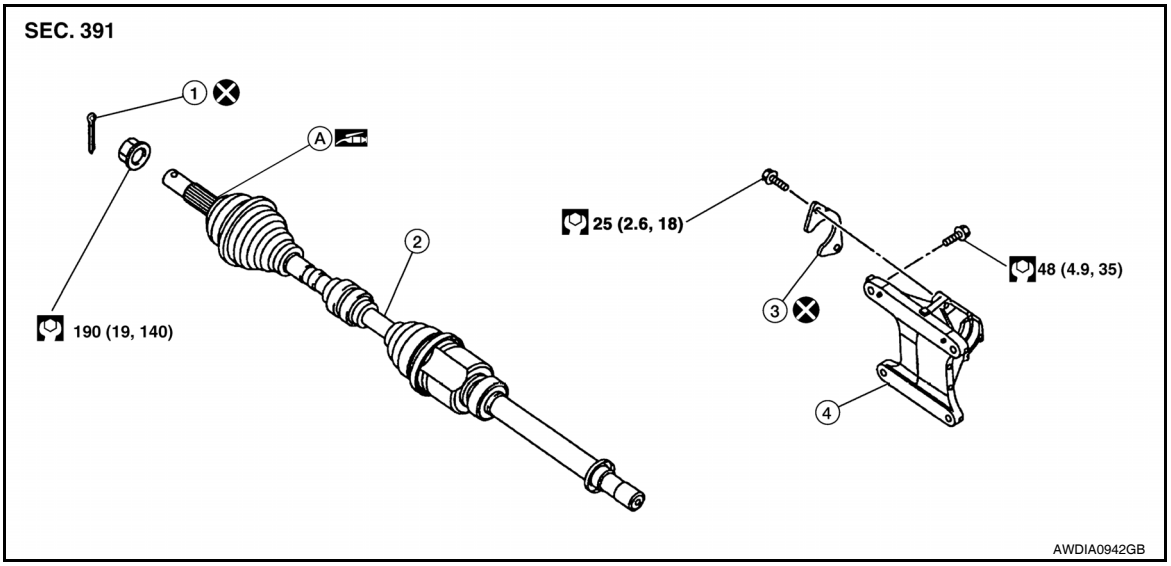
- Apply Molykote M77 to contact surface between wheel hub and driveshaft. Use sufficient grease to completely coat contact area.
- Check transaxle fluid level. Refer to MT-12, "Checking M/T Oil" (Manual RS6F94R), AT-16, "Checking A/T Fluid" (Automatic), CVT-14, "Checking CVT Fluid" (CVT).



Removal and Installation (Right Side)

INFOID:0000000007332065

COMPONENTS

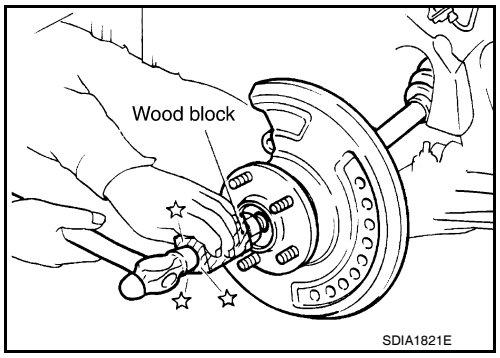


1. Cotter pin
2. Drive shaft
3. Support bearing bracket plate
4. Support bearing bracket
A. Molykote M77

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

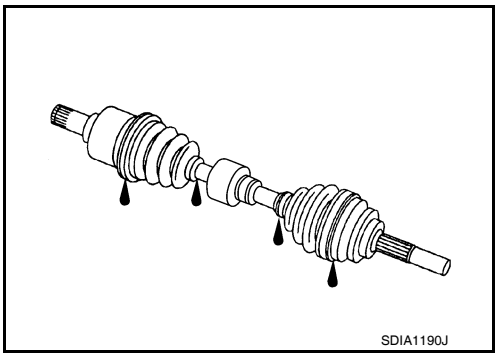
1. Remove wheel and tire using power tool. Refer to WT-7, "Adjustment".
2. Remove wheel sensor from steering knuckle. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove cotter pin, then loosen hub lock nut using power tool.
   CAUTION:
   Temporarily leave the hub lock nut installed to prevent damage to threads.
4. Remove transverse link ball joint nut and bolt. Then, remove transverse link from steering knuckle.
5. Separate the drive shaft from the wheel hub and bearing assembly by lightly tapping the end of the drive shaft using a hammer or suitable tool and wood block, and then remove hub lock nut.
   NOTE:
   Use a suitable puller if wheel hub and bearing assembly and drive shaft cannot be separated after performing the above procedure.



6. Remove the drive shaft from the wheel hub and bearing assembly.
   CAUTION:
   - **Do not apply an excessive angle to drive shaft joint when removing from the wheel hub and bearing assembly,**
   - **Do not excessively extend slide joint.**
   - **Do not allow drive shaft to hang down. Support the entire drive shaft.**
7. Remove the support bearing bracket plate bolts and support bearing bracket plate.
8. Remove the drive shaft from the transaxle assembly.
   CAUTION:
   - **Do not apply an excessive angle to drive shaft joint when removing from the transaxle.**
   - **Do not excessively extend slide joint.**
   - **Do not allow drive shaft to hang down. Support the entire drive shaft.**
9. If necessary, remove the support bearing bracket bolts and the support bearing bracket.

INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in axial direction. Check for any rough movement or significant looseness.
- Check boot for cracks or other damage, and for grease leakage.
- If damaged, disassemble drive shaft to verify damage, and repair or replace as necessary.
- Check for cracks or other damage to the support bearing bracket, replace as necessary.

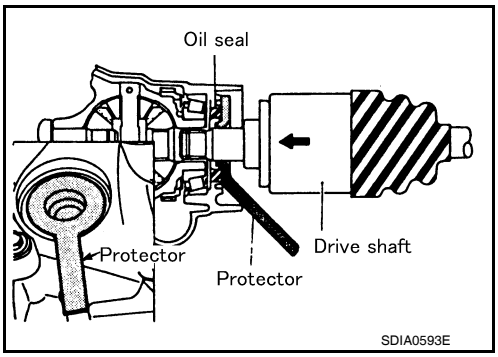

SDIA1190J

INSTALLATION

Installation is in the reverse order of removal.

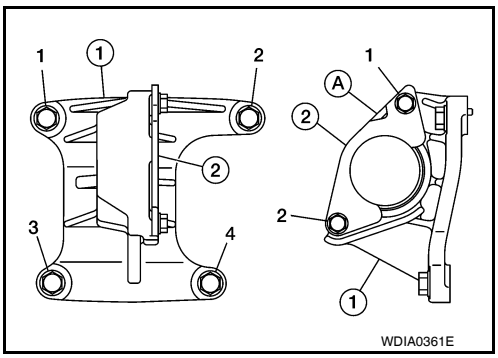
- In order to prevent damage to differential side oil seal, place Tool onto oil seal before inserting drive shaft as shown. Slide drive shaft into slide joint and tap with a hammer to install securely.

Tool number : KV38106700 (J-34296)



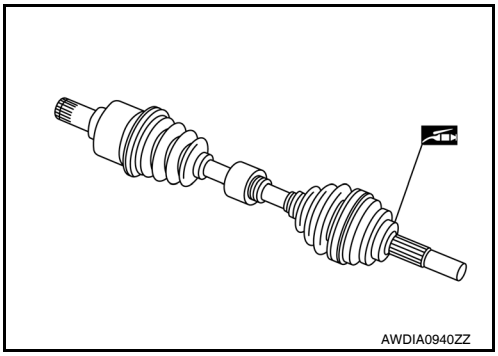
SDIA0593E

- When installing the support bearing bracket (1), note the following:
  a. Tighten the support bearing bracket bolts in two stages, in the order as shown.
  b. Install the plate (2) with the notch (A) upward. Tighten the plate bolts in two stages, in the order as shown.



WDIA0361E

- Apply grease Molykote M77 to contact surface between wheel hub and driveshaft. Use sufficient grease to completely coat contact area.
- Check transaxle fluid level. Refer to MT-12, "Checking M/T Oil" (Manual RS6F94R), AT-16, "Checking A/T Fluid" (Automatic), CVT-14, "Checking CVT Fluid" (CVT).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Disassembly and Assembly (Left Side)

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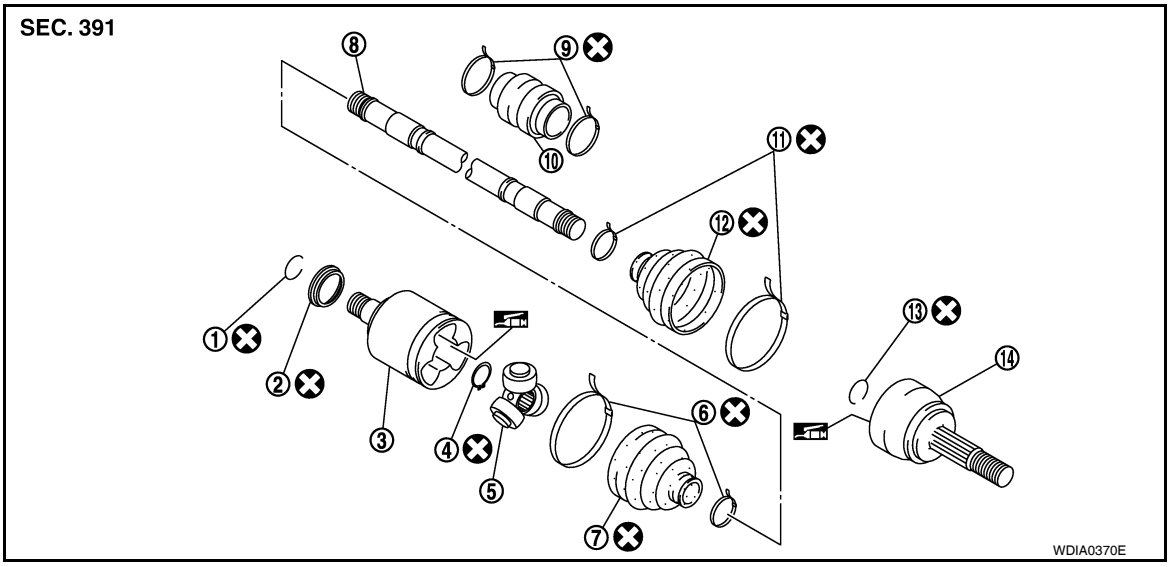
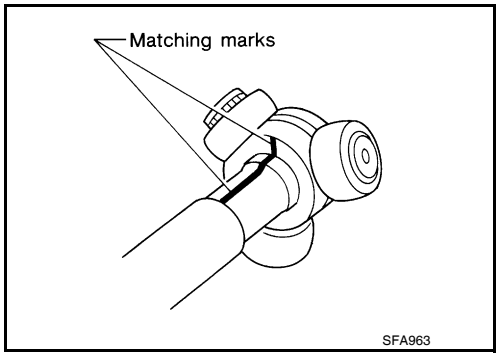


1. Circlip
2. Dust shield
3. Slide joint housing
4. Snap ring
5. Spider assembly
6. Boot band
7. Boot
8. Shaft
9. Damper band
10. Damper
11. Boot band
12. Boot
13. Circlip
14. Joint sub-assembly

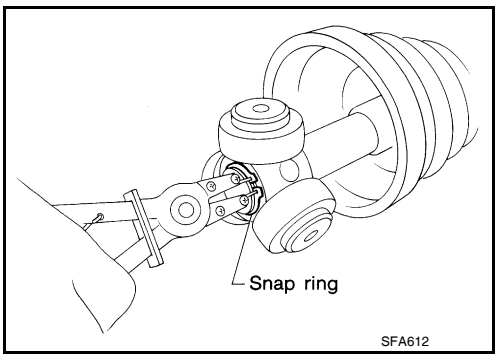
DISASSEMBLY

Transaxle Side

1. Mount drive shaft in a vise.
   CAUTION:
   When mounting shaft in a vise, always use copper or aluminum plates between vise and shaft.
2. Remove boot bands and slide the boot back.
3. Remove circlip and dust shield from slide joint housing.
4. Put matching marks on slide joint housing and shaft, then pull out shaft from slide joint housing.
5. Put matching marks on spider assembly and shaft.

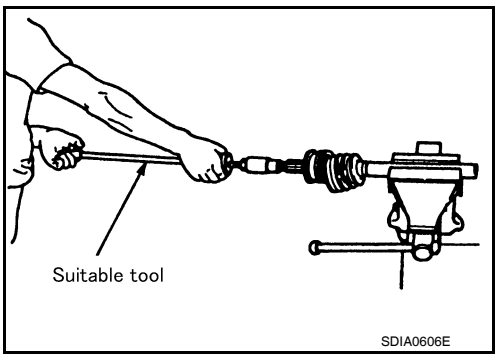


6. Remove snap ring using a suitable tool, then remove spider assembly from shaft.
7. Remove boot from shaft.
8. Clean the old grease off of the slide joint assembly.



Wheel Side

1. Mount the front drive shaft in a vise.
   CAUTION:
   When mounting shaft in a vise, always use copper or aluminum plates between vise and shaft.
2. Remove boot bands and slide the boot back.
3. Screw a sliding hammer or suitable tool 30 mm (1.18 in) or more into threaded part of joint sub-assembly. Pull joint sub-assembly out of shaft.
   CAUTION:
   - **Align sliding hammer or suitable tool and drive shaft then remove joint sub-assembly by pulling directly.**
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace the entire drive shaft assembly.**



4. Remove circlip from shaft.
5. Remove boot from shaft.
6. While rotating ball cage, clean the old grease off of the joint sub-assembly.

Damper

- Remove damper bands, then remove damper from shaft.

INSPECTION AFTER DISASSEMBLY

Shaft

Replace shaft if there is bending, cracking, or other damage.

Joint Sub-Assembly

- Make sure there is no rough rotation or unusual axial looseness.
- Make sure there is no foreign material inside joint sub-assembly.
- Check joint sub-assembly for compression scars, cracks or fractures.

CAUTION:
If there are any irregular conditions of joint sub-assembly components, replace the entire joint sub-assembly.

Slide Joint Housing and Spider Assembly

Make sure there are no compression scars, cracks, fractures or unusual wear of housing or spider roller contact surface.

CAUTION:
If there are any irregular conditions of the slide joint housing and spider assembly components, replace them as a set.

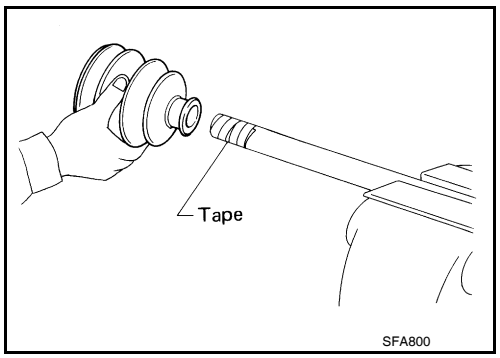
Damper

Check damper for cracks or wear. Replace as necessary.

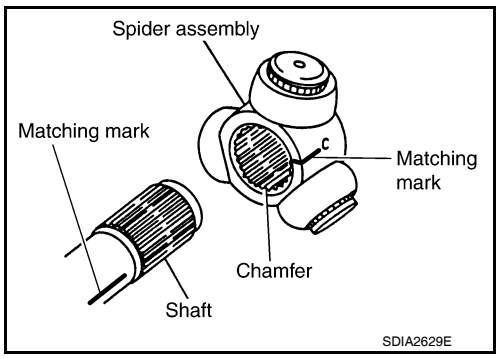
ASSEMBLY

Transaxle Side

1. Install new boot and new small boot band on shaft.
CAUTION:
- **Do not reuse boot or boot band.**
- **Cover drive shaft serration with tape to prevent damage to boot during installation.**
2. Remove protective tape wound around serrated part of shaft.

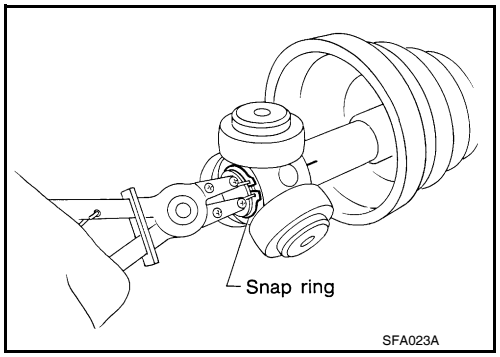


3. Align matching mark on spider assembly with matching mark on shaft and install spider assembly with chamfer facing shaft.



4. Install new snap ring using a suitable tool.
CAUTION:
Do not reuse snap ring.
5. Apply recommended grease (Genuine NISSAN Grease or equivalent) to spider assembly and sliding surface.
6. Install the slide joint housing onto the spider assembly and pack with the balance of recommended grease (Genuine NISSAN Grease or equivalent).

Grease amount : Refer to FAX-25, "Drive Shaft"

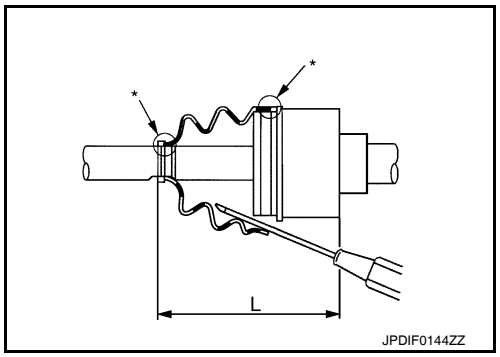


7. Install boot securely into grooves (indicated by * marks) as shown.
CAUTION:
If there is grease on boot mounting surfaces (indicated by * marks) of shaft and housing, boot may come off. Clean all grease from surfaces.
8. Make sure boot installation length (L) is the length specified below. Insert a suitable tool into the large end of boot. Bleed air from boot to prevent boot deformation.

Boot installation length (L)

M/T models : Refer to FAX-25, "Drive Shaft"

Except for M/T models : Refer to FAX-25, "Drive Shaft"

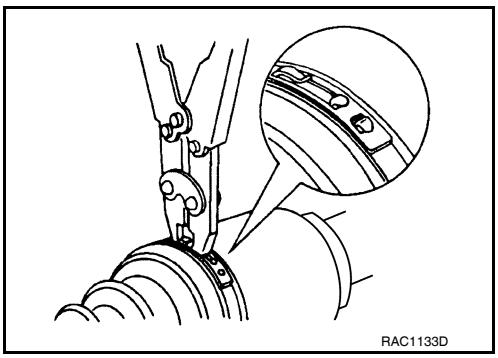


CAUTION:
- **Boot may break if boot installation length is outside the standard value.**
- **Be careful that screwdriver tip does not contact inside surface of boot.**

9. Secure large end of boot with new boot band.
   1. Set boot band onto boot and insert first pawl on boot band into the first groove on opposite end of boot band.

2. Pull and tighten the boot band using suitable tool until both pawls of boot band are secured in the boot band grooves.

CAUTION:
Do not reuse boot band.

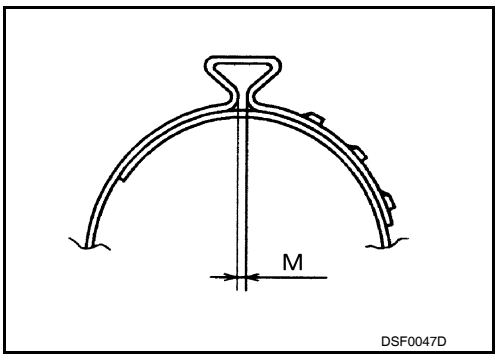


10. Install new small boot band securely using Tool.

Tool number : KV40107300 (—)

CAUTION:
- **Do not reuse boot band.**
- **Secure boot band so that dimension (M) meets specification as shown.**

Dimension (M) : Refer to FAX-26, "Boot Bands"

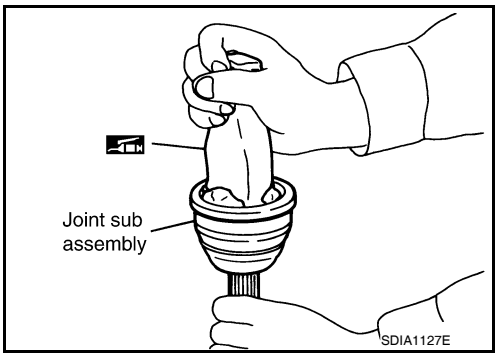


11. Rotate the slide joint and confirm that the boot position is correct. If boot position is not correct, remove the boot bands, reposition the boot and install new boot bands.
12. Install new dust shield to slide joint housing.

CAUTION:
Do not reuse dust shield.

Wheel Side

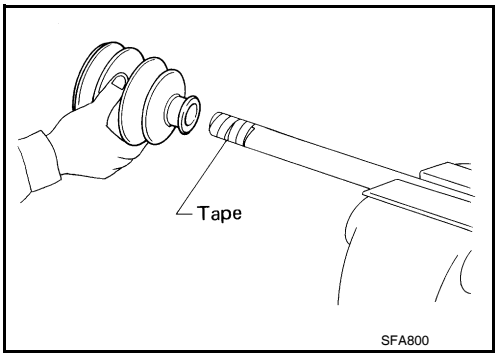
1. Insert recommended grease (Genuine NISSAN Grease or equivalent) into joint sub-assembly serration hole until grease begins to ooze from ball groove and serration hole. After inserting grease, use a shop cloth to wipe off old grease that has oozed out.



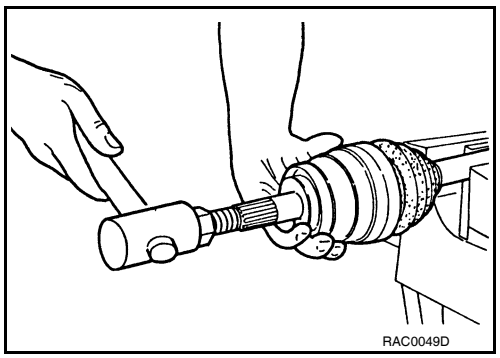
2. Cover serrated part of shaft with tape. Install new boot band and new boot to shaft.

CAUTION:
Do not reuse boot or boot band.

3. Remove protective tape wound around serrated part of shaft.



4. Attach new circlip to shaft. Thread nut onto end of joint sub-assembly and press fit using suitable tool.



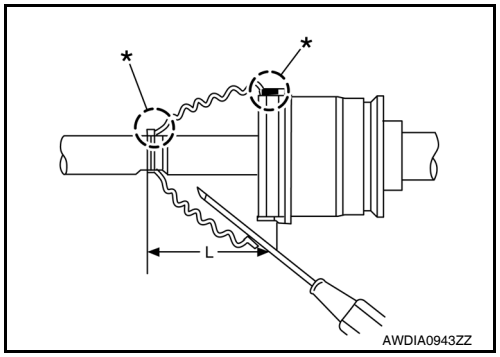
CAUTION:
- **Do not reuse circlip.**
- **Circlip must fit securely into shaft groove.**

5. Insert the balance of new grease (Genuine NISSAN Grease or equivalent) listed below into housing from large end of boot.

Grease amount : Refer to FAX-25, "Drive Shaft"

6. Install boot securely into grooves (indicated by * marks) as shown.

CAUTION:
If there is grease on boot mounting surfaces (indicated by * marks) of shaft and housing, boot may come off. Remove all grease from surfaces.



7. Make sure boot installation length (L) is the specified length indicated below. Insert a suitable tool into the large end of boot. Bleed air from boot to prevent boot deformation.

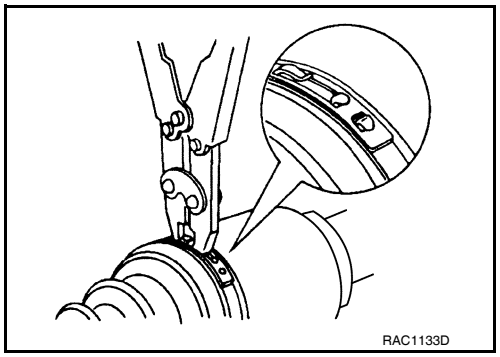
Boot installation length (L) : Refer to FAX-25, "Drive Shaft"

CAUTION:
- **Boot may break if boot installation length is outside the standard value.**
- **Be careful that screwdriver tip does not contact inside surface of boot.**

8. Install new large and small boot bands securely using Tool.

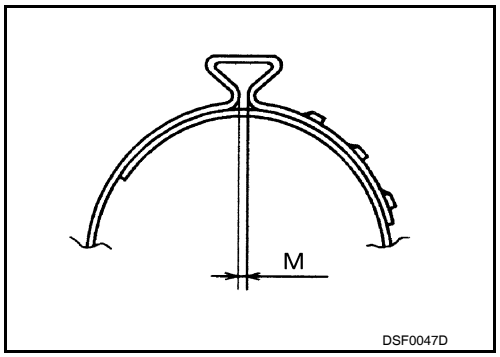
Tool number : KV40107300 (—)

CAUTION:
- **Do not reuse boot bands.**



- **Secure boot band so that dimension (M) meets specification as shown.**

Dimension (M) : Refer to FAX-26, "Boot Bands"

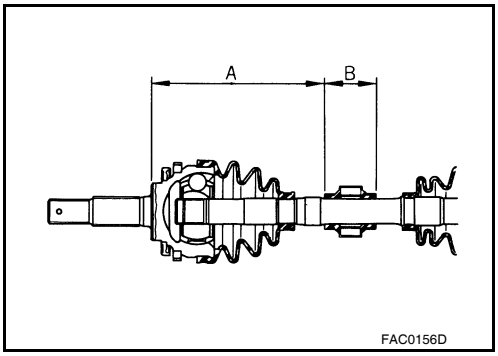


9. Rotate the joint sub assembly and confirm that the boot position is correct. If boot position is not correct, remove the boot bands, reposition the boot and install new boot bands.

Damper

1. Secure damper with new damper bands.

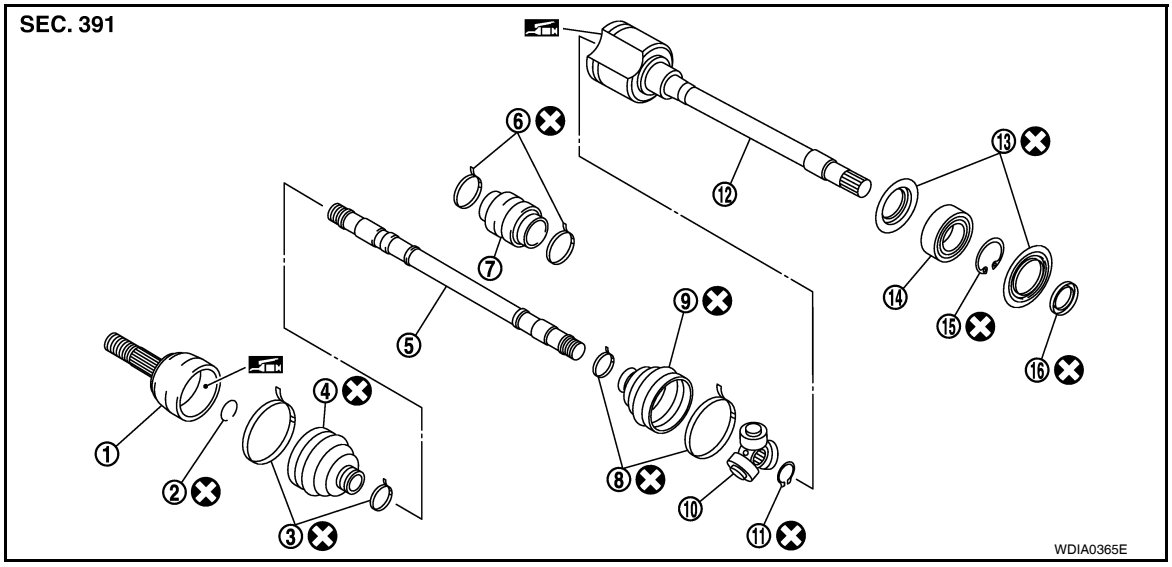
(A)	Except for CVT models	: Refer to FAX-25, "Drive Shaft"
	CVT models	: Refer to FAX-25, "Drive Shaft"
(B)		: Refer to FAX-25, "Drive Shaft"



CAUTION:
Do not reuse damper bands.

Disassembly and Assembly (Right Side)

INFOID:0000000007332067



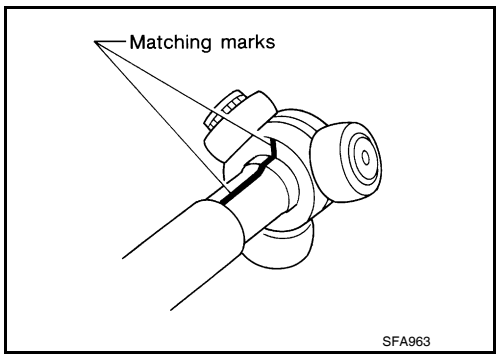
1. Joint sub-assembly
2. Circlip
3. Boot bands
4. Boot
5. Shaft
6. Damper bands
7. Damper
8. Boot band
9. Boot
10. Spider assembly
11. Snap ring
12. Slide joint housing
13. Dust shield
14. Bearing
15. Snap ring
16. Dust shield

DISASSEMBLY

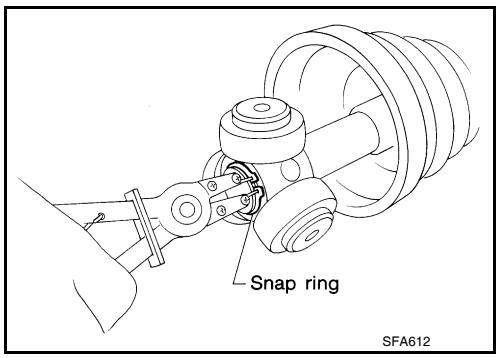
Transaxle Side

1. Mount drive shaft in a vise.
   CAUTION:
   When mounting shaft in a vise, always use copper or aluminum plates between vise and shaft.
2. Remove boot bands and slide the boot back.
3. Put matching marks on slide joint housing and shaft, then pull out shaft from slide joint housing.

4. Put matching marks on spider assembly and shaft.

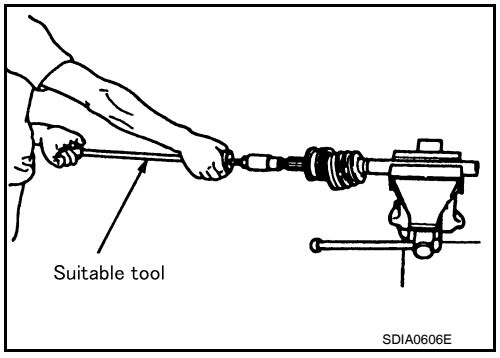


5. Remove snap ring using a suitable tool, then remove spider assembly from shaft.
6. Remove boot from shaft.
7. Clean the old grease off of the slide joint assembly.



Wheel Side

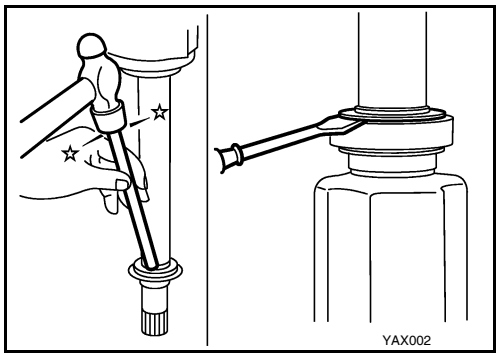
1. Mount the front drive shaft in a vise.
   CAUTION:
   When mounting shaft in a vise, always use copper or aluminum plates between vise and shaft.
2. Remove boot bands and slide the boot back.
3. Screw a sliding hammer or suitable tool 30 mm (1.18 in) or more into threaded part of joint sub-assembly. Pull joint sub-assembly out of shaft.
   CAUTION:
   - **Align sliding hammer or suitable tool and drive shaft then remove joint sub-assembly by pulling directly.**
   - **If joint sub-assembly cannot be removed after five or more unsuccessful attempts, replace the entire drive shaft assembly.**



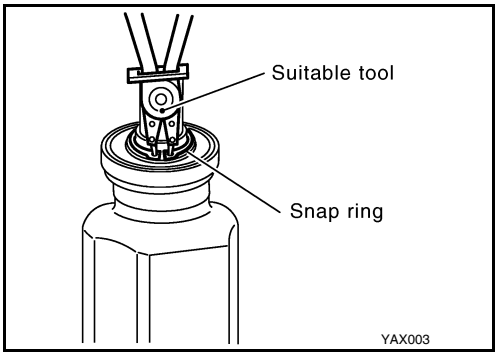
4. Remove circlip from shaft.
5. Remove boot from shaft.
6. While rotating ball cage, clean the old grease off of the joint sub-assembly.

Support Bearing

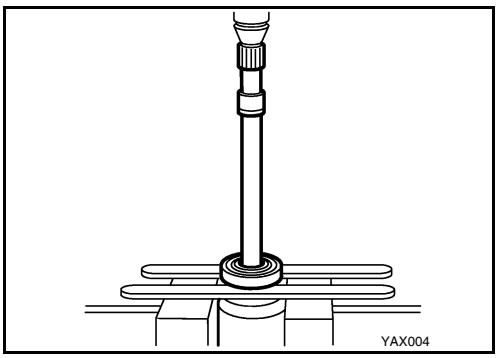
1. Remove dust shield from slide joint assembly using a suitable tool.



2. Remove dust shield, then remove snap ring using a suitable tool.



3. Press support bearing assembly off slide joint assembly using a suitable tool.
4. Remove dust shield.



Damper
- Remove damper bands, then remove damper from shaft.

INSPECTION AFTER DISASSEMBLY

Shaft
Replace shaft if there is bending, cracking, or other damage.

Joint Sub-Assembly
- Make sure there is no rough rotation or unusual axial looseness.
- Make sure there is no foreign material inside joint sub-assembly.
- Check joint sub-assembly for compression scars, cracks or fractures.

CAUTION:
If there are any irregular conditions of joint sub-assembly components, replace the entire joint sub-assembly.

Slide Joint Housing and Spider Assembly
Make sure there are no compression scars, cracks, fractures or unusual wear of housing or spider roller contact surface.

CAUTION:
If there are any irregular conditions of the slide joint housing and spider assembly components, replace them as a set.

Support Bearing
Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear.

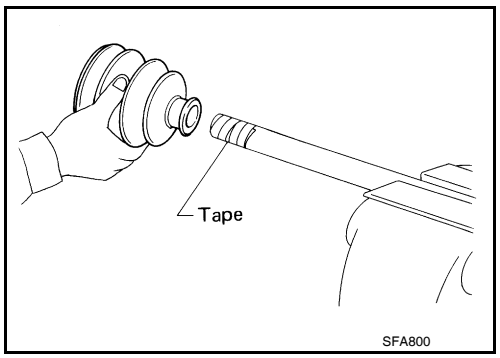
Support Bearing Bracket
Check for bending, cracks, or damage.

Damper
Check damper for cracks or wear. Replace as necessary.

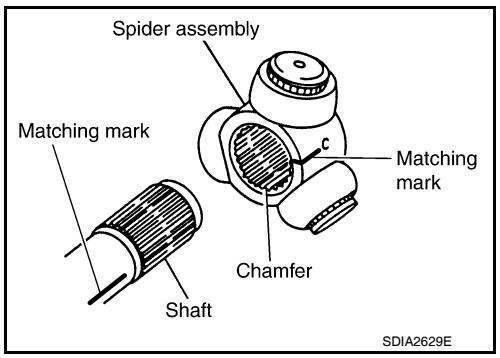
ASSEMBLY

Transaxle Side

1. Install new boot and new small boot band on shaft.
   CAUTION:
   - **Do not reuse boot or boot band.**
   - **Cover drive shaft serration with tape to prevent damage to boot during installation.**
2. Remove protective tape wound around serrated part of shaft.

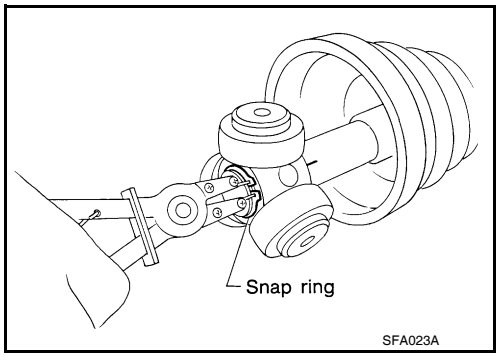


3. Align matching mark on spider assembly with matching mark on shaft and install spider assembly with chamfer facing shaft.



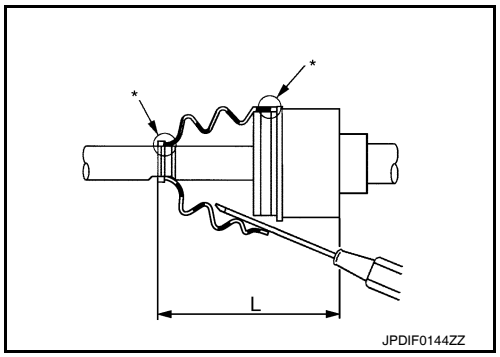
4. Install new snap ring using a suitable tool.
   CAUTION:
   Do not reuse snap ring.
5. Apply recommended grease (Genuine NISSAN Grease or equivalent) to spider assembly and sliding surface.
6. Install the slide joint housing onto the spider assembly and pack with the balance of recommended grease (Genuine NISSAN Grease or equivalent).

   Grease amount : Refer to FAX-25, "Drive Shaft"



7. Install boot securely into grooves (indicated by * marks) as shown.
   CAUTION:
   If there is grease on boot mounting surfaces (indicated by * marks) of shaft and housing, boot may come off. Clean all grease from surfaces.
8. Make sure boot installation length (L) is the length specified below. Insert a suitable tool into the large end of boot. Bleed air from boot to prevent boot deformation.

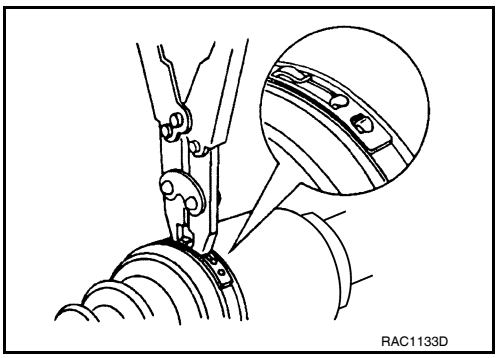
   Boot installation length (L) : Refer to FAX-25, "Drive Shaft"



   CAUTION:
   - **Boot may break if boot installation length is outside the standard value.**
   - **Be careful that screwdriver tip does not contact inside surface of boot.**
9. Secure large end of boot with new boot band.
   1. Set boot band onto boot and insert first pawl on boot band into the first groove on opposite end of boot band.

2. Pull and tighten the boot band using suitable tool until both pawls of boot band are secured in the boot band grooves.

CAUTION:
Do not reuse boot band.

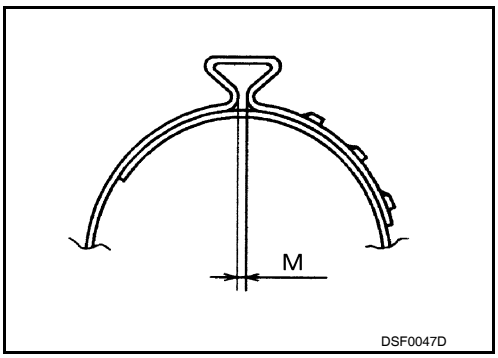


10. Install new small boot band securely using Tool.

Tool number : KV40107300 (—)

CAUTION:
- **Do not reuse boot band.**
- **Secure boot band so that dimension (M) meets specification as shown.**

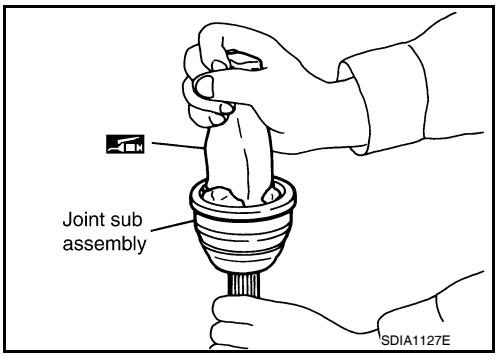
Dimension (M) : Refer to FAX-26, "Boot Bands"



11. Rotate the slide joint and confirm that the boot position is correct. If boot position is not correct, remove the boot bands, reposition the boot and install new boot bands.

Wheel Side

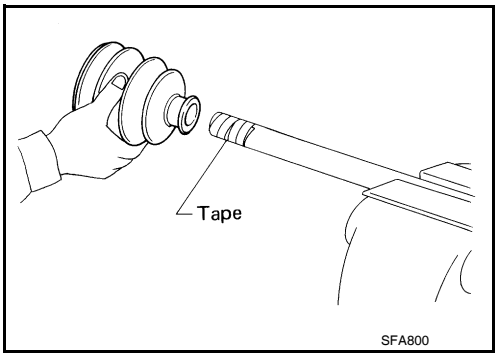
1. Insert recommended grease (Genuine NISSAN Grease or equivalent) into joint sub-assembly serration hole until grease begins to ooze from ball groove and serration hole. After inserting grease, use a shop cloth to wipe off old grease that has oozed out.



2. Cover serrated part of shaft with tape. Install new boot band and new boot to shaft.

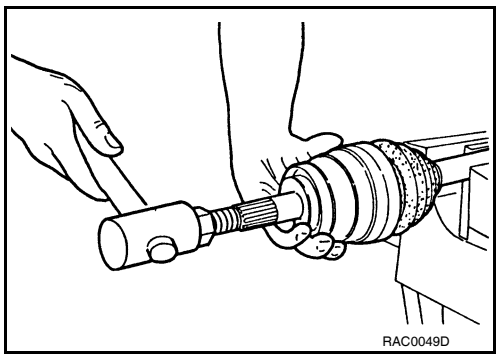
CAUTION:
Do not reuse boot or boot band.

3. Remove protective tape wound around serrated part of shaft.



4. Attach new circlip to shaft. Thread nut onto end of joint sub-assembly and press fit using suitable tool.

CAUTION:
- **Do not reuse circlip.**
- **Circlip must fit securely into shaft groove.**

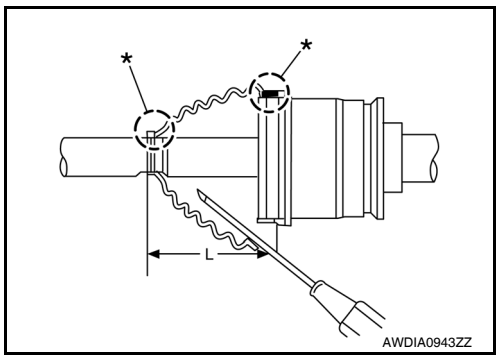


5. Insert the balance of new grease (Genuine NISSAN Grease or equivalent) listed below into housing from large end of boot.

Grease amount : Refer to FAX-25, "Drive Shaft"

6. Install boot securely into grooves (indicated by * marks) as shown.

CAUTION:
If there is grease on boot mounting surfaces (indicated by * marks) of shaft and housing, boot may come off. Remove all grease from surfaces.



7. Make sure boot installation length (L) is the specified length indicated below. Insert a suitable tool into the large end of boot. Bleed air from boot to prevent boot deformation.

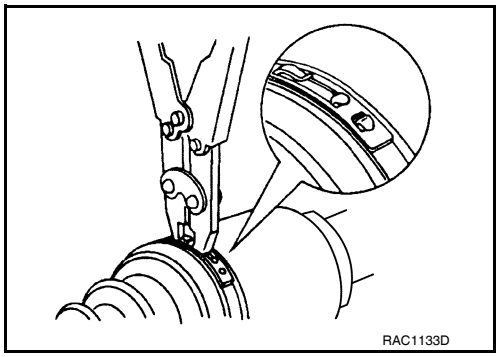
Boot installation length (L) : Refer to FAX-25, "Drive Shaft"

CAUTION:
- **Boot may break if boot installation length is outside the standard value.**
- **Be careful that screwdriver tip does not contact inside surface of boot.**

8. Install new large and small boot bands securely using Tool.

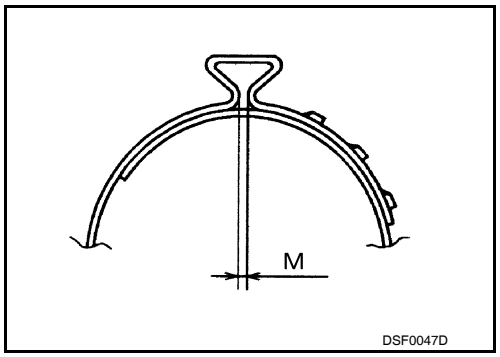
Tool number : KV40107300 (—)

CAUTION:
- **Do not reuse boot bands.**



- **Secure boot band so that dimension (M) meets specification as shown.**

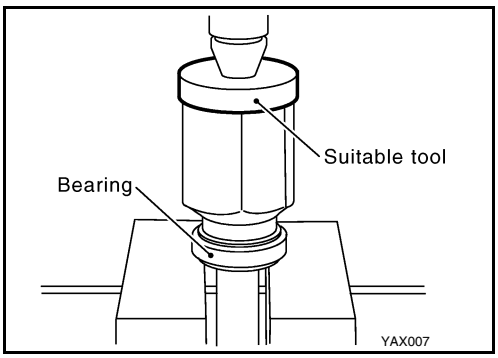
Dimension (M) : Refer to FAX-26, "Boot Bands"



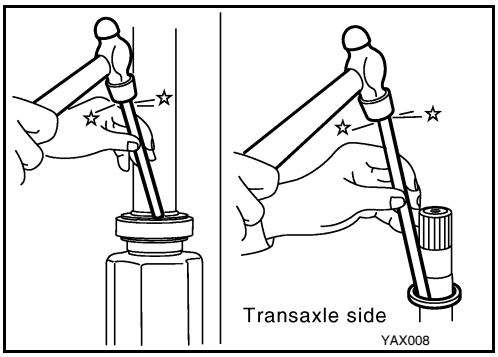
9. Rotate the joint sub assembly and confirm that the boot position is correct. If boot position is not correct, remove the boot bands, reposition the boot and install new boot bands.

Support Bearing

1. Install new dust shield on drive shaft.
   CAUTION:
   Do not reuse dust shield.
2. Press support bearing onto drive shaft.



3. Install new snap ring.
   CAUTION:
   Do not reuse snap ring.
4. Install new dust shield
   CAUTION:
   Do not reuse dust shield.

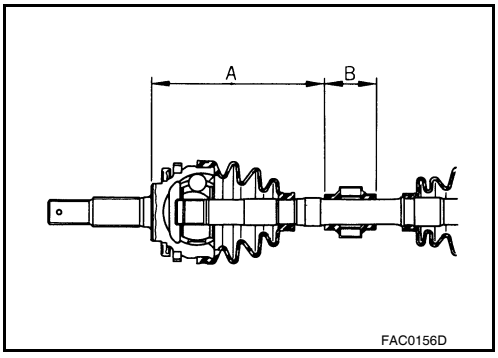


Damper

1. Secure damper with new damper bands.

(A)	**Except for CVT models**	**: Refer to FAX-25, "Dynamic Damper"**
	CVT models	**: Refer to FAX-25, "Dynamic Damper"**
(B)		**: Refer to FAX-25, "Dynamic Damper"**

CAUTION:
Do not reuse damper bands.



SERVICE DATA AND SPECIFICATIONS (SDS)

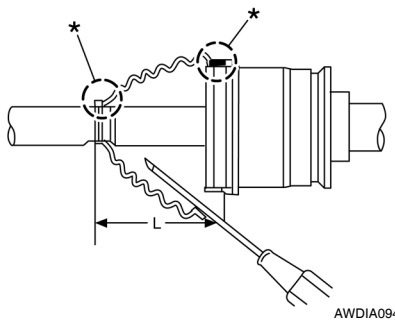
Wheel Bearing (Front)

INFOID:0000000007332068

Axial end play limit	0.05 mm (0.002 in) or less

Drive Shaft

INFOID:0000000007332069



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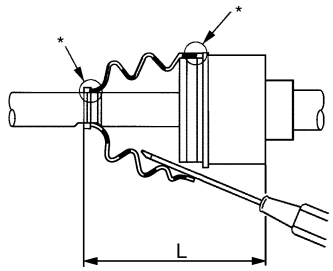

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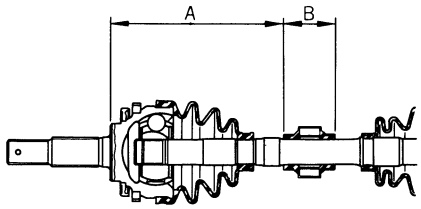
		Wheel side	Transaxle side
Joint type			
Grease quantity		70 - 90 g (2.5 - 3.2 oz)	130 - 140 g (4.6 - 4.9 oz)
Boots installed length	Left side	142 mm (5.59 in)	181.2 mm (7.13 in) (M/T models) 176 mm (6.93 in) (Except for M/T models)
	Right side		178 mm (7.01 in) (A/T models) 168 mm (6.61 in) (Except for A/T models)

Dynamic Damper

INFOID:0000000007332070



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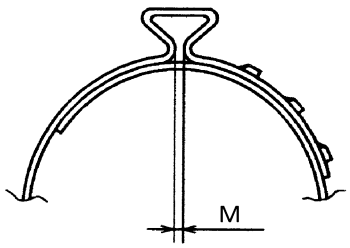
Dimension (A)	Except for CVT models	230 – 236 mm (9.06 – 9.29 in)
	CVT models	225 – 231 mm (8.86 – 9.09 in)
Dimension (B)		70 mm (2.76 in)

Boot Bands

INFOID:0000000007332071

Unit: mm (in)



DSF0047D

Dimension (M)	1.0 - 4.0 (0.039 - 0.157)

SECTION RAX
REAR AXLE

CONTENTS

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Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 2
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Removal and Installation 6

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Wheel Bearing 8

SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330867

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330868

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

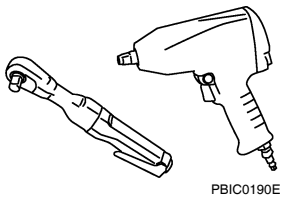
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Commercial Service Tool

INFOID:0000000007330869

Tool name	Description
Power tool  PBIC0190E	Removing wheel nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007330870

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			RAX-6	—	RAX-6	RSU-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Parts interference	Wheel bearing damage	REAR SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	REAR AXLE	Noise	×	×		×	×	×	×	×
		Shake	×	×		×	×	×	×	×
		Vibration	×	×		×	×			×
		Shimmy	×	×		×	×	×	×	×
		Shudder	×			×	×	×	×	×
		Poor quality ride or handling	×	×	×	×	×	×		

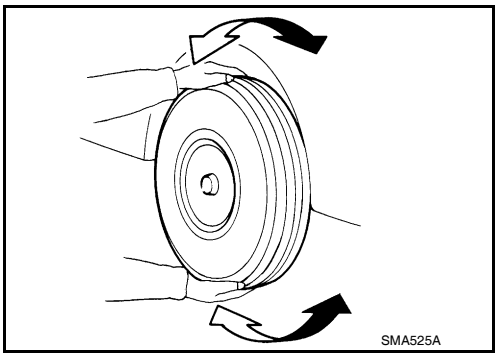
×: Applicable

WHEEL HUB

On-Vehicle Inspection and Service

INFOID:0000000007330871

- Check the axle and suspension parts for excessive play, wear, or damage.
- Shake each rear wheel to check for excessive play as shown.



REAR WHEEL BEARING INSPECTION

- Move wheel hub and bearing assembly in the axial direction by hand. Make sure the axial end play is within specification.

Axial end play : 0.05 mm (0.002 in) or less

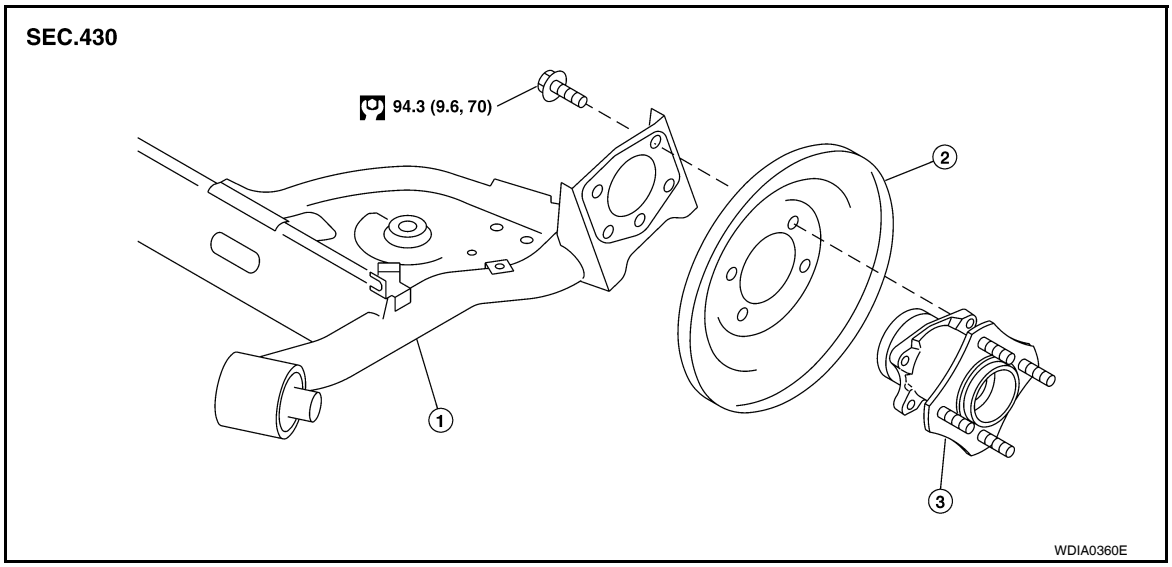
- Check that the wheel hub bearing operates smoothly.
- Replace the wheel hub assembly if the axial end play exceeds specification, or if the wheel bearing does not turn smoothly. Refer to RAX-6, "Removal and Installation".

CAUTION:
The wheel hub assembly does not require maintenance. If any of the following symptoms are noted, replace the wheel hub assembly.
- **Growling noise is emitted from the wheel hub bearing during operation.**
- **Wheel hub bearing drags or turns roughly.**

Removal and Installation

INFOID:0000000007330872

COMPONENTS



1. Rear suspension beam
2. Back plate
3. Wheel hub and bearing assembly

REMOVAL

1. Remove wheel and tire using power tool.
2. Remove wheel sensor from wheel hub and bearing assembly.
   CAUTION:

Do not pull on wheel sensor harness.

3. Remove the brake drum only. Refer to BR-33, "Removal and Installation of Drum Brake Assembly".
4. Remove wheel hub and bearing assembly bolts, and then remove wheel hub and bearing assembly from vehicle.
5. Suspend back plate with suitable wire, or if necessary, remove back plate using the following procedure.
   1. Remove parking brake rear cable from back plate. Refer to PB-6, "Removal and Installation".
   2. Separate brake tube from wheel cylinder. Refer to BR-12, "Rear Brake Tube and Hose".

INSPECTION AFTER REMOVAL

Check for any deformity, cracks, or other damage on the wheel hub assembly, replace if necessary.

CAUTION:

The wheel hub assembly does not require maintenance. If any of the following symptoms are noted, replace the wheel hub assembly.

- **Growling noise is emitted from the wheel hub bearing during operation.**
- **Wheel hub bearing drags or turns roughly.**

INSTALLATION

Installation is in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Bearing

INFOID:0000000007330873

Axial end play	0.05 mm (0.002 in) or less

SECTION FSU
FRONT SUSPENSION

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007328959

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007328960

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

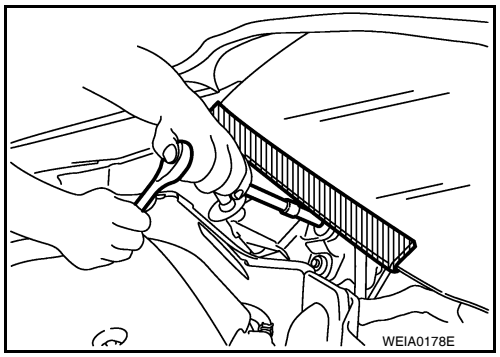
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage).
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007328961

When performing the procedure after removing cowl top cover, cover the lower end of windshield.



General Precautions

INFOID:0000000007328962

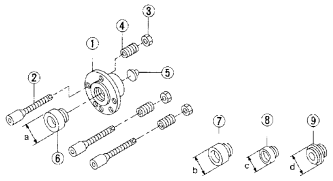
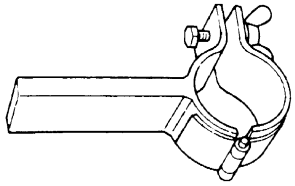
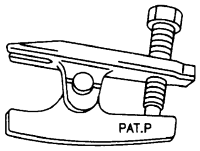
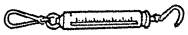
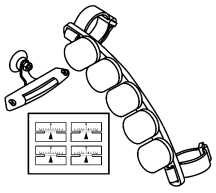
- When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- Unladen conditions mean that fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.
- After servicing suspension parts, be sure to check wheel alignment.
- Self-lock nuts are not reusable. Always use new ones when installing.

PREPARATION

Special Service Tool

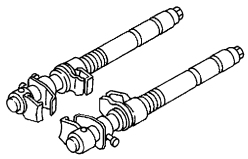
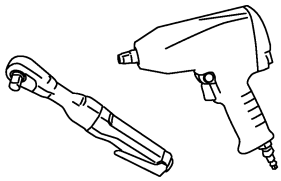
INFOID:0000000007328963

The actual shapes of Kent-Moore tools may differ from those of special tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV991040S0 (—) CCK gauge attachment 1. Plate 2. Guide bolt 3. Nut 4. Spring 5. Center plate 6. KV99104020 Adapter A a: 72 mm (2.83 in) dia. 7. KV99104030 Adapter B b: 65 mm (2.56 in) dia. 8. KV99104040 Adapter C c: 57 mm (2.24 in) dia. 9. KV99104050 Adapter D d: 53.4 mm (2.102 in) dia.  S-NT498	Measuring wheel alignment
ST35652000 (—) Strut attachment  ZZA0807D	Disassembling and assembling strut
HT72520000 (J-25730-A) Ball joint remover  NT146	Removing sterring outer socket
— (J-44372) Pull gauge  LST024	Measuring steering wheel turning force and ball joint swinging force
— (J-49286) Drift and Pull gauge  AWEIA0156ZZ	Measuring drift and pull

Commercial Service Tool

INFOID:0000000007328964

Tool name	Description
Spring compressor  S-NT717	Removing and installing coil spring
Power tool  PBIC0190E	• Removing wheel nuts • Removing front suspension component parts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007328965

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		FSU-10	FSU-13	FSU-10	FSU-10	FSU-18	FSU-10	FSU-17	FSU-16	FAX-5, "NVH Troubleshooting Chart"	FSU-6, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	FAX-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS		Improper installation, looseness	Strut deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	FRONT AXLE	FRONT SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×
	Shake	×	×	×	×		×			×	×	×	×	×	×	×
	Vibration	×	×	×	×	×				×	×	×		×		×
	Shimmy	×	×	×	×			×		×	×	×	×		×	×
	Shudder	×	×	×						×	×	×	×		×	×
	Poor quality ride or handling	×	×	×	×	×		×	×	×	×	×	×			

×: Applicable

FRONT SUSPENSION ASSEMBLY

On-Vehicle Inspection and Service

INFOID:0000000007328966

Make sure the mounting conditions (looseness, back lash) of each component and component conditions (wear, damage) are normal.

INSPECTION OF LOWER BALL JOINT END PLAY

1. Set front wheels in a straight-ahead position. Do not depress brake pedal.
2. Place an iron bar or similar tool between transverse link and steering knuckle.
3. Measure axial end play by prying it up and down.

Axial end play : 0 mm (0 in)

CAUTION:
Be careful not to damage ball joint boot. Do not damage the installation position by applying excessive force.

STRUT INSPECTION

Check for oil leakage, damage and replace as necessary.

Wheel Alignment Inspection

INFOID:0000000007328967

PRELIMINARY INSPECTION

WARNING:
Always adjust the alignment with the vehicle on a flat surface.
NOTE:
If alignment is out of specification, inspect and replace any damaged or worn rear suspension parts before making any adjustments.

1. Check and adjust the wheel alignment with the vehicle under unladen conditions. “Unladen conditions” means that the fuel, coolant, and lubricant are full; and that the spare tire, jack, hand tools and mats are in their designated positions.
2. Check the tires for incorrect air pressure and excessive wear.
3. Check the wheels for run out and damage. Refer to WT-6, "Inspection".
4. Check the wheel bearing axial end play. Refer to FAX-6, "On-Vehicle Inspection and Service".
5. Check the shock absorbers for leaks or damage.
6. Check each mounting point of the suspension components for any excessive looseness or damage.
7. Check each link, arm, and the suspension member for any damage.
8. Check the vehicle height. Refer to FSU-18, "Wheelarch Height (Unladen*)".

GENERAL INFORMATION AND RECOMMENDATIONS

1. A Four-Wheel Thrust Alignment should be performed.
   - This type of alignment is recommended for any NISSAN vehicle.
   - The four-wheel “thrust” process helps ensure that the vehicle is properly aligned and the steering wheel is centered.
   - The alignment machine itself should be capable of accepting any NISSAN vehicle.
   - The alignment machine should be checked to ensure that it is level.
2. Make sure the alignment machine is properly calibrated.
   - Your alignment machine should be regularly calibrated in order to give correct information.
   - Check with the manufacturer of your specific alignment machine for their recommended Service/Calibration Schedule.

THE ALIGNMENT PROCESS

IMPORTANT: Use only the alignment specifications listed in this Service Manual. Refer to FSU-17, "Wheel Alignment (Unladen*)".

1. When displaying the alignment settings, many alignment machines use “indicators”: (Green/red, plus or minus, Go/No Go). **Do NOT use these indicators.**
   - The alignment specifications programmed into your alignment machine that operate these indicators may not be correct.

- This may result in an ERROR.

2. Most camera-type alignment machines are equipped with both "Rolling Compensation" method and optional "Jacking Compensation" method to "compensate" the alignment targets or head units. "Rolling Compensation" is the preferred method.
   - If using the "Rolling Compensation" method, after installing the alignment targets or head units, push or pull on the rear wheel to move the vehicle. Do not push or pull on the vehicle body.
   - If using the "Jacking Compensation" method, after installing the alignment targets or head units, raise the vehicle and rotate the wheels 1/2 turn both ways.
     NOTE:
     Do not use the "Rolling Compensation" method if you are using sensor-type alignment equipment.
   - Follow all instructions for the alignment machine you are using for more information.

CAMBER, CASTER AND KINGPIN INCLINATION ANGLES INSPECTION

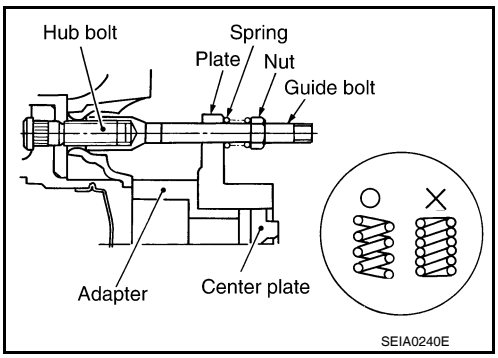
- Camber, caster, kingpin inclination angles cannot be adjusted.
- Before inspection, mount front wheels onto turning radius gauge. Mount rear wheels onto a stand that has same height so vehicle will remain horizontal.

Using a CCK Gauge

Install the CCK gauge attachment [SST: KV991040S0] with the following procedure on wheel, then measure wheel alignment.

Tool number : KV991040S0 (—)

1. Remove three wheel nuts, and install the guide bolts to hub bolt.
2. Screw the adapter into the plate until it contacts the plate tightly.
3. Screw the center plate into the plate.
4. Insert the plate assembly on the guide bolt. Put the spring in, and then evenly screw the three guide bolt nuts. When fastening the guide nuts, do not completely compress the spring.

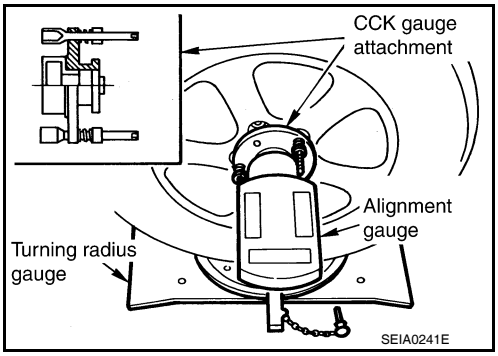


5. Place the dent of alignment gauge onto the projection of the center plate and tightly contact them to measure.

Camber, caster, kingpin inclination angles:

Refer to FSU-17, "Wheel Alignment (Unladen*)".

CAUTION:
- **If camber, caster, or kingpin inclination angle is outside the specification, check front suspension parts for wear and damage. Replace suspect parts if a malfunction is detected.**
- **Kingpin inclination angle is reference value, no inspection is required.**



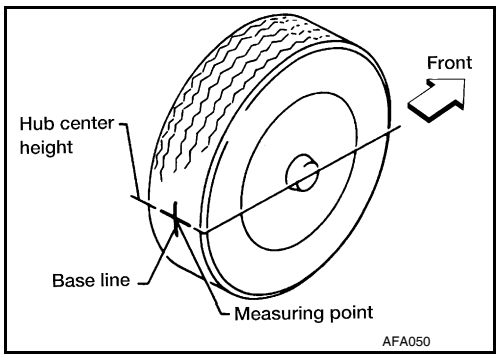
TOE-IN INSPECTION

Measure toe-in using the following procedure.

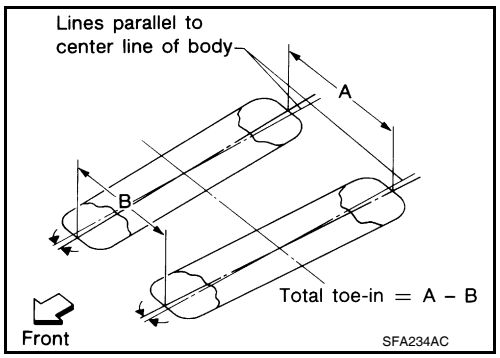
WARNING:
- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce the front of vehicle up and down to stabilize the vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).

3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



4. Measure distance (A) from rear side.
5. Push vehicle slowly ahead to rotate wheels 180 degrees (1/2 turn).
   CAUTION:
   If wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.
6. Measure distance (B) from front side.



7. Use the formula below to calculate total toe-in.

   Total toe-in = A - B

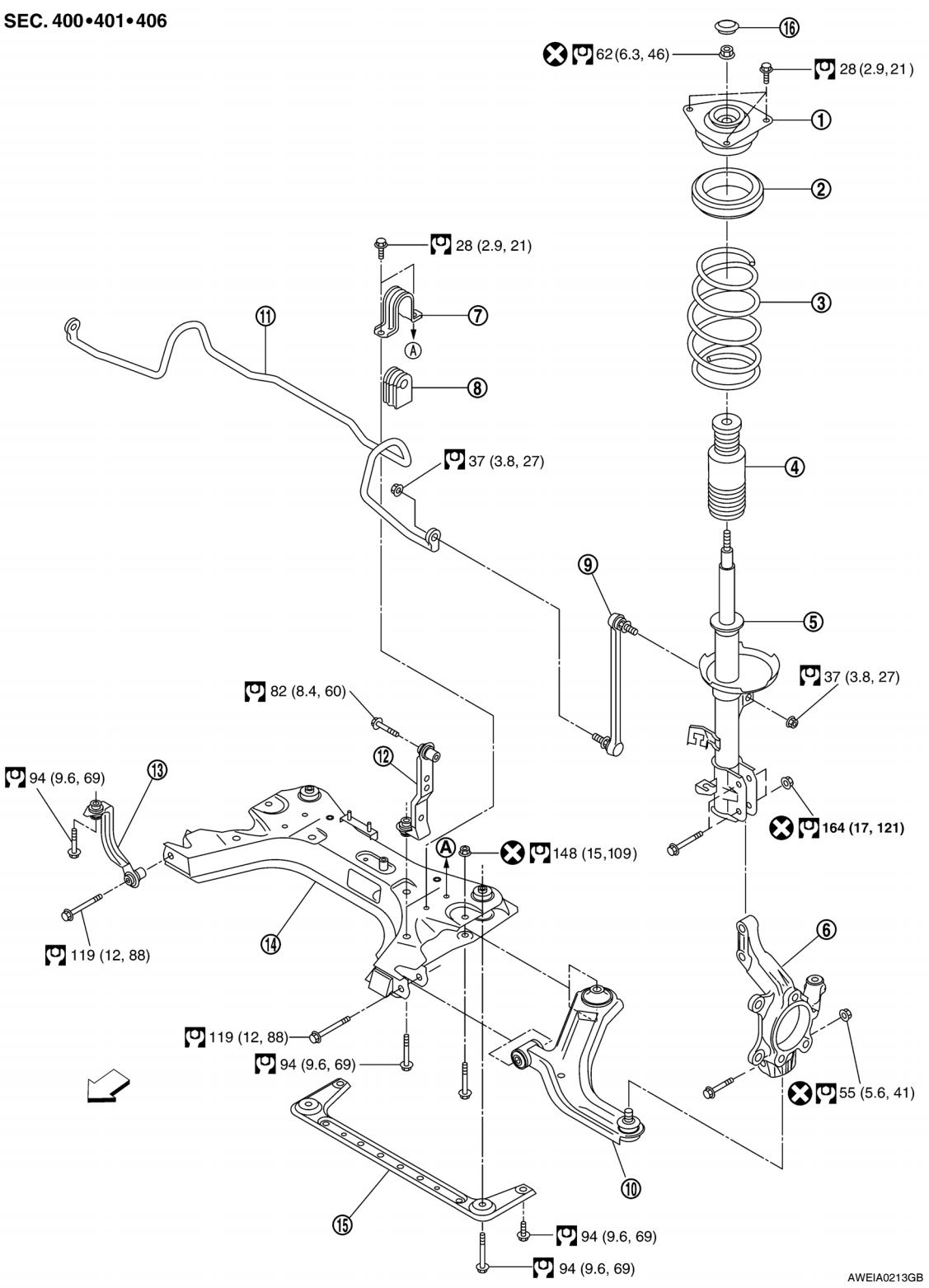
   For total toe-in specification, refer to FSU-17, "Wheel Alignment (Unladen*)".

   - If the total toe-in is outside the specification, adjust toe-in by varying the length of between steering outer socket and inner socket.

Component

INFOID:0000000007328968

SEC. 400•401•406



1. Strut mounting insulator
2. Strut mounting bearing
3. Coil spring
4. Bound bumper
5. Strut
6. Steering knuckle
7. Stabilizer clamp
8. Stabilizer bushing
9. Stabilizer connecting rod
10. Transverse link
11. Stabilizer bar
12. Upper link (left)

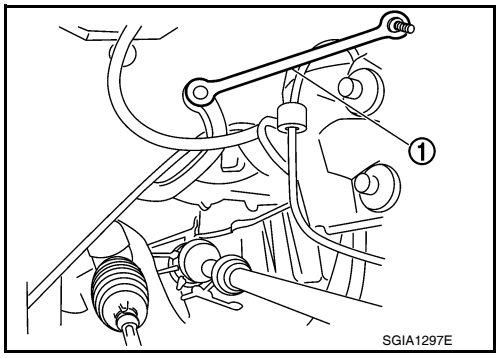
13. Upper link (right)
14. Front suspension member
15. Member stay
16. Cap
⇦ Front

Removal and Installation

INFOID:0000000007328969

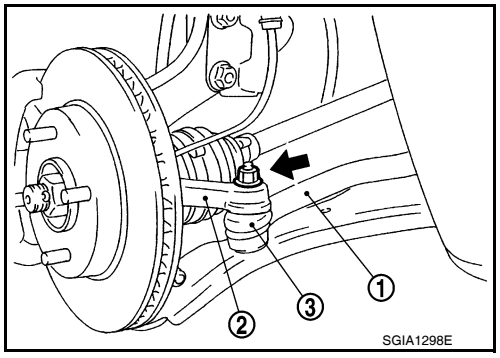
REMOVAL

1. Separate intermediate shaft from steering gear pinion shaft. Refer to PS-13, "Removal and Installation".
2. Remove front tires from vehicle using a power tool.
3. Remove wheel sensor from steering knuckle. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
4. Remove the nut on the upper side of stabilizer connecting rod (1) with a power tool, and then remove stabilizer connecting rod (1) from strut assembly.



5. Loosen steering outer socket (1) nut.
6. Remove steering outer socket (1) from steering knuckle (2) so as not to damage ball joint boot (3) using Tool.
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the Tool from suddenly coming off.

   Tool number : HT72520000 (J-25730-A)



7. Remove rear torque rod. Refer to EM-78, "Component".
8. Remove transverse link ball joint nut and bolt. Then, remove transverse link from steering knuckle.
9. Set jack under front suspension member.
10. Remove upper side bolts of upper link.
11. Remove the bolts of member stay, and then remove member stay from vehicle.
12. Gradually lower a jack to remove front suspension assembly.

INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to FSU-10, "Component".
- Perform final tightening of each of parts (rubber bushing), under unladen conditions, which were removed when removing front suspension assembly. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- Check wheel sensor harness for proper connection. Refer to BRC-51, "Removal and Installation" .

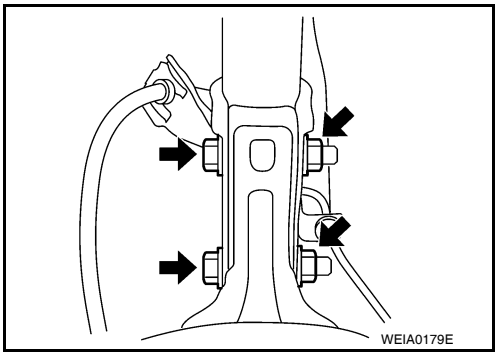
COIL SPRING AND STRUT

Removal and Installation

INFOID:0000000007328970

REMOVAL

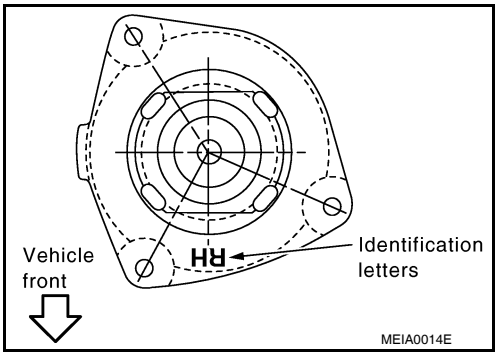
1. Remove cowl top panel. Refer to EI-22, "Removal and Installation".
2. Remove front tires using power tool.
3. Remove harness of wheel sensor from strut assembly. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
4. Remove brake hose lock plate. Refer to BR-12, "Rear Brake Tube and Hose".
5. Remove the nut on the upper side of stabilizer connecting rod using power tool, and then remove stabilizer connecting rod from strut assembly.
6. Remove nuts and bolts, and then remove steering knuckle from strut assembly. Refer to FSU-10, "Component".
7. Remove the strut mounting insulator bolts, then remove strut assembly.



INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to FSU-10, "Component".
- Perform final tightening of bolts and nuts at the strut assembly lower side (rubber bushing) under unladen conditions with tires on level ground. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".
- Check wheel sensor harness for proper connection. Refer to BRC-51, "Removal and Installation".
- Attach strut mounting insulator as shown.

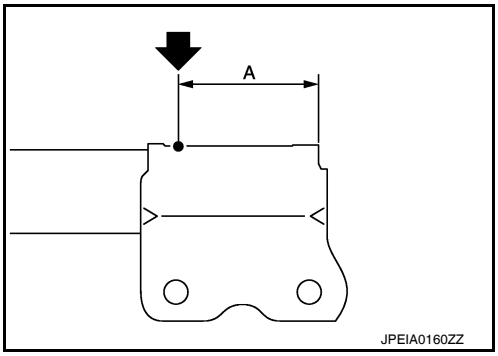


Disposal

INFOID:0000000007328971

1. Set strut assembly horizontally with the piston rod fully extended.
2. Drill 2 – 3 mm (0.08 – 0.12 in) hole at the position (●) from top as shown in the figure to release gas gradually.
   CAUTION:
   - **Wear eye protection (safety glasses).**
   - **Wear gloves.**
   - **Be careful with metal chips or oil blown out by the compressed gas.**

   NOTE:
   - Drill vertically in this direction (⬅).
   - Directly to the outer tube avoiding brackets.
   - The gas is clear, colorless, odorless, and harmless.



A : 20 – 30 mm (0.79 – 1.18 in)

3. Position the drilled hole downward and drain oil by moving the piston rod several times.
CAUTION:
Dispose of drained oil according to the law and local regulations.

Disassembly and Assembly

INFOID:0000000007328972

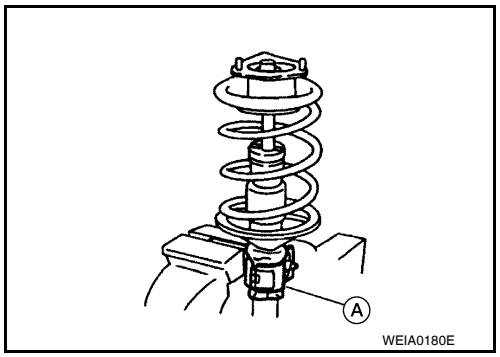
DISASSEMBLY

CAUTION:
Do not damage strut piston rod when removing components from strut assembly.

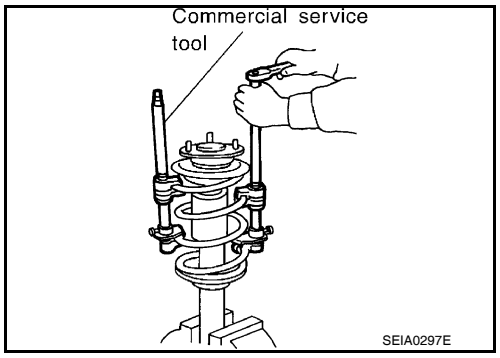
1. Install Tool (A) to strut and secure it in a vise.

Tool number : ST35652000 (—)

CAUTION:
When installing the strut attachment to strut, wrap a shop cloth around strut to protect it from damage.



2. Using a spring compressor (commercial service tool), compress coil spring between strut mounting bearing and spring lower seat (on strut) until coil spring is free.
CAUTION:
Be sure the spring compressor is securely attached to the coil spring before compressing coil spring.
3. Make sure coil spring with spring compressor between strut mounting bearing and spring lower seat (strut) is free. Then remove piston rod lock nut while securing the piston rod tip so that piston rod does not turn.
4. Remove strut mounting insulator, strut mounting bearing, and bound bumper from strut.



5. Remove coil spring with spring compressor, and then gradually release a spring compressor.
CAUTION:
Loosen while making sure coil spring attachment position does not move.
6. Remove the strut attachment from strut.

INSPECTION AFTER DISASSEMBLY

Strut Inspection

Check the following:
- Strut for deformation, cracks or damage, and replace it if necessary.
- Piston rod for damage, uneven wear or distortion, and replace it if necessary.
- For oil leakage, and replace it if necessary.

Strut Mounting Insulator and Rubber Parts Inspection

Check strut mounting insulator for cracks and rubber parts for wear. Replace it if malfunction is detected.

Coil Spring Inspection

Check coil spring for cracks, wear or damage, and replace it if necessary.

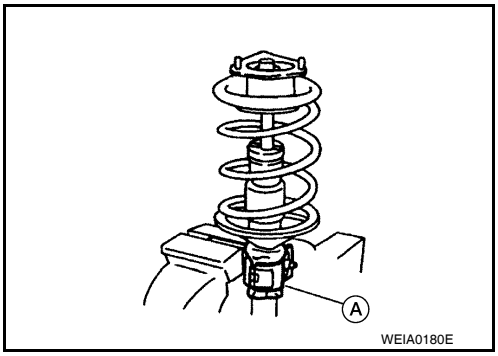
ASSEMBLY

CAUTION:
Do not damage strut piston rod when installing components to strut.

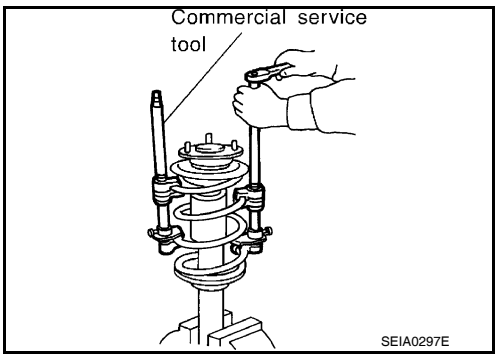
1. Install the Tool (A) to strut and secure it in a vise.

Tool number : ST35652000 (—)

CAUTION:
When installing the strut attachment to strut, wrap a shop cloth around strut to protect it from damage.



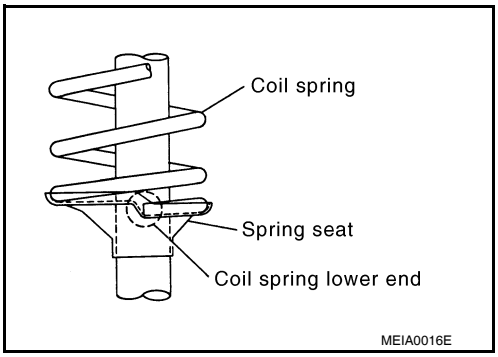
2. Compress coil spring using a spring compressor (commercial service tool), and install it onto strut.



CAUTION:
- **Face tube side of coil spring downward. Align the lower end to spring lower seat as shown.**
- **Be sure spring compressor is securely attached to coil spring. Compress coil spring.**

3. Apply soapy water to bound bumper. Insert bound bumper into strut mounting insulator.

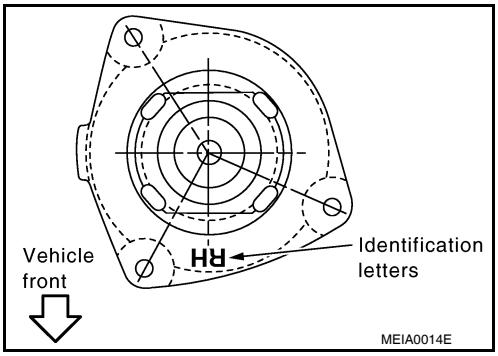
CAUTION:
Do not use machine oil.



4. Attach strut mounting bearing and strut mounting insulator.
   - Installation position of strut mounting insulator as shown.
5. Secure piston rod tip so that piston rod does not turn, then tighten piston rod lock nut to specified torque.
6. Gradually release a spring compressor, and remove coil spring.

CAUTION:
Loosen while making sure coil spring attachment position does not move.

7. Remove the strut attachment from strut.



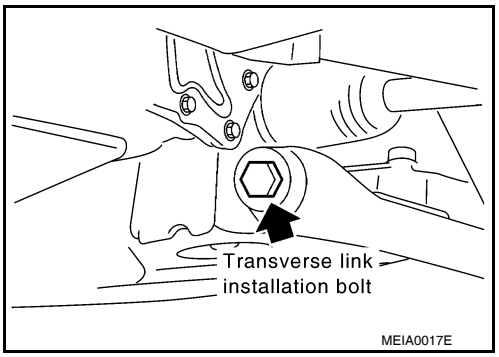
TRANSVERSE LINK

Removal and Installation

INFOID:0000000007328973

REMOVAL

1. Remove wheel and tire. Refer to WT-7, "Adjustment".
2. Remove transverse link ball joint nut and bolt. Then, remove transverse link from steering knuckle.
3. Remove transverse link nuts and bolts, then remove transverse link from front suspension member.
   NOTE:
   When removing LH transverse link it may be necessay to lower the suspension member in order to remove bolts to avoid contact with the transaxle.



   a. Set jack under front suspension member.
   b. Loosen RH upper link bolts, LH upper link bolt (front suspension member side), front suspension member bolts (left/right). Lower the front suspension member in order to remove transverse link bolts.
4. Remove transverse link from vehicle.

INSPECTION AFTER REMOVAL

Visual Inspection

Check the following:

- Transverse link and bushing for deformation, cracks or damage. Replace it if necessary.
- Ball joint boot for cracks or other damage, and also for grease leakage. Replace it if necessary.

Ball Joint Inspection

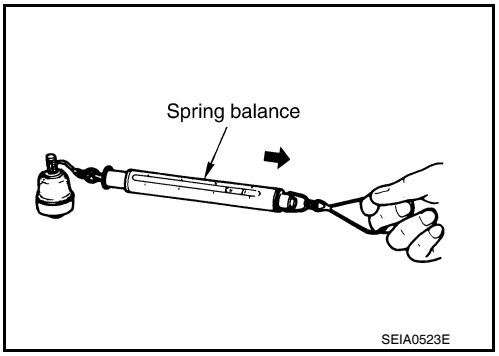
Manually move ball stud to confirm it moves smoothly with no binding.

Swing Torque Inspection

NOTE:

Before measurement, move ball stud at least ten times by hand to check for smooth movement.

- Hook Tool at the cutout on ball stud. Confirm spring balance measurement value is within specifications when ball stud begins moving.



Tool number : — (J-44572)

Swing torque : Refer to FSU-18, "Ball Joint".

Spring balance measurement : Refer to FSU-18, "Ball Joint".

- If it is outside the specified range, replace transverse link assembly.

Axial End Play Inspection

- Move tip of ball stud in axial direction to check for looseness.

Axial end play : 0 mm (0 in)

- If it is outside the specified range, replace transverse link assembly.

INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to FSU-10, "Component".
- Perform final tightening of bolts and at the front suspension member installation position (rubber bushing) under unladen conditions with tires on level ground. Check wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".

STABILIZER BAR

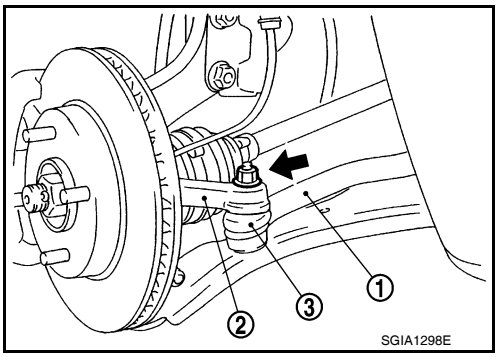
Removal and Installation

INFOID:0000000007328974

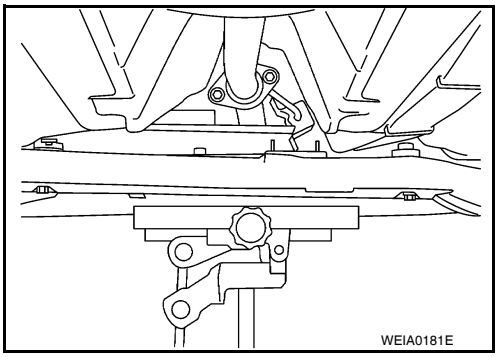
REMOVAL

1. Separate intermediate shaft from steering gear pinion shaft. Refer to PS-13, "Removal and Installation".
2. Remove front tires using power tool.
3. Remove the nut on the lower side of stabilizer connecting rod using power tool, and then remove stabilizer connecting rod from stabilizer bar.
4. If necessary remove stabilize connecting rod upper nut using power tool. Separate stabilizer connecting rod and strut.
5. Loose steering outer socket (1) nut.
6. Remove steering outer socket (1) from steering knuckle (2) so as not to damage ball joint boot (3) using the Tool.
   CAUTION:
   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover (suitable tool) from suddenly coming off.

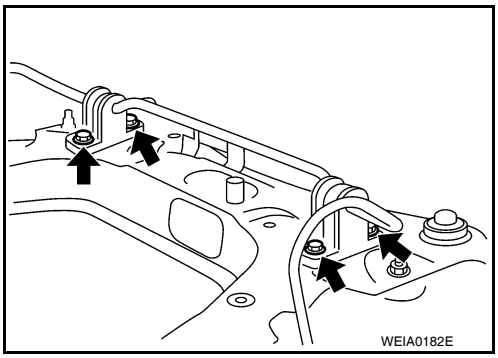
   Tool number : HT72520000 (J-25730-A)



7. Remove rear torque rod. Refer to EM-78, "Component".
8. Set jack under front suspension member.
9. Remove the bolts of member stay, and then remove member stay.
10. Gradually lower front suspension member in order to remove stabilizer bolts.
    CAUTION:
    Be careful not to lower it too far. (Do not over load the links.)



11. Remove the bolts of stabilizer clamp, and then remove stabilizer clamp and stabilizer bushing.
12. Remove stabilizer bar.



INSPECTION AFTER REMOVAL

Check stabilizer bar, stabilizer connecting rod, stabilizer bushing, and stabilizer clamp for deformation, cracks, and damage. Replace it if necessary.

INSTALLATION

Installation is in the reverse order of removal.

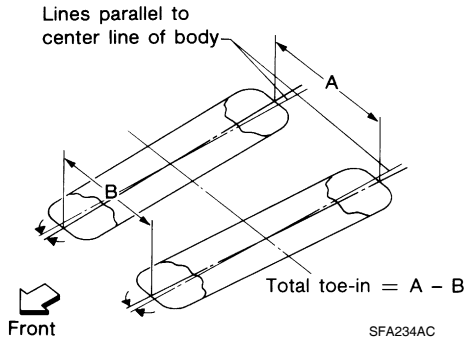
- For tightening torques, refer to FSU-10, "Component".

SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Alignment (Unladen*)

INFOID:0000000007328975

Market		United States and Canada	
Tire size		P185/65R15, P195/55R16	
Camber Degree minute (Decimal degree)	RH	Minimum	- 0° 55′ (- 0.92°)
		Nominal	- 0° 10′ (- 0.17°)
		Maximum	0° 35′ (0.58°)
	LH	Minimum	- 0° 55′ (- 0.92°)
		Nominal	- 0° 10′ (- 0.17°)
		Maximum	0° 35′ (0.58°)
	Left or right difference (LH - RH)	Minimum	-0° 33′ (-0.55°)
		Nominal	0° 0′ (0°)
		Maximum	0° 33′ (0.55°)
Caster Degree minute (Decimal degree)	RH	Minimum	4° 05′ (4.08°)
		Nominal	4° 50′ (4.83°)
		Maximum	5° 35′ (5.58°)
	LH	Minimum	3° 55′ (3.92°)
		Nominal	4° 40′ (4.67°)
		Maximum	5° 25′ (5.42°)
	Left or right difference (LH - RH)	Minimum	-0° 45′ (-0.75°)
		Nominal	-0° 12′ (-0.20°)
		Maximum	0° 21′ (0.35°)
Kingpin inclination Degree minute (Decimal degree)		Minimum	9° 10′ (9.17°)
		Nominal	9° 55′ (9.92°)
		Maximum	10° 40′ (10.67°)



Total toe-in	Distance (A - B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left or right, each side) Degree minute second (Decimal degree)	Minimum	0° 0′ 0" (0°)
		Nominal	0° 2′ 42" (0.05°)
		Maximum	0° 5′ 24" (0.09°)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Ball Joint

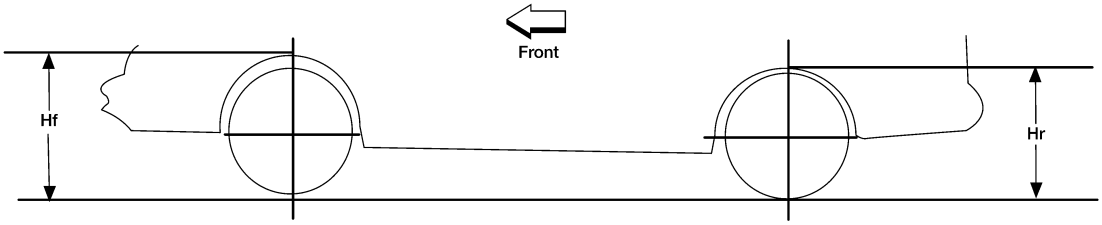
INFOID:0000000007328976

Swing torque	0.5 - 4.9 N·m (0.06 - 0.49 kg-m, 5 - 43 in-lb)
Measurement on spring balance	15.4 - 150.8 N (1.6 - 15.4 kg-f, 3.5 - 40 lb-f)
Axial end play	0 mm (0 in)

Wheelarch Height (Unladen*)

INFOID:0000000007328977

Unit: mm (in)



LEIA0085E

Tire size	P185/65R15		P195/55R16
Market	United States	Canada	United States
Front (Hf)	685 (26.97)	685 (26.97)	686 (27.01)
Rear (Hr)	682 (26.85)	683 (26.89)	683 (26.89)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

SECTION RSU
REAR SUSPENSION

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330912

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330913

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Rear Suspension

INFOID:0000000007330914

- When installing the rubber bushings, the final tightening must be done under unladen condition and with the tires on level ground. Oil will shorten the life of the rubber bushings, so wipe off any spilled oil immediately.
- Unladen condition means the fuel tank, engine coolant and lubricants are at the full specification. The spare tire, jack, hand tools, and mats are in their designated positions.
- After installing suspension components, check the wheel alignment.
- Caulking nuts are not reusable. Always use new caulking nuts for installation. New caulking nuts are pre-oiled, do not apply any additional lubrication.

PREPARATION

Commercial Service Tool

INFOID:0000000007330915

Tool name	Description
Power tool PIIB1407E	Removing nuts, bolts and screws

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007330916

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		RSU-8	RSU-9	RSU-9	RSU-9	RSU-11	RSU-8	RSU-6	RSU-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS		Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	REAR AXLE	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×		×	×	×	×	×
	Shake	×	×	×	×		×		×	×	×	×	×
	Vibration	×	×	×	×	×			×	×			×
	Shimmy	×	×	×	×			×	×	×	×	×	×
	Shudder	×	×	×					×	×	×	×	×
	Poor quality ride or handling	×	×	×	×	×		×	×	×	×		

×: Applicable

REAR SUSPENSION ASSEMBLY

On-Vehicle Inspection and Service

INFOID:0000000007330917

Make sure the mounting conditions (looseness, backlash) of each component and component conditions (wear, damage) are within specifications.

SHOCK ABSORBER INSPECTION

Check shock absorber for oil leakage, damage and replace it if necessary.

Wheel Alignment Inspection

INFOID:0000000007330918

DESCRIPTION

Measure wheel alignment under unladen conditions.

NOTE:

“Unladen conditions” means that fuel, engine coolant, and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

PRELIMINARY

Check the following:

1. Tires for improper air pressure and wear.
2. Road wheels for runout. Refer to WT-6 .
3. Wheel bearing axial end play. Refer to RAX-6, "On-Vehicle Inspection and Service" .
4. Shock absorber operation.
5. Each mounting part of suspension for looseness and deformation.
6. Rear suspension beam for cracks, deformation, and other damage.
7. Vehicle height (posture).

GENERAL INFORMATION AND RECOMMENDATIONS

1. A Four-Wheel Thrust Alignment should be performed.
   - This type of alignment is recommended for any NISSAN vehicle.
   - The four-wheel “thrust” process helps ensure that the vehicle is properly aligned and the steering wheel is centered.
   - The alignment machine itself should be capable of accepting any NISSAN vehicle.
   - The alignment machine should be checked to ensure that it is level.
2. Make sure the alignment machine is properly calibrated.
   - Your alignment machine should be regularly calibrated in order to give correct information.
   - Check with the manufacturer of your specific alignment machine for their recommended Service/Calibration Schedule.

THE ALIGNMENT PROCESS

IMPORTANT: Use only the alignment specifications listed in this Service Manual. Refer to RSU-13, "Wheel Alignment (Unladen*)" .

1. When displaying the alignment settings, many alignment machines use “indicators”: (Green/red, plus or minus, Go/No Go). **Do NOT use these indicators.**
   - The alignment specifications programmed into your alignment machine that operate these indicators may not be correct.
   - This may result in an ERROR.
2. Most camera-type alignment machines are equipped with both "Rolling Compensation" method and optional "Jacking Compensation" method to "compensate" the alignment targets or head units. "Rolling Compensation" is the preferred method.
   - If using the "Rolling Compensation" method, after installing the alignment targets or head units, push or pull on the rear wheel to move the vehicle. Do not push or pull on the vehicle body.
   - If using the "Jacking Compensation" method, after installing the alignment targets or head units, raise the vehicle and rotate the wheels 1/2 turn both ways.
     NOTE:
     Do not use the "Rolling Compensation" method if you are using sensor-type alignment equipment.
   - Follow all instructions for the alignment machine you are using for more information.

CAMBER INSPECTION

- Measure camber of both right and left wheels with a suitable alignment gauge.

Camber : **Refer to** RSU-13, "Wheel Alignment (Unladen*)" **.**

- If it is out of the specification value, inspect and replace any damaged or worn rear suspension parts.

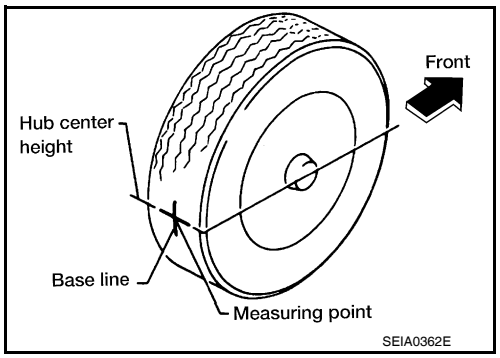
TOE-IN INSPECTION

Measure toe-in using following procedure. If it is out of the specification, inspect and replace any damaged or worn rear suspension parts.

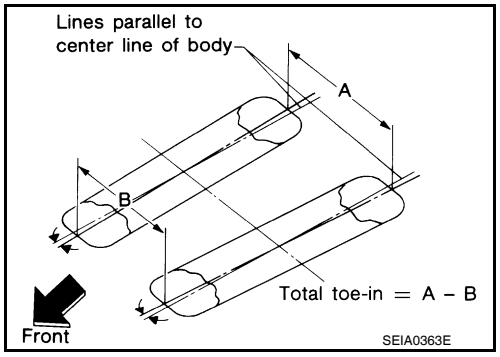
WARNING:

- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce the rear of vehicle up and down to stabilize the vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



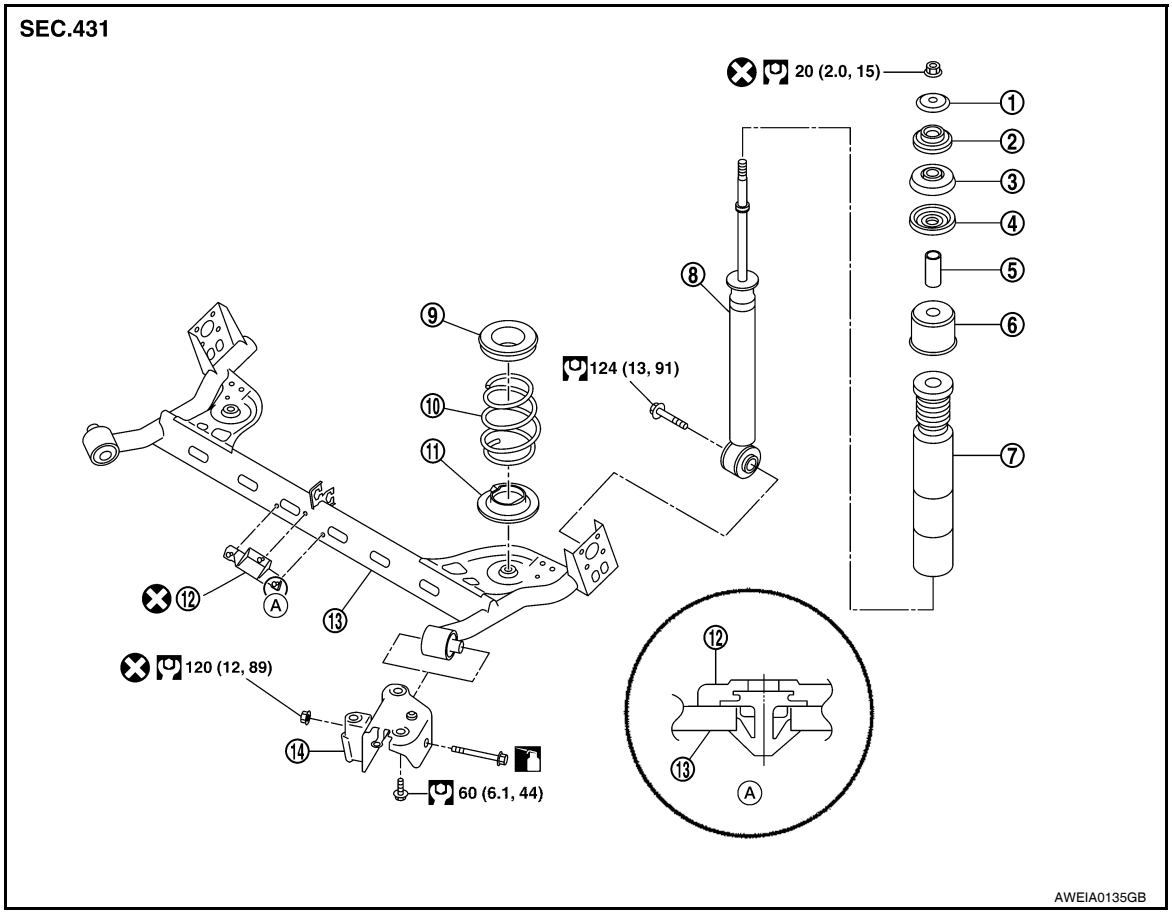
4. Measure distance (A) from rear side.
5. Push vehicle slowly ahead to rotate wheels 180 degrees (1/2 turn). If wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.
6. Measure distance (B) from front side.



Total toe-in : **Refer to** RSU-13, "Wheel Alignment (Unladen*)" **.**

Component

INFOID:0000000007330919



1. Washer (upper)
2. Bushing (upper)
3. Bushing (lower)
4. Washer (lower)
5. Distance tube
6. Bound bumper cover
7. Bound bumper
8. Shock absorber
9. Rear spring rubber seat (upper)
10. Coil spring
11. Rear spring rubber seat (lower)
12. Brake tube protector
13. Rear suspension beam
14. Rear suspension beam bracket
A. View of brake tube protector clip

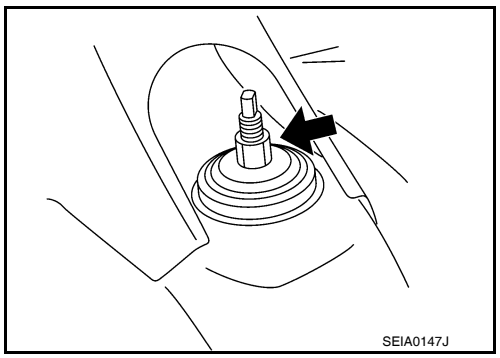
SHOCK ABSORBER

Removal and Installation

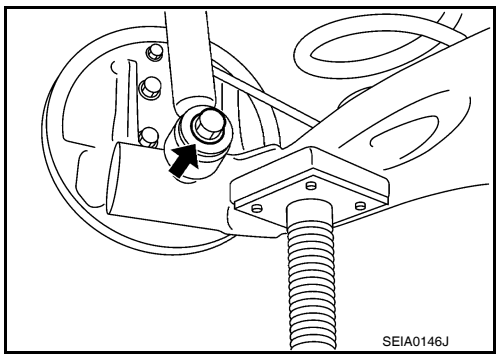
INFOID:0000000007330920

REMOVAL

1. Remove wheel and tire using power tool.
2. Remove wheel sensor from wheel hub and bearing assembly and rear suspension beam. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove shock absorber mask from trunk side finisher using a flat-bladed screwdriver. Refer to EI-44 .
   CAUTION:
   Wrap the tip of a screwdriver with cloth to avoid damaging components.
4. Set jack under rear suspension beam.
5. Remove upper nut of the shock absorber, and then remove washer (upper), bushing (upper) from shock absorber.



6. Remove shock absorber lower side bolt.
7. Gradually lower the jack, and remove the bushing (lower), washer (lower), distance tube, bound bumper cover, bound bumper and shock absorber from vehicle.



INSPECTION AFTER REMOVAL

Shock Absorber

Check the following:

- Shock absorber for deformation, cracks or damage, and replace if necessary.
- Piston rod for damage, uneven wear or distortion, and replace if necessary .

Bound Bumper and Bushing

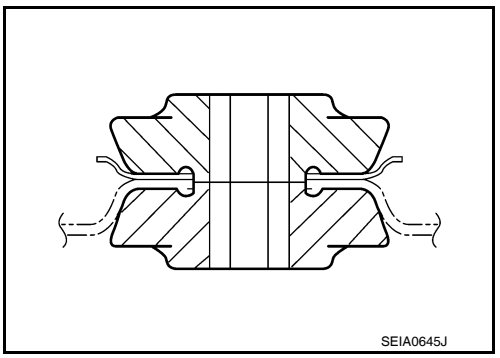
Check bound bumper and bushing for cracks, deformation or other damage, and replace applicable parts if necessary .

INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to RSU-8, "Component".
- Tighten wheel nuts to specification. Refer to WT-7, "Adjustment".

- When installing body side bushing (upper), install the projection to the body side hole securely.

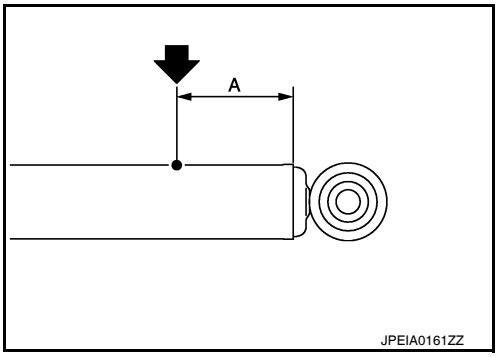


Disposal

INFOID:0000000007330921

1. Set shock absorber horizontally with the piston rod fully extended.
2. Drill 2 – 3 mm (0.08 – 0.12 in) hole at the position (●) from top as shown in the figure to release gas gradually.
   CAUTION:
   - **Wear eye protection (safety glasses).**
   - **Wear gloves.**
   - **Be careful with metal chips or oil blown out by the compressed gas.**

   NOTE:
   - Drill vertically in this direction (⬅).
   - Directly to the outer tube avoiding brackets.
   - The gas is clear, colorless, odorless, and harmless.



A : 20 – 30 mm (0.79 – 1.18 in)

3. Position the drilled hole downward and drain oil by moving the piston rod several times.
   CAUTION:
   Dispose of drained oil according to the law and local regulations.

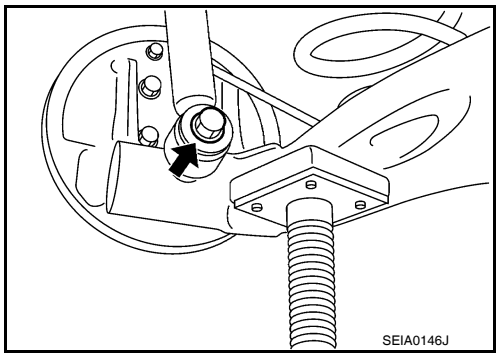
COIL SPRING

Removal and Installation

INFOID:0000000007330922

REMOVAL

1. Remove wheel and tire using power tool.
2. Remove wheel sensor from wheel hub and bearing assembly. Refer to BRC-51, "Removal and Installation".
   CAUTION:
   Do not pull on wheel sensor harness.
3. Set jack under rear suspension beam.
4. Remove shock absorber lower side bolt. Refer to RSU-9, "Removal and Installation".
5. Gradually lower the jack, and then remove coil spring and rear spring rubber seat (upper and lower).



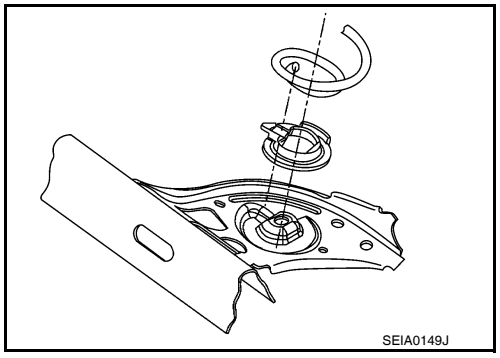
INSPECTION AFTER REMOVAL

Check coil spring and spring rubber seat for deformation, cracks, and damage, and replace it if a malfunction is detected.

INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to RSU-8, "Component".
- Tighten wheel nuts to specification. Refer to WT-7, "Adjustment".
- When installing spring, be sure to securely install the spring end position aligned to flush of rear spring rubber seat (lower) as shown.



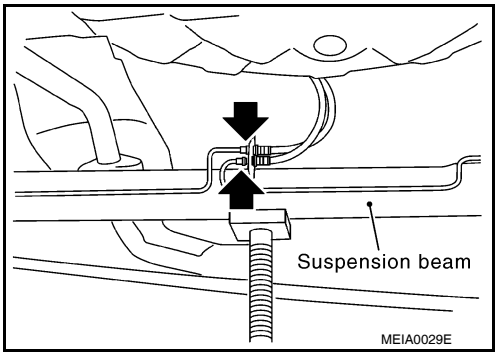
REAR SUSPENSION BEAM

Removal and Installation

INFOID:0000000007330923

REMOVAL

1. Remove wheel and tire using power tool.
2. Separate parking brake rear cable from rear drum brake and rear suspension beam. Refer to PB-5, "On-Vehicle Service".
3. Remove wheel sensor and wheel sensor harness from wheel hub and bearing assembly and rear suspension beam. Refer to BRC-51, "Removal and Installation".
4. Remove lock plate and separate brake tube from brake hose. Refer to BR-12, "Rear Brake Tube and Hose".
5. Remove wheel hub and bearing assembly and back plate. Refer to RAX-6, "On-Vehicle Inspection and Service".
6. Set jack under rear suspension beam.
7. Remove coil spring (left/right). Refer to RSU-11, "Removal and Installation".
8. Remove bolts between body and rear suspension beam bracket. Refer to RSU-8, "Component".
9. Gradually lower the jack, and then remove rear suspension beam from vehicle.



10. Remove the rear suspension beam bracket bolt and nut, and then remove rear suspension beam bracket from rear suspension beam. Refer to RSU-8, "Component".
11. Remove brake tube protector from rear suspension beam.

INSPECTION AFTER REMOVAL

Check components for deformation, cracks, and other damage, and replace if necessary.

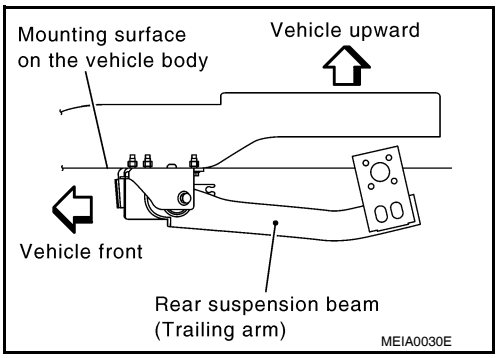
INSTALLATION

Installation is in the reverse order of removal.

- For tightening torque, refer to RSU-8, "Component".
- Refill with new brake fluid and bleed air. Refer to BR-9, "Bleeding Brake System".
- Tighten wheel nuts to specification. Refer to WT-7, "Adjustment".
- Check the following after finishing work.

- Parking brake operation (stroke): Refer to PB-5, "On-Vehicle Service".
- Wheel sensor harness for proper connection: Refer to BRC-51, "Removal and Installation".

- Perform final tightening of rear suspension beam and rear suspension beam bracket (rubber bushing) under unladen conditions with tires on level ground.

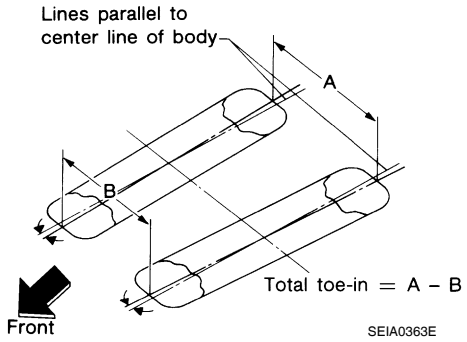


SERVICE DATA AND SPECIFICATIONS (SDS)

Wheel Alignment (Unladen*)

INFOID:0000000007330924

Market		United States and Canada
Tire size		P185/65R15, P195/55R16
Camber Degree minute (Decimal degree)	Minimum	– 2° 0′ 30" (– 2.01°)
	Nominal	– 1° 30′ 30" (– 1.51°)
	Maximum	– 1° 0′ 30" (– 1.01°)



SEIA0363E

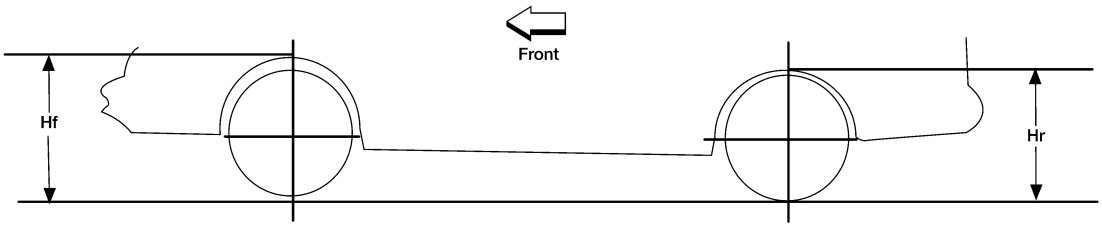
Total toe-in			
	Distance (A - B)	Minimum	–1.0 mm (–0.039 in)
		Nominal	3.0 mm (0.118 in)
		Maximum	7.0 mm (0.276 in)
	Angle (left or right, each side) Degree minute (Decimal degree)	Minimum	–0° 2′ 30" (–0.04°)
		Nominal	0° 8′ 30" (0.14°)
		Maximum	0° 19′ 0" (0.32°)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Wheelarch Height (Unladen*)

INFOID:0000000007330925

Unit: mm (in)



LEIA0085E

Tire size	P185/65R15		P195/55R16
Market	United States	Canada	United States
Front (Hf)	685 (26.97)	685 (26.97)	686 (27.01)
Rear (Hr)	682 (26.85)	683 (26.89)	683 (26.89)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

SECTION WT
ROAD WHEELS & TIRES

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330926

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330927

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

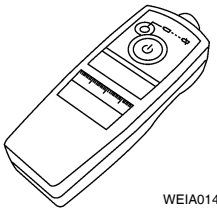
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Special Service Tool

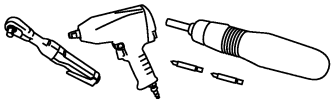
INFOID:0000000007330928

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV991B1000 (J-45295) Transmitter activation tool  WEIA0144E	• Transmitter wake up operation • ID registration procedure
— (J-50190) Signal Tech II ALEIA0131ZZ	• Activate and display TPMS transmitter ID's • Display tire pressure reported by the TPMS transmitter • Read TPMS DTC's • Register TPMS transmitter ID's • Check Intelligent Key relative strength • Confirm vehicle Intelligent Key antenna signal strength

Commercial Service Tool

INFOID:0000000007330929

Tool name	Description
Power tool  PIIB1407E	Removing wheel nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007330930

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			FAX-6	WT-6	WT-7	WT-30	WT-6	WT-6	WT-30	WT-30	FAX-5, "NVH Troubleshooting Chart", FSU-6, "NVH Troubleshooting Chart"	RAX-5, "NVH Troubleshooting Chart", RSU-5, "NVH Troubleshooting Chart"	Refer to TIRES in this chart	Refer to ROAD WHEELS in this chart	FAX-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Out-of-round	Imbalance	Incorrect tire pressure	Uneven tire wear	Deformation or damage	Non-uniformity	Incorrect tire size	FRONT AXLE AND FRONT SUSPENSION	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKE	STEERING
Symptom	TIRES	Noise	×	×	×	×	×	×	×		×	×		×	×	×	×
		Shake	×	×	×	×	×	×		×	×	×		×	×	×	×
		Vibration				×				×	×	×			×		×
		Shimmy	×	×	×	×	×	×	×	×	×	×		×		×	×
		Shudder	×	×	×	×	×	×		×	×	×		×		×	×
		Poor quality ride or handling	×	×	×	×	×	×		×	×	×		×			
	ROAD WHEELS	Noise	×	×	×			×			×	×	×		×	×	×
		Shake	×	×	×			×			×	×	×		×	×	×
		Shimmy, Shudder	×	×	×			×			×	×	×			×	×
		Poor quality ride or handling	×	×	×			×			×	×	×				

×: Applicable

ROAD WHEEL

Inspection

INFOID:0000000007330931

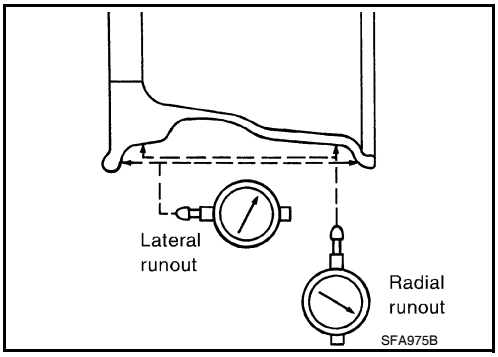
ALUMINUM WHEEL

1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

a. Remove tire from aluminum wheel and mount on a tire balance machine.

b. Set dial indicator as shown.

Wheel runout (Dial indicator value) : **Refer to WT-30, "Road Wheel".**



STEEL WHEEL

1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

a. Remove tire from steel wheel and mount on a tire balance machine.

b. Set two dial indicators as shown.

c. Set each dial indicator to 0.

d. Rotate wheel and check dial indicators at several points around the circumference of the wheel.

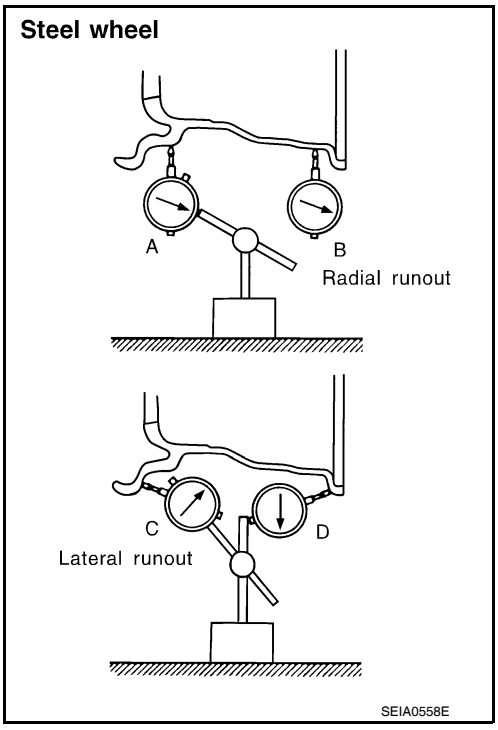
e. Calculate runout at each point as shown.

Radial runout = (A+B)/2

Lateral runout = (C+D)/2

f. Select maximum positive runout value and the maximum negative value.
Add the two values to determine total runout. In case a positive or negative value is not available, use the maximum value (negative or positive) for total runout. If the total runout value exceeds the limit, replace steel wheel.

Wheel runout : **Refer to WT-30, "Road Wheel".**



ROAD WHEEL TIRE ASSEMBLY

Adjustment

INFOID:0000000007330932

BALANCING WHEELS (ADHESIVE WEIGHT TYPE)

Preparation Before Adjustment

Remove inner and outer balance weights from the road wheel using releasing agent. Remove double-faced adhesive tape from the road wheel.

CAUTION:

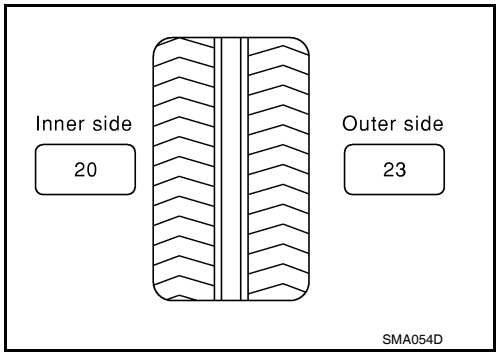
- **Be careful not scratch the road wheel during removal.**
- **After removing double-faced adhesive tape, wipe clean traces of releasing agent from the road wheel.**

Wheel Balance Adjustment

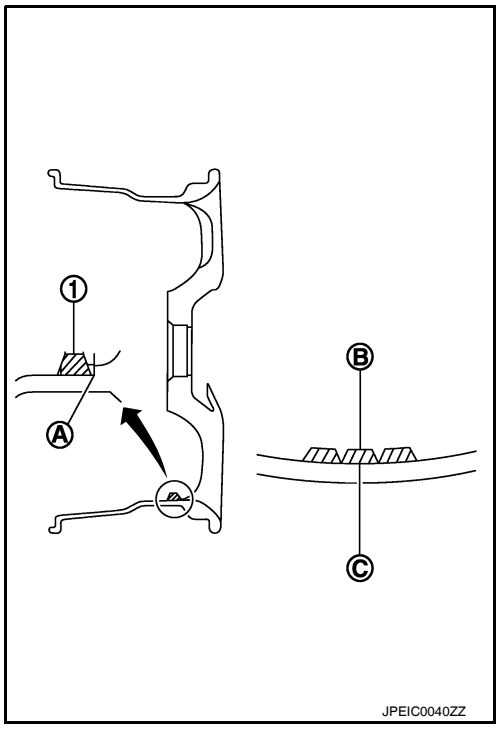
- If a balancer machine has an adhesive weight mode setting, select the adhesive weight mode setting and skip Step 2. below. If a balancer machine only has the clip-on (rim flange) weight mode setting, follow Step 2. to calculate the correct size adhesive weight.

1. Set road wheel on balancer machine using the center hole as a guide. Start the balancer machine.
2. For balancer machines that only have a clip-on (rim flange) weight mode setting, follow this step to calculate the correct size adhesive weight to use. When inner and outer imbalance values are shown on the balancer machine indicator, multiply outer imbalance value by 5/3 (1.67) to determine balance weight that should be used. Select the outer balance weight with a value closest to the calculated value above and install in to the designated outer position of, or at the designated angle in relation to the road wheel.

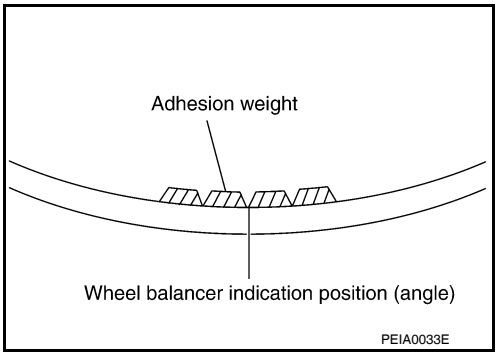
a. Indicated imbalance value × 5/3 (1.67) = balance weight to be installed
Calculation example:
23 g (0.81 oz) × 5/3 (1.67) = 38.33 g (1.35 oz) ⇒ 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
NOTE:
Note that balance weight value must be closer to the calculated balance weight value.
Example:
37.4 ⇒ 35 g (1.23 oz)
37.5 ⇒ 40 g (1.41 oz)



3. Install balance weight in the position shown.
CAUTION:
- **Do not install the inner balance weight before installing the outer balance weight.**
- **Before installing the balance weight, be sure to clean the mating surface of the road wheel.**
- When installing balance weight (1) to road wheel, set it into the grooved area (A) on the inner wall of the road wheel as shown so that the balance weight center (B) is aligned with the balancer machine indication position (angle) (C).
CAUTION:
- **Always use genuine NISSAN adhesive balance weights.**
- **Balance weights are non-reusable; always replace with new ones.**
- **Do not install more than three sheets of balance weight.**



4. If calculated balance weight value exceeds 50 g (1.76 oz), install two balance weight sheets in line with each other as shown.
   CAUTION:
   Do not install one balance weight sheet on top another.
5. Start balancer machine again.
6. Install balance weight on inner side of road wheel in the balancer machine indication position (angle).
   CAUTION:
   Do not install more than two balance weights.
7. Start balancer machine. Make sure that inner and outer residual imbalance values are 5 g (0.17 oz) each or below.

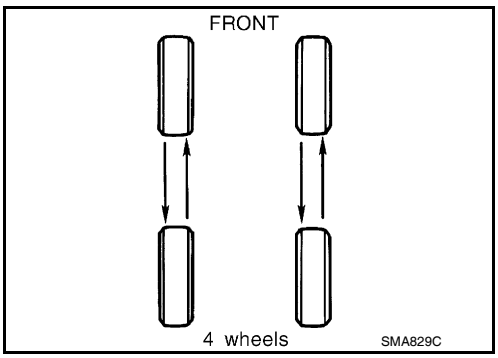


8. If either residual imbalance value exceeds 5 g (0.17 oz), repeat installation procedures.

Wheel balance	Dynamic (At flange)	Static (At flange)
Maximum allowable imbalance	Refer to WT-30, "Road Wheel".	

TIRE ROTATION

- Follow the maintenance schedule for tire rotation service intervals. Refer to MA-6, "General Maintenance".
- When installing the wheel, tighten wheel nuts to the specified torque.
  CAUTION:
  - **Do not include the T-type spare tire when rotating the tires.**
  - **When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.**
  - **Be careful not to tighten wheel nut at torque exceeding the criteria for preventing strain of disc rotor.**
  - **Use NISSAN genuine wheel nuts for aluminum wheels.**



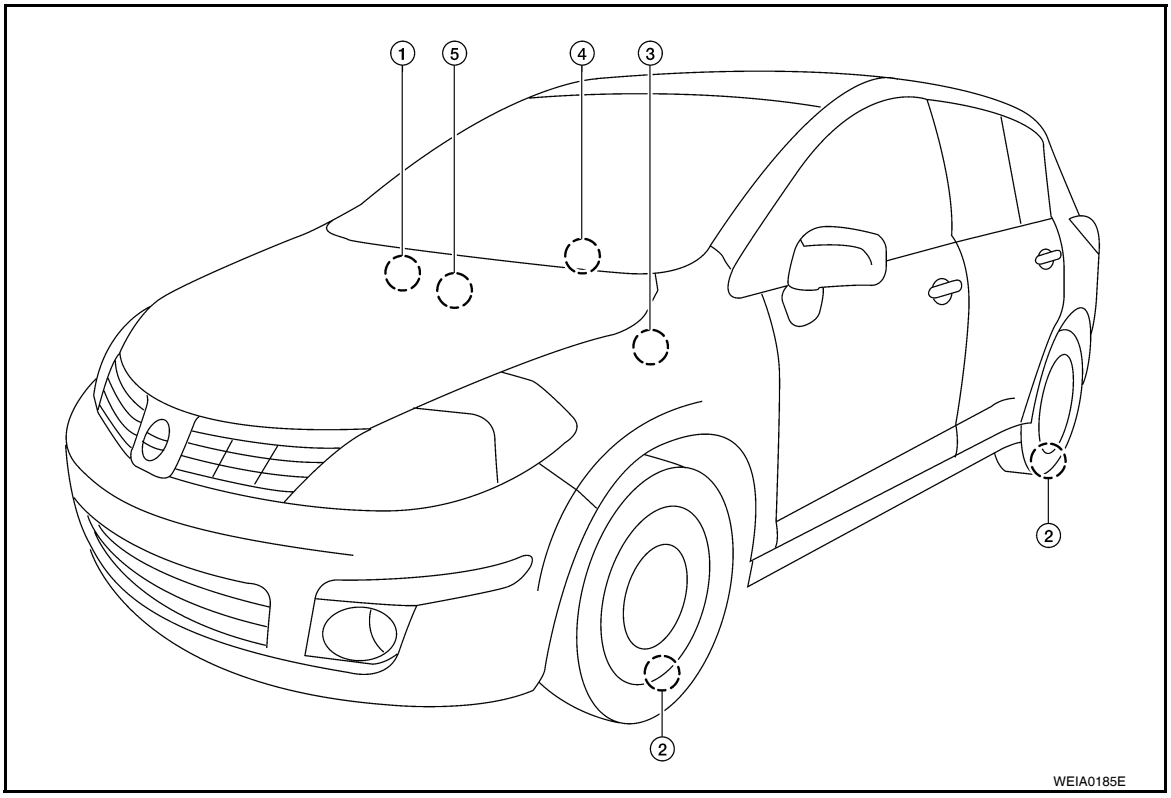
Wheel nut tightening torque : 113 N·m (12 kg-m, 83 ft-lb)

- Perform the ID registration, after tire rotation. Refer to WT-13, "ID Registration Procedure".

TIRE PRESSURE MONITORING SYSTEM

System Component

INFOID:0000000007330933



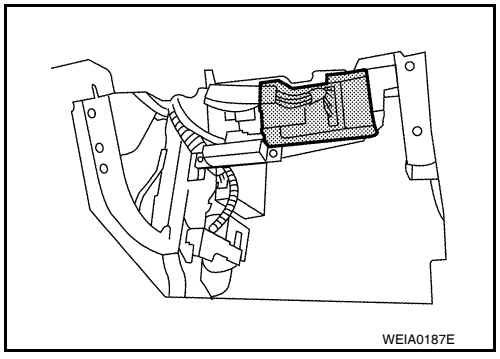
1. BCM
   M18, M20
2. Transmitters
3. Tire pressure warning check connector
   M39
4. Combination meter
   M24
5. Remote keyless entry receiver
   M23

System Description

INFOID:0000000007330934

BODY CONTROL MODULE (BCM)

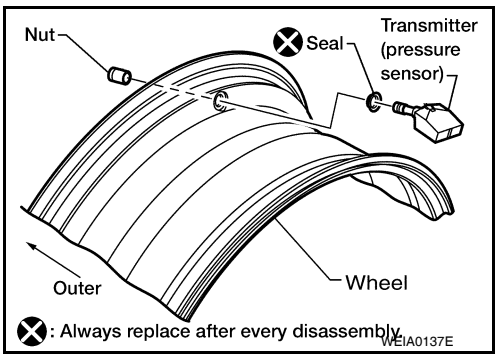
The BCM is shown with the glove box removed. The BCM reads the air pressure signal received by the remote keyless entry receiver, and controls the low tire pressure warning lamp as shown below. It also has a self-diagnosis function to detect a system malfunction.



Condition	Low tire pressure warning lamp
System normal	On for 1 second after ignition ON
Tire less than 193 kPa (2.0 kg/cm^2 , 28 psi) [Flat tire]	ON
Tire pressure monitoring system malfunction	After key ON, flashes once per second for 1 minute, then stays ON

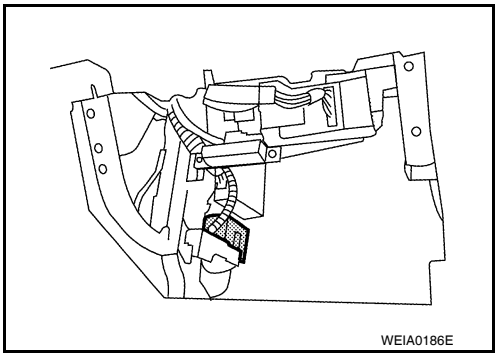
TRANSMITTER

A sensor-transmitter integrated with a valve is installed in each wheel, and transmits a detected air pressure signal in the form of a radio wave. The radio signal is received by the remote keyless entry receiver.



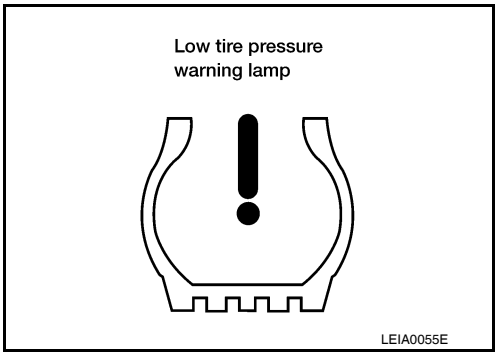
REMOTE KEYLESS ENTRY RECEIVER

The remote keyless entry receiver is shown with the glove box removed. The remote keyless entry receiver receives the air pressure signal transmitted by the transmitter in each wheel.



COMBINATION METER

The combination meter receives tire pressure status from the BCM using CAN communication. When a low tire pressure condition is sensed by the BCM, the combination meter low tire pressure warning lamp is activated.



TIRE PRESSURE WARNING CHECK CONNECTOR

The tire pressure warning check connector can be grounded in order to initiate self-diagnosis without a CONSULT. Refer to WT-18, "Self-Diagnosis (Without CONSULT)". The tire pressure warning check connector is located behind the lower portion of the instrument panel LH. Refer to PG-38, "Harness Layout".

CAN COMMUNICATION

System Description

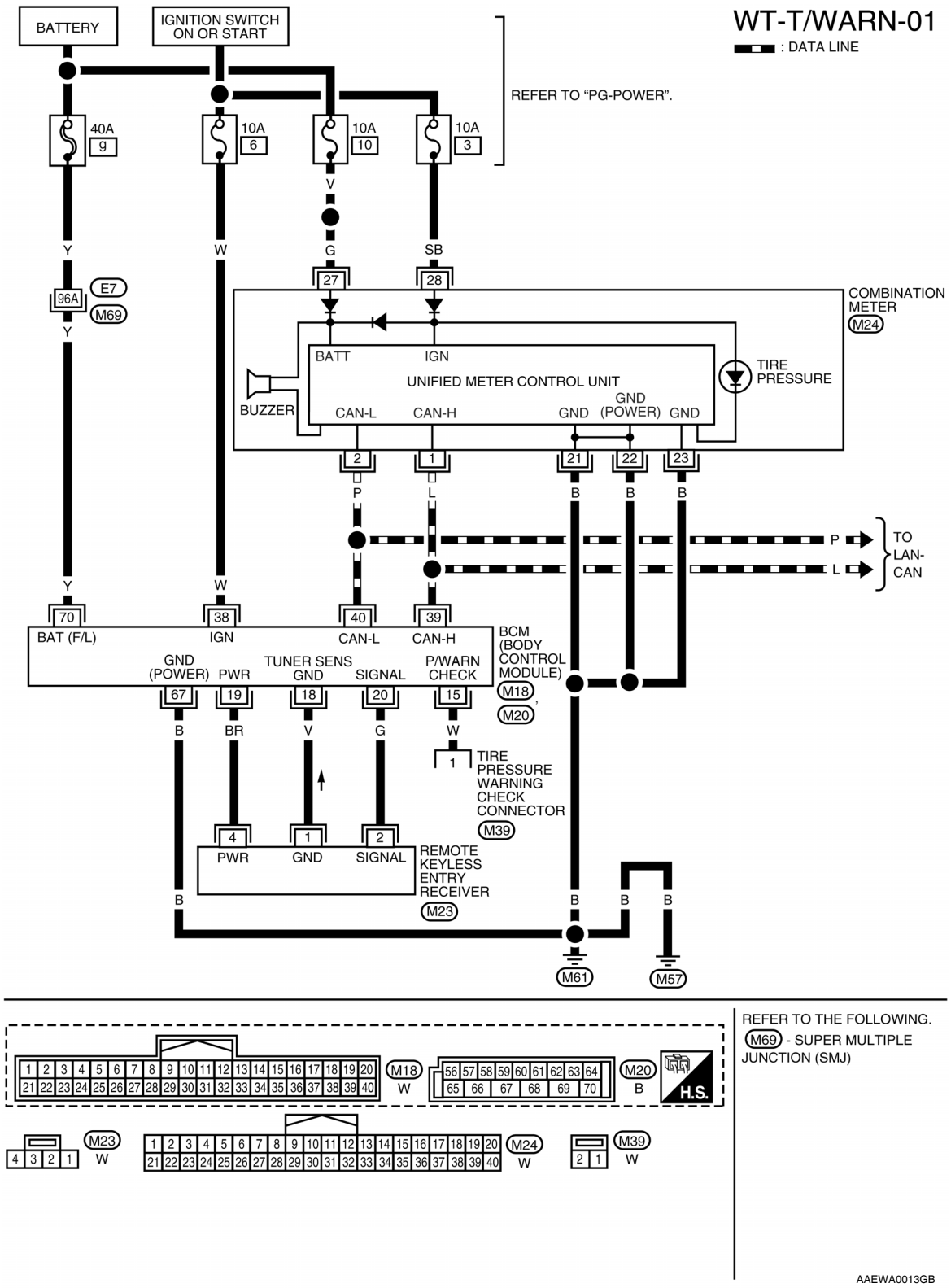
INFOID:0000000007330935

Refer to LAN-5.

TROUBLE DIAGNOSES

Wiring Diagram- T/WARN -

INFOID:0000000007330936



Terminal and Reference Value for BCM

INFOID:0000000007330937

Refer to BCS-12, "Terminal and Reference Value for BCM" .

ID Registration Procedure

INFOID:0000000007330938

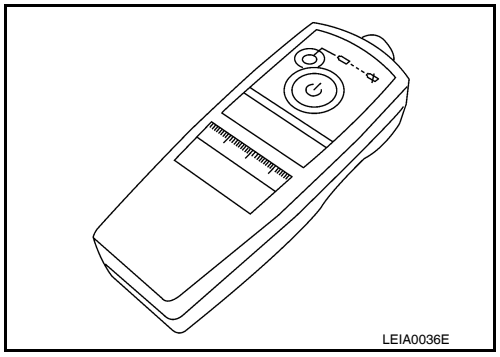
NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

ID REGISTRATION WITH TRANSMITTER ACTIVATION TOOL

NOTE:
This procedure must be done after replacement of a TPMS transmitter or BCM. New replacement transmitters are provided "asleep" and must first be "woken up" using Transmitter Activation Tool J-45295 or Signal Tech II Tool J-50190 before ID registration can be performed. Use the following procedure when using the Transmitter Activation Tool J-45295.

1. Connect CONSULT.
2. Select “AIR PRESSURE MONITOR” on "SELECT TEST ITEM" screen.
3. Select “WORK SUPPORT” on "SELECT DIAG MODE" screen, and select "ID REGIST".
4. Push the transmitter activation tool against the tire near the front left transmitter. Press the button for 5 seconds.

   Tool number : (J-45295)



5. Register the IDs in order from FR LH, FR RH, RR RH and RR LH. When ID registration of each wheel has been completed, a buzzer sounds and the hazard warning lamps flash.

Activation tire position		Buzzer	Hazard warning lamp	CONSULT
1	Front LH	Once	2 times flashing	“YET” ↓ “DONE”
2	Front RH	2 times		
3	Rear RH	3 times		
4	Rear LH	4 times		

6. After completing all ID registrations, press “END” to complete the procedure.

NOTE:
Be sure to register the IDs in order from FR LH, FR RH, RR RH, to RR LH, or the self-diagnostic results display will not function properly.

ID REGISTRATION WITHOUT TRANSMITTER ACTIVATION TOOL

NOTE:
This procedure must be done after replacement of a TPMS transmitter or BCM. New replacement transmitters are provided "asleep" and must first be "woken up" using Transmitter Activation Tool J-45295 or Signal Tech II Tool J-50190 before ID registration can be performed. Use the following procedure when using the Transmitter Activation Tool J-45295.

1. Connect CONSULT.
2. Select “AIR PRESSURE MONITOR” on “SELECT TEST ITEM" screen.
3. Select “WORK SUPPORT” on “SELECT DIAG MODE" screen, and select "ID REGIST".
4. Adjust the tire pressure to the values shown in the table below and drive the vehicle at 15 km/h (9.4 MPH) or more for a few minutes.

Tire position	Tire pressure kPa (kg/cm^2 , psi)
Front – Left	250 (2.5, 36)
Front – Right	230 (2.3, 33)
Rear – Right	210 (2.1, 30)
Rear – Left	190 (1.9, 27)

5. After completing all ID registrations, press “END” to complete the procedure.

Activation tire position	CONSULT
Front LH	“YET” ↓ “DONE”
Front RH	
Rear RH	
Rear LH	

6. Inflate all tires to proper pressure. Refer to WT-30, "Tire" .

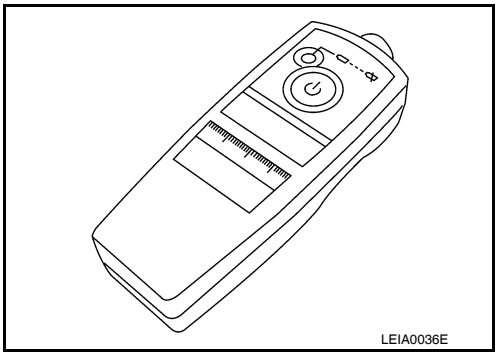
Transmitter Wake Up Operation

INFOID:0000000007330939

NOTE:
This procedure must be done after replacement of a TPMS transmitter or BCM. New replacement transmitters are provided "asleep" and must first be "woken up" using Transmitter Activation Tool J-45295 or Signal Tech II Tool J-50190 before ID registration can be performed. Use the following procedure when using the Transmitter Activation Tool J-45295.
NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

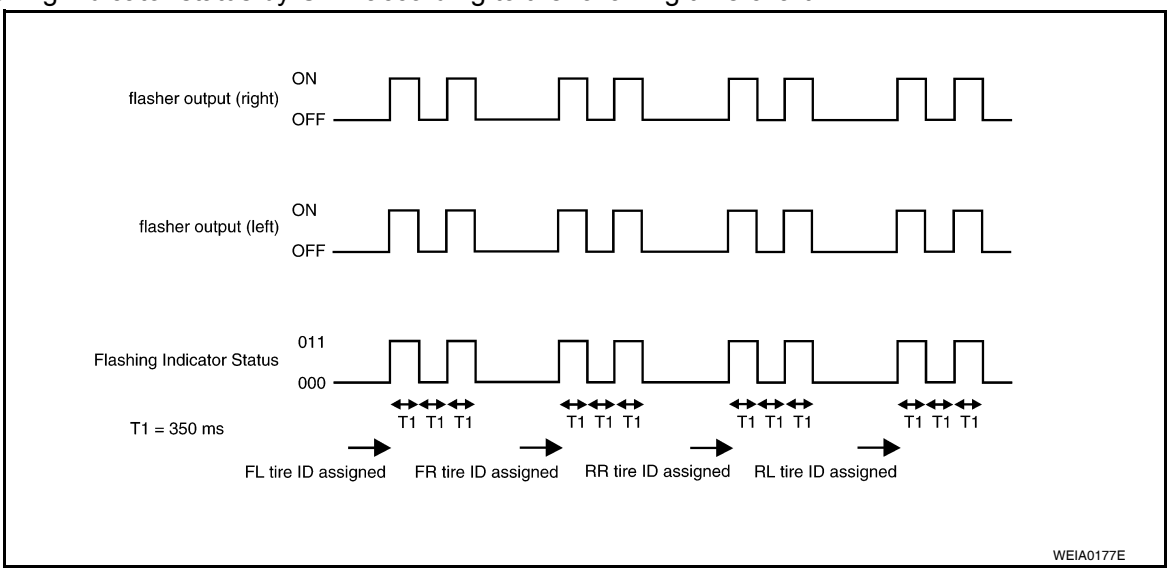
1. Turn ignition switch ON. Push the transmitter activation tool against the tire near the front left transmitter. Press the button for 5 seconds. The hazard warning lamps flash per the diagram below.

Tool number : (J-45295)



2. Repeat this procedure for each tire in the following order: FL, FR, RR, RL.

3. When the BCM finishes assigning each tire ID, the BCM flashes the hazard warning lamps and sends flashing indicator status by CAN according to the following time chart.



4. After completing wake up of all transmitters, make sure low tire pressure warning lamp goes out.

CONSULT Function (BCM)

INFOID:0000000007330940

NOTE:
This procedure must be done after replacement of a TPMS transmitter or BCM. New replacement transmitters are provided "asleep" and must first be "woken up" using Transmitter Activation Tool J-45295 or Signal Tech II Tool J-50190 before ID registration can be performed. Use the following procedure when using the Transmitter Activation Tool J-45295.
CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

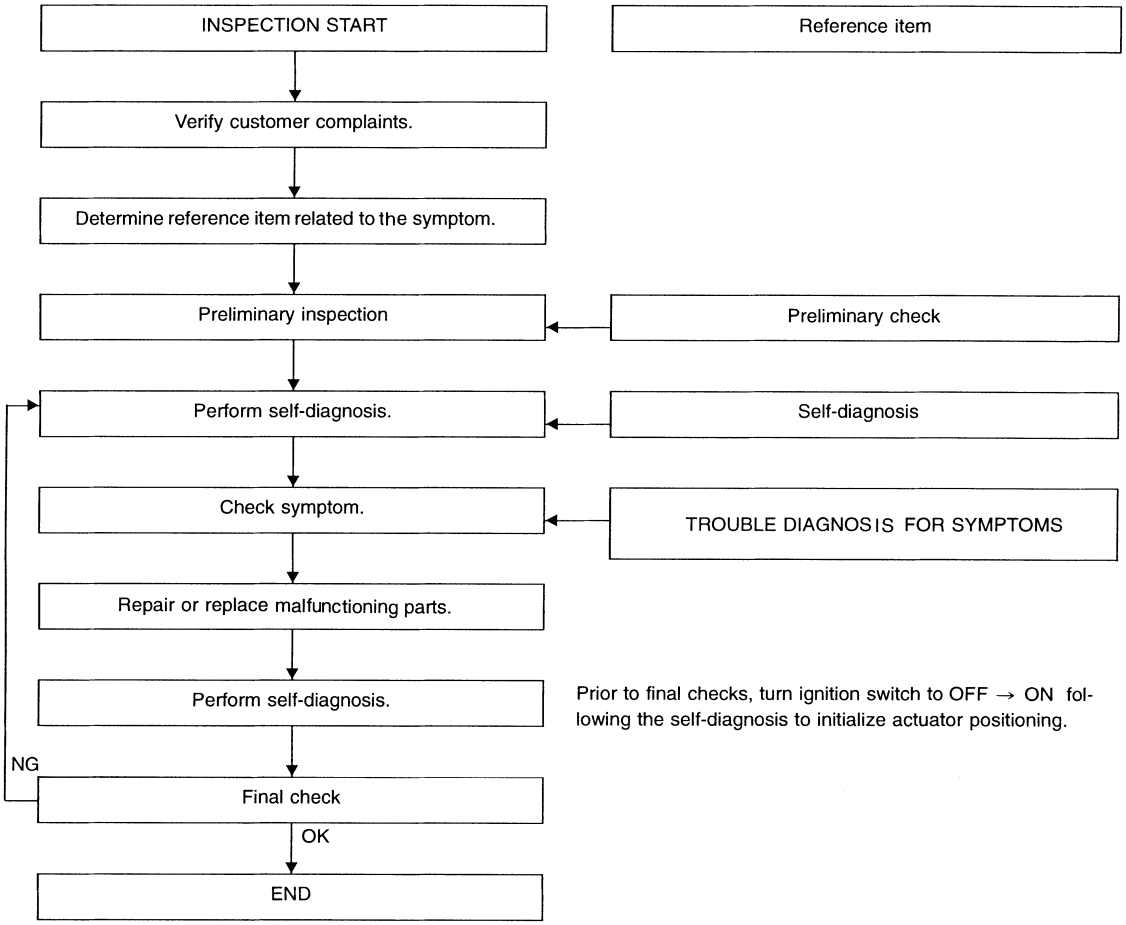
How to Perform Trouble Diagnosis for Quick and Accurate Repair

INFOID:0000000007330941

INTRODUCTION

- Before troubleshooting, verify customer complaints.
- If a vehicle malfunction is difficult to reproduce, harnesses, harness connectors or terminals may be malfunctioning. Hold and shake these parts to make sure they are securely connected.
- When using a circuit tester to measure voltage or resistance of each circuit, be careful not to damage or deform connector terminals.

WORK FLOW



SEIA0100E

Preliminary check : WT-16 Self-diagnosis : WT-17 Trouble diagnosis for symptoms : WT-24

Preliminary Check

INFOID:0000000007330942

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

BASIC INSPECTION

1.CHECK ALL TIRE PRESSURES

Check all tire pressures. Refer to WT-30, "Tire" .

OK or NG

OK >> GO TO 2.
NG >> Adjust tire pressure to specified value.

2.CHECK LOW TIRE PRESSURE WARNING LAMP ACTIVATION

Check low tire pressure warning lamp activation.

Does warning lamp activate for 1 second when ignition switch is turned ON?

YES >> GO TO 3.
NO >> GO TO WT-24, "Low Tire Pressure Warning Lamp Does Not Come On When Ignition Switch Is Turned On" .

3.CHECK BCM CONNECTOR

1. Disconnect BCM harness connector.
2. Check terminals for damage or loose connection.
3. Reconnect harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK TRANSMITTER ACTIVATION TOOL

Check transmitter activation tool battery.

OK or NG

OK >> Carry out self-diagnosis.
NG >> Replace battery in transmitter activation tool.

Self-Diagnosis (With CONSULT)

INFOID:0000000007330943

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

DESCRIPTION

During driving, the tire pressure monitoring system receives the signal transmitted from the transmitter installed in each wheel, and turns on the low tire pressure warning lamp when the tire pressure becomes low. The control unit (BCM) for this system has pressure judgement and self-diagnosis functions.

FUNCTION

When the tire pressure monitoring system detects low inflation pressure or an internal malfunction, the low tire pressure warning lamp in the combination meter comes on. The malfunction location is indicated by the low tire pressure warning lamp flashing and the buzzer sounding.

CONSULT Application to Tire Pressure Monitoring System

ITEM	SELF-DIAGNOSTIC RESULTS	DATA MONITOR
Front - Left transmitter	×	×
Front - Right transmitter	×	×
Rear - Left transmitter	×	×
Rear - Right transmitter	×	×
Warning lamp	—	×
Vehicle speed	×	×
Buzzer (in combination meter)	—	×
CAN Communication	×	×

× : Applicable
– : Not applicable

Self-Diagnostic Results Mode

Diagnostic item	Diagnostic item is detected when …	Reference page
FLAT - TIRE - FL [C1704] FLAT - TIRE - FR [C1705] FLAT - TIRE - RR [C1706] FLAT - TIRE - RL [C1707]	Tire pressure dropped below specified value. Refer to WT-9, "System Description".	—
[NO-DATA] - FL [C1708] [NO-DATA] - FR [C1709] [NO-DATA] - RR [C1710] [NO-DATA] - RL [C1711]	Data from FL transmitter cannot be received. Data from FR transmitter cannot be received. Data from RR transmitter cannot be received. Data from RL transmitter cannot be received.	WT-21
[CHECKSUM- ERR] - FL [C1712] [CHECKSUM- ERR] - FR [C1713] [CHECKSUM- ERR] - RR [C1714] [CHECKSUM- ERR] - RL [C1715]	Checksum data from FL transmitter is malfunctioning. Checksum data from FR transmitter is malfunctioning. Checksum data from RR transmitter is malfunctioning. Checksum data from RL transmitter is malfunctioning.	WT-21
[PRESSDATA- ERR] - FL [C1716] [PRESSDATA- ERR] - FR [C1717] [PRESSDATA- ERR] - RR [C1718] [PRESSDATA- ERR] - RL [C1719]	Air pressure data from FL transmitter is malfunctioning. Air pressure data from FR transmitter is malfunctioning. Air pressure data from RR transmitter is malfunctioning. Air pressure data from RL transmitter is malfunctioning.	WT-22
[CODE- ERR] - FL [C1720] [CODE- ERR] - FR [C1721] [CODE- ERR] - RR [C1722] [CODE- ERR] - RL [C1723]	Function code data from FL transmitter is malfunctioning. Function code data from FR transmitter is malfunctioning. Function code data from RR transmitter is malfunctioning. Function code data from RL transmitter is malfunctioning.	WT-21
[BATT - VOLT - LOW] - FL [C1724] [BATT - VOLT - LOW] - FR [C1725] [BATT - VOLT - LOW] - RR [C1726] [BATT - VOLT - LOW] - RL [C1727]	Battery voltage of FL transmitter drops. Battery voltage of FR transmitter drops. Battery voltage of RR transmitter drops. Battery voltage of RL transmitter drops.	WT-21
VHCL_SPEED_SIG_ERR [C1729]	Vehicle speed signal is in error.	WT-23
IGN_CIRCUIT_OPEN [C1735]	Vehicle ignition signal is in error.	WT-23

NOTE:

Before performing the self-diagnosis, be sure to register the ID or else the actual malfunction location may be different from that displayed on CONSULT.

Data Monitor Mode

MONITOR	CONDITION	SPECIFICATION
VEHICLE SPEED	Drive vehicle.	Vehicle speed (km/h or MPH)
AIR PRESS FL AIR PRESS FR AIR PRESS RR AIR PRESS RL	• Drive vehicle for a few minutes. or • Ignition switch ON and activation tool is transmitting activation signals.	Tire pressure (kPa or psi)
ID REGST FL1 ID REGST FR1 ID REGST RR1 ID REGST RL1	Ignition switch ON	Registration ID: DONE No registration ID: YET
WARNING LAMP		Low tire pressure warning lamp on: ON Low tire pressure warning lamp off: OFF
BUZZER		Buzzer in combination meter on: ON Buzzer in combination meter off: OFF

NOTE:

Before performing the self-diagnosis, be sure to register the ID, or the actual malfunction location may be different from that displayed on CONSULT.

Self-Diagnosis (Without CONSULT)

INFOID:0000000007330944

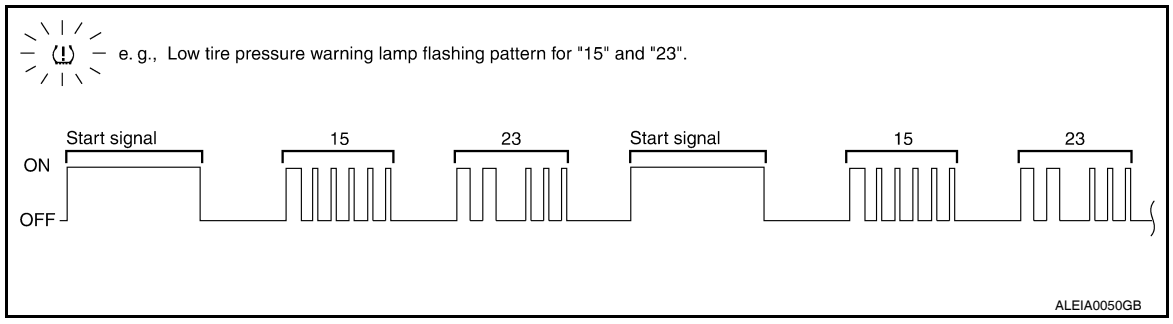
NOTE:

The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

SELF DIAGNOSTIC PROCEDURE (WITHOUT CONSULT)

1. Turn ignition switch ON.
2. Ground the tire pressure warning check connector to initiate self diagnosis.
3. Compare the flashing pattern with the flash code chart below.



NOTE:
The system is normal when the low tire pressure warning lamp flashes 5 times and continues repeating. Self-diagnosis results are erased automatically by turning the ignition switch “OFF”.

Flash Code or Symptom	Malfunction part	Reference page
15 16 17 18	Tire pressure dropped below specified value. Refer to WT-9, "System Description".	—
21 22 23 24	Transmitter no data (FL) Transmitter no data (FR) Transmitter no data (RR) Transmitter no data (RL)	WT-21
31 32 33 34	Transmitter checksum error (FL) Transmitter checksum error (FR) Transmitter checksum error (RR) Transmitter checksum error (RL)	WT-21
35 36 37 38	Transmitter pressure data error (FL) Transmitter pressure data error (FR) Transmitter pressure data error (RR) Transmitter pressure data error (RL)	WT-22
41 42 43 44	Transmitter function code error (FL) Transmitter function code error (FR) Transmitter function code error (RR) Transmitter function code error (RL)	WT-21
45 46 47 48	Transmitter battery voltage low (FL) Transmitter battery voltage low (FR) Transmitter battery voltage low (RR) Transmitter battery voltage low (RL)	WT-21
52	Vehicle speed signal	WT-23
54	Vehicle ignition signal	WT-23
Low tire pressure warning lamp does not come on when ignition switch is turned on.	• Fuse or combination meter • BCM connector or circuit • BCM	WT-24
Low tire pressure warning lamp stays on when ignition switch is turned on.	• Combination meter • BCM connector or circuit • BCM	WT-24

Flash Code or Symptom	Malfunction part	Reference page
Low tire pressure warning lamp flashes when ignition switch is turned on.	• BCM harness connector or circuit • BCM • Transmitter's mode off • ID registration not completed yet	WT-25
Hazard warning lamps flash when ignition switch is turned on.	• BCM harness connector or circuit • BCM	WT-26
ID registration cannot be completed.	• Transmitter • Remote keyless entry receiver harness connector or circuit • Remote keyless entry receiver • BCM harness connector or circuit • BCM	WT-27

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

Data from Transmitter Not Being Received

INFOID:0000000007330945

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

MALFUNCTION CODE NO. 21, 22, 23 OR 24 (DTC C1708, C1709, C1710 OR C1711)

1.CHECK BCM

Drive for several minutes. Check all tire pressures with CONSULT.

Are all tire pressures displayed as 0 kPa?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK REMOTE KEYLESS ENTRY RECEIVER CONNECTOR

Check remote keyless entry receiver connector for damage or loose connections.

OK or NG

OK >> Replace BCM, then GO TO 3. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Repair or replace remote keyless entry receiver connector.

3.PERFORM ID REGISTRATION

Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".

Is there a tire that cannot register ID?

YES >> Replace transmitter of the tire, then GO TO 5. Refer to WT-28, "Transmitter (Pressure Sensor)".
NO >> GO TO 4.

4.DRIVE VEHICLE

1. Drive at a speed of 40 km/h (25 MPH) or more for several minutes without stopping.
2. Check all tire pressures with CONSULT within 15 minutes after vehicle speed becomes 17 km/h (11 MPH).

Does “DATA MONITOR ITEM” display tire pressure as normal without any warning lamp?

YES >> Inspection End.
NO >> GO TO 5.

5.ID REGISTRATION AND VEHICLE DRIVING

1. Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".
2. Drive at a speed of 40 km/h (25 MPH) or more for 3 minutes, and then drive the vehicle at any speed for 10 minutes.
3. Check all tire pressures with CONSULT within 5 minutes.

Does “DATA MONITOR ITEM” display tire pressure as normal without any warning lamp?

YES >> Inspection End.
NO >> GO TO the inspection applicable to DTC.

Transmitter Malfunction

INFOID:0000000007330946

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

MALFUNCTION CODE NO. 31, 32, 33, 34, 41, 42, 43, 44, 45, 46, 47 OR 48 (DTC C1712, C1713,

C1714, C1715, C1720, C1721, C1722, C1723, C1724, C1725, C1726 OR C1727)

1.PERFORM ID REGISTRATION

1. Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".
2. Drive at a speed of 40 km/h (25 MPH) or more for 3 minutes, and then drive the vehicle at any speed for 10 minutes.

>> GO TO 2.

2.REPLACE TRANSMITTER

1. Check low tire pressure warning lamp again for flashing, replace malfunctioning transmitter. Refer to WT-28, "Transmitter (Pressure Sensor)".
2. Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".

Can ID registration of all transmitters be completed?

YES >> GO TO 3.
NO >> GO TO WT-21, "Data from Transmitter Not Being Received".

3.DRIVE VEHICLE

1. Drive at a speed of 40 km/h (25 MPH) or more for 3 minutes, and then drive the vehicle at any speed for 10 minutes.
2. Check all tire pressures with CONSULT within 5 minutes.

Does “DATA MONITOR ITEM” display tire pressure as normal without any warning lamp?

YES >> Inspection End.
NO >> Replace malfunctioning transmitter, and perform Step 3 again. Refer to WT-28, "Transmitter (Pressure Sensor)".

Transmitter Pressure Malfunction

INFOID:0000000007330947

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

MALFUNCTION CODE NO. 35, 36, 37 OR 38 (DTC C1716, C1717, C1718 OR C1719)

1.CHECK ALL TIRE PRESSURES

Check all tire pressures. Refer to WT-30, "Tire".

Are there any tires with pressure of 64 psi or more?

YES >> Adjust tire pressure to specified value.
NO >> GO TO 2.

2.ID REGISTRATION AND VEHICLE DRIVING

1. Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".
2. Drive at a speed of 40 km/h (25 MPH) or more for several minutes without stopping.
3. Check all tire pressures with CONSULT within 15 minutes after vehicle speed becomes 17 km/h (11 MPH).

Does “DATA MONITOR ITEM” display 64 psi or more?

YES >> Replace transmitter. Refer to WT-28, "Transmitter (Pressure Sensor)". GO TO 3.
NO >> GO TO 3.

3.ID REGISTRATION AND VEHICLE DRIVING

1. Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".
2. Drive at a speed of 40 km/h (25 MPH) or more for 3 minutes, and then drive the vehicle at any speed for 10 minutes.
3. Check all tire pressures with CONSULT within 5 minutes.

Does “DATA MONITOR ITEM” display tire pressure as normal without any warning lamp?

YES >> Inspection End.
NO >> GO TO the inspection applicable to DTC.

Vehicle Speed Signal

INFOID:0000000007330948

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

MALFUNCTION CODE NO. 52 (DTC C1729)

1.SELF-DIAGNOSTIC RESULT CHECK

Using CONSULT, check display contents in self-diagnostic results.

Is " CAN COMM CIRCUIT" displayed in the self-diagnosis display items?

YES >> Malfunction in CAN communication system. GO TO LAN-11, "CAN Diagnosis with CONSULT".
NO >> GO TO 2.

2.CHECK BCM

Perform BCM diagnosis. Refer to BCS-17, "CONSULT Function (BCM)".

Inspection results OK?

OK >> Perform Vehicle Speed Sensor Inspection. Refer to EC-398, "M/T MODELS : Diagnosis Procedure" (M/T MODELS) or EC-399, "EXCEPT FOR M/T MODELS : Diagnosis Procedure" (EXCEPT FOR M/T MODELS).
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

Vehicle Ignition Signal

INFOID:0000000007330949

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

MALFUNCTION CODE NO. 54 (DTC C1735)

1.CAN IGNITION SIGNAL

Check BCM IGN RLY signal with CONSULT. Refer to BCS-12, "Terminal and Reference Value for BCM".

Are the inspection results normal with the ignition switch ON?

YES >> GO TO 2.
NO >> Check CAN system. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

2.BCM POWER SUPPLY

Check BCM power supply (ignition ON). Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the power supply with the ignition switch ON normal?

YES >> GO TO 3.
NO >> Repair power supply as necessary.

3.DRIVE VEHICLE

Clear DTC and then test drive the vehicle and check the low tire pressure warning lamp.

Does the vehicle operate without any low tire pressure warning lamp?

YES >> Inspection End.
NO >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

TROUBLE DIAGNOSIS FOR SYMPTOMS

Low Tire Pressure Warning Lamp Does Not Come On When Ignition Switch Is Turned On

INFOID:0000000007330950

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

DIAGNOSTIC PROCEDURE

1.SELF-DIAGNOSTIC RESULT CHECK

Using CONSULT, check display contents in self-diagnostic results.

Is "CAN COMM CIRCUIT" displayed in the self-diagnosis display items?

YES >> Malfunction in CAN communication system. GO TO LAN-11, "CAN Diagnosis with CONSULT".
NO >> GO TO 2.

2.CHECK COMBINATION METER

Check combination meter operation. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

Inspection results OK?

OK >> GO TO 3.
NG >> Replace combination meter. Refer to IP-12, "Removal and Installation".

3.CHECK LOW TIRE PRESSURE WARNING LAMP

Disconnect BCM harness connector.

Does the low tire pressure warning lamp activate?

YES >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NO >> Check combination meter operation. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

Low Tire Pressure Warning Lamp Stays On When Ignition Switch Is Turned On

INFOID:0000000007330951

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

DIAGNOSTIC PROCEDURE

1.CHECK BCM CONNECTORS

1. Turn ignition switch OFF.
2. Disconnect BCM harness connectors M18 and M20.
3. Check terminals for damage or loose connections.

Inspection results OK?

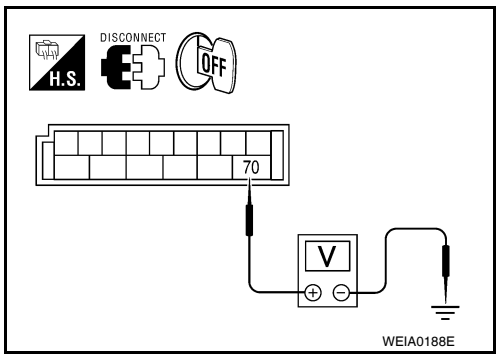
OK >> GO TO 2.
NG >> Repair or replace damaged parts.

2.CHECK BCM POWER SUPPLY CIRCUIT (BAT)

Check voltage between BCM harness connector M20 terminal 70 and ground.

1.

Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
M20	70		



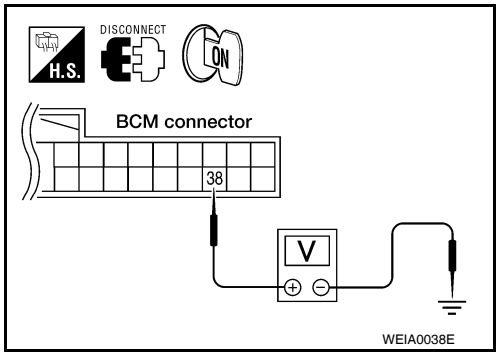
OK or NG

OK >> GO TO 3.
NG >> Check BCM power supply circuit for open or short.

3. CHECK BCM POWER SUPPLY CIRCUIT (IGN)

1. Turn ignition switch ON.
2. Check voltage between BCM harness connector M18 terminal 38 and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
M18	38		



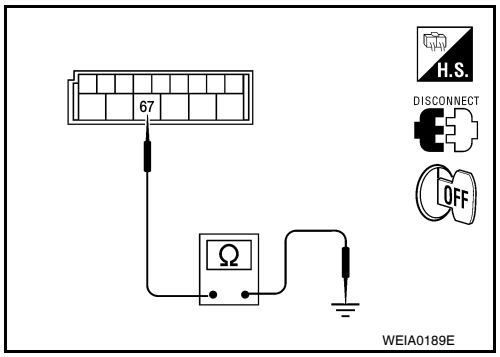
OK or NG

OK >> GO TO 4.
NG >> Check BCM power supply circuit for open or short.

4. CHECK BCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between BCM harness connector M20 terminal 67 and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal	Ground	Yes
M20	67		



OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Repair BCM ground circuit.

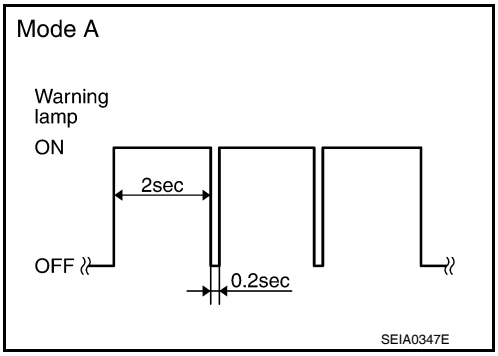
Low Tire Pressure Warning Lamp Flashes When Ignition Switch Is Turned On

INFOID:0000000007330952

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

NOTE:
If low tire pressure warning lamp flashes as shown, the system is normal.
Flash Mode A

- This mode shows transmitter status is OFF-mode.
  Carry out transmitter wake up operation. Refer to WT-14, "Transmitter Wake Up Operation".



DIAGNOSTIC PROCEDURE

1.CHECK BCM CONNECTORS

1. Turn ignition switch OFF.
2. Disconnect BCM harness connectors M18 and M20.
3. Check terminals for damage or loose connections.

Inspection results OK?

OK >> GO TO 2.
NG >> Repair or replace damaged parts.

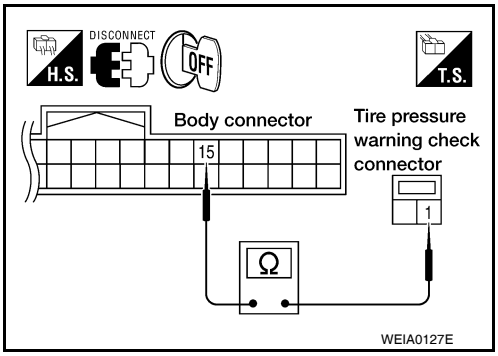
2.CHECK TIRE PRESSURE WARNING CHECK CONNECTOR CIRCUIT

Check continuity between BCM harness connector M18 terminal 15 and check connector M39 terminal 1.

Continuity should exist.

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Repair or replace harness connector.



Hazard Warning Lamps Flash When Ignition Switch Is Turned On

INFOID:0000000007330953

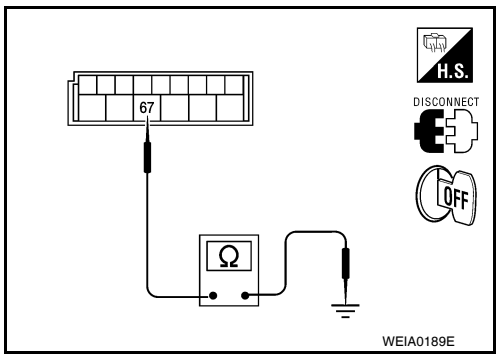
NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

DIAGNOSTIC PROCEDURE

1.CHECK BCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM harness connector M20.
3. Check continuity between BCM harness connector M20 terminal 67 and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal	Ground	Yes
M20	67		



OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

NG >> Repair BCM ground circuit.

ID Registration Cannot Be Completed

INFOID:0000000007330954

NOTE:

The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs

DIAGNOSTIC PROCEDURE

1.PERFORM ID REGISTRATION OF ALL TRANSMITTERS

Carry out ID registration of all transmitters. Refer to WT-13, "ID Registration Procedure".

Can ID registration of all transmitters be completed?

YES >> Inspection End.

NO >> GO TO WT-21, "Data from Transmitter Not Being Received".

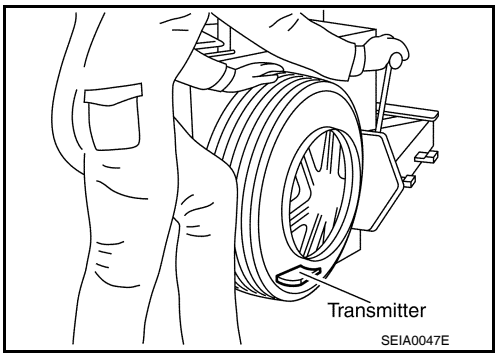
REMOVAL AND INSTALLATION

Transmitter (Pressure Sensor)

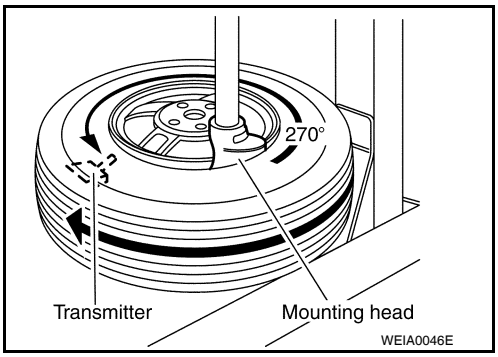
INFOID:0000000007330955

REMOVAL

1. Remove wheel and tire using power tool.
2. Deflate tire. Unscrew transmitter retaining nut and allow transmitter to fall into tire.
3. Gently bounce tire so that transmitter falls to bottom of tire. Place wheel and tire assembly on tire changing machine and break both tire beads. Ensure that the transmitter remains at the bottom of the tire while breaking the bead.

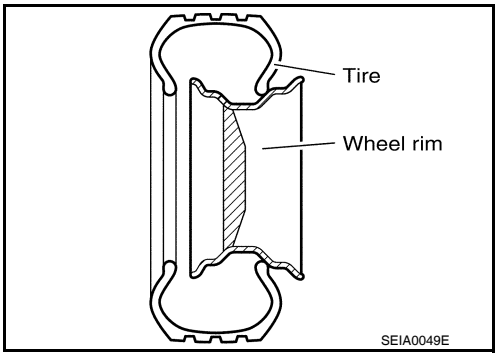


4. Turn tire so that valve hole is at bottom, and gently bounce the tire to ensure transmitter is near valve hole. Carefully lift tire onto turntable and position valve hole (and transmitter) 270 degrees from mounting/dismounting head.
5. Lubricate tire well with a suitable non-silicone lubricant, and remove top side of tire. Reach inside the tire and remove the transmitter.
   CAUTION:
   Do not use silicone lubricant. Use of silicone lubricant will deteriorate the tire and wheel.
6. Remove the second side of the tire as normal.



INSTALLATION

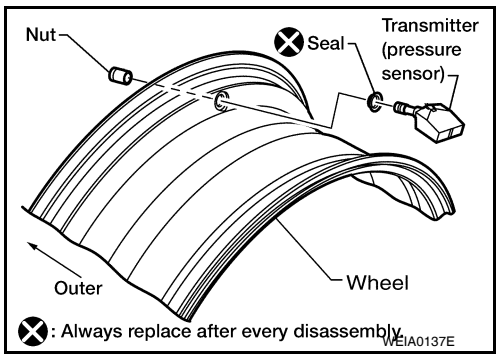
1. Place first side of tire onto rim.



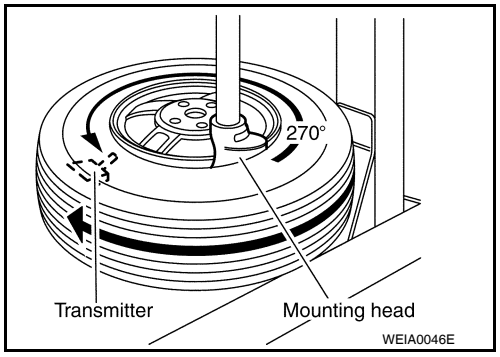
2. Apply a suitable non-silicone lubricant to new transmitter seal then install seal on transmitter. Refer to MA-13.
   CAUTION:
   - **Do not use silicone lubricant. Use of silicone lubricant will deteriorate the tire and wheel.**
   - **Do not reuse seal.**

3. Mount transmitter on rim and tighten nut.
NOTE:
Make sure no burrs exist in the valve stem hole of the wheel.

Transmitter nut : 7.7 N·m (0.79 kg-m, 68 in-lb)



4. Place wheel on turntable of tire machine. Ensure that transmitter is 270 degrees from mounting/dismounting head.
NOTE:
Do not touch transmitter with mounting head.
5. Lubricate tire well with a suitable non-silicone lubricant, and install second side of tire as normal. Ensure that tire does not rotate relative to rim.
CAUTION:
Do not use silicone lubricant. Use of silicone lubricant will deteriorate the tire and wheel.
6. Inflate tire and balance the wheel and tire assembly. Refer to WT-7, "Adjustment".



7. Install wheel and tire assembly in appropriate wheel position on vehicle. Refer to WT-7, "Adjustment".
NOTE:
If replacing the transmitter, then transmitter wake up operation must be performed. Refer to WT-14, "Transmitter Wake Up Operation".

SERVICE DATA AND SPECIFICATIONS (SDS)

Road Wheel

INFOID:0000000007330956

Standard item		Allowable	
		Aluminum	Steel
Maximum radial runout limit	Lateral deflection	Less than 0.3 mm (0.012 in)	Less than 0.5 mm (0.020 in)
	Radial deflection	Less than 0.3 mm (0.012 in)	Less than 0.8 mm (0.031 in)
Maximum allowable imbalance	Dynamic (At rim flange)	Less than 5 g (0.18 oz) (one side)	
	Static (At rim flange)	Less than 10 g (0.35 oz)	

Tire

INFOID:0000000007330957

Unit: kPa (kg/cm^2, psi)

Tire size	Cold tire pressure		
	Conventional tire		Spare tire
	United States	Canada	
P185/65R15	240 (2.4, 35)	240 (2.4, 35)	—
P195/55R16	240 (2.4, 35)	—	—
T125/70D15	—	—	420 (4.2, 60)

SECTION BR
BRAKE SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007328832

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007328833

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

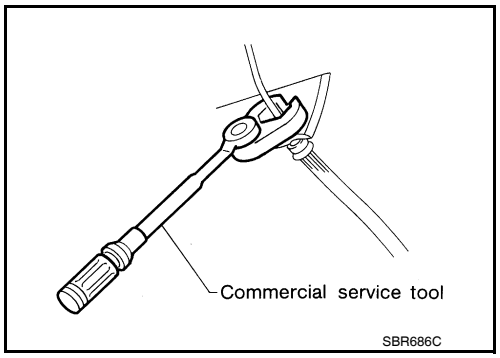
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Brake System

INFOID:0000000007328834

- Refill using recommended brake fluid. Refer to MA-13.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces of body immediately wipe it off with cloth and then wash it away with water.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use new brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing a brake tube and use a flare nut torque wrench when installing a brake tube.
- When installing brake tubes and hoses, be sure to check torque.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.
- Burnish the new braking surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to BR-32, "Brake Burnishing Procedure" .

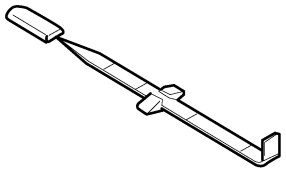
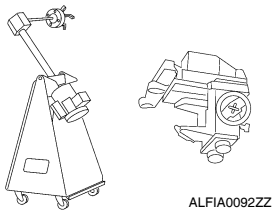


PREPARATION

Special Service Tool

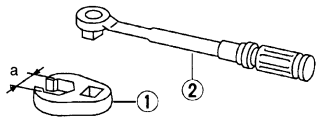
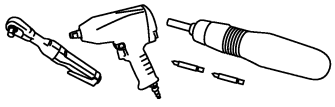
INFOID:0000000007328835

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46532) Brake and clutch pedal height measurement tool  LFIA0227E	Measuring brake pedal height
38-PFM90.5 (—) Pro-Cut PFM90 On-Car Brake Lathe  ALFIA0092ZZ	Turning rotors

Commercial Service Tool

INFOID:0000000007328836

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Removing and installing brake piping **a: 10 mm (0.39 in) / 12 mm (0.47 in)**
Pin punch ZZA0515D	Removing and installing reservoir tank pin **Tip diameter: 4 mm (0.16 in)**
Power tool  PIIB1407E	Removing nuts, bolts and screws

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007328837

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		BR-25, BR-33	BR-25, BR-33	BR-25	BR-29, BR-33	BR-29, BR-33	BR-29, BR-33	BR-29, BR-33	BR-29, BR-33	—	BR-29, BR-33	BR-33	FAX-5, "NVH Troubleshooting Chart"	MT-9, "NVH Troubleshooting Chart"	FSU-6, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	FAX-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS		Pads/Lining damaged	Pads/Lining - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	Drum out of round	WHEEL HUB	DIFFERENTIAL	SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	Noise	×	×	×									×	×	×	×	×	×	×
	Shake				×								×		×	×	×	×	×
	Shimmy, Shudder				×	×	×	×	×	×	×	×			×	×	×		×

×: Applicable

BRAKE PEDAL

Inspection and Adjustment

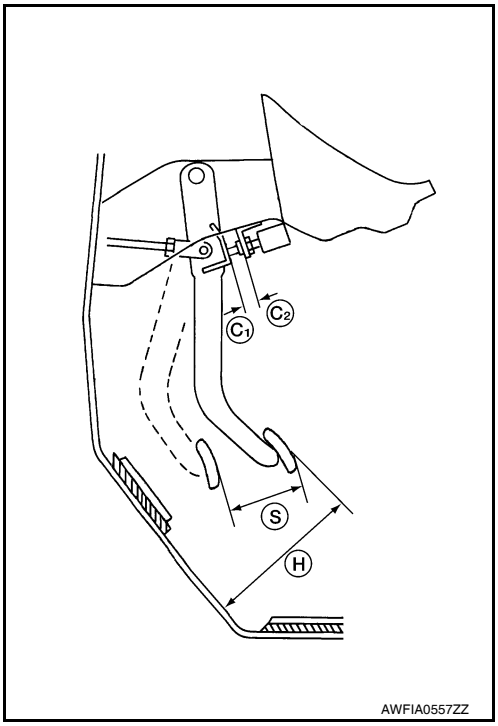
INFOID:0000000007328838

INSPECTION

1. Check brake pedal free height (H) from dash panel top surface using Tool.

Tool number : — (J-46532)

2. Check clearance between pedal stopper (C_1) and threaded end of stop lamp switch and ASCD cancel switch (C_2), if equipped.



Brake pedal free height (H) (from dash panel top surface)	**: Refer to BR-38, "Brake Pedal".**
Brake pedal full stroke (S)	**: Refer to BR-38, "Brake Pedal".**
Clearance between pedal stopper (C_1) and threaded end of stop lamp switch and ASCD cancel switch (C_2), if equipped.	**: Refer to BR-38, "Brake Pedal".**

ADJUSTMENT

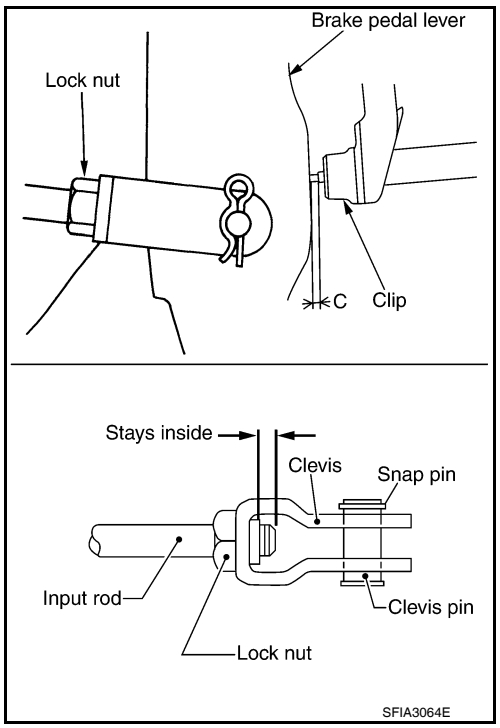
1. Loosen stop lamp switch and ASCD cancel switch, if equipped, by rotating it counterclockwise by 45°.

2. Loosen lock nut on input rod, then rotate input rod to set pedal to the specified height, and tighten the lock nut.
CAUTION:
Make sure that the threaded end of input rod stays inside clevis.

Lock nut : Refer to BR-21, "Removal and Installation".

3. With the pedal pulled and held by hand, press stop lamp switch and ASCD cancel switch, if equipped, until their threaded end contacts the brake pedal stopper.
4. With the threaded end of stop lamp switch and ASCD cancel switch, if equipped, contacting brake pedal stopper, rotate the switches clockwise by 45° to secure.
CAUTION:
Make sure that the clearance (C) between pedal stopper and switch threaded end is within specification.

Clearance between pedal stopper (C_1) and threaded end of stop lamp switch and ASCD cancel switch (C_2), if equipped : Refer to BR-38, "Brake Pedal".

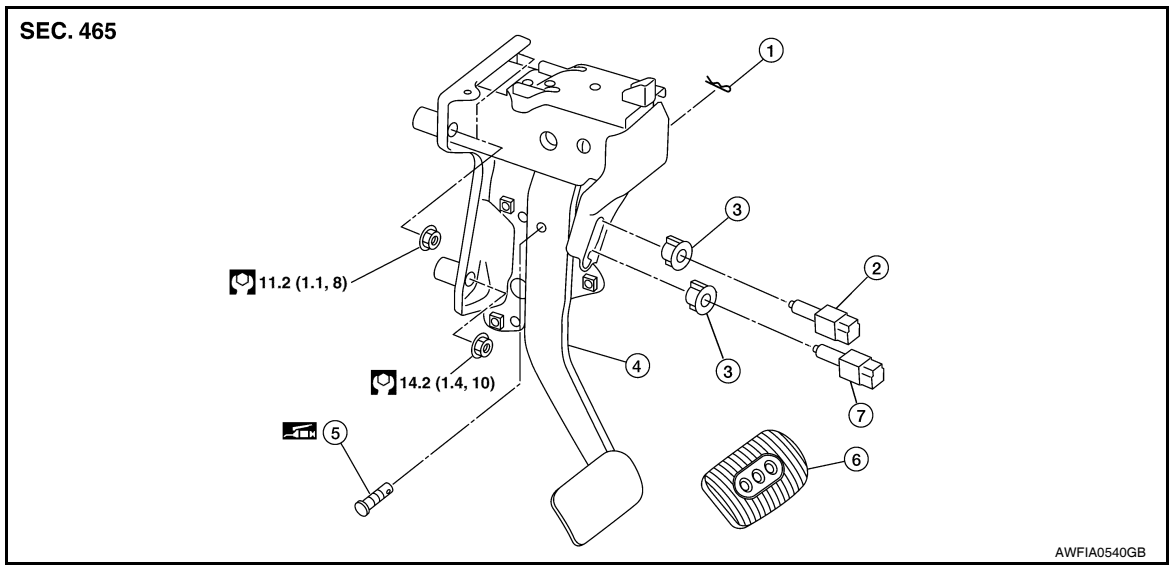


5. Check that the stop lamps go out when the brake pedal is released.
CAUTION:
Make sure that stop lamps go off when brake pedal is released.
6. Start the engine and check the brake pedal for smooth operation.

Removal and Installation

INFOID:0000000007328839

COMPONENTS

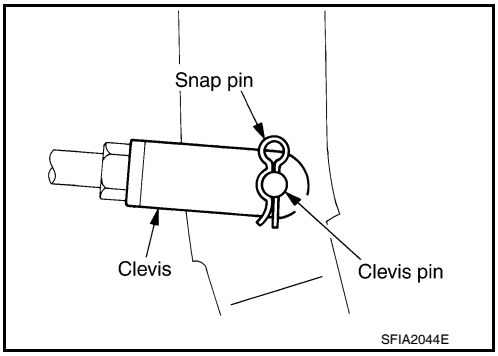


1. Snap pin
2. Stop lamp switch
3. Clip
4. Brake pedal assembly
5. Clevis pin
6. Brake pedal pad
7. ASCD cancel switch (if equipped)

REMOVAL

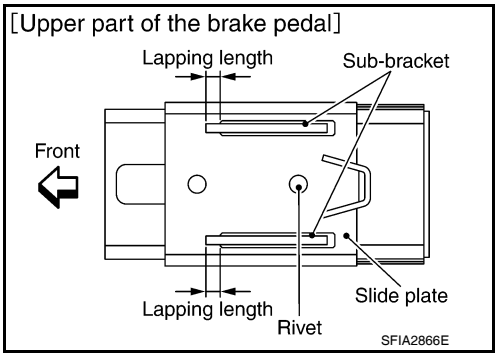
1. Remove the instrument lower panel LH. Refer to IP-11, "Component Parts".

2. Disconnect accelerator pedal position sensor harness connector.
3. Remove stop lamp switch and ASCD cancel switch, if equipped, from brake pedal assembly.
4. Remove snap pin and clevis pin from clevis of brake booster.
5. Remove nuts from brake pedal bracket, and remove brake pedal assembly from vehicle.
6. Remove accelerator pedal from brake pedal assembly.

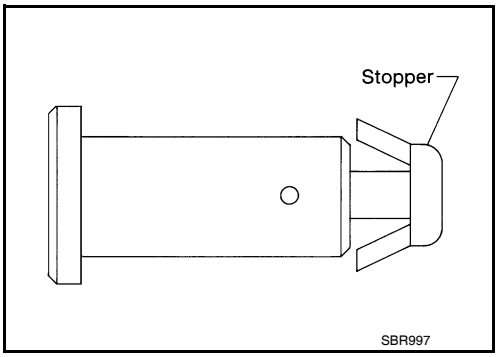


INSPECTION AFTER REMOVAL

- Check brake pedal upper rivet for deformation.
- Make sure that the lapping length of sub-bracket and slide plate is at least 6.9 ± 0.5 mm (0.272 ± 0.020 in).
- Check brake pedal for bend, damage, and cracks on the welded parts.
- Replace brake pedal assembly if any non-standard condition is detected.

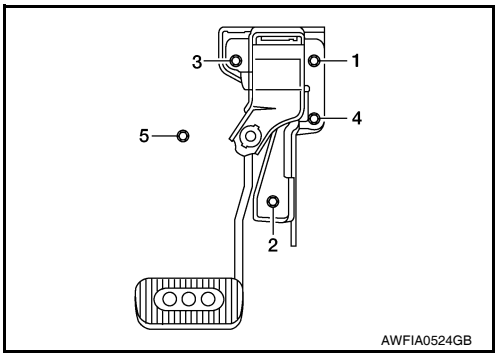


- Check clevis pin and plastic stopper for damage and deformation. Replace clevis pin as necessary.



INSTALLATION

1. Install the accelerator pedal on the brake pedal assembly. Refer to ACC-4, "Removal and Installation".
2. Install the brake pedal assembly on the lower dash panel and tighten the brake pedal assembly nuts in the order as shown to specification.



3. Installation of the remaining components are in the reverse order of the removal.
   - After installing brake pedal assembly to vehicle, adjust brake pedal. Refer to BR-6, "Inspection and Adjustment".
   - After installing accelerator pedal, check accelerator pedal. Refer to ACC-4, "Removal and Installation".

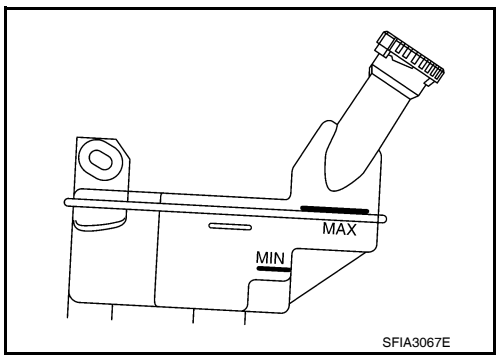
BRAKE FLUID

On Board Inspection

INFOID:0000000007328840

CHECKING BRAKE FLUID LEVEL

- Make sure the fluid level in the reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around the reservoir tank for fluid leaks.
- If fluid level is excessively low, check brake system for fluid leaks.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for fluid leaks.



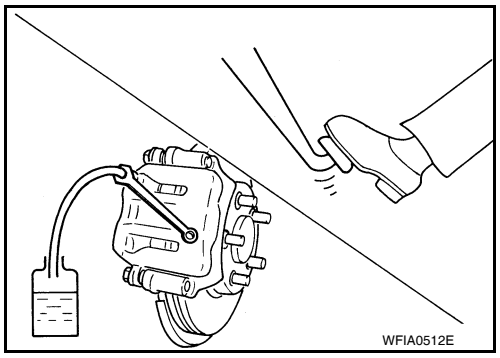
Drain and Refill

INFOID:0000000007328841

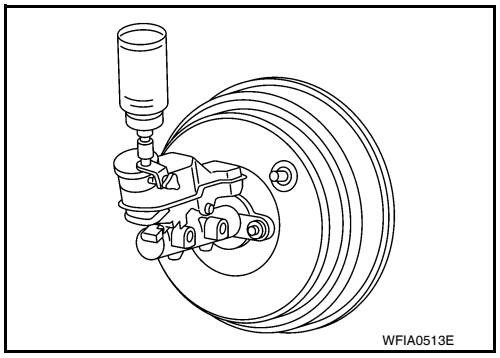
CAUTION:

- **Refill using recommended brake fluid. Refer to MA-13, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, immediately wipe them with cloth and wash it away with water.**
- **Before working, disconnect connectors of ABS actuator and electric unit (control unit) or battery negative terminal.**

1. Connect a vinyl tube to bleed valve.
2. Depress the brake pedal, loosen the bleed valve, and gradually remove the brake fluid.



3. Clean inside of reservoir tank, and refill with new brake fluid.
4. Loosen bleed valve, depress brake pedal slowly to full stroke and then release it. Repeat the procedure every 2 or 3 seconds until the new brake fluid comes out, then close the bleed valve while depressing the brake pedal. Repeat the same procedure for each wheel.
5. Bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System" .



Bleeding Brake System

INFOID:0000000007328842

CAUTION:

- **While bleeding, pay attention to master cylinder fluid level.**
- **Before working, disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.**

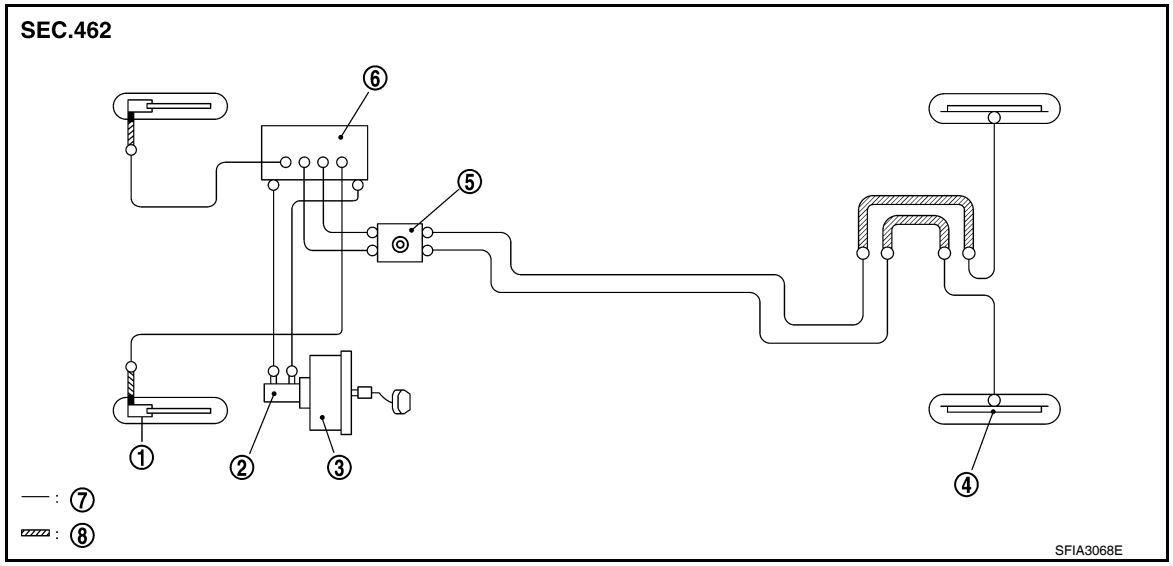
1. Connect a vinyl tube to the rear right bleed valve.
2. Fully depress brake pedal 4 to 5 times.

3. With brake pedal depressed, loosen bleed valve to let the air out, and then tighten it immediately.
4. Repeat steps 2, 3 until no more air comes out.
5. Tighten bleed valve to specified torque. Refer to BR-25, "Component" (front disc brake), BR-33, "Component" (rear drum brake).
6. Following the steps 1 to 5 above, with master cylinder reservoir tank filled at least half way, bleed air from the rear right, front left, rear left, and front right brake, in that order.

BRAKE TUBE AND HOSE

Hydraulic Circuit

INFOID:0000000007328843



1.	Front disc brake	2.	Brake master cylinder	3.	Brake booster
4.	Rear drum brake	5.	Connector	6.	ABS actuator and electric unit (control unit)
7.	Brake tube	8.	Brake hose		
■:	Union bolt 18.2 N.m (1.9 kg-m, 13.0 ft-lb)	◎:	Connector bolt 7.0 N.m (0.71 kg-m, 62 in-lb)	○:	Flare nut 16.2 N.m (1.7 kg-m, 12.0 ft-lb)

CAUTION:

- **All tubes and hoses must be free from excessive bending, twisting and pulling.**
- **Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.**
- **Brake tubes and hoses are an important safety part. Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted surfaces of body, immediately wipe them with cloth and then wash it away with water.**
- **Do not bend or twist brake hose sharply, or strongly pull it.**
- **When removing components, cover brake line connections so that dirt, dust, or other foreign matters do not get in.**
- **Refill using recommended brake fluid. Refer to MA-13, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Do not reuse copper sealing washers.**

NOTE:

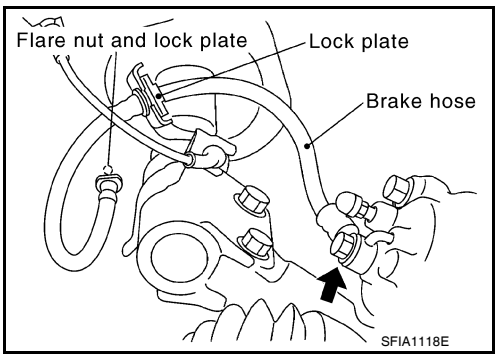
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

Front Brake Tube and Hose

INFOID:0000000007328844

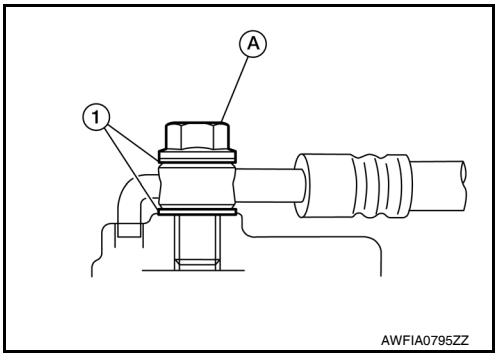
REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill".
2. Using a flare nut wrench, remove brake tube from brake hose.
3. Remove union bolt and discard the copper sealing washers.
   CAUTION:
   Do not reuse copper sealing washers.
4. Remove brake hose from caliper assembly.
5. Remove lock plate, and remove brake hose.



INSTALLATION

1. Assemble union bolt (A) and new copper sealing washers (1) on to brake hose.
   CAUTION:
   Do not reuse copper sealing washers.
2. Position the L-shape metal fitting of the brake hose to the brake caliper assembly positioning hole.
3. Tighten union bolt (A) to the specified torque. Refer to BR-11, "Hydraulic Circuit".
4. Connect brake hose to brake tube, and temporarily tighten flare nut by hand as much as possible.
5. Secure brake hose and brake tube with lock plates.
6. Tighten flare nut to the specified torque with a suitable tool. Refer to BR-11, "Hydraulic Circuit".
7. Bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System".



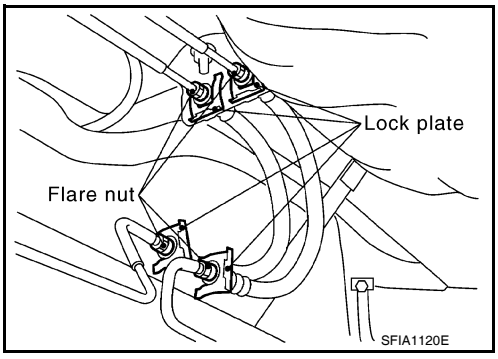
Rear Brake Tube and Hose

INFOID:0000000007328845

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

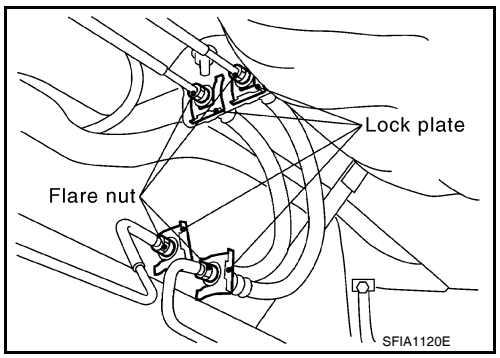
1. Drain brake fluid. Refer to BR-9, "Drain and Refill".
2. Remove brake tube from brake hose using a suitable tool.
3. Remove lock plate, and remove brake hose.



INSTALLATION

1. Connect brake hose to brake tube, and temporarily tighten flare nut by hand as much as possible.

2. Secure it to the bracket with the lock plate.
3. Tighten flare nut to the specified torque using a suitable tool. Refer to BR-11, "Hydraulic Circuit".



4. Bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System".

Inspection After Installation

INFOID:0000000007328846

CAUTION:

- **Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.**
- **If leak is detected at the connections, retighten it or replace the damaged part.**

1. Check brake hose, tube, and connections for fluid leaks, damage, twisting, deformation, contact with other parts, and loose connections.
2. While depressing pedal under a force of 785 N (80 kg-f, 177 lb-f) with the engine running for approximately 5 seconds, check for fluid leaks from each part of the brake hydraulic system.

BRAKE MASTER CYLINDER

On-Board Inspection

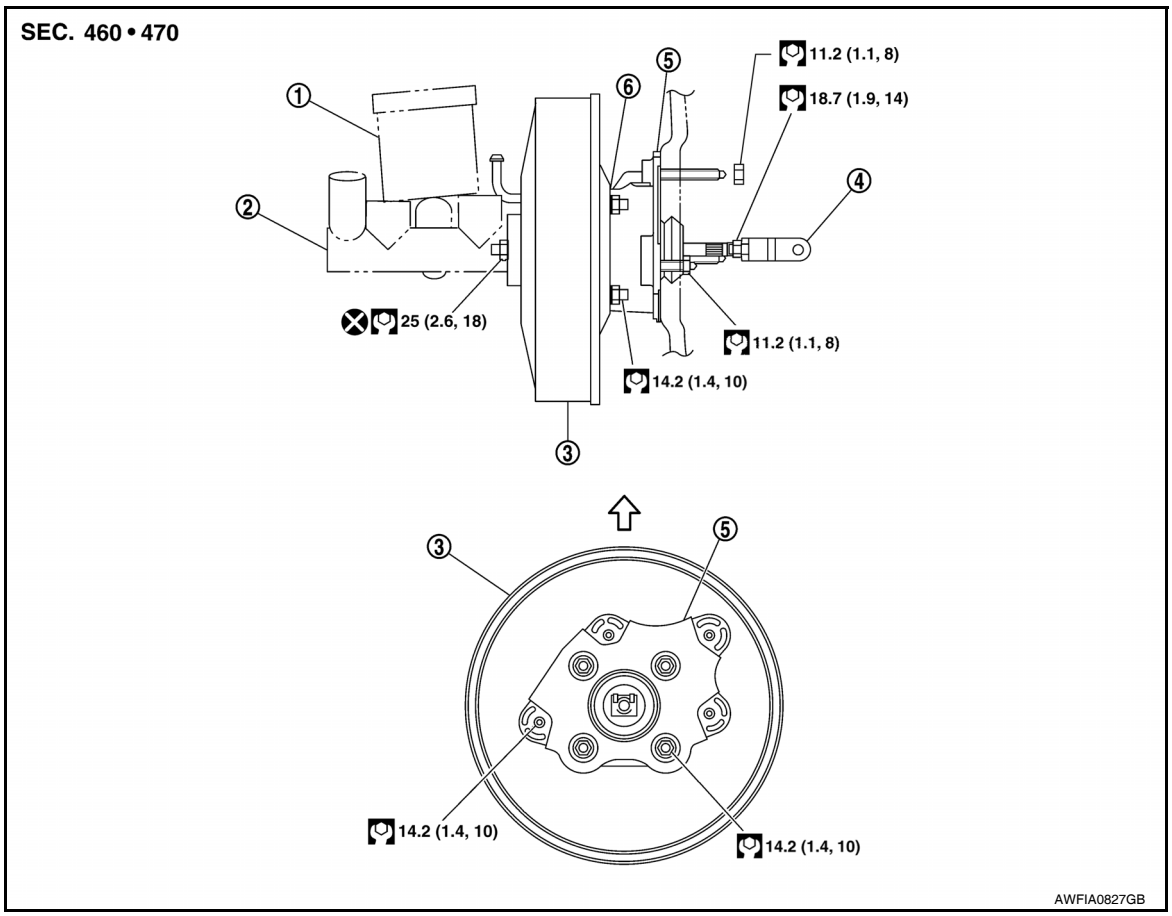
INFOID:0000000007328849

LEAK INSPECTION

- Check for leaks around the master cylinder installation surface, the reservoir tank installation surface, and all the brake tube connections.

Removal and Installation

INFOID:0000000007328850



1. Reservoir tank
2. Master cylinder
3. Brake booster
4. Clevis
5. Spacer
6. Gasket

⇦ Up

CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, immediately wipe them with cloth and wash it away with water.**
- **Do not reuse O-ring.**
- **Do not reuse master cylinder nuts.**

NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

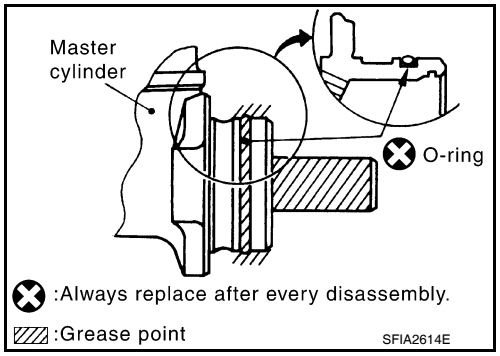
1. Drain the brake fluid. Refer to BR-9, "Drain and Refill".
2. Remove the battery. Refer to SC-7, "Removal and Installation".
3. Remove the air duct. Refer to EM-16, "Removal and Installation".
4. Remove the air cleaner. Refer to EM-16, "Removal and Installation".

5. Disconnect the brake fluid level switch harness connector.
6. Disconnect the clutch hose from the reservoir tank, if equipped.
7. Remove the brake tube from master cylinder using a suitable tool.
8. Remove the master cylinder assembly nuts, and remove master cylinder assembly.
9. Remove O-ring from master cylinder.

INSTALLATION

CAUTION:
- **Refill using recommended brake fluid. Refer to MA-13, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Check if the rod of primary piston has dust or scratches.**

1. Install O-ring to master cylinder.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply silicone grease for O-ring, primary piston rod and to inside of booster.**
2. Install master cylinder to brake booster assembly, and tighten nuts to the specified torque.
   CAUTION:
   - **Do not damage or strain rod of primary piston.**
   - **Do not reuse master cylinder nuts.**

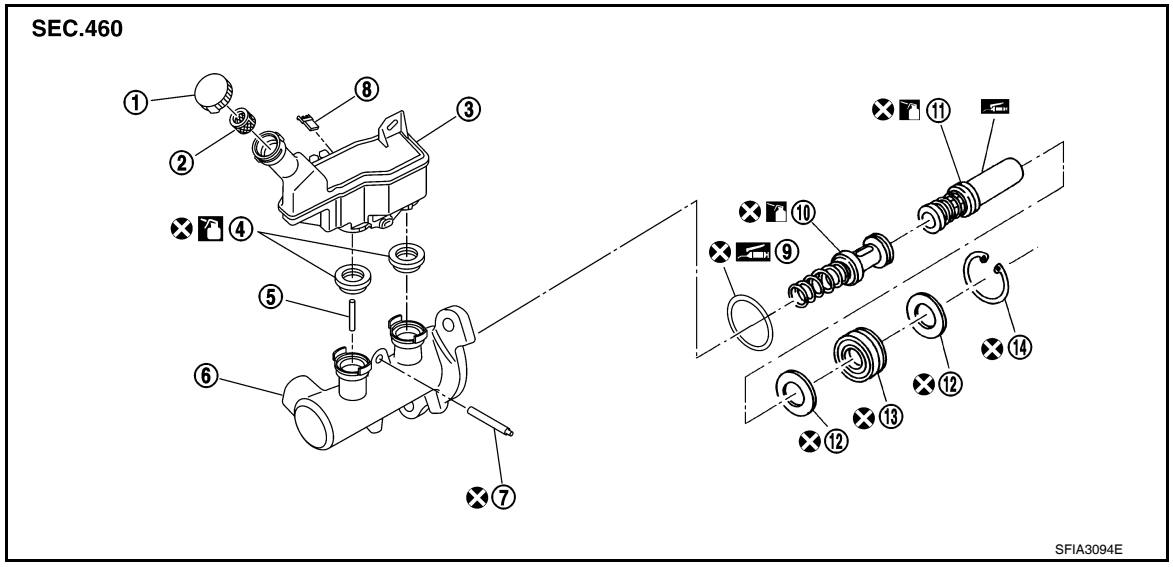


3. Install brake tubes to master cylinder, and temporarily tighten the flare nuts on the brake tube to master cylinder by hand.
4. Tighten brake tube flare nuts to the specified torque using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit".
5. Connect the clutch hose to the reservoir tank, if equipped.
6. Connect brake fluid level switch harness connector.
7. Install the air cleaner. Refer to EM-16, "Removal and Installation".
8. Install the air duct. Refer to EM-16, "Removal and Installation".
9. Install the battery. Refer to SC-7, "Removal and Installation".
10. Refill with new brake fluid and bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System".

Disassembly and Assembly

INFOID:0000000007328851

COMPONENTS



1. Reservoir cap
2. Oil filter
3. Reservoir tank
4. Grommet
5. Piston stopper
6. Cylinder body
7. Pin
8. Brake fluid level switch
9. O-ring
10. Secondary piston assembly
11. Primary piston assembly
12. Plate
13. Guide assembly
14. Snap ring

: Brake fluid

: PBC (Poly Butyl Cuprysil) grease or silicone-based grease

DISASSEMBLY

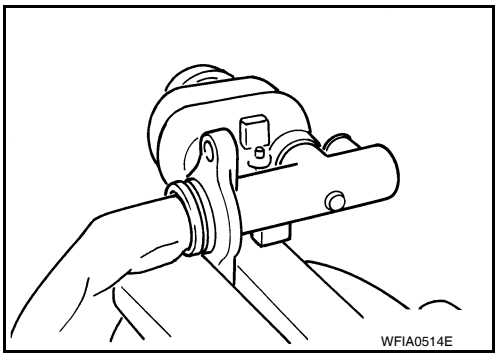
CAUTION:

While working, cover primary piston rod with cloth to prevent it from being damaged.

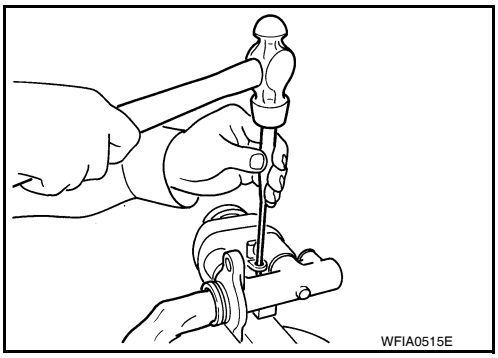
1. Secure flange of cylinder body in vise as shown.

CAUTION:

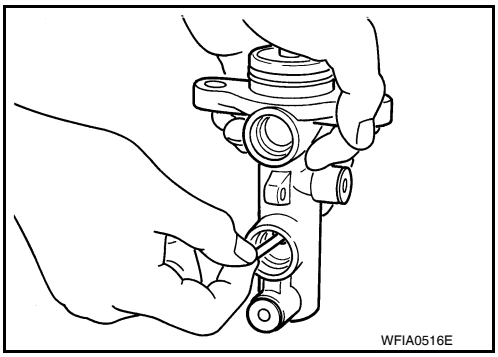
- **Use copper plate or cloth to cover flange when securing in vise.**
- **When securing master cylinder assembly in a vise, be sure not to over-tighten.**



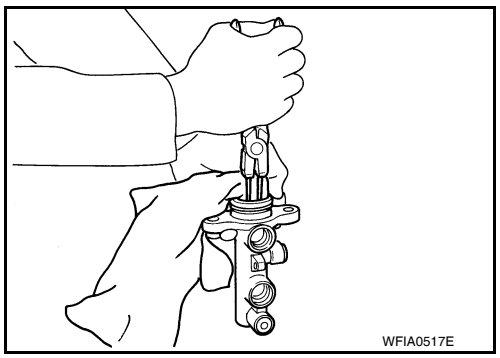
2. Using a pin-punch [commercial service tool: diameter approx. 4 mm (0.16 in)], remove pin from reservoir tank.
3. Remove master cylinder assembly from vise.
4. Remove reservoir tank and grommet from cylinder body.



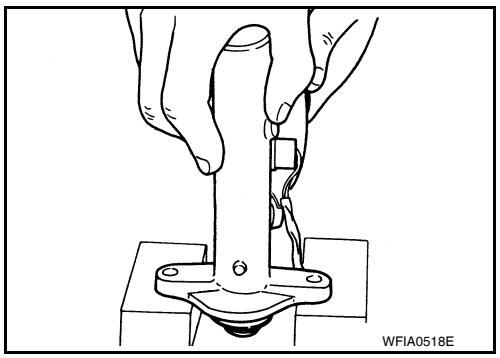
5. While pushing primary piston, remove piston stopper through secondary tank boss hole in the cylinder body.



6. Remove snap ring while pushing primary piston.
CAUTION:
Be careful not to pop out piston.
7. Holding rod of primary piston, remove primary piston assembly, plate and guide assembly by pulling straight to prevent piston cup from being caught by the inner wall of cylinder.
8. Remove plate and guide assembly from primary piston.
CAUTION:
Be careful not to damage rod from the inner wall of plate.


WFIA0517E

9. Tap flange using a soft block such as wood, and carefully pull secondary piston assembly straight out to prevent cylinder inner wall from being damaged.


WFIA0518E

INSPECTION AFTER DISASSEMBLY

Cylinder Body

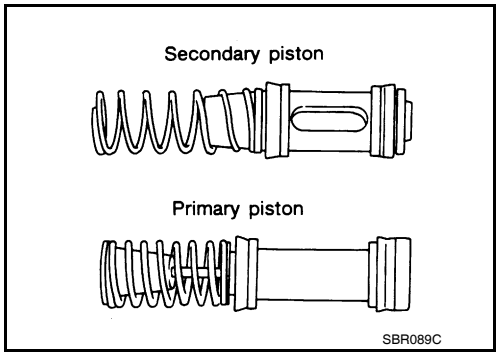
- Check the inner wall of cylinder for damage, wear, corrosion, and pin holes. Replace cylinder body if necessary.

ASSEMBLY

CAUTION:

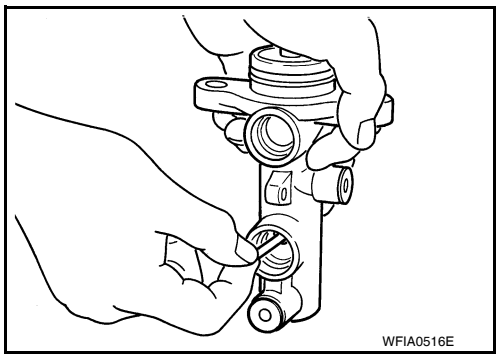
- **Never use mineral oils such as kerosene or gasoline during the cleaning and assembly processes.**
- **Make sure that there is no foreign material such as dirt and dust on the inner wall of cylinder, piston, and piston cup. Be careful not to damage parts with a service tool when assembling.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to the inner wall of cylinder body, primary piston assembly and secondary piston assembly.
2. Insert secondary piston and primary piston assembly into cylinder body in this order.
CAUTION:
  - **Pay attention to the orientation of piston cup, and insert straight to prevent cup from being caught by the inner wall of cylinder.**
  - **Always replace inner kit as a set.**

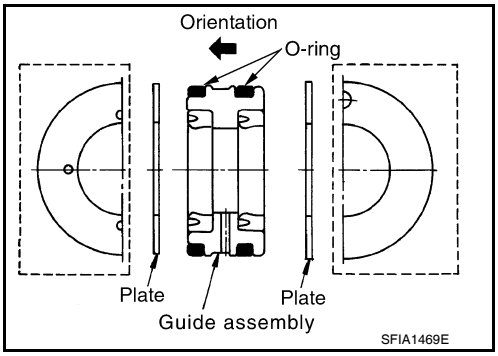


SBR089C

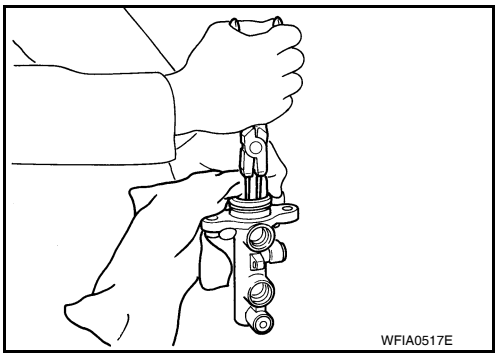
3. Set the slit of secondary piston towards the piston stopper mounting hole of cylinder body while pushing in the primary piston. Then install the piston stopper through the slit of secondary piston.


WFIA0516E

4. Insert plate and guide assembly into cylinder body.
CAUTION:
- **Be careful not to damage rod of primary piston.**
- **Pay attention to the orientation of guide assembly.**
- **Do not drop O-ring.**
- **Be careful the guide and/or plate are not inserted at an angle to cylinder inner wall.**

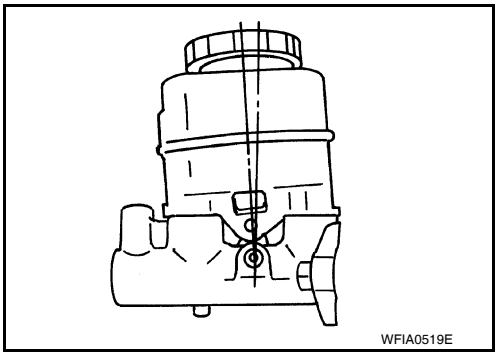


5. Be careful not to damage rod of primary piston with the cloth. Then insert snap ring to cylinder body while pushing primary piston.
CAUTION:
Make sure that snap ring is securely engaged in cylinder body inner diameter groove.

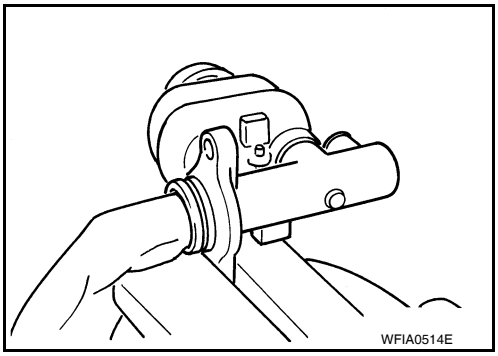


6. Apply brake fluid to a grommet, and press it into reservoir tank to install.

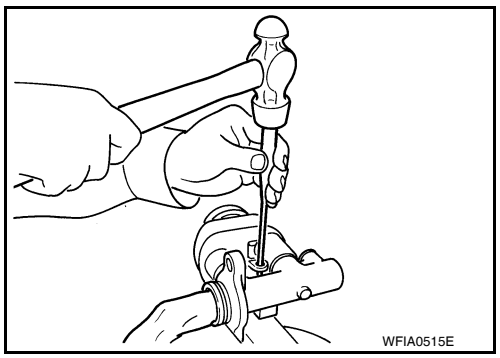
7. Install reservoir tank to cylinder body.
CAUTION:
Pay attention to the orientation of reservoir tank. Make sure reservoir tank is fully seated on master cylinder.



8. Secure flange of cylinder body in vise as shown.
CAUTION:
- **Use copper plate or cloth to cover flange for securing in the vise.**
- **When securing master cylinder assembly in a vise, be sure not to over-tighten.**
- **Be sure to secure the flange part with the brake tube installation side of cylinder body facing up (chamfered pin insert hole of cylinder body facing up).**



9. Using a pin punch [commercial service tool: diameter approx. 4 mm (0.16 in)], insert the reservoir tank pin into the pin hole.



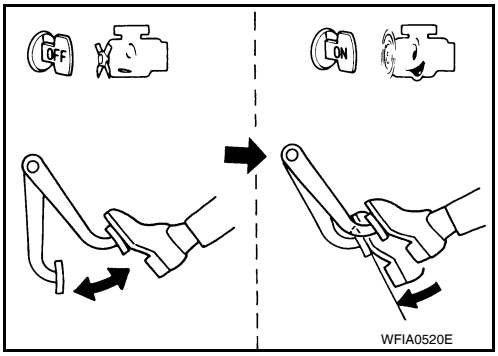
BRAKE BOOSTER

On Board Inspection

INFOID:0000000007328852

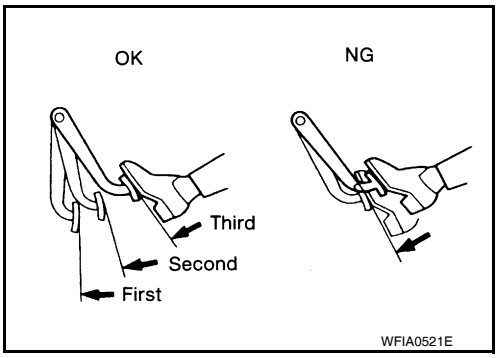
OPERATING CHECK

- With the engine stopped, change the vacuum to the atmospheric pressure by depressing brake pedal several times at intervals of 5 seconds.
- Then with brake pedal fully depressed, start engine and when the vacuum pressure reaches the standard, make sure that the clearance between brake pedal and floor panel decreases.



AIRTIGHT CHECK

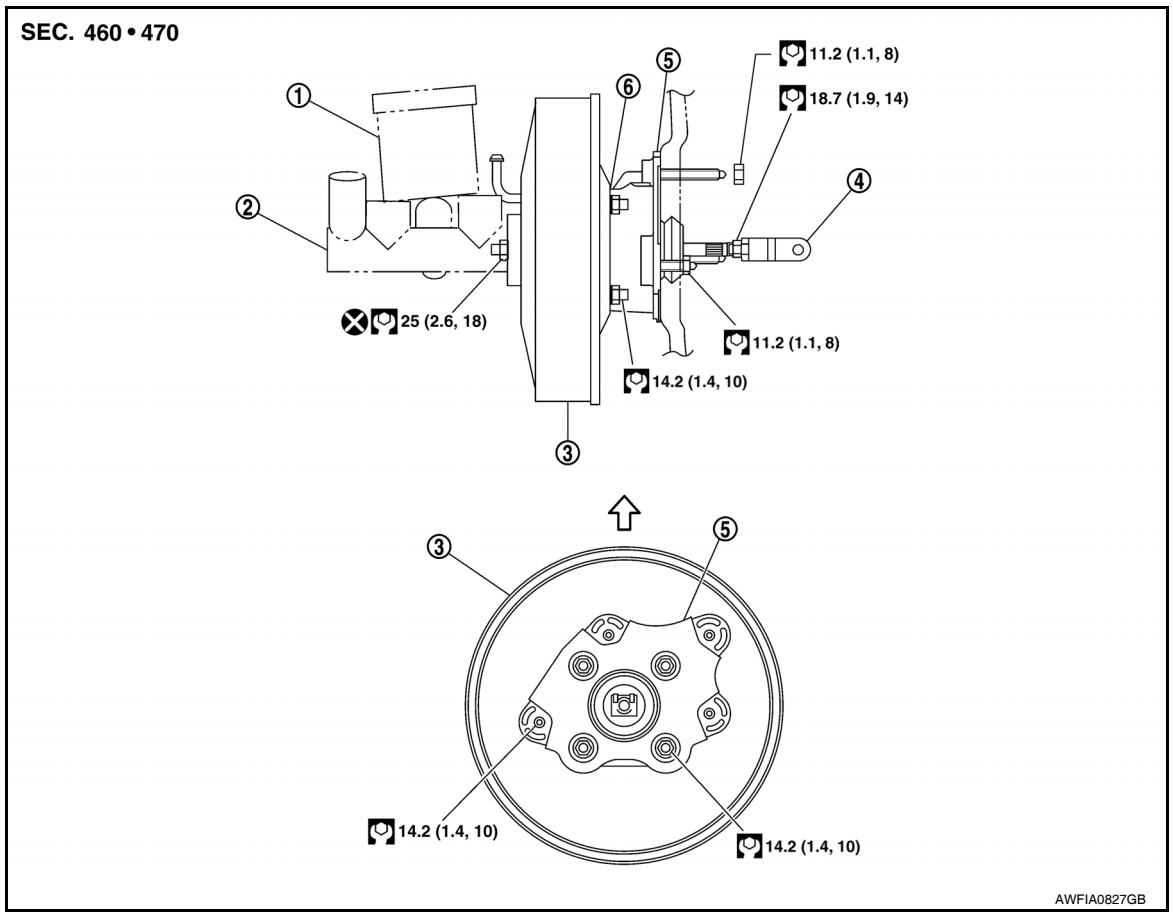
- Run engine at idle for approximately 1 minute, and stop it after applying vacuum to booster. Depress brake pedal normally to change the vacuum to the atmospheric pressure. Make sure that distance between brake pedal and floor panel gradually increases.



- Depress the brake pedal while engine is running, then stop engine with brake pedal depressed. The pedal stroke should not change after holding pedal down for 30 seconds.

Removal and Installation

INFOID:0000000007328853



1. Reservoir tank
2. Master cylinder
3. Brake booster
4. Clevis
5. Spacer
6. Gasket

⇦ Up

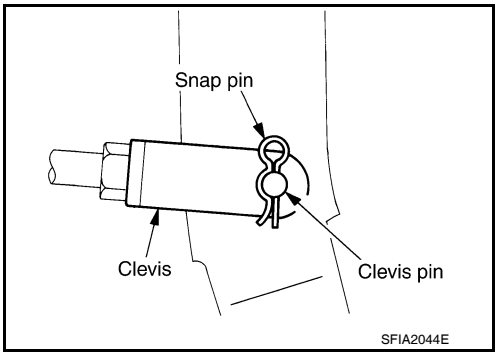
REMOVAL

CAUTION:

- **Be careful not to splash brake fluid on painted areas such as body. It may cause paint damage. If brake fluid is splashed on painted surfaces of body, wipe them with cloth immediately and then wash it away with water.**
- **Be careful not to deform or bend brake tubes while removing and installing brake booster.**
- **Replace clevis pin if it is damaged.**
- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted or inclined during installation, dash panel may damage the threads.**

1. Remove vacuum hose from brake booster.
2. Remove master cylinder assembly. Refer to BR-14, "Removal and Installation".
3. Remove the battery and battery tray. Refer to SC-7, "Removal and Installation".
4. Remove the instrument lower panel LH. Refer to IP-11, "Component Parts".

5. Remove snap pin and clevis pin on the clevis of the brake booster, and disconnect the input rod from the brake pedal.

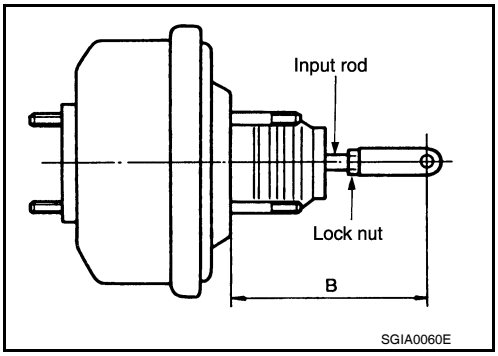


6. Remove brake pedal nuts on pedal bracket.
7. Remove the cowl top. Refer to EI-22, "Removal and Installation".
8. Remove between spacer and dash panel nut from dash panel.
9. Remove brake booster and spacer.
10. Remove spacer and gasket from brake booster.

INSTALLATION

1. Loosen lock nut to adjust input rod length (B) to the specified value.

Input rod length (B) : Refer to BR-39, "Brake Booster".

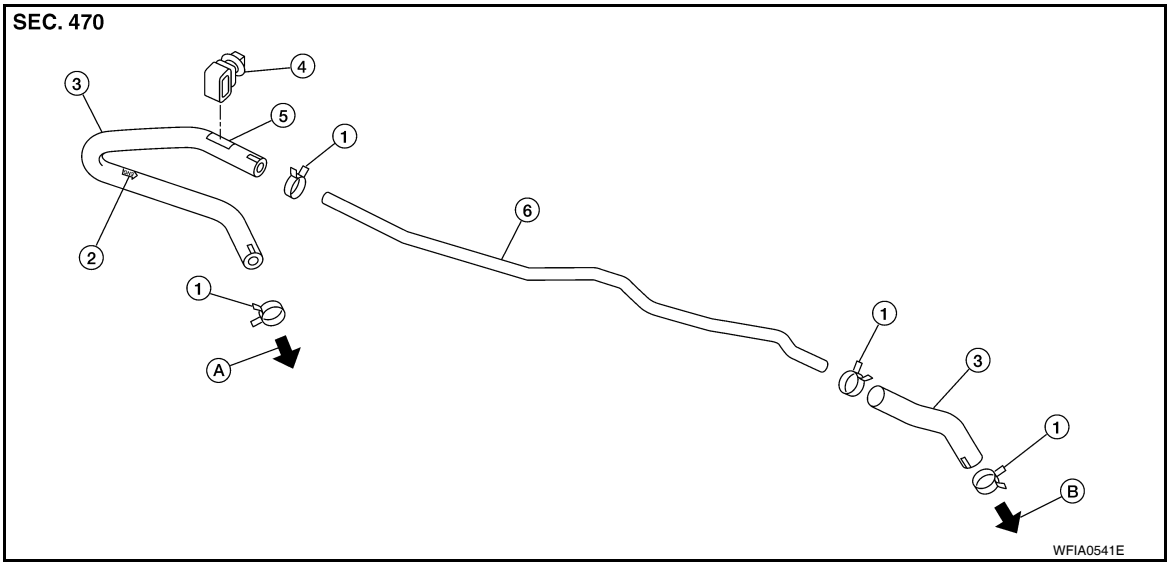


2. Install spacer and gasket to brake booster and tighten spacer nut (brake booster side) to the specified torque.
   CAUTION:
   Be sure to install the gasket between brake booster and dash panel.
3. After adjusting length (B), temporarily tighten lock nut to install brake booster assembly to dash panel.
4. Connect brake pedal to clevis of input rod with the clevis pin and snap pin.
5. Install brake pedal bracket nuts and tighten them to the specified torque.
6. Install master cylinder assembly. Refer to BR-14, "Removal and Installation".
7. Install the battery tray and battery. Refer to SC-7, "Removal and Installation".
8. Adjust the height and play of brake pedal. Refer to BR-6, "Inspection and Adjustment".
9. Tighten lock nut of input rod to the specified torque.
10. Install vacuum hose into brake booster. Refer to BR-23, "Removal and Installation".
11. Install cowl top. Refer to EI-22, "Removal and Installation".
12. Install instrument lower panel LH. Refer to IP-11, "Component Parts".
13. Bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System".

VACUUM LINES

Component

INFOID:0000000007328854



1. Hose clamp	2. Engine side indicator stamp (for built-in check valve orientation)	3. Vacuum hose
4. Clip	5. Clip position stamp	6. Vacuum tube
A. To intake manifold	B. To brake booster	

Removal and Installation

INFOID:0000000007328855

REMOVAL

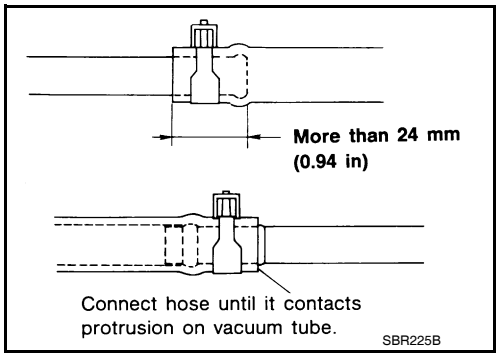
1. Remove the air intake duct. Refer to EM-16, "Removal and Installation".
2. Disconnect the vacuum hose from the intake manifold.
3. Disconnect the vacuum hose from the brake booster.
4. Disconnect the vacuum hose from the clip and remove the vacuum hose and vacuum tube assembly.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Because the vacuum hose at the intake manifold contains a built-in check valve, it must be installed in the correct orientation. Refer to the stamp or label to confirm correct installation orientation. Brake booster will not operate normally if hose is installed in the reverse orientation.**
- **Insert vacuum hose at least 24 mm (0.94 in) on to the vacuum tube and vacuum fittings on the brake booster and intake manifold as shown.**
- **Never use lubricating oil during assembly.**



Inspection

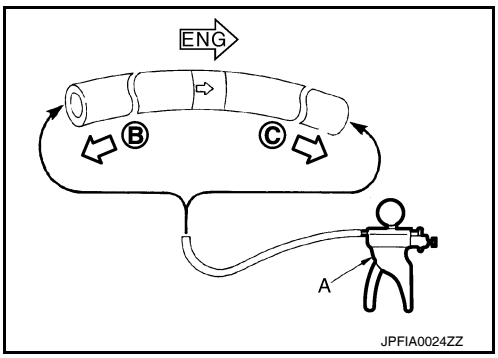
INFOID:0000000007328856

VISUAL INSPECTION

Check for improper installation, damage and deterioration. Replace parts as necessary.

CHECK VALVE INSPECTION

Use a suitable tool (A) to check the built-in check valve.
Replace the vacuum hose with the built-in check valve as an assembly if the vacuum hose is out of specifications.



When connected to booster side (B) : **Refer to** **BR-39, "Check Valve".**

When connected to engine side (C) : **Refer to** **BR-39, "Check Valve".**

FRONT DISC BRAKE

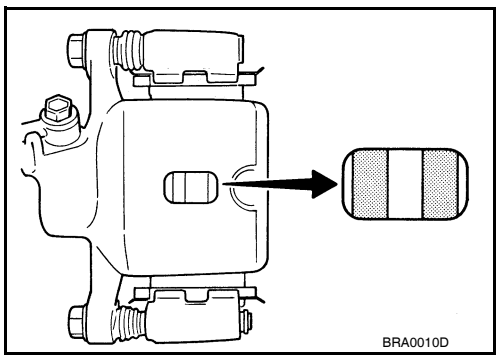
On Board Inspection

INFOID:0000000007328857

PAD WEAR INSPECTION

- Check pad thickness from check hole on cylinder body.

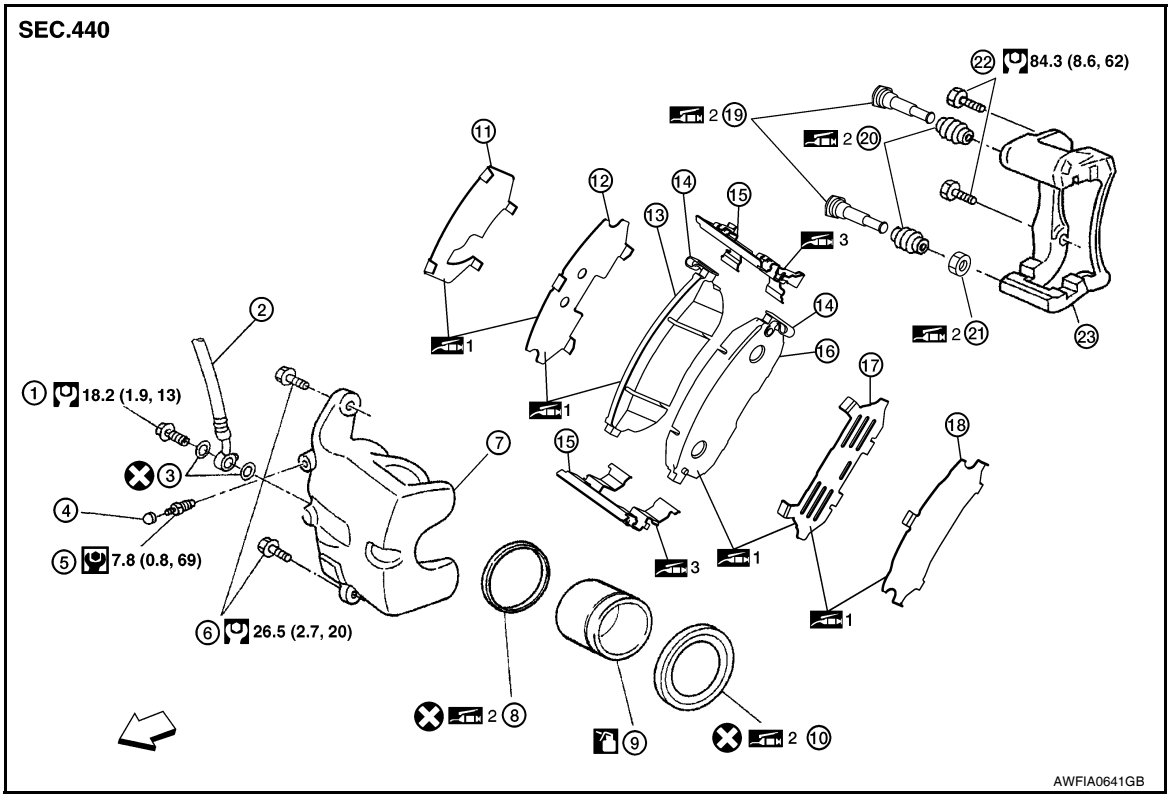
Standard thickness	**: Refer to BR-39, "Front Disc Brake".**
Repair limit thickness	**: Refer to BR-39, "Front Disc Brake".**



Component

INFOID:0000000007328858

CLZ25VF



1. Union bolt	2. Brake hose	3. Copper sealing washer
4. Cap	5. Bleed valve	6. Sliding pin bolt
7. Cylinder body	8. Piston seal	9. Piston
10. Piston boot	11. Inner shim cover	12. Inner shim
13. Inner pad	14. Pad wear sensor	15. Pad retainer
16. Outer pad	17. Outer shim	18. Outer shim cover
19. Sliding pin	20. Sliding pin boot	21. Bushing
22. Torque member bolt	23. Torque member	⇦ Front
: Brake fluid	1:Molykote AS-880N grease	2: Rubber grease
3: Molykote 7439 grease		

CAUTION:
- **Clean dust on caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.**
- **While removing brake pad or cylinder body, do not depress brake pedal because piston will pop out.**
- **It is not necessary to remove torque member mounting bolts and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so that brake hose is not under tension.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Keep rotor free from brake fluid.**
- **When replacing brake pad, replace shim with a new one.**
- **Burnish the brake pads and disc rotor mutually contacting surfaces, after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-32, "Brake Burnishing Procedure".**

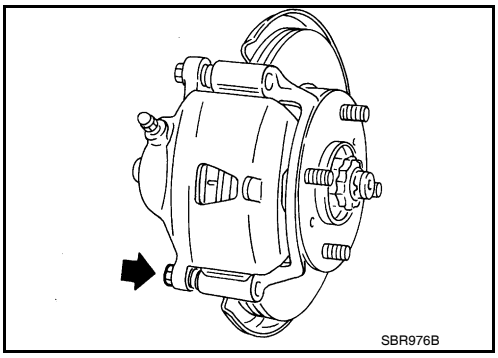
Removal and Installation of Brake Pad

INFOID:0000000007328859

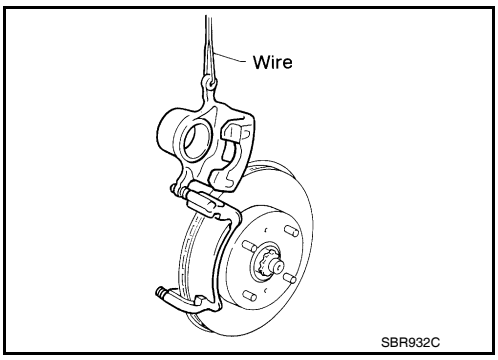
CLZ25VF

Removal

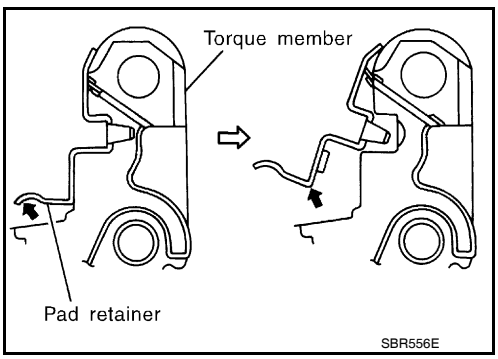
1. Partially drain brake fluid from reservoir. refer to BR-9, "Drain and Refill".
2. Remove the front wheel and tire using power tool.
3. Remove sliding pin bolt (lower side).



4. Hang cylinder body with a wire, and remove pads, shims and pad retainers from torque member.

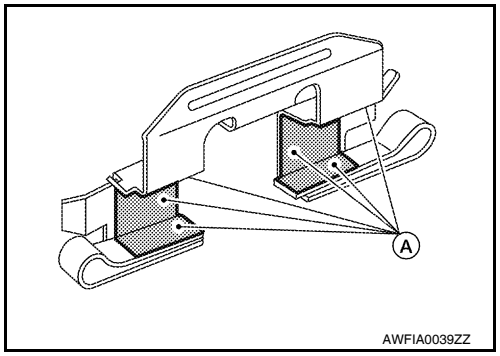


CAUTION:
When removing pad retainer from torque member, lift pad retainer in the direction shown by arrow, so as not to deform it.

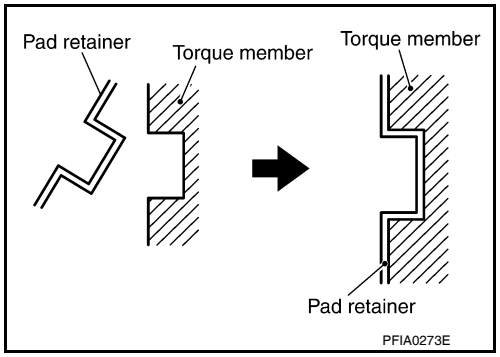


Installation

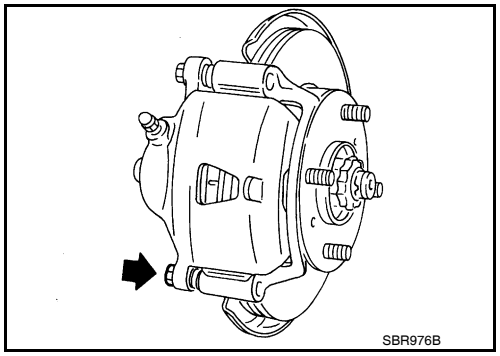
1. Apply Molykote AS-880N grease to the shims. Install shims to pads.
CAUTION:
Securely install shims according to mounting direction of pads.
2. Apply Molykote 7439 grease as shown (A).



3. Install pad retainers, shims, shim covers and pads to the torque member.
CAUTION:
When installing pad retainer, attach it firmly so that it is not lifted up from torque member, as shown.



4. Install cylinder body over the pads and shims on to torque member and apply rubber grease, then install lower sliding pin bolt (lower side) and tighten it to the specified torque. Refer to BR-25, "Component".
CAUTION:
Check the brake fluid level in the reservoir tank for fluid level because brake fluid returns to master cylinder reservoir tank when pressing piston in.
NOTE:
Use a disc brake piston tool (commercial service tool) to easily press to piston in.



5. Check brake for drag.
6. Install the front wheel and tire. Refer to WT-7, "Adjustment".
7. Check brake fluid level. Refer to BR-9, "On Board Inspection".

Removal and Installation of Brake Caliper Assembly

INFOID:0000000007328860

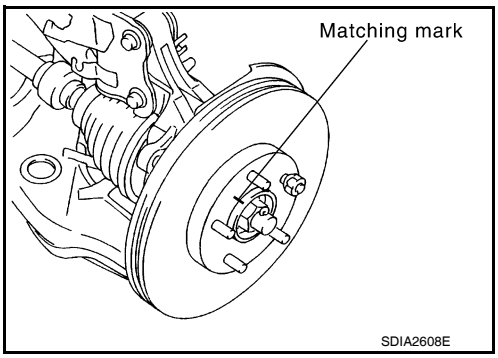
WARNING:
Clean dust on caliper and brake pads with a vacuum dust collector to minimize the hazard of air borne particles or other materials.
CAUTION:
- **While removing caliper, do not depress the brake pedal because the piston will pop out.**
- **Do not damage piston boot.**
- **Keep disc rotor free from brake fluid.**
- **Refill the brake reservoir with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

- **Burnish the brake pads and disc rotor mutually contacting surfaces, after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-32, "Brake Burnishing Procedure".**

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

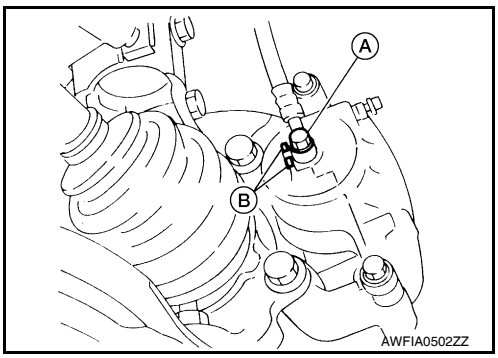
REMOVAL

1. Remove front wheel and tire.
2. Secure the disc rotor using wheel nuts.
   CAUTION:
   Put matching marks on wheel hub assembly and disc rotor, if it is necessary to remove the disc rotor.

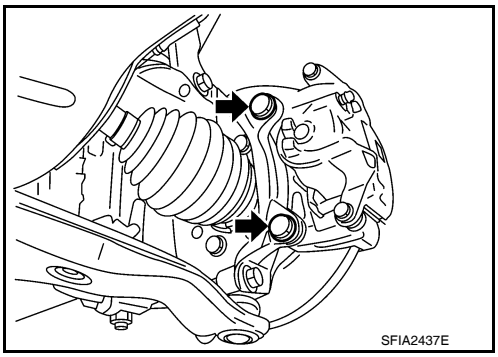


3. Drain brake fluid. Refer to BR-9, "Drain and Refill".
4. Remove the union bolt (A) and discard the copper sealing washers. Remove the brake hose from the cylinder body.
   - Protrusions (B)

   CAUTION:
   Do not reuse copper sealing washers

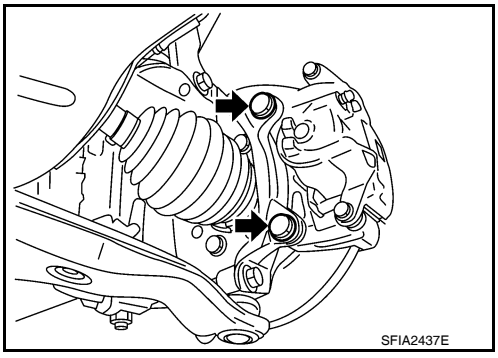


5. Remove the torque member bolts and remove the cylinder body and torque member as an assembly.

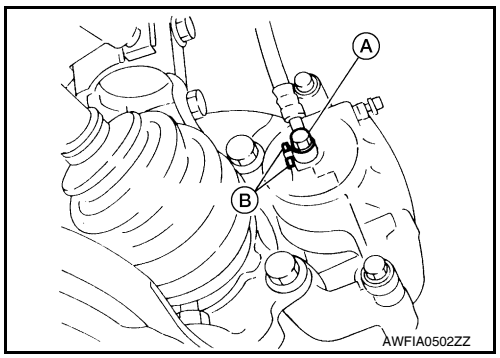


INSTALLATION

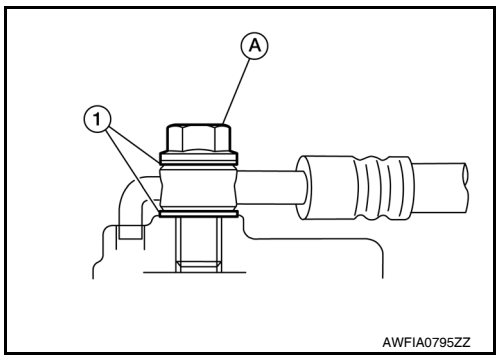
1. Install the torque member and cylinder body as an assembly and tighten the torque member bolts to the specified torque. Refer to BR-25, "Component".
   CAUTION:
   Before installing torque member to vehicle, wipe oil and grease on mounting surface of steering knuckle and torque member.



2. Install the brake hose to caliper assembly with new copper sealing washers. Align the brake hose tab between the protrusions (B) on the cylinder body as shown. Tighten the union bolt (A) to the specified torque. Refer to BR-11, "Hydraulic Circuit".



CAUTION:
- **Do not reuse copper sealing washers (1).**
- **Union bolt (A).**



3. Refill with new brake fluid and bleed air. Refer to BR-9, "Bleeding Brake System".
4. Check front disc brake for drag.
5. Install front wheel and tire. Refer to WT-7, "Adjustment".

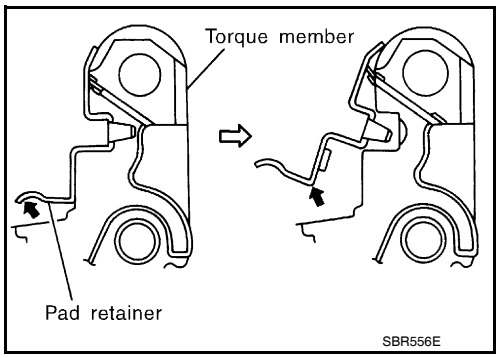
Disassembly and Assembly of Brake Caliper Assembly

INFOID:0000000007328861

DISASSEMBLY

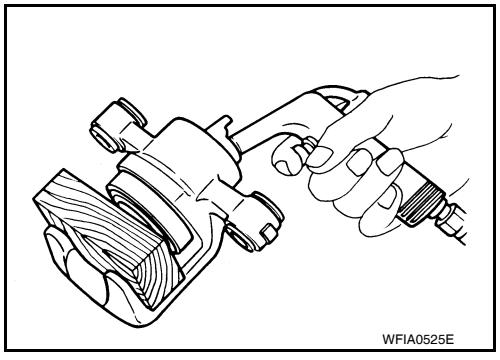
1. Remove the caliper assembly. Refer to BR-27, "Removal and Installation of Brake Caliper Assembly".
2. Remove sliding pin bolts and remove cylinder body from the torque member. Remove pads, shims, and pad retainers from torque member as necessary.

CAUTION:
When removing pad retainer from torque member, lift the pad retainer in the direction shown by arrow, so as not to deform it.

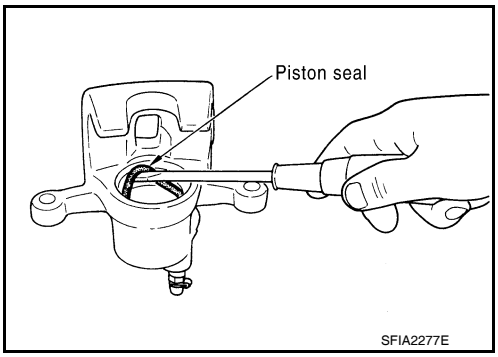


3. Remove sliding pins and sliding pin boots from torque member.
4. Place a wooden block as shown, and blow air from union bolt mounting hole to remove piston and piston boot.

WARNING:
Do not get fingers caught between the piston and wooden block.



5. Remove piston seal with a suitable tool.
   CAUTION:
   - **Be careful not to damage the inner wall of cylinder.**
   - **Do not reuse the piston seal.**



INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of cylinder for corrosion, wear, and damage. Replace cylinder body as necessary.

CAUTION:

Clean cylinder body using new brake fluid. Never use mineral oils such as gasoline or kerosene.

Torque Member

Check for wear, cracks, and damage. Replace torque member as necessary.

Piston

Check piston surface for corrosion, wear, and damage. Replace piston as necessary.

CAUTION:

The piston sliding surface is plated. Do not polish with sandpaper.

Sliding Pin, Sliding Pin Bolt, and Sliding Pin Boot

Check sliding pins, sliding pin bolts and sliding pin boots for wear, damage, and cracks. Replace applicable part as necessary.

DISC ROTOR INSPECTION

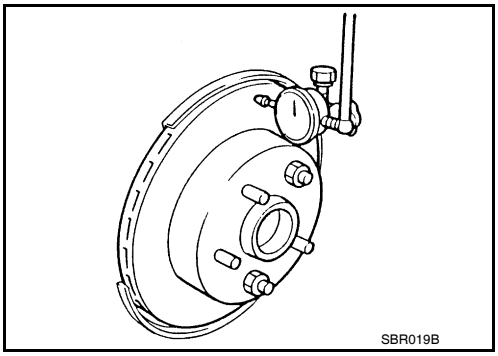
Visual Inspection

Check surfaces of disc rotor for uneven wear, cracks, and serious damage. Replace as necessary.

Runout Inspection

1. Using wheel nuts, secure disc rotor to wheels hub at two or more positions.
2. Using a dial indicator, check runout.
   CAUTION:
   Make sure that wheel bearing axial end play is within the specifications before measuring runout. Refer to FAX-6, "On-Vehicle Inspection and Service".

   Runout limit [measured at 10.0 mm (0.394 in) inside the disc edge] : **Refer to BR-39, "Front Disc Brake".**



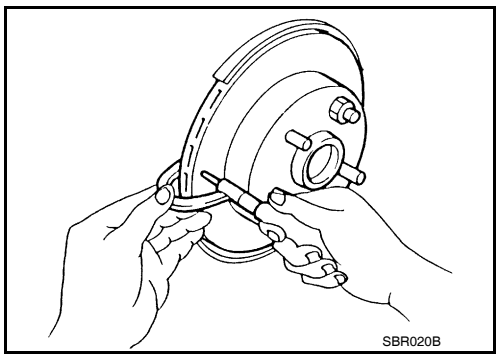
3. If runout is outside the limit, find the minimum runout point by shifting the mounting positions of disc rotor and wheel hub by one hole.
4. If runout is still out of the specification, grind rotor on-car using Tool until runout is within the specified limit.

   Tool number : 38-PFM90.5 (—)

Thickness Inspection

Using a micrometer, check thickness of disc rotor. If thickness is outside the specifications, replace disc rotor.

Standard thickness (new)	**: Refer to BR-39, "Front Disc Brake".**
Repair limit thickness	**: Refer to BR-39, "Front Disc Brake".**
Maximum uneven wear (measured at 8 positions)	**: Refer to BR-39, "Front Disc Brake".**

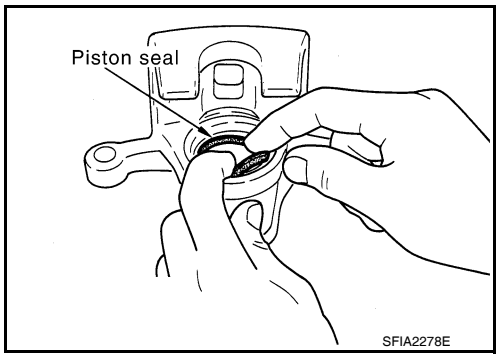


ASSEMBLY

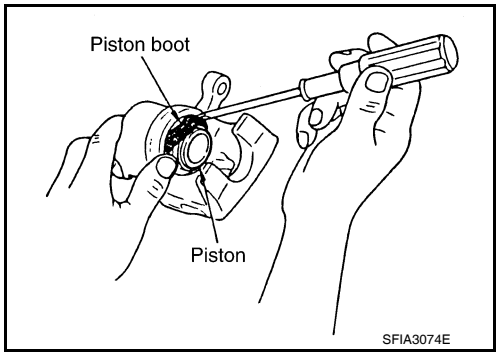
CAUTION:

Use rubber grease during assembly.

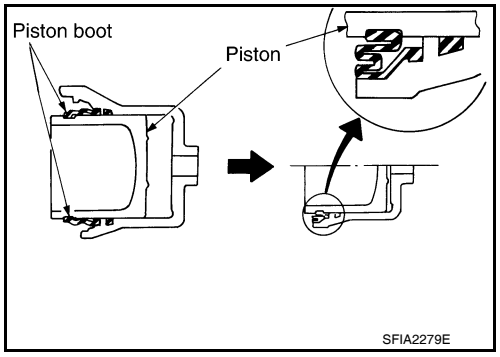
1. Apply rubber grease to new piston seal and install on cylinder body.
   CAUTION:
   Do not reuse the piston seal.



2. Apply rubber grease to piston boot and apply brake fluid to piston. Cover the piston end with piston boot, and install cylinder-side lip on piston boot properly into groove on cylinder body.



3. Press piston into cylinder body by hand to assemble piston-side lip on piston boot properly into a groove on piston.
   CAUTION:
   Press piston evenly and change pressing point to prevent inner wall of cylinder from being rubbed.
4. Install sliding pins and sliding pin boots to the torque member.



5. Install pads, shims, shim covers and pad retainers to the torque member. Refer to BR-26, "Removal and Installation of Brake Pad".
6. Install cylinder body to torque member.
7. Tighten sliding pin bolts to specified torque. Refer to BR-25, "Component".
8. Install the caliper assembly. Refer to BR-27, "Removal and Installation of Brake Caliper Assembly".

Brake Burnishing Procedure

INFOID:0000000007328862

Burnish the new braking surfaces according to following procedure after refinishing or replacing disc rotors, pads, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

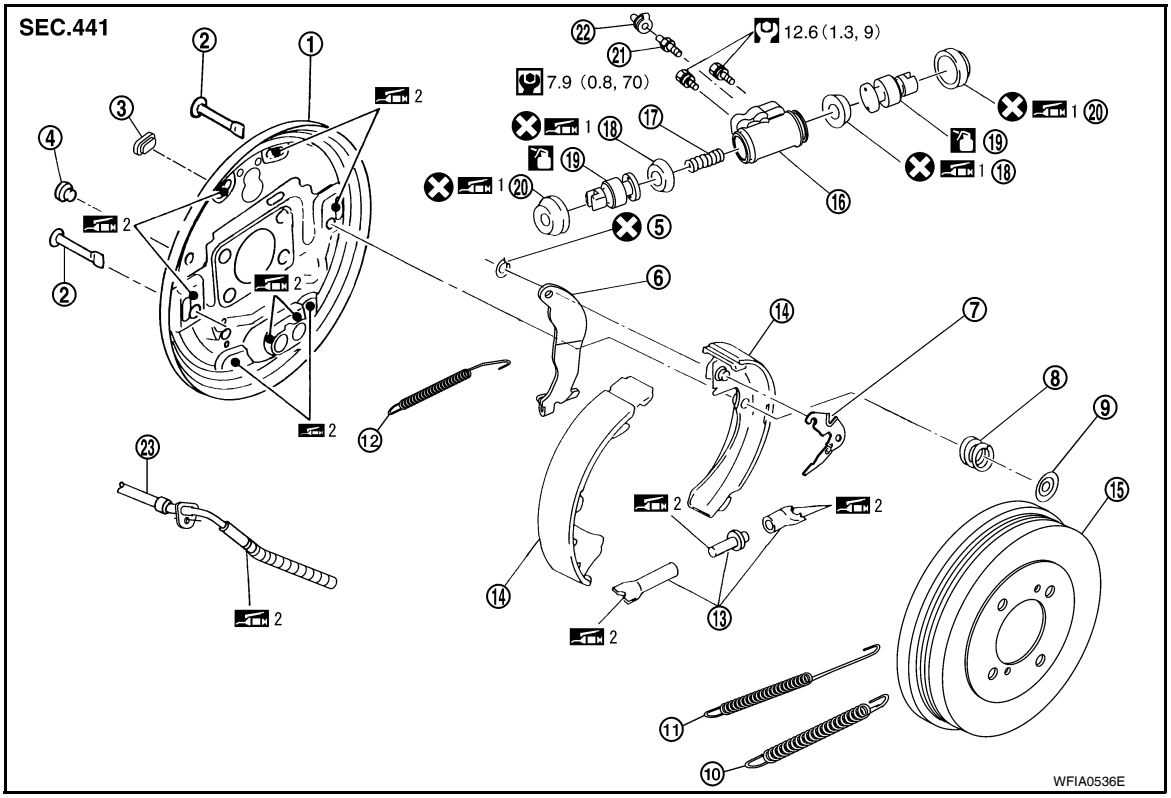
1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake pedal for a few minutes to cool brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

REAR DRUM BRAKE

Component

INFOID:0000000007328863

LT23



1. Back plate	2. Shoe hold pin	3. Plug
4. Plug	5. Retainer ring	6. Operating lever
7. Adjuster lever	8. Spring	9. Retainer
10. Return spring (lower side)	11. Return spring (upper side)	12. Adjuster spring
13. Adjuster	14. Brake shoe	15. Brake drum
16. Wheel cylinder	17. Spring	18. Piston seal
19. Piston	20. Boot	21. Bleed valve
22. Cap	23. Parking brake rear cable	: Brake fluid
1: Rubber grease	2: PBC (Poly Butyl Cuprysil) grease or silicone-based grease	

WARNING:
Clean dust on drum and back plate with a vacuum dust collector to minimize the hazard of air borne particles or other materials.
CAUTION:
Make sure parking brake lever is released completely.

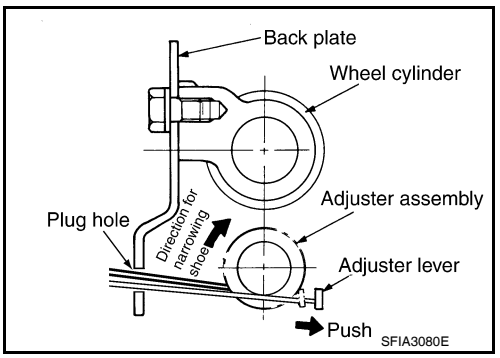
Removal and Installation of Drum Brake Assembly

INFOID:0000000007328864

REMOVAL

1. Remove rear wheel and tire using power tool.
2. With the parking brake lever released, remove the brake drum. If it is difficult to remove the brake drum, remove as follows:

a. Press up adjuster lever using suitable tool from plug hole (plug hole at the side of wheel cylinder) on the back plate as shown. Turn frame of adjuster assembly with a suitable tool in the direction that reduces brake shoe adjustment.

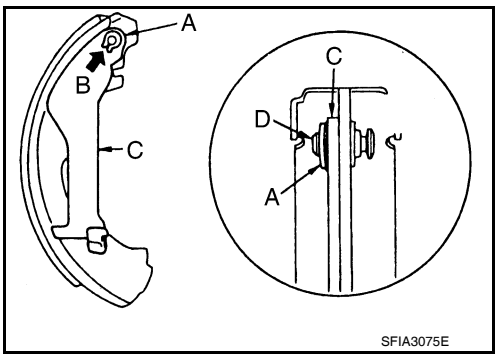


3. While pushing and rotating the retainer, pull out shoe hold pin, and remove shoe assembly.
CAUTION:
Do not damage the wheel cylinder boot.

4. Remove the parking brake rear cable from the operating lever.
CAUTION:
Do not bend the parking brake cable.

5. Disassemble the shoe assembly (shoe, springs, adjuster, adjuster lever).

6. Remove retainer ring (A) with a tool to separate operating lever (C) from brake shoe.
- Retainer ring (A)
- Contact point (B)
- Operating lever (C)
- Pin (D)

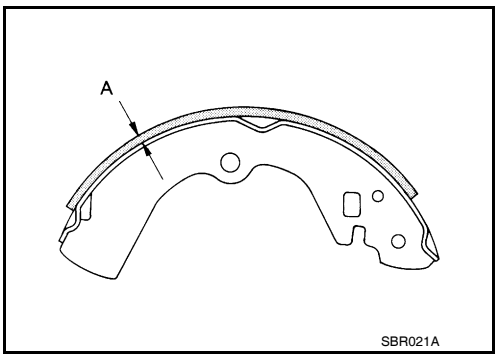


INSPECTION AFTER REMOVAL

Lining Thickness Inspection
Check lining thickness.

Standard thickness (A) (new) : Refer to BR-39, "Rear Drum Brake".

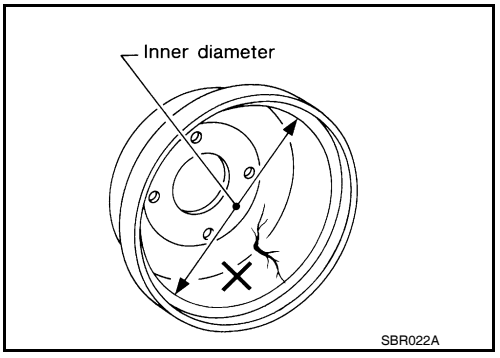
Repair limit thickness (A) : Refer to BR-39, "Rear Drum Brake".



Drum Inner Diameter Inspection
Check inner diameter of brake drum.
Measurement area: lining contact surface (center)

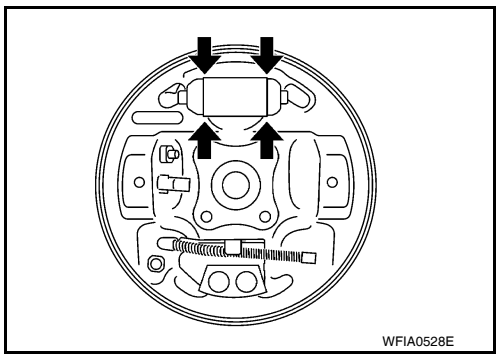
Standard inner diameter : Refer to BR-39, "Rear Drum Brake".

Repair limit inner diameter : Refer to BR-39, "Rear Drum Brake".



Wheel Cylinder Leakage Inspection

- Check wheel cylinder for brake fluid leakage.
- Check for wear, damage, and looseness. If any non-standard condition is found, replace it.



Other Inspections

Check the following:

- Inside of the drum for excessive wear, damage, and cracks.
- Lining for excessive wear, damage, and peeling.
- Shoe sliding surface for excessive wear and damage.
- Return spring for sagging.
- Check back plate for damage, cracks, and deformation. Replace back plate as necessary.

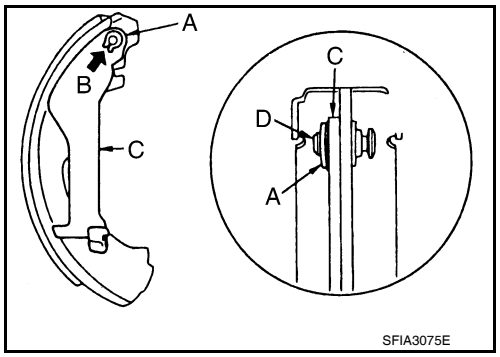
Replace applicable part as necessary.

INSTALLATION

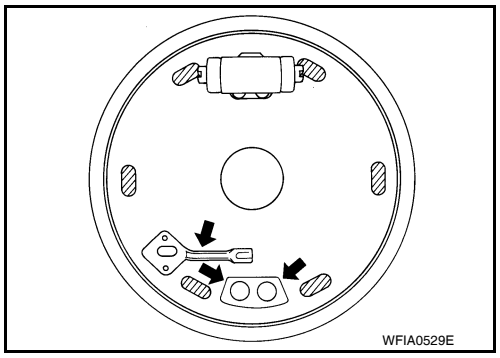
1. Install operating lever (C) if removed, using the following steps.

a. Install operating lever (C) to brake shoe.

b. Install retainer ring (A) to operating lever (C), and crimp them until their contact points (B) are met.
   - Retainer ring (A)
   - Contact point (B)
   - Operating lever (C)
   - Pin (D)

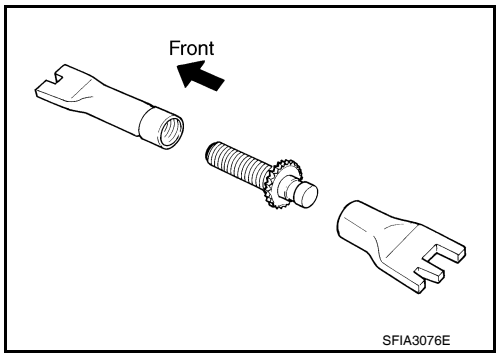


2. Apply PBC (Poly Butyl Cuprysil) grease or silicone based grease to brake shoes sliding surfaces (the shaded areas) and other parts on the back plate as indicated by arrows.



3. Apply PBC (Poly Butyl Cuprysil) grease or silicone based grease to screw and confirm the difference between right and left wheel for assembling when disassembled.

Right rear wheel	**Thread cutting direction**	**: Right-hand screw**
Left rear wheel	**Thread cutting direction**	**: Left-hand screw**



4. Assemble the shoe, adjuster, adjuster lever and springs to the shoe assembly.

5. Connect the parking brake rear cable to the operating lever.
6. Install the shoe assembly. After assembly, be sure that each part is installed properly.
   CAUTION:
   Do not damage the wheel cylinder piston boot.
7. Install the brake drum.
8. Depress brake pedal for several times (approximately 2 or 3 times).
9. Adjust clearance of brake shoe. Refer to PB-5, "On-Vehicle Service".
10. Install rear wheel and tire. Refer to WT-7, "Adjustment".

Removal and Installation of Wheel Cylinder

INFOID:0000000007328865

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Drain the brake fluid. Refer to BR-9, "Drain and Refill".
2. Remove the rear brake shoe assembly. Refer to BR-33, "Removal and Installation of Drum Brake Assembly".
3. Remove the bleed valve.
4. Disconnect the brake tube from the wheel cylinder.
5. Remove the wheel cylinder bolts and then remove the wheel cylinder from the back plate.

INSTALLATION

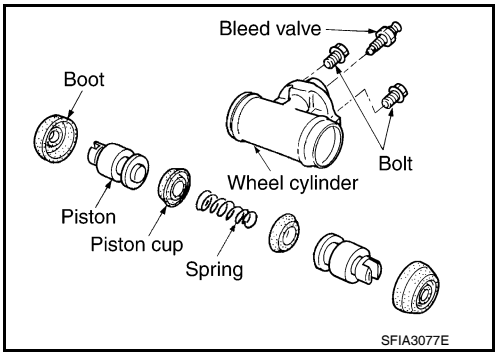
Installation is in the reverse order of removal.
- Tighten bolts and bleed valve to the specified torque. Refer to BR-33, "Component".
- Refill with new brake fluid and bleed the air. Refer to BR-9, "Bleeding Brake System".

Disassembly and Assembly of Wheel Cylinder

INFOID:0000000007328866

DISASSEMBLY

1. Remove boots at the right and left of the wheel cylinder, and pull the pistons and spring out of the cylinder.
2. Remove the piston cups from the pistons.



INSPECTION AFTER DISASSEMBLY

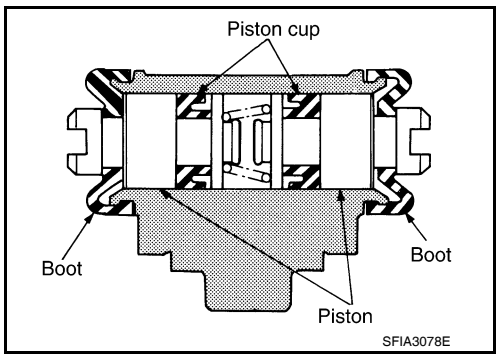
Check the pistons, spring and inner wall of the cylinder for wear, corrosion, and damage. Replace any parts as necessary.

ASSEMBLY

CAUTION:
When inserting the piston, be careful not to scratch the cylinder.

1. Apply brake fluid to the piston sliding surface on the wheel cylinder.

2. Apply rubber grease to the piston cups and boots and assemble the wheel cylinder as shown.



SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007328867

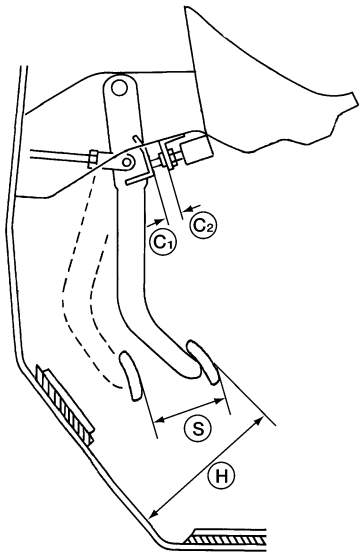
MR18DE

Front brake	Brake model	CLZ25VF
	Cylinder bore diameter	57.2 mm (2.252 in)
	Pad Length × width × thickness	125.6 mm × 48.0 mm × 9.5 mm (4.945 in × 1.890 in × 0.374 in)
	Rotor outer diameter × thickness	280 mm × 24.0 mm (11.02 in × 0.945 in)
Rear brake	Brake model	LT23
	Cylinder bore diameter	19.06 mm (0.750 in)
	Drum inner diameter	228.6 mm (9.000 in)
Master cylinder	Cylinder bore diameter	23.81 ± 0.015 mm (0.937 ± 0.001 in)
Brake booster	Booster model	C255
	Diaphragm diameter	255 mm (10.04 in)
Recommended brake fluid		Refer to MA-13, "Fluids and Lubricants".

Brake Pedal

INFOID:0000000007328868

Unit: mm (in)



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Brake pedal free height (H) (from dash panel top surface)	A/T, CVT model	172.4 +10/-0 (6.78 +0.39/-0)
	M/T model	162.3 +10/-0 (6.39 +0.39/-0)
Brake pedal full stroke (S)		133 (5.24)
Clearance between the pedal stopper and threaded end of stop lamp switch (C_1) and ASCD cancel switch (C_2), if equipped		0.74 - 1.96 (0.0291 - 0.0772)

Check Valve

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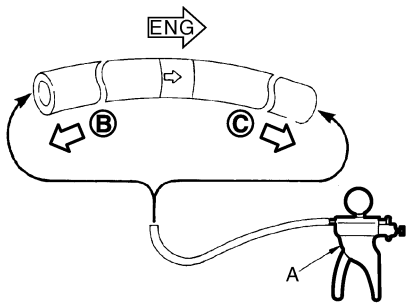
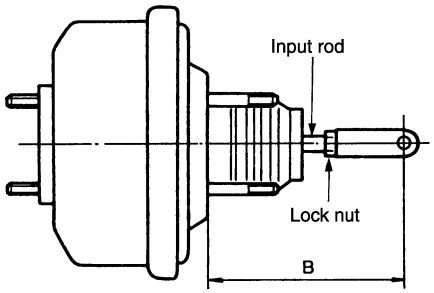


JPFIA0024ZZ

When suitable tool (A) is connected to booster side (B)	Within 1.3 kPa (10 mmHg, 0.39 inHg) of vacuum for 15 seconds [at vacuum of – 66.7 kPa (– 500 mmHg, – 19.69 inHg]
When suitable tool (A) is connected to engine side (C)	No vacuum will be applied

Brake Booster

INFOID:0000000007328870



SGIA0060E

Input rod installation standard dimension (B)	159 ± 0.95 mm (6.26 ± 0.037 in)
Vacuum leakage [at vacuum of – 66.7 kPa (– 500 mmHg, –19.69 inHg)]	Within 3.3 kPa (25 mmHg, 0.98 inHg) of vacuum for 15 seconds

Front Disc Brake

INFOID:0000000007328871

Unit: mm (in)

Brake model		CLZ25VF
Brake pad	Standard thickness (new)	9.5 (0.374)
	Minimum thickness	2.0 (0.079)
Disc rotor	Standard thickness (new)	24.0 (0.945)
	Repair limit thickness	22.0 (0.866)
	Runout limit (measured at 10.0 mm (0.394 in) inside the disc edge	0.07 (0.0028)
	Maximum uneven wear (measured at 8 positions)	0.02 mm (0.0008 in) or less

Rear Drum Brake

INFOID:0000000007328872

Unit: mm (in)

Brake model		LT23
Brake lining	Standard thickness (new)	4.0 (0.157)
	Minimum thickness	1.5 (0.059)
Drum	Standard inner diameter (new)	228.6 (9.000)
	Repair limit inner diameter	230.0 (9.055)

SECTION PB
PARKING BRAKE SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329046

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329047

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Commercial Service Tool

INFOID:0000000007329048

Tool name	Description
Power tool PIIB1407E	Removing nuts, bolts and screws

PARKING BRAKE CONTROL

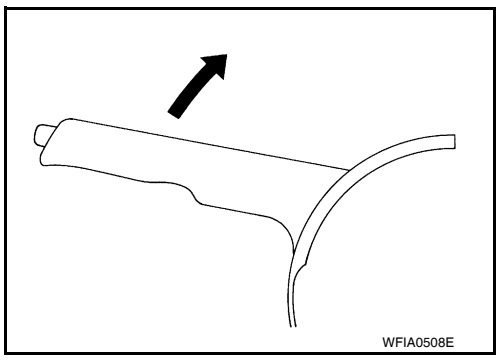
On-Vehicle Service

INFOID:0000000007329049

OPERATION

When parking brake lever is operated with a force of 196 N (20 kg-f, 44 lb-f), make sure parking brake lever stroke is within the specified number of notches. (Check it by listening and counting ratchet clicks.)

Number of notches : Refer to PB-8, "Parking Brake Control".



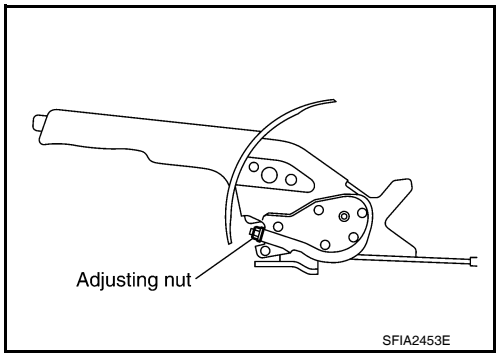
INSPECTION

- Make sure that the mounting conditions (looseness, backlash, etc.) of each component are normal.
- Check the following:

- Device assembly for bends, damage and cracks. Replace if any damage is noted.
- Cables and equalizer for wear and damage. Replace if any damage is noted.
- Parking brake switch. Replace if it does not work correctly.

ADJUSTMENT

1. Remove console mask cover. Refer to IP-12, "Removal and Installation".
2. Engage parking brake lever, then lift up the end of the trim on the lever to access the adjusting nut.
3. Insert a deep socket wrench onto adjusting nut. Rotate adjusting nut to fully loosen cable, and then release parking brake lever.



4. Depress the foot brake about 10 times and adjust the rear shoe clearance.
   CAUTION:
   Be sure to securely depress the foot brake.
5. Rotate brake drum to make sure that there is no drag.
6. Adjust parking brake cable with the following procedure.

a. When replace parking brake cable, operate parking brake lever with a force of 490 N (50 kg-f, 110 lb-f) about 10 times.
b. Engage parking brake lever, then lift up the end of the trim on the lever to access the adjusting nut.
c. Rotate adjusting nut to adjust parking brake lever stroke using a deep socket wrench.
d. Operate parking brake lever with a force of 196 N (20 kg-f, 44 lb-f), make sure the parking brake lever stroke is within the specified number of notches. (Check it by listening and counting ratchet clicks.)

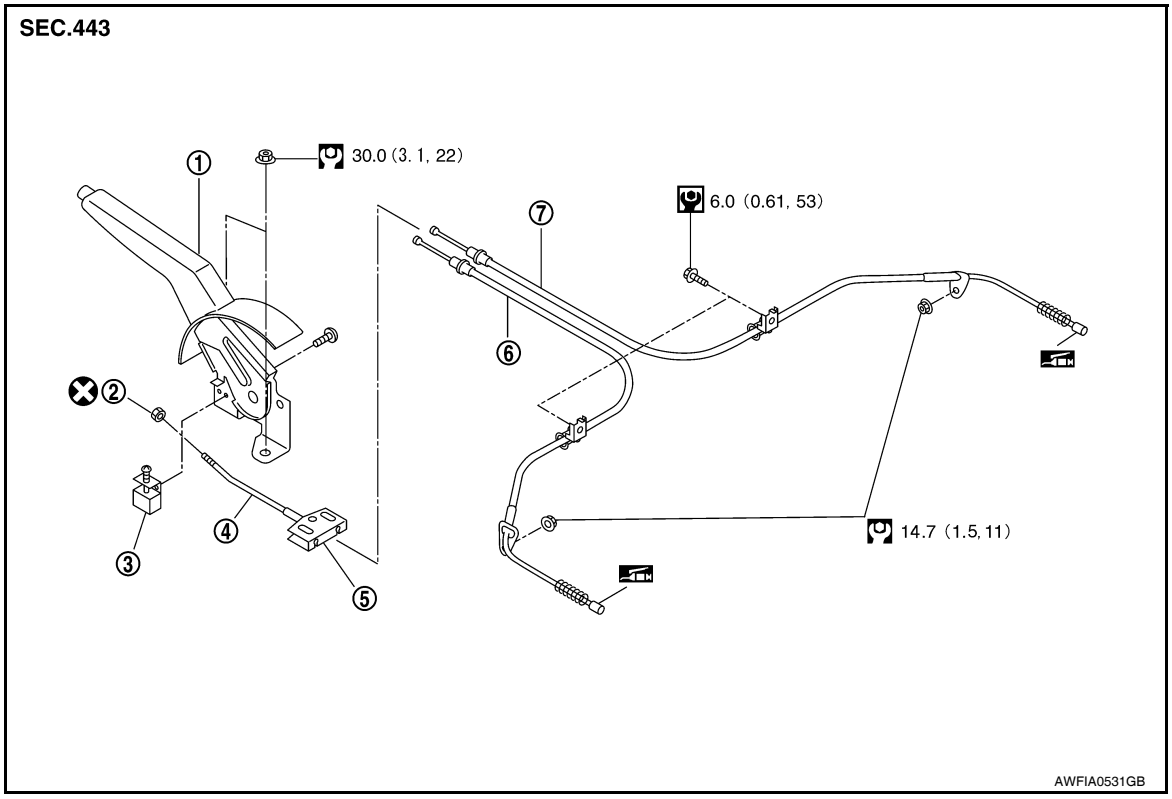
Number of notches : Refer to PB-8, "Parking Brake Control".

e. Make sure that there is no drag on rear brake with parking brake lever completely released.

7. Install console mask cover. Refer to IP-12, "Removal and Installation".

Component

INFOID:0000000007329050



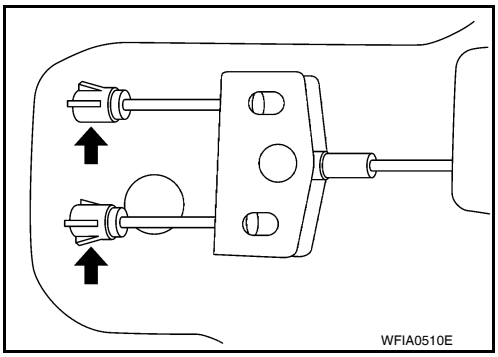
1. Device assembly
2. Adjusting nut
3. Parking brake switch
4. Front cable
5. Equalizer
6. LH rear cable
7. RH rear cable

Removal and Installation

INFOID:0000000007329051

REMOVAL

1. Remove center console assembly. Refer to IP-12, "Removal and Installation".
2. Disconnect parking brake switch connector.
3. Loosen adjusting nut.
4. Remove equalizer from rear cable terminal ends.
5. Take off rear cable clip, and unplug rear cable outward.
   NOTE:
   Close opening to take off clip.



6. Remove device assembly nuts, and remove device assembly.
7. Remove rear brake shoe and remove rear cable from the operating lever. Refer to BR-33, "Removal and Installation of Drum Brake Assembly".
8. Remove the center muffler. Refer to EX-5, "Component".
9. Remove rear cable bolt and nut, and then remove rear cable.

10. Remove adjusting nut and discard. Remove the front cable from the device assembly.
CAUTION:
Discard the adjusting nut, do not reuse.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Adjust the parking brake. Refer to PB-5, "On-Vehicle Service".**
- **Adjust clearance of rear brake shoes. Refer to PB-5, "On-Vehicle Service".**

SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Brake Control

INFOID:0000000007329052

Control type	Hand lever
Number of notches [under a force of 196 N (20 kg-f, 44lb-f)]	8 – 9
Number of notches when brake warning lamp comes on	1

SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

VDC/TCS/ABS

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007328907

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007798355

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

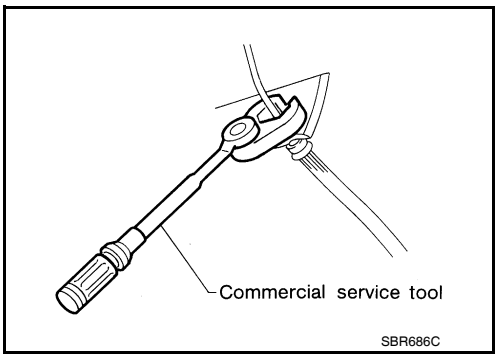
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Brake System

INFOID:0000000007328909

CAUTION:

- **Refer to MA-13, "Fluids and Lubricants" for recommended brake fluid.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.**
- **Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.**
- **Use flare nut wrench when removing and installing brake tube.**
- **If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.**
- **Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.**
- **Always torque brake lines when installing.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.**
  Refer to BR-32, "Brake Burnishing Procedure".



WARNING:

- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

Precaution for Brake Control

INFOID:0000000007328910

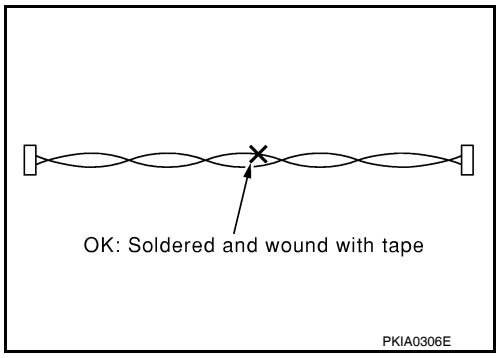
- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.

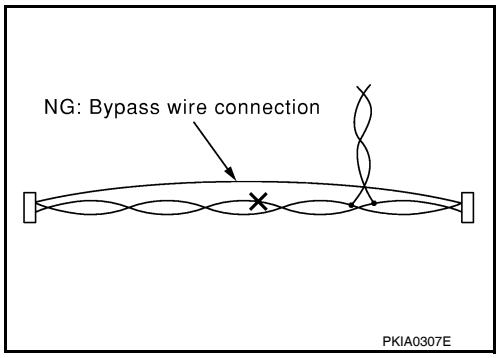
Precaution for CAN System

INFOID:0000000007328911

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).



- Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)

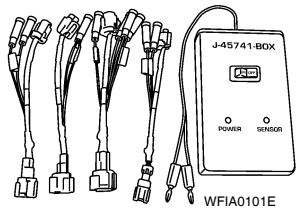


PREPARATION

Special Service Tool

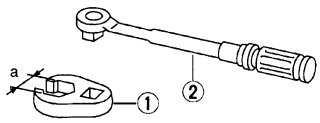
INFOID:0000000007328912

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
(J-45741) ABS active wheel sensor tester  WFIA0101E	Checking operation of ABS active wheel sensor

Commercial Service Tool

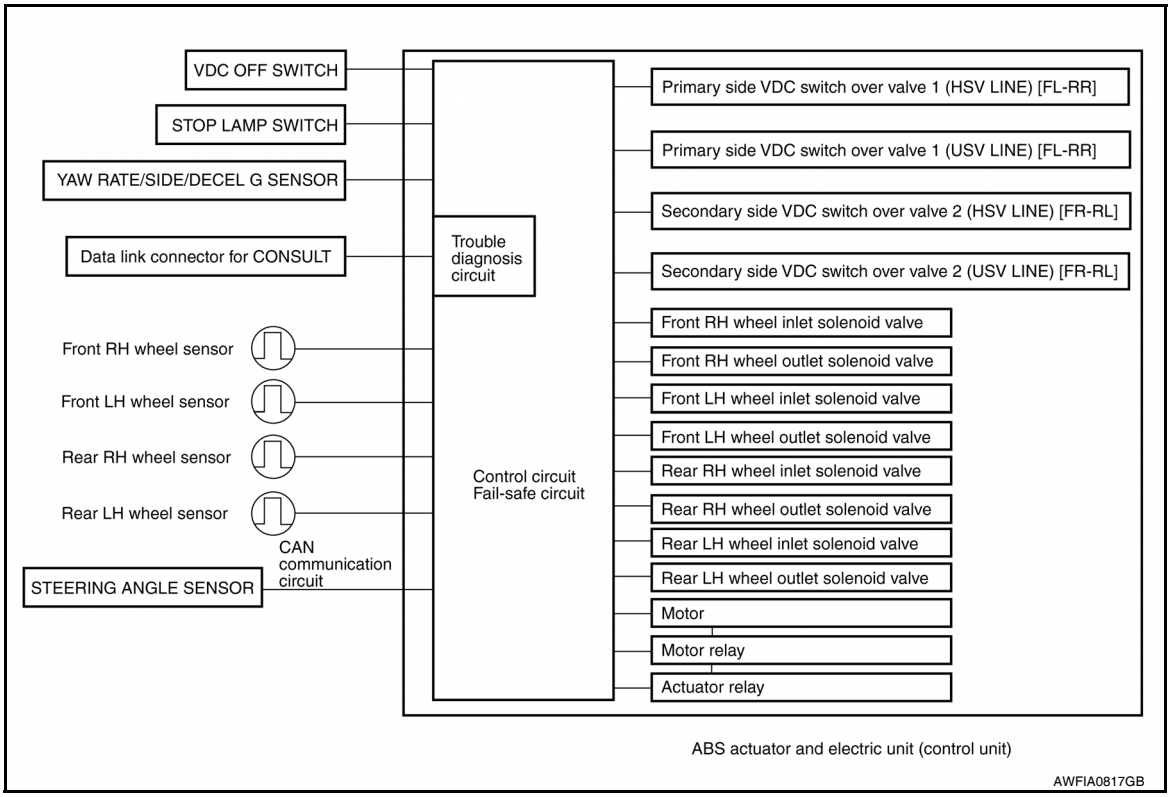
INFOID:0000000007328913

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Removing and installing brake piping **a: 10mm (0.39 in)/12mm (0.47 in)**

SYSTEM DESCRIPTION

System Component

INFOID:0000000007328914



ABS Function

INFOID:0000000007328915

- The Anti-Lock Brake System detects wheel revolution while braking and improves handling stability during sudden braking by electrically preventing wheel lockup. Maneuverability is also improved for avoiding obstacles.
- If the electrical system malfunctions, the Fail-Safe function is activated, the ABS becomes inoperative and the ABS warning lamp turns on.
- The electrical system can be diagnosed using CONSULT.
- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

EBD Function

INFOID:0000000007328916

- Electronic Brake Distribution is a function that detects subtle slippages between the front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- If the electrical system malfunctions, the Fail-Safe function is activated, the EBD and ABS become inoperative, and the ABS warning lamp and BRAKE warning lamp are turned on.
- The electrical system can be diagnosed using CONSULT.
- During EBD operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

TCS Function

INFOID:0000000007328917

- Spinning of the drive wheels is detected by the ABS/TCS/VDC control unit using inputs from the wheel speed sensors. If wheel spin occurs, the drive wheel right and left brake fluid pressure control and engine fuel cut are conducted while the throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the throttle opening is controlled to achieve the optimum engine torque.
- Depending on road condition, the vehicle may have a sluggish feel. This is normal, because optimum traction has the highest priority during TCS operation.
- TCS may be activated during sudden vehicle acceleration, wide open throttle acceleration, sudden transmission shifts or when the vehicle is driven on a road with a varying surface friction coefficient.
- The SLIP indicator lamp flashes to inform the driver of TCS operation.

VDC Function

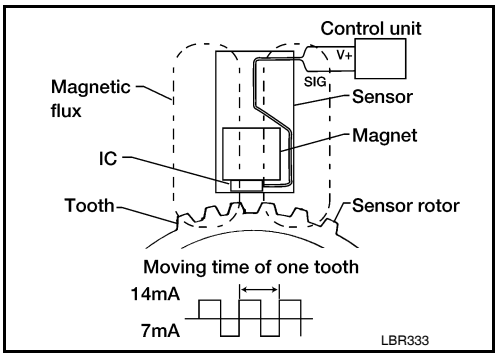
INFOID:0000000007328918

- In addition to the ABS/TCS function, the driver steering amount and brake operation amount are detected from the steering angle sensor, and the vehicle's driving status (amount of under steering/over steering) is determined using inputs from the yaw rate/side/decel G sensor, wheel speed sensors, etc. and this information is used to improve vehicle stability by controlling the braking and engine torque application to the wheels.
- The SLIP indicator lamp flashes to inform the driver of VDC operation.
- During VDC operation, the vehicle body and brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn on when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is on a turn table or a ship while the engine is running or steep slope. In this case, restart the engine on a normal road and if the ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp turn off, there is no problem.

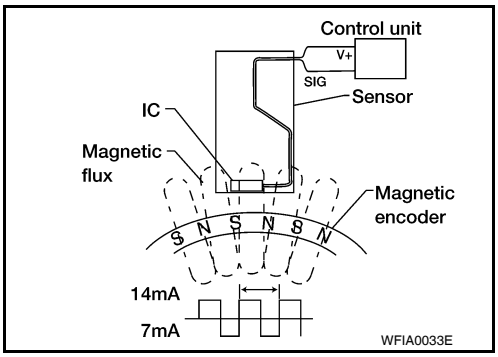
Wheel Sensors

INFOID:0000000007328919

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet around which a coil is wound. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



The rear sensor units consist of wheel hubs with a series of internal magnets and a sensor element. The rear wheel sensors are installed on the inner side of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



Fail-Safe Function

INFOID:0000000007328920

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on.

The system will revert to one of the following conditions of the Fail-Safe function.

1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of vehicles without ABS/TCS/VDC system.
2. For EBD malfunction, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without ABS/TCS/VDC or EBD system.

VDC/TCS SYSTEM

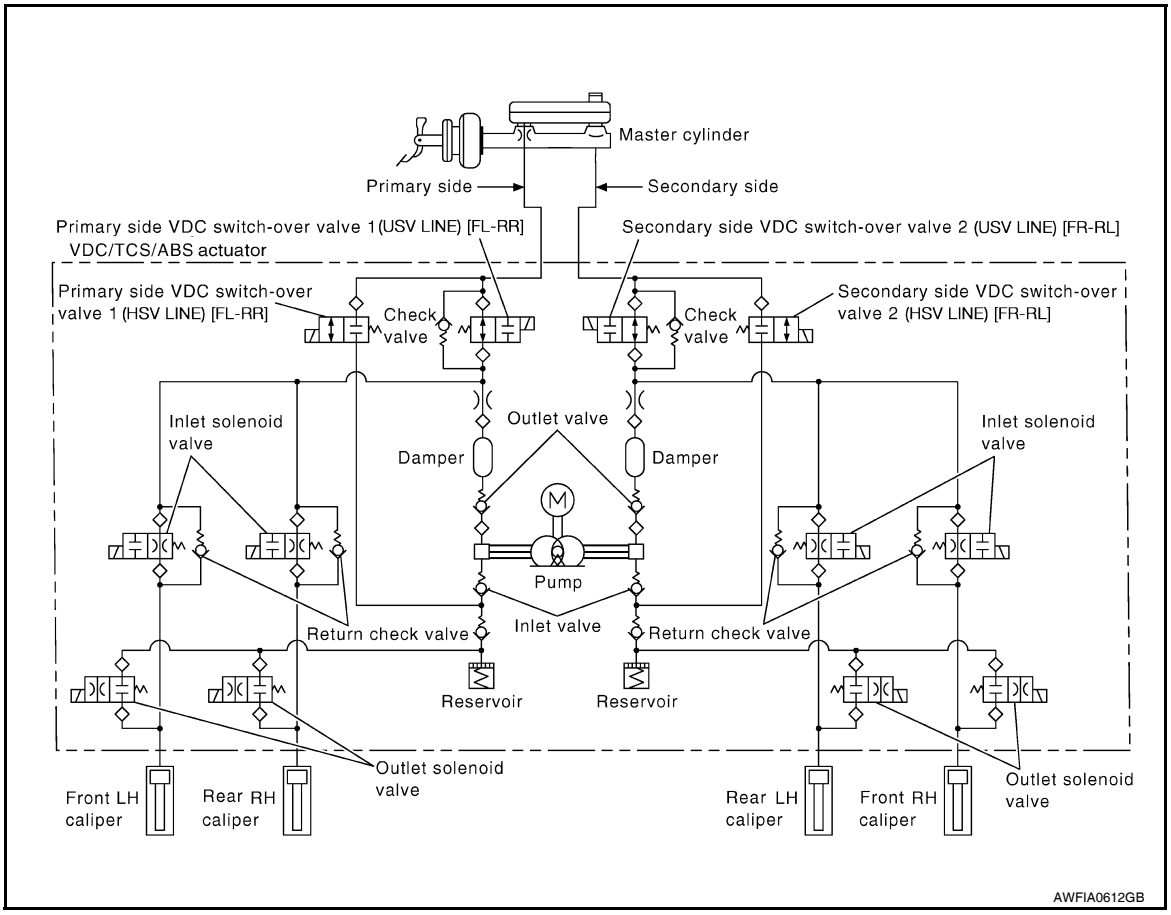
In case of TCS/VDC system malfunction, the VDC OFF indicator lamp and SLIP indicator lamp are turned on and the condition of the vehicle is the same as the condition of vehicles without TCS/VDC system. In case of an electrical malfunction with the TCS/VDC system, the ABS control continues to operate normally without TCS/VDC control.

CAUTION:

If the Fail-Safe function is activated, perform the Self Diagnosis for ABS/TCS/VDC system.

Hydraulic Circuit Diagram

INFOID:0000000007328921



CAN COMMUNICATION

System Description

INFOID:0000000007328922

Refer to LAN-5, "System Description".

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnosis for Quick and Accurate Repair

INFOID:0000000007328923

INTRODUCTION

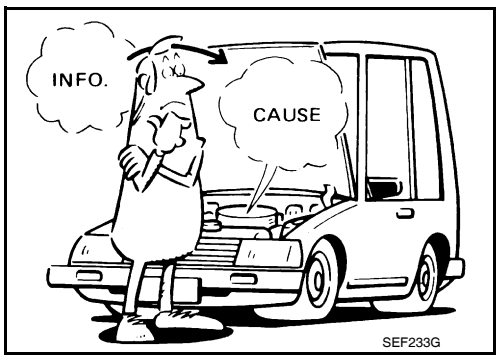
The ABS/TCS/VDC system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and controls actuator operation. It is also important to check for conventional malfunctions such as air leaks in the booster or lines, lack of brake fluid, or other malfunctions with the brake system.

It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electrical connections or wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

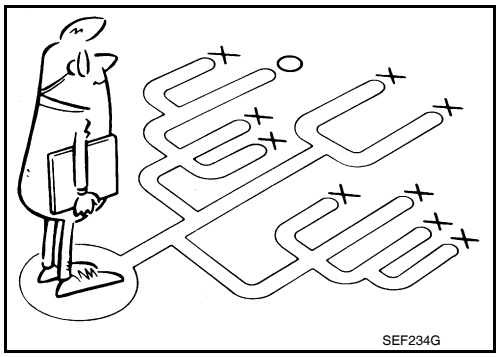
A visual check only may not find the cause of the malfunction, so a road test should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with an ABS/TCS/VDC complaint. The customer is a very good source of information, especially for intermittent malfunctions. Through the talks with the customer, find out what symptoms are present and under what conditions they occur.

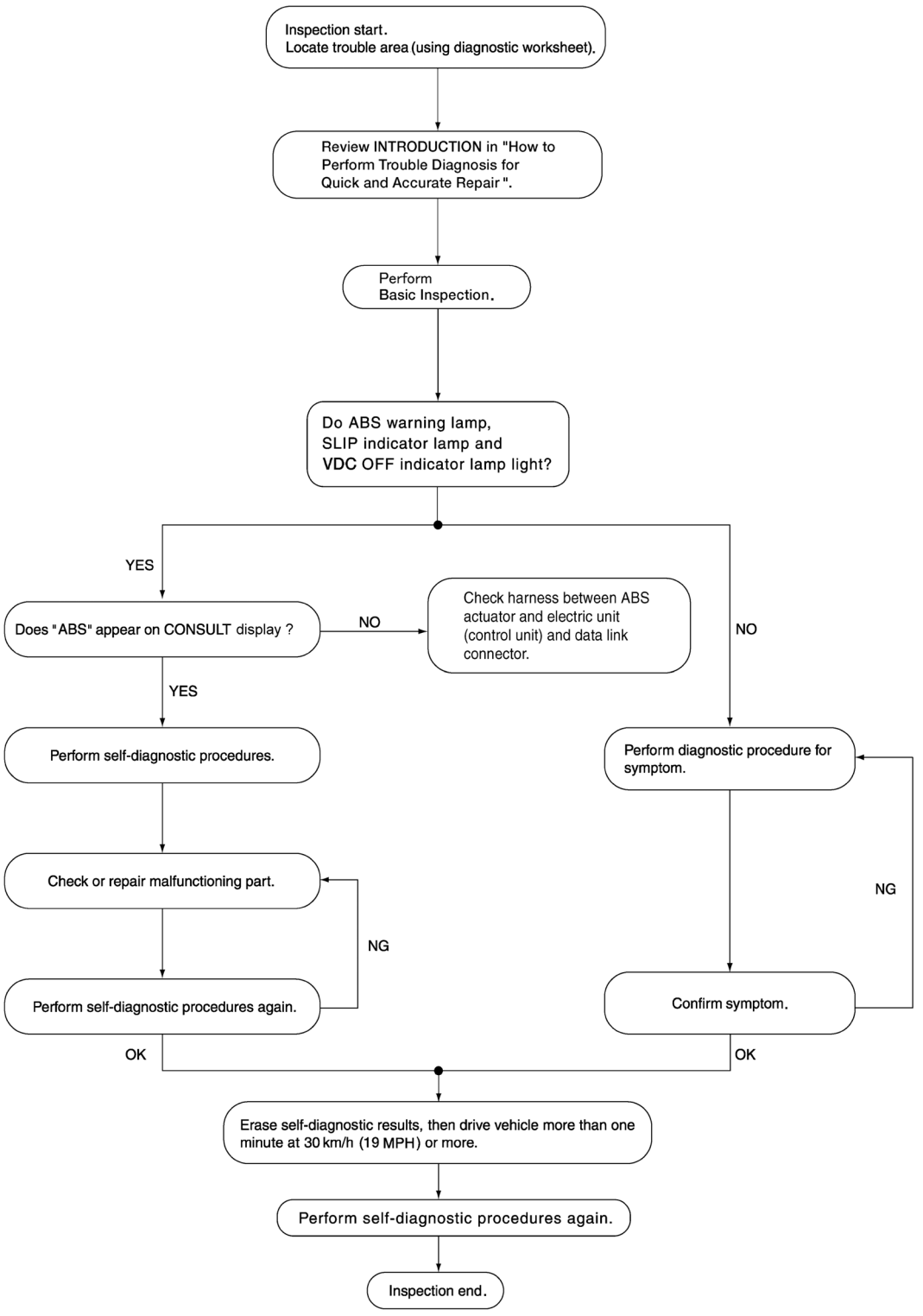
Start your diagnosis by looking for “conventional” malfunctions first. This is one of the best ways to troubleshoot brake malfunctions on an ABS/TCS/VDC equipped vehicle. Also check related Service Bulletins for information.



SEF233G


SEF234G

WORK FLOW



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CLARIFY CONCERN

- A customer's description of a vehicle concern may vary depending on the individual. It is important to clarify the customer's concern.
- Ask the customer about what symptoms are present under what conditions. Use this information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet to understand what type of trouble the customer is having.

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

EXAMPLE OF DIAGNOSIS SHEET

Customer name	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ ABS warning lamp activates ☐ SLIP warning lamp activates	☐ Pedal operation ☐ Large stroke pedal operation ☐ Firm pedal
	☐ TCS does not work (drive wheels slip when accelerating)	☐ ABS does not work (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐ Snow ☐ Gravel ☐ Other) ☐ Bumps/potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

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Component Parts and Harness Connector Location

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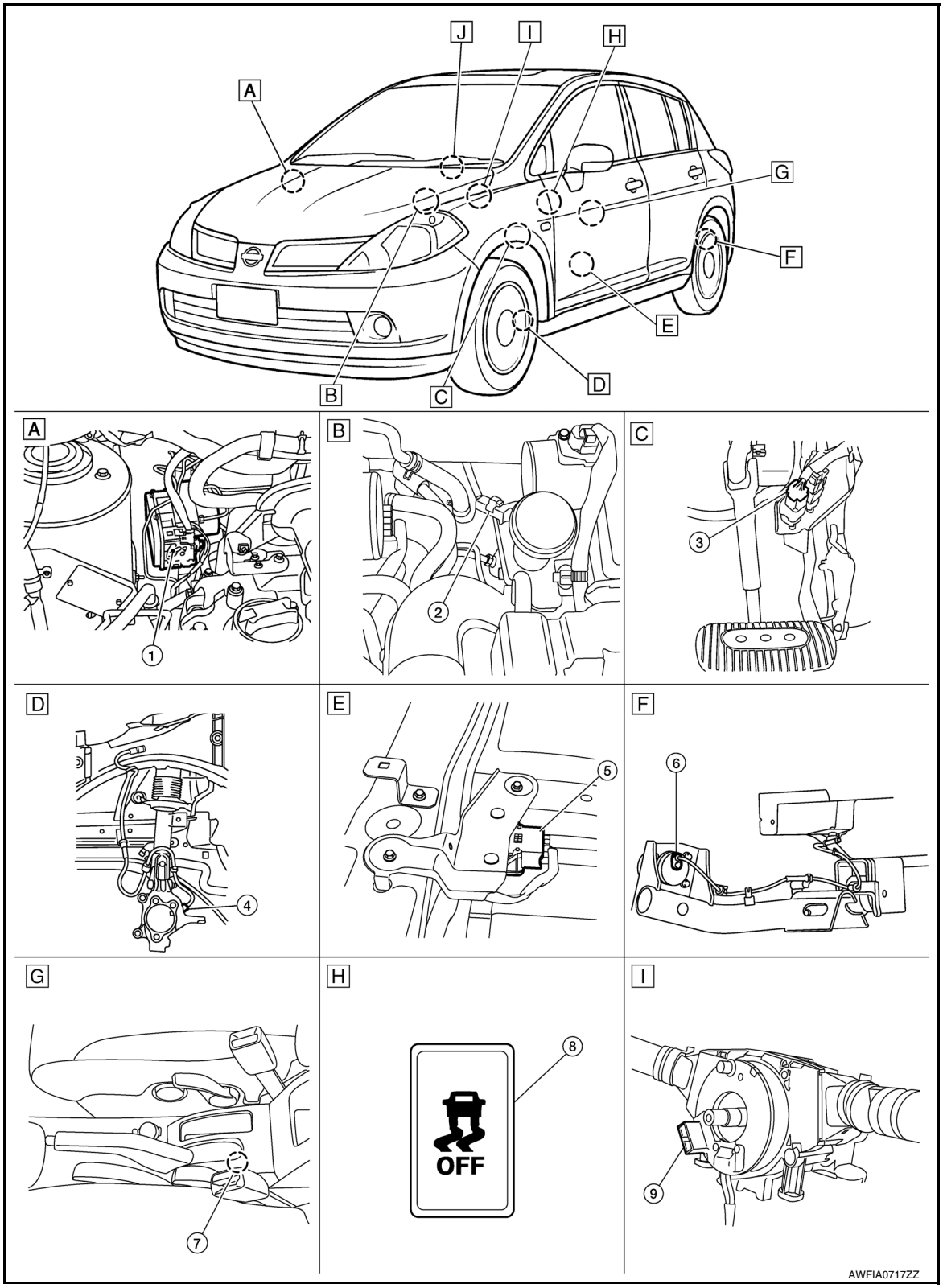
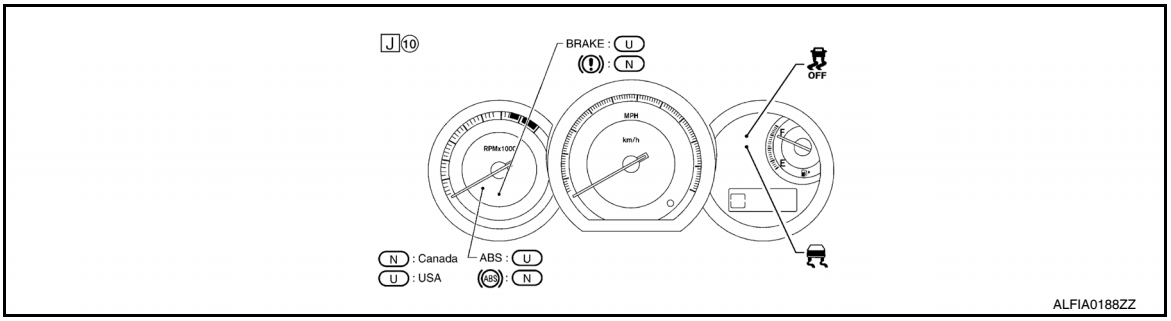
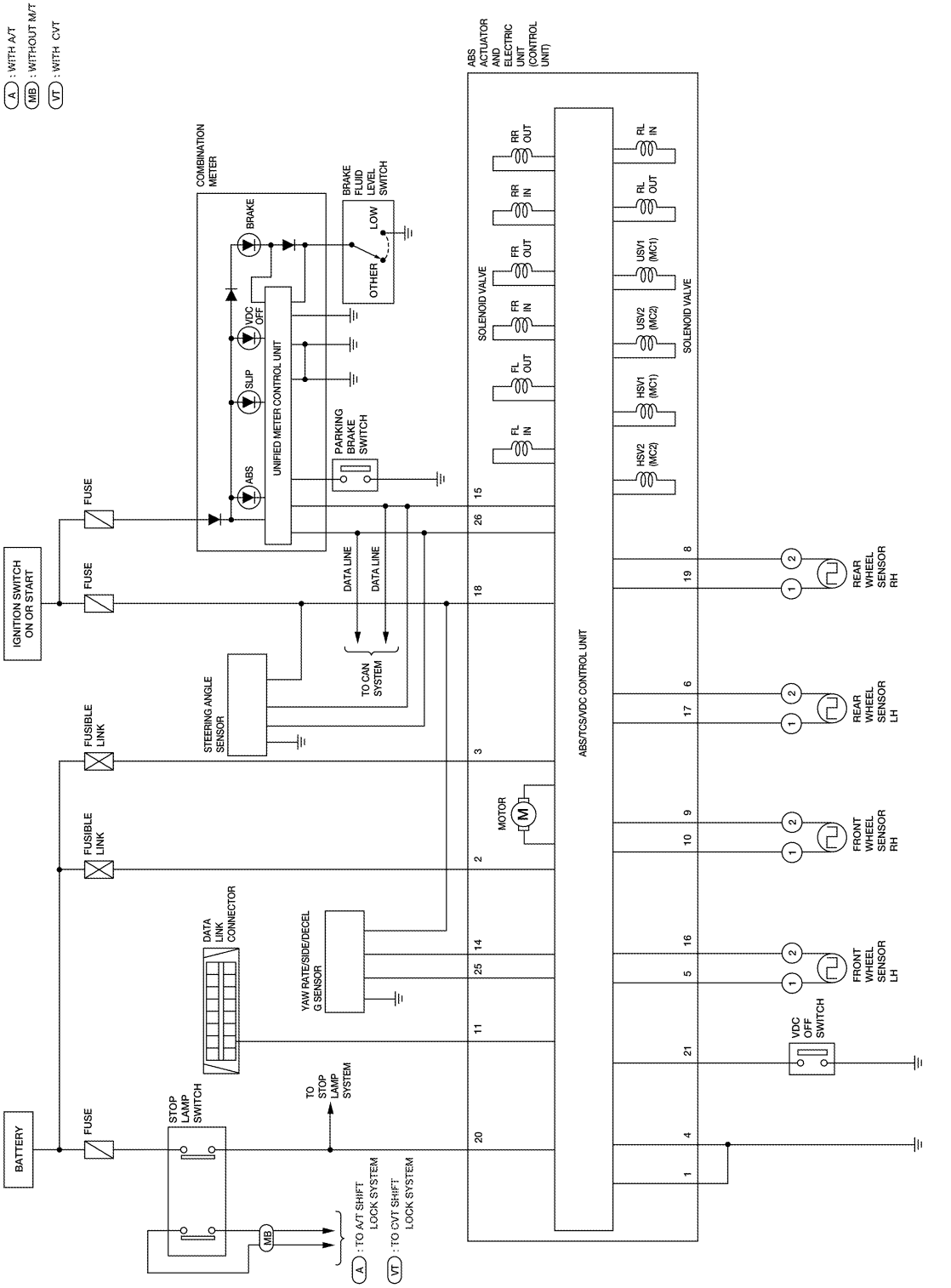




1. ABS actuator and electric unit (control unit) E33
2. Brake fluid level switch E40
3. Stop lamp switch E13
4. Front wheel sensor LH E51
   Front wheel sensor RH E52
5. Yaw rate/side/decel G sensor B3 (driver seat and carpet removed for clarity)
6. Rear wheel sensor LH B123
   Rear wheel sensor RH B124
7. Parking brake switch M17
8. VDC OFF switch M34
9. Steering angle sensor M64 (steering wheel removed for clarity)
10. Combination meter M24

Schematic

INFOID:0000000007328925



ABFWA0161GB

Wiring Diagram - VDC -

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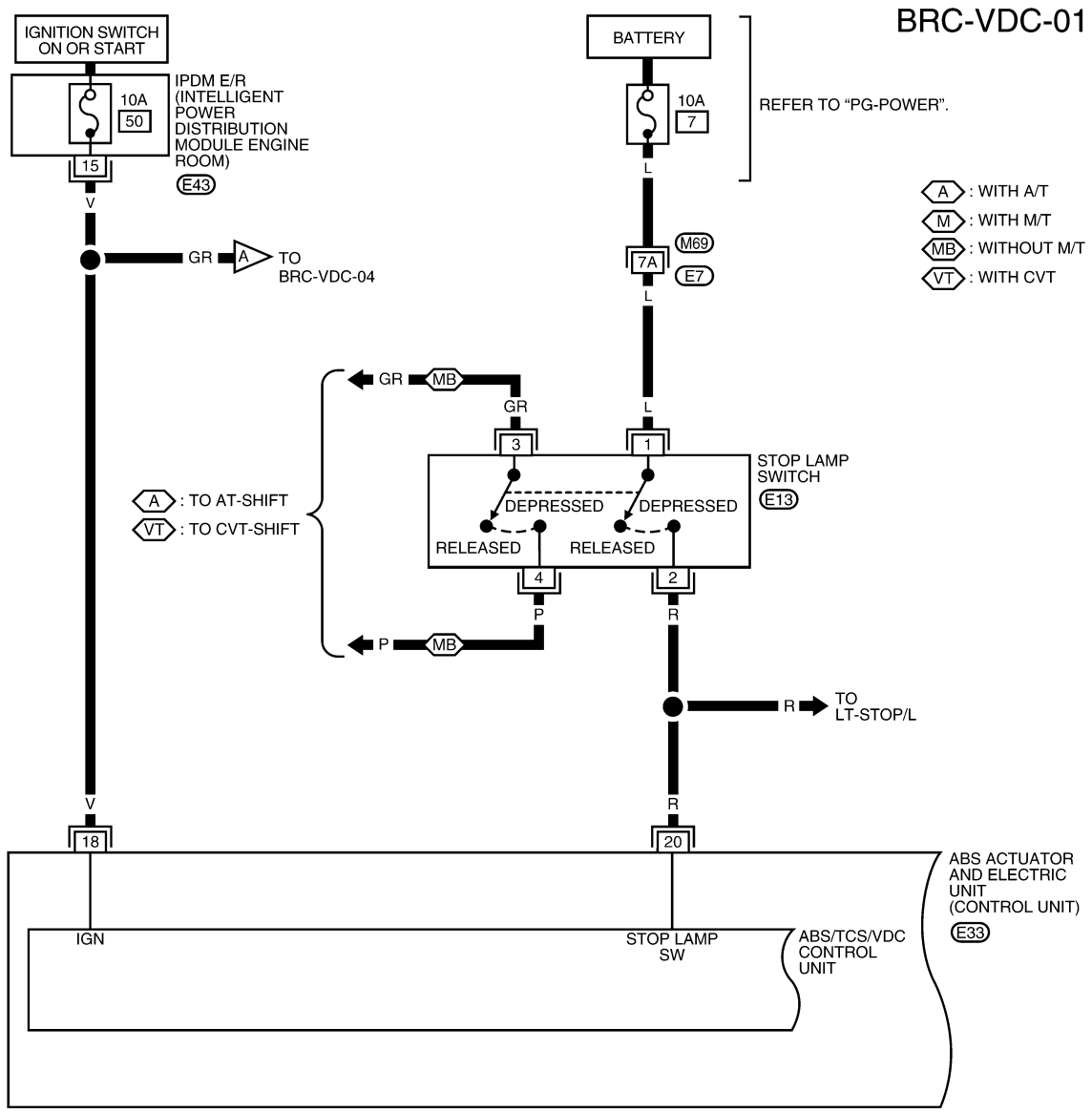
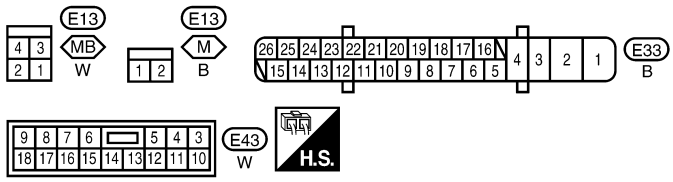
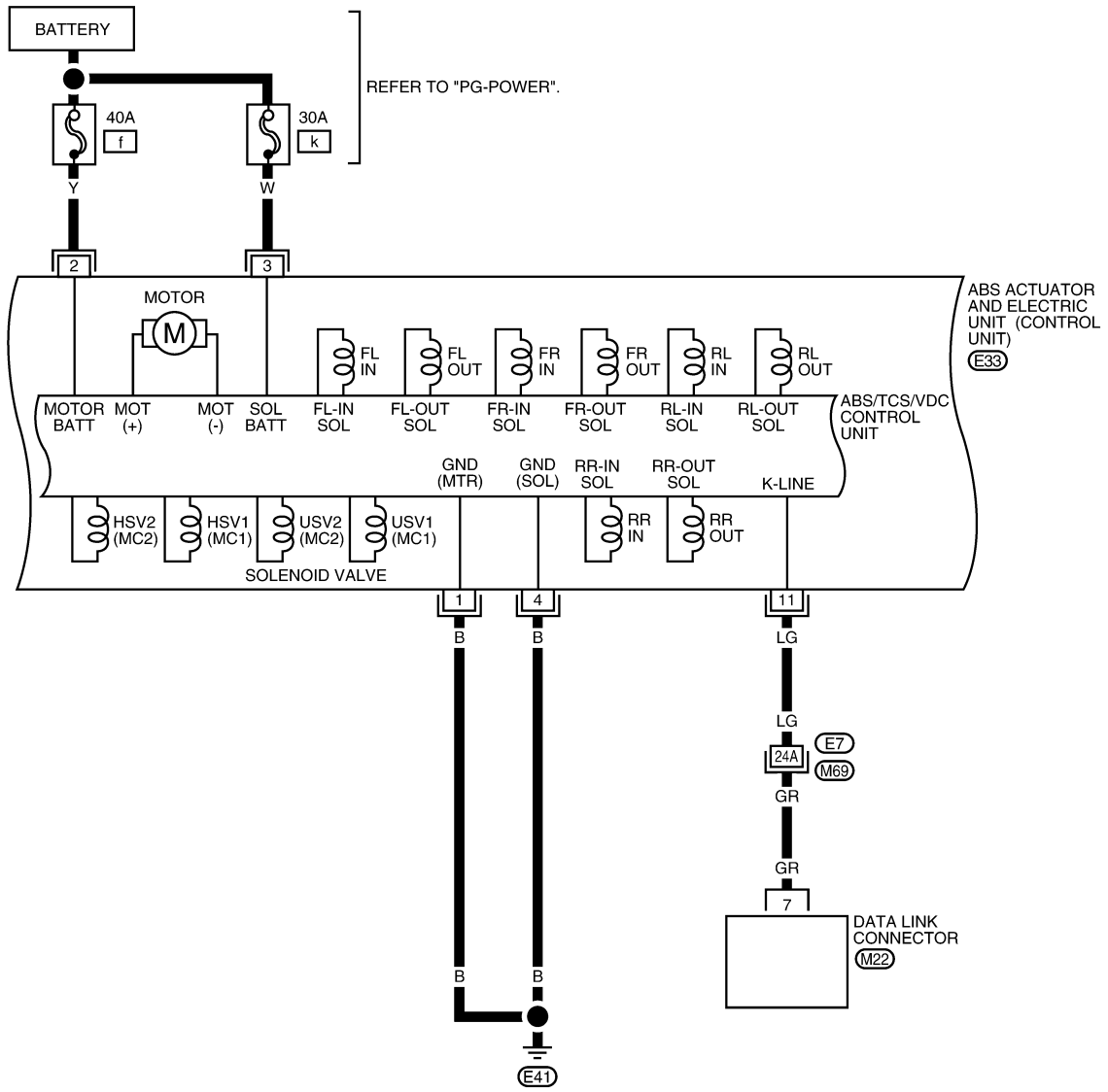


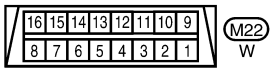


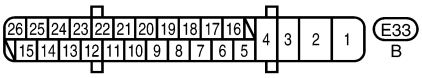
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABFWA0109GB

BRC-VDC-02







REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

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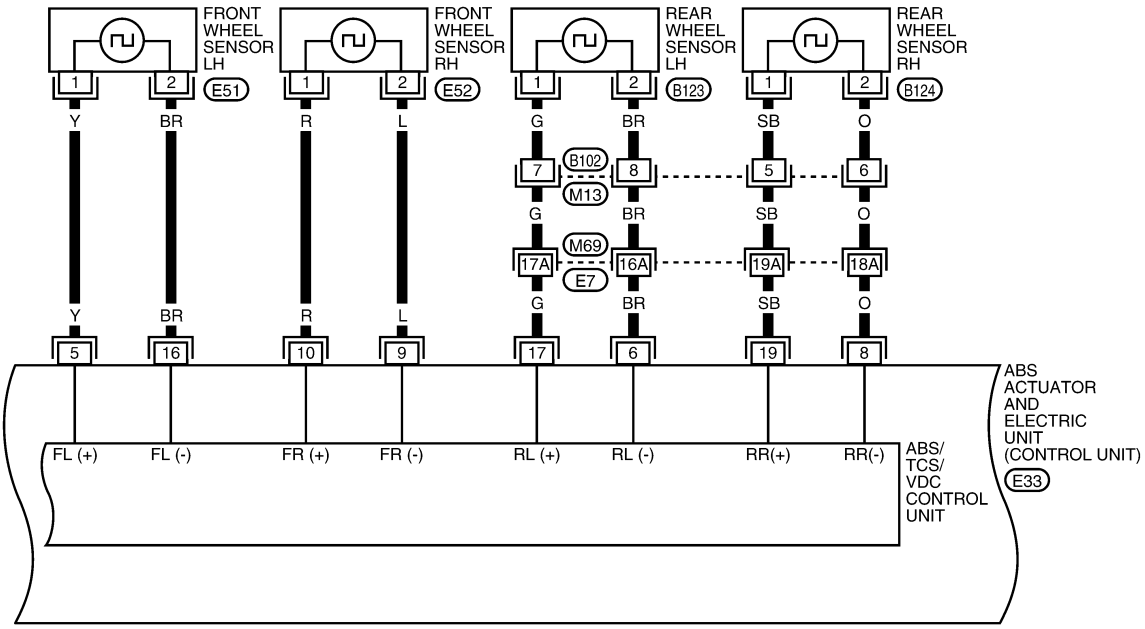
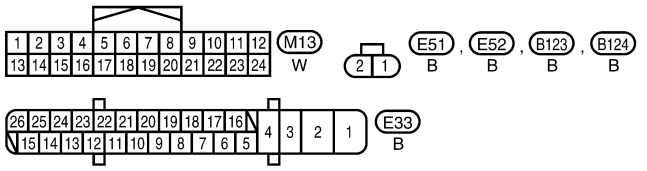
BRC-VDC-03





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

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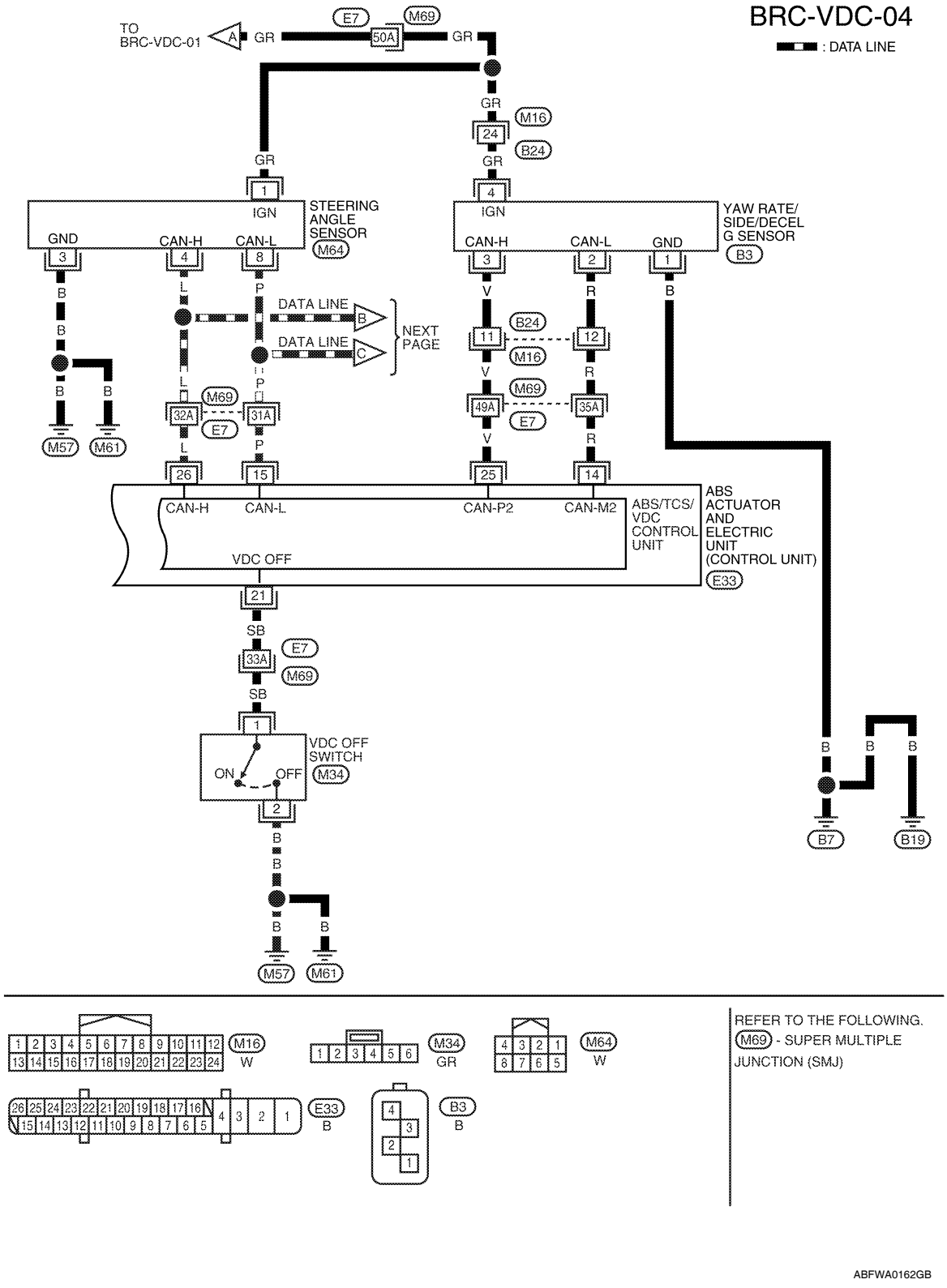
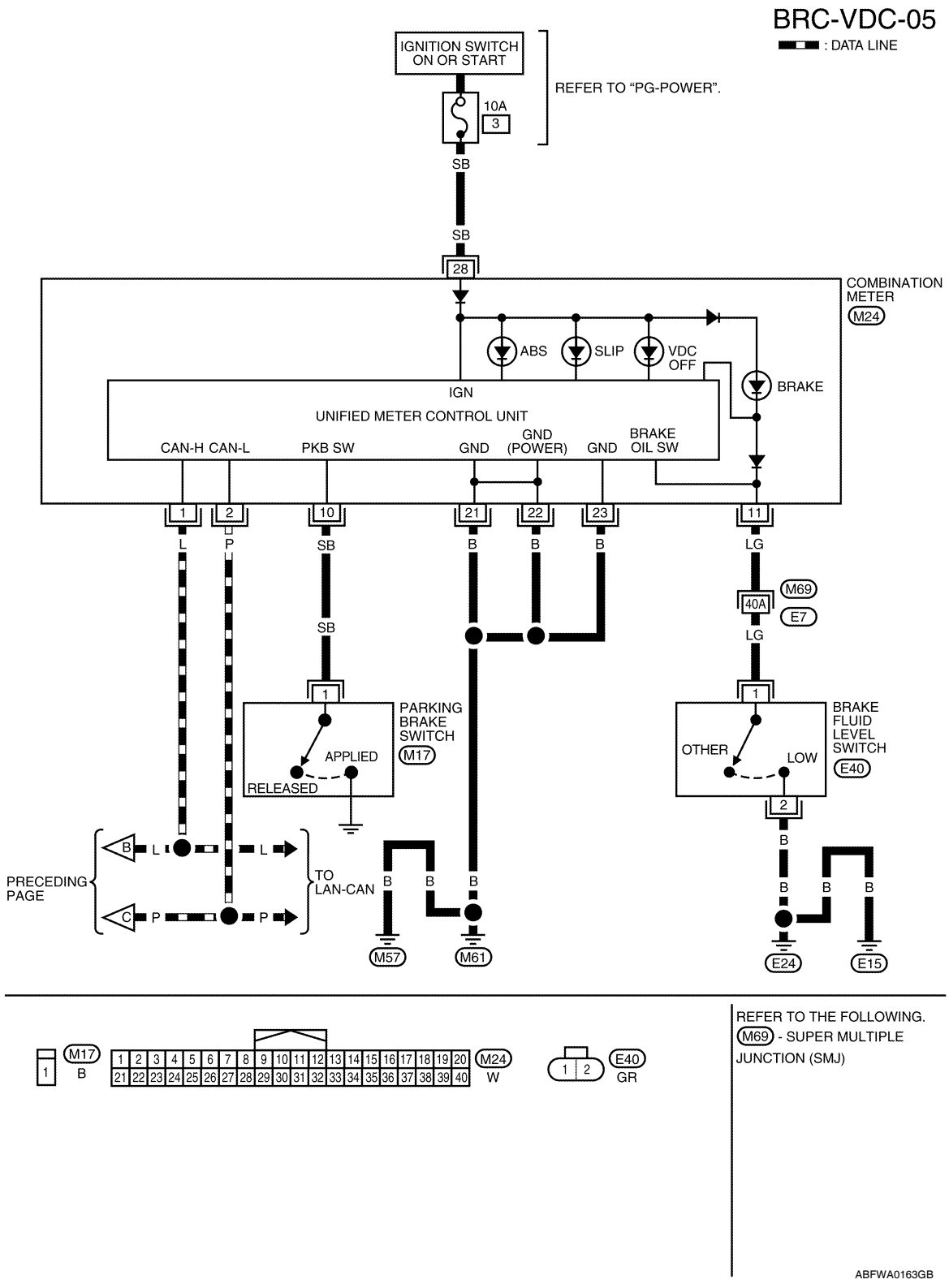

BRC-VDC-04
: DATA LINE
TO BRC-VDC-01
A
GR
E7
M69
50A
GR
GR
M16
24
B24
GR
GR
1
IGN
STEERING ANGLE SENSOR
M64
GND
CAN-H
CAN-L
3
4
8
B
L
P
DATA LINE
B
DATA LINE
C
NEXT PAGE
B
B
M57
M61
L
P
M69
32A
31A
E7
L
P
26
15
4
IGN
YAW RATE/ SIDE/DECEL G SENSOR
B3
CAN-H
CAN-L
GND
3
2
1
V
R
B
B24
11
12
M16
V
R
M69
49A
35A
E7
V
R
25
14
CAN-H
CAN-L
CAN-P2
CAN-M2
ABS/TCS/ VDC CONTROL UNIT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E33
VDC OFF
21
SB
E7
33A
M69
SB
1
VDC OFF SWITCH
ON
OFF
M34
2
B
B
B
B
M57
M61
B
B
B
B7
B19
M16
W
M34
GR
M64
W
E33
B
B3
B
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABFWA0162GB



Basic Inspection

INFOID:0000000007328927

BRAKE FLUID LEVEL, FLUID LEAK, AND BRAKE PAD INSPECTION

1. Check fluid level in the brake fluid reservoir. If fluid level is low, add fluid.
2. Check the brake piping and around the ABS actuator and electric unit (control unit) for leaks. If there is leaking or seeping fluid, check the following items.
   - If ABS actuator and electric unit (control unit) connection is loose, tighten the piping to the specified torque and recheck for leaks.

- If there is damage to the connection flare nut or ABS actuator and electric unit (control unit) screw, replace the damaged part and recheck for leaks.
- When there is fluid leaking or seeping from a fluid connection, use a clean cloth to wipe off the fluid and recheck for leaks. If fluid is still seeping out, replace the damaged part. If the fluid is leaking at the ABS actuator and electric unit (control unit), replace the ABS actuator and electric unit (control unit) assembly.

CAUTION:
The ABS actuator and electric unit (control unit) cannot be disassembled and must be replaced as an assembly.

3. Check the brake pads for excessive wear.

POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

Make sure the battery positive cable, negative cable and ground connection are not loose. In addition, make sure the battery is sufficiently charged.

ABS WARNING LAMP, SLIP INDICATOR LAMP AND VDC OFF INDICATOR LAMP INSPECTION

1. Make sure ABS warning lamp, SLIP indicator lamp and VDC OFF indicator lamp (when VDC OFF switch is off), turn on for approximately 2 seconds when the ignition switch is turned ON. If they do not, check the VDC OFF indicator lamp and then VDC OFF switch. Refer to BRC-44, "Component Inspection". Check CAN communications. If there are no errors with VDC OFF switch and CAN communication system, check combination meter. Refer to DI-31, "Component Inspection".
2. Make sure the lamps turn off approximately 2 seconds after the ignition switch is turned ON. If the lamp does not turn off, conduct self-diagnosis.
3. With the engine running, make sure VDC OFF indicator lamp turns on and off when VDC OFF switch is turned on and off. If the indicator lamp status does not correspond to switch operation, check the VDC OFF switch system. Refer to BRC-44, "Component Inspection".
4. Make sure ABS warning lamp, SLIP indicator lamp and VDC OFF indicator lamp turn off approximately 2 seconds after the engine is started. If ABS warning lamp, SLIP indicator lamp or VDC OFF indicator lamp have not turned off 10 seconds after the engine has been started, conduct self-diagnosis of the ABS actuator and electric unit (control unit).
5. After conducting the self-diagnosis, be sure to erase the error memory. Refer to BRC-25, "CONSULT Function (ABS)".

Warning Lamp and Indicator Timing

INFOID:0000000007328928

×: ON –: OFF

Condition	ABS warning lamp	VDC OFF indicator lamp	SLIP indicator lamp	Remarks
When the ignition switch is OFF	–	–	–	–
After the ignition switch is turned ON For approx. 2 seconds	×	×	×	–
Ignition switch ON Approx. 2 seconds later	–	–	–	–
When the VDC OFF switch turns ON (VDC function OFF).	–	×	–	–
ABS/TCS/VDC malfunction	×	×	×	–
	×	×	–	When the ABS/TCS/VDC control unit is malfunctioning (power supply or ground malfunction).
When the VDC is malfunctioning.	–	×	×	–

Control Unit Input/Output Signal Standard

INFOID:0000000007328929

REFERENCE VALUE FROM CONSULT

CAUTION:
The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short circuited.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (mph)]	BRC-32, "Wheel Sensor System Inspection"
		Vehicle running (Note 1)	Almost in accordance with speedometer display (within ±10%)	
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Solenoid valve operation	Actuator (solenoid) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode).	On	BRC-37, "Solenoid and VDC Change-Over Valve System Inspection"
		When actuator (solenoid) is not active and actuator relay is active (ignition switch ON).	Off	
STOP LAMP SW	Brake pedal operation	Brake pedal depressed	On	BRC-39, "Stop Lamp Switch System Inspection"
		Brake pedal released	Off	
MOTOR RELAY	Operation status of motor and motor relay	Ignition switch ON or engine running (ABS not operated)	Off	BRC-38, "Actuator Motor, Motor Relay, and Circuit Inspection"
		Ignition switch ON or engine running (ABS operated)	On	
ACTUATOR RLY	Actuator relay operation status	Vehicle stopped (Ignition switch ON)	Off	
		Vehicle stopped (Engine running)	On	
ABS WARN LAMP	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	On	BRC-48, "ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On"
		ABS warning lamp OFF	Off	
OFF LAMP	VDC OFF indicator lamp status (Note 2)	When VDC OFF indicator lamp is ON	On	BRC-44, "CAN Communication System Inspection"
		When VDC OFF indicator lamp is OFF	Off	
OFF SW	VDC OFF switch ON/OFF status	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On	BRC-44, "Component Inspection"
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off	
SLIP LAMP	SLIP indicator lamp status (Note 2)	When SLIP indicator lamp is ON	On	BRC-44, "CAN Communication System Inspection"
		When SLIP indicator lamp is OFF	Off	
BATTERY VOLT	Battery voltage supplied to ABS actuator and electric unit (control unit)	Ignition switch ON	10 to 16V	BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection"
GEAR	Manual mode gear position determined by TCM	Ignition switch ON	1 2 3 4 5	—
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	Vehicle stopped	Approx. 0 d/s	BRC-35, "Yaw Rate/Side/Decel G Sensor System Inspection"
		Vehicle turning	–75 to 75 d/s	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
ACCEL POS SIG	Open/close condition of throttle valve (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0%	BRC-44, "CAN Communication System Inspection"
		Depress accelerator pedal (ignition switch is ON)	0 to 100%	
SIDE G-SENSOR	Transverse G detected by side G-sensor	Vehicle stopped	Approx. 0 m/s^2	BRC-35, "Yaw Rate/Side/Decel G Sensor System Inspection"
		Vehicle turning right	negative value (m/s^2)	
		Vehicle turning left	positive value (m/s^2)	
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0°	BRC-34, "Steering Angle Sensor System Inspection"
		Steering wheel turned	–720 to 720°	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch ON and brake pedal released	Approx. 0 bar	BRC-42, "Pressure Sensor System Inspection"
		With ignition switch ON and brake pedal depressed	–40 to 300 bar	
EBD SIGNAL	EBD operation	EBD is active	On	—
		EBD is inactive	Off	
ABS SIGNAL	ABS operation	ABS is active	On	—
		ABS is inactive	Off	
TCS SIGNAL	TCS operation	TCS is active	On	—
		TCS is inactive	Off	
VDC SIGNAL	VDC operation	VDC is active	On	—
		VDC is inactive	Off	
EBD FAIL SIG	EBD fail-safe signal	In EBD fail safe mode	On	—
		EBD is normal	Off	
ABS FAIL SIG	ABS fail-safe signal	In ABS fail safe mode	On	—
		ABS is normal	Off	
TCS FAIL SIG	TCS fail-safe signal	In TCS fail safe mode	On	—
		TCS is normal	Off	
VDC FAIL SIG	VDC fail-safe signal	In VDC fail safe mode	On	—
		VDC is normal	Off	
CRANKING SIG	Crank operation	Crank is active	On	—
		Crank is inactive	Off	
FLUID LEV SW	Status of brake fluid level switch	When brake fluid level switch ON	On	BRC-41, "Brake Fluid Level Switch System Inspection"
		When brake fluid level switch OFF	Off	
PARK BRAKE SW	Status of parking brake switch	Parking brake switch is active	On	BRC-44, "Component Inspection"
		Parking brake switch is inactive	Off	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
USV[FL-RR] USV[FR-RL] HSV[FL-RR] HSV[FR-RL]	VDC switch-over valve status	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode).	On	BRC-37, "Solenoid and VDC Change-Over Valve System Inspection"
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON).	Off	
V/R OUTPUT	Solenoid valve relay activated	When solenoid valve relay is active (ignition switch OFF)	On	
		When solenoid valve relay is not active (in fail-safe mode)	Off	
M/R OUTPUT	Actuator motor and motor relay activated	When actuator motor and motor relay are active (“ACTIVE TEST” with CONSULT)	On	BRC-38, "Actuator Motor, Motor Relay, and Circuit Inspection"
		When actuator motor and motor relay are inactive	Off	
ENGINE RPM	With engine running	With engine stopped	0 rpm	BRC-33, "Engine System Inspection"
		Engine running	Almost in accordance with tachometer display	

Note 1: Confirm tire pressure is normal.

Note 2: On and Off timing for warning lamp and indicator lamp.

CONSULT Function (ABS)

INFOID:0000000007328930

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

ABS diagnostic mode	Description
WORK SUPPORT	Supports inspection and adjustments. Commands are transmitted to the ABS actuator and electric unit (control unit) for setting the status suitable for required operation, input/output signals are received from the ABS actuator and electric unit (control unit) and received data is displayed.
SELF DIAGNOSTIC RESULT	Displays ABS actuator and electric unit (control unit) self-diagnosis results.
DATA MONITOR	Displays ABS actuator and electric unit (control unit) input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT instead of a technician to determine whether each system is "OK" or "NG".
ECU IDENTIFICATION	ABS actuator and electric unit (control unit) part number can be read.

SELF-DIAGNOSIS

Description

If an error is detected in the system, the ABS warning lamp will turn on. In this case, perform self-diagnosis as follows:

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT To the data link connector.
3. Turn ignition switch ON.
4. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
5. After stopping the vehicle, with the engine running, touch “ABS”, “SELF-DIAG RESULTS” in order on the CONSULT screen.

6. The self-diagnostic results are displayed.
   • When “NO DTC IS DETECTED” is displayed, check the ABS warning lamp, SLIP indicator lamp and VDC OFF indicator lamp.
7. Conduct the appropriate inspection from the display item list, and repair or replace the malfunctioning component.
8. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
   CAUTION:
   • When a wheel sensor “short-circuit” is detected, if the vehicle is not driven at 30 km/h (19 MPH) for at least 1 minute, the ABS warning lamp will not turn off even if the malfunction is repaired.
9. Turn ignition switch OFF to prepare for erasing the memory.
10. Start the engine and touch “ABS”, “SELF-DIAG RESULTS”, “ERASE” in order on the CONSULT screen to erase the error memory.
    If “ABS” is not indicated, go to GI-36, "CONSULT Data Link Connector (DLC) Circuit".
    CAUTION:
    If the error memory is not erased, re-conduct the operation from step 5.
11. For the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute and confirm that the ABS warning lamp, SLIP indicator lamp, and VDC OFF indicator lamp are off.

Display Item List

Self-diagnostic item	Malfunction detecting condition	Check system
RR RH SENSOR 1 [C1101]	Circuit of rear RH wheel sensor is open.	BRC-32, "Wheel Sensor System Inspection" (Note 1)
RR LH SENSOR 1 [C1102]	Circuit of rear LH wheel sensor is open.	
FR RH SENSOR 1 [C1103]	Circuit of front RH wheel sensor is open.	
FR LH SENSOR 1 [C1104]	Circuit of front LH wheel sensor is open.	
RR RH SENSOR 2 [C1105]	Circuit of rear RH wheel sensor is shorted, or sensor power voltage is unusual. ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
RR LH SENSOR 2 [C1106]	Circuit of rear LH wheel sensor is shorted, or sensor power voltage is unusual. ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
FR RH SENSOR 2 [C1107]	Circuit of front RH wheel sensor is shorted, or sensor power voltage is unusual. ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
FR LH SENSOR 2 [C1108]	Circuit of front LH wheel sensor is shorted, or sensor power voltage is unusual. ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	ABS actuator and electric unit (control unit) power voltage is too low.	BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection"
CONTROLLER FAILURE [C1110]	Internal malfunction of ABS actuator and electric unit (control unit).	BRC-33, "ABS/TCS/VDC Control Unit Inspection"
PUMP MOTOR [C1111]	During actuator motor operation with ON, when actuator motor turns OFF or when control line for actuator motor relay is open.	BRC-38, "Actuator Motor, Motor Relay, and Circuit Inspection"
	During actuator motor operation with OFF, when actuator motor turns ON or when control line for relay is shorted to ground.	

Self-diagnostic item	Malfunction detecting condition	Check system
MAIN RELAY [C1114]	During actuator relay OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to ground.	BRC-37, "Solenoid and VDC Change-Over Valve System Inspection"
	During actuator relay ON, when the actuator relay turns ON, or when the control line for the relay is open.	
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-32, "Wheel Sensor System Inspection" (NOTE 1)
STOP LAMP SW [C1116]	Stop lamp switch or circuit malfunction.	BRC-39, "Stop Lamp Switch System Inspection"
FR LH IN ABS SOL [C1120]	Circuit of front LH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	BRC-37, "Solenoid and VDC Change-Over Valve System Inspection"
FR LH OUT ABS SOL [C1121]	Circuit of front LH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
FR RH IN ABS SOL [C1122]	Circuit of front RH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
FR RH OUT ABS SOL [C1123]	Circuit of front RH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
RR LH IN ABS SOL [C1124]	Circuit of rear LH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
RR LH OUT ABS SOL [C1125]	Circuit of rear LH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
RR RH IN ABS SOL [C1126]	Circuit of rear RH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
RR RH OUT ABS SOL [C1127]	Circuit of rear RH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	
ENGINE SIGNAL 1 [C1130]	ECM judges the communication between ABS/TCS/VDC control unit and ECM is abnormal.	BRC-33, "Engine System Inspection"
ENGINE SIGNAL 2 [C1131]	ECM judges the communication between ABS/TCS/VDC control unit and ECM is abnormal.	
ENGINE SIGNAL 3 [C1132]	ECM judges the communication between ABS/TCS/VDC control unit and ECM is abnormal.	
ENGINE SIGNAL 4 [C1133]	ECM judges the communication between ABS/TCS/VDC control unit and ECM is abnormal.	
ENGINE SIGNAL 6 [C1136]	ECM judges the communication between ABS/TCS/VDC control unit and ECM is abnormal.	
PRESS SEN CIRCUIT [C1142]	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-42, "Pressure Sensor System Inspection"
ST ANGLE SEN CIRCUIT [C1143]	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning.	BRC-34, "Steering Angle Sensor System Inspection"
ST ANGLE SEN SIGNAL [C1144]	Neutral position correction of steering angle sensor is not finished.	
YAW RATE SENSOR [C1145]	Yaw rate sensor has generated an error, or yaw rate sensor signal line is open or shorted.	BRC-35, "Yaw Rate/ Side/Decel G Sensor System Inspection"
SIDE G-SEN CIRCUIT [C1146]	Lateral G-sensor is malfunctioning, or signal line of lateral G-sensor is open or shorted.	

Self-diagnostic item	Malfunction detecting condition	Check system
USV LINE [FL-RR] [C1147]	Front side VDC switch-over solenoid valve (cut valve) is open or shorted, or control line is open or shorted to power supply or ground.	BRC-37, "Solenoid and VDC Change-Over Valve System Inspection"
USV LINE [FR-RL] [C1148]	Rear side VDC switch-over solenoid valve (cut valve) is open or shorted, or control line is open or shorted to power supply or ground.	
HSV LINE [FL-RR] [C1149]	Front side VDC switch-over solenoid valve (suction valve) is open or shorted, or control line is open or shorted to power supply or ground.	
HSV LINE [FR-RL] [C1150]	Rear side VDC switch-over solenoid valve (suction valve) is open or shorted, or control line is open or shorted to power supply or ground.	
EMERGENCY BRAKE [C1153]	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)	BRC-33, "ABS/TCS/VDC Control Unit Inspection"
PNP POS SIG [C1154]	Transmission range switch signal or communication line between the ABS actuator and electric unit (control unit) and TCM is open or shorted.	BRC-43, "Transmission Range Switch System Inspection"
BR FLUID LEVEL LOW [C1155]	Brake fluid level drops or circuit between ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	BRC-41, "Brake Fluid Level Switch System Inspection"
ST ANG SEN COM CIR [C1156]	CAN communication line or steering angle sensor has generated an error.	BRC-44, "CAN Communication System Inspection" (Note 2)
VARIANT CODING [C1170]	In case where VARIANT CODING is different.	BRC-33, "ABS/TCS/VDC Control Unit Inspection"
CAN COMM CIRCUIT [U1000]	• CAN communication line is open or shorted. • ABS actuator and electric unit (control unit) internal malfunction • Battery voltage for ECM is suddenly interrupted for approximately 0.5 seconds or more.	BRC-44, "CAN Communication System Inspection" (Note 2)

Note 1. If wheel sensor 2 for each wheel is indicated, check ABS actuator and electric unit (control unit) power supply voltage in addition to wheel sensor circuit check.
Note 2. If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

DATA MONITOR

Display Item List

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
FR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear RH wheel sensor signal is displayed.
FR RH IN SOL (On/Off)	—	×	×	Front RH IN ABS solenoid (On/Off) status is displayed.
FR RH OUT SOL (On/Off)	—	×	×	Front RH OUT ABS solenoid (On/Off) status is displayed.
FR LH IN SOL (On/Off)	—	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.

FR LH OUT SOL (On/Off)	—	×	×	Front LH OUT ABS solenoid (On/Off) status is displayed.
RR RH IN SOL (On/Off)	—	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	—	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	—	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	—	×	×	Rear LH OUT ABS solenoid (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	—	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	—	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	—	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	—	×	×	VDC OFF lamp (On/Off) status is displayed.
OFF SW (On/Off)	×	×	×	VDC OFF switch (On/Off) status is displayed.
SLIP LAMP (On/Off)	—	×	×	SLIP indicator lamp (On/Off) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage (V) supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR (1, 2, 3, 4)	×	×	×	A/T gear position (1, 2, 3, 4) determined by TCM is displayed.
SLCT LVR POSI (P, R, N, D)	×	×	×	Selector lever position judged by transmission range switch signal.
YAW RATE SEN (d/s)	×	×	×	Yaw rate (d/s) detected by yaw rate sensor is displayed.
ACCEL POS SIG (%)	×	—	×	Throttle valve open/close (%) status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s^2)	×	—	×	Lateral acceleration (m/s^2) detected by side G sensor is displayed.
STR ANGLE SIG (deg)	×	—	×	Steering angle (deg) detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	—	×	Brake fluid pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)	—	—	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	—	—	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	—	—	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	—	—	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	—	—	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	—	—	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	—	—	×	TCS fail signal (On/Off) status is displayed.

VDC FAIL SIG (On/Off)	—	—	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	—	—	×	Cranking condition (On/Off) status is displayed.
FLUID LEV SW (On/Off)	×	—	×	Brake fluid level switch (On/Off) status is displayed.
PARK BRAKE SW (On/Off)	×	—	×	Parking brake switch (On/Off) status is displayed.
USV[FL-RR] (On/Off)	—	—	×	Primary side USV solenoid valve (On/Off) status is displayed.
USV[FR-RL] (On/Off)	—	—	×	Secondary side USV solenoid valve (On/Off) status is displayed.
HSV[FL-RR] (On/Off)	—	—	×	Primary side HSV solenoid valve (On/Off) status is displayed.
HSV[FR-RL] (On/Off)	—	—	×	Secondary side HSV solenoid valve (On/Off) status is displayed.
V/R OUTPUT (On/Off)	—	—	×	Valve relay operation signal (On/Off) status is displayed.
M/R OUTPUT (On/Off)	—	—	×	Motor relay operation signal (On/Off) status is displayed.
ENGINE RPM (rpm)	×	—	×	Engine speed judged by CAN communication signal is displayed.

×: Applicable

–: Not applicable

ACTIVE TEST

CAUTION:

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp, VDC indicator lamp, SLIP indicator lamp or brake warning lamp on.**
- **ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.**

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again, touch BACK.

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select “MAIN SIGNALS” for each test item.
- For ABS solenoid valve, touch “Up”, “Keep”, and “Down” on the display screen. For ABS solenoid valve (ACT), touch “Up”, “ACT UP”, “ACT KEEP” and confirm that solenoid valves operate as shown in the table below.

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	—	—	—
	FR RH OUT SOL	Off	Off	On*	—	—	—
	USV [FR-RL]	Off	Off	On*	—	—	—
	HSV [FR-RL]	Off	Off	On*	—	—	—

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR LH SOL	FR LH IN SOL	Off	On	On	—	—	—
	FR LH OUT SOL	Off	Off	On*	—	—	—
	USV [FL-RR]	Off	Off	On*	—	—	—
	HSV [FL-RR]	Off	Off	On*	—	—	—
RR RH SOL	RR RH IN SOL	Off	On	On	—	—	—
	RR RH OUT SOL	Off	Off	On*	—	—	—
	USV [FL-RR]	Off	Off	On*	—	—	—
	HSV [FL-RR]	Off	Off	On*	—	—	—
RR LH SOL	RR LH IN SOL	Off	On	On	—	—	—
	RR LH OUT SOL	Off	Off	On*	—	—	—
	USV [FR-RL]	Off	Off	On*	—	—	—
	HSV [FR-RL]	Off	Off	On*	—	—	—
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	—	—	—	Off	Off	Off
	FR RH OUT SOL	—	—	—	Off	Off	Off
	USV [FR-RL]	—	—	—	Off	On	On
	HSV [FR-RL]	—	—	—	Off	On*	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	—	—	—	Off	Off	Off
	FR LH OUT SOL	—	—	—	Off	Off	Off
	USV [FL-RR]	—	—	—	Off	Off	Off
	HSV [FL-RR]	—	—	—	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	—	—	—	Off	Off	Off
	RR RH OUT SOL	—	—	—	Off	Off	Off
	USV [FL-RR]	—	—	—	Off	Off	Off
	HSV [FL-RR]	—	—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	—	—	—	Off	Off	Off
	RR LH OUT SOL	—	—	—	Off	Off	Off
	USV [FR-RL]	—	—	—	Off	On	On
	HSV [FR-RL]	—	—	—	Off	On*	Off

*: On for 1 to 2 seconds after the touch, and then Off

ABS MOTOR
- Touch “On” and “Off” on screen. Make sure motor relay, actuator relay, V/R output and M/R output operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

Wheel Sensor System Inspection

INFOID:0000000007328931

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E33 and wheel sensor of malfunctioning code.
Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3.
NO >> Replace the wheel sensor. Refer to BRC-51, "Removal and Installation".

3.CHECK TIRES

Check for inflation pressure, wear and size of each tire. Refer to WT-30, "Tire".

Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4.
NO >> Adjust tire pressure or replace tire(s).

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-6, "On-Vehicle Inspection and Service" or RAX-6, "On-Vehicle Inspection and Service".

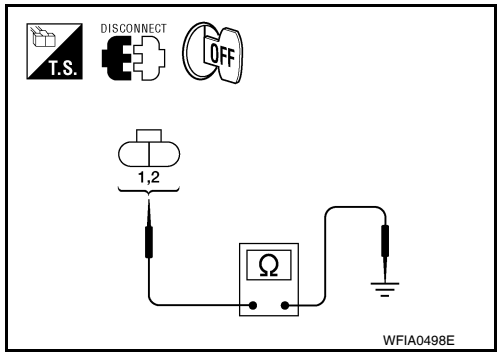
OK or NG

OK >> GO TO 5.
NG >> Repair or replace as necessary. Refer to FAX-6, "Removal and Installation" (front) or RAX-6, "Removal and Installation" (rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
3. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.



OK or NG

OK >> GO TO 6.
NG >> Repair the circuit.

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminals	Connector	Terminals	
Front LH	E33	5	E51	1	Yes
		16		2	
Front RH		10	E52	1	
		9		2	
Rear LH		17	B123	1	
		6		2	
Rear RH		19	B124	1	
		8		2	

OK or NG

OK >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".

NG >> Repair the circuit.

Engine System Inspection

INFOID:0000000007328932

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1
ENGINE SIGNAL 2
ENGINE SIGNAL 3
ENGINE SIGNAL 4
ENGINE SIGNAL 6

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

2.ENGINE SYSTEM INSPECTION

1. Perform ECM self-diagnosis and repair as necessary.
2. Perform ABS actuator and electric unit (control unit) self-diagnosis again.

OK or NG

OK >> Inspection End.

NG >> Repair as necessary.

ABS/TCS/VDC Control Unit Inspection

INFOID:0000000007328933

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE

Self-diagnosis results
EMERGENCY BRAKE
VARIANT CODING

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CHECK WHEEL SENSORS

Check all wheel sensors. Refer to BRC-32, "Wheel Sensor System Inspection".

OK or NG

OK >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
NG >> Repair or replace as necessary.

Steering Angle Sensor System Inspection

INFOID:0000000007328934

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
ST ANGLE SEN CIRCUIT
ST ANGLE SEN SIGNAL

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 3.
NO >> GO TO 2.

2.DATA MONITOR CHECK

Conduct “DATA MONITOR” of the “STR ANGLE SIG” to check if the status is normal.

Steering condition	Data monitor
Straight-ahead	-2.5 ° to +2.5°
Turn wheel 90° to the right.	Approx. +90°
Turn wheel 90° to the left.	Approx. -90°

OK or NG

OK >> Inspection End.
NG >> GO TO 3.

3.CONNECTOR INSPECTION

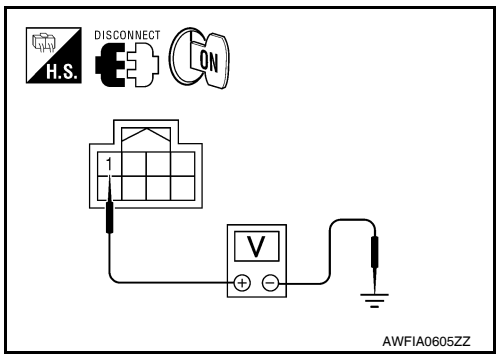
1. Disconnect the ABS actuator and electric unit (control unit) and steering angle sensor connectors.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace as necessary.

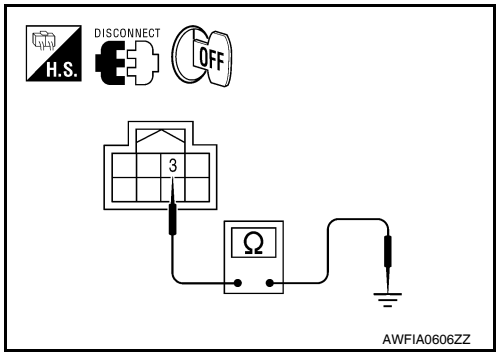
4. CHECKING STEERING ANGLE SENSOR POWER AND GROUND

1. Turn the ignition switch ON.
2. Check voltage between steering angle sensor connector M64 terminal 1 and ground.



Steering angle sensor		Ground	Voltage (Approx.)
Connector	Terminal		
M64	1	—	Battery voltage

3. Turn the ignition switch OFF.
4. Check resistance between steering angle sensor connector M64 terminal 3 and ground.



Steering angle sensor		Ground	Continuity
Connector	Terminal		
M64	3	Ground	Yes

OK or NG

OK >> Check the CAN communication system. Refer to BRC-44, "CAN Communication System Inspection". If the CAN communication system is OK, replace steering angle sensor. Refer to BRC-56, "Removal and Installation".

NG >> Repair the circuit.

Yaw Rate/Side/Decel G Sensor System Inspection

INFOID:0000000007328935

CAUTION:

Sudden turns (such as spin turns, acceleration turns), drifting, etc. When VDC function is OFF may cause the yaw rate/side/decel G sensor system to indicate a problem. However this is not a problem if normal operation can be resumed after restarting the engine.

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR
SIDE G-SEN CIRCUIT

CAUTION:

When on a turntable, such as at a parking structure entrance, or when on a moving object with the engine running, the VDC OFF indicator lamp might turn on and the self-diagnosis using the CONSULT the yaw rate sensor system might be displayed, but in this case there is no problem with the yaw rate sensor system. As soon as the vehicle leaves the turntable or moving object, restart the engine to return the system to normal.

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

2.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) and yaw rate/side/decel G sensor connectors. Check the terminals for deformation, disconnection, looseness or damage.

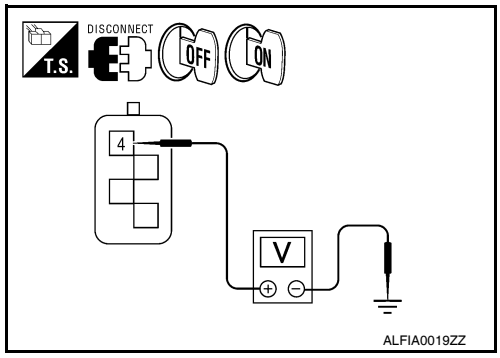
OK or NG

OK >> GO TO 3.

NG >> Repair or replace as necessary.

3.CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY CIRCUIT

Check voltage between yaw rate/side/decel G sensor connector B3 terminal 4 and ground.



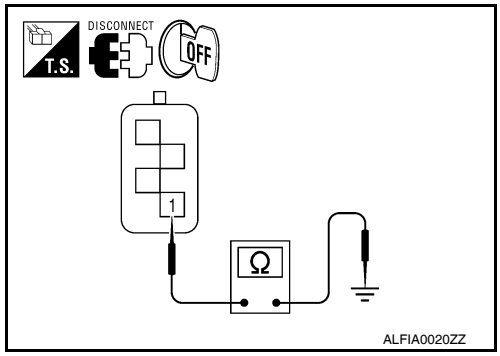
Yaw rate/side/decel G sensor		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
B3	4	—	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	0V

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace malfunctioning components.

4.CHECK YAW RATE/SIDE/DECEL G SENSOR GROUND SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check resistance between yaw rate/side/decel G sensor connector B3 terminal 1 and ground.



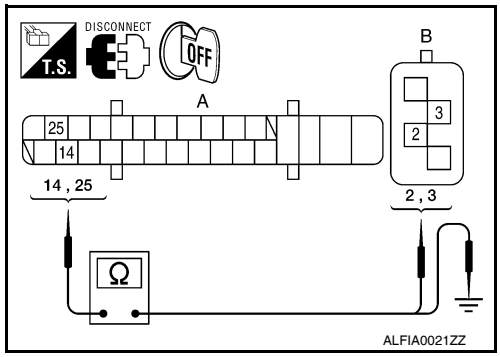
Yaw rate/side/decel G sensor		Ground	Continuity
Connector	Terminal		
B3	1	—	Yes

Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace malfunctioning components.

5.CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS

1. Check continuity between ABS actuator and electric unit (control unit) connector E33 (A) terminals 14 and 25 and yaw rate/side/decel G sensor connector B3 (B) terminals 2 and 3.



ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E33 (A)	14	B3 (B)	2	Yes
	25		3	

2. Check continuity between ABS actuator and electric unit (control unit) connector E33 (A) terminals 14, 25 and ground.

ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E33 (A)	14	—	No
	25		

Is the inspection result normal?

YES >> GO TO 6
NO >> Repair or replace malfunctioning components.

6.CHECK DATA MONITOR

1. Connect Yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) connectors.

2. Select “YAW RATE SEN”, “SIDE G-SENSOR” in “Data Monitor” and check Yaw rate/side/decel G sensor signal.

Vehicle condition	Yaw rate sensor (Data monitor)	Side G sensor (Data monitor)
Stopped	Approx. 0 d/s	Approx. 0 m/s^2
Turning right	Negative value	Negative value
Turning left	Positive value	Positive value

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".

NO >> Replace Yaw rate/side/decel G sensor. Refer to BRC-57, "Removal and Installation".

Solenoid and VDC Change-Over Valve System Inspection

INFOID:0000000007328936

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR LH OUT ABS SOL
RR RH IN ABS SOL
RR RH OUT ABS SOL
FR RH IN ABS SOL
FR RH OUT ABS SOL
RR LH IN ABS SOL
RR LH OUT ABS SOL
USV LINE [FL-RR]
USV LINE [FR-RL]
HSV LINE [FL-RR]
HSV LINE [FR-RL]
MAIN RELAY

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

2.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

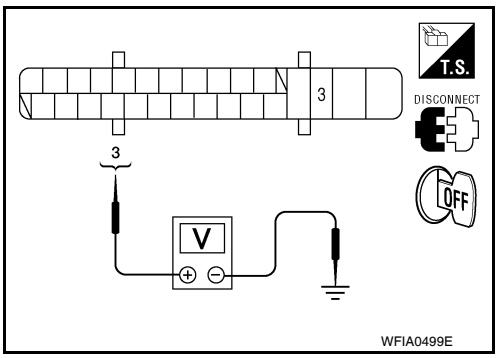
OK >> GO TO 3.

NG >> Repair or replace as necessary.

3. CHECKING SOLENOID POWER AND GROUND

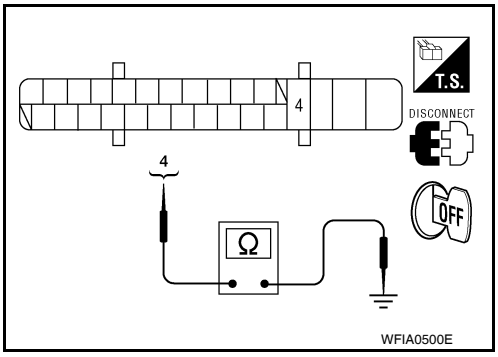
1. Check voltage between ABS actuator and electric unit (control unit) harness connector E33 and body ground.

ABS actuator and electric unit (control unit) harness connector E33	Body ground	Measured value (Approx.)
3	—	12V



2. Check resistance between ABS actuator and electric unit (control unit) harness connector E33 and body ground.

ABS actuator and electric unit (control unit) harness connector E33	Body ground	Measured value (Approx.)
4	—	0Ω



OK or NG

OK >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".

NG >> Repair the circuit.

Actuator Motor, Motor Relay, and Circuit Inspection

INFOID:0000000007328937

INSPECTION PROCEDURE

1.CHECKING SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

2.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector.
Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

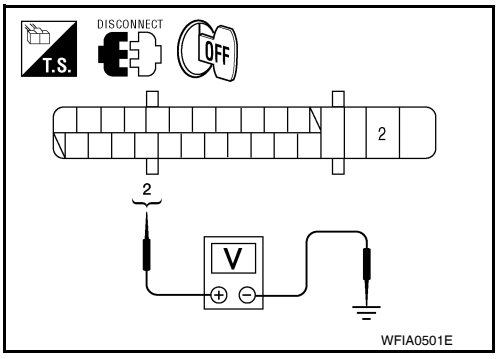
OK >> GO TO 3.

NG >> Repair or replace as necessary.

3. CHECKING ABS MOTOR AND MOTOR RELAY POWER SYSTEM

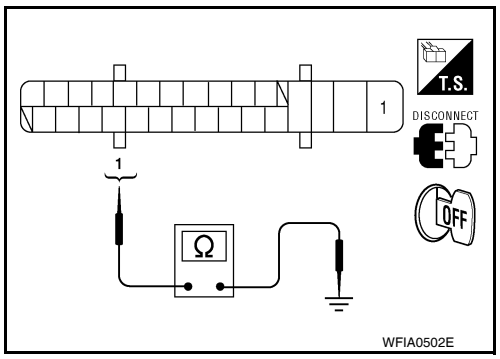
1. Check voltage between ABS actuator and electric unit (control unit) harness connector E33 and ground.

ABS actuator and electric unit (control unit) harness connector E33	Body ground	Measured value (Approx.)
2	—	12V



2. Check resistance between ABS actuator and electric unit (control unit) connector E33 and ground.

ABS actuator and electric unit (control unit) harness connector E33	Body ground	Measured value (Approx.)
1	—	0Ω



OK or NG

OK >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".

NG >> Repair the circuit.

Stop Lamp Switch System Inspection

INFOID:0000000007328938

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

2.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) and stop lamp switch connectors.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

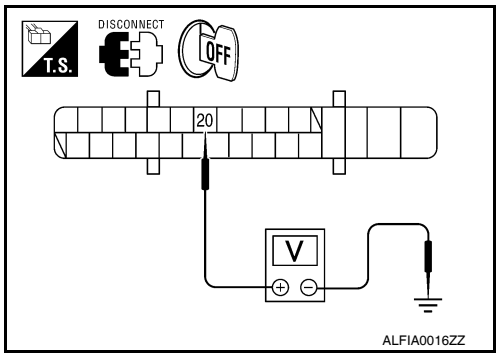
OK >> GO TO 3.

NG >> Repair or replace as necessary.

3.CHECK STOP LAMP SWITCH CIRCUIT

1. Connect stop lamp switch connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector E33 terminal 20 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E33	20	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V



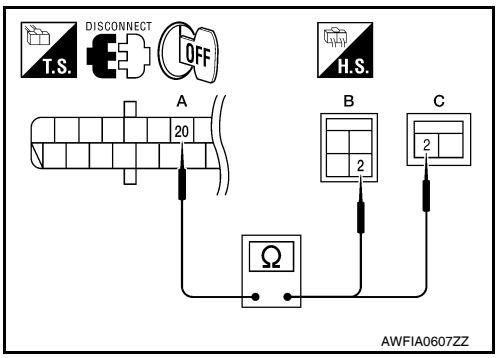
Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".

NO >> GO TO 4

4.CHECK STOP LAMP SWITCH CIRCUIT FOR OPEN

1. Disconnect stop lamp switch connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E33 (A) terminal 20 and stop lamp switch connector E13 (B) terminal 2 (without M/T), or E13 (C) terminal 2 (with M/T).



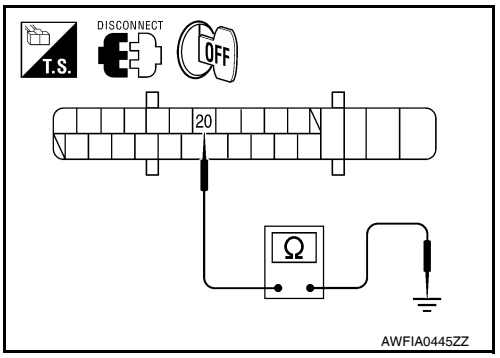
ABS actuator and electric unit (control unit)		stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E33 (A)	20	E13 (B) (without M/T)	2	Yes
		E13 (C) (with M/T)		

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace as necessary.

5.CHECK STOP LAMP SWITCH CIRCUIT FOR SHORT

Check continuity between ABS actuator and electric unit (control unit) connector E33 terminal 20 and ground.



ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E33	20	—	No

Is the inspection result normal?

YES >> Replace stop lamp switch.
NO >> Repair harness or connectors.

ABS/TCS/VDC Control Unit Power and Ground Systems Inspection

INFOID:0000000007328939

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace as necessary.

3.ABS/TCS/VDC CONTROL UNIT POWER AND GROUND CIRCUIT INSPECTION

Measure the voltage and continuity between the ABS actuator and electric unit (control unit) connector E33 and ground.

Signal name	ABS actuator and electric unit (control unit) connector E33	Ground	Measured value

Power supply	2	—	Battery voltage (Approx. 12V)
	3		
Ground	1		Continuity should exist.
	4		

OK or NG

OK >> Check the battery for loose terminals, low voltage, etc. Repair as necessary.
NG >> Repair the circuit.

Brake Fluid Level Switch System Inspection

INFOID:0000000007328940

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

1. Check the brake reservoir tank fluid level. If the level is low, add brake fluid.
2. Erase the self-diagnosis results and check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CONNECTOR INSPECTION

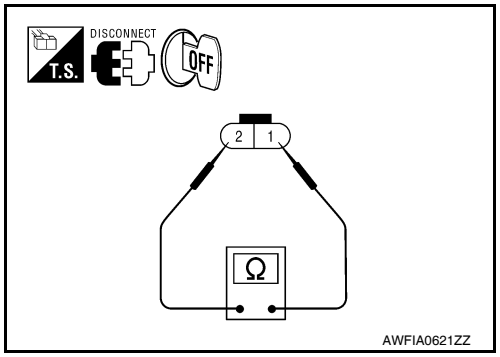
1. Disconnect the ABS actuator and electric unit (control unit) and brake fluid level switch connectors.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace as necessary.

3.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Check continuity between brake fluid level switch terminals 1 and 2.



Brake fluid level switch terminals	Condition	Continuity
1— 2	Brake fluid reservoir full	No
	Brake fluid reservoir empty	Yes

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace brake fluid level switch.

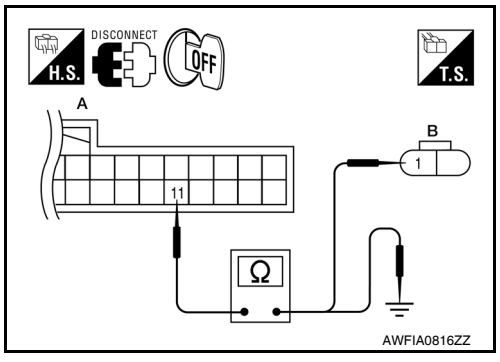
4.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Disconnect combination meter connector.
2. Check continuity between combination meter connector M24 (A) terminal 11 and brake fluid level switch connector E40 (B) terminal 1.

11 - 1 : Continuity should exist.

3. Check continuity between combination meter connector M24 (A) terminal 11 and ground.

11 - Ground : Continuity should not exist.

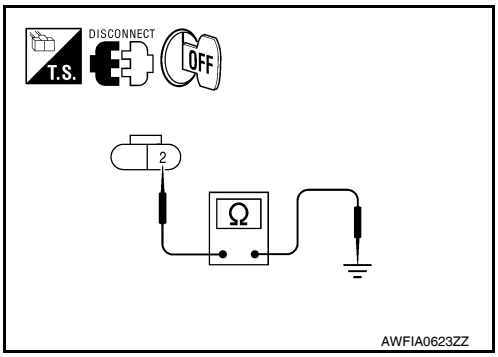


Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace malfunctioning components.

5.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check continuity between brake fluid level switch connector E40 terminal 2 and ground.



2 - Ground : Continuity should exist.

Is the inspection result normal?

YES >> Inspection End.
NO >> • Repair or replace malfunctioning components.
• Perform the self-diagnosis, and make sure that the result shows ″NO DTC IS DETECTED″.

Pressure Sensor System Inspection

INFOID:0000000007328941

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
PRESS SEN CIRCUIT

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector and stop lamp switch connector.
3. Check terminals for deformation, disconnection, looseness and damage. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors securely.
5. Start engine.
6. Pump brake pedal carefully several times, and perform self-diagnosis.

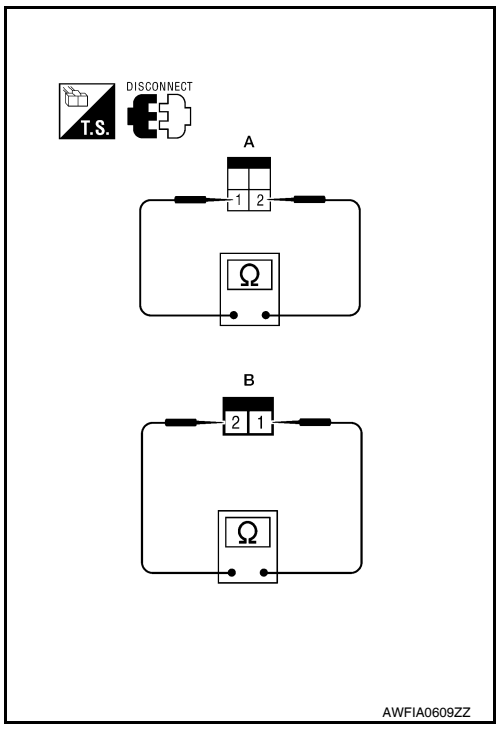
Is the inspection result normal?

YES >> GO TO 3
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch (A) (without M/T) or (B) (with M/T) terminals 1 and 2.

Stop lamp switch terminals	Condition	Continuity
1 – 2	Brake pedal depressed	Yes
	Brake pedal released	No



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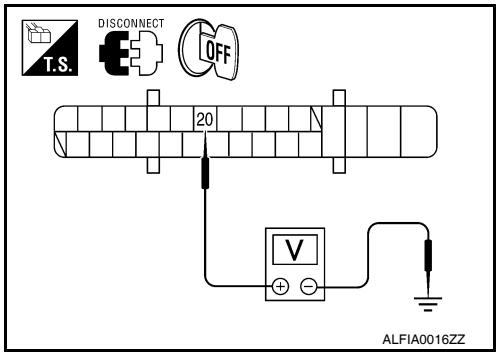
Is the inspection result normal?

YES >> GO TO 4
NO >> Replace stop lamp switch.

4. CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) connector E33 terminal 20 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E33	20	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V



ALFIA0016ZZ

Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace malfunctioning components.

5. CHECK DATA MONITOR

On “DATA MONITOR”, select “PRESS SENSOR” and check the brake fluid pressure.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	– 40 to 300 bar

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
NO >> Inspection End.

Transmission Range Switch System Inspection

INFOID:0000000007328942

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
PNP POS SIG

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) and brake fluid level switch connectors.
2. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace as necessary.

3.CHECK TRANSMISSION RANGE SWITCH

Perform transmission range switch inspection. Refer to AT-91, "Component Inspection" (with A/T) or CVT-65, "Component Inspection" (with CVT).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

CAN Communication System Inspection

INFOID:0000000007328943

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN COM CIR
CAN COMM CIRCUIT

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.
NO >> Inspection End.

2.CHECK CONNECTOR

1. Disconnect the ABS actuator and electric unit (control unit) connector, and check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminals.
2. Reconnect connector to perform self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".

Is “CAN COMM CIRCUIT” displayed in the self-diagnosis display items?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Connector terminal connection is loose, damaged, open, or shorted.

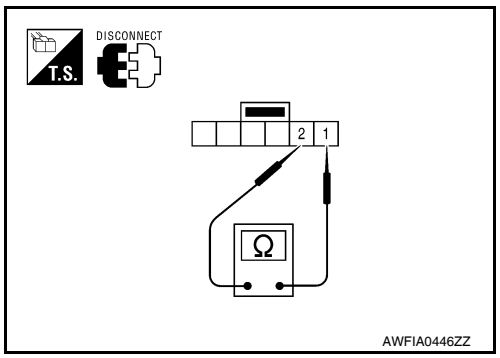
Component Inspection

INFOID:0000000007328944

VDC OFF SWITCH

Check the continuity between terminals 1 and 2.

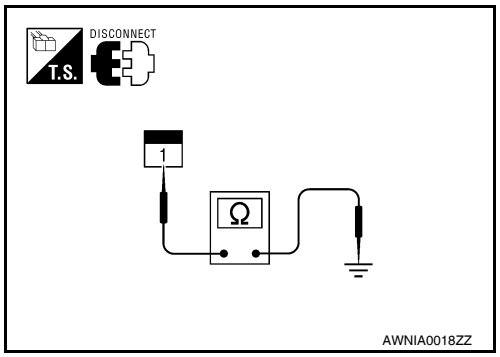
1 -2 : Continuity should exist when pushing the switch.
Continuity should not exist when releasing the switch.



PARKING BRAKE SWITCH

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch terminal 1 and ground.



Component	Terminal	Condition	Continuity
Parking brake switch	1	Parking brake applied	Yes
		Parking brake released	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace parking brake switch.

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS Works Frequently

INFOID:0000000007328945

1.CHECK WARNING LAMP ACTIVATION

Make sure warning lamp remains off while driving.

OK or NG

OK >> GO TO 2.
NG >> Carry out self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".

2.CHECK WHEEL SENSORS

Check the following.
- Wheel sensor mounting for looseness
- Wheel sensors for physical damage
- Wheel sensor connectors for terminal damage or loose connections

OK or NG

OK >> GO TO 3.
NG >> Repair as necessary.

3.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-6, "On-Vehicle Inspection and Service" or RAX-6, "On-Vehicle Inspection and Service".

OK or NG

OK >> GO TO 4.
NG >> Repair as necessary.

4.CHECK BRAKE FLUID PRESSURE

Check brake fluid pressure distribution.
Refer to BR-9, "On Board Inspection".

Is brake fluid pressure distribution normal?

YES >> Inspection End.
NO >> Perform Basic Inspection. Refer to BRC-21, "Basic Inspection".

Unexpected Pedal Action

INFOID:0000000007328946

1.CHECK WARNING LAMP ACTIVATION

Make sure warning lamp remains off while driving.

OK or NG

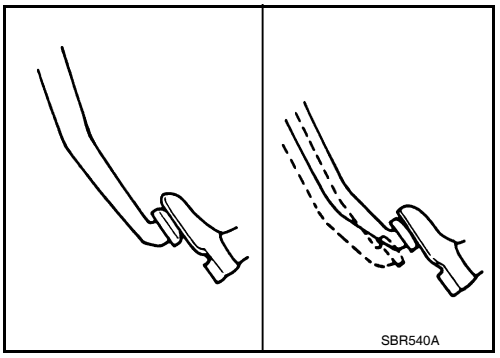
OK >> GO TO 2.
NG >> Carry out self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".

2.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is pedal stroke excessive?

YES >> Perform Basic Inspection. Refer to BRC-21, "Basic Inspection".
NO >> GO TO 3.



3.CHECK CONNECTOR AND BRAKING PERFORMANCE

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check brake effectiveness.

NOTE:
Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs. Refer to BRC-25, "CONSULT Function (ABS)".

OK or NG

OK >> GO TO 4.
NG >> Perform Basic Inspection. Refer to BRC-21, "Basic Inspection".

4.CHECK WHEEL SENSORS

Check the following.
- Wheel sensor mounting for looseness
- Wheel sensors for physical damage
- Wheel sensor connectors for terminal damage or loose connections

OK or NG

OK >> Check ABS actuator and electric unit (control unit) pin terminals for damage and the connection of harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.
NG >> Repair as necessary.

Long Stopping Distance

INFOID:0000000007328947

1.CHECK BASE BRAKING SYSTEM PERFORMANCE

1. Disable ABS by disconnecting ABS actuator and electric unit (control unit) connector.
2. Drive vehicle and check to see if stopping distance is still long.

NOTE:
Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs. Refer to BRC-25, "CONSULT Function (ABS)".

OK or NG

OK >> Go to BRC-46, "ABS Works Frequently".
NG >> Perform Basic Inspection. Refer to BRC-21, "Basic Inspection".

NOTE:
Stopping distance may be longer than vehicles without ABS when road condition is slippery.

ABS Does Not Work

INFOID:0000000007328948

CAUTION:
The ABS does not operate when the vehicle speed is 10 km/h (6 MPH) or less.

1.CHECK WARNING LAMP ACTIVATION

Turn ignition switch ON and check for warning lamp activation.
- Warning lamp should activate for approximately 2 seconds after turning the ignition switch ON.

OK or NG

OK >> Carry out self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".
NG >> Go to BRC-48, "ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On".

Pedal Vibration or ABS Operation Noise

INFOID:0000000007328949

NOTE:
During ABS activation, pedal vibration may be felt and a noise may be heard. This is normal and does not indicate a malfunction.

1.CHECK SYMPTOM

1. Apply brake.
2. Start engine.

Does the symptom occur only when engine is started?

YES >> Carry out self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".
NO >> GO TO 2.

2.RECHECK SYMPTOM

Does the symptom occur only when electrical equipment switches (such as headlamp) are turned on?

YES >> Check for radio, antenna or related wiring that is routed too close to the ABS actuator and electric unit (control unit) and reroute as necessary.
NO >> Go to BRC-46, "ABS Works Frequently".

ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On

INFOID:0000000007328950

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) FUSES

Check 40A fusible link **f** and 30A fusible link **k** for ABS actuator and electric unit (control unit).

OK or NG

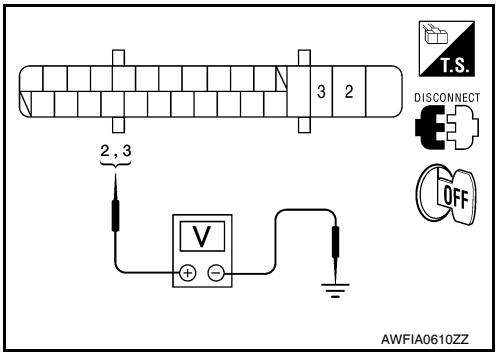
OK >> GO TO 2.
NG >> If fusible link is blown, be sure to eliminate cause of problem before replacing.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUITS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector E33 terminals 2, 3 and ground.

Does battery voltage exist?

YES >> GO TO 3.
NO >> Repair harness or connectors between fusible link and ABS actuator and electric unit (control unit).

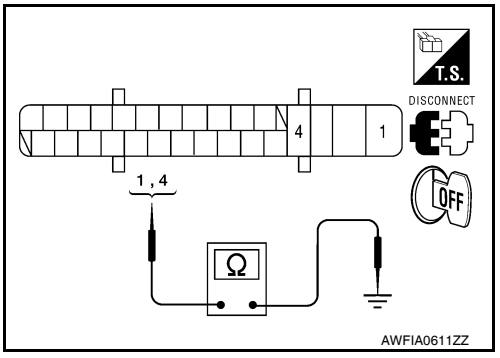


3.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E33 terminals 1, 4 and ground.

Does continuity exist?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
NO >> Repair harness or connectors between ABS actuator and electric unit (control unit) and ground.



ABS Warning Lamp Stays On When Ignition Switch Is Turned On

INFOID:0000000007328951

1.CARRY OUT SELF-DIAGNOSIS

Carry out self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".

Are malfunctions detected in self-diagnosis?

YES >> Refer to BRC-25, "CONSULT Function (ABS)".
NO >> Refer to DI-20, "Schematic".

Vehicle Jerks During TCS/VDC Activation

INFOID:0000000007328952

1. ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis result items displayed?

YES >> After checking and repairing the applicable item, perform the ABS actuator and electric unit (control unit) self-diagnosis again.
NO >> GO TO 2.

2. ENGINE SPEED SIGNAL INSPECTION

Perform data monitor with CONSULT for the ABS actuator and electric unit (control unit).

Is the engine speed at idle 400 rpm or higher?

YES >> GO TO 4.
NO >> GO TO 3.

3. ECM SELF-DIAGNOSIS

Perform ECM self-diagnosis.

Are self-diagnosis result items displayed?

YES >> After checking and repairing the applicable item, perform the ECM self-diagnosis again.
NO >> GO TO 4.

4. TCM SELF-DIAGNOSIS

Perform TCM self-diagnosis.

Are self-diagnosis result items displayed?

YES >> After checking and repairing the applicable item, perform the TCM self-diagnosis again.
NO >> GO TO 5.

5. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and the ECM connectors and check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace the connector terminal.

6. CAN COMMUNICATION INSPECTION

Check the CAN communication system. Refer to BRC-44, "CAN Communication System Inspection".

OK or NG

OK >> Inspection End.
NG >> Reconnect the connectors, and perform ABS actuator and electric unit (control unit) self-diagnosis.

ON-VEHICLE SERVICE

Adjustment of Steering Angle Sensor Neutral Position

INFOID:0000000007328953

After removing/installing or replacing ABS actuator and electric unit (control unit), steering angle sensor, steering and suspension components which affect wheel alignment or after adjusting wheel alignment, be sure to adjust neutral position of steering angle sensor before running vehicle.

NOTE:

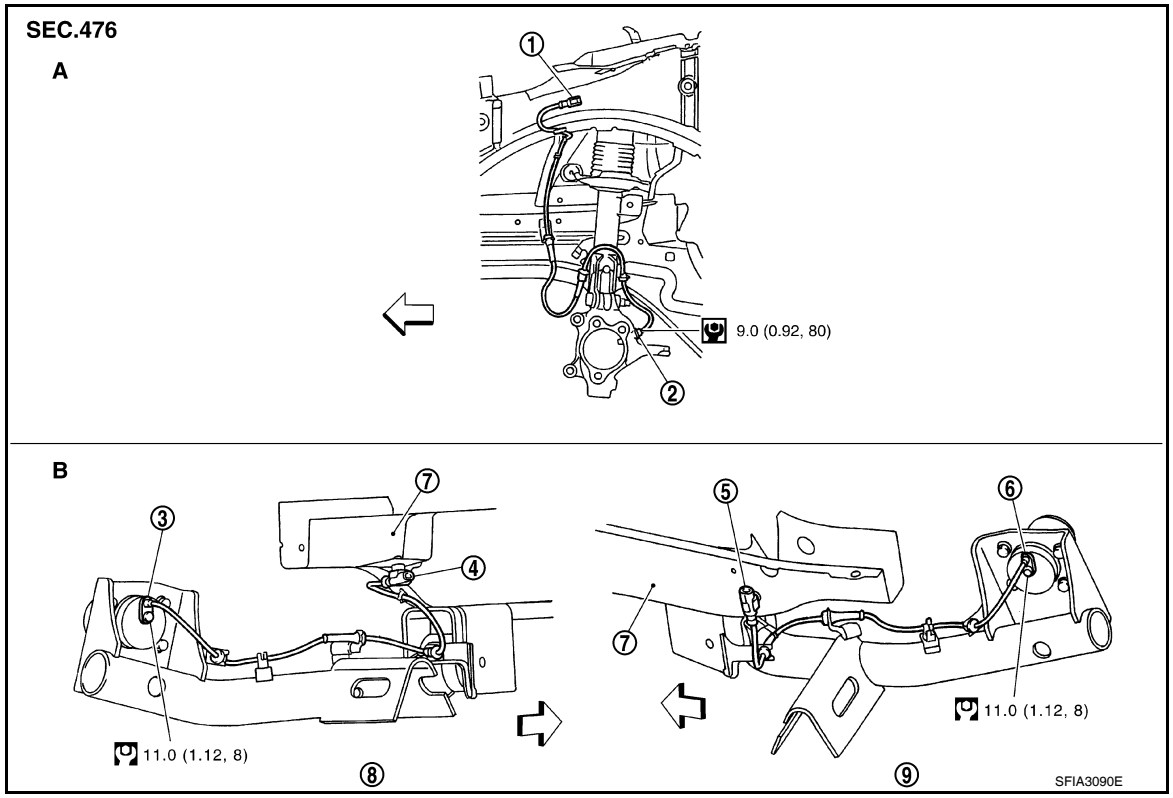
Adjustment of steering angle sensor neutral position requires CONSULT.

1. Stop vehicle with front wheels in straight-ahead position.
2. Connect CONSULT to data link connector on vehicle, and turn ignition switch ON (do not start engine).
3. Touch “ABS”, “WORK SUPPORT” and “ST ANGLE SENSOR ADJUSTMENT” on CONSULT screen in this order.
4. Touch “START”.
   CAUTION:
   Do not touch steering wheel while adjusting steering angle sensor.
5. After approximately 10 seconds, touch “END”. (After approximately 60 seconds, it ends automatically.)
6. Turn ignition switch OFF, then turn it ON again.
7. Run vehicle with front wheels in straight-ahead position, then stop.
8. Select “DATA MONITOR”, “SELECTION FROM MENU”, and “STR ANGLE SIG” on CONSULT screen. Then check that “STR ANGLE SIG” is within 0±2.5 deg. If value is more than specification, repeat steps 1 to 5.
9. Erase memory of ABS actuator and electric unit (control unit) and ECM.
10. Turn ignition switch to OFF.

WHEEL SENSORS

Removal and Installation

INFOID:0000000007328954



A. Front	B. Rear	1. Front wheel sensor connector (LH)
2. Front wheel sensor (LH)	3. Rear wheel sensor (LH)	4. Rear wheel sensor connector (LH)
5. Rear wheel sensor connector (RH)	6. Rear wheel sensor (RH)	7. Side member
8. LH side	9. RH side	⇦ Front

NOTE:

The top portion of the figure (front side) shows the view from LH side of the vehicle. The RH side is the mirror image of the LH side.

FRONT WHEEL SENSOR

Removal

CAUTION:

- **As much as possible, avoid rotating wheel sensor when removing it. Pull wheel sensors out without pulling on sensor harness.**
- **Take care to avoid damaging wheel sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to wheel sensor wiring and loss of sensor function.**

1. Remove the front wheel and tire. Refer to WT-7, "Adjustment".
2. Remove the front fender protector. Refer to EI-24, "Removal and Installation".
3. Disconnect the front wheel sensor connector.
4. Remove the front wheel sensor.

Installation

Installation is in the reverse order of removal.

CAUTION:

- **When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.**

- **When installing front wheel sensor, press rubber grommets of strut bracket and body all the way in until they get locked, and be careful not to apply a twist to harness. Harness should not be twisted after installation. (Install it with harness paint mark on body side grommet facing front of vehicle, and the strut side grommet facing outside of vehicle.)**

REAR WHEEL SENSOR

Removal

CAUTION:

- **As much as possible, avoid rotating wheel sensor when removing it. Pull wheel sensors out without pulling on sensor harness.**
- **Take care to avoid damaging wheel sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to wheel sensor wiring and loss of sensor function.**

1. Disconnect the rear wheel sensor connector.
2. Remove the rear wheel sensor.

Installation

Installation is in the reverse order of removal.

CAUTION:

- **When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.**
- **When installing rear wheel sensor, press rubber grommets of suspension arm bracket and harness of side member all the way in until they get locked, and be careful not to apply a twist to harness. Harness should not be twisted after installation. (Aim the paint mark upward of vehicle.)**

SENSOR ROTOR

Removal and Installation

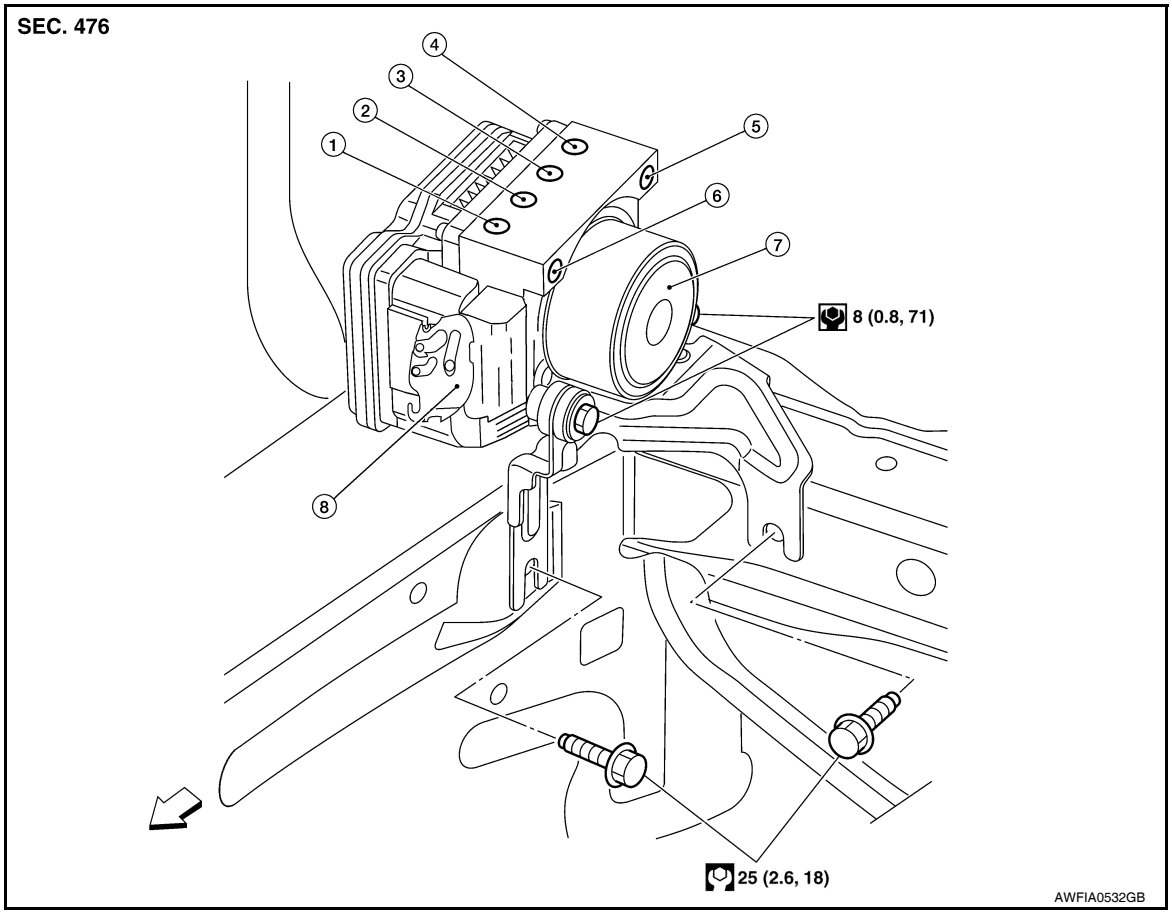
INFOID:0000000007328955

The front and rear sensor rotors are part of the hub and bearing assembly and cannot be removed separately. To replace the front or rear sensor rotors, the hub and bearing assembly must be replaced. Refer to FAX-6, "Removal and Installation" (front axle), RAX-6, "Removal and Installation" (rear axle).

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:0000000007328956



1.	To front right caliper	2.	To rear left wheel cylinder	3.	To rear right wheel cylinder
4.	To front left caliper	5.	From master cylinder primary side	6.	From master cylinder secondary side
7.	ABS actuator and electric unit (control unit)	8.	Harness connector	⇦	Front

CAUTION:

- **Before servicing, disconnect battery negative terminal.**
- **To remove brake tube, use flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench, tighten flare nut to the specified torque. Refer to BR-11, "Hydraulic Circuit".**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System".**

NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Disconnect the battery negative terminal.
2. Remove the cowl top. Refer to EI-22, "Removal and Installation".
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove brake booster hose from engine. Refer to BR-23, "Removal and Installation".

6. Remove ABS actuator and electric unit (control unit) bracket bolts.
7. Remove ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

- Bleed the brake system. Refer to BR-9, "Bleeding Brake System".
- Adjust steering angle sensor neutral position. Refer to BRC-50, "Adjustment of Steering Angle Sensor Neutral Position".

CAUTION:

After installing harness connector in the ABS actuator and electric unit (control unit), make sure the connector is securely locked.

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000007328957

NOTE:
The steering angle sensor is part of the spiral cable assembly and is not available separately.

REMOVAL

Remove the spiral cable. Refer to SRS-37, "Removal and Installation".

INSTALLATION

Installation is in the reverse order of removal.

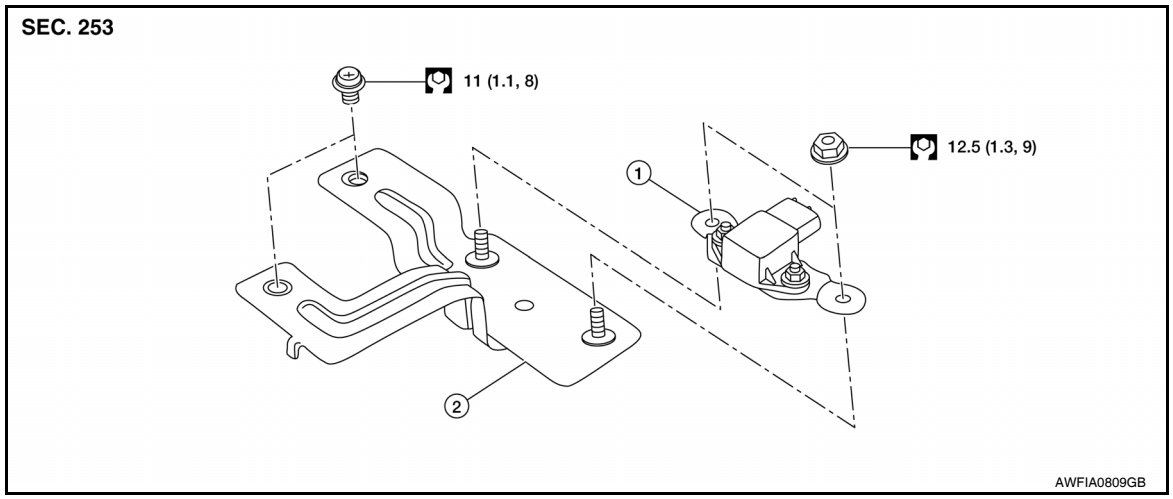
CAUTION:
Perform the neutral position adjustment for the steering angle sensor. Refer to BRC-50, "Adjustment of Steering Angle Sensor Neutral Position".

YAW RATE/SIDE/DECEL G SENSOR

Removal and Installation

INFOID:0000000007328958

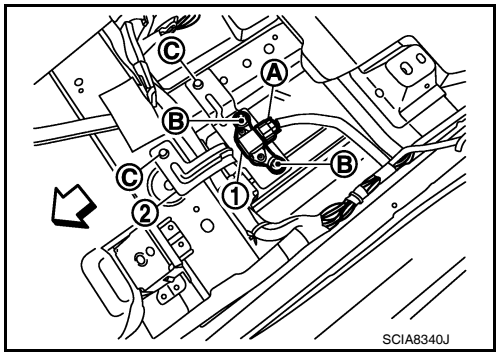
EXPLODED VIEW



1. Yaw rate/side/decel G sensor
2. Bracket

REMOVAL

1. Disconnect battery negative terminal.
2. Remove driver seat. Refer to SE-14, "Removal and Installation".
3. Partially remove and reposition carpet from driver seat area. Refer to EI-39, "Removal and Installation".
4. Disconnect harness connector (A).
5. Remove attaching nuts (B) and remove yaw rate/side/decel G sensor (1).
   - 2: yaw rate/side/decel G sensor bracket
   - C: yaw rate/side/decel G sensor bracket bolts



CAUTION:

- **Do not drop or strike the yaw rate/side/decel G sensor.**
- **Do not use power tools to remove or install yaw rate/side/decel G sensor.**

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not drop or strike the yaw rate/side/decel G sensor.**

SECTION PS
POWER STEERING SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007332072

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007332073

NOTE:

- This procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition switch in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage).
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Steering System

INFOID:0000000007332074

- In case of removing steering gear assembly, make the final tightening with grounded and unloaded vehicle condition, and then check wheel alignment.
- Observe the following precautions when disassembling.
- Before disassembly, thoroughly clean the outside of the unit.
- Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- For easier and proper assembly, place disassembled parts in order on a parts rack.
- Use nylon cloth or paper towels to clean the parts; common shop rags can leave lint that might interfere with their operation.
- Do not reuse non-reusable parts.
- Before assembling, apply the specified grease to the directed parts.

PREPARATION

Special Service Tool

INFOID:0000000007332075

The actual shapes of Kent-Moore tools may differ from those of special tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST3127S000 (J-25742-1) Preload gauge (J-25765-A) 1. GG91030000 Torque wrench 2. HT62940000 (—) Socket adapter (1/2") 3. HT62900000 (—) Socket adapter (3/8")	Inspecting rotating torque for steering column assembly and pinion assembly
KV40107300 (—) Boot Band crimping tool	Installing boot bands
KV48103400 (—) Preload adapter	Inspecting of rotating torque for pinion assembly
— (J-44372) Pull gauge	Measuring steering wheel turning force and ball joint swinging force.

Commercial Service Tool

INFOID:0000000007332076

Tool number Tool name	Description
Power tool	Removing nuts and bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007332077

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		PS-15	PS-15	PS-6	PS-15, "Disassembly and Assembly"	PS-6, "On-Vehicle Inspection and Service"	PS-10, "Removal and Installation"	PS-15, PS-15	PS-10, "Removal and Installation"	PS-10, "Removal and Installation"	PS-15	FAX-5, "NVH Troubleshooting Chart"	FSU-6, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	WT-5, "NVH Troubleshooting Chart"	FAX-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"
Possible cause and SUSPECTED PARTS		Outer/Inner socket ball joint swinging torque	Outer/Inner socket ball joint end play	Steering wheel play	Steering gear pinion rotating torque	Improper steering wheel	Improper installation or looseness of tilt lock lever	Mounting loosenesss	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	WHEEL HUB	SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
Symptom	Noise	×	×	×	×							×	×	×	×	×	×
	Shake					×	×	×				×	×	×	×	×	×
	Vibration					×	×	×	×	×		×	×	×		×	
	Shimmy					×	×	×			×	×	×	×	×		×
	Shudder							×			×	×	×	×	×		×

×: Applicable

STEERING WHEEL

On-Vehicle Inspection and Service

INFOID:0000000007332078

CHECKING CONDITION OF INSTALLATION

- Check installation conditions of steering gear assembly, front suspension assembly, axle and steering column assembly.
- Check if movement exists when steering wheel is moved up and down, to the left and right and to the axial direction.

Steering wheel axial end play : 0 mm (0 in)

- Check steering gear assembly bolts and nuts for looseness. Refer to PS-15, "Removal and Installation".

CHECKING STEERING WHEEL PLAY

- Turn steering wheel so that front wheels come to the straight-ahead position. Start engine and lightly turn steering wheel to the left and right until front wheels start to move. Measure steering wheel movement on the outer circumference.

Steering wheel play : 0 - 35 mm (0 - 1.38 in)

- When the measurement value is outside the standard value, check backlash for each joint of steering column assembly and installation condition of steering gear assembly.

CHECKING NEUTRAL POSITION STEERING WHEEL

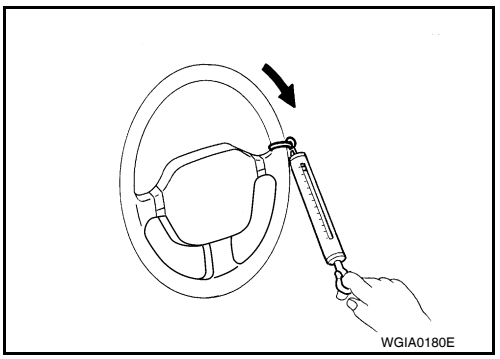
- Make sure that steering gear assembly, steering column assembly and steering wheel are installed in the correct position.
- Perform neutral position inspection after wheel alignment. Refer to PS-2, "Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"".
- Set vehicle to the straight-ahead position and confirm steering wheel is in the neutral position.
- Loosen outer socket lock nut and turn inner socket to left and right equally to make fine adjustments if steering wheel is not in the neutral position.

CHECKING STEERING WHEEL TURNING FORCE

1. Park vehicle on a level and dry surface, set parking brake.
2. Start engine.
3. Check steering wheel turning force when steering wheel has been turned 360° from neutral position using Tool as shown.

Tool number : — (J-44372)

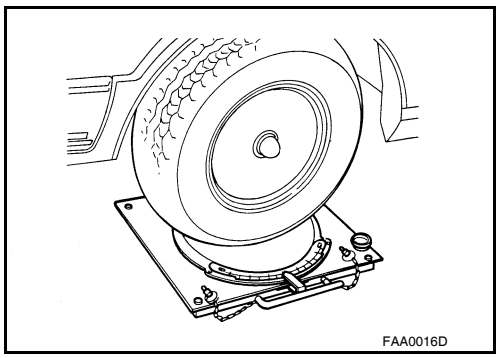
Steering wheel turning force : Less than 36 N (3.7 kg-f, 8.2 lb-f)



4. If steering wheel turning force is out of the specification, refer to GI-9, "How to Follow Trouble Diagnosis".

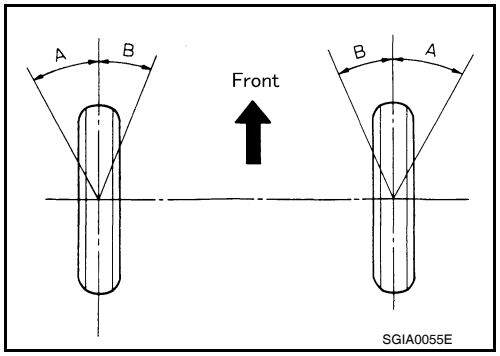
CHECKING FRONT WHEEL TURNING ANGLE

- Check front wheel turning angle after toe-in inspection. Place front wheels on turning radius gauges and rear wheels on stands. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.



- With the engine at idle, turn steering wheel from full left stop to full right stop and measure the turning angles.

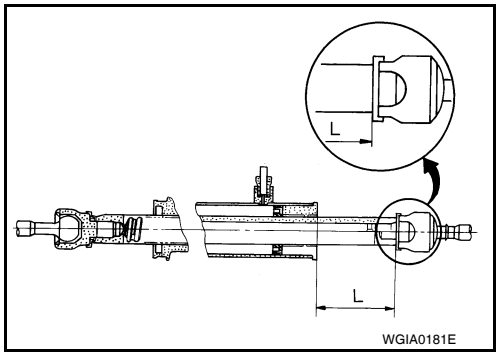
Inner wheel (Angle: A)	**Minimum**	**35° 00′ (35.0°)**
	Nominal	**38° 00′ (38.0°)**
	Maximum	**39° 00′ (39.0°)**
Outer wheel (Angle: B)		**33° 00′ (33.0°)**



- Measure rack stroke if angles are outside the specified value.

Rack stroke (L) : 65.0 mm (2.559 in)

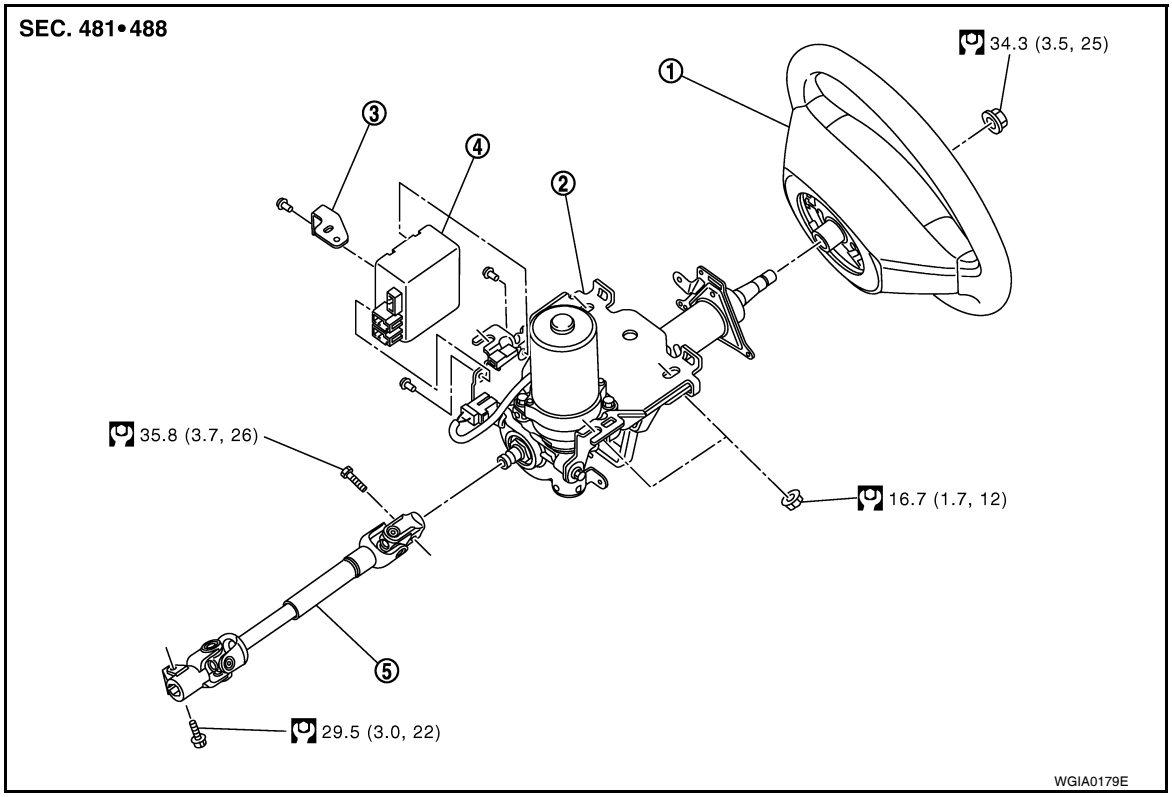
- Disassemble steering gear assembly to check the cause that rack stroke is outside of the standard.
- Steering angles are not adjustable. Check steering gear assembly, steering column assembly and front suspension components for wear or damage if any of the turning angles are different from the specified value. Replace any of them, if any non-standard condition exists.



Removal and Installation

INFOID:0000000007332079

COMPONENT



1.	Steering wheel	2.	Steering column assembly (with motor, reduction gear, sensor)	3.	Bracket
4.	EPS control unit	5.	Intermediate shaft		

CAUTION:

- **After installing steering wheel, perform wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".**

REMOVAL

NOTE:

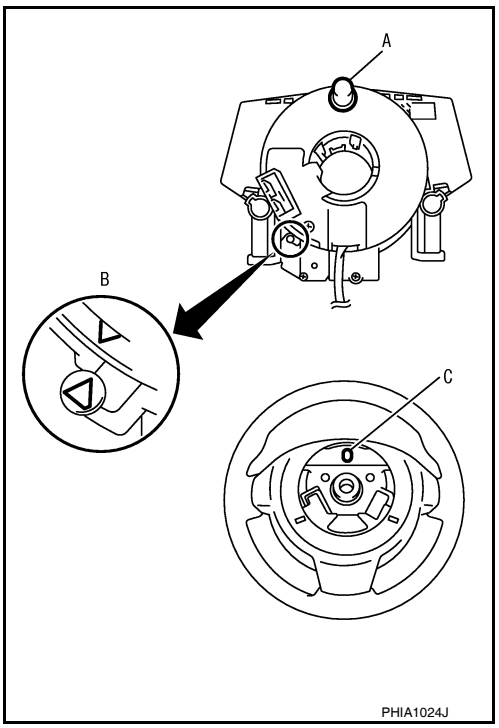
When reconnecting spiral cable, secure cable with a tape so that case and rotating part keep aligned. This will omit neutral position alignment procedure during spiral cable installation.

1. Set vehicle to the straight-ahead position.
2. Remove driver air bag module. Refer to SRS-34, "Removal and Installation".
3. Remove steering wheel lock nut after steering is locked.
4. Remove steering wheel.

INSTALLATION

Installation is in the reverse order of removal.

- Align spiral cable correctly when installing steering wheel. Make sure spiral cable alignment and centering marks (B) are matched and in the neutral position. The neutral position is detected by turning left 2.5 revolutions from the right end position, ending with the locating pin (A) at the top. Place steering wheel in straight ahead position, then install it with the locating pin hole (C) directly over spiral cable locating pin.
- After the work is completed, perform self-diagnosis to make sure no malfunction is detected. Refer to SRS-19, "SRS Operation Check".



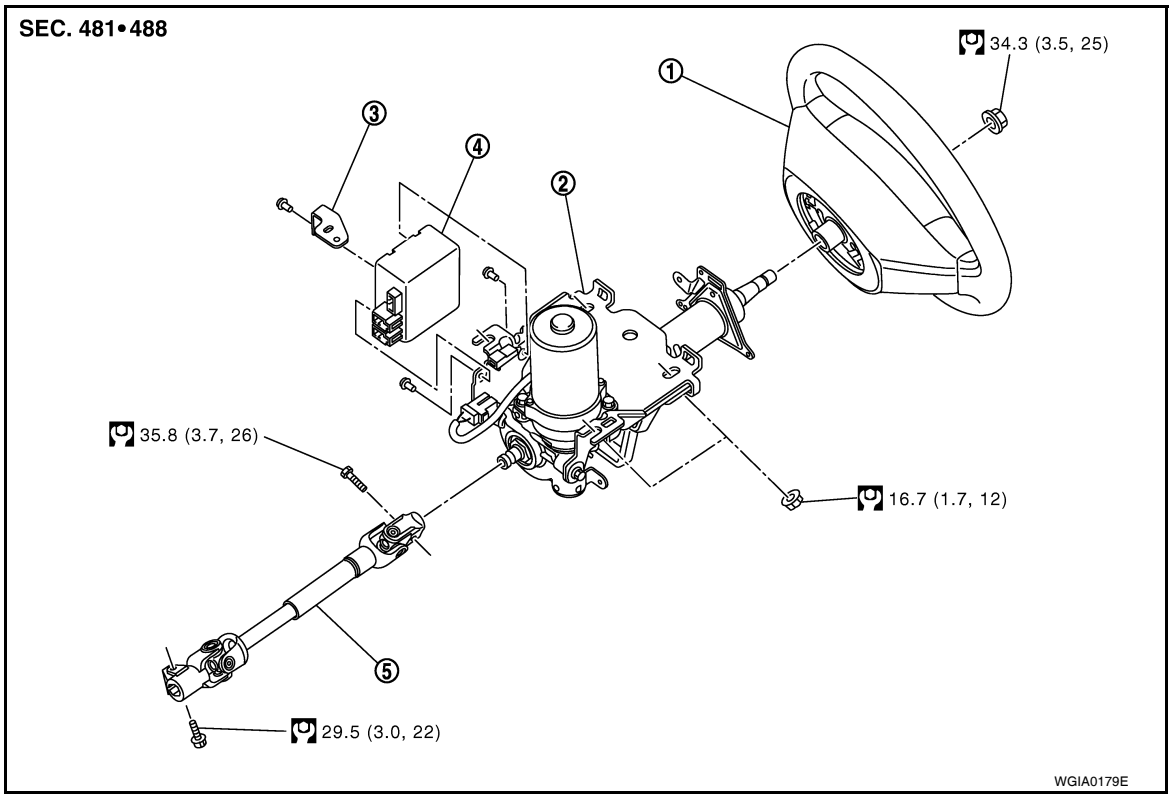
- Tighten steering wheel lock nut to specification.

STEERING COLUMN

Removal and Installation

INFOID:0000000007332080

COMPONENT



1.	Steering wheel	2.	Steering column assembly (with motor, reduction gear, sensor)	3.	Bracket
4.	EPS control unit	5.	Intermediate shaft		

CAUTION:

- **Any time the ignition switch has been removed or installed, the keys must be re-registered in the BCM. Refer to CONSULT operation manual IVIS/NVIS.**
- **Do not allow axial impact to steering column assembly during removal and installation.**
- **Steering column must be kept at maximum tilt up position during removal and installation. Do not operate tilt mechanism while steering column is out of the vehicle.**
- **Put matching mark on intermediate shaft and steering column assembly before removing steering column.**
- **When steering wheel is turned repeatedly with the vehicle stopped, care must be taken because motor and EPS control unit may get too hot.**
- **Steering column assembly is heavy. Care must be taken when removing steering column assembly from vehicle.**
- **Do not put steering column assembly near the things that generate excessive magnetic force.**
- **Steering column assembly (with motor, reduction gear, sensor) cannot be disassembled.**
- **After installing steering column, perform wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".**

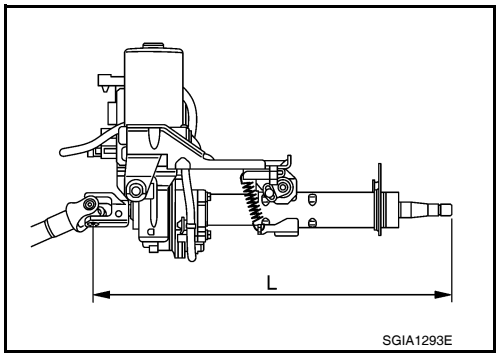
REMOVAL

1. Set vehicle to the straight ahead-position.
2. Remove driver air bag module. Refer to SRS-34, "Removal and Installation".
3. Remove steering wheel. Refer to PS-7, "Removal and Installation".
4. Remove steering column cover (upper and lower). Refer to IP-11, "Component Parts".
5. Remove combination switch and spiral cable. Refer to SRS-37, "Removal and Installation".

6. Remove instrument lower finisher. Refer to IP-11, "Component Parts".
7. Disconnect each switch connector installed to steering column assembly, and then disconnect harness from steering column assembly.
8. Remove bolt of intermediate shaft (upper side), and then remove intermediate shaft from steering column assembly.
9. Remove steering column assembly nuts, and then remove steering column assembly from vehicle.
10. Remove screws of bracket and EPS control unit, and then remove bracket and EPS control unit from steering column assembly.

INSPECTION AFTER REMOVAL

- Check each part of steering column assembly, EPS control unit and intermediate shaft for damage and. replace as necessary.
- Measure the length (L) as shown, if vehicle has been involved in a minor collision. Replace steering column assembly (with motor, reduction gear, sensor) if outside the standard.



Steering column length (L)	**: Refer to PS-20, "Steering Column".**

- Check tilt mechanism for damage or other malfunctions. Replace steering column assembly (with motor, reduction gear, sensor) as necessary.
- Measure steering column assembly rotating torque using Tool. Replace steering column assembly (with motor, reduction gear, sensor) if outside the standard.

Tool number : ST3127S000 (J-25742-1)

Rotating torque : Refer to PS-20, "Steering Column".

INSTALLATION

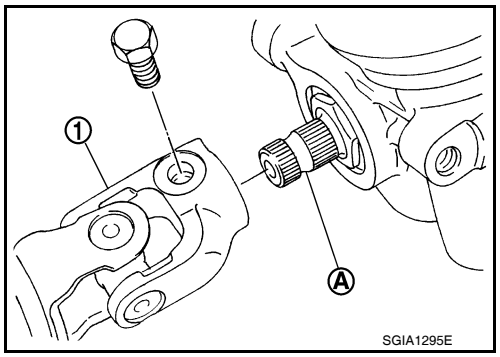
Installation is in the reverse order of removal.

- Installation is in the reverse order of removal.
- When tightening bolt (intermediate shaft lower side), tighten it by hand first, and make sure there is no feeling of sticking or galling before final tightening.

CAUTION:

Insert bolt in the proper direction. (Do not insert it from the other side.)

- When connecting intermediate shaft upper side (1) and column shaft, make sure the bolt is securely seated in groove (A) of column shaft (A) before final tightening.

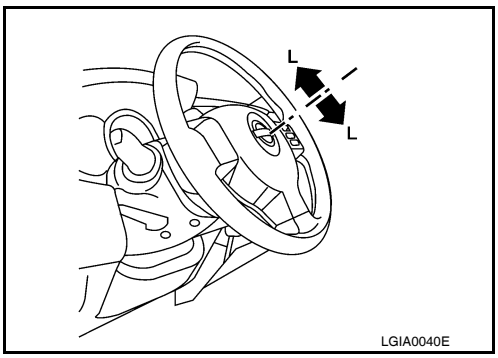


INSPECTION AFTER INSTALLATION

- Rotate steering wheel to check for decentered condition, binding, noise or excessive steering effort.
- After installing steering column assembly, perform self-diagnosis with CONSULT to ensure correct operation. Refer to STC-7, "CONSULT Function".

- Check tilt mechanism operating range (L) as shown.

Tilt operating range (L) : **Refer to PS-20, "Steering Column".**

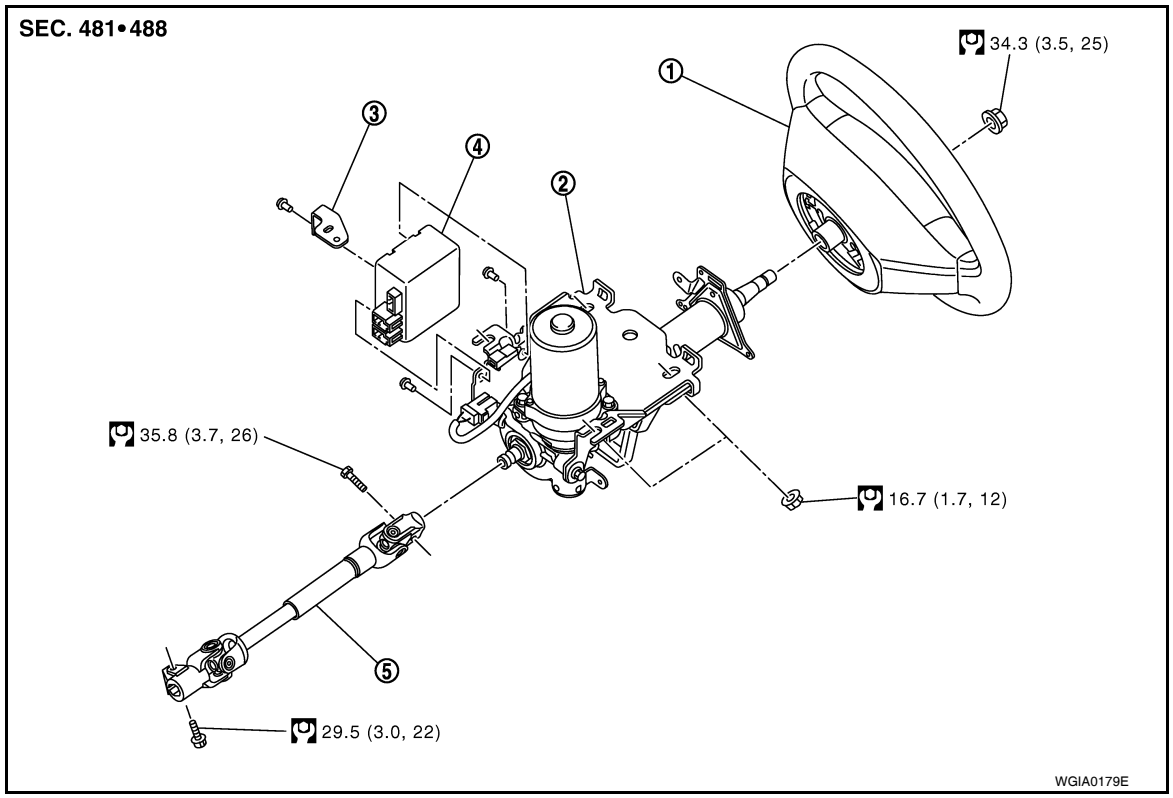


STEERING SHAFT

Removal and Installation

INFOID:0000000007332081

COMPONENT



1. Steering wheel
2. Steering column assembly (with motor, reduction gear, sensor)
3. Bracket
4. EPS control unit
5. Intermediate shaft

CAUTION:

- **Put matching mark on intermediate shaft and steering column assembly before removing intermediate shaft.**
- **After installing intermediate shaft, perform wheel alignment. Refer to FSU-7, "Wheel Alignment Inspection".**

REMOVAL

1. Set vehicle to the straight ahead-position.
2. Remove instrument lower finisher. Refer to IP-11, "Component Parts".
3. Remove bolt of intermediate shaft (upper side), and then remove intermediate shaft from steering column assembly.
4. Remove bolt of intermediate shaft (lower side), and then remove intermediate shaft from vehicle.

INSPECTION AFTER REMOVAL

- Check intermediate shaft for damage and replace as necessary.

INSTALLATION

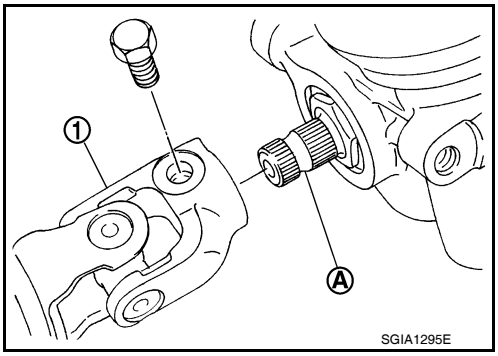
Installation is in the reverse order of removal.

- Installation is in the reverse order of removal.
- When tightening bolt (intermediate shaft lower side), tighten it by hand first, and make sure there is no feeling of sticking or galling before final tightening.

CAUTION:

Insert bolt in the proper direction. (Do not insert it from the other side).

- When connecting intermediate shaft upper side (1) and column shaft, make sure the bolt is securely seated in groove (A) of column shaft (A) before final tightening.



INSPECTION AFTER INSTALLATION

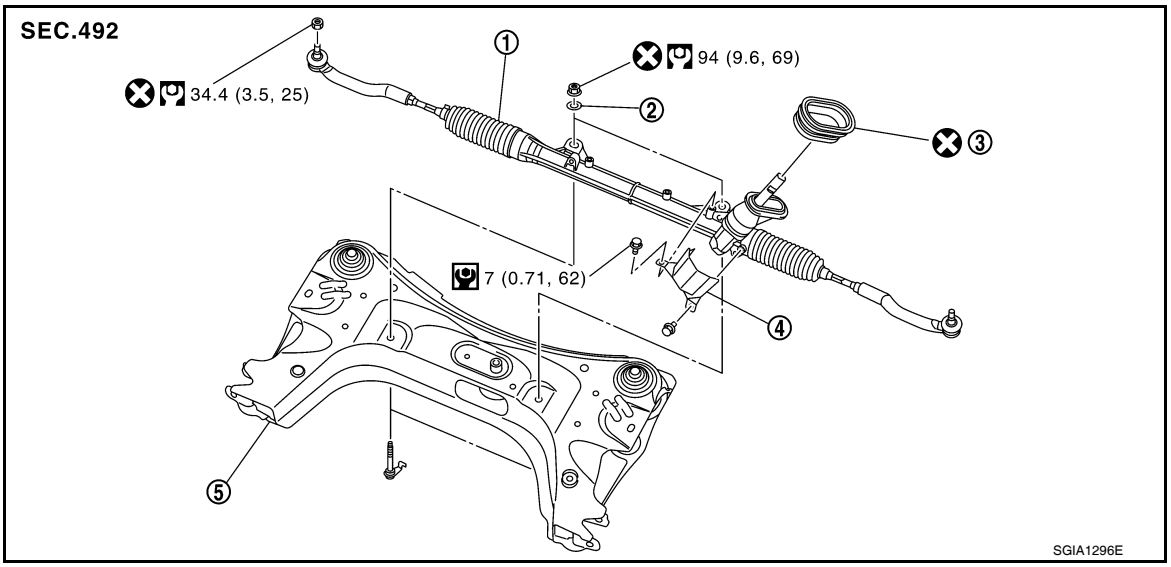
- Rotate steering wheel to check for decentered condition, binding, noise or excessive steering effort.

POWER STEERING GEAR

Removal and Installation

INFOID:0000000007332082

COMPONENT



1. Steering gear assembly
2. Washer
3. Lower dash seal
4. Heat insulator
5. Front suspension member

Refer to GI-7, "Description" for the symbols.

CAUTION:

Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Be sure to secure steering wheel using string to avoid turning.

REMOVAL

1. Remove front suspension member. Refer to FSU-11, "Removal and Installation".
2. Remove bolts and nuts of steering gear assembly.

INSTALLATION

Installation is in the reverse order of removal.

- Clean mounting surface on the body side of lower dash seal when installing steering gear assembly.
- Check wheel alignment under unladen conditions with tires on level ground. Refer to FSU-7, "Wheel Alignment Inspection".

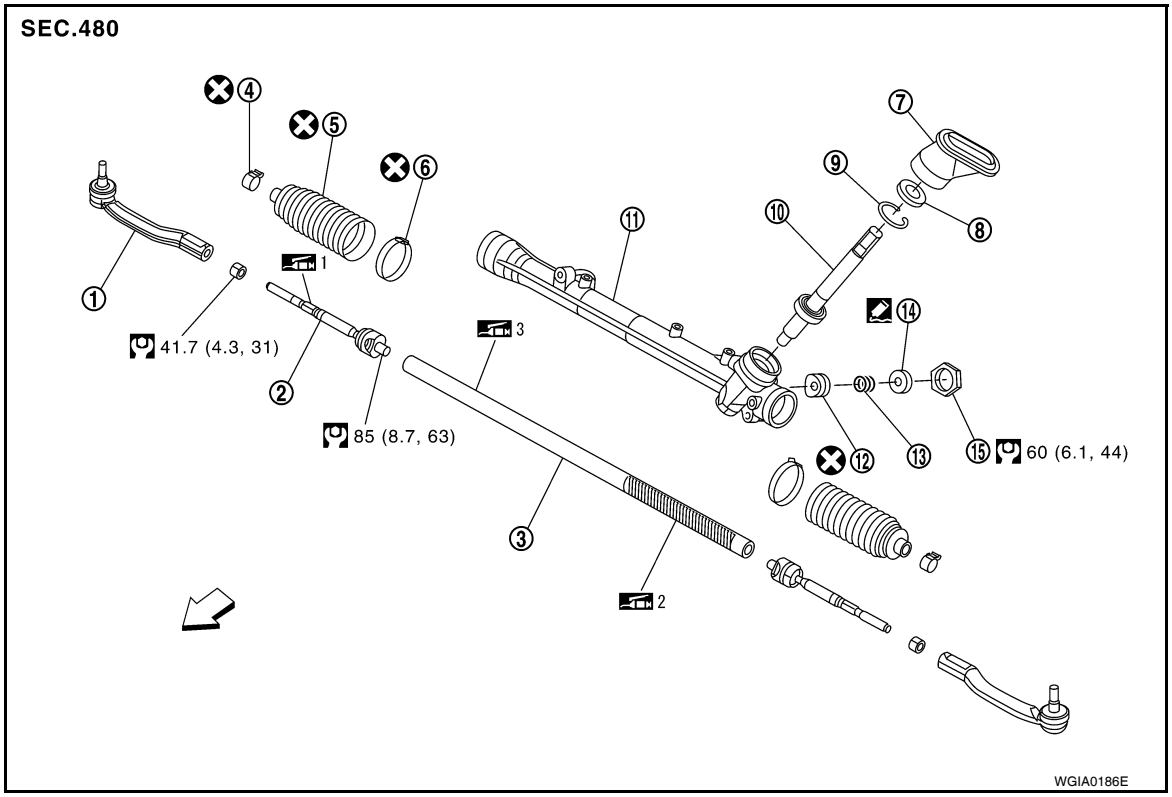
INSPECTION AFTER INSTALLATION

Rotate steering wheel to check for decentered condition, binding, noise or excessive steering effort.

Disassembly and Assembly

INFOID:0000000007332083

COMPONENT (R24K TYPE)



1.	Outer socket	2.	Inner socket	3.	Rack assembly
4.	Boot clamp (small diameter)	5.	Boot	6.	Boot clamp (large diameter)
7.	Joint cover	8.	Pinion seal	9.	Snap ring
10.	Pinion assembly	11.	Gear housing assembly	12.	Retainer
13.	Spring	14.	Adjusting screw	15.	Lock nut

⇦ : Front

Refer to GI-7 for the symbols unless shown below.

: Apply Genuine Thread Locking Sealant, Three Bound 1141 or equivalent.

:1 Apply Genuine Lithium Soap, Idemitsu Autorex A or equivalent.

:2 Apply Genuine Lithium Soap, Wanlouver MO No.2 (manufactured by Kyoudouyushi) or equivalent.

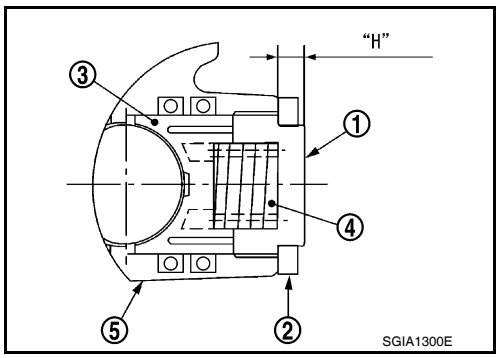
:3 Apply Genuine Lithium Soap, Multemp AC-P (manufactured by Kyoudouyushi) or equivalent.

CAUTION:
Clean steering gear assembly with kerosene before disassembling.

DISASSEMBLY

1. Loosen outer socket lock nut, and then remove outer socket from inner socket.
2. Remove boot clamp, and then remove boot from inner socket.
   CAUTION:
   Do not damage inner socket and gear housing assembly when removing boot. Inner socket and gear housing assembly must be replaced if inner socket and gear housing assembly are damaged because it may allow foreign material to enter.
3. Remove inner socket from rack assembly while holding the flat portion of the rack next to the inner socket using a suitable tool.

4. Measure adjusting screw height “H”, and loosen lock nut (2).
5. Remove adjusting screw (1), retainer (3) and spring (4) from gear housing assembly (5).



INSPECTION AFTER DISASSEMBLY

Joint Cover

Check joint cover protrusion for damage. Replace if there are.

Rack and Pinion Assembly

- Check pinion assembly for damage or wear. Replace as necessary.
- Rotate pinion assembly and check for torque variation or rattle. Replace steering gear as necessary.

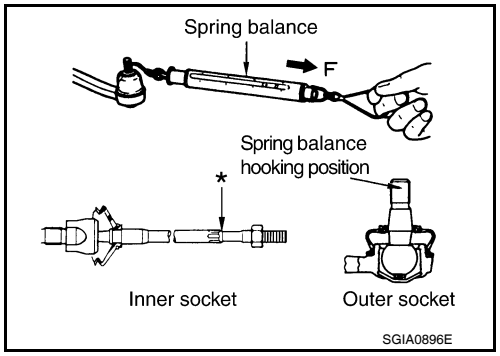
Gear Housing Assembly

Check gear housing assembly for damage or scratches. Replace steering gear as necessary.

Outer Socket and Inner Socket

1. Check ball joint swinging torque.
   - Hook Tool at the point shown and pull the spring balance. Make sure that the spring balance reads the specified value when ball stud and inner socket start to move. Replace outer socket and inner socket if they are outside the standard.

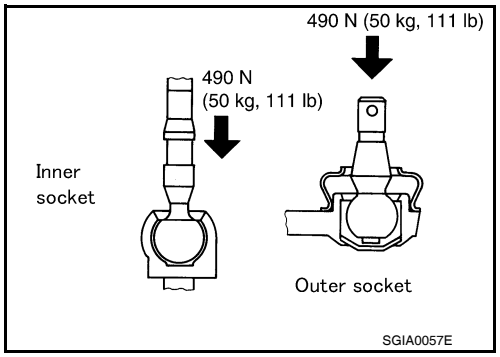
Tool number : — (J-44372)



Items	Outer socket	Inner socket
Measuring point of spring balance	Ball stud upper side	Measuring point at * mark shown in the figure
Swinging torque	Refer to PS-20, "Steering Outer Socket and Inner Socket".	Refer to PS-20, "Steering Outer Socket and Inner Socket".
Spring balance measurement		

2. Ball joint axial end play
   - Apply an axial load of 490 N (50 kg-f, 111 lb-f) to ball stud. Measure amount of stud movement using a dial gauge, and then make sure that the value is within the specified range. Replace outer socket and inner socket if the measured value is outside the standard.

Outer socket axial end play	Refer to PS-20, "Steering Outer Socket and Inner Socket".
Inner socket axial end play	

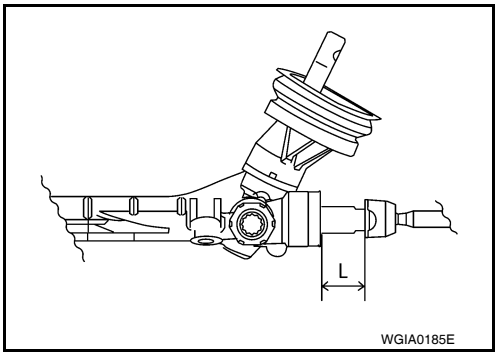


ASSEMBLY

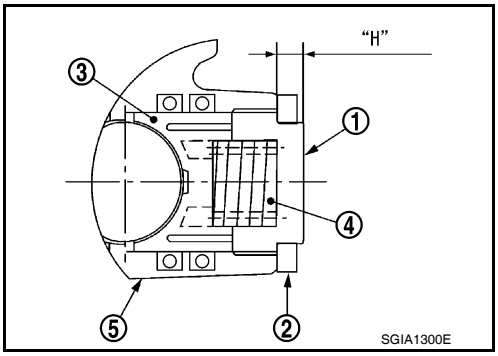
1. Apply recommended grease to teeth part and bush part of rack assembly, if necessary.
2. Apply recommended grease to back of rack assembly, if necessary.

3. Install inner socket to rack assembly. Torque to specified value while holding the flat portion of the rack next to the inner socket using a suitable tool.
4. Apply recommended grease to inner socket.
5. Decide on the neutral position for the rack assembly.

Rack stroke "L" : Refer to PS-21, "Steering Gear".

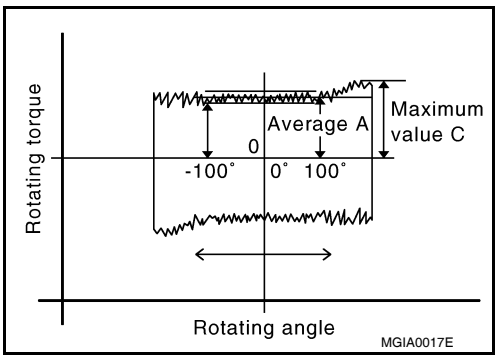


6. Apply recommended grease to around retainer (3), then install retainer (3), spring (4) and adjusting screw (1) to gear housing assembly (5).
7. Apply recommended thread locking sealant to the thread (2 turns thread), and then screw in the adjusting screw (1) until it reaches height "H" from gear housing assembly (5) measured before disassembling.
8. Tighten lock nut to (2) the specified torque securing it to prevent adjusting screw (1) from freewheeling condition.
9. Move rack assembly 10 strokes throughout the full stroke so that the parts can fit with each other.



10. Using Tools A and B, measure rotating torque of pinion assembly. If the measurement is outside of the specified range, readjust pinion rotating torque. If the measurement is outside of the specified range for readjust, replace steering gear assembly.

Tool numbers A: ST3127S000 (J-25742-1)
B: KV48103400 (—)

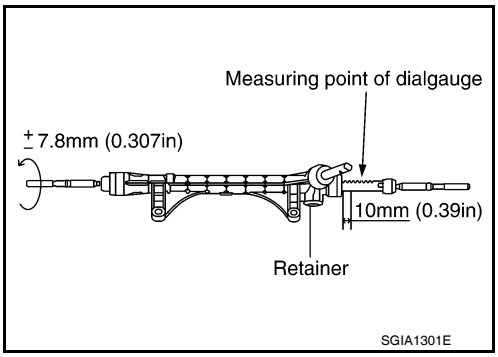


Pinion rotating torque standard	
Around neutral position (within±100°) Average A	Refer to PS-21, "Steering Gear".
Maximum variation C	

11. Set dial gauge to the back of rack assembly on the pinion assembly side around the center of stroke. Measure displacement of rack under torsional torque of ± 7.8 N·m (0.80 kg-m, 69 in-lb), and then check if it is within the standard value. If the measurement is outside the standard value, adjust it again. After the readjustment, if measurement is still outside the standard value, replace steering gear assembly.

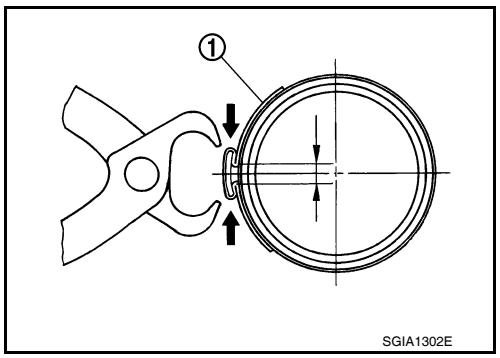
Standard value : Less than 0.1 mm (0.004 in)

12. Install boot to gear housing assembly and inner socket.

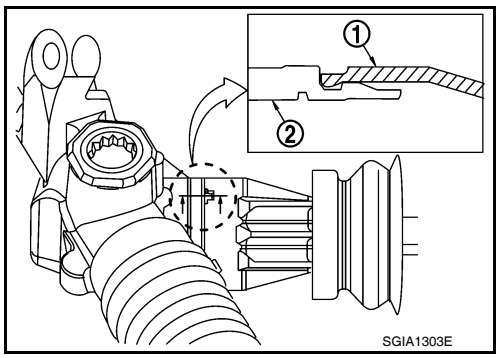


13. Install boot clamp (1) to boot using Tool.
NOTE:
Install large diameter side boot clamp (1) securely to boot groove, and crimp it so as to have clearance of 3 mm (0.12 in) or less as shown.

Tool number : KV40107300 (—)



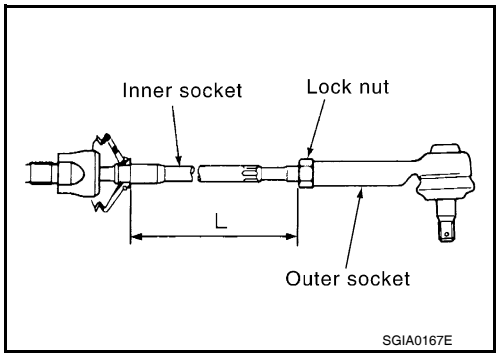
14. Install joint cover (1) to gear housing assembly (2).
CAUTION:
Install joint cover so that the protrusion for locating is securely set to gear housing groove.



15. Adjust inner socket to standard length “L”, and then tighten lock nut to the specified torque. Check length of inner socket “L” again after tightening lock nut. Make sure that the length is the standard.

Inner socket length “L” : Refer to PS-20, "Steering Outer Socket and Inner Socket"

CAUTION:
Adjust toe-in. Refer to FSU-7, "Wheel Alignment Inspection". Length achieved after toe-in adjustment is not necessarily the above value.



SERVICE DATA AND SPECIFICATIONS (SDS)

Steering Wheel

INFOID:0000000007332084

Steering wheel axial end play	0 mm (0 in)
Steering wheel play	0 - 35 mm (0 - 1.38 in)
Steering wheel turning force	Less than 36 N (3.7 kg-f, 8.2 lb-f)

Steering Angle

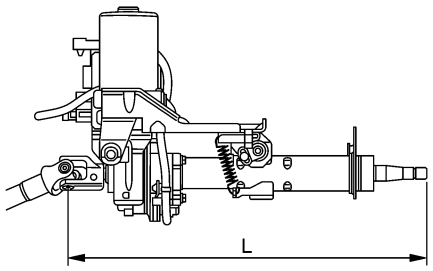
INFOID:0000000007332085

Inner wheel Degree minute (Decimal degree)	Minimum	35° 00′ (35.0°)
	Nominal	38° 00′ (38.0°)
	Maximum	39° 00′ (39.0°)
Outer wheel Degree minute (Decimal degree)		33° 00′ (33.0°)

Steering Column

INFOID:0000000007332086

Steering column length “L”	Minimum	462.1 mm (18.19 in)
	Nominal	464.1 mm (18.27 in)
	Maximum	466.1 mm (18.35 in)



SGIA1293E

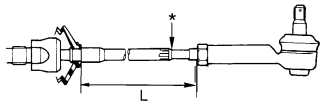
Steering column assembly rotating torque	0 - 2.1 N·m (0 - 0.21 kg-m, 0 - 18 in-lb)
Tilt operating range	20 mm (0.79 in)

Steering Outer Socket and Inner Socket

INFOID:0000000007332087

Steering gear type		R24K
Outer socket ball stud	Swinging torque	0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3.0 - 25 in-lb)
	Measurement on spring balance Measuring point: ball stud upper side	6.0 - 58 N (0.61 - 5.91 kg-f, 1.35 - 13.03 lb-f)
	Axial end play	0.5 mm (0.020 in) or less
Inner socket ball joint	Swinging torque	0.5 - 5.0 N·m (0.06 - 0.51 kg-m, 5 - 44 in-lb)
	• Measurement on spring balance • Measuring point at *mark shown	4.3 - 43.5 N (0.44 - 4.44 kg-f, 0.97 - 9.79 lb-f)
	Axial end play	0.2 mm (0.008 in) or less

Steering gear type	R24K
Inner socket length “L”	57.8 mm (2.276 in)

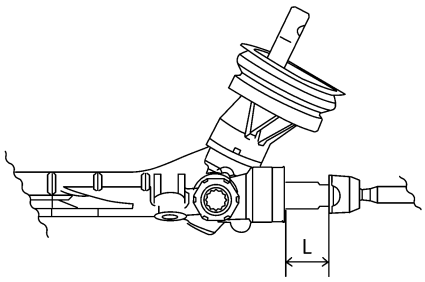


SGIA0950E

Steering Gear

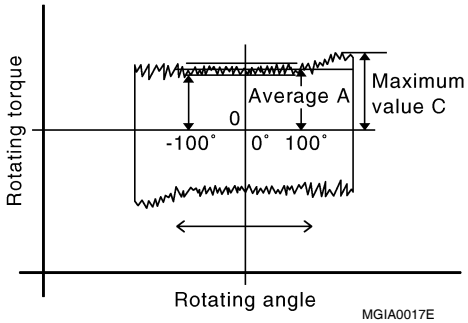
INFOID:0000000007332088

Steering gear model	R24K
Rack neutral position, dimension “L” (rack stroke)	65.0 mm (2.559 in)



WGIA0185E

Pinion rotating torque standard	Around neutral position (within ± 100°) Average A	0.3 - 1.5 N·m (0.03 - 0.15 kg-m, 3 - 13 in-lb)
	Maximum variation C	1.86 N·m (0.19 kg-m, 16 in-lb)



MGIA0017E

SECTION STC
STEERING CONTROL SYSTEM

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000007328978

1.OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurs.

>> GO TO 2.

2.CHECK DTC

1. Check for DTC.
2. If a DTC exists, perform the following operations.

- Records the DTCs.
- Erase DTCs
- Check that the root cause clarified with DTC matches to the malfunction information described by the customer.

3. Check also the related service information or others.

Do malfunction information or DTC exist?

Malfunction information and DTC exist. >>GO TO 3.
Malfunction information exists but no DTC. >>GO TO 4.
No malfunction information, but DTC exists. >>GO TO 5.

3.REPRODUCE THE MALFUNCTION INFORMATION

Check the malfunction described by the customer on the vehicle.
Record the status of each signal when a symptom occurs with “Data Monitor” in CONSULT.
Inspect the relation of the information and the condition when it occurs.

>> GO TO 5.

4.CHECK THE MALFUNCTION

Check the malfunction described by the customer on the vehicle.
Record the status of each signal when a symptom occurs with “Data Monitor” in CONSULT.
Inspect the relation of the information and the condition when it occurs.

>> GO TO 6.

5.PERFORM “DTC CONFIRMATION PROCEDURE”

Perform the “DTC conformation procedure” to the detected DTC and check that the DTC is detected again.
Refer to STC-23, "DTC Inspection Priority Chart" when multiple DTCs are detected, and then judge the order for performing the diagnosis.

Is any DTC detected?

YES >> GO TO 7.
NO >> Follow GI-9, "How to Follow Trouble Diagnosis" to check.

6.IDENTIFY MALFUNCTIONING SYSTEM WITH “SYMPTOM DIAGNOSIS”

Use the “Symptom diagnosis” from the symptom inspection result in step 4. Then identify where to start performing the diagnosis based on the possible causes and the symptoms.

>> GO TO 7.

7.IDENTIFY MALFUNCTIONING PARTS WITH “COMPONENT DIAGNOSIS”

Perform the inspection with the “component diagnosis” of the applicable system.
NOTE:
The “component diagnosis” mainly consists of the check for an open circuit.

The circuit check in the diagnosis procedure also requires the check for a short circuit. Refer to GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident" for details.

>> GO TO 8.

8. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

1. Repair or replace the part detected as malfunctioning.
2. After repairing or replacing, reinstall/reconnect parts or connectors removed/disconnected in the “component diagnosis”, and then erase the DTC.

>> GO TO 9.

9. FINAL CHECK

Perform the “DTC confirmation procedure” or “component Inspection” to check that the repair is correctly performed. Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3 or 4.

Is the check result normal?

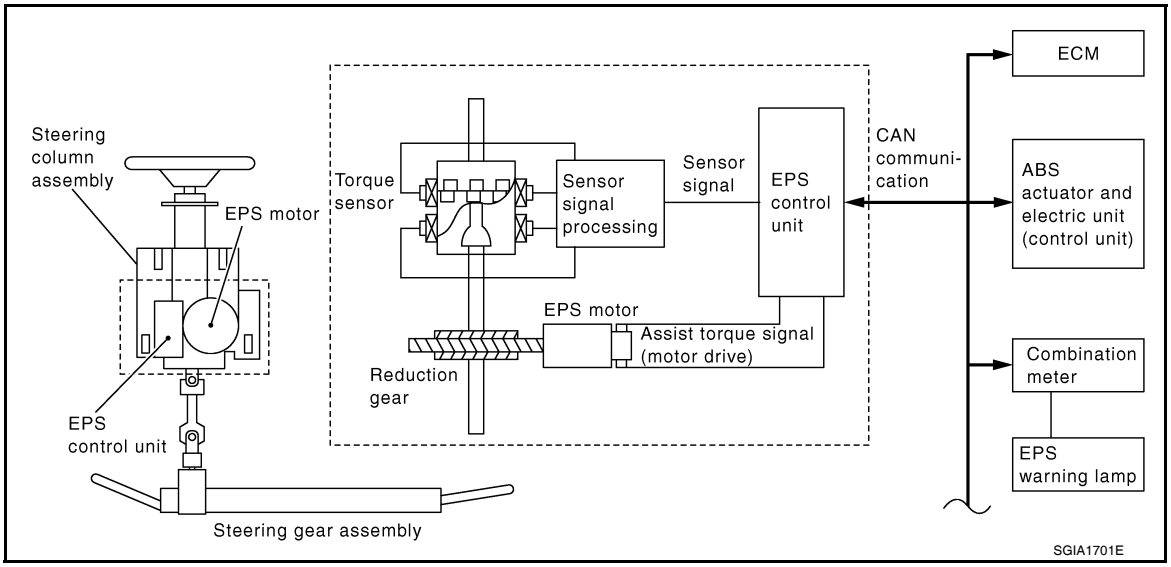
YES >> Trouble diagnosis is completed.
NO-1 >> The DTC is reproduced. GO TO 7.
NO-2 >> The symptom is reproduced. GO TO 6.

SYSTEM DESCRIPTION

EPS SYSTEM

System Diagram

INFOID:0000000007328979



System Description

INFOID:0000000007328980

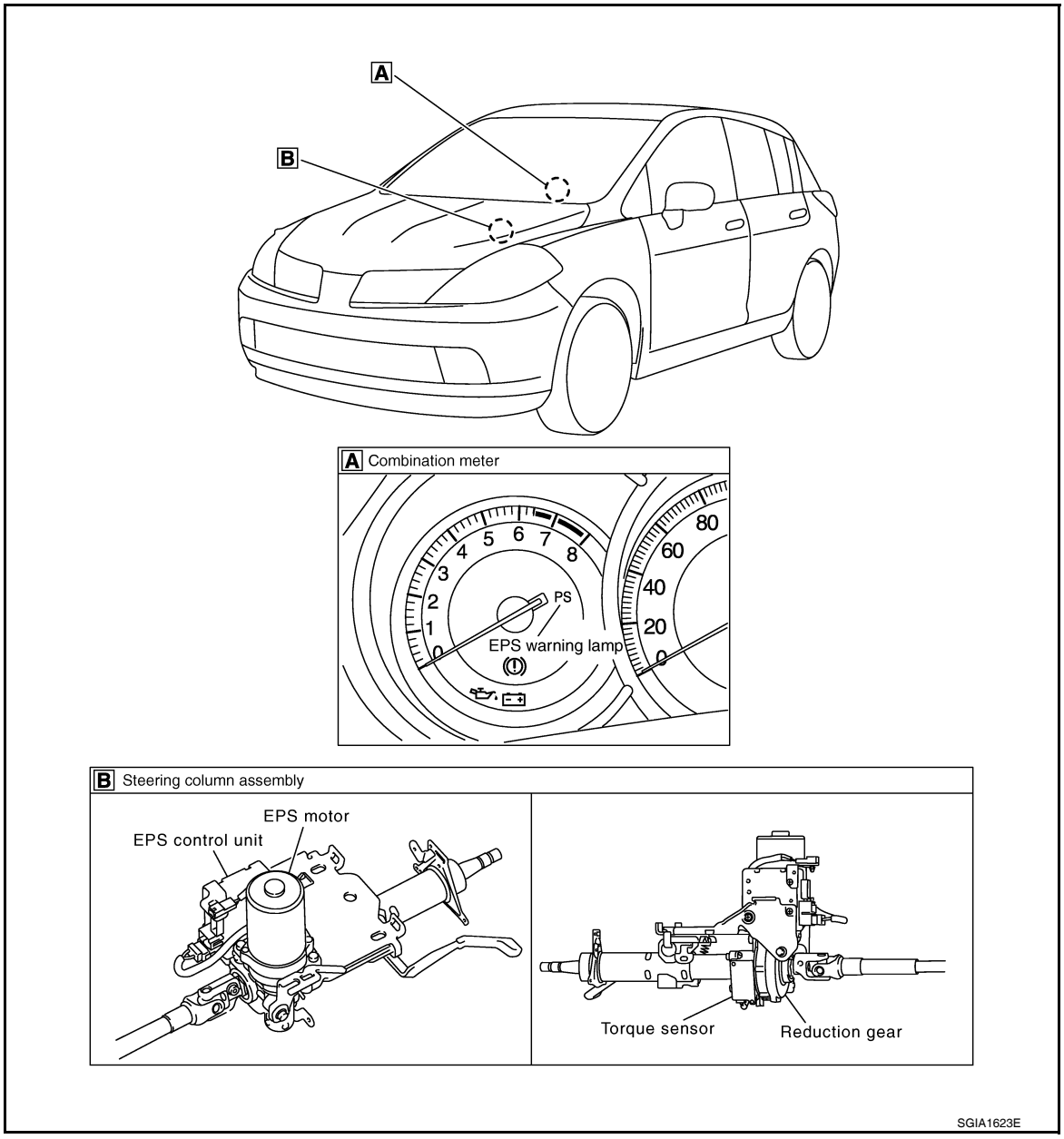
- EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according to the driving condition.
- EPS control unit decreases the output signal to EPS motor while extremely using the power steering function (e.g., full steering) consecutively for protecting EPS motor and EPS control unit (Overload protection control). While activating overload protection control, the assist torque gradually decreases, and the steering wheel turning force becomes heavy. The normal assist torque reactivates by no steering.
- In case of an error in the electrical system, the fail-safe function stops output signals to the EPS motor. Then the previous state is changed to the manual steering state.
- Self-diagnosis can be done with CONSULT.
- EPS control unit will decrease assistance under the following 2 conditions.

- Extensive steering at low speed will cause the ECU and MOTOR to heat up, once temperature reaches critical point ECU will reduce current to reduce heat up. System will recover as temperature lowers (reduced or no assistance).
- Holding steering on rack-end (full lock) for 1 second will cause the system to engage rack-end protection. This reduces assistance down to 50% in order to prevent heat up. Assistance is immediately returned to 100% when steering released or turned away from rack-end.
- Communicates the signal from each control unit via CAN communication.

Control unit	Signal status
ECM	Transmits mainly the following signals to EPS control unit via CAN communication. Engine status signal
ABS actuator and electric unit (control unit)	Transmits mainly the following signals to EPS control unit via CAN communication. Vehicle speed signal
Combination meter	• Transmits mainly the following signals to EPS control unit via CAN communication. Vehicle speed signal • EPS warning lamp signal is received from the EPS control unit via CAN communication.

Component Parts Location

INFOID:0000000007328981



Component Description

INFOID:0000000007328982

Components parts	Reference
EPS control unit	STC-14, "Description"
EPS motor	STC-12, "Description"
Torque sensor	STC-10, "Description"
Reduction gear	Reduction gear increases the assist torque provided from EPS motor with worm gears, and outputs to the column shaft.
EPS warning lamp	STC-18, "Description"

DIAGNOSIS SYSTEM (EPS CONTROL UNIT)

CONSULT Function

INFOID:0000000007328983

FUNCTION

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
ECU identification	Steering column assembly number can be read.
Self diagnostic result	Self-diagnostic results can be read and erased quickly.
CAN diag support MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
Data monitor	Input/Output data in the EPS control unit can be read.

ECU IDENTIFICATION

Displays the part number stored in the control unit.

SELF-DIAG RESULTS MODE

Display Item List

Refer to STC-23, "DTC Index".

CAUTION:

If “CAN COMM CIRCUIT [U1000]” is displayed with other DTCs, first perform the trouble diagnosis for CAN communication line.

DATA MONITOR MODE

Display Item List

Monitor item (Unit)	Remarks
BATTERY VOLT (V)	Displays the power supply voltage for EPS control unit.
TORQUE SENSOR (Nm)	Displays steering wheel turning force detected by torque sensor.
MOTOR CURRENT (A)	Displays the current value consumed by EPS motor.
MOTOR SIG (A)*1	Displays the current commanded value to EPS motor.
VEHICLE SPEED (km/h) or (MPH)*2	Vehicle speed is displayed from vehicle speed signal via CAN communication.
WARNING LAMP (On/Off)	EPS warning lamp control status is displayed.
ENGINE STATUS (Stop/Run)	Engine speed is displayed from engine status signal via CAN communication.

*1: Almost in accordance with the value of MOTOR SIG. It is not a malfunction though these values are not accorded when steering quickly.

*2: It is not a malfunction, though it might not be corresponding just after ignition switch in turned ON.

DTC/CIRCUIT DIAGNOSIS

C1601 BATTERY POWER SUPPLY

Description

INFOID:0000000007328984

Power is supplied from the battery to EPS control unit.

DTC Logic

INFOID:0000000007328985

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1601	BATTERY VOLT	When a power supply voltage to the EPS control unit is maintained at or above 17.5 V or less than 9 V continuously for more than five seconds.	• Harness or connector • EPS control unit • Fuse • Power supply system

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1601” detected?

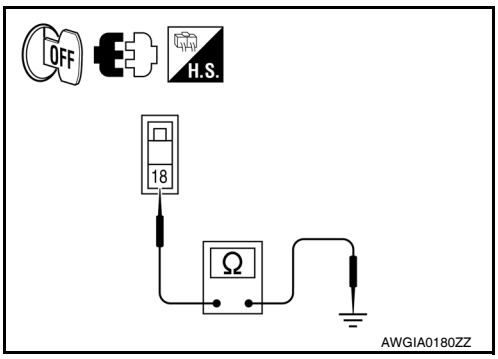
YES >> Proceed to diagnosis procedure. Refer to STC-8, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000007328986

1. CHECK EPS CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EPS control unit harness connector.
3. Check continuity between EPS control unit harness connector terminal and ground.



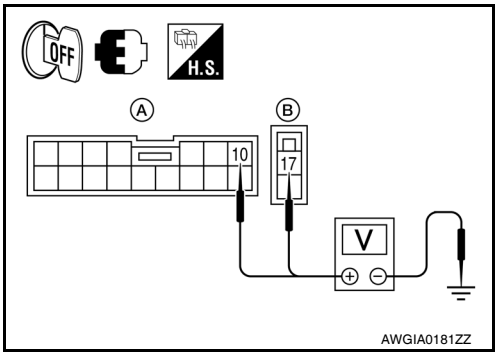
EPS control unit		—	Continuity
Connector	Terminal		
M54	18	Ground	Existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK EPS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Connect EPS control unit harness connector.
2. Check voltage between EPS control unit harness connector M53 (A), M54 (B) terminals and ground.

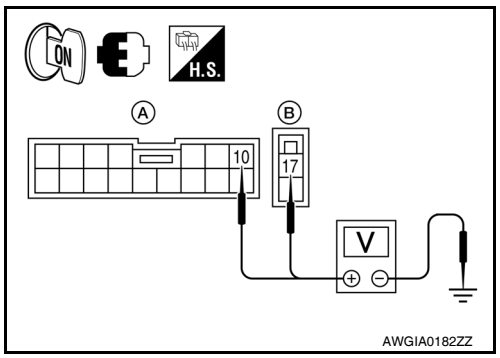


EPS control unit		—	Voltage
Connector	Terminal		
M53 (A)	10	Ground	Approx. 0 V
M54 (B)	17		Battery voltage

3. Turn ignition switch ON.

CAUTION:
Never start the engine.

4. Check voltage between EPS control unit harness connector M53 (A), M54 (B) terminals and ground.



EPS control unit		—	Voltage
Connector	Terminal		
M53 (A)	10	Ground	Battery voltage
M54 (B)	17		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the following. If any items are damaged, repair or replace damaged parts.

- 10A fuse (#2) open
- Harness for short between 10A fuse (#2) and power steering control unit harness connector No. 10 terminal.
- 60A fusible link (M) open
- Harness for short between 60A fusible link (M) and power steering control unit harness connector No. 10 terminal.
- Harness for open between ignition switch and power steering control unit harness connector No. 17 terminal.
- Harness for open between battery and power steering control unit harness connector No. 17 terminal.
- Battery or ignition switch.

3. CHECK BATTERY VOLTAGE SIGNAL (1)

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Select “EPS”, “DATA MONITOR” and “MOTOR VOLT”, and perform the battery voltage inspection.

Monitor item	Condition	Display value
MOTOR VOLT	Engine running	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".

4. CHECK MOTOR VOLTAGE SIGNAL (2)

With CONSULT

Select “MOTOR VOLT” in “DATA MONITOR” of the EPS control unit. Check motor voltage with the steering wheel fully turned leftward or rightward.

Is the value in “DATA MONITOR”“between 9 V and 17.5 V”?

YES >> Check pin terminal and connection of each harness connector for damage or loose connection.

NO >> Check battery power supply and ignition power supply. Refer to STC-21, "Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM -".

C1604 TORQUE SENSOR

Description

INFOID:0000000007328987

Torque sensor detects the steering torque, and transmit the signal to EPS control unit.

DTC Logic

INFOID:0000000007328988

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1604	TORQUE SENSOR	When torque sensor output signal is malfunctioning.	• Harness or connector • Torque sensor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1604” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-10, "Diagnosis Procedure".
NO >> Inspection End.

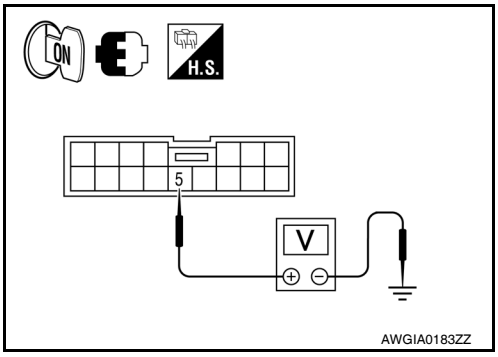
Diagnosis Procedure

INFOID:0000000007328989

1.CHECK TORQUE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF to ON.
   CAUTION:
   Never start the engine.
2. Check voltage between EPS control unit harness connector terminals and ground.
   CAUTION:
   Steering wheel is neutral position. (There is no steering force.)

EPS control unit		—	Voltage
Connector	Terminal		
M53	5	Ground	Approx. 5 V



Is the inspection result normal?

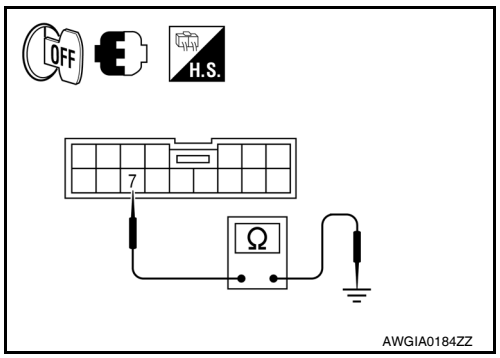
YES >> GO TO 2.
NO >> Perform the trouble diagnosis for battery power supply circuit. Refer to STC-8, "Diagnosis Procedure".

2.CHECK TORQUE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between EPS control unit harness connector terminal and ground.
   CAUTION:

Steering wheel is neutral position. (There is no steering force.)

EPS control unit		—	Continuity
Connector	Terminal		
M53	7	Ground	Yes



Is the inspection result normal?

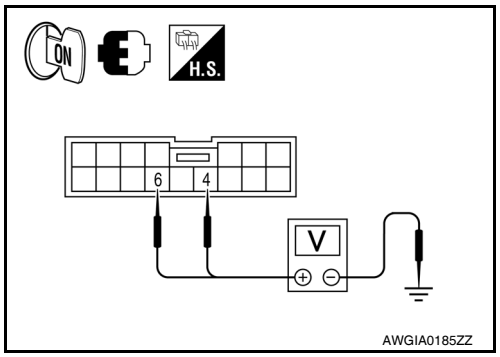
YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK TORQUE SENSOR SIGNAL

1. Turn ignition switch ON.
2. Check voltage between EPS control unit harness connector terminal and ground.

CAUTION:
Steering wheel is neutral position. (There is no steering force.)

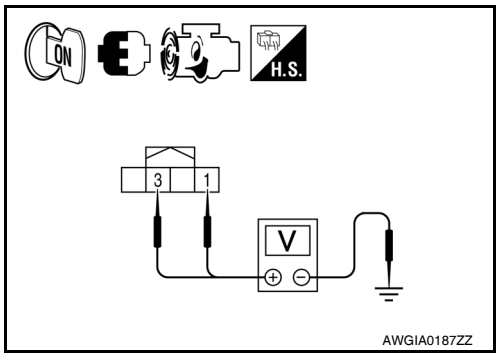
EPS control unit		—	Voltage
Connector	Terminal		
M53	4	Ground	Approx. 2.5V
	6		



3. Start the engine.

Check voltage between torque sensor harness connector terminal and ground while turning the steering wheel.

Torque sensor		—	Voltage
Connector	Terminal		
M63	1	Ground	1.6 V – 3.4 V
	3		(The value is changed according to steering left or right)



Is the inspection result normal?

YES >> GO TO 4.
NO >> Torque sensor is malfunction. Replace steering column assembly. Refer to PS-10, "Removal and Installation".

4. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect torque sensor harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Is the inspection result normal?

YES >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1606 EPS MOTOR

Description

INFOID:0000000007328990

EPS motor provides the assist torque by the control signal from EPS control unit.

DTC Logic

INFOID:0000000007328991

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1606	EPS MOTOR	When the motor driver malfunction of EPS control unit or EPS motor malfunction is detected.	• Harness or connector • EPS motor • EPS control unit

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1606” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-12, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000007328992

1.CHECK EPS MOTOR

Check the EPS motor. Refer to STC-12, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> EPS motor is malfunction. Replace steering column assembly. Refer to PS-10, "Removal and Installation".

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect EPS motor harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Is the inspection result normal?

YES >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

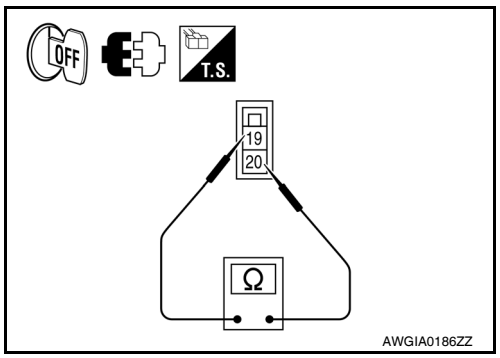
INFOID:0000000007328993

1.CHECK EPS MOTOR

1. Turn the ignition switch OFF.
2. Disconnect EPS motor harness connector.

3. Check resistance between EPS motor connector terminals.

EPS motor		Resistance (Approx.)
Terminal		
19	20	0.1 Ω or less



Is the inspection result normal?

YES >> Inspection End
NO >> EPS motor is malfunction. Replace steering column assembly. Refer to PS-10, "Removal and Installation".

C1607, C1608 EPS CONTROL UNIT

Description

INFOID:0000000007328994

EPS control unit performs an arithmetical operation on data, such as steering wheel turning force (sensor signal) from the torque sensor, vehicle speed signal, etc. Then it generates an optimum assist torque signal to the EPS motor according to the driving condition.

DTC Logic

INFOID:0000000007328995

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1607	EEPROM	When the memory (EEPROM) system malfunction is detected in EPS control unit.	EPS control unit
C1608	CONTROL UNIT	When the internal malfunction is detected in EPS control unit.	

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1607” or “C1608” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-14, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000007328996

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Erase EPS control unit self-diagnostic results.
3. Perform EPS control unit self-diagnosis.

Is DTC “C1607” or “C1608” detected?

YES >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace error-detected parts.

C1609 VEHICLE SPEED SIGNAL

Description

INFOID:0000000007328997

EPS control unit receives the vehicle speed signal from ABS actuator and electric unit (control unit) via CAN communication line.

DTC Logic

INFOID:0000000007328998

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1609	CAN VHCL SPEED	• Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) via CAN communication. • ABS actuator and electric unit (control unit) input signal error is detected.	• Harness or connector • CAN communication line • EPS control unit • ABS malfunction - Vehicle speed signal error

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT
1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1609” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-15, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000007328999

1.PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

With CONSULT
1. Turn the ignition switch OFF to ON.
2. Perform ABS actuator and electrical unit (control unit) self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)".

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-25, "CONSULT Function (ABS)".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT
Perform EPS control unit self-diagnosis.

Is DTC “C1609” detected?

YES >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace error-detected parts.

C1610 ENGINE STATUS SIGNAL

Description

INFOID:0000000007329000

EPS control unit receives the engine status signal from ECM via CAN communication line.

DTC Logic

INFOID:0000000007329001

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1610	CAN ENG RPM	• Malfunction is detected in engine status signal that is output from ECM via CAN communication. • ECM input signal error is detected.	• Harness or connector • CAN communication line • EPS control unit • ECM - Engine status signal error

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “C1610” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-16, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000007329002

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform ECM self-diagnosis. Refer to EC-119, "CONSULT Function (ENGINE)".

Is any DTC detected?

YES >> Check the DTC. Refer to EC-9, "U0101-U1001".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

Perform EPS control unit self-diagnosis.

Is DTC “C1610” detected?

YES >> Replace EPS control unit. Refer to PS-10, "Removal and Installation".
NO >> Check EPS control unit pin terminals for damage or loose connection with harness connector. If any item are damaged, repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007329003

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit communicate data but selectively reads required data only.

DTC Logic

INFOID:0000000007329004

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	EPS control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.	• CAN communication error • EPS control unit

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to STC-17, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007329005

1.PERFORM SELF-DIAGNOSIS

With CONSULT

Perform EPS control unit self-diagnosis.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Inspection End.

EPS WARNING LAMP

Description

INFOID:0000000007329006

- Turn ON when there is a malfunction in EPS system. If indicates that fail-safe mode is engaged and enters a manual steering state (Control turning force steering wheel becomes heavy).
- Also turns ON when ignition switch is turned ON, for purpose of lamp check. Turns OFF after the engine starts, if system is normal.

EPS WARNING LAMP INDICATION

Condition	EPS warning lamp
Ignition switch ON. (Lamp check)	ON
Engine running.	OFF
EPS system malfunction [Other diagnostic item]	ON

CAUTION:

EPS warning lamp also turns ON due to data reception error, CAN communication error etc.

Component Function Check

INFOID:0000000007329007

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> Inspection End
NO >> Perform trouble diagnosis. Refer to STC-18, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007329008

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-23, "DTC Index".
NO >> GO TO 2.

2.CHECK EPS WARNING LAMP SIGNAL

With CONSULT

1. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
2. On “DATA MONITOR”, select “WARNING LAMP”.
3. Check that the EPS warning lamp is turned ON.

EPS warning lamp ON: On

4. Start the engine.
   CAUTION:
   Stop the vehicle.
5. Check that the EPS warning lamp is turned OFF.

EPS warning lamp OFF: Off

Is the inspection result normal?

YES >> Perform the trouble diagnosis for combination meter power supply circuit. Refer to DI-15, "Power Supply and Ground Circuit Inspection".
NO >> Replace the EPS control unit. Refer to PS-10, "Removal and Installation".

ECU DIAGNOSIS INFORMATION

EPS CONTROL UNIT

Reference Value

INFOID:0000000007329009

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

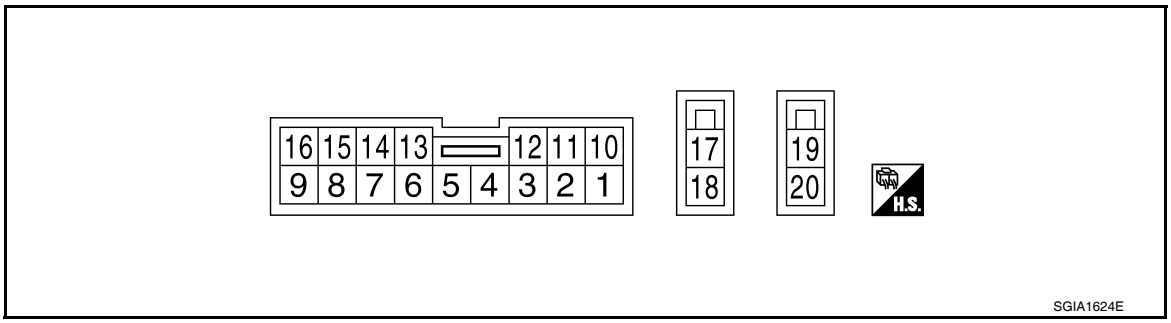
The output signal indicates the EPS control unit calculation data. The normal values will be displayed even in the event that the output circuit (harness) is open.

Monitor item	Display content	Data monitor		
		Condition		Display value
MOTOR VOL	Power supply voltage for EPS control unit	Ignition switch: ON		Battery voltage
TORQUE SENSOR	Steering wheel turning force	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
			Steering wheel: Right turn	Positive value (Nm)
			Steering wheel: Left turn	Negative value (Nm)
MOTOR CURRENT	Consumption current of EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 A
			Steering wheel: Right or left turn	Displays consumption current of EPS motor (A)*1
MOTOR SIG	Command current to EPS motor	Engine running	Steering wheel: Not steering (There is no steering force)	Approx. 0 A
			Steering wheel: Right turn	Negative value (A)
			Steering wheel: Left turn	Positive value (A)
DERATING STAT	Displays overload status.	Engine running		Off
VEHICLE SPEED	Vehicle speed	Vehicle stopped		0 km/h (0 mph)
		While driving		Approximately equal to the indication on speedometer (inside of ±10%)*2
WARNING LAMP	EPS warning lamp condition	EPS warning lamp: ON		On
		EPS warning lamp: OFF		Off
ENGINE STATUS	Engine status	Engine not running		Stop
		Engine running		Run

*1: Almost in accordance with the value of MOTOR SIG. It is not a malfunction though these values are not accorded when steering quickly.

*2: It is not a malfunction, though it might not be corresponding just after ignition switch in turned ON.

TERMINAL LAYOUT



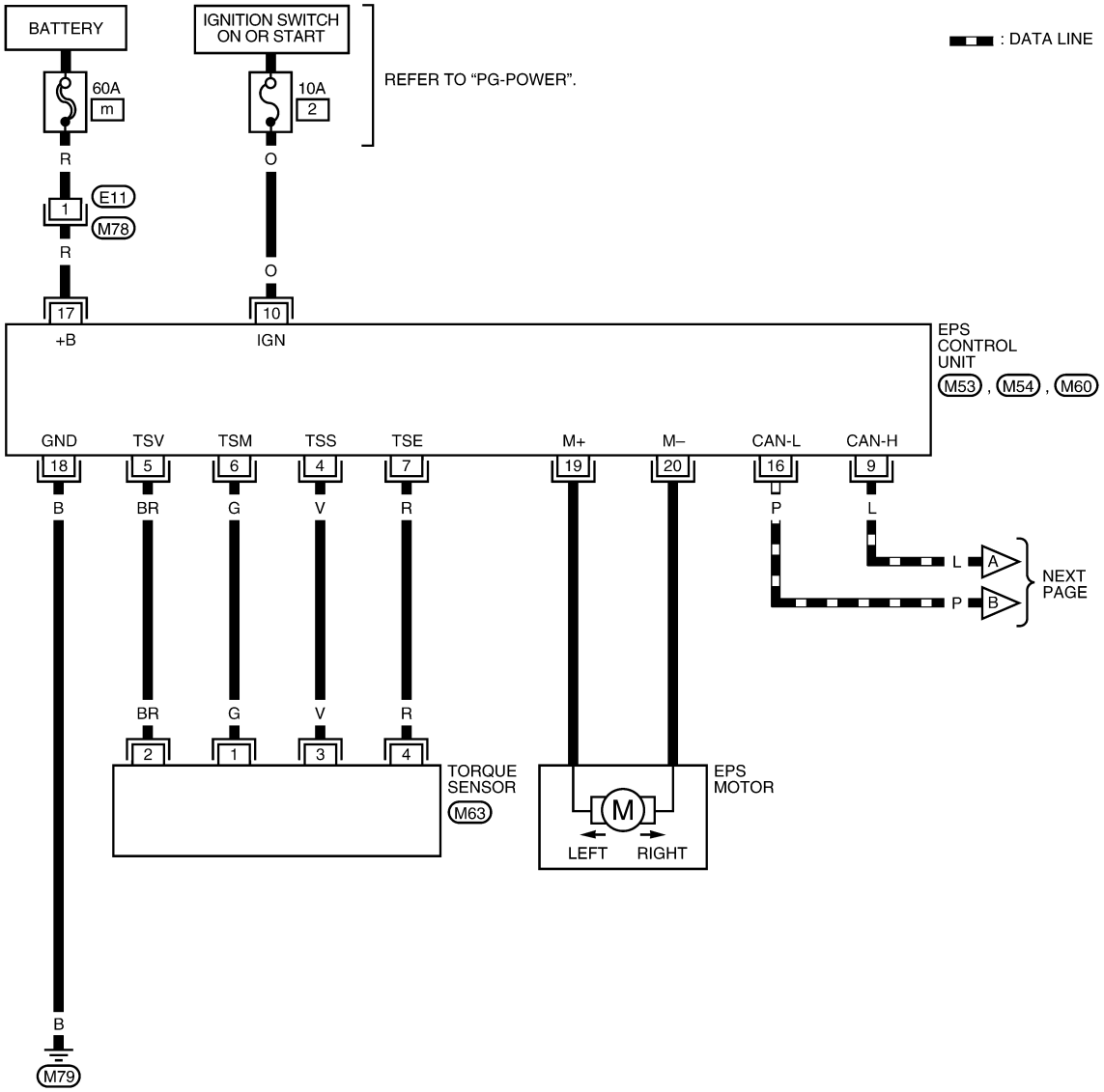
PHYSICAL VALUES

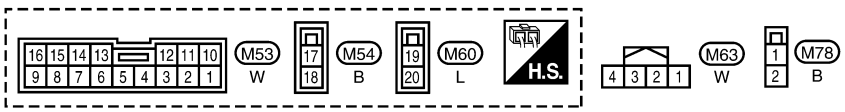
Terminal No. (Wire Color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/Output			
4 (V)	Ground	Torque sensor sub	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	2.5 V
				Engine running	Steering wheel: steering	1.6 V – 3.4 V (The value is changed according to steering left or right)
5 (BR)	Ground	Torque sensor power supply	Output	Ignition switch: ON		5 V
6 (G)	Ground	Torque sensor main	Input	Ignition switch: ON	Steering wheel: Not steering (There is no steering force)	2.5 V
				Engine running	Steering wheel: steering	1.6 V – 3.4 V (The value is changed according to steering left or right)
7 (R)	Ground	Torque sensor ground	—	Always		0 V
9 (L)	Ground	CAN-H	Input/Output	—		—
10 (O)	Ground	Ignition power supply	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
16 (P)	Ground	CAN-L	Input/Output	—		—
17 (R)	Ground	Battery power supply	Input	Always		Battery voltage
18 (B)	Ground	Ground	—	Always		0 V
19	—	Motor +	—	—		—
20	—	Motor −	—	—		—

Wiring Diagram - ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM -

INFOID:0000000007329010

STC-EPS-01





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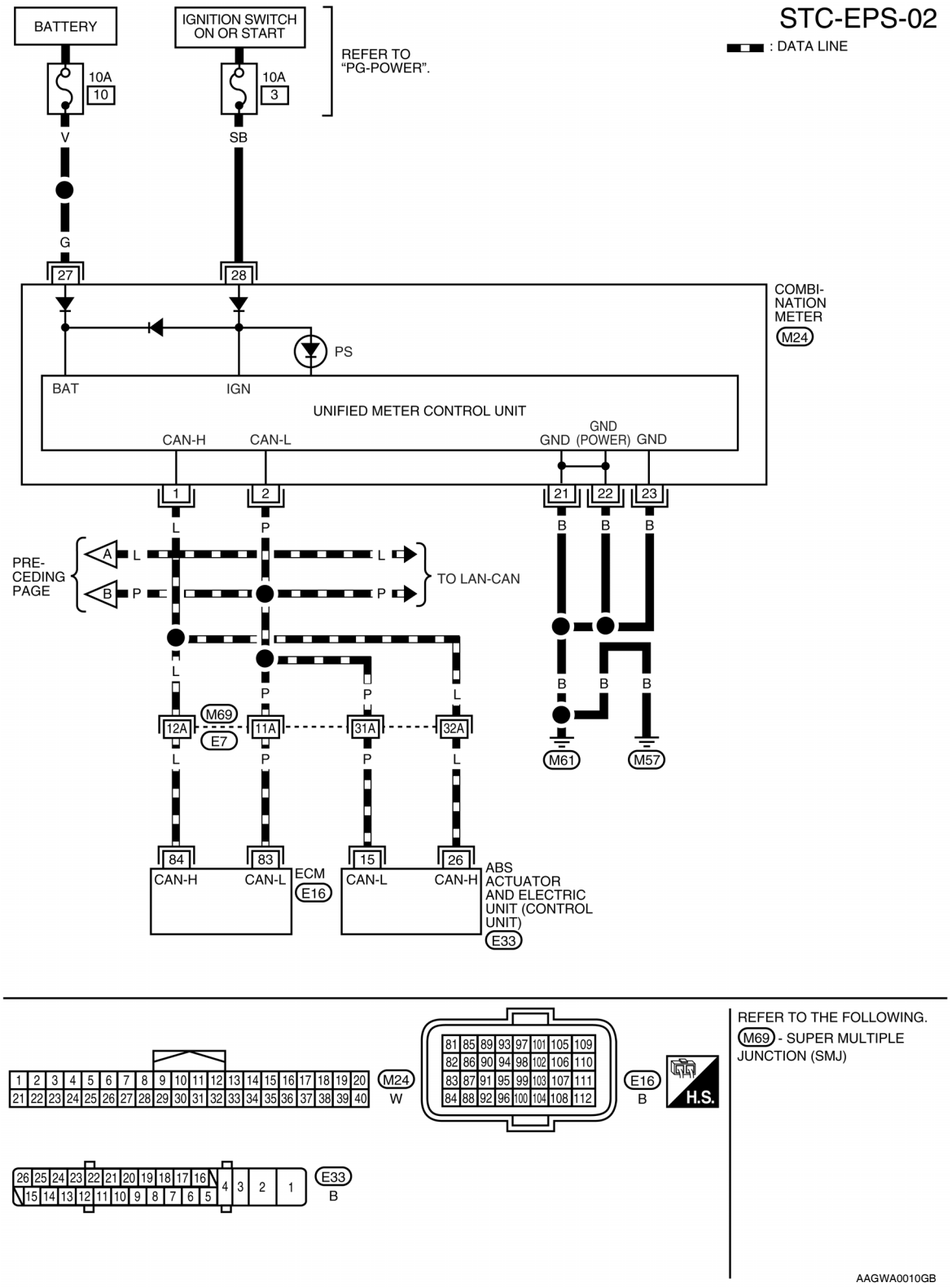


Fail-Safe

INFOID:0000000007329011

- If any malfunction occurs in the system, and control unit detects the malfunction, EPS warning lamp on combination meter turns ON to indicate system malfunction.
- When EPS warning lamp is ON, enters into a manual steering state. (Control turning force steering wheel becomes heavy.)

DTC Inspection Priority Chart

INFOID:0000000007329012

When multiple DTCs are detected simultaneously, check one by one depending on the following priority list.

Priority	Priority order item (DTC)
1	U1000 CAN COMM CIRCUIT
2	C1601 BATTERY POWER SUPPLY
3	Other than the above

DTC Index

INFOID:0000000007329013

DTC	Items (CONSULT screen terms)	Reference
C1601	BATTERY VOLT	STC-8, "DTC Logic"
C1604	TORQUE SENSOR	STC-10, "DTC Logic"
C1606	EPS MOTOR	STC-12, "DTC Logic"
C1607	EEPROM	STC-14, "DTC Logic"
C1608	CONTROL UNIT	STC-14, "DTC Logic"
C1609	CAN VHCL SPEED	STC-15, "DTC Logic"
C1610	CAN ENG RPM	STC-16, "DTC Logic"
U1000	CAN COMM CIRCUIT	STC-17, "DTC Logic"

SYMPTOM DIAGNOSIS

EPS WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000007329014

EPS warning lamp does not turn ON when turning ignition switch ON from OFF. (Check the illumination of the EPS warning lamp.)

Diagnosis Procedure

INFOID:0000000007329015

1.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning Lamp. Refer to STC-18, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
NO >> Repair or replace the specific malfunctioning part.

EPS WARNING LAMP DOES NOT TURN OFF

Description

INFOID:0000000007329016

EPS warning lamp does not turn OFF several seconds after engine started.

Diagnosis Procedure

INFOID:0000000007329017

1.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-23, "DTC Index".
NO >> GO TO 2.

2.CHECK EPS WARNING LAMP

Perform the trouble diagnosis of EPS warning Lamp. Refer to STC-18, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the specific malfunctioning part.

3.CHECK EPS CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of EPS control unit power supply and ground. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check that there is no malfunction in each harness connector pin terminal or disconnection.
NO >> Repair or replace the specific malfunctioning part.

STEERING WHEEL TURNING FORCE IS HEAVY OR LIGHT

Description

INFOID:0000000007329018

Steering wheel turning force is heavy or light.

Diagnosis Procedure

INFOID:0000000007329019

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF to ON.
2. Perform EPS control unit self-diagnosis.

Is any DTC detected?

YES >> Check the DTC. Refer to STC-23, "DTC Index".
NO >> GO TO 3.

3.CHECK EPS CONTROL UNIT SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Turn steering wheel from full left stop to full right stop.
3. Select “TORQUE SENSOR” of “DATA MONITOR” for EPS control unit.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-12, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace the specific malfunctioning part.

5.CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to PS-6, "On-Vehicle Inspection and Service".

Is the inspection result normal?

YES >> Inspection End
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to PS-6, "On-Vehicle Inspection and Service".

UNBALANCE STEERING WHEEL TURNING FORCE AND RETURN BETWEEN RIGHT AND LEFT

Description

INFOID:0000000007329020

Unbalance steering wheel turning force and return between right and left.

Diagnosis Procedure

INFOID:0000000007329021

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to STC-25, "Diagnosis Procedure".

2.CHECK WHEEL ALIGNMENT

1. Check the wheel alignment. Refer to FSU-7, "On-Vehicle Inspection and Service".
2. Perform EPS control unit self-diagnosis.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjustment of wheel alignment.

3.CHECK EPS CONTROL UNIT SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Turn steering wheel from full left stop to full right stop.
3. Select “TORQUE SENSOR” of “DATA MONITOR” for EPS control unit.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-12, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace the specific malfunctioning part.

5.CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to PS-6, "On-Vehicle Inspection and Service".

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to PS-6, "On-Vehicle Inspection and Service".

UNBALANCE STEERING WHEEL TURNING FORCE (TORQUE VARIATION)

Description

INFOID:0000000007329022

Unbalance steering wheel turning force (torque variation).

Diagnosis Procedure

INFOID:0000000007329023

1.CHECK THE ILLUMINATION OF THE EPS WARNING LAMP

Check that the EPS warning lamp turns ON when ignition switch turns ON. Then, EPS warning lamp turns OFF after the engine is started.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to STC-25, "Diagnosis Procedure".

2.CHECK STEERING COLUMN AND STEERING GEAR

Check the steering column assembly and steering gear assembly.
- Steering column assembly. Refer to PS-10, "Removal and Installation".
- Steering gear assembly. Refer to PS-15, "Disassembly and Assembly".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the specific malfunctioning part.

3.CHECK EPS CONTROL UNIT SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Turn steering wheel from full left stop to full right stop.
3. Select “TORQUE SENSOR” of “DATA MONITOR” for EPS control unit.

Monitor item	Condition	Display value
TORQUE SENSOR	Steering wheel: Not steering (There is no steering force)	Approx. 0 Nm
	Steering wheel: Right turn	Positive value (Nm)
	Steering wheel: Left turn	Negative value (Nm)

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK EPS MOTOR

Perform the trouble diagnosis of EPS motor. Refer to STC-12, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace the specific malfunctioning part.

5.CHECK STEERING WHEEL TURNING FORCE

Check the steering wheel turning force. Refer to PS-6, "On-Vehicle Inspection and Service".

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the steering wheel turning force for mechanical malfunction. Refer to PS-6, "On-Vehicle Inspection and Service".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329024

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329025

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

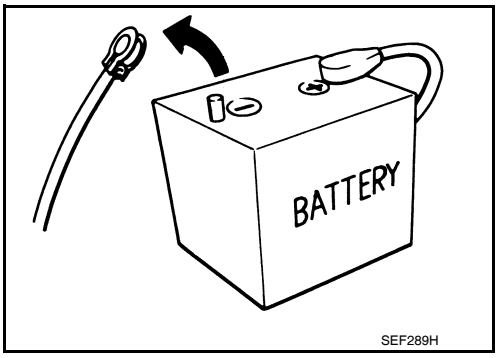
Service Notice or Precaution for EPS System

INFOID:0000000007329026

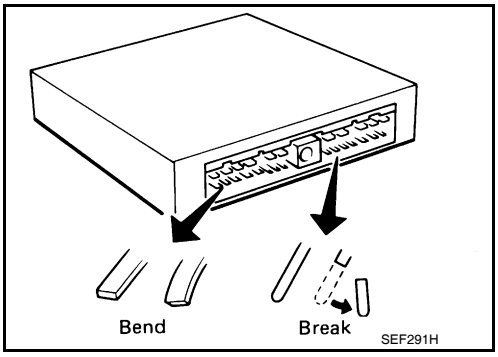
CAUTION:

Check or confirm the following item when performing the trouble diagnosis.

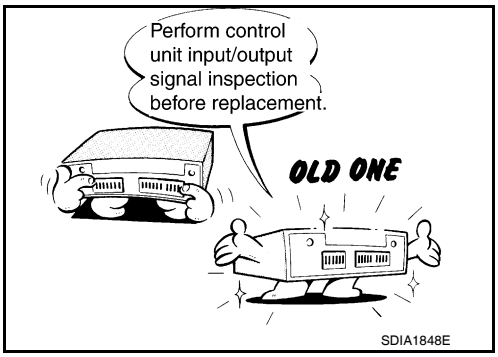
- **Check any possible causes by interviewing the symptom and it's condition from the customer if any malfunction, such as EPS warning lamp turns ON, occurs.**
- **Check if air pressure and size of tires are proper, the specified part is used for the steering wheel, and control unit is genuine part.**
- **Check if the connection of steering column assembly and steering gear assembly is proper (there is not looseness of mounting bolts, damage of rods, boots or sealants, and leakage of grease, etc).**
- **Check if the wheel alignment is adjusted properly.**
- **Check if there is any damage or modification to suspension or body resulting in increased weight or altered ground clearance.**
- **Check if installation conditions of each link and suspension are proper.**
- **Check if the battery voltage is proper**
- **Check connection conditions of each connector are proper.**
- **Before connecting or disconnecting the EPS control unit harness connector, turn ignition switch "OFF" and disconnect battery ground cable. Because battery voltage is applied to EPS control unit even if ignition switch is turned "OFF".**



- **When connecting or disconnecting pin connectors into or from EPS control unit, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors, make sure that there are no bends or breaks on EPS control unit pin terminal.



- **Before replacing EPS control unit, perform EPS control unit input/output signal inspection and make sure whether EPS control unit functions properly or not. Refer to STC-19, "Reference Value".**



SECTION SB
SEAT BELTS

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329038

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329039

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Seat Belt Service

INFOID:0000000007329040

CAUTION:

- **Before removing the front seat belt pre-tensioner assembly, turn the ignition switch off, disconnect the both battery cables and wait at least 3 minutes.**
- **After replacing or reinstalling front seat belt pre-tensioner assembly, or reconnecting front seat belt pre-tensioner connector, check the system function. Refer to SRS-19, "SRS Operation Check".**
- **Do not disassemble buckle or seat belt assembly.**
- **Do not reuse seat belt anchor bolts after removal. Replace with new ones.**
- **Replace anchor bolts if they are deformed or worn out.**
- **Never oil tongue and buckle.**
- **If any component of seat belt assembly is questionable, do not repair. Replace the whole seat belt assembly.**
- **If webbing is cut, frayed, or damaged, replace seat belt assembly.**
- **When replacing seat belt assembly, use a genuine NISSAN seat belt assembly.**

AFTER A COLLISION

WARNING:

- **Inspect all seat belt assemblies including retractors and attaching hardware after any collision.**
- **NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.**

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident. (i.e. torn webbing, bent retractor or guide).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

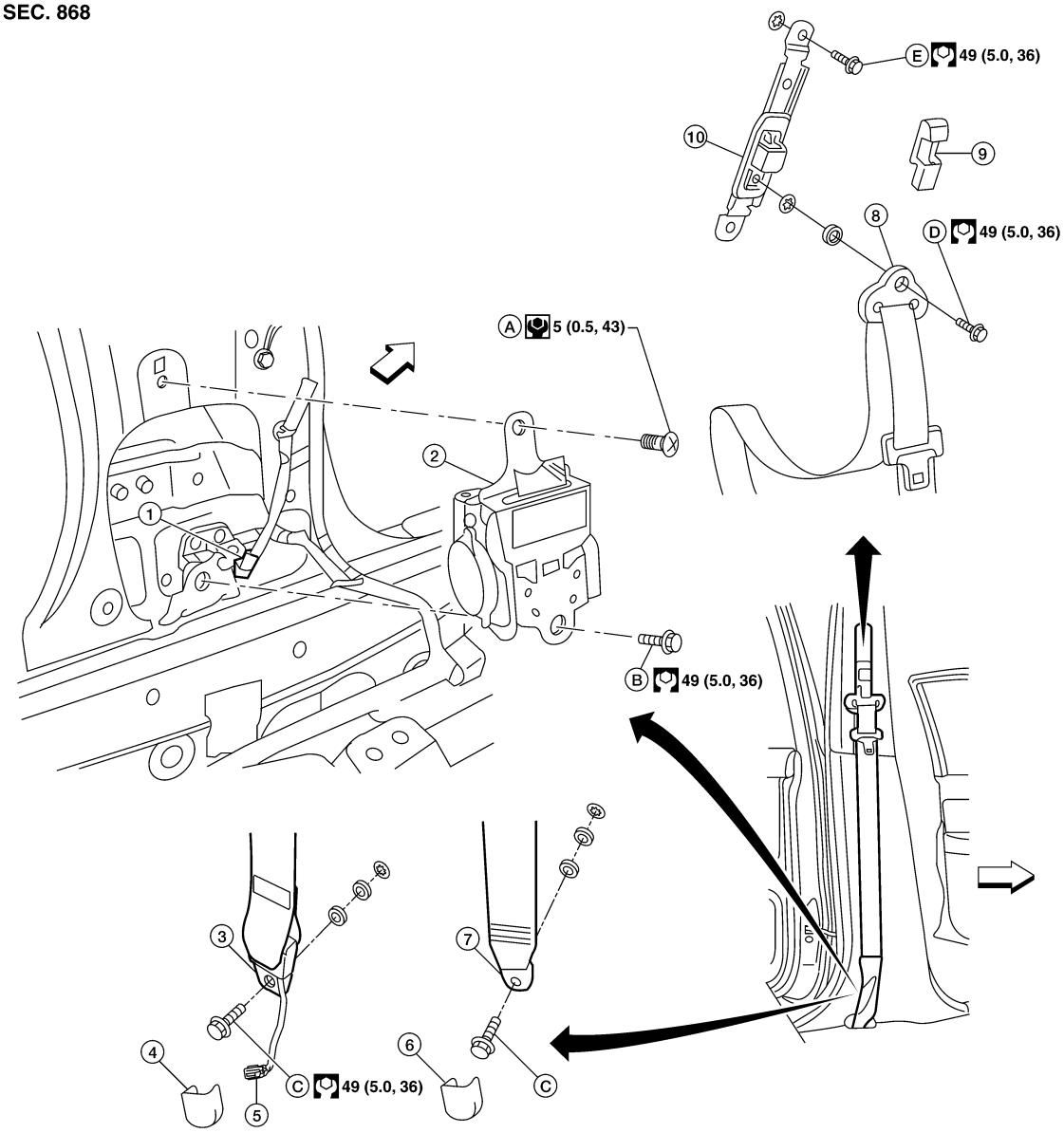
ON-VEHICLE REPAIR

SEAT BELTS

Removal and Installation of Front Seat Belt

INFOID:0000000007329041

SEC. 868



1. Seat belt pre-tensioner connector
2. Seat belt retractor
3. Outer anchor RH (belt tension sensor)
4. Anchor cover (belt tension sensor)
5. Belt tension sensor connector
6. Anchor cover
7. Outer anchor LH
8. D-ring anchor
9. Adjuster cover
10. Seat belt adjuster
A. Retractor bolt upper
B. Retractor anchor bolt
C. Outer anchor bolt
D. D-ring anchor bolt
E. Adjuster anchor bolt

⇦ Vehicle front

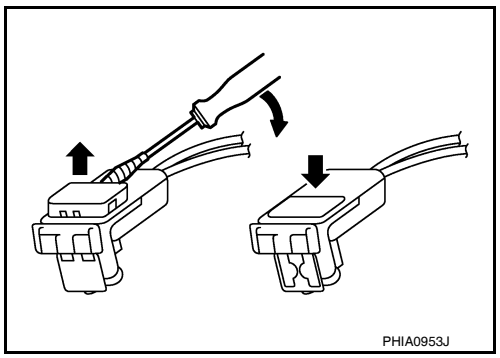
CAUTION:

Before servicing the SRS, turn the ignition switch off, disconnect both battery terminals and wait at least three minutes.

REMOVAL OF SEAT BELT RETRACTOR

1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Remove the adjuster cover and D-ring anchor bolt.
3. Remove both the center pillar upper and lower garnish. Refer to EI-35.

   WARNING:
   Do not reuse center pillar upper garnish if removed.
4. Pull the floor trim away from center pillar.
5. Disconnect seat belt tension sensor connector and pre-tensioner connector. Refer to SRS-7, "SRS Component Connectors".



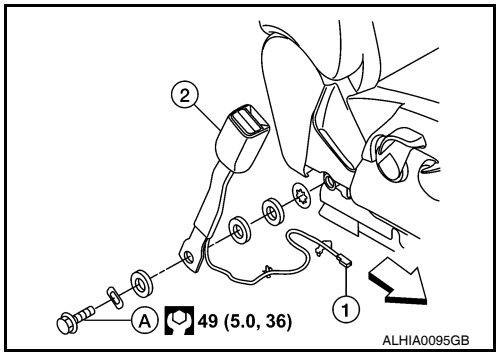
6. Remove the outer anchor bolt.
7. Remove the seat belt retractor screw and anchor bolt, then remove the seat belt retractor.

INSTALLATION OF SEAT BELT RETRACTOR

Installation is in the reverse order of removal.

REMOVAL OF SEAT BELT BUCKLE

1. Remove the front seat, refer to SE-14, "Removal and Installation".
2. Disconnect the seat belt buckle harness connector (1).
   ⇦: Vehicle front
3. Remove the anchor bolt (A), then remove the seat belt buckle (2).



INSTALLATION OF SEAT BELT BUCKLE

Installation is in the reverse order of removal.

Removal and Installation of Rear Seat Belt

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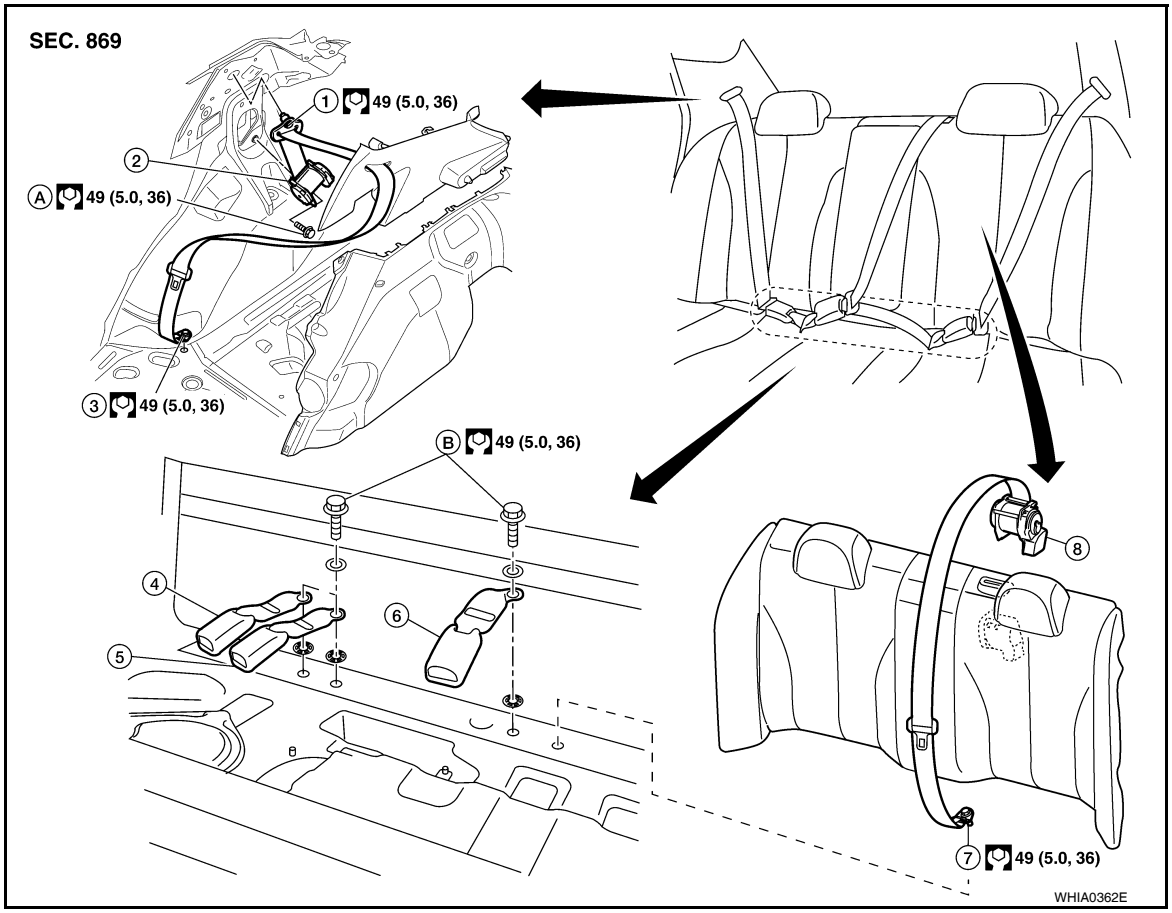


1. D-ring anchor
2. Outer seat belt retractor RH
3. Outer anchor bolt
4. Seat belt buckle center
5. Seat belt buckle RH
6. Seat belt buckle LH
7. Center anchor bolt
8. Center seat belt retractor
A. Outer retractor anchor bolt RH
B. Buckle anchor bolt

REMOVAL OF OUTER SEAT BELT RETRACTOR

1. Remove rear seatback, cushion and seat back side, refer to SE-22, "Removal and Installation".
2. Remove the tonneau board. Refer to EI-44, "Removal and Installation".
3. Remove the luggage floor center board. Refer to EI-44, "Removal and Installation".
4. Remove the outer anchor bolt.
5. Remove the luggage side lower finisher, refer to EI-44, "Removal and Installation".
6. Remove the D-ring anchor bolt.
7. Remove the outer retractor anchor bolt, then remove outer seat belt retractor.

INSTALLATION OF OUTER SEAT BELT RETRACTOR

Installation is in the reverse order of removal.

REMOVAL OF CENTER SEAT BELT RETRACTOR

1. Remove and disassemble the rear seat cushion, refer to SE-22, "Removal and Installation".
2. Remove the center seat belt retractor.

INSTALLATION OF CENTER SEAT BELT RETRACTOR

Installation is in the reverse order of removal.

REMOVAL OF SEAT BELT BUCKLE

1. Remove rear seat cushion, refer to SE-22, "Removal and Installation".

2. Remove the tonneau board. Refer to EI-44, "Removal and Installation".
3. Remove the luggage floor center board. Refer to EI-44, "Removal and Installation".
4. Remove buckle anchor bolt, then remove seat belt buckle.

INSTALLATION OF SEAT BELT BUCKLE

Installation is in the reverse order of removal.

Seat Belt Inspection

INFOID:0000000007329043

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attaching hardware after any collision. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident. (i.e. torn webbing, bent retractor or guide, etc.)
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Switch ignition ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about seven seconds.

b. Fasten driver's seat belt. The seat belt warning lamp should go out and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis using CONSULT, and air bag warning lamp. Refer to SRS-19, "SRS Operation Check".
3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.
4. Check the shoulder seat belt guide and shoulder belt height adjuster for front seats. Make sure guide swivels freely and that webbing lays flat and does not bind in guide. Make sure height adjuster operates properly and holds securely.
5. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Make sure that webbing returns smoothly and completely into the retractor. If the seat belt does not return smoothly, wipe the inside of the loops with a clean paper cloth. Dirt build-up in the loops of the upper anchors can cause the seat belts to retract slowly.

c. Fasten the seat belt. Check the seat belt returns smoothly and completely to the retractor. If the webbing does not return smoothly, the cause may be an accumulation of dust or dirt. Use the “SEAT BELT TAPE SET” and perform the following steps.

Inspect the front seat belt through-anchor

1. Pull the seat belt out to a length of 500 mm (19.69 in) or more.
2. Use a clip or other device to attach the seat belt at the center pillar webbing opening.
3. Pass a thin wire though the D-ring anchor webbing opening. Hold both ends of the wire and pull taut while moving it up and down several times along the webbing opening surface to remove matter stuck there.
4. Any dirt that cannot be removed with the wire can be removed by cleaning the opening with a clean cloth.
5. Apply tape at the point where the webbing contacts the through-anchor webbing opening.

NOTE:

Apply the tape so that there is no looseness or wrinkling.

6. Remove the clip attaching the seat belt and check that the webbing returns smoothly.

6. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NOTE:

All seat belt retractors are of the Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the webbing from extending any further. All 3-point type seat belt retractors except the driver's seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the webbing is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the webbing cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors using the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

Grasp the shoulder webbing and pull it forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

1. Pull out entire length of seat belt from retractor until a click is heard.
2. Retract the webbing partially. A clicking noise should be heard as the webbing retracts, indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The webbing must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the webbing to retract to cancel the automatic locking mode.

ELR Function Moving Check

WARNING:

Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event the retractor does not lock.

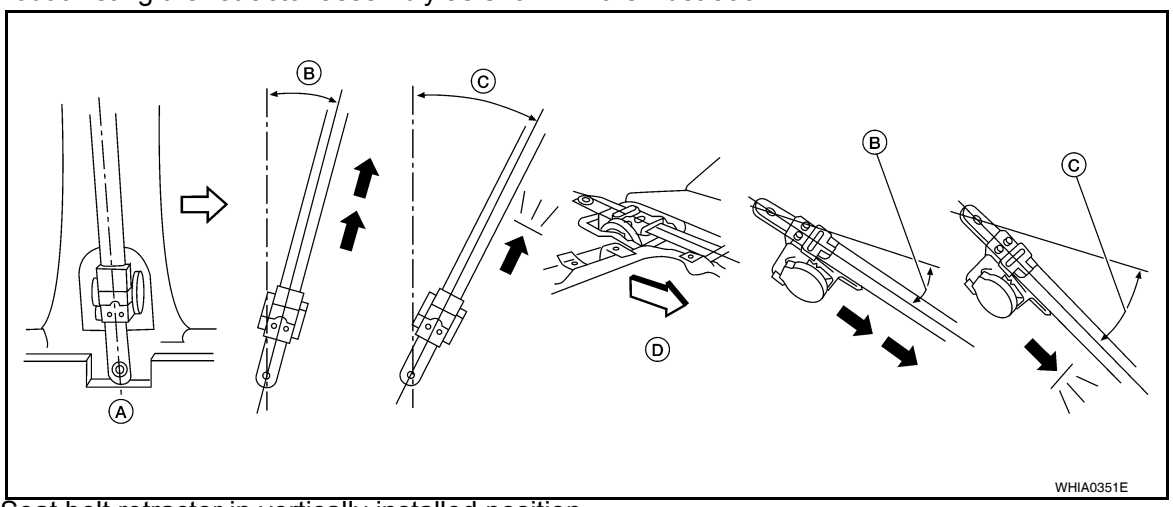
1. Fasten driver's seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event the retractor does not lock, apply brakes firmly and make a very hard stop.

During the stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

1. Remove the seat belt retractor. Refer to SB-4, "Removal and Installation of Front Seat Belt".

2. Slowly pull out seat belt webbing while tilting the retractor assembly forward from the installed position without twisting the retractor assembly as shown in the illustration.



A: Seat belt retractor in vertically installed position.
B: With 15° or less tilt, the webbing can be pulled out.
C: With 35° or more tilt, the webbing can not be pulled out.
D: Seat belt retractor in horizontally installed position.
⇦: Vehicle front.
If the seat belt does not operate properly within the specifications, replace the seat belt retractor assembly.

LATCH (LOWER ANCHORS AND TETHER FOR CHILDREN) SYSTEM

Removal and Installation

INFOID:0000000007329044

NOTE:
The LATCH (Lower Anchors and Tether for Children) system is not serviceable.

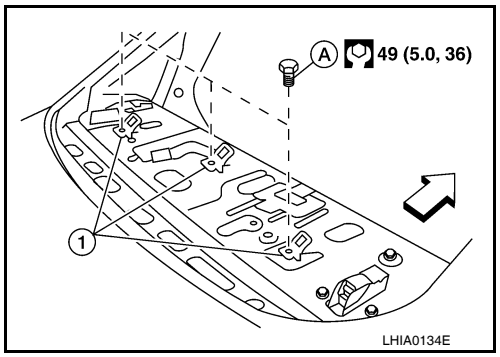
TOP TETHER STRAP CHILD RESTRAINT

Removal and Installation

INFOID:0000000007329045

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the tonneau board. Refer to EI-44, "Removal and Installation".
3. Remove the bolt (A), then remove the top tether bracket (1) from the body panel.
   ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.

SECTION SRS
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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330533

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution for SRS "AIR BAG" and "SEAT BELT PRE-TENSIONER" Service

INFOID:0000000007330534

- Do not use electrical test equipment to check SRS circuits unless instructed to in this Service Manual.
- Before servicing the SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.
  For approximately 3 minutes after the cables are removed, it is still possible for the air bag and seat belt pretensioner to deploy. Therefore, do not work on any SRS connectors or wires until at least 3 minutes have passed.
- The air bag diagnosis sensor unit must always be installed with the arrow mark “⇐” pointing toward the front of the vehicle for proper operation. Also check air bag diagnosis sensor unit for cracks, deformities or rust before installation and replace as required.
- The spiral cable must be aligned with the neutral position since its rotations are limited. Do not attempt to turn steering wheel or column after removal of steering gear.
- Handle air bag module carefully. Always place driver and front passenger air bag modules with the pad side facing upward and seat mounted front side air bag module standing with the stud bolt side facing down.
- Conduct self-diagnosis to check entire SRS for proper function after replacing any components.
- After air bag inflates, the front instrument panel assembly should be replaced if damaged.
- Do not reuse center pillar upper garnish if removed.

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330535

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.

- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Occupant Classification System Precaution

INFOID:0000000007330536

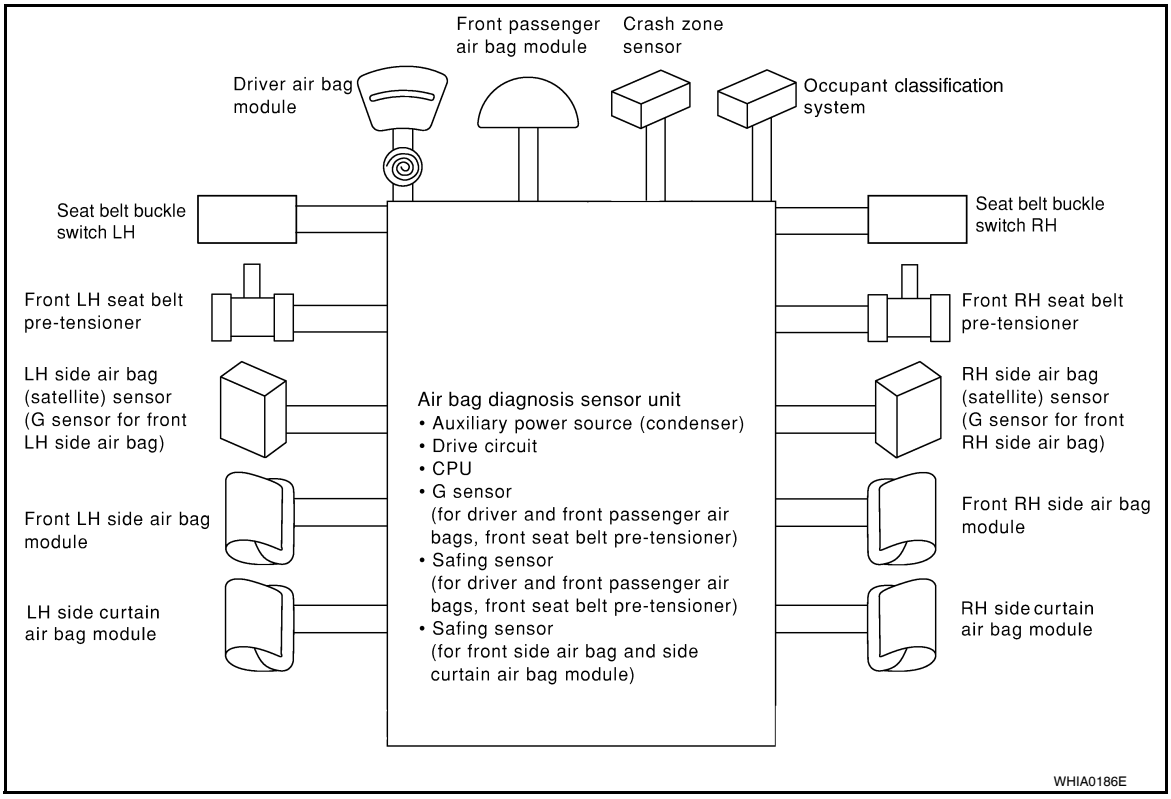
Replace control unit and passenger front seat cushion as an assembly.

SYMPTOM DIAGNOSIS

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

SRS Configuration

INFOID:0000000007330537



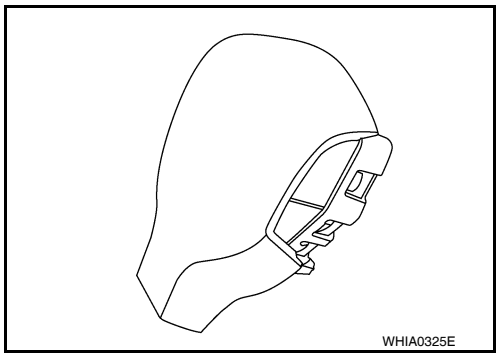
The air bag deploys if the air bag diagnosis sensor unit is activated while the ignition switch is in the ON or START position.
The collision modes for which supplemental restraint systems are activated are different among the SRS systems. For example, the driver air bag module, front passenger air bag module and front seat belt pre-tensioners are activated in a frontal collision but not in a side collision.
SRS configurations for some collision modes are as follows:

SRS configuration	Frontal collision	Left side collision	Right side collision
Driver air bag module	×	—	—
Front passenger air bag module	×	—	—
Front LH seat belt pre-tensioner	×	—	—
Front RH seat belt pre-tensioner	×	—	—
Front LH side air bag module	—	×	—
Front RH side air bag module	—	—	×
LH side curtain air bag module	—	×	—
RH side curtain air bag module	—	—	×

Driver Air Bag Module

INFOID:0000000007330538

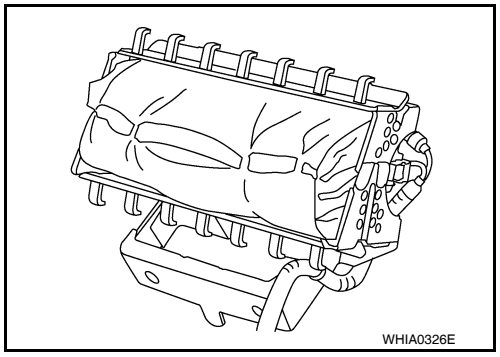
The driver air bag module is dual stage and located in the steering wheel assembly. It operates with the SRS system in a frontal collision exceeding a specified level.



Front Passenger Air Bag Module

INFOID:0000000007330539

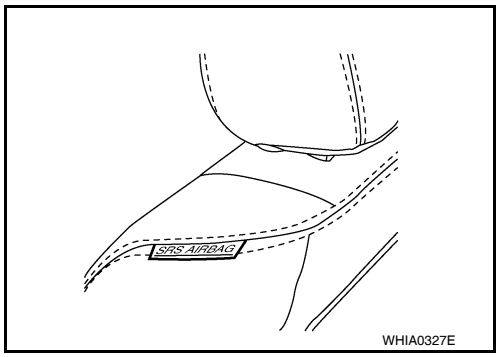
The front passenger air bag module is located behind the instrument panel assembly (mounted to the steering member). It operates with the SRS system in a frontal collision exceeding a specified level. Refer to SRS-6, "Occupant Classification System (OCS)" for more information.



Front Side Air Bag

INFOID:0000000007330540

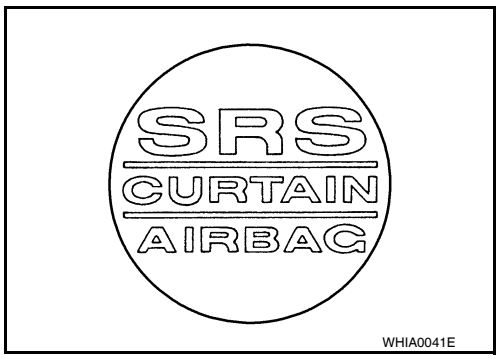
Front side air bag modules are built into the front seatback assemblies. Vehicles with side air bags are equipped with labels as shown.



Side Curtain Air Bag

INFOID:0000000007330541

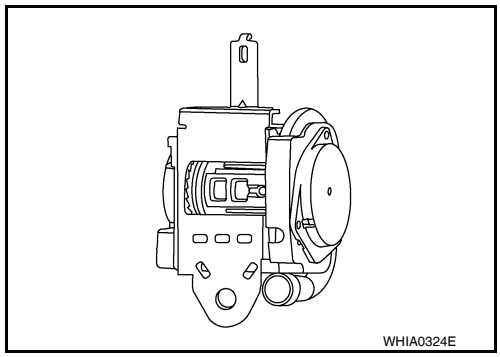
Side curtain air bag modules are located above the vehicle headlining and run from the front to the rear of the vehicle. Vehicles with side curtain air bags are equipped with labels as shown.



Front Seat Belt Pre-tensioner with Load Limiter

INFOID:0000000007330542

The seat belt pre-tensioner system with load limiter is installed for both the driver's seat and the front passenger's seat. It operates simultaneously with the SRS air bag system in the event of a frontal collision with an impact exceeding a specified level.
When the frontal collision with an impact exceeding a specified level occurs, seat belt slack resulting from clothing or other factors is immediately taken up by the pre-tensioner. Vehicle passengers are securely restrained.
When passengers in a vehicle are thrown forward in a collision and the restraining force of the seat belt exceeds a specified level, the load limiter permits the specified extension of the seat belt by the twisting of the ELR shaft, and a relaxation of the chest-area seat belt web tension while maintaining force.



Occupant Classification System (OCS)

INFOID:0000000007330543

The occupant classification system (OCS) identifies different size occupants, out of position occupants, and detects if child seat is present in the front passenger seat. The OCS receives inputs from the occupant classification system sensor (located under the passenger seat cushion assembly) and belt tension sensor (part of the passenger front seat belt assembly and located at the belt anchor location). Depending on classification of the passenger, the OCS sends a signal to the air bag diagnosis sensor unit. The air bag diagnosis sensor unit uses this signal and the seat belt buckle switch RH signal to determine deployment or non deployment of the front passenger air bag module in the event of a collision. Depending on the signals received, the air bag diagnosis sensor unit can disable the front passenger air bag module completely.

NOTE:

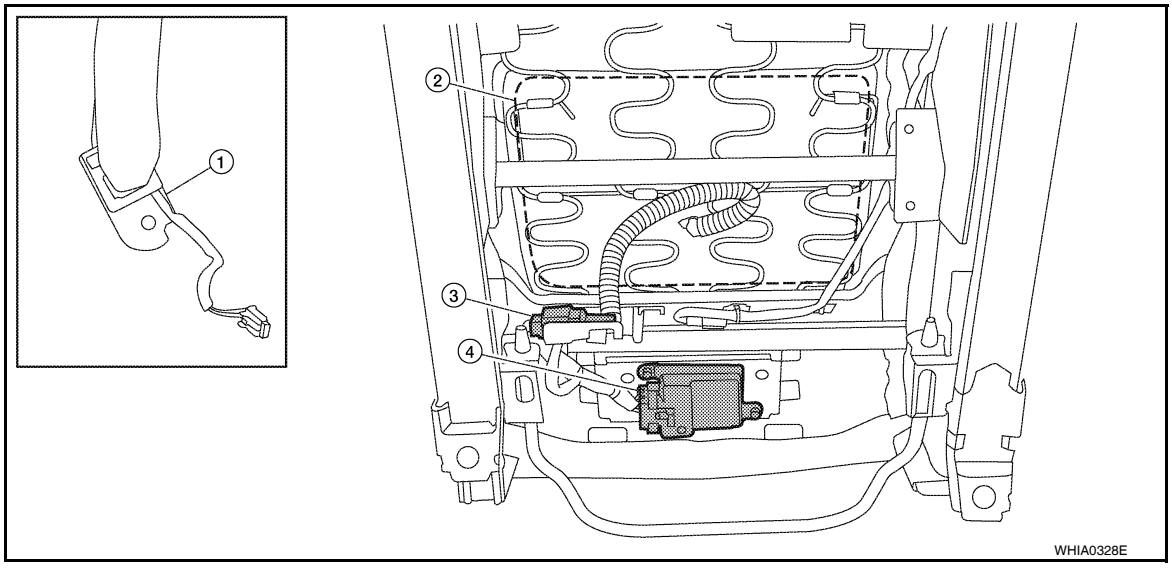
In case of customer concern, CONSULT can be used to confirm the passenger air bag status (readiness).

Passenger Air Bag Status Conditions

Front Passenger Seat (Condition)	PASS AIR BAG OFF Indicator (Status)	Passenger Air Bag Status (Readiness)	CONSULT Display
Seat occupied	OFF	Active (enabled)	ON
Seat occupied NOTE	ON	Deactivated (disabled)	OFF
Seat empty	OFF	Deactivated (disabled)	OFF

NOTE:

Passenger does not meet Occupant Classification System specifications for passenger air bag activation.



1. Belt tension sensor
2. Occupant classification system bladder
3. Occupant classification system sensor
4. Occupant classification system control unit

SRS Component Connectors

INFOID:0000000007687355

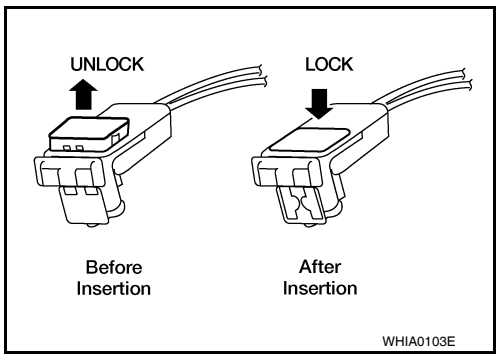
DIRECT CONNECT

The following SRS components use direct-connect style harness connectors.

- Driver front air bag module
- Passenger front air bag module
- LH side curtain air bag module
- RH side curtain air bag module
- Front LH seat belt pre-tensioner
- Front RH seat belt pre-tensioner

Always pull up to release locking tab prior to removing connector from SRS component.

Always push down to lock locking tab after installing connector to SRS component. When locked, the locking tab is level with the connector housing.

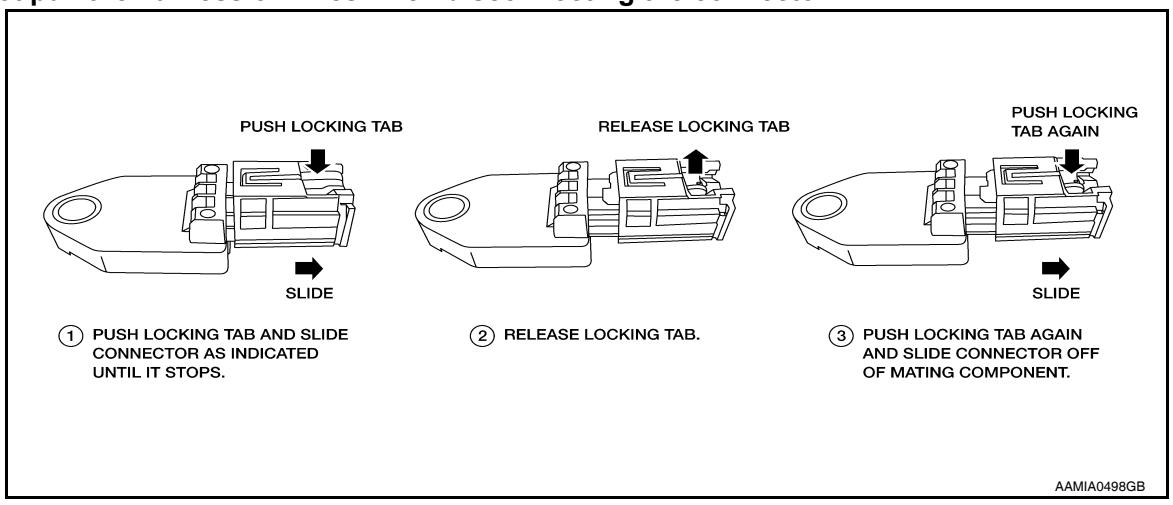


SLIDE DOUBLE LOCKING

- A new style slide double locking type connector is used on certain systems and components, especially those related to airbag control systems.
- The slide double locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide double locking type connectors are disconnected by pushing or pulling the slider. Refer to the figure below.

CAUTION:

- **Do not pull the harness or wires when disconnecting the connector.**



TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction

INFOID:0000000007330545

CAUTION:

- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to do so in this Service Manual.**
- **Do not attempt to repair, splice or modify SRS wiring harnesses. If a harness is damaged, replace it with a new one.**
- **Keep ground connections clean.**

DIAGNOSIS FUNCTION

The SRS self-diagnosis results can be read by using “AIR BAG” warning lamp and/or CONSULT.
The User mode is exclusively prepared for the customer (driver). This mode warns the driver of a system malfunction through the operation of the “AIR BAG” warning lamp.
The Diagnosis mode allows the technician to locate and inspect the malfunctioning part.
The mode applications for the “AIR BAG” warning lamp and CONSULT are as follows:

	User mode	Diagnosis mode	Display type
“AIR BAG” warning lamp	X	X	ON-OFF operation
CONSULT	—	X	Monitoring

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

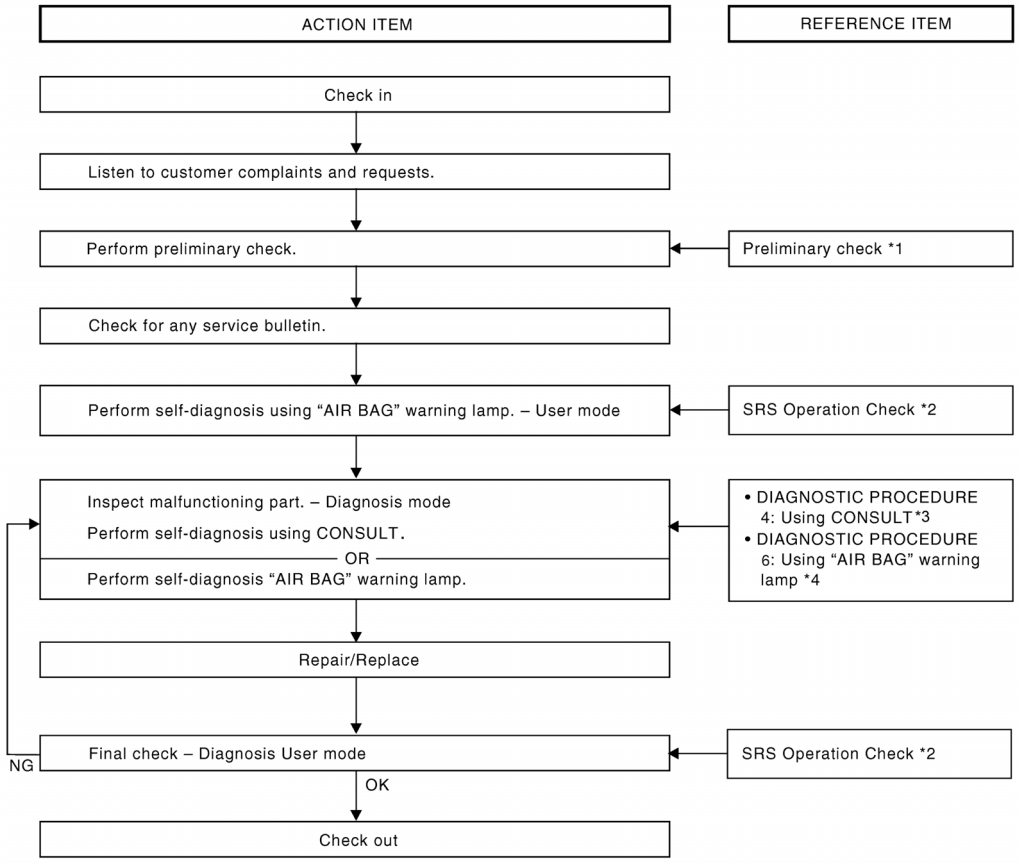
A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Information From Customer
WHAT - Vehicle model
WHEN - Date, Frequencies
WHERE - Road conditions
HOW - Operating conditions, Symptoms

Preliminary Check
Check that the following parts are in good order.

- Battery (Refer to SC-5, "How to Handle Battery".)
- Fuses (Refer to SRS-11, "Schematic".)
- System component-to-harness connections

WORK FLOW



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*1: "PRELIMINARY CHECK" *2: SRS-19 *3: SRS-20
*4: SRS-28

SRS Component Parts Location

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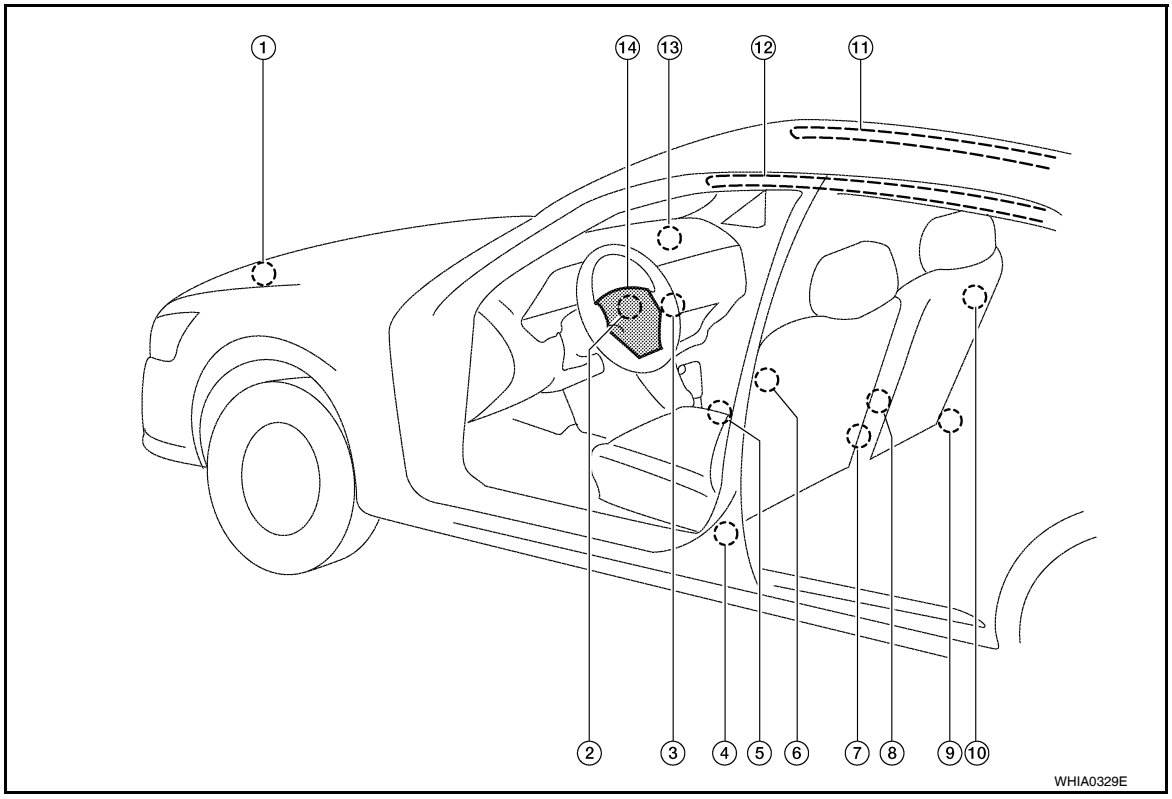
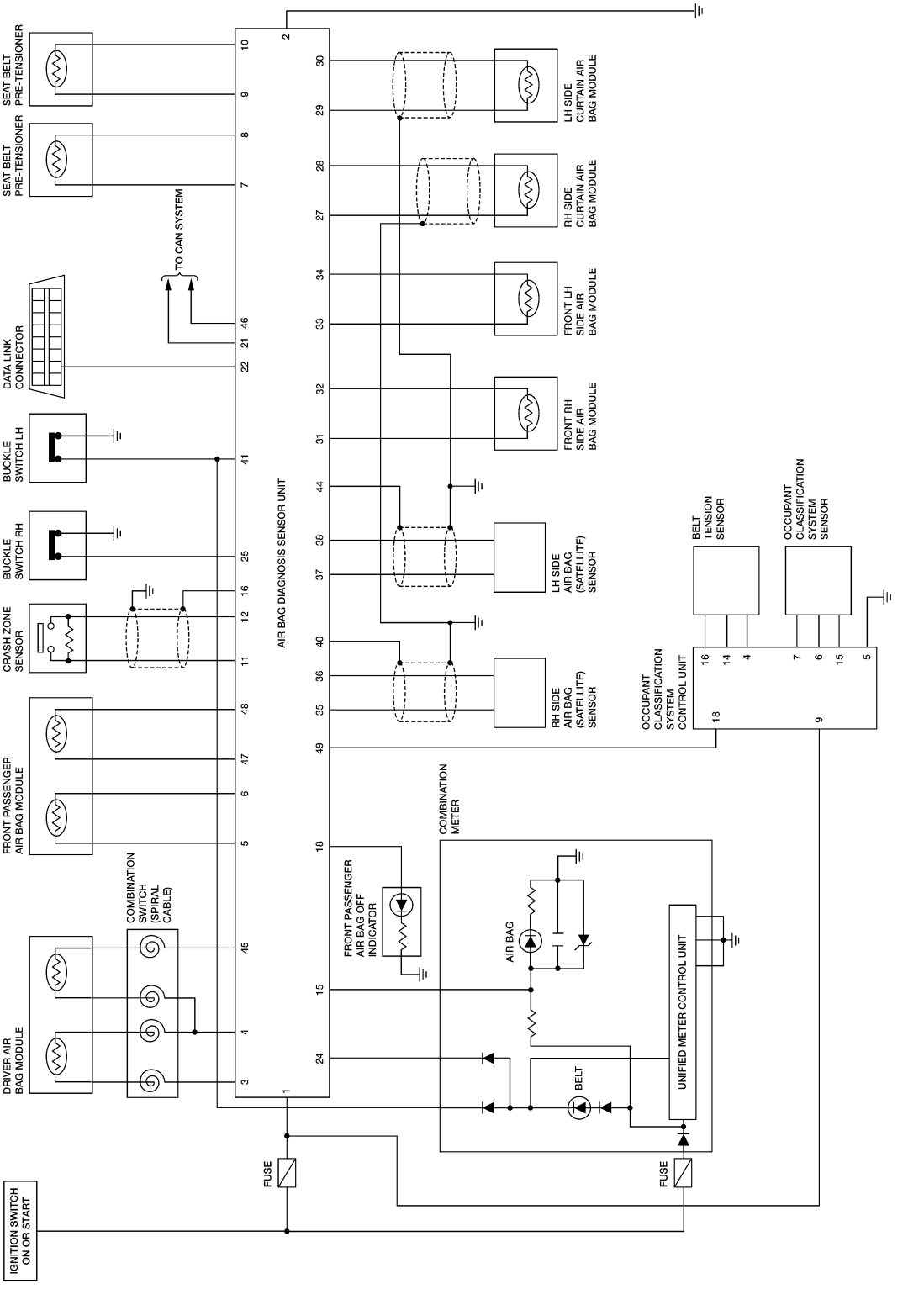


1. Crash zone sensor
2. Spiral cable
3. Front passenger air bag off indicator
4. Front LH seat belt pre-tensioner
   LH side air bag (satellite) sensor
5. Air bag diagnosis sensor unit
6. Front LH side air bag module
7. Seat belt buckle switch (LH)
   Seat belt buckle switch (RH)
8. Occupant classification system control unit
   Occupant classification system sensor
9. Front RH seat belt pre-tensioner
   RH side air bag (satellite) sensor
   Belt tension sensor
10. Front RH side air bag module
11. RH side curtain air bag module
12. LH side curtain air bag module
13. Front passenger air bag module
14. Driver air bag module

Schematic

INFOID:0000000007330547



Wiring Diagram - SRS-

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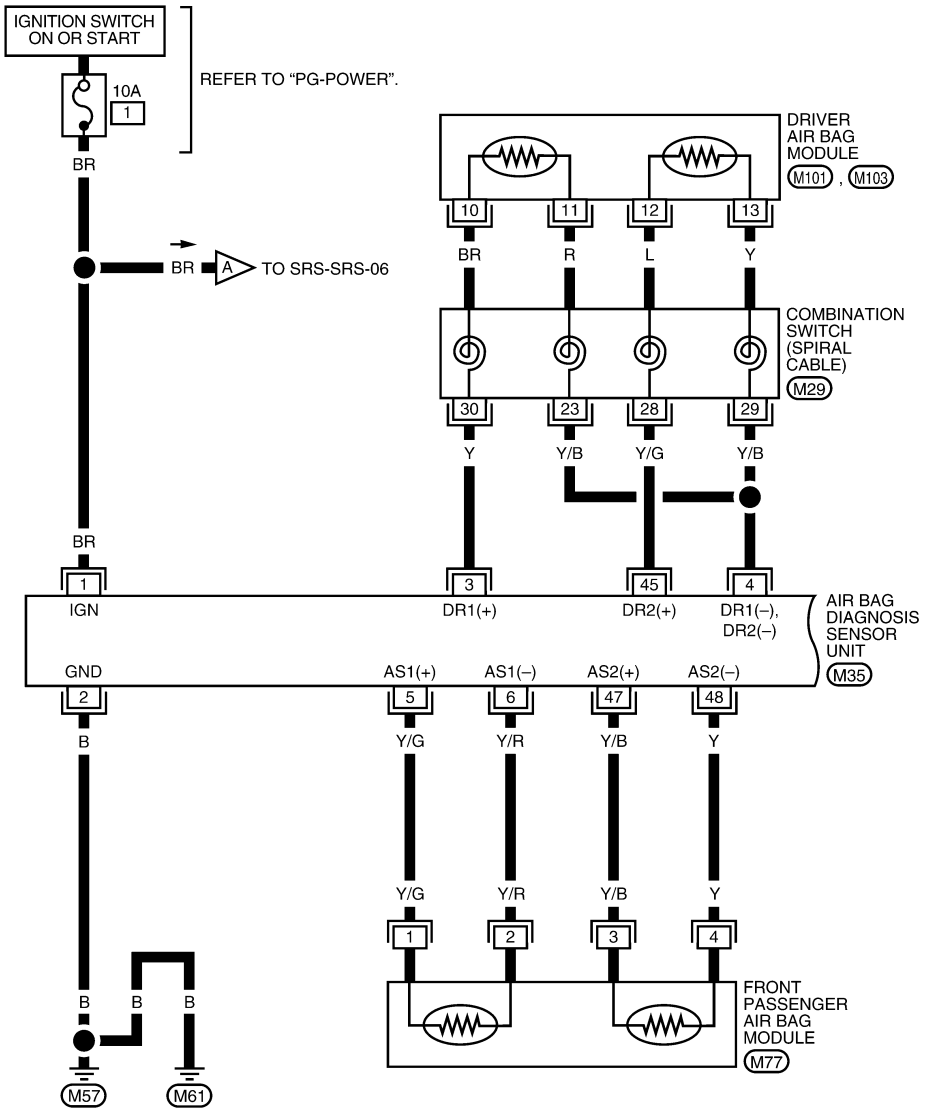
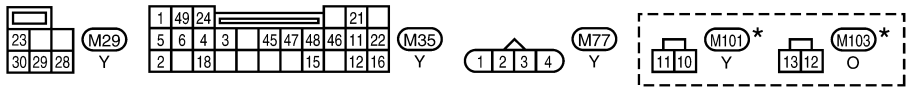
SRS-SRS-01





*: THIS CONNECTOR IS NOT SHOWN IN “HARNESS LAYOUT” OF PG SECTION.

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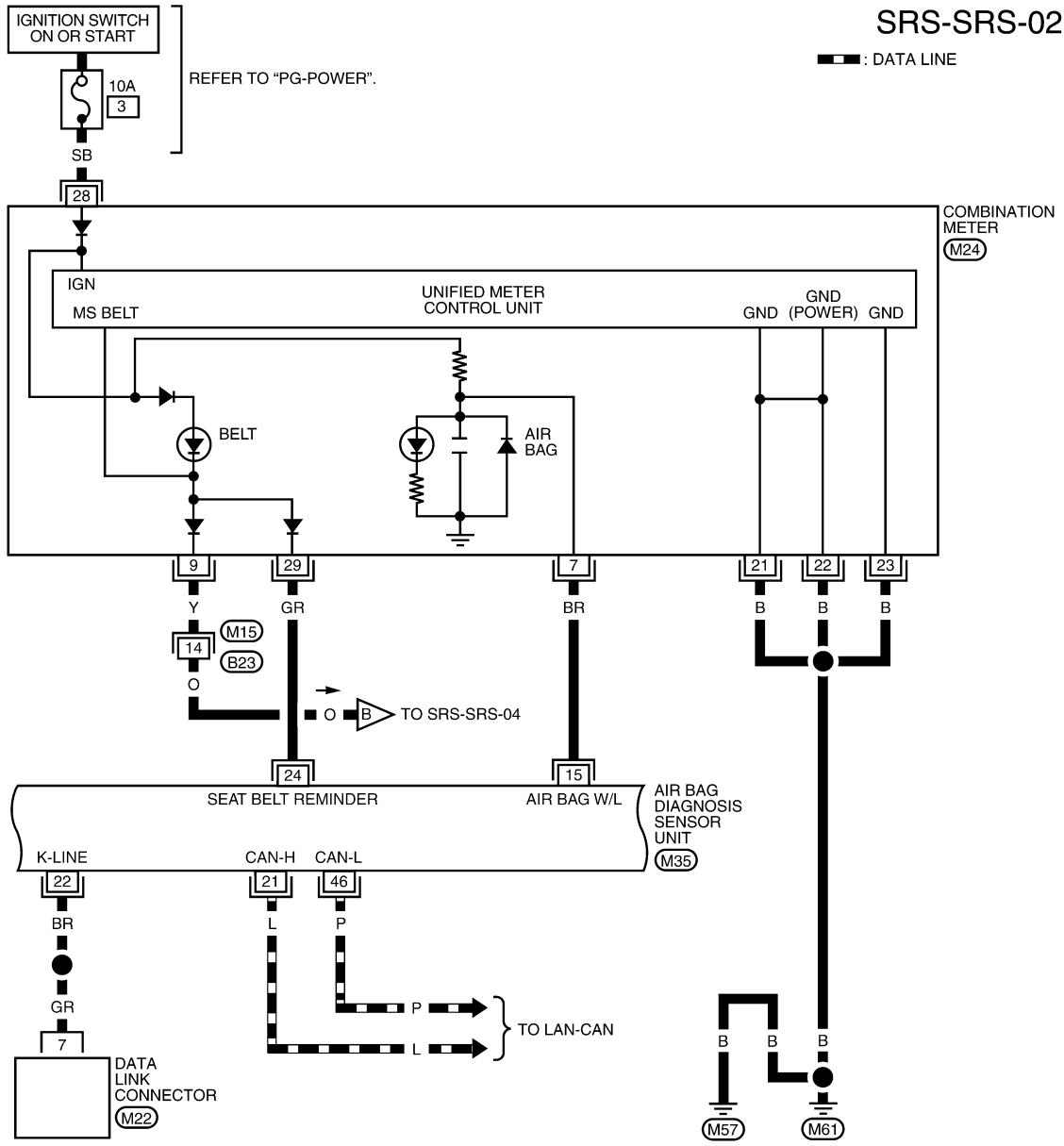

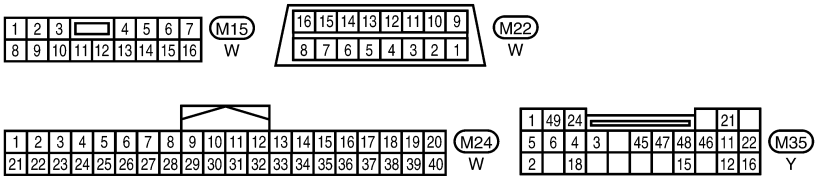

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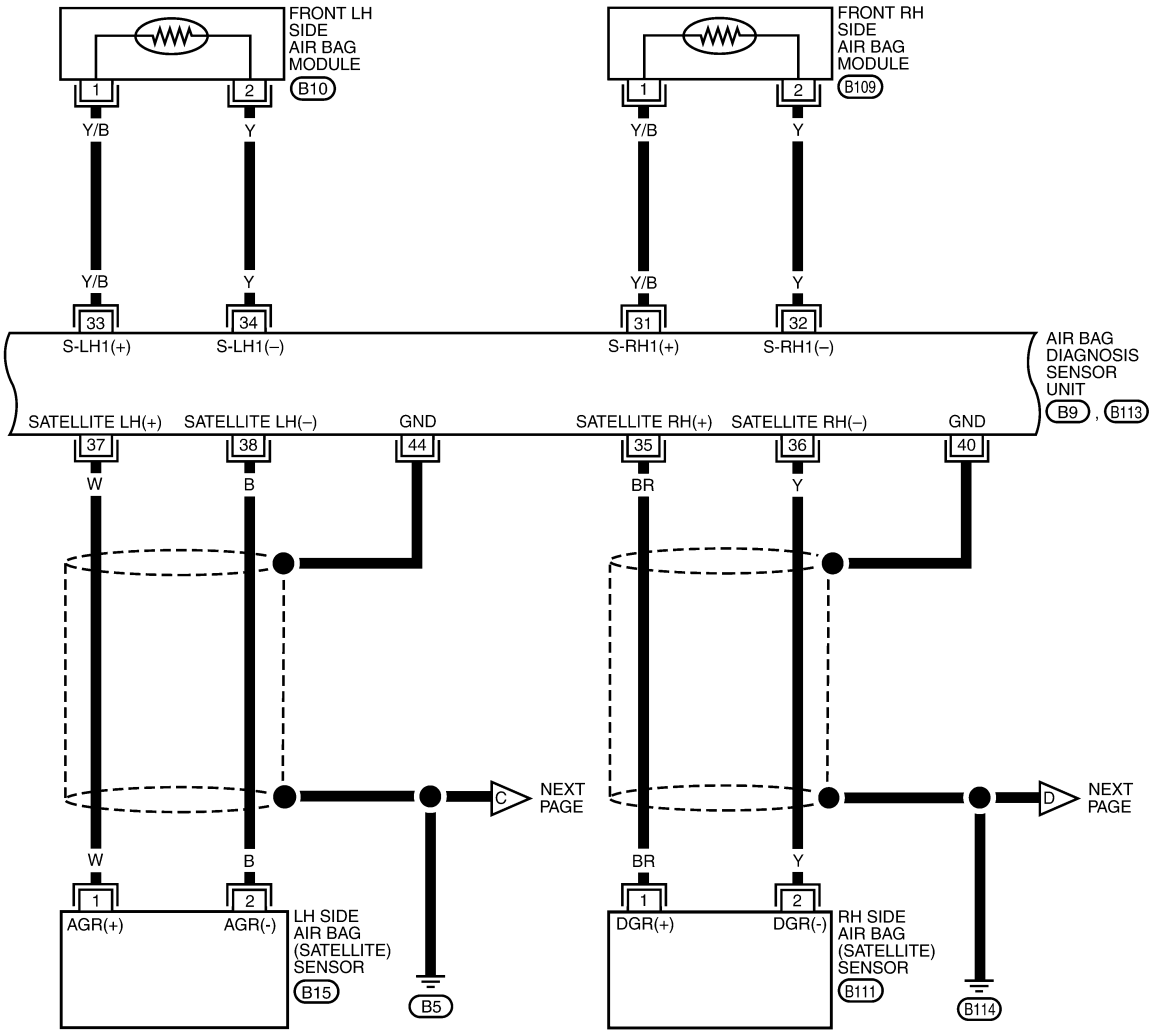
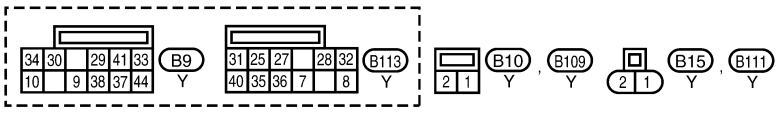
SRS-SRS-03





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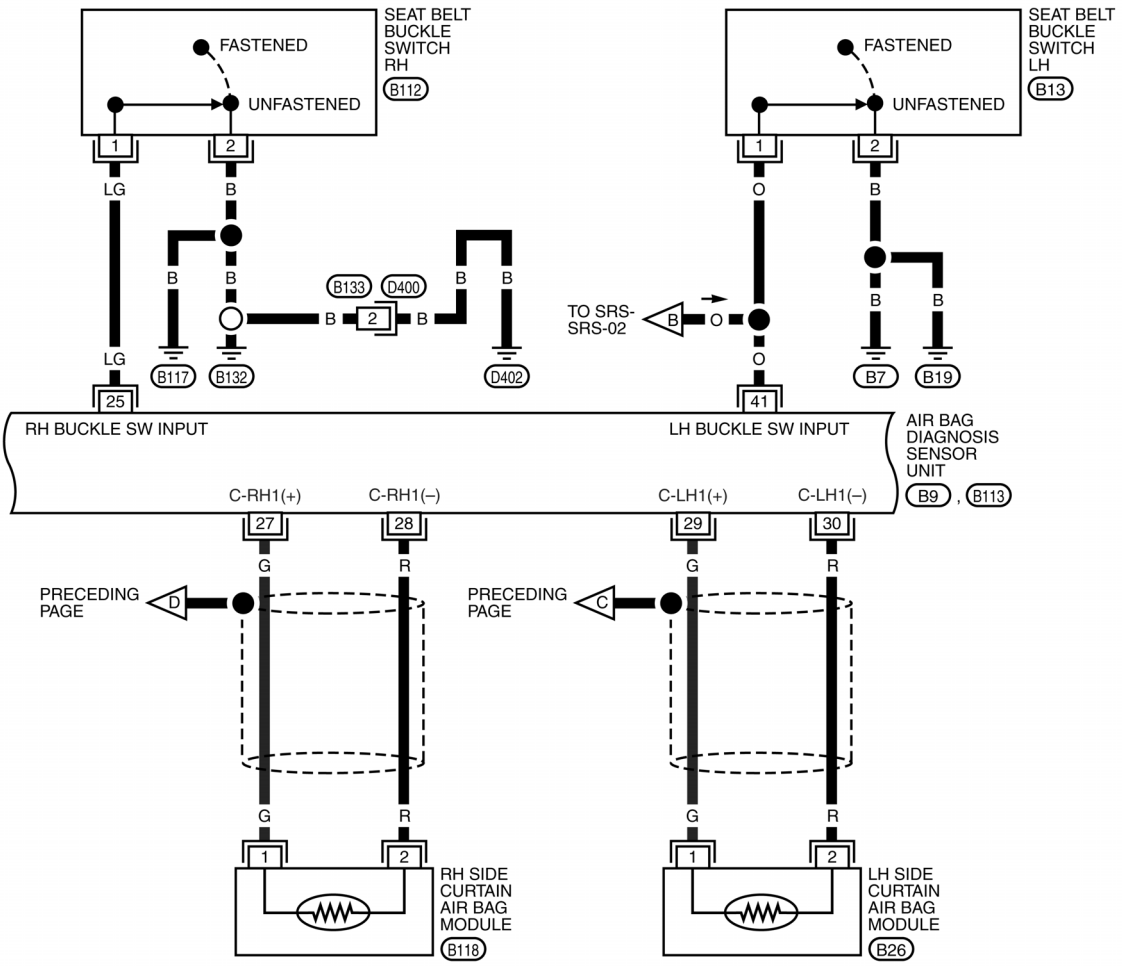
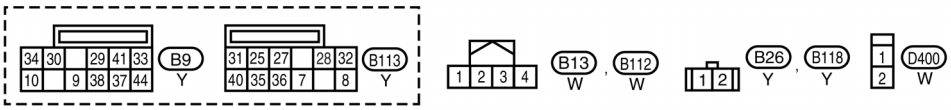
SRS-SRS-04





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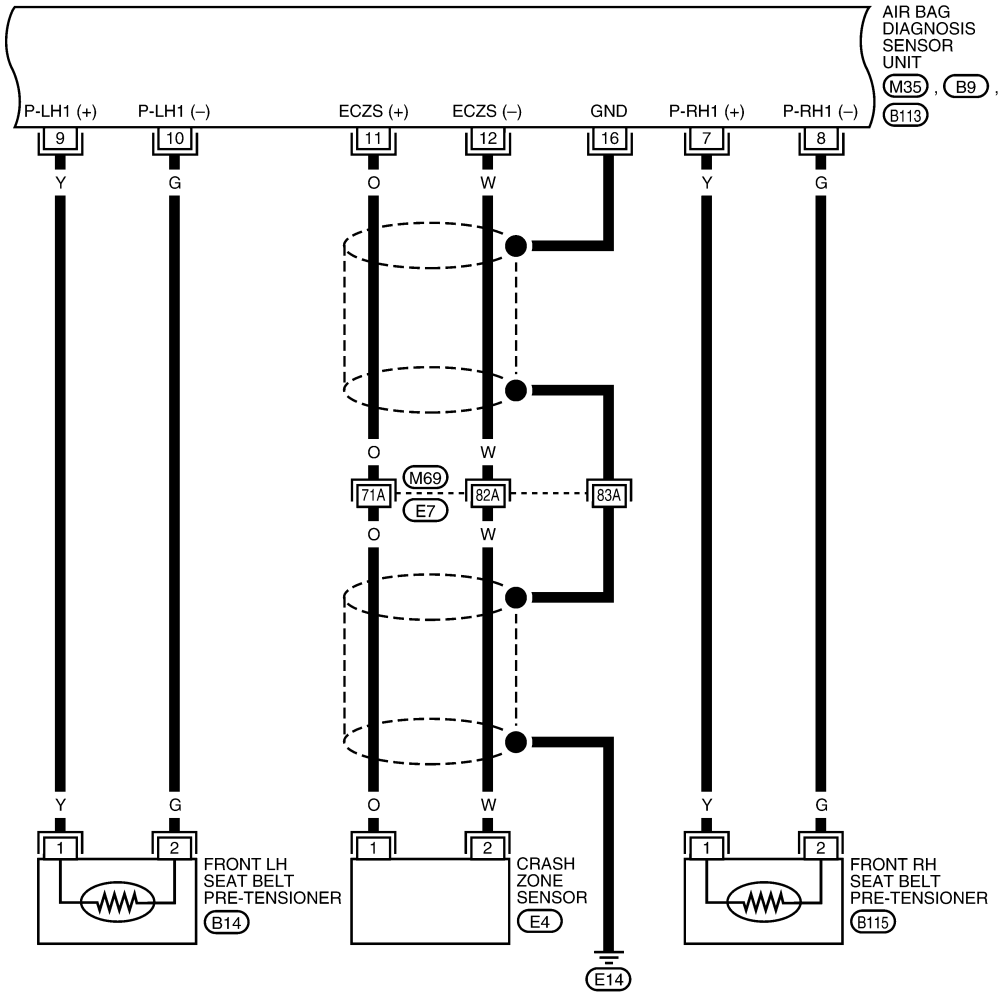
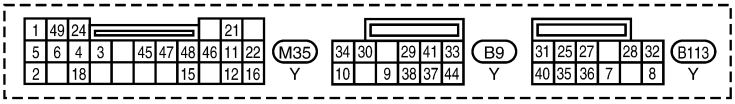
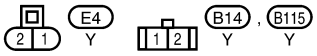
SRS-SRS-05







REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

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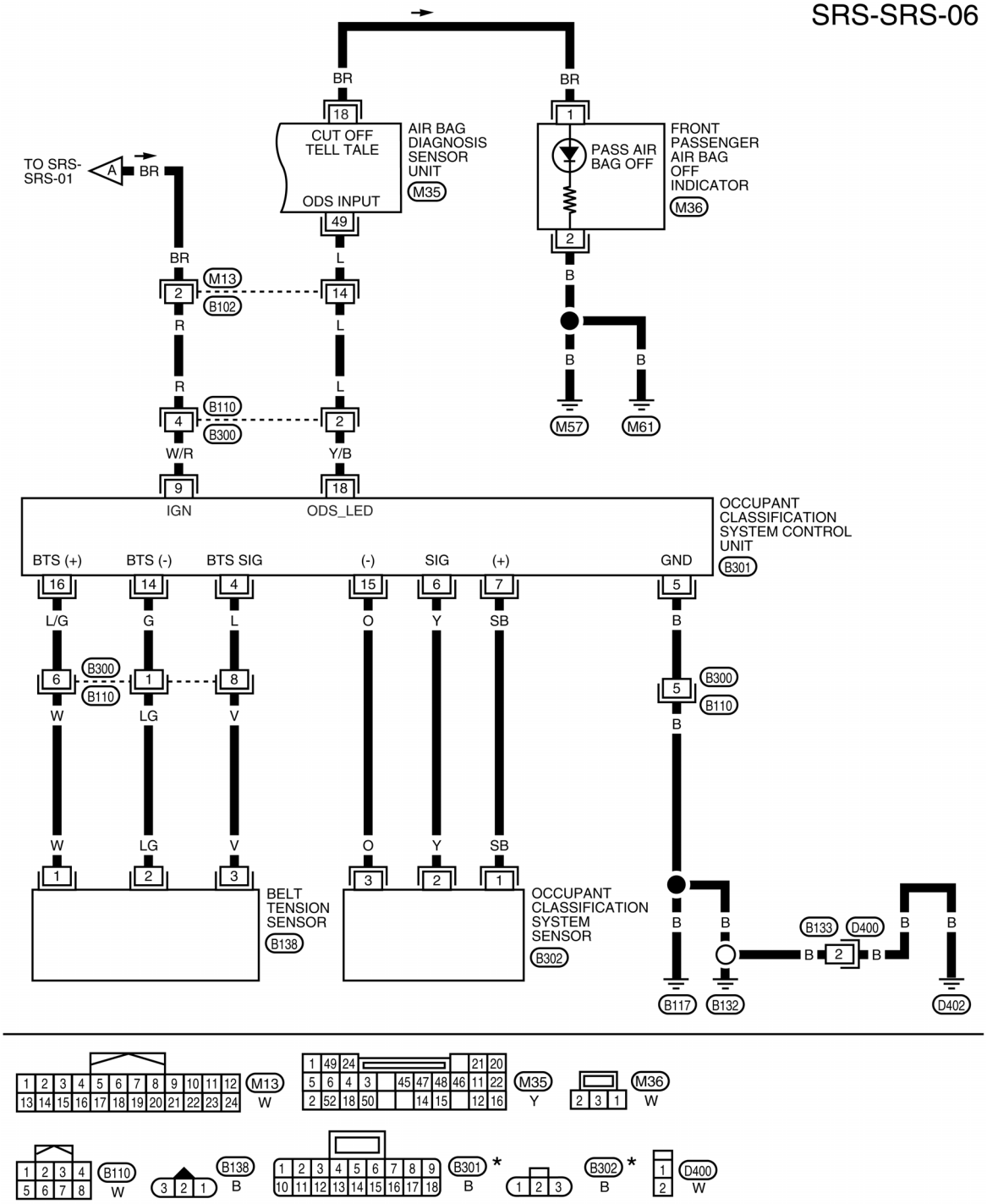
SRS-SRS-06



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

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CONSULT Function (AIR BAG)

INFOID:0000000007330549

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

AIR BAG diagnostic mode	Description
SELF-DIAG [CURRENT]	A current Self-diagnosis result is displayed on the CONSULT screen in real time. This refers to a malfunctioning part requiring replacement.
SELF-DIAG [PAST]	Diagnosis results previously stored in the memory are displayed on the CONSULT screen. The stored results will remain until the memory is erased.
TROUBLE DIAG RECORD	With TROUBLE DIAG RECORD, diagnosis results previously erased by a reset operation can be displayed on the CONSULT screen.
ECU DISCRIMINATED NO.	Air bag diagnosis sensor unit ECU discriminated number (identification number) or part number is displayed. Air bag diagnosis sensor unit has individual ECU discriminated number (identification number) or part number based on model and equipment.
PASSENGER AIR BAG	The STATUS (readiness) of the front passenger air bag module is displayed. The STATUS displayed (ON/OFF) depends on the signals supplied to the occupant classification system control module and air bag diagnosis sensor unit. Refer to SRS-6, "Occupant Classification System (OCS)" for more information.

HOW TO CHANGE BETWEEN SELF-DIAGNOSIS MODE AND USER MODE WITH CONSULT

From User Mode to Diagnosis Mode
After selecting “AIR BAG” on the “SELECT SYSTEM” screen, User mode automatically changes to Diagnosis mode.

From Diagnosis Mode to User Mode
To return to User mode from Diagnosis mode, touch “BACK” key of CONSULT until “SELECT SYSTEM” appears, Diagnosis mode automatically changes to User mode.

HOW TO ERASE SELF-DIAGNOSIS RESULTS

NOTE:
If the memory in “SELF-DIAG [PAST]” is not erased, User mode will continue to show the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.

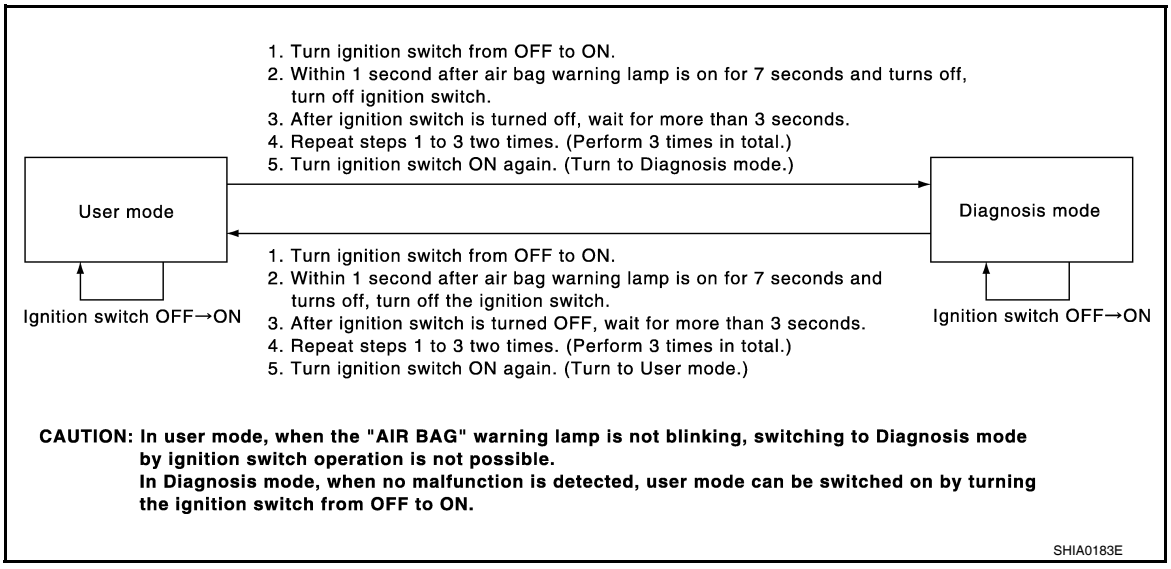
- “SELF-DIAG [CURRENT]”
  A current self-diagnosis result is displayed on the CONSULT screen in real time. After the malfunction is repaired completely, no malfunction is detected on “SELF-DIAG [CURRENT]”.
- “SELF-DIAG [PAST]”
  Return to the “SELF-DIAG [CURRENT]” CONSULT screen by touching “BACK” key of CONSULT and select “SELF-DIAG [CURRENT]” in SELECT DIAG MODE. Touch “ERASE” in “SELF-DIAG [CURRENT]” mode.
- “TROUBLE DIAG RECORD”
  The memory of “TROUBLE DIAG RECORD” cannot be erased.

Self-Diagnosis Function (Without CONSULT)

INFOID:0000000007330550

The reading of these results is accomplished using one of two modes —“User mode” and “Diagnosis mode”.

HOW TO CHANGE BETWEEN USER MODE AND SELF-DIAGNOSIS MODE WITHOUT CONSULT



HOW TO ERASE SELF-DIAGNOSIS RESULTS

After a malfunction is repaired, turn the ignition switch OFF for at least one second, then back ON. Diagnosis mode returns to the User mode. At that time, the self-diagnostic result is cleared.

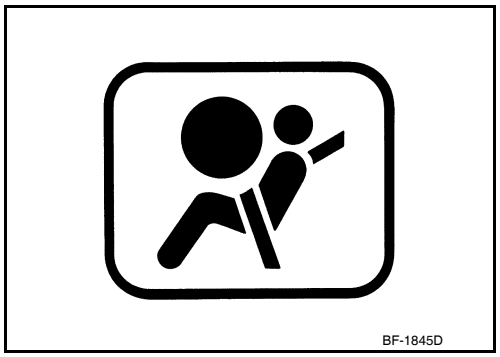
SRS Operation Check

INFOID:0000000007330551

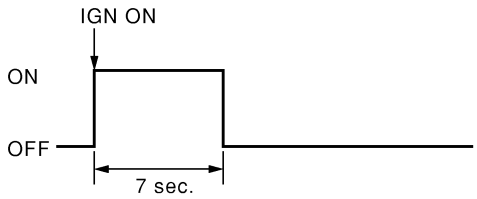
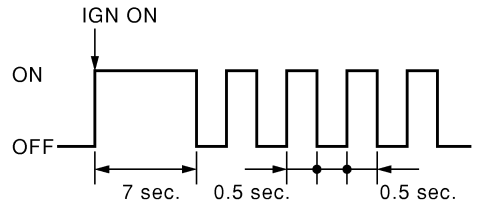
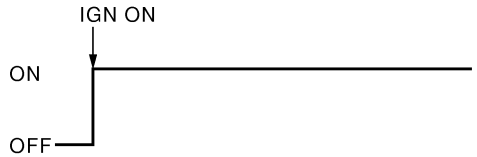
DIAGNOSTIC PROCEDURE 1

Checking SRS Operation Using “AIR BAG” Warning Lamp—User Mode

1. Turn the ignition switch from OFF to ON, and check that the air bag warning lamp blinks.
2. Compare the SRS air bag warning lamp blinking pattern with the examples.



Air bag warning lamp examples

"AIR BAG" warning lamp operation-User mode-	SRS condition	Reference item
 SHIA0011E	• No malfunction is detected. • No further action is necessary.	—
 SHIA0012E	• The system is malfunctioning and needs to be repaired as indicated.	Go to SRS-20, "Trouble Diagnosis with CONSULT" with CONSULT or SRS-28, "Trouble Diagnosis without CONSULT" without CONSULT.
 SHIA0013E	• Air bag is deployed. • Seat belt pre-tensioner is deployed.	Go to SRS-49, "For Frontal Collision".
	• Air bag diagnosis sensor unit is malfunctioning. • Air bag power supply circuit is malfunctioning. • Air bag warning lamp circuit is malfunctioning.	Go to SRS-32, "Trouble Diagnosis: "AIR BAG" Warning Lamp Does Not Turn Off".
SHIA0014E	• Air bag diagnosis sensor unit is malfunctioning. • Air bag warning lamp circuit is malfunctioning.	Go to SRS-32, "Trouble Diagnosis: "AIR BAG" Warning Lamp Does Not Turn On".

Trouble Diagnosis with CONSULT

INFOID:0000000007330552

DIAGNOSTIC PROCEDURE 2

Diagnostic code is displayed on "SELF-DIAG [CURRENT]".
If no malfunction is detected on "SELF-DIAG [CURRENT]", but malfunction is detected in "SRS Operation Check", the following cases may exist:
- "SELF-DIAG [PAST]" memory might not be erased.
- The SRS system malfunctions intermittently.

Refer to "DIAGNOSTIC PROCEDURE 4"

CONSULT Diagnostic Code Chart ("SELF-DIAG [CURRENT]")

Diagnostic item	Explanation		Repair order Recheck SRS at each replacement
NO DTC IS DETECTED	Malfunction is indicated by the “AIR BAG” warning lamp in User mode.	Low battery voltage (Less than 9V)	1. Go to SC-5, "How to Handle Battery". 2. Go to "DIAGNOSTIC PROCEDURE 3" .
		“SELF-DIAG [PAST]” memory might not be erased.	Go to "DIAGNOSTIC PROCEDURE 4" .
		Intermittent malfunction has been detected in the past.	Go to "DIAGNOSTIC PROCEDURE 5" .
	No malfunction is detected in User mode.		—
DRIVER AIRBAG MODULE [OPEN] [B1049] or [B1054]	Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Inspect spiral cable circuit. 4. Replace the air bag diagnosis sensor unit. 5. Replace driver air bag module. 6. Replace the related harness.
DRIVER AIRBAG MODULE [VB-SHORT] [B1050] or [B1055]	Driver air bag module circuit is shorted to some power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT] [B1051] or [B1056]	Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT] [B1052] or [B1057]	Driver air bag module circuits are shorted to each other.		
ASSIST A/B MODULE [OPEN] [B1065] or [B1070]	Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front passenger air bag module. 5. Replace the related harness.
ASSIST A/B MODULE [VB-SHORT] [B1066] or [B1071]	Front passenger air bag module circuit is shorted to some power supply circuit.		
ASSIST A/B MODULE [GND-SHORT] [B1067] or [B1072]	Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT] [B1068] or [B1073]	Front passenger air bag module circuits are shorted to each other.		
CRASH ZONE SEN [UNIT FAIL] [B1033] or [B1034] CRASH ZONE SEN [COMM FAIL] [B1035]	Crash zone sensor		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [OPEN] [B1134]	Front LH side air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front LH side air bag module. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT] [B1135]	Front LH side air bag module circuit is shorted to some power supply circuit.		
SIDE MODULE LH [GND-SHORT] [B1136]	Front LH side air bag module circuit is shorted to ground.		
SIDE MODULE LH [SHORT] [B1137]	Front LH side air bag module circuits are shorted to each other.		

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
SIDE MODULE RH [OPEN] [B1129]	Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front RH side air bag module. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT] [B1130]	Front RH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE RH [GND-SHORT] [B1131]	Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT] [B1132]	Front RH side air bag module circuits are shorted to each other.	
SATELLITE SENS LH [UNIT FAIL] [B1118] or [B1119] SATELLITE SENS LH [COMM FAIL] [B1120]	LH side air bag (satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
SATELLITE SENS RH [UNIT FAIL] [B1113] or [B1114] SATELLITE SENS RH [COMM FAIL] [B1115]	RH side air bag (satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [OPEN] [B1086]	The circuit for front LH seat belt pre-tensioner is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT] [B1087]	The circuit for front LH seat belt pre-tensioner is shorted to some power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT] [B1088]	The circuit for front LH seat belt pre-tensioner is shorted to ground.	
PRE-TEN FRONT LH [SHORT] [B1089]	The circuits for the front LH seat belt pre-tensioner are shorted to each other.	
PRE-TEN FRONT RH [OPEN] [B1081]	The circuit for front RH seat belt pre-tensioner is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT] [B1082]	The circuit for front RH seat belt pre-tensioner is shorted to some power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT] [B1083]	The circuit for front RH seat belt pre-tensioner is shorted to ground.	
PRE-TEN FRONT RH [SHORT] [B1084]	The circuits for the front RH seat belt pre-tensioner are shorted to each other.	

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
CURTAIN MODULE LH [OPEN] [B1150]	The LH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace LH side curtain air bag module. 5. Replace the related harness.
CURTAIN MODULE LH [VB-SHORT] [B1151]	The LH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE LH [GND-SHORT] [B1152]	The LH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE LH [SHORT] [B1153]	The circuits for the LH side curtain air bag module are shorted to each other.	
CURTAIN MODULE RH [OPEN] [B1145]	The RH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace RH side curtain air bag module. 5. Replace the related harness.
CURTAIN MODULE RH [VB-SHORT] [B1146]	The RH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE RH [GND-SHORT] [B1147]	The RH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE RH [SHORT] [B1148]	The circuits for the RH side curtain air bag module are shorted to each other.	
CONTROL UNIT [B1XXX]	Air bag diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the air bag diagnosis sensor unit.
OCCUPANT SENS C/U [UNIT FAIL] [B1017] or [B1021]	The OCS control unit is malfunctioning.	1. Replace RH front seat cushion/ occupant classification system control unit assembly.
OCCUPANT SENS C/U [UNIT FAIL] [B1020]	The OCS control unit is malfunctioning.	1. Replace the harness if it has visible damage. 2. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 3. Replace the RH front seat belt assembly.
OCCUPANT SENS C/U [COMM FAIL] [B1022]	Communication between the OCS control unit and air bag diagnosis sensor unit is interrupted.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
OCCUPANT SENS [UNIT FAIL] [B1018]	OCS sensor is malfunctioning.	1. Visually check the wiring harness connection to the OCS sensor. 2. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly.

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
BELT TENSION SENS [UNIT FAIL] [B1019]	Belt tension sensor is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH front seat belt assembly. 4. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 5. Replace the related harness.
FRONTAL COLLISION DETECTION [B1209]	Driver and front passenger air bag modules are deployed.	Refer to SRS-49, "For Frontal Collision".
SIDE COLLISION DETECTION [B1210]	Side or curtain air bag modules are deployed.	Refer to SRS-51, "For Side and Rollover Collision".

NOTE:
Follow the procedures in numerical order when performing repairs. Confirm whether the repair has been successful using air bag warning lamp or CONSULT after each repair. If malfunction is still observed, proceed to the next step. When malfunction has been eliminated, further repair work is not required.

DIAGNOSTIC PROCEDURE 3

Final Check of SRS Using CONSULT—Diagnosis Mode

1. If no DTC is detected on “SELF-DIAG [CURRENT]”, repair of SRS is completed. Go to step 2.
   If any DTC is detected on “SELF-DIAG [CURRENT]”, the malfunctioning part has not been repaired completely or another malfunctioning part is being detected. Go to "DIAGNOSTIC PROCEDURE 2".
2. Touch “ERASE”.
   NOTE:
   Touch “ERASE” to clear the memory of the malfunction (“SELF-DIAG [PAST]”).
   If the memory of the malfunction in “SELF-DIAG [PAST]” is not erased, the User mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.
3. Touch “BACK” key of CONSULT to “SELECT DIAG MODE” screen. Touch “SELF-DIAG [PAST]”.
4. Check that no malfunction is detected on “SELF-DIAG [PAST]”.
5. Touch “BACK” key of CONSULT until “SELECT SYSTEM” appears in order to return to User mode from Diagnosis mode.
6. Turn ignition switch OFF then turn off and disconnect CONSULT.
7. Go to SRS-19, "SRS Operation Check".

DIAGNOSTIC PROCEDURE 4

Check SRS Repair History

1. CONSIDER POSSIBILITY THAT SELF-DIAGNOSTIC RESULT WAS NOT ERASED AFTER REPAIR

Check repair history of the SRS.

Have any previous repairs been made to the SRS?

Yes >> Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. Go to "DIAGNOSTIC PROCEDURE 3".

No >> Go to "DIAGNOSTIC PROCEDURE 2".

DIAGNOSTIC PROCEDURE 5

Check SRS Intermittent Malfunction Using CONSULT—Diagnosis Mode

1. If diagnostic codes are displayed on “SELF-DIAG [PAST]”, go to step 4.
   If no malfunction is detected on “SELF-DIAG [PAST]”, touch “BACK” and go back to “SELECT DIAG MODE”.

2. Touch “TROUBLE DIAG RECORD”.
NOTE:
With “TROUBLE DIAG RECORD”, diagnosis results previously erased by a reset operation can be displayed.
3. Diagnostic code is displayed on “TROUBLE DIAG RECORD”.
4. Touch “PRINT”.
5. Compare diagnostic codes to "CONSULT Diagnostic Code Chart ("SELF-DIAG [PAST]" or "TROUBLE DIAG RECORD")".
6. Touch “BACK” key of CONSULT until “SELECT SYSTEM” appears.
7. Turn ignition switch OFF, then turn off and disconnect CONSULT, and both battery cables.
8. Repair the system as outlined by the “Repair order” in “Intermittent Malfunction Diagnostic Code Chart”, that corresponds to the self-diagnostic result. For replacement procedure of component parts, refer to the Removal and Installation procedure for the appropriate component.
9. Go to "DIAGNOSTIC PROCEDURE 3", for final checking.

CONSULT Diagnostic Code Chart ("SELF-DIAG [PAST]" or "TROUBLE DIAG RECORD")

Diagnostic item	Explanation		Repair order Recheck SRS at each replacement
NO DTC IS DETECTED	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	• Low battery voltage (Less than 9V)	• Go to "DIAGNOSTIC PROCEDURE 3" .
		• Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. • Intermittent malfunction has been detected in the past.	• Go to "DIAGNOSTIC PROCEDURE 4" . • Go to "DIAGNOSTIC PROCEDURE 5" .
	• No malfunction is detected.		—
DRIVER AIRBAG MODULE [OPEN] [B1049] or [B1054]	Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Inspect spiral cable circuit. 4. Replace the air bag diagnosis sensor unit. 5. Replace driver air bag module. 6. Replace the related harness.
DRIVER AIRBAG MODULE [VB-SHORT] [B1050] or [B1055]	Driver air bag module circuit is shorted to some power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT] [B1051] or [B1056]	Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT] [B1052] or [B1057]	Driver air bag module circuits are shorted to each other.		
ASSIST A/B MODULE [OPEN] [B1065] or [B1070]	Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front passenger air bag module. 5. Replace the related harness.
ASSIST A/B MODULE [VB-SHORT] [B1066] or [B1071]	Front passenger air bag module circuit is shorted to some power supply circuit.		
ASSIST A/B MODULE [GND-SHORT] [B1067] or [B1072]	Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT] [B1068] or [B1073]	Front passenger air bag module circuits are shorted to each other.		

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
CRASH ZONE SEN [UNIT FAIL] [B1033] or [B1034] CRASH ZONE SEN [COMM FAIL] [B1035]	Crash zone sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [OPEN] [B1134]	Front LH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front LH side air bag module. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT] [B1135]	Front LH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE LH [GND-SHORT] [B1136]	Front LH side air bag module circuit is shorted to ground.	
SIDE MODULE LH [SHORT] [B1137]	Front LH side air bag module circuits are shorted to each other.	
SIDE MODULE RH [OPEN] [B1129]	Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front RH side air bag module. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT] [B1130]	Front RH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE RH [GND-SHORT] [B1131]	Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT] [B1132]	Front RH side air bag module circuits are shorted to each other.	
SATELLITE SENS LH [UNIT FAIL] [B1118] or [B1119] SATELLITE SENS LH [COMM FAIL] [B1120]	LH side air bag (satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
SATELLITE SENS RH [UNIT FAIL] [B1113] or [B1114] SATELLITE SENS RH [COMM FAIL] [B1115]	RH side air bag (satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
PRE-TEN FRONT LH [OPEN] [B1086]	The circuit for front LH seat belt pre-tensioner is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT] [B1087]	The circuit for front LH seat belt pre-tensioner is shorted to some power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT] [B1088]	The circuit for front LH seat belt pre-tensioner is shorted to ground.	
PRE-TEN FRONT LH [SHORT] [B1089]	The circuits for the front LH seat belt pre-tensioner are shorted to each other.	
PRE-TEN FRONT RH [OPEN] [B1081]	The circuit for front RH seat belt pre-tensioner is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT] [B1082]	The circuit for front RH seat belt pre-tensioner is shorted to some power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT] [B1083]	The circuit for front RH seat belt pre-tensioner is shorted to ground.	
PRE-TEN FRONT RH [SHORT] [B1084]	The circuits for the front RH seat belt pre-tensioner are shorted to each other.	
CURTAIN MODULE LH [OPEN] [B1150]	The LH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace LH side curtain air bag module. 5. Replace the related harness.
CURTAIN MODULE LH [VB-SHORT] [B1151]	The LH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE LH [GND-SHORT] [B1152]	The LH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE LH [SHORT] [B1153]	The circuits for the LH side curtain air bag module are shorted to each other.	
CURTAIN MODULE RH [OPEN] [B1145]	The RH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace RH side curtain air bag module. 5. Replace the related harness.
CURTAIN MODULE RH [VB-SHORT] [B1146]	The RH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE RH [GND-SHORT] [B1147]	The RH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE RH [SHORT] [B1148]	The circuits for the RH side curtain air bag module are shorted to each other.	
CONTROL UNIT [B1XXX]	Air bag diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the air bag diagnosis sensor unit.
OCCUPANT SENS C/U [UNIT FAIL] [B1017] or [B1021]	The OCS control unit is malfunctioning.	1. Replace RH front seat cushion/ occupant classification system control unit assembly.

Diagnostic item	Explanation	Repair order Recheck SRS at each replacement
OCCUPANT SENS C/U [UNIT FAIL] [B1020]	The OCS control unit is malfunctioning.	1. Replace the harness if it has visible damage. 2. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 3. Replace the RH front seat belt assembly.
OCCUPANT SENS C/U [COMM FAIL] [B1022]	Communication between the OCS control unit and air bag diagnosis sensor unit is interrupted.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
OCCUPANT SENS [UNIT FAIL] [B1018]	OCS sensor is malfunctioning.	1. Visually check the wiring harness connection to the OCS sensor. 2. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly.
BELT TENSION SENS [UNIT FAIL] [B1019]	Belt tension sensor is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH front seat belt assembly. 4. Replace the RH front seat cushion assembly. Do not disassemble the seat cushion assembly. 5. Replace the related harness.
PASS A/B INDCTR CKT [B1023]	Front passenger air bag off indicator is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag off indicator. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.
FRONTAL COLLISION DETECTION [B1209]	Driver and front passenger air bag modules are deployed.	Refer to SRS-49, "For Frontal Collision".
SIDE COLLISION DETECTION [B1210]	Side or curtain air bag modules are deployed.	Refer to SRS-51, "For Side and Rollover Collision".

NOTE:
Follow the procedures in numerical order when performing repairs. Confirm whether the repair has been successful using air bag warning lamp or CONSULT after each repair. If malfunction is still observed, proceed to the next step. When malfunction has been eliminated, further repair work is not required.

Trouble Diagnosis without CONSULT

INFOID:0000000007330553

DIAGNOSTIC PROCEDURE 6

Inspect SRS Malfunction Using "AIR BAG" Warning Lamp—Diagnosis Mode

NOTE:
SRS will not enter Diagnosis mode if no malfunction is detected in User mode.

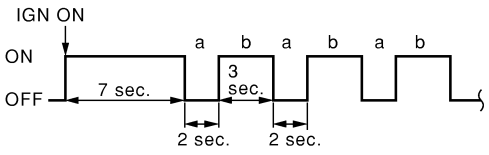
1. Turn ignition switch ON.

2. After “AIR BAG” warning lamp lights for 7 seconds, turn ignition switch OFF within 1 second.
3. Wait more than 3 seconds.
4. Repeat steps 1 to 3 two times.
5. Turn ignition switch ON.

SRS is now in Diagnosis mode.
"AIR BAG" warning lamp operates in Diagnosis mode according to the Warning Lamp Flash Code Chart:

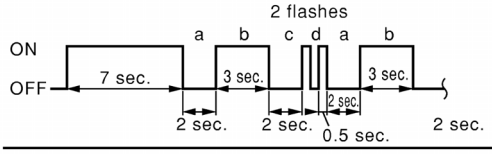
WARNING LAMP FLASH CODE CHART

<Diagnosis results (previously stored in the memory) might not be erased after repair or intermittent malfunctions have been detected in the past.>

Flash pattern	Repair order
a through b are repeated. 	1. Go to DIAGNOSTIC PROCEDURES 2 and 3.

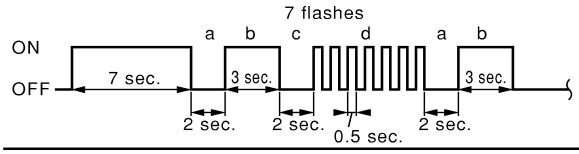
SHIA0026E

<Driver air bag module>

Flash pattern	Repair order
a through d are repeated. d: Two flashes indicate malfunctioning driver air bag module circuits. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Inspect spiral cable circuit. 4. Replace the air bag diagnosis sensor unit. 5. Replace driver air bag module. 6. Replace the related harness.

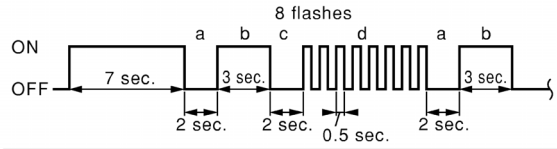
AWHIA0311GB

<Air bag diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace the related harness.

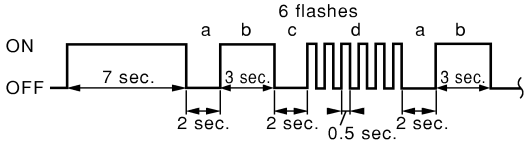
WHIA0198E

<Front passenger air bag module>

Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace front passenger air bag module. 5. Replace the related harness.

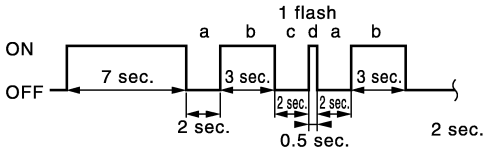
AWHIA0312GB

<Crash zone sensor>

Flash pattern	Repair order
a through d are repeated. d: Six flashes indicate malfunctioning crash zone sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

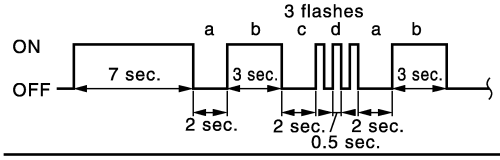
WHIA0200E

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

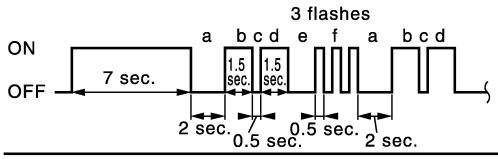
WHIA0262E

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

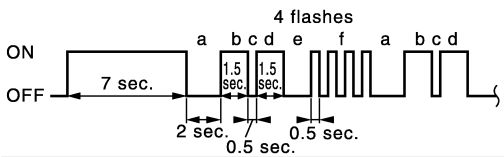
WHIA0263E

<RH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

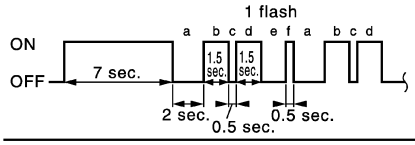
WHIA0203E

<LH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

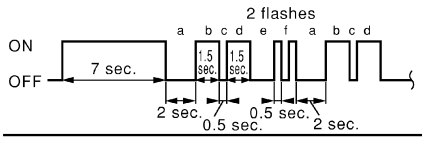
WHIA0204E

<Front RH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: One flash indicate malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace the front RH side air bag module. 5. Replace the related harness.

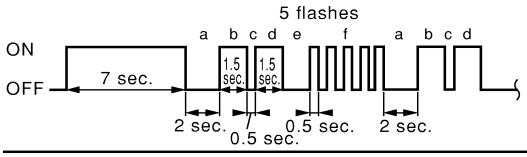
AWHIA0305GB

<Front LH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace the front LH side air bag module. 5. Replace the related harness.

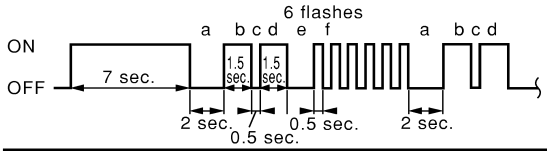
AWHIA0304GB

<RH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace RH side curtain air bag module. 5. Replace the related harness.

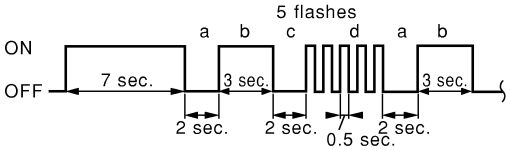
AWHIA0308GB

<LH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the air bag diagnosis sensor unit. 4. Replace LH side curtain air bag module. 5. Replace the related harness.

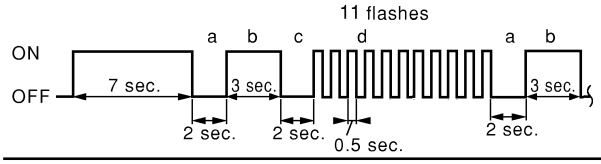
AWHIA0309GB

<Occupant classification system>

Flash pattern	Repair order
a through d are repeated. d: Five flashes indicate malfuntioning occupant classification system control unit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH front seat cushion occupant classification system control unit assembly. 4. Replace the air bag diagnosis sensor unit.

WHIA0211E

<Front passenger air bag off indicator>

Flash pattern	Repair order
a through d are repeated. d: Eleven flashes indicate malfunctioning front passenger air bag off indicator. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag off indicator. 4. Replace the air bag diagnosis sensor unit. 5. Replace the related harness.

WHIA0212E

Trouble Diagnosis: "AIR BAG" Warning Lamp Does Not Turn Off

INFOID:0000000007330554

DIAGNOSTIC PROCEDURE 7

1.CHECK CONDITION OF AIR BAG MODULE

Inspect for any deployed air bag modules or seat belt pre-tensioners.

Are any air bag modules or seat belt pre-tensioners deployed?

Yes >> Refer to SRS-49, "For Frontal Collision" or SRS-51, "For Side and Rollover Collision".
No >> GO TO 2.

2.CHECK THE AIR BAG FUSE

Check 10A fuse [No. 1, located in the fuse block (J/B)].
Refer to SRS-11, "Schematic".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK AIR BAG FUSE AGAIN

Replace 10A fuse [No. 1, located in the fuse block (J/B)] and turn ignition switch ON.

Does the fuse blow again?

Yes >> Repair harness.
No >> Inspection End.

4.CHECK AIR BAG DIAGNOSIS SENSOR UNIT

Connect CONSULT and touch “START”.

Is “AIR BAG” displayed on CONSULT?

Yes >> GO TO 5.
No >> Visually inspect the air bag diagnosis sensor unit harness connections. If the connections are OK, replace the air bag diagnosis sensor unit. Refer to SRS-46, "Removal and Installation".

5.CHECK HARNESS CONNECTION

Check for loose connections between the combination meter and the air bag diagnosis sensor unit.

OK or NG

OK >> Replace air bag diagnosis sensor unit. Refer to SRS-46, "Removal and Installation".
NG >> Properly connect the combination meter and air bag diagnosis sensor unit harness connectors. If “AIR BAG” warning lamp still does not turn off, replace the wiring harness.

Trouble Diagnosis: "AIR BAG" Warning Lamp Does Not Turn On

INFOID:0000000007330555

DIAGNOSTIC PROCEDURE 8

1.CHECK METER FUSE

Check the 10A fuse [No. 3, located in the fuse block (J/B)] .
Refer to SRS-11, "Schematic".

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. REPLACE METER FUSE AND CHECK AGAIN

Replace 10A fuse [No. 3, located in the fuse block (J/B)] and turn ignition switch ON.

Does the fuse blow again?

Yes >> Replace harness.
No >> Inspection End.

3. CHECK HARNESS CONNECTIONS BETWEEN AIR BAG DIAGNOSIS SENSOR UNIT AND COMBINATION METER

Inspect the harness and connectors between the air bag diagnosis sensor unit and the combination meter.

Do the harness or connectors have any visible damage?

Yes >> Replace harness.
No >> GO TO 4.

4. CHECK COMBINATION METER

Disconnect the air bag diagnosis sensor unit harness connectors and turn ignition switch ON.

Does “AIR BAG” warning lamp turn on?

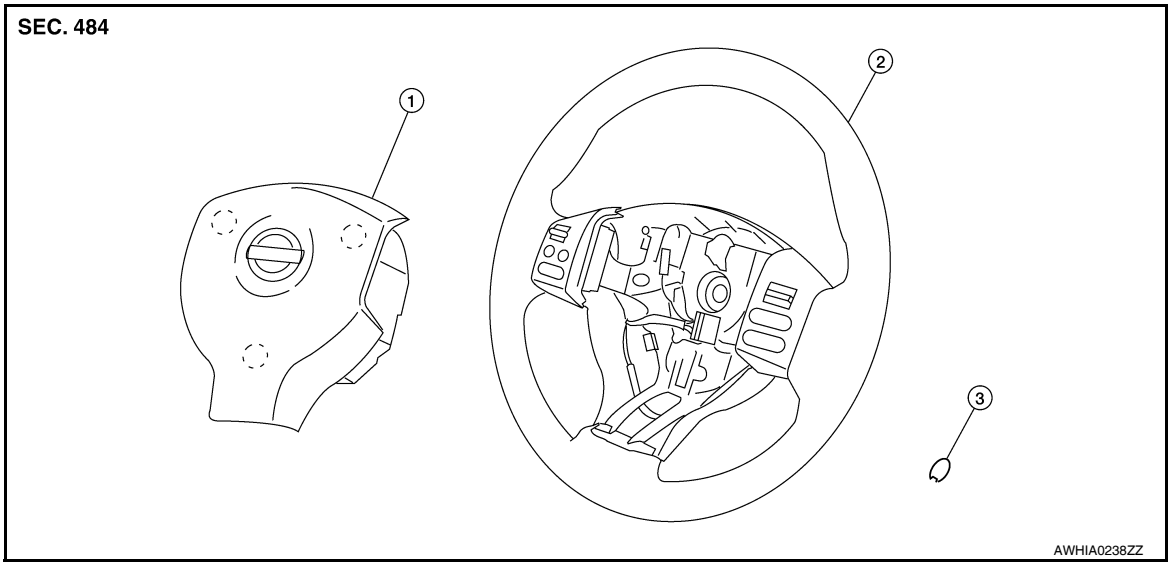
Yes >> Replace the air bag diagnosis sensor unit. Refer to SRS-46, "Removal and Installation".
No >> Replace the combination meter. Refer to DI-19, "Removal and Installation".

ON-VEHICLE REPAIR

DRIVER AIR BAG MODULE

Removal and Installation

INFOID:0000000007330556



1. Driver air bag module
2. Steering wheel
3. Cover

◌ Pawl

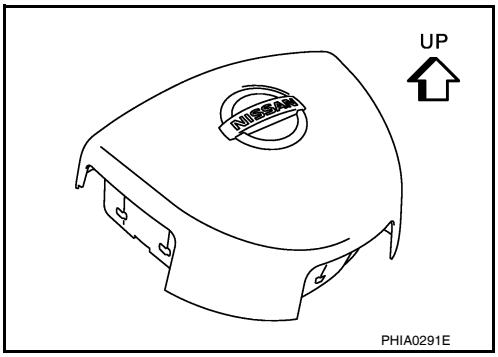
REMOVAL

WARNING:

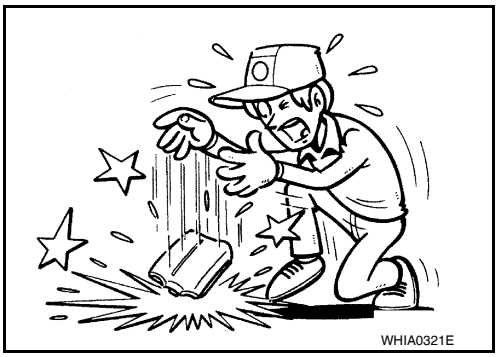
- **When servicing the SRS, do not work from directly in front of air bag module.**
- **Always place air bag module with pad side facing upward.**

CAUTION:

- **Before servicing the SRS, turn ignition switch OFF, disconnect both battery terminals, then wait at least three minutes.**
- **Do not attempt to repair or replace damaged direct-connect SRS component connectors. If a driver air bag direct-connect harness connector is damaged, the spiral cable must be replaced.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module or harness connectors.**
- **Do not disassemble air bag module.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**



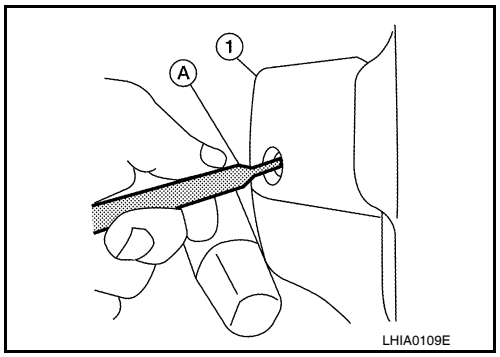
- **Replace the air bag module if it has been dropped or sustained an impact.**
- **Do not allow oil, grease or water to come in contact with the air bag module.**



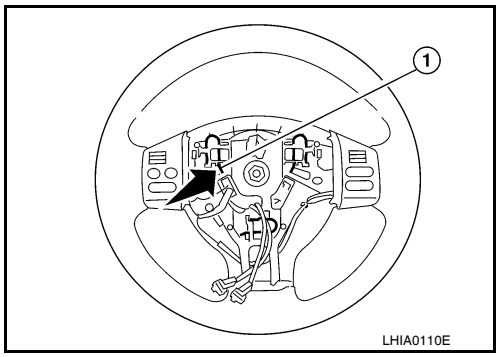
1. Place the steering wheel in the straight ahead position.
2. Disconnect the negative and positive battery terminals, then wait at least three minutes.
3. Remove the covers RH/LH.

4. Release the driver air bag module retaining clips RH/LH.
   - Insert suitable 4mm - 6mm blunt tool (A) through LH access hole on back side of steering wheel (1) and contact retaining clip.

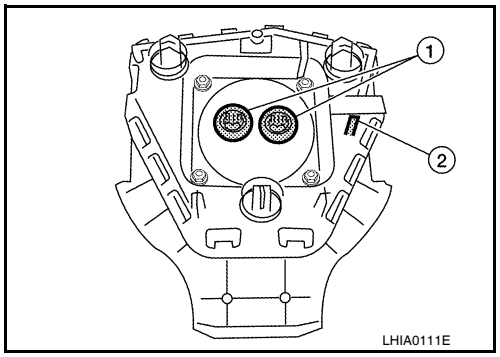
   CAUTION:
   Do not use sharp edged objects such as screwdrivers to release driver air bag module from steering wheel, SRS components may be unintentionally damaged.



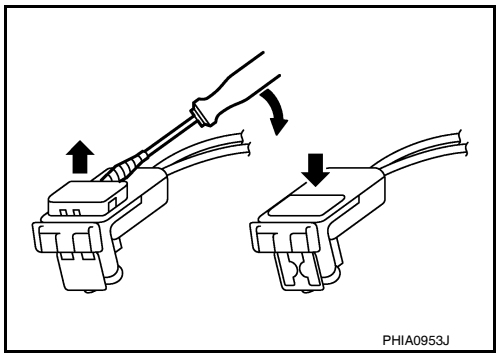
   - Press tool inward with sufficient force on retaining clip (1) to release LH pawl of driver air bag module from steering wheel.
   - Repeat for RH pawl of driver air bag module from steering wheel.
   - Tilt top edge away from steering wheel, then lift upward releasing lower pawl of driver air bag module from steering wheel.



5. Disconnect driver air bag module connectors (1) and horn connector (2).



   - For removal/installation of the direct-connect SRS connectors, refer to SRS-7, "SRS Component Connectors".



INSTALLATION

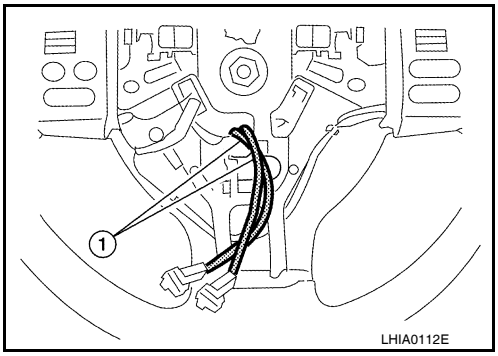
Installation is in the reverse order of removal.

CAUTION:

- **Make sure driver air bag module harness (1) is routed properly to avoid SRS component damage during installation.**

NOTE:

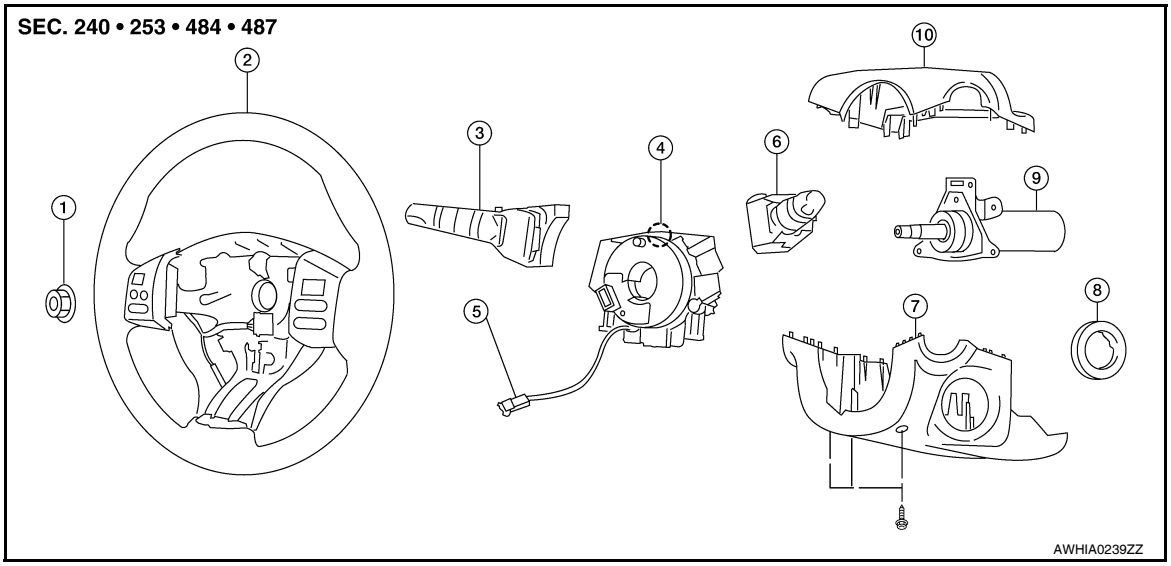
- For removal/installation of the direct-connect SRS connectors, refer to SRS-7, "SRS Component Connectors".
- If driver air bag module is being replaced due to deployment, spiral cable must also be replaced. Refer to SRS-37.
- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".



SPIRAL CABLE

Removal and Installation

INFOID:0000000007330557



1. Nut, refer to PS-7, "Removal and Installation"
2. Steering wheel
3. Lighting and turn signal switch
4. Spiral cable
5. Driver air bag module connectors
6. Wiper and washer switch
7. Column cover lower
8. Steering lock escutcheon
9. Steering column assembly
10. Column cover upper
- Pawl

REMOVAL

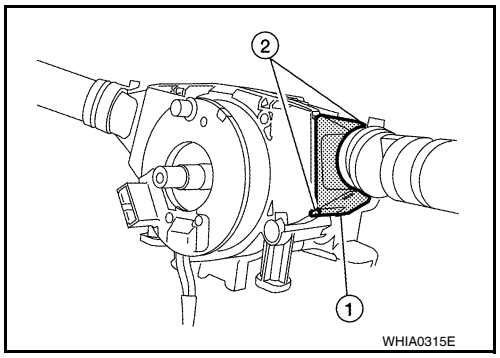
WARNING:

When servicing the SRS, do not work from directly in front of air bag module.

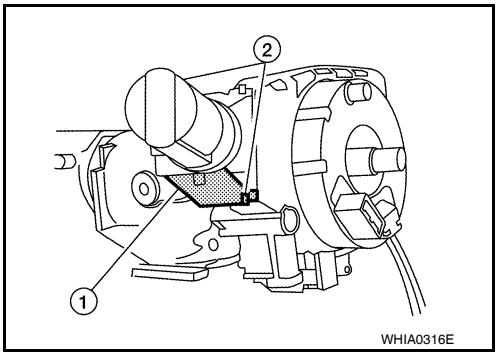
CAUTION:

- **Before servicing the SRS, turn ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not tap or bump the steering wheel.**
- **Do not disassemble the spiral cable.**
- **Do not allow oil, grease or water to come in contact with the spiral cable.**
- **Replace the spiral cable if it has been dropped or sustained an impact.**
- **With the steering linkage disconnected, the spiral cable may snap by turning the steering wheel beyond the limited number of turns. The spiral cable can be turned counterclockwise about 2.5 turns from the neutral position.**

1. Set the front wheels to the straight-ahead/neutral position.
2. Disconnect the negative and positive battery terminals, then wait at least three minutes.
3. Remove the steering wheel. Refer to PS-7, "Removal and Installation".
4. Remove the column cover upper and lower.
5. Disconnect wiper and washer switch connector (1). Then while pressing tabs (2), pull wiper and washer switch away from spiral cable to remove.



6. Disconnect lighting and turn signal switch connector (1). Then while pressing tabs (2), pull lighting and turn signal switch toward driver door to remove.
7. Remove the screws, then release the tab at the top and pull the spiral cable away from the steering column assembly.
8. Disconnect spiral cable connectors.

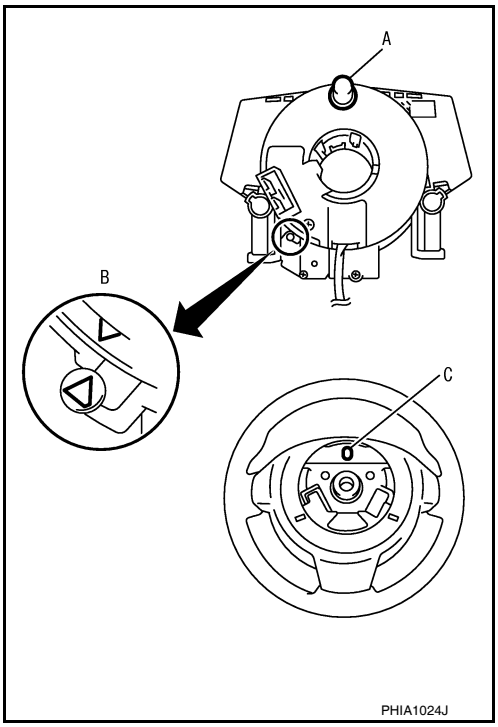


INSTALLATION

Installation is in the reverse order of removal.

NOTE:

- Align spiral cable correctly when installing steering wheel. Make sure spiral cable alignment and centering marks (B) are matched and in the neutral position. The neutral position is detected by turning left 2.5 revolutions from the right end position, ending with the locating pin (A) at the top. Place steering wheel in straight ahead position, then install it with the locating pin hole (C) directly over spiral cable locating pin.
- After the work is completed, perform self-diagnosis to make sure no malfunction is detected. Refer to SRS-19, "SRS Operation Check".



FRONT PASSENGER AIR BAG MODULE

Removal and Installation

INFOID:0000000007330558

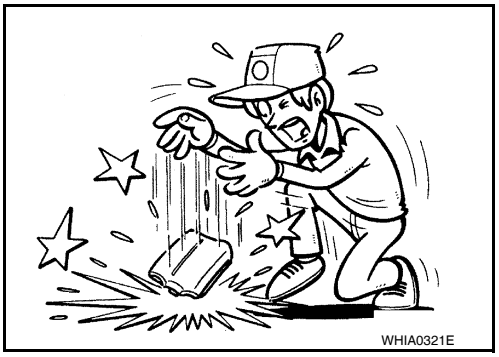
REMOVAL

WARNING:

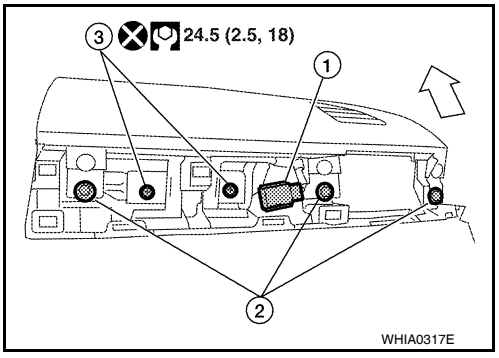
- **When servicing the SRS, do not work from directly in front of air bag module.**
- **Always place front passenger air bag module with pad side facing upward.**

CAUTION:

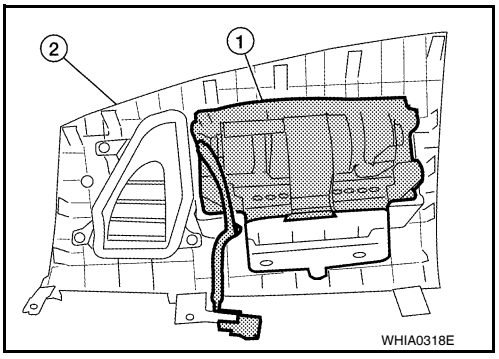
- **Before servicing SRS, turn the ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not use old bolts after removal; replace with new bolts.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module or harness connectors.**
- **Do not disassemble air bag module.**
- **Do not expose the front passenger air bag module to temperatures exceeding 90°C (194°F).**
- **Replace the front passenger air bag module if it has been dropped or sustained an impact.**
- **Do not allow oil, grease or water to come in contact with the front passenger air bag module.**



1. Disconnect the negative and positive battery terminals, then wait at least three minutes.
2. Remove the side ventilator assembly (right). Refer to IP-11.
3. Disconnect front passenger air bag module connector (1) and remove the upper instrument panel assembly bolts (2).
   ⇦: Vehicle front
4. Remove the front passenger air bag module bolts (3) from the steering member.



5. Release the pawls and remove the front passenger air bag module (1) from the upper instrument panel assembly (2).



INSTALLATION

Installation is in the reverse order of removal.

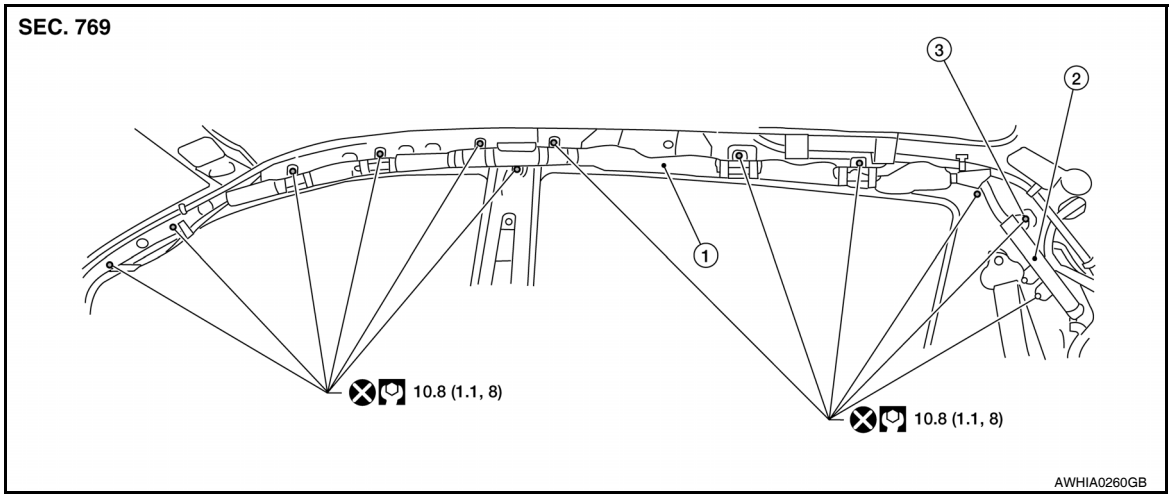
NOTE:

- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

SIDE CURTAIN AIR BAG MODULE

Component

INFOID:0000000007330559



1. Side curtain air bag module
2. Inflator
3. Ground bolt

⇦ Vehicle front

Removal and Installation

INFOID:0000000007330560

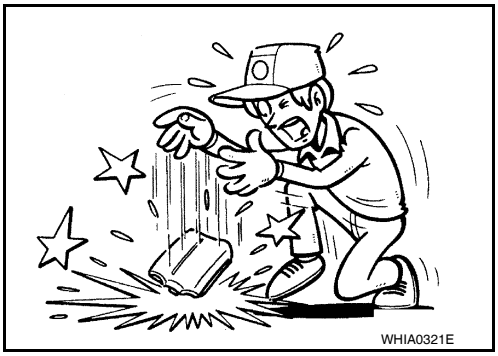
REMOVAL

WARNING:

- **When servicing the SRS, do not work from directly in front of air bag module.**
- **Always place the curtain air bag module with deployment side facing upward.**
- **Do not reuse center pillar upper garnish if removed.**

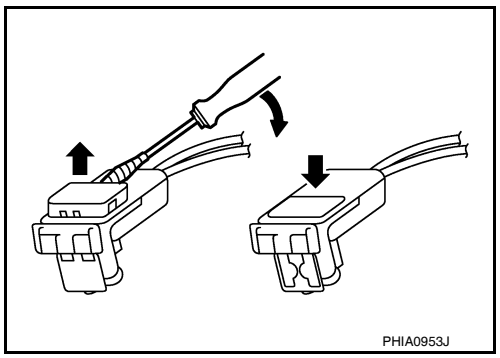
CAUTION:

- **Before servicing SRS, turn the ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not use old bolts after removal; replace with new bolts.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module or harness connectors.**
- **Do not disassemble air bag module.**
- **Do not expose the side curtain air bag module to temperatures exceeding 90°C (194°F).**
- **Replace the side curtain air bag module if it has been dropped or sustained an impact.**
- **Do not allow oil, grease or water to come in contact with the side curtain air bag module.**
- **Do not attempt to repair or replace damaged direct-connect SRS component connectors. If a direct-connect harness connector is damaged, the harness must be replaced.**



1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Remove the headlining. Refer to EI-42, "Removal and Installation".

3. Disconnect side curtain air bag module connector.
NOTE:
For removal/installation of the direct-connect SRS connectors, refer to SRS-7, "SRS Component Connectors".
4. Remove the bolts in order starting at the rear, then remove the side curtain air bag module.



INSTALLATION

Installation is in the reverse order of removal.
NOTE:
- For removal/installation of the direct-connect SRS connectors, refer to SRS-7, "SRS Component Connectors".
- After replacement of side curtain air bag module, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

SIDE AIR BAG MODULE

Removal and Installation

INFOID:0000000007795981

For side air bag module removal and installation, the front seatback must be disassembled, refer to SE-14, "Disassembly and Assembly".

NOTE:

If the vehicle has been involved in a collision and the side air bag has deployed, the front seatback assembly must be replaced.

CRASH ZONE SENSOR

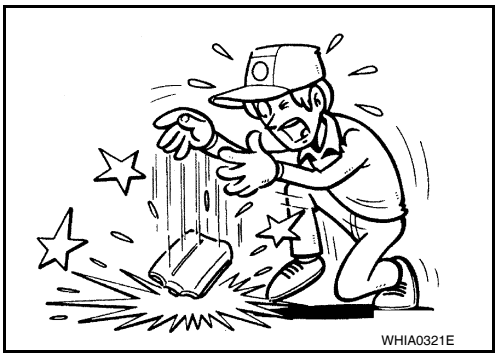
Removal and Installation

INFOID:0000000007330561

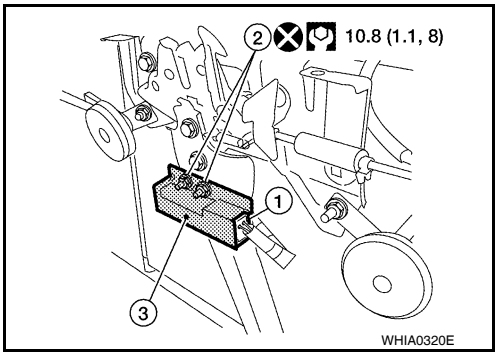
REMOVAL

CAUTION:

- **Before servicing the SRS, turn ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not disassemble the crash zone sensor.**
- **Do not use old nuts after removal; replace with new nuts.**
- **Replace the crash zone sensor if it has been dropped or sustained an impact.**
- **Check crash zone sensor to make sure it is free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with a new one.**



1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Remove the air intake duct. Refer to EM-16, "Component".
3. Remove the upper radiator cover and front grille, refer to EI-21, "Removal and Installation".
4. Disconnect crash zone sensor harness connector (1).
5. Remove the nuts (2) and remove the crash zone sensor (3).



INSTALLATION

Installation is in the reverse order of removal.

NOTE:

- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

SIDE AIR BAG (SATELLITE) SENSOR

Removal and Installation

INFOID:0000000007330562

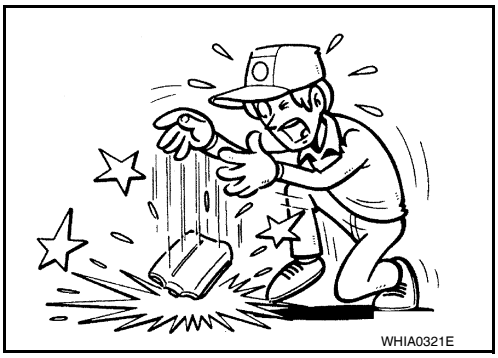
REMOVAL

WARNING:

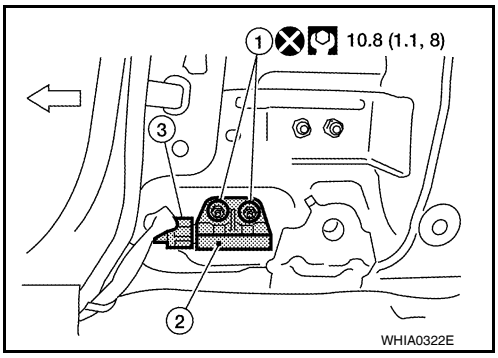
Do not reuse center pillar upper garnish if removed.

CAUTION:

- **Before servicing the SRS, turn ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not disassemble the side air bag (satellite) sensor.**
- **Do not use old nuts after removal; replace with new nuts.**
- **Replace the side air bag (satellite) sensor if it has been dropped or sustained an impact.**
- **Check side air bag (satellite) sensor to make sure it is free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with a new one.**



1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Remove the body side welt, kicking plate, and center pillar lower garnish. Refer to EI-35, "Component".
3. Remove the nuts (1) and remove side air bag (satellite) sensor (2).
   ⇦: Vehicle front
4. Disconnect the side air bag (satellite) sensor harness connector (3).



INSTALLATION

Installation is in the reverse order of removal.

NOTE:

- After the work is completed, perform self-diagnosis to make sure no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

FRONT SEAT BELT PRE-TENSIONER

Removal and Installation

INFOID:0000000007330563

For removal and installation procedures, refer to SB-4, "Removal and Installation of Front Seat Belt".

DIAGNOSIS SENSOR UNIT

Removal and Installation

INFOID:0000000007330564

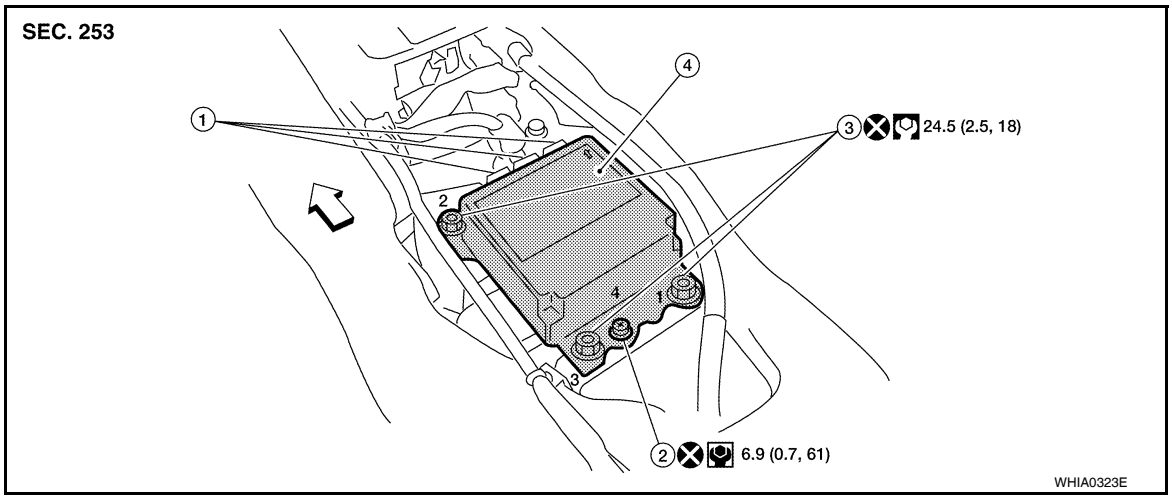
REMOVAL

WARNING:

Before disconnecting diagnosis sensor unit harness connector(s), be sure to disconnect harness connectors from air bag modules and front seat belt pre-tensioner to prevent deployment by static electricity.

CAUTION:

- **Before servicing the SRS, turn the ignition switch OFF, disconnect both battery terminals and wait at least three minutes.**
- **Do not disassemble diagnosis sensor unit.**
- **Do not use old bolts; replace with new bolts.**
- **Replace the diagnosis sensor unit if it has been dropped or sustained an impact.**
- **Check diagnosis sensor unit bracket to make sure it is free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace with new one.**
- **The diagnosis sensor unit must always be installed with the arrow mark "⇦" pointing toward the front of the vehicle for proper operation.**
- **When replacing the air bag diagnosis sensor unit, always check with the parts department for he latest parts information. Installing an incorrect air bag diagnosis sensor unit may or may not cause the air bag warning lamp to illuminate and may cause incorrect deployment of the supplemental air bags and seat belt pre-tensioner in a collision resulting in serious personal injury or death.**



1. Diagnosis sensor unit connectors
2. Ground Bolt
3. Bolt
4. Diagnosis sensor unit
⇦ Vehicle front

1. Always check the air bag diagnosis sensor unit ECU discriminated number (identification number) using CONSULT.
2. Disconnect the negative and positive battery terminals, then wait at least three minutes.
3. Disconnect the harness connectors for the following SRS components: Refer to SRS-40 (Side Curtain Air Bag Module), SRS-45 (Front Seat Belt Pre-tensioner), SE-14, "Disassembly and Assembly" (Side Air Bag Module).
4. Remove the rear seatback assembly. Refer to SE-21, "Component Parts Drawing".
5. Remove center console assembly. Refer to IP-11.
6. Disconnect diagnosis sensor unit connectors.
7. Remove the bolts and the ground bolt, then remove the diagnosis sensor unit.

INSTALLATION

Installation is in the reverse order of removal.

- The diagnosis sensor unit must always be installed with the arrow mark "⇦" pointing toward the front of the vehicle.

- Follow the tightening sequence 1,2,3,4 as shown.
- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

CAUTION:

- **After replacing the air bag diagnosis sensor unit, confirm using CONSULT that the ECU discriminated number (identification number) of the new replacement air bag diagnosis sensor unit matches the ECU discriminated number (identification number) of the replaced (old) air bag diagnosis sensor unit.**

NOTE:

- If the ECU discriminated number of the new replacement air bag diagnosis sensor unit differs from the ECU discriminated number of the replaced air bag diagnosis sensor unit, reconfirm the parts information and verify that the correct air bag diagnosis sensor unit was installed.

OCCUPANT CLASSIFICATION SYSTEM CONTROL UNIT

Removal and Installation

INFOID:0000000007330565

The occupant classification system control unit, occupant classification system sensor, and bladder are an integral part of the front passenger seat cushion and are replaced as an assembly. Refer to SE-11 to remove the seat, and SE-14, "Disassembly and Assembly" to replace the seat cushion.

COLLISION DIAGNOSIS

For Frontal Collision

INFOID:0000000007330566

FOR FRONTAL COLLISION: When SRS is activated in a collision

CAUTION:
Due to varying models and option levels, not all parts listed in the chart below apply to all vehicles.

WORK PROCEDURE

1. Before performing any of the following steps, ensure that all vehicle body and structural repairs have been completed.
2. Replace the diagnosis sensor unit.
3. Remove the front air bag modules, crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
4. Check the SRS components using the table below:
   Replace any SRS components showing visible signs of damage. (dents, cracks and deformation, etc.)
5. Install new front air bag modules, crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
6. Perform self-diagnosis using CONSULT or air bag warning lamp. Refer to SRS-18, "Self-Diagnosis Function (Without CONSULT)" for details.
   Ensure entire SRS operates properly.
7. After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

SRS INSPECTION (FOR FRONTAL COLLISION)

Part	Inspection
Driver air bag module	If the driver air bag has deployed: REPLACE Install with new fasteners.
Front passenger air bag module (if equipped)	If the front passenger air bag has deployed: REPLACE Install with new fasteners.
Crash zone sensor	If any of the front air bags or seat belt pre-tensioners* have been activated: REPLACE the crash zone sensor and bracket with new fasteners. *: Confirm seat belt pre-tensioner activation using CONSULT only.
Seat belt pre-tensioner assemblies (All applicable locations: buckle, retractor, lap outer)	If either the driver or passenger seat belt pre-tensioner* has been activated: REPLACE all seat belt pre-tensioner assemblies with new fasteners. *: Confirm seat belt pre-tensioner activation using CONSULT only.
Diagnosis sensor unit	If any of the SRS components have been activated: REPLACE the diagnosis sensor unit. Install with new fasteners.
Steering wheel	1. Visually check steering wheel for deformities. 2. Check harness (built into steering wheel) and connectors for damage, and terminals for deformities. 3. Install driver air bag module into the steering wheel to check fit and alignment with the wheel. 4. Check steering wheel for excessive free play. 5. If no damage is found, reinstall. 6. If damaged—REPLACE.
Spiral cable	If the driver front air bag has deployed: REPLACE the spiral cable.
Occupant classification system (Passenger seat)	1. Remove passenger seat assembly. 2. Check control unit case for dents, cracks of deformities. 3. Check connectors and pressure sensor tube for damage, and terminals for deformities. 4. Check seat frame and cushion pan for dents or deformities. 5. If no damage is found, reinstall seat with new fasteners. 6. If damaged — REPLACE seat cushion assembly with new fasteners.

Part	Inspection
Harness and connectors	1. Check connectors for poor connection, damage, and terminals for deformities. 2. Check harness for binding, chafing, cuts, or deformities. 3. If no damage is found, reinstall the harness and connectors. 4. If damaged—REPLACE the damaged harness. Do not attempt to repair, splice or modify any SRS harness.
Instrument panel assembly	If the passenger front air bag has deployed: REPLACE the instrument panel assembly. (integrated type)

FOR FRONTAL COLLISION: When SRS is not activated in a collision

CAUTION:
Due to varying models and option levels, not all parts listed in the chart below apply to all vehicles.

WORK PROCEDURE

1. Before performing any of the following steps, ensure that all vehicle body and structural repairs have been completed.
2. Check the SRS components using the table below:
   Replace any SRS components showing visible signs of damage. (dents, cracks and deformation, etc.)
3. Perform self-diagnosis using CONSULT or air bag warning lamp. Refer to SRS-18, "Self-Diagnosis Function (Without CONSULT)" for details.
   Ensure entire SRS operates properly.
4. After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-19, "SRS Operation Check".

SRS INSPECTION (FOR FRONTAL COLLISION)

Part	Inspection
Driver air bag module	If the driver air bag has NOT been activated: 1. Remove driver air bag module. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Install driver air bag module into the steering wheel to check fit and alignment with the wheel. 3. If no damage is found, reinstall with new fasteners. 4. If damaged—REPLACE. Install driver air bag modules with new fasteners.
Front passenger air bag module (if equipped)	If the front passenger air bag has NOT been activated: 1. Remove front passenger air bag module. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Install front passenger air bag module into the instrument panel to check fit with the instrument panel. 3. If no damage is found, reinstall with new fasteners. 4. If damaged—REPLACE. Install front passenger air bag modules with new fasteners.
Crash zone sensor	If the front air bags or seat belt pre-tensioners have NOT been activated: 1. Remove the crash zone sensor. Check harness connectors for damage, terminals for deformities, and harness for binding. 2. Check for visible signs of damage (dents, cracks, deformation) of the crash zone sensor and bracket. 3. Install the crash zone sensor to check fit. 4. If no damage is found, reinstall with new fasteners. 5. If damaged—REPLACE the crash zone sensor and bracket with new fasteners.
Seat belt pre-tensioner assemblies (All applicable locations: buckle, retractor, lap outer)	If the pre-tensioners have NOT been activated: 1. Remove seat belt pre-tensioners. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Check belts for damage and anchors for loose mounting. 3. Check retractor for smooth operation. 4. Check seat belt adjuster for damage. 5. Check for deformities of the center pillar inner. 6. If the center pillar inner has no damage, REPLACE the seat belt pre-tensioner assembly. 7. If no damage is found, reinstall seat belt pre-tensioner assembly. 8. If damaged—REPLACE. Install the seat belt pre-tensioners with new fasteners.

Part	Inspection
Diagnosis sensor unit	If none of the SRS components have been activated: 1. Check case for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall with new fasteners. 4. If damaged—REPLACE. Install diagnosis sensor unit with new fasteners.
Steering wheel	1. Visually check steering wheel for deformities. 2. Check harness (built into steering wheel) and connectors for damage, and terminals for deformities. 3. Install driver air bag module into the steering wheel to check fit and alignment with the wheel. 4. Check steering wheel for excessive free play. 5. If no damage is found, reinstall. 6. If damaged—REPLACE.
Spiral cable	If the driver front air bag has not deployed: 1. Visually check spiral cable and combination switch for damage. 2. Check connectors and protective tape for damage. 3. Check steering wheel for noise, binding or heavy operation. 4. If no damage is found, reinstall. 5. If damaged—REPLACE.
Occupant classification system (Passenger seat)	1. Remove passenger seat assembly. 2. Check control unit case for dents, cracks of deformities. 3. Check connectors and pressure sensor tube for damage, and terminals for deformities. 4. Check seat frame and cushion pan for dents or deformities. 5. If no damage is found, reinstall seat with new fasteners. 6. If damaged — REPLACE seat cushion assembly with new fasteners.
Harness and connectors	1. Check connectors for poor connection, damage, and terminals for deformities. 2. Check harness for binding, chafing, cuts, or deformities. 3. If no damage is found, reinstall the harness and connectors. 4. If damaged—REPLACE the damaged harness. Do not attempt to repair, splice or modify any SRS harness.
Instrument panel assembly	If the passenger front air bag has NOT deployed: 1. Visually check instrument panel for damage. 2. If no damage is found, reinstall the instrument panel assembly. 3. If damaged—REPLACE the instrument panel assembly.

For Side and Rollover Collision

INFOID:0000000007330567

FOR SIDE AND ROLLOVER COLLISION: When SRS is activated in a collision

CAUTION:

Due to varying models and option levels, not all parts listed in the chart below apply to all vehicles.

WORK PROCEDURE

1. Before performing any of the following steps, ensure that all vehicle body and structural repairs have been completed.
2. Replace the following components:

- Front seat back assembly (on the side on which side air bag is activated).
- Door finisher (on the side on which door-mounted curtain air bag is activated).
- Pop-up roll bar assemblies and pop-up roll bar covers.
- Side air bag (satellite) sensor LH/RH (on the side on which side air bag is activated).
- Diagnosis sensor unit.
- Seat belt pre-tensioner assemblies.

3. Check the SRS components and the related parts using the following table.
   Replace any SRS components and the related parts showing visible signs of damage (dents, cracks, deformation, etc.).
4. Perform self-diagnosis using CONSULT and “AIR BAG” warning lamp. Refer to SRS-19, "SRS Operation Check" for details. Make sure entire SRS operates properly.
5. After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-18, "Self-Diagnosis Function (Without CONSULT)".

SRS INSPECTION (FOR SIDE AND ROLLOVER COLLISION)

Part	Inspection
Side curtain air bag module LH	If the side curtain air bag LH has deployed: REPLACE the side curtain air bag module LH. Install with new fasteners.
Side curtain air bag module RH	If the side curtain air bag RH has deployed: REPLACE the side curtain air bag module RH. Install with new fasteners.
Front side air bag module LH	If the front side air bag LH has deployed: REPLACE front seatback assembly LH.
Front side air bag module RH	If the front side air bag RH has deployed: REPLACE front seatback assembly RH.
Side air bag (satellite) sensor (LH or RH)	If any of the SRS components have deployed: REPLACE the side air bag (satellite) sensor on the collision side with new fasteners.
Diagnosis sensor unit	If any of the SRS components have deployed: REPLACE the diagnosis sensor unit with new fasteners.
Seat belt pre-tensioner assemblies (All applicable locations: buckle, retractor, lap outer)	If either the driver or passenger seat belt pre-tensioner* has been activated: REPLACE all seat belt pre-tensioner assemblies with new fasteners. *: Confirm seat belt pre-tensioner activation using CONSULT only.
Center inner pillar	1. Check the center inner pillar on the collision side for damage (dents, cracks, deformation). 2. If damaged—REPAIR the center inner pillar.
Seat (if equipped with front side air bag)	If either the front LH or front RH side air bag modules has been deployed: REPLACE front seatback assembly on the deployed side.
Trim/headlining	1. Check for visible signs of damage (dents, cracks, deformation) of the interior trim on the collision side. 2. If damaged—REPLACE the damaged trim parts.
Door-mounted curtain air bag module LH	If the door-mounted curtain air bag module LH has been deployed: REPLACE the door finisher LH and door-mounted curtain air bag module. Install with new fasteners.
Door-mounted curtain air bag module RH	If the door-mounted curtain air bag module RH has been deployed: REPLACE the door finisher RH and door-mounted curtain air bag module. Install with new fasteners.
Pop-up roll bar assemblies	If the pop-up roll bar has deployed: REPLACE pop-up roll bar assemblies and pop-up roll bar covers. Install with new fasteners.

FOR SIDE AND ROLLOVER COLLISION: When SRS is not activated in a collision

CAUTION:

Due to varying models and option levels, not all parts listed in the chart below apply to all vehicles.

WORK PROCEDURE

1. Before performing any of the following steps, ensure that all vehicle body and structural repairs have been completed.
2. Check the SRS components and the related parts using the following table.

- If the front seat back assembly is damaged, the front seat back assembly must be replaced.
- If the door finisher assembly is damaged, the door finisher assembly and door-mounted curtain air bag module must be replaced.

3. Perform self-diagnosis using CONSULT and “AIR BAG” warning lamp. Refer to SRS-19, "SRS Operation Check" for details. Make sure entire SRS operates properly.
4. After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-18, "Self-Diagnosis Function (Without CONSULT)".

SRS INSPECTION (FOR SIDE AND ROLLOVER COLLISION)

Part	Inspection
Side curtain air bag module LH	If the side curtain air bag LH has NOT deployed: 1. Check for visible signs of damage (dents, tears, deformation) of the center pillar on the collision side. 2. If damaged—Remove the side curtain air bag module LH. 3. Check for visible signs of damaged (tears etc.) of the side curtain air bag module LH. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damage is found, reinstall the side curtain air bag module LH with new fasteners. 6. If damaged—REPLACE the side curtain air bag module LH with new fasteners.
Side curtain air bag module RH	If the side curtain air bag RH has NOT deployed: 1. Check for visible signs of damage (dents, tears, deformation) of the center pillar on the collision side. 2. If damaged—Remove the side curtain air bag module RH. 3. Check for visible signs of damaged (tears etc.) of the side curtain air bag module RH. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damage is found, reinstall the side curtain air bag module RH with new fasteners. 6. If damaged—REPLACE the side curtain air bag module RH with new fasteners.
Front side air bag module LH	If the front LH side air bag has NOT deployed: 1. Check for visible signs of damage (dents, tears, deformation) of the seat back on the collision side. 2. Check harness and connectors for damage, and terminals for deformities. 3. If damaged—REPLACE the front seatback assembly LH.
Front side air bag module RH	If the front side air bag RH has NOT deployed: 1. Check for visible signs of damage (dents, tears, deformation) of the seat back on the collision side. 2. Check harness and connectors for damage, and terminals for deformities. 3. If damaged—REPLACE the front seatback assembly RH.
Side air bag (satellite) sensor (LH or RH)	If none of the SRS components have been activated: 1. Remove the side air bag (satellite) sensor (LH or RH) on the collision side. Check harness connectors for damage, terminals for deformities, and harness for binding. 2. Check for visible signs of damage (dents, cracks, deformation) of the side air bag (satellite) sensor (LH or RH). 3. Install the side air bag (satellite) sensor (LH or RH) to check fit. 4. If no damage is found, reinstall the side sir bag (satellite) sensor (LH or RH) with new fasteners. 5. If damaged—REPLACE the side air bag (satellite) sensor (LH or RH) with new fasteners.
Diagnosis sensor unit	If none of the SRS components have been activated: 1. Check case and bracket for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall the diagnosis sensor unit with new fasteners. 4. If damaged—REPLACE the diagnosis sensor unit with new fasteners.
Seat belt pre-tensioner assemblies (All applicable locations: buckle, retractor, lap outer)	If the pre-tensioners have NOT been activated: 1. Remove seat belt pre-tensioners. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Check belts for damage and anchors for loose mounting. 3. Check retractor for smooth operation. 4. Check seat belt adjuster for damage. 5. Check for deformities of the center pillar inner. 6. If the center pillar inner has no damage, REPLACE the seat belt pre-tensioner assembly. 7. If no damage is found, reinstall seat belt pre-tensioner assembly. 8. If damaged—REPLACE. Install the seat belt pre-tensioners with new fasteners.
Seat (with front side air bag)	If the front LH or front RH side air bag modules have NOT deployed: 1. Visually check the seat on the collision side. 2. Remove the seat on the collision side and check the following for damage and deformities. - Harness, connectors and terminals - Frame and recliner (for front and rear seat), and also adjuster and slides (for front seat) 3. If no damage is found, reinstall the seat. 4. If damaged—REPLACE the damaged seat parts using new fasteners. If the front seat back is damaged, the front seat back assembly must be replaced.

Part	Inspection
Center inner pillar	1. Check the center inner pillar on the collision side for damage (dents, cracks, deformation, etc.). 2. If damaged - REPAIR the center inner pillar.
Trim/headlining	1. Check for visible signs of damage (dents, cracks, deformation, etc.) of the interior tim on the collision side. 2. If damaged - REPLACE the damaged trim parts.
Door-mounted curtain air bag module LH	If the door-mounted curtain air bag LH has NOT deployed: 1. Check for visible signs of damage (dents tears, deformation, etc.) of the door finisher on the collision side. 2. If damaged - REPLACE the door finisher LH with new fasteners. 3. Check for visible signs of damaged (dears etc.) of the door-mounted curtain air bag module LH. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damage is found, reinstall door finisher. **CAUTION:** **When removing door mounted curtain air bag module from door finisher, never reuse door finisher.** 6. If damaged - REPLACE the door finisher LH and door-mounted curtain air bag module LH with new fasteners.
Door-mounted curtain air bag module RH	If the door-mounted curtain air bag RH has NOT deployed: 1. Check for visible signs of damage (dents tears, deformation, etc.) of the door finisher on the collision side. 2. If damaged - REPLACE the door finisher RH with new fasteners. 3. Check for visible signs of damaged (tears etc.) of the door-mounted curtain air bag module RH. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damage is found, reinstall door finisher. **CAUTION:** **When removing door mounted curtain air bag module from door finisher, never reuse door finisher.** 6. If damaged - REPLACE the door finisher RH and door-mounted curtain air bag module RH with new fasteners.
Pop-up roll bar	If the pop-up roll bar NOT deployed: 1. Check for visible signs of damage (dents tears, deformation, etc.) of the pop-up roll bar. 2. If damaged - REPLACE the pop-up roll bar with new fasteners. 3. Check harness and connectors for damage, and terminals for deformities. 4. If no damage is found, reinstall the pop-up roll bar with new fasteners. 5. Check for visible signs of damage (dents, cracks, deformation, etc.) of the seatback support brace assembly. 6. If damaged - REPAIR the seatback support brace assembly.

SECTION BL

BODY, LOCK & SECURITY SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329960

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329961

NOTE:

- This procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

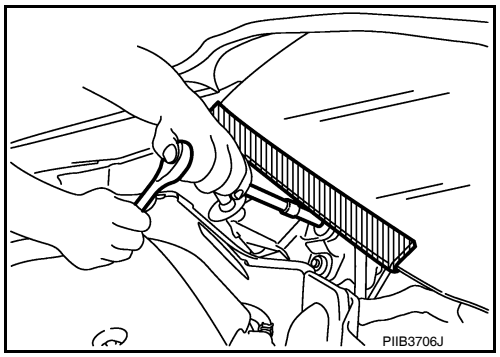
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007329962

When performing the procedure after removing cowl top cover, cover the lower end of windshield.



Precaution for Work

INFOID:0000000007793371

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

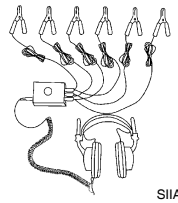
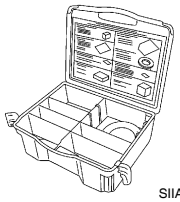
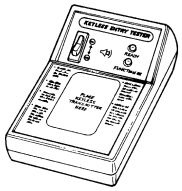
- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

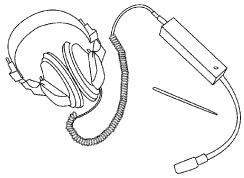
Special Service Tool

INFOID:0000000007329964

Tool number (Kent-Moore No.) Tool name		Description
— (J-39570) Chassis ear	 SIIA0993E	Locating the noise
— (J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of noise
— (J-43241) Remote Keyless Entry Tester	 LEL946A	Used to test key fobs
— (J-50190) Signal Tech II	 ALEIA0131ZZ	• Activate and display TPMS transmitter IDs • Display tire pressure reported by the TPMS transmitter • Read TPMS DTCs • Register TPMS transmitter IDs • Check Intelligent Key relative signal strength • Confirm vehicle Intelligent Key antenna signal strength

Commercial Service Tool

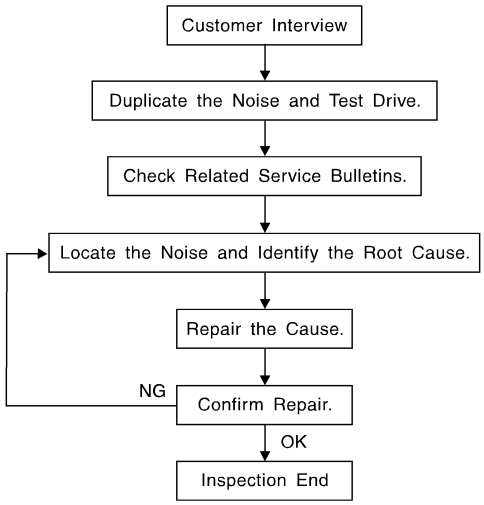
INFOID:0000000007329965

Tool name	Description
Engine ear  SIIA0995E	Locating the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000007768830



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CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to BL-12, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping.
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on CVT and A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565 and mechanic's stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:
   - removing the components in the area that you suspect the noise is coming from.
     Do not use too much force when removing clips and fasteners, otherwise clips and fasteners can be broken or lost during the repair, resulting in the creation of new noise.
   - tapping or pushing/pulling the component that you suspect is causing the noise.
     Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
   - feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
   - placing a piece of paper between components that you suspect are causing the noise.
   - looking for loose components and contact marks.
     Refer to BL-10, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A NISSAN Squeak and Rattle Kit (J-43980) is available through your authorized NISSAN Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.
The following materials are contained in the NISSAN Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100×135 mm (3.94×5.31 in)/76884-71L01: 60×85 mm (2.36×3.35 in)/76884-71L02: 15×25 mm (0.59×0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50×50 mm (1.97×1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50×50 mm (1.97×1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30×50 mm (1.18×1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15×25 mm (0.59×0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll. The following materials not found in the kit can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE

Used instead of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007768831

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lens loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component installed to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator installation pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

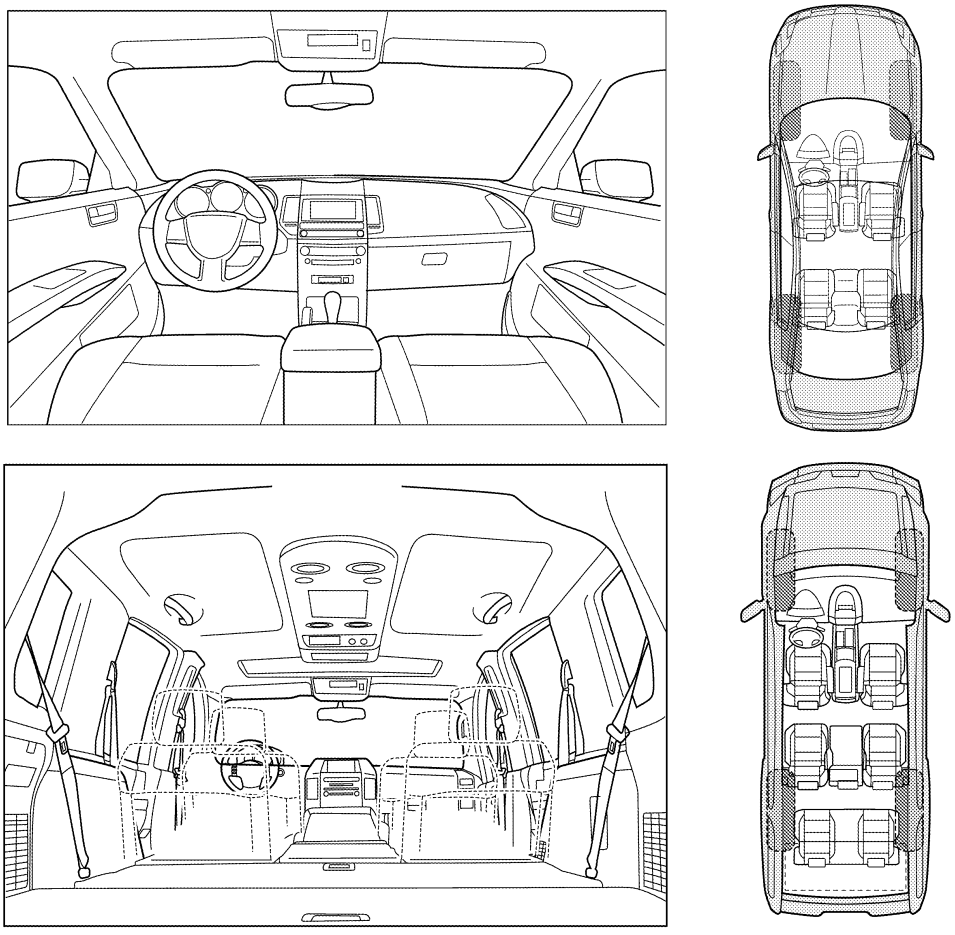
Diagnostic Worksheet

INFOID:0000000007768833

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

LAIA0072E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

This form must be attached to Work Order

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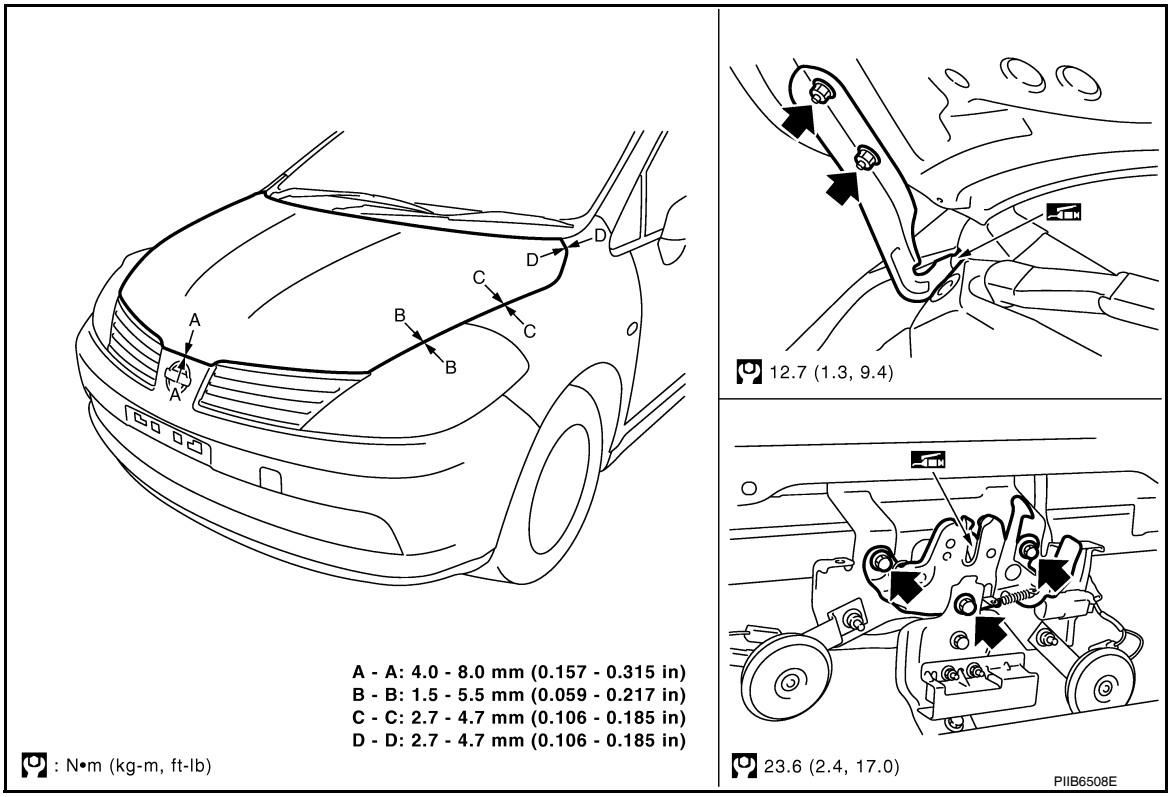
HOOD

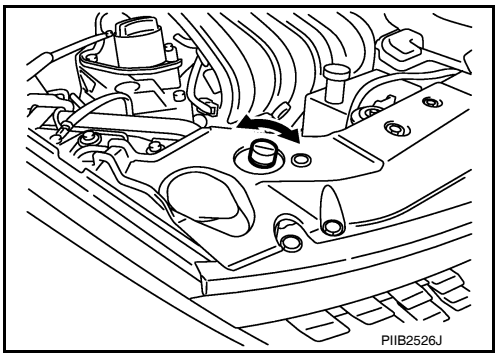
Fitting Adjustment

INFOID:0000000007329969



FRONT END HEIGHT ADJUSTMENT AND LATERAL/LONGITUDINAL CLEARANCE ADJUSTMENT

1. Remove the front grille. Refer to EI-21.
2. Remove hood lock. Rotate bumper rubber to adjust height until hood becomes 1.0 to 1.5 mm lower than the fender.
3. Position hood lock and engage striker. Check hood lock and striker for looseness. Tighten lock bolts to the specified torque.
4. Install the front grille. Refer to EI-21.



CAUTION:

Adjust the clearance between hood and other parts so that the dimensional difference left and right is as follows.

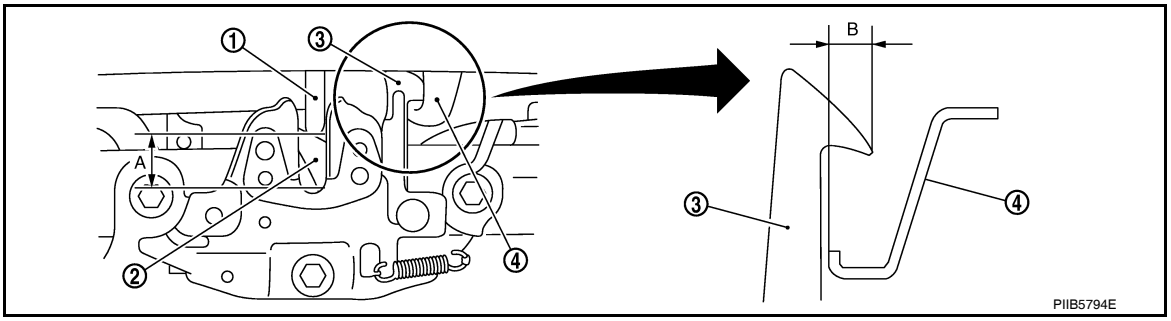
Hood and headlamp (B - B)	**: Less than 2.0 mm (0.08 in)**
Hood and fender (C - C)	**: Less than 1.5 mm (0.06 in)**
Hood and fender (D - D)	**: Less than 1.5 mm (0.06 in)**

SURFACE MISMATCH ADJUSTMENT

1. Remove the front grille. Refer to EI-21.
2. Release hood lock, and adjust surface level difference of hood, fender, and headlamp according to the fitting standard dimension, using RH and LH bumper rubbers.

Hood and front bumper (A - A)	**: -1.3 - 2.7 mm (-0.05 - 0.11 in)**
Hood and fender (D - D)	**: -0.4 - 1.7 mm (-0.16 - 0.07 in)**

3. Install and align the hood lock until the center of the striker and the hood lock are vertically aligned.
4. Press the hood lightly with [approx. 29 N (3 kg] of force and adjust A and B as shown.



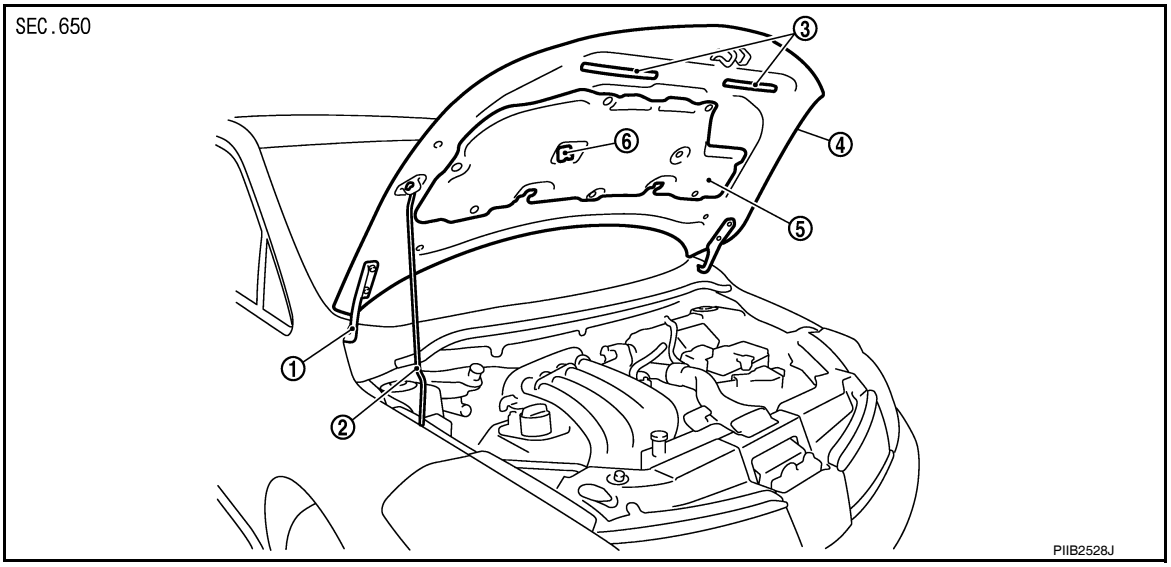
1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch

A : 20 mm (0.79 in)
B : 6.8 mm (0.268 in) min.

5. After adjustment tighten lock bolts to the specified torque.
6. Install the front grille. Refer to EI-21.

Removal and Installation

INFOID:0000000007329970



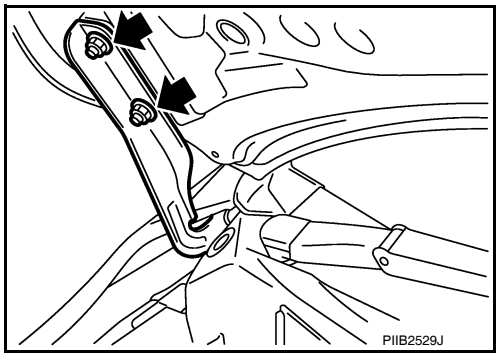
1. Hood hinge
2. Hood stay
3. Radiator core seal rubber
4. Hood assembly
5. Hood insulator
6. Hood stay holder

HOOD ASSEMBLY

Removal

1. Remove hinge nuts on hood and remove hood assembly.
CAUTION:
Two technicians should be used to avoid damaging the hood during removal.

12.7 N·m (1.3 kg-m, 9.4 ft-lb)



Installation
Installation is in the reverse order of removal.

CAUTION:

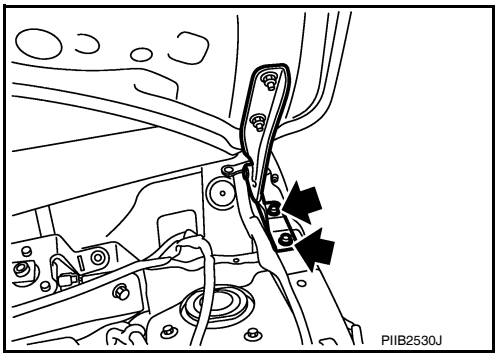
- **Before installing hood hinge, apply anticorrosive agent onto the surfaces that make contact with the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to BL-14, "Fitting Adjustment".**

HOOD HINGE

Removal

1. Remove hood assembly. Refer to BL-15, "Removal and Installation".
2. Remove front fender. Refer to BL-22, "Removal and Installation".
3. Remove bolts and the hood hinge.

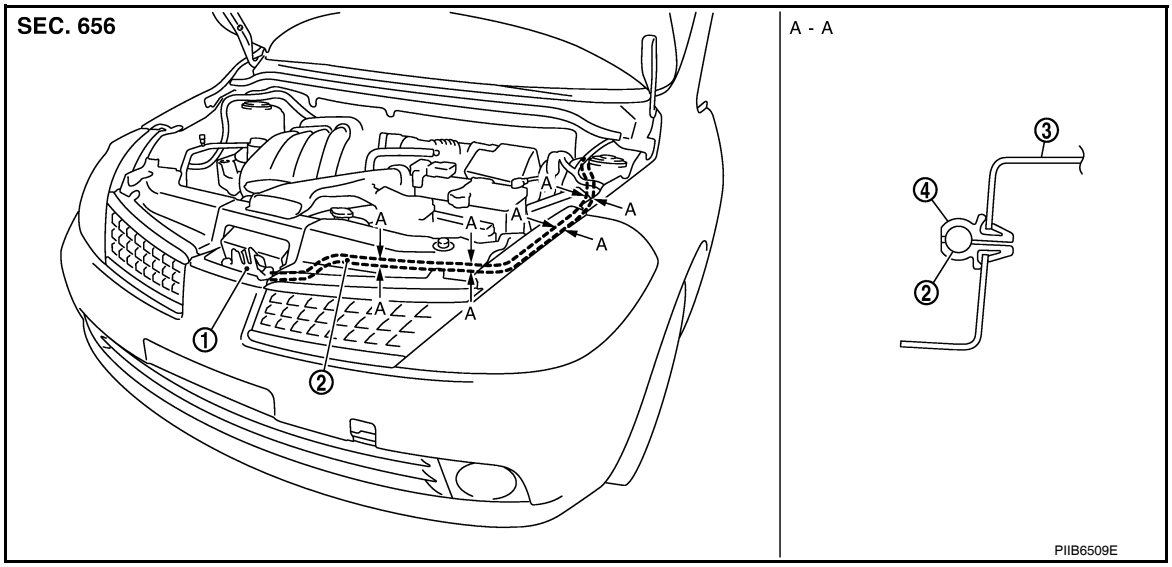
12.7 N·m (1.3 kg-m, 9.4 ft-lb)



Installation
Installation is in the reverse order of removal.

Removal and Installation of Hood Lock Control

INFOID:0000000007329971



1. Hood lock
2. Hood lock cable
3. Hood ledge upper front
4. Clip

REMOVAL

Hood Lock

1. Remove front grille (LH). Refer to EI-21, "Removal and Installation".
2. Remove hood lock bolts.

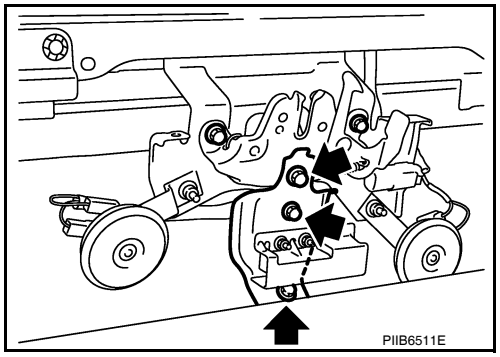
23.6 N·m (2.4 kg-m, 17 ft-lb)

3. Remove hood lock from hood lock cable.

Hood Lock Reinforcement

1. Remove front bumper. Refer to EI-15, "Removal and Installation".
2. Remove crash zone sensor. Refer to SRS-43, "Removal and Installation".
3. Remove bolts, and the hood lock reinforcement.

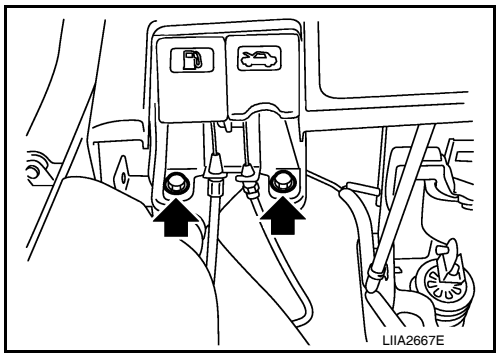
23.6 N·m (2.4 kg-m, 17 ft-lb)



Hood Lock Cable

1. Remove front grille (LH/RH). Refer to EI-21, "Removal and Installation".
2. Remove fender protector (LH). Refer to EI-24, "Component".
3. Remove hood lock, and remove hood lock cable from hood lock.
4. Remove radiator core upper support, hood ledge, and then remove hood lock cable.
5. Remove hood opener on bottom left of instrument panel, and then remove hood lock cable.
6. Remove grommet on lower dashboard, and pull out hood lock cable from passenger room side.

CAUTION:
While pulling the cable, be careful not to damage (peel) hood opener cable outer surface on edges of body through hole.



INSTALLATION

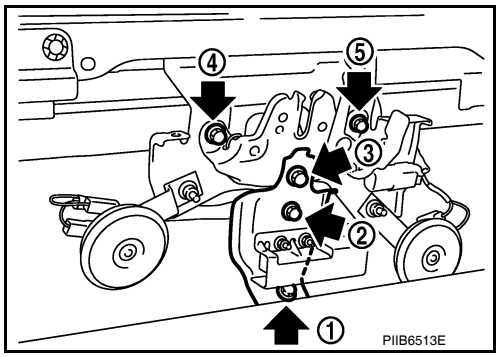
Installation is in the reverse order of removal.

- Perform hood fitting adjustment. Refer to BL-14, "Fitting Adjustment".

Hood Lock Reinforcement

When installing hood lock reinforcement, loosen hood bolts, and then tighten bolts in the order as shown.

23.6 N·m (2.4 kg-m, 17 ft-lb)



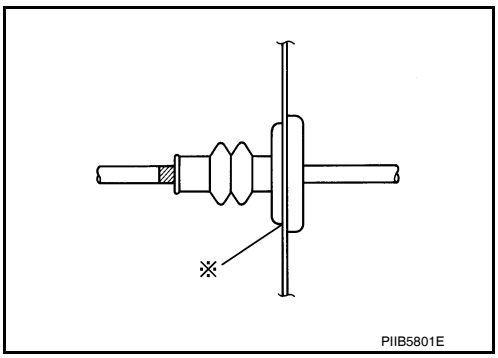
Hood Lock Cable

1. Pull the hood lock cable through the panel hole to the engine compartment.

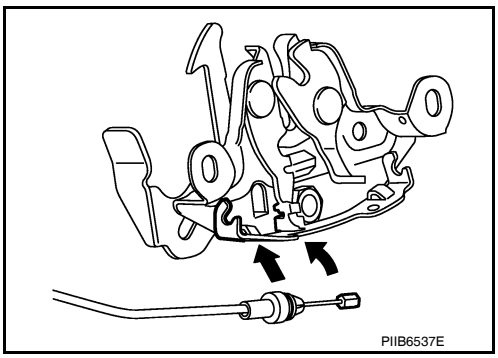
CAUTION:

Be careful not to bend the cable too much, keeping the radius 100 mm (3.94 in) or more.

2. Check that the cable is not offset from the positioning grommet, and push the grommet into the panel hole securely.
3. Apply the sealant around the grommet (at * mark).



4. Install cable securely to lock.
5. After installing, check hood lock adjustment and hood opener operation.



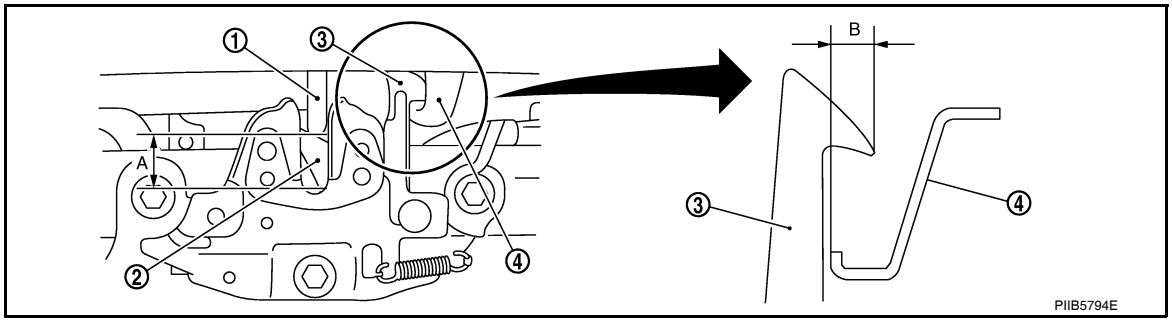
Hood Lock Control Inspection

INFOID:0000000007329972

CAUTION:

If the hood lock cable is bent or deformed, replace it.

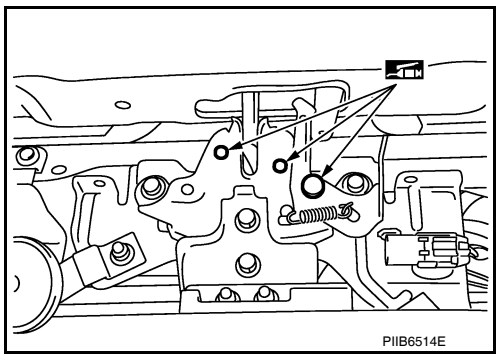
1. Check that the secondary latch is properly engaged with the secondary striker (B: 6.8 mm (0.268 in) with hood's own weight.



1. Hood striker
2. Primary latch
3. Secondary striker
4. Secondary latch
A. 20 mm (0.79 in)
B. 6.8 mm (0.268 in)

2. While operating the hood release handle, carefully check that the front end of the hood is raised by approx. 20 mm (0.79 in). Also check that the hood release handle returns to the original position.
3. Check that the secondary hood release operates at 29.4 N (3.0 kg) or below.
4. Confirm static closing force of the hood is 343 – 441 N·m (35 – 44 kg-m).

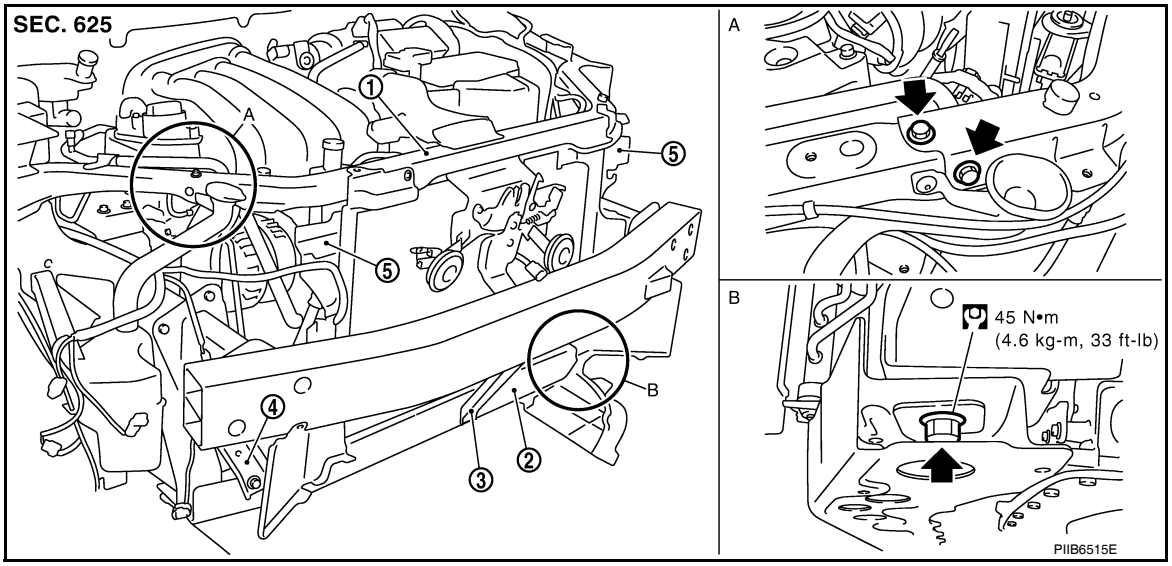
5. Check the hood lock lubrication condition. If necessary, apply “body grease” to the points as shown.



RADIATOR CORE SUPPORT

Removal and Installation

INFOID:0000000007329973



1. Radiator core support upper
2. Radiator core support lower
3. Radiator core support lower stay
4. Radiator core support side stay
5. Air guide

REMOVAL

Radiator Core Support Upper

1. Remove the air duct. Refer to EM-16, "Removal and Installation".
2. Remove the headlamp (LH/RH). Refer to LT-25, "Removal and Installation".
3. Remove the hood lock assembly, and remove hood lock cable. Refer to BL-16 .
4. Remove the air guide and hood lock cable clip.
5. Remove the washer tank inlet. Refer to WW-25, "Removal and Installation of Washer Tank".
6. Remove the radiator core support upper.

Radiator Core Support Lower

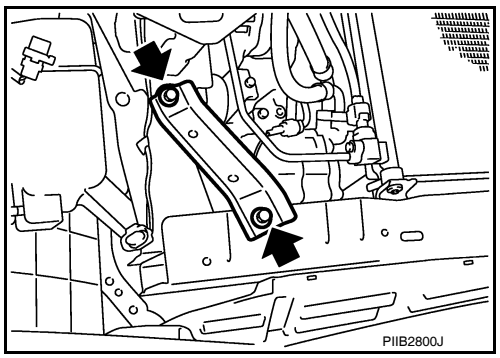
1. Remove the air duct. Refer to EM-16, "Removal and Installation".
2. Remove the front bumper. Refer to EI-15, "Removal and Installation".
3. Remove the headlamp (LH/RH). Refer to LT-25, "Removal and Installation".
4. Remove the hood lock assembly, and remove hood lock cable. Refer to BL-16 .
5. Remove the air guide and hood lock cable mounting clip.
6. Remove the front bumper reinforcement. Refer to EI-15, "Removal and Installation".
7. Remove the radiator core lower stay.

24.5 N·m (2.5 kg-m, 18 ft-lb)

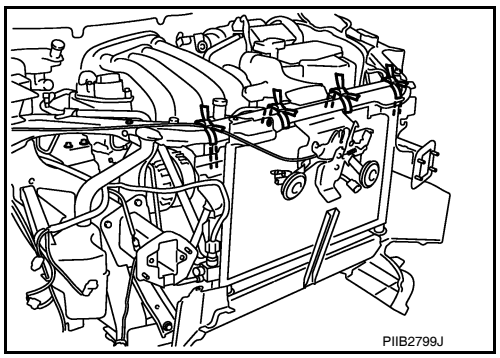
8. Remove the undercover.

9. Remove radiator core support lower side stay.

55.0 N·m (5.6 kg-m, 41 ft-lb)



10. Tie a cord to all radiator core upper supports of the radiator and condenser.
NOTE:
To prevent the condenser and radiator from being dropped when the radiator core lower support is removed.
11. Remove the bolts, and lower radiator core lower supports.
12. Remove the radiator core lower supports.



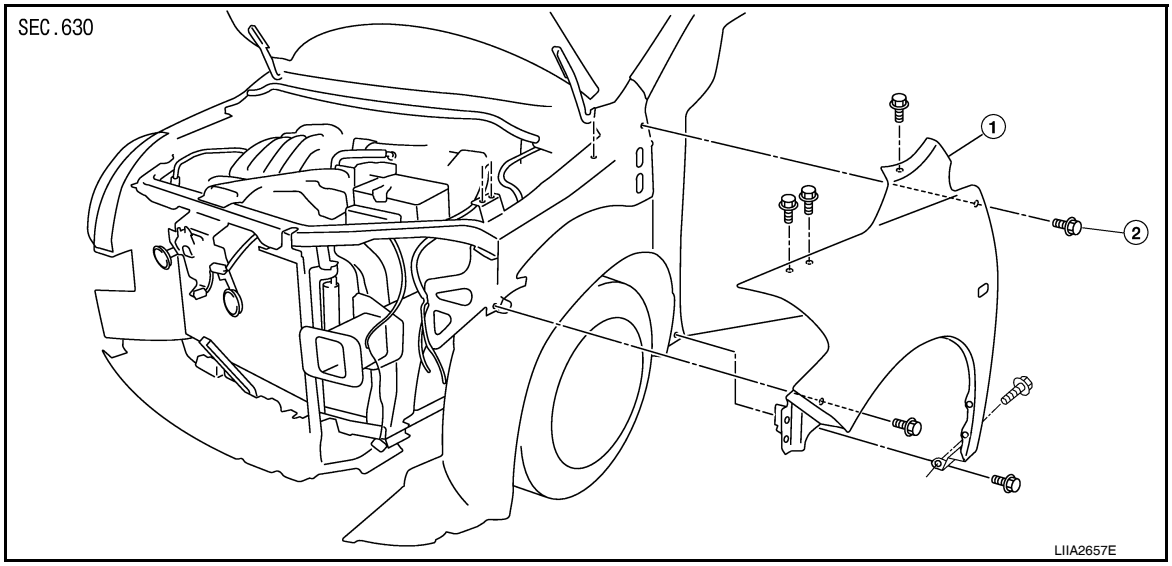
INSTALLATION

Installation is in the reverse order of removal.

FRONT FENDER

Removal and Installation

INFOID:0000000007329974



1. Front fender
2. Bolt (LH 7 bolts required) (RH 8 bolts required)

REMOVAL

1. Remove the headlamp assemblies. Refer to LT-25, "Removal and Installation".
2. Remove the cowl top cover (LH/RH). Refer to EI-22, "Removal and Installation".
3. Remove the front fender protector. Refer to EI-24, "Component".
4. Remove the bolt and the front fender.

CAUTION:
While removing use a shop cloth to protect the body from damage.

INSTALLATION

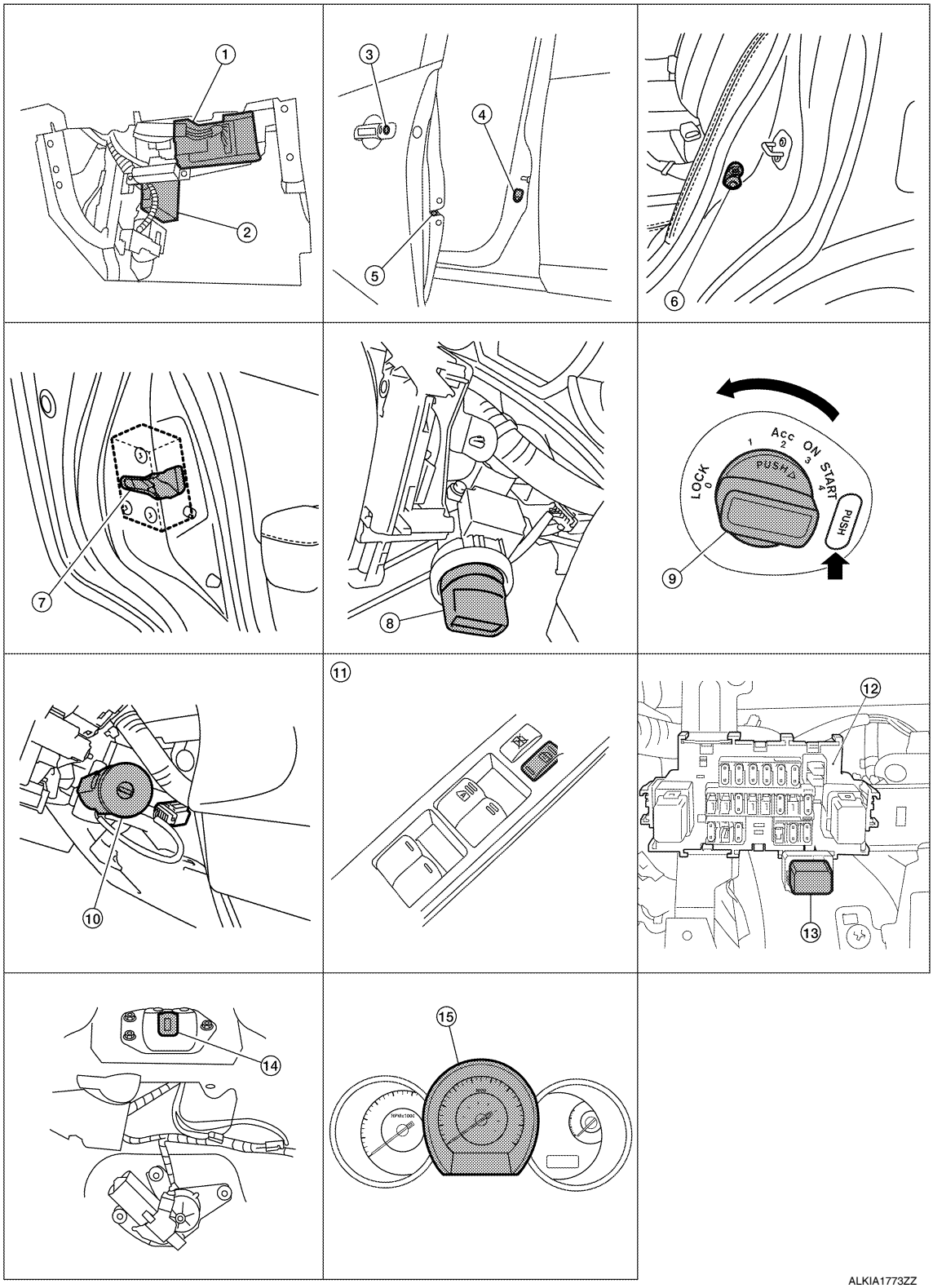
Installation is in the reverse order of removal.

CAUTION:
- **After installing, apply touch-up paint onto the head of the front fender bolts.**
- **After installing, check front fender adjustment. Refer to BL-14, "Fitting Adjustment" and BL-154, "Fitting Adjustment".**

POWER DOOR LOCK SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007329975



ALKIA1773ZZ

1. BCM M18, M19, M20 (view with glove box removed)
2. Intelligent Key unit M52 (if equipped)
3. Front door lock assembly LH (key cylinder switch) D14
4. Front door switch LH B8, RH B108
5. Front door lock assembly LH (actuator) D14
   Front door lock assembly RH (actuator) D114
6. Rear door switch LH B6, RH B116
7. Rear door lock actuator LH D205
   RH D305
8. Key switch and ignition knob switch M73 (with A/T or CVT and Intelligent Key)
9. Key switch and ignition knob switch M73 (with M/T and Intelligent Key)
10. Key switch and key lock solenoid M27 (without Intelligent Key)
11. Main power window and door lock/unlock switch D7, D8
    Power window and door lock/unlock switch RH D105
12. Fuse block (view with instrument panel LH removed)
13. Passenger select unlock relay M2 (with Intelligent Key)
14. Back door lock assembly (back door switch) D405 (view with back door open)
15. Combination meter M24

System Description

INFOID:0000000007329976

Power is supplied at all times
- through 40A fusible link (letter **g**, located in the fuse and fusible link box)
- to BCM terminal 70
- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to BCM terminal 57
- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to key switch and key lock solenoid terminal 2 (without Intelligent Key system)
- through 10A fuse [No. 31, located in the fuse block (J/B)]
- to key switch and ignition knob switch terminals 2 and 4 (with Intelligent Key system).

When key switch is ON (key is inserted in ignition key cylinder), power is supplied
- through key switch terminal 1 (without Intelligent Key system) or key switch and ignition knob terminal 1 (with Intelligent Key system)
- to BCM terminal 37.

Ground is supplied
- to BCM terminal 67
- through body grounds M57 and M61.

LOCK OPERATION

When the door is locked with main power window and door lock/unlock switch, ground is supplied
- to BCM terminal 45
- through main power window and door lock and unlock switch terminals 17 and 18
- through body grounds M57 and M61.

When the door is locked with power window and door lock/unlock switch RH, ground is supplied
- to BCM terminal 45
- through power window and door lock and unlock switch RH terminals 1 and 3
- through body grounds M57 and M61.

When the door is locked with front door lock assembly LH (key cylinder switch), ground is supplied
- to BCM terminal 8
- through front door lock assembly LH (key cylinder switch) terminals 4 and 6
- through body grounds M57 and M61.

UNLOCK OPERATION

When the door is unlocked with main power window and door lock/unlock switch, ground is supplied
- to BCM terminal 46
- through main power window and door lock/unlock switch terminals 6 and 17
- through body grounds M57 and M61.

When the door is unlocked with power window and door lock/unlock switch RH, ground is supplied
- to BCM terminal 46
- through power window and door lock and unlock switch RH terminals 2 and 3
- through body grounds M57 and M61.

When the door is unlocked with front door lock assembly LH (key cylinder switch), ground is supplied
- to BCM terminal 7
- through front door lock assembly LH (key cylinder switch) terminals 4 and 5
- through body grounds M57 and M61.

When the front door switch LH is ON (door is OPEN), ground is supplied
- to BCM terminal 47
- through front door switch LH terminal 2
- through front door switch LH case ground.

When the front door switch RH is ON (door is OPEN), ground is supplied
- to BCM terminal 12
- through front door switch RH terminal 2
- through front door switch RH case ground.

When the rear door switch LH is ON (door is OPEN), ground is supplied
- to BCM terminal 48
- through rear door switch LH terminal 1
- through rear door switch LH case ground.

When the rear door switch RH is ON (door is OPEN), ground is supplied
- to BCM terminal 13
- through rear door switch RH terminal 1
- through rear door switch RH case ground.

When the back door lock assembly (back door switch) is ON (back door is OPEN), ground is supplied
- to BCM terminal 43
- through back door lock assembly (back door switch) terminals 3 and 4
- through body grounds B117, B132 and D402.

OUTLINE

Functions available by operating the inside door lock and unlock switches
- Interlocked with the locking operation of door lock and unlock switch, door lock actuators of all doors are locked.
- Interlocked with the unlocking operation of door lock and unlock switch, door lock actuators of all doors are unlocked.

Functions available by operating the front door lock assembly LH (key cylinder switch)
- Interlocked with the locking operation of front door lock assembly LH (key cylinder switch), door lock actuators of all doors are locked.
- When front door lock assembly LH (key cylinder switch) is unlocked, front door lock assembly LH (actuator) is unlocked.
- When front door lock assembly LH (key cylinder switch) is unlocked for the second time within 5 seconds after the first operation, front door lock assembly RH (actuator), rear door lock actuator LH and rear door lock actuator RH are unlocked.

Key reminder door system

When door lock and unlock switch is operated to lock doors with ignition key inserted in key cylinder and any door open, all door lock actuators are locked and then unlocked.

AUTOMATIC DOOR LOCKS (LOCK OPERATION)

The interlock door lock function is the function that locks all doors linked with the vehicle speed.

Vehicle Speed Sensing Auto Door Lock*1

All doors are locked when the vehicle speed reaches 24 km/h (15 MPH) or more.

BCM outputs the lock signal to all door lock actuators when it detects that the ignition switch is turned ON, all doors are closed and the vehicle speed received from the combination meter via CAN communication becomes 15 MPH (24 km/h) or more.

If a door is opened and closed at any time during one ignition cycle (OFF → ON), even after initial auto door lock has taken place, the BCM will relock all doors when the vehicle speed reaches 15 MPH (24 km/h) or more again.

Setting change of Automatic Door Locks (LOCK) Function

The lock operation setting of the automatic door locks function can be changed.

With CONSULT

The ON/OFF switching of the automatic door locks (LOCK) function and the type selection of the automatic door locks (LOCK) function can be performed at the WORK SUPPORT setting of CONSULT. Refer to BL-42, "CONSULT Function (BCM)".

Without CONSULT

The automatic door locks (LOCK) function can be switched ON/OFF by performing the following operation.

1. Close all doors (door switch OFF).

2. Turn ignition switch ON.
3. Within 20 seconds of turning the ignition switch ON, press and hold the door lock and unlock switch to the LOCK position for more than 5 seconds.
4. The switching is completed when the hazard lamps blink.

OFF → ON	: 2 blinks
ON → OFF	: 1 blink

5. The ignition switch must be turned OFF and ON again between each setting change.

AUTOMATIC DOOR LOCKS (UNLOCK OPERATION)

The automatic door locks (UNLOCK) function is the function that unlocks all doors linked with the key position.

IGN OFF Interlock Door Unlock*1

For vehicles equipped with Intelligent Key system, all doors are unlocked when the power supply position is changed from ON to OFF.
For vehicles not equipped with Intelligent Key system, all doors are unlocked when the mechanical key is removed from the ignition key cylinder.
BCM outputs the unlock signal to all door lock actuators when it detects that the power supply position is changed from ignition switch ON to OFF (with Intelligent Key) or when the mechanical key is removed from the ignition key cylinder (without Intelligent Key).

Setting change of Automatic Door Locks (UNLOCK) Function

The lock operation setting of the automatic door locks function can be changed.

With CONSULT

The ON/OFF switching of the automatic door locks (UNLOCK) function and the type selection of the automatic door locks (UNLOCK) function can be performed at the WORK SUPPORT setting of CONSULT. Refer to BL-42, "CONSULT Function (BCM)".

Without CONSULT

The automatic door locks (UNLOCK) function can be switched ON/OFF by performing the following operation.

1. Close all doors (door switch OFF).
2. Turn ignition switch ON.
3. Within 20 seconds of turning the ignition switch ON, press and hold the door lock and unlock switch to the UNLOCK position for more than 5 seconds.
4. The switching is completed when the hazard lamps blink.

OFF → ON	: 2 blinks
ON → OFF	: 1 blink

5. The ignition switch must be turned OFF and ON again between each setting change.

*1: This function is set to ON before delivery.

CAN Communication System Description

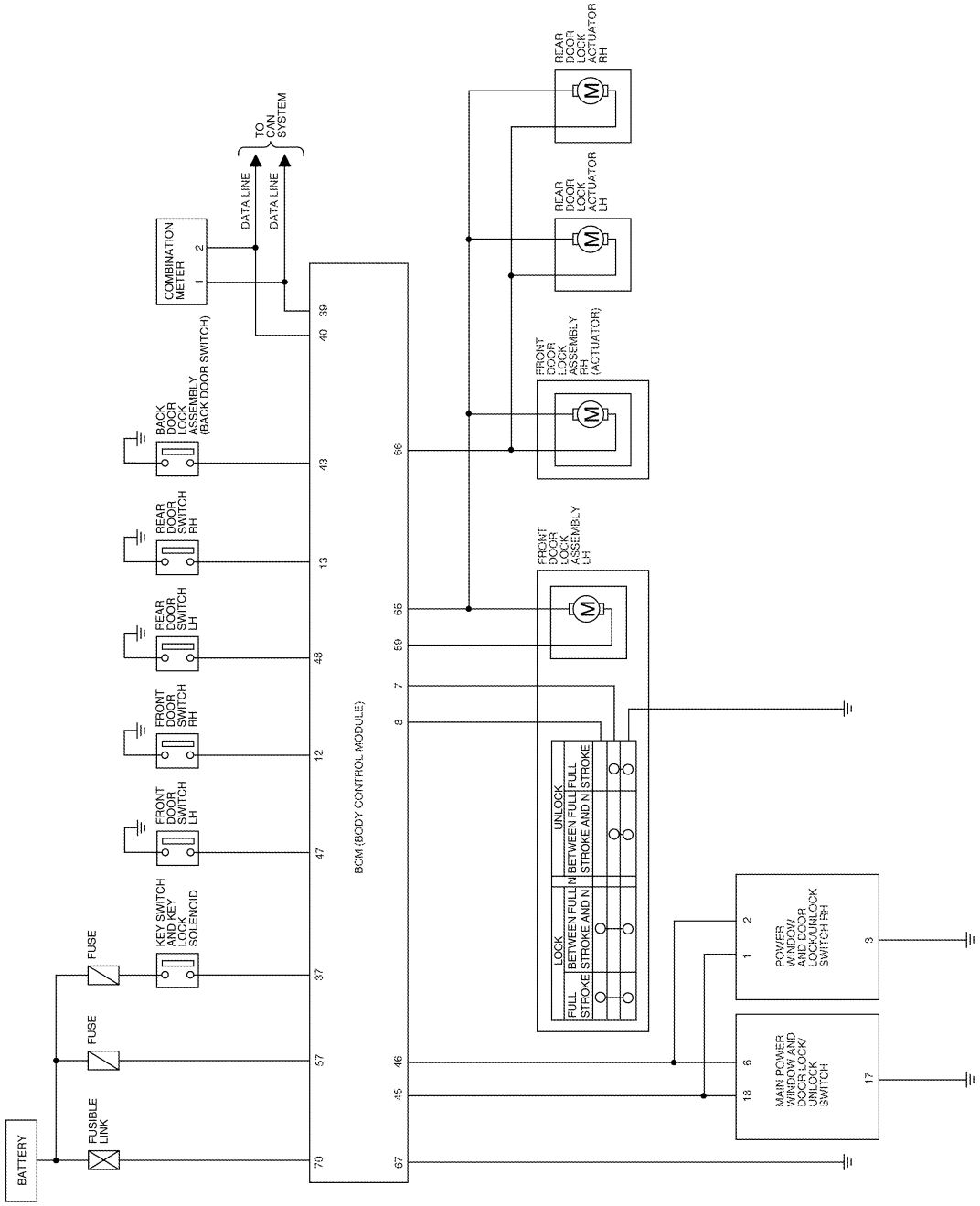
INFOID:0000000007329977

Refer to LAN-5 .

Schematic

INFOID:0000000007329978

WITHOUT INTELLIGENT KEY SYSTEM

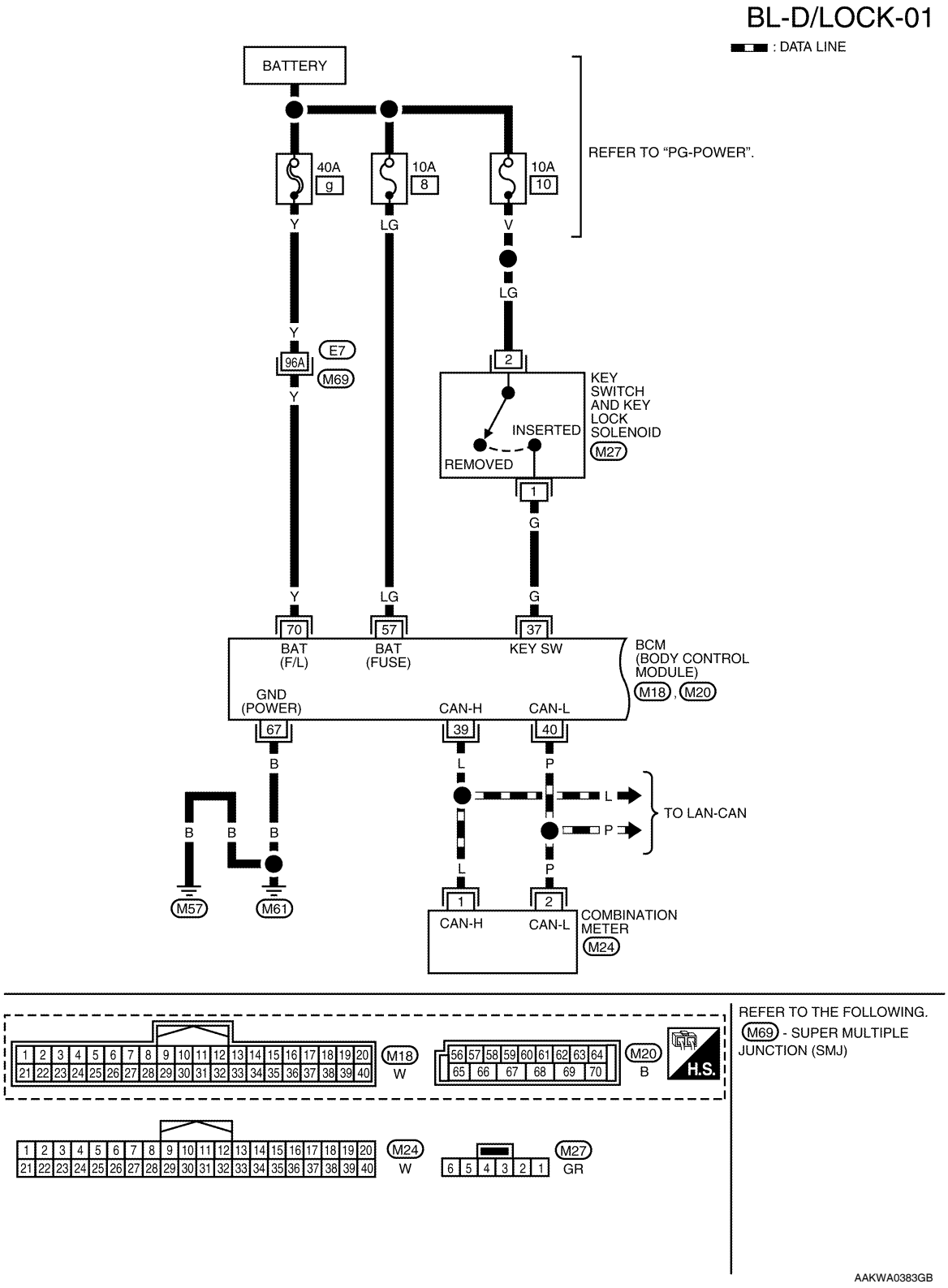


AAKWA0382GB

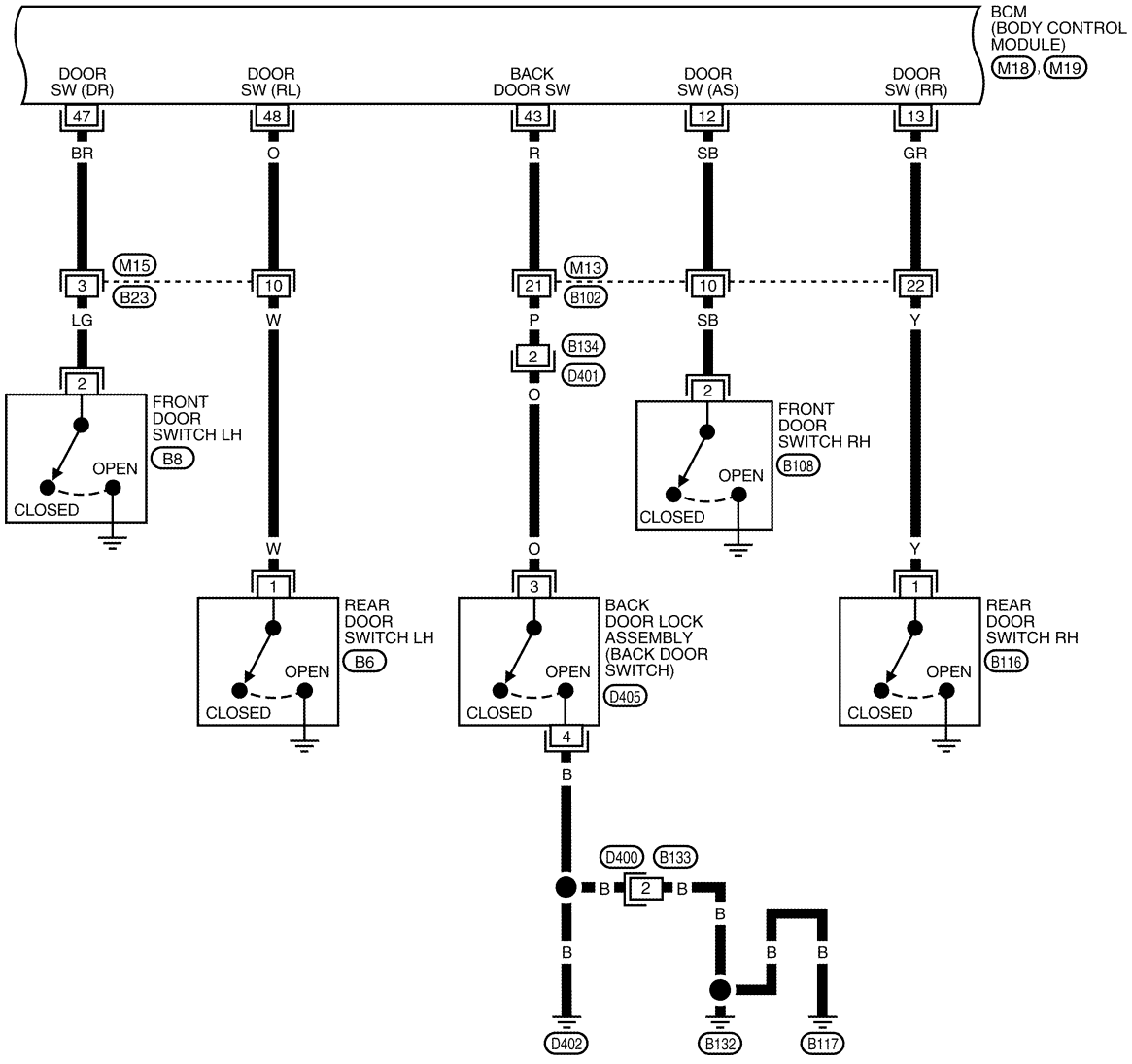
Wiring Diagram - D/LOCK -

INFOID:0000000007329979

WITHOUT INTELLIGENT KEY SYSTEM

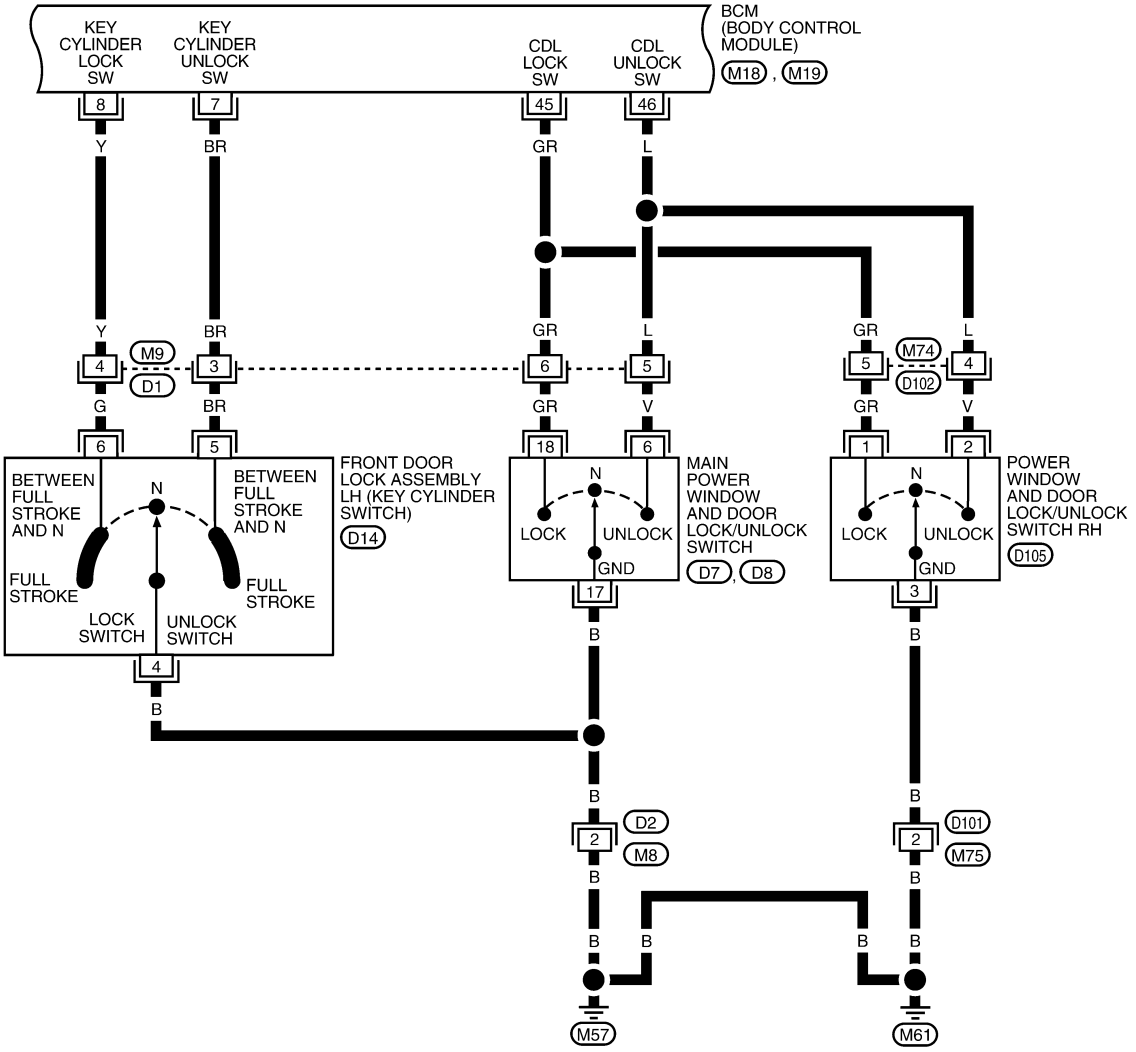


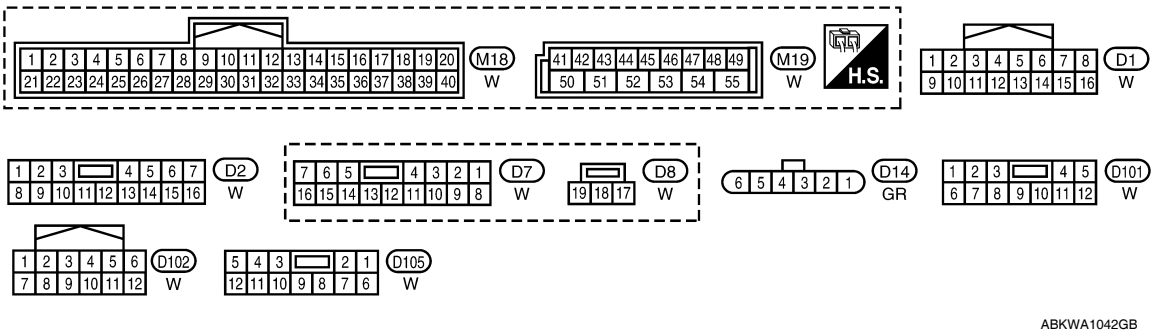
BL-D/LOCK-02



AAKWA0384GB

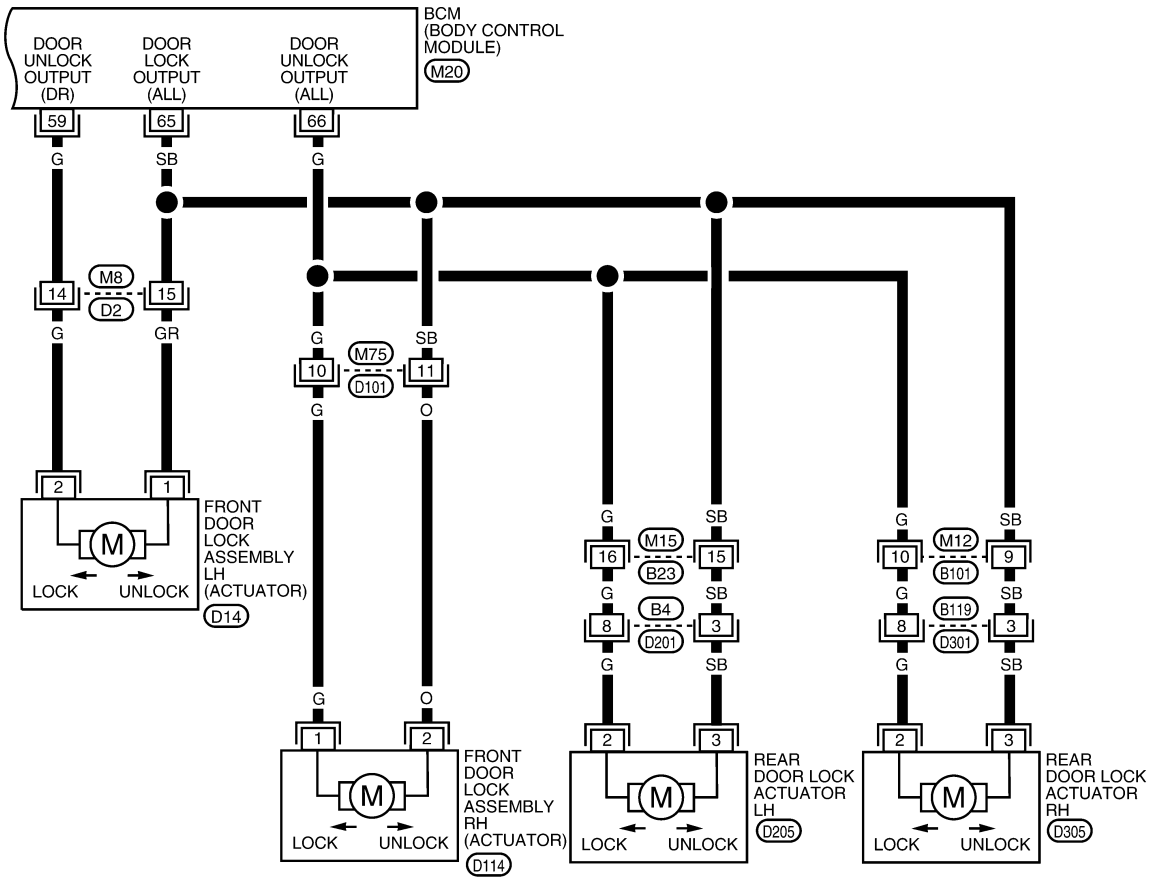
BL-D/LOCK-03

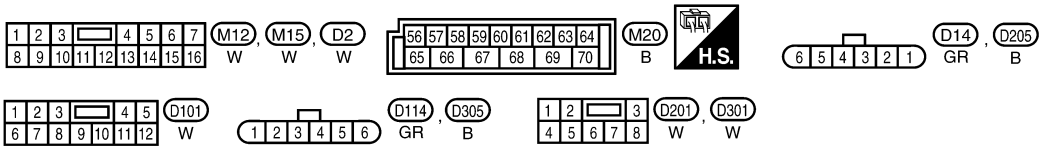




ABKWA1042GB

BL-D/LOCK-04



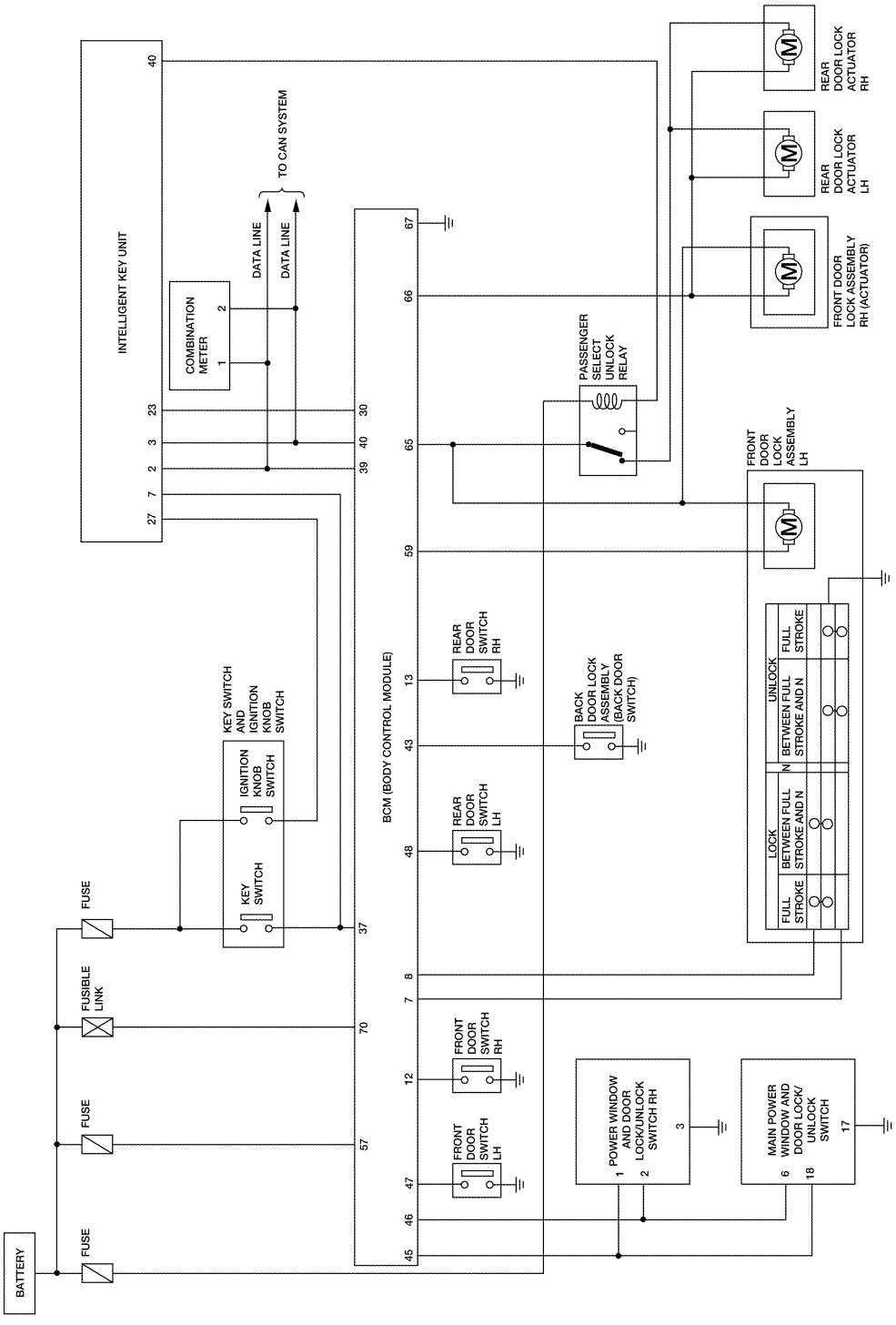


ABKWA1043GB

Schematic

INFOID:0000000007329980

WITH INTELLIGENT KEY SYSTEM



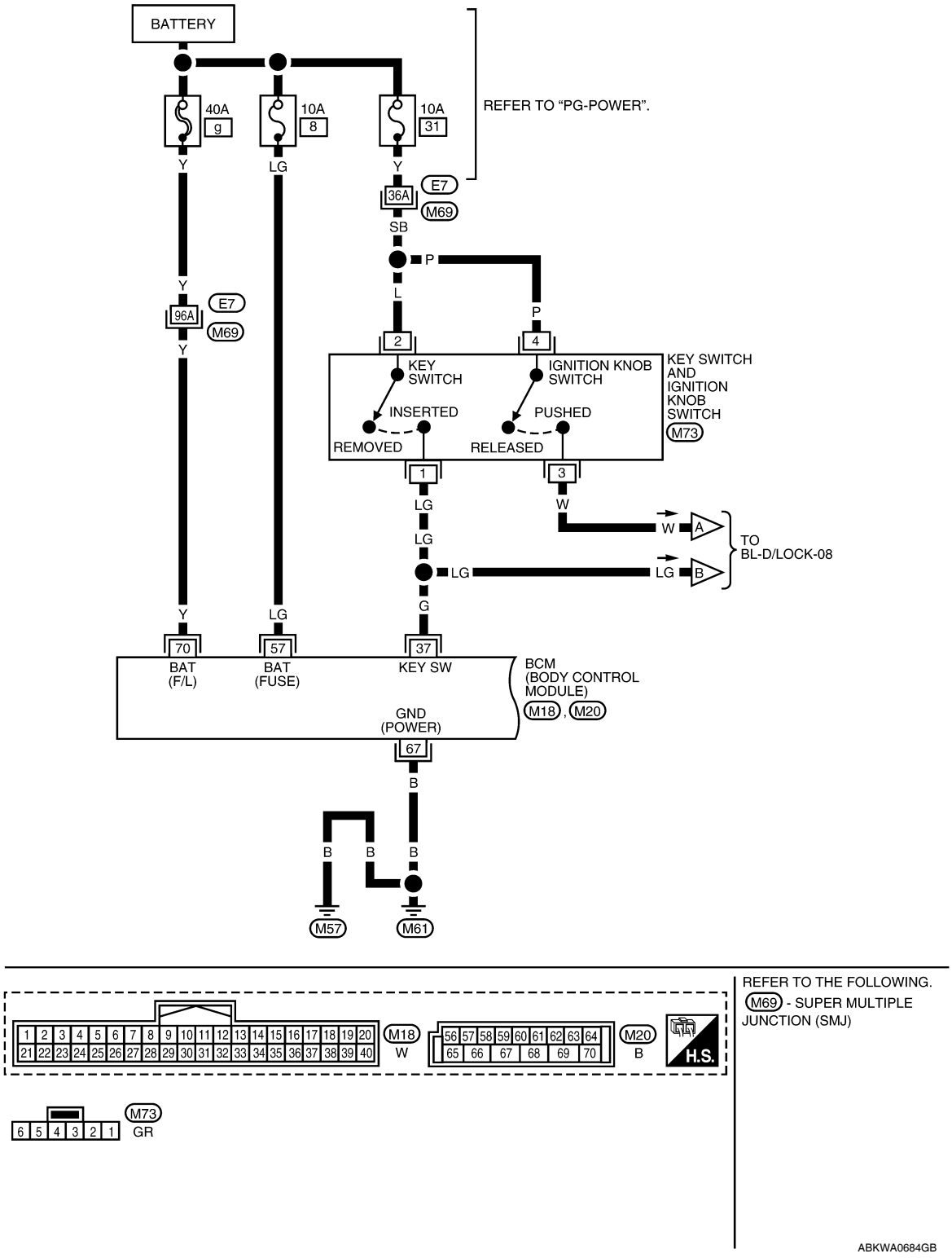
AAKWA0385GB

Wiring Diagram - D/LOCK -

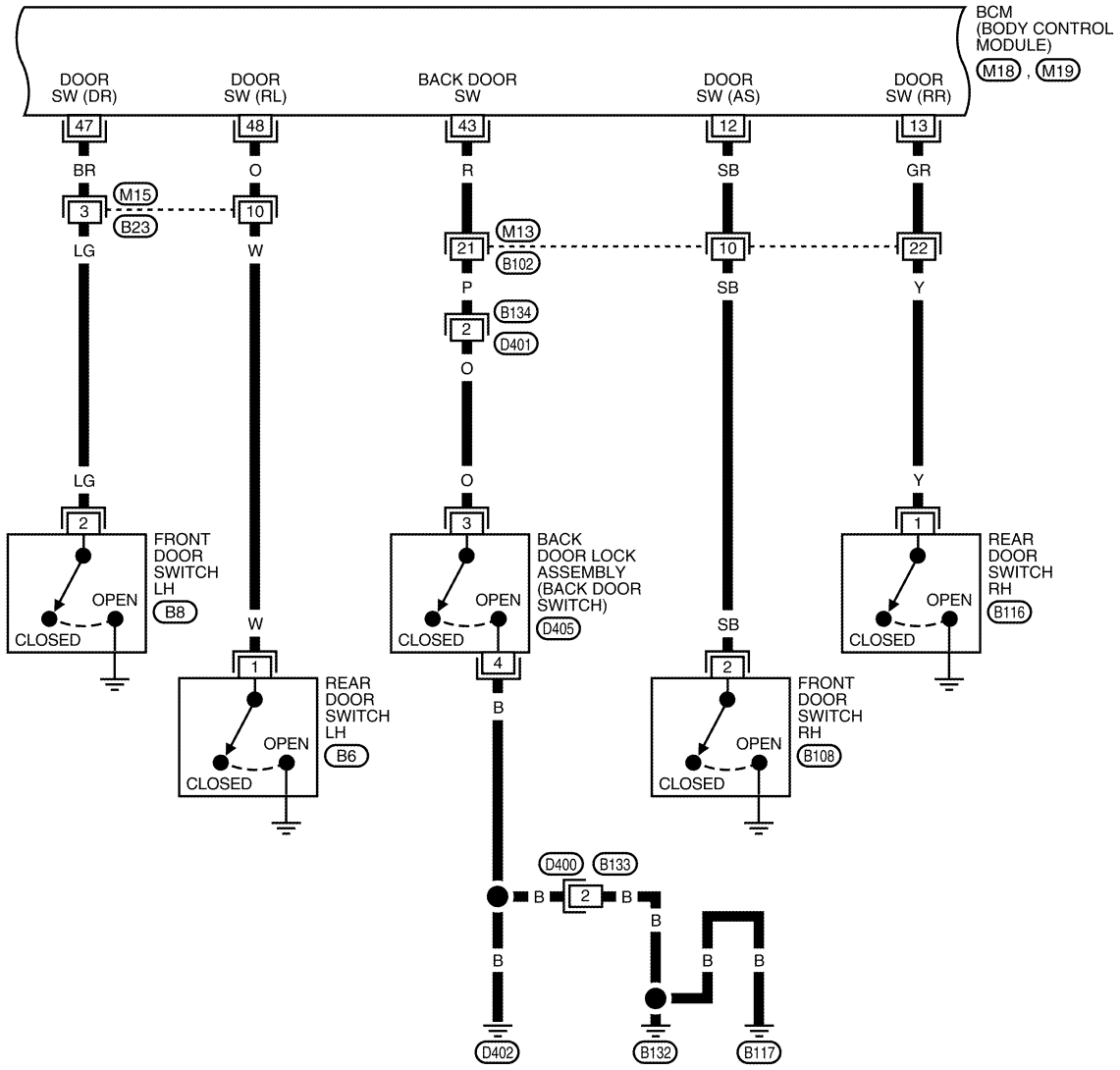
INFOID:0000000007329981

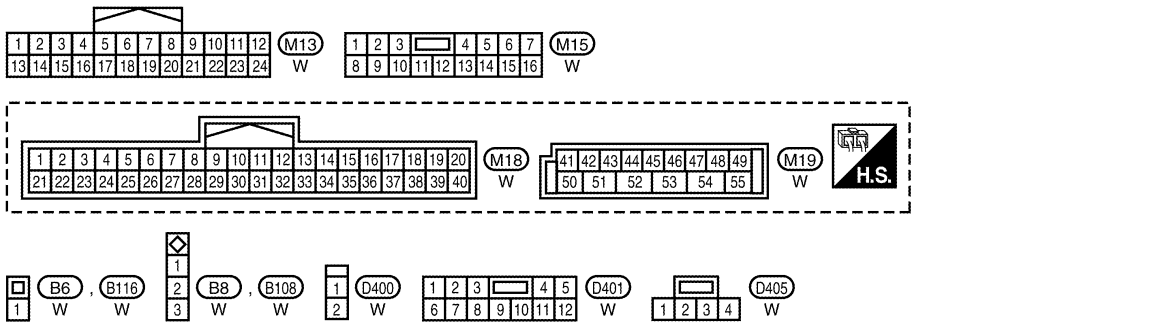
WITH INTELLIGENT KEY SYSTEM

BL-D/LOCK-05



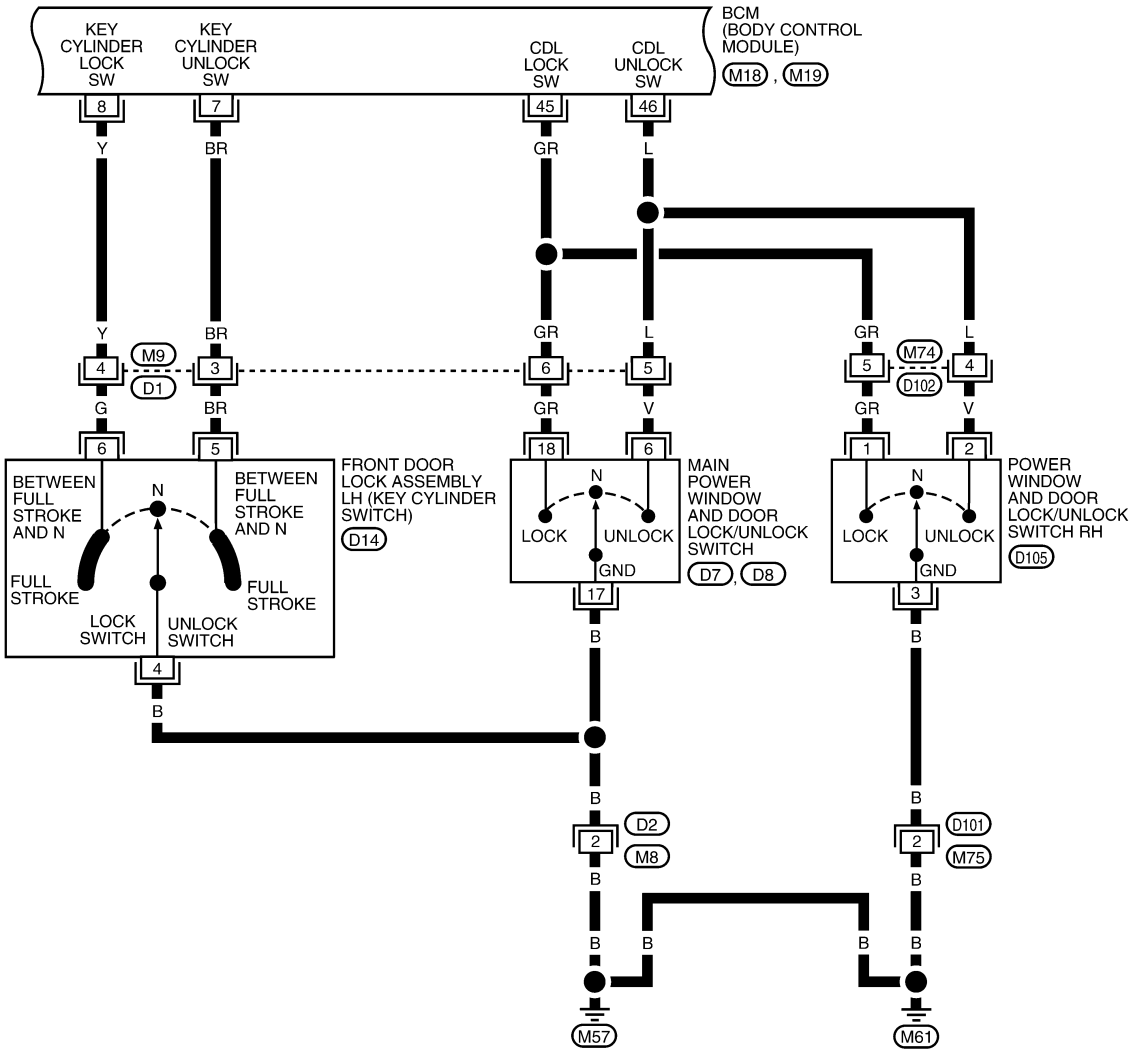
BL-D/LOCK-06

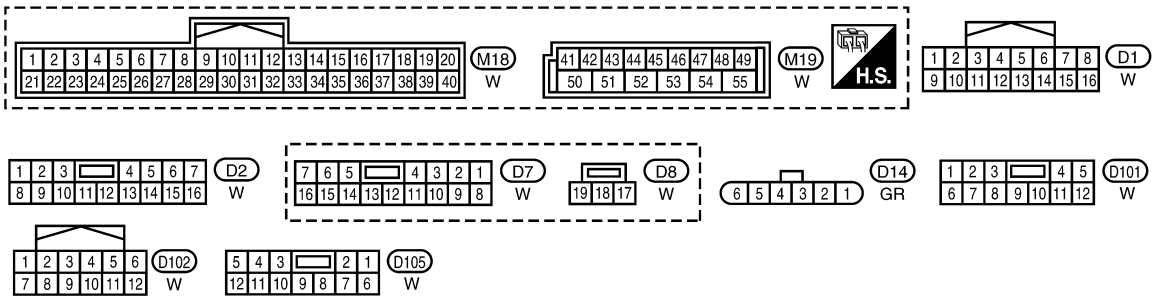




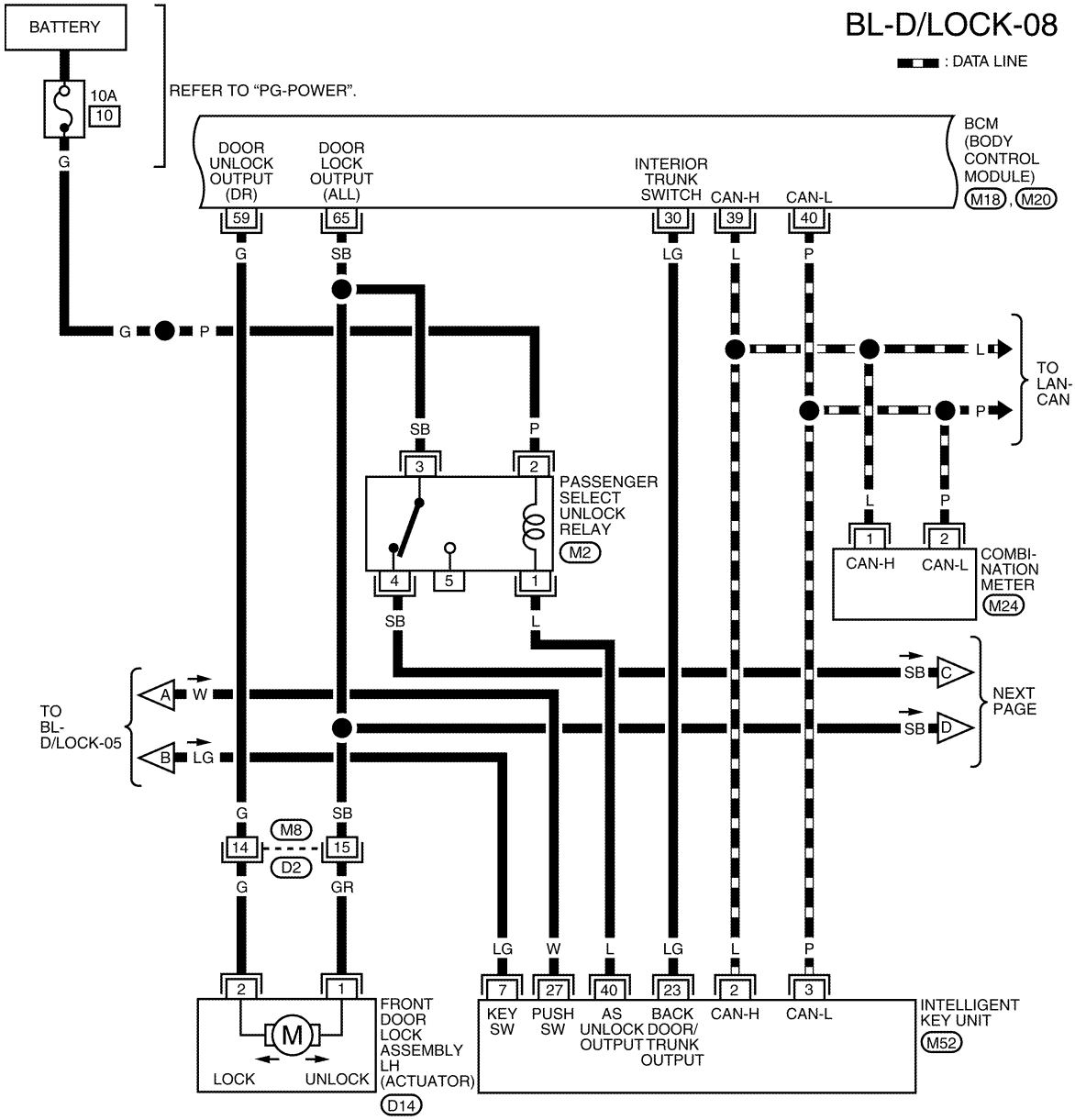
AAKWA0386GB

BL-D/LOCK-07

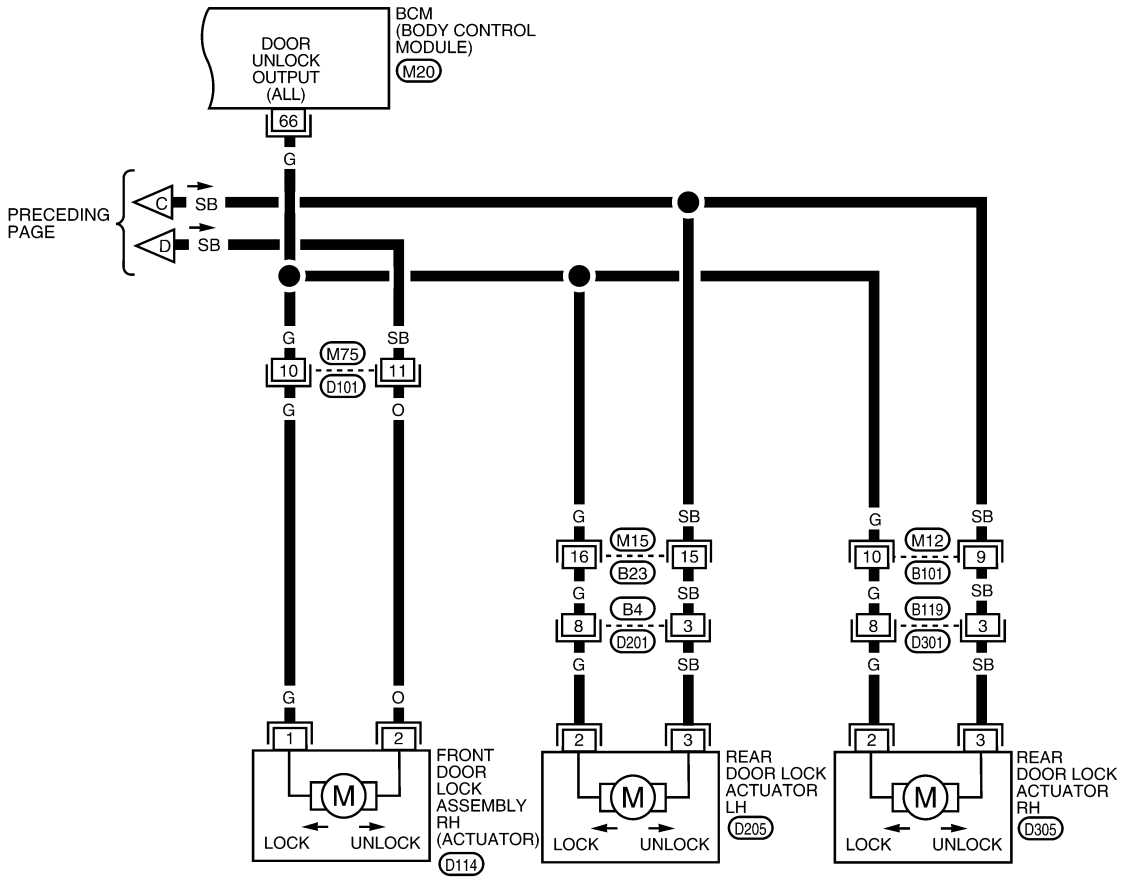


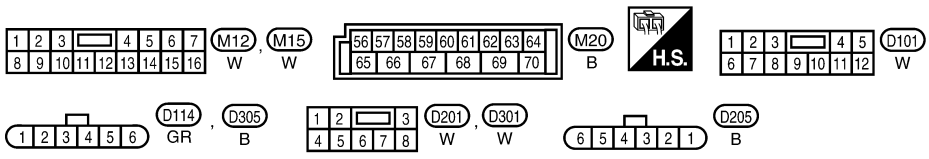


ABKWA1046GB


BL-D/LOCK-08
: DATA LINE
BATTERY
10A
10
REFER TO "PG-POWER".
BCM (BODY CONTROL MODULE)
M18, M20
DOOR UNLOCK OUTPUT (DR)
DOOR LOCK OUTPUT (ALL)
INTERIOR TRUNK SWITCH
CAN-H
CAN-L
59
65
30
39
40
TO LAN-CAN
PASSENGER SELECT UNLOCK RELAY
M2
COMBI-NATION METER
M24
TO BL-D/LOCK-05
NEXT PAGE
M8
D2
FRONT DOOR LOCK ASSEMBLY LH (ACTUATOR)
D14
LOCK
UNLOCK
KEY SW
PUSH SW
AS UNLOCK OUTPUT
BACK DOOR/ TRUNK OUTPUT
INTELLIGENT KEY UNIT
M52
H.S.
M18
M20
M24
M52
D2
D14
AAKWA0412GB

BL-D/LOCK-09

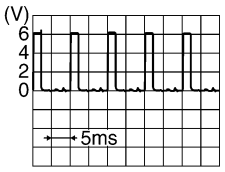
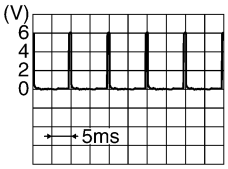
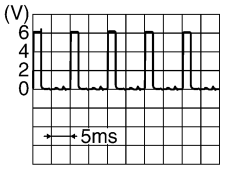
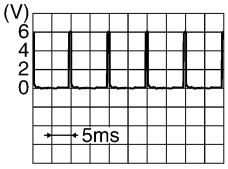


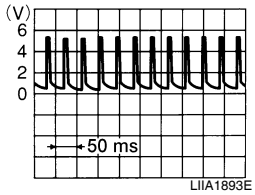
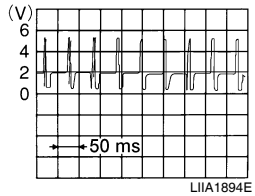
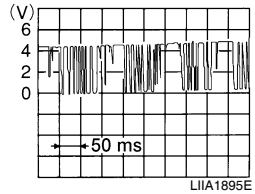
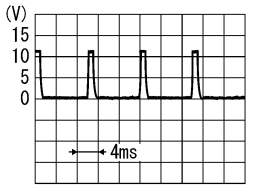


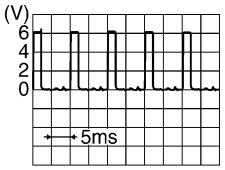
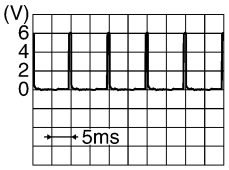
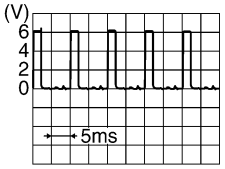
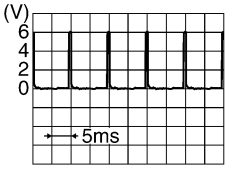
ABKWA1048GB

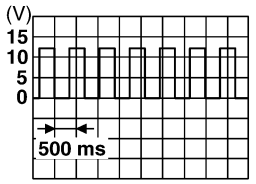
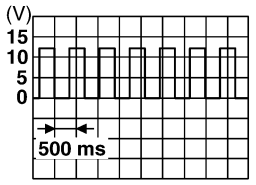
Terminal and Reference Value for BCM

INFOID:0000000007698795

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

1: With Intelligent Key

2: Without Intelligent Key

Work Flow

INFOID:0000000007329983

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to BL-24, "System Description" .
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to BL-116, "Trouble Diagnosis Symptom Chart" .
4. Does power door lock system operate normally? OK: GO TO 5, NG: GO TO 3.
5. Inspection End.

CONSULT Function (BCM)

INFOID:0000000007329984

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received date is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

WORK SUPPORT

Work item	Description
DOOR LOCK-UNLOCK SET	Select unlock mode can be changed in this mode. Selects ON-OFF of select unlock mode.
ANTI-LOCK OUT SET	Key reminder door mode can be changed in this mode. Selects ON-OFF of key reminder door mode.
AUTOMATIC DOOR LOCK SELECT	The following modes can be selected for automatic door lock function: • VH SPD: All doors are locked when vehicle speed is more than 15 MPH (25 km/h) (factory setting). • SHIFT OUT OF P: Not allowed.

Work item	Description
AUTOMATIC DOOR UNLOCK SELECT	The following modes can be selected for automatic door unlock function: • MODE1: Allowed (factory setting for vehicles with Intelligent Key). All doors are unlocked when the ignition switch is turned from ON to OFF. • MODE2: Not allowed. • MODE3: Allowed (factory setting for vehicles without Intelligent Key). All doors are unlocked when the key is removed from the ignition switch. • MODE4: Not allowed. • MODE5: Not allowed. • MODE6: Not allowed.
AUTOMATIC LOCK/UNLOCK SELECT	• ON • OFF

DATA MONITOR

Monitor item	Content
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of lock signal from door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of unlock signal from door lock and unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEY CYL LK-SW	Indicates [ON/OFF] condition of lock signal from key cylinder.
KEY CYL UN-SW	Indicates [ON/OFF] condition of unlock signal from key cylinder.
KEYLESS LOCK*	Indicates [ON/OFF] condition of lock signal from keyfob.
KEYLESS UNLOCK*	Indicates [ON/OFF] condition of unlock signal from keyfob.
I-KEY LOCK**	Indicates [ON/OFF] condition of lock signal from door request switch.
I-KEY UNLOCK**	Indicates [ON/OFF] condition of unlock signal from door request switch.

*: With Remote Keyless Entry system

**: With Intelligent Key system

ACTIVE TEST

Test item	Content
DOOR LOCK	This test is able to check door lock operation [ALL LCK/ALL ULK/DR UNLK/OTR ULK].

Trouble Diagnosis Symptom Chart

INFOID:0000000007329985

Symptom	Repair order	Refer to page
Key reminder door function does not operate properly.	1. BCM power supply and ground circuit check	BCS-16
	2. Door switch check	BL-45
	3. Key switch (insert) check	BL-47
	4. Replace BCM.	BCS-19
Power door lock does not operate with door lock and unlock switch on main power window and door lock/unlock switch or power window and door lock/unlock switch RH	1. Door lock/unlock switch check	BL-48
	2. Replace BCM.	BCS-19
One or both rear door lock actuators do not operate.	1. Passenger select unlock relay circuit check	BL-55
Front door lock assembly LH (actuator) does not operate.	1. Front door lock assembly LH (actuator) check	BL-51

Symptom	Repair order	Refer to page
Specific door lock actuator does not operate.	1. Door lock actuator check (Front RH, Rear LH/RH)	BL-53
Power door lock does not operate with front door key cylinder switch operation.	1. Front door key cylinder switch check	BL-53
	2. Replace BCM.	BCS-19
All power door locks do not operate.	1. BCM power supply and ground circuit check	BCS-16
	2. Door lock/unlock switch check	BL-48
	3. Replace BCM.	BCS-19
Vehicle speed sensing auto door LOCK operation does not operate.	1. Ensure automatic door lock/unlock function (lock operation) is enabled.	BL-42
	2. Check combination meter vehicle speed signal.	DI-16
	3. Check intermittent incident.	GI-22
Ignition OFF interlock auto door UNLOCK function does not operate.	1. Ensure automatic door lock/unlock function (unlock operation) is enabled.	BL-42
	2. Check BCM for DTCs.	BCS-18
	3. Check intermittent incident.	GI-22

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007329986

1.CHECK FUSES AND FUSIBLE LINK

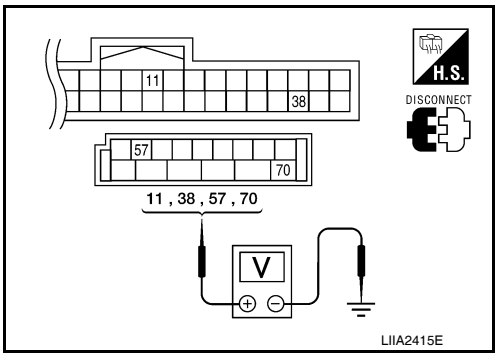
- Check 40A fusible link (letter **g** , located in the fuse and fusible link box).
- Check 10A fuses [No. 6, 8 and 20, located in the fuse block (J/B)].

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "Schematic" .

2.CHECK BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM.
3. Check voltage between BCM connectors and ground.



Connector	Terminals (+)	Terminals (-)	Power source	Condition	Voltage (V) (Approx.)
M18	11	Ground	ACC power supply	Ignition switch ACC or ON	Battery voltage
	38	Ground	Ignition power supply	Ignition switch ON or START	Battery voltage
M20	57	Ground	Battery power supply	Ignition switch OFF	Battery voltage
	70	Ground	Battery power supply	Ignition switch OFF	Battery voltage

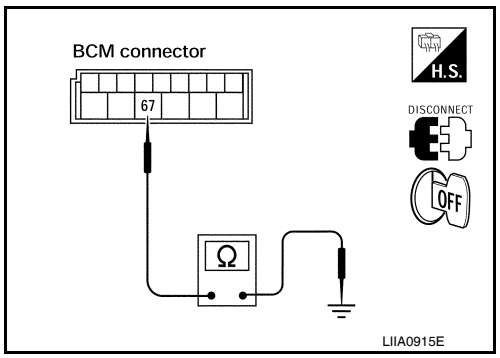
OK or NG

OK >> GO TO 3.
NG >> Repair or replace the harness.

3.CHECK GROUND CIRCUIT

Check continuity between BCM connector M20 terminal 67 and ground.

67 - Ground : Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Repair or replace harness.

Door Switch Check

INFOID:0000000007329987

1.CHECK DOOR SWITCHES INPUT SIGNAL

With CONSULT

Check door switches ("DOOR SW-DR", "DOOR SW-AS", "DOOR SW-RL", "DOOR SW-RR", "BACK DOOR SW") in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When doors are open:

DOOR SW-DR : ON
DOOR SW-AS : ON
DOOR SW-RL : ON
DOOR SW-RR : ON
BACK DOOR SW : ON

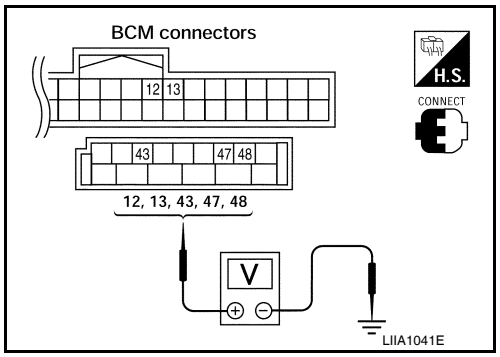
- When doors are closed:

DOOR SW-DR : OFF
DOOR SW-AS : OFF
DOOR SW-RL : OFF
DOOR SW-RR : OFF
BACK DOOR SW : OFF

Without CONSUL

Check voltage between BCM connector M18 or M19 terminals 12, 13, 43, 47, 48 and ground.

Connector	Item	Terminals (+)	Terminals (–)	Condition	Voltage (V) (Approx.)
M18	Front door switch RH	12	Ground	Open ↓ Closed	0 ↓ Battery voltage
	Rear door switch RH	13			
M19	Back door switch	43			
	Front door switch LH	47			
	Rear door switch LH	48			



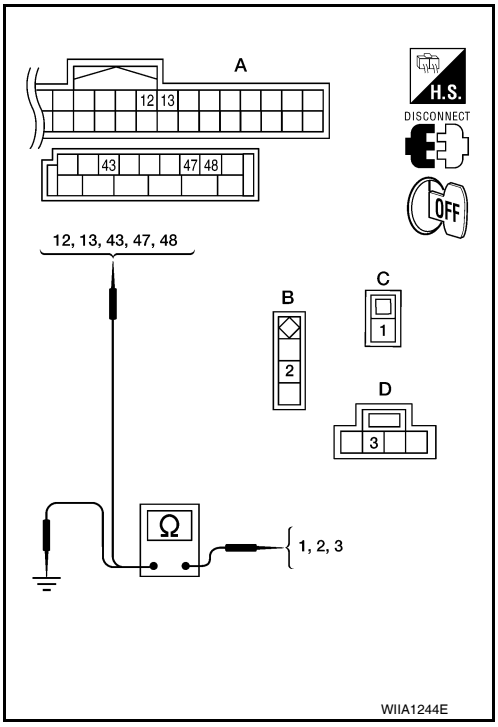
OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

2.CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door switch and BCM.
3. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 2 or back door lock assembly connector (D) D405 terminal 3 and BCM connectors (A) M18, M19 terminals 12, 13, 43, 47 and 48.

1 - 13 : Continuity should exist.
1 - 48 : Continuity should exist.
2 - 12 : Continuity should exist.
2 - 47 : Continuity should exist.
3 - 43 : Continuity should exist.



4. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and ground.

1 - Ground : Continuity should not exist.
2 - Ground : Continuity should not exist.
3 - Ground : Continuity should not exist.

OK or NG

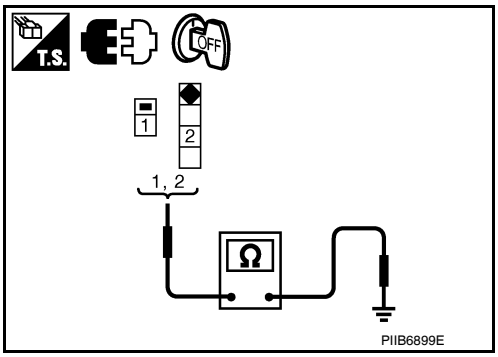
OK >> GO TO 3
NG >> Repair or replace harness.

3. CHECK DOOR SWITCHES

FRONT AND REAR DOORS

Check continuity between front door switch terminal 2 or rear door switch terminal 1 and exposed metal of switch while pressing and releasing switch.

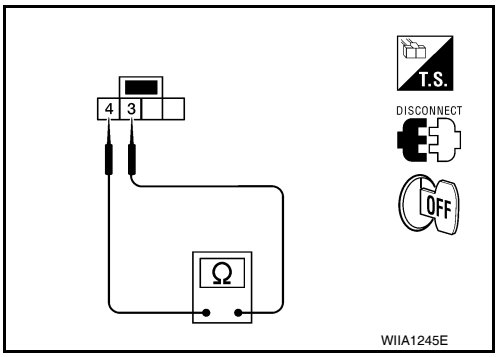
Door switch is released : Continuity should exist.
Door switch is pushed : Continuity should not exist.



BACK DOOR

Check continuity between back door lock assembly connector (back door switch) terminals 3 and 4 while pressing (closing back door) and releasing (opening back door) switch.

When back door is open : Continuity should exist.
When back door is closed : Continuity should not exist.



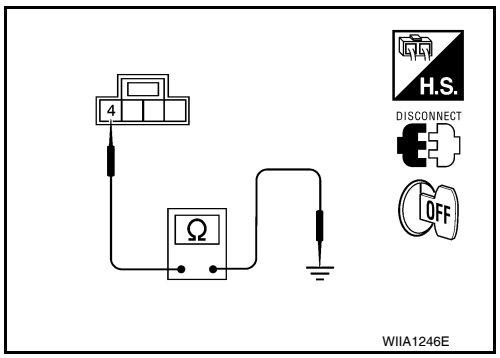
OK or NG

OK1 >> (Front and rear doors) Switch circuit is OK.
OK2 >> (Back door) GO TO 4
NG >> Replace door switch.

4. CHECK BACK DOOR SWITCH GROUND

Check continuity between back door lock assembly connector D405 terminal 4 and ground.

4 - Ground : Continuity should exist.



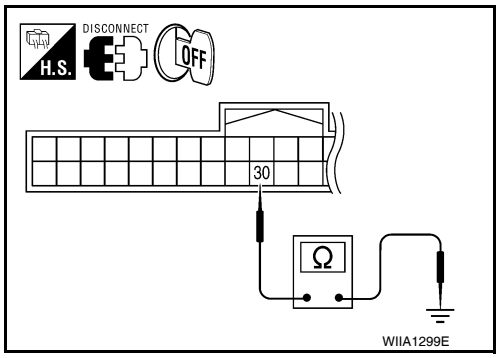
OK or NG

OK1 >> Back door switch circuit is OK (without Intelligent Key).
OK2 >> GO TO 5 (with Intelligent Key).
NG >> Repair or replace harness.

5. CHECK BACK DOOR SWITCH SIGNAL FOR SHORT

1. Disconnect Intelligent Key unit.
2. Check continuity between BCM connector M18 terminal 30 and ground.

30 - Ground : Continuity should not exist.



OK or NG

OK >> Back door switch circuit is OK.
NG >> Repair or replace harness.

Key Switch (Insert) Check

INFOID:0000000007329989

1. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT

Check key switch "KEY ON SW" in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When key is inserted into ignition key cylinder:

KEY ON SW : ON

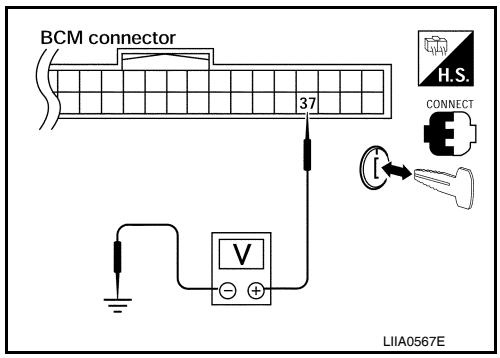
- When key is removed from ignition key cylinder:

KEY ON SW : OFF

Without CONSULT

Check voltage between BCM connector and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M18	37	Ground	Key is inserted.	Battery voltage
			Key is removed.	0



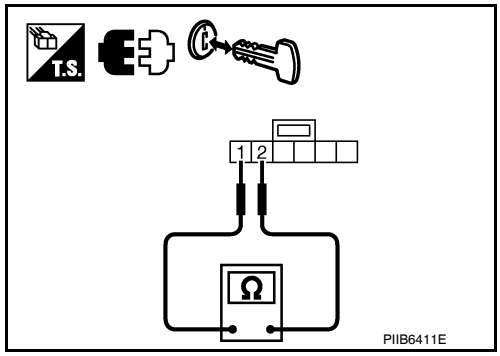
OK or NG

OK >> Key switch circuit is OK.
NG-1 >> GO TO 2 (with Intelligent Key).
NG-2 >> GO TO 3 (without Intelligent Key).

2.CHECK KEY SWITCH (WITH INTELLIGENT KEY)

1. Turn ignition switch OFF.
2. Disconnect key switch and ignition knob switch connector.
3. Check key switch.

Terminal		Condition		Continuity
Key switch and ignition knob switch				
1	2	Key	Inserted	Yes
			Removed	No



OK or NG

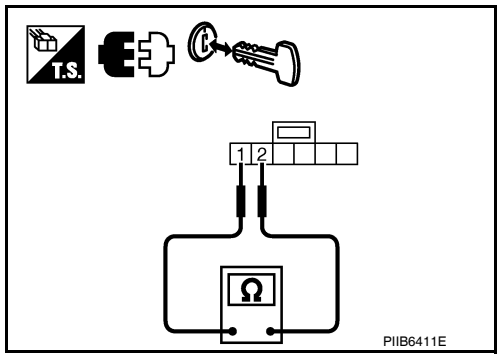
OK >> Check the following.
- 10A fuse (No. 31, located in fuse and fusible link block)
- Harness for open or short between key switch and ignition knob switch and fuse
- Harness for open or short between BCM and key switch and ignition knob switch

NG >> Replace key switch and ignition knob switch.

3.CHECK KEY SWITCH (WITHOUT INTELLIGENT KEY)

1. Turn ignition switch OFF.
2. Disconnect key switch and key lock solenoid connector.
3. Check key switch.

Terminals	Condition	Continuity
1 – 2	Key is inserted.	Yes
	Key is removed.	No



OK or NG

OK >> Check the following.
- 10A fuse [No. 10, located in fuse block (J/B)]
- Harness for open or short between key switch and key lock solenoid and fuse
- Harness for open or short between BCM and key switch and key lock solenoid

NG >> Replace key switch and key lock solenoid.

Door Lock and Unlock Switch Check

INFOID:0000000007329990

1.CHECK DOOR LOCK AND UNLOCK INPUT SIGNAL

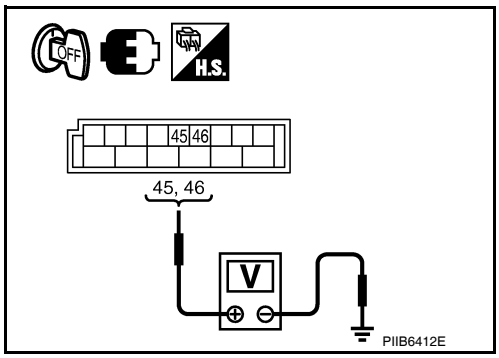
With CONSULT

Check door lock and unlock switch (“CDL LOCK SW” and “CDL UNLOCK SW”) in DATA MONITOR mode with CONSULT.

Test item	Condition	
CDL LOCK SW	Door lock and unlock switch is turned to LOCK	: ON
	Other than above	: OFF
CDL UNLOCK SW	Door lock and unlock switch is turned to UNLOCK	: ON
	Other than above	: OFF

Without CONSULT
Check voltage between BCM connector and ground

Terminals			Door lock and unlock switch condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M19	45	Ground	Lock	0
			Neutral / Unlock	Battery voltage
	46		Unlock	0
			Neutral / Lock	Battery voltage



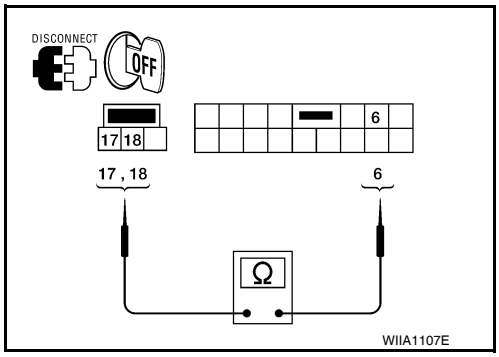
OK or NG

OK >> Door lock and unlock switch is OK.
NG >> GO TO 2

2. CHECK DOOR LOCK/UNLOCK SWITCH

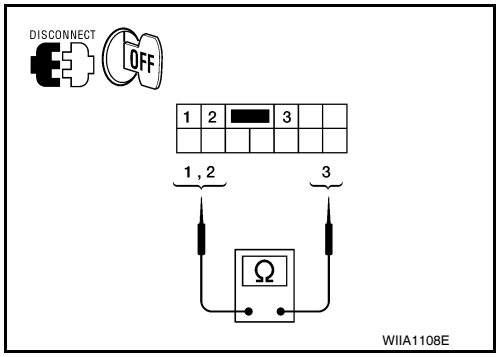
1. Turn ignition switch OFF.
2. Disconnect door lock/unlock switch.
3. Check continuity between main power window and door lock/unlock switch terminals 6, 17 and 18.

Terminal		Condition	Continuity
18	17	Lock	Yes
		Unlock/Neutral	No
6		Unlock	Yes
		Lock/Neutral	No



4. Check continuity between power window and door lock/unlock switch RH terminals 1, 2 and 3.

Terminal		Condition	Continuity
1	3	Lock	Yes
		Unlock/Neutral	No
2		Unlock	Yes
		Lock/Neutral	No



OK or NG

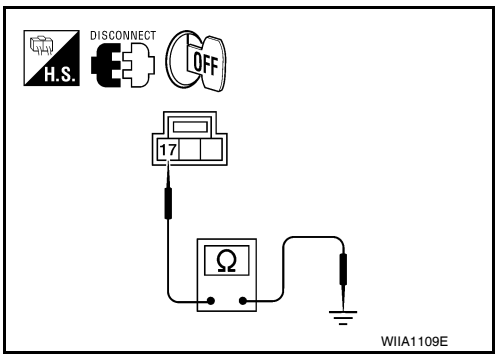
OK >> GO TO 3
NG >> Replace door lock/unlock switch.

3. CHECK DOOR LOCK/UNLOCK SWITCH GROUND HARNESS

1. Disconnect main power window and door lock/unlock switch or power window and door lock/unlock switch RH.

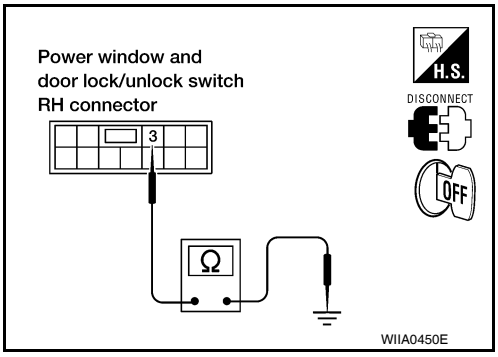
2. Check continuity between main power window and door lock/unlock switch connector D8 terminal 17 and ground.

17 - Ground : Continuity should exist.



3. Check continuity between power window and door lock/unlock switch RH connector D105 terminal 3 and ground

3 - Ground : Continuity should exist.



OK or NG

OK >> GO TO 4
NG >> Repair or replace harness.

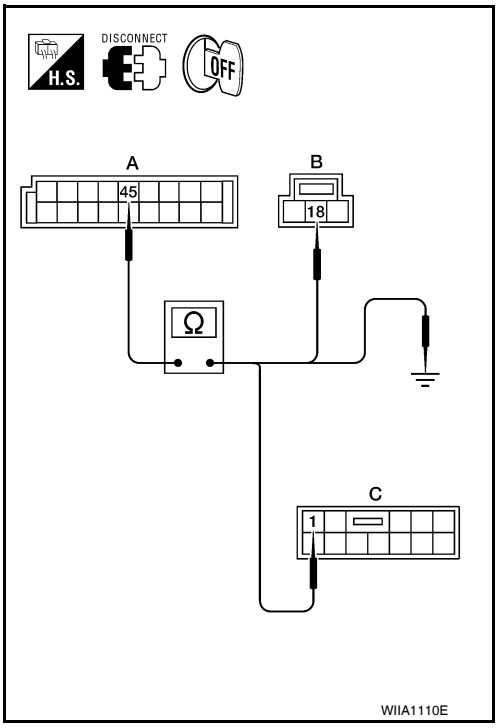
4. CHECK DOOR LOCK SWITCH CIRCUIT

1. Disconnect BCM.
2. Check continuity between BCM connector M19 (A) terminal 45 and main power window and door lock/unlock switch connector D8 (B) terminal 18 or power window and door lock/unlock switch RH connector D105 (C) terminal 1.

1 - 45 : Continuity should exist.
18 - 45 : Continuity should exist.

3. Check continuity between BCM connector M19 (A) terminal 45 and ground.

45 - Ground : Continuity should not exist.



4. Check continuity between BCM connector M19 (A) terminal 46 and main power window and door lock/unlock switch LH connector D7 (B) terminal 6 or power window and door lock/unlock switch RH connector D105 (C) terminal 2.

2 - 46 **: Continuity should exist.**

6 - 46 **: Continuity should exist.**

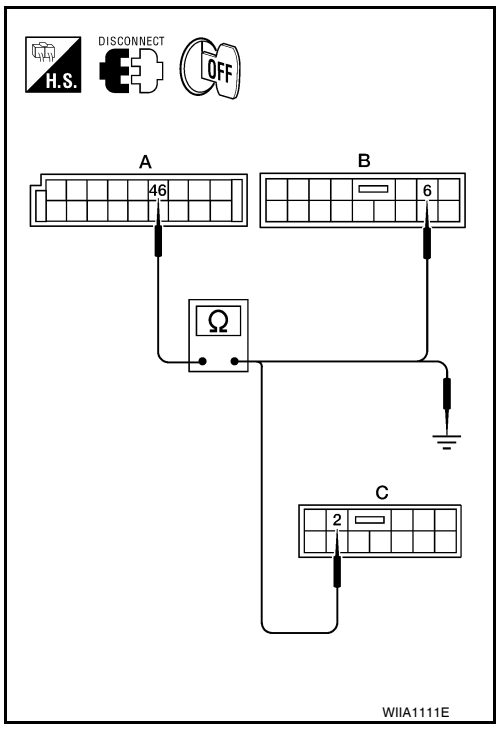
5. Check continuity between BCM connector M19 (A) terminal 46 and ground.

46 - Ground **: Continuity should not exist.**

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

NG >> Repair or replace harness.

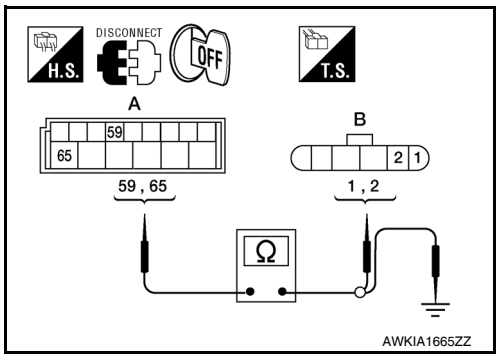


Front Door Lock Assembly LH (Actuator) Check

INFOID:0000000007329991

1.CHECK FRONT DOOR LOCK ASSEMBLY LH (ACTUATOR) HARNESS

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock assembly LH (actuator).
3. Check continuity between BCM connector (A) M20 terminals 59, 65 and front door lock assembly LH (actuator) connector (B) D14 terminals 2, 1.



Connector	Terminal	Connector	Terminal	Continuity
A: M20	59	B: D14	2	Yes
	65		1	Yes

4. Check continuity between BCM connector (A) M20 terminals 59, 65 and body ground.

Connector	Terminals		Continuity
A: M20	59	Ground	No
	65		No

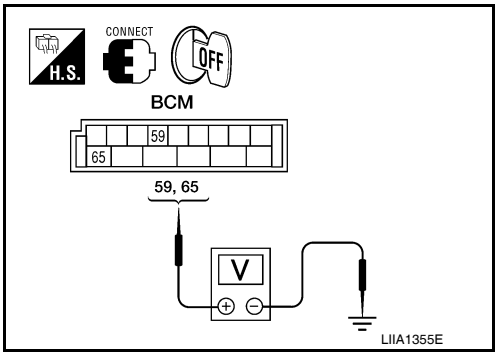
OK or NG

OK >> GO TO 2

NG >> Repair or replace harness.

2.CHECK FRONT DOOR LOCK ASSEMBLY LH SIGNAL

1. Reconnect BCM.
2. Check voltage between BCM connector M20 terminals 59, 65 and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M20	59	Ground	Main power window and door lock/unlock switch is turned to UNLOCK	0 → Battery voltage
	65		Main power window and door lock/unlock switch is turned to LOCK	0 → Battery voltage

OK or NG

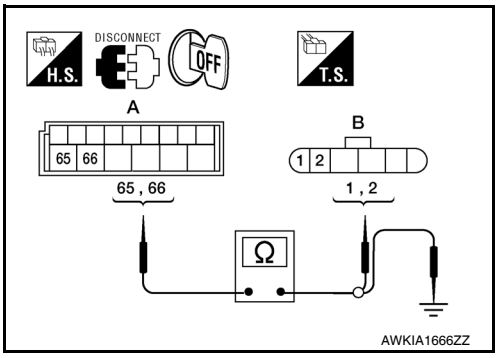
OK >> Replace front door lock assembly LH (actuator). Refer to BL-161, "Removal and Installation" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

Front Door Lock Assembly RH (Actuator) Check

INFOID:0000000007329992

1.CHECK FRONT DOOR LOCK ASSEMBLY RH (ACTUATOR) HARNESS

1. Turn ignition switch OFF.
2. Disconnect BCM and front door lock assembly RH (actuator).
3. Check continuity between BCM connector (A) M20 terminals 65, 66 and front door lock assembly RH (actuator) connector (B) D114 terminals 2, 1.



Connector	Terminal	Connector	Terminal	Continuity
A: M20	65	B: D114	2	Yes
	66		1	Yes

4. Check continuity between BCM connector (A) M20 terminals 65, 66 and body ground.

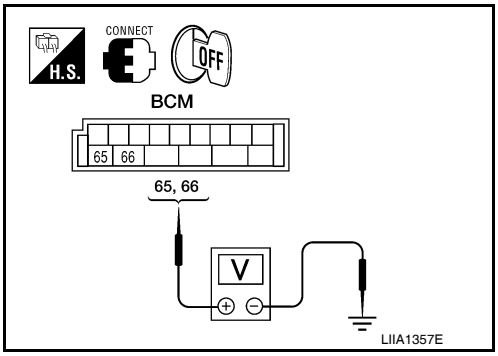
Connector	Terminals		Continuity
A: M20	65	Ground	No
	66		No

OK or NG

OK >> GO TO 2
NG >> Repair or replace harness.

2.CHECK FRONT DOOR LOCK ASSEMBLY RH SIGNAL

1. Reconnect BCM.
2. Check voltage between BCM connector M20 terminals 65, 66 and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M20	65	Ground	Main power window and door lock/unlock switch is turned to UNLOCK	0 → Battery voltage
	66		Main power window and door lock/unlock switch is turned to LOCK	0 → Battery voltage

OK or NG

OK >> Replace front door lock assembly RH (actuator). Refer to BL-161, "Removal and Installation" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

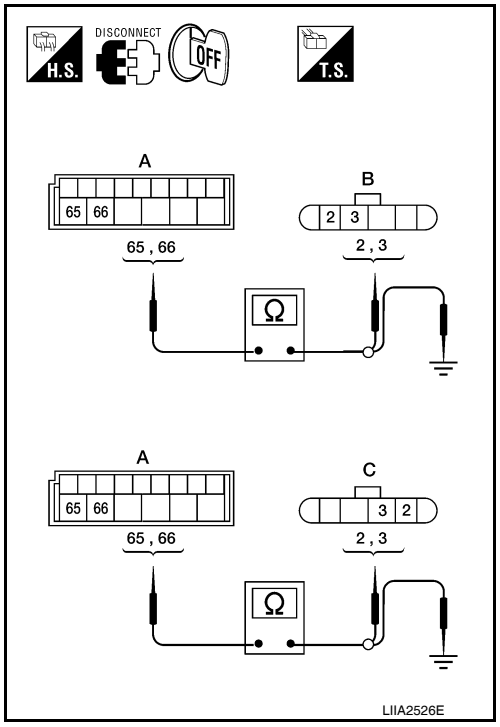
Rear Door Lock Actuator LH/RH Check

INFOID:0000000007329993

1.CHECK DOOR LOCK ACTUATOR HARNESS

NOTE:
For models with Intelligent Key, insure that passenger select unlock relay remains connected during this test.

1. Turn ignition switch OFF.
2. Disconnect BCM and each door lock actuator.
3. Check continuity between BCM connector (A) M20 terminals 65, 66 and rear door lock actuator RH connector (B) D305, rear door lock actuator LH connector (C) D205 terminals 2, 3.



Connector	Terminal	Connector	Terminal	Continuity
A: M20	65	B: D305 C: D205	3	Yes
	66		2	Yes

4. Check continuity between BCM connector (A) M20 terminals 65, 66 and body ground.

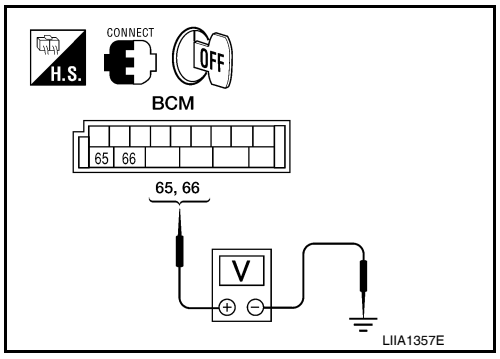
Connector	Terminals		Continuity
A: M20	65	Ground	No
	66		No

OK or NG

OK >> GO TO 2
NG >> Check the following:
- Without Intelligent Key: Repair or replace harness.
- With Intelligent Key: Repair or replace harness or passenger select unlock relay.

2.CHECK DOOR LOCK ACTUATOR SIGNAL

1. Reconnect BCM.
2. Check voltage between BCM connector M20 terminals 65, 66 and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M20	65	Ground	Main power window and door lock/unlock switch is turned to UNLOCK	0 → Battery voltage
	66		Main power window and door lock/unlock switch is turned to LOCK	0 → Battery voltage

OK or NG

OK >> Replace rear door lock actuator LH/RH. Refer to BL-164, "Removal and Installation" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

Front Door Lock Assembly LH (Key Cylinder Switch) Check

INFOID:0000000007329994

1.CHECK FRONT DOOR LOCK ASSEMBLY LH (KEY CYLINDER SWITCH)

With CONSULT

Check front door key cylinder switch ("KEY CYL LK-SW") and ("KEY CYL UN-SW) in DATA MONITOR mode in CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When key inserted in front key cylinder is turned to LOCK:

KEY CYL LK-SW : ON

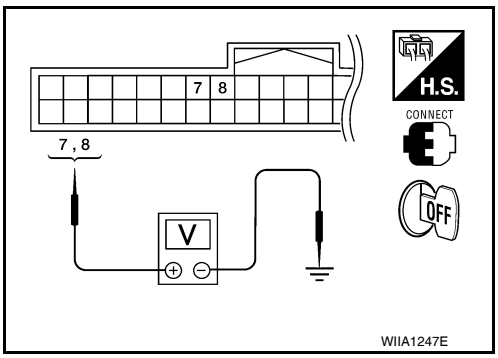
- When key inserted in front key cylinder is turned to UNLOCK:

KEY CYL UN-SW : ON

Without CONSULT

Check voltage between BCM connector M18 terminals 7, 8 and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M18	7	Ground	Neutral/Lock	5
			Unlock	0
	8		Neutral/Unlock	5
			Lock	0



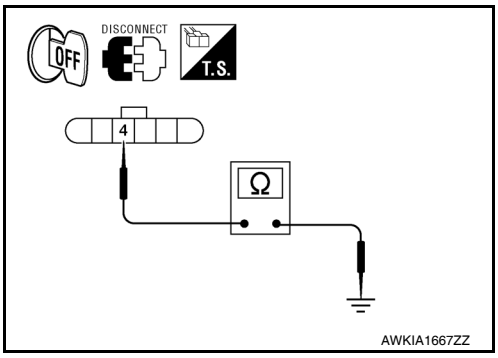
OK or NG

OK >> Front door lock assembly LH (key cylinder switch) signal is OK.
NG >> GO TO 2

2. CHECK FRONT DOOR LOCK ASSEMBLY LH (KEY CYLINDER SWITCH) GROUND HARNESS

1. Turn ignition switch OFF.
2. Disconnect front door lock assembly LH (key cylinder switch).
3. Check continuity between front door lock assembly LH (key cylinder switch) connector D14 terminal 4 and body ground.

Connector	Terminals	Continuity
D14	4 – Ground	Yes



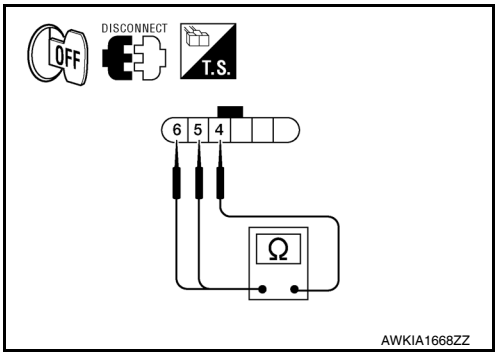
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

3. CHECK FRONT DOOR LOCK ASSEMBLY LH (KEY CYLINDER SWITCH)

Check continuity between front door lock assembly LH (key cylinder switch) terminals.

Terminals	Door key cylinder switch position	Continuity
4 – 6	Neutral/Unlock	No
	Lock	Yes
4 – 5	Neutral/Lock	No
	Unlock	Yes



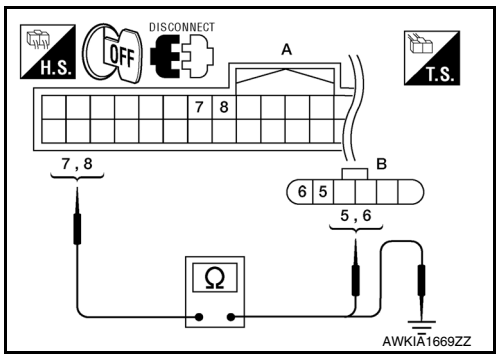
OK or NG

OK >> GO TO 4
NG >> Replace front door lock assembly LH (key cylinder switch). Refer to BL-161 .

4. CHECK FRONT DOOR LOCK ASSEMBLY LH (KEY CYLINDER SWITCH) HARNESS

1. Disconnect BCM connector M18.
2. Check continuity between BCM connector (A) M18 terminals 7, 8 and front door lock assembly LH (key cylinder switch) connector (B) D14 terminals 5, 6 and body ground.

Connector	Terminal	Connector	Terminal	Continuity
A: M18	7	B: D14	5	Yes
	8		6	Yes
	7	Ground		No
	8	Ground		No



OK or NG

OK >> Front door lock assembly LH (key cylinder switch) circuit is OK.
NG >> Repair or replace harness.

Passenger Select Unlock Relay Circuit Inspection (With Intelligent Key)

INFOID:0000000007329995

1.CHECK PASSENGER SELECT UNLOCK RELAY CIRCUIT

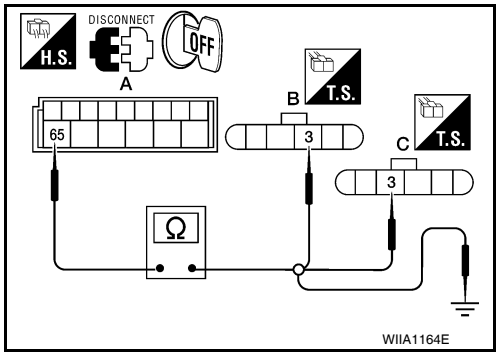
NOTE:
Passenger select unlock relay must remain connected during this step.

1. Turn ignition switch OFF.
2. Disconnect BCM and inoperative rear door lock actuator.
3. Check continuity between BCM connector (A) M20 terminal 65 and rear door lock actuator LH connector (B) D205 terminal 3 or rear door lock actuator RH connector (C) D305 Terminal 3.

65 - 3 : Continuity should exist.

4. Check continuity between BCM connector (A) M20 terminal 65 and body ground.

65 - Ground : Continuity should not exist.



OK or NG

OK >> GO TO 4
NG >> GO TO 2

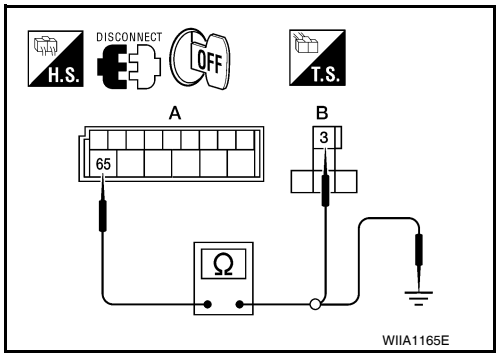
2.CHECK PASSENGER SELECT UNLOCK RELAY INPUT

1. Disconnect passenger select unlock relay.
2. Check continuity between BCM connector (A) M20 terminal 65 and passenger select unlock relay connector (B) M2 terminal 3.

65 - 3 : Continuity should exist.

3. Check continuity between BCM connector (A) M20 terminal 65 and body ground.

65 - Ground : Continuity should not exist.



OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between BCM and relay.

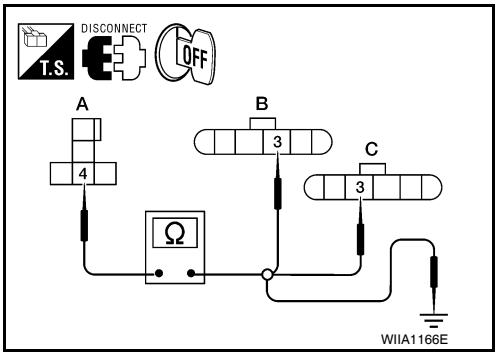
3.CHECK PASSENGER SELECT UNLOCK RELAY OUTPUT

1. Check continuity between passenger select unlock relay connector (A) M2 terminal 4 and rear door lock actuator LH connector (B) D205 or rear door lock actuator RH connector (C) D305 terminal 3.

4 - 3 : Continuity should exist.

2. Check continuity between passenger select unlock relay connector (A) M2 terminal 4 and ground.

4 - Ground : Continuity should not exist.



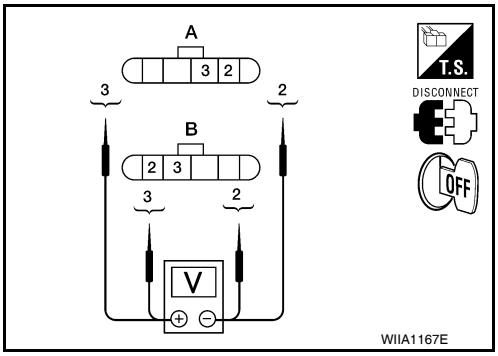
OK or NG

OK >> Replace passenger select unlock relay.
NG >> Repair or replace harness between relay and actuator.

4. CHECK REAR DOOR LOCK ACTUATOR ASSEMBLY

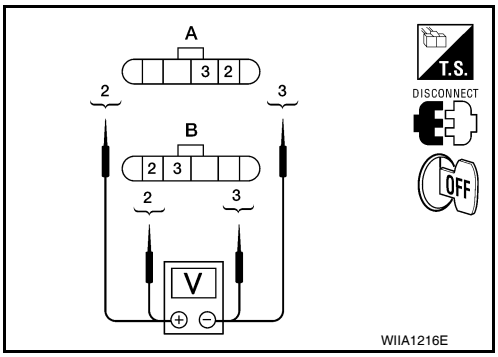
1. Reconnect BCM.
2. Check voltage between rear door lock actuator connector LH (A) D205 or rear door lock actuator connector RH (B) D305 terminals 2 and 3.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
A: D205 (LH) B: D305 (RH)	3	2	Main power window and door lock/unlock switch is turned to LOCK	0 → Battery voltage



3. Check voltage between rear door lock actuator connector LH (A) D205 or rear door lock actuator connector RH (B) D305 terminals 2 and 3.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
A: D205 (LH) B: D305 (RH)	2	3	Main power window and door lock/unlock switch is turned to UNLOCK	0 → Battery voltage



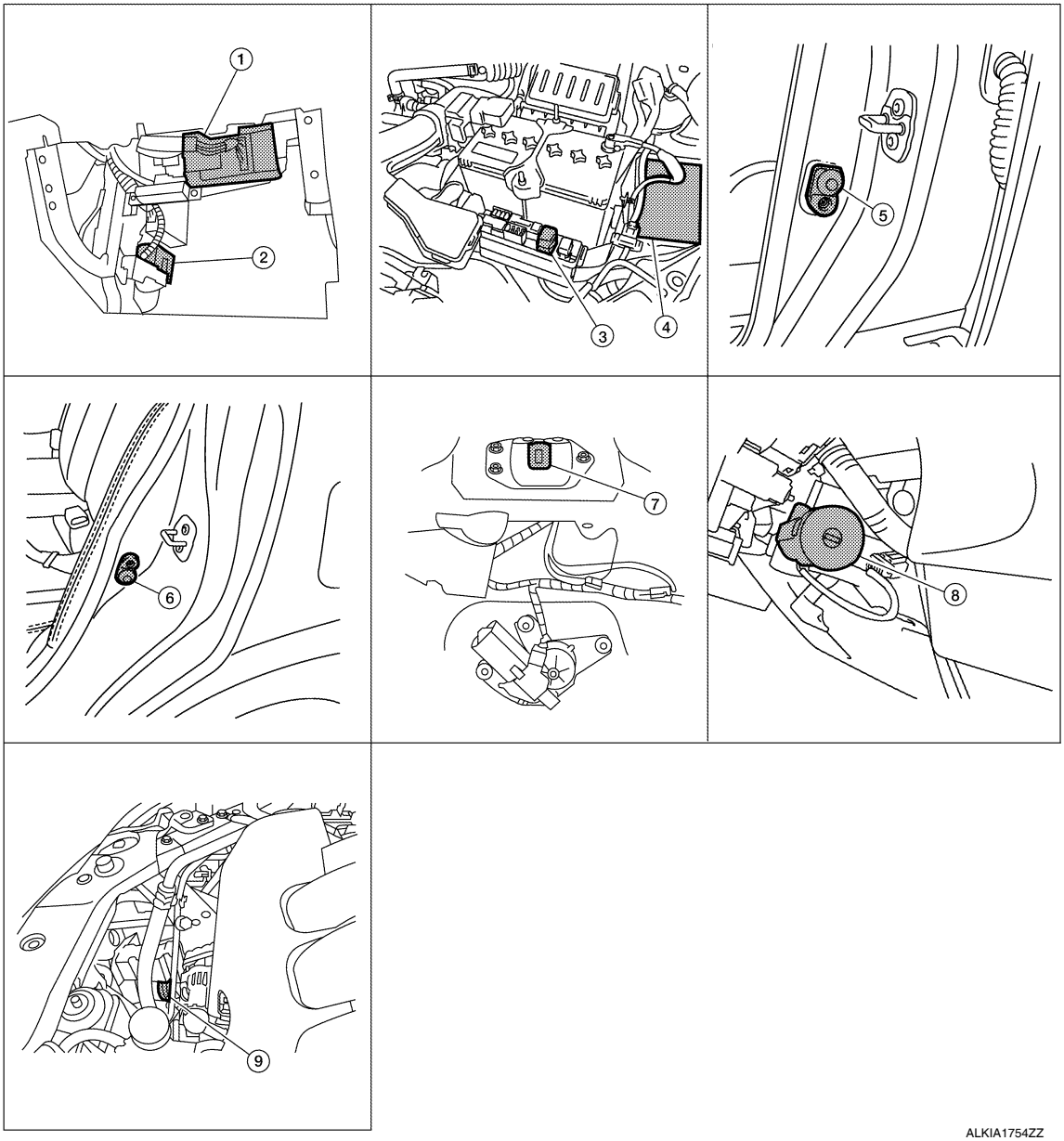
OK or NG

OK >> Replace rear door lock actuator. Refer to BL-164, "Removal and Installation" .
NG >> Repair or replace harness between actuator and splice.

REMOTE KEYLESS ENTRY SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007329996



ALKIA1754ZZ

1. BCM M18, M19, M20 (view with glove box removed)
2. Remote keyless entry receiver M23
3. Horn relay H-1 (front of battery)
4. IPDM E/R E46, E48
5. Front door switch LH B8, RH B108
6. Rear door switch LH B6, RH B116
7. Back door lock assembly (back door switch) D405 (view with back door open)
8. Key switch and key lock solenoid M27
9. Horn E18, E20

System Description

INFOID:0000000007329997

INPUTS

Power is supplied at all times

- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM terminal 70
- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to BCM terminal 57.

When the key switch is ON (key is inserted in ignition key cylinder), power is supplied

• through 10A fuse [No. 10, located in the fuse block (J/B)]
• through key switch terminals 2 and 1
• to BCM terminal 37.
When the ignition switch is ACC or ON, power is supplied
• through 10A fuse [No. 20, located in the fuse block (J/B)]
• to BCM terminal 11.
Ground is supplied
• to BCM terminal 67
• through body grounds M57 and M61.
When the front door switch LH is ON (door is OPEN), ground is supplied
• to BCM terminal 47
• through front door switch LH terminal 2
• through front door switch LH case ground.
When the front door switch RH is ON (door is OPEN), ground is supplied
• to BCM terminal 12
• through front door switch RH terminal 2
• through front door switch RH case ground.
When the rear door switch LH is ON (door is OPEN), ground is supplied
• to BCM terminal 48
• through rear door switch LH terminal 1
• through rear door switch LH case ground.
When the rear door switch RH is ON (door is OPEN), ground is supplied
• to BCM meter terminal 13
• through rear door switch RH terminal 1
• through rear door switch RH case ground.
When the back door lock assembly (back door switch) is ON (back door is OPEN), ground is supplied
• to BCM terminal 43
• through back door lock assembly (back door switch) terminals 3 and 4
• through body grounds B117, B132 and D402.
Keyfob signal is inputted to BCM from remote keyless entry receiver.
The remote keyless entry system controls operation of the
• power door lock
• hazard reminder
• auto door lock
• panic alarm
• room lamp

OPERATED PROCEDURE

Power Door Lock Operation
BCM receives a LOCK signal from keyfob. BCM locks all doors with input of LOCK signal from keyfob.
BCM receives a UNLOCK signal from keyfob. BCM unlocks all doors with input of UNLOCK signal from keyfob.

Hazard and Horn Reminder
When the doors are locked or unlocked by keyfob, power is supplied to sound horn and flash hazard warning lamps as follows
• LOCK operation: 3 or 4 mode (lamps flash twice)
• UNLOCK operation: 2 or 4 mode (lamps flash once)
• Horn sounds once with LOCK function when this feature is set ON.
The hazard reminder has modes 1, 2, 3 or 4. The horn reminder can be turned ON/OFF with any LOCK mode.

Operating function of hazard reminder

	Mode 1		Mode 2		Mode 3		Mode 4	
Keyfob operation	Lock	Unlock	Lock	Unlock	Lock	Unlock	Lock	Unlock
Hazard warning lamp flash	—	—	—	Twice	Once	—	Once	Twice
Horn sound (ON/OFF)	ON: once	—	ON: once	—	ON: once	—	ON: once	—

Hazard and horn reminders do not operate if any door switch is ON (any door is OPEN).
How to change hazard and horn reminder modes
With CONSULT

Hazard reminder can be changed using “HAZARD LAMP SET” mode in “WORK SUPPORT”.
Horn reminder can be changed using “HORN CHIRP SET” mode in “WORK SUPPORT”.
Refer to BL-68, "CONSULT Function (BCM)" .

Without CONSULT
Refer to Owner's Manual for instructions.

Auto Door Lock Operation
Auto lock function signal is sent for operation when any of the following signals are not sent within 1 minute after the unlock signal is sent from the keyfob:
- when door switch is turned ON for open.
- when the key switch is turned ON.
- when the lock signal is sent from the keyfob.

Auto door lock mode can be changed using “AUTO LOCK SET” mode in “WORK SUPPORT”.
Refer to BL-68, "CONSULT Function (BCM)" .

Panic Alarm Operation
When key switch is OFF (when ignition key is not inserted in key cylinder), BCM turns on and off horn intermittently with input of PANIC ALARM signal from keyfob.
BCM outputs to IPDM E/R for panic alarm signal (horn signal) as DATA LINE (CAN H line and CAN L line).
The alarm automatically turns off after 25 seconds or when BCM receives any signal from keyfob.
Panic alarm operation mode can be changed using “PANIC ALARM SET” mode in “WORK SUPPORT”.
Refer to BL-68, "CONSULT Function (BCM)" .

Interior Lamp Operation
When the following conditions come:
- condition of interior lamp switch is in the DOOR position;
- door switch OFF (when all the doors are closed);

Remote keyless entry system turns on interior lamp (for 30 seconds) with input of UNLOCK signal from keyfob. For detailed description, refer to LT-87 .

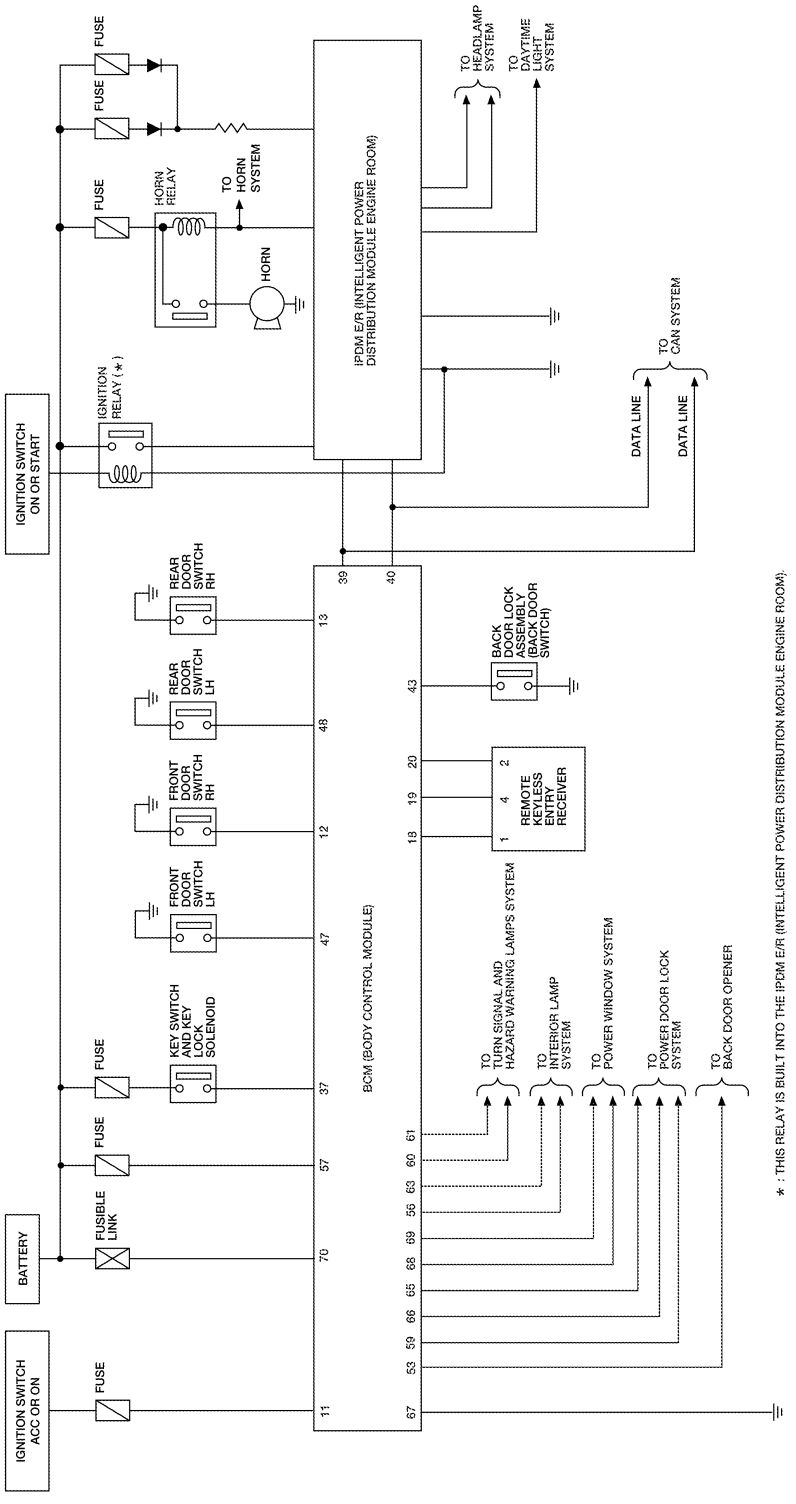
CAN Communication System Description

INFOID:0000000007329998

Refer to LAN-5 .

Schematic

INFOID:0000000007329999



AAKWA0387GB

Wiring Diagram - KEYLES -

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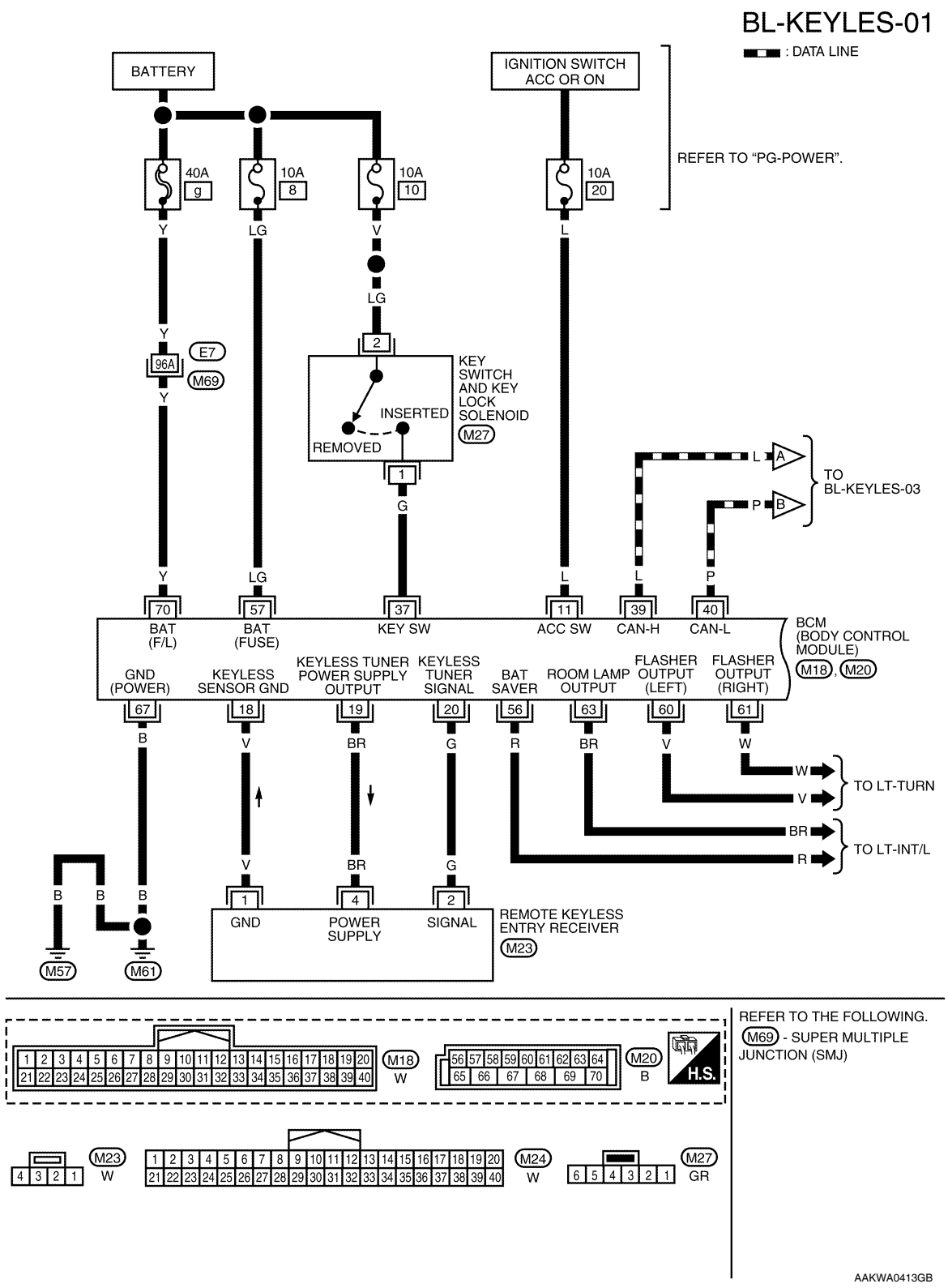
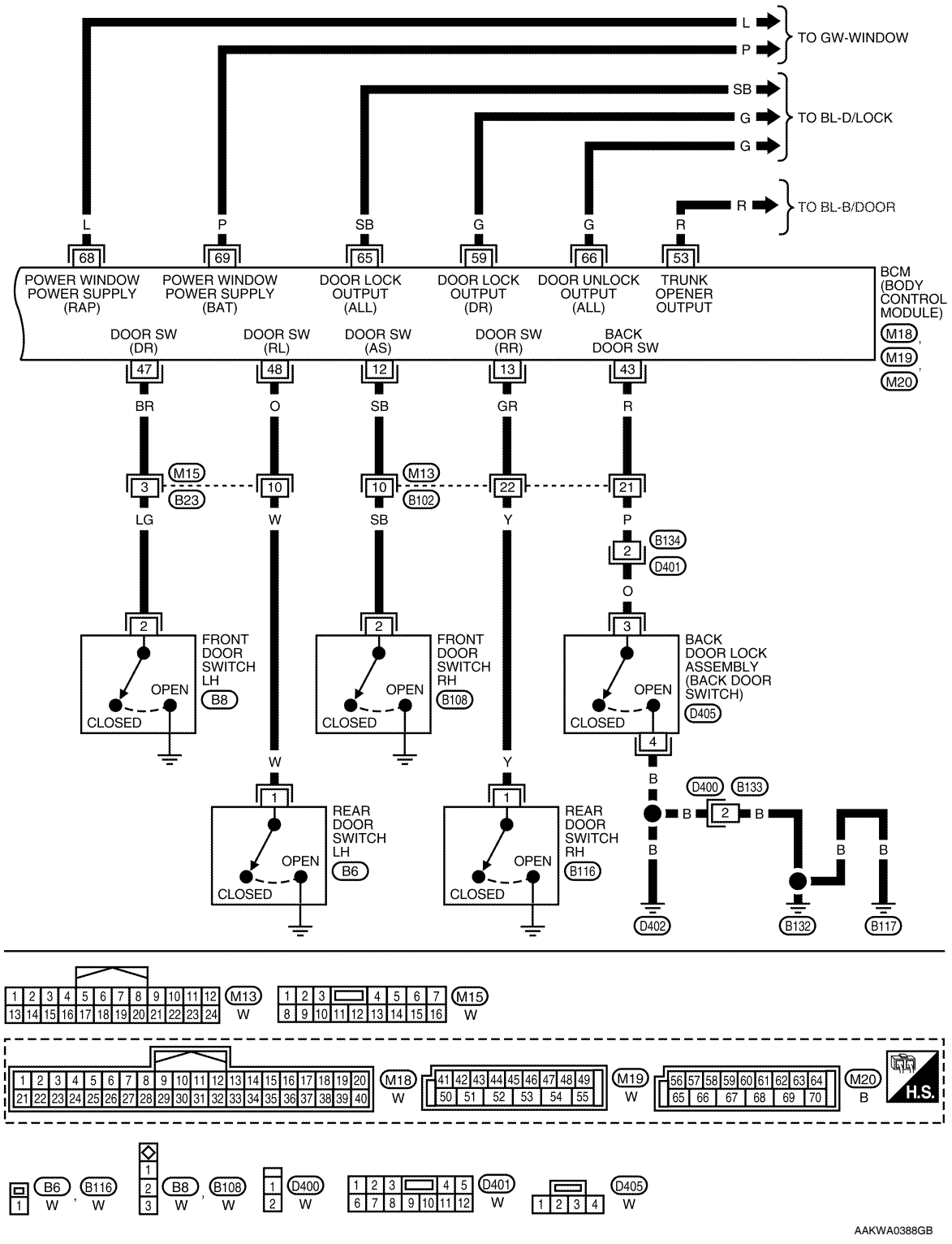
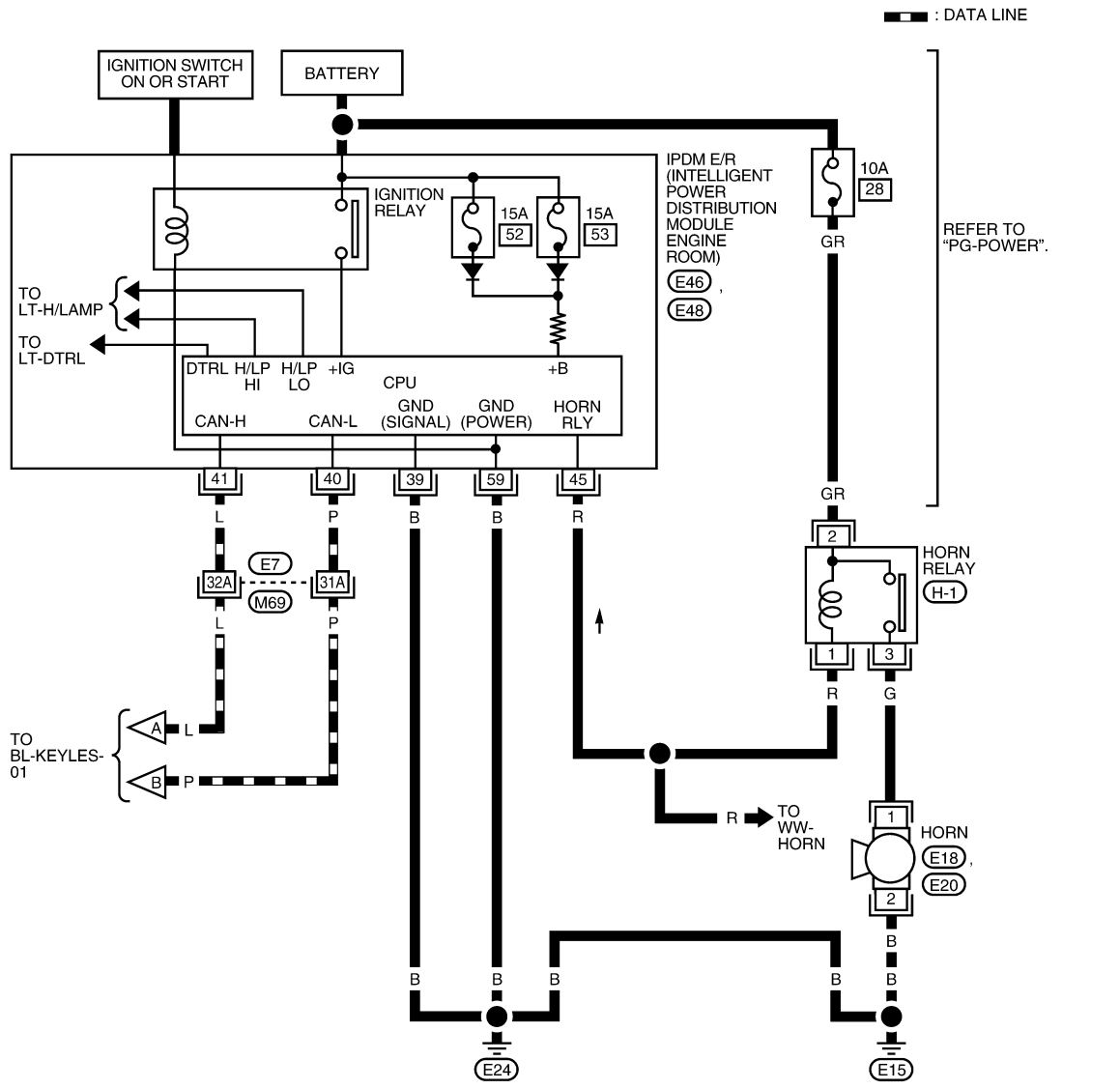
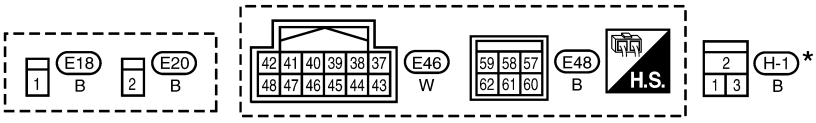


BL-KEYLES-02


L
P
TO GW-WINDOW
SB
G
TO BL-D/LOCK
G
R
TO BL-B/DOOR
68
69
65
59
66
53
POWER WINDOW POWER SUPPLY (RAP)
POWER WINDOW POWER SUPPLY (BAT)
DOOR LOCK OUTPUT (ALL)
DOOR LOCK OUTPUT (DR)
DOOR UNLOCK OUTPUT (ALL)
TRUNK OPENER OUTPUT
BCM (BODY CONTROL MODULE)
M18, M19, M20
DOOR SW (DR)
DOOR SW (RL)
DOOR SW (AS)
DOOR SW (RR)
BACK DOOR SW
47
48
12
13
43
BR
O
SB
GR
R
M15
B23
M13
B102
3
10
10
22
21
LG
W
SB
Y
P
B134
D401
2
O
FRONT DOOR SWITCH LH
B8
FRONT DOOR SWITCH RH
B108
BACK DOOR LOCK ASSEMBLY (BACK DOOR SWITCH)
D405
OPEN
CLOSED
W
Y
REAR DOOR SWITCH LH
B6
REAR DOOR SWITCH RH
B116
B
D400
B133
D402
B132
B117
M13
W
M15
W
M18
W
M19
W
M20
B
H.S.
B6
B116
B8
B108
D400
D401
D405
AAKWA0388GB

BL-KEYLES-03





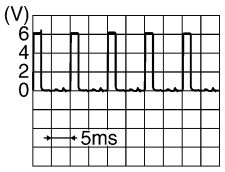
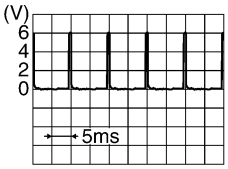
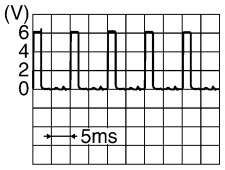
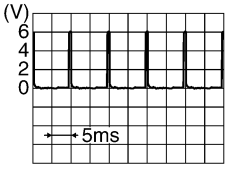
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

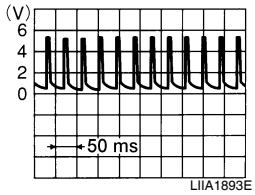
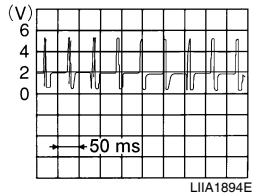
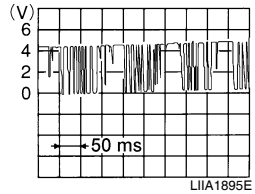
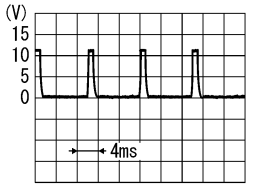
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

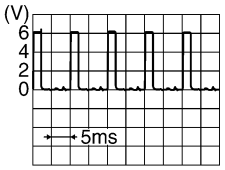
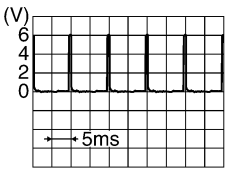
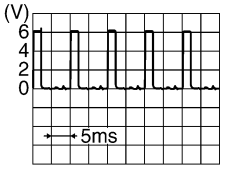
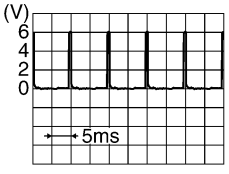
AAKWA0084GB

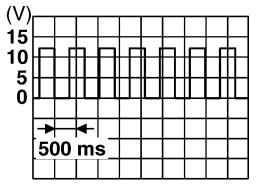
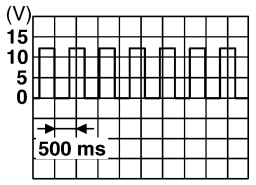
Terminal and Reference Value for BCM

INFOID:0000000007698798

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

1: With Intelligent Key

2: Without Intelligent Key

How to Perform Trouble Diagnosis

INFOID:0000000007330002

1. Confirm the symptom or customer complaint.
2. Understand operation, description and function description. Refer to BL-57, "System Description" .
3. Perform the Preliminary Check. Refer to LT-12, "Preliminary Check" .
4. Check symptom and repair or replace the component.
5. Does the remote keyless entry system operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. Inspection End.

Preliminary Check

INFOID:0000000007330003

CHECK BCM CONFIGURATION

1.CHECK BCM CONFIGURATION

Confirm BCM configuration for "KEYLESS ENTRY" is set to "WITH". Refer to BCS-18, "Configuration" .

OK or NG

OK >> Refer to BL-69, "Work Flow" .
NG >> Change BCM configuration for "KEYLESS ENTRY" to "WITH". Refer to BCS-18, "Configuration" .

CONSULT Function (BCM)

INFOID:0000000007330004

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received date is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

CONSULT APPLICATION ITEMS

Work Support

Test Item	Description
HORN CHIRP SET	Horn chirp (On/Off) when keyfob Lock or Unlock is pressed can be selected.
REMO CONT ID REGIST	Keyfob ID code can be registered.
REMO CONT ID ERASER	Keyfob ID code can be erased.
REMO CONT ID CONFIR	Keyfob ID code can be checked whether it is registered or not.

HAZARD LAMP SET

	MODE 1	MODE 2	MODE 3	MODE 4
Hazard lamp operation mode	Nothing	Unlock only	Lock only	Lock and Unlock

AUTO LOCK SET

	MODE 1	MODE 2	MODE 3
Auto locking function	30 seconds	Nothing	1 minutes

PANIC ALARM SET

	MODE 1	MODE 2	MODE 3
Keyfob operation	0.5 seconds	Nothing	1.5 seconds

TRUNK OPEN SET

	MODE 1	MODE 2	MODE 3
Keyfob operation	0.5 seconds	Nothing	1.5 seconds

Data Monitor

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEYLESS LOCK	Indicates [ON/OFF] condition of lock signal from keyfob.
KEYLESS UNLOCK	Indicates [ON/OFF] condition of unlock signal from keyfob.
KEYLESS PANIC	Indicates [ON/OFF] condition of panic alarm signal from keyfob.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch driver side.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch passenger side.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of lock signal from door lock and unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of unlock signal from door lock and unlock switch.
KEY CYL LK SW	Indicates [ON/OFF] condition of driver key cylinder lock signal.

Active Test

Test Item	Description
DOOR LOCK	This test is able to check all door lock actuators operation [OTR ULK/DR UNLK/ALL ULK/ALL LCK].
FLASHER	This test is able to check right and left hazard reminder operation. [LH/RH]
HORN	This test is able to check horn reminder operation. [ON/OFF]
TRUNK/BACK DOOR	This test is able to check back door actuator operation [OFF/OPEN].

Work Flow

INFOID:0000000007330005

1. Check the symptom and customer's requests.
2. Understand outline of system. Refer to BL-57, "System Description" .
3. Confirm that power door lock system operates normally.

Refer to BL-23 .

4. Repair or replace any malfunctioning parts.
   Refer to BL-70, "Trouble Diagnosis Symptom Chart" .
5. Does remote keyless entry system operate normally? If Yes, GO TO 6. If No, GO TO 4.
6. INSPECTION END

Trouble Diagnosis Symptom Chart

INFOID:0000000007330006

NOTE:
- Always check the “Work Flow” before troubleshooting. Refer to BL-69, "Work Flow" .
- Always check keyfob battery before replacing keyfob.

Symptom	Diagnoses/service procedure	Reference page
All function of remote keyless entry system do not operate.	1. Check key switch.	BL-75
	2. Check keyfob battery and function (use Remote Keyless Entry Tester J-43241 or Signal Tech II Tool J-50190). **NOTE:** If the result of keyfob function check with CONSULT is OK, keyfob is not malfunctioning.	BL-71
	3. Check remote keyless entry receiver.	BL-77
	4. Refer to ID Code Entry Procedure.	BL-80
	5. Replace BCM.	BCS-19
The new ID of keyfob cannot be entered.	1. Check keyfob battery and function (use Remote Keyless Entry Tester J-43241 or Signal Tech II Tool J-50190). **NOTE:** If the result of keyfob function check with CONSULT is OK, keyfob is not malfunctioning.	BL-71
	2. Check key switch.	BL-75
	3. Check door switch.	BL-73
	4. Check ACC switch.	BL-72
	5. Replace keyfob. Refer to ID Code Entry Procedure.	BL-80
	6. Replace BCM.	BCS-19
Door lock does not function with keyfob. (Power door lock system is “OK”.)	1. Check keyfob function (use Remote Keyless Entry Tester J-43241 or Signal Tech II Tool J-50190). (Lock) **NOTE:** If the result of keyfob function check with CONSULT is OK, keyfob is not malfunctioning.	BL-79
	2. Replace keyfob. Refer to ID Code Entry Procedure.	BL-80
	3. Check door switch.	BL-73
	4. Replace BCM.	BCS-19
Door unlock does not function with keyfob (Power door lock system is “OK”)	1. Check keyfob function (use Remote Keyless Entry Tester J-43241 or Signal Tech II Tool J-50190). (Unlock)	BL-79
	2. Replace keyfob. Refer to ID Code Entry Procedure. **NOTE:** If the result of keyfob function check with CONSULT is OK, keyfob is not malfunctioning.	BL-80
	3. Replace BCM.	BCS-19
Hazard reminder does not activate properly when pressing lock or unlock button of keyfob.	1. Check hazard reminder mode.* *: Hazard reminder mode can be changed. First check the hazard reminder setting.	BL-68
	2. Check hazard function.	BL-76
	3. Replace BCM.	BCS-19

Symptom	Diagnoses/service procedure	Reference page
Panic alarm does not activate when panic alarm button is continuously pressed.	1. Check panic alarm mode.* *: Panic alarm mode can be changed. First check the panic alarm setting.	BL-68
	2. Check keyfob battery and function (use Remote Keyless Entry Tester J-43241 or Signal Tech II Tool J-50190). **NOTE:** If the result of keyfob function check with CONSULT is OK, keyfob is not malfunctioning.	BL-71
	3. Check horn function.	BL-76
	4. Check key switch.	BL-75
	5. Replace keyfob. Refer to ID Code Entry Procedure.	BL-80
	6. Replace BCM.	BCS-19
Auto door lock operation does not activate properly. (All other remote keyless entry system functions are OK.)	1. Check auto door lock operation mode.* *: Auto door lock operation mode can be changed. First check the auto door lock operation setting.	BL-68
	2. Replace BCM.	BCS-19
Interior lamp operation does not activate properly.	1. Check interior lamp operation.	BL-77
	2. Replace BCM.	BCS-19

Keyfob Battery and Function Check

INFOID:0000000007330007

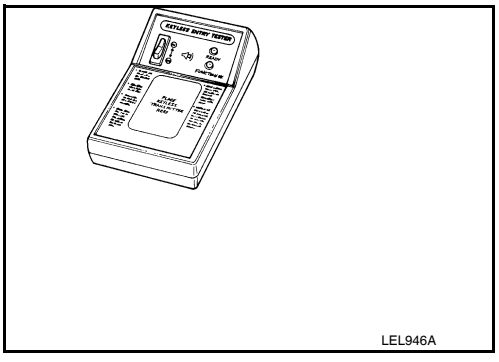
NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

1.CHECK KEYFOB FUNCTION

With CONSULT
Check keyfob function in “DATA MONITOR” mode with CONSULT. When pushing each button of keyfob, the corresponding monitor item should be turned as follows.

Condition	Monitor item	
Pushing LOCK	KEYLESS LOCK	: ON
Pushing UNLOCK	KEYLESS UNLOCK	: ON
Pushing PANIC	KEYLESS PANIC	: ON

Without CONSULT
Check keyfob function using Signal Tech II Tool J-50190 or Remote Keyless Entry Tester J-43241 (shown).

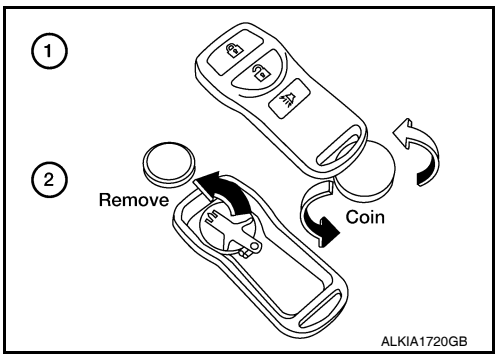


OK or NG

OK >> Keyfob is OK.
NG >> GO TO 2

2. CHECK KEY FOB COMPONENTS

1. Open the lid using a coin.
   CAUTION:
   - **Do not touch the circuit board or battery terminal.**
   - **The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.**
2. Remove the key fob battery.
   CAUTION:
   - **Keep dirt, grease, and other foreign materials off the electrode contact area.**
3. Visually inspect keyfob internal components.



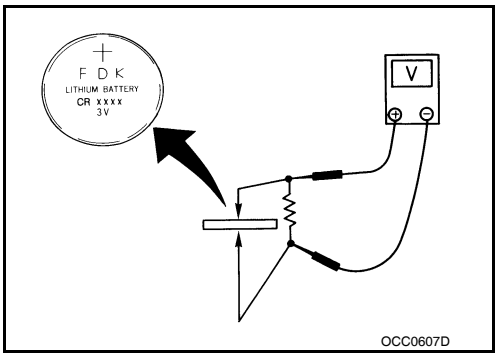
Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning parts.

3. CHECK KEY FOB BATTERY

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5 - 3.0V

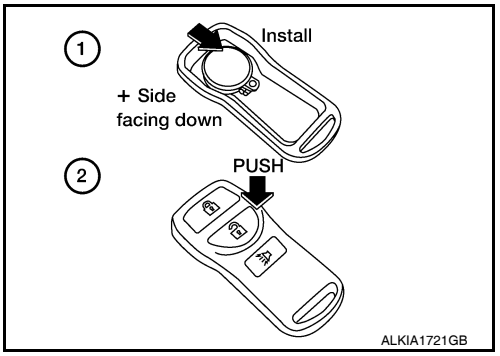


Is the measurement value within specification?

YES >> Key fob battery is OK. Check remote keyless entry receiver. Refer to BL-77, "Remote Keyless Entry Receiver Check".
NO >> GO TO 4

4. REPLACE KEY FOB BATTERY

1. Replace the key fob battery, positive side down.
2. Align the tips of the upper and lower parts, and then push them together until it is securely closed.
   CAUTION:
   - **When replacing battery, keep dirt, grease, and other foreign materials off the electrode contact area.**
3. After replacing the battery, check that all key fob functions work properly.



Is the inspection result normal?

YES >> Key fob is OK.
NO >> Check remote keyless entry receiver. Refer to BL-77, "Remote Keyless Entry Receiver Check".

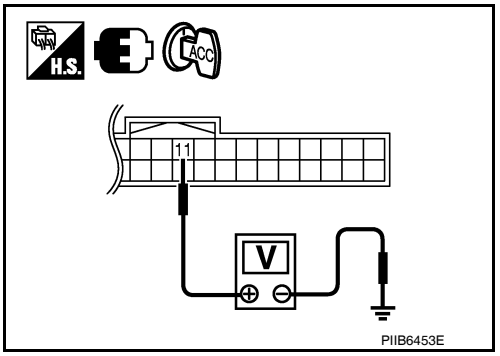
ACC Switch Circuit Check

INFOID:0000000007330008

1. CHECK ACC SWITCH CIRCUIT

Check voltage between BCM connector and ground.

Terminals			Ignition switch condition	Voltage (V) (Approx.)
(+)		(–)		
BCM connector	Terminal			
M18	11	Ground	ACC or ON	Battery voltage
			OFF	0



OK or NG

OK >> ACC switch circuit is OK.
NG >> Check the following.
- 10A fuse [No. 20, located in fuse block (J/B)]
- Harness for open or short between BCM and fuse.

Door Switch Check

INFOID:0000000007330009

1.CHECK DOOR SWITCHES INPUT SIGNAL

With CONSULT

Check door switches ("DOOR SW-DR", "DOOR SW-AS", "DOOR SW-RL", "DOOR SW-RR", "BACK DOOR SW") in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When doors are open:

DOOR SW-DR	**: ON**
DOOR SW-AS	**: ON**
DOOR SW-RL	**: ON**
DOOR SW-RR	**: ON**
BACK DOOR SW	**: ON**

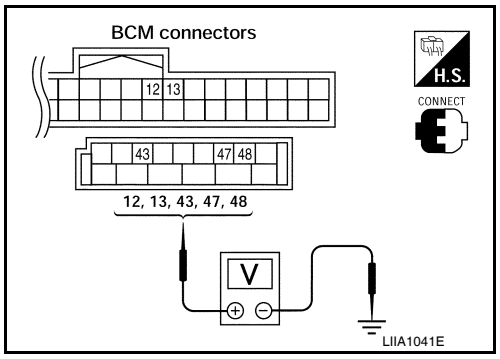
- When doors are closed:

DOOR SW-DR	**: OFF**
DOOR SW-AS	**: OFF**
DOOR SW-RL	**: OFF**
DOOR SW-RR	**: OFF**
BACK DOOR SW	**: OFF**

Without CONSULT

Check voltage between BCM connector M18 or M19 terminals 12, 13, 43, 47, 48 and ground.

Connector	Item	Terminals (+)	Terminals (–)	Condition	Voltage (V) (Approx.)
M18	Front door switch RH	12	Ground	Open ↓ Closed	0 ↓ Battery voltage
	Rear door switch RH	13			
M19	Back door switch	43			
	Front door switch LH	47			
	Rear door switch LH	48			



OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

2.CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door switch and BCM.
3. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and BCM connectors (A) M18, M19 terminals 12, 13, 43, 47 and 48.

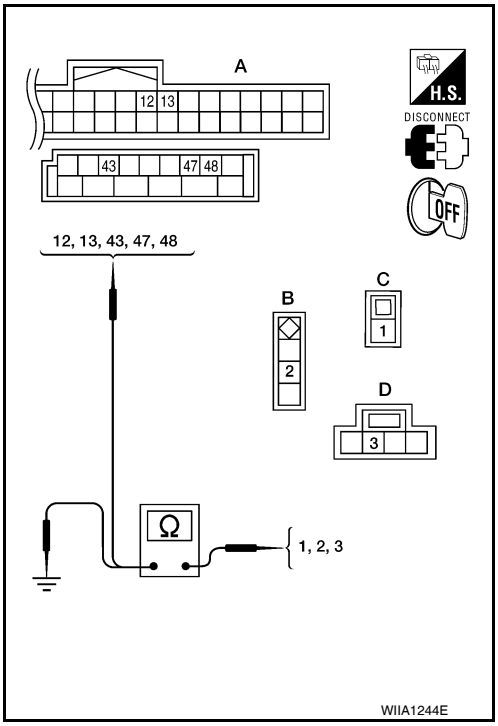
1 - 13 : **Continuity should exist.**
1 - 48 : **Continuity should exist.**
2 - 12 : **Continuity should exist.**
2 - 47 : **Continuity should exist.**
3 - 43 : **Continuity should exist.**

4. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and ground.

1 - Ground : **Continuity should not exist.**
2 - Ground : **Continuity should not exist.**
3 - Ground : **Continuity should not exist.**

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

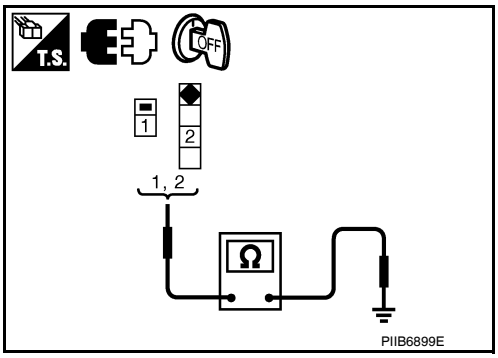


3. CHECK DOOR SWITCHES

FRONT AND REAR DOORS

Check continuity between front door switch terminal 2 or rear door switch terminal 1 and exposed metal of switch while pressing and releasing switch.

Door switch is released : **Continuity should exist.**
Door switch is pushed : **Continuity should not exist.**



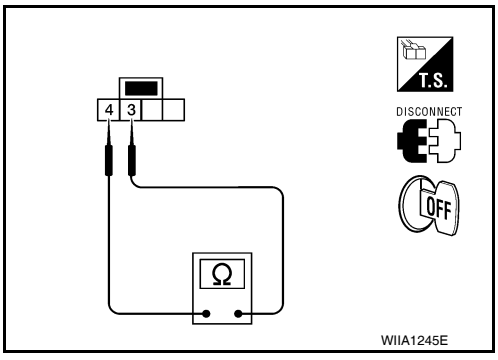
BACK DOOR

Check continuity between back door lock assembly connector (back door switch) terminals 3 and 4 while pressing (closing back door) and releasing (opening back door) switch.

When back door is open : **Continuity should exist.**
When back door is closed : **Continuity should not exist.**

OK or NG

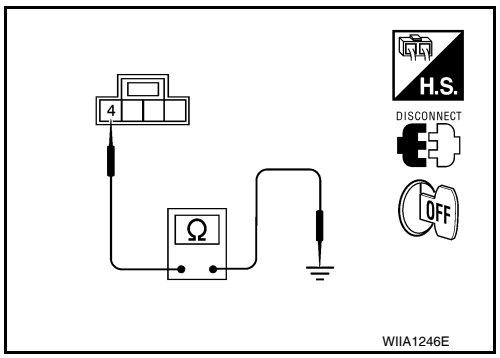
OK1 >> (Front and rear doors) Switch circuit is OK.
OK2 >> (Back door) GO TO 4
NG >> Replace door switch.



4. CHECK BACK DOOR SWITCH GROUND

Check continuity between back door lock assembly connector D405 terminal 4 and ground.

4 - Ground : Continuity should exist.



OK or NG

OK >> Back door switch circuit is OK.
NG >> Repair or replace harness.

Key Switch (Insert) Check

INFOID:0000000007330011

1.CHECK KEY SWITCH INPUT SIGNAL

With CONSULT

Check key switch "KEY ON SW" in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When key is inserted into ignition key cylinder:

KEY ON SW : ON

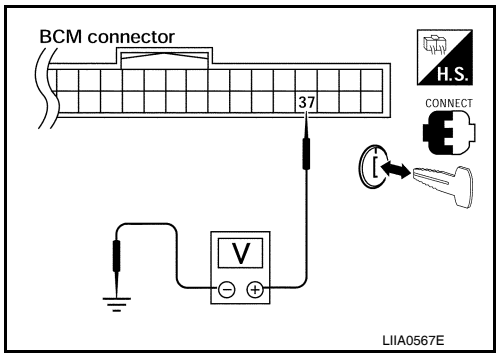
- When key is removed from ignition key cylinder:

KEY ON SW : OFF

Without CONSULT

Check voltage between BCM connector and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M18	37	Ground	Key is inserted.	Battery voltage
			Key is removed.	0



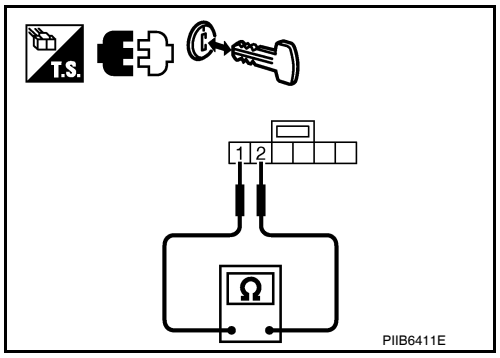
OK or NG

OK >> Key switch circuit is OK.
NG-1 >> GO TO 2 (with Intelligent Key).
NG-2 >> GO TO 3 (without Intelligent Key).

2.CHECK KEY SWITCH (WITH INTELLIGENT KEY)

1. Turn ignition switch OFF.
2. Disconnect key switch and ignition knob switch connector.
3. Check key switch.

Terminal		Condition		Continuity
Key switch and ignition knob switch				
1	2	Key	Inserted	Yes
			Removed	No



OK or NG

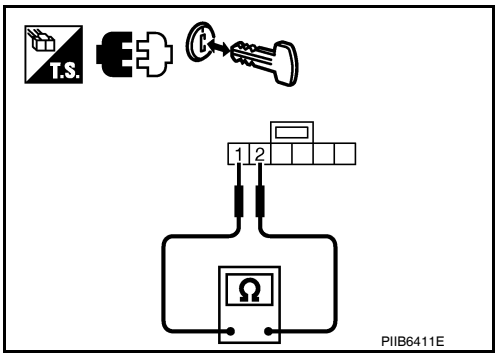
OK >> Check the following.
- 10A fuse (No. 31, located in fuse and fusible link block)
- Harness for open or short between key switch and ignition knob switch and fuse
- Harness for open or short between BCM and key switch and ignition knob switch

NG >> Replace key switch and ignition knob switch.

3.CHECK KEY SWITCH (WITHOUT INTELLIGENT KEY)

1. Turn ignition switch OFF.
2. Disconnect key switch and key lock solenoid connector.
3. Check key switch.

Terminals	Condition	Continuity
1 – 2	Key is inserted.	Yes
	Key is removed.	No



OK or NG

OK >> Check the following.
- 10A fuse [No. 10, located in fuse block (J/B)]
- Harness for open or short between key switch and key lock solenoid and fuse
- Harness for open or short between BCM and key switch and key lock solenoid

NG >> Replace key switch and key lock solenoid.

Hazard Function Check

INFOID:0000000007330012

1.CHECK HAZARD WARNING LAMP

Does hazard warning lamp flash with hazard switch?

OK or NG

OK >> Hazard warning lamp circuit is OK.
NG >> Check hazard circuit. Refer to LT-50 .

Horn Function Check

INFOID:0000000007330013

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT, then perform the trouble diagnosis of malfunction system indicated “SELF-DIAG RESULTS” of “BCM”. Refer to BCS-18, "CAN Communication Inspection Using CONSULT (Self-Diagnosis)" .

1.CHECK HORN FUNCTION

Does horn sound with horn switch?

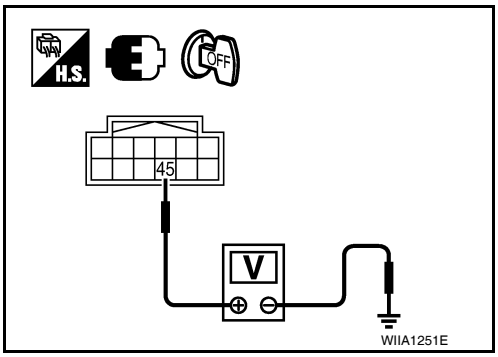
OK or NG

OK >> GO TO 2
NG >> Check horn circuit. Refer to WW-40 .

2.CHECK IPDM E/R INPUT SIGNAL

Check voltage between IPDM E/R connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
IPDM E/R connector	Terminal		
E46	45	Ground	Battery voltage



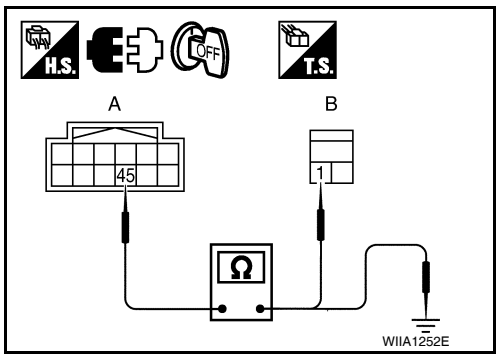
OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> GO TO 3

3.CHECK HORN RELAY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and horn relay connector.

3. Check continuity between IPDM E/R harness connector (A) and horn relay harness connector (B).



A		B		Continuity
IPDM E/R connector	Terminal	Horn relay connector	Terminal	
E46	45	H-1	1	Yes

4. Check continuity between IPDM E/R harness connector (A) and ground.

A		Ground	Continuity
IPDM E/R connector	Terminal		
E46	45		No

OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

Interior Lamp and Ignition Keyhole Illumination Function Check

INFOID:0000000007330014

1.CHECK INTERIOR LAMP AND IGNITION KEYHOLE ILLUMINATION FUNCTION

When map lamp switch is in “DOOR” position, open the front door (LH or RH).

Does interior lamp illuminate?

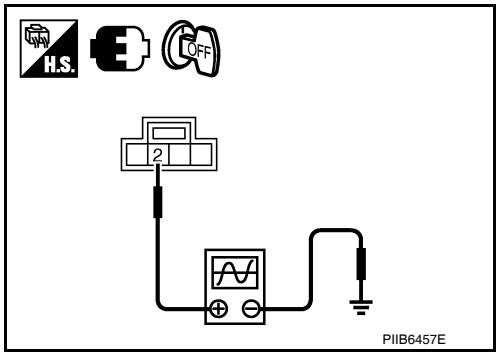
YES >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NO >> Check interior lamp circuit. Refer to LT-87 .

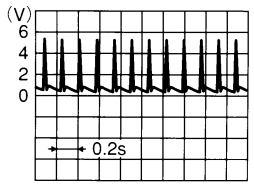
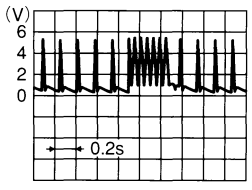
Remote Keyless Entry Receiver Check

INFOID:0000000007330015

1.CHECK REMOTE KEYLESS ENTRY RECEIVER OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check remote keyless entry receiver connector and ground signal with oscilloscope.



Terminals			Keyfob condition	Signal (Reference value)
(+)		(–)		
Remote keyless entry receiver connector	Terminal			
M23	2	Ground	No function	
			Any button is pressed	

OCC3879D
OCC3880D

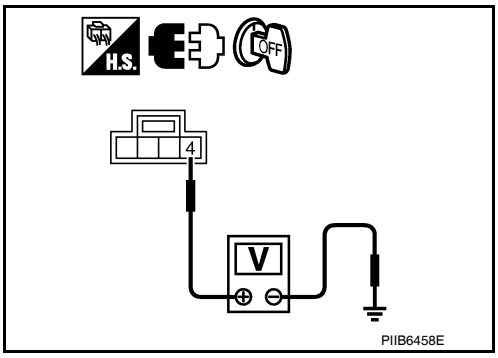
OK or NG

OK >> Remote keyless entry receiver circuit is OK.
NG >> GO TO 2

2.CHECK REMOTE KEYLESS ENTRY RECEIVER INPUT VOLTAGE

1. Disconnect remote keyless entry receiver connector.
2. Check voltage between remote keyless entry receiver connector M23 terminal 4 and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Remote keyless entry receiver connector	Terminal		
M23	4	Ground	4.5



OK or NG

OK >> GO TO 4
NG >> GO TO 3

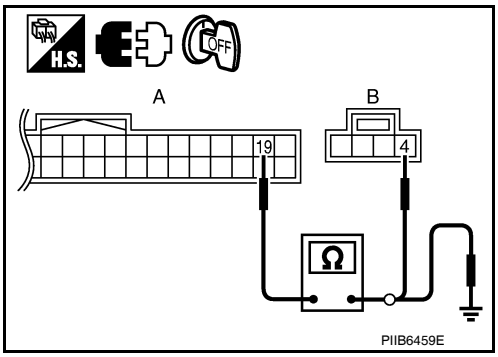
3.CHECK REMOTE KEYLESS ENTRY RECEIVER POWER SUPPLY CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector (A) M18 terminal 19 and remote keyless entry receiver connector (B) M23 terminal 4.

A		B		Continuity
BCM connector	Terminal	Remote keyless entry receiver connector	Terminal	
M18	19	M23	4	Yes

3. Check continuity between BCM connector (A) M18 terminal 19 and ground.

A		Ground	Continuity
BCM connector	Terminal		
M18	19		No



OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Repair or replace the harness.

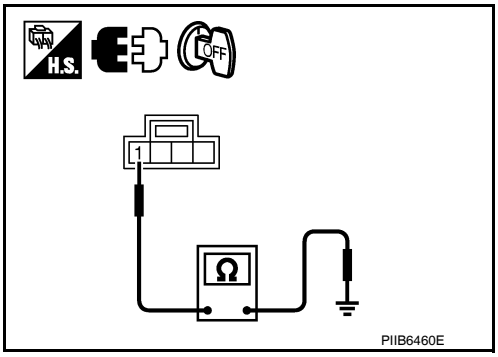
4.CHECK REMOTE KEYLESS ENTRY RECEIVER GROUND CIRCUIT

Check continuity between remote keyless entry receiver connector M23 terminal 1 and ground.

Remote keyless entry receiver connector	Terminal	Ground	Continuity
M23	1		Yes

OK or NG

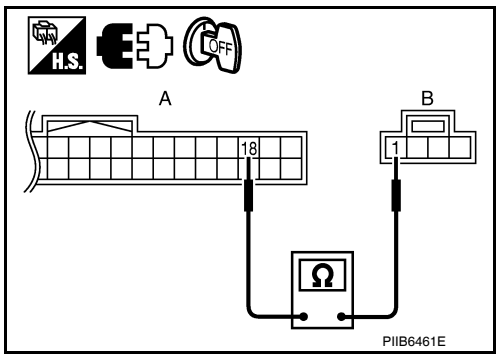
OK >> GO TO 6
NG >> GO TO 5



5.CHECK REMOTE KEYLESS ENTRY RECEIVER GROUND CIRCUIT

Check continuity between BCM connector (A) M18 terminal 18 and remote keyless entry receiver connector (B) M23 terminal 1.

A		B		Continuity
BCM connector	Terminal	Remote keyless entry receiver connector	Terminal	
M18	18	M23	1	Yes



OK or NG

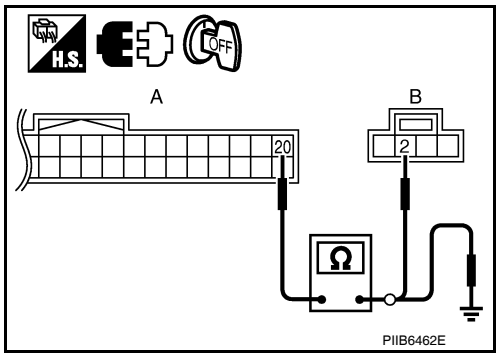
OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

NG >> Repair or replace the harness.

6. CHECK REMOTE KEYLESS ENTRY RECEIVER SIGNAL CIRCUIT

1. Check continuity between BCM connector (A) M18 terminal 20 and remote keyless entry receiver connector (B) M23 terminal 2.

A		B		Continuity
BCM connector	Terminal	Remote keyless entry receiver connector	Terminal	
M18	20	M23	2	Yes



2. Check continuity between BCM connector (A) M18 terminal 20 and ground.

A		Ground	Continuity
BCM connector	Terminal		
M18	20		No

OK or NG

OK >> Replace remote keyless entry receiver. Refer to BL-82, "Removal and Installation of Remote Keyless Entry Receiver" .

NG >> Repair or replace harness.

Keyfob Function (Lock) Check

INFOID:0000000007330016

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

1. CHECK KEYFOB FUNCTION

With CONSULT

Check keyfob function in “DATA MONITOR” mode with CONSULT. When pushing lock button of keyfob, the corresponding monitor item should be turned as follows.

Test item	Condition
KEYLESS LOCK	Pushing LOCK button: ON
	Other than above: OFF

OK or NG

OK >> Keyfob is OK.

NG >> Replace keyfob.

Keyfob Function (Unlock) Check

INFOID:0000000007330017

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

1.CHECK KEYFOB FUNCTION

With CONSULT

Check keyfob function in “DATA MONITOR” mode with CONSULT. When pushing unlock button of keyfob, the corresponding monitor item should be turned as follows.

Test item	Condition
KEYLESS UNLOCK	Pushing UNLOCK button: ON
	Other than above: OFF

OK or NG

OK >> Keyfob is OK.
NG >> Replace keyfob.

ID Code Entry Procedure

INFOID:0000000007330018

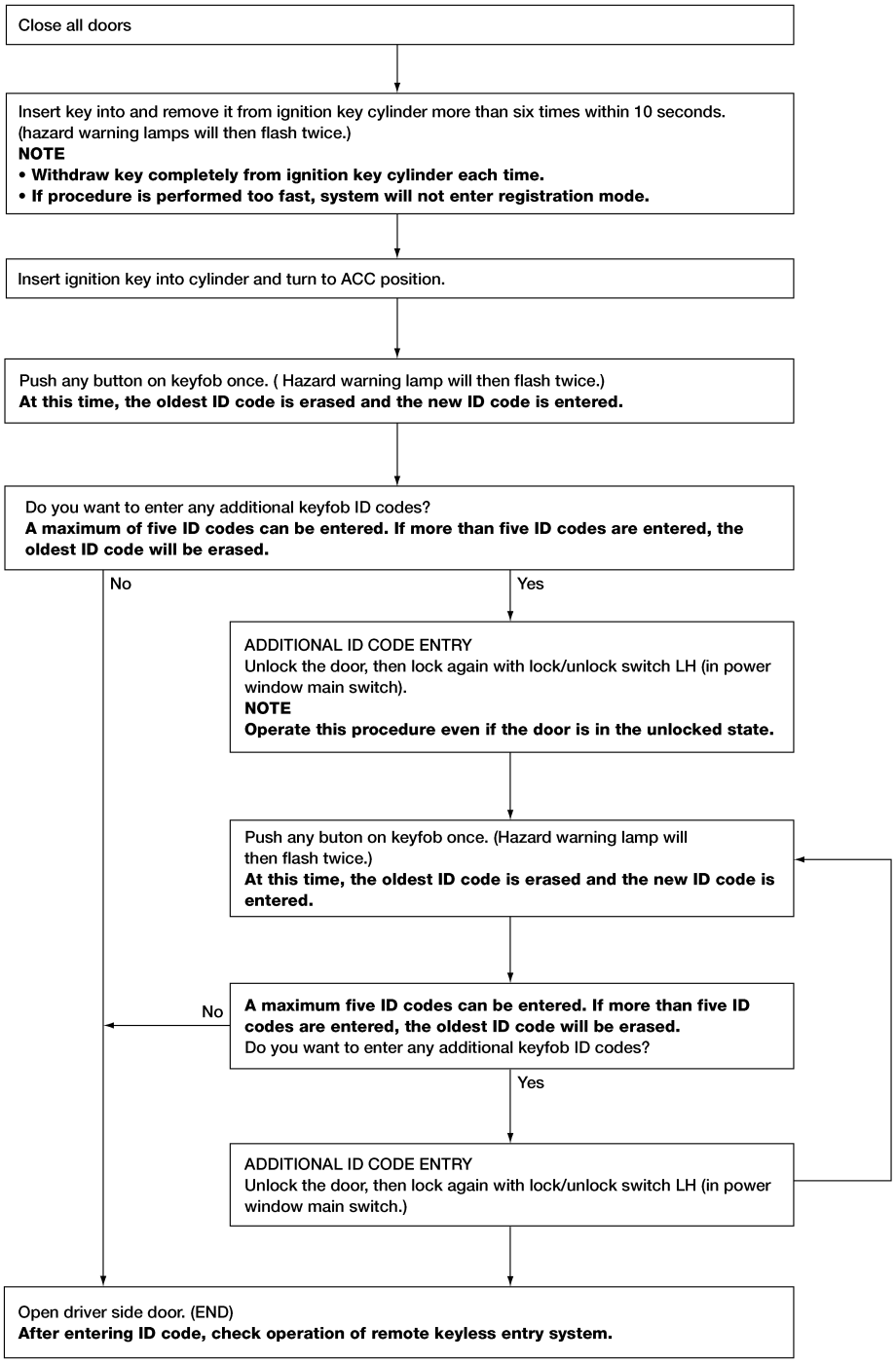
KEYFOB ID SET UP WITH CONSULT

NOTE:

- **If a keyfob is lost, the ID code of the lost keyfob must be erased to prevent unauthorized use. A specific ID code can be erased with CONSULT. However, when the ID code of a lost keyfob is not known, all controller ID codes should be erased. After all ID codes are erased, the ID codes of all remaining and/or new keyfobs must be re-registered.**
- **When registering an additional keyfob, the existing ID codes in memory may or may not be erased. If five ID codes are stored in memory, when an additional code is registered, only the oldest code is erased. If less than five ID codes are stored in memory, when an additional ID code is registered, the new ID code is added and no ID codes are erased.**
- **Entry of maximum five ID codes is allowed. When more than five ID codes are entered, the oldest ID code will be erased.**
- **Even if same ID code that is already in the memory is input, the same ID code can be entered. The code is counted as an additional code.**

1. Touch “MULTI REMOTE ENT”.
2. Touch “WORK SUPPORT”.
3. The items are shown on the figure can be set up.
   - “REMO CONT ID CONFIR”
     Use this mode to confirm if a keyfob ID code is registered or not.
   - “REMO CONT ID REGIST”
     Use this mode to register a keyfob ID code.
     NOTE:
     Register the ID code when keyfob or BCM is replaced, or when additional keyfob is required.
   - “REMO CONT ID ERASUR”
     Use this mode to erase a keyfob ID code.

KEYFOB ID SET UP WITHOUT CONSULT



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NOTE:

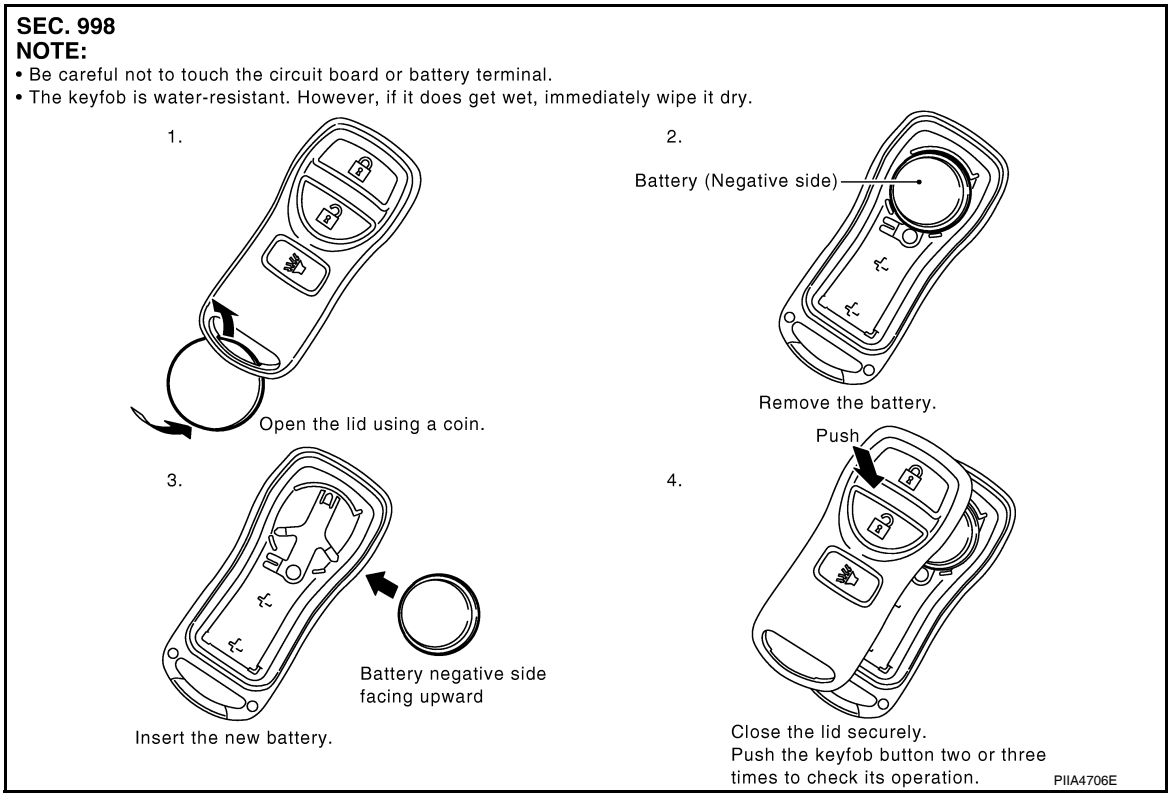
- If a keyfob is lost, the ID code of the lost keyfob must be erased to prevent unauthorized use. A specific ID code can be erased with CONSULT. However, when the ID code of a lost keyfob is not known, all controller ID codes should be erased. After all ID codes are erased, the ID codes of all remaining and/or new keyfobs must be re-registered.
  To erase all ID codes in memory, register one ID code (keyfob) five times. After all ID codes are erased, the ID codes of all remaining and/or new keyfobs must be re-registered.

- When registering an additional keyfob, the existing ID codes in memory may or may not be erased. If five ID codes are stored in memory, when an additional code is registered, only the oldest code is erased. If less than five ID codes are stored in memory, when an additional ID code is registered, the new ID code is added and no ID codes are erased.
- If you need to activate more than two additional new keyfobs, repeat the procedure “Additional ID code entry” for each new keyfob.
- Entry of maximum five ID codes is allowed. When more than five ID codes are entered, the oldest ID code will be erased.
- Even if same ID code that is already in the memory is input, the same ID code can be entered. The code is counted as an additional code.

Keyfob Battery Replacement

INFOID:0000000007330019

SEC. 998
NOTE:
- Be careful not to touch the circuit board or battery terminal.
- The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.

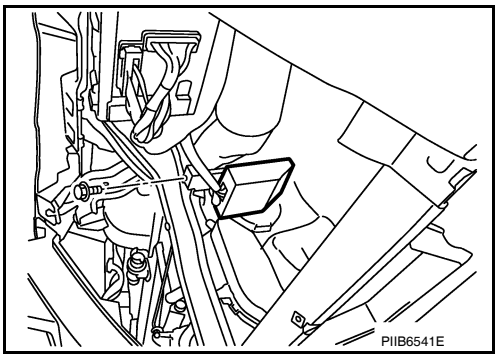


Removal and Installation of Remote Keyless Entry Receiver

INFOID:0000000007330020

REMOVAL

1. Remove glove box assembly. Refer to IP-12, "Removal and Installation" .
2. Disconnect remote keyless entry receiver connector, remove screw and remote keyless entry receiver.



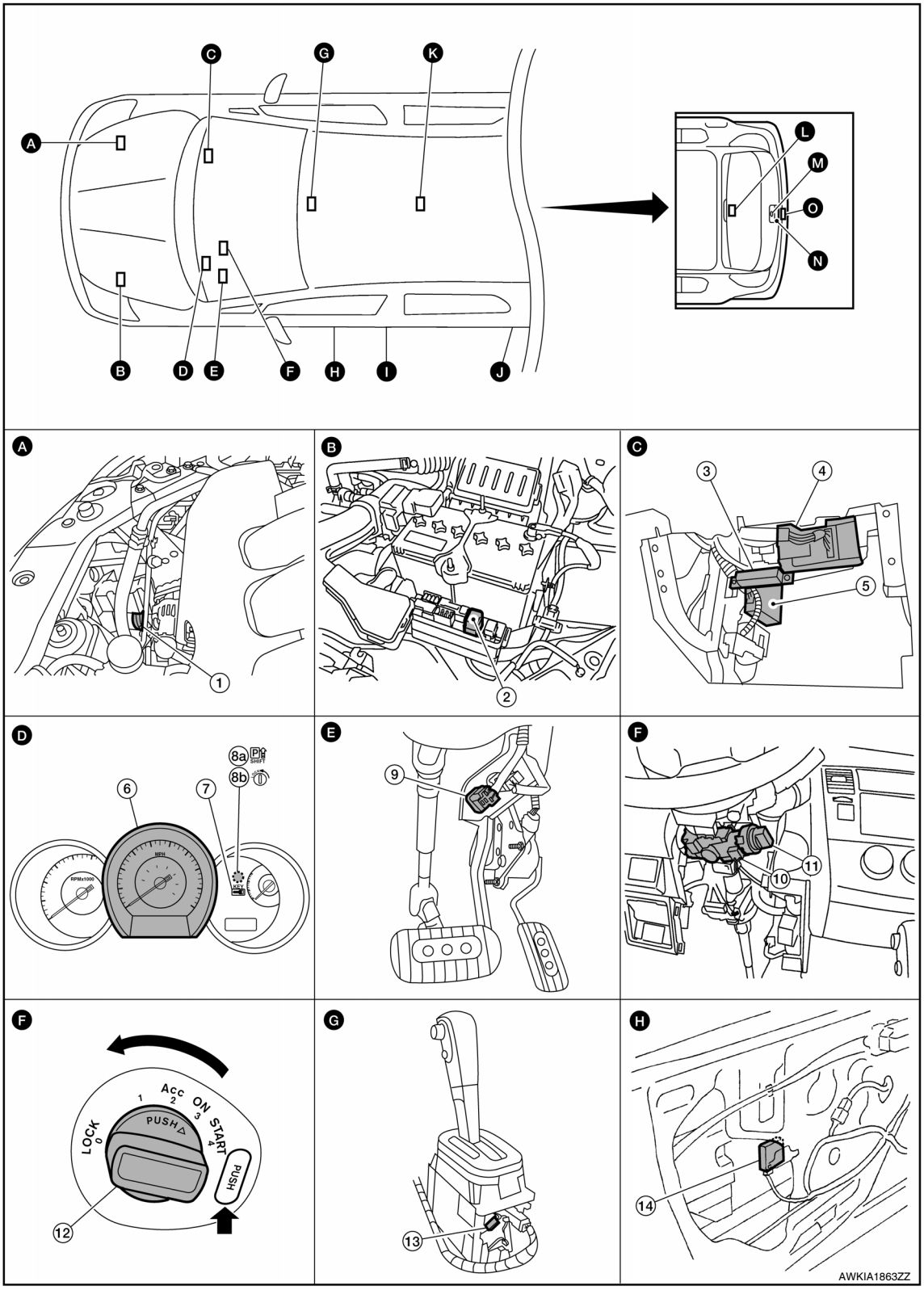
INSTALLATION

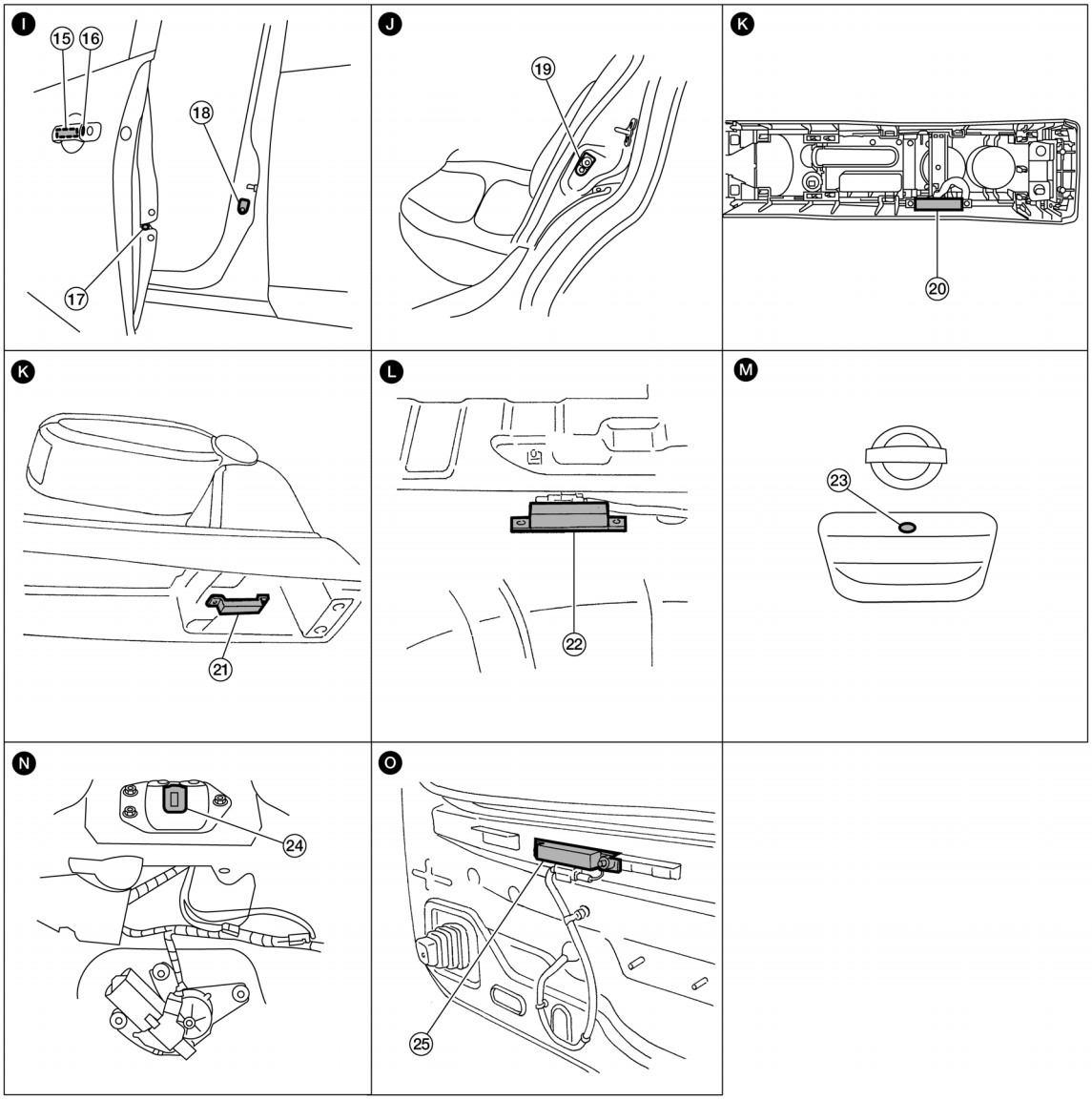
Installation is in the reverse order of removal.

INTELLIGENT KEY SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007330021





AWKIA1864ZZ

1. Horn E18, E20
2. Horn relay H-1
3. Instrument panel antenna M10 (view with glove box removed)
4. BCM M18, M19, M20
5. Intelligent Key unit M52
6. Combination meter M24
7. Intelligent Key "KEY" warning indicator
8a. Intelligent Key warning indicator (CVT or A/T)
8b. Intelligent Key warning indicator (M/T)
9. Stop lamp switch E13
10. Steering lock solenoid M6 (bottom view of steering column)
11. Key switch and ignition knob switch M73 (with CVT or A/T)
12. Key switch and ignition knob switch M73 (with M/T)
13. CVT or A/T shift selector (park position switch) M38 (without M/T)
14. Intelligent Key warning buzzer (front door LH) D6 (view with front door finisher LH removed)
15. Front outside antenna LH D10, RH D106
16. Front door request switch LH D5, RH D103
17. Front door lock assembly LH (door unlock sensor) D14
18. Front door switch LH B8, RH B108
19. Rear door switch LH B6, RH B116
20. Front console antenna B125 (view of front console without arm rest removed)
21. Front console antenna B125 (view of front console with arm rest removed)

22. Rear floor antenna B126 (behind rear seat)
23. Back door request switch D406
24. Back door lock assembly (back door switch) D405 (view with back door open)
25. Rear bumper antenna B2 (view with rear fascia removed)

System Description

INFOID:0000000007330022

- The Intelligent Key system is a system that makes it possible to lock and unlock the door locks (door lock/unlock function), and start the engine (engine start function) by carrying around the Intelligent Key (without some key operation), which operates based on the results of electronic ID verification using two-way communications between the Intelligent Key and the vehicle (Intelligent Key unit).
- Vehicles equipped with a manual transmission include a key interlock solenoid located in the steering column to prevent accidental shut-off of the ignition switch and locking of the steering wheel during driving condition when the vehicle is moving.

CAUTION:

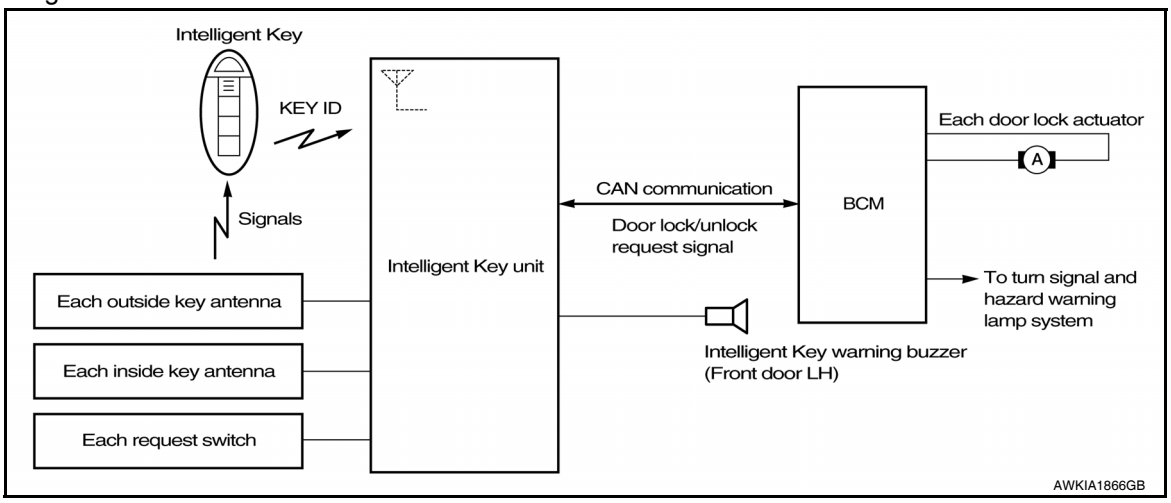
The driver should always carry the Intelligent Key

- Operation of the remote controller buttons on the Intelligent Key also provides the same functions as the remote control entry system. (Remote keyless entry functions)
- If an action that does not meet the operating conditions of the Intelligent Key system is taken, the buzzer goes off to inform the driver. (Warning chime functions)
- When a door lock is locked or unlocked with request switch or remote controller button operation, the hazard lamps flash and the buzzer (outside vehicle) sounds (Hazard and buzzer reminder function).
- Even if the Intelligent Key battery is completely discharged, the door locks can be locked and unlocked and the engine started with the mechanical key built into the Intelligent Key.
- The settings for each function can be changed with the CONSULT.
- If an Intelligent Key is lost, a new Intelligent Key can be registered. A maximum of 4 Intelligent Keys can be registered.
- It has been made possible to diagnose the system and register an Intelligent Key with the CONSULT.

DOOR LOCK/UNLOCK FUNCTION

Only when pressing the request switch, it is possible to lock and unlock the door by carrying around the Intelligent Key (without some key operation).

System Diagram



Operation Description

- When the Intelligent Key unit detects that each request switch is pressed, it starts the outside key antenna and inside key antenna corresponding to the pressed request switch and sends the request signal to the Intelligent Key. And then, make sure that the Intelligent Key is near door.
- If the Intelligent Key is within the outside key antenna detection area, it receives the request signal and sends the key ID signal to the Intelligent Key unit.
- Intelligent Key unit receives the key ID signal and compares it with the registered key ID.
- If the key ID check result is OK, the Intelligent Key unit sends the door lock/unlock request signal to BCM (Body control module) via CAN communication line.
- Intelligent Key unit sends the door lock/unlock signal and sounds Intelligent Key warning buzzer (lock: 2 times, unlock: 1 time) at the same time.

- When BCM receives the door lock/unlock signal, it operates door lock actuator and flashes the hazard warning lamp (lock: 2 times, unlock: 1 time) at the same time as reminder.

Operation Condition

If the following conditions are not satisfied, door lock/unlock operations are not performed even if the request switch is operated.

Each request switch operation	Operation condition	Operation
Lock operation	• All doors are closed • Intelligent Key is outside of the vehicle • Intelligent Key is within outside key antenna detection area	All doors lock
Unlock Operation	• All doors are closed • Intelligent Key is outside of the vehicle • Intelligent Key is within outside key antenna detection area*	All doors unlock

*: Even with a registered Intelligent Key remaining inside the vehicle, door locks can be unlocked from outside of the vehicle with a spare Intelligent Key as long as Key IDs are different.

Outside Key Antenna Detection Area

The outside key antenna detection area of door lock/unlock function is in the range of approximately 80 cm (31.50 in) surrounding the request switch (driver side, passenger side and back door).

Hazard and Buzzer Reminder

When all doors are locked or unlocked by each request switch, Intelligent Key unit sends hazard request signal to BCM via CAN communication line.

BCM flashes hazard warning lamps as a reminder and Intelligent Key unit sounds Intelligent Key warning buzzer(s) as a reminder.

Operating function of hazard and buzzer reminder

Request switch operation	Hazard warning lamp flash	Intelligent Key warning buzzer (front door LH)
Unlock	Once	Once
Lock	Twice	Twice

Auto Door Lock Function

When all doors are locked, ignition knob switch is OFF (when ignition switch is not pressed) and key switch is OFF (when mechanical key is out of ignition key cylinder), all doors are unlocked with each request switch.

When Intelligent Key unit does not receive the following signals within 1 minute, all doors are locked.

- Door switch is ON (door is opened)
- Door lock signal from Intelligent Key button
- Ignition knob switch is ON (ignition switch is pressed)
- Key switch is ON (mechanical key is inserted in ignition key cylinder)

Auto door lock mode can be changed by “AUTO RELOCK TIMER” mode in “WORK SUPPORT”. Refer to BL-114, "CONSULT Application Item".

List of Operation Related Parts

Parts marked with × are the parts related to operation.

Door lock open function	Intelligent Key	Key switch	Ignition knob switch	Door switch	Back door lock assembly (back door switch)	Request switch (driver, passenger, back)	Door lock actuator	Inside key antenna	Outside key antenna	Intelligent Key warning buzzer (front door LH)	Intelligent Key unit	CAN communication system	BCM	Hazard warning lamp
Door lock/unlock function by request switch	×			×	×	×	×	×	×		×	×	×	
Door lock/unlock function by mechanical key							×						×	
Hazard and buzzer reminder function										×	×	×	×	×
Auto door lock function		×	×	×	×		×				×	×	×	

KEY REMINDER FUNCTION

Key reminder functions have the following 2 functions.

Key reminder function	Operation condition	Operation
Door is open to close	Right after all doors are closed under the following conditions. • Intelligent Key is inside the vehicle • Any door is opened • All doors are locked by door lock and unlock switch or door lock knob	• All doors unlock operation • Sound Intelligent Key warning buzzer for 3 seconds

CAUTION:

- **The above function operates when the Intelligent Key is inside the vehicle. However, there may be times when the Intelligent Key cannot be detected, and this function will not operate when the Intelligent Key is on the instrument panel, rear parcel shelf or in the glove box. Also, this system sometimes does not operate if the Intelligent Key is in the door pocket of an open door.**

List of Operation Related Parts

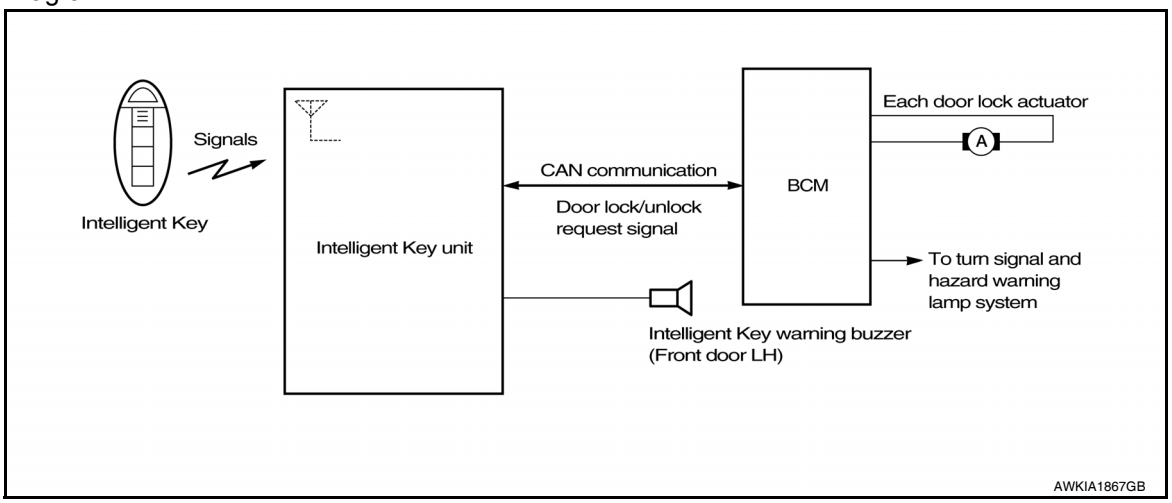
Parts marked with × are the parts related to operation

Key reminder functions	Intelligent Key	Door switch	Unlock sensor	Door lock actuator	Inside key antenna	Intelligent Key warning buzzer(s)	Intelligent Key unit	CAN communication system	BCM
Any door open to close	×	×	×	×	×	×	×	×	×

REMOTE KEYLESS ENTRY FUNCTIONS

The Intelligent Key has the same functions as the remote keyless entry system. Therefore, it can be used in the same manner as the keyfob by operating the door lock/unlock button.

System Diagram



Door Lock/Unlock Function

- When door lock/unlock button of the Intelligent Key is pressed, lock signal or unlock signal is sent from Intelligent Key to Intelligent Key unit.
- Intelligent Key unit sends the door lock/unlock request signal to BCM via CAN communication line.
- Intelligent Key unit sends the door lock/unlock signal and sounds Intelligent Key warning buzzer(s) (lock: 2 times, unlock: 1 time) at the same time.
- When BCM receives the door lock/unlock signal, it operates door lock actuator and flashes the hazard warning lamp (lock: 2 times, unlock: 1 time) at the same time as reminder.

Operation Condition

Remote controller operation	Operation condition	Operation
Lock	All doors are closed	All doors lock

Hazard and Buzzer Reminder

When all doors are locked or unlocked by Intelligent Key button, Intelligent Key unit sends hazard request signal to BCM via CAN communication line.
BCM flashes hazard warning lamps as a reminder and Intelligent Key unit sounds Intelligent Key warning buzzer as a reminder.

Operating function of hazard and buzzer reminder

Intelligent Key button operation	Hazard warning lamp flash	Intelligent Key warning buzzer(s)	Horn
Lock	Twice	—	Once
Unlock	Once	—	—

Auto Door Lock Function

When all doors are locked, ignition knob switch is OFF (when ignition switch is not pressed) and key switch is OFF (when mechanical key is out of ignition key cylinder), doors are unlocked with Intelligent Key button. When Intelligent Key unit does not receive the following signals within 1 minute, all doors are locked.

- Door switch is ON (door is opened)
- Door is locked
- Ignition knob switch is ON (ignition switch is pressed)
- Key switch is ON (mechanical key is inserted in ignition switch)

Auto door lock mode can be changed by “AUTO RELOCK TIMER” mode in “WORK SUPPORT”. Refer to BL-114, "CONSULT Application Item".

Panic Alarm Function

When ignition knob switch is OFF (ignition switch is not pressed), or key switch is OFF (mechanical key is not inserted in key cylinder), pressing and holding the panic alarm button on Intelligent Key will send a panic alarm signal to Intelligent Key unit.
Intelligent Key unit sends alarm request signal to BCM via CAN communication line.
BCM sends headlamp request signal and horn signal to IPDM E/R. Then, IPDM E/R turns on and off headlamp and horn intermittently.
The headlamp flashes and the horn sounds intermittently.

The alarm automatically turns off:
- After 25 seconds
- When Intelligent Key unit receives any signal from remote controller of Intelligent Key
- When door request switch is pressed (Intelligent Key is outside vehicle)

Panic alarm function's press and holding time value can be changed in “PANIC ALARM DELAY” mode in “WORK SUPPORT”. Refer to BL-114, "CONSULT Application Item".

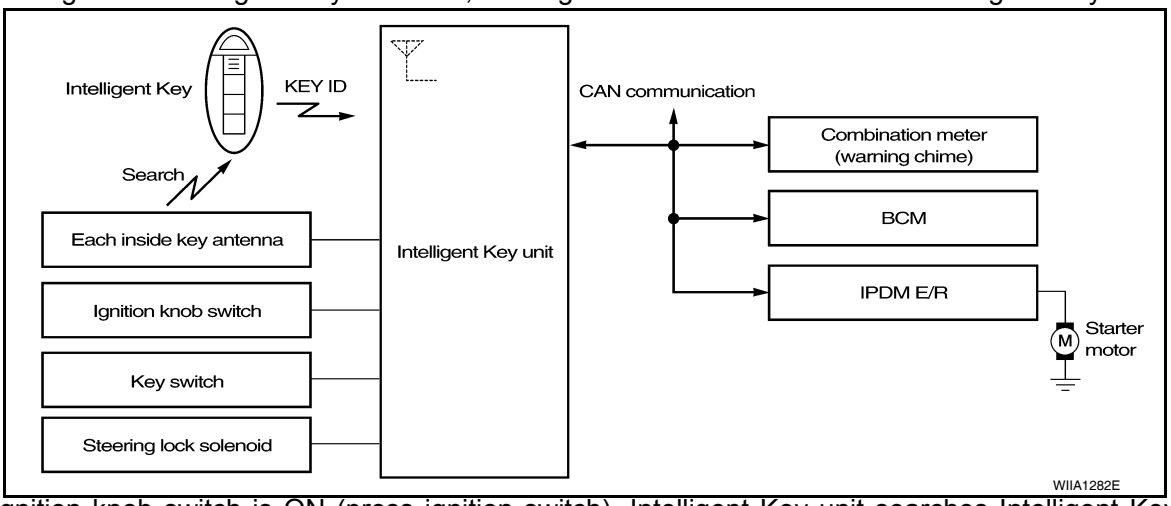
List of Operation Related Parts

Parts marked with × are the parts related to operation.

Remote keyless entry functions	Intelligent Key	Key switch	Ignition knob switch	Door request switch	Door switch	Back door lock assembly (back door switch)	Door lock actuator	Intelligent Key warning buzzer	Intelligent Key unit	CAN communication system	BCM	Hazard warning lamp	Horn	IPDM E/R	Head lamp
Door lock/unlock function by Intelligent Key button	×				×	×	×		×	×	×				
Hazard and buzzer reminder function								×	×	×	×	×			
Auto door lock function		×	×		×	×	×		×	×	×				
Panic alarm function	×	×	×	×					×	×	×		×	×	×

ENGINE START FUNCTION

When the registered Intelligent Key is carried, the engine can be started without inserting the key.



When ignition knob switch is ON (press ignition switch), Intelligent Key unit searches Intelligent Key in the vehicle using inside key antenna.

Then Intelligent Key is inside the vehicle, it performs the following operation.
- Illuminate green “KEY” warning lamp in combination meter.
- Released steering lock and ignition switch can be turned from OFF to ACC, ON or START position.

NOTE:

If Intelligent Key is not registered, “KEY” warning lamp in combination meter illuminates red.

- Intelligent Key sends engine start signal to BCM via CAN communication line.

When ignition switch turns to START position, BCM sends starter request signal to IPDM E/R. Then, engine starts.

Even if Intelligent Key battery runs down, Intelligent Key unit can start engine with mechanical key built Intelligent Key. For details, refer toBL-211.

All of the originally supplied Intelligent Key IDs (except for key) have been registered in Intelligent Key system. If requested by the vehicle owner, a maximum of four Intelligent Key IDs can be registered into the Intelligent Key system components.

List of Operation Related Parts
Parts marked with × are the parts related to operation.

Engine start functions	Intelligent Key	Key switch	Ignition knob switch	Inside key antenna	Intelligent Key unit	CAN communication system	BCM	Combination meter	IPDM E/R	NATS antenna amp.	Steering lock solenoid
Engine start function by the Intelligent Key	×	×	×	×	×	×	×	×	×		×
Engine start function by the mechanical key		×			×	×	×		×	×	×

WARNING CHIME/BUZZER/LAMPS FUNCTION

Operation Description
The following warning chime (combination meter), Intelligent Key warning buzzer (front door LH), warning lamps "KEY" and “P-SHIFT” (with CVT or A/T) or "LOCK" (with M/T) are given to the user as warning information while using the Intelligent Key system.

- Ignition switch warning chime
- Ignition key warning chime
- OFF position warning chime
- Take away warning chime
- Door lock operation warning chime
- Intelligent Key low battery warning
- P position warning (with CVT or A/T)
- LOCK position warning (with M/T)

NOTE:
For key-in-ignition warning chime related concerns only, refer to DI-42.

Operation Condition

Operation	Condition	Warning chime/buzzer		Warning lamp		
		Chime (combination meter)	Buzzer(s)	KEY	LOCK (M/T)	P-SHIFT (CVT or A/T)
Ignition switch warning chime	• Mechanical key is out of ignition switch (Key switch is OFF) • Ignition switch is in the ACC, OFF or LOCK position. [ignition switch is pressed (ignition knob switch is ON).] • Driver door is open.	activate	—	—	—	—
Ignition key warning chime (When mechanical key is used)	• Mechanical key is inserted in ignition switch (key switch is ON). • Ignition switch is in the ACC, OFF or LOCK position. • Driver door is open.	activate	—	—	—	—
P position warning (CVT or A/T)	When selector lever is in other than P position, ignition switch is turned from ON to OFF.	activate	—	—	—	Flash

Operation		Condition	Warning chime/buzzer		Warning lamp		
			Chime (combination meter)	Buzzer(s)	KEY	LOCK (M/T)	P-SHIFT (CVT or A/T)
OFF position warning chime	For internal	• Ignition switch is turned from ACC to OFF. [ignition switch is pressed (ignition knob switch is ON).] • Ignition switch is in the LOCK position and pressed for 1 second.	activate	—	—	Flash	—
	For external	When driver door is opened and then closed while the OFF position warning chime above is operating	—	activate	—	—	—
Take away warning	Right after door is closed	Right after door is closed and the following conditions are met. • Ignition knob is pressed and in rotatable or rotated state • Intelligent Key can not be detected inside the vehicle	—	activate	Flash (red)	—	—
	Any door is opened	Any door is opened and the following conditions are met. • Ignition knob is pressed and in rotatable or rotated state • Intelligent Key unit will perform key ID verification with Intelligent Key through inside key antenna every 5 second, if the key ID verification is NG.	—	—	Flash (red)	—	—
	Take away from the window	Take away from the window and the following conditions are met. • Ignition knob is pressed and in rotatable or rotated state • Vehicle speed below 5 km/h (3 m.p.h.) • Intelligent Key unit will perform key ID verification with Intelligent Key through inside key antenna every 30 second, if the key ID verification is NG. (This warning function will be disabled if mechanical key is inserted into the key cylinder.) **NOTE:** Default setting of this function is OFF.	activate	—	Flash (red)	—	—
Door lock operation warning	Lock operation with request switch	Lock operation with request switch and the following condition is met. • Intelligent Key is inside the vehicle	—	activate	—	—	—
Intelligent Key low battery warning		When Intelligent Key is low battery, Intelligent Key unit is detected after ignition switch is turned ON.	—	—	Flash (green)	—	—

List of Operation Related Parts

Parts marked with × are the parts related to operation.

Warning and alarm functions		Intelligent Key	Key switch	Ignition knob switch	Ignition switch ACC position input signal	Ignition switch ON position input signal	Door switch	Door request switch	Inside key antenna	Outside key antenna (Driver, Passenger)	Outside key antenna (rear bumper)	Intelligent Key warning buzzer(s)	Intelligent Key unit	CAN communication system	BCM	Warning lamp	Warning chime (combination meter)
Ignition switch warning chime				×		×	×						×	×	×		×
Ignition key warning chime (When mechanical key used)			×			×	×							×	×		×
OFF position warning chime	For internal			×	×	×						×	×	×	×	×	×
	For external			×	×	×	×					×	×	×	×	×	
Take away warning chime	Right after door is closed	×	×	×			×		×			×	×	×	×	×	
	Any door is open	×	×	×			×		×				×	×	×	×	
	Take away from window	×	×	×			×		×			×	×	×	×	×	×
Door lock operation warning chime		×						×	×	×	×	×	×	×	×		
Intelligent Key low battery warning		×				×			×				×	×		×	

CHANGE SETTINGS FUNCTION

The settings for each function can be changed with the CONSULT.

Changing Settings Using CONSULT

The settings for the Intelligent Key system functions can be changed using CONSULT (WORK SUPPORT).
Refer to BL-114, "CONSULT Application Item".

NOTE:
Once a function setting is changed, it will remain effective even if the battery is disconnected.

INTELLIGENT KEY REGISTRATION

Intelligent Key-ID registration is performed using the CONSULT.

CAUTION:

- **After a new Intelligent Key-ID is registered, be sure to check the function.**
- **When registering an additional Intelligent Key-ID, take any Intelligent Keys already registered and Intelligent Keys for any other vehicles out of the vehicle before starting.**

CONSULT can be used to check and delete Intelligent Key-IDs.
For further information, see the CONSULT Operation Manual NATS.

STEERING LOCK SOLENOID REGISTRATION

Steering Lock Solenoid ID Registration

CAUTION:

- **The method for registering a steering lock solenoid ID depends on the status of the steering lock solenoid and Intelligent Key unit (new or old unit).**
- **After registration is completed, press ignition switch with an Intelligent Key in the vehicle so that it can be turned, and confirm that it cannot be turned even when ignition switch is pressed without an Intelligent Key in the vehicle.**

For further information, see the CONSULT Operation Manual NATS-IVIS/NVIS.

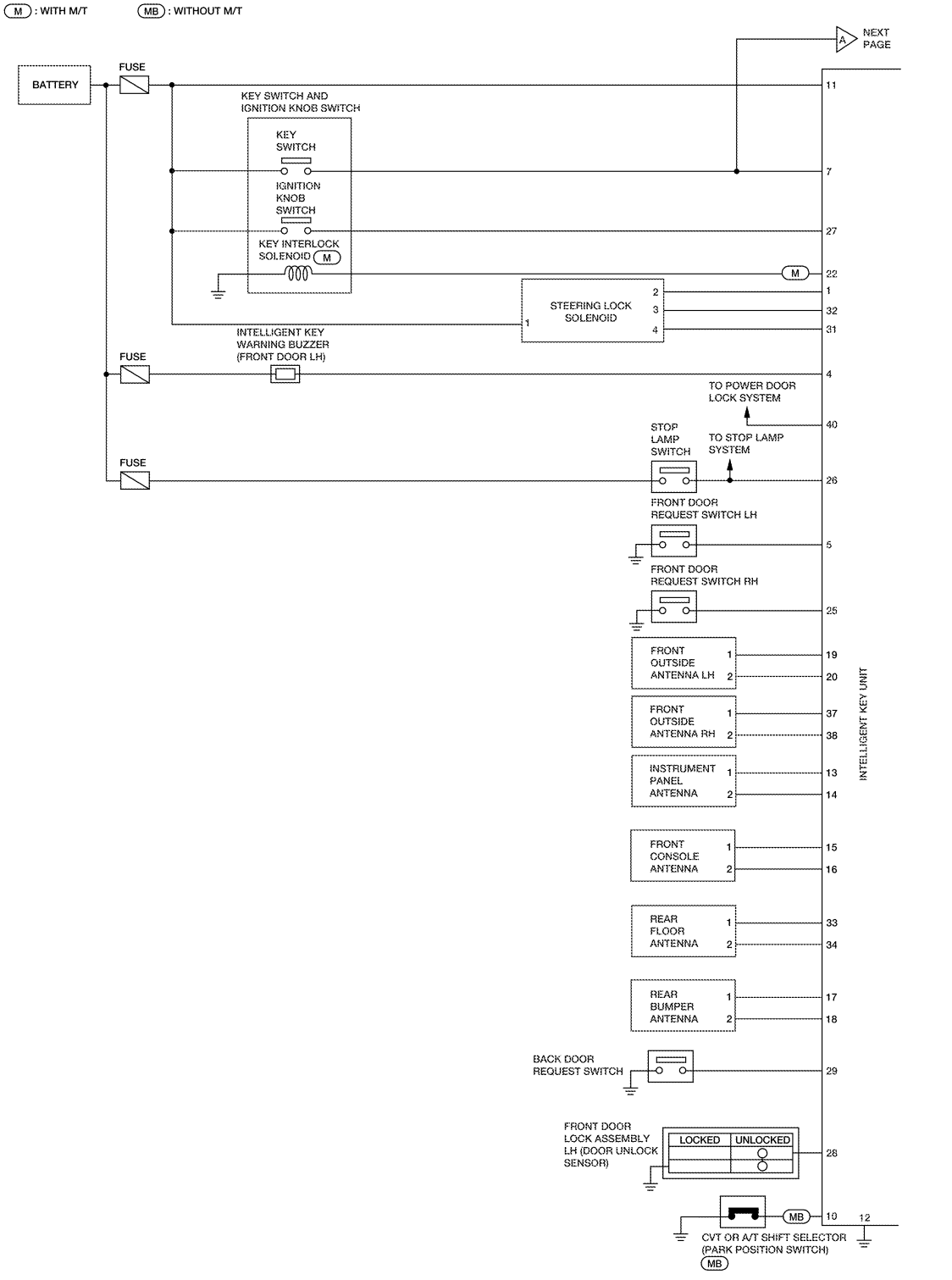
CAN Communication System Description

INFOID:0000000007330023

Refer to LAN-5.

Schematic

INFOID:0000000007330024



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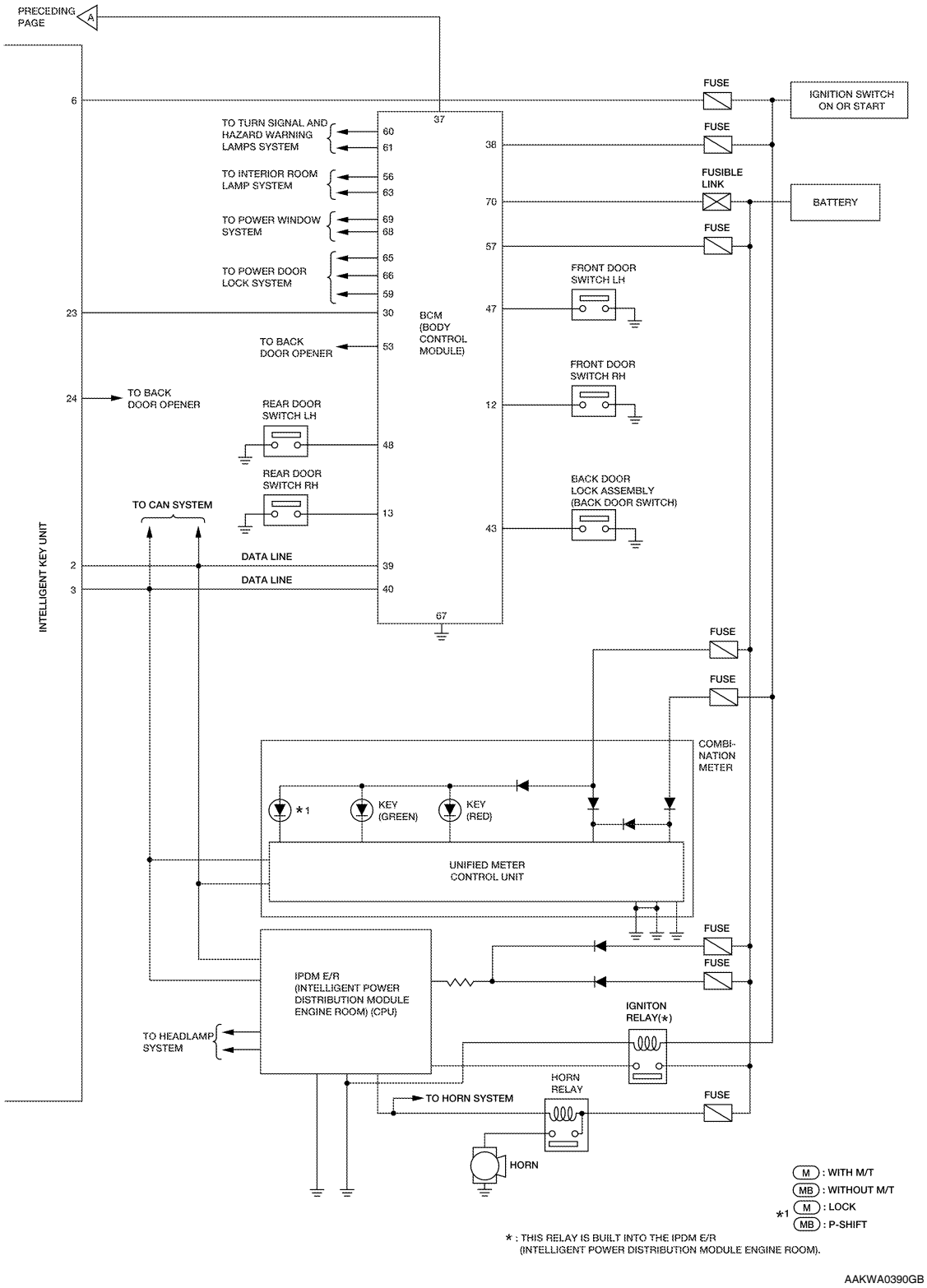

AAKWA0390GB

Wiring Diagram - I/KEY -

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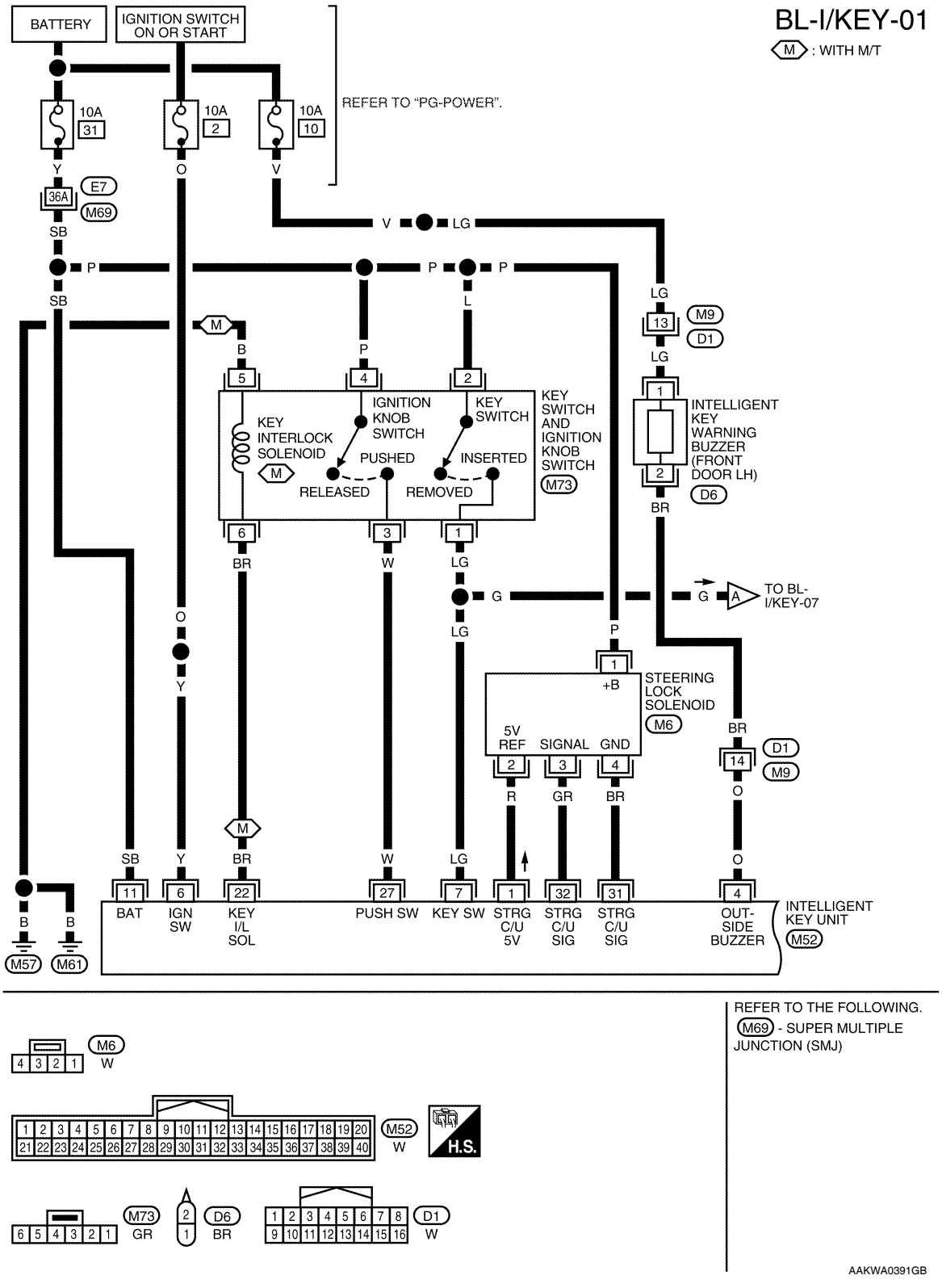
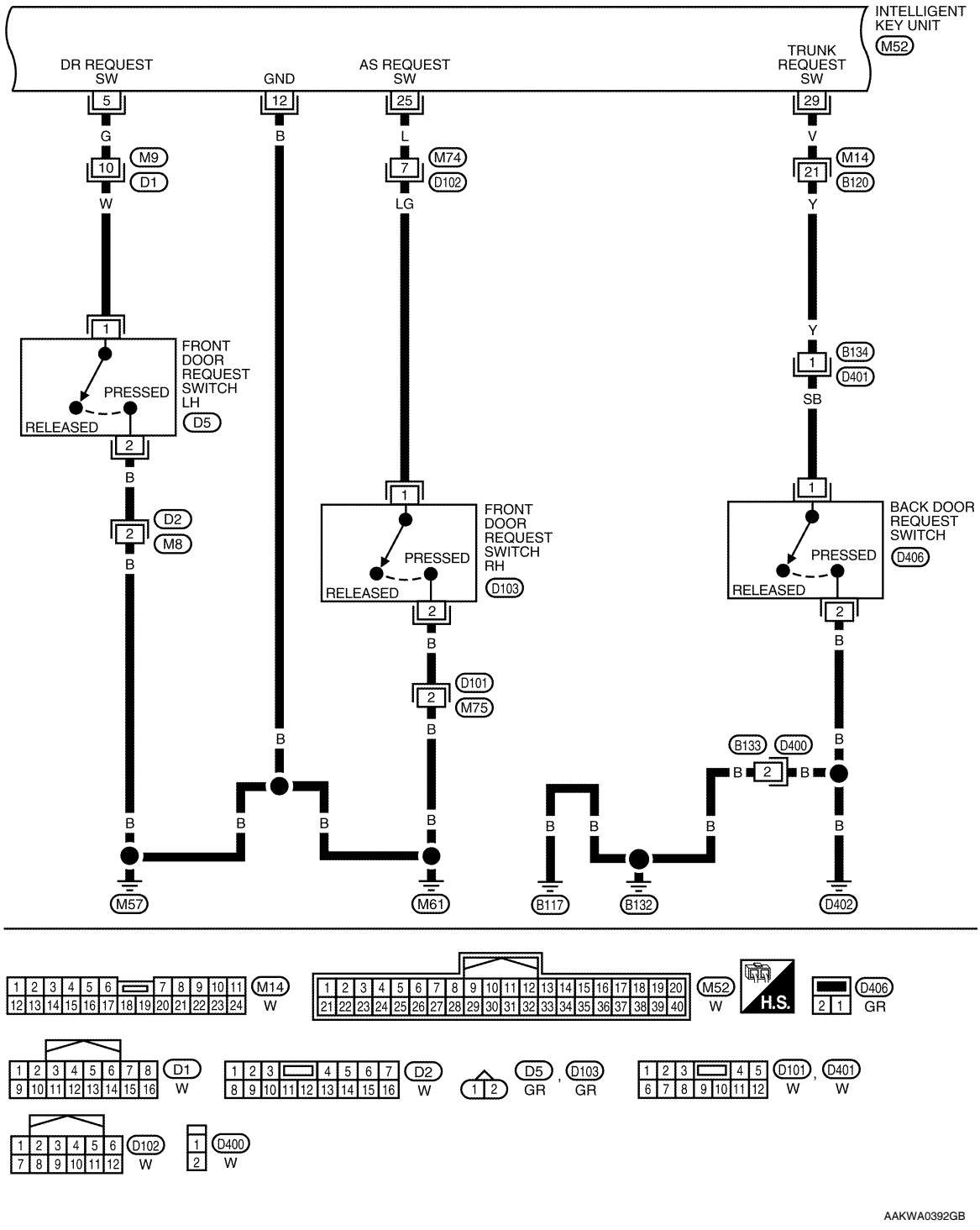


BL-I/KEY-02



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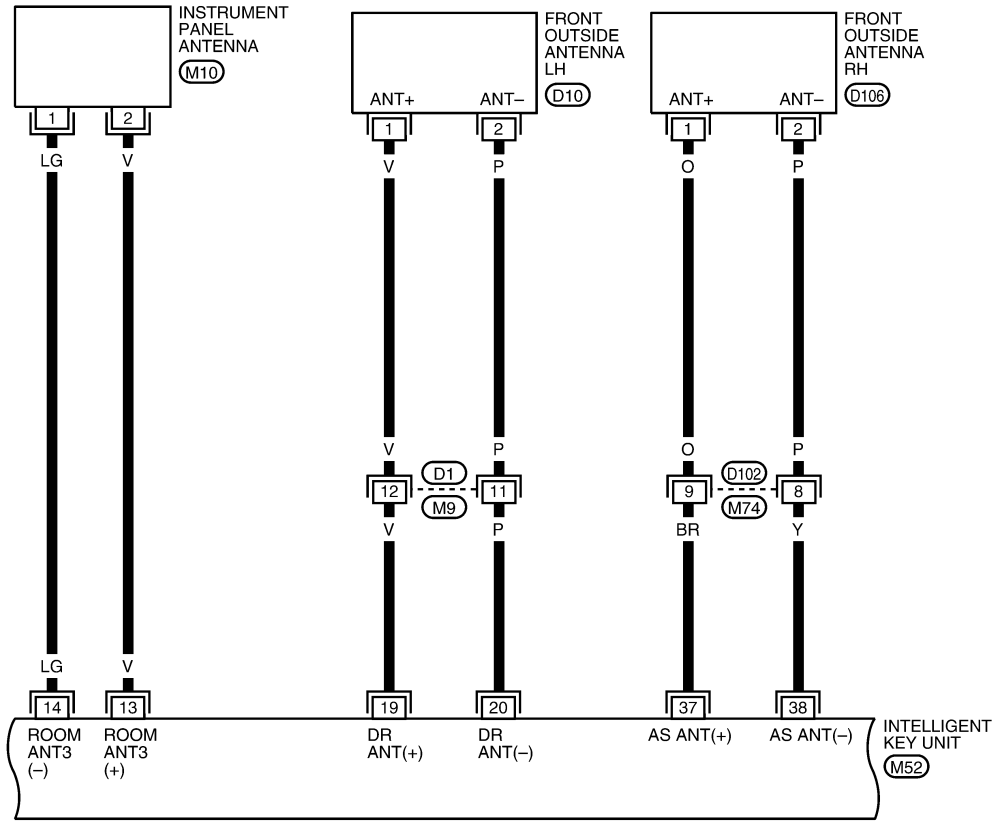
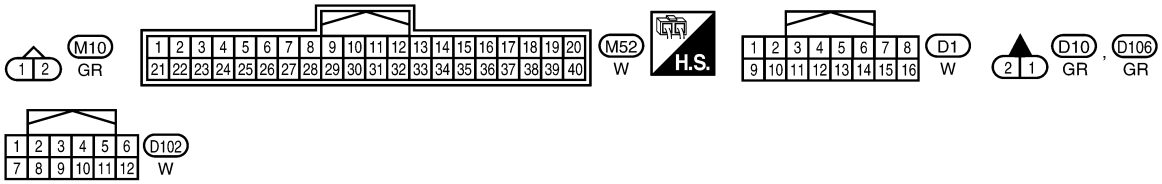
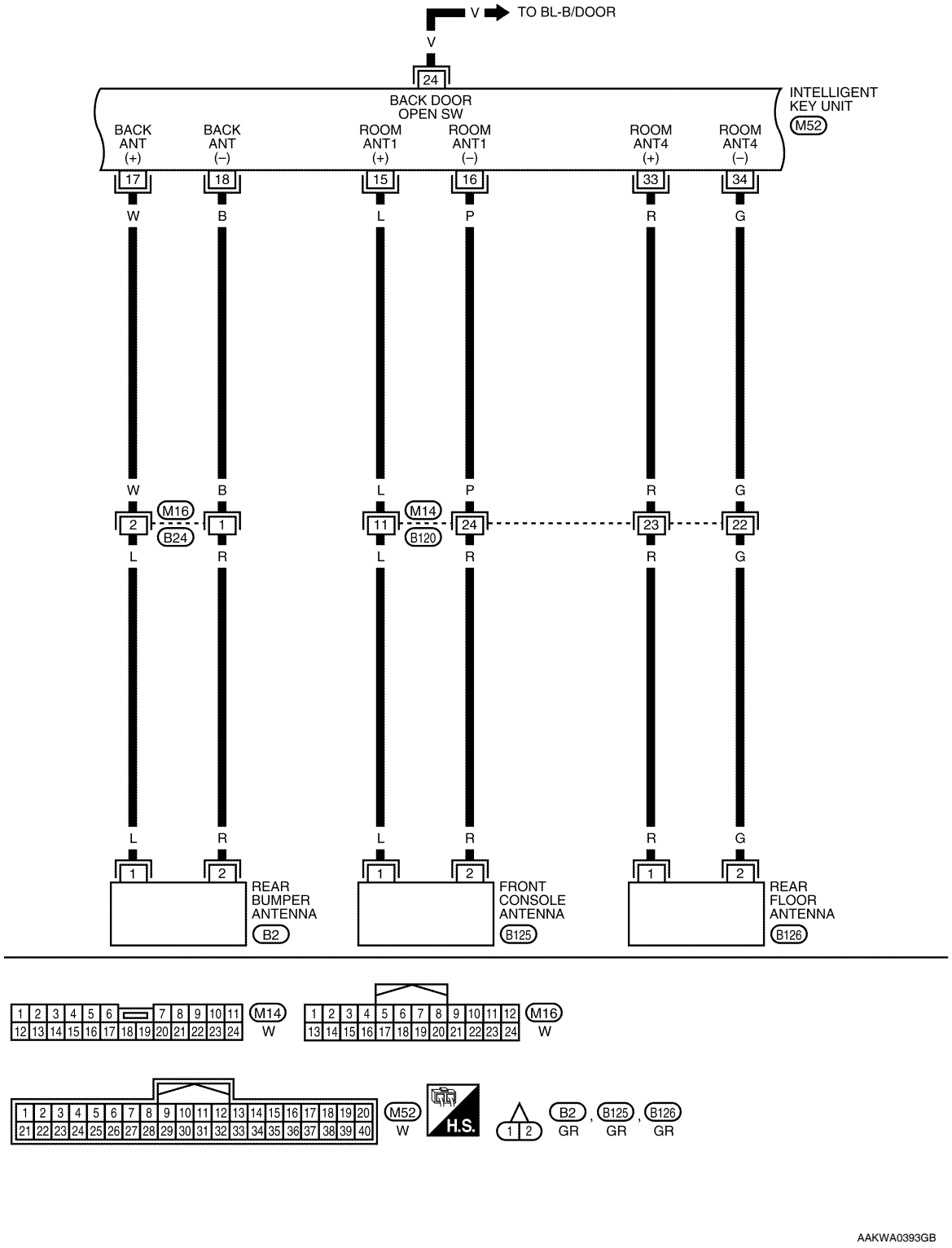
BL-I/KEY-03



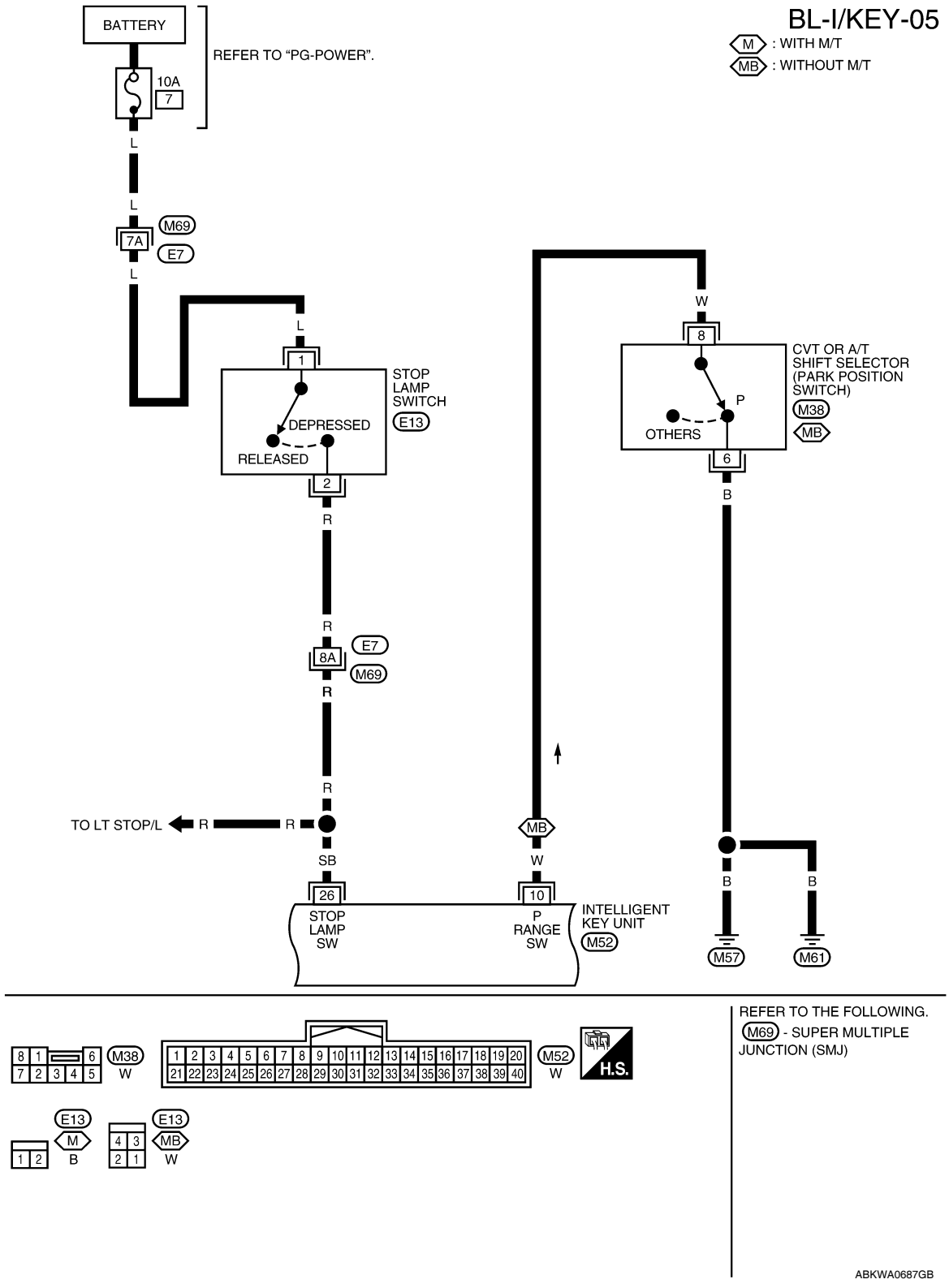


ALKWA0195GB

BL-I/KEY-04

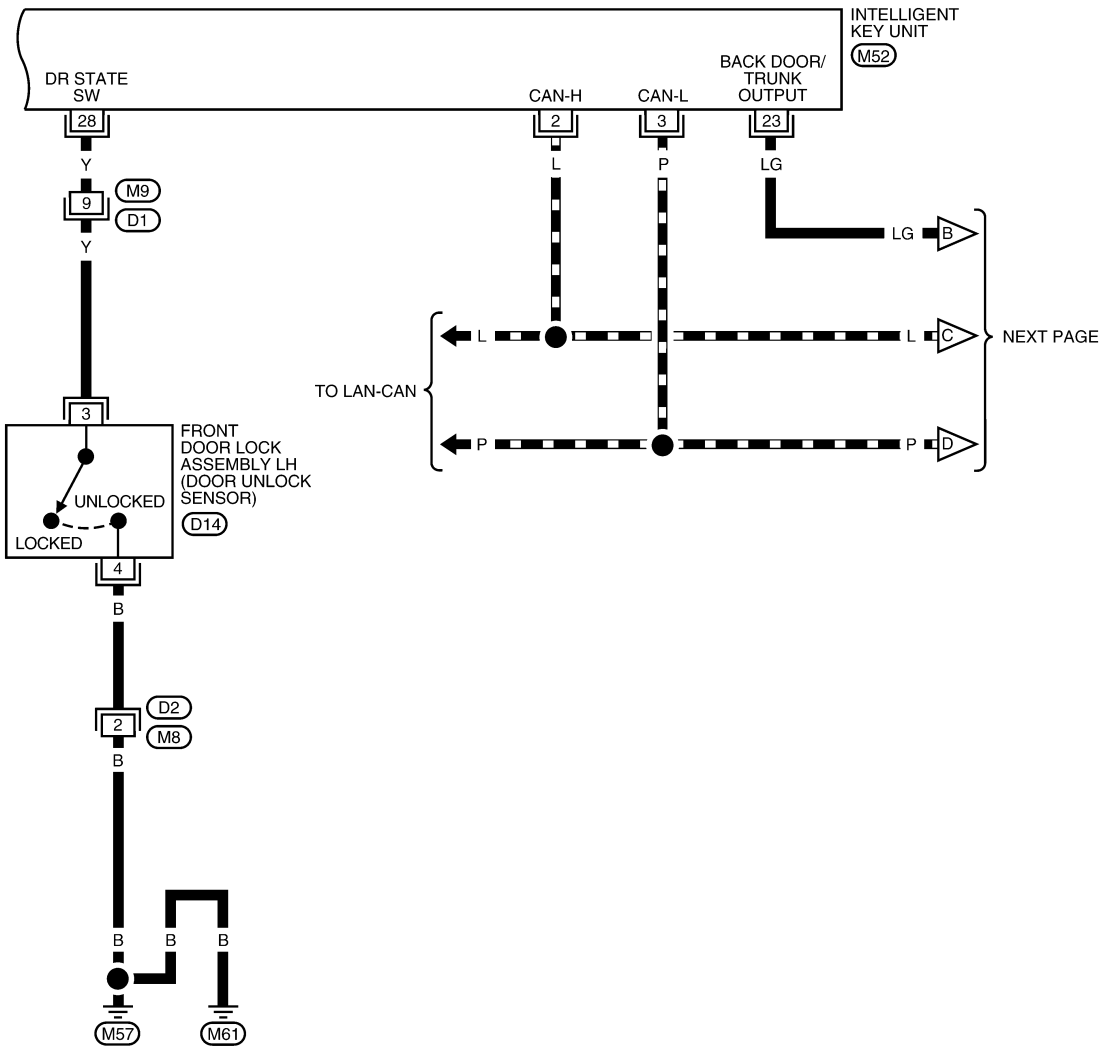


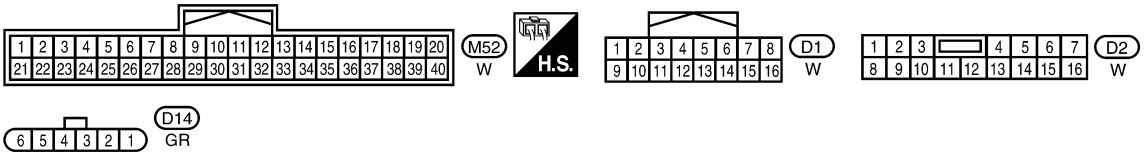
AAKWA0393GB


BL-I/KEY-05
M : WITH M/T
MB : WITHOUT M/T
BATTERY
REFER TO "PG-POWER".
10A
7
L
M69
7A
E7
STOP LAMP SWITCH
E13
DEPRESSED
RELEASED
1
2
CVT OR A/T SHIFT SELECTOR (PARK POSITION SWITCH)
M38
MB
P
OTHERS
8
6
W
B
R
8A
TO LT STOP/L
SB
26
STOP LAMP SW
10
P RANGE SW
INTELLIGENT KEY UNIT
M52
M57
M61
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABKWA0687GB

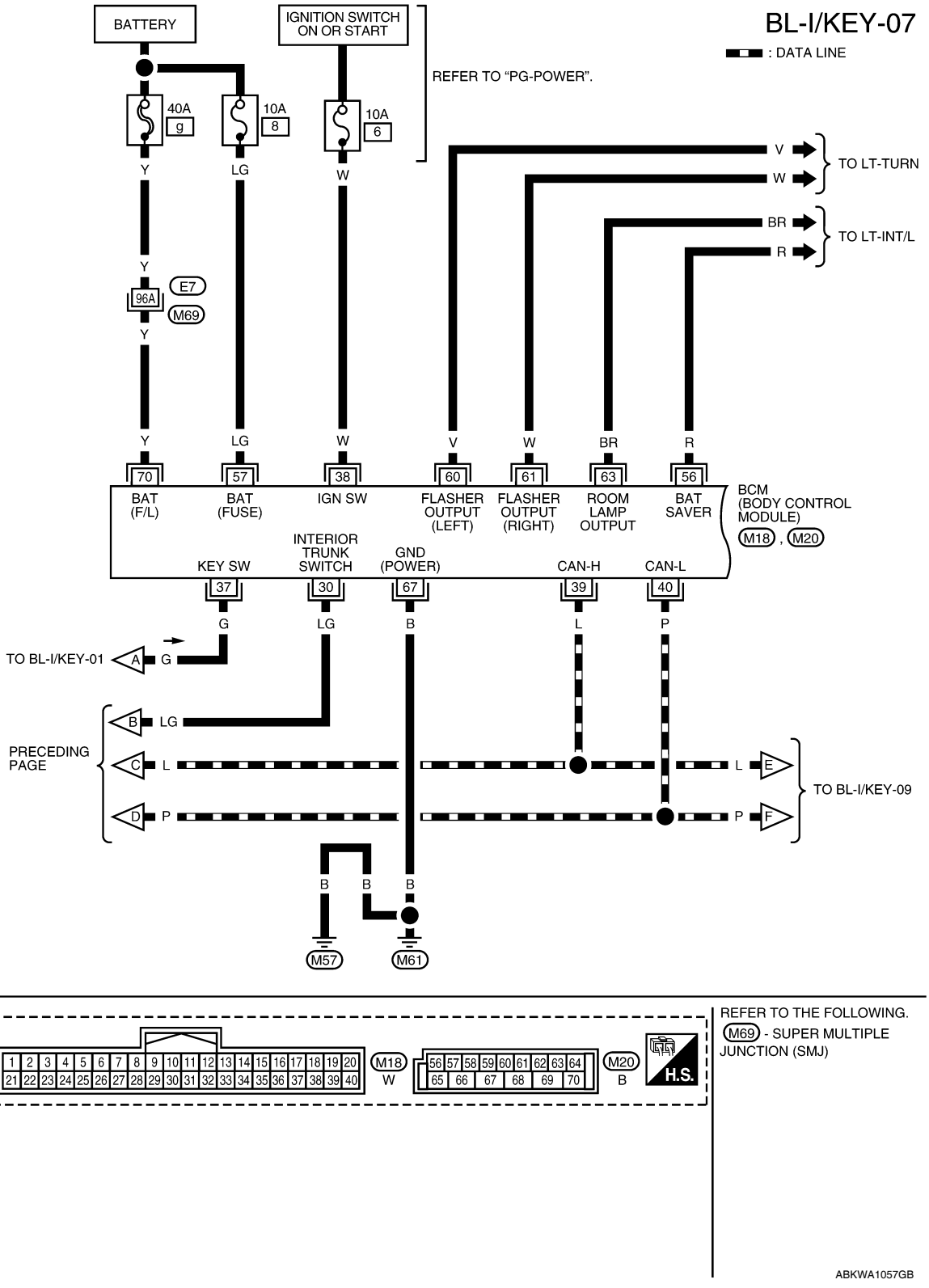
BL-I/KEY-06

: DATA LINE

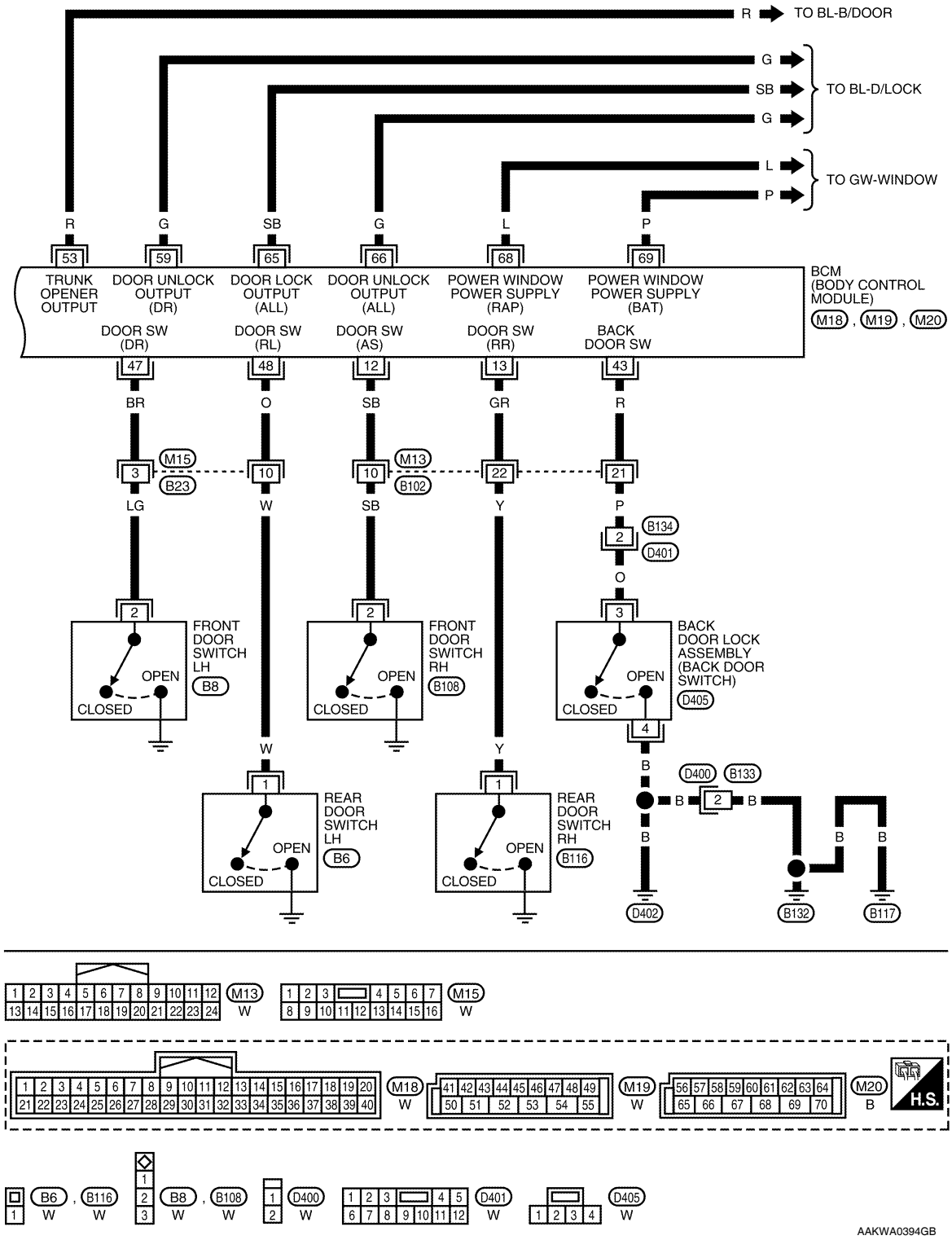


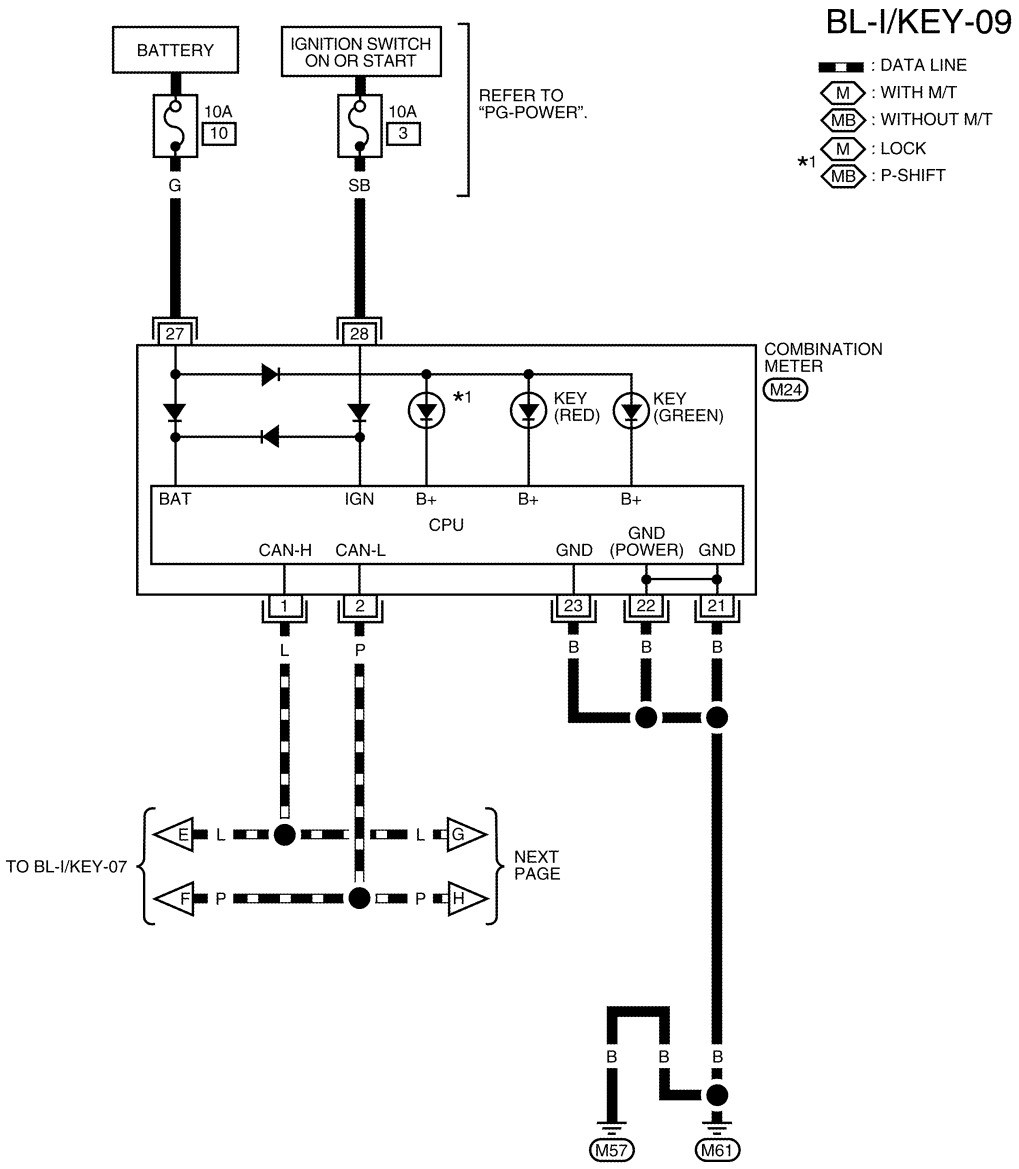


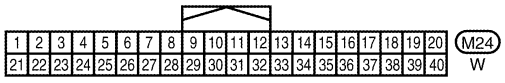
ABKWA1056GB


BL-I/KEY-07
: DATA LINE
BATTERY
IGNITION SWITCH ON OR START
REFER TO "PG-POWER".
40A g
10A 8
10A 6
Y
LG
W
V
W
BR
R
TO LT-TURN
TO LT-INT/L
96A
E7
M69
70
57
38
60
61
63
56
BAT (F/L)
BAT (FUSE)
IGN SW
FLASHER OUTPUT (LEFT)
FLASHER OUTPUT (RIGHT)
ROOM LAMP OUTPUT
BAT SAVER
BCM (BODY CONTROL MODULE)
M18 , M20
KEY SW
INTERIOR TRUNK SWITCH
GND (POWER)
CAN-H
CAN-L
37
30
67
39
40
G
LG
B
L
P
TO BL-I/KEY-01
A
PRECEDING PAGE
B
C
D
E
F
TO BL-I/KEY-09
M57
M61
M18
W
M20
B
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABKWA1057GB

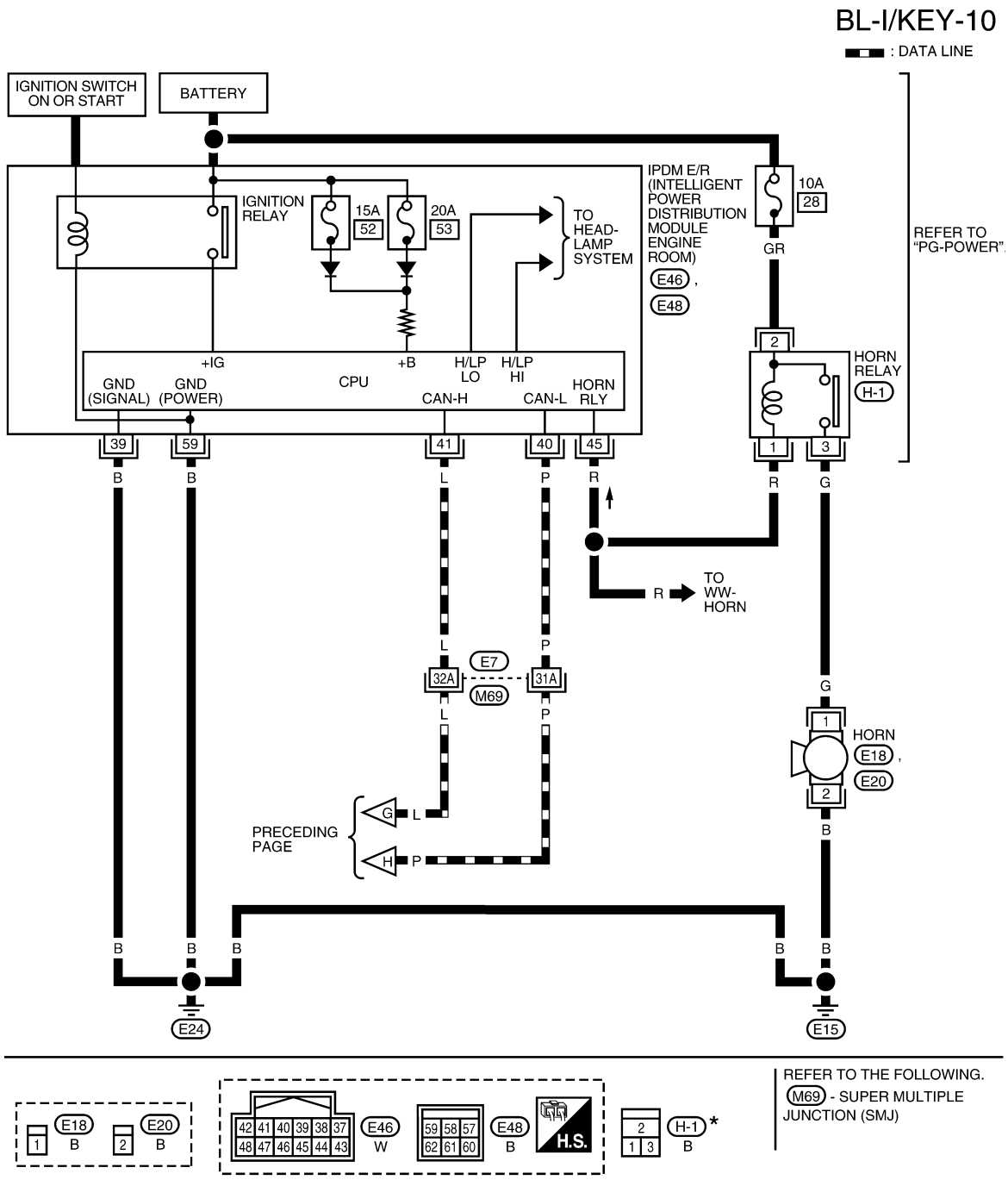
BL-I/KEY-08


R
TO BL-B/DOOR
G
SB
G
TO BL-D/LOCK
L
P
TO GW-WINDOW
R
G
SB
G
L
P
53
59
65
66
68
69
TRUNK OPENER OUTPUT
DOOR UNLOCK OUTPUT (DR)
DOOR LOCK OUTPUT (ALL)
DOOR UNLOCK OUTPUT (ALL)
POWER WINDOW POWER SUPPLY (RAP)
POWER WINDOW POWER SUPPLY (BAT)
BCM (BODY CONTROL MODULE)
M18 , M19 , M20
DOOR SW (DR)
DOOR SW (RL)
DOOR SW (AS)
DOOR SW (RR)
BACK DOOR SW
47
48
12
13
43
BR
O
SB
GR
R
M15
B23
M13
B102
3
10
10
22
21
LG
W
SB
Y
P
B134
D401
2
O
2
2
3
FRONT DOOR SWITCH LH
B8
FRONT DOOR SWITCH RH
B108
BACK DOOR LOCK ASSEMBLY (BACK DOOR SWITCH)
D405
OPEN
CLOSED
4
W
Y
B
D400
B133
1
1
2
REAR DOOR SWITCH LH
B6
REAR DOOR SWITCH RH
B116
D402
B132
B117
M13
W
M15
W
M18
W
M19
W
M20
B
H.S.
B6 , B116
W
W
B8 , B108
W
W
D400
W
D401
W
D405
W
AAKWA0394GB





AAKWA0414GB

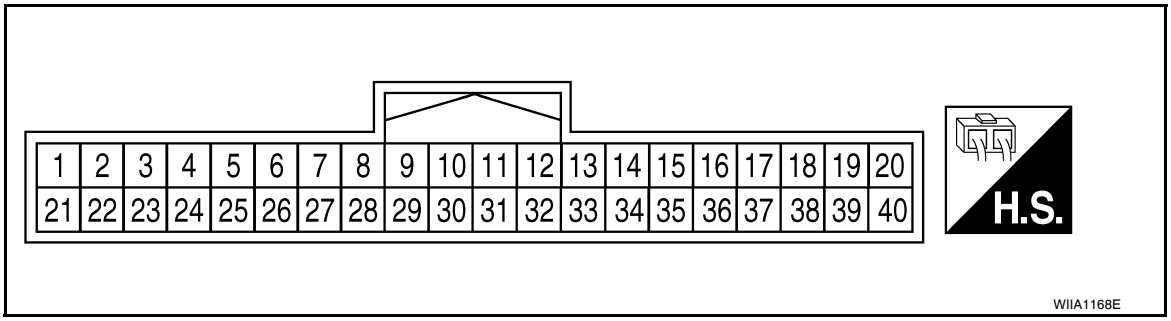


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

AAKWA0090GB

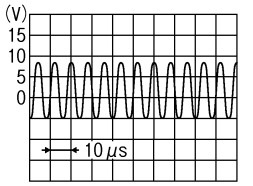
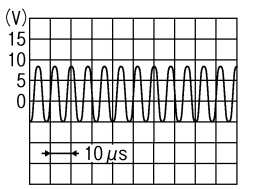
Intelligent Key Unit Harness Connector Terminal Layout

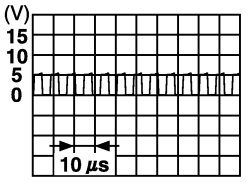
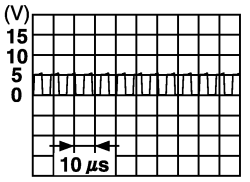
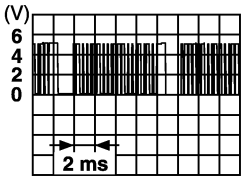
INFOID:0000000007330026

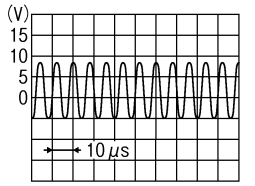
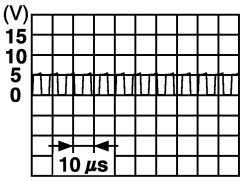


Terminal and Reference Value for Intelligent Key Unit

INFOID:0000000007330027

Terminal	Wire Color	Item	Condition			Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions		
1	R	Steering lock solenoid power supply	LOCK	—		5
2	L	CAN-H	—	—		—
3	P	CAN-L	—	—		—
4	O	Intelligent Key warning buzzer	LOCK	Operate door request switch.	Buzzer OFF	Battery voltage
					Sound buzzer	0
5	G	Front door request switch LH	—	Press door request switch (driver side).		0
				Other than above		5
6	Y	Ignition switch (ON)	ON	—		Battery voltage
7	LG	Key switch	LOCK	Insert mechanical key into ignition switch.		Battery voltage
				Remove mechanical key from ignition switch.		0
10*1	W	CVT or A/T shift selector (park position switch)	ON	Shift lever in park position.		0
				Other than above		Battery voltage
11	SB	Power source (Fuse)	—	—		Battery voltage
12	B	Ground	—	—		0
13	V	Instrument panel antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)		 PIIB5502J
14	LG	Instrument panel antenna (-) signal				
15	L	Front console antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)		 PIIB5502J
16	P	Front console antenna (-) signal				

Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
17	W	Rear bumper antenna (+) signal	LOCK	Press back door request switch.	 SIIA1910J
18	B	Rear bumper antenna (-) signal			
19	V	Front outside antenna LH (+) signal	LOCK	Press door request switch LH.	 SIIA1910J
20	P	Front outside antenna LH (-) signal			
22*2	BR	Key interlock solenoid	—	With Intelligent Key present or mechanical key in ignition cylinder, press "PUSH" button on ignition cylinder.	Battery voltage
				Other than above	0
23	LG	Back door open output	—	Back door open (switch closed)	0
				Back door closed (switch open)	5
24	V	Back door opener switch	—	Press and hold back door switch.	0
				Other than above	5
25	L	Front door request switch RH	—	Press front door request switch RH.	0
				Other than above	5
26	SB	Stop lamp switch	—	Depress brake pedal	Battery voltage
				Other than above	0
27	W	Ignition knob switch	—	Press ignition switch.	Battery voltage
				Release ignition switch.	0
28	Y	Unlock sensor (driver side)	—	Door (driver side) is locked.	5
				Door (driver side) is unlocked.	0
29	V	Back door request switch	—	Press back door request switch.	0
				Other than above	5
31	BR	Steering lock solenoid ground	—	—	0
32	GR	Steering lock solenoid communication signal	LOCK	When Intelligent Key is inside vehicle, press ignition knob switch.	 SIIA1911J
				Other than above	5

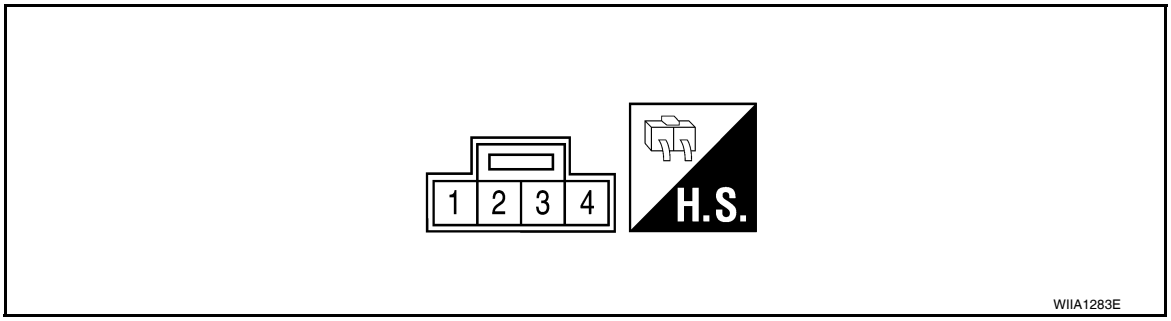
Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
33	R	Rear floor antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)	 PIIB5502J
34	G	Rear floor antenna (-) signal			
37	BR	Front outside antenna RH (+) signal	LOCK	Press door request switch RH.	 SIIA1910J
38	Y	Front outside antenna RH (-) signal			

*1: With continuously variable transmission (CVT) or automatic transmission (A/T).

*2: With manual transmission (M/T).

Steering Lock Solenoid Harness Connector Terminal Layout

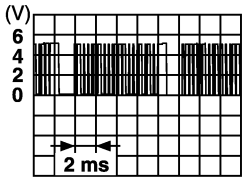
INFOID:0000000007330028



WIIA1283E

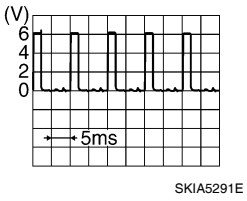
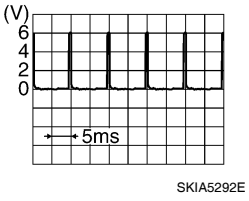
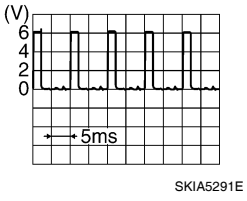
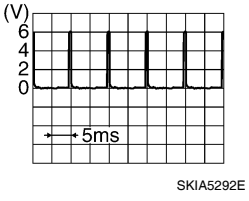
Terminal and Reference Value for Steering Lock Solenoid

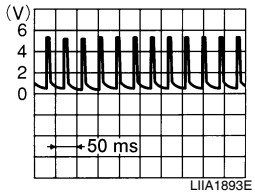
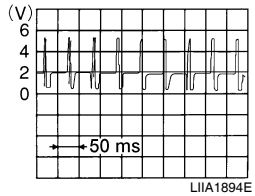
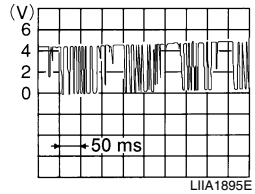
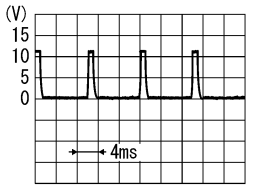
INFOID:0000000007330029

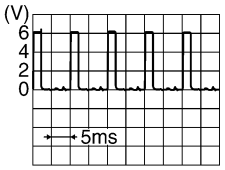
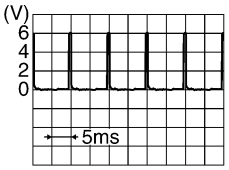
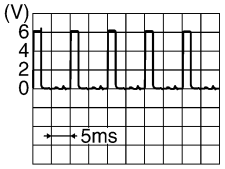
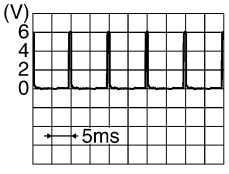
Terminal	Wire Color	Signal Designation	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
1	P	Battery power supply	LOCK	—	Battery voltage
2	R	Steering lock solenoid power supply	LOCK	—	5
3	GR	Steering lock solenoid communication signal	LOCK	When Intelligent Key is inside vehicle, press ignition knob switch.	 SIIA1911J
				Other than the above	5
4	BR	Steering lock solenoid ground	—	—	0

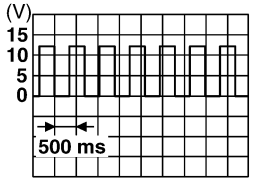
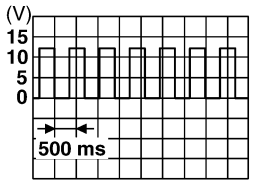
Terminal and Reference Value for BCM

INFOID:0000000007697947

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch — ON (open)	0V
					Any door switch — OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

1: With Intelligent Key

2: Without Intelligent Key

Trouble Diagnosis Procedure

INFOID:0000000007330031

PRELIMINARY CHECK

1.GET SYMPTOMS

Listen to customer concerns. (Get symptoms)

NOTE:

If customer reports a “No start” condition, request all Intelligent Keys to be brought to the dealer in case of Intelligent Key system malfunction.

Intelligent Key or mechanical key service request>>For further information, refer to CONSULT operation manual.

Malfunctions>>GO TO 2

2.CHECK BCM CONFIGURATION

Confirm BCM configuration for "I-KEY" is set to "WITH". Refer to BCS-18, "Configuration".

OK or NG

OK >> GO TO 3

NG >> Change BCM configuration for "I-KEY" to "WITH". Refer to BCS-18, "Configuration".

3.START ENGINE WITH INTELLIGENT KEY

Check if the engine could be started by all registered Intelligent Keys.

The engine cannot be started by some Intelligent Keys>>Intelligent Key is low battery or malfunction. Refer to BL-152, "Intelligent Key Battery Replacement".

The engine cannot be started by all Intelligent Keys >>GO TO 4

The engine can be started by all Intelligent Keys >> GO TO 5

4.CHECK “KEY” WARNING LAMP ILLUMINATION

When pushing the ignition switch, check if “KEY” warning lamp in combination meter illuminates.

KEY warning lamp illuminates green >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

KEY warning lamp illuminates red >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

Does not illuminate>>GO TO BL-116, "Trouble Diagnosis Symptom Chart".

5.START ENGINE WITH MECHANICAL KEY

Check if the engine could be started by all registered mechanical keys.

No start by some mechanical keys >> Register mechanical key. Refer to CONSULT operation manual.

Engine starts by mechanical or Intelligent Key >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

No start by mechanical key or Intelligent Key >> Refer to NATS BL-219, "Trouble Diagnosis Procedure".
Engine starts with Intelligent Key or mechanical key >> GO TO "WORK FLOW".
The engine can be started by all mechanical keys >>GO TO 6

6.PERFORM SELF-DIAGNOSIS

1. Turn ignition switch to ON by carrying the Intelligent Key.
2. Perform self-diagnosis of Intelligent Key system with CONSULT.

DTC is displayed >> Refer to BL-114, "CONSULT Application Item".
DTC is not displayed >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

WORK FLOW

Before performing the work flow, carry out preliminary check. Refer to "PRELIMINARY CHECK".

1.CHECK FUNCTION OF INTELLIGENT KEY SYSTEM

Check if the function related to Intelligent Key system operates normally.

All functions of Intelligent Key system do not operate >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".
Specific function of Intelligent Key system does not operate >> GO TO 2

2.CHECK POWER DOOR LOCK OPERATION

Check if door lock/unlock function operates with door lock and unlock switch.

OK or NG

OK >> GO TO 3
NG >> Refer to BL-23.

3.CHECK DOOR REQUEST SWITCH OPERATION

Check if door lock/unlock function operates with request switch.

OK or NG

OK >> GO TO 4
NG >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

4.CHECK REMOTE KEYLESS FUNCTION

Check if the following function responds with Intelligent Key button.
- Door lock/unlock function
- Panic alarm function

OK or NG

OK >> GO TO 5
NG >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

5.CHECK HAZARD AND BUZZER REMINDER FUNCTION

Check if hazard and buzzer reminder function responds with the following switches.
- Door request switch
- Intelligent Key button

OK or NG

OK >> GO TO 6
NG >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

6.CHECK WARNING CHIME FUNCTION

Check if warning chime function operates normally according to system description. Refer to BL-85, "System Description".

OK or NG

OK >> GO TO 7
NG >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

7.CHECK WARNING LAMP FUNCTION

Check if warning lamp could be turn on normally according to system description. Refer to BL-85, "System Description".

OK or NG

OK >> Inspection End.
NG >> Refer to BL-116, "Trouble Diagnosis Symptom Chart".

CONSULT Functions (INTELLIGENT KEY)

INFOID:0000000007330032

CONSULT can display each diagnostic item using the diagnostic test modes as shown below.

Diagnostic mode	Description
WORK SUPPORT	Changes settings for each function.
SELF DIAGNOSTIC RESULT	Intelligent Key unit performs CAN communication diagnosis.
DATA MONITOR	Displays Intelligent Key unit input data in real time.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN Communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending driving signal to them.
ECU IDENTIFICATION	Displays Intelligent Key unit part No.

CONSULT Application Item

INFOID:0000000007330033

SELF-DIAGNOSTIC RESULTS

Self-diag results	Description	Diagnosis procedure	Reference page
CAN COMM	Malfunction is detected in CAN communication.	Check CAN communication system.	BL-122
CAN COMM2	Intelligent Key unit internal malfunction	Check CAN communication system.	BL-122
STRG COMM	Malfunction is detected in communication of Intelligent Key unit and steering lock solenoid.	Check steering lock solenoid.	BL-141
I-KEY C/U	Intelligent Key unit internal malfunction	Replace Intelligent Key unit.	BL-152
IMMU	NATS malfunction	Check NATS.	BL-211

DATA MONITOR

Monitor item	Content
PUSH SW	Indicates [ON/OFF] condition of ignition knob switch.
KEY SW	Indicates [ON/OFF] condition of key switch.
DR REQ SW	Indicates [ON/OFF] condition of door request switch (driver side).
AS REQ SW	Indicates [ON/OFF] condition of door request switch (passenger side).
BD/TR REQ SW	Indicates [ON/OFF] condition of back door request switch.
IGN SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
STOP LAMP SW	Indicates [ON/OFF] condition of stop lamp switch.
P RANGE SW	Indicates [ON/OFF] condition of shift lever park position.
BD OPEN SW	Indicates [ON/OFF] condition of back door open switch.
DOOR LOCK SIG*	Indicates [ON/OFF] condition of door lock signal from Intelligent Key button.
DOOR UNLOCK SIG*	Indicates [ON/OFF] condition of door unlock signal from Intelligent Key button
KEYLESS PANIC*	Indicates [ON/OFF] condition of panic signal from Intelligent Key button
DOOR SW DR*	Indicates [OPEN/CLOSE] condition of front door switch driver side from BCM via CAN communication line.
DOOR SW AS*	Indicates [OPEN/CLOSE] condition of front door switch passenger side from BCM via CAN communication line.
DOOR SW RR*	Indicates [OPEN/CLOSE] condition of rear door switch RH from BCM via CAN communication line.

Monitor item	Content
DOOR SW RL*	Indicates [OPEN/CLOSE] condition of rear door switch LH from BCM via CAN communication line.
VEHICLE SPEED*	Indicates [km/h] condition of vehicle speed.

*: Select “SELECTION FROM MENU”.

ACTIVE TEST

Test item	Description
DOOR LOCK/UNLOCK	This test is able to check door lock/unlock operation. • The all door lock actuators are unlocked when “ALL UNLK” on CONSULT screen is touched. • The all door lock actuators are locked when “LOCK” on CONSULT screen is touched.
ANTENNA	This test is able to check Intelligent Key antenna operation. When the following conditions are met, hazard warning lamps flash. • Inside key antenna (front console) detects Intelligent Key, when “ROOM ANT1” on CONSULT screen is touched. • Inside key antenna (instrument panel and rear floor) detects Intelligent Key, when “ROOM ANT2” on CONSULT screen is touched. • Outside key antenna (driver side) detects Intelligent Key, when “DR ANT” on CONSULT screen is touched. • Outside key antenna (passenger side) detects Intelligent Key, when “AS ANT” on CONSULT screen is touched. • Outside key antenna (rear bumper) detects Intelligent Key, when “BK DR ANT” on CONSULT screen is touched.
OUTSIDE BUZZER	This test is able to check Intelligent Key warning buzzer operation. Intelligent Key warning buzzer sounds when “ON” on CONSULT screen is touched.
INSIDE BUZZER	This test is able to check Intelligent Key warning chime (Instrument panel) operation. • Take away warning chime sounds when “TAKE OUT” on CONSULT screen is touched. • Ignition switch warning chime sounds when “KNOB” on CONSULT screen is touched. • Ignition key warning chime sounds when “KEY” on CONSULT screen is touched.
INDICATOR	This test is able to check warning lamp operation. • “KEY” Warning lamp (Green) illuminates when “BLUE ON” on CONSULT screen is touched. • “KEY” Warning lamp (Red) illuminates when “RED ON” on CONSULT screen is touched. • “LOCK” Warning lamp illuminates when “KNOB ON” on CONSULT screen is touched. • “KEY” Warning lamp (Green) flashes when “BLUE IND” on CONSULT screen is touched. • “KEY” Warning lamp (RED) flashes when “RED IND” on CONSULT screen is touched. • “P-SHIFT” Warning lamp flashes when “KNOB IND” on CONSULT screen is touched.

WORK SUPPORT

Monitor item	Description
CONFIRM KEY FOB ID	It can be checked whether Intelligent Key ID code is registered or not in this mode.
TAKE OUT FROM WINDOW WARN	Take away warning chime (from window) mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
LOW BAT OF KEY FOB WARN	Intelligent Key low battery warning mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
ANSWER BACK FUNCTION	Buzzer reminder function mode by Intelligent button can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
SELECTIVE UNLOCK FUNCTION	Selective unlock function mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
ANTI KEY LOCK IN FUNCTION	Key reminder function mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
HORN WITH KEYLESS LOCK	Horn reminder function mode by Intelligent Key remote control button can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.

Monitor item	Description
HAZARD ANSWER BACK	Hazard reminder function mode can be selected from the following with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched. • LOCK ONLY: Door lock operation only • UNLOCK ONLY: Door unlock operation only • LOCK/UNLOCK: Lock/Unlock operation • OFF: Non-operation
ANSWER BACK WITH I-KEY LOCK	Buzzer reminder function (lock operation) mode by door request switch (driver side, passenger side and back door side) can be selected from the following with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched. • BUZZER: Sound buzzer • OFF: Non-operation
ANSWER BACK WITH I-KEY UNLOCK	Buzzer reminder function (unlock operation) mode by door request switch can be changed to operate (ON) or not operate (OFF) with this mode.
AUTO RELOCK TIMER	Auto door lock timer mode can select the following with this mode. • 1 minute • OFF: Non-operation
PANIC ALARM DELAY	Panic alarm button's pressing time on Intelligent Key remote control button can be selected from the following with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched. • 0.5 second • 1.5 second • OFF: Non-operation
P/W DOWN DELAY	Unlock button's pressing time on Intelligent Key remote control button can be selected from the following with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched. • 3 seconds • 5 seconds • OFF: Non-operation
ENGINE START BY I-KEY	Engine start function mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.
LOCK/UNLOCK BY I-KEY	Door lock/unlock function by door request switch (driver side, passenger side and back door side) mode can be changed to operate (ON) or not operate (OFF) with this mode. The operation mode will be changed when “CHANGE SETT” on CONSULT screen is touched.

Trouble Diagnosis Symptom Chart

INFOID:0000000007330034

KEY WARNING LAMP (GREEN) ILLUMINATES

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnoses/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Intelligent Key is registered.
- Key is not inserted in ignition switch.
- One or more registered Intelligent Keys are in the vehicle.

Symptom	Diagnosis/service procedure	Reference page
Ignition switch does not turn on with Intelligent Key. [KEY warning lamp (green) illuminates].	1. Check steering lock solenoid.	BL-141
	2. Replace Intelligent Key unit.	BL-152

KEY WARNING LAMP (RED) ILLUMINATES

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".

- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnoses/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Intelligent Key is registered.
- Key is not inserted in ignition switch.
- One or more registered Intelligent Keys are in the vehicle.

Symptom	Diagnosis/service procedure	Reference page
Ignition switch does not turn on with Intelligent Key. [KEY warning lamp (red) illuminates].	1. Check inside key antenna.	BL-139
	2. Replace Intelligent Key unit.	BL-152

KEY WARNING LAMP DOES NOT ILLUMINATE

NOTE:
- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnoses/service procedure” column in this order.
- Check if ignition switch turns using mechanical key. If it turns, check if “ENGINE START BY I-KEY” in “WORK SUPPORT” mode is ON.

Conditions of Vehicle (Operating Conditions)
- Intelligent Key is registered.
- Mechanical key is out of ignition switch.
- One or more registered Intelligent Keys are in the vehicle.

Symptom	Diagnosis/service procedure	Reference page
Ignition switch does not turn on with Intelligent Key. [GREEN key warning lamp does not illuminate].	1. Check Intelligent Key unit power supply and ground circuit.	BL-123
	2. Check ignition knob switch.	BL-126
	3. Check key switch.	BL-123
	4. Check "KEY" warning lamp (GREEN).	BL-149
	5. Replace Intelligent Key unit.	BL-152
RED key warning lamp does not illuminate [Without Intelligent Key].	1. Check "KEY" warning lamp (RED).	BL-149
	2. Replace Intelligent Key unit.	BL-152

NON-DTC ITEM

NOTE:
- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnoses/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)
- Intelligent Key is registered.
- Multiple mechanical keys are not set in a keyfob.
  (If mechanical keys are near the ignition switch, the operation may not work properly.)

Symptom	Diagnosis/service procedure	Reference page
Non DTC Item	1. Check key switch.	BL-123
	2. Check NATS antenna amp.	BL-211

ENGINE START CONDITION CHECK

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- If the following “symptoms” are detected, check systems shown in the ”Diagnoses/service procedure” column in this order.

Symptom	Diagnosis/service procedure	Reference page
Engine start condition check	1. Check CVT or A/T shift selector (park position switch). (with CVT or A/T)	BL-146
	2. Check key interlock solenoid (with M/T).	BL-143
	3. Check stop lamp switch (with CVT or A/T).	BL-144
	4. Check stop lamp switch (with M/T).	BL-145

ALL FUNCTIONS OF INTELLIGENT KEY SYSTEM DO NOT OPERATE

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “ENGINE START BY I-KEY” and “LOCK/UNLOCK BY I-KEY” are ON when setting on CONSULT.
- Mechanical key is out of ignition switch.
- Ignition switch is not depressed.
- All doors are closed.
- Intelligent Key is registered.

Symptom	Diagnosis/service procedure	Reference page
All function of Intelligent Key system dose not operate.	1. Check Intelligent Key unit power supply and ground circuit.	BL-123
	2. Check Intelligent Key battery inspection.	BL-152
	3. Replace Intelligent Key unit.	BL-152

DOOR LOCK/UNLOCK FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- “LOCK/UNLOCK BY I-KEY” is ON when setting on CONSULT.
- Mechanical key is out of ignition switch.
- Ignition switch is not depressed.
- All doors are closed.
- Intelligent Key is registered.

Symptom	Diagnosis/service procedure	Reference page
Door lock/unlock does not operate by all request switches.	1. Check door switch.	BL-127
	2. Check key switch.	BL-123
	3. Check ignition knob switch.	BL-126
	4. Replace Intelligent Key unit.	BL-152
Door lock/unlock does not operate by request switch (driver side).	1. Check door request switch (driver side).	BL-130
	2. Check outside key antenna (driver side).	BL-136
	3. Replace Intelligent Key unit.	BL-152
Door lock/unlock does not operate by request switch (passenger side).	1. Check door request switch (passenger side).	BL-130
	2. Check outside key antenna (passenger side).	BL-136
	3. Replace Intelligent Key unit.	BL-152
Door lock/unlock does not operate by back door request switch.	1. Check back door request switch.	BL-132
	2. Check outside key antenna (rear bumper).	BL-138
	3. Replace Intelligent Key unit.	BL-152
Auto lock function does not operate.	1. Check “AUTO RELOCK TIMER” setting in “WORK SUPPORT”.	BL-114
	2. Replace Intelligent Key unit.	BL-152
Key reminder function does not operate.	1. Check door switch.	BL-127
	2. Check inside key antenna.	BL-139
	3. Check unlock sensor.	BL-133
	4. Check Intelligent Key battery.	BL-152
	5. Replace Intelligent Key unit.	BL-152

REMOTE KEYLESS ENTRY FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Ignition switch is not depressed.
- All doors are closed.

Symptom	Diagnosis/service procedure	Reference page
All of the remote keyless entry functions do not operate.	1. Check Intelligent Key unit power supply and ground circuit.	BL-123
	2. Check key switch (BCM input).	BL-125
	3. Check Intelligent Key battery.	BL-152
	4. Remote Keyless Entry function inspection.	BL-152
	5. Replace Intelligent Key unit.	BL-152
Auto lock function does not operate.	1. Check “AUTO RELOCK TIMER” setting in “WORK SUPPORT”.	BL-114
	2. Replace Intelligent Key unit.	BL-152
Key reminder function does not operate.	1. Check door switch.	BL-127
	2. Check inside key antenna.	BL-139
	3. Check unlock sensor.	BL-133
	4. Check Intelligent Key battery.	BL-152
	5. Replace Intelligent Key unit.	BL-152

Symptom	Diagnosis/service procedure	Reference page
Panic alarm function does not operate.	1. Check “PANIC ALARM DELAY” setting in “WORK SUPPORT”.	BL-114
	2. Check Intelligent Key battery inspection.	BL-152
	3. Check horn function.	BL-150
	4. Check headlamp function.	BL-151
	5. Check key switch.	BL-123
	6. Check ignition knob switch.	BL-126
	7. Replace Intelligent Key unit.	BL-152

HAZARD AND BUZZER REMINDER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

- Ignition switch is not depressed.
- All doors are closed.

Symptom		Diagnosis/service procedure	Reference page
Hazard reminder does not operate by request switch. (Buzzer reminder operate).		1. Check “HAZARD ANSWER BACK” setting in “WORK SUPPORT”.	BL-114
		2. Check hazard function with hazard switch.	BL-150
		3. Replace Intelligent Key unit.	BL-152
Buzzer reminder does not operate by request switch. (Hazard reminder operates).	Intelligent Key warning buzzer does not operate.	1. Check “ANSER BACK WITH I-KEY LOCK” or “ANSER BACK WITH I-KEY UNLOCK” setting in “WORK SUPPORT”.	BL-114
		2. Check Intelligent Key warning buzzer(s).	BL-135
		3. Replace Intelligent Key unit.	BL-152
Hazard reminder does not operate by Intelligent Key (door lock/unlock button). (Buzzer reminder operates properly).		1. Check “HAZARD ANSWER BACK” setting in “WORK SUPPORT”.	BL-114
		2. Check hazard function with hazard switch.	BL-150
		3. Replace Intelligent Key.	BL-152
Buzzer reminder does not operate by Intelligent Key (door lock/unlock button). (Hazard reminder operates).	Intelligent Key warning buzzer does not operate.	1. Check “HORN WITH KEYLESS LOCK” setting in “WORK SUPPORT”.	BL-114
		2. Check Intelligent Key warning buzzer(s).	BL-135
		3. Replace Intelligent Key unit.	BL-152

WARNING CHIME/BUZZER FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- Make sure that vehicle is under the condition shown in “Conditions of vehicle” before starting diagnosis, and check each symptom.
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Conditions of Vehicle (Operating Conditions)

Warning chime/buzzer functions operating condition is extremely complicated, during operating confirmations, reconfirm the list above twice in order to ensure proper operation.

Symptom		Diagnosis/service procedure	Reference page
Ignition switch warning chime does not operate.		1. Check ignition knob switch.	BL-126
		2. Check door switch.	BL-127
		3. Check key switch.	BL-123
		4. Check Intelligent Key warning chime.	BL-150
		5. Replace Intelligent Key unit.	BL-152
Ignition key warning chime does not operate. (When mechanical key used).		1. Check key switch (Intelligent Key unit input).	BL-123
		2. Check key switch (BCM input).	BL-125
		3. Check door switch.	BL-127
		4. Check Intelligent Key warning chime.	BL-150
		5. Replace Intelligent Key unit.	BL-152
OFF position warning chime (For internal) does not operate.		1. Check ignition switch position.	BL-144
		2. Check ignition knob switch.	BL-126
		3. Check key switch.	BL-123
		4. Check combination meter warning chime.	BL-150
		5. Replace Intelligent Key unit.	BL-152
OFF position warning chime/buzzer (for external) does not operate.	Both Intelligent Key warning chime and buzzer do not operate.	1. Check ignition switch position.	BL-144
		2. Check ignition knob switch.	BL-126
		3. Check key switch.	BL-123
		4. Check Intelligent Key warning chime.	BL-150
		5. Check Intelligent Key warning buzzer(s).	BL-135
		6. Replace Intelligent Key unit.	BL-152
	Intelligent Key warning buzzer does not operate.	Check Intelligent Key warning buzzer(s).	BL-135
Take away warning chime/buzzer (door open to close) does not operate.	Both Intelligent Key warning chime and buzzer do not operate.	1. Check door switch.	BL-127
		2. Check inside key antenna.	BL-139
		3. Check key switch.	BL-123
		4. Check Intelligent Key warning chime.	BL-135
		5. Check Intelligent Key warning buzzer(s).	BL-135
		6. Replace Intelligent Key unit.	BL-152
	Intelligent Key warning buzzer does not operate.	Check Intelligent Key warning buzzer(s).	BL-135
Take away warning chime (through window) does not operate.		1. Check “TAKE OUT FROM WINDOW WARN” setting in “WORK SUPPORT”.	BL-114
		2. Check inside key antenna.	BL-139
		3. Check key switch.	BL-123
		4. Check Intelligent Key battery.	BL-152
		5. Check Intelligent Key warning chime.	BL-150
		6. Replace Intelligent Key unit.	BL-152

Symptom	Diagnosis/service procedure	Reference page
Door lock operation warning buzzer does not operate.	1. Check door switch.	BL-127
	2. Check ignition knob switch.	BL-126
	3. Check door request switch.	BL-130
	4. Check back door request switch.	BL-132
	5. Check outside key antenna (driver side and passenger side).	BL-136
	6. Check outside key antenna (rear bumper).	BL-138
	7. Check inside key antenna.	BL-139
	8. Check Intelligent Key warning buzzer(s).	BL-135
	9. Replace Intelligent Key unit.	BL-152

WARNING LAMP FUNCTION MALFUNCTION

NOTE:

- Before performing the diagnosis in the following table, check “Trouble Diagnosis Procedure”. Refer to BL-112, "Trouble Diagnosis Procedure".
- If the following “symptoms” are detected, check systems shown in the “Diagnosis/service procedure” column in this order.

Symptom	Diagnosis/service procedure	Reference page
When Intelligent Key low battery warning operate, “KEY” warning lamp (green) does not illuminate.	1. Check “LOW BAT OF KEY FOB WARN” setting in “WORK SUPPORT”.	BL-114
	2. Check Intelligent Key battery.	BL-152
	3. Check KEY warning lamp (green).	BL-149
	4. Replace Intelligent Key unit.	BL-152
P position warning lamp does not illuminate properly. (With CVT or A/T)	1. Check CVT or A/T shift selector (park position switch).	BL-146
	2. Check “P-SHIFT” warning lamp (red).	BL-148
	3. Replace Intelligent Key unit.	BL-152
LOCK warning lamp does not illuminate properly. (With M/T)	1. Check key interlock solenoid.	BL-143
	2. Check "LOCK" warning lamp.	BL-148
	3. Replace Intelligent Key unit.	BL-152
Take away warning lamp does not illuminate properly. (Take away warning chime is operated).	1. Check KEY warning lamp (red).	BL-152
	2. Replace Intelligent Key unit.	BL-152
Ignition switch warning lamp does not illuminate properly. (Ignition switch warning chime is operated).	1. Check KEY warning lamp (red).	BL-149
	2. Replace Intelligent Key unit.	BL-152

CAN Communication System Inspection

INFOID:0000000007330035

1. CHECK SELF-DIAGNOSTIC RESULTS

With CONSULT

- Connect CONSULT, and turn ignition switch ON.
- Touch “INTELLIGENT KEY” on “SELECT SYSTEM” screen.
- Touch “SELF-DIAG RESULTS” on “SELECT DIAG MODE” screen.
- Check display content in self-diagnostic results.

CONSULT display item	DTC code
NO DTC IS DETECTED	—
CAN COMM	U1000
CAN COMM2	U1010

OK or NG

NO DTC IS DETECTED>> Inspection End.
CAN COMM [U1000]>> After printing “SELF-DIAGNOSIS RESULTS”, go to “CAN SYSTEM”. Refer to LAN-14, "Trouble Diagnosis Flow Chart".
CAN COMM2 [U1010] >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

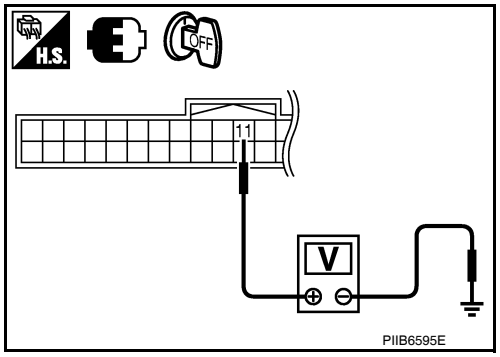
Power Supply and Ground Circuit Inspection

INFOID:0000000007330036

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit connector.
3. Check voltage between Intelligent Key unit harness connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit connector	Terminal		
M52	11	Ground	Battery voltage



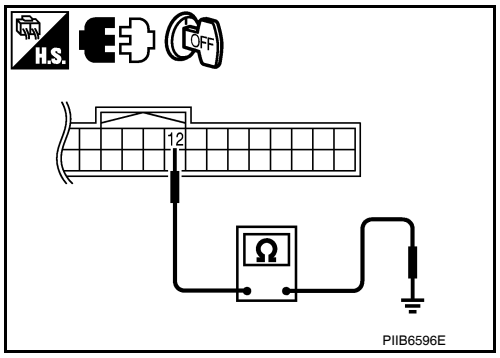
OK or NG

OK >> GO TO 2
NG >> Repair or replace Intelligent Key power supply circuit.

2.CHECK GROUND CIRCUIT

Check continuity between Intelligent Key unit harness connector and ground.

Intelligent Key unit connector	Terminal	Ground	Continuity
M52	12		Yes



OK or NG

OK >> Power supply and ground circuits are OK.
NG >> Repair or replace the Intelligent Key unit ground circuit.

Key Switch (Intelligent Key Unit Input) Check

INFOID:0000000007330037

1.CHECK KEY SWITCH INPUT SIGNAL

With CONSULT

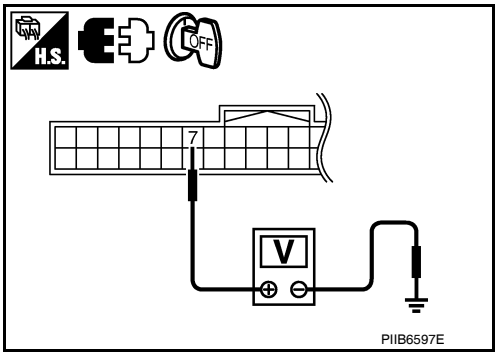
Check key switch (“KEY SW”) in “DATA MONITOR” mode with CONSULT.

Monitor item	Condition
KEY SW	Insert mechanical key into ignition switch: ON
	Remove mechanical key from ignition switch: OFF

Without CONSULT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit connector.

3. Check voltage between Intelligent Key unit and ground.



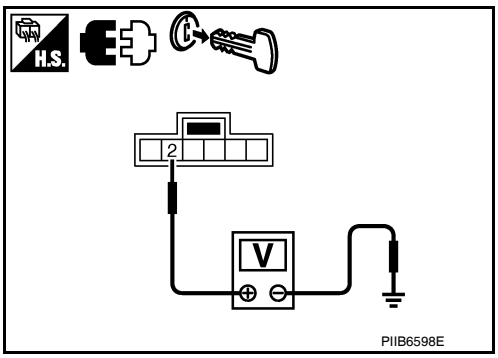
Terminals			Condition of key switch	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	7	Ground	Insert mechanical key into ignition switch	Battery voltage
			Remove mechanical key from ignition switch	0

OK or NG

OK >> Key switch circuit is OK.
NG >> GO TO 2

2.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove mechanical key from ignition switch.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch and ground.



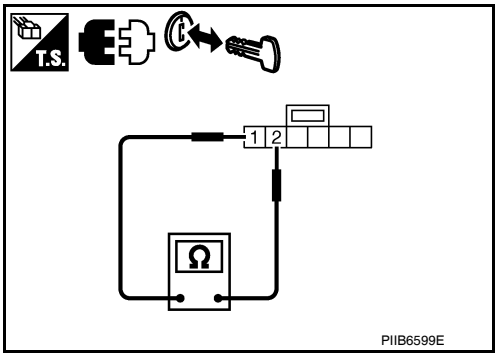
Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch and ignition knob switch connector	Terminal		
M73	2	Ground	Battery voltage

OK or NG

OK >> GO TO 3
NG >> Repair or replace key switch and ignition knob switch power supply circuit.

3.CHECK KEY SWITCH

Check continuity of key switch and ignition knob switch.



Terminal		Condition of key switch	Continuity
Key switch and ignition knob switch			
1	2	Insert mechanical key into ignition switch	Yes
		Remove mechanical key from ignition switch	No

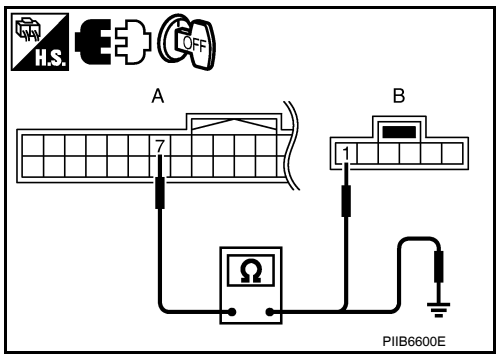
OK or NG

OK >> GO TO 4
NG >> Replace key cylinder assembly (built-in key switch).

4.CHECK KEY SWITCH CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit and key switch and ignition knob switch.

A		B		Continuity
Intelligent Key unit connector	Terminal	Key switch and ignition knob switch connector	Terminal	
M52	7	M73	1	Yes



3. Check continuity between Intelligent Key unit and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	7		No

OK or NG

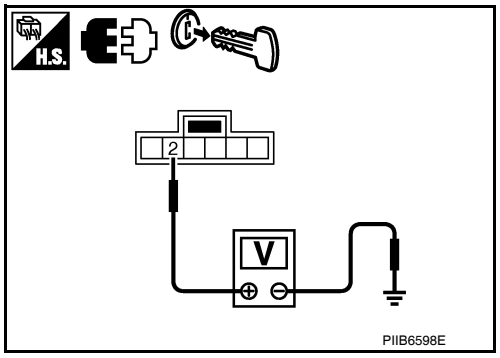
OK >> Check the condition of harness and harness connector.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.

Key Switch (BCM Input) Check

INFOID:0000000007330038

1.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Remove mechanical key from ignition switch.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch and ground.



Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch and ignition knob switch connector	Terminal		
M73	2	Ground	Battery voltage

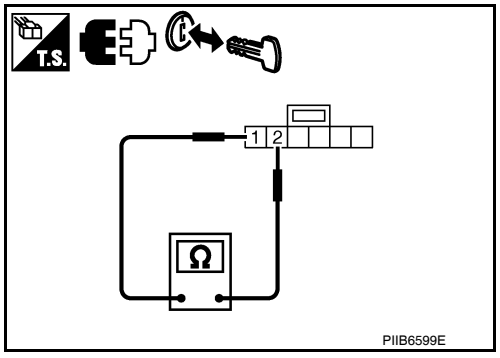
OK or NG

OK >> GO TO 2
NG >> Check harness between key switch and ignition knob switch and fuse.

2.CHECK KEY SWITCH OPERATION

Check continuity of key switch and ignition knob switch.

Terminal		Condition of key switch	Continuity
Key switch and ignition knob switch			
1	2	Insert mechanical key into ignition switch	Yes
		Remove mechanical key from ignition switch	No



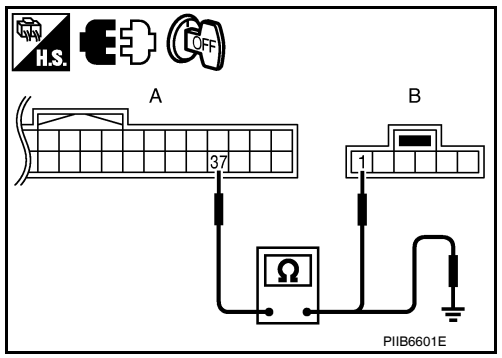
OK or NG

OK >> GO TO 3
NG >> Replace key cylinder assembly (built-in key switch).

3.CHECK KEY SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector (A) M18 terminal 37 and key switch and ignition knob switch connector (B) terminal 1.

A		B		Continuity
BCM connector	Terminal	Key switch and ignition knob switch connector	Terminal	
M18	37	M73	1	Yes



3. Check continuity between BCM connector (A) M18 terminal 37 and ground.

A		Ground	Continuity
BCM connector	Terminal		
M18	37		No

OK or NG

OK >> Key switch (BCM input) circuit is OK.
NG >> Repair or replace harness between key switch and ignition knob switch and BCM.

Ignition Knob Switch Check

INFOID:0000000007330039

1.CHECK IGNITION KNOB SWITCH INPUT SIGNAL

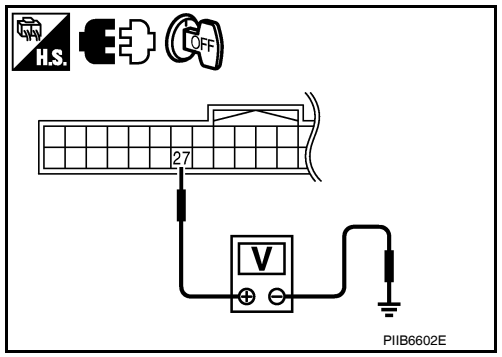
With CONSULT

Display “PUSH SW” on DATA MONITOR screen, and check if ON/OFF display is linked to ignition switch operation.

Monitor item	Condition
PUSH SW	Ignition switch is pressed: ON
	Ignition switch is released: OFF

Without CONSULT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit connector.
3. Check voltage between Intelligent Key unit and ground.



Terminals			Condition of key switch	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	27	Ground	Ignition switch is pressed	Battery voltage
			Ignition switch is released	0

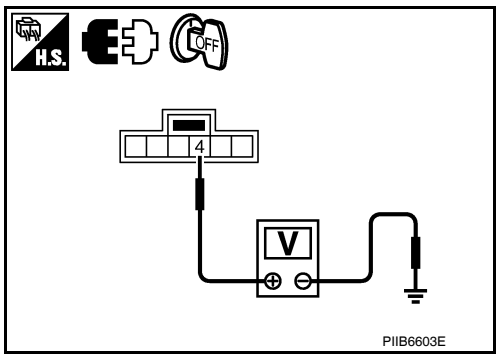
OK or NG

OK >> Ignition knob switch circuit is OK.
NG >> GO TO 2

2.CHECK IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Key switch and ignition knob switch connector	Terminal		
M73	4	Ground	Battery voltage



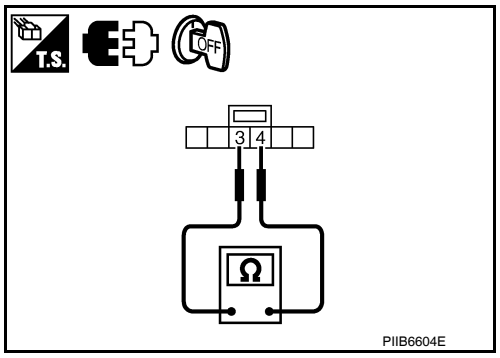
OK or NG

OK >> GO TO 3
NG >> Repair or replace key switch and ignition knob switch power supply circuit.

3. CHECK IGNITION KNOB SWITCH

Check continuity of ignition knob switch.

Terminal		Condition of key switch	Continuity
Key switch and ignition knob switch			
3	4	Ignition switch is pressed	Yes
		Ignition switch is released	No



OK or NG

OK >> GO TO 4
NG >> Replace key switch and ignition knob switch.

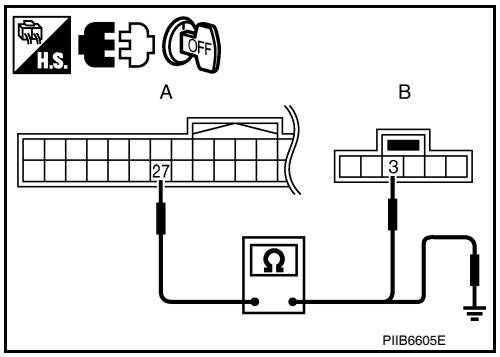
4. CHECK IGNITION KNOB SWITCH CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector (A) terminal 27 and key switch and ignition knob switch connector (B) terminal 3.

A		B		Continuity
Intelligent Key unit connector	Terminal	Key switch and ignition knob switch connector	Terminal	
M52	27	M73	3	Yes

3. Check continuity between Intelligent Key unit connector (A) terminal 27 and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	27		No



OK or NG

OK >> Check the condition of harness and harness connector.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.

Door Switch Check

INFOID:0000000007330040

1. CHECK DOOR SWITCHES INPUT SIGNAL

With CONSULT

Check door switches ("DOOR SW-DR", "DOOR SW-AS", "DOOR SW-RL", "DOOR SW-RR", "BACK DOOR SW") in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)" .

- When doors are open:

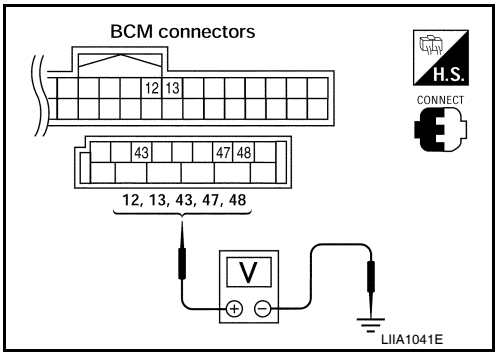
DOOR SW-DR : ON
DOOR SW-AS : ON
DOOR SW-RL : ON
DOOR SW-RR : ON
BACK DOOR SW : ON

- When doors are closed:

DOOR SW-DR : OFF
DOOR SW-AS : OFF
DOOR SW-RL : OFF
DOOR SW-RR : OFF
BACK DOOR SW : OFF

Without CONSULT
Check voltage between BCM connector M18 or M19 terminals 12, 13, 43, 47, 48 and ground.

Connector	Item	Terminals		Condition	Voltage (V) (Approx.)
		(+)	(–)		
M18	Front door switch RH	12	Ground	Open ↓ Closed	0 ↓ Battery voltage
	Rear door switch RH	13			
M19	Back door switch	43			
	Front door switch LH	47			
	Rear door switch LH	48			



OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

2.CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door switch and BCM.
3. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and BCM connectors (A) M18, M19 terminals 12, 13, 43, 47 and 48.

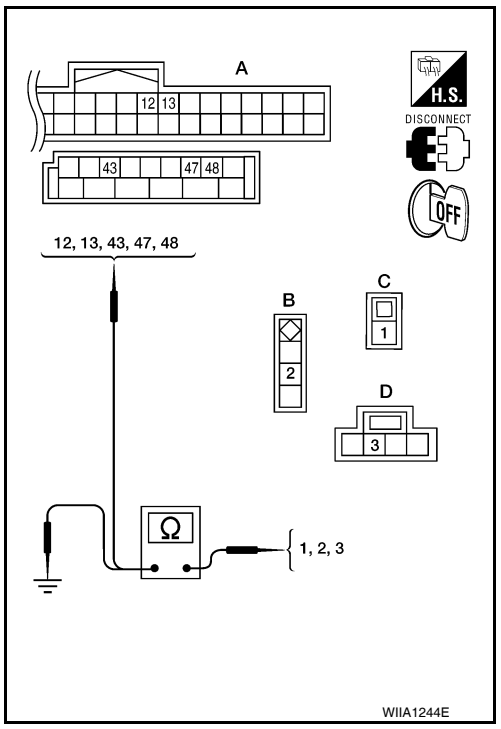
1 - 13 : **Continuity should exist.**
1 - 48 : **Continuity should exist.**
2 - 12 : **Continuity should exist.**
2 - 47 : **Continuity should exist.**
3 - 43 : **Continuity should exist.**

4. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and ground.

1 - Ground : **Continuity should not exist.**
2 - Ground : **Continuity should not exist.**
3 - Ground : **Continuity should not exist.**

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

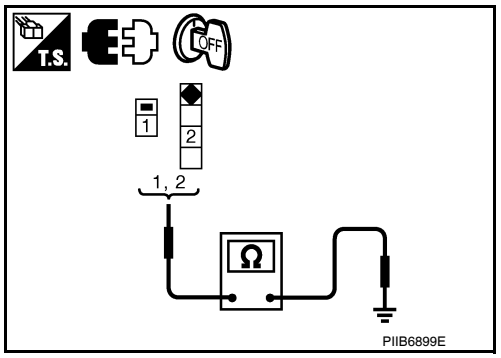


3. CHECK DOOR SWITCHES

FRONT AND REAR DOORS

Check continuity between front door switch terminal 2 or rear door switch terminal 1 and exposed metal of switch while pressing and releasing switch.

Door switch is released : **Continuity should exist.**
Door switch is pushed : **Continuity should not exist.**



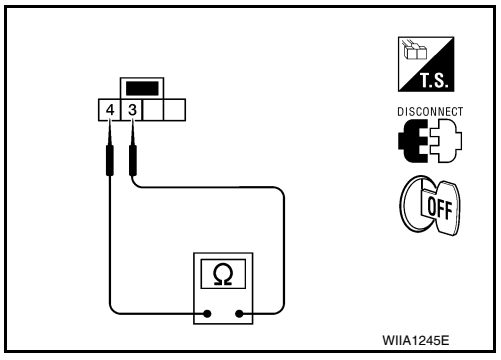
BACK DOOR

Check continuity between back door lock assembly connector (back door switch) terminals 3 and 4 while pressing (closing back door) and releasing (opening back door) switch.

When back door is open : **Continuity should exist.**
When back door is closed : **Continuity should not exist.**

OK or NG

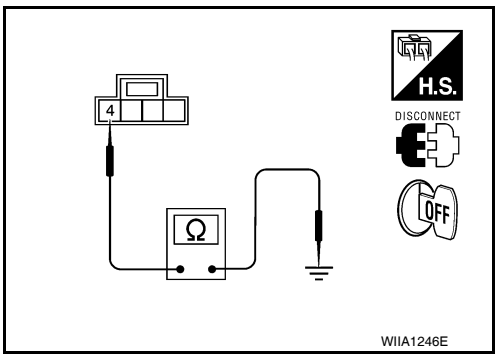
OK1 >> (Front and rear doors) Switch circuit is OK.
OK2 >> (Back door) GO TO 4
NG >> Replace door switch.



4. CHECK BACK DOOR SWITCH GROUND

Check continuity between back door lock assembly connector D405 terminal 4 and ground.

4 - Ground : Continuity should exist.



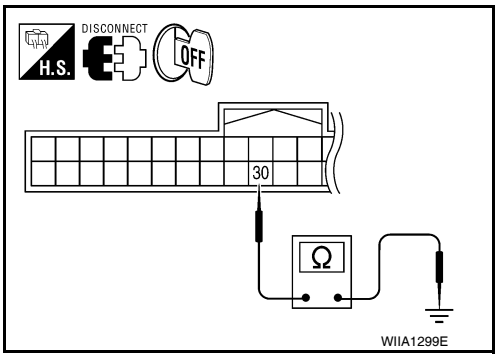
OK or NG

OK >> GO TO 5
NG >> Repair or replace harness.

5.CHECK BACK DOOR SWITCH SIGNAL FOR SHORT

1. Disconnect Intelligent Key unit.
2. Check continuity between BCM connector M18 terminal 30 and ground.

30 - Ground : Continuity should not exist.



OK or NG

OK >> Back door switch circuit is OK.
NG >> Repair or replace harness.

Door Request Switch Check

INFOID:0000000007330042

1.CHECK DOOR REQUEST SWITCH

With CONSULT

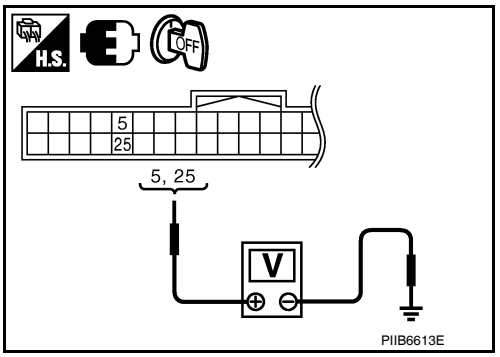
Check door request switch (“DR REQ SW” or “AS REQ SW”) in “DATA MONITOR” mode.

Monitor item	Condition
DR REQ SW AS REQ SW	Door request switch is pressed: ON
	Door request switch is released: OFF

Without CONSULT

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit harness connector and ground.

Terminals				Door request switch Condition	Voltage (V) (Approx.)
(+)			(–)		
Intelligent Key unit connector		Terminal			
M52	Front door request switch LH	5	Ground	Pressed	0
				Released	5
	Front door request switch RH	25		Pressed	0
				Released	5



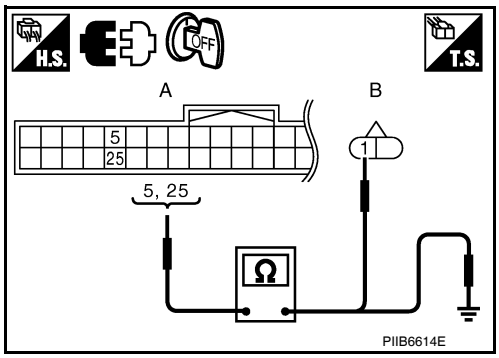
OK or NG

OK >> Door request switch circuit is OK.
NG >> GO TO 2

2.CHECK DOOR REQUEST SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and front door request switch connector.
3. Check continuity between Intelligent Key unit connector and front door request switch connector.

A		B			Continuity
Intelligent Key unit connector	Terminal	Front door request switch connector		Terminal	
M52	5	LH	D5	1	Yes
	25	RH	D103		



4. Check continuity between Intelligent Key unit connector and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	5		No
	25		

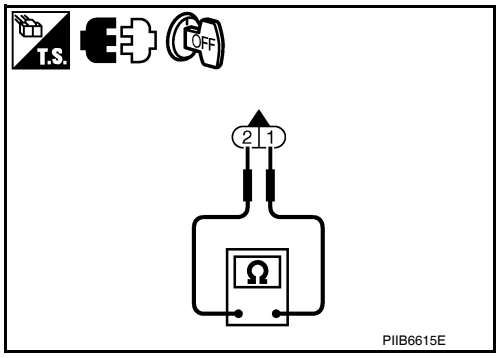
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between Intelligent Key unit and front door request switch.

3.CHECK DOOR REQUEST SWITCH OPERATION

Check front door request switch.

Terminal		Door request switch condition	Continuity
Front outside handle			
1	2	Pressed	Yes
		Released	No



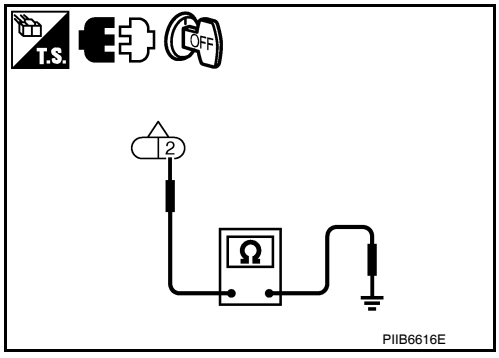
OK or NG

OK >> GO TO 4
NG >> Replace front door request switch.

4.CHECK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between front door request switch connector and ground.

Front outside handle connector		Terminal	Ground	Continuity
Driver side	D5	2		Yes
Passenger side	D103			



OK or NG

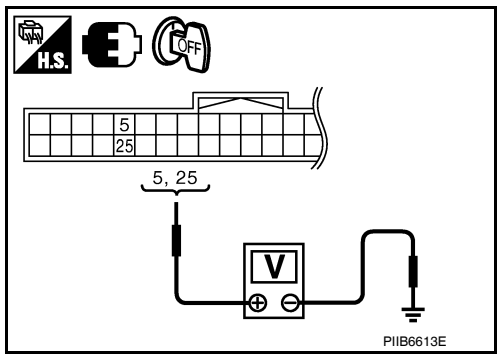
OK >> GO TO 5
NG >> Repair or replace front door request switch ground circuit.

5.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.

2. Check voltage between Intelligent Key unit connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit connector	Terminal		
M52	5	Ground	5
	25		



OK or NG

OK >> Check the condition of harness and connector.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

Back Door Request Switch Check

INFOID:0000000007330043

1.CHECK BACK DOOR REQUEST SWITCH

With CONSULT

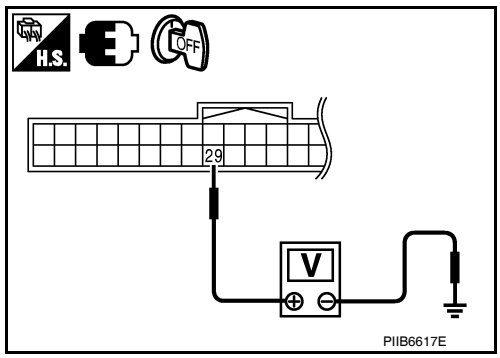
Check back door request switch (“BD/TR REQ SW”) in “DATA MONITOR” mode.

Monitor item	Condition
BD/TR REQ SW	Back door request switch is pressed: ON
	Back door request switch is released: OFF

Without CONSULT

1. Turn ignition switch OFF.
2. Check voltage between Intelligent Key unit connector and ground.

Terminals			Back door request switch condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	29	Ground	Pressed	0
			Released	5



OK or NG

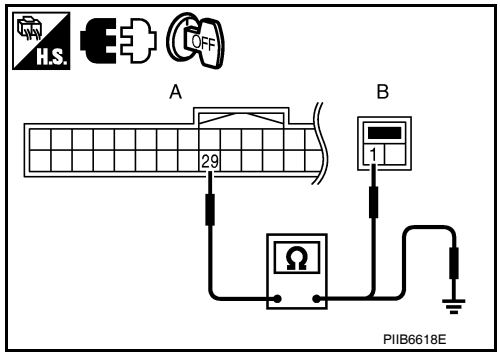
OK >> Back door request switch circuit is OK.
NG >> GO TO 2

2.CHECK BACK DOOR REQUEST SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and back door request switch connector.
3. Check continuity between Intelligent Key unit connector (A) M52 terminal 29 and back door request switch connector (B) D406 terminal 1.

A		B		Continuity
Intelligent Key unit connector	Terminal	Back door request switch connector	Terminal	
M52	29	D406	1	Yes

4. Check continuity between Intelligent Key unit connector (A) M52 terminal 29 and ground.



A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	29		No

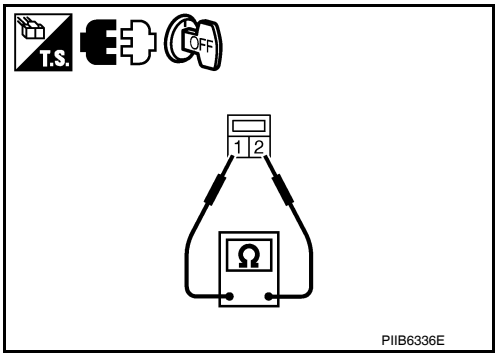
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between Intelligent Key unit and back door request switch.

3.CHECK BACK DOOR REQUEST SWITCH OPERATION

Check continuity of back door request switch.

Terminal		Back door request switch condition	Continuity
Back door request switch			
1	2	Pressed	Yes
		Released	No



PIIB6336E

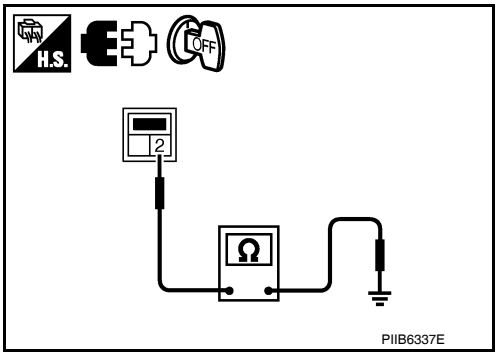
OK or NG

OK >> GO TO 4
NG >> Replace back door request switch.

4.CHECK BACK DOOR REQUEST SWITCH GROUND CIRCUIT

Check continuity between back door request switch connector D406 terminal 2 and ground.

Back door request switch connector	Terminal	Ground	Continuity
D406	2		Yes



PIIB6337E

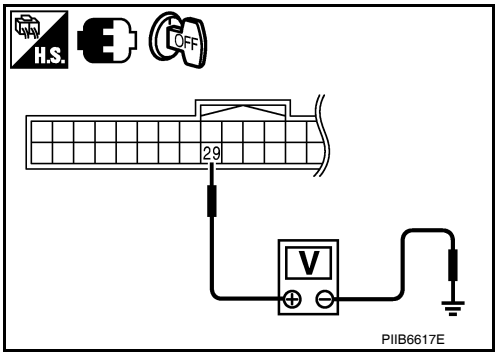
OK or NG

OK >> GO TO 5
NG >> Repair or replace back door request switch ground circuit.

5.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between Intelligent Key unit connector M52 terminal 29 and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit connector	Terminal		
M52	29	Ground	5



PIIB6617E

OK or NG

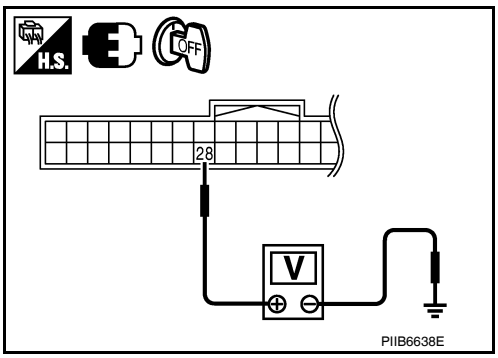
OK >> Check the condition of harness and connector.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

Unlock Sensor Check

INFOID:0000000007330045

1.CHECK UNLOCK SENSOR INPUT SIGNAL

Check voltage between Intelligent Key unit connector and ground.



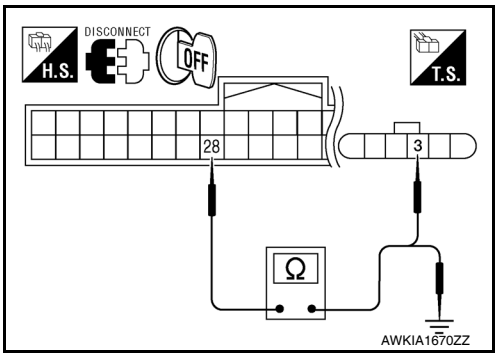
Terminals			Front door lock (driver side) condition	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	28	Ground	Locked	5
			Unlocked	0

OK or NG

OK >> Unlock sensor circuit is OK.
NG >> GO TO 2

2.CHECK UNLOCK SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and front door lock assembly LH (door unlock sensor) connector.
3. Check continuity between Intelligent Key unit connector (A) terminal 28 and front door lock assembly LH (door unlock sensor) connector (B) terminal 3.



A		B		Continuity
Intelligent Key unit connector	Terminal	Front door lock assembly LH (door unlock sensor) connector	Terminal	
M52	28	D14	3	Yes

4. Check continuity between Intelligent Key unit connector and ground.

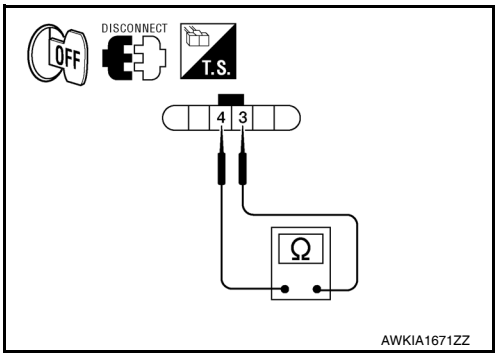
A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	28		No

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between Intelligent Key unit and front door lock assembly LH (door unlock sensor).

3.CHECK UNLOCK SENSOR OPERATION

Check unlock sensor.



Terminal		Driver side door condition	Continuity
Unlock sensor			
3	4	Lock	No
		Unlock	Yes

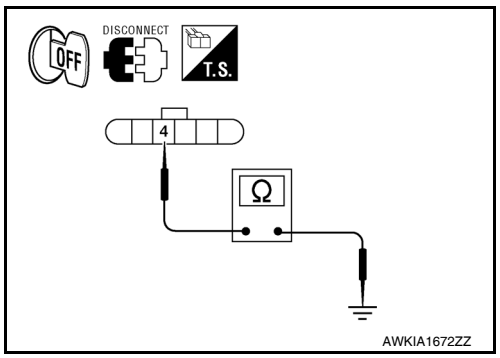
OK or NG

OK >> GO TO 4
NG >> Replace front door lock assembly LH (door unlock sensor). Refer to BL-161, "Removal and Installation".

4.CHECK UNLOCK SENSOR GROUND CIRCUIT

Check continuity between front door lock assembly LH (door unlock sensor) connector and ground.

Front door lock assembly LH (door unlock sensor) connector	Terminal	Ground	Continuity
D14	4		Yes



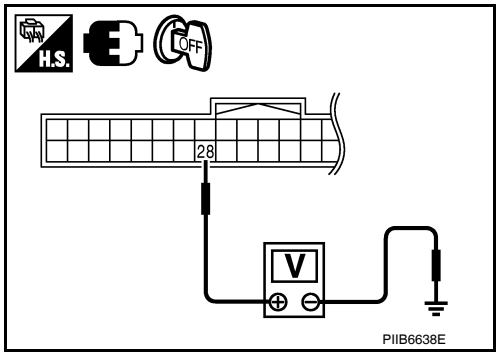
OK or NG

OK >> GO TO 5
NG >> Repair or replace harness.

5. CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit harness connector.
2. Check voltage between Intelligent Key unit connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit connector	Terminal		
M52	28	Ground	5



OK or NG

OK >> Check the condition of harness and connector.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

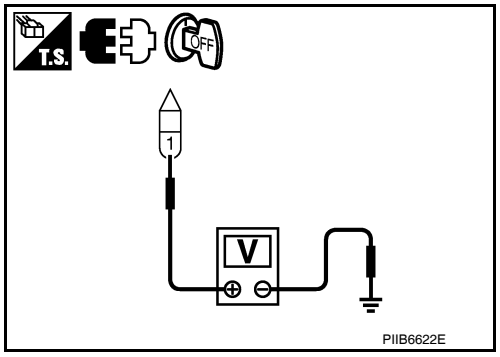
Intelligent Key Warning Buzzer(s) Check

INFOID:0000000007330046

1. CHECK INTELLIGENT KEY WARNING BUZZER POWER SUPPLY CIRCUIT

1. Disconnect inoperative Intelligent Key warning buzzer connector.
2. Check voltage between Intelligent Key warning buzzer connector and ground.

Terminals				Voltage (V) (Approx.)
(+)			(–)	
Intelligent Key warning buzzer connector		Terminal		
Front door LH	D6	1	Ground	Battery voltage



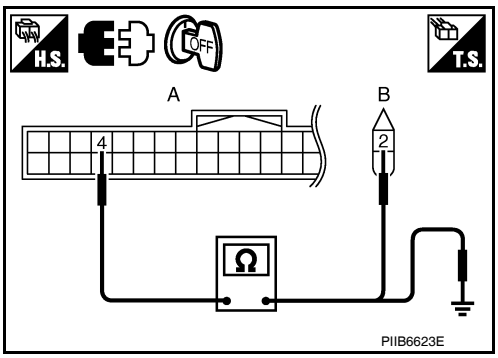
OK or NG

OK >> GO TO 2
NG >> Repair or replace Intelligent Key warning buzzer power supply circuit.

2. CHECK INTELLIGENT KEY WARNING BUZZER CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector and inoperative Intelligent Key warning buzzer connector.

A		B			Continuity
Intelligent Key unit connector	Terminal	Intelligent Key warning buzzer connector		Terminal	
M52	4	Front door LH	D6	2	Yes



3. Check continuity between Intelligent Key unit connector and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	4		No

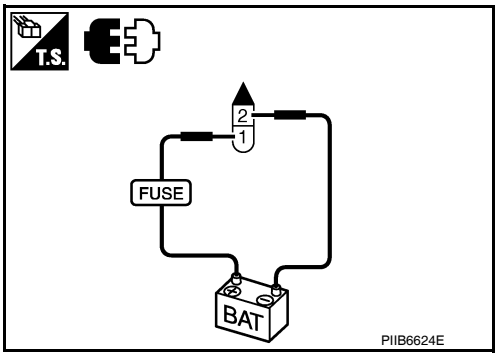
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between Intelligent Key unit and Intelligent Key warning buzzer.

3.CHECK INTELLIGENT KEY WARNING BUZZER OPERATION

Connect battery power supply to Intelligent Key warning buzzer terminals 1 and 2, and check the operation.

1 (BAT+) - 2 (BAT-) : the buzzer sounds



OK or NG

OK >> Intelligent Key warning buzzer is OK.
NG >> Replace inoperative Intelligent Key warning buzzer.

Outside Key Antenna (Driver Side and Passenger Side) Check

INFOID:0000000007330047

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Check Intelligent Key relative signal strength
- Confirm vehicle Intelligent Key antenna signal strength

1.CHECK OUTSIDE KEY ANTENNA FUNCTION

With CONSULT
1. Check the operation with (“ANTENNA”) in the ACTIVE TEST.
2. Touch “DRIVER ANT” and “ASSIST ANT” on screen.
3. Carry the Intelligent Key into the antenna detection area.

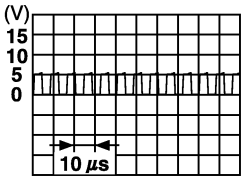
Test item	Corresponding antenna
DRIVER ANT	Outside key antenna driver side
ASSIST ANT	Outside key antenna passenger side

Do the hazard lamps flash?

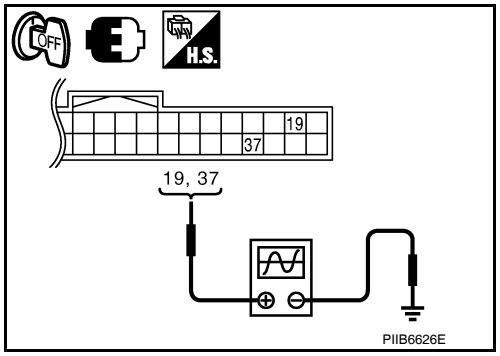
Yes >> Outside key antenna (driver side or passenger side) is OK.
No >> GO TO 2

2.CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals				Condition	Signal (Reference value.)
(+)			(–)		
Intelligent Key unit connector		Terminal			
M52	Driver side	19	Ground	Door request switch is pushed	
	Passenger side	37			

SIIA1910J



PIIB6626E

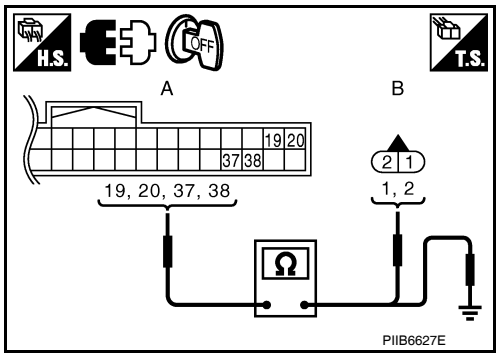
OK or NG

OK >> Outside key antenna is OK.
NG >> GO TO 3

3. CHECK OUTSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit and outside key antenna connector.
2. Check continuity between Intelligent Key unit connector and outside key antenna connector.

A		B		Continuity
Intelligent Key unit connector	Terminal	Outside key antenna connector	Terminal	
M52	19	D10	1	Yes
	20		2	
	37	D106	1	
	38		2	



PIIB6627E

3. Check continuity between Intelligent Key unit connector and ground.

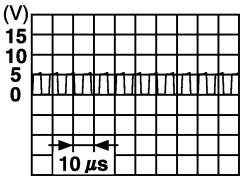
A			Continuity
Intelligent Key unit connector	Terminal		
M52	19	Ground	No
	20		
	37		
	38		

OK or NG

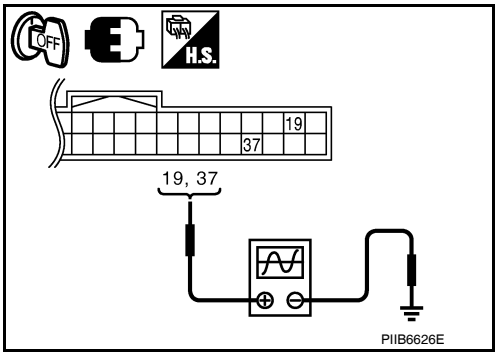
OK >> GO TO 4
NG >> Repair or replace harness between Intelligent Key unit and outside key antenna.

4. CHECK OUTSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace outside key antenna (New antenna or other antenna).
2. Connect Intelligent Key unit and outside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector		Terminal (+)	Terminals (–)	Condition	Signal (Reference value.)
M52	Driver side	19	Ground	Door request switch is pushed	
	Passenger side	37			

SIIA1910J



PIIB6626E

OK or NG

OK >> Replace malfunctioning outside key antenna.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

Outside Key Antenna (Rear Bumper) Check

INFOID:0000000007330048

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Check Intelligent Key relative signal strength
- Confirm vehicle Intelligent Key antenna signal strength

1.CHECK REAR BUMPER ANTENNA FUNCTION

With CONSULT
1. Check the operation with (“ANTENNA”) in the ACTIVE TEST.
2. Touch “BD/TR ANT” on screen.
3. Carry the Intelligent Key into the antenna detection area.

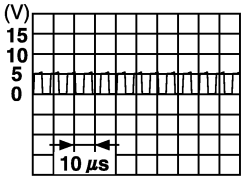
Test item	Corresponding antenna
BK DOOR ANT	Rear bumper antenna

Do the hazard lamps flash?

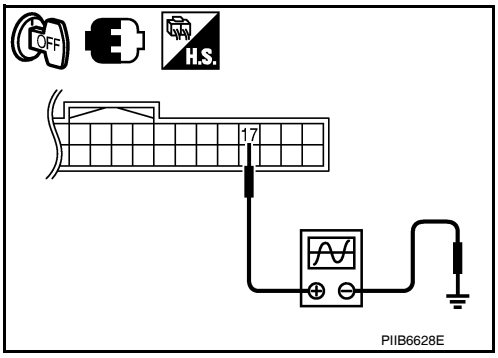
Yes >> Rear bumper antenna is OK.
No >> GO TO 2

2.CHECK REAR BUMPER ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.
2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector	Terminal (+)	Terminals (–)	Condition	Signal (Reference value.)
M52	17	Ground	Back door request switch is pushed	

SIIA1910J



PIIB6628E

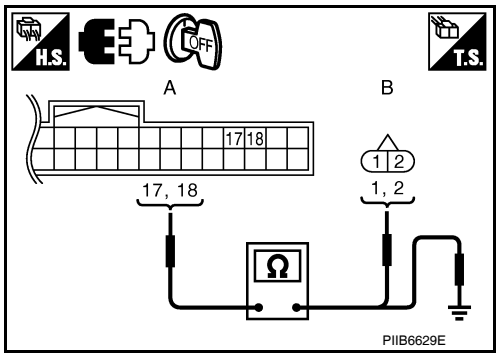
OK or NG

OK >> Rear bumper antenna is OK.
NG >> GO TO 3

3.CHECK REAR BUMPER ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit and rear bumper antenna connector.
2. Check continuity between Intelligent Key unit connector and rear bumper antenna connector.

A		B		Continuity
Intelligent Key unit connector	Terminal	Rear bumper antenna connector	Terminal	
M52	17	B2	1	Yes
	18		2	



3. Check continuity between Intelligent Key unit connector and ground.

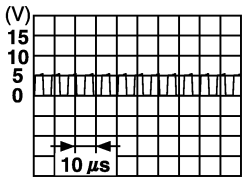
A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	17		No
	18		

OK or NG

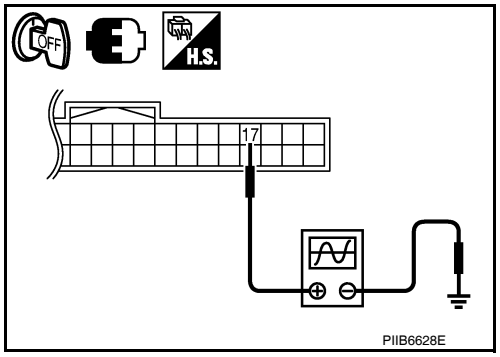
OK >> GO TO 4
NG >> Repair or replace harness between Intelligent Key unit and rear bumper antenna.

4.CHECK REAR BUMPER ANTENNA INPUT SIGNAL 2

1. Replace rear bumper antenna (new antenna or other antenna).
2. Connect Intelligent Key unit and rear bumper antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals			Condition	Signal (Reference value.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	17	Ground	Back door request switch is pushed	

SIIA1910J



OK or NG

OK >> Replace rear bumper antenna.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

Inside Key Antenna Check

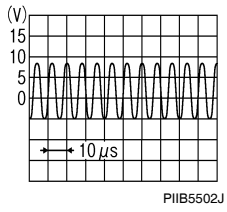
INFOID:0000000007330049

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.
- Check Intelligent Key relative signal strength
- Confirm vehicle Intelligent Key antenna signal strength

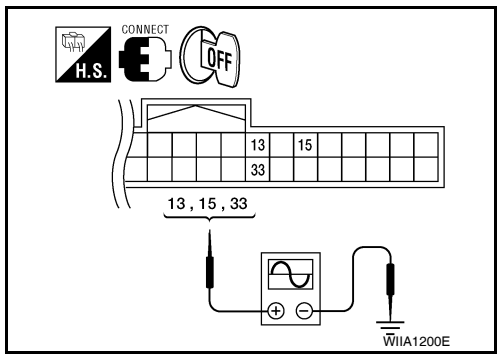
1.CHECK INSIDE KEY ANTENNA INPUT SIGNAL 1

1. Turn ignition switch OFF.

2. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector		Terminals (+) Terminal	Terminals (–)	Condition	Signal (Reference value.)
M52	Instrument panel area	13	Ground	Any door is open → close	
	Front console area	15			
	Rear floor area	33			

PIIB5502J



WIIA1200E

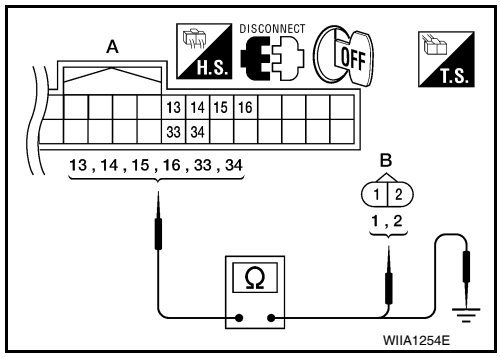
OK or NG

OK >> Check the condition of harness and connector.
NG >> GO TO 2

2. CHECK INSIDE KEY ANTENNA CIRCUIT

1. Disconnect Intelligent Key unit and inside key antenna connector.
2. Check continuity between Intelligent Key unit connector and inside key antenna connector.

A Intelligent Key unit connector	A Terminal	B Inside key antenna connector		B Terminal	Continuity
M52	13	M10	Instrument panel	2	Yes
	14			1	
	15	B125	Front console	1	
	16			2	
	33	B126	Rear floor	1	
	34			2	



WIIA1254E

3. Check continuity between Intelligent Key unit connector and ground.

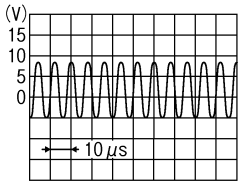
A Intelligent Key unit connector		A Terminal	Ground	Continuity
M52	Instrument panel	13	Ground	No
		14		
	Front console	15		
		16		
	Rear floor	33		
		34		

OK or NG

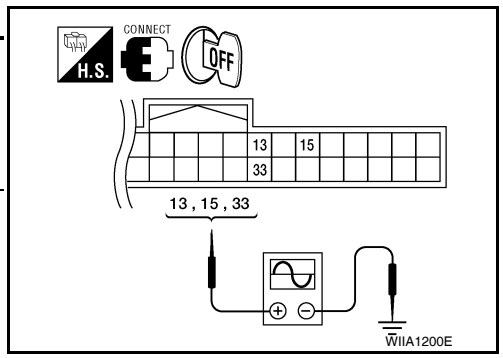
OK >> GO TO 3
NG >> Repair or replace harness between Intelligent Key unit and inside key antenna.

3. CHECK INSIDE KEY ANTENNA INPUT SIGNAL 2

1. Replace inside key antenna. (New antenna or other antenna)
2. Connect Intelligent Key unit and inside key antenna connector.
3. Check signal between Intelligent Key unit connector and ground with oscilloscope.

Terminals (+) Intelligent Key unit connector		Terminal	Terminals (–)	Condition	Signal (Reference value.)
M52	Instrument panel area	13	Ground	Any door is open → close	
	Front console area	15			
	Rear floor area	33			

PIIB5502J



WIIA1200E

OK or NG

OK >> Replace malfunction inside key antenna.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit"

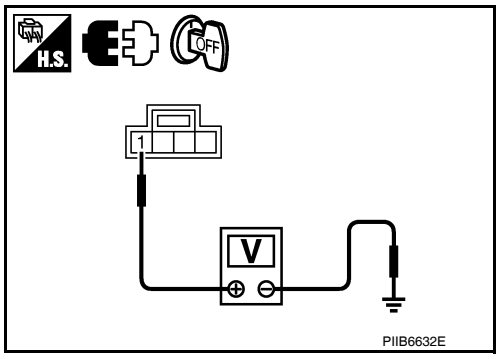
Steering Lock Solenoid Check

INFOID:0000000007330050

1.CHECK STEERING LOCK SOLENOID POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect steering lock solenoid connector.
3. Check voltage between steering lock solenoid and ground.

Terminals (+) Steering lock solenoid	Terminal	Terminals (–)	Voltage (V) (Approx.)
M6	1	Ground	Battery voltage



PIIB6632E

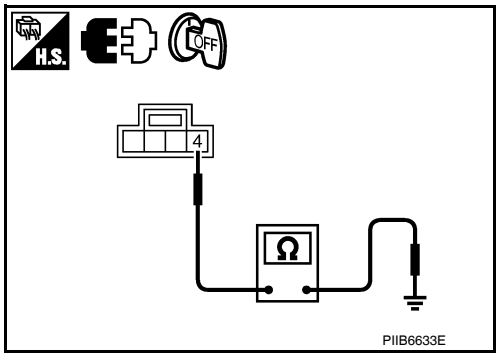
OK or NG

OK >> GO TO 2
NG >> Repair or replace steering lock solenoid power supply circuit.

2.CHECK STEERING LOCK SOLENOID GROUND CIRCUIT

Check continuity between steering lock solenoid and ground.

Steering lock solenoid connector	Terminal	Ground	Continuity
M6	4		Yes



PIIB6633E

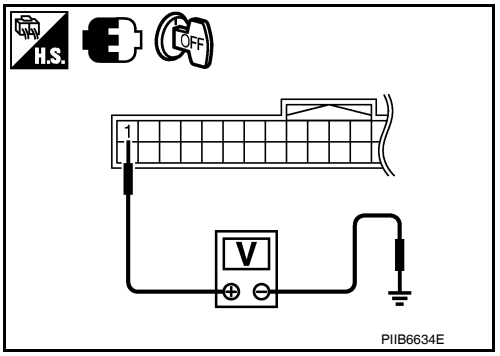
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

3.CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect steering lock solenoid connector.
2. Check voltage between Intelligent Key unit and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
Intelligent Key unit connector	Terminal		
M52	1	Ground	5

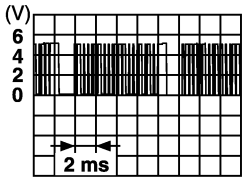


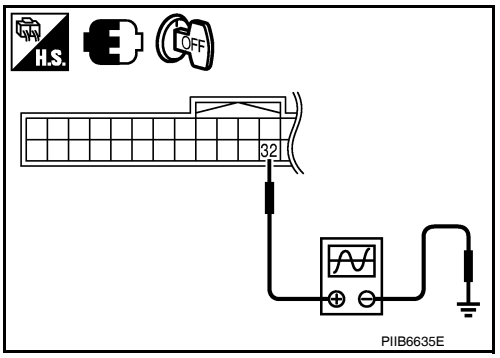
OK or NG

OK >> GO TO 4
NG >> GO TO 6

4. CHECK STEERING LOCK COMMUNICATION SIGNAL

Check signal between Intelligent Key unit and ground with oscilloscope.

Terminals			Condition of key switch	Voltage (V) (Approx.)
(+)		(–)		
Intelligent Key unit connector	Terminal			
M52	32	Ground	Ignition switch is pushed	



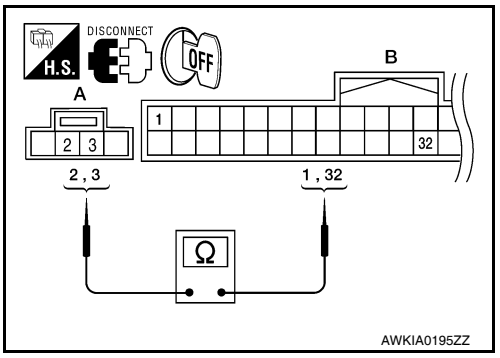
OK or NG

OK >> GO TO 5
NG >> GO TO 6

5. CHECK STEERING LOCK SOLENOID COMMUNICATION CIRCUIT FOR OPEN

1. Disconnect Intelligent Key unit and steering lock solenoid connectors.
2. Check continuity between steering lock solenoid and Intelligent Key unit.

A		B		Continuity
Steering lock solenoid connector	Terminal	Intelligent Key unit connector	Terminal	
M6	2	M52	1	Yes
	3		32	



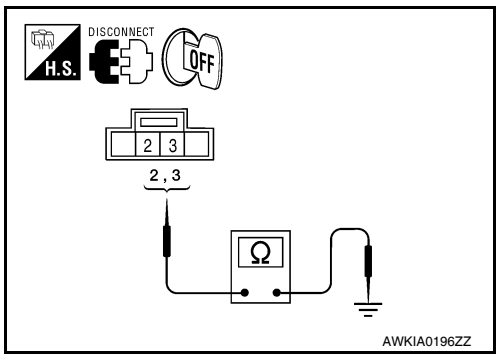
OK or NG

OK >> Replace steering lock solenoid.
NG >> Repair or replace harness between steering lock solenoid and Intelligent Key unit.

6. CHECK STEERING LOCK SOLENOID COMMUNICATION CIRCUIT FOR SHORT

1. Disconnect Intelligent Key unit and steering lock solenoid connectors.

2. Check continuity between steering lock solenoid connector and ground.



Steering lock solenoid connector	Terminal	Ground	Continuity
M6	2,3		No

OK or NG

OK >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

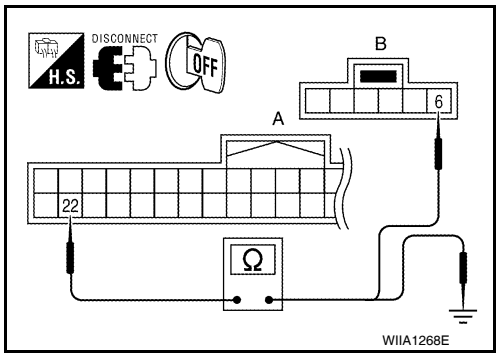
NG >> Repair or replace harness between steering lock solenoid and Intelligent Key unit.

Key Interlock Solenoid (With M/T) Check

INFOID:0000000007330051

1.CHECK INTERLOCK SOLENOID POWER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and key switch and ignition knob switch connector.
3. Check continuity between Intelligent Key unit connector M52 (A) terminal 22 and key switch and ignition knob switch connector M73 (B) terminal 6.



A		B		Continuity
Intelligent Key unit connector	Terminal	Key switch and ignition knob switch connector	Terminal	
M52	22	M73	6	Yes

4. Check continuity between Intelligent Key unit connector (A) terminal 22 and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	22		No

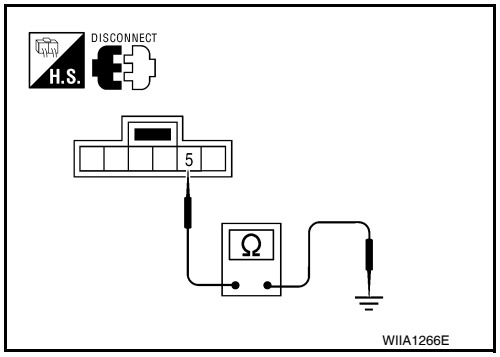
OK or NG

OK >> GO TO 2

NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.

2.CHECK INTERLOCK SOLENOID GROUND CIRCUIT

Check continuity between key switch and ignition knob switch connector M73 terminal 5 and ground.



Key switch and ignition knob switch connector	Terminal	Ground	Continuity
M73	5		Yes

OK or NG

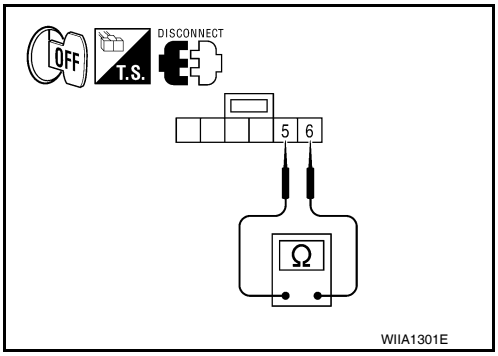
OK >> GO TO 3

NG >> Repair or replace harness.

3.CHECK INTELLIGENT KEY SOLENOID RESISTANCE

Check resistance between key switch and ignition knob switch terminals 5 and 6.

Key switch and ignition knob switch	Terminal	Terminal	Resistance
	5	6	1-10 Ω



OK or NG

OK >> Key switch and ignition knob switch is OK.
NG >> Replace key switch and ignition knob switch.

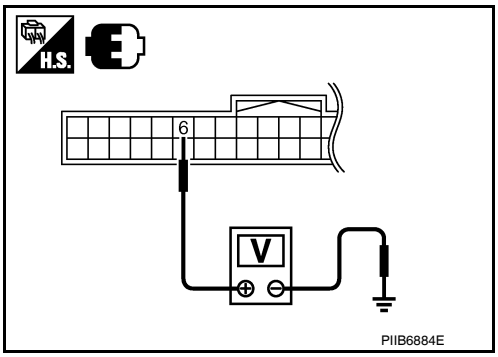
Ignition Switch Position Check

INFOID:0000000007330052

1.CHECK IGNITION POWER SUPPLY

Check voltage between Intelligent Key unit connector and ground.

Terminals			Ignition switch position		
(+)		(–)			
Intelligent Key unit connector	Terminal		OFF	ACC	ON
M52	6	Ground	0	0	Battery voltage



OK or NG

OK >> Ignition power supply is OK.
NG >> Check the following.
- Intelligent Key unit power supply circuit.
- 10A fuse [No. 2, located in the fuse block (J/B)]

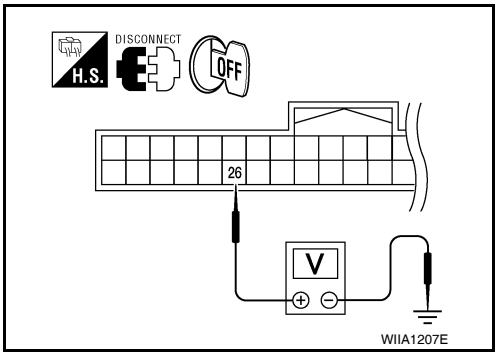
Stop Lamp Switch Check (With CVT or A/T)

INFOID:0000000007330053

1.CHECK STOP LAMP SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit connector.
3. Check voltage between Intelligent Key unit harness connector M52 terminal 26 and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M52	26	Ground	Brake pedal depressed	Battery voltage
			Brake pedal released	0



OK or NG

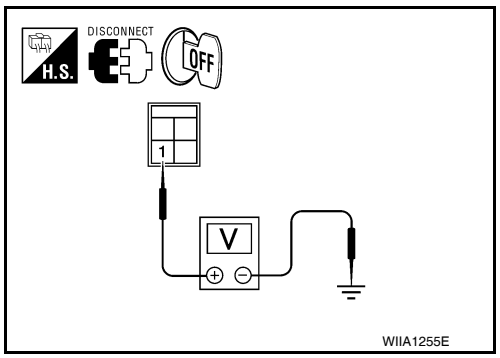
OK >> Stop lamp switch is OK.
NG >> GO TO 2

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch connector.

2. Check voltage between stop lamp switch harness connector E13 terminal 1 and ground.

1 - Ground : Battery voltage



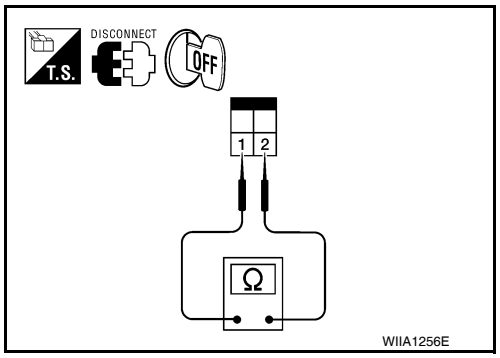
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between stop lamp switch power supply circuit and fuse.

3. CHECK STOP LAMP SWITCH OPERATION

Check continuity between stop lamp switch terminals 1 and 2.

Component	Terminals		Condition	Continuity
Stop lamp switch	1	2	Brake pedal depressed	Yes
			Brake pedal not depressed	No



OK or NG

OK >> GO TO 4
NG >> Replace stop lamp switch.

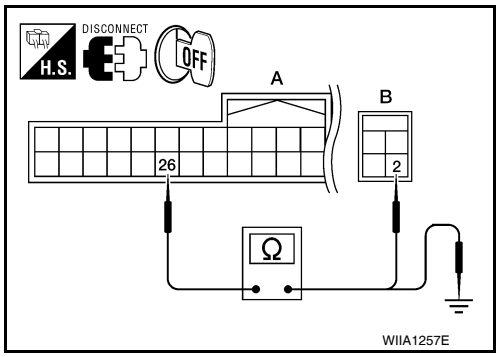
4. CHECK STOP LAMP SWITCH CIRCUIT

1. Check continuity between Intelligent Key unit harness connector (A) M52 terminal 26 and stop lamp switch harness connector (B) E13 terminal 2.

26 - 2 : Continuity should exist.

2. Check continuity between Intelligent Key unit harness connector M52 terminal 26 and ground.

26 - Ground : Continuity should not exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

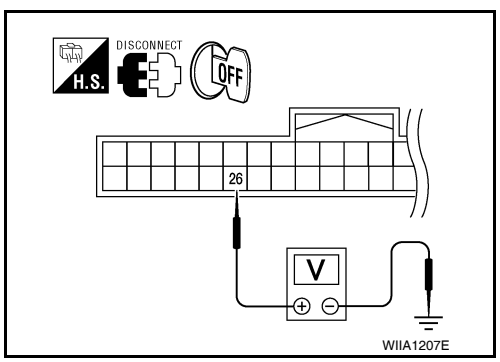
Stop Lamp Switch Check (With M/T)

INFOID:0000000007330054

1. CHECK STOP LAMP SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit connector.
3. Check voltage between Intelligent Key unit harness connector M52 terminal 26 and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M52	26	Ground	Brake pedal depressed	Battery voltage
			Brake pedal released	0



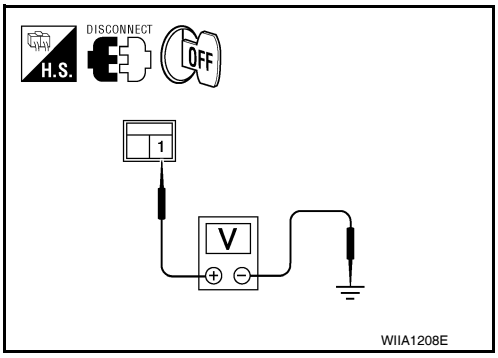
OK or NG

OK >> Stop lamp switch is OK.
NG >> GO TO 2

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch connector.
2. Check voltage between stop lamp switch harness connector E13 terminal 1 and ground.

1 - Ground : Battery voltage



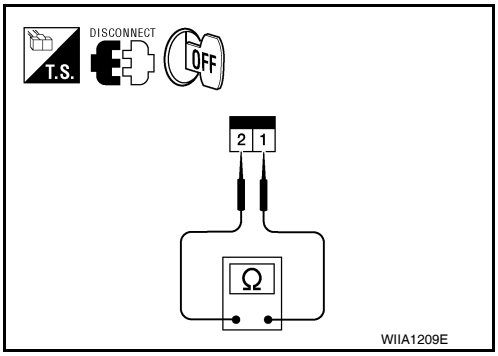
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between stop lamp switch power supply circuit and fuse.

3.CHECK STOP LAMP SWITCH OPERATION

Check continuity between stop lamp switch terminals 1 and 2.

Component	Terminals		Condition	Continuity
Stop lamp switch	1	2	Brake pedal depressed	Yes
			Brake pedal not depressed	No



OK or NG

OK >> GO TO 4
NG >> Replace stop lamp switch.

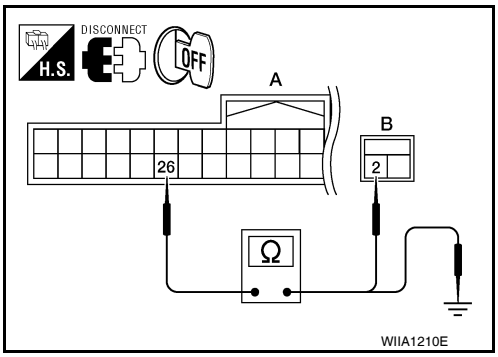
4.CHECK STOP LAMP SWITCH CIRCUIT

1. Check continuity between Intelligent Key unit harness connector (A) M52 terminal 26 and stop lamp switch harness connector (B) E13 terminal 2.

26 - 2 : Continuity should exist.

2. Check continuity between Intelligent Key unit harness connector M52 terminal 26 and ground.

26 - Ground : Continuity should not exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

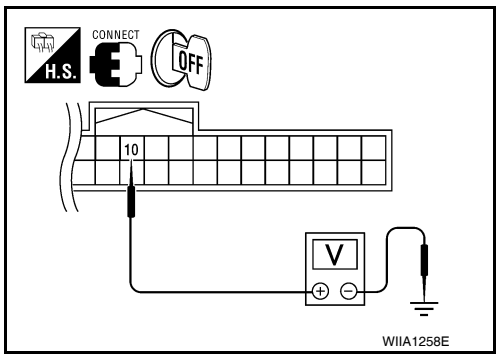
CVT or A/T Shift Selector (Park Position Switch) Check

INFOID:0000000007330055

1.CHECK CVT OR A/T SHIFT SELECTOR (PARK POSITION SWITCH) INPUT SIGNAL

1. Turn ignition switch OFF.
2. While pressing the ignition knob switch, check voltage between Intelligent Key unit harness connector M52 terminal 10 and ground.

Connector	Terminals (+)	Terminals (-)	Condition	Voltage (V) (Approx.)
M52	10	Ground	Selector lever is in "P" position	0
			Other than above	Battery voltage



OK or NG

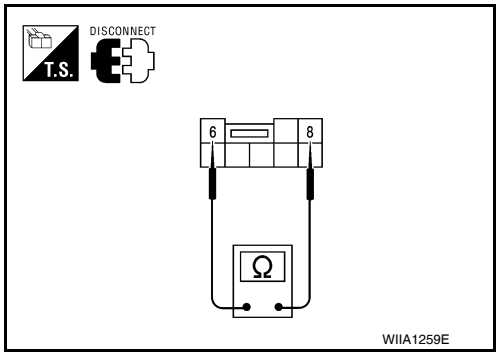
OK >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

NG >> GO TO 2

2. CHECK CVT OR A/T SHIFT SELECTOR (PARK POSITION SWITCH)

1. Disconnect CVT or A/T shift selector (park position switch) connector.
2. Check continuity between CVT or A/T shift selector (park position switch) terminals 6 and 8.

Component	Terminals		Condition	Continuity
CVT or A/T shift selector (park position switch)	6	8	Selector lever is in "P" position	Yes
			Other than above	No



OK or NG

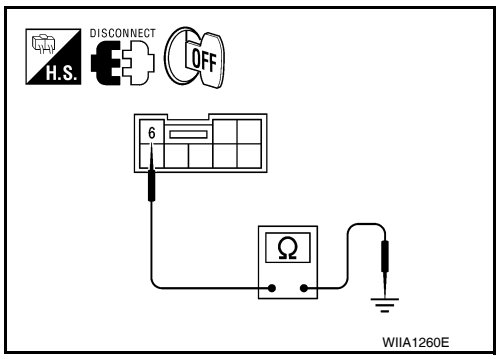
OK >> GO TO 3

NG >> Replace CVT or A/T shift selector (park position switch).

3. CHECK PARK POSITION SWITCH GROUND CIRCUIT

Check continuity between CVT or A/T shift selector (park position switch) harness connector M38 terminal 6 and ground.

6 – Ground : Continuity should exist.



OK or NG

OK >> GO TO 4

NG >> Repair or replace harness.

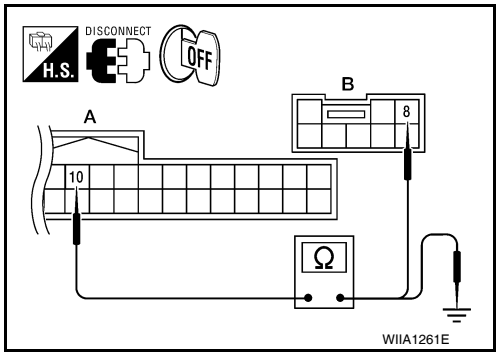
4. CHECK PARK POSITION SWITCH CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit harness connector (A) M52 terminal 10 and CVT or A/T shift selector (park position switch) harness connector (B) M38 terminal 8.

10 – 8 : Continuity should exist.

3. Check continuity between Intelligent Key unit harness connector (A) M52 terminal 10 and ground.

10 – Ground : Continuity should not exist.



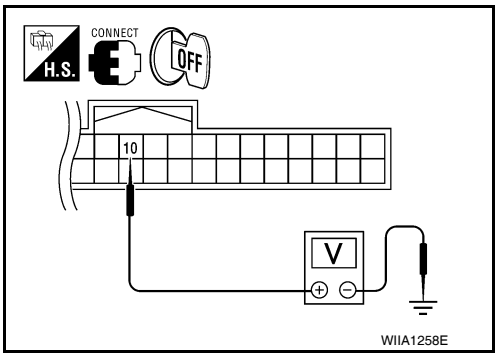
OK or NG

OK >> GO TO 5
NG >> Repair or replace harness.

5.CHECK INTELLIGENT KEY OUTPUT SIGNAL

1. Connect Intelligent Key unit connector and CVT or A/T shift selector (park position switch) connector.
2. Check voltage between Intelligent Key unit connector M52 terminal 10 and ground.

Connector	Terminal (+)	Terminal (-)	Condition	Voltage (V) (Approx.)
M52	10	Ground	Selector lever is in “P” position	0
			Other than above	Battery voltage



OK or NG

OK >> CVT or A/T shift selector (park position switch) circuit is OK.
NG >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".

"P-SHIFT" Warning Lamp (With CVT or A/T) Check

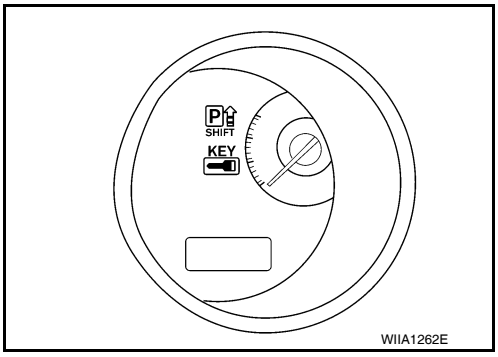
INFOID:0000000007330056

1.CHECK WARNING LAMP OPERATION

With CONSULT
- Check “INDICATOR” in “ACTIVE TEST” mode with CONSULT.
- Select “KNOB ON”.

“P-SHIFT” warning lamp should illuminate.

Without CONSULT
1. Turn ignition switch OFF.
2. While monitoring the combination meter warning lamps, turn ignition switch ON. "P-SHIFT" warning lamp should illuminate for 1 second to perform a bulb check.



OK or NG

OK >> Inspection End.
NG >> Check combination meter. Refer to DI-4.

"LOCK" Warning Lamp (With M/T) Check

INFOID:0000000007330057

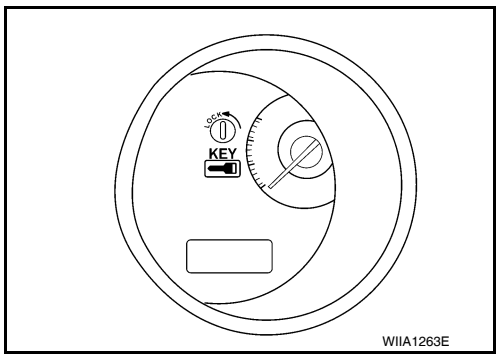
1.CHECK WARNING LAMP OPERATION

With CONSULT
- Check “INDICATOR” in “ACTIVE TEST” mode with CONSULT.
- Select “KNOB ON”.

“LOCK” warning lamp should illuminate.

Without CONSULT
1. Turn ignition switch OFF.

2. While monitoring the combination meter warning lamps, turn ignition switch ON. "LOCK" warning lamp should illuminate for 1 second to perform a bulb check.



OK or NG

OK >> Inspection End.
NG >> Check combination meter. Refer to DI-4.

"KEY" Warning Lamp (RED) Check

INFOID:0000000007330058

1.CHECK WARNING LAMP OPERATION

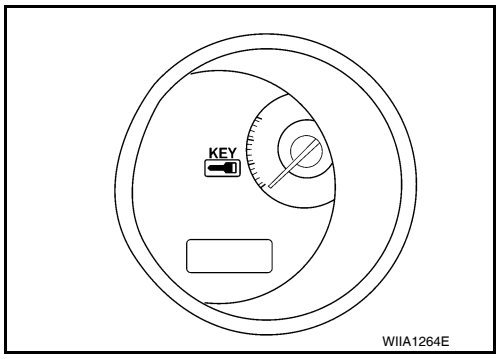
With CONSULT

- Check “INDICATOR” in “ACTIVE TEST” mode with CONSULT.
- Select “RED ON”.

“KEY” warning lamp (red) should illuminate.

Without CONSULT

1. Turn ignition switch OFF.
2. Ensure Intelligent Key is outside and away from the vehicle.
3. While monitoring the combination meter warning lamps, push the ignition knob switch.
4. The "KEY" warning lamp (red) should illuminate indicating that the Intelligent Key is not nearby.



OK or NG

OK >> Inspection End.
NG >> Check combination meter. Refer to DI-4.

"KEY" Warning Lamp (GREEN) Check

INFOID:0000000007330059

1.CHECK WARNING LAMP OPERATION

With CONSULT

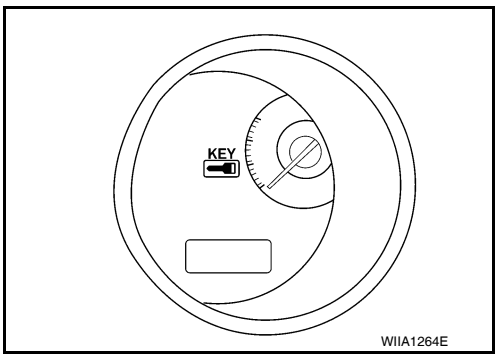
- Check “INDICATOR” in “ACTIVE TEST” mode with CONSULT.
- Select “BLUE ON”.

“KEY” warning lamp (green) should illuminate.

Without CONSULT

1. Turn ignition switch OFF.
2. Ensure Intelligent Key is in your possession inside the vehicle.

3. While monitoring the combination meter warning lamps, push the ignition knob switch.
4. The "KEY" warning lamp (green) should illuminate indicating that the Intelligent Key is nearby.



OK or NG

OK >> Inspection End.
NG >> Check combination meter. Refer to DI-4.

Check Warning Chime in Combination Meter

INFOID:0000000007330060

1.CHECK WARNING CHIME OPERATION

With CONSULT

- Check “INSIDE BUZZER” in “ACTIVE TEST” mode with CONSULT.
- Touch “TAKE OUT”, “KNOB” and “KEY” on “ACTIVE TEST” screen.

Does each warning chime sound?

OK or NG

OK >> Inspection End.
NG >> GO TO 2.

2.CHECK OTHER WARNING CHIME OPERATION

Check other warning chime operation using combination meter.

Does warning chime in combination meter sound?

OK or NG

OK >> Inspection End.
NG >> Refer to DI-42.

Hazard Function Check

INFOID:0000000007330061

1.CHECK HAZARD WARNING LAMP

Do hazard warning lamps flash with hazard switch?

YES or NO

YES >> Hazard warning lamp circuit is OK.
NO >> Check hazard circuit. Refer to LT-50.

Horn Function Check

INFOID:0000000007330062

First perform the “SELF-DIAG RESULTS” of “BCM” with CONSULT, then perform the trouble diagnosis of malfunction system indicated in “SELF-DIAG RESULTS” of “BCM”. Refer to BCS-18, "CAN Communication Inspection Using CONSULT (Self-Diagnosis)".

1.CHECK HORN OPERATION

Check if horn sounds with horn switch.

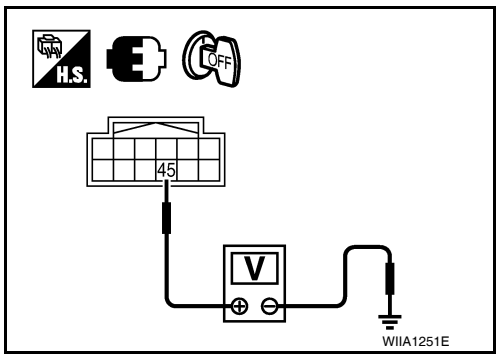
Does horn operate?

Yes >> GO TO 2
No >> Check horn circuit. Refer to WW-40.

2.CHECK IPDM E/R INPUT SIGNAL

Check voltage between IPDM E/R connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
IPDM E/R connector	Terminal		
E46	45	Ground	Battery voltage



OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".

NG >> GO TO 3

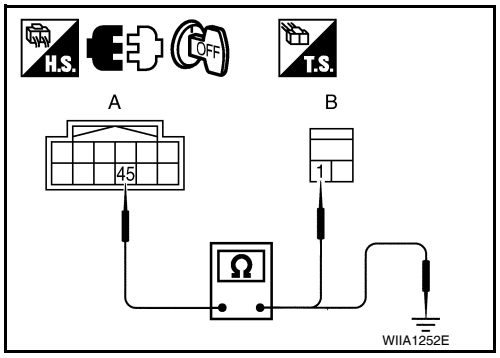
3.CHECK HORN RERAY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and horn relay connector.
3. Check continuity between IPDM E/R harness connector and horn relay harness connector.

A		B		Continuity
IPDM E/R connector	Terminal	Horn relay connector	Terminal	
E46	45	H-1	1	Yes

4. Check continuity between IPDM E/R harness connector and ground.

A		Ground	Continuity
IPDM E/R connector	Terminal		
E46	45		No



OK or NG

OK >> Check condition of harness and connector.

NG >> Repair or replace harness.

Headlamp Function Check

INFOID:0000000007330063

1.CHECK HEADLAMP OPERATION

Check if headlamps operate by lighting switch.

Do headlamps come on when turning lighting switch ON?

YES >> Headlamp circuit is OK.

NO >> Check headlamp system. Refer to LT-5 or LT-27.

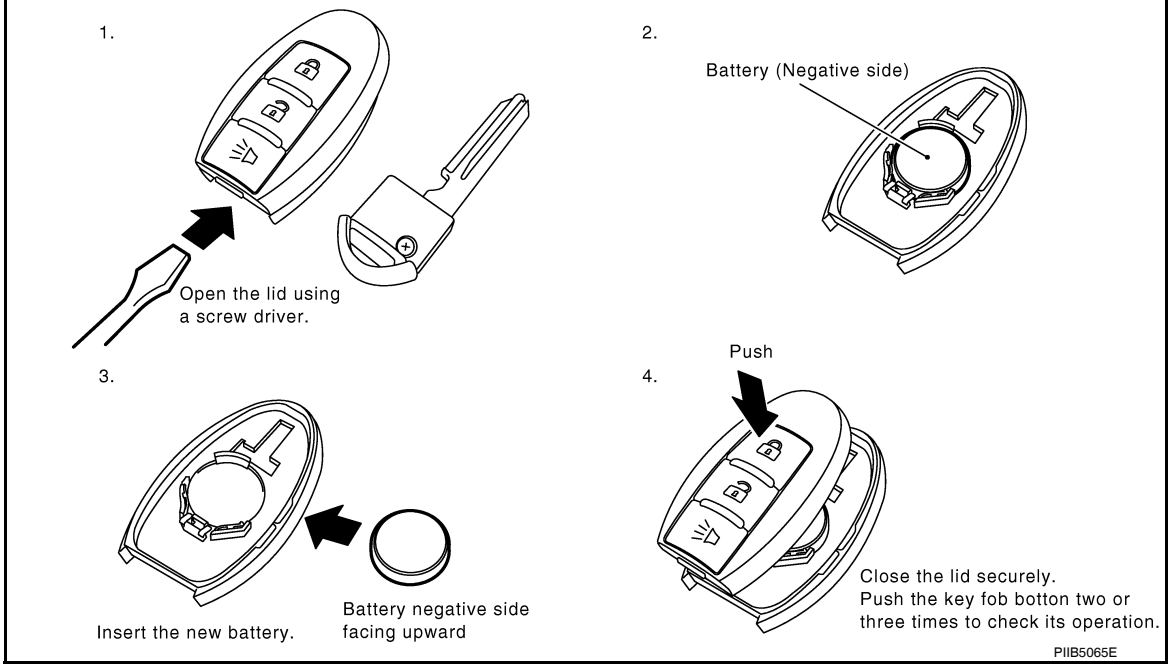
Intelligent Key Battery Replacement

INFOID:0000000007330064

SEC.998

NOTE:

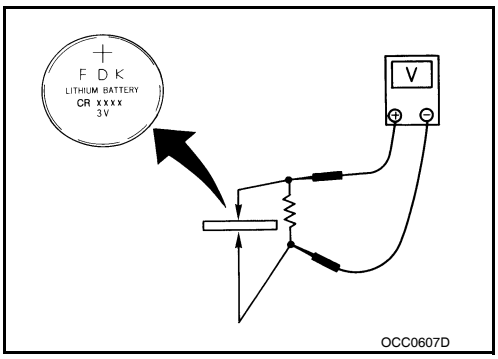
- Be careful not to touch the circuit board or battery terminal.
- The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.



INTELLIGENT KEY BATTERY INSPECTION

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

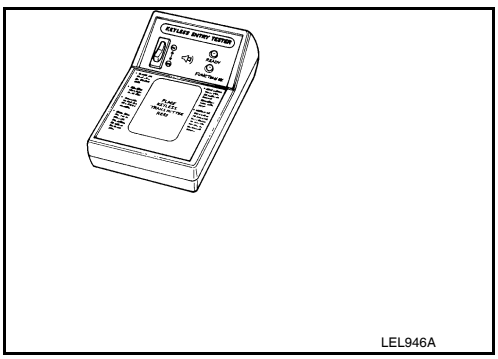
Standard : Approx. 2.5 - 3.0V



Remote Keyless Entry Function

INFOID:0000000007330065

Check keyfob function using Signal Tech II Tool J-50190 or Remote Keyless Entry Tester J-43241 (shown).



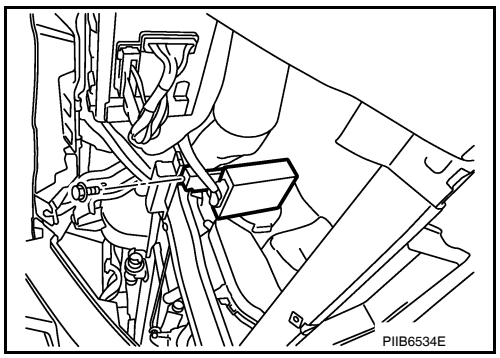
Removal and Installation of Intelligent Key Unit

INFOID:0000000007330066

REMOVAL

1. Remove glove box assembly. Refer to IP-12, "Removal and Installation".

2. Disconnect Intelligent Key unit connector, remove screw and Intelligent Key unit.



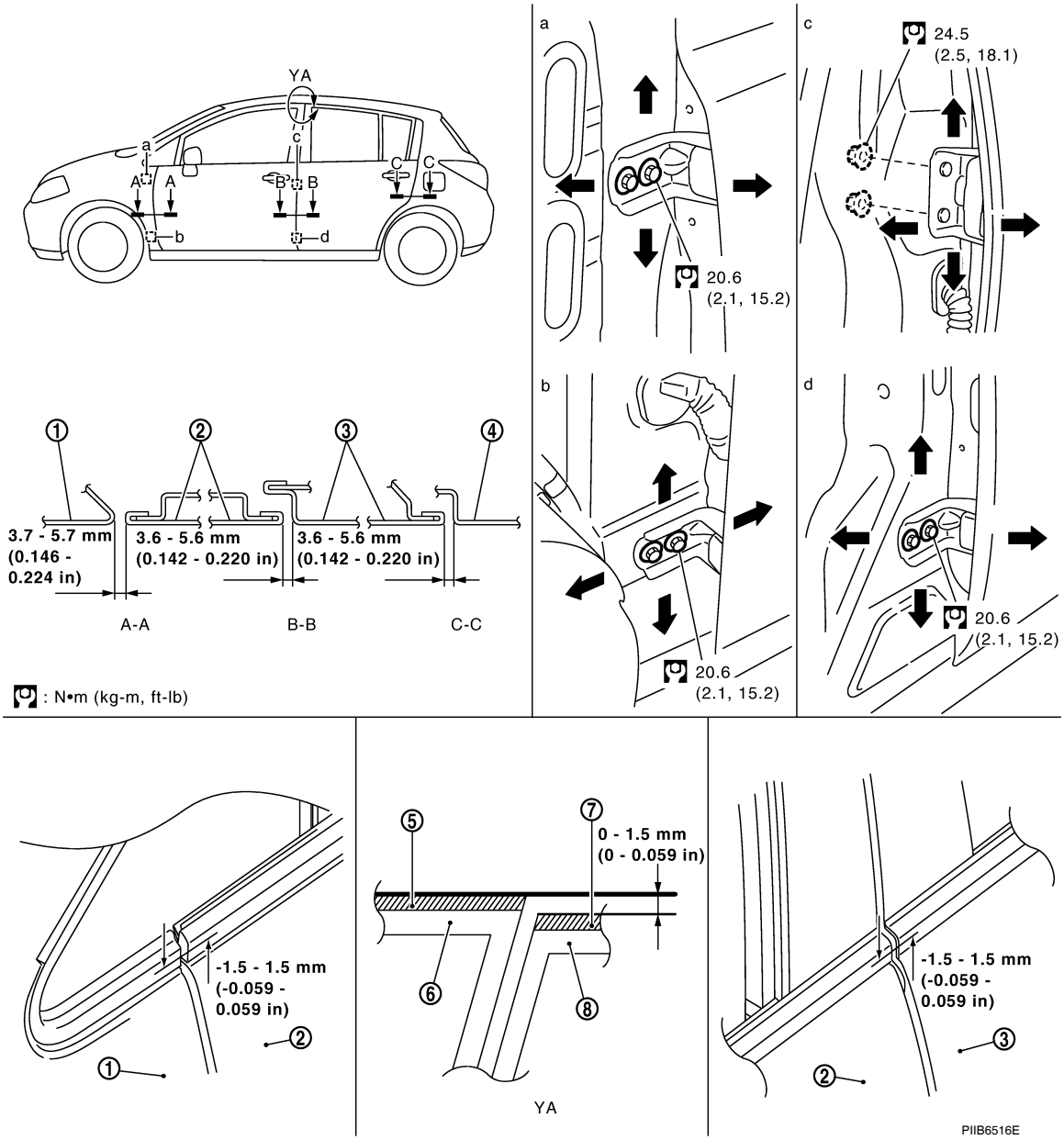
INSTALLATION

Installation is in the reverse order of removal.

DOOR

Fitting Adjustment

INFOID:0000000007330067



1. Front fender
2. Front door outer
3. Rear door outer
4. Rear fender
5. Front door weatherstrip
6. Front door sash
7. Rear door weatherstrip
8. Rear door sash

FRONT DOOR

Longitudinal Clearance at Front End

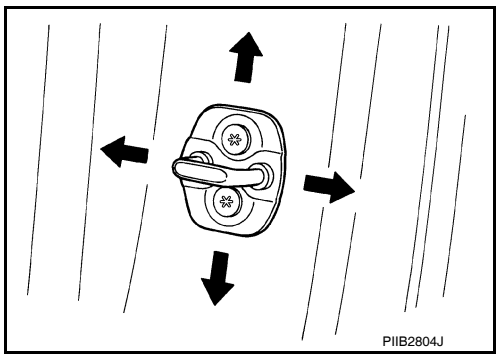
Access from inside the fender to loosen the hinge bolts. Raise the front door at rear end to adjust.

Surface Height Adjustment

Loosen the front door bolts, and adjust the surface height difference of fender and front door according to the fitting standard dimension.

Striker Adjustment

16.7 N·m (1.7 kg-m, 12 ft-lb)



REAR DOOR

Longitudinal Clearance and Surface Height Adjustment at Front End

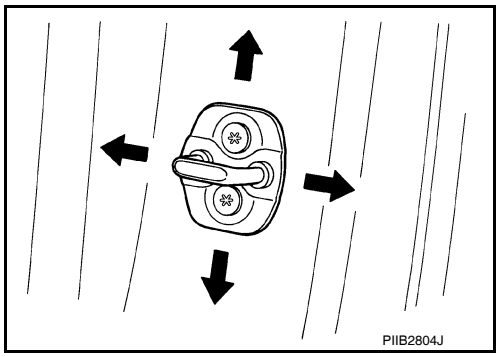
1. Remove the center pillar upper and lower garnishes. Refer to EI-35.
2. Access from inside the vehicle to loosen the hinge nuts. Open the rear door, and raise the rear door at rear end to adjust.

Surface Height Adjustment

Loosen the front door striker bolts and rear door hinge nuts, and adjust the surface height difference of front and rear doors according to the fitting standard dimension.

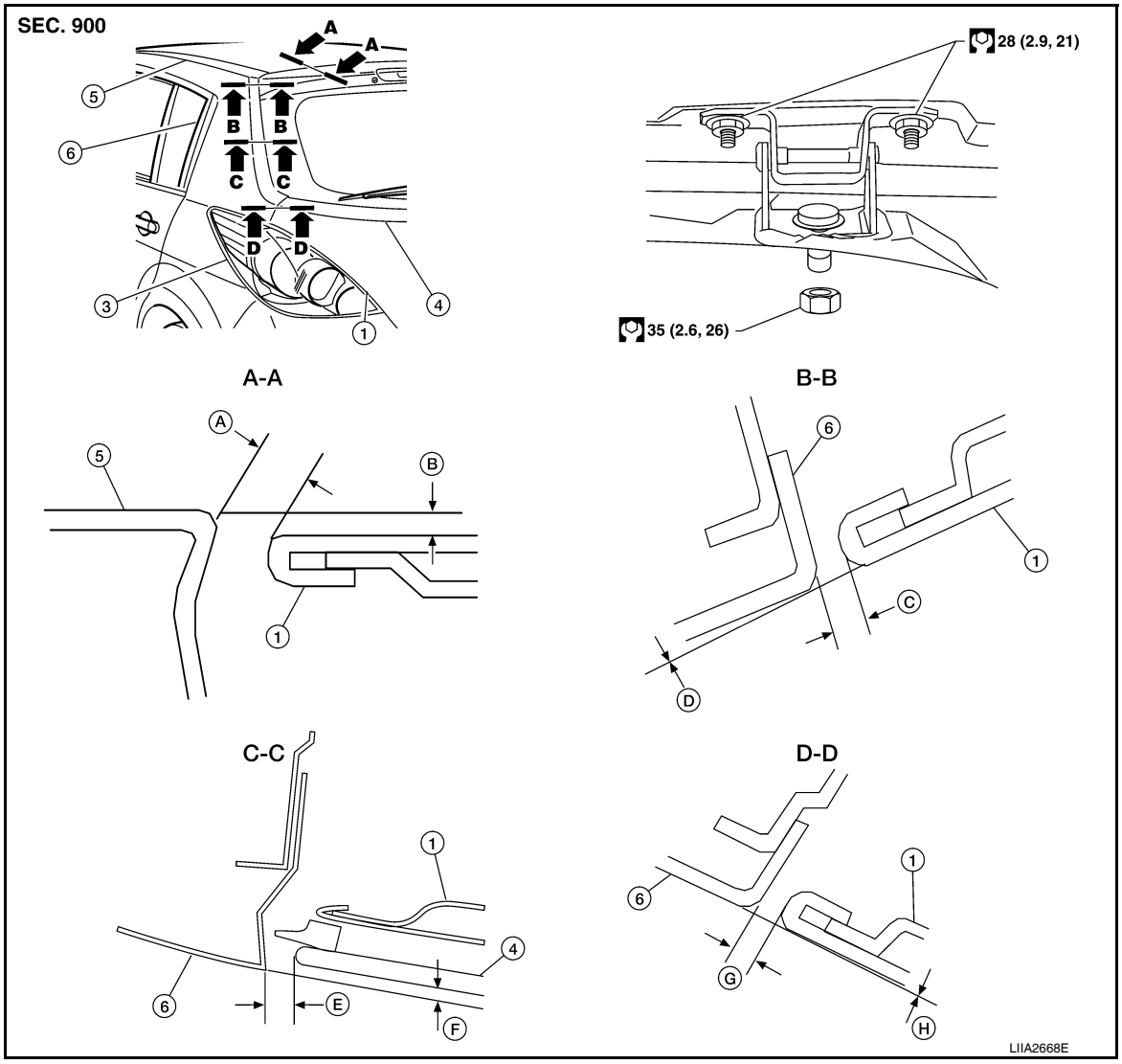
Striker Adjustment

16.7 N·m (1.7 kg-m, 12 ft-lb)



BACK DOOR

Longitudinal Clearance and Surface Height Adjustment

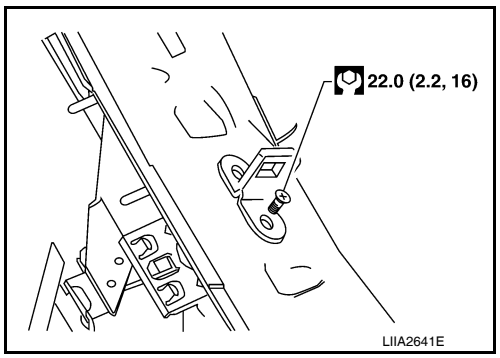


1. Back door assembly	2. Back door hinge	3. Tail lamp assembly
4. Back window glass	5. Roof	6. Rear pillar
A. 6.0 ± 1.0 mm (0.24 ± 0.04 in)	B. -0.5 ± 1.0 mm (-0.02 ± 0.04 in)	C. 5.0 ± 1.2 mm (0.20 ± 0.05 in)
D. 0.0 ± 1.5 mm (0.0 ± 0.06 in)	E. 5.0 ± 2.3 mm (0.20 ± 0.9 in)	F. 2.7 +1.6 -2.1 mm (0.11 + 0.06 - 0.08 in)
G. 5.0 ± 1.2 mm (0.20 ± 0.05 in)	H. 0.0 ± 1.5 mm (0.0 ± 0.06 in)	

1. Open and support the back door.
2. Slightly loosen the hinge nuts.
3. Reposition the door as necessary and tighten the nuts.
4. Confirm the adjustment. Repeat as necessary to obtain the desired fit.

Striker Adjustment

20 N·m (2.2 kg-m, 16 ft-lb)



Removal and Installation

INFOID:0000000007330068

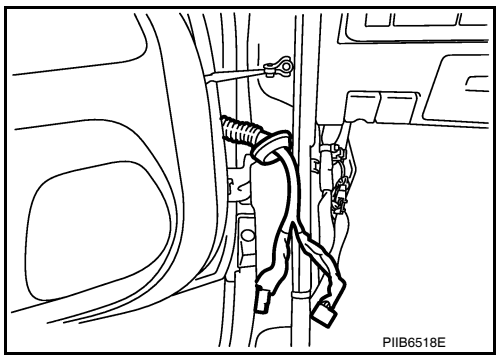
FRONT DOOR

CAUTION:

- **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
- **When removing and installing front door assembly, be sure to carry out the fitting adjustment. Refer to BL-154, "Fitting Adjustment".**
- **After installing, apply touch-up paint onto the head of the hinge nuts.**
- **Check the hinge rotating part for lubrication. If necessary, apply “body grease”.**
- **Operate with two workers, because of its heavy weight.**
- **Check front door open/close operation after installation.**

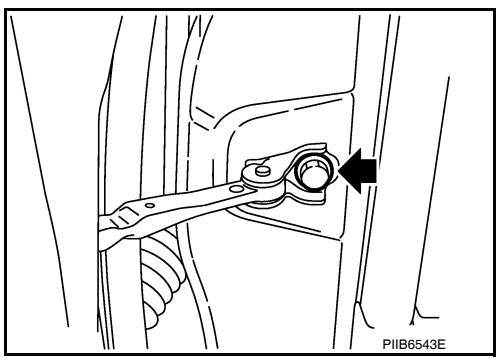
Removal

1. Remove dash side finisher. Refer to EI-35, "Removal and Installation".
2. Disconnect the front door harness connectors.
3. Remove the front door harness grommet, and then remove the harness from the vehicle.



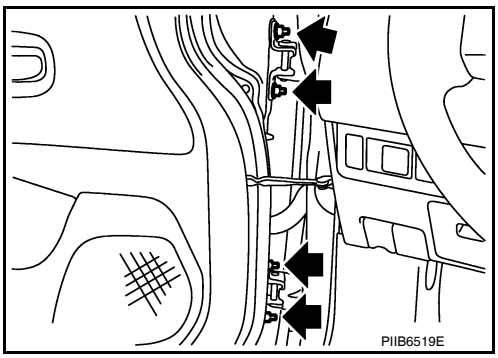
4. Remove the check link bolt.

14.7 N·m (1.5 kg-m, 11 ft-lb)



5. Remove the hinge nuts and then the door assembly.

24.5 N·m (2.5 kg-m, 18 ft-lb)



Installation
Installation is in the reverse order of removal.

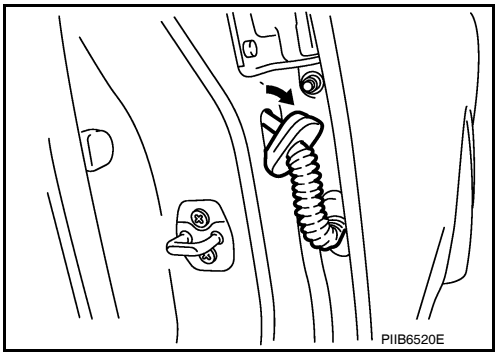
REAR DOOR

CAUTION:

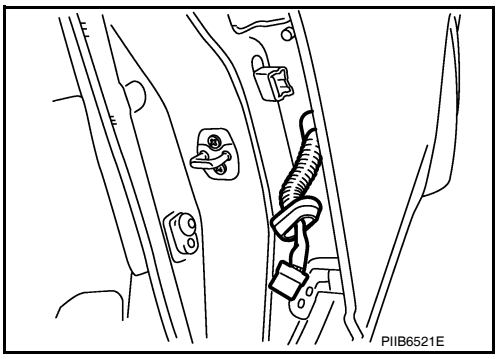
- **When removing and installing the rear door assembly, support the door with a jack and cloth to protect the door and body.**
- **When removing and installing rear door assembly, be sure to carry out the fitting adjustment. Refer to BL-154, "Fitting Adjustment".**
- **After installing, apply touch-up paint onto the head of the hinge nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply “body grease”.**
- **Operate with two workers, because of its heavy weight.**
- **Check rear door open/close operation after installation.**

Removal

1. Remove the rear door harness grommet.

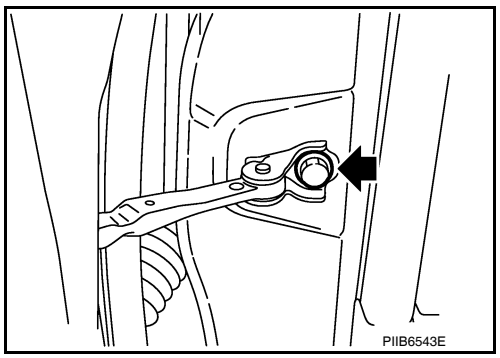


2. Disconnect the rear door harness connector.



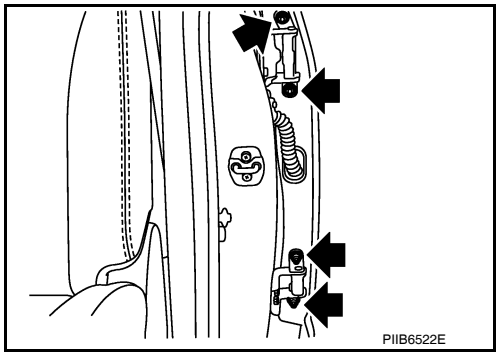
3. Remove the check link bolt.

14.7 N·m (1.5 kg-m, 11 ft-lb)



4. Remove the hinge nuts and the door assembly.

24.5 N·m (2.5 kg-m, 18 ft-lb)

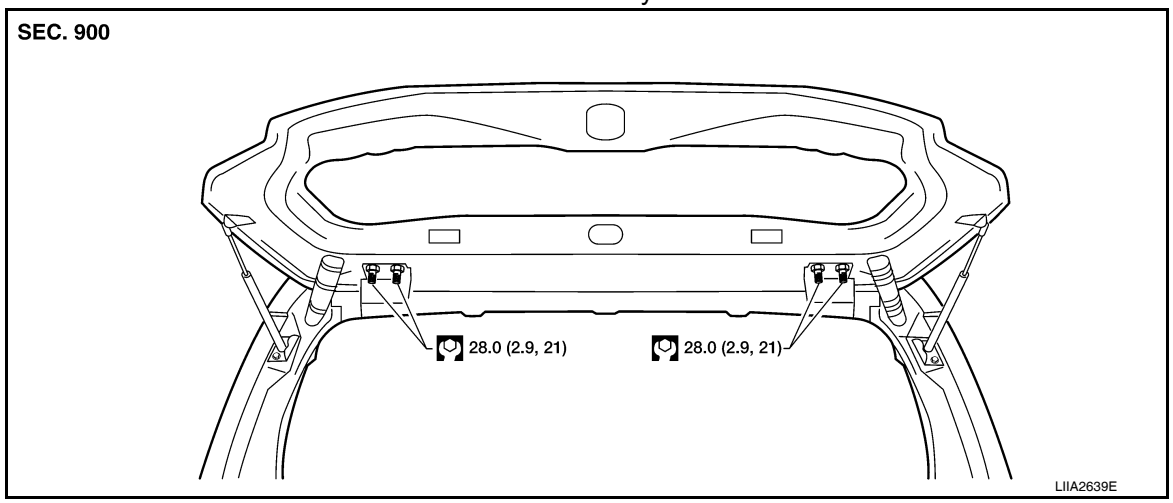


Installation
Installation is in the reverse order of removal.

BACK DOOR

Removal

1. Remove the back door glass. Refer to GW-16.
2. Remove the back door lock assembly. Refer to BL-167.
3. Remove the back door wire harness.
4. Remove the rear washer nozzle and hose from the back door. Refer to WW-34, "Removal and Installation".
5. Support the back door.
   CAUTION:
   Two technicians should be used to avoid damaging the back door during removal.
6. Remove the back door stays.
7. Remove the door side nuts and the back door assembly.



Installation
Installation is in the reverse order of removal.
- Align the back door. Refer to BL-154, "Fitting Adjustment".

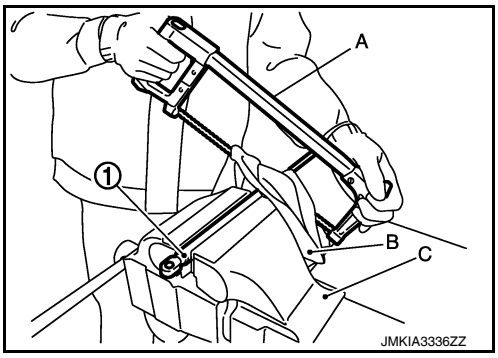
Back Door Stay Disposal

INFOID:0000000007330069

1. Fix back door stay (1) using a vise (C).
2. Using hacksaw (A) slowly make 2 holes in the back door stay, in numerical order as shown in the figure.

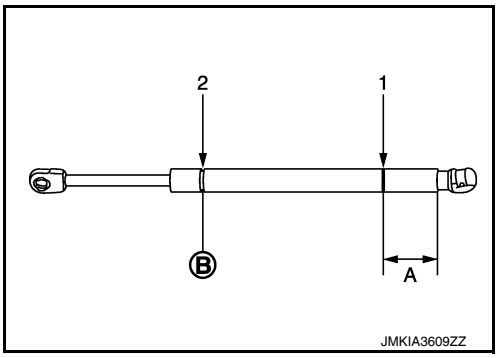
CAUTION:

- **When cutting a hole on back door stay, always cover a hacksaw using a shop cloth (B) to avoid scattering metal fragments or oil.**
- **Wear eye protection (safety glasses).**
- **Wear gloves.**



A: 20 mm (0.787 in)

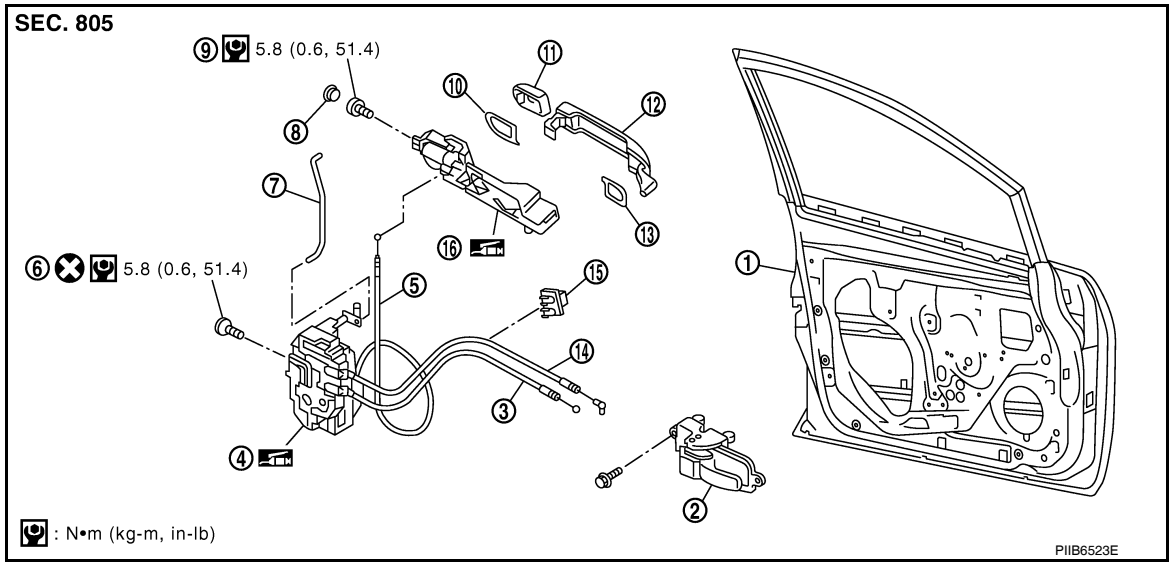
B: Cut at the groove.



FRONT DOOR LOCK

Component Parts Location

INFOID:0000000007330070



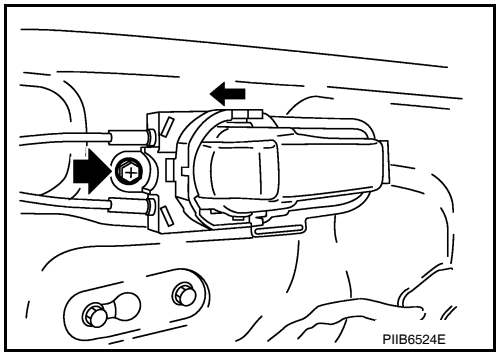
1. Front door
2. Inside handle
3. Inside handle cable
4. Door lock assembly
5. Outside handle cable
6. TORX bolt (T30)
7. Key cylinder connecting rod
8. Grommet
9. TORX bolt (T30)
10. Rear gasket
11. Door key cylinder assembly (Driver's side) Outside handle escutcheon (passenger's side)
12. Outside handle
13. Front gasket
14. Lock knob cable
15. Holder
16. Outside handle bracket

Removal and Installation

INFOID:0000000007330071

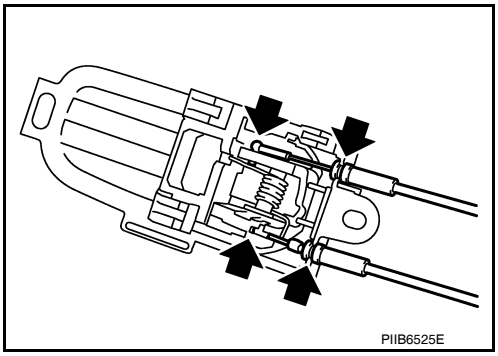
REMOVAL

1. Remove front door finisher. Refer to EI-30, "Removal and Installation".
2. Fully close front door window.
3. Position aside the vapor barrier.
   NOTE:
   If vapor barrier is reused, cut butyl tape in a way that leaves it on the vapor barrier.
4. Remove front door rear glass run channel. Refer to GW-42, "Removal and Installation".
5. Remove the cables from the holder.
6. Remove inside handle bolt, and slide the handle toward the rear of the vehicle.

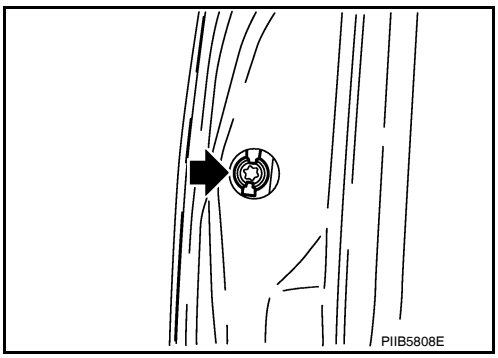


7. Disengage the handle from the door panel, and remove the inside handle.

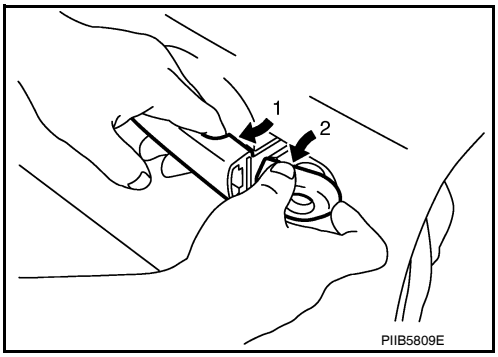
8. Disconnect the inside handle cable and lock knob cable from the inside handle.
CAUTION:
During removal and installation, work so as not to bend the ends of the lock knob cable and inside handle cable.



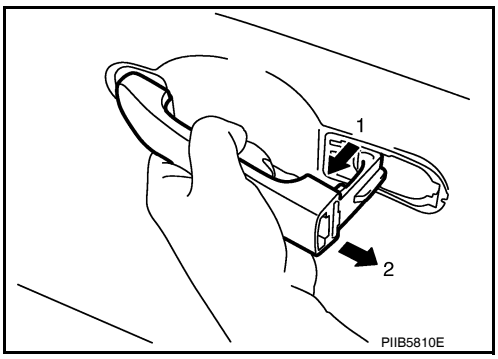
9. Remove the door side grommet, and the door key cylinder assembly (escutcheon) bolt.
10. Remove the key cylinder connecting rod (key cylinder side).
11. If equipped, disconnect the door antenna, the door request switch connector and remove the harness clamp. (Vehicle with Intelligent Key systems only).



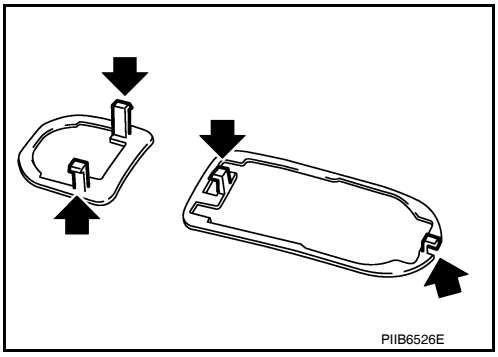
12. Remove the door cylinder assembly while pulling the outside handle forward.



13. Pull the outside door handle forward and then slide it toward the rear of the vehicle to remove.

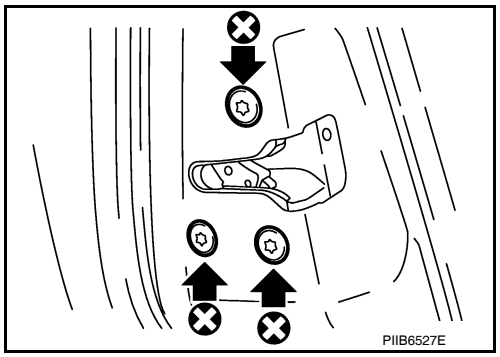


14. Remove the front and rear gaskets.

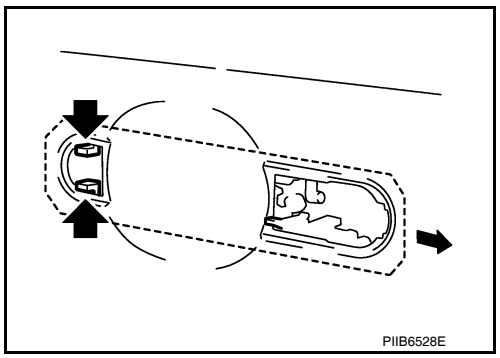


15. Remove the door lock assembly bolts.

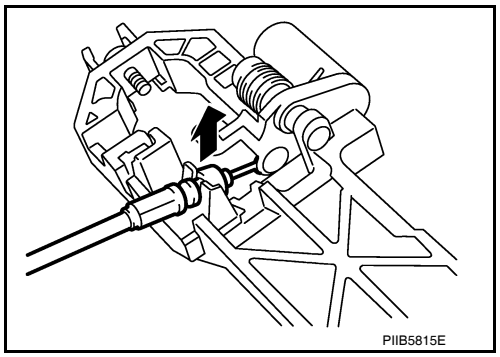
5.8 N·m (0.6 kg-m, 51.4 in-lb)



16. Slide the outside handle bracket toward the rear of the vehicle, and remove the assembly.



17. If equipped, disconnect the door lock assembly electrical connector.
18. Separate the outside handle cable from the outside handle bracket.

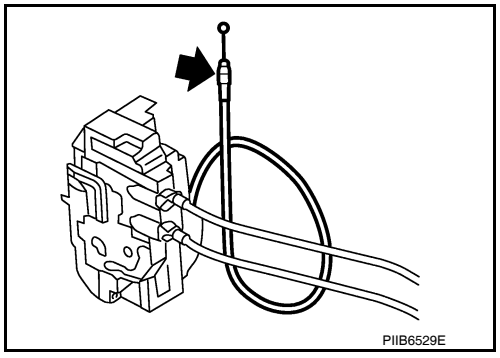


INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

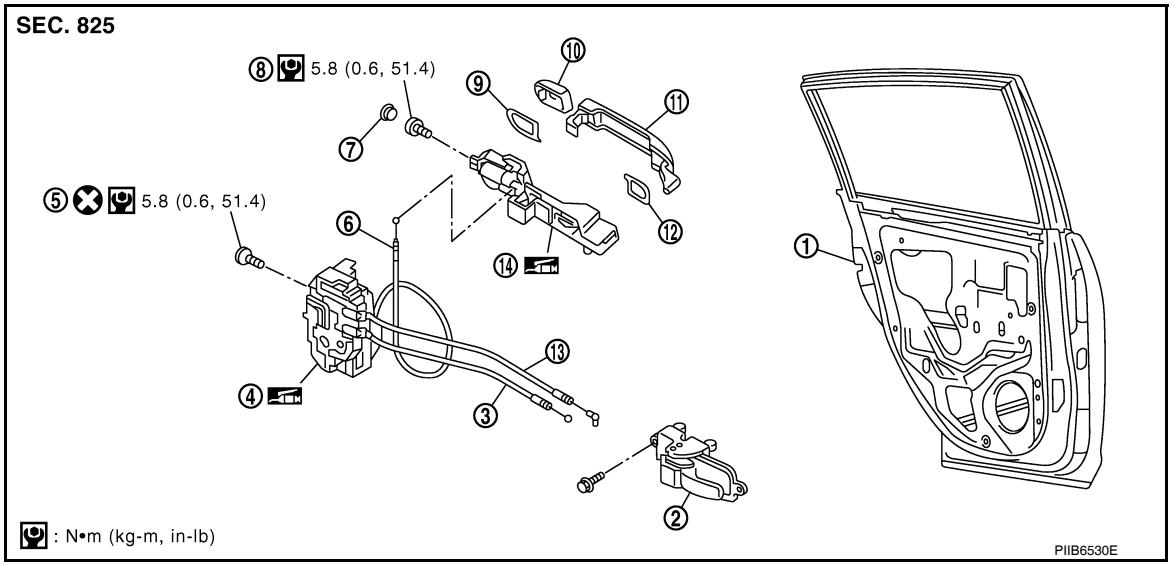
- **To install each rod, be sure to rotate the rod holder until a click is felt.**
- **When installing door lock assembly, be careful when rotating the outside handle cable as shown in the figure.**
  - **Place the outside handle bracket cable on the inside of door lock assembly before installing.**



REAR DOOR LOCK

Component Parts Location

INFOID:0000000007330072



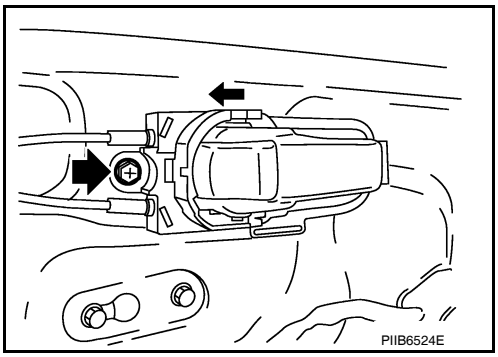
1. Rear door
2. Inside handle
3. Inside handle cable
4. Door lock assembly
5. TORX bolt (T30)
6. Outside handle cable
7. Grommet
8. TORX bolt (T30)
9. Rear gasket
10. Outside handle escutcheon
11. Outside handle
12. Front gasket
13. Lock knob cable
14. Outside handle bracket

Removal and Installation

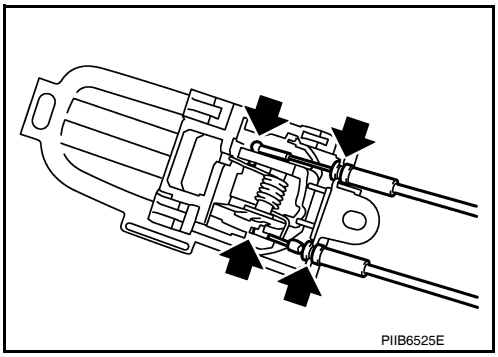
INFOID:0000000007330073

REMOVAL

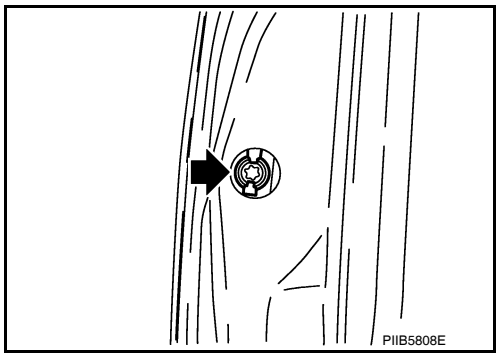
1. Remove the partition glass. Refer to GW-46 .
2. Support door glass while lifting it up to the door window completely closed position.
3. Remove inside handle bolt, slide handle toward rear of vehicle, disconnect it from the door panel, and remove the inside handle.



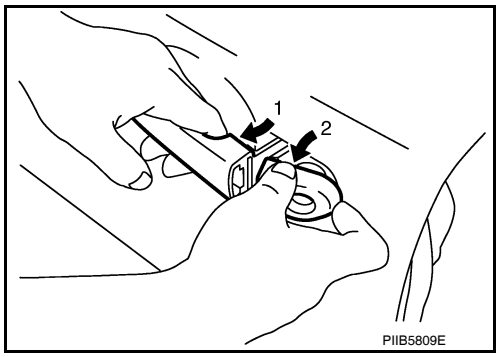
4. Disconnect the inside handle and lock knob cables from the inside handle.
   CAUTION:
   During removal and installation, do not to bend the ends of the lock knob cable and inside handle cable.



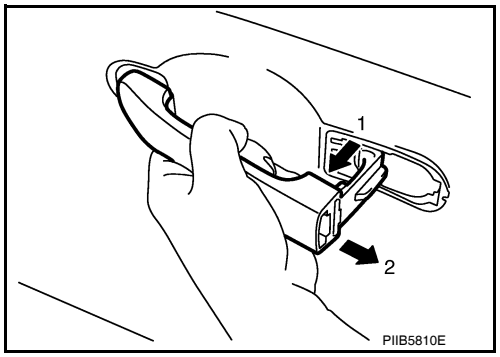
5. Remove the door side grommet, and the outside handle escutcheon screw.



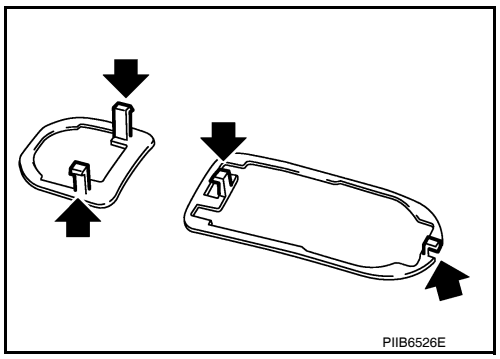
6. Pull the outside handle forward (1), while removing outside handle escutcheon (2).



7. Pull outside door handle forward (1), and slide it toward the rear of the vehicle to remove (2).

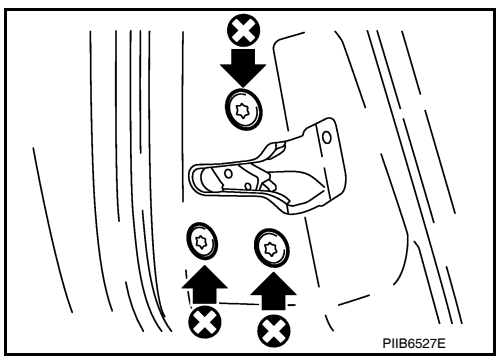


8. Remove the front and rear gaskets.

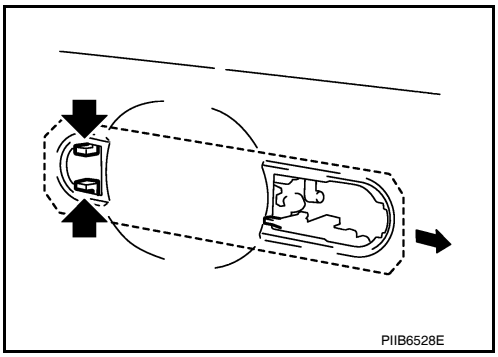


9. Remove the door lock assembly screws.

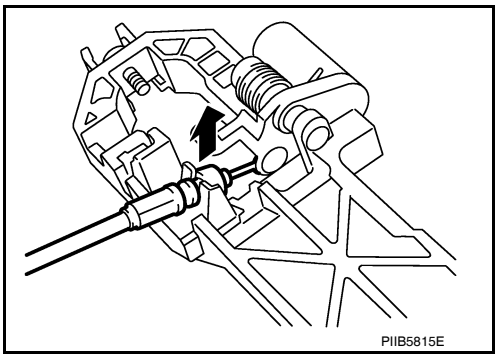
: 5.8 N·m (0.6 kg-m, 51.4 in-lb)



10. Slide the outside handle bracket toward the rear of vehicle, remove the outside handle bracket and the door lock assembly.



11. If equipped, disconnect the door lock assembly electrical connector.
12. Disconnect the outside handle cable from the outside handle bracket.

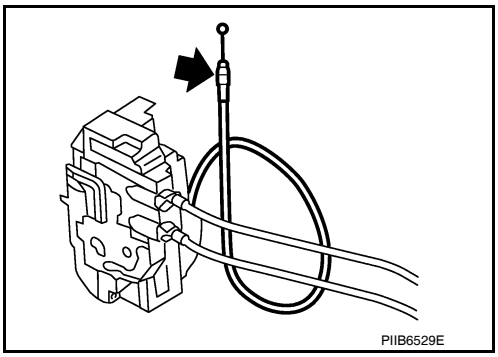


INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

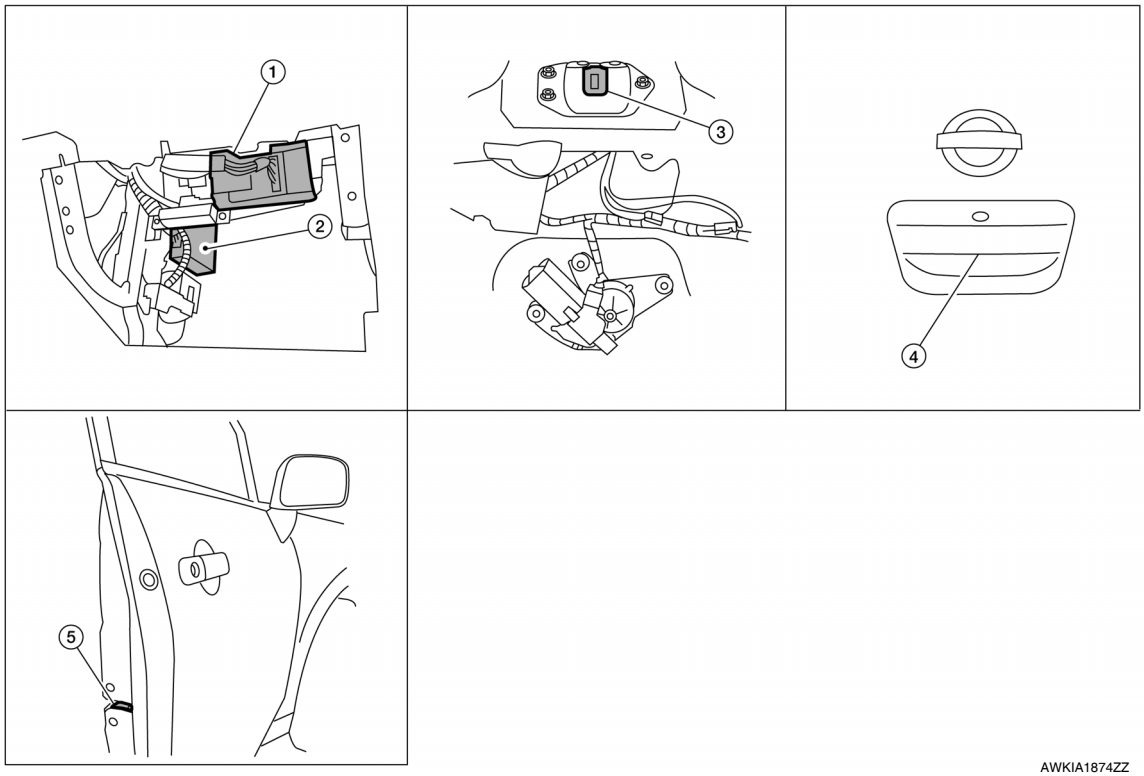
- **To install each rod, be sure to rotate the rod holder until a click is felt.**
- **When installing door lock assembly, be careful when rotating the outside handle cable as shown.**
  - **Place the outside handle bracket cable on the inside of door lock assembly before installing.**



BACK DOOR LOCK

Component Parts and Harness Connector Location

INFOID:0000000007330074



AWKIA1874ZZ

1. BCM M18, M19, M20 (view with glove box removed)
2. Intelligent Key unit M52 (with Intelligent Key)
3. Back door lock assembly (actuator) D405
4. Back door opener switch D408
5. Front door lock assembly RH (door unlock sensor) D114

System Description

INFOID:0000000007330075

Power is supplied at all times
- through 40A fusible link (letter **g,** located in fuse and fusible link box)
- to BCM terminal 70
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57
- through 10A fuse [No. 31, located in fuse block (J/B)]
- to Intelligent Key unit terminal 11 (if equipped).

Ground is supplied
- to BCM terminal 67 and
- to Intelligent Key unit terminal 12 (if equipped)
- through body grounds M57 and M61.

When back door opener switch is ON (pushed), ground is supplied
- to BCM terminal 30 (without Intelligent Key)
- through back door opener switch terminals 1 and 2
- through front door lock assembly RH (door unlock sensor) terminals 3 and 4
- through body grounds M57 and M61
- to Intelligent Key unit terminal 24 (if equipped)
- through back door opener switch terminals 1 and 2
- through body grounds B117, B132 and D402.

Then power is supplied
- through BCM terminal 53
- to back door lock assembly (actuator) terminal 1.

Ground is supplied

• to back door lock assembly (actuator) terminal 2
• through body grounds B117, B132 and D402.

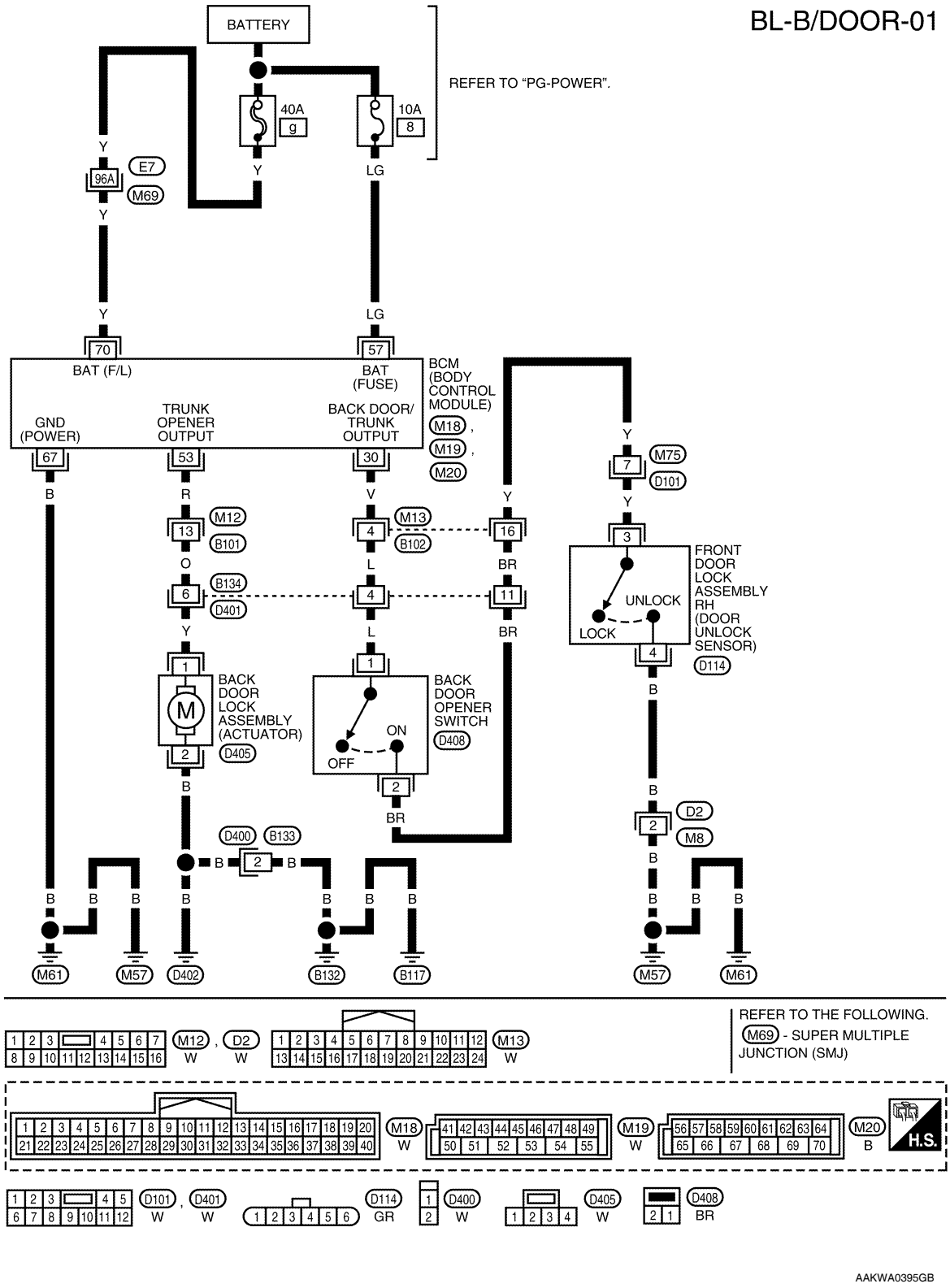
Then BCM operates back door lock assembly (actuator).

Wiring Diagram - B/DOOR -

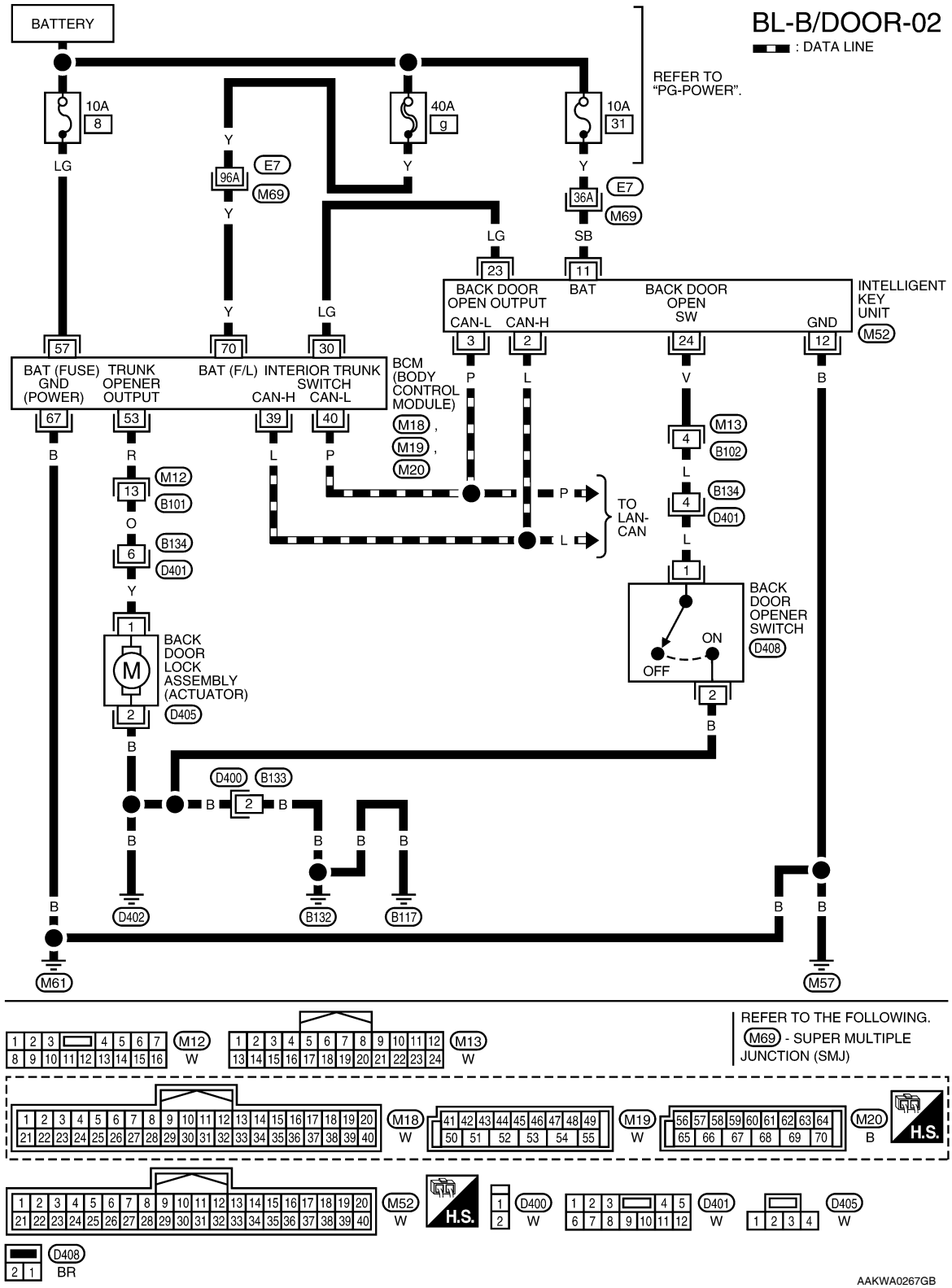
INFOID:0000000007330076

WITHOUT INTELLIGENT KEY SYSTEM

BL-B/DOOR-01

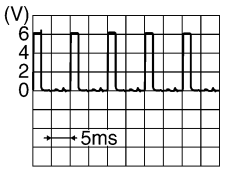
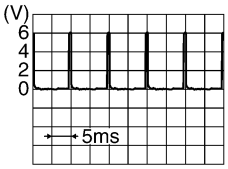
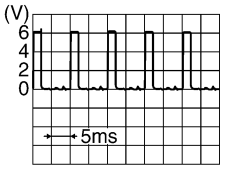
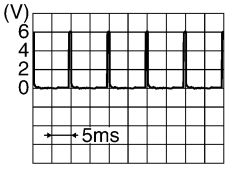


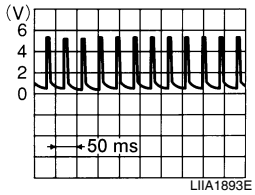
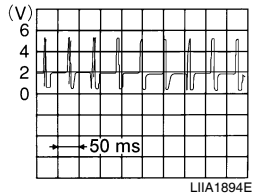
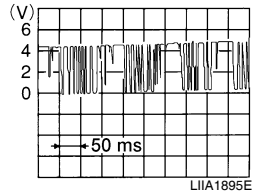
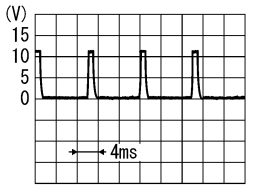
AAKWA0395GB

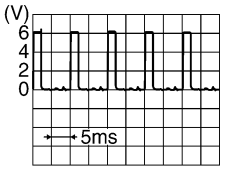
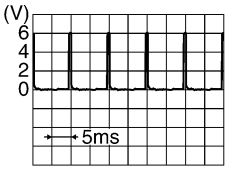
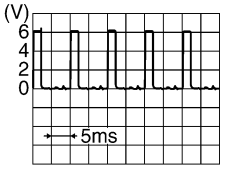
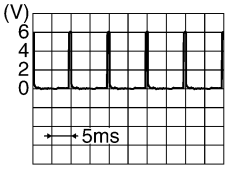

BL-B/DOOR-02
: DATA LINE
BATTERY
REFER TO "PG-POWER".
10A 8
40A g
10A 31
LG
Y
96A
E7
M69
36A
SB
23
11
BACK DOOR OPEN OUTPUT
BAT
BACK DOOR OPEN SW
INTELLIGENT KEY UNIT
CAN-L
CAN-H
GND
M52
57
70
30
3
2
24
12
BAT (FUSE) GND (POWER)
TRUNK OPENER OUTPUT
BAT (F/L)
INTERIOR TRUNK SWITCH
BCM (BODY CONTROL MODULE)
M18, M19, M20
67
53
39
40
P
L
V
B
R
O
M12
B101
M13
B102
B134
D401
TO LAN-CAN
13
6
4
1
BACK DOOR OPENER SWITCH
D408
ON
OFF
BACK DOOR LOCK ASSEMBLY (ACTUATOR)
D405
D400
B133
D402
B132
B117
M61
M57
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
M12
M13
M18
M19
M20
M52
D400
D401
D405
D408
H.S.
W
B
BR
AAKWA0267GB

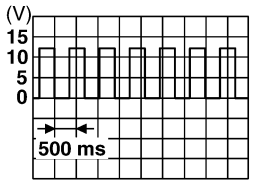
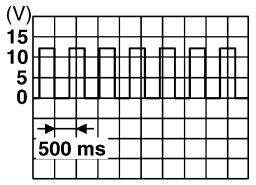
Terminal and Reference Value for BCM

INFOID:0000000007698796

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

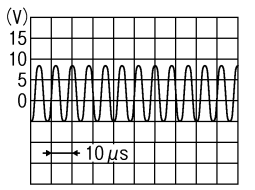
Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

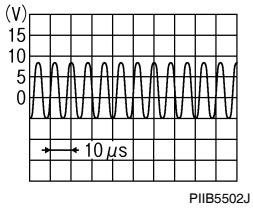
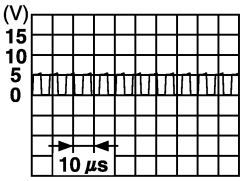
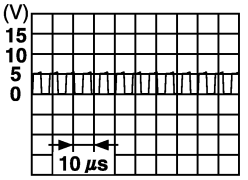
1: With Intelligent Key

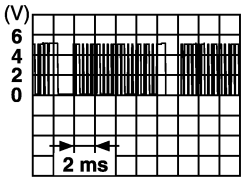
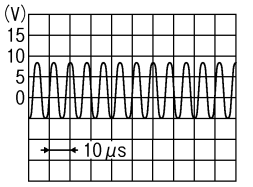
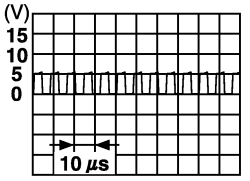
2: Without Intelligent Key

Terminal and Reference Value for Intelligent Key Unit

INFOID:0000000007698797

Terminal	Wire Color	Item	Condition			Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions		
1	R	Steering lock solenoid power supply	LOCK	—		5
2	L	CAN-H	—	—		—
3	P	CAN-L	—	—		—
4	O	Intelligent Key warning buzzer	LOCK	Operate door request switch.	Buzzer OFF	Battery voltage
					Sound buzzer	0
5	G	Front door request switch LH	—	Press door request switch (driver side).		0
				Other than above		5
6	Y	Ignition switch (ON)	ON	—		Battery voltage
7	LG	Key switch	LOCK	Insert mechanical key into ignition switch.		Battery voltage
				Remove mechanical key from ignition switch.		0
10*1	W	CVT or A/T shift selector (park position switch)	ON	Shift lever in park position.		0
				Other than above		Battery voltage
11	SB	Power source (Fuse)	—	—		Battery voltage
12	B	Ground	—	—		0
13	V	Instrument panel antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)		 PIIB5502J
14	LG	Instrument panel antenna (-) signal				

Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
15	L	Front console antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)	 PIIB5502J
16	P	Front console antenna (-) signal			
17	W	Rear bumper antenna (+) signal	LOCK	Press back door request switch.	 SIIA1910J
18	B	Rear bumper antenna (-) signal			
19	V	Front outside antenna LH (+) signal	LOCK	Press door request switch LH.	 SIIA1910J
20	P	Front outside antenna LH (-) signal			
22*2	BR	Key interlock solenoid	—	With Intelligent Key present or mechanical key in ignition cylinder, press "PUSH" button on ignition cylinder.	Battery voltage
				Other than above	0
23	LG	Back door open output	—	Back door open (switch closed)	0
				Back door closed (switch open)	5
24	V	Back door opener switch	—	Press and hold back door switch.	0
				Other than above	5
25	L	Front door request switch RH	—	Press front door request switch RH.	0
				Other than above	5
26	SB	Stop lamp switch	—	Depress brake pedal	Battery voltage
				Other than above	0
27	W	Ignition knob switch	—	Press ignition switch.	Battery voltage
				Release ignition switch.	0
28	Y	Unlock sensor (driver side)	—	Door (driver side) is locked.	5
				Door (driver side) is unlocked.	0
29	V	Back door request switch	—	Press back door request switch.	0
				Other than above	5
31	BR	Steering lock solenoid ground	—	—	0

Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
32	GR	Steering lock solenoid communication signal	LOCK	When Intelligent Key is inside vehicle, press ignition knob switch.	 SIIA1911J
				Other than above	5
33	R	Rear floor antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)	 PIIB5502J
34	G	Rear floor antenna (-) signal			
37	BR	Front outside antenna RH (+) signal	LOCK	Press door request switch RH.	 SIIA1910J
38	Y	Front outside antenna RH (-) signal			

*1: With continuously variable transmission (CVT) or automatic transmission (A/T).

*2: With manual transmission (M/T).

CONSULT Function (BCM)

INFOID:0000000007330079

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received date is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

CONSULT APPLICATION ITEMS

Data Monitor

Monitor item	Content
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of back door open signal from back door opener switch.
VEHICLE SPEED	Indicates [km/h] condition of vehicle speed.

Active Test

Test item	Content
TRUNK/BACK DOOR	This test checks back door lock assembly operation. Back door opens when “Open” is selected.

Work Flow

INFOID:0000000007330080

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to BL-167, "System Description".
3. Repair or replace any malfunctioning parts. Refer to BL-177, "Trouble Diagnosis Chart by Symptom".
4. Does back door opener operate normally? If Yes, GO TO 5. If No, GO TO 3.
5. Inspection End.

Trouble Diagnosis Chart by Symptom

INFOID:0000000007330081

Symptom	Diagnoses/service procedure	Reference page
Back door opener does not operate. (Without Intelligent Key)	1. Check BCM power supply and ground circuit.	BCS-16
	2. Check back door opener switch circuit.	BL-178
	3. Check back door lock assembly (actuator) circuit.	BL-183
	4. Replace BCM.	BCS-19
Back door opener does not operate. (With Intelligent Key)	1. Check BCM power supply and ground circuit.	BCS-16
	2. Check Intelligent Key power supply and ground circuit.	BL-123
	3. Check back door opener switch circuit.	BL-180
	4. Check back door lock assembly (actuator) circuit.	BL-183
	5. Replace BCM.	BCS-19

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007330082

1.CHECK FUSES AND FUSIBLE LINK

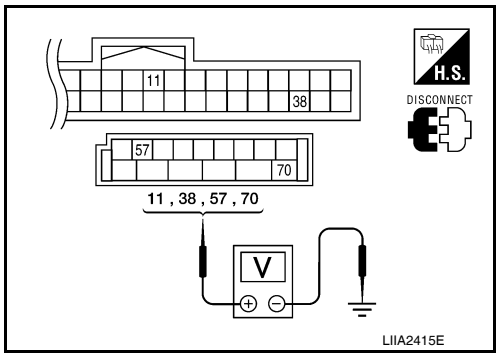
- Check 40A fusible link (letter **g** , located in the fuse and fusible link box).
- Check 10A fuses [No. 6, 8 and 20, located in the fuse block (J/B)].

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "Schematic".

2.CHECK BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM.
3. Check voltage between BCM connectors and ground.



Connector	Terminals (+)	Terminals (-)	Power source	Condition	Voltage (V) (Approx.)
M18	11	Ground	ACC power supply	Ignition switch ACC or ON	Battery voltage
	38	Ground	Ignition power supply	Ignition switch ON or START	Battery voltage
M20	57	Ground	Battery power supply	Ignition switch OFF	Battery voltage
	70	Ground	Battery power supply	Ignition switch OFF	Battery voltage

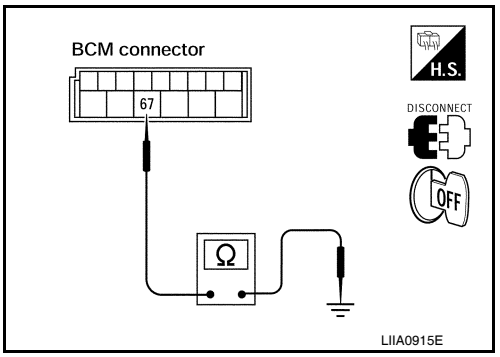
OK or NG

OK >> GO TO 3.
NG >> Repair or replace the harness.

3.CHECK GROUND CIRCUIT

Check continuity between BCM connector M20 terminal 67 and ground.

67 - Ground : Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Repair or replace harness.

Check Back Door Opener Switch Circuit (Without Intelligent Key)

INFOID:0000000007330084

1.CHECK BACK DOOR OPENER SWITCH SIGNAL 1

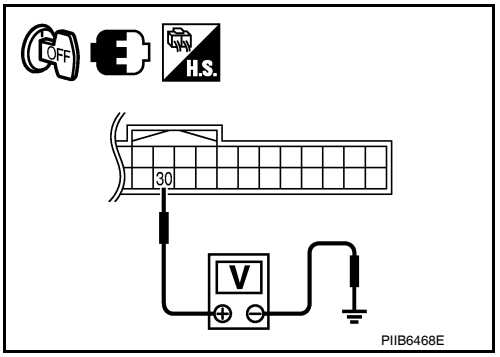
With CONSULT

1. Insure front door lock assembly RH is in the UNLOCK position.
2. Check back door opener switch (“TRNK OPNR SW”) in “DATA MONITOR” mode with CONSULT.

Test item	Condition
TRNK OPNR SW	Back door opener switch is pushed: ON
	Back door opener switch is released: OFF

Without CONSULT

1. Insure front door lock assembly RH is in the UNLOCK position.
2. Check voltage between BCM connector M18 terminal 30 and ground.



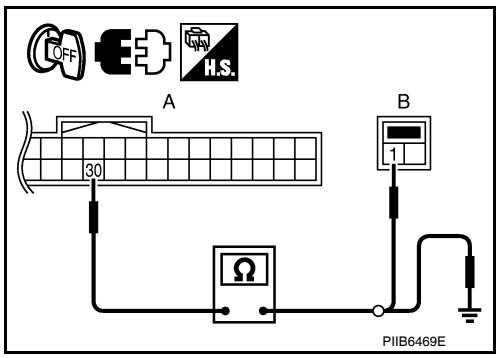
Terminals (+) BCM connector	Terminals (+) Terminal	Terminals (–)	Door condition		Voltage (V) (Approx.)
M18	30	Ground	Back door opener switch	Pushed	0
				Released	Battery voltage

OK or NG

OK >> Back door opener switch is OK.
NG >> GO TO 2

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT 1

1. Turn ignition switch OFF.
2. Disconnect BCM and back door opener switch connector.
3. Check continuity between BCM connector (A) M18 terminal 30 and back door opener switch connector (B) terminal 1.



A		B		Continuity
BCM connector	Terminal	Back door opener switch connector	Terminal	
M18	30	D408	1	Yes

4. Check continuity between BCM connector (A) M18 terminal 30 and ground.

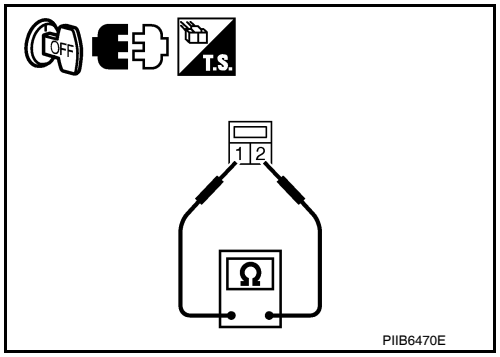
A		Ground	Continuity
BCM connector	Terminal		
M18	30		No

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

3.CHECK BACK DOOR OPENER SWITCH

Check continuity between back door opener switch terminals 1 and 2.



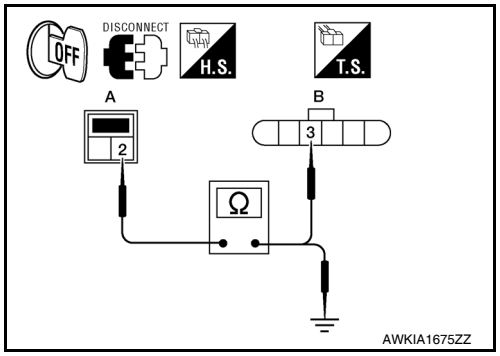
Terminal		Back door opener switch condition	Continuity
Back door opener switch			
1	2	Pushed	Yes
		Released	No

OK or NG

OK >> GO TO 4
NG >> Replace back door opener switch.

4.CHECK BACK DOOR OPENER SWITCH CIRCUIT 2

1. Disconnect front door lock assembly RH (door unlock sensor) connector.
2. Check continuity between back door opener switch connector (A) D408 terminal 2 and front door lock assembly RH (door unlock sensor) connector (B) D114 terminal 3.



A		B		Continuity
Back door opener switch connector	Terminal	Front door lock assembly RH (door unlock sensor) connector	Terminal	
D408	2	D114	3	Yes

3. Check continuity between back door opener switch connector (A) D408 terminal 2 and ground.

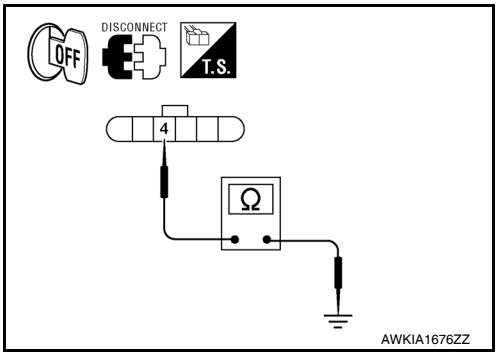
Back door opener switch connector	Terminal	Ground	Continuity
D408	2		No

OK or NG

OK >> GO TO 5
NG >> Repair or replace harness between back door opener switch and front door lock assembly RH (door unlock sensor).

5.CHECK FRONT DOOR LOCK ASSEMBLY RH (DOOR UNLOCK SENSOR) GROUND CIRCUIT

Check continuity between front door lock assembly RH (door unlock sensor) connector terminal 4 and ground.



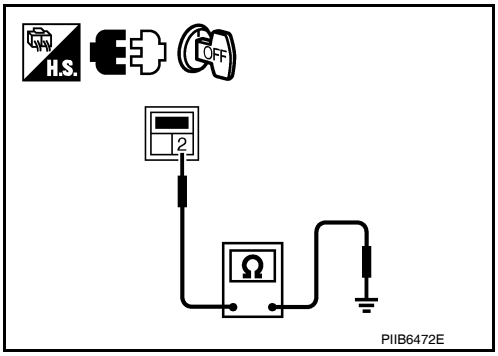
Front door lock assembly RH (door unlock sensor) connector	Terminal	Ground	Continuity
D114	4		Yes

OK or NG

OK >> GO TO 6
NG >> Repair or replace harness.

6.CHECK UNLOCK SENSOR FUNCTION

1. Connect front door lock assembly RH (door unlock sensor) connector.
2. Check continuity between back door opener switch connector D408 terminal 2 and ground.



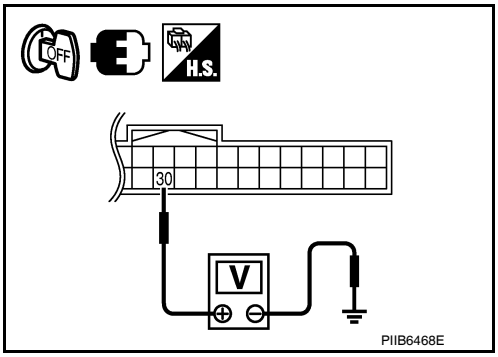
Back door opener switch connector	Terminal		Front door lock assembly RH position	Continuity
D408	2	Ground	Unlock	Yes
			Lock	No

OK or NG

OK >> GO TO 7
NG >> Replace front door lock assembly RH (door unlock sensor). Refer to BL-161.

7.CHECK BACK DOOR OPENER SWITCH SIGNAL 2

1. Connect BCM connector.
2. Check voltage between BCM connector and ground.



Terminals			Voltage (V) (Approx.)
(+)		(–)	
BCM connector	Terminal		
M18	30	Ground	Battery voltage

OK or NG

OK >> Check the condition of harness and connector.
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

Check Back Door Opener Switch Circuit (With Intelligent Key)

INFOID:0000000007330085

1.CHECK BACK DOOR OPENER SWITCH SIGNAL

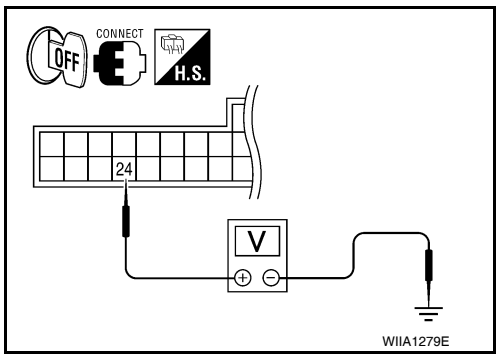
With CONSULT

Check back door opener switch (“TRNK OPNR SW”) in “DATA MONITOR” mode with CONSULT.

Test item	Condition
TRNK OPNR SW	Back door opener switch is pushed: ON
	Back door opener switch is released: OFF

Without CONSULT

Check voltage between Intelligent Key unit connector M52 terminal 24 and ground.



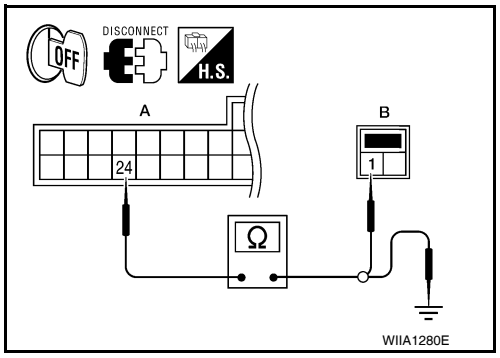
Terminals			Door condition		Voltage (V) (Approx.)
(+)		(–)			
Intelligent Key unit connector	Terminal				
M52	24	Ground	Back door opener switch	Pushed	0
				Released	5

OK or NG

OK >> Back door opener switch circuits are OK.
NG >> GO TO 2

2.CHECK BACK DOOR OPENER SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Intelligent Key unit and back door opener switch connector.
3. Check continuity between Intelligent Key unit connector (A) M52 terminal 24 and back door opener switch connector (B) terminal 1.



A		B		Continuity
Intelligent Key unit connector	Terminal	Back door opener switch connector	Terminal	
M52	24	D408	1	Yes

4. Check continuity between Intelligent Key unit connector (A) M52 terminal 24 and ground.

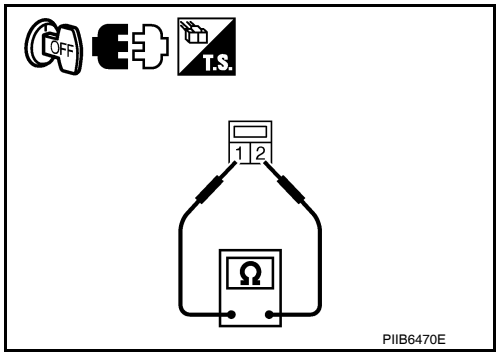
A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	24		No

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

3.CHECK BACK DOOR OPENER SWITCH

Check continuity between back door opener switch terminals 1 and 2.



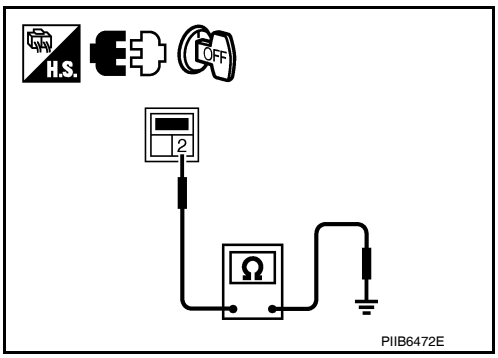
Terminal		Back door opener switch condition	Continuity
Back door opener switch			
1	2	Pushed	Yes
		Released	No

OK or NG

OK >> GO TO 4
NG >> Replace back door opener switch.

4. CHECK BACK DOOR OPENER SWITCH GROUND CIRCUIT

Check continuity between back door opener switch connector terminal 2 and ground.



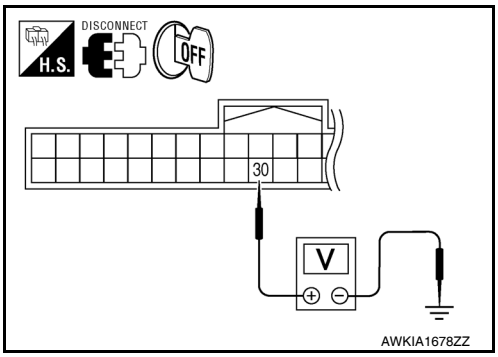
Back door opener switch connector	Terminal	Ground	Continuity
D408	2		Yes

OK or NG

OK >> GO TO 5
NG >> Repair or replace harness.

5. CHECK INTELLIGENT KEY UNIT OUTPUT SIGNAL

1. Connect Intelligent Key unit connector.
2. Check voltage between BCM connector M18 terminal 30 and ground.



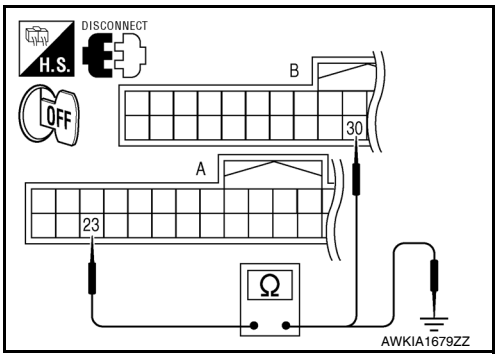
Terminals			Condition		Voltage (V) (Approx.)
(+)		(–)			
BCM connector	Terminal				
M18	30	Ground	Back door opener switch	Pushed	Battery voltage ↓ 0 ↓ Battery voltage
				Released	Battery voltage

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> GO TO 6

6. CHECK BACK DOOR INPUT CIRCUIT

1. Disconnect Intelligent Key unit connector M52 and BCM connector M18.
2. Check continuity between Intelligent Key unit connector (A) M52 terminal 23 and BCM connector (B) M18 terminal 30.



A		B		Continuity
Intelligent Key unit connector	Terminal	BCM connector	Terminal	
M52	23	M18	30	Yes

3. Check continuity between Intelligent Key unit connector (A) M52 terminal 23 and ground.

A		Ground	Continuity
Intelligent Key unit connector	Terminal		
M52	23		No

OK or NG

OK >> Replace Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".
NG >> Repair or replace harness.

Check Back Door Lock Assembly (Actuator) Circuit

INFOID:0000000007330086

1. CHECK BACK DOOR LOCK ASSEMBLY (ACTUATOR) FUNCTION

With CONSULT

Check the operation with ("TRUNK/BACK DOOR") in the ACTIVE TEST.

Does back door actuator system operate normally?

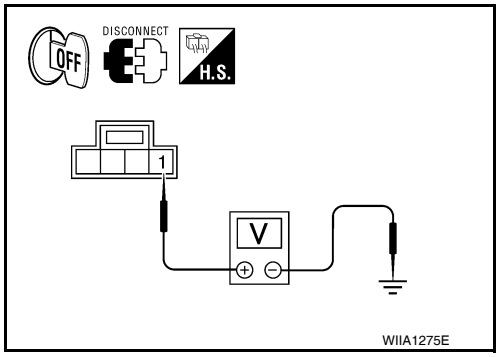
YES or NO

YES >> Back door lock assembly (actuator) is OK.
NO >> GO TO 2

2. CHECK BACK DOOR LOCK ASSEMBLY (ACTUATOR) POWER SUPPLY

1. Turn ignition switch OFF.
2. Insure both front door lock knobs are turned to the UNLOCK position.
3. Disconnect back door lock assembly (actuator) connector.
4. Check voltage between back door lock assembly (actuator) connector D405 terminal 1 and ground.

Terminals			Condition		Voltage (V) (Approx.)
(+)		(–)			
Back door lock assembly (actuator) connector	Terminal				
D405	1	Ground	Back door opener switch	Pushed	0 ↓ Battery voltage ↓ 0
				Released	0



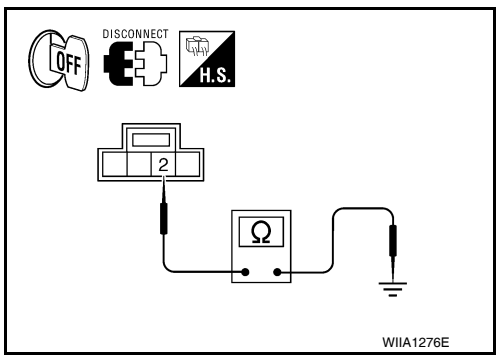
OK or NG

OK >> GO TO 3
NG >> GO TO 4

3. CHECK BACK DOOR LOCK ASSEMBLY (ACTUATOR) GROUND CIRCUIT

Check continuity between back door lock assembly (actuator) connector D405 terminal 2 and ground.

Back door lock assembly (actuator) connector	Terminal	Ground	Continuity
D405	2		Yes



OK or NG

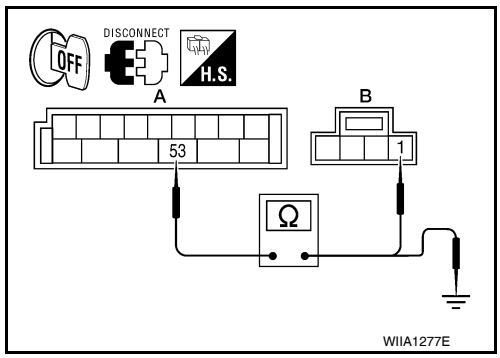
OK >> Replace back door lock assembly (actuator). Refer to BL-167.
NG >> Repair or replace harness.

4. CHECK BACK DOOR LOCK ASSEMBLY (ACTUATOR) CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM connector (A) M19 terminal 53 and back door lock assembly (actuator) connector (B) D405 terminal 1.

A		B		Continuity
BCM connector	Terminal	Back door opener actuator connector	Terminal	
M19	53	D405	1	Yes

3. Check continuity between BCM connector (A) M19 terminal 53 and ground.



BCM connector	Terminal	Ground	Continuity
M19	53		No

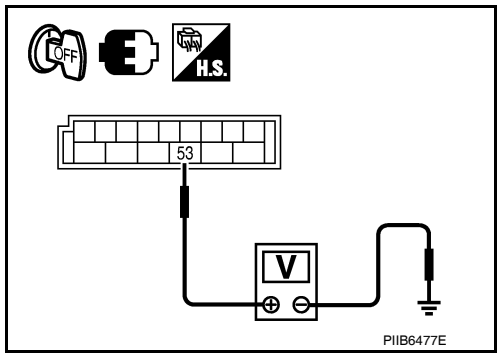
OK or NG

OK >> GO TO 5
NG >> Repair or replace harness between BCM and back door lock assembly (actuator).

5. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M19 terminal 53 and ground.

Terminals			Condition		Voltage (V) (Approx.)
(+)		(–)			
BCM connector	Terminal				
M19	53	Ground	Back door opener switch	Pushed	0 ↓ Battery voltage ↓ 0
				Released	0



OK or NG

OK >> Check the condition of harness and connector.
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

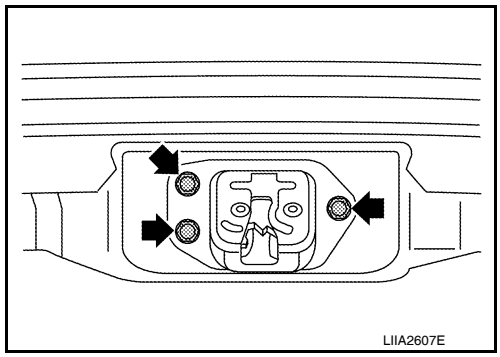
Removal and Installation

INFOID:0000000007330087

BACK DOOR LOCK

Removal

1. Remove the back door finisher lower. Refer to EI-34.
2. Remove the bolts, disconnect the electrical connector and separate the lock from the door.

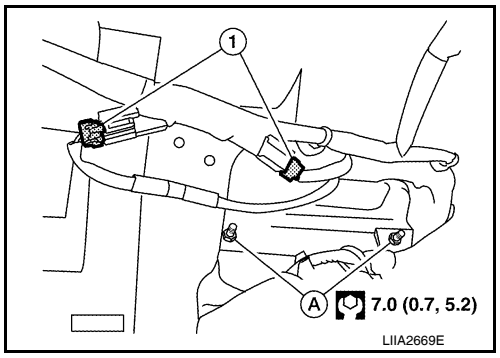


Installation
Installation is in the reverse order of removal.

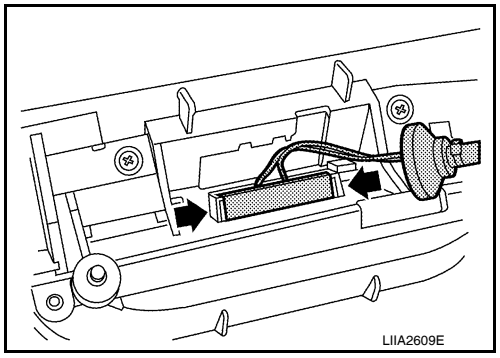
BACK DOOR HANDLE

Removal

1. Remove the back door finisher lower. Refer to EI-34.
2. Disconnect the harness connectors (1), remove the nuts and the back door handle (A).



3. Release the clips and remove the switch from the housing.



Installation

Installation is in the reverse order of removal.

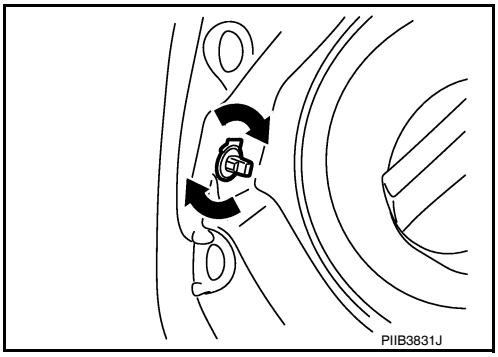
FUEL FILLER LID OPENER

Removal and Installation of Fuel Filler Lid Opener

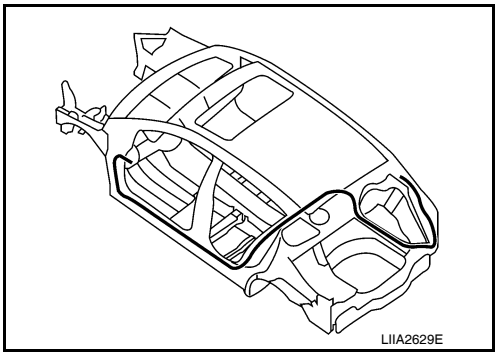
INFOID:0000000007330104

REMOVAL

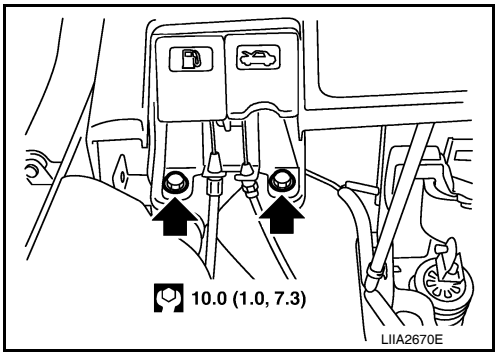
1. Remove trunk side finisher (RH). Refer to EI-44, "Removal and Installation".
2. Remove fuel filler lock.
3. Remove front kicking plate and rear kicking plate. Refer to EI-35, "Removal and Installation".
4. Remove rear cushion assembly. Refer to SE-22, "Removal and Installation".



5. Remove fuel filler lid opener cable clip from the vehicle.



6. Remove the bolts and the fuel filler lid opener.
7. Remove the fuel filler lid opener cable.



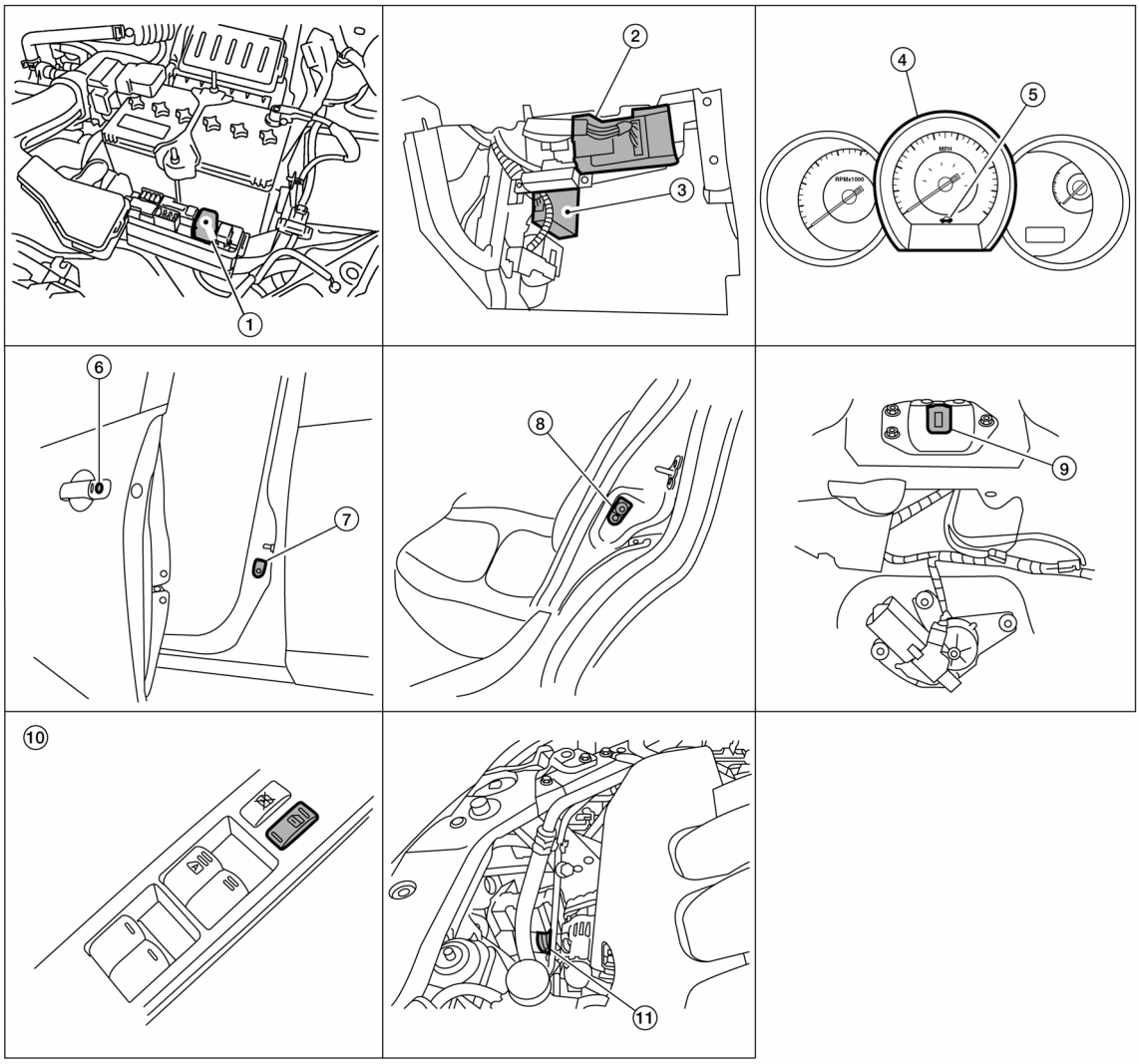
INSTALLATION

Installation is in the reverse order of removal.

VEHICLE SECURITY (THEFT WARNING) SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007330105



AWKIA1872ZZ

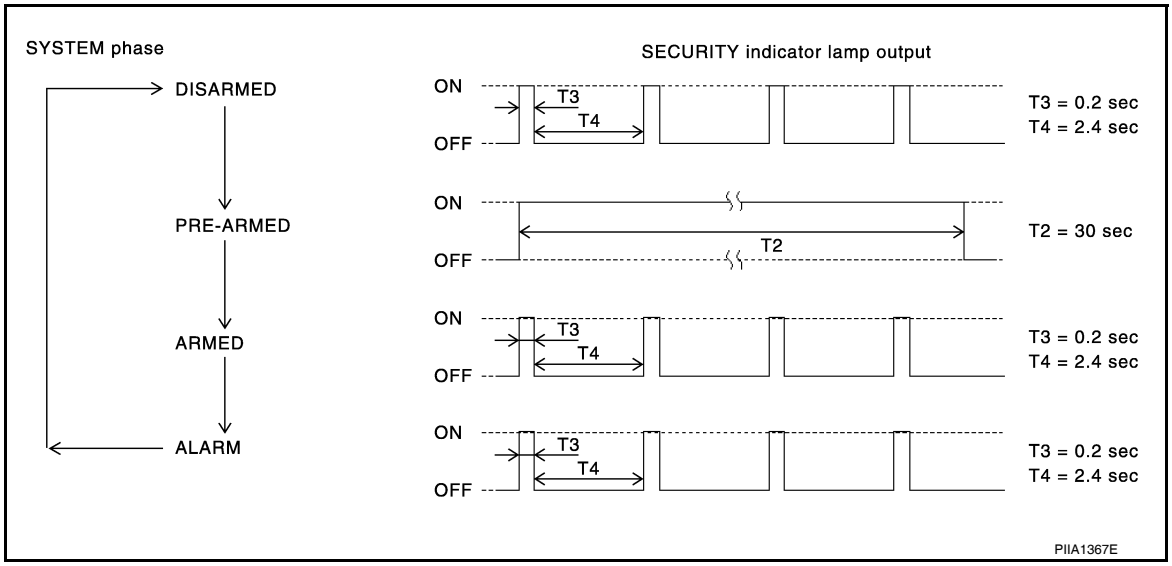
1. Horn relay H-1
2. BCM M18, M19, M20 (view with glove box removed)
3. Intelligent Key unit M52 (with Intelligent Key)
4. Combination meter M24
5. Security indicator lamp
6. Front door lock assembly LH (key cylinder switch) D14
7. Front door switch LH B8 RH B108
8. Rear door switch LH B6 RH B116
9. Back door lock assembly (back door switch) D405 (view with back door open)
10. Main power window and door lock/unlock switch D7, D8 Power window and door lock/unlock switch RH D105
11. Horn E18, E20

System Description

INFOID:0000000007330106

DESCRIPTION

Operation Flow



Setting the vehicle security system

Initial condition
- Ignition switch is in OFF position.

Disarmed phase
- When the vehicle is being driven or when any door is open, the vehicle security system is set in the disarmed phase on the assumption that the owner is inside or near the vehicle.

Pre-armed phase and armed phase
- The vehicle security system turns into the "pre-armed" phase (security lamp illuminates) when the BCM receives LOCK signal from front door key cylinder switch, keyfob or Intelligent Key after all doors are closed.
- All doors are closed after front doors are locked by key or door lock and unlock switch. The security indicator lamp illuminates for 30 seconds. then, the system automatically shifts into the "armed" phase.

Canceling the set vehicle security system

Armed phase is canceled when the driver unlocks the doors with the key, keyfob or Intelligent Key.

Activating the alarm operation of the vehicle security system

Make sure the system is in the armed phase.

When one of the following operations is performed, the system sounds the horns and flashes the headlamps for about 50 seconds.

1. Any door is opened before unlocking door with key, keyfob or Intelligent Key.
2. Door is unlocked without using key, keyfob or Intelligent Key.

POWER SUPPLY AND GROUND

Power is supplied at all times
- through 10A fuse [No.10, located in the fuse block (J/B)]
- to combination meter terminal 27 (security indicator lamp)
- through 40A fusible link (letter **g**, located in the fuse and fusible link box)
- to BCM terminal 70
- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to BCM terminal 57
- through 10A fuse (No. 28, located in the fuse and fusible link box)
- to horn relay terminal 2
- through 15A fuse (No. 52, located in the IPDM E/R)
- to IPDM E/R internal CPU.
- through 20A fuse (No. 53, located in the IPDM E/R)
- to IPDM E/R internal CPU.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in the fuse block (J/B)]
- to BCM terminal 11.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38.

Ground is supplied
- to BCM terminal 67
- through body grounds M57 and M61.

INITIAL CONDITION TO ACTIVATE THE SYSTEM

The operation of the vehicle security system is controlled by the doors.
To activate the vehicle security system, BCM must receive signals indicating the ignition switch is OFF, doors are closed and locked.
When a door is open, BCM terminal 12, 13, 43, 47 or 48 receives a ground signal from each door switch. In addition to BCM, when back door is open, the Intelligent Key unit terminal 23 receives a ground signal from back door through BCM terminal 30.
When front door LH is unlocked, BCM terminal 46 receives a signal from terminal 6 of main power window and door lock/unlock switch.
When front door RH is unlocked, BCM terminal 46 receives a signal from terminal 2 of power window and door lock/unlock switch RH.

VEHICLE SECURITY SYSTEM ALARM OPERATION

The vehicle security system is triggered by
- Opening a door without using the key, keyfob or Intelligent Key.

The vehicle security system will be triggered once the system is in armed phase,
- when BCM receives a ground signal at terminals 12, 13, 47, 48 (front or rear door switch) or terminal 43 (back door switch).

When the vehicle security system is triggered, ground is supplied intermittently
- from IPDM E/R terminal 45
- to horn relay terminal 1.

The headlamps flash and the horn sounds intermittently.
The alarm automatically turns off after 50 seconds, but will reactivate if the vehicle is tampered with again.

VEHICLE SECURITY SYSTEM DEACTIVATION

To deactivate the vehicle security system, a door must be unlocked with the key, keyfob or Intelligent Key.
When the key is used to unlock the driver door, BCM terminal 7 receives signal
- from terminal 3 of the front door lock assembly LH (key cylinder switch).

When the BCM receives an unlock signal from keyfob, Intelligent Key or front door key cylinder switch LH, the vehicle security system is deactivated (Disarmed phase).

PANIC ALARM OPERATION

Intelligent Key and remote keyless entry system may or may not operate vehicle security system (horn and headlamps) as required.
When the vehicle security system is triggered, ground is supplied intermittently
- from IPDM E/R terminal 45
- to horn relay terminal 1.

The headlamp flashes and the horn sounds intermittently.
The alarm automatically turns off after 25 seconds or when BCM receives any signal from keyfob or Intelligent Key.

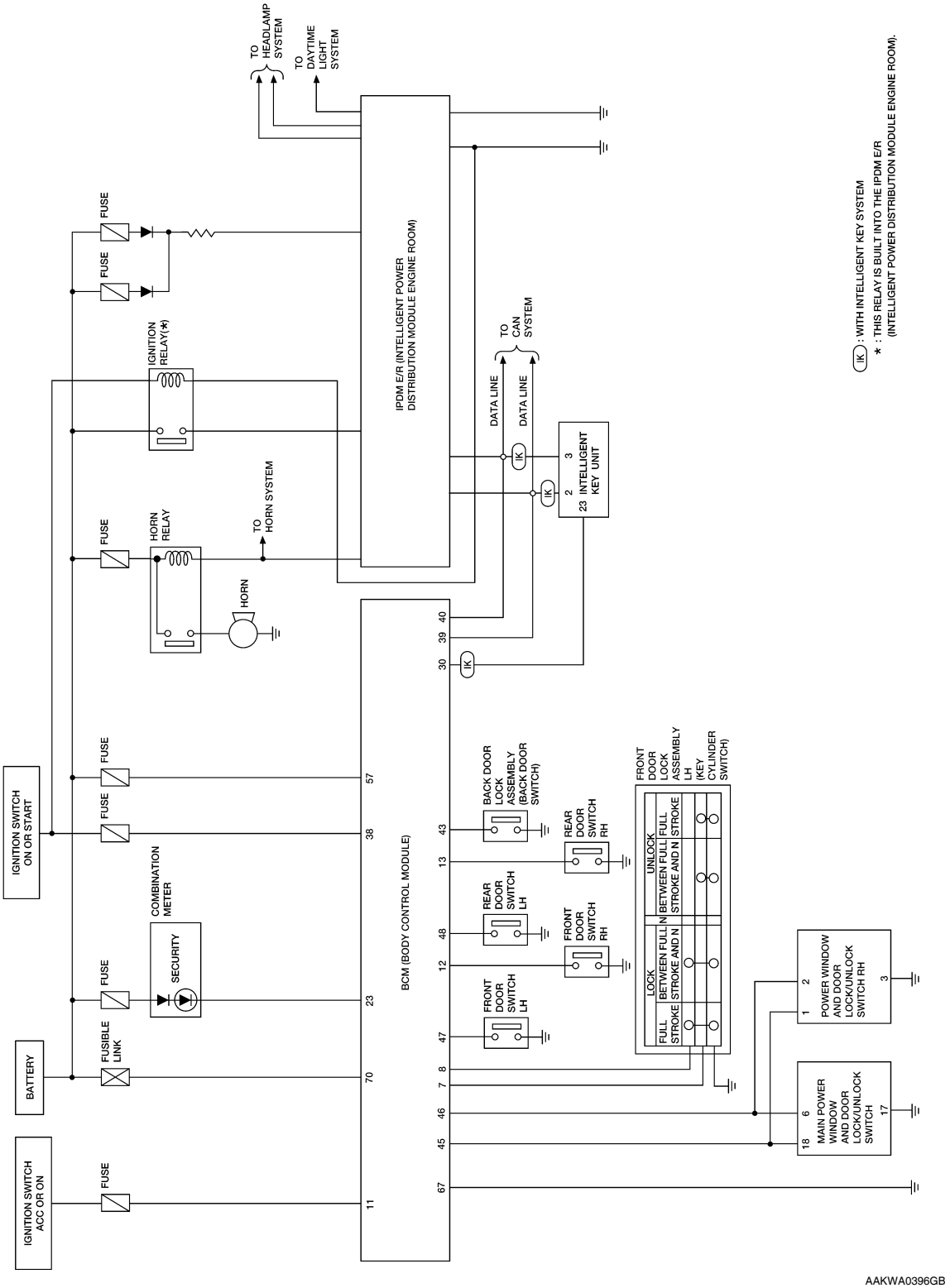
CAN Communication System Description

INFOID:0000000007330107

Refer to LAN-5.

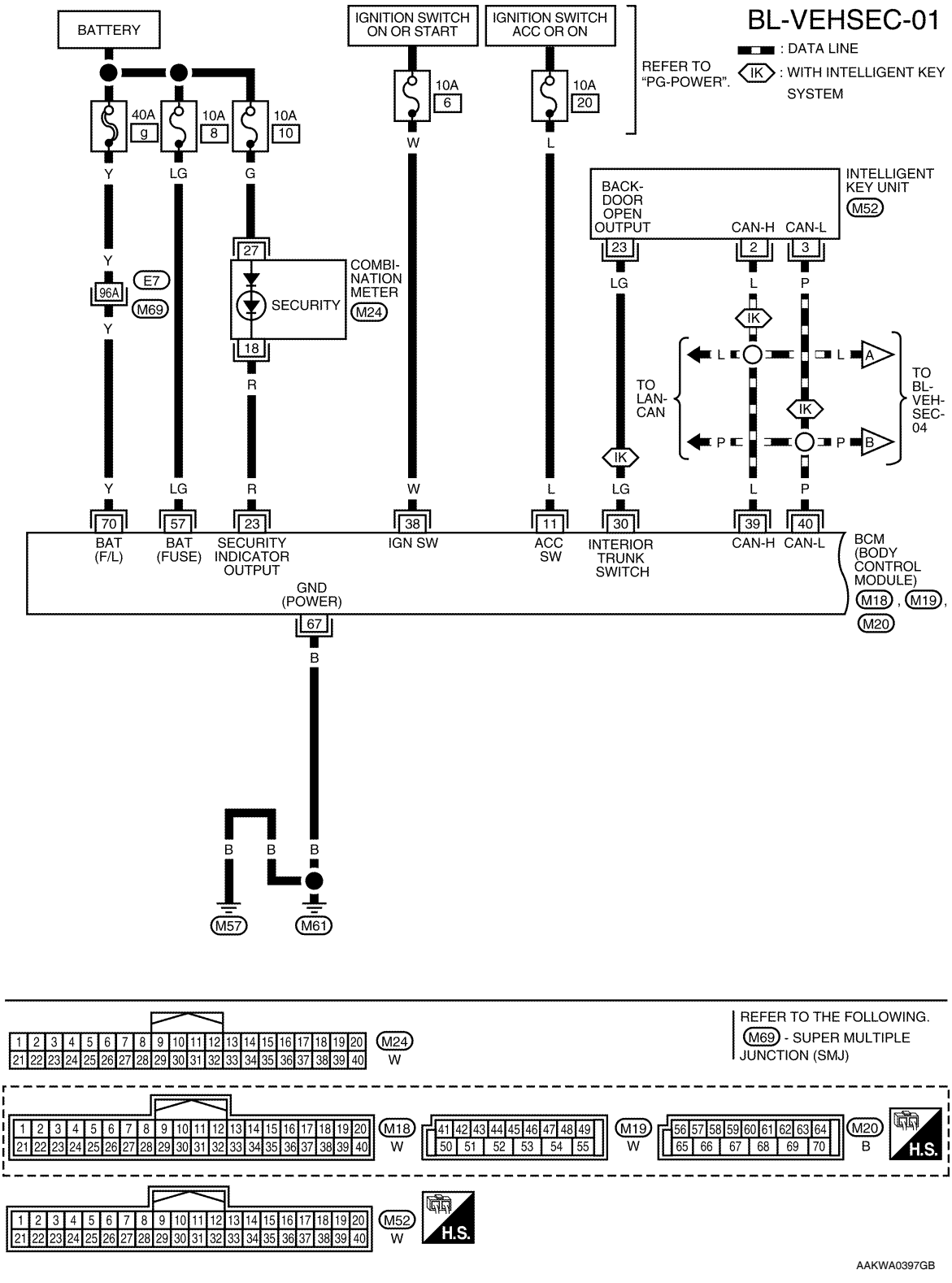
Schematic

INFOID:0000000007330108

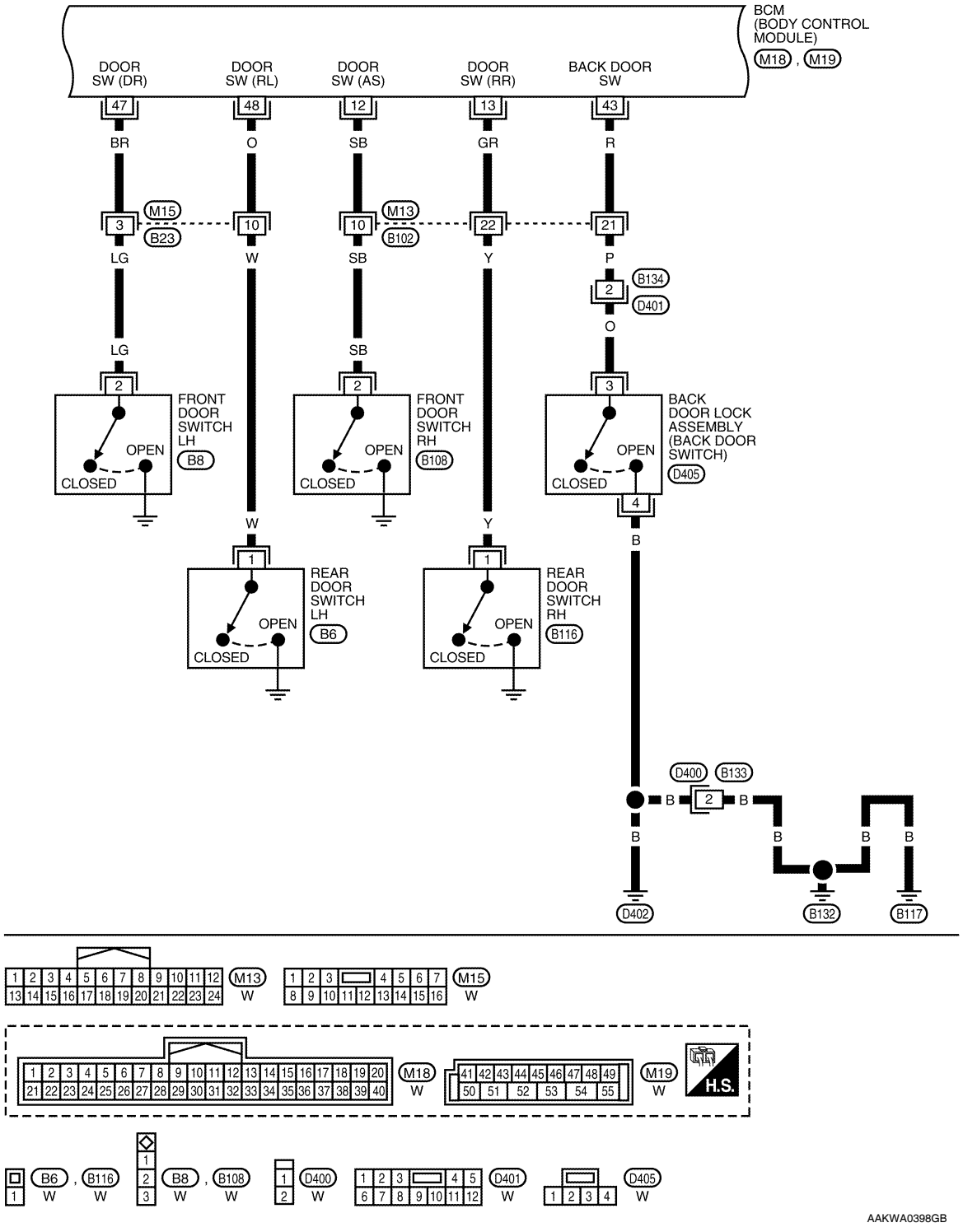


Wiring Diagram - VEHSEC -

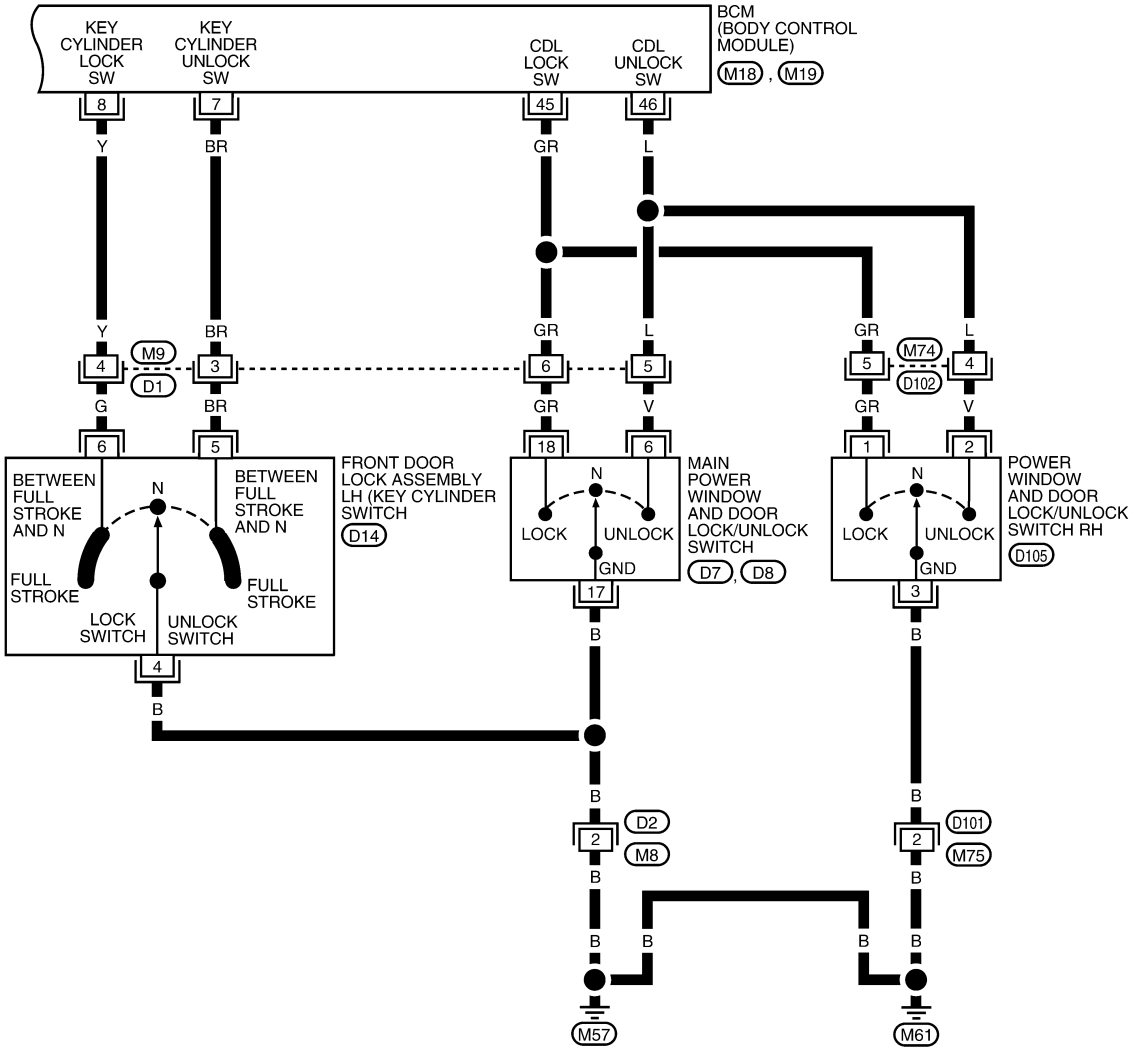
INFOID:0000000007330109

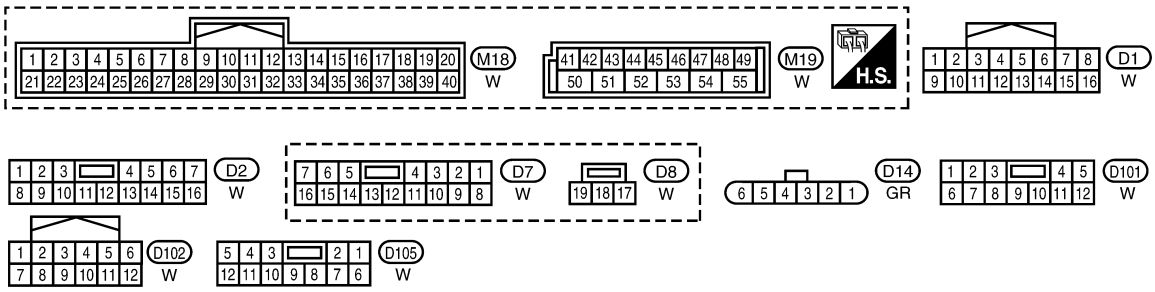


BL-VEHSEC-02

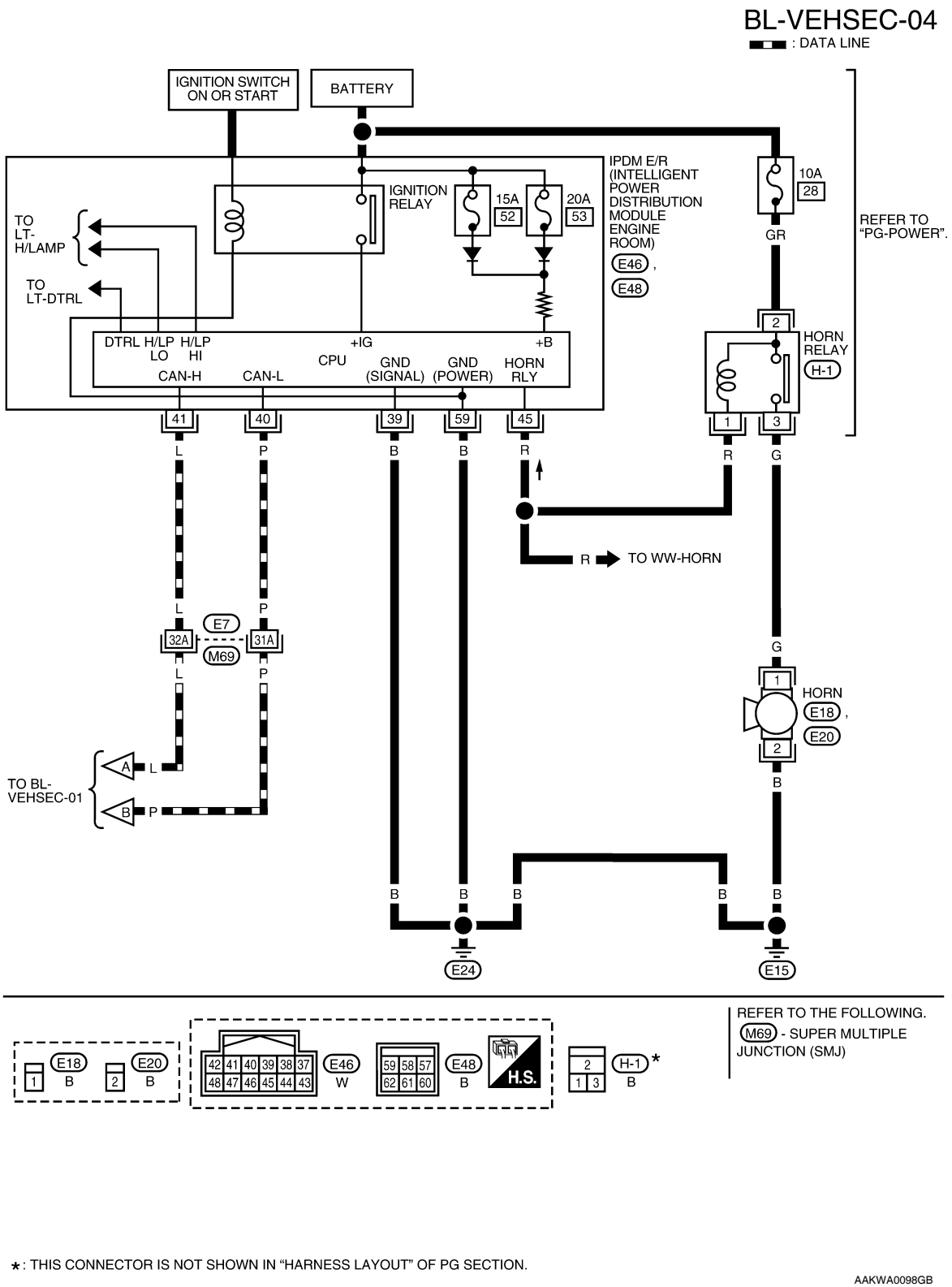

BCM
(BODY CONTROL
MODULE)
M18 , M19
DOOR
SW (DR)
DOOR
SW (RL)
DOOR
SW (AS)
DOOR
SW (RR)
BACK DOOR
SW
47
48
12
13
43
BR
O
SB
GR
R
M15
B23
M13
B102
3
10
10
22
21
LG
W
SB
Y
P
B134
D401
2
O
LG
SB
2
2
3
FRONT
DOOR
SWITCH
LH
B8
FRONT
DOOR
SWITCH
RH
B108
BACK
DOOR LOCK
ASSEMBLY
(BACK DOOR
SWITCH)
D405
OPEN
CLOSED
4
W
Y
B
1
1
REAR
DOOR
SWITCH
LH
B6
REAR
DOOR
SWITCH
RH
B116
D400
B133
2
D402
B132
B117
M13
W
M15
W
M18
W
M19
W
H.S.
B6 , B116
W W
B8 , B108
W W
D400
W
D401
W
D405
W
AAKWA0398GB

BL-VEHSEC-03





ABKWA1064GB

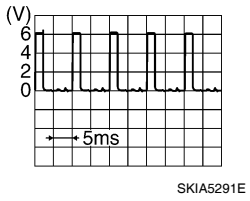
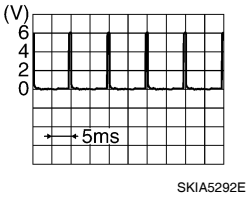
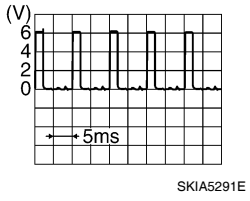
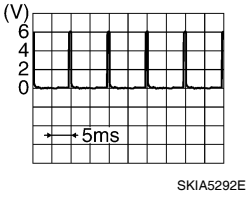


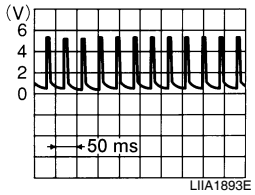
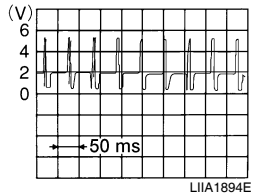
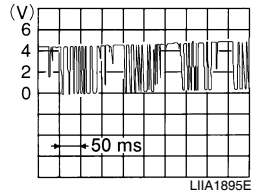
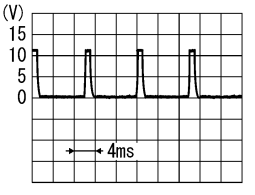
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

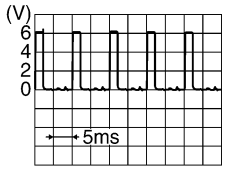
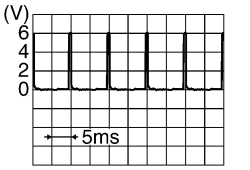
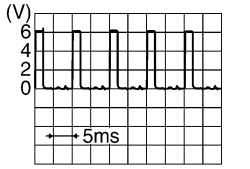
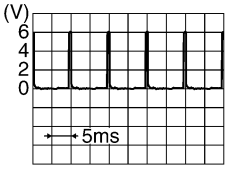
AAKWA0098GB

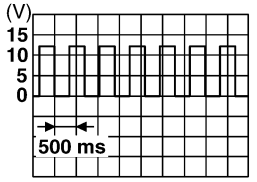
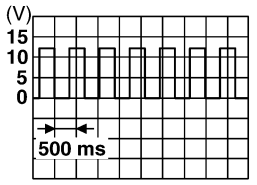
Terminal and Reference Value for BCM

INFOID:0000000007698394

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

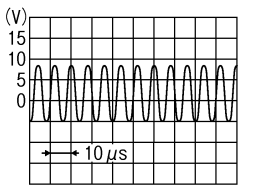
Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

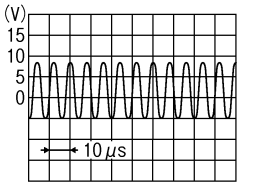
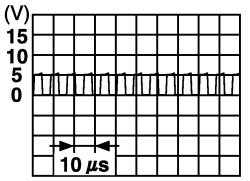
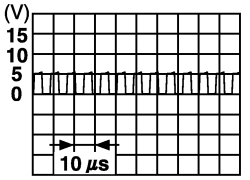
1: With Intelligent Key

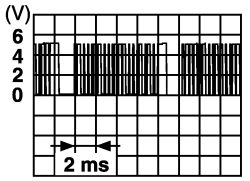
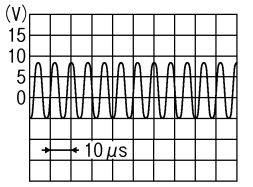
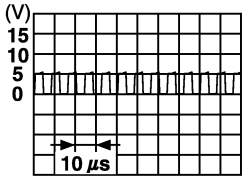
2: Without Intelligent Key

Terminal and Reference Value for Intelligent Key Unit

INFOID:0000000007698396

Terminal	Wire Color	Item	Condition			Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions		
1	R	Steering lock solenoid power supply	LOCK	—		5
2	L	CAN-H	—	—		—
3	P	CAN-L	—	—		—
4	O	Intelligent Key warning buzzer	LOCK	Operate door request switch.	Buzzer OFF	Battery voltage
					Sound buzzer	0
5	G	Front door request switch LH	—	Press door request switch (driver side).		0
				Other than above		5
6	Y	Ignition switch (ON)	ON	—		Battery voltage
7	LG	Key switch	LOCK	Insert mechanical key into ignition switch.		Battery voltage
				Remove mechanical key from ignition switch.		0
10*1	W	CVT or A/T shift selector (park position switch)	ON	Shift lever in park position.		0
				Other than above		Battery voltage
11	SB	Power source (Fuse)	—	—		Battery voltage
12	B	Ground	—	—		0
13	V	Instrument panel antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)		 PIIB5502J
14	LG	Instrument panel antenna (-) signal				

Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
15	L	Front console antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)	 PIIB5502J
16	P	Front console antenna (-) signal			
17	W	Rear bumper antenna (+) signal	LOCK	Press back door request switch.	 SIIA1910J
18	B	Rear bumper antenna (-) signal			
19	V	Front outside antenna LH (+) signal	LOCK	Press door request switch LH.	 SIIA1910J
20	P	Front outside antenna LH (-) signal			
22*2	BR	Key interlock solenoid	—	With Intelligent Key present or mechanical key in ignition cylinder, press "PUSH" button on ignition cylinder.	Battery voltage
				Other than above	0
23	LG	Back door open output	—	Back door open (switch closed)	0
				Back door closed (switch open)	5
24	V	Back door opener switch	—	Press and hold back door switch.	0
				Other than above	5
25	L	Front door request switch RH	—	Press front door request switch RH.	0
				Other than above	5
26	SB	Stop lamp switch	—	Depress brake pedal	Battery voltage
				Other than above	0
27	W	Ignition knob switch	—	Press ignition switch.	Battery voltage
				Release ignition switch.	0
28	Y	Unlock sensor (driver side)	—	Door (driver side) is locked.	5
				Door (driver side) is unlocked.	0
29	V	Back door request switch	—	Press back door request switch.	0
				Other than above	5
31	BR	Steering lock solenoid ground	—	—	0

Terminal	Wire Color	Item	Condition		Voltage (V) Approx.
			Ignition Switch Position	Operation or Conditions	
32	GR	Steering lock solenoid communication signal	LOCK	When Intelligent Key is inside vehicle, press ignition knob switch.	 SIIA1911J
				Other than above	5
33	R	Rear floor antenna (+) signal	LOCK	• Any door open → all door close • Press ignition knob switch: ON (Ignition knob switch)	 PIIB5502J
34	G	Rear floor antenna (-) signal			
37	BR	Front outside antenna RH (+) signal	LOCK	Press door request switch RH.	 SIIA1910J
38	Y	Front outside antenna RH (-) signal			

*1: With continuously variable transmission (CVT) or automatic transmission (A/T).

*2: With manual transmission (M/T).

CONSULT Function (BCM)

INFOID:0000000007330112

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received date is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

CONSULT APPLICATION ITEM

Work Support

Test Item	Description
SECURITY ALARM SET	This mode can confirm and change security alarm ON-OFF setting.
THEFT ALM TRG	The switch which triggered vehicle security alarm is recorded. This mode is able to confirm and erase the record of vehicle security alarm. The trigger data can be erased by touching “CLEAR” on CONSULT screen.

Data Monitor

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEYLESS LOCK*	Indicates [ON/OFF] condition of lock signal from keyfob.
KEYLESS UNLOCK*	Indicates [ON/OFF] condition of unlock signal from keyfob.
I-KEY LOCK**	Indicates [ON/OFF] condition of lock signal from keyfob.
I-KEY UNLOCK**	Indicates [ON/OFF] condition of unlock signal from keyfob.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
KEY CYL LK-SW	Indicates [ON/OFF] condition of lock signal from key cylinder switch.
KEY CYL UN-SW	Indicates [ON/OFF] condition of unlock signal from key cylinder switch.
CDL LOCK SW	Indicates [ON/OFF] condition of lock signal from door lock/unlock switch LH and RH.
CDL UNLOCK SW	Indicates [ON/OFF] condition of unlock signal from door lock/unlock switch LH and RH.

* : With remote keyless entry system

** : With Intelligent Key system

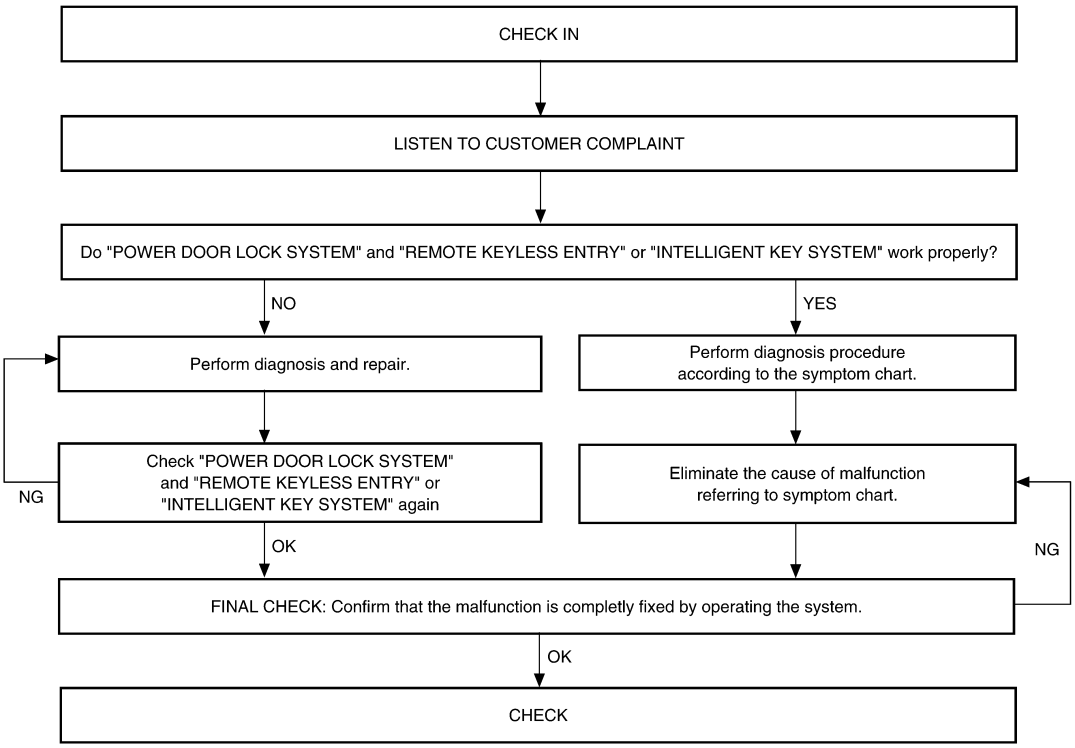
Active Test

Test Item	Description
THEFT IND	This test is able to check security indicator lamp operation. The lamp will be turned on when “ON” on CONSULT screen is touched.
VEHICLE SECURITY HORN	This test is able to check vehicle security horn operation. The horns will be activated for 0.5 seconds after “ON” on CONSULT screen is touched.
HEADLAMP (HI)	This test is able to check vehicle security lamp operation. The headlamps will be activated for 0.5 seconds after “ON” on CONSULT screen is touched.

Trouble Diagnosis

INFOID:0000000007330113

WORK FLOW



LIIA2635E

- For “POWER DOOR LOCK SYSTEM” diagnosis, refer to BL-23.
- For "INTELLIGENT KEY SYSTEM” diagnosis, refer to BL-83.
- For “REMOTE KEYLESS ENTRY SYSTEM” diagnosis, refer to BL-57.

Preliminary Check

INFOID:0000000007330114

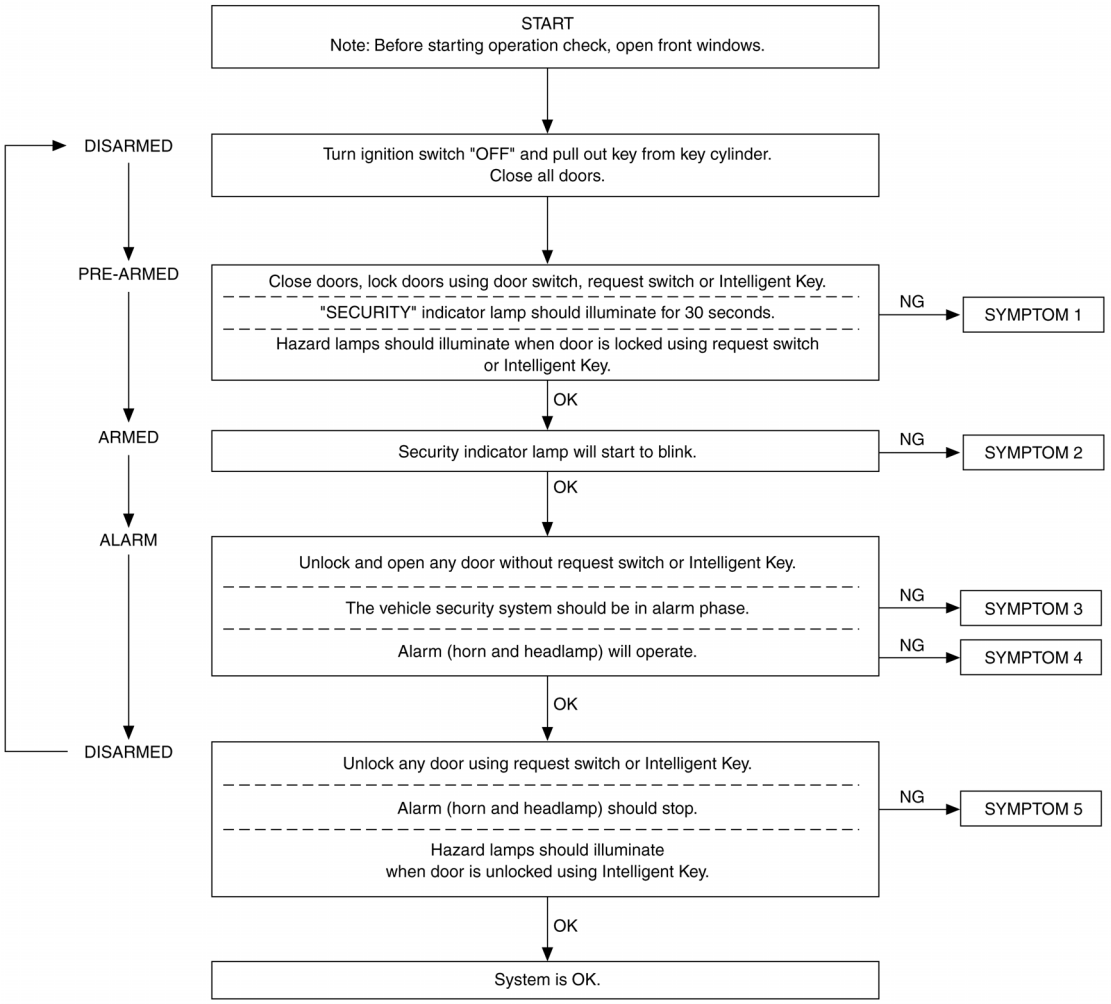
1.CHECK BCM CONFIGURATION

Confirm BCM configuration for "THEFT ALARM" is set to "WITH". Refer to BCS-18, "Configuration".

OK or NG

OK >> Proceed with the preliminary check to verify system operation.
NG >> Change BCM configuration for "THEFT ALARM" to "WITH". Refer to BCS-18, "Configuration".

The system operation is canceled by turning ignition switch to ACC at any step between START and ARMED in the following flow chart.



AWKIA1868GB

After performing preliminary check, go to symptom chart. Refer to BL-205, "Symptom Chart".

Symptom Chart

INFOID:0000000007330115

	SYMPTOM	PROCEDURE	Diagnostic procedure
1	Vehicle security system cannot be set by ····	All items	Diagnostic Procedure 1 (Door switch check) Refer to BL-205, "Diagnosis Procedure 1".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
		Lock/unlock switch	Diagnostic Procedure 6 (Door lock/unlock switch check) Refer to BL-209, "Diagnosis Procedure 6".
			If the above systems are “OK”, check main power window and door lock/unlock switch. Refer to GW-18.
		Door outside key (driver)	Diagnostic Procedure 3 (Door key cylinder switch check) Refer to BL-209, "Diagnosis Procedure 3".
			If the above systems are “OK”, check main power window and door lock/unlock switch. Refer to GW-18.
		Intelligent Key	Check Intelligent Key entry function. Refer to BL-85, "System Description"
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
		Keyfob (without Intelligent Key)	Check remote keyless entry function. Refer to BL-68, "Preliminary Check".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
2	Security indicator does not turn “ON”.	Security indicator lamp	Diagnostic Procedure 2 (Security indicator lamp check) Refer to BL-208, "Diagnosis Procedure 2".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
3	*1 Vehicle security system does not alarm when ····	Any door is opened.	Diagnostic Procedure 1 (Door switch check) Refer to BL-205, "Diagnosis Procedure 1".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
4	Vehicle security alarm does not activate.	Horn alarm	Diagnostic Procedure 4 (Vehicle security horn alarm check). Refer to BL-209, "Diagnosis Procedure 4".
			If the above systems are “OK”, check horn system. Refer to WW-40.
		Head lamp alarm	Diagnostic Procedure 5 (Head lamp alarm check). Refer to BL-209, "Diagnosis Procedure 5".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
5	Vehicle security system cannot be canceled by ····	Door outside key (driver)	Diagnostic Procedure 3 (Door key cylinder switch check). Refer to BL-209, "Diagnosis Procedure 3".
			If the above systems are “OK”, check main power window and door lock/unlock switch. Refer to GW-18.
		Intelligent Key	Check Intelligent Key entry function. Refer to BL-85, "System Description"
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
		Keyfob (without Intelligent Key)	Check remote keyless entry function. Refer to BL-68, "Preliminary Check".
			If the above systems are “OK”, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

*1 : Make sure the system is in the armed phase.

Diagnosis Procedure 1

INFOID:0000000007330116

1-1 DOOR SWITCH CHECK

1.CHECK DOOR SWITCHES INPUT SIGNAL

With CONSULT

Check door switches ("DOOR SW-DR", "DOOR SW-AS", "DOOR SW-RL", "DOOR SW-RR", "BACK DOOR SW") in DATA MONITOR mode with CONSULT. Refer to BL-42, "CONSULT Function (BCM)".

- When doors are open:

DOOR SW-DR	**: ON**
DOOR SW-AS	**: ON**
DOOR SW-RL	**: ON**
DOOR SW-RR	**: ON**
BACK DOOR SW	**: ON**

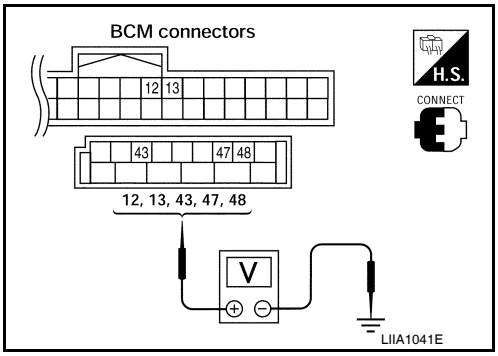
- When doors are closed:

DOOR SW-DR	**: OFF**
DOOR SW-AS	**: OFF**
DOOR SW-RL	**: OFF**
DOOR SW-RR	**: OFF**
BACK DOOR SW	**: OFF**

Without CONSULT

Check voltage between BCM connector M18 or M19 terminals 12, 13, 43, 47, 48 and ground.

Connector	Item	Terminals		Condition	Voltage (V) (Approx.)
		(+)	(–)		
M18	Front door switch RH	12	Ground	Open ↓ Closed	0 ↓ Battery voltage
	Rear door switch RH	13			
M19	Back door switch	43			
	Front door switch LH	47			
	Rear door switch LH	48			



OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

2.CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door switch and BCM.
3. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and BCM connectors (A) M18, M19 terminals 12, 13, 43, 47 and 48.

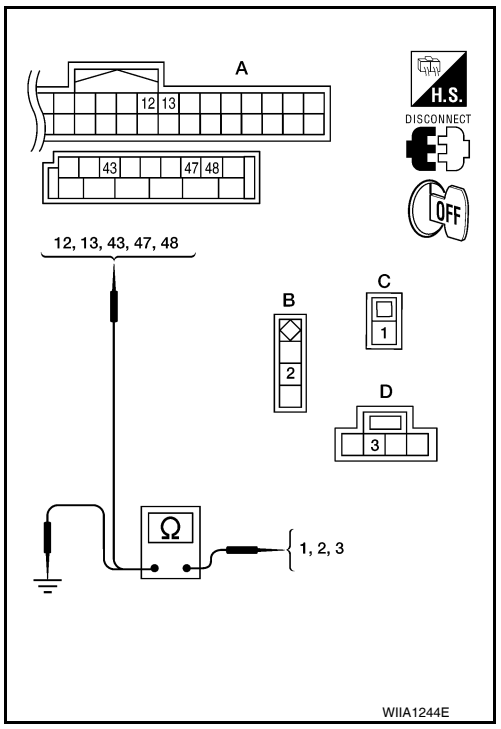
1 - 13 : **Continuity should exist.**
1 - 48 : **Continuity should exist.**
2 - 12 : **Continuity should exist.**
2 - 47 : **Continuity should exist.**
3 - 43 : **Continuity should exist.**

4. Check continuity between door switch connector (B) B8 (front LH), B108 (front RH) terminal 2 or (C) B6 (rear LH), B116 (rear RH) terminal 1 or back door lock assembly connector (D) D405 terminal 3 and ground.

1 - Ground : **Continuity should not exist.**
2 - Ground : **Continuity should not exist.**
3 - Ground : **Continuity should not exist.**

OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

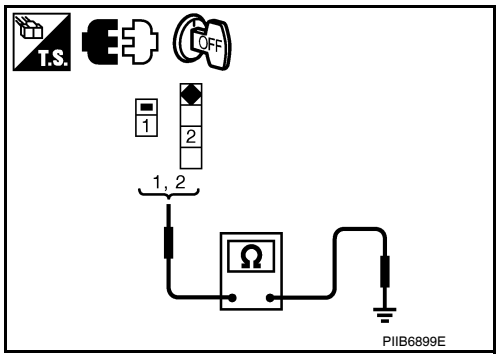


3. CHECK DOOR SWITCHES

FRONT AND REAR DOORS

Check continuity between front door switch terminal 2 or rear door switch terminal 1 and exposed metal of switch while pressing and releasing switch.

Door switch is released : **Continuity should exist.**
Door switch is pushed : **Continuity should not exist.**



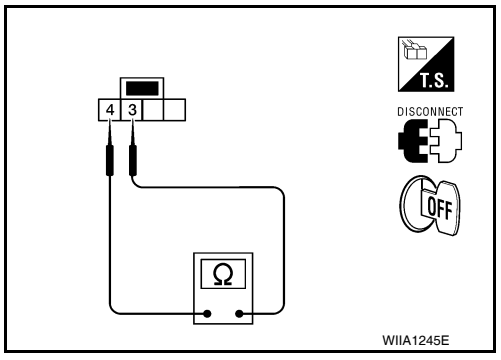
BACK DOOR

Check continuity between back door lock assembly connector (back door switch) terminals 3 and 4 while pressing (closing back door) and releasing (opening back door) switch.

When back door is open : **Continuity should exist.**
When back door is closed : **Continuity should not exist.**

OK or NG

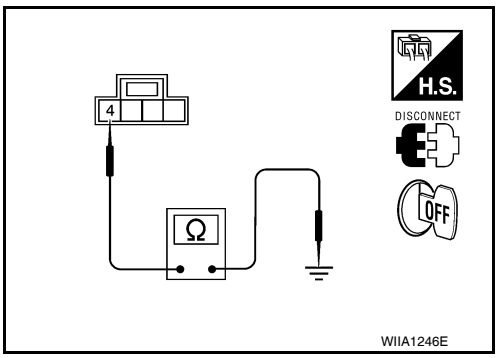
OK1 >> (Front and rear doors) Switch circuit is OK.
OK2 >> (Back door) GO TO 4
NG >> Replace door switch.



4. CHECK BACK DOOR SWITCH GROUND

Check continuity between back door lock assembly connector D405 terminal 4 and ground.

4 - Ground : Continuity should exist.



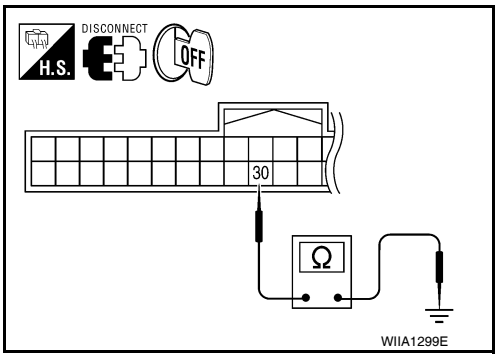
OK or NG

OK1 >> Back door switch circuit is OK (without Intelligent Key).
OK2 >> GO TO 5 (with Intelligent Key).
NG >> Repair or replace harness.

5.CHECK BACK DOOR SWITCH SIGNAL FOR SHORT

1. Disconnect Intelligent Key unit.
2. Check continuity between BCM connector M18 terminal 30 and ground.

30 - Ground : Continuity should not exist.



OK or NG

OK >> Back door switch circuit is OK.
NG >> Repair or replace harness.

Diagnosis Procedure 2

INFOID:0000000007330117

SECURITY INDICATOR LAMP CHECK

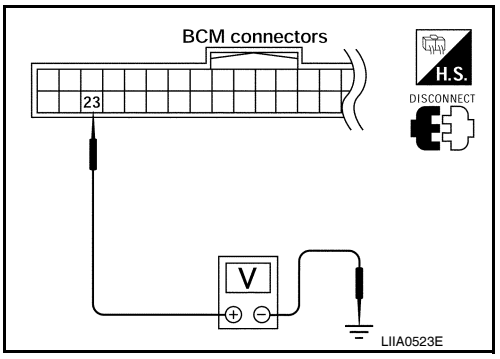
1.SECURITY INDICATOR LAMP ACTIVE TEST

With CONSULT

Check "THEFT IND" in "ACTIVE TEST" mode with CONSULT.

Without CONSULT

1. Disconnect BCM.
2. Check voltage between BCM harness connector M18 terminal 23 and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M18	23	Ground	ON	0
			OFF	Battery voltage

OK or NG

OK >> Security indicator lamp is OK.
NG >> GO TO 2.

2.SECURITY INDICATOR LAMP CHECK

Check security indicator lamp condition.

OK or NG

OK >> GO TO 3.
NG >> Replace combination meter. Refer to DI-19, "Removal and Installation".

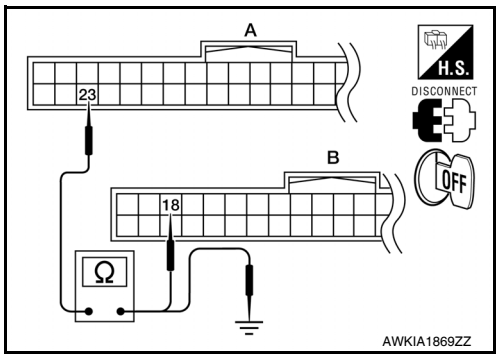
3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and combination meter.
3. Check continuity between BCM connector (A) M18 terminal 23 and combination meter connector (B) M24 terminal 18.

23 - 18 : Continuity should exist.

4. Check continuity between BCM connector (A) M18 terminal 23 and ground.

23 - Ground : Continuity should not exist.



OK or NG

OK >> Check the following:
- 10A fuse [No. 10, located in fuse block (J/B)]
- Harness for open or short between combination meter and fuse

NG >> Repair or replace harness.

Diagnosis Procedure 3

INFOID:0000000007330118

1.FRONT DOOR LOCK ASSEMBLY LH (KEY CYLINDER SWITCH) CHECK

Check front door lock assembly LH (key cylinder switch) with key.

Do doors lock/unlock when using the key?

YES >> Front door lock assembly LH (key cylinder switch) is OK.
NO >> Check front door lock assembly LH (key cylinder switch) circuit. Refer to BL-53, "Front Door Lock Assembly LH (Key Cylinder Switch) Check".

Diagnosis Procedure 4

INFOID:0000000007330119

VEHICLE SECURITY HORN ALARM CHECK

1.CHECK HORN OPERATION

Check if horn sounds with horn switch.

Does horn operate?

YES >> Check harness for open or short between IPDM E/R and horn relay.
NO >> Check horn circuit. Refer to WW-40.

Diagnosis Procedure 5

INFOID:0000000007330120

VEHICLE SECURITY HEADLAMP ALARM CHECK

1.CHECK VEHICLE SECURITY HEADLAMP ALARM OPERATION

Check if headlamps operate with lighting switch.

Do headlamps come on when turning switch ON?

YES >> Headlamp alarm is OK.
NO >> Check headlamp system. Refer to LT-5 or LT-27.

Diagnosis Procedure 6

INFOID:0000000007330121

DOOR LOCK/UNLOCK SWITCH CHECK

1.CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL

Check if power door lock operates with door lock/unlock switch.

Do doors lock/unlock when using each door lock/unlock switch?

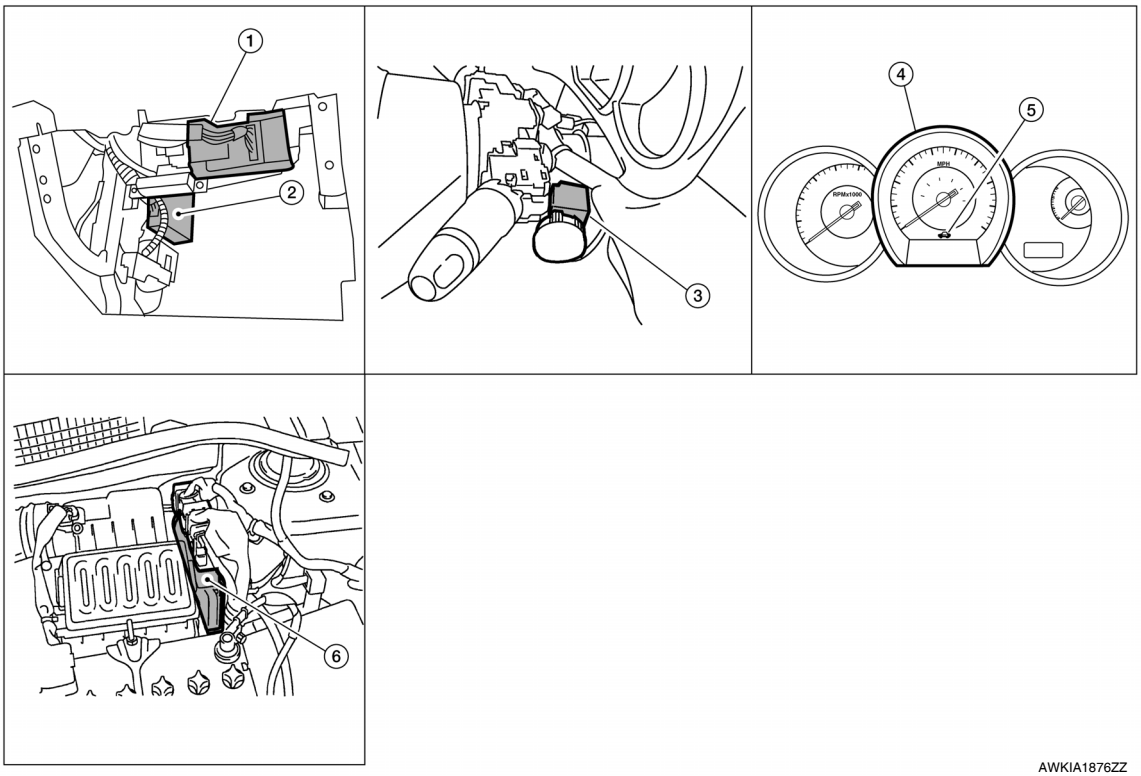
YES >> Door lock/unlock switch is OK.

NO >> Refer to BL-48, "Door Lock and Unlock Switch Check".

NATS (NISSAN ANTI-THEFT SYSTEM)

Component Parts and Harness Connector Location

INFOID:0000000007330125



AWKIA1876ZZ

1. BCM M18, M20 (view with glove box removed)
2. Intelligent Key unit M52 (if equipped)
3. NATS antenna amp. M21 (inside steering column)
4. Combination meter M24
5. Security indicator lamp
6. ECM E16

System Description

INFOID:0000000007330126

DESCRIPTION

NOTE:
If customer reports a "No start" condition, request ALL KEYS to be brought to a Nissan dealer in case of a NATS malfunction.

NATS (Nissan Anti-Theft System) has the following functions:

- NATS shows a higher anti-theft performance at preventing engine to be started by an unregistered key. (registered key: mechanical key and Intelligent Key).
- Only a key with key ID registered in BCM and ECM can start engine, it has a higher protection against auto theft that duplicates keys.
- If a malfunction has been detected, security indicator will illuminate when ignition switch is in ON position.
- If the owner requires, mechanical key can be registered for up to 5 keys.
- During trouble diagnosis or when the following parts have been replaced, and if mechanical key is added, registration* is required.
  *: All mechanical keys of the vehicle should be registered.

- ECM
- BCM
- Mechanical key

- NATS trouble diagnoses, system initialization and additional registration of other NATS mechanical key IDs must be carried out using CONSULT hardware and CONSULT NATS software. When NATS initialization has been completed, the ID of the inserted mechanical key can be displayed.
  Regarding the procedures of NATS initialization and mechanical key ID registration, refer to CONSULT operation manual NATS.

SECURITY INDICATOR

- Forewarns that the vehicle is equipped with NATS.

- Security indicator will not blink while the ignition knob is in ON or START state.
  NOTE:
  Because security indicator is highly efficient, the battery is barely affected.

Condition of Security Indicator

- When operating the ignition switch with Intelligent Key, security indicator lamp will turn off at once if ignition switch is pressed and blinks when ignition switch is released.
- When operating the ignition switch with mechanical key security indicator will turn off at once if mechanical key is inserted into key cylinder and blinks when mechanical key is removed.
  (Once the mechanical key is inserted into key cylinder, BCM will only perform the key ID verification with mechanical key)

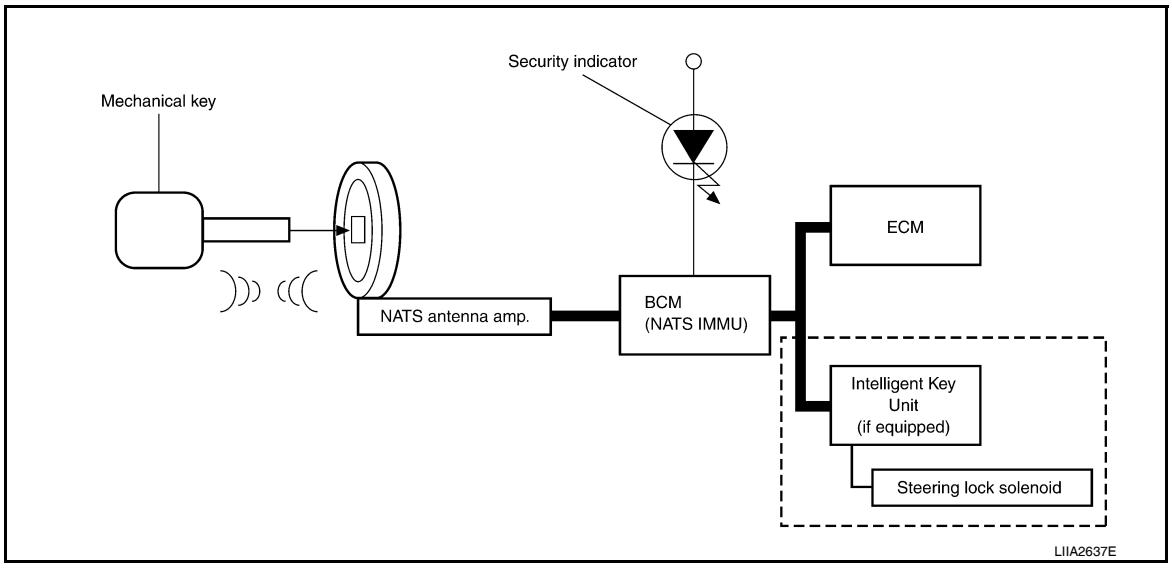
System Composition

INFOID:0000000007330127

The function of the NATS consists of the following:

- Mechanical key
- NATS antenna amp. located in the ignition key cylinder
- BCM
- ECM (Engine control module)
- Security indicator
- Intelligent Key unit (if equipped)

NOTE:
The communication between ECM, BCM and/or Intelligent Key unit uses the CAN communication system.



ECM Re-communicating Function

INFOID:0000000007330128

Performing the following procedure can automatically perform re-communication of ECM and BCM or Intelligent Key unit, but only when the ECM has been replaced with a new one which has never been energized on-board.
(In this step, initialization procedure by CONSULT is not necessary)

NOTE:

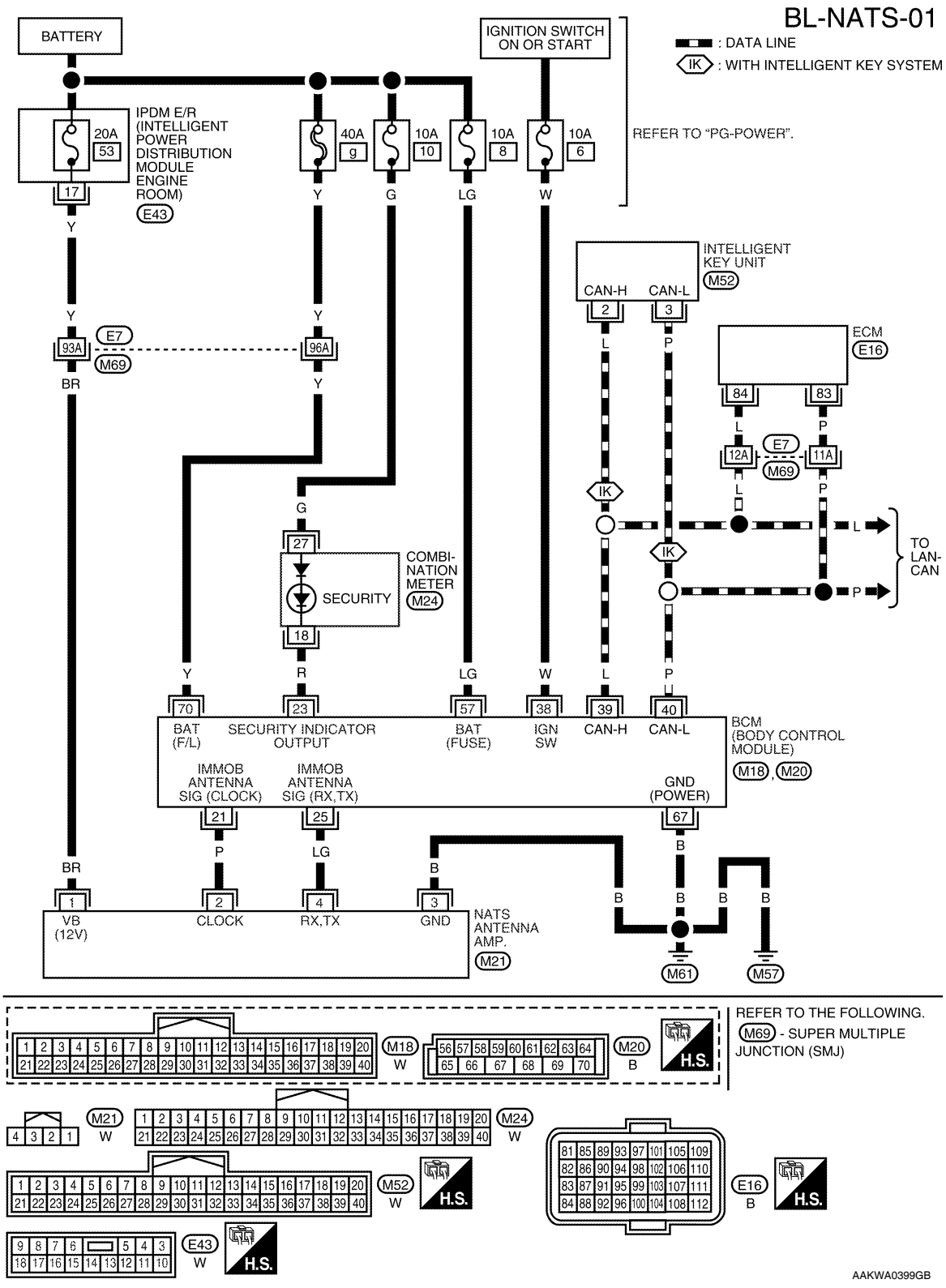
- **When registering new Key IDs or replacing the ECM other than brand new, refer to CONSULT Operation Manual NATS.**
- **If multiple keys are attached to the key holder, separate them before work.**
- **Distinguish keys with unregistered key ID from those with registered ID.**

1. Install ECM.
2. Use a registered key (*), turn ignition switch to “ON”.
   *: To perform this step, use the key that has been used before to perform ECM replacement.
3. Maintain ignition switch in “ON” position for at least 5 seconds.
4. Turn ignition switch to “OFF”.
5. Start engine.
   If engine can be started, procedure is completed.

If engine cannot be started, refer to CONSULT Operation Manual NATS and initialize control unit.

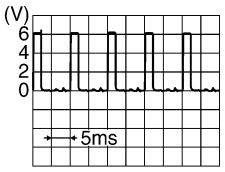
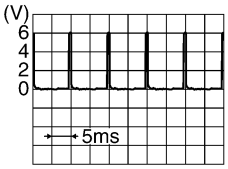
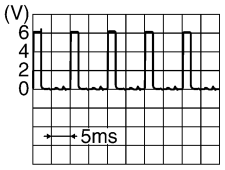
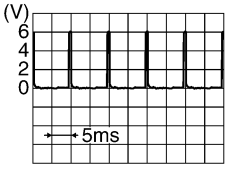
Wiring Diagram - NATS -

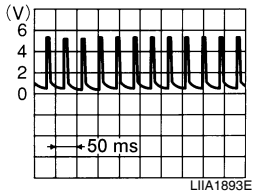
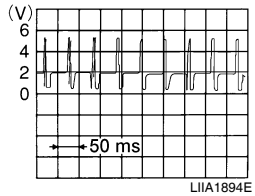
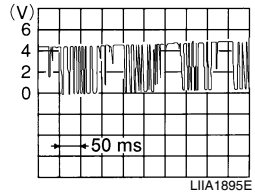
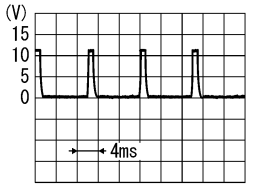
INFOID:0000000007330129

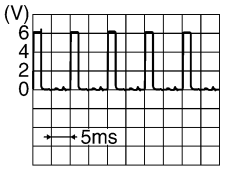
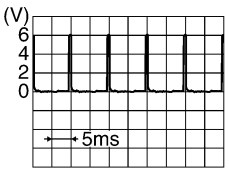
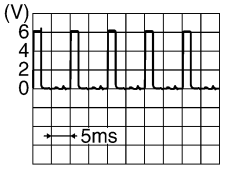
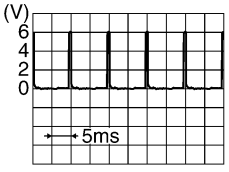


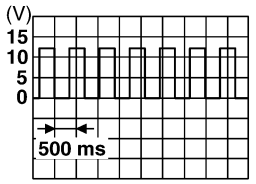
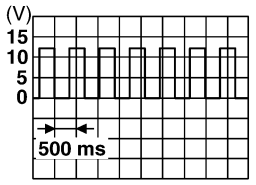
Terminal and Reference Value for BCM

INFOID:0000000007698400

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

1: With Intelligent Key

2: Without Intelligent Key

CONSULT Function

INFOID:0000000007330131

CONSULT DIAGNOSTIC TEST MODE FUNCTION

Diagnostic mode	Description
C/U INITIALIZATION	When replacing any of the following components, C/U initialization and re-registration of all NATS mechanical keys are necessary. [NATS mechanical key/ BCM/ ECM*]
SELF DIAGNOSTIC RESULT	Detected items (screen terms) are as shown in the chart. Refer to "NATS SELF-DIAGNOSTIC RESULTS ITEM CHART" .

*: When replace ECM, refer to BL-212, "ECM Re-communicating Function" .

NOTE:

- When any initialization is performed, all ID previously registered will be erased and all NATS mechanical keys must be registered again.
- The engine cannot be started with an unregistered key. In this case, the system will show “DIFFERENCE OF KEY” or “LOCK MODE” as a self-diagnostic result on the CONSULT screen.
- In rare case, “CHAIN OF ECM-IMMU” might be stored as a self-diagnostic result during key registration procedure, even if the system is not malfunctioning.

NATS SELF DIAGNOSTIC RESULT ITEM CHART

Detected items [NATS program card screen terms]	P No. Code (Self-diagnostic result of “ENGINE”)	Malfunction is detected when.....	Reference page
CHAIN OF ECM-IMMU [P1612]	NATS MALFUNCTION P1612	Communication impossible between ECM and BCM In rare case, “CHAIN OF ECM-IMMU” might be stored during key registration procedure, even if the system is not malfunctioning.	BL-222
DIFFERENCE OF KEY [P1615]	NATS MALFUNCTION P1615	BCM can receive the key ID signal but the result of ID verification between key ID and BCM is NG.	BL-228
CHAIN OF IMMU-KEY [P1614]	NATS MALFUNCTION P1614	BCM cannot receive the key ID signal.	BL-224
ID DISCORD, IMM-ECM [P1611]	NATS MALFUNCTION P1611	The result of ID verification between BCM and ECM is NG. System initialization is required.	BL-225

Detected items [NATS program card screen terms]	P No. Code (Self-diagnostic result of "ENGINE")	Malfunction is detected when.....	Reference page
LOCK MODE [P1610]	NATS MALFUNCTION P1610	When the starting operation is carried out five or more times consecutively under the following conditions, NATS will shift the mode to one which prevents the engine from being started. • Unregistered mechanical key is used. • BCM or ECM's malfunctioning.	BL-227
DON'T ERASE BEFORE CHECKING ENG DIAG	—	All engine trouble codes except NATS trouble code has been detected in ECM.	BL-219

Trouble Diagnosis Procedure

INFOID:0000000007330132

PRELIMINARY CHECK

1.GET SYMPTOMS

Listen to customer complaints request. (Get symptoms)

NOTE:

If customer reports a "No start" condition, request all Intelligent Keys to be brought to the dealer in case of Intelligent Key system malfunction.

Intelligent Key or mechanical key service request>> For further information, refer to CONSULT operation manual.

Malfunctions>>GO TO 2

2.START ENGINE WITH INTELLIGENT KEY (IF EQUIPPED)

Check if the engine could be started by all registered Intelligent Keys.

The engine cannot be started by some Intelligent Keys>>Intelligent Key is low battery or malfunction. Refer to BL-152, "Intelligent Key Battery Replacement" .

The engine cannot be started by all Intelligent Keys >> GO TO 3

The engine can be started by all Intelligent Keys >> GO TO 4

3.CHECK "KEY" WARNING LAMP ILLUMINATION

When pushing the ignition switch, check if "KEY" warning lamp in combination meter illuminates.

KEY warning lamp illuminates green >> Refer to BL-116, "Trouble Diagnosis Symptom Chart" .

KEY warning lamp illuminates red >> Refer to BL-116, "Trouble Diagnosis Symptom Chart" .

Does not illuminate >> Refer to BL-116, "Trouble Diagnosis Symptom Chart" .

4.START ENGINE WITH MECHANICAL KEY

Check if the engine could be started by all registered mechanical keys.

The engine can not be started by some mechanical keys >> Register mechanical key. Refer to CONSULT operation manual.

The engine cannot be started by all mechanical keys >> "WORK FLOW" .

The engine can be started by all mechanical keys >> GO TO 5

5.PERFORM SELF-DIAGNOSIS

1. Turn ignition switch to ON by carrying the Intelligent Key.
2. Perform self-diagnosis of Intelligent Key system with CONSULT.

Malfunction is detected >> Refer to BL-114, "CONSULT Application Item" .

No malfunction is detected >> Refer to BL-112, "Trouble Diagnosis Procedure" .

WORK FLOW

1.STARTING ENGINE

Check if the engine could be started by inserting the mechanical key into the ignition key cylinder and operate ignition switch.

OK >> System is normal.
NG >> GO TO 2

2.PERFORM SELF DIAGNOSIS

Perform NATS SELF-DIAGNOSIS using CONSULT.
NOTE:
NATS program card is necessary to display the “SELF-DIAGNOSIS”.

No malfunction is detected >> Recheck the starting engine section GO TO 1
Malfunction related to NATS is detected >> GO TO 3
Malfunctions related to “DON’T ERASE BEFORE CHECKING ENG DIAG” and NATS are detected >> GO TO 7

3.IDENTIFYING NATS MALFUNCTION

Self-diagnosis results referring to NATS, but no information about engine self-diagnosis result is displayed on CONSULT. Refer to BL-221, "Trouble Diagnosis" .

>> GO TO 4

4.NATS TROUBLE DIAGNOSIS

Repair NATS (if necessary, perform “C/U INITIALIZATION” with CONSULT.)

>> GO TO 5

5.ERASE SELF-DIAGNOSIS

Erase the record of “SELF-DIAGNOSIS” by using CONSULT.

>> GO TO 6

6.STARTING ENGINE

Check if the engine could be started by inserting the mechanical key into the ignition key cylinder and operate ignition switch.

NG >> GO TO 2
OK >> Inspection End.

7.IDENTIFYING NATS AND ENGINE CONTROL MALFUNCTION

NATS malfunction and “DON’T ERASE BEFORE CHECKING ENG DIAG” are displayed on the CONSULT screen.
NOTE:
This indication means that malfunction have been detected in NATS and engine control system.

>> GO TO 8

8.NATS TROUBLE DIAGNOSIS

Repair NATS according to self-diagnosis results refer to NATS (if necessary, perform “C/U INITIALZATIN” with CONSULT.)
NOTE:
Do not erase “SELF-DIAGNOSIS” by using CONSULT.

>> GO TO 9

9. IDENTIFYING ENGINE CONTROL MALFUNCTION

Check engine “SELF-DIAGNOSIS” records with a generalized program card instead of the NATS program card.

>> GO TO 10

10. ENGINE CONTROL SYSTEM TROUBLE DIAGNOSIS

Repair engine control system if engine related malfunction is detected.
With engine diagnostic codes present, refer to EC-9, "U0101-U1001".
Without engine diagnostic codes present, refer to EC-92, "Trouble Diagnosis Introduction".

NOTE:
If only “NATS MALFUNCTION” is displayed, erase the self-diagnosis results.

>> GO TO 11

11. STARTING ENGINE

Check if the engine could be started by inserting the mechanical key into the ignition key cylinder and operate ignition switch.

OK >> GO TO 12
NG >> GO TO 2

12. ERASE SELF-DIAGNOSIS

Erase both NATS and ENGINE "SELF-DIAGNOSIS" records by using CONSULT NATS program card.

>> GO TO 13

13. COMFIRMATION

Perform running test with CONSULT in engine “SELF-DIAGNOSIS” mode.

“NO DTC” is displayed >> Inspection End.
Malfunction information is displayed >>GO TO 2

Trouble Diagnosis

INFOID:0000000007330133

SYMPTOM MATRIX CHART 1

Self-diagnosis related item

SYMPTOM	Displayed "SELF-DIAG RESULTS" on CONSULT screen.	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)
• Security indicator lighting up* • Engine cannot be started	CHAIN OF ECM-IMMU [P1612]	PROCEDURE 1 (BL-222)	In rare case, "CHAIN OF ECM-IMMU" might be stored during key registration procedure, even if the system is not malfunctioning.
			Open circuit in battery voltage line of BCM circuit
			Open circuit in ignition line of BCM circuit
			Open circuit in ground line of BCM circuit
			Open or short circuit between BCM and ECM communication line
			ECM
			BCM
	DIFFERENCE OF KEY [P1615]	PROCEDURE 6 (BL-228)	Unregistered ignition key is used.
			BCM is malfunctioning.
	CHAIN OF IMMU-KEY [P1614]	PROCEDURE 2 (BL-224)	Malfunction of key ID chip
			Communication line between ANT/ AMP and BCM: Open circuit or short circuit of battery voltage line or ground line
			Open circuit in power source line of ANT/ AMP circuit
			Open circuit in ground line of ANT/ AMP circuit
			NATS antenna amp.
			BCM
	ID DISCORD, IMM-ECM [P1611]	PROCEDURE 3 (BL-225)	System initialization has not yet been completed.
			ECM
	LOCK MODE [P1610]	PROCEDURE 5 (BL-227)	When the starting operation is carried out five or more times consecutively under the following conditions, NATS will shift the mode to one which prevents the engine from being started. • Unregistered ignition key is used. • BCM or ECM's malfunctioning.
Security indicator lighting up*	DON'T ERASE BEFORE CHECKING ENG DIAG	WORK FLOW (BL-219)	Engine trouble data and NATS trouble data have been detected in ECM

• *: When NATS detects trouble, the security indicator lights up while ignition key is in the "ON" position.

SYMPTOM MATRIX CHART 2

Non self-diagnosis related item

SYMPTOM	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)
Security indicator does not light up*.	PROCEDURE 4 (BL-226)	Security indictor.
		Open circuit between Fuse and BCM
		BCM

*: CONSULT self-diagnostic results display screen "no malfunction is detected".

Diagnosis Procedure 1

INFOID:0000000007330134

Self-diagnostic results:
"CHAIN OF ECM-IMMU" displayed on CONSULT screen
First perform the "SELF-DIAG RESULTS" in "BCM" with CONSULT, then perform the trouble diagnosis of malfunction system indicated "SELF-DIAG RESULTS" of "BCM". Refer to BCS-18, "CAN Communication Inspection Using CONSULT (Self-Diagnosis)" .

1.CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “CHAIN OF ECM-IMMU” displayed on CONSULT screen.

NOTE:

In rare case, “CHAIN OF ECM-IMMU” might be stored during key registration procedure, even if the system is not malfunctioning.

Is “CHAIN OF ECM-IMMU” displayed?

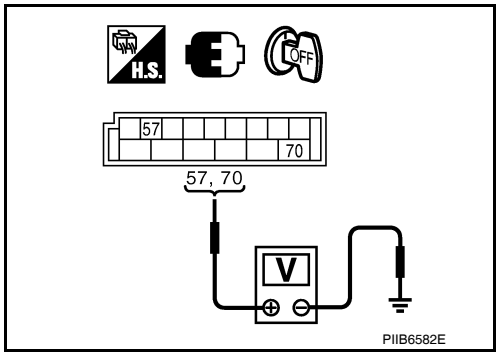
Yes >> GO TO 2

No >> GO TO BL-221, "Trouble Diagnosis" .

2.CHECK POWER SUPPLY CIRCUIT FOR BCM

1. Turn ignition switch OFF.
2. Check voltage between BCM and ground with CONSULT or tester.

BCM connector	Terminals		Voltage [V] (Approx.)
	(+)	(–)	
M20	57	Ground	Battery voltage
	70		



OK or NG

OK >> GO TO 3

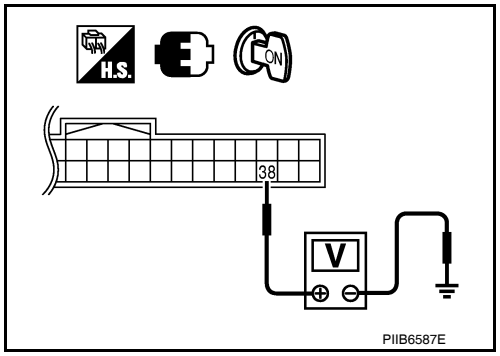
NG >> Check the following.

- 40A fusible link (letter **g** , located in the fuse and fusible link box).
- 10A fuse [No.8, located in the fuse block (J/B)].
- Harness for open or short between fusible link and BCM.
- Harness for open or short between fuse and BCM.

3.CHECK IGNITION SWITCH ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between BCM connector and ground with CONSULT or tester.

BCM connector	Terminal		Voltage [V] (Approx.)
	(+)	(–)	
M18	38	Ground	Battery voltage



OK or NG

OK >> GO TO 4

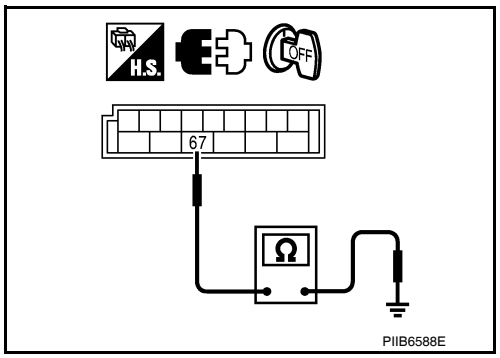
NG >> Check the following.

- 10A fuse [No. 6, located in the fuse block (J/B)].
- Harness for open or short between fuse and BCM.

4.CHECK GROUND CIRCUIT FOR BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector and ground.

BCM connector	Terminal		Continuity
	(+)	(–)	
M20	67	Ground	Yes



OK or NG

OK >> GO TO 5

NG >> Repair or replace harness.

5.REPLACE BCM

1. Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
2. Perform initialization with CONSULT.
   For initialization, refer to “CONSULT Operation Manual NATS”.

Does the engine start?

Yes >> BCM is malfunctioning.
- Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
- Perform initialization with CONSULT
- For initialization, refer to “CONSULT Operation Manual NATS”

No >> ECM is malfunctioning.
- Replace ECM.
- Perform initialization or re-communicating function
- For initialization, refer to “CONSULT Operation Manual NATS”
- For re-communicating function, refer to BL-212, "ECM Re-communicating Function"

Diagnosis Procedure 2

INFOID:0000000007330135

Self-diagnostic results:
“CHAIN OF IMMU-KEY” displayed on CONSULT screen

1.CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “CHAIN OF IMMU-KEY” displayed on CONSULT screen.

Is “CHAIN OF IMMU-KEY” displayed?

Yes >> GO TO 2
No >> GO TO BL-221, "Trouble Diagnosis" .

2.CHECK NATS ANTENNA AMP. INSTALLATION

Check NATS antenna amp. installation. Refer to BL-228, "How to Replace NATS Antenna Amp" .

OK or NG

OK >> GO TO 3
NG >> Reinstall NATS antenna amp. correctly.

3.CHECK NATS IGNITION KEY ID CHIP

Start engine with another registered NATS ignition key.

Does the engine start?

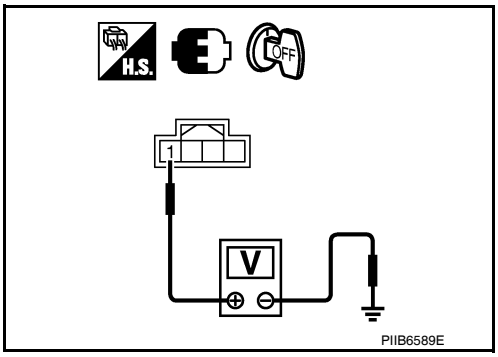
Yes >> Ignition key ID chip is malfunctioning.
- Replace the ignition key
- Perform initialization with CONSULT
  For initialization, refer to “CONSULT Operation Manual NATS”

No >> GO TO 4

4.CHECK POWER SUPPLY FOR NATS ANTENNA AMP.

1. Turn ignition switch “OFF”.
2. Check voltage between NATS antenna amp. connector and ground.

NATS antenna amp. connector	Terminal		Voltage [V] (Approx.)
	(+)	(–)	
M21	1	Ground	Battery voltage



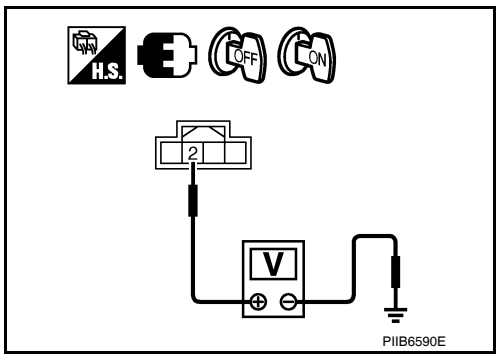
OK or NG

OK >> GO TO 5
NG >> Check the following.
- 20A fuse [No. 53, located in IPDM E/R]
- Harness for open or short between fuse and NATS antenna amp.

5.CHECK NATS ANTENNA AMP. SIGNAL LINE- 1

Check voltage between NATS antenna amp. connector and ground with analog tester.

NATS antenna amp. connector	Terminal (+)	Terminal (–)	Conditions	Status of Voltage and tester
M21	2	Ground	Before tuning ignition switch to ON	Approx. 0 [V]
			Right after tuning ignition switch to ON	Pointer of tester should move



OK or NG

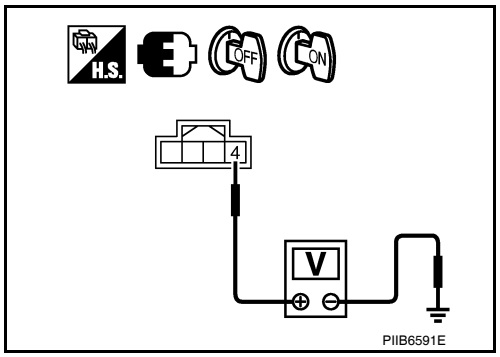
OK >> GO TO 6

NG >> • Check harness for open or short between NATS antenna amp. and BCM.
NOTE:
If harness is OK, replace BCM, perform initialization with CONSULT. For initialization, refer to "CONSULT Operation Manual NATS".

6. CHECK NATS ANTENNA AMP. SIGNAL LINE- 2

Check voltage between NATS antenna amp. connector and ground with analog tester.

NATS antenna amp. connector	Terminal (+)	Terminal (–)	Conditions	Status of Voltage and tester
M21	4	Ground	Before tuning ignition switch to ON	Approx. 0 [V]
			Right after tuning ignition switch to ON	Pointer of tester should move



OK or NG

OK >> GO TO 7

NG >> • Check harness for open or short between NATS antenna amp. and BCM.
NOTE:
If harness is OK, replace BCM, perform initialization with CONSULT. For initialization, refer to "CONSULT Operation Manual.

7. CHECK NATS ANTENNA AMP. GROUND LINE CIRCUIT

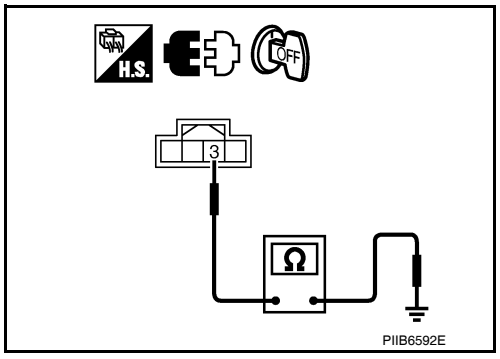
1. Turn ignition switch "OFF".
2. Disconnect NATS antenna amp. connector.
3. Check continuity between NATS antenna amp. connector and ground.

NATS antenna amp. connector	Terminal (+)	Terminal (–)	Continuity
M21	3	Ground	Yes

OK or NG

OK >> NATS antenna amp. is malfunctioning, reinstall antenna or replace it.

NG >> Repair or replace NATS antenna amp. ground circuit.



Diagnosis Procedure 3

INFOID:0000000007330136

Self-diagnostic results:
"ID DISCORD, IMM-ECM" displayed on CONSULT screen

1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "ID DISCORD, IMM-ECM" displayed on CONSULT screen.
NOTE:

"ID DISCORD IMM-ECM":
Registered ID of BCM is in discord with that of ECM.

Is "ID DISCORD IMM-ECM" displayed?

Yes >> GO TO 2
No >> GO TO BL-221, "Trouble Diagnosis" .

2.PERFORM INITIALIZATION WITH CONSULT

Perform initialization with CONSULT. Re-register all NATS ignition key IDs.
For initialization, refer to "CONSULT Operation Manual NATS".

NOTE:
If the initialization is not completed or malfunctions, CONSULT shows message on the screen.

Can the system be initialized?

Yes >> • Start engine. (END)
• (System initialization had not been completed.)
No >> ECM is malfunctioning.
• Replace ECM.
• Perform initialization with CONSULT
For initialization, refer to "CONSULT Operation Manual NATS"

Diagnosis Procedure 4

INFOID:0000000007330137

"COMBINATION METER (SECURITY) DOES NOT LIGHT UP"

1.CHECK FUSE

Check 10A fuse [No.10, located in the fuse block (J/B)]

OK or NG

OK >> GO TO 2
NG >> Replace fuse.

2.CHECK COMBINATION METER (SECURITY)

1. Install 10A fuse.
2. Start engine and turn ignition switch OFF.
3. Check if the combination meter (security) lights up.

Combination meter (security) should light up.

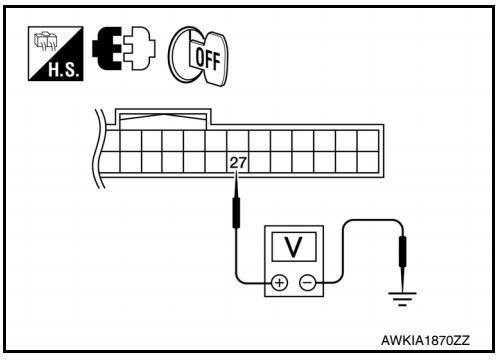
OK or NG

OK >> Inspection End.
NG >> GO TO 3

3.CHECK COMBINATION METER (SECURITY) POWER SUPPLY CIRCUIT

1. Disconnect combination meter (security) connector.
2. Check voltage between combination meter (security) connector and ground.

Combination meter (security) connector	Terminal		Voltage [V] (Approx.)
	(+)	(-)	
M24	27	Ground	Battery voltage



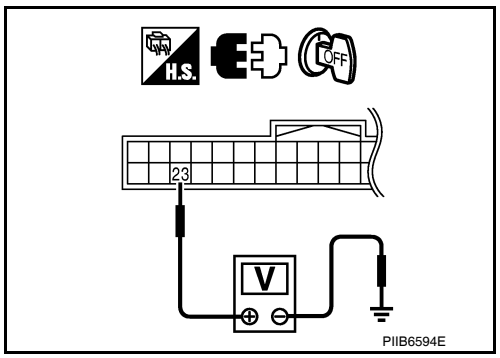
OK or NG

OK >> GO TO 4
NG >> Check harness for open or short between fuse and combination meter (security).

4.CHECK BCM FUNCTION

1. Connect combination meter (security) connector.
2. Disconnect BCM connector.
3. Check voltage between BCM connector and ground.

BCM connector	Terminal		Voltage [V] (Approx.)
	(+)	(-)	
M18	23	Ground	Battery voltage



OK or NG

OK >> BCM is malfunctioning.
- Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
- Perform initialization with CONSULT
- For initialization, refer to “CONSULT Operation Manual.

NG >> Check the following.
- Harness for open or short between combination meter (security) and BCM
- Indicator lamp condition

Diagnosis Procedure 5

INFOID:0000000007330138

Self-diagnostic results:
“LOCK MODE” displayed on CONSULT screen

1.CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “LOCK MODE” is displayed on CONSULT screen.

Is “LOCK MODE” displayed?

Yes >> GO TO 2
No >> GO TO BL-221, "Trouble Diagnosis" .

2.ESCAPE FROM LOCK MODE

1. Turn ignition switch OFF.
2. Turn ignition switch ON with registered key. (Do not start engine.) Wait 5 seconds.
3. Return the key to OFF position. Wait 5 seconds.
4. Repeat steps 2 and 3 twice (total of three cycles).
5. Start the engine.

Does engine start?

Yes >> System is OK (Now system is escaped from “LOCK MODE”).
No >> GO TO 3

3.PERFORM INITIALIZATION WITH CONSULT

Perform initialization with CONSULT.
For initialization, refer to “CONSULT Operation Manual.

NOTE:
If the initialization is not completed or malfunctions, CONSULT shows the message on the screen.

Can the system be initialized?

Yes >> System is OK.
No >> GO TO 4

4.PERFORM INITIALIZATION WITH CONSULT AGAIN

1. Replace BCM.
2. Perform initialization with CONSULT.
   For initialization, refer to “CONSULT Operation Manual NATS”.

NOTE:
If the initialization is not completed or malfunctions, CONSULT shows the message on the screen.

Can the system be initialized?

Yes >> System is OK. (BCM is malfunctioning.)
No >> ECM is malfunctioning.
- Replace ECM.
- Perform initialization with CONSULT
- For initialization, refer to “CONSULT Operation Manual NATS”

Diagnosis Procedure 6

INFOID:0000000007330139

Self-diagnostic results:
“DIFFERENCE OF KEY” displayed on CONSULT screen

1.CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “DIFFERENCE OF KEY” displayed on CONSULT screen.

Is “DIFFERENCE OF KEY” displayed?

YES >> GO TO 2
NO >> GO TO BL-221, "Trouble Diagnosis".

2.PERFORM INITIALIZATION WITH CONSULT

Perform initialization with CONSULT. Re-register all NATS ignition key IDs.
For initialization and registration of NATS ignition key IDs, refer to CONSULT Operation Manual.

NOTE:
If the initialization is not completed or malfunctions, CONSULT shows message on the screen.

Can the system be initialized and can the engine be started with re-registered NATS ignition key?

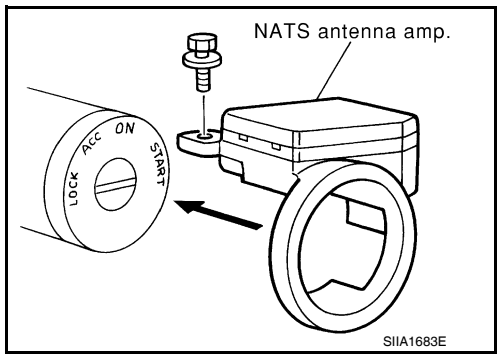
YES >>
- Ignition key ID was unregistered.

NO >>
- BCM is malfunctioning.
- Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
- Perform initialization with CONSULT.
- For initialization, refer to CONSULT Operation Manual.

How to Replace NATS Antenna Amp

INFOID:0000000007330140

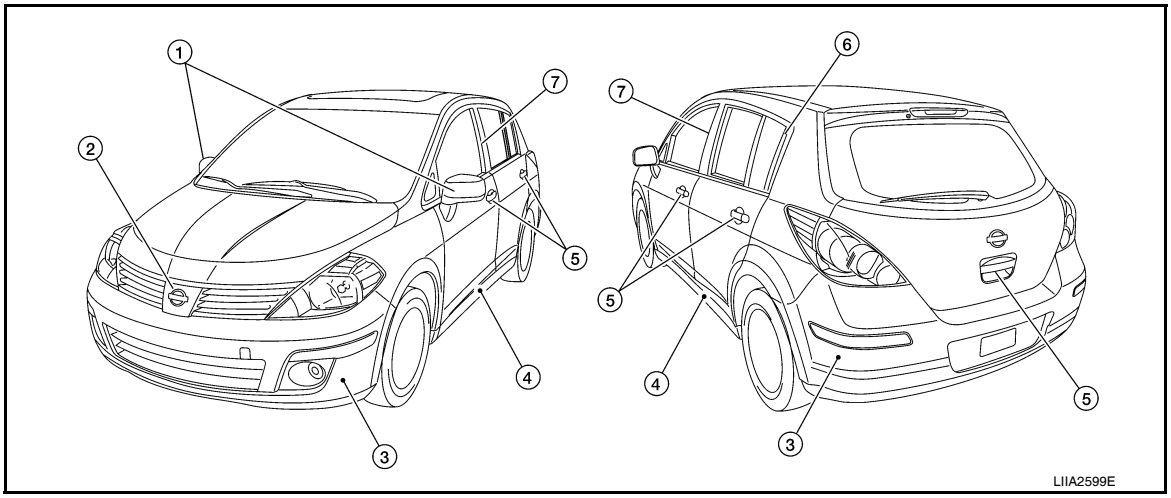
NOTE:
- **If NATS antenna amp. is not installed correctly, NATS system will not operate properly and SELF-DIAG RESULTS on CONSULT screen will show “LOCK MODE” or “CHAIN OF IMMU-KEY”.**
- **Initialization is not necessary only when NATS antenna amp. is replaced with a new one.**



BODY REPAIR

Body Exterior Paint Color

INFOID:0000000007330141



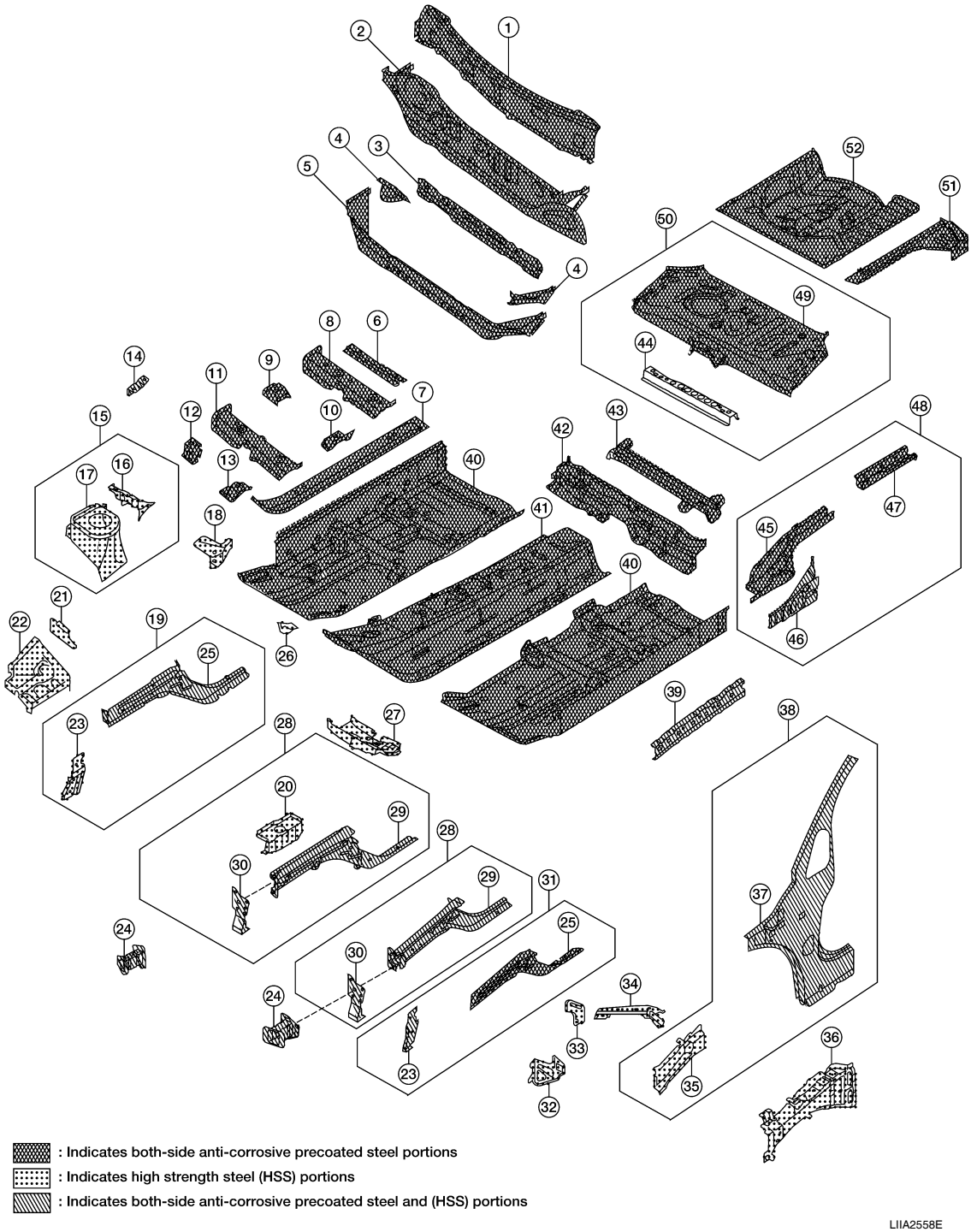
Component		Color code	A20	B17	CAE	RAF	B23	K23	K36	KH3	QM1
		Description	Red Alert	Metallic Blue	Espresso Black	Arctic Blue	Blue Onyx	Brilliant Silver	Magnetic Grey	Super Black	Fresh Powder
		Paint type	2M	2M	2M	2M	2M	2M	2M	2M	S
		Clear coat	t	t	t	t	t	t	t	t	t
1	Outside mirror	Body color	A20	B17	CAE	RAF	B23	K23	K36	KH3	QM1
2	Radiator grille	Chromium-plate + Black	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1	Cr2P + G02-1
3	Bumper fascia	Body color	A20	B17	CAE	RAF	B23	K23	K36	KH3	QM1
4	Center mudguard	Body color/ Black	A20/ G01-1	B17/ G01-1	CAE/ G01-1	RAF/ G01-1	B23/ G01-1	K23/ G01-1	K36/ G01-1	KH3/ G01-1	QM1/ G01-1
5	Outside handle	Body color	A20	B17	CAE	RAF	B23	K23	K36	KH3	QM1
6	Rear pillar trim	Black	G01-1	G01-1	G01-1	G01-1	G01-1	G01-1	G01-1	G01-1	G01-1
7	Door sash	Black tape	X	X	X	X	X	X	X	X	X

M: Metallic; 2S: 2-Coat Solid, 2P: 2-Coat Pearl; 3P: 3-Coat Pearl; G01-1: Material color; G02-1: Material color; t: Carbamate clear

Body Component Parts

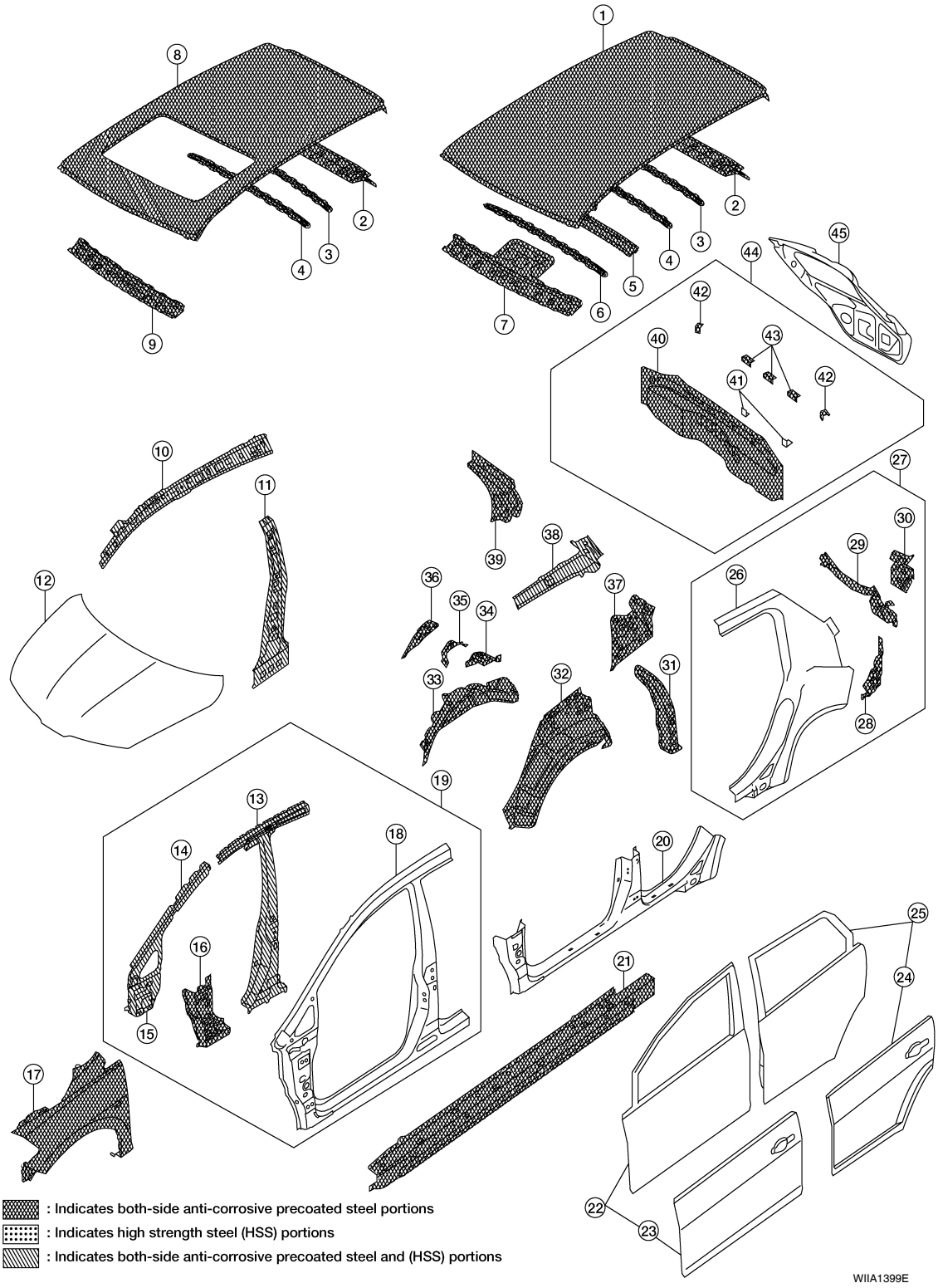
INFOID:0000000007330142

UNDERBODY COMPONENT PARTS



1. Upper dash assembly
2. Lower dash assembly
3. Lower dash crossmember

4. Front pillar inner reinforcement (RH&LH)
5. Lower dash reinforcement
6. 4th crossmember (RH&LH)
7. Front side member rear extension (RH&LH)
8. 3rd crossmember (RH&LH)
9. Front seat outer rear bracket (RH&LH)
10. Front seat inner rear bracket (RH&LH)
11. 2nd crossmember (RH&LH)
12. Front seat outer front bracket (RH&LH)
13. Front seat inner front bracket (RH&LH)
14. Fender bracket (RH&LH)
15. Strut housing assembly RH
16. Cowl top side upper (RH&LH)
17. Front strut housing (RH&LH)
18. Upper torque rod reinforcement
19. Closing plate assembly RH
20. Engine mount reinforcement
21. Strut tower front reinforcement RH
22. Front hood ledge lower RH
23. Frame bracket outer (RH&LH)
24. Front bumper support bracket (RH&LH)
25. Closing plate (RH&LH)
26. Front suspension rear bracket (RH&LH)
27. Front side member outrigger (RH&LH)
28. Front side member assembly (RH&LH)
29. Front side member (RH&LH)
30. Frame bracket (RH&LH)
31. Closing plate assembly LH
32. Hoodledge connector (RH&LH)
33. Radiator core side support (RH&LH)
34. Radiator core support upper (RH&LH)
35. Hoodledge upper (RH&LH)
36. Hoodledge reinforcement assembly (RH&LH)
37. Dash side (RH&LH)
38. Dash side assembly (RH& LH)
39. Front floor reinforcement (RH&LH)
40. Front floor front (RH&LH)
41. Front floor center
42. Rear seat crossmember
43. Rear center crossmember
44. Rear seat upper crossmember
45. Rear side member (RH&LH)
46. Sill inner extension (RH&LH)
47. Rear side member extension (RH&LH)
48. Rear side member assembly (RH & LH)
49. Rear floor front
50. Rear floor front assembly
51. Rear floor side (RH&LH)
52. Rear floor rear



1. Roof panel assembly
2. Rear roof rail assembly
3. 4th roof rail assembly
4. 3rd roof rail assembly
5. 2nd roof rail assembly

6. 1st roof rail assembly
7. Front roof rail assembly
8. Sun roof assembly
9. Front roof rail assembly (if equipped with sunroof)
10. Roof side rail reinforcement (RH & LH)
11. Inner center pillar (RH & LH)
12. Hood assembly
13. Center pillar reinforcement (RH & LH)
14. Front pillar inner (RH & LH)
15. Front pillar upper reinforcement (RH & LH)
16. Front pillar lower reinforcement (RH & LH)
17. Fender (RH & LH)
18. Side body (RH & LH)
19. Side body assembly (RH & LH)
20. Outer sill (RH & LH)
21. Outer sill reinforcement (RH & LH)
22. Front door assembly (RH & LH)
23. Outer front door panel (RH & LH)
24. Outer rear door panel (RH & LH)
25. Rear door assembly (RH & LH)
26. Rear fender (RH & LH)
27. Rear fender assembly (RH & LH)
28. Rear fender corner (RH & LH)
29. Rear fender extension (RH & LH)
30. Rear combination lamp base (RH & LH)
31. Rear pillar inner reinforcement (RH & LH)
32. Rear wheel housing outer (RH & LH)
33. Rear wheel housing inner (RH & LH)
34. Rear spring base assembly (RH & LH)
35. Rear seatback hinge bracket (RH & LH)
36. Rear seatback catch bracket (RH & LH)
37. Rear pillar inner (RH & LH)
38. Rear roof rail reinforcement (RH & LH)
39. Rear roof rail brace (RH & LH)
40. Rear panel
41. Rear bumper fascia lower bracket
42. Rear bumper fascia upper bracket
43. Rear bumper fascia center bracket
44. Rear panel assembly
45. Back door assembly

Corrosion Protection

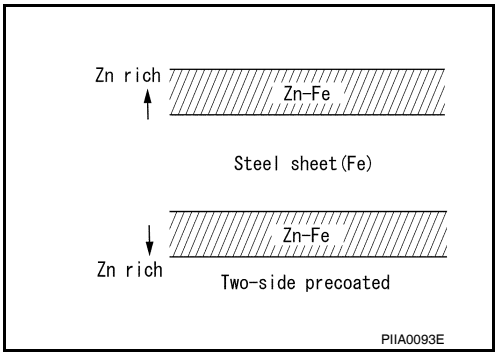
INFOID:0000000007330143

DESCRIPTION

To provide improved corrosion prevention, the following anti-corrosive measures have been implemented in NISSAN production plants. When repairing or replacing body panels, it is necessary to use the same anti-corrosive measures.

ANTI-CORROSIVE PRECOATED STEEL (GALVANNEALED STEEL)

To improve repairability and corrosion resistance, a new type of anti-corrosive precoated steel sheet has been adopted replacing conventional zinc-coated steel sheet.
Galvanized steel is electroplated and heated to form Zinc-iron alloy, which provides excellent and long term corrosion resistance with electro primer.



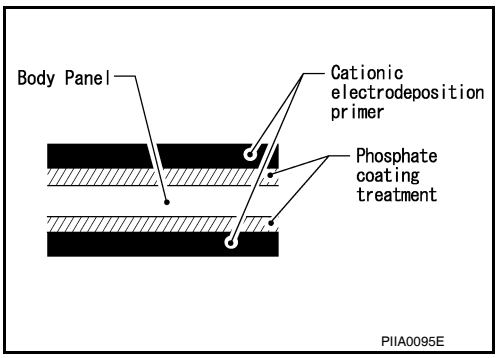
Nissan Genuine Service Parts are fabricated from galvanized steel. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain the anti-corrosive performance built into the vehicle at the factory.

PHOSPHATE COATING TREATMENT AND CATIONIC ELECTRODEPOSITION PRIMER

A phosphate coating treatment and a cationic electrode position primer, which provide excellent corrosion protection, are employed on all body components.

CAUTION:

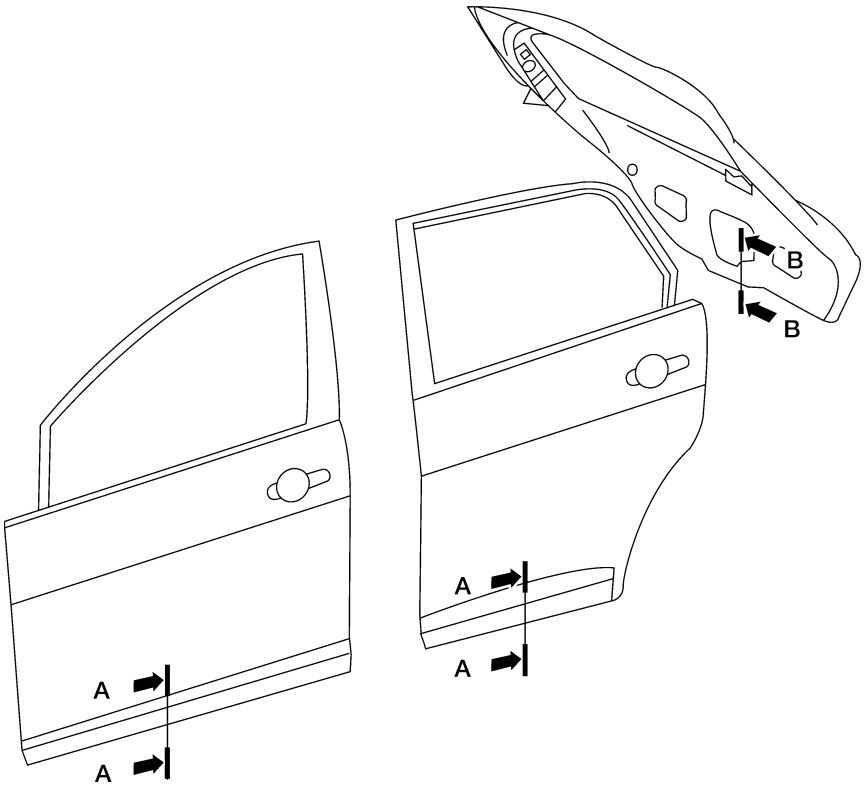
Confine paint removal during welding operations to an absolute minimum.



Nissan Genuine Service Parts are also treated in the same manner. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain anti-corrosive performance built into the vehicle at the factory.

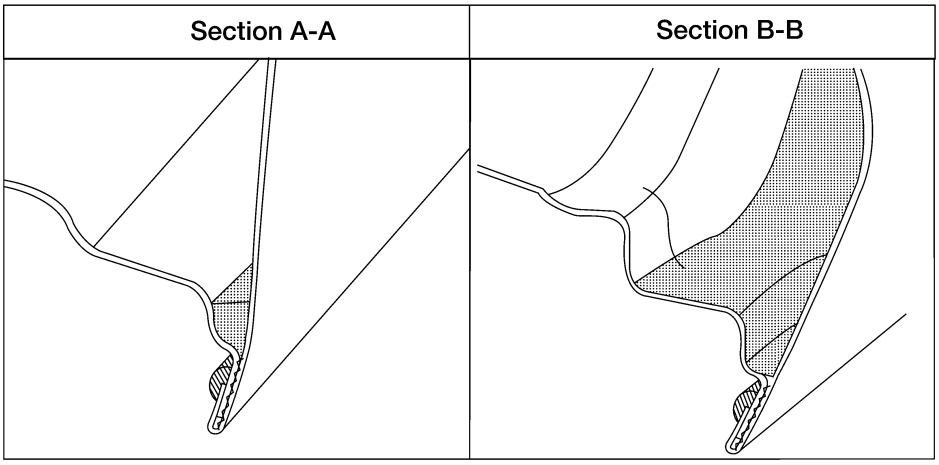
ANTI-CORROSIVE WAX

To improve corrosion resistance, anti-corrosive wax is applied inside the body sill and inside other closed sections. Accordingly, when replacing these parts, be sure to apply anti-corrosive wax to the appropriate areas of the new parts. Select an excellent anti-corrosive wax which will penetrate after application and has a long shelf life.



: indicates outside body sealant

: Indicates anti-corrosive wax coated portions



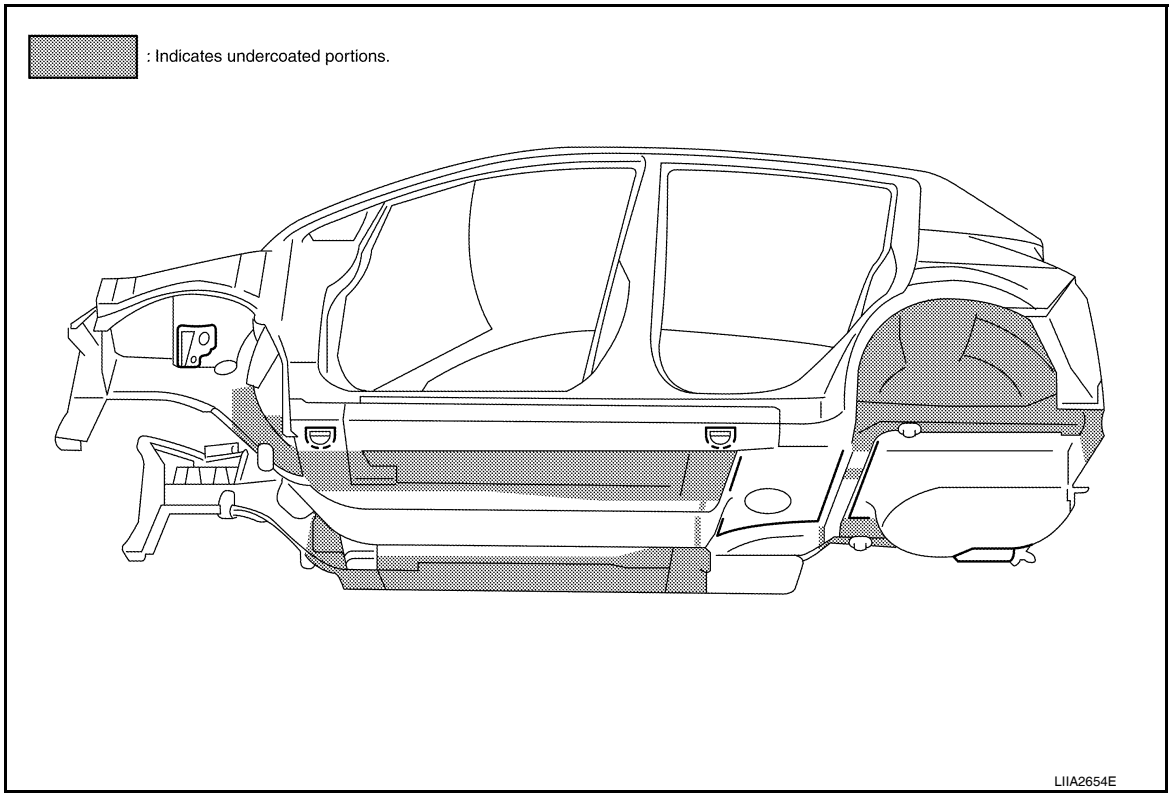
LIIA2600E

UNDERCOATING

The underside of the floor and wheelhouse are undercoated to prevent rust, vibration, noise and stone chipping. Therefore, when such a panel is replaced or repaired, apply undercoating to that part. Use an undercoating which is rust preventive, soundproof, vibration-proof, shock-resistant, adhesive, and durable.

Precautions in undercoating

1. Do not apply undercoating to any place unless specified (such as the areas above the muffler and three way catalyst which are subjected to heat).
2. Do not undercoat the exhaust pipe or other parts which become hot.
3. Do not undercoat rotating parts.

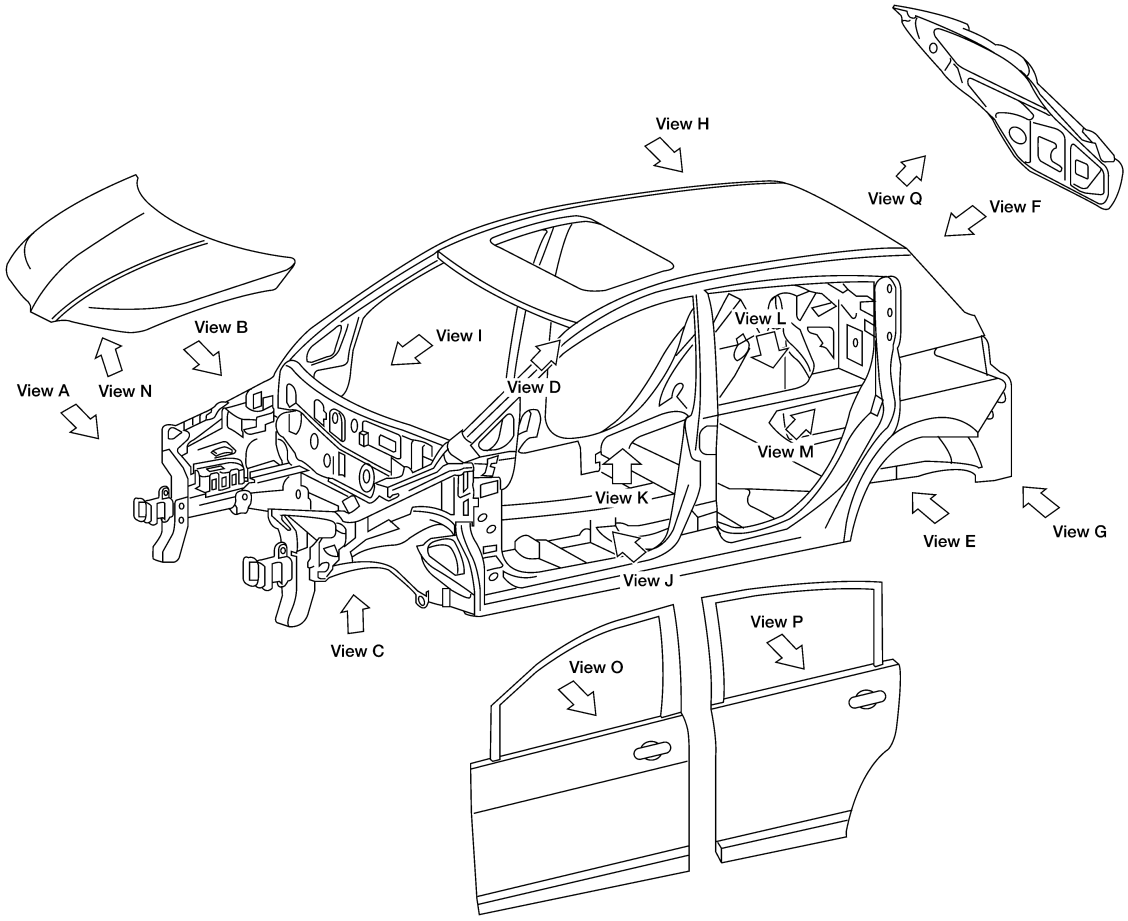


Body Sealing

INFOID:0000000007330144

DESCRIPTION

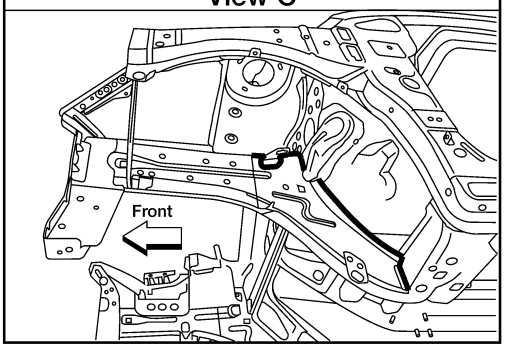
The following figure shows the areas which are sealed at the factory. Sealant which has been applied to these areas should be smooth and free from cuts or gaps. Care should be taken not to apply an excess amount of sealant and not to allow other unaffected parts to come into contact with the sealant.


View H
View Q
View F
View B
View I
View L
View A
View N
View D
View M
View K
View E
View G
View J
View C
View P
View O

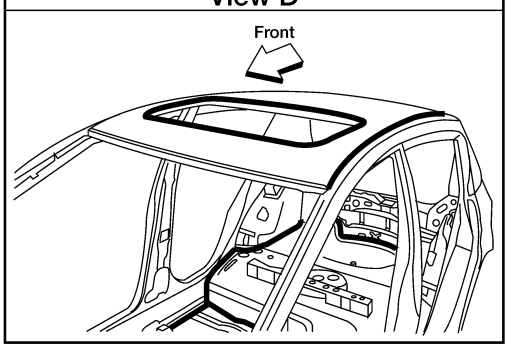
View A
View B
Front
Front

LIIA2545E

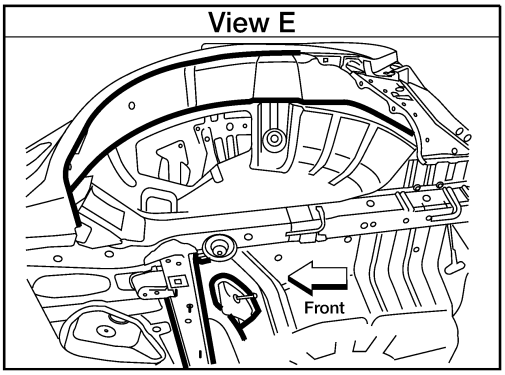
View C



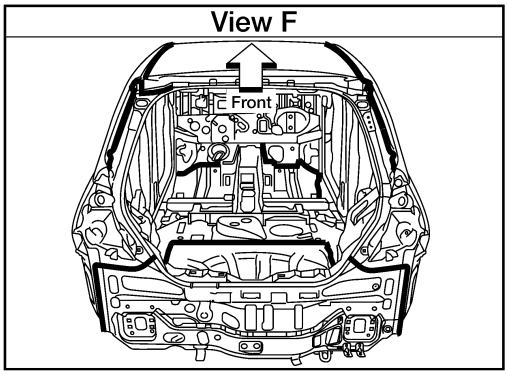
View D



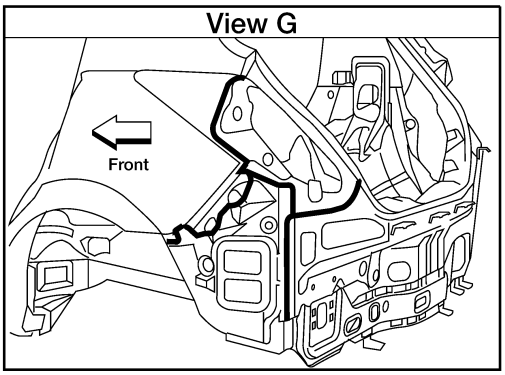
View E



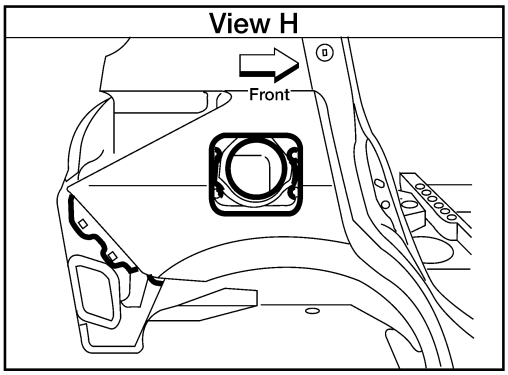
View F



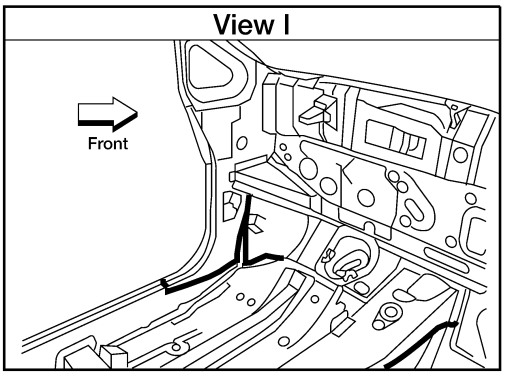
View G



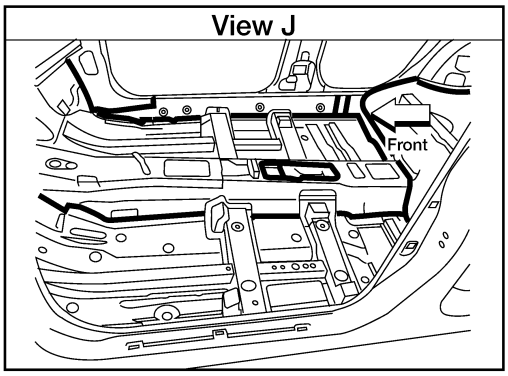
View H



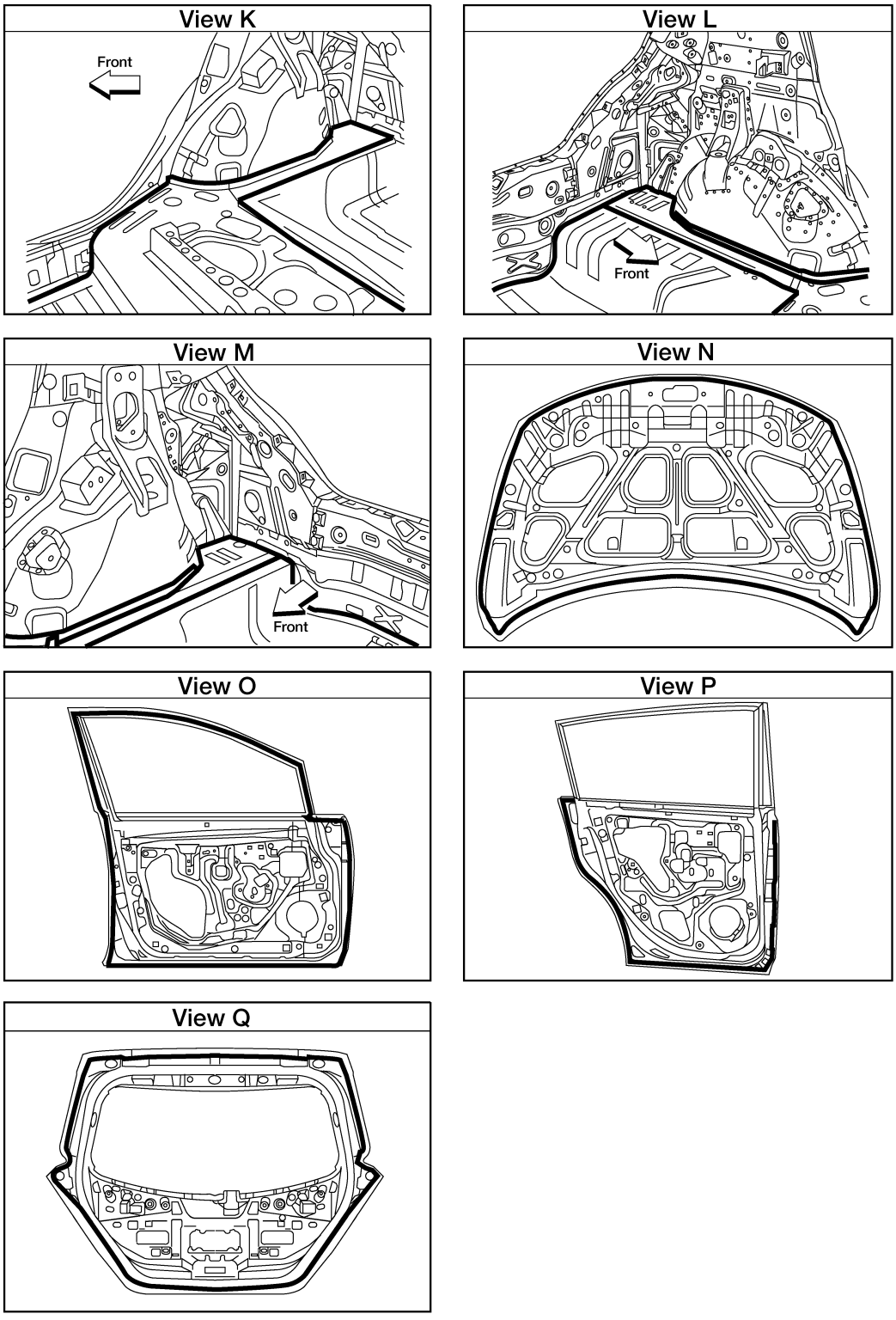
View I



View J



LIIA2546E

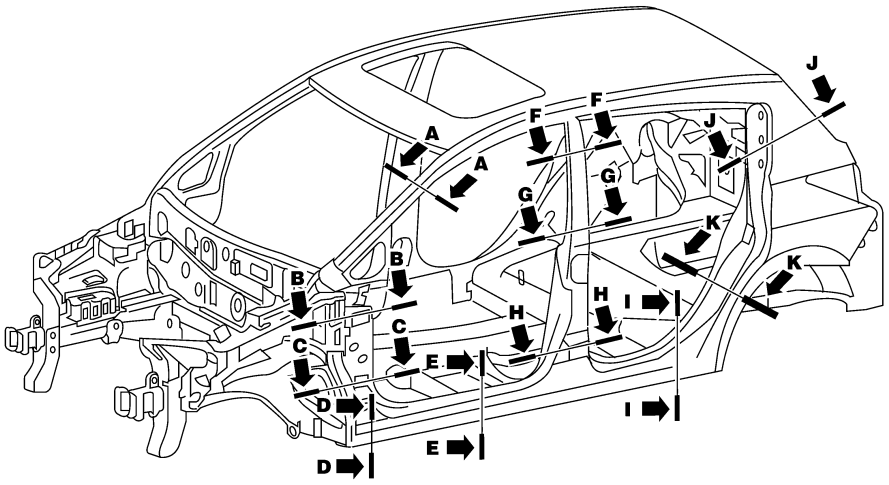


LIIA2547E

Body Construction

INFOID:0000000007330145

BODY CONSTRUCTION



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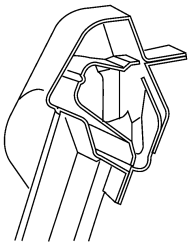	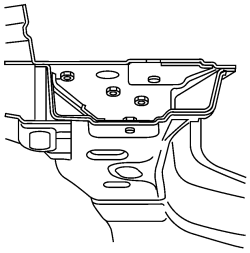	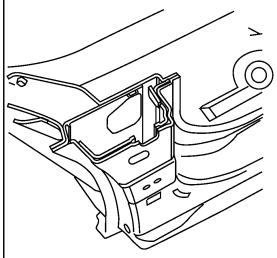	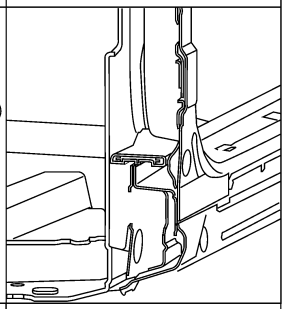
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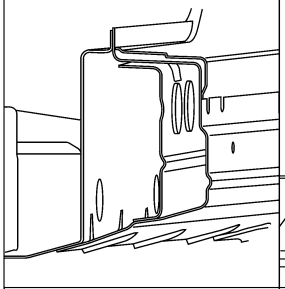
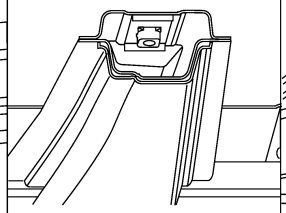
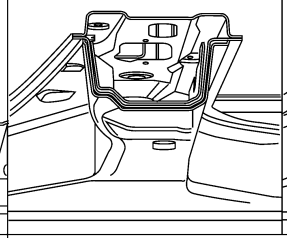
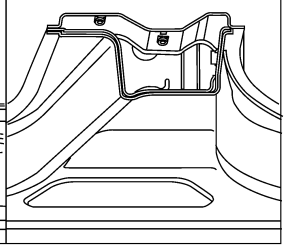
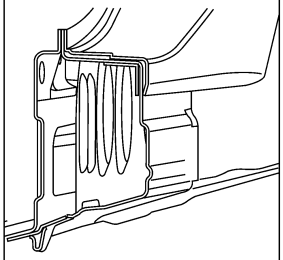
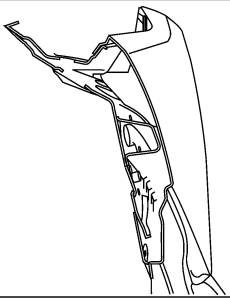
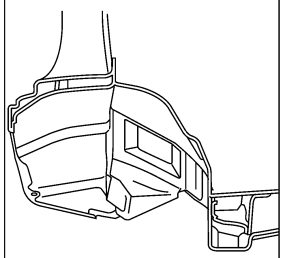
			
Section I - I	**Section J - J**	**Section K - K**	
			

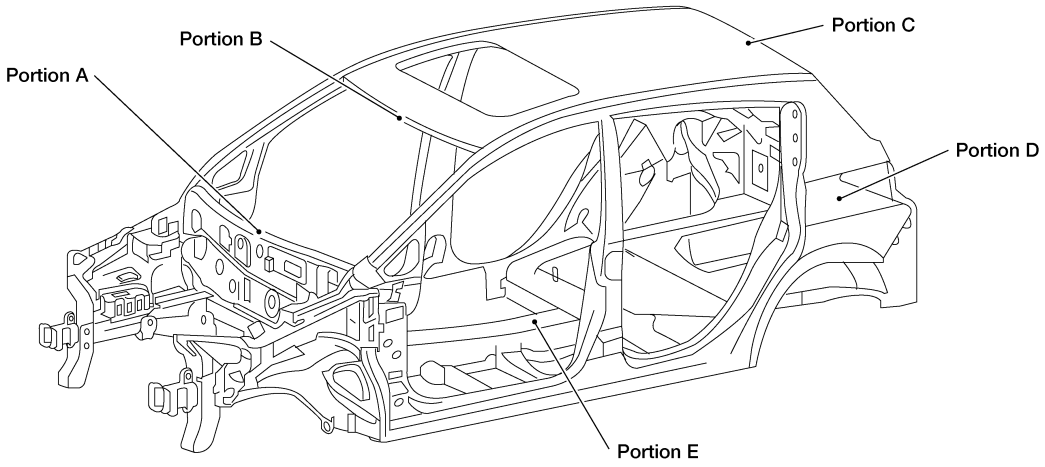
LIIA2548E

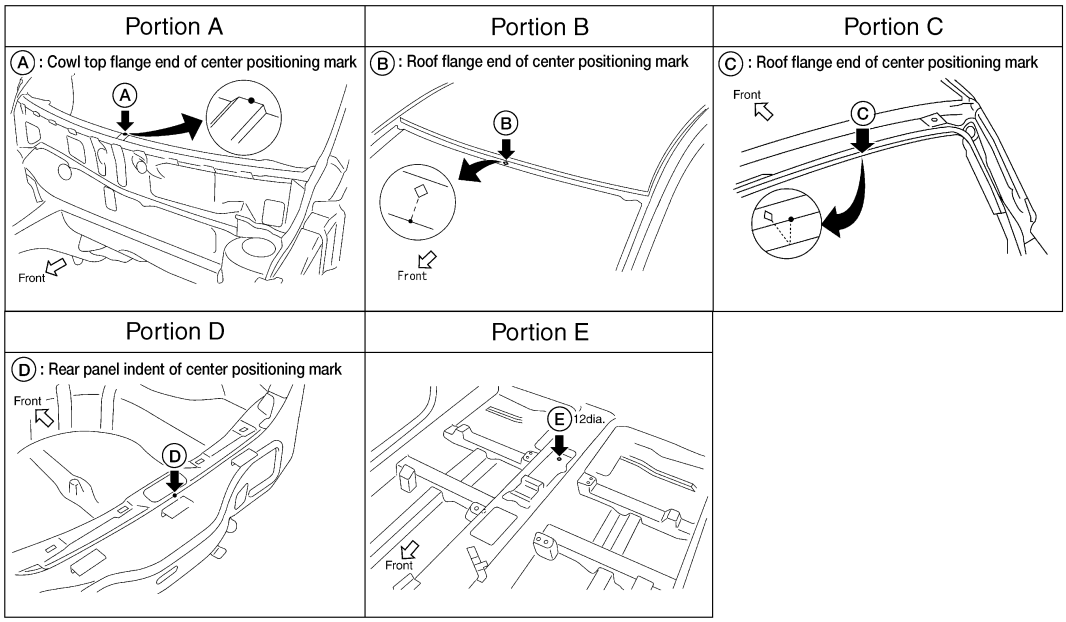
Body Alignment

INFOID:0000000007330146

BODY CENTER MARKS

A mark has been placed on each part of the body to indicate the vehicle center. When repairing parts damaged by an accident which might affect the vehicle frame (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.

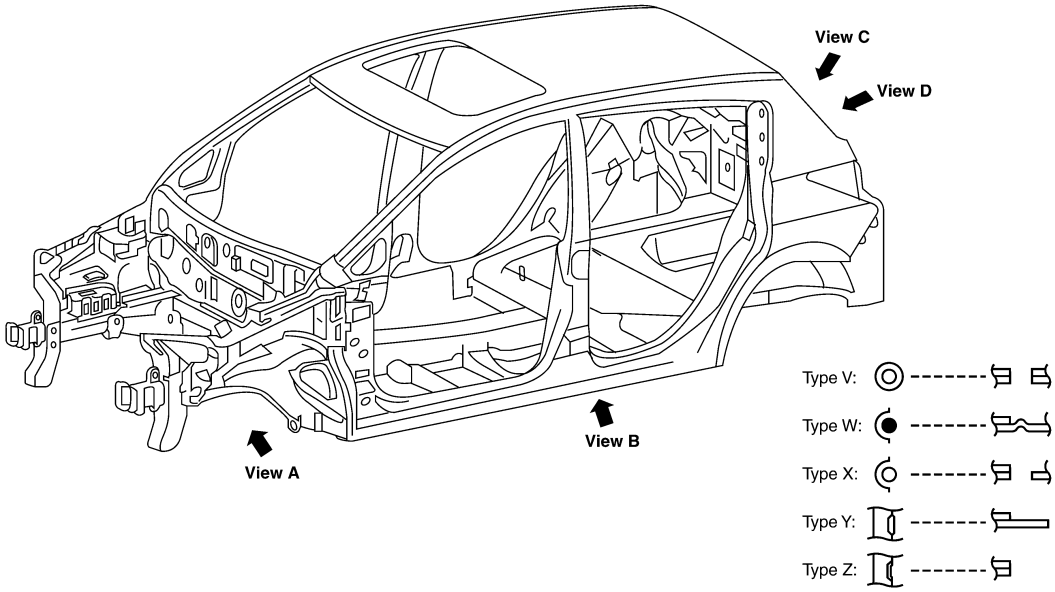


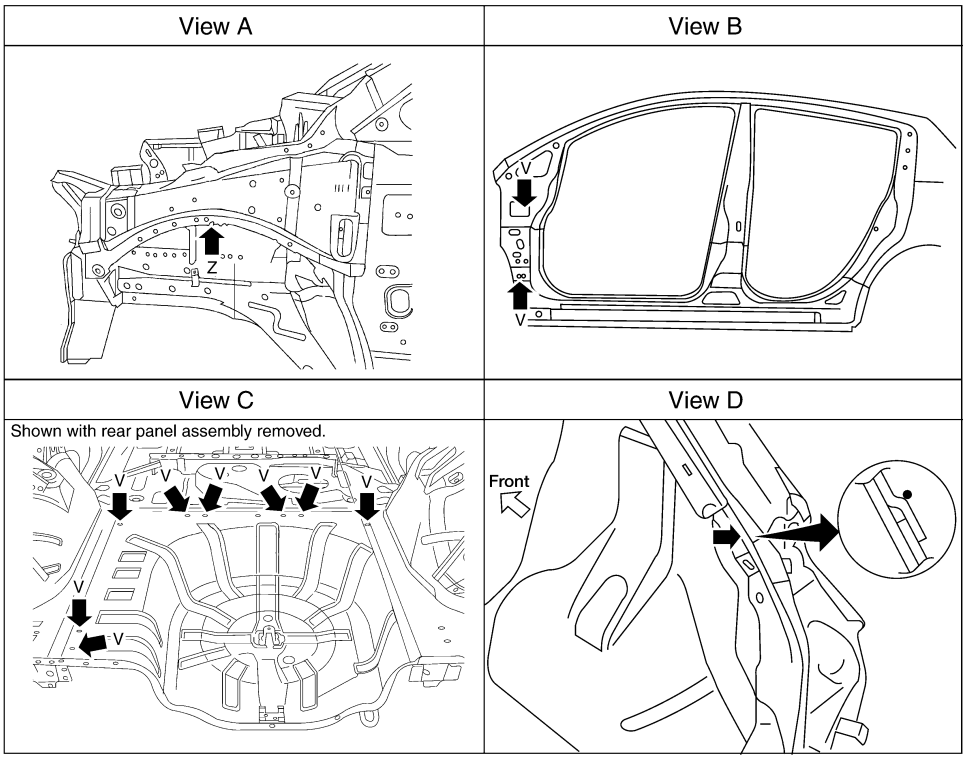


LIIA2627E

PANEL PARTS MATCHING MARKS

A mark has been placed on each body panel to indicate the parts matching positions. When repairing parts damaged by an accident which might affect the vehicle structure (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.

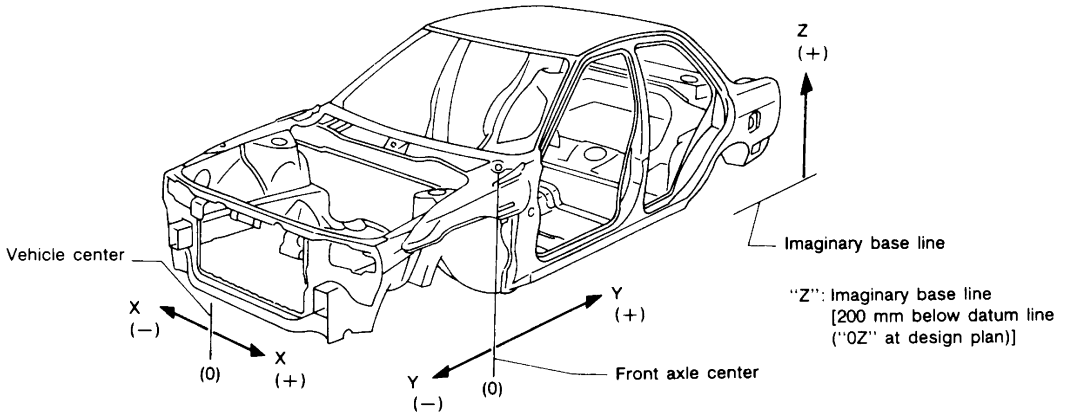




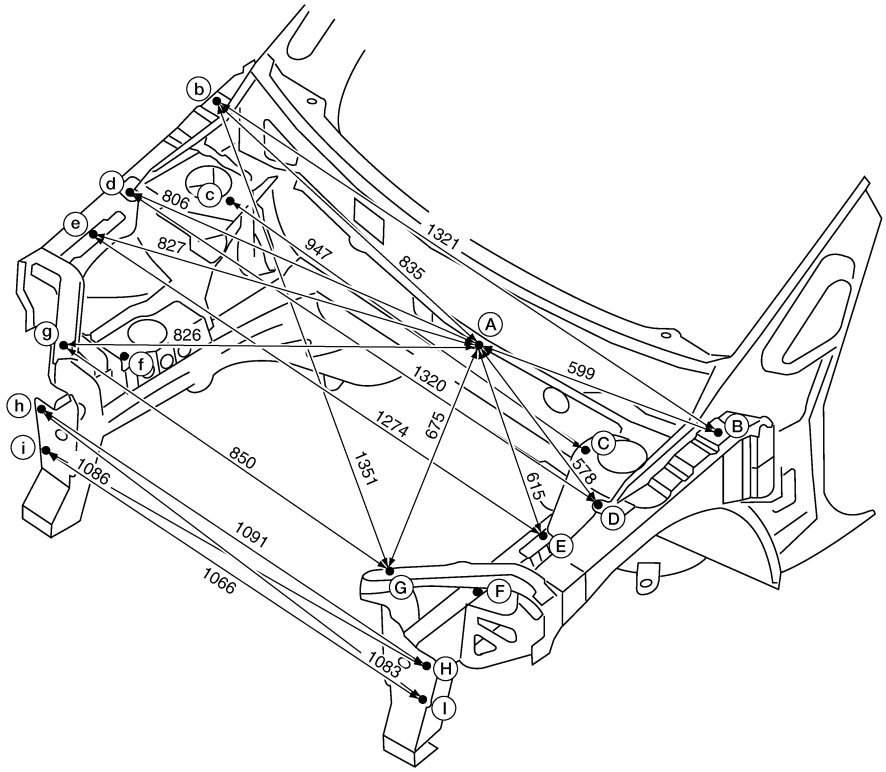
LIIA2628E

DESCRIPTION

- All dimensions indicated in the figures are actual.
- When using a tracking gauge, adjust both pointers to equal length. Then check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of ″X″, ″Y″ and ″Z″.



ENGINE COMPARTMENT

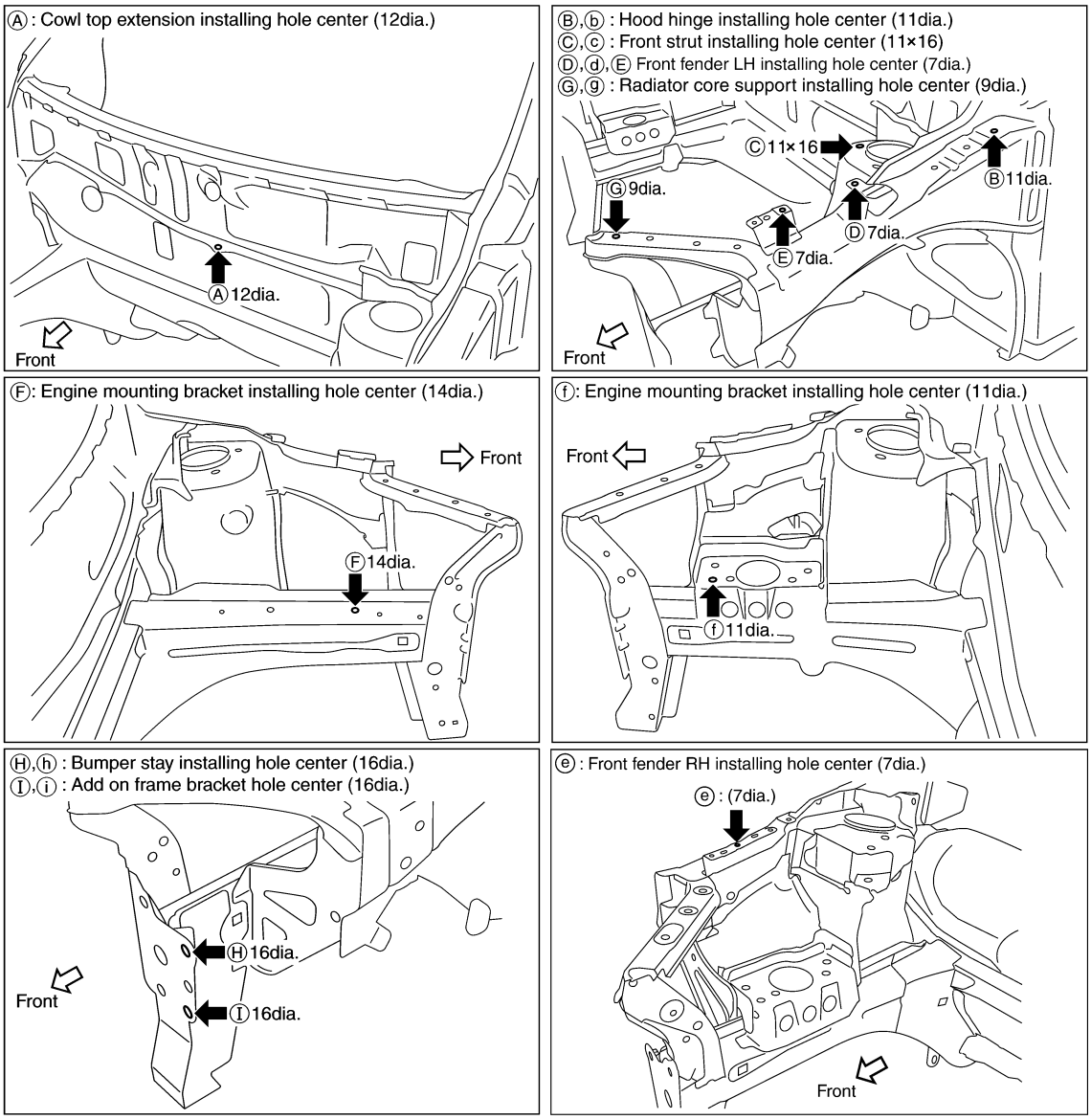


Point	Dimension	Point	Dimension	Point	Dimension
Ⓐ~Ⓕ	555	Ⓒ~ⓕ	1072	Ⓔ~ⓕ	1147
Ⓐ~ⓕ	745	Ⓒ~Ⓖ	502	ⓔ~Ⓕ	1143
Ⓑ~Ⓒ	266	Ⓒ~ⓖ	1108	ⓔ~ⓕ	264
Ⓑ~ⓒ	1236	ⓒ~Ⓖ	1096	Ⓔ~Ⓖ	317
ⓑ~ⓒ	1239	ⓒ~ⓖ	484	Ⓔ~ⓖ	1143
Ⓑ~Ⓓ	294	Ⓓ~Ⓔ	135	ⓔ~Ⓖ	1127
Ⓑ~ⓓ	1396	Ⓓ~ⓔ	1304	ⓔ~ⓖ	290
Ⓑ~Ⓔ	429	Ⓓ~Ⓕ	373	Ⓕ~ⓕ	966
Ⓑ~ⓔ	1408	Ⓓ~ⓕ	1187	Ⓕ~Ⓖ	319
Ⓑ~Ⓖ	728	ⓓ~ⓕ	343	Ⓕ~ⓖ	1002
Ⓑ~ⓖ	1361	ⓓ~Ⓕ	1179	ⓕ~Ⓖ	982
Ⓒ~Ⓓ	177	Ⓓ~Ⓖ	443	ⓕ~ⓖ	243
Ⓒ~ⓓ	1183	Ⓓ~ⓖ	1201		
Ⓒ~Ⓔ	266	ⓓ~Ⓖ	1186		
Ⓒ~ⓔ	1180	ⓓ~ⓖ	418		
Ⓒ~Ⓕ	380	Ⓔ~Ⓕ	313		

Unit : mm

LIIA2885E

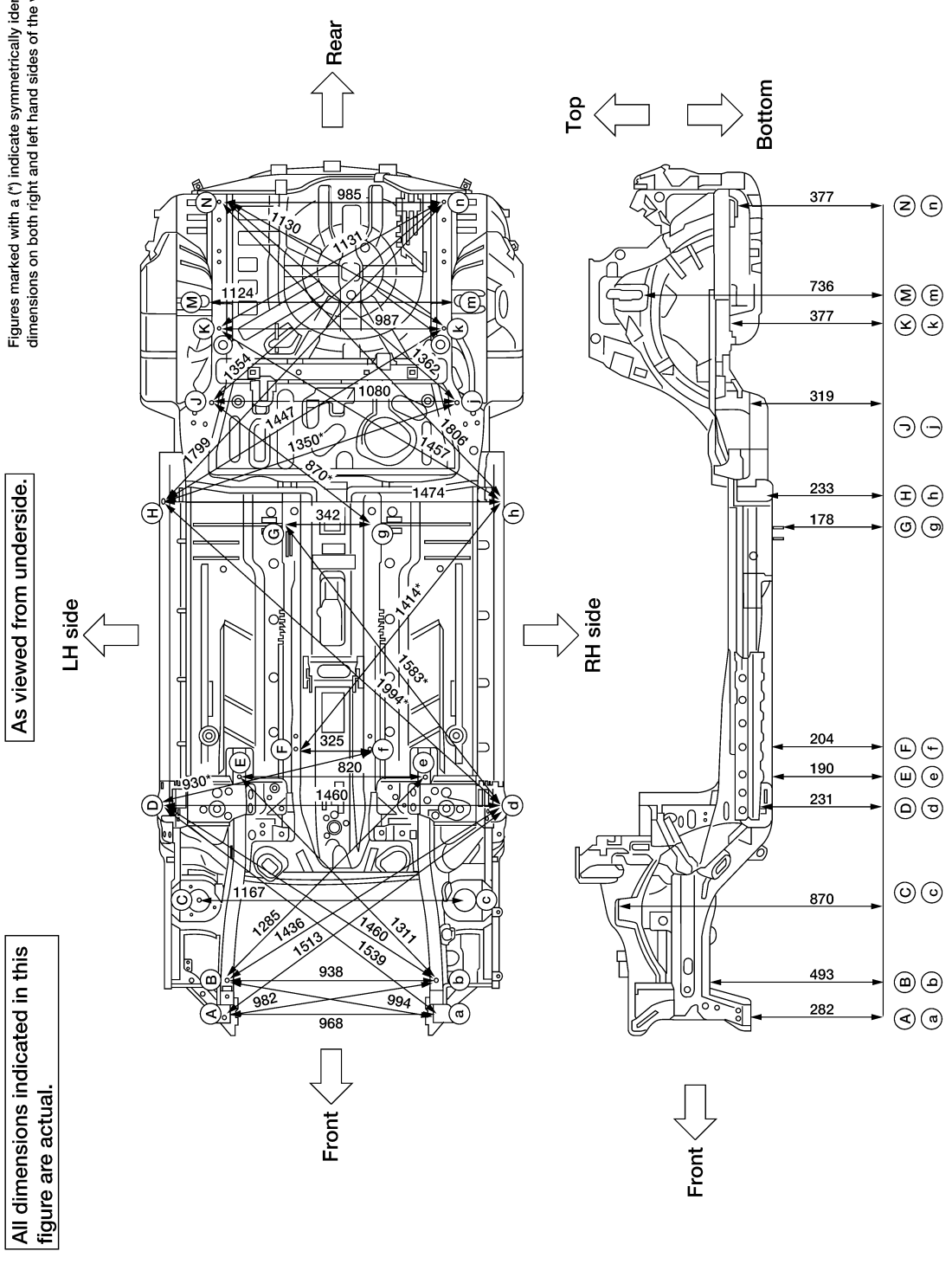
Measurement Points

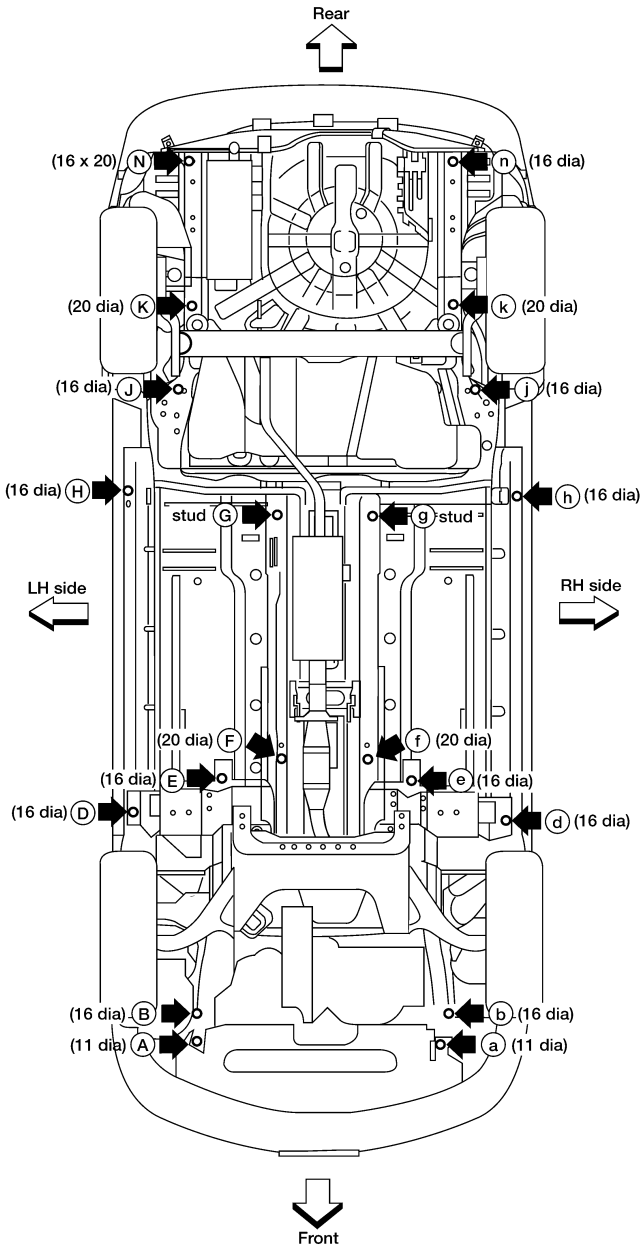


LIIA2611E

UNDERBODY

Unit: mm


Figures marked with a (*) indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.
Rear
Front
LH side
RH side
Top
Bottom
As viewed from underside.
All dimensions indicated in this figure are actual.
985
1130
1131
1124
987
1354
1362
1080
1447
1350*
1799
1457
1806
870*
1474
342
1414*
1583*
1994*
325
820
930*
1460
1167
1285
1436
1513
1460
1311
1539
938
982
994
968
377
736
377
319
233
178
204
190
231
870
493
282
LIIA2601E



Coordinates:

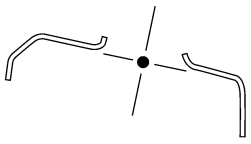
A	a
X : -476	X : 492
Y : -502	Y : -525
Z : 282	Z : 282
B	b
X : -462	X : 475
Y : -346	Y : -372
Z : 493	Z : 493
D, d	k
X : ±730	X : 488
Y : 410	Y : 2518
Z : 231	Z : 377
E, e	n
X : ±410	X : 487
Y : 547	Y : 3070
Z : 190	Z : 377
F, f	
X : ±162	
Y : 670	
Z : 204	
G, g	
X : ±171	
Y : 1710	
Z : 178	
H, h	
X : ±737	
Y : 1760	
Z : 233	
J, j	
X : ±540	
Y : 2190	
Z : 319	
K	
X : -499	
Y : 2518	
Z : 377	
N	
X : -498	
Y : 3070	
Z : 377	

Strut tower centers

Coordinates:

C, c Front
X : ±584
Y : 7
Z : 870

M, m Rear
X : ±562
Y : 2639
Z : 736



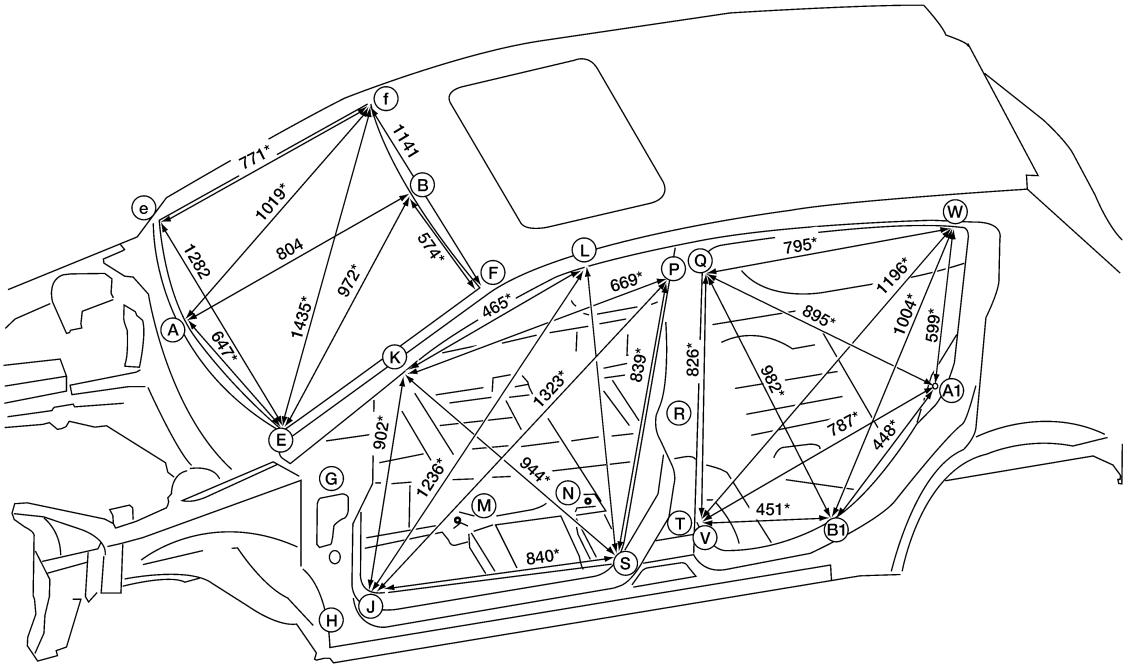
Unit: mm

LIIA2602E

PASSENGER COMPARTMENT HATCHBACK

Unit : mm

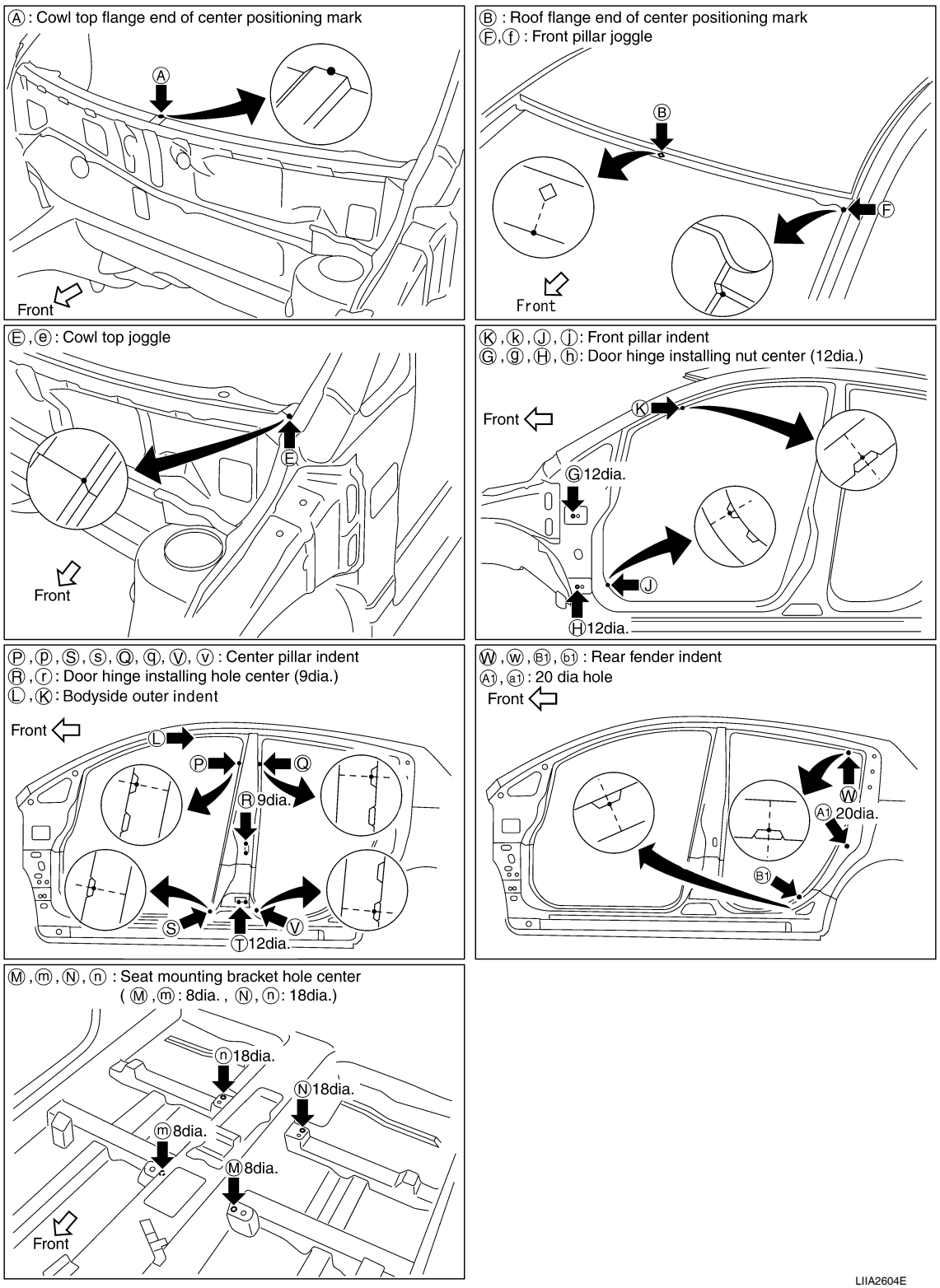
Figures marked with a (*) indicate symmetrically identical dimensions on both right and left side of the vehicle.



Point	Dimension	Point	Dimension	Point	Dimension
Ⓚ~ⓚ	1,238	Ⓠ~ⓐ1	1,580*	Ⓜ~ⓚ	1,114*
Ⓚ~ⓙ	1,586*	Ⓠ~ⓑ1	1,628*	Ⓜ~Ⓟ	1,260*
Ⓚ~ⓟ	1,405*	Ⓠ~ⓦ	1,440*	Ⓜ~Ⓙ	728*
Ⓚ~ⓢ	1,613*	Ⓥ~ⓥ	1,380	Ⓜ~Ⓢ	714*
Ⓙ~ⓙ	1,373	Ⓥ~ⓐ1	1,588*	Ⓝ~Ⓠ	1,162*
Ⓙ~ⓟ	1,855*	Ⓥ~ⓑ1	1,448*	Ⓝ~Ⓦ	1,541*
Ⓙ~ⓢ	1,612*	Ⓥ~ⓦ	1,746*	Ⓝ~Ⓐ1	1,172*
Ⓟ~ⓟ	1,232	Ⓦ~ⓦ	1,172	Ⓝ~Ⓑ1	834*
Ⓟ~ⓢ	1,550*	Ⓦ~ⓐ1	1,405*	Ⓝ~Ⓥ	603*
Ⓢ~ⓢ	1,380*	Ⓦ~ⓑ1	1,618*	Ⓖ~Ⓡ	1,158*
Ⓠ~ⓠ	1,229*	Ⓐ1~ⓐ1	1,379	Ⓖ~Ⓣ	1,170*
Ⓠ~ⓥ	1,542*	Ⓐ1~ⓑ1	1,447*	Ⓗ~Ⓡ	1,205*
				Ⓗ~Ⓣ	1,104*

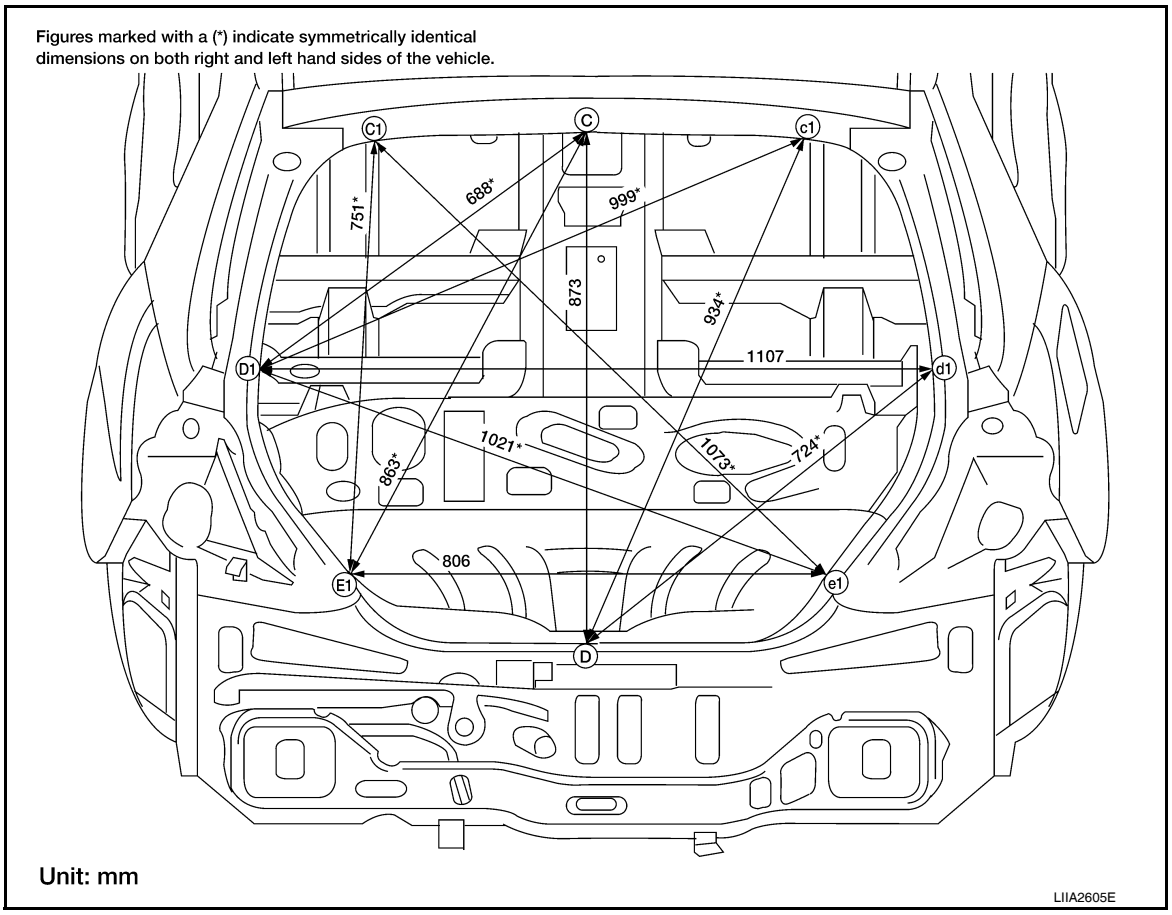
LIIA2603E

Measurement Points

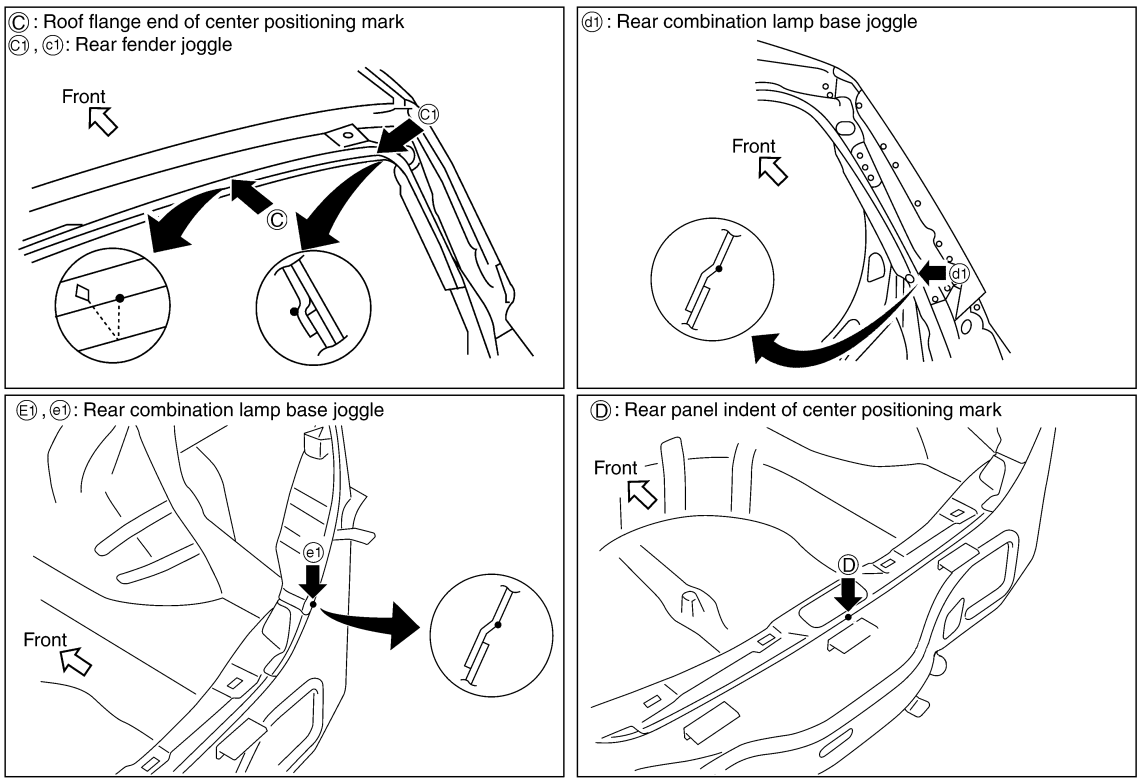


REAR BODY HATCHBACK

Measurement



Measurement Points



LIIA2606E

Handling Precaution for Plastics

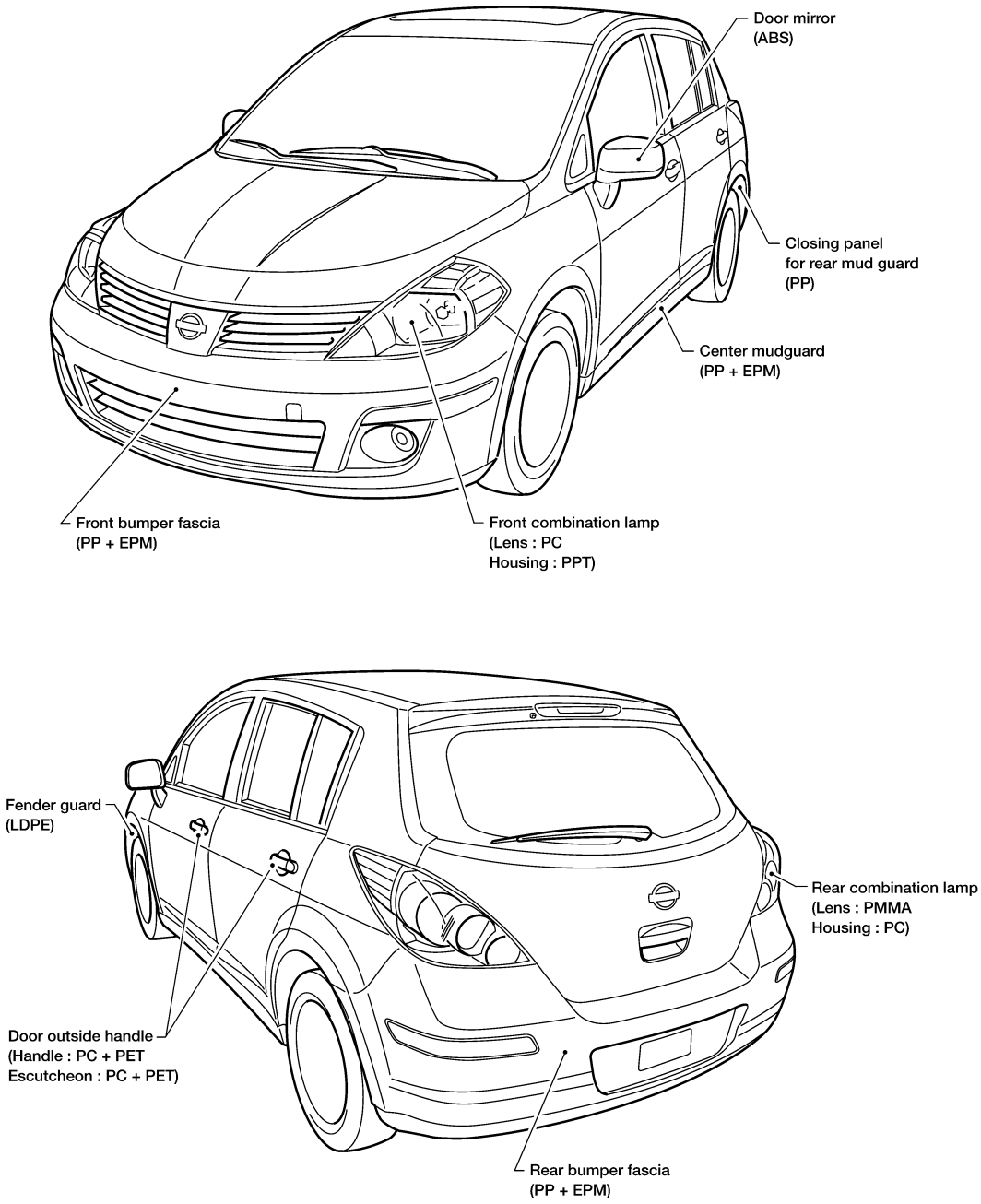
INFOID:0000000007330147

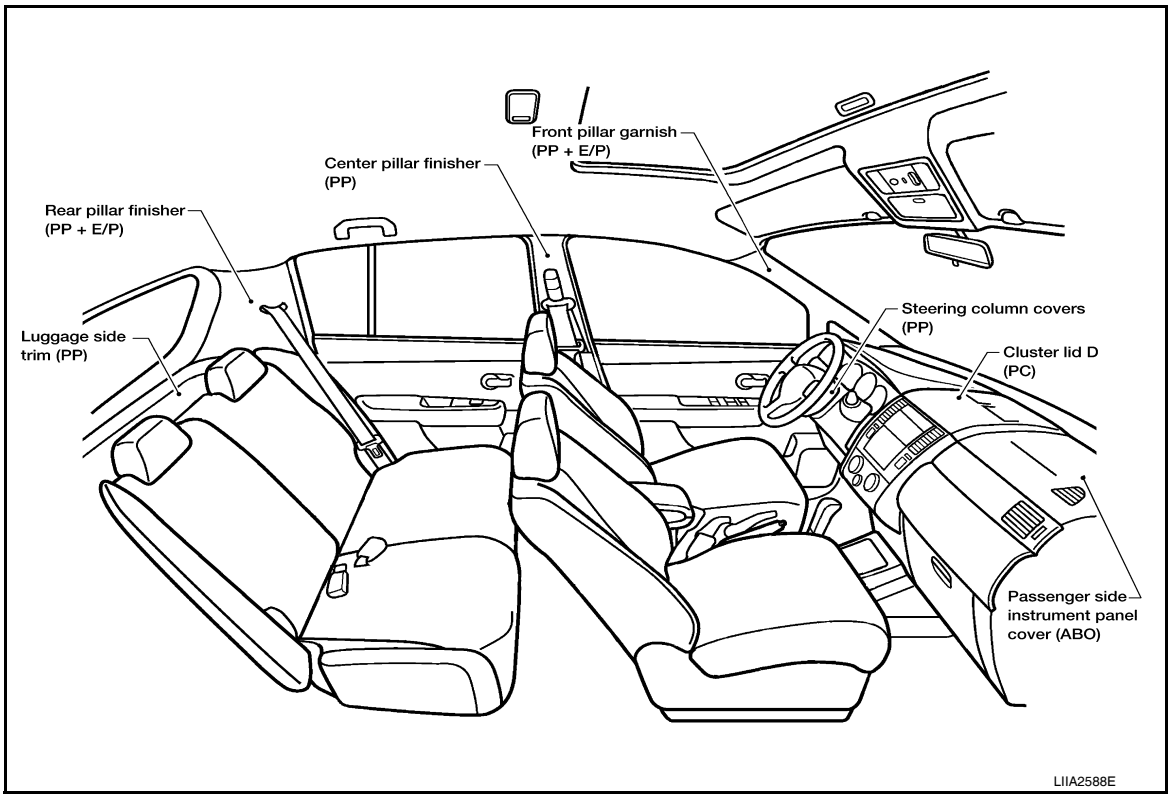
HANDLING PRECAUTIONS FOR PLASTICS

Abbre-viation	Material name	Heatresisting temperature °C (°F)	Resistance to gasoline and solvents	Other cautions
PE	Polyethylene	60 (140)	Gasoline and most solvents are harmless if applied for a very short time (wipe up quickly).	Flammable
PVC	Polyvinyl Chloride	80 (176)	Same as above.	Poison gas is emitted when burned.
EPM/ EPDM	Ethylene Propylene (Diene) rubber	80 (176)	Same as above.	Flammable
TPO/ TPR	Thermoplastic Olefine/ Thermoplastic Rubber	80 (176)	Same as above.	Flammable
PP	Polypropylene	90 (194)	Same as above.	Flammable, avoid battery acid.
UP	Polyester thermoset	90 (194)	Same as above.	Flammable
PS	Polystyrene	80 (176)	Avoid solvents.	Flammable
ABS	Acrylonitrile Butadiene Styrene resin	80 (176)	Avoid gasoline and solvents.	
AES	Acrylonitrile Ethylene Styrene	80 (176)	Same as above.	
PMMA	Polymethyl Methacrylate	85 (185)	Same as above.	
AAS	Acrylonitrile Acrylic Styrene	85 (185)	Same as above.	
AS	Acrylonitrile Styrene	85 (185)	Same as above.	
EVA	Polyvinyl Ethyl Acetate	90 (194)	Same as above.	
ASA	Acrylonitrile Styrene Acrylate	100 (222)	Same as above.	Flammable
PPO/ PPE	Polyphenylene Oxide/ Polyphenylene Ether	110 (230)	Same as above.	
PC	Polycarbonate	120 (248)	Same as above.	
PAR	Polyacrylate	180 (356)	Same as above.	
L-LDPE	Lenear Low Density PE	45 (100)	Gasoline and most solvents are harmless.	Flammable
PUR	Polyurethane	90 (194)	Same as above.	
TPU	Thermoplastic Urethane	110 (230)	Same as above.	
PPC	Polypropylene Composite	115 (239)	Same as above.	Flammable
POM	Polyacetal	120 (248)	Same as above.	Avoid battery acid.
PBT+PC	Polybutylene Terephthalate+Polycarbonate	120 (248)	Same as above.	Flammable
PA	Polyamide (Nylon)	140 (284)	Same as above.	Avoid immersing in water.
PBT	Polybutylene Terephthalate	140 (284)	Same as above.	
FRP	Fiber Reinforced Plastics	170 (338)	Same as above.	Avoid battery acid.
PET	Polyethylene Terephthalate	180 (356)	Same as above.	
PEI	Polyetherimide	200 (392)	Same as above.	

1. When repairing and painting a portion of the body adjacent to plastic parts, consider their characteristics (influence of heat and solvent) and remove them if necessary or take suitable measures to protect them.
2. Plastic parts should be repaired and painted using methods suiting the materials' characteristics.

LOCATION OF PLASTIC PARTS


Door mirror
(ABS)
Closing panel
for rear mud guard
(PP)
Center mudguard
(PP + EPM)
Front bumper fascia
(PP + EPM)
Front combination lamp
(Lens : PC
Housing : PPT)
Fender guard
(LDPE)
Rear combination lamp
(Lens : PMMA
Housing : PC)
Door outside handle
(Handle : PC + PET
Escutcheon : PC + PET)
Rear bumper fascia
(PP + EPM)
LIIA2587E



Precaution in Repairing High Strength Steel

INFOID:0000000007330148

High strength steel is used for body panels in order to reduce vehicle weight.
Accordingly, precautions in repairing automotive bodies made of high strength steel are described below:

HIGH STRENGTH STEEL (HSS) USED IN NISSAN VEHICLES

Tensile strength	Nissan/Infiniti designation	Major applicable parts
373 N/mm^2 (38kg/mm^2 ,54klb/sq in)	SP130	• Front & rear side member assembly • Front side member closing plate assembly • Front strut housing • Lower dash • Rear seat crossmember • Other reinforcements
785-1350 N/mm^2 (80-138kg/mm^2 , 114-196klb/sq in)	SP150	• Center pillar reinforcement (Component part) • Outer roof side rail reinforcement (Component part)

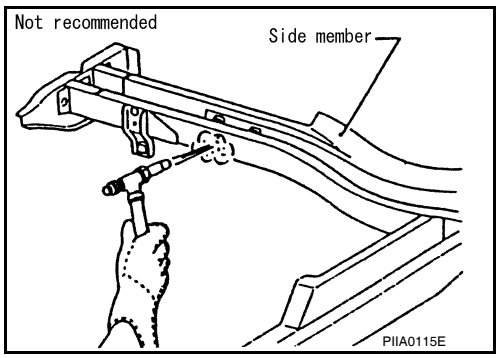
SP130 is the most commonly used HSS.

SP150 HSS is used only on parts that require much more strength.

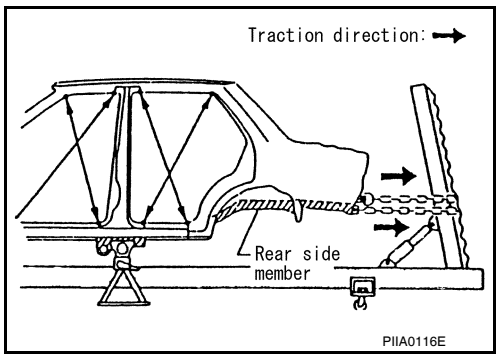
Read the Following Precautions When Repairing HSS:

1. Additional points to consider

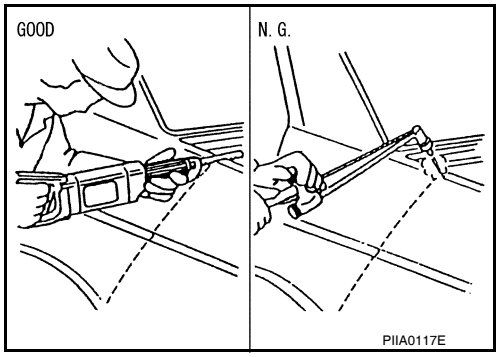
- The repair of reinforcements (such as side members) by heating is not recommended since it may weaken the component. When heating is unavoidable, do not heat HSS parts above 550°C (1,022°F).
  Verify heating temperature with a thermometer.
  (Crayon-type and other similar type thermometer are appropriate.)



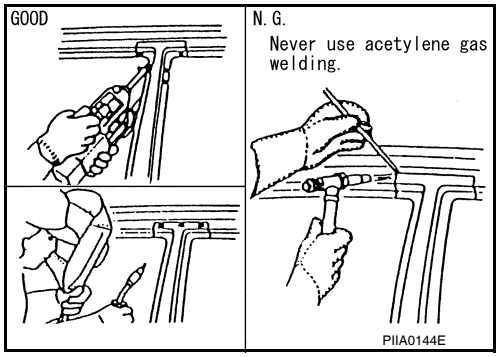
- When straightening body panels, use caution in pulling any HSS panel. Because HSS is very strong, pulling may cause deformation in adjacent portions of the body. In this case, increase the number of measuring points, and carefully pull the HSS panel.



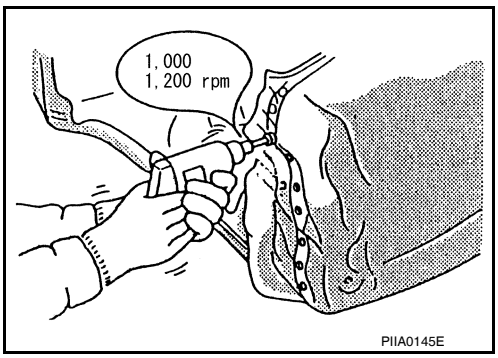
- When cutting HSS panels, avoid gas (torch) cutting if possible. Instead, use a saw to avoid weakening surrounding areas due to heat. If gas (torch) cutting is unavoidable, allow a minimum margin of 50 mm (1.97in).



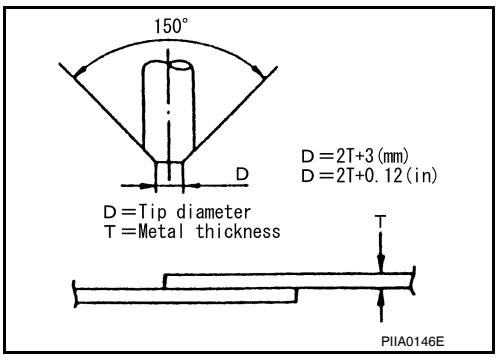
- When welding HSS panels, use spot welding whenever possible in order to minimize weakening surrounding areas due to heat.
  If spot welding is impossible, use M.I.G. welding. Do not use gas (torch) welding because it is inferior in welding strength.



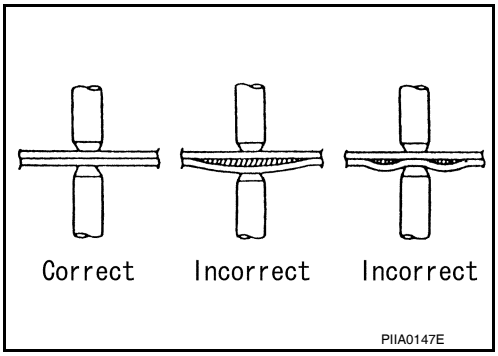
- The spot weld on HSS panels is harder than that of an ordinary steel panel.
  Therefore, when cutting spot welds on a HSS panel, use a low speed high torque drill (1,000 to 1,200 rpm) to increase drill bit durability and facilitate the operation.



2. Precautions in spot welding HSS
   This work should be performed under standard working conditions. Always note the following when spot welding HSS:
   - The electrode tip diameter must be sized properly according to the metal thickness.



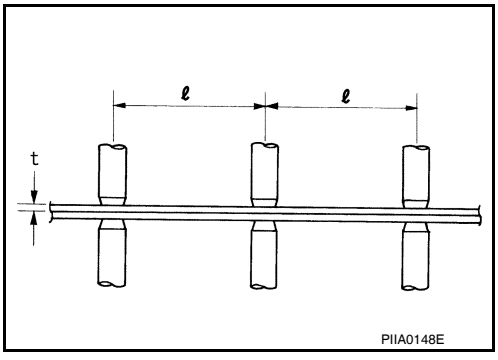
   - The panel surfaces must fit flush to each other, leaving no gaps.



   - Follow the specifications for the proper welding pitch.

Unit: mm

Thickness (t)	Minimum pitch (ℓ)
0.6 (0.024)	10 (0.39) or over
0.8 (0.031)	12 (0.47) or over
1.0 (0.039)	18 (0.71) or over
1.2 (0.047)	20 (0.79) or over
1.6 (0.063)	27 (1.06) or over
1.8 (0.071)	31 (1.22) or over



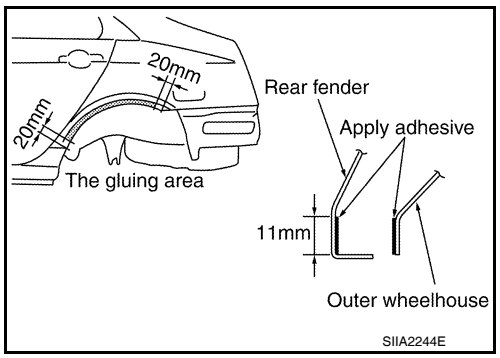
Rear fender hemming process

1. A wheel arch is to be installed and hemmed over left and right outer wheel house.
2. In order to hem the wheel arch, it is necessary to repair any damaged or defaced parts around outer wheel house.
   CAUTION:
   Ensure that the area that is to be glued around outer wheelhouse is undamaged or defaced.

Procedure of the hemming process

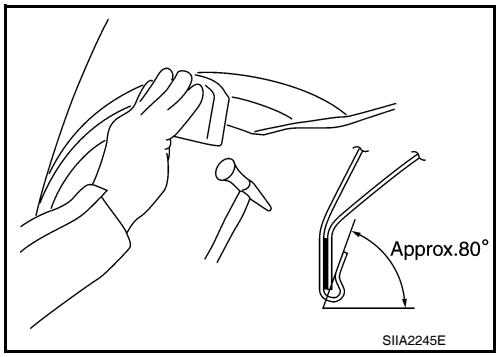
- Peel off old bonding material on the surface of outer wheelhouse and clean thoroughly.
- Peel off a primer coat in the specified area where new adhesive is to be applied on rear fender (the replacing part).
- Apply new adhesive to both specified areas of outer wheelhouse and rear fender.

<Adhesive> 3M automix panel bond 8115, or any equivalents

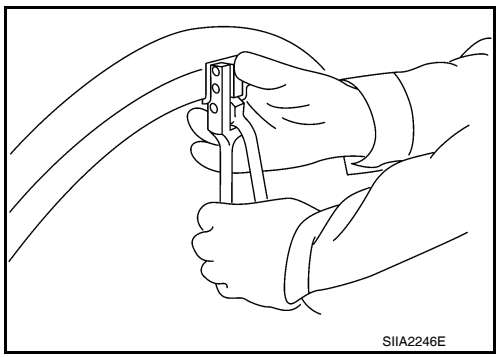


- Attach rear fender to the body of the car, and weld the required part except the hemming part.

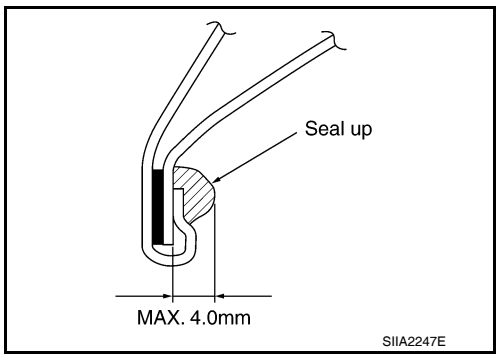
- Bend the welded part starting from the center of the wheel arch gradually with a hammer and a dolly. (Also hem the end of the flange.)
- Hemming with a hammer is conducted to an approximate angle of 80 degrees.



- Starting from the center, hem the wheel arch gradually, using slight back and forth motion with a hemming tool.



- Seal up the area around the hemmed end of the flange.



Foam Repair

INFOID:0000000007330149

During factory body assembly, foam insulators are installed in certain body panels and locations around the vehicle. Use the following procedure(s) to replace any factory-installed foam insulators.

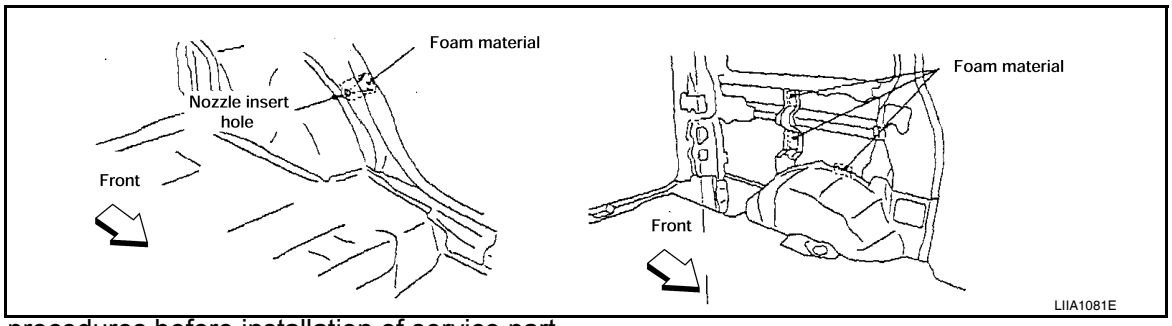
URETHANE FOAM APPLICATIONS

Use commercially available spray foam for sealant (foam material) repair of material used on vehicle. Read instructions on product for fill procedures.

FILL PROCEDURES

1. Fill procedures after installation of service part.

- Remove foam material remaining on vehicle side.
- Clean area in which foam was removed.
- Install service part.
- Insert nozzle into hole near fill area and fill foam material or fill in enough to close gap with the service part.



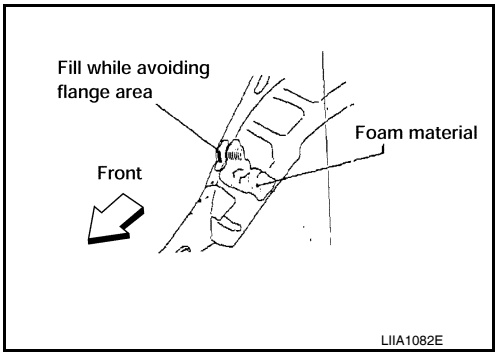
2. Fill procedures before installation of service part.

- Remove foam material remaining on vehicle side.
- Clean area in which foam was removed.
- Fill foam material on wheelhouse outer side.

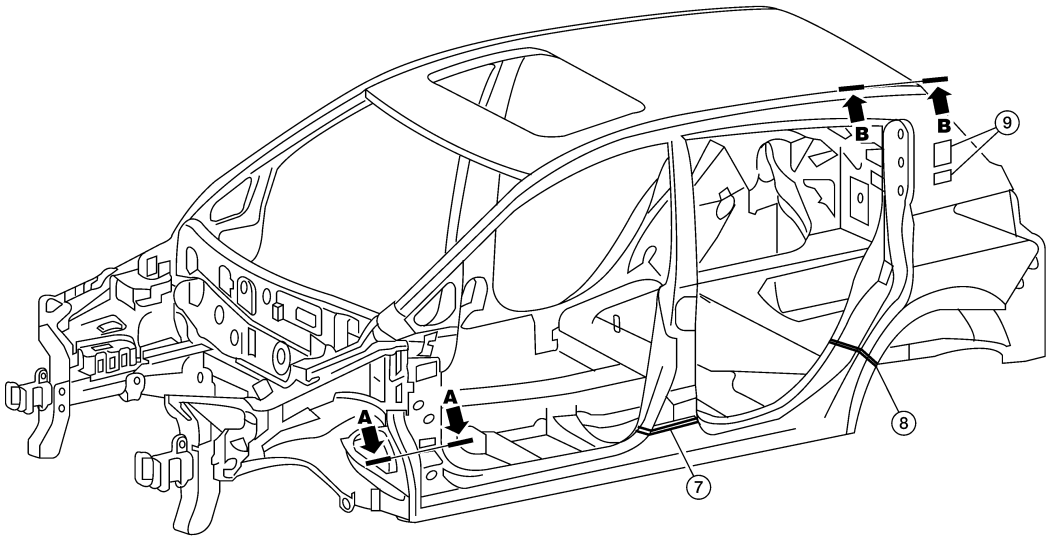
NOTE:
Fill in enough to close gap with service part while avoiding flange area.

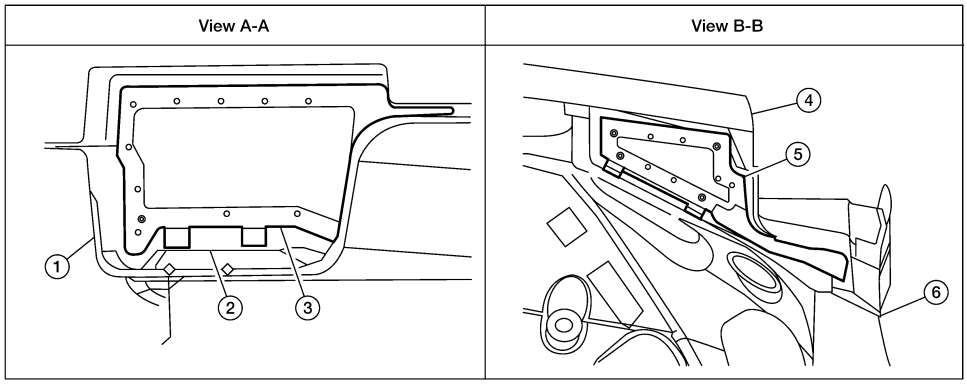
- Install service part.

NOTE:
Refer to label for information on working times.



Hatchback





LIIA2665E

1. Body side outer
2. Front pillar lower reinforcement
3. Body side insulation (foam) front pillar
4. Roof panel assembly
5. Body side insulation (Foam) rear roof rail
6. Rear roof rail assembly
7. Body side insulation strip, center pillar
8. Body side insulation strip, rear pillar lower
9. Body side insulation strip, rear pillar upper

Replacement Operation

INFOID:0000000007330150

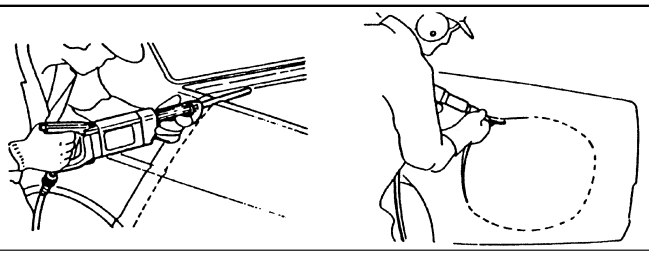
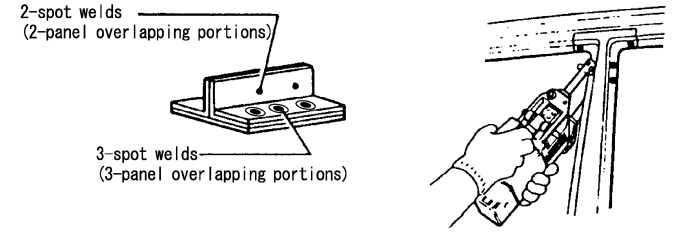
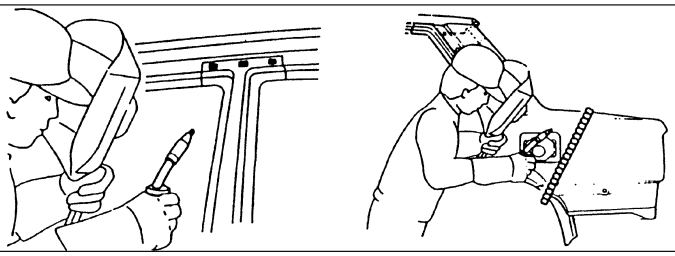
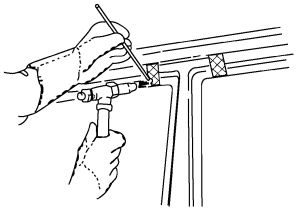
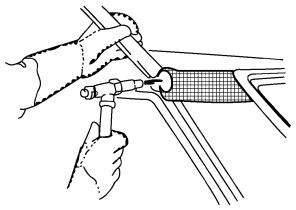
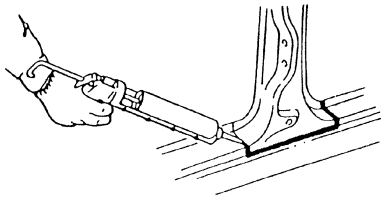
DESCRIPTION

This section is prepared for technicians who have attained a high level of skill and experience in repairing collision-damaged vehicles and also use modern service tools and equipment. Persons unfamiliar with body repair techniques should not attempt to repair collision-damaged vehicles by using this section.

Technicians are also encouraged to read Body Repair Manual (Fundamentals) in order to ensure that the original functions and quality of the vehicle can be maintained. The Body Repair Manual (Fundamentals) contains additional information, including cautions and warnings, that are not including in this manual. Technicians should refer to both manuals to ensure proper repairs.

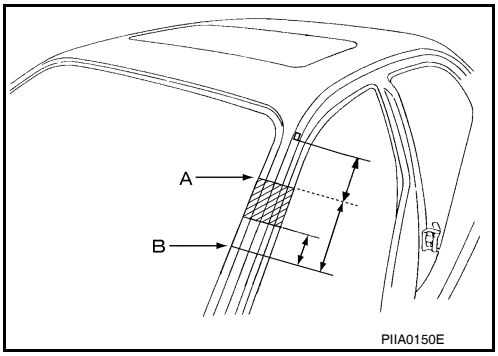
Please note that this information is prepared for worldwide usage, and as such, certain procedures may not apply in some regions or countries.

The symbols used in this section for cutting and welding / brazing operations are shown below.

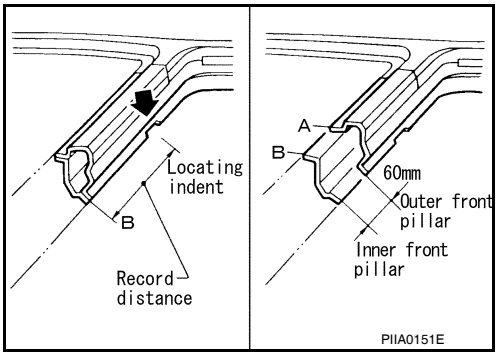
Saw cut or air chisel cut	
Spot weld 2-spot welds	
Spot weld 3-spot welds	
MIG plug weld MIG seam weld/ Point weld	
Brazing	
Soldering	
Sealing	

PIIA0149E

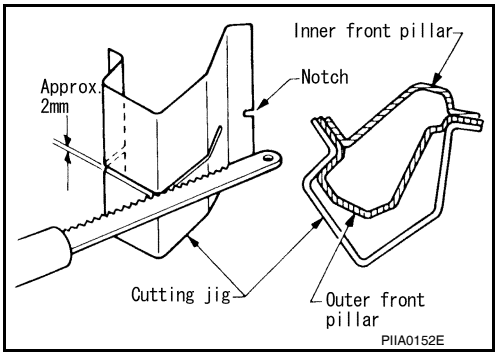
- Front pillar butt joint can be determined anywhere within shaded area as shown in the figure. The best location for the butt joint is at position A due to the construction of the vehicle. Refer to the front pillar section.



- Determine cutting position and record distance from the locating indent. Use this distance when cutting the service part. Cut outer front pillar over 60 mm above inner front pillar cut position.

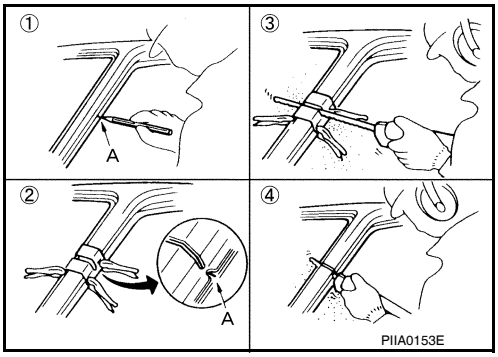


- Prepare a cutting jig to make outer pillar easier to cut. Also, this will permit service part to be accurately cut at joint position.



- An example of cutting operation using a cutting jig is as follows.

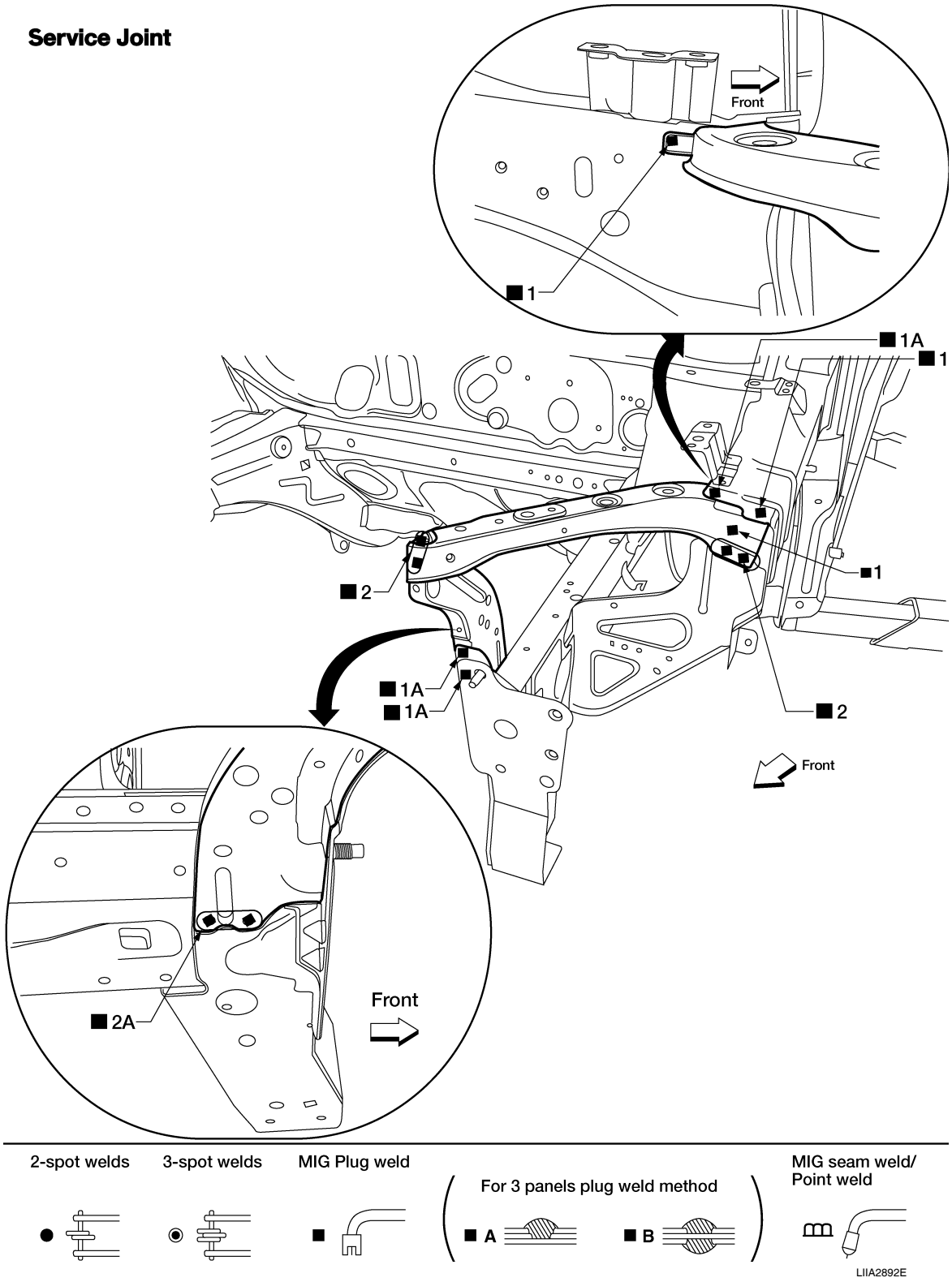
1. Mark cutting lines.
   A: Cut position of outer pillar
   B: Cut position of inner pillar
2. Align cutting line with notch on jig. Clamp jig to pillar.
3. Cut outer pillar along groove of jig. (At position A)
4. Remove jig and cut remaining portions.
5. Cut inner pillar at position B in same manner.



RADIATOR CORE SUPPORT

- Work after radiator core support upper and lower bolt on crossmembers have been removed.

Service Joint



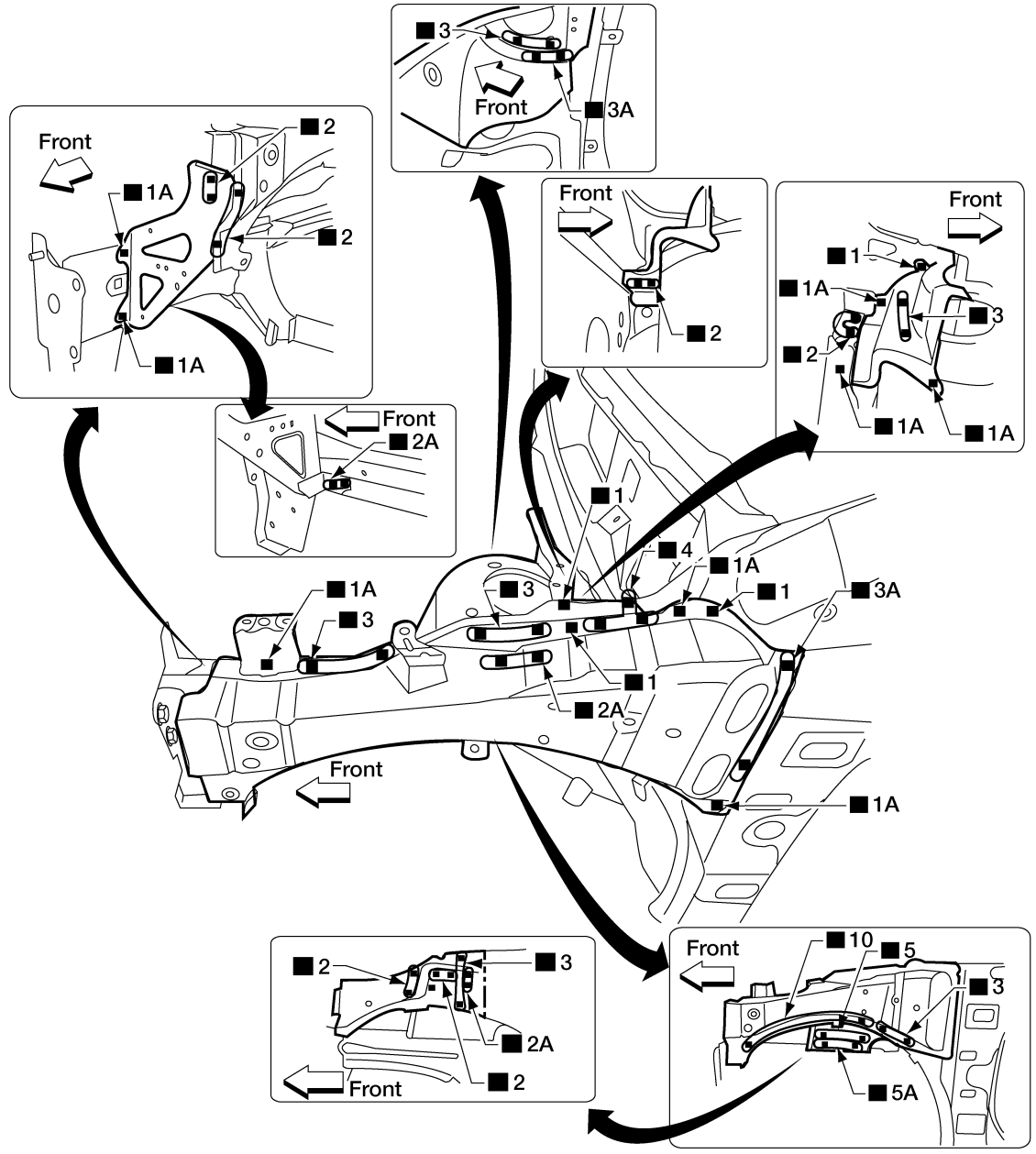
Change Parts

- Radiator core side support
- Radiator core support upper

HOODLEDGE LH

- Work after radiator core support upper and lower have been removed.

Service Joint

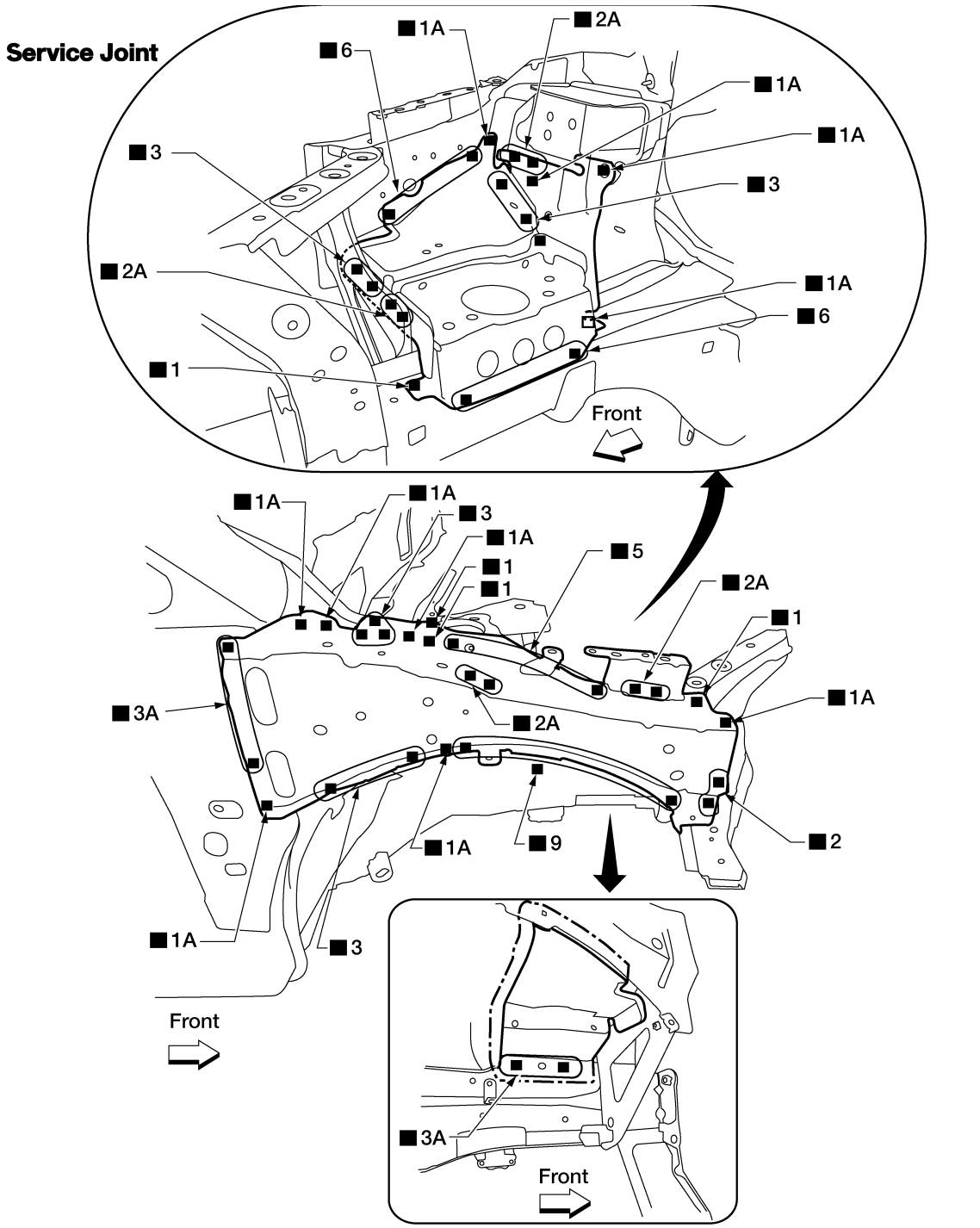


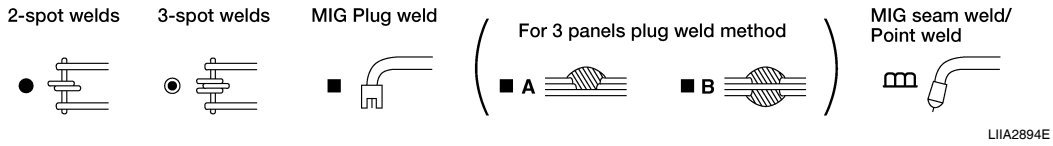
Change Parts

- Hoodledge reinforcement assembly
- Cowl top side upper
- Front strut housing
- Hoodledge upper
- Fender bracket
- Hoodledge connector

HOODLEDGE RH

• Work after radiator core support upper and lower have been removed.



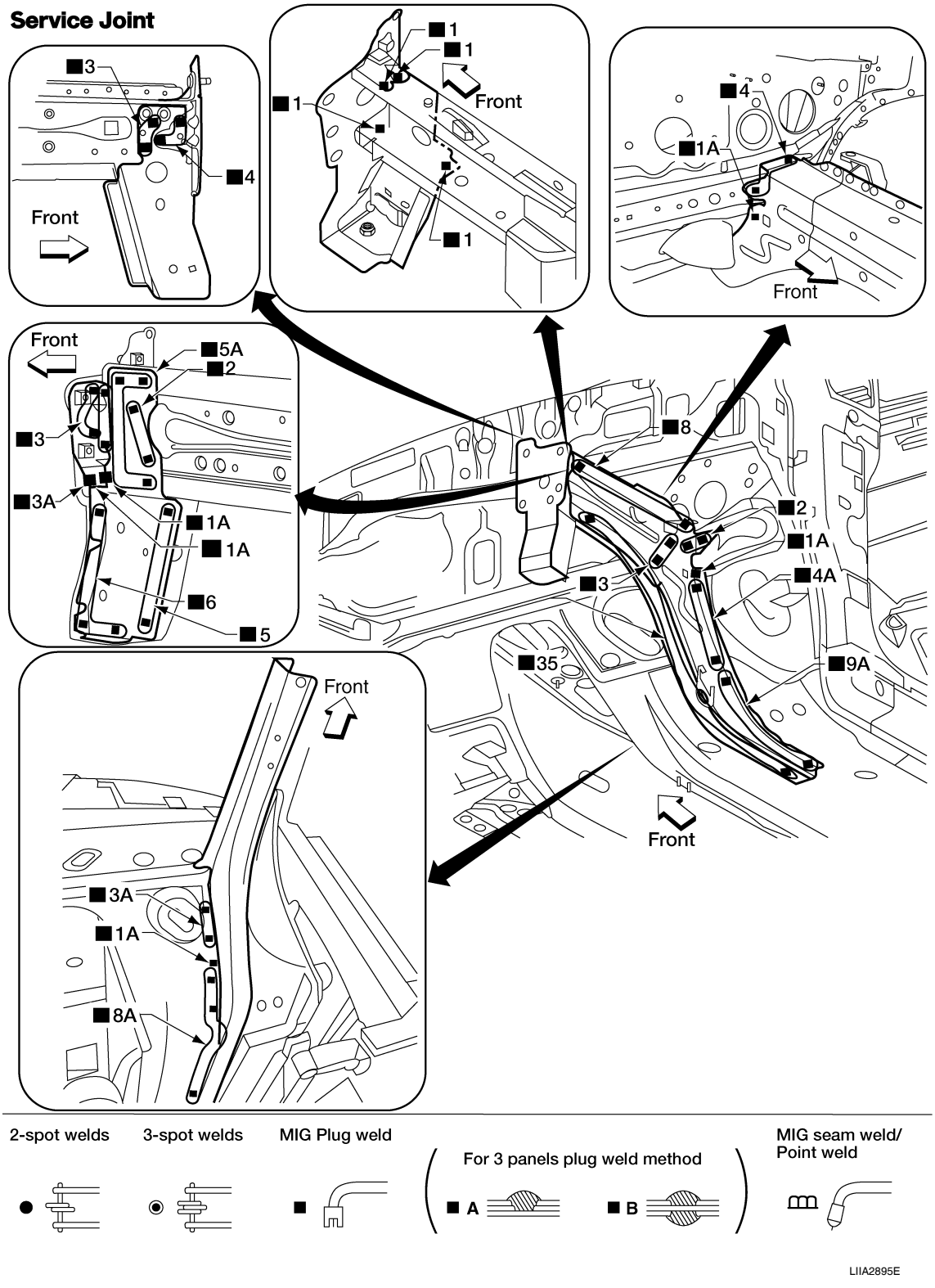


Change Parts

- Hoodledge reinforcement assembly
- Cowl top side upper
- Front strut housing
- Hoodledge upper
- Fender bracket
- Hoodledge connector

FRONT SIDE MEMBER

- Work after hoodledge and radiator core support have been removed.



Change parts

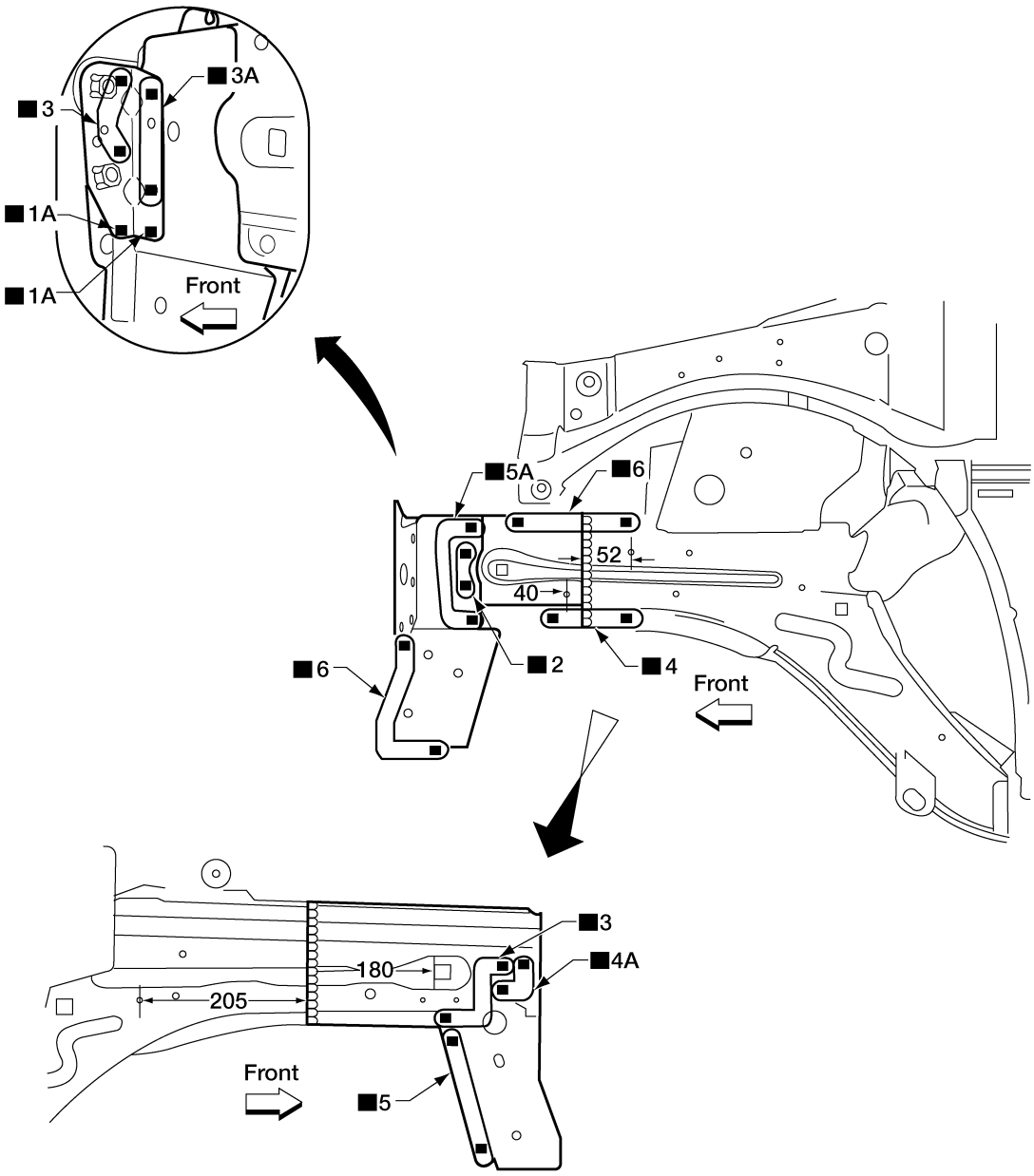
- Front side member
- Front side member closing plate
- Front side member outrigger
- Frame bracket outer

FRONT SIDE MEMBER PARTIAL

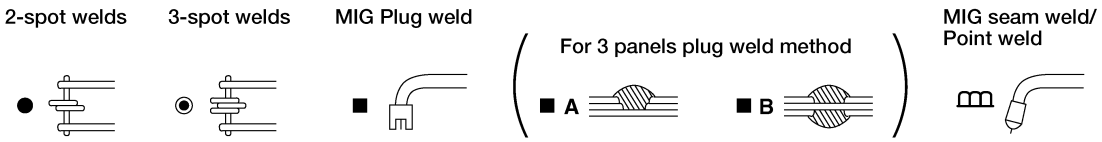
LH

• Work after radiator core support and hoodledge connector have been removed.

Service Joint



Unit: mm



WIIA1393E

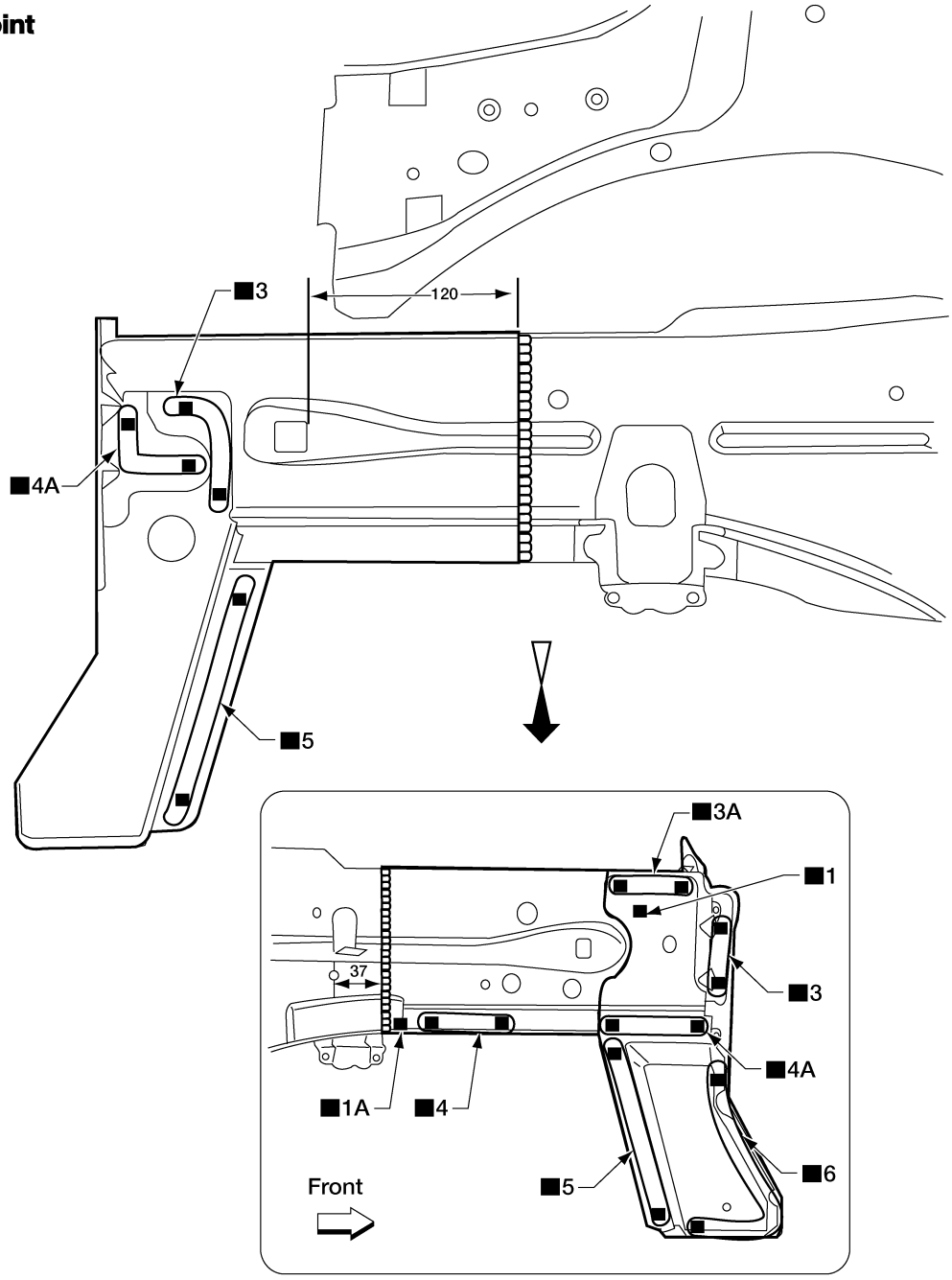
Change parts

- Front side member partial
- Front side member closing plate partial
- Frame bracket outer
- Frame bracket

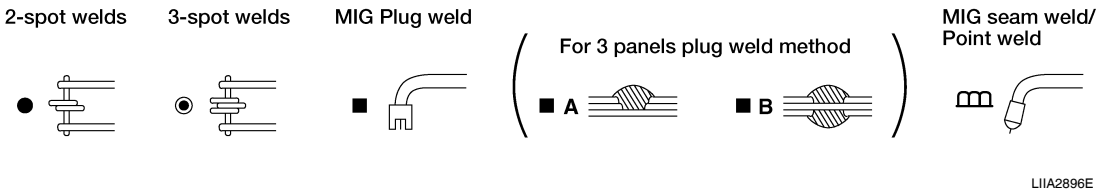
RH

- Work after radiator core support and hoodledge connector have been removed.

Service Joint



Unit:mm



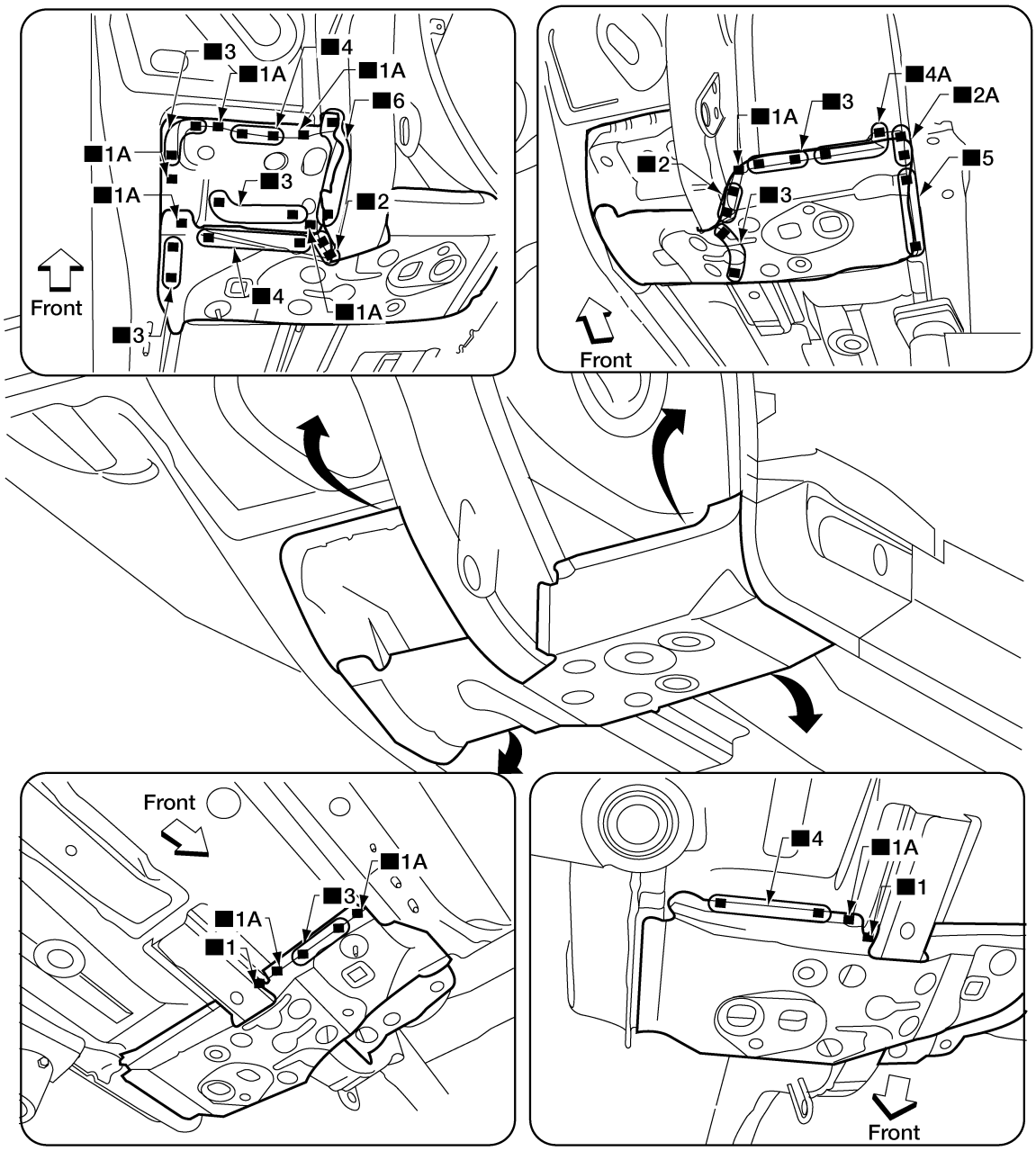
LIIA2896E

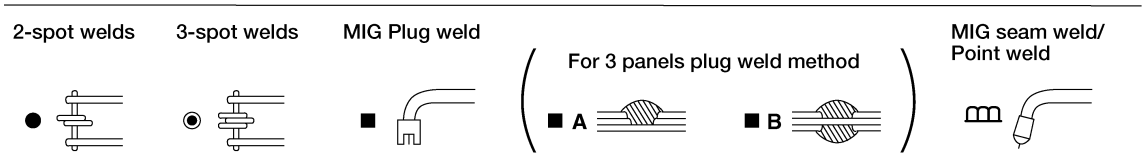
Change parts

- Front side member partial
- Front side member closing plate partial
- Frame bracket outer
- Frame bracket

OUTRIGGER

Service Joint





LIIA2897E

Change parts

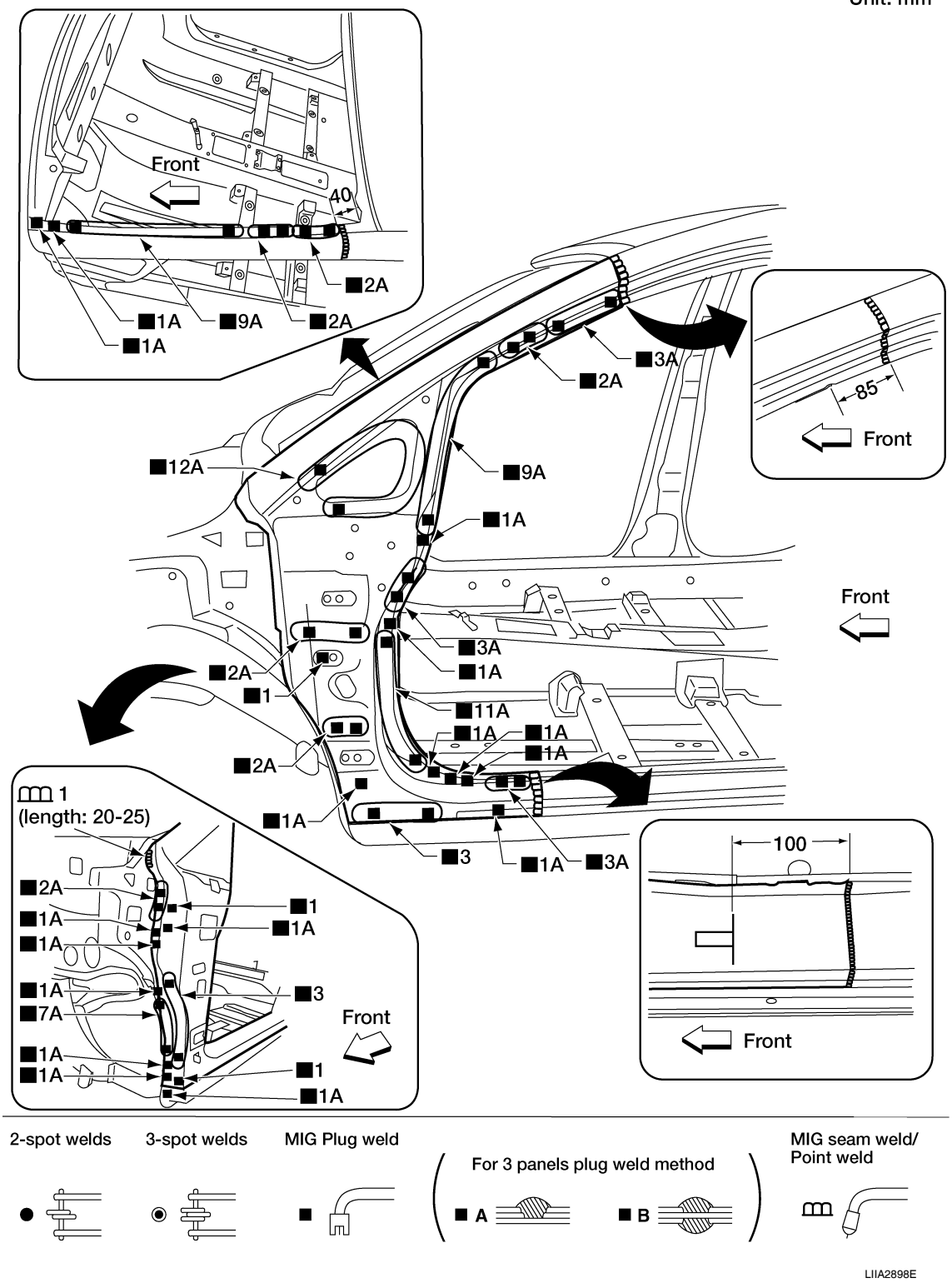
- Outrigger
- Front suspension bracket

FRONT PILLAR

- Work after the rear hoodledge reinforcement and the outer sill reinforcement have been removed.

Service Joint

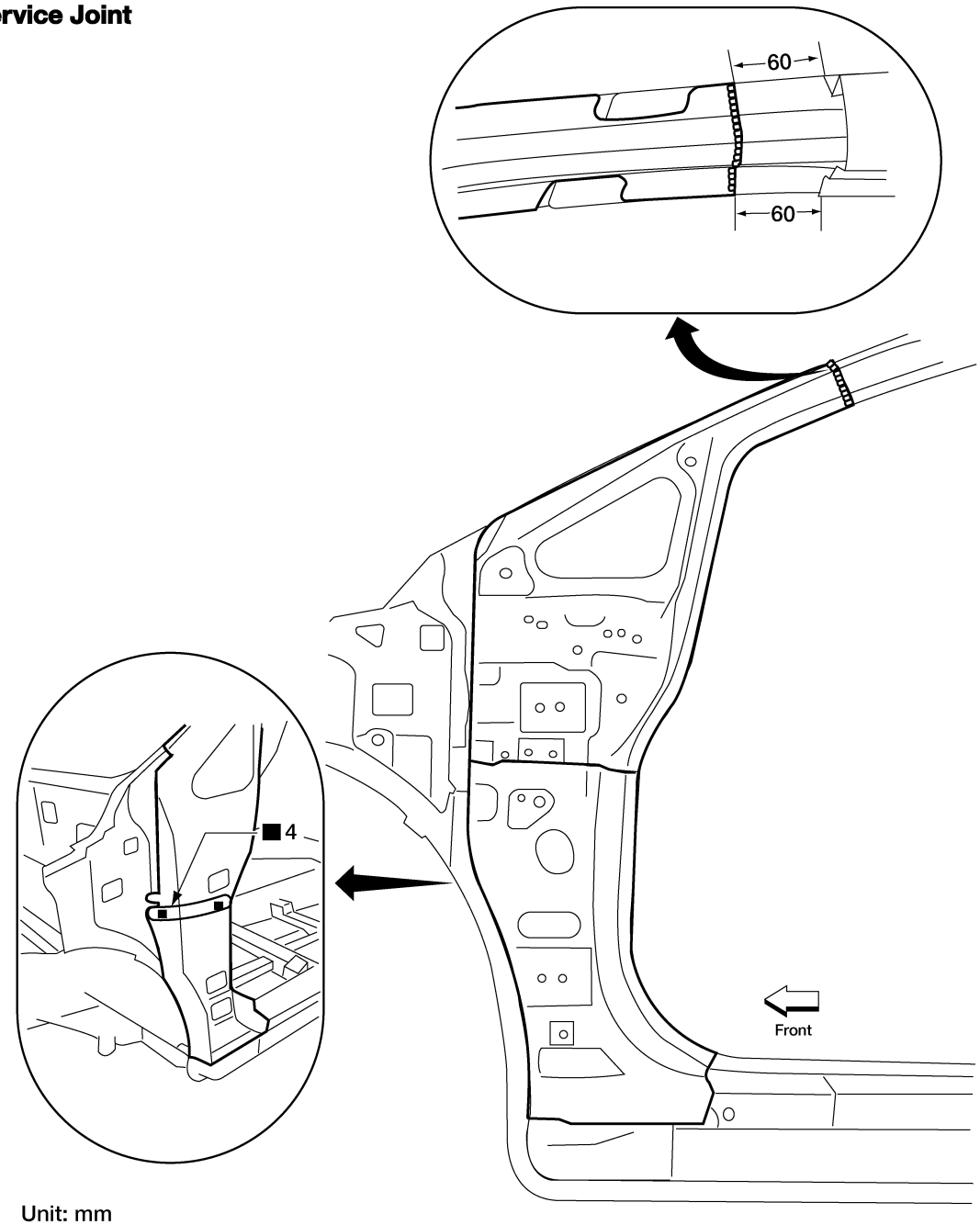
Unit: mm



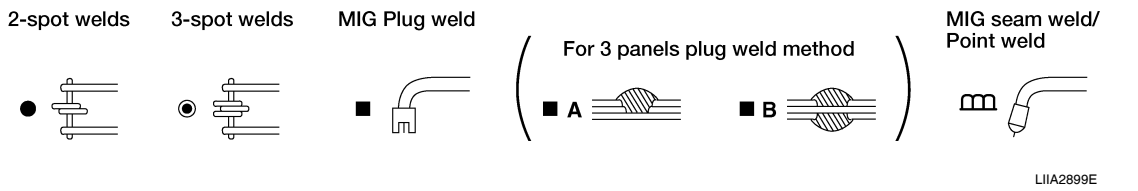
Change parts

- Front pillar section of side body

Service Joint



Unit: mm

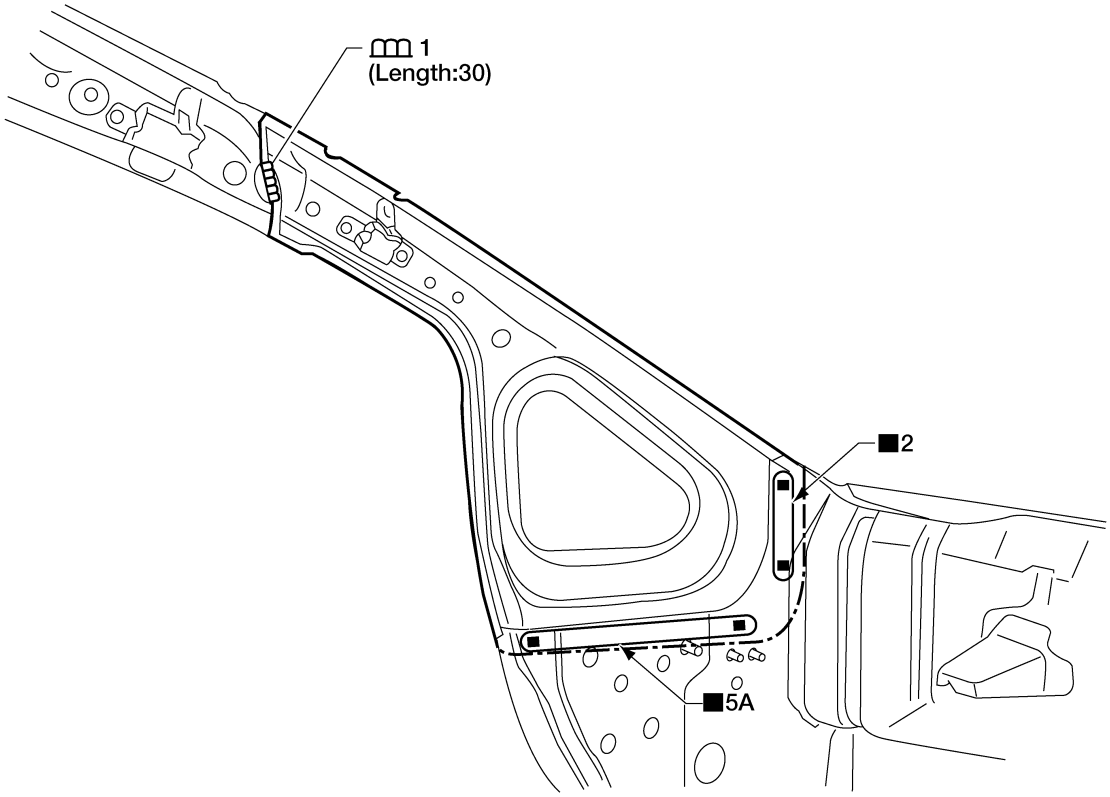


LIIA2899E

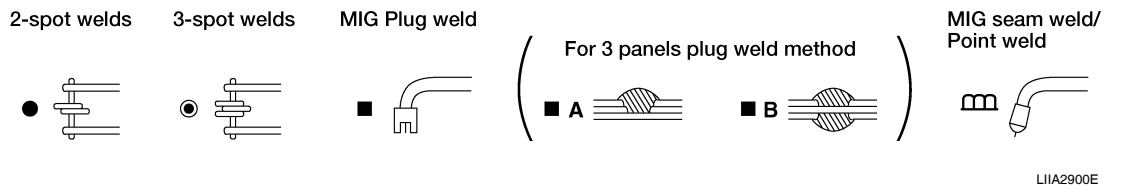
Change parts

- Front pillar upper reinforcement
- Front pillar lower reinforcement

Service Joint



Unit : mm



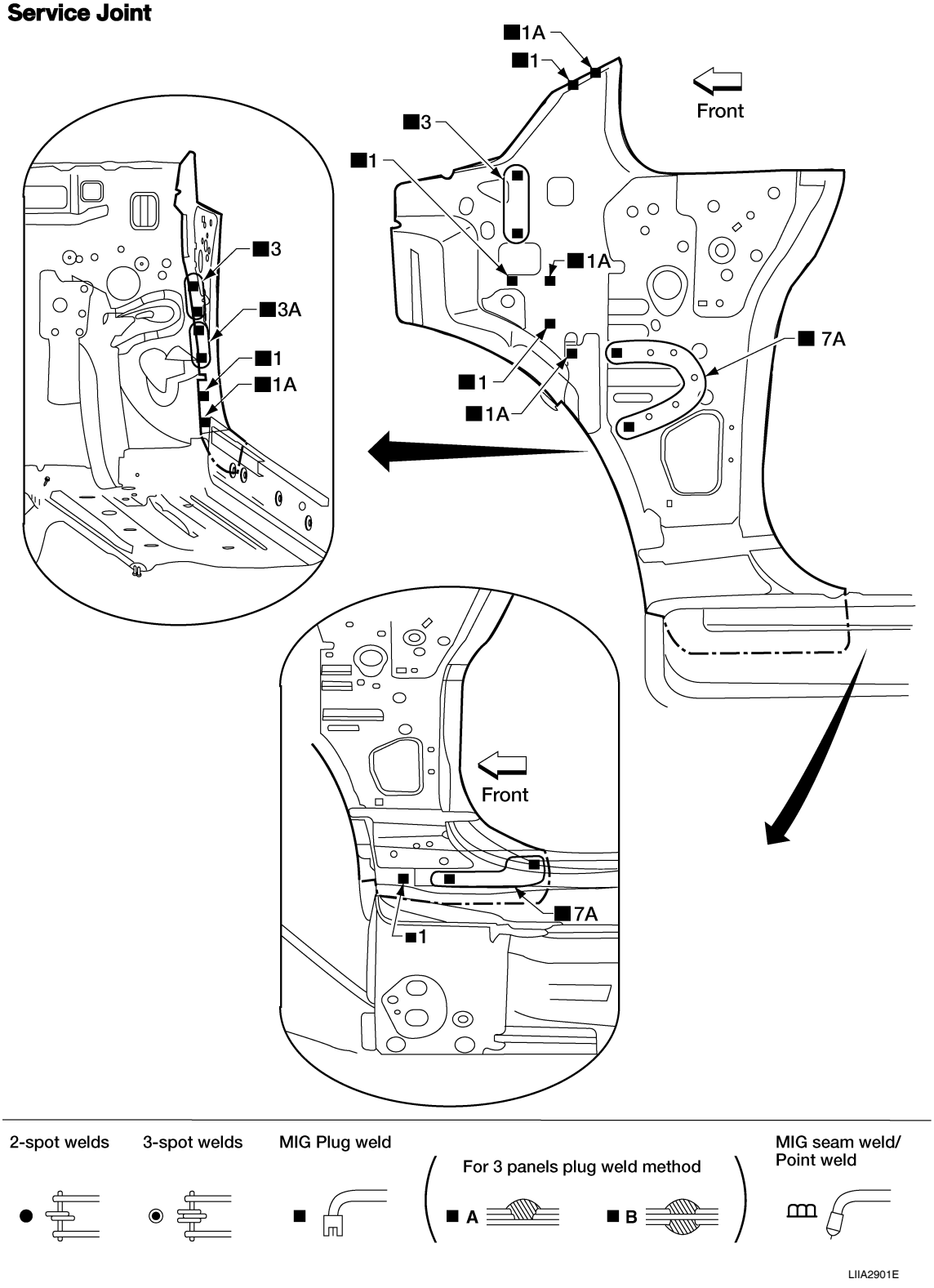
Change parts

- Front pillar inner reinforcement

DASH SIDE

Work after front pillar and outer sill reinforcement have been removed.

Service Joint



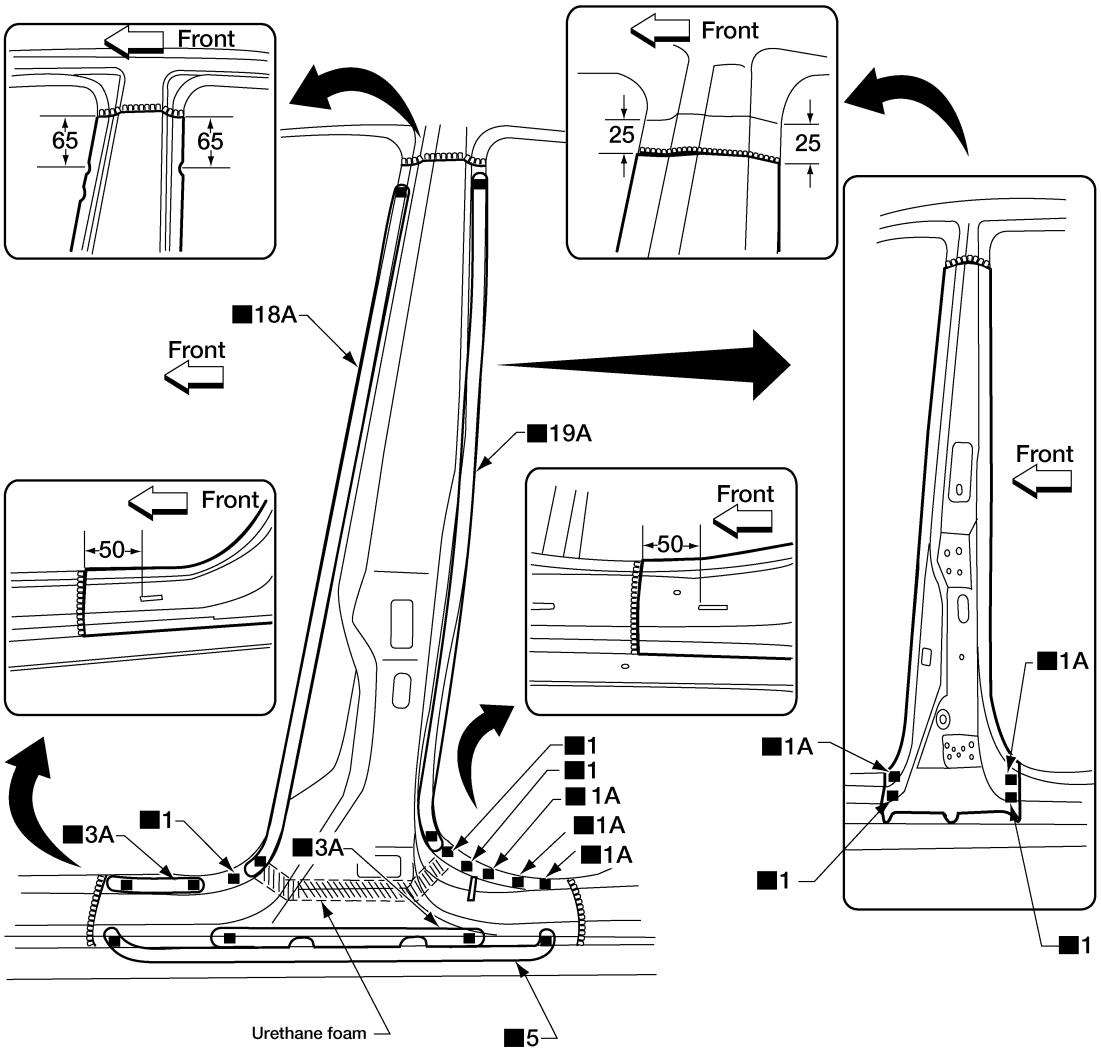
Change parts

- Dash side

CENTER PILLAR

Outer

Service Joint



Unit : mm

2-spot welds | 3-spot welds | MIG Plug weld | For 3 panels plug weld method (■ A | ■ B) | MIG seam weld/ Point weld

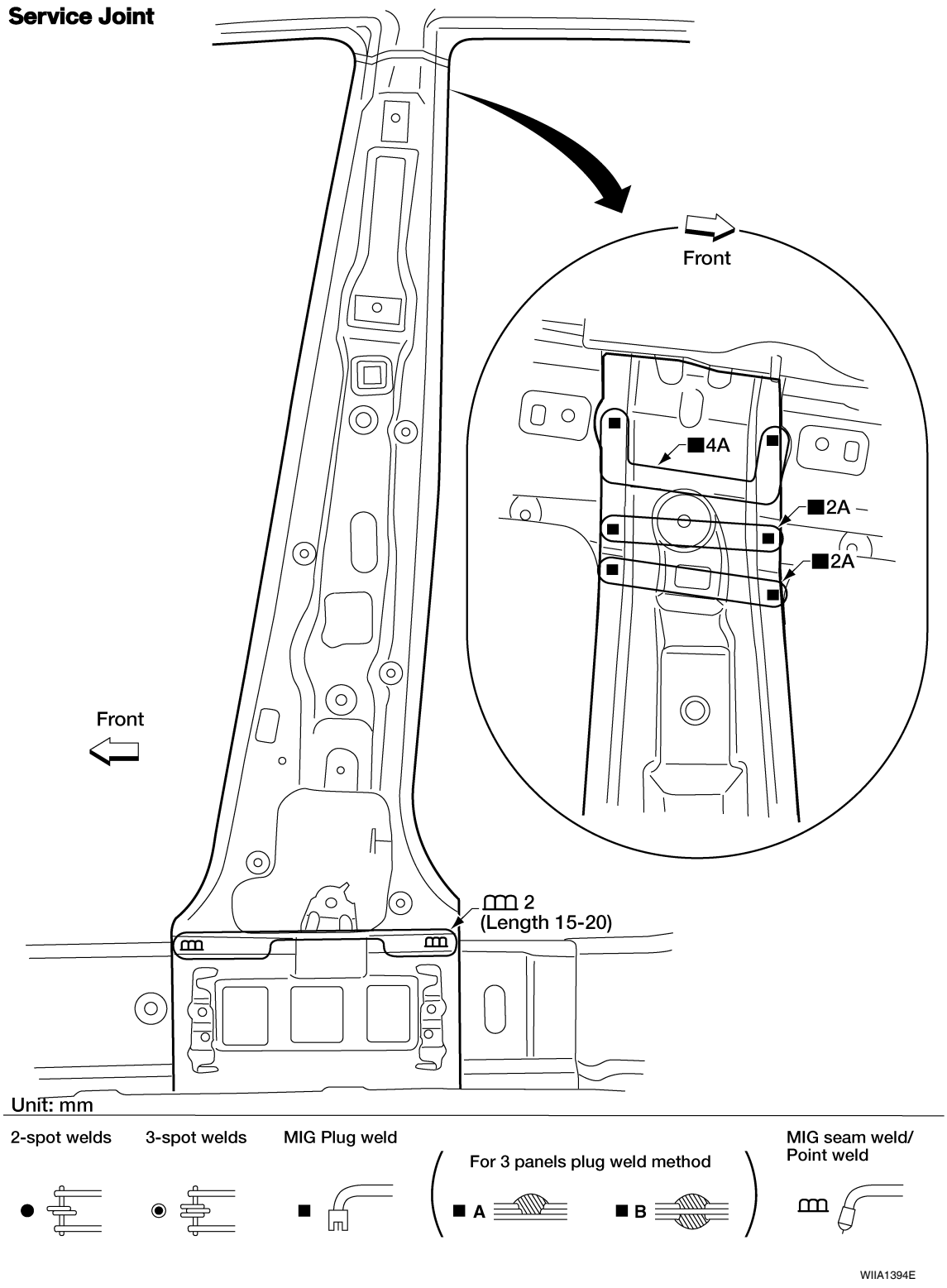
LIIA2902E

Change parts

- Center pillar portion of side body
- Lower portion of center pillar reinforcement

Inner
Work after outer sill reinforcement has been removed.

Service Joint

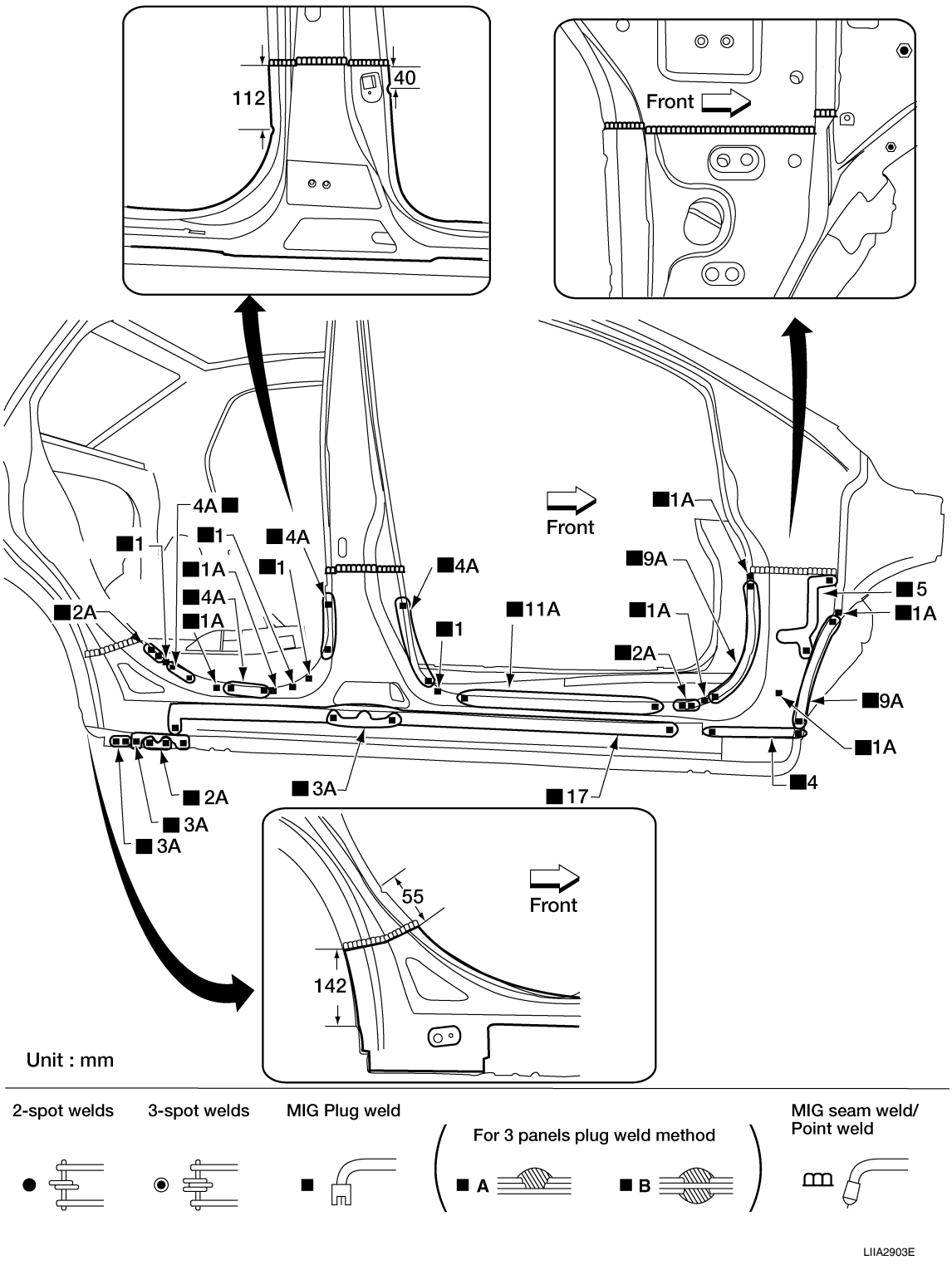


Change parts

- Inner center pillar

OUTER SILL

Service Joint



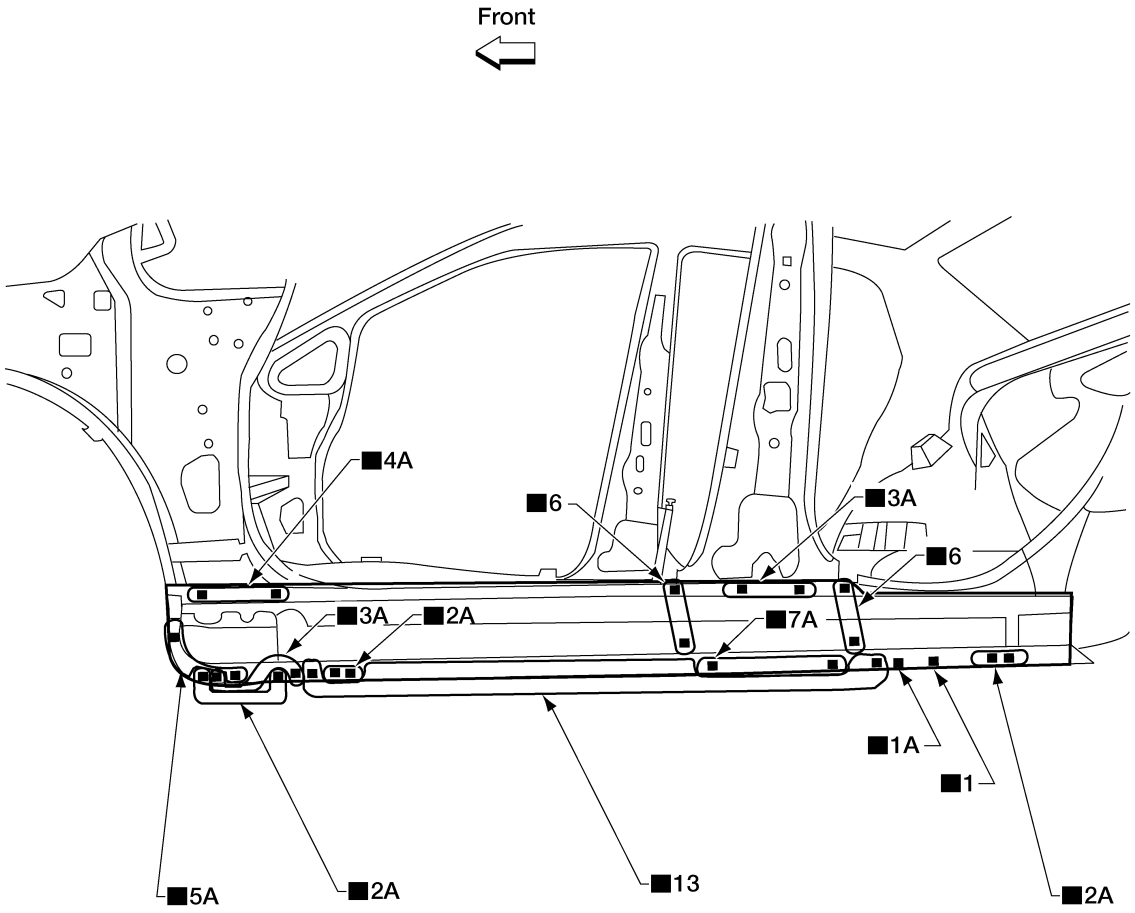
Change parts

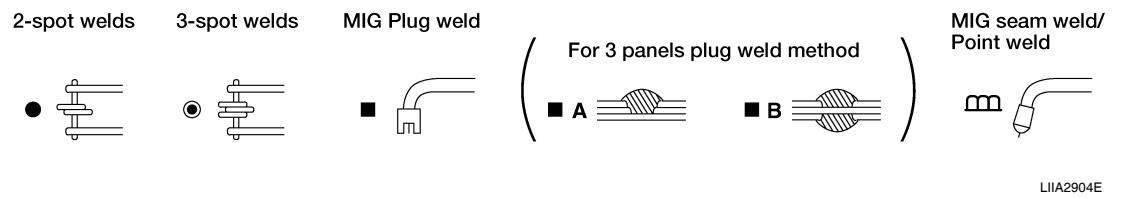
- Outer sill

OUTER SILL REINFORCEMENT

• Work with front pillar lower reinforcement, inner center pillar, and outer sill removed.

Service Joint



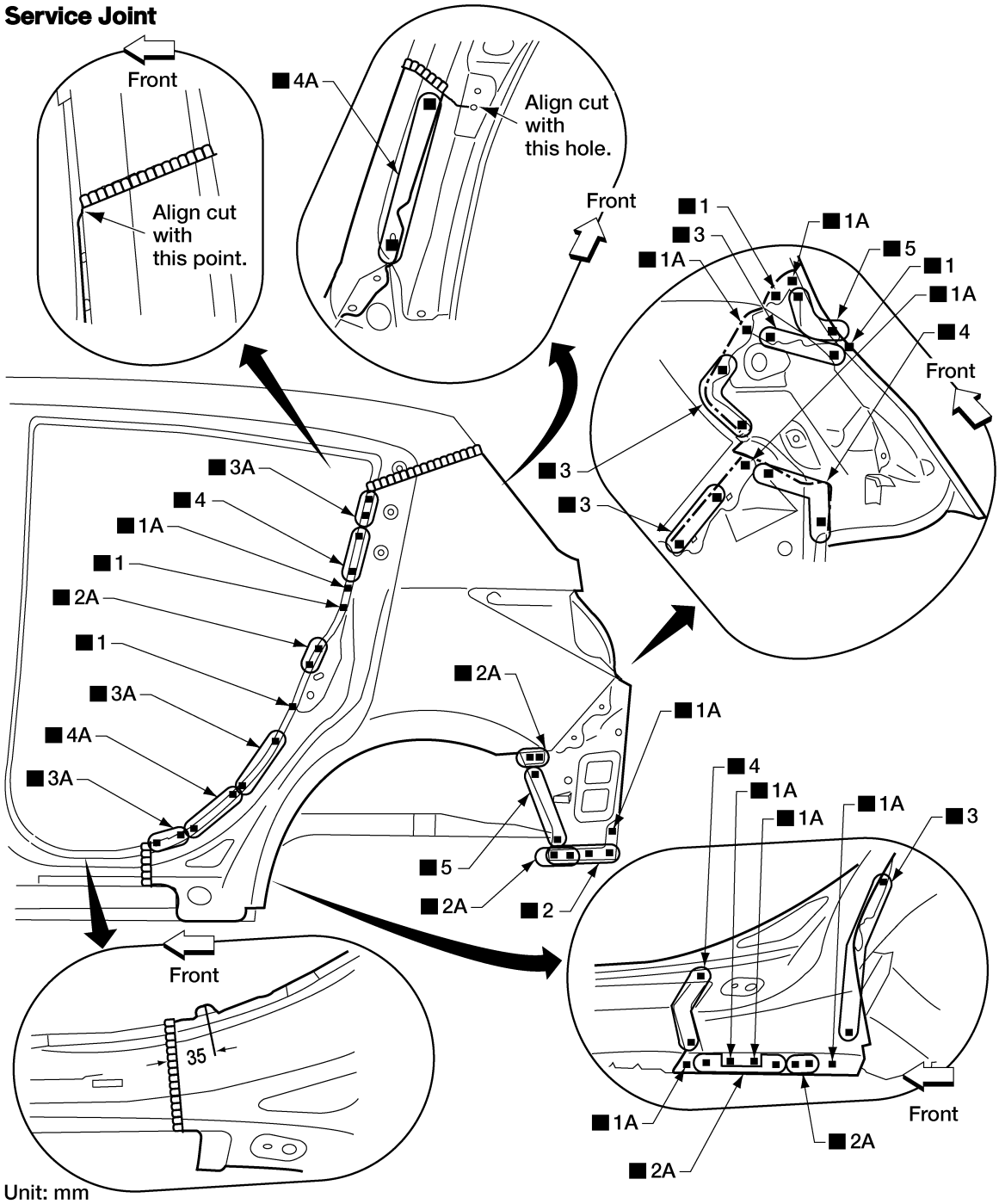


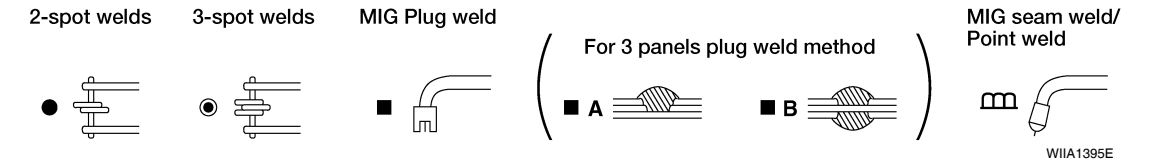
Change parts

- Outer sill reinforcement

REAR FENDER

Hatchback



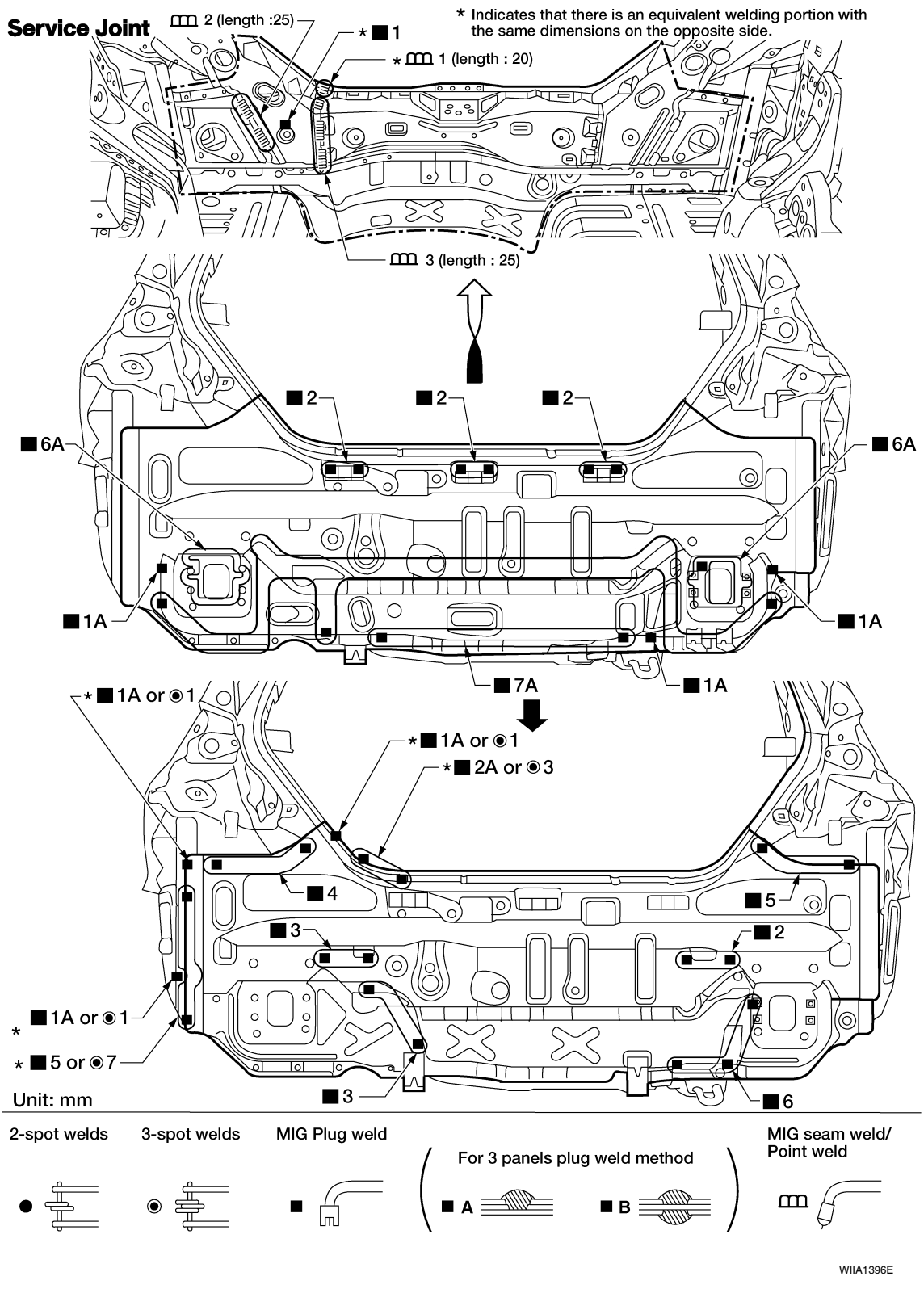


Change parts

- Rear fender
- Rear fender corner
- Rear combination lamp base

REAR PANEL

Hatchback



Change parts

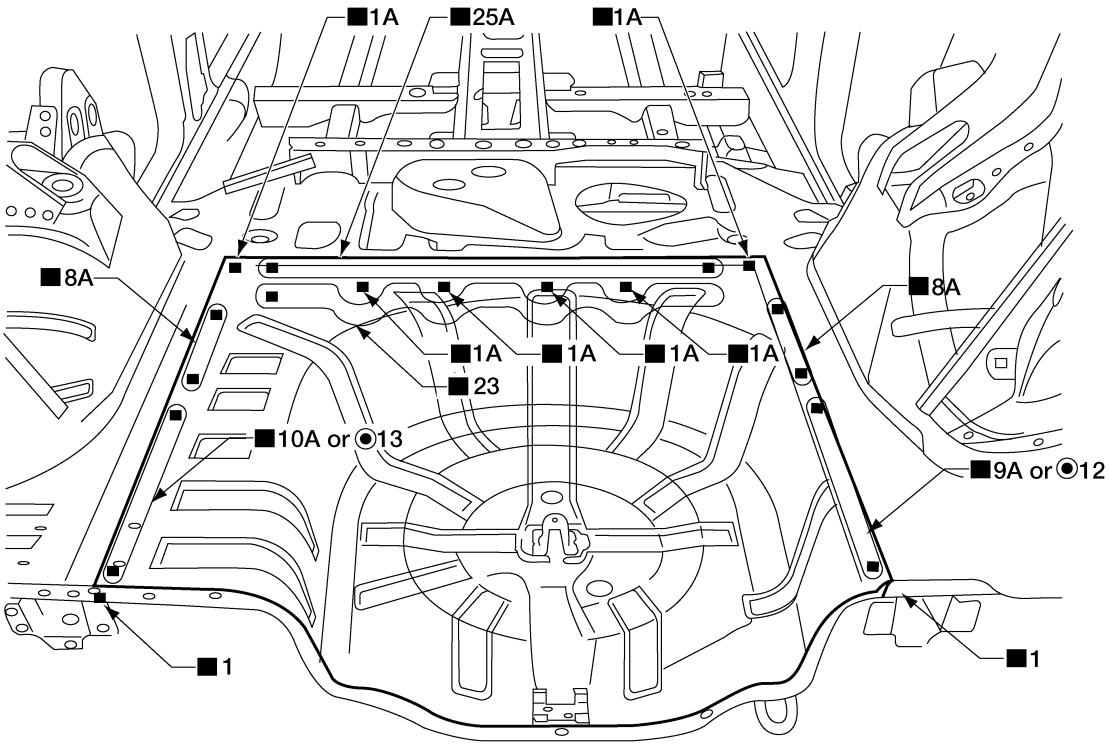
- Rear end crossmember
- Rear panel assembly
- Rear bumper fascia brackets

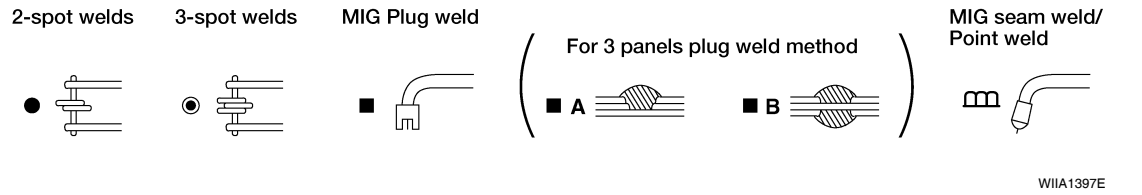
REAR FLOOR REAR

• Work after rear panel assembly has been removed.

Hatchback

Service Joint





Change parts

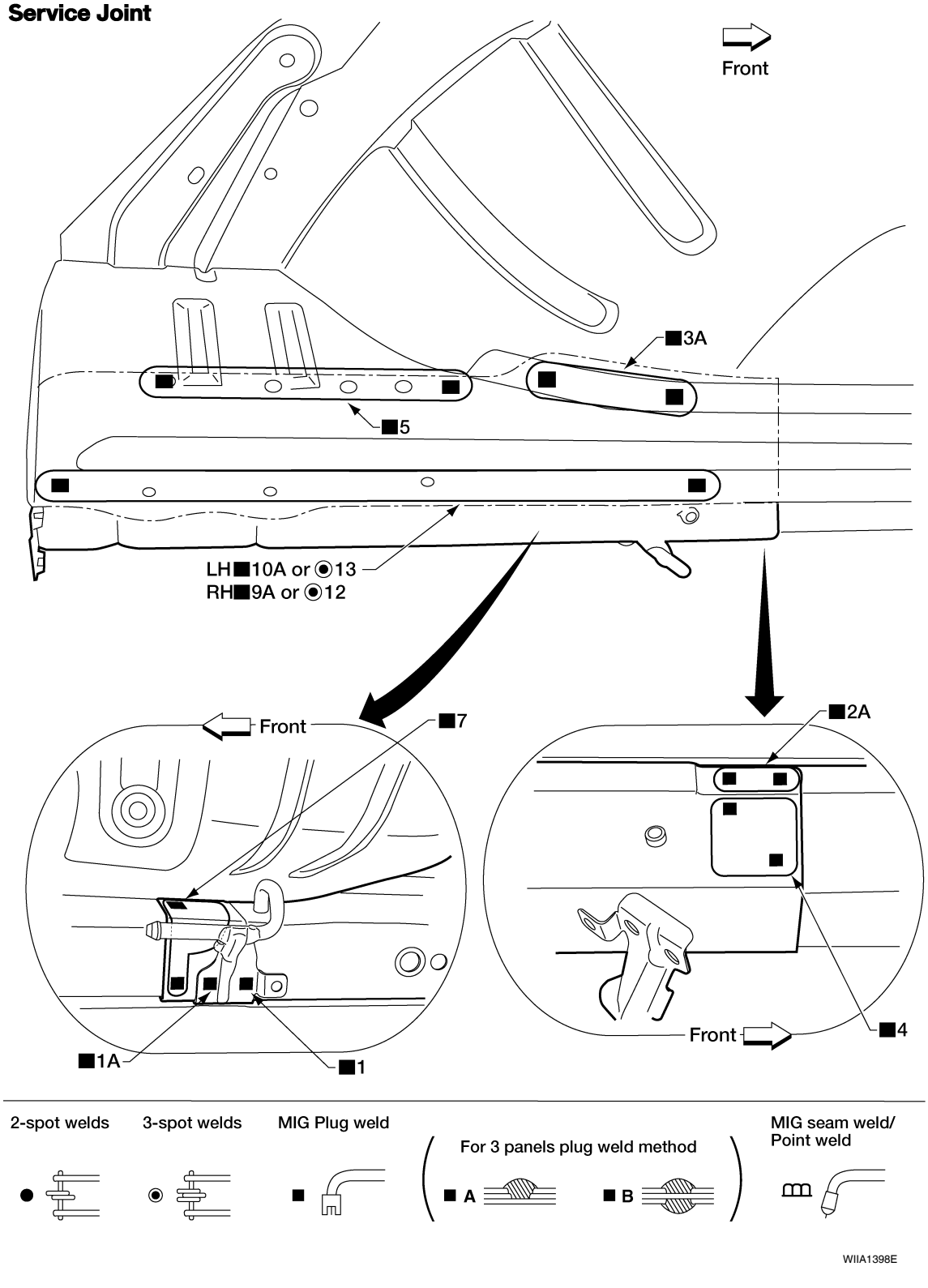
- Rear floor rear

REAR SIDE MEMBER EXTENSION

Hatchback

• Work after rear panel assembly and rear floor rear have been removed.

Service Joint



Change parts

- Rear side member extension

SECTION GW

GLASSES, WINDOW SYSTEM & MIRRORS

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330151

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330152

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

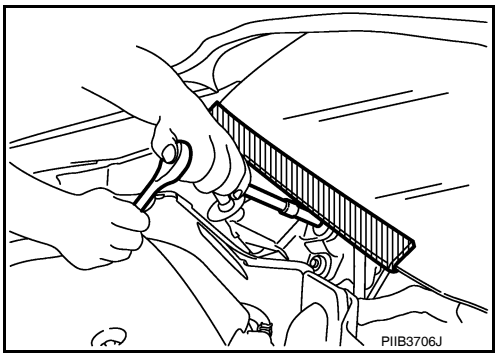
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007330153

When performing the procedure after removing cowl top cover, cover the lower end of windshield.



Handling for Adhesive and Primer

INFOID:0000000007330154

- Do not use an adhesive which is past its usable date. Shelf life of the adhesive is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.
- Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.
- Open the seal of the primer and adhesive just before application. Discard the remainder after application.
- Before application, be sure to shake the primer container to stir the contents. If any floating material is found, do not use it.
- If any primer or adhesive contacts the skin, wipe it off with gasoline or equivalent and wash the skin with soap.
- When using primer and adhesive, always observe the precautions in the instruction manual.

Precaution for Work

INFOID:0000000007793369

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

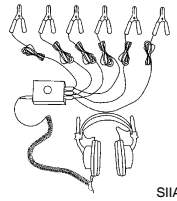
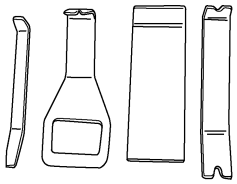
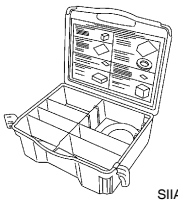
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

Special Service Tools

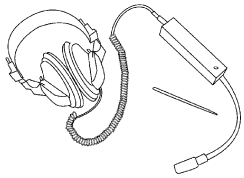
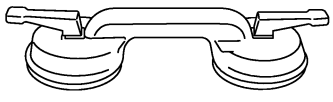
INFOID:0000000007330155

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
(J-39570) Chassis ear  SIIA0993E	Locating the noise
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components
(J-43980) NISSAN Squeak and Rattle Kit  SIIA0994E	Repairing the cause of noise

Commercial Service Tool

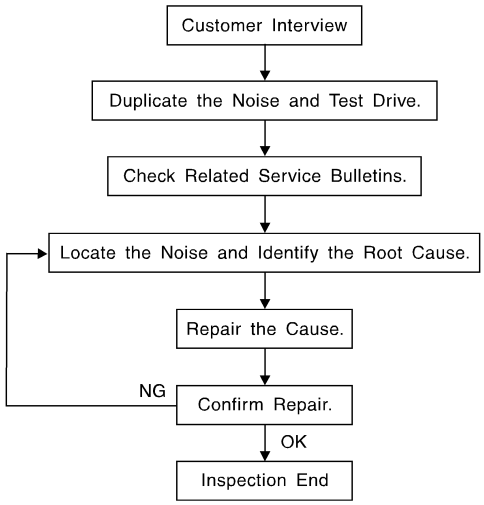
INFOID:0000000007330156

Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Suction lifter  PIIB1805J	Holding of door glass

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000007774119



SBT842

CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to GW-10, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping.
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on CVT and A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565 and mechanic's stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:
   - removing the components in the area that you suspect the noise is coming from.
     Do not use too much force when removing clips and fasteners, otherwise clips and fasteners can be broken or lost during the repair, resulting in the creation of new noise.
   - tapping or pushing/pulling the component that you suspect is causing the noise.
     Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
   - feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
   - placing a piece of paper between components that you suspect are causing the noise.
   - looking for loose components and contact marks.
     Refer to GW-8, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A NISSAN Squeak and Rattle Kit (J-43980) is available through your authorized NISSAN Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.
The following materials are contained in the NISSAN Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100×135 mm (3.94×5.31 in)/76884-71L01: 60×85 mm (2.36×3.35 in)/76884-71L02: 15×25 mm (0.59×0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50×50 mm (1.97×1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50×50 mm (1.97×1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30×50 mm (1.18×1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15×25 mm (0.59×0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll. The following materials not found in the kit can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE

Used instead of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007774120

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lens loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component installed to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator installation pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine rpm or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

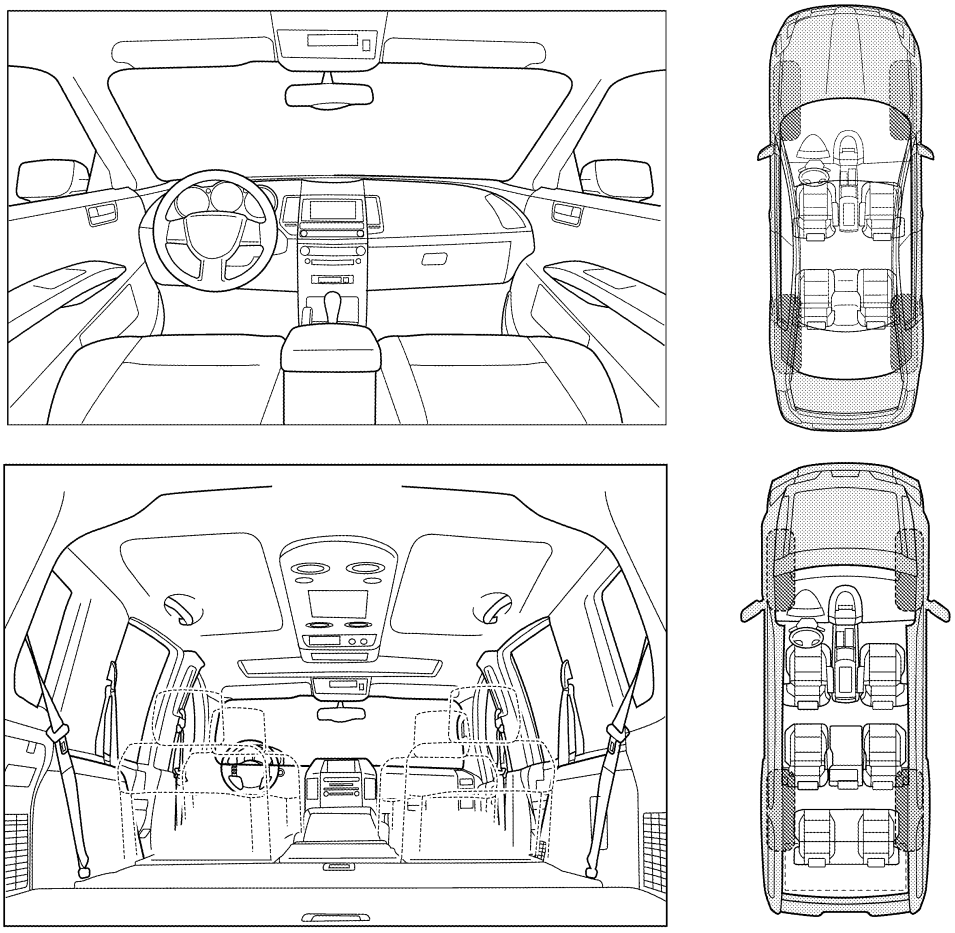
Diagnostic Worksheet

INFOID:0000000007774122

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

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SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

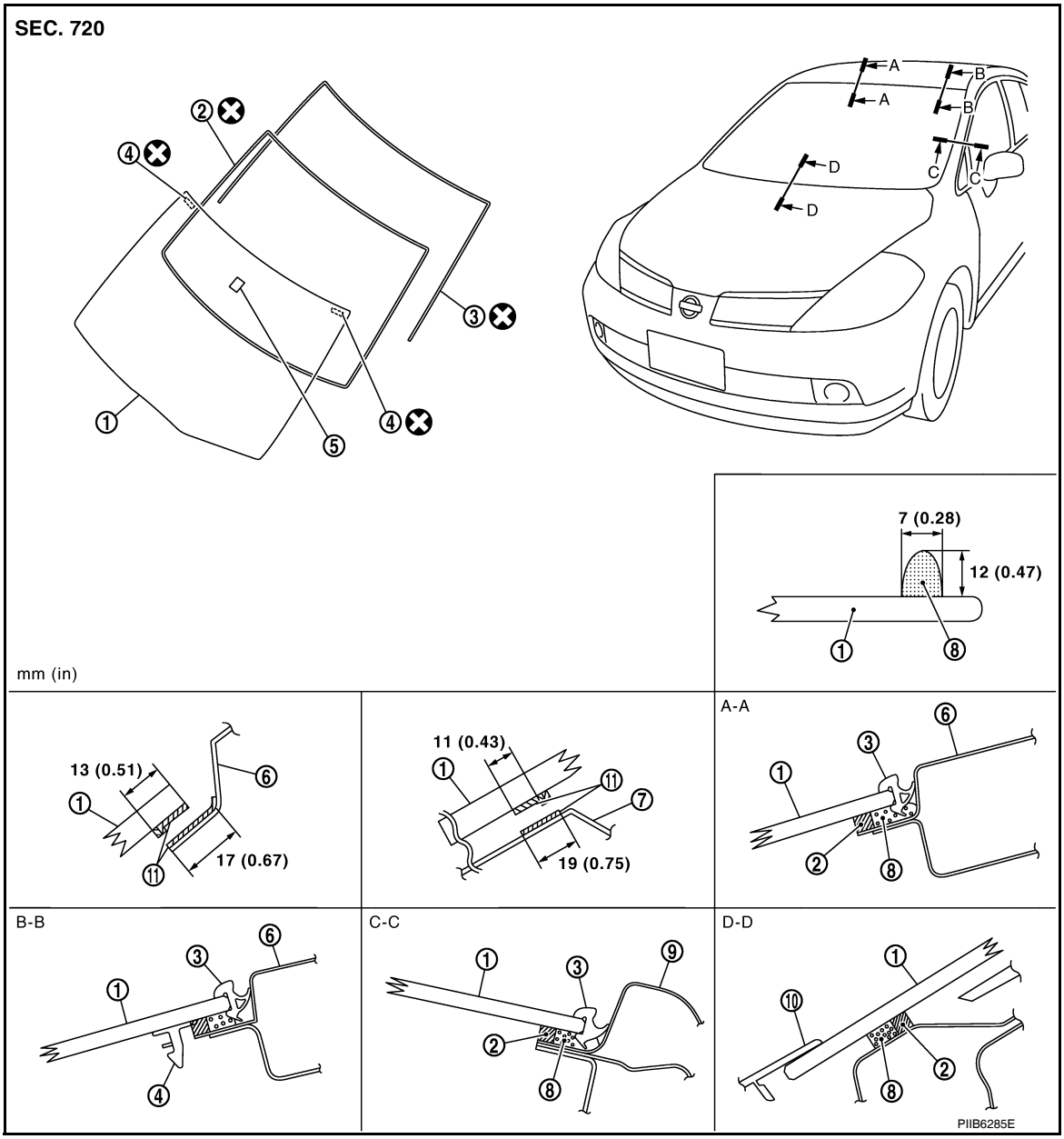
This form must be attached to Work Order

LAIA0071E

WINDSHIELD GLASS

Removal and Installation

INFOID:0000000007330160



1. Windshield glass assembly
2. Dam sealant
3. Windshield molding
4. Spacer
5. Mirror base
6. Roof panel outer
7. Cowl top front
8. Adhesive
9. Front pillar outer panel
10. Cowl top cover
11. Primer

REMOVAL

1. Partially remove the headlining (front edge). Refer to EI-41.
2. Remove the front wiper arms. Refer to WW-20, "Removal and Installation of Front Wiper Arms".
3. Remove the cowl top cover. Refer to EI-22.
4. Apply protective tape around the windshield glass to protect the painted surface from damage.

After removing windshield upper molding, remove glass using piano wire or power cutting tool (A) and an inflatable pump bag (B).

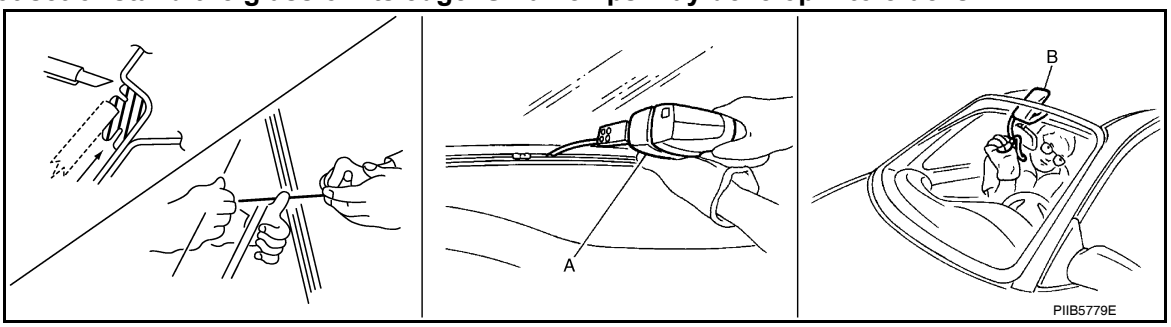
- If a windshield glass is to be reused, mark the body and the glass with mating marks.

WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **When a windshield glass is to be reused, do not use a cutting knife or power cutting tool.**
- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**



INSTALLATION

- Use a genuine NISSAN Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger room air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

CAUTION:

- **Do not use an adhesive which is past its usable term. Shelf life of the adhesive is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidities. The curing time will increase under lower temperatures and lower humidities.**

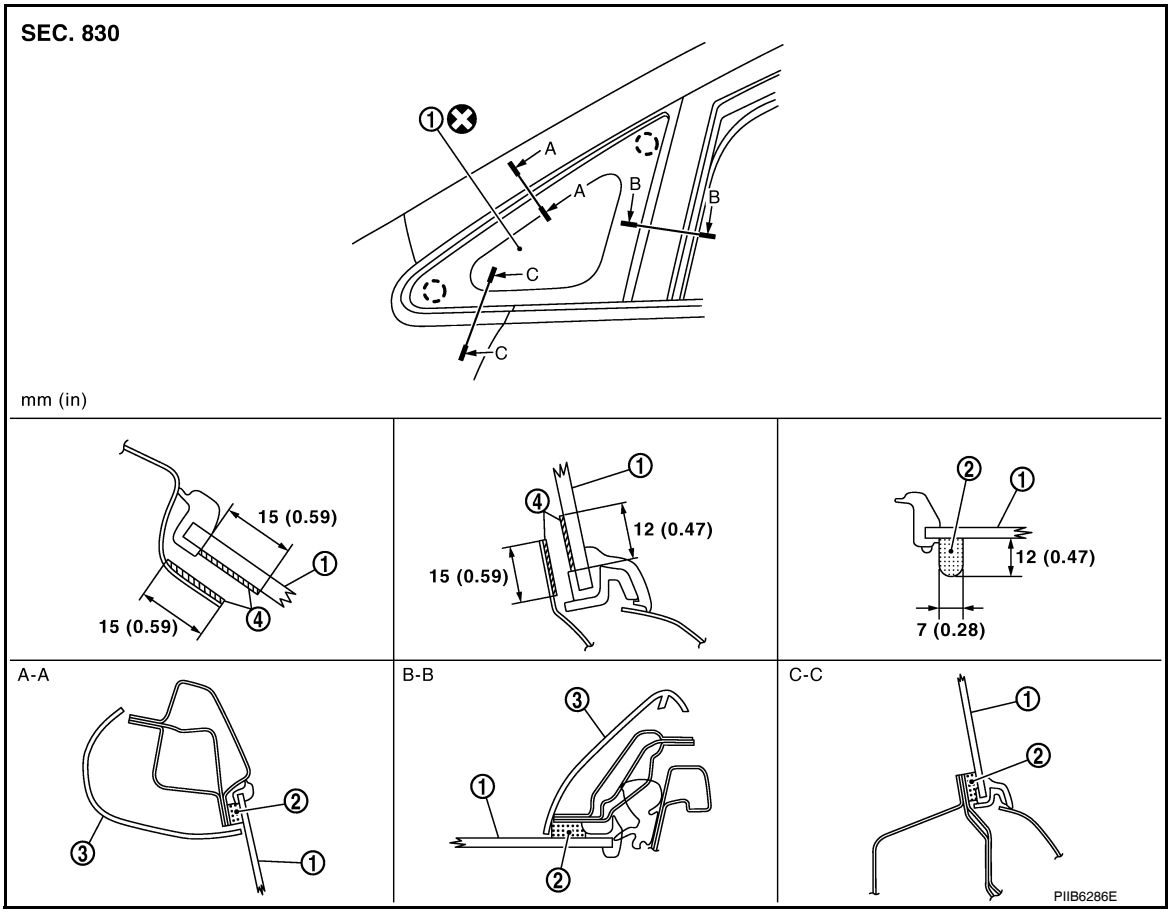
Repairing Water Leaks

Leaks can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the windshield area while pushing glass outward.
To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

OPERA WINDOW GLASS

Removal and Installation

INFOID:0000000007330161



1. Opera window glass
2. Adhesive
3. Front pillar garnish
4. Primer

REMOVAL

1. Remove the front pillar finisher. Refer to EI-35, "Removal and Installation".
2. Remove the instrument side panel. Refer to IP-11.
3. Apply protective tape around the opera window glass to protect the painted surface from damage.

- If a opera window glass is to be reused, mark the body and the glass with mating marks.

4. Remove the opera window glass using piano wire or power cutting tool and inflatable pump bag.

WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **When a opera window glass is to be reused, do not use a cutting knife or power cutting tool.**
- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**
- **Clips are molded to the side window glass. Replace the clips with new ones if they are damaged when removing the side window glass.**

INSTALLATION

- Use a genuine NISSAN Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger room air pressure when a door is closed.
- The opera window glass must be installed securely so that the molding around glass is in position and leaves no gap.

- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the side window in case of an accident.**

CAUTION:

- **Do not use an adhesive which is past its usable term. Shelf life of the adhesive is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidities. The curing time will increase under lower temperature and lower humidity.**

Repairing Water Leaks

Leaks can be repaired without removing and reinstalling glass.

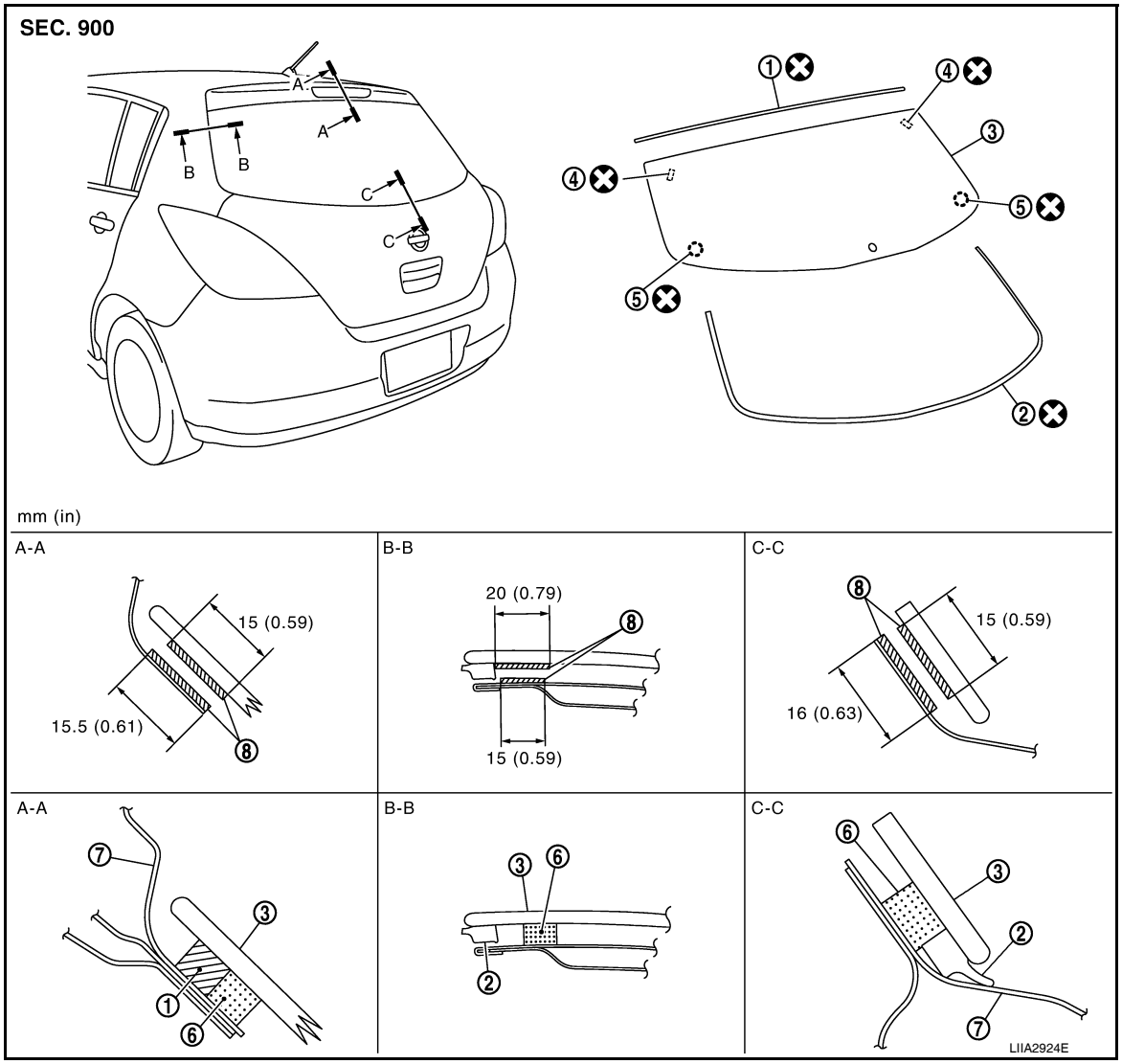
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the side window area while pushing glass outward.

To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

REAR WINDOW GLASS AND MOLDING

Removal and Installation

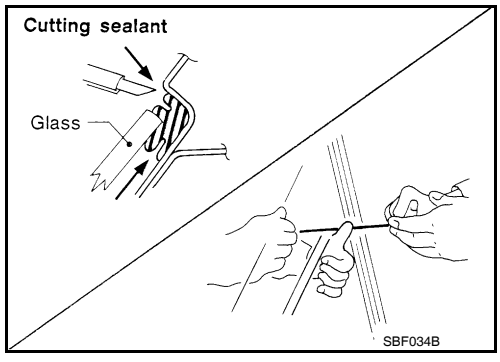
INFOID:0000000007330162



1. Rubber dam
2. Back door window molding (Lower)
3. Back door window glass
4. Clip (Upper)
5. Clip (Lower)
6. Adhesive
7. Back door outer panel
8. Primer

REMOVAL

1. Remove the rear wiper arm and motor. Refer to WW-34, "Removal and Installation".
2. Remove the connectors and grounds for the rear window defogger.
3. Remove glass using piano wire or power cutting tool and an inflatable pump bag.
   - If the rear window glass is to be reused, mark the body and the glass with mating marks



WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **When a windshield glass is to be reused, do not use a cutting knife or power cutting tool.**

- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION

Installation is in the reverse order of removal.

- Use a genuine NISSAN Urethane Adhesive Kit (if available) or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Check gap along bottom to confirm that glass does not contact sheet metal.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

CAUTION:

- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperatures and lower humidities.**

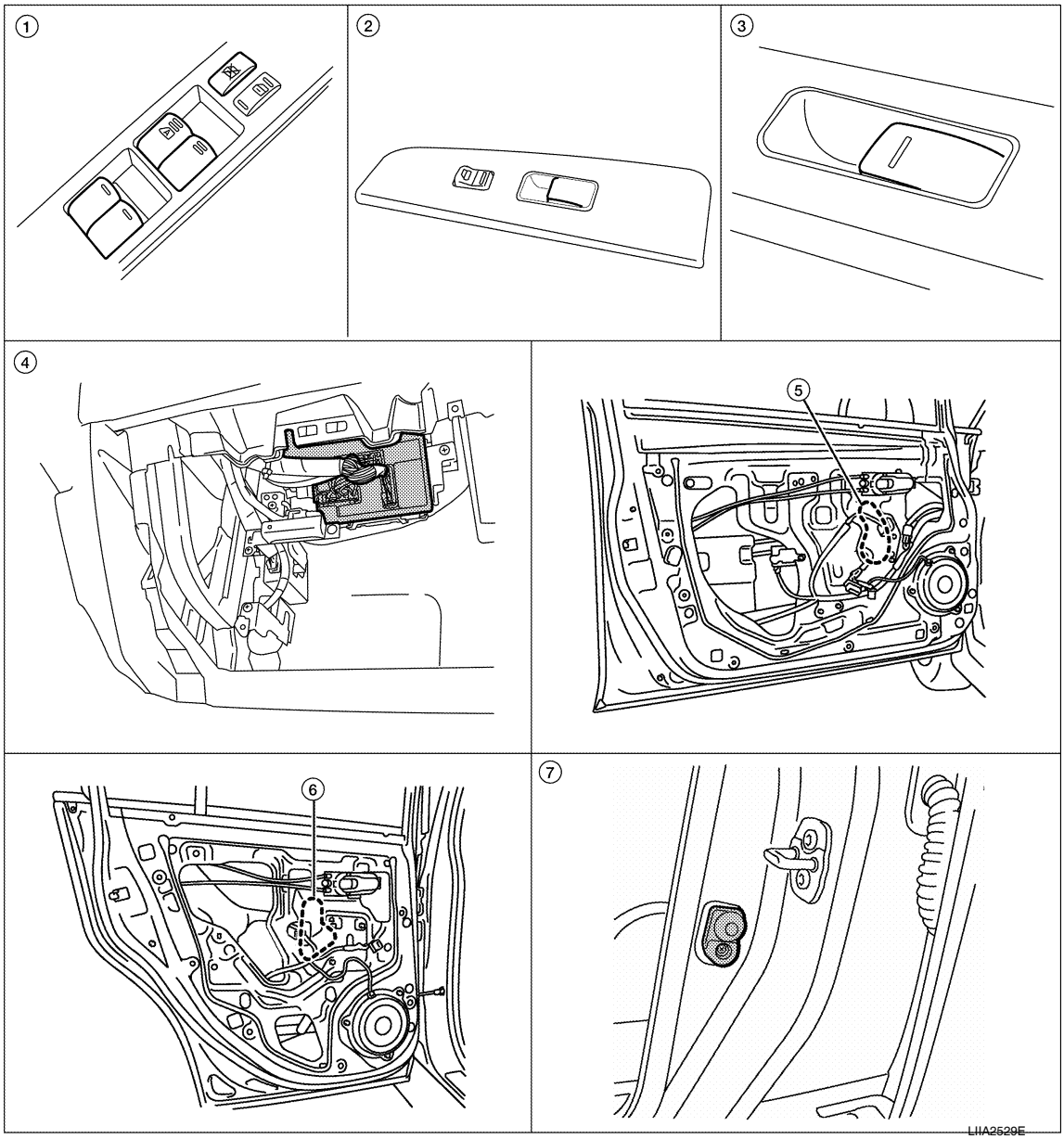
Repairing Water leaks for Rear Window Glass

Leaks can be repaired without removing or reinstalling glass.
If water is leaking between urethane adhesive material and body or glass, determine the extent of leakage.
This can be done by applying water to the rear window area while pushing glass outward.
To stop leak, apply primer (if necessary) and then urethane adhesive to the leak point.

POWER WINDOW SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007330163



1. Main power window and door lock/unlock switch D7, D8
2. Power window and door lock/unlock switch RH D105
3. Rear power window switch LH D203, RH D303
4. BCM M18, M19, M20 (view with glove box removed)
5. Front power window motor LH D9, RH D104
6. Rear power window motor LH D204, RH D304
7. Front door switch LH B8, RH B108

System Description

INFOID:0000000007330164

Power is supplied at all times
- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM terminal 70.

With ignition switch in ON or START position, power is supplied
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38

• through BCM terminal 68
• to main power window and door lock/unlock switch terminal 10
• to power window and door lock/unlock switch RH terminal 8 and
• to rear power window switches LH and RH terminal 1.

Ground is supplied
• to BCM terminal 67
• to main power window and door lock/unlock switch terminal 17
• through body grounds M57 and M61.

With ignition switch in ACC or ON position, power is supplied
• through 10A fuse [No. 20, located in the fuse block (J/B)]
• to BCM terminal 11.

MANUAL OPERATION

Front Door LH

WINDOW UP

When the front LH switch in the main power window and door lock/unlock switch is pulled in the up position, power is supplied
• through main power window and door lock/unlock switch terminal 8
• to front power window motor LH terminal 2.

Ground is supplied
• through main power window and door lock/unlock switch terminal 11
• to front power window motor LH terminal 3.

Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the front LH switch in the main power window and door lock/unlock switch is pressed in the down position, power is supplied
• through main power window and door lock/unlock switch terminal 11
• to front power window motor LH terminal 3.

Ground is supplied
• through main power window and door lock/unlock switch terminal 8
• to front power window motor LH terminal 2.

Then, the motor lowers the window until the switch is released.

Front Door RH

POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH OPERATION

WINDOW UP

When the power window and door lock/unlock switch RH is pulled in the up position, power is supplied
• through power window and door lock/unlock switch RH terminal 7
• to front power window motor RH terminal 2.

Ground is supplied
• through power window and door lock/unlock switch RH terminal 6
• to front power window motor RH terminal 1.

Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the power window and door lock/unlock switch RH is pressed in the down position, power is supplied
• through power window and door lock/unlock switch RH terminal 6
• to front power window motor RH terminal 1.

Ground is supplied
• through power window and door lock/unlock switch RH terminal 7
• to front power window motor RH terminal 2.

Then, the motor lowers the window until the switch is released.

MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH OPERATION

WINDOW UP

When the main power window and door lock/unlock switch (front RH) is pulled in the up position, power is supplied
• through main power window and door lock/unlock switch terminal 16
• to power window and door lock/unlock switch RH terminal 12
• through power window and door lock/unlock switch RH terminal 7
• to front power window motor RH terminal 2.

Ground is supplied
• through main power window and door lock/unlock switch terminal 12

• to power window and door lock/unlock switch RH terminal 11
• through power window and door lock/unlock switch LH terminal 6
• to front power window motor RH terminal 1.
Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the main power window and door lock/unlock switch (front RH) is pressed in the down position, power is supplied
• through main power window and door lock/unlock switch terminal 12
• to power window and door lock/unlock switch LH terminal 11
• through power window and door lock/unlock switch LH terminal 6
• to front power window motor RH terminal 1.
Ground is supplied
• through main power window and door lock/unlock switch terminal 16
• to power window and door lock/unlock switch RH terminal 12
• through power window and door lock/unlock switch LH terminal 7
• to front power window motor RH terminal 2.
Then, the motor lowers the window until the switch is released.

Rear Door (LH or RH)

REAR POWER WINDOW SWITCH LH OR RH OPERATION

WINDOW UP

When the rear power window switch LH or RH is pulled in the up position, power is supplied
• through rear power window switch LH or RH terminal 5
• to rear power window motor LH or RH terminal 2.
Ground is supplied
• through rear power window switch LH or RH terminal 4
• to rear power window motor LH or RH terminal 1.
Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the rear power window switch LH or RH is pressed in the down position, power is supplied
• through rear power window switch LH or RH terminal 4
• to rear power window motor LH or RH terminal 1.
Ground is supplied
• through rear power window switch LH or RH terminal 5
• to rear power window motor LH or RH terminal 2.
Then, the motor lowers the window until the switch is released.

MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH OPERATION

WINDOW UP

When the main power window and door lock/unlock switch (rear LH) is pulled in the up position, power is supplied
• through main power window and door lock/unlock switch terminal 1
• to rear power window switch LH terminal 2
• through rear power window switch LH terminal 5
• to rear power window motor LH terminal 2.
Ground is supplied
• through main power window and door lock/unlock switch terminal 3
• to rear power window switch LH terminal 3
• through rear power window switch LH terminal 4
• to rear power window motor LH terminal 1.
Then, the motor raises the window until the switch is released.
When the main power window and door lock/unlock switch (rear RH) is pulled in the up position, power is supplied
• through main power window and door lock/unlock switch terminal 7
• to rear power window switch RH terminal 2
• through rear power window switch RH terminal 5
• to rear power window motor RH terminal 2.
Ground is supplied
• through main power window and door lock/unlock switch terminal 5
• through rear power window switch RH terminal 3
• to rear power window switch RH terminal 4
• to rear power window motor RH terminal 1.
Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the main power window and door lock/unlock switch (rear LH) is pressed in the down position, power is supplied

- through main power window and door lock/unlock switch terminal 3
- to rear power window switch LH terminal 3
- through rear power window switch LH terminal 4
- to rear power window motor LH terminal 1.

Ground is supplied

- through main power window and door lock/unlock switch terminal 1
- to rear power window switch LH terminal 2
- through rear power window switch LH terminal 5
- to rear power window motor LH terminal 2.

Then, the motor lowers the window until the switch is released.

When the main power window and door lock/unlock switch (rear RH) is pressed in the down position, power is supplied

- through main power window and door lock/unlock switch terminal 5
- to rear power window switch RH terminal 3
- through rear power window switch RH terminal 4
- to rear power window motor RH terminal 1.

Ground is supplied

- through main power window and door lock/unlock switch terminal 7
- to rear power window switch RH terminal 2
- through rear power window switch RH terminal 5
- to rear power window motor RH terminal 2.

Then, the motor lowers the window until the switch is released.

AUTO OPERATION

The power window AUTO feature enables the driver to open the window without holding the window switch in the down position.

POWER WINDOW LOCK

The power window lock is designed to lock operation of all windows except for front door window LH.

When in the lock position, the power window lock disables power window and door lock/unlock switch RH and rear power window switch LH and RH by disconnecting switch ground signal. This prevents the power window motors from operating.

RETAINED POWER OPERATION

When the ignition switch is turned to the OFF position from ON or START position, power is supplied for 45 seconds

- through BCM terminal 68
- to main power window and door lock/unlock switch terminal 10
- to power window and door lock/unlock switch RH terminal 8 and
- to rear power window switches LH and RH terminal 1.

When power and ground are supplied, the BCM continues to be energized, and the power window can be operated.

The retained power operation is canceled when the front LH or front RH door is opened.

Retained power operation period can be changed by CONSULT. Refer to GW-28, "CONSULT Function (BCM)" .

ANTI-PINCH SYSTEM

Main power window and door lock/unlock switch monitors the power window motor operation and the power window position (full closed or other) for front LH power window by the signal from encoder in front power window motor LH.

When main power window and door lock/unlock switch detects interruption during the following close operations

- automatic close operation when ignition switch is in the ON position
- automatic close operation during retained power operation

Main power window and door lock/unlock switch controls front power window motor LH for open and the power window will be lowered.

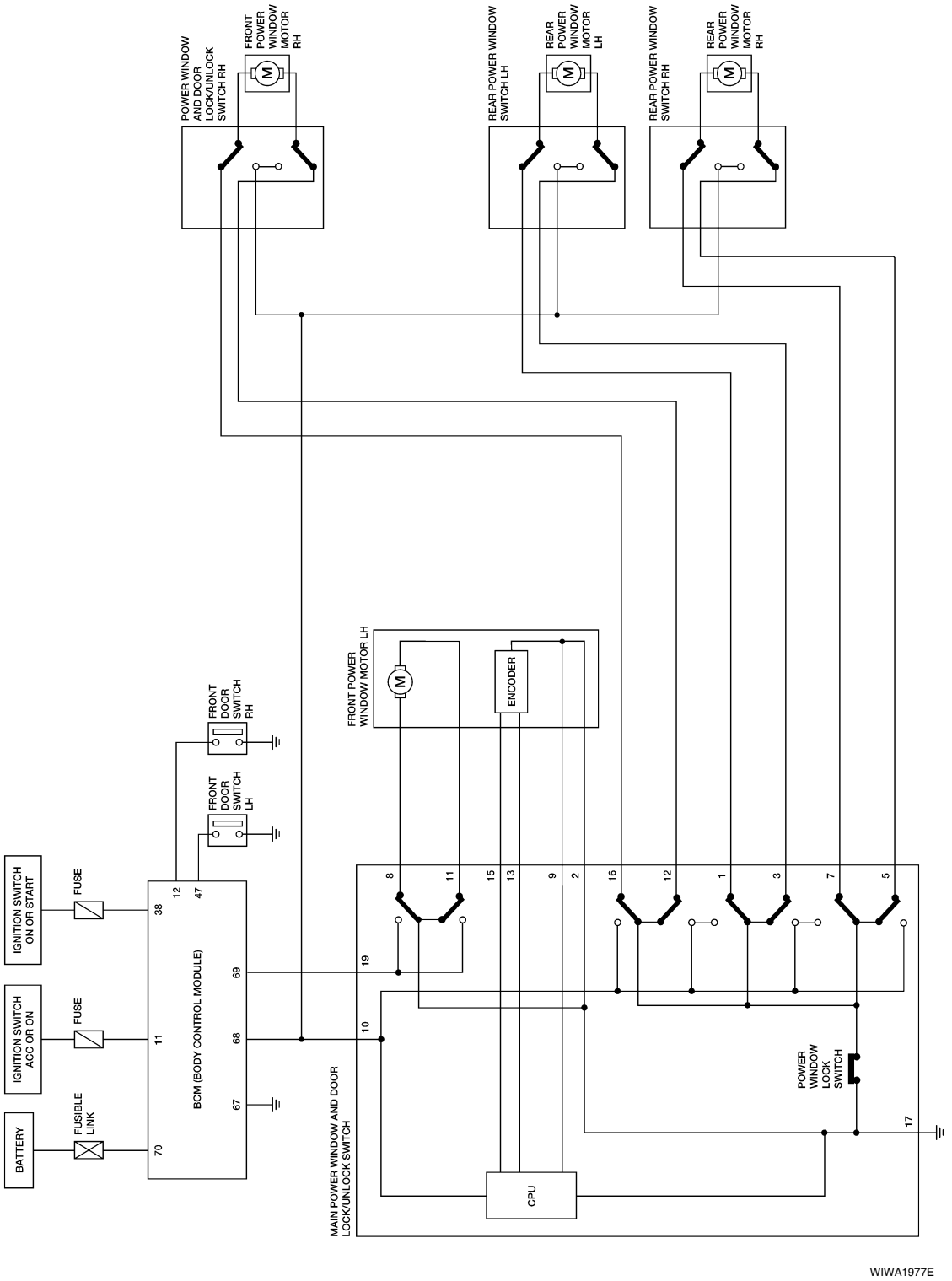
CAN Communication System Description

INFOID:0000000007330165

Refer to LAN-5, "System Description".

Schematic

INFOID:0000000007330166



Wiring Diagram - WINDOW-

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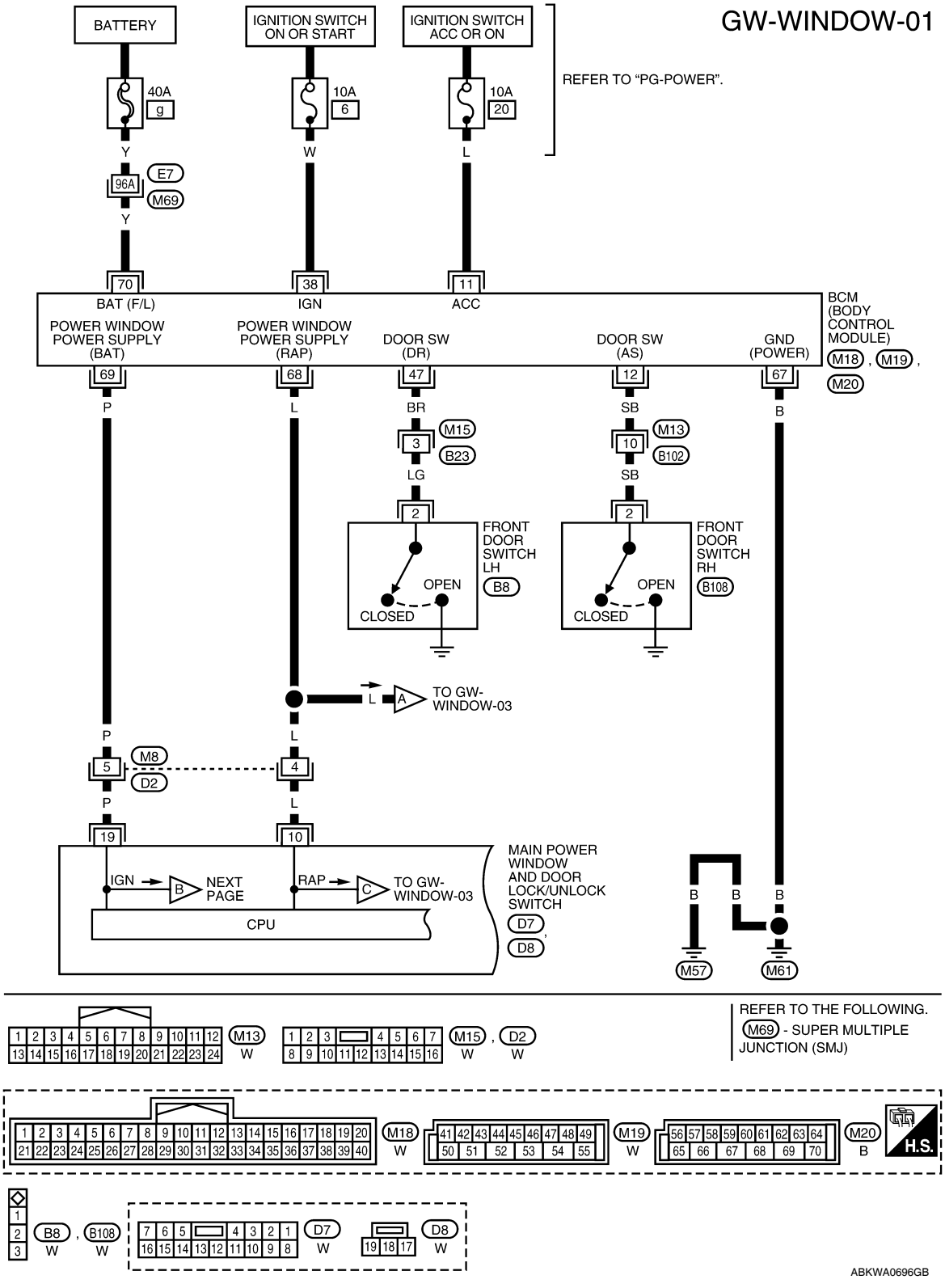
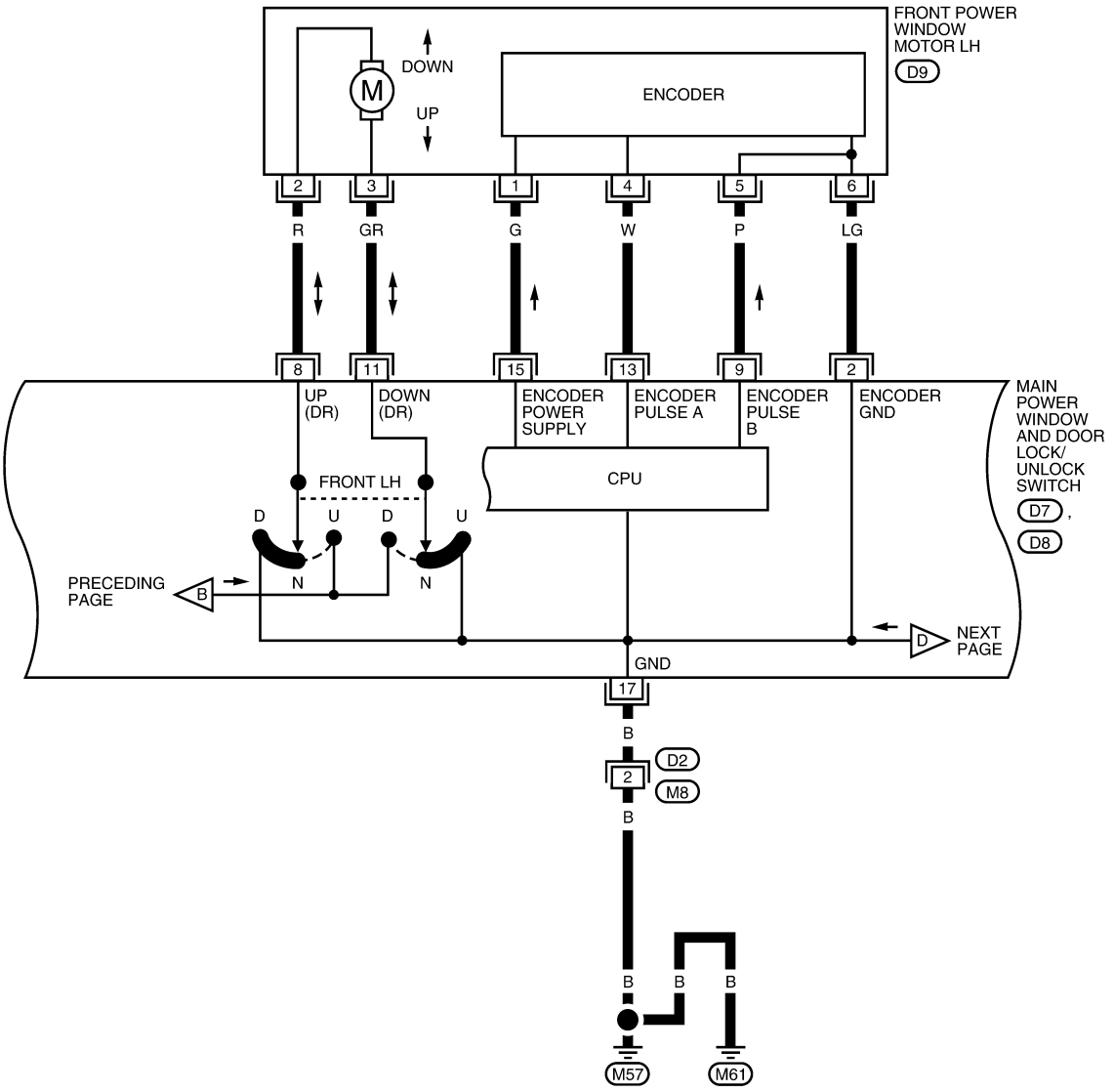
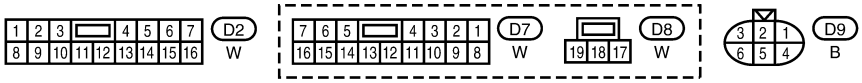


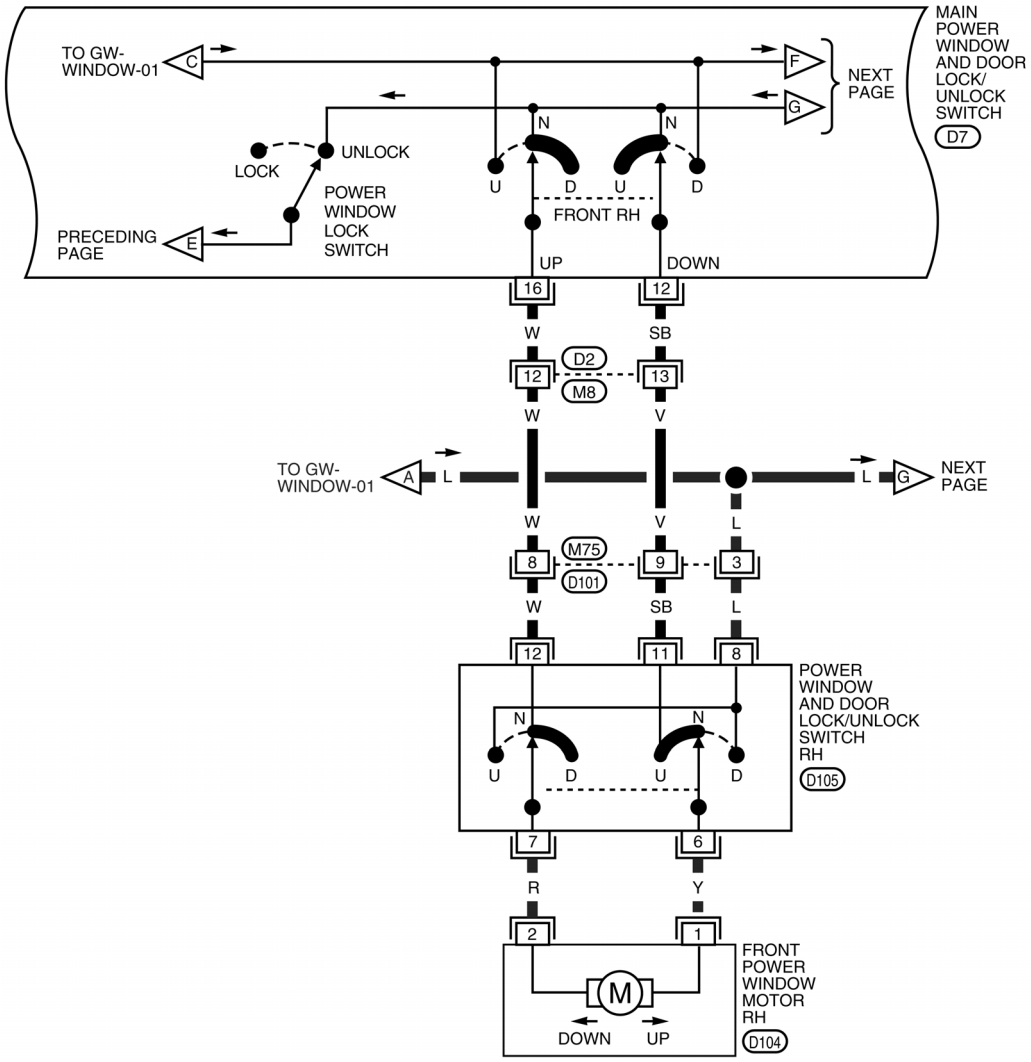
GW-WINDOW-02

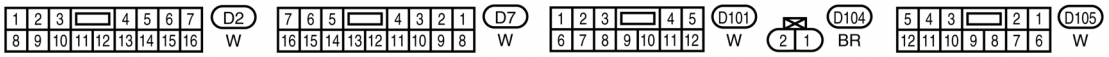




LIWA0556E

GW-WINDOW-03





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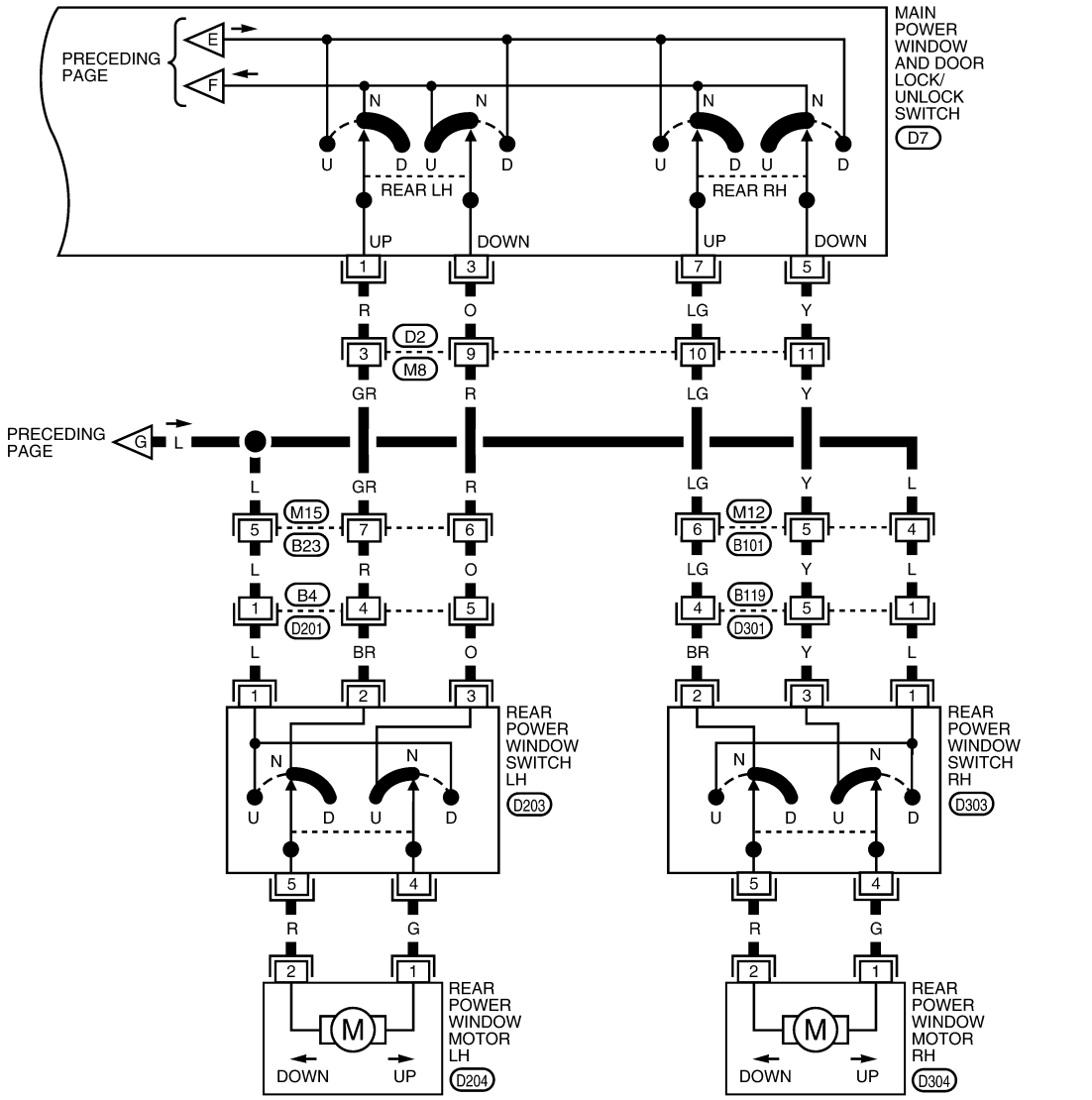
GW-WINDOW-04



M12 W, M15 W, D2 W

D7 W

D201 W, D301 W

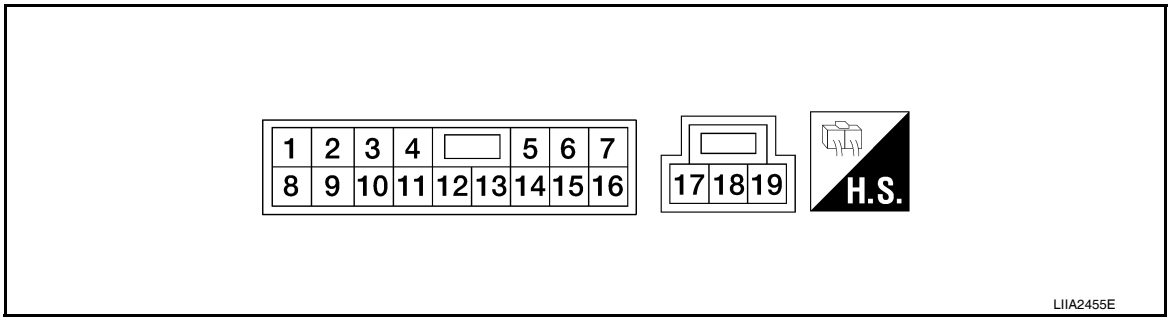
D203 W, D303 W

D204 BR, D304 BR

WIWA1980E

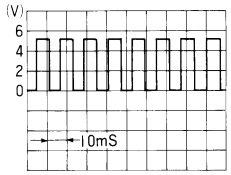
Main Power Window and Door Lock/Unlock Switch Harness Connector Terminal Layout

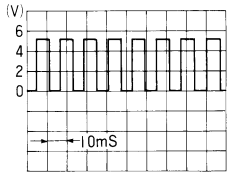
INFOID:0000000007330168



Terminal and Reference Value for Main Power Window and Door Lock/Unlock Switch

INFOID:0000000007330169

Terminal	Wire Color	Item	Condition	Voltage (V) (Approx.)
1	R	Rear power window LH UP signal	When rear LH switch in main power window and door lock/unlock switch is operated UP	Battery voltage
2	LG	Encoder ground	—	0
3	O	Rear power window LH DOWN signal	When rear LH switch in main power window and door lock/unlock switch is operated DOWN	Battery voltage
5	Y	Rear power window RH DOWN signal	When rear RH switch in main power window and door lock/unlock switch is operated DOWN	Battery voltage
7	LG	Rear power window RH UP signal	When rear RH switch in main power window and door lock/unlock switch is operated UP	Battery voltage
8	R	Front power window motor LH UP signal	When power window motor is operated UP	Battery voltage
9	P	Encoder pulse B signal	When power window switch operates	 OCC3383D
10	L	RAP signal	When ignition switch ON	Battery voltage
			Within 45 seconds after ignition switch is turned to OFF	Battery voltage
			More than 45 seconds after ignition switch is turned to OFF	0
			When front door LH or RH open or power window timer operates	0
11	GR	Front power window motor LH DOWN signal	When power window motor is operated DOWN	Battery voltage
12	SB	Front power window motor RH DOWN signal	When power window motor is operated DOWN	Battery voltage

Terminal	Wire Color	Item	Condition	Voltage (V) (Approx.)
13	W	Encoder pulse A signal	When power window motor operates	 OCC3383D
15	G	Encoder power supply	When ignition switch ON or power window timer operates	10
16	W	Front power window motor LH UP signal	When power window motor is operated UP	Battery voltage
17	B	Ground	—	0
19	P	Battery power supply	—	Battery voltage

Terminal and Reference Value for BCM

INFOID:0000000007330170

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Work Flow

INFOID:0000000007330171

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to GW-18, "System Description" .
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to GW-29, "Trouble Diagnosis Symptom Chart" .
4. Does power window system operate normally? If Yes, GO TO 5, If No, GO TO 3.
5. Inspection End.

CONSULT Function (BCM)

INFOID:0000000007330172

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Content
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ECU IDENTIFICATION	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

ACTIVE TEST

Test Item	Description
RETAINED PWR	This test is able to supply RAP signal (power) from BCM (body control module) to power window system and power sunroof system (if equipped). Those systems can be operated when turning on “RETAINED PWR” on CONSULT screen even if the ignition switch is turned OFF. **NOTE:** During this test, CONSULT can be operated with ignition switch in OFF position. “RETAINED PWR” should be turned “ON” or “OFF” on CONSULT screen when ignition switch is ON. Then turn ignition switch OFF to check retained power operation. CONSULT might be stuck if “RETAINED PWR” is turned “ON” or “OFF” on CONSULT screen when ignition switch is OFF.

WORK SUPPORT

Work item	Description
RETAINED PWR	RAP signal’s power supply period can be changed by mode setting. Selects RAP signal’s power supply period between three steps • MODE1 (45 sec.)/MODE2 (OFF)/MODE3 (2 min.).

DATA MONITOR

Work item	Description
IGN ON SW	Indicates (ON/OFF) condition of ignition switch
DOOR SW-DR	Indicates (ON/OFF) condition of front door switch LH
DOOR SW-AS	Indicates (ON/OFF) condition of front door switch RH

Power Window Auto Operation Initialization

INFOID:0000000007330173

1. Turn the ignition switch ON.
2. Open the window—all the way DOWN.
3. Pull all the way UP on the switch and hold (close the window).
   • Continue holding the switch all the way UP for 4 seconds after the window is closed.
4. Confirm the window is now operating correctly.
   NOTE:
   • If the window is still not operating correctly, refer to GW-29, "Trouble Diagnosis Symptom Chart".
   • The above initialization procedure must be performed if any of the following occur:
   - Battery cable is disconnected
   - Power window switch connector is disconnected
   - Power window regulator is replaced
   - Power window motor is replaced
   - Window glass is removed
   - Window glass run rubber is replaced
   - Power window fuse is blown
   - Window is partly opened and/or closed many times without being fully closed.

Trouble Diagnosis Symptom Chart

INFOID:0000000007330174

Check that other systems using the signal of the following systems operate normally.

Symptom	Repair order	Refer to page
None of the power windows can be operated using any switch	1. BCM power supply and ground circuit check	BCS-16
	2. Main power window and door lock/unlock power supply and ground circuit check	GW-30
	3. Replace main power window and door lock/unlock switch	EI-30
Front power window LH alone does not operate	1. Front power window motor LH circuit check	GW-31
	2. Replace main power window and door lock/unlock switch	EI-30

Symptom	Repair order	Refer to page
Front power window RH does not operate from power window and door lock/unlock switch RH only	1. Front power window RH circuit check (power window and door lock/unlock switch RH operation)	GW-32
Front power window RH does not operate from main power window and door lock/unlock switch only	1. Replace main power window and door lock/unlock switch	EI-30
Front power window RH does not operate from any switch	1. Front power window motor RH circuit check	GW-33
Anti-pinch system does not operate normally (Front LH)	1. Door window sliding part malfunction • A foreign material adheres to window glass or glass run rubber. • Glass run rubber wear or deformation. • Sash is tilted too much, or not enough.	—
	2. Encoder circuit check	GW-34
Front power window LH automatic operation does not function properly	1. Power window system initiailization	GW-44
	2. Main power window and door lock/unlock power supply and ground circuit check	GW-30
	3. Encoder circuit check	GW-34
Rear power window LH does not operate from rear power window switch LH only	1. Rear power window LH circuit check (rear power window switch LH operation)	GW-37
Rear power window LH does not operate from main power window and door lock/unlock switch only	1. Replace main power window and door lock/unlock switch	EI-30
Rear power window LH does not operate from any switch	1. Rear power window motor LH circuit check	GW-38
Rear power window RH does not operate from rear power window switch RH only	1. Rear power window RH circuit check (rear window switch RH operation)	GW-38
Rear power window RH does not operate from main power window and door lock/unlock switch only	1. Replace main power window and door lock/unlock switch	EI-30
Rear power window RH does not operate from any switch	1. Rear power window motor RH circuit check	GW-40
Power window retained power operation does not operate properly	1. Check the retained power operation mode setting.	GW-28
	2. Door switch check	GW-36
	3. Replace BCM.	BCS-19

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007330175

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

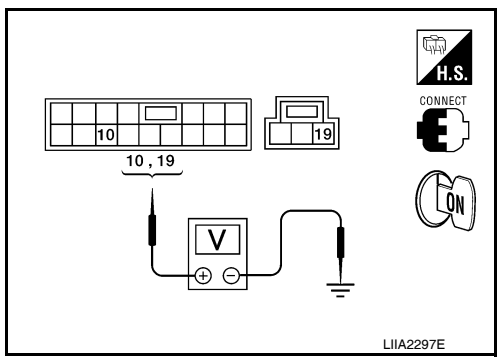
Main Power Window and Door Lock/Unlock Switch Power Supply and Ground Circuit Inspection

INFOID:0000000007330176

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between main power window and door lock/unlock switch connector D7 terminal 10, D8 terminal 19 and ground.

10 - Ground : Battery voltage
19 - Ground : Battery voltage



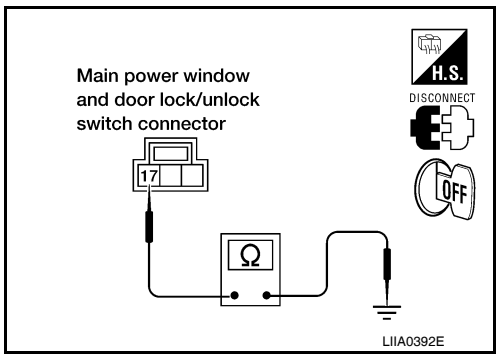
OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect main power window and door lock/unlock switch.
3. Check continuity between main power window and door lock/unlock switch connector D8 terminal 17 and ground.

17 - Ground : Continuity should exist.

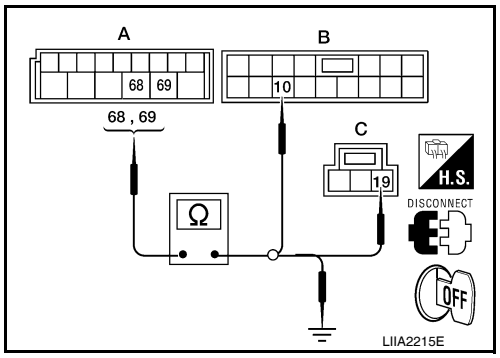


OK or NG

OK >> Power supply and ground circuit are OK.
NG >> Repair or replace harness.

3. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and main power window and door lock/unlock switch.
3. Check continuity between BCM connector (A) and main power window and door lock/unlock switch connector D7 (B) terminal 10 and D8 (C) terminal 19.



Connector	Terminal	Connector	Terminal	Continuity
A		B		
BCM: M20	68	Main power window and door lock/unlock switch: D7	10	Yes
	69	C	19	Yes
		Main power window and door lock/unlock switch: D8		

4. Check continuity between BCM connector (A) and ground.

Connector	Terminal	Ground	Continuity
A			
BCM: M20	68		No
	69		No

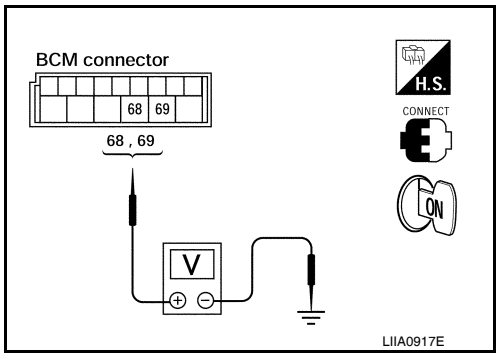
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM.
2. Turn ignition switch ON.
3. Check voltage between BCM connector M20 terminals 68, 69 and ground.

68 - Ground : Battery voltage
69 - Ground : Battery voltage



OK or NG

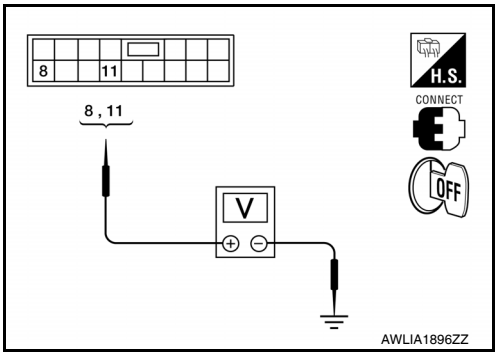
OK >> Check the condition of the harness and the connector.
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

Front Power Window Motor LH Circuit Inspection

INFOID:0000000007330177

1. CHECK MAIN POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between main power window and door lock/unlock switch connector D7 terminals 8, 11 and ground.



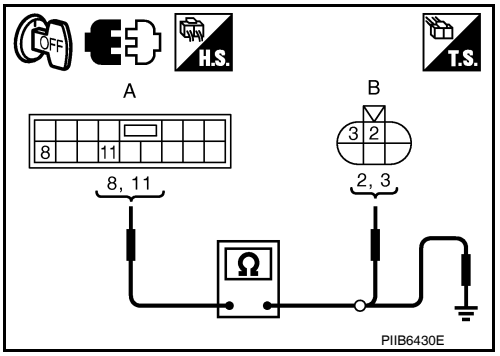
Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	8	Ground	UP	Battery voltage
			DOWN	0
	11		UP	0
			DOWN	Battery voltage

OK or NG

OK >> GO TO 2.
NG >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

2.CHECK POWER WINDOW MOTOR CIRCUIT

1. Disconnect main power window and door lock/unlock switch and front power window motor LH.
2. Check continuity between main power window and door lock/unlock switch connector (A) and front power window motor LH connector (B).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
Main power window and door lock/unlock switch: D7	8	Front power window motor LH: D9	2	Yes
	11		3	Yes

3. Check continuity between main power window and door lock/unlock switch connector (A) and ground.

Connector	Terminal	Ground	Continuity
A			
Main power window and door lock/unlock switch: D7	8		No
	11		No

OK or NG

OK >> Replace front power window motor LH. Refer to GW-42 .
NG >> Repair or replace harness.

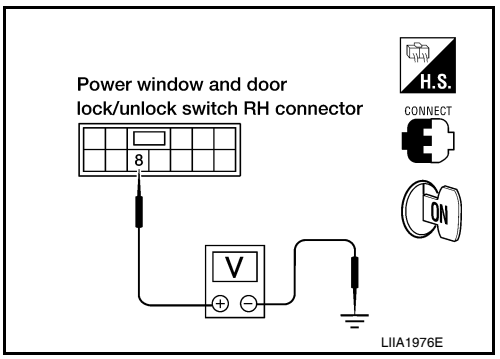
Front Power Window RH Circuit Inspection (Power Window and Door Lock/Unlock Switch RH Operation)

INFOID:0000000007330178

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between power window and door lock/unlock switch RH connector D105 terminal 8 and ground.

8 - Ground : Battery voltage



OK or NG

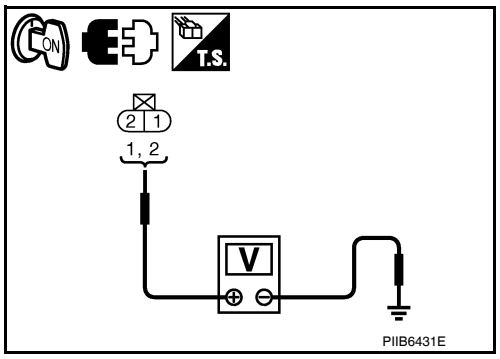
OK >> Replace power window and door lock/unlock switch RH. Refer to EI-30, "Removal and Installation" .
NG >> Repair or replace harness.

Front Power Window Motor RH Circuit Inspection

INFOID:0000000007330179

1. CHECK POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect front power window motor RH.
3. Turn ignition switch ON.
4. Check voltage between front power window motor RH connector and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
Front power window motor RH: D104	1	Ground	UP	0
			DOWN	Battery voltage
	2		UP	Battery voltage
			DOWN	0

OK or NG

OK >> Replace front power window motor RH. Refer to GW-42 .
NG >> GO TO 2.

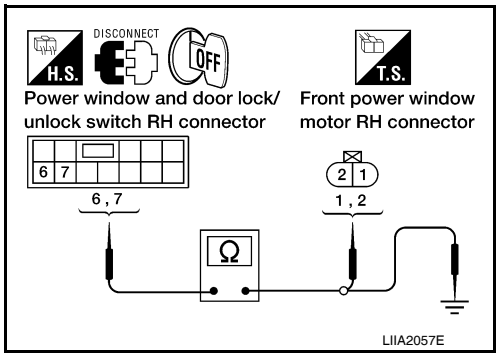
2. CHECK FRONT POWER WINDOW MOTOR RH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window and door lock/unlock switch RH.
3. Check continuity between rear power window switch RH connector D105 terminals 6, 7 and rear power window motor RH connector D104 terminals 1, 2.

6 - 1 : Continuity should exist.
7 - 2 : Continuity should exist.

4. Check continuity between power window and door lock/unlock switch RH connector D105 terminals 6, 7 and ground.

6 - Ground : Continuity should not exist.
7 - Ground : Continuity should not exist.

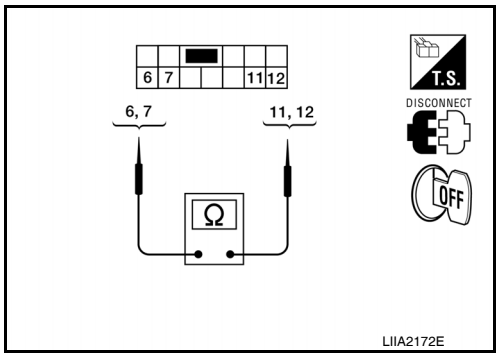


OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH

1. Check continuity between power window and door lock/unlock switch RH terminals.



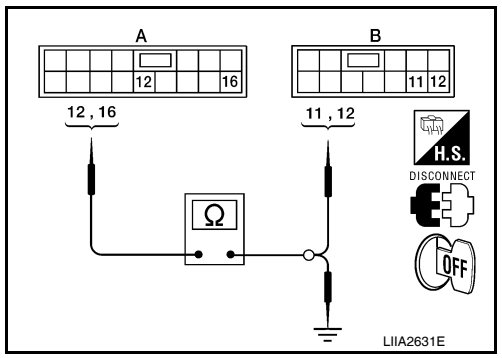
	Terminals		Condition	Continuity
Power window and door lock/unlock switch RH	6	11	DOWN	No
			Other than above	Yes
	7	12	UP	No
			Other than above	Yes

OK or NG

OK >> GO TO 4.
NG >> Replace power window and door lock/unlock switch RH. Refer to EI-30, "Removal and Installation" .

4. CHECK POWER WINDOW AND DOOR LOCK/UNLOCK SWITCH RH CIRCUIT

1. Disconnect main power window and door lock/unlock switch.
2. Check continuity between main power window and door lock/unlock switch connector (A) and power window and door lock/unlock switch RH connector (B).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
Main power window and door lock/unlock switch: D7	12	Power window and door lock/unlock switch RH: D105	11	Yes
	16		12	

3. Check continuity power window main switch connector (A) and ground.

Connector	Terminal	Ground	Continuity
A			
Main power window and door lock/unlock switch: D7	12		No
	16		

OK or NG

OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

NG >> Repair or replace harness.

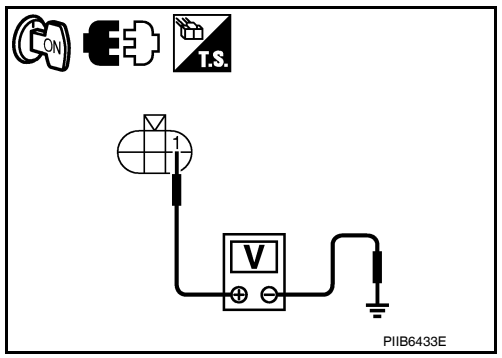
Encoder Circuit Inspection

INFOID:0000000007330180

1.CHECK FRONT POWER WINDOW MOTOR LH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect front power window motor LH.
3. Turn ignition switch ON.
4. Check voltage between front power window motor LH connector D9 terminal 1 and ground.

1 - Ground : Approx. 10V



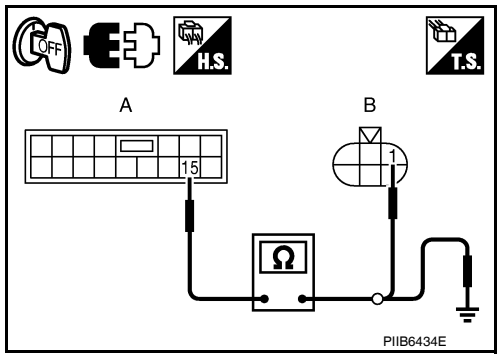
OK or NG

OK >> GO TO 3.

NG >> GO TO 2.

2.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect main power window and door lock/unlock switch.
3. Check continuity between front power window motor LH connector (B) and main power window and door lock/unlock switch connector (A).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
Main power window and door lock/unlock switch: D7	15	Front power window motor LH: D9	1	Yes

4. Check continuity between front power window motor LH connector (B) and ground.

Connector	Terminal	Ground	Continuity
B			
Front power window motor LH: D9	1		No

OK or NG

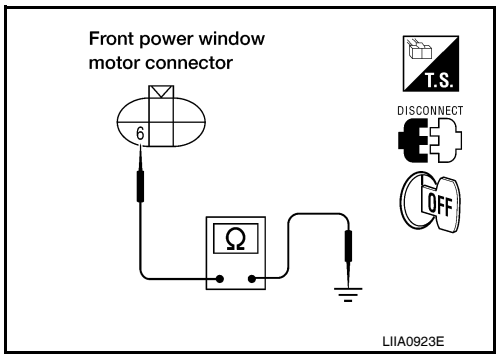
OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

NG >> Repair or replace harness.

3. CHECK ENCODER GROUND

1. Turn ignition switch OFF.
2. Check continuity between front power window motor LH connector D9 terminal 6 and ground.

6 - Ground : Continuity should exist.



OK or NG

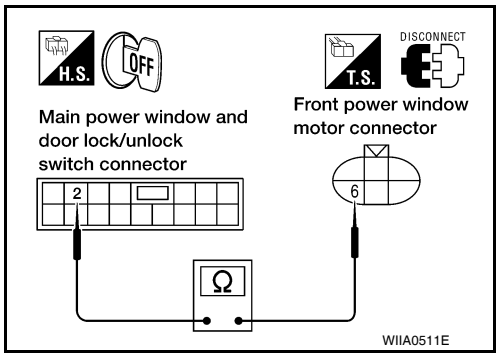
OK >> GO TO 5.

NG >> GO TO 4.

4. CHECK ENCODER GROUND CIRCUIT

1. Disconnect main power window and door lock/unlock switch.
2. Check continuity between front power window motor LH connector D9 terminal 6 and main power window and door lock/unlock switch connector D7 terminal 2.

6 - 2 : Continuity should exist.



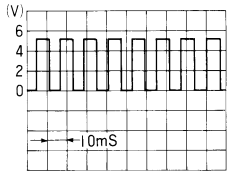
OK or NG

OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

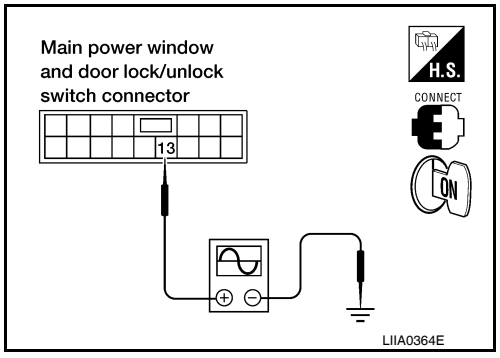
NG >> Repair or replace harness.

5. CHECK ENCODER PULSE A SIGNAL

1. Connect front power window motor LH.
2. Turn ignition switch ON.
3. Check the signal between main power window and door lock/unlock switch connector and ground with oscilloscope.

Connector	Terminals (+)	Terminals (-)	Condition	Signal
D7	13	Ground	Opening	

OCC3383D



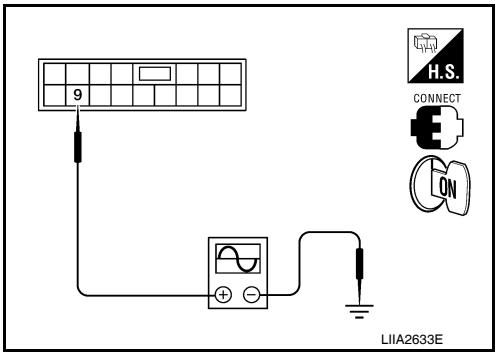
OK or NG

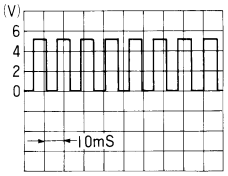
OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

NG >> GO TO 6.

6. CHECK ENCODER PULSE B SIGNAL

Check the signal between main power window and door lock/unlock switch connector and ground with oscilloscope.



Connector	Terminals		Condition	Signal
	(+)	(-)		
D7	9	Ground	Opening	

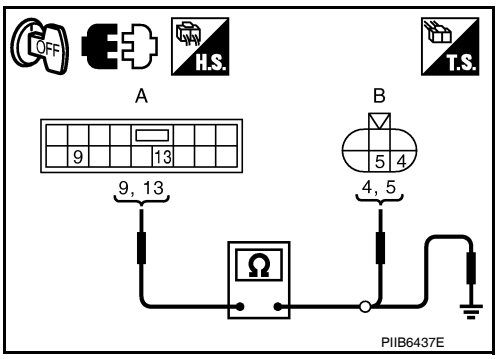
OK or NG

OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

NG >> GO TO 7.

7.CHECK ENCODER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front power window motor LH and main power window and door lock/unlock switch.
3. Check continuity between front power window motor LH connector (B) and main power window and door lock/unlock switch connector (A).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
Main power window and door lock/unlock switch: D7	9	Front power window motor LH: D9	5	Yes
	13		4	

4. Check continuity between main power window and door lock/unlock switch connector (A) and ground.

Connector	Terminal	Ground	Continuity
A			
Main power window and door lock/unlock switch: D7	9		No
	13		

OK or NG

OK >> Replace front power window motor LH. Refer to GW-42 .

NG >> Repair or replace harness.

Door Switch Check

INFOID:0000000007330181

1.CHECK FRONT DOOR SWITCH INPUT SIGNAL

With CONSULT

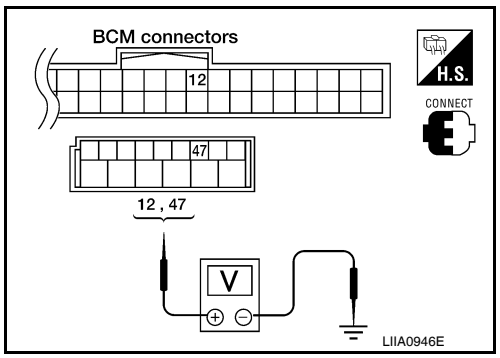
Check front door switches (“DOOR SW-DR” and “DOOR SW-AS”) in “DATA MONITOR” mode with CONSULT.

Monitor item	Condition
DOOR SW-DR	OPEN: ON
	CLOSE: OFF
DOOR SW-AS	OPEN: ON
	CLOSE: OFF

Without CONSULT

Check voltage between BCM connector and ground.

Item	Connector	Terminals (+)	Terminals (-)	Condition	Voltage (V) (Approx.)
Front RH	M18	12	Ground	OPEN	0
				CLOSE	Battery voltage
Front LH	M19	47		OPEN	0
				CLOSE	Battery voltage



OK or NG

OK >> Front door switch is OK.
NG >> GO TO 2.

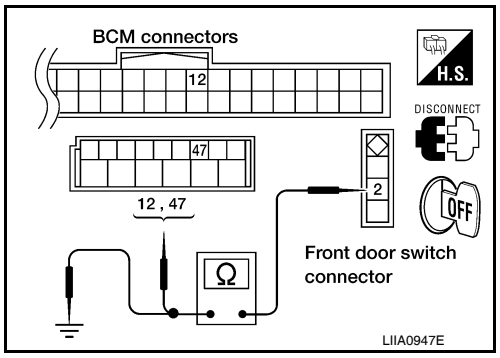
2. CHECK FRONT DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front door switch LH or RH and BCM.
3. Check continuity between front door switch connector B8 (LH) or B108 (RH) terminal 2 and BCM connector M19 terminal 47 (LH) or connector M18 terminal 12 (RH).

Front LH
2 - 47 : Continuity should exist.
Front RH
2 - 12 : Continuity should exist.

4. Check continuity between front door switch connector B8 (LH) or B108 (RH) terminal 2 and ground.

2 - Ground : Continuity should not exist.



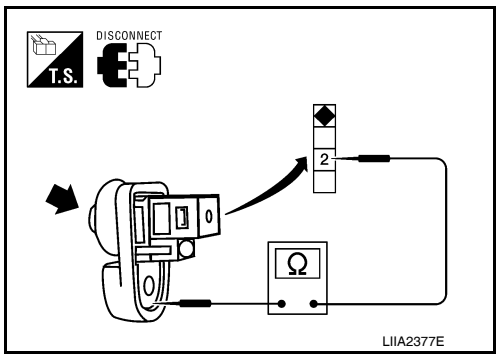
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between each front door switch terminal 2 and body ground part of front door switch.

Terminal		Door switch	Continuity
2	Body ground part of front door switch	Pushed	No
		Released	Yes



OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Replace malfunctioning front door switch.

Rear Power Window LH Circuit Inspection (Rear Power Window Switch LH Operation)

INFOID:0000000007330182

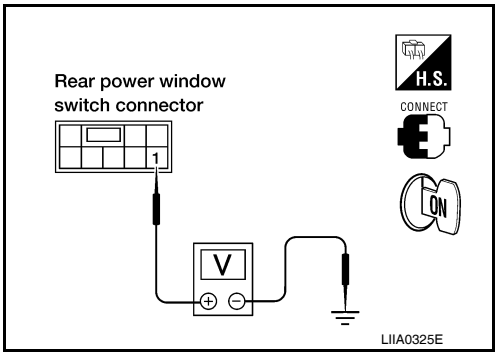
1. CHECK POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between rear power window switch LH connector D203 terminal 1 and ground.

1 - Ground : Battery voltage

OK or NG

OK >> Replace rear power window switch LH. Refer to EI-30, "Removal and Installation" .
NG >> Repair or replace harness.



Rear Power Window RH Circuit Inspection (Rear Power Window Switch RH Operation)

INFOID:0000000007330183

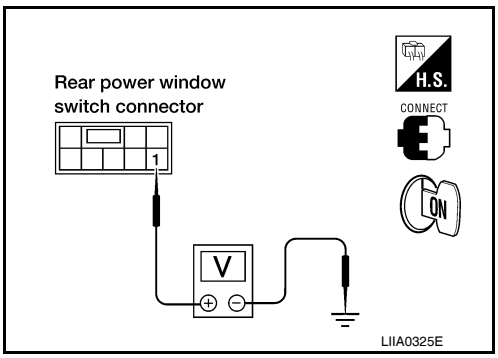
1.CHECK POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between rear power window switch RH connector D303 terminal 1 and ground.

1 - Ground : Battery voltage

OK or NG

OK >> Replace rear power window switch RH. Refer to EI-30, "Removal and Installation" .
NG >> Repair or replace harness.



Rear Power Window Motor LH Circuit Inspection

INFOID:0000000007330184

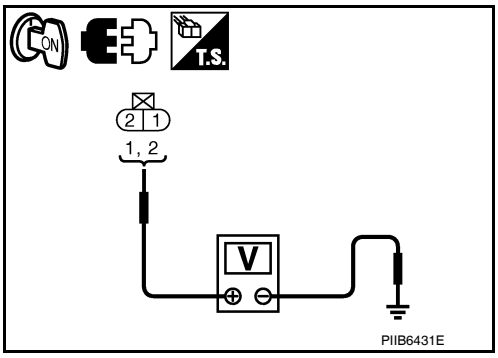
1.CHECK REAR POWER WINDOW SWITCH LH OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect rear power window motor LH.
3. Turn ignition switch ON.
4. Check voltage between rear power window motor LH connector and ground.

Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
Rear power window motor LH: D204	1	Ground	UP	0
			DOWN	Battery voltage
	2		UP	Battery voltage
			DOWN	0

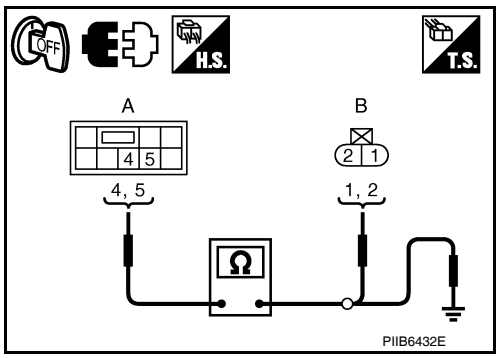
OK or NG

OK >> Replace rear power window motor LH. Refer to GW-46 .
NG >> GO TO 2.



2.CHECK REAR POWER WINDOW MOTOR LH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear power window switch LH.
3. Check continuity between rear power window switch LH connector D203 (A) terminals 4, 5 and rear power window motor LH connector D204 (B) terminals 1, 2.



4 - 1 : Continuity should exist.
5 - 2 : Continuity should exist.

4. Check continuity between rear power window switch LH connector D203 (A) terminals 4, 5 and ground.

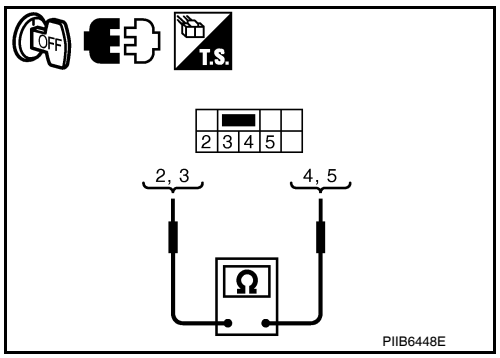
4 - Ground : Continuity should not exist.
5 - Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK POWER WINDOW SWITCH

1. Check continuity between rear power window switch LH terminals.



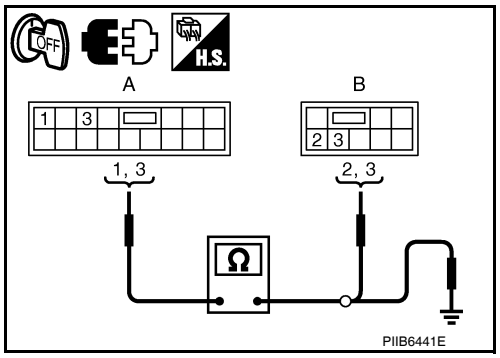
	Terminals		Condition	Continuity
Rear power window switch LH	2	5	UP	No
			Other than above	Yes
	3	4	DOWN	No
			Other than above	Yes

OK or NG

OK >> GO TO 4.
NG >> Replace rear power window switch LH. Refer to EI-30, "Removal and Installation" .

4. CHECK REAR POWER WINDOW SWITCH LH CIRCUIT

1. Disconnect main power window and door lock/unlock switch.
2. Check continuity between power window main switch connector (A) and rear power window switch LH connector (B).



Connector A	Terminal	Connector B	Terminal	Continuity
Main power window and door lock/unlock switch: D7	1	Rear power window switch LH: D203	2	Yes
	3		3	

3. Check continuity power window main switch connector (A) and ground.

Connector A	Terminal	Ground	Continuity
Main power window and door lock/unlock switch: D7	1		No
	3		

OK or NG

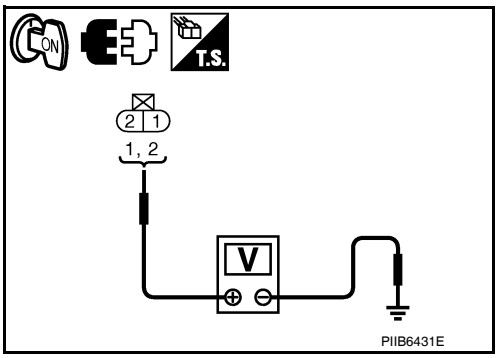
OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .
NG >> Repair or replace harness.

Rear Power Window Motor RH Circuit Inspection

INFOID:0000000007330185

1. CHECK REAR POWER WINDOW SWITCH RH OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect rear power window motor RH.
3. Turn ignition switch ON.
4. Check voltage between rear power window motor RH connector and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
Rear power window motor RH: D304	1	Ground	UP	0
			DOWN	Battery voltage
	2		UP	Battery voltage
			DOWN	0

OK or NG

OK >> Replace rear power window motor RH. Refer to GW-46 .
NG >> GO TO 2.

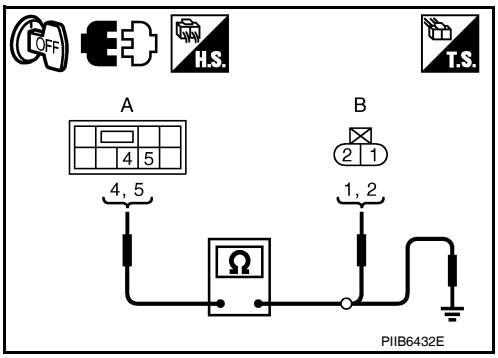
2. CHECK REAR POWER WINDOW MOTOR RH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear power window switch RH.
3. Check continuity between rear power window switch RH connector D303 (A) terminals 4, 5 and rear power window motor RH connector D304 (B) terminals 1, 2.

4 - 1 : Continuity should exist.
5 - 2 : Continuity should exist.

4. Check continuity between rear power window switch RH connector D303 (A) terminals 4, 5 and ground.

4 - Ground : Continuity should not exist.
5 - Ground : Continuity should not exist.

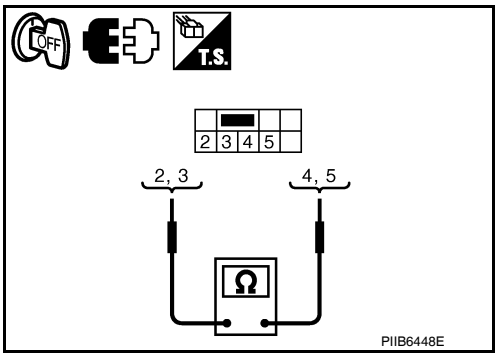


OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK POWER WINDOW SWITCH

1. Check continuity between rear power window switch RH terminals.



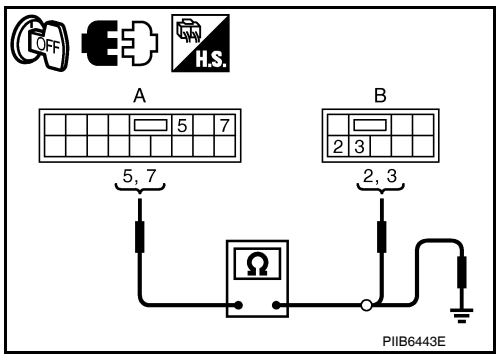
	Terminals		Condition	Continuity
Rear power window switch RH	2	5	UP	No
			Other than above	Yes
	3	4	DOWN	No
			Other than above	Yes

OK or NG

OK >> GO TO 4.
NG >> Replace rear power window switch RH. Refer to EI-30, "Removal and Installation" .

4. CHECK REAR POWER WINDOW SWITCH RH CIRCUIT

1. Disconnect main power window and door lock/unlock switch.
2. Check continuity between power window main switch connector (A) and rear power window switch RH connector (B).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
Main power window and door lock/unlock switch D7	5	Rear power window switch RH D303	3	Yes
	7		2	

3. Check continuity power window main switch connector (A) and ground.

Connector	Terminal	Ground	Continuity
A			
Main power window and door lock/unlock switch D7	5		No
	7		

OK or NG

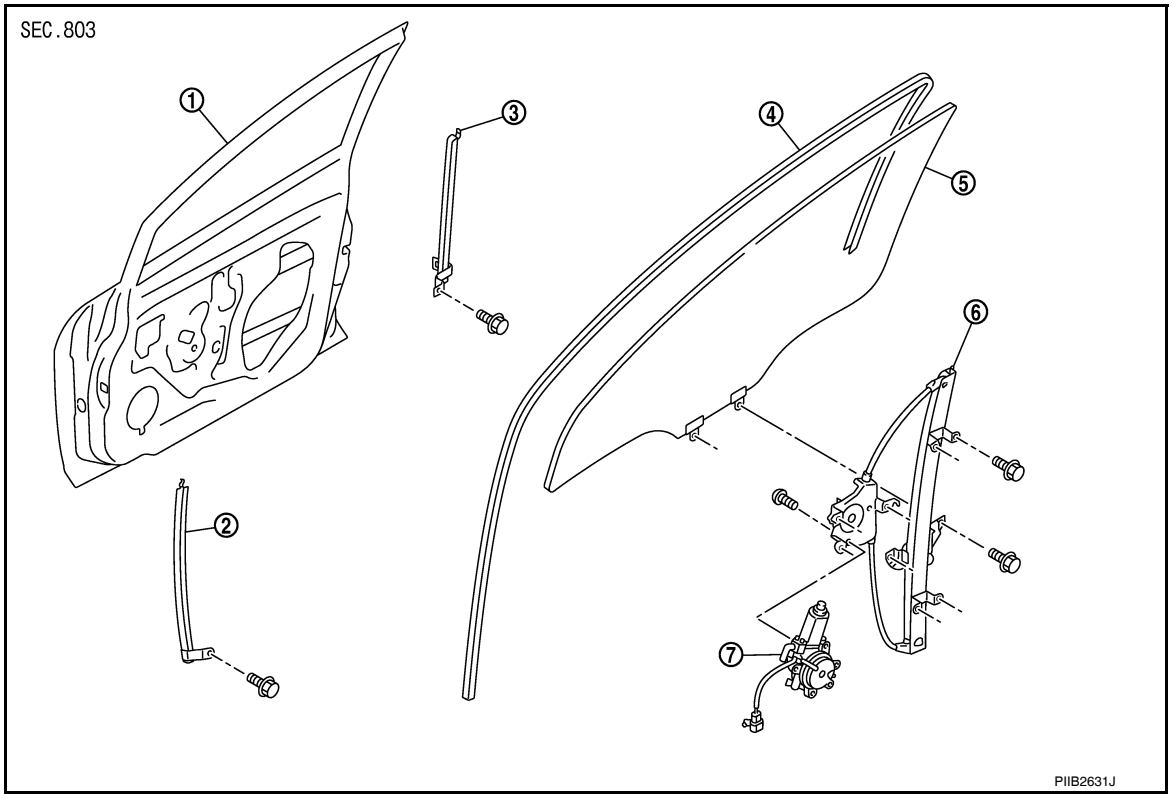
OK >> Replace main power window and door lock/unlock switch. Refer to EI-30, "Removal and Installation" .

NG >> Repair or replace harness.

FRONT DOOR GLASS AND REGULATOR

Removal and Installation

INFOID:0000000007330186

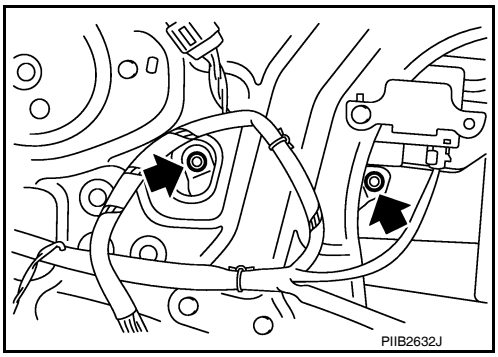


1. Door panel
2. Lower sash (front)
3. Lower sash (rear)
4. Door glass run
5. Door glass
6. Regulator assembly
7. Power window motor

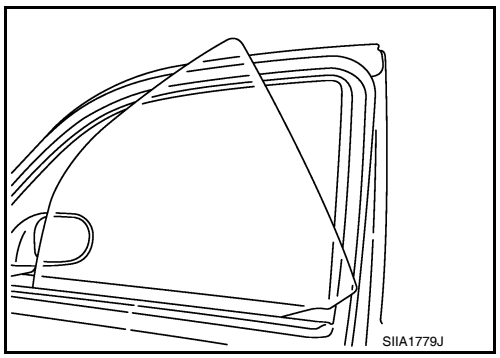
DOOR GLASS

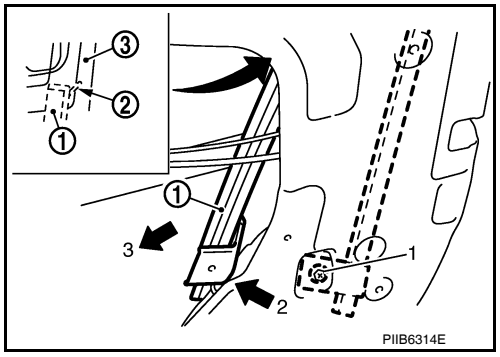
Removal

1. Remove the front door finisher. Refer to EI-30, "Removal and Installation".
2. Disconnect the front door speaker harness connector.
3. Position aside vapor barrier.
   NOTE:
   If the vapor barrier is reused, cut the butyl-tape so that a part of butyl-tape remains on the vapor barrier.
4. Temporarily reconnect the power window switch to operate the window.
5. Raise or lower the window until the glass bolts can be seen.
6. Remove the door glass bolts.



7. While holding the door window, raise it at the rear end to pull the glass out of the sash toward the inside of the door.
8. Remove the lower sash (rear) bolt, move the lower end portion ahead of the door panel.(3) and pull out the insertion (2) of the upper end from the door panel to remove the lower sash (rear)(1).





9. Remove the lower sash (front) bolt and pull out the lower sash (front) just downward to remove it.
10. Remove the door glass run from the door panel.

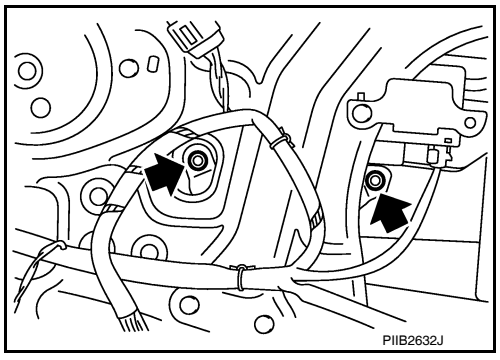
Installation

Installation is in the reverse order of removal.

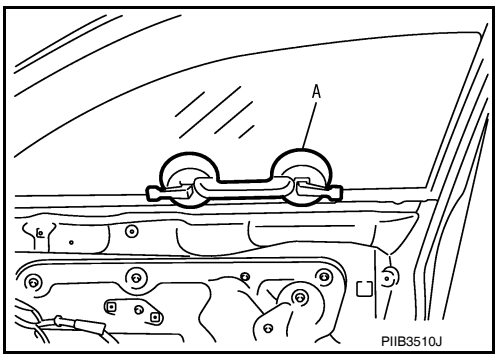
REGULATOR ASSEMBLY

Removal

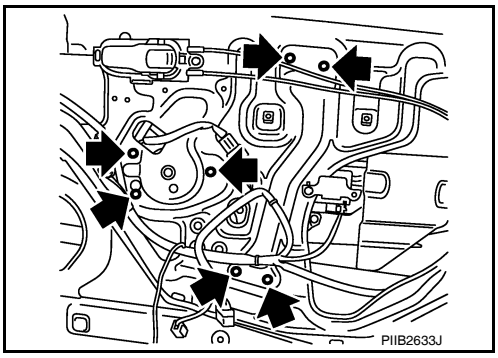
1. Remove the front door finisher. Refer to EI-30, "Removal and Installation".
2. Disconnect the harness connector for the front speaker
3. Position aside the vapor barrier.
   NOTE:
   If vapor barrier is reused, cut the butyl-tape so that a part of butyl-tape remains on the vapor barrier.
4. Temporarily reconnect the power window switch to operate the window.
5. Raise or lower the window until the glass bolts can be seen.
6. Remove the door glass bolts.



7. Raise the door glass and hold with a suction lifter A.

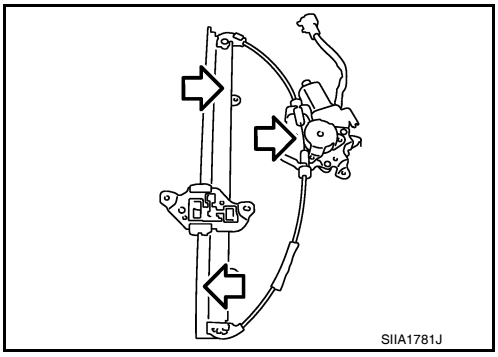


8. Disconnect the harness connector from the regulator assembly.
9. Remove the regulator assembly bolts, and then remove the regulator assembly.



Installation
Installation is in the reverse order of removal.

Inspection after Removal
Check the regulator assembly for the following. [If a problem is detected, grease or replace it as shown].
- Wire wear
- Regulator deformation
- Grease condition for each sliding part



Disassembly and Assembly

INFOID:0000000007330187

POWER WINDOW REGULATOR ASSEMBLY

Disassembly
Remove the power window motor from the regulator assembly.

Assembly
Assembly is in the reverse order of disassembly.

Inspection after Installation

INFOID:0000000007330188

POWER WINDOW SYSTEM INITIALIZATION
Initialize power window system Refer to:GW-29, "Power Window Auto Operation Initialization"

INSPECT THE FUNCTION OF THE ANTI-PINCH SYSTEM
1. Fully open the door glass.
2. Place a wooden piece (wooden hammer handle, etc.) near the fully closed position.
3. Carry out fully closing operation with auto up switch.

- Check that the glass reverses without pinching the wooden piece, is lowered approx.150 mm (5.91 in) or for 2 seconds and then stops.
- The glass should not be raised with power window main switch while it is reversing or lowering.

CAUTION:

- **Use care to avoid being pinched during the inspection. Do not use a hand, etc. in place of the wooden piece during the inspection.**
- **Check that auto up function is normal before inspection, following the system initialization.**

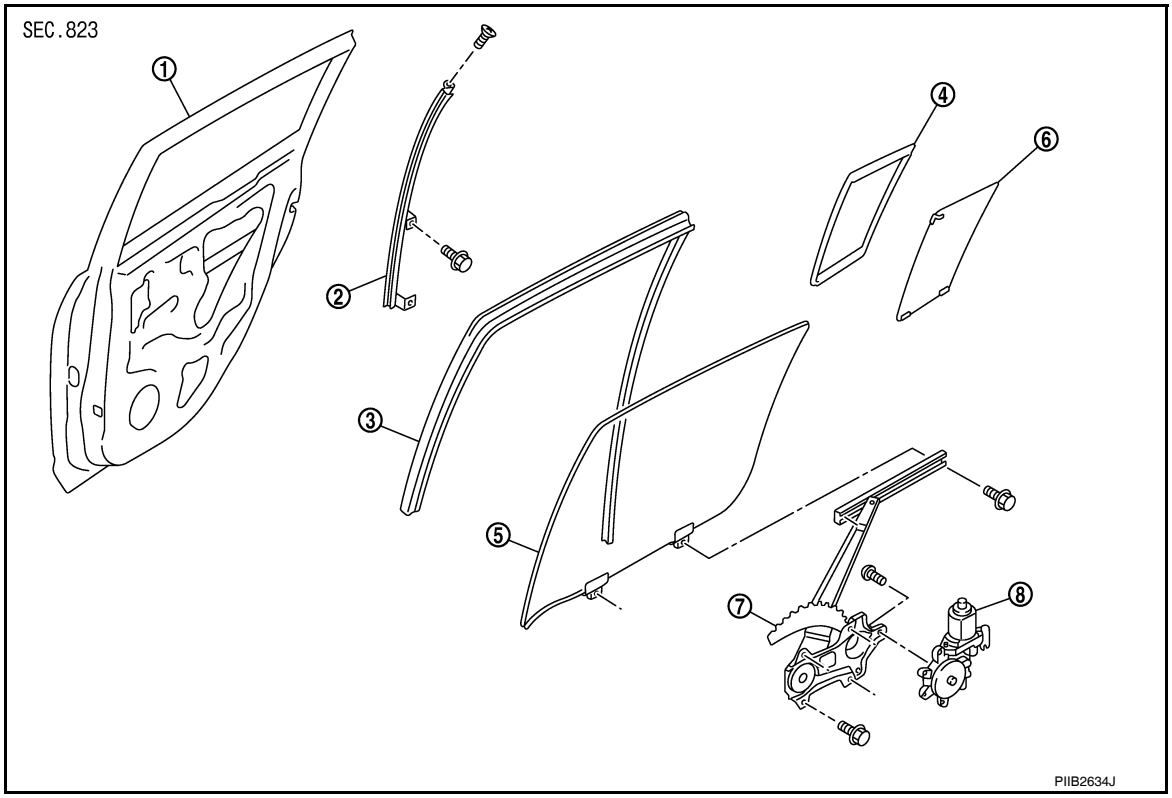
FITTING INSPECTION

- Make sure the glass is securely fit into the glass run groove.
- Lower the glass slightly [approx. 10 to 20 mm (0.39 to 0.79 in)] and make sure the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator bolts, guide rail bolts, and the glass and guide rail bolts to correct the glass position.
- Make sure the system is normal with raising and lowering the glass.

REAR DOOR GLASS AND REGULATOR

Removal and Installation

INFOID:0000000007330189

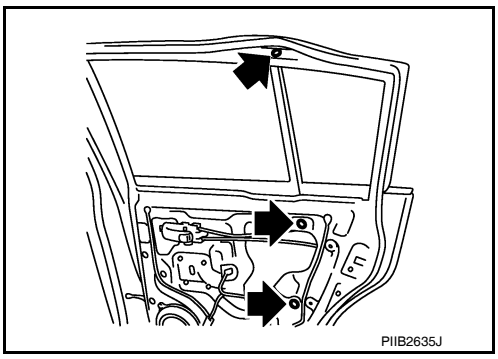


1. Door panel
2. Partition sash
3. Door glass run
4. Partition glass weatherstrip
5. Door glass
6. Partition glass
7. Regulator assembly
8. Power window motor

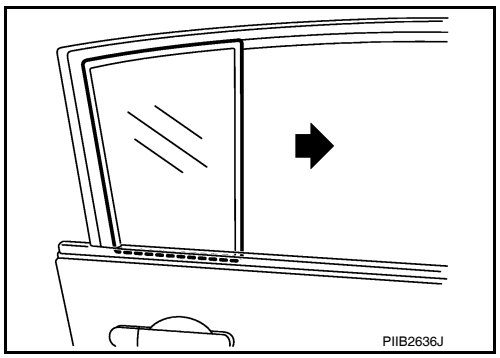
DOOR GLASS

Removal

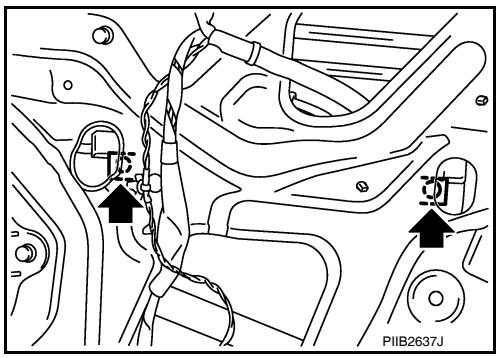
1. Remove the rear door finisher. Refer to EI-30, "Removal and Installation".
2. Disconnect the harness connector of rear door speaker.
3. Position aside the vapor barrier.
   NOTE:
   If the vapor barrier is reused, cut the butyl-tape so that a part of the butyl-tape remains on the vapor barrier.
4. Remove partition sash bolt and screw, pull the partition sash downward and tilt the upper end of the sash forward to pull out the sash upward.



5. Pull out the partition glass in the direction as shown.



6. Temporarily reconnect the power window switch to operate the windows.
7. Raise or lower until lower glass bolts can be seen.
8. Remove the rear door glass bolts.
9. Pull out the rear door glass toward the outside of the door to remove.



10. Remove the door glass run from the door panel.

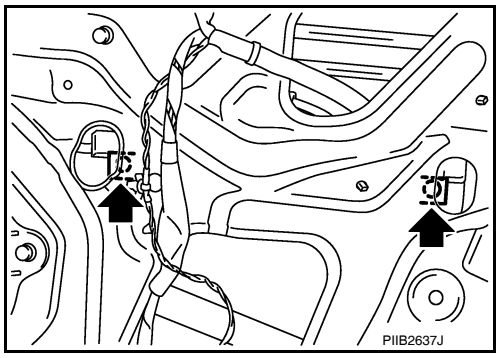
Installation

Installation is in the reverse order of removal.

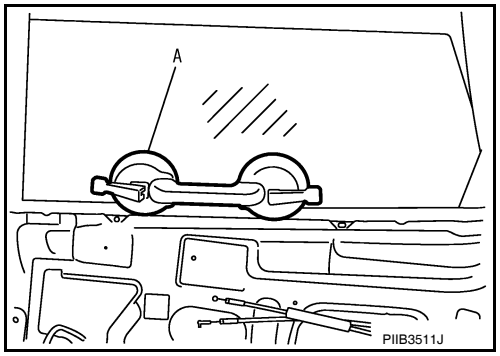
REGULATOR ASSEMBLY

Removal

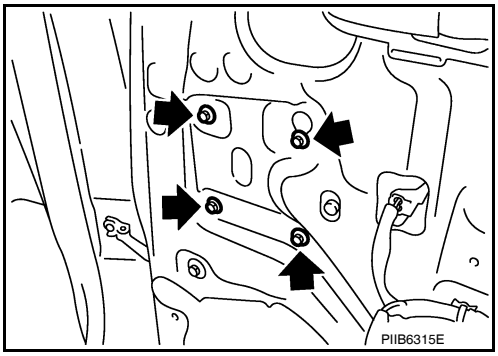
1. Remove and position aside the rear door finisher. Refer to EI-30, "Removal and Installation".
2. Disconnect the harness connector of rear speaker.
3. Position aside the vapor barrier.
4. Temporarily reconnect the power window switch to operate the windows.
5. Raise or lower until lower glass bolts can be seen.
6. Remove the rear door glass bolts.



7. Raise up the door glass and hold with a suction lifter A.

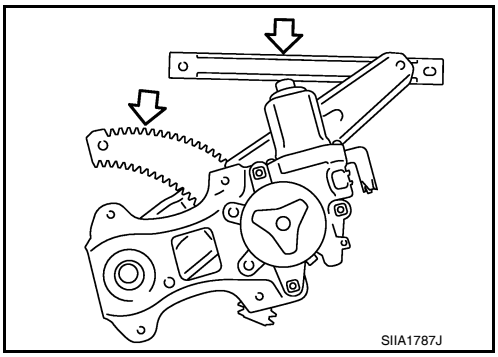


8. Remove the regulator bolts, and then remove the regulator assembly from the door panel.



Installation
Installation is in the reverse order of removal.

Inspection after Removal
Check the regulator assembly for the following. [If a problem is detected, grease or replace it as shown].
- Gear wear
- Regulator deformation
- Grease condition for each sliding part



Disassembly and Assembly

INFOID:0000000007330190

POWER WINDOW REGULATOR ASSEMBLY

Disassembly
Remove the power window motor from the regulator assembly.

Assembly
Assembly is in the reverse order of disassembly.

Inspection after Installation

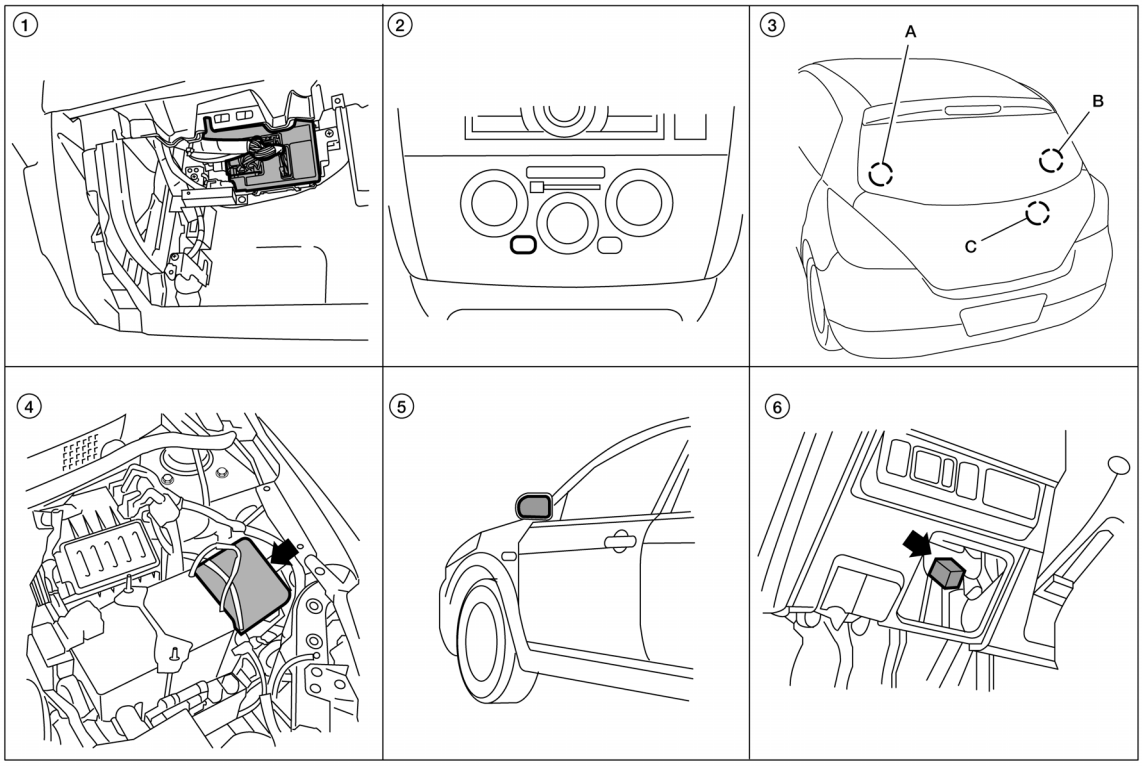
INFOID:0000000007330191

FITTING INSPECTION
- Make sure the glass is securely fit into the glass run groove.
- Lower the glass slightly [approx. 10 to 20 mm (0.39 to 0.79 in)], and make sure the clearance to the sash is parallel. If the clearance between the glass and sash is not parallel, loosen the regulator bolts, guide rail bolts, and glass and carrier plate bolts to correct the glass position.

REAR WINDOW DEFOGGER

Component Parts and Harness Connector Location

INFOID:0000000007330192



AWKIA1851ZZ

1. BCM M18, M20 (view with glove box removed)
2. Front air control M33
3. A. Rear window defogger ground connector D413
   B. Rear window defogger connector D412
   C. Condenser-1 D409, D411
4. IPDM E/R E46, E48
5. Door mirror LH D4, RH D107 (with heated mirrors)
6. Heated mirror relay M48 (with heated mirrors)

System Description

INFOID:0000000007330193

The rear window defogger system is controlled by BCM (body control module) and IPDM E/R (intelligent power distribution module engine room).
The rear window defogger only operates for approximately 15 minutes.
Power is supplied at all times
- through 15A fuses (No. 46 and 47, located in the IPDM E/R)
- to rear window defogger relay
- through 10A fuse [No. 12 (with heated mirrors), located in the fuse block (J/B)]
- to heated mirror relay terminal 3
- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM terminal 70.

With the ignition switch turned to ON or START position, power is supplied
- through ignition relay
- to rear window defogger relay (located in the IPDM E/R)
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38.

Ground is supplied

- to BCM terminal 67 and
- to front air control terminal 8
- through body grounds M57 and M61
- to IPDM E/R terminals 39 and 59
- through body grounds E15 and E24.

When front air control (rear window defogger switch) is turned to ON, ground is supplied
- to BCM terminal 9
- through front air control terminal 3
- through front air control terminal 8
- through body grounds M57 and M61.

Then rear window defogger switch is illuminated.
Then BCM recognizes that rear window defogger switch is turned to ON.
Then it sends rear window defogger switch signals to IPDM E/R via CAN communication (CAN-H, CAN-L).
When IPDM E/R receives rear window defogger switch signals, ground is supplied
- to rear window defogger relay (located in the IPDM E/R)
- through IPDM E/R terminals 39 and 59
- through body grounds E15 and E24

Then rear window defogger relay is energized.
With power and ground supplied, rear window defogger filaments heat and defog the rear window.
When rear window defogger relay is turned to ON (with heated mirrors), power is supplied
- through heated mirror relay terminal 5
- to door mirror (LH and RH) terminal 1.

Door mirror (LH and RH) is grounded through body grounds M57 and M61.
With power and ground supplied, rear window defogger filaments heat and defog the rear window and door mirror filaments heat and defog the mirrors.

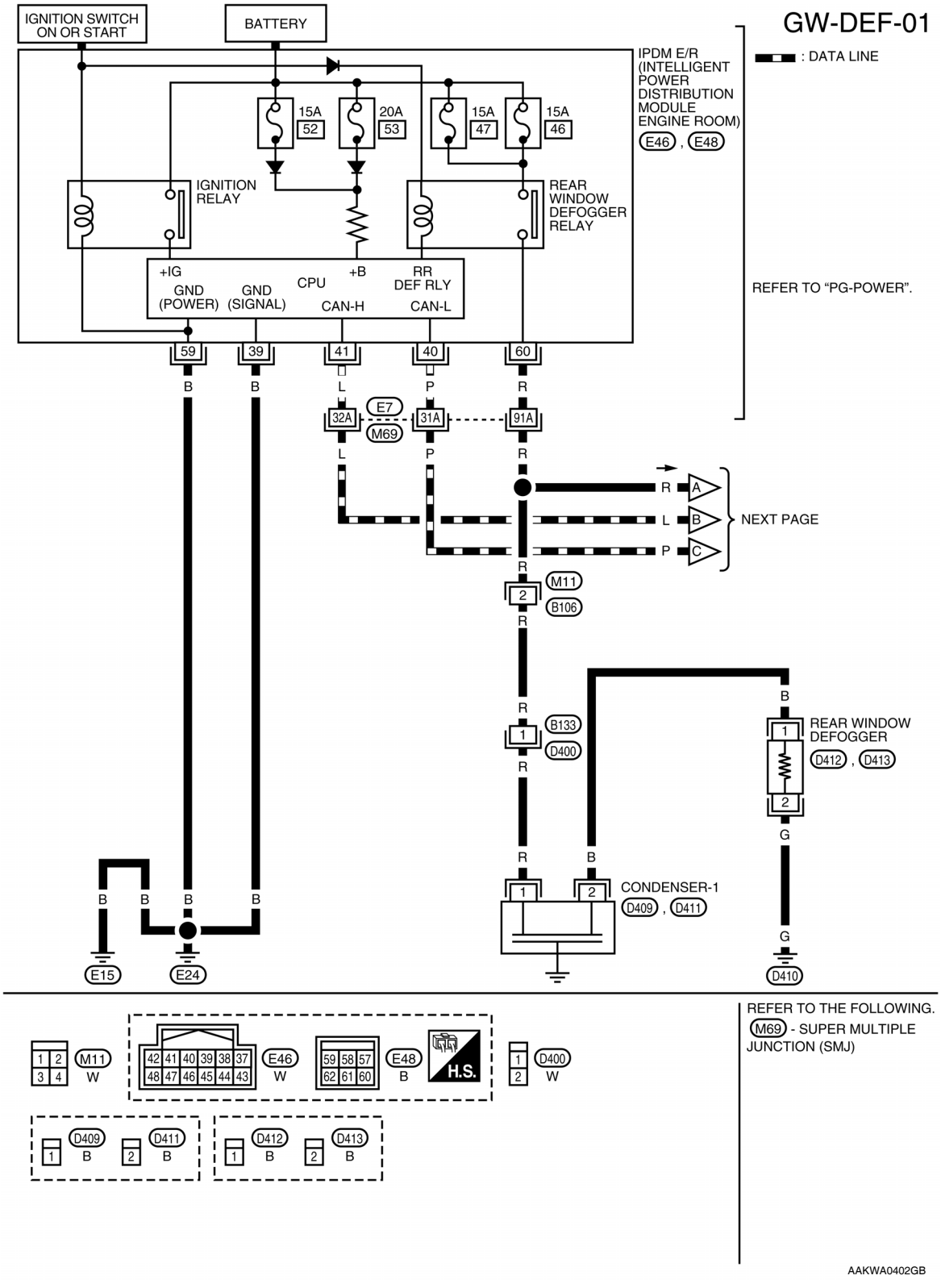
CAN Communication System Description

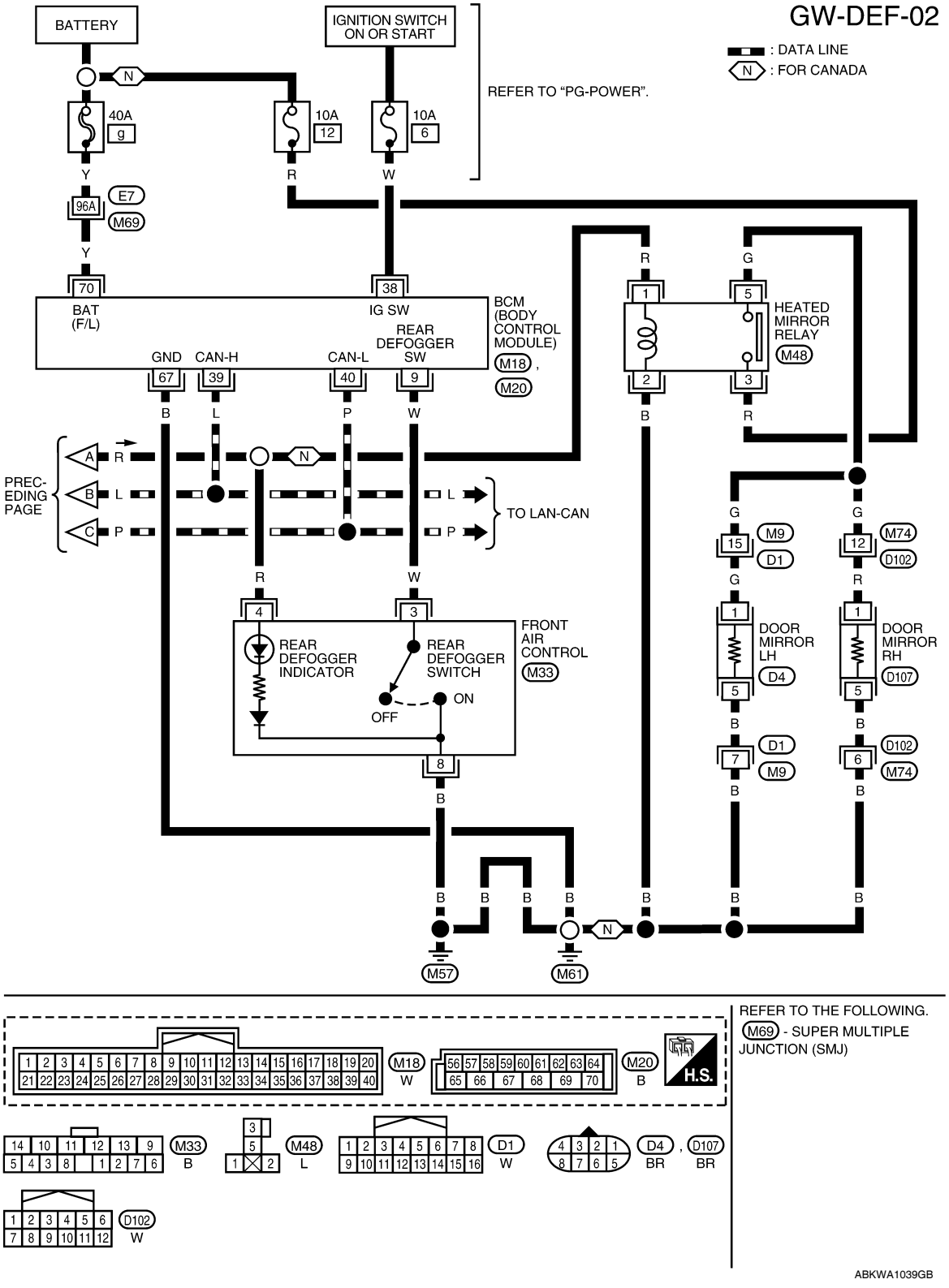
INFOID:0000000007330194

Refer to LAN-5, "System Description".

Wiring Diagram - DEF -

INFOID:0000000007330195




GW-DEF-02
: DATA LINE
N : FOR CANADA
BATTERY
IGNITION SWITCH ON OR START
REFER TO "PG-POWER".
40A g
10A 12
10A 6
Y
R
W
96A E7 M69
70 BAT (F/L)
38 IG SW
BCM (BODY CONTROL MODULE) M18, M20
GND CAN-H CAN-L REAR DEFOGGER SW
67 39 40 9
B L P W
PRECEDING PAGE
A R
B L
C P
N
TO LAN-CAN
HEATED MIRROR RELAY M48
1 2 5 3
FRONT AIR CONTROL M33
REAR DEFOGGER INDICATOR
REAR DEFOGGER SWITCH
ON
OFF
4 3 8
DOOR MIRROR LH D4
DOOR MIRROR RH D107
15 M9 D1
12 M74 D102
7 M9
6 M74
M57
M61
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
M18 W
M20 B
H.S.
M33 B
M48 L
D1 W
D4 BR
D107 BR
D102 W
ABKWA1039GB

Terminal and Reference Value for BCM

INFOID:0000000007330196

Refer to BCS-12, "Terminal and Reference Value for BCM".

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330197

Refer to PG-24, "Terminal and Reference Value for IPDM E/R".

Work Flow

INFOID:0000000007330198

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to GW-49, "System Description".
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to GW-53, "Trouble Diagnosis Symptom Chart".
4. Does rear window defogger operate normally? YES: GO TO 5, NO: GO TO 3.
5. Inspection End.

CONSULT Function (BCM)

INFOID:0000000007330199

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Content
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ECU IDENTIFICATION	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

DATA MONITOR

Display Item List

Monitor item “Operation”		Content
REAR DEF SW	“ON/OFF”	Indicates (ON/OFF) condition of the rear window defogger switch.
IGN ON SW	“ON/OFF”	Indicates (ON/OFF) condition of the ignition switch signal.

ACTIVE TEST

Display Item List

Test item	Content
REAR WINDOW DEFOGGER	Gives a drive signal to the rear window defogger to activate it.

Trouble Diagnosis Symptom Chart

INFOID:0000000007330200

Make sure other systems using the signal of the following systems operate normally.

Symptom	Diagnoses / Service procedure	Refer to page
Rear window defogger and door mirror defoggers do not operate. (With heated mirrors)	1. BCM power supply and ground circuit check	BCS-16
	2. IPDM E/R auto active test check	PG-20
	3. Rear window defogger switch circuit check	GW-54
	4. Replace IPDM E/R	PG-27
Rear window defogger does not operate. (Without heated mirrors)	1. BCM power supply and ground circuit check	BCS-16
	2. IPDM E/R auto active test check	PG-20
	3. Rear window defogger switch circuit check	GW-54
	4. Rear window defogger circuit check	GW-55
	5. Filament check	GW-59
	7. Replace IPDM E/R	PG-27
Rear window defogger does not operate but both door mirror defoggers operate. (With heated mirrors)	1. Rear window defogger circuit check	GW-55
	2. Filament check	GW-59
Door mirror defoggers do not operate but rear window defogger operates. (With heated mirrors)	1. Door mirror defogger circuit check	GW-57
Rear window defogger switch does not light, but rear window defogger operates.	1. Replace front air control	MTC-56

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007330201

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Rear Window Defogger Switch Circuit Inspection

INFOID:0000000007330202

1.CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

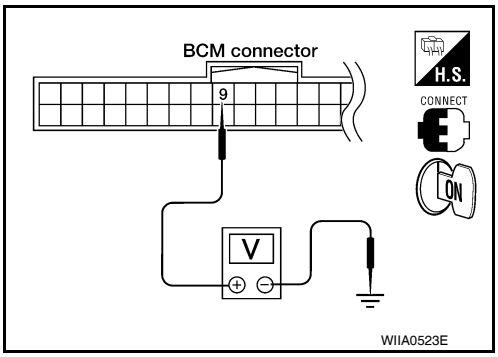
With CONSULT

Check (“REAR DEF SW”, “IGN ON SW”) in DATA MONITOR mode with CONSULT.

When rear window defogger switch is turned to ON
REAR DEF SW : ON
When ignition switch is turned to ON
IGN ON SW : ON

Without CONSULT

1. Turn ignition switch ON.
2. Check voltage between BCM connector and ground.



Connector	Terminals (+)	Terminals (-)	Condition	Voltage (V) (Approx.)
M18	9	Ground	Rear window defogger switch is pressed	0
			Rear window defogger switch is released	5

OK or NG

OK >> Rear window defogger switch check is OK.
NG >> GO TO 2.

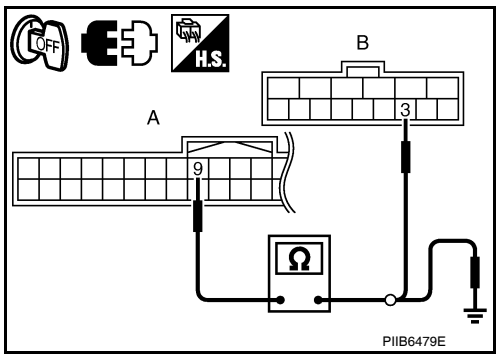
2.CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front air control.
3. Check continuity between BCM connector M18 (A) terminal 9 and front air control connector M33 (B) terminal 3.

9 - 3 : Continuity should exist.

4. Check continuity between BCM connector M18 (A) terminal 9 and ground

9 - Ground : Continuity should not exist.



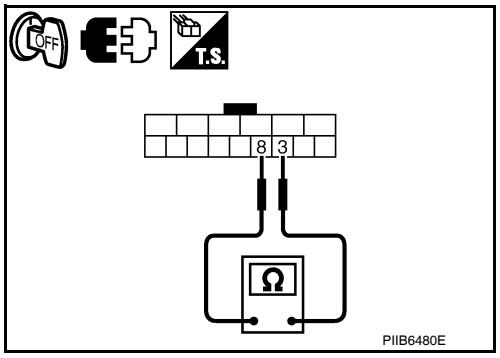
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3.CHECK REAR WINDOW DEFOGGER SWITCH

Check continuity between front air control terminals.

Terminals		Condition	Continuity
3	8	Rear window defogger switch is ON (pressed)	Yes
		Rear window defogger switch is OFF (released)	No



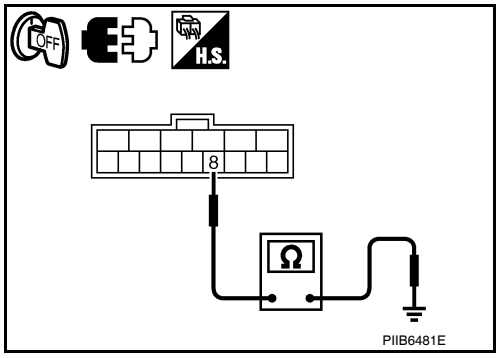
OK or NG

OK >> GO TO 4.
NG >> Replace front air control. Refer to MTC-56, "Removal and Installation".

4.CHECK REAR WINDOW DEFOGGER SWITCH GROUND

Check continuity between front air control connector M33 terminal 8 and ground.

Connector	Terminal	Ground	Continuity
M33	8		Yes



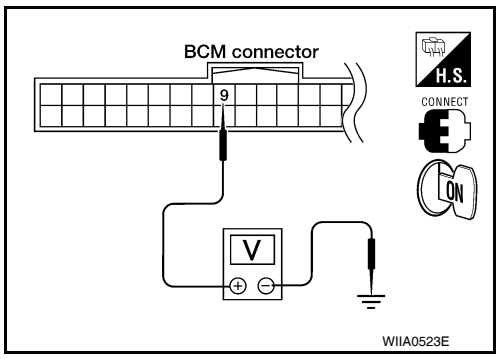
OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5.CHECK BCM OUTPUT SIGNAL

1. Connect BCM.
2. Turn ignition switch ON.
3. Check voltage between BCM connector M18 terminal 9 and ground.

9 - Ground : Approx. 5V



OK or NG

OK >> Replace front air control. Refer to MTC-56 .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

Rear Window Defogger Circuit Inspection

INFOID:0000000007330203

1.CHECK FUSES

Check if any of the following fuses in IPDM E/R are blown.

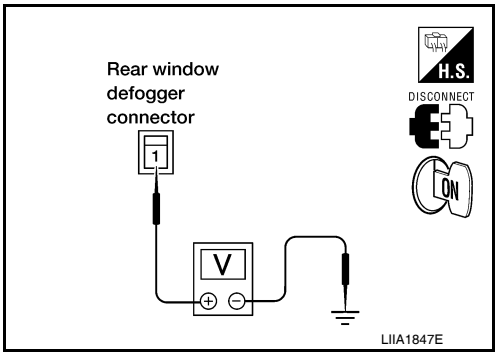
Component Parts	Ampere	Fuse No.
IPDM E/R	15A	46
IPDM E/R	15A	47

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK REAR WINDOW DEFOGGER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear window defogger.
3. Turn ignition switch ON.
4. Check voltage between rear window defogger connector and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D412	1	Ground	Rear window defogger switch ON	Battery voltage
			Rear window defogger switch OFF	0

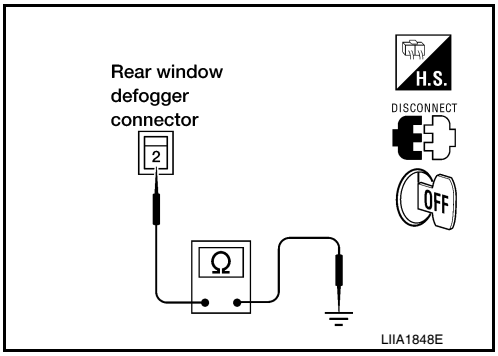
OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK REAR WINDOW DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between rear window defogger connector D413 terminal 2 and ground.

2 - Ground : Continuity should exist.



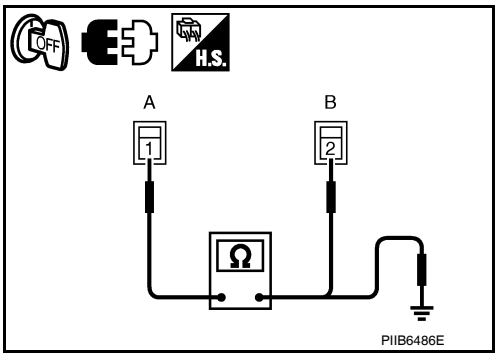
OK or NG

OK >> Check filament. Refer to GW-59, "Filament Check".
- If filament is OK.
  Check the condition of the harness and the connector.
- If filament is NG.
  Repair filament. Refer to GW-60, "Filament Repair".

NG >> Repair or replace harness.

4.CHECK CONDENSER-1 CIRCUIT

1. Disconnect condenser-1.
2. Check continuity between rear window defogger connector (A) and condenser-1 connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
D412	1	D411	2	Yes

3. Check continuity between rear window defogger connector (A) and ground.

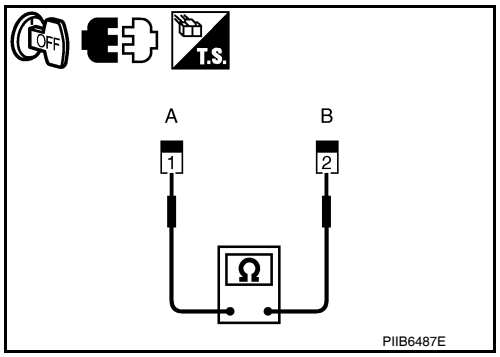
A		Ground	Continuity
Connector	Terminal		
D412	1		No

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5.CHECK CONDENSER-1

Check continuity between condenser-1 (A) and (B) terminals.



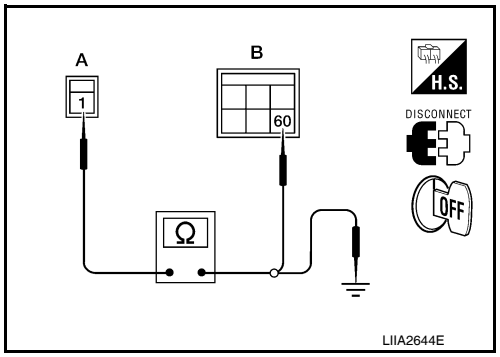
A	B	Continuity
Terminal	Terminal	
1	2	Yes

OK or NG

OK >> GO TO 6.
NG >> Replace condenser-1.

6.CHECK CONDENSER-1 HARNESS CONTINUITY

1. Disconnect IPDM E/R.
2. Check continuity between condenser-1 connector (A) and IPDM E/R connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
D409	1	E48	60	Yes

3. Check continuity between condenser-1 connector (A) and ground.

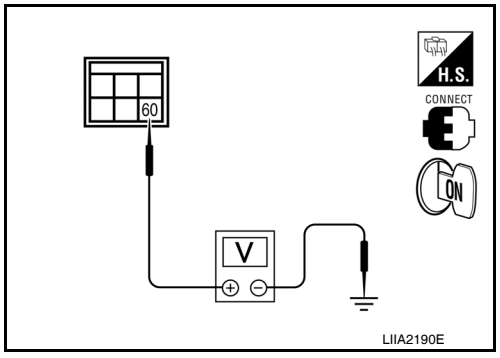
A		Ground	Continuity
Condenser-1 connector	Terminal		
D409	1		No

OK or NG

OK >> GO TO 7.
NG >> Repair or replace harness.

7.CHECK REAR WINDOW DEFOGGER RELAY OUTPUT SIGNAL

1. Connect IPDM E/R.
2. Turn ignition switch ON.
3. Check voltage between IPDM E/R connector and ground.



Connector	Terminals		Condition	Voltage (V) (Approx.)
	(+)	(-)		
E48	60	Ground	Rear window defogger switch ON	Battery voltage
			Rear window defogger switch OFF	0

OK or NG

OK >> Check condition of harness and connector.
NG >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

Door Mirror Defogger Circuit Inspection

INFOID:0000000007330204

1.CHECK FUSE

Check if the following fuse in the fuse block (J/B) is blown.

Component Parts	Ampere	Fuse No.
Fuse block (J/B)	10A	12

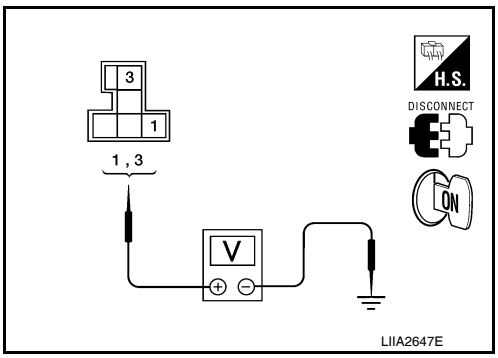
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

2.CHECK HEATED MIRROR RELAY POWER SUPPLY CIRCUIT

1. Disconnect heated mirror relay.
2. Turn ignition switch ON.
3. Check voltage between heated mirror relay connector and ground.

Connector	Terminals		Voltage (V) (Approx.)
	(+)	(-)	
M48	1	Ground	Battery voltage
	3		



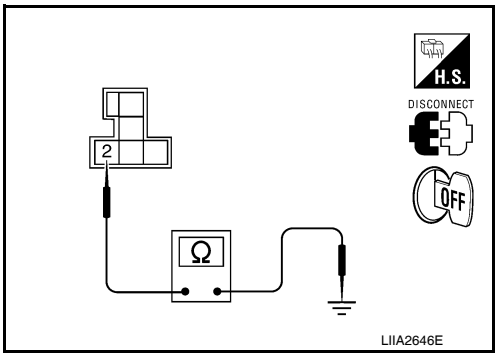
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3.CHECK HEATED MIRROR RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between heated mirror relay connector M48 terminal 2 and ground.

2 - Ground : Continuity should exist.



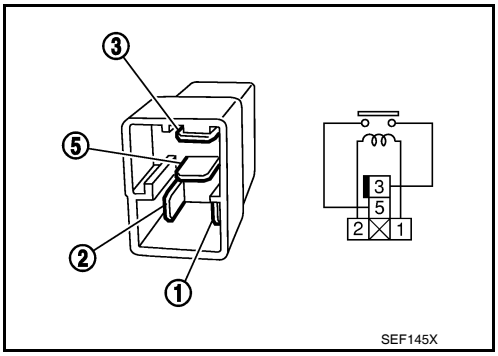
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4.INSPECTION OF HEATED MIRROR RELAY

Check continuity between heated mirror relay terminals 3 and 5.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

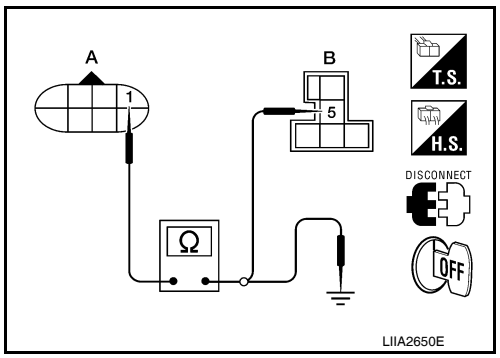


OK or NG

OK >> GO TO 5.
NG >> Replace heated mirror relay.

5.CHECK HARNESS CONTINUITY

1. Disconnect door mirror (LH or RH).
2. Check continuity between door mirror (LH or RH) connector (A) and heated mirror relay connector (B).



Connector	Terminal	Connector	Terminal	Continuity
A		B		
D4 (LH)	1	M48	5	Yes
D107 (RH)				

3. Check continuity between door mirror (LH or RH) connector (A) and ground.

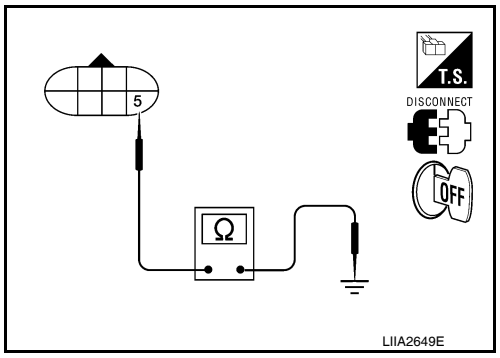
A		Ground	Continuity
Connector	Terminal		
D4 (LH)	1		No
D107 (RH)			

OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness.

6. CHECK GROUND CIRCUIT

Check continuity between door mirror (LH or RH) connector and ground.



Connector	Terminals		Continuity
D4 (LH)	5	Ground	Battery voltage
D107 (RH)			

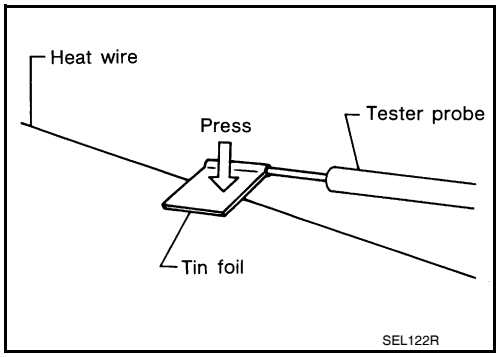
OK or NG

OK >> Replace door mirror (LH or RH). Refer to GW-63, "Removal and Installation".
NG >> Repair or replace harness.

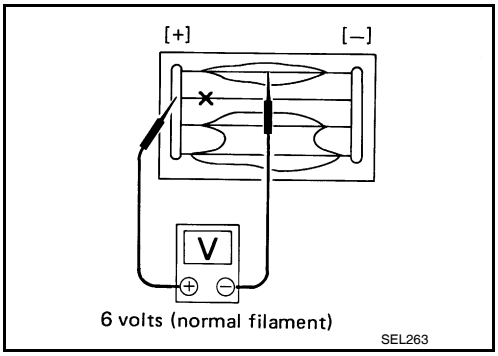
Filament Check

INFOID:0000000007330205

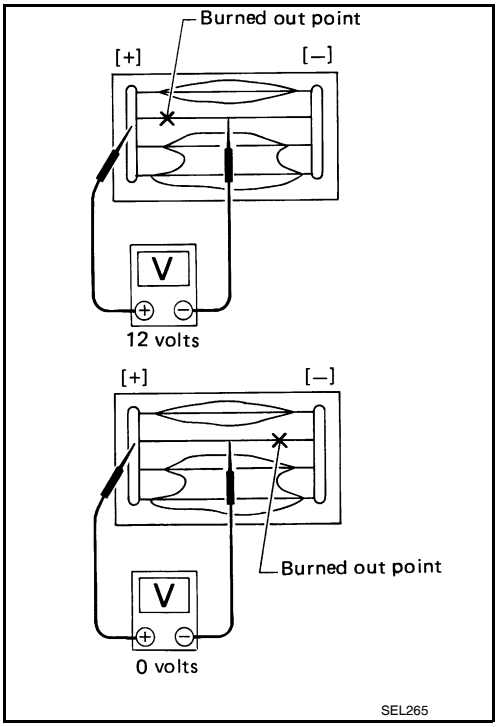
1. When measuring voltage, wrap tin foil around the top of the negative probe. Then press the foil against the wire with your finger.



2. Attach probe circuit tester (in Volt range) to middle portion of each filament.



3. If a filament is burned out, circuit tester registers 0 or battery voltage.
4. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.



Filament Repair

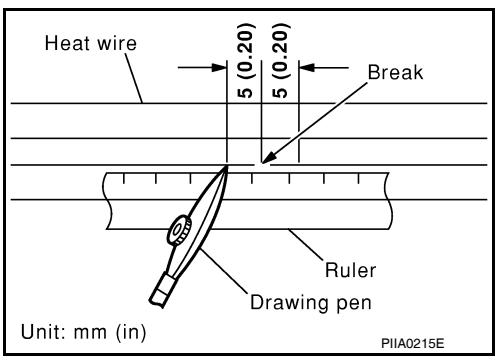
INFOID:0000000007330206

REPAIR EQUIPMENT

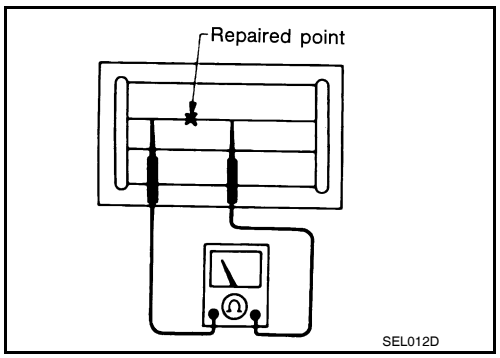
- Conductive silver composition (DuPont No. 4817 or equivalent)
- Ruler 30 cm (11.8 in) long
- Drawing pen
- Heat gun
- Alcohol
- Cloth

REPAIRING PROCEDURE

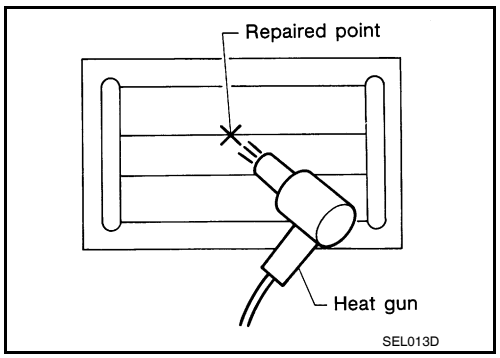
1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.
   Shake silver composition container before use.
3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.



4. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.
   Do not touch repaired area while test is being conducted.



5. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet.
   If a heat gun is not available, let the repaired area dry for 24 hours.

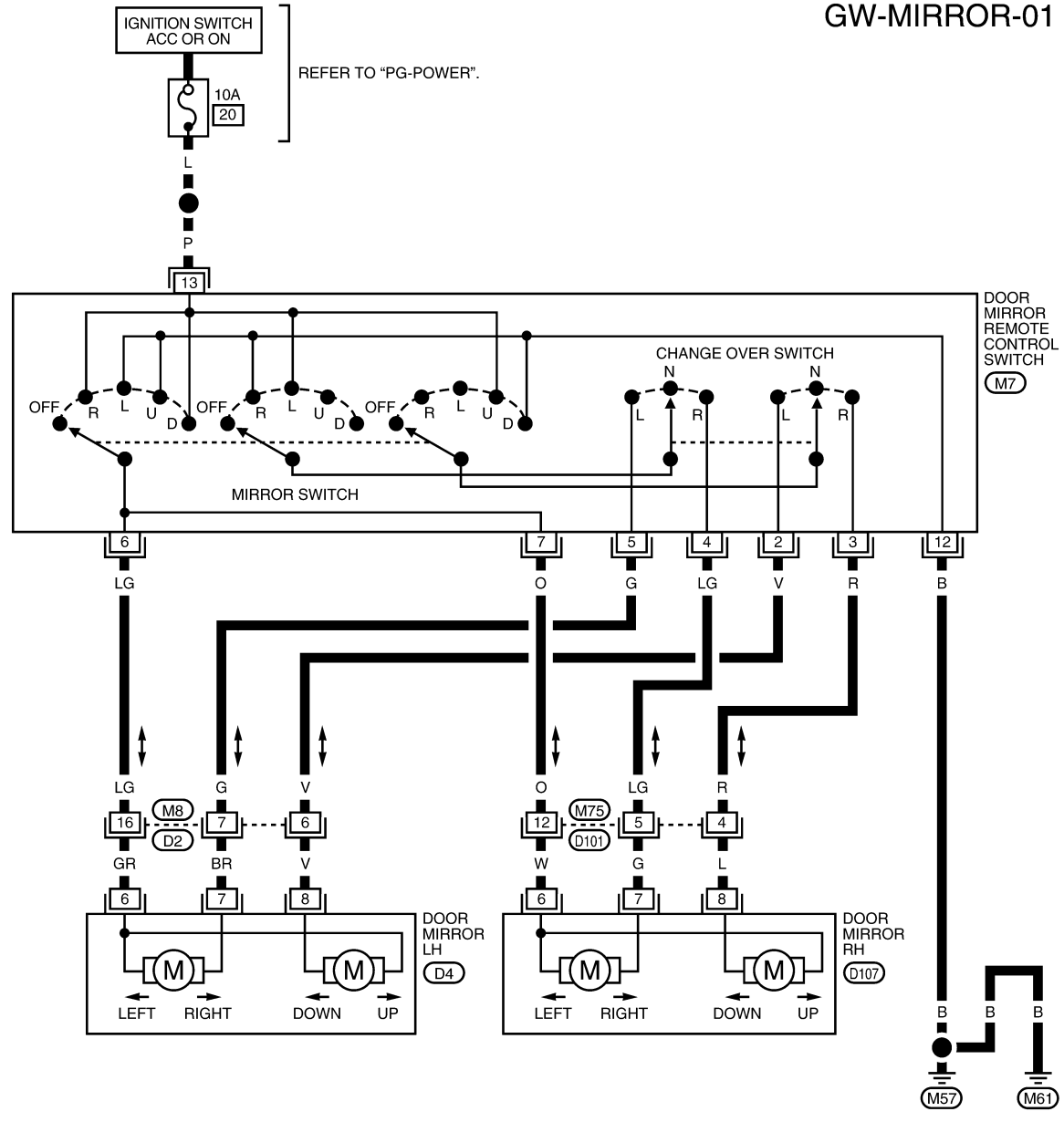


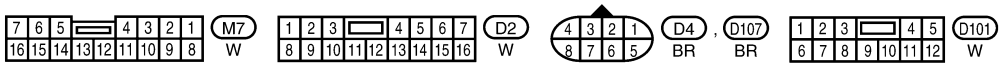
DOOR MIRROR

Wiring Diagram - MIRROR -

INFOID:0000000007330207

GW-MIRROR-01

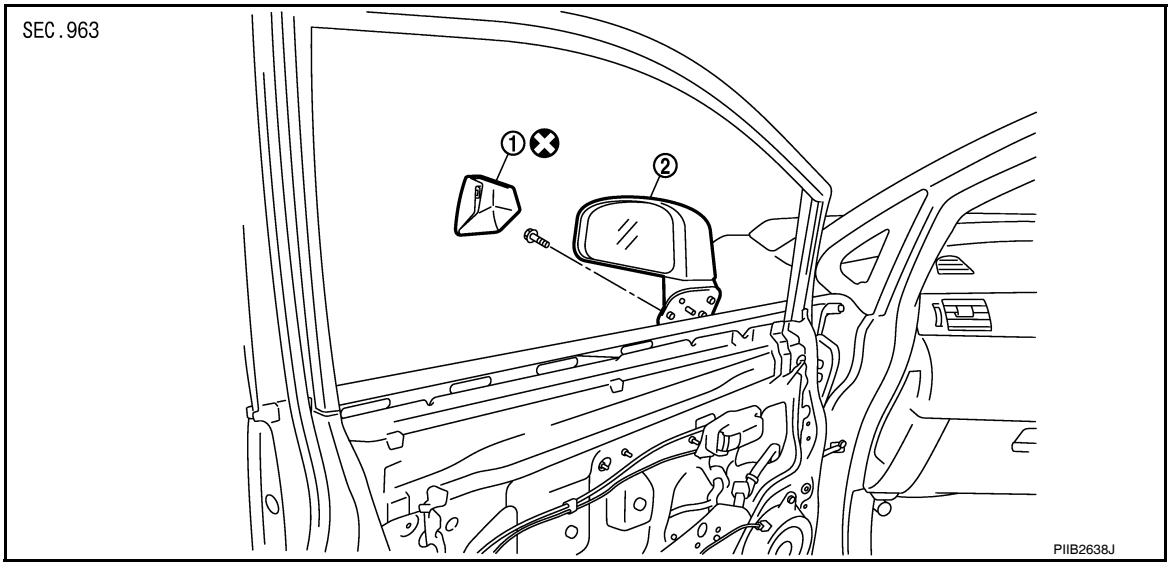




LIWA0559E

Removal and Installation

INFOID:0000000007330208

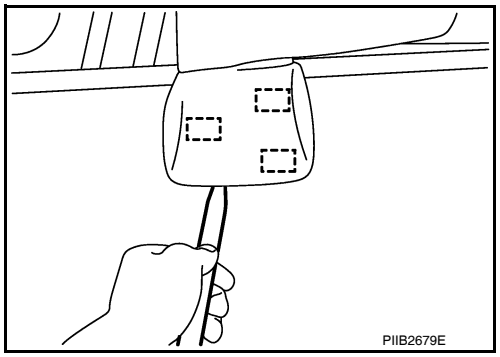


1. Door mirror base cover
2. Door mirror

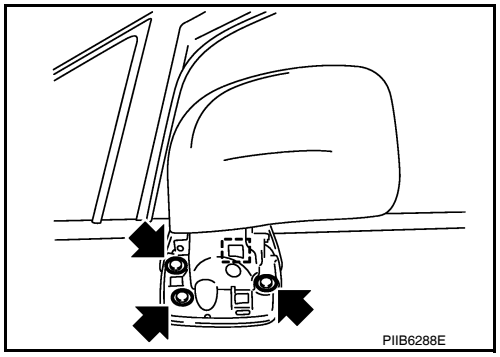
CAUTION:
Be careful not to damage the mirror body.

REMOVAL

1. Remove the front door finisher. Refer to EI-30, "Removal and Installation".
2. Disconnect the harness connector of door mirror.
3. Using a suitable tool remove door mirror base cover.
   CAUTION:
   - **Do not reuse the disassembled door mirror base cover.**
   - **Be careful not to damage the door panel with a tool.**



4. Remove the door mirror bolts, and remove the door mirror assembly.
   CAUTION:
   Do not use force to remove the door mirror assembly by force because it is attached by clip.



INSTALLATION

Installation is in the reverse order of removal.

Disassembly and Assembly

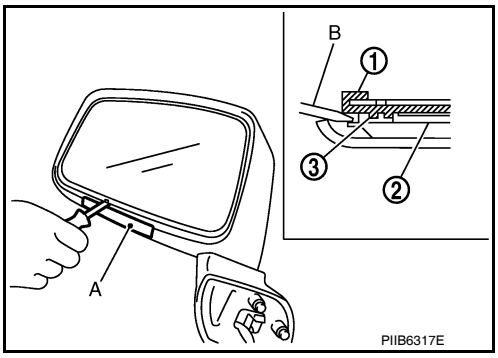
INFOID:0000000007330209

DISASSEMBLY

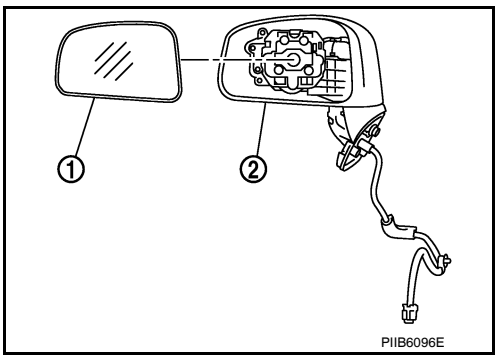
1. Pull out all the terminals from the connector.
   NOTE:

Before pulling out the terminal, note the connector terminal arrangement.

2. Turn the mirror glass surface upward.
3. Apply a protective tape (A) to the housing.
4. Insert suitable tool (B) into the concave gap between mirror holder (1) and power unit (2). Push up tabs (3) (2 locations) on mirror holder to disengage lower part of mirror holder, and remove mirror body assembly.
   NOTE:
   When pushing up the tabs, do not forcefully push up only 1 concave position but try to push up 2 concave positions.

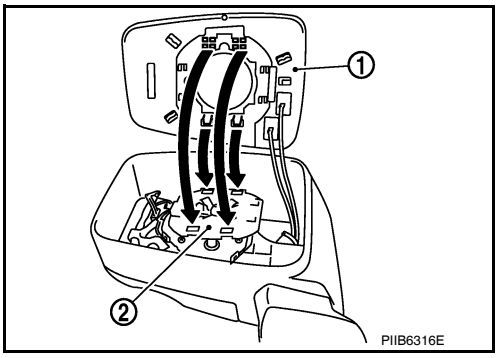


5. Remove the mirror body (1) from the mirror housing assembly (2).
6. If necessary, remove screws and mirror actuators.



ASSEMBLY

1. Warm the lower tabs with a dryer or equivalent.
   NOTE:
   Warm the lower tabs sufficiently before installing the mirror body. The tabs may be broken if it is cold. Be especially careful in the winter.
2. Engage upper tabs of mirror body (1) with power unit (2). Then, press lower part of mirror glass down until the lower part snaps to allow engagement of lower tabs.
   NOTE:
   After installation, visually check that the lower tabs are securely engaged when viewed from the bottom of mirror surface.
3. Insert the harness terminals into the connector.
   NOTE:
   Make sure to insert the harness terminals into the correct connector. Do not confuse the locations.

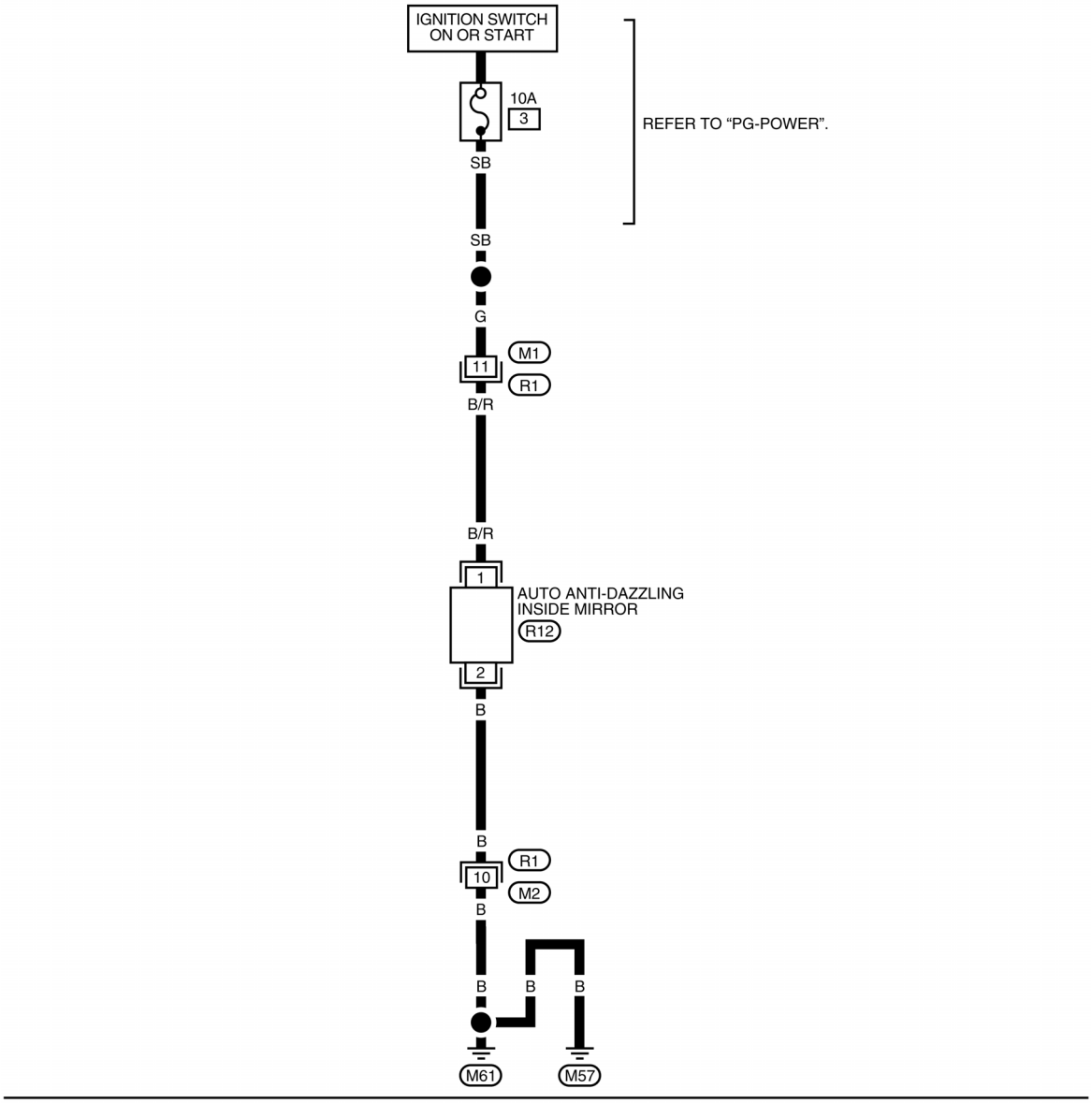


INSIDE MIRROR

Wiring Diagram - I/MIRR -

INFOID:0000000007687760

GW-I/MIRR-01



AAKWA0403GB

Removal and Installation

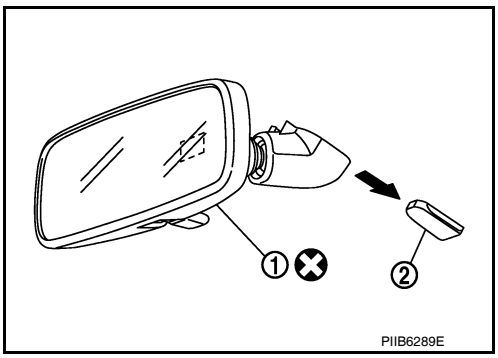
INFOID:0000000007330210

REMOVAL

Slide the inside mirror upward, and then remove inside mirror (1) from the mirror base (2).

CAUTION:

- **Do not use excessive force to remove the inside mirror because it is inserted tightly into the mirror base.**
- **Do not reuse the inside mirror disassembled from mirror base.**



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to insert the inside mirror to the mirror base until the pawl is engaged to the mirror base.

SECTION RF
ROOF

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330211

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330212

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007793162

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

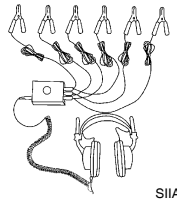
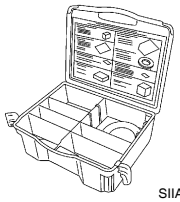
PREPARATION

PREPARATION

Special Service Tool

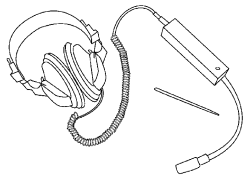
INFOID:0000000007793163

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-39570) Chassis ear  SIIA0993E	Locating the noise
— (J-43980) NISSAN Squeak and Rattle Kit  SIIA0994E	Repairing the cause of noise

Commercial Service Tool

INFOID:0000000007793164

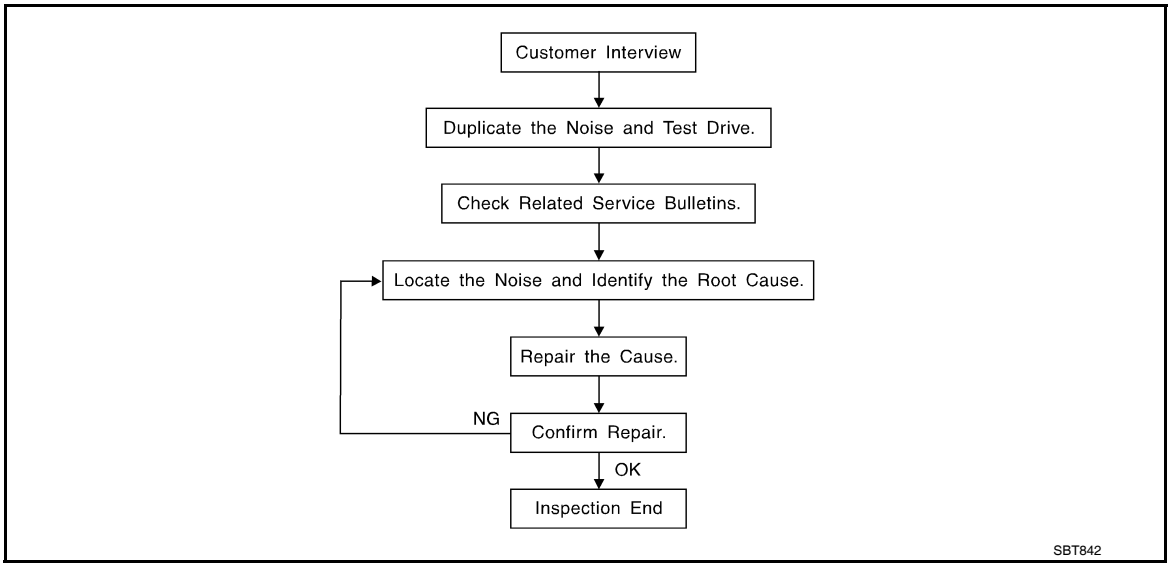
Tool name	Description
Engine ear  SIIA0995E	Locating the noise

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000007330215



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to IP-9, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on CVT and A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Engine Ear or mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to RF-7, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape are available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
NOTE:
Always check with the Parts Department for the latest parts information.
Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll

The following materials, not available through NISSAN Parts Department, can also be used to repair squeaks and rattles.
UHMW(TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007330216

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment

2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lens loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component installed on the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

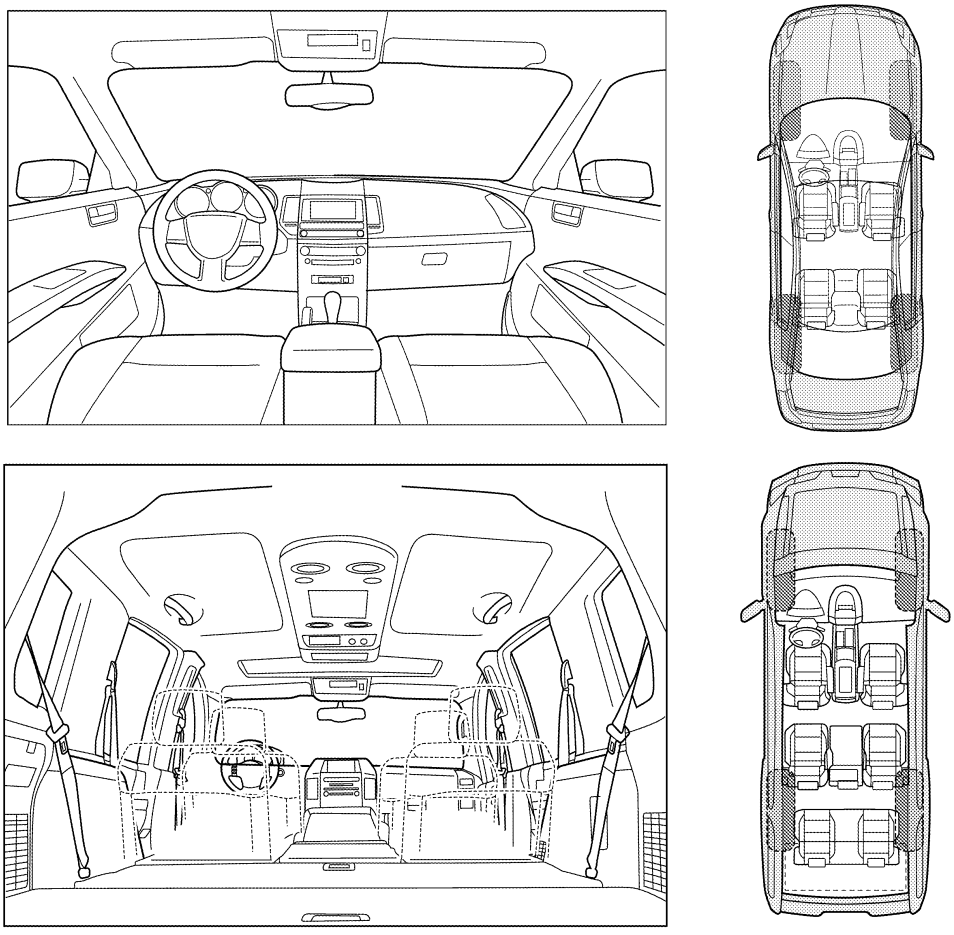
Diagnostic Worksheet

INFOID:0000000007330217

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

LAIA0072E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

This form must be attached to Work Order

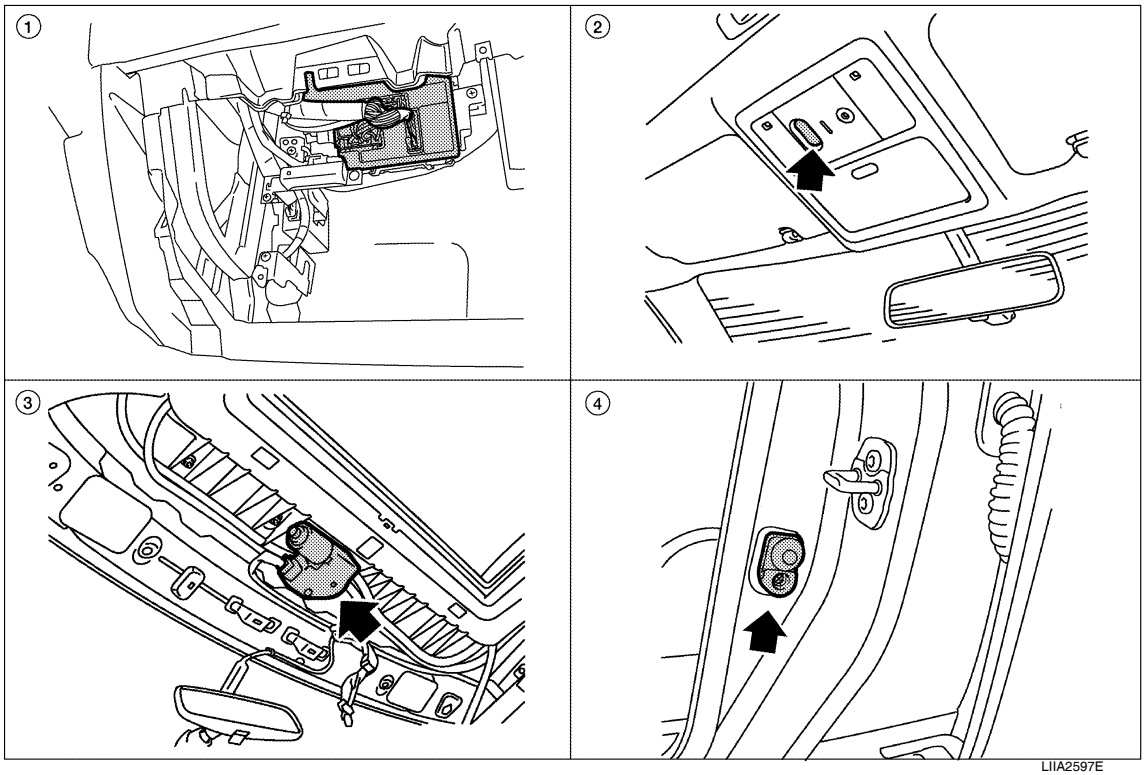
LAIA0071E

FUNCTION DIAGNOSIS

TROUBLE DIAGNOSIS

Component Parts and Harness Connector Location

INFOID:0000000007330218



1. BCM M18, M19, M20 (view with glove box removed)
2. Sunroof switch R6
3. Sunroof motor assembly R4
4. Front door switch LH B8, RH B108

System Description

INFOID:0000000007330219

OUTLINE

Electric sunroof system consists of
- Sunroof switch
- Sunroof motor assembly
- BCM (body control module)

BCM supplies power to the sunroof motor. Sunroof operation depends on sunroof switch condition.

OPERATION

Power is supplied at all times
- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM terminal 70, and
- through BCM terminal 69
- to sunroof motor assembly terminal 7.

When the ignition switch is in the ON or START position, power is supplied
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38, and
- through BCM terminal 68
- to sunroof motor assembly terminal 9.

Ground is supplied
- to BCM terminal 67
- through grounds M57 and M61.

TILT UP/SLIDE CLOSE OPERATION

When up/close switch is pressed, ground is supplied

- to sunroof motor assembly terminal 1
- through sunroof switch terminal 3
- through sunroof switch terminal 2
- through grounds M57 and M61.

Then the sunroof will tilt up/slide closed.

TILT DOWN/SLIDE OPEN OPERATION

When down/open switch is pressed, ground is supplied

- to sunroof motor assembly terminal 5
- through sunroof switch terminal 1
- through sunroof switch terminal 2
- through grounds M57 and M61.

Then the sunroof will tilt down/slide open.

AUTO OPERATION

The power sunroof AUTO feature makes it possible to slide open and slide closed or tilt up and tilt down the sunroof without holding the sunroof switch in the UP/CLOSE or DOWN/OPEN position.

RETAINED POWER OPERATION

When the ignition switch is turned to OFF position from ON position, power is supplied for 45 seconds

- through BCM terminal 68
- to sunroof motor assembly terminal 9.

When power is supplied, the sunroof can be operated.
The retained power operation is canceled when the front door LH or RH is opened.
RAP signal period can be changed by CONSULT. Refer to RF-17, "Work Support" .

ANTI-PINCH FUNCTION

The CPU (central processing unit) of sunroof motor assembly monitors the sunroof motor operation and the sunroof position (fully-closed or other) by the signals from sunroof motor.
When sunroof motor detects an interruption during the following slide close and tilt down operation, sunroof switch controls the motor for open and the sunroof will operate until it reaches full up position (during tilt down operation) or 125 mm (4.92 in) or more in an open direction (during slide close operation).

- close operation and tilt down when ignition switch is in the ON position.
- close operation and tilt down during retained power operation.

INITIALIZATION FAILURE CONDITIONS

Initialization and teaching of system should be conducted if the following conditions exist:

- sunroof will only move in the UP/CLOSE direction, having a step by step motion
- sunroof does not have any auto operation.

INITIALIZATION PROCEDURE

If the sunroof does not open or close automatically, use the following procedure to return sunroof operation to normal.

NOTE:

If the sunroof switch is released at any time during step 3, the procedure must be started over again. Leave the ignition switch ON for at least 2 seconds after this procedure.

1. Push the ignition switch to the ON position.
2. Hold the sunroof switch in the tilt up position. Release the switch when the sunroof has reached the full tilt up position.
3. Within 5 seconds of releasing the switch in step 2, hold the sunroof switch in the tilt up position again. The sunroof will move from the open position and back to the close position. Release the switch only when the sunroof has reached the full closed position.

RE-TEACHING CONDITIONS

Re-teaching of system should be conducted if any of the following conditions exist:

- the sunroof is manually operated using the sunroof wrench with the battery discharged or disconnected.
- the sunroof is manually operated using the sunroof wrench with the key switch in the OFF position and retained power timed out (after approximately 45 seconds or with a front door open).
- the sunroof motor assembly is replaced with a new one.
- the sunroof motor is removed from the sunroof assembly and operated before it is reinstalled.
- the sunroof motor is removed from the sunroof assembly and the glass panel position is changed.

RE-TEACHING PROCEDURE

1. Using the UP/CLOSE switch, move the sunroof toward the tilt position until it stops.

2. Release the UP/CLOSE switch.
3. Press the UP/CLOSE switch again and continuously hold. The sunroof will begin to move in about 10 seconds.
4. Continue to hold the UP/CLOSE switch while the sunroof moves in a jogging motion to the full tilt position. When the sunroof reaches the full tilt position, it will back up a few millimeters and stop.
5. Release the UP/CLOSE switch.
6. Within 5 seconds of releasing the UP/CLOSE switch, press and hold the UP/CLOSE switch again. The sunroof will move to the full open position and back to the closed position.

NOTE:
If the UP/CLOSE switch is released anytime during this teaching process, all learned profile data will be discarded and the procedure will have to be started over.

7. Release the UP/CLOSE switch. Do not disconnect power for at least two seconds. The sunroof is now retaught.

CAN Communication System Description

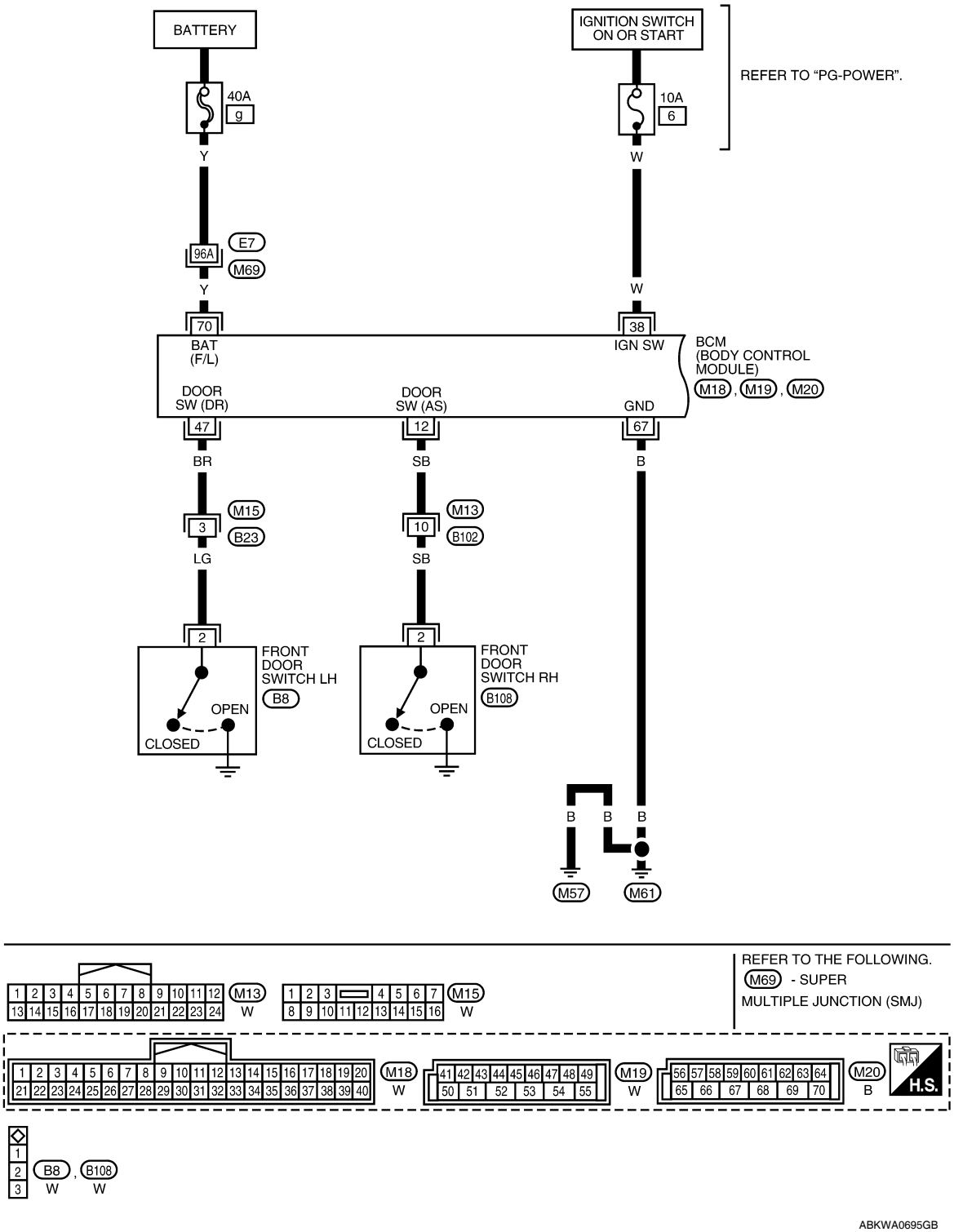
INFOID:0000000007330220

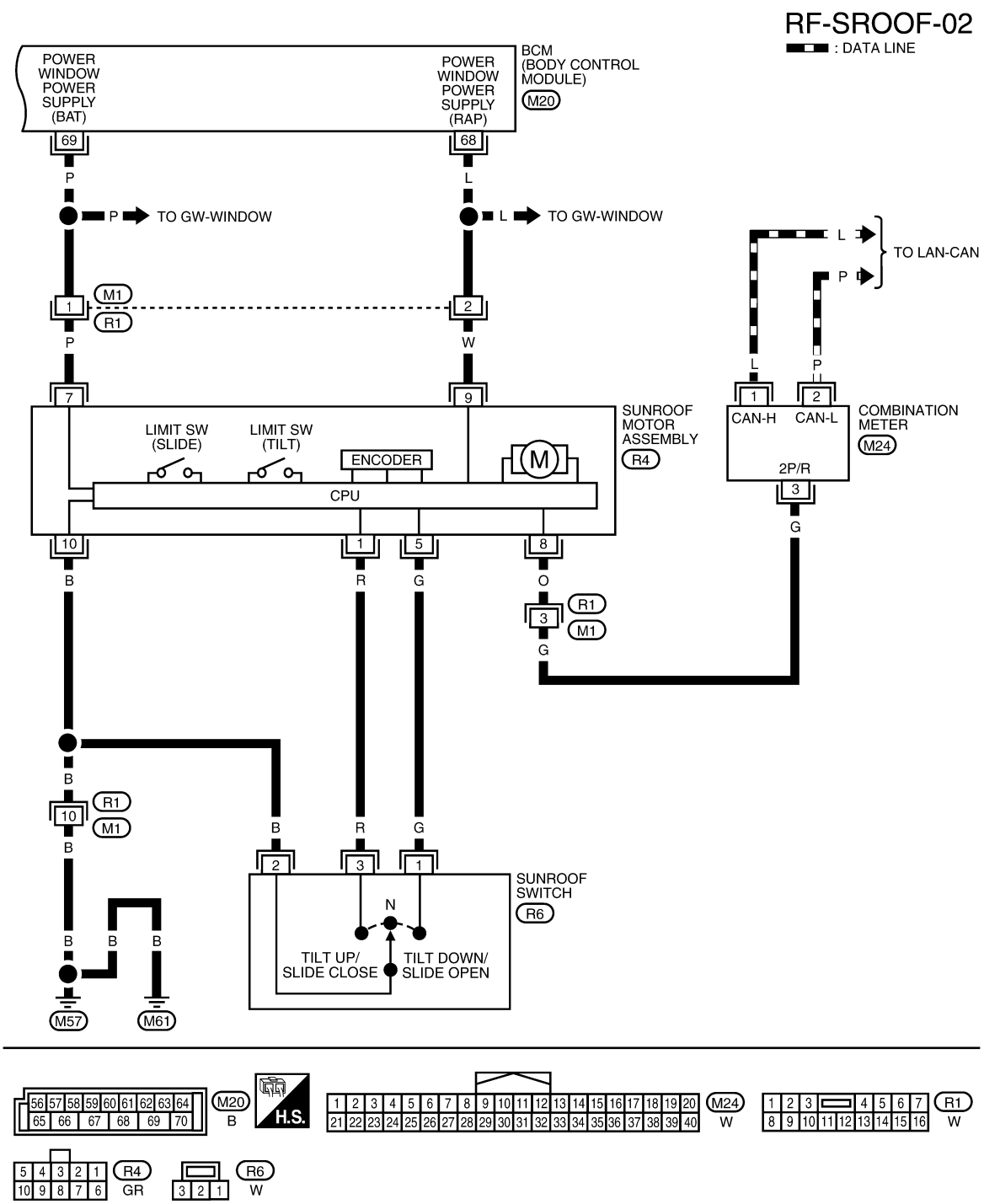
Refer to LAN-5 .

Wiring Diagram - SROOF -

INFOID:0000000007330221

RF-SROOF-01





WIWA1951E

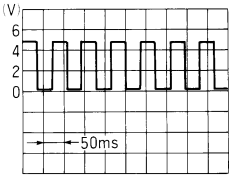
Terminal and Reference Value for BCM

INFOID:0000000007330222

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Terminal and Reference Value for Sunroof Motor Assembly

INFOID:0000000007330223

Terminal	Wire color	Item	Condition	Voltage (Approx.)
1	R	Sunroof switch (UP/CLOSE) signal	Ignition switch ON and sunroof switch in UP/CLOSE position	0
			Ignition switch ON and sunroof switch in OFF position	Battery voltage
5	G	Sunroof switch (DOWN/OPEN) signal	Ignition switch ON and sunroof switch in DOWN/OPEN position	0
			Ignition switch ON and sunroof switch in OFF position	Battery voltage
7	P	BAT power supply	—	Battery voltage
8	O	Vehicle speed signal	Speedometer operated [when vehicle speed is approx. 40 km/h (25 MPH)]	 ELF1080D
9	W	RAP signal	Ignition switch ON	Battery voltage
			Within 45 seconds after ignition switch is turned OFF	Battery voltage
			When front door LH or RH is opened while retained power is operating	0
10	B	Ground	—	0

Work Flow

INFOID:0000000007330224

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to RF-11, "System Description" .
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to RF-17, "Trouble Diagnosis Chart by Symptom" .
4. Does sunroof system operate normally? If Yes, GO TO 5. If No, GO TO 3.
5. Inspection End.

CONSULT Function (BCM)

INFOID:0000000007330225

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Description
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
	ECU IDENTIFICATION	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

Work Support

INFOID:0000000007330226

Work item	Description
RETAINED PWR SET	RAP signal's power supply period can be changed by mode setting. Selects RAP signal's power supply period between the following three steps. • MODE 1 (45 sec.) / MODE 2 (OFF) / MODE 3 (2 min.)

Active Test

INFOID:0000000007330227

Test item	Description
RETAINED PWR	This test is able to supply RAP signal (power) from BCM to power window system, power sunroof system. Those systems can be operated when turning on "RETAINED PWR" on CONSULT screen even if the ignition switch is turned OFF. **NOTE:** **During this test, CONSULT can be operated with ignition switch in "OFF" position. "RETAINED PWR" should be turned "ON" or "OFF" on CONSULT screen when ignition switch ON. Then turn ignition switch OFF for checking retained power operation. CONSULT might be stuck if "RETAINED PWR" is turned "ON" or "OFF" on CONSULT screen when ignition switch is OFF.**

Data Monitor

INFOID:0000000007330228

Monitored item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.

Trouble Diagnosis Chart by Symptom

INFOID:0000000007330229

Symptom	Diagnostic procedure and repair order	Refer to page
Sunroof does not operate.	1. BCM power supply and ground circuit check	BCS-16
	2. Sunroof motor assembly power supply and ground circuit check	RF-19
	3. Sunroof switch system check	RF-17
	4. Replace sunroof motor assembly	RF-22
Motor does not stop at the sunroof fully-open or fully-closed position.	1. Initialization procedure check	RF-11
	2. Replace sunroof motor assembly	RF-22
Retained power operation does not operate properly.	1. Check the retained power operation mode setting	RF-11
	2. BCM power supply and ground circuit check	BCS-16
	3. Door switch check	RF-20
	4. Replace sunroof motor assembly	RF-22
Sunroof does not do the interruption detection.	1. Replace sunroof motor assembly	RF-22

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007330230

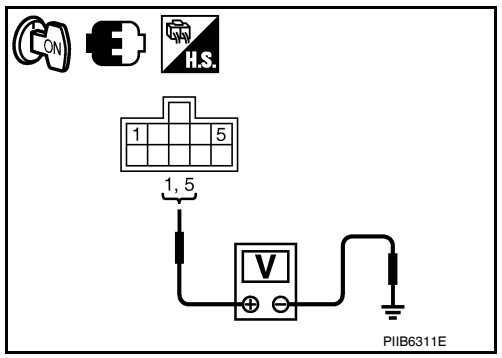
Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

Sunroof Switch System Inspection

INFOID:0000000007330231

1.SUNROOF SWITCH INPUT SIGNAL CHECK

1. Turn ignition switch ON.
2. Check voltage between sunroof motor assembly connector and ground.



Connector	Terminal (+)	Terminal (-)	Condition	Voltage (Approx.)
R4	1	Ground	Sunroof switch is operated to UP/CLOSE	0
			Other than above	Battery voltage
	5		Sunroof switch is operated to DOWN/OPEN	0
			Other than above	Battery voltage

OK or NG

OK >> Sunroof switch input signal circuits are OK.
NG >> GO TO 2.

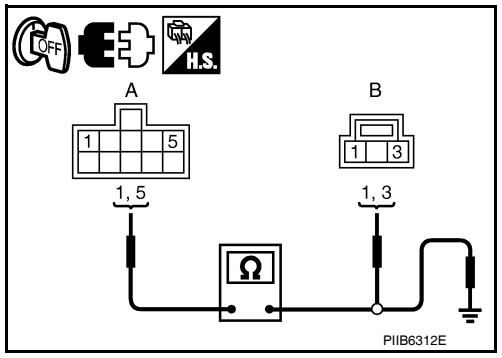
2.SUNROOF SWITCH CIRCUIT CHECK

1. Turn ignition switch OFF.
2. Disconnect sunroof motor assembly and sunroof switch.
3. Check continuity between sunroof motor assembly connector R4 (A) terminals 1, 5 and sunroof switch connector R6 (B) terminals 1, 3.

1 - 3 : Continuity should exist.
5 - 1 : Continuity should exist.

4. Check continuity between sunroof motor assembly connector R4 (A) terminals 1, 5 and ground.

1 - Ground : Continuity should not exist.
5 - Ground : Continuity should not exist.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

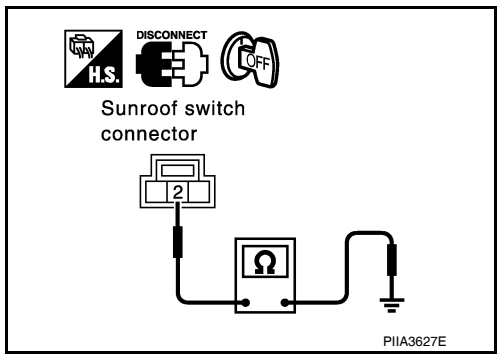
3.SUNROOF SWITCH GROUND CIRCUIT CHECK

Check continuity between sunroof switch connector R6 terminal 2 and ground.

2 - Ground : Continuity should exist.

OK or NG

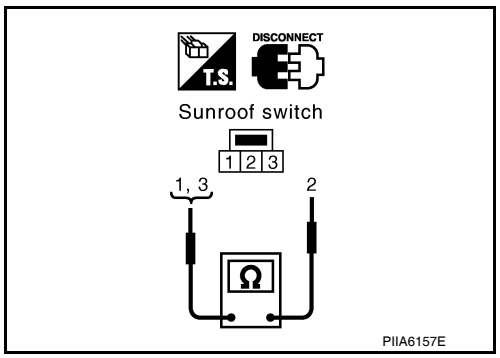
OK >> GO TO 4.
NG >> Repair or replace harness.



4.SUNROOF SWITCH CHECK

Check continuity between sunroof switch terminals 1, 3 and 2.

Terminals		Condition	Continuity
1	2	Sunroof switch is operated to DOWN/OPEN	Yes
		Other than above	No
3		Sunroof switch is operated to UP/CLOSE	Yes
		Other than above	No



OK or NG

OK >> Replace sunroof motor assembly. Refer to RF-22, "Removal and Installation" .
NG >> Replace sunroof switch.

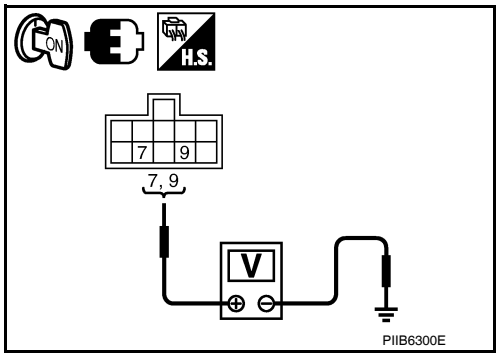
Sunroof Motor Assembly Power Supply and Ground Circuit Inspection

INFOID:0000000007330232

1.CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between sunroof motor assembly connector R4 terminals 7, 9 and ground.

7 - Ground : Battery voltage
9 - Ground : Battery voltage



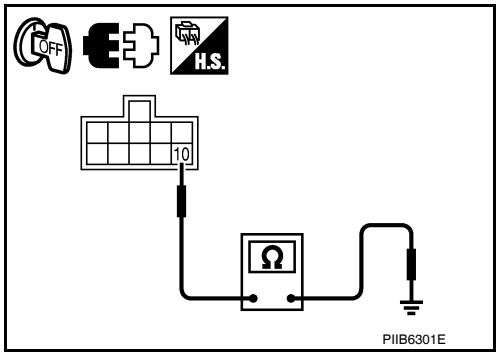
OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sunroof motor assembly.
3. Check continuity between sunroof motor assembly connector R4 terminal 10 and ground.

10 - Ground : Continuity should exist.



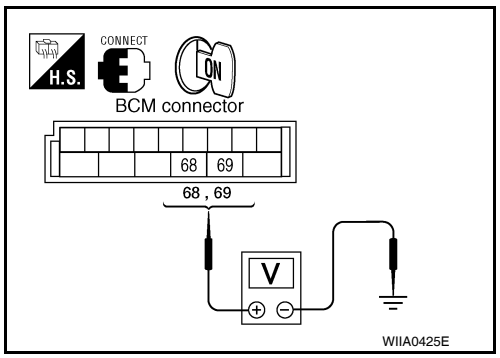
OK or NG

OK >> Sunroof motor assembly power supply and ground circuits are OK. Further inspection is necessary. Refer to RF-17, "Trouble Diagnosis Chart by Symptom" .
NG >> Repair or replace harness.

3.CHECK BCM OUTPUT SIGNAL

Check voltage between BCM connector M20 terminals 68, 69 and ground.

68 - Ground : Battery voltage
69 - Ground : Battery voltage



OK or NG

OK >> GO TO 4.
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

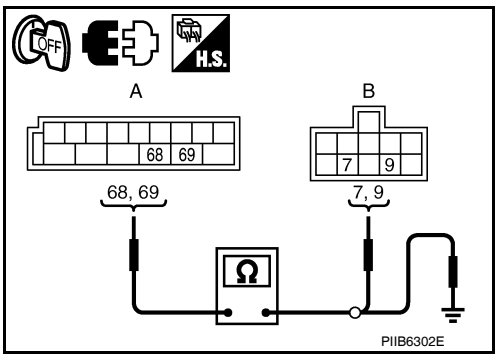
4.CHECK SUNROOF MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and sunroof motor assembly connectors.
3. Check continuity between BCM connector M20 (A) terminals 68, 69 and sunroof motor assembly connector R4 (B) terminals 7, 9.

68 - 9 : Continuity should exist.
69 - 7 : Continuity should exist.

4. Check continuity between BCM connector M20 (A) terminals 68, 69 and ground.

68 - Ground : Continuity should not exist.
69 - Ground : Continuity should not exist.



OK or NG

OK >> Sunroof motor assembly power supply circuits are OK. Further inspection is necessary. Refer to RF-17, "Trouble Diagnosis Chart by Symptom" .
NG >> Repair or replace harness.

Door Switch Check

INFOID:0000000007330233

1.CHECK DOOR SWITCH INPUT SIGNAL

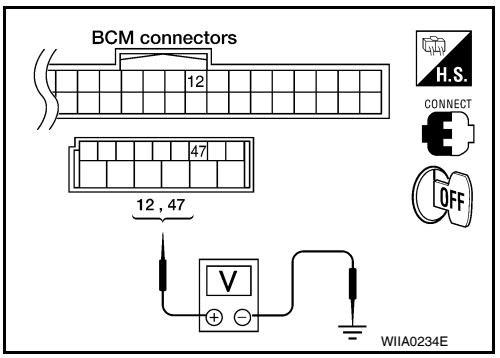
With CONSULT

Check ("DOOR SW-DR" and "DOOR SW-AS") in "DATA MONITOR" mode with CONSULT.

Monitor item	Condition	
DOOR SW-DR	DOOR OPEN	: ON
	DOOR CLOSED	: OFF
DOOR SW-AS	DOOR OPEN	: ON
	DOOR CLOSED	: OFF

Without CONSULT

Check voltage between BCM connector M18, M19 terminals 12, 47 and ground.



Item	Terminal (+)	Terminal (-)	Condition	Voltage (Approx.)
Front door switch RH	12	Ground	DOOR OPEN (Switch closed)	0
			DOOR CLOSED (Switch open)	Battery voltage
Front door switch LH	47		DOOR OPEN (Switch closed)	0
			DOOR CLOSED (Switch open)	Battery voltage

OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2.

2.CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door switch and BCM.
3. Check continuity between BCM connector M18, M19 terminals 12, 47 and door switch connectors B8, B108 terminal 2.

Front door LH

47 - 2 : Continuity should exist.

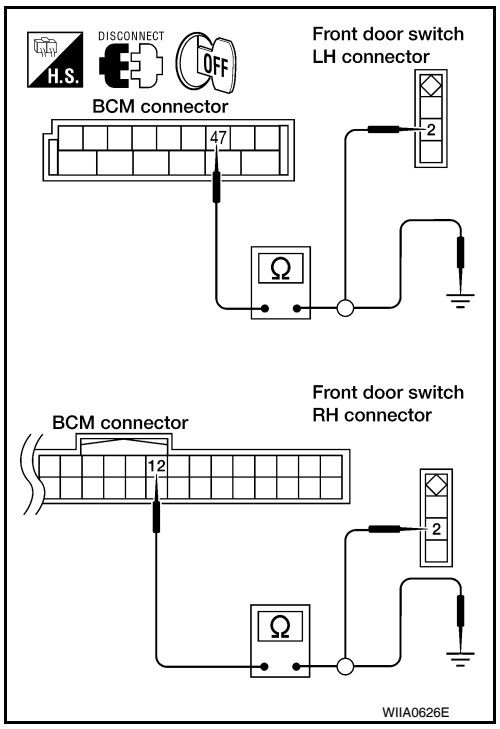
Front door RH

12 - 2 : Continuity should exist.

4. Check continuity between BCM connector M18, M19 terminals 12, 47 and ground.

12 - Ground : Continuity should not exist.

47 - Ground : Continuity should not exist.



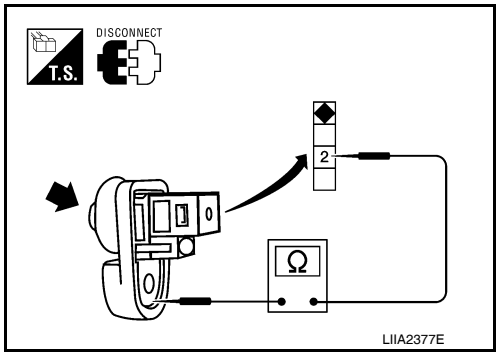
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between door switches terminal 2 and ground part of door switch.

Terminal		Door switch	Continuity
2	Ground part of door switch	Pushed	No
		Released	Yes



OK or NG

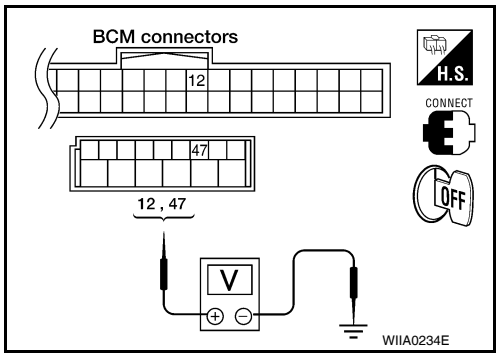
OK >> GO TO 4.
NG >> Replace malfunctioning door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM.
2. Check voltage between BCM connector M18, M19 terminals 12, 47 and ground.

12 - Ground : Battery voltage

47 - Ground : Battery voltage



OK or NG

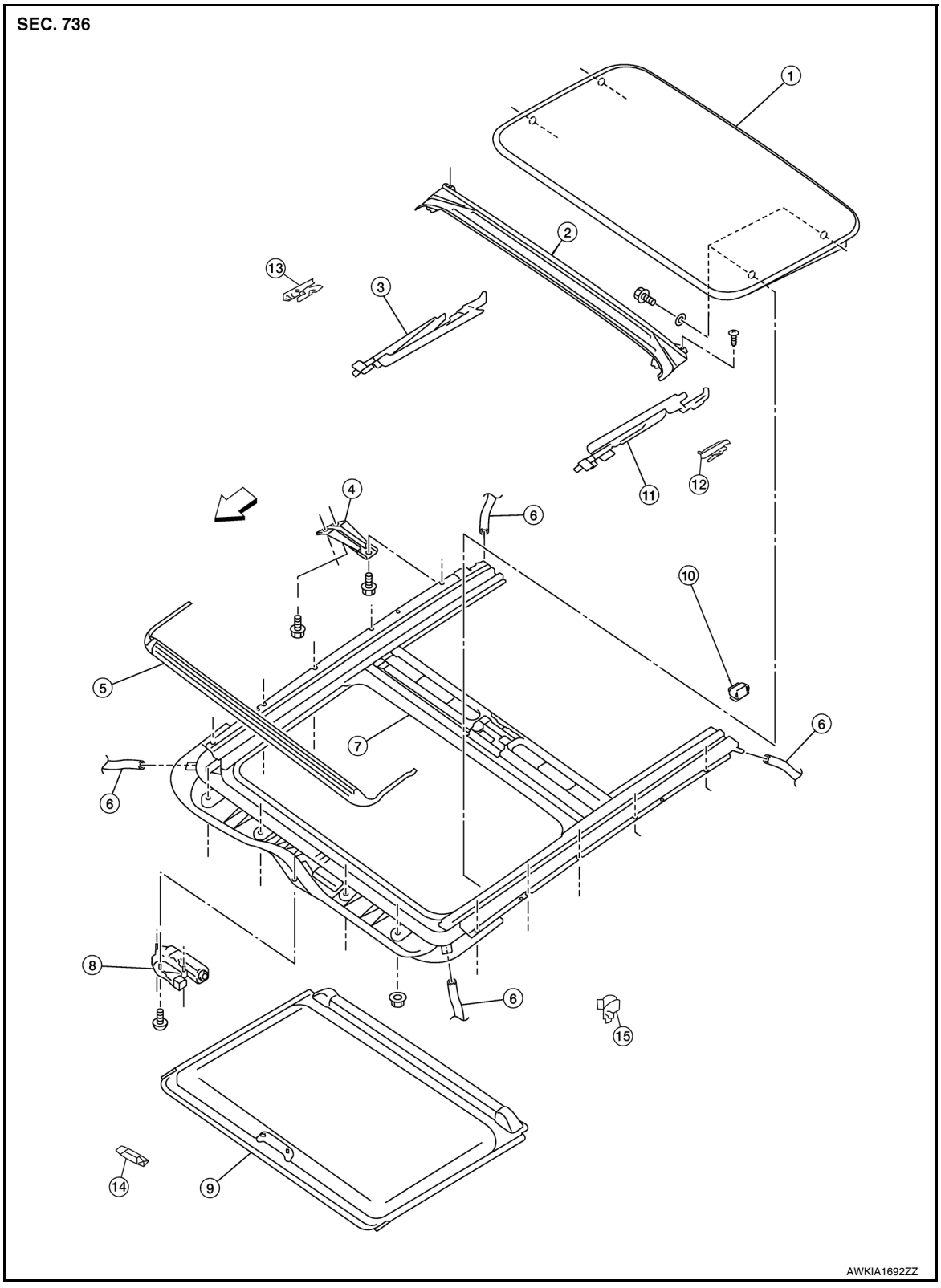
OK >> Further inspection is necessary. Refer to RF-17, "Trouble Diagnosis Chart by Symptom" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

ON-VEHICLE REPAIR

SUNROOF

Removal and Installation

INFOID:0000000007330234



1. Glass lid
2. Rear drain assembly
3. Link assembly (RH)
4. Sunroof bracket
5. Wind deflector
6. Drain hose
7. Sunroof unit assembly
8. Sunroof motor assembly
9. Sunshade
10. Sunshade stopper
11. Link assembly (LH)
12. Wire guide assembly (LH)
13. Wire guide assembly (RH)
14. Sunshade handle
15. Drain hose clip

⇦ Vehicle front

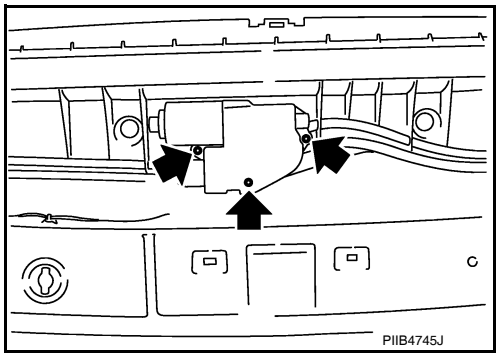
CAUTION:
- **After installation or any adjustment, check clearances for sunroof operation and glass lid alignment.**
- **Handle glass lid with care to prevent damage.**
- **Fully close the glass lid before removal, then do not operate sunroof motor assembly after removal.**
- **When removing sunroof unit assembly, use shop cloths to protect the seats and trim from damage.**
- **Always work with a helper.**

NOTE:
For easy installation, mark each point before removal.

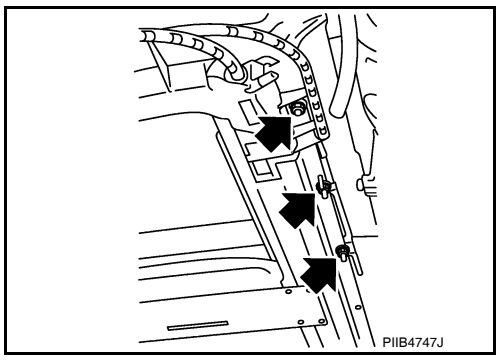
SUNROOF UNIT ASSEMBLY

Removal

1. Remove glass lid. Refer to GLASS LID REMOVAL AND INSTALLATION procedure in this section.
2. Position sunroof unit assembly to the fully closed position.
3. Remove the headlining. Refer to EI-41, "Component".
4. Disconnect drain hoses.
5. Remove the screws, then disconnect the sunroof motor assembly.
   CAUTION:
   - **Before removing sunroof motor assembly, make sure that sunroof is fully closed.**
   - **After removing sunroof motor assembly, do not attempt to rotate sunroof motor as a single unit.**

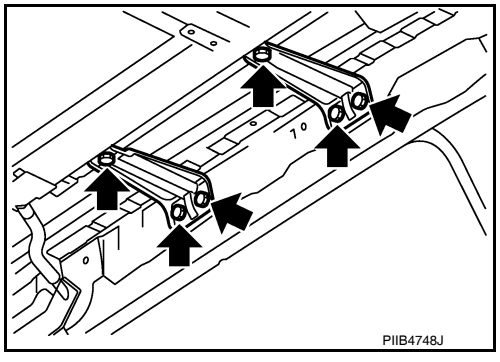


6. Remove the side and front sunroof unit assembly nuts.



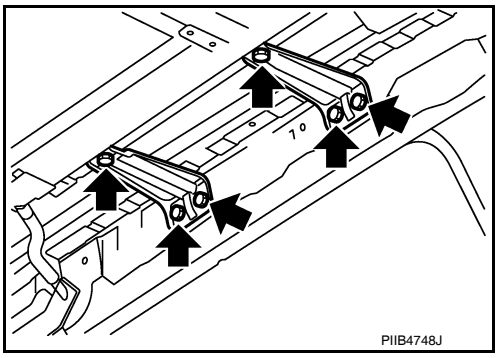
7. Remove sunroof bracket bolts, then remove sunroof unit assembly from roof panel.
   - Remove sunroof unit assembly through the passenger door opening.

   CAUTION:
   Use care during assembly removal and installation to avoid damage to seats and trim.

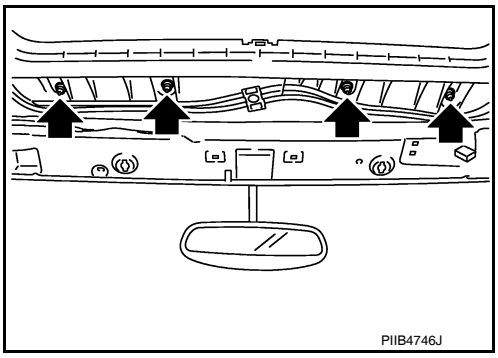


Installation

1. Install sunroof brackets and bolts to the roof panel only, but do not tighten.
2. Bring sunroof unit assembly into passenger compartment and position rear of the assembly on the sunroof brackets.
3. Install sunroof bracket bolts to the sunroof unit assembly side, but do not tighten.

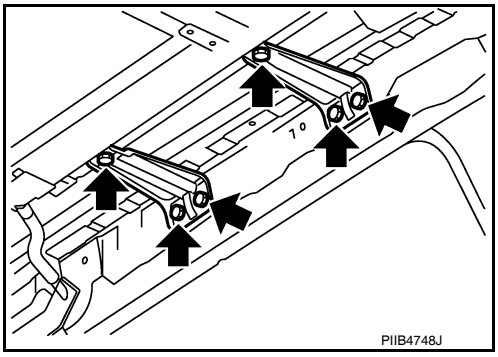


4. Install the front and side sunroof unit assembly nuts, but do not tighten.

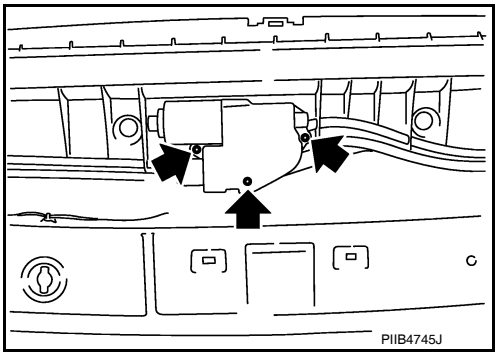


5. Tighten the sunroof unit assembly.

a. First, tighten the sunroof bracket bolts to the roof panel, then tighten the bolts to the sunroof unit assembly.
b. Next, tighten the front and side sunroof unit assembly nuts diagonally.



7. Connect the sunroof motor assembly harness connector, install the sunroof motor assembly and secure with screws.



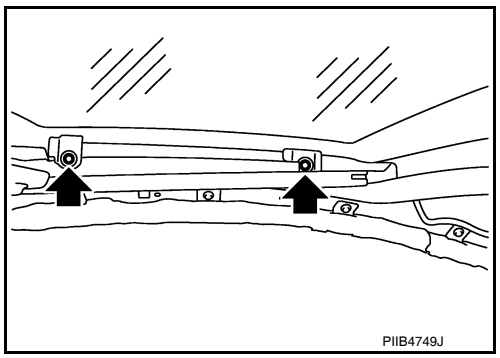
8. Install the glass lid. Refer to GLASS LID REMOVAL AND INSTALLATION procedure in this section.
9. Connect drain hoses.
10. Install headlining. Refer to EI-41, "Component".
11. Perform fitting adjustment and test for leaks, refer to RF-26, "Fitting Adjustment".

GLASS LID

Removal

1. Open the sunshade fully and close the glass lid.

2. Remove glass lid bolts, then remove glass lid.



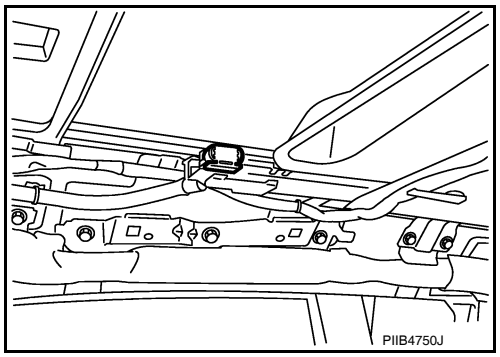
Installation

1. Position the glass lid on sunroof unit assembly.
2. Partially install glass lid bolts. Tighten left front bolt first, then right rear to prevent uneven torque while tightening remaining bolts.
3. After installation, check sunroof operation and glass lid alignment. Refer to RF-26, "Fitting Adjustment".

SUNSHADE

Removal

1. Remove the headlining. Refer to EI-41, "Component".
2. Remove sunshade stopper RH/LH.
3. Pull sunshade out rear of sunroof unit assembly.



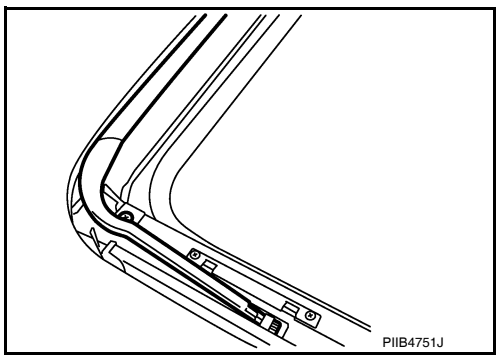
Installation

Installation is in the reverse order of removal.

WIND DEFLECTOR

Removal

1. Open the glass lid.
2. Remove spring retainer screws RH/LH, then slide spring retainer forward and out of sunroof unit assembly channel.
3. Lift wind deflector and rotate arms upward to release from sunroof unit assembly.



Installation

Installation is in the reverse order of removal.

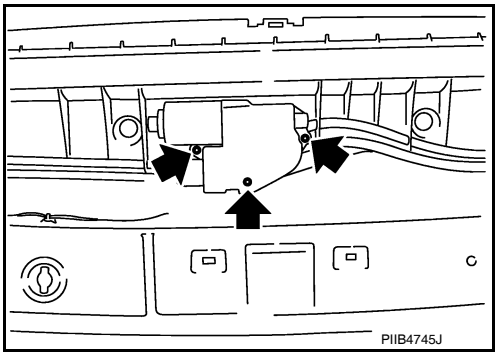
SUNROOF MOTOR ASSEMBLY

Removal

1. Close the glass lid.

2. Remove headlining. Refer to EI-41, "Component".
3. Remove sunroof motor assembly screws.
4. Disconnect sunroof motor assembly harness connector, then remove sunroof motor assembly.

CAUTION:
- **When removing the sunroof motor assembly, be sure that the sunroof lid is in the fully closed position.**
- **Do not operate the removed sunroof motor assembly as a single unit.**



Installation

CAUTION:
- **Before installing the sunroof motor assembly, be sure the link assembly is in the symmetrical and fully closed position.**
- **Align the link notch with the hole of the guide track (fully closed: RH and LH).**

1. Place the sunroof motor assembly flat onto the sunroof unit assembly surface.
2. Laterally move the assembly little by little so that the gear is completely engaged into the wire and there is no gap between the sunroof unit assembly and sunroof motor assembly.
3. Install the sunroof motor assembly screws, then connect the harness connector.
4. After installing, perform the initialization procedure. Refer to RF-11, "System Description".

LINK ASSEMBLY

Removal

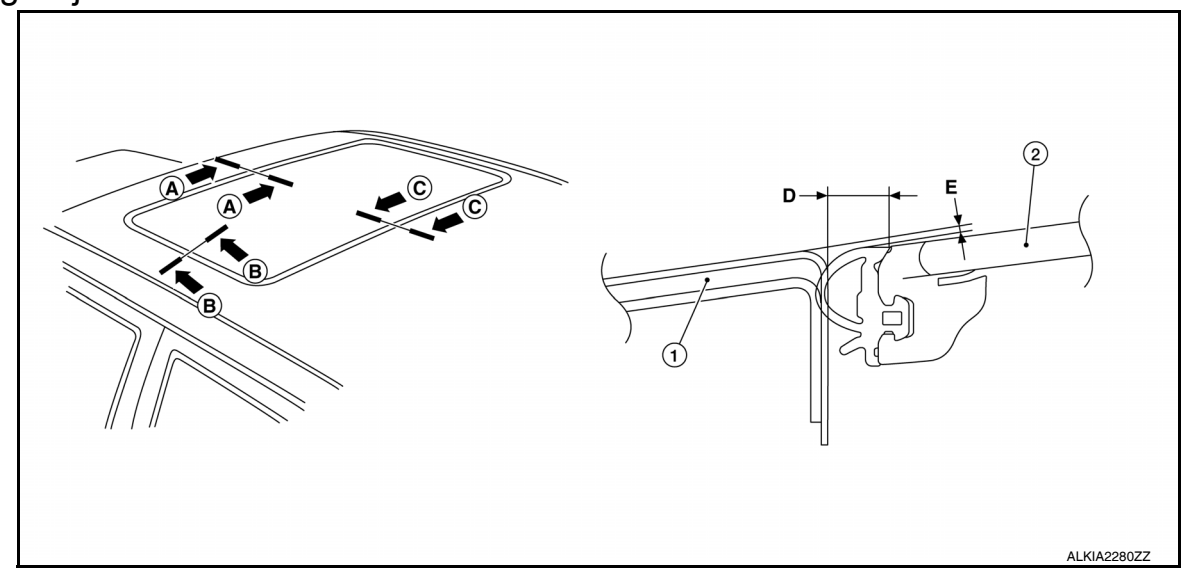
1. Remove sunroof unit assembly. Refer to SUNROOF UNIT ASSEMBLY REMOVAL AND INSTALLATION procedure in this section.
2. Remove screws, then remove rear drain assembly.
3. Remove sunroof motor assembly. Refer to SUNROOF MOTOR ASSEMBLY REMOVAL AND INSTALLATION procedure in this section.
4. Remove link assembly from the rear end of the sunroof unit assembly.

Installation

Installation is in the reverse order of removal.

Fitting Adjustment

INFOID:0000000007330235



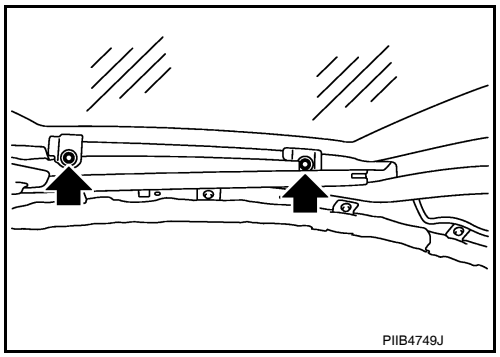
Unit: mm (in)

Portion	Gap (D)	Surface height difference (E)
(A – A)	5.8 (0.23)	0.0 ± 1.5 (0.00 ± 0.06)
(B – B)	5.8 (0.23)	0.0 ± 1.5 (0.00 ± 0.06)
(C – C)	5.8 (0.23)	0.0 ± 1.5 (0.00 ± 0.06)

GAP ADJUSTMENT

1. Open sunshade assembly (1).
   ⇦:Vehicle front
2. Tilt up glass lid.
3. Loosen glass lid bolts, then tilt down glass lid.
4. Manually adjust glass lid from outside of vehicle so gaps are within specifications.
   - For gap adjustment "A-A" "C-C", carefully slide glass lid forward and rearward in vehicle.
   - For gap adjustment "B-B", loosen sunroof unit assembly and shift side to side.

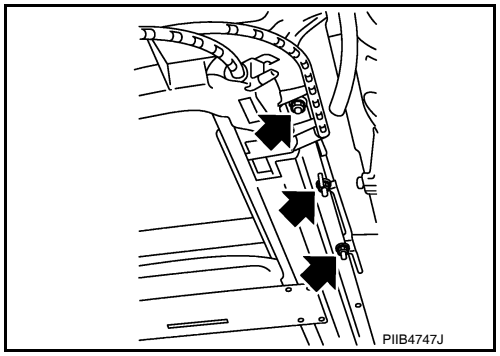
   NOTE:
   To prevent glass lid from moving after adjustment, lightly tighten the bolts.
5. Tighten left front bolt, then right rear bolt to prevent uneven torque. Tighten remaining bolts, being careful to prevent glass lid from moving.
6. Tilt glass lid up and down several times to check that it moves smoothly, and retains the adjustment.



HEIGHT ADJUSTMENT

1. Tilt up glass lid.
2. Loosen glass lid bolts, then tilt down glass lid.
3. Adjust glass lid from outside of vehicle so height is within specifications.
   - For height adjustment, manually raise/lower glass lid assembly until height difference is within specifications.

   NOTE:
   - If necessary, shims may be added between sunroof unit assembly and roof panel to increase glass lid height adjustment range.
   - To prevent glass lid from moving after adjustment, lightly tighten the bolts.
4. Tighten left front bolt, then right rear bolt to prevent uneven torque. Tighten remaining bolts, being careful to prevent glass lid from moving.
5. Tilt glass lid up and down several times to check that it moves smoothly, and retains the adjustment.



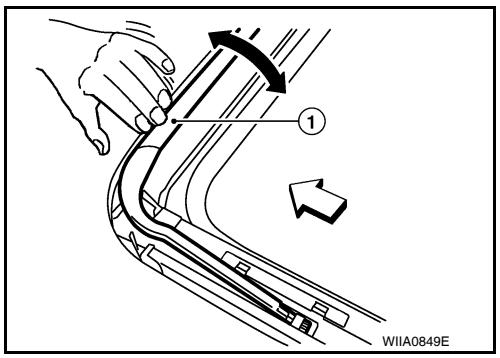
Inspection

INFOID:0000000007330236

WIND DEFLECTOR

Check that the wind deflector (1) moves freely within the sunroof unit assembly while manually pressing down and releasing. If a malfunction is detected, remove and visually check the deflector for damage, deteriorated components, or foreign objects within mechanism. Check to determine if a sufficient amount of grease has been applied to the pivot areas for non-binding operation, if not add grease as required. If it is damaged, replace it with a new one. If no damage is found, reinstall it properly.

⇦: Vehicle front



LINK ASSEMBLY AND WIRE

NOTE:
Before replacing a suspect part, make sure it is the source of noise being experienced.

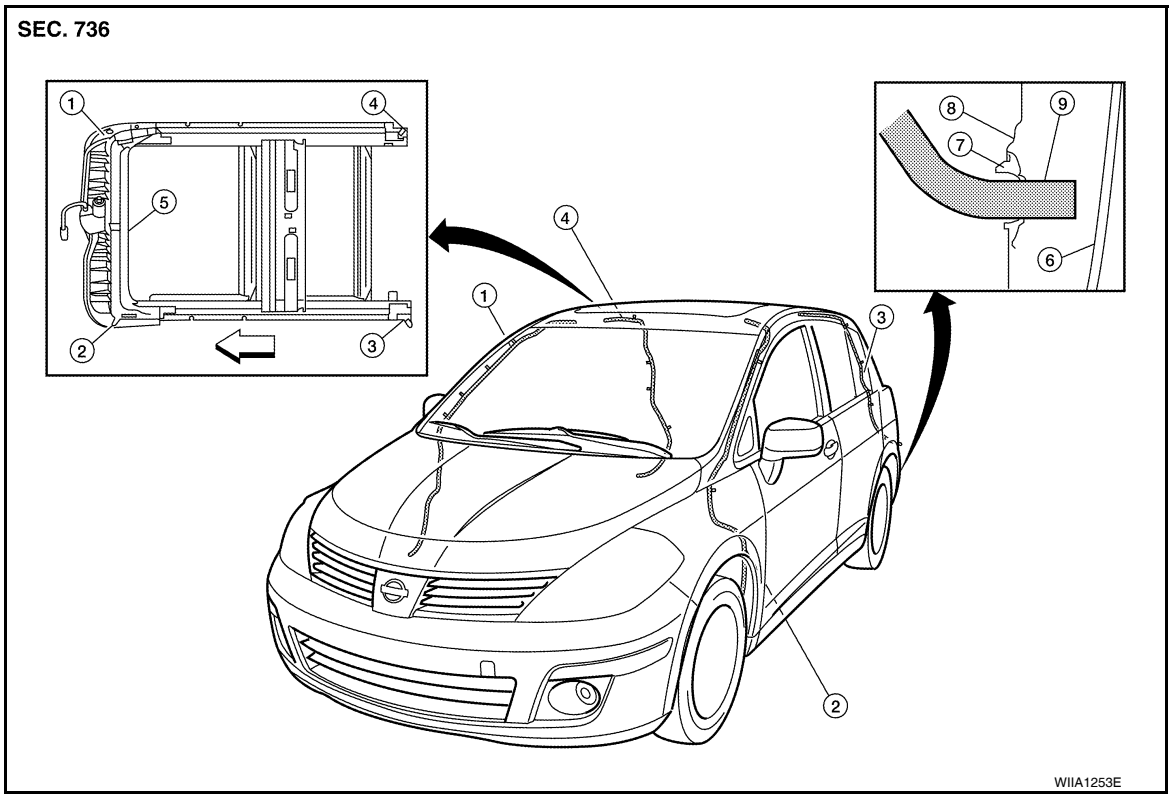
1. Check link to determine if coated film has peeled off to such an extent that substrate is visible. Check also to determine if link is the source of noise. If it is, replace it.
2. Visually check to determine if a sufficient amount of grease has been applied to wire or rail groove of the sunroof unit assembly. If not, add grease as required.
3. Check wire for any damage or deterioration. If any damage is found, replace sunroof unit assembly.

WEATHERSTRIP

1. Visually check weatherstrip for damage, deterioration, or deformation.
   - Open glass lid assembly enough to inspect front edge of weatherstrip.
   - Tilt up glass lid assembly fully to inspect sides and rear edge of weatherstrip.

   If any area of the weatherstrip is found to be damaged, replace the glass lid. Refer to RF-22, "Removal and Installation".
2. Check for leakage around glass lid.
   - Close glass lid fully.
   - Pour water around surface to determine area of concern.
   - For gaps or misalignment, adjust glass lid to specifications. Refer to RF-26, "Fitting Adjustment".
   - For damaged sealing surfaces, either replace glass lid RF-22, "Removal and Installation" or repair the panel BL-254, "Precaution in Repairing High Strength Steel".

DRAIN HOSES



1. Drain hose front RH
2. Drain hose front LH
3. Drain hose rear LH
4. Drain hose rear RH
5. Sunroof unit assembly
6. Fascia
7. Seal
8. Fender
9. Drain hose

⇦ Vehicle front

1. Remove headlining. Refer to EI-41, "Component".
2. Visually check drain hoses for:
   - Proper connection at sunroof unit assembly.
   - Damage, pinch, cracks, deterioration.

- Proper fastening and routing on body panels.

3. Pour water through drain hoses to determine watertight performance.

If a damaged or leaking portion in any drain hose is found, replace entire drain hose as an assembly.

SECTION EI
EXTERIOR & INTERIOR

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007332089

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007332090

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007768850

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000007332092

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-39570) Chassis ear	Locating the noise
— (J-43980) NISSAN Squeak and Rattle kit	Repairing the cause of noise
— (J-46534) Trim Tool Set	Removing trim components

Commercial Service Tool

INFOID:0000000007332093

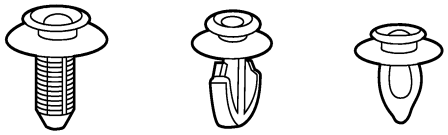
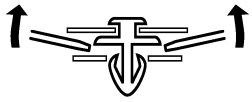
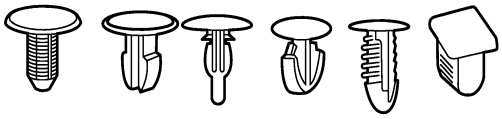
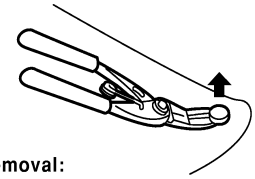
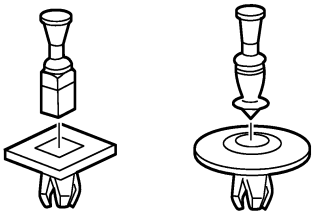
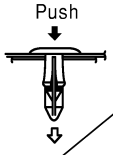
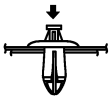
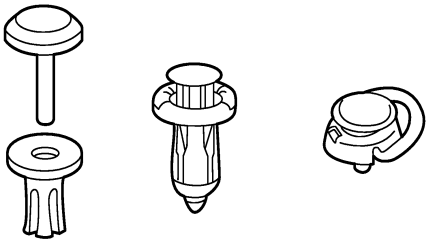
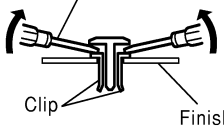
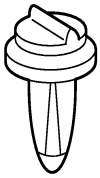
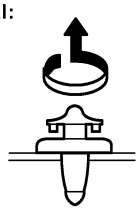
Tool number (Kent-Moore No.) Tool name	Description
— (J-39565) Engine ear	Locating the noise

CLIP LIST

Descriptions for Clips

INFOID:0000000007768854

Replace any clips which are damaged during removal or installation.

Symbol No.	Shapes	Removal & Installation
C101		**Removal:** Remove by bending up with flat-bladed screwdrivers or clip remover. 
C103		 **Removal:** Remove with a clip remover.
C203		**Removal:** Push center pin to catching position. (Do not remove center pin by hitting it.)  Push  Push **Installation:**
C205		**Removal:** Flat-bladed screwdriver  Clip Finisher
C206		**Removal:** 

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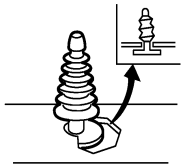
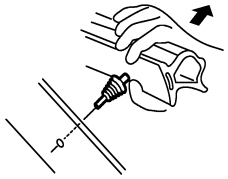
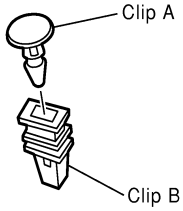
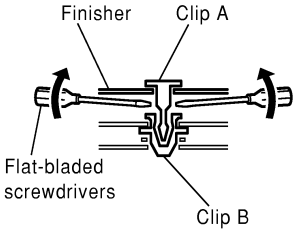
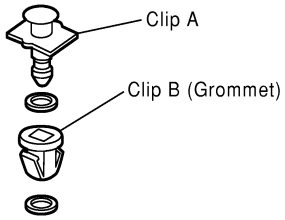
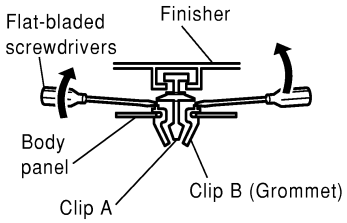
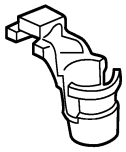
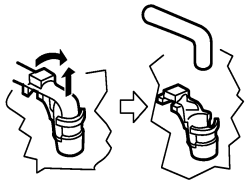
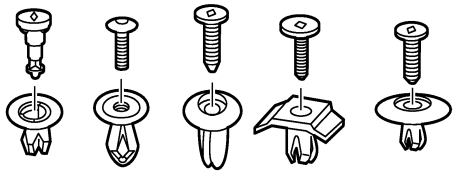
CLIP LIST

Symbol No.	Shapes	Removal & Installation
CE103		**Removal:** 
CF110		**Removal:** 
CF118		**Removal:** 
CR103		**Removal:** Holder portion of clip must be spread out to remove rod. 
CS101		**Removal:** 1. Screw out with a Phillips screwdriver. 2. Remove female portion with flat-bladed screwdriver.

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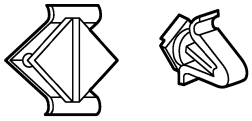
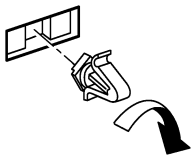
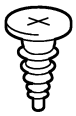
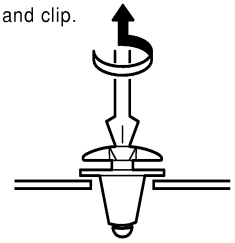
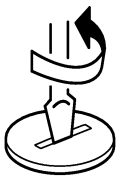
Symbol No.	Shapes	Removal & Installation	
CG101		**Removal:** Rotate 45° to remove **Removal:**	**Installation:** 
CS102			
CS113		**Removal:** Disconnect upper connection of clip with a flat-bladed screwdriver, then remove clip while inserting a flat-bladed screwdriver between body panel and clip. 	
C111			

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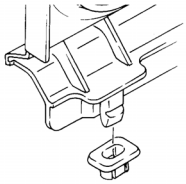
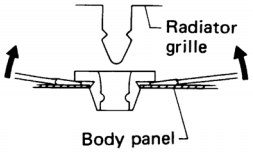
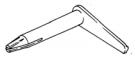
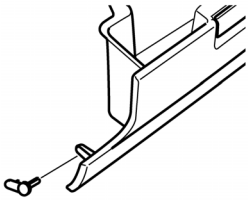
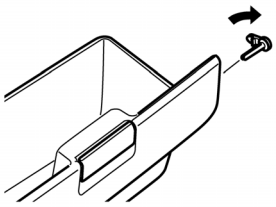
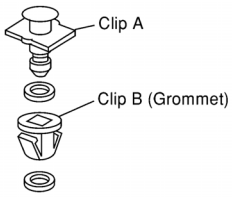
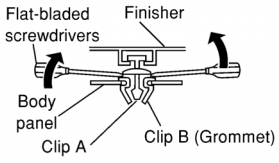
Symbol No.	Shapes	Removal & Installation
CG104		**Removal:** **Remove by bending up with flat-bladed screwdrivers.** 
CE114 		
CF118		**Removal:** 

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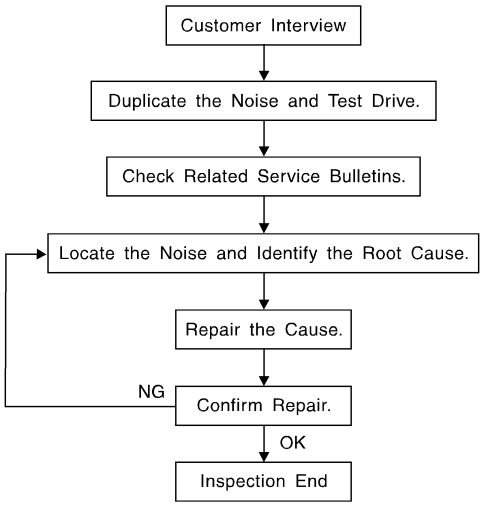
SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSIS

Work Flow

INFOID:0000000007768851



SBT842

CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to EI-13, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping.
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on CVT and A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565 and mechanic's stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:
   - removing the components in the area that you suspect the noise is coming from.
     Do not use too much force when removing clips and fasteners, otherwise clips and fasteners can be broken or lost during the repair, resulting in the creation of new noise.
   - tapping or pushing/pulling the component that you suspect is causing the noise.
     Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
   - feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
   - placing a piece of paper between components that you suspect are causing the noise.
   - looking for loose components and contact marks.
     Refer to EI-11, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A NISSAN Squeak and Rattle Kit (J-43980) is available through your authorized NISSAN Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.
The following materials are contained in the NISSAN Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100×135 mm (3.94×5.31 in)/76884-71L01: 60×85 mm (2.36×3.35 in)/76884-71L02: 15×25 mm (0.59×0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50×50 mm (1.97×1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50×50 mm (1.97×1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30×50 mm (1.18×1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15×25 mm (0.59×0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll. The following materials not found in the kit can also be used to repair squeaks and rattles.

UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used instead of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007768852

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together

4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lens loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component installed to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator installation pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine rpm or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

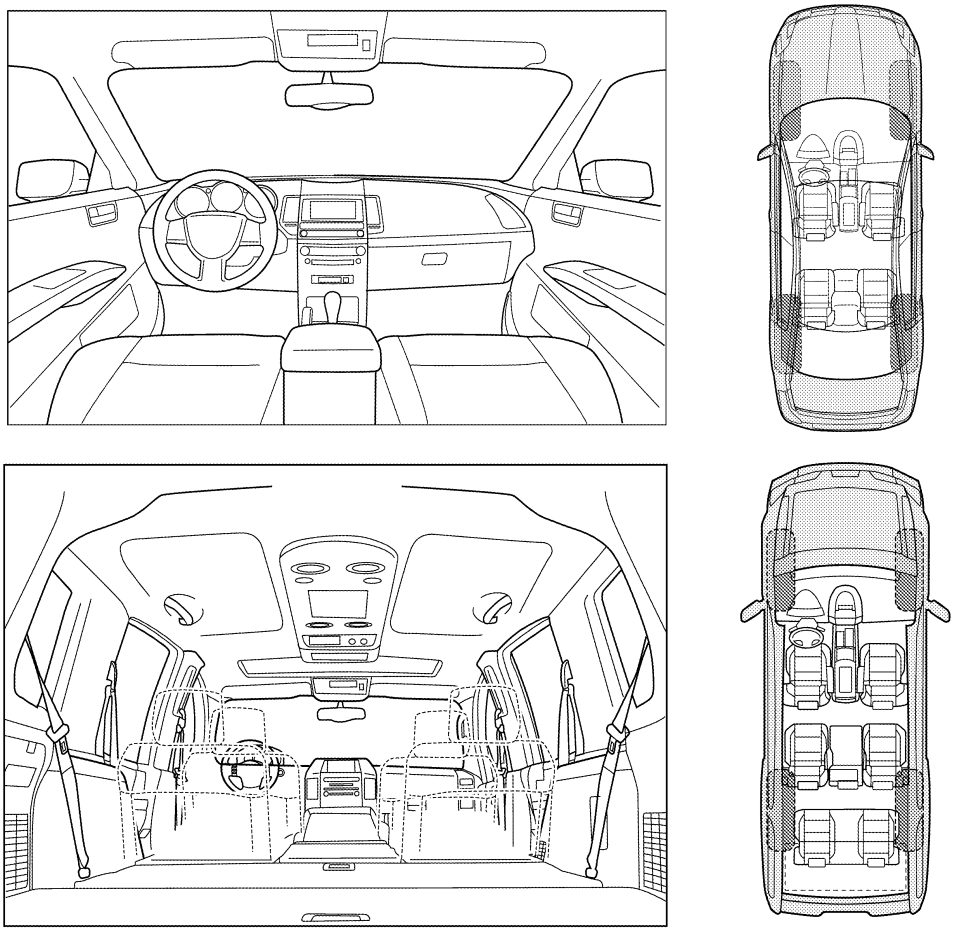
Diagnostic Worksheet

INFOID:0000000007768853

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

LAIA0072E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

This form must be attached to Work Order

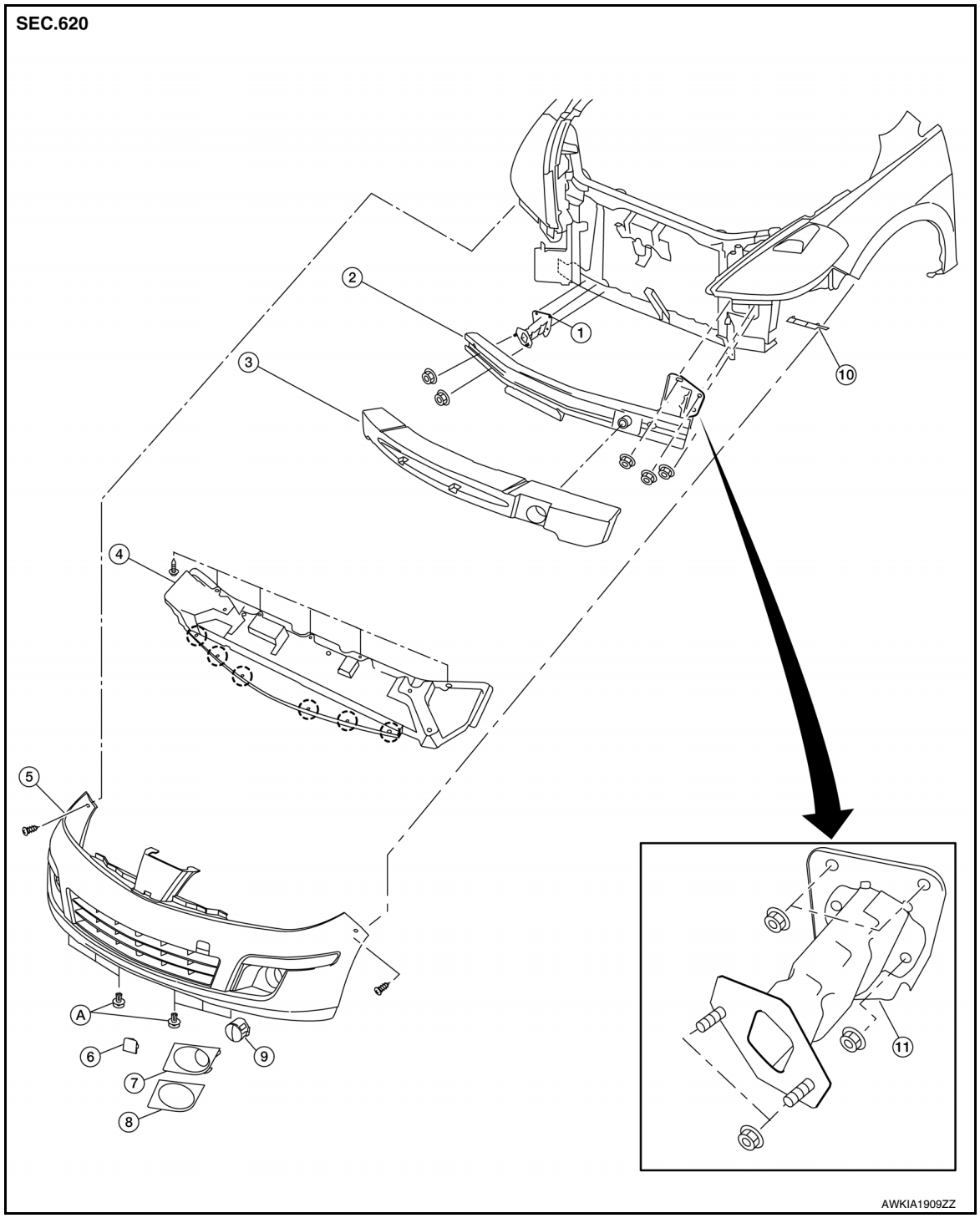
LAIA0071E

ON-VEHICLE REPAIR

FRONT BUMPER

Removal and Installation

INFOID:0000000007332098

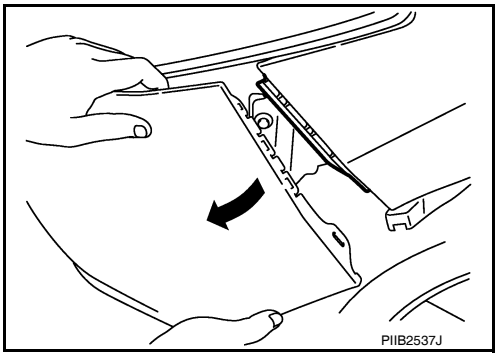


1. Bumper stay RH	2. Bumper reinforcement (production)	3. Bumper energy absorber
4. Front valance	5. Front bumper fascia	6. Tow cover
7. Fog lamp opening finisher (without fog lamps)	8. Fog lamp opening finisher (with fog lamps)	9. Fog lamp assembly
10. Bumper side retainer	11. Bumper stay LH (service)	A. Clip C205

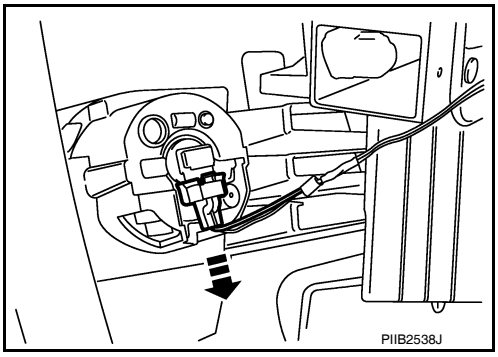
CAUTION:
Bumper fascia is made of resin. Do not apply strong force to it, and be careful to prevent contact with oil.

REMOVAL

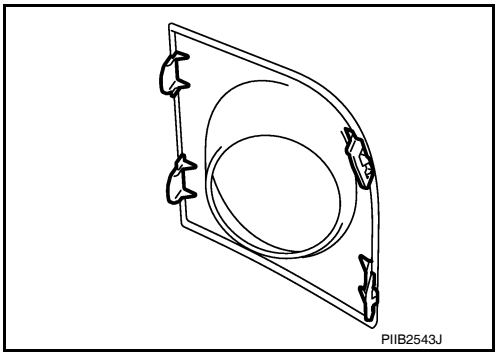
1. Open hood.
2. Remove front grille. Refer to EI-21.
3. Remove front fender protectors RH/LH. Refer to EI-24.
4. Remove front valance.
5. Remove screws of front bumper fascia RH/LH.
6. Pull the outboard edge of front bumper fascia away from vehicle to disengage from the bumper side retainer.



7. Disconnect fog lamp harness connector RH/LH (if equipped).
8. Remove the front bumper fascia.



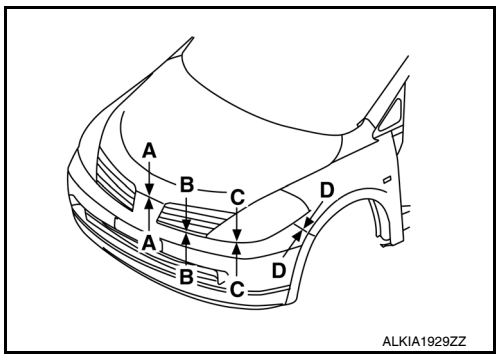
9. Remove fog lamp opening finisher and fog lamp assembly RH/LH (if equipped). Refer to LT-49, "Removal and Installation".
10. Remove bumper energy absorber.



11. Remove RH/LH air guide mounting clips of bumper reinforcement.
12. Remove the nuts, then remove bumper reinforcement and bumper stay(s):
    - For production, bumper stay LH is part of bumper reinforcement.
    - For service, bumper stay RH/LH are separate assemblies.
13. Remove bumper side bracket RH/LH after front bumper fascia removal.

INSTALLATION

Installation is in the reverse order of removal.



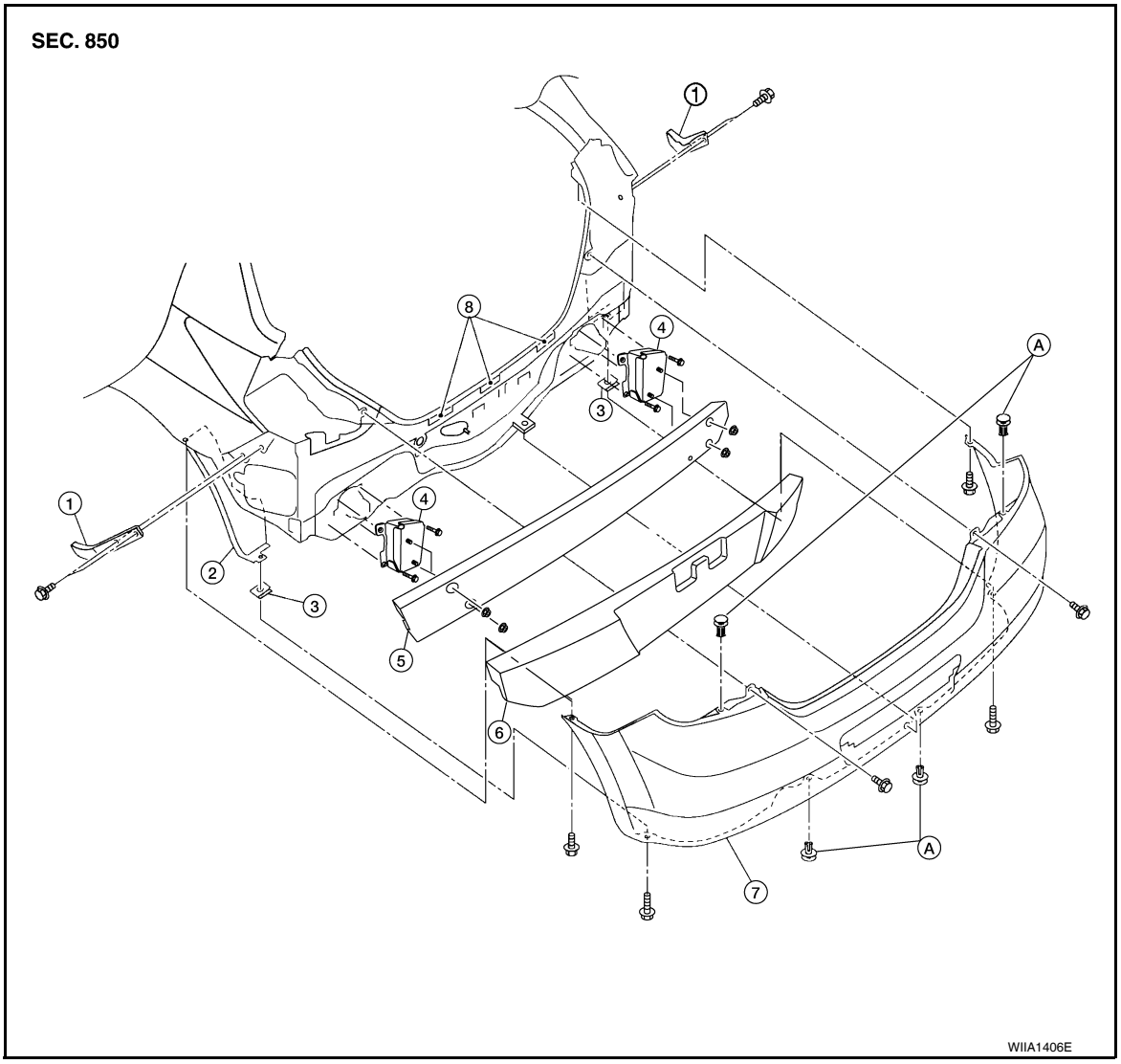
mm (in)

Component	Portion	Minimum	Target Value	Maximum
Front bumper - Hood Clearance	A-A	4.0 (0.157)	6.0 (0.236)	8.5 (0.335)
Front bumper - Hood Surface	A-A	-1.9 (0.075)	0.65 (0.026)	2.65 (0.104)
Front bumper - Front grille	B-B	1.0 (0.039)	2.0 (0.079)	3.0 (0.118)
Front bumper - Head lamp	C-C	0.3 (0.012)	2.0 (0.079)	3.7 (0.146)
Front bumper - Front fender Clearance	D-D	0.0 (0.000)	0.0 (0.000)	1.0 (0.039)
Front bumper - Front fender Surface	D-D	-0.35 (0.014)	0.65 (0.026)	1.65 (0.065)

REAR BUMPER

Component

INFOID:0000000007332099



1. Bumper side bracket
2. Rear fender protector
3. Spring nut
4. Bumper reinforcement bracket
5. Rear bumper reinforcement
6. Energy absorbing foam
7. Rear bumper fascia
8. Rear bumper upper retainer
A. Clip C205

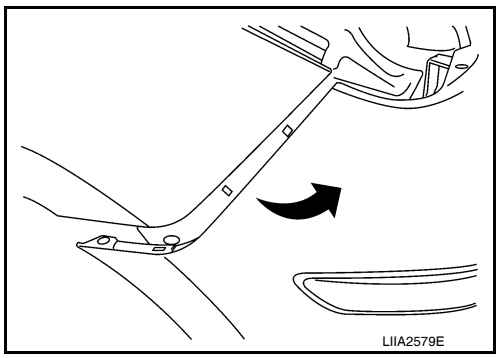
Removal and Installation

INFOID:0000000007332100

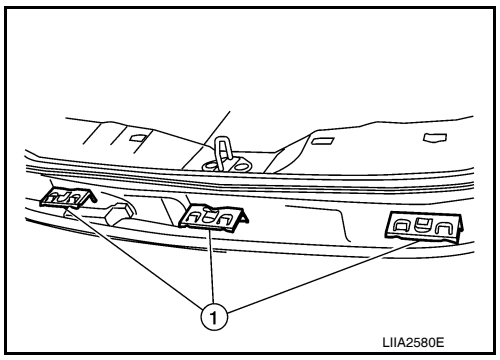
REMOVAL

1. Open back door.
2. Remove rear combination lamp RH/LH. Refer to LT-83, "Removal and Installation".
3. Remove rear bumper fascia spring nuts and screws RH/LH.
4. Remove rear fender protector. Refer to EI-24, "Removal and Installation".

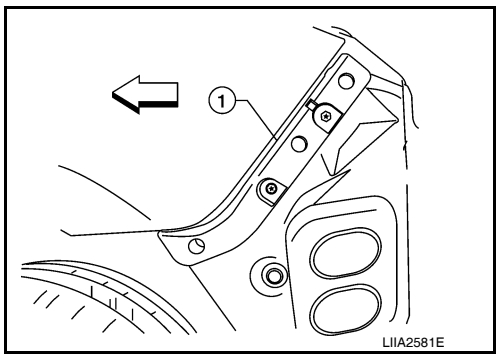
5. Pull the rear bumper fascia side outward and release the bumper side bracket.



6. Remove rear bumper fascia upper clips and screws.
7. Release rear bumper upper retainer (1), then pull rear bumper fascia outward away from rear of vehicle.

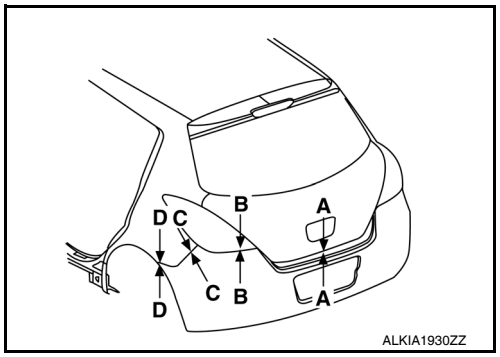


8. Disconnect license lamp connector.
9. Remove energy absorbing foam and rear bumper reinforcement.
10. Remove the bumper side bracket (1) RH/LH.
    - ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.



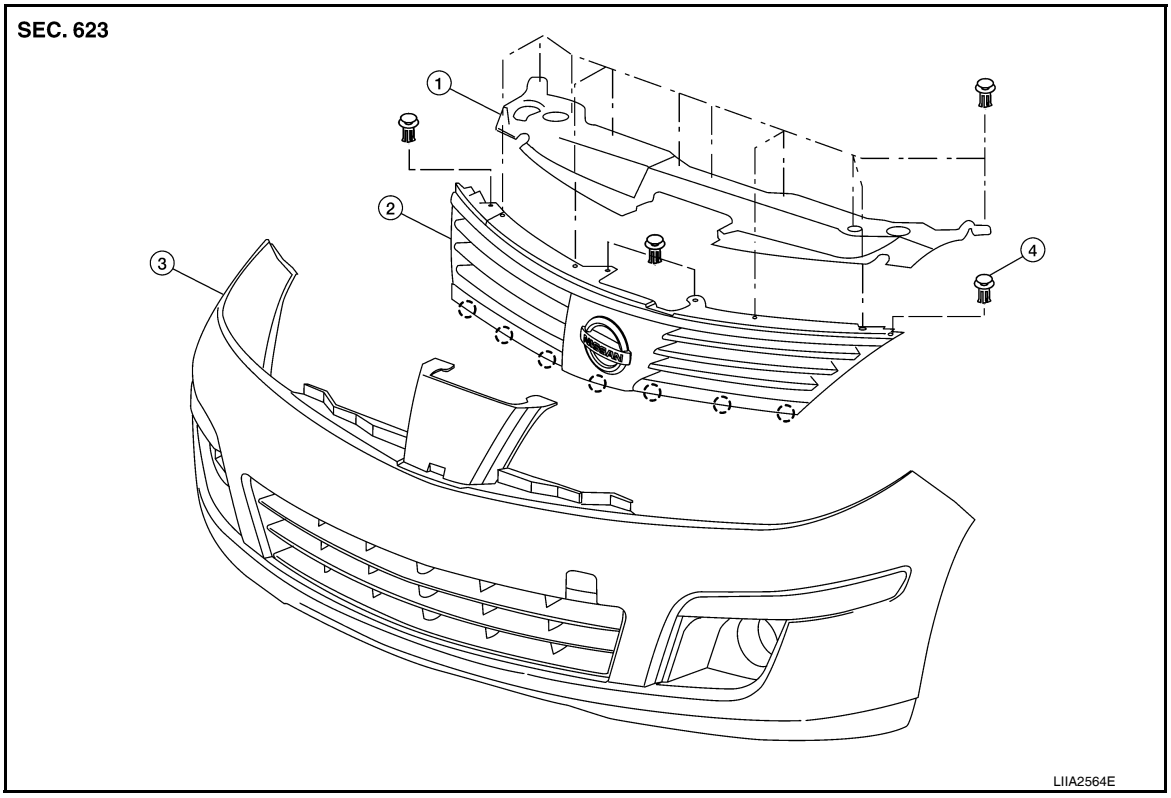
mm (in)

Component	Portion	Minimum	Target Value	Maximum
Rear bumper - Back door clearance	A-A	4.0 (0.157)	6.0 (0.236)	8.0 (0.315)
Rear bumper - Rear combination lamp clearance	B-B	1.0 (0.039)	2.0 (0.079)	3.5 (0.138)
Rear bumper - Rear combination lamp surface	B-B	-1.7 (-0.067)	0.0 (0.000)	1.7 (0.067)
Rear bumper - Rear fender clearance	C-C D-D	0.0 (0.000)	0.0 (0.000)	1.0 (0.039)
Rear bumper - Rear fender surface	C-C	-1.7 (-0.067)	-0.7 (-0.028)	0.3 (0.012)
Rear bumper - Rear fender surface	D-D	-0.3 (-0.012)	0.7 (0.028)	1.7 (0.067)

FRONT GRILLE

Removal and Installation

INFOID:0000000007332102



1. Upper radiator cover
2. Front grille
3. Front bumper fascia
4. Clip C205
◌ Pawl

REMOVAL

1. Open hood assembly.
2. Remove the clips, then remove upper radiator cover.
3. Remove the upper clips and release the lower pawls, then pull outward to remove the front grille.

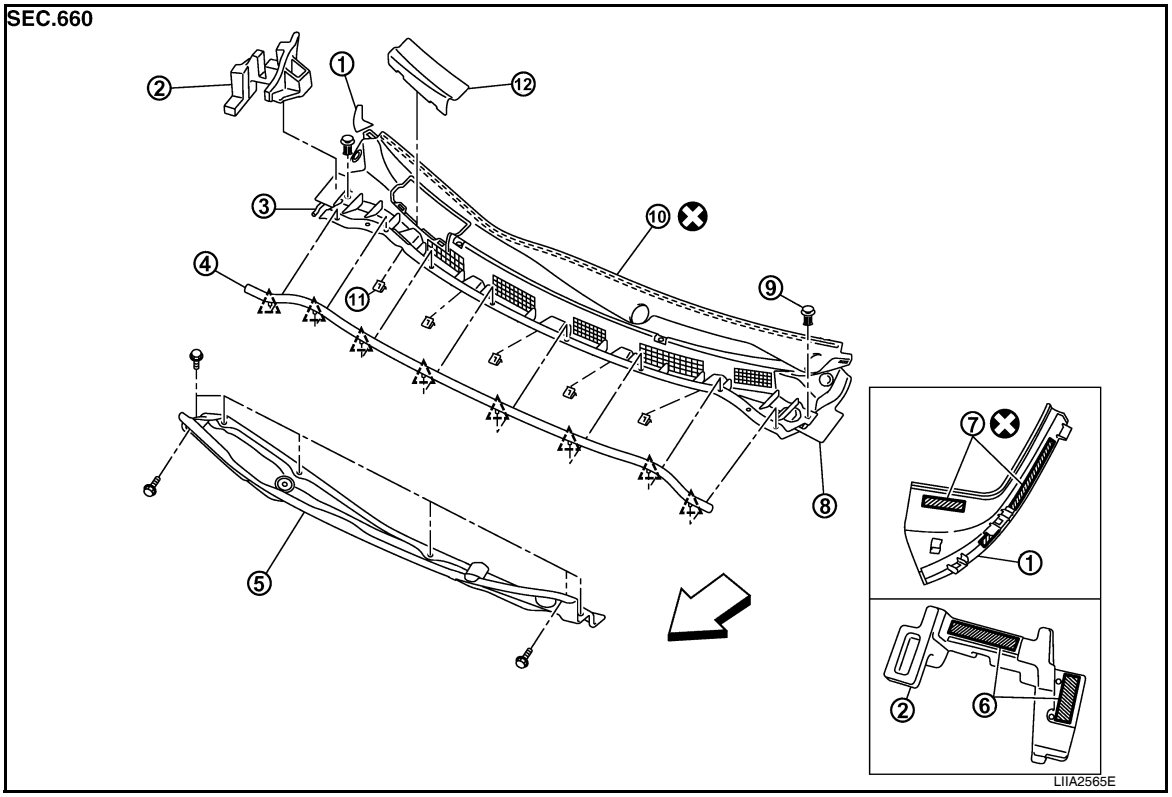
INSTALLATION

Installation is in the reverse order of removal.

COWL TOP

Removal and Installation

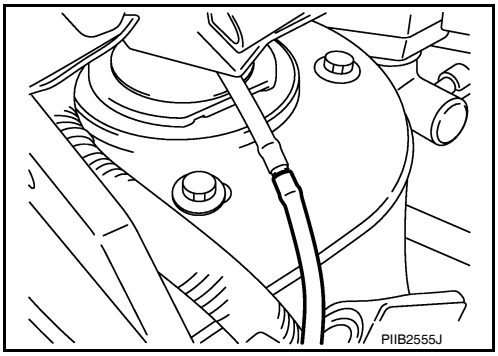
INFOID:0000000007332103



1. Fender cover	2. Fender seal	3. Washer tube
4. Cowl top seal	5. Cowl extension panel	6. Dual lock fastener
7. Double-faced adhesive tape	8. Cowl top cover	9. Clip C205
10. EPT sealer	11. Cowl extension clip	12. Cover
△ Clip CE103	⇦ Vehicle front	

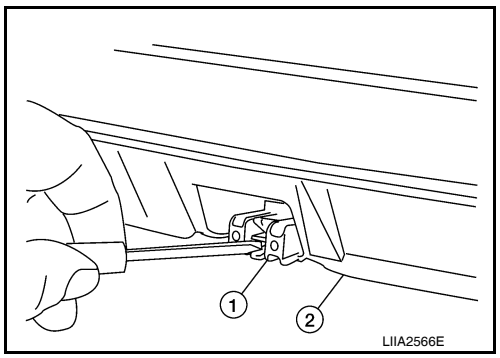
REMOVAL

1. Remove front wiper arm RH/LH from vehicle. Refer to WW-20, "Removal and Installation of Front Wiper Arms".
2. Disconnect washer tube.

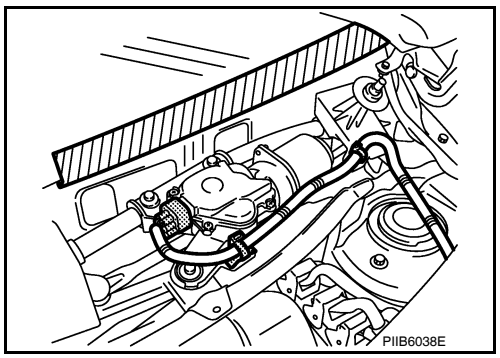


3. Remove fender seal and fender cover RH/LH.
4. Release the cowl top seal clips, then remove cowl top seal.

5. Release the cowl extension clip (1) by prying the center pawls apart and pulling clip outward. Remove remaining clips, then remove cowl top cover (2).



6. Disconnect and remove the front wiper motor and linkage assembly. Refer to WW-22, "Removal and Installation of Front Wiper Drive Assembly".
CAUTION:
To avoid damage, make sure to cover the lower edge of windshield with suitable protection material.



7. Remove cowl extension panel bolts, then remove cowl extension panel.

INSTALLATION

Installation is in the reverse order of removal.

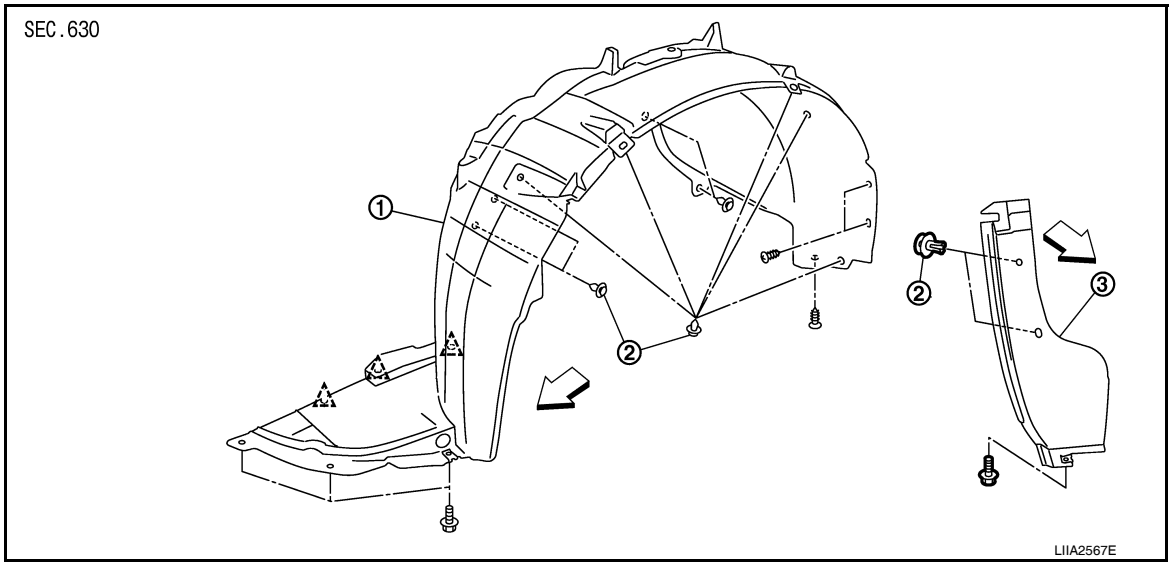
NOTE:

- For wiper arm RH/LH installation and adjustment, Refer to WW-20, "Removal and Installation of Front Wiper Arms".
- Always replace EPT sealer and double-faced adhesive tape when installing cowl top cover.

FENDER PROTECTOR

Component

INFOID:0000000007332104



1. Front fender protector
2. Clip C205
3. Rear fender protector
- Clip C103
- Vehicle front

Removal and Installation

INFOID:0000000007332105

FRONT FENDER PROTECTOR

Removal

1. Remove front fender protector bolts and clips.
2. Remove front fender protector.

Installation

Installation is in the reverse order of removal.

REAR FENDER PROTECTOR

Removal

1. Remove rear fender protector bolt and clip.
2. Remove rear fender protector.

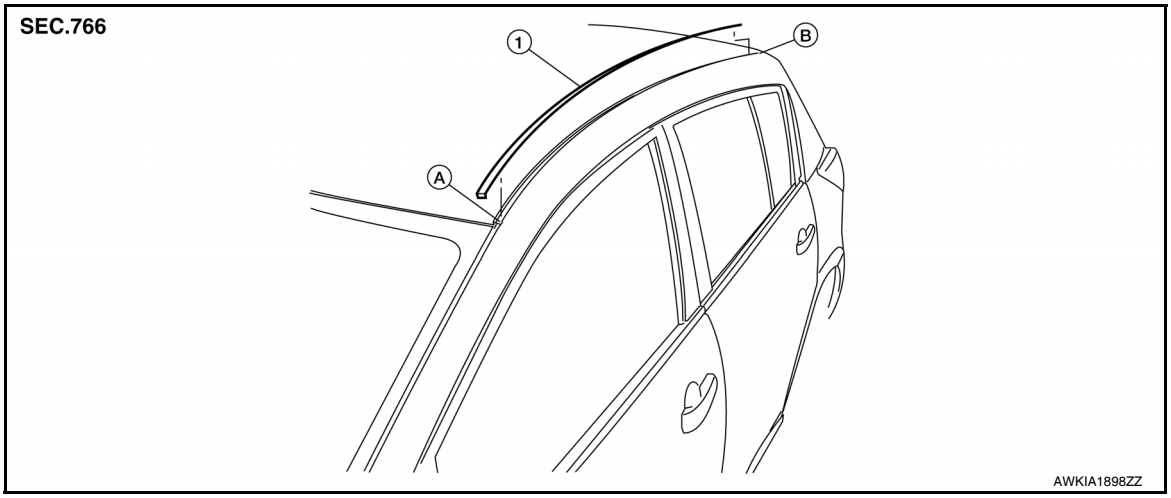
Installation

Installation is in the reverse order of removal.

ROOF SIDE MOLDING

Component

INFOID:0000000007332106



1. Roof side molding
A. Front roof side molding clip
B. Rear roof side molding clip

Removal and Installation

INFOID:0000000007332107

REMOVAL

1. Using a suitable tool, release the rear roof side molding clip and remove.
2. Lift up rear edge of roof side molding working forward.
3. Release front roof side molding clip, then remove roof side molding.

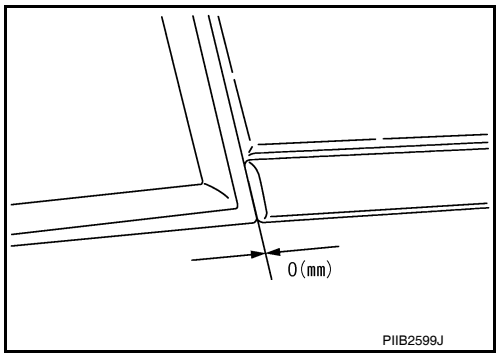
INSTALLATION

Installation is in the reverse order of removal.

NOTE:

Make sure front edge of roof side molding contacts windshield molding with no gap.

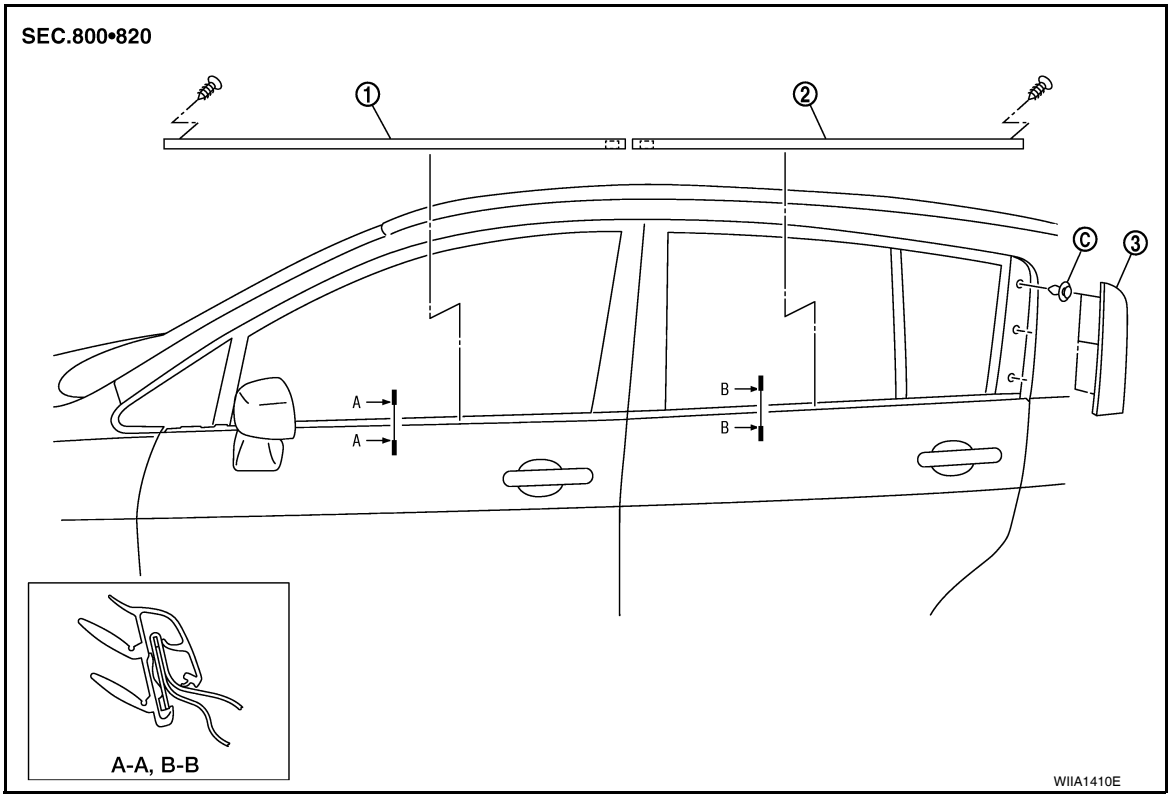
- For setting a new clip A or B, use Epoxy Adhesive DP-100C made by 3M. For adhesive DP-100C application use an applicator 9170 EPX W 1:1 and mixer nozzle 9742 EPX 50ML made by 3M.



DOOR OUTSIDE MOLDING

Component

INFOID:0000000007332108



1. Front door outside molding
2. Rear door outside molding
3. Rear door corner cover
C. Clip C101

Removal and Installation

INFOID:0000000007332109

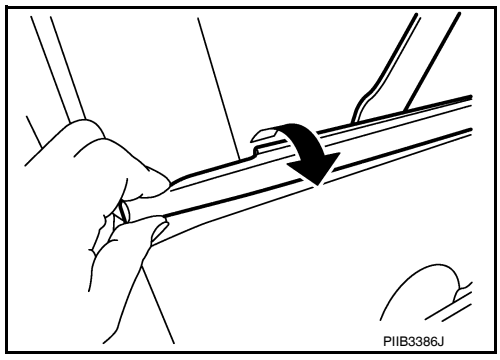
FRONT DOOR OUTSIDE MOLDING

CAUTION:

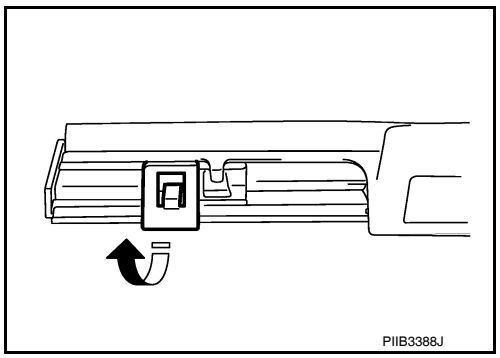
- **Use care while removing to avoid permanent damage to part from excessive force during removal.**
- **After removal, visually inspect molding; replace if deformed or damaged.**

Removal

1. Open front door window.
2. Remove front door outside molding screw.
3. While pulling up on front of front door outside molding, insert a suitable tool beneath the molding and release it from the door top edge.



4. Twist the lower edge of the molding away from the door at the rear to gain access to the locking tab.
5. Insert a suitable tool behind the molding pressing the center of the tab inward to release.
6. Remove front door outside molding while pulling up after disengaging.


PIIB3388J

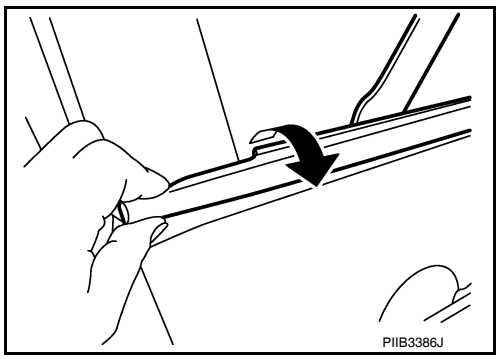
Installation
Installation is in the reverse order of removal.

REAR DOOR OUTSIDE MOLDING

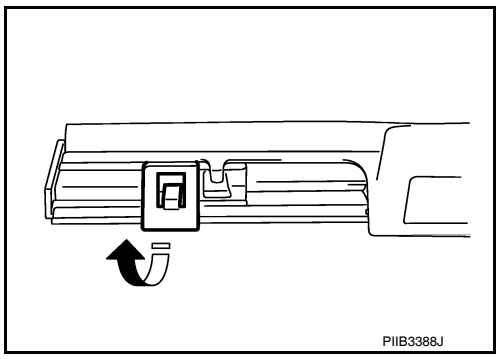
CAUTION:
- **Use care while removing to avoid permanent damage to part from excessive force during removal.**
- **After removal, visually inspect molding; replace if deformed or damaged.**

Removal

1. Open rear door window.
2. Remove rear door outside molding screw.
3. While pulling up on rear of rear door outside molding, insert a suitable tool beneath the molding and release it from the door top edge.


PIIB3386J

4. Twist the lower edge of the molding away from the door at the front to gain access to the locking tab.
5. Insert a suitable tool behind the molding pressing the center of the tab inward to release.
6. Remove rear door outside molding while pulling up after disengaging.


PIIB3388J

Installation
Installation is in the reverse order of removal.

REAR DOOR CORNER COVER

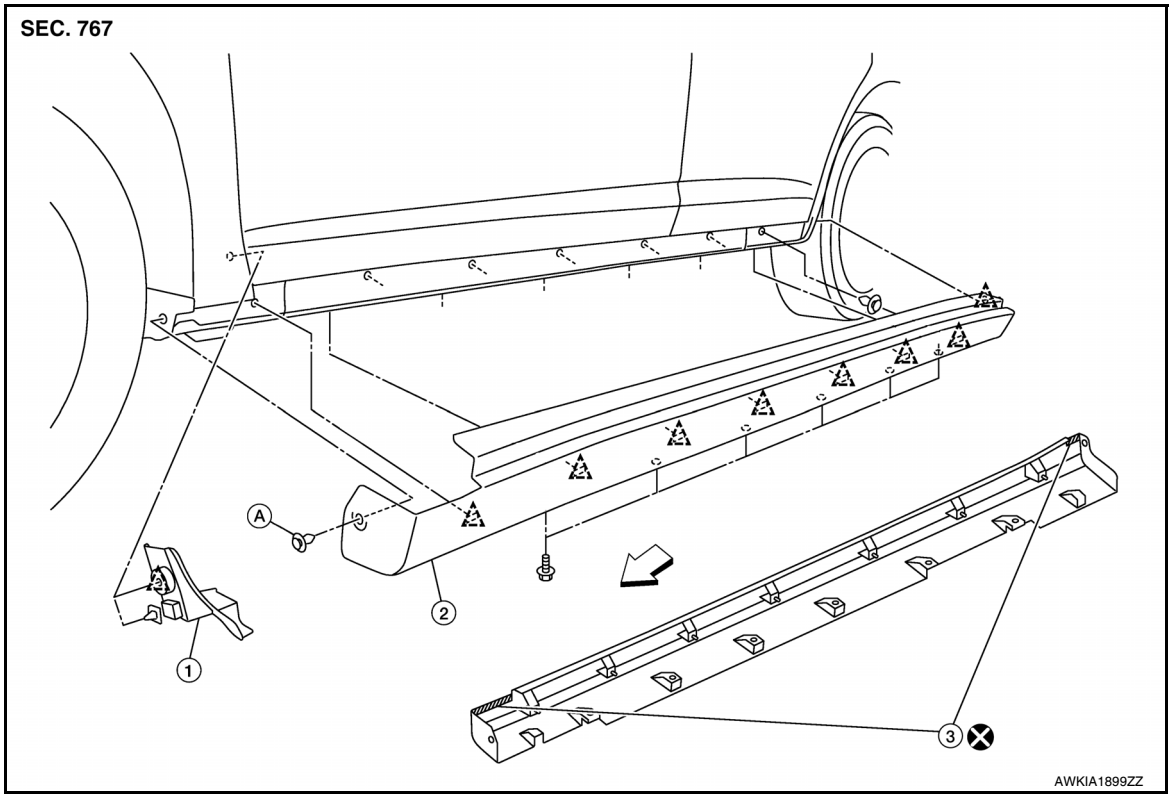
Removal
Using a suitable tool, release the clips while pulling outward and remove the rear door corner cover.

Installation
Installation is in the reverse order of removal.

CENTER MUD GUARD

Removal and Installation

INFOID:0000000007332110



1. Sill cover cap
2. Center mud guard
3. Double-faced adhesive tape
- A. Clip C205
- △ Clip C101
- ⇦ Vehicle front

REMOVAL

1. Remove center mud guard screws, front and rear.
2. Remove center mud guard bolts at bottom edge and release double-faced adhesive tape from body side.
3. Open front and rear doors, then using a suitable tool, remove the clips and remove the center mud guard from the body side.
4. Release the sill cover cap clips, then remove sill cover cap.

INSTALLATION

Installation is in the reverse order of removal.

NOTE:

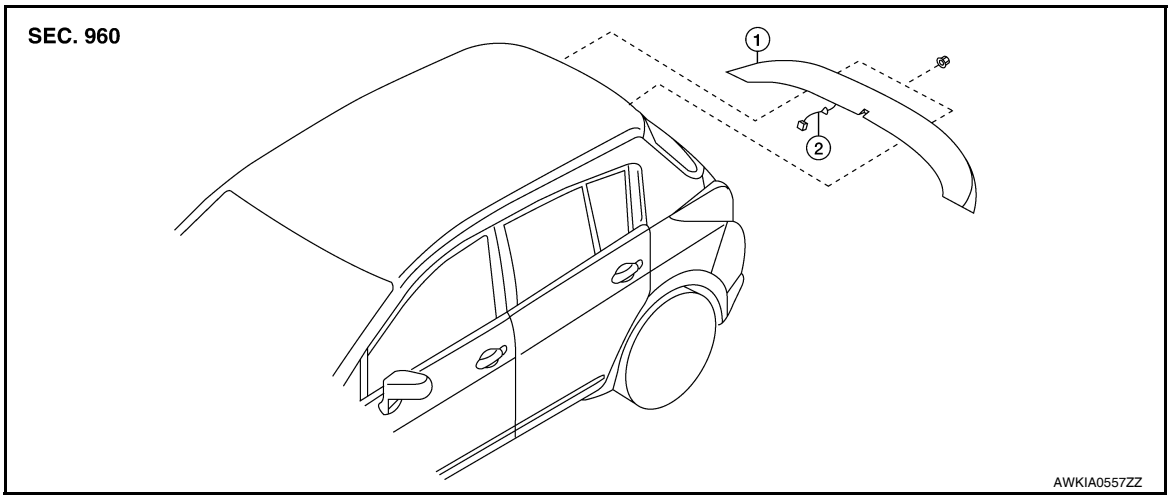
- Always replace double-faced adhesive tape on back of center mud guard when installing.
- Do not wash vehicle within 24 hours after installation.

REAR AIR SPOILER

Removal and Installation

INFOID:0000000007332112

Exploded View



1. Rear air spoiler assembly
2. High mounted stop lamp harness

Removal

1. Remove back door finisher upper. Refer to EI-34.
2. Disconnect high mounted stop lamp connector.
3. Remove the nuts and carefully lift the rear air spoiler from the back door.
   CAUTION:
   Use care not to damage painted surfaces during removal, or releasing of adhesive backed foam tapes if equipped.
4. Release the high mounted stop lamp harness grommet from back door, then remove rear air spoiler.

Installation

Installation is in the reverse order of removal.

NOTE:

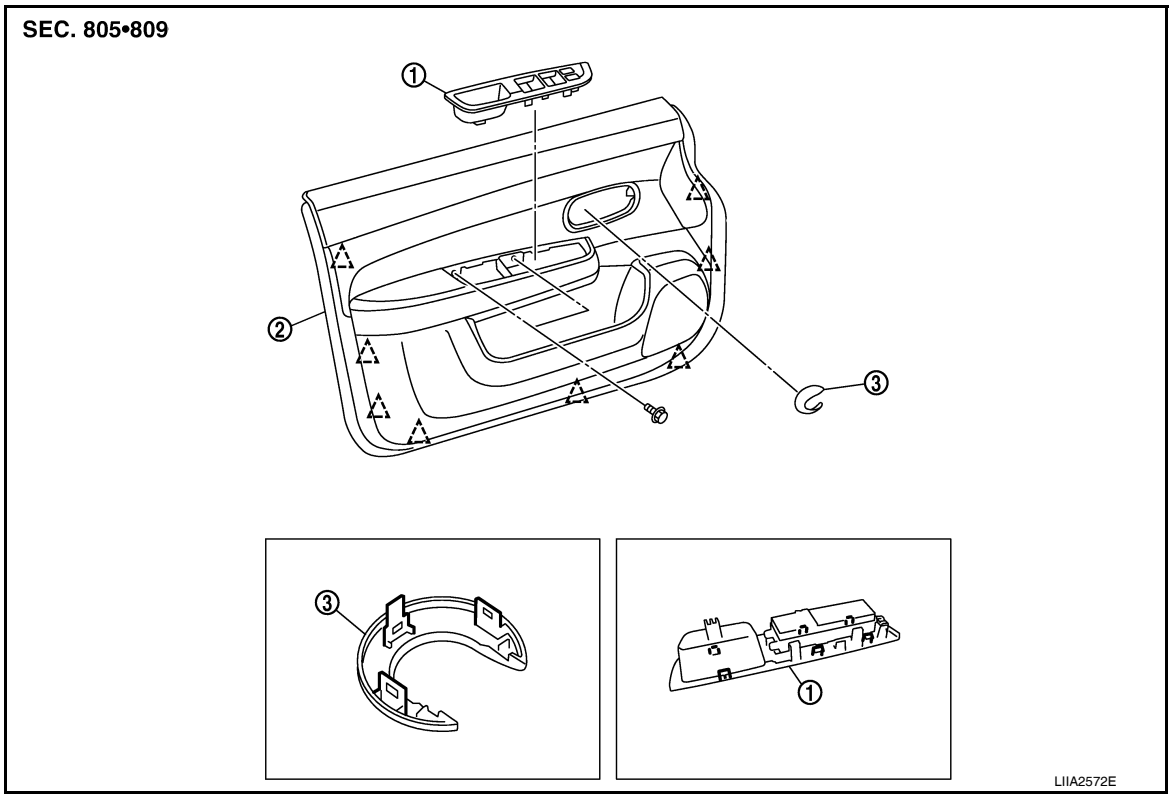
- Before installing rear air spoiler, clean the surface where it will be mounted with isopropyl alcohol or equivalent to degrease the surface.
- Before installing, be sure there are no gaps or waves in the foam tape (if equipped) where the surfaces meet.
- During installation, be sure grommet of high mounted stop lamp harness is fully seated into back door opening prior to final rear air spoiler placement.

DOOR FINISHER

Removal and Installation

INFOID:0000000007332113

FRONT DOOR

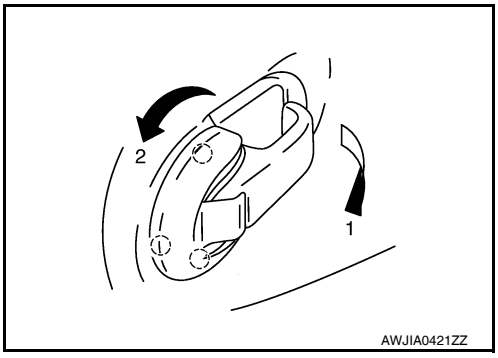


1. Power window and door lock/unlock switch finisher
2. Front door finisher
3. Inside handle escutcheon

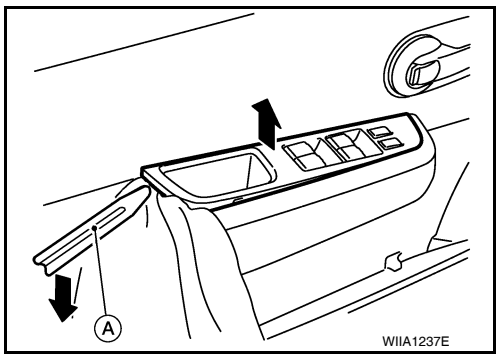
△ Clip C101

Removal

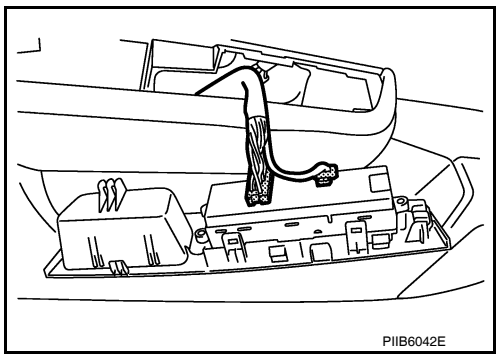
1. Open front door and front door window.
2. Release the front door inside handle escutcheon pawls, then slide the escutcheon rearward to remove from front door finisher.
   ◌: Pawl



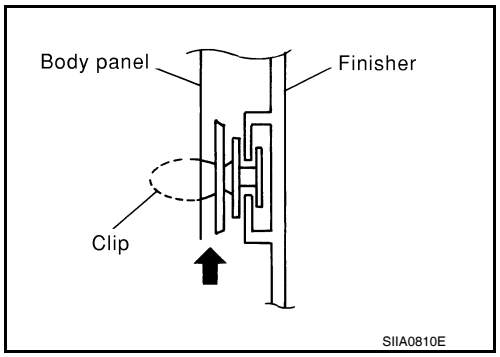
3. Insert a suitable tool into back edge of front door power window and door lock/unlock switch finisher. Lift upward to release the clips and remove.



4. Disconnect front door power window and door lock/unlock switch harness connector.



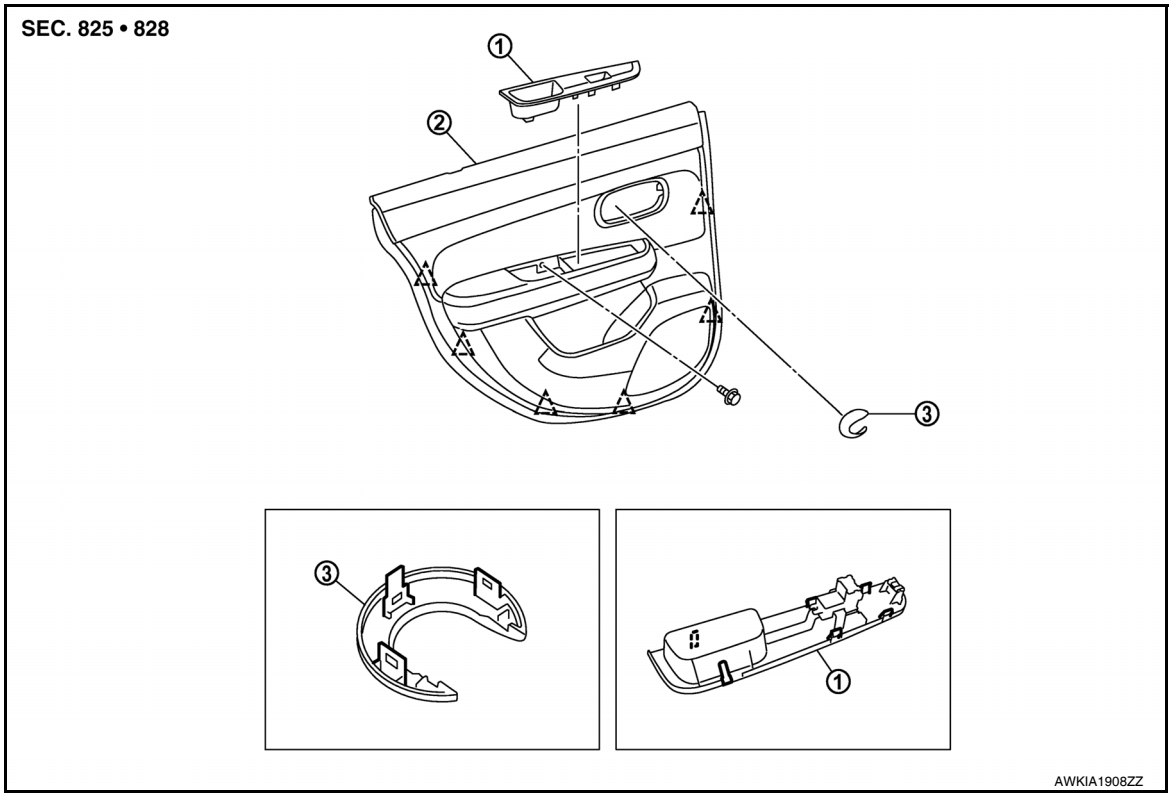
5. Remove the two front door finisher screws.
6. Release the clips, then lift front door finisher upward to remove it from door body panel.



Installation

Installation is in the reverse order of removal.

REAR DOOR

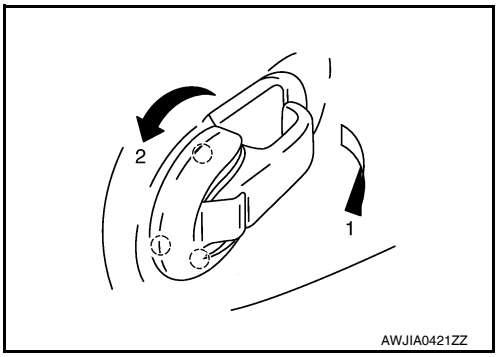


1. Rear power window switch finisher
2. Rear door finisher
3. Inside handle escutcheon

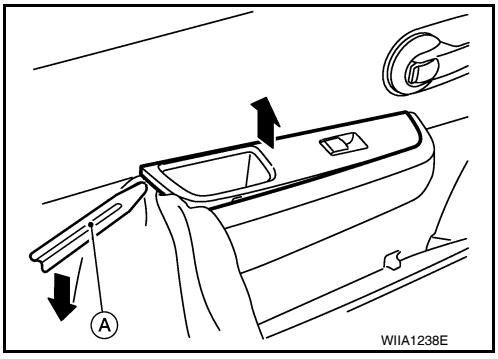
△△ Clip C101

Removal

1. Open rear door and rear door window.
2. Release the rear door inside handle escutcheon pawls, then slide the escutcheon rearward to remove from rear door finisher.
   ◌: Pawl

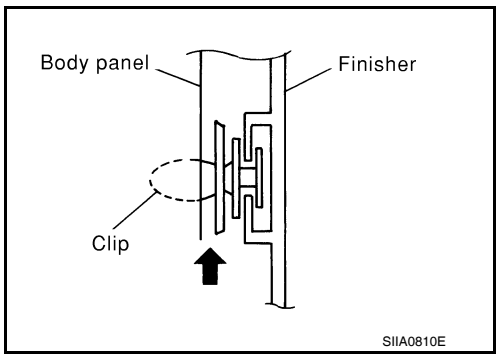


3. Insert a suitable tool into back edge of rear door power window switch finisher. Lift upward to release the clips and remove.



4. Disconnect rear door power window switch harness connector.
5. Remove rear door finisher screw.

6. Release the clips, then lift rear door finisher upward to remove it from door body panel.



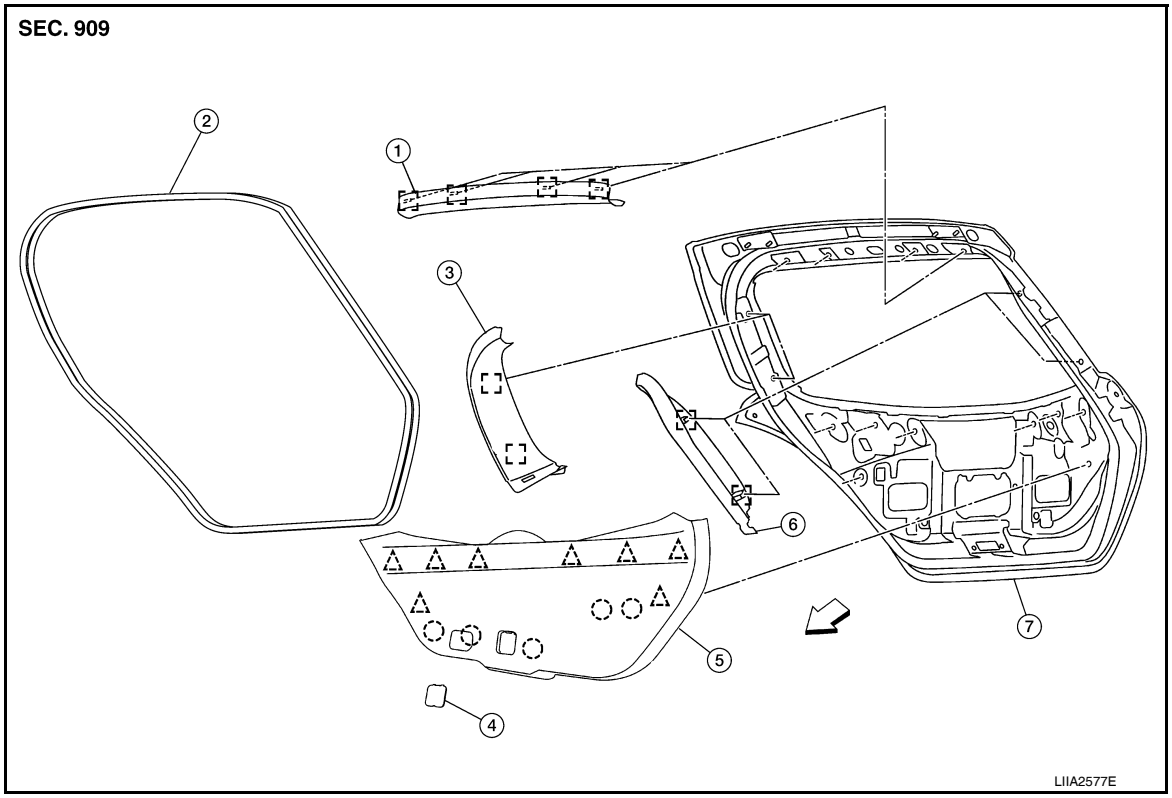
Installation

Installation is in the reverse order of removal.

BACK DOOR TRIM

Removal and Installation

INFOID:0000000007332114

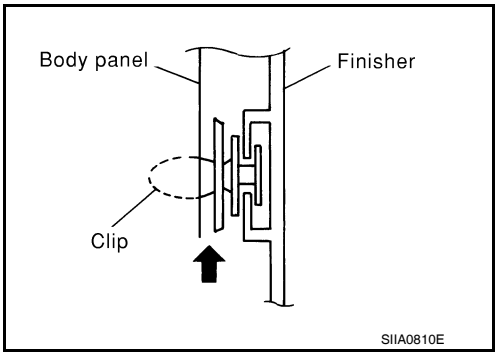


1. Back door finisher upper	2. Back door weatherstrip	3. Back door side garnish (RH)
4. Cover	5. Back door finisher lower	6. Back door side garnish (LH)
7. Back door	Pawl	Metal clip
Clip C101	Vehicle front	

REMOVAL

CAUTION:

- **Insert a suitable tool between panel on vehicle and clips (as indicated with arrow) to release clips.**
- **Use a suitable tool when removing metal clips from garnishes.**
- **Be careful not to damage the body while prying to release clips.**
- **Make sure clips are properly aligned in panel holes on body when installing, then press them in completely.**



1. Open back door.
2. Release the clips, then lift upward to release the pawls and remove the back door finisher lower.
3. Release the clips, then remove back door side garnish RH/LH.
4. Release the clips, then remove back door finisher upper from the back door.

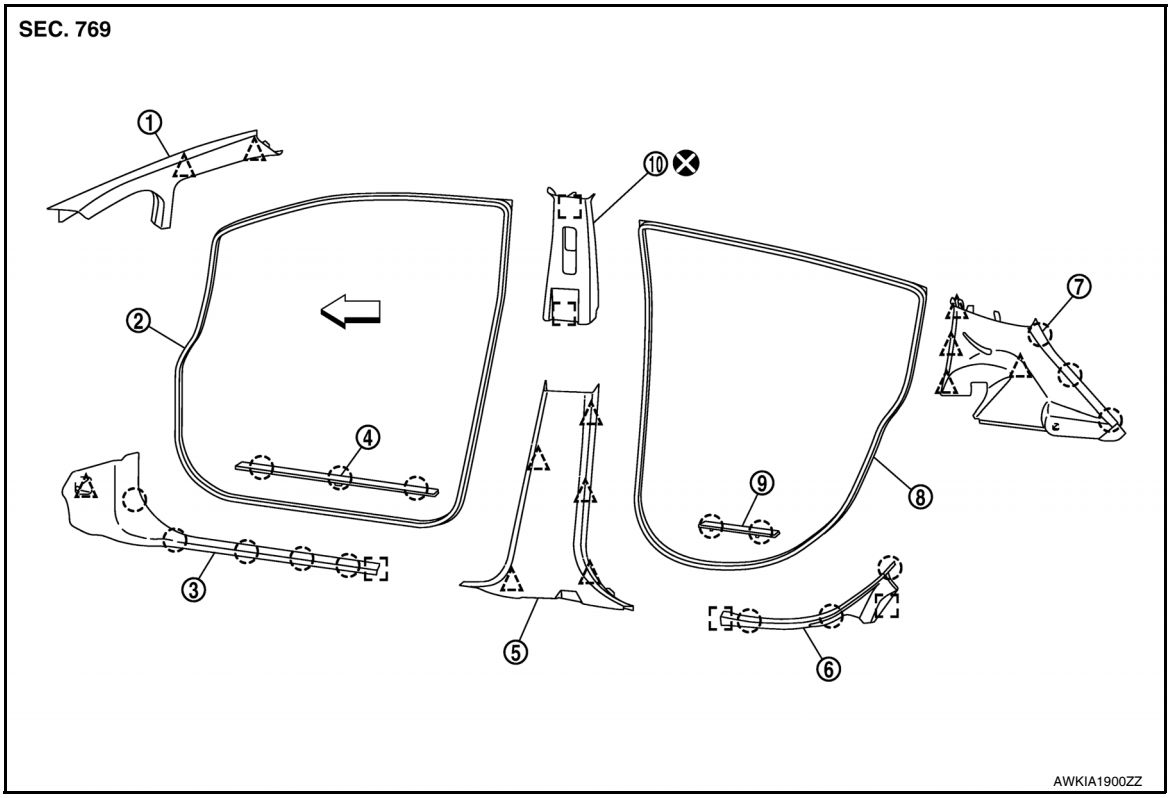
INSTALLATION

Installation is in the reverse order of removal.

BODY SIDE TRIM

Component

INFOID:0000000007332115

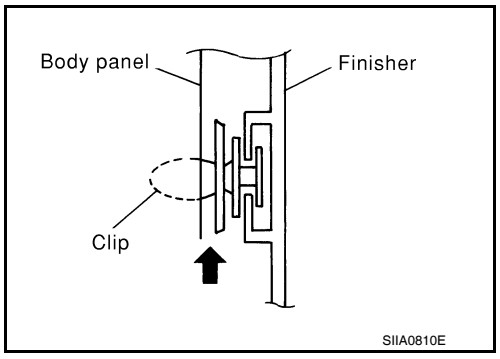


1. Front pillar garnish	2. Front body side welt	3. Front kicking plate inner
4. Front kicking plate outer	5. Center pillar lower garnish	6. Rear kicking plate inner
7. Rear pillar finisher	8. Rear body side welt	9. Rear kicking plate outer
10. Center pillar upper garnish	Pawl	Metal clip
Clip	Vehicle front	

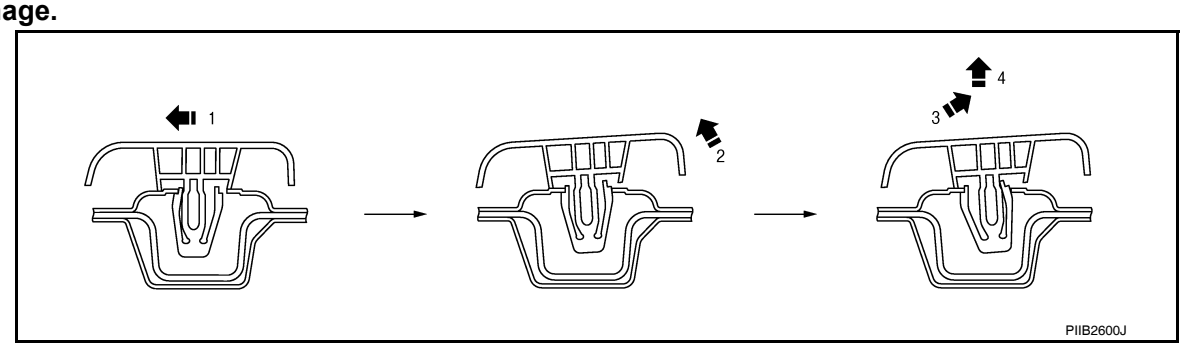
Removal and Installation

INFOID:0000000007332116

WARNING:
Do not reuse center pillar upper garnish if removed.
CAUTION:
- **Insert a suitable tool between panel on vehicle and clips (as indicated with arrow) to release clips.**
- **Use a suitable tool when removing metal clips from garnishes.**
- **Be careful not to damage the body while prying to release clips.**
- **Make sure clips are properly aligned in panel holes on body when installing, then press them in completely.**



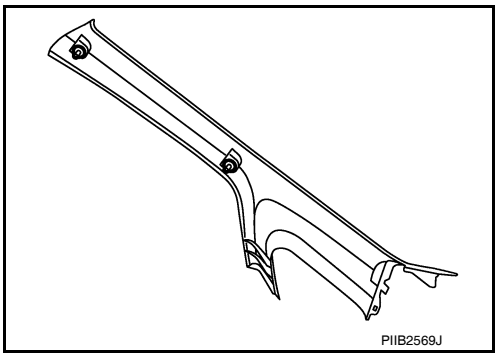
- **When releasing molded-in pawls or resin clips, follow the steps below to prevent garnish or clip damage.**



FRONT PILLAR GARNISH

Removal

Release the clips, then remove front pillar garnish.



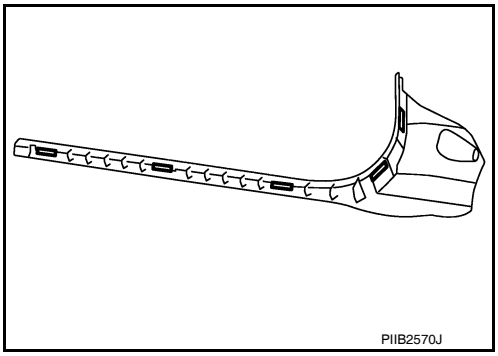
Installation

Installation is in the reverse order of removal.

FRONT KICKING PLATE INNER

Removal

Release the clips, then remove front kicking plate inner.



Installation

Installation is in the reverse order of removal.

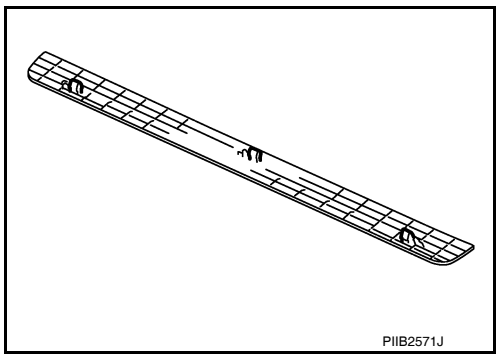
CAUTION:

Install the kicking plate inner starting at the front and engage the metal clips and pawls towards the rear of the vehicle.

FRONT KICKING PLATE OUTER

Removal

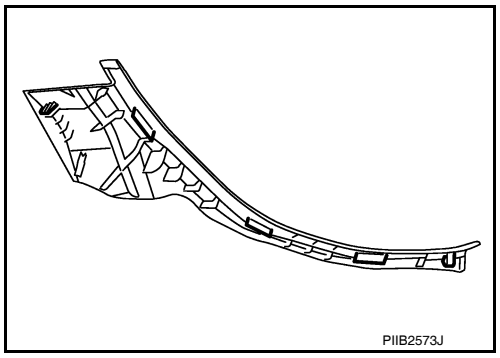
Release the clips, then remove front kicking plate outer.



Installation
Installation is in the reverse order of removal.

REAR KICKING PLATE INNER

Removal
Release the clips, then remove rear kicking plate inner.

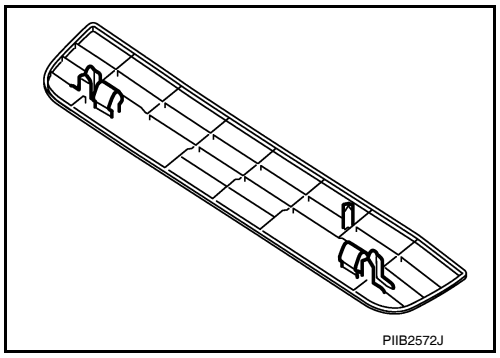


Installation
Installation is in the reverse order of removal.

CAUTION:
Install the kicking plate inner starting at the front and engage the metal clips and pawls towards the rear of the vehicle.

REAR KICKING PLATE OUTER

Removal
Release the clips, then remove rear kicking plate outer.



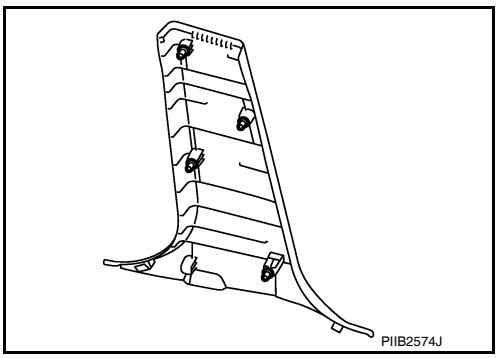
Installation
Installation is in the reverse order of removal.

CENTER PILLAR LOWER GARNISH

Removal

1. Remove front kicking plate inner. Refer to FRONT KICKING PLATE INNER procedure in this section.
2. Remove rear kicking plate inner. Refer to REAR KICKING PLATE INNER procedure in this section.
3. Remove front and rear body side welts.

4. Release the clips, then remove center pillar lower garnish.



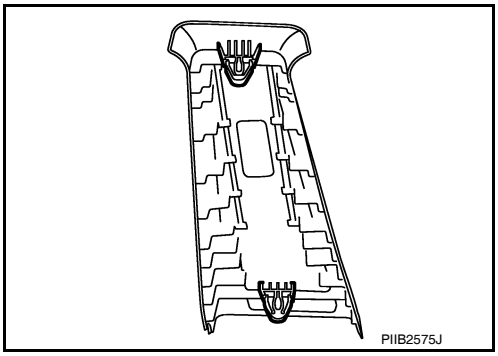
Installation
Installation is in the reverse order of removal.

CENTER PILLAR UPPER GARNISH

Removal

WARNING:
Do not reuse center pillar upper garnish if removed.

1. Remove center pillar lower garnish. Refer to CENTER PILLAR LOWER GARNISH procedure in this section.
2. Remove front seat belt shoulder anchor. Refer to SB-4, "Removal and Installation of Front Seat Belt".
3. Remove front and rear body side welts.
4. Release the resin clips, then remove center pillar upper garnish.



Installation
Installation is in the reverse order of removal.

REAR PILLAR FINISHER

Removal

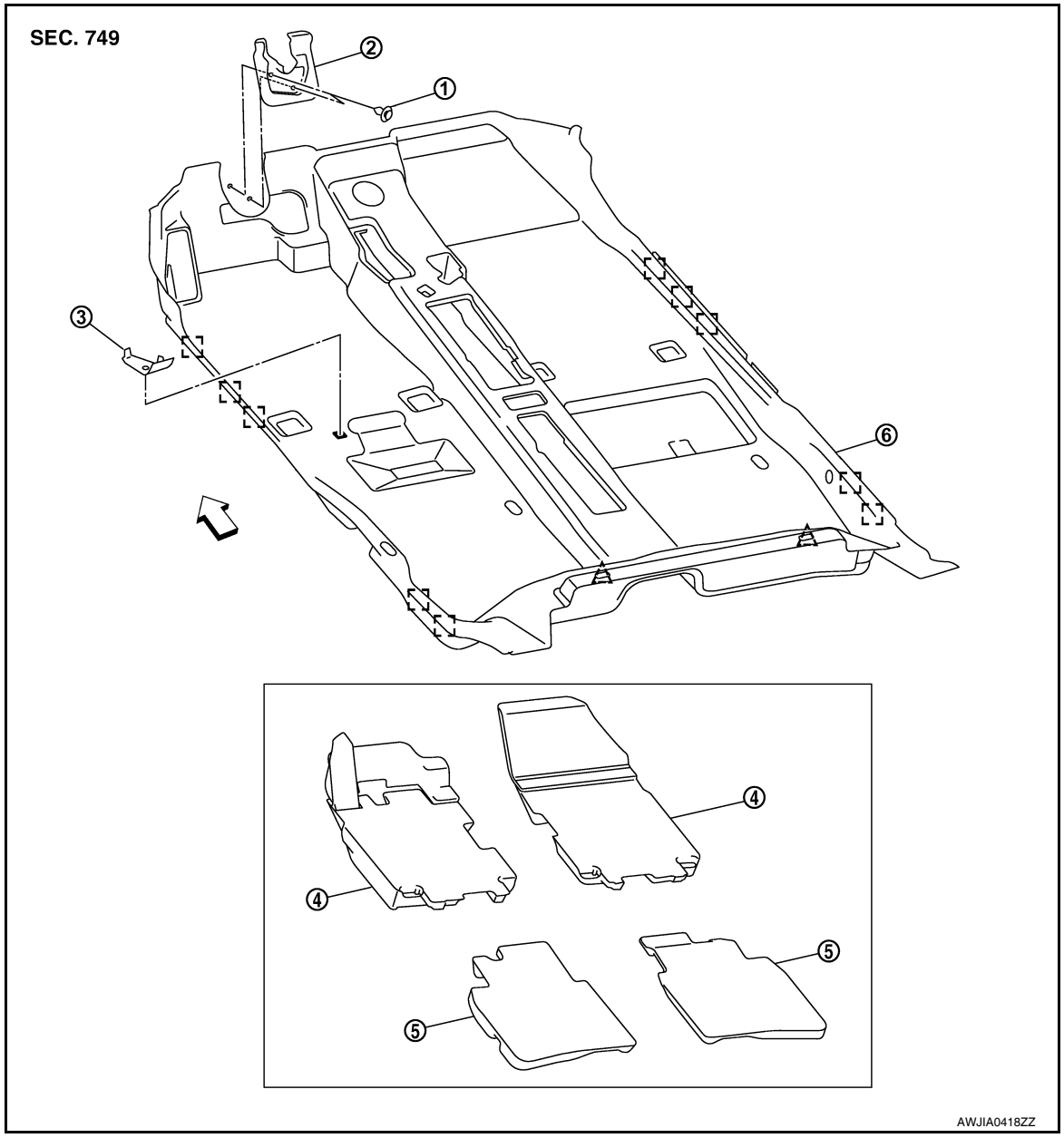
1. Remove rear kicking plate outer and rear body side welt. Refer to REAR KICKING PLATE OUTER in this section.
2. Remove rear seatback side cushion. Refer to SE-22, "Removal and Installation" (Non-Sliding Seat), or SE-22, "Removal and Installation" (Sliding Seat).
3. Remove rear seat. Refer to SE-22, "Removal and Installation" (Non-Sliding Seat), or SE-22, "Removal and Installation" (Sliding Seat).
4. Remove back door weatherstrip. Refer to EI-34, "Removal and Installation".
5. Remove luggage floor center board and luggage rear plate. Refer to EI-44, "Removal and Installation".
6. Remove luggage side lower finisher. Refer to EI-44, "Removal and Installation".
7. Remove rear seat belt outer anchor bolt. Refer to SB-6, "Removal and Installation of Rear Seat Belt".
8. Release the clips, then remove rear pillar finisher.

Installation
Installation is in the reverse order of removal.

FLOOR TRIM

Removal and Installation

INFOID:0000000007332118



1. Clip C101
2. Steering column shaft cover
3. Floor carpet hook
4. Front floor spacer
5. Rear floor spacer
6. Floor trim
- Metal clip
- Clip CF110
- Vehicle front

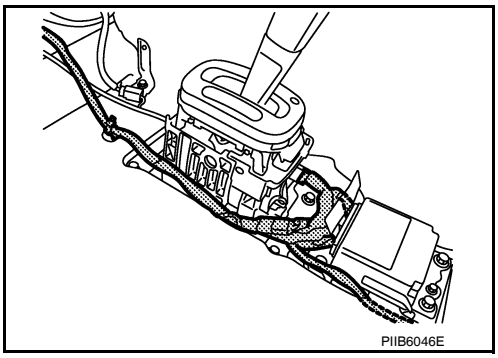
REMOVAL

CAUTION:

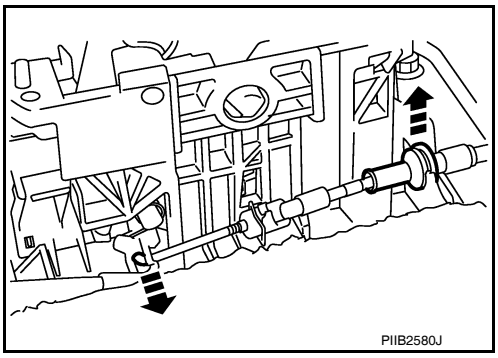
Before servicing, turn the ignition switch OFF, disconnect both battery terminals and wait at least three minutes.

1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Remove front seat assembly RH/LH and rear seat cushion. Refer to SE-14, "Removal and Installation" (Front seat), and SE-22, "Removal and Installation" (60:40 Split Fold Down Seat).
3. Remove center console and floor bracket. Refer to IP-12, "Removal and Installation".
4. Remove instrument lower cover. Refer to IP-12, "Removal and Installation".

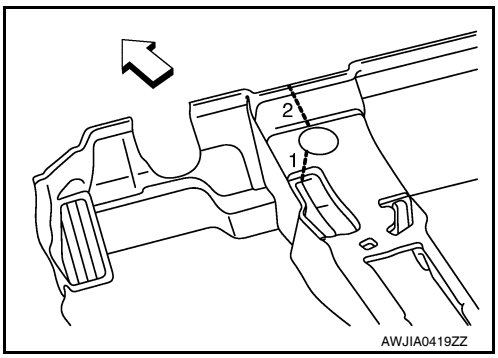
5. Remove front kicking plate inner RH/LH, center pillar lower garnish RH/LH, and rear kicking plate inner RH/LH. Refer to EI-35, "Removal and Installation".
6. Disconnect floor harness connector.
7. Remove diagnosis sensor unit. Refer to SRS-46.


PIIB6046E

8. Remove key interlock cable. Refer to AT-216.


PIIB2580J

9. Remove floor carpet hook.
10. Cut floor trim using a blade knife first between openings (1), then at front edge (2) as shown.
    - ⇦: Vehicle front



AWJIA0419ZZ

11. Release floor trim metal clips after cutting, then pull out floor trim through door opening.
12. Remove floor spacer RH/LH.

INSTALLATION

Installation is in the reverse order of removal.

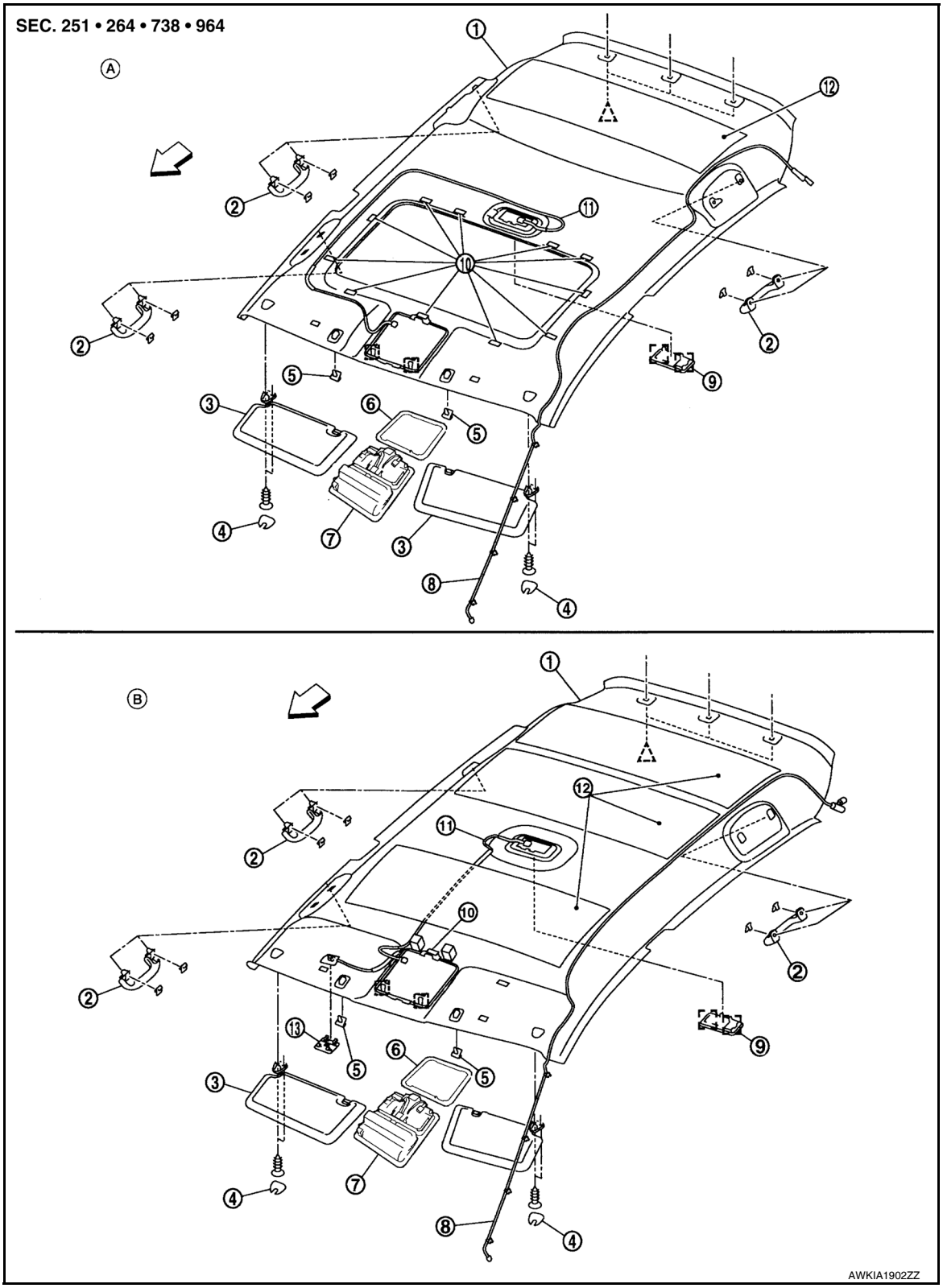
CAUTION:

When replacing the floor trim with a new one, prepare for installation by cutting it like the old one. Make sure there is a quality fit between floor trim and instrument lower cover by tucking the cut edge completely.

HEADLINING

Component

INFOID:0000000007332119



1. Headlining
2. Assist grip
3. Sun visor
4. Cap
5. Sun visor holder
6. Roof console retainer

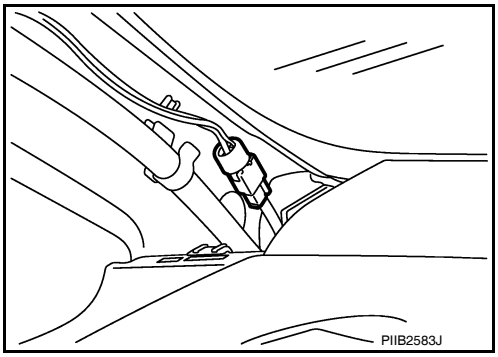
7. Roof console/map lamp assembly (if equipped)
8. Antenna feeder cable
9. Room lamp
10. Dual lock fastener
11. Room lamp harness
12. Insulator
13. Finisher
A. With sunroof
B. Without sunroof
Metal clip
Clip C103
Vehicle front

Removal and Installation

INFOID:0000000007332120

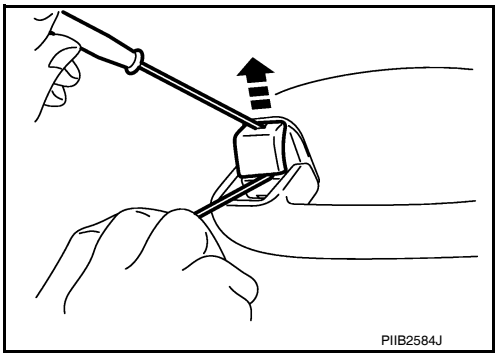
REMOVAL

1. Remove rear seat cushion and rear seatback. Refer to SE-22, "Removal and Installation" (60:40 Split Fold Down Seat).
2. Remove front seat belt shoulder anchor RH/LH. Refer to SB-4, "Removal and Installation of Front Seat Belt".
3. Remove front pillar garnish RH/LH. Refer to EI-35, "Removal and Installation".
4. Remove antenna feeder cable clip, then disconnect antenna feeder cable connector.

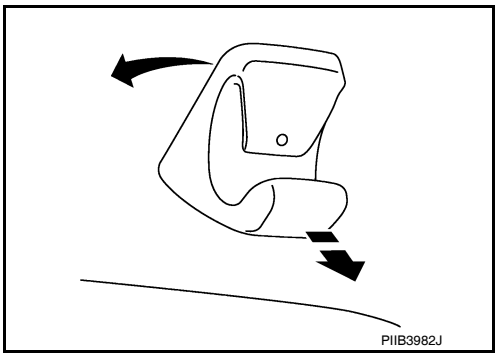


5. Remove front and rear kicking plate inner RH/LH, center pillar lower garnish, center pillar upper garnish, front and rear body side welt RH/LH. Refer to EI-35, "Removal and Installation".

   WARNING:
   Do not reuse center pillar upper garnish if removed.
6. Remove back door weatherstrip. Refer to EI-34.
7. Release the clips using a suitable tool, then remove the front and rear assist grips.

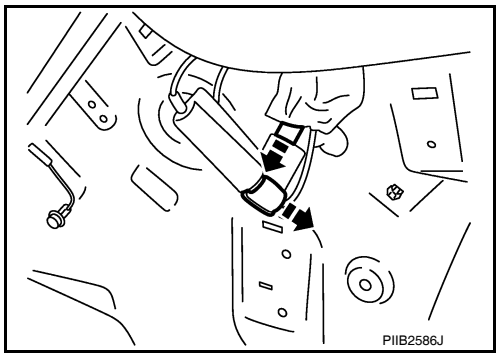


8. Remove the sun visor caps and screws, then remove sun visor RH/LH.
9. Remove sun visor holders RH/LH by rotating 45 degrees, then pulling outward.



10. Release the metal clips, then remove the roof console/map lamp assembly (if equipped).

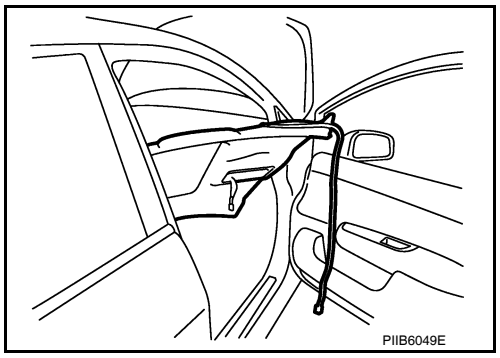
11. Release remaining headlining clips.
12. Disconnect antenna feeder cable near rear pillar finisher LH.



13. Disengage the dual lock fastener on the backside of headlining.
    - Insert a suitable tool into the edge of dual lock fastener, then move the tool side to side horizontally to release it.

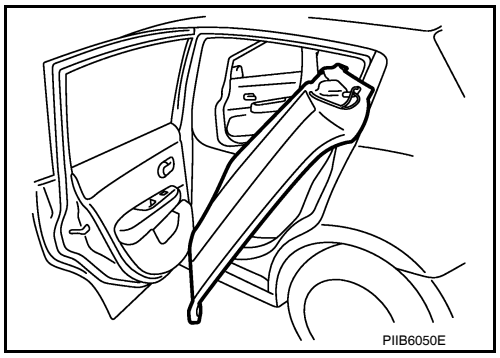
    CAUTION:
    Excessive up and down force may cause roof panel damage.

14. Position the headlining so the front edge goes through the opening of the right side front door.



15. Position the headlining so the rear edge goes through the opening of the left rear door, then remove headlining.

CAUTION:
- **2 technicians should be used to avoid damage when removing or replacing headlining.**
- **During headlining removal and installation, cover the center console finisher upper surface to prevent damage.**
- **Set A/T or CVT shift selector to the D position, and make a space to remove front end of headlining right side.**
- **Do not bend headlining when removing.**



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
Avoid headlining damage when installing by inserting rear clips first during assembly.

LUGGAGE FLOOR TRIM

Removal and Installation

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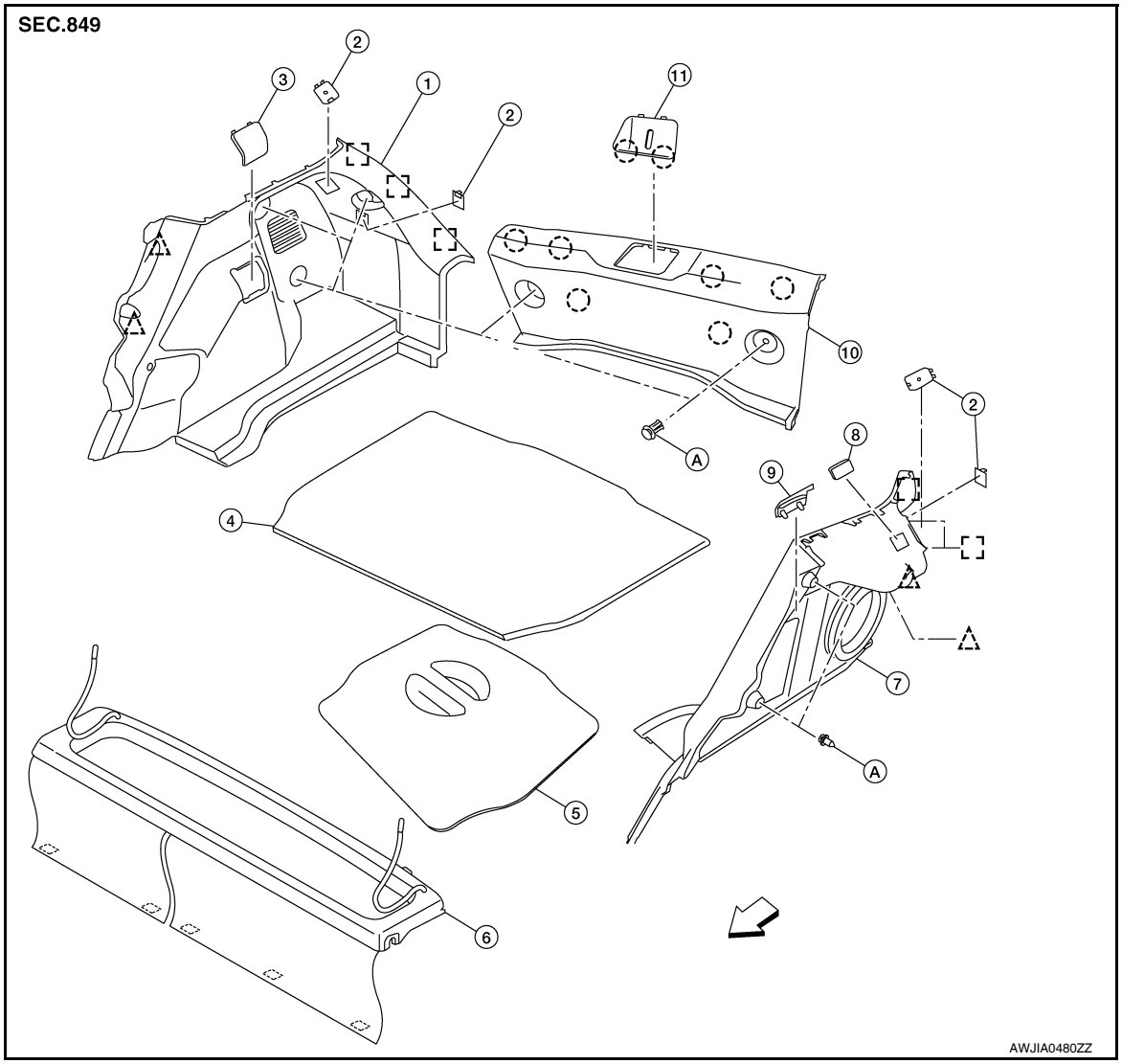
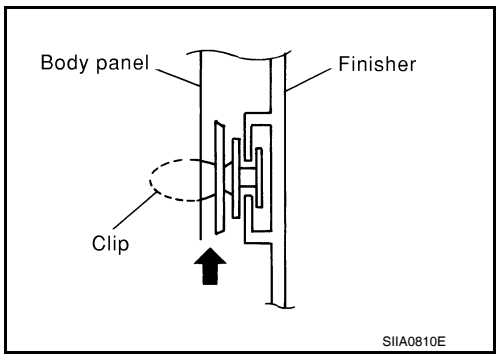


1. Luggage side lower finisher RH
2. Access cover
3. Shock absorber cover RH
4. Luggage floor center board
5. Luggage floor spacer
6. Tonneau board
7. Luggage side lower finisher LH
8. Luggage room lamp
9. Shock absorber cover LH
10. Luggage rear plate
11. Striker cover plate
- A. Clip
- ◌ Pawl
- ⬚ Metal clip
- △ Clip
- ⇦ Vehicle front

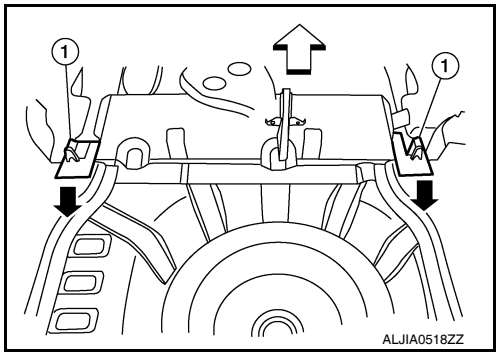
REMOVAL

CAUTION:

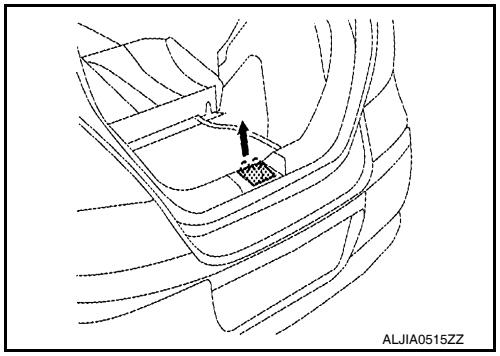
- **Insert a suitable tool between panel on vehicle and clips (as indicated with arrow) to release clips.**
- **Use a suitable tool when removing metal clips from garnishes.**
- **Be careful not to damage the body while prying to release clips.**
- **Make sure clips are properly aligned in panel holes on body when installing, then press them in completely.**



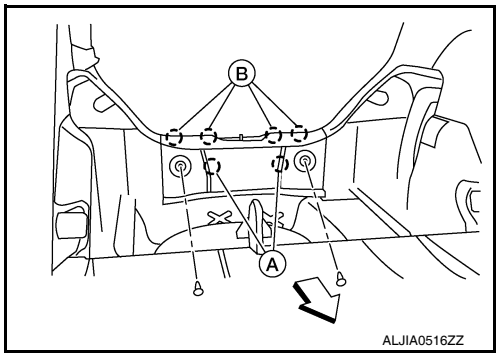
1. Position rear seat.
   - For non-sliding type, remove rear seat. Refer to SE-22, "Removal and Installation".
   - For sliding type seat, fold down the seatback and slide to forward most position in vehicle.
2. Lift and remove the luggage floor center board and luggage floor spacer.
3. Partially remove lower edge of back door weatherstrip and set aside. Refer to EI-34, "Removal and Installation".
4. If equipped, remove the bracket cover (1).
   ⇦: Vehicle front



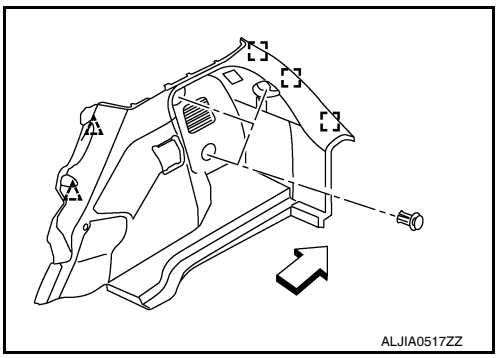
5. Using a suitable tool, release the pawls at the front edge (forward in vehicle) of striker cover plate, then lift upward to remove.
   ◌: Pawl



6. Remove the clips, then while pressing down on the top edge, pull bottom edge inboard releasing hidden pawls (A). Pull upward to release hidden pawls (B), and remove luggage rear plate.
   ⇦: Vehicle front
   ◌: Pawl



7. Remove the clips, then using a suitable tool release metal clips first at rear edge (rearward in vehicle) of luggage side lower finisher.
   ⇦: Vehicle rear
   : Metal clip
   : Clip
8. Release the clips at the front edge (forward in vehicle) and pull luggage side lower finisher RH/LH inboard from the top and bottom evenly to remove
   • For LH side, disconnect luggage room lamp connector.



INSTALLATION

Installation is in the reverse order of removal.

SECTION IP
INSTRUMENT PANEL

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329027

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329028

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007793166

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

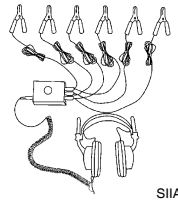
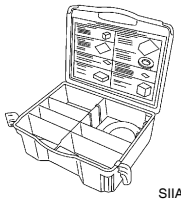
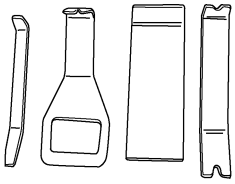
PREPARATION

PREPARATION

Special Service Tool

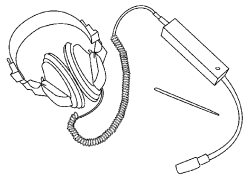
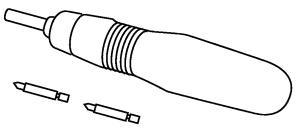
INFOID:0000000007329030

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-39570) Chassis ear  SIIA0993E	Locating the noise
— (J-43980) NISSAN Squeak and Rattle Kit  SIIA0994E	Repairing the cause of noise
— (J-46534) Trim tool set  AWJIA0483ZZ	For removing trim

Commercial Service Tool

INFOID:0000000007329031

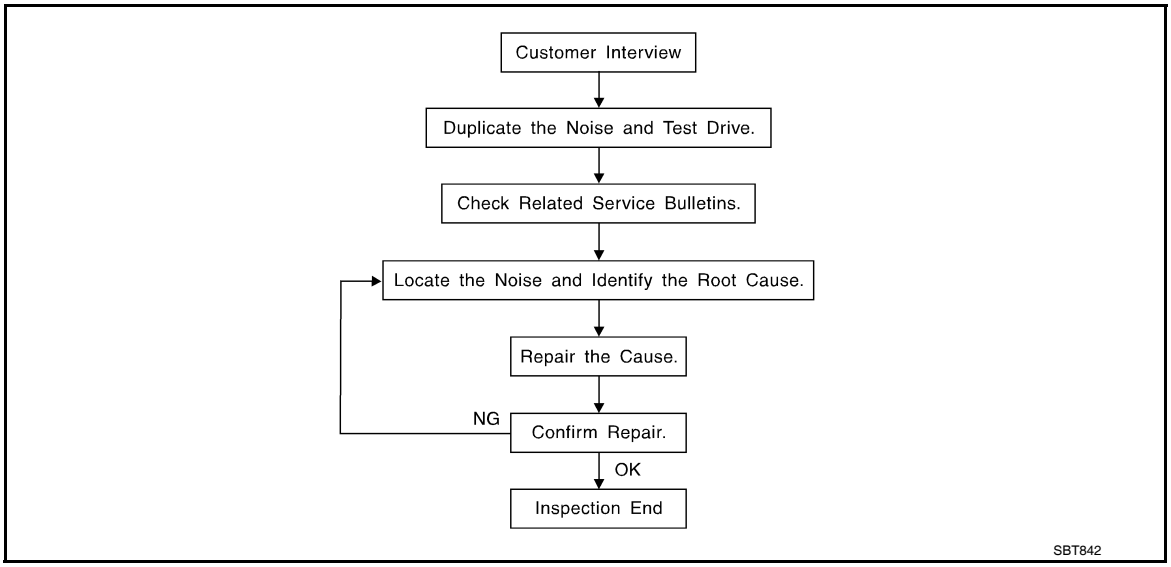
Tool name	Description
Engine ear  SIIA0995E	Locating the noise
Power tool  PBIC0191E	Loosening bolts and nuts

SYMPTOM DIAGNOSIS

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000007329032



CUSTOMER INTERVIEW

Interview the customer, if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to IP-9, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.

- Squeak — (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping.
- Creak — (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle — (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock — (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick — (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump — (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz — (Like a bumblebee)
  Buzz characteristics include high frequency rattle/firm contact.

- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1. Close a door.
2. Tap or push/pull around the area where the noise appears to be coming from.
3. Rev the engine.
4. Use a floor jack to recreate vehicle “twist”.
5. At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on CVT and A/T models).
6. Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565, and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:
   - Removing the components in the area that you suspect the noise is coming from.
     Do not use too much force when removing clips and fasteners, otherwise clips and fasteners can be broken or lost during the repair, resulting in the creation of new noise.
   - Tapping or pushing/pulling the component that you suspect is causing the noise.
     Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
   - Feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
   - Placing a piece of paper between components that you suspect are causing the noise.
   - Looking for loose components and contact marks.

   Refer to IP-7, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- Separate components by repositioning or loosening and retightening the component, if possible.
- Insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A NISSAN Squeak and Rattle Kit (J-43980) is available through your authorized NISSAN Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.
The following materials are contained in the NISSAN Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100 x 135 mm (3.94 x 5.31 in)/76884-71L01: 60 x 85 mm (2.36 x 3.35 in)/76884-71L02: 15 x 25 mm (0.59 x 0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50 x 50 mm (1.97 x 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 x 50 mm (1.97 x 1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 x 50 mm (1.18 x 1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.

68370-4B000: 15 x 25 mm (0.59 x 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007329033

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment

2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lens loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

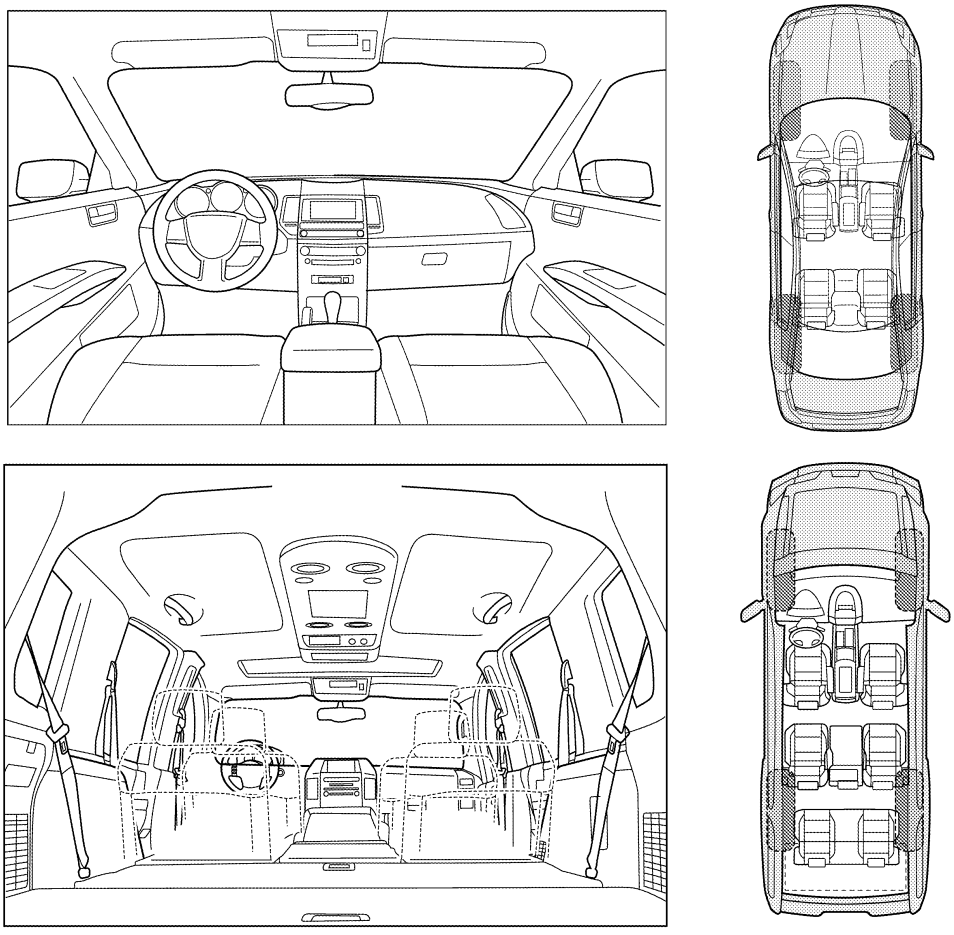
Diagnostic Worksheet

INFOID:0000000007329034

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

LAIA0072E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

This form must be attached to Work Order

LAIA0071E

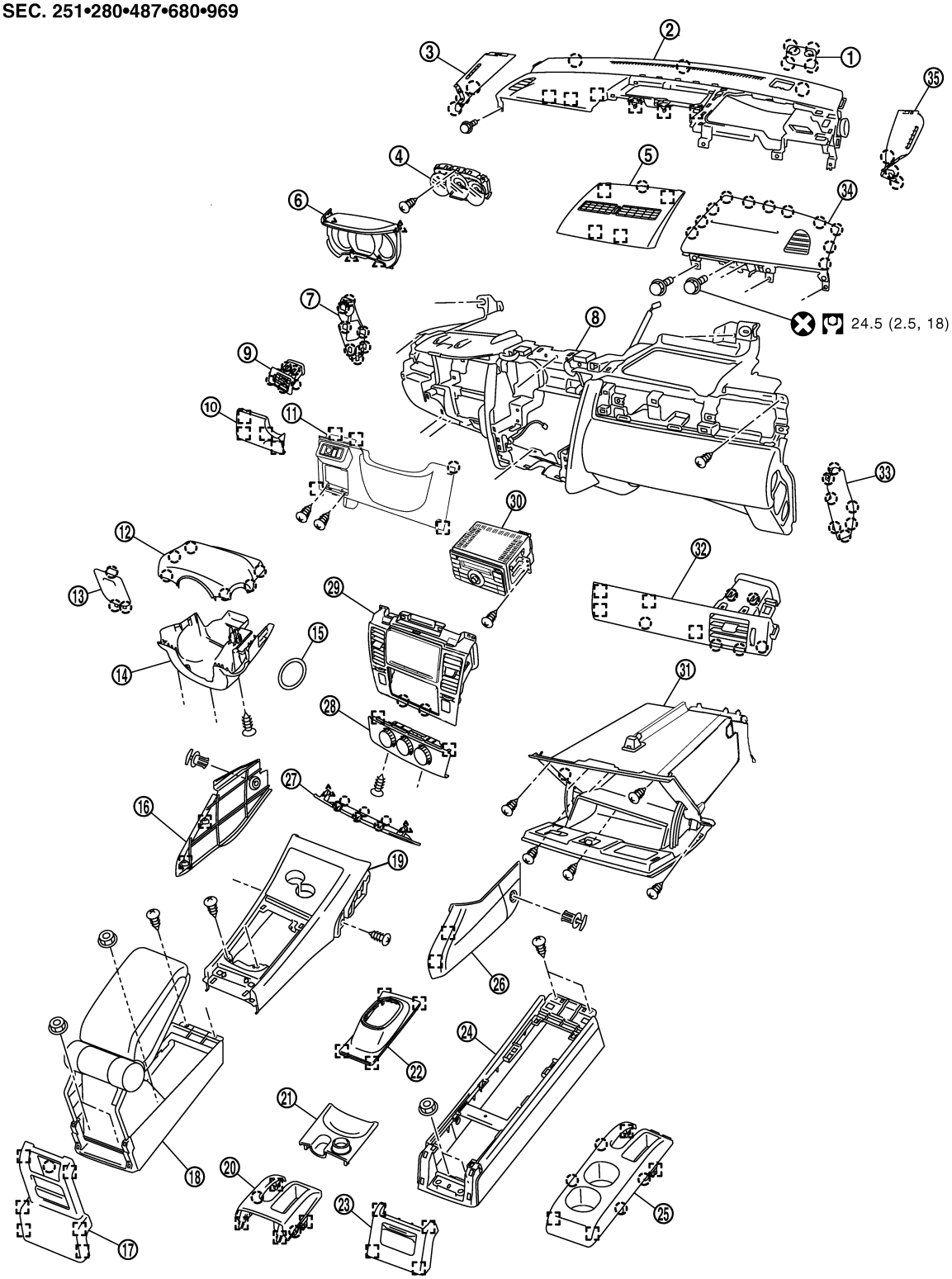
ON-VEHICLE REPAIR

INSTRUMENT PANEL ASSEMBLY

Component Parts

INFOID:0000000007329035

SEC. 251•280•487•680•969



1.	Instrument upper mask	2.	Instrument upper panel assembly	3.	Instrument side panel (LH)
4.	Combination meter	5.	Instrument finisher E	6.	Cluster lid A
7.	Instrument side mask (LH)	8.	Instrument panel & pad	9.	Side ventilator assembly (LH)
10.	Instrument side finisher	11.	Instrument lower finisher	12.	Steering column cover upper
13.	Fuse block lid	14.	Steering column cover lower	15.	Steering lock escutcheon
16.	Instrument lower cover (LH)	17.	Console rear finisher (with armrest)	18.	Console body assembly (with armrest)
19.	Center console	20.	Console mask cover (with armrest)	21.	Console mask
22.	A/T console finisher / M/T console boot / CVT console finisher	23.	Console rear finisher (without armrest)	24.	Console body assembly (without armrest)
25.	Rear cup holder (without armrest)	26.	Instrument lower cover (RH)	27.	Instrument finisher D
28.	Controller	29.	Cluster lid C	30.	Audio unit
31.	Glove box assembly	32.	Side ventilator assembly (RH)	33.	Instrument side mask (RH)
34.	Passenger air bag module assembly	35.	Instrument side panel (RH)	◌	Pawl
△	Clip	⬚	Metal clip		

Removal and Installation

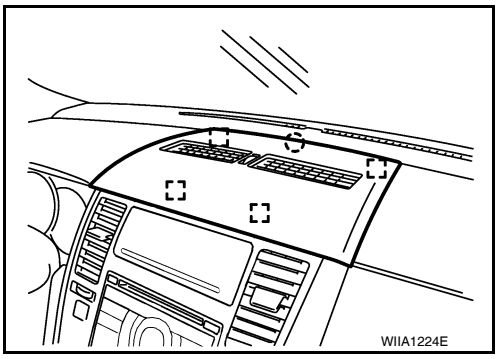
INFOID:0000000007329036

CAUTION:
- **Disconnect both the negative and positive battery terminals, then wait at least three minutes.**
- **Never tamper with or force air bag lid open, as this may adversely affect air bag performance.**
- **Be careful not to scratch pad and other parts.**

INSTRUMENT PANEL ASSEMBLY

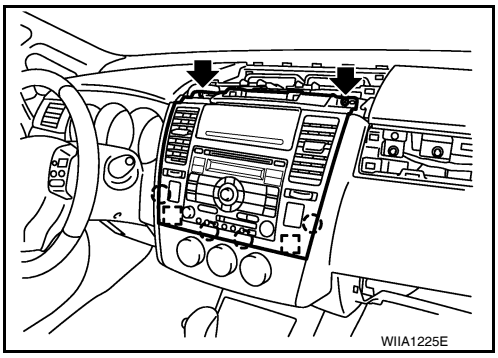
Removal

1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Pull instrument finisher E backward by approximately 30 degrees while disengaging the metal clips and pawl.
   ⬚: Metal clip
   ◌: Pawl



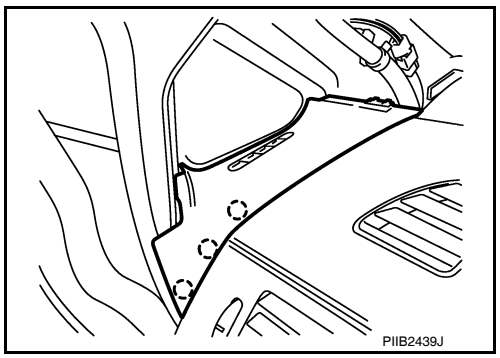
3. Remove cluster lid C.
   ⬚: Metal clip
   ◌: Pawl

a. Remove the upper screws from cluster lid C.
b. Pull cluster lid C backward while disengaging the metal clips and pawl.
c. Disconnect harness connector, and then remove cluster lid C.

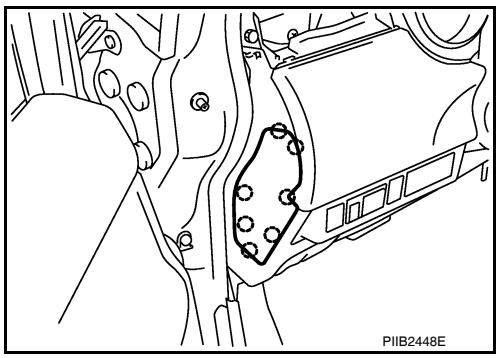


4. Remove audio unit. Refer to AV-30, "Removal and Installation" (Audio without Navigation) or AV-73, "Removal and Installation" (Audio with Navigation).
5. Remove front pillar garnish. Refer to EI-35.

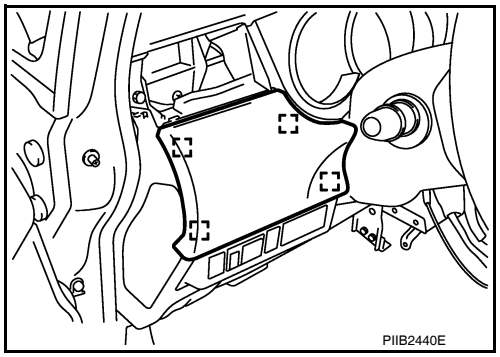
6. Remove the instrument side panel (LH/RH).
   ◌: Pawl
a. Pull up instrument side panel and disengage pawls.
b. Remove instrument side panel.



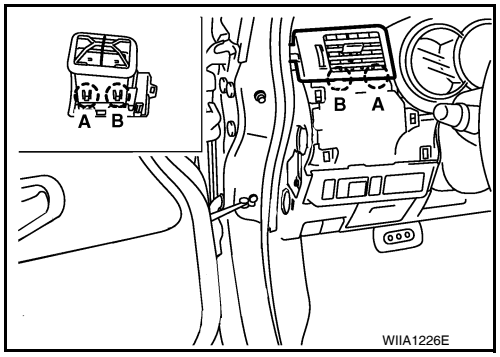
7. Remove instrument side mask (LH/RH).
   ◌: Pawl
a. Insert a suitable tool into upper space of instrument side mask.
b. Disengage pawls, and then remove instrument side mask.



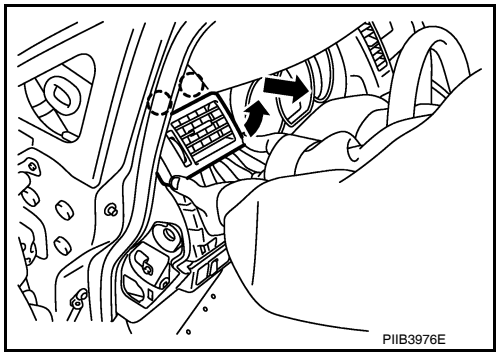
8. Remove instrument side finisher.
   ⬚: Metal clip
a. Insert a suitable tool into space of instrument side finisher.
b. Disengage instrument side finisher metal clips, and then remove instrument side finisher.



9. Remove side ventilator assembly (LH).
   ◌: Pawl
a. Insert a suitable tool into the bottom gap of side ventilator assembly and push against (A) and (B) as shown to disengage the pawls.

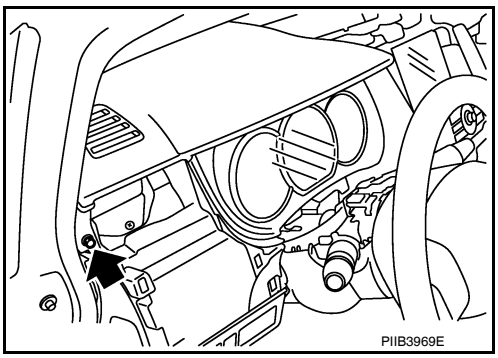


b. Lift the side ventilator up from the bottom, pull backward while disengaging the side ventilator assembly upper pawls, and then remove the side ventilator.
   ◌: Pawl

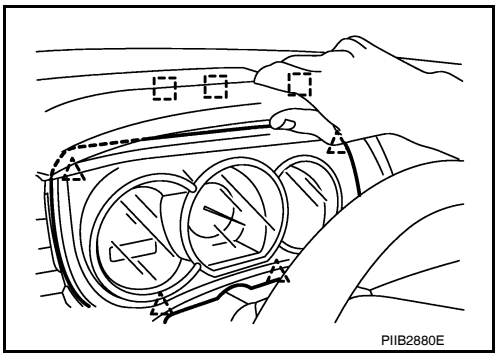


10. Remove steering lock escutcheon.
11. Remove the steering column cover screws, then disengage pawls and remove the steering column covers.
12. Remove cluster lid A.

a. Remove screws from instrument upper panel right side.

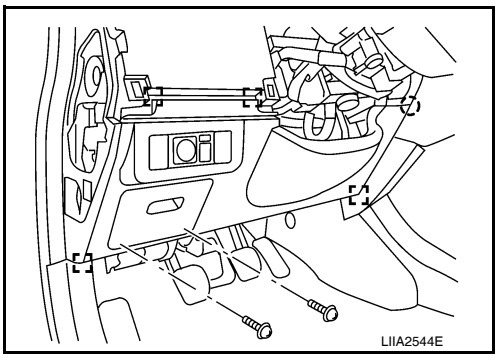


b. Lift the instrument upper panel up, disengage metal clips.
   : Metal clip
   : Clip
c. Pull backward and disengage clips.
d. Remove cluster lid A.



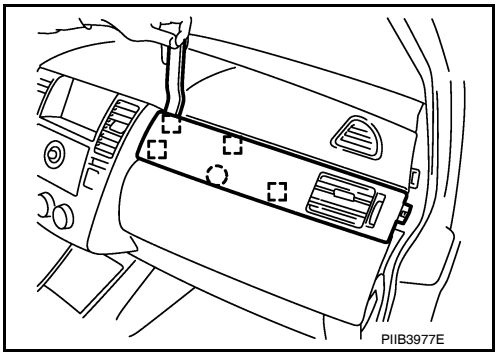
13. Remove combination meter. Refer to COMBINATION METER procedure.
14. Disengage pawls and remove fuse block lid.
15. Remove instrument lower finisher.
    : Metal clip
    : Pawl

a. Remove the instrument lower finisher screws.
b. Pull backward while disengaging the instrument lower finisher metal clips and pawl.
c. Disconnect harness connector, and then remove instrument lower finisher.



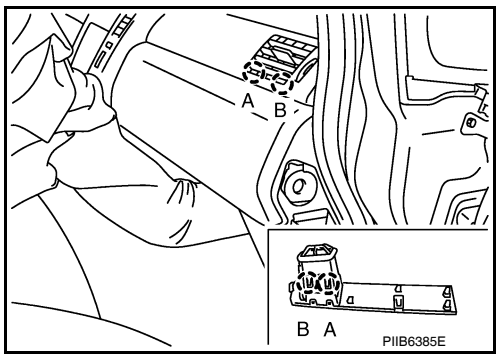
16. Remove glove box. Refer to GLOVE BOX ASSEMBLY procedure.
17. Remove side ventilator assembly (RH).
    : Metal clip
    : Pawl

a. Insert a suitable tool into the top gap of the side ventilator assembly, then starting from center console side, disengage the clips and pawl of instrument panel pad.

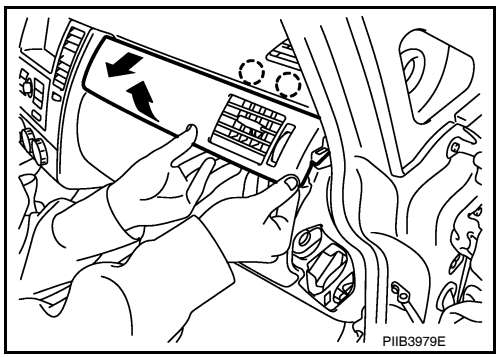


b. Reach through the glove box compartment by hand to the backside of the side ventilator and push against (A) as shown to engage the pawl.
: Pawl

c. Insert a suitable tool into the bottom gap of side ventilator assembly after removing the instrument side mask and push against (B) as shown to disengage the pawl.



d. Lift the side ventilator assembly up from the bottom, pull backward while disengaging the side ventilator assembly upper pawls, and then remove the side ventilator assembly.
: Pawl

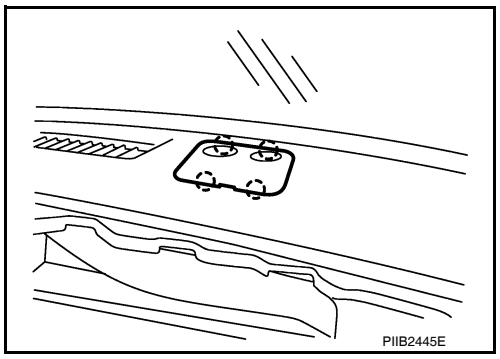


18. Remove front passenger air bag module. Refer to SRS-39.

19. Remove instrument upper mask.
: Pawl

a. Insert a suitable tool into backside space of instrument upper mask.

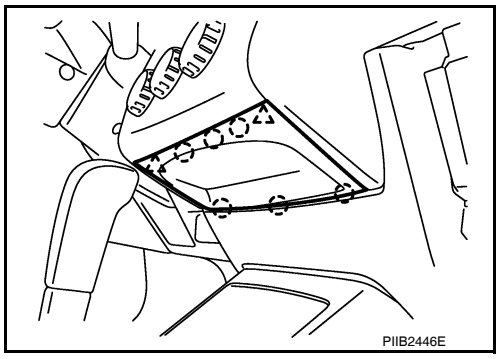
b. Disconnect harness connector, and then remove instrument upper mask.



20. Remove instrument finisher D.
: Pawl
: Clip

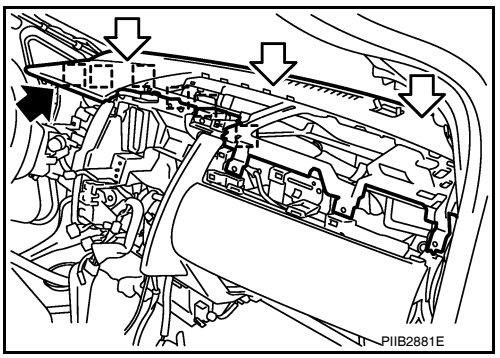
a. Insert a suitable tool into upper space of instrument finisher D.

b. Disengage clips and pawls, then remove instrument finisher D.



21. Remove controller. Refer to MTC-56.

22. Remove instrument upper panel assembly.
    : Metal clip
a. Remove bolts and screws.
b. Pull backward and remove instrument upper panel assembly.



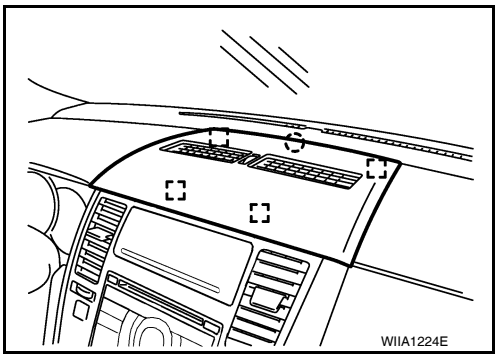
23. Remove lighting & turn signal switch. Refer to LT-62.
24. Remove wiper & washer switch. Refer to WW-25, "Removal and Installation of Front Wiper and Washer Switch".
25. Remove hood opener handle and fuel filler lid opener handle. Refer to BL-16, "Removal and Installation of Hood Lock Control".
26. Remove screws, and then remove instrument panel & pad from passenger door opening portion.

Installation
Installation is in the reverse order of removal.

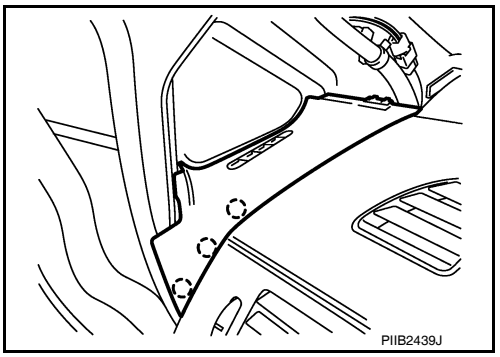
CLUSTER LID A

Removal

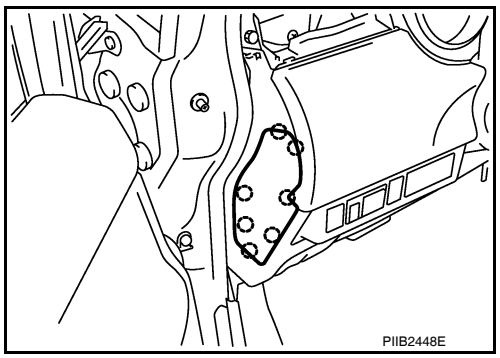
1. Pull instrument finisher E backward by approximately 30 degrees while disengaging the metal clips and pawl.
    : Metal clip
    : Pawl



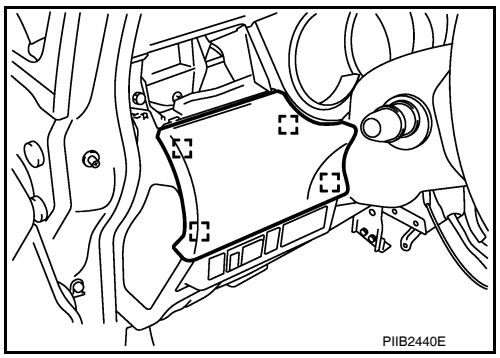
2. Remove front pillar garnish. Refer to EI-35.
3. Remove the instrument side panel (LH/RH).
    : Pawl
a. Pull up instrument side panel and disengage pawls.
b. Remove instrument side panel.



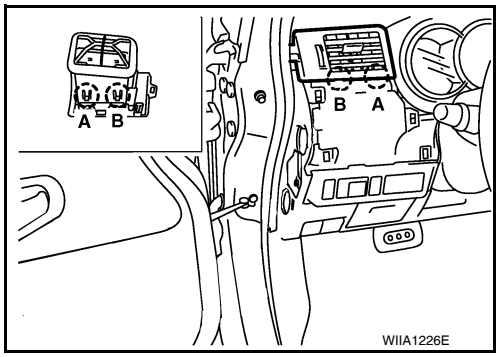
4. Remove instrument side mask (LH).
   ◌: Pawl
a. Insert a suitable tool into upper space of instrument side mask.
b. Disengage pawls, and then remove instrument side mask.



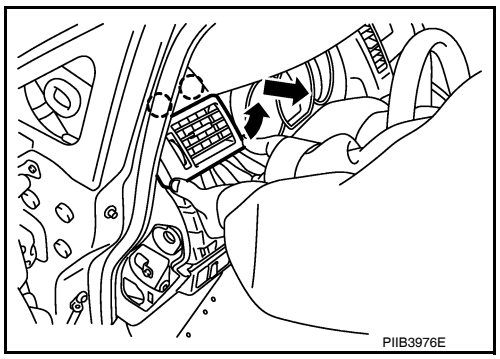
5. Remove instrument side finisher.
   ⬚: Metal clip
a. Insert a suitable tool into space of instrument side finisher.
b. Disengage instrument side finisher metal clips, and then remove instrument side finisher.



6. Remove side ventilator assembly (LH).
   ◌: Pawl
a. Insert a suitable tool into the bottom gap of side ventilator assembly and push against (A) and (B) as shown to disengage the pawls.



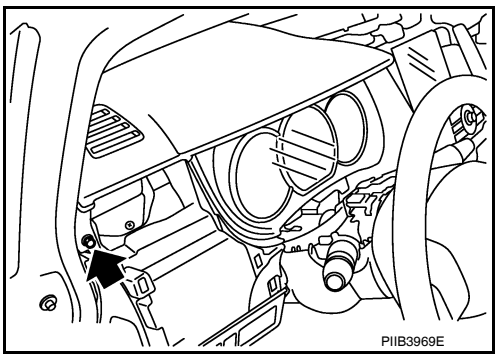
b. Lift the side ventilator up from the bottom, pull backward while disengaging the side ventilator assembly upper pawls, and then remove the side ventilator.
   ◌: Pawl



7. Remove the steering column cover screws, then disengage pawls and remove the steering column upper cover.

8. Remove cluster lid A.

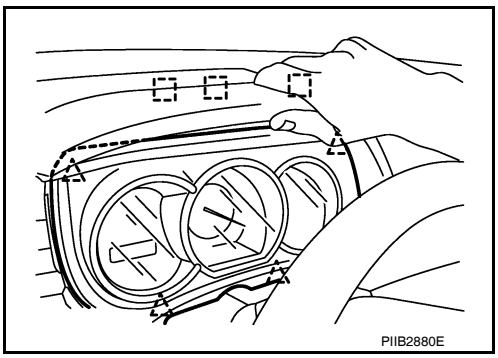
a. Remove screws from instrument upper panel right side.



b. Lift the instrument upper panel up, disengage metal clips.
   : Metal clip
   : Clip

c. Pull backward and disengage clips.

d. Remove cluster lid A.



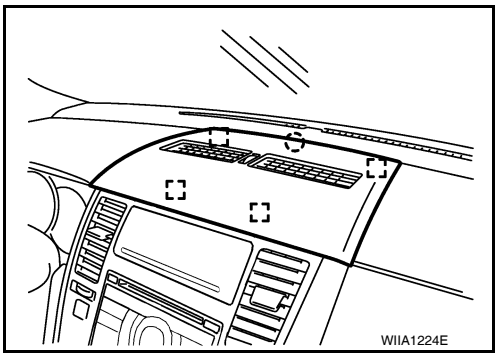
Installation

Installation is in the reverse order of removal.

CLUSTER LID C

Removal

1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Pull instrument finisher E backward by approximately 30 degrees while disengaging the metal clips and pawl.
   : Metal clip
   : Pawl

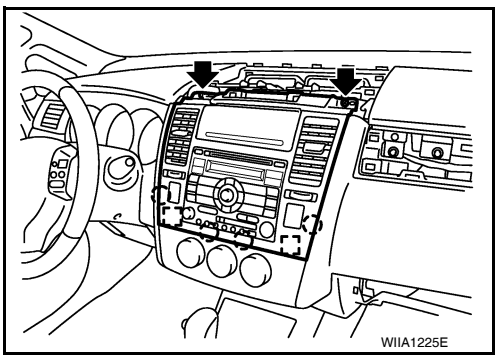


3. Remove cluster lid C.
   : Metal clip
   : Pawl

a. Remove the upper screws from cluster lid C.

b. Pull cluster lid C backward while disengaging the metal clips and pawl.

c. Disconnect harness connector, and then remove cluster lid C.



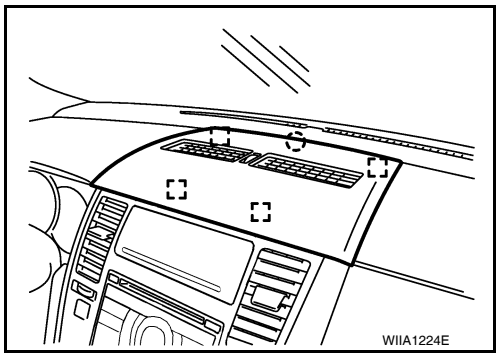
Installation

Installation is in the reverse order of removal.

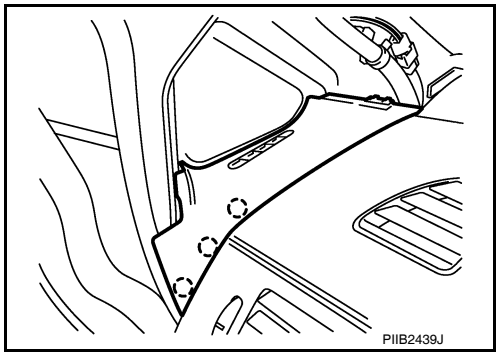
COMBINATION METER

Removal

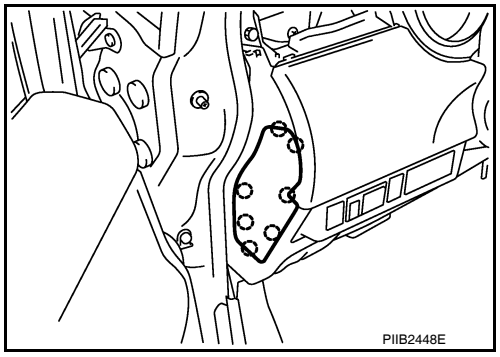
1. Disconnect both the negative and positive battery terminals, then wait at least three minutes.
2. Pull instrument finisher E backward by approximately 30 degrees while disengaging the metal clips and pawl.
   : Metal clip
   : Pawl



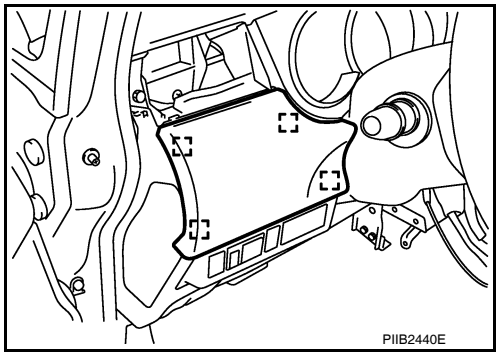
3. Remove front pillar garnish. Refer to EI-35.
4. Remove the instrument side panel (LH).
   : Pawl
   a. Pull up instrument side panel and disengage pawls.
   b. Remove instrument side panel.



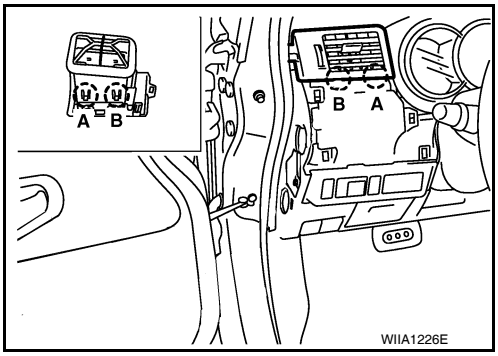
5. Remove instrument side mask (LH/RH).
   : Pawl
   a. Insert a suitable tool into upper space of instrument side mask.
   b. Disengage pawls, and then remove instrument side mask.



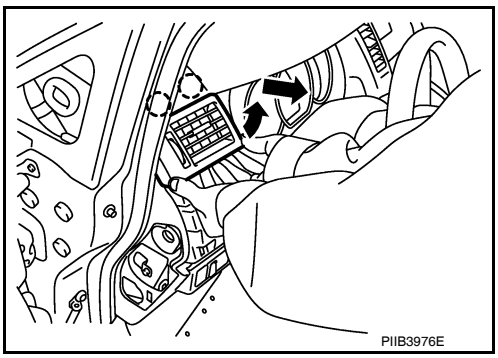
6. Remove instrument side finisher.
   : Metal clip
   a. Insert a suitable tool into space of instrument side finisher.
   b. Disengage instrument side finisher metal clips, and then remove instrument side finisher.



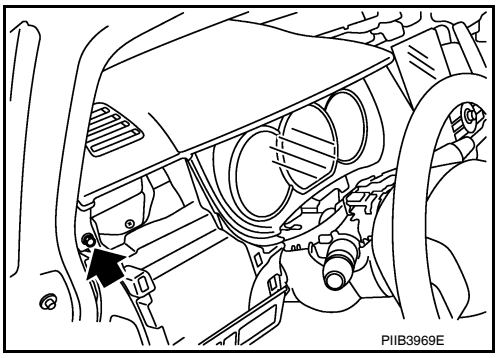
7. Remove side ventilator assembly (LH).
   ◌: Pawl
a. Insert a suitable tool into the bottom gap of side ventilator assembly and push against (A) and (B) as shown to disengage the pawls.



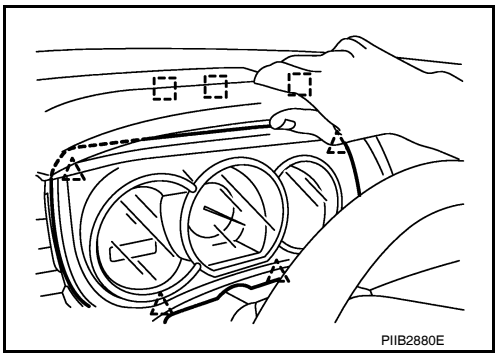
b. Lift the side ventilator up from the bottom, pull backward while disengaging the side ventilator assembly upper pawls, and then remove the side ventilator.
   ◌: Pawl



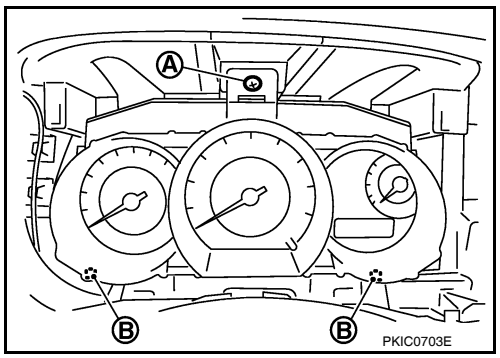
8. Remove the steering column cover screws, then disengage pawls and remove the steering column upper cover.
9. Remove cluster lid A.
a. Remove screws from instrument upper panel right side.



b. Lift the instrument upper panel up, disengage metal clips.
   ⬚: Metal clip
   △: Clip
c. Pull backward and disengage clips.
d. Remove cluster lid A.



10. Remove screw (A) and disengage metal clips (B), and pull combination meter out.
11. Disconnect combination meter connectors and remove combination meter.

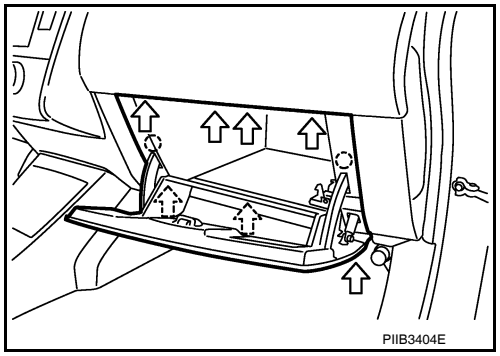


Installation
Installation is in the reverse order of removal.

GLOVE BOX ASSEMBLY

Removal

1. Remove glove box screws.
   NOTE:
   There are three lower and four upper screws.
2. Pull backward while disengaging the glove box assembly pawls.
   ◌: Pawl
3. Remove glove box assembly.



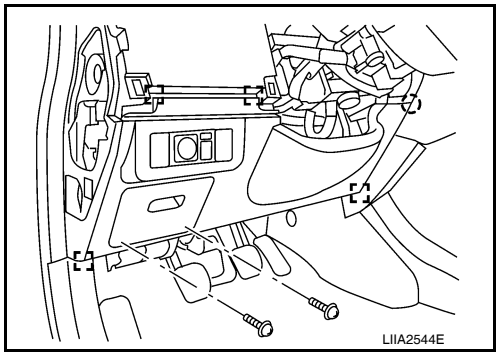
Installation
Installation is in the reverse order of removal.

INSTRUMENT LOWER FINISHER

Removal

1. Disengage pawls and remove fuse block lid.
2. Remove instrument lower finisher.
   ⬚: Metal clip
   ◌: Pawl

a. Remove the instrument lower finisher screws.
b. Pull backward while disengaging the instrument lower finisher metal clips and pawl.
c. Disconnect harness connector, and then remove instrument lower finisher.

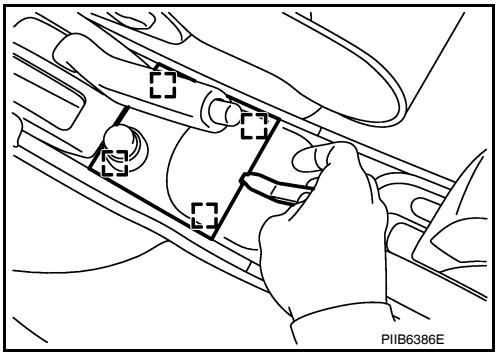


Installation
Installation is in the reverse order of removal.

CENTER CONSOLE ASSEMBLY

Removal

1. Insert a suitable tool into front side space of console mask, and disengage metal clips.
   : Metal clip
2. Disconnect harness connector, and then remove console mask.



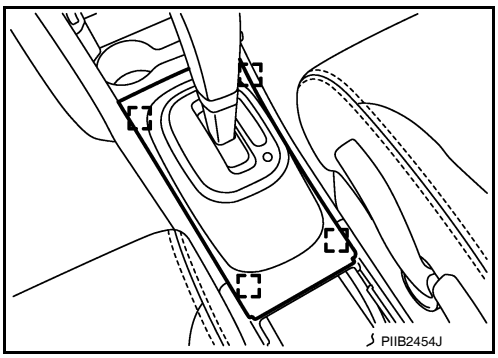
3. On models with A/T or CVT, remove the A/T or CVT console finisher.

a. Place the shift selector in "D" position.

b. Remove shift selector handle. Refer to AT-210, "A/T Shift Selector Removal and Installation" (A/T) or CVT-160, "Removal and Installation" (CVT).

c. Pull up and disengage A/T or CVT console finisher metal clips.
   : Metal clip

d. Remove A/T or CVT console finisher.



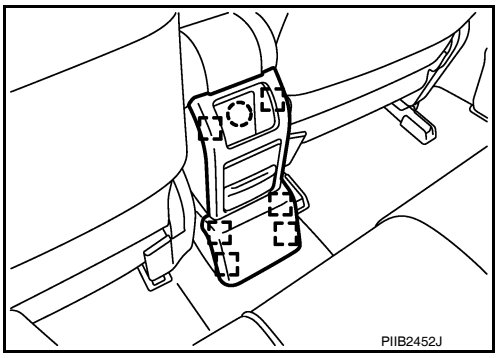
5. On models with M/T, remove the M/T console boot.

a. Remove M/T shift selector handle. Refer to MT-51

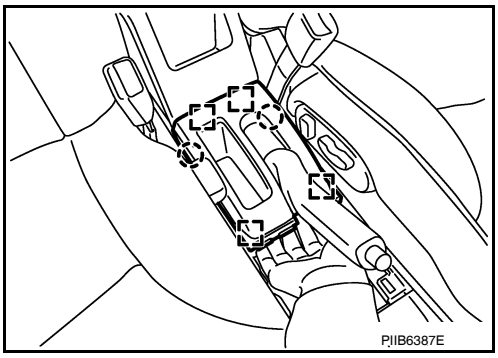
b. Pull up and disengage M/T console boot metal clips.

c. Remove M/T console boot.

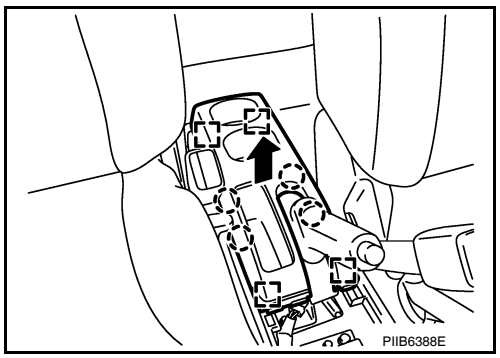
6. Disengage console rear finisher metal clips and pawl.
   NOTE:
   Console rear finisher with armrest is shown in illustration, without armrest is similar.
   : Metal clip
   : Pawl
7. Remove console rear finisher.



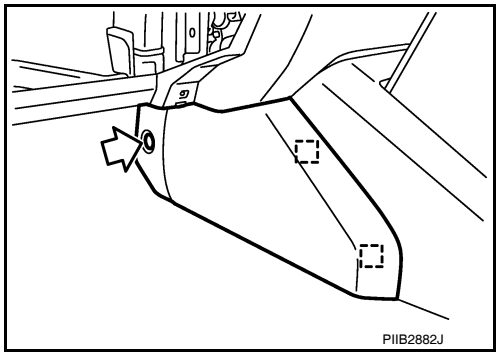
8. On models with an armrest, disengage console mask cover metal clips and pawls, and then remove console mask cover.
   : Metal clip
   : Pawl



9. On models without an armrest, disengage rear cup holder metal clips and pawls and then remove the rear cup holder.
   : Metal clip
   : Pawl



10. Remove console body assembly screws and nut.
11. Disconnect harness connector, and then remove console body assembly.
12. Remove both of the instrument lower cover LH and RH clips.
13. Disengage instrument lower cover LH and RH metal clips and remove both of the instrument lower covers.
    : Metal clip



14. Remove screws and then remove center console.

Installation
Installation is in the reverse order of removal.

Disassembly and Assembly

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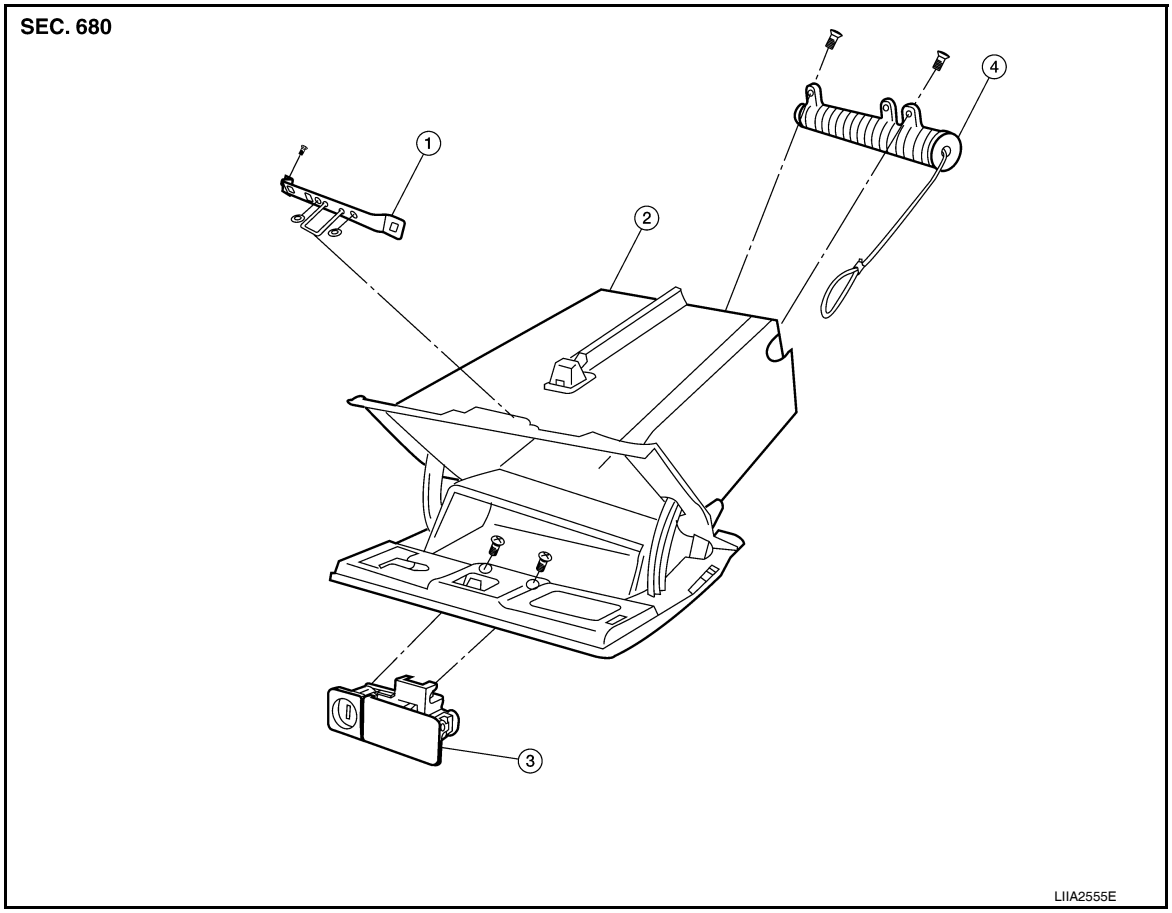
GLOVE BOX ASSEMBLY



1. Glove box striker
2. Glove box
3. Glove box latch
4. Damper

Disassembly

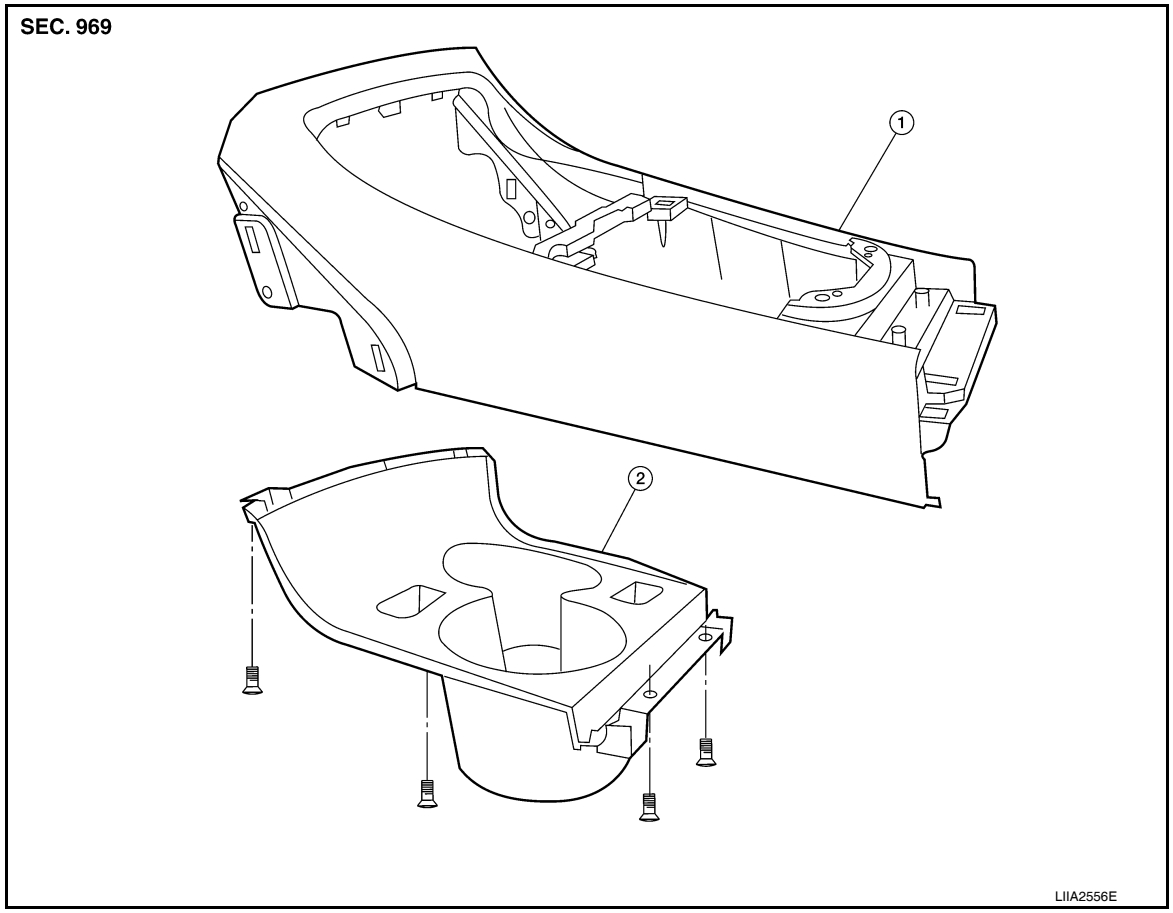
1. Remove screws of damper, and then remove damper.
2. Remove screws of glove box striker, and then remove glove box striker.
3. Remove screws of glove box latch, and then remove glove box latch.

Assembly

Assembly is in the reverse order of disassembly.

CENTER CONSOLE ASSEMBLY

SEC. 969



1. Center console
2. Front cup holder

Disassembly

Remove the four screws, and then remove front cup holder from center console.

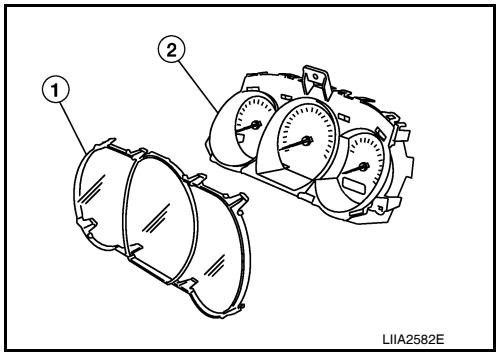
Assembly

Assembly is in the reverse order of disassembly.

COMBINATION METER

Disassembly

Disengage the eight tabs to separate front cover (1) from the unified meter control unit assembly (2).



Assembly

Assembly is in the reverse order of disassembly.

SECTION SE
SEAT

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330237

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330238

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Service Notice

INFOID:0000000007330239

- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding instruments, grille, etc. carefully during removing or installing. Be careful not to oil or damage them.
- Apply sealing compound where necessary when installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, member, etc.), be sure to take rust prevention measures.

Precaution for Work

INFOID:0000000007793387

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

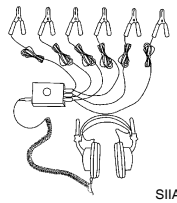
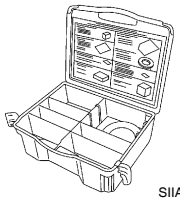
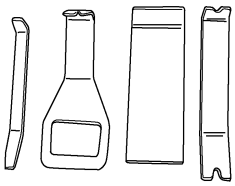
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

Special Service Tool

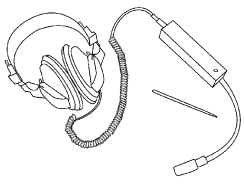
INFOID:0000000007330241

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-39570) Chassis ear  SIIA0993E	Locating the noise
— (J-43980) NISSAN Squeak and Rattle Kit  SIIA0994E	Repairing the cause of noise
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

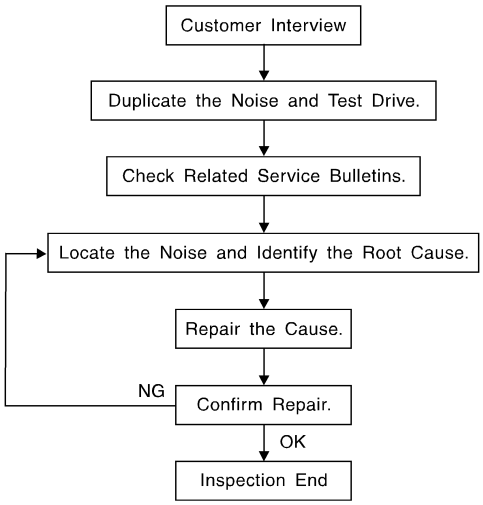
INFOID:0000000007330242

(Kent-Moore No.) Tool name	Description
(J-39565) Engine ear  SIIA0995E	Locating the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

Work Flow

INFOID:0000000007330243



SBT842

CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to SE-9, "Diagnostic Worksheet". This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping.
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T model, shift selector in the drive position for CVT and A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area.To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565 and mechanic's stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fasteners can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to SE-7, "Generic Squeak and Rattle Troubleshooting".

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

- separate components by repositioning or loosening and retightening the component, if possible.
- insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A NISSAN Squeak and Rattle Kit (J-43980) is available through your authorized NISSAN Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.
The following materials are contained in the NISSAN Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100×135 mm (3.94×5.31 in)/76884-71L01: 60×85 mm (2.36×3.35 in)/76884-71L02: 15×25 mm (0.59×0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50×50 mm (1.97×1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50×50 mm (1.97×1.97 in)
INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30×50 mm (1.18×1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15×25 mm (0.59×0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll. The following materials not found in the kit can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE

Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used instead of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

INFOID:0000000007330244

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicone spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shift selector cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the NISSAN Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sun visor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

OVERHEAD CONSOLE (FRONT AND REAR)

Overhead console noises are often caused by the console panel clips not being engaged correctly. Most of these incidents are repaired by pushing up on the console at the clip locations until the clips engage.
In addition look for:

1. Loose harness or harness connectors.
2. Front console map/reading lamp lense loose.
3. Loose screws at console attachment points.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

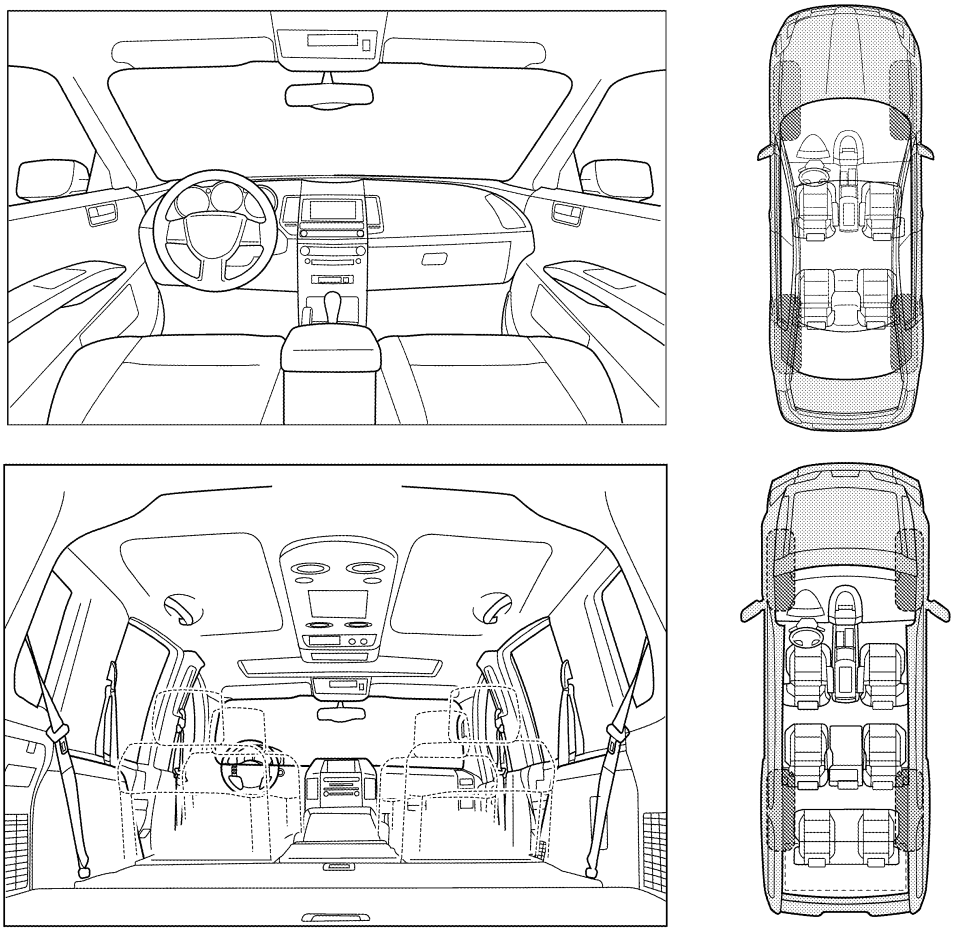
Diagnostic Worksheet

INFOID:0000000007330245

Dear Customer:
We are concerned about your satisfaction with your vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your vehicle right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to page 2 of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

LAIA0072E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET - page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (please check the boxes that apply)

- ☐ Anytime
- ☐ 1st time in the morning
- ☐ Only when it is cold outside
- ☐ Only when it is hot outside
- ☐ After sitting out in the rain
- ☐ When it is raining or wet
- ☐ Dry or dusty conditions
- ☐ Other:

III. WHEN DRIVING:

- ☐ Through driveways
- ☐ Over rough roads
- ☐ Over speed bumps
- ☐ Only about ____ mph
- ☐ On acceleration
- ☐ Coming to a stop
- ☐ On turns: left, right or either (circle)
- ☐ With passengers or cargo
- ☐ Other: _____
- ☐ After driving _____ miles or _____ minutes

IV. WHAT TYPE OF NOISE

- ☐ Squeak (like tennis shoes on a clean floor)
- ☐ Creak (like walking on an old wooden floor)
- ☐ Rattle (like shaking a baby rattle)
- ☐ Knock (like a knock at the door)
- ☐ Tick (like a clock second hand)
- ☐ Thump (heavy muffled knock noise)
- ☐ Buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL

Test Drive Notes:

_____

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	☐	☐	_____
- Noise verified on test drive	☐	☐	_____
- Noise source located and repaired	☐	☐	_____
- Follow up test drive performed to confirm repair	☐	☐	_____

VIN: _____ Customer Name _____

W.O.# _____ Date: _____

This form must be attached to Work Order

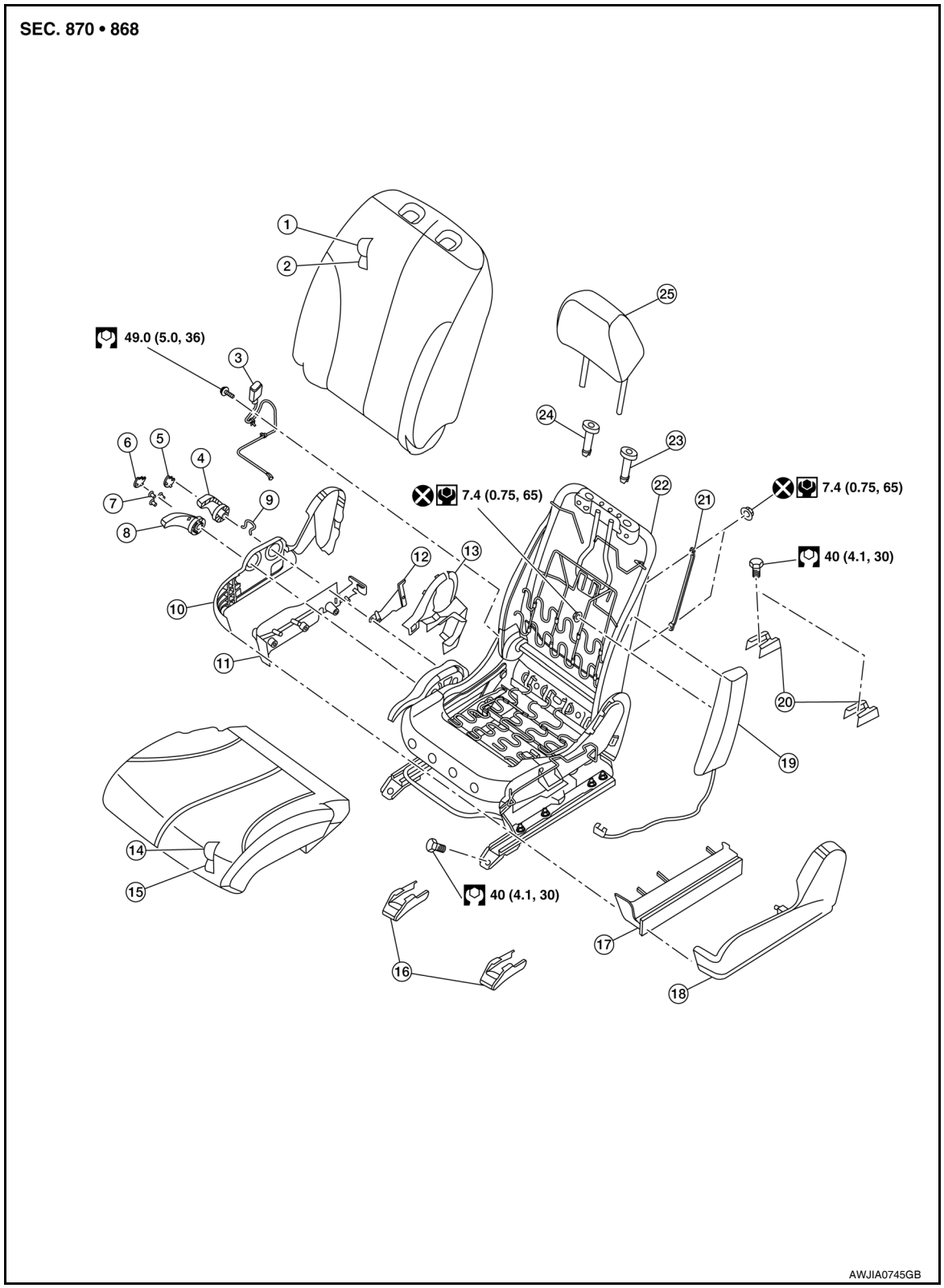
LAIA0071E

FRONT SEAT

Exploded View

INFOID:0000000007330246

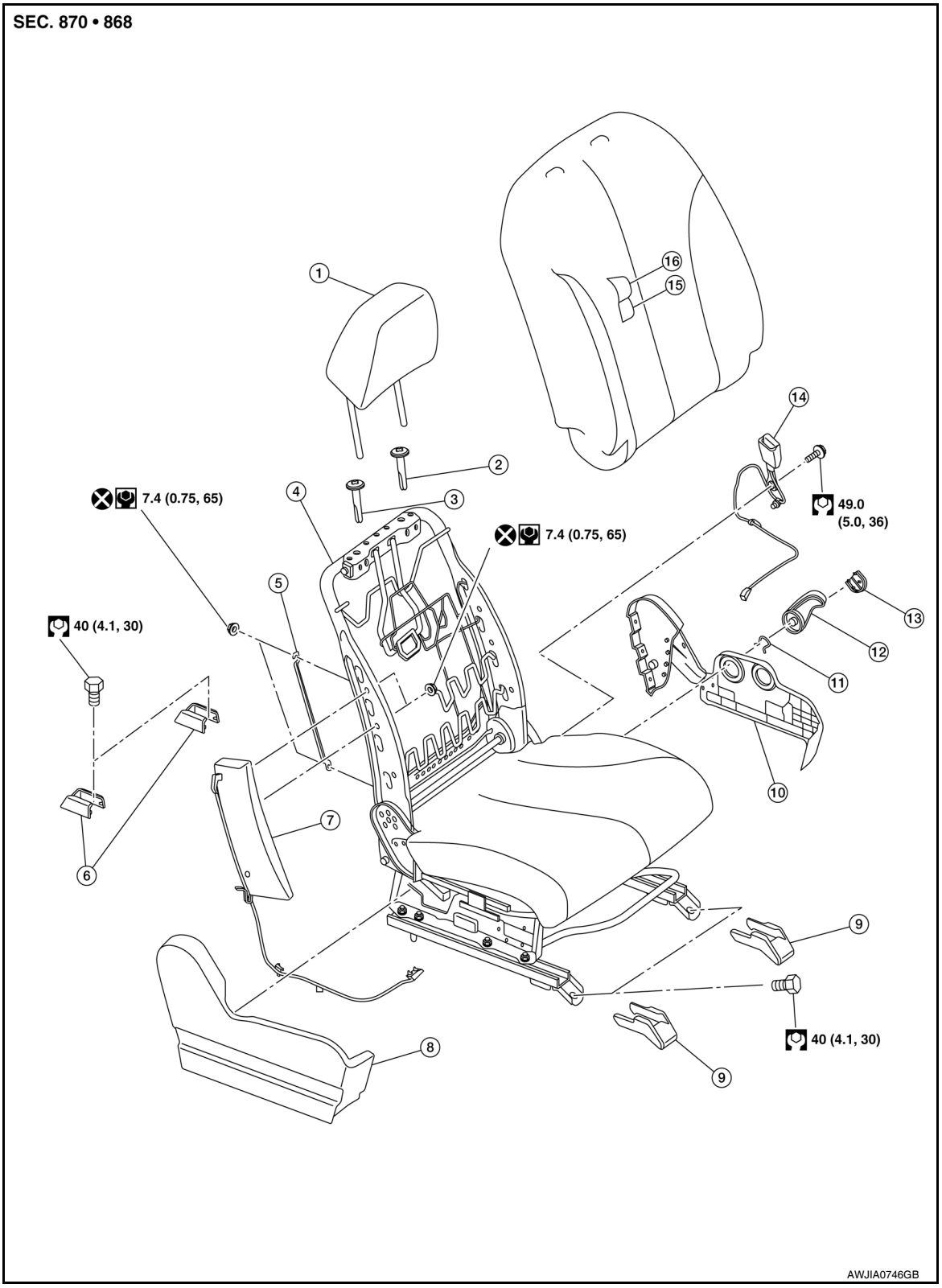
DRIVER SEAT



1. Seatback trim
2. Seatback pad
3. Seat belt buckle
4. Reclining lever
5. Reclining lever cover
6. Lifter lever cover (if equipped)
7. Lifter lever screws (if equipped)
8. Lifter lever (if equipped)
9. Reclining lever clip
10. Seat cushion inner finisher
11. Seat cushion inner finisher lower (if equipped)
12. Slide inner cover (if equipped)
13. Reclining device inner cover
14. Seat cushion trim
15. Seat cushion pad
16. Front leg cover
17. Seat cushion outer finisher lower (if equipped)
18. Seat cushion outer finisher
19. Side air bag module
20. Rear leg cover
21. Chute rod
22. Seat assembly
23. Headrest holder (locked)
24. Headrest holder (free)
25. Headrest

PASSENGER SEAT

SEC. 870 • 868



1. Headrest
2. Headrest holder (locked)
3. Headrest holder (free)
4. Seat assembly
5. Chute rod
6. Rear leg cover
7. Side air bag module
8. Seat cushion outer finisher
9. Front leg cover
10. Seat cushion inner finisher
11. Reclining lever clip
12. Reclining lever
13. Reclining lever cover
14. Seat belt buckle
15. Seatback pad
16. Seatback trim

Removal and Installation

INFOID:0000000007330248

CAUTION:
- **When removing and installing, use shop cloths to protect parts from damage.**
- **Before removal, be sure to turn ignition switch OFF, disconnect both battery terminals, then wait for at least three minutes.**

REMOVAL

1. Disconnect the negative and positive battery terminals, then wait at least three minutes.
2. Remove the seat assembly bolts on the back side of the front seat.
3. Remove the seat assembly bolts on the front side of the front seat.
4. Disconnect the body harness connector(s), then release the harness clips from the seat assembly.
5. Remove the front seat assembly from the vehicle.
   NOTE:
   Before removing the seat assembly from the vehicle, adjust the seatback to the upright position.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
Always route the side air bag module harness in the original location. Replace any deformed or damaged clips with the same type and color. Always install clips in the original location on the harness.
NOTE:
- Before installation of the seat assembly, confirm that the inside and outside slide rails are both locked at the same positions.
- Confirm that the slide rail locating pin is set to the locating hole on the floor.

Disassembly and Assembly

INFOID:0000000007330249

SEAT CUSHION FINISHER

CAUTION:
- **Front passenger seat is equipped with an Occupant Classification System sensor and control module. Do not disassemble front passenger seat cushion assembly or remove the seat cushion trim as this will affect the Occupant Classification System calibration.**
- **During installation, the harness clips must be installed in the holes they were originally in. Do not add additional clips.**

Disassembly

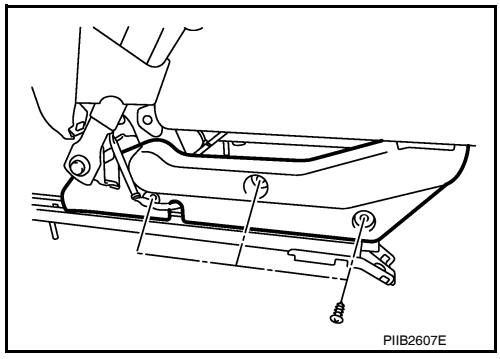
1. Remove the front seat assembly. Refer to SE-14, "Removal and Installation".
2. Remove the reclining lever.

a. Remove the reclining lever cover.
b. Release the reclining lever clip and remove the reclining lever.

3. Remove the lifter lever (if equipped).

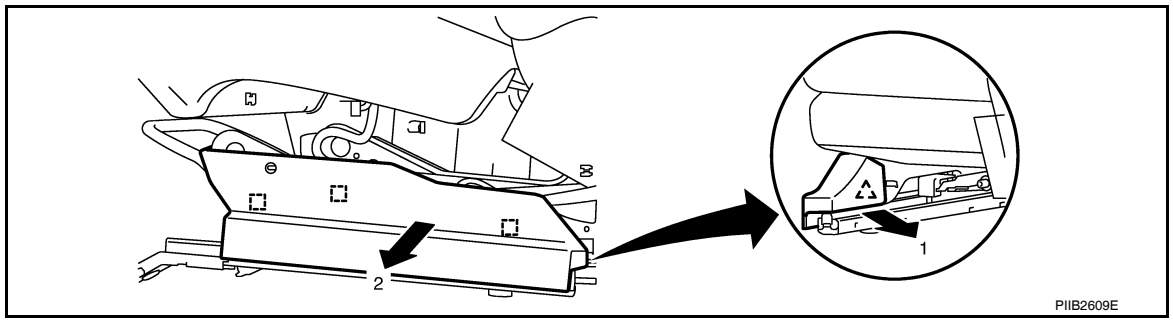
a. Remove the lifter lever cover.
b. Remove the lifter lever screws.
c. Remove the lifter lever.

4. Remove the front seat belt buckle. Refer to SB-4, "Removal and Installation of Front Seat Belt".
5. Remove the screws, then remove the seat cushion inner finisher lower (if equipped).



6. Release the clips, then remove the seat cushion outer finisher.
7. For driver seat, remove the seat cushion outer finisher lower (if equipped).

a. Release the clip at the back inside edge of the seat cushion outer finisher lower.
b. Release the metal clips and remove the seat cushion outer finisher lower.



: Metal clip : Clip

Assembly
Assembly is in the reverse order of disassembly.

SEAT CUSHION TRIM AND PAD

Disassembly

CAUTION:
- **Front passenger seat is equipped with an Occupant Classification System sensor and control module. Do not disassemble front passenger seat cushion assembly or remove the seat cushion trim as this will affect the Occupant Classification System calibration.**
- **During installation, the harness clips must be installed in the holes they were originally in. Do not add additional clips.**

NOTE:
For passenger side only, the occupant classification system control unit, occupant classification system sensor, and bladder are an integral part of the front passenger seat cushion trim and pad and are replaced together as an assembly.

1. Remove the seat cushion finishers. Refer to "SEAT CUSHION FINISHER".
2. Remove the J-retainer of seat cushion trim.
3. Remove the hog rings to separate the seat cushion pad and seat cushion trim.
   NOTE:
   Remove all pieces of hog rings and discard them.
4. Remove seat cushion trim and seat cushion pad from the seat cushion frame.

Assembly
Assembly is in the reverse order of disassembly.
Install new hog rings on the seat cushion trim in their original positions.
NOTE:
Use NISSAN standard hog rings to assemble.

SEATBACK

WARNING:
Never leave any objects (screwdrivers, tools, etc.) on the seat during seatback repair. It can lead to personal injury if the side air bag module should accidentally deploy.
CAUTION:
- **Before servicing, turn ignition switch OFF, disconnect both battery terminals and wait at least 3 minutes.**
- **Handle the side air bag module carefully. During disassembly, always hold the side air bag module, do not let it hang by the wire harness.**
- **Always place the side air bag module with the deployment side facing upward.**
- **Always work from the side or back of the seatback assembly, do not work in front of seat.**
- **Do not use air tools or electric tools for servicing the seat assembly.**
- **Replace the side air bag module if it has been dropped or sustained an impact.**

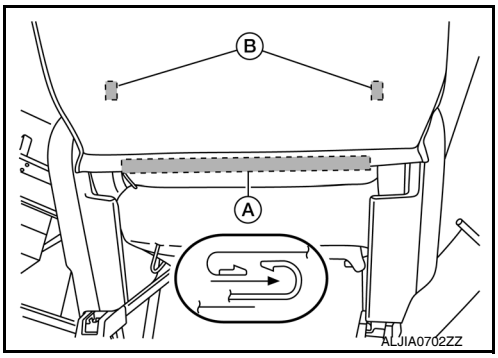
- **Do not insert any objects into the side air bag module.**
- **Do not attempt to disassemble the side air bag module.**
- **Do not expose the side air bag module to temperatures exceeding 90°C (194°F).**
- **Do not expose the side air bag module to any oil, grease, detergent or water.**
- **During disassembly, do not damage the seatback trim, chutes, harness connectors, retainers, clips, module harness or the side air bag module.**

NOTE:

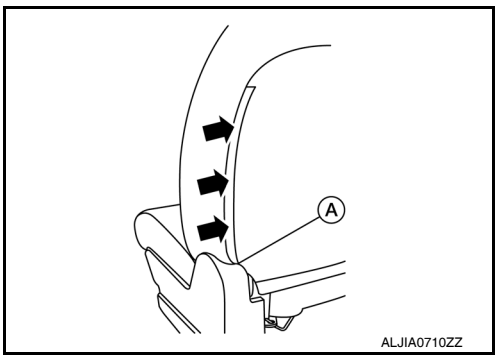
- If the vehicle has been involved in a collision and the side air bag has deployed, the front seatback assembly must be replaced.
- Driver side shown, passenger side similar.

Disassembly

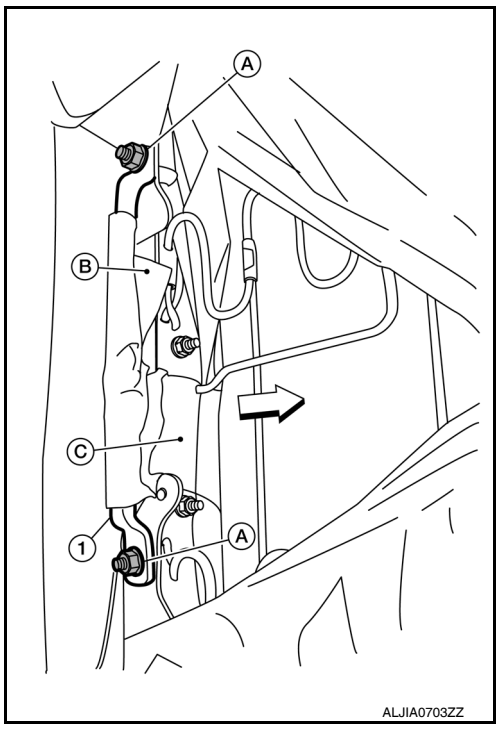
1. Remove the front seat assembly. Refer to SE-14, "Removal and Installation".
2. Release the seatback lower center J-retainer (A).
3. Release the seatback lower left and right J-retainers (B).



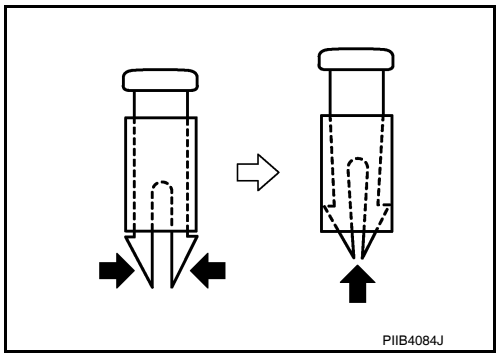
4. Unzip the slider (A) of the seatback outboard side zipper, then unzip the slider of the seatback inboard side zipper (if equipped).



5. Remove and discard the two chute rod nuts (A). Then remove the chute rod (1) by routing it through the loops in the outer chute (B) and the inner chute (C).
   ⇦: Front
   CAUTION:
   Do not reuse the chute rod nuts.

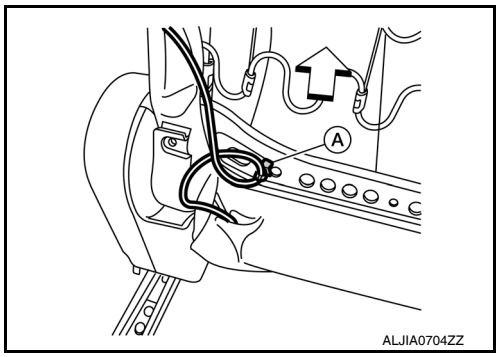


6. Press the headrest holder lock button in and remove the headrest.
7. Remove the headrest holders by pinching the hooks together at the bottom and pulling them upward and out of the seatback.
   CAUTION:
   Make sure to note the position of headrest holders for proper lock/free operation after assembly.

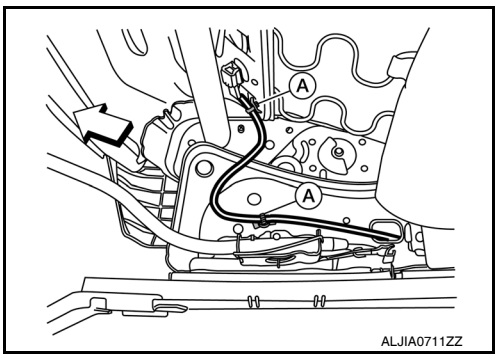


8. Push the bottom of the seatback trim and pad toward front edge of seat, away from the seatback frame, then remove the seatback trim and pad by lifting them together as an assembly.
   CAUTION:
   Make sure to lift the seatback trim and pad from the seatback frame slowly, or it may get torn.
9. Release the side air bag module harness clips.

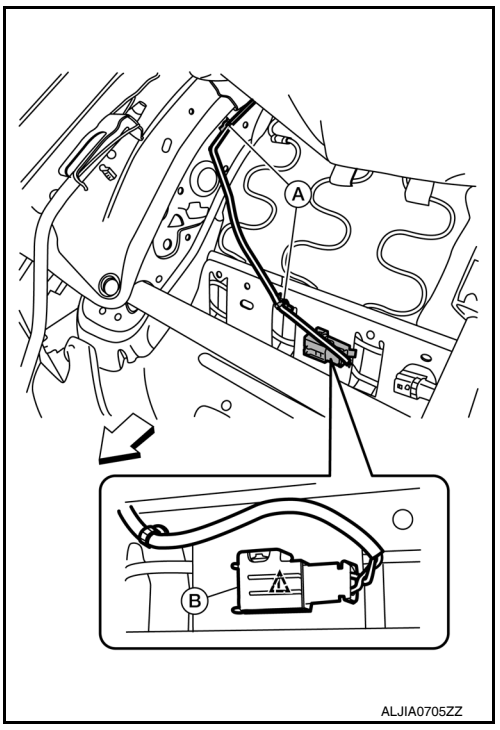
a. Release the side air bag module harness upper clip (A) from the seatback frame lower crossbar.
   ⇦: Front



b. For seats equipped with seat lifter, release the side air bag module harness lower clips (A) from the seat cushion frame.
⇦: Front



c. Release the side air bag module harness lower and front clips (A) and harness connector clip (B) from the seat frame.
⇦: Front
△: Clip

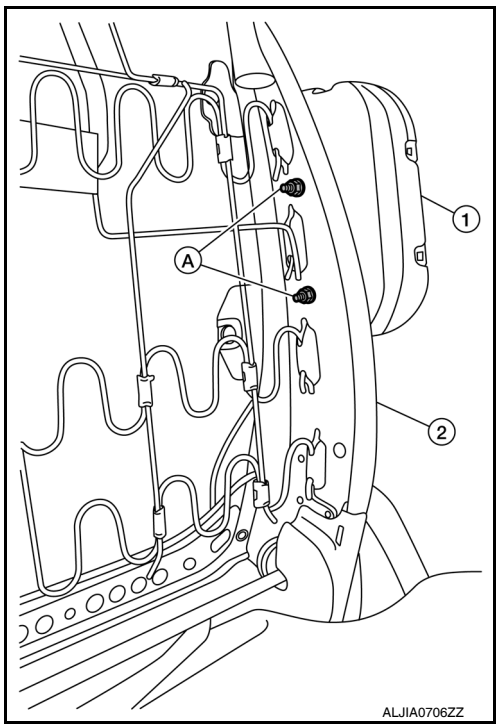


10. Remove the side air bag module.

a. Route the side air bag module harness and harness clips through the slot in the seat cushion trim.

b. Remove and discard the two side air bag module nuts (A).
CAUTION:
Do not reuse the side air bag module nuts.

c. Remove the side air bag module (1) from the seatback frame (2).



11. If necessary, separate the seatback trim from the seatback pad by cutting the center of hog rings and removing them.
NOTE:
Remove all pieces of hog rings and discard them.

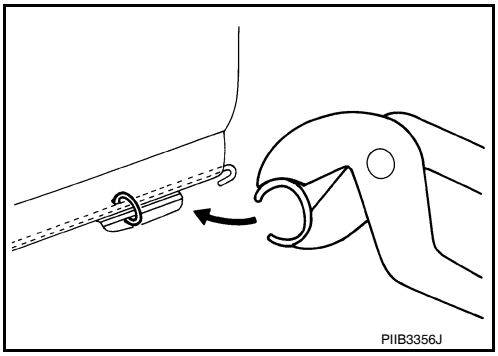
Assembly

Assembly is in the reverse order of disassembly.

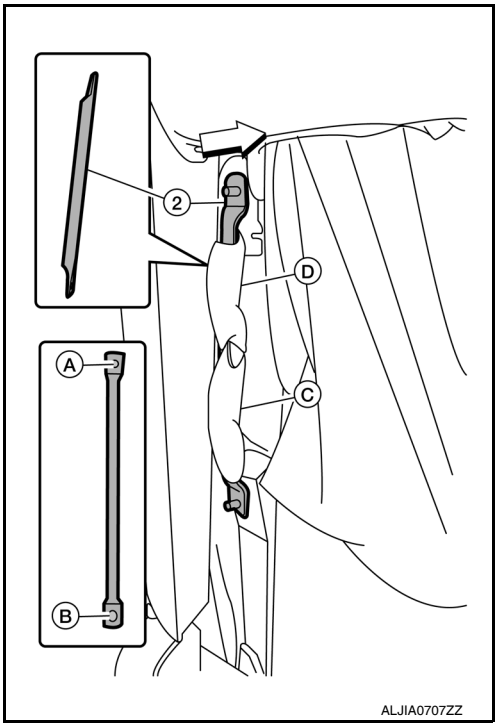
CAUTION:
- **If a malfunction was detected by the air bag warning lamp, after repair or replacement of the malfunction parts, reset the memory using self-diagnosis or CONSULT.**
- **After work is completed, check that no system malfunction is detected by air bag warning lamp.**
- **Always install new side air bag module nuts and side air bag chute rod nuts.**
- **Always route the side air bag module harness in the original location. Replace any deformed or damaged clips with the same type and color. Always install clips in the original location on the harness.**
- **Smooth out all wrinkles in chutes and trim during assembly.**
- **Inspect seatback trim, seatback pad and side air bag chutes. Replace any damaged parts.**
- **Replace any deformed or damaged parts.**
- **Replace any deformed or damaged hog rings. Make sure any old hog ring pieces are removed from seat.**
- **Use only one hog ring in each designated location.**
- **Make sure hog rings are correctly fastened around both the seatback trim and seatback pad wires.**

NOTE:
Use NISSAN standard hog rings to assemble.
- Before installing headrest holders, check for their correct orientation. (Front/Rear, Right/Left)
- When installing the seatback trim, firmly press on the seams to make sure the hook and loop fasteners below the trim are fastened properly.

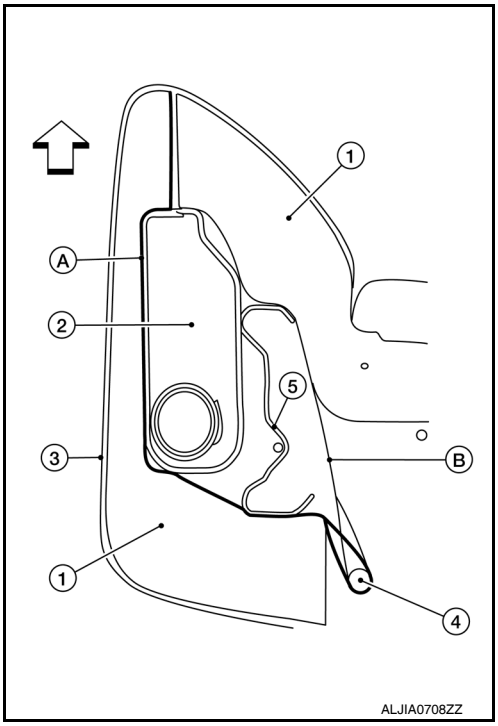
- Install new hog rings on the seatback trim in their original positions.



- Make sure the chute rod (2) is properly positioned and installed with the round hole opening (A) at the top and the oblong hole opening (B) at the bottom as shown.
  ⇦: Front
  CAUTION:
  Do not reuse chute rod nuts.
  NOTE:
  Make sure that both the side air bag inner chute end (C) and outer chute end (D) are pushed through the opening in the seatback pad.



- Make sure the side air bag outer chute (A) is pulled around the outboard surface of the side air bag module (2) and the side air bag inner chute (B) is pulled around the inboard surface of the side air bag module and seatback frame (5). Make sure there are no wrinkles in the chute fabric, and the chutes are not folded, twisted or pinched.
  (1) Seatback pad
  (3) Seatback trim
  (4) Chute rod
  ⇦: Front



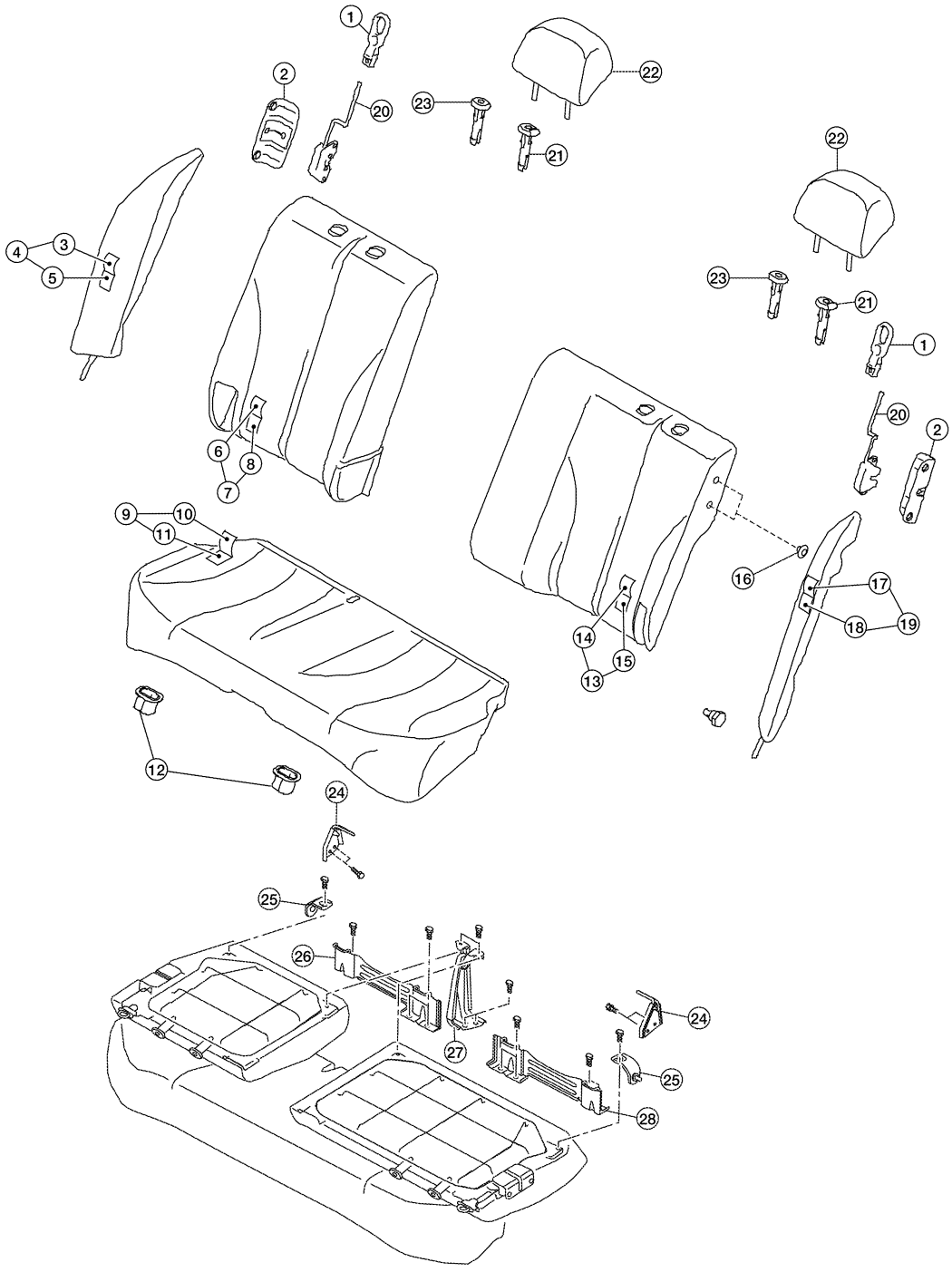
REAR SEAT

Component Parts Drawing

INFOID:0000000007330250

60:40 SPLIT FOLD DOWN SEAT - HATCHBACK

SEC. 880



ALJIA0527ZZ

1. Rear seatback lock knob
2. Rear seat striker cover
3. Rear seatback side trim RH
4. Rear seatback side assembly RH
5. Rear seatback side pad and frame RH
6. Rear seatback trim RH

7. Rear seatback assembly RH	8. Rear seatback pad RH	9. Seat cushion assembly
10. Rear seat cushion trim	11. Rear seat cushion pad and frame	12. Rear seat cushion hook (body)
13. Rear seatback assembly LH	14. Rear seatback trim LH	15. Rear seatback pad LH
16. Trim clip	17. Rear seatback side trim RH	18. Rear seatback side pad and frame LH
19. Rear seatback side assembly LH	20. Rear seat lock assembly	21. Locking headrest holder
22. Rear headrest	23. Free headrest holder	24. Rear seat cushion hook (seat)
25. Rear seatback side bracket	26. Rear seat striker RH	27. Rear seatback center bracket
28. Rear seat striker LH		

Removal and Installation

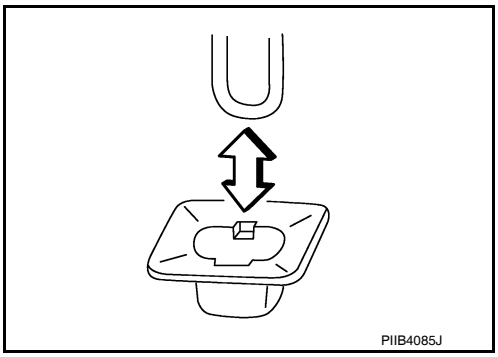
INFOID:0000000007330251

CAUTION:
When removing and installing, use shop cloths to protect parts from damage.

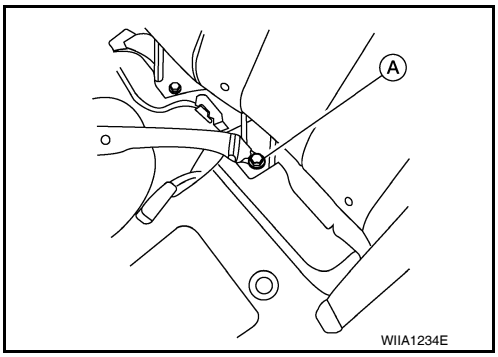
60:40 SPLIT FOLD DOWN SEAT - HATCHBACK

Removal

1. Remove the tonneau board. Refer toEI-44, "Removal and Installation".
2. Remove the luggage floor center board. Refer to EI-44, "Removal and Installation".
3. Pull seat cushion up, then remove the seat cushion from the seat cushion hook.
   NOTE:
   • Always replace the seat cushion hooks when the seat cushion has been released.

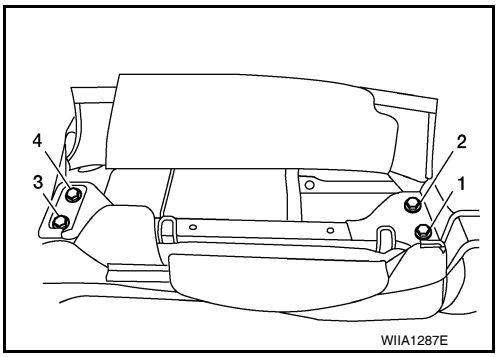

PIIB4085J

4. Remove the center seatbelt anchor bolt (A) from under the seat.



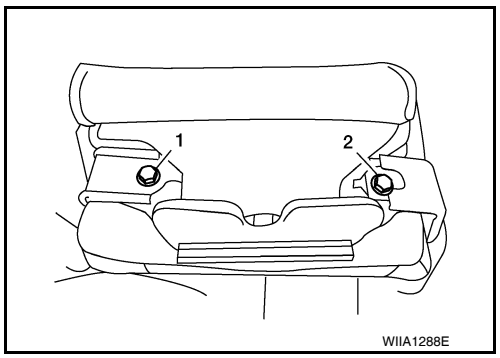
WIIA1234E

5. Remove the seatback bolts in the reverse order as shown from the right rear seat back brackets.

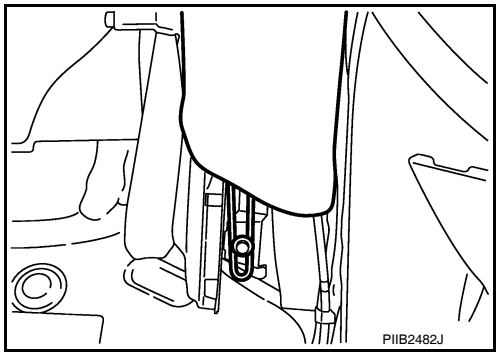


WIIA1287E

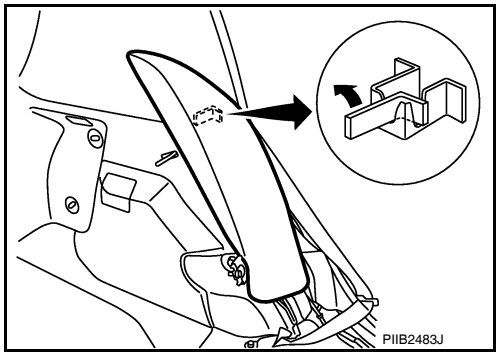
6. Remove the seatback bolts in the reverse order as shown from the left rear seat back brackets.



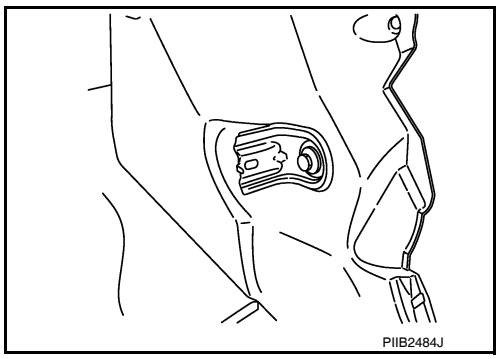
7. Remove the seatback from the vehicle.
8. Remove the kicking plate rear inner. Refer to EI-35, "Component".
9. Remove the bolt under the seatback side.



10. Pull seatback side up, and then remove seatback side.



11. Remove the rear seatback center bracket bolts and the rear seatback center bracket.
12. Remove the rear seatback side bracket bolt and the rear seatback side bracket.



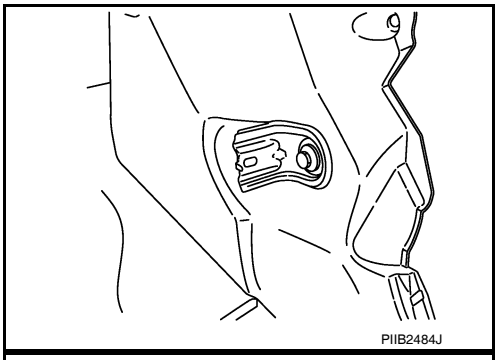
13. Remove the rear seatback finisher. Refer to SE-21, "Component Parts Drawing".
14. Remove the rear seat striker bolts and the rear seat striker.

Installation

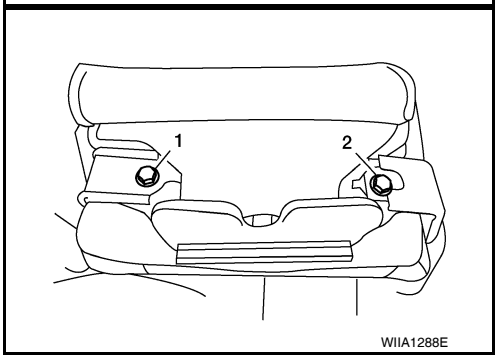
Installation is in the reverse order of removal.

- When installing the rear seatback side bracket perform the following procedure:

1. Install the rear seatback side bracket, temporarily tighten the seatback assembly and rear seatback side bracket bolt.
2. Lift to fold up seatback assembly. Be sure to lock seatback assembly to rear seat striker.
3. Tighten the rear seatback side bracket bolt.
   NOTE:
   Confirm that side hinge bracket location pin is set to the hole on the seatback backside.

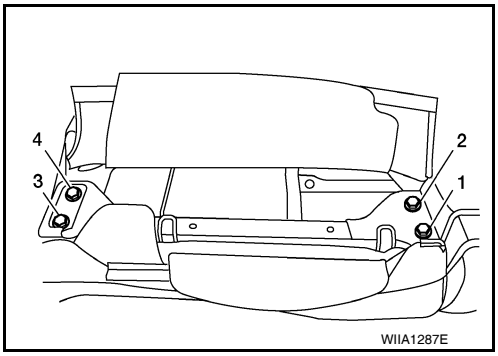

PIIB2484J

- Install the left rear seat back brackets and seatback bolts.



WIIA1288E

- Install the right rear seat back brackets and the rear seat back bracket bolts.



WIIA1287E

Disassembly and Assembly

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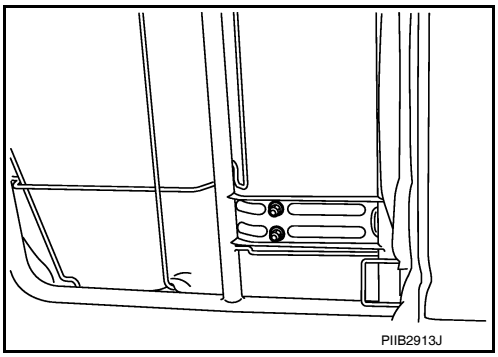
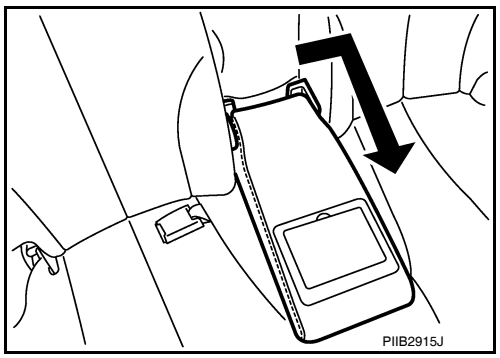
60:40 SPLIT FOLD DOWN SEAT - HATCHBACK

Disassembly of Armrest

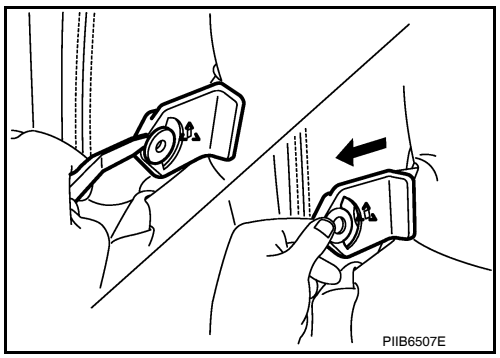
1. Fold up the backside of the seatback trim and then remove the armrest nuts.


PIIB2913J

2. Push the armrest toward left side while pulling backward to remove.



3. Remove the rear seat bushing, and then remove the armrest hinge cover by pulling it backward.

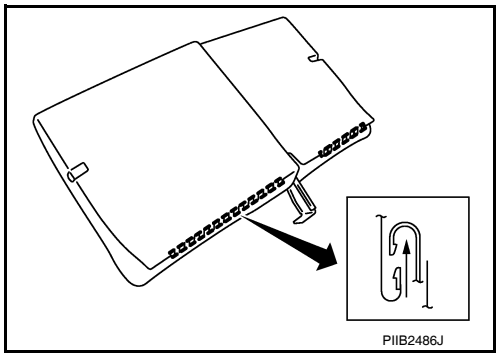


Assembly of Armrest

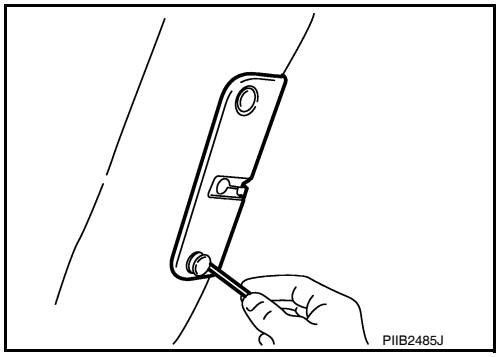
Assembly is in the reverse order of disassembly.

Disassembly of Seatback Trim and Pad

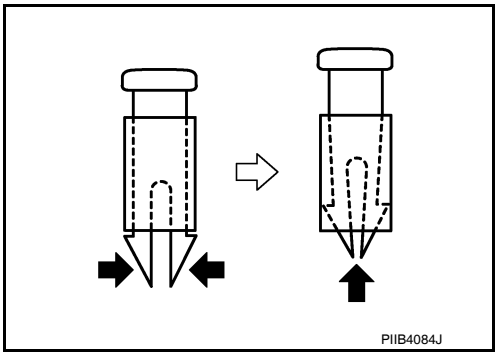
1. Remove the headrest.
2. Remove the retainer under the back of seatback.



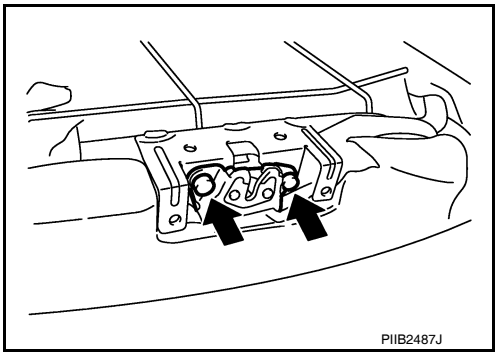
3. Remove the clips, and then remove the striker cover.



4. Remove the headrest holder.



5. To remove armrest, refer to "Disassembly of Armrest " .
6. Remove the seatback trim.
7. Remove the bolts, and then remove the rear seat lock assembly.



8. Remove the seatback pad from the seatback frame.
9. Remove the seatback center bracket bolt and then remove the seatback frame.

Assembly of Seatback Trim and Pad

Assembly is in the reverse order of disassembly.

- Before installing headrest holder, check its orientation (front/rear and right/left).

Disassembly of Seat Cushion Trim and Pad

Remove the rings to separate the trim and pad.

Assembly of Seat Cushion Trim and Pad

Assembly is in the reverse order of disassembly.

SECTION MTC
MANUAL AIR CONDITIONER

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329053

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329054

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007795977

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

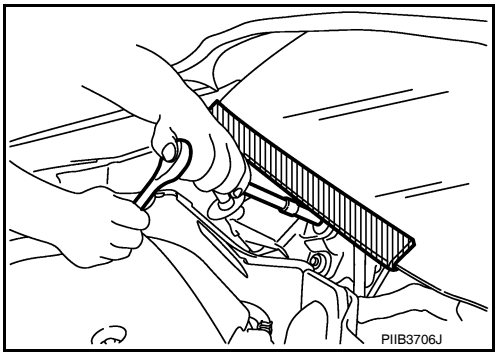
- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007329055

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for Working with HFC-134a (R-134a)

INFOID:0000000007329056

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed a compressor malfunction is likely to occur.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**

- **Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.**

General Refrigerant Precaution

INFOID:0000000007329057

WARNING:

- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**
- **Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (126° F).**
- **Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Do not intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**

Oil Precaution

INFOID:0000000007329058

- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat.
  Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

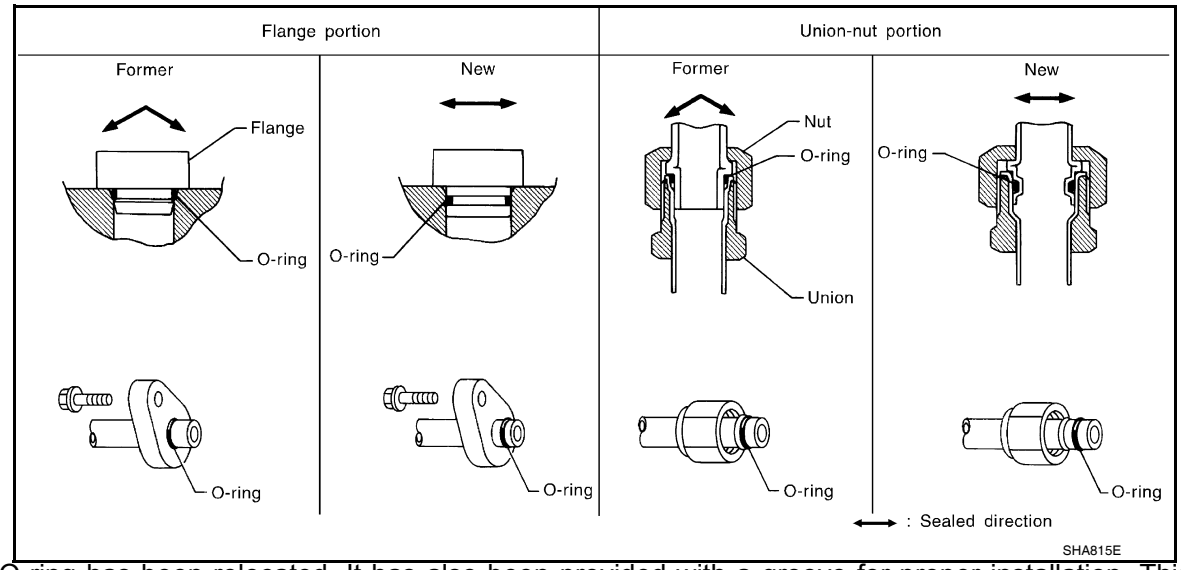
Precaution for Refrigerant Connection

INFOID:0000000007329059

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to evaporator
- Refrigerant pressure sensor to condenser

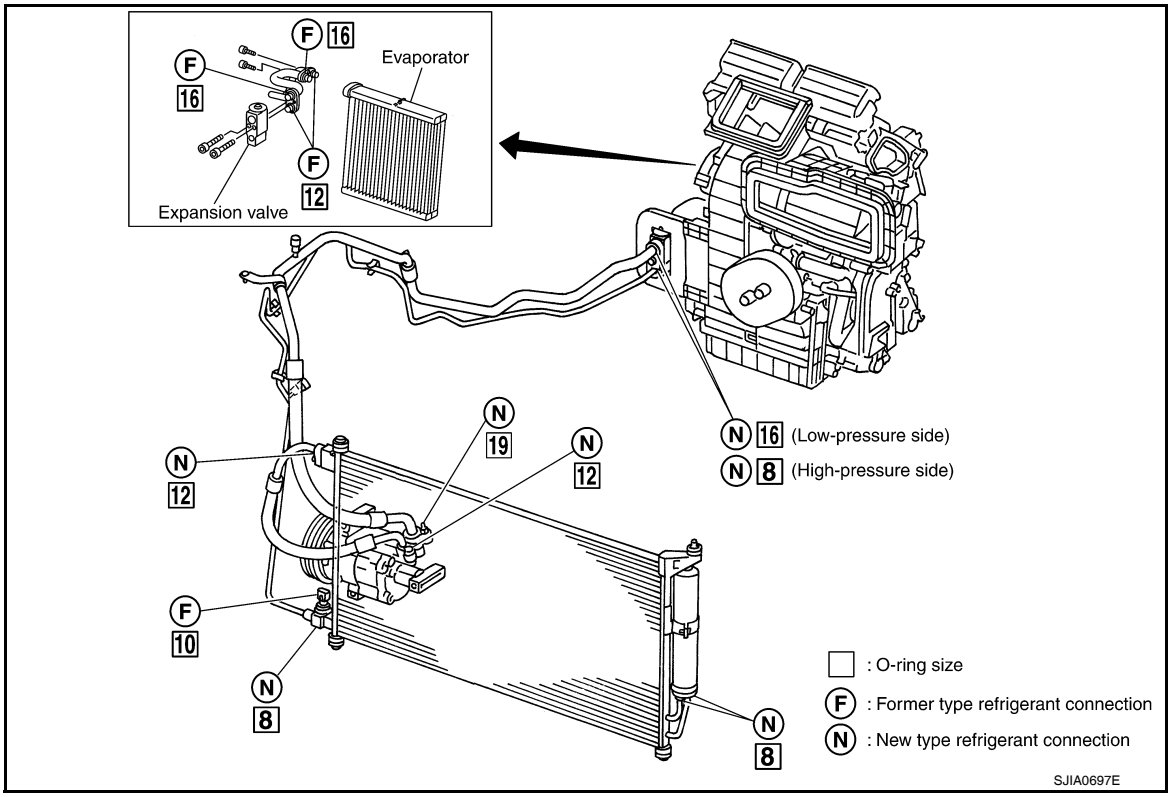
FEATURES OF NEW TYPE REFRIGERANT CONNECTION



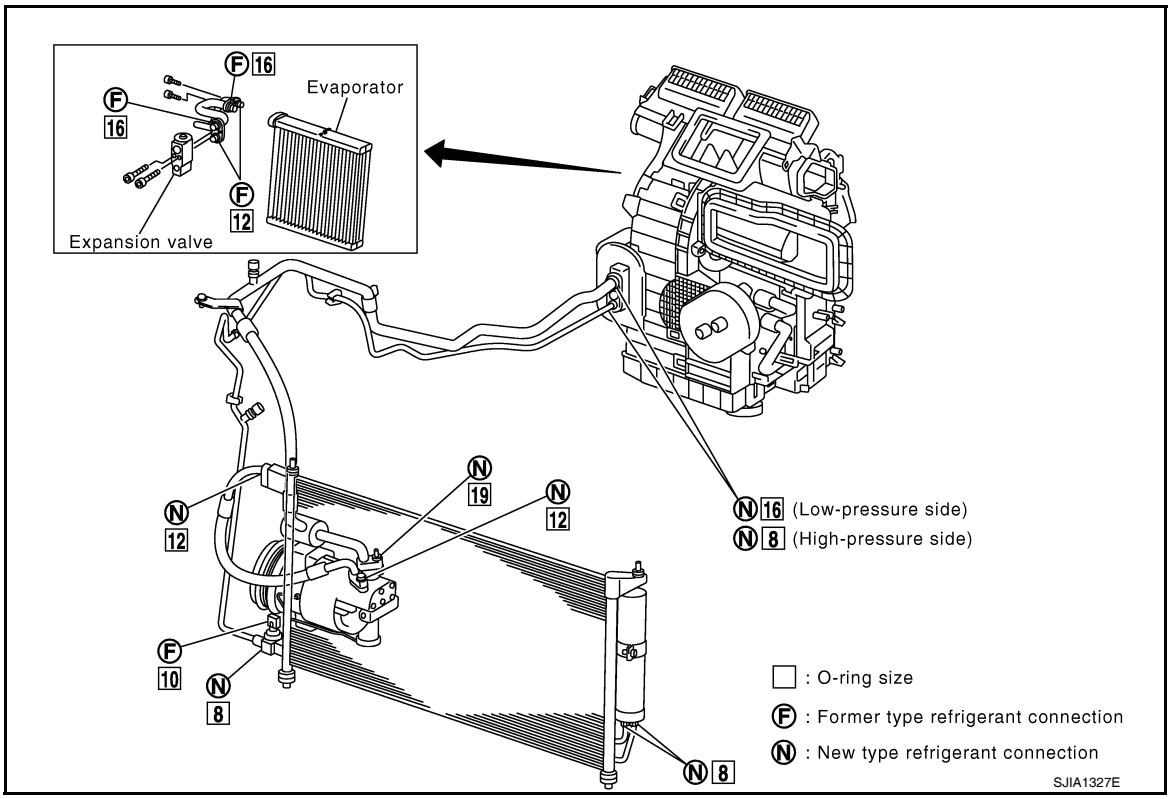
- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.

O-RING AND REFRIGERANT CONNECTION

MR18DE - TYPE 1



MR18DE - TYPE 2



WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Specifications*

Connection type	Piping connection point		QTY	O-ring size
New	Condenser to high-pressure flexible hose		1	12
	Condenser to high-pressure pipe		1	8
	Low-pressure flexible hose to expansion valve		1	16
	High-pressure pipe to expansion valve		1	8
	Compressor to low-pressure flexible hose		1	19
	Compressor to high-pressure flexible hose		1	12
	Liquid tank to condenser pipe	Inlet	1	8
		Outlet	1	
Former	Refrigerant pressure sensor to condenser		1	10
	Expansion valve to evaporator	Inlet	2	12
		Outlet	2	16

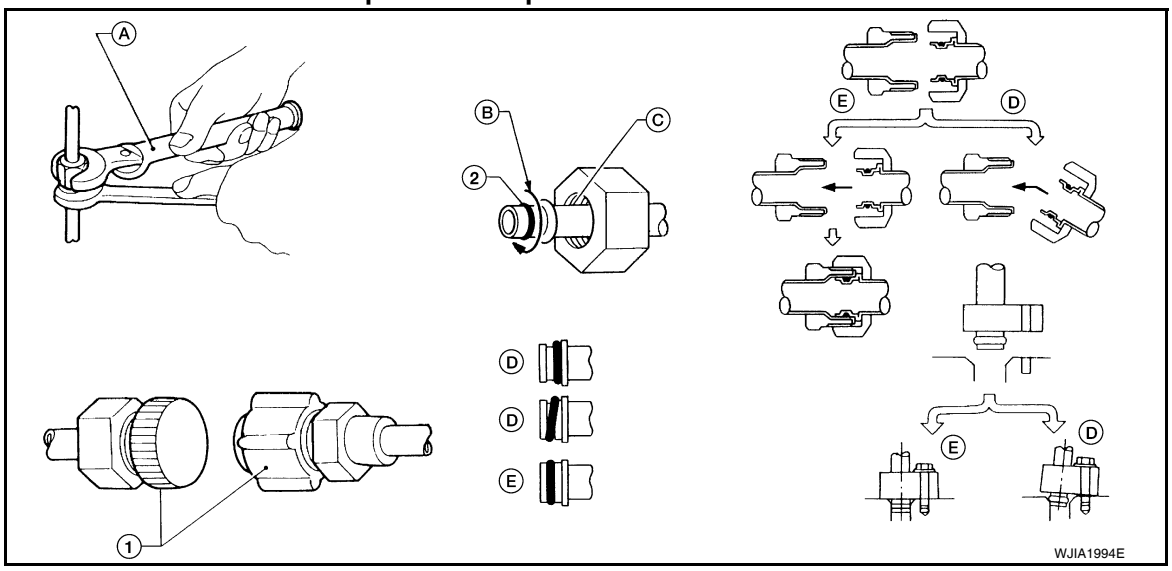
* : Always check with the parts department for the latest parts information.

CAUTION:

When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same position as it is when installed on the vehicle. Doing so will cause oil to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.**

- **When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply the specified A/C oil to circle of the O-rings. Be careful not to apply oil to threaded portion. Refer to MTC-93, "Oil".**
- **O-ring must be closely attached to dented portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.**
- **After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



1. Plug
2. O-ring
A. Torque wrench
B. Apply oil
C. Do not apply oil to thread
D. NG
E. OK

Precaution for Service of Compressor

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- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow "Maintenance of Oil Quantity in Compressor" exactly. Refer to MTC-17, "Maintenance of Oil Quantity in Compressor".**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with oil, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute oil inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for usual operation.**

Precaution for Service Equipment

INFOID:0000000007329061

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

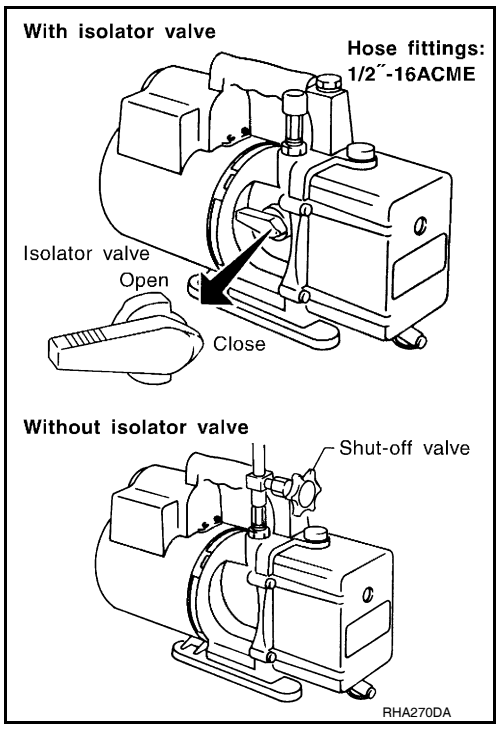
VACUUM PUMP

The oil contained inside the vacuum pump is not compatible with the specified oil for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump oil may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

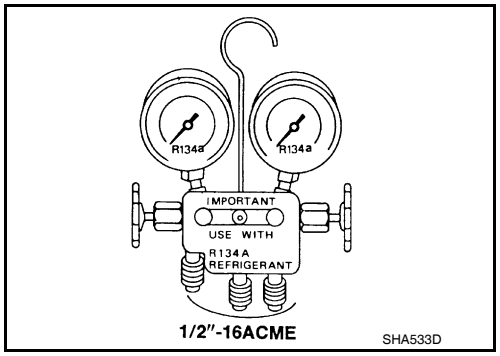
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



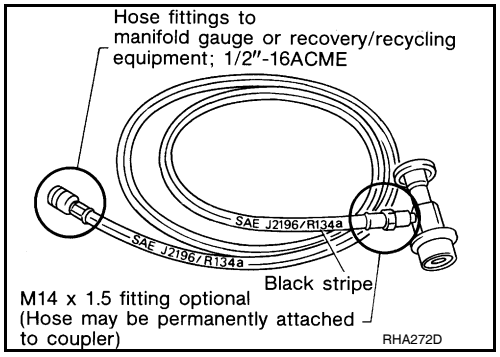
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified oils.



SERVICE HOSES

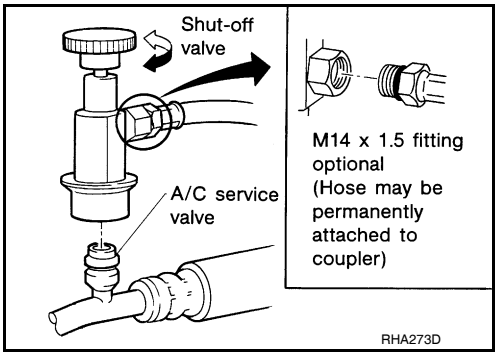
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

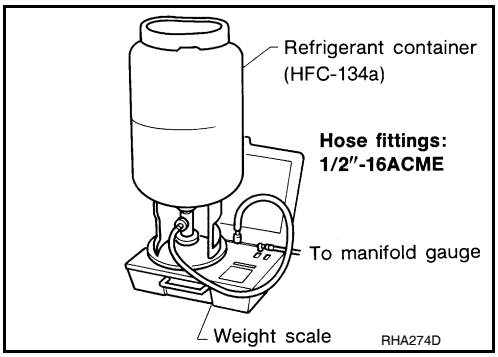
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified oils have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

Precaution for Leak Detection Dye

INFOID:0000000007329062

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to pinpoint refrigerant leaks.
- For your safety and your customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector.
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.
- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce /7.4 cc) per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detector dye in HFC-134a (R-134a) A/C system or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor malfunction occurs.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have an identification label on the front underside of the hood.

NOTE:

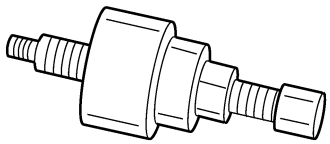
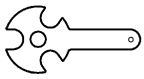
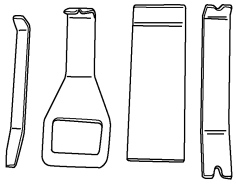
- Vehicles with factory installed fluorescent dye have a green label.
- Vehicles without factory installed fluorescent dye have a blue label.

PREPARATION

Special Service Tool

INFOID:0000000007742252

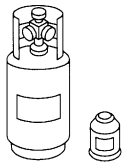
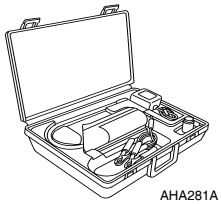
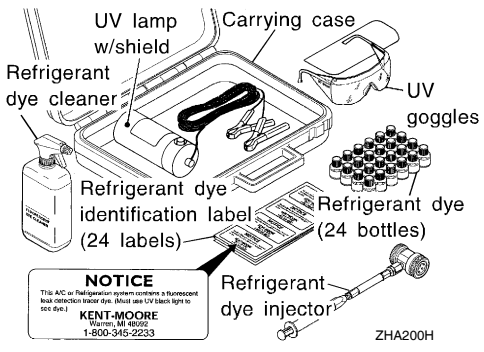
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

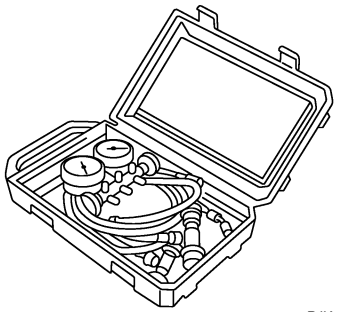
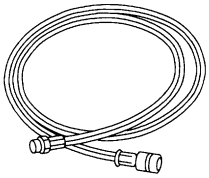
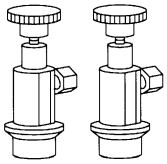
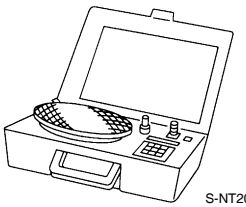
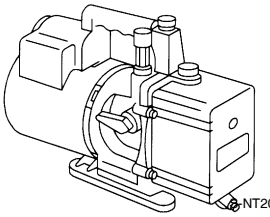
Tool number (Kent-Moore No.) Tool name	Description
— (J-38873-A) Drive plate installer  WJIA0367E	Installing pulley and drive plate
— (J-44614) Clutch disc holding tool  WHA230	Clutch disc holding tool
— (J-46534) Trim tool set  AWJIA0483ZZ	Removing trim parts

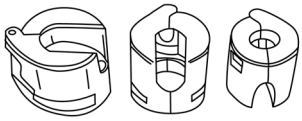
HFC-134a (R-134a) Service Tool and Equipment

INFOID:0000000007329063

Never mix HFC-134a refrigerant and/or its specified oil with CFC-12 (R-12) refrigerant and/or its oil.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/oil.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or oil) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/oil.
Adapters that convert one size fitting to another must never be used refrigerant/oil contamination will occur and compressor failure will result.

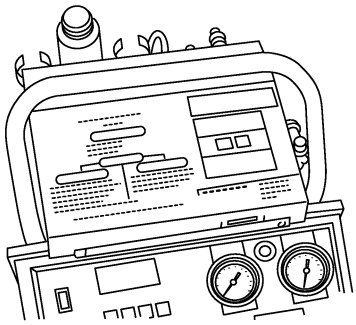
Tool number (Kent-Moore No.) Tool name	Description
HFC-134a (R-134a) (—) Refrigerant  S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • large container 1/2”-16 ACME
— (—) NISSAN A/C System Oil Type S S-NT197	Type: Poly Alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) variable displacement swash plate compressors (NISSAN only)
— (—) NISSAN A/C System Oil Type R S-NT197	Type: Poly Alkylene glycol oil (PAG), type R Application: HFC-134a (R-134a) vane rotary compressors (NISSAN only)
— (J-48710) NISSAN ACR2009 RRR Unit WJIA0293E	Refrigerant recovery, recycling and recharging
— (J-41995) Electronic refrigerant leak detector  AHA281A	Checking for refrigerant leaks Power supply: DC 12V (battery terminal)
— (J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) Refrigerant dye injector (J-41447) Quantity 24, 1/4 ounce bottles of HFC-134a (R-134a) fluorescent leak detection dye (J-43872) Refrigerant dye cleaner  ZHA200H	Leak detection dye Power supply: DC 12V (battery terminal)

Tool number (Kent-Moore No.) Tool name		Description
— (J-39183-C) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: • The gauge face indicates R-134a. Fitting size: Thread size • 1/2”-16 ACME
Service hoses: • (J-39500-72B) High side hose • (J-39500-72R) Low side hose • (J-39500-72Y) Utility hose	 S-NT201	Hose colors: • Low side hose: Blue with black stripe • High side hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2”-16 ACME
Service couplers: • (J-39500-20A) High side coupler • (J-39500-24A) Low side coupler	 S-NT202	Hose fitting to service hose: • M14 x 1.5 fitting is optional or permanently attached.
— (J-39699) Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size - thread size: • 1/2” - 16 ACME
— (J-39649) Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) Fitting size: Thread size • 1/2”-16 ACME

Tool number (Kent-Moore No.) Tool name	Description
— (J-41425-NIS) Aluminum tube repair kit ALIIA0390ZZ	Repairing leaks in A/C tubes
— (J-45815) A/C disconnect tool set  ALIIA0472ZZ	For disconnecting A/C lines

Commercial Service Tool

INFOID:0000000007329064

(Kent-Moore No.) Tool name	Description
(J-41810-NI) Refrigerant identifier equipment (R-134a)  RJIA0197E	For checking refrigerant purity and system contamination
Power tool PIIB1407E	Loosening bolts and nuts

REFRIGERATION SYSTEM

Refrigerant Cycle

INFOID:0000000007329065

REFRIGERANT FLOW

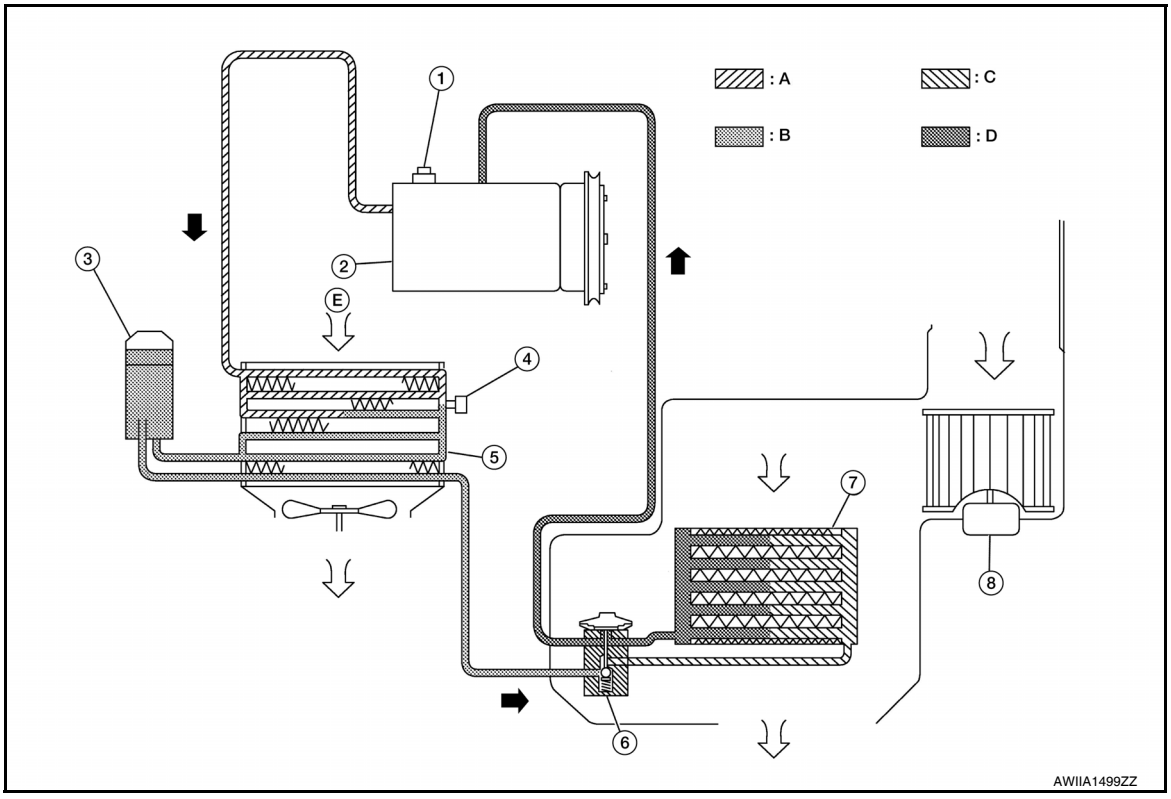
The refrigerant flows in the standard pattern, that is, through the compressor, the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

FREEZE PROTECTION

Under usual operating conditions, when the A/C is switched ON, the compressor runs continuously, and the evaporator pressure, and temperature is controlled by the compressor to prevent freeze up.

Refrigerant System Protection

INFOID:0000000007329066



1. Pressure relief valve
2. Compressor
3. Liquid tank
4. Refrigerant pressure sensor
5. Condenser
6. Expansion valve
7. Evaporator
8. Blower motor
A. High-pressure gas
B. High-pressure liquid
C. Low-pressure liquid
D. Low-pressure gas
E. Outside air

REFRIGERANT PRESSURE SENSOR

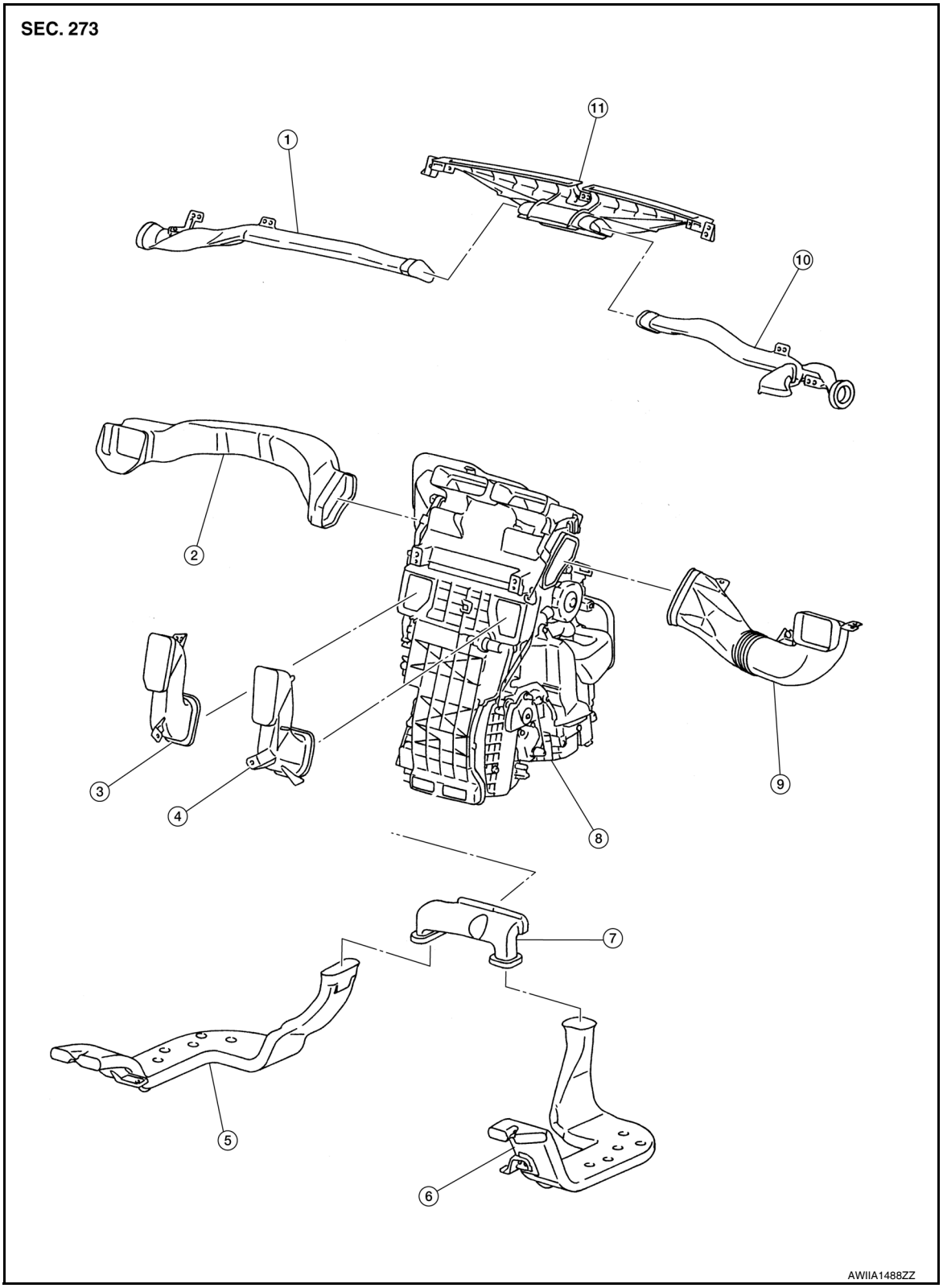
The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (27.46 bar, 28.0 kg/cm^2 , 398 psi), or below about 134 kPa (1.34 bar, 1.4 kg/cm^2 , 20 psi).

PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3.8 MPa (38 bar, 38.76 kg/cm^2 , 551 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

Component Part Location

INFOID:0000000007329067



1. Side defroster duct RH
2. Side ventilator duct RH
3. Center ventilator duct RH
4. Center ventilator duct LH
5. Rear floor duct RH (if equipped)
6. Rear floor duct LH (if equipped)
7. Front floor duct (if equipped)
8. A/C unit
9. Side ventilator duct LH
10. Side defroster duct LH
11. Defroster nozzle

OIL

Maintenance of Oil Quantity in Compressor

INFOID:0000000007329068

The oil in the compressor circulates through the system with the refrigerant. Add oil to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.
If oil quantity is not maintained properly, the following malfunctions may result:
- Lack of oil: May lead to a seized compressor.
- Excessive oil: Inadequate cooling (thermal exchange interference)

OIL

TYPE 1 Compressor (CR-10) : NISSAN A/C System Oil Type R
TYPE 2 Compressor (CSV511) : NISSAN A/C System Oil Type S

OIL ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

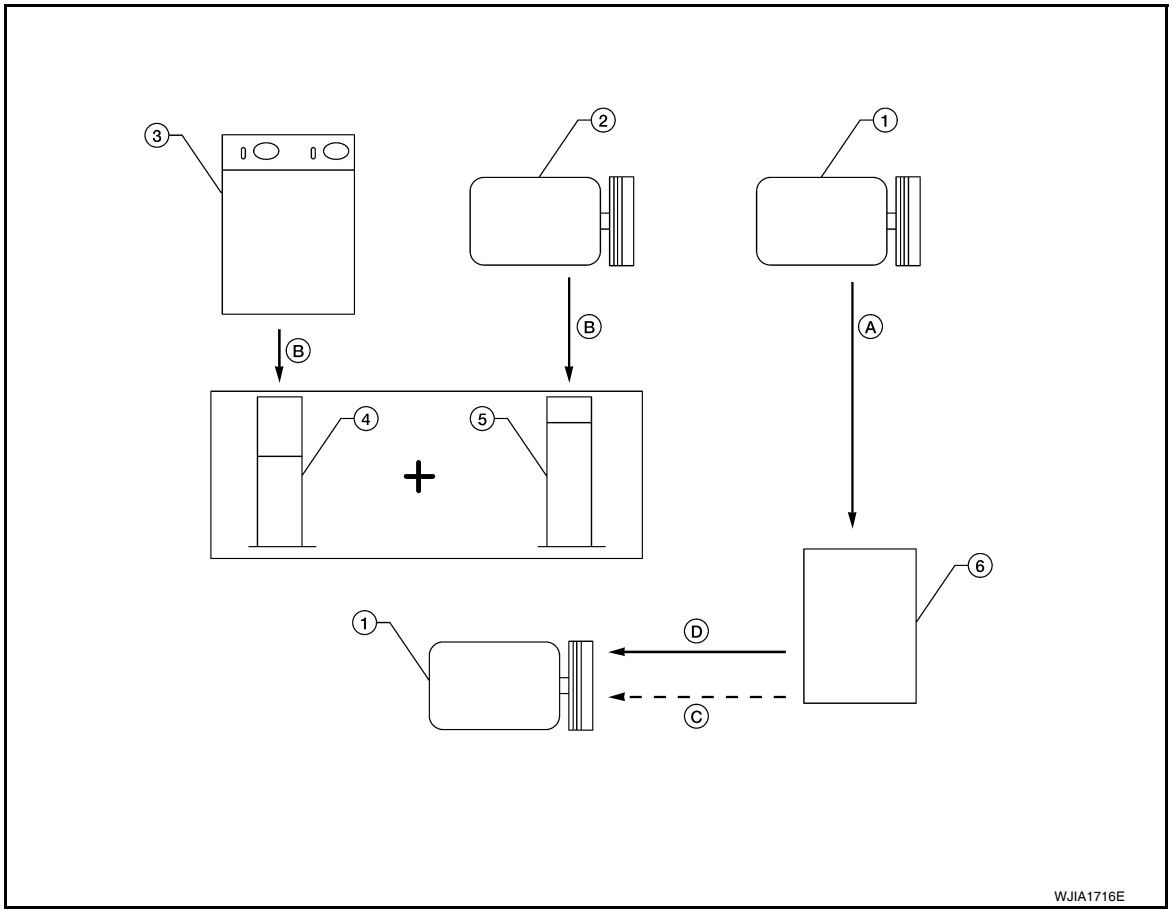
After replacing any of the following major components, add the correct amount of oil to the system.

Amount Of Oil To Be Added

Part replaced	Oil to be added to system	Remarks
	Amount of oil m ℓ (US fl oz, Imp fl oz)	
Evaporator	35 (1.2, 1.2)	-
Condenser	15 (0.5, 0.5)	-
Liquid tank	5 (0.2, 0.2)	-
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	None *1	Small leak *1

*1: If refrigerant leak is small, no addition of oil is needed.

OIL ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT



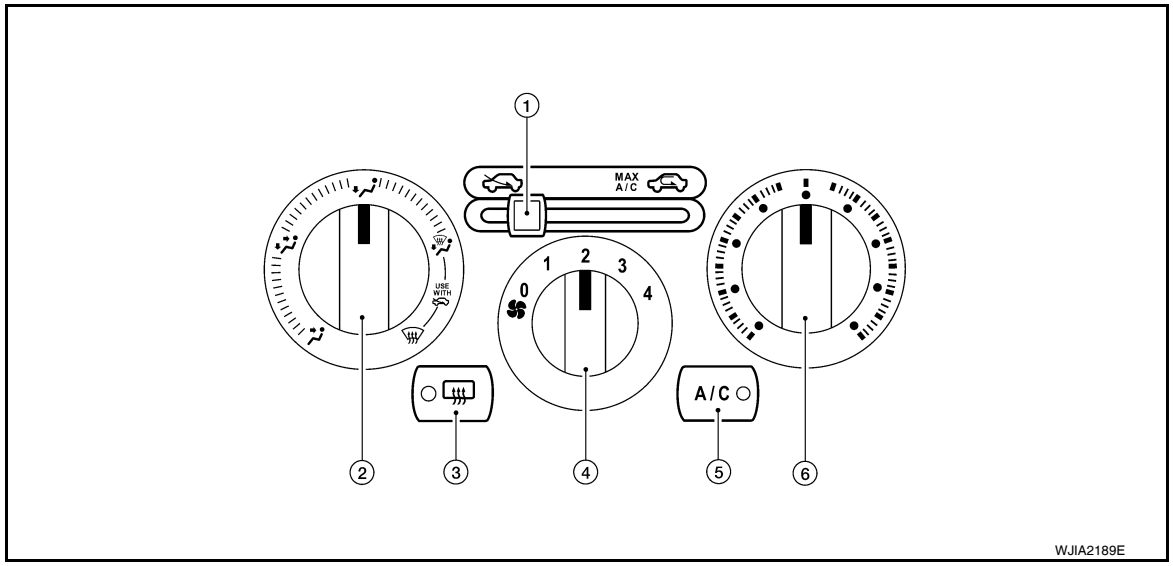
1. New compressor
2. Old compressor
3. Recovery/recycling equipment
4. Measuring cup X
5. Measuring cup Y
6. New oil
- A. Drain oil from the new compressor into clean container
- B. Record amount of oil recovered
- C. Add an additional 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz) of new oil when replacing liquid tank
- D. Install new oil equal to recorded amounts in measuring cups X plus Y

1. Before connecting recovery/recycling equipment to vehicle, check recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
3. Drain the oil from the old (removed) compressor into a graduated container and recover the amount of oil drained.
4. Drain the oil from the new compressor into a separate, clean container.
5. Measure an amount of new oil installed equal to amount drained from old compressor. Add this oil to new compressor through the suction port opening.
6. Measure an amount of new oil equal to the amount recovered during discharging. Add this oil to new compressor through the suction port opening.
7. If the liquid tank also needs to be replaced, add another 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz.) of oil at this time.
   Add this 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz.) of oil only when replacing the compressor.

AIR CONDITIONER CONTROL

Control Operation

INFOID:0000000007329069



1. Intake door lever
2. Mode door control dial
3. Rear window defogger switch
4. Blower control dial
5. A/C switch (if equipped)
6. Temperature control dial

BLOWER CONTROL DIAL

This dial turns the fan ON and OFF, and controls fan speed.

TEMPERATURE CONTROL DIAL

This dial allows you to adjust the temperature of the discharge air.

MODE DOOR CONTROL DIAL

This dial controls the outlet air flow.

INTAKE DOOR LEVER

- Recirculation (REC) position: Interior air is recirculated inside the vehicle.
- Fresh (FRE) position: Outside air is drawn into the passenger compartment.

REAR WINDOW DEFOGGER SWITCH

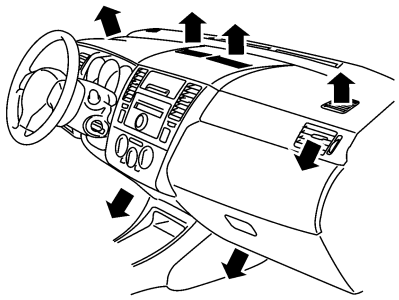
When illumination is ON, rear window is defogged.

A/C SWITCH (IF EQUIPPED)

The A/C switch controls the air conditioner system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp also illuminates.

Discharge Air Flow

INFOID:0000000007329070



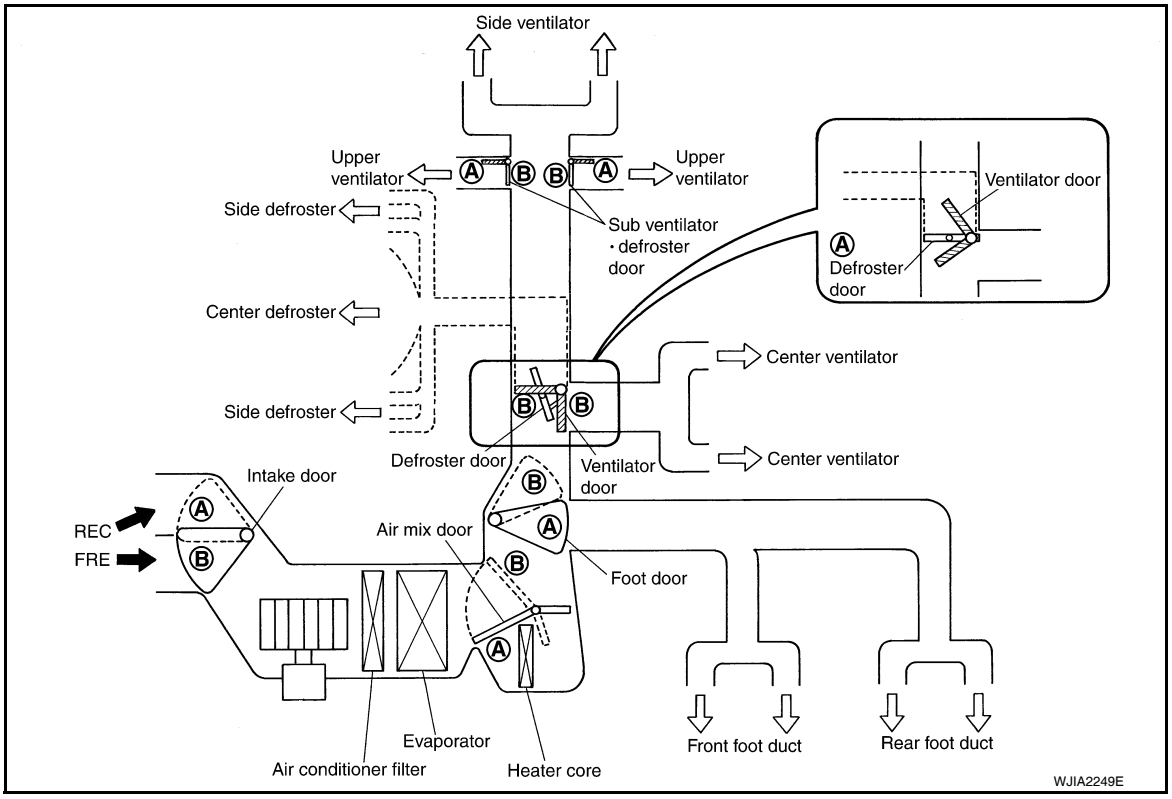
WJIA2190E

Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	—	—
	56%	44%	—
	16%	64%	20%
	16%	53%	31%
	17%	—	83%
Airflow always present at driver and passenger side demisters			

System Description

INFOID:0000000007329071

SWITCHES AND THEIR CONTROL FUNCTION



Door \ Mode control dial	MODE Position					Intake door lever		Temperature control dial		
	VENT	B/L	FOOT	D/F	DEF	FRE	REC	Full cold	◄—►	Full hot
Ventilator door	Ⓐ	Ⓐ	Ⓑ *1	Ⓑ *1	Ⓑ *1	—		—		
Sub ventilator door	Ⓐ	Ⓐ	Ⓑ	Ⓑ	Ⓑ	—		—		
Defroster door	Ⓐ	Ⓐ	*2 Ⓐ ~ Ⓑ	*3 Ⓐ ~ Ⓑ	Ⓑ	—		—		
Foot door	Ⓐ	Ⓐ ~ Ⓑ	Ⓑ *1	Ⓐ ~ Ⓑ	Ⓐ	—		—		
Intake door	—					Ⓑ	Ⓐ	—		
Air mix door	—					—		Ⓐ	Ⓐ~Ⓑ	Ⓑ

*1 In the Ⓑ position, the ventilator and foot doors are not completely closed.
*2 In the Ⓐ ~ Ⓑ position, the foot door is 60% open.
*3 In the Ⓐ ~ Ⓑ position, the defroster is 75% open.

WJIA2234E

TROUBLE DIAGNOSIS

CONSULT Function (BCM)

INFOID:0000000007329072

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Content
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF-DIAG RESULTS	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ECU PART NUMBER	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

ITEMS OF EACH PART

NOTE:
CONSULT will only display systems the vehicle possesses.

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF−DIAG RESULTS	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU PART NUMBER	ACTIVE TEST	CONFIGURATION
BCM	BCM	×	×	×		×		×
Power door lock system	DOOR LOCK	×			×		×	
Rear defogger	REAR DEFOGGER				×		×	
Warning chime	BUZZER				×		×	
Room lamp timer	INT LAMP	×			×		×	
Remote keyless entry system	MULTI REMOTE ENT	×			×		×	
Headlamp	HEAD LAMP	×			×		×	
Wiper	WIPER	×			×		×	
Turn signal lamp Hazard lamp	FLASHER				×		×	
Blower fan switch signal Air conditioner switch signal	AIR CONDITIONER				×			
Intelligent Key	INTELLIGENT KEY				×			
Combination switch	COMB SW				×			
NVIS (NATS)	IMMU				×		×	
Interior lamp battery saver	BATTERY SAVER	×			×		×	
Back door/Trunk	TRUNK				×		×	
Theft alarm	THEFT ALARM	×			×		×	

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF–DIAG RESULTS	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU PART NUMBER	ACTIVE TEST	CONFIGURATION
Retained accessory power control	RETAINED PWR	×			×		×	
Oil pressure switch	SIGNAL BUFFER				×		×	
Low tire pressure monitor	AIR PRESSURE MONITOR	×	×		×		×	
Panic alarm	PANIC ALARM						×	

WORK SUPPORT

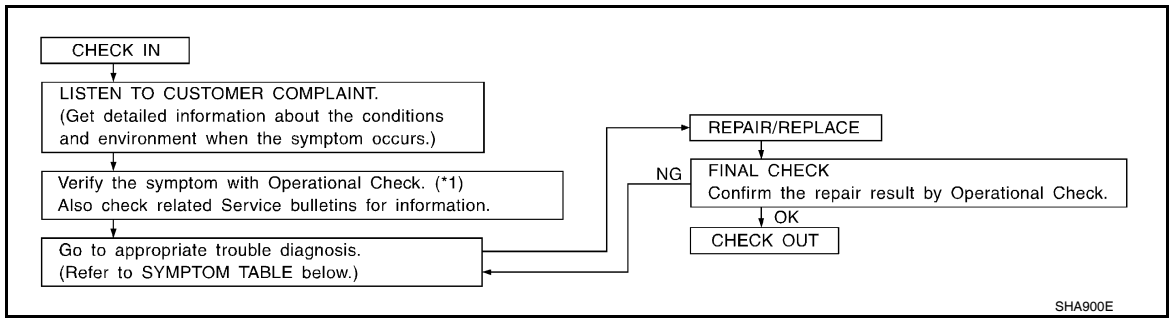
Display Item List

Item	Description
RESET SETTING VALUE	Return a value set with WORK SUPPORT of each system to a default value in factory shipment.

How to Perform Trouble Diagnosis for Quick and Accurate Repair

INFOID:0000000007329073

WORK FLOW



*1 MTC-31, "Operational Check"

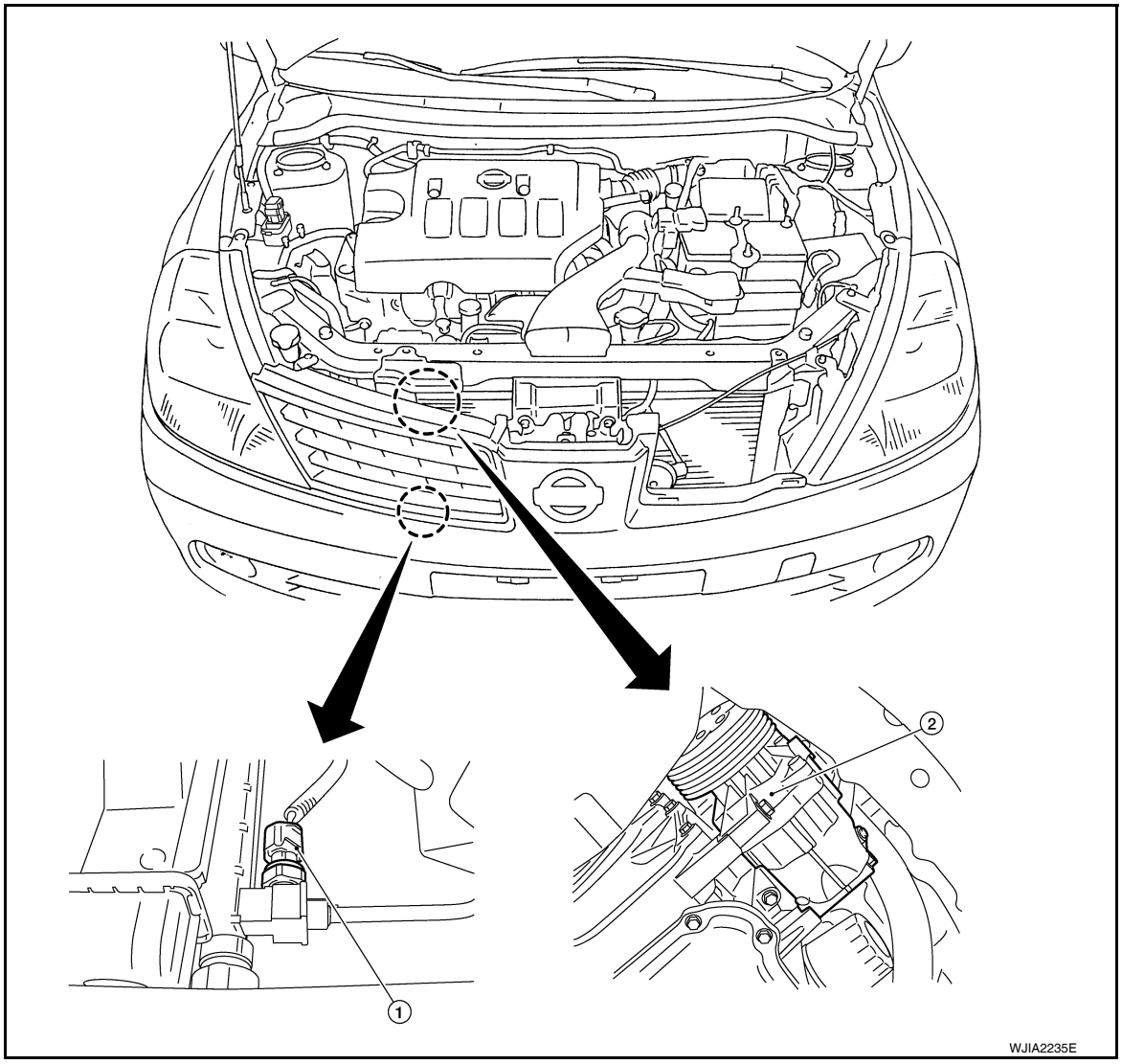
SYMPTOM TABLE

Symptom	Reference Page	
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door.	MTC-32
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door.	MTC-33
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door.	MTC-34
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	MTC-34
Magnet clutch does not engage in A/C, defrost/foot, or defrost mode.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	MTC-38
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	MTC-46
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	MTC-53
Noise	Go to Trouble Diagnosis Procedure for Noise.	MTC-54

Component Parts and Harness Connector Location

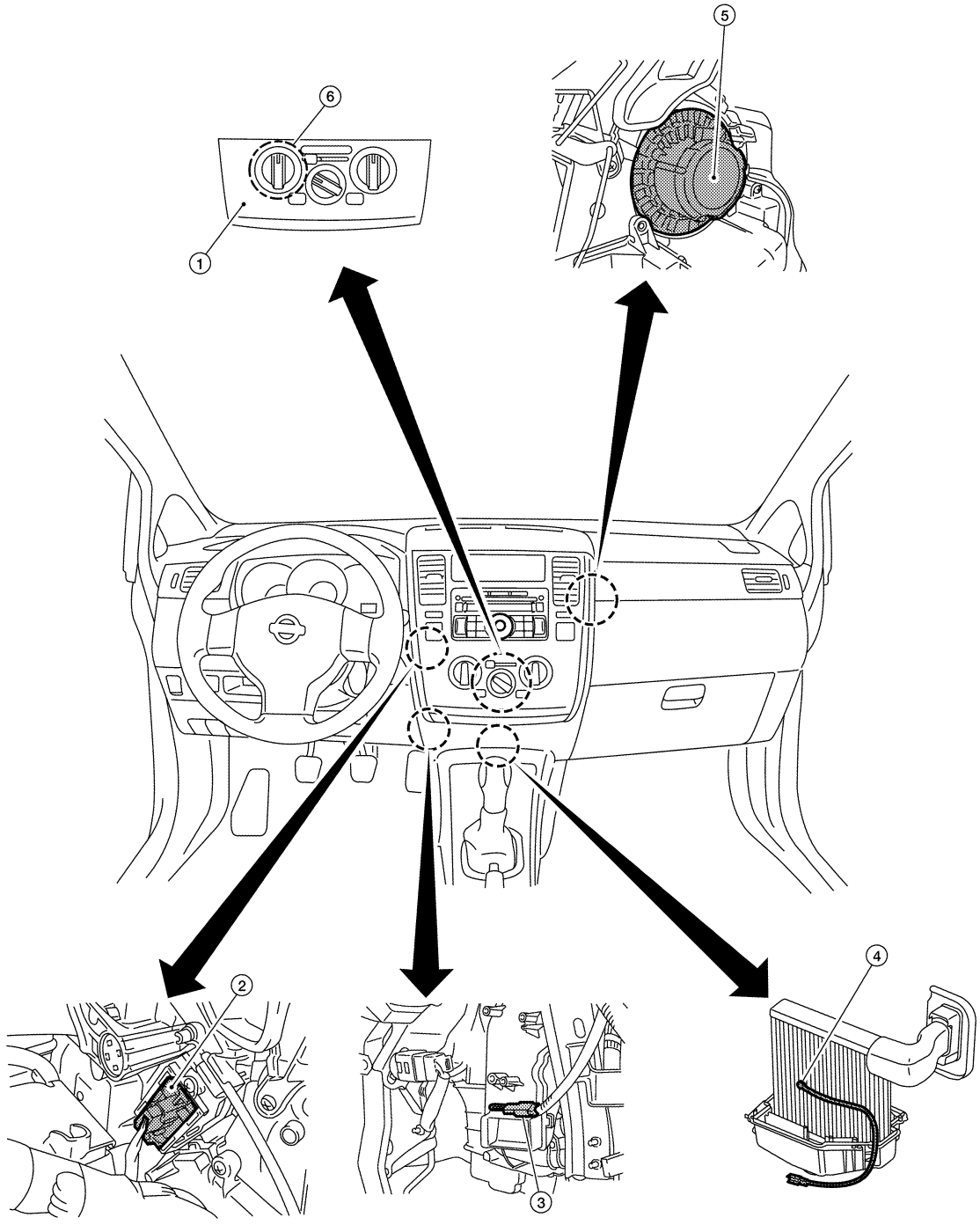
INFOID:0000000007329074

ENGINE COMPARTMENT



1. Refrigerant pressure sensor E17 (if equipped)
2. A/C compressor F3 (if equipped)

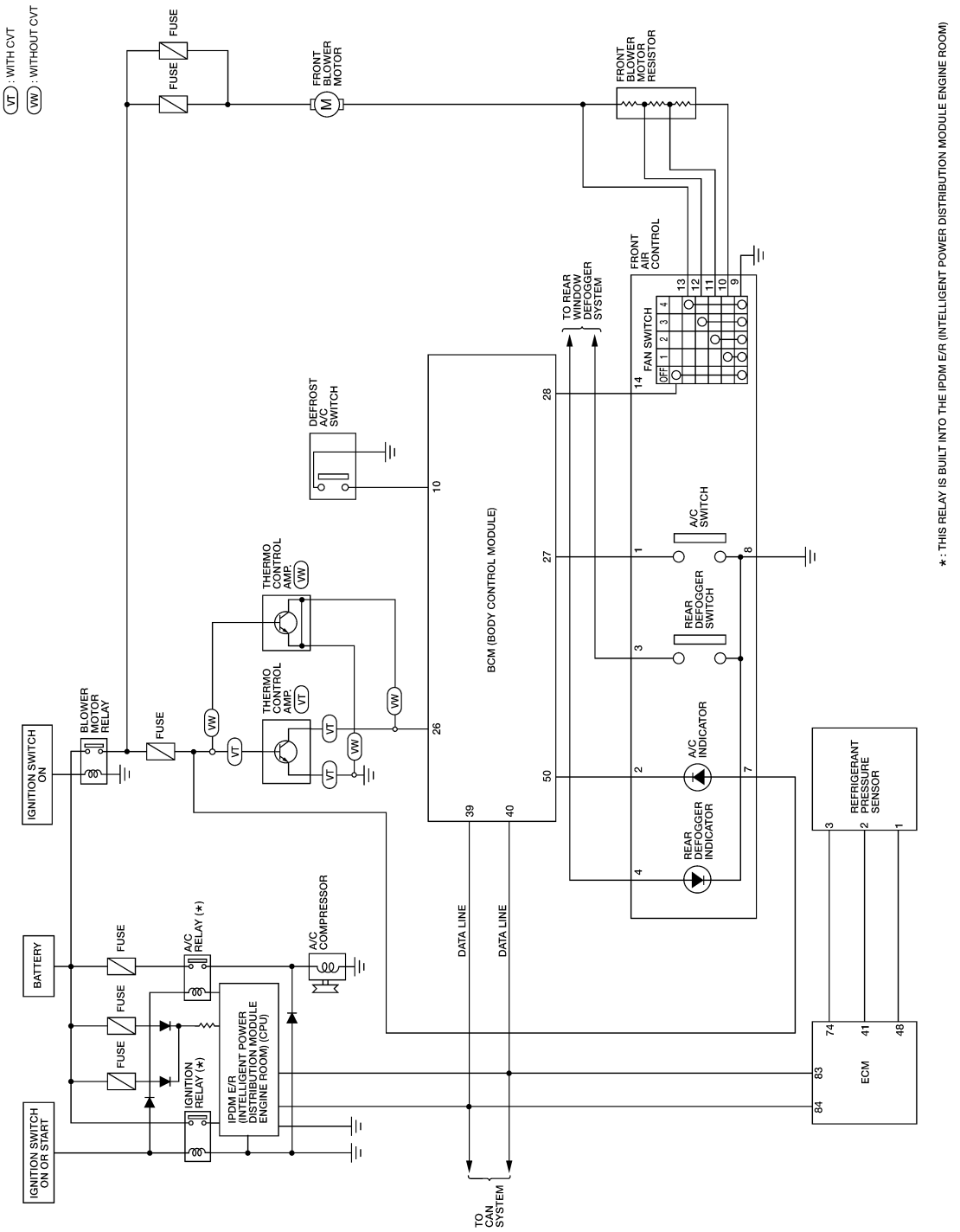
PASSENGER COMPARTMENT



1. Front air control M33
2. Front blower motor resistor M151
3. Thermo control amp. jumper connector (with CVT), (if equipped)
4. Thermo control amp. M42 (without CVT), (if equipped)
5. Front blower motor M62
6. Defrost A/C switch M41 (located on back side of front air control)

Schematic

INFOID:0000000007329075

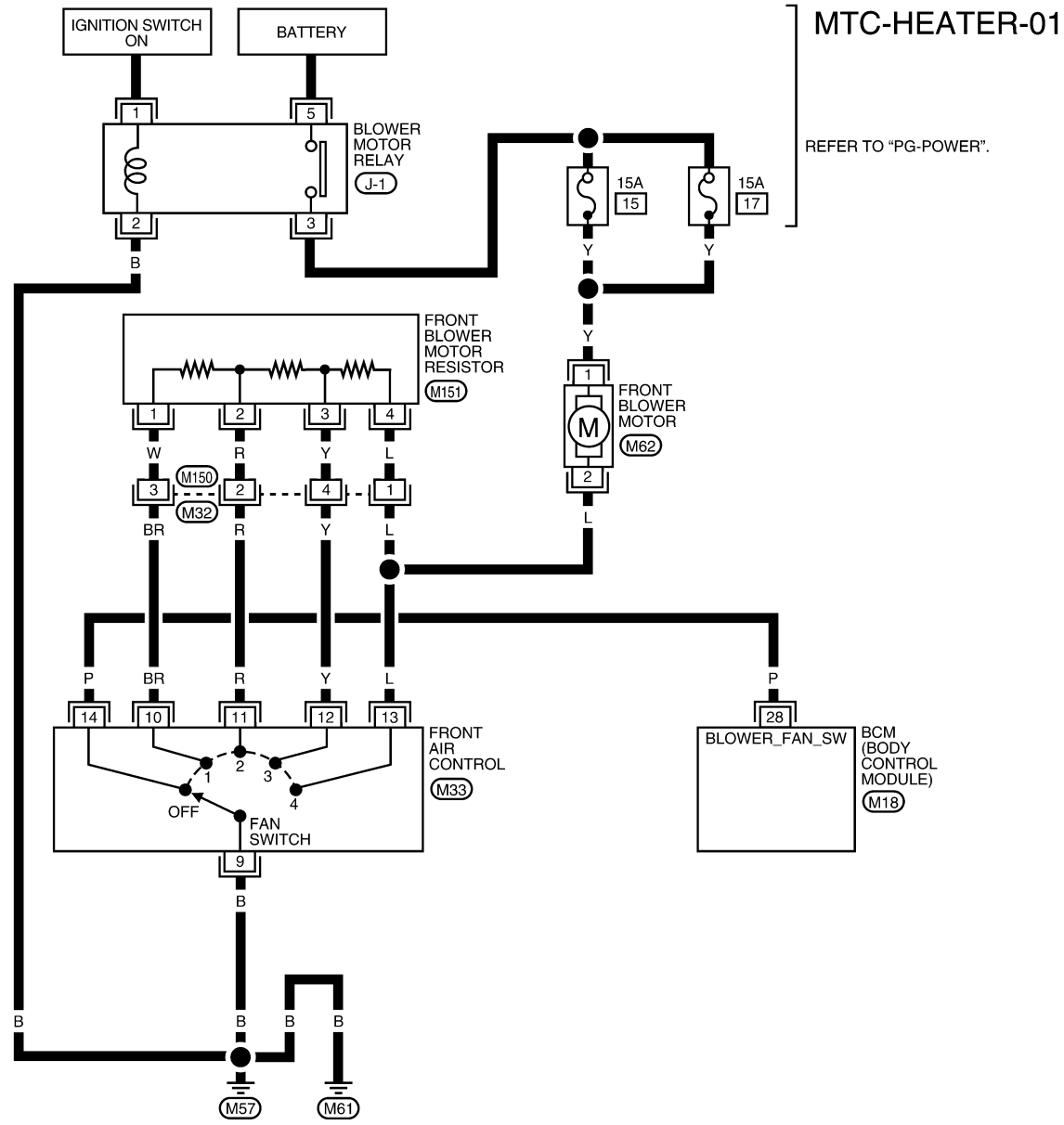


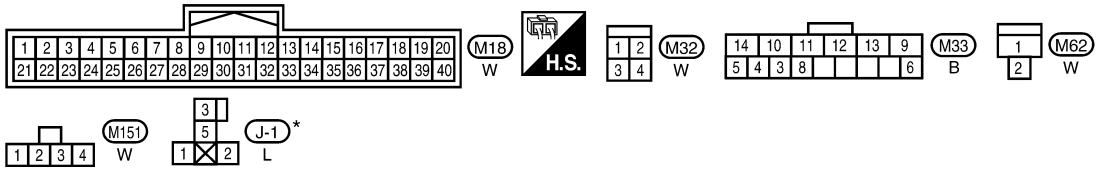
ABIWA0134GB

Wiring Diagram - Heater -

INFOID:0000000007329076

WITHOUT A/C



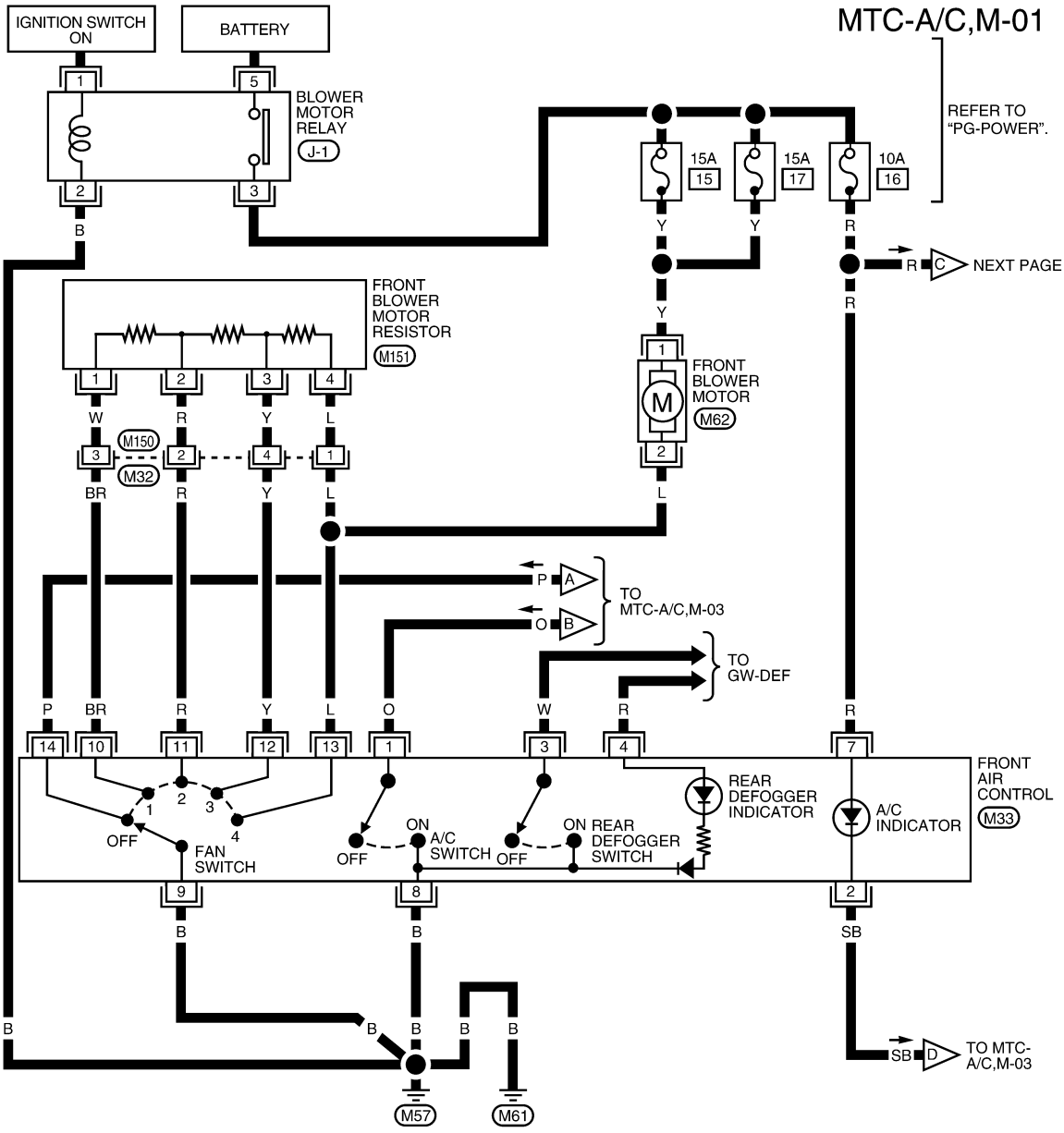


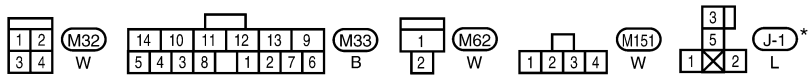
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

AAIWA0079GB

Wiring Diagram - A/C,M -

INFOID:0000000007329077





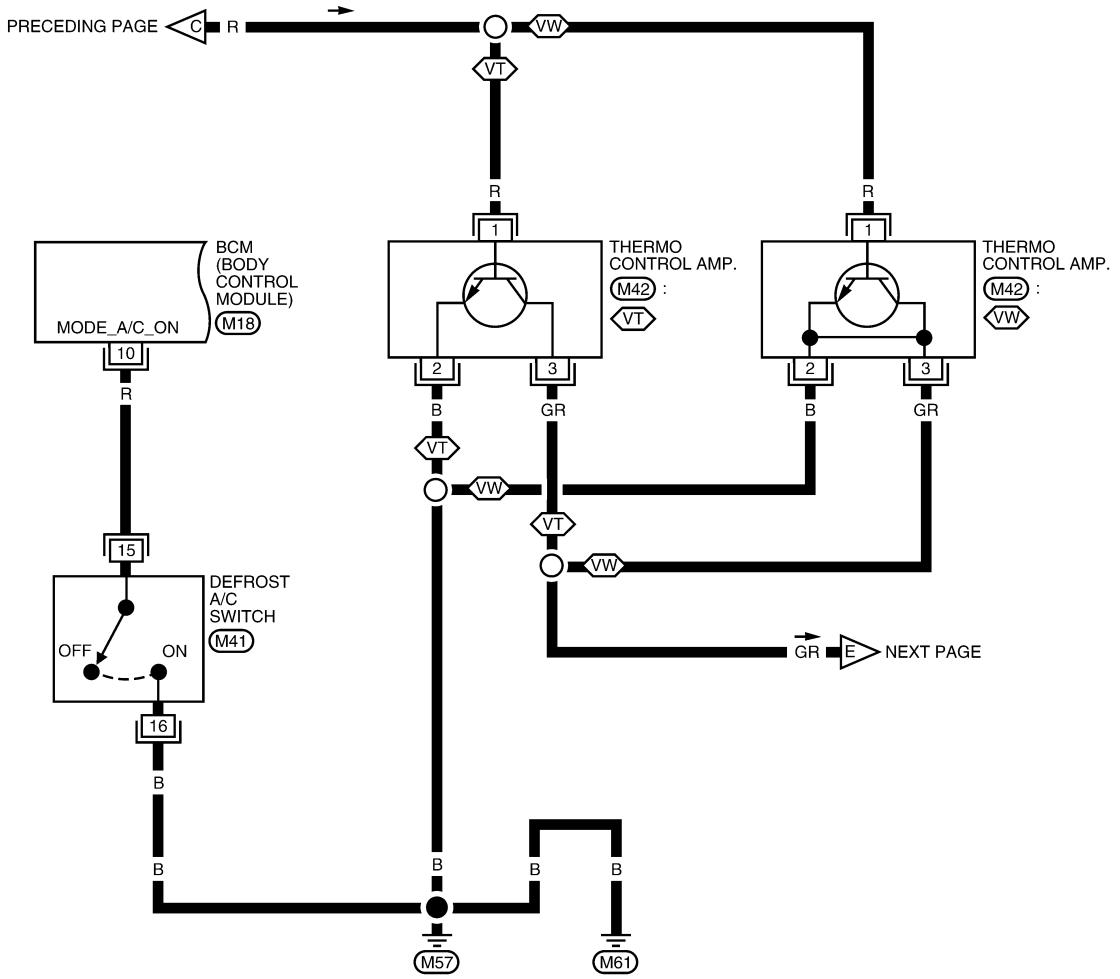
REFER TO THE FOLLOWING.
M31 - SUPER MULTIPLE JUNCTION (SMJ)

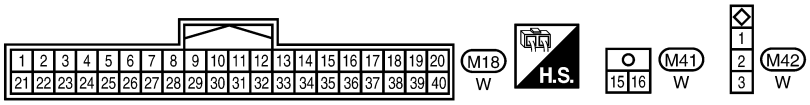
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

ABIWA0135GB

MTC-A/C,M-02

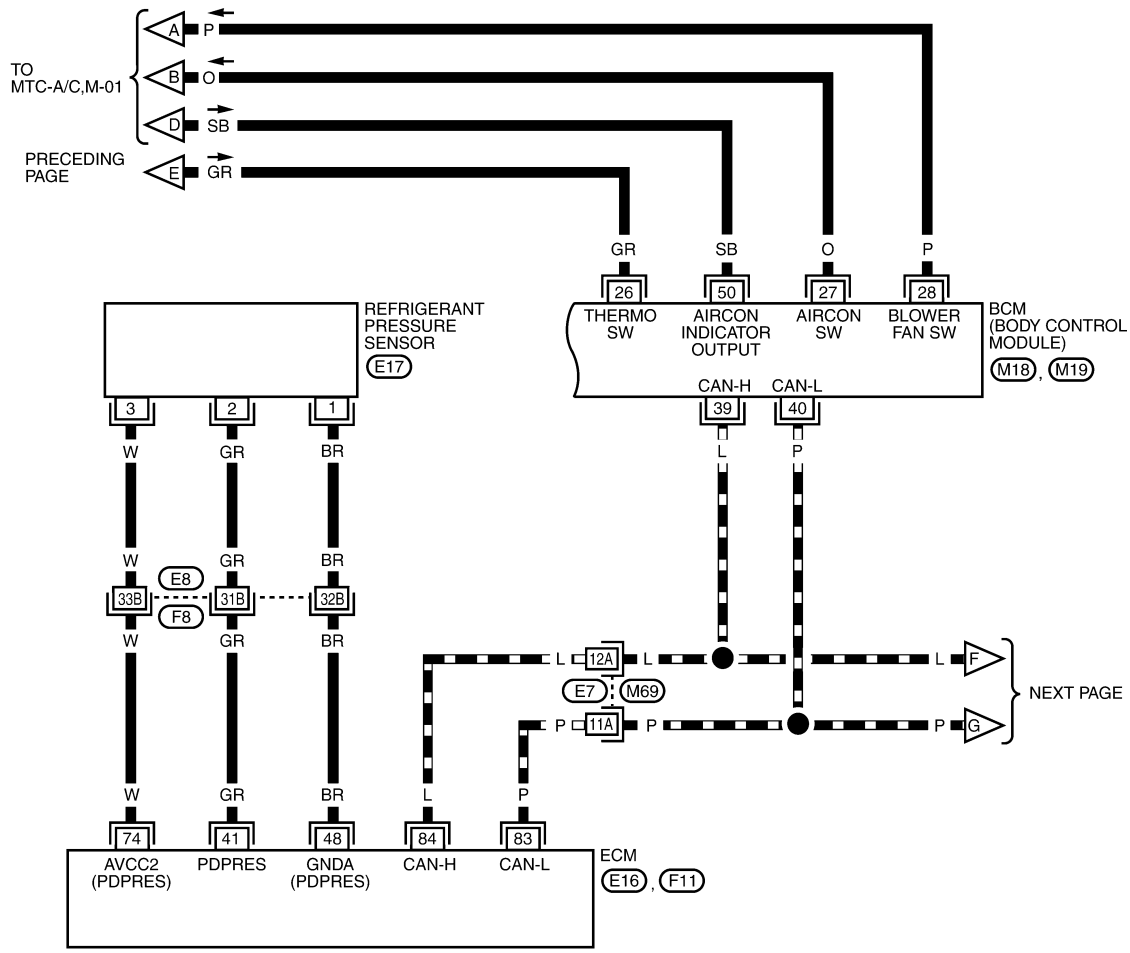
VT : WITH CVT
VW : WITHOUT CVT

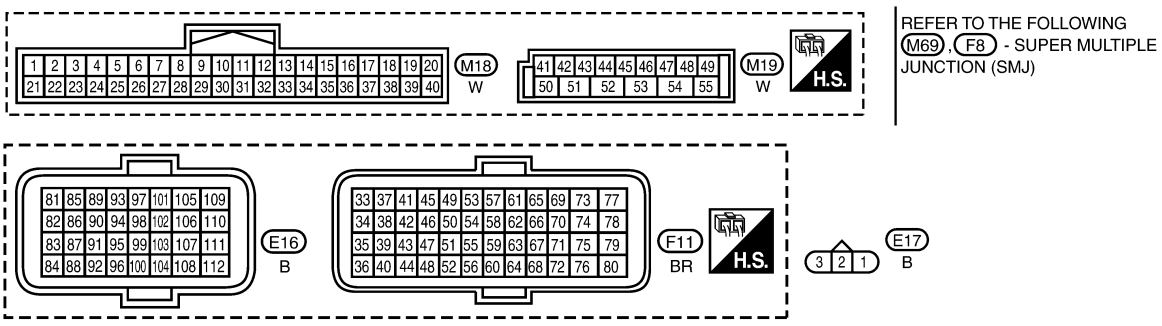




ABIWA0136GB

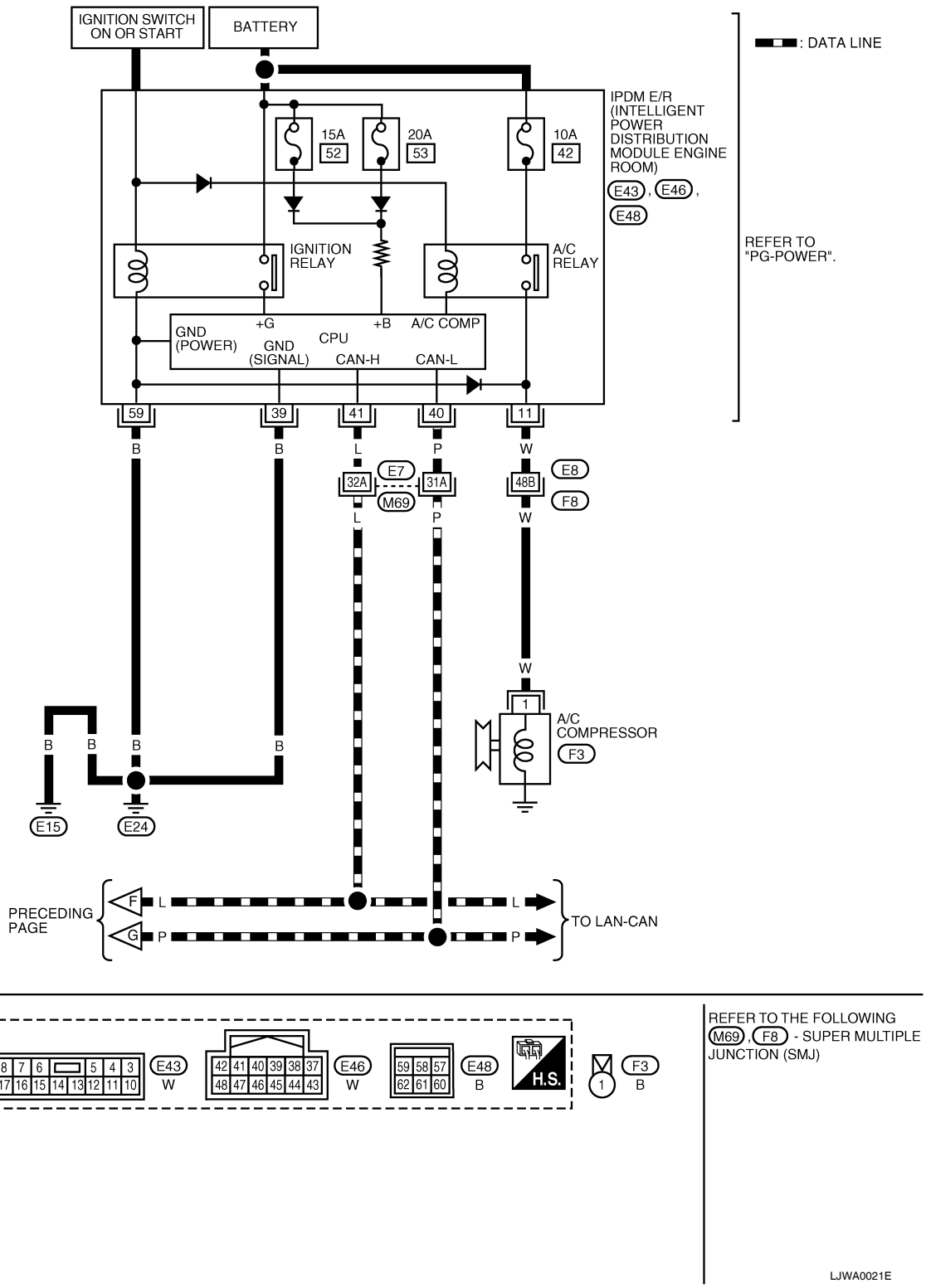
MTC-A/C,M-03
: DATA LINE





WJWA0488E

MTC-A/C,M-04



Operational Check

INFOID:0000000007329078

The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at normal operating temperature

CHECKING BLOWER

1. Turn blower control dial clockwise to "1" position. Blower should operate on low speed.
2. Turn blower control dial clockwise to "2" position, and continue checking blower speed until all speeds are checked.
3. Leave blower on Maximum speed.

If NG, go to trouble diagnosis procedure for MTC-34, "Front Blower Motor Circuit".
If OK, continue the check.

CHECKING DISCHARGE AIR

1. Turn mode door control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to MTC-20, "Discharge Air Flow".

If NG, go to trouble diagnosis procedure for MTC-32, "Mode Door".
If OK, continue the check.

CHECKING RECIRCULATION

1. Set intake door lever to REC position.
2. Operate intake door lever to FRE position.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for MTC-34, "Intake Door".
If OK, continue the check.

CHECKING TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise to full cold position.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for MTC-46, "Insufficient Cooling".
If OK, continue the check.

CHECKING TEMPERATURE INCREASE

1. Turn temperature control dial clockwise to full hot position.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for MTC-53, "Insufficient Heating".
If OK, continue the check.

CHECKING A/C SWITCH (IF EQUIPPED)

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for MTC-38, "Magnet Clutch Circuit (If Equipped)".
If OK, continue the check.

CHECKING DEFROST A/C SWITCH (IF EQUIPPED)

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Turn mode dial to ( ) DEF.
3. Confirm that the compressor clutch engages (sound or visual inspection) and the A/C switch indicator illuminates.

If NG, go to trouble diagnosis procedure for MTC-38, "Magnet Clutch Circuit (If Equipped)".
If all operational checks are OK (symptom cannot be duplicated), go to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" and perform tests as outlined. If symptom appears, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair" and perform applicable trouble diagnosis procedures.

Mode Door

INFOID:0000000007329079

SYMPTOM: Air outlet does not change.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

1. Rotate the mode door control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to MTC-20, "Discharge Air Flow".

NOTE:
Confirm that the compressor clutch (with A/C) is engaged (visual inspection) when DEF ( ) or D/F ( ) is selected.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to MTC-31, "Operational Check".

Is the inspection result normal?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK MODE DOOR CONTROL CABLE

Check and verify mode door mechanism for smooth operation in each mode.

OK or NG

OK >> If the symptom still exists, perform a complete operational check and check for other symptoms. Refer to MTC-31, "Operational Check". If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NG >> Repair or adjust mode door control cable. Refer to MTC-66, "Mode Door Cable Adjustment".

Air Mix Door

INFOID:0000000007329080

SYMPTOM: Air mix door does not change.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Turn the temperature control dial clockwise until maximum heat.
2. Check for hot air at discharge air outlets.

>> GO TO 2.

2.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn the temperature control dial counterclockwise until maximum cold.
2. Check for cold air at discharge air outlets.

Is the inspection results normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to MTC-31, "Operational Check".

Is the inspection results normal?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

4.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 5.

5.CHECK AIR MIX DOOR CONTROL LINKAGE

Check and verify air mix door mechanism for smooth operation.

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to MTC-31, "Operational Check" If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".

NG >> Repair or adjust air mix door control linkage. Refer to MTC-65, "Air Mix Door Cable Adjustment".

Intake Door

INFOID:0000000007329081

SYMPTOM:
- Intake door does not change.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC ( )

1. Slide the intake door lever to the REC ( ) position.
2. Turn the blower motor to maximum speed.
3. Slide the intake door lever to the FRE position.
4. Listen for intake door position change (you should hear blower sound change slightly).

Is the inspection results normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to MTC-31, "Operational Check".

Is the inspection results normal?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage mechanism for smooth operation.

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to MTC-31, "Operational Check". If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".

NG >> Repair or adjust control linkage. Refer to MTC-64, "Intake Door Cable Adjustment".

Front Blower Motor Circuit

INFOID:0000000007329082

SYMPTOM: Front blower motor operation is malfunctioning.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER

1. Turn blower control dial to "1" position. Blower should operate on low speed.
2. Turn the blower control dial to "2" position, and continue checking blower speed until all speeds are checked.

Is the inspection results normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to MTC-31, "Operational Check".

Is the inspection results normal?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK FRONT BLOWER MOTOR CIRCUIT

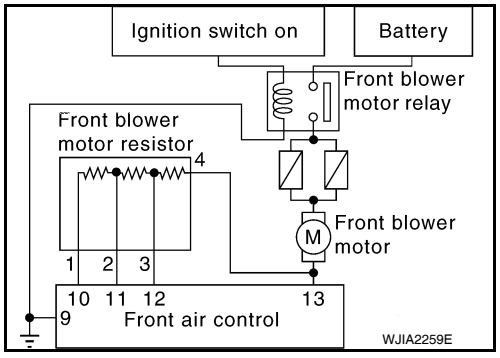
Check front blower motor circuit. Refer to "DIAGNOSTIC PROCEDURE FOR FRONT BLOWER MOTOR" .

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to MTC-31, "Operational Check". If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NG >> Repair as necessary.

DIAGNOSTIC PROCEDURE FOR FRONT BLOWER MOTOR

SYMPTOM: Blower motor operation is malfunctioning.



1.CHECK FRONT BLOWER MOTOR OPERATION

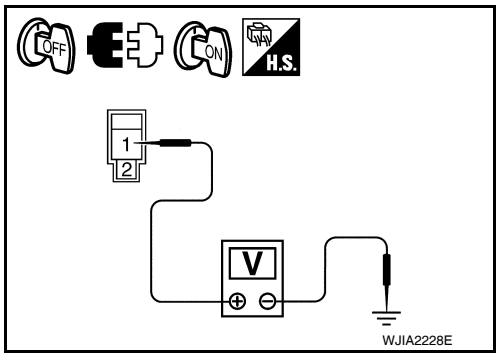
1. Turn ignition switch ON.
2. Check front blower motor operation at each fan speed.

OK or NG

OK >> Inspection End.
NG >> • Front blower motor does not operate at any speed, GO TO 2.
• Front blower motor does not operate at one or more of the four speeds, GO TO 10.

2.CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector.
3. Turn ignition switch ON.
4. Check voltage between front blower motor harness connector M62 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Front blower motor: M62	1		Battery voltage

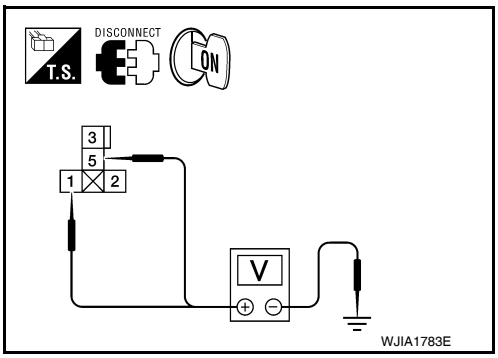
OK or NG

OK >> GO TO 6.

NG >> Check power supply circuit and 15A fuses [Nos. 15 and 17, located in the fuse block (J/B)]. Refer to PG-4, "Schematic".
- If fuses are OK, reinstall fuses and GO TO 3.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

3. CHECK BLOWER MOTOR RELAY POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.
2. Disconnect blower motor relay connector.
3. Turn ignition switch ON.
4. Check voltage between blower motor relay harness connector J-1 terminal 1, 5 and ground.



1 - Ground **Battery voltage should exist.**

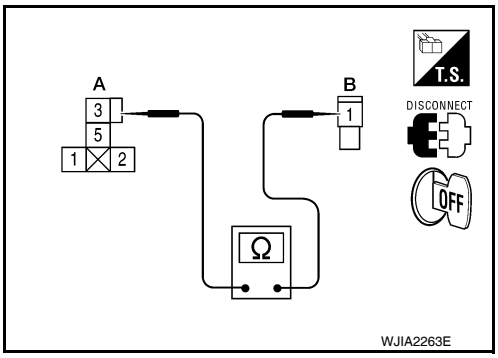
5 - Ground **Battery voltage should exist.**

OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK BLOWER MOTOR RELAY (SWITCH SIDE) CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Check continuity between blower motor relay harness connector J-1 (A) terminal 3 and front blower motor harness connector M62 (B) terminal 1.



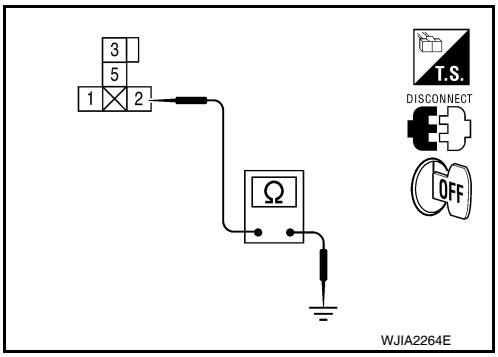
Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5. CHECK BLOWER MOTOR RELAY GROUND CIRCUIT

Check continuity between blower motor relay harness connector J-1 terminal 2 and ground.



Continuity should exist.

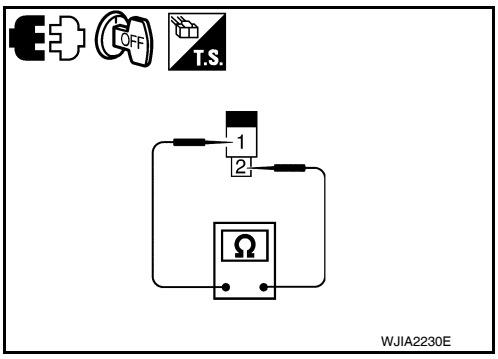
OK or NG

OK >> Replace blower motor relay.
NG >> Repair harness or connector.

6. CHECK FRONT BLOWER MOTOR

Check continuity between front blower motor terminals 1 and 2.

NOTE:
Ensure that there are no foreign particles inside the A/C unit assembly for a smooth rotation of the front blower motor.



1 - 2 **: Continuity should exist.**

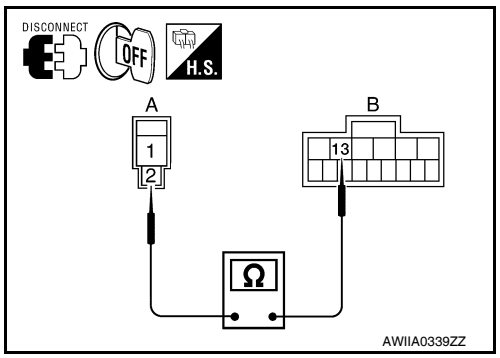
OK or NG

OK >> GO TO 7.
NG >> Replace front blower motor. Refer to MTC-63, "Removal and Installation".

7. CHECK CIRCUIT CONTINUITY BETWEEN FRONT BLOWER MOTOR AND FRONT AIR CONTROL

1. Disconnect front air control connector.
2. Check continuity between front blower motor harness connector M62 (A) terminal 2 and front air control harness connector M33 (B) terminal 13.

2 - 13 : Continuity should exist.



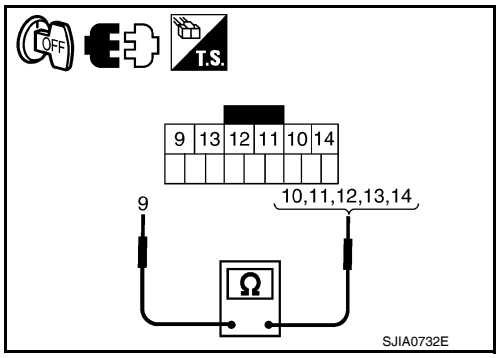
OK or NG

OK >> GO TO 8.
NG >> Repair harness or connector.

8. CHECK FAN SWITCH

Check continuity between front air control terminal 9 and 10, 11, 12, 13, 14.

Terminals		Condition	Continuity
9	14	Blower control dial: OFF	Yes
	10	Blower control dial: 1-speed	
	11	Blower control dial: 2-speed	
	12	Blower control dial: 3-speed	
	13	Blower control dial: 4-speed	



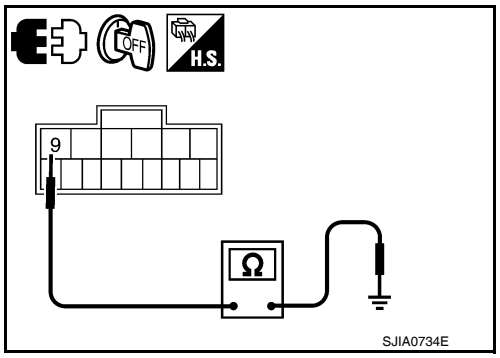
OK or NG

OK >> GO TO 9.
NG >> Replace front air control. Refer to MTC-59, "Removal and Installation".

9. CHECK FAN SWITCH GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 9 and ground.

Continuity should exist.

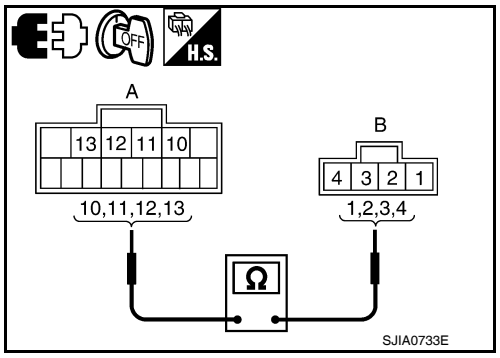


OK or NG

OK >> Inspection End.
NG >> Repair harness or connector.

10. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND FRONT BLOWER MOTOR RESISTOR

1. Turn ignition switch OFF.
2. Disconnect front blower motor resistor and front air control connectors.
3. Check continuity between front air control harness connector M33 (A) terminals and front blower motor resistor harness connector M151 (B) terminals.



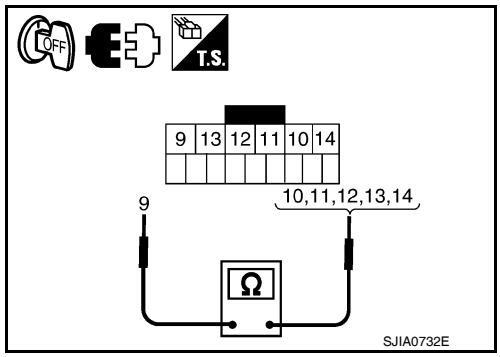
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M33	10	Front blower motor resistor: M151	1	Yes
	11		2	
	12		3	
	13		4	

OK or NG

OK >> GO TO 11.
NG >> Repair harness or connector.

11.CHECK FAN SWITCH

Check continuity between front air control terminal 9 and 10, 11, 12, 13, 14.



Terminals		Condition	Continuity
9	14	Fan control dial: OFF	Yes
	10	Fan control dial: 1-speed	
	11	Fan control dial: 2-speed	
	12	Fan control dial: 3-speed	
	13	Fan control dial: 4-speed	

OK or NG

OK >> Replace the front blower motor resistor. Refer to MTC-67, "Removal and Installation".
NG >> Replace front air control. Refer to MTC-59, "Removal and Installation".

Magnet Clutch Circuit (If Equipped)

INFOID:0000000007329083

SYMPTOM: Magnet clutch does not engage.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH

1. Turn ignition switch ON.
2. Turn blower control dial to the desired (1 to 4 speed) position.
3. Press the A/C switch. A/C indicator will turn on.
4. Confirm that the compressor clutch engages (sound or visual inspection).

Is the inspection results normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to MTC-31, "Operational Check".

Does another symptom exist?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK COMPRESSOR BELT TENSION

Check compressor belt tension. Refer to EM-13, "Checking Drive Belts".

OK or NG

OK >> GO TO 5.
NG >> Adjust or replace A/C compressor belt. Refer to EM-13, "Removal and Installation".

5.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to MTC-46, "Insufficient Cooling".

OK or NG

OK >> GO TO 6.
NG >> Perform trouble diagnosis for unusual pressure. Refer to MTC-46, "Insufficient Cooling".

6.CHECK MAGNET CLUTCH CIRCUIT

Perform diagnostic procedure for the magnetic clutch. Refer to "DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH".

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to MTC-31, "Operational Check". If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".

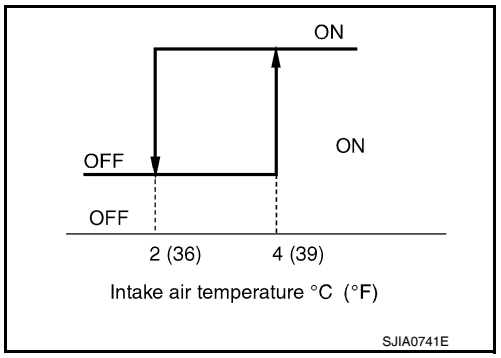
NG >> Repair as necessary.

SYSTEM DESCRIPTION

Thermo control amp. controls A/C compressor operation by intake air temperature and signal from ECM.
The defrost A/C switch controls A/C compressor operation by the BCM when the mode switch is turned to the (DEF) position.

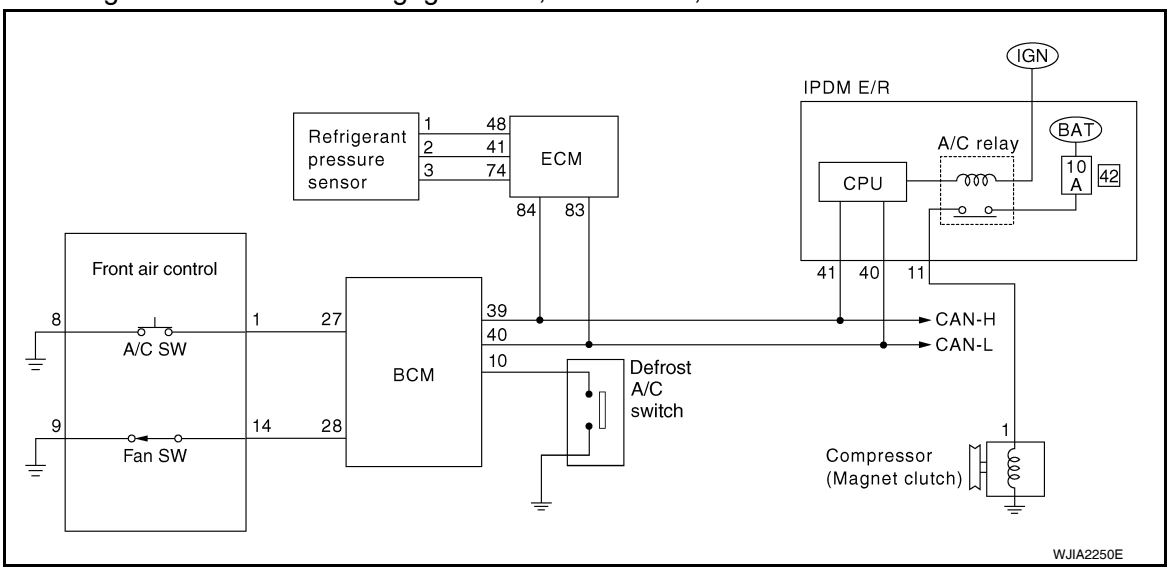
Low Temperature Protection Control

When intake air temperatures are higher than 4°C (39°F), the compressor turns ON. The compressor turns OFF when intake air temperatures are lower than 2°C (36°F).



DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage in A/C, defrost/foot, or defrost mode.



1. PERFORM AUTO ACTIVE TEST

Refer to PG-20, "Auto Active Test".

Does the magnet clutch operate?

YES >> GO TO 5.

NO >> Check 10A fuse (No. 42, located in the IPDM E/R). Refer to PG-23, "IPDM E/R Terminal Arrangement".
- If fuse is OK, GO TO 2.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK POWER SUPPLY FOR IPDM E/R

Check power supply to 10A fuse (No. 42 located in the IPDM E/R).

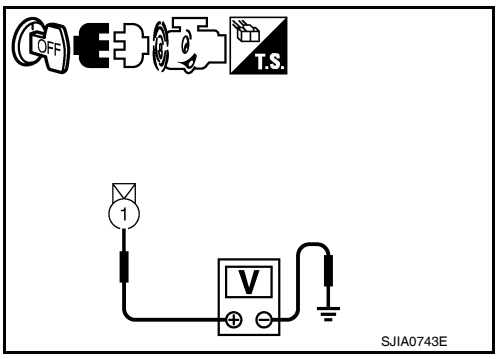
:Battery voltage should exist

OK or NG

OK >> GO TO 3.
NG >> Check harness for open circuit. Repair or replace if necessary.

3. CHECK POWER SUPPLY FOR A/C COMPRESSOR

1. Disconnect A/C compressor connector.
2. Start the engine.
3. Turn blower control dial and A/C switch ON.
4. Check voltage between A/C compressor harness connector F3 terminal 1 and ground.



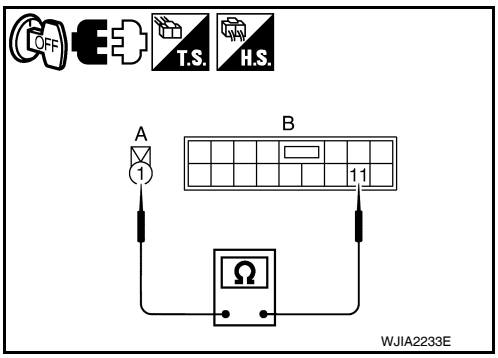
1 - Ground :Battery voltage

OK or NG

OK >> Replace magnet clutch. Refer to MTC-79, "Removal and Installation of Compressor".
NG >> GO TO 4.

4. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between A/C compressor harness connector F3 (A) terminal 1 and IPDM E/R harness connector E43 (B) terminal 11.



1 - 11 :Continuity should exist

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair harness or connector.

5. CHECK DEFROST A/C SWITCH

1. Start the engine.
2. Turn the mode control dial to (DEF) position.

Does the magnet clutch operate

OK >> GO TO 6.
NG >> GO TO 23.

6. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

1. Turn ignition switch OFF.
2. Check compressor ON/OFF signal. Refer to MTC-22, "CONSULT Function (BCM)".

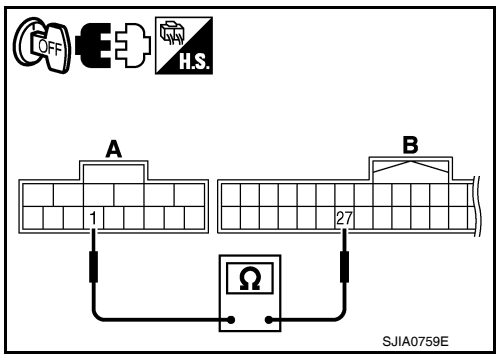
A/C SW ON : AIR COND SW ON
A/C SW OFF : AIR COND SW OFF

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM

1. Turn ignition switch OFF.
2. Disconnect front air control and BCM connector.
3. Check continuity between front air control harness connector M33 (A) terminal 1and BCM harness connector M18 (B) terminal 27.



1 - 27 :Continuity should exist

OK or NG

OK >> GO TO 8.
NG >> Repair harness or connector.

8.CHECK REFRIGERANT PRESSURE SENSOR

1. Reconnect front air control connector and BCM connector.
2. Check refrigerant pressure sensor. Refer to EC-540, "Diagnosis Procedure".

.OK or NG

OK >> • WITH CONSULT
GO TO 9.
• WITHOUT CONSULT
GO TO 10.
NG >> Replace as necessary.

9.CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to MTC-22, "CONSULT Function (BCM)".

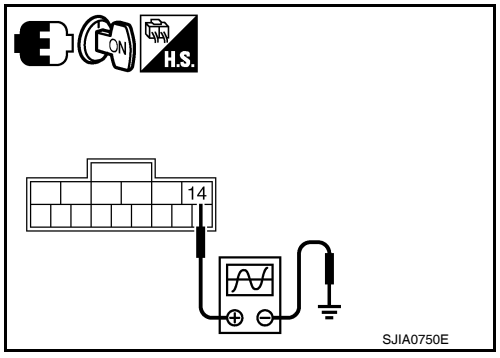
FAN CONTROL DIAL ON : FAN ON SIG ON
FAN CONTROL DIAL OFF : FAN ON SIG OFF

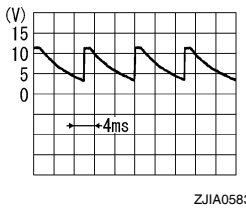
OK or NG

OK >> GO TO 12.
NG >> GO TO 10.

10.CHECK BCM INPUT (FAN ON) SIGNAL

1. Turn ignition switch ON.
2. Turn blower control dial to "1" position.
3. Confirm fan on signal between front air control harness connector M33 terminal 14 and ground using oscilloscope.



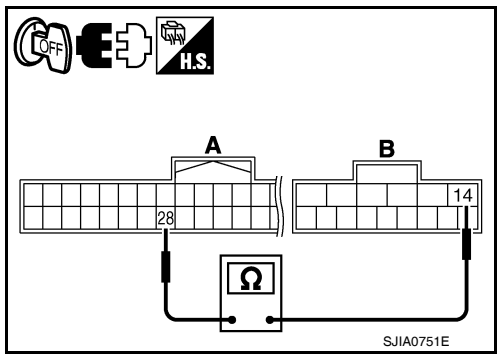
Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
Front air control: M33	14	Ground	

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector and BCM connector.
3. Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M33 (B) terminal 14.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
BCM: M18	28	Front air control: M33	14	Yes

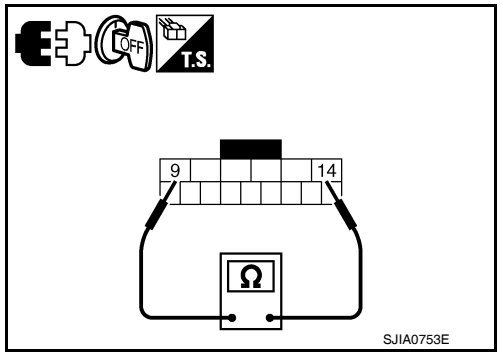
OK or NG

OK >> GO TO 12.
NG >> Repair harness or connector.

12. CHECK FAN SWITCH CIRCUIT

1. Turn blower control dial to the OFF position.
2. Check continuity between front air control terminals 9 and 14.

9 - 14 :Continuity should exist



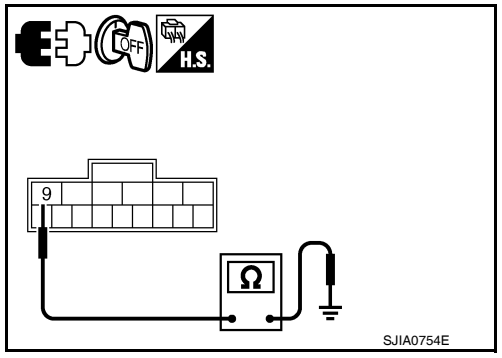
OK or NG

OK >> GO TO 13.
NG >> Replace front air control. Refer to MTC-57, "Disassembly and Assembly".

13. CHECK FRONT AIR CONTROL GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 9 and ground.

9 - Ground :Continuity should exist

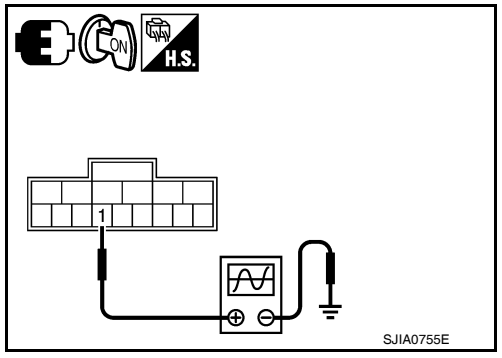


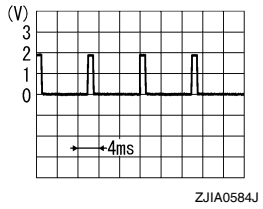
OK or NG

OK >> GO TO 14.
NG >> Repair harness or connector.

14. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

1. Reconnect BCM connector and front air control connectors.
2. Turn ignition switch ON.
3. Turn blower control dial clockwise to position "1".
4. Confirm compressor on signal between front air control harness connector M33 terminal 1 and ground using oscilloscope.



Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
Front air control: M33	1	Ground	

ZJIA0584J

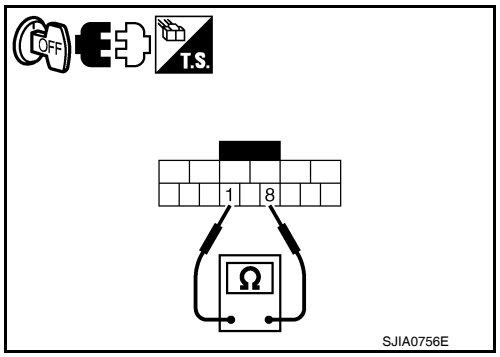
OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK A/C SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. While pressing the A/C switch, check continuity between front air control terminals 1 and 8.

1 - 8 :Continuity should exist



SJIA0756E

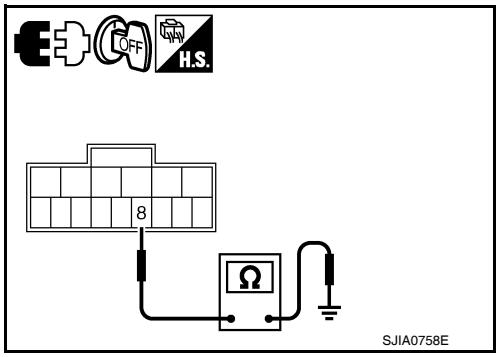
OK or NG

OK >> GO TO 16.
NG >> Replace front air control. Refer to MTC-57, "Disassembly and Assembly".

16. CHECK FRONT AIR CONTROL GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 8 and ground.

8 - Ground :Continuity should exist



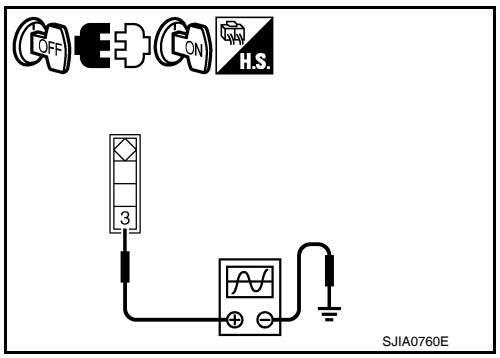
SJIA0758E

OK or NG

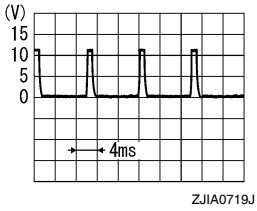
OK >> GO TO 17.
NG >> Repair harness or connector.

17. CHECK POWER SUPPLY FOR THERMO CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect thermo control amp. connector.
3. Turn ignition switch ON.
4. Confirm thermo amp signal between thermo control amp. harness connector M42 terminal 3 and ground using oscilloscope.



SJIA0760E

Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
Thermo control amp.: M42	3	Ground	

ZJIA0719J

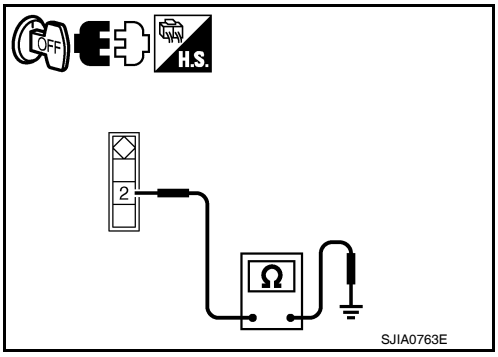
OK or NG

OK >> • GO TO 18 (with CVT).
• GO TO 19 (without CVT).
NG >> GO TO 21.

18. CHECK THERMO CONTROL AMP. GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between thermo control amp. harness connector M42 terminal 2 and ground.

2 - Ground :Continuity should exist



SJIA0763E

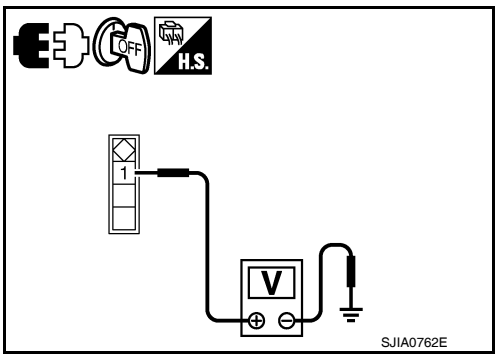
OK or NG

OK >> Repair thermo control amp. jumper as necessary.
NG >> Repair harness or connector.

19. CHECK POWER SUPPLY FOR THERMO CONTROL AMP.

Check voltage between thermo control amp. harness connector M42 terminal 1 and ground.

1 - Ground :Battery voltage



SJIA0762E

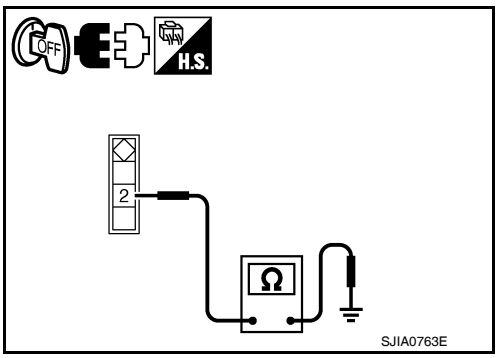
OK or NG

OK >> GO TO 20.
NG >> Check power supply circuit and 10A fuse [No. 16, located in the fuse block (JB)]. Refer to PG-70.
• If fuse is OK, check harness for open circuit. Repair or replace if necessary.
• If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

20. CHECK THERMO CONTROL AMP. GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between thermo control amp. harness connector M42 terminal 2 and ground.

2 - Ground :Continuity should exist



SJIA0763E

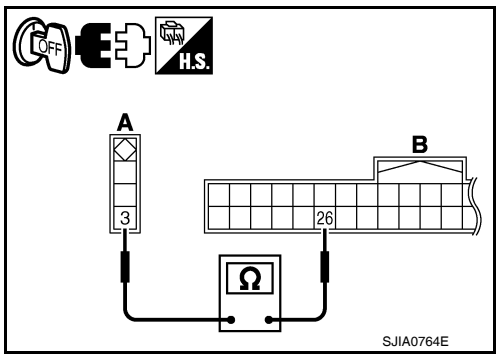
OK or NG

OK >> Replace thermo control amp. Refer to MTC-58, "Removal and Installation".
NG >> Repair harness or connector.

21. CHECK CIRCUIT CONTINUITY BETWEEN THERMO CONTROL AMP. AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between thermo control amp. harness connector M42 (A) terminal 3 and BCM harness connector M18 (B) terminal 26.

3 - 26 :Continuity should exist



OK or NG

OK >> GO TO 22.
NG >> Repair harness or connector.

22. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-14, "Trouble Diagnosis Flow Chart".
- BCM – ECM
- ECM – IPDM E/R

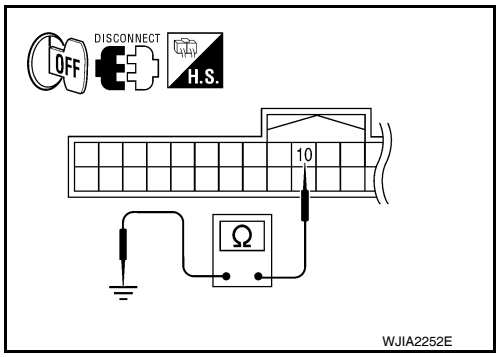
OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Repair or replace malfunctioning part(s).

23. CHECK DEFROST A/C SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Press the defrost A/C switch.
   NOTE:
   The defrost A/C switch is located on back side of the front air control.
4. Check continuity between BCM harness connector M18 terminal 10 and ground.

10 - Ground :Continuity should exist



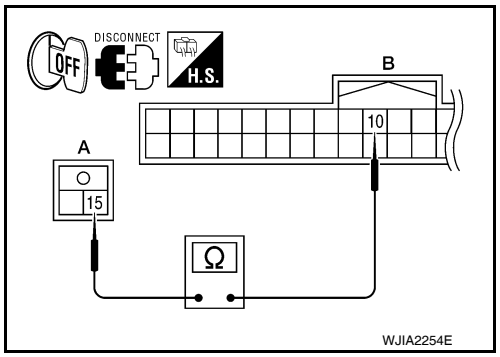
OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> GO TO 24.

24. CHECK CIRCUIT CONTINUITY BETWEEN DEFROST A/C SWITCH AND BCM

1. Disconnect defrost A/C switch connector.
2. Check continuity between BCM harness connector M18 (B) terminal 10 and defrost A/C switch harness connector M41 (A) terminal 15.

10 - 15 :Continuity should exist



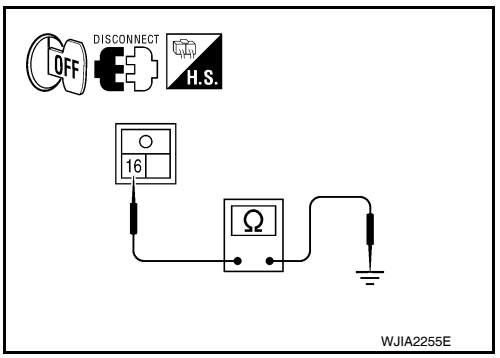
OK or NG

OK >> GO TO 25.
NG >> Repair harness or connector.

25. CHECK CIRCUIT CONTINUITY BETWEEN DEFROST A/C SWITCH AND GROUND

Check continuity between A/C defrost switch harness connector M41 terminal 16 and ground.

16 - Ground :Continuity should exist



OK or NG

OK >> Replace defrost A/C switch.
NG >> Repair harness or connector.

Insufficient Cooling

INFOID:0000000007329084

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise to maximum cold position.
2. Check for cold air at discharge air outlets.

Is the inspection results normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to MTC-31, "Operational Check".

Does another symptom exist?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK COMPRESSOR DRIVE BELT TENSION

Check compressor belt tension. Refer to EM-13, "Checking Drive Belts".

OK or NG

OK >> GO TO 5.
NG >> Adjust or replace compressor belt. Refer to EM-13, "Removal and Installation".

5.CHECK AIR MIX DOOR CABLE

Check and verify air mix door cable operation. Refer to MTC-65, "Air Mix Door Cable Adjustment".

Does air mix door operate correctly?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6.CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation. Refer to EC-425, "Overall Function Check".

Does cooling fan motor operate correctly?

YES >> GO TO 7.
NO >> Check cooling fan motor. Refer to EC-425, "Overall Function Check".

7.CHECK FOR EVAPORATOR FREEZE UP

Start engine and run A/C. Check for evaporator freeze up.

Does evaporator freeze up?

YES >> Perform diagnostic work flow. Refer to "DIAGNOSTIC WORK FLOW".

NO >> GO TO 8.

8. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to "PERFORMANCE CHART".

OK or NG

OK >> GO TO 9.
NG >> Perform diagnostic work flow. Refer to "DIAGNOSTIC WORK FLOW".

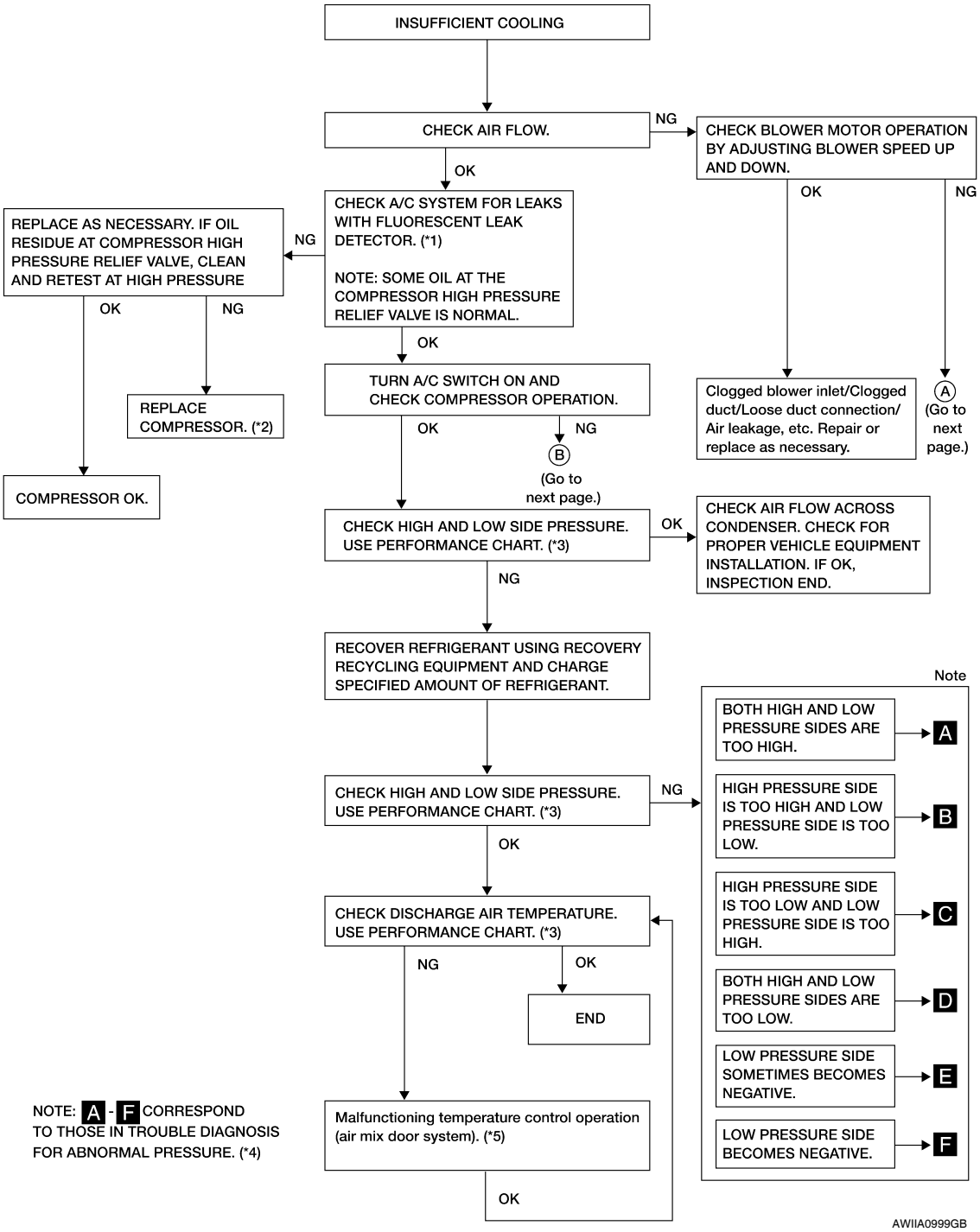
9. CHECK AIR DUCTS

Check ducts for air leaks.

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to MTC-31, "Operational Check". If other symptoms exist, refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NG >> Repair air leaks.

DIAGNOSTIC WORK FLOW



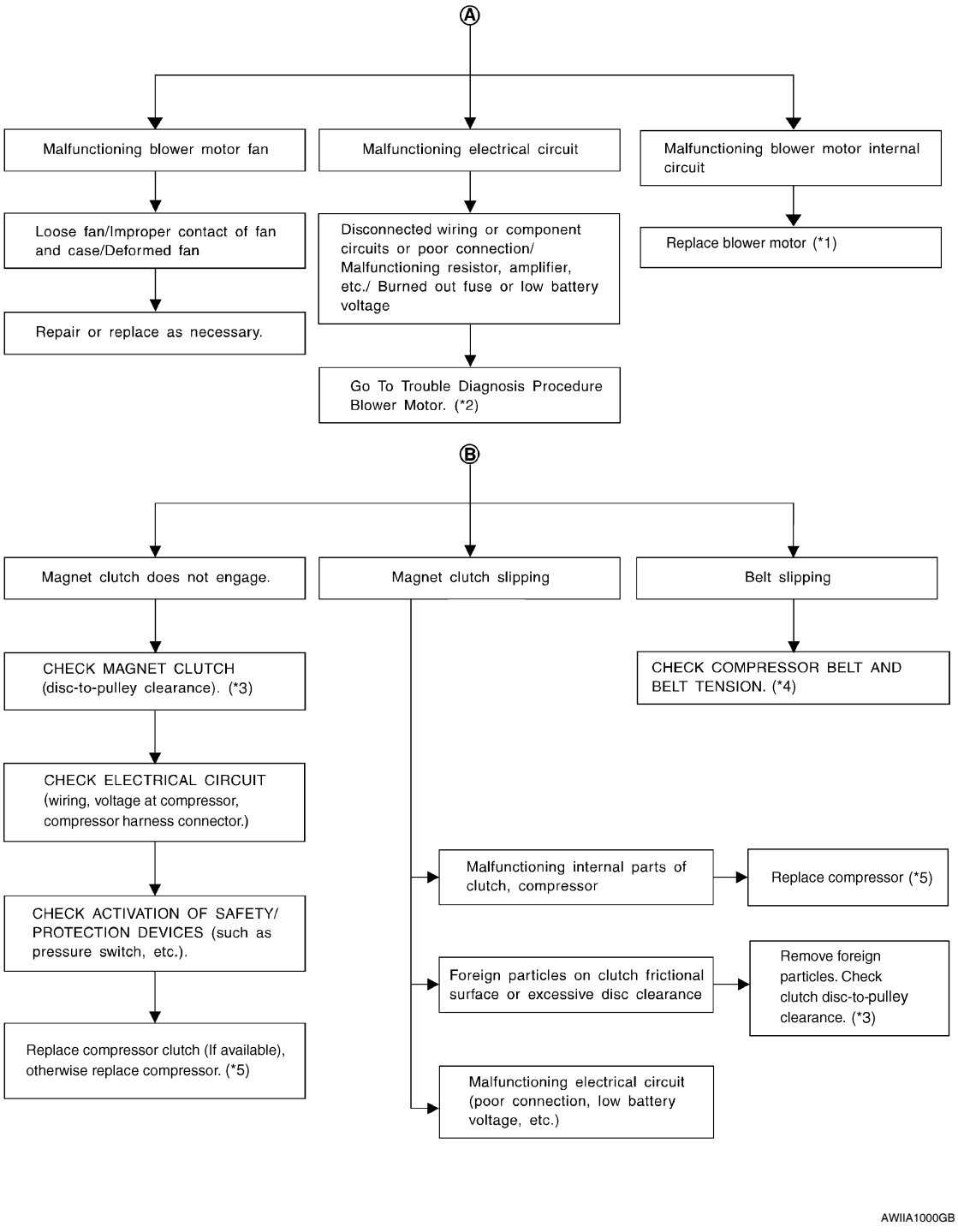
*1 MTC-89, "Checking System for Leaks Using the Fluorescent Leak Detector"

*2 MTC-79, "Removal and Installation of Compressor"

*3 "PERFORMANCE CHART"

*4 "TROUBLE DIAGNOSIS FOR ABNORMAL PRESSURE"

*5 MTC-33, "Air Mix Door"



AWIIA1000GB

*1 MTC-63, "Removal and Installation" *2 MTC-34, "Front Blower Motor Circuit" *3 MTC-79, "Removal and Installation of Compressor"

*4 EM-13, "Checking Drive Belts" *5 MTC-79, "Removal and Installation of Compressor"

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle condition	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door window	Open
Hood	Open
TEMP.	Max. COLD
Mode control dial	(Ventilation) set
Intake door lever	(Recirculation) set
Blower speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

TEST READING

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	7.2 - 9.1 (45 - 48)
	25 (77)	11.4 - 13.8 (53 - 57)
	30 (86)	15.5 - 18.4 (60 - 65)
	35 (95)	20.3 - 23.7 (69 - 75)
60 - 70	20 (68)	9.1 - 10.9 (48 - 52)
	25 (77)	13.8 - 16.2 (57 - 61)
	30 (86)	18.4 - 21.3 (65 - 70)
	35 (95)	23.7 - 27.1 (75 - 81)

Ambient Air Temperature-to-operating Pressure Table

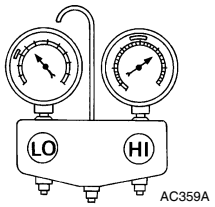
Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2 , psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2 , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	843 - 1,036 *1 (11.08 - 13.63, 8.6 - 10.6, 122 - 150)	159.0 - 194.0 (1.59 - 1.94, 1.62 - 1.98, 23.1 - 28.1)
	25 (77)	1,094 - 1,338 *1 (10.94 - 13.38, 11.2 - 13.6, 159 - 194)	196.3 - 240.0 (1.96 - 2.40, 2.00 - 2.45, 28.5 - 34.8)
	30 (86)	1,298 - 1,590 *1 (12.98 - 15.90, 13.2 - 16.2, 188 - 231)	248.0 - 302.7 (2.48 - 3.03, 2.53 - 3.09, 36.0 - 43.9)
	35 (95)	1,383 - 1,688 *2 (13.83 - 16.88, 14.1 - 17.2, 201 - 245)	308.8 - 377.4 (3.09 - 3.77, 3.15 - 3.85, 44.8 - 54.7)
	40 (104)	1,628 - 1,988 *2 (16.28 - 19.88, 16.6 - 20.3, 236 - 288)	377.4 - 461.2 (3.77 - 4.61, 3.85 - 4.70, 54.7 - 66.8)

*1: With blower control dial in the "1" position
*2: With blower control dial in the "4" position.

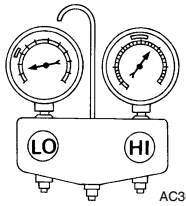
TROUBLE DIAGNOSIS FOR ABNORMAL PRESSURE

Whenever system's high and/or low side pressure(s) is/are abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

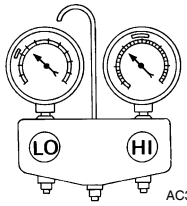
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
A Both high- and low-pressure sides are too high.  AC359A	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan if necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2 , 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

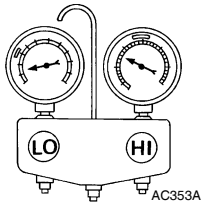
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
B High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check oil for contamination.

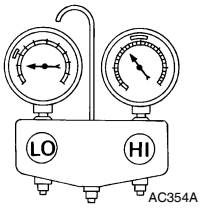
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
C High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

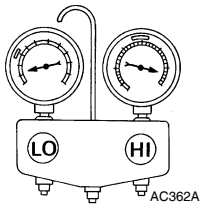
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
D Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to MTC-89, "Checking of Refrigerant Leaks" .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check oil for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check thermo control amp. Refer to MTC-38, "Magnet Clutch Circuit (If Equipped)" . • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to MTC-34, "Front Blower Motor Circuit" .

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
E Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
F Low-pressure side becomes negative.  	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check oil for contamination.

Insufficient Heating

INFOID:0000000007329085

SYMPTOM: Insufficient heating

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Turn temperature control dial clockwise to maximum heat position.
2. Check for hot air at discharge air outlets.

Is the inspection results normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to MTC-31, "Operational Check".

Does another symptom exist?

YES >> Refer to MTC-23, "How to Perform Trouble Diagnosis for Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK COOLANT SYSTEM

1. Check engine coolant level. Refer to CO-11, "Inspection".
2. Check hoses for leaks or kinks.
3. Check Radiator cap. Refer to CO-14, "Checking Radiator Cap".

OK or NG

OK >> GO TO 5.
NG >> Repair/replace as necessary.

5.CHECK AIR MIX DOOR CABLE

Check air mix door cable operation. Refer to MTC-65, "Air Mix Door Cable Adjustment".

OK or NG

YES >> GO TO 6.

NO >> Adjust or replace air mix door cable. Refer to MTC-65, "Air Mix Door Cable Adjustment".

6.CHECK AIR DUCTS

Check ducts for air leaks.

OK or NG

OK >> GO TO 7.
NG >> Repair air leaks.

7.CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inlet hose hot and the outlet hose warm?

YES >> GO TO 8.
NO >> Both hoses warm: GO TO 9.

8.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine control temperature sensor. Refer to EC-200, "Component Inspection".

OK or NG

OK >> System OK.
NG >> Repair or replace as necessary. Retest.

9.CHECK HEATER HOSES

Check heater hoses for proper installation.

OK or NG

OK >> GO TO 10.
NG >> Repair /replace as necessary. Retest GO TO 7.

10.BACK FLUSH HEATER CORE

1. Back flush heater core.
2. Drain the water from the system.
3. Refill system with new engine coolant. Refer to CO-11, "Changing Engine Coolant".
4. Start engine and warm it up to normal operating temperature.
5. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inlet hose hot and the outlet hose warm?

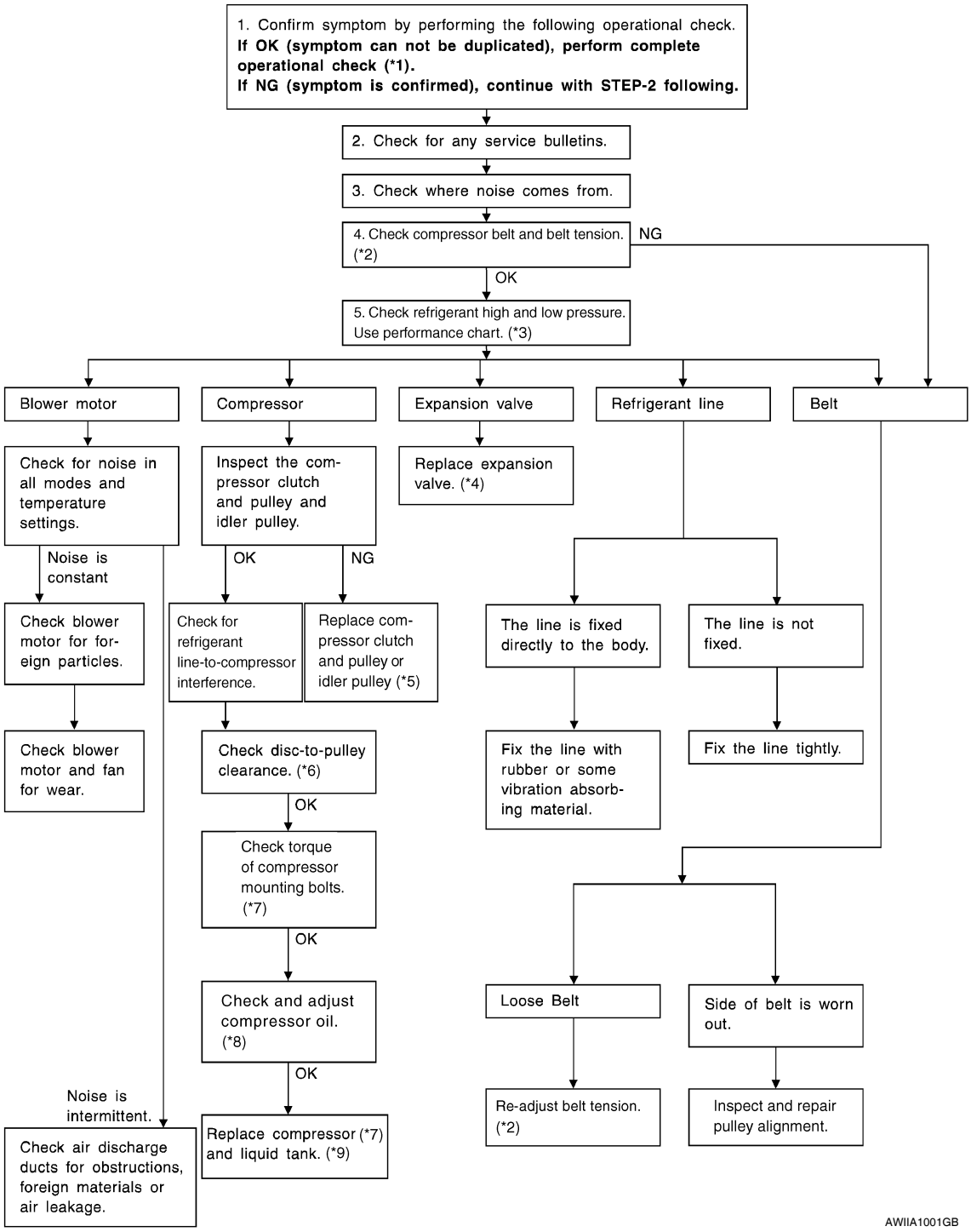
YES >> System OK.
NO >> Replace heater core and refill engine coolant. Refer to MTC-68, "Removal and Installation".

Noise

INFOID:0000000007329086

SYMPTOM: Noise

INSPECTION FLOW



*1. MTC-31, "Operational Check"
*2. EM-13, "Checking Drive Belts"
*3. MTC-46, "Insufficient Cooling"
*4. MTC-89, "Removal and Installation of Expansion Valve"
*5. MTC-79, "Removal and Installation of Compressor"
*6 MTC-79, "Removal and Installation of Compressor"
*7. MTC-79, "Removal and Installation of Compressor"
*8. MTC-17, "Maintenance of Oil Quantity in Compressor"
*9 MTC-87, "Removal and Installation of Liquid Tank"

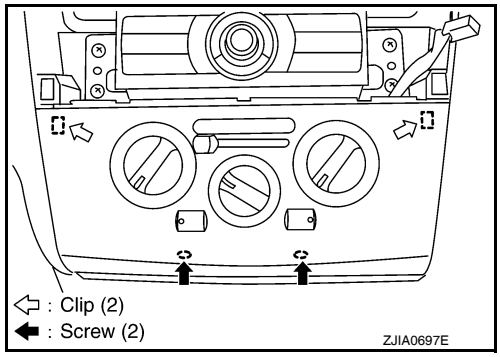
CONTROLLER

Removal and Installation

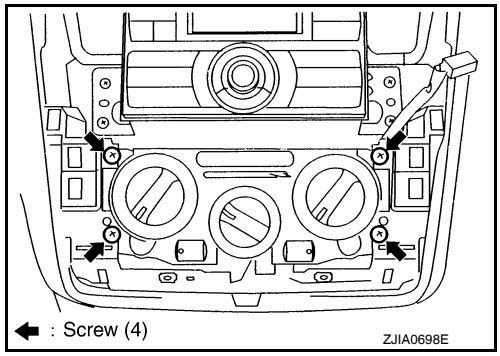
INFOID:0000000007329087

REMOVAL

1. Remove the instrument finisher E. Refer to IP-11, "Component Parts".
2. Remove the instrument finisher D. Refer to IP-11, "Component Parts".
3. Remove the cluster lid C. Refer to IP-11, "Component Parts".
4. Remove the intake door lever knob. Refer to MTC-57, "Disassembly and Assembly".
5. Remove the controller finisher mounting screws and clips and the controller finisher.



6. Remove the controller mounting screws and the controller.



7. Remove the fuse block lid. Refer to IP-11, "Component Parts".
8. Remove the instrument panel side finisher. Refer to IP-11, "Component Parts".
9. Remove the instrument panel lower finisher. Refer to IP-11, "Component Parts".
10. Remove the glove box assembly. Refer to IP-11, "Component Parts".
11. Remove the air mix door cable, mode door cable and intake door cable from A/C unit assembly.
12. Disconnect connector, and then remove the controller.

INSTALLATION

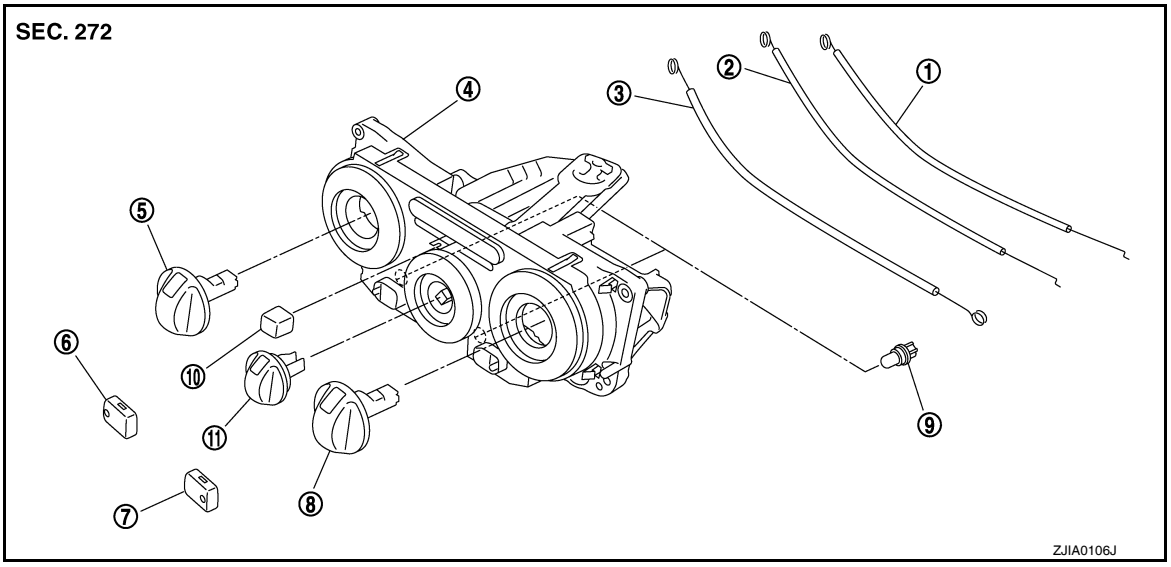
Installation is in the reverse order of removal.

CAUTION:

Adjust the door cables during installation. Refer to MTC-64, "Intake Door Cable Adjustment", MTC-66, "Mode Door Cable Adjustment" and MTC-65, "Air Mix Door Cable Adjustment".

Disassembly and Assembly

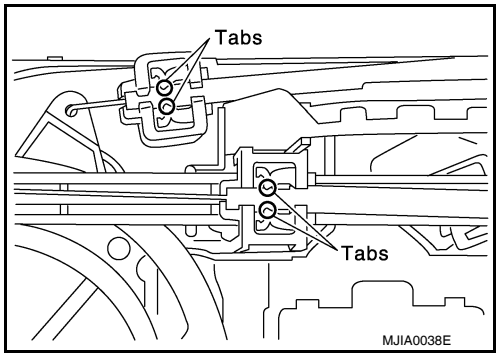
INFOID:0000000007329088



1. Air mix door cable
2. Intake door cable
3. Mode door cable
4. A/C controller assembly
5. Mode control dial
6. Rear DEF button
7. A/C button
8. Temperature control dial
9. Illumination bulb
10. Intake door lever knob
11. Fan control dial

CAUTION:

Install inner cable of each door cable to the corresponding lever, as shown in the figure. Press outer cable until it hooks on the tabs and becomes secure.



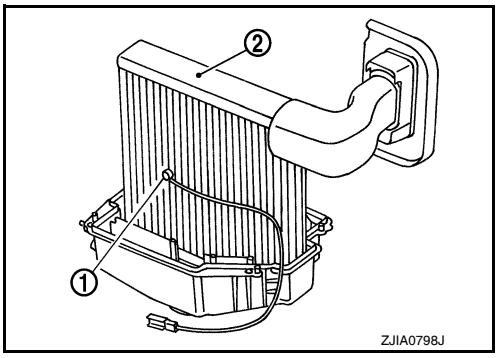
THERMO CONTROL AMPLIFIER

Removal and Installation

INFOID:0000000007329089

REMOVAL

1. Remove the evaporator. Refer to MTC-88, "Removal and Installation of Evaporator".
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
2. Mark the mounting position of the thermo control amp. and then remove the thermo control amp. (1) from the evaporator (2).



INSTALLATION

Installation is in the reverse order of removal.

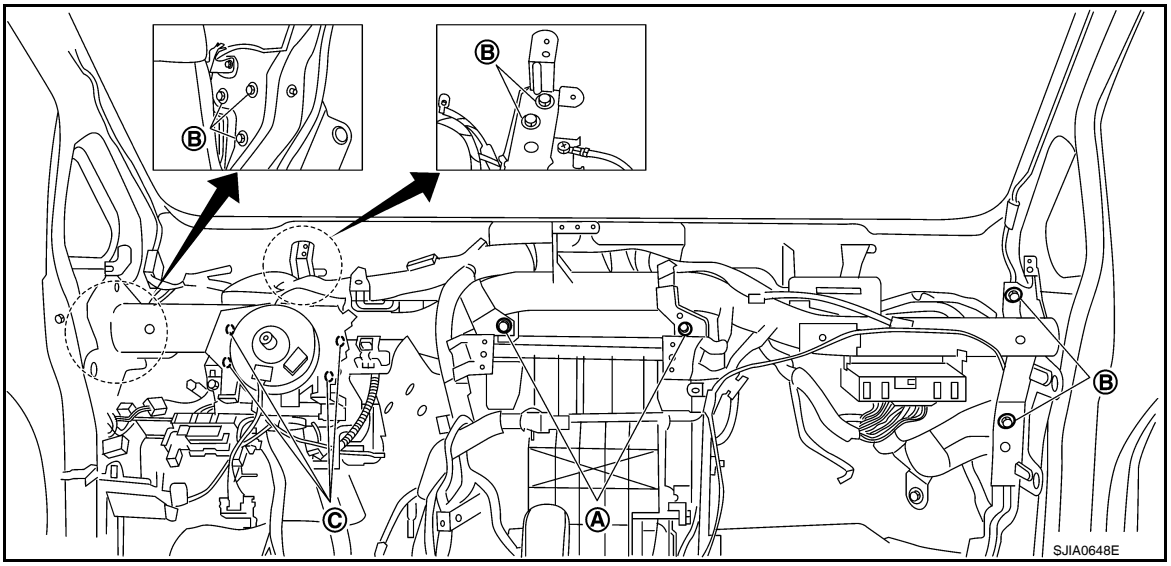
CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **Install the thermo control amp. at the mark made during removal of the thermo control amp.**
- **When recharging refrigerant, check for leaks.**

A/C UNIT ASSEMBLY

Removal and Installation

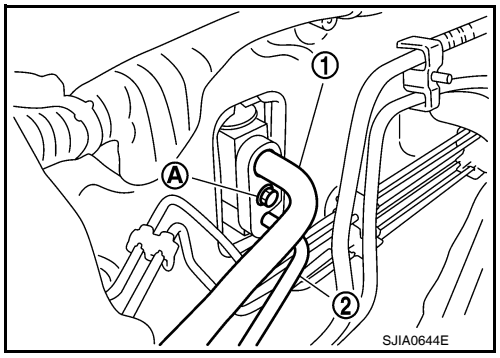
INFOID:0000000007329090



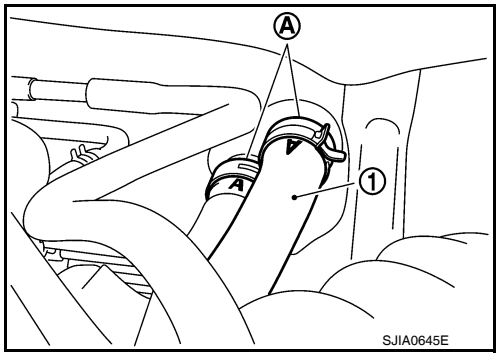
A. A/C unit assembly bolts B. Steering member bolts C. Steering column nuts

REMOVAL

1. Use a recovery/recycling equipment (for HFC-134a) to discharge refrigerant.
2. Drain the coolant from cooling system. Refer to CO-11, "Changing Engine Coolant".
3. Remove the upper clip and position the lower dash insulator aside.
4. Remove the bolt (A), and then disconnect the low-pressure flexible hose (1) and high-pressure pipe (2) from the evaporator.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

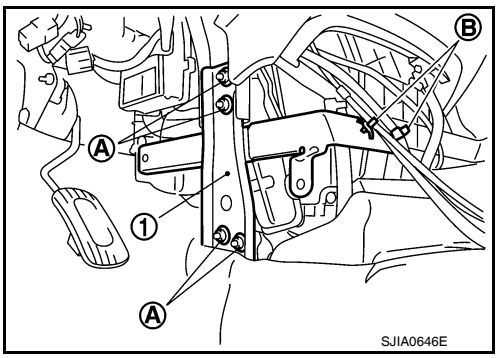


5. Remove the clamps (A), and then disconnect the heater hoses (1) from heater core.

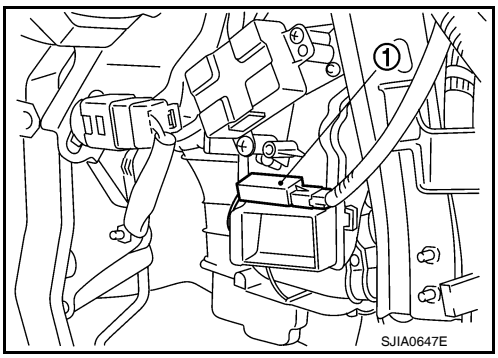


6. Remove the center console assembly. Refer to IP-12, "Removal and Installation".

7. Remove the instrument stay nuts (A) and harness clamps (B), and then remove the instrument stay (1).



8. Disconnect the thermo control amp. connector (1) for TYPE 2 systems as shown. Disconnect the thermo control amp. short connector for TYPE 1 systems.



9. Remove the instrument panel and pad. Refer to IP-11, "Component Parts".
10. Remove the side ventilator ducts. Refer to MTC-70, "Removal and Installation".
11. Remove the center ventilator ducts. Refer to MTC-70, "Removal and Installation".
12. Remove the side kicking plates. Refer to EI-35, "Component".
13. Disconnect the fuel filler door cable and the rear hatch door cable.
14. Remove the A/C unit assembly bolts, steering member bolts, steering column nuts and harness clips.
15. Remove the steering member, and then remove A/C unit assembly.

INSTALLATION

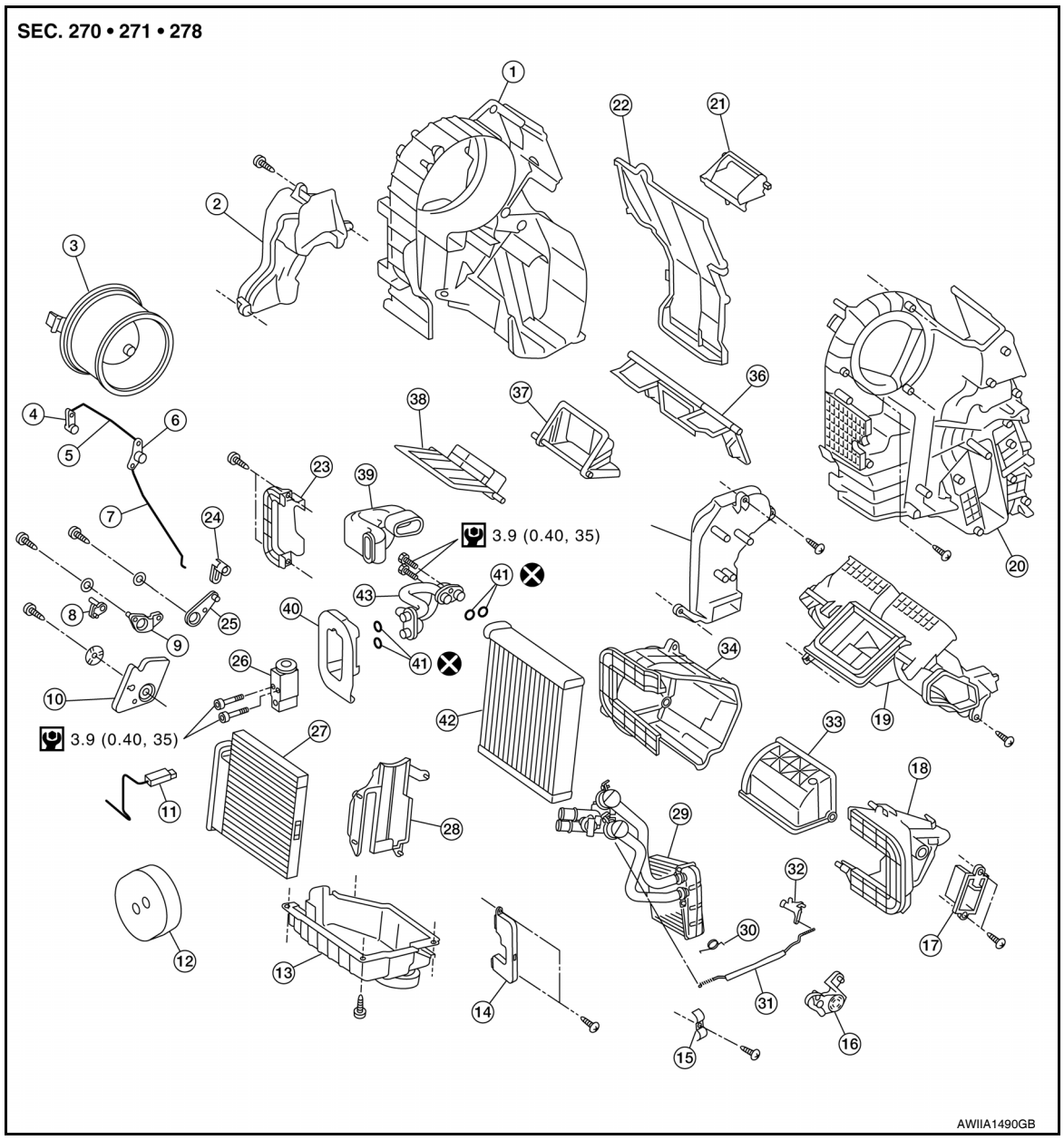
Installation is in the reverse order of removal.
- When filling radiator with coolant, refer to CO-11, "Changing Engine Coolant".
- Recharge the refrigerant.

A/C unit assembly bolt	**: 6.9 N·m (0.7 kg-m, 61 in-lb)**
Steering member bolt	**: 12 N·m (1.25 kg-m, 9 ft-lb)**
Steering column nut	**: Refer to PS-10, "Removal and Installation".**

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **When recharging refrigerant, check for leaks.**

Disassembly and Assembly

INFOID:0000000007329091



1. Blower case (right)
2. Foot duct (right)
3. Blower motor
4. Sub ventilator·defroster door lever
5. Sub ventilator·defroster door rod
6. Ventilator·defroster door lever
7. Ventilator·defroster door rod
8. Intake door lever
9. Ventilator·defroster door link
10. Main link
11. Thermo control amp.
12. Heater pipe packing
13. Lower blower case
14. Heater pipe cover
15. Heater pipe clip
16. Intake door link
17. Blower fan resistor
18. Intake case (left)
19. Center defroster duct
20. Blower case (left)
21. Cover
22. Cover
23. Expansion valve cover
24. Foot door lever
25. Foot door link
26. Expansion valve
27. Air conditioner filter
28. Evaporator cover
29. Heater core
30. Spring
31. Water valve rod
32. Air mix door lever
33. Intake door
34. Intake case (right)
35. Foot duct (left)
36. Ventilator·defroster door
37. Foot door
38. Air mix door
39. Seal

40. Expansion valve grommet
41. O-ring
42. Evaporator
43. Cooler pipe assembly

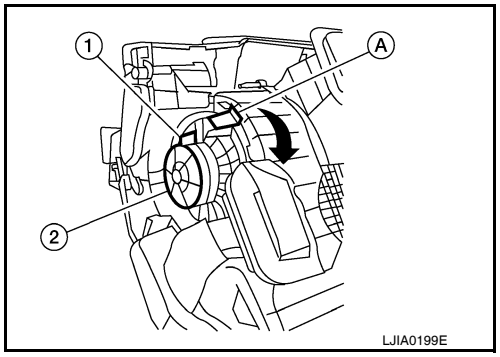
BLOWER MOTOR

Removal and Installation

INFOID:0000000007329092

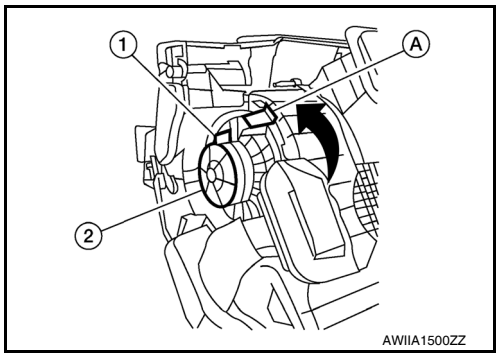
REMOVAL

1. Remove the instrument panel and pad. Refer to IP-12, "Removal and Installation".
2. Disconnect the blower motor connector (1).
3. Push the flange holding hook (A) toward the blower motor (2), then rotate the blower motor (2) clockwise and remove it from the A/C unit assembly.



INSTALLATION

1. Rotate the blower motor (2) until the blower motor flange holding hook (A) locks securely into the A/C unit assembly.
2. Connect the blower motor connector (1).



3. Install the instrument panel and pad assembly. Refer to IP-12, "Removal and Installation".

INTAKE DOOR

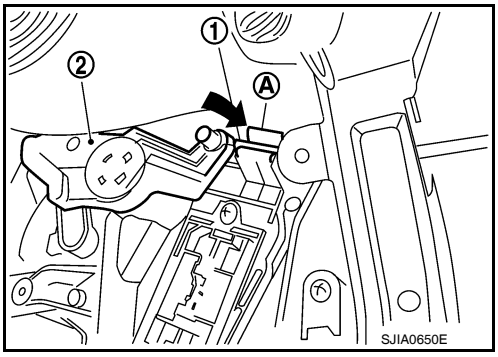
Intake Door Cable Adjustment

INFOID:0000000007329093

1. Remove the glove box assembly. Refer to IP-12, "Removal and Installation".
2. Remove the outer cable of the intake door cable (1) from the clamp (A).
3. Set the intake door lever to REC position.
4. Push the intake door link (2) in the direction shown by the arrow, and then carefully pull the outer cable to controller side, and install the clamp (A).
5. Operate the intake door lever to insure that inner cable moves smoothly.

CAUTION:

When clamping the outer cable, do not move the inner cable.



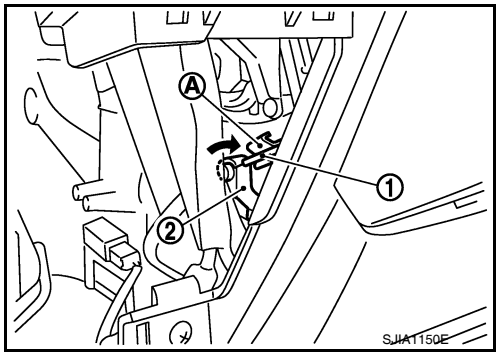
AIR MIX DOOR

Air Mix Door Cable Adjustment

INFOID:0000000007329094

1. Remove the glove box assembly. Refer to IP-12, "Removal and Installation".
2. Remove the outer cable of the air mix door cable (1) from the clamp (A).
3. Set the temperature control dial to full cold position.
4. Push the air mix door lever (2) in the direction shown by the arrow, and then carefully pull the outer cable toward the controller side, and install the clamp (A).
5. Operate the temperature control dial to insure that the inner cable moves smoothly.

CAUTION:
When clamping the outer cable, do not move the inner cable.

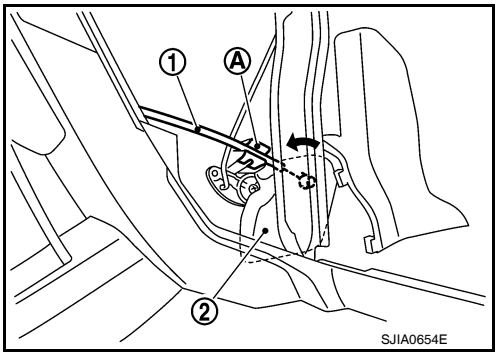


MODE DOOR

Mode Door Cable Adjustment

INFOID:0000000007329095

1. Remove the glove box assembly. Refer to IP-12, "Removal and Installation".
2. Remove the outer cable of the mode door cable (1) from the clamp (A).
3. Set the mode control dial to the VENT position.
4. Push the main link (2) in the direction shown by the arrow, and then carefully pull the outer cable to the controller side, and install the clamp (A).
5. Operate the mode control dial to insure that the inner cable moves smoothly.
   CAUTION:
   When clamping the outer cable, do not move the inner cable.



6. Turn the mode control dial to each position.
7. Confirm that the discharge air comes out according to the air distribution table. Refer to MTC-20, "Discharge Air Flow".

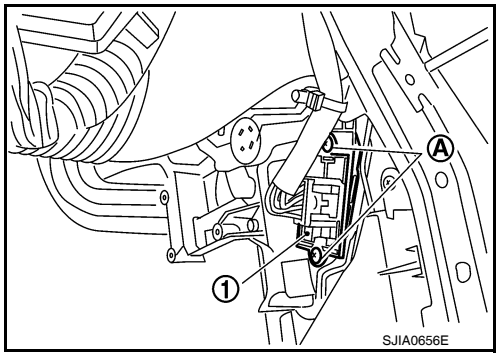
BLOWER FAN RESISTOR

Removal and Installation

INFOID:0000000007329096

REMOVAL

1. Remove the instrument lower finisher. Refer to IP-11, "Component Parts".
2. Remove the instrument lower cover (LH). Refer to IP-11, "Component Parts".
3. Remove the brake pedal assembly. Refer to BR-7, "Removal and Installation".
4. Disconnect the blower fan resistor connector.
5. Remove the blower fan resistor screws (A), then remove the blower fan resistor (1).



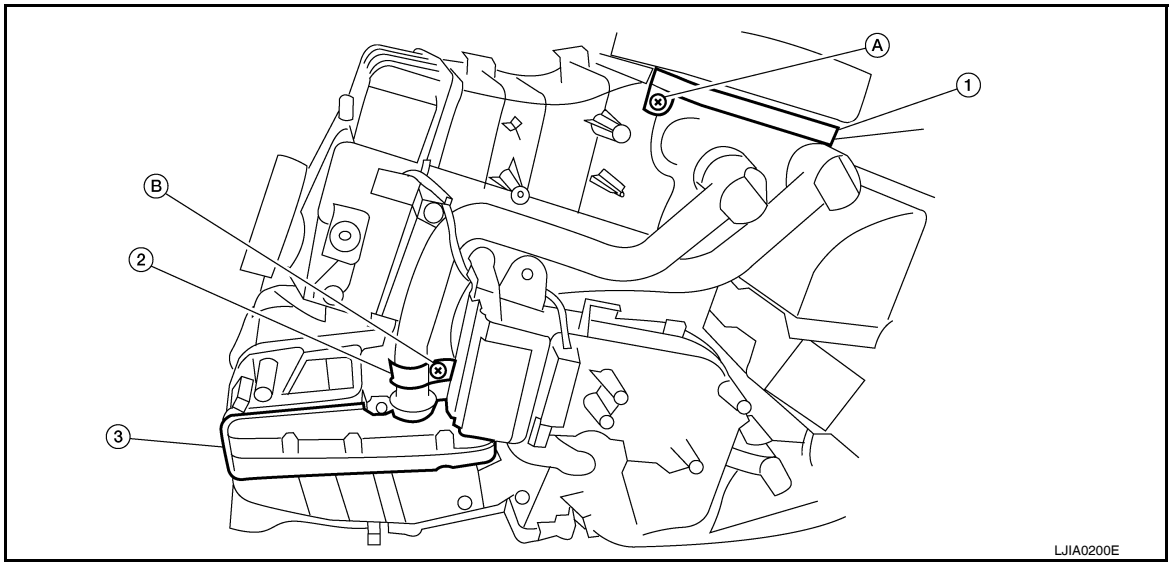
INSTALLATION

Installation is in the reverse order of removal.

HEATER CORE

Removal and Installation

INFOID:0000000007329097



1. Heater pipe cover
2. Heater pipe clip
3. Heater core
A. Heater pipe cover screw
B. Heater pipe clip screw

REMOVAL

1. Remove the A/C unit assembly. Refer to MTC-59, "Removal and Installation".
2. Remove the foot duct (left). Refer to MTC-70, "Removal and Installation".
3. Remove the heater pipe cover screw, then remove the heater pipe cover.
4. Remove the heater pipe clip screw, then remove the heater pipe clip.
5. Slide the heater core out of the A/C unit assembly.

INSTALLATION

Installation is in the reverse order of removal.

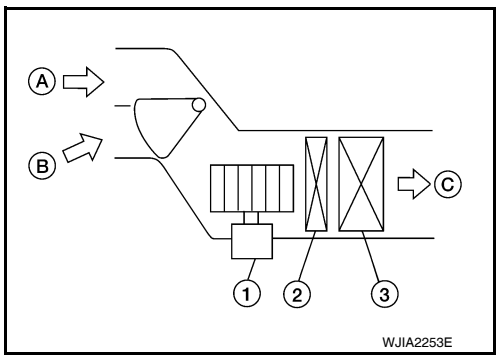
AIR CONDITIONER FILTER

Changing Air Conditioner Filter

INFOID:0000000007793407

FUNCTION

The fresh air (A) and the recirculated air (B) drawn inside the passenger compartment by the front blower motor (1) is kept clean (C) on either mode by the air conditioner filter (2), located before the evaporator (3), in the A/C unit assembly.



REPLACEMENT TIMING

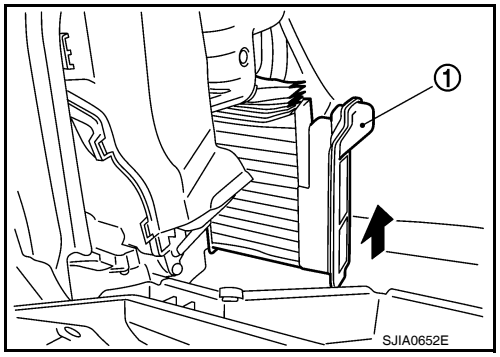
Replace the air conditioner filter according to the maintenance schedules. Refer to MA-6, "General Maintenance".

NOTE:

The air conditioner filter caution label is located inside the glove box door.

REPLACEMENT PROCEDURES

1. Remove the glove box assembly. Refer to IP-11, "Component Parts".
2. Compress the air conditioner filter (1) downward while sliding it to the RH side of the vehicle to release the upper pawl.
3. Move the bottom of air conditioner filter (1) upward as shown to release the bottom tab, then remove it.

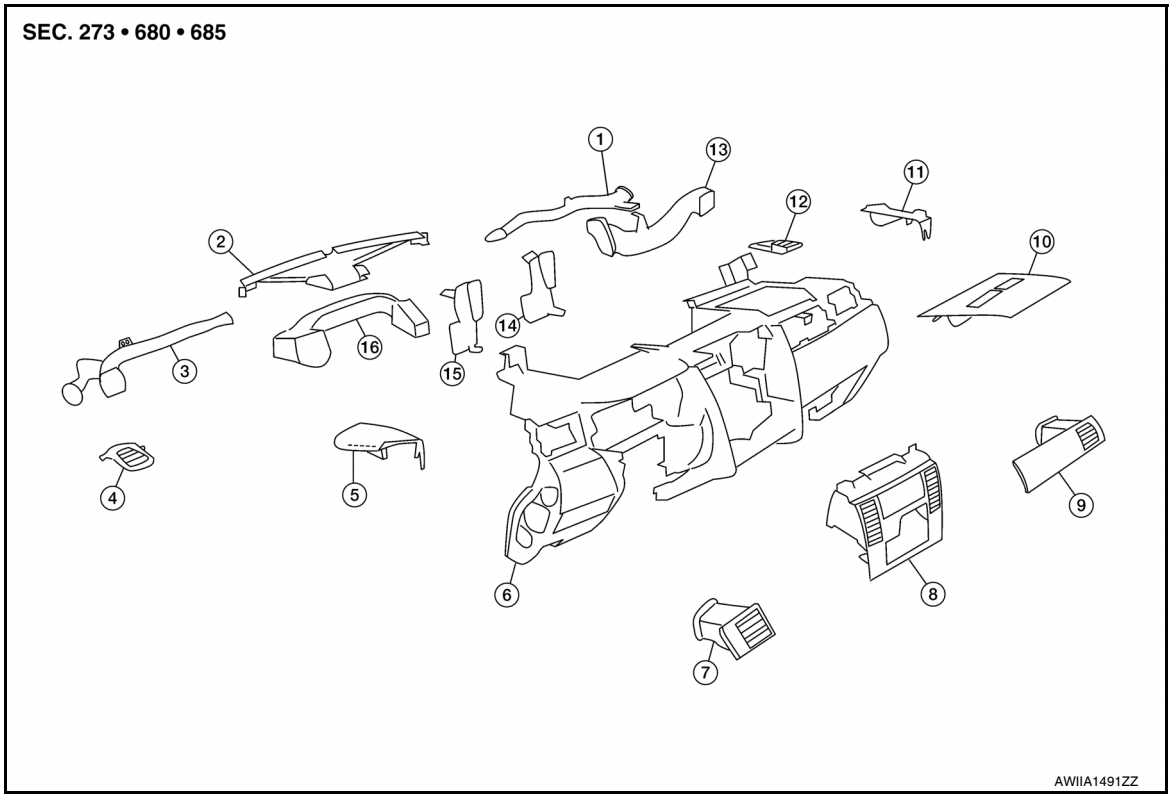


4. Replace the air conditioner filter with new one and install the new filter in the A/C unit assembly.
   CAUTION:
   Make sure that the air conditioner filter lower tab is fully seated, and that the air conditioner upper pawl is locked into place securing the new filter into the A/C unit assembly.
5. Install the glove box assembly. Refer to IP-11, "Component Parts".

DUCTS AND GRILLES

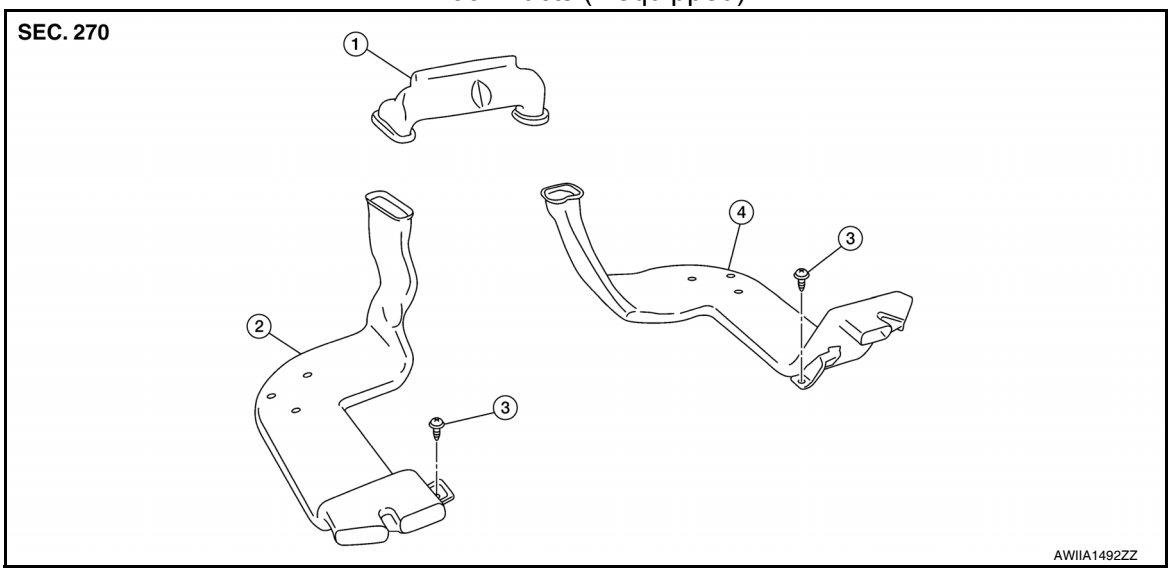
Removal and Installation

INFOID:0000000007329098



1. Side defroster duct (right)
2. Defroster nozzle
3. Side defroster duct (left)
4. Side defroster grille (left)
5. Instrument side panel (left)
6. Instrument panel and pad
7. Side ventilator assembly (left)
8. Cluster lid C
9. Side ventilator assembly (right)
10. Instrument finisher E
11. Instrument side panel (right)
12. Side defroster grille (right)
13. Side ventilator duct (right)
14. Center ventilator duct (right)
15. Center ventilator duct (left)
16. Side ventilator duct (left)

Floor Ducts (if equipped)

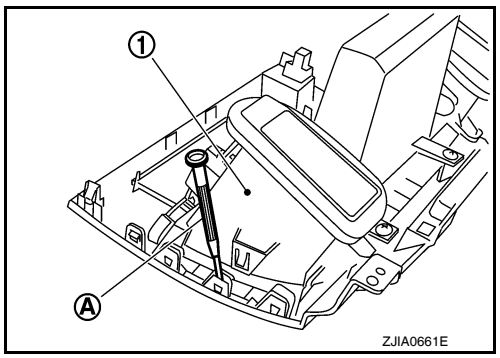


1. Front floor duct
2. Rear floor duct (left)
3. Clip
4. Rear floor duct (right)

CENTER VENTILATOR GRILLES

Removal

1. Remove the cluster lid C. Refer to IP-11, "Component Parts".
2. Remove the center ventilator grills (1) from cluster lid C using a suitable tool (A).



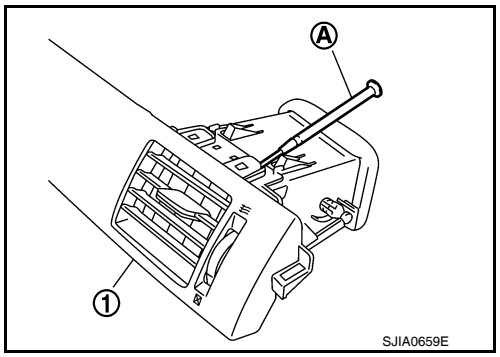
Installation

Installation is in the reverse order of removal.

SIDE VENTILATOR GRILLES (LH/RH)

Removal

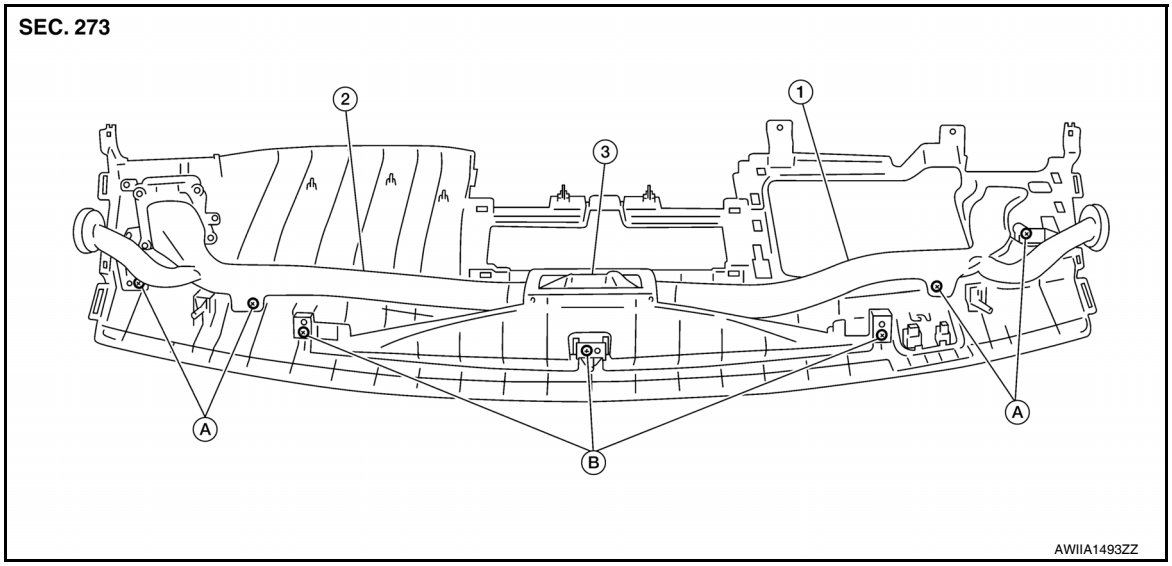
1. Remove the side ventilator duct (LH/RH). Refer to MTC-70, "Removal and Installation".
2. Remove the side ventilator grille screw (RH only).
3. Remove the side ventilator grille (1)(LH/RH) using a suitable tool (A). Refer to MTC-70, "Removal and Installation".
   NOTE:
   Right hand side grille shown, left hand side grille similar.



Installation

Installation is in the reverse order of removal.

DEFROSTER NOZZLE AND SIDE DEFROSTER DUCTS (LH/RH)



1. Side defroster duct (RH)
2. Side defroster duct (LH)
3. Defroster nozzle

A. Side defroster duct screw
B. Defroster nozzle screw

Removal

1. Remove the instrument upper finisher. Refer to IP-11, "Component Parts".
2. Remove the screws, then remove the side defroster duct (RH) and side defroster duct (LH).
3. Remove the screws, then remove the defroster nozzle.

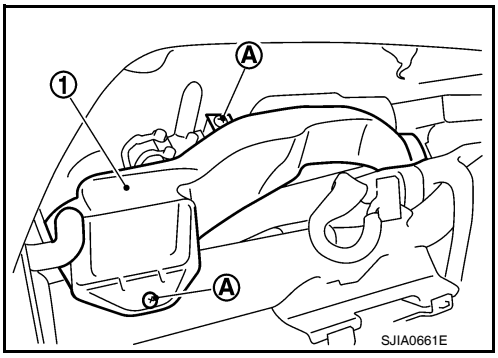
Installation

Installation is in the reverse order of removal.

SIDE VENTILATOR DUCTS

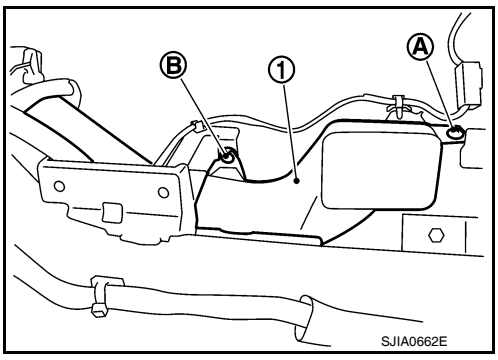
Left hand side

1. Remove the instrument panel and pad assembly. Refer to IP-12, "Removal and Installation".
2. Remove the mounting screws (A), and then remove the side ventilator duct (left)(1).



Right hand side

1. Remove the instrument upper panel assembly. Refer to IP-11, "Component Parts".
2. Remove the screw (A) and clip (B), and then remove the side ventilator duct (right)(1).

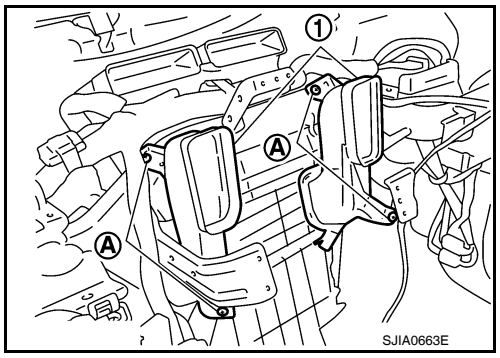


Installation
Installation is in the reverse order of removal.

CENTER VENTILATOR DUCTS

Removal

1. Remove the center console assembly. Refer to IP-12, "Removal and Installation".
2. Remove the instrument panel and pad assembly. Refer to IP-12, "Removal and Installation".
3. Remove the screws (A), and then remove the center ventilator ducts (1).



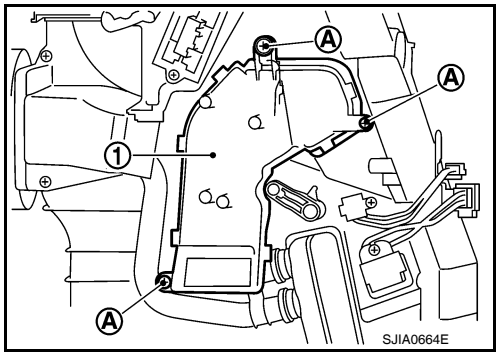
Installation
Installation is in the reverse order of removal.

SIDE FOOT DUCTS

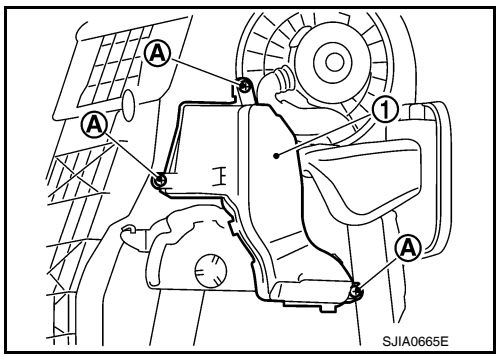
NOTE:
The side foot ducts are part of the A/C unit assembly.

Removal

1. Remove the instrument panel and pad assembly. Refer to IP-12, "Removal and Installation".
2. Remove screws (A), and then remove the side foot duct (LH) (1).



3. Remove screws (A), and then remove side foot duct (RH) (1).



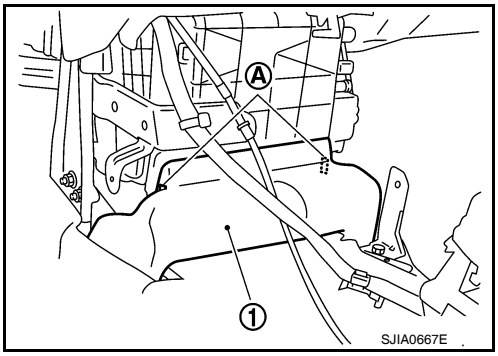
Installation
Installation is in the reverse order of removal.

FLOOR DUCTS (IF EQUIPPED)

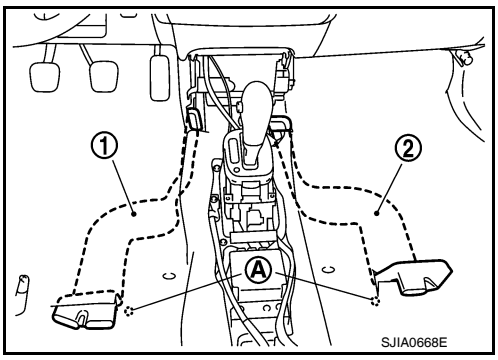
Removal

1. Remove the front seats. Refer to SE-14, "Removal and Installation".
2. Remove the center console assembly. Refer to IP-12, "Removal and Installation".

3. Disengage pawls (A), and then remove the front floor duct (1).



4. Peel back floor trim to a point where the floor duct is visible.
5. Remove the clips (A), and then remove the rear floor duct (left) (1) and rear floor duct (right) (2).



Installation
Installation is in the reverse order of removal.

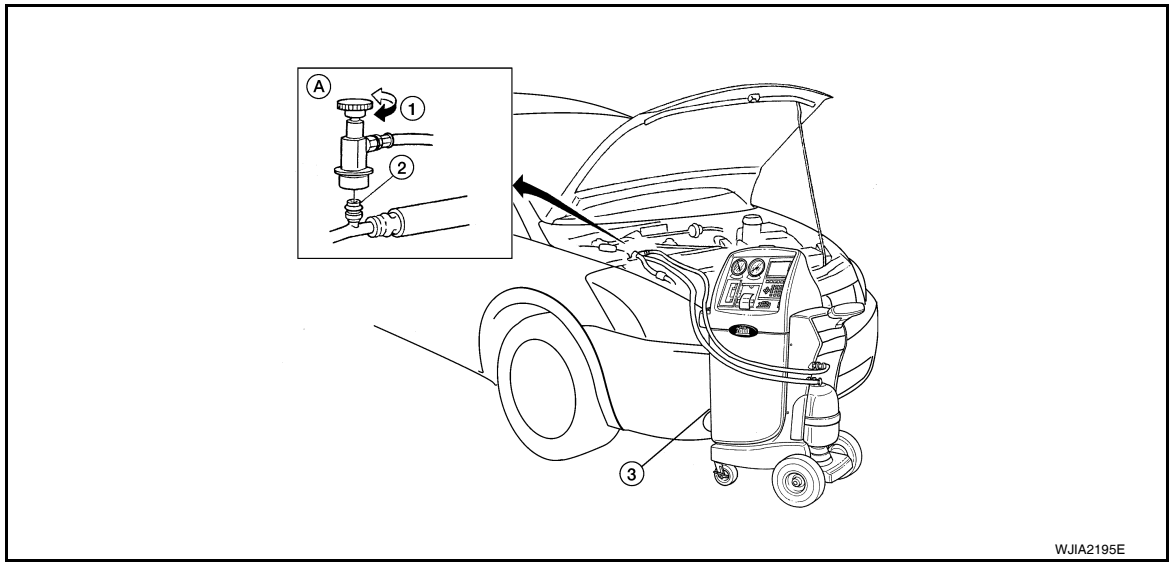
REFRIGERANT LINES

HFC-134a (R-134a) Service Procedure

INFOID:0000000007329099

SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant



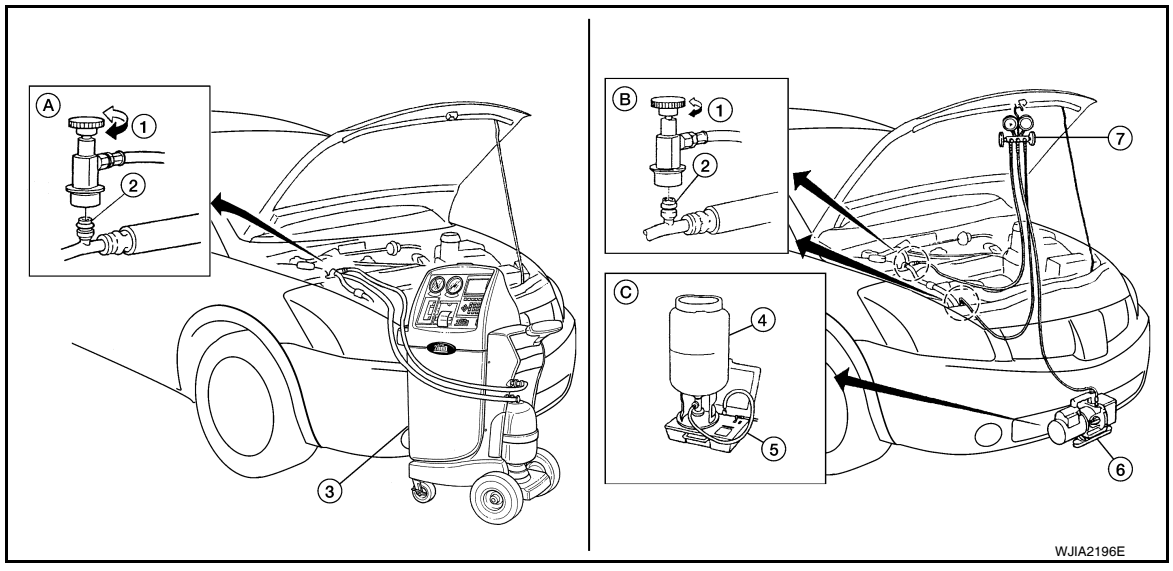
1. Shut-off valve
2. A/C service valve
3. Recovery/recycling equipment

A. Preferred (best) method

WARNING:

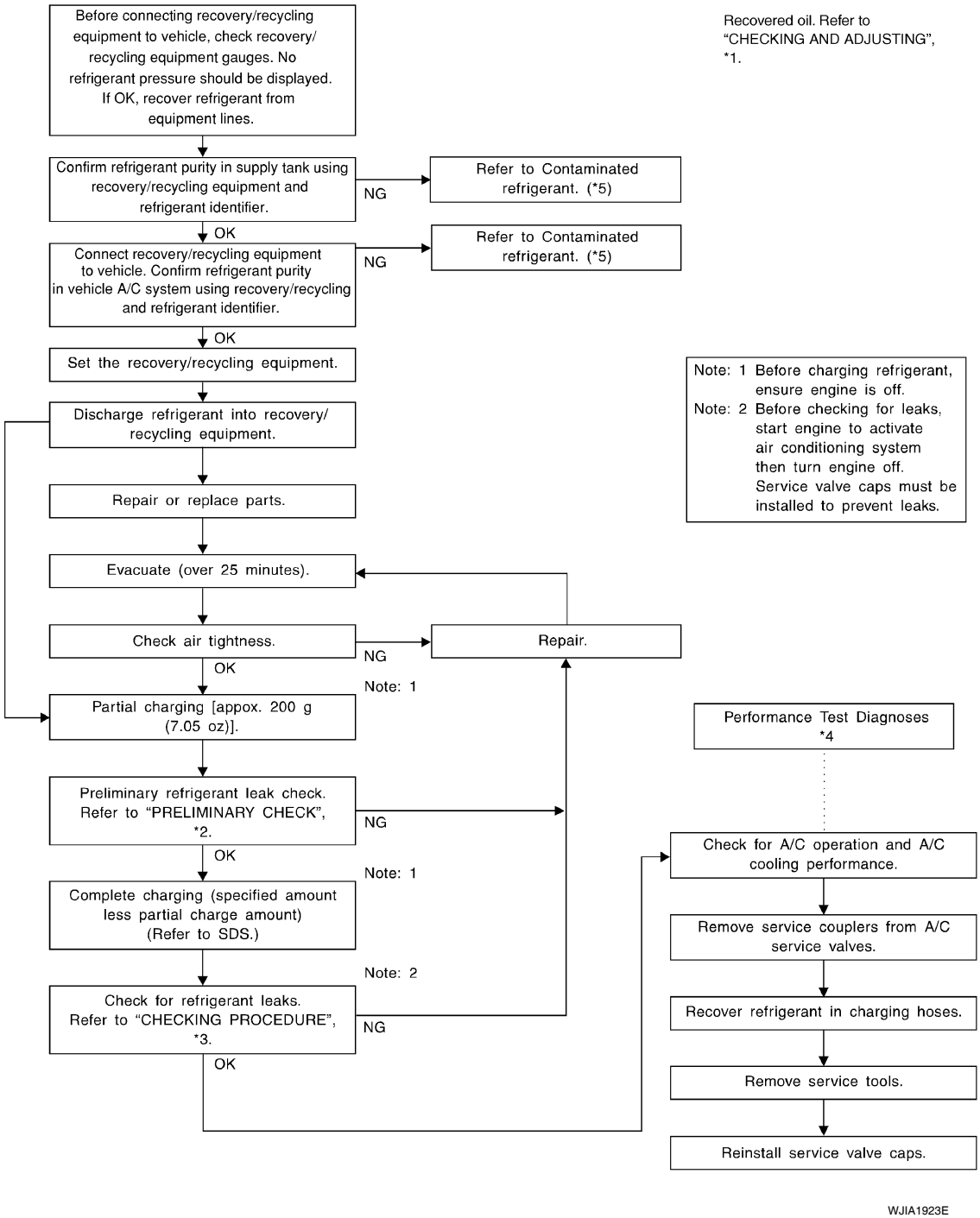
Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) refrigerant from the A/C system using certified service equipment meeting requirements of SAE J2210 HFC-134a (R-134a) recycling equipment or SAE J2201 HFC-134a (R-134a) recovery equipment. If an accidental system discharge occurs, ventilate the work area before resuming service. Additional health and safety information may be obtained from the refrigerant and oil manufacturers.

Evacuating System and Charging Refrigerant



1. Shut-off valve
2. A/C service valve
3. Recovery/recycling equipment
4. Refrigerant container (HFC-134a)
5. Weight scale (J-39650)
6. Evacuating vacuum pump (J-39699)

7. Manifold gauge set (J-39183) A. Preferred (best) method B. Alternative method
C. For charging

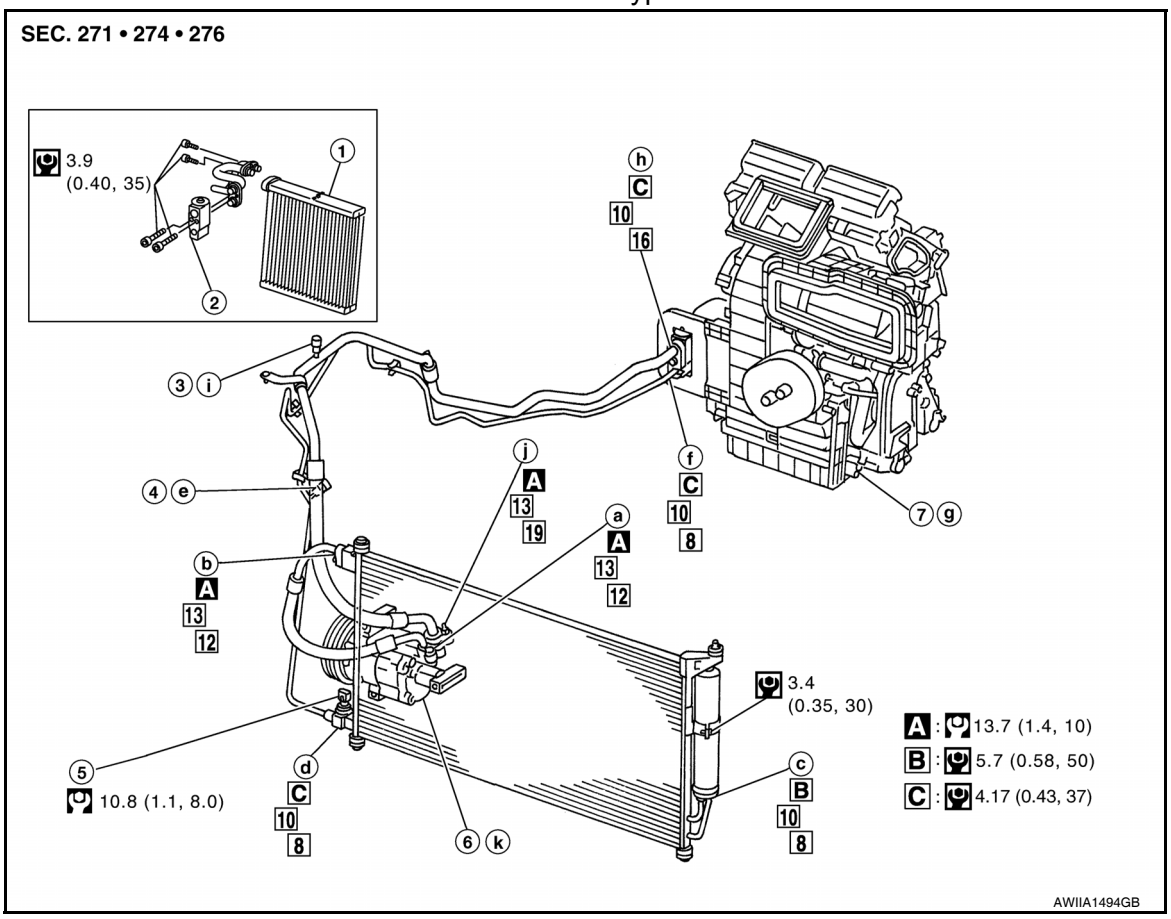


*1 MTC-17, "Maintenance of Oil Quantity in Compressor" *2 MTC-89, "Checking of Refrigerant Leaks" *3 MTC-90, "Electronic Refrigerant Leak Detector"
*4 MTC-46, "Insufficient Cooling"

Component

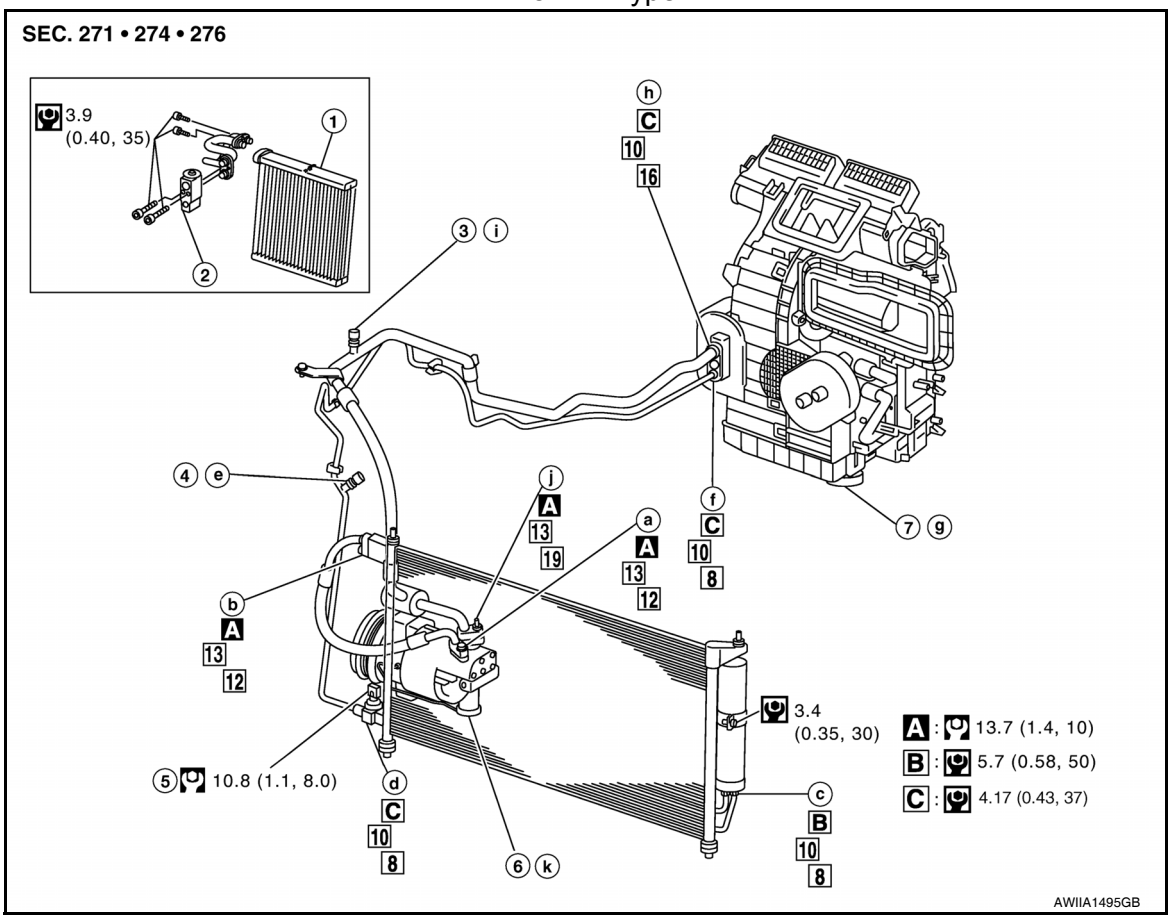
INFOID:0000000007329100

MR18DE - Type 1



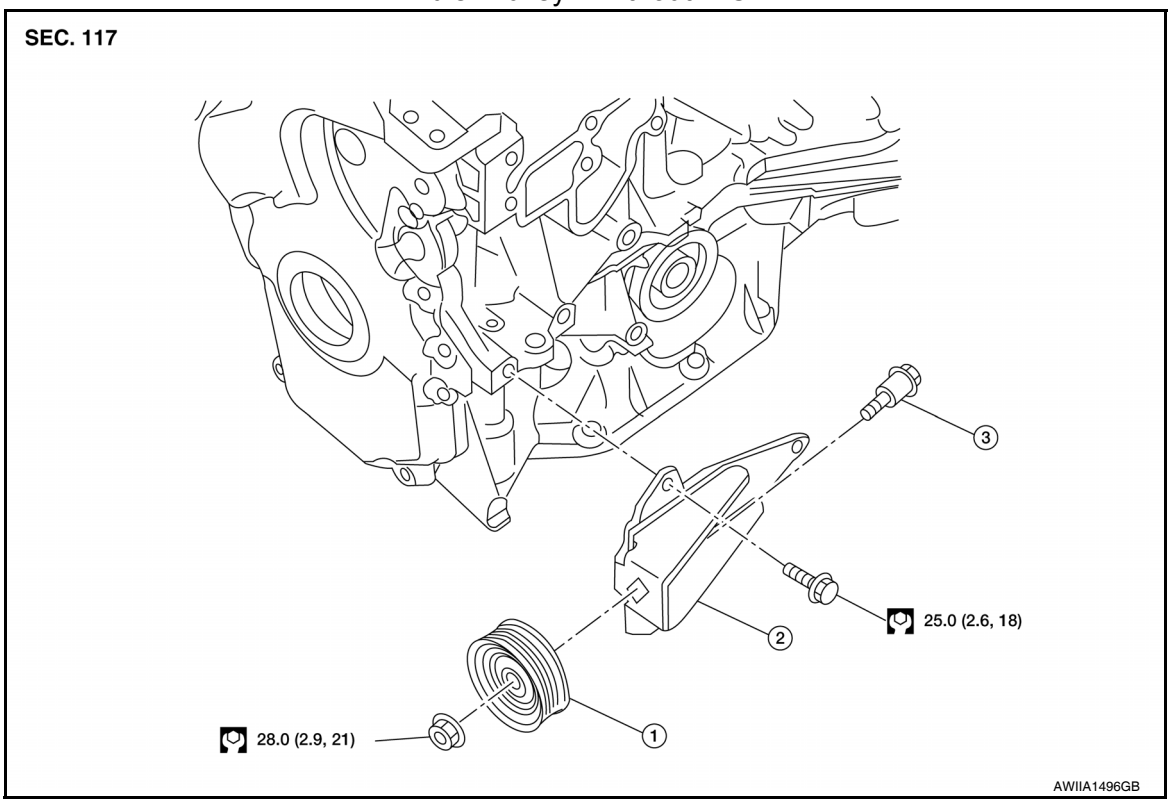
1. Evaporator
2. Expansion valve
3. Low-pressure service valve
4. High-pressure service valve
5. Refrigerant pressure sensor
6. Shaft seal
7. Drain hose

MR18DE - Type 2



1. Evaporator
2. Expansion valve
3. Low-pressure service valve
4. High-pressure service valve
5. Refrigerant pressure sensor
6. Shaft seal
7. Drain hose

Idler Pulley - Without A/C

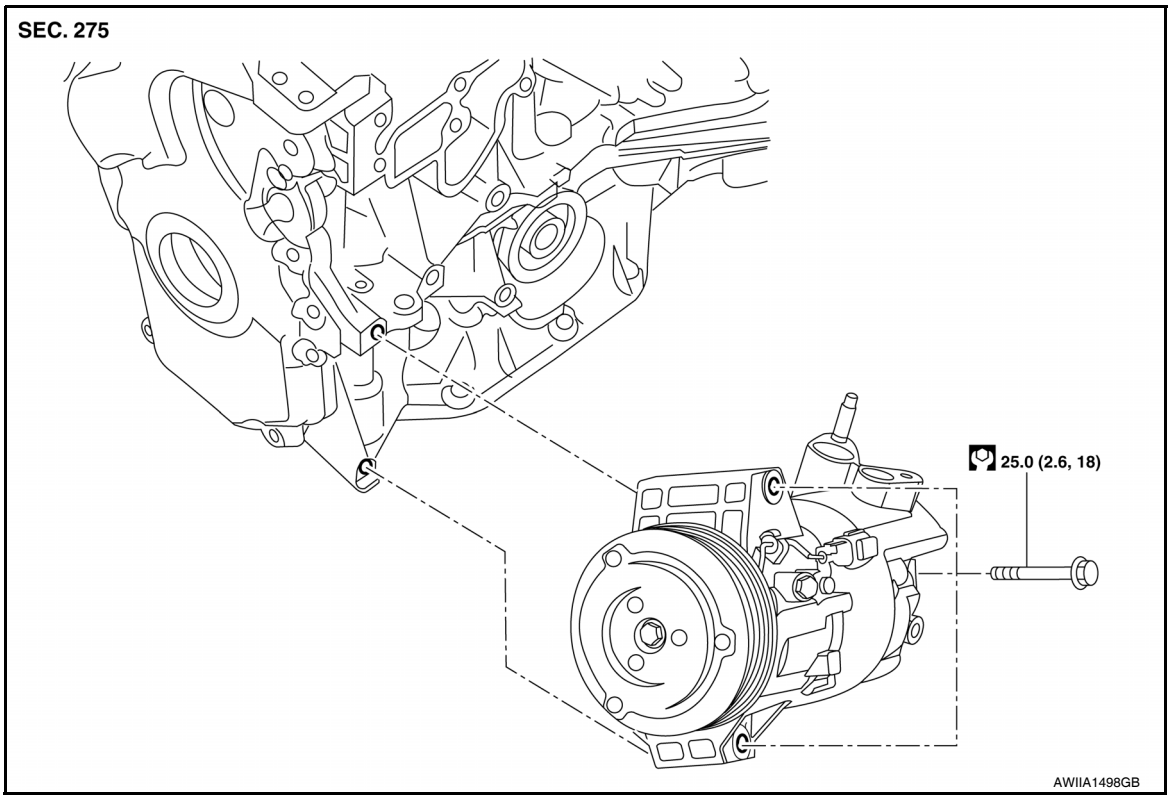


1. Idler pulley
2. Bracket
3. Shaft

Refer to MTC-5, "Precaution for Refrigerant Connection".

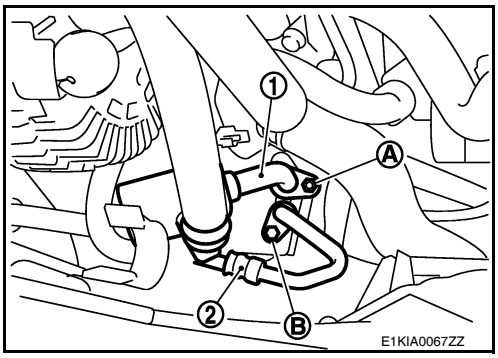
Removal and Installation of Compressor

INFOID:0000000007329102

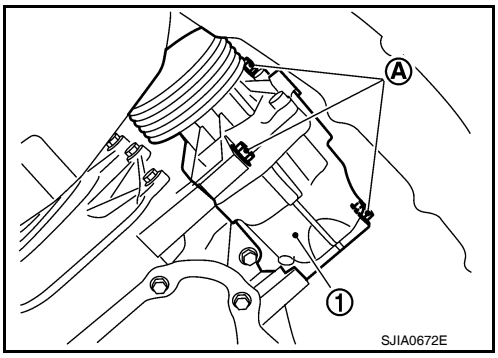


REMOVAL

1. Use the recovery/recycling equipment to evacuate the refrigerant. Refer to MTC-75, "HFC-134a (R-134a) Service Procedure".
2. Remove the nut (A) for the low-pressure flexible hose (1) and the bolt (B) for the high-pressure flexible hose (2) and remove the hoses from the compressor.
   CAUTION:
   Cap or wrap the joint of compressor, low-pressure flexible hose and high-pressure flexible hose with suitable material such as vinyl tape to avoid the entry of air.



3. Remove the engine undercover, using power tools.
4. Remove the A/C compressor belt. Refer to EM-13, "Removal and Installation".
5. Disconnect the compressor connector.
6. Remove the bolts (A) from the compressor (1), using power tools.
7. Remove the compressor (1), moving downward from the engine compartment.

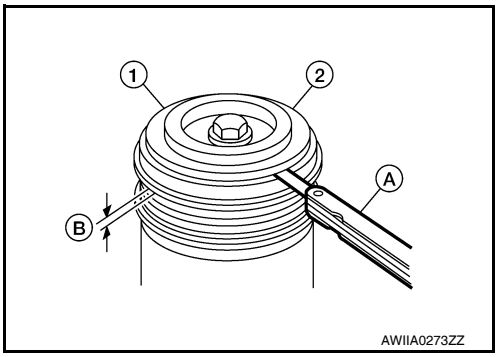


INSPECTION FOR CLUTCH DISC TO PULLEY CLEARANCE

1. Check the clearance (B) around the entire periphery of the clutch disc (1) and pulley (2) using a suitable tool (A) as shown.

   Clutch disc to pulley clearance (B) : 0.3 - 0.6 mm (0.012 - 0.024 in)

2. If specified clearance (B) is not obtained, replace compressor.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the low-pressure flexible hose and high-pressure flexible hose for installation.**
- **When recharging refrigerant, check for leaks. Refer to MTC-89, "Checking of Refrigerant Leaks".**

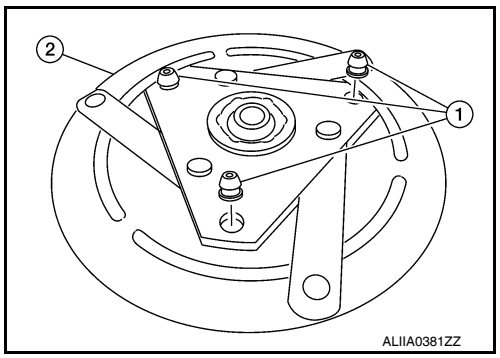
Removal and Installation for Compressor Clutch

INFOID:0000000007329104

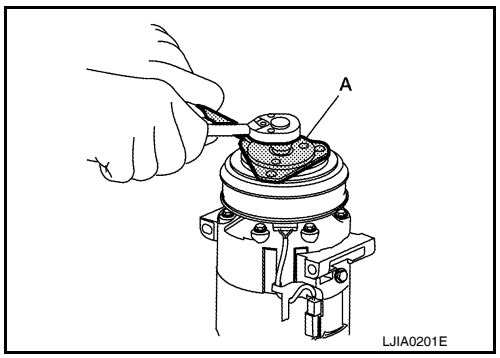
REMOVAL

1. Remove the compressor. Refer to MTC-79, "Removal and Installation of Compressor".

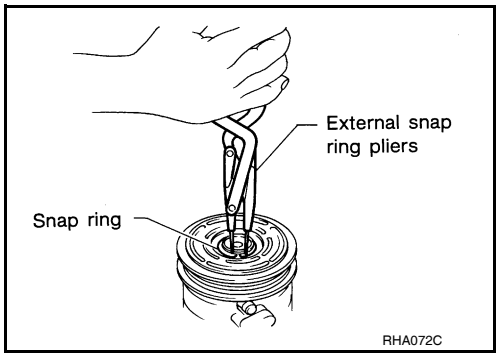
2. Remove the three rubber plugs (1) from the clutch disc (2). To ease removal, apply some light lubricant to the three rubber plugs (1).
NOTE:
The three rubber plug holes are used for attaching the suitable tool when removing and installing the center bolt.



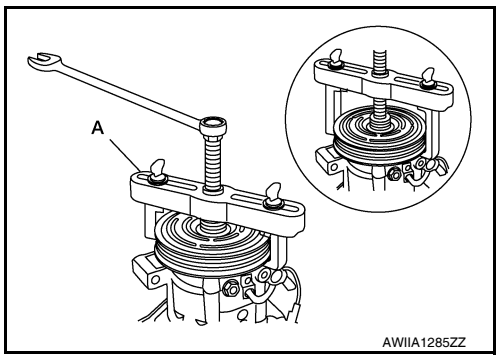
3. Remove the center bolt by holding the clutch disc steady using a suitable tool (A).
4. Remove the clutch disc and shim(s).



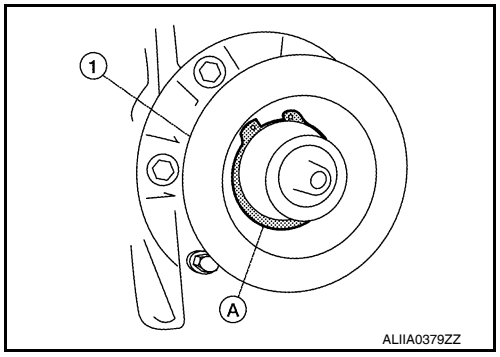
5. Remove the snap ring using external snap ring pliers.



6. Remove the pulley assembly using suitable tool (A).
CAUTION:
To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.



7. Remove the magnet coil snap ring (A) using a suitable tool. Then remove the magnet coil (1) from compressor shaft.



INSPECTION AFTER REMOVAL

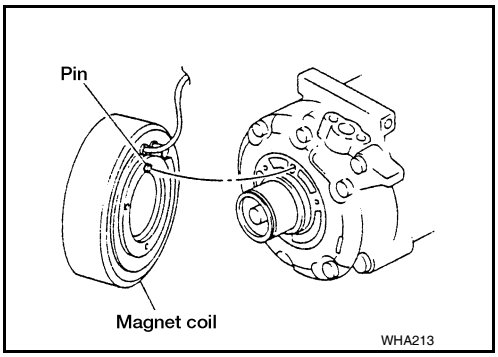
Clutch Disc
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley
Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving, replace the clutch disc and pulley. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before installation.

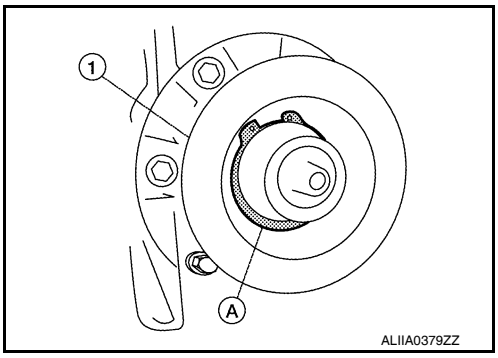
Coil
Check the magnet coil for a loose connection or cracked insulation.

INSTALLATION

1. Install the magnet coil.
   CAUTION:
   Be sure to align the magnet coil pin with the hole in the compressor front head.

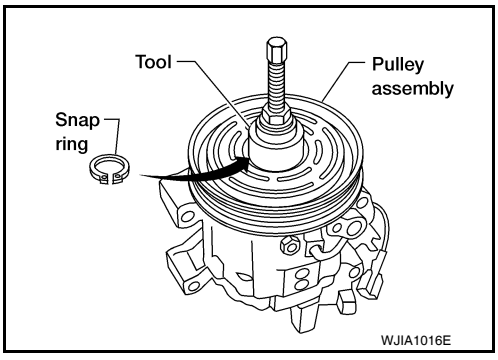


2. Install the magnet coil (1) on compressor shaft with the snap ring (A) using suitable tool.



3. Install the pulley assembly using Tool and a wrench, and then install the snap ring using snap ring pliers.

   Tool number : — (J-38873-A)

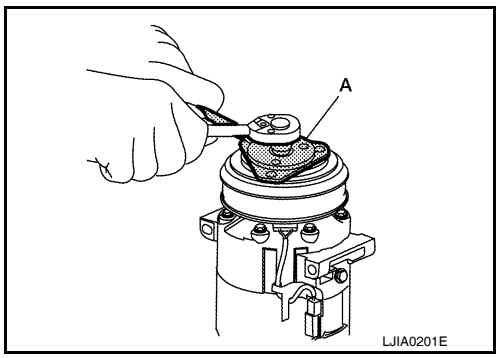


4. Install the clutch disc on the drive shaft, together with the original shim(s) using a suitable tool. Press the clutch disc down using Tool.

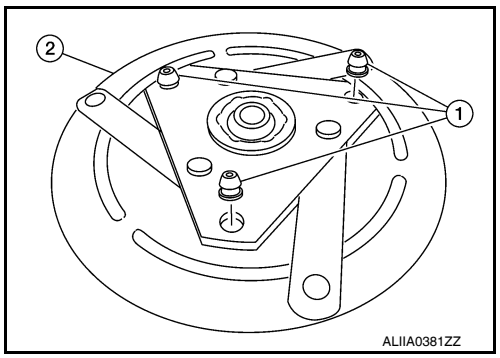
5. Install the center bolt using suitable tool (A).

Center bolt : 12 N·m (1.2 kg-m, 9 ft-lb).

- After tightening the center bolt to specification, check that the pulley rotates smoothly.



6. Install the three runner plugs (1) on the clutch disc (2). To ease installation apply some light lubricant to the three rubber plugs (1).

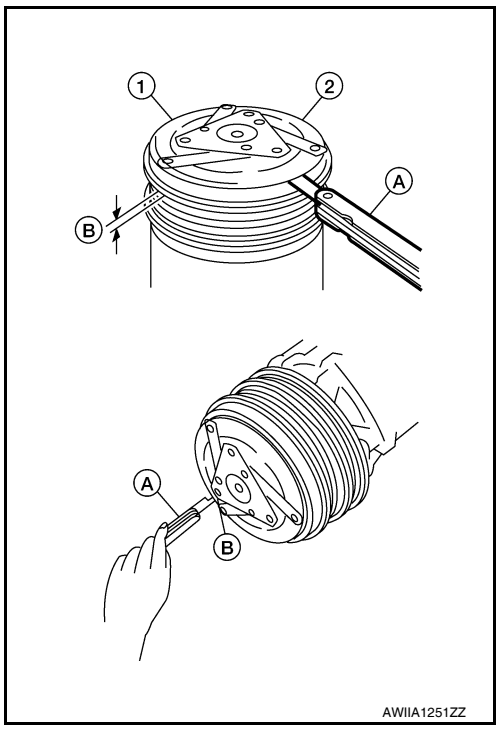


INSPECTION OF CLUTCH DISC TO PULLEY CLEARANCE

1. Check the clearance around the entire periphery of the clutch disc (1) and pulley (2) using a suitable tool (A).

Clutch disc to pulley clearance (B) : 0.3 - 0.6 mm (0.012 - 0.024 in)

- Measure the clearance for the type 1 compressor as shown.



2. If specified clearance is not obtained, replace compressor clutch.

BREAK-IN OPERATION

When replacing compressor clutch assembly, always conduct the break-in operation. This is done by engaging and disengaging the clutch about 30 times. Break-in operation raises the level of transmitted torque.

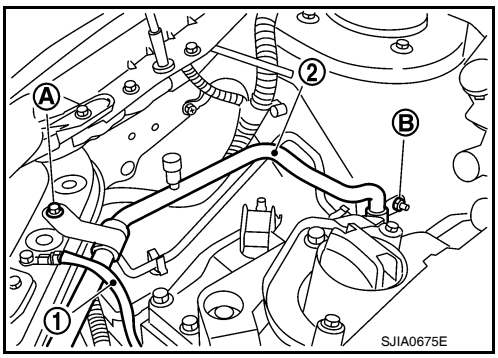
Removal and Installation of Low-Pressure Flexible Hose

INFOID:0000000007329105

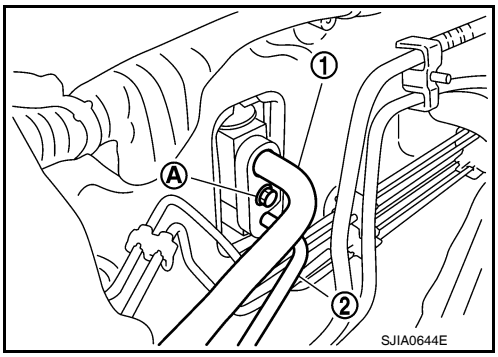
REMOVAL

1. Use the recovery/recycling equipment to evacuate the refrigerant.

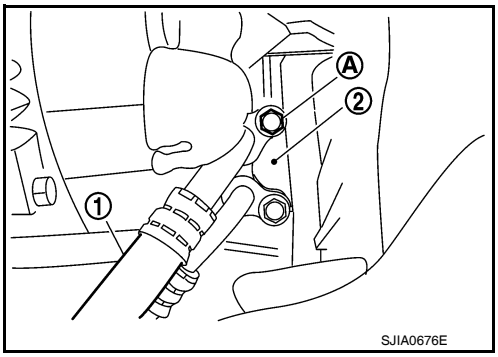
2. Remove the engine cover (MR18DE only).
3. Remove the cowl top cover (MR18DE only). Refer to EI-22, "Removal and Installation".
4. Remove the lower dash insulator.
5. Remove the ground wire harness (1).
6. Remove the bolt (A) and nut (B) from the low-pressure flexible hose (2) bracket.



7. Remove the bolt (A), and then disconnect the low-pressure flexible hose (1) and high-pressure pipe (2).
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



8. Remove the nut (A), and then remove the low-pressure flexible hose (1) from compressor (2).
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



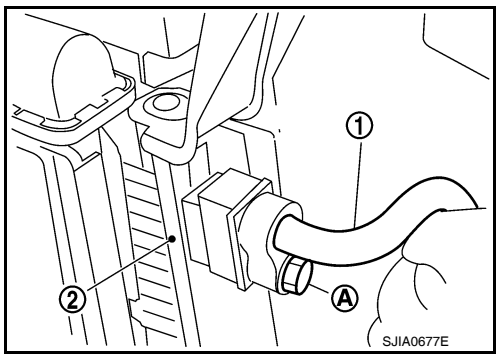
INSTALLATION
Installation is in the reverse order of removal.
CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Flexible Hose

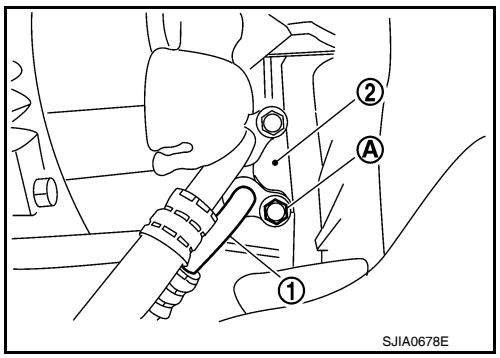
INFOID:0000000007329106

REMOVAL
1. Use the recovery/recycling equipment to evacuate the refrigerant.

2. Remove the high-pressure flexible hose (1) bolt (A) from condenser (2).



3. Remove the bolt (A), and then remove the high-pressure flexible hose (1) from compressor (2).
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



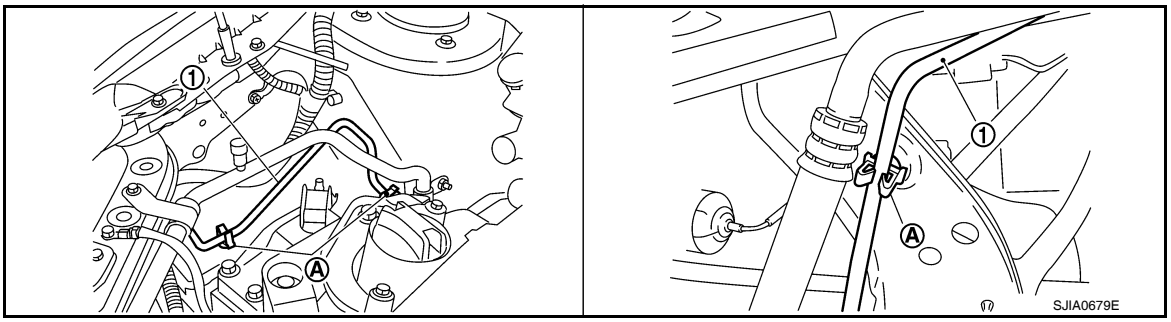
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the high-pressure flexible hose for installation.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Pipe

INFOID:0000000007329107

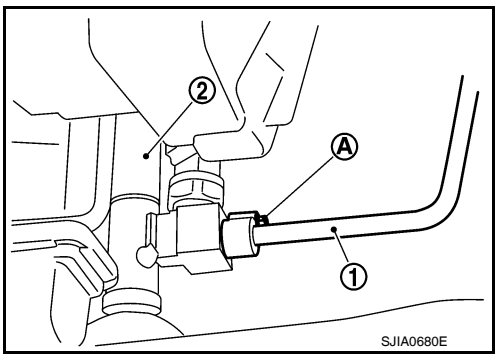


1. High-pressure pipe
A. High-pressure pipe clips

REMOVAL

1. Remove the low-pressure flexible hose. Refer to MTC-83, "Removal and Installation of Low-Pressure Flexible Hose".
2. Remove the high-pressure pipe from the clips.

3. Remove the high-pressure pipe bolt (A), and then remove high-pressure pipe (1) from condenser (2).
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

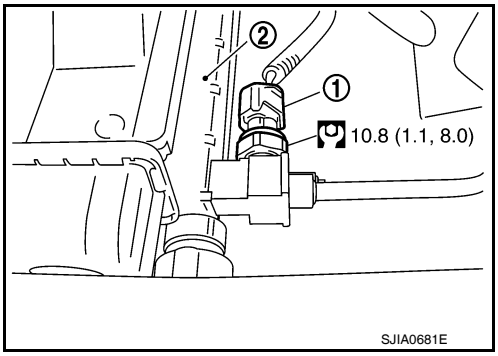


INSTALLATION
Installation is in the reverse order of removal.
CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the high-pressure pipe for installation.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Refrigerant Pressure Sensor

INFOID:0000000007329108

REMOVAL
1. Use the recovery/recycling equipment to evacuate the refrigerant.
2. Remove the engine undercover. Refer to EI-15, "Removal and Installation".
3. Disconnect the connector, and then remove the refrigerant pressure sensor (1) from condenser (2).
CAUTION:
When working, be careful not to damage the condenser fins.



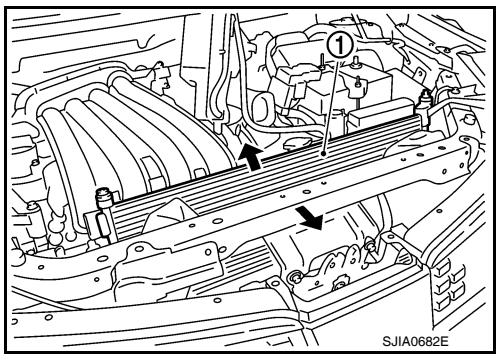
INSTALLATION
Installation is in the reverse order of removal.
CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the refrigerant pressure sensor for installation.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Condenser

INFOID:0000000007329109

REMOVAL
1. Remove the three upper head lamp bolts to reposition the head lamps out of the way.
2. Remove the air duct. Refer to EM-16, "Removal and Installation".
3. Remove the high-pressure flexible hose and high-pressure pipe from condenser. Refer to MTC-84, "Removal and Installation of High-Pressure Flexible Hose" and MTC-85, "Removal and Installation of High-Pressure Pipe".
CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
4. Disconnect the refrigerant pressure sensor connector.

5. Tilt the radiator toward rear of vehicle, and then remove the condenser (1) from in between the radiator and the radiator core support upper.
CAUTION:
Be careful not to damage the core surface of condenser and radiator.

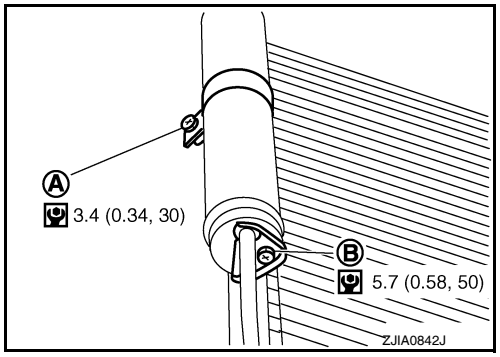


INSTALLATION
Installation is in the reverse order of removal.
CAUTION:
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **When recharging refrigerant, check for leaks.**

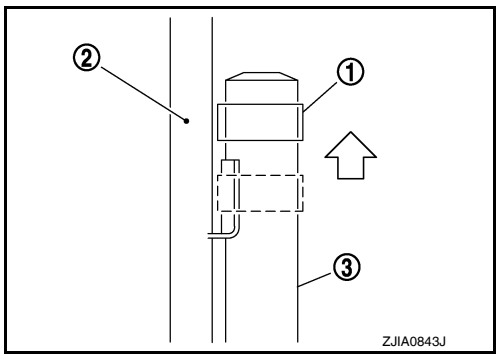
Removal and Installation of Liquid Tank

INFOID:0000000007329110

REMOVAL
1. Remove the condenser. Refer to MTC-86, "Removal and Installation of Condenser".
2. Clean the liquid tank and its surrounding area, and remove dirt and rust from liquid tank.
CAUTION:
Be sure to clean carefully.
3. Remove the bolts (A) and (B) from liquid tank.



4. Remove the liquid tank bracket (1) from protruding part of condenser (2).
5. Slide the liquid tank (3) upward, and then remove the liquid tank (3).

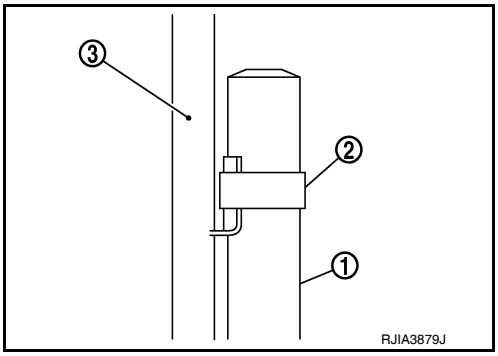


INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Make sure liquid tank bracket (2) is securely installed at protrusion of condenser (3). [Make sure liquid tank bracket (2) does not move to a position below center of liquid tank (1).]**
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **When recharging refrigerant, check for leaks. Refer to MTC-89, "Checking of Refrigerant Leaks".**

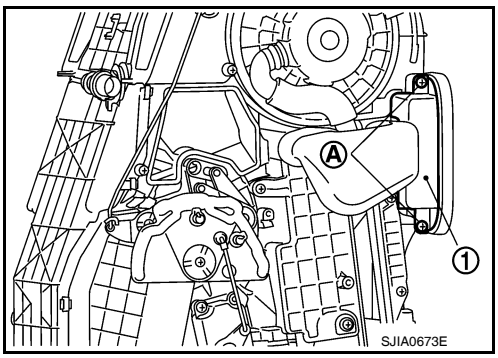


Removal and Installation of Evaporator

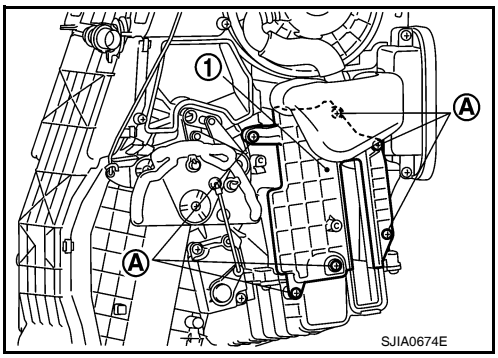
INFOID:0000000007329111

REMOVAL

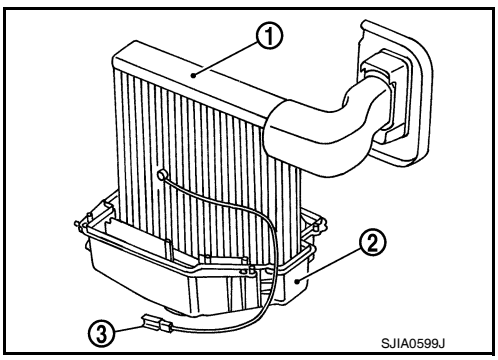
1. Remove the A/C unit assembly. Refer to MTC-59, "Removal and Installation".
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
2. Remove the foot duct (right). Refer to MTC-70, "Removal and Installation".
3. Remove the screws (A), and then remove the expansion valve cover (1).



4. Remove the screws (A), and then remove the evaporator cover (1).



5. Remove the evaporator (1) with lower blower case (2) from the A/C unit assembly.
6. Mark the position of the thermo control amp. if reusing the evaporator and then remove thermo control amp. (3) from evaporator (1).
7. Remove the evaporator (1) from lower blower case (2).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**

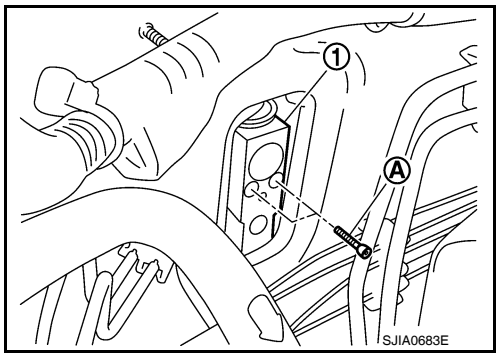
- **Apply A/C oil to the O-rings of the A/C piping for installation.**
- **If reusing the evaporator, install the thermo control amp. at the position marked when removing the thermo control amp.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Expansion Valve

INFOID:0000000007329112

REMOVAL

1. Use the recovery/recycling equipment to evacuate the refrigerant.
2. Remove the lower dash insulator.
3. Disconnect the low-pressure flexible hose and high-pressure pipe from evaporator. Refer to MTC-59, "Removal and Installation".
4. Remove the expansion valve bolts (A), and then remove expansion valve (1).
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-rings.**
- **Apply A/C oil to the O-rings of the evaporator for installation.**
- **When recharging refrigerant, check for leaks.**

Checking of Refrigerant Leaks

INFOID:0000000007329113

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C oil leakage, damage and corrosion. A/C oil leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electronic refrigerant leak detector or fluorescent dye leak detector.

If dye is observed, confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.

When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 25 to 50 mm (1 to 2 in) per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

Checking System for Leaks Using the Fluorescent Leak Detector

INFOID:0000000007329114

1. Check A/C system for leaks using the UV lamp and safety goggles J-42220 in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner J-43872 to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and oils, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

Dye Injection

INFOID:0000000007329115

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

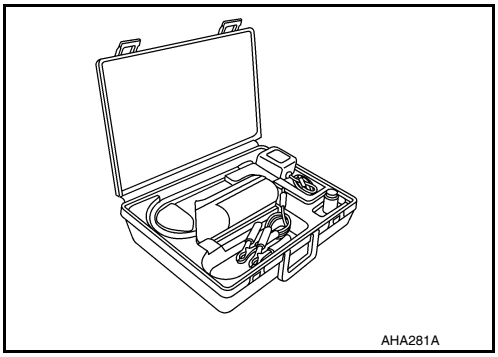
1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.45 bar, 3.52 kg/cm^2, 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool J-41459.
3. Connect the injector tool to the A/C low-pressure side service fitting.
4. Start engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool J-41459 (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service fitting.
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

Electronic Refrigerant Leak Detector

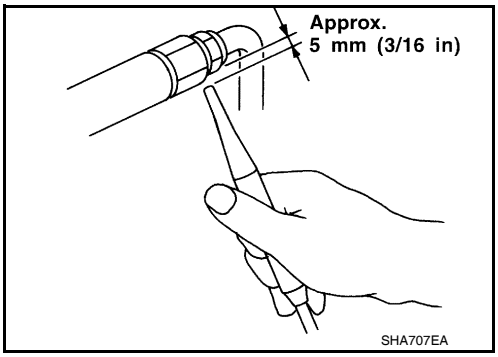
INFOID:0000000007329116

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use an A/C electrical leak detector (SST) or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

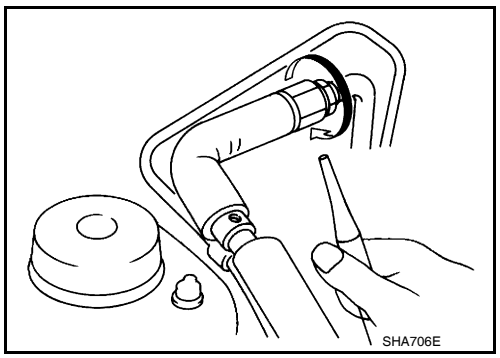

AHA281A

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.

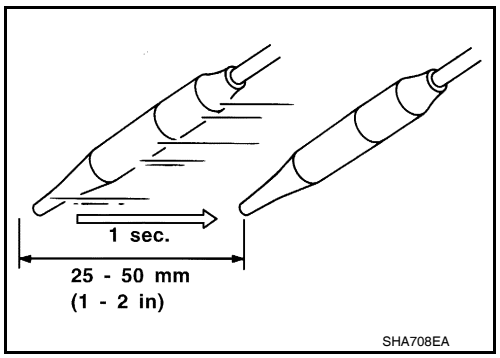


SHA707EA

2. When testing, circle each fitting completely with probe.



3. Move probe along component approximately 25 to 50 mm (1 to 2 in) per second.



CHECKING PROCEDURE

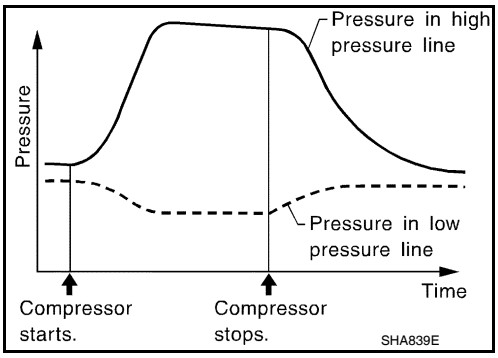
To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine OFF.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.45 bar, 3.52 kg/cm^2, 50 psi) above 16°C. If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.
   NOTE:
   At temperatures below 16°C, leaks may not be detected since the system may not reach 345 kPa (3.45 bar, 3.52 kg/cm^2, 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet f) to the low-pressure side (evaporator drain hose g to shaft seal k). Refer to MTC-77, "Component". Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.
   - Compressor
     Check the fitting of high- and low-pressure flexible hoses, relief valve and shaft seal.
   - Condenser
     Check the fitting of high-pressure flexible hose and pipe, refrigerant pressure sensor.
   - Liquid tank
     Check the refrigerant connection.
   - Service valves
     Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
     NOTE:
     After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
   - Cooling unit (Evaporator)
     With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
     Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.
5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.

6. Do not stop when one leak is found. Continue to check for additional leaks at all system components. If no leaks are found, perform steps 7-10.
7. Start engine.
8. Set the heater A/C control as follows;

a. A/C switch: ON
b. Mode control dial position: VENT (Ventilation)
c. Intake door lever position: Recirculation
d. Max. cold temperature
e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.
    Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling equipment to vehicle, check recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines.
12. Discharge A/C system using approved refrigerant recovery/recycling equipment. Repair the leaking fitting or component if necessary.
13. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
14. Perform A/C performance test to ensure system works properly.

SERVICE DATA AND SPECIFICATIONS (SDS)

Compressor

INFOID:0000000007329117

Application		TYPE 1	TYPE 2
Compressor model		Calsonic Kansei make CR-10	Calsonic Kansei make CSV511
Type		Vane rotary	Variable displacement swash plate
Displacement cm^3 (in^3) / revolution	maximum	96 (5.86)	105 (6.41)
Cylinder bore × stroke mm (in)	maximum	—	34.8 (1.37) × 22.1 (0.87)
Direction of rotation		Clockwise (viewed from drive end)	
Drive belt		Poly-V Ribbed 6-Groove	

Oil

INFOID:0000000007329118

Application		TYPE 1	TYPE 2
Compressor model		Calsonic Kansei make CR-10	Calsonic Kansei make CSV511
Type		NISSAN A/C System Oil Type R	NISSAN A/C System Oil Type S
Capacity m ℓ (US fl oz, Imp fl oz)	Total in system	120 (4.1, 4.2)	100 (3.4, 3.5)
	Compressor (service part) charging amount	Refer to MTC-17, "Maintenance of Oil Quantity in Compressor" .	Refer to MTC-17, "Maintenance of Oil Quantity in Compressor" .

Refrigerant

INFOID:0000000007329119

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.45 ± 0.05 (0.99 ± 0.11)

SECTION SC
STARTING & CHARGING SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329881

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329882

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

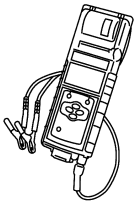
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Special Service Tool

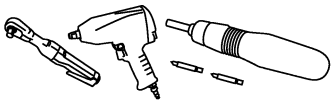
INFOID:0000000007329883

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station	 AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.
— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer	 JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tool

INFOID:0000000007329884

Tool name		Description
Power tool	 PIIB1407E	Loosening bolts, screws and nuts

BATTERY

How to Handle Battery

INFOID:0000000007784197

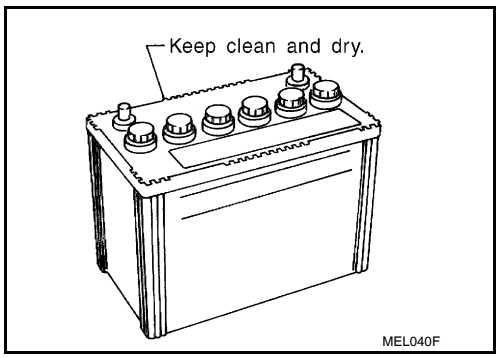
CAUTION:

- **If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.**
- **After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.**
- **Never add distilled water through the hole used to check specific gravity.**

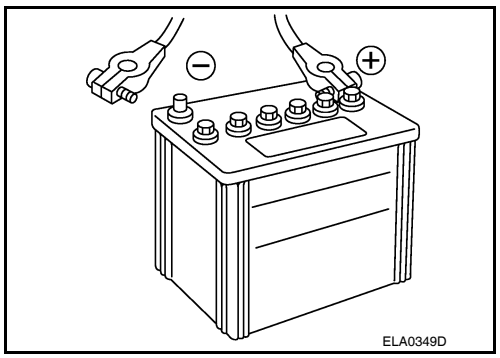
METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level.
  This also applies to batteries designated as “low maintenance” and “maintenance-free”.



- When the vehicle is not going to be used over a long period of time, disconnect the battery cable from the negative terminal. (If the vehicle has an extended storage switch, turn it off.)



Work Flow

INFOID:0000000007784198

BATTERY DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

To diagnose and confirm the condition of the battery, use the following special service tools:

- EXP-800 NI Battery and electrical diagnostic analyzer
- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the applicable Instruction Manual for proper battery diagnosis procedures.

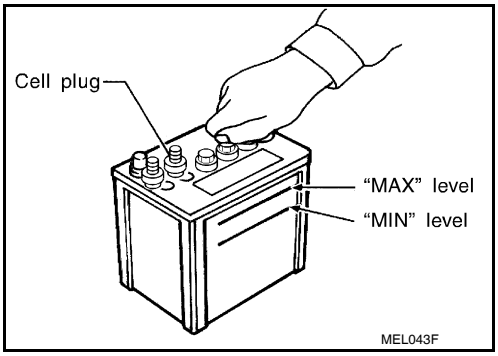
BATTERY DIAGNOSIS WITHOUT EXP-800 NI OR GR8-1200 NI

Checking Electrolyte Level

WARNING:

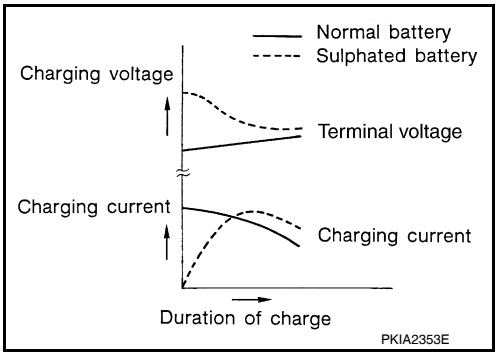
Never allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, never touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention. Failure to do this may cause personal injury or damage to clothing or the painted surfaces.

- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



SULFATION

- **A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulfation on the cell plates.**
- **To determine if a battery has been "sulfated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulfated batteries.**
- **A sulfated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.**



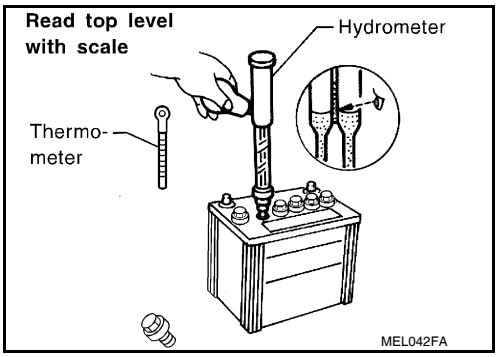
Specific Gravity Check

NOTE:

Check the charge condition of the battery.

Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

1. Read hydrometer and thermometer indications at eye level.
2. Use the chart below to correct your hydrometer reading according to electrolyte temperature.



Hydrometer Temperature Correction

Battery electrolyte temperature [°C (°F)]	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (130)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	–0.004
16 (60)	–0.008
10 (50)	–0.012

Battery electrolyte temperature [°C (°F)]	Add to specific gravity reading
4 (40)	−0.016
−1 (30)	−0.020
−7 (20)	−0.024
−12 (10)	−0.028
−18 (0)	−0.032

Corrected specific gravity	Approximate charge condition
1.260 - 1.280	Fully charged
1.230 - 1.250	3/4 charged
1.200 - 1.220	1/2 charged
1.170 - 1.190	1/4 charged
1.140 - 1.160	Almost discharged
1.110 - 1.130	Completely discharged

Charging The Battery

CAUTION:

- **Never “quick charge” a fully discharged battery.**
- **Keep the battery away from open flame while it is being charged.**
- **When connecting the charger, connect the leads first, then turn on the charger. Never turn on the charger first, as this may cause a spark.**
- **If battery electrolyte temperature rises above 55 °C (131 °F), stop charging. Always charge battery at a temperature below 55 °C (131 °F).**

Charging Rates (Standard Charge)

Approximate charge condition	Charge current (A)	Charge time (h)
Fully charged	7	2
3/4 charged		2.5
1/2 charged		5
1/4 charged		7.5
Almost discharged		9
Completely discharged		10

Charging Rates (Quick Charge)

Approximate charge condition	Charge current (A)	Charge time (h)
Fully charged	—	—
3/4 charged	16	0.5
1/2 charged	33	
1/4 charged		
Almost discharged		
Completely discharged	—	—

NOTE:

The ammeter reading on your battery charger will automatically decrease as the battery charges. This indicates that the voltage of the battery is increasing normally as the state of charge improves. The charging amps indicated above refer to initial charge rate.

- If, after charging, the specific gravity of any two cells varies more than 0.050, the battery should be replaced.

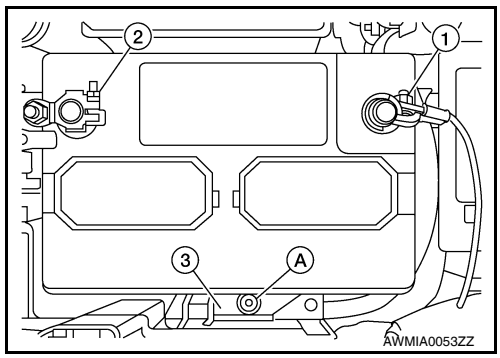
Removal and Installation

INFOID:0000000007329887

EQUIPPED WITH M/T OR A/T

Removal

1. Disconnect battery negative (1) and positive (2) terminals.
   CAUTION:
   Disconnect the battery negative terminal first.
2. Remove battery hold-down wedge bolt (A) and remove battery hold-down wedge bracket (3).
3. Remove battery cover.
4. Remove battery.



Installation
Installation is in the reverse order of removal.
CAUTION:
Connect the battery positive terminal first.

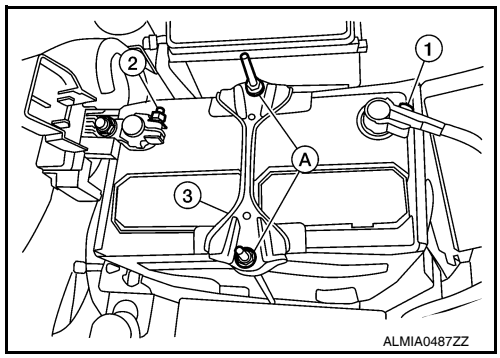
Battery wedge bracket bolt	**: 14.2 N·m (1.4 kg-m, 10 ft-lb)**
Battery terminal nut	**: 5.4 N·m (0.55 kg-m, 48 in-lb)**

Reset electronic systems as necessary. Refer to SC-8, "Required Procedure After Battery Disconnection".

EQUIPPED WITH CVT

Removal

1. Disconnect battery negative (1) and positive (2) terminals.
   CAUTION:
   Disconnect the battery negative terminal first.
2. Remove battery hold-down frame bolts (A) and remove battery hold-down frame (3).
3. Remove battery cover.
4. Remove battery.



Installation
Installation is in the reverse order of removal.
CAUTION:
Connect the battery positive terminal first.

Battery hold-down frame bolt	**: 14.2 N·m (1.4 kg-m, 10 ft-lb)**
Battery terminal nut	**: 5.4 N·m (0.55 kg-m, 48 in-lb)**

Reset electronic systems as necessary. Refer to SC-8, "Required Procedure After Battery Disconnection".

Required Procedure After Battery Disconnection

INFOID:0000000007329888

System	Item	Reference
Engine Control	Idle Air Volume Learning	EC-87
Glasses, Window System & Mirrors	Power Window System Initialization	GW-29
Roof	Sunroof Memory Reset/Initialization	RF-11
Audio, Visual, Navigation & Telephone	Audio (Radio Preset)	Refer to Owner's Manual.
	Navigation System	Refer to Owner's Manual.

STARTING SYSTEM

System Description

INFOID:0000000007329889

M/T Models

Power is supplied at all times
- to starter motor terminal B, and
- through 40A fusible link (letter **h**, located in the fuse and fusible link box)
- to ignition switch terminal B.

With the ignition switch in the START position, power is supplied
- from ignition switch terminal ST
- to IPDM E/R terminal 21.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse (No. 49, located in the IPDM E/R)
- to the clutch interlock switch terminal 1.

With the clutch pedal depressed, power is supplied
- through the clutch interlock switch terminal 2
- to IPDM E/R terminal 35.

Ground is supplied at all times
- to IPDM E/R terminals 39 and 59
- through body grounds E15 and E24.

If the IPDM E/R receives a starter relay request ON signal from the BCM over the CAN communication lines, the IPDM E/R grounds the starter relay and power is supplied
- through terminal 19 of the IPDM E/R
- to terminal S of the starter motor.

The starter motor magnetic switch energizes closing the circuit between the battery and the starter motor. The starter motor is case ground through the cylinder block. With power and ground supplied, the starter motor operates.

A/T Models

Power is supplied at all times
- to starter motor terminal B, and
- through 40A fusible link (letter **h**, located in the fuse and fusible link box)
- to ignition switch terminal B.

With the ignition switch in the START position, power is supplied
- from ignition switch terminal ST
- to IPDM E/R terminal 21.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse (No. 54, located in the IPDM E/R)
- to transmission range switch terminal 1.

With the selector lever in the P or N position, power is supplied
- through transmission range switch terminal 2
- to IPDM E/R terminal 35.

Ground is supplied at all times
- to IPDM E/R terminals 39 and 59
- through body grounds E15 and E24.

If the IPDM E/R receives a starter relay request ON signal from the BCM over the CAN communication lines, the IPDM E/R grounds the starter relay and power is supplied
- through terminal 19 of the IPDM E/R
- to terminal S of the starter motor.

The starter motor magnetic switch energizes closing the circuit between the battery and the starter motor. The starter motor is case ground through the cylinder block. With power and ground supplied, the starter motor operates.

CVT Models

Power is supplied at all times
- to starter motor terminal B, and
- through 40A fusible link (letter **h**, located in the fuse and fusible link box)
- to ignition switch terminal B.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse (No. 49, located in the IPDM E/R)

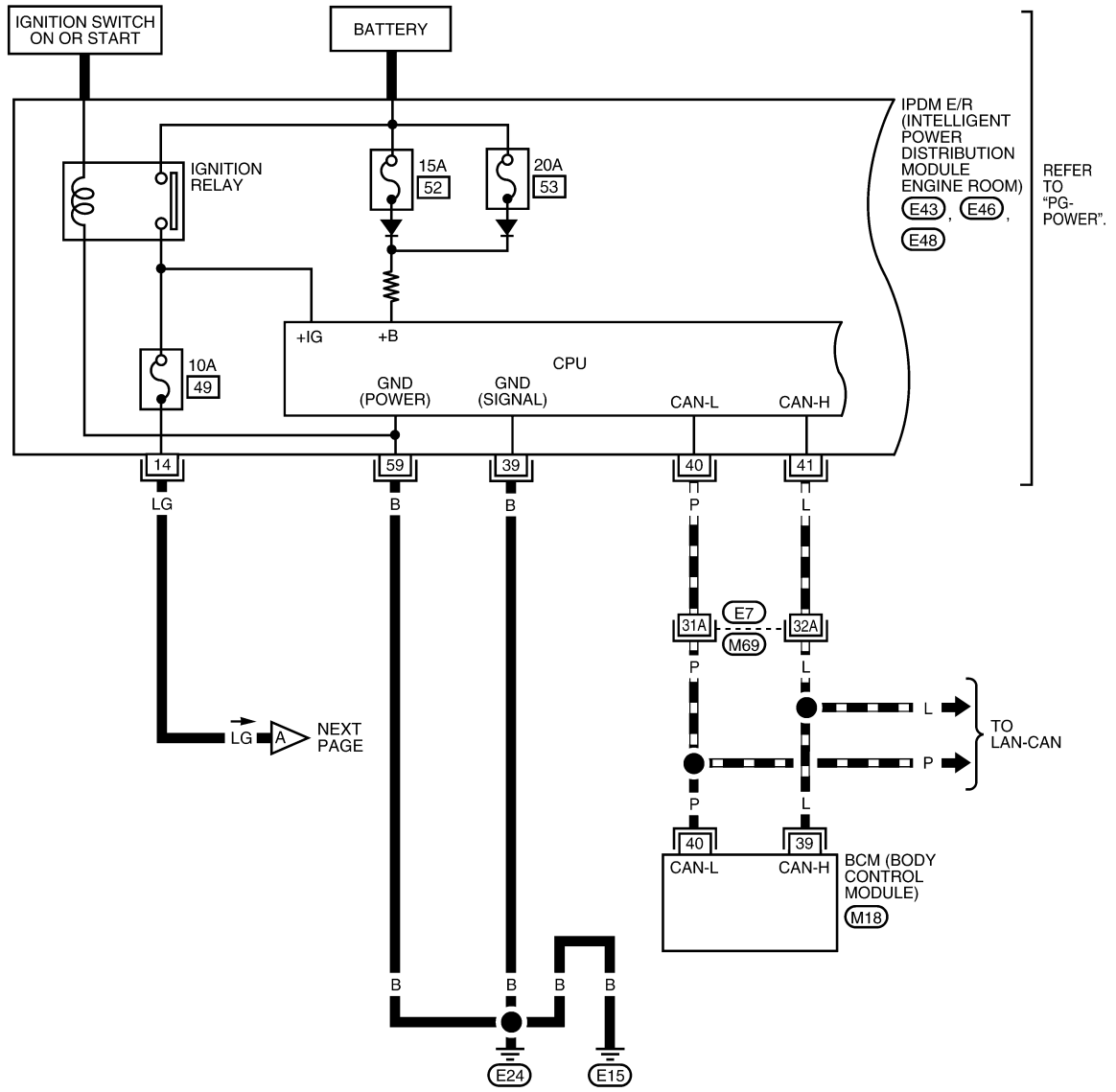
• to transmission range switch terminal 1.
With the selector lever in the P or N position, power is supplied
• through transmission range switch terminal 2
• to IPDM E/R terminal 35.
Ground is supplied at all times
• to IPDM E/R terminals 39 and 59
• through body grounds E15 and E24.
If the IPDM E/R receives a starter relay request ON signal from the BCM over the CAN network, the IPDM E/R grounds the starter relay and power is supplied
• through terminal 19 of the IPDM E/R
• to terminal S of the starter motor.
The starter motor magnetic switch energizes closing the circuit between the battery and the starter motor. The starter motor is case ground through the cylinder block. With power and ground supplied, the starter motor operates.

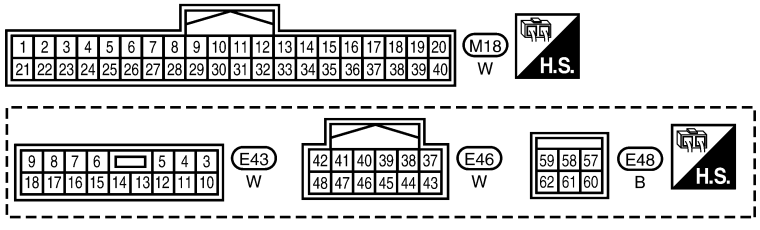
Wiring Diagram - START -

INFOID:0000000007329890

M/T Models

SC-START-01

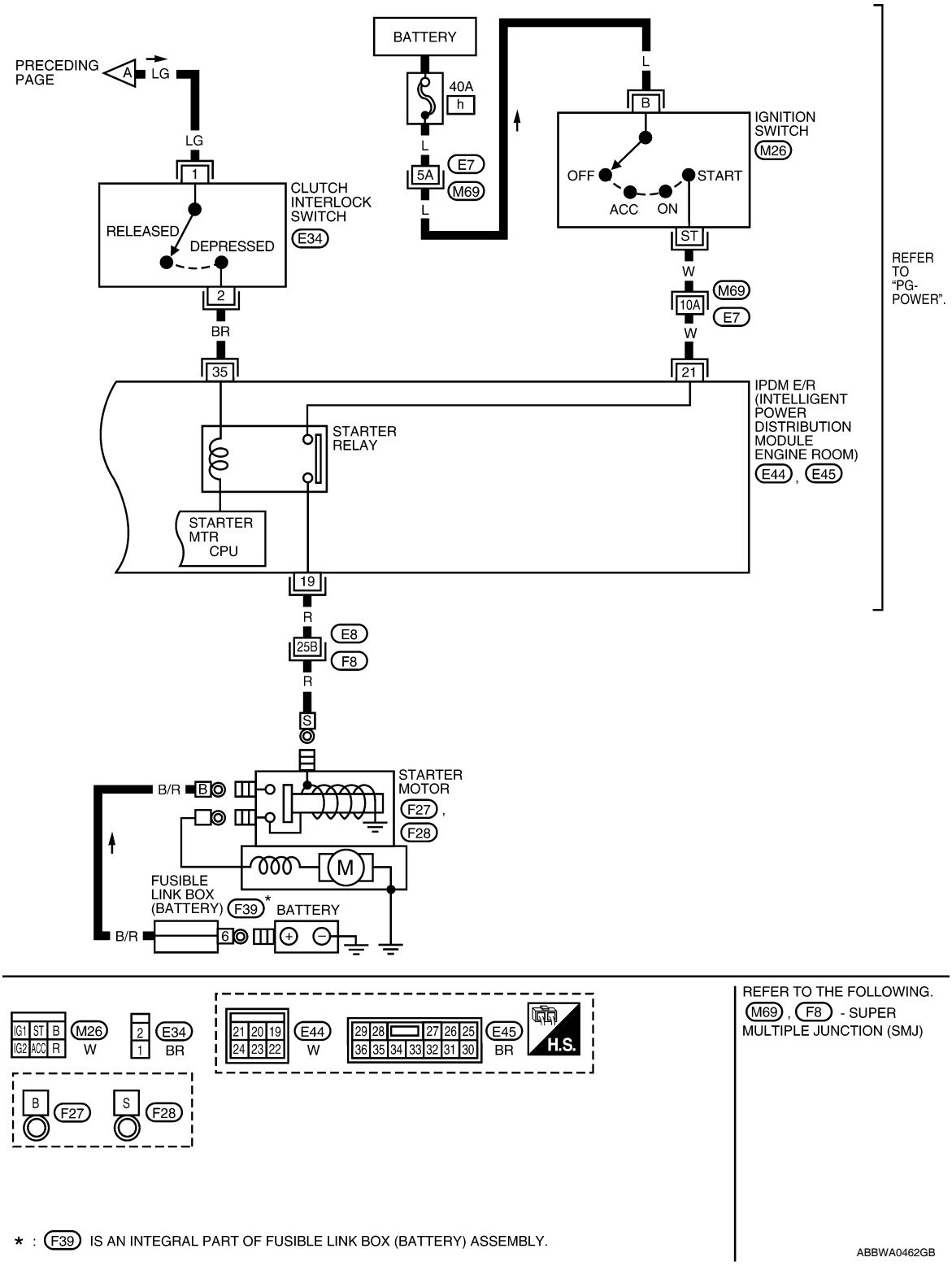




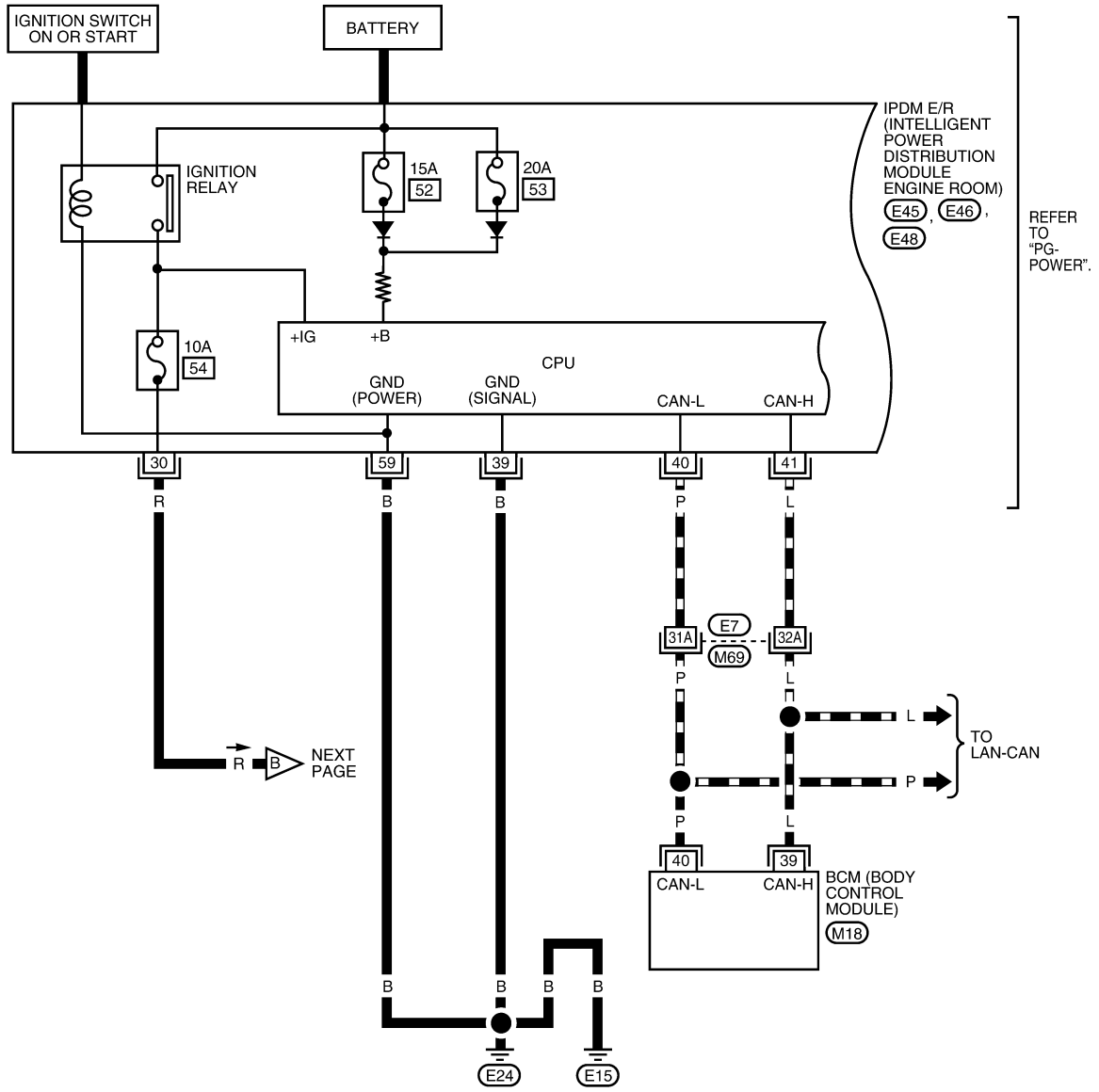
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

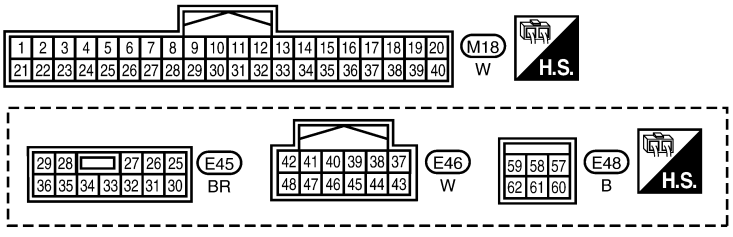
WKWA4964E

SC-START-02


PRECEDING PAGE
A
LG
BATTERY
40A
h
L
5A
E7
M69
L
B
IGNITION SWITCH
M26
OFF
START
ACC
ON
ST
W
M69
10A
E7
W
LG
1
CLUTCH INTERLOCK SWITCH
E34
RELEASED
DEPRESSED
2
BR
35
21
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E44
E45
STARTER RELAY
STARTER MTR CPU
19
R
25B
E8
F8
R
S
STARTER MOTOR
F27
F28
B/R
B
M
FUSIBLE LINK BOX (BATTERY)
F39
*
BATTERY
B/R
6
REFER TO "PG-POWER".
IG1 ST B
IG2 ACC R
M26
W
2
1
E34
BR
21 20 19
24 23 22
E44
W
29 28 27 26 25
36 35 34 33 32 31 30
E45
BR
H.S.
B
F27
S
F28
REFER TO THE FOLLOWING.
M69 , F8 - SUPER MULTIPLE JUNCTION (SMJ)
* : F39 IS AN INTEGRAL PART OF FUSIBLE LINK BOX (BATTERY) ASSEMBLY.
ABBWA0462GB

SC-START-03

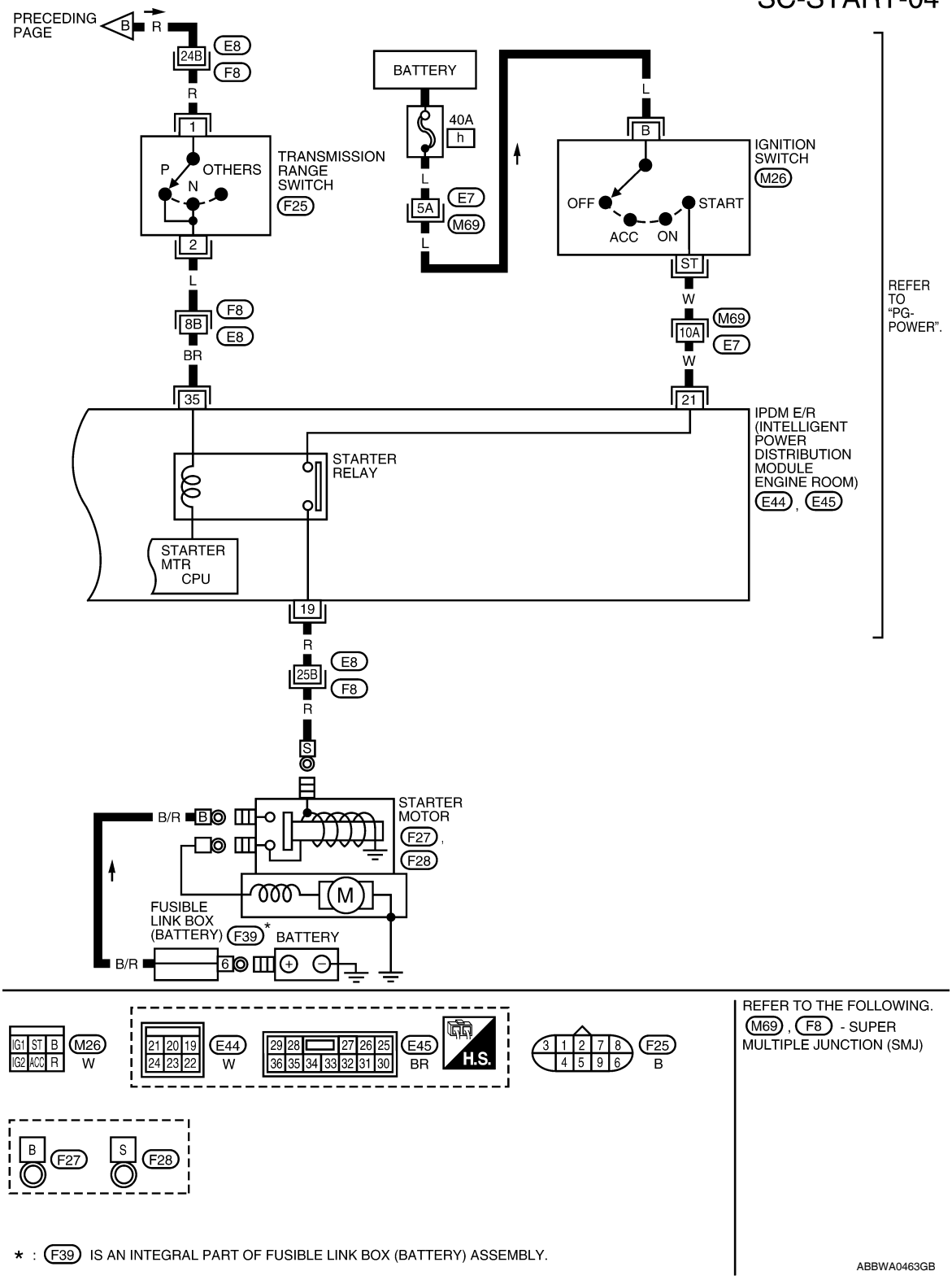




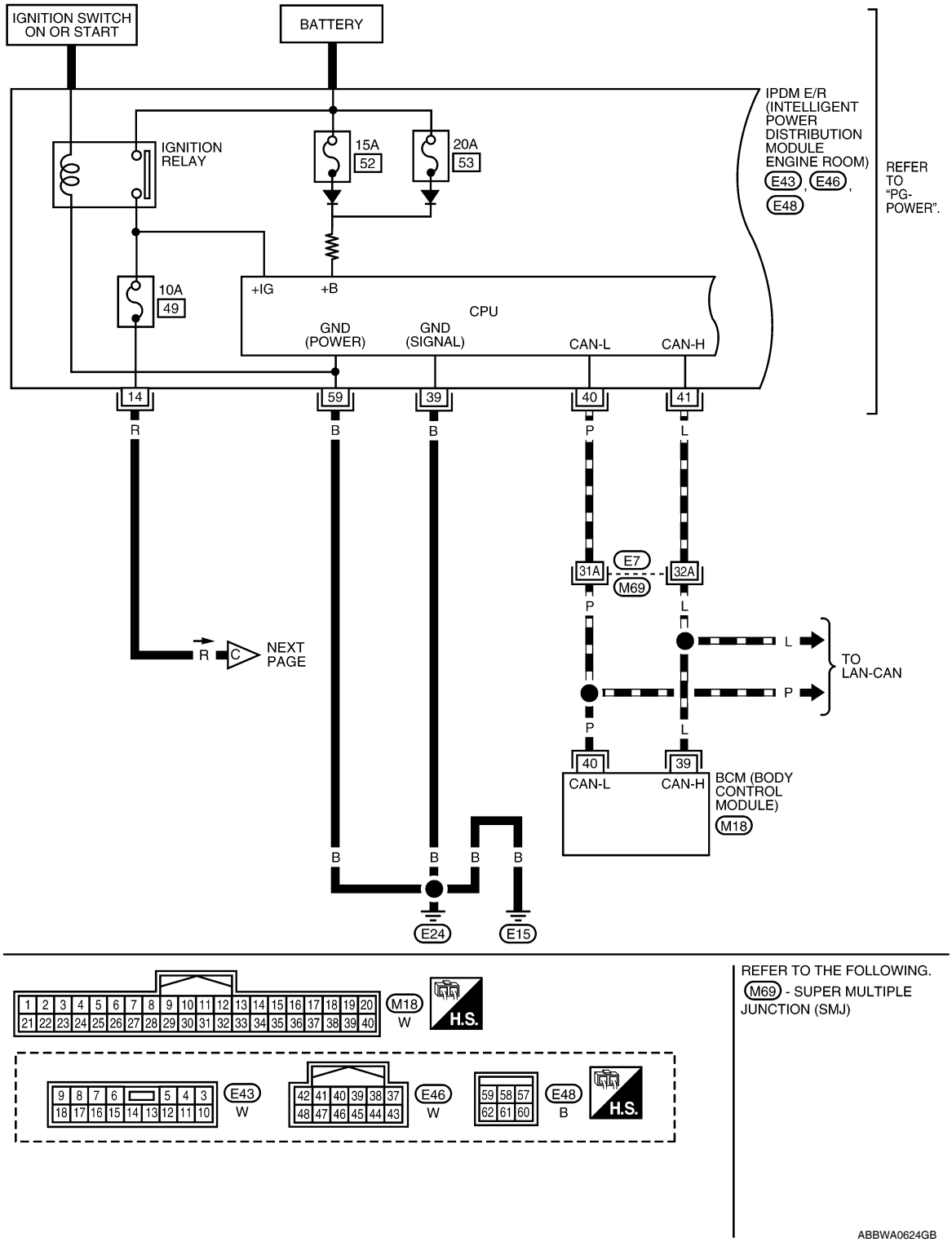
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

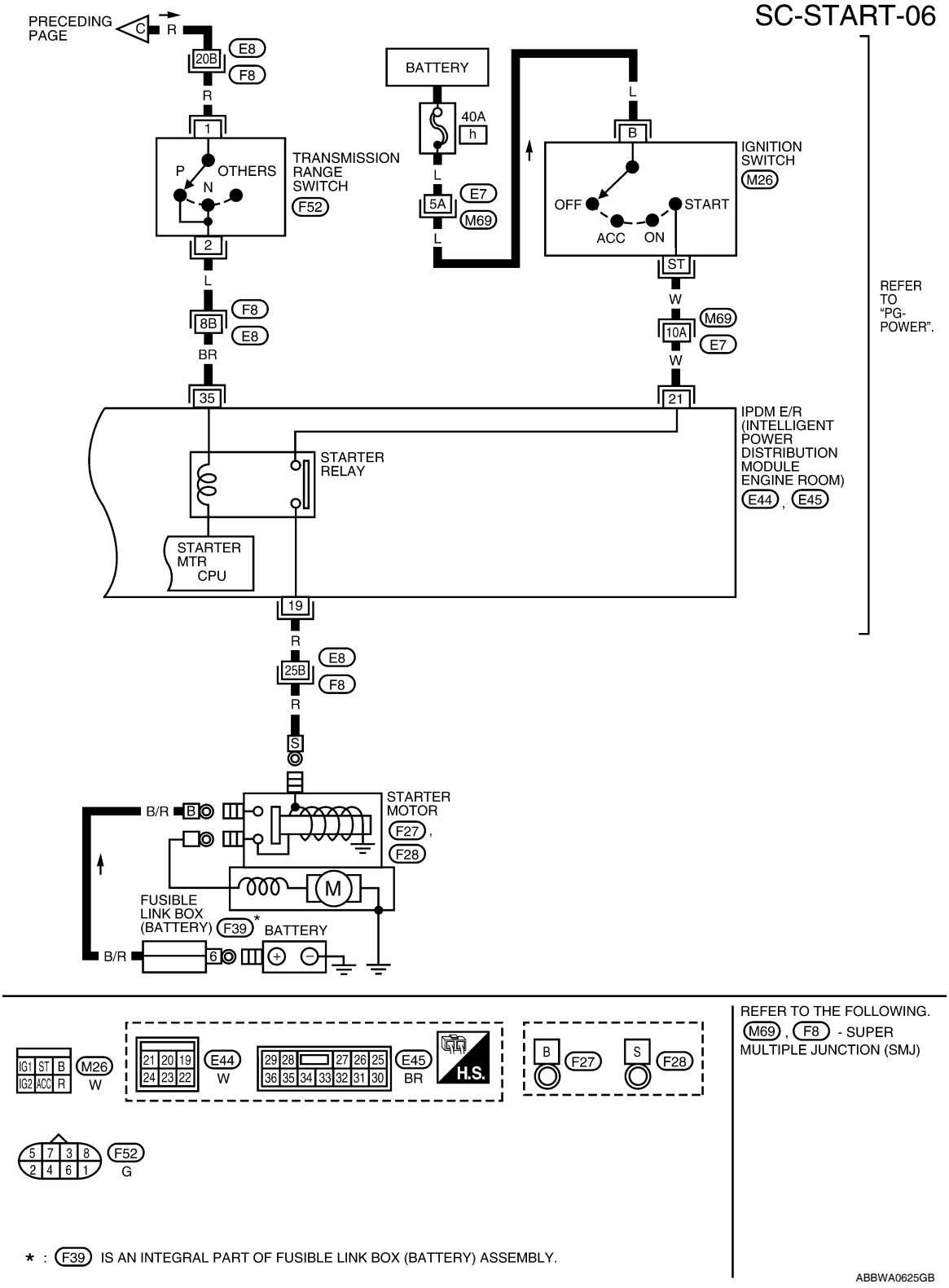
WKWA4966E

SC-START-04


PRECEDING PAGE
B
R
24B
E8
F8
R
1
P
OTHERS
N
2
TRANSMISSION RANGE SWITCH
F25
L
8B
F8
E8
BR
35
BATTERY
40A
h
L
5A
E7
M69
L
B
IGNITION SWITCH
M26
OFF
START
ACC
ON
ST
W
10A
M69
E7
W
21
REFER TO "PG-POWER".
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E44 , E45
STARTER RELAY
STARTER MTR CPU
19
R
25B
E8
F8
R
S
STARTER MOTOR
F27 ,
F28
B/R
B
M
FUSIBLE LINK BOX (BATTERY)
F39
*
BATTERY
B/R
6
IG1 ST B
IG2 ACC R
M26
W
21 20 19
24 23 22
E44
W
29 28 27 26 25
36 35 34 33 32 31 30
E45
BR
H.S.
3 1 2 7 8
4 5 9 6
F25
B
B
F27
S
F28
REFER TO THE FOLLOWING.
M69 , F8 - SUPER MULTIPLE JUNCTION (SMJ)
* : F39 IS AN INTEGRAL PART OF FUSIBLE LINK BOX (BATTERY) ASSEMBLY.
ABBWA0463GB

SC-START-05


IGNITION SWITCH ON OR START
BATTERY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E43, E46, E48
REFER TO "PG-POWER".
IGNITION RELAY
15A 52
20A 53
10A 49
+IG
+B
CPU
GND (POWER)
GND (SIGNAL)
CAN-L
CAN-H
14
59
39
40
41
R
B
B
P
L
E7
31A
32A
M69
NEXT PAGE
TO LAN-CAN
BCM (BODY CONTROL MODULE)
M18
E24
E15
M18 W
E43 W
E46 W
E48 B
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABBWA0624GB

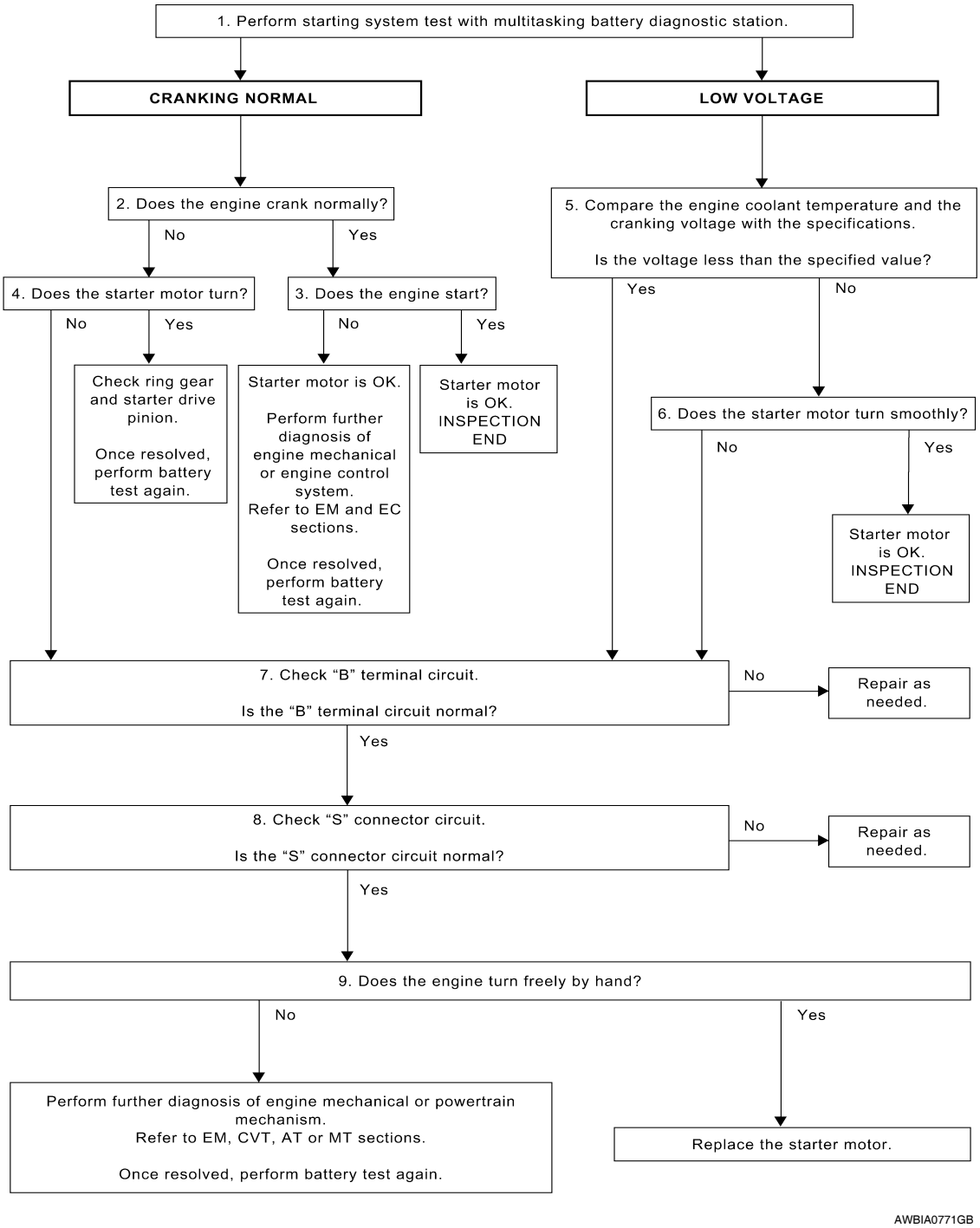


Trouble Diagnosis with Multitasking Battery Diagnostic Station

INFOID:0000000007329891

Refer to diagnostic station instruction manual.

WORK FLOW



AWBIA0771GB

DIAGNOSTIC PROCEDURE 1

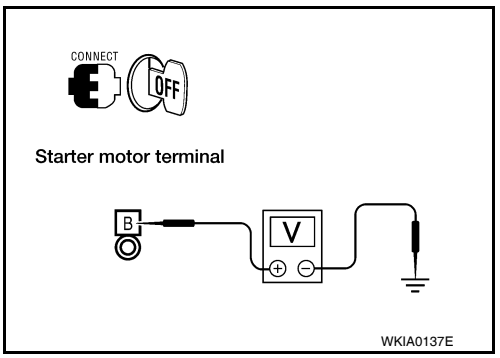
Check Starter Motor Circuit

1.CHECK POWER SUPPLY TO STARTER MOTOR

1. Remove the fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn the ignition switch OFF.
4. Check that the starter motor connector F27 connection is clean and tight.

5. Check voltage between starter motor connector F27 terminal B and ground using a digital circuit tester.

Battery voltage should exist



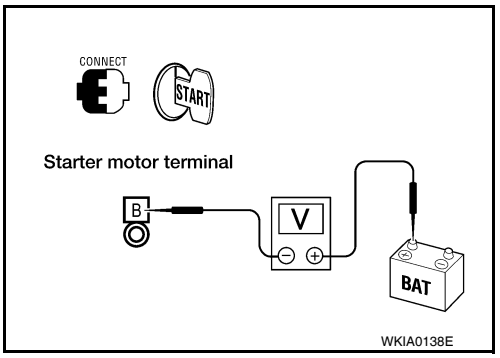
OK or NG

OK >> GO TO 2.
NG >> Check harness between the battery and the starter motor for open circuit.

2.CHECK VOLTAGE DROP ON STARTER MOTOR CIRCUIT

1. Check voltage between starter motor connector F27 terminal B and battery positive terminal using a digital circuit tester.

Ignition switch in START : Less than 0.2V



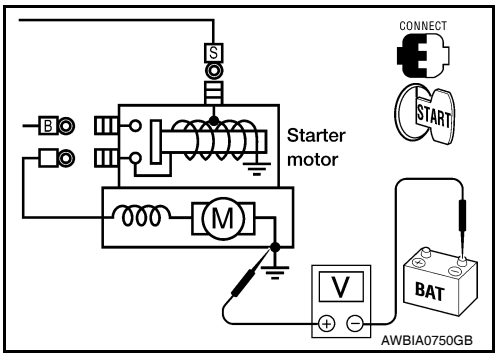
OK or NG

OK >> GO TO 3.
NG >> Check harness between the battery and the starter motor for poor continuity.

3.CHECK VOLTAGE DROP ON STARTER MOTOR GROUND CIRCUIT

1. Check voltage between starter motor case and battery negative terminal using a digital circuit tester.

Ignition switch in START : Less than 0.2V



OK or NG

OK >> Starter motor ground circuit is OK. Further inspection is necessary. Refer to "WORK FLOW".
NG >> Check harness between the starter motor case and ground for poor continuity.

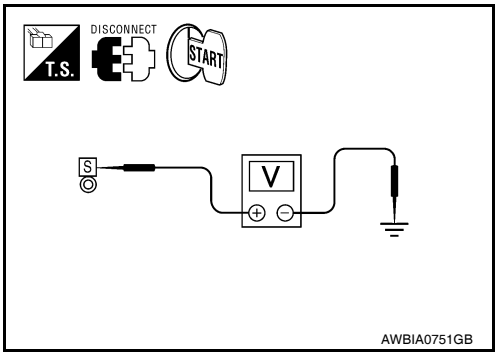
DIAGNOSTIC PROCEDURE 2

Check Magnetic Switch Circuit

1.CHECK POWER SUPPLY TO MAGNETIC SWITCH

1. Remove the fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn the ignition switch OFF.
4. Disconnect starter motor connector F28.
5. Check voltage between starter motor connector F28 terminal S and ground using a digital circuit tester.

Ignition switch in START : Battery voltage



OK or NG

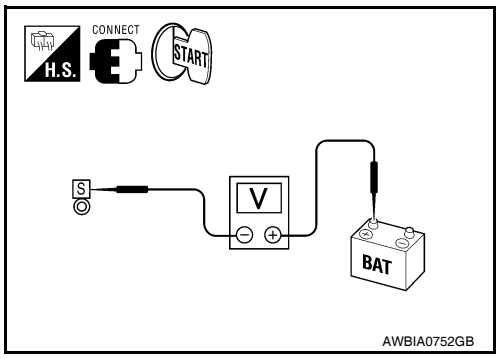
OK >> GO TO 2.
NG >> Check the following:
- 40A fusible link (letter **h**, located in fuse and fusible link box)

- 10A fuse (No. 49, M/T models, located in the IPDM E/R)
- 15A fuse (No. 52, located in the IPDM E/R)
- 20A fuse (No. 53, located in the IPDM E/R)
- Transmission range switch, clutch interlock switch or TCM depending on equipment
- Ignition switch
- Ignition relay IPDM E/R
- Starter relay IPDM E/R
- Starter relay request ON signal from BCM
- Harness for open or short circuit

2.CHECK VOLTAGE DROP ON MAGNETIC SWITCH CIRCUIT

1. Connect starter motor connector F28.
2. Check voltage between starter motor connector F28 terminal S and battery positive terminal using a digital circuit tester.

Ignition switch in START : Less than 1V



OK or NG

OK >> Magnetic switch circuit is OK. Further inspection is necessary. Refer to "WORK FLOW".

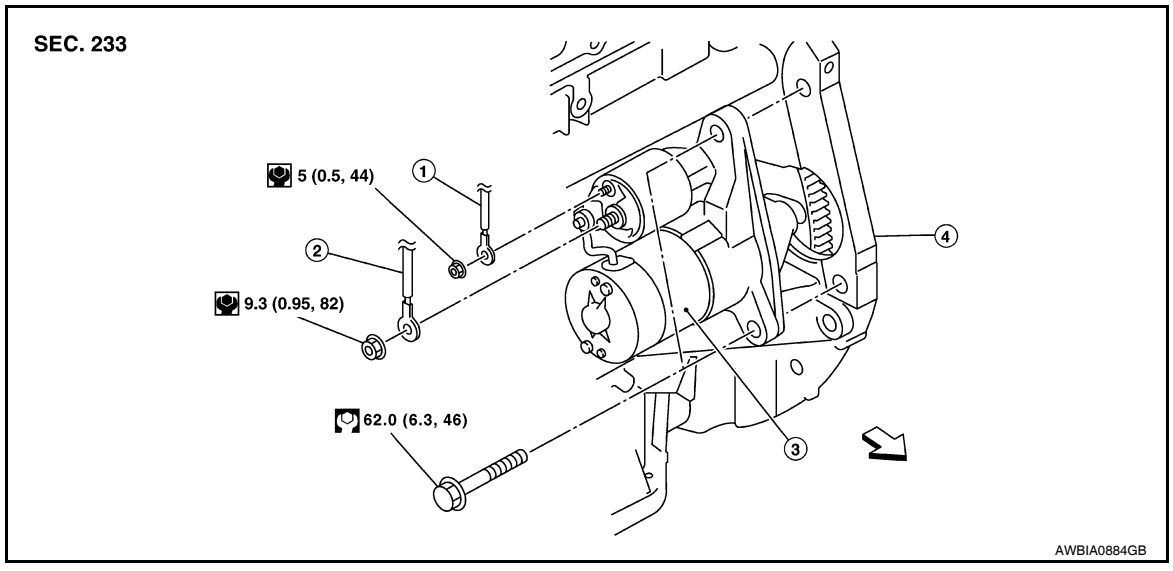
NG >> Check harness, components and connections between the battery and the magnetic switch for poor continuity.

MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

Engine coolant temperature	Voltage V
−30°C to −20°C (−22°F to −4°F)	8.4
−19°C to −10°C (−2°F to 14°F)	8.9
−9°C to 0°C (16°F to 32°F)	9.3
More than 1°C (More than 34°F)	9.7

Removal and Installation

INFOID:0000000007329893



1. "S" terminal harness
2. "B" terminal harness
3. Starter motor
4. Cylinder block
⇦ Front

REMOVAL

1. Disconnect the battery negative terminal. Refer to SC-7, "Removal and Installation".
2. Remove air duct (inlet). Refer to EM-16, "Removal and Installation".
3. Remove reservoir tank. Refer to CO-15, "Component".
4. Remove “S” terminal nut.
5. Remove “B” terminal nut.
6. Remove starter motor bolts.
7. Remove starter motor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten terminal nuts carefully.

CHARGING SYSTEM

System Description

INFOID:0000000007329894

The generator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.
Power is supplied at all times to generator terminal 3 through
- 10A fuse (No. 29, located in the fuse and fusible link box).

Power is supplied through terminal 1 to charge the battery and operate the vehicle's electrical system. Output voltage is monitored at terminal 3 by the IC regulator. The charging circuit is protected by the 120A fusible link [letter **a** , located in the fusible link box (battery)].
Ground is supplied
- to generator terminal 5
- through body ground F5, and
- through the generator case to the cylinder block

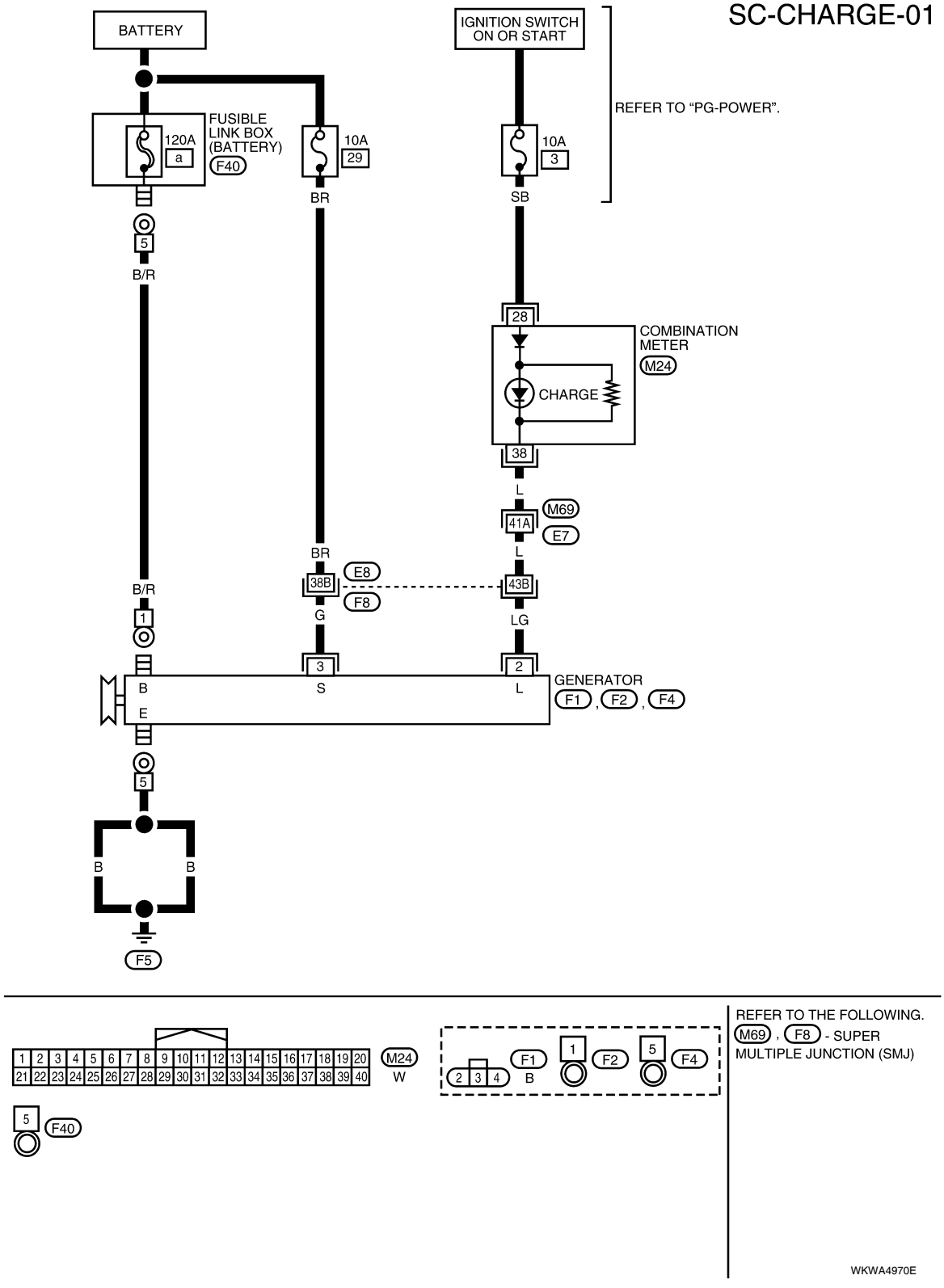
With the ignition switch in the ON or START position, power is supplied
- through 10A fuse [No. 3, located in the fuse block (J/B)]
- to combination meter terminal 28 for the charge warning lamp.

The IC regulator controls ground to terminal 38 of the combination meter through terminal 2 of the generator. When the ignition is turned on and power becomes available at terminal 2, this "wakes up" the regulator. The regulator monitors charge output and grounds terminal 2 or leaves it open depending on charge output. With power and ground supplied, the charge warning lamp will illuminate. When the generator is providing sufficient voltage, the ground is opened and the charge warning lamp will go off.
If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Wiring Diagram - CHARGE -

INFOID:0000000007329895

SC-CHARGE-01

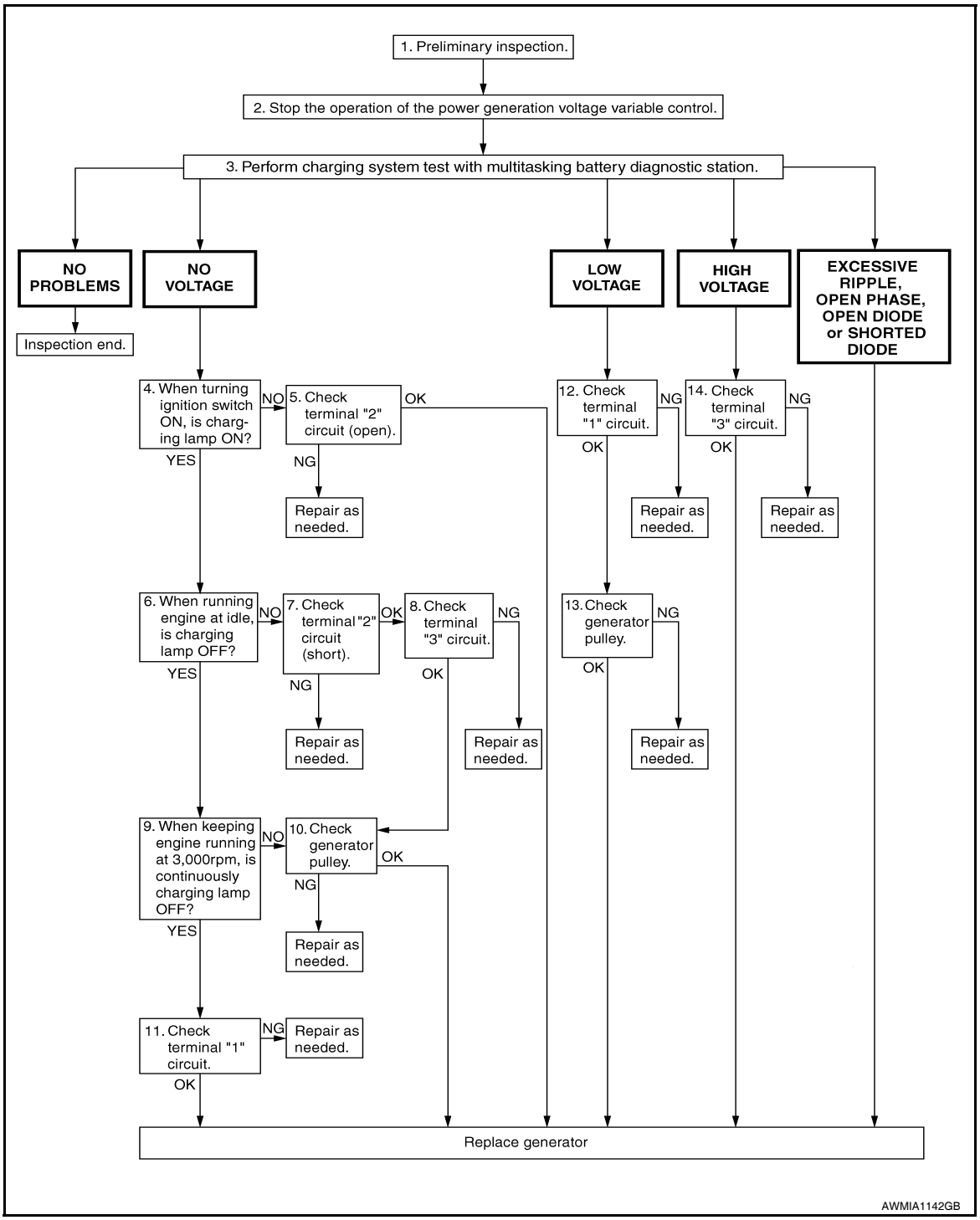


Trouble Diagnosis with Multitasking Battery Diagnostic Station

INFOID:0000000007329896

Refer to diagnostic station instruction manual.

WORK FLOW



DIAGNOSTIC PROCEDURE 1

Check Charge Warning Lamp Circuit

1. CHECK CHARGE WARNING LAMP CIRCUIT CONNECTION

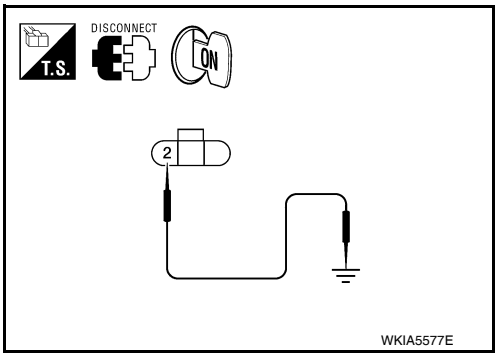
Check to see if terminal 2 is clean and tight.

OK or NG

OK >> GO TO 2.
NG >> Repair terminal 2 connection. Confirm repair by performing complete Starting/Charging system test. Refer to diagnostic station instruction manual.

2.CHECK CHARGE WARNING LAMP CIRCUIT

1. Disconnect generator connector F1.
2. Apply ground to generator connector F1 terminal 2 with the ignition switch in the ON position.



CHARGE lamp should light up.

OK or NG

OK >> GO TO "WORK FLOW" .
NG >> Check the following.
- 10A fuse [No. 3, located in fuse block (J/B)]
- CHARGE lamp
- Harness for open or short between combination meter and fuse
- Harness for open or short between combination meter and generator

DIAGNOSTIC PROCEDURE 2

Check Battery Circuit

1.CHECK BATTERY CIRCUIT CONNECTION

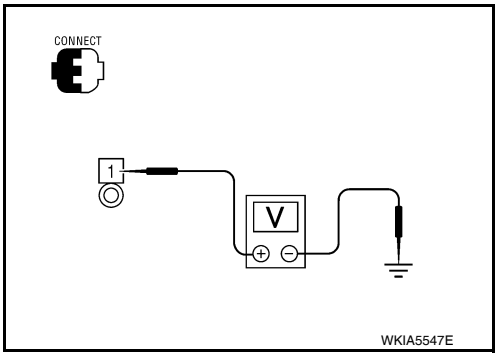
Check to see if terminal 1 is clean and tight.

OK or NG

OK >> GO TO 2.
NG >> Repair terminal 1 connection. Confirm repair by performing complete Starting/Charging system test. Refer to diagnostic station instruction manual.

2.CHECK BATTERY CIRCUIT

Check voltage between generator connector F2 terminal 1 and ground using a digital circuit tester.



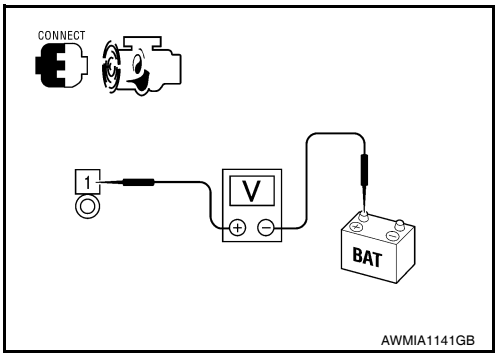
Battery voltage should exist.

OK or NG

OK >> GO TO 3.
NG >> Check the following.
- 120A fusible link [letter **a** , located in fusible link box (battery)]
- Harness for open or short between generator and fusible link

3.CHECK VOLTAGE DROP ON BATTERY CIRCUIT

Check voltage between generator connector F2 terminal 1 and battery positive terminal using a digital circuit tester.



With engine running at idle and warm : Less than 0.2V

OK or NG

OK >> Replace the generator. Refer to SC-25, "Removal and Installation" . Confirm repair by performing complete Starting/Charging system test. Refer to diagnostic station instruction manual.
NG >> Check harness between the battery and the generator for poor continuity.

DIAGNOSTIC PROCEDURE 3

Check Voltage Regulator Circuit

1.CHECK VOLTAGE REGULATOR CIRCUIT CONNECTION

Check to see if terminal 3 is clean and tight.

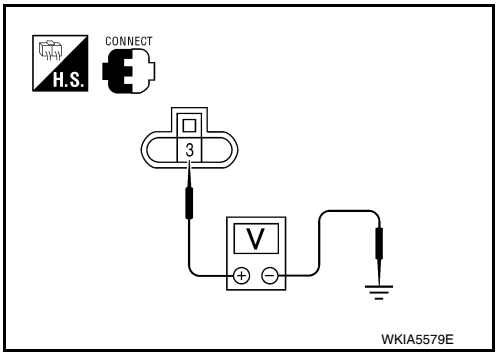
OK or NG

OK >> GO TO 2.
NG >> Repair terminal 3 connection. Confirm repair by performing complete Starting/Charging system test. Refer to diagnostic station instruction manual.

2.CHECK VOLTAGE REGULATOR CIRCUIT

Check voltage between generator connector F1 terminal 3 and ground using a digital circuit tester.

Battery voltage should exist.



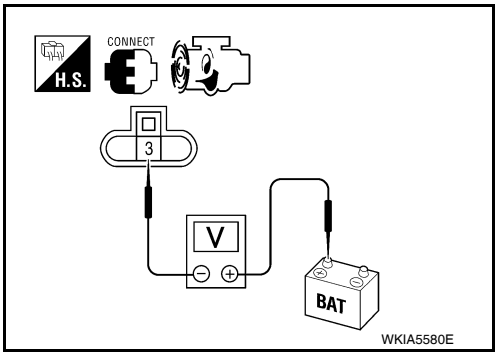
OK or NG

OK >> GO TO 3.
NG >> Check the following.
- 10A fuse (No. 29, located in fuse and fusible link box)
- Harness for open or short between generator and fuse

3.CHECK VOLTAGE DROP ON VOLTAGE REGULATOR CIRCUIT

Check voltage between generator connector F1 terminal 3 and battery positive terminal using a digital circuit tester.

With engine running at idle and warm : Less than 0.2V

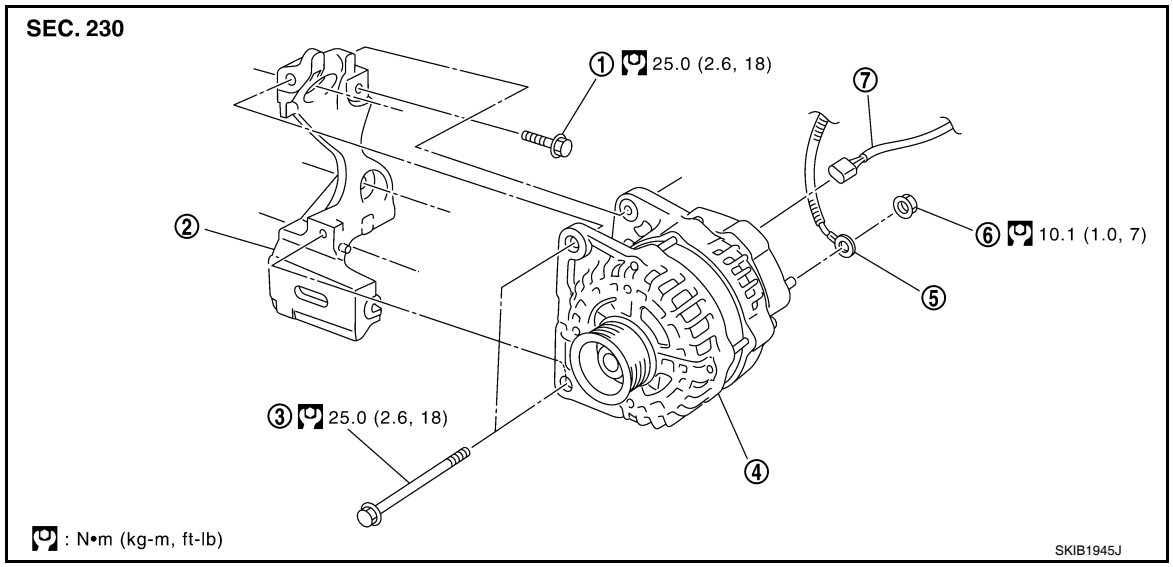


OK or NG

OK >> Replace the generator. Refer to SC-25, "Removal and Installation" . Confirm repair by performing complete Starting/Charging system test. Refer to diagnostic station instruction manual.
NG >> Check harness between the battery and the generator for poor continuity.

Removal and Installation

INFOID:0000000007329897



1. Generator bracket bolt
2. Generator bracket
3. Generator bolt
4. Generator
5. Generator "B" terminal harness
6. "B" terminal nut
7. Generator connector

REMOVAL

1. Disconnect the battery negative terminal. Refer to SC-7, "Removal and Installation".
2. Remove drive belt. Refer to EM-13, "Removal and Installation".
3. Remove radiator reservoir tank. Refer to CO-15, "Removal and Installation".
4. Disconnect generator connector.
5. Remove “B” terminal nut.
6. Remove generator bolts.
7. Remove generator assembly from the vehicle.

GENERATOR PULLEY INSPECTION

- Check that the generator pulley does not rattle.
- Check that the generator pulley nut is properly tightened.

Generator pulley nut : 118 N·m (12.0 kg-m, 87 ft-lb)

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

INFOID:0000000007329898

Applied model	M/T and A/T	CVT
Type*	T4	Gr.51 R
20 hours rate capacity	12 V - 47 AH	12 V - 43 AH
Cold Cranking Amps (CCA) at -18°C (0°F)	470 amp	410 amp

*: Always check with the Parts Department for the latest parts information

Starter

INFOID:0000000007329899

Applied model		MR18DE
Type*		S114-955
		HITACHI
		Reduction gear type
System voltage		12 V
No-load	Terminal voltage	11 V
	Current	Less than 110 A
	Revolution	More than 3,000 rpm

*: Always check with the Parts Department for the latest parts information

Generator

INFOID:0000000007329900

Applied model	MR18DE
Type*	A002TG1581AC
	MITSUBISHI
Nominal rating	12 V - 100 A
Ground polarity	Negative
Minimum revolution under no-load (when 13.5 V is applied)	Less than 1,000 rpm
Hot output current (when 13.5 V is applied)	More than 16 A/1,300 rpm More than 82 A/2,500 rpm More than 97 A/5,000 rpm
Regulated output voltage	14.1 - 14.7 V

*: Always check with the Parts Department for the latest parts information

SECTION LT
LIGHTING SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330568

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330569

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

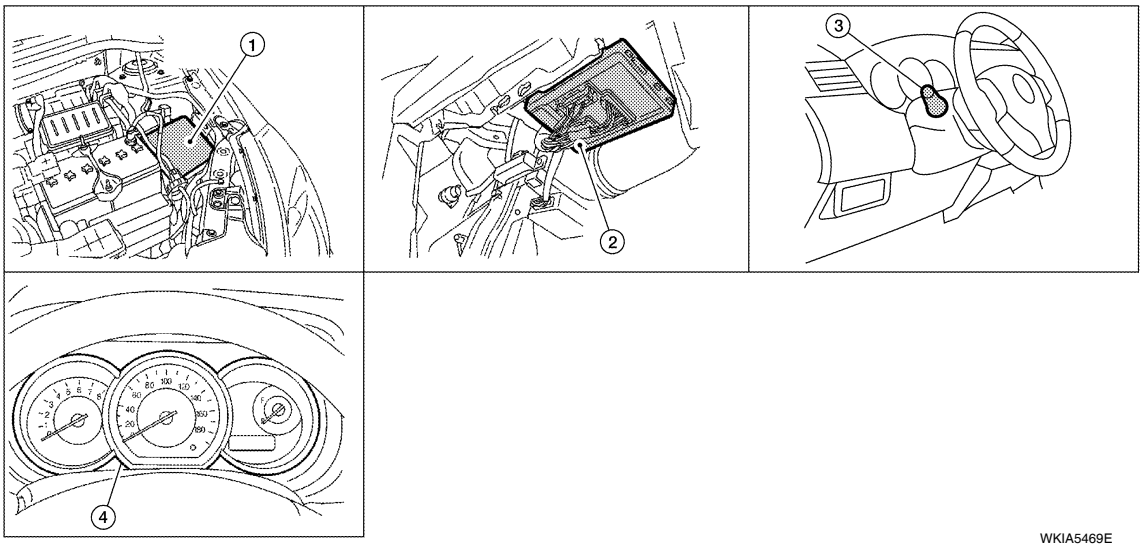
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

HEADLAMP (FOR USA)

Component Parts and Harness Connector Location

INFOID:0000000007330570



WKIA5469E

1. IPDM E/R E46, E47 and E48
2. BCM M18 and M20 (view with glove box removed)
3. Combination switch (lighting and turn signal switch) M28
4. Combination meter M24

System Description

INFOID:0000000007330571

Headlamp operation is controlled by the BCM (body control module) based on inputs from the combination switch (lighting and turn signal switch). When the lighting switch is placed in the 2ND position, the BCM receives an input signal requesting the headlamps (and tail lamps) illuminate. The BCM sends a signal, via the CAN communication lines, to the IPDM E/R (intelligent power distribution module engine room) requesting the headlamps be turned ON. The CPU (central processing unit) located in the IPDM E/R controls ground for the headlamp high and headlamp low relay coils. These relays direct power to the respective headlamps, which then illuminate.

OUTLINE

Power is supplied at all times
- to headlamp high relay RH and LH (located in IPDM E/R),
- to headlamp low relay (located in IPDM E/R),
- to ignition relay (located in IPDM E/R),
- through 15A fuse (No. 52, located in IPDM E/R) and
- through 20A fuse (No. 53, located in IPDM E/R)
- to CPU located in IPDM E/R,
- through 40A fusible link (letter **g** , located in fuse and fusible link block)
- to BCM terminal 70,
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57, and
- through 10A fuse [No. 10, located in fuse block (J/B)]
- to combination meter terminal 27.

With the ignition switch in the ON or START position, power is supplied
- to the ignition relay (located in IPDM E/R),
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38,
- through 10A fuse [No. 3, located in fuse block (J/B)]
- to combination meter terminal 28.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in fuse block (J/B)]
- to BCM terminal 11.

Ground is supplied
- to BCM terminal 67
- to combination meter terminals 21, 22 and 23
- through grounds M57 and M61, and
- to IPDM E/R terminals 39 and 59
- through grounds E15 and E24.

HEADLAMP OPERATION

Low Beam Operation

With the lighting switch in 2ND position, the BCM receives an input signal requesting the headlamps to illuminate. The BCM then sends a signal, via the CAN communication lines, to the IPDM E/R requesting the low beam headlamps be turned ON. The CPU located in the IPDM E/R controls ground to the headlamp low relay coil, which when energized, directs power
- through 15A fuse (No. 41, located in IPDM E/R)
- through IPDM E/R terminal 54
- to headlamp RH terminal 3, and
- through 15A fuse (No. 40, located in IPDM E/R)
- through IPDM E/R terminal 52
- to headlamp LH terminal 3.

Ground is supplied
- to headlamp RH and LH terminals 2
- through grounds E15 and E24.

With power and ground supplied, low beam headlamps illuminate.

High Beam Operation/Flash-to-Pass Operation

With the lighting switch in 2ND position and high beam switch in the HIGH position, the BCM receives an input signal requesting the headlamp high beams to illuminate. The flash to pass feature can be used any time and also sends a signal to the BCM. This input signal is then communicated to the IPDM E/R and the combination meter via the CAN communication. The CPU located in the IPDM E/R controls the headlamp high relays (LH and RH), which when energized, directs power
- through 10A fuse (No. 34, located in IPDM E/R)
- through IPDM E/R terminal 56
- to headlamp RH terminal 1, and
- through 10A fuse (No. 35, located in IPDM E/R)
- through IPDM E/R terminal 55
- to headlamp LH terminal 1.

Ground is supplied
- to headlamp RH and LH terminal 2
- through grounds E15 and E24.

With power and ground supplied, the high beam headlamps illuminate.
The BCM sends a signal, via the CAN communication lines, to the combination meter requesting the high beam indicator lamp be turned ON.

COMBINATION SWITCH READING FUNCTION

Refer to BCS-4, "System Description" .

EXTERIOR LAMP BATTERY SAVER CONTROL

Refer to LT-72, "System Description" .

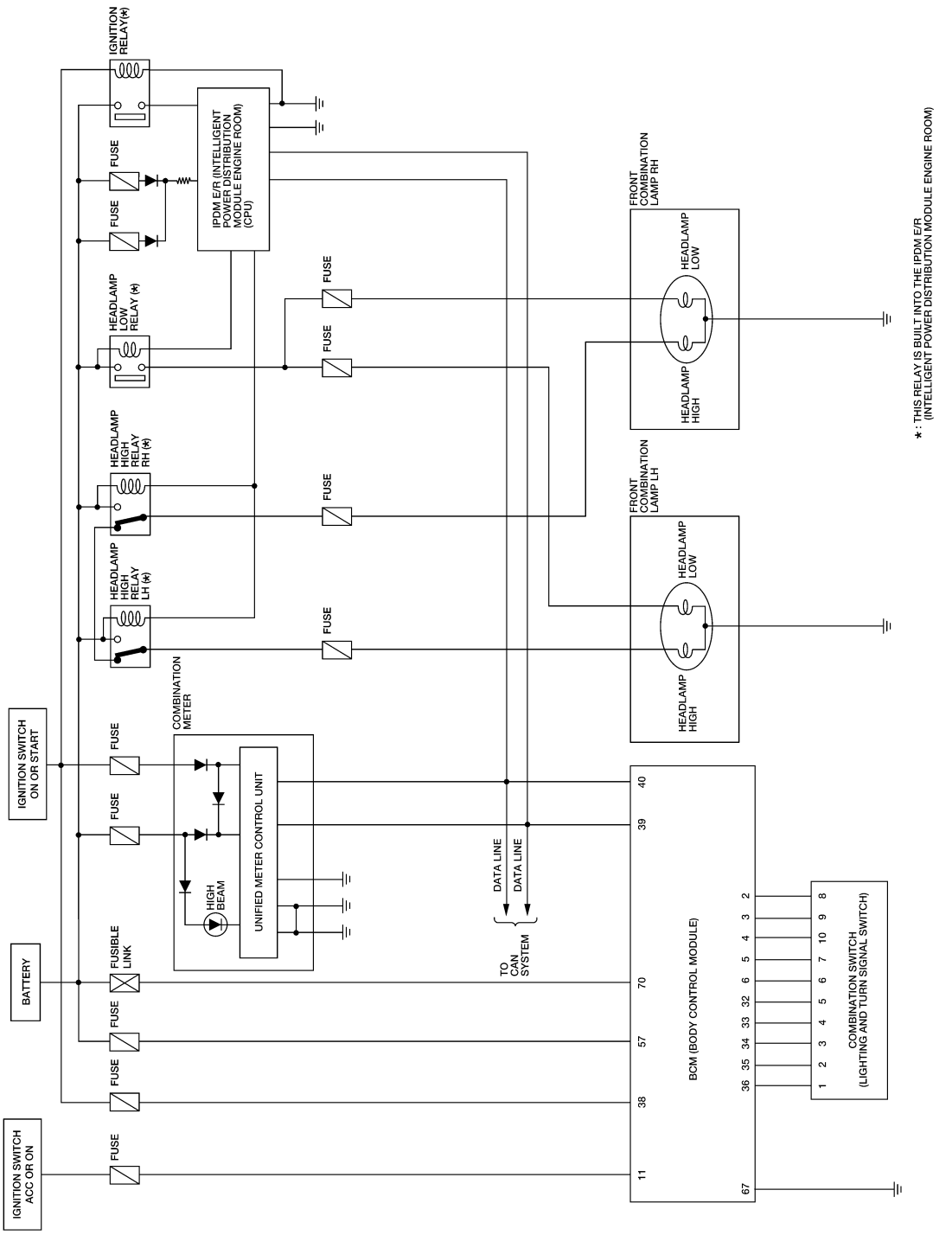
CAN COMMUNICATION SYSTEM DESCRIPTION

INFOID:0000000007330572

Refer to LAN-5 .

Schematic

INFOID:0000000007330573

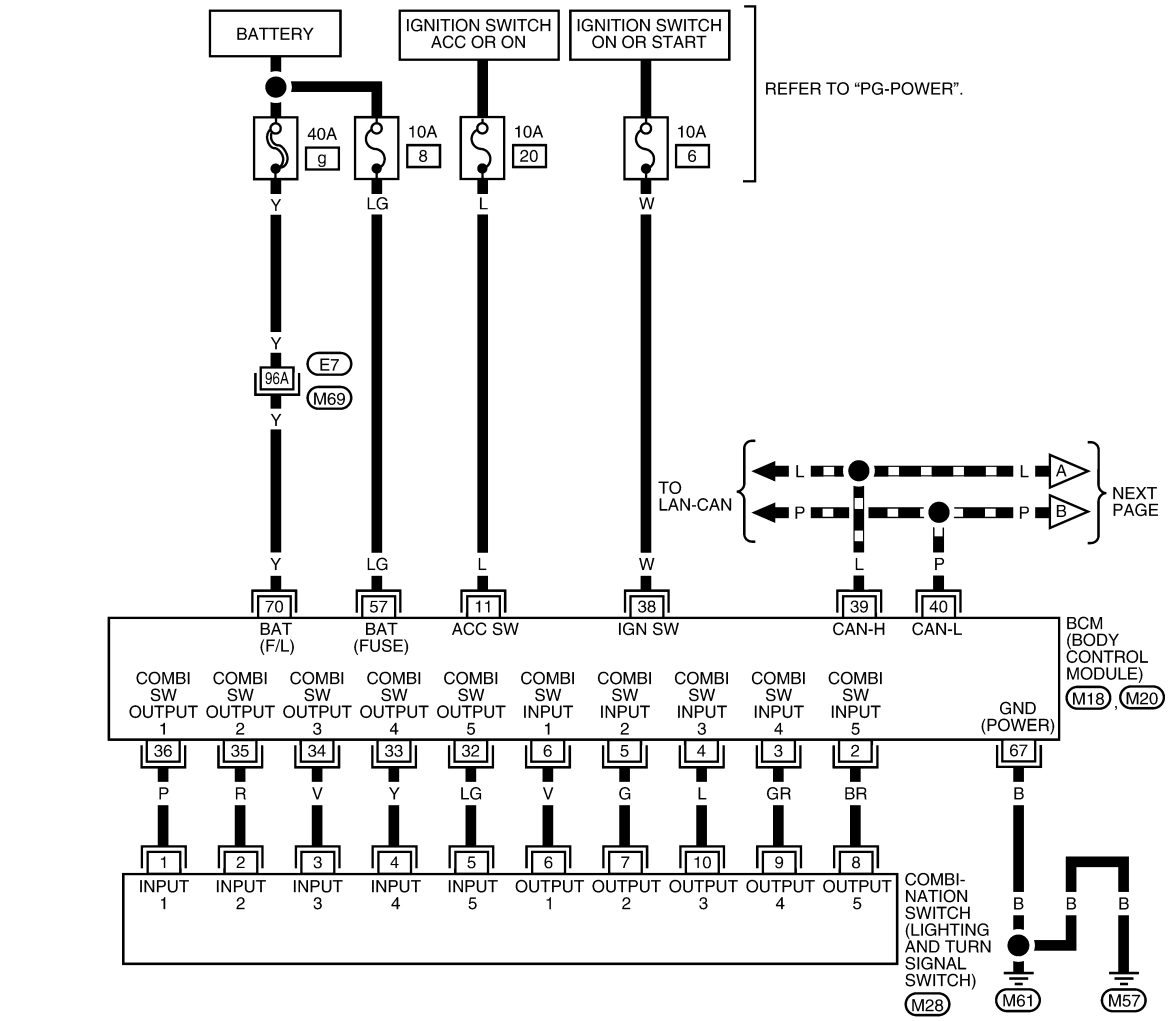


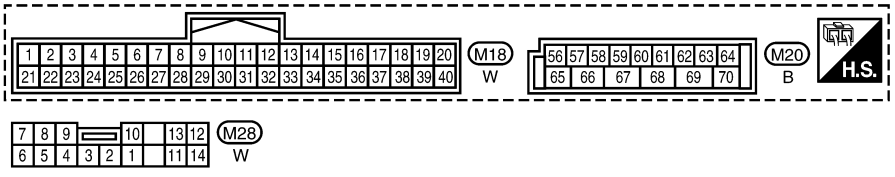
Wiring Diagram

INFOID:0000000007330574

LT-H/LAMP-01

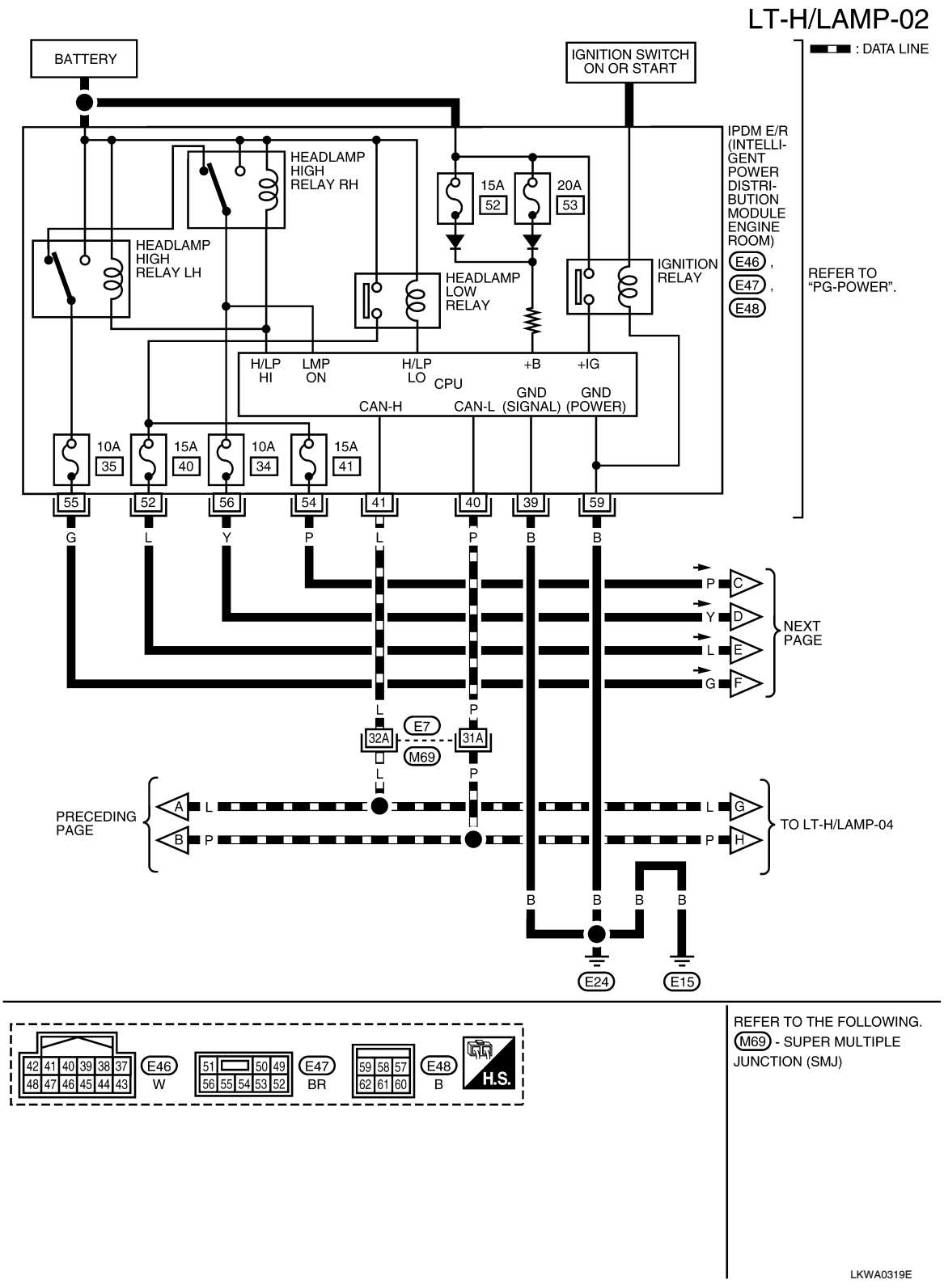
: DATA LINE



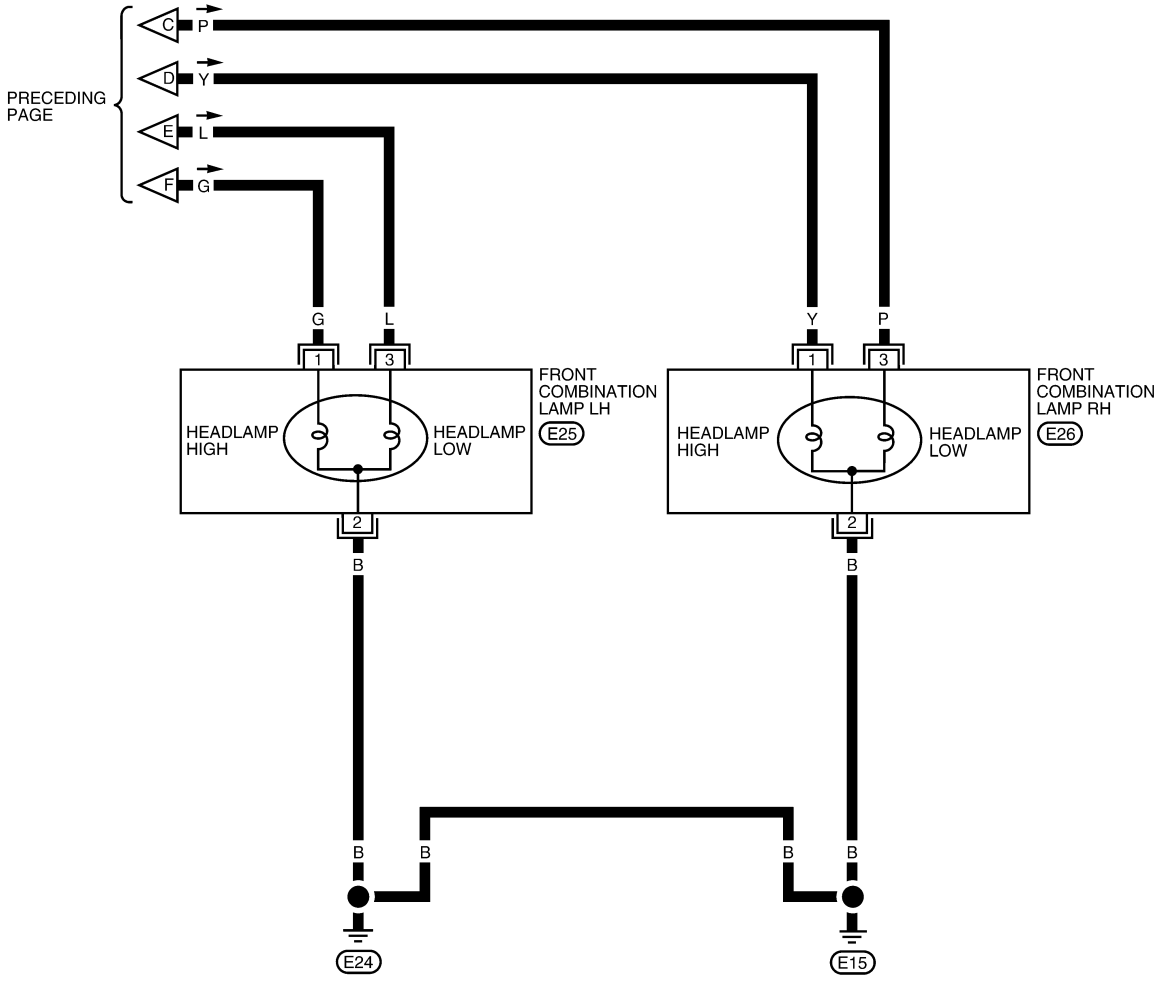


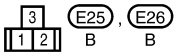
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABLWA1013GB

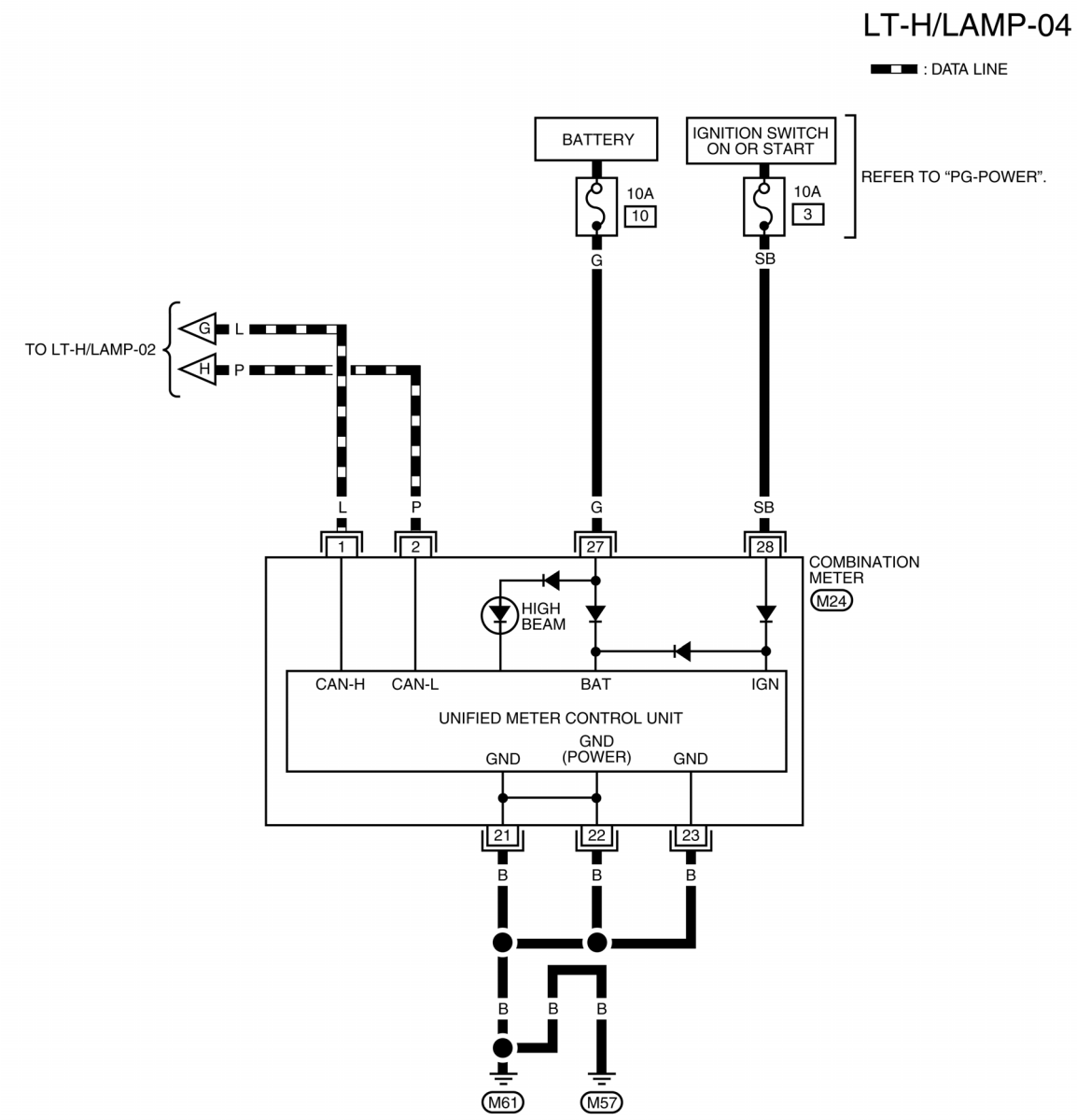

LT-H/LAMP-02
: DATA LINE
BATTERY
IGNITION SWITCH ON OR START
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E46
E47
E48
REFER TO "PG-POWER".
HEADLAMP HIGH RELAY RH
HEADLAMP HIGH RELAY LH
HEADLAMP LOW RELAY
IGNITION RELAY
15A 52
20A 53
10A 35
15A 40
10A 34
15A 41
H/LP HI
LMP ON
H/LP LO
CPU
+B
+IG
GND (SIGNAL)
GND (POWER)
CAN-H
CAN-L
55 52 56 54 41 40 39 59
G L Y P L P B B
NEXT PAGE
P C
Y D
L E
G F
E7
32A
31A
M69
PRECEDING PAGE
A L
B P
L G
P H
TO LT-H/LAMP-04
E24
E15
E46 W
E47 BR
E48 B
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
LKWA0319E

LT-H/LAMP-03





LKWA0320E



AALWA0367GB

Terminal and Reference Value for BCM

INFOID:0000000007330575

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330576

Refer to PG-24, "Terminal and Reference Value for IPDM E/R" .

How to Perform Trouble Diagnosis

INFOID:0000000007330577

1. Confirm the symptom or customer complaint.
2. Understand operation description and function description. Refer to LT-5, "System Description" .
3. Perform the Preliminary Check. Refer to LT-12, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Do the headlamps operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. INSPECTION END

Preliminary Check

INFOID:0000000007330578

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR IPDM E/R

Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007688464

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Content
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

ITEMS OF EACH PART

NOTE:

CONSULT will only display systems the vehicle possesses.

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF DIAGNOSTIC RESULT	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU IDENTIFICATION	ACTIVE TEST	CONFIGURATION
BCM	BCM	×	×	×		×		×
Power door lock system	DOOR LOCK	×			×		×	
Rear defogger	REAR DEFOGGER				×		×	
Warning chime	BUZZER				×		×	
Room lamp timer	INT LAMP	×			×		×	
Remote keyless entry system	MULTI REMOTE ENT	×			×		×	
Headlamp	HEAD LAMP	×			×		×	
Wiper	WIPER	×			×		×	
Turn signal lamp Hazard lamp	FLASHER				×		×	

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF DIAGNOSTIC RESULT	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU IDENTIFICATION	ACTIVE TEST	CONFIGURATION
Blower fan switch signal Air conditioner switch signal	AIR CONDITIONER				×		×	
Intelligent Key	INTELLIGENT KEY				×			
Combination switch	COMB SW				×			
NVIS (NATS)	IMMU				×		×	
Interior lamp battery saver	BATTERY SAVER	×			×		×	
Back door/Trunk	TRUNK				×		×	
Theft alarm	THEFT ALARM	×			×		×	
Retained accessory power control	RETAINED PWR	×			×		×	
Oil pressure switch	SIGNAL BUFFER				×		×	
Low tire pressure monitor	AIR PRESSURE MONITOR	×	×		×		×	
Panic alarm	PANIC ALARM						×	

WORK SUPPORT

Display Item List

Item	Description
RESET SETTING VALUE	Return a value set with WORK SUPPORT of each system to a default value in factory shipment.

CONSULT Function (IPDM E/R)

INFOID:0000000007688465

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

IPDM E/R diagnostic Mode	Description
SELF-DIAG RESULTS	Displays IPDM E/R self-diagnosis results.
DATA MONITOR	Displays IPDM E/R input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.

SELF-DIAGNOSTIC RESULTS

Display Item List

Display items	CONSULT display code	Malfunction detection	TIME		Possible causes
			CRNT	PAST	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—	—	—
CAN COMM CIRC	U1000	• If CAN communication reception/transmission data has a malfunction, or if any of the control units fail, data reception/transmission cannot be confirmed. • When the data in CAN communication is not received before the specified time.	X	X	Any of items listed below have errors: • TRANSMIT DIAG • ECM • BCM/SEC

Display items	CONSULT display code	Malfunction detection	TIME		Possible causes
			CRNT	PAST	
IGN RELAY ON	—	When the ignition switch is not in the ON position, the ignition relay in the IPDM E/R is ON.	X	X	Ignition relay (integrated in IPDM E/R)
IGN RELAY OFF	—	When the ignition switch is not in the ON position, the ignition relay in the IPDM E/R is OFF.	X	X	Ignition relay (integrated in IPDM E/R)
EEPROM	—	Malfunction is detected with the integrated EEPROM memory diagnosis.	X	X	IPDM E/R

x: Applicable

NOTE:

The details for display of the period are as follows:

- CRNT: Error currently detected with IPDM E/R.
- PAST: Error detected in the past and placed in IPDM E/R memory.

DATA MONITOR

All Signals, Main Signals, Selection From Menu

Item name	CONSULT screen display	Display or unit	Monitor item selection			Description
			ALL SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
Motor fan request	MOTOR FAN REQ	1/2/3/4	X	X	X	Signal status input from ECM
Compressor request	AC COMP REQ	ON/OFF	X	X	X	Signal status input from ECM
Parking, license, and tail lamp request	TAIL & CLR REQ	ON/OFF	X	X	X	Signal status input from BCM
Headlamp low beam request	HL LO REQ	ON/OFF	X	X	X	Signal status input from BCM
Headlamp high beam request	HL HI REQ	ON/OFF	X	X	X	Signal status input from BCM
Front fog request	FR FOG REQ	ON/OFF	X	X	X	Signal status input from BCM
FR wiper request	FR WIP REQ	STOP/1LO/LO/HI	X	X	X	Signal status input from BCM
Wiper auto stop	WIP AUTO STOP	ACT P/STOP P	X	X	X	Output status of IPDM E/R
Wiper protection	WIP PROT	OFF/LS/HS/Block	X	X	X	Control status of IPDM E/R
Starter request	ST RLY REQ	ON/OFF	X		X	Status of input signal (*1)
Ignition relay status	IGN RLY	ON/OFF	X	X	X	Ignition relay status monitored with IPDM E/R
Rear defogger request	RR DEF REQ	ON/OFF	X	X	X	Signal status input from BCM
Oil pressure switch	OIL P SW	OPEN/CLOSE	X		X	Signal status input from IPDM E/R
Hood switch	HOOD SW (*2)	OFF	X		X	Signal status input from IPDM E/R
Theft warning horn request	THFT HRN REQ	ON/OFF	X		X	Signal status input from BCM
Horn chirp	HORN CHIRP	ON/OFF	X		X	Output status of IPDM E/R
Daytime light request	DTRL REQ	ON/OFF	X		X	Signal status input from BCM

*1 Perform monitoring of IPDM E/R data with the ignition switch ON. When the ignition switch is in ACC position, display may not be correct.

*2 This item is displayed, but does not function.

CAN DIAG SUPPORT MNTR

Refer to LAN-7, "Description" .

ACTIVE TEST

Display Item List

Test name	CONSULT screen display	Description
Head, tail, fog lamp output	EXTERNAL LAMPS	With a certain ON-OFF operation (OFF, TAIL, LO, HI, FOG), the front fog lamp, headlamp low, headlamp high RH, headlamp high LH, and tail lamp relays can be operated.
Rear defogger output	REAR DEFOGGER	With a certain ON-OFF operation, the rear defogger relay can be operated.
Front wiper (HI, LO) output	FRONT WIPER	With a certain operation (OFF, HI ON, LO ON), the front wiper relays (Lo, Hi) can be operated.
Cooling fan output	MOTOR FAN	With a certain operation (1, 2, 3, 4), the cooling fan relays can be operated.
Horn output	HORN	With a certain ON-OFF operation, the horn relay can be operated.

Headlamp High Beam Does Not Illuminate (Both Sides)

INFOID:0000000007330581

1.CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

With CONSULT

1. Select “BCM” on CONSULT. Select “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “HI BEAM SW” turns ON-OFF linked with operation of lighting switch.

When lighting switch is high position : HI BEAM SW ON

Without CONSULT

Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

2.HEADLAMP ACTIVE TEST

With CONSULT

1. Select “IPDM E/R” on CONSULT. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
3. Touch “HI” screen.
4. Make sure headlamp high beam operates.

Headlamp high beam should operate (Headlamp high beam repeats ON–OFF every 2 seconds).

Without CONSULT

1. Start auto active test. Refer to PG-20, "Auto Active Test" .
2. Make sure headlamp high beam operates.

Headlamp high beam should operate.

OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK IPDM E/R

1. Select “IPDM E/R” on CONSULT. Select “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Make sure “HL HI REQ” turns ON when lighting switch is in high position.

When lighting switch is high position : HL HI REQ ON

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

4.HEADLAMP HIGH BEAM FUSE INSPECTION

Inspect 10A fuse No. 34 (RH) and fuse No. 35 (LH).

OK or NG

OK >> GO TO 5.
NG >> Repair harness.

5.BULB INSPECTION

Inspect inoperative headlamp bulbs.

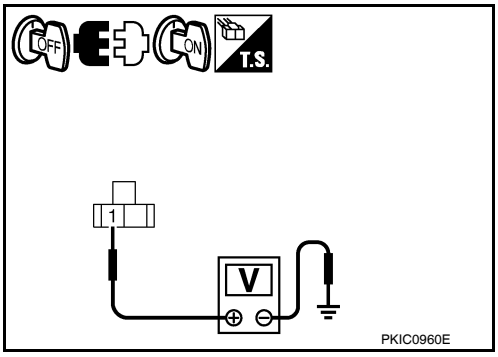
OK or NG

OK >> GO TO 6.
NG >> Replace headlamp bulb. LT-24, "Bulb Replacement" .

6.CHECK HEADLAMP INPUT SIGNAL

With CONSULT

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Select “IPDM E/R” on CONSULT. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
5. Touch “HI” screen.
6. When headlamp high beam is operating, check voltage between headlamp harness connector and ground (Headlamp high beam repeats ON–OFF every 2 seconds).



Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	1	Ground	Battery voltage
LH	E25			

Without CONSULT

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. When headlamp high beam is operating, check voltage between headlamp harness connector and ground.

Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	1	Ground	Battery voltage
LH	E25			

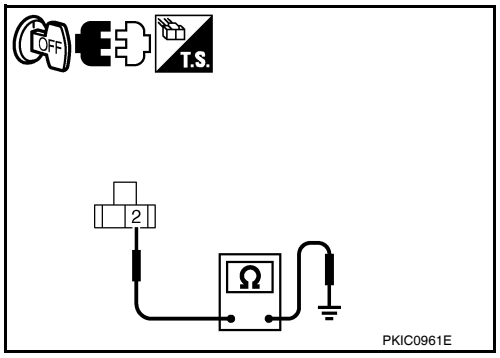
OK or NG

OK >> GO TO 7.
NG >> GO TO 8.

7.CHECK HEADLAMP GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between headlamp harness connector and ground.

Headlamp connector		Terminal	Ground	Continuity
RH	E26	2		Yes
LH	E25			



OK or NG

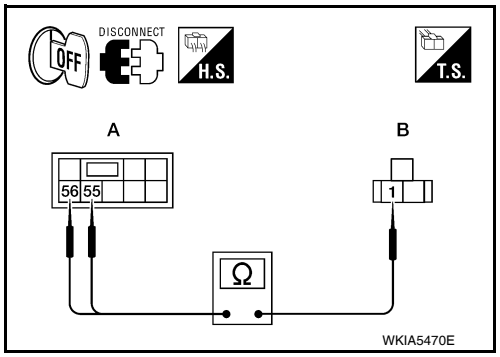
OK >> Check front combination lamp connector for damage or poor connection. Repair as necessary.

NG >> Repair harness.

8.CHECK HEADLAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector (A) and headlamp harness connector (B).

Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	56	E26	1	Yes
LH		55	E25		



OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

NG >> Repair harness or connector.

Headlamp High Beam Does Not Illuminate (One Side)

INFOID:0000000007330582

1.HEADLAMP HIGH BEAM FUSE INSPECTION

Inspect 10A fuse No. 34 (RH) or fuse No. 35 (LH).

OK or NG

OK >> GO TO 2.

NG >> Repair harness.

2.CHECK BULB

Check headlamp bulb which does not illuminate.

OK or NG

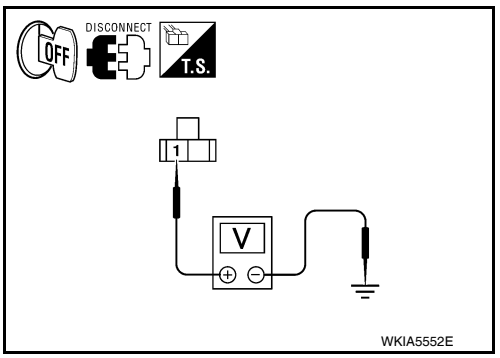
OK >> GO TO 3.

NG >> Replace bulb. Refer to LT-24, "Bulb Replacement" .

3.CHECK HEADLAMP INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Lighting switch is turned to HIGH position.

4. Check voltage between headlamp harness connector and ground.



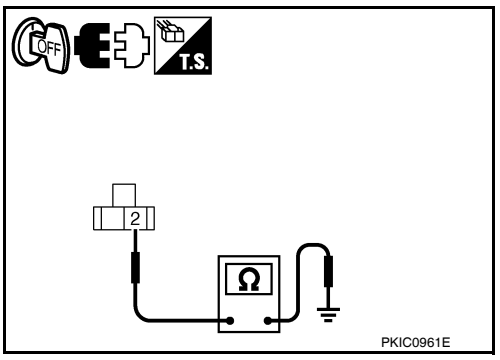
Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	1	Ground	Battery voltage
LH	E25			

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK HEADLAMP GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between headlamp harness connector and ground.



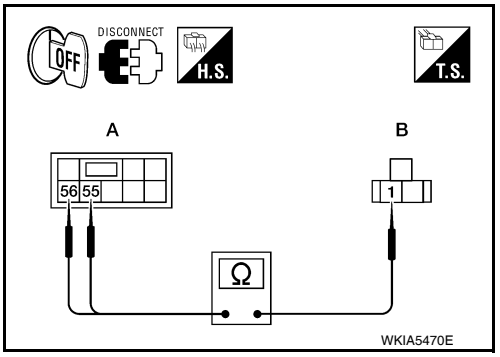
Headlamp connector		Terminal	Ground	Continuity
RH	E26	2		Yes
LH	E25			

OK or NG

OK >> Check connecting condition headlamp harness connector.
NG >> Repair harness or connector.

5. CHECK HEADLAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector (A) and headlamp harness connector (B).



Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	56	E26	1	Yes
LH		55	E25		

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

High Beam Indicator Lamp Does Not Illuminate

INFOID:0000000007330583

1. BULB INSPECTION

Inspect CAN communication system. Refer to LAN-5 .

OK or NG

OK >> Replace combination meter. Refer to DI-19, "Removal and Installation" .
NG >> Repair as necessary.

Headlamp Low Beam Does Not Illuminate (Both Sides)

INFOID:0000000007330584

1. CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

With CONSULT

1. Select “BCM” on CONSULT. Select “HEAD LAMP” on “SELECT TEST ITEM” screen.

2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “HEAD LAMP SW 1” and “HEAD LAMP SW 2” turns ON-OFF linked with operation of lighting switch.

When lighting switch is 2ND position : HEAD LAMP SW 1 ON
: HEAD LAMP SW 2 ON

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

2.CHECK HEADLAMP ACTIVE TEST

With CONSULT
1. Select “IPDM E/R” on CONSULT. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
3. Touch “LO” screen.
4. Make sure headlamp low beam operates.

Headlamp low beam should operate.

Without CONSULT
1. Start auto active test. Refer to PG-20, "Auto Active Test" .
2. Make sure headlamp low beam operates.

Headlamp low beam should operate.

OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK IPDM E/R

1. Select “IPDM E/R” on CONSULT. Select “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Make sure “HL LO REQ” turns ON when lighting switch is in 2ND position.

When lighting switch is 2ND position : HL LO REQ ON

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Replace BCM. Refer toBCS-19, "Removal and Installation of BCM" .

4.HEADLAMP LOW BEAM FUSE INSPECTION

Inspect 15A fuse No. 40 (LH) and fuse No. 41 (RH).

OK or NG

OK >> GO TO 5.
NG >> Repair harness.

5.BULB INSPECTION

Inspect inoperative headlamp bulbs.

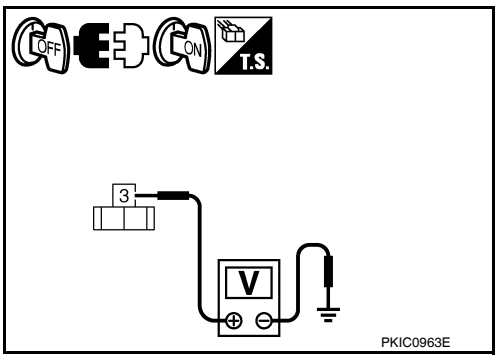
OK or NG

OK >> GO TO 6.
NG >> Replace headlamp bulb.LT-24, "Bulb Replacement" .

6.CHECK HEADLAMP INPUT SIGNAL

With CONSULT
1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Select “IPDM E/R” on CONSULT. Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.

4. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
5. Touch “LO” screen.
6. When headlamp low beam is operating, check voltage between headlamp harness connector and ground.



Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	3	Ground	Battery voltage
LH	E25			

Without CONSULT

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. When headlamp low beam is operating, check voltage between headlamp harness connector and ground.

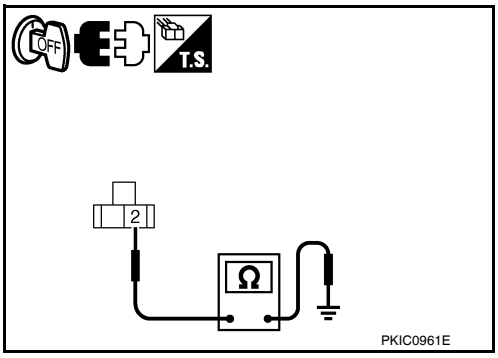
Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	3	Ground	Battery voltage
LH	E25			

OK or NG

OK >> GO TO 7.
NG >> GO TO 8.

7. CHECK HEADLAMP GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between headlamp harness connector (B) and ground.



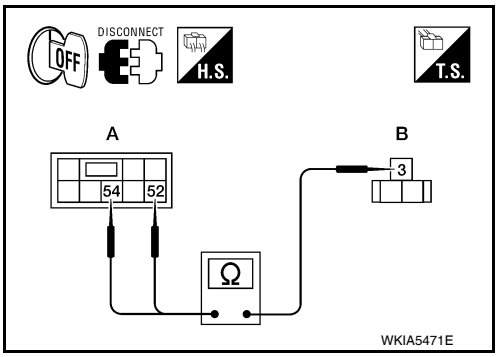
Headlamp connector		Terminal	Ground	Continuity
RH	E26	2		Yes
LH	E25			

OK or NG

OK >> Check front combination lamp connector for damage or poor connection. Repair as necessary.
NG >> Repair harness.

8. CHECK HEADLAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector (A) and headlamp harness connector (B).



Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	54	E26	3	Yes
LH		52	E25		

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

Headlamp Low Beam Does Not Illuminate (One Side)

INFOID:0000000007330585

1. HEADLAMP LOW BEAM FUSE INSPECTION

Inspect 15A fuse No. 40 (LH) and fuse No. 41 (RH).

OK or NG

OK >> GO TO 2.
NG >> Repair harness.

2. CHECK BULB

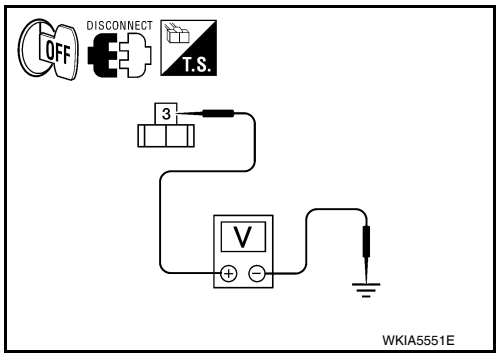
Check bulb of headlamp which does not illuminate.

OK or NG

OK >> GO TO 3.
NG >> Replace bulb. Refer to LT-24, "Bulb Replacement" .

3. CHECK HEADLAMP INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Lighting switch is turned to 2ND position.
4. Check voltage between headlamp harness connector and ground.



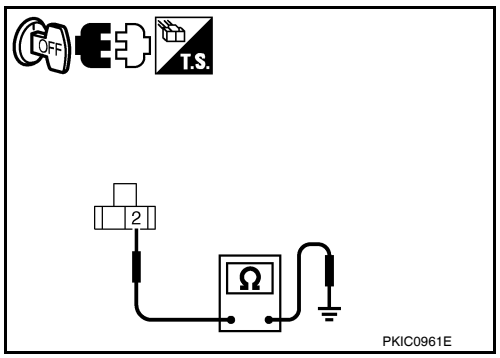
Terminal				Voltage
(+)			(–)	
Headlamp connector		Terminal		
RH	E26	3	Ground	Battery voltage
LH	E25			

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK HEADLAMP GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between headlamp harness connector and ground.



Headlamp connector		Terminal		Continuity
RH	E26	2	Ground	Yes
LH	E25			

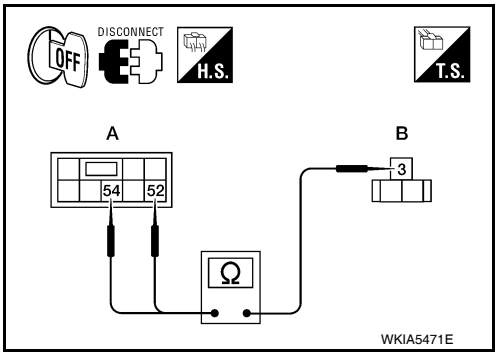
OK or NG

OK >> Check condition of headlamp harness connector.
NG >> Repair harness or connector.

5. CHECK HEADLAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.

3. Check continuity between IPDM E/R harness connector (A) and headlamp harness connector (B).



Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	54	E26	3	Yes
LH		52	E25		

OK or NG

OK >> Replace IPDM E/R. Refer to PG-26, "IPDM E/R Power/ Ground Circuit Inspection" .

NG >> Repair harness or connector.

Headlamps Do Not Turn OFF

INFOID:0000000007330586

1.CHECK HEADLAMPS TURN OFF

Make sure that lighting switch is OFF. Make sure headlamp turns OFF when ignition switch is turned OFF.

OK or NG

OK >> GO TO 3.

NG >> GO TO 2.

2.CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

1. Select “BCM” on CONSULT. Select “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “HEAD LAMP SW 1” and “HEAD LAMP SW 2” turns ON-OFF linked with operation of lighting switch.

When lighting switch is OFF position : HEAD LAMP SW 1 OFF
: HEAD LAMP SW 2 OFF

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

3.CHECKING CAN COMMUNICATIONS BETWEEN BCM AND IPDM E/R

Select “BCM” on CONSULT, and perform self-diagnosis for “BCM”.

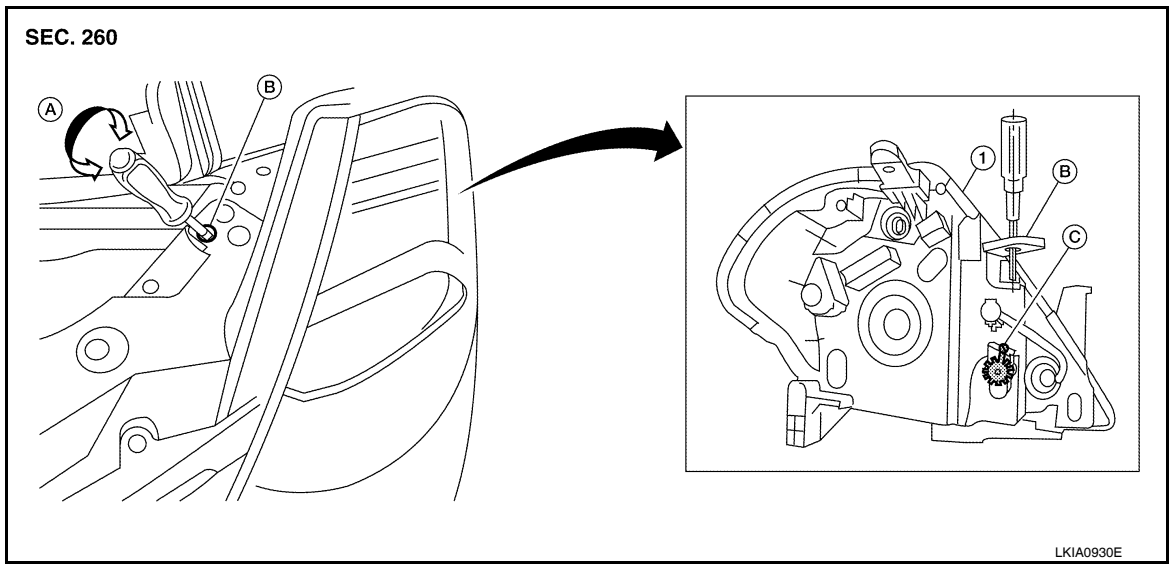
Display of self-diagnosis results

NO DTC>> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".

CAN COMM CIRCUIT>> Refer to LAN-5, "System Description".

Aiming Adjustment

INFOID:0000000007330587



1. Headlamp
A. Inner and outer adjustment
B. Adjusting screw access hole
C. Adjusting screw

PREPARATION BEFORE ADJUSTING

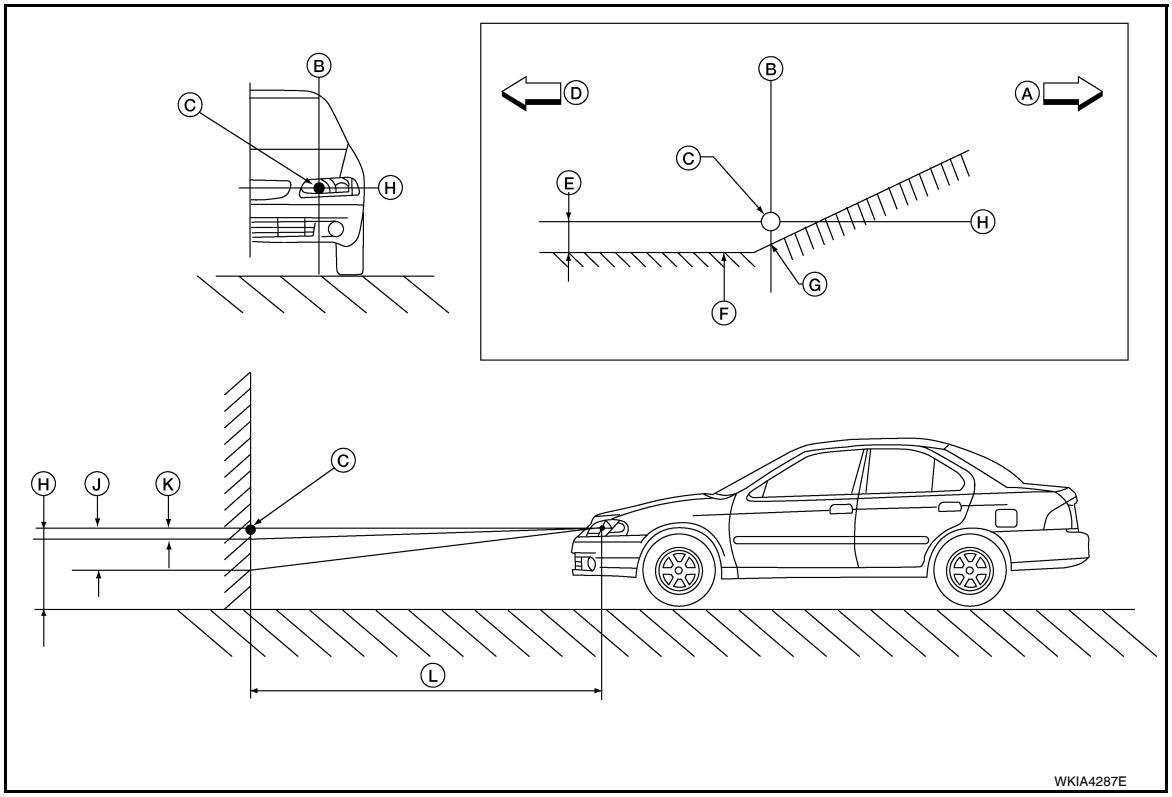
Before performing aiming adjustment, check the following.

1. Keep all tires inflated to correct pressures.
2. Place vehicle on level surface.
3. See that there is no-load in vehicle other than the driver (or equivalent weight placed in driver's position). Coolant, engine oil filled up to correct level and full fuel tank, spare tire, jack and tools are properly stowed.

LOW BEAM AND HIGH BEAM

1. Turn headlamp low beam ON.
2. Use adjusting screw to perform aiming adjustment.
3. Insert the tool through the adjusting screw access hole to avoid damage to the adjusting screw.

ADJUSTMENT USING AN ADJUSTMENT SCREEN (LIGHT/DARK BORDERLINE)



A.	Right	B.	Vertical center line of headlamp	C.	Horizontal and vertical aiming center point of headlamp
D.	Left	E.	Vertical aiming cutoff point	F.	Cutoff line for vertical aiming evaluation
G.	Acceptable vertical cutoff setting at horizontal aiming point	H.	Horizontal center line of headlamp	J.	Maximum acceptable vertical aiming point
K.	Minimum acceptable vertical aiming point	L.	Aiming distance from center of headlamp to aiming screen		

• Aim each headlamp individually and ensure other headlamp beam pattern is blocked from screen.
- For vertical headlamp aiming, adjust headlamp until beam pattern is positioned per specified dimensions.

Description	Halogen Headlamp
Vertical aiming cutoff point (E)	53.2 mm (2.094 in)
Minimum acceptable vertical aiming point (K)	13.3 mm (0.52 in)
Maximum acceptable vertical aiming point (J)	93.1 mm (3.67 in)
Aiming distance from center of headlamp to aiming screen (L)	7.62 m (25 ft)

Bulb Replacement

INFOID:0000000007330588

CAUTION:
After installing bulb, be sure to install plastic cap and bulb socket securely to ensure watertightness.

HEADLAMP (HIGH/LOW)

1. Turn lighting switch OFF.
2. Disconnect headlamp bulb connector.
3. Remove headlamp bulb back cover.
4. Unlock retaining spring and remove headlamp bulb from front combination lamp assembly.

PARKING LAMP

1. Turn lighting switch OFF.

2. Turn bulb socket counterclockwise and unlock from the front combination lamp assembly.
3. Remove bulb from its socket.

FRONT TURN SIGNAL LAMP

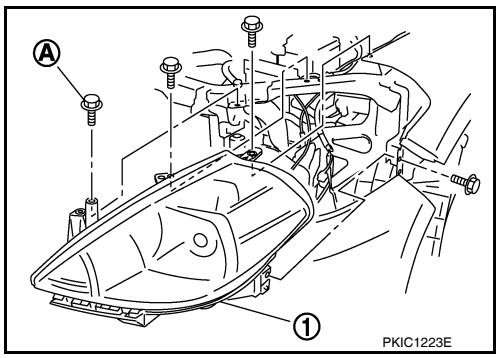
1. Turn lighting switch OFF.
2. Turn bulb socket counterclockwise and unlock from the front combination lamp assembly.
3. Remove bulb from its socket.

Removal and Installation

INFOID:0000000007330589

REMOVAL

1. Disconnect the negative battery terminal.
2. Remove front bumper fascia. Refer to EI-15.
3. Remove front combination lamp assembly bolts (A).
4. Pull front combination lamp assembly (1) toward the vehicle front, disconnect connector, and remove assembly.



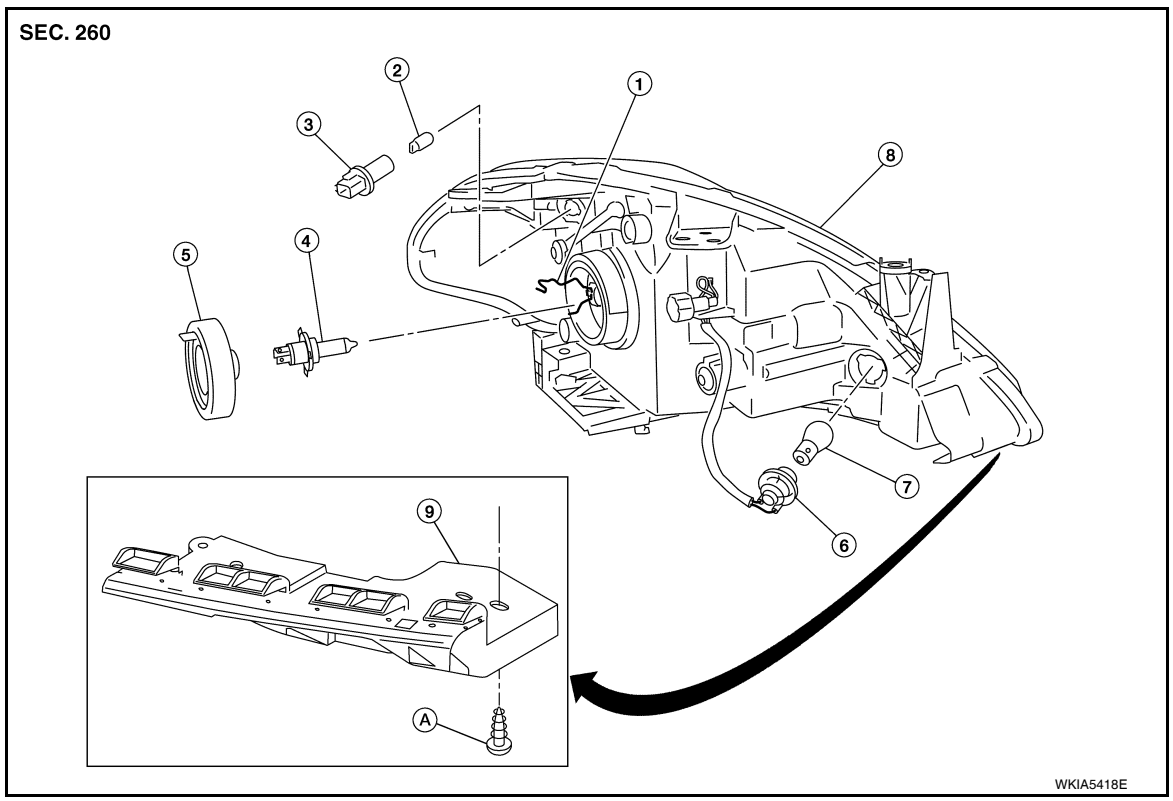
INSTALLATION

Installation is in the reverse order of removal.

- After installation, perform aiming adjustment. Refer to LT-23, "Aiming Adjustment".

Disassembly and Assembly

INFOID:0000000007330590



1. Retaining spring
2. Parking lamp bulb
3. Parking lamp bulb socket
4. Halogen headlamp bulb (High/Low)
5. Headlamp bulb back cover
6. Front turn signal lamp bulb socket
7. Front turn signal lamp bulb
8. Front combination lamp assembly
9. Bumper stay

A. Screw

DISASSEMBLY

1. Remove headlamp bulb back cover.
2. Unlock retaining spring and remove headlamp bulb (High/Low).
3. Turn parking lamp bulb socket counterclockwise and unlock it.
4. Remove parking lamp bulb from its socket.
5. Turn front turn signal lamp bulb socket counterclockwise and unlock it.
6. Remove front turn signal lamp bulb from its socket.
7. Remove the bumper stay.

ASSEMBLY

Assembly is in the reverse order of disassembly.

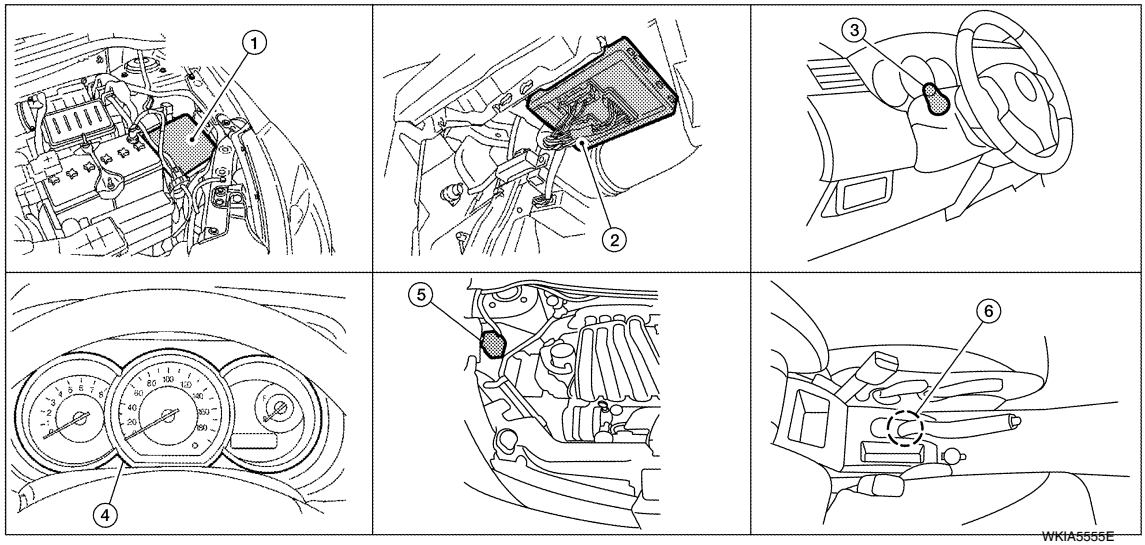
CAUTION:

- **After installing bulb, be sure to install plastic cap securely to insure water tight seal.**

HEADLAMP (FOR CANADA) - DAYTIME LIGHT SYSTEM -

Component Parts and Harness Connector Location

INFOID:0000000007330591



1. IPDM E/R E43, E46, E47 and E48
2. BCM M18 and M20 (view with glove box removed)
3. Combination switch (lighting and turn signal switch) M28
4. Combination meter M24
5. Daytime light relay 1 E37 and daytime light relay 2 E38
6. Parking brake switch M17

System Description

INFOID:0000000007330592

Headlamp operation is controlled by the BCM (body control module) based on inputs from the combination switch (lighting and turn signal switch). When the lighting switch is placed in the 2ND position, the BCM receives an input signal requesting the headlamps (and tail lamps) illuminate. The request is then communicated to the IPDM E/R (intelligent power distribution module engine room) via the CAN communication lines. The CPU (central processing unit) located in the IPDM E/R controls ground for the headlamp high and headlamp low relay coils. These relays direct power to the respective headlamps, which then illuminate. When the headlamp switch is OFF or in the 1ST position (parking lamps ON), the parking brake is released and the engine is running, the IPDM E/R de-energizes the headlamp relays and supplies ground to the daytime light relay 1 to actuate the daytime light function.

OUTLINE

Power is supplied at all times
- to headlamp high relay RH and LH (located in IPDM E/R)
- to headlamp low relay (located in IPDM E/R) and
- to ignition relay (located in IPDM E/R)
- through 15A fuse (No. 52, located in IPDM E/R) and
- through 20A fuse (No. 53, located in IPDM E/R)
- to CPU located in IPDM E/R,
- through 40A fusible link (letter **g** , located in fuse and fusible link box)
- to BCM terminal 70,
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57,
- through 10A fuse [No. 10, located in fuse block (J/B)]
- to combination meter terminal 27,
- through 10A fuse (No. 26, located in fuse and fusible link box)
- to the daytime light relay 1.

With the ignition switch in the ON or START position, power is supplied
- to the ignition relay (located in IPDM E/R),
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38,

• through 10A fuse [No. 3, located in fuse block (J/B)]
• to combination meter terminal 28.
With the ignition switch in the ACC or ON position, power is supplied
• through 10A fuse [No. 20, located in fuse block (J/B)]
• to BCM terminal 11.
Ground is supplied
• to BCM terminal 67 and
• to combination meter terminals 21, 22 and 23
• through grounds M57 and M61,
• to IPDM E/R terminals 39 and 59
• through grounds E15 and E24,

HEADLAMP OPERATION

Low Beam Operation

With the lighting switch in 2ND position, the BCM receives an input signal requesting the headlamps to illuminate. This input signal is communicated to the IPDM E/R via the CAN communication lines. The CPU located in the IPDM E/R controls the headlamp low relay coil, which when energized, directs power
• through 15A fuse (No. 41, located in IPDM E/R)
• through IPDM E/R terminal 54
• to daytime light relay 2 terminals 1 and 5 (energizing the relay),
• through daytime light relay 2 terminal 3
• to front combination lamp RH terminal 3, and
• through 15A fuse (No. 40, located in IPDM E/R)
• through IPDM E/R terminal 52
• to front combination lamp LH terminal 3.
Ground is supplied
• to front combination lamp LH terminal 2
• through grounds E15 and E24,
• to headlamp RH terminal 2 via
• daytime light relay 1 terminals 3 and 4
• through grounds E15 and E24.
With power and ground supplied, low beam headlamps illuminate.

High Beam/Flash-to-Pass Operation

With the lighting switch in 2ND position and high beam switch in the HIGH position, the BCM receives input signal requesting the headlamp high beams to illuminate. The flash-to-pass feature can be used any time and also sends a signal to the BCM. This input signal is communicated to the IPDM E/R and the combination meter via the CAN communication lines. The CPU located in the IPDM E/R controls the headlamp high relay coil, which when energized, directs power
• through 10A fuse (No. 34, located in IPDM E/R)
• through IPDM E/R terminal 56
• to front combination lamp RH terminal 1, and
• through 10A fuse (No. 35, located in IPDM E/R)
• through IPDM E/R terminal 55
• to front combination lamp LH terminal 1.
Ground is supplied
• to front combination lamp LH terminal 2
• through grounds E15 and E24, and
• to front combination lamp RH terminal 2 via
• daytime light relay 1 terminals 3 and 4
• through grounds E15 and E24.
With power and ground supplied, the high beam headlamps illuminate.
The BCM sends a signal to the combination meter requesting the high beam indicator lamp to turn ON.

Daytime Light System Operation

With the lighting switch in the OFF or 1ST position (parking lamps ON), the BCM receives inputs requesting the headlights off. If the parking brake is released and the engine is running, the BCM then sends a signal, via the CAN communication lines, requesting the IPDM E/R to activate the daytime light system. The CPU located in the IPDM E/R controls the daytime light relay 1 coil, which when energized, directs power
• from daytime light relay 1 terminal 3
• to front combination lamp RH terminal 2,
• through front combination lamp RH high beam terminal 1

- to IPDM E/R terminal 56,
- through 10A fuse (No. 34, located in IPDM E/R) and
- through both de-energized headlamp high relays
- to 10A fuse (No. 35, located in IPDM E/R),
- through IPDM E/R terminal 55
- to front combination lamp LH terminal high beam 1.

Ground is supplied

- to front combination lamp LH terminal 2
- through grounds E15 and E24,
- to daytime light relay 1 terminal 1
- through IPDM E/R terminal 6.

With power and ground supplied, high beam headlamps illuminate at reduced intensity.

COMBINATION SWITCH READING FUNCTION

Refer to BCS-4, "System Description" .

EXTERIOR LAMP BATTERY SAVER CONTROL

Refer to LT-72, "System Description" .

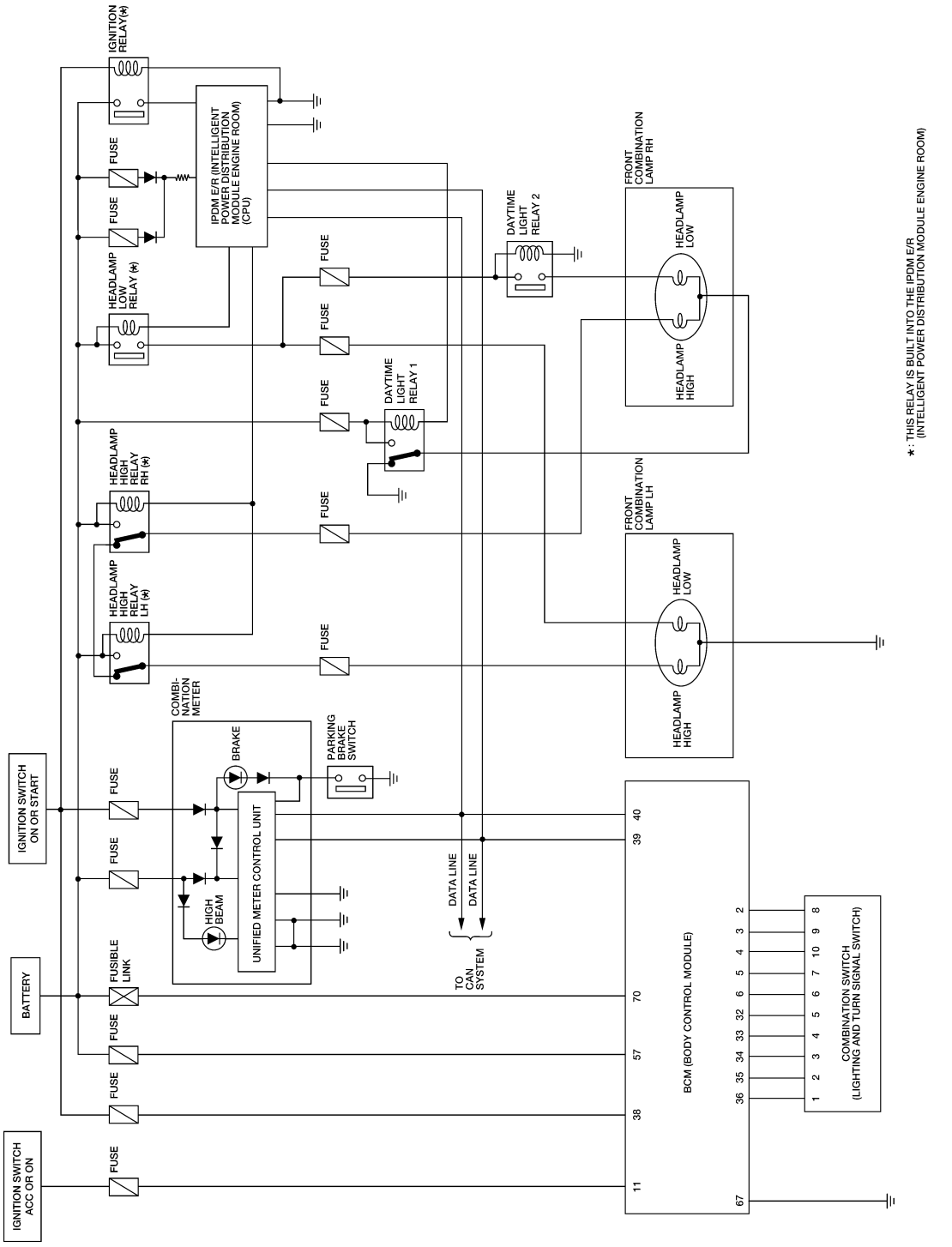
CAN Communication System Description

INFOID:0000000007330593

Refer to LAN-5, "System Description" .

Schematic

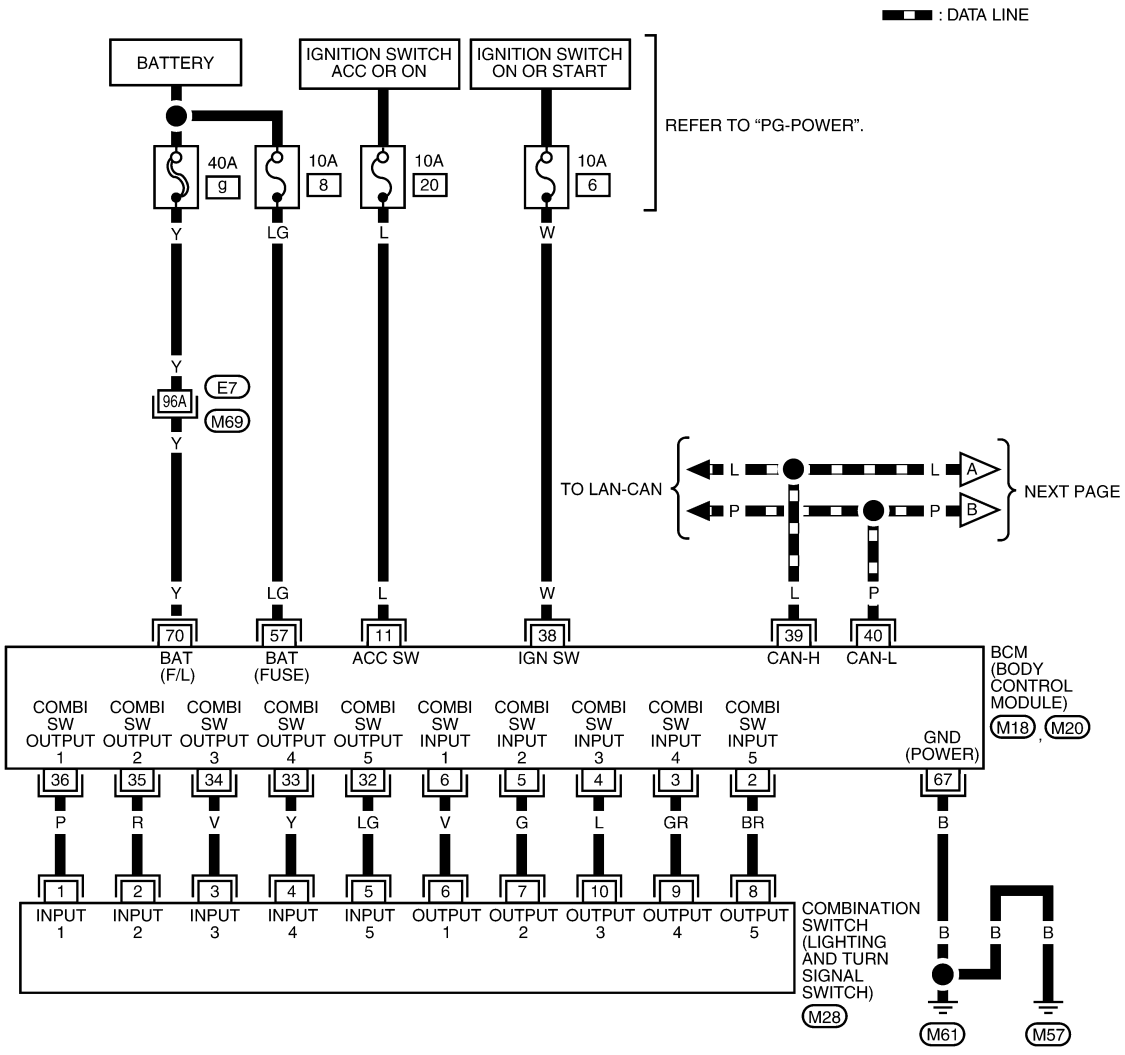
INFOID:0000000007330594

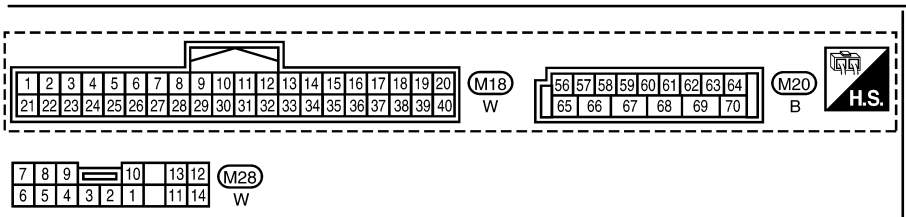


Wiring Diagram - DTRL -

INFOID:0000000007330595

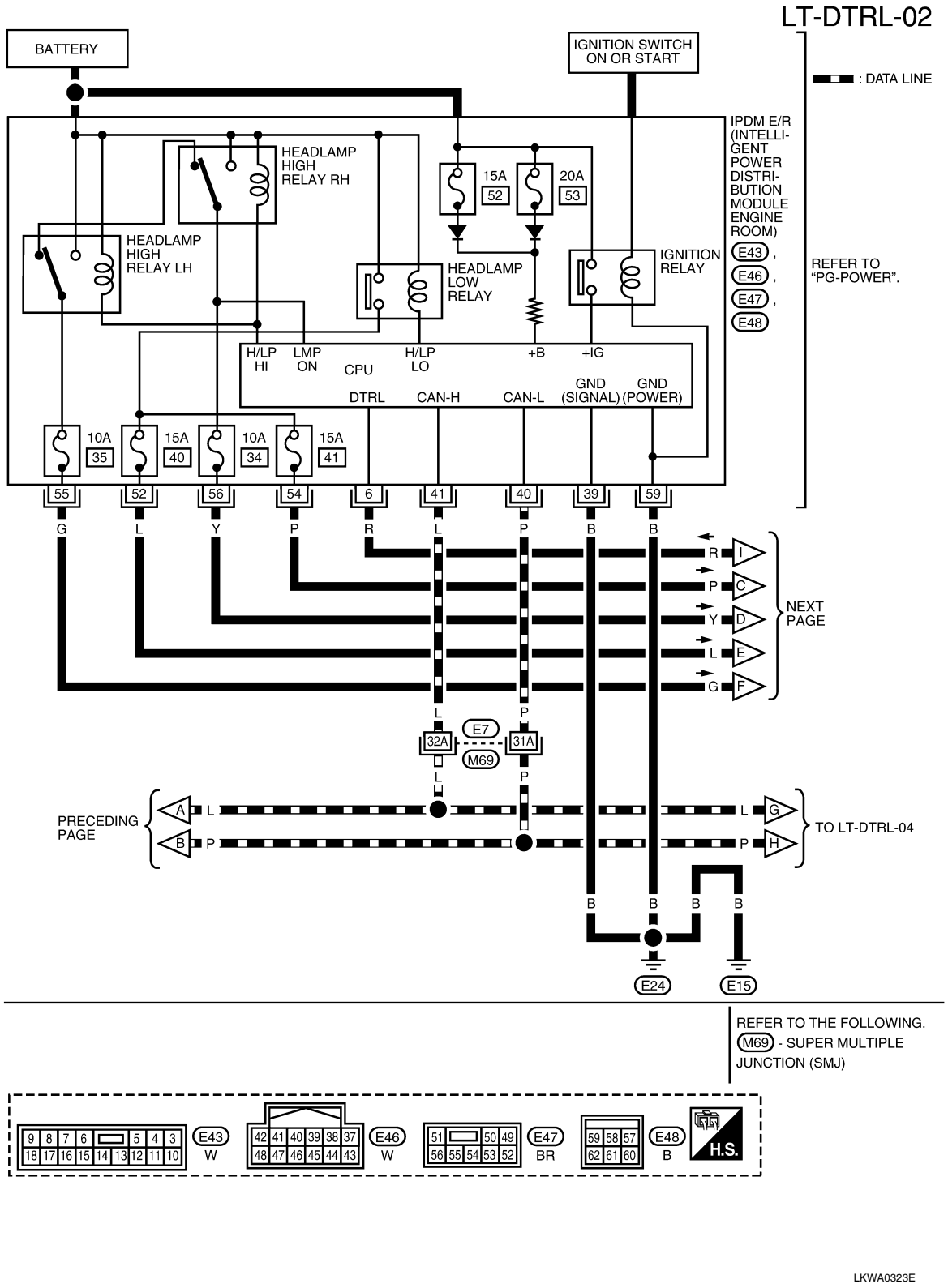
LT-DTRL-01





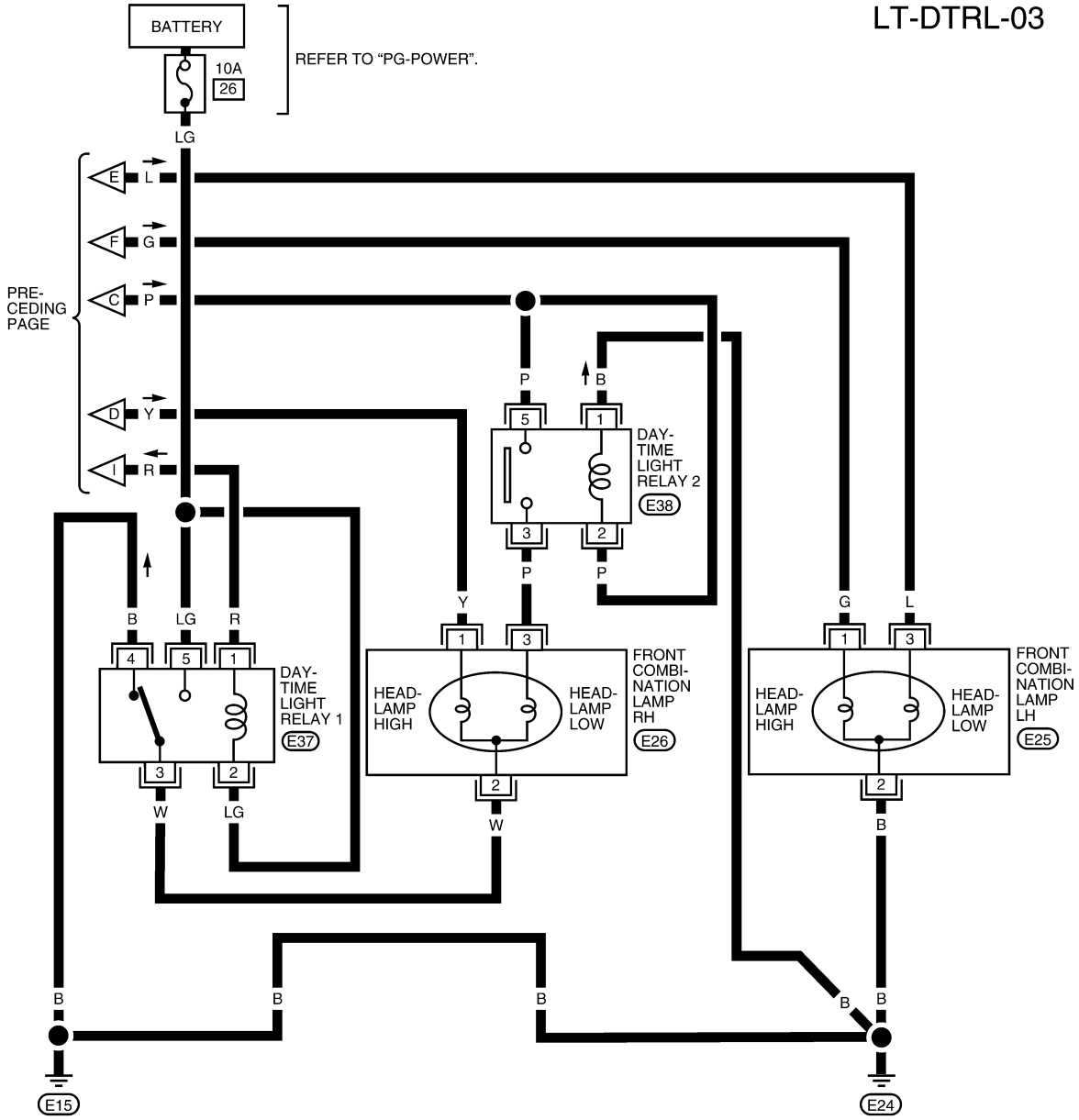
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

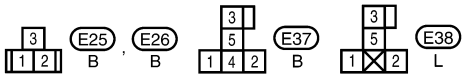
ABLWA1015GB


LT-DTRL-02
BATTERY
IGNITION SWITCH ON OR START
: DATA LINE
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E43, E46, E47, E48
REFER TO "PG-POWER".
HEADLAMP HIGH RELAY RH
HEADLAMP HIGH RELAY LH
HEADLAMP LOW RELAY
IGNITION RELAY
15A 52
20A 53
H/LP HI
LMP ON
CPU
H/LP LO
+B
+IG
DTRL
CAN-H
CAN-L
GND (SIGNAL)
GND (POWER)
10A 35
15A 40
10A 34
15A 41
55 52 56 54 6 41 40 39 59
G L Y P R L P B B
NEXT PAGE
E7
32A
31A
M69
PRECEDING PAGE
TO LT-DTRL-04
E24
E15
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
E43 W
E46 W
E47 BR
E48 B
H.S.

LKWA0323E

LT-DTRL-03





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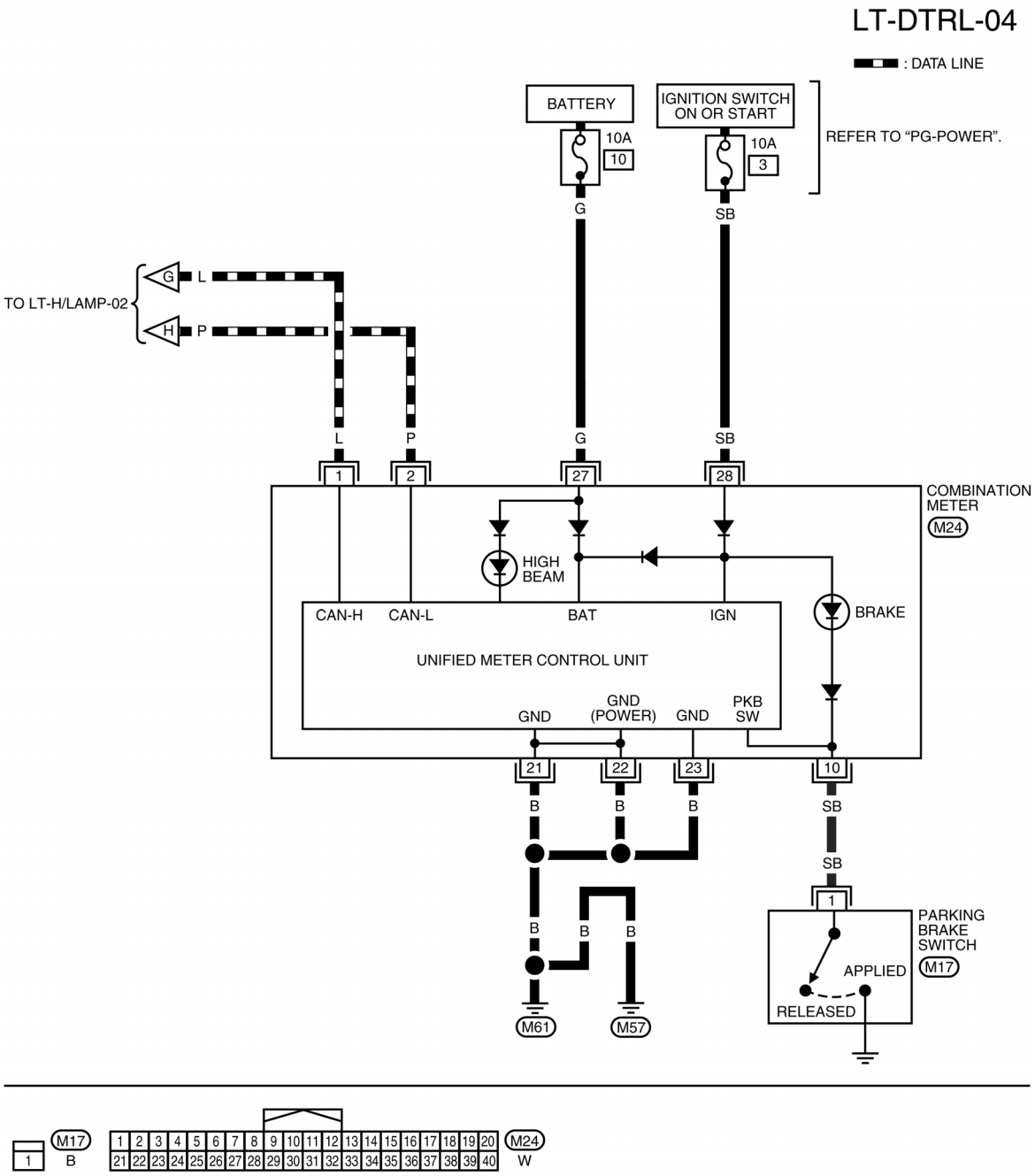

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Terminal and Reference Value for BCM

INFOID:0000000007330596

Refer to BCS-12, "Terminal and Reference Value for BCM"

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330597

Refer to PG-24, "Terminal and Reference Value for IPDM E/R" .

How to Perform Trouble Diagnosis

INFOID:0000000007330598

1. Confirm the symptom or customer complaint.
2. Understand operation description and function description. Refer to LT-27, "System Description" .
3. Perform the Preliminary Check. Refer to LT-35, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Does the daytime light system operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. INSPECTION END

Preliminary Check

INFOID:0000000007330599

CHECK BCM CONFIGURATION

1.CHECK BCM CONFIGURATION

Confirm BCM configuration for "DTRL" is set to "WITH". Refer to BCS-18, "Configuration" .

OK or NG

OK >> Continue preliminary check. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

NG >> Change BCM configuration for "DTRL" to "WITH". Refer to BCS-18, "Configuration" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR IPDM E/R

Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330600

Refer to BCS-17, "CONSULT Function (BCM)" .

CONSULT Function (IPDM E/R)

INFOID:0000000007330601

Refer to PG-18, "CONSULT Function (IPDM E/R)" .

Daytime Light Control Does Not Operate Properly (High Beam Headlamps Operate Properly)

INFOID:0000000007330602

1.CHECK DAYTIME LIGHT RELAY 1 FUSE

Inspect daytime light relay fuse 10A fuse (No. 26, located in the fuse and fusible link box).

OK or NG

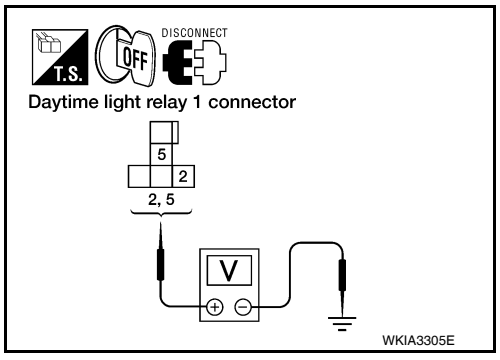
OK >> GO TO 2.

NG >> Repair harness.

2.CHECK DAYTIME LIGHT RELAY 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Remove daytime light relay 1.
3. Check voltage between daytime light relay 1 harness connector E37 terminals 2, 5 and ground.

2, 5 - Ground : Battery voltage should exist.



OK or NG

OK >> GO TO 3.

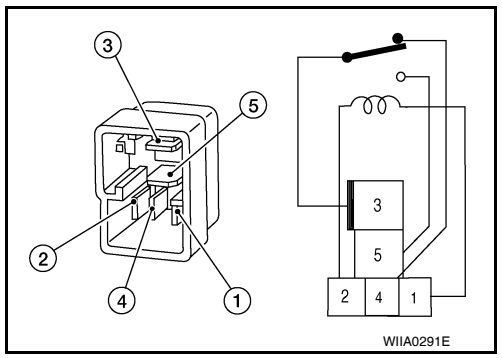
NG >> Repair harness or connector.

3.CHECK DAYTIME LIGHT RELAY 1

1. Apply battery voltage to daytime light relay 1 terminal 2 and supply ground to terminal 1.

2. Check continuity between terminals 3 and 5.

3 - 5 : Continuity should exist.



OK or NG

OK >> GO TO 4.
NG >> Replace daytime light relay 1.

4. CHECK INPUT SIGNAL

1. Connect daytime light relay 1.
2. Apply parking brake and start engine. Headlamp switch OFF.
3. Select "IPDM E/R" on CONSULT. With DATA MONITOR, make sure "DTRL REQ" turns OFF-ON linked with operation of parking brake switch.

Parking brake ON : DTRL REQ OFF
Parking brake OFF : DTRL REQ ON

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. CHECKING CAN COMMUNICATIONS

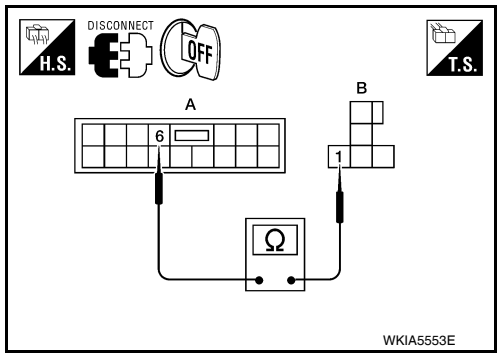
Select "BCM" on CONSULT and perform self-diagnosis for BCM.

Displayed self-diagnosis results

NO DTC>>Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
CAN COMM CIRCUIT>> Check BCM CAN communication system. Refer to LAN-14, "Trouble Diagnosis Flow Chart" .

6. CHECK DAYTIME LIGHT RELAY 1 CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect daytime light relay 1 connector E37.
3. Disconnect IPDM E/R connector E43.
4. Check continuity between IPDM E/R connector E43 (A) terminal 6 and daytime light relay 1 connector E37 (B) terminal 1.



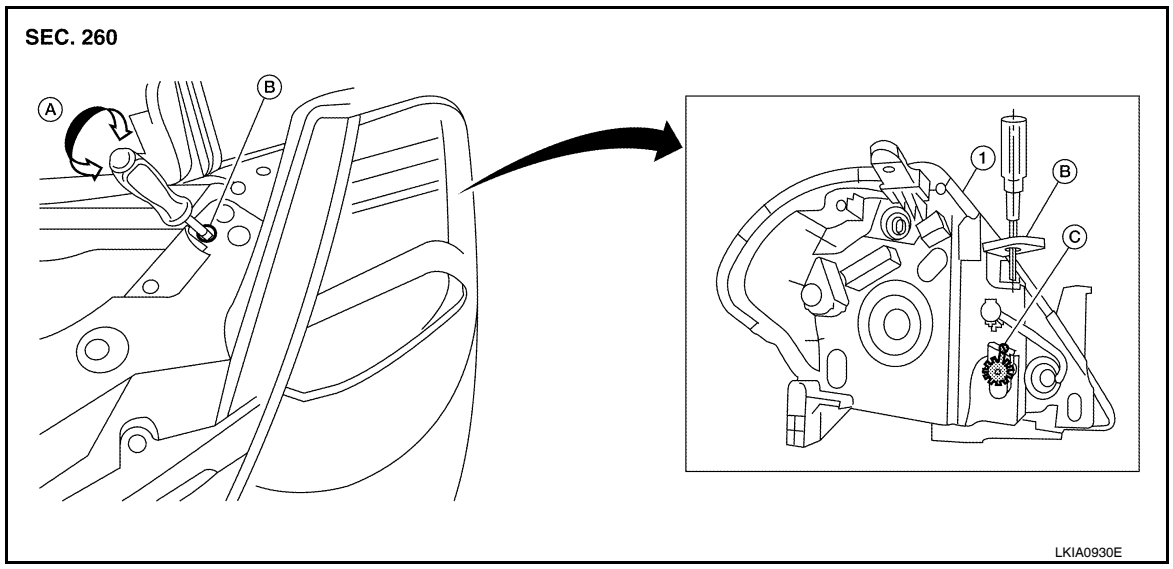
A		B		Continuity
Connector	Terminal	Connector	Terminal	Yes
E43	6	E37	1	

OK or NG

OK >> Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

Aiming Adjustment

INFOID:0000000007330603



1. Headlamp
A. Inner and outer adjustment
B. Adjusting screw access hole
C. Adjusting screw

PREPARATION BEFORE ADJUSTING

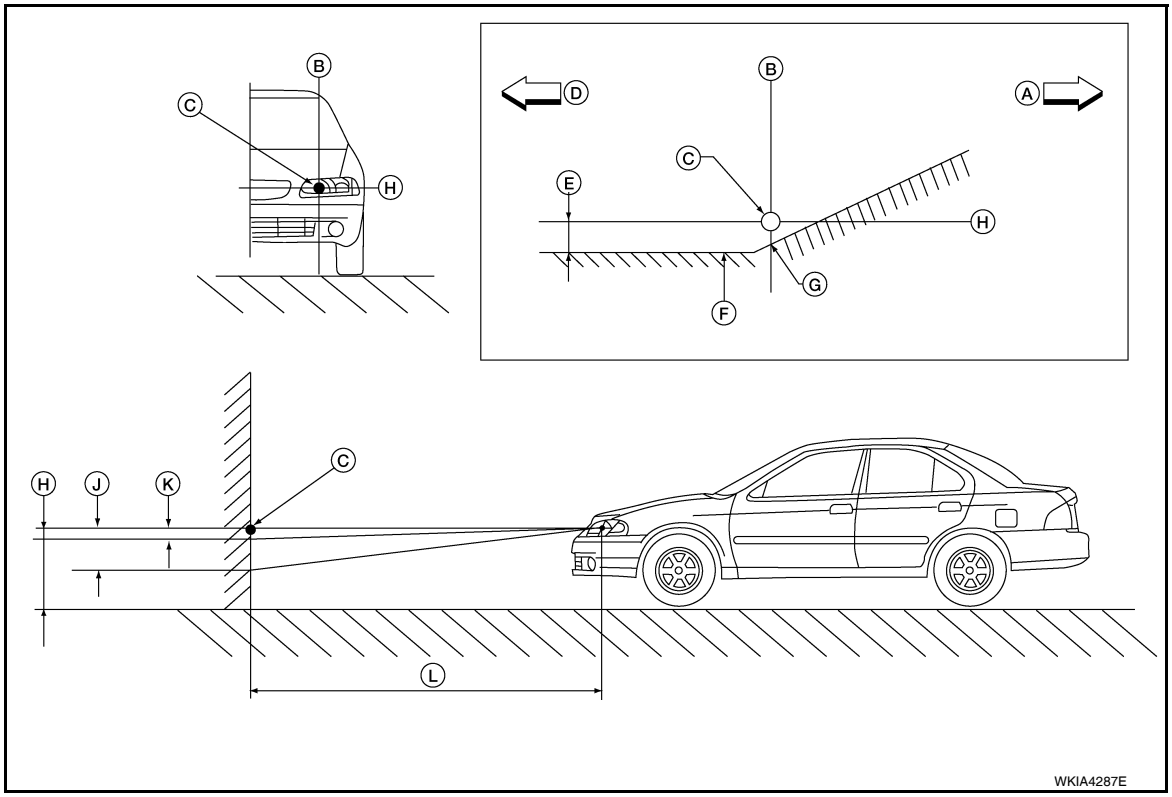
Before performing aiming adjustment, check the following.

1. Keep all tires inflated to correct pressures.
2. Place vehicle on level surface.
3. Set that there is no-load in vehicle other than the driver (or equivalent weight placed in driver's position). Coolant, engine oil filled up to correct level and full fuel tank, spare tire, jack and tools are properly stowed.

LOW BEAM AND HIGH BEAM

1. Turn headlamp low beam ON.
2. Use adjusting screw to perform aiming adjustment.
3. Insert the tool through the adjusting screw access hole to avoid damage to the adjusting screw.

ADJUSTMENT USING AN ADJUSTMENT SCREEN (LIGHT/DARK BORDERLINE)



A.	Right	B.	Vertical center line of headlamp	C.	Horizontal and vertical aiming center point of headlamp
D.	Left	E.	Vertical aiming cutoff point	F.	Cutoff line for vertical aiming evaluation
G.	Acceptable vertical cutoff setting at horizontal aiming point	H.	Horizontal center line of headlamp	J.	Maximum acceptable vertical aiming point
K.	Minimum acceptable vertical aiming point	L.	Aiming distance from center of headlamp to aiming screen		

• Aim each headlamp individually and ensure other headlamp beam pattern is blocked from screen.
- For vertical headlamp aiming, adjust headlamp until beam pattern is positioned per specified dimensions.

Description	Halogen Headlamp
Vertical aiming cutoff point (E)	53.2 mm (2.094 in)
Minimum acceptable vertical aiming point (K)	13.3 mm (0.52 in)
Maximum acceptable vertical aiming point (J)	93.1 mm (3.67 in)
Aiming distance from center of headlamp to aiming screen (L)	7.62 m (25 ft)

Bulb Replacement

INFOID:0000000007330604

CAUTION:
After installing bulb, be sure to install plastic cap and bulb socket securely to ensure watertightness.

HEADLAMP (HIGH/LOW)

1. Turn lighting switch OFF.
2. Disconnect headlamp bulb connector.
3. Remove headlamp bulb back cover.
4. Unlock retaining spring and remove bulb from front combination lamp assembly.

PARKING LAMP

1. Turn lighting switch OFF.

2. Turn bulb socket counterclockwise and unlock from front combination lamp assembly.
3. Remove bulb from its socket.

FRONT TURN SIGNAL LAMP

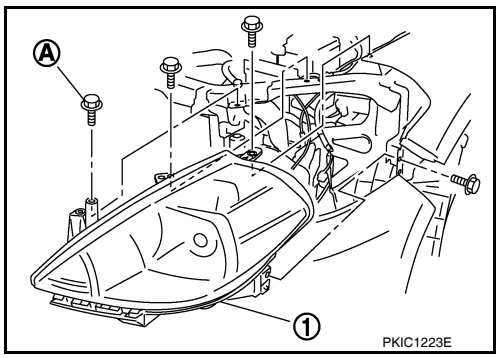
1. Turn lighting switch OFF.
2. Turn bulb socket counterclockwise and unlock from front combination lamp assembly.
3. Remove bulb from its socket.

Removal and Installation

INFOID:0000000007330605

REMOVAL

1. Disconnect the negative battery terminal.
2. Remove front bumper fascia. Refer to EI-15.
3. Remove front combination lamp assembly bolts (A).
4. Pull front combination lamp assembly (1) toward the vehicle front, disconnect connector, and remove assembly.



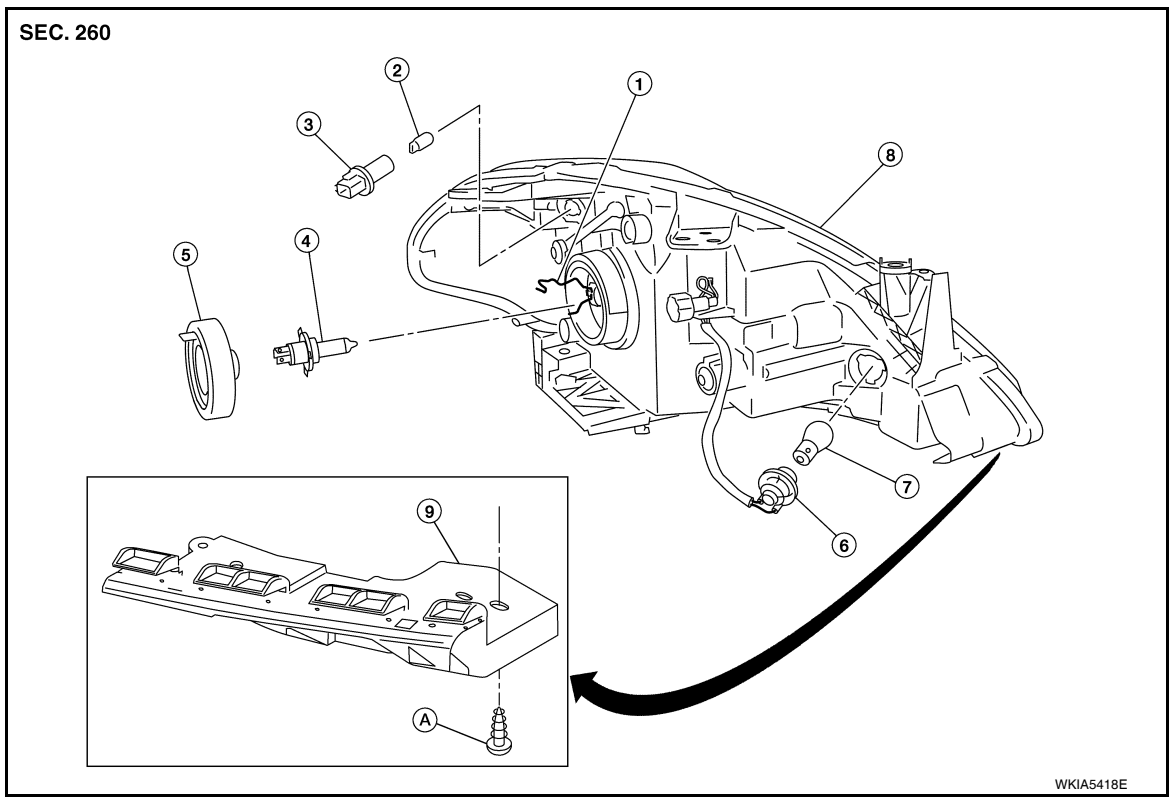
INSTALLATION

Installation is in the reverse order of removal.

- After installation, perform aiming adjustment. Refer to LT-37, "Aiming Adjustment".

Disassembly and Assembly

INFOID:0000000007330606



1. Retaining spring
2. Parking lamp bulb
3. Parking lamp bulb socket
4. Halogen headlamp bulb (High/Low)
5. Headlamp bulb back cover
6. Front turn signal lamp bulb socket
7. Front turn signal lamp bulb
8. Front combination lamp assembly
9. Bumper stay

A. Screw

DISASSEMBLY

1. Remove back cover.
2. Unlock retaining spring and remove bulb (High/Low).
3. Turn parking (clearance) lamp bulb socket counterclockwise and unlock it.
4. Remove parking (clearance) lamp bulb from its socket.
5. Turn front turn signal lamp bulb socket counterclockwise and unlock it.
6. Remove front turn signal lamp bulb from its socket.
7. Remove the bumper stay.

ASSEMBLY

Assembly is in the reverse order of disassembly.

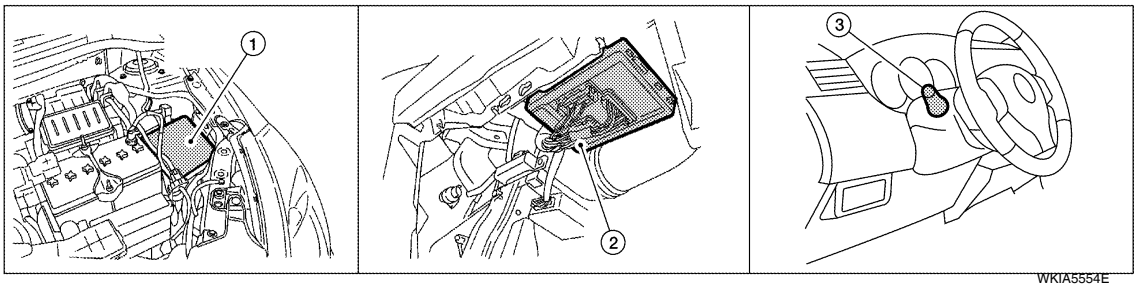
CAUTION:

- **After installing bulb, be sure to install plastic cap securely to insure water tight seal.**

FRONT FOG LAMP

Component Parts and Harness Connector Location

INFOID:0000000007330607



1. IPDM E/R E46, E47 and E48
2. BCM M18 and M20 (viewed with glove box removed)
3. Combination switch (lighting and turn signal switch) M28

System Description

INFOID:0000000007330608

The front fog lamps are controlled by lighting switch inputs to the BCM (body control module). The lighting switch must be in the 1ST or 2ND position with the high beams OFF before the BCM will request the IPDM E/R (intelligent power distribution module engine room) to turn the front fog lamps on. The BCM requests the front fog lamps over the CAN communication lines to the IPDM E/R. The CPU (central processing unit) of the IPDM E/R controls the front fog lamp relay coil ground. When energized, the relay directs power to the front fog lamps.

OUTLINE

Power is supplied at all times:
- to front fog lamp relay (located in IPDM E/R),
- to ignition relay (located in IPDM E/R),
- through 15A fuse (No. 52, located in IPDM E/R) and
- through 20A fuse (No. 53, located in IPDM E/R)
- to CPU located in IPDM E/R,
- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM terminal 70,
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57,

With the ignition switch in the ON or START position, power is supplied:
- to ignition relay (located in IPDM E/R),
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in fuse block (J/B)]
- to BCM terminal 11.

Ground is supplied
- to BCM terminal 67
- through grounds M57 and M61,
- to IPDM E/R terminals 39 and 59
- through grounds E15 and E24.

FOG LAMP OPERATION

The front fog lamp switch is built into the lighting switch. The lighting switch must be in 1ST position or 2ND position and front fog lamp switch must be ON position for front fog lamp operation. The fog lamp will not operate with the high beam headlamps ON.

When the front fog lamp switch is in the ON position, the BCM sends a request, via the CAN communication lines, to the CPU of the IPDM E/R to ground the coil side of the front fog lamp relay. The front fog lamp relay then directs power
- through 15A fuse (No. 56, located in IPDM E/R)
- through IPDM E/R terminal 50
- to front fog lamp LH terminal 1, and

- through IPDM E/R terminal 51
- to front fog lamp RH terminal 1.

Ground is supplied

- to front fog lamp terminal 2,
- through grounds E15 and E24.

With power and grounds supplied, front fog lamps illuminate.

COMBINATION SWITCH READING FUNCTION

Refer to BCS-4, "System Description" .

EXTERIOR LAMP BATTERY SAVER CONTROL

Refer to LT-72, "System Description" .

CAN Communication System Description

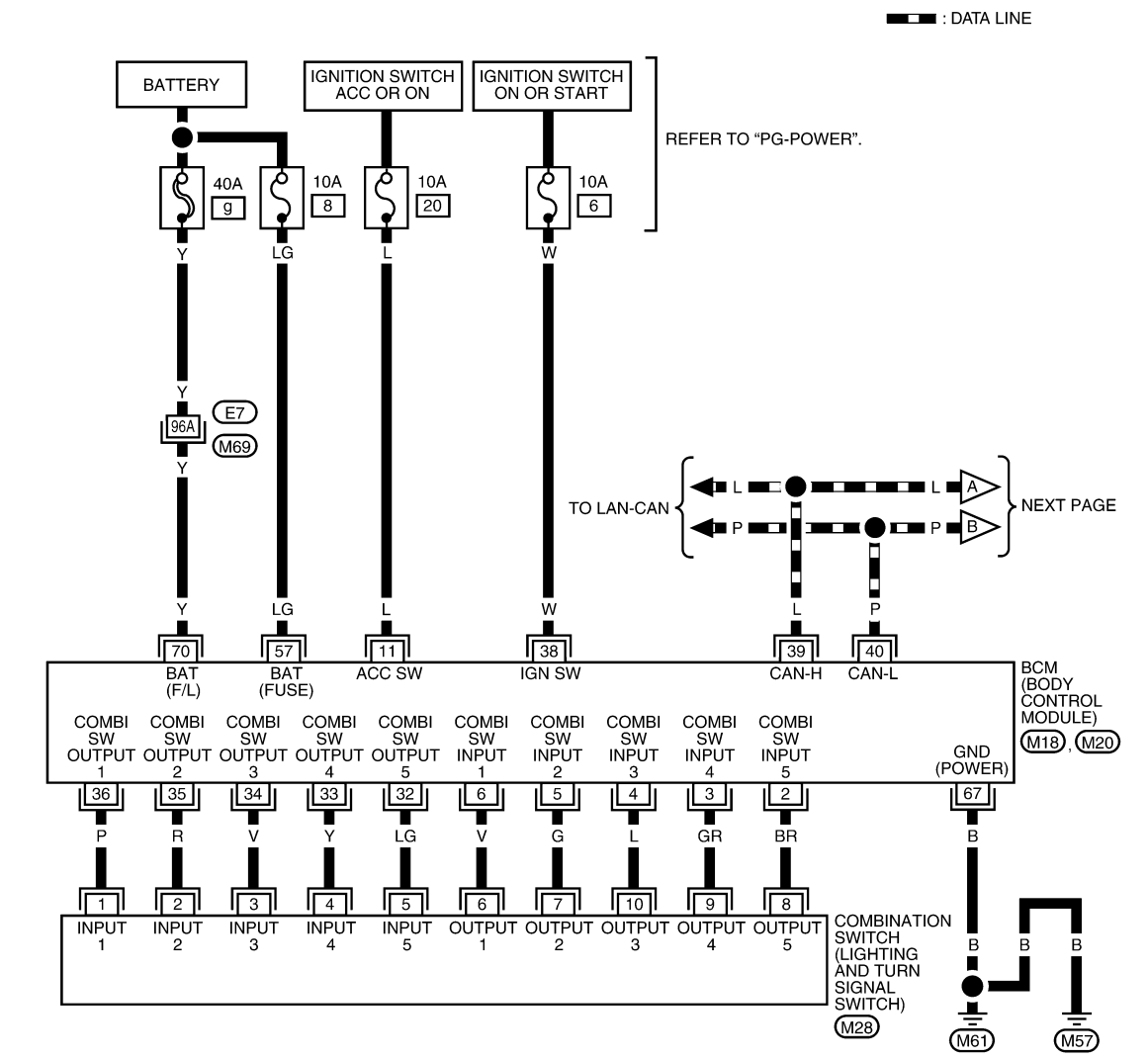
INFOID:0000000007330609

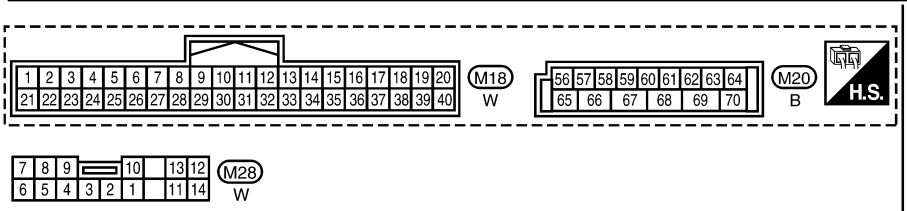
Refer to LAN-5, "System Description" .

Wiring Diagram - F/FOG -

INFOID:0000000007330610

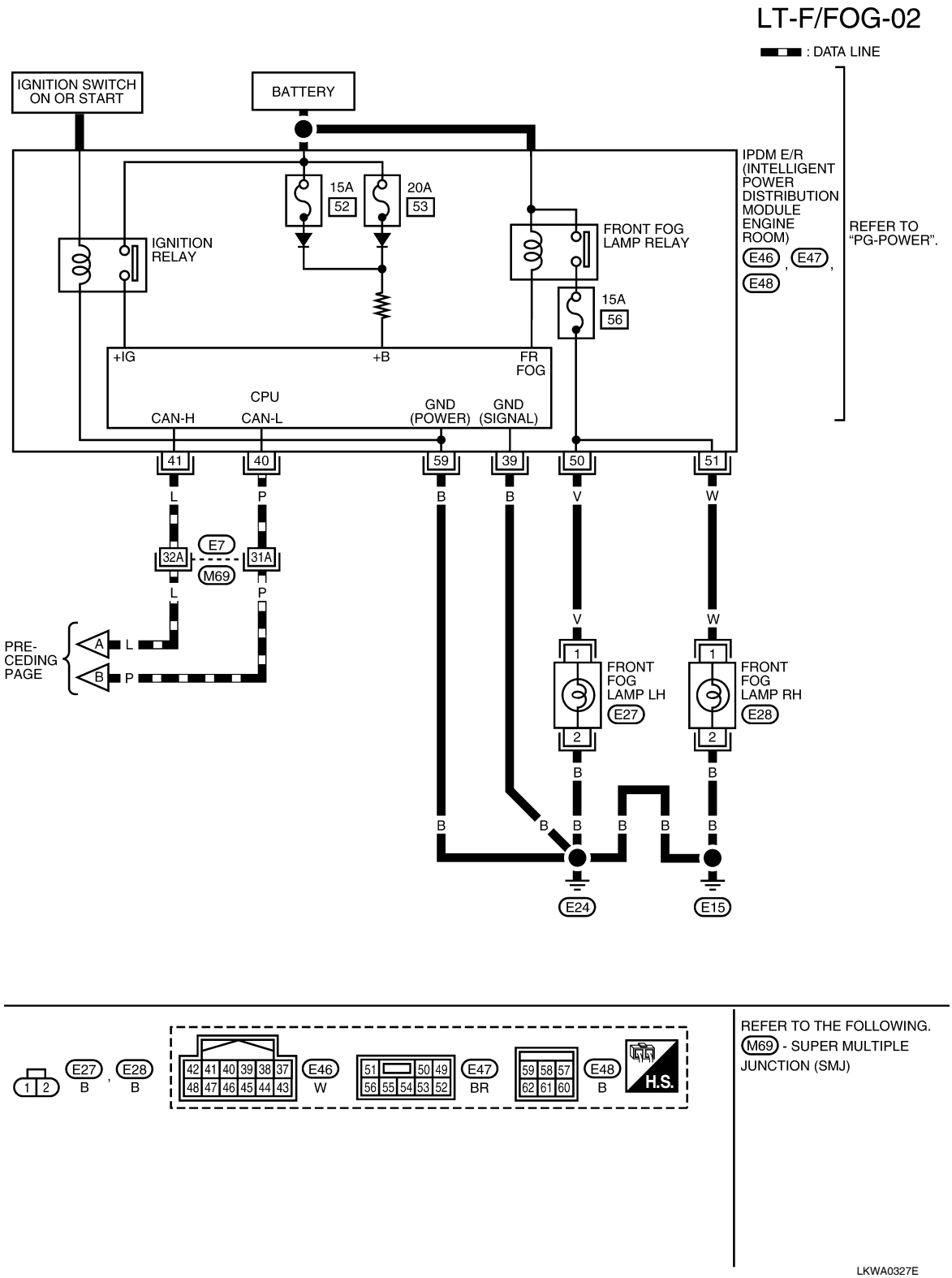
LT-F/FOG-01





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABLWA1016GB



Terminal and Reference Value for BCM

INFOID:0000000007330611

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330612

Refer to PG-24, "Terminal and Reference Value for IPDM E/R" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330613

1. Confirm the symptom or customer complaint.
2. Understand operation description and function description. Refer to LT-41, "System Description" .
3. Perform the Preliminary Check. Refer to LT-45, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Do the front fog lamps operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. INSPECTION END.

Preliminary Check

INFOID:0000000007330614

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM
Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR IPDM E/R
Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330615

Refer to BCS-17, "CONSULT Function (BCM)" .

CONSULT Function (IPDM E/R)

INFOID:0000000007330616

Refer to PG-18, "CONSULT Function (IPDM E/R)" .

Front Fog lamps Do Not Illuminate (Both Sides)

INFOID:0000000007330617

1.INSPECT FOG LAMP FUSE

Inspect fog lamp 15A fuse No. 56 in IPDM E/R.

OK or NG

OK >> GO TO 2.
NG >> Repair harness.

2.CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

1. Select “BCM” on CONSULT. Select “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR FOG SW” turns ON-OFF linked with operation of fog lamp switch.

When fog lamp switch is ON : FR FOG SW ON

With CONSULT
Select “BCM” on CONSULT. With “HEAD LAMP” data monitor, make sure “FR FOG SW” turns ON-OFF linked with operation of front fog lamp switch.
Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

3.FOG LAMP ACTIVE TEST

With CONSULT
1. Select “IPDM E/R” on CONSULT Select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
3. Touch “FOG” screen.
4. Make sure front fog lamp operates.

Front fog lamp should operate.

Without CONSULT
1. Start auto active test. Refer to PG-20, "Auto Active Test" .
2. Make sure front fog lamp operates.

Front fog lamp should operate.

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK IPDM E/R

1. Select “IPDM E/R” on CONSULT. Select “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Make sure “FR FOG REQ” turns ON when front fog lamp switch is in ON position.

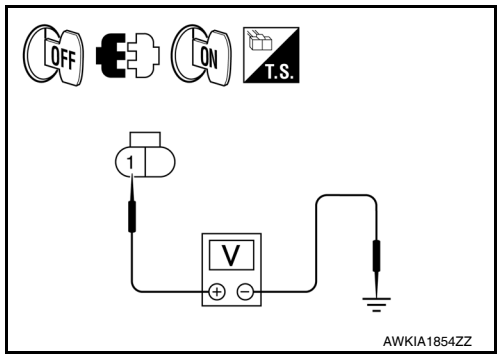
When front fog lamp switch is ON position : FR FOG REQ ON

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Replace BCM. Refer toBCS-19, "Removal and Installation of BCM" .

5. CHECK FOG LAMP INPUT SIGNAL

With CONSULT
1. Turn ignition switch OFF.
2. Disconnect front fog lamp connector.
3. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
5. Touch “FOG” screen.
6. When front fog lamp relay is operating, check voltage between front fog lamp harness connector and ground.



(+)		(–)	Voltage
Front fog lamp connector	Terminal		
RH	E28	1	Ground	Battery voltage
LH	E27			

Without CONSULT
1. Turn ignition switch OFF.
2. Disconnect front fog lamp connector.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. When front fog lamp relay is operating, check voltage between front fog lamp harness connector and ground.

(+)		(–)	Voltage
Front fog lamp connector	Terminal		
RH	E28	1	Ground	Battery voltage
LH	E27			

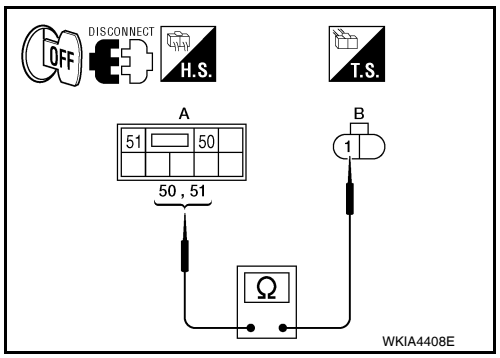
OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. CHECK FOG LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.

3. Check continuity between IPDM E/R harness connector (A) and front fog lamp harness connector (B).



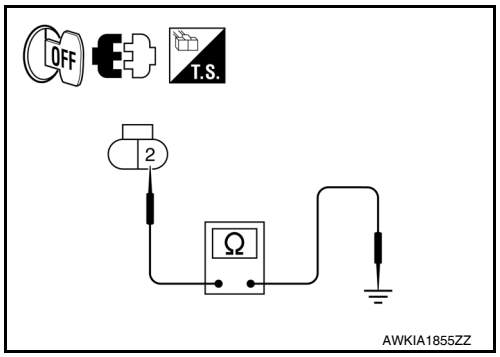
Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	51	E28	1	Yes
LH		50	E27		

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

7. CHECK FOG LAMP GROUND

1. Check continuity between front fog lamp harness connector and ground.



Front fog lamp connector		Terminal	Ground	Continuity
RH	E28	2		Yes
LH	E27			

OK or NG

OK >> Check front fog lamp bulbs.
NG >> Repair harness or connector.

Front Fog Lamp Does Not Illuminate (One Side)

INFOID:0000000007330618

1. CHECK BULB

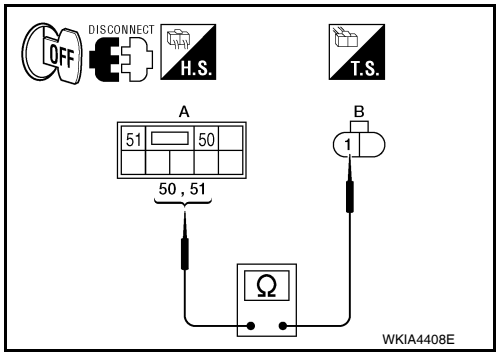
Check bulb of lamp which does not illuminate.

OK or NG

OK >> GO TO 2.
NG >> Replace front fog lamp bulb.

2. CHECK FOG LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front fog lamp connector.
3. Check continuity between IPDM E/R harness connector (A) and front fog lamp harness connector (B).



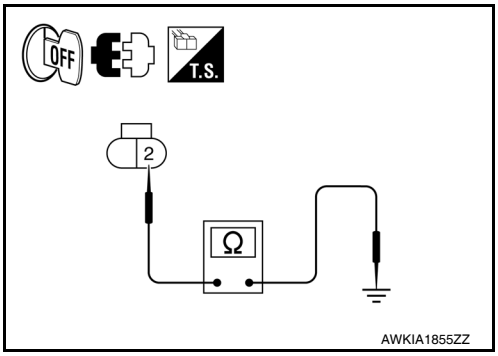
Circuit	A		B		Continuity
	Connector	Terminal	Connector	Terminal	
RH	E47	51	E28	1	Yes
LH		50	E27		

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK FOG LAMP GROUND

1. Check continuity between front fog lamp harness connector and ground.



Front fog lamp connector		Terminal		Continuity
RH	E28	2	Ground	Yes
LH	E27			

OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

NG >> Repair harness or connector.

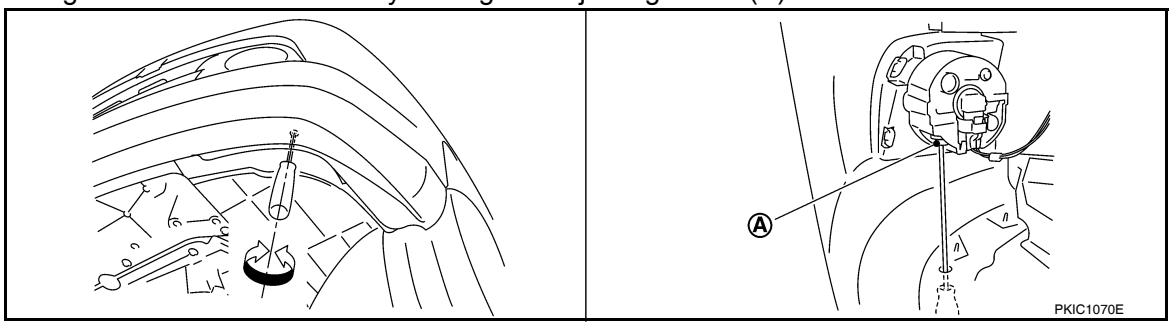
Aiming Adjustment

INFOID:0000000007330619

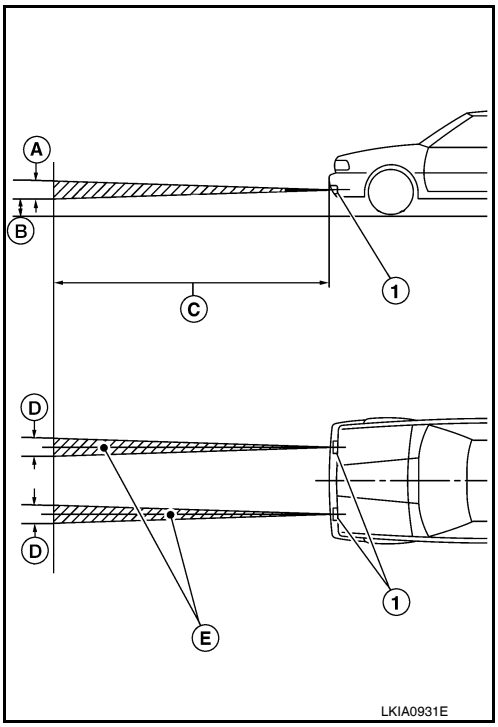
The front fog lamp is a semi-sealed beam type which uses a replaceable halogen bulb. Before performing aiming adjustment, make sure of the following.

- Keep all tires inflated to correct pressure.
- Place vehicle on level surface.
- Set that there is no-load in vehicle other than the driver (or equivalent weight placed in driver's position). Coolant, engine oil filled up to correct level and full fuel tank, spare tire, jack and tools are properly stowed.

Adjust aiming in the vertical direction by turning the adjusting screw (A).



1. Set the distance (C) between the screen and the center of front fog lamp lens as shown.
   - Vertical center line of fog lamp (E).
2. Turn front fog lamps (1) to ON.
3. Adjust front fog lamps using adjusting screw so that the top edge of the high intensity zone (A) is as shown.



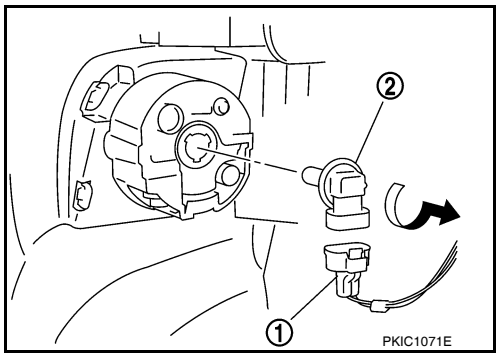
Aiming distance from center of fog lamp to screen (C)	10 m (32.8 ft)
Fog lamp beam width (D)	870 mm (34.3 in)
Distance from ground to bottom edge of high intensity zone (B)	220 mm (8.7 in)
Distance from bottom edge to top edge of high intensity zone (A)	21.75 mm (0.9 in)

NOTE:
When performing adjustment, if necessary, cover the headlamps and opposite front fog lamp.

Bulb Replacement

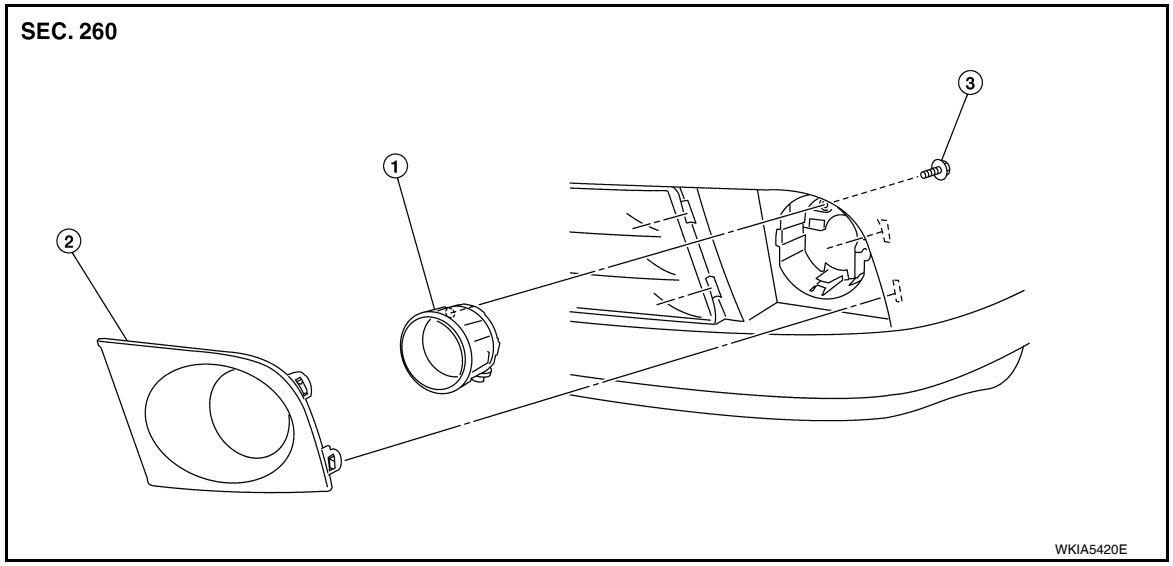
INFOID:0000000007330620

1. Turn lighting switch OFF.
2. Partially remove the fender protector (front) to obtain work space between the fender protector and fender.
3. Disconnect front fog lamp connector (1).
4. Turn bulb socket (2) counterclockwise unlock and remove it.
5. Remove bulb from its socket.



Removal and Installation

INFOID:0000000007330621



1. Front fog lamp
2. Front bumper finisher
3. Bolt

REMOVAL

1. Partially remove the fender protector and undercover to obtain work space between the fender protector and fender.
2. Disconnect front fog lamp connector.
3. Release the pawl, and remove the front bumper finisher from the front bumper.
4. Remove bolt and remove front fog lamp from bracket.

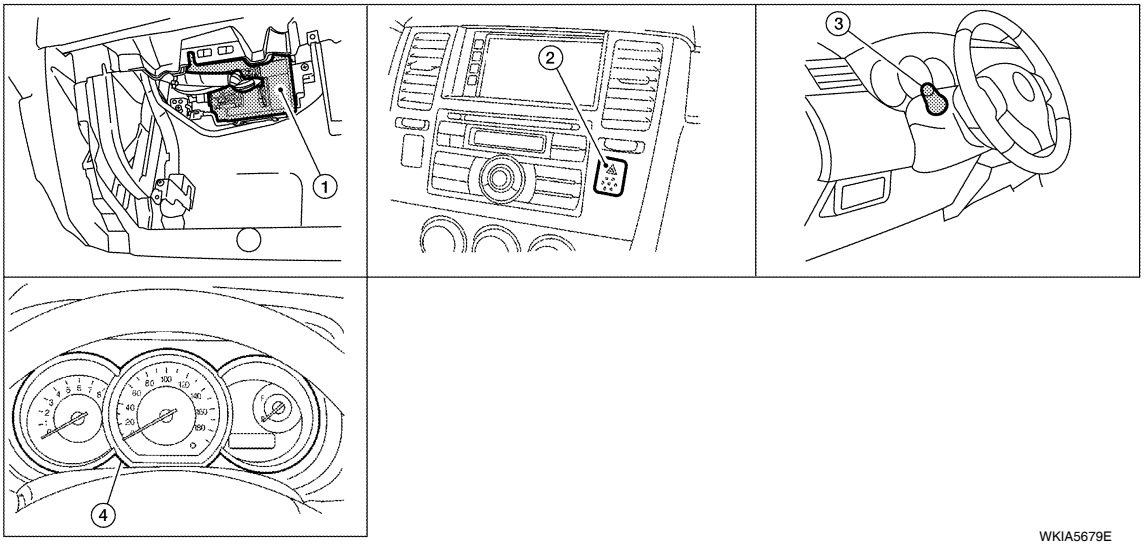
INSTALLATION

Installation is in the reverse order of removal.

TURN SIGNAL AND HAZARD WARNING LAMPS

Component Parts and Harness Connector Location

INFOID:0000000007330622



WKIA5679E

1. BCM M18 and M20 (view with glove box removed)
2. Hazard switch M55
3. Combination switch (lighting and turn signal switch) M28
4. Combination meter M24

System Description

INFOID:0000000007330623

TURN SIGNAL OPERATION

Power is supplied at all times
- through 40A fusible link (letter **g** , located in the fuse and fusible link box)
- to BCM (body control module) terminal 70,
- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to BCM terminal 57,
- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to combination meter terminal 27.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38,
- through 10A fuse [No. 3, located in fuse block (J/B)]
- to combination meter terminal 28.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in the fuse block (J/B)]
- to BCM terminal 11.

Ground is supplied
- to BCM terminal 67 and
- to combination meter terminals 21, 22 and 23
- through grounds M57 and M61.

LH Turn Signal Lamp

When the turn signal switch is moved to the left turn position, the BCM receives an input signal requesting left turn signals to flash. The BCM then supplies power
- through BCM terminal 60
- to front combination lamp LH terminal 4 and
- to rear combination lamp LH terminal 6.

Ground is supplied
- to front combination lamp LH terminal 5
- through grounds E15 and E24,
- to rear combination lamp LH terminal 1

• through grounds B7 and B19.

The BCM also sends a request, via the CAN communication lines, to the combination meter to flash the left turn signal indicator. The unified meter control unit in the combination meter supplies ground to the left turn signal indicator lamp and activates the audible turn signal indicator.

With power, ground and input supplied, the BCM controls the flashing of the turn signal lamps.

RH Turn Signal Lamp

When turn signal switch is moved to the right turn position, the BCM receives an input signal requesting right turn signals to flash. The BCM then supplies power

• through BCM terminal 61
• to front combination lamp RH terminal 4 and
• to rear combination lamp RH terminal 6.

Ground is supplied

• to front combination lamp RH terminal 5
• through grounds E15 and E24,
• to rear combination lamp RH terminal 1
• through grounds B117, B132 and D402.

The BCM also sends a request, via the CAN communication lines, to the combination meter to flash the right turn signal indicator. The unified meter control unit in the combination meter supplies ground to the right turn signal indicator lamp and activates the audible turn signal indicator.

With power, ground and input supplied, the BCM controls the flashing of the turn signal lamps.

HAZARD LAMP OPERATION

Power is supplied at all times

• through 40A fusible link (letter **g** , located in fuse, fusible link and relay box)
• to BCM terminal 70,
• through 10A fuse [No. 8, located in fuse block (J/B)]
• to BCM terminal 57,
• through 10A fuse [No. 10, located in fuse block (J/B)]
• to combination meter terminal 27.

Ground is supplied

• to hazard switch terminal 1,
• to BCM terminal 67, and
• to combination meter terminals 21, 22 and 23
• through grounds M57 and M61.

When hazard switch is depressed, ground is supplied

• through hazard switch terminal 2
• to BCM terminal 29.

BCM then supplies power

• to front combination lamp LH terminal 4 and
• to rear combination lamp LH terminal 6
• through BCM terminal 60,
• to front combination lamp RH terminal 4 and
• to rear combination lamp RH terminal 6
• through BCM terminal 61.

Ground is supplied

• to front combination lamp LH and RH terminal 5
• through grounds E15 and E24,
• to rear combination lamp LH terminal 1
• through grounds B7 and B19,
• to rear combination lamp RH terminal 1
• through grounds B117, B132 and D402.

The BCM also supplies input to combination meter across the CAN communication lines. This input is processed by unified meter control unit in combination meter, which in turn supplies ground to the left and right turn signal indicator lamps.

With power and input supplied, BCM controls flashing of hazard warning lamps.

REMOTE KEYLESS ENTRY SYSTEM OPERATION

Power is supplied at all times

• through 40A fusible link (letter **g** , located in fuse, fusible link and relay box)
• to BCM terminal 70,
• through 10A fuse [No. 10, located in fuse block (J/B)]

• to combination meter terminal 27.
Ground is supplied
• to BCM terminal 67 and
• to combination meter terminals 21, 22 and 23
• through grounds M57 and M61.
When the remote keyless entry system is triggered by input from the keyfob, the BCM supplies power
• through BCM terminal 60
• to front combination lamp LH terminal 4 and
• to rear combination lamp LH terminal 6,
• through BCM terminal 61
• to front turn signal lamp RH terminal 4 and
• to rear combination lamp RH terminal 6.
Ground is supplied
• to front combination lamp LH and RH terminals 5
• through grounds E15 and E24,
• to rear combination lamp LH terminal 1
• through grounds B7 and B19,
• to rear combination lamp RH terminal 1
• through grounds B117, B132 and D402.
The BCM also supplies input to combination meter via the CAN communication lines. This input is processed by the unified meter control unit in combination meter, which in turn supplies ground to the left and right turn signal indicator lamps.
With power and ground supplied, BCM controls flashing of hazard warning lamps when keyfob is used to activate remote keyless entry system.

COMBINATION SWITCH READING FUNCTION

Refer to BCS-4, "System Description" .

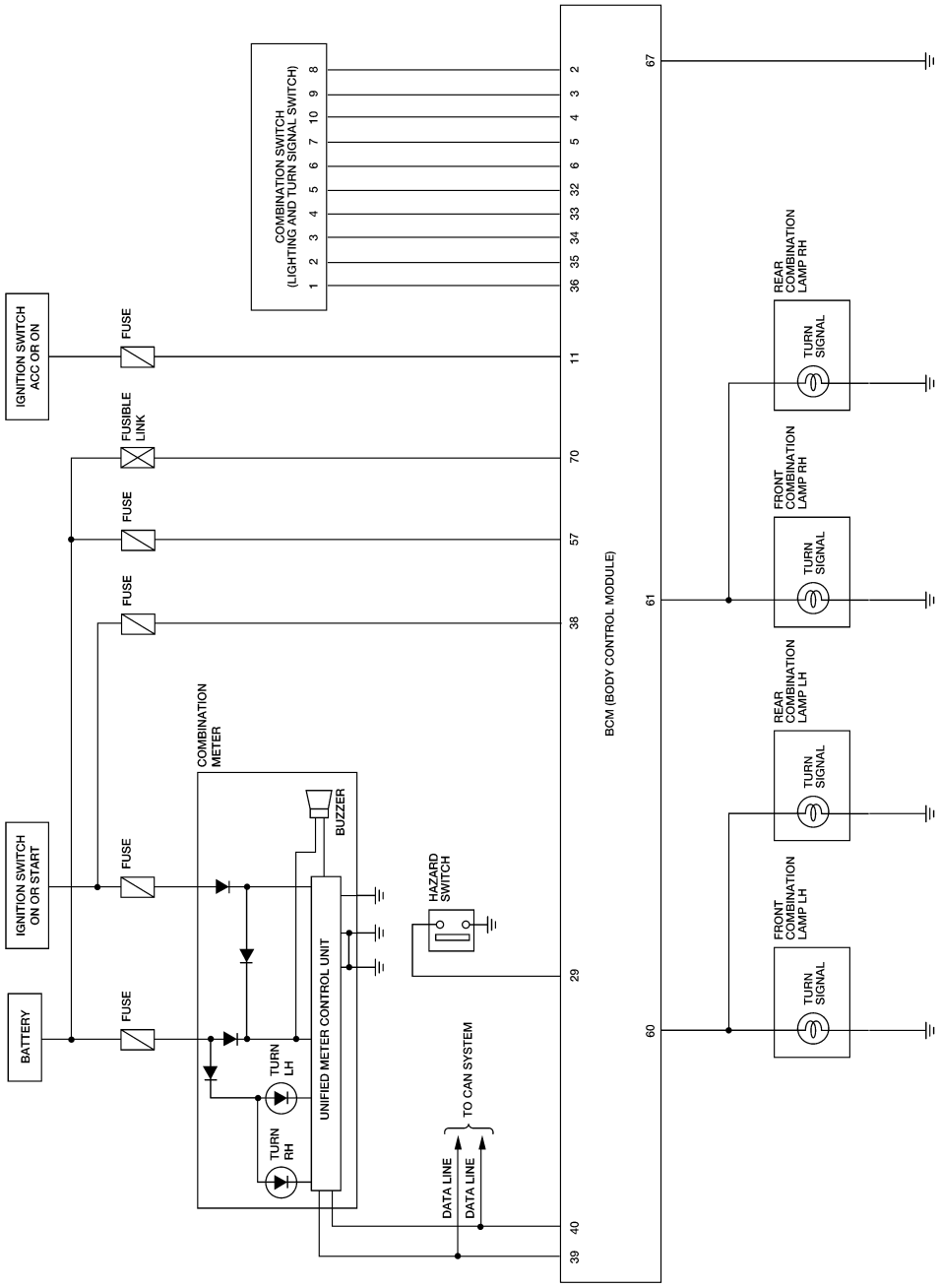
CAN Communication System Description

INFOID:0000000007330624

Refer to LAN-5, "System Description" .

Schematic

INFOID:0000000007330625



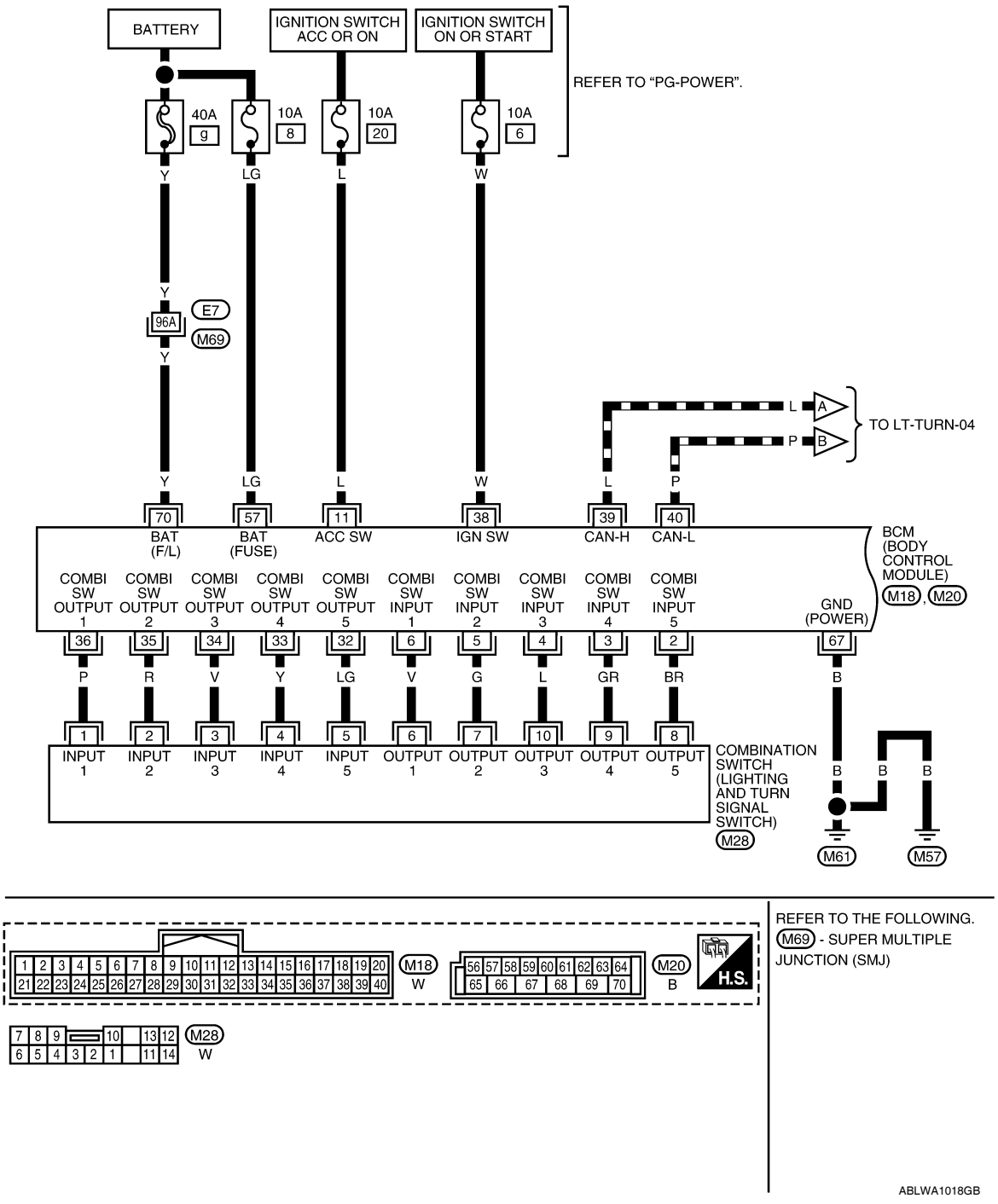
ABLWA1017GB

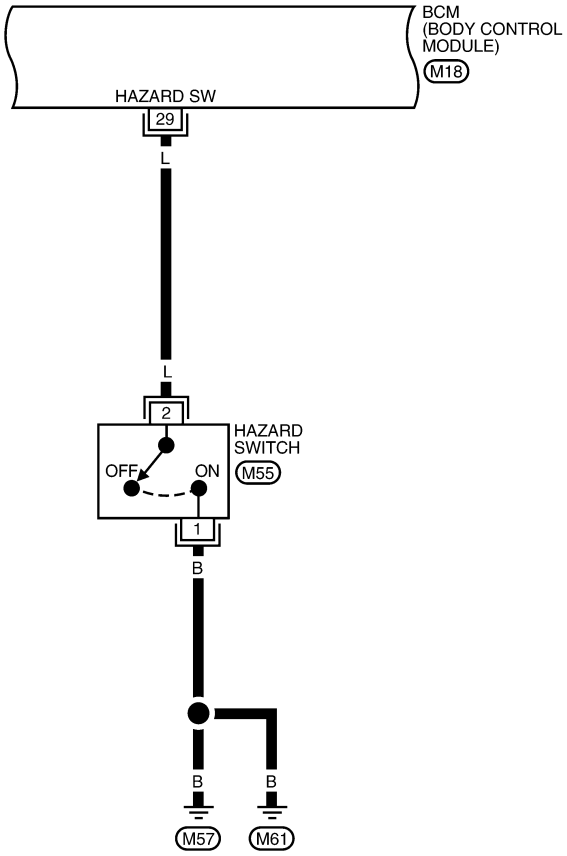
Wiring Diagram - TURN -

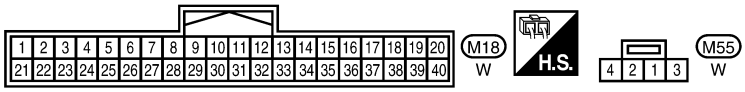
INFOID:0000000007330626

LT-TURN-01

: DATA LINE

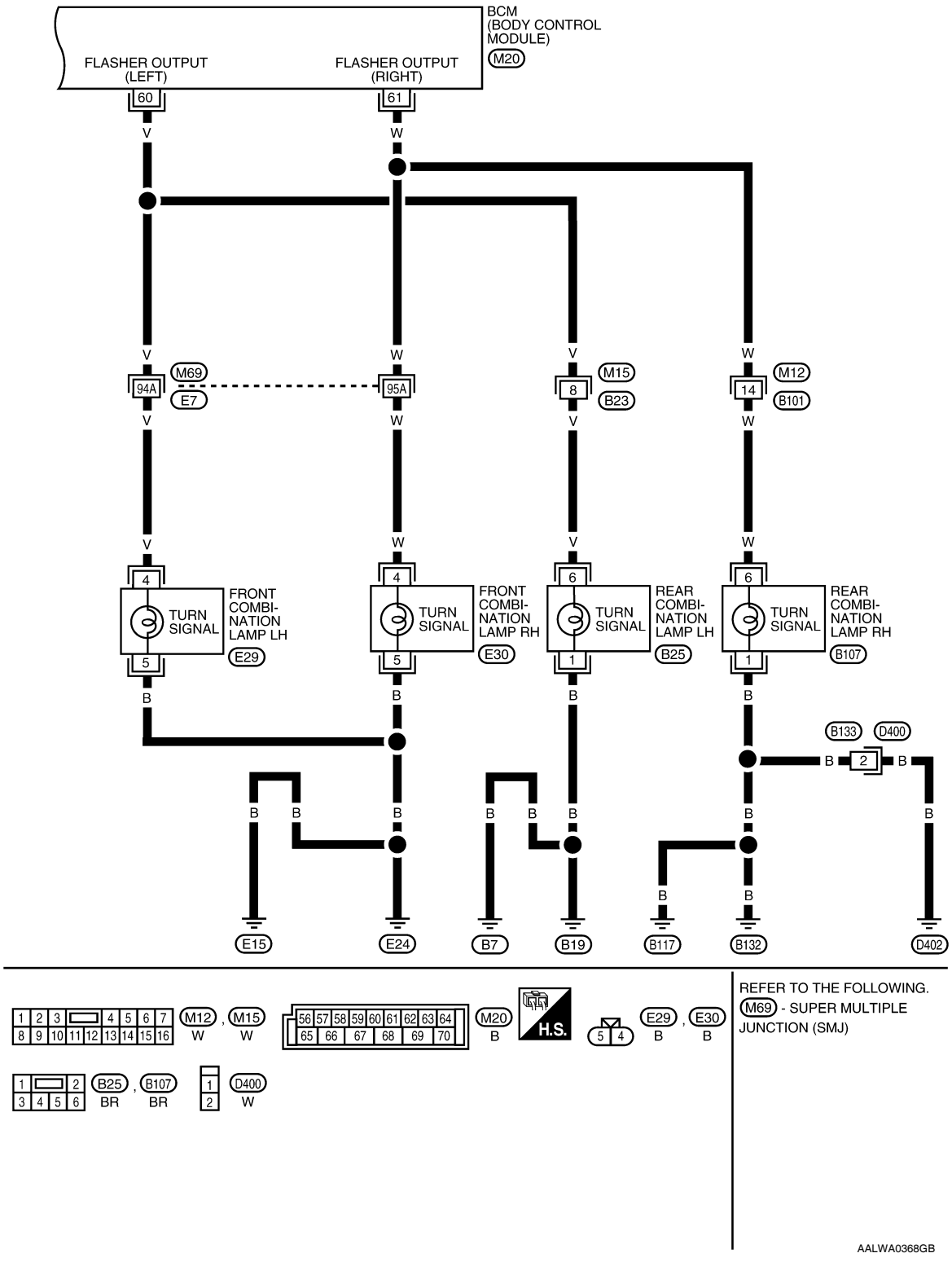


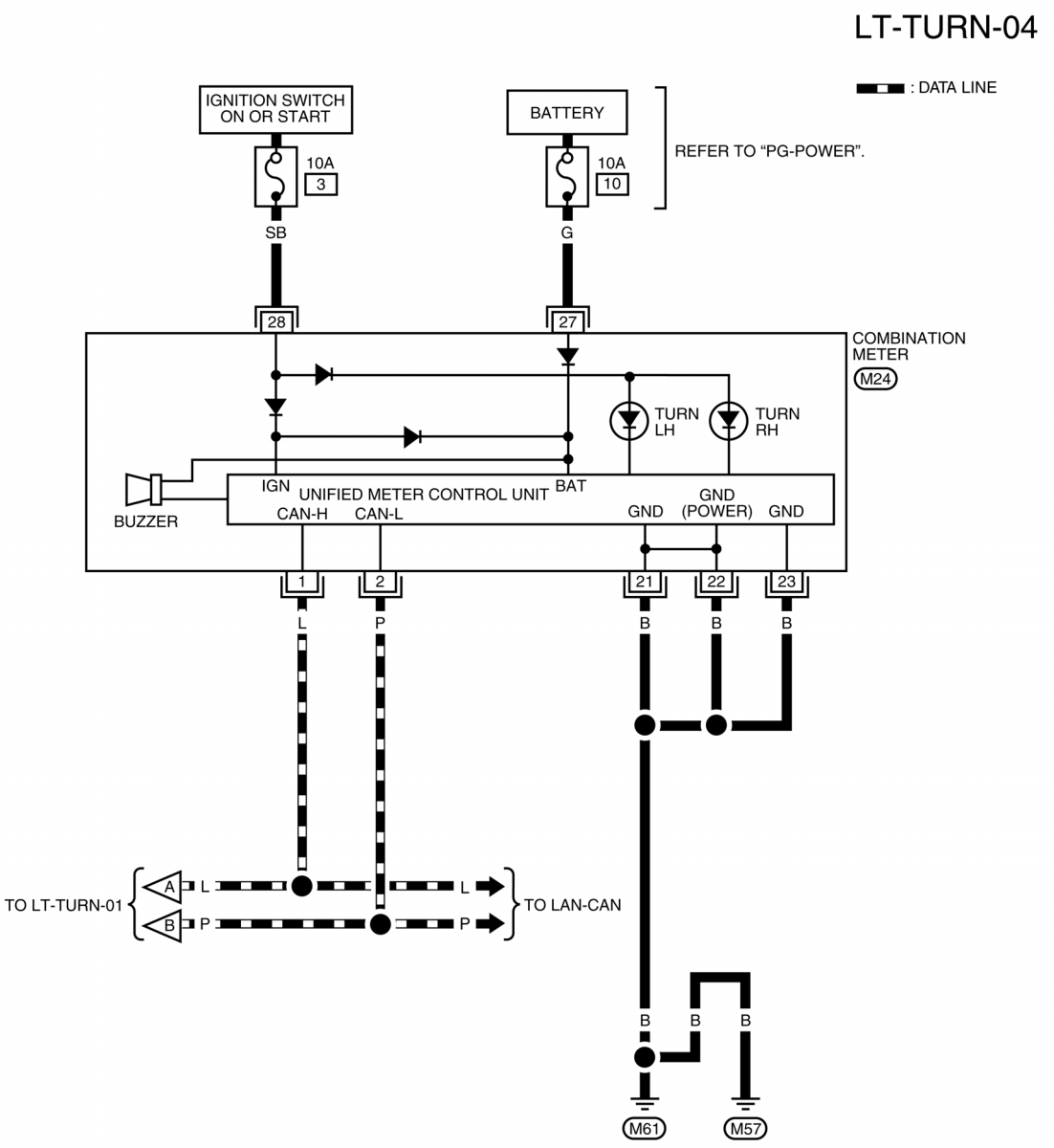

BCM
(BODY CONTROL
MODULE)
M18
HAZARD SW
29
L
L
2
HAZARD
SWITCH
OFF
ON
M55
1
B
B
B
M57
M61

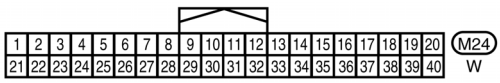

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
M18
W
H.S.
4 2 1 3
M55
W

LKWA0330E

LT-TURN-03


BCM
(BODY CONTROL
MODULE)
M20
FLASHER OUTPUT
(LEFT)
60
FLASHER OUTPUT
(RIGHT)
61
V
W
M69
E7
94A
95A
M15
B23
8
M12
B101
14
TURN
SIGNAL
FRONT
COMBI-
NATION
LAMP LH
E29
FRONT
COMBI-
NATION
LAMP RH
E30
REAR
COMBI-
NATION
LAMP LH
B25
REAR
COMBI-
NATION
LAMP RH
B107
4
5
6
1
B
B133
D400
2
E15
E24
B7
B19
B117
B132
D402
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE
JUNCTION (SMJ)
M12 , M15
W W
M20
B
H.S.
E29 , E30
B B
B25 , B107
BR BR
D400
W
AALWA0368GB





AALWA0370GB

Terminal and Reference Value for BCM

INFOID:0000000007330627

Refer to BCS-12, "Terminal and Reference Value for BCM" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330628

1. Confirm the symptom or customer complaint.
2. Understand operation description and function description. Refer to LT-50, "System Description" .

3. Perform the preliminary check. Refer to LT-58, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Do turn signal and hazard warning lamps operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. INSPECTION END

Preliminary Check

INFOID:0000000007330629

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM
Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330630

Refer to BCS-17, "CONSULT Function (BCM)" .

Turn Signals Do Not Operate

INFOID:0000000007330631

1.CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

With CONSULT
1. Select “BCM” on CONSULT. Select “FLASHER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “TURN SIGNAL R” and “TURN SIGNAL L” turns ON-OFF linked with operation of lighting switch.

When turn signal switch is right position : TURN SIGNAL R ON

When turn signal switch is left position : TURN SIGNAL L ON

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> Replace the BCM. BCS-19, "Removal and Installation of BCM"
NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

Front Turn Signal Lamp Does Not Operate

INFOID:0000000007330632

1.CHECK BULB

Verify the bulb standard of each turn signal lamp is correct. Refer to LT-110, "Exterior Lamp" .

OK or NG

OK >> GO TO 2.
NG >> Replace turn signal lamp bulb. Refer to LT-61, "Bulb Replacement for Front Turn Signal Lamp" .

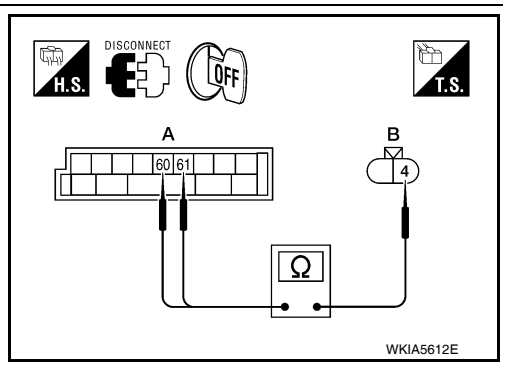
2.CHECK FRONT TURN SIGNAL LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and front combination lamp LH or RH connector.
3. Check continuity between BCM harness connector M20 (A) terminal 60 and front combination lamp LH harness connector E29 (B) terminal 4.

60 - 4 : Continuity should exist.

4. Check continuity between BCM harness connector M20 terminal 61 (A) and front combination lamp RH harness connector E30 (B) terminal 4.

61 - 4 : Continuity should exist.



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

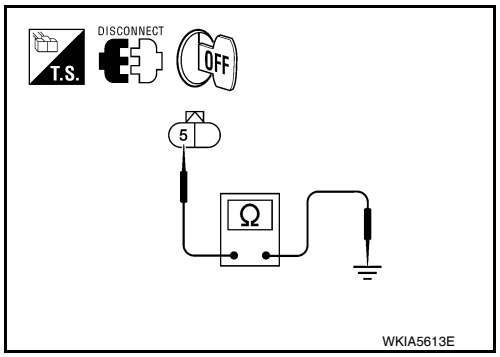
3.CHECK GROUND CIRCUIT

1. Check continuity between front combination lamp LH harness connector E29 terminal 5 and ground.

5 - Ground : Continuity should exist.

2. Check continuity between front combination lamp RH harness connector E30 terminal 5 and ground.

5 - Ground : Continuity should exist.



OK or NG

OK >> Inspect connection at front combination lamp.
NG >> Repair harness.

Rear Turn Signal Lamp Does Not Operate

INFOID:0000000007330633

1.CHECK BULB

Verify the bulb standard of each turn signal lamp is correct. Refer to LT-110, "Exterior Lamp" .

OK or NG

OK >> GO TO 2.
NG >> Replace turn signal lamp bulb. Refer to LT-61, "Bulb Replacement for Rear Turn Signal Lamp" .

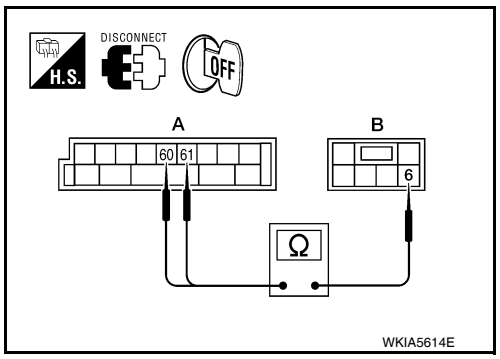
2.CHECK REAR TURN SIGNAL LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and rear combination lamp LH or RH connector.
3. Check continuity between BCM harness connector M20 (A) terminal 60 and rear combination lamp LH harness connector B25 (B) terminal 6.

60 - 6 : Continuity should exist.

4. Check continuity between BCM harness connector M20 (A) terminal 61 and rear combination lamp RH harness connector B107 (B) terminal 6.

61 - 6 : Continuity should exist.



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

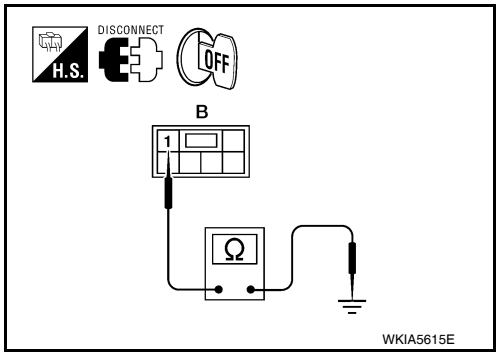
3.CHECK GROUND CIRCUIT

1. Check continuity between rear combination lamp LH harness connector B25 terminal 1 and ground.

1 - Ground : Continuity should exist.

2. Check continuity between rear combination lamp RH harness connector B107 terminal 1 and ground.

1 - Ground : Continuity should exist.



OK or NG

OK >> Check rear combination lamp connector for proper connection. Repair as necessary.
NG >> Repair harness or connector.

Hazard Warning Lamp Does Not Operate But Turn Signal Lamp Operates

INFOID:0000000007330634

1. CHECK HAZARD SWITCH INPUT SIGNAL

With CONSULT

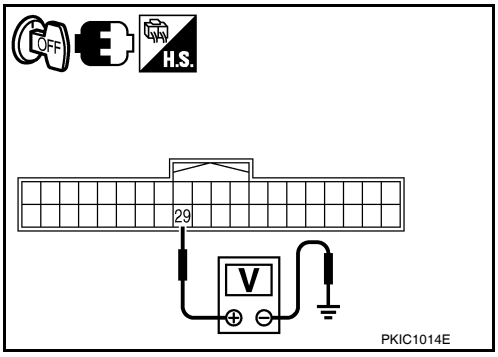
1. Select “BCM” on CONSULT. Select “FLASHER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “HAZARD SW” turns ON-OFF linked with operation of hazard switch.

When hazard switch is in ON position : HAZARD SW ON

Without CONSULT

Check voltage between BCM harness connector and ground.

Terminal			Condition	Voltage
(+)		(–)		
BCM connector	Terminal			
M18	29	Ground	Hazard switch is ON	0V
			Hazard switch is OFF	Battery voltage



OK or NG

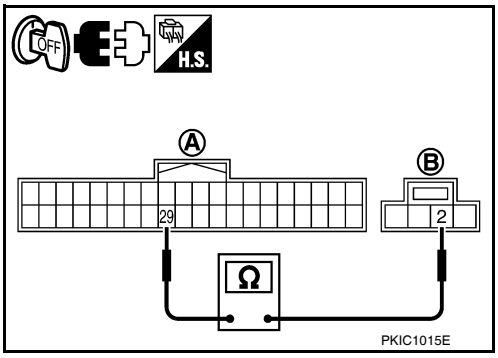
OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

NG >> GO TO 2.

2. CHECK HAZARD SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and hazard switch connector.
3. Check continuity BCM harness connector M18 (A) and hazard switch harness connector M55 (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
M18	29	M55	2	Yes



OK or NG

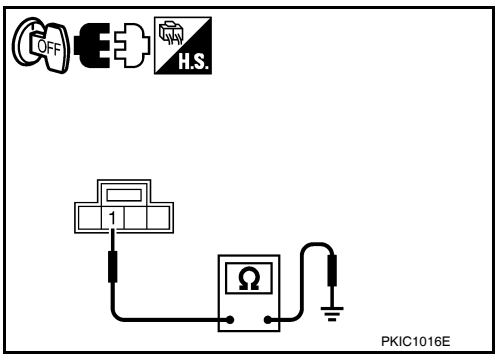
OK >> GO TO 3.

NG >> Repair harness or connector.

3. CHECK GROUND CIRCUIT

Check continuity between hazard switch harness connector M55 terminal 1 and ground.

1 – Ground : Continuity should exist.



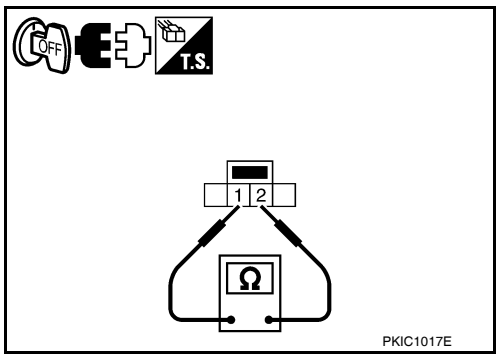
OK or NG

OK >> GO TO 4.

NG >> Repair harness or connector.

4. CHECK HAZARD SWITCH

1. Disconnect hazard switch connector.
2. Check continuity hazard switch terminals.



Terminal		Condition	Continuity
Hazard switch			
1	2	Hazard switch is ON	Yes
		Hazard switch is OFF	No

OK or NG

OK >> Replace BCM if hazard warning lamps do not operate after setting the connector again. Refer to BCS-19, "Removal and Installation of BCM" .

NG >> Replace hazard switch.

Turn Signal Indicator Lamp Does Not Operate

INFOID:0000000007330635

1.CHECK CAN COMMUNICATION SYSTEM

Check CAN communication. Refer to LAN-5 .

OK or NG

OK >> Replace combination meter. Refer to DI-19, "Removal and Installation" .

NG >> Repair as necessary.

Bulb Replacement for Front Turn Signal Lamp

INFOID:0000000007330636

Refer to LT-24, "Bulb Replacement" .

Bulb Replacement for Rear Turn Signal Lamp

INFOID:0000000007330637

Refer to LT-83, "Bulb Replacement" .

Removal and Installation of Front Turn Signal Lamp

INFOID:0000000007330638

Refer to LT-25, "Removal and Installation" .

Removal and Installation of Rear Turn Signal Lamp

INFOID:0000000007330639

Refer to LT-83, "Removal and Installation" .

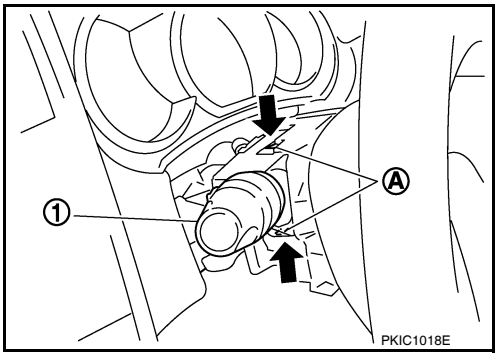
LIGHTING AND TURN SIGNAL SWITCH

Removal and Installation

INFOID:0000000007330640

REMOVAL

1. Remove steering column cover. Refer to IP-11 .
2. While pressing pawls (A) in direction as shown, pull lighting and turn signal switch (1) toward LH door and disconnect from the base.



INSTALLATION

Installation is in the reverse order of removal.

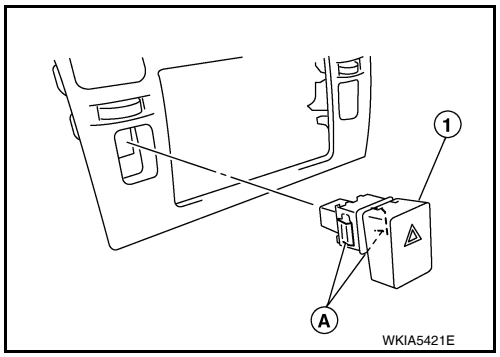
HAZARD SWITCH

Removal and Installation

INFOID:0000000007330641

REMOVAL

1. Remove cluster lid C. Refer to IP-11 .
2. Disconnect hazard switch connector.
3. Press pawl (A) on reverse side and remove the hazard switch (1).



INSTALLATION

Installation is in the reverse order of removal.

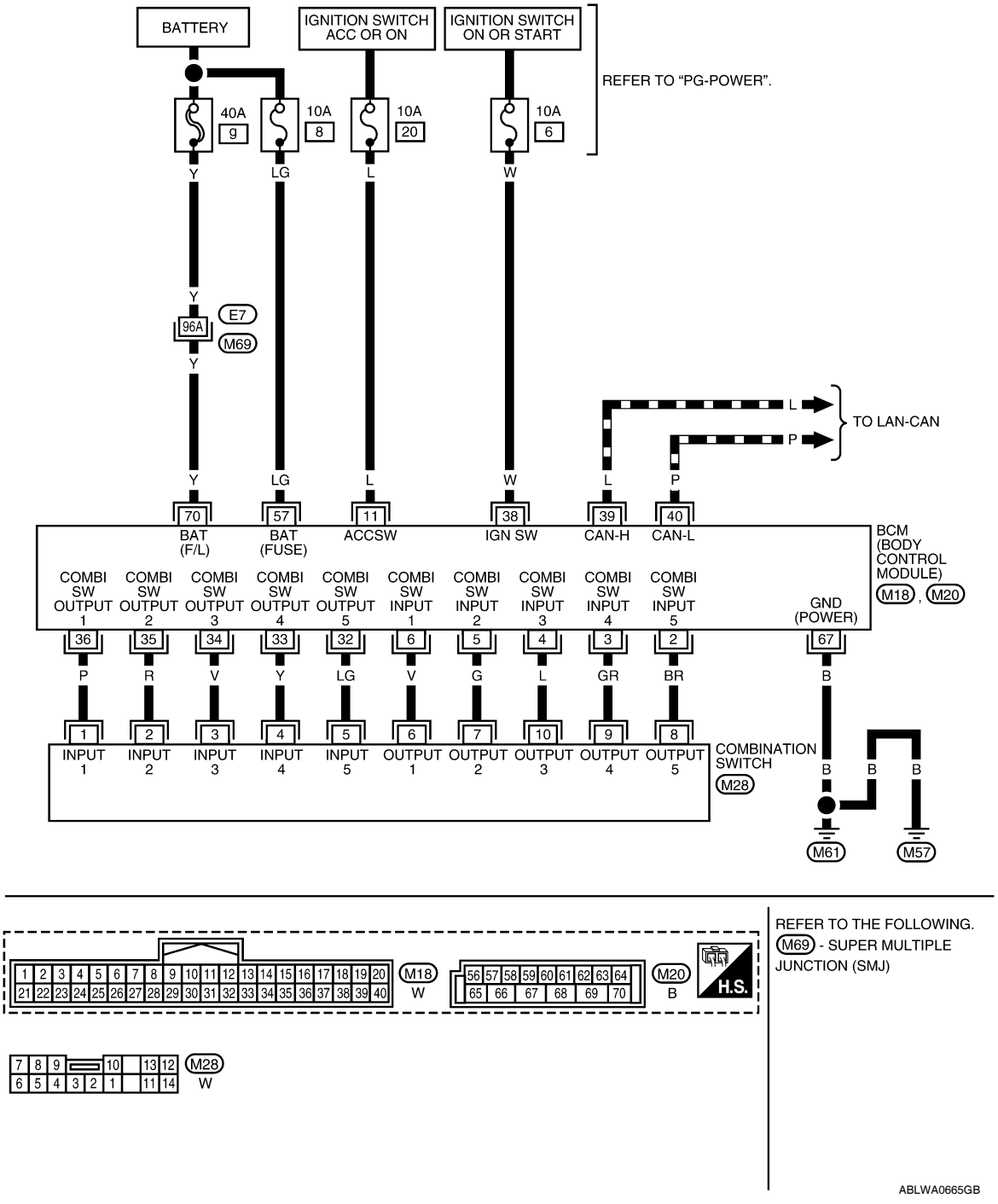
COMBINATION SWITCH

Wiring Diagram - COMBSW -

INFOID:0000000007330642

LT-COMBSW-01

: DATA LINE



Combination Switch Reading Function

INFOID:0000000007330643

For details, refer to BCS-4, "System Description" .

Terminal and Reference Value for BCM

INFOID:0000000007330644

Refer to BCS-12, "Terminal and Reference Value for BCM" .

CONSULT Function (BCM)

INFOID:0000000007330645

Refer to BCS-17, "CONSULT Function (BCM)" .

Combination Switch Inspection

INFOID:0000000007330646

1.SYSTEM CHECK

Referring to table below, check which system malfunctioning switch belongs to.

System 1	System 2	System 3	System 4	System 5
—	FRONT WASHER	FRONT WIPER LO	TURN LH	TURN RH
FRONT WIPER HI	—	FRONT WIPER INT	PASSING	HEAD LAMP 1
INT VOLUME 1	—	—	HEAD LAMP 2	HI BEAM
—	INT VOLUME 3	—	—	LIGHT SW 1ST
INT VOLUME 2	—	—	FRONT FOG	—

>> Check the system to which the switch belongs, and GO TO 2.

2.SYSTEM CHECK

With CONSULT

CAUTION:

If CONSULT is used with no connection of CONSULT CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

1. Connect CONSULT, and select “COMB SW” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR”.
3. Select “START”, and confirm that other switches in the system operate normally.
   Example: When turn signal LH is inoperative, confirm that PASSING, HEAD LAMP 2 or FRONT FOG (if equipped) turn ON-OFF normally.

Without CONSULT

Operating combination switch, and confirm that other switches in the system operate normally.
Example: When a turn signal switch is inoperative, confirm that FRONT WIPER LO or FRONT WIPER INT turn ON-OFF normally.

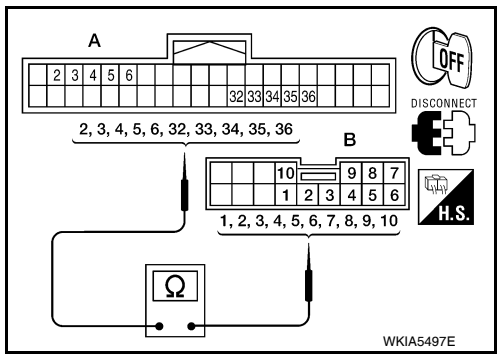
Check results

Other switches in the system operate normally.>>Replace lighting switch or wiper switch.
Other switches in the system do not operate normally.>>GO TO 3.

3.HARNESS INSPECTION

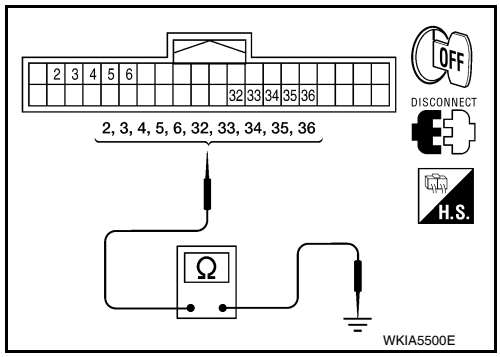
1. Turn ignition switch OFF.
2. Disconnect BCM connector and combination switch connector.
3. Check for continuity between BCM harness connector of the suspect system and the corresponding combination switch harness connector.

Suspect system	A			B		Continuity
	Connector	Terminal		Connector	Terminal	
1	M18	Input 1	6	M28	6	Yes
		Output 1	36		1	
2		Input 2	5		7	
		Output 2	35		2	
3		Input 3	4		10	
		Output 3	34		3	
4		Input 4	3		9	
		Output 4	33		4	
5		Input 5	2		8	
		Output 5	32		5	



4. Check for continuity between of BCM harness connector in suspect system and ground.

Suspect system	BCM				Continuity
	Connector	Terminal			
1	M18	Input 1	6	Ground	No
		Output 1	36		
2		Input 2	5		
		Output 2	35		
3		Input 3	4		
		Output 3	34		
4		Input 4	3		
		Output 4	33		
5		Input 5	2		
		Output 5	32		

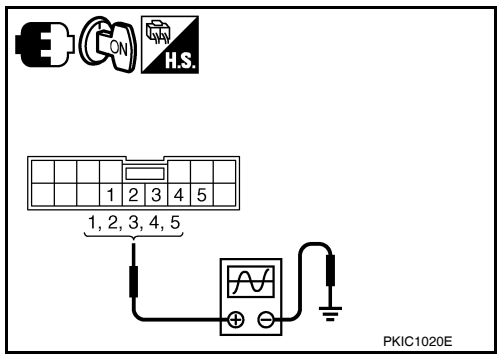


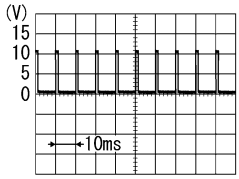
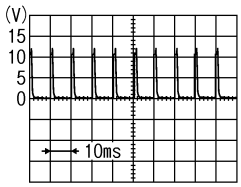
OK or NG

OK >> GO TO 4.
NG >> Check harness between BCM and combination switch for open or short circuit.

4. CHECK BCM OUTPUT TERMINAL

1. Connect BCM and combination switch connectors.
2. Turn ignition switch ON.
3. Turn lighting switch and wiper switch to OFF position.
4. Set wiper dial position 4.
5. Check BCM output terminal voltage waveform of suspect system.



Suspect system	Terminal (+) Combination switch connector	Terminal (+) Terminal	Terminal (–)	Reference value
1	M28	1	Ground	 PKIB4958J 1.2V
2		2		
3		3		
4		4		
5		5		 PKIB8643J 1.2V

OK or NG

OK >> Open circuit in combination switch, GO TO 5.
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

5. COMBINATION SWITCH INSPECTION

Referring to table below, perform combination switch inspection.

Procedure													
1	2		3	4		5	6		7				
Replace lighting switch	Confirm check results	OK	INSPECTION END	Confirm check results	OK	INSPECTION END	Confirm check results	OK	INSPECTION END				
		NG	Replace wiper switch		NG	Replace switch base		NG	Confirm symptom again				

>> INSPECTION END

Removal and Installation

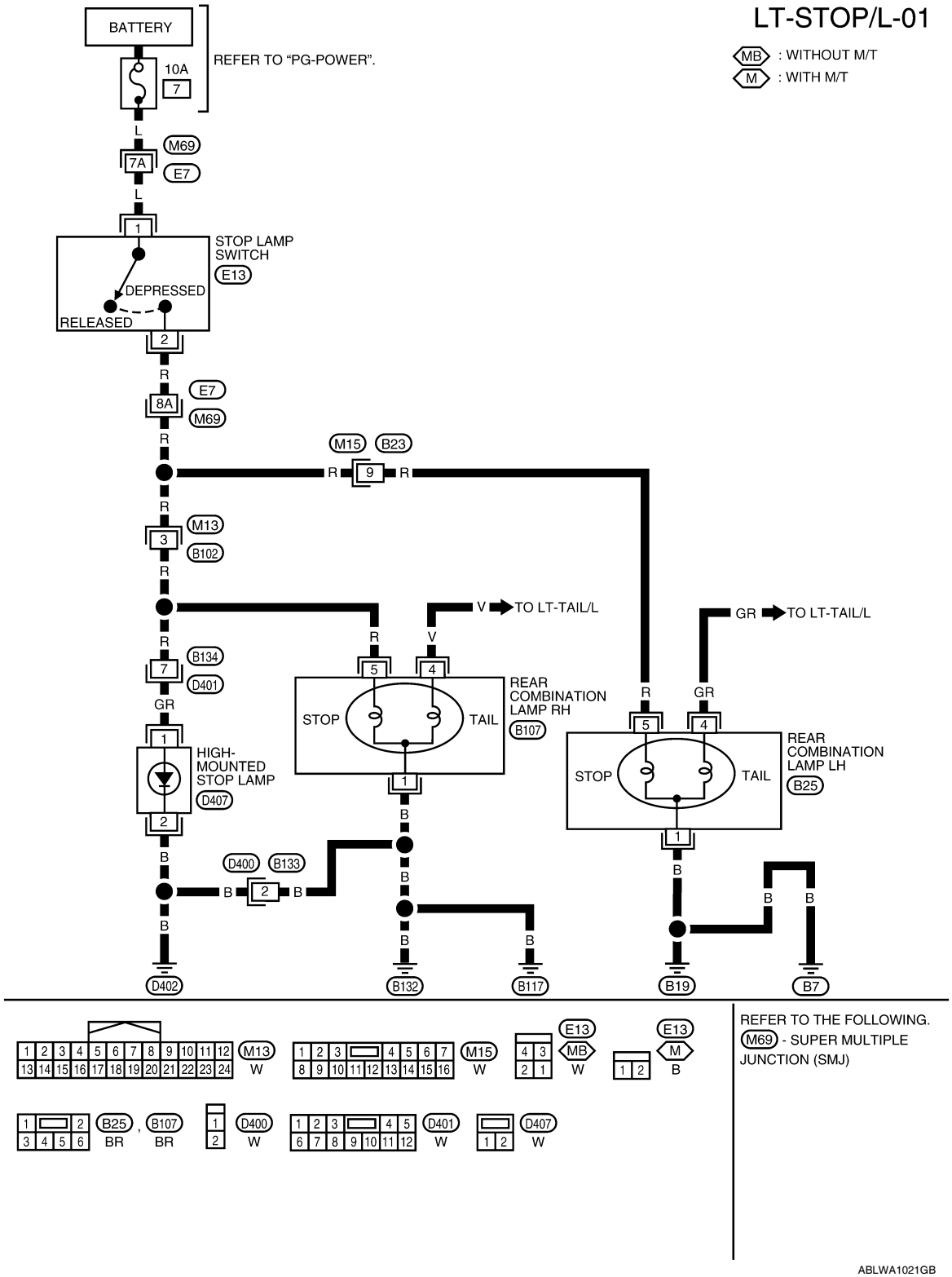
INFOID:0000000007330647

Refer to LT-62 .

STOP LAMP

Wiring Diagram - STOP/L

INFOID:0000000007330648



Bulb Replacement (High-Mounted Stop Lamp)

INFOID:0000000007330650

HIGH -MOUNTED STOP LAMP

The LED element is not serviced separately, the high-mounted stop lamp must be replaced as an assembly. Refer to LT-69, "Removal and Installation (High-Mounted Stop Lamp)".

Bulb Replacement (Rear Combination Lamp)

INFOID:0000000007330651

Refer to LT-83, "Bulb Replacement".

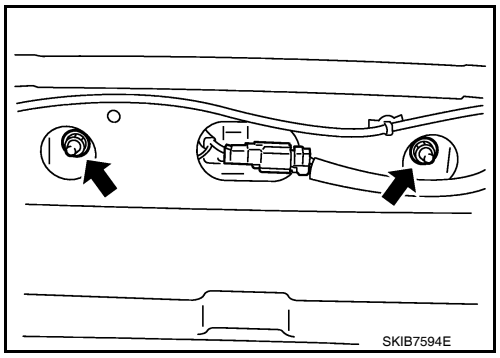
Removal and Installation (High-Mounted Stop Lamp)

INFOID:0000000007330652

HIGH-MOUNTED STOP LAMP

Removal

1. Remove the back door finisher upper. Refer to EI-34, "Removal and Installation".
2. Disconnect the high-mounted stop lamp connector.
3. Remove the nuts and remove the high-mounted stop lamp from rear hatch.



Installation

Installation is in the reverse order of removal.

CAUTION:

Properly seal the high-mounted stop lamp base to the rear hatch to prevent water leaks.

Removal and Installation (Rear Combination Lamp)

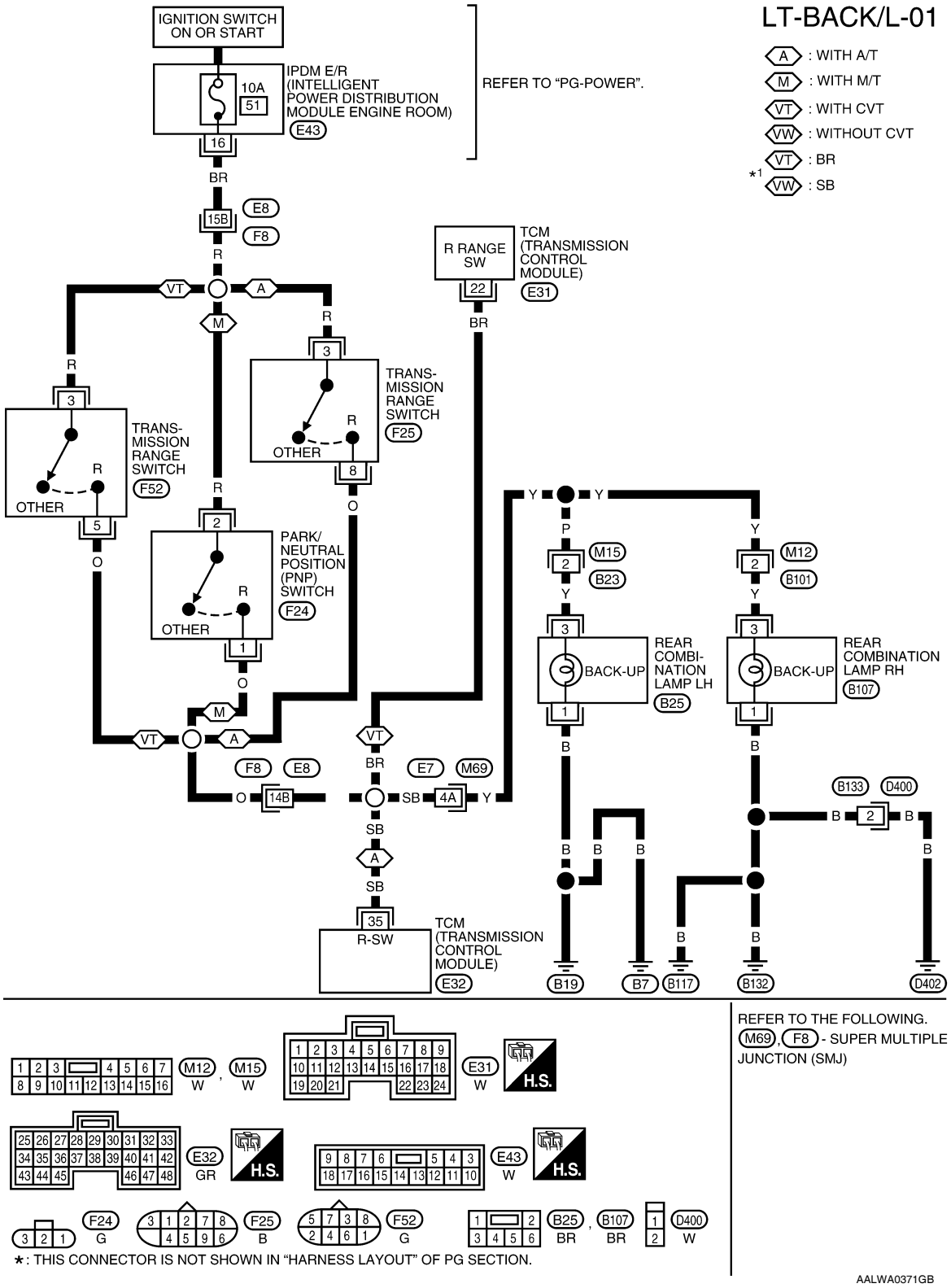
INFOID:0000000007330653

Refer to LT-83, "Removal and Installation".

BACK-UP LAMP

Wiring Diagram - BACK/L -

INFOID:0000000007330654



Bulb Replacement

INFOID:0000000007330655

Refer to LT-83, "Bulb Replacement" .

Removal and Installation

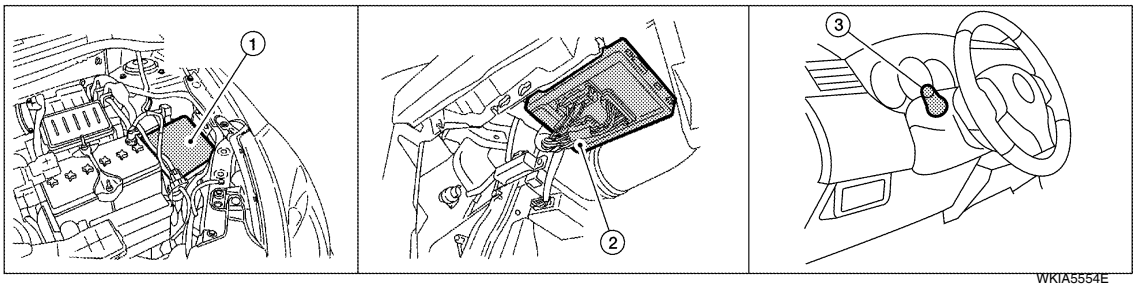
INFOID:0000000007330656

Refer to LT-83, "Removal and Installation" .

PARKING, LICENSE PLATE AND TAIL LAMPS

Component Parts and Harness Connector Location

INFOID:0000000007330657



WKIA5554E

1. IPDM E/R E45, E46 and E48
2. BCM M18 and M20 (view with glove box removed)
3. Combination switch (lighting and turn signal switch) M28

System Description

INFOID:0000000007330658

The control of the parking, license plate and tail lamp operation is dependent upon the position of lighting switch. When the lighting switch is placed in the 1ST position, the BCM (body control module) receives input signal requesting the parking, license plate and tail lamps to illuminate. This input signal is communicated to the IPDM E/R (intelligent power distribution module engine room) via the CAN communication lines. The CPU (central processing unit) located in the IPDM E/R controls the tail lamp relay coil. This relay, when energized, directs power to parking, license plate and tail lamps, which then illuminate.

Power is supplied at all times
- to ignition relay located in IPDM E/R,
- to tail lamp relay located in IPDM E/R,
- through 15A fuse (No. 52, located in IPDM E/R) and
- through 20A fuse (No. 53, located in IPDM E/R)
- to the CPU located in the IPDM E/R,
- through 40A fusible link (letter **g** , located in fuse and fusible link block)
- to BCM terminal 70,
- through 10A fuse [No. 8, located in fuse block (J/B)],
- to BCM terminal 57.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38,
- to ignition relay located in IPDM E/R and
- through the ignition relay
- to the CPU of the IPDM E/R.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in fuse block (J/B)]
- to BCM terminal 11.

Ground is supplied
- to BCM terminal 67
- through grounds M20 and M61,
- to IPDM E/R terminals 59 and 39
- through grounds E15 and E24.

OPERATION BY LIGHTING SWITCH

With the lighting switch in the 1ST or 2ND position, the BCM receives an input signal requesting parking, license plate and tail lamps to illuminate. This input signal is communicated to the IPDM E/R via the CAN communication lines. The CPU, located in the IPDM E/R, controls the tail lamp relay coil. When energized, the tail lamp relay directs power
- through 10A fuse (No. 37, located in IPDM E/R),
- through IPDM E/R terminal 26
- to front combination lamp LH terminal 6, and
- through IPDM E/R terminal 27

- to front combination lamp RH terminal 6,
- through IPDM E/R terminal 28
- to rear combination lamp LH terminal 4 and
- to license plate lamp LH and RH terminal 1,
- through IPDM E/R terminal 29
- to rear combination lamp RH terminal 4.

Ground is supplied

- to front combination lamp LH and RH terminal 7
- through grounds E15 and E24,
- to rear combination lamp LH terminal 1 and
- to license plate lamp LH and RH terminal 2
- through grounds B7 and B19, and
- to rear combination lamp RH terminal 1
- through grounds B117, B132 and D402.

With power and ground supplied, parking, license plate and tail lamps illuminate.

COMBINATION SWITCH READING FUNCTION

Refer to BCS-4, "System Description" .

EXTERIOR LAMP BATTERY SAVER CONTROL

When the combination switch (lighting and turn signal switch) is in the 1ST (or 2ND) position and the ignition switch is turned from ON or ACC to OFF, the battery saver control feature is activated.
Under this condition, the parking, license and tail lamps remain illuminated for 5 minutes, then the parking, license plate and tail lamps are turned off.
Exterior lamp battery saver control mode can be changed by the function setting of CONSULT.

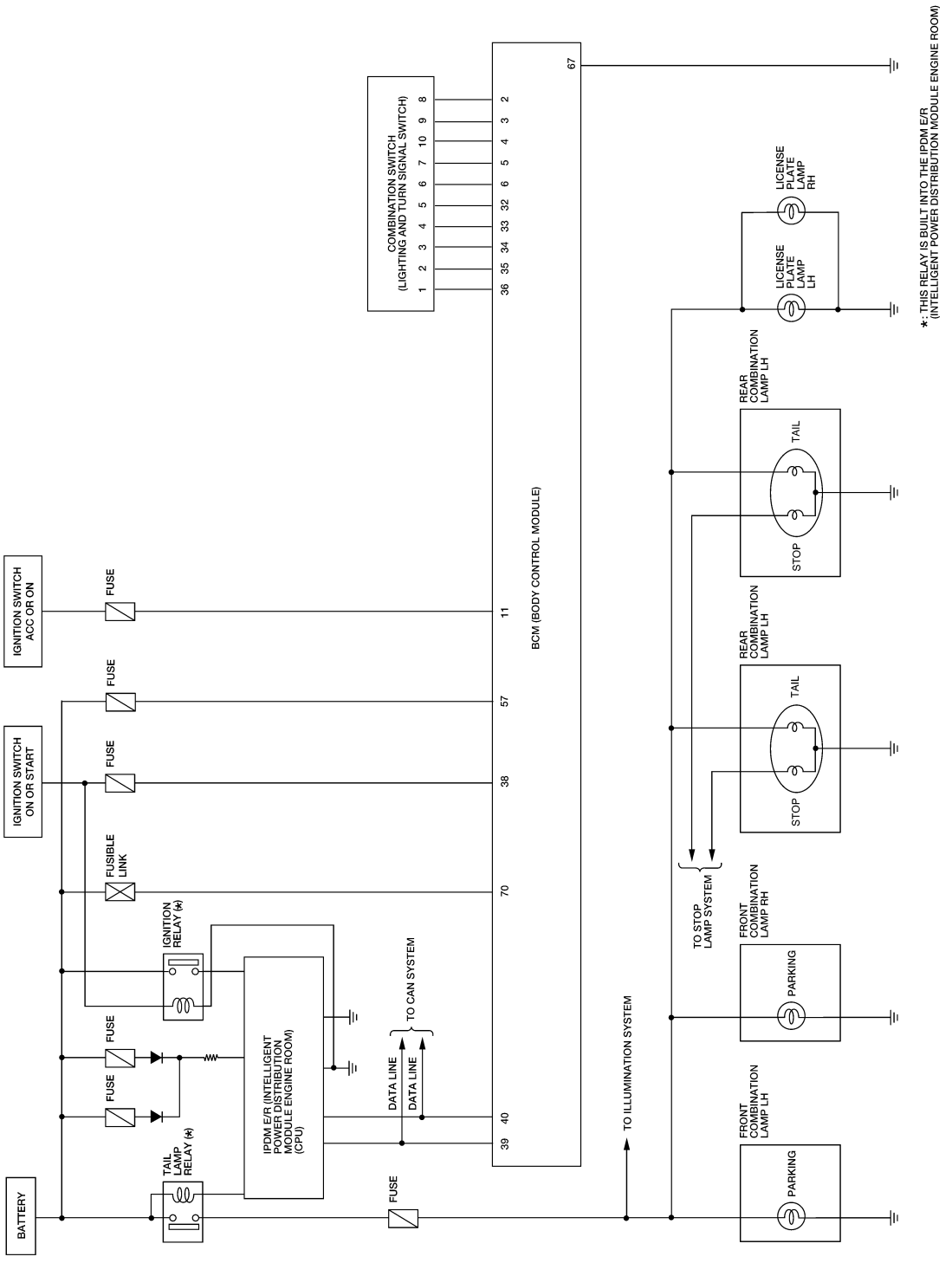
CAN Communication System Description

INFOID:0000000007330659

Refer to LAN-5, "System Description" .

Schematic

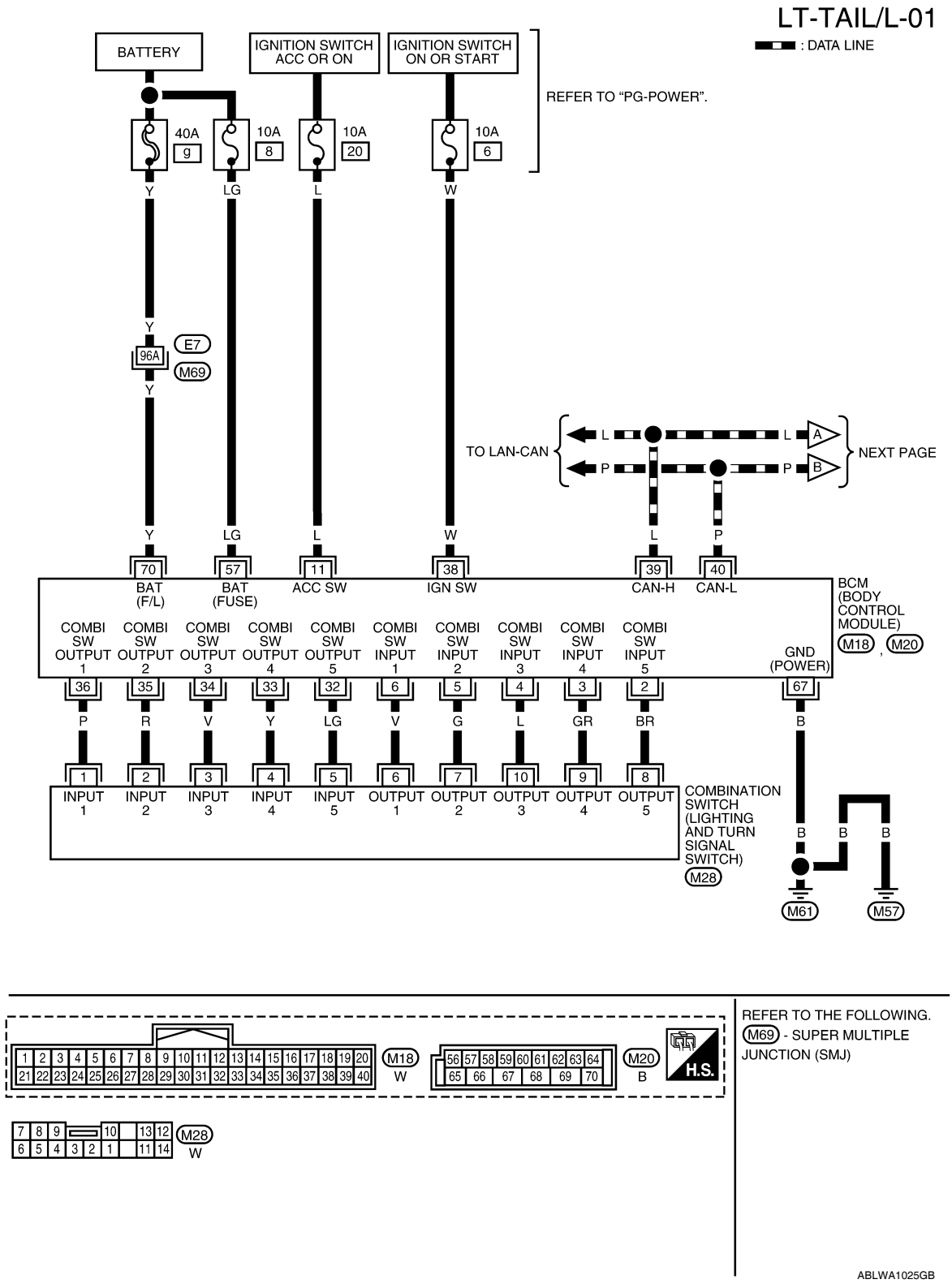
INFOID:0000000007330660

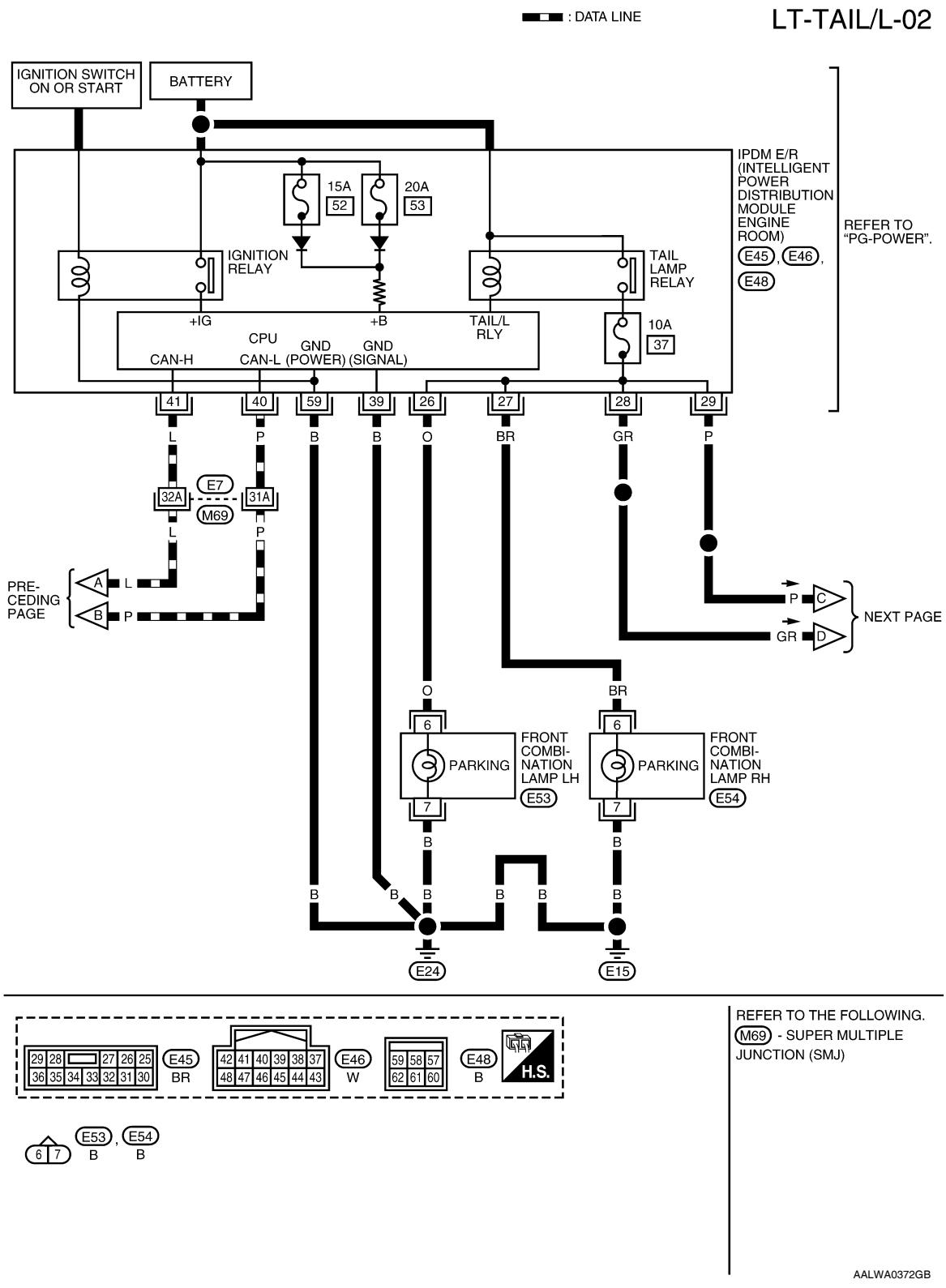


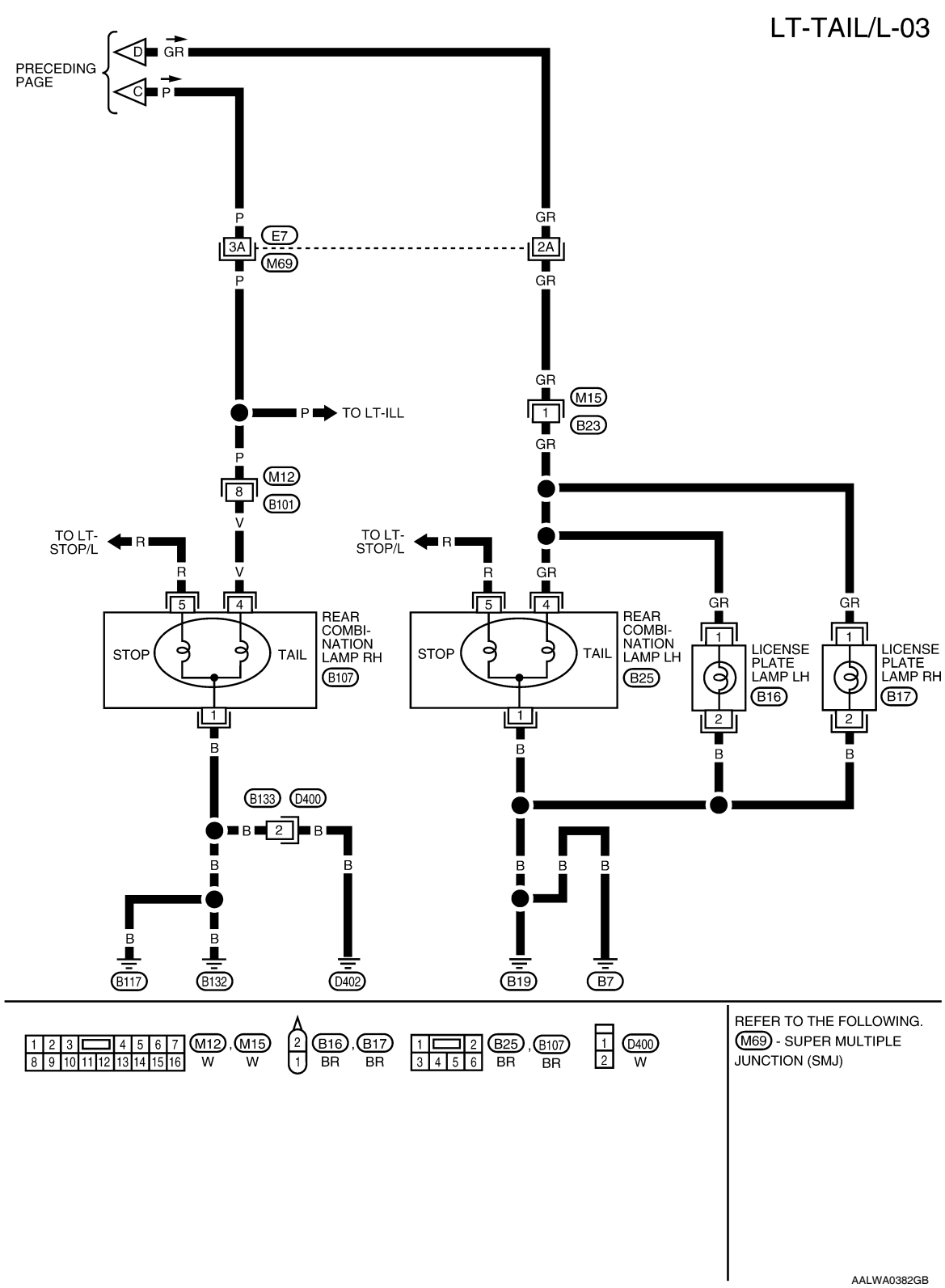
ABLWA1024GB

Wiring Diagram - TAIL/L -

INFOID:0000000007330661




: DATA LINE
LT-TAIL/L-02
IGNITION SWITCH ON OR START
BATTERY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E45, E46, E48
REFER TO "PG-POWER".
15A 52
20A 53
IGNITION RELAY
TAIL LAMP RELAY
+IG
+B
TAIL/L RLY
10A 37
CPU
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
41 40 59 39 26 27 28 29
L P B B O BR GR P
E7
32A 31A
M69
PRE-CEDING PAGE
A L
B P
P C
GR D
NEXT PAGE
6 PARKING 7
FRONT COMBI-NATION LAMP LH
E53
FRONT COMBI-NATION LAMP RH
E54
E24
E15
29 28 27 26 25 36 35 34 33 32 31 30
E45
BR
42 41 40 39 38 37 48 47 46 45 44 43
E46
W
59 58 57 62 61 60
E48
B
H.S.
6 7
E53, E54
B B
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
AALWA0372GB



Terminal and Reference Value for BCM

INFOID:0000000007330662

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330663

Refer to PG-24, "Terminal and Reference Value for IPDM E/R" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330664

1. Confirm the symptom or customer complaint.
2. Understand operation description and function description. Refer to LT-72, "System Description" .
3. Perform the preliminary check. Refer to LT-78, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Do the parking, license plate and tail lamps operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. Inspection End.

Preliminary Check

INFOID:0000000007330665

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM
Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR IPDM E/R
Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330666

Refer to BCS-17, "CONSULT Function (BCM)" .

CONSULT Function (IPDM E/R)

INFOID:0000000007330667

Refer to PG-18, "CONSULT Function (IPDM E/R)" .

Parking, License Plate and Tail Lamps Do Not Illuminate

INFOID:0000000007330668

1.CHECK TAIL LAMP FUSE

Inspect tail lamp 10A fuse (No. 37, located in IPDM E/R).

OK or NG

OK >> GO TO 2.
NG >> Repair harness.

2.CHECK COMBINATION SWITCH (LIGHTING AND TURN SIGNAL SWITCH) INPUT SIGNAL

With CONSULT
1. Select “BCM” on CONSULT. Select “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure “LIGHT SW 1ST” turns ON-OFF linked with operation of lighting switch.

When lighting switch is 1ST position : LIGHT SW 1ST ON

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Check combination switch (lighting and turn signal switch). Refer to LT-65, "Combination Switch Inspection" .

3.ACTIVE TEST

With CONSULT
1. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
3. Touch “TAIL” on "ACTIVE TEST" screen.
4. Make sure parking, license plate and tail lamps operate.

Parking, license plate and tail lamps should operate.

Without CONSULT
1. Start auto active test. Refer to PG-20, "Auto Active Test" .
2. Make sure parking, license plate and tail lamps operate.

Parking, license plate and tail lamps should operate.

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK IPDM E/R

1. Select “IPDM E/R” on CONSULT, and select “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Make sure “TAIL&CLR REQ” turns ON when lighting switch is in 1ST position.

When lighting switch is 1ST position : TAIL&CLR REQ ON

OK or NG

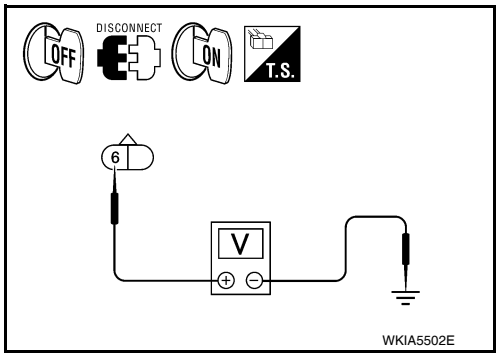
OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

5. CHECK INPUT SIGNAL

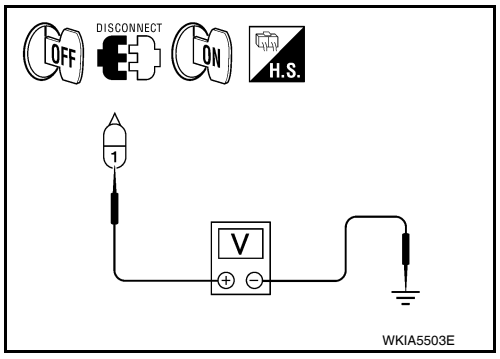
With CONSULT
1. Turn ignition switch OFF.
2. Disconnect front combination lamp, license plate lamp and rear combination lamp connectors.
3. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “EXTERNAL LAMPS” on “SELECT TEST ITEM” screen.
5. Touch “TAIL” on "ACTIVE TEST" screen.
6. When tail lamp relay is operating, check voltage between front combination lamp, license plate lamp and rear combination lamp harness connector and ground.

Without CONSULT
1. Turn ignition switch OFF.
2. Disconnect front combination lamp, license plate lamp and rear combination lamp connectors.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. When tail lamp relay is operating, check voltage between front combination lamp, license plate lamp and rear combination lamp harness connector and ground.

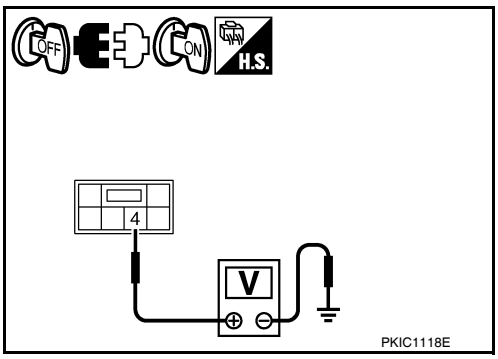
Terminal				Voltage
(+)			(–)	
Front combination lamp connector		Terminal		
RH	E54	6	Ground	Battery voltage
LH	E53			



Terminal				Voltage
(+)			(–)	
License plate lamp connector		Terminal		
RH	B17	1	Ground	Battery voltage
LH	B16			



Terminal				Voltage
(+)			(–)	
Rear combination lamp connector (Tail lamp)		Terminal		
RH	B107	4	Ground	Battery voltage
LH	B25			



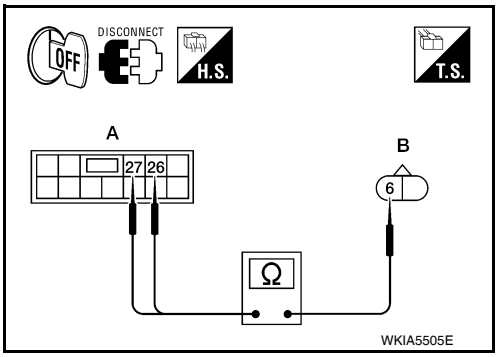
OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. CHECK PARKING, LICENSE PLATE AND TAIL LAMP CIRCUIT

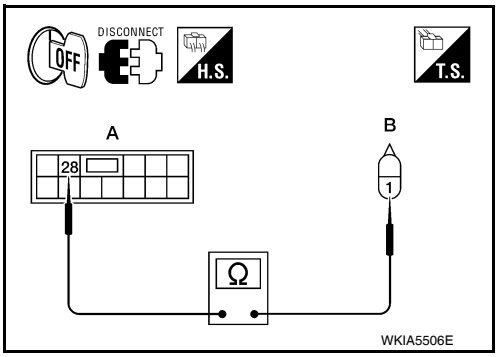
1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector (A) and front combination lamp harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	27	RH E54	6	Yes
	26	LH E53		



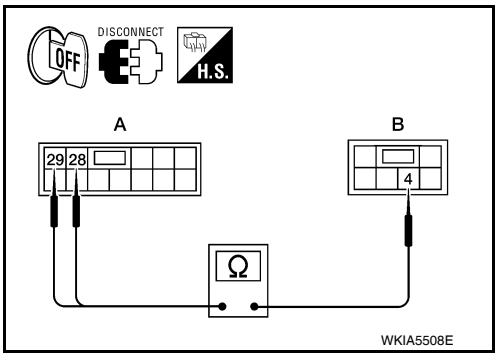
4. Check continuity between IPDM E/R harness connector (A) and license plate lamp harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	28	RH B17	1	Yes
		LH B16		



5. Check continuity between IPDM E/R harness connector (A) and rear combination lamp harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	29	RH B107	4	Yes
	28	LH B25		



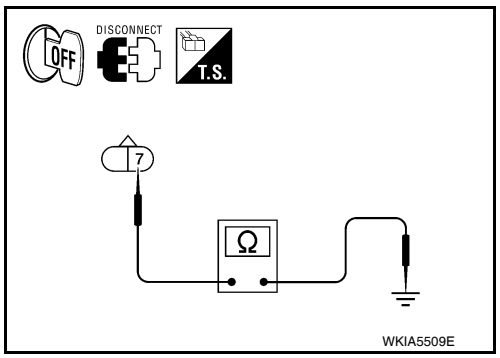
OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .
NG >> Repair harness or connector.

7. CHECK PARKING, LICENSE PLATE AND TAIL LAMPS GROUND CIRCUIT

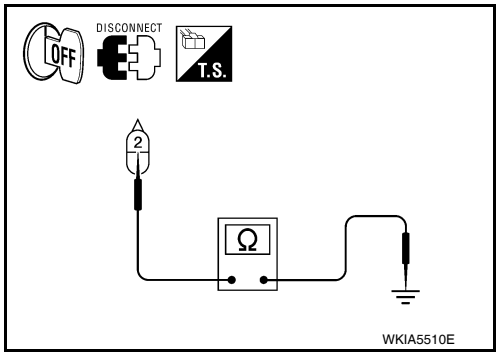
1. Check continuity between front combination lamp harness connector and ground.

Front combination lamp connector		Terminal	Ground	Continuity
RH	E54	7		Yes
LH	E53			



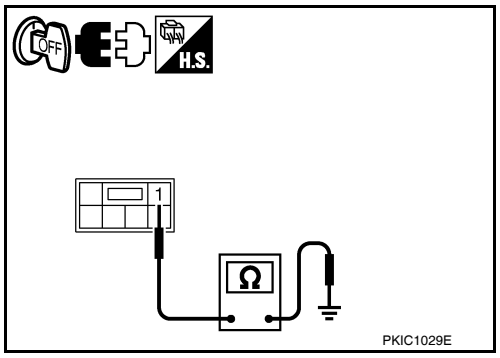
2. Check continuity between license plate lamp harness connector and ground.

License plate lamp connector		Terminal	Ground	Continuity
RH	B17	2		Yes
LH	B16			



3. Check continuity between rear combination lamp harness connector and ground.

Rear combination lamp connector		Terminal	Ground	Continuity
RH	B107	1		Yes
LH	B25			



OK or NG

OK >> Check bulbs.
NG >> Repair harness or connector.

Parking, License Plate and Tail Lamps Do Not Turn OFF (After Approx. 10 Minutes)

INFOID:0000000007330669

- This symptom is related to the ignition relay in IPDM E/R. Refer to PG-18, "Function of Detecting Ignition Relay Malfunction" .
- Select “BCM” on CONSULT. Select “HEADLAMP” on “SELECT TEST ITEM” screen and select “DATA MONITOR” on “SELECT DIAG MODE” screen. If “LIGHT SW 1ST” is OFF when lighting switch is OFF, replace IPDM E/R.

Bulb Replacement

INFOID:0000000007330670

PARKING LAMP

Refer to LT-83, "Bulb Replacement".

LICENSE PLATE LAMP

License Plate Lamp

1. Remove the license plate lamp. Refer to LT-82, "Removal and Installation".
2. Turn bulb socket counterclockwise and unlock it.
3. Remove bulb from the socket.
4. Installation is in the reverse order of removal.

TAIL LAMP

Refer to LT-83, "Bulb Replacement".

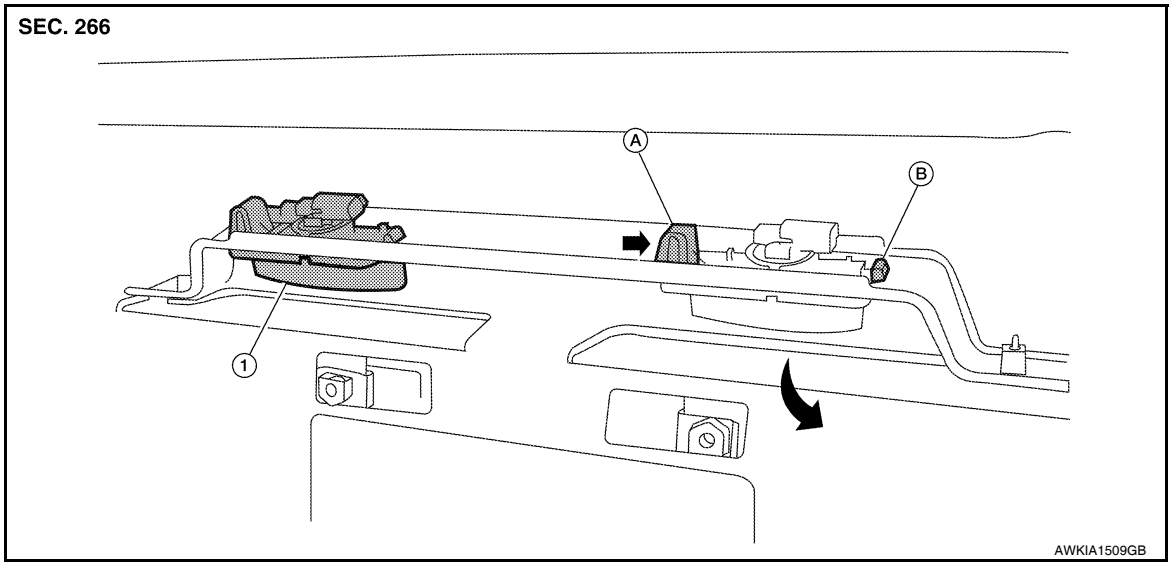
Removal and Installation

INFOID:0000000007330671

PARKING LAMP

Refer to LT-83, "Removal and Installation".

LICENSE PLATE LAMP



1. License plate lamp
A. Pawl
B. Hook

Removal

1. Press the license plate lamp pawl on the side of the rear bumper fascia, then swing the license plate lamp down to release the license plate lamp hook from the rear bumper fascia.
2. Disconnect the license plate lamp connector and remove the licence plate lamp.

Installation

Installation is in the reverse order of removal.

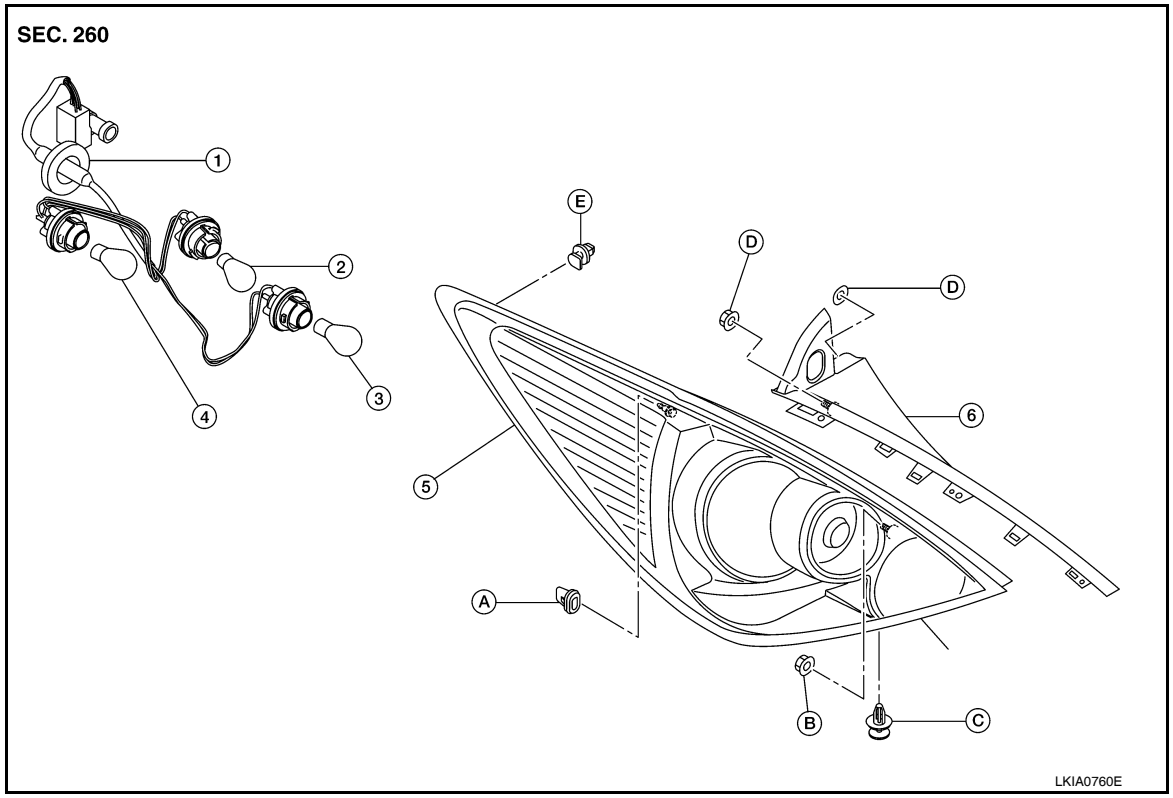
TAIL LAMP

Refer to LT-83, "Removal and Installation".

REAR COMBINATION LAMP

Component

INFOID:0000000007330672



1. Rear combination lamp harness	2. Turn signal lamp bulb	3. Back-up lamp bulb
4. Stop/tail lamp bulb	5. Rear combination lamp assembly	6. Bumper stay
A. Grommet	B. Nut	C. Clip
D. Nuts	E. Clip	

Bulb Replacement

INFOID:0000000007330673

REMOVAL

Removal

CAUTION:

It is not necessary to remove the luggage side finisher, Doing so may render the part damaged or unusable.

1. Remove the rear combination lamp assembly. Refer to LT-83, "Removal and Installation".
2. Turn bulb socket counterclockwise and unlock it.
3. Remove bulb.

Installation

Installation is in the reverse order of removal.

Removal and Installation

INFOID:0000000007330674

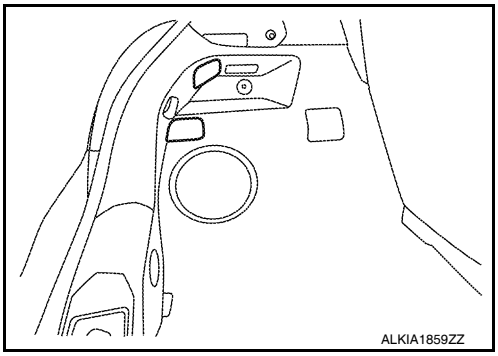
REMOVAL

Removal

CAUTION:

It is not necessary to remove the luggage side finisher. Doing so may render the part damaged or unusable.

1. Remove the access panels using suitable tool.
2. Remove rear combination lamp assembly nuts.
3. Pull the rear combination lamp assembly toward rear of the vehicle.
4. Disconnect rear combination lamp connector, and remove rear combination lamp assembly.



Installation
Installation is in the reverse order of removal.

Disassembly and Assembly

INFOID:0000000007330675

DISSASEMBLY

1. Remove the rear combination lamp harness.
2. Remove the bulbs from the rear combination lamp harness, as necessary.
3. Remove the bumper stay.

ASSEMBLY

Assembly is in the reverse order of disassembly.

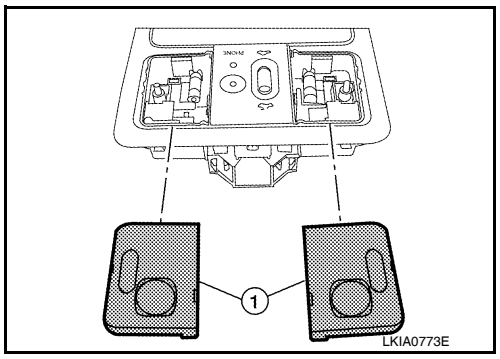
INTERIOR LAMP

Map Lamp

INFOID:0000000007330676

BULB REPLACEMENT

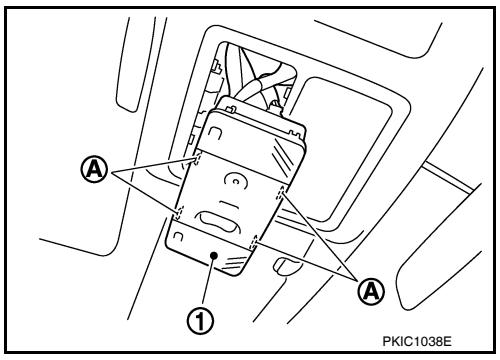
1. Remove the map lamp lens (1).
2. Remove the bulb from lamp.
   NOTE:
   Pull bulb end from Y-shaped connector first to remove.
3. Installation is in the reverse order of removal.
   - Install the map lamp lens (1) so the round lens is positioned to the front of the vehicle as shown. There is a tab on the lens to prevent incorrect installation of the lens.



REMOVAL AND INSTALLATION

Removal

1. Insert a suitable tool and disengage the pawl (A) fittings from the map lamp (1).
2. Disconnect map lamp connector and remove map lamp (1).



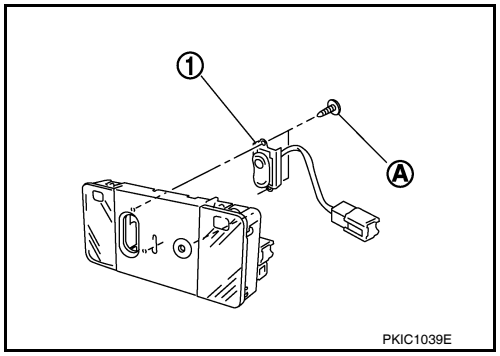
Installation

Installation is in the reverse order of removal.

DISASSEMBLY AND ASSEMBLY

Disassembly

1. Remove screw (A).
2. Remove sunroof switch (1).



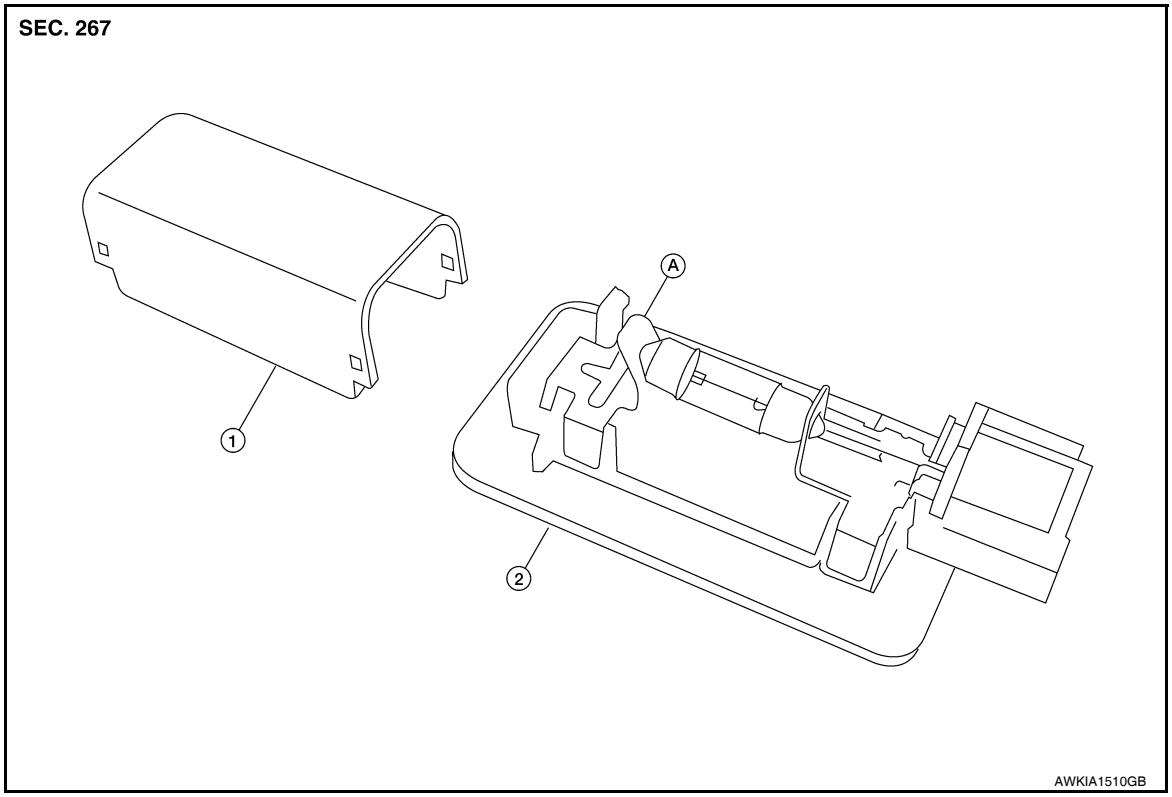
Assembly

Assembly is in the reverse order of disassembly.

Luggage Room Lamp, Hatch Back

INFOID:0000000007330677

BULB REPLACEMENT



1. Luggage compartment lamp bulb cover 2. Luggage compartment lamp A. Tab A

1. Remove luggage compartment lamp from the luggage side finisher LH.
2. Remove luggage compartment lamp cover.
3. Press tab A and remove the bulb.
4. Installation is in the reverse order of removal.

REMOVAL AND INSTALLATION

Removal

1. Remove luggage compartment lamp from the luggage side finisher LH.
2. Disconnect luggage compartment lamp connector.

Installation
Installation is in the reverse order of removal.

Vanity Mirror Lamp

INFOID:0000000007330679

BULB REPLACEMENT

Removal

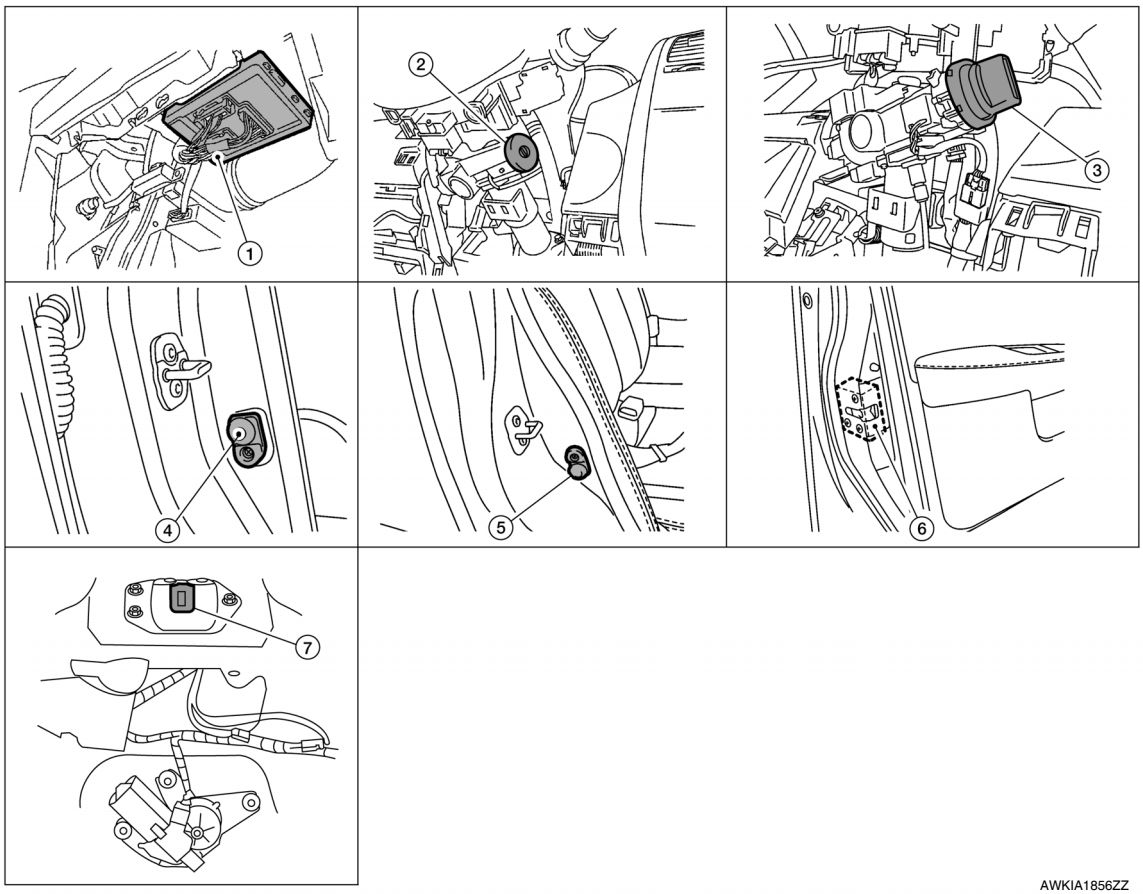
1. Remove the lens using a suitable tool.
2. Remove the bulb.

Installation
Installation is in the reverse order of removal.

INTERIOR ROOM LAMP

Component Parts and Harness Connector Location

INFOID:0000000007330680



AWKIA1856ZZ

1. BCM M18, M19 and M20 (view with glove box removed)
2. Key switch and key lock solenoid (without Intelligent Key) M27
3. Key switch and ignition knob switch (with Intelligent Key) M73
4. Front door switch LH B8 and RH B108
5. Rear door switch LH B6 and RH B116
6. Front door lock assembly LH (key cylinder switch) D14
7. Back door lock assembly D405

System Description

INFOID:0000000007330681

When room lamp switch is in DOOR position, room lamp ON/OFF is controlled by timer according to signals from switches including key switch, front door switch LH, unlock signal from keyfob, door lock and unlock switch, key cylinder lock and unlock switch, ignition switch.
When room lamp turns ON, there is a gradual brightening over 1 second.
When room lamp turns OFF, there is a gradual dimming over 1 second.
Interior room lamp timer is controlled by BCM (body control module).
Interior room lamp timer control settings can be changed with CONSULT.

POWER SUPPLY AND GROUND

Power is supplied at all times (without Intelligent Key system)
- through 10A fuse [No. 10, located in fuse block (J/B)]
- to key switch and key lock solenoid terminal 2,
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57,
- through 40A fusible link (letter **g** , located in fuse and fusible link box)
- to BCM terminal 70.

Power is supplied at all times (with Intelligent Key system)
- through 10A fuse (No. 31, located in fuse and fusible link box)

• to key switch and ignition knob switch terminals 2 and 4,
• through 10A fuse [No. 8, located in fuse block (J/B)]
• to BCM terminal 57,
• through 40A fusible link (letter **g** , located in fuse and fusible link box)
• to BCM terminal 70.

When key is inserted in the key switch and key lock solenoid, power is supplied (without Intelligent Key system)
• through key switch and key lock solenoid terminal 1
• to BCM terminal 37.

When key is inserted in the key switch and ignition knob switch, power is supplied (with Intelligent Key system)
• through key switch and ignition knob switch terminal 1
• to BCM terminal 37.

When ignition knob switch is pushed, power is supplied (with Intelligent Key system)
• through key switch and ignition knob switch terminal 3
• to Intelligent Key unit terminal 27.

With the ignition switch in the ON or START position, power is supplied
• through 10A fuse [No. 6, located in fuse block (J/B)]
• to BCM terminal 38.

Ground is supplied
• to BCM terminal 67
• through grounds M57 and M61.

When front door LH is opened, ground is supplied
• to BCM terminal 47
• through front door switch LH terminal 2
• through case ground of front door switch LH.

When front door RH is opened, ground is supplied
• to BCM terminal 12
• through front door switch RH terminal 2
• through case ground of front door switch RH.

When rear door LH is opened, ground is supplied
• to BCM terminal 48
• through rear door switch LH terminal 1
• through case ground of rear door switch LH.

When rear door RH is opened, ground is supplied
• to BCM terminal 13
• through rear door switch RH terminal 1
• through case ground of rear door switch RH.

When back door is opened, ground is supplied
• to BCM terminal 43
• through back door lock assembly (back door switch) terminal 3
• through back door lock assembly (back door switch) terminal 4
• through grounds B117, B132 and D402.

When front door LH is unlocked by front door lock assembly LH (key cylinder switch), the BCM receives a ground signal
• to BCM terminal 7
• through front door lock assembly LH (key cylinder switch) terminal 5
• through front door lock assembly LH (key cylinder switch) terminal 4
• through grounds M57 and M61.

When a signal, or combination of signals is received by BCM, ground is supplied
• to room lamp terminal 2
• through map lamp terminals 5 and 2 (with map lamp)
• through BCM terminal 63.

With power and ground supplied, the interior room lamp illuminates.

SWITCH OPERATION

When map lamp switch is ON (with map lamp), ground is supplied
• through grounds M57 and M61.
• to map lamp terminal 1

Power is supplied
• through BCM terminal 56
• to map lamp terminal 4.

When interior room lamp switch is ON, ground is supplied

• to interior room lamp terminal 1
• through map lamp (with map lamp) terminal 7
• through map lamp (with map lamp) terminal 1
• through grounds M57 and M61.

Power is supplied
• through BCM terminal 56
• through map lamp (with map lamp) terminal 4
• through map lamp (with map lamp) terminal 6
• to room lamp terminal 3.

INTERIOR ROOM LAMP TIMER OPERATION

Without Intelligent Key System

When room lamp switch is in DOOR position, and when all conditions below are met, BCM performs timer control (maximum 30 seconds) for room lamp ON/OFF.
In addition, when the interior room lamp turns ON or OFF there is gradual brightening or dimming over 1 second.
Power is supplied
• through 10A fuse [No. 10, located in fuse block (J/B)]
• to key switch and key lock solenoid terminal 2.

When the key is removed from ignition key cylinder (key switch OFF), power will not be supplied to BCM terminal 37.
When front door lock assembly LH (key cylinder switch) is unlocked, ground is supplied
• to BCM terminal 7
• through front door lock assembly LH (key cylinder switch) terminal 5
• through front door lock assembly LH (key cylinder switch) terminal 4
• through grounds M57 and M61.

At the time that front door LH is opened, BCM detects that front door LH is unlocked. It determines that interior room lamp timer operation condition is met, and turns the room lamp ON for 30 seconds.
When key is in ignition key cylinder (key switch ON),
Power is supplied
• through key switch and key lock solenoid terminal 1
• to BCM terminal 37.

When key is removed from key switch and key lock solenoid (key switch OFF), the power supply to BCM terminal 37 is terminated. BCM detects that key has been removed, determines that interior room lamp timer conditions are met, and turns the room lamp ON for 30 seconds.
When front door LH opens → closes, and the key is not inserted in the key switch and key lock solenoid (key switch OFF), voltage at BCM terminal 47 changes between 0V (door open) → 12V (door closed). The BCM determines that conditions for room lamp operation are met and turns the room lamp ON for 30 seconds.
Interior room lamp timer control is canceled under the following conditions:
• Front door LH is locked (locked by front door lock assembly LH (key cylinder switch), keyfob or door lock/unlock switch).
• Front door LH is opened (front door switch LH).
• Ignition switch ON.

With Intelligent Key System

When the room lamp switch is in DOOR position, and when all conditions below are met, BCM performs timer control (maximum 30 second) for room lamp ON/OFF.
In addition, when interior room lamp turns ON or OFF there is gradual brightening or dimming over 1 second.
Power is supplied
• through 10A fuse (No. 31, located in fuse and fusible link box)
• to key switch and ignition knob switch terminals 2 and 4.

When key is removed from ignition key cylinder (key switch OFF), power will not be supplied to BCM terminal 37.
When the ignition knob switch is released, power will not be supplied to Intelligent Key unit terminal 27.
When front door lock assembly LH (key cylinder switch) is unlocked, ground is supplied
• to BCM terminal 7
• through front door lock assembly LH (key cylinder switch) terminal 5
• through front door lock assembly LH (key cylinder switch) terminal 4
• through grounds M57 and M61.

At the time the front door LH is opened, the BCM detects the front door LH is unlocked. It determines that the interior room lamp timer operation conditions are met, and interior room lamp ON for 30 seconds.

When the key is in ignition key cylinder (key switch ON), or ignition knob switch is pushed, power is supplied
- through key switch and ignition knob switch terminal 1
- to BCM terminal 37, or
- through key switch and ignition knob switch terminal 3
- to Intelligent Key unit terminal 27.

When the key is removed from key switch (key switch OFF), power supply to BCM terminal 37 is terminated. When the ignition knob switch is released, power supply to Intelligent Key unit is terminated. The BCM detects that the key has been removed, determines that interior room lamp timer conditions are met, and turns room lamp ON for 30 seconds.

When the front door LH opens → closes, and key is not inserted in key switch (or ignition knob switch is released), BCM terminal 47 changes between 0V (door open) → 12V (door closed). BCM determines that conditions for room lamp operation are met, and turns room lamp ON for 30 seconds.

Interior room lamp timer control is canceled under the following conditions:
- Front door LH is locked (with keyfob, front door lock assembly LH (key cylinder switch) or door lock/unlock switch).
- Front door LH is opened (front door switch LH).
- Ignition switch ON.

INTERIOR LAMP BATTERY SAVER CONTROL

If an interior room lamp is left ON, it will not be turned OFF even when door is closed.

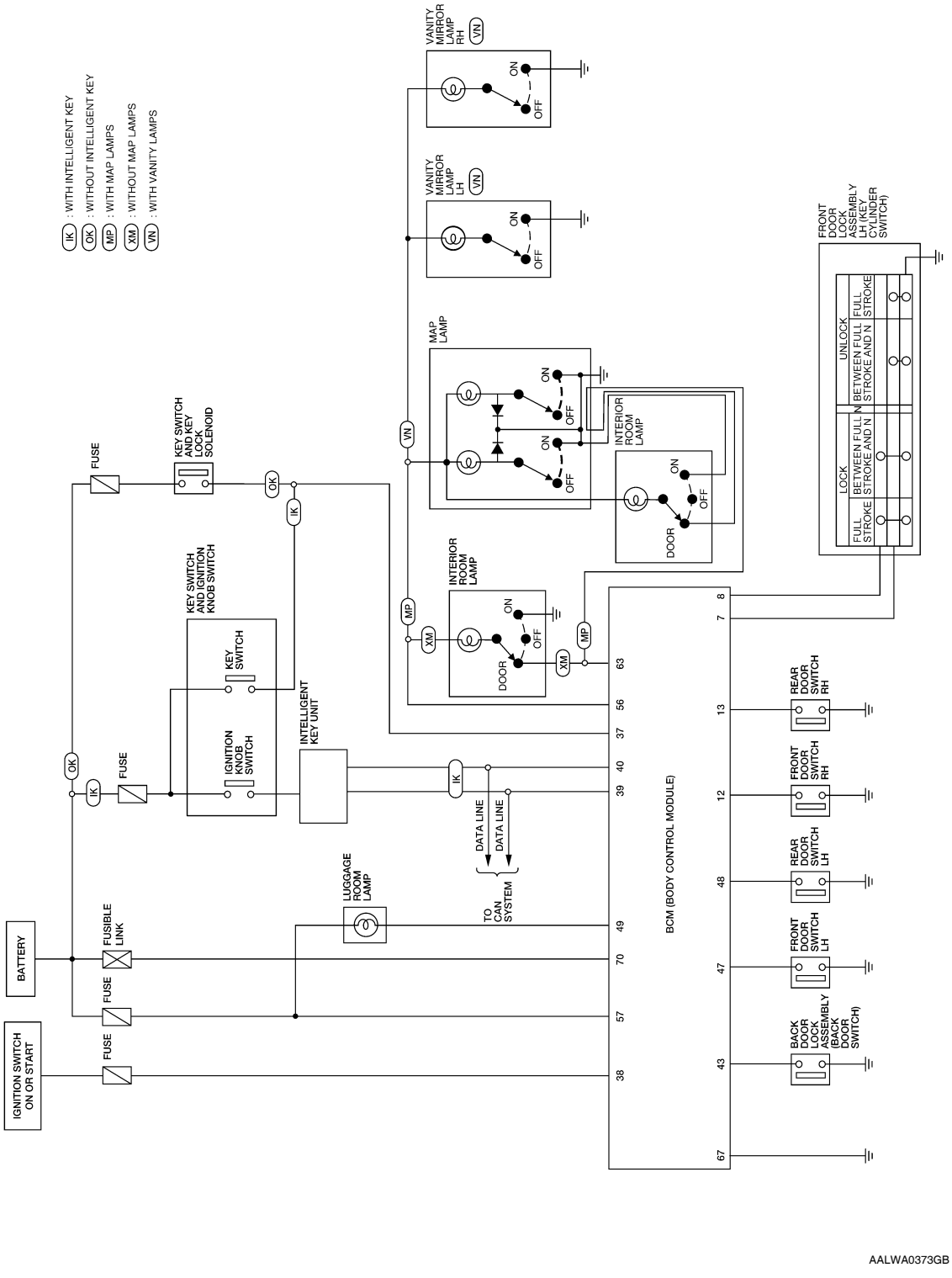
BCM turns off interior lamp automatically to save battery 15 minutes after ignition switch is turned off.

After lamps are turned OFF by the battery saver system, the lamps illuminate again when
- front door lock assembly LH (key cylinder switch) is locked or unlocked
- door is opened or closed
- key is removed from ignition key cylinder or inserted in ignition key cylinder, or the ignition knob switch is pushed or released.

Interior lamp battery saver control time period can be changed by the function setting of CONSULT.

Schematic

INFOID:0000000007330682



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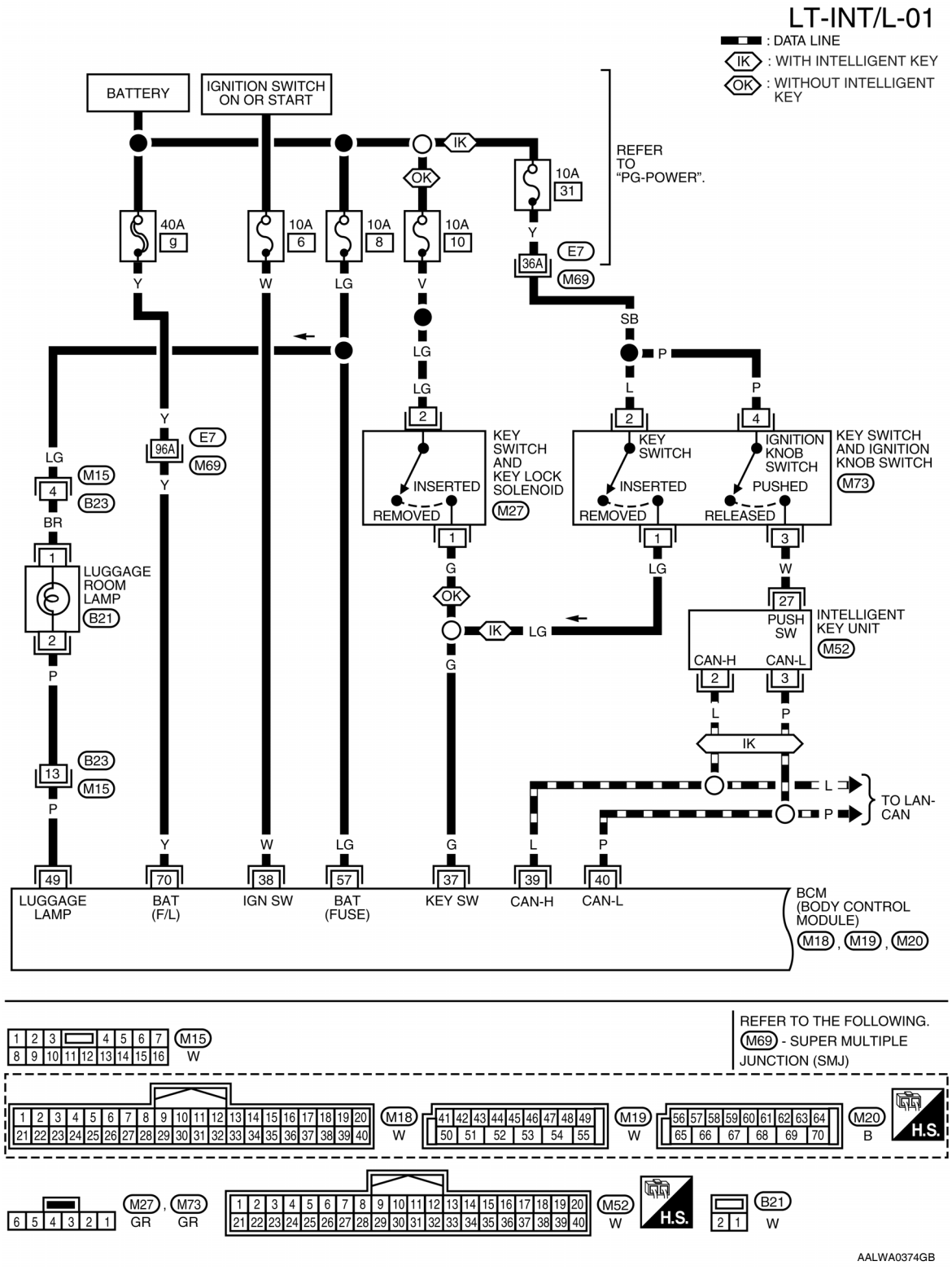
Wiring Diagram - INT/L -

INFOID:0000000007330683



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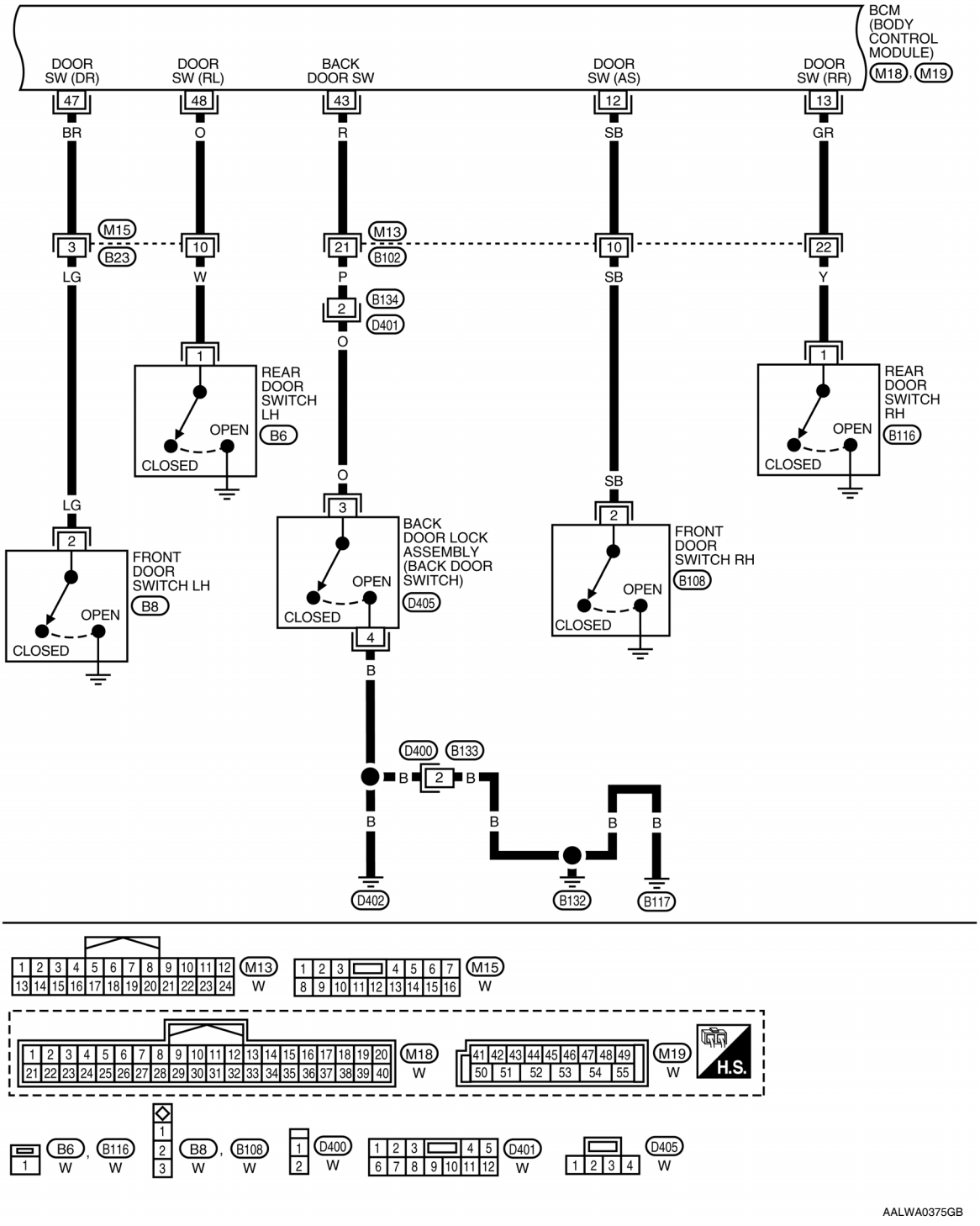
LT-INTL/L-02



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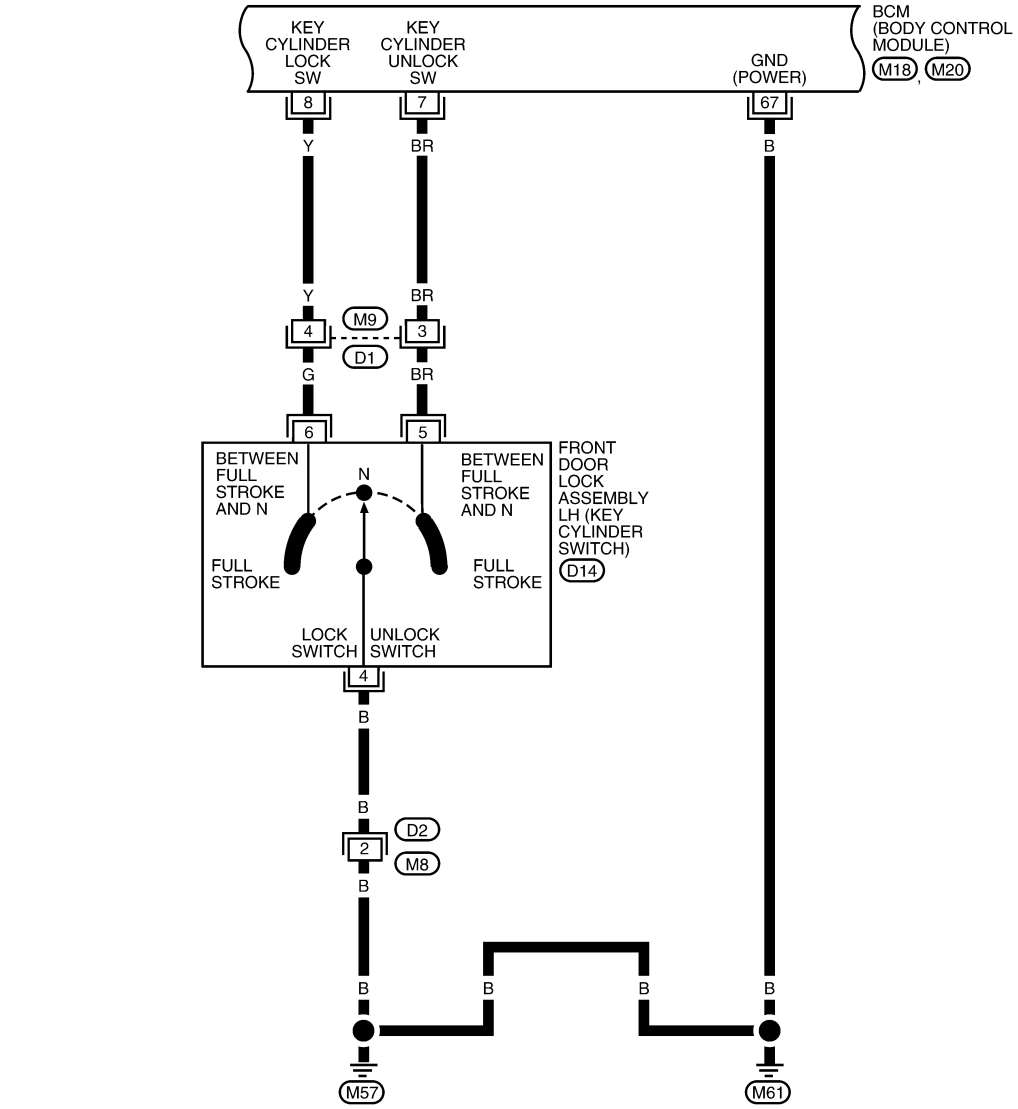

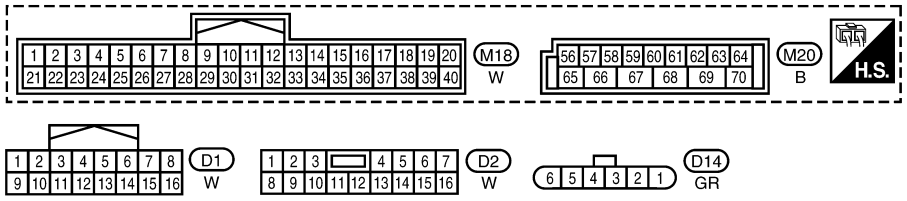

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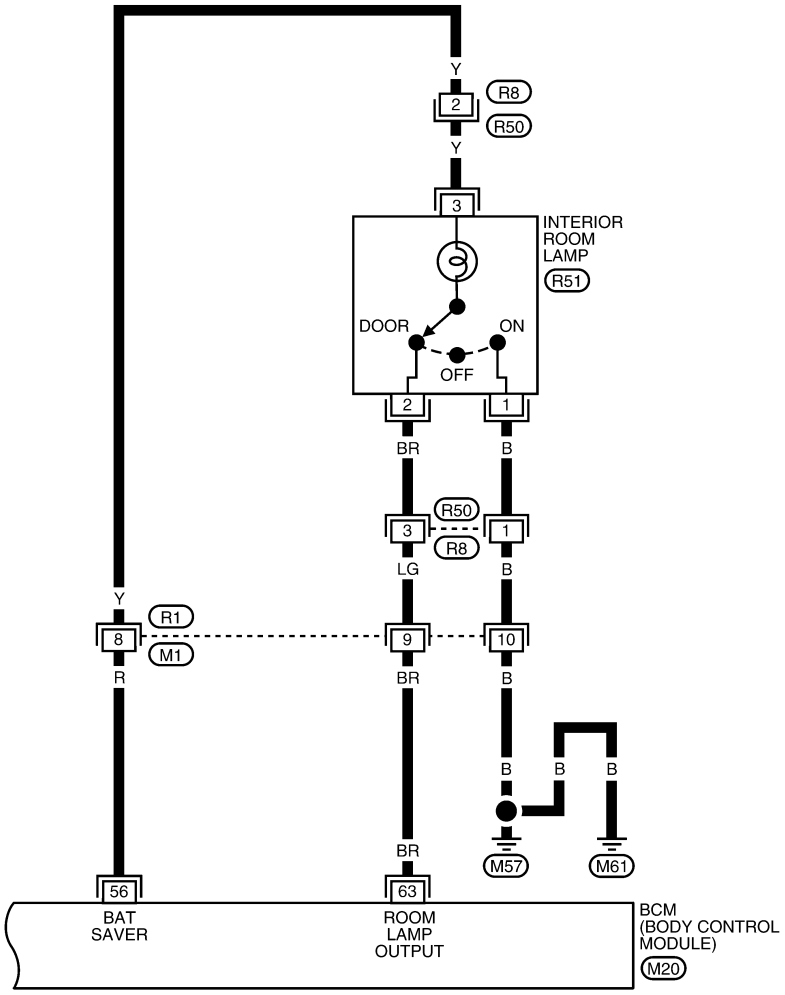
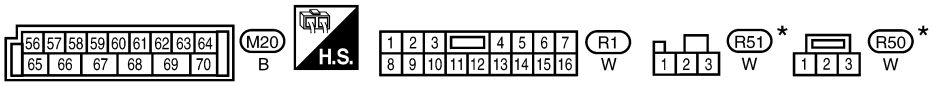
LT-INT/L-04





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

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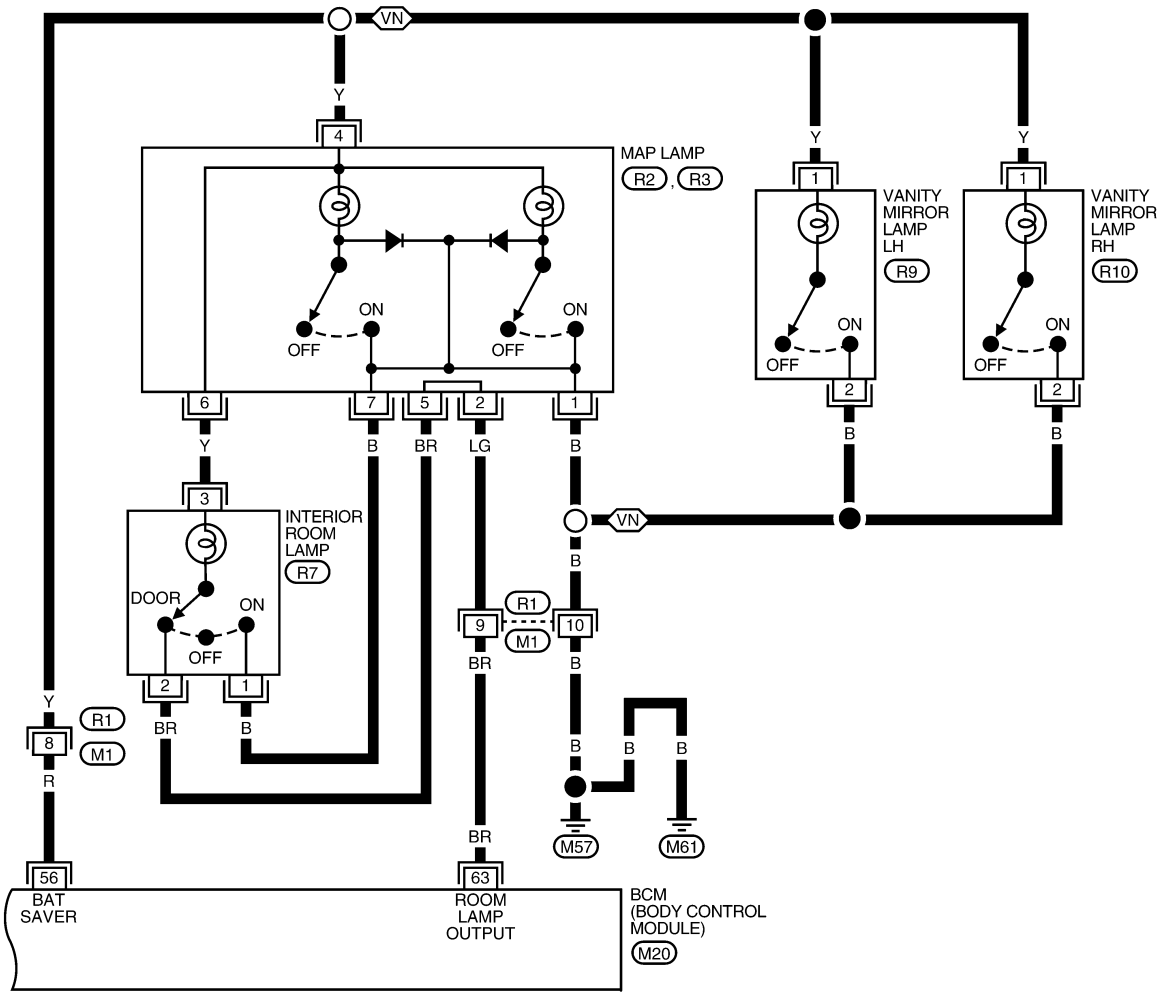
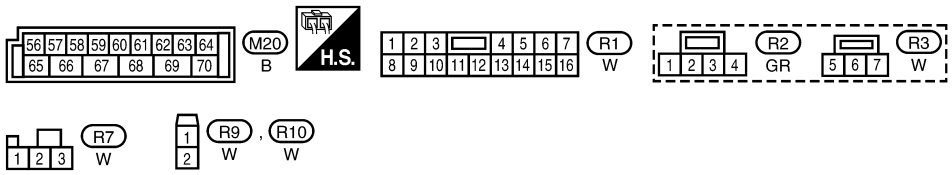
LT-INT/L-05

VN : WITH VANITY LAMPS





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Terminal and Reference Value for BCM

INFOID:0000000007330684

Refer to BCS-12, "Terminal and Reference Value for BCM" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330685

1. Confirm the symptom or customer complaint.

2. Understand operation description and function description. Refer to LT-87, "System Description" .
3. Perform the preliminary check. Refer to LT-97, "Preliminary Check" .
4. Check symptom and repair or replace the cause of the malfunction.
5. Does the interior room lamp operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. Inspection End

Preliminary Check

INFOID:0000000007330686

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR IPDM E/R

Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330687

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Content
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ECU IDENTIFICATION	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

ITEMS OF EACH PART

NOTE:

CONSULT will only display systems the vehicle possesses.

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF–DIAG RESULTS	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU PART NUMBER	ACTIVE TEST	CONFIGURATION
BCM	BCM	×	×	×		×		×
Power door lock system	DOOR LOCK	×			×		×	
Rear defogger	REAR DEFOGGER				×		×	
Warning chime	BUZZER				×		×	
Room lamp timer	INT LAMP	×			×		×	
Headlamp	HEAD LAMP	×			×		×	
Wiper	WIPER	×			×		×	
Turn signal lamp Hazard lamp	FLASHER				×		×	
Intelligent Key[2]	INTELLIGENT KEY			×	×			

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF–DIAG RESULTS	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU PART NUMBER	ACTIVE TEST	CONFIGURATION
Blower fan switch signal Air conditioner switch signal	AIR CONDITIONER				×		×	
Combination switch	COMB SW				×			
NVIS (NATS)	IMMU				×		×	
Interior lamp battery saver	BATTERY SAVER	×			×		×	
Back door/Trunk	TRUNK/BACK DOOR				×		×	
Theft alarm	THEFT ALM	×			×		×	
Retained accessory power control	RETAINED PWR	×			×		×	
Oil pressure switch	SIGNAL BUFFER				×		×	
Panic alarm	PANIC ALARM						×	
Remote keyless entry system[1]	MULTI REMOTE ENTRY	×			×		×	

1 : With remote keyless entry system

2: With Intelligent Key system

WORK SUPPORT

Display Item List

Item	Description
RESET SETTING VALUE	Return a value set with WORK SUPPORT of each system to a default value in factory shipment.

Interior Room Lamp Control Does Not Operate (With Map Lamp)

INFOID:0000000007330688

1.CHECK EACH SWITCH

Select "BCM" on CONSULT. With "INT LAMP" data monitor, make sure switches listed in display item list turn ON-OFF linked with switch operation. Refer to BCS-17, "CONSULT Function (BCM)" for switches and their functions.

OK or NG

OK >> GO TO 2.
NG >> Inspect malfunctioning switch system.

2.ACTIVE TEST

1. Select “BCM” on CONSULT. Select “INT LAMP" active test.
2. When room lamp switch is in DOOR position, make sure room lamp operates.

Room lamp should operate.

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> GO TO 3.

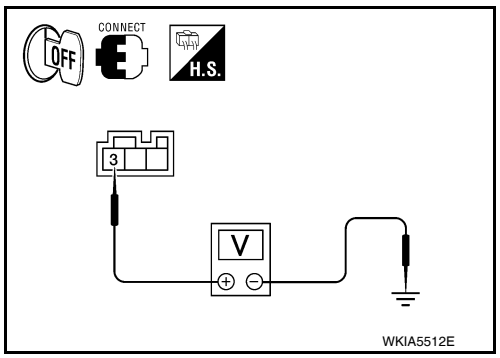
3.CHECK ROOM LAMP INPUT VOLTAGE

1. Turn ignition switch OFF.
2. Check voltage between interior room lamp harness connector R7 terminal 3 and ground.

3 - Ground : Battery voltage.

OK or NG

OK >> GO TO 6.
NG >> GO TO 4.



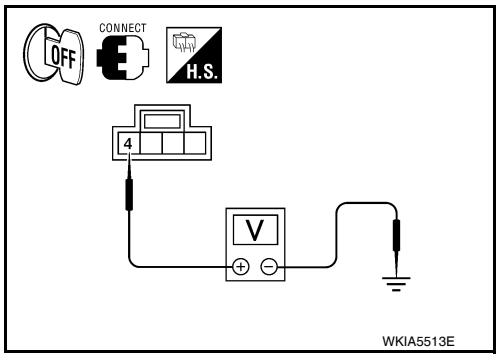
4. CHECK MAP LAMP INPUT CIRCUIT

1. Map lamp switch is in OFF position.
2. Check voltage between map lamp harness connector R2 terminal 4 and ground.

4 - Ground : Battery voltage.

OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.



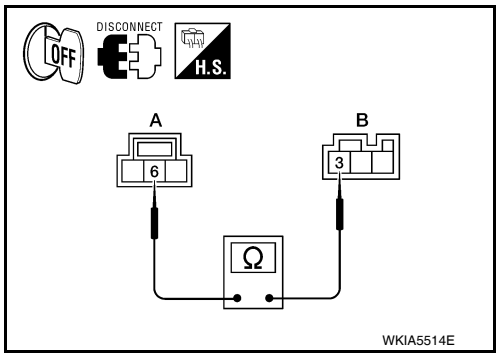
5. CHECK ROOM LAMP INPUT CIRCUIT

1. Disconnect map lamp connector and interior room lamp connector.
2. Check continuity between map lamp harness connector R3 (A) terminal 6 and interior room lamp harness connector R7 (B) terminal 3.

6 - 3 : Continuity should exist.

OK or NG

OK >> Replace map lamp.
NG >> Repair harness or connector.



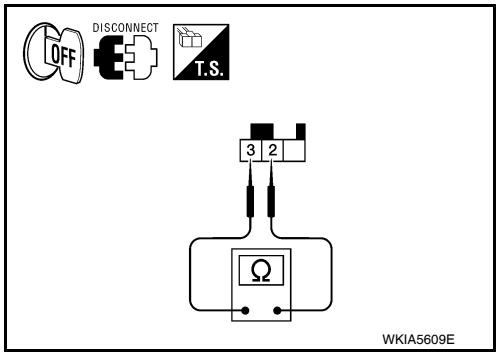
6. CHECK ROOM LAMP

1. Disconnect interior room lamp connector.
2. Check continuity between interior room lamp terminals.

Terminal		Condition	Continuity
Interior room lamp			
2	3	Room lamp switch is in DOOR position	Yes
		Room lamp switch is in OFF position	No

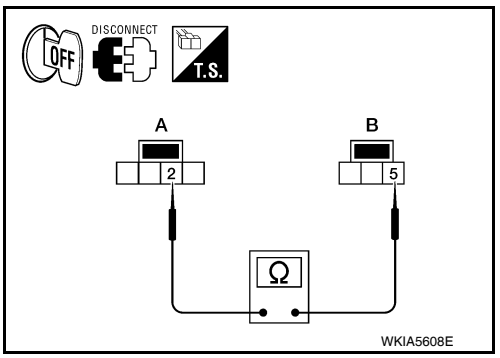
OK or NG

OK >> GO TO 7.
NG >> Check bulb. If OK, replace interior room lamp.



7. CHECK MAP LAMP

1. Disconnect map lamp connectors.
2. Check continuity between map lamp terminals.



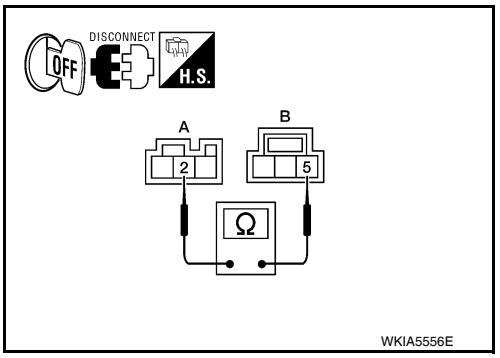
2 - 5 : Continuity should exist.

OK or NG

OK >> GO TO 8.
NG >> Replace map lamp.

8. CHECK CIRCUIT BETWEEN ROOM LAMP AND MAP LAMP

Check continuity between interior room lamp harness connector R7 (A) terminal 2 and map lamp harness connector R3 (B) terminal 5.



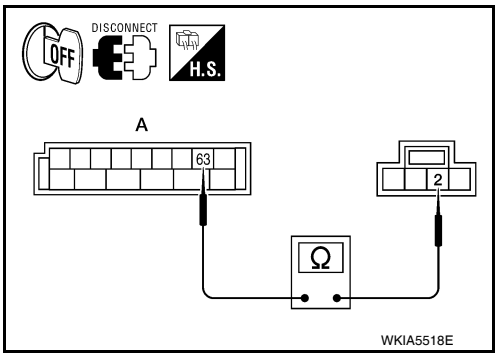
2 - 5 : Continuity should exist.

OK or NG

OK >> GO TO 9.
NG >> Repair harness or connector.

9. CHECK CIRCUIT BETWEEN MAP LAMP AND BCM

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector M20 (A) terminal 63 and map lamp harness connector R2 (B) terminal 2.



63 - 2 : Continuity should exist.

OK or NG

OK >> Replace BCM if room lamp does not work after setting the connector again. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Repair harness or connector.

Interior Room Lamp Control Does Not Operate (Without Map Lamp)

INFOID:0000000007330689

1. CHECK EACH SWITCH

Select "BCM" on CONSULT. With "INT LAMP" data monitor, make sure switches listed in display item list turn ON-OFF linked with switch operation. Refer to BCS-17, "CONSULT Function (BCM)" for switches and their functions.

OK or NG

OK >> GO TO 2.
NG >> Inspect malfunctioning switch system.

2. ACTIVE TEST

1. Select "BCM" on CONSULT. Select "INT LAMP" active test.
2. When room lamp switch is in DOOR position, make sure room lamp operates.

Room lamp should operate.

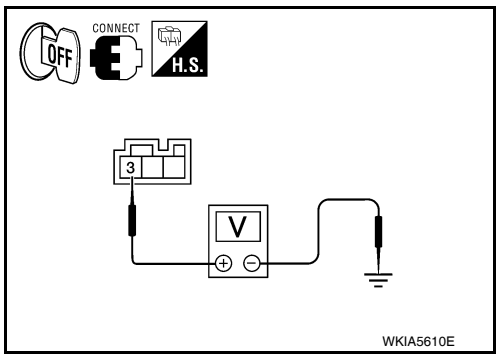
OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> GO TO 3.

3. CHECK ROOM LAMP INPUT VOLTAGE

1. Turn ignition switch OFF.
2. Check voltage between interior room lamp harness connector R7 terminal 3 and ground.

3 - Ground : Battery voltage should exist.



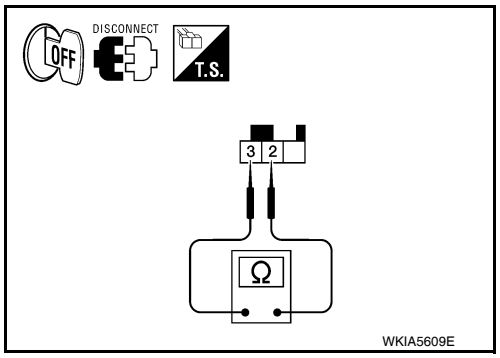
OK or NG

OK >> GO TO 4.
NG >> GO TO 6.

4. CHECK ROOM LAMP

1. Disconnect room lamp connector.
2. Check continuity between room lamp terminals.

Room lamp		Condition	Continuity
Terminal			
2	3	Room lamp switch is in DOOR position	Yes
		Room lamp switch is in OFF position	No



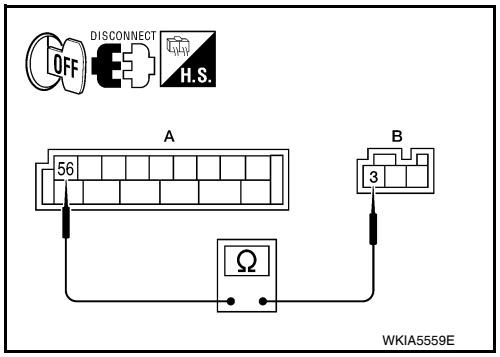
OK or NG

OK >> GO TO 5.
NG >> Check bulb. If OK, replace room lamp. Refer to LT-101, "Bulb Replacement" .

5. CHECK ROOM LAMP CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector M20 (A) terminal 56 and room lamp harness connector R7 (B) terminal 3.

56 - 3 : Continuity should exist.



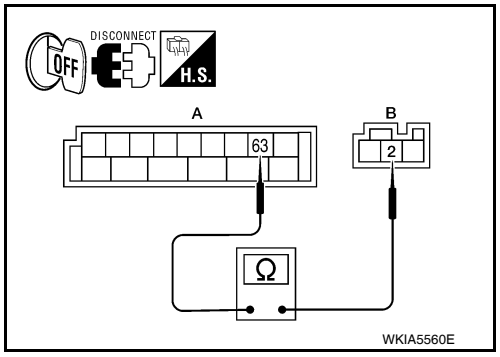
OK or NG

OK >> GO TO 6.
NG >> Repair harness or connector.

6. CHECK ROOM LAMP CIRCUIT

1. Disconnect BCM connector and room lamp connector.
2. Check continuity between BCM harness connector M20 (A) terminal 63 and room lamp harness connector R7 (B) terminal 2.

63 - 2 : Continuity should exist.



OK or NG

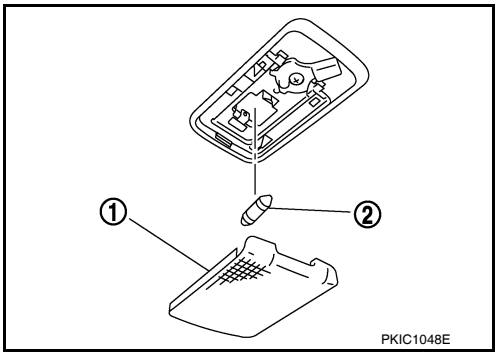
OK >> Replace BCM if interior lamp does not work after setting the connector again. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Repair harness or connector.

Bulb Replacement

INFOID:0000000007330690

ROOM LAMP

1. Remove lens (1) by inserting suitable tool and releasing LH (switch side first).
2. Remove bulb (2).
3. Installation is in the reverse order of removal.
   NOTE:
   Insert the lens hook end RH side first to install lens.



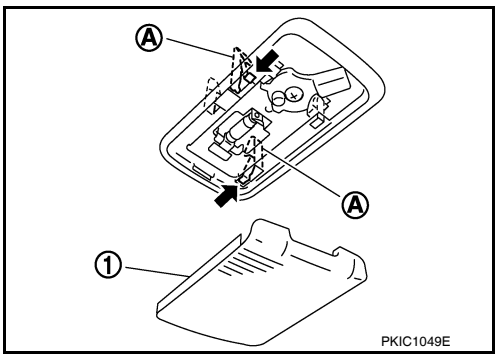
Removal and Installation

INFOID:0000000007330691

ROOM LAMP

Removal

1. Remove lens (1) and remove the room lamp by pulling down to release the room lamp metal clips (A).
2. Disconnect connector and remove room lamp.



Installation
Installation is in the reverse order of removal.

ILLUMINATION

System Description

INFOID:0000000007330692

The control of the illumination lamps operation is dependent upon the position of the lighting switch. When the lighting switch is placed in the 1ST or 2ND position, the BCM (body control module) receives input signal requesting the illumination lamps to illuminate. This input signal is communicated to IPDM E/R (intelligent power distribution module engine room) across CAN communication lines. CPU (central processing unit) located in the IPDM E/R controls the tail lamp relay coil. This relay, when energized, directs power to the illumination lamps, which then illuminate.

Power is supplied at all times
- to ignition relay, located in IPDM E/R,
- to tail lamp relay, located in IPDM E/R,
- through 15A fuse (No. 52, located in IPDM E/R) and
- through 20A fuse (No. 53, located in IPDM E/R)
- to CPU located in IPDM E/R,
- through 40A fusible link (letter **g**, located in fuse and fusible link box)
- to BCM terminal 70, and
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to BCM terminal 57.

With the ignition switch in the ON or START position, power is supplied
- to ignition relay, located in IPDM E/R, and
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in fuse block (J/B)]
- to BCM terminal 11.

Ground is supplied
- to BCM terminal 67
- through grounds M57 and M61
- to IPDM E/R terminals 39 and 59, and
- through grounds E15 and E24.

ILLUMINATION OPERATION BY LIGHTING SWITCH

With the lighting switch in the 1ST or 2ND position, BCM receives input signal requesting the illumination lamps to illuminate. This input signal is communicated to IPDM E/R across CAN communication lines. CPU located in the IPDM E/R controls the tail lamp relay coil, which, when energized, directs power
- through 10A fuse (No. 37, located in IPDM E/R)
- through IPDM E/R terminal 29
- to illumination control switch terminal 1
- to VDC OFF switch terminal 3
- to audio unit terminal 9
- to front air control terminal 5
- to A/T shift selector terminal 3 (with A/T)
- to CVT shift selector terminal 3 (with CVT)
- to hazard switch terminal 3
- to combination meter terminal 12
- to door mirror remote control switch terminal 16
- to combination switch (spiral cable) terminal 26 (with steering wheel audio control switches)
- to steering wheel audio control switches through combination switch (spiral cable) terminal 18 (with steering wheel audio control switches).

Ground is supplied
- to VDC OFF switch terminal 4
- to illumination control switch terminal 3, and
- through grounds M57 and M61.

The illumination control switch controls illumination intensity by varying the ground to the following
- through illumination control switch terminal 2
- to audio unit terminal 8
- to front air control terminal 6
- to A/T shift selector terminal 4 (with A/T)
- to CVT shift selector terminal 3 (with CVT)

- to hazard switch terminal 4
- to combination meter terminal 13
- to door mirror remote control switch terminal 15
- to combination switch (spiral cable) terminal 27 (with steering wheel audio control switches)
- to steering wheel audio control switches through combination switch (spiral cable) terminal 21 (with steering wheel audio control switches).

With power and ground supplied, illumination lamps illuminate.

EXTERIOR LAMP BATTERY SAVER CONTROL

Refer to LT-72, "System Description".

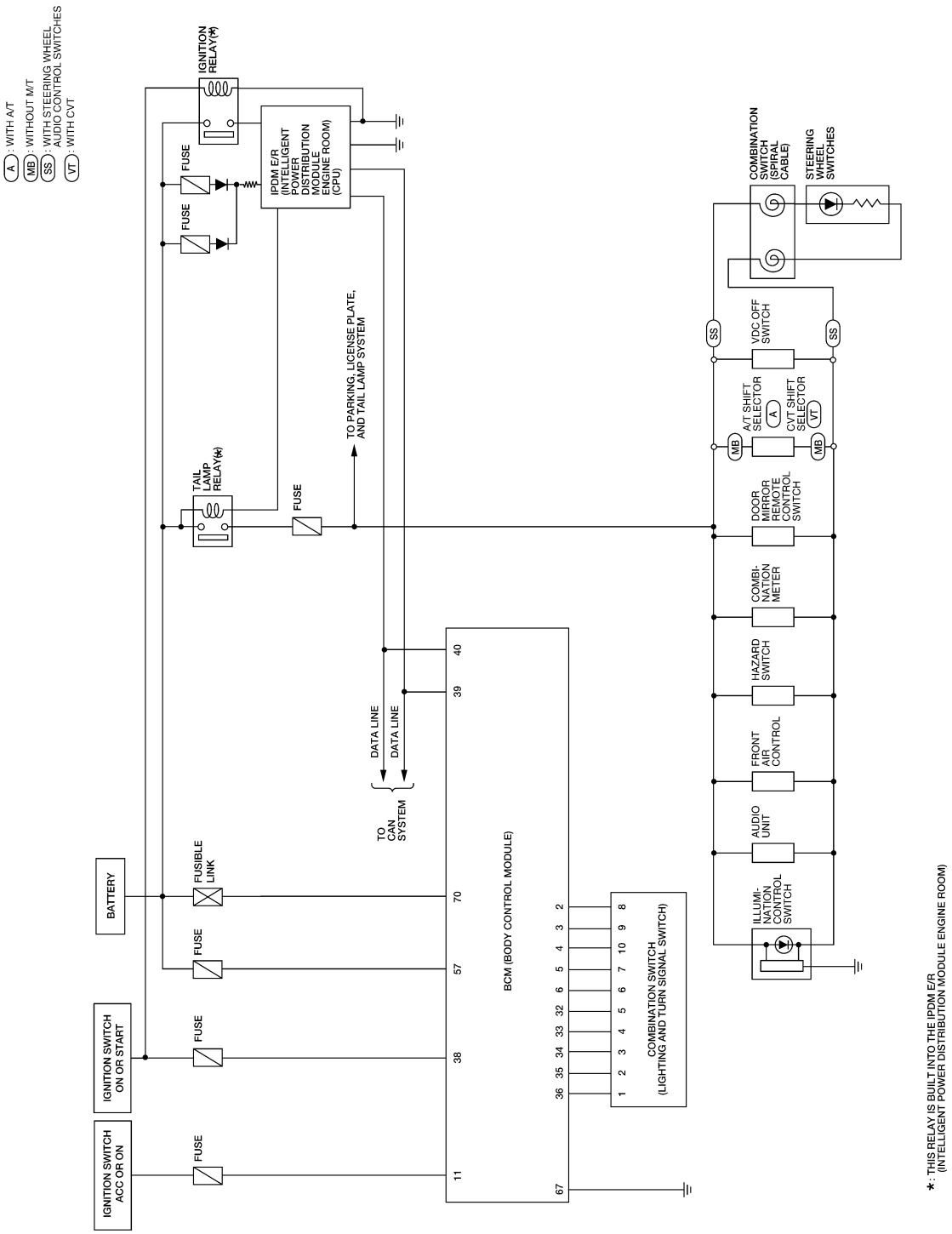
CAN Communication System Description

INFOID:0000000007330693

Refer to LAN-5, "System Description" .

Schematic

INFOID:0000000007330694



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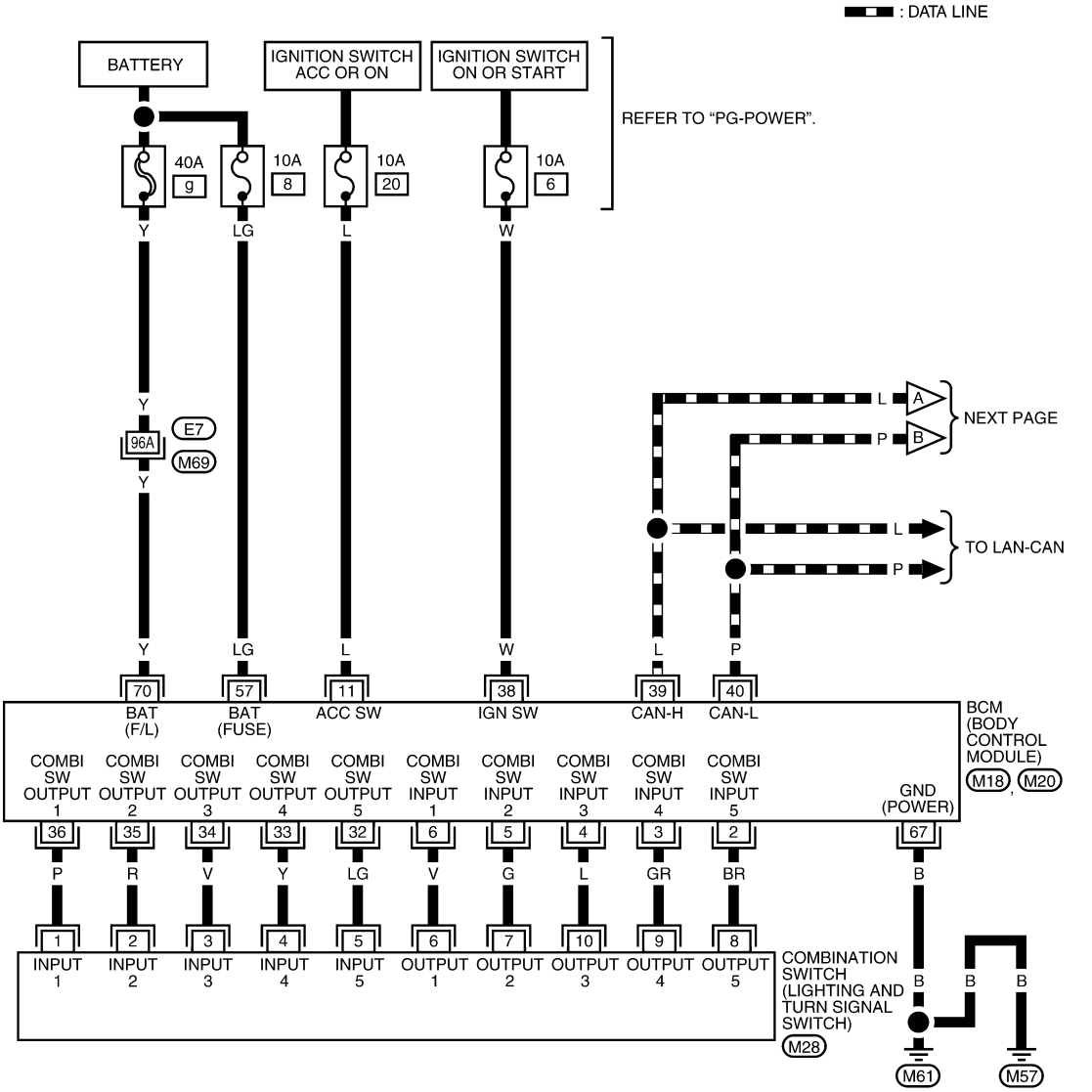
Wiring Diagram - ILL -

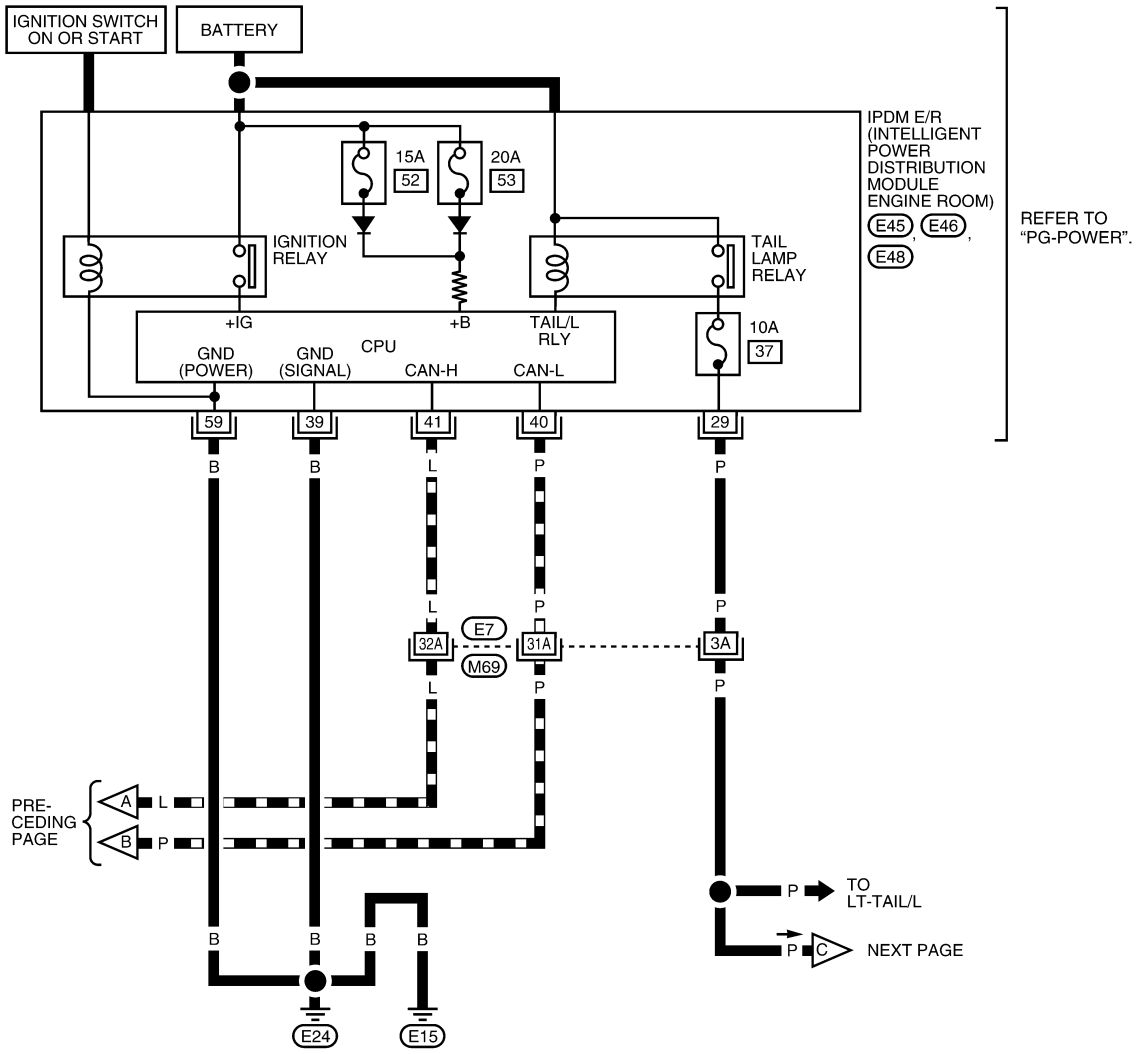
INFOID:0000000007330695

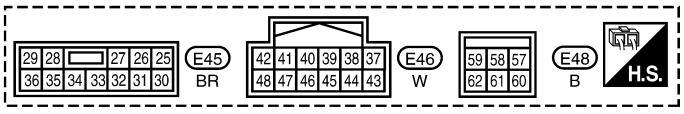
LT-ILL-01



LT-ILL-02

: DATA LINE





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

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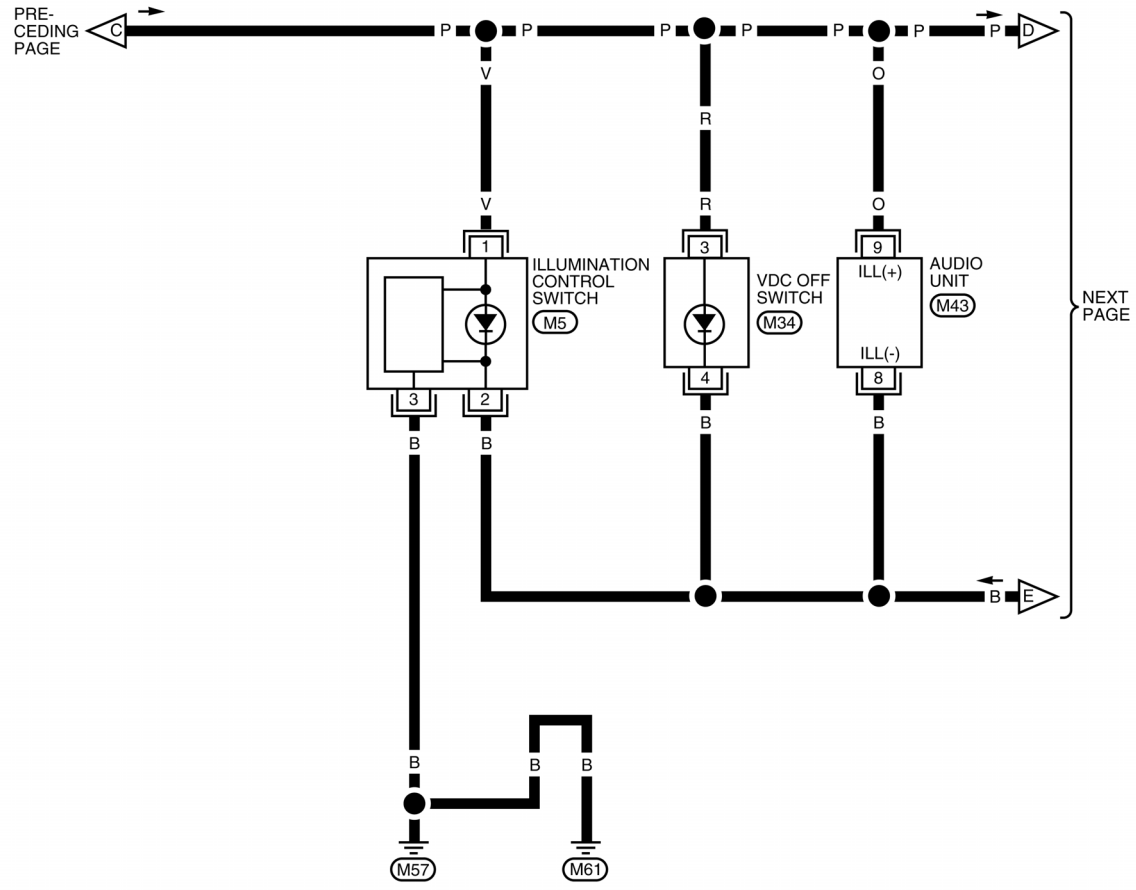
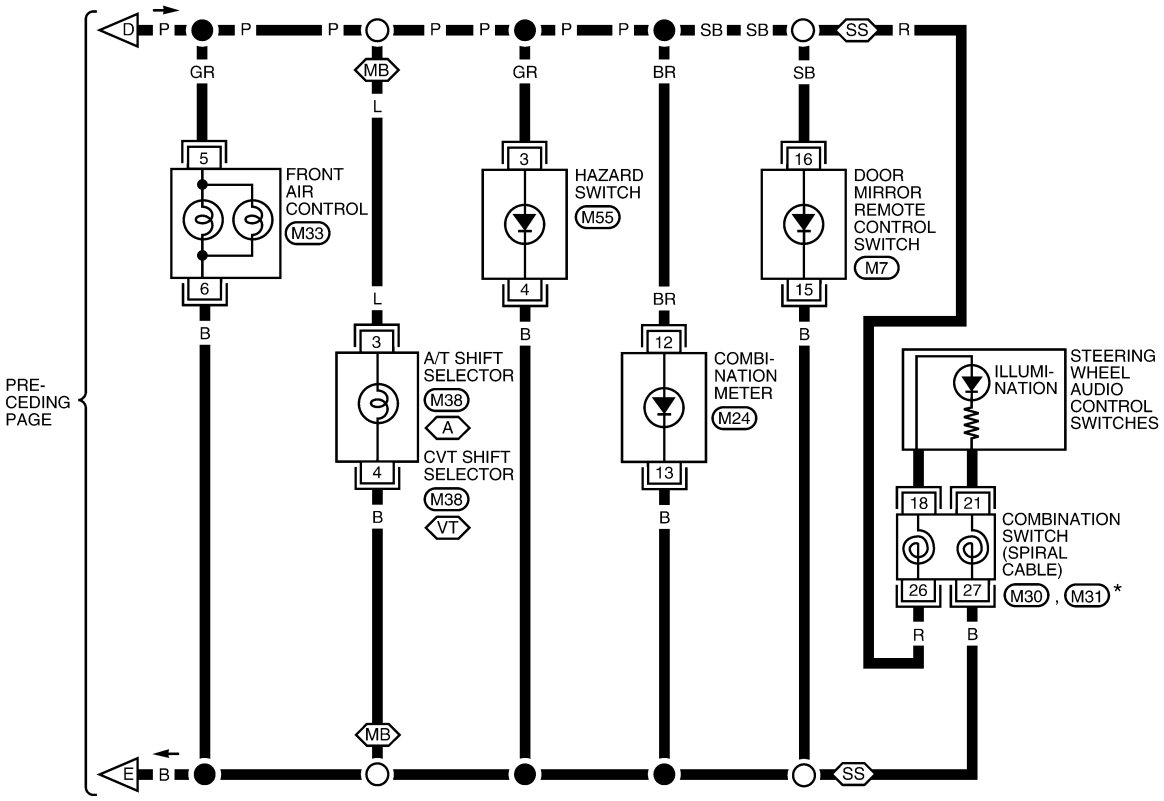
LT-ILL-03

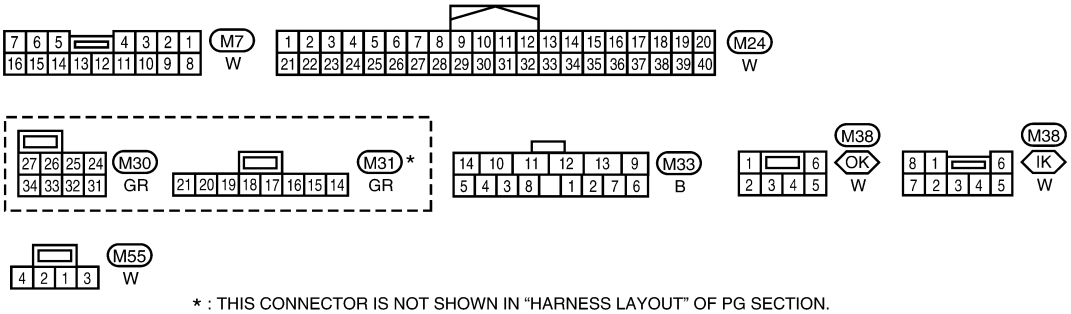


AALWA0377GB

LT-ILL-04

A : WITH A/T
IK : WITH INTELLIGENT KEY
MB : WITHOUT M/T
OK : WITHOUT INTELLIGENT KEY
SS : WITH STEERING WHEEL AUDIO CONTROL SWITCHES
VT : WITH CVT





* : THIS CONNECTOR IS NOT SHOWN IN “HARNESS LAYOUT” OF PG SECTION.

AALWA0378GB

BULB SPECIFICATIONS

Headlamp

INFOID:0000000007330696

Item	Wattage (W)
High/Low (Halogen type)	60/55

Exterior Lamp

INFOID:0000000007330697

Item		Wattage (W)
Front combination lamp	Turn signal lamp	21 (amber)
	Parking (clearance) lamp	5
Rear combination lamp	Stop/Tail lamp	21/5
	Turn signal lamp	21 (amber)
	Back-up lamp	21
Front fog lamp		35
License plate lamp		5
High-mounted stop lamp		LED

Interior Lamp/Illumination

INFOID:0000000007330698

Item	Wattage (W)
Map lamp	8
Room lamp	8
Luggage room lamp	5
Vanity mirror lamp	*

* Always check with the parts department for the latest parts information.

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DRIVER INFORMATION SYSTEM

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SERVICE INFORMATION

PRECAUTION

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329901

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329902

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

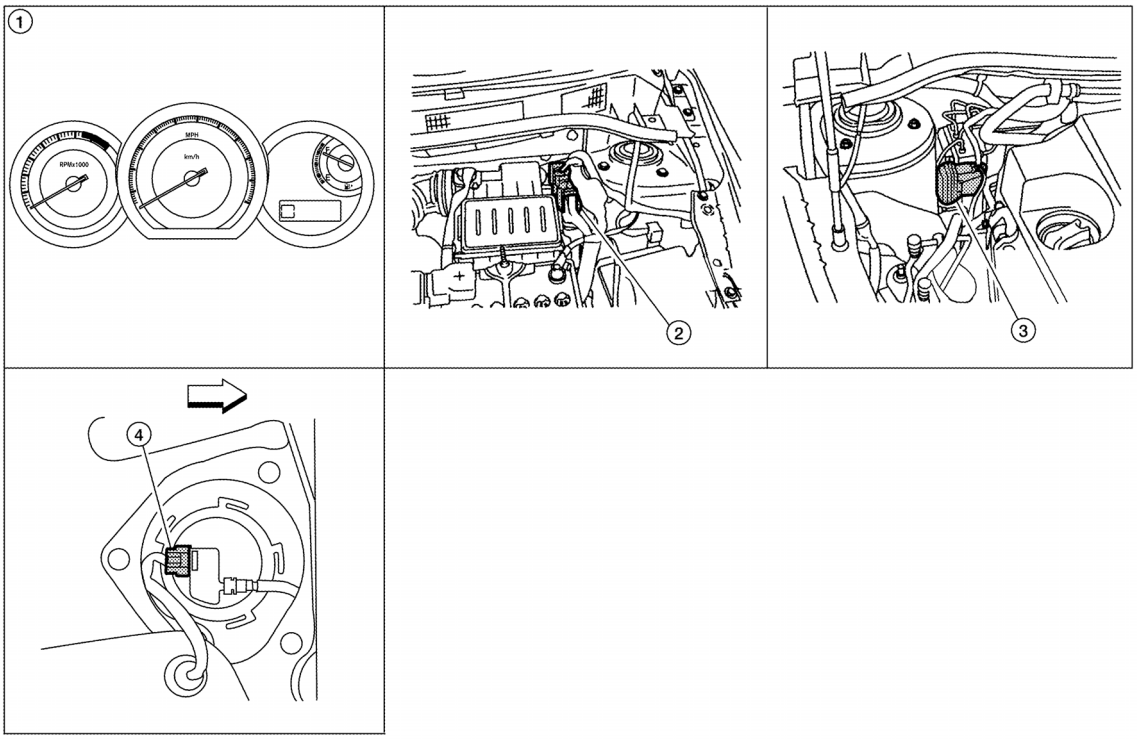
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

COMBINATION METERS

Component Parts and Harness Connector Location

INFOID:0000000007329903



AWNIA2453ZZ

1. Combination meter M24
2. ECM E16
3. ABS actuator and electric unit (control unit) E33
4. Fuel level sensor unit and fuel pump (fuel level sensor) B100 (view with rear seat and inspection hole cover removed) (⇐: Front)

System Description

INFOID:0000000007329904

UNIFIED METER CONTROL UNIT

- Speedometer, odo/trip meter, tachometer and fuel gauge are controlled by the unified meter control unit, which is built into the combination meter.
- Warning and indicator lamps are controlled by signals drawn from the CAN communication system, BCM (body control module), and components connected directly to the combination meter.
- Odo/trip meter and A/T indicator (with A/T) or CVT indicator (with CVT) segments can be checked in self-diagnosis mode.
- Meters/gauges can be checked in self-diagnosis mode.

POWER SUPPLY AND GROUND CIRCUIT

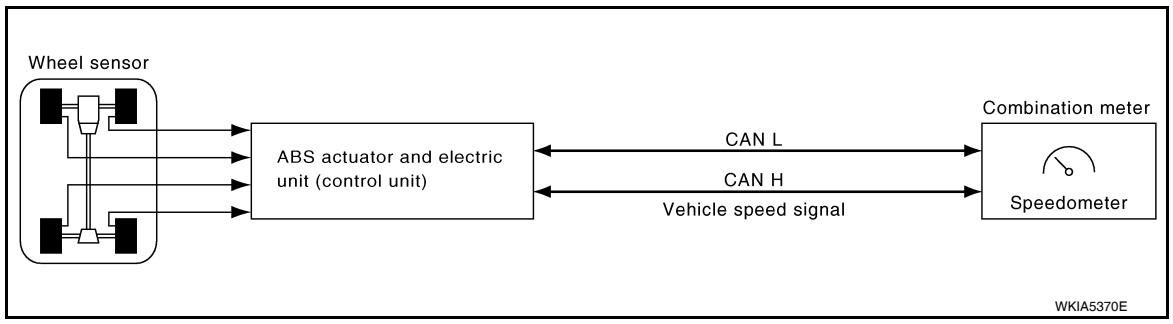
Power is supplied at all times
- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to combination meter terminal 27.

With the ignition switch in the ON or START position, power is supplied
- through 10A fuse [No. 3, located in the fuse block (J/B)]
- to combination meter terminal 28.

Ground is supplied
- to combination meter terminals 21, 22 and 23
- through grounds M57 and M61.

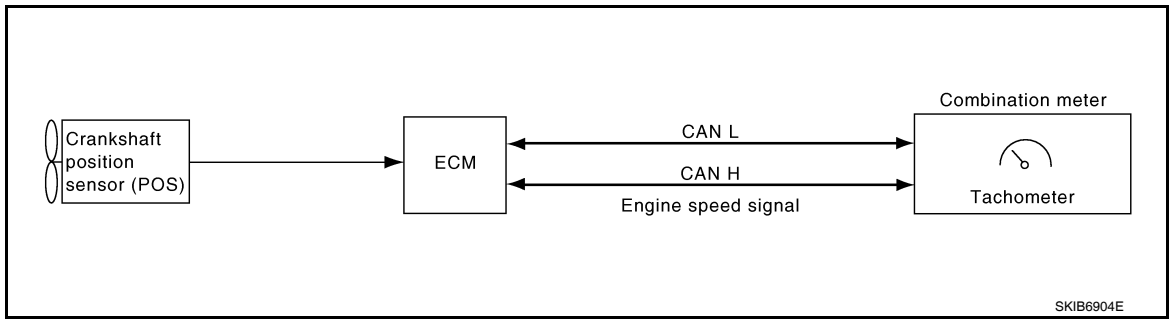
SPEEDOMETER

The ABS actuator and electric unit (control unit) provides a vehicle speed signal to the combination meter via CAN communication lines.



TACHOMETER

The tachometer indicates engine speed in revolutions per minute (rpm). The ECM provides an engine speed signal to combination meter via CAN communication lines.



FUEL GAUGE

The fuel gauge indicates the approximate fuel level in the fuel tank.
The fuel gauge is regulated by the unified meter control unit and a variable resistor signal supplied

- to combination meter terminal 24
- through fuel level sensor unit and fuel pump terminal 5
- through fuel level sensor unit and fuel pump terminal 2
- from combination meter terminal 6.

ODO/TRIP METER

The vehicle speed signal and the memory signals from the meter memory circuit are processed by the combination meter and the mileage is displayed.

Loose Fuel Cap Indicator (If Equipped)

The LOOSE FUEL CAP indicator will display in the odometer when the fuel-filler cap is not tightened correctly. The indicator will turn off as soon as the ECM detects the fuel-filler cap is properly tightend. The ECM provides a loose fuel cap signal to the combination meter via CAN communication lines.

How to Change the Display

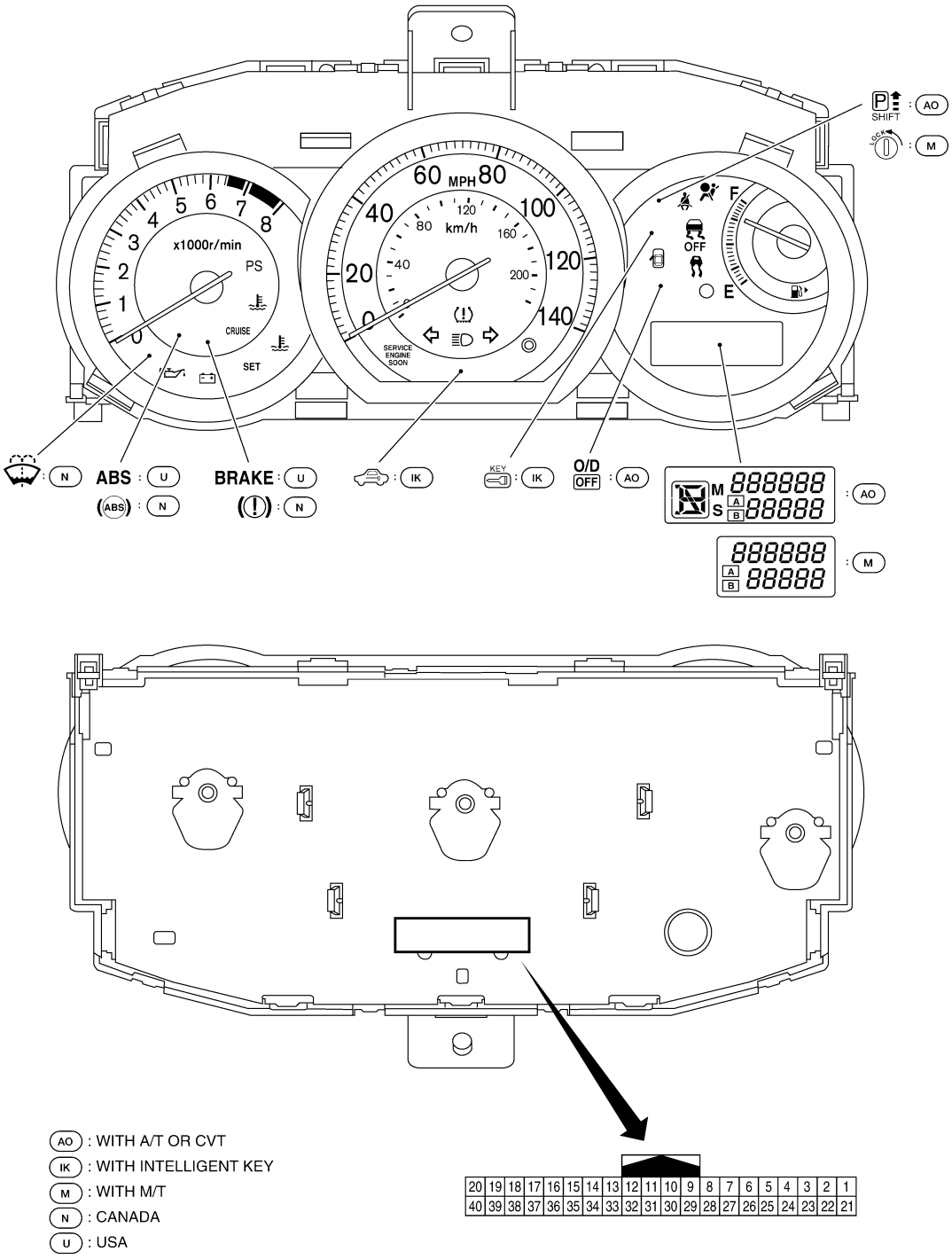
Refer to Owner's Manual for odo/trip meter operating instructions.

CAN COMMUNICATION SYSTEM DESCRIPTION

Refer to LAN-5 .

Arrangement of Combination Meter

INFOID:0000000007329905



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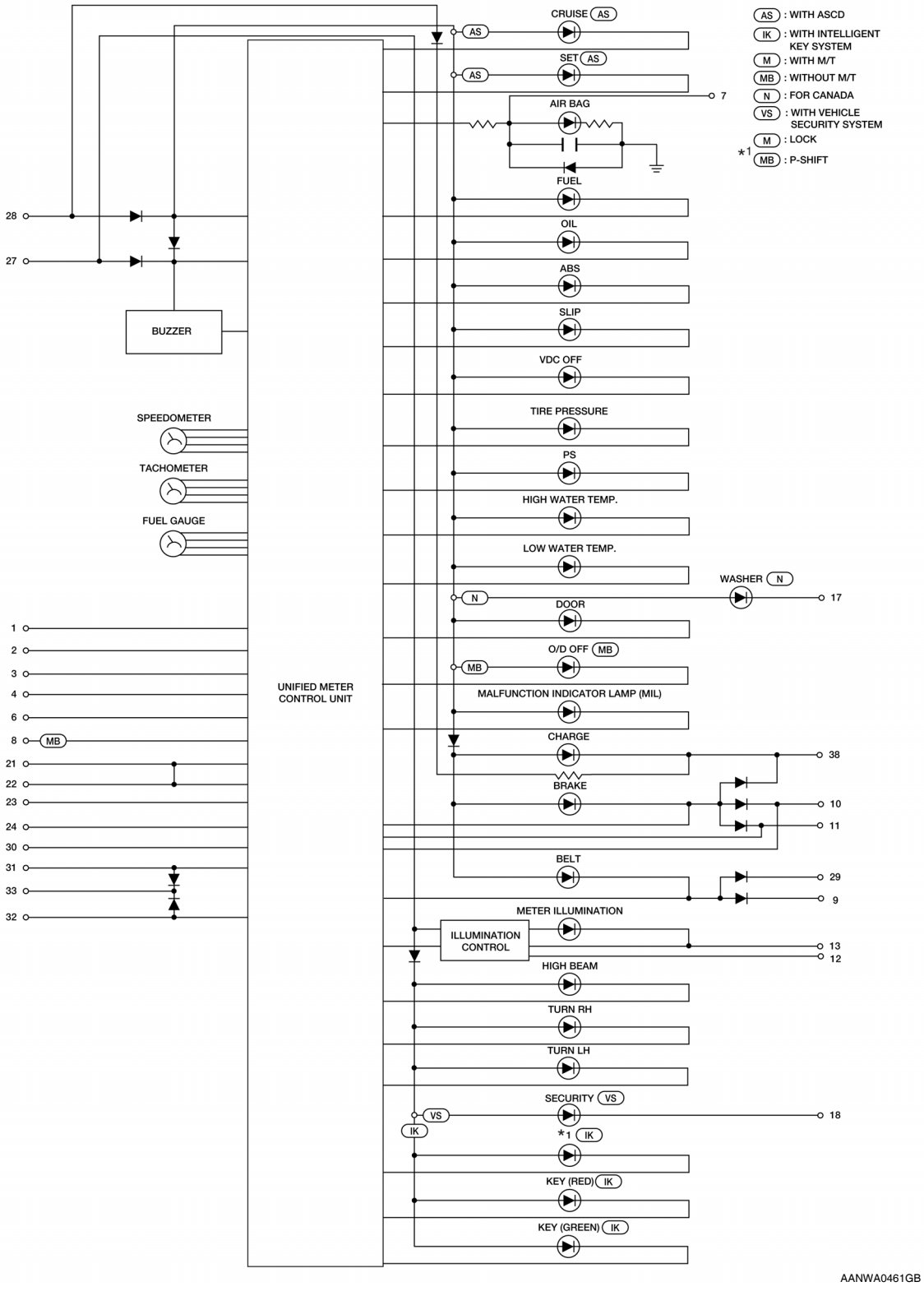
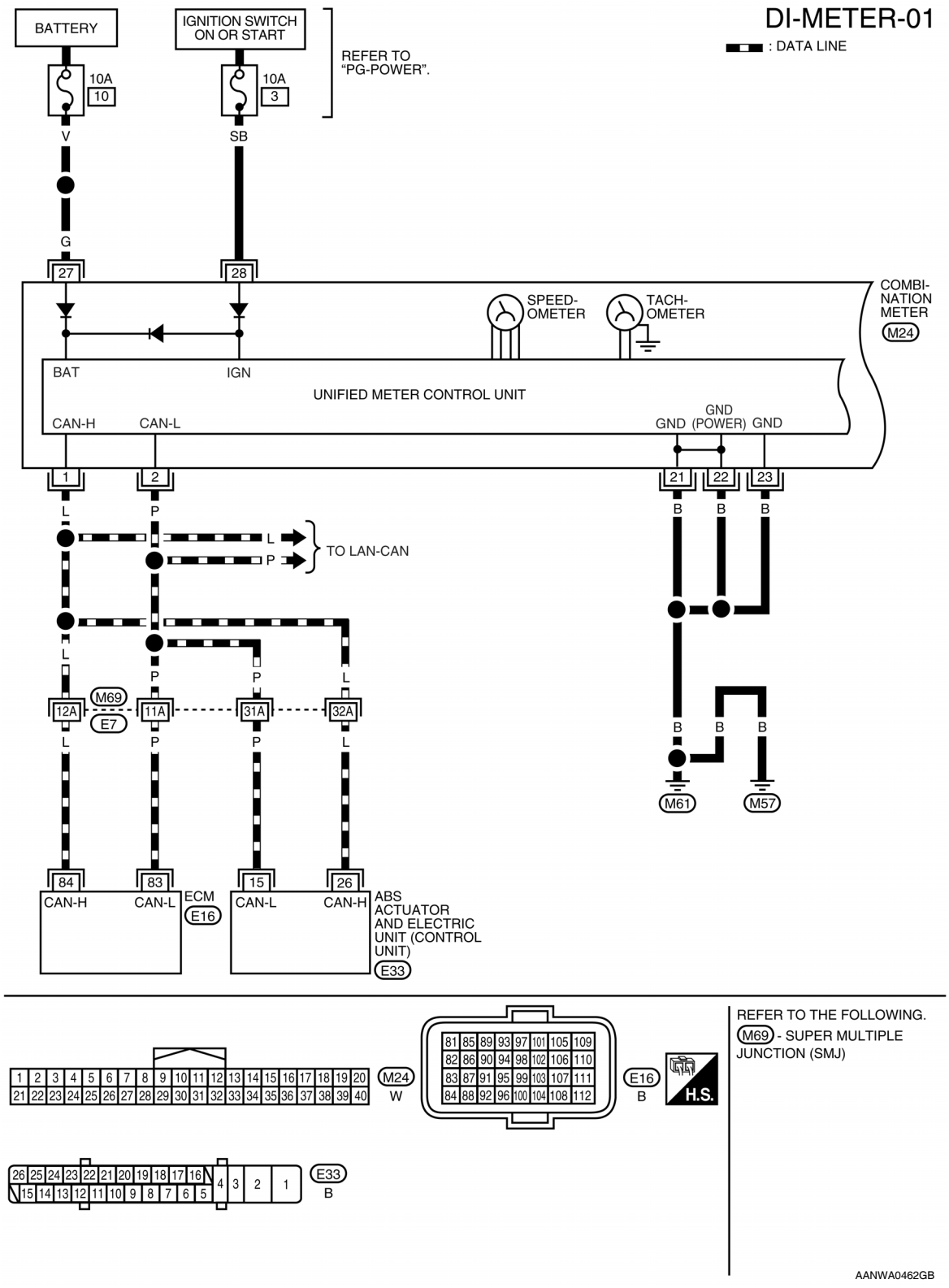
Internal Circuit

INFOID:0000000007329906

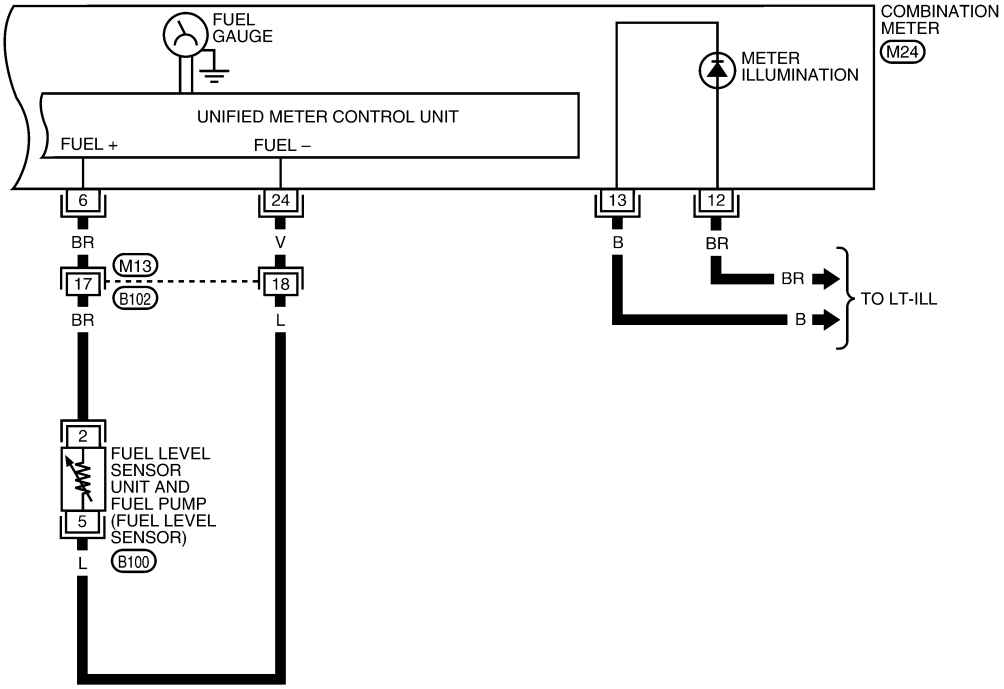


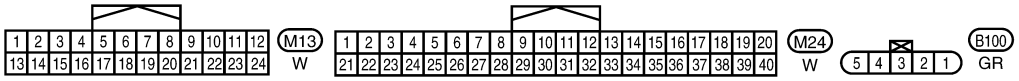
Wiring Diagram - METER -

INFOID:0000000007329907



DI-METER-02





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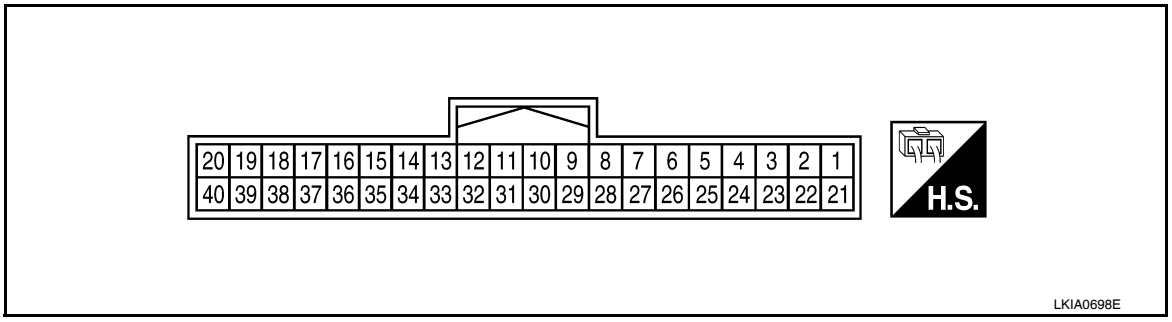
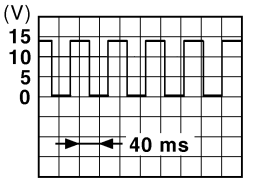
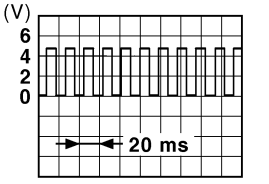
Combination Meter Harness Connector Terminal Layout

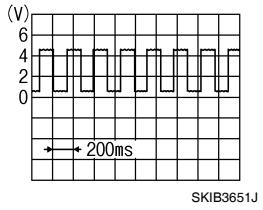
INFOID:0000000007329908



Terminal and Reference Value for Combination Meter

INFOID:0000000007329909

Terminal No.	Wire color	Item	Condition		Reference value (V) (Approx.)
			Ignition switch	Operation or condition	
1	L	CAN-H	—	—	—
2	P	CAN-L	—	—	—
3	G	Vehicle speed signal output (2-pulse)	ON	Speedometer operated [When vehicle speed is approx. 40 km/h (25 MPH)]	**NOTE:** Maximum voltage may be 5 V due to specifications (connected units).  PKIC0642E
4	SB	Vehicle speed signal output (8-pulse)	ON	Speedometer operated [When vehicle speed is approx. 40 km/h (25 MPH)]	**NOTE:** Maximum voltage may be 12 V due to specifications (connected units).  PKIC0643E
6	BR	Fuel level sensor signal (+)	—	—	Refer to DI-19, "Electrical Component Inspection" .
8	P	O/D OFF switch	ON	O/D OFF switch pressed	0
				O/D OFF switch released	Battery voltage
9	Y	Seat belt buckle switch LH	ON	Unfastened (ON)	0
				Fastened (OFF)	Battery voltage
10	SB	Parking Brake switch	ON	Parking brake applied	0
				Parking brake released	Battery voltage
11	LG	Brake fluid level switch	ON	Brake fluid level low	0
				Brake fluid level normal	Battery voltage
12	BR	Illumination control switch (+)	—	—	Refer to LT-103, "System Description" .
13	B	Illumination control switch (-)	—	—	Refer to LT-103, "System Description" .

Terminal No.	Wire color	Item	Condition		Reference value (V) (Approx.)
			Ignition switch	Operation or condition	
17	G	Washer fluid level switch (Canada models)	ON	Washer fluid level low	0
				Washer fluid level normal	Battery voltage
21	B	Ground	—	—	0
22					
23					
24	V	Fuel level sensor ground (-)	ON	—	0
27	G	Battery power supply	OFF	—	Battery voltage
28	SB	Ignition switch ON or START	ON	—	Battery voltage
29	GR	Seat belt buckle switch RH	ON	Unfastened (ON)	0
				Fastened (OFF)	Battery voltage
30	G	Stop lamp switch	ON	Brake pedal depressed	Battery voltage
				Brake pedal released	0
31	V	A/T N-range input (with A/T)	ON	Transmission gear selector lever in N position	Battery voltage
				Transmission gear selector lever other than N position	0
32	W	A/T P-range input (with A/T)	ON	Transmission gear selector lever in P position	Battery voltage
				Transmission gear selector lever other than P position	0
33	Y	A/T PN output (with A/T)	ON	Transmission gear selector lever in P or N position	0
				Transmission gear selector lever other than P or N position	Battery voltage
35	BR	Engine coolant temperature signal output	ON	At idle [after warming up, approx. 80°C (176°F)] NOTE: The waveforms vary depending on engine coolant temperature.	 SKIB3651J
38	L	Generator	ON	Generator voltage low	0
				Generator voltage normal	Battery voltage

Self-Diagnosis Mode of Combination Meter

INFOID:0000000007329910

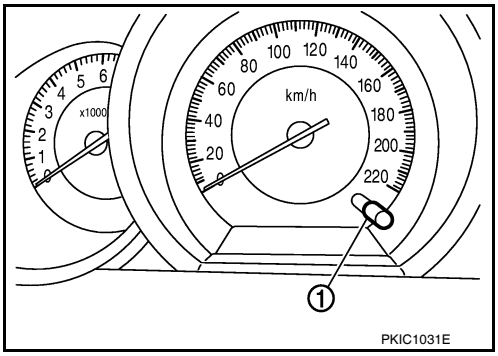
SELF-DIAGNOSIS MODE FUNCTION

- Self-diagnosis can check for continuity between meter control circuit and each meter (speedometer, tachometer and fuel gauge).
- Self-diagnosis can check for odo/trip meter and A/T indicator (with A/T) or CVT indicator (with CVT) segment, low-fuel level warning lamp, low water temperature indicator lamp, and high water temperature warning lamp.

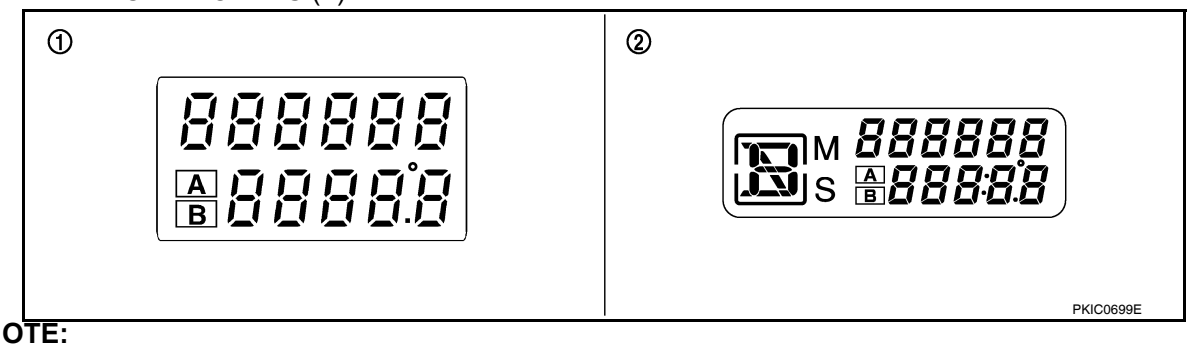
OPERATION PROCEDURE

1. Turn the ignition switch ON, and switch the odo/trip meter to “trip A” or “trip B”.
   NOTE:
   If the diagnosis function is activated with “trip A” displayed, the mileage on “trip A” will indicate “0000.0”, but the actual trip mileage will be retained. (The same applies for “trip B”.)
2. Turn ignition switch OFF.

3. While pushing the odo/trip meter switch (1), turn the ignition switch ON.
4. Confirm that the trip meter displays “0000.0”.
5. Push the odo/trip meter switch at least 3 times. (Within 7 seconds after the ignition switch is turned ON.)

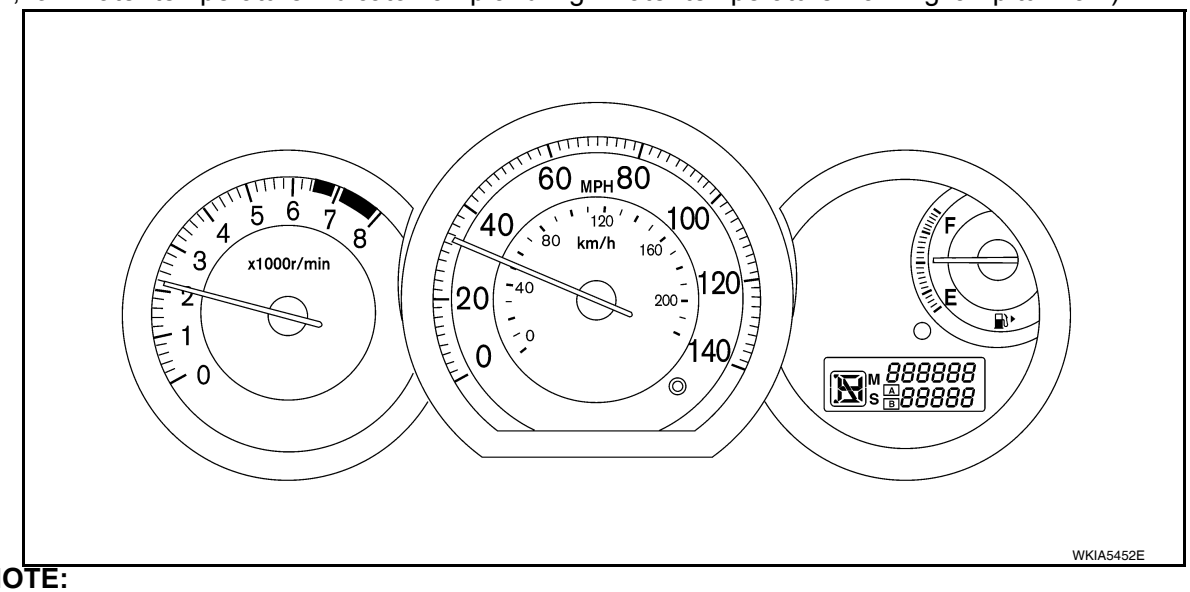


6. All the segments on the odo/trip meter, and simultaneously the low-fuel warning lamp indicator illuminates. At this time, the unified meter control unit is turned to self-diagnosis mode.
   - M/T MODELS (1)
   - A/T AND CVT MODELS (2)



NOTE:
- Check combination meter power supply and ground circuit when self-diagnosis mode of combination meter does not start. Replace combination meter if normal. Refer to IP-12, "Removal and Installation" .
- If any of the segments is not displayed, replace combination meter. Refer to IP-12, "Removal and Installation" .

7. Each meter activates while pressing odo/trip meter switch. (At this time, the low-fuel warning lamp turns off, low water temperature indicator lamp and high water temperature warning lamp turn on.)



NOTE:
If any of the meter and gages are not activated, replace combination meter. Refer to IP-12, "Removal and Installation" .

CONSULT Function (METER/M&A)

INFOID:0000000007329911

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

METER diagnosis mode	Description
SELF-DIAG RESULTS	Displays combination meter self-diagnosis results.
DATA MONITOR	Displays combination meter input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAGNOSTIC RESULTS

Display Item List

CONSULT display	Malfunction	Reference page
CAN COMM CIRC [U1000]	Malfunction is detected in CAN communication lines. **CAUTION:** **Even when there is no malfunction on CAN communication system, malfunction may be misinterpreted when battery has low voltage (when maintaining 7 - 8 V for about 2 seconds) or 10A fuse [No. 14, located in the fuse block (J/B)] is removed.**	DI-18
VEHICLE SPEED CIRC [B2205]	Malfunction is detected when an erroneous speed signal is input. **CAUTION:** **Even when there is no malfunction on speed signal system, malfunctions may be misinterpreted when battery has low voltage (when maintaining 7 - 8 V for about 2 seconds).**	DI-16

NOTE:
"TIME" indicates the following.
- 0: Indicates that a malfunction is detected at present.
- 1-63: Indicates that a malfunction was detected in the past. (Displays number of ignition switch OFF → ON cycles after malfunction is detected. Self-diagnostic result is erased when "63" is exceeded.)

DATA MONITOR

Display Item List

Display item [Unit]	MAIN SIGNALS	SELECTION FROM MENU	Contents
SPEED METER [km/h]	X	X	The value of vehicle speed signal, which is input from ABS actuator and electric unit (control unit).
SPEED OUTPUT [km/h]	X	X	The value of vehicle speed signal, which is transmitted to each unit with CAN communication.
TACHO METER [rpm]	X	X	The value of engine speed signal, which is input from ECM.
W TEMP METER [°C]	X	X	The value of engine coolant temperature signal, which is input from ECM.
FUEL METER [lit.]	X	X	The value, which processes a resistance signal from fuel gauge.
DISTANCE [km]	X	X	The value, which is calculated by vehicle speed signal from ABS actuator and electric unit (control unit), fuel gauge and fuel consumption signal from ECM.
FUEL W/L [ON/OFF]	X	X	Indicates [ON/OFF] condition of low-fuel warning lamp.
C-ENG W/L [ON/OFF]		X	Indicates [ON/OFF] condition of malfunction indicator lamp (MIL).
AIR PRES W/L		X	Indicates [ON/OFF] condition of low tire pressure warning lamp.
SEAT BELT W/L		X	Indicates [ON/OFF] condition of seat belt warning lamp.
BUZZER [ON/OFF]	X	X	Indicates [ON/OFF] condition of buzzer.
DOOR W/L [ON/OFF]		X	Indicates [ON/OFF] condition of door warning lamp.
HI-BEAM IND [ON/OFF]		X	Indicates [ON/OFF] condition of high beam indicator lamp.
TURN IND [ON/OFF]		X	Indicates [ON/OFF] condition of turn indicator.
OIL W/L [ON/OFF]		X	Indicates [ON/OFF] condition of oil pressure warning lamp.

Display item [Unit]	MAIN SIGNALS	SELECTION FROM MENU	Contents
VDC/TCS IND [ON/OFF]		X	Indicates [ON/OFF] condition of VDC OFF indicator lamp.
ABS W/L [ON/OFF]		X	Indicates [ON/OFF] condition of ABS warning lamp.
SLIP IND [ON/OFF]		X	Indicates [ON/OFF] condition of SLIP indicator lamp.
BRAKE W/L [ON/OFF]		X	Indicates [ON/OFF] condition of brake warning lamp.*
KEY G/Y W/L [ON/OFF]		X	Indicates [ON/OFF] condition of KEY warning lamp (green).
KEY R W/L [ON/OFF]		X	Indicates [ON/OFF] condition of KEY warning lamp (red).
KEY KNOB W/L [ON/OFF]		X	Indicates [ON/OFF] condition of LOCK warning lamp.
PNP P SW [ON/OFF]	X	X	Indicates [ON/OFF] condition of inhibitor P switch.
PNP N SW [ON/OFF]	X	X	Indicates [ON/OFF] condition of inhibitor N switch.
O/D OFF SW [ON/OFF]		X	Indicates [ON/OFF] condition of O/D OFF switch.
BRAKE SW [ON/OFF]		X	Indicates [ON/OFF] condition of parking brake switch.
P RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T or CVT shift P range indicator.
R RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T or CVT shift R range indicator.
N RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T or CVT shift N range indicator.
D RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T or CVT shift D range indicator.
2 RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T shift 2 range indicator.
L RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of CVT shift L range indicator.
1 RANGE IND [ON/OFF]	X	X	Indicates [ON/OFF] condition of A/T shift 1 range indicator.
CRUISE IND [ON/OFF]		X	Indicates [ON/OFF] condition of CRUISE indicator.
SET IND [ON/OFF]		X	Indicates [ON/OFF] condition of SET indicator.
O/D OFF W/L [ON/OFF]		X	Indicates [ON/OFF] condition of O/D OFF indicator lamp.
EPS W/L [ON/OFF]		X	Indicates [ON/OFF] condition of EPS warning lamp.

NOTE:

Some items are not available due to vehicle specification.

*: The monitor will indicate “OFF” even though the brake warning lamp is on if either of the following conditions exist.

- The parking brake is engaged
- The brake fluid level is low

Trouble Diagnosis

INFOID:0000000007329912

HOW TO PERFORM TROUBLE DIAGNOSIS

1. Confirm the symptom or customer complaint.
2. Perform preliminary check. Refer to "PRELIMINARY CHECK" .
3. According to the symptom chart, repair or replace the cause of the malfunction. Refer to DI-15, "Symptom Chart" .
4. Does the meter operate normally? If so, GO TO 5. If not, GO TO 2.
5. Inspection End.

PRELIMINARY CHECK

1.CHECK SELF-DIAGNOSIS OPERATION OF COMBINATION METER

Perform self-diagnosis of combination meter. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter" .

Does self-diagnosis mode operate?

YES >> GO TO 2.

NO >> Check power supply and ground circuit of combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection" .

2.CHECK COMBINATION METER (CONSULT)

Select “METER/M&A” on CONSULT and perform self-diagnosis of combination meter. Refer to DI-12, "CONSULT Function (METER/M&A)" .

Self-diagnostic results content

No malfunction detected>> Refer to DI-15, "Symptom Chart" .
Malfunction detected>> Refer to DI-12, "CONSULT Function (METER/M&A)" .

Symptom Chart

INFOID:0000000007329913

Symptom	Possible cause
Improper speedometer and odo/trip meter indication.	Refer to DI-16, "Vehicle Speed Signal Inspection" .
Improper tachometer indication.	Refer to DI-16, "Engine Speed Signal Inspection" .
Improper fuel gauge indication.	Refer to DI-16, "Fuel Level Sensor Signal Inspection" .
Low-fuel warning lamp indication is irregular.	
Improper A/T position indication.	Refer to DI-35, "A/T Indicator Does Not Illuminate" .
Improper CVT position indication.	Refer to DI-40, "CVT Indicator Does Not Illuminate" .

Power Supply and Ground Circuit Inspection

INFOID:0000000007329914

1.CHECK FUSE

Check for blown combination meter fuses.

Power source	Fuse No.
Battery	10
Ignition switch ON or START	3

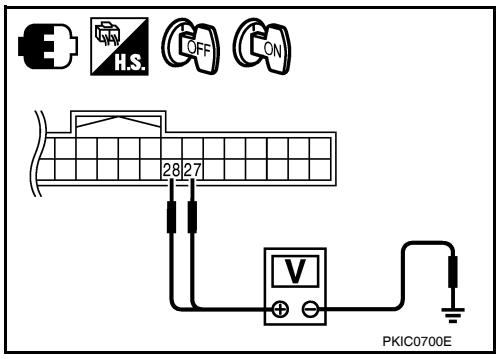
OK or NG

OK >> GO TO 2.
NG >> Be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4 .

2.CHECK POWER SUPPLY CIRCUIT

Check voltage between combination meter harness connector terminals and ground.

Terminals			Ignition switch position	
(+)		(–)	OFF	ON
Combination meter connector	Terminal			
M24	27	Ground	Battery voltage	Battery voltage
	28		0 V	Battery voltage



OK or NG

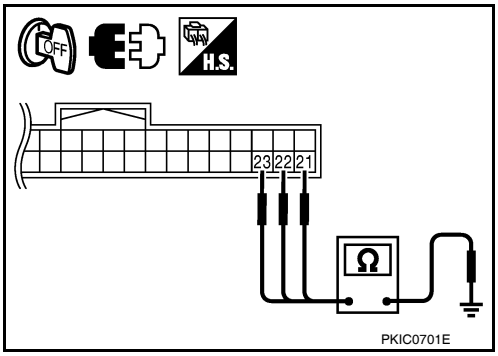
OK >> GO TO 3.
NG >> Repair harness or connector.

3.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.

3. Check continuity between combination meter harness connector terminals and ground.

Combination meter connector	Terminal		Continuity
M24	21	Ground	Yes
	22		
	23		



OK or NG

OK >> Replace combination meter. Refer to IP-12, "Removal and Installation" .

NG >> Repair harness or connector.

Vehicle Speed Signal Inspection

INFOID:0000000007329915

Symptom:
- Improper speedometer and odo/trip meter indication.
- Display VEHICLE SPEED CIRC [B2205] at the result of self-diagnosis for combination meter.

1.CHECK COMBINATION METER INPUT SIGNAL

1. Start engine and select “METER/M&A” on CONSULT.
2. Using “SPEED METER” on “DATA MONITOR”, compare the value of “DATA MONITOR” with speedometer pointer of combination meter.

OK or NG

OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-25, "CONSULT Function (ABS)" .

NG >> Replace combination meter. Refer to IP-12, "Removal and Installation" .

Engine Speed Signal Inspection

INFOID:0000000007329916

Symptom: Improper tachometer indication.

1.CHECK COMBINATION METER INPUT SIGNAL

1. Start engine and select “METER/M&A” on CONSULT.
2. Using “TACHO METER” on “DATA MONITOR”, compare the value of “DATA MONITOR” with tachometer pointer of combination meter.

OK or NG

OK >> Perform ECM self-diagnosis. Refer to EC-119, "CONSULT Function (ENGINE)".

NG >> Replace combination meter. Refer to IP-12, "Removal and Installation" .

Fuel Level Sensor Signal Inspection

INFOID:0000000007329917

Symptom:
- Improper fuel gauge indication.
- Low-fuel warning lamp indication is irregular.

NOTE:
The following symptoms do not indicate a malfunction.
- Depending on vehicle position or driving circumstance, the fuel level in the tank shifts and the indication may fluctuate.
- If the vehicle is fueled with the ignition switch ON, the indication will update slowly.
- If the vehicle is tilted when the ignition switch is turned ON, fuel in the tank may flow to one direction resulting in a change of reading.

1.CHECK COMBINATION METER INPUT SIGNAL

1. Select “METER/M&A” on CONSULT.
2. Using “FUEL METER” on “DATA MONITOR”, compare the value of “DATA MONITOR” with fuel gauge pointer of combination meter.

Fuel gauge pointer	Reference value of data monitor [lit.]
Full	Approx. 49
3/4	Approx. 34
1/2	Approx. 22
1/4	Approx. 10
Empty	Approx. 4

OK or NG

OK >> GO TO 2.
NG >> Replace combination meter. Refer to IP-12, "Removal and Installation" .

2.CHECK HARNESS CONNECTOR

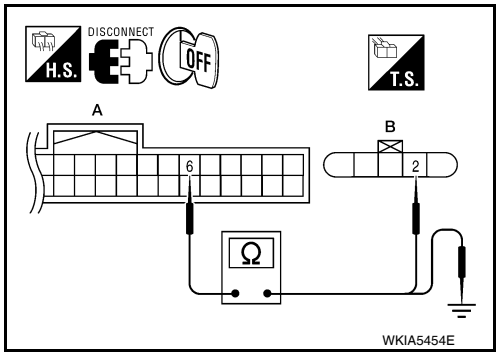
1. Turn ignition switch OFF.
2. Check combination meter and fuel level sensor unit terminals (meter-side and harness-side) for poor connection.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace terminals or connectors.

3.CHECK FUEL LEVEL SENSOR UNIT CIRCUIT

1. Disconnect combination meter connector and fuel level sensor unit connector.
2. Check continuity between combination meter harness connector (A) and fuel level sensor unit and fuel pump harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M24	6	B100	2	Yes

3. Check continuity between combination meter harness connector (A) and ground.

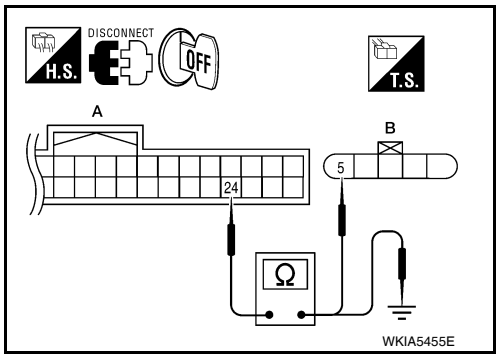
A		Ground	Continuity
Connector	Terminal		
M24	6		No

OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4.CHECK FUEL LEVEL SENSOR UNIT GROUND CIRCUIT

1. Check continuity between combination meter harness connector (A) and fuel level sensor unit and fuel pump harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M24	24	B100	5	Yes

2. Check continuity between combination meter harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M24	24		No

OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5.CHECK FUEL LEVEL SENSOR UNIT

Check fuel level sensor unit. Refer to DI-19, "Electrical Component Inspection" .

OK or NG

OK >> Check fuel level sensor unit installation, and check whether the float arm interferes or binds with any of the internal components in the fuel tank. Repair or replace malfunctioning part, if necessary.
NG >> Replace fuel level sensor unit.

Fuel Gauge Fluctuates, Indicates Wrong Value, or Varies

INFOID:0000000007329918

1.CHECK FUEL GAUGE FLUCTUATION

Test drive vehicle to see if gauge fluctuates only during driving or at the instant of stopping.

Does the indication value vary only during driving or at the at the instant of stopping?

YES >> The pointer fluctuation may be caused by fuel level change in the fuel tank. Condition is normal.
NO >> Ask the customer about the situation when the symptom occurs in detail, and perform the trouble diagnosis.

Fuel Gauge Does Not Move to Full-position

INFOID:0000000007329919

1.OBSERVE FUEL GAUGE

Does it take a long time for the pointer to move to FULL position?

YES or NO

YES >> GO TO 2.
NO >> GO TO 3.

2.IDENTIFY FUELING CONDITION

Was the vehicle fueled with the ignition switch ON?

YES or NO

YES >> Be sure to fuel the vehicle with the ignition switch OFF. Otherwise, it will take a long time to move to FULL position because of the characteristic of the fuel gauge.
NO >> GO TO 3.

3.OBSERVE VEHICLE POSITION

Is the vehicle parked on an incline?

YES or NO

YES >> Check the fuel level indication with vehicle on a level surface.
NO >> GO TO 4.

4.OBSERVE FUEL GAUGE POINTER

During driving, does the fuel gauge pointer move gradually toward EMPTY position?

YES or NO

YES >> Check the components. Refer to DI-19, "Electrical Component Inspection" .
NO >> The float arm may interfere or bind with any of the components in the fuel tank.

DTC [U1000] CAN Communication Circuit

INFOID:0000000007329920

Symptom: Display CAN COMM CIRC [U1000] at the result of self-diagnosis for combination meter.

1.CHECK CAN COMMUNICATION

1. Select "SELF-DIAG RESULTS" mode for "METER/M&A" with CONSULT.
2. Print out CONSULT screen.

>> Go to "CAN SYSTEM". Refer to LAN-14, "Trouble Diagnosis Flow Chart".

Electrical Component Inspection

INFOID:0000000007329921

FUEL LEVEL SENSOR UNIT CHECK

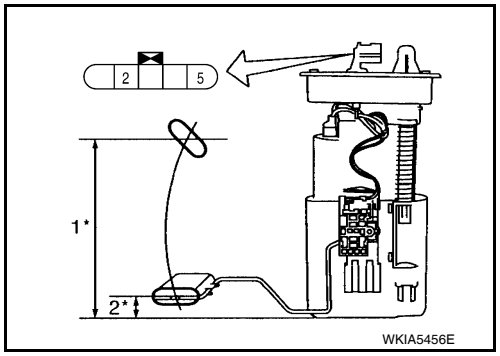
For removal, refer to FL-6, "Removal and Installation" .

Check Fuel Level Sensor Unit and Fuel Pump

Check resistance between terminals 2 and 5.

Terminals		Float position mm (in)			Resistance value (Ω) (Approx.)
2	5	1*	Full	167.3 (6.59)	5
		2*	Empty	21.1 (0.83)	81.5

1* and 2*: When float rod is in contact with stopper.

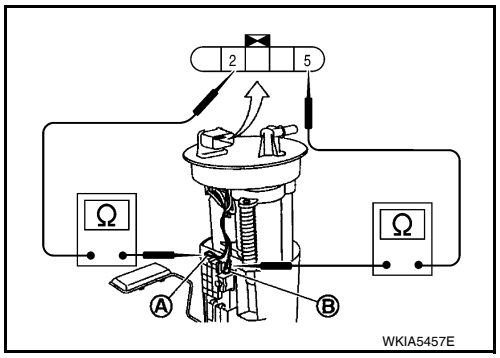


Check Fuel Level Sensor Unit and Fuel Pump Harness

Check continuity at the following terminals.

Terminal	Continuity
2 - Signal terminal (A)	Yes
5 - Ground terminal (B)	

- If the results of check are NG, replace fuel pump assembly. If the results of check are OK, replace fuel level sensor unit.



Removal and Installation

INFOID:0000000007329922

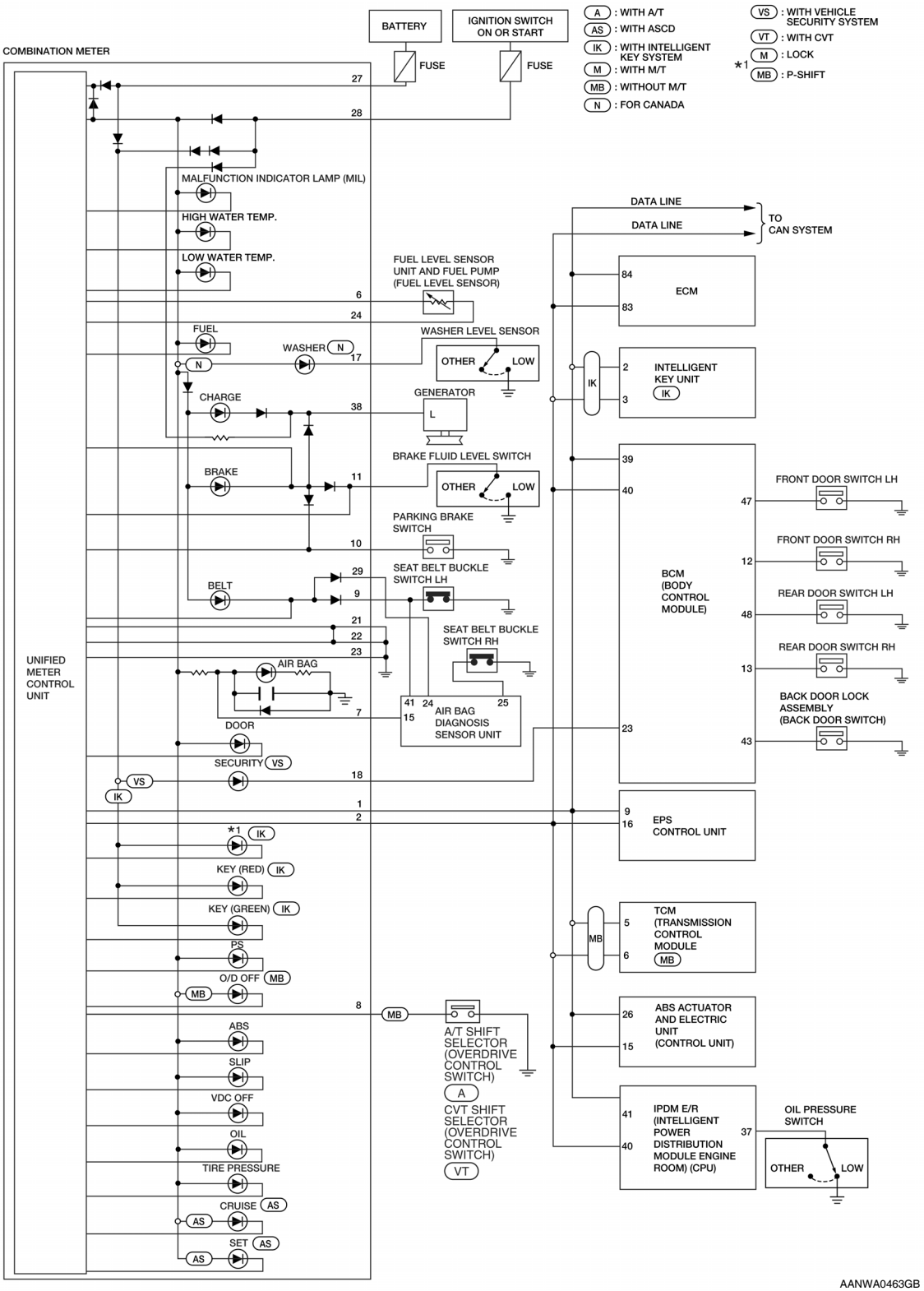
COMBINATION METER

Refer to IP-12, "Removal and Installation".

WARNING LAMPS

Schematic

INFOID:0000000007329923



Wiring Diagram - WARN -

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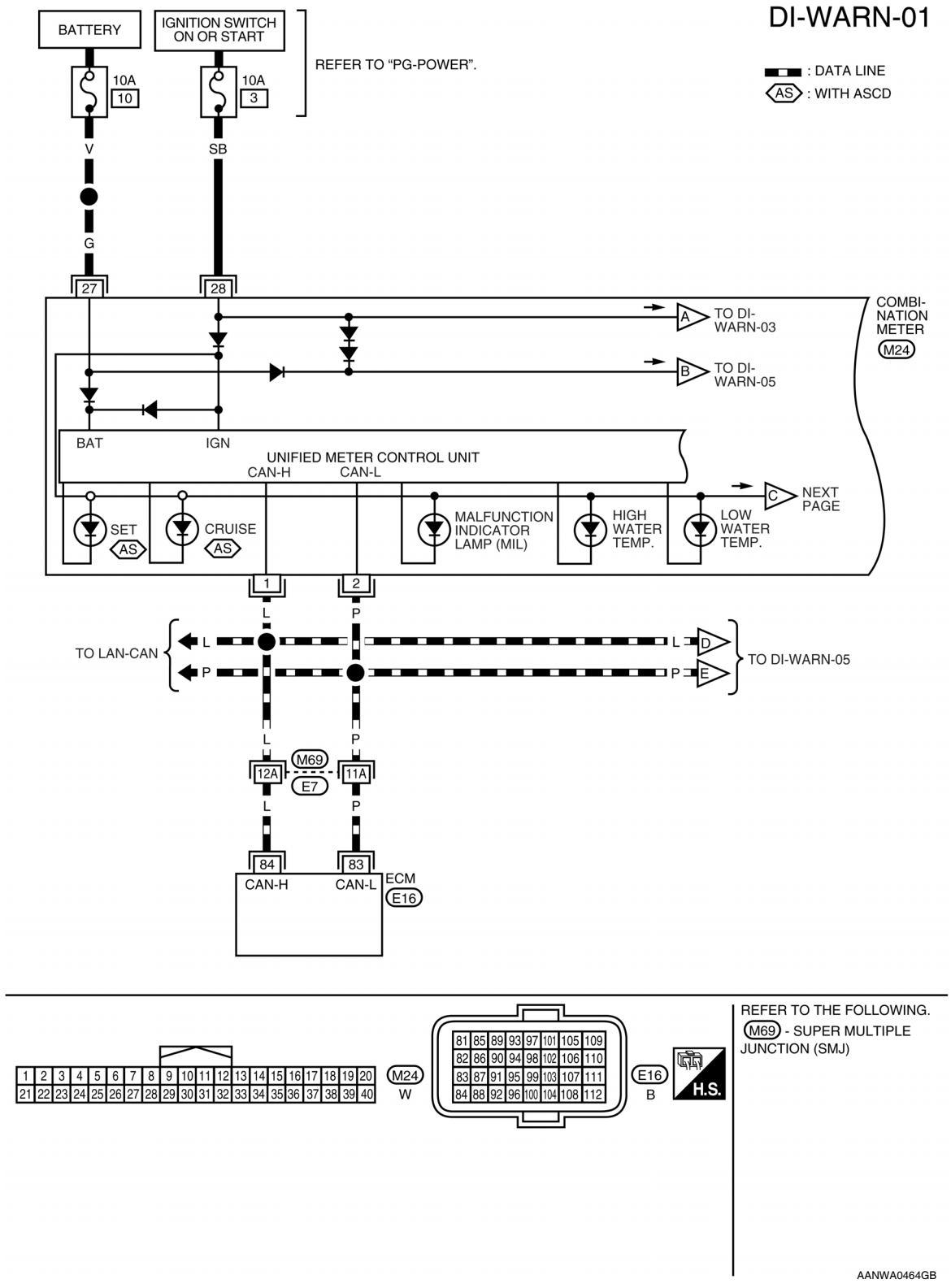
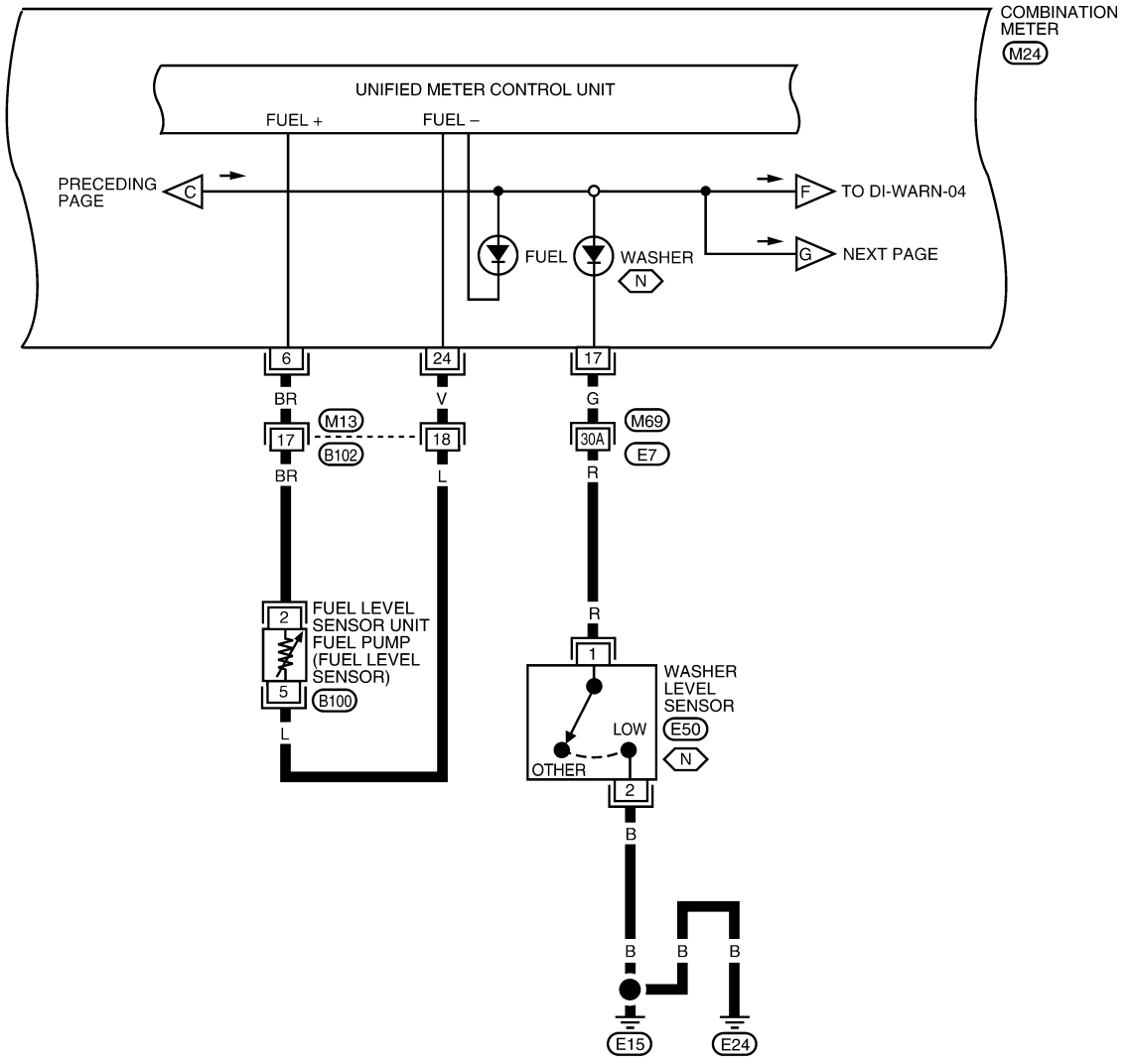
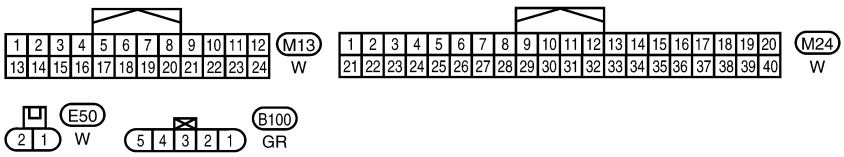


DI-WARN-02

N : FOR CANADA

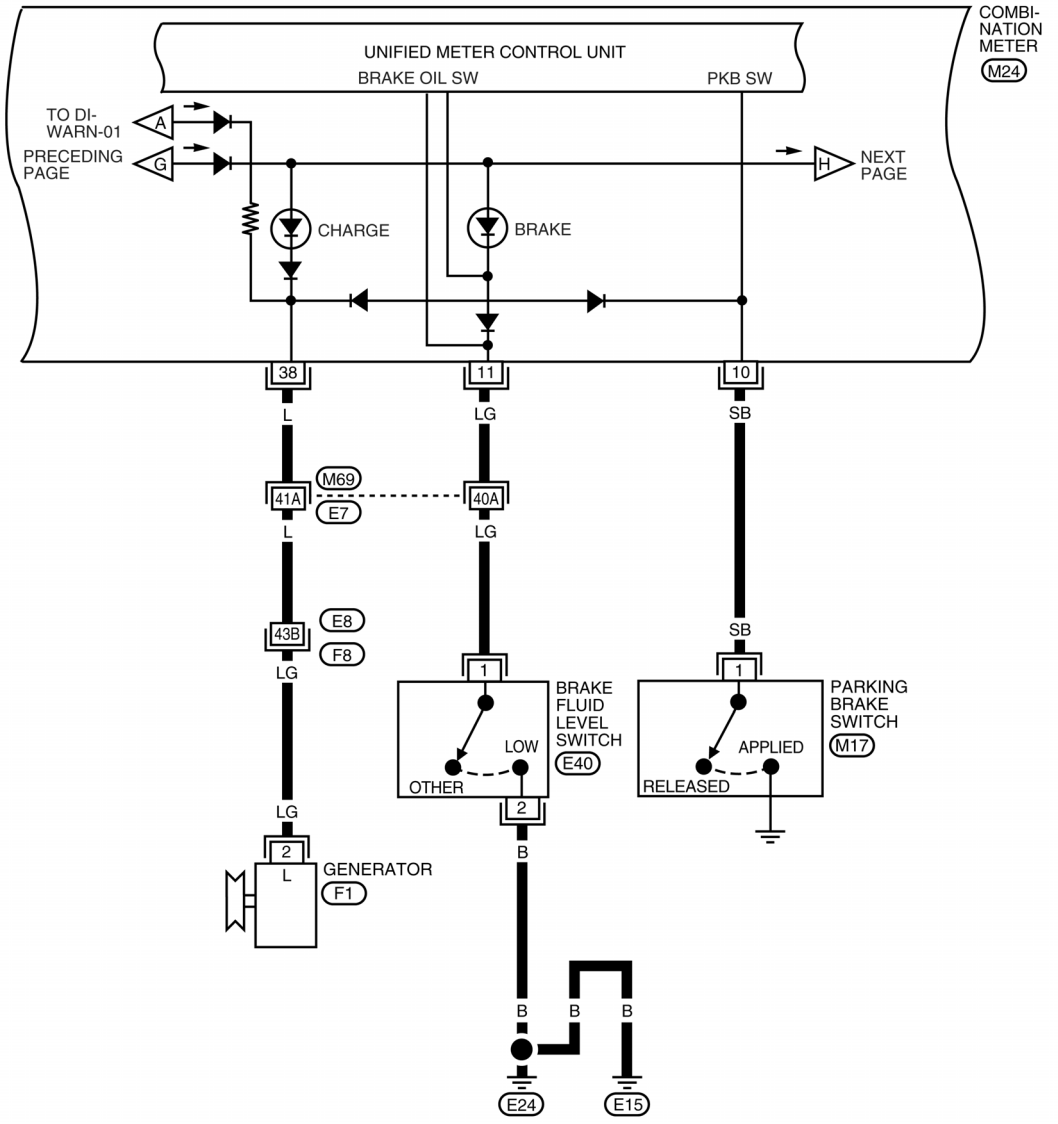


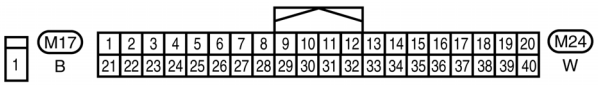


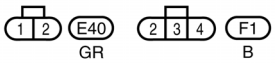
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABNWA0841GB

DI-WARN-03

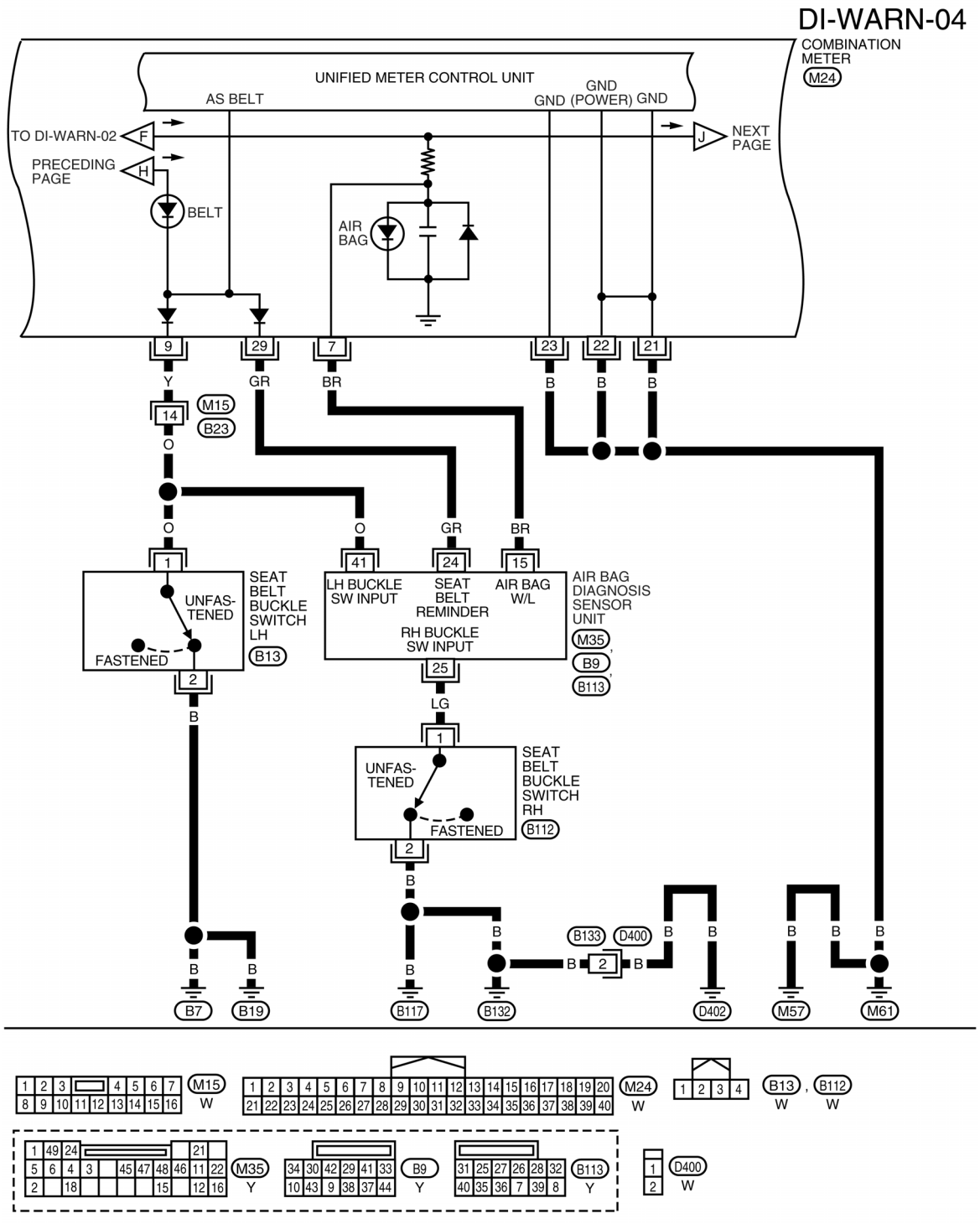






REFER TO THE FOLLOWING.
M69, F8 - SUPER MULTIPLE JUNCTION (SMJ)

AANWA0465GB


DI-WARN-04
COMBINATION METER
M24
UNIFIED METER CONTROL UNIT
AS BELT
GND
GND (POWER) GND
TO DI-WARN-02
F
PRECEDING PAGE
H
J
NEXT PAGE
BELT
AIR BAG
9
29
7
23
22
21
Y
GR
BR
B
B
B
M15
B23
14
O
O
O
GR
BR
1
41
24
15
SEAT BELT BUCKLE SWITCH LH
UNFAS-TENED
FASTENED
B13
LH BUCKLE SW INPUT
SEAT BELT REMINDER
AIR BAG W/L
RH BUCKLE SW INPUT
AIR BAG DIAGNOSIS SENSOR UNIT
M35
B9
B113
2
25
B
LG
1
SEAT BELT BUCKLE SWITCH RH
UNFAS-TENED
FASTENED
B112
2
B
B
B
B
B
B
B133
D400
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B
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B
B
B
B7
B19
B117
B132
D402
M57
M61
M15
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B113
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D400
W
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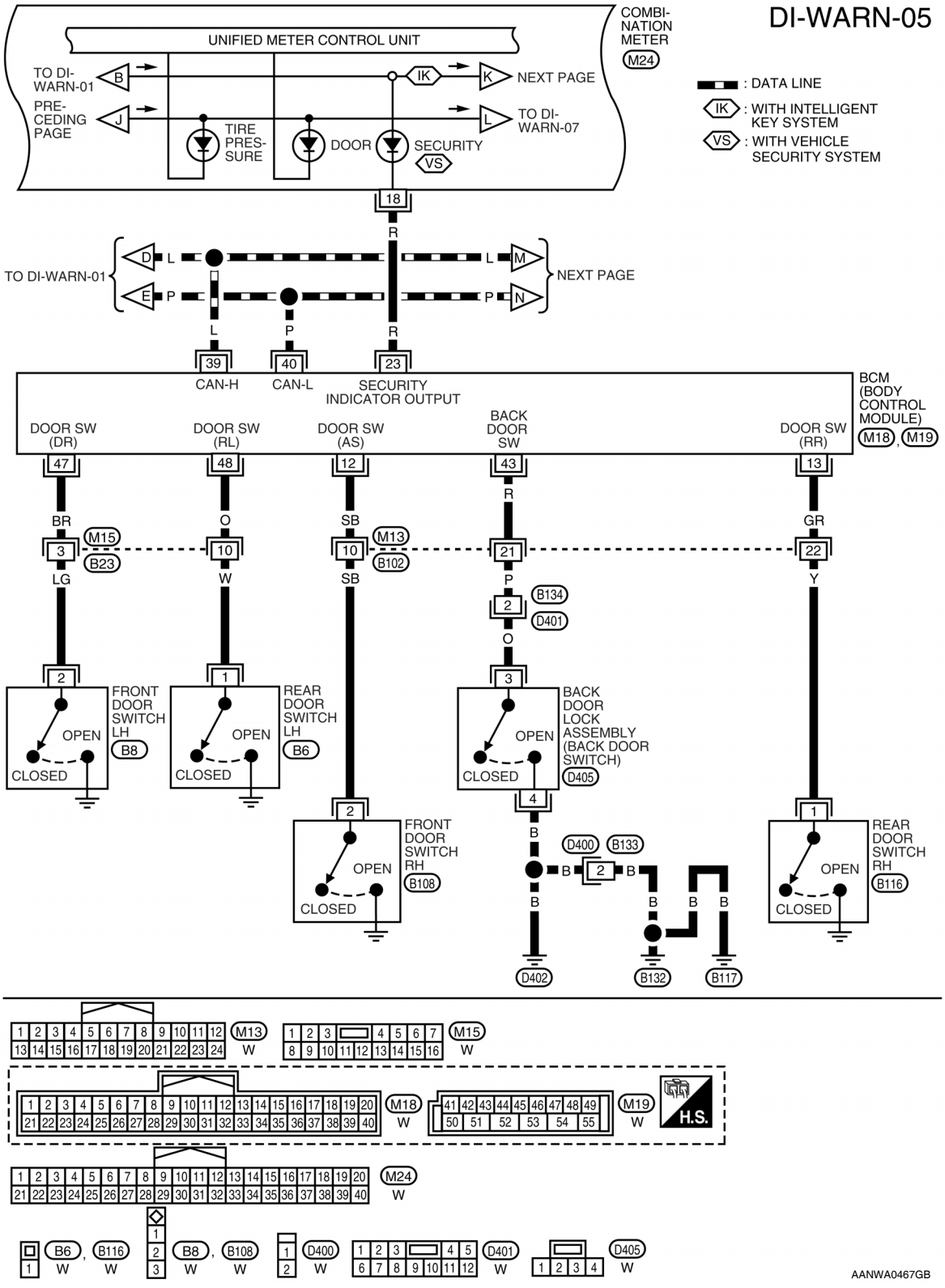
DI-WARN-05
COMBI-NATION METER
M24
UNIFIED METER CONTROL UNIT
TO DI-WARN-01
PRE-CEDING PAGE
NEXT PAGE
TO DI-WARN-07
TIRE PRES-SURE
DOOR
SECURITY
VS
IK
: DATA LINE
: WITH INTELLIGENT KEY SYSTEM
: WITH VEHICLE SECURITY SYSTEM
CAN-H
CAN-L
SECURITY INDICATOR OUTPUT
BCM (BODY CONTROL MODULE)
M18, M19
DOOR SW (DR)
DOOR SW (RL)
DOOR SW (AS)
BACK DOOR SW
DOOR SW (RR)
FRONT DOOR SWITCH LH
B8
REAR DOOR SWITCH LH
B6
FRONT DOOR SWITCH RH
B108
BACK DOOR LOCK ASSEMBLY (BACK DOOR SWITCH)
D405
REAR DOOR SWITCH RH
B116
OPEN
CLOSED
M13
M15
M18
M19
M24
B6
B8
B108
B116
D400
D401
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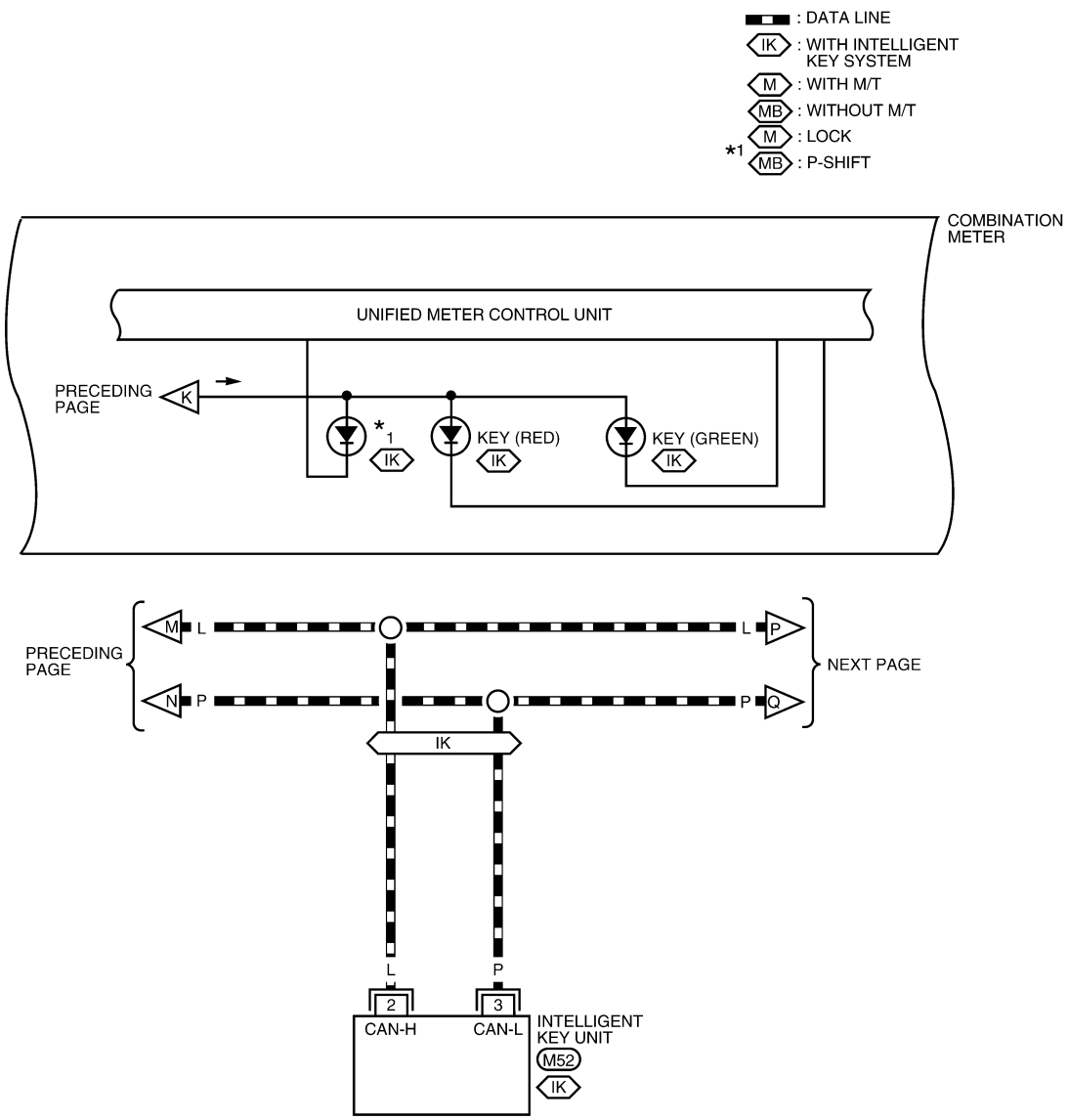
DI-WARN-06



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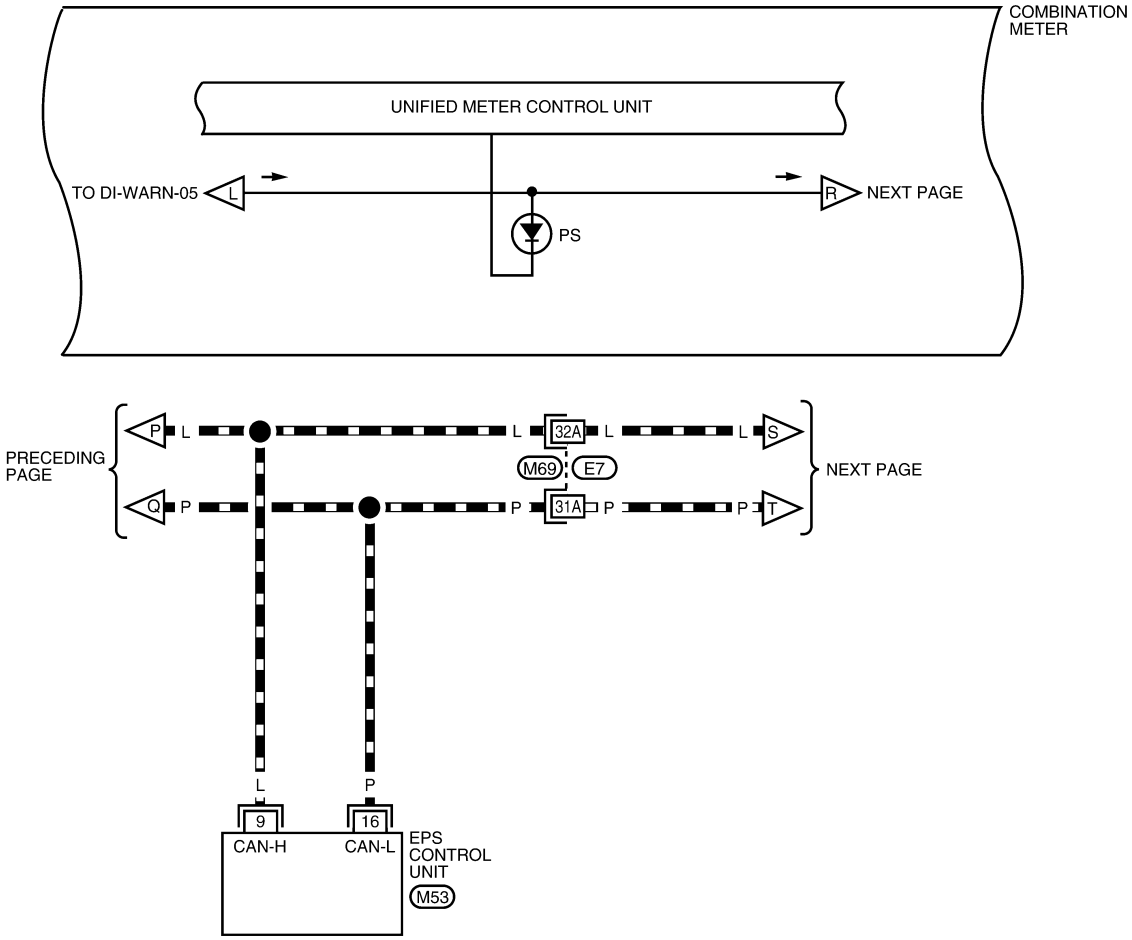
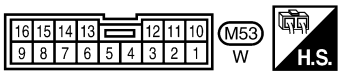
DI-WARN-07

: DATA LINE

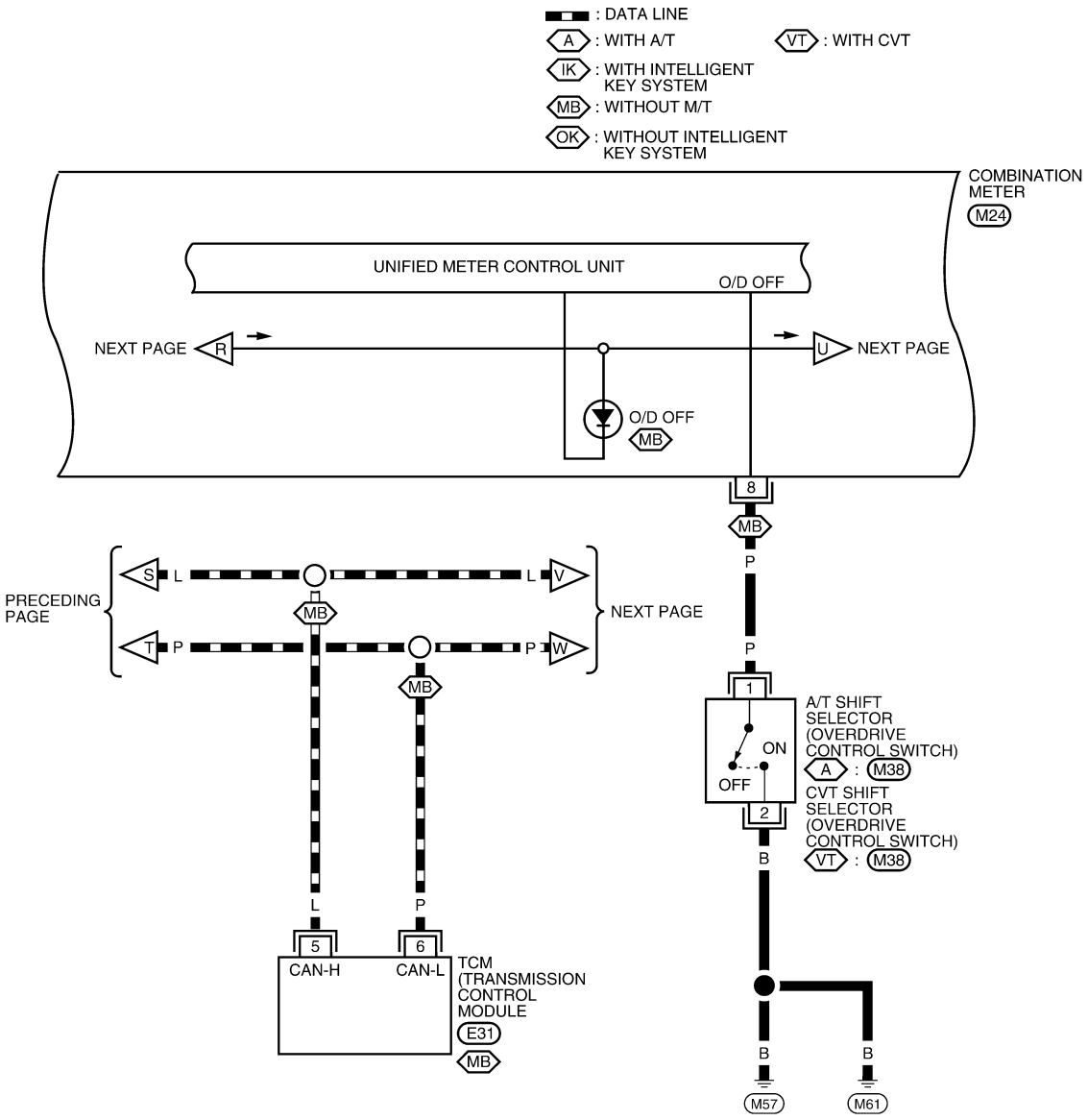




REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

LKWA0357E

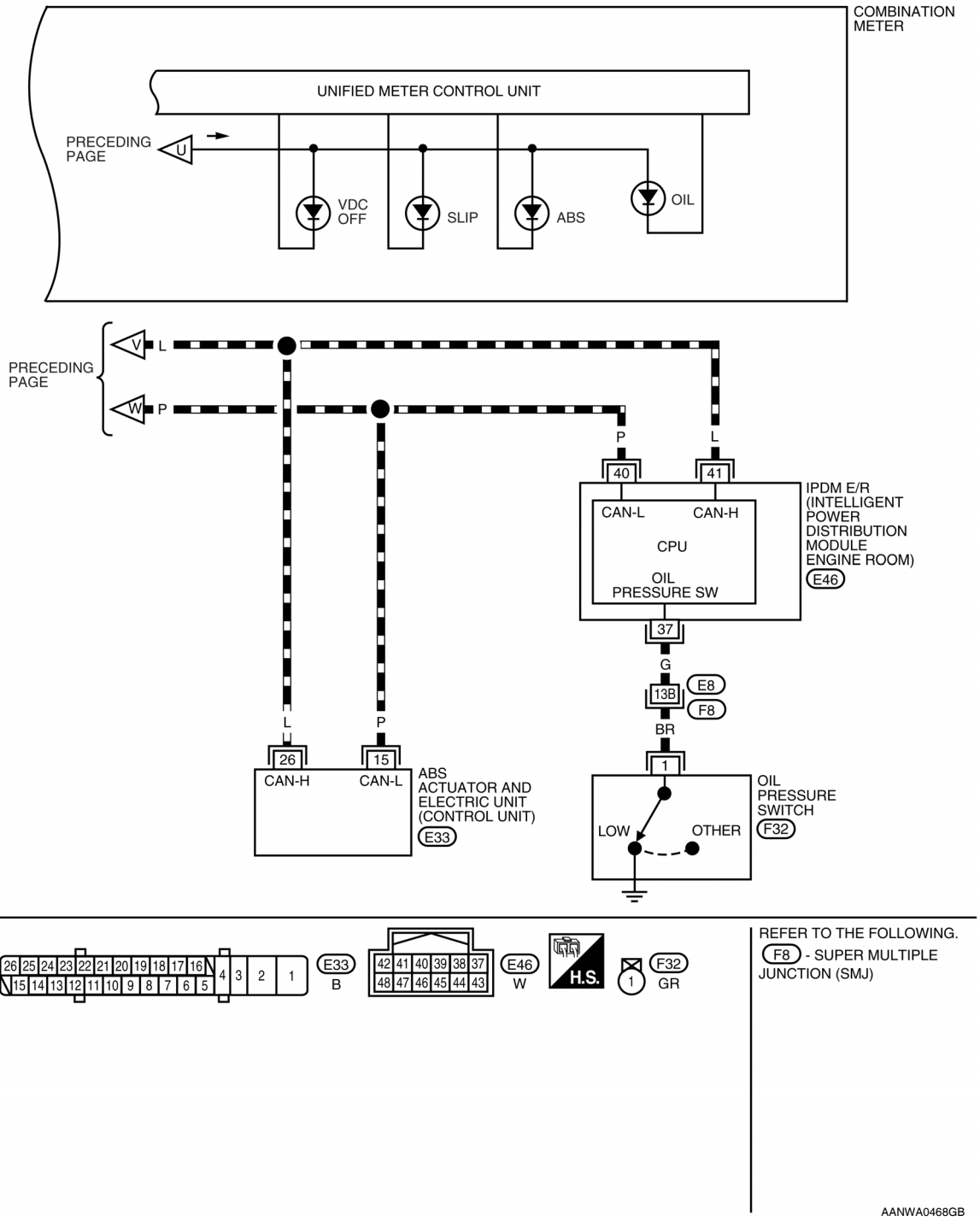
DI-WARN-08



ABNWA0844GB

DI-WARN-09

: DATA LINE



AANWA0468GB

Oil Pressure Warning Lamp Stays Off (Ignition Switch ON)

INFOID:0000000007329925

1. CHECK OIL PRESSURE WARNING LAMP OPERATION

Activate IPDM E/R auto active test. Refer to PG-20, "Auto Active Test".

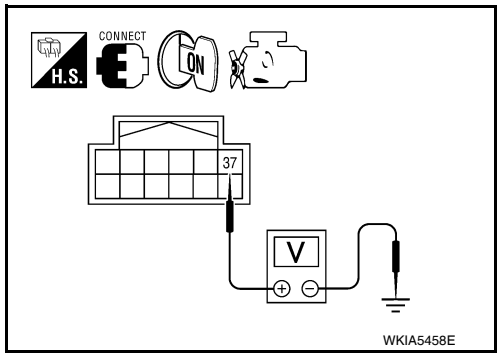
Does oil pressure warning lamp blink?

YES >> GO TO 2.
NO >> GO TO 5.

2.CHECK IPDM E/R INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R harness connector and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
IPDM E/R connector	Terminal			
E46	37	Ground	Engine stopped	0 V



OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".

NG >> GO TO 3.

3.CHECK OIL PRESSURE SWITCH

1. Turn ignition switch OFF.
2. Disconnect oil pressure switch connector.
3. Check oil pressure switch. Refer to DI-31, "Component Inspection".

OK or NG

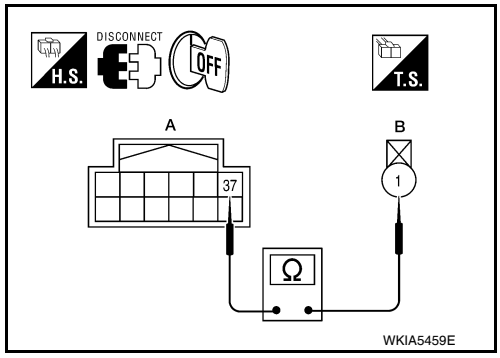
OK >> GO TO 4.

NG >> Replace oil pressure switch.

4.CHECK OIL PRESSURE SWITCH CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R harness connector (A) and oil pressure switch harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E46	37	F32	1	Yes



OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".

NG >> Repair harness or connector.

5.CHECK CAN COMMUNICATION

Select “METER/M&A” on CONSULT, and perform self-diagnosis of combination meter.

Self-diagnostic results content

No malfunction detected>>GO TO 6.

Malfunction detected>> Check applicable parts, and repair or replace as necessary.

6.CHECK COMBINATION METER INPUT SIGNAL

Select “METER/M&A” on CONSULT. Operate ignition switch with “OIL W/L” of “DATA MONITOR” and check operation status.

“OIL W/L”

When ignition switch is in ON position (Engine stopped.) : ON

When engine running : OFF

OK or NG

OK >> Replace combination meter. Refer to IP-12, "Removal and Installation".

NG >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".

Oil Pressure Warning Lamp Does Not Turn Off (Oil Pressure Is Normal)

INFOID:0000000007329926

NOTE:
For oil pressure inspection, refer to LU-8, "Inspection".

1.CHECK OIL PRESSURE WARNING LAMP OPERATION

Activate IPDM E/R auto active test. Refer to PG-20, "Auto Active Test".

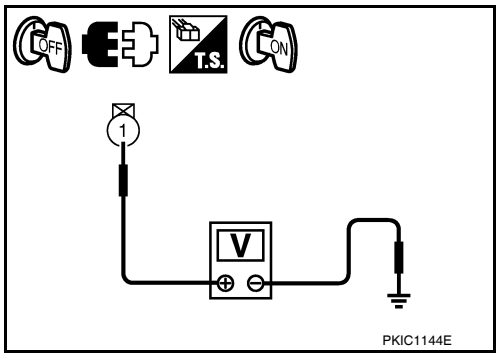
Does oil pressure warning lamp blink?

YES >> GO TO 2.
NO >> GO TO 5.

2.CHECK IPDM E/R OUTPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect oil pressure switch connector.
3. Turn ignition switch ON.
4. Check voltage between oil pressure switch harness connector and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Oil pressure switch connector	Terminal		
F32	1	Ground	12 V



OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3.CHECK OIL PRESSURE SWITCH

1. Turn ignition switch OFF.
2. Check oil pressure switch. Refer to DI-31, "Component Inspection".

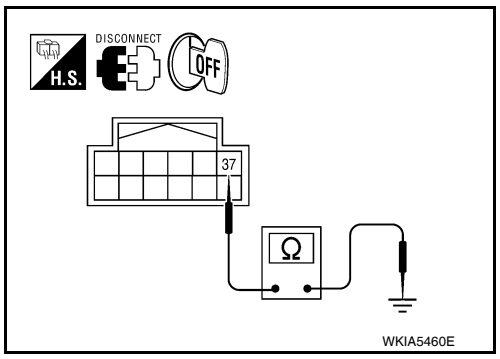
OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Replace oil pressure switch.

4.CHECK OIL PRESSURE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector and ground.

IPDM E/R connector	Terminal	Ground	Continuity
E46	37		No



OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
NG >> Repair harness or connector.

5.CHECK IPDM E/R (CONSULT)

Perform self-diagnosis of IPDM E/R. Refer to PG-18, "CONSULT Function (IPDM E/R)".

Self-diagnostic results content

No malfunction detected>>Replace combination meter. Refer to IP-12, "Removal and Installation".
Malfunction detected>> Check applicable parts, and repair or replace as necessary.

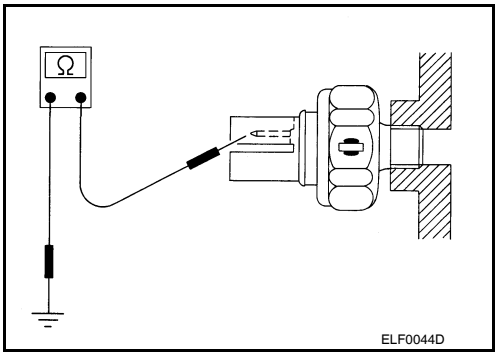
Component Inspection

INFOID:0000000007329927

OIL PRESSURE SWITCH

Check continuity between oil pressure switch and ground.

Condition	Oil pressure [kPa (bar, kg/cm^2, psi)]	Continuity
Engine stopped	Less than 29 (0.3, 0.3, 4)	Yes
Engine running	More than 29 (0.3, 0.3, 4)	No

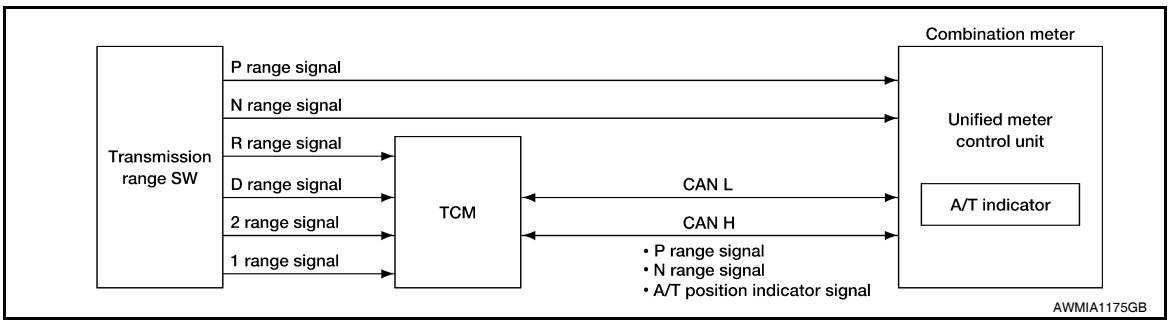


A/T INDICATOR

System Description

INFOID:0000000007329928

The TCM receives A/T indicator signals from the transmission range switch (R-range, D-range, 2-range and 1-range) and the combination meter (P-range and N-range). The TCM then sends A/T position indicator signals to the combination meter via CAN communication lines. The combination meter indicates the received shift position.

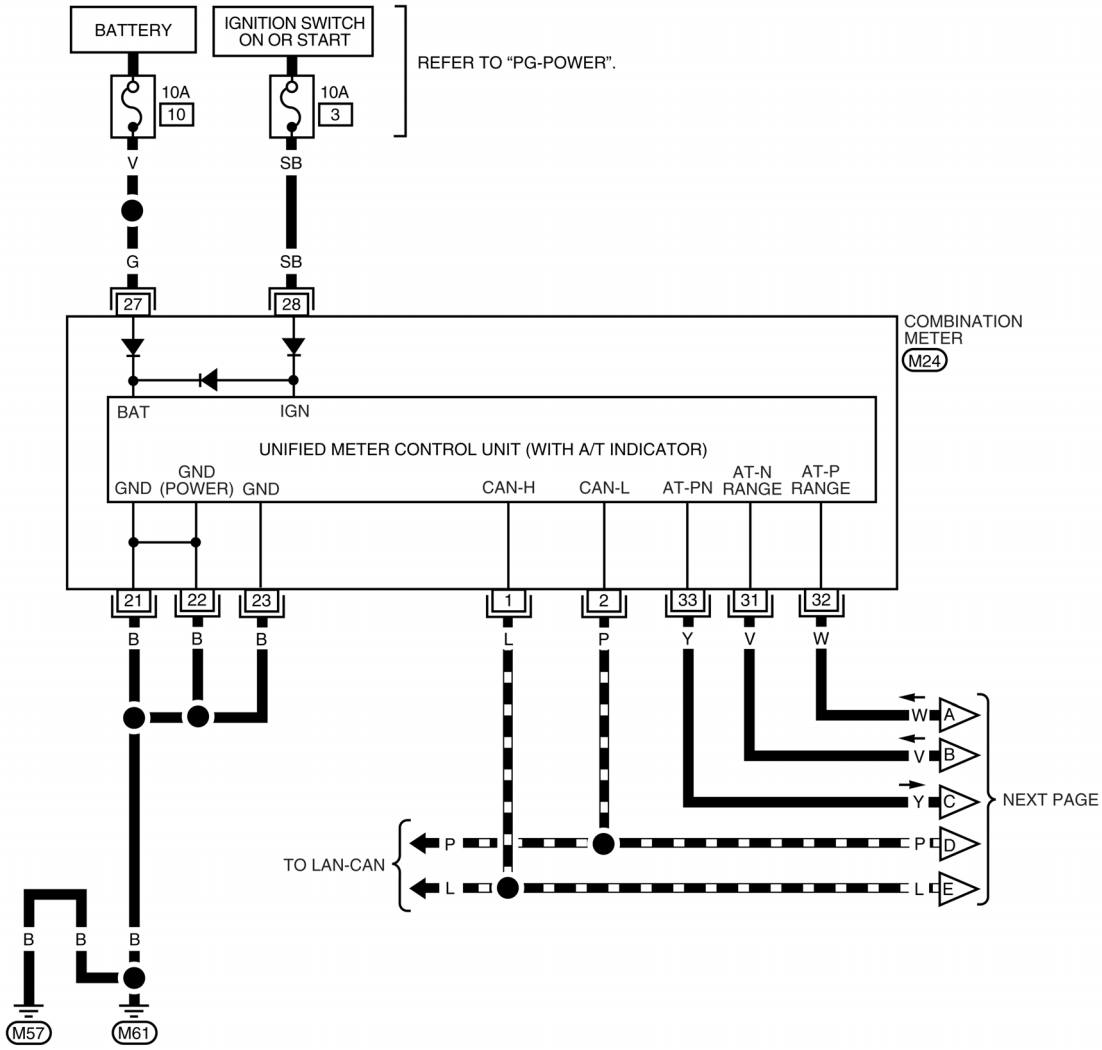


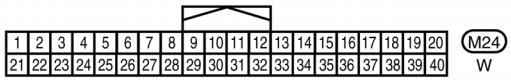
Wiring Diagram - AT/IND -

INFOID:0000000007329929

DI-AT/IND-01

: DATA LINE

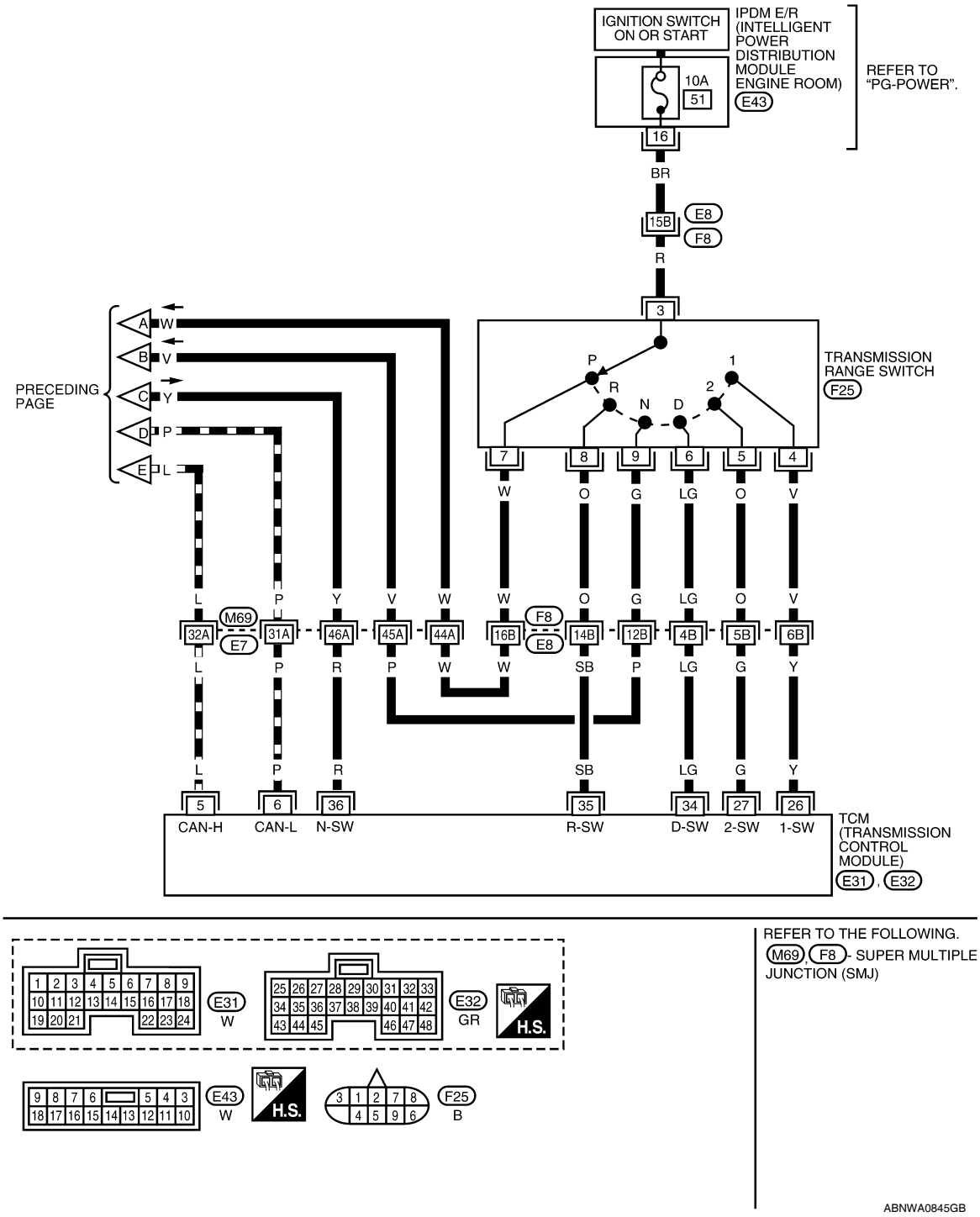




AANWA0469GB

DI-AT/IND-02

: DATA LINE



ABNWA0845GB

A/T Indicator Does Not Illuminate

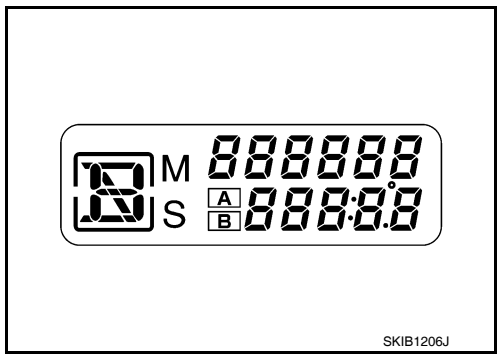
INFOID:0000000007329930

1. CHECK SEGMENT OF A/T INDICATOR

Perform self-diagnosis of combination meter. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

Are all segments displayed?

YES >> GO TO 2.
NO >> Replace combination meter. Refer to IP-12, "Removal and Installation".



2. CHECK COMBINATION METER (CONSULT)

1. Connect CONSULT.
2. Select “METER/M&A” on CONSULT, and perform self-diagnosis of combination meter. Refer to DI-12, "CONSULT Function (METER/M&A)".

Self-diagnostic results content

No malfunction detected>>GO TO 3.
Malfunction detected>> Check applicable parts, and repair or replace as necessary.

3. CHECK COMBINATION METER INPUT SIGNAL

Use “DATA MONITOR” of “METER/M&A” on CONSULT. Confirm each indication on the monitor when operating the A/T selector lever.

CONSULT display	Switch operation	Operation status
P RANGE IND	P range position	ON
	Except for P range position	OFF
R RANGE IND	R range position	ON
	Except for R range position	OFF
N RANGE IND	N range position	ON
	Except for N range position	OFF
D RANGE IND	D range position	ON
	Except for D range position	OFF
2 RANGE IND	2 range position	ON
	Except for 2 range position	OFF
1 RANGE IND	1 range position	ON
	Except for 1 range position	OFF

OK or NG

OK >> Replace combination meter. Refer to IP-12, "Removal and Installation".
NG >> GO TO 4.

4. CHECK SELF-DIAGNOSIS RESULTS OF TCM

Perform self-diagnosis of TCM. Refer to AT-74, "CONSULT Function (TRANSMISSION)".

OK or NG

OK >> Check TCM input/output signal. Repair or replace malfunctioning part, if necessary. Refer to AT-29, "Input/Output Signal of TCM".
NG >> Check applicable part, and repair or replace as necessary.

CVT INDICATOR

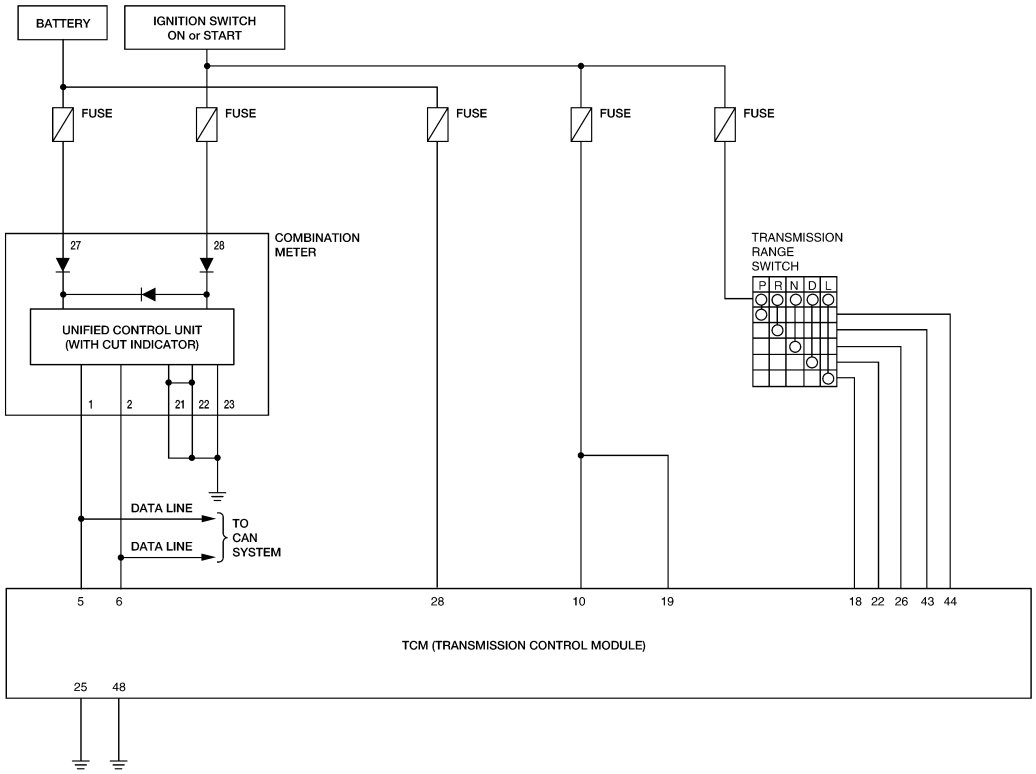
System Description

INFOID:0000000007329931

The TCM receives CVT indicator signals from the transmission range switch. The TCM then sends CVT position indicator signals to the combination meter via CAN communication lines. The combination meter indicates the received shift position.

Schematic

INFOID:0000000007329932



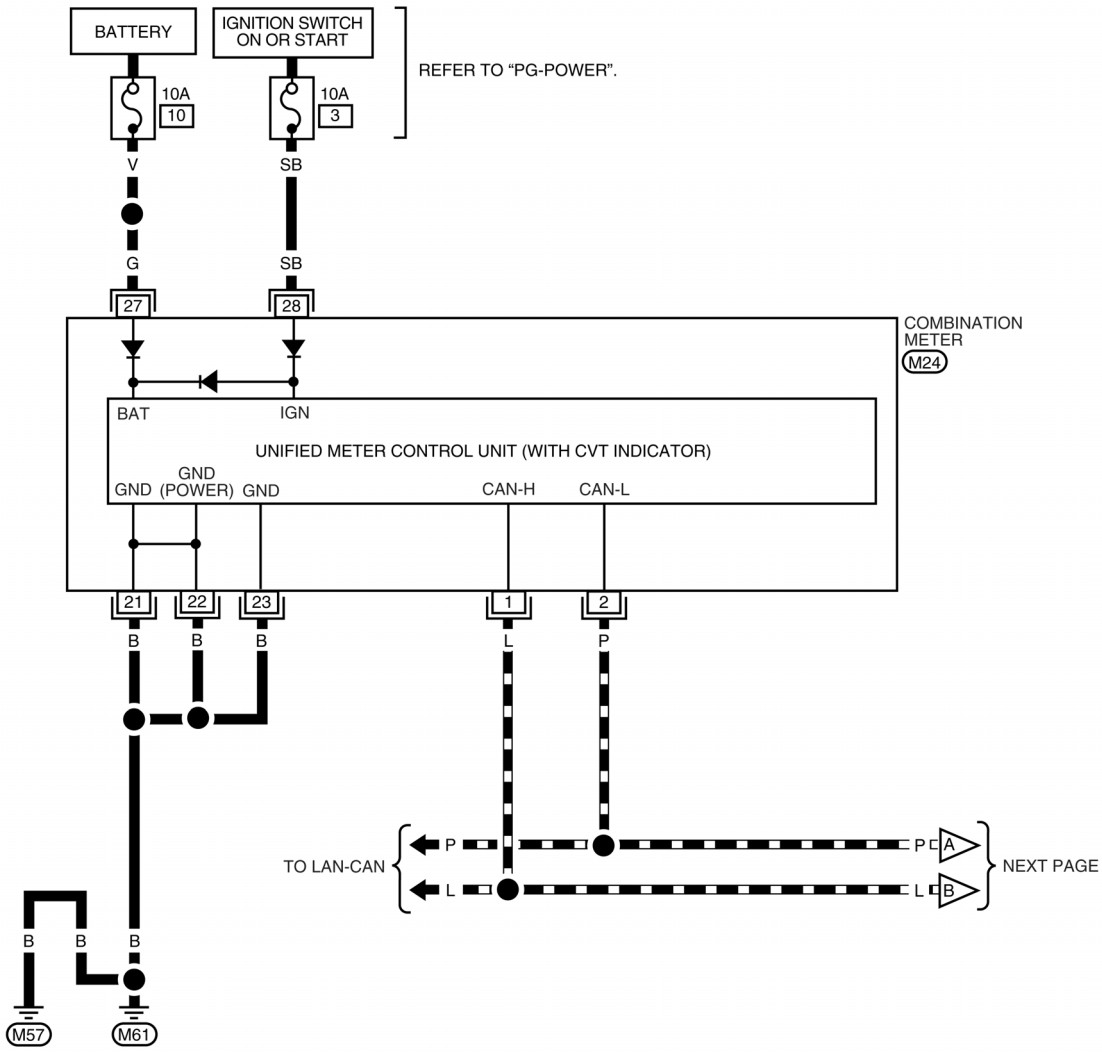
ABNWA0597GB

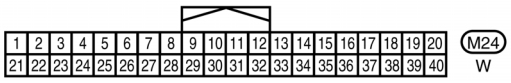
Wiring Diagram - CVTIND -

INFOID:0000000007329933

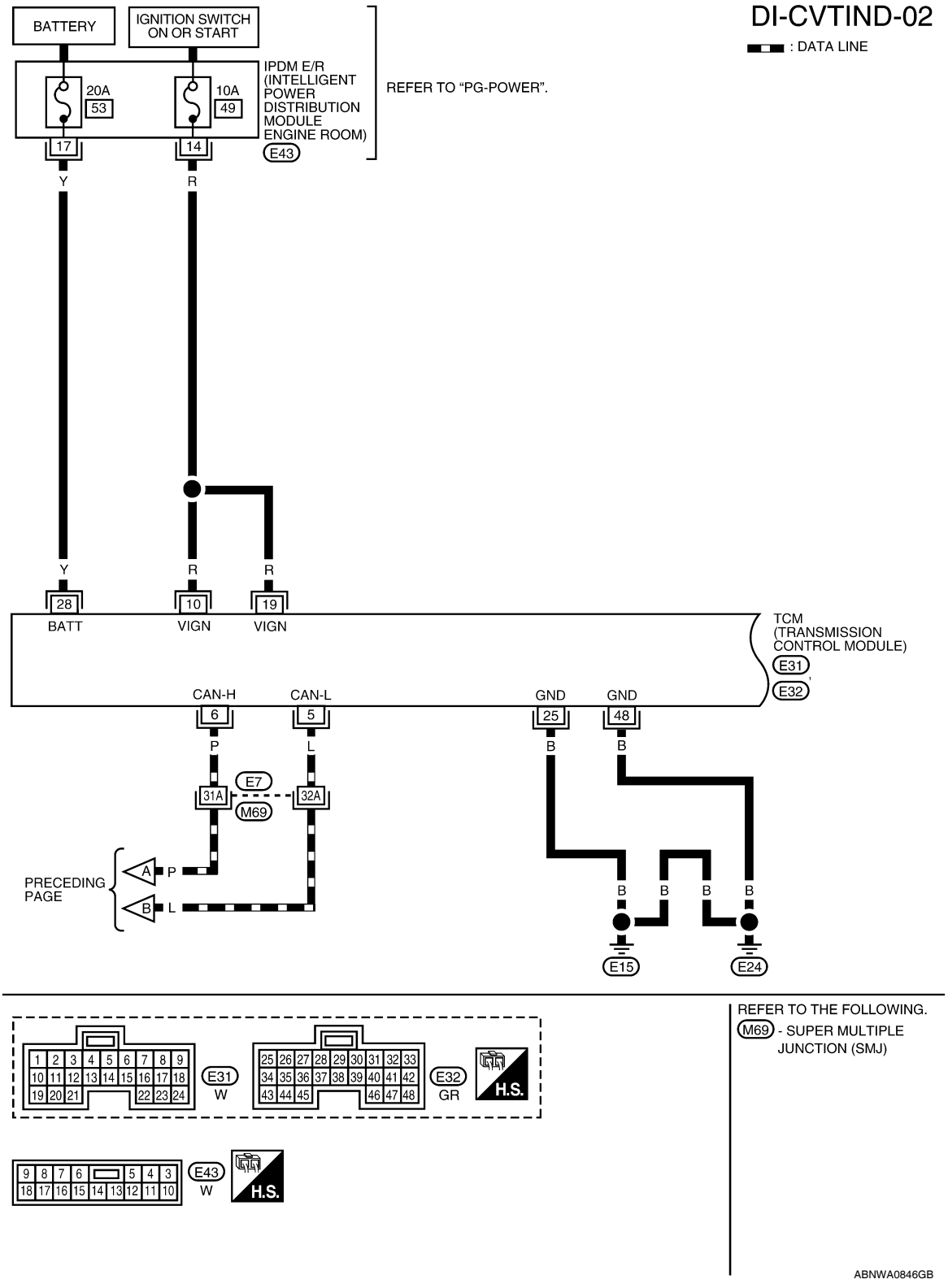
DI-CVTIND-01

: DATA LINE



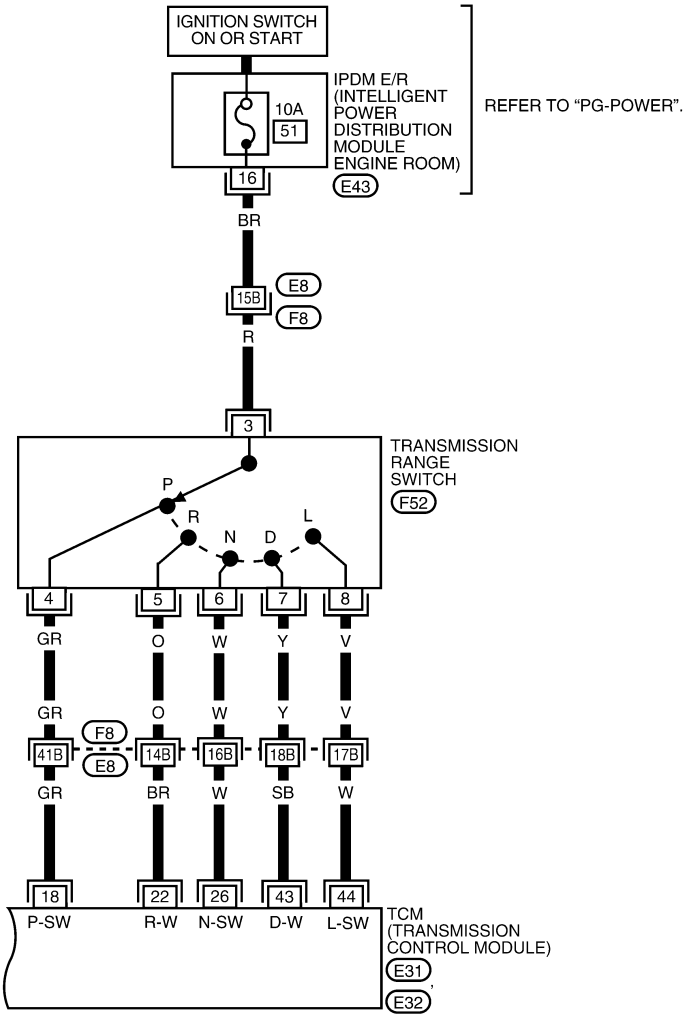


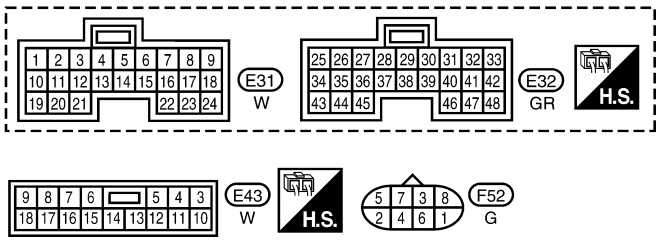
AANWA0470GB


DI-CVTIND-02
: DATA LINE
BATTERY
IGNITION SWITCH ON OR START
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E43
REFER TO "PG-POWER".
20A
53
10A
49
17
14
Y
R
Y
R
R
28
10
19
BATT
VIGN
VIGN
TCM (TRANSMISSION CONTROL MODULE)
E31
E32
CAN-H
CAN-L
GND
GND
6
5
25
48
P
L
B
B
E7
31A
M69
32A
PRECEDING PAGE
A
P
B
L
B
B
B
B
E15
E24
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24
E31
W
25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41 42
43 44 45 46 47 48
E32
GR
H.S.
9 8 7 6 5 4 3
18 17 16 15 14 13 12 11 10
E43
W
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABNWA0846GB

DI-CVTIND-03

: DATA LINE





REFER TO THE FOLLOWING.
F8 - SUPER MULTIPLE JUNCTION (SMJ)

ABNWA0599GB

CVT Indicator Does Not Illuminate

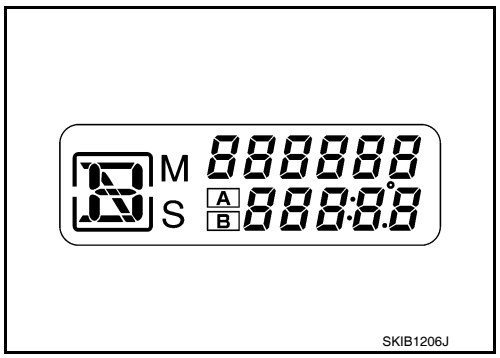
INFOID:0000000007329934

1. CHECK SEGMENT OF CVT INDICATOR

Perform self-diagnosis of combination meter. Refer to DI-11, "Self-Diagnosis Mode of Combination Meter".

Are all segments displayed?

YES >> GO TO 2.
NO >> Replace combination meter. Refer to IP-12, "Removal and Installation".



2. CHECK COMBINATION METER (CONSULT)

1. Connect CONSULT.
2. Select “METER/M&A” on CONSULT, and perform self-diagnosis of combination meter. Refer to DI-12, "CONSULT Function (METER/M&A)".

Self-diagnostic results content

No malfunction detected>>GO TO 3.
Malfunction detected>> Check applicable parts, and repair or replace as necessary.

3. CHECK COMBINATION METER INPUT SIGNAL

Use “DATA MONITOR” of “METER/M&A” on CONSULT. Confirm each indication on the monitor when operating the CVT selector lever.

CONSULT display	Switch operation	Operation status
P RANGE IND	P range position	ON
	Except for P range position	OFF
R RANGE IND	R range position	ON
	Except for R range position	OFF
N RANGE IND	N range position	ON
	Except for N range position	OFF
D RANGE IND	D range position	ON
	Except for D range position	OFF
L RANGE IND	L range position	ON
	Except for L range position	OFF

OK or NG

OK >> Replace combination meter. Refer to IP-12, "Removal and Installation".
NG >> GO TO 4.

4. CHECK SELF-DIAGNOSIS RESULTS OF TCM

Perform self-diagnosis of TCM. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

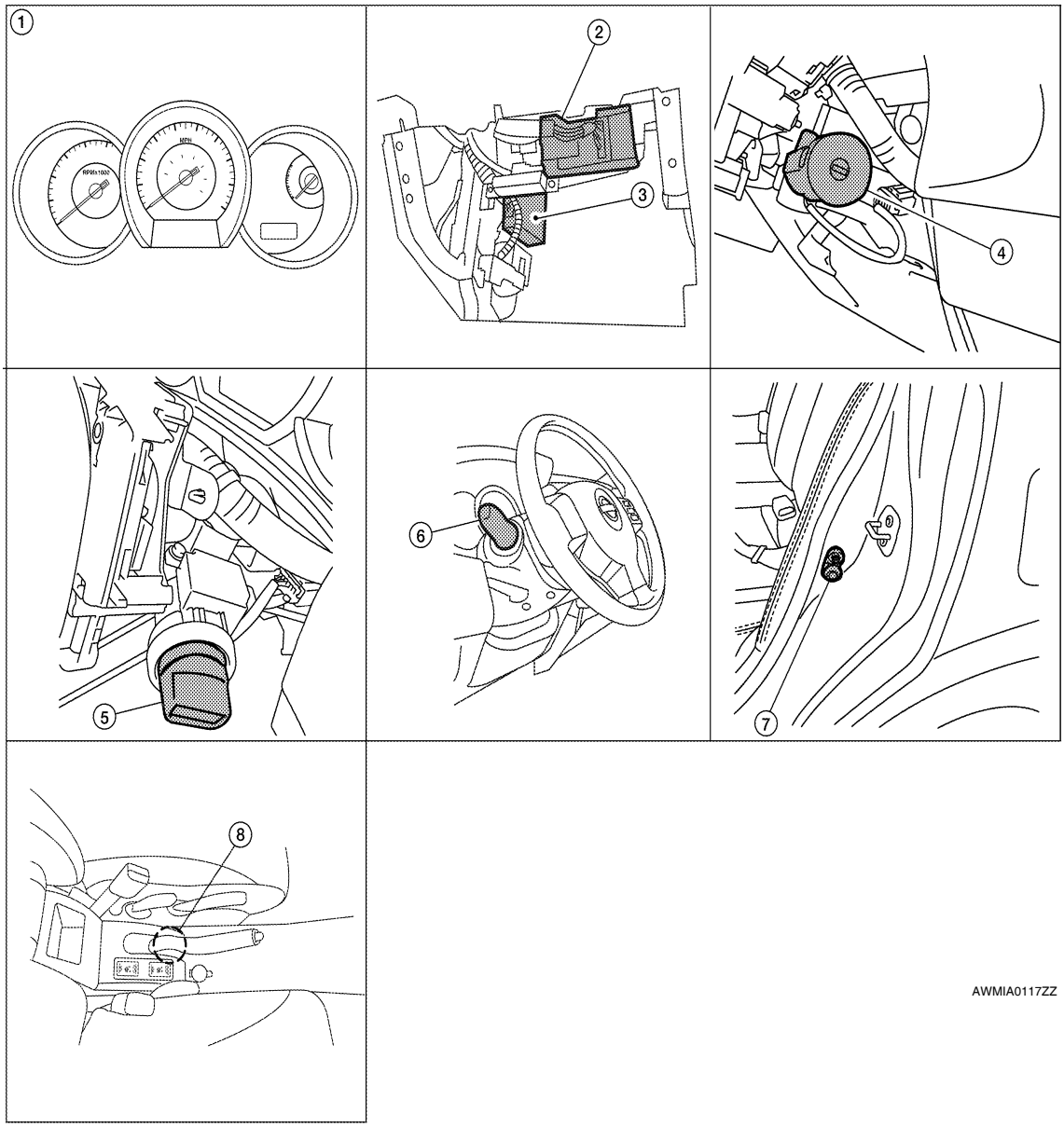
OK or NG

OK >> Check TCM input/output signal. Repair or replace malfunctioning part, if necessary. Refer to CVT-22, "Input/Output Signal of TCM".
NG >> Check applicable part, and repair or replace as necessary.

WARNING CHIME

Component Parts and Harness Connector Location

INFOID:0000000007329935



1. Combination meter M24
2. BCM M18, M19, M20 (view with glove box removed)
3. Intelligent Key unit M52 (with Intelligent Key)
4. Key switch and key lock solenoid M27 (without Intelligent Key)
5. Key switch and ignition knob switch M73 (with Intelligent Key)
6. Combination switch (lighting switch) M28
7. Front door switch LH B8
8. Parking brake switch M17

System Description

INFOID:0000000007329936

- Buzzer for warning chime system is installed in the combination meter.
- The buzzer sounds when combination meter receives buzzer output signal with CAN communication line.

POWER SUPPLY AND GROUND CIRCUIT

Power is supplied at all times

- through 40A fusible link (letter **g**, located in the fuse and fusible link box)
- to BCM terminal 70,

- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to BCM terminal 57,
- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to combination meter terminal 27.

With ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38,
- through 10A fuse [No. 3, located in the fuse block (J/B)]
- to combination meter terminal 28.

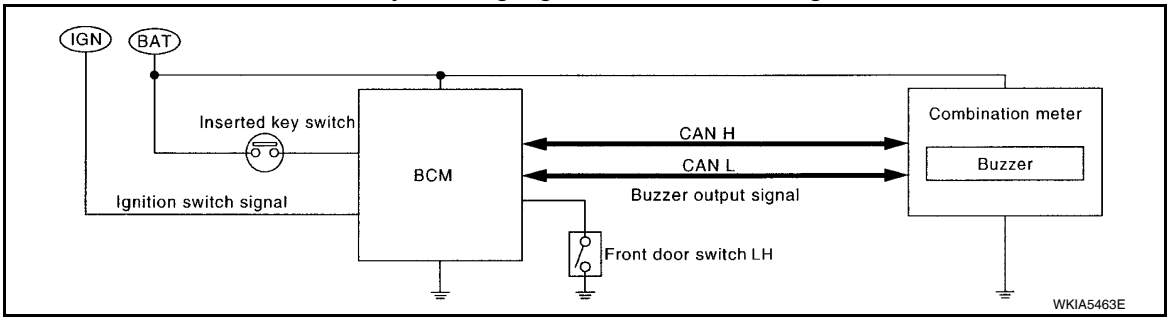
Ground is supplied

- to BCM terminal 67 and
- to combination meter terminals 21, 22 and 23
- through grounds M57 and M61.

IGNITION KEY WARNING CHIME (WITHOUT INTELLIGENT KEY)

With the key inserted into the key switch, and the ignition switch in the OFF or ACC position, when driver's door is opened, the warning chime will sound.

- BCM detects key inserted into the ignition switch, and sends key warning signal to combination meter with CAN communication line.
- When combination meter receives key warning signal, it sounds warning chime.

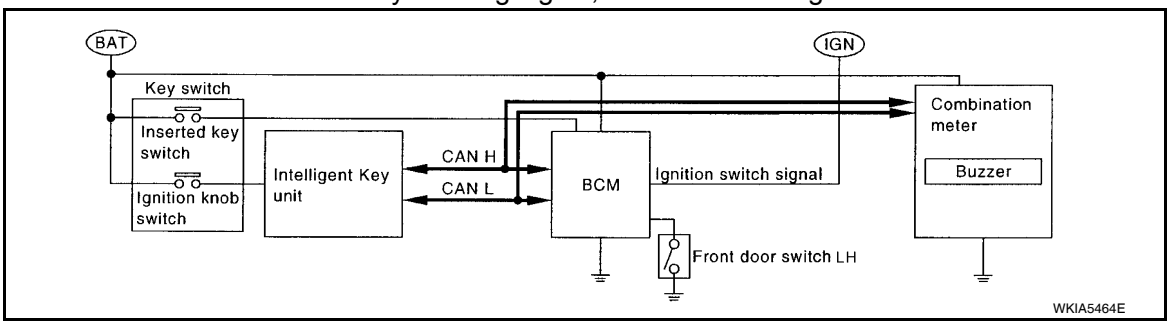


IGNITION KEY WARNING CHIME (WITH INTELLIGENT KEY)

When Mechanical Key Is Used

With the key inserted into the key switch, and the ignition switch in the LOCK or ACC position, when driver's door is opened, the warning chime will sound.

- BCM detects key inserted into the ignition switch, and sends key warning signal to combination meter with CAN communication line.
- When combination meter receives key warning signal, it sounds warning chime.



When Intelligent Key Is Carried With The Driver

Refer to BL-85, "System Description".

LIGHT WARNING CHIME

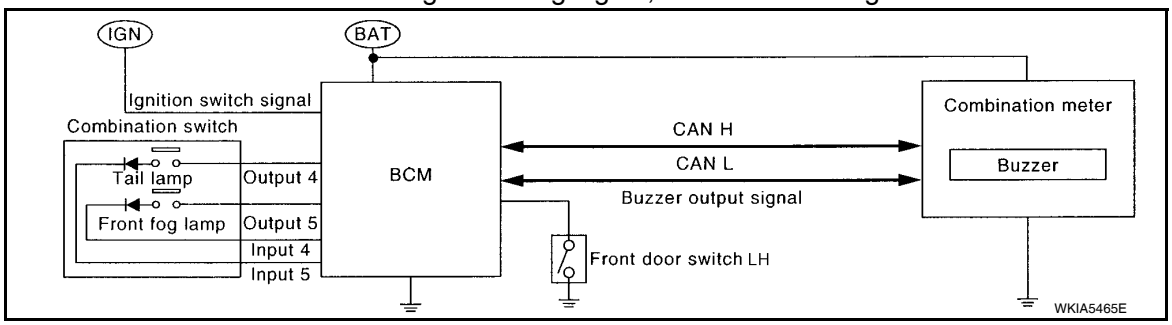
The warning chime sounds, when driver's door is opened (door switch ON) with lighting switch ON and the ignition switch is in any position other than ON or START.

NOTE:

BCM detected lighting switch in the 1st or 2nd position, refer to LT-64, "Combination Switch Reading Function".

- BCM detects headlamps are illuminated, and sends light warning signal to combination meter with CAN communication lines.

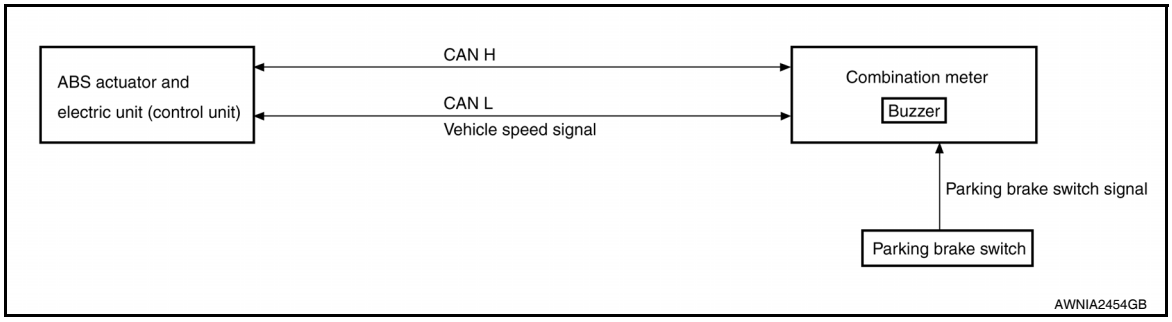
- When the combination meter receives light warning signal, it sounds warning chime.



PARKING BRAKE WARNING CHIME

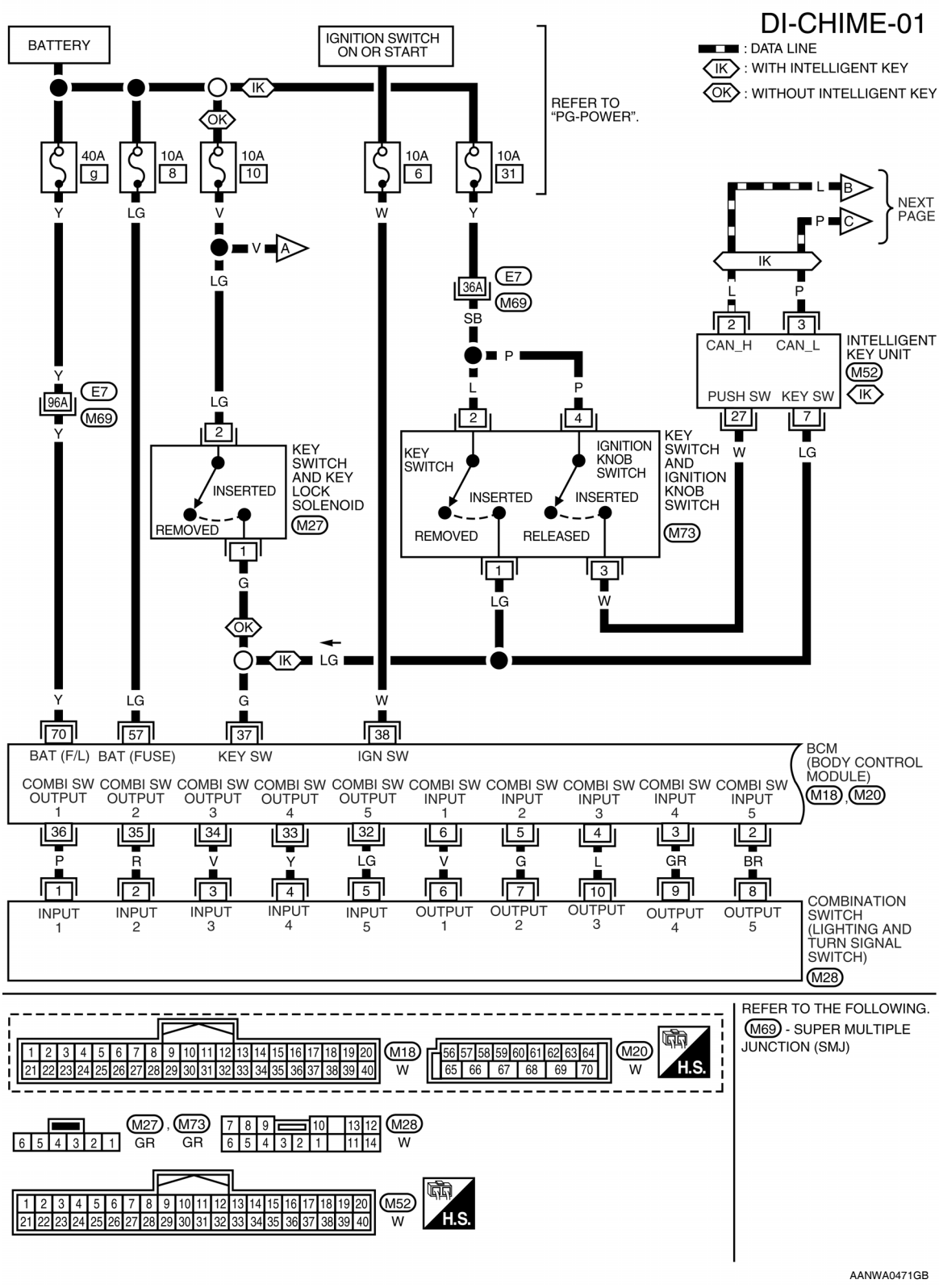
The parking brake warning chime sounds when the parking brake is applied and vehicle speed reaches approximately 2 km/h (1 MPH).

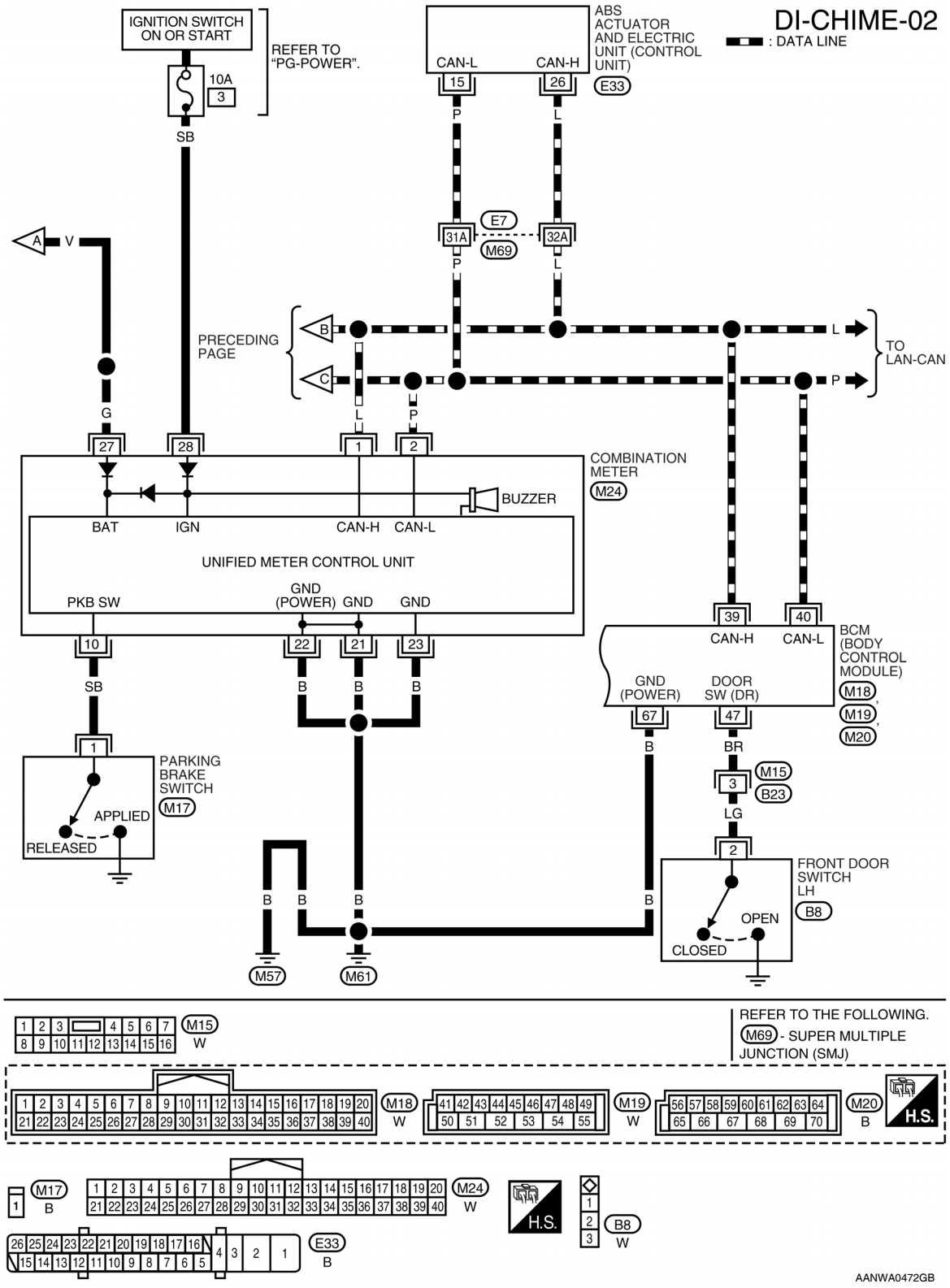
- The combination meter receives a parking brake applied signal from the parking brake switch.
- When the combination meter receives a vehicle speed signal from the ABS actuator and electric unit (control unit), it sounds the buzzer.



Wiring Diagram - CHIME -

INFOID:0000000007329937





AANWA0472GB

Terminal and Reference Value for BCM

INFOID:0000000007329938

Refer to BCS-12, "Terminal and Reference Value for BCM".

CONSULT Function (BCM)

INFOID:0000000007329939

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Description
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF-DIAG RESULTS	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
	ECU PART NUMBER	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

DATA MONITOR

Display Item List

Monitored item	ALL SIGNALS	SELECTION FROM MENU	Contents
IGN ON SW	X	X	Indicates [ON/OFF] condition of ignition switch.
KEY ON SW	X	X	Indicates [ON/OFF] condition of key switch.
DOOR SW-DR	X	X	Indicates [ON/OFF] condition of front door switch LH.
LIGHT SW 1ST	X	X	Indicates [ON/OFF] condition of lighting switch.
BUCKLE SW	X	X	Indicates [ON/OFF] condition of seat belt buckle switch LH.

ACTIVE TEST

Display Item List

Test item	Malfunction is detected when···
IGN KEY WARN ALM	This test is able to check key warning chime operation.
LIGHT WARN ALM	This test is able to check light warning chime operation.
SEAT BELT WARN TEST	This test is able to check seat belt warning chime operation.

SELF-DIAG RESULTS

Display Item List

Display item [Code]	Malfunction is detected when...
CAN communication [U1000]	Malfunction is detected in CAN communication.

NOTE:
If “CAN communication [U1000]” is indicated, after printing the monitor item, go to “LAN system”. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

Trouble Diagnosis

INFOID:0000000007329940

HOW TO PERFORM TROUBLE DIAGNOSIS

1. Confirm the symptom and customer complaint.
2. Understand the outline of system. Refer to DI-42, "System Description".
3. Perform the preliminary inspection. Refer to "PRELIMINARY INSPECTION".
4. According to symptom chart, repair or replace the cause of the malfunction. Refer to "SYMPTOM CHART".
5. Does warning chime system operate normally? If it operates normally, GO TO 6. If not, GO TO 4.
6. Inspection End.

PRELIMINARY INSPECTION

1.CHECK BCM

Perform self-diagnosis of BCM. Refer to DI-46, "CONSULT Function (BCM)".

Self-diagnostic results content

No malfunction detected>> GO TO 2.
Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

2.CHECK COMBINATION METER

Perform self-diagnosis of combination meter. Refer to DI-12, "CONSULT Function (METER/M&A)".

Self-diagnostic results content

No malfunction detected>> Inspection End.
Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

SYMPTOM CHART

Symptom		Diagnoses/Service procedure
All warning chime systems do not activate.		Perform the following inspections. • DI-48, "Combination Meter Buzzer Circuit Inspection" • DI-49, "Front Door Switch LH Signal Inspection" If above check is OK, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
Key warning chime does not activate.	Without Intelligent Key.	Perform DI-50, "Key Switch Signal Inspection (Without Intelligent Key)". If above check is OK, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
	With Intelligent Key, when mechanical key is used.	Perform DI-51, "Key Switch and Ignition Knob Switch Signal Inspection (With Intelligent Key, When Mechanical Key Is Used)". If above check is OK, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
	With Intelligent Key, when Intelligent Key is carried with the driver.	Refer to BL-116, "Trouble Diagnosis Symptom Chart".
Light warning chime does not activate.		Perform DI-53, "Lighting Switch Signal Inspection". If above check is OK, replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
Parking brake warning chime does not activate		Perform the following inspections • DI-53, "Parking Brake Switch Signal Inspection" • DI-16, "Vehicle Speed Signal Inspection"

Combination Meter Buzzer Circuit Inspection

INFOID:0000000007329941

1.CHECK CHIME OPERATION

1. Select “BUZZER” of “BCM” on CONSULT.
2. Perform “LIGHT WARN ALM” or “IGN KEY WARN ALM” of “ACTIVE TEST”.

Does chime sound?

YES >> Combination meter buzzer circuit is OK. Return to DI-47, "Trouble Diagnosis".
NO >> GO TO 2.

2.CHECK COMBINATION METER INPUT SIGNAL

1. Select “METER/M&A” on CONSULT.
2. Turn on hazard switch or lighting switch while monitoring “BUZZER” of “DATA MONITOR” and check operation status.

“BUZZER”

While hazard switch or lighting switch is ON	**: ON and OFF repeatedly**
Except above	**: OFF**

OK or NG

OK >> Check battery power supply circuit of combination meter. If OK, replace combination meter. Refer to IP-12, "Removal and Installation".
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

Front Door Switch LH Signal Inspection

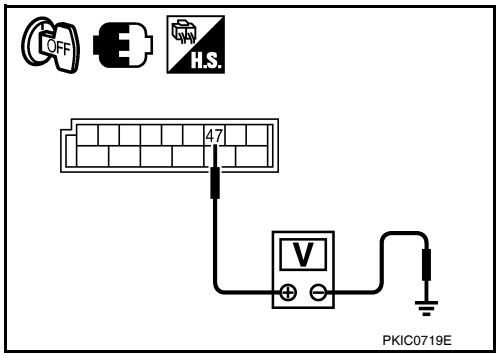
INFOID:0000000007329942

1.CHECK BCM INPUT SIGNAL

With CONSULT
1. Select “BCM”.
2. With “DATA MONITOR” of “BUZZER”, confirm “DOOR SW-DR” when the driver's door is operated.

“DOOR SW-DR”
When driver's door is opened : ON
When driver's door is closed : OFF

Without CONSULT
Check voltage between BCM harness connector and ground.

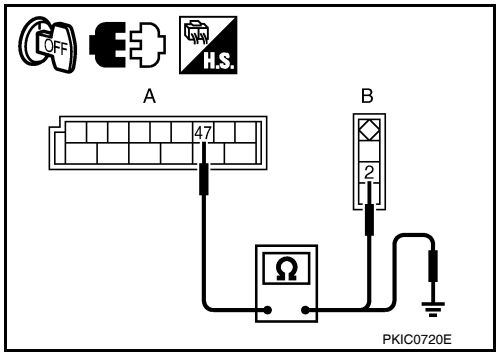


Terminals			Condition	Voltage (Approx.)
(+)		(−)		
BCM connector	Terminal			
M19	47	Ground	Driver's door is opened	0
			Driver's door is closed	Battery voltage

OK or NG
OK >> Front door switch LH signal is OK. Return to DI-47, "Trouble Diagnosis".
NG >> GO TO 2.

2.CHECK FRONT DOOR SWITCH LH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and front door switch LH connector.
3. Check continuity between BCM harness connector (A) and front door switch LH harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M19	47	B8	2	Yes

4. Check continuity between BCM harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M19	47		No

OK or NG
OK >> GO TO 3.
NG >> Repair harness or connector.

3.CHECK FRONT DOOR SWITCH LH

Check front door switch LH. Refer to DI-54, "Electrical Component Inspection".
OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Replace front door switch LH.

Key Switch Signal Inspection (Without Intelligent Key)

INFOID:0000000007329943

1.CHECK FUSE

Check if the key switch and key lock solenoid 10A fuse [No. 14, located in the fuse block (J/B)] is blown.

OK or NG

OK >> GO TO 2.
NG >> Be sure to repair the cause of malfunction before installing new fuse. Refer to PG-4.

2.CHECK BCM INPUT SIGNAL

With CONSULT

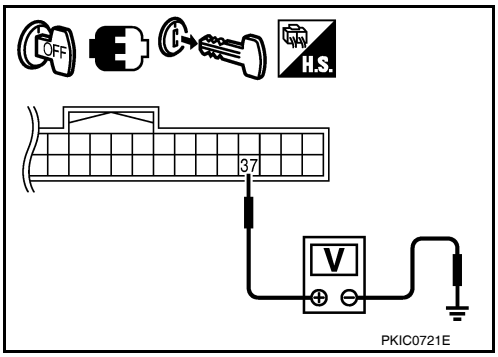
1. Select “BCM”.
2. With “DATA MONITOR” of “BUZZER”, confirm “KEY ON SW” when the key is operated.

“KEY ON SW”
When key is inserted into ignition key cylinder : ON
When key is removed from ignition key cylinder : OFF

Without CONSULT

Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(−)		
BCM connector	Terminal			
M18	37	Ground	Key is inserted	Battery voltage
			Key is removed	0 V



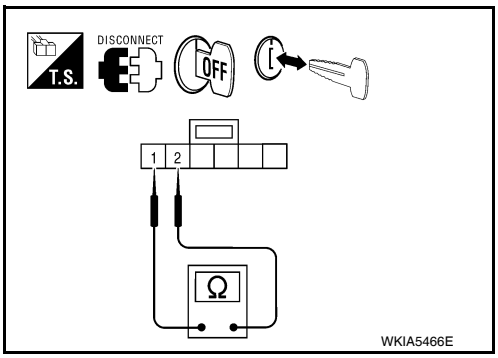
OK or NG

OK >> Key switch signal is OK. Return to DI-47, "Trouble Diagnosis".
NG >> GO TO 3.

3.CHECK KEY SWITCH

1. Turn ignition switch OFF.
2. Disconnect key switch and key lock solenoid connector.
3. Check continuity between key switch and key lock solenoid terminals 1 and 2.

Terminals		Condition	Continuity
1	2	When key is inserted into ignition key cylinder	Yes
		When key is removed from ignition key cylinder	No



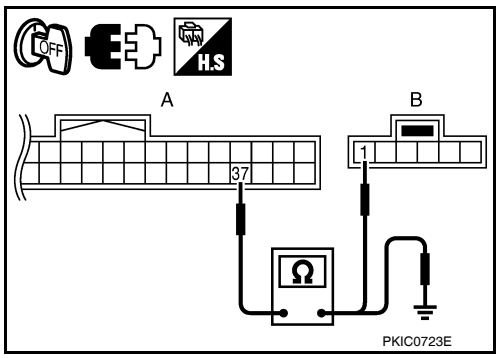
OK or NG

OK >> GO TO 4.
NG >> Replace key switch and key lock solenoid.

4.CHECK KEY SWITCH CIRCUIT

1. Disconnect BCM connector.

2. Check continuity between BCM harness connector (A) and key switch and key lock solenoid harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M18	37	M27	1	Yes

3. Check continuity between BCM harness connector (A) and ground.

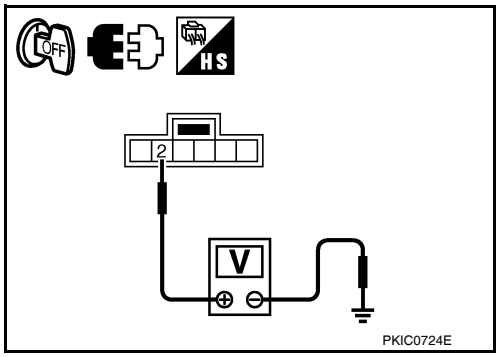
A		Ground	Continuity
Connector	Terminal		
M18	37		No

OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5.CHECK KEY SWITCH POWER SUPPLY CIRCUIT

Check voltage between key switch and key lock solenoid harness connector and ground.



Terminals			Voltage (Approx.)
(+)		(−)	
Key switch and key lock solenoid connector	Terminal		
M27	2	Ground	Battery voltage

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".
NG >> Repair harness or connector.

Key Switch and Ignition Knob Switch Signal Inspection (With Intelligent Key, When Mechanical Key Is Used)

INFOID:0000000007329944

1.CHECK FUSE

Check if the key switch and ignition knob switch 10A fuse (No. 31, located in the fuse and fusible link box) is blown.

OK or NG

OK >> GO TO 2.
NG >> Be sure to repair the cause of malfunction before installing new fuse. Refer to PG-4.

2.CHECK BCM INPUT SIGNAL

With CONSULT

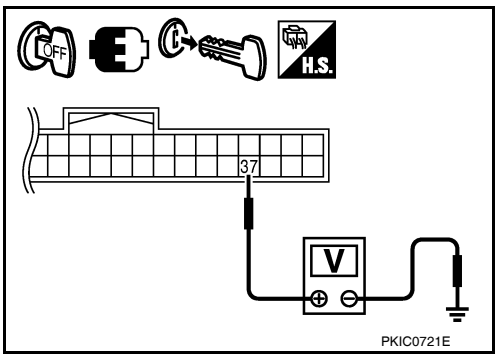
1. Select “BCM”.
2. With “DATA MONITOR” of “BUZZER”, confirm “KEY ON SW” when the key is operated.

“KEY ON SW”
When key is inserted into ignition key cylinder : ON
When key is removed from ignition key cylinder : OFF

Without CONSULT

Check voltage between BCM harness connector and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(−)		
BCM connector	Terminal			
M18	37	Ground	Key is inserted	Battery voltage
			Key is removed	0



OK or NG

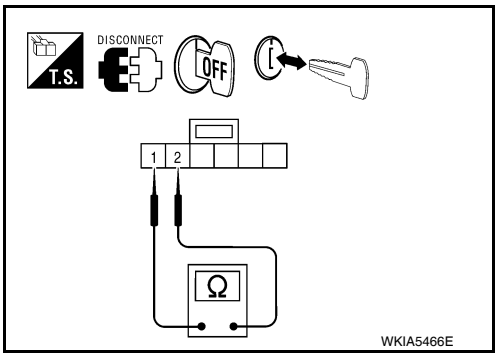
OK >> Key switch and ignition knob switch signal is OK. Return to DI-47, "Trouble Diagnosis".

NG >> GO TO 3.

3. CHECK KEY SWITCH

1. Turn ignition switch OFF.
2. Disconnect key switch and ignition knob switch connector.
3. Check continuity between key switch and ignition knob switch terminals 1 and 2.

Terminals		Condition	Continuity
1	2	When key is inserted into ignition key cylinder	Yes
		When key is removed from ignition key cylinder	No



OK or NG

OK >> GO TO 4.

NG >> Replace key switch and ignition knob switch.

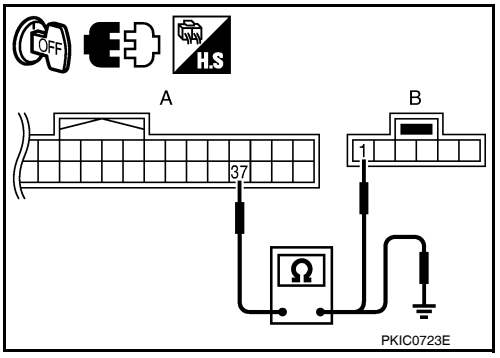
4. CHECK KEY SWITCH CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector (A) and key switch and ignition knob switch harness connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
M18	37	M73	1	Yes

3. Check continuity between BCM harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M18	37		No



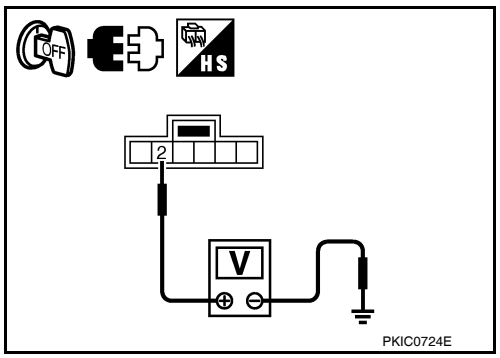
OK or NG

OK >> GO TO 5.

NG >> Repair harness or connector.

5. CHECK KEY SWITCH POWER SUPPLY CIRCUIT

Check voltage between key switch and ignition knob switch harness connector and ground.



Terminals			Voltage (Approx.)
(+)		(−)	
Key switch and ignition knob switch connector	Terminal		
M73	2	Ground	Battery voltage

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM".

NG >> Repair harness or connector.

Lighting Switch Signal Inspection

INFOID:0000000007329945

1.CHECK BCM INPUT SIGNAL

1. Select “BCM”.
2. With “DATA MONITOR” of “BUZZER”, confirm “LIGHT SW 1ST” when the lighting switch is operated.

“LIGHT SW 1ST”
Lighting switch (1st position) : ON
Lighting switch (OFF) : OFF

OK or NG

OK >> Lighting switch signal is OK. Return to DI-47, "Trouble Diagnosis".

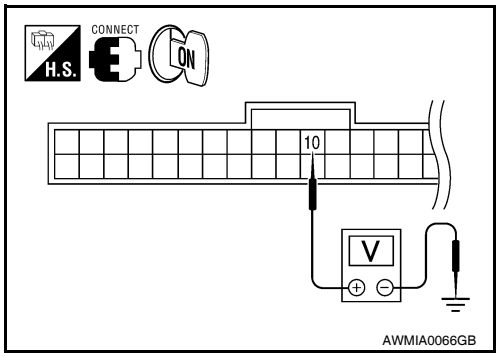
NG >> Check the lighting switch. Refer to LT-65, "Combination Switch Inspection".

Parking Brake Switch Signal Inspection

INFOID:0000000007329946

1.CHECK PARKING BRAKE SWITCH SIGNAL INPUT (COMBINATION METER)

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector M24 terminal 10 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(−)		
Combination meter connector	Terminal			
M24	10	Ground	Parking brake released	Battery voltage
			Parking brake applied	0

OK or NG

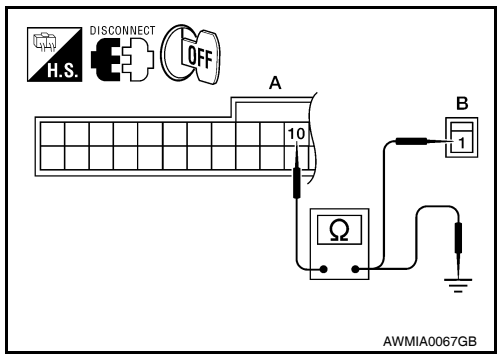
OK >> Replace combination meter. Refer to DI-19, "Removal and Installation".

NG >> GO TO 2.

2.CHECK PARKING BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.

3. Check continuity between combination meter harness connector (A) and parking brake switch harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
M24	10	M17	1	Yes

4. Check continuity between combination meter harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
M24	10		No

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK PARKING BRAKE SWITCH

Check parking brake switch. Refer to DI-54, "Electrical Component Inspection".

OK or NG

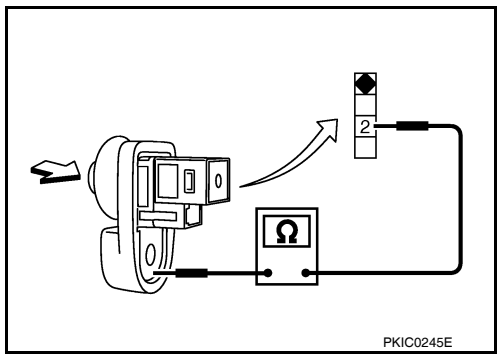
OK >> Check parking brake switch case ground.
NG >> Replace parking brake switch.

Electrical Component Inspection

INFOID:0000000007329947

FRONT DOOR SWITCH LH

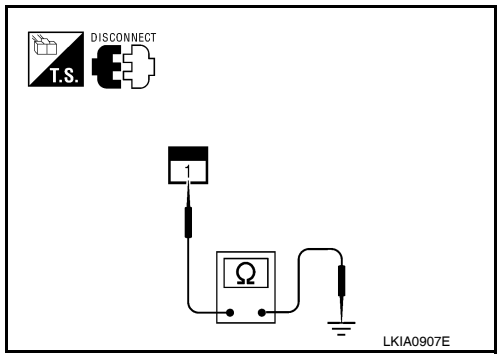
Check continuity between terminal 2 and door switch case ground.



Terminal		Condition	Continuity
2	Door switch case ground	When door switch is released.	Yes
		When door switch is pushed.	No

PARKING BRAKE SWITCH

Check continuity between terminal 1 and parking brake switch case ground.



Terminal		Condition	Continuity
1	Parking brake switch case ground	When parking brake is applied.	Yes
		When parking brake is released.	No

SECTION WW
WIPER, WASHER & HORN

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SERVICE INFORMATION

PRECAUTION

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330347

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007330348

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

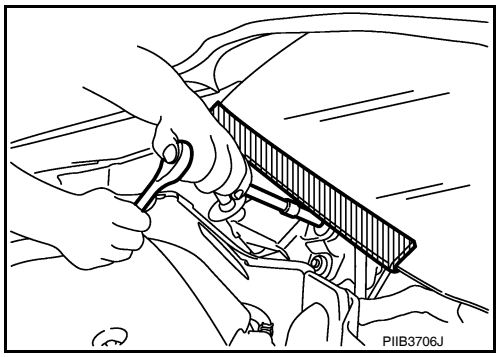
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007330349

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.

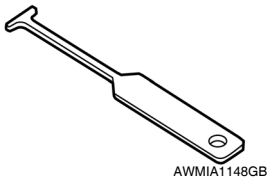


PREPARATION

Special Service Tool

INFOID:0000000007330350

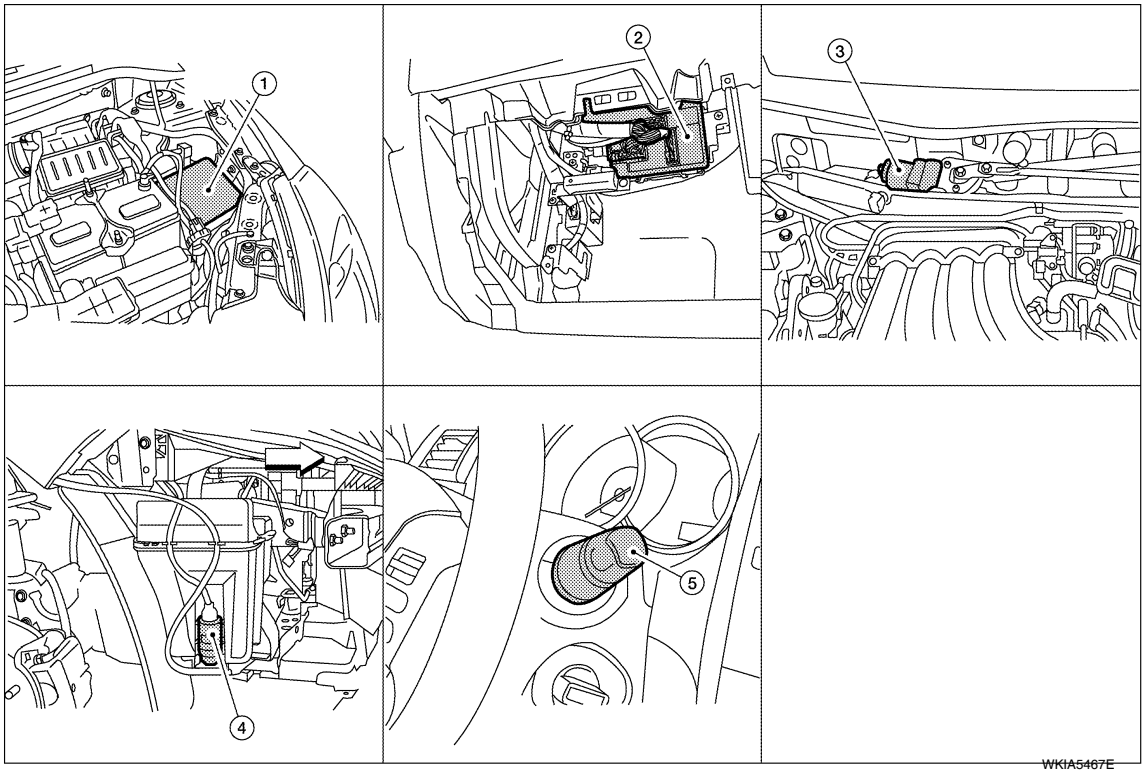
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-42059) Power socket removal tool  AWMIA1148GB	For removing power sockets

FRONT WIPER AND WASHER SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007330351



1. IPDM E/R E45, E46 and E48
2. BCM M18 and M20 (view with glove box removed)
3. Front wiper motor E1 (view with cowl top cover removed)
4. Front and rear washer motor E2 (view with front bumper fascia removed)
5. Combination switch (wiper switch) M28

⇦: Front

System Description

INFOID:0000000007330352

- Front wiper relays (front wiper relay, front wiper high relay) are located in the IPDM E/R (intelligent power distribution module engine room).
- Combination switch (wiper switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM (body control module) when switch is turned ON.
- BCM controls front wiper LO, HI, and INT (intermittent) operation.
- IPDM E/R operates wiper motor according to CAN communication signals from BCM.

OUTLINE

Power is supplied at all times
- to ignition relay, located in IPDM E/R, from battery directly,
- through 40A fusible link (letter **g**, located in fuse and fusible link box)
- to BCM terminal 70,
- through 30A fuse (No. 39, located in IPDM E/R)
- to front wiper relay located in IPDM E/R
- through 15A fuse (No. 52, located in IPDM E/R), and
- through 20A fuse (No. 53, located in IPDM E/R)
- to CPU located in IPDM E/R.

When ignition switch is in ON or START position, power is supplied
- through ignition relay (located in IPDM E/R)
- to front wiper relay (located in IPDM E/R), and

- to front wiper high relay (located in IPDM E/R), and
- to CPU (located in IPDM E/R),
- through 10A fuse [No. 6, located in fuse block (J/B)]
- to BCM terminal 38,
- through 15A fuse [No. 4, located in fuse block (J/B)]
- to combination switch (wiper switch) terminal 14.

Ground is supplied
- to IPDM E/R terminals 39 and 59, and
- to front wiper motor terminal 2
- through grounds E15 and E24
- to BCM terminal 67, and
- to combination switch (wiper switch) terminal 12
- through grounds M57 and M61.

LOW SPEED WIPER OPERATION

When the front combination switch (wiper switch) is in LO position, the BCM detects the low speed wiper ON signal by means of the BCM combination switch (wiper switch) reading function.
The BCM sends a front wiper request signal (LO) through the CAN communication line
- from BCM terminals 39 and 40
- to IPDM E/R terminals 40 and 41.

When the IPDM E/R receives front wiper request signal (LO), it turns ON front wiper relay, located in IPDM E/R, power is supplied
- through IPDM E/R terminal 33 and front wiper high relay and front wiper relay
- to front wiper motor terminal 3.

Ground is supplied
- to front wiper motor terminal 2
- through grounds E15 and E24.

With power and ground is supplied, front wiper motor operates at low speed.

HIGH SPEED WIPER OPERATION

When the front combination switch (wiper switch) is in HI position, the BCM detects a high speed wiper ON signal by means of the BCM combination switch (wiper switch) reading function.
The BCM sends a front wiper request signal (HI) through the CAN communication line
- from BCM terminals 39 and 40
- to IPDM E/R terminals 40 and 41.

When the IPDM E/R receives front wiper request signal (HI), it turns ON front wiper relay and front wiper high relay, located in IPDM E/R, power is supplied
- through IPDM E/R terminal 32
- to front wiper motor terminal 5.

Ground is supplied
- to front wiper motor terminal 2
- through grounds E15 and E24.

With power and ground is supplied, front wiper motor operates at high speed.

INTERMITTENT OPERATION

Wiper intermittent operation delay interval is determined from the intermittent wiper dial position inputs. During each intermittent operation delay interval, the BCM sends a front wiper request signal to the IPDM E/R to operate the wipers.
When the ignition switch is in the ON or START position, and the front combination switch (wiper switch) is turned to the intermittent position, the BCM detects a front wiper (intermittent) ON signal by means of the BCM combination switch (wiper switch) reading function.
BCM then sends front wiper (intermittent) request signal through the CAN communication lines
- from BCM terminals 39 and 40
- to IPDM E/R terminals 40 and 41.

When BCM determines that combination switch (wiper switch) status is front wiper intermittent ON, it performs the following operations.
- BCM detects ON/OFF status of intermittent wiper dial position
- BCM calculates operation interval from wiper dial position.
- BCM sends a front wiper request signal (INT) to IPDM E/R at calculated operation interval.

When IPDM E/R receives the front wiper request signal (INT), it supplies ground to energize the front wiper relay. It then sends auto-stop signal to the BCM and conducts intermittent front wiper motor operation.

AUTO STOP OPERATION

With combination switch (wiper switch) turned OFF, wiper motor will continue to operate until wiper arms reach windshield base.
When the wiper arms are not located at base of windshield with combination switch (wiper switch) OFF, ground is supplied
- from IPDM E/R terminal 33
- to front wiper motor terminal 3, in order to continue wiper motor operation at low speed.

When the wiper arms reach base of windshield, front wiper motor terminals 4 and 2 are connected, and ground is supplied
- to IPDM E/R terminal 38
- through front wiper motor terminals 4 and 2, and
- through grounds E15 and E24.

Then the IPDM E/R sends auto stop operation signal to BCM with CAN communication line.
When the BCM receives auto-stop operation signal, BCM sends wiper stop signal to IPDM E/R with CAN communication line.
IPDM E/R stops wiper motor. Wiper motor will then stop wiper arms at the STOP position.

WASHER OPERATION

When the combination switch (wiper switch) is in front wiper washer position, BCM detect front wiper washer signal by BCM combination switch (wiper switch) reading function. Refer to BCS-4, "System Description" .

Combination switch (wiper switch) power is supplied
- through combination switch (wiper switch) terminal 14
- to washer motor terminal 1.

Ground is supplied
- to front washer motor terminal 2
- through combination switch (wiper switch) terminal 11, and
- through combination switch (wiper switch) terminal 12
- through grounds M57 and M61.

With ground supplied, front washer motor is operated.
When the BCM detects that front washer motor has operated for 0.4 seconds or longer, BCM operates front wiper motor for low speed.
When the BCM detects washer switch is OFF, low speed operation cycles approximately 2 times and stops.

MIST OPERATION

When the combination switch (wiper switch) is turned to the mist position, wiper low speed operation cycles once and then stops.
For additional information about wiper operation under this condition, refer to "LOW SPEED WIPER OPERATION" .
If switch is held in mist position, low speed operation continues.

FAIL-SAFE FUNCTION

If an abnormality occurs in CAN communications, IPDM E/R holds the condition just before fail-safe status is initiated until ignition switch is turned OFF. (If wipers were operating in LO just before the initiation of fail-safe status, they continue to operate in LO until ignition switch is turned OFF.)

COMBINATION SWITCH (WIPER SWITCH) READING FUNCTION

Refer to BCS-4, "System Description" .

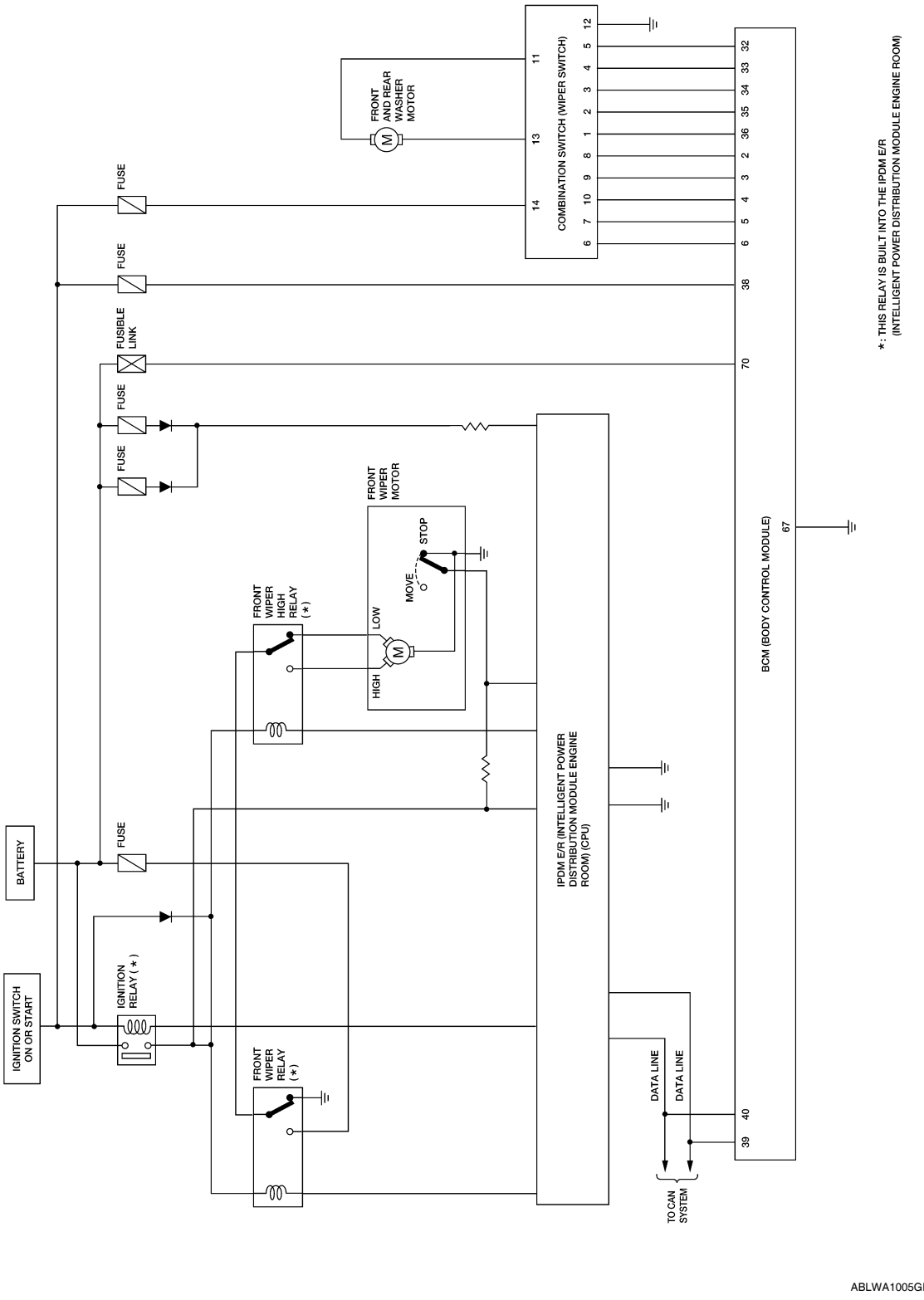
CAN Communication System Description

INFOID:0000000007330353

Refer to LAN-5, "System Description".

Schematic

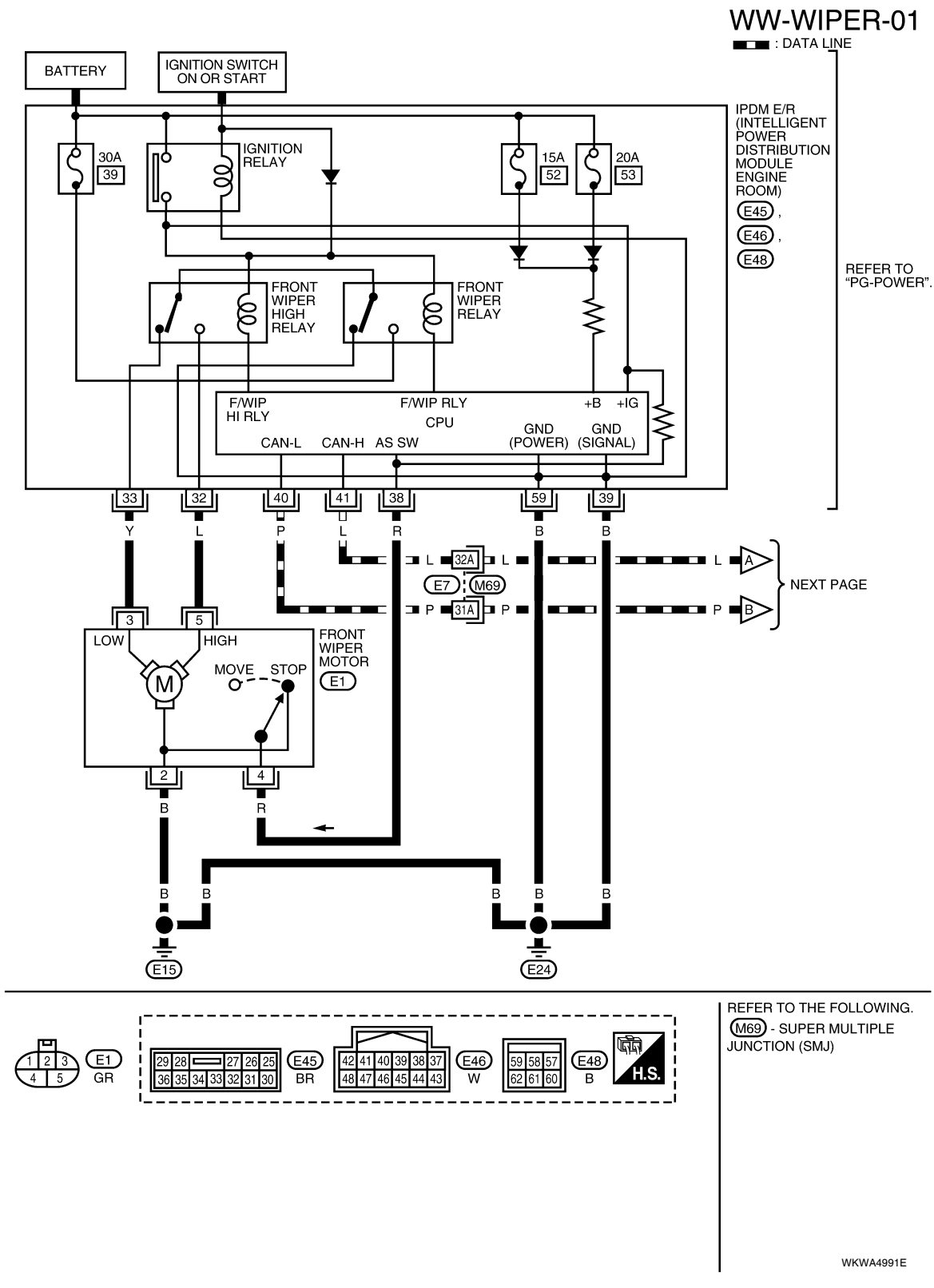
INFOID:0000000007330354



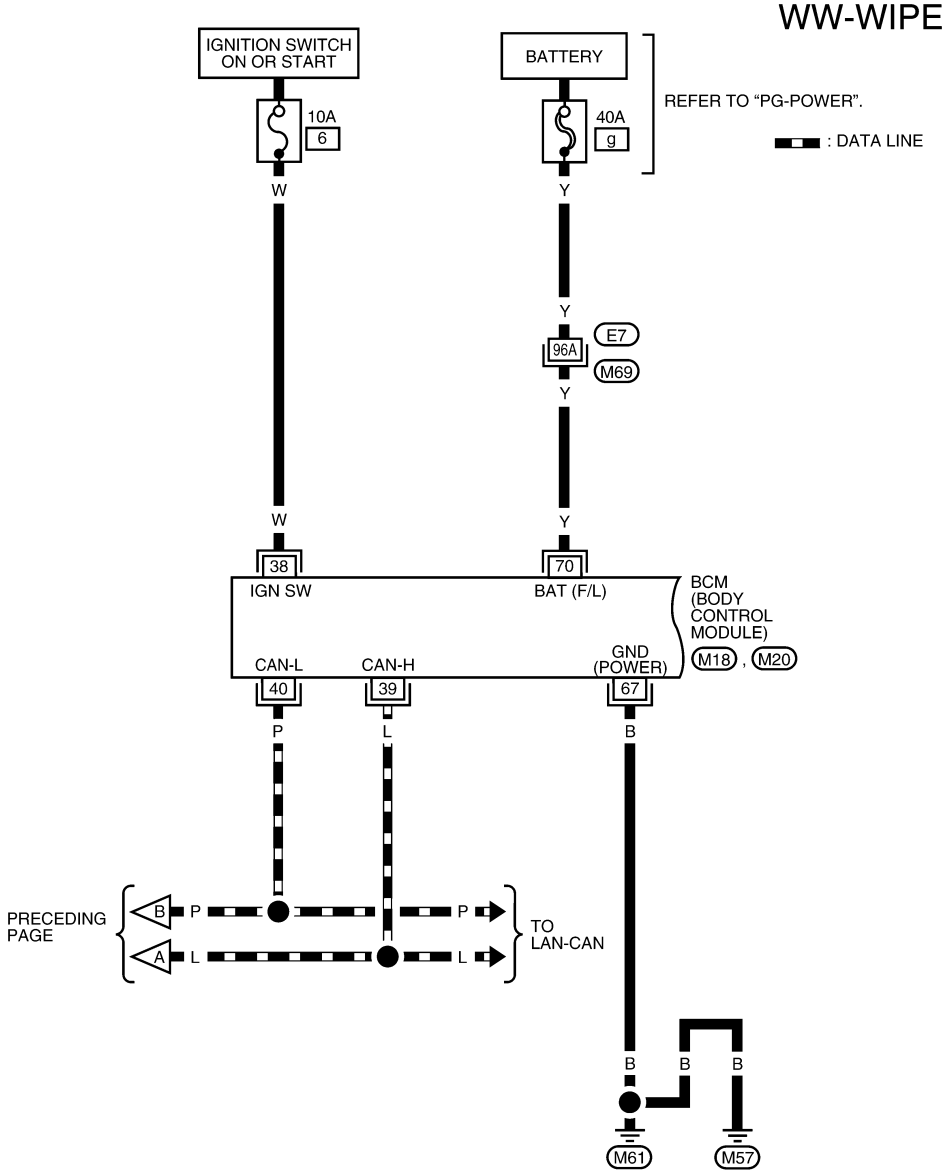
ABLWA1005GB

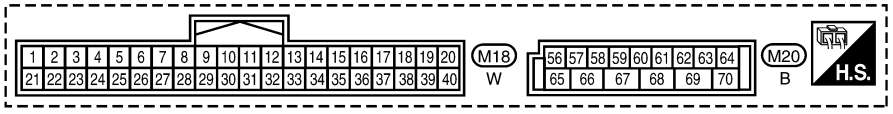
Wiring Diagram - WIPER -

INFOID:0000000007330355



WW-WIPER-02

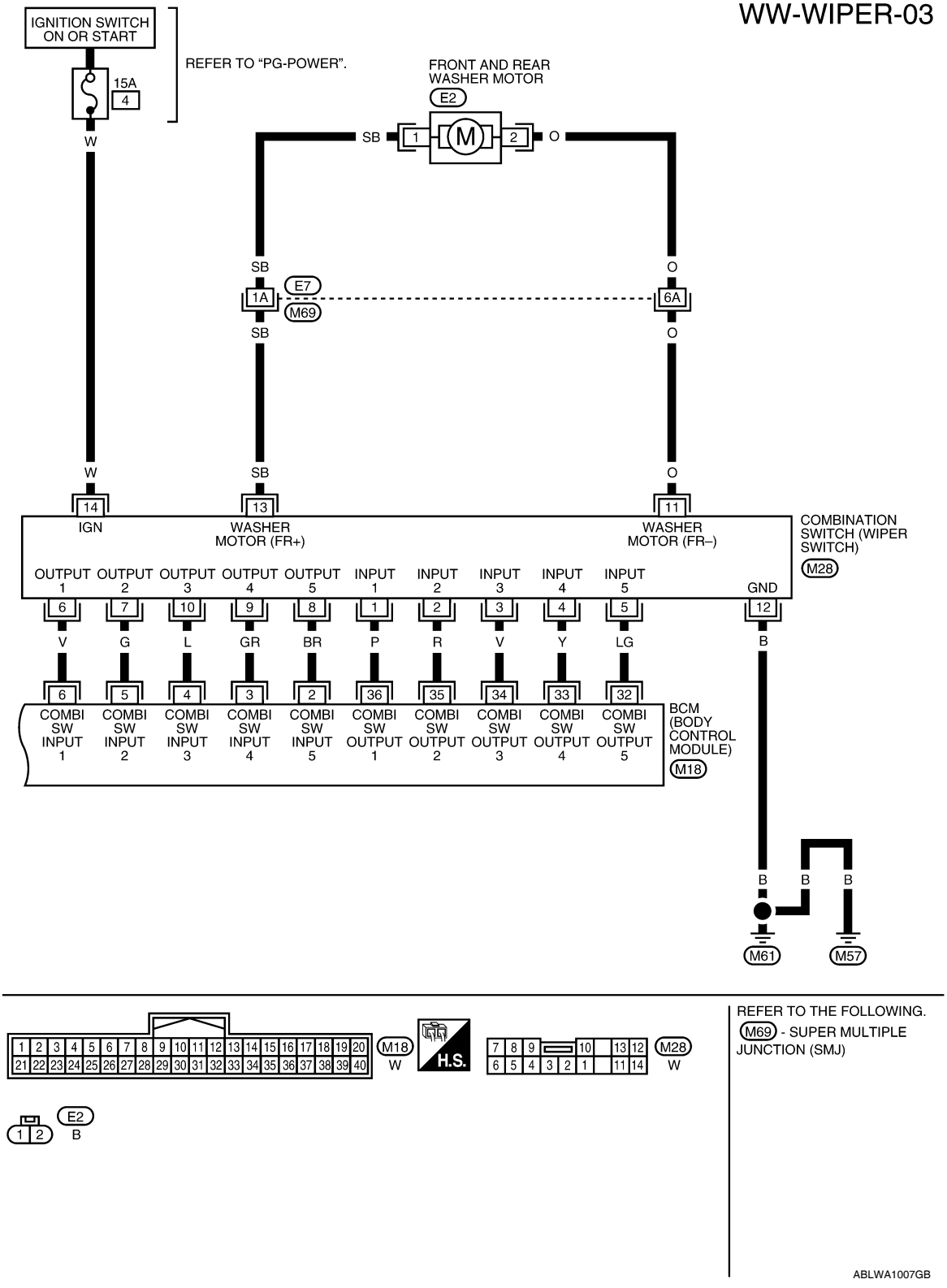




REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABLWA1006GB

WW-WIPER-03


IGNITION SWITCH ON OR START
REFER TO "PG-POWER".
15A
4
W
FRONT AND REAR WASHER MOTOR
E2
SB
1
M
2
O
SB
1A
E7
M69
SB
O
6A
O
W
SB
O
14
13
11
IGN
WASHER MOTOR (FR+)
WASHER MOTOR (FR–)
COMBINATION SWITCH (WIPER SWITCH)
M28
OUTPUT 1
OUTPUT 2
OUTPUT 3
OUTPUT 4
OUTPUT 5
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
GND
6
7
10
9
8
1
2
3
4
5
12
V
G
L
GR
BR
P
R
V
Y
LG
B
6
5
4
3
2
36
35
34
33
32
COMBI SW INPUT 1
COMBI SW INPUT 2
COMBI SW INPUT 3
COMBI SW INPUT 4
COMBI SW INPUT 5
COMBI SW OUTPUT 1
COMBI SW OUTPUT 2
COMBI SW OUTPUT 3
COMBI SW OUTPUT 4
COMBI SW OUTPUT 5
BCM (BODY CONTROL MODULE)
M18
B
B
B
M61
M57
M18
W
H.S.
M28
W
E2
B
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
ABLWA1007GB

Terminal and Reference Value for BCM

INFOID:0000000007330356

Refer to BCS-12, "Terminal and Reference Value for BCM" .

Terminal and Reference Value for IPDM E/R

INFOID:0000000007330357

Refer to PG-24, "Terminal and Reference Value for IPDM E/R" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330358

1. Confirm symptoms and customer complaint.
2. Understand operation description and function description. Refer to WW-5, "System Description" .
3. Perform preliminary check. Refer to WW-12, "Preliminary Check" .
4. Check symptom and repair or replace malfunctioning parts.
5. Does front wiper and washer operate normally? If YES, GO TO 6. If NO, GO TO 4.
6. Inspection End.

Preliminary Check

INFOID:0000000007330359

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection"

CONSULT Function (BCM)

INFOID:0000000007330360

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnosis position	Diagnosis mode	Description
WIPER	WORK SUPPORT	Changes the setting for each function.
	DATA MONITOR	Displays BCM input data in real time.
	ACTIVE TEST	Device operation can be checked by applying a drive signal to device.
BCM	SELF DIAGNOSTIC RESULT	BCM performs self-diagnosis of CAN communication.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.

WORK SUPPORT

Display Item List

Item	Description	CONSULT	Factory setting
WIPER SPEED SETTING	Vehicle speed sensing type wiper control mode can be changed in this mode.	ON	—
		OFF	×

DATA MONITOR

ALL SIGNALS	Monitors all the signals.
SELECTION FROM MENU	Selects items and monitor them.

Display Item List

Monitor item		Contents
IGN ON SW	“ON/OFF”	Displays “ignition switch ON (ON)/Other OFF or ACC (OFF)” status as judged from ignition switch signal.
IGN SW CAN	“ON/OFF”	Displays “ignition switch ON (ON)/Other OFF or ACC (OFF)” status as judged from CAN communication signal.
FR WIPER HI	“ON/OFF”	Displays “FRONT WIPER HI (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.

Monitor item		Contents
FR WIPER LOW	“ON/OFF”	Displays “FRONT WIPER LOW (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
FR WIPER INT	“ON/OFF”	Displays “FRONT WIPER INT (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
FR WASHER SW	“ON/OFF”	Displays “FRONT WASHER Switch (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
INT VOLUME	“1 - 7”	Displays intermittent operation dial position setting (1 - 7) as judged from combination switch (wiper switch) signal.
FR WIPER STOP	“ON/OFF”	Displays “Stopped (ON)/Operating (OFF)” status as judged from auto-stop signal.
VEHICLE SPEED	“km/h”	Displays vehicle speed status as judged from vehicle speed signal.
RR WIPER ON	“ON/OFF”	Displays “REAR WIPER (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
RR WIPER INT	“ON/OFF”	Displays “REAR WIPER INT (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
RR WASHER SW	“ON/OFF”	Displays “FRONT WASHER Switch (ON)/Other (OFF)” status as judged from combination switch (wiper switch) signal.
RR WIPER STOP	“ON/OFF”	Displays “Stopped (ON)/Operating (OFF)” status as judged from auto-stop switch 1.
RR WIPER STP2	“ON/OFF”	Displays “Stopped (ON)/Operating (OFF)” status as judged from auto-stop switch 2.

ACTIVE TEST

Display Item List

Test item	Display on CONSULT screen	Description
Front wiper output	FR WIPER	Operates front wiper in (INT), (LO), or (HI).
Rear wiper output	RR WIPER	Operates rear wiper in (ON) or (OFF)

CONSULT Function (IPDM E/R)

INFOID:0000000007330361

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

IPDM E/R diagnostic Mode	Description
SELF DIAGNOSTIC RESULT	Displays IPDM E/R self-diagnosis results.
DATA MONITOR	Displays IPDM E/R input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.

DATA MONITOR

ALL SIGNALS	Monitors all items.
MAIN SIGNALS	Monitor the predetermined item.
SELECTION FROM MENU	Selects items and monitors them.

All Signals, Main Signals, Selection From Menu

Item name	CONSULT screen display	Display or unit	Monitor item selection			Description
			ALL SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
FR wiper request	FR WIP REQ	STOP/1LOW/ LOW/HI	×	×	×	Signal status input from BCM
Wiper auto stop	WIP AUTO STOP	ACT P/STOP P	×	×	×	Output status of IPDM E/R
Wiper protection	WIP PROT	OFF/BLOCK	×	×	×	Control status of IPDM E/R

NOTE:

Perform monitoring of IPDM E/R data with ignition switch ON. When ignition switch is at ACC, the display may not be correct.

ACTIVE TEST

Test item	CONSULT screen display	Description
Front wiper (HI, LO) output	FRONT WIPER	With a certain operation (OFF, HI ON, LO ON), front wiper relay (Lo, Hi) can be operated.

Front Wiper Does Not Operate

INFOID:0000000007330362

CAUTION:

- **During IPDM E/R fail-safe control, front wipers may not operate. Refer to PG-17, "System Description" in "PG IPDM E/R" to make sure that it is not in fail-safe status.**

1.ACTIVE TEST

With CONSULT

1. Select "IPDM E/R" on CONSULT, and select "ACTIVE TEST" on "SELECT DIAG MODE" screen.
2. Select "FRONT WIPER" on "SELECT TEST ITEM" screen.
3. Touch "LO" or "HI" screen.

Without CONSULT

Start up auto active test. Refer to PG-20, "Auto Active Test" .

Does front wiper operate normally?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CIRCUIT BETWEEN COMBINATION SWITCH (WIPER SWITCH) AND BCM

With CONSULT

1. Select "BCM" on CONSULT, and select "WIPER" on "SELECT TEST ITEM" screen.
2. Select "DATA MONITOR" on "SELECT DIAG MODE" screen. Make sure that "FR WIPER INT", "FR WIPER LOW", and "FR WIPER HI" turn ON-OFF according to combination switch (wiper switch) operation.

Without CONSULT

Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Check combination switch (wiper switch). Refer to LT-65, "Combination Switch Inspection" .

3.CHECK CIRCUIT BETWEEN IPDM E/R AND BCM

Select "BCM" on CONSULT, and perform self-diagnosis for "BCM".

Displayed self-diagnosis results

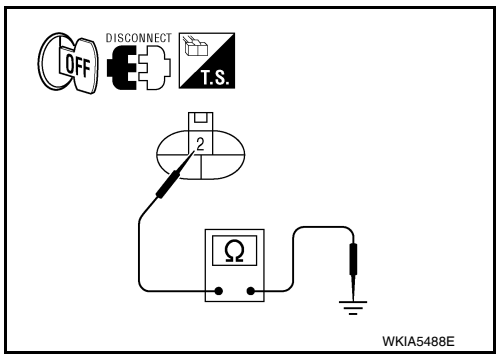
NO DTC>>Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
CAN COMM CIRCUIT>>Check CAN communication line of BCM. Refer to BCS-18, "CAN Communication Inspection Using CONSULT (Self-Diagnosis)" .

4.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front wiper motor.

3. Check continuity between front wiper motor connector and ground.

Front wiper motor connector	Terminal	Ground	Continuity
E1	2		Yes



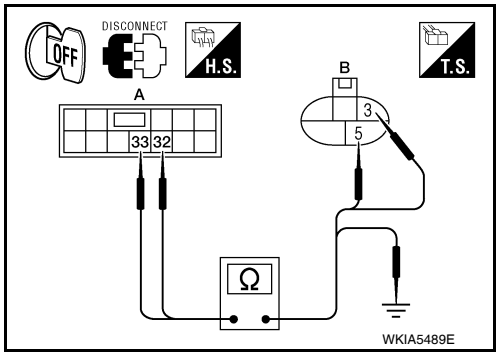
OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5. CHECK FRONT WIPER CIRCUIT

1. Disconnect IPDM E/R.
2. Check continuity between IPDM E/R connector (A) and front wiper motor connector (B).

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	32	E1	5	Yes
	33		3	



3. Check continuity between IPDM E/R connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
E45	32		No
	33		

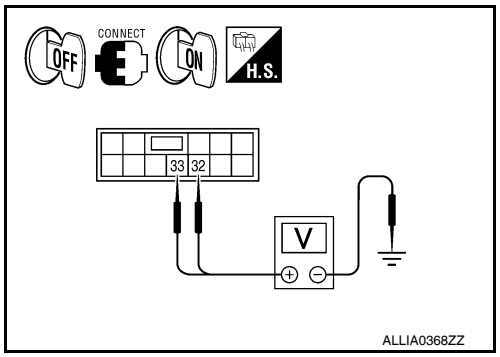
OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness.

6. CHECK IPDM E/R

With CONSULT
1. Connect IPDM E/R.
2. Turn ignition switch ON.
3. Select “IPDM E/R” by CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “LO” or “HI” screen.
6. Check voltage between IPDM E/R connector and ground while front wiper (HI, LO) is operating.

Terminal			Condition	Voltage (Approx.)
(+)		(-)		
IPDM E/R connector	Terminal			
E45	33	Ground	Stopped	0V
			LO operation	Battery voltage
	32		Stopped	0V
			HI operation	Battery voltage



Without CONSULT
1. Connect IPDM E/R.
2. Turn ignition switch ON.

3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. Check voltage between IPDM E/R connector and ground while front wiper (HI, LO) is operating.

Terminal			Condition	Voltage (Approx.)
(+)		(-)		
IPDM E/R connector	Terminal			
E45	33	Ground	Stopped	0V
			LO operation	Battery voltage
	23		Stopped	0V
			HI operation	Battery voltage

OK or NG

OK >> Replace front wiper motor. Refer to WW-22, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

Front Wiper Does Not Return to Stop Position (After Front Wiper Operates for 10 Seconds, They Stop for 20 Seconds, and After Repeating the Operation Five Times, They Become Inoperative)

INFOID:0000000007330363

CAUTION:

- **When auto-stop signal has not varied for 10 seconds or longer while IPDM E/R is operating front wipers, IPDM E/R considers that front wipers are locked, and stops wiper output. That causes this symptom.**
- **This status can be checked by "DATA MONITOR" of "IPDM E/R" on which "WIPER PROT" item shows "BLOCK".**

1.CHECK FRONT WIPER STOP SIGNAL

With CONSULT

Select "IPDM E/R" on CONSULT. With "DATA MONITOR", make sure that "WIP AUTO STOP" turns "ACT P"-"STOP P" linked with wiper operation.

Without CONSULT

GO TO 2.

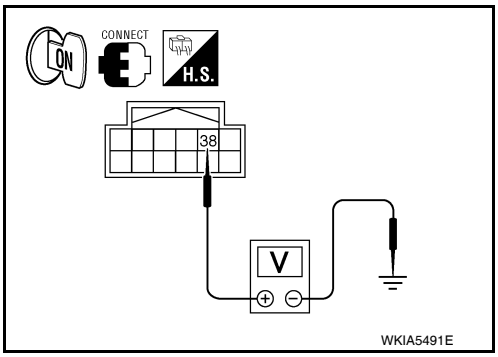
OK or NG

OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

NG >> GO TO 2.

2.CHECK IPDM E/R

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R connector and ground while front wiper motor is stopped and while it is operating.



Terminal			Condition	Voltage (Approx.)
(+)		(-)		
IPDM E/R connector	Terminal			
E46	38	Ground	Wiper stopped	0V
			Wiper operating	Battery voltage

OK or NG

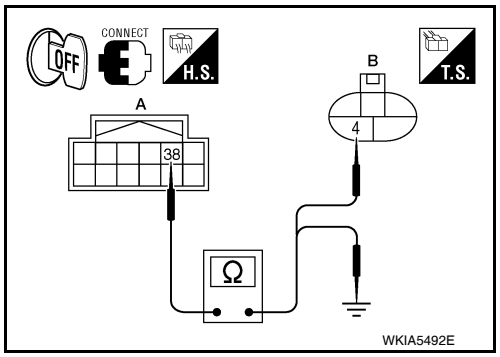
OK >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

NG >> GO TO 3.

3.CHECK FRONT WIPER AUTO STOP CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R and wiper motor.
3. Check continuity between IPDM E/R connector (A) and front wiper motor connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
E46	38	E1	4	Yes

4. Check continuity between IPDM E/R harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
E46	38		No

OK or NG

OK >> Replace front wiper motor. Refer to WW-22, "Removal and Installation of Front Wiper Drive Assembly" .
NG >> Repair or replace harness.

Only Front Wiper Low Does Not Operate

INFOID:0000000007330364

1.ACTIVE TEST

With CONSULT
1. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Touch “LO” screen.

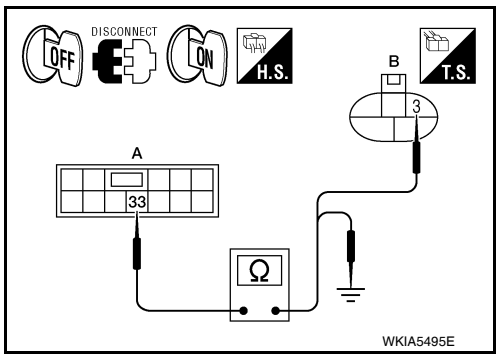
Without CONSULT
Start auto active test. Refer to PG-20, "Auto Active Test" .

Does front wiper operate normally?

YES >> Refer to LT-65, "Combination Switch Inspection" .
NO >> GO TO 2.

2.CHECK FRONT WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R and front wiper motor.
3. Check continuity between IPDM E/R connector (A) and front wiper motor connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	33	E1	3	Yes

4. Check continuity between IPDM E/R harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
E45	33		No

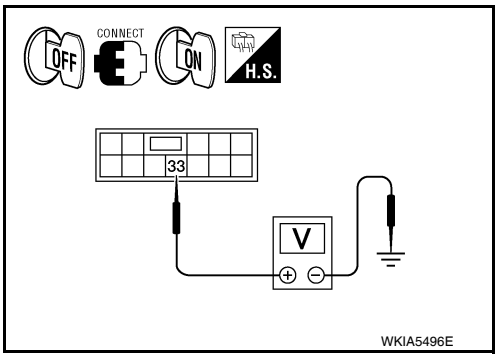
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3.CHECK IPDM E/R

With CONSULT

1. Connect IPDM E/R.
2. Turn ignition ON.
3. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “LO” screen.
6. Check voltage between IPDM E/R connector and ground while front wiper LO is operating.



Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E45	33	Ground	Battery voltage

Without CONSULT
1. Connect IPDM E/R.
2. Turn ignition ON.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. Check voltage between IPDM E/R connector and ground while front wiper LO is operating.

Terminal			Continuity
(+)		(-)	
IPDM E/R connector	Terminal		
E45	33	Ground	Battery voltage

OK or NG

OK >> Replace front wiper motor. Refer to WW-22, "Removal and Installation of Front Wiper Drive Assembly" .

NG >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

Only Front Wiper High Does Not Operate

INFOID:0000000007330365

1.ACTIVE TEST

With CONSULT
1. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Touch “HI” screen.

Without CONSULT
Start auto active test. Refer to PG-20, "Auto Active Test" .

Does front wiper operate normally?

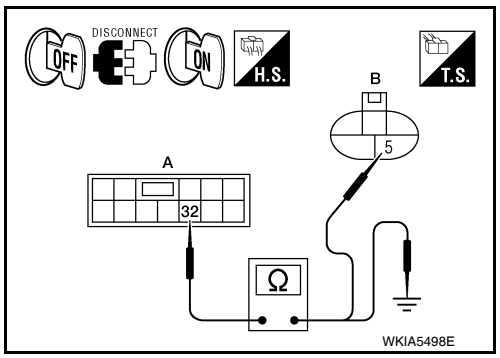
YES >> Refer to LT-65, "Combination Switch Inspection" .

NO >> GO TO 2.

2.CHECK FRONT WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E45 and front wiper motor connector E1.

3. Check continuity between IPDM E/R connector (A) E45 terminal 32 and front wiper motor connector (B) E1 terminal 1.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
E45	32	E1	5	Yes

4. Check continuity between IPDM E/R harness connector (A) E45 terminal 32 and ground.

A		Ground	Continuity
Connector	Terminal		
E45	32		No

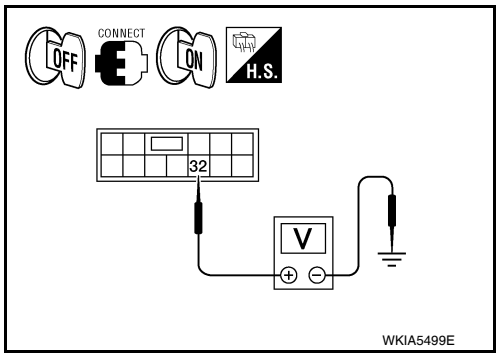
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3.CHECK IPDM E/R

With CONSULT

1. Connect IPDM E/R connector E45.
2. Turn ignition switch ON.
3. Select “IPDM E/R” on CONSULT, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
4. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
5. Touch “HI” screen.
6. Check voltage between IPDM E/R connector E45 terminal 32 and ground while front wiper HI is operating.



Terminal			Voltage (Approx.)
(+)		(-)	
IPDM E/R connector	Terminal		
E45	32	Ground	Battery voltage

Without CONSULT

1. Connect IPDM E/R connector E45.
2. Turn ignition switch ON.
3. Start auto active test. Refer to PG-20, "Auto Active Test" .
4. Check voltage between IPDM E/R connector E45 terminal 32 and ground while front wiper HI is operating.

Terminal			Voltage (Approx.)
(+)		(-)	
IPDM E/R connector	Terminal		
E45	32	Ground	Battery voltage

OK or NG

OK >> Replace front wiper motor. Refer to WW-22, "Removal and Installation of Front Wiper Drive Assembly" .
NG >> Replace IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R" .

Only Front Wiper Intermittent Does Not Operate

INFOID:0000000007330366

1.CHECK COMBINATION SWITCH (WIPER SWITCH)

With CONSULT

1. Select “BCM” on CONSULT, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WIPER INT”, turn ON-OFF according to combination switch (wiper switch) operation.

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check combination switch (wiper switch). Refer to LT-65, "Combination Switch Inspection" .

Front Wiper Intermittent Operation Switch Position Cannot Be Adjusted

INFOID:0000000007330367

1.CHECK CIRCUIT BETWEEN COMBINATION SWITCH (WIPER SWITCH) AND BCM

With CONSULT
1. Select “BCM” on CONSULT, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “INT VOLUME”, changes in order from 1 to 7 according to combination switch (wiper switch) operation.

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check combination switch (wiper switch). Refer to LT-65, "Combination Switch Inspection" .

Wiper Does Not Wipe When Front Washer Operates

INFOID:0000000007330368

1.CHECK CIRCUIT BETWEEN COMBINATION SWITCH (WIPER SWITCH) AND BCM

With CONSULT
1. Select “BCM” on CONSULT, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WASHER SW” turn ON-OFF according to front combination switch (wiper switch) operation.

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check combination switch (wiper switch). Refer to LT-65, "Combination Switch Inspection" .

Front Wiper Does Not Stop

INFOID:0000000007330369

1.CHECK CIRCUIT BETWEEN COMBINATION SWITCH (WIPER SWITCH) AND BCM

With CONSULT
1. Select “BCM” on CONSULT, and select “WIPER” on “SELECT TEST ITEM” screen.
2. Select “DATA MONITOR” on “SELECT DIAG MODE” screen. Make sure that “FR WIPER INT”, “FR WIPER LOW”, “FR WIPER HI”, and “FR WASHER SW” turn ON-OFF according to front combination switch (wiper switch) operation.

Without CONSULT
Refer to LT-65, "Combination Switch Inspection" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection" .
NG >> Check combination switch (wiper switch). Refer to LT-65, "Combination Switch Inspection" .

Removal and Installation of Front Wiper Arms

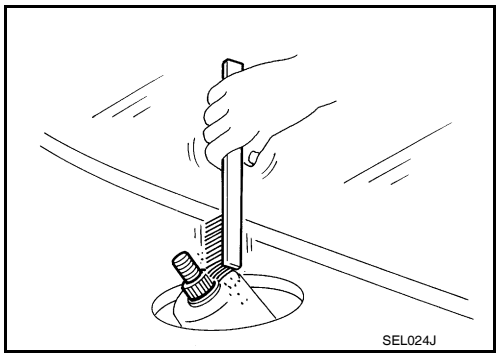
INFOID:0000000007330370

REMOVAL

1. Turn combination switch (wiper switch) on to operate wiper motor, and then turn combination switch (wiper switch) off (auto stop).
2. Open hood, remove wiper arm caps, and remove wiper arm nuts.
3. Raise wiper arm, and remove wiper arm from the vehicle.

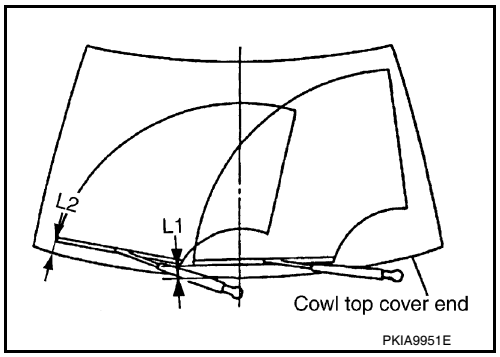
INSTALLATION

1. Clean up the pivot area as shown. This will reduce possibility of wiper arm looseness.
2. Prior to wiper arm installation, turn on combination switch (wiper switch) to operate wiper motor and then turn it off (auto stop).
3. Push wiper arm onto pivot shaft, paying attention to blind spline.



4. Lift the blade up and then set it down onto glass surface to set the blade center to clearance “L1” and “L2” immediately before temporarily tightening the wiper arm nuts.
5. Spray washer fluid. Turn on combination switch (wiper switch) to operate wiper motor and then turn it off.
6. Make sure that wiper blades stop within clearance “L1” and “L2” and reposition as necessary.

Clearance “L1” : 38.7 ± 7.5 mm (1.524 ± 0.295 in)
Clearance “L2” : 38.4 ± 7.5 mm (1.512 ± 0.295 in)



7. Tighten wiper arm nuts to specification.
8. Attach wiper arm caps.

Adjustment of Wiper Arm Stop Location

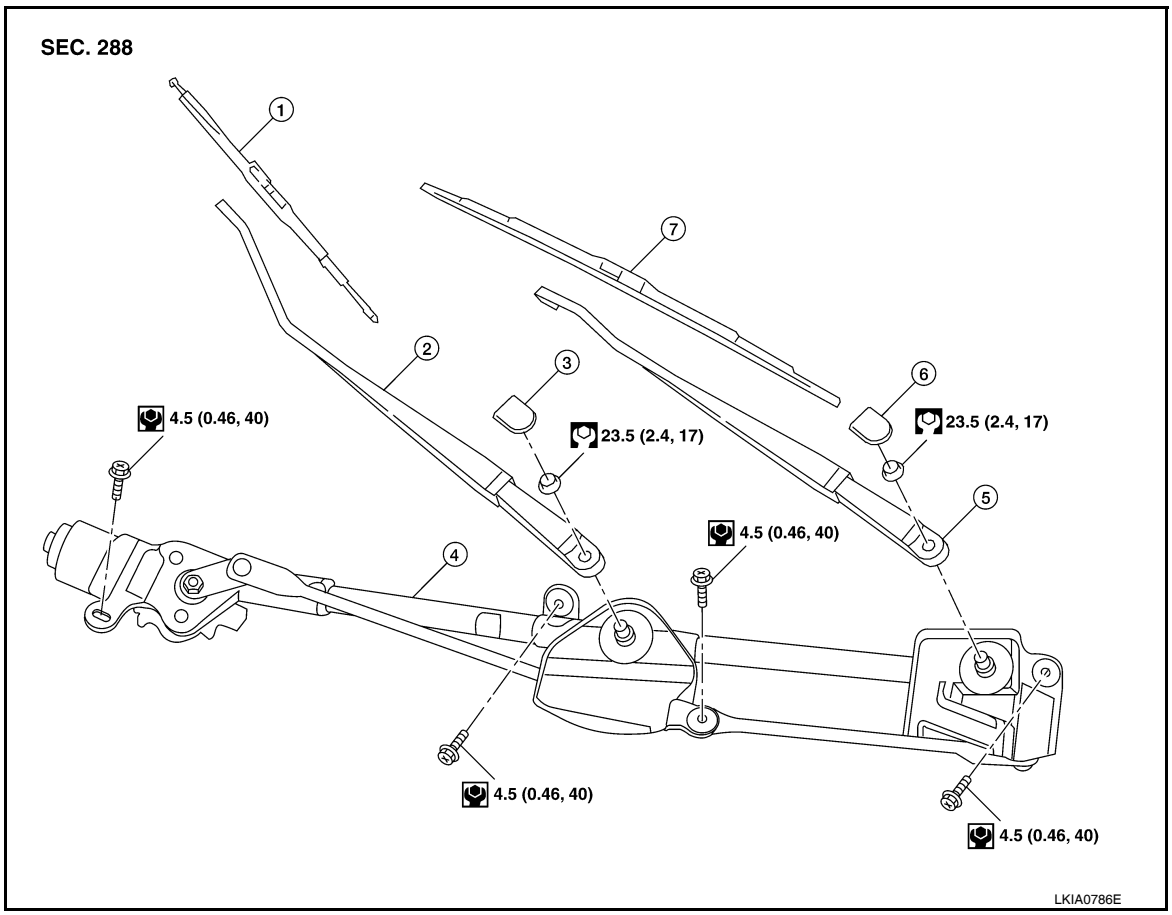
INFOID:0000000007330371

ADJUSTMENT

To adjust the wiper arm stop location, the wiper arm must be removed and installed. Refer to WW-20, "Removal and Installation of Front Wiper Arms" .

Removal and Installation of Front Wiper Drive Assembly

INFOID:0000000007330372



1. Front RH wiper blade
2. Front RH wiper arm
3. Wiper arm cap
4. Front wiper drive assembly
5. Front LH wiper arm
6. Wiper arm cap
7. Front LH wiper blade

REMOVAL

1. Operate the front wiper motor, and stop at the auto stop position.
2. Remove cowl top cover. Refer to EI-22, "Removal and Installation" .
3. Disconnect wiper motor connector.
4. Remove front wiper drive assembly bolts, and remove front wiper drive assembly.

INSTALLATION

1. Install front wiper drive assembly.
2. Connect wiper motor connector. Turn combination switch (wiper switch) on to operate wiper motor, then turn combination switch (wiper switch) off (auto stop).
3. Install cowl top cover. Refer to EI-22, "Removal and Installation" .

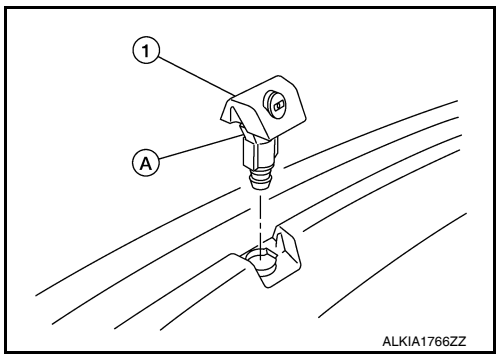
Removal and Installation of Front Washer Nozzle

INFOID:0000000007330373

REMOVAL

1. Remove cowl top cover. Refer to EI-22, "Removal and Installation" .
2. Remove washer tube.

3. While pressing pawl (A) on the reverse side of front washer nozzle (1), remove front washer nozzle (1) from cowl top cover.



INSTALLATION

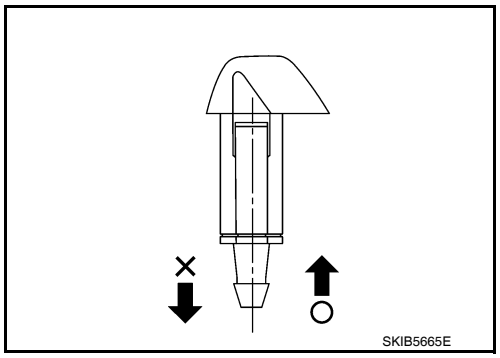
1. Install washer tube in nozzle.
2. Install nozzle to the vehicle.
3. Adjust nozzle spray location. Refer to WW-24, "Washer Nozzle Adjustment" .
   CAUTION:
   The spray points differ, so be sure to install left and right nozzles correctly.

Inspection for Washer Nozzle

INFOID:0000000007330374

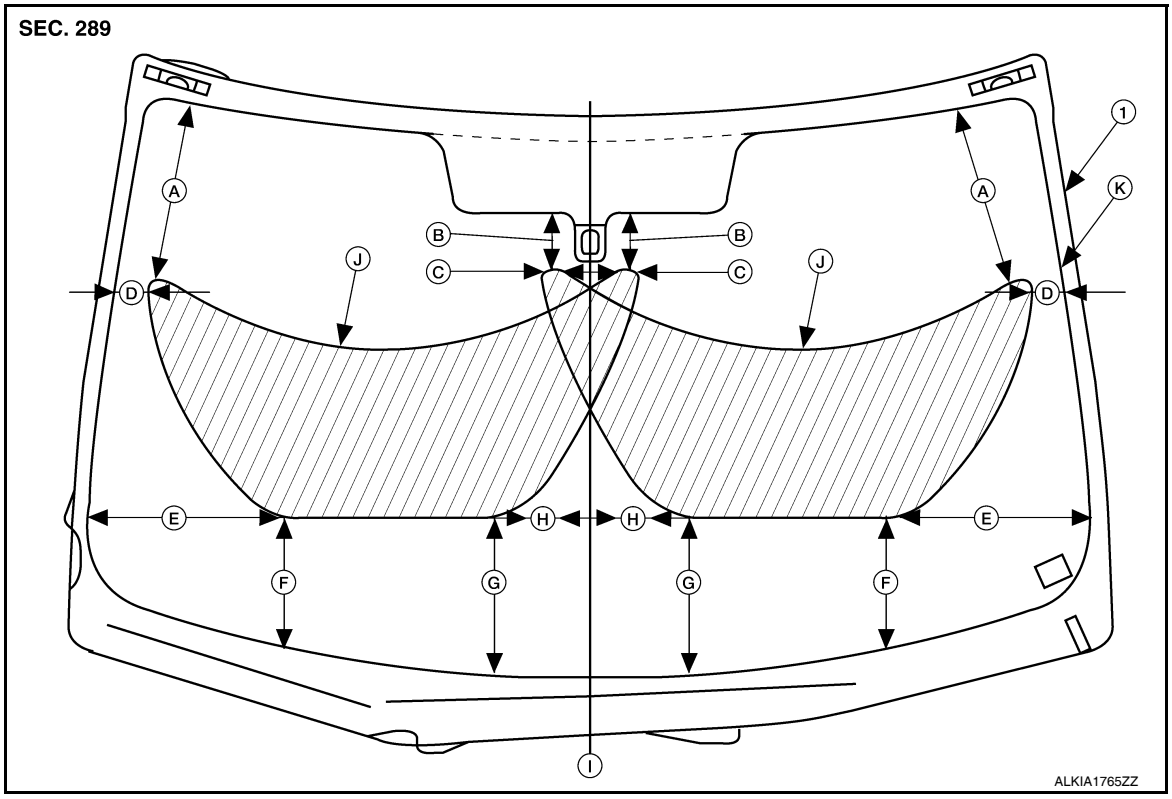
CHECK VALVE INSPECTION

Blow air in the injection direction, and make sure that air flows only one way. Make sure that the reverse direction is not possible.



Washer Nozzle Adjustment

INFOID:0000000007330375

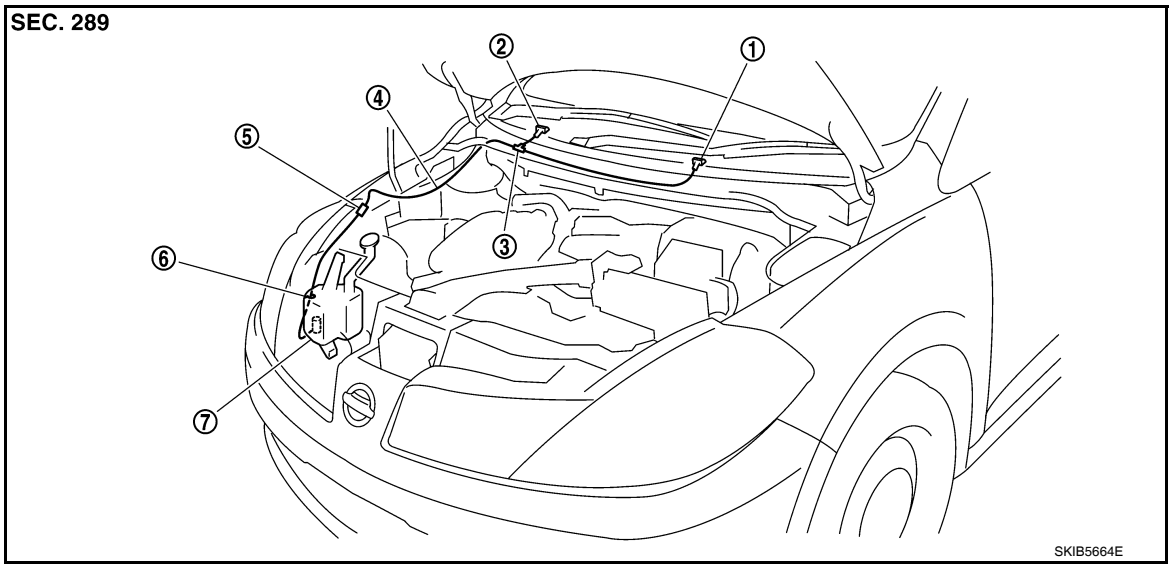


1.	Windshield	A.	211 mm (8.31 in)	B.	72 mm (2.83 in)
C.	51 mm (2.01 in)	D.	33 mm (1.30 in)	E.	228 mm (8.98 in)
F.	160 mm (6.30 in)	G.	200 mm (7.87 in)	H.	95 mm (3.74 in)
I.	Center of windsheild	J.	Spray pattern area	K.	Black mask

- Adjust spray positions to match the positions as shown.
- Insert a suitable tool into the nozzle hole and move up/down and left/right to adjust to the specified spray position.

Washer Tube Layout

INFOID:0000000007330376



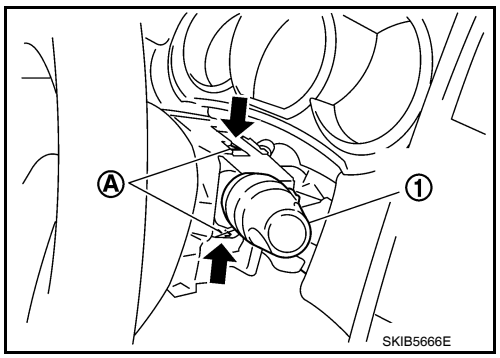
1. Washer nozzle LH
2. Washer nozzle RH
3. Joint washer tube
4. Washer tube
5. Clip
6. Clamp
7. Washer tank

Removal and Installation of Front Wiper and Washer Switch

INFOID:0000000007330377

REMOVAL

1. Remove the steering column cover. Refer to IP-11, "Component Parts" .
2. Disconnect the wiper and washer switch connector.
3. Pull wiper and washer switch (1) toward the passenger door while pressing pawls (A) in direction shown by the arrow, and remove it from the base.



INSTALLATION

Installation is in the reverse order of removal.

Inspection of Front Wiper and Washer Switch Circuit

INFOID:0000000007330378

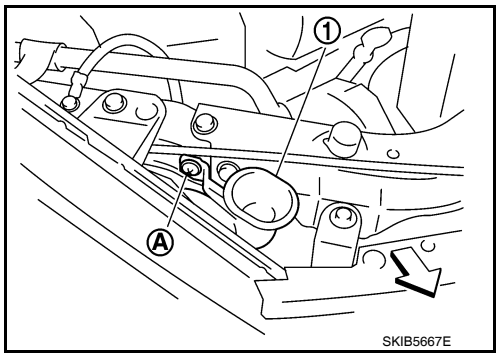
Refer to LT-65, "Combination Switch Inspection" .

Removal and Installation of Washer Tank

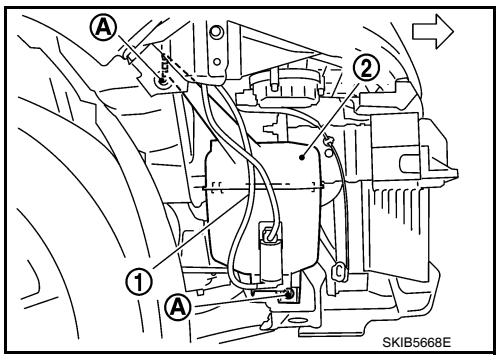
INFOID:0000000007330379

REMOVAL

1. Remove the front grille. Refer to EI-21, "Removal and Installation" .
2. Remove clip (A) and pull washer tank inlet (1) out of washer tank.
   - ⇦: Vehicle front



3. Remove the front fender protector. Refer to EI-24, "Removal and Installation" .
4. Disconnect the washer motor connector and washer fluid level sensor connector.
5. Remove the washer tank screw (A).
   - ⇦: Vehicle front
6. Remove the washer tube (1), and remove washer tank (2) from the vehicle.
   - ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.

Washer tank nuts	**: 4.5 N·m (0.46 kg-m, 40 in-lb)**
Washer tank screw	**: 4.5 N·m (0.46 kg-m, 40 in-lb)**

CAUTION:

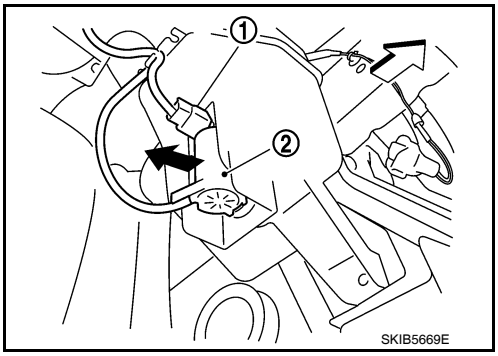
After installation, add water up to the upper level of washer tank inlet, and check for water leaks.

Removal and Installation of Front Washer Motor

INFOID:0000000007330380

REMOVAL

1. Remove the front fender protector RH. Refer to EI-24, "Component" .
2. Disconnect washer motor connector (1) and remove washer tube.
   - ⇦: Vehicle front
3. Pull out front washer motor (2) in the direction shown. Remove the front washer motor (2) from washer tank.
   - ⇦: Vehicle front



INSTALLATION

Installation is in the reverse order of removal.

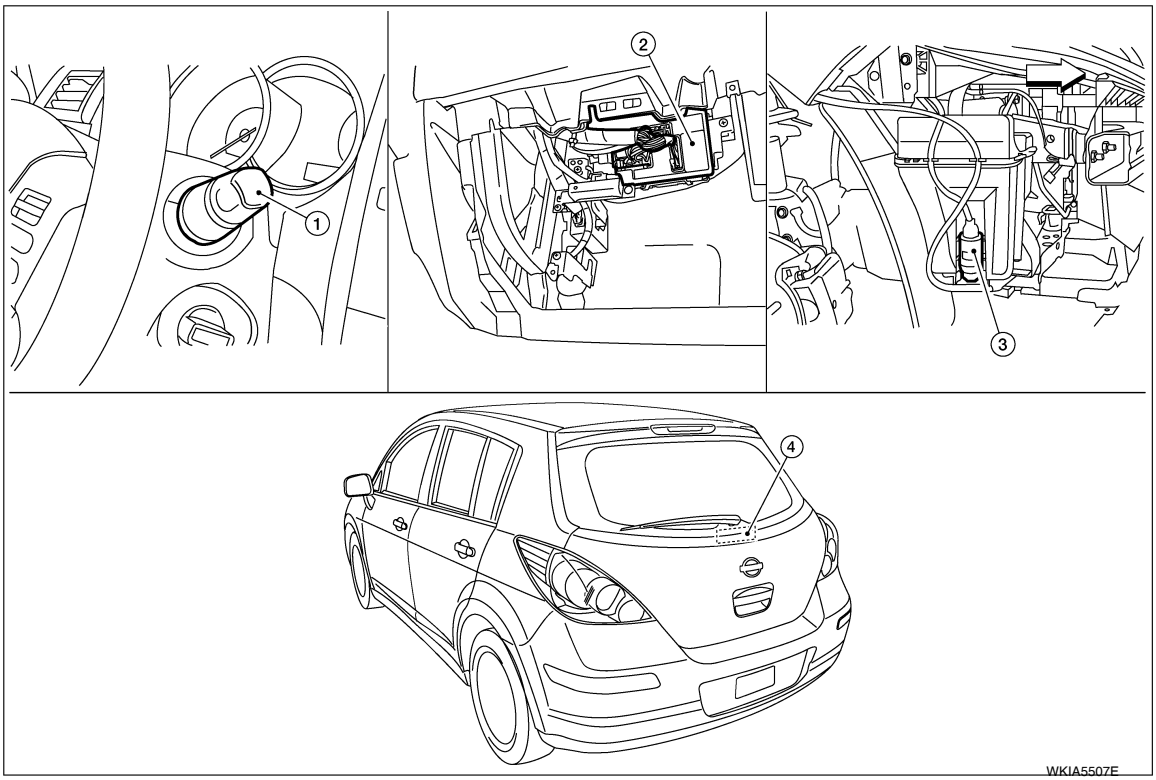
CAUTION:

When installing washer motor, there should be no packing twists, etc.

REAR WIPER AND WASHER SYSTEM

Component Parts and Harness Connector Location

INFOID:0000000007330381



1. Combination switch (wiper switch) M28
2. BCM M18, M19, M20 (view with glove box removed)
3. Front and rear washer motor E2 (view with front bumper fascia removed)
4. Rear wiper motor D404

⇦: Front

System Description

INFOID:0000000007330382

- The combination switch (wiper switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by the BCM (body control module) when switch is turned ON.
- The BCM controls rear wiper ON and INT (intermittent) operation.

Power is supplied at all times
- through 40A fusible link (letter **g** , located in fuse and fusible link box)
- to BCM terminal 70.

With the ignition switch in ON or START position, power is supplied
- through 15A fuse [No. 4, located in the fuse block (J/B)]
- to combination switch (wiper switch) terminal 2
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to BCM terminal 38.

Ground is supplied
- to BCM terminal 67, and
- to combination switch (wiper switch) terminal 12
- through grounds M57 and M61.

REAR WIPER OPERATION

When the ignition switch is in the ON or START position, and the rear combination switch (wiper switch) is in the ON position, the BCM detects a rear wiper ON request through the combination switch (wiper switch) reading function and controls the rear wiper motor as follows.

Power is supplied
- through BCM terminal 55
- to rear wiper motor terminal 1.

Ground is supplied

• to rear wiper motor terminal 3
• through grounds B117, B132 and D402.
With power and ground supplied, the rear wiper motor operates.

INTERMITTENT OPERATION

The rear wiper motor operates the wiper arm at low speed approximately every 7 seconds.
When the combination switch (wiper switch) is in the rear wiper INT position, the BCM detects a rear wiper INT request through the combination switch (wiper switch) reading function.
When BCM operates rear wiper motor, power is supplied
• through BCM terminal 55
• to rear wiper motor terminal 1.
Ground is supplied
• to rear wiper motor terminal 3
• through grounds B117, B132 and D402.
With power and ground supplied, the rear wiper operates in intermittent mode.

AUTO STOP OPERATION

When the rear wiper arm is not located at the base of the rear window, and the rear combination switch (wiper switch) is turned OFF, the rear wiper motor will continue to operate until the rear wiper arm is at the base of the rear window. When the rear wiper arm reaches the base, rear wiper motor terminals 2 and 1 are connected.
Ground is supplied
• to BCM terminal 44
• through rear wiper motor terminal 2, and
• through rear wiper motor terminal 3, and
• through grounds B117, B132 and D402.

REAR WASHER OPERATION

When the ignition switch is in the ON or START position, and the front and rear washer switches are OFF, the front and rear washer motor is supplied power
• through 15A fuse [No. 4, located in the fuse block (J/B)]
• to combination switch (wiper switch) terminal 14
• through combination switch (wiper switch) terminal 11
• to front and rear washer motor terminal 2.
When the rear combination switch (wiper switch) is in rear washer position, the BCM detects a rear washer signal by BCM combination switch (wiper switch) reading function. Combination switch (wiper switch) ground is supplied
• to front and rear washer motor terminal 1
• through combination switch (wiper switch) terminal 13, and
• through combination switch (wiper switch) terminal 12
• through grounds M57 and M61.
With ground supplied, the front and rear washer motor is operated in the rear direction.
When the BCM detects that the rear washer motor has operated for 0.4 seconds or longer, BCM operates the rear wiper motor.
When the BCM detects that the rear washer switch is in OFF, the rear wiper motor cycles approximately 3 times and then stops.
If the rear washer is operated with the rear combination switch (wiper switch) in the INT position, normal rear wiper operation will take over. Once the rear washer switch is released the rear wiper will return to INT operation.

BCM Combination Switch (Wiper Switch) Reading Function

Refer to BCS-4, "System Description" .

Wiring Diagram - WIP/R -

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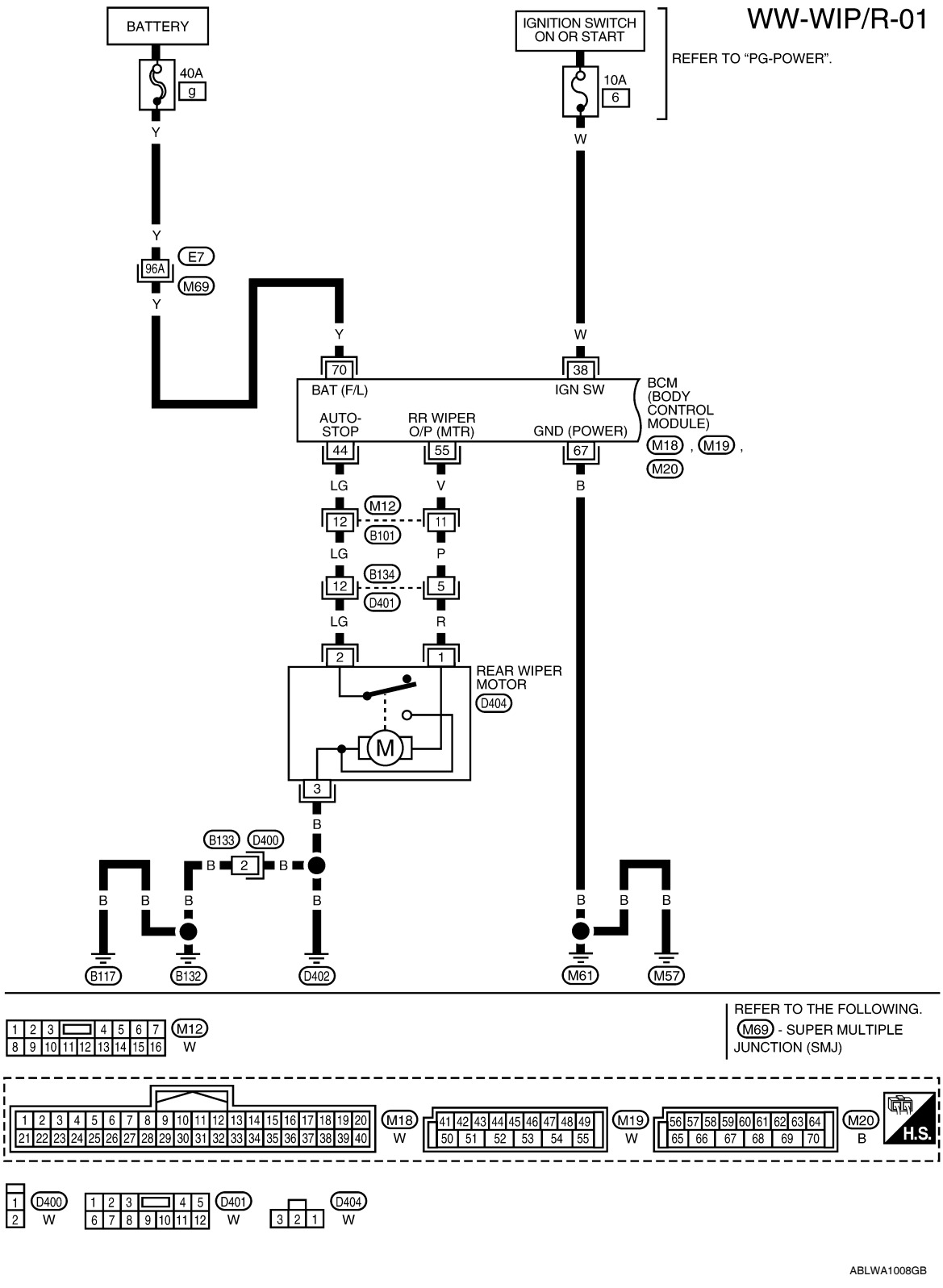

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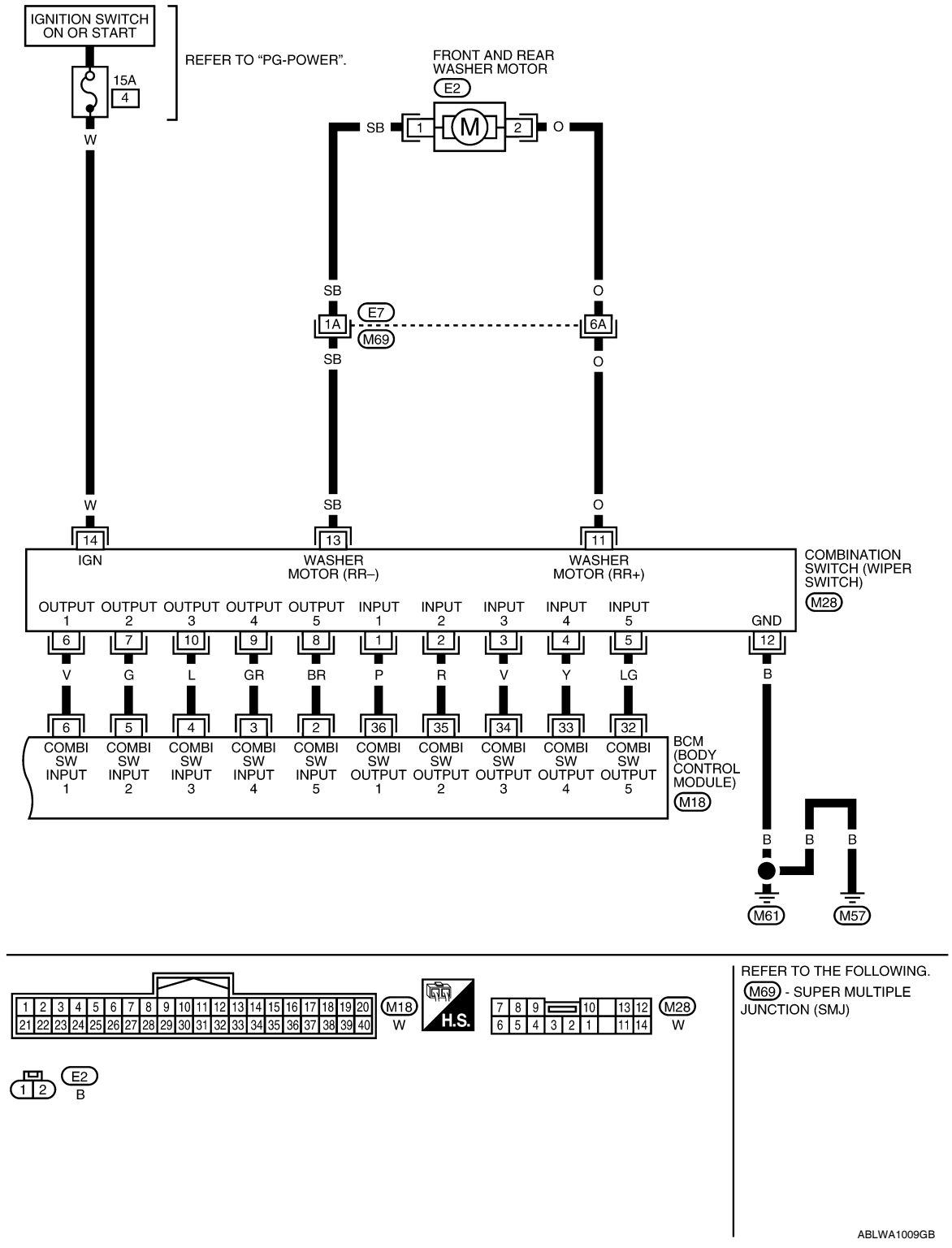

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Terminal and Reference Value for BCM

INFOID:0000000007330384

Refer to BCS-12, "Terminal and Reference Value for BCM" .

How to Proceed with Trouble Diagnosis

INFOID:0000000007330385

1. Confirm the symptoms and customer complaint.
2. Understand operation description and function description. Refer to WW-27, "System Description" .
3. Perform the Preliminary Check. Refer to WW-31, "Preliminary Check" .
4. Check symptom and repair or replace the cause of malfunction.
5. Does the rear wiper operate normally? If YES: GO TO 6. If NO: GO TO 4.
6. Inspection End.

Preliminary Check

INFOID:0000000007330386

CHECK POWER SUPPLY AND GROUND CIRCUIT FOR BCM

Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection" .

CONSULT Function (BCM)

INFOID:0000000007330387

Refer to WW-12, "CONSULT Function (BCM)" .

Rear Wiper Does Not Operate

INFOID:0000000007330388

1.REAR WIPER ACTIVE TEST

1. Select "BCM" on CONSULT, and select "WIPER" on "SELECT TEST ITEM" screen.
2. Select "ACTIVE TEST" on "SELECT DIAG MODE" screen.
3. Select "RR WIPER" on "SELECT TEST ITEM" screen.
4. Make sure rear wiper operates.

Wiper should operate.

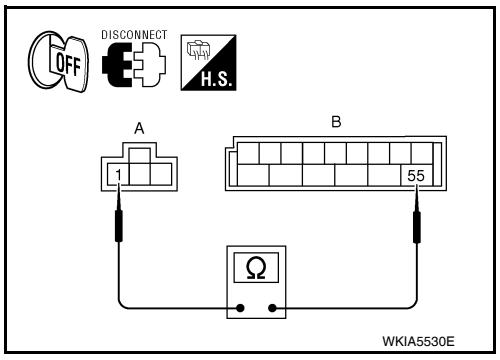
OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2.CHECK REAR WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear wiper motor.
3. Check continuity between rear wiper motor connector (A) D404 terminal 1 and BCM connector (B) M19 terminal 55.

55 - 1 : Continuity should exist.



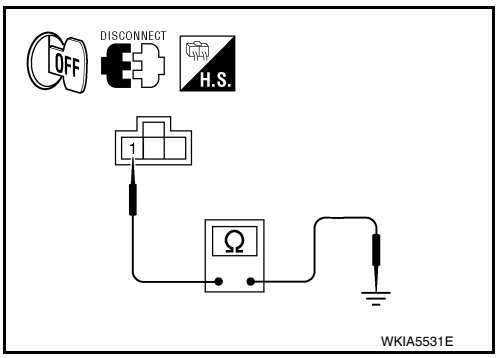
OK or NO

OK >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK REAR WIPER MOTOR SHORT CIRCUIT

Check continuity between rear wiper motor harness D404 terminal 1 and ground.

1 - Ground : Continuity should not exist.



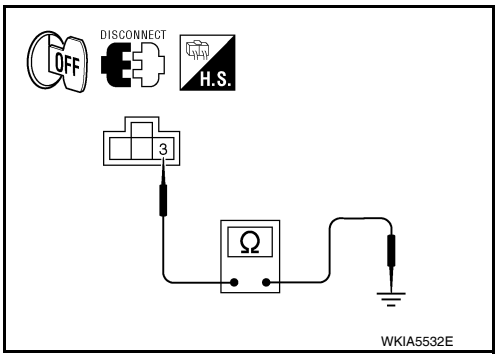
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4. CHECK GROUND CIRCUIT

Check continuity between rear wiper motor connector D404 terminal 3 and ground.

3 - Ground : Continuity should exist.

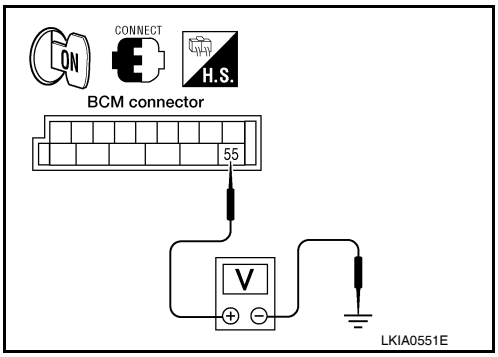


OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5. CHECK REAR WIPER OPERATING

1. Connect BCM and rear wiper motor.
2. Select "RR WIPER" during "ACTIVE TEST". Refer to WW-13, "CONSULT Function (IPDM E/R)" . When rear wiper is operating, check voltage between BCM harness connector and ground.



BCM (+)		(–)	Condition	Voltage (Approx.)
Connector	Terminal			
M19	55	Ground	Stopped	0V
			ON operation	Battery voltage

OK or NG

OK >> Replace rear wiper motor. Refer to WW-34, "Removal and Installation" .
NG >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .

6. CHECK COMBINATION SWITCH (WIPER SWITCH) INPUT SIGNAL

Select "BCM" on CONSULT. With "WIPER" data monitor, make sure "RR WIPER INT", "RR WIPER ON" turn ON-OFF according to operation of combination switch (wiper switch).

When combination switch (wiper switch) is in INT position : RR WIPER INT ON

When combination switch (wiper switch) is in ON position : RR WIPER ON ON

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check the combination switch (wiper switch). Refer to BCS-4, "System Description" .

Rear Wiper Stop Position Is Incorrect

INFOID:0000000007330389

1. CHECK COMBINATION SWITCH (WIPER SWITCH) INPUT SIGNAL

Select "BCM" on CONSULT. With "WIPER" data monitor, make sure "RR WIPER STOP" turns ON-OFF according to wiper operation.

When combination switch (wiper switch) is in OFF position : RR WIPER STOP OFF

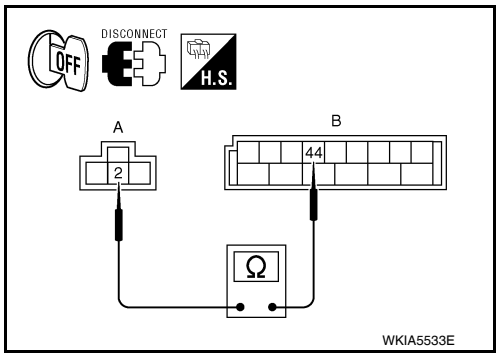
OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> GO TO 2.

2. CHECK REAR WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear wiper motor.
3. Check continuity between rear wiper motor connector (A) D404 terminal 2 and BCM connector (B) M19 terminal 44.

44 - 2 : Continuity should exist.



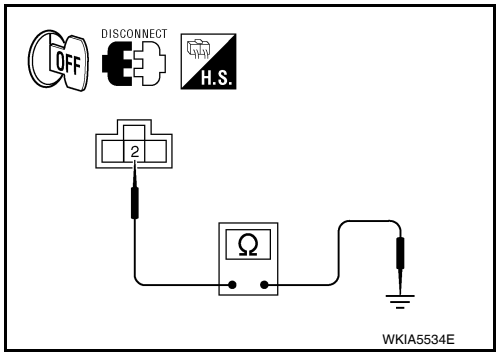
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK REAR WIPER MOTOR SHORT CIRCUIT

Check continuity between rear wiper motor connector D404 terminal 2 and ground.

2 - Ground : Continuity should not exist.



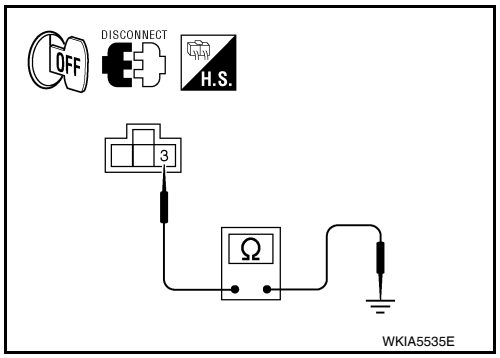
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4. CHECK GROUND CIRCUIT

Check continuity between rear wiper motor connector D404 terminal 3 and ground.

3 - Ground : Continuity should exist.

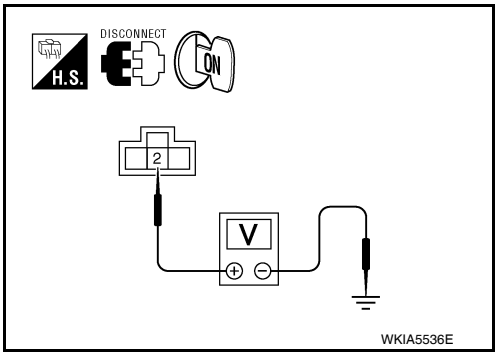


OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5. CHECK AUTO STOP SIGNAL

1. Connect BCM.
2. Turn ignition switch ON.
3. Check voltage between rear wiper motor connector D404 terminal 2 and ground.



2 - Ground : Battery voltage should exist.

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Replace rear wiper motor. Refer to WW-34, "Removal and Installation" .

Only Rear Wiper Does Not Operate

INFOID:0000000007330390

1.CHECK COMBINATION SWITCH (WIPER SWITCH) INPUT SIGNAL

Select "BCM" on CONSULT. With "WIPER" data monitor, make sure "RR WIPER ON" turns ON-OFF according to operation of combination switch (wiper switch).

When rear combination switch (wiper switch) is in ON position : RR WIPER ON ON

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check the combination switch (wiper switch). Refer to BCS-4, "System Description" .

Only Rear Wiper Intermittent Does Not Operate

INFOID:0000000007330391

1.CHECK COMBINATION SWITCH (WIPER SWITCH) INPUT SIGNAL

Select "BCM" on CONSULT. With "WIPER" data monitor, make sure "RR WIPER INT" turns ON-OFF according to operation of combination switch (wiper switch).

When rear combination switch (wiper switch) is in INT position : RR WIPER INT ON

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check the combination switch (wiper switch). Refer to BCS-4, "System Description" .

Wiper Does Not Wipe When Rear Washer Operates

INFOID:0000000007330392

1.CHECK COMBINATION SWITCH (WIPER SWITCH) INPUT SIGNAL

Select "BCM" on CONSULT. With "WIPER" data monitor, make sure "RR WASHER SW" turns ON-OFF according to operation of rear washer switch.

When rear combination switch (wiper switch) is in WASHER position : RR WASHER SW ON

OK or NG

OK >> Replace BCM. Refer to BCS-19, "Removal and Installation of BCM" .
NG >> Check the combination switch (wiper switch). Refer to BCS-4, "System Description" .

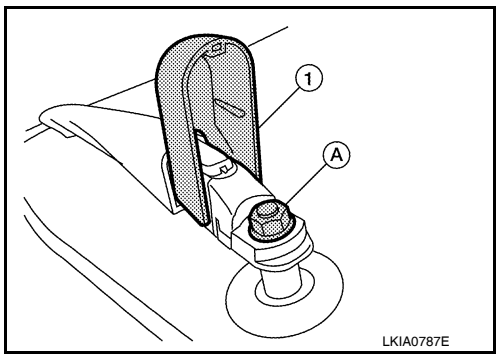
Removal and Installation

INFOID:0000000007330393

REAR WIPER ARM

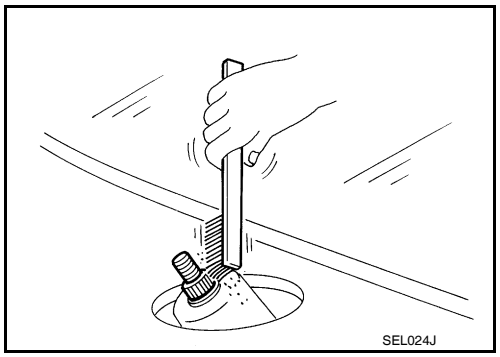
Removal

1. Raise wiper arm cover (1), and remove the rear wiper arm nut (A).
2. Remove the wiper arm.
3. Remove wiper blade.

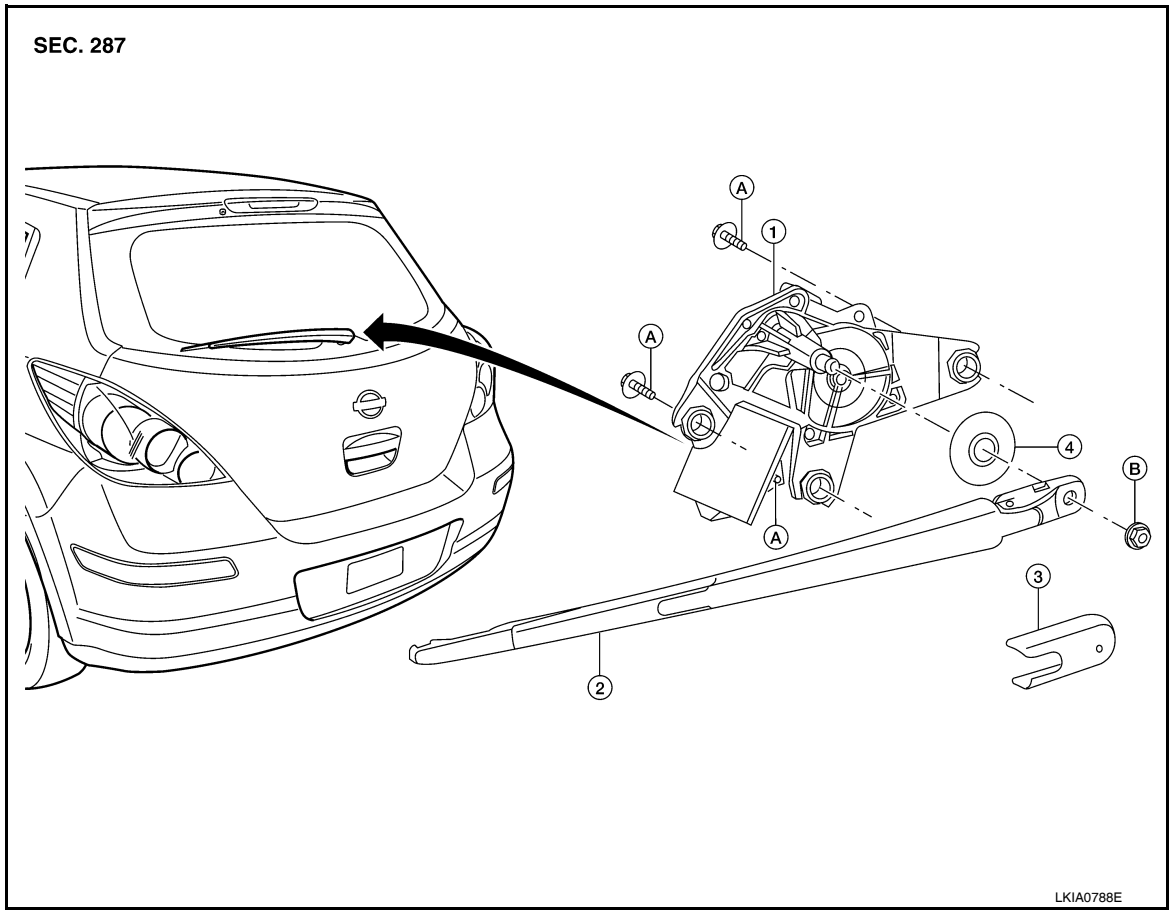


Installation

1. Operate rear wiper motor one full cycle, then turn "OFF" (Auto Stop).
2. Clean pivot area as shown. This will reduce the possibility of wiper arm looseness.
3. Install wiper blade.
4. Install wiper arm so that the arm rests in the stopper and tighten rear wiper arm nut.
5. Install wiper arm cover.



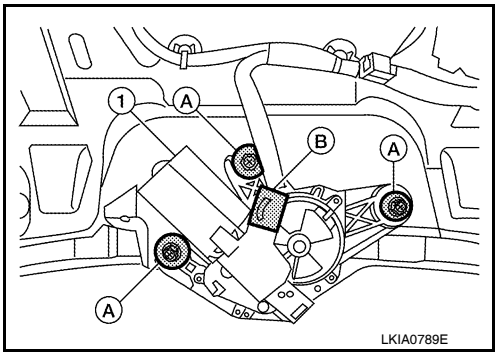
REAR WIPER MOTOR



1. Rear wiper motor
2. Rear wiper arm and blade
3. Wiper arm cover
4. Pivot cap
A. Wiper motor bolts
B. Rear wiper motor nut

Removal

1. Remove wiper arm. Refer to "REAR WIPER ARM" .
2. Raise arm cap.
3. Remove the rear wiper motor nut, remove the rear wiper arm and blade.
4. Remove the back door lower finisher. Refer to EI-34, "Removal and Installation" .
5. Disconnect the rear wiper motor connector (B).
6. Remove the bolts (A) and remove the rear wiper motor (1).



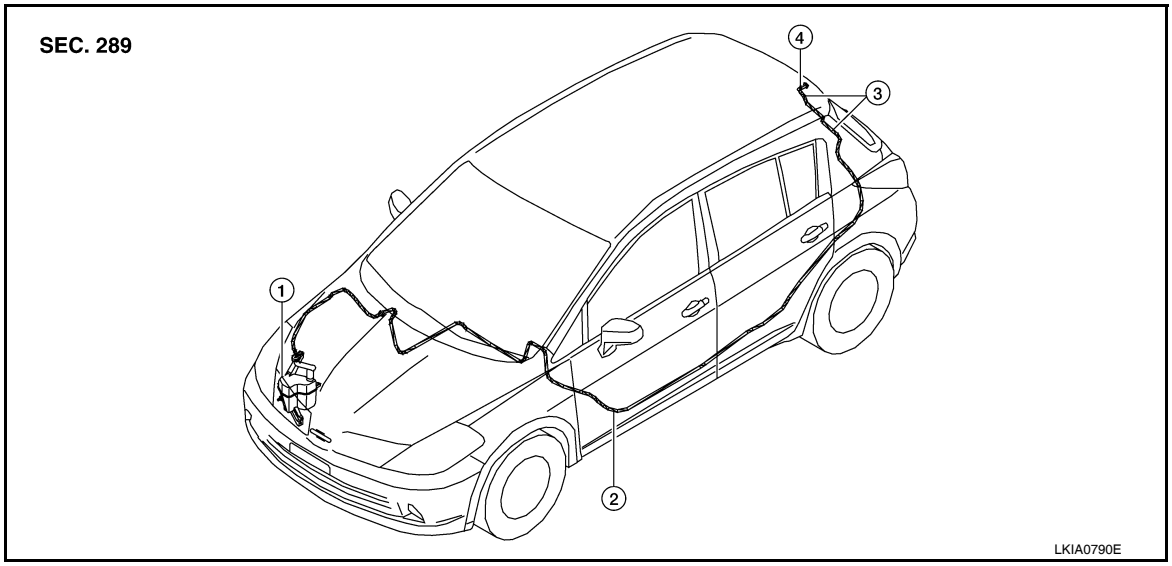
Installation

Installation is in the reverse order of removal.

CAUTION:

Do not drop the wiper motor or cause it to contact other parts.

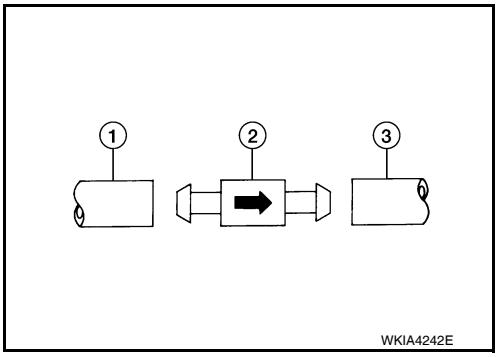
REAR WASHER TUBE LAYOUT



1	Washer fluid reservoir	2	Washer fluid tube to rear door	3	Check valve
4	Rear washer nozzle				

NOTE:

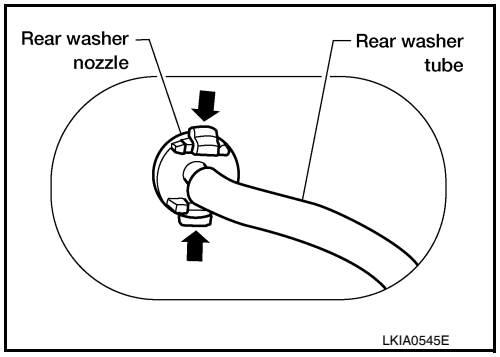
Connect the check valve (2) to the washer fluid tube (1) so that the directional arrow on the check valve (2) points towards the washer nozzle tube (3).



REAR WASHER NOZZLE

Removal

1. Remove the back door side garnish. Refer to EI-34, "Removal and Installation" .
2. Disconnect rear washer tube from rear washer nozzle.
3. Release retaining clips and remove washer nozzle.



Installation

Installation is in the reverse order of removal.

NOTE:

- Do not pinch the rear washer tube when installing the back door side garnish.
- Inspect rear washer nozzle for proper spray pattern, adjust as necessary. Refer to WW-37, "Washer Nozzle Adjustment".

WASHER FLUID RESERVOIR

Refer to WW-25, "Removal and Installation of Washer Tank" .

WIPER AND WASHER SWITCH

Refer to WW-25, "Removal and Installation of Front Wiper and Washer Switch" .

WASHER MOTOR

Refer to WW-26, "Removal and Installation of Front Washer Motor" .

Washer Nozzle Adjustment

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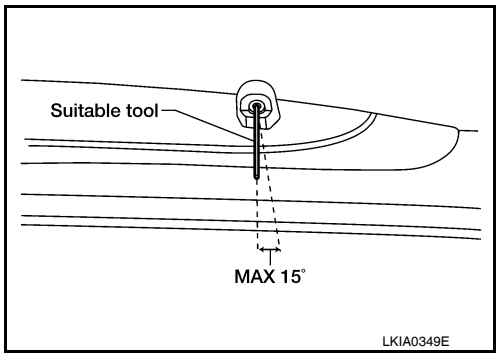
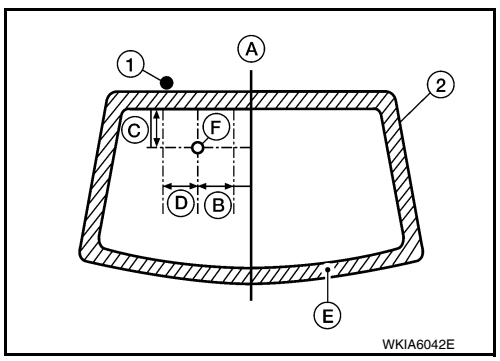
Adjust the washer nozzle to specification using suitable tool as shown.

Adjustable range : ±15° (In any direction)



- Rear washer nozzle (1)
- Back glass (2)
- Center line (A)
- 148 mm (5.83 in) (B)
- 27 mm (1.06 in) (C)
- 35 mm (1.38 in) (D)
- Black printed area (E)
- Spray target area (F)



POWER SOCKET

Wiring Diagram - P/SCKT -

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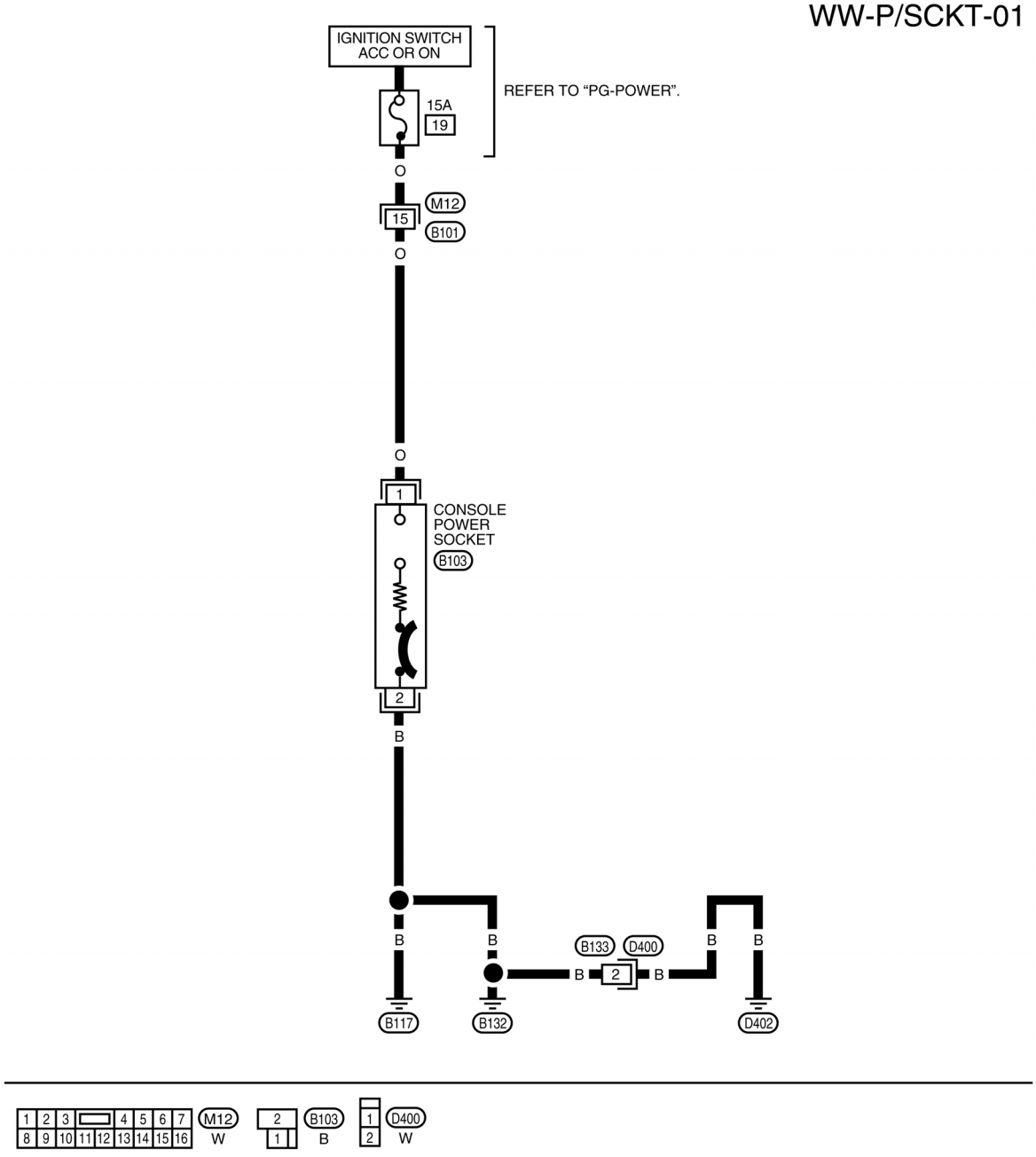
WW-P/SCKT-01



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Removal and Installation

INFOID:0000000007330396

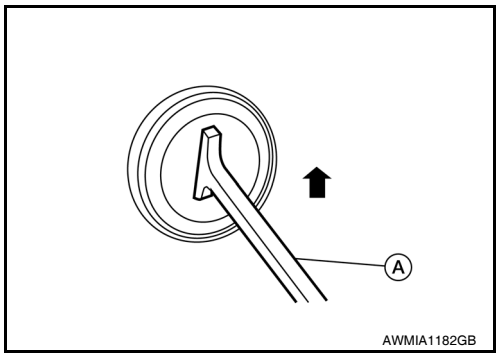
REMOVAL

1. Remove the fuse for the power socket.

2. Remove the console mask. Refer to IP-11, "Component Parts".
3. Insert one end of the Tool (A) into one of the square holes inside the power socket.

Tool number: — (J-42059)

4. Lift up the handle of the Tool until the other end of the Tool is inside the socket and snaps into the other square hole in the power socket.
5. Pull the power socket straight out with the Tool.
6. Disconnect power socket connector.

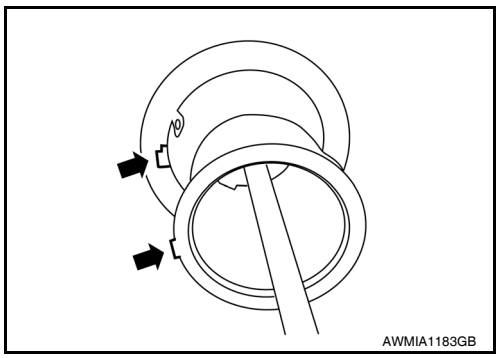


Installation

Installation is in the reverse order of removal.

NOTE:

Make sure to align the tab with the square notched area during installation.

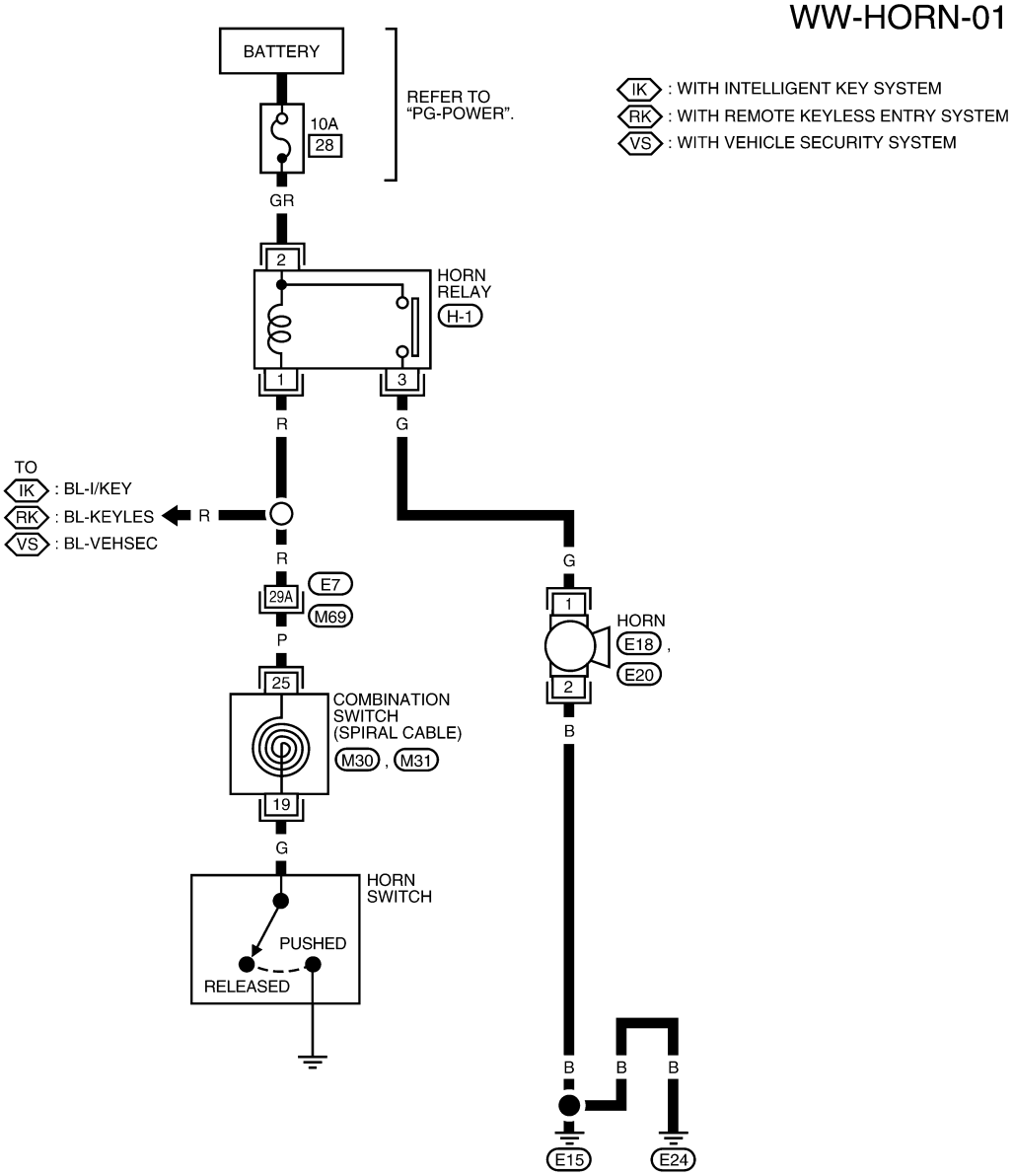


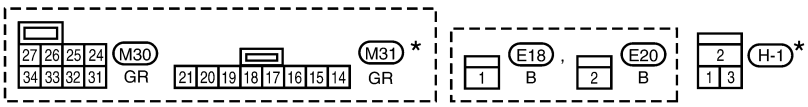
HORN

Wiring Diagram - HORN -

INFOID:0000000007330397

WW-HORN-01





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

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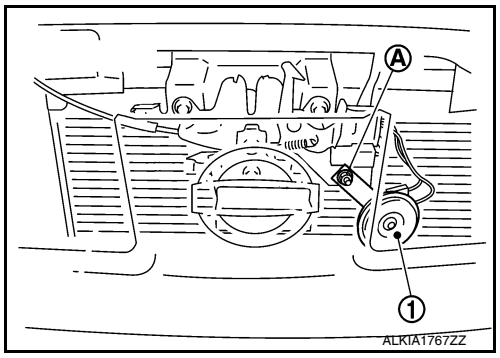
Removal and Installation

INFOID:0000000007330398

REMOVAL

1. Remove the front grille. Refer to EI-21, "Removal and Installation".

2. Disconnect the horn connector.
3. Remove the horn nut (A) and remove the horn (1).



INSTALLATION

Installation is in the reverse order of removal.

SECTION BCS
BODY CONTROL SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329948

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329949

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

BCM (BODY CONTROL MODULE)

System Description

INFOID:0000000007329950

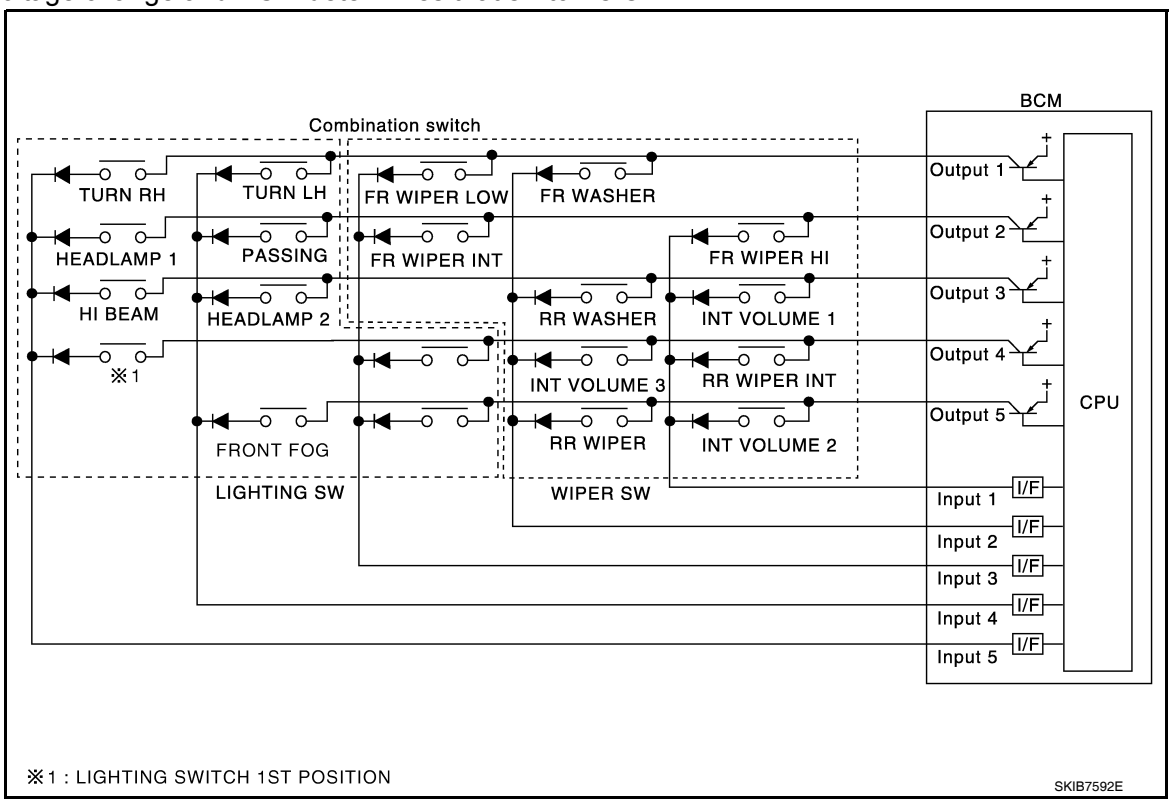
BCM (body control module) controls the operation of various electrical units installed on the vehicle.

BCM FUNCTION

BCM has a combination switch reading function for reading the operation of combination switches (light, wiper, washer, turn signal) in addition to the function for controlling the operation of various electrical components. Also, it functions as an interface that receives signals from the front air control, and sends signals to ECM using CAN communication.

COMBINATION SWITCH READING FUNCTION

1. Description
   - BCM reads combination switch (light, wiper) status, and controls various electrical components according to the results.
   - BCM reads information of a maximum of 20 switches by combining five output terminals (OUTPUT 1-5) and five input terminals (INPUT 1-5).
2. Operation description
   - BCM activates transistors of output terminals (OUTPUT 1-5) periodically and allows current to flow in turn.
   - If any (1 or more) of the switches are turned ON, circuit of output terminals (OUTPUT 1-5) and input terminals (INPUT 1-5) becomes active.
   - At this time, transistors of output terminals (OUTPUT 1-5) are activated to allow current to flow. When voltage of input terminals (INPUT 1-5) corresponding to that switch changes, interface in BCM detects voltage change and BCM determines that switch is ON.



3. BCM - Operation table of combination switch
   - BCM reads operation status of combination switch by the combination shown in the following table.

	COMB SW OUTPUT 1		COMB SW OUTPUT 2		COMB SW OUTPUT 3		COMB SW OUTPUT 4		COMB SW OUTPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
COMB SW INPUT 1	—	—	FRONT WIPER HI ON	FRONT WIPER HI OFF	INT VOLUME 1 ON	INT VOLUME 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	INT VOLUME 2 ON	INT VOLUME 2 OFF
COMB SW INPUT 2	FRONT WASHER ON	FRONT WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	INT VOLUME 3 ON	INT VOLUME 3 OFF	RR WIPER ON	RR WIPER OFF
COMB SW INPUT 3	FRONT WIPER LO ON	FRONT WIPER LO OFF	FRONT WIPER INT ON	FRONT WIPER INT OFF	—	—	—	—	—	—
COMB SW INPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEAD-LAMP 2 ON	HEAD-LAMP 2 OFF	—	—	FRONT FOG ON	FRONT FOG OFF
COMB SW INPUT 5	TURN RH ON	TURN RH OFF	HEAD-LAMP 1 ON	HEAD-LAMP 1 OFF	HI BEAM ON	HI BEAM OFF	LIGHTING SW (1ST) ON	LIGHTING SW (1ST) OFF	—	—

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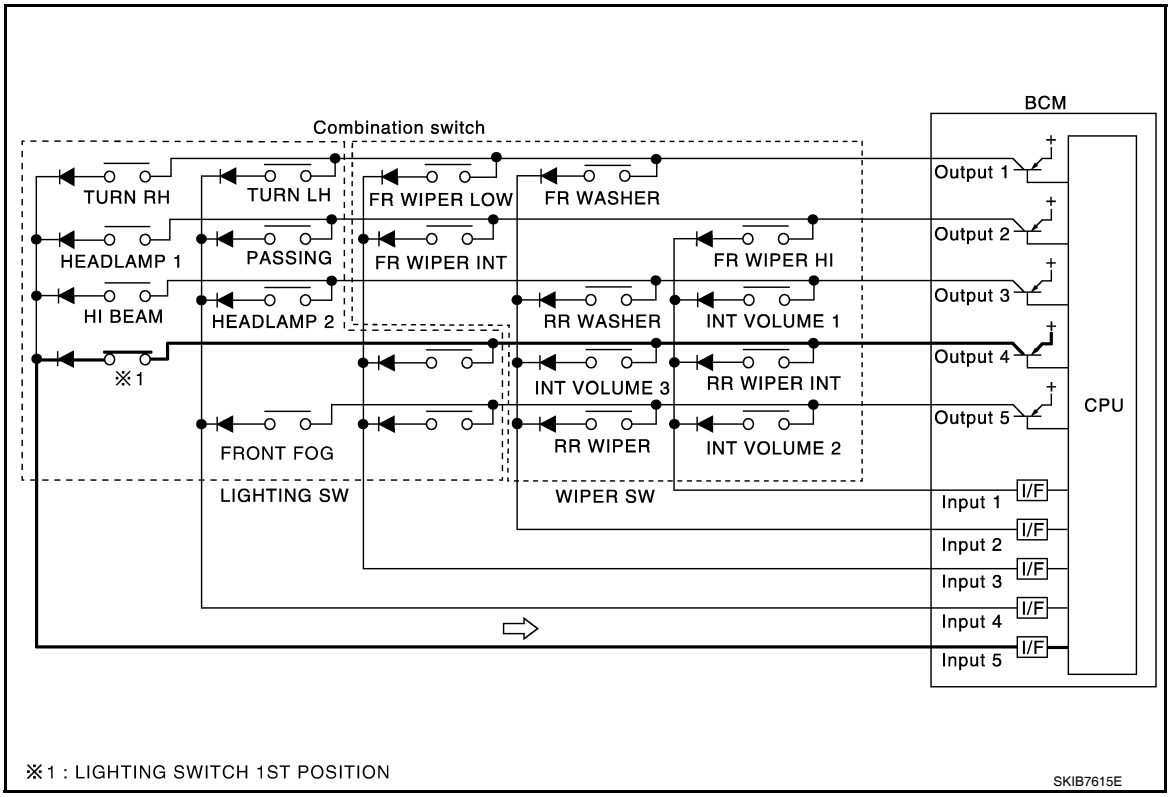
NOTE:
Headlamp has a dual system switch.

4. Example operation: (When lighting switch 1st position is turned ON)
   - When lighting switch 1st position is turned ON, contact in combination switch turns ON. At this time if OUTPUT 4 transistor is activated, BCM detects that voltage changes in INPUT 5.
   - When OUTPUT 4 transistor is ON, BCM detects that voltage changes in INPUT 5, and judges lighting switch 1st position is ON. Then BCM sends tail lamp ON signal to IPDM E/R using CAN communication.
   - When OUTPUT 4 transistor is activated again, BCM detects that voltage changes in INPUT 5 and recognizes that lighting switch 1st position is continuously ON.

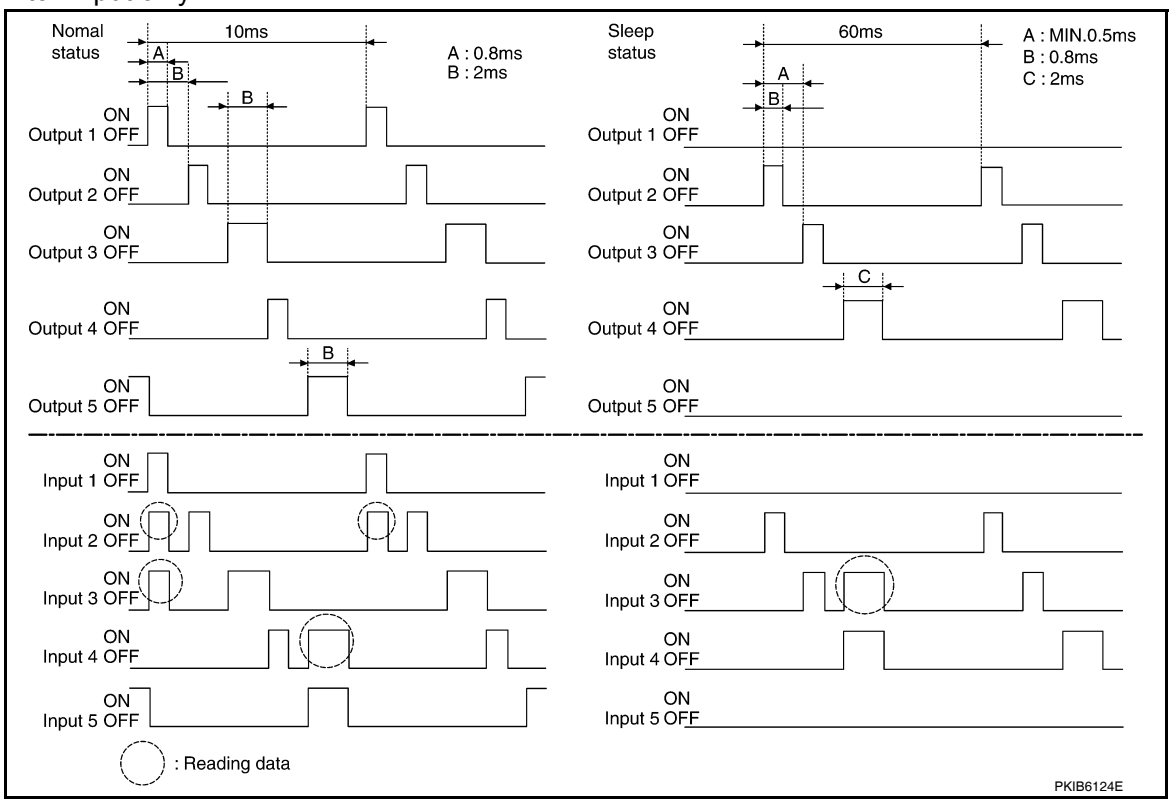


NOTE:
Each OUTPUT terminal transistor is activated at 10ms intervals. Therefore, after a switch is turned ON, electrical loads are activated with a time delay. But this time delay is so short that it cannot be noticed.

5. Operation mode
   - Combination switch reading function has operation modes as follows:

Normal status
- When BCM is not in sleep status, OUTPUT terminals (1-5) each turn ON-OFF every 10ms.

Sleep status
- When BCM is in sleep mode, transistors of OUTPUT 1 and 5 stop the output, and BCM enters low-current-consumption mode. OUTPUTS (2, 3, and 4) turn ON-OFF at 60ms intervals, and receives lighting switch input only.



CAN COMMUNICATION CONTROL

CAN communication allows a high rate of information through the two communication lines (CAN-L, CAN-H) connecting the various control units in the system. Each control unit transmits/receives data, but selectively reads required data only.

BCM STATUS CONTROL

BCM changes its status depending on the operation status in order to save power consumption.

1. CAN communication status
   - With ignition switch ON, CAN communicates with other control units normally.
   - Control by BCM is being operated properly.
   - When ignition switch is OFF, switching to sleep mode is possible.
   - Even when ignition switch is OFF, if CAN communication with IPDM E/R and combination meter is active, CAN communication status is active.
2. Sleep transient status
   - This status shuts down CAN communication when ignition switch is turned OFF.
   - It transmits sleep request signal to IPDM E/R and combination meter.
   - Two seconds after CAN communication of all control units stops, CAN communication switches to inactive status.
3. CAN communication inactive status
   - With ignition switch OFF, CAN communication is not active.
   - With ignition switch OFF, control performed only by BCM is active.
   - Three seconds after CAN communication of all control units stops, CAN communication switches to inactive status.
4. Sleep status
   - BCM is activated with low current consumption mode.
   - CAN communication is not active.

- When CAN communication operation is detected, it switches to CAN communication status.
- When a state of the following switches changes, it switches to CAN communication state:
  - Ignition switch
  - Key switch (without Intelligent Key)
  - Key switch and ignition knob switch (with Intelligent Key)
  - Hazard switch
  - Door lock/unlock switch
  - Front door switch (LH, RH)
  - Rear door switch (LH, RH)
  - Back door lock assembly
  - Combination switch (passing, lighting switch 1st position, front fog lamp)
  - Keyfob (lock/unlock signal)
  - Front door key cylinder switch LH
- When control performed only by BCM is required by switch, it shifts to CAN communication inactive mode.
- Status of combination switch reading function is changed.

SYSTEMS CONTROLLED BY BCM DIRECTLY

- Power door lock system. Refer to BL-24, "System Description".
- Remote keyless entry system. Refer to BL-57, "System Description".
- Power window system. Refer to GW-18, "System Description". NOTE
- Sunroof system (with sunroof). Refer to RF-11, "System Description". NOTE
- Room lamp timer. Refer to LT-87, "System Description".
- Rear wiper and washer system. Refer to WW-27, "System Description".

NOTE:
Power supply only. No system control.

SYSTEMS CONTROLLED BY BCM AND IPDM E/R

- Panic system. Refer to BL-57, "System Description".
- Vehicle security (theft warning) system. Refer to BL-187, "System Description".
- NVIS(NATS) system. Refer to BL-211, "System Description".
- Headlamp, tail lamp and battery saver control systems. Refer to LT-72, "System Description", LT-5, "System Description" or LT-27, "System Description".
- Front fog lamp (with front fog lamps). Refer to LT-41, "System Description".
- Front wiper and washer system. Refer to WW-5, "System Description".
- Rear window defogger system. Refer to GW-49, "System Description".

SYSTEMS CONTROLLED BY BCM AND COMBINATION METER

- Warning chime. Refer to DI-42, "System Description".
- Turn signal and hazard warning lamps. Refer to LT-50, "System Description".

SYSTEMS CONTROLLED BY BCM AND INTELLIGENT KEY UNIT (WITH INTELLIGENT KEY)

- Intelligent Key system. Refer to BL-85, "System Description".

MAJOR COMPONENTS AND CONTROL SYSTEM

System	Input	Output
Remote keyless entry system	Remote keyless entry receiver (keyfob)	• All door locking actuators • Turn signal lamp (LH, RH) • Combination meter (turn signal lamp)
Intelligent Key system (with Intelligent Key)	Intelligent Key unit	• All door locking actuators • Turn signal lamp (LH, RH) • Combination meter (turn signal lamp)
Power door lock system	Front power door lock/unlock switch (LH, RH)	All door locking actuators
Power supply (IGN/RAP) to power window	Ignition retained power supply	Power supply to power window and sunroof system
Power supply (BAT) to power window	Battery power supply	Power supply to power window and sunroof system
Panic alarm	• Key switch • Keyfob	IPDM E/R

System	Input	Output
Vehicle security system	• All door switches • Keyfob • Door lock/unlock switch • Front door key cylinder switch LH	• IPDM/ER • Security indicator lamp
Battery saver control	• Ignition switch • Combination switch	IPDM E/R
Headlamp	Combination switch	IPDM E/R
Tail lamp	Combination switch	IPDM E/R
Front fog lamp (with front fog lamps)	Combination switch	IPDM E/R
Turn signal lamp	Combination switch	• Turn signal lamp • Combination meter
Hazard lamp	Hazard switch	• Turn signal lamp • Combination meter
Room lamp timer	• Key switch • Keyfob • Main power window and door lock/unlock switch • Front door switch LH • All door switch	Interior room lamp
Back door switch signal	Back door lock assembly	Luggage room lamp
Back door lock signal	Back door lock assembly	Back door opener
Key warning chime	• Key switch • Front door switch LH	Combination meter (warning buzzer)
Light warning chime	• Combination switch • Key switch • Front door switch LH	Combination meter (warning buzzer)
Seat belt warning chime	• Seat belt buckle switch LH • Ignition switch	Combination meter (warning buzzer)
Front wiper and washer system	• Combination switch • Ignition switch	IPDM E/R
Rear window defogger	Rear window defogger switch	IPDM E/R
Rear wiper and washer system	• Combination switch • Ignition switch	Rear wiper motor
A/C switch signal	Front air control	ECM
Blower fan switch signal	Front air control	ECM
A/C indicator signal	Front air control	A/C indicator
Low tire pressure warning system	Remote keyless entry receiver	Combination meter

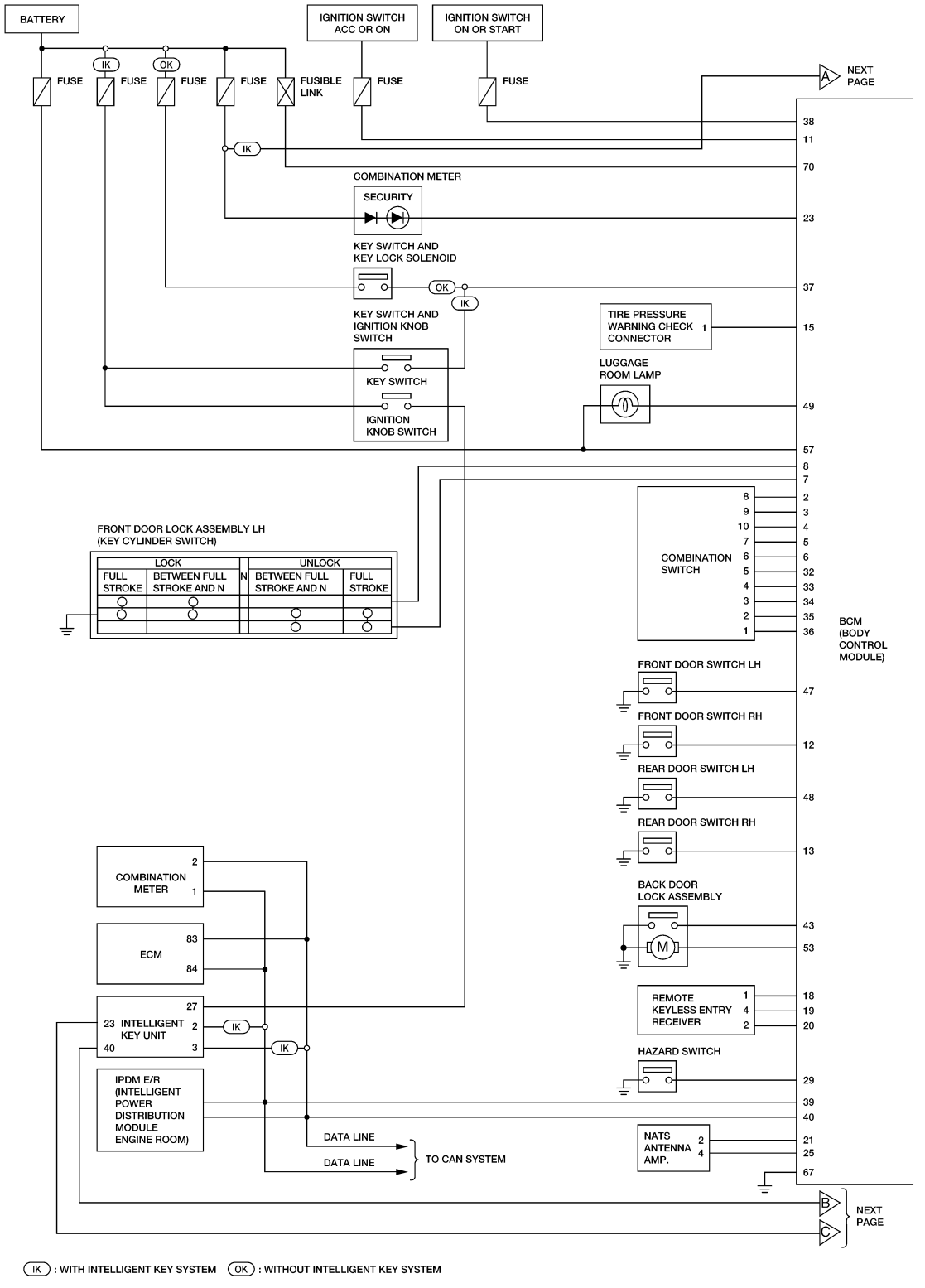
CAN Communication System Description

INFOID:0000000007329951

Refer to LAN-5, "System Description".

Schematic

INFOID:0000000007329952



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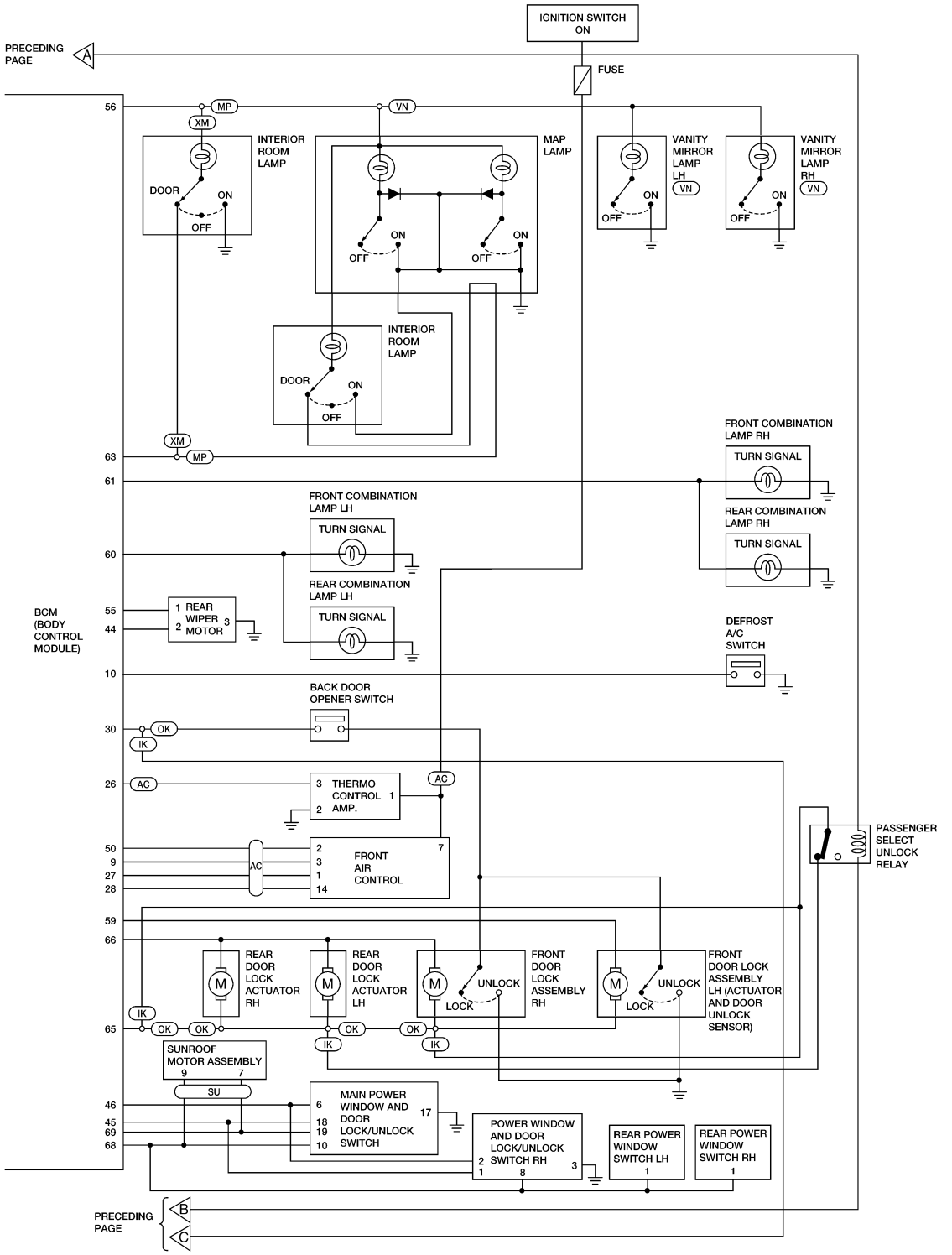

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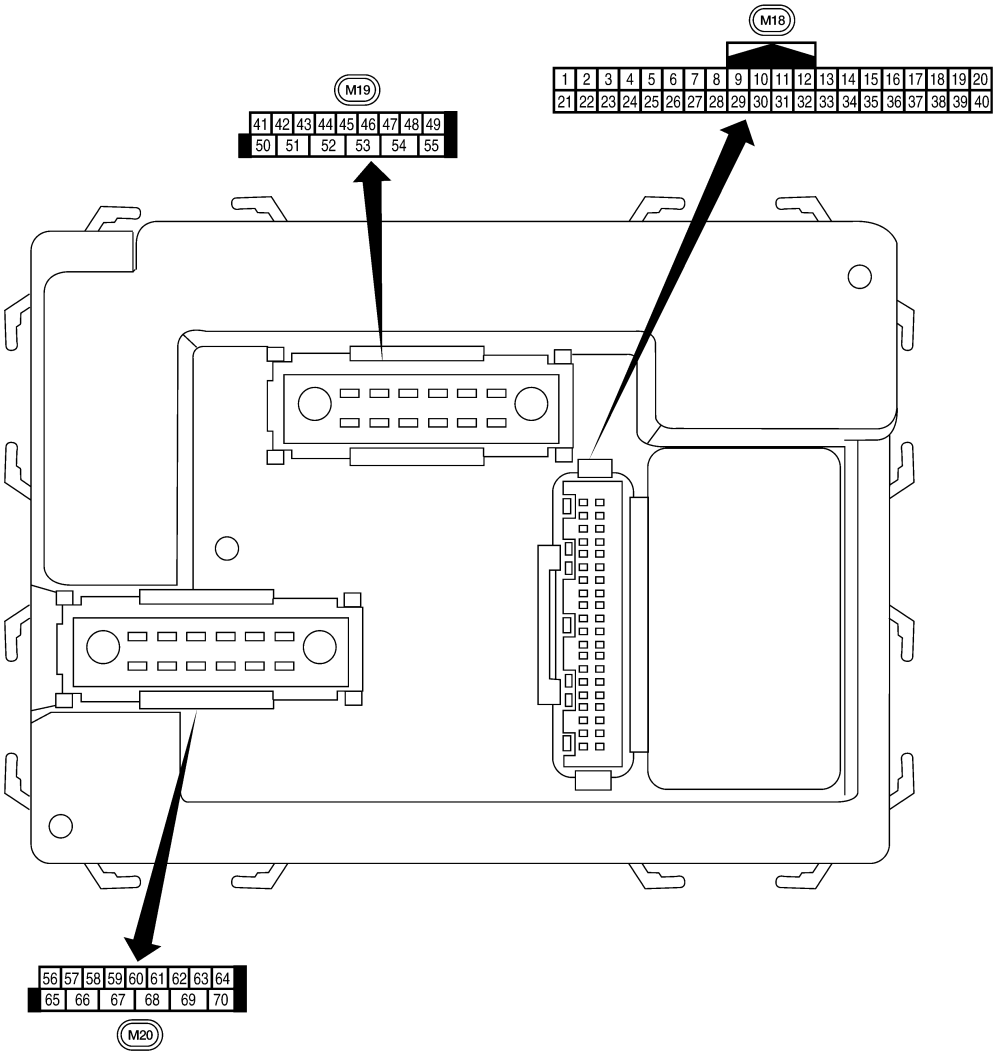
BCM Terminal Arrangement

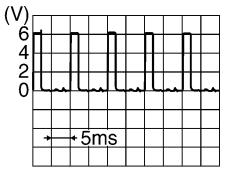
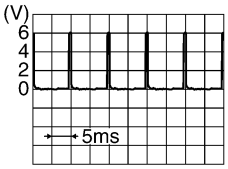
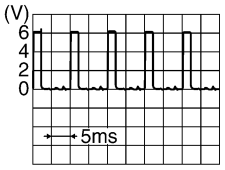
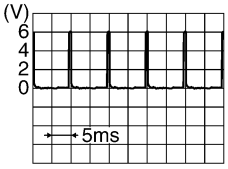
INFOID:0000000007329953

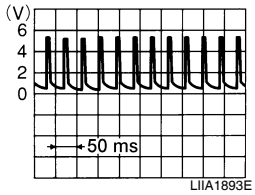
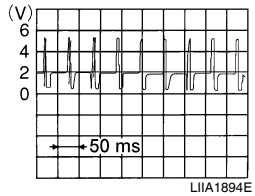
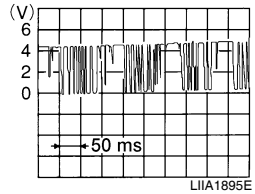
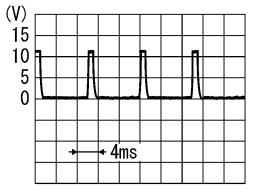


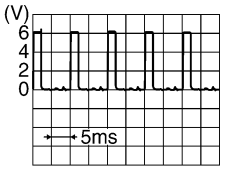
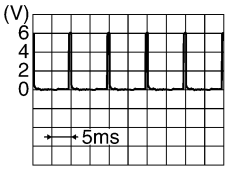
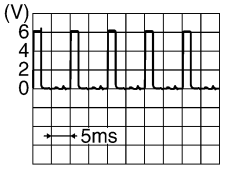
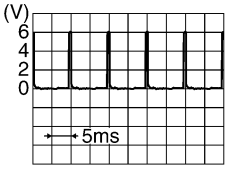
LIIA2443E

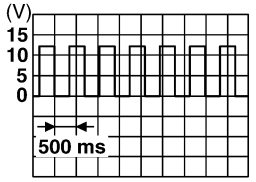
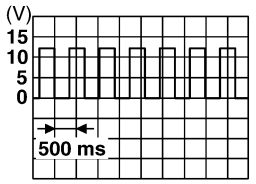
Terminal and Reference Value for BCM

INFOID:0000000007329954

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
2	BR	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	GR	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	L	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
7	BR	Front door key cylinder switch LH (unlock)	Input	OFF	ON (open, 2nd turn)	Momentary 1.5V
					OFF (closed)	0V
8	Y	Front door key cylinder switch LH (lock)	Input		On (open)	Momentary 1.5V
					OFF (closed)	0V
9	W	Rear window defogger switch	Input	ON	Rear window defogger switch ON	0V
					Rear window defogger switch OFF	5V
10	R	Defrost A/C switch signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
11	L	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	SB	Front door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
13	GR	Rear door switch RH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
15	W	Tire pressure warning check connector	Input	OFF	—	5V
18	V	Remote keyless entry receiver (ground)	Output	OFF	—	0V
19	BR	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G	Remote keyless entry receiver signal (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	P	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
23	R	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	LG	NATS antenna amp.	Input/ Output	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
26	GR	Thermo control amp.	Input	ON	A/C switch ON	 ZJIA0719J
27	O	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	P	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	L	Hazard switch	Input	OFF	ON	0V
					OFF	5V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
30[1]	LG	Back door input	Input	—	Back door opener switch ON (closed)	Battery voltage ↓ 0 ↓ Battery voltage
					Back doo opener switch OFF (open)	Battery voltage
30[2]	V	Back door opener switch	Input	—	All doors locked (SW OFF)	Battery voltage
					All doors unlocked (SW ON)	0V
32	LG	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	V	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	R	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	P	Combination switch output 1				
37[1]	G	Key switch and ignition knob switch	Input	OFF	Intelligent Key inserted	Battery voltage
					Intelligent Key removed	0V
37[2]	G	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
43	R	Back door switch	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
44	LG	Rear wiper auto stop	Input	ON	Rear wiper operating	0
					Rear wiper stopped	Battery

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
45	GR	Lock switch	Input	OFF	ON (lock)	0V
					OFF	Battery voltage
46	L	Unlock switch	Input	OFF	ON (unlock)	0V
					OFF	Battery voltage
47	BR	Front door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
48	O	Rear door switch LH	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
49	P	Luggage room lamp	Output	OFF	Any door open (ON)	0V
					All doors closed (OFF)	Battery voltage
50	SB	A/C indicator	Output	ON	A/C OFF	0
					A/C ON	Battery voltage
53	R	Back door lock assembly (actuator)	Output	OFF	Back door (open)	Battery voltage
55	V	Rear wiper motor output	Output	ON	OFF	0
					ON	Battery voltage
56	R	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	LG	Battery power supply	Input	OFF	—	Battery voltage
59	G	Front door lock actuator LH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	V	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	W	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
63	BR	Interior room lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	SB	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G	Front door lock actuator RH, rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
67	B	Ground	Input	ON	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
68	L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	P	Battery power supply	Output	OFF	—	Battery voltage
70	Y	Battery power supply	Input	OFF	—	Battery voltage

1: With Intelligent Key

2: Without Intelligent Key

BCM Power Supply and Ground Circuit Inspection

INFOID:0000000007329955

1.CHECK FUSES AND FUSIBLE LINK

- Check 40A fusible link (letter **g** , located in the fuse and fusible link box).
- Check 10A fuses [No. 6, 8 and 20, located in the fuse block (J/B)].

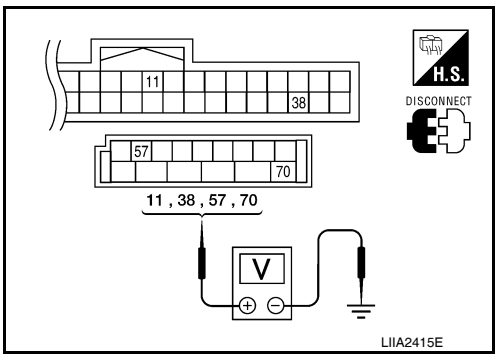
OK or NG

OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "Schematic" .

2.CHECK BCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM.
3. Check voltage between BCM connectors and ground.



Connector	Terminals		Power source	Condition	Voltage (V) (Approx.)
	(+)	(-)			
M18	11	Ground	ACC power supply	Ignition switch ACC or ON	Battery voltage
	38	Ground	Ignition power supply	Ignition switch ON or START	Battery voltage
M20	57	Ground	Battery power supply	Ignition switch OFF	Battery voltage
	70	Ground	Battery power supply	Ignition switch OFF	Battery voltage

OK or NG

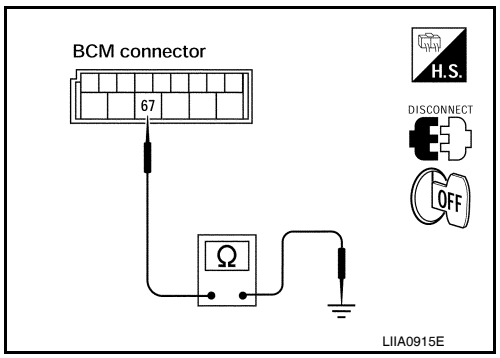
OK >> GO TO 3.

NG >> Repair or replace the harness.

3.CHECK GROUND CIRCUIT

Check continuity between BCM connector M20 terminal 67 and ground.

67 - Ground : Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Repair or replace harness.

CONSULT Function (BCM)

INFOID:0000000007329956

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic mode	Content
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
DATA MONITOR	Displays BCM input/output data in real time.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
SELF DIAGNOSTIC RESULT	Displays BCM self-diagnosis results.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
ECU IDENTIFICATION	BCM part number can be read.
CONFIGURATION	Performs BCM configuration read/write functions.

ITEMS OF EACH PART

NOTE:
CONSULT will only display systems the vehicle possesses.

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF DIAGNOSTIC RESULT	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU IDENTIFICATION	ACTIVE TEST	CONFIGURATION
BCM	BCM	×	×	×		×		×
Power door lock system	DOOR LOCK	×			×		×	
Rear defogger	REAR DEFOGGER				×		×	
Warning chime	BUZZER				×		×	
Room lamp timer	INT LAMP	×			×		×	
Remote keyless entry system	MULTI REMOTE ENT	×			×		×	
Headlamp	HEAD LAMP	×			×		×	
Wiper	WIPER	×			×		×	
Turn signal lamp Hazard lamp	FLASHER				×		×	
Blower fan switch signal Air conditioner switch signal	AIR CONDITIONER				×		×	
Intelligent Key	INTELLIGENT KEY				×			

System and item	CONSULT display	Diagnostic test mode (Inspection by part)						
		WORK SUPPORT	SELF DIAGNOSTIC RESULT	CAN DIAG SUPPORT MNTR	DATA MONITOR	ECU IDENTIFICATION	ACTIVE TEST	CONFIGURATION
Combination switch	COMB SW				×			
NVIS (NATS)	IMMU				×		×	
Interior lamp battery saver	BATTERY SAVER	×			×		×	
Back door/Trunk	TRUNK				×		×	
Theft alarm	THEFT ALARM	×			×		×	
Retained accessory power control	RETAINED PWR	×			×		×	
Oil pressure switch	SIGNAL BUFFER				×		×	
Low tire pressure monitor	AIR PRESSURE MONITOR	×	×		×		×	
Panic alarm	PANIC ALARM						×	

WORK SUPPORT

Display Item List

Item	Description
RESET SETTING VALUE	Return a value set with WORK SUPPORT of each system to a default value in factory shipment.

CAN Communication Inspection Using CONSULT (Self-Diagnosis)

INFOID:0000000007329957

1.SELF-DIAGNOSTIC RESULT CHECK

1. Connect CONSULT and select “BCM” on “SELECT SYSTEM” screen.
2. Select “BCM” on “SELECT TEST ITEM” screen, and select “SELF-DIAG RESULTS”.
3. Check display content in self-diagnostic results.

CONSULT display code	Diagnosis item
U1000	INITIAL DIAG
	TRANSMIT DIAG
	ECM
	IPDM E/R
	METER/M&A
	I-KEY

Contents displayed

No malfunction>>Inspection End

Malfunction in CAN communication system>>After printing the monitor items, go to “CAN System”. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

Configuration

INFOID:0000000007329958

DESCRIPTION

CONFIGURATION has three functions as follows:

- READ CONFIGURATION is the function to read (extract) vehicle configuration of current BCM.
- WRITE CONFIGURATION-Manual selection is the function to select and write vehicle configuration on BCM manually.
- WRITE CONFIGURATION-Config file is the function to write vehicle configuration with the data extracted from current BCM.

- For READ CONFIGURATION and WRITE CONFIGURATION-Config file, refer to CONSULT Operation Manual.
- For WRITE CONFIGURATION-Manual selection using the following flow chart, identify the correct model and configuration list. Confirm and/or change setting value for each item according to the configuration list. Depending on CONSULT software version being used, some or all of the write configuration items shown in the following configuration lists may be displayed. If an item does not appear on the CONSULT WRITE CONFIGURATION-Manual selection screen(s), then it is an auto setting item and it cannot be manually set or changed.

NOTE:
Confirm vehicle model on IDENTIFICATION PLATE. Refer to GI-43, "Model Variation".

ITEM	SET VAL	NOTE
KEYLESS ENTRY	WITH ⇔ WITHOUT	—
I-KEY	WITH ⇔ WITHOUT	—
SPEED SNS WIP	WITHOUT	—
THEFT ALARM	WITH ⇔ WITHOUT	—
AUTO DOOR UNLOCK TIMING	WITH I-KEY ⇔ WITHOUT I-KEY	—

CAUTION:
- **When replacing BCM, you must perform WRITE CONFIGURATION with CONSULT.**
- **Complete the procedure of WRITE CONFIGURATION in order.**
- **If you set incorrect WRITE CONFIGURATION, incidents will occur.**
- **Configuration is different for each vehicle model. Confirm configuration of each vehicle model.**

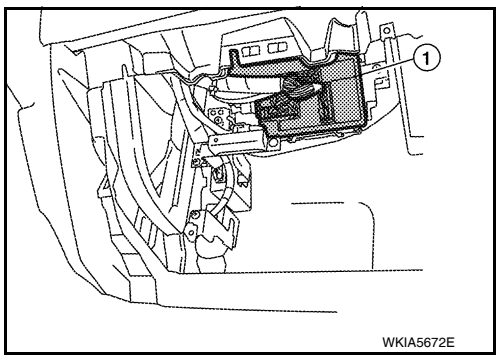
Removal and Installation of BCM

INFOID:0000000007329959

REMOVAL

CAUTION:
Before replacing BCM, perform “READ CONFIGURATION" to save or print current vehicle specification. Refer to BCS-18, "Configuration".

1. Disconnect the battery negative terminal.
2. Remove the glove box. Refer to IP-12, "Removal and Installation".
3. Remove the BCM screws, disconnect the connectors and remove the BCM (1).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **When replacing BCM, perform “WRITE CONFIGURATION”. Refer to BCS-18, "Configuration".**
- **When replacing BCM, perform the system initialization (NATS). Refer to the CONSULT operation manual for the initialization procedure.**
- **When replacing BCM, if new BCM does not come with key fobs attached, all existing key fobs must be re-registered. Refer to the CONSULT operation manual for the initialization procedure.**

SECTION LAN

LAN SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precautions for Trouble Diagnosis

INFOID:0000000007330699

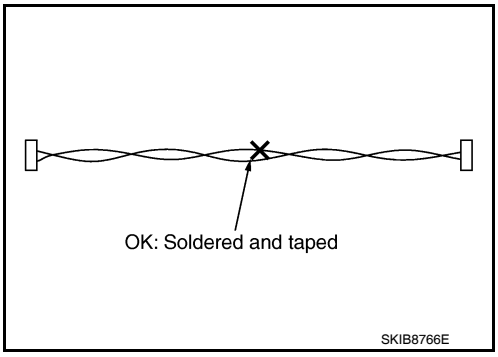
CAUTION:

- **Never apply 7.0 V or more to the measurement terminal.**
- **Use a tester with open terminal voltage of 7.0 V or less.**
- **Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.**

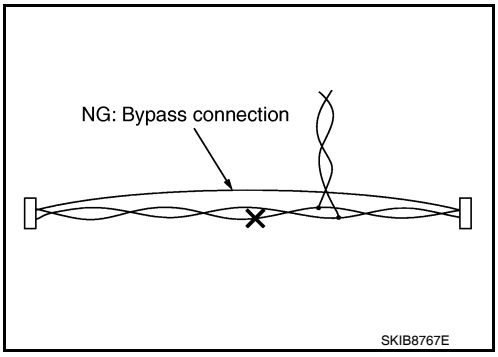
Precautions for Harness Repair

INFOID:0000000007330700

- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  NOTE:
  Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

CAN COMMUNICATION SYSTEM

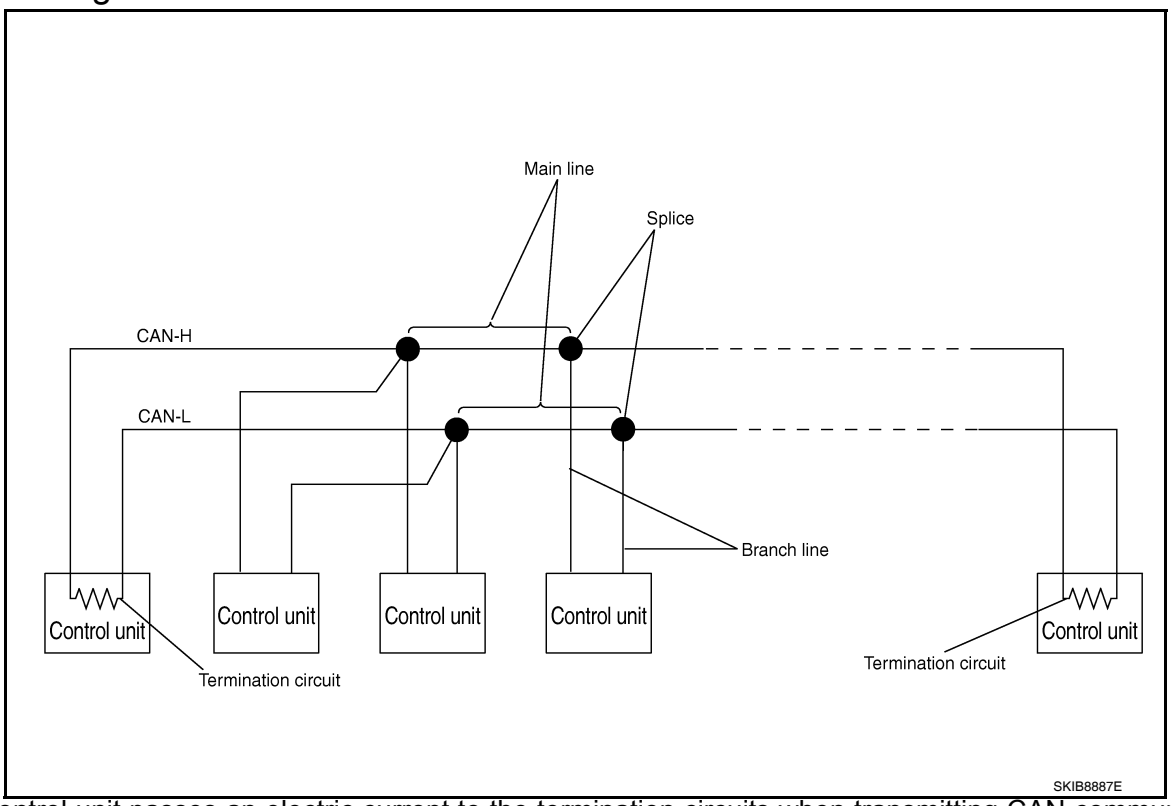
System Description

INFOID:0000000007330701

- CAN communication is a multiplex communication system. This enables the system to transmit and receive large quantities of data at high speed by connecting control units with two communication lines (CAN-H and CAN-L).
- Control units on the CAN network transmit signals using the CAN communication control circuit. They receive only necessary signals from other control units to operate various functions.
- CAN communication lines adopt twisted-pair line style (two lines twisted) for noise immunity.

System Diagram

INFOID:0000000007330702

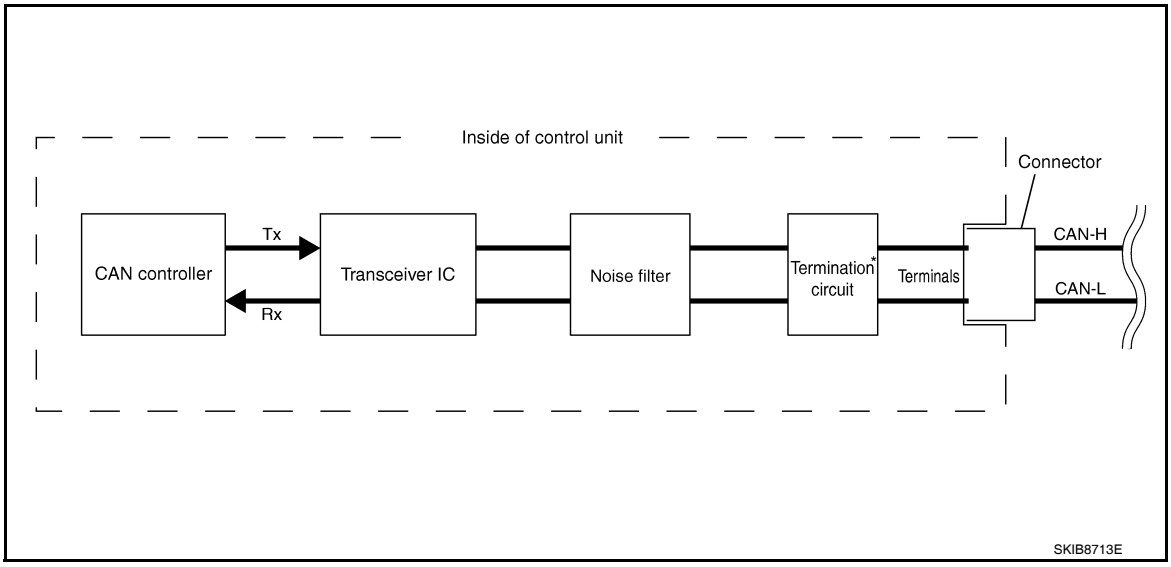


Each control unit passes an electric current to the termination circuits when transmitting CAN communication signal. The termination circuits produce an electrical potential difference between CAN-H and CAN-L. CAN communication system transmits and receives CAN communication signals by the potential difference.

Component	Description
Main line	CAN communication line between splices
Branch line	CAN communication line between splice and a control unit
Splice	A point connecting a branch line with a main line
Termination circuit	Refer to LAN-6, "CAN Communication Control Circuit".

CAN Communication Control Circuit

INFOID:0000000007330703



Component	System description
CAN controller	It controls CAN communication signal transmission and reception, error detection, etc.
Transceiver IC	It converts digital signal into CAN communication signal, and CAN communication signal into digital signal.
Noise filter	It eliminates noise of CAN communication signal.
Termination circuit* (Resistance of approx. 120 Ω)	It produces potential difference.

*: These are the only control units wired with both ends of CAN communication system.

DIAG ON CAN

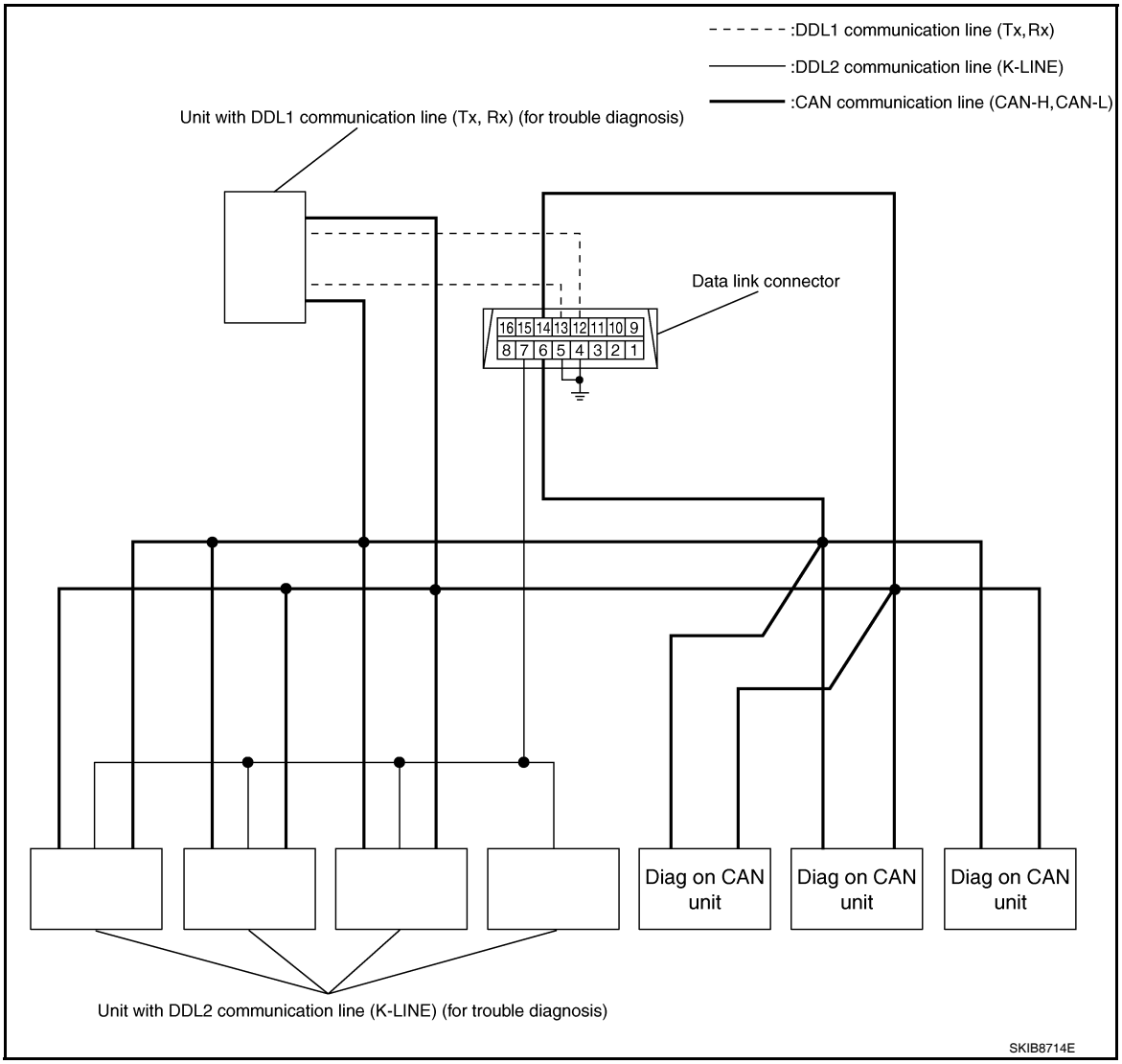
Description

INFOID:0000000007330704

"Diag on CAN" is a diagnosis using CAN communication instead of previous DDL1 and DDL2 communication lines, between control units and diagnosis unit.

System Diagram

INFOID:0000000007330705



Name	Harness	Description
DDL1	Tx Rx	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)
DDL2	K-LINE	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)
Diag on CAN	CAN-H CAN-L	It is used for trouble diagnosis and control.

TROUBLE DIAGNOSIS

Condition of Error Detection

INFOID:0000000007753514

DTC (e.g. U1000 and U1001) of CAN communication is indicated on SELF-DIAG RESULTS on CONSULT if a CAN communication signal is not transmitted or received between units for 2 seconds or more.

CAN COMMUNICATION SYSTEM ERROR

- CAN communication line open (CAN-H, CAN-L, or both)
- CAN communication line short (ground, between CAN communication lines, other harnesses)
- Error of CAN communication control circuit of the unit connected to CAN communication line

WHEN DTC OF CAN COMMUNICATION IS INDICATED EVEN THOUGH CAN COMMUNICATION SYSTEM IS NORMAL

- Removal/installation of parts: Error may be detected when removing and installing CAN communication unit and related parts while turning the ignition switch ON. (A DTC except for CAN communication may be detected.)
- Fuse blown out (removed): CAN communication of the unit may cease.
- Voltage drop: Error may be detected if voltage drops due to discharged battery when turning the ignition switch ON (Depending on the control unit which carries out CAN communication).
- Error may be detected if the power supply circuit of the control unit, which carries out CAN communication, malfunctions (Depending on the control unit which carries out CAN communication).
- Error may be detected if reprogramming is not completed normally.

CAUTION:

CAN communication system is normal if DTC of CAN communication is indicated on SELF-DIAG RESULTS of CONSULT under the above conditions. Erase the memory of the self-diagnosis of each unit.

Symptom When Error Occurs in CAN Communication System

INFOID:0000000007753515

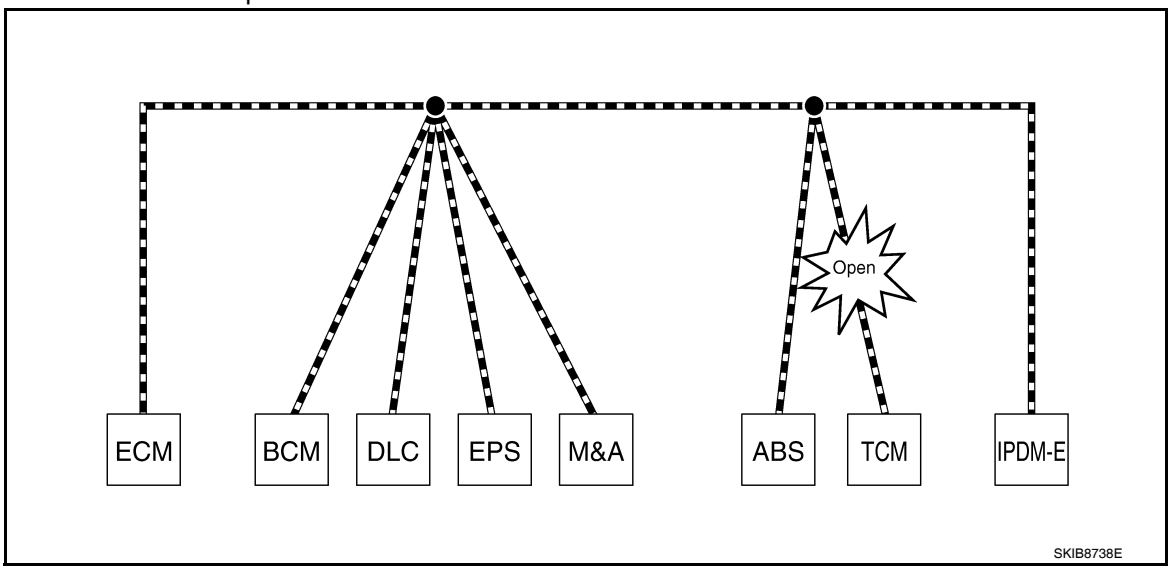
In CAN communication system, multiple units mutually transmit and receive signals. Each unit cannot transmit and receive signals if any error occurs on CAN communication line. Under this condition, multiple control units related to the root cause malfunction or go into fail-safe mode.

ERROR EXAMPLE

NOTE:

- Each vehicle differs in symptom of each unit under fail-safe mode and CAN communication line wiring.
- Refer to LAN-19, "Abbreviation List" for the unit abbreviation.

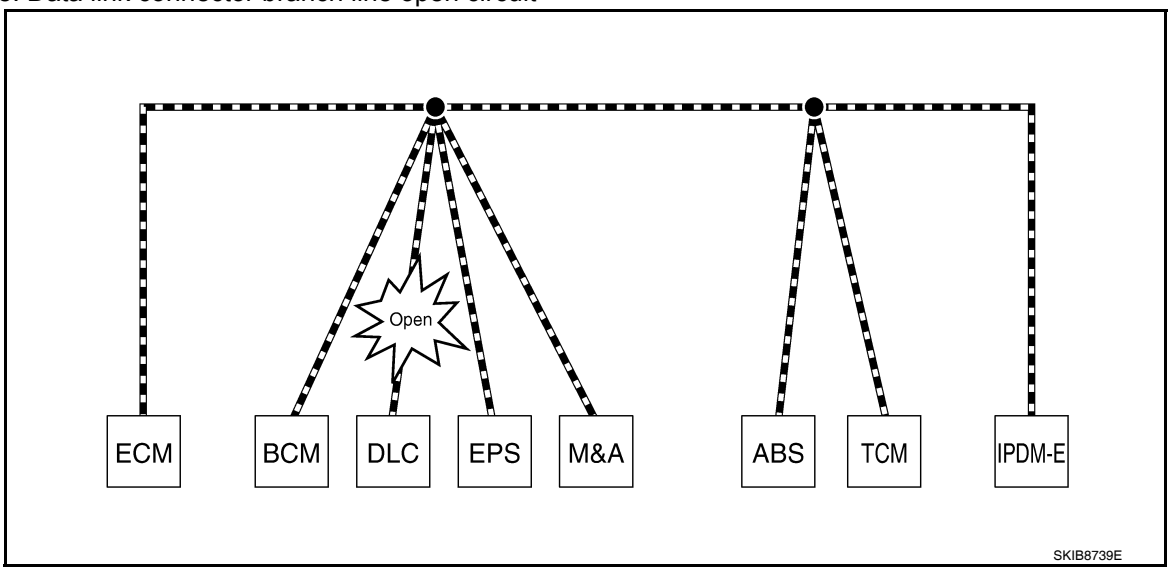
Example: TCM branch line open circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	Reverse warning chime does not sound.

Unit name	Symptom
EPS control unit	Normal operation.
Combination meter	• Shift position indicator and OD OFF indicator turn OFF. • Warning lamps turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	Normal operation.

Example: Data link connector branch line open circuit

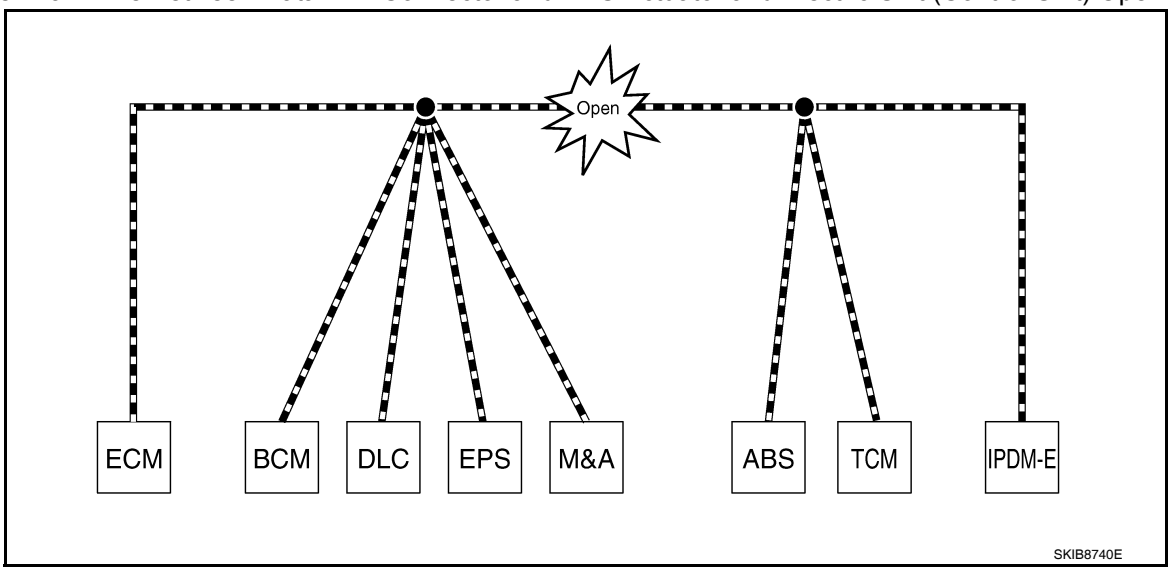


Unit name	Symptom
ECM	Normal operation.
BCM	
EPS control unit	
Combination meter	
ABS actuator and electric unit (control unit)	
TCM	
IPDM E/R	

NOTE:
- When data link connector branch line is open, transmission and reception of CAN communication signals are not affected. Therefore, no symptoms occur. However, be sure to repair malfunctioning circuit.
- The model (all units on CAN communication system are Diag on CAN) cannot perform CAN diagnosis with CONSULT if the following error occurs. The error is judged by the symptom.

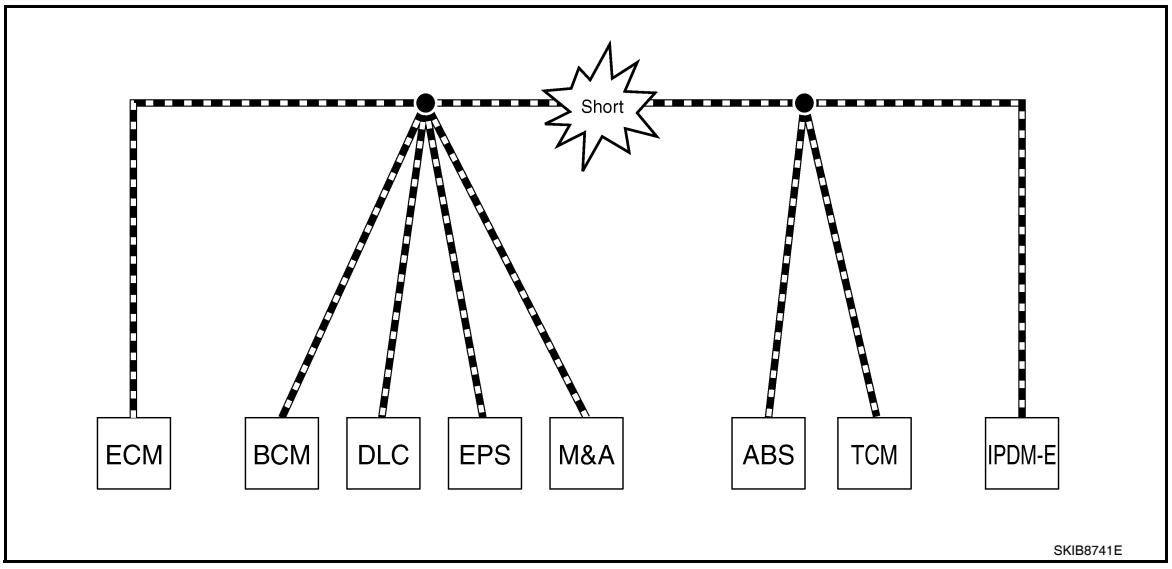
Error	Difference of symptom
Data link connector branch line open circuit	Normal operation.
CAN-H, CAN-L harness short-circuit	Most of the units which are connected to the CAN communication system enter fail-safe mode or are deactivated.

Example: Main Line Between Data Link Connector and ABS Actuator and Electric Unit (Control Unit) Open Circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position.
EPS control unit	The steering effort increases.
Combination meter	• The shift position indicator and OD OFF indicator turn OFF. • The speedometer is inoperative. • The odo/trip meter stops.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.

Example: CAN-H, CAN-L Harness Short Circuit



Unit name	Symptom
ECM	• Engine torque limiting is affected, and shift harshness increases. • Engine speed drops.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position. • The room lamp does not turn ON. • The engine does not start (if an error or malfunction occurs while turning the ignition switch OFF.) • The steering lock does not release (if an error or malfunction occurs while turning the ignition switch OFF.)
EPS control unit	The steering effort increases.
Combination meter	• The tachometer and the speedometer do not move. • Warning lamps turn ON. • Indicator lamps do not turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.

CAN Diagnosis with CONSULT

INFOID:0000000007753516

CAN diagnosis on CONSULT extracts the root cause by receiving the following information.
- Response to the system call
- Control unit diagnosis information
- Self-diagnosis
- CAN diagnostic support monitor

Self-Diagnosis

INFOID:0000000007753517

If communication signals cannot be transmitted or received among units communicating via CAN communication line, CAN communication-related DTC is displayed on the CONSULT “Self Diagnostic Result” screen.
NOTE:
The following table shows examples of CAN communication-related DTC. For other DTC, refer to the applicable sections.

DTC	Self-diagnosis item (CONSULT indication)	DTC detection condition		Inspection/Action
U1000	CAN COMM CIRCUIT	ECM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.	Start the inspection. Refer to the applicable section of the indicated control unit.
		Except for ECM	When a control unit (except for ECM) is not transmitting or receiving CAN communication signal for 2 seconds or more.	
U1001	CAN COMM CIRCUIT	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.		
U1002	SYSTEM COMM	When a control unit is not transmitting or receiving CAN communication signal for 2 seconds or less.		
U1010	CONTROL UNIT(CAN)	When an error is detected during the initial diagnosis for CAN controller of each control unit.		Replace the control unit indicating “U1010”.

CAN Diagnostic Support Monitor

INFOID:0000000007753518

MONITOR ITEM (CONSULT)

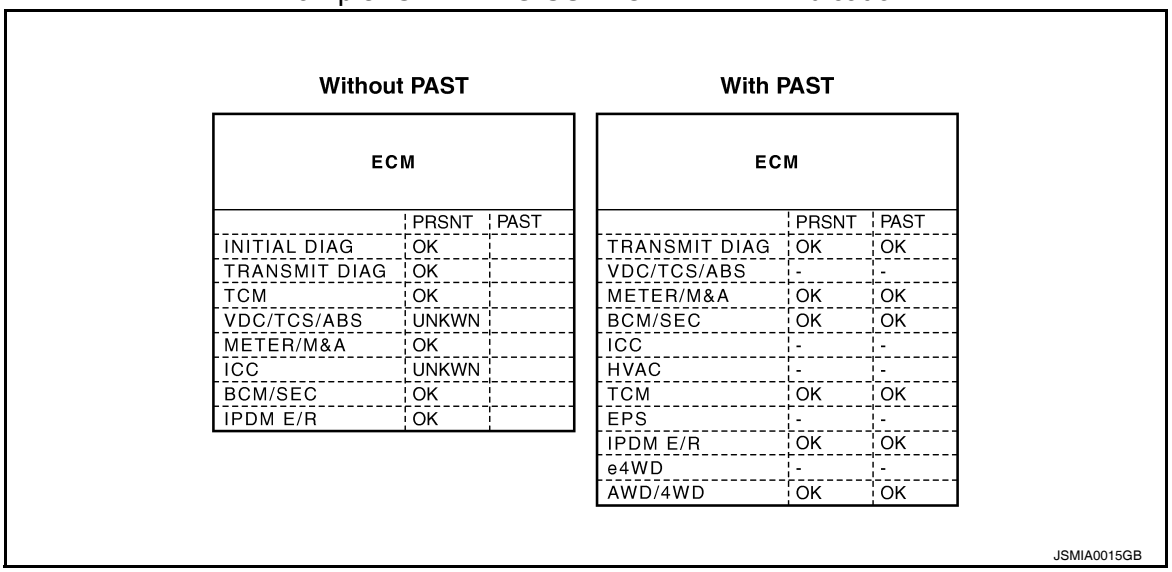
Example: CAN DIAG SUPPORT MNTR indication

Without PAST

ECM		
	PRSNT	PAST
INITIAL DIAG	OK	
TRANSMIT DIAG	OK	
TCM	OK	
VDC/TCS/ABS	UNKWN	
METER/M&A	OK	
ICC	UNKWN	
BCM/SEC	OK	
IPDM E/R	OK	

With PAST

ECM		
	PRSNT	PAST
TRANSMIT DIAG	OK	OK
VDC/TCS/ABS	-	-
METER/M&A	OK	OK
BCM/SEC	OK	OK
ICC	-	-
HVAC	-	-
TCM	OK	OK
EPS	-	-
IPDM E/R	OK	OK
e4WD	-	-
AWD/4WD	OK	OK



Without PAST

Item	PRSNT	Description
Initial diagnosis	OK	Normal at present
	NG	Control unit error (Except for some control units)
Transmission diagnosis	OK	Normal at present
	UNKWN	Unable to transmit signals for 2 seconds or more.
		Diagnosis not performed
Control unit name (Reception diagnosis)	OK	Normal at present
	UNKWN	Unable to receive signals for 2 seconds or more.
		Diagnosis not performed
		No control unit for receiving signals. (No applicable optional parts)

With PAST

Item	PRSNT	PAST	Description
Transmission diagnosis	OK	OK	Normal at present and in the past
		1 – 39	Normal at present, but unable to transmit signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to transmit signals for 2 seconds or more at present.
Control unit name (Reception diagnosis)	OK	OK	Normal at present and in the past
		1 – 39	Normal at present, but unable to receive signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to receive signals for 2 seconds or more at present.
	–	–	Diagnosis not performed.
			No control unit for receiving signals. (No applicable optional parts)

MONITOR ITEM (ON-BOARD DIAGNOSIS)

NOTE:

For some models, CAN communication diagnosis result is received from the vehicle monitor.

Example: Vehicle Display

Item	Result indicated	Error counter	Description
CAN_COMM (Initial diagnosis)	OK	0	Normal at present
	NG	1 – 50	Control unit error (The number indicates how many times diagnosis has been run.)
CAN_CIRC_1 (Transmission diagnosis)	OK	0	Normal at present
	UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
CAN_CIRC_2 – 9 (Reception diagnosis of each unit)	OK	0	Normal at present
	UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
			Diagnosis not performed.
			No control unit for receiving signals. (No applicable optional parts)

How to Use CAN Communication Signal Chart

INFOID:0000000007330711

The CAN communication signal chart lists the signals needed for trouble diagnosis. It is useful for detecting the root cause by finding a signal related to the symptom, and by checking transmission and reception unit.

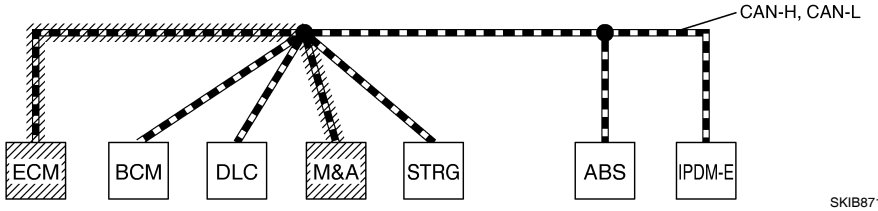
Example: Tachometer does not move even though the engine rotates.

T: Transmit R: Receive

Signal name/Connecting unit	ECM	BCM	M&A	STRG	ABS	IPDM-E
A/C compressor feedback signal	T		R			
A/C compressor request signal	T					R
Accelerator pedal position signal	T				R	
Cooling fan motor operation signal	T					R
Engine coolant temperature signal	T		R			
Engine speed signal	T		R		R	
Fuel consumption monitor signal	T		R			
Malfunction indicator lamp signal	T		R			
A/C switch signal	R	T				
Ignition switch signal		T				R
Sleep/wake up signal		T	R			R

No communication between ECM and M&A.

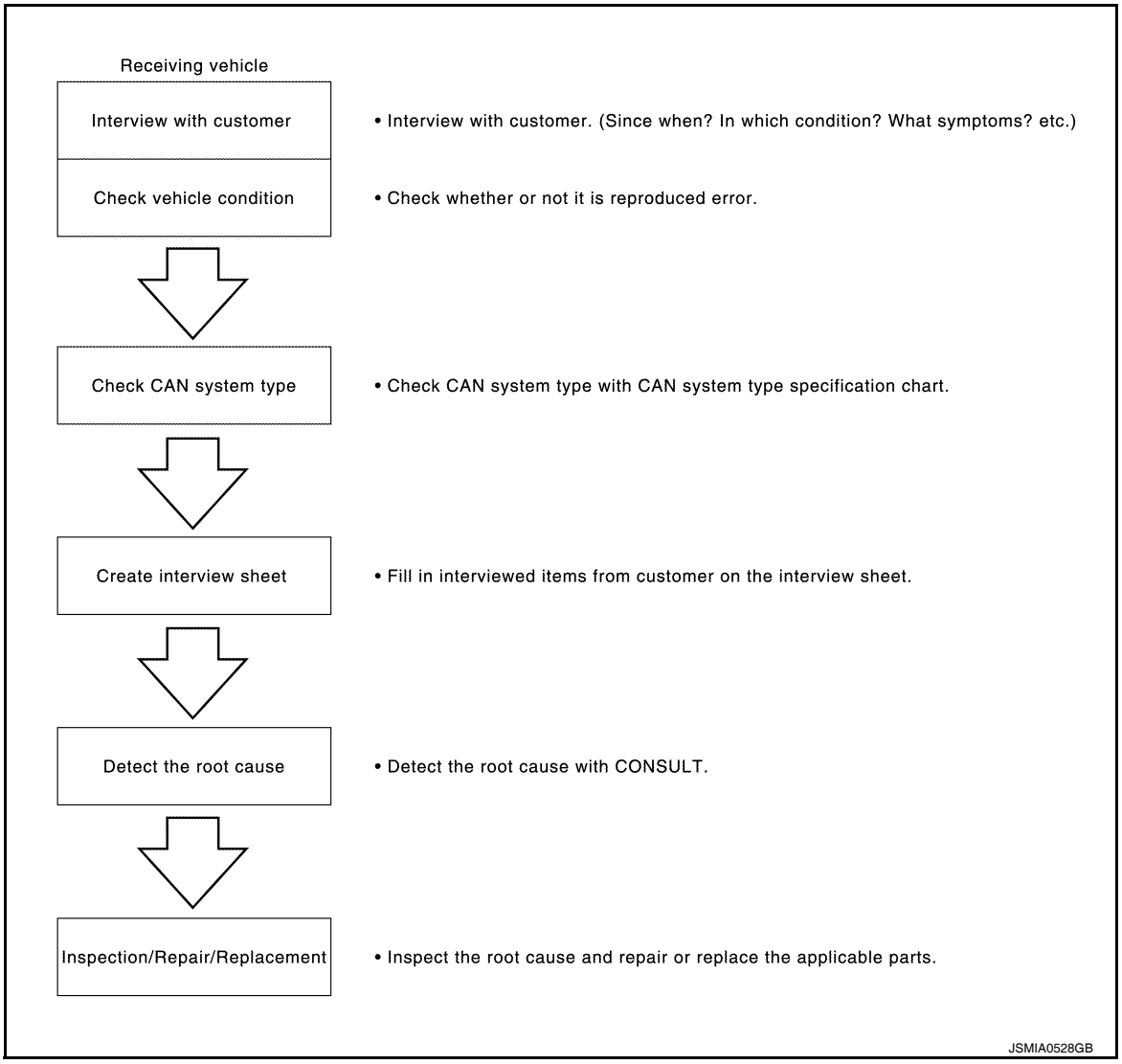
It indicates that an error occurs between ECM and M&A (Shaded area).



DIAGNOSIS AND REPAIR WORKFLOW

Trouble Diagnosis Flow Chart

INFOID:0000000007330712



Trouble Diagnosis Procedure

INFOID:0000000007753520

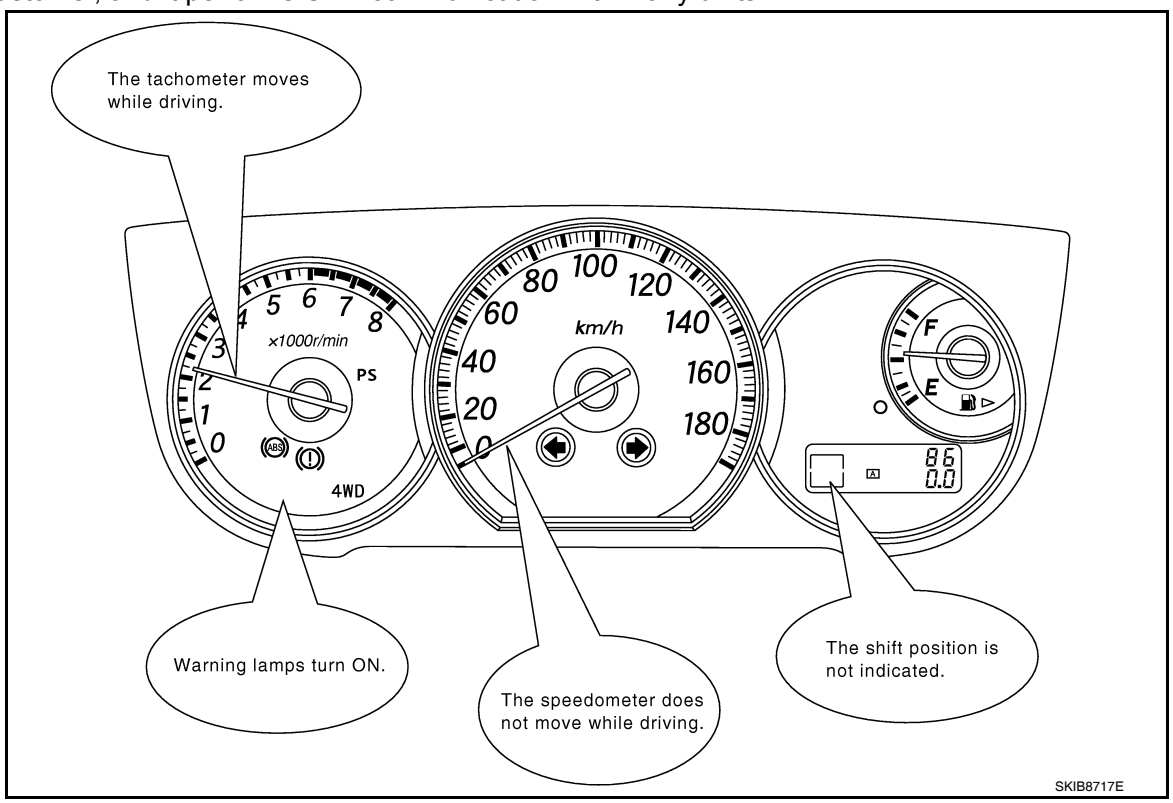
INTERVIEW WITH CUSTOMER

Interview with the customer is important to detect the root cause of CAN communication system errors and to understand vehicle condition and symptoms for proper trouble diagnosis.

Points in interview
- What: Parts name, system name
- When: Date, Frequency
- Where: Road condition, Place
- In what condition: Driving condition/environment
- Result: Symptom

NOTE:
- Check normal units as well as error symptoms.
- Example: Circuit between ECM and the combination meter is judged normal if the customer indicates tachometer functions normally.
- When a CAN communication system error is present, multiple control units may malfunction or go into fail-safe mode.

- Indication of the combination meter is important to detect the root cause because it is the most obvious to the customer, and it performs CAN communication with many units.



INSPECTION OF VEHICLE CONDITION

Check whether the symptom is reproduced or not.

NOTE:

Do not turn the ignition switch OFF or disconnect the battery cable while reproducing the error. The error may temporarily correct itself, making it difficult to determine the root cause.

CHECK OF CAN SYSTEM TYPE (HOW TO USE CAN SYSTEM TYPE SPECIFICATION CHART)

Determine CAN system type based on vehicle equipment.

NOTE:

- This chart is used if CONSULT does not automatically recognize CAN system type.
- There are two styles for CAN system type specification charts. Depending on the number of available system types, either style A or style B may be used.

CAN System Type Specification Chart (Style A)

NOTE:

CAN system type is easily checked with the vehicle equipment identification information shown in the chart.

Example:
Vehicle is equipped as follows: Wagon, AWD, VQ35DE, CVT, VDC, and Intelligent Key system. ( ) shows an example of CAN system type.)

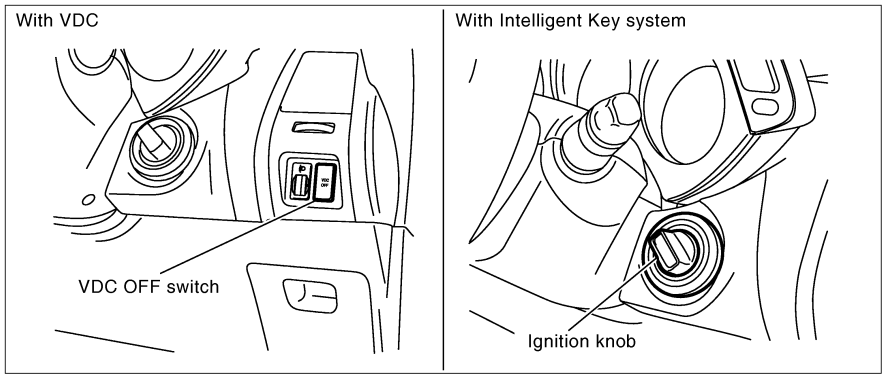
CAN System Specification Chart
Determine CAN system type from the following specification chart.

Body type	Wagon					
Axle	2WD				AWD	
Engine	QR25DE		VQ35DE			
Transmission	A/T		CVT			
Brake control	ABS				VDC	
Intelligent Key system		×		×		×
CAN system type	1	2	3	4	5	6
CAN communication signal chart	XX-XX. "TYPE 1/TYPE 2"		XX-XX. "TYPE 3/TYPE 4"		XX-XX. "TYPE 5/TYPE 6"	

Check the vehicle equipment with the vehicle identification number plate.
Check the vehicle equipment.
The number indicates the CAN system type of the vehicle.

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION
NOTE:
Check CAN system type from the vehicle shape and equipment.



In the above example,
- Checking VDC OFF switch leads to judge whether or not VDC is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.

For the above case, CAN system type is "6".

JSMIA0017GB

CAN System Type Specification Chart (Style B)
NOTE:

CAN system type is easily checked with the vehicle equipment identification information shown in the chart.

Example:
Vehicle is equipped as follows: Sedan, 2WD, MR20DE, CVT, ABS, Active AFS, Intelligent Key system, Navigation system and Automatic drive positioner. ( ) shows an example of CAN system type.)

CAN System Specification Chart

Refer to the specification as shown in the chart.

Body type	Sedan		
Axle	2WD		AWD
Engine	HR15DE	MR20DE	HR15DE
Transmission	A/T	CVT	A/T
Brake control	ABS		
Specification chart	XX.XX "SPECIFICATION CHART A"	XX.XX "SPECIFICATION CHART B"	XX.XX "SPECIFICATION CHART C"

Check the vehicle equipment with the vehicle identification number plate.
Check the vehicle equipment.
Select the applicable vehicle equipment. Refer to the specification chart.

×: Applicable

SPECIFICATION CHART B

Determine CAN system type from the following specification chart.

Body type	Sedan										
Axle	2WD										
Engine	MR20DE										
Transmission	CVT										
Brake control	ABS										
Active AFS		×			×	×			×	×		×
Intelligent Key system			×		×		×	×	×	×	×	×
Navigation system				×		×	×		×		×	×
Automatic drive positioner								×		×	×	×
CAN system type	9	10	11	12	13	14	15	16	17	18	19	20
CAN communication signal chart	XX.XX "TYPE 9/TYPE 10/TYPE 11/TYPE 12/TYPE 13/TYPE 14/TYPE 15/TYPE 16/TYPE 17/TYPE 18/TYPE 19/TYPE 20"											

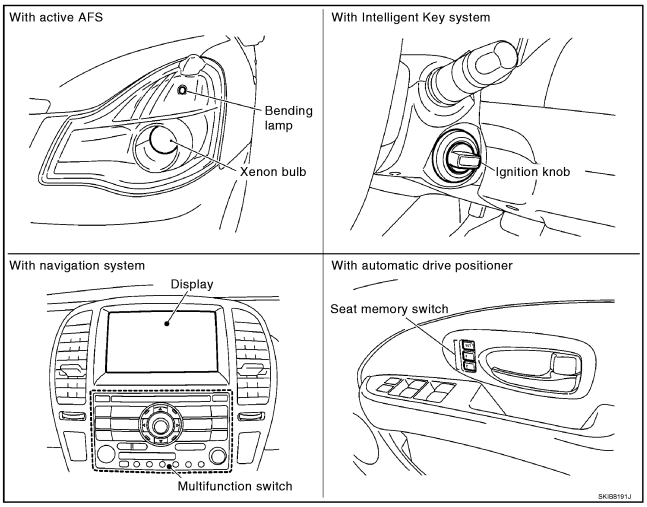
Check the vehicle equipment.
The number indicates the CAN system type of the vehicle.

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

Check CAN system type from the vehicle shape and equipment.



In the above example,
- Checking Xenon bulb and bending lamp lead to judge whether or not Active AFS is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.
- Checking display and multifunction switch lead to judge whether or not Navigation system is equipped.
- Checking seat memory switch leads to judge whether or not Automatic drive positioner is equipped.

For the above case, CAN system type is "20".

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CREATE INTERVIEW SHEET

Fill out the symptom described by the customer, vehicle condition, and CAN system type on the interview sheet.

Interview Sheet (Example)

CAN Communication System Diagnosis Interview Sheet

Date received:	3, Feb. 2006
Type:	DBA-KG11
VIN No.:	KG11-005040
Model:	BDRARGZ397EDA-E-J-
First registration:	10, Jan. 2001
Mileage:	62,140
CAN system type:	Type 19

Symptom (Results from interview with customer)

- Headlamps suddenly turn ON while driving the vehicle.
- The engine does not restart after stopping the vehicle and turning the ignition switch OFF.
- The cooling fan continues rotating while turning the ignition switch ON.

Condition at inspection

Error Symptom: (Present) / Past

The engine does not start.
While turning the ignition switch ON,
- The headlamps (Lo) turn ON, and the cooling fan continues rotating.
- The interior lamp does not turn ON.

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DETECT THE ROOT CAUSE

CAN diagnosis function of CONSULT detects the root cause.

SERVICE INFORMATION

HOW TO USE THIS SECTION

Caution

INFOID:0000000007330714

- This section describes information peculiar to a vehicle and inspection procedures.
- For trouble diagnosis procedure, refer to LAN-14, "Trouble Diagnosis Procedure".

Abbreviation List

INFOID:0000000007330715

Unit name abbreviations in CONSULT CAN diagnosis and in this section are as per the following list.

Abbreviation	Unit name
A-BAG	Air bag diagnosis sensor unit
ABS	ABS actuator and electric unit (control unit)
BCM	BCM
DLC	Data link connector
ECM	ECM
EPS	EPS control unit
I-KEY	Intelligent Key unit
IPDM-E	IPDM E/R
M&A	Combination meter
STRG	Steering angle sensor
TCM	TCM

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007330716

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the “SUPPLEMENTAL RESTRAINT SYSTEM” and “SEAT BELTS” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SUPPLEMENTAL RESTRAINT SYSTEM”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precautions for Trouble Diagnosis

INFOID:0000000007330717

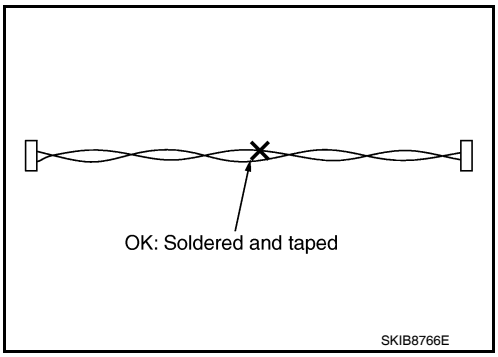
CAUTION:

- **Never apply 7.0 V or more to the measurement terminal.**
- **Use a tester with open terminal voltage of 7.0 V or less.**
- **Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.**

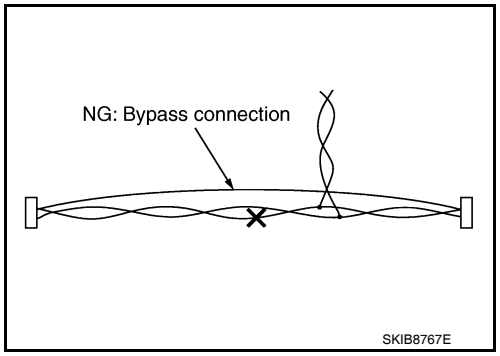
Precautions for Harness Repair

INFOID:0000000007330718

- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  NOTE:
  Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

DIAGNOSIS AND REPAIR WORKFLOW

Interview Sheet

INFOID:0000000007330719

CAN Communication System Diagnosis Interview Sheet

Date received:

Type: VIN No.:

Model:

First registration: Mileage:

CAN system type:

Symptom (Results from interview with customer)

Condition at inspection

Error symptom : Present / Past

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CAN COMMUNICATION SYSTEM

CAN System Specification Chart

INFOID:0000000007330720

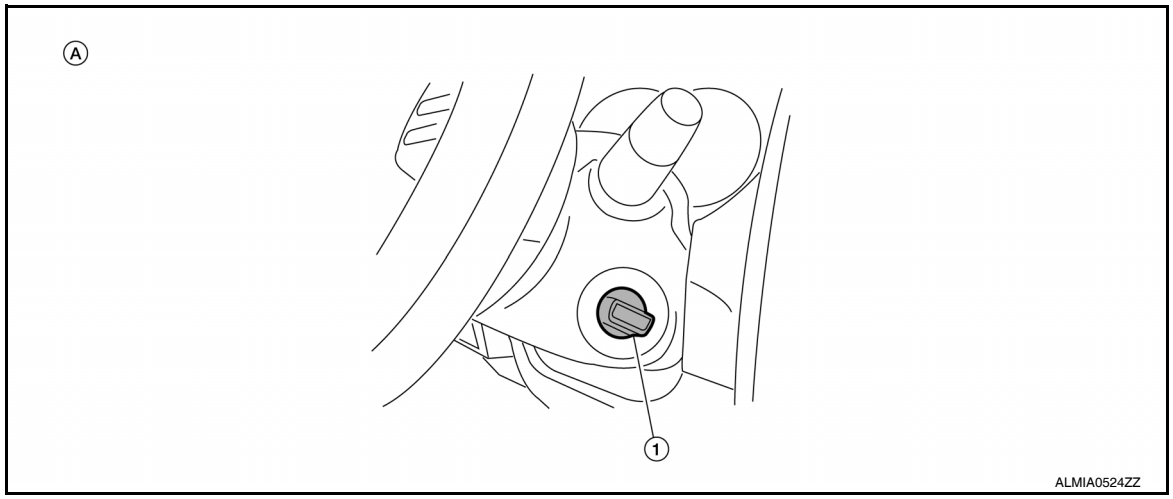
NOTE:
Refer to LAN-14, "Trouble Diagnosis Procedure" for how to use CAN system specification chart.

Body type	Hatchback			
Axle	2WD			
Engine	MR18DE			
Transmission	M/T	A/T	CVT	
Brake control	VDC			
Intelligent Key system				×
CAN system type	1	2	3	4

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:
Check CAN system type from the vehicle shape and equipment.



1. Ignition knob
A. With Intelligent Key system

CAN Communication Signal Chart

INFOID:0000000007330721

Refer to LAN-13, "How to Use CAN Communication Signal Chart" for how to use CAN communication signal chart.

NOTE:
Refer to LAN-19, "Abbreviation List" for the abbreviations of the connecting units.

T: Transmit R: Receive

Signal name/Connecting unit	ECM	BCM	EPS	I-KEY	M&A	STRG	ABS	TCM*1	TCM*2	IPDM-E
A/C compressor request signal	T									R
Accelerator pedal position signal	T						R	R	R	
ASCD CRUISE lamp signal	T				R					
ASCD SET lamp signal	T				R					
Closed throttle position signal	T							R	R	
Cooling fan motor operation signal	T									R

Signal name/Connecting unit	ECM	BCM	EPS	I-KEY	M&A	STRG	ABS	TCM*1	TCM*2	IPDM-E
Engine coolant temperature signal	T				R					
Engine speed signal	T				R		R		R	
Engine status signal	T		R		R		R			
Fuel consumption monitor signal	T				R					
Malfunction indicator lamp signal	T				R					
Wide open throttle position signal	T							R	R	
A/C switch signal	R	T								
Blower fan motor switch signal	R	T								
Buzzer output signal		T			R					
				T	R					
Day time running light request signal*3		T								R
Door lock/unlock status signal		T		R						
Door switch signal		T		R	R					R
Front wiper request signal		T								R
High beam request signal		T			R					R
Horn chirp signal		T								R
Ignition switch signal		T								R
Low beam request signal		T								R
Position lights request signal		T			R					R
Rear window defogger switch signal		T								R
Sleep/wake up signal		T		R	R					R
		R			T					
Theft warning horn request signal		T								R
Tire pressure signal*4		T			R					
Trunk open/close status signal		T		R						
Turn indicator signal		T			R					
EPS operation signal			T		R					
EPS warning lamp signal			T		R					
Door lock/unlock/trunk open request signal		R		T						
Hazard request signal		R		T						
Ignition knob switch signal		R		T						
KEY warning lamp signal				T	R					
LOCK warning lamp signal				T	R					
Panic alarm request signal		R		T						
Fuel level sensor signal	R				T					
Overdrive control switch signal					T			R	R	
Parking brake switch signal					T		R			
Stop lamp switch signal					T			R	R	
Vehicle speed signal	R	R	R	R	T					
	R		R		R		T		R	
Steering angle sensor signal						T	R			
ABS warning lamp signal					R		T			

Signal name/Connecting unit	ECM	BCM	EPS	I-KEY	M&A	STRG	ABS	TCM*1	TCM*2	IPDM-E
Brake warning lamp signal					R		T			
SLIP indicator lamp signal					R		T			
VDC OFF indicator lamp signal					R		T			
VDC warning lamp signal					R		T			
A/T check indicator signal					R			T		
A/T self-diagnosis signal	R							T		
Input speed signal	R							T		
OD OFF indicator signal					R			T		
Output shaft revolution signal	R							T	T	
Shift position indicator signal					R		R	T	T	
CVT self-diagnosis signal	R								T	
Input shaft revolution signal	R								T	
OD OFF indicator signal					R				T	
Front wiper stop position signal		R								T
High beam status signal	R									T
Low beam status signal	R									T
Oil pressure switch signal	R	R			R					T
Rear window defogger control signal		R								T

*1: A/T models

*2: CVT models

*3: Models for Canada

*4: Models for USA

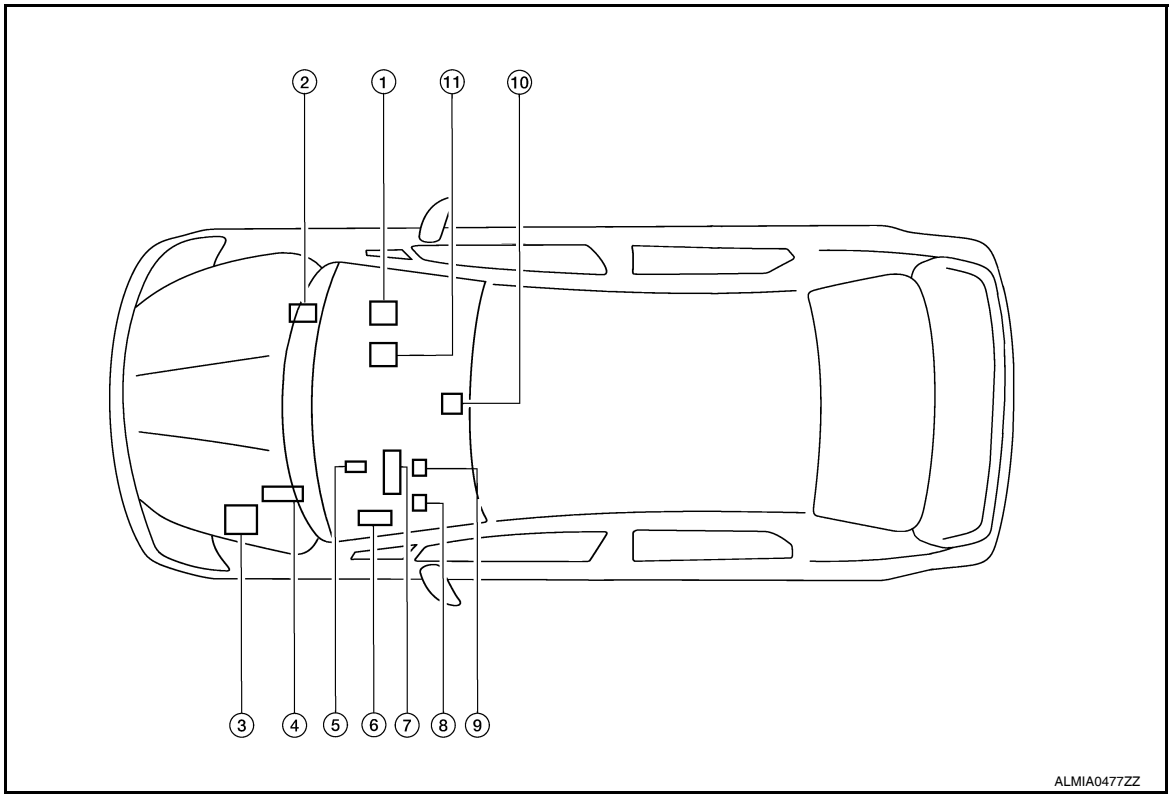
NOTE:

CAN data of the air bag diagnosis sensor unit is not used by usual service work, thus it is omitted.

CAN COMMUNICATION SYSTEM

Component Parts Location

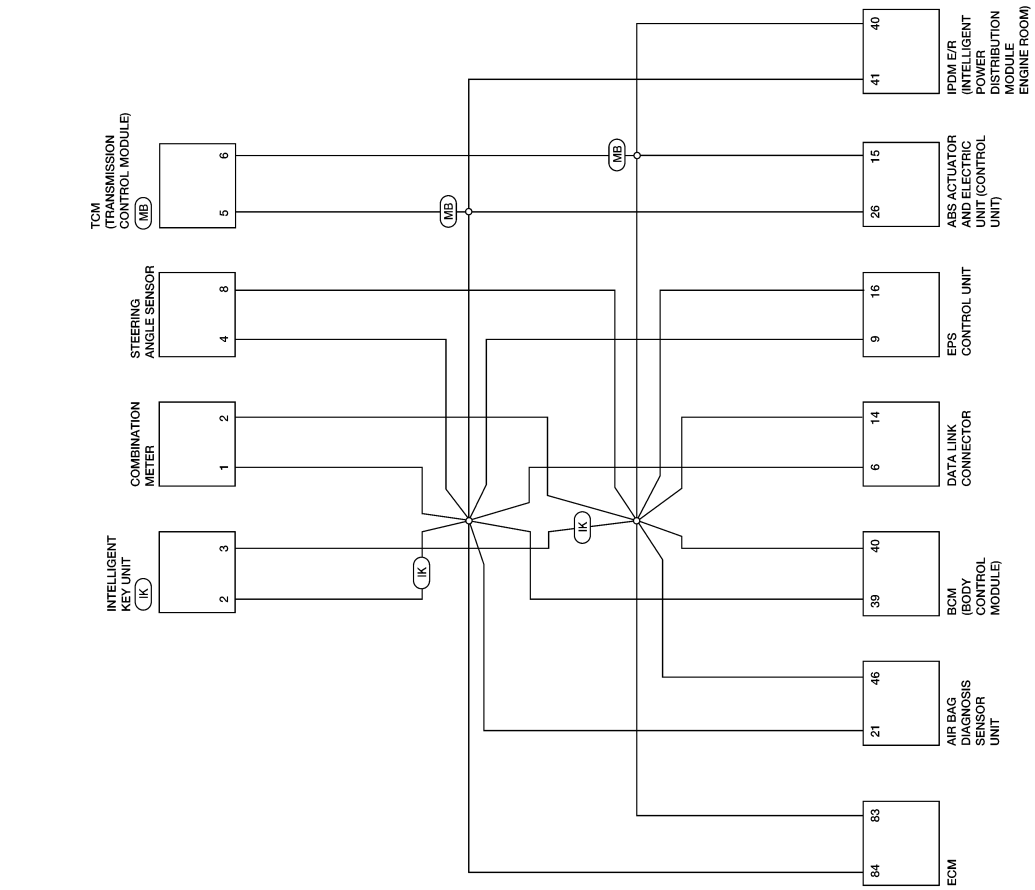
INFOID:0000000007330722



1. BCM M18
2. ABS actuator and electric unit (control unit) E33
3. IPDM E/R E46
4. ECM E16
5. EPS control unit M53
6. TCM E31
7. Combination meter M24
8. Data link connector M22
9. Steering angle sensor M64
10. Air bag diagnosis sensor unit M35
11. Intelligent Key unit M52

Schematic

INFOID:0000000007330723



IK : WITH INTELLIGENT KEY SYSTEM
MB : WITHOUT M/T

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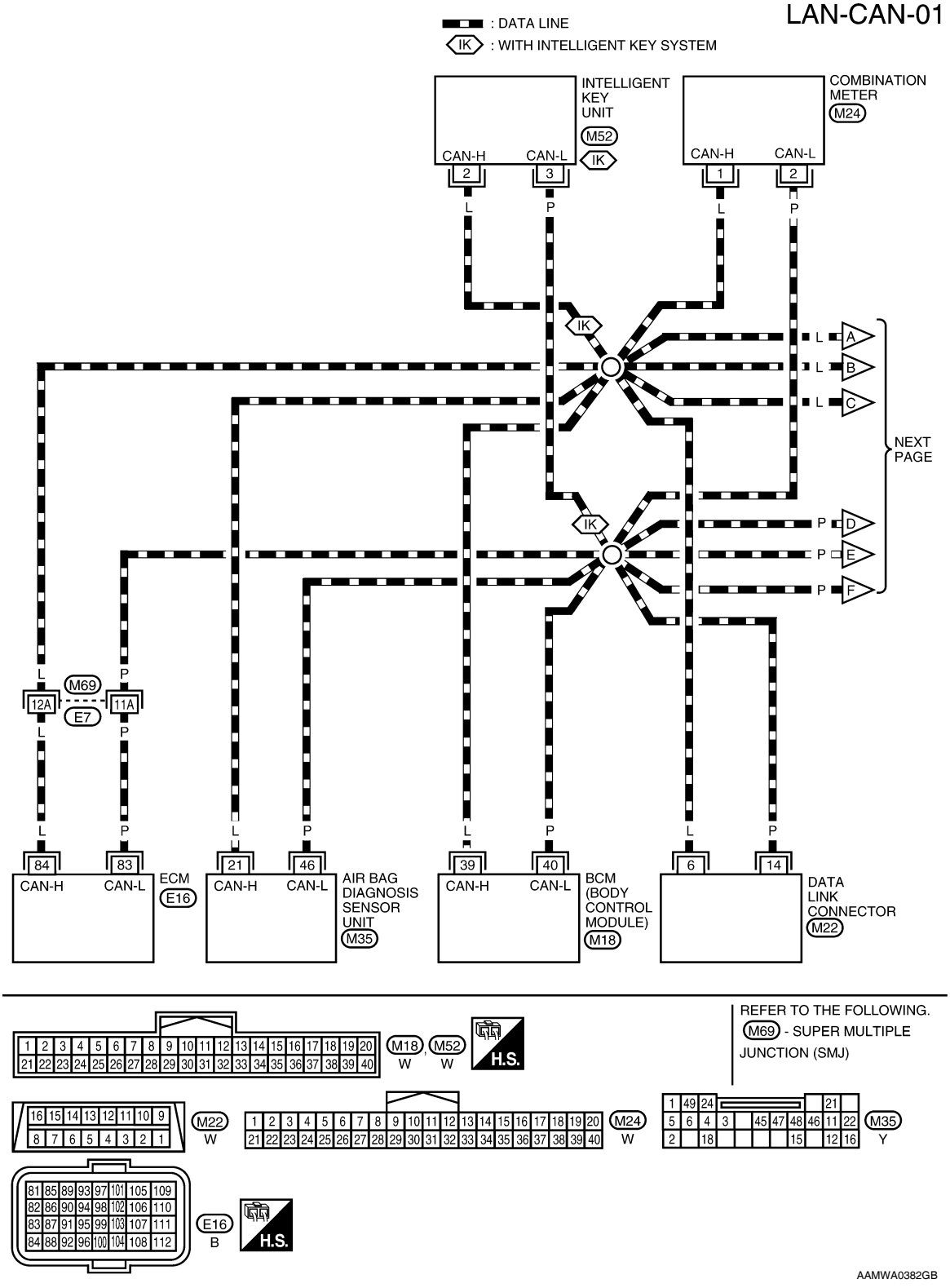
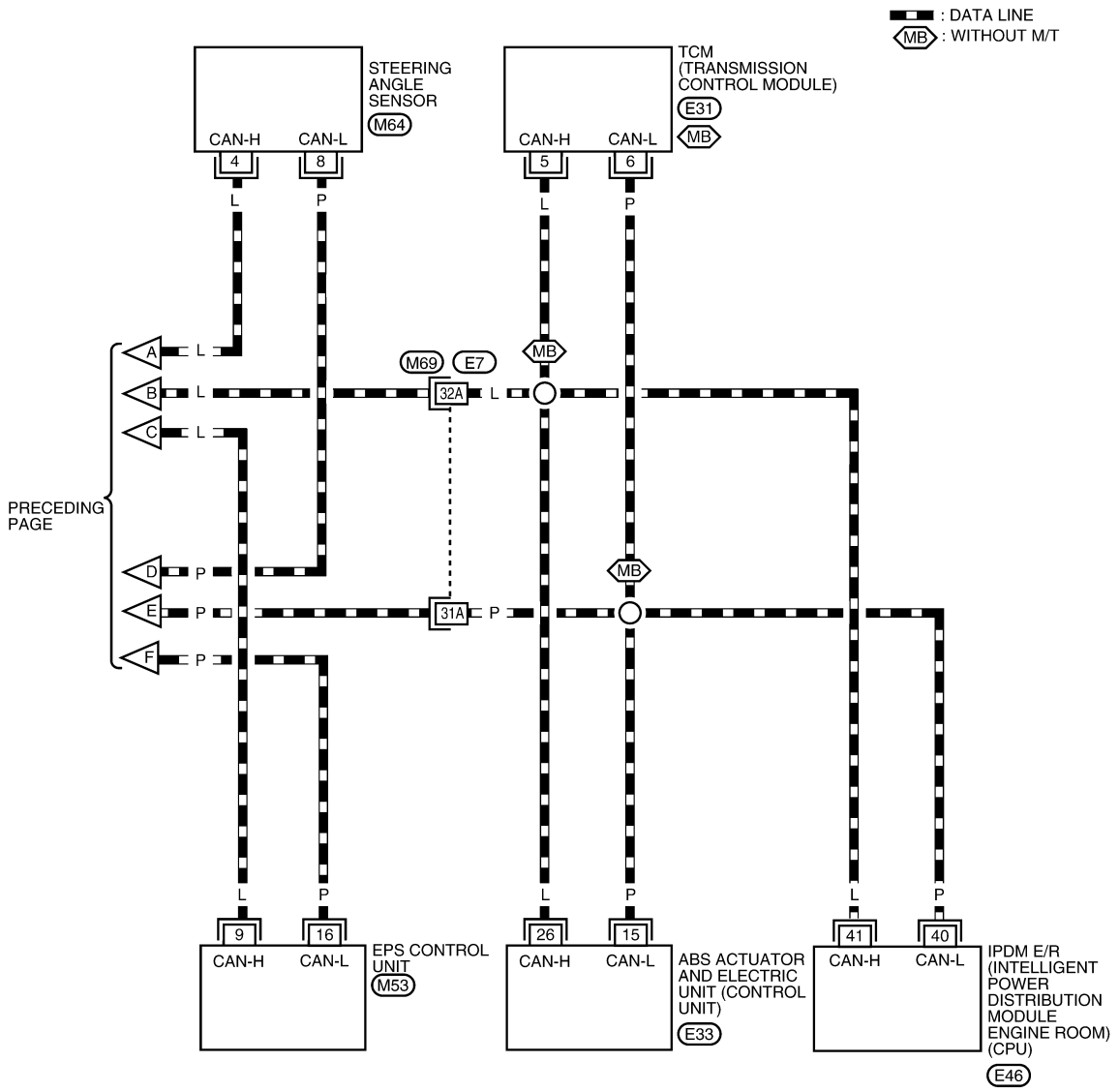
Wiring Diagram - CAN -

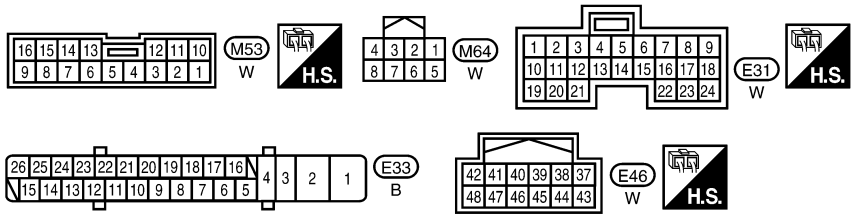
INFOID:0000000007330724

LAN-CAN-01



LAN-CAN-02





REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

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MALFUNCTION AREA CHART

Main Line

INFOID:0000000007330725

Malfunction area	Reference
Main line between data link connector and ABS actuator and electric unit (control unit)	LAN-31, "Diagnosis Procedure"
Main line between data link connector and TCM	LAN-32, "Diagnosis Procedure"

Branch Line

INFOID:0000000007330726

Malfunction area	Reference
ECM branch line circuit	LAN-33, "Diagnosis Procedure"
BCM branch line circuit	LAN-34, "Diagnosis Procedure"
Data link connector branch line circuit	LAN-35, "Diagnosis Procedure"
EPS control unit branch line circuit	LAN-36, "Diagnosis Procedure"
Intelligent Key unit branch line circuit	LAN-37, "Diagnosis Procedure"
Combination meter branch line circuit	LAN-38, "Diagnosis Procedure"
Steering angle sensor branch line circuit	LAN-39, "Diagnosis Procedure"
ABS actuator and electric unit (control unit) branch line circuit	LAN-40, "Diagnosis Procedure"
TCM branch line circuit	LAN-41, "Diagnosis Procedure"
IPDM E/R branch line circuit	LAN-42, "Diagnosis Procedure"

Short Circuit

INFOID:0000000007330727

Malfunction area	Reference
CAN communication circuit	LAN-43, "Diagnosis Procedure"

MAIN LINE BETWEEN DLC AND ABS CIRCUIT

Diagnosis Procedure

INFOID:0000000007330728

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the continuity between the harness connector and the ABS actuator and electric unit (control unit) harness connector.

Harness connector		ABS actuator and electric unit (control unit) harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E33	26	Existed
	31A		15	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the ABS actuator and electric unit (control unit).
NO >> Repair the main line between the harness connector E7 and the ABS actuator and electric unit (control unit).

MAIN LINE BETWEEN DLC AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000007330729

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of TCM.
2. Check the continuity between the harness connector and the TCM harness connector.

Harness connector		TCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E31	5	Existed
	31A		6	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the TCM.
NO >> Repair the main line between the harness connector E7 and the TCM.

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330730

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- ECM
- Harness connector E7
- Harness connector M69

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-142, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to EC-86, "Procedure After Replacing ECM".
YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330731

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M18	39	40	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-19, "Removal and Installation of BCM".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330732

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330733

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M53	9	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to PS-10, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330734

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M52	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to BL-123, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330735

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M24	1	2	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to IP-12, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330736

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M64	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-16, "Schematic".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-56, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330737

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E33	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330738

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connector of the TCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E31	5	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to the following.
- A/T models: AT-166, "Diagnosis Procedure"
- CVT models: CVT-115, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to the following.
- A/T models: AT-209, "Removal and Installation"
- CVT models: CVT-159, "Removal and Installation"

YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007330739

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connector of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E46	41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000007330740

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

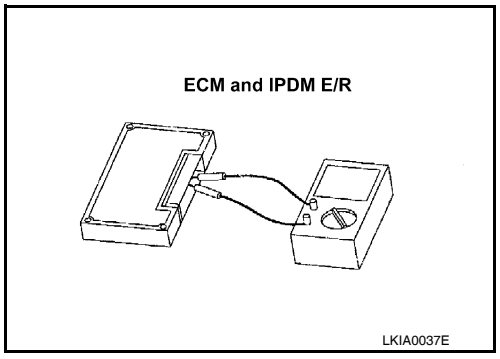
Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M22	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.



ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.

IPDM E/R		Resistance (Ω)
Terminal No.		
41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

SERVICE INFORMATION

MAIN LINE BETWEEN DLC AND ABS CIRCUIT

Diagnosis Procedure

INFOID:0000000007759056

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the continuity between the harness connector and the ABS actuator and electric unit (control unit) harness connector.

Harness connector		ABS actuator and electric unit (control unit) harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E33	26	Existed
	31A		15	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the ABS actuator and electric unit (control unit).
NO >> Repair the main line between the harness connector E7 and the ABS actuator and electric unit (control unit).

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759057

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- ECM
- Harness connector E7
- Harness connector M69

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-142, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to EC-86, "Procedure After Replacing ECM".
YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759058

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M18	39	40	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-19, "Removal and Installation of BCM".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759059

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759060

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M53	9	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to PS-10, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759062

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M24	1	2	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to IP-12, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759063

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M64	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-16, "Schematic".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-56, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759064

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E33	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759066

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connector of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E46	41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000007759067

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M22	6		Not existed
	14		Not existed

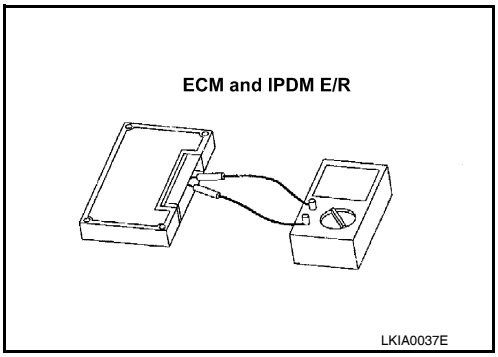
Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

IPDM E/R		Resistance (Ω)
Terminal No.		
41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

SERVICE INFORMATION

MAIN LINE BETWEEN DLC AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000007759068

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of TCM.
2. Check the continuity between the harness connector and the TCM harness connector.

Harness connector		TCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E31	5	Existed
	31A		6	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the TCM.
NO >> Repair the main line between the harness connector E7 and the TCM.

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759069

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- ECM
- Harness connector E7
- Harness connector M69

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-142, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to EC-86, "Procedure After Replacing ECM".
YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759070

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M18	39	40	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-19, "Removal and Installation of BCM".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759071

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759072

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M53	9	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to PS-10, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759074

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M24	1	2	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to IP-12, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759075

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M64	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-16, "Schematic".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-56, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759076

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E33	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759077

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connector of the TCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E31	5	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to the following.

- A/T models: AT-166, "Diagnosis Procedure"
- CVT models: CVT-115, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to the following.
- A/T models: AT-209, "Removal and Installation"
- CVT models: CVT-159, "Removal and Installation"

YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759078

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connector of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E46	41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000007759079

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M22	6		Not existed
	14		Not existed

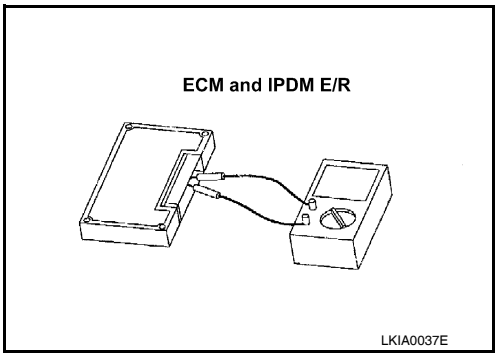
Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

IPDM E/R		Resistance (Ω)
Terminal No.		
41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

SERVICE INFORMATION

MAIN LINE BETWEEN DLC AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000007759081

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of TCM.
2. Check the continuity between the harness connector and the TCM harness connector.

Harness connector		TCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E31	5	Existed
	31A		6	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the TCM.
NO >> Repair the main line between the harness connector E7 and the TCM.

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759082

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- ECM
- Harness connector E7
- Harness connector M69

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-142, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to EC-86, "Procedure After Replacing ECM".
YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759083

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M18	39	40	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-19, "Removal and Installation of BCM".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759084

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759085

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M53	9	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to PS-10, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759087

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M24	1	2	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to IP-12, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759088

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M64	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-16, "Schematic".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-56, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759089

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E33	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759090

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connector of the TCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E31	5	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to the following.

- A/T models: AT-166, "Diagnosis Procedure"
- CVT models: CVT-115, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to the following.
- A/T models: AT-209, "Removal and Installation"
- CVT models: CVT-159, "Removal and Installation"

YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759091

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connector of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E46	41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000007759092

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M22	6		Not existed
	14		Not existed

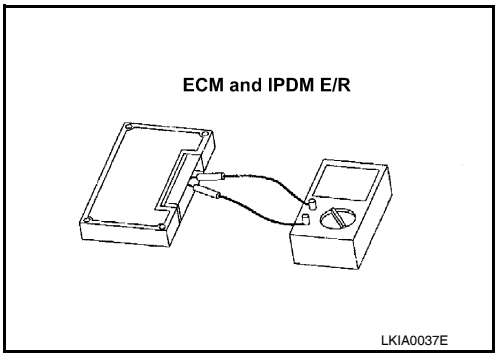
Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132



3. Check the resistance between the IPDM E/R terminals.

IPDM E/R		Resistance (Ω)
Terminal No.		
41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

SERVICE INFORMATION

MAIN LINE BETWEEN DLC AND TCM CIRCUIT

Diagnosis Procedure

INFOID:0000000007759094

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M69
- Harness connector E7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M69 and E7.
2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M22	6	M69	32A	Existed
	14		31A	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M69.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of TCM.
2. Check the continuity between the harness connector and the TCM harness connector.

Harness connector		TCM harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E7	32A	E31	5	Existed
	31A		6	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the main line between the data link connector and the TCM.
NO >> Repair the main line between the harness connector E7 and the TCM.

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759095

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- ECM
- Harness connector E7
- Harness connector M69

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ECM.
2. Check the resistance between the ECM harness connector terminals.

ECM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E16	84	83	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ECM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-142, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to EC-86, "Procedure After Replacing ECM".
YES (Past error)>>Error was detected in the ECM branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759096

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.
2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M18	39	40	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to BCS-16, "BCM Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-19, "Removal and Installation of BCM".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759097

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Resistance (Ω)
Connector No.	Terminal No.		
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.
YES (Past error)>>Error was detected in the data link connector branch line circuit.
NO >> Repair the data link connector branch line.

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759098

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M53	9	16	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to STC-8, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to PS-10, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

I-KEY BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759099

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the Intelligent Key unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of Intelligent Key unit.
2. Check the resistance between the Intelligent Key unit harness connector terminals.

Intelligent Key unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M52	2	3	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Intelligent Key unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Intelligent Key unit. Refer to BL-123, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the Intelligent Key unit. Refer to BL-152, "Removal and Installation of Intelligent Key Unit".
YES (Past error)>>Error was detected in the Intelligent Key unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759100

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of combination meter.
2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M24	1	2	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to DI-15, "Power Supply and Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to IP-12, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759101

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of steering angle sensor.
2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M64	4	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to BRC-16, "Schematic".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-56, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759102

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (control unit) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E33	26	15	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-40, "ABS/TCS/VDC Control Unit Power and Ground Systems Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-54, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

TCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759103

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the terminals and connector of the TCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of TCM.
2. Check the resistance between the TCM harness connector terminals.

TCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E31	5	6	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCM. Refer to the following.
- A/T models: AT-166, "Diagnosis Procedure"
- CVT models: CVT-115, "Diagnosis Procedure"

Is the inspection result normal?

YES (Present error)>>Replace the TCM. Refer to the following.
- A/T models: AT-209, "Removal and Installation"
- CVT models: CVT-159, "Removal and Installation"

YES (Past error)>>Error was detected in the TCM branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000007759104

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Check the following terminals and connector of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.
2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E46	41	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to PG-26, "IPDM E/R Power/Ground Circuit Inspection".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PG-27, "Removal and Installation of IPDM E/R".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000007759105

1.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect all the unit connectors on CAN communication system.
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M22	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

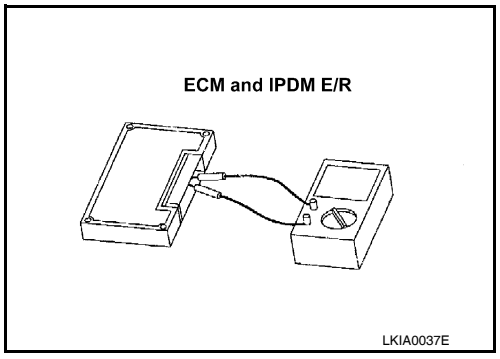
4.CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.
2. Check the resistance between the ECM terminals.

ECM		Resistance (Ω)
Terminal No.		
84	83	Approx. 108 – 132

3. Check the resistance between the IPDM E/R terminals.

IPDM E/R		Resistance (Ω)
Terminal No.		
41	40	Approx. 108 – 132



Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect one of the unit connectors of CAN communication system.
   NOTE:
   ECM and IPDM E/R have a termination circuit. Check other units first.
4. Connect the battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure.
Non-reproduced>>Replace the unit whose connector was disconnected.

SECTION AV

AUDIO, VISUAL, NAVIGATION & TELEPHONE SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329183

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329184

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007665770

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

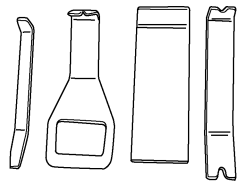
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

Special Service Tool

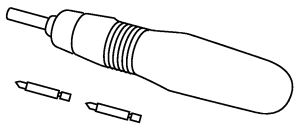
INFOID:0000000007665771

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46534) Trim tool set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

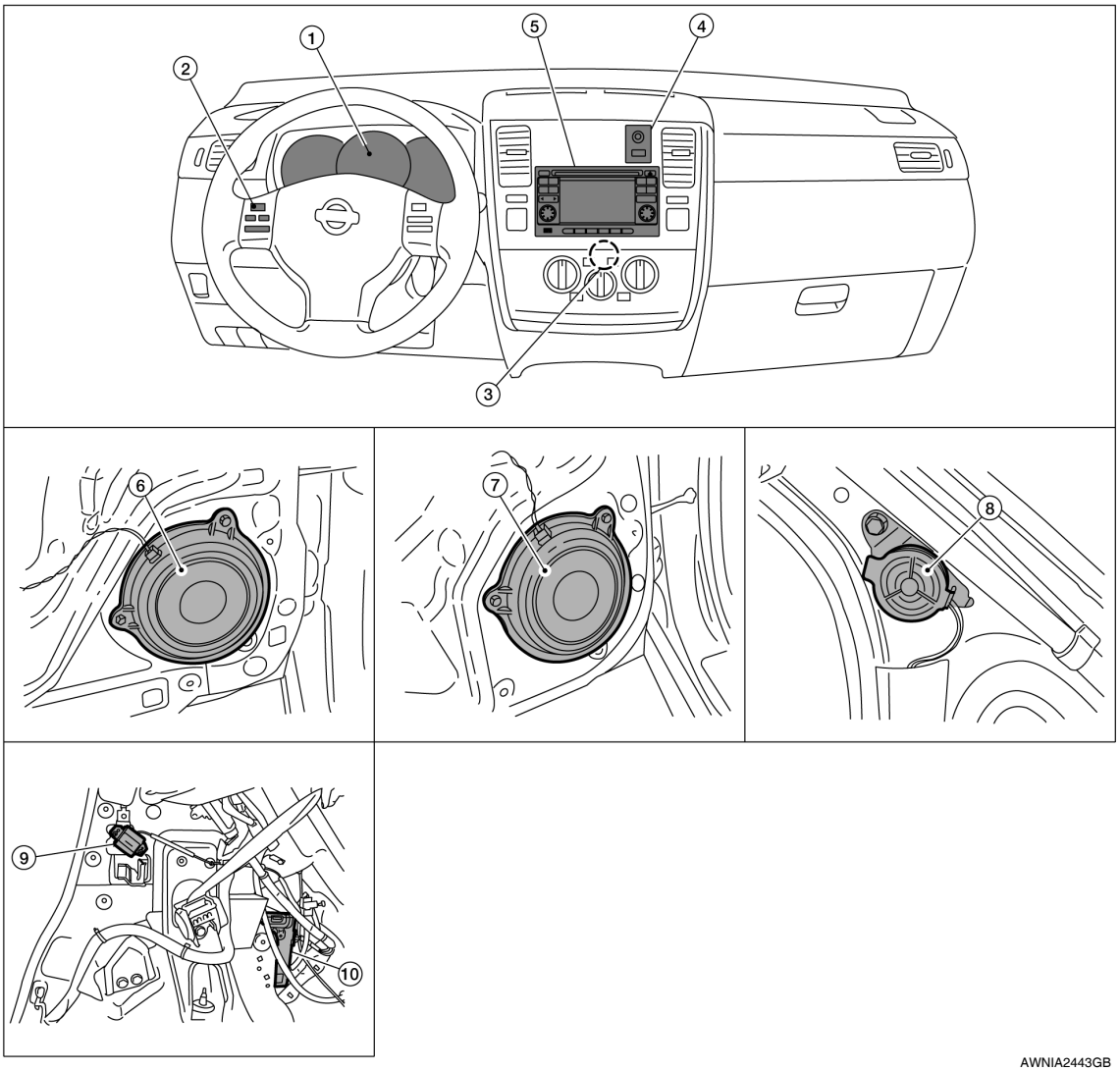
INFOID:0000000007329185

Tool name	Description
Power tool  PBIC0191E	Loosening bolts and nuts

AUDIO

Component Parts Location

INFOID:0000000007329186



AWNIA2443GB

1. Combination meter M24
2. Steering wheel audio control switches (with Bluetooth)
3. iPod® adapter M49 (premium system)
4. iPod® side M50 (premium system)
5. Audio unit M43 (base system) Audio unit M40, M43, M44 (premium system)
6. Front door speaker LH D12, RH D112
7. Rear door speaker LH D207, RH D307
8. Front tweeter LH M46, RH M47 (premium system) (view with front pillar garnish removed)
9. Bluetooth antenna [view with luggage side lower finisher (RH) removed]
10. Bluetooth control unit B121, B122

iPod® is a trademark of Apple inc., registered in the U.S. and other countries.

System Description

INFOID:0000000007329187

BASE SYSTEM

Refer to Owner's Manual for audio system operating instructions.
Power is supplied at all times
- through 20A fuse (No. 27, located in the fuse and fusible link box)
- to audio unit terminal 19.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse (No. 20, located in the fuse and fusible link box)
- to audio unit terminal 7.

Ground is supplied through the case of the audio unit.
Then audio signals are supplied
- through audio unit terminals 2, 3, 4, 5, 11, 12, 13 and 14
- to terminals + and - of front door speaker LH and RH and
- to terminals + and - of rear door speaker LH and RH.

PREMIUM SYSTEM

Refer to Owner's Manual for audio system operating instructions.
Power is supplied at all times
- through 20A fuse (No. 27, located in the fuse and fusible link box)
- to audio unit terminal 19.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse (No. 20, located in the fuse and fusible link box)
- to audio unit terminal 7.

Ground is supplied
- to audio unit terminals 20 and 61
- through body grounds M57 and M61.

Then audio signals are supplied
- through audio unit terminals 2, 3, 4, 5, 11, 12, 13, and 14
- to terminals + and - of front door speaker LH and RH and
- to terminals + and - of front tweeter LH and RH and
- to terminals + and - of rear door speaker LH and RH.

Steering Wheel Audio Control Switches (with Bluetooth)

When one of steering wheel audio control switches is pushed, the resistance in steering switch circuit changes depending on which button is pushed.

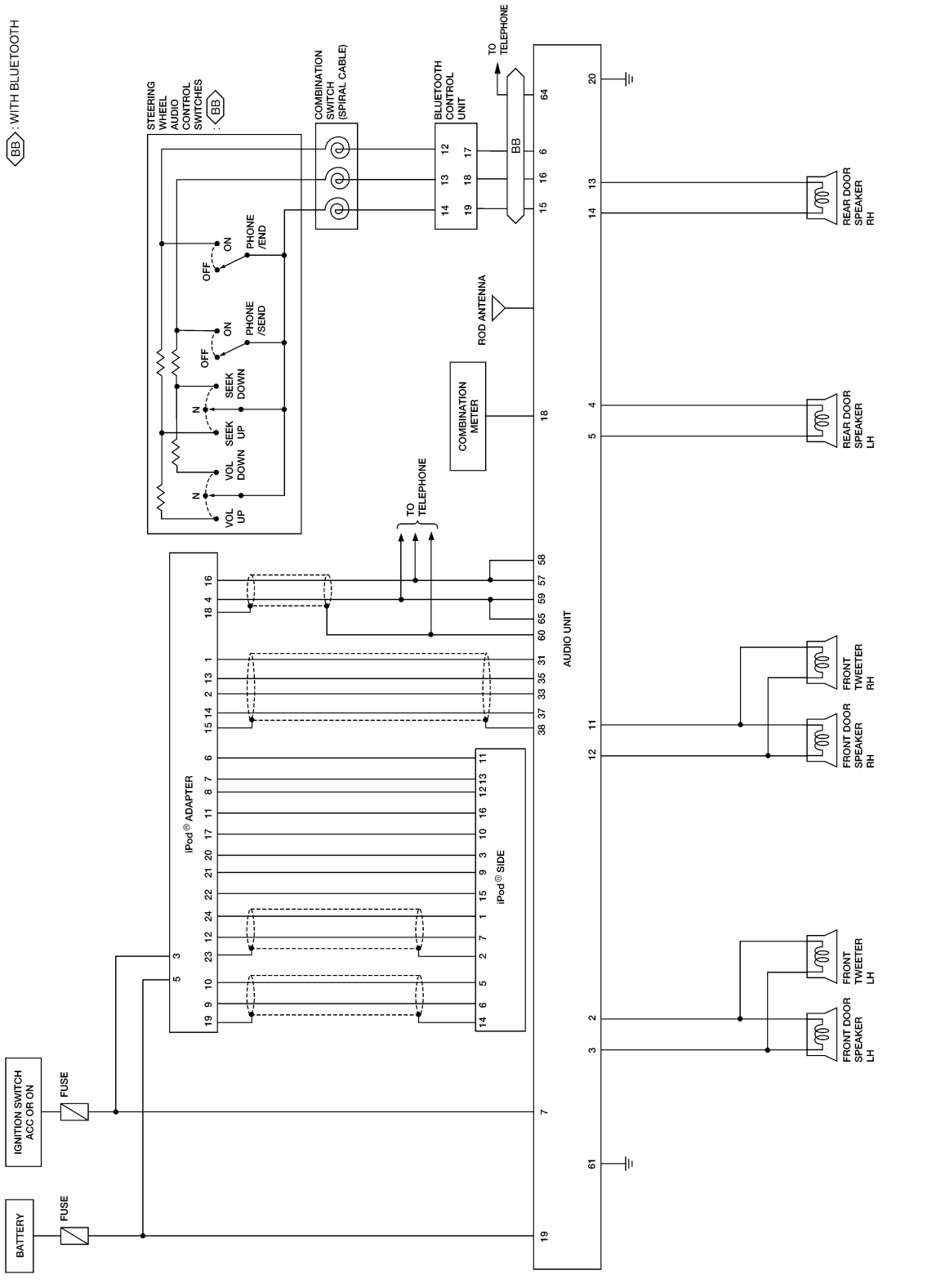
SPEED SENSITIVE VOLUME SYSTEM (PREMIUM SYSTEM)

Volume level of this system goes up and down automatically in proportion to the vehicle speed. The control level can be selected by the customer. Refer to Owner's Manual for operating instructions.

Schematic

INFOID:0000000007329188

PREMIUM SYSTEM



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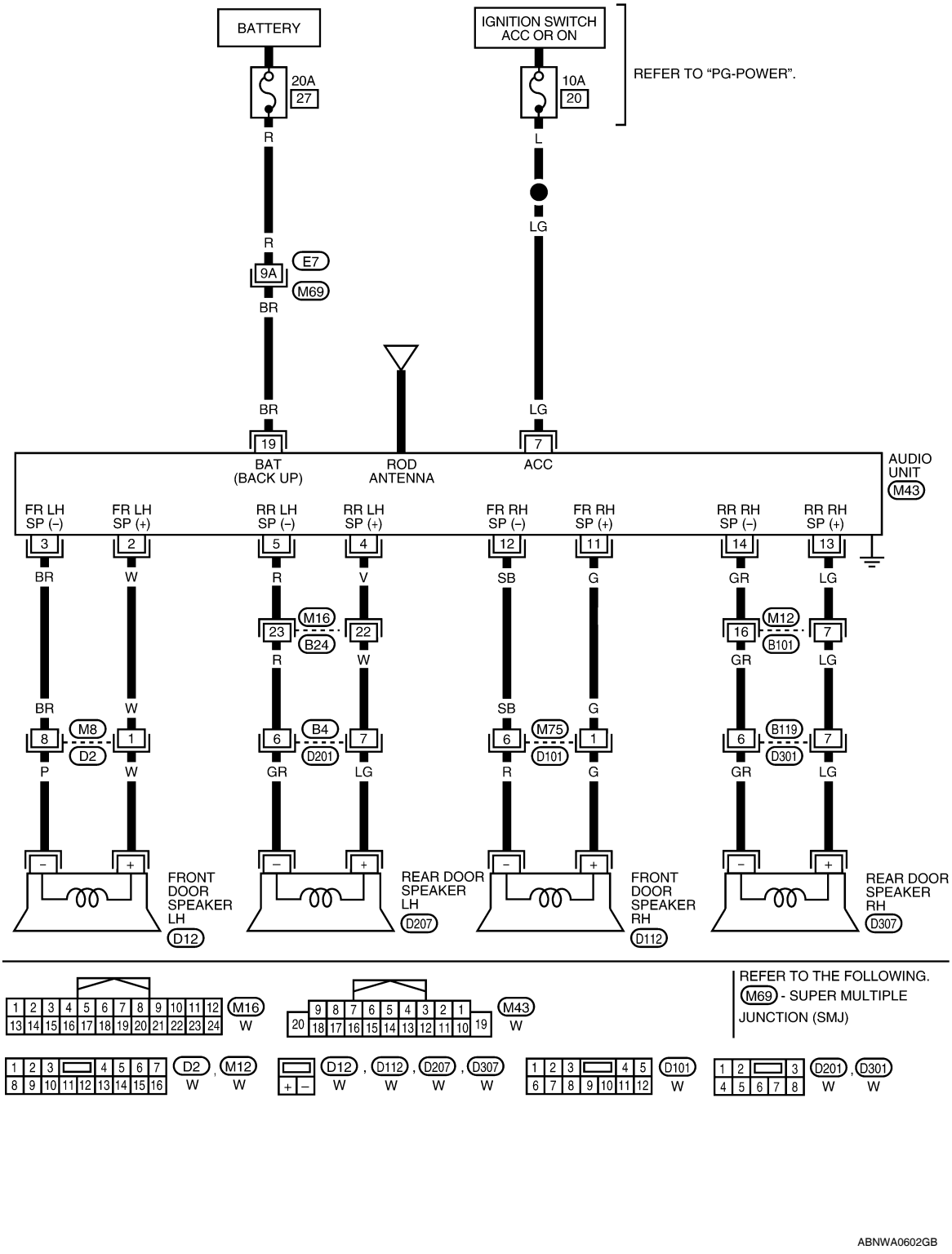
Wiring Diagram - AUDIO -

INFOID:0000000007329189

BASE SYSTEM

AV-AUDIO-01



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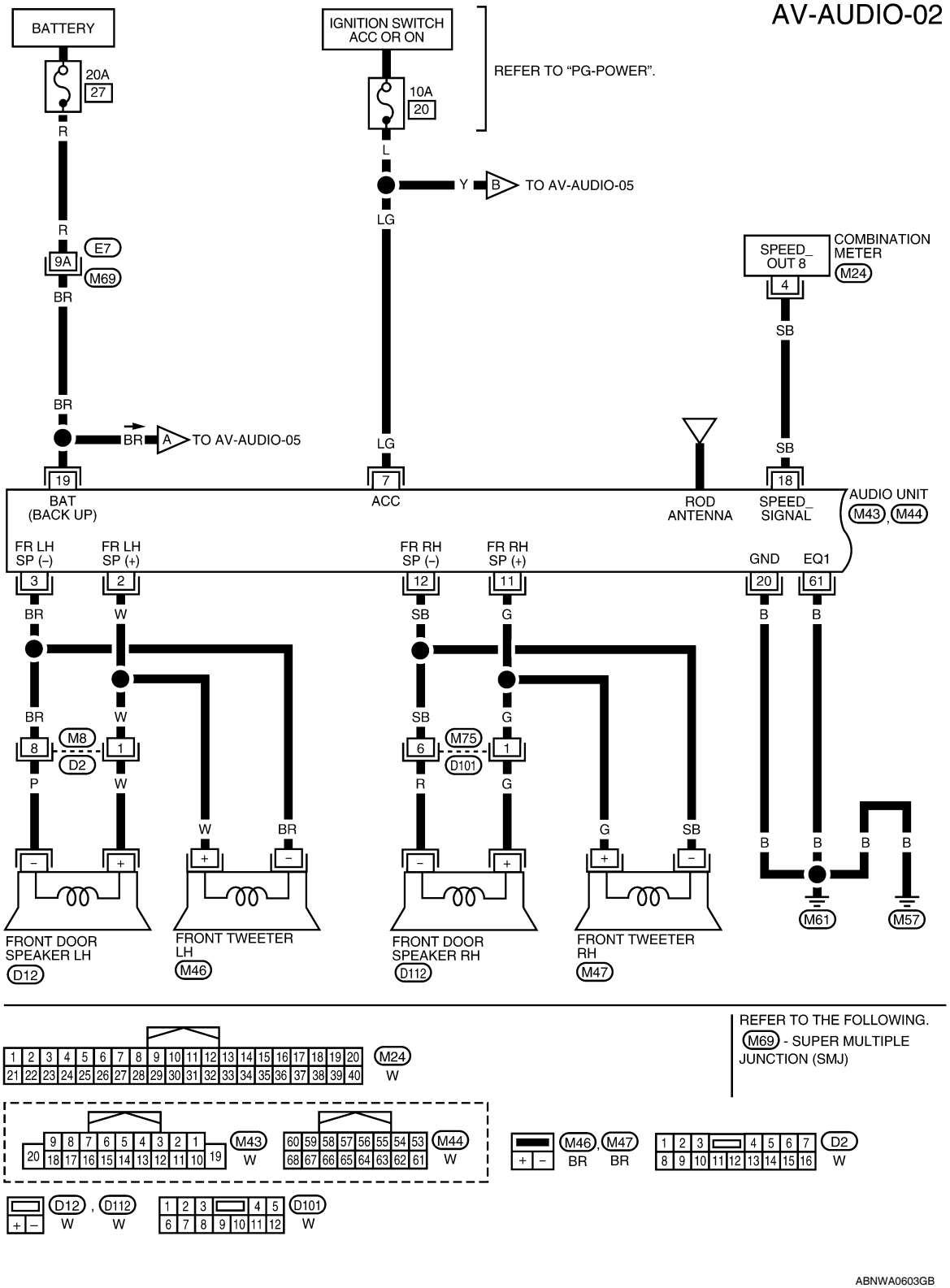
PREMIUM SYSTEM

AV-AUDIO-02



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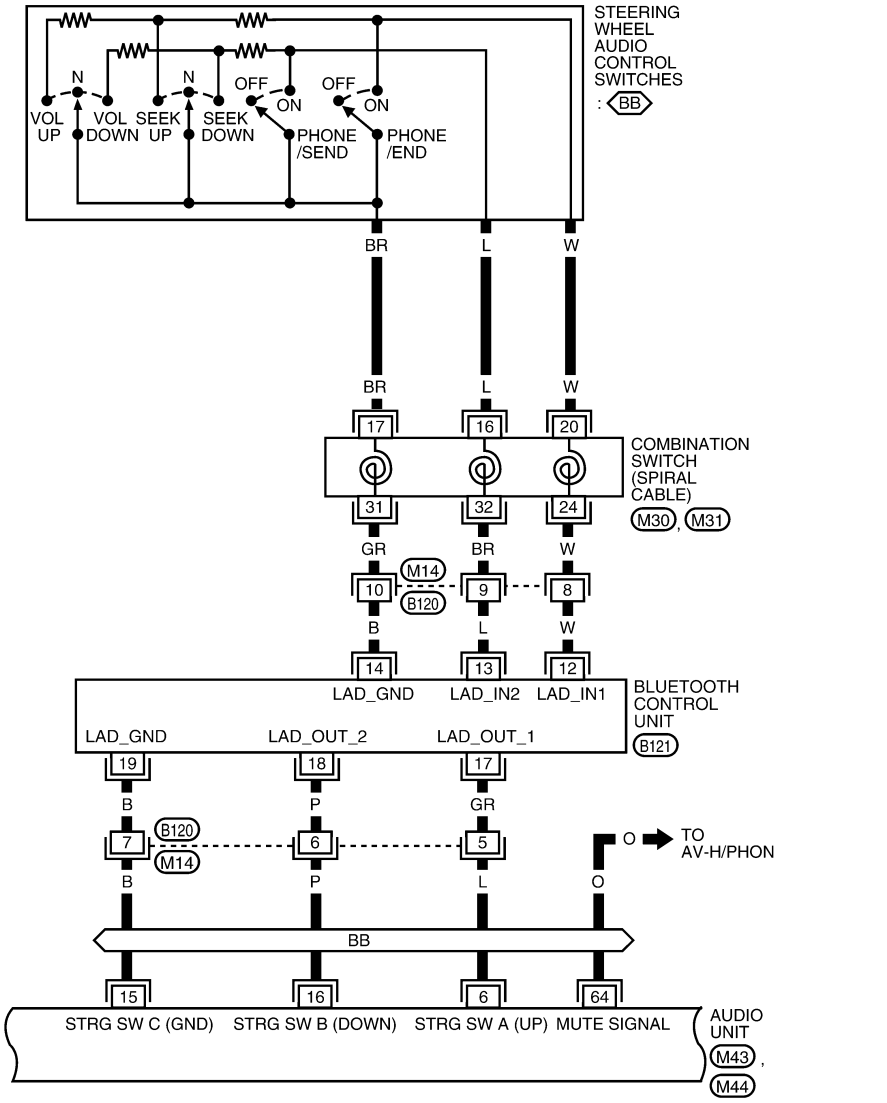
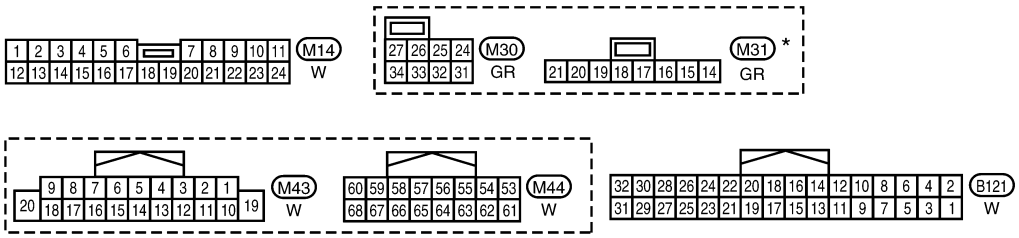
AV-AUDIO-03

BB : WITH BLUETOOTH





* : THIS CONNECTOR IS NOT SHOWN IN “HARNESS LAYOUT” OF PG SECTION.

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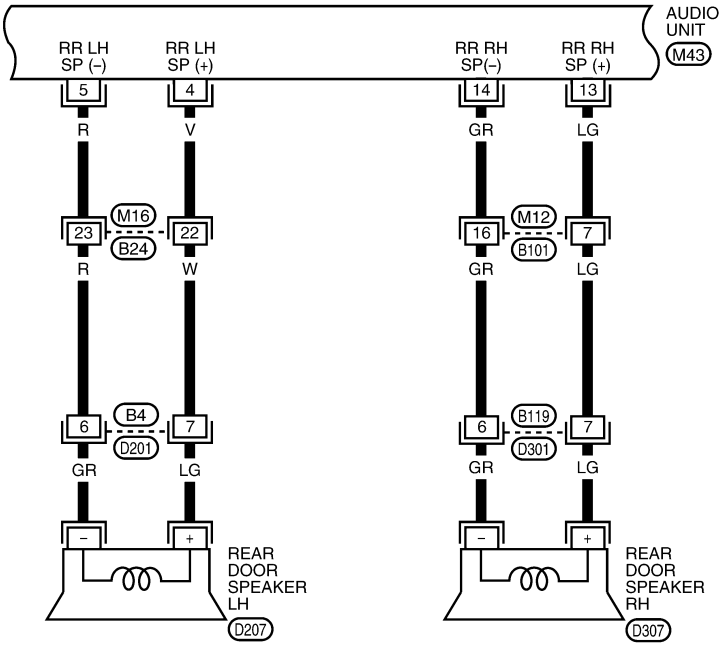
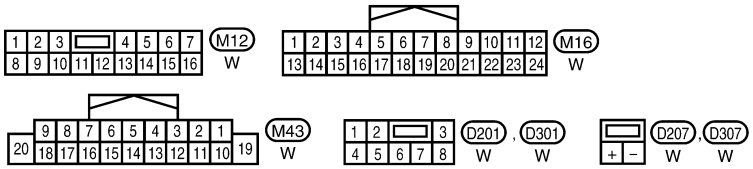
AV-AUDIO-04





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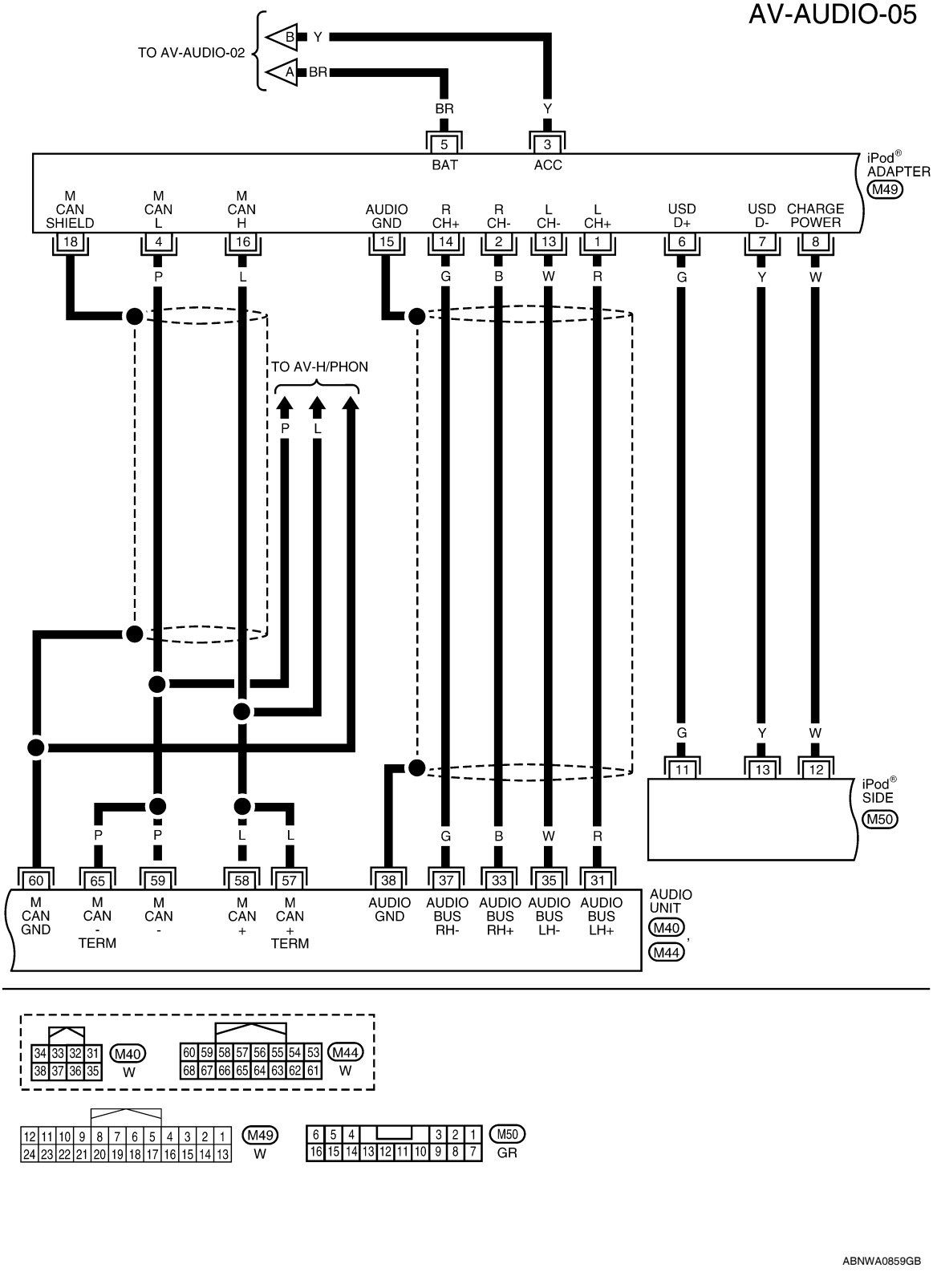
AV-AUDIO-05



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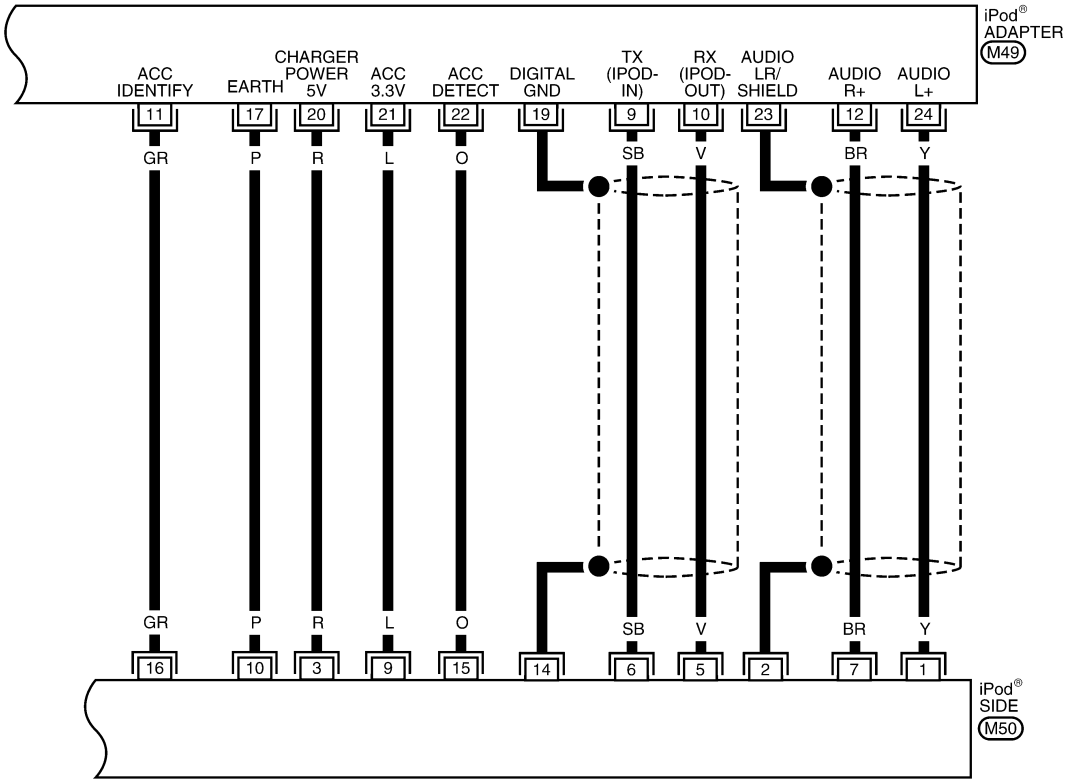
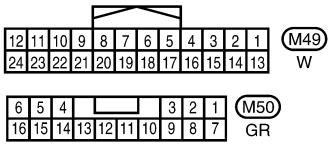
AV-AUDIO-06

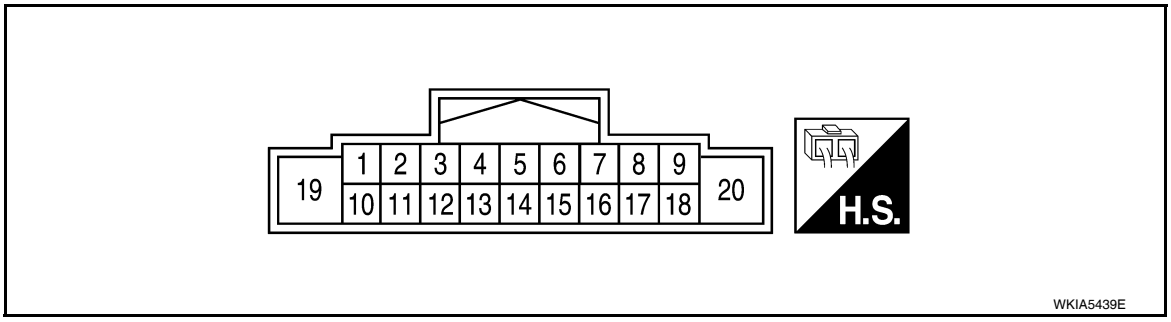




ABNWA0860GB

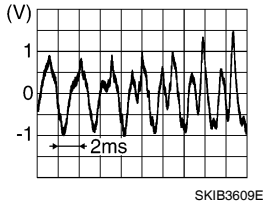
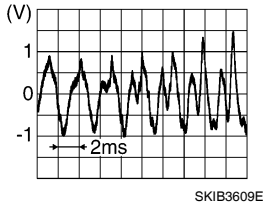
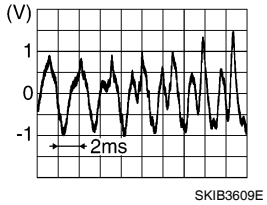
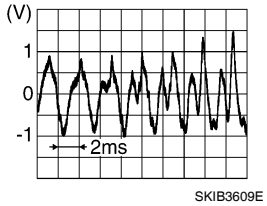
Audio Unit (Base System) Harness Connector Terminal Layout

INFOID:0000000007329190



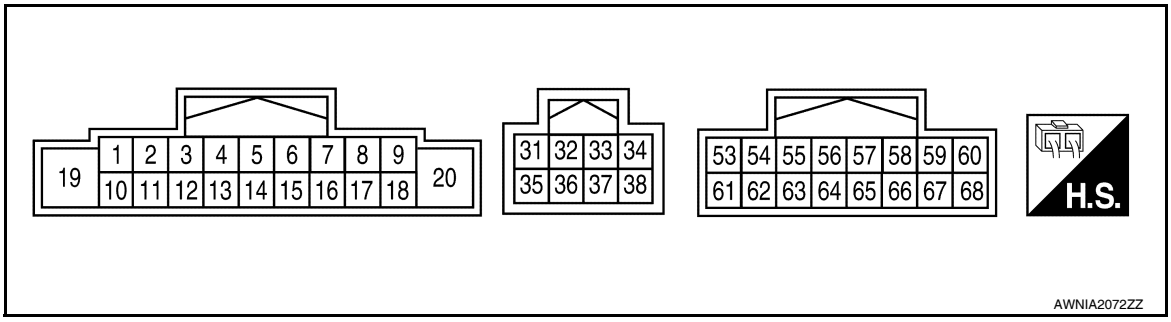
Terminal and Reference Value for Audio Unit (Base System)

INFOID:0000000007329191

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)
+	–			Ignition switch	Operation	
2 (W)	3 (BR)	Audio signal front LH	Output	ON	Receive audio signal	 SKIB3609E
4 (V)	5 (R)	Audio signal rear LH	Output	ON	Receive audio signal	 SKIB3609E
7 (LG)	Ground	ACC power supply	Input	ACC	–	Battery voltage
11 (G)	12 (SB)	Audio signal front RH	Output	ON	Receive audio signal	 SKIB3609E
13 (LG)	14 (GR)	Audio signal rear RH	Output	ON	Receive audio signal	 SKIB3609E
19 (BR)	Ground	Battery power supply	Input	OFF	–	Battery voltage

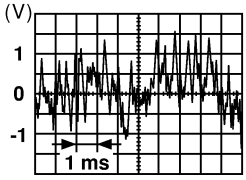
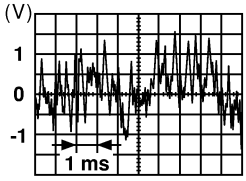
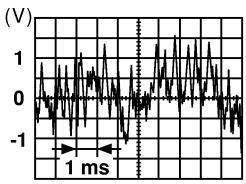
Audio Unit (Premium System) Harness Connector Terminal Layout

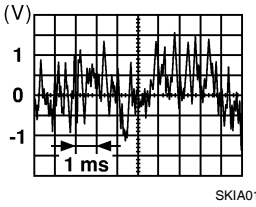
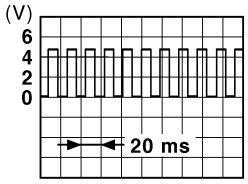
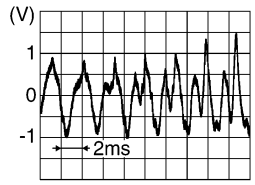
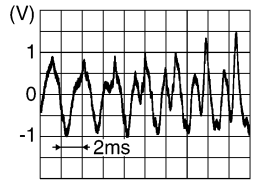
INFOID:0000000007329192

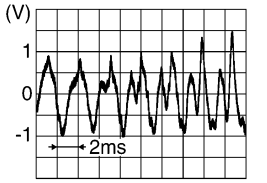


Terminal and Reference Value for Audio Unit (Premium System)

INFOID:0000000007329193

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
2 (W)	3 (BR)	Audio sound signal front LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker LH or tweeter LH.
4 (V)	5 (R)	Audio sound signal rear LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear door speaker LH.
6 (L)*1	Ground	Remote control A	Input	ON	Press Phone/ End switch	0V	Steering wheel audio controls do not function
					Press SEEK UP switch	1.7V	
					Press VOL UP switch	3.3V	
					Except for above	5.0V	
7 (LG)	Ground	ACC signal	Input	ON	Ignition switch ACC or ON	Battery voltage	System does not work properly.
11 (G)	12 (SB)	Audio sound signal front RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker RH or tweeter RH.

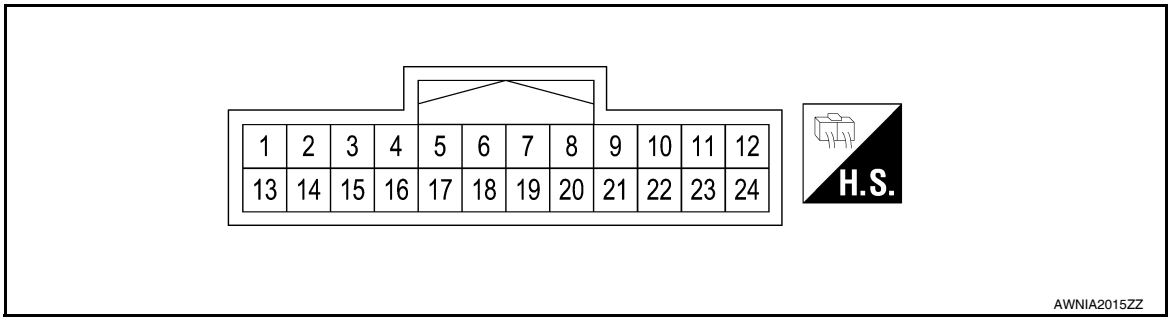
Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
13 (LG)	14 (GR)	Audio sound signal rear RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear door speaker RH.
15 (B)*1	–	Remote control ground	Input	–	–	–	Steering wheel audio controls do not function
16 (P)*1	Ground	Remote control B	Input	ON	Press Phone/ Send switch	0V	Steering wheel audio controls do not function
					Press SEEK DOWN switch	1.7V	
					Press VOL DOWN switch	3.3V	
					Except for above	5.0V	
18 (SB)	Ground	Vehicle speed signal (8–pulse)	Input	ON	When vehicle speed is approx. 40 km/h (25 MPH)	 PKIC0643E	Speed sensitive volume is inoperative.
19 (BR)	Ground	Battery power	Input	–	–	Battery voltage	Audio unit will not work properly.
20 (B)	Ground	Ground	–	–	–	–	–
31 (R)	35 (W)	iPod® audio signal LH	Input	ON	With iPod® operating	 SKIB3609E	—
33 (B)	37 (G)	iPod® audio signal RH	Input	ON	With iPod® operating	 SKIB3609E	—
38	—	Shield	—	—	—	—	—
57 (L)	—	AV communication signal 1 (H)	Input/ Output	—	—	—	—
58 (L)	—	AV communication signal 1 (H)	Input/ Output	—	—	—	—

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
59 (P)	—	AV communication signal 1 (L)	Input/ Output	—	—	—	—
60	—	Shield	—	—	—	—	—
61 (B)	Ground	Ground	–	–	–	–	–
64 (O)*1	–	Bluetooth ON	Output	ON	Audio unit sends power signal to Bluetooth control unit	–	Mute inoperative
65 (P)	—	AV communication signal 1 (L)	Input/ Output	—	—	—	—
66 (LG)*1	67 (V)*1	Audio out	Output	ACC/ ON	Audio unit receives audio signal from Bluetooth control unit	 SKIB3609E	Bluetooth can not be heard.
68*1	–	Shield	–	–	–	–	–

*1: With Bluetooth

IPod Adapter Harness Connector Terminal Layout

INFOID:0000000007329194



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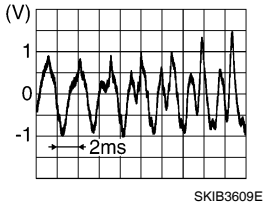
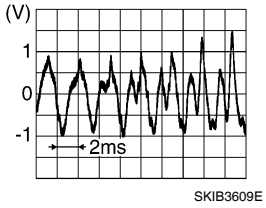
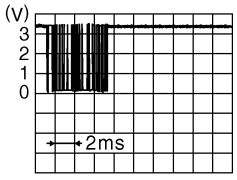
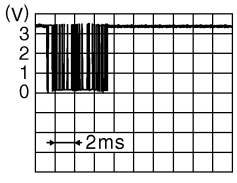
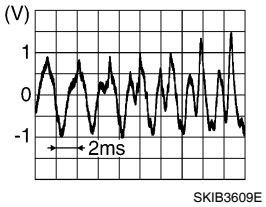
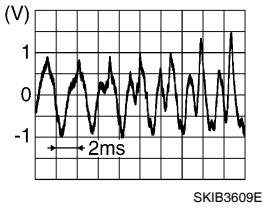
Terminal and Reference Value for IPod Adapter

INFOID:0000000007329195

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
1 (R)	13 (W)	iPod® sound signal LH	Output	Ignition switch ON	When iPod® mode is selected.	 SKIB3609E
2 (B)	14 (G)	iPod® sound signal RH	Output	Ignition switch ON	When iPod® mode is selected.	 SKIB3609E
3 (Y)	Ground	ACC power supply	Input	Ignition switch ACC	—	Battery voltage
4 (P)	—	AV communication signal (L)	Input/ Output	—	—	—
5 (BR)	Ground	Battery power supply	Input	Ignition switch OFF	—	Battery voltage
6 (G)	7 (Y)	iPod® USD signal	—	Ignition switch ON	—	—
8 (W)	Ground	iPod® battery charge	Output	Ignition switch ON	Connected to iPod®.	Battery voltage
9 (SB)	Ground	Communication signal (iPod® adapter→iPod®)	Output	Ignition switch ON	The wave pattern is displayed just after iPod® connection.	 JPNIA0462GB **NOTE:** After the wave pattern display, the value continues Approx 3.3V
10 (V)	Ground	Communication signal (iPod®→iPod® adapter)	Input	Ignition switch ON	Connected to iPod®.	 JPNIA0462GB
11 (GR)	Ground	ACCESSORY-IDENTIFY	—	Ignition switch ON	Connected to iPod®.	0V

Terminal (Wire color)		Description		Condition		Reference value (Approx.)
+	–	Signal name	Input/ Output			
12 (BR)	Ground	iPod® sound signal RH	Input	Ignition switch ON	When iPod® mode is selected.	 SKIB3609E
15	—	Shield	—	—	—	—
16 (L)	—	AV communication signal (H)	Input/ Output	—	—	—
17 (P)	Ground	Ground	—	Ignition switch ON	—	0V
18	—	Shield	—	—	—	—
19	—	Shield	—	—	—	—
20 (R)	Ground	iPod® battery charge	Output	Ignition switch ON	Connected to iPod®.	5.0V
21 (L)	Ground	iPod® connection recognition signal	Input	Ignition switch ON	Not connected to iPod®.	4.0V
					Connected to iPod®.	0V
22 (O)	Ground	ACCESSORY-DETECT	—	Ignition switch ON	Connected to iPod®.	0V
23	—	Shield	—	—	—	—
24 (Y)	Ground	iPod® sound signal LH	Input	Ignition switch ON	When iPod® mode is selected.	 SKIB3609E

Trouble Diagnosis

INFOID:0000000007329196

The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunctioning. Check if noise is caused and/or changed by engine speed, ignition switch turned to each position, and operation of each piece of electrical equipment, and then determine the cause.

NOTE:

The majority of the audio malfunctions are the result of outside causes (damaged CD, electromagnetic interference, etc.). Check the symptoms below to diagnose the malfunction.

Symptom	Check item
Audio system does not work properly.	• Audio unit power supply circuit. Refer to AV-22, "Power Supply Circuit Inspection". • Audio unit. Refer to AV-30, "Removal and Installation".
No sound can be heard from all speakers.	• Speaker circuit shorted to ground. Refer to AV-9, "Wiring Diagram - AUDIO -". • Audio unit. Refer to AV-30, "Removal and Installation".

Symptom	Check item
No sound can be heard from one or several speakers.	• Open or short in audio signal circuit between audio unit and front speaker. Refer to AV-24, "Sound Is Not Heard from Front Door Speaker (Base System)" or AV-27, "Sound Is Not Heard from Front Door Speaker or Tweeter (Premium System)". • Front speaker. Refer to AV-24, "Sound Is Not Heard from Front Door Speaker (Base System)" or AV-27, "Sound Is Not Heard from Front Door Speaker or Tweeter (Premium System)". • Open or short in audio signal circuit between audio unit and rear speaker. Refer to AV-25, "Sound Is Not Heard from Rear Door Speaker (Base System)" or AV-28, "Sound Is Not Heard from Rear Door Speaker (Premium System)". • Rear speaker. Refer to AV-25, "Sound Is Not Heard from Rear Door Speaker (Base System)" or AV-28, "Sound Is Not Heard from Rear Door Speaker (Premium System)". • Tweeter (mid level and premium system) AV-27, "Sound Is Not Heard from Front Door Speaker or Tweeter (Premium System)" or AV-28, "Sound Is Not Heard from Rear Door Speaker (Premium System)". • Audio unit. Refer to AV-30, "Removal and Installation".
No sound can be heard from radio or noise is heard.	• Antenna feeder. Refer to AV-34, "Location of Antenna". • Antenna. Refer to AV-34, "Location of Antenna". • Audio unit. Refer to AV-30, "Removal and Installation".
Buzz/rattle sound from speaker.	The majority of buzz/rattle sounds are not indicative of an issue with the speaker, usually something nearby the speaker is causing the buzz/rattle. Refer to "SQUEAK AND RATTLE TROUBLE DIAGNOSIS" in appropriate interior trim section.

NOTE:
Noise resulting from variations in field strength, such as fading noise and multi-path noise, or external noise from trains and other sources. It is not a malfunction.
- Fading noise: This noise occurs because of variations in the field strength in a narrow range due to mountains or buildings blocking the signal.
- Multi-path noise: This noise results from the waves sent directly from the broadcast station arriving at the antenna at a different time from the waves that reflect off of mountains or buildings.

Noise Inspection

INFOID:0000000007329197

The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunctioning. Check if noise is caused and/or changed by engine speed, ignition switch turned to each position, and operation of each piece of electrical equipment, and determine the cause.
NOTE:
The source of the noise can be found easily by listening to the noise while removing the fuses of electrical components, one by one.

TYPE OF NOISE AND POSSIBLE CAUSE

Occurrence condition		Possible cause
Occurs only when engine is ON.	A continuous growling noise occurs. The speed of the noise varies with changes in the engine speed.	Ignition components
	A whistling noise occurs while the engine speed is high. A booming noise occurs while the engine is running and the lighting switch is ON.	Generator
Noise only occurs when various electrical components are operating.	A cracking or snapping sound occurs with the operation of various switches.	Relay malfunction, radio malfunction
	The noise occurs when various motors are operating.	• Motor case ground • Motor
The noise occurs constantly, not just under certain conditions.		• Rear defogger coil malfunction • Open circuit in printed heater
A cracking or snapping sound occurs while the vehicle is being driven, especially when it is vibrating excessively.		• Ground wire of body parts. • Ground due to improper part installation • Wiring connections or a short circuit

Power Supply Circuit Inspection

INFOID:0000000007329198

1.CHECK FUSE

Check that the following fuses of the audio unit are not blown.

Unit	Terminals	Signal name	Fuse No.
Audio unit	19	Battery power	27
	7	Ignition switch ACC or ON	20

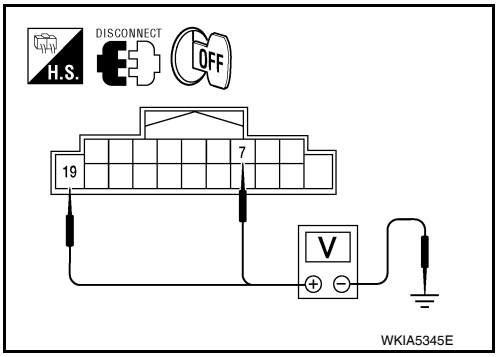
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of blown fuse before installing new fuse. Refer to PG-4, "Schematic" .

2.AUDIO UNIT POWER SUPPLY CIRCUIT CHECK

1. Disconnect audio unit connector.
2. Check voltage between the audio unit and ground.

Unit	Terminal No. (+) Connector	Terminal No. (+) Terminal	Terminal No. (-)	OFF	ACC	ON
Audio unit	M43	19	Ground	Battery voltage	Battery voltage	Battery voltage
		7	Ground	0V	Battery voltage	Battery voltage



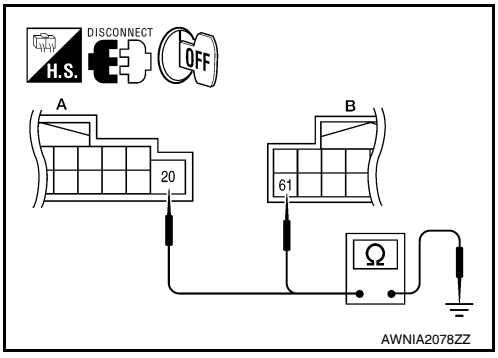
OK or NG

OK >> With premium system, GO TO 3.
NG >>
- Check connector housings for disconnected or loose terminals.
- Repair harness or connector.

3.GROUND CIRCUIT CHECK

Check continuity between audio unit (premium system) harness connectors M43 (A), M44 (B) terminals 20, 61 and ground.

Continuity should exist.



OK or NG

OK >> Inspection End.
NG >>
- Check connector housings for disconnected or loose terminals.
- Repair harness or connector.

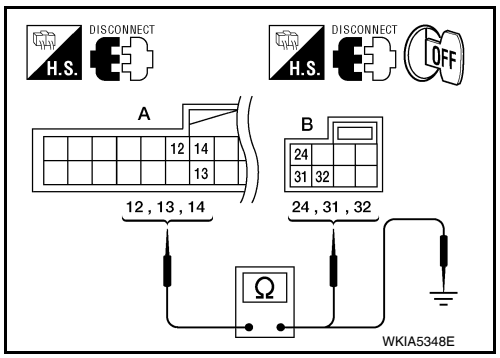
Steering Switch Check (With Bluetooth)

INFOID:0000000007329199

1.CHECK HARNESS

1. Turn ignition switch OFF.
2. Disconnect Bluetooth control unit connector and spiral cable connector M30.
3. Check continuity between Bluetooth control unit (A) connector B121 terminals 12, 14, and 13 and spiral cable (B) connector M30 terminals 24, 31, and 32.

Terminals				Continuity
A		B		
Connector	Terminal	Connector	Terminal	
B121	12	M30	24	Yes
	13		32	
	14		31	



4. Check continuity between Bluetooth control unit and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal		
B121	12	Ground	No
	13		
	14		

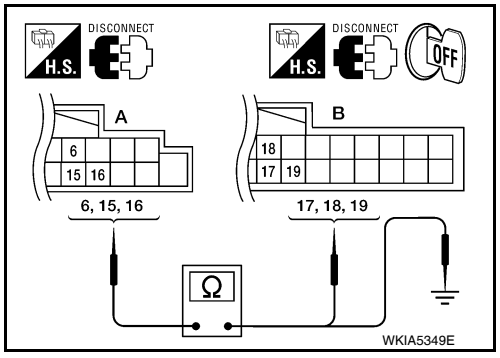
OK or NG

OK >> GO TO 2.
NG >> Repair harness.

2.CHECK HARNESS

1. Disconnect audio unit connector.
2. Check continuity between audio unit (A) connector M43 terminals 6, 15, and 16 and Bluetooth control unit (B) connector B121 terminals 17, 19, and 18.

Terminals				Continuity
(A)		(B)		
Connector	Terminal	Connector	Terminal	
M43	6	B121	17	Yes
	15		19	
	16		18	



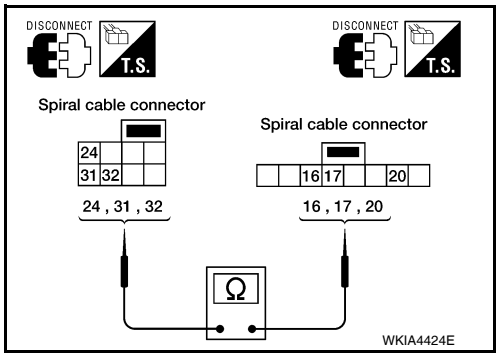
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3.SPIRAL CABLE CHECK

1. Disconnect spiral cable connector M31.
2. Check continuity between spiral cable terminals.

16 - 32 : Continuity should exist.
17 - 31 : Continuity should exist.
20 - 24 : Continuity should exist.



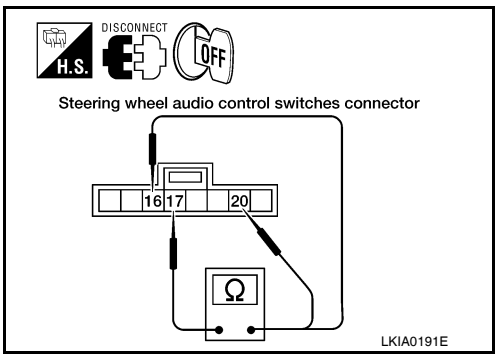
OK or NG

OK >> GO TO 4.
NG >> Replace spiral cable. Refer to SRS-37, "Removal and Installation" .

4.CHECK STEERING SWITCH RESISTANCE

Check resistance between spiral cable connector M31 terminals.

Terminal		Signal name	Condition	Resistance (Ω) (Approx.)
16	17	Seek (down)	Depress Seek down switch.	165
		Phone/Send	Depress Phone/Send switch.	0
		Volume (down)	Depress VOL down switch.	487
20	17	Seek (up)	Depress Seek up switch.	165
		Phone/End	Depress Phone/End switch.	0
		Volume (up)	Depress VOL up switch.	487



OK or NG

OK >> Inspection End.
NG >> Replace steering switch. Refer to AV-30, "Removal and Installation" .

Sound Is Not Heard from Front Door Speaker (Base System)

INFOID:0000000007329200

1.CONNECTOR CHECK

Check the audio unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair the terminal and connector.

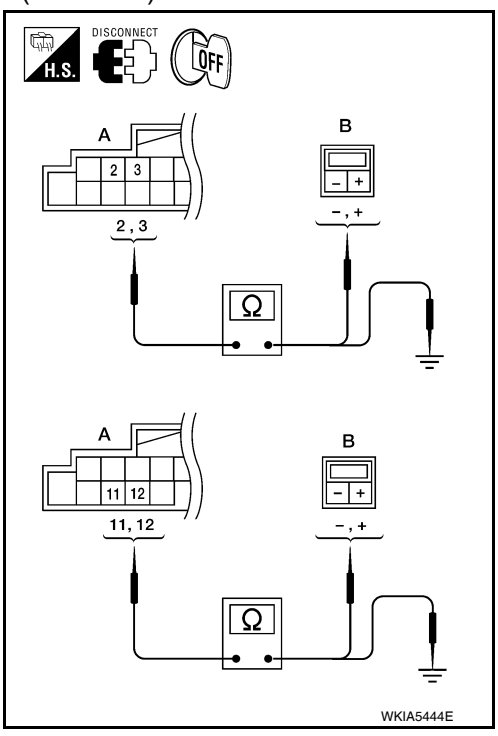
2.HARNESS CHECK

1. Disconnect audio unit connector and front door speaker connector (LH or RH).
2. Check continuity between audio unit connector M43 (A) terminal and suspect speaker connector (B) terminal.

Terminals				Continuity
A		B		
Connector	Terminal	Connector	Terminal	
M43	2	D12	+	Yes
	3		-	
	11	D112	+	
	12		-	

3. Check continuity between audio unit connector M43 terminal and ground.

Terminals			Continuity
Audio unit		—	
Connector	Terminal		
M43	2	Ground	No
	3		
	11		
	12		

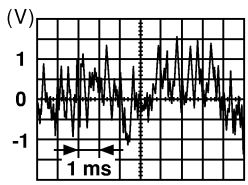


OK or NG

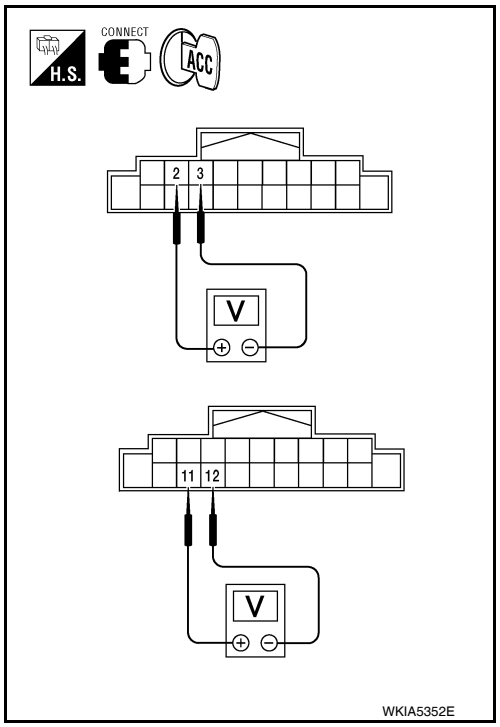
OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

3.FRONT SPEAKER SIGNAL CHECK

1. Connect audio unit connector and suspect speaker connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.
4. Check the signal between audio unit harness connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	2	M43	3	Receive audio signal	
	11		12		

SKIA0177E



WKIA5352E

OK or NG

OK >> Replace front door speaker. Refer to AV-30, "Removal and Installation".

NG >> Replace audio unit. Refer to AV-30, "Removal and Installation" .

Sound Is Not Heard from Rear Door Speaker (Base System)

INFOID:0000000007329201

1.CONNECTOR CHECK

Check the audio unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2

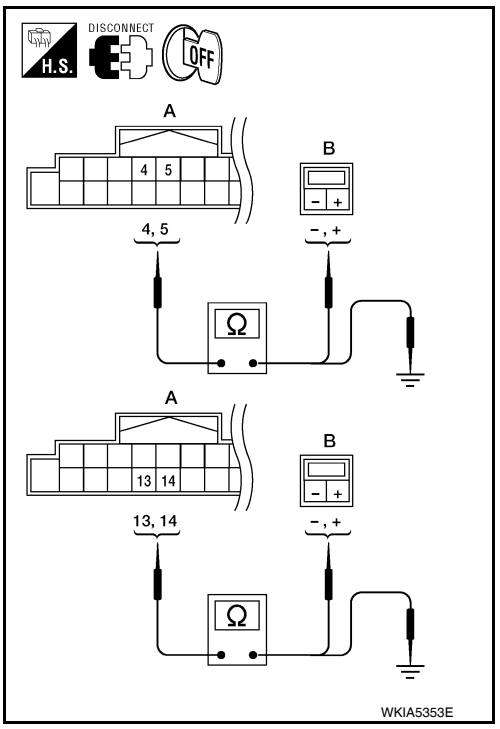
NO >> Repair the terminal and connector.

2.HARNESS CHECK

1. Disconnect audio unit connector and rear door speaker connector.

2. Check continuity between audio unit (A) connector terminal and rear door speaker (B) connector terminal.

Terminals				Continuity
A		B		
Connector	Terminal	Connector	Terminal	
M43	5	D207	-	Yes
	4		+	
	14	D307	-	
	13		+	



3. Check continuity between audio unit harness connector terminal and ground.

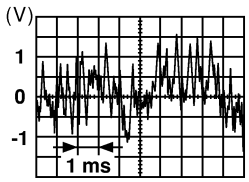
Terminals			Continuity
Audio unit		—	
Connector	Terminal		
M43	5	Ground	No
	4		
	14		
	13		

OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

3. REAR SPEAKER SIGNAL CHECK

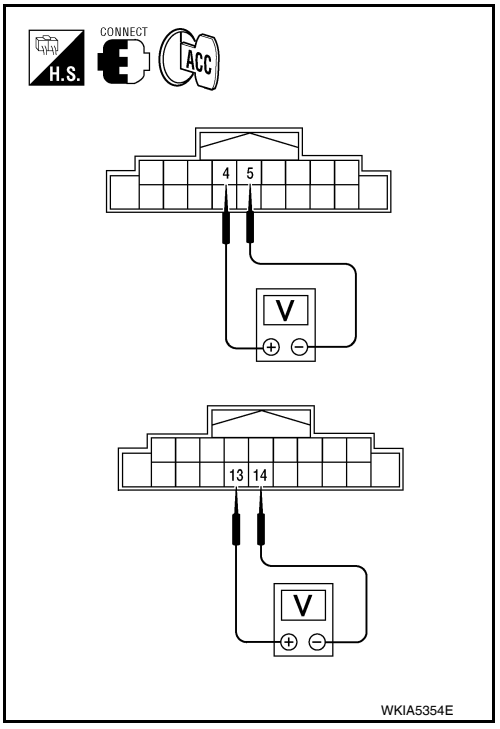
1. Connect audio unit connector and rear speaker connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.
4. Check the signal between audio unit harness connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	4	M43	5	Receive audio signal	
	13		14		

SKIA0177E

OK or NG

OK >> Replace rear door speaker. Refer to AV-30, "Removal and Installation" .
NG >> Replace audio unit. Refer to AV-30, "Removal and Installation" .



Sound Is Not Heard from Front Door Speaker or Tweeter (Premium System)

INFOID:0000000007329202

1.CONNECTOR CHECK

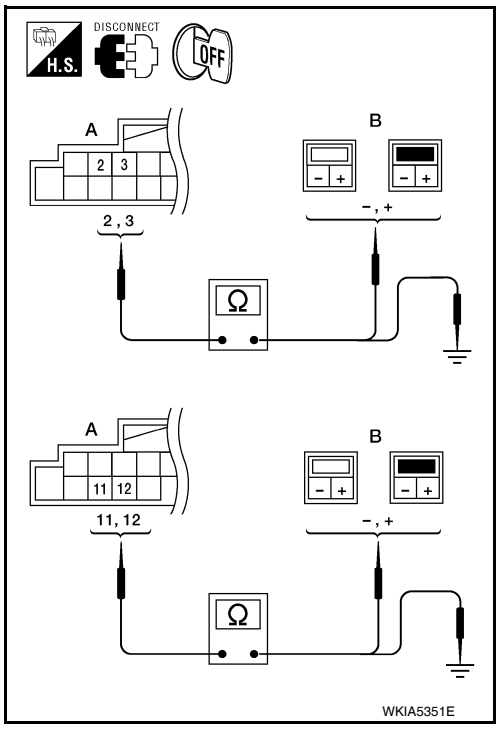
Check the audio unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair the terminal and connector.

2.HARNESS CHECK

1. Disconnect audio unit connector and front door speaker and tweeter connector (LH or RH).
2. Check continuity between audio unit harness connector terminal and front door speaker and tweeter harness connector terminal.



Terminals				Continuity
Audio unit.		Speaker or tweeter		
Connector	Terminal	Connector	Terminal	
A:M43	2	B:M46	+	Yes
	3		-	
	11	B:M47	+	
	12		-	
	2	B:D12	+	
	3		-	
	11	B:D112	+	
	12		-	

3. Check continuity between audio unit harness connector terminal and ground.

Terminals		—	Continuity
Audio unit			
Connector	Terminal		
M43	2	Ground	No
	3		
	11		
	12		

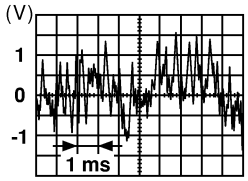
OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

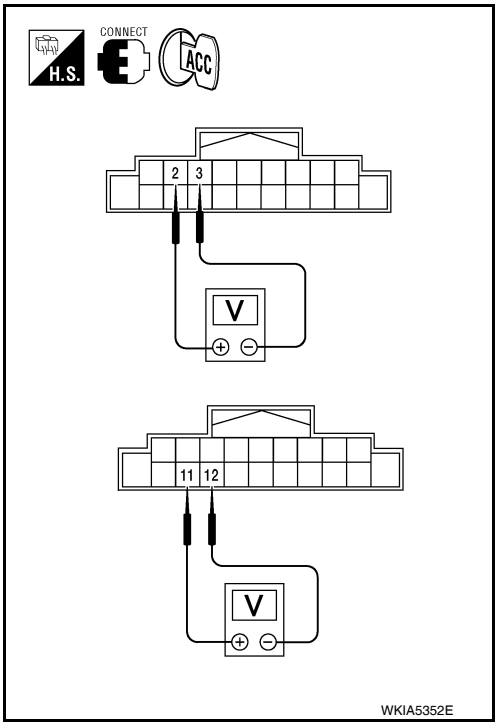
3.FRONT SPEAKER SIGNAL CHECK

1. Connect audio unit connector, front door speaker connector and tweeter connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.

4. Check the signal between audio unit connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	2	M43	3	Receive audio signal	
	11		12		

SKIA0177E



WKIA5352E

OK or NG

OK >> Replace front speaker. Refer to AV-30, "Removal and Installation".

NG >> Replace audio unit. Refer to AV-30, "Removal and Installation".

Sound Is Not Heard from Rear Door Speaker (Premium System)

INFOID:0000000007329203

1.CONNECTOR CHECK

Check the audio unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2

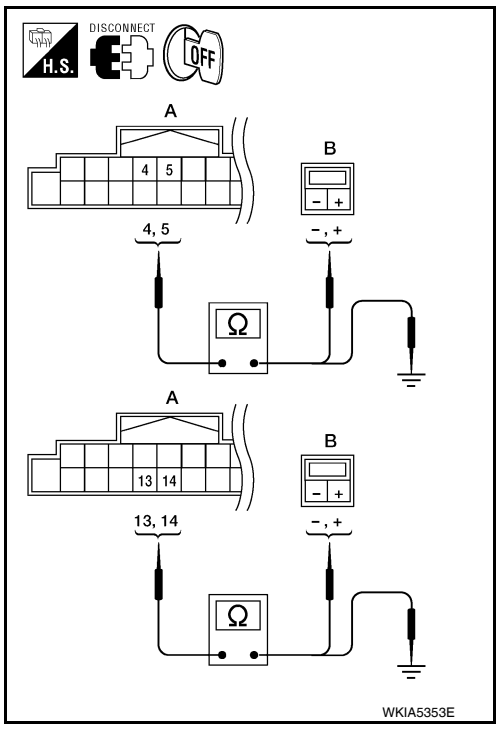
NO >> Repair the terminal and connector.

2.HARNESS CHECK

1. Disconnect audio unit connector and rear door speaker connector.

2. Check continuity between audio unit harness connector terminal and speaker harness connector terminal.

Terminals				Continuity
Audio unit		Speaker		
Connector	Terminal	Connector	Terminal	
M43	4	D207	+	Yes
	5		-	
	13	D307	+	
	14		-	



3. Check continuity between audio unit harness connector terminal and ground.

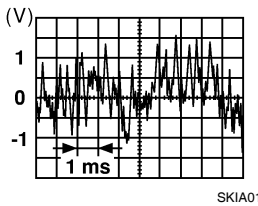
Terminals		—	Continuity
Audio unit			
Connector	Terminal		
M43	4	Ground	No
	5		
	13		
	14		

OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

3. REAR SPEAKER SIGNAL CHECK

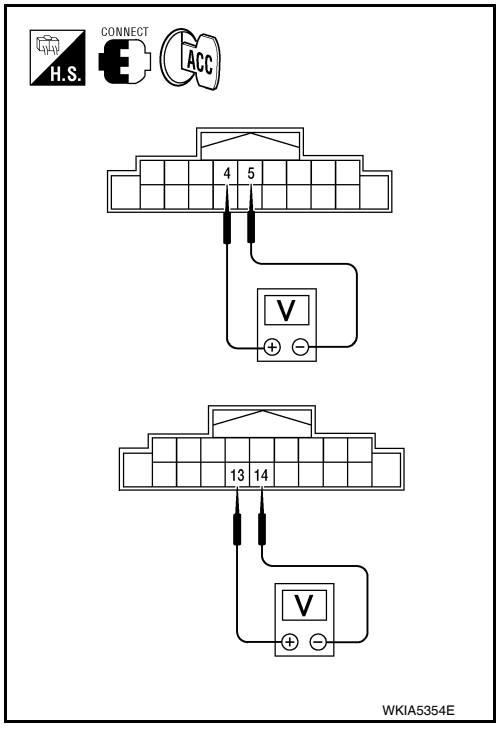
1. Connect audio unit connector and rear door speaker connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.
4. Check the signal between audio unit harness connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	5	M43	4	Receive audio signal	
	14		13		

SKIA0177E

OK or NG

OK >> Replace speaker. Refer to AV-30, "Removal and Installation".
NG >> Replace audio unit. Refer to AV-30, "Removal and Installation".



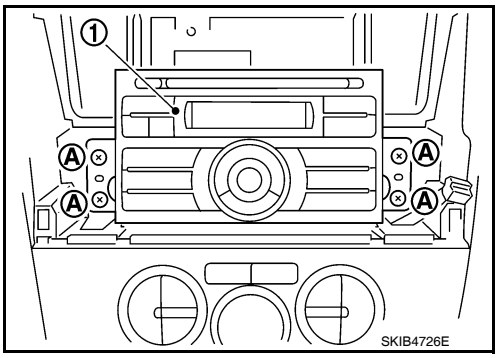
Removal and Installation

INFOID:0000000007329204

AUDIO UNIT

Removal

1. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
2. Remove the audio unit screws (A), disconnect the connectors and remove the audio unit (1).
3. Remove the audio unit bracket.

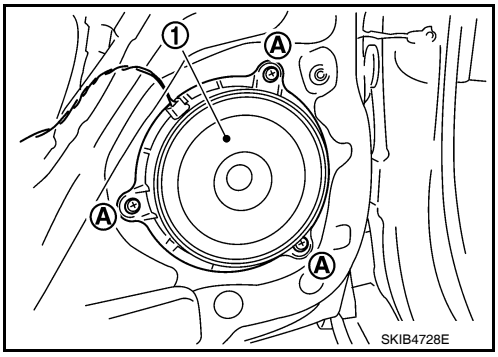


Installation
Installation is in the reverse order of removal.

FRONT DOOR SPEAKER

Removal

1. Remove the front door finisher. Refer to EI-30, "Removal and Installation".
2. Remove the front door speaker screws (A), disconnect the connector and remove the front door speaker (1).

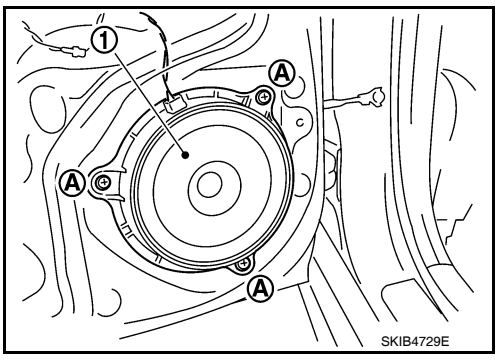


Installation
Installation is in the reverse order of removal.

REAR DOOR SPEAKER

Removal

1. Remove the rear door finisher. Refer to EI-30, "Removal and Installation".
2. Remove the rear door finisher screws (A), disconnect the connector and remove the rear door speaker (1).

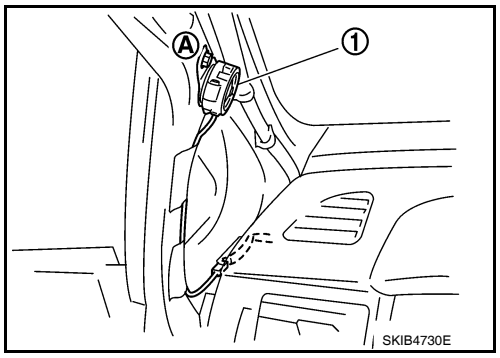


Installation
Installation is in the reverse order of removal.

TWEETER

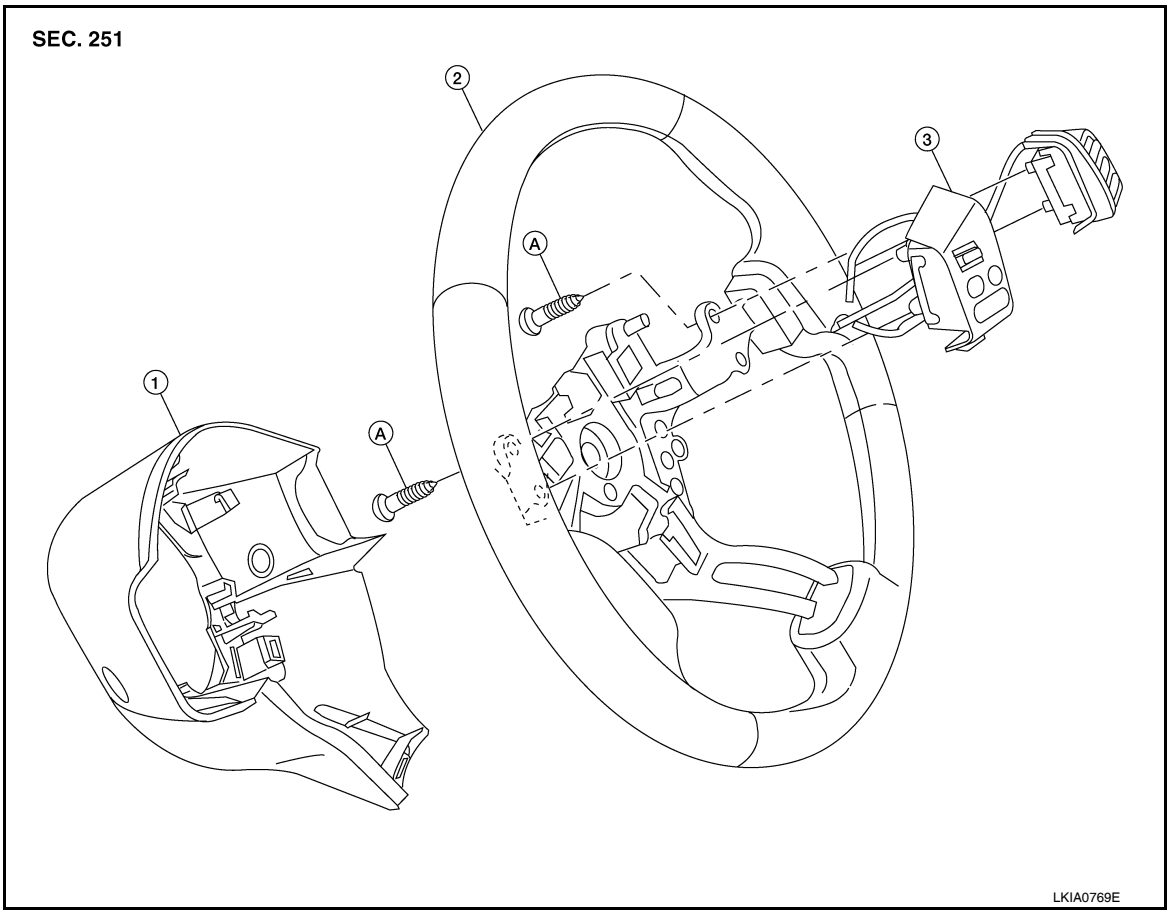
Removal

1. Remove the front pillar garnish. Refer to EI-35, "Component".
2. Remove the tweeter screw (A), disconnect the connector and remove the tweeter (1).



Installation
Installation is in the reverse order of removal.

STEERING WHEEL AUDIO CONTROL SWITCHES



1. Steering wheel finisher cover
2. Steering wheel
3. Steering wheel audio control switches

A. Screws

Removal
1. Remove the steering wheel. Refer to PS-7, "Removal and Installation".
2. Remove the steering wheel finisher cover.
3. Remove the screws and the steering wheel audio control switches.

Installation
Installation is in the reverse order of removal.

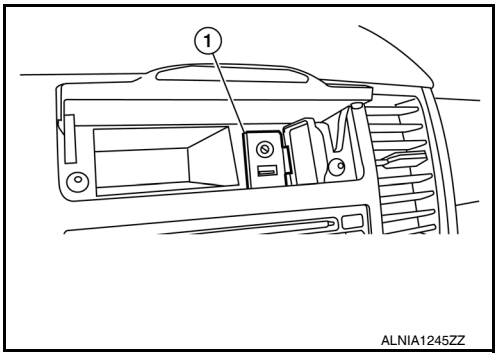
IPOD® CONNECTOR

Removal and Installation

INFOID:0000000007329205

REMOVAL

1. Remove the cluster lid C. Refer to IP-12, "Removal and Installation".
2. Push the pawl from the back of the cluster lid C to remove the iPod® connector (1).



INSTALLATION

Installation is in the reverse order of removal.

IPOD® ADAPTER

Removal and Installation

INFOID:0000000007329206

REMOVAL

1. Disconnect the battery negative terminal.
2. Remove the audio unit. Refer to AV-30, "Removal and Installation".
3. Disconnect the iPod® adapter connector, then remove the iPod® adapter.

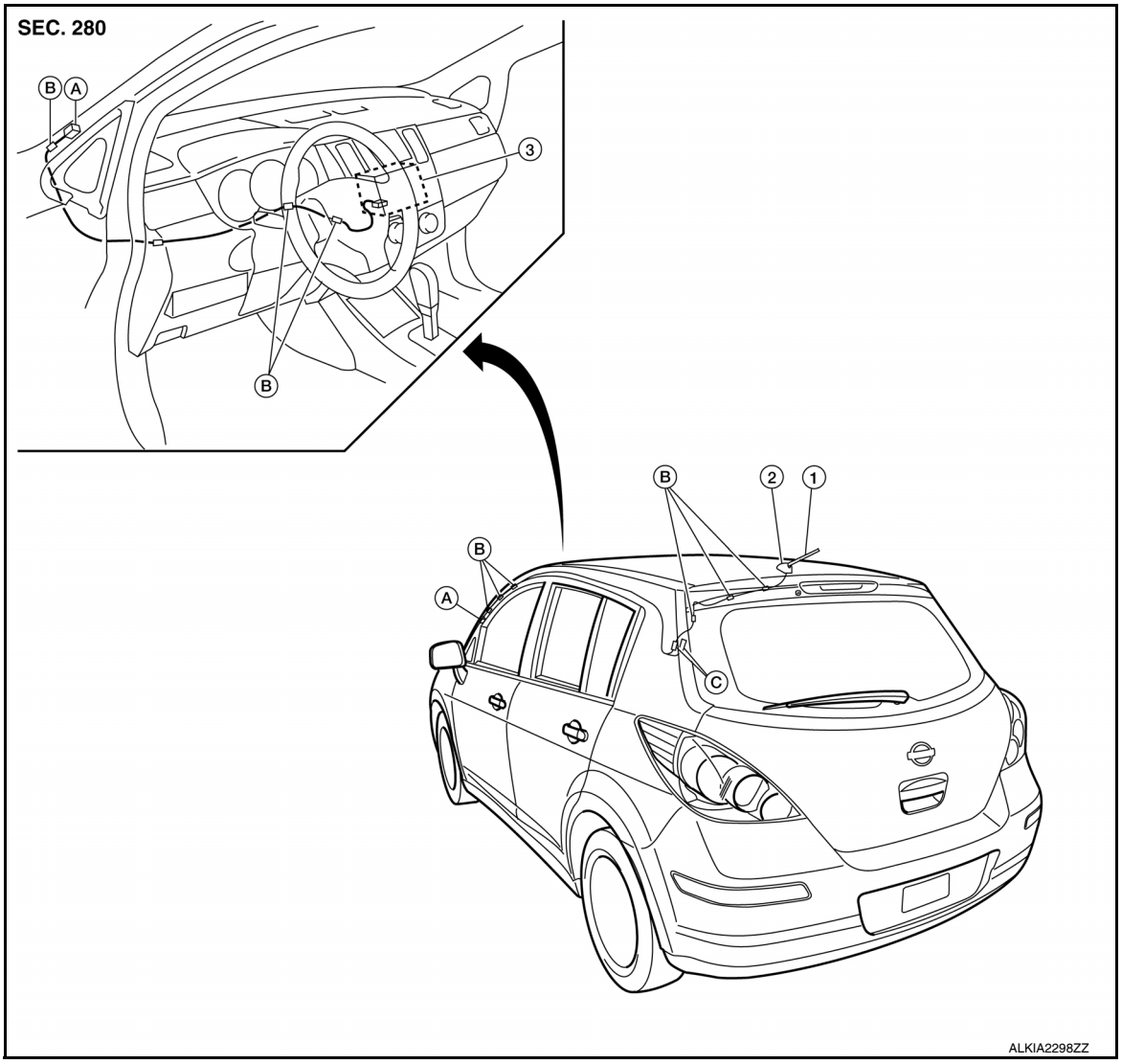
INSTALLATION

Installation is in the reverse order of removal.

AUDIO ANTENNA

Location of Antenna

INFOID:0000000007329207



1. Roof antenna
2. Roof antenna base
3. Audio unit
A. Audio antenna harness connector
B. Harness clips
C. Roof antenna harness connectors

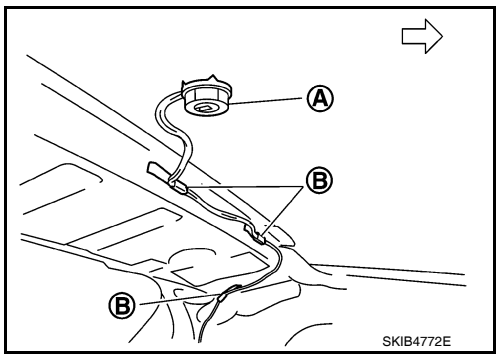
Removal and Installation of Roof Antenna

INFOID:0000000007329208

REMOVAL

1. Remove the luggage side upper finisher (LH). Refer to EI-44, "Removal and Installation".
2. Remove rear assist grip (LH). Refer to EI-41, "Component".
3. Remove three clips of headlining (rear side). Pull down headlining (rear side) and obtain space for work between vehicle and headlining.
4. Disconnect the roof antenna harness connectors.
5. Remove nut (A) and clips (B).

• ⇦: Vehicle front



6. Remove the roof antenna.

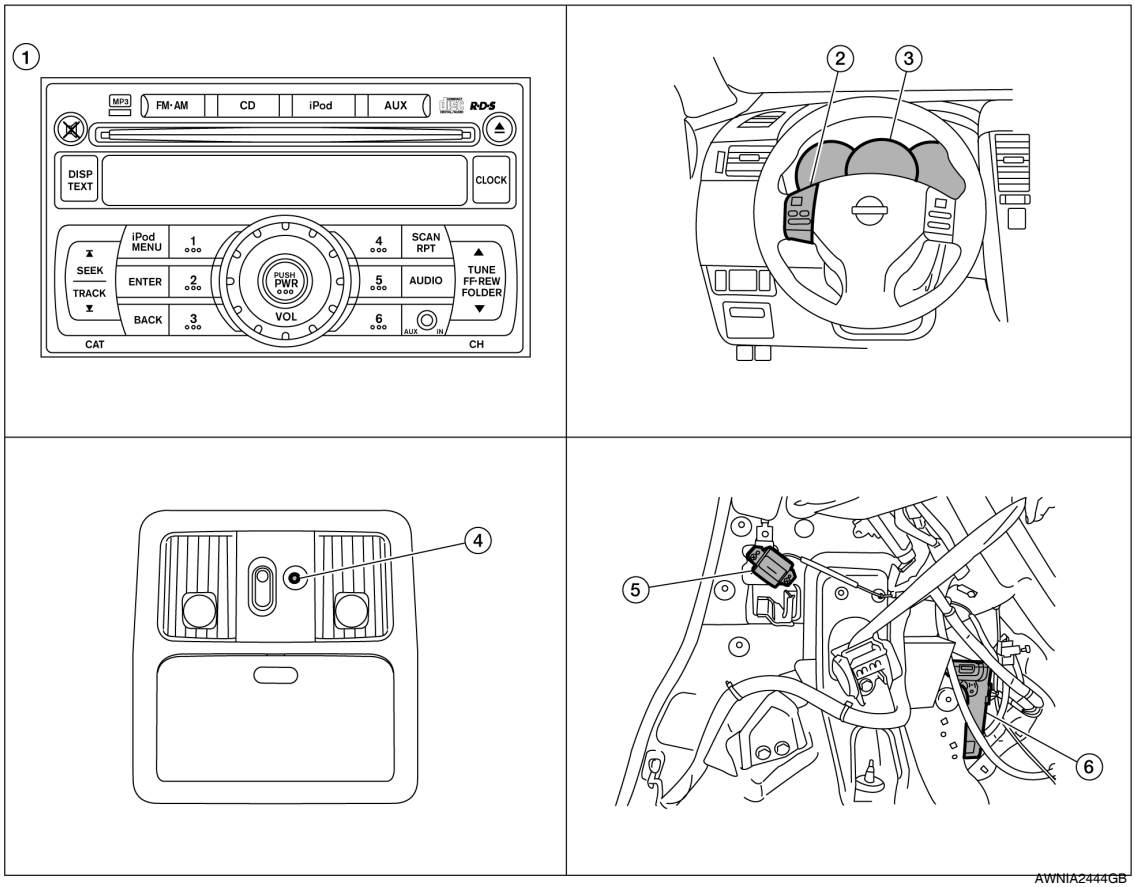
INSTALLATION

Installation is in the reverse order of removal.

TELEPHONE

Component Parts and Harness Connector Location

INFOID:0000000007329209



1. Audio unit M43, M44
2. Steering wheel audio control switches
3. Combination meter M24
4. Bluetooth microphone R15
5. Bluetooth antenna
6. Bluetooth control unit B121, B122 [view with luggage side lower finisher (RH) removed]

System Description

INFOID:0000000007329210

BLUETOOTH® HANDS-FREE PHONE SYSTEM

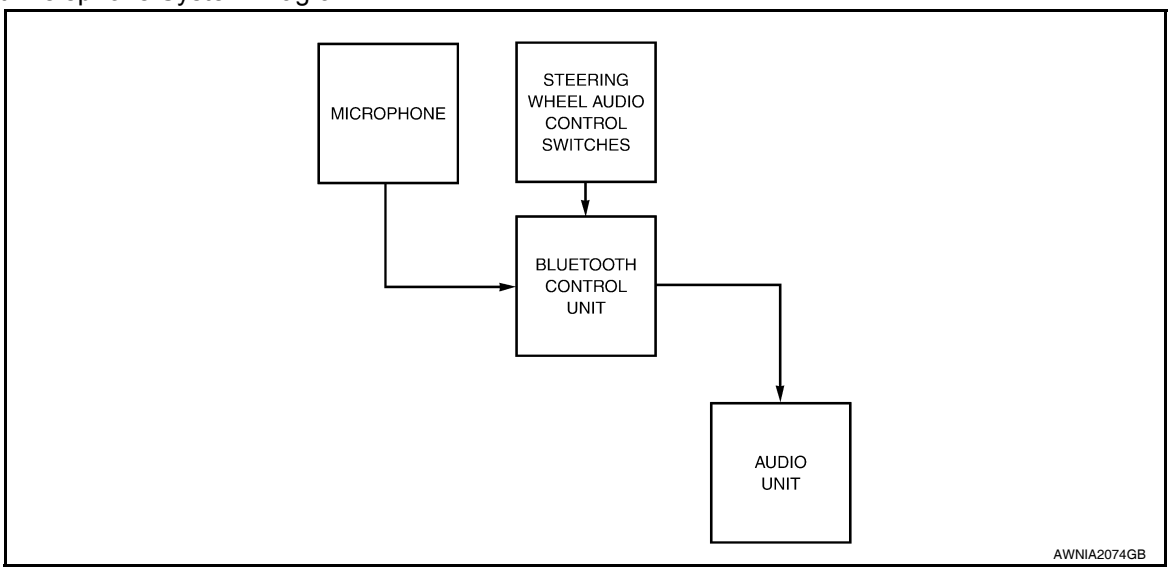
Refer to the Owner's Manual for Bluetooth telephone system operating instructions.

NOTE:

Cellular telephones must have their wireless connection set up (paired) before using the Bluetooth telephone system.

Bluetooth telephone system allows users who have a Bluetooth cellular telephone to make a wireless connection between their cellular telephone and the Bluetooth control unit. Hands-free cellular telephone calls can be sent and received. Personal memos can be created using the NISSAN Voice Recognition system. Some Bluetooth cellular telephones may not be recognized by the Bluetooth control unit. When a cellular telephone or the Bluetooth control unit is replaced, the telephone must be paired with the Bluetooth control unit. Different cellular telephones may have different pairing procedures. Refer to the cellular telephone operating manual.

Bluetooth Telephone System Diagram



Bluetooth Control Unit

When the ignition switch is turned to ACC or ON, the Bluetooth control unit will power up. During power up, the Bluetooth control unit is initialized and performs various self checks. Initialization may take up to 10 seconds. If a phone is present in the vehicle and paired with the Bluetooth control unit, NISSAN Voice Recognition will then become active. Bluetooth telephone functions can be turned off using the NISSAN Voice Recognition system. For Bluetooth control unit location, refer to AV-36, "Component Parts and Harness Connector Location".

Steering Wheel Audio Control Switches

When buttons on the steering wheel audio control switch are pushed, the resistance in steering wheel audio control switch circuit changes depending on which button is pushed. The Bluetooth control module uses this signal to perform various functions while navigating through the voice recognition system.

The following functions can be performed using the steering wheel audio control switch:

- Initiate Self Diagnosis of the Bluetooth telephone system
- Start a voice recognition session
- Answer and end telephone calls
- Adjust the volume of calls
- Record memos

Volume Switch

Call volume can be adjusted using the audio unit volume switch.

Bluetooth Microphone

The Bluetooth microphone is located in the roof console assembly. The Bluetooth microphone sends a signal to the Bluetooth control unit. The Bluetooth microphone can be actively tested during self-diagnosis. For Bluetooth microphone location, refer to AV-36, "Component Parts and Harness Connector Location".

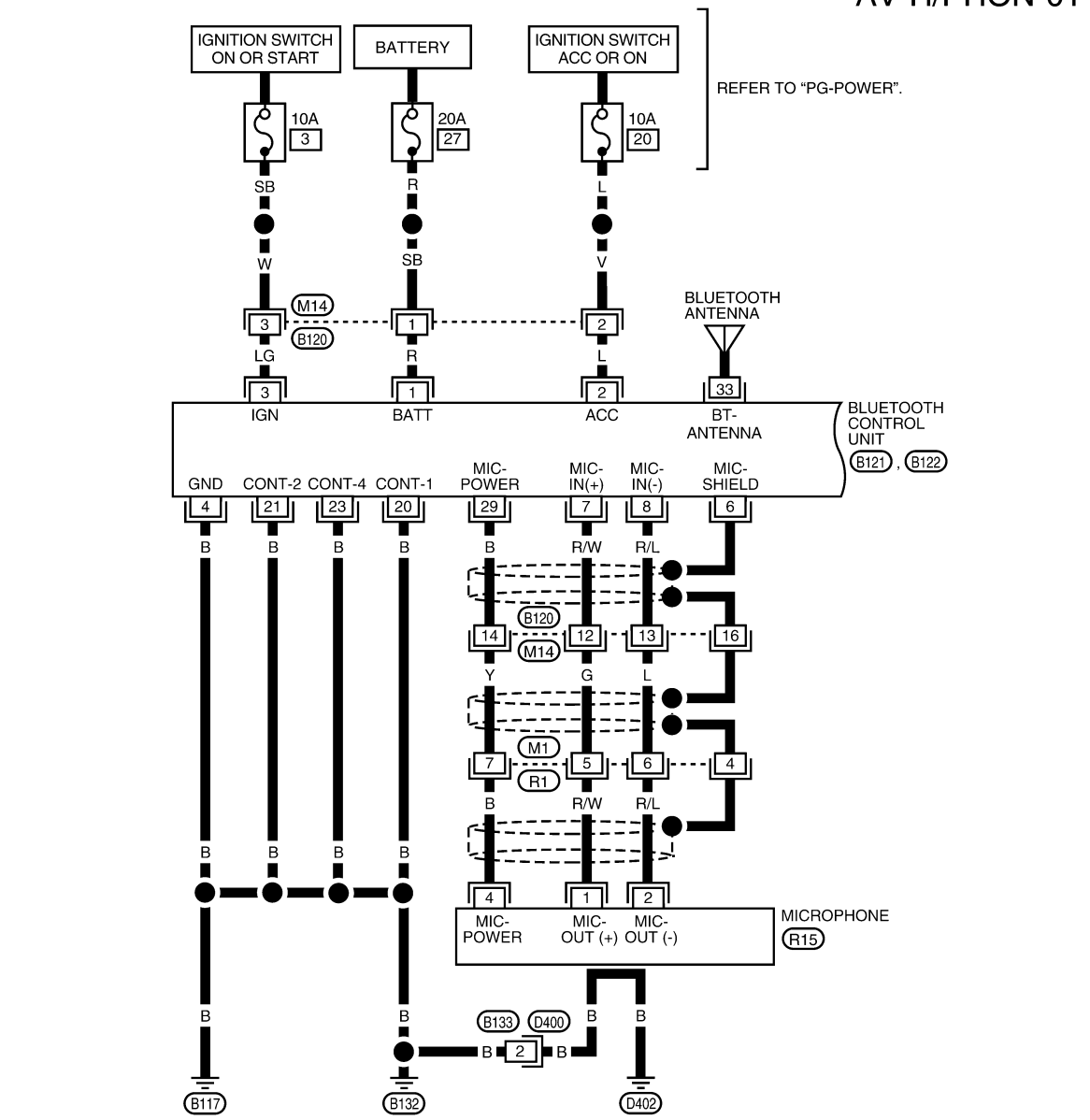
Audio Unit

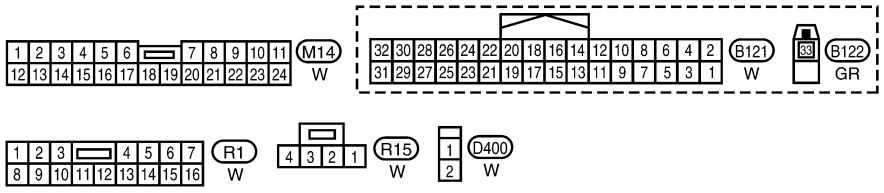
The audio unit receives signals from the Bluetooth control unit and sends audio signals to the speakers.

Wiring Diagram - H/PHON -

INFOID:0000000007329211

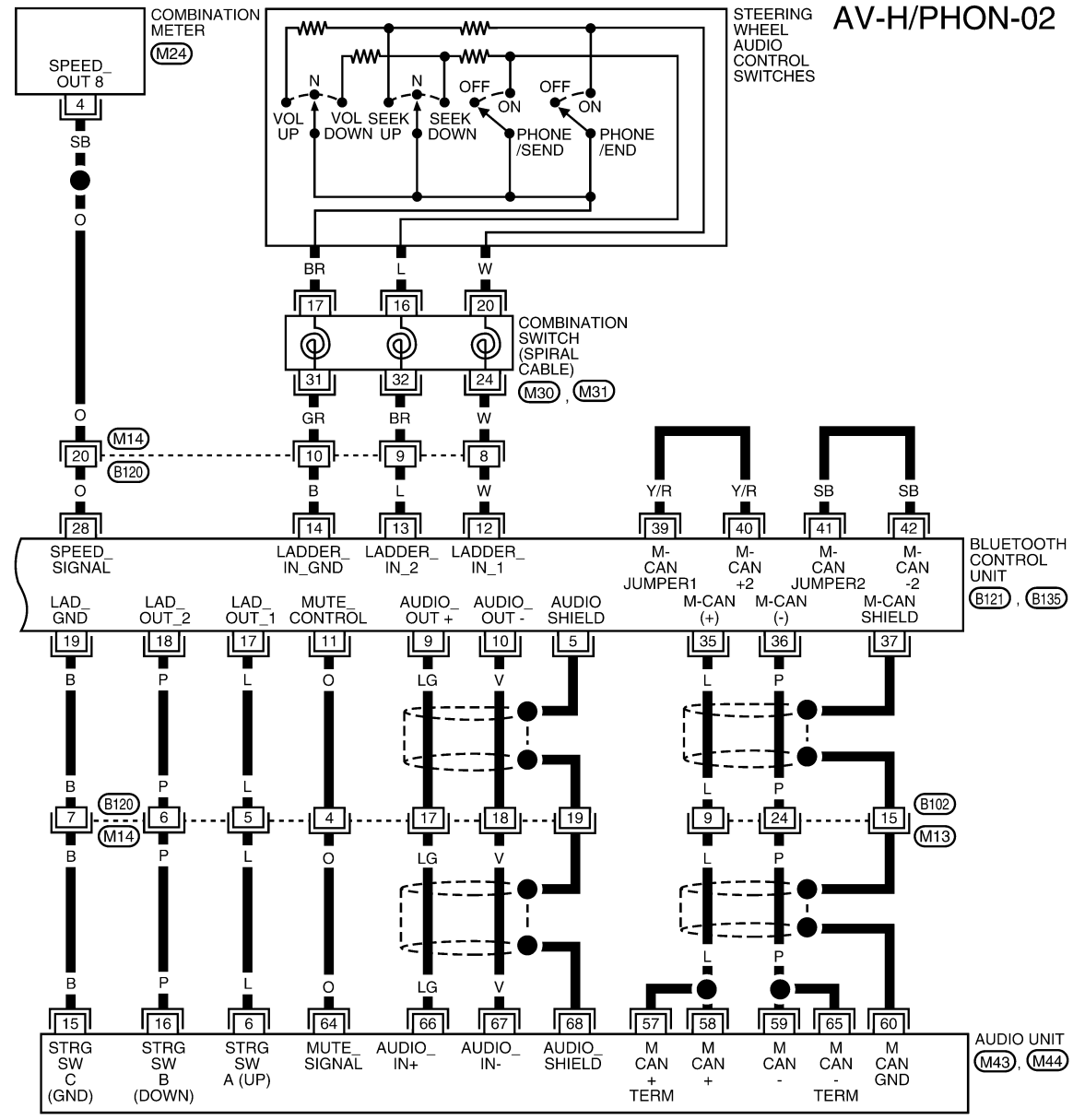
AV-H/PHON-01





AANWA0452GB

AV-H/PHON-02

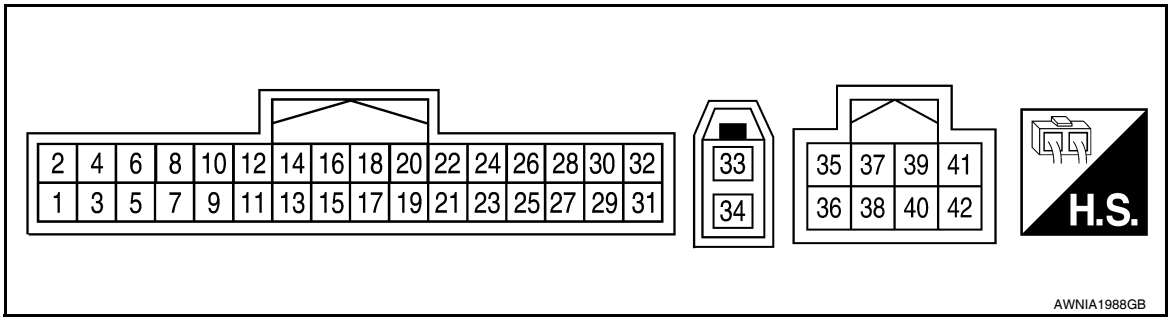


* : THIS CONNECTOR IS NOT SHOWN IN “HARNESS LAYOUT” OF PG SECTION.

AANWA0478GB

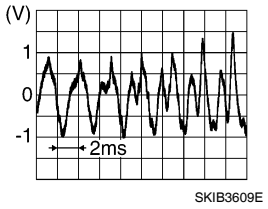
Bluetooth Control Unit Harness Connector Terminal Layout

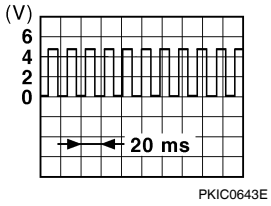
INFOID:0000000007329212



Terminal and Reference Value for Bluetooth Control Unit

INFOID:0000000007329213

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
1 (R)	Ground	Battery power	Input	–	–	Battery voltage	System does not work properly.
2 (L)	Ground	ACC power	Input	ACC/ ON	–	Battery voltage	System does not work properly.
3 (LG)	Ground	IGN power	Input	ON/ START	–	Battery voltage	System does not work properly.
4 (B)	–	Ground	–	–	–	–	–
5	–	Shield	–	–	–	–	–
6	–	Shield	–	–	–	–	–
7 (R/W)	8 (R/L)	Mic-in signal	Input	–	–	–	Bluetooth Microphone inoperative.
9 (LG)	10 (V)	Audio out	Output	ACC/ ON	Bluetooth control unit sends audio signal		Audio can not be heard.
11(O)	–	Mute	Output	–	–	5V	Mute inoperative.
12 (W)	Ground	Remote control switch 1	Input	ACC/ ON	Press PHONE/ END switch	0V	Steering wheel audio control switches do not function.
					Press SEEK UP switch	0.75V	
					Press VOL UP switch	2V	
					Except for above	5V	
13 (L)	Ground	Remote control switch 2	Input	ACC/ ON	Press PHONE/ SEND switch	0V	Steering wheel audio control switches do not function.
					Press SEEK DOWN switch	0.75V	
					Press VOL DOWN switch	2V	
					Except for above	5V	

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
14 (B)	–	Remote control ground	Input	–	–	–	Steering wheel audio control switches do not function.
17 (L)	Ground	Audio unit switch 1	Output	ACC/ ON	Press PHONE/ END switch	0V	Steering wheel audio controls do not function.
					Press SEEK UP switch	0.75V	
					Press VOL UP switch	2V	
					Except for above	5V	
18 (P)	Ground	Audio unit switch 2	Output	ACC/ ON	Press PHONE/ SEND switch	0V	Steering wheel audio controls do not function.
					Press SEEK DOWN switch	0.75V	
					Press VOL DOWN switch	2V	
					Except for above	5V	
19 (B)	Ground	Audio unit switch ground	Output	–	–	–	Steering wheel audio controls do not function.
20 (B)	–	Cont-1	–	–	–	–	–
21 (B)	–	Cont-2	–	–	–	–	–
23 (B)	–	Cont-4	–	–	–	–	–
28 (O)	Ground	Vehicle speed signal (8–pulse)	Input	ON	When vehicle speed is approx. 40 km/h (25 MPH)	 PKIC0643E	Speed sensitive volume is inoperative.
29 (B)	Ground	Bluetooth Microphone power	Output	–	–	5V	Bluetooth Microphone inoperative.
33	–	Bluetooth antenna signal	Input	–	–	–	–
35 (L)	—	M CAN +	—	—	—	—	—
36 (P)	—	M CAN -	—	—	—	—	—
37	—	M CAN shield	—	—	—	—	—
39 (Y/R)	—	M CAN jumper 1	—	—	—	—	—
40 (Y/R)	—	M CAN 1	—	—	—	—	—
41 (SB)	—	M CAN jumper 2	—	—	—	—	—
42 (SB)	—	M CAN 2	—	—	—	—	—

Bluetooth Control Unit Self-Diagnosis Function

INFOID:0000000007329214

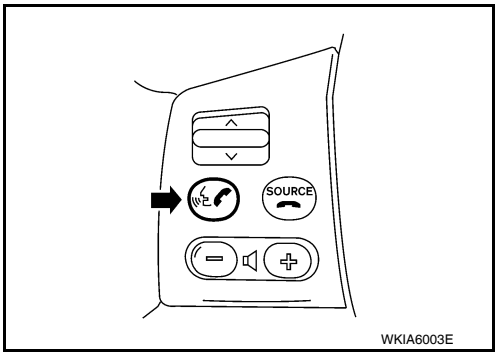
The Bluetooth control unit has two diagnostic checks. The first diagnostic check is performed automatically every ignition cycle during control unit initialization. The second diagnostic check is performed by the technician using the steering wheel audio control switches prior to trouble diagnosis.

BLUETOOTH CONTROL UNIT INITIALIZATION CHECKS

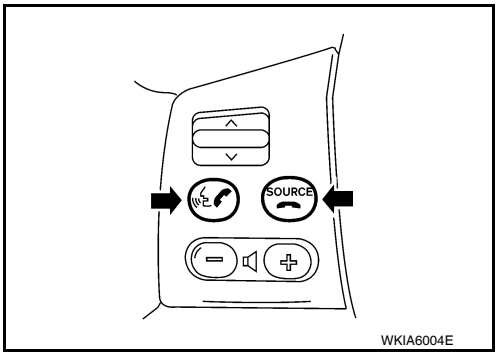
- Internal control unit failure
- Bluetooth antenna connection open or shorted
- Steering wheel audio control switches (PHONE/SEND, PHONE/END) stuck closed
- Vehicle speed pulse count
- Bluetooth Microphone connection test (with playback to operator)
- Bluetooth inquiry check

SELF-DIAGNOSIS MODE

1. Turn ignition switch to ACC or ON.
2. Wait for the Bluetooth system to complete initialization and the Bluetooth ON indicator to stop flashing. This may take up to 10 seconds.
3. Press and hold the steering wheel audio control switch PHONE/SEND button for at least 5 seconds. The Bluetooth system will begin to play a verbal prompt.



4. While the prompt is playing, momentarily press both the steering wheel audio control switches PHONE/SEND and PHONE/END buttons simultaneously. The Bluetooth system will sound a 5 second beep.
5. While the beep is sounding, momentarily press both the steering wheel audio control switches PHONE/SEND and PHONE/END buttons simultaneously again.
6. The Bluetooth system has now entered into the diagnostic mode. Results of the diagnostic checks will be verbalized to the technician. Refer to AV-42, "Workflow".
7. If there are no failure records to report, the speed pulse count will be reported next.



8. After the speed pulse count is reported, an interactive Bluetooth microphone test will be performed. Follow the voice prompt. If the Bluetooth microphone test fails refer to AV-42, "Workflow".
9. Self-diagnosis mode is complete when the voice prompt says "All diagnostic functions completed". A short beep is heard.

Workflow

INFOID:0000000007329215

Flashing Pattern (Bluetooth ON indicator)	Failure Message	Action
1	"Internal failure"	Replace Bluetooth control unit. Refer to AV-47, "Removal and Installation".
2	"Bluetooth antenna open"	1. Inspect harness connection. 2. Replace Bluetooth antenna. Refer to AV-47, "Removal and Installation".
3	"Bluetooth antenna shorted"	

Flashing Pattern (Bluetooth ON indicator)	Failure Message	Action
4	"Phone/Send for the Hands Free Phone System is stuck"	Check steering wheel audio control switches. Refer to AV-22, "Steering Switch Check (With Bluetooth)".
5	"Phone/End for the Hands Free Phone System is stuck"	
–	"Bluetooth Microphone test" (failed interactive test)	1. Inspect harness between Bluetooth control unit and Bluetooth microphone. 2. Replace Bluetooth microphone. Refer to AV-47, "Removal and Installation".

Power Supply and Ground Circuit Inspection for Bluetooth Control Unit

INFOID:0000000007329216

1.CHECK FUSES

Make sure the following fuses for the Bluetooth control unit are not blown.

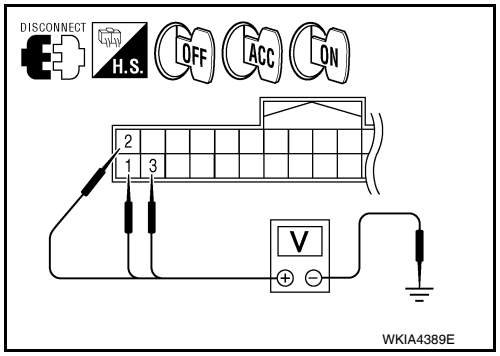
Terminals		Ignition Switch	Fuse No.
Connector	Terminal		
B121	1	All positions	27
	2	ACC/ON	20
	3	ON/START	3

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "Schematic".

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect Bluetooth control unit connector B121.
2. Check voltage between connector terminals and ground as follows.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal				
B121	1	Ground	Battery voltage	Battery voltage	Battery voltage
	2		0V	Battery voltage	Battery voltage
	3		0V	0V	Battery voltage

OK or NG

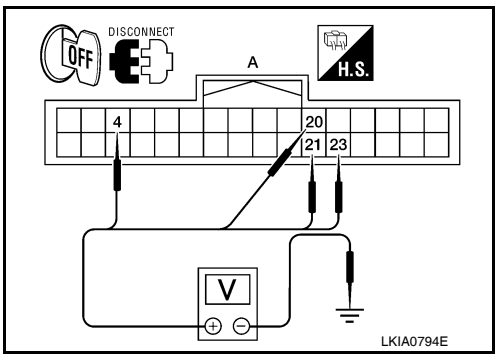
OK >> GO TO 3.
NG >> Check harness for open between Bluetooth control unit and fuse.

3.CHECK GROUND CIRCUITS

1. Turn ignition switch OFF.

2. Check continuity between the following Bluetooth control unit terminals and ground.

Terminals			Continuity
Connector	Terminal	—	
B121	4	Ground	Yes
	20		
	21		
	23		



OK or NG

OK >> Inspection End.
NG >> Repair or replace harness.

Steering Wheel Audio Control Switch Does Not Operate

INFOID:0000000007329217

1. CHECK STEERING WHEEL AUDIO CONTROL SWITCH RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect steering wheel audio control switch connector.
3. Check steering wheel audio control switch. Refer to AV-22, "Steering Switch Check (With Bluetooth)".

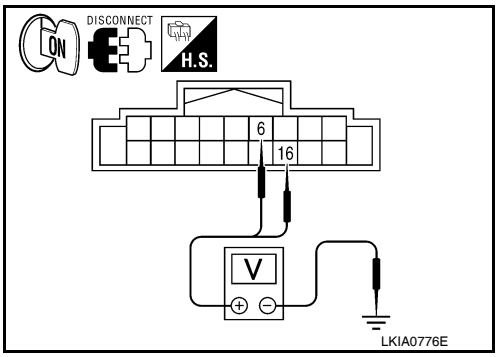
OK or NG

OK >> GO TO 2.
NG >> Replace steering wheel audio control switch. AV-30, "Removal and Installation".

2. CHECK AUDIO UNIT

1. Connect Bluetooth control unit connector.
2. Turn ignition switch ON.
3. Check voltage between audio unit harness connector M43 terminals 6, 16 and ground.

6 - Ground : Approx. 5 V
16 - Ground : Approx. 5 V



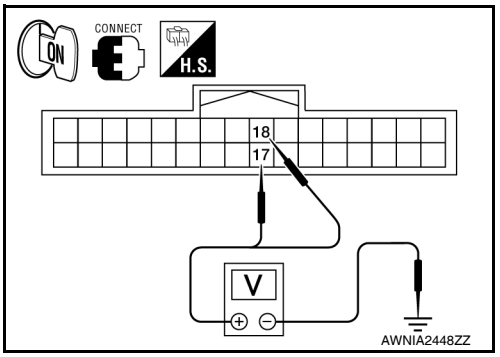
OK or NG

OK >> Replace audio unit. Refer to AV-30, "Removal and Installation".
NG >> GO TO 3.

3. CHECK BLUETOOTH CONTROL UNIT

1. Check voltage between Bluetooth control unit harness connector B121 terminals 17, 18 and ground.

17 - Ground : Approx. 5 V
18 - Ground : Approx. 5 V



OK or NG

OK >> Repair or replace harness.
NG >> Replace Bluetooth control unit. AV-47, "Removal and Installation".

Voice Activated Control Function Does Not Operate

INFOID:0000000007329218

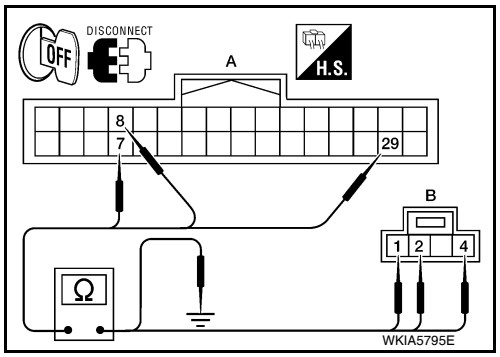
NOTE:
Even under the normal condition, Bluetooth voice guidance may not occur when pressing steering wheel audio control switch.

BLUETOOTH VOICE GUIDANCE IS HEARD WHEN PRESSING STEERING WHEEL AUDIO CON-

TROL SWITCH

1. CHECK HARNESS BETWEEN BLUETOOTH CONTROL UNIT AND BLUETOOTH MICROPHONE

1. Turn ignition switch OFF.
2. Disconnect Bluetooth control unit connector and Bluetooth microphone connector.
3. Check continuity between Bluetooth control unit connector B121 (A) and Bluetooth microphone connector R15 (B).



Terminals				Continuity
Connector	Terminal	Connector	Terminal	
A: B121	7	B: R15	1	Yes
	8		2	
	29		4	

4. Check continuity between Bluetooth control unit harness connector B121 and ground.

Terminals			Continuity
Connector	Terminal	—	
A: B121	7	Ground	No
	8		
	29		

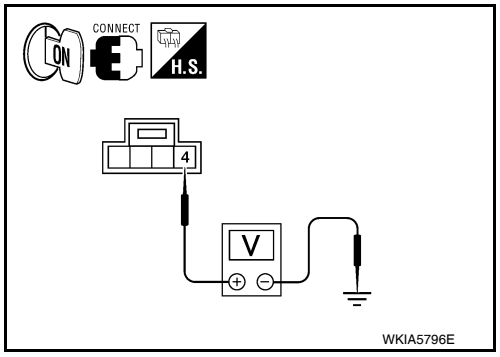
OK or NG

OK >> GO TO 2.
NG >> Repair harness or connector.

2. CHECK BLUETOOTH MICROPHONE POWER SUPPLY

1. Connect Bluetooth control unit connector and Bluetooth microphone connector.
2. Turn ignition switch ON.
3. Check voltage between Bluetooth microphone connector R15 terminal 4 and ground.

4 - Ground : Approx. 5 V



YES or NO

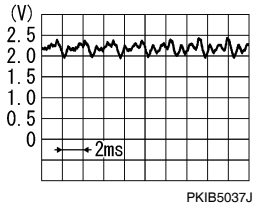
YES >> GO TO 3.
NO >> Replace Bluetooth control unit. Refer to AV-47, "Removal and Installation".

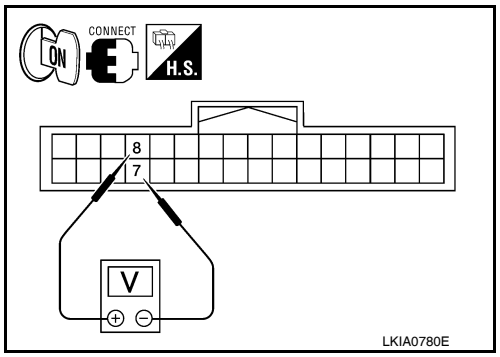
3. CHECK MIC. SIGNAL

1. Check signal between Bluetooth control unit harness connector B121 terminals 7 and 8.

When giving a voice

7 – 8:





OK or NG

OK >> Replace Bluetooth control unit. Refer to AV-47, "Removal and Installation".
NG >> Replace Bluetooth microphone. Refer to AV-47, "Removal and Installation".

BLUETOOTH VOICE GUIDANCE IS NOT HEARD WHEN PRESSING STEERING WHEEL AUDIO CONTROL SWITCH

1.CHECK STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

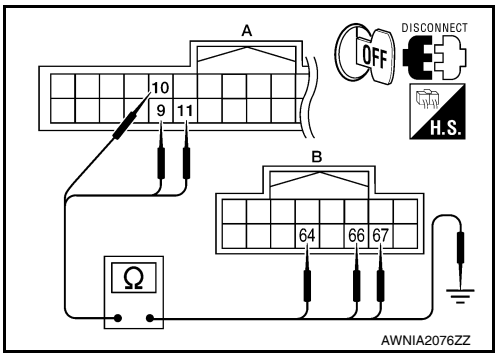
Refer to AV-22, "Steering Switch Check (With Bluetooth)".

OK or NG

OK >> GO TO 2.
NG >> Replace applicable parts.

2.CHECK BLUETOOTH VOICE SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Bluetooth control unit connector and audio unit connector.
3. Check continuity between Bluetooth control unit harness connector B121 (A) and audio unit harness connector M44 (B).



Terminals				Continuity
Connector	Terminal	Connector	Terminal	
A: B121	9	B: M44	66	Yes
	10		67	
	11		64	

4. Check continuity between Bluetooth control unit harness connector B121 (A) and ground.

Terminals			Continuity
Connector	Terminal	—	
A: B121	9	Ground	No
	10		
	11		

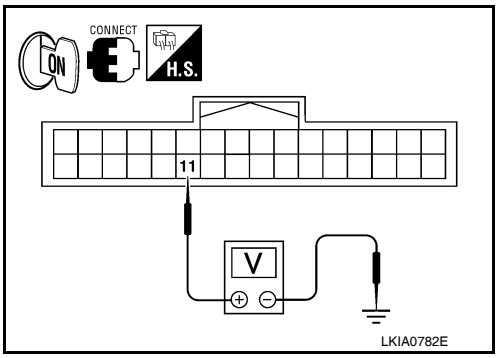
OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3.CHECK MUTE SIGNAL

1. Connect Bluetooth control unit connector and audio unit connector.
2. Turn ignition switch ON.
3. Check voltage between Bluetooth control unit connector B121 terminal 11 and ground.

11 - Ground : Approx. 5 V

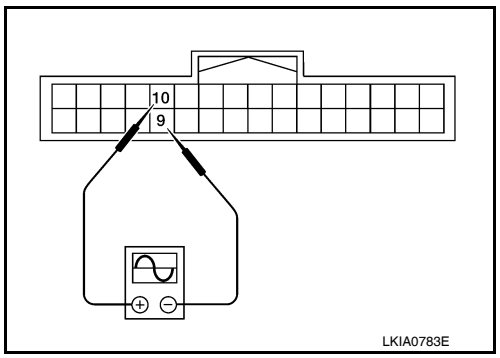


OK or NG

OK >> GO TO 4.
NG >> Replace audio unit. Refer to AV-30, "Removal and Installation".

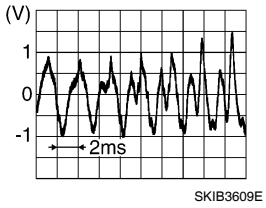
4.CHECK BLUETOOTH VOICE SIGNAL

1. Check signal between Bluetooth control unit harness connector B121 terminals 9 and 10.



When giving a voice

9 – 10:



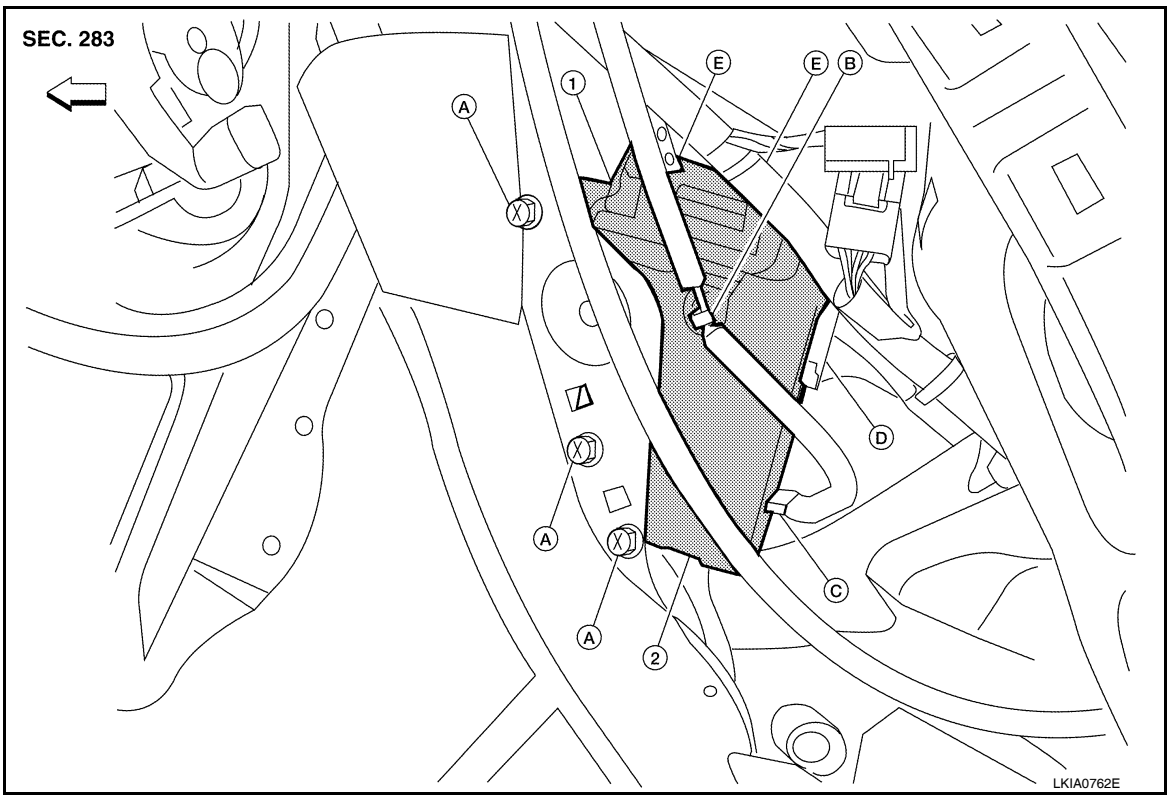
OK or NG

OK >> Replace audio unit. Refer to AV-30, "Removal and Installation".
NG >> Replace Bluetooth control unit. Refer to AV-47, "Removal and Installation".

Removal and Installation

INFOID:0000000007329219

BLUETOOTH CONTROL UNIT



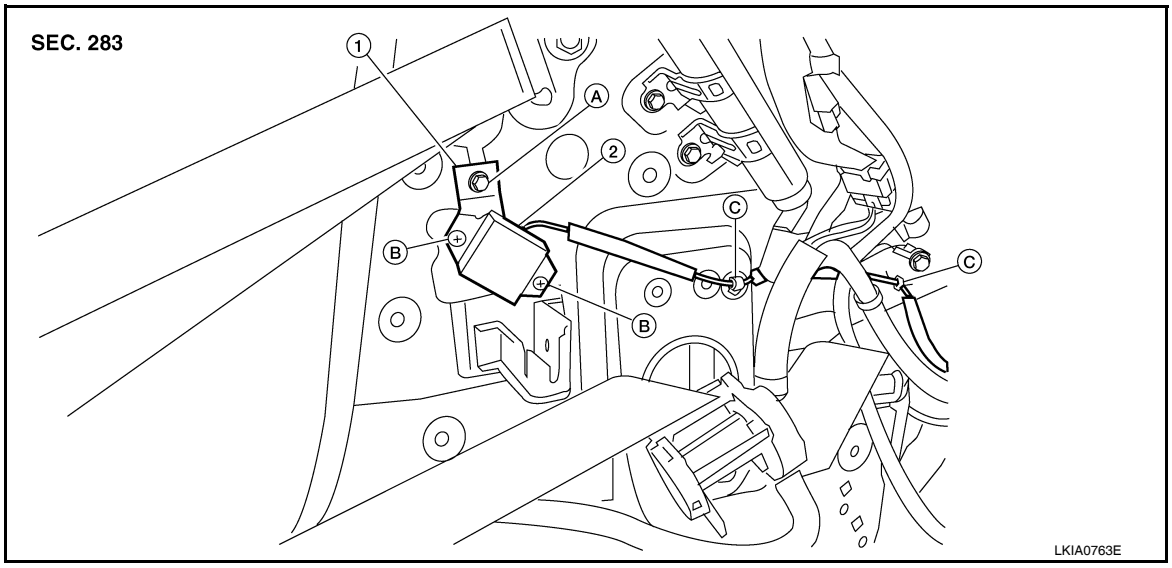
1. Bluetooth control unit bracket
2. Bluetooth control unit
A. Blue tooth control unit bolts
B. BLuetooth antenna feeder harness clip
C. Bluetooth antenna feeder harness connector
D. Bluetooth control unit connector
E. Bluetooth control unit bracket screws
⇦ Front

Removal

1. Remove luggage side lower finish (RH). Refer to EI-44, "Removal and Installation".
   • Disconnect Bluetooth antenna harness clip.
2. Disconnect the Bluetooth control unit harness connector.
3. Remove the Bluetooth control unit upper and lower bracket bolts.
4. Unhook the Bluetooth control unit upper and lower brackets and remove Bluetooth control unit.
5. Remove Bluetooth control unit bracket screws and remove the upper and lower brackets from unit.

Installation
Installation is in the reverse order of removal.

BLUETOOTH ANTENNA



1. Bluetooth antenna bracket
2. Bluetooth antenna
A. Bluetooth antenna bracket bolts
B. Bluetooth antenna screws
C. Bluetooth antenna feeder harness clips

Removal

1. Remove luggage side lower finisher (RH). Refer to EI-44, "Removal and Installation".
2. Disconnect the Bluetooth antenna feeder harness clips.
3. Disconnect the Bluetooth antenna feeder harness connector.
4. Remove the Bluetooth antenna bracket bolt(s) and remove antenna.
5. Remove the Bluetooth antenna screws and remove bracket.

Installation
Installation is in the reverse order of removal.

BLUETOOTH MICROPHONE

Removal

1. Remove over-head console assembly, roof finisher. Refer to EI-41, "Component".
2. Remove the Bluetooth microphone.

Installation
Installation is in the reverse order of removal.

SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329220

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329221

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Work

INFOID:0000000007666202

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

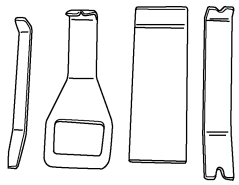
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

Special Service Tool

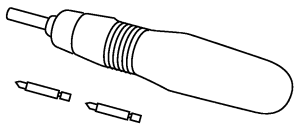
INFOID:0000000007666203

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46534) Trim tool set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

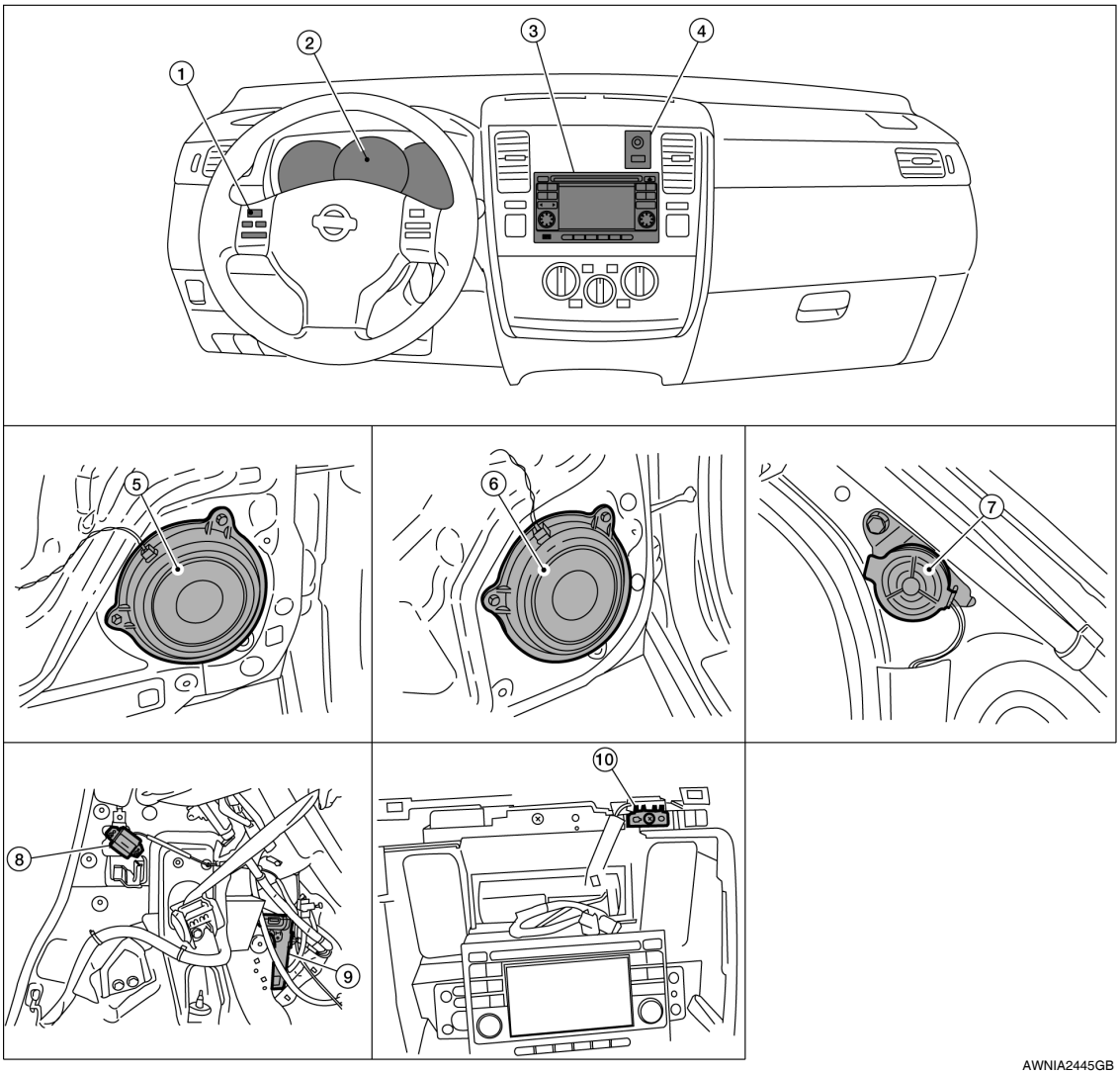
INFOID:0000000007329222

Tool name	Description
Power tool  PBIC0191E	Loosening bolts and nuts

AUDIO

Component Parts Location

INFOID:0000000007329223

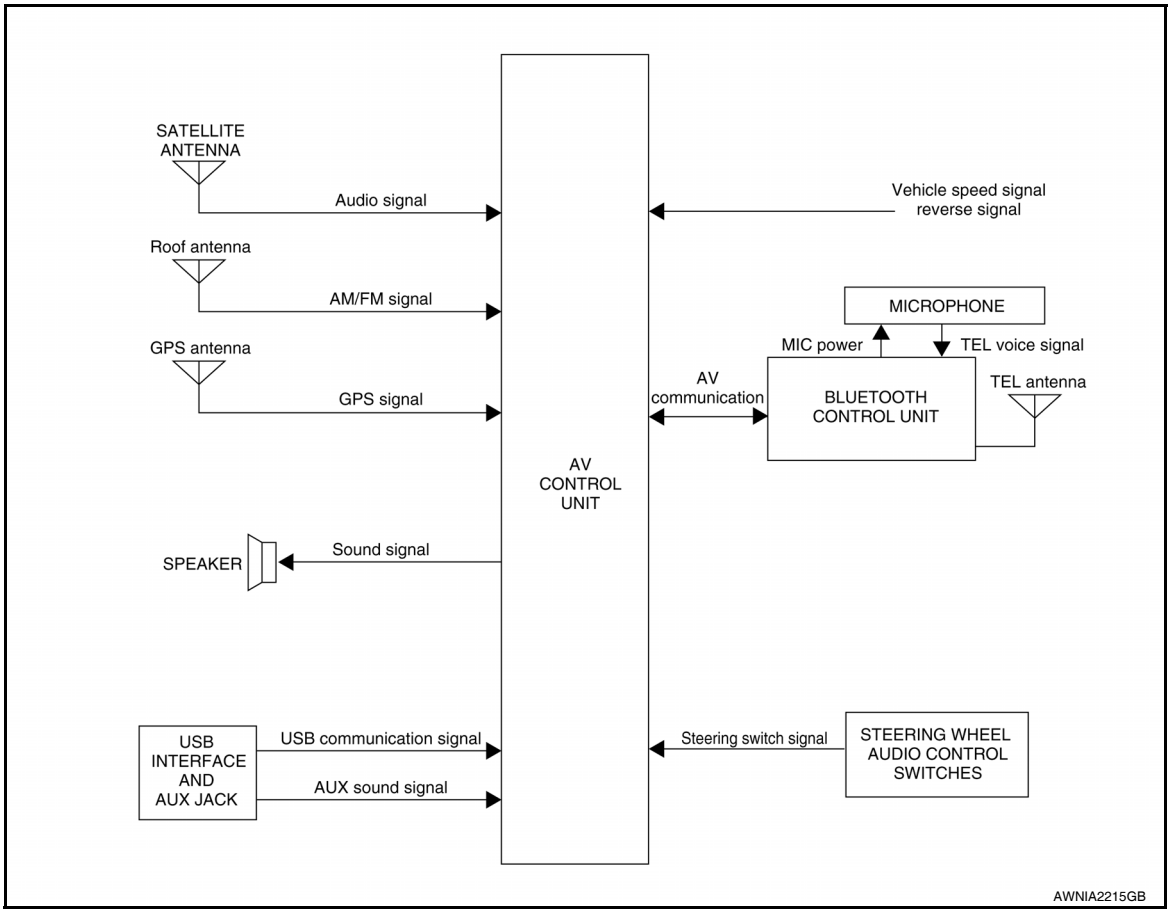


AWNIA2445GB

1. Steering wheel audio control switches
2. Combination meter M24
3. AV control unit M43, M70, M71, M87, M88, M89
4. USB interface and AUX jack M72, M76
5. Front door speaker LH D12, RH D112
6. Rear door speaker LH D207, RH D307
7. Front tweeter LH M46, RH M47 (view with front pillar garnish removed)
8. Bluetooth antenna [view with luggage side lower finisher (RH) removed]
9. Bluetooth control unit B121, B122, B135
10. GPS antenna (view with cluster lid C removed)

System Description

INFOID:0000000007329224



AUDIO SYSTEM

Refer to Owner's Manual for audio system operating instructions.
Navigation is built into AV control unit.
This navigation has the following functions.

- Full support for playback of music from iPod® and USB device.
- High resolution full color touch panel 5 “WQVGA” display.
- FM/AM twin digital tuner.
- USB mass storage.
- XM traffic.
- POI Support is included. User POI download.

Power is supplied at all times
- through 20A fuse (No. 27, located in the fuse and fusible link box)
- to AV control unit terminal 19.

With the ignition switch in the ACC or ON position, power is supplied
- through 10A fuse [No. 20, located in the fuse block (J/B)]
- to AV control unit terminal 7.

Ground is supplied to
- to AV control unit terminals 20 and 32
- through grounds M57 and M61.

Then audio signals are supplied
- through AV control unit terminals 2, 3, 4, 5, 11, 12, 13 and 14
- to terminals + and - of front door speaker LH and RH
- to terminals + and - of front tweeter LH and RH and
- to terminals + and - of rear door speaker LH and RH.

STEERING WHEEL AUDIO CONTROL SWITCHES

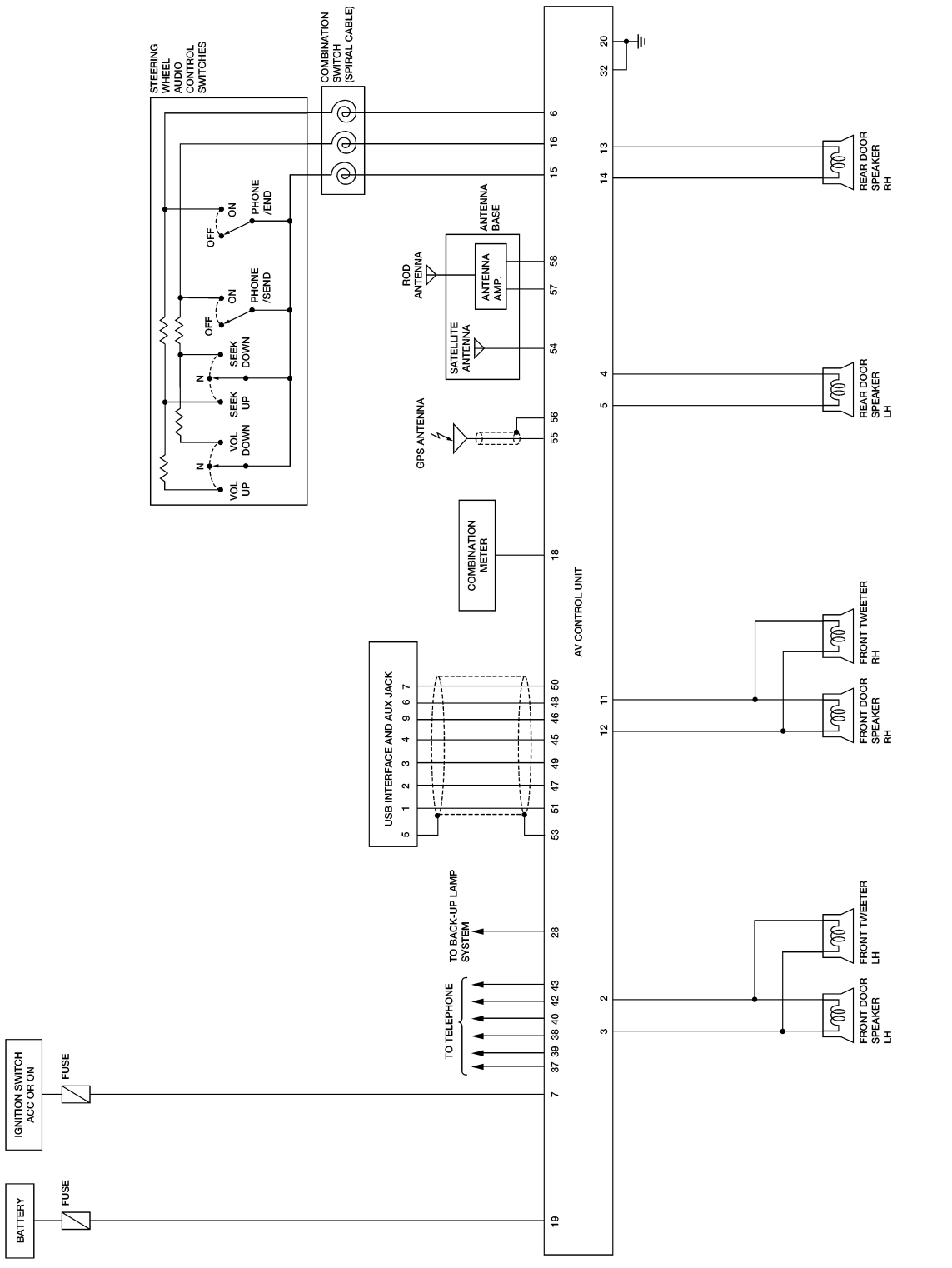
When one of steering wheel audio control switches is pushed, the resistance in steering switch circuit changes depending on which button is pushed.

SPEED SENSITIVE VOLUME SYSTEM

Volume level of this system goes up and down automatically in proportion to the vehicle speed. The control level can be selected by the customer. Refer to Owner's Manual for operating instructions.

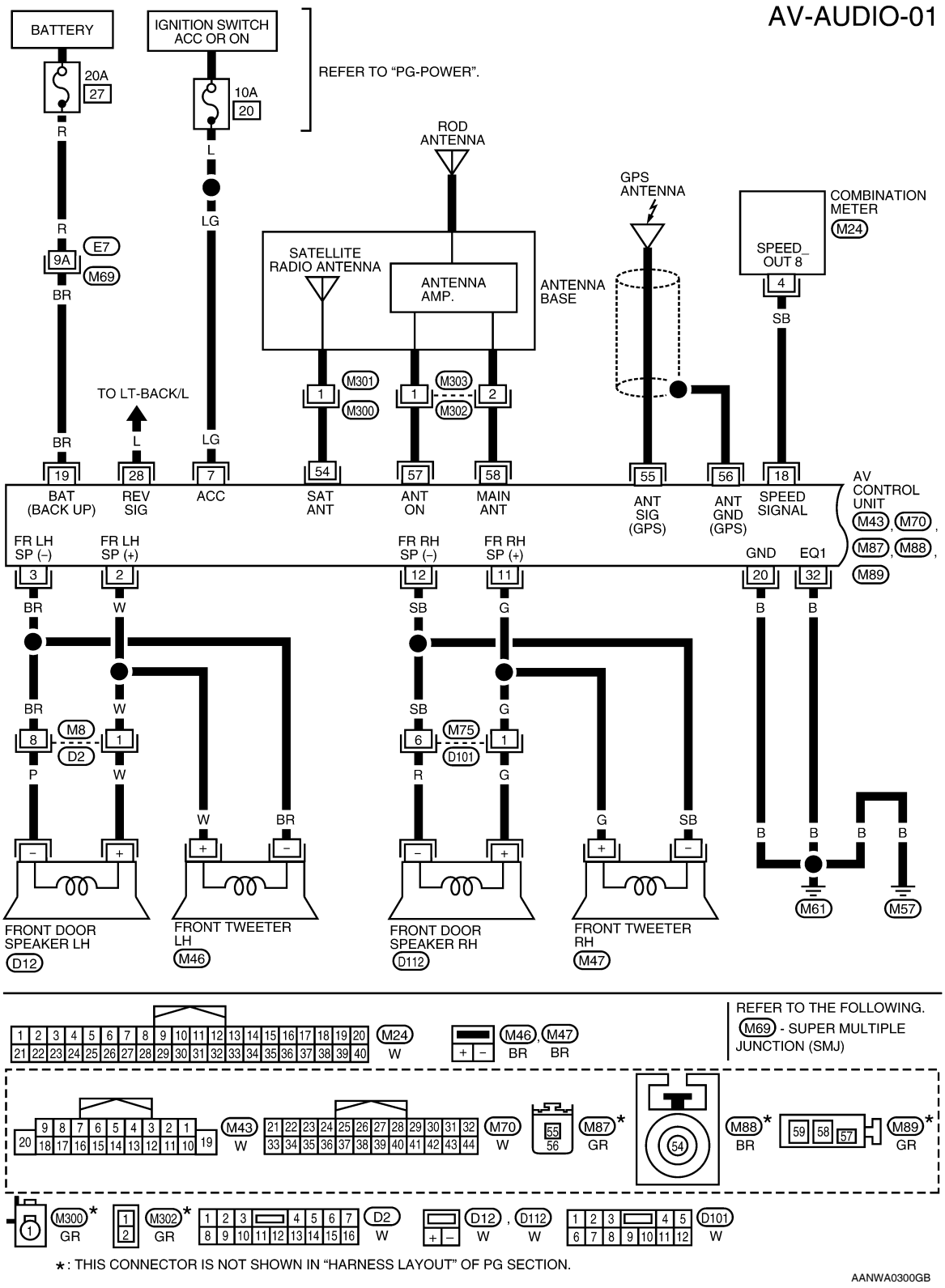
Schematic

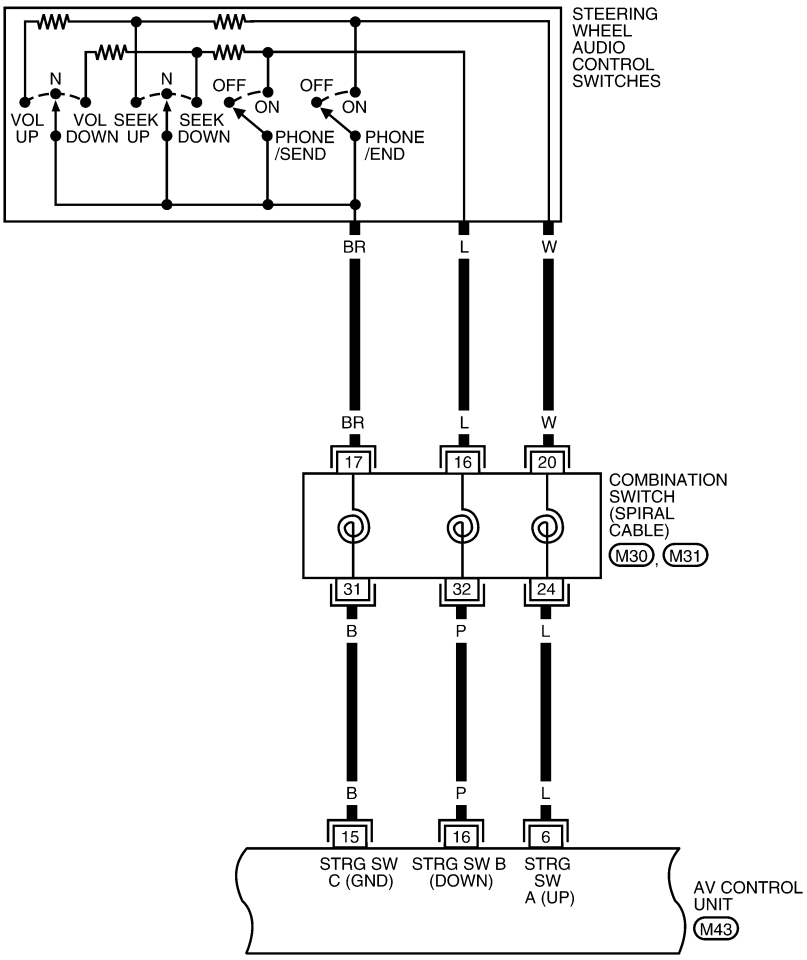
INFOID:0000000007329225

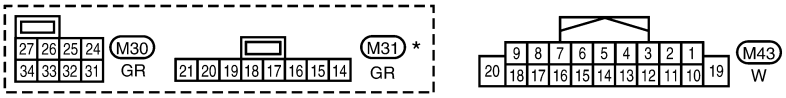


Wiring Diagram - AUDIO -

INFOID:0000000007329226

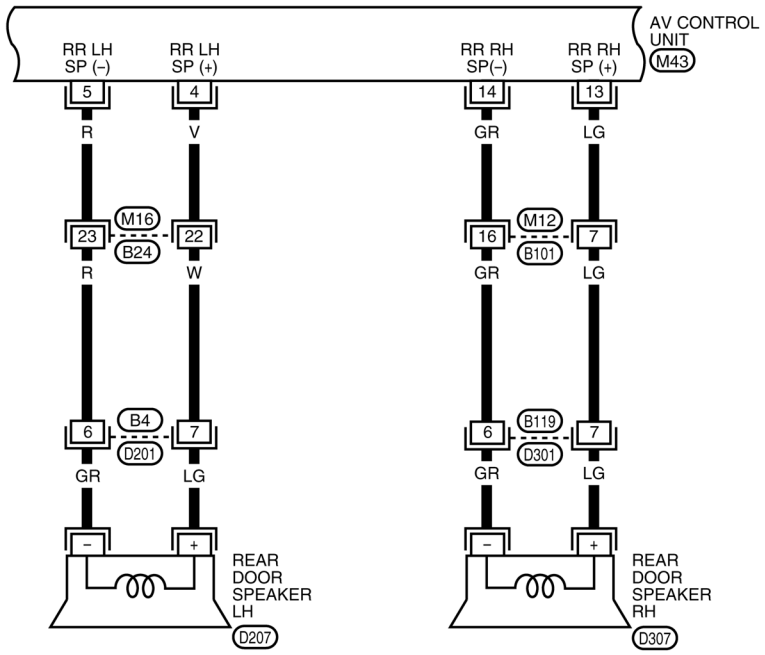


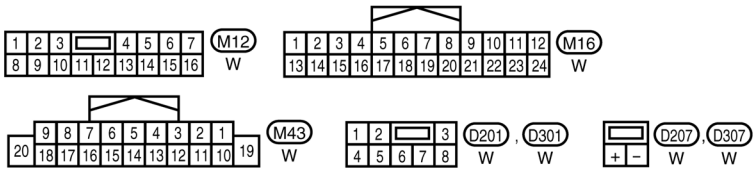




* : THIS CONNECTOR IS NOT SHOWN IN “HARNESS LAYOUT” OF PG SECTION.

AANWA0479GB





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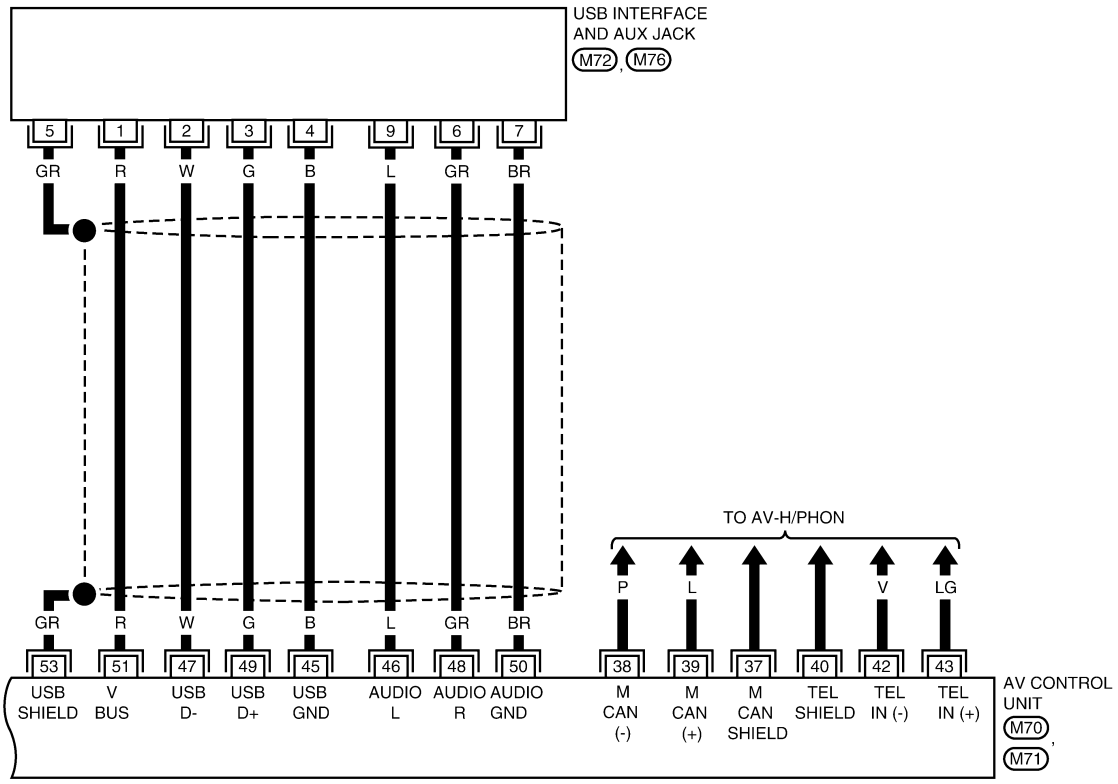

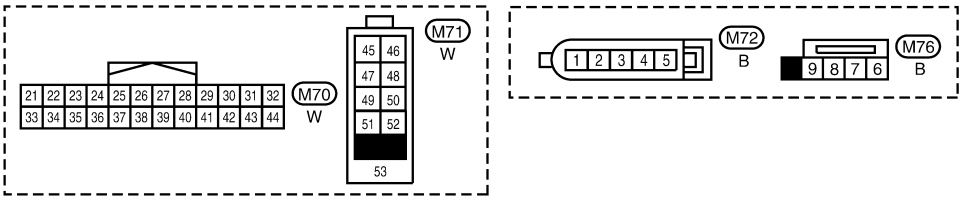

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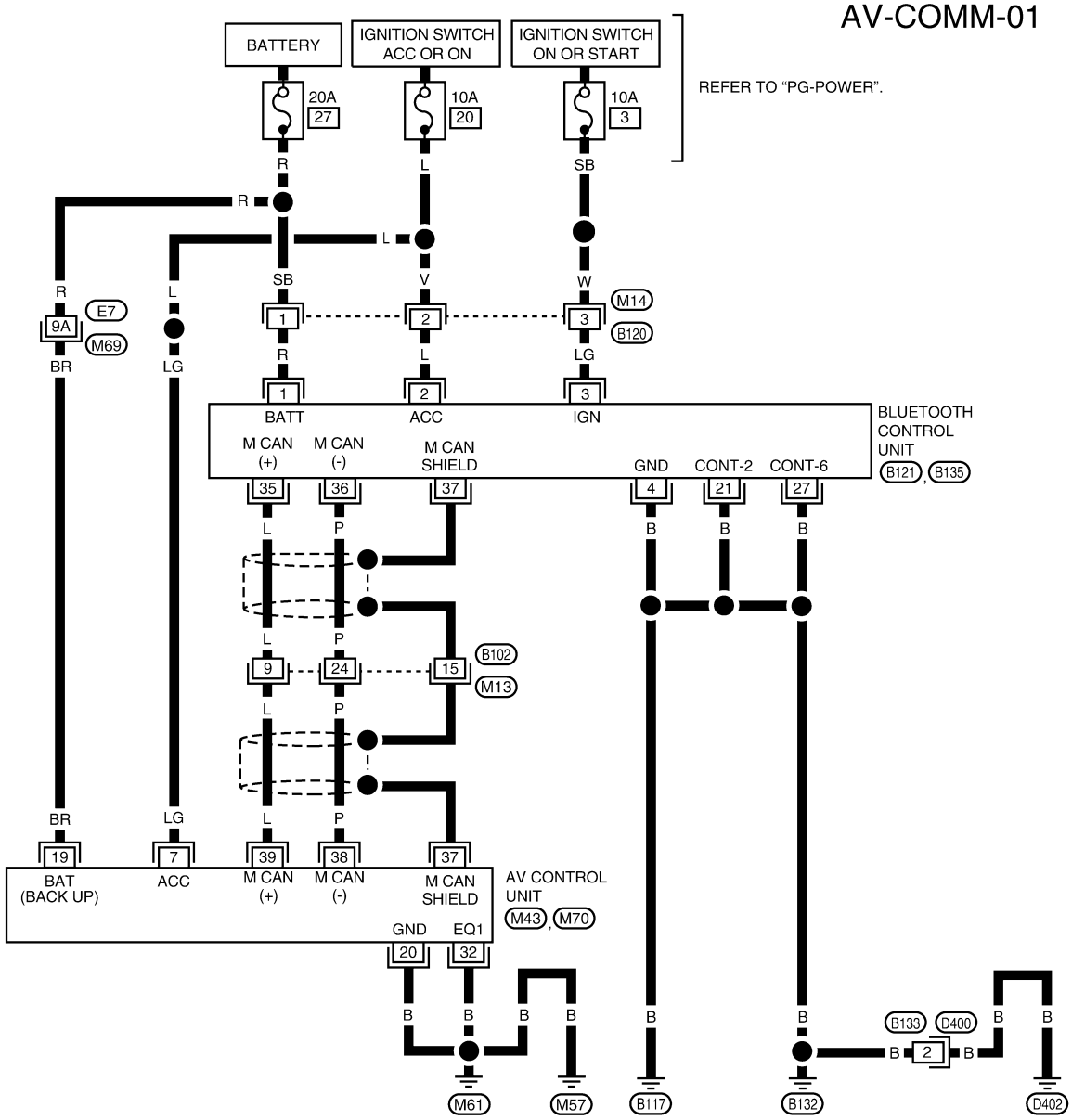
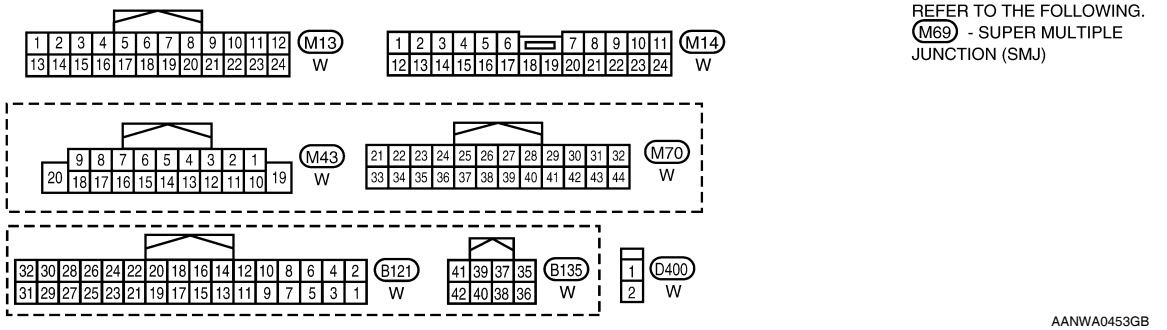
AV-COMM-01



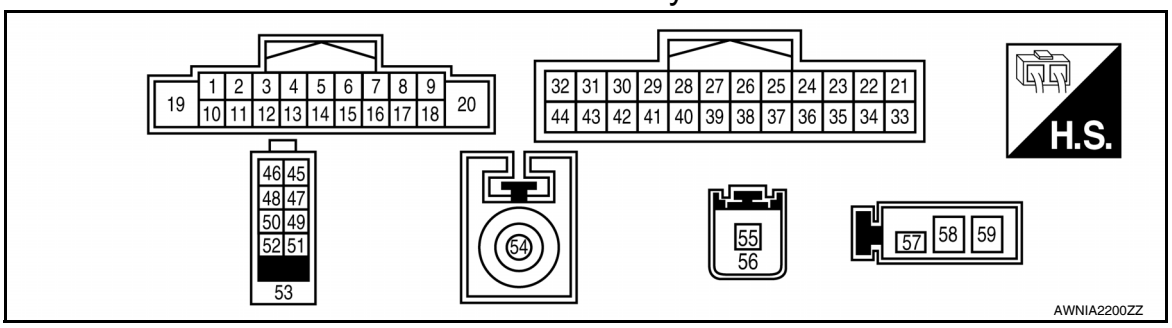


REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

AANWA0453GB

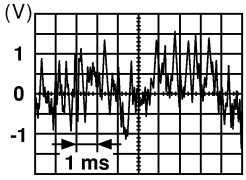
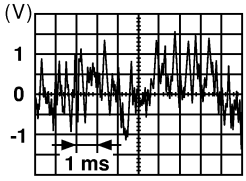
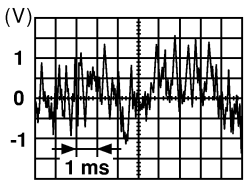
AV Control Unit Harness Connector Terminal Layout

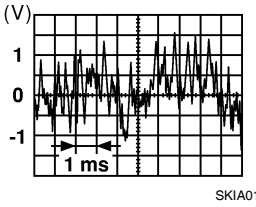
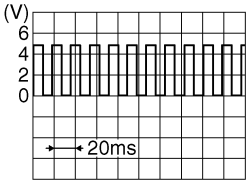
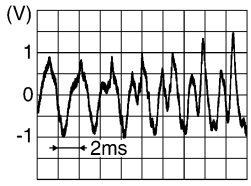
INFOID:0000000007329227



Terminal and Reference Value for AV Control Unit

INFOID:0000000007329228

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
2 (W)	3 (BR)	Audio sound signal front LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker LH or tweeter LH.
4 (V)	5 (R)	Audio sound signal rear LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear speaker LH.
6 (L)	Ground	Remote control A	Input	ON	Press Phone/ End switch	0V	Steering wheel audio controls do not function
					Press SEEK UP switch	1.7V	
					Press VOL UP switch	3.3V	
					Except for above	5.0V	
7 (LG)	Ground	ACC signal	Input	ON	Ignition switch ACC or ON	Battery voltage	System does not work properly.
11 (G)	12 (SB)	Audio sound signal front RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker RH or tweeter RH.

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
13 (LG)	14 (GR)	Audio sound signal rear RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear speaker RH.
15 (B)	—	Remote control ground	Input	—	—	—	Steering wheel audio controls do not function
16 (P)	Ground	Remote control B	Input	ON	Press Phone/ Send switch	0V	Steering wheel audio controls do not function
					Press SEEK DOWN switch	1.7V	
					Press VOL DOWN switch	3.3V	
					Except for above	5.0V	
18 (SB)	Ground	Vehicle speed signal (8-pulse)	Input	ON	When vehicle speed is approx. 40 km/h (25 MPH)	 SKIA6649J	Ground
19 (BR)	Ground	Battery power	Input	—	—	Battery voltage	System does not work properly.
20 (B)	Ground	Ground	—	ON	—	—	—
28 (L)	Ground	Reverse signal	Input	ON	R position	Battery voltage	Ground
						Other than R position	0V
32 (B)	Ground	Ground	—	ON	—	—	—
37	—	Shield	—	—	—	—	—
38 (P)	—	AV communication signal 1 (-)	Input/ Output	—	—	—	—
39 (L)	—	AV communication signal 1 (+)	Input/ Output	—	—	—	—
40	—	Shield	—	—	—	—	—
43 (LG)	42 (V)	TEL voice audio signal	Input	ON	Start confirmation/adjustment mode, and then Voice Microphone Test by selecting “Voice Microphone Test” on Handsfree Microphone screen.	 SKIB3609E	TEL voice audio signal
45 (B)	—	USB ground	—	—	—	—	—

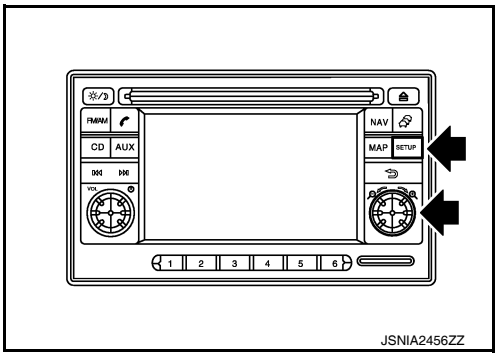
Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
46 (L)	—	AUX sound signal LH	—	—	—	—	—
47 (W)	—	USB D-	—	—	—	—	—
48 (GR)	—	AUX sound signal RH	—	—	—	—	—
49 (G)	—	USB D+	—	—	—	—	—
50 (BR)	—	AUX sound signal ground	—	—	—	—	—
51 (R)	—	USB V BUS signal	—	—	—	—	—
53 (GR)	—	SHIELD	—	—	—	—	—
54	—	Satellite antenna signal	—	—	—	—	—
55	—	GPS antenna signal	—	—	—	—	—
56	—	SHIELD	—	—	—	—	—
57	—	Antenna on signal	—	—	—	—	—
58	—	Main antenna signal	—	—	—	—	—

On-Board Diagnosis

INFOID:0000000007329229

METHOD OF STARTING

1. Start the engine.
2. Turn OFF audio.
3. While pressing the “SET UP” switch, turn the MENU dial counterclockwise 3 clicks or more first, then clockwise and counterclockwise 3 clicks or more, respectively. (After the diagnosis mode starts, the initial screen of the diagnosis mode appears.)



JSNIA2456ZZ

- On-board diagnosis can be performed in the service test mode.
- On-board diagnosis checks that the system can be operated normally.

Service test mode

Mode	Item	Content
Service version	—	The version data of the parts is shown displayed.

Mode		Item	Content
Radio	FM monitor	—	The Change Mediator monitors the dynamic values of the current tuner. If the band is switched within the radio monitor context, the active monitor is switched as well.
	AM monitor	—	
	XM monitor	—	The version data is displayed.
	XM functions	• Clear XM Chipset NVM • Reset all XM settings • XM CBM debug mode ON/OFF • External Diag mode ON/OFF	The current system status is displayed.
User Configuration	Touch Display Calibration	—	The function allows connection of the position detection accuracy of the touch panel.

Mode		Item	Content
System state	Running system status	• SD card slot Access • Power Supply • Speed Signal • Direction Signal • Illumination Signal • GPS Antenna • EXT. Phone Sig • Microphone Current • Radio Antenna • USB Device • iPod® firmware version • Steering wheel X11C	The current system status is displayed.
	System history	• Bluetooth® Module - Sub-Unit Connection Malfunction • SD-card Slot - Sub-Unit Connection Malfunction • Programming Error • Radio-Antenna Circuit Malfunction • FM-Antenna 1 Connection Malfunction • Satellite Antenna Connection Failure • GPS Antenna Circuit Malfunction • CD-Drive Mechanical Malfunction • CD Read Malfunction • Power Supply voltage: Lower Limit Exceeded • Power Supply voltage: Upper Limit Exceeded • Reduced system Functionality due to over temperature • Display switched OFF due to over temperature • SD card removed without being de-mounted • Code plug missing	The history of the system status is reported in the report memory, displayed.
	Speaker test 100Hz	—	This activates a sequence of test tone outputs to the four speaker lines one after the other for 1 second. The frequency can be chosen by user selection (100Hz and 4KHz).
	Speaker test 4KHz		
	Display test	—	This provides a test sequence where test displays (plain colored display: e.g. white, black, red, blue, green) are shown one after the other. The respective color is shown for an indicated period of time (parameter). After the display test, the design of the display previously available is stored. While the screen shows a plain colored display, a pixel malfunction may be detected.

Mode	Item	Content
System configuration	• 8 pulses speed • Clock ON/OFF • Equalizer setup X11C • RF tuning • Antenna type • Sound system • Sub Out: Code • Steering wheel	The device is configured by a connected hardware circuit. The parameter is influenced.
Self test	• Bluetooth® module Access Malfunction • SD-card Access Malfunction • Radio-Antenna Circuit Malfunction • GPS Antenna Circuit Malfunction • Microphone Circuit Malfunction	A system self test is executed: the result is stored into the error memory which is shown afterwards as a list of codes of the detected malfunctions.

END ON-BOARD DIAGNOSIS
Turn OFF ignition switch.

Noise Inspection

INFOID:0000000007329230

The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunctioning. Check if noise is caused and/or changed by engine speed, ignition switch turned to each position, and operation of each piece of electrical equipment, and determine the cause.

NOTE:
The source of the noise can be found easily by listening to the noise while removing the fuses of electrical components, one by one.

TYPE OF NOISE AND POSSIBLE CAUSE

Occurrence condition		Possible cause
Occurs only when engine is ON.	A continuous growling noise occurs. The speed of the noise varies with changes in the engine speed.	Ignition components
	A whistling noise occurs while the engine speed is high. A booming noise occurs while the engine is running and the lighting switch is ON.	Generator
Noise only occurs when various electrical components are operating.	A cracking or snapping sound occurs with the operation of various switches.	Relay malfunction, radio malfunction
	The noise occurs when various motors are operating.	• Motor case ground • Motor
The noise occurs constantly, not just under certain conditions.		• Rear defogger coil malfunction • Open circuit in printed heater
A cracking or snapping sound occurs while the vehicle is being driven, especially when it is vibrating excessively.		• Ground wire of body parts. • Ground due to improper part installation • Wiring connections or a short circuit

Symptom Chart

INFOID:0000000007329231

MALFUNCTION WITH NAVIGATION

Symptoms	Check items	Probable malfunction location / Action to take
Display does not turn ON.	All switches cannot be operated.	AV control unit power supply and ground circuit. Refer to AV-68.
	All switches can be operated.	AV control unit. Refer to AV-73.

Symptoms	Check items		Probable malfunction location / Action to take
All switches cannot be operated.	Display does not turn ON.		AV control unit power supply and ground circuit. Refer to AV-68.
	Display turn ON.		AV control unit. Refer to AV-73.
Only specified switch cannot be operated.	–		AV control unit. Refer to AV-68.
Voice guidance is not heard.	Audio sound is normal.		AV control unit. Refer to AV-60.
Display does not dim.	Check “Illumination Signal” in “SERVICE SYSTEM STATUS”, “SERVICE MENU”.	“Illumination Signal” reaches 100% when the lighting switch is ON.	AV control unit. Refer to AV-73.
		“Illumination Signal” does not reach 100% when the lighting switch is ON.	Illumination signal circuit. Refer to LT-103.
Vehicle icon does not move.	Check “Speed Signal” in “SERVICE SYSTEM STATUS”, “SERVICE MENU”.	A value of “Speed Signal” changes according to vehicle speeds.	AV control unit. Refer to AV-73.
		A value of “Speed Signal” does not change according to vehicle speeds.	Vehicle speed signal circuit. Refer to DI-16.
Map matching is not complete GPS icon is not displayed	Check “GPS Antenna” in “SERVICE SYSTEM SELF TEST”, “SERVICE MENU”.	“Connected” is displayed for “GPS Antenna”.	AV control unit. Refer to AV-73.
		“Connected” is not displayed for “GPS Antenna”.	GPS antenna. Refer to AV-90.
Traffic information (XM Traffic) is not received.	Radio broadcasts are received.		AV control unit. Refer to AV-73.
	Radio broadcasts are not received.		• Radio antenna. Refer to AV-88. • Antenna feeder. Refer to AV-88.

MALFUNCTION WITH AUDIO

- The majority of the audio malfunctions are the result of outside causes (Malfunction CD, electromagnetic interference, etc.). Check the symptoms below to diagnose the malfunction.
- The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunctioning. Check if noise is caused and/or changed by engine speed, ignition switch turned to each position, and operation of each piece of electrical equipment, and then determine the cause.

NOTE:

- CD-R is not guaranteed to play because they can contain compressed audio (MP3, WMA) or could be incorrectly mastered by the customer on a computer.
- Check if the CDs have the Compact Disc logo. If not, the disc is not mastered to the “red book” Compact Disc standard and may not play.

Symptom	Probable malfunction location
Audio system does not work normally.	• AV control unit power supply and ground circuit. Refer to AV-68. • AV control unit. Refer to AV-73.
Audio steering wheel switch does not operate properly.	• Remote control signal circuit between steering switch and AV control unit. Refer to AV-68. • Steering wheel audio control switch. Refer to AV-73. • AV control unit. Refer to AV-73.
No sound can be heard from any speakers.	• Speaker circuit shorted to ground. Refer to AV-55. • AV control unit. Refer to AV-73.
No sound can be heard from front speakers.	• Audio signal circuit between AV control unit and front speakers. Refer to AV-70. • Front speaker. Refer to AV-73. • Front tweeter. Refer to AV-73. • AV control unit. Refer to AV-73.

Symptom	Probable malfunction location
No sound can be heard from rear speakers.	• Audio signal circuit between AV control unit and rear speakers. Refer to AV-71. • Rear speaker. Refer to AV-73. • AV control unit. Refer to AV-73.
No sound can be heard from radio or noise is heard.	• Antenna feeder. Refer to AV-88. • Roof antenna. Refer to AV-88. • AV control unit. Refer to AV-73.
Speed dependent volume system does not function.	• Vehicle speed signal circuit between combination meter and AV control unit. Refer to DI-16. • AV control unit. Refer to AV-73. • Combination meter. Refer to DI-19.
There is no sound from the iPod® or Aux jack.	• iPod® sound signal circuit between AV control unit and Auxiliary jack assembly. Refer to AV-68. • AV control unit. Refer to AV-73.
Buzz/rattle sound from speaker.	The majority of buzz/rattle sounds are not indicative of an issue with the speaker, usually something nearby the speaker is causing the buzz/rattle. Refer to "SQUEAK AND RATTLE TROUBLE DIAGNOSIS" in appropriate interior trim section.

NOTE:
Noise resulting from variations in field strength, such as fading noise and multi-path noise, or external noise from trains and other sources, is not a malfunction.
- Fading noise: This noise occurs because of variations in the field strength in a narrow range due to mountains or buildings blocking the signal.
- Multi-path noise: This noise results from a time difference between the broadcast waves directly from the station arriving at the antenna and the waves reflected by mountains or buildings.

MALFUNCTION WITH USB

NOTE:
Check that there is no malfunction of USB equipment main body before performing a diagnosis.

Symptoms	Check items		Probable malfunction location / Action to take
iPod® or USB memory can not be recognized.	With iPod® or USB memory Connected, check “USB Device” in “SERVICE STATUS”, “SERVICE MENU”.	iPod® or USB memory name is displayed for “USB Device”.	• USB interface and AUX jack harness • USB interface and AUX jack. Refer to AV-87. • AV control unit. Refer to AV-73.
		“Removed” is displayed for “USB Device”.	• USB interface and AUX jack harness • USB interface and AUX jack. Refer to AV-87.
	—	—	Generation of iPod® not supported

MALFUNCTION WITH AUXILIARY INPUT

NOTE:
Check that there is no malfunction of AUX equipment main body before performing a diagnosis.

Symptoms	Check items	Probable malfunction location
No voice sound is heard when AUX mode is selected.	Voice sound is heard when other modes are selected.	• USB interface and AUX jack harness • USB interface and AUX jack. Refer to AV-87.

MALFUNCTION WITH STEERING SWITCH

Symptoms	Possible malfunction location / Action to take
All steering switches are not operated.	Steering switch. Refer to AV-68.
Only specified switch cannot be operated.	
“SEEK UP”, “VOL UP” and “SOURCE” switches are not operated.	
“SOURCE”, “SEEK DOWN” and “VOL DOWN” switches are not operated.	

AV Control Unit Power and Ground Supply Circuit Inspection

INFOID:0000000007329232

1.CHECK FUSE

Check that the following fuses of the AV control unit are not blown.

Unit	Terminals	Signal name	Fuse No.
AV control unit	19	Battery power	27
	7	Ignition switch ACC or ON	20

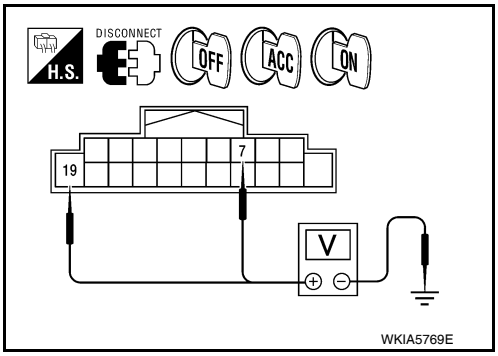
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "Schematic".

2.AV CONTROL UNIT POWER SUPPLY CIRCUIT CHECK

1. Disconnect AV control unit connector.
2. Check voltage between the AV control unit connector and ground.

Unit	Terminal No. (+) Connector	Terminal No. (+) Terminal	Terminal No. (-)	OFF	ACC	ON
AV control unit	M43	19	Ground	Battery voltage	Battery voltage	Battery voltage
		7	Ground	0V	Battery voltage	Battery voltage



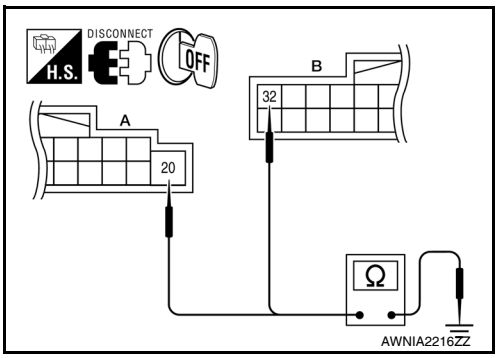
OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

3.GROUND CIRCUIT CHECK

Check continuity between AV control unit harness connectors M43 (A), M70 (B) terminals 20, 32 and ground.

Continuity should exist.



OK or NG

OK >> Inspection End.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

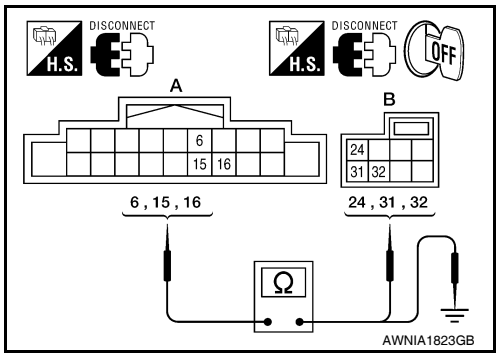
Steering Switch Check

INFOID:0000000007329233

1.CHECK HARNESS

1. Turn ignition switch OFF.
2. Disconnect AV control unit connector and combination switch (spiral cable) connector.
3. Check continuity between AV control unit harness connector (A) terminals and combination switch (spiral cable) harness connector (B) terminals.

Terminals				Continuity
A		B		
Connector	Terminal	Connector	Terminal	
M43	6	M30	24	Yes
	15		31	
	16		32	



4. Check continuity between AV control unit and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal		
M43	6	Ground	No
	15		
	16		

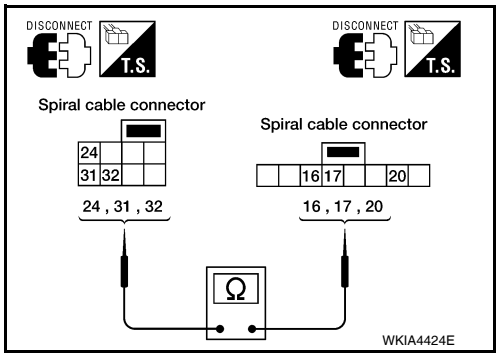
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

2.SPIRAL CABLE CHECK

1. Disconnect combination switch (spiral cable) connector M31.
2. Check continuity between combination switch (spiral cable) terminals.

16 - 32 : Continuity should exist.
17 - 31 : Continuity should exist.
20 - 24 : Continuity should exist.



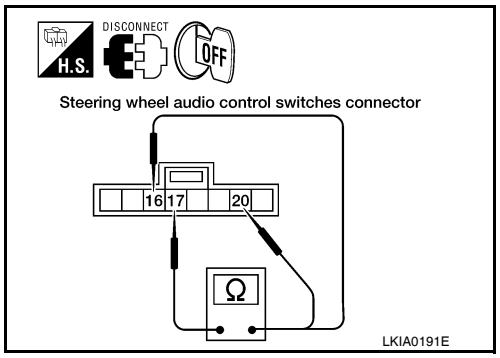
OK or NG

OK >> GO TO 4.
NG >> Replace combination switch (spiral cable). Refer to SRS-37, "Removal and Installation".

3.CHECK STEERING SWITCH RESISTANCE

Check resistance between combination switch (spiral cable) connector M31 terminals.

Terminal		Signal name	Condition	Resistance (Ω) (Approx.)
16	17	Seek (down)	Depress Seek down switch.	165
		Phone/ Send	Depress Phone/ Send switch.	0
		Volume (down)	Depress VOL down switch.	652
20	17	Seek (up)	Depress Seek up switch.	165
		Phone/ End	Depress Phone/ End switch.	0
		Volume (up)	Depress VOL up switch.	652



OK or NG

OK >> Inspection End.
NG >> Replace steering wheel audio control switch. Refer to AV-73, "Removal and Installation".

Sound Is Not Heard from Front Door Speaker or Front Tweeter

INFOID:0000000007329234

1.CONNECTOR CHECK

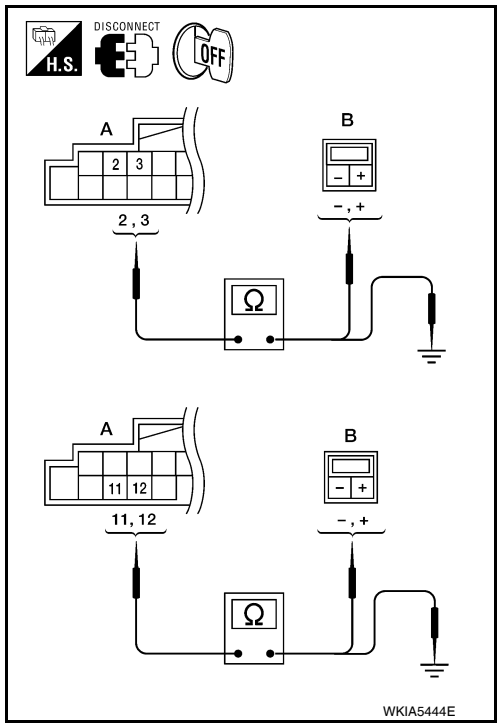
Check the AV control unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair the terminal and connector.

2.HARNESS CHECK

1. Disconnect AV control unit connector and front door speaker and front tweeter connector (LH or RH).
2. Check continuity between AV control unit harness connector terminal and front door speaker and front tweeter harness connector terminal.



Terminals				Continuity
AV control unit		Speaker or tweeter		
Connector	Terminal	Connector	Terminal	
A: M43	2	B: M46	+	Yes
	3		-	
	11	B: M47	+	
	12		-	
	2	B: D12	+	
	3		-	
	11	B: D112	+	
	12		-	

3. Check continuity between AV control unit harness connector terminal and ground.

Terminals		—	Continuity
AV control unit			
Connector	Terminal		
A: M43	2	Ground	No
	3		
	11		
	12		

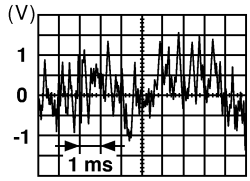
OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

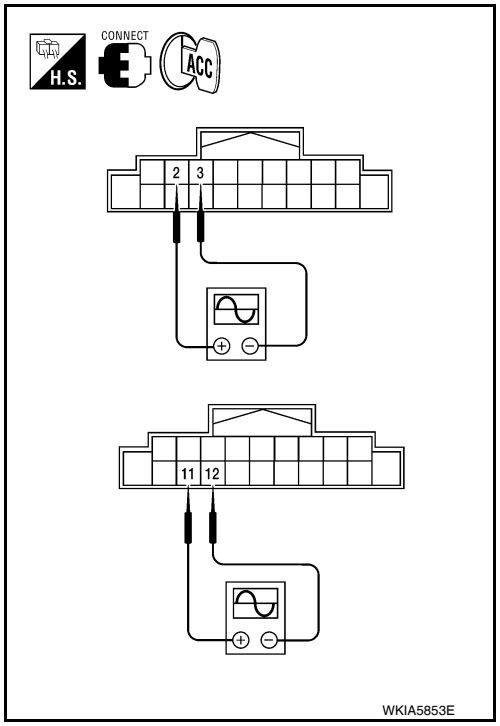
3.FRONT SPEAKER SIGNAL CHECK

1. Connect AV control unit connector, front door speaker connector and front tweeter connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.

4. Check the signal between AV control unit connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	2	M43	3	Receive audio signal	
	11		12		

SKIA0177E



WKIA5853E

OK or NG

OK >> Replace front speaker. Refer to AV-73, "Removal and Installation".

NG >> Replace AV control unit. Refer to AV-73, "Removal and Installation".

Sound Is Not Heard from Rear Speaker

INFOID:0000000007329235

1.CONNECTOR CHECK

Check the AV control unit and speaker connectors for the following:
- Proper connection
- Damage
- Disconnected or loose terminals

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair the terminal and connector.

2.HARNESS CHECK

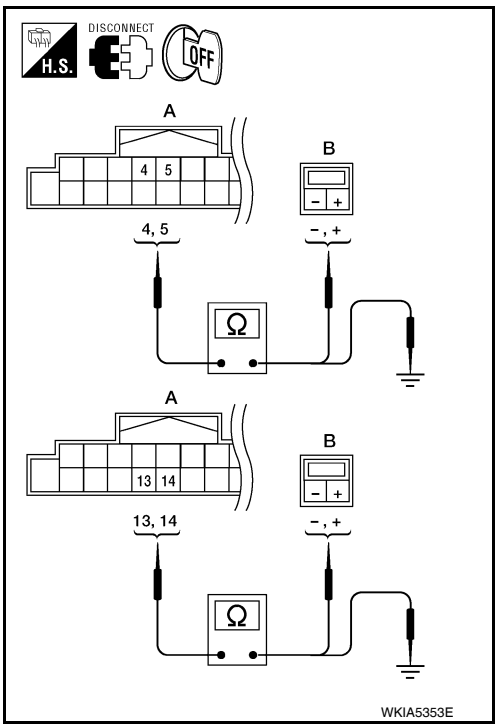
1. Disconnect AV control unit connector and rear speaker connector.

2. Check continuity between AV control unit harness connector terminal and rear speaker harness connector terminal.

Terminals				Continuity
AV control unit		Speaker		
Connector	Terminal	Connector	Terminal	
A: M43	4	B: D207	+	Yes
	5		-	
	13	B: D307	+	
	14		-	

3. Check continuity between AV control unit harness connector terminal and ground.

Terminals		—	Continuity
AV control unit			
Connector	Terminal		
A: M43	4	Ground	No
	5		
	13		
	14		

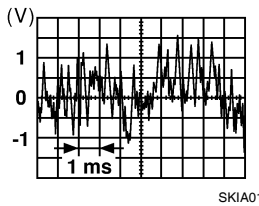


OK or NG

OK >> GO TO 3.
NG >> • Check connector housings for disconnected or loose terminals.
• Repair harness or connector.

3. REAR SPEAKER SIGNAL CHECK

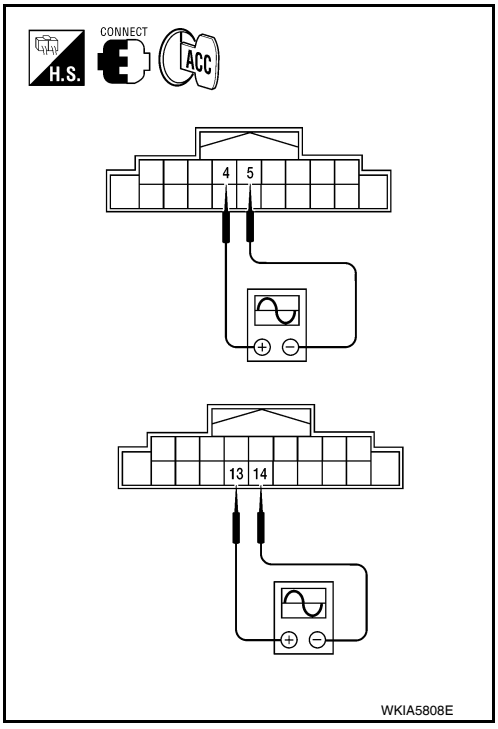
1. Connect AV control unit connector and rear speaker connector.
2. Turn ignition switch to ACC.
3. Push “POWER” switch.
4. Check the signal between AV control unit harness connector terminals with CONSULT or oscilloscope.

Terminals				Condition	Reference signal
(+)		(-)			
Connector	Terminal	Connector	Terminal		
M43	4	M43	5	Receive audio signal	
	13		14		

SKIA0177E

OK or NG

OK >> Replace speaker. Refer to AV-73, "Removal and Installation".
NG >> Replace AV control unit. Refer to AV-73, "Removal and Installation".



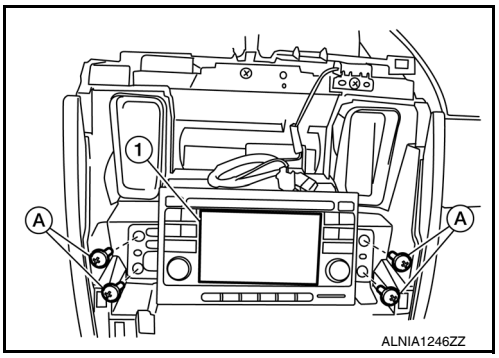
Removal and Installation

INFOID:0000000007329236

AUDIO UNIT

Removal

1. Remove cluster lid C. Refer to IP-12, "Removal and Installation".
2. Remove the audio unit screws (A), disconnect the connectors and remove the audio unit (1).
3. Remove the audio unit bracket.



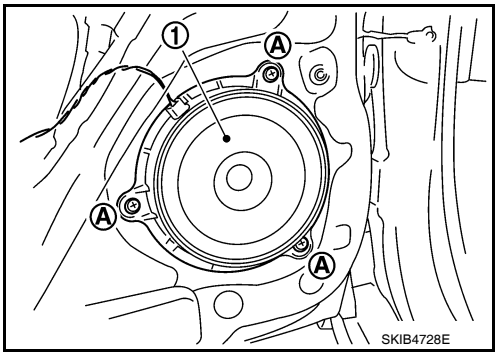
Installation

Installation is in the reverse order of removal.

FRONT DOOR SPEAKER

Removal

1. Remove the front door finisher. Refer to EI-30, "Removal and Installation".
2. Remove the front door speaker screws (A), disconnect the connector and remove the front door speaker (1).



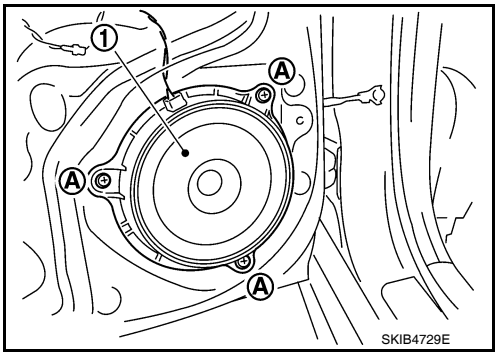
Installation

Installation is in the reverse order of removal.

REAR DOOR SPEAKER

Removal

1. Remove the rear door finisher. Refer to EI-30, "Removal and Installation".
2. Remove the rear door finisher screws (A), disconnect the connector and remove the rear door speaker (1).



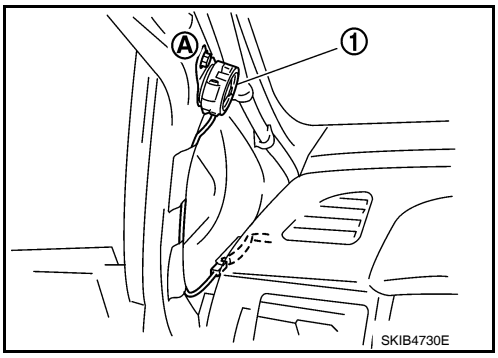
Installation

Installation is in the reverse order of removal.

TWEETER

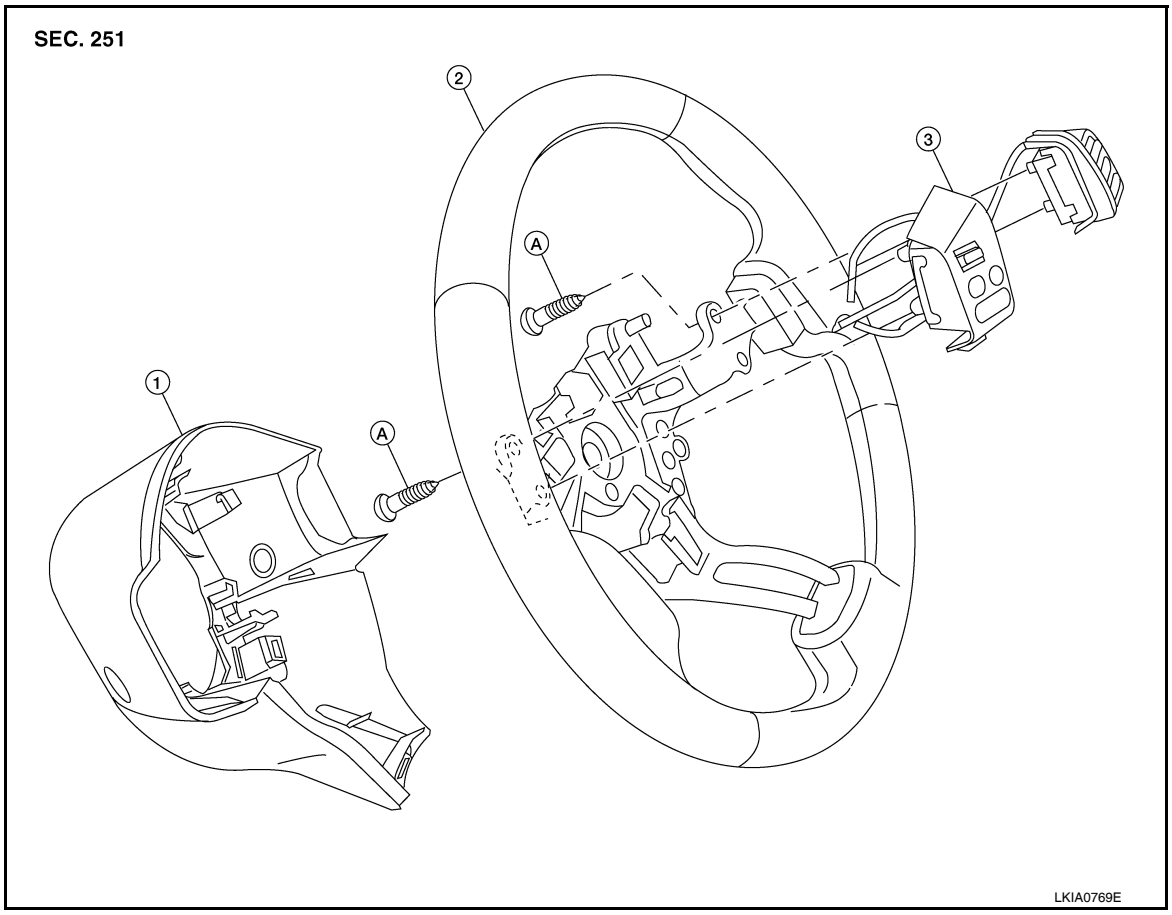
Removal

1. Remove the front pillar garnish. Refer to EI-35, "Component".
2. Remove the tweeter screw (A), disconnect the connector and remove the tweeter (1).



Installation
Installation is in the reverse order of removal.

STEERING WHEEL AUDIO CONTROL SWITCHES



1. Steering wheel finisher cover
2. Steering wheel
3. Steering wheel audio control switches

A. Screws

Removal
1. Remove the steering wheel. Refer to PS-7, "Removal and Installation".
2. Remove the steering wheel finisher cover.
3. Remove the screws and the steering wheel audio control switches.

Installation
Installation is in the reverse order of removal.

NAVIGATION SYSTEM

How to Proceed with Trouble Diagnosis

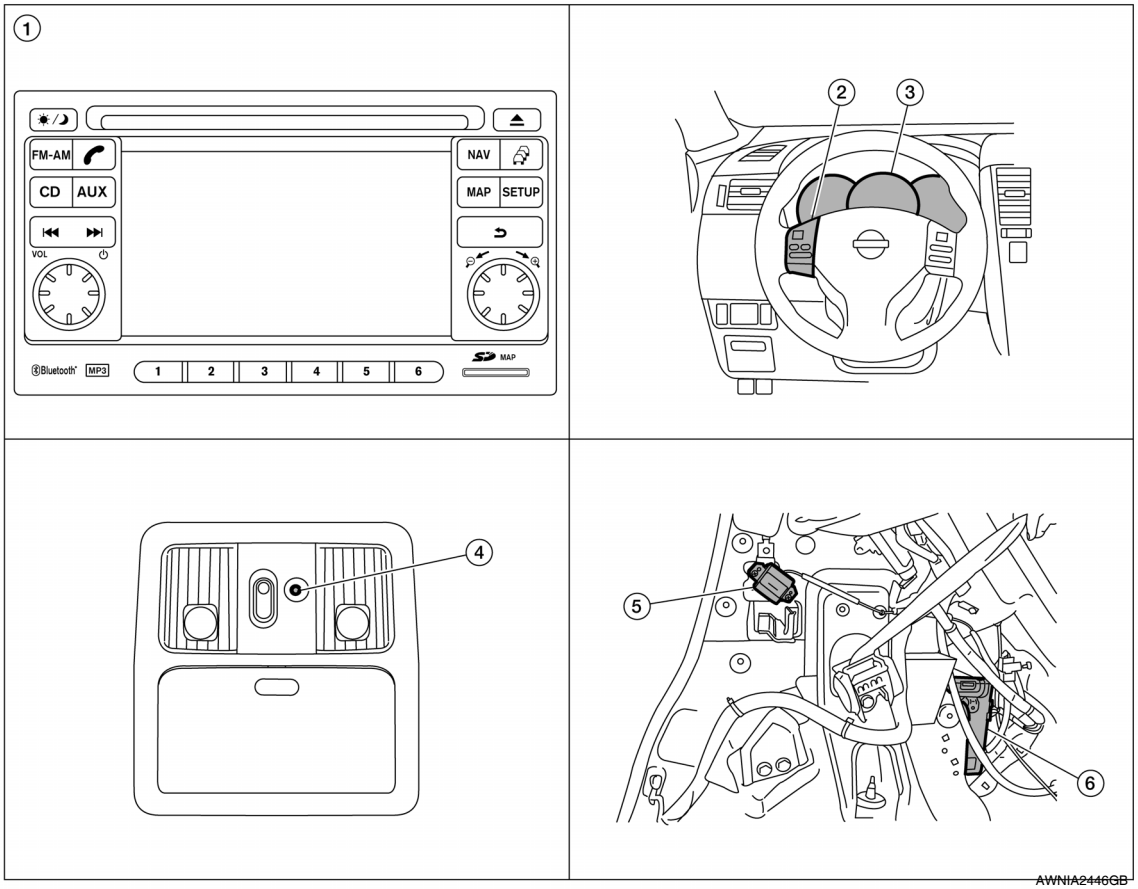
INFOID:0000000007329237

Refer to AV-65, "Symptom Chart".

TELEPHONE

Component Parts and Harness Connector Location

INFOID:0000000007329238



1. AV control unit M70
2. Steering wheel audio control switches
3. Combination meter M24
4. Bluetooth microphone R15
5. Bluetooth antenna
6. Bluetooth control unit B121, B122, B135 [view with luggage side lower finisher (RH) removed]

System Description

INFOID:0000000007329239

BLUETOOTH® HANDS-FREE PHONE SYSTEM

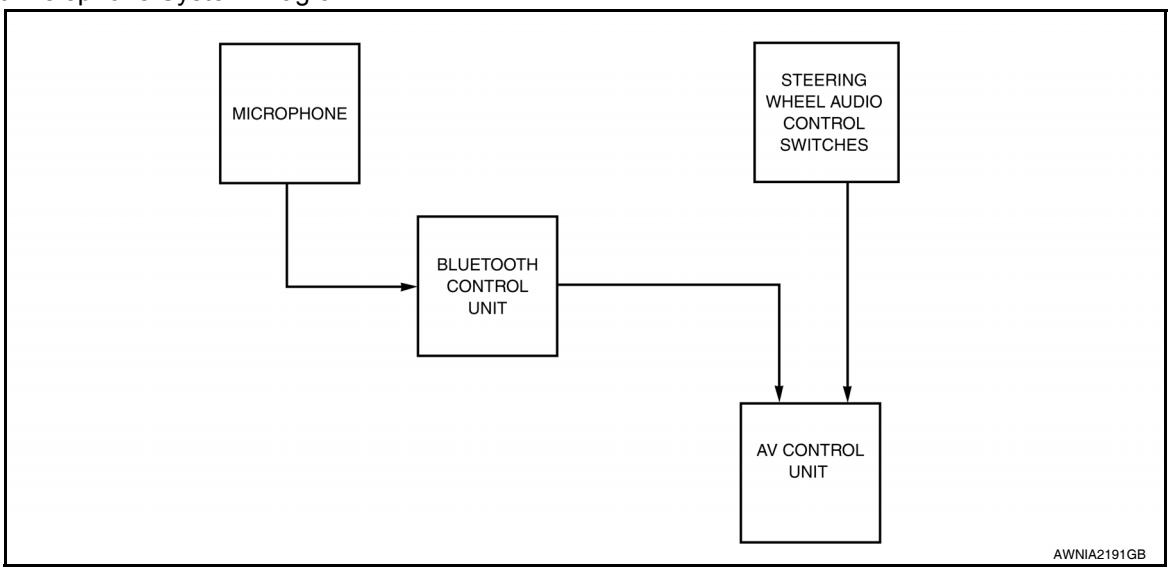
Refer to the Owner's Manual for Bluetooth telephone system operating instructions.

NOTE:

Cellular telephones must have their wireless connection set up (paired) before using the Bluetooth telephone system.

Bluetooth telephone system allows users who have a Bluetooth cellular telephone to make a wireless connection between their cellular telephone and the Bluetooth control unit. Hands-free cellular telephone calls can be sent and received. Some Bluetooth cellular telephones may not be recognized by the Bluetooth control unit. When a cellular telephone or the Bluetooth control unit is replaced, the telephone must be paired with the Bluetooth control unit. Different cellular telephones may have different pairing procedures. Refer to the cellular telephone operating manual.

Bluetooth Telephone System Diagram



Bluetooth Control Unit

When the ignition switch is turned to ACC or ON, the Bluetooth control unit will power up. During power up, the Bluetooth control unit is initialized and performs various self checks. Initialization may take up to 20 seconds. If a phone is present in the vehicle and paired with the Bluetooth control unit, Nissan Voice Recognition will then become active. Bluetooth telephone functions can be turned off using the Nissan Voice Recognition system. For Bluetooth control unit location, refer to AV-76, "Component Parts and Harness Connector Location".

Steering Wheel Audio Control Switches

When buttons on the steering wheel audio control switch are pushed, the resistance in steering wheel audio control switch circuit changes depending on which button is pushed. The Bluetooth control module uses this signal to perform various functions while navigating through the voice recognition system.

The following functions can be performed using the steering wheel audio control switch:

- Initiate Self Diagnosis of the Bluetooth telephone system
- Start a voice recognition session
- Answer and end telephone calls
- Adjust the volume of calls

Volume Switch

Call volume can be adjusted using the AV control unit volume switch.

Bluetooth Microphone

The Bluetooth microphone is located in the roof console assembly. The Bluetooth microphone sends a signal to the Bluetooth control unit. The Bluetooth microphone can be actively tested during self-diagnosis. For Bluetooth microphone location, refer to AV-76, "Component Parts and Harness Connector Location".

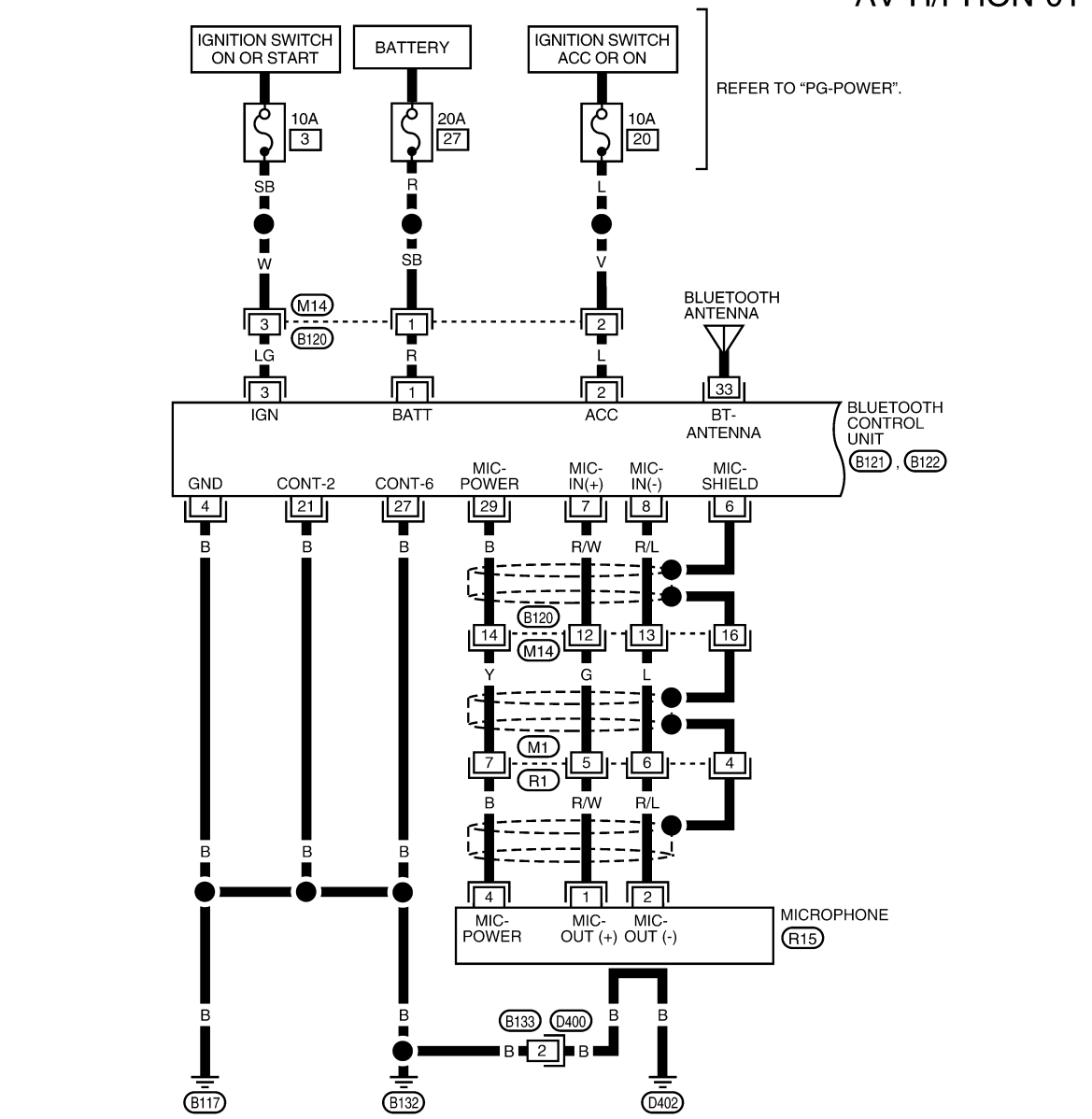
AV Control Unit

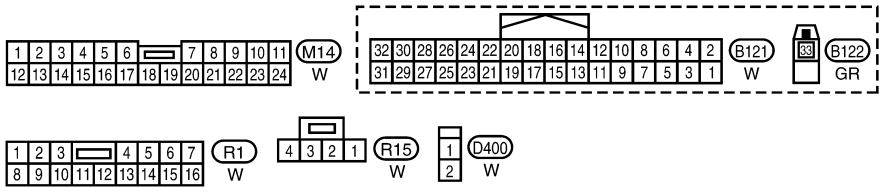
The AV control unit receives signals from the Bluetooth control unit and sends audio signals to the speakers.

Wiring Diagram - H/PHON -

INFOID:0000000007329240

AV-H/PHON-01





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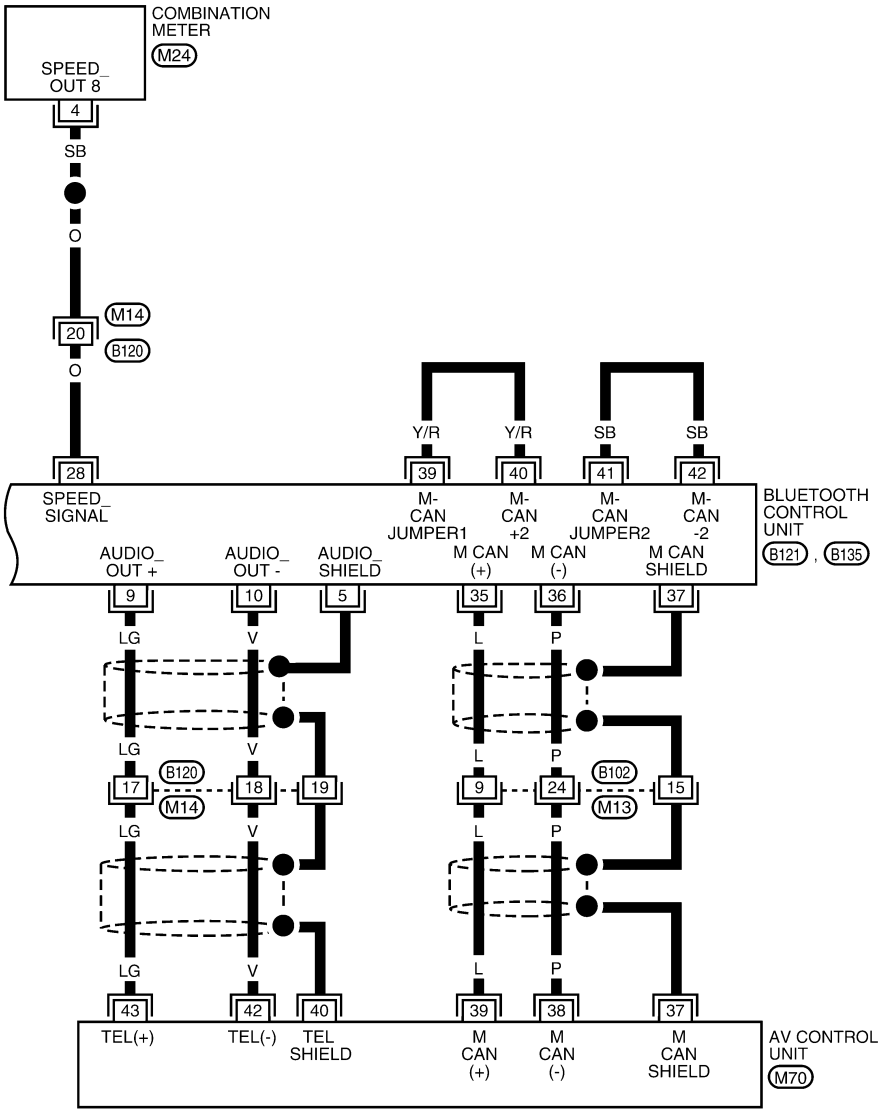
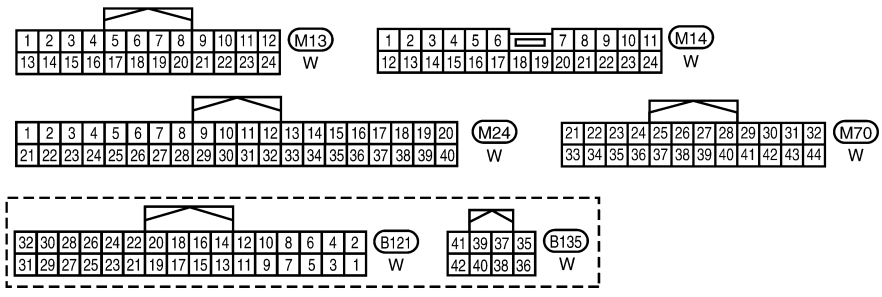
AV-H/PHON-02





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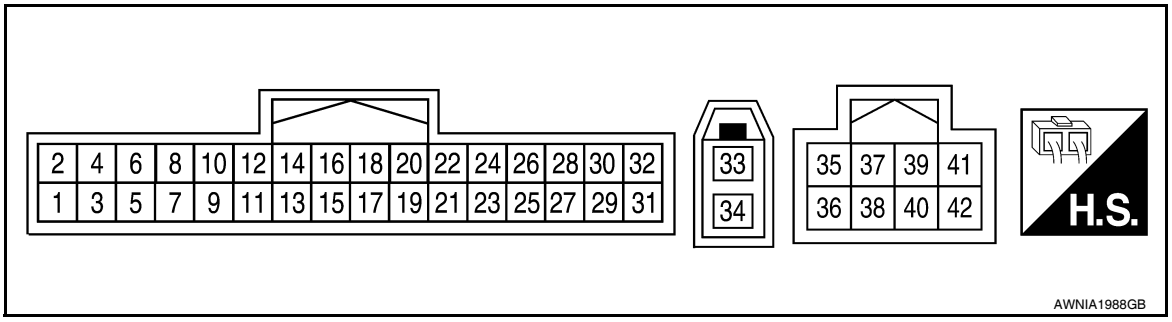
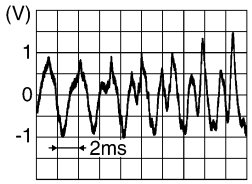
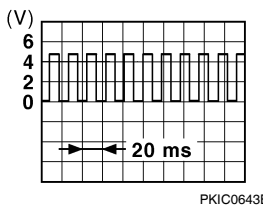
Bluetooth Control Unit Harness Connector Terminal Layout

INFOID:0000000007329241



Terminal and Reference Value for Bluetooth Control Unit

INFOID:0000000007329242

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
1 (R)	Ground	Battery power	Input	–	–	Battery voltage	System does not work properly.
2 (L)	Ground	ACC power	Input	ACC/ ON	–	Battery voltage	System does not work properly.
3 (LG)	Ground	IGN power	Input	ON/ START	–	Battery voltage	System does not work properly.
4 (B)	–	Ground	–	–	–	–	–
5	–	Shield	–	–	–	–	–
6	–	Shield	–	–	–	–	–
7 (R/W)	8 (R/L)	Mic-in signal	Input	–	–	–	Bluetooth Microphone inoperative.
9 (LG)	10 (V)	Audio out	Output	ACC/ ON	Bluetooth control unit sends audio signal		Audio can not be heard.
21 (B)	–	Cont-2	–	–	–	–	–
27 (B)	–	Cont-6	–	–	–	–	–
28 (O)	Ground	Vehicle speed signal (8–pulse)	Input	ON	When vehicle speed is approx. 40 km/h (25 MPH)		Speed sensitive volume is inoperative.
29 (B)	Ground	Bluetooth Microphone power	Output	–	–	5V	Bluetooth Microphone inoperative.
33	–	Bluetooth antenna signal	Input	–	–	–	–
35 (L)	—	M CAN +	—	—	—	—	—

Terminal (Wire color)		Item	Signal input/ output	Condition		Reference value (Approx.)	Example of symptom
+	–			Ignition switch	Operation		
36 (P)	—	M CAN -	—	—	—	—	—
37	—	M CAN shield	—	—	—	—	—
39 (Y/R)	—	M CAN jumper 1	—	—	—	—	—
40 (Y/R)	—	M CAN 1	—	—	—	—	—
41 (SB)	—	M CAN jumper 2	—	—	—	—	—
42 (SB)	—	M CAN 2	—	—	—	—	—

Bluetooth Control Unit Self-Diagnosis Function

INFOID:0000000007329243

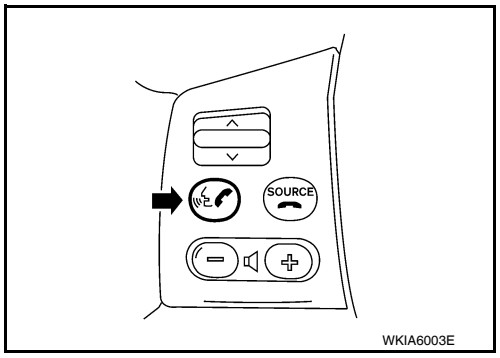
The Bluetooth control unit has two diagnostic checks. The first diagnostic check is performed automatically every ignition cycle during control unit initialization. The second diagnostic check is performed by the technician using the steering wheel audio control switches prior to trouble diagnosis.

BLUETOOTH CONTROL UNIT INITIALIZATION CHECKS

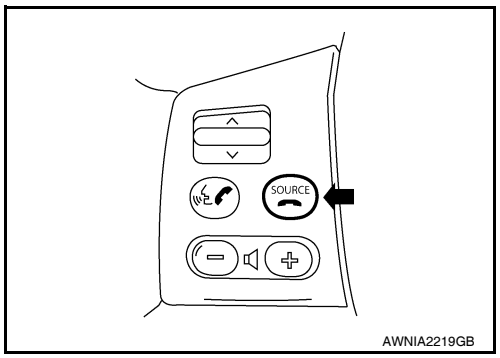
- Internal control unit failure
- Bluetooth antenna connection open or shorted
- Steering wheel audio control switches (PHONE/SEND, PHONE/END) stuck closed
- Vehicle speed pulse count
- Bluetooth Microphone connection test (with playback to operator)
- Bluetooth inquiry check

SELF-DIAGNOSIS MODE

1. Turn ignition switch to ACC or ON.
2. Wait for the Bluetooth system to complete initialization. This may take up to 20 seconds.
3. Press and hold the steering wheel audio control switch PHONE/ SEND button for at least 5 seconds. The Bluetooth system will begin to play a verbal prompt.
   NOTE:
   At any time, press and hold the steering wheel audio control switch PHONE/SEND button for at least 5 seconds to exit diagnostic mode.



4. While the prompt is playing, press and hold the steering wheel audio control switch PHONE/END button for at least 5 seconds. The Bluetooth system will sound a 5 second beep.
5. While the beep is sounding, press and hold the steering wheel audio control switch PHONE/END button for at least 5 seconds again.
6. The Bluetooth system has now entered into the diagnostic mode. Results of the diagnostic checks will be verbalized to the technician. Refer to AV-82, "Workflow".
7. If there are no failure records to report, the speed pulse count will be reported next.
8. After the speed pulse count is reported, an interactive Bluetooth microphone test will be performed. Follow the voice prompt. If the Bluetooth microphone test fails refer to AV-82, "Workflow".
9. Self-diagnosis mode is complete when the voice prompt says "All diagnostic functions completed". A short beep is heard.



Workflow

INFOID:0000000007329244

Failure Message	Action
“Internal failure”	Replace Bluetooth control unit. Refer to AV-85, "Removal and Installation".
“Bluetooth antenna open”	1. Inspect harness connection. 2. Replace Bluetooth antenna. Refer to AV-85, "Removal and Installation".
“Bluetooth antenna shorted”	
“Phone/Send for Hands Free System is stuck”	Check steering wheel audio control switches. Refer to AV-68, "Steering Switch Check".
“Phone/End for the Hands Free System is stuck”	
“Microphone test” (failed interactive test)	1. Inspect harness between Bluetooth control unit and microphone. 2. Replace microphone. Refer to AV-85, "Removal and Installation".

Power Supply and Ground Circuit Inspection for Bluetooth Control Unit

INFOID:0000000007329245

1.CHECK FUSES

Make sure the following fuses for the Bluetooth control unit are not blown.

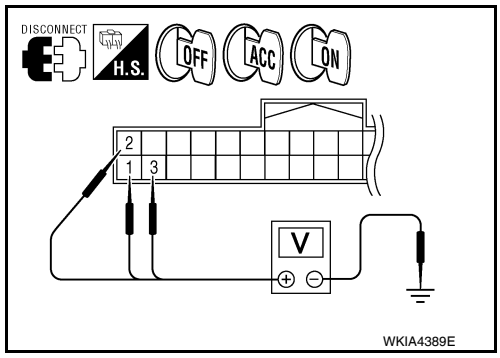
Terminals		Ignition Switch	Fuse No.
Connector	Terminal		
B121	1	All positions	27
	2	ACC/ON	20
	3	ON/START	3

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-6, "Wiring Diagram - POWER -".

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect Bluetooth control unit connector B121.
2. Check voltage between connector terminals and ground as follows.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal				
B121	1	Ground	Battery voltage	Battery voltage	Battery voltage
	2		0V	Battery voltage	Battery voltage
	3		0V	0V	Battery voltage

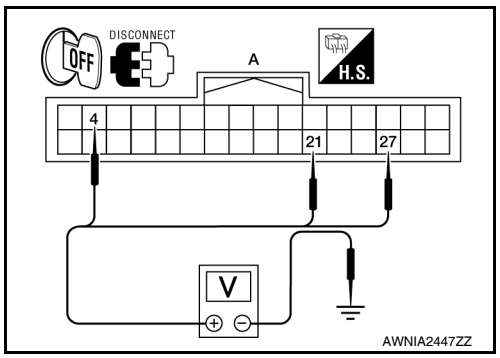
OK or NG

OK >> GO TO 3.
NG >> Check harness for open between Bluetooth control unit and fuse.

3.CHECK GROUND CIRCUITS

1. Turn ignition switch OFF.

2. Check continuity between the following Bluetooth control unit terminals and ground.



Terminals			Continuity
Connector	Terminal	—	
B121	4	Ground	Yes
	21		
	27		

OK or NG

OK >> Inspection End.
NG >> Repair or replace harness.

Steering Wheel Audio Control Switch Does Not Operate

INFOID:0000000007329246

Refer to AV-68, "Steering Switch Check".

Voice Activated Control Function Does Not Operate

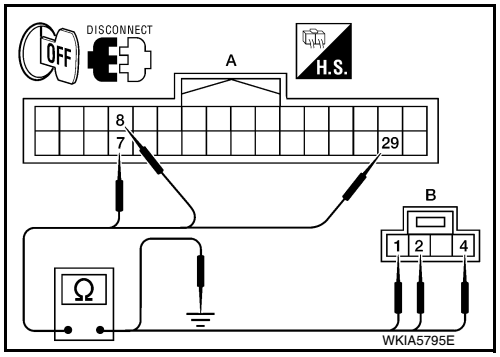
INFOID:0000000007329247

NOTE:
Even under the normal condition, Bluetooth voice guidance may not occur when pressing steering wheel audio control switch.

BLUETOOTH VOICE GUIDANCE IS HEARD WHEN PRESSING STEERING WHEEL AUDIO CONTROL SWITCH

1. CHECK HARNESS BETWEEN BLUETOOTH CONTROL UNIT AND BLUETOOTH MICROPHONE

1. Turn ignition switch OFF.
2. Disconnect Bluetooth control unit connector and Bluetooth microphone connector.
3. Check continuity between Bluetooth control unit connector B121 (A) and Bluetooth microphone connector R15 (B).



Terminals				Continuity
Connector	Terminal	Connector	Terminal	
A: B121	7	B: R15	1	Yes
	8		2	
	29		4	

4. Check continuity between Bluetooth control unit harness connector B121 and ground.

Terminals			Continuity
Connector	Terminal	—	
A: B121	7	Ground	No
	8		
	29		

OK or NG

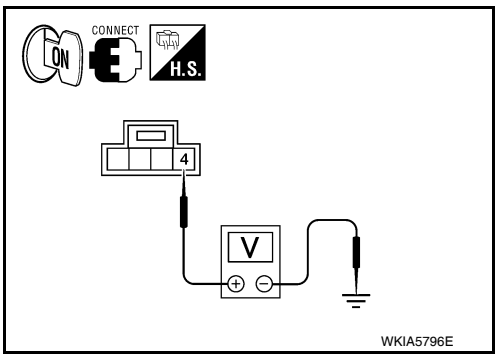
OK >> GO TO 2.
NG >> Repair harness or connector.

2. CHECK BLUETOOTH MICROPHONE POWER SUPPLY

1. Connect Bluetooth control unit connector and Bluetooth microphone connector.
2. Turn ignition switch ON.

3. Check voltage between Bluetooth microphone connector R15 terminal 4 and ground.

4 - Ground : Approx. 5 V



YES or NO

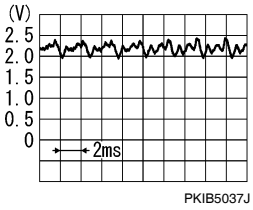
YES >> GO TO 3.
NO >> Replace Bluetooth control unit. Refer to AV-85, "Removal and Installation".

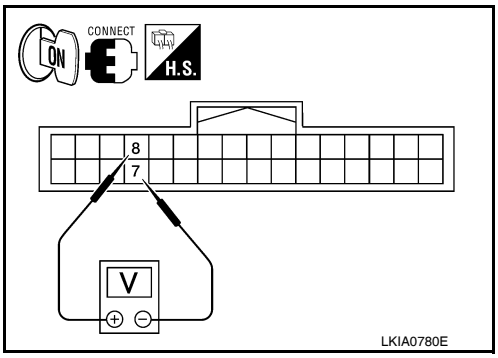
3.CHECK MIC. SIGNAL

1. Check signal between Bluetooth control unit harness connector B121 terminals 7 and 8.

When giving a voice

7 – 8:





OK or NG

OK >> Replace Bluetooth control unit. Refer to AV-85, "Removal and Installation".
NG >> Replace Bluetooth microphone. Refer to AV-85, "Removal and Installation".

BLUETOOTH VOICE GUIDANCE IS NOT HEARD WHEN PRESSING STEERING WHEEL AUDIO CONTROL SWITCH

1.CHECK STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT

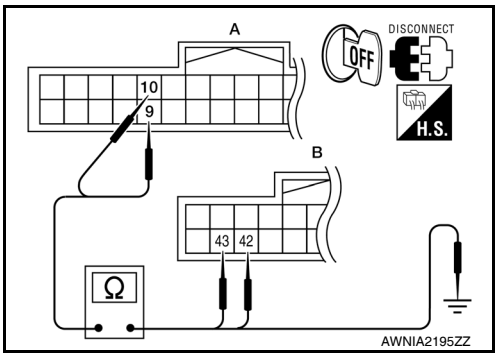
Refer to AV-68, "Steering Switch Check".

OK or NG

OK >> GO TO 2.
NG >> Replace applicable parts.

2.CHECK BLUETOOTH VOICE SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Bluetooth control unit connector and AV control unit connector.
3. Check continuity between Bluetooth control unit harness connector B121 (A) and AV control unit harness connector M70 (B).



Terminals				Continuity
Connector	Terminal	Connector	Terminal	
A: B121	9	B: M70	43	Yes
	10		42	

4. Check continuity between Bluetooth control unit harness connector B121 (A) and ground.

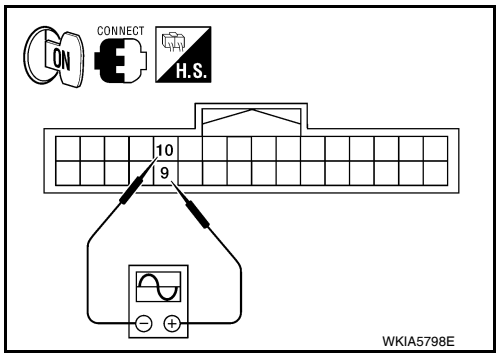
Terminals			Continuity
Connector	Terminal	—	
A: B121	9	Ground	No
	10		

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

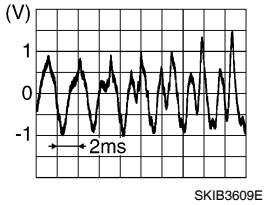
3. CHECK BLUETOOTH VOICE SIGNAL

Check signal between Bluetooth control unit harness connector B121 terminals 9 and 10.



When giving a voice

9 – 10:



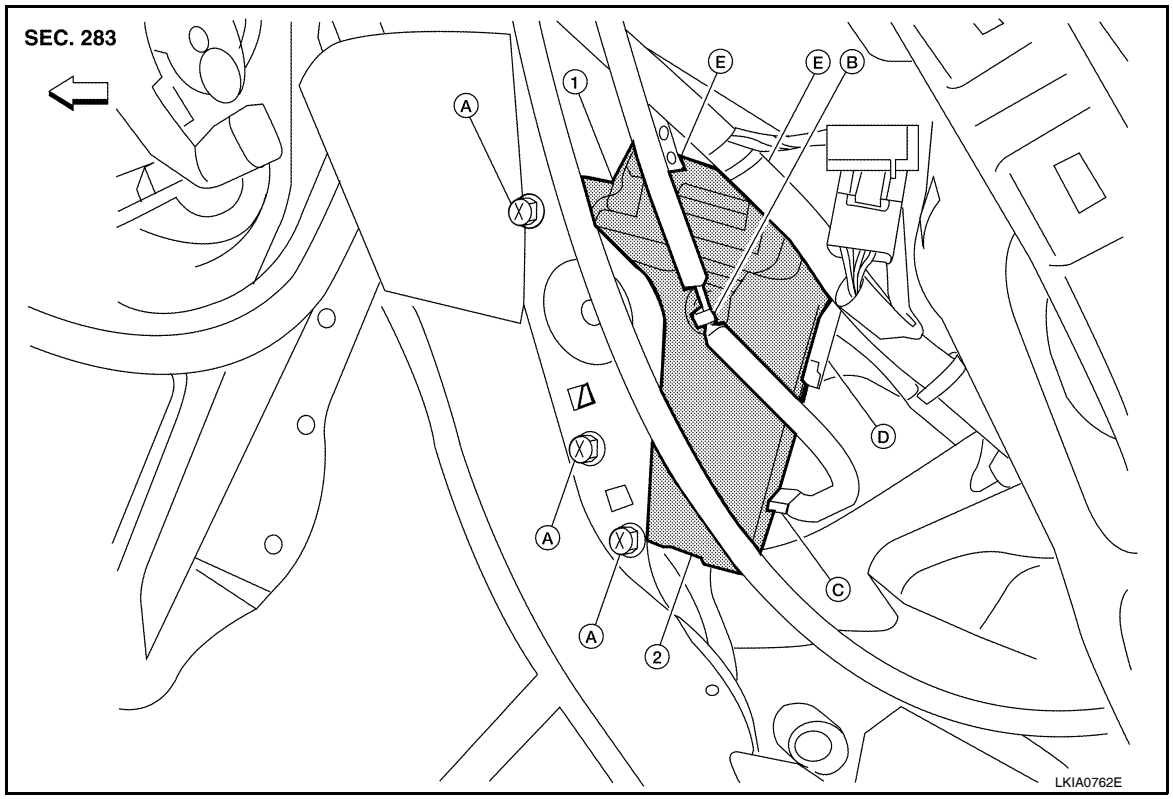
OK or NG

OK >> Replace AV control unit. Refer to AV-73, "Removal and Installation".
NG >> Replace Bluetooth control unit. Refer to AV-85, "Removal and Installation".

Removal and Installation

INFOID:0000000007329248

BLUETOOTH CONTROL UNIT



1.	Bluetooth control unit bracket	2.	Bluetooth control unit	A.	Blue tooth control unit bolts
B.	BLuetooth antenna feeder harness clip	C.	Bluetooth antenna feeder harness connector	D.	Bluetooth control unit connector
E.	Bluetooth control unit bracket screws	⇦	Front		

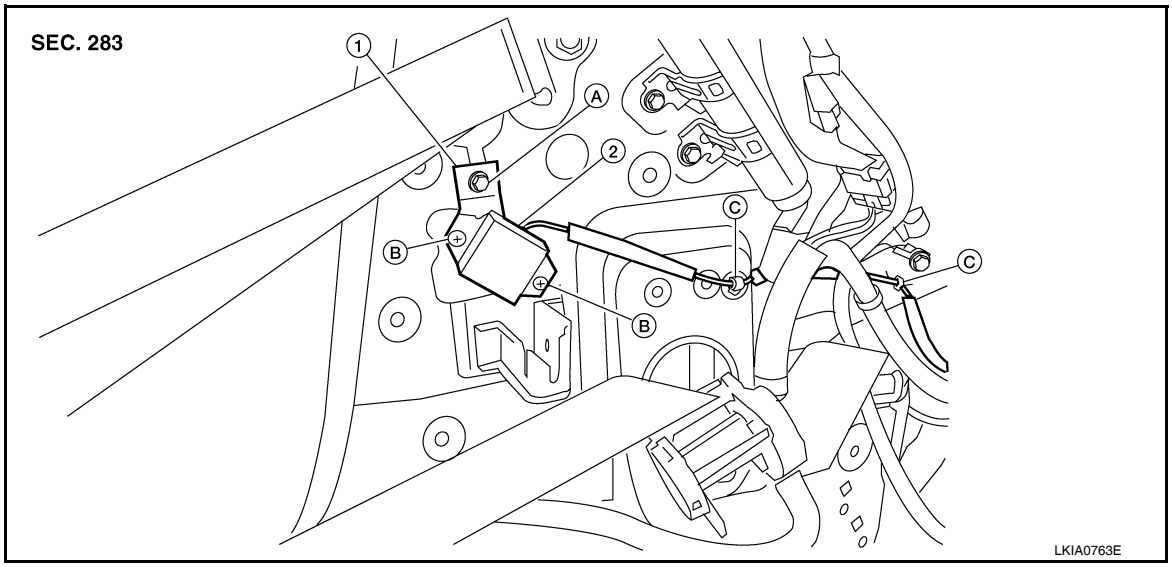
Removal

1. Remove luggage side lower finisher (RH). Refer to EI-44, "Removal and Installation".
   • Disconnect Bluetooth antenna harness clip.
2. Disconnect the Bluetooth control unit harness connector.

3. Remove the Bluetooth control unit upper and lower bracket bolts.
4. Unhook the Bluetooth control unit upper and lower brackets and remove Bluetooth control unit.
5. Remove Bluetooth control unit bracket screws and remove the upper and lower brackets from unit.

Installation
Installation is in the reverse order of removal.

BLUETOOTH ANTENNA



1. Bluetooth antenna bracket
2. Bluetooth antenna
A. Bluetooth antenna bracket bolts
B. Bluetooth antenna screws
C. Bluetooth antenna feeder harness clips

Removal

1. Remove luggage side lower finisher (RH). Refer to EI-44, "Removal and Installation".
2. Disconnect the Bluetooth antenna feeder harness clips.
3. Disconnect the Bluetooth antenna feeder harness connector.
4. Remove the Bluetooth antenna bracket bolt(s) and remove antenna.
5. Remove the Bluetooth antenna screws and remove bracket.

Installation
Installation is in the reverse order of removal.

BLUETOOTH MICROPHONE

Removal

1. Remove over-head console assembly, roof finisher. Refer to EI-41, "Component".
2. Remove the Bluetooth microphone.

Installation
Installation is in the reverse order of removal.

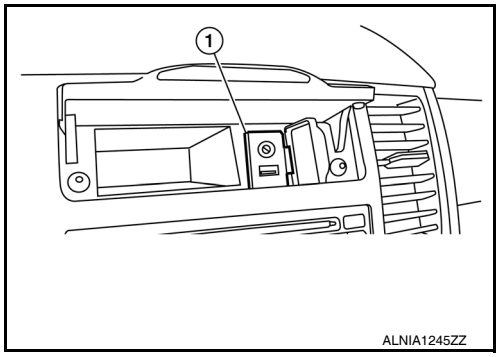
USB CONNECTOR AND AUX JACK

Removal and Installation

INFOID:0000000007329249

REMOVAL

1. Remove the cluster lid C. Refer to IP-12, "Removal and Installation".
2. Push the pawl from the back of the cluster lid C to remove the USB connector and aux jack (1).



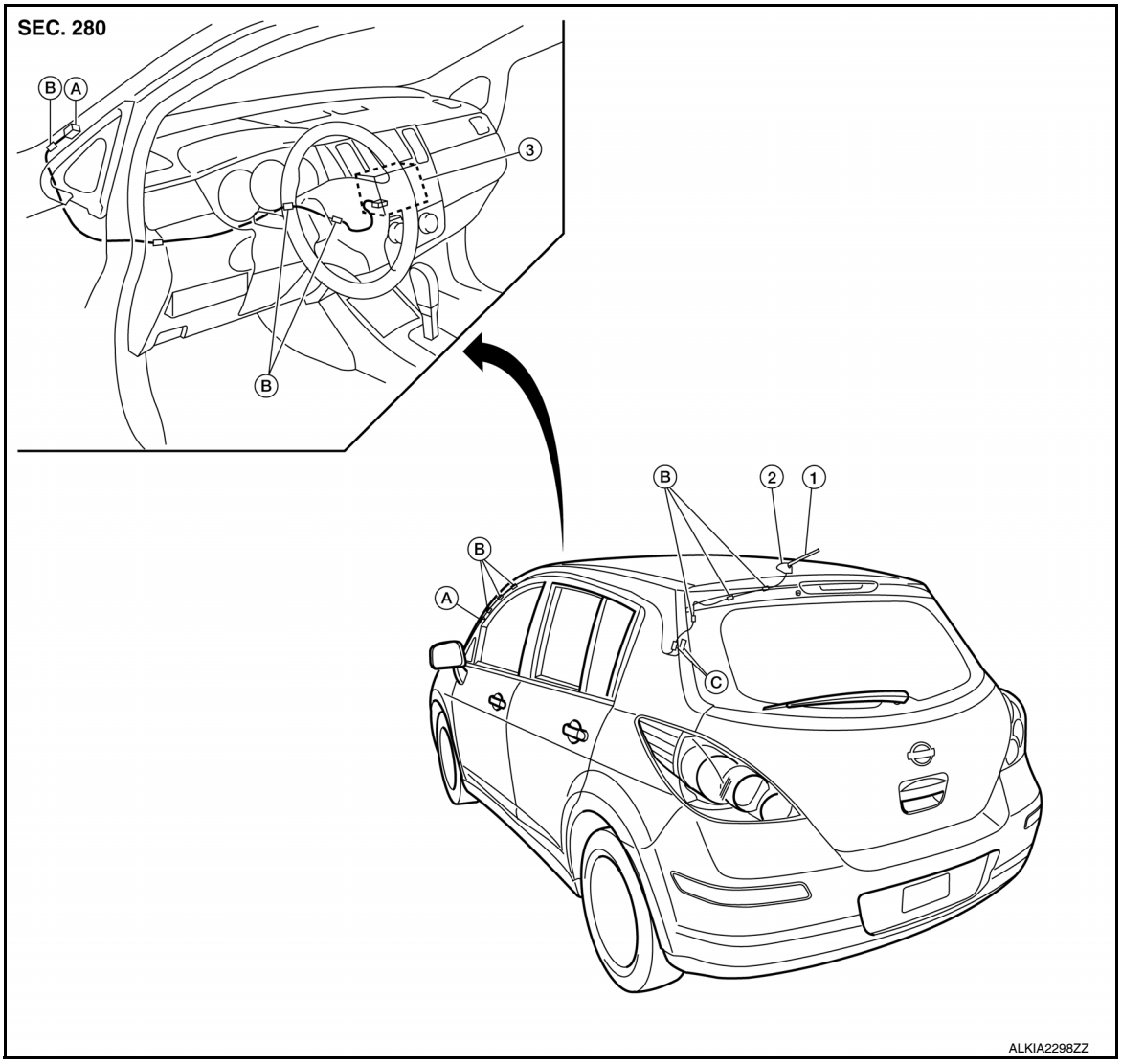
INSTALLATION

Installation is in the reverse order of removal.

AUDIO ANTENNA

Location of Antenna

INFOID:0000000007329250



1. Roof antenna
2. Roof antenna base
3. AV control unit
A. Audio antenna harness connector
B. Harness clips
C. Roof antenna harness connectors

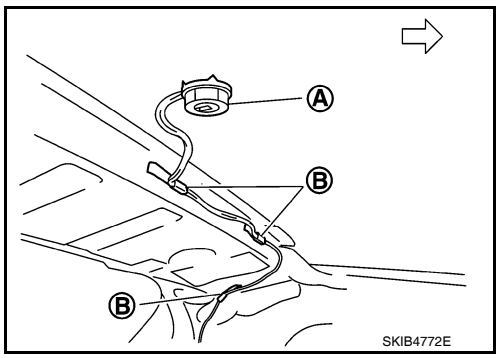
Removal and Installation of Roof Antenna

INFOID:0000000007329251

REMOVAL

1. Remove the luggage side upper finisher (LH). Refer to EI-44.
2. Remove rear assist grip (LH). Refer to EI-41, "Component".
3. Remove three clips of headlining (rear side). Pull down headlining (rear side) and obtain space for work between vehicle and headlining.
4. Disconnect the roof antenna harness connectors.
5. Remove nut (A) and clips (B).

• ⇦: Vehicle front



6. Remove the roof antenna.

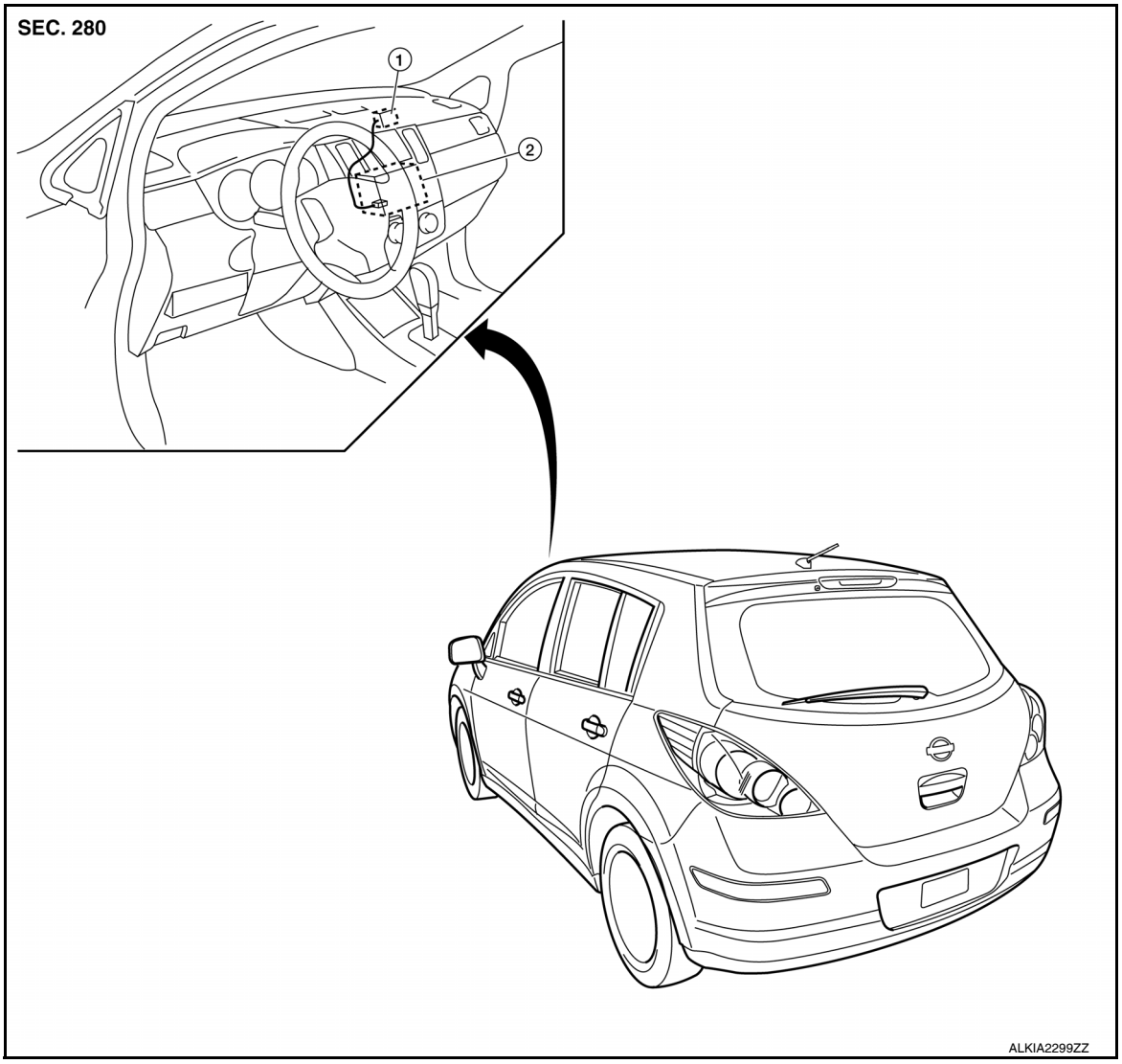
INSTALLATION

Installation is in the reverse order of removal.

GPS ANTENNA

Location of Antenna

INFOID:0000000007329252

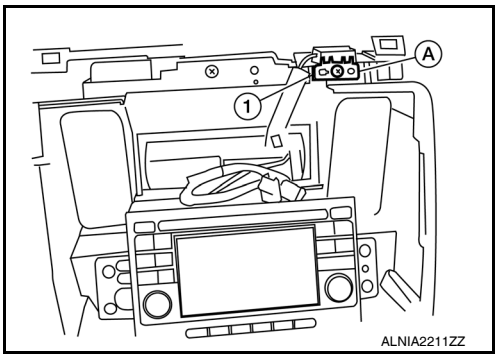


1. GPS antenna
2. AV control unit

Removal and Installation of GPS Antenna

INFOID:0000000007329253

1. Remove cluster lid C.Refer to IP-12, "Removal and Installation"
2. Remove audio unit and disconnect GPS antenna connector.
3. Remove screw (A) and remove GPS antenna (1).



SECTION ACS
AUTO CRUISE CONTROL SYSTEM

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SERVICE INFORMATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329120

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007697766

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Description

INFOID:0000000007329121

Regarding the information for ASCD system, refer to EC-28, "System Description".

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MAINTENANCE

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329122

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329123

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

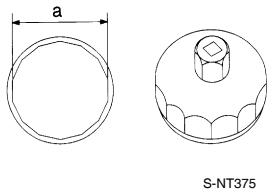
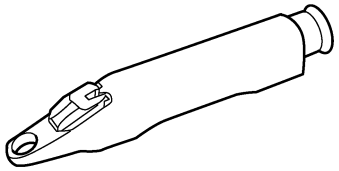
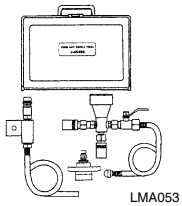
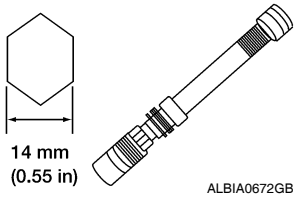
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

PREPARATION

Special Service Tool

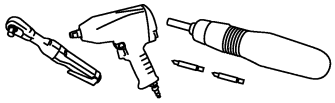
INFOID:0000000007329124

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10115801 (—) Oil filter wrench  S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**
KV991J0010 (J-23688) Engine coolant refractometer  WBIA0539E	Checking concentration of ethylene glycol in engine coolant
KV991J0070 (J-45695) Coolant Refill Tool  LMA053	Refilling engine cooling system
— (J-48891) Spark plug socket  ALBIA0672GB	Removing and installing spark plug

Commercial Service Tool

INFOID:0000000007329125

(Kent-Moore No.) Tool name	Description
Power tool  PIIB1407E	Loosening bolts, screws and nuts

GENERAL MAINTENANCE

Explanation of General Maintenance

INFOID:0000000007329126

General Maintenance

INFOID:0000000007329127

General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform checks and inspections themselves or have their NISSAN dealers do them.

OUTSIDE THE VEHICLE

The maintenance items listed here should be performed from time to time, unless otherwise specified.

Item		Reference page
Tires	Check the pressure with a gauge often and always prior to long distance trips. Adjust the pressure in all tires, including the spare, to the specified pressure. Check carefully for damage, cuts or excessive wear.	WT-30
Wheel nuts	When checking the tires, make sure no nuts are missing, and check for any loose nuts. Tighten if necessary.	WT-7
Tire rotation	Tires should be rotated every 7,500 miles (12,000 km).	WT-7
Tire Pressure Monitor System (TPMS) transmitter components	Replace the TPMS transmitter grommet seal, valve core and cap when the tires are replaced due to wear or age.	WT-9
Windshield	Clean the windshield on a regular basis. Check the windshield at least every six months for cracks or other damage. Repair as necessary.	GW-12
Windshield wiper blades	Check for cracks or wear if they do not wipe properly. Replace as necessary.	—
Doors and engine hood	Check that all doors and the engine hood operate smoothly as well as the back door. Also make sure that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released. When driving in areas using road salt or other corrosive materials, check lubrication frequently.	MA-36
Lamps	Make sure that the headlamps, stop lamps, tail lamps, turn signal lamps, and other lamps are all operating properly and installed securely. Also check headlamp aim. Clean the headlamps on a regular basis.	LT-23

INSIDE THE VEHICLE

The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.

Item		Reference page
Warning lamps and chimes	Make sure that all warning lamps and chimes are operating properly.	—
Windshield wiper and washer	Check that the wipers and washer operate properly and that the wipers do not streak.	—
Windshield defroster	Check that the air comes out of the defroster outlets properly and in sufficient quantity when operating the heater or air conditioning.	—
Steering wheel	Check that it has the specified play. Check for changes in the steering condition, such as excessive play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	—
Seats	Check seat position controls such as seat adjusters, seat back recliner, etc. to make sure they operate smoothly and that all latches lock securely in every position. Check that the head restraints move up and down smoothly and that the locks (if equipped) hold securely in all latched positions. Check that the latches lock securely for folding-down rear seat backs.	—
Seat belts	Check that all parts of the seat belt system (e.g. buckles, anchors, adjusters and retractors) operate properly and smoothly and are installed securely. Check the belt webbing for cuts, fraying, wear or damage.	MA-36
Accelerator pedal	Check the pedal for smooth operation and make sure the pedal does not catch or require uneven effort. Keep the floor mats away from the pedal.	—

Item		Reference page
Brakes	Check that the brake does not pull the vehicle to one side when applied.	—
Brake pedal and booster	Check the pedal for smooth operation and make sure it has the proper distance under it when depressed fully. Check the brake booster function. Be sure to keep floor mats away from the pedal.	BR-6 and BR-20
Clutch pedal	Make sure the pedal operates smoothly and check that it has the proper free play.	CL-6
Parking brake	Check that the lever has the proper travel and make sure that the vehicle is held securely on a fairly steep hill when only the parking brake is applied.	PB-5
Automatic transaxle "P" (Park) position mechanism	Check that the lock release button on the shift selector operates properly and smoothly. On a fairly steep hill check that the vehicle is held securely with the shift selector in the "P" (Park) position without applying any brakes.	—
CVT"P" (Park) position mechanism	On a fairly steep hill check that the vehicle is held securely with the shift selector in the "P" (Park) position without applying any brakes.	—

UNDER THE HOOD AND VEHICLE
The maintenance items listed here should be checked periodically (e.g. each time you check the engine oil or refuel).

Item		Reference page
Windshield washer fluid	Check that there is adequate fluid in the tank.	—
Engine coolant level	Check the coolant level when the engine is cold.	CO-11
Radiator and hoses	Check the front of the radiator and clean off any dirt, insects, leaves, etc., that may have accumulated. Make sure the radiator hoses have no cracks, deformation, deterioration or loose connections.	—
Brake and clutch fluid levels	Make sure that the brake and clutch fluid level(s) is (are) between the "MAX" and "MIN" lines on the reservoir(s).	BR-9
Battery	Check the fluid level in each cell. It should be between the "MAX" and "MIN" lines. Vehicles operated in high temperatures or under severe conditions require frequent checks of the battery fluid level.	—
Engine drive belts	Make sure that no belt is frayed, worn, cracked or oily.	EM-13
Engine oil level	Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	MA-19
Automatic transaxle fluid level	Check the level on the dipstick after putting the shift selector in "P" (Park) position with the engine idling.	MA-30
Exhaust system	Make sure there are no loose supports, cracks or holes. If the sound of the exhaust seems unusual or there is a smell of exhaust fumes, immediately locate the trouble and correct it.	MA-25
Underbody	The underbody is frequently exposed to corrosive substances such as those used on icy roads or to control dust. It is very important to remove these substances, otherwise rust will form on the floor pan, frame, fuel lines and around the exhaust system. At the end of winter, the underbody should be thoroughly flushed with plain water, being careful to clean those areas where mud and dirt can easily accumulate.	—
Fluid leaks	Check under the vehicle for fuel, oil, water or other fluid leaks after the vehicle has been parked for a while. Water dripping from the air conditioner after use is normal. If you should notice any leaks or gasoline fumes are evident, check for the cause and correct it immediately.	—

PERIODIC MAINTENANCE

Introduction of Periodic Maintenance

INFOID:0000000007329128

Two different maintenance schedules are provided, and should be used, depending upon the conditions in which the vehicle is mainly operated. **After 60,000 miles (96,000 km) or 48 months, continue the periodic maintenance at the same mileage/time intervals.**

Schedule 1	Follow Periodic Maintenance Schedule 1 if your driving habits frequently includes one or more of the following driving conditions: • Repeated short trips of less than 5 miles (8 km). • Repeated short trips of less than 10 miles (16 km) with outside temperatures remaining below freezing. • Operating in hot weather in stop-and-go “rush hour” traffic. • Extensive idling and/or low speed driving for long distances, such as police, taxi or door-to-door delivery use. • Driving in dusty conditions. • Driving on rough, muddy, or salt spread roads. • Towing a trailer, using a camper or a car-top carrier.	Emission Control System Maintenance	MA-8
		Chassis and Body Maintenance	MA-8
Schedule 2	Follow Periodic Maintenance Schedule 2 if none of the driving conditions shown in Schedule 1 apply to your driving habits.	Emission Control System Maintenance	MA-10
		Chassis and Body Maintenance	MA-10

Schedule 1

INFOID:0000000007329129

Emission Control System Maintenance

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.75 (6) 3	7.5 (12) 6	11.25 (18) 9	15 (24) 12	18.75 (30) 15	22.5 (36) 18	26.25 (42) 21	30 (48) 24	
Drive belt	NOTE (1)									MA-15
Air cleaner filter	NOTE (2)								[R]	EM-17
EVAP vapor lines									I*	MA-24
Fuel lines									I*	FL-5
Fuel filter	NOTE (3)									—
Engine coolant*	NOTE (4)									CO-11
Engine oil		R	R	R	R	R	R	R	R	LU-9
Engine oil filter (Use genuine oil filter or equivalent)		R	R	R	R	R	R	R	R	LU-11
Spark plugs (Iridium/ platinum - tipped type)		Replace every 105,000 miles (168,000 km)								EM-32
Intake and exhaust valve clearance*	NOTE (5)									EM-111

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	33.75 (54) 27	37.5 (60) 30	41.25 (66) 33	45 (72) 36	48.75 (78) 39	52.5 (84) 42	56.25 (90) 45	60 (96) 48	
Drive belt	NOTE (1)								I*	EM-13
Air cleaner filter	NOTE (2)								[R]	EM-16
EVAP vapor lines									I*	MA-24
Fuel lines									I*	MA-18
Fuel filter	NOTE (3)									—
Engine coolant*	NOTE (4)									CO-11
Engine oil		R	R	R	R	R	R	R	R	LU-9
Engine oil filter (Use genuine oil filter or equivalent)		R	R	R	R	R	R	R	R	LU-11
Spark plugs (Iridium/ platinum - tipped type)		Replace every 105,000 miles (168,000 km)								EM-32
Intake and exhaust valve clearance*	NOTE (5)									EM-111

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months. Replace the drive belts if found damaged.

(2) If operating mainly in dusty conditions, more frequent maintenance may be required.

(3) Maintenance-free item. For service procedures, refer to the FL section.

(4) First replacement interval is 105,000 miles (168,000 km) or 84 months. After first replacement, replace every 75,000 miles (120,000 km) or 60 months. Use only Pre-diluted Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent. Mixing any other type of coolant or water will reduce the life expectancy of the factory-filled coolant.

(5) Periodic maintenance is not required. However, if valve noise increases, inspect valve clearance.

* Maintenance items and intervals with "*" are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required.

Chassis and Body Maintenance

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.75 (6) 3	7.5 (12) 6	11.25 (18) 9	15 (24) 12	18.75 (30) 15	22.5 (36) 18	26.25 (42) 21	30 (48) 24	
Brake lines & cables					I				I	MA-34
Brake pads, rotors, drums & linings			I		I		I		I	MA-34 MA-34
Brake fluid					R				R	MA-33
Manual transaxle oil or automatic transaxle fluid	NOTE (1)				I				I	MT-12 (RS6F94R) AT-16 (A/T)

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.75 (6) 3	7.5 (12) 6	11.25 (18) 9	15 (24) 12	18.75 (30) 15	22.5 (36) 18	26.25 (42) 21	30 (48) 24	
CVT fluid	NOTE (2)				I				I	CVT-14 (RE0F08B)
Steering gear & linkage, axle & suspension parts			I		I		I		I	PS-15, MA-35
Tire rotation	NOTE (3)									WT-7
Front drive shaft boots			I		I		I		I	MA-36
Exhaust system			I		I		I		I	MA-25
In-cabin microfilter					R				R	MA-25

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	33.75 (54) 27	37.5 (60) 30	41.25 (66) 33	45 (72) 36	48.75 (78) 39	52.5 (84) 42	56.25 (90) 45	60 (96) 48	
Brake lines & cables					I				I	MA-34
Brake pads, rotors, drums & linings			I		I		I		I	MA-34 MA-34
Brake fluid					R				R	MA-33
Manual transaxle oil or automatic transaxle fluid	NOTE (1)				I				I	MA-29 (RS6F94R) MA-31 (A/T)
CVT fluid	NOTE (2)				I				I	MA-27 (RE0F08B)
Steering gear & linkage, axle & suspension parts			I		I		I		I	PS-15, MA-35
Tire rotation	NOTE (3)									WT-7
Front drive shaft boots			I		I		I		I	FAX-9
Exhaust system			I		I		I		I	MA-25
In-cabin microfilter					R				R	MA-25

(1) If towing a trailer, using a camper or car-top carrier, or driving on rough or muddy roads, change (not just inspect) oil/fluid at every 30,000 miles (48,000 km) or 24 months.

(2) If towing a trailer, using a camper or car-top carrier, or driving on rough or muddy roads, inspect CVT fluid deterioration with CONSULT every 60,000 miles (96,000 km), then change CVT fluid NS-2 if necessary. (Refer to CVT section) If CONSULT is not available, change (not just inspect) CVT fluid NS-2 every 60,000 miles (96,000 km). **Using transmission fluid other than Genuine NISSAN CVT Fluid NS-2 will damage the CVT, which is not covered by the NISSAN new vehicle limited warranty.**

(3) Refer to “Tire rotation” under the “GENERAL MAINTENANCE” heading earlier in this section.

Schedule 2

INFOID:0000000007329130

Emission Control System Maintenance

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Drive belt	NOTE (1)								I*	EM-13
Air cleaner filter					[R]				[R]	EM-17
EVAP vapor lines					I*				I*	MA-24
Fuel lines					I*				I*	FL-5
Fuel filter	NOTE (2)									—
Engine coolant*	NOTE (3)									CO-11
Engine oil		R	R	R	R	R	R	R	R	LU-9
Engine oil filter (Use genuine oil filter or equivalent.)		R	R	R	R	R	R	R	R	LU-11
Spark plugs (Iridium/platinum - tipped type)		Replace every 105,000 miles (168,000 km)								EM-32
Intake and exhaust valve clearance*	NOTE (4)									EM-111

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months. Replace the drive belt if found damaged or if the auto belt tensioner reading reaches the maximum limit.

(2) Maintenance-free item. For service procedures, refer to the FL section.

(3) First replacement interval is 105,000 miles (168,000 km) or 84 months. After first replacement, replace every 75,000 miles (120,000 km) or 60 months. Use only Pre-diluted Genuine NISSAN Long Life Antifreeze/Coolant (blue) or equivalent. Mixing any other type of coolant or water will reduce the life expectancy of the factory-filled coolant.

(4) Periodic maintenance is not required. However, if valve noise increases, inspect valve clearance.

* Maintenance items and intervals with "*" are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required.

Chassis and Body Maintenance

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. .

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Brake lines & cables			I		I		I		I	MA-34
Brake pads, rotors, drums & linings			I		I		I		I	MA-34 MA-34
Brake fluid					R				R	MA-33
Manual transaxle oil or automatic transaxle fluid			I		I		I		I	MT-12 (RS6F94R) AT-16 (A/T)
CVT fluid	NOTE (1)		I		I		I		I	CVT-15 (RE0F08B)
Steering gear & linkage, axle & suspension parts					I				I	PS-15, MA-35
Tire rotation	NOTE (2)									WT-7
Front drive shaft boots			I		I		I		I	MA-36
Exhaust system					I				I	MA-25
In-cabin microfilter			R		R		R		R	MA-25

(1) Using transmission fluid other than Genuine NISSAN CVT Fluid NS-2 will damage the CVT, which is not covered by the NISSAN new vehicle limited warranty.

(2) Refer to “Tire rotation” under the “GENERAL MAINTENANCE” heading earlier in this section.

RECOMMENDED FLUIDS AND LUBRICANTS

Fluids and Lubricants

INFOID:0000000007329131

Description			Capacity (Approximate)			Recommended Fluids/Lubricants
			Metric	US measure	Imp measure	
Fuel			50.0 ℓ	13 1/4 gal	11 gal	Unleaded gasoline with an octane rating of at least 87 AKI (RON 91)
Engine oil Drain and refill	With oil filter change		4.1 ℓ	4 3/8 qt	3 5/8 qt	• Engine oil with API Certification Mark *1 • Viscosity SAE 5W-30
	Without oil filter change		3.9 ℓ	4 1/8 qt	3 3/8 qt	
Dry engine (engine overhaul)			4.9 ℓ	5 1/8 qt	4 3/8 qt	
Cooling system (with reservoir at MAX level)			6.8 ℓ	7 1/4 qt	6 qt	Prediluted Genuine NISSAN Long Life Anti-freeze / Coolant (blue) or equivalent
Manual transaxle fluid (MTF)		RS6F949	2.0 ℓ	4 1/4 pt	3 1/2 pt	Genuine NISSAN gear oil (Chevron Texaco ETL8997B) 75W-80, or equivalent *2
Automatic transaxle fluid (ATF)			7.9 ℓ	8 3/8 qt	7 qt	Genuine NISSAN Matic D ATF *3
CVT fluid		RE0F08B	6.9 ℓ	7 1/4 qt	6 1/8 qt	Genuine NISSAN CVT Fluid NS-2 *4
Brake and clutch fluid			—	—	—	Genuine NISSAN Super Heavy Duty Brake Fluid *5 or equivalent DOT 3 (US FMVSS No. 116)
Multi-purpose grease			—	—	—	NLGI No. 2 (Lithium soap base)
Windshield washer fluid			4.5 ℓ	4 3/4 qt	4 qt	Genuine NISSAN Windshield Washer Concentrate Cleaner & Anti-Freeze or equivalent
Air conditioning system refrigerant			0.45 ± 0.05 kg	0.99 ± 0.11 lb	0.99 ± 0.11 lb	HFC-134a (R-134a) *6
Air conditioning system oil		MR18DE - Type 1	120 m ℓ	4.1 fl oz	4.2 fl oz	A/C System Oil Type R (DH-PR) *6
		MR18DE - Type 2	100 m ℓ	3.4 fl oz	3.5 fl oz	A/C System Oil Type S (DH-PS) *6

*1: For additional information, see “Engine Oil Recommendation”.

*2: If Genuine NISSAN gear oil is not available, API GL-4, Viscosity SAE 75W-80 may be used as a temporary replacement. However use Genuine NISSAN gear oil as soon as it is available.

*3: Using automatic transaxle fluid (ATF) other than Genuine NISSAN Matic D ATF will cause deterioration in driveability and automatic transaxle durability, and may damage the automatic transaxle, which is not covered by the NISSAN new vehicle limited warranty.

*4: **Use only Genuine NISSAN CVT Fluid NS-2. Using transmission fluid other than Genuine NISSAN CVT Fluid NS-2 will damage the CVT, which is not covered by the NISSAN new vehicle limited warranty.**

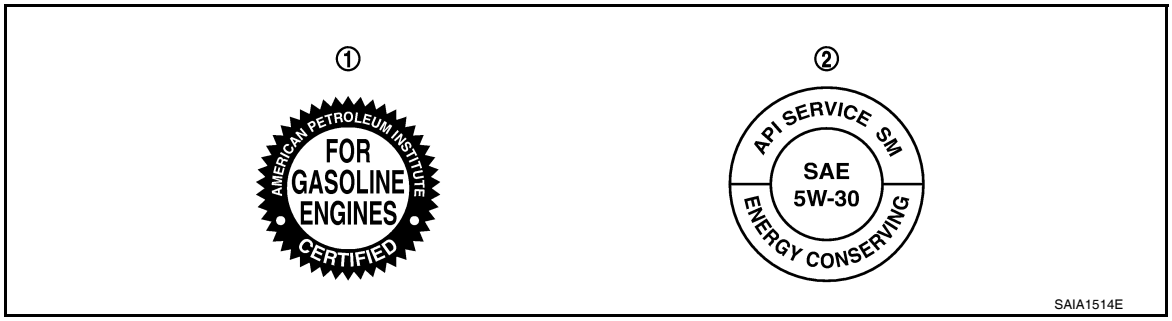
*5: Available in mainland U.S.A. through a NISSAN dealer.

*6: For further details, see "Air conditioner specification label".

SAE Viscosity Number

INFOID:0000000007329132

NISSAN recommends the use of an energy conserving oil in order to improve fuel economy.
Select only engine oils that meet the American Petroleum Institute (API) certification and International Lubrication Standardization and Approval Committee (ILSAC) certification and SAE viscosity standard. These oils have the API certification mark on the front of the container. Oils which do not have the specified quality label should not be used as they could cause engine damage.



1. API certification mark
2. API service symbol

Anti-freeze Coolant Mixture Ratio

INFOID:0000000007329133

The engine cooling system is filled at the factory with a pre-diluted high-quality, long life, year-round, anti-freeze coolant solution. The anti-freeze solution contains rust and corrosion inhibitors. Therefore, additional cooling system additives are not necessary.

CAUTION:

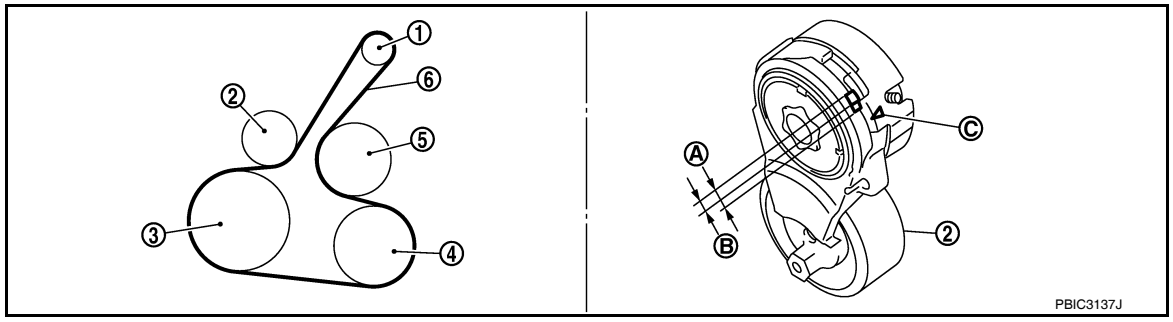
- **When adding or replacing coolant, be sure to use only Pre-diluted Genuine NISSAN Long Life Anti-Freeze/Coolant (blue) or equivalent. Pre-diluted Genuine NISSAN Long Life Antifreeze/Coolant (blue) is pre-diluted to provide antifreeze protection to 34° F (-37° C). If additional freeze protection is needed due to weather where you operate your vehicle, add Genuine NISSAN Long Life Antifreeze/ Coolant (blue) concentrate following the directions on the container. if an equivalent coolant other than Pre-diluted Genuine NISSAN Long Life Anti-Freeze/Coolant (blue) is used, follow the coolant manufacturer's instructions to maintain minimum freeze protection to 34° F (-37° C). The use of other types of coolant solutions other than Pre-diluted Genuine NISSAN Long Life Anti-Freeze/Coolant (blue) or equivalent may damage the engine cooling system.**

ENGINE MAINTENANCE (MR18DE)

DRIVE BELT

DRIVE BELT : Component

INFOID:0000000007329147



1.	Generator	2.	Drive belt auto–tensioner	3.	Crankshaft pulley
4.	A/C compressor (models with A/C) Idler pulley (models without A/C)	5.	Water pump	6.	Drive belt
A.	Possible use range	B.	Range when new drive belt is installed	C.	Indicator

DRIVE BELT : Checking Drive Belts

INFOID:0000000007329148

WARNING:
Be sure to perform this step when the engine is stopped.
NOTE:
On vehicles not equipped with A/C, there is an idler pulley in the position for the drive belt routing.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range.

  NOTE:
  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range.
  - Visually check entire drive belt for wear, damage or cracks.
  - If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

DRIVE BELT : Tension Adjustment

INFOID:0000000007329149

Belt tension is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

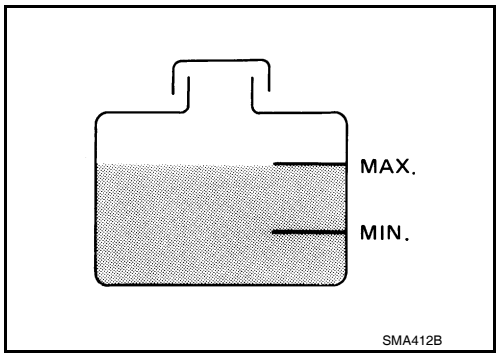
ENGINE COOLANT

ENGINE COOLANT : Inspection

INFOID:0000000007329150

LEVEL CHECK

- Check if the reservoir tank engine coolant level is within the “MIN” to “MAX” range when engine is cool.
- Adjust the engine coolant level as necessary.



ENGINE COOLANT : Changing Engine Coolant

INFOID:0000000007329151

WARNING:

- **To avoid being scalded, do not change engine coolant when engine is hot.**
- **Wrap a thick cloth around radiator cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

CAUTION:

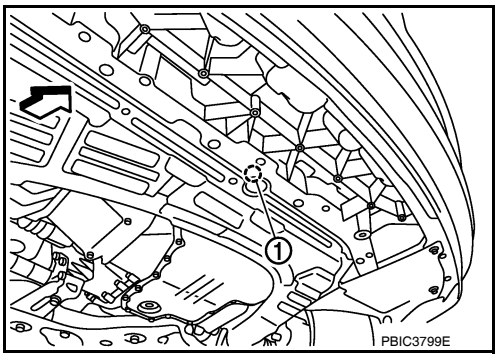
- **Do not spill engine coolant on drive belt.**

DRAINING ENGINE COOLANT

1. Open radiator drain plug (1) at the bottom of radiator, and then remove radiator cap.
   - ⇦ Front

   When draining all of engine coolant in the system, open water drain plug on cylinder block. Refer to EM-84.

   CAUTION:
   - **Perform this step when engine is cold.**
   - **Do not spill engine coolant on drive belt.**



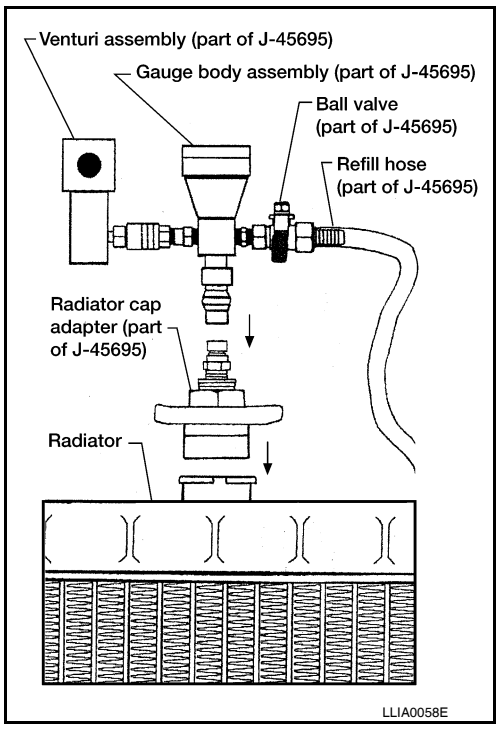
2. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing. Refer to CO-15, "Component".
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush the engine cooling system.

REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug, if removed for a total system drain or for engine removal or repair.
   - **The radiator must be completely empty of coolant and water.**
   - **Apply sealant to the threads of the cylinder block drain plugs. Use Genuine High Performance Thread Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

   Radiator drain plug : Refer to CO-15, "Component".
   Cylinder block drain plug : 9.8 N·m (1.0 kg-m, 87 in-lb)
2. If disconnected, reattach the upper radiator hose at the engine side.
3. Set the vehicle heater controls to the full HOT and heater ON position. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.

4. Install the Tool by installing the radiator cap adapter onto the radiator neck opening. Then attach the gauge body assembly with the refill tube and the venturi assembly to the radiator cap adapter.



Tool number : KV991J0070 (J-45695)

5. Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.
   - **Use recommended coolant or equivalent.**
     Refer to MA-14, "Anti-freeze Coolant Mixture Ratio".

Engine coolant capacity (with reservoir tank) : Refer to MA-13, "Fluids and Lubricants".

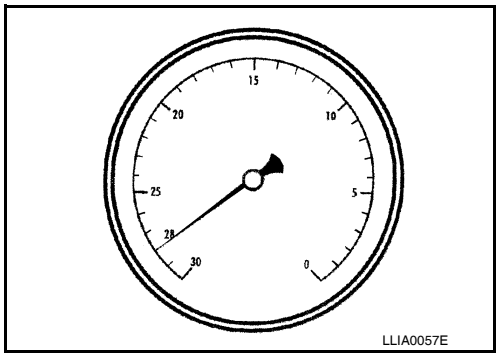
6. Install an air hose to the venturi assembly, the air pressure must be within specification.

Compressed air supply pressure : 549 - 824 kPa (5.6 - 8.4 kg/cm^2, 80 - 119 psi)

CAUTION:
The compressed air supply must be equipped with an air dryer.

7. The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve on the refill hose slightly. Coolant will be visible rising in the refill hose. Once the refill hose is full of coolant, close the ball valve. This will purge any air trapped in the refill hose.

8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, use the vacuum specifications based on the altitude above sea level.



Altitude above sea level	Vacuum gauge reading
0 - 100 m (328 ft)	: 28 inches of vacuum
300 m (984 ft)	: 27 inches of vacuum
500 m (1,641 ft)	: 26 inches of vacuum
1,000 m (3,281 ft)	: 24 - 25 inches of vacuum

9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
10. Place the coolant container (with the refill hose inserted) at the same level as the top of the radiator. Then open the ball valve on the refill hose so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.
    CAUTION:
    Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.
11. Remove the Tool from the radiator neck opening.
12. Fill the cooling system reservoir tank to the specified level and install the radiator cap. Run the engine to warm up the cooling system and top up the system as necessary.

FLUSHING COOLING SYSTEM

1. Install reservoir tank if removed. Refer to CO-15, "Component".
2. Install radiator drain plug.
   - **If water drain plug on cylinder block is removed, close and tighten it. Refer to EM-84, "Disassembly and Assembly".**

CAUTION:

Be sure to clean radiator drain plug and install with new O-ring. Refer to CO-15, "Component".

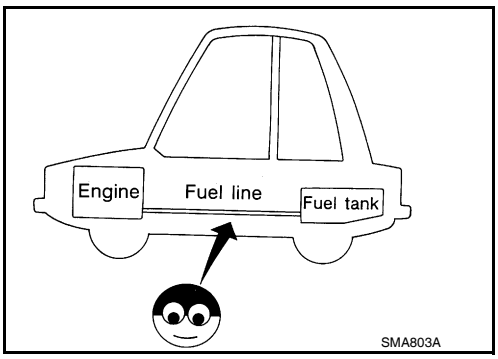
3. Fill radiator and reservoir tank with water and reinstall radiator cap.
4. Run engine and warm it up to normal operating temperature.
5. Rev engine two or three times under no-load.
6. Stop engine and wait until it cools down.
7. Drain water from the cooling system.
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

FUEL LINES

FUEL LINES : Checking Fuel Line

INFOID:0000000007329152

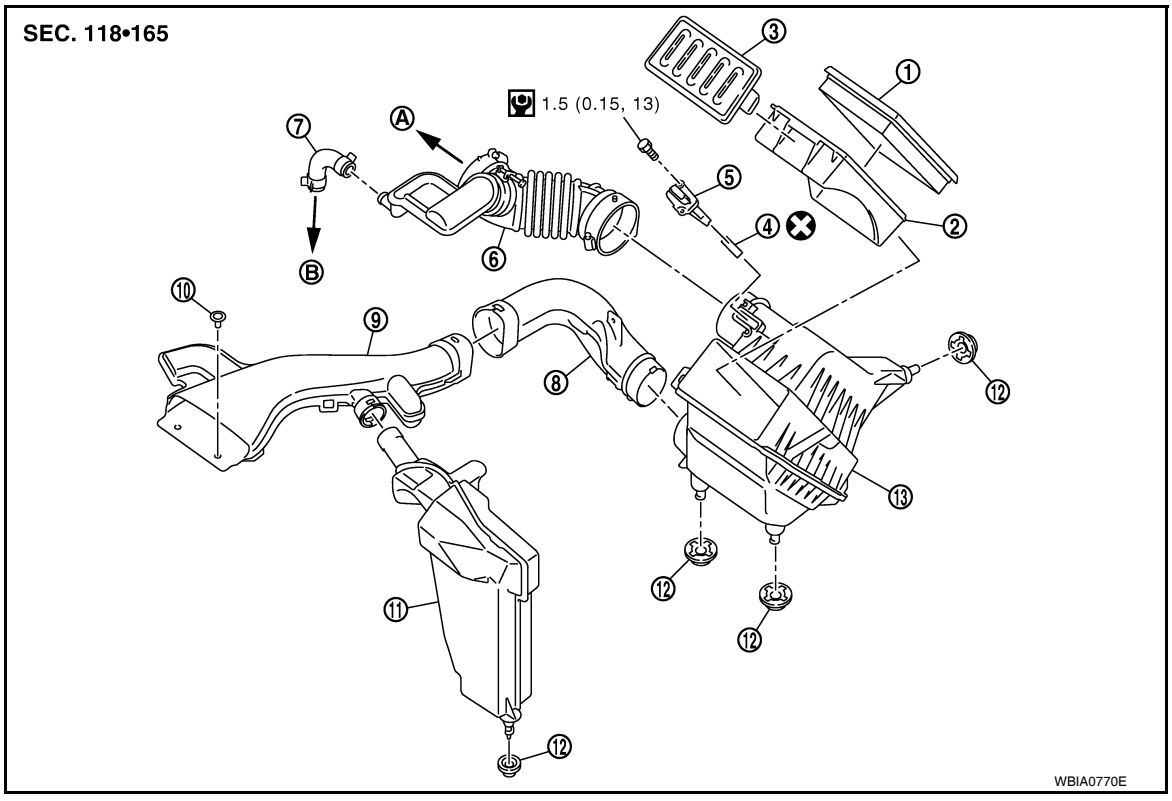
Inspect fuel lines, fuel filler cap and fuel tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



AIR CLEANER FILTER

AIR CLEANER FILTER : Component

INFOID:0000000007329153



1. Air cleaner filter
2. Holder
3. Air cleaner cover
4. Seal
5. Mass air flow sensor
6. Air duct
7. PCV hose
8. Air duct (Inlet)
9. Air duct (Front)

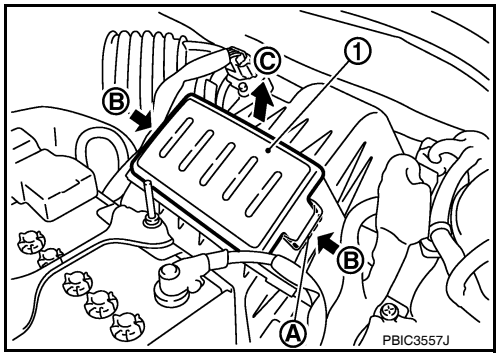
10. Clip
11. Resonator
12. Grommet
13. Air cleaner case
A. To electric throttle control actuator
B. To rocker cover

AIR CLEANER FILTER : Changing Air Cleaner Filter

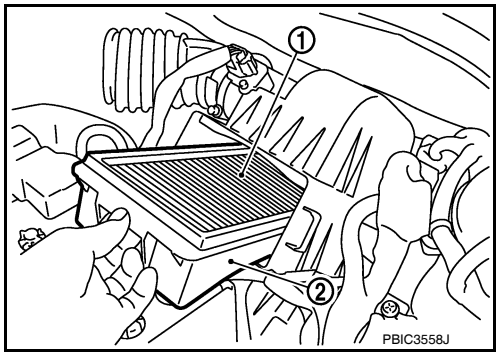
INFOID:0000000007329154

REMOVAL

1. Push the tabs (A) of both ends of the air cleaner cover (1) into the inside (B).
2. Pull up the air cleaner cover (1) and remove it (C).



3. Remove the air cleaner filter (1) and holder (2) assembly from the air cleaner case.
4. Remove the air cleaner filter (1) from the holder (2).



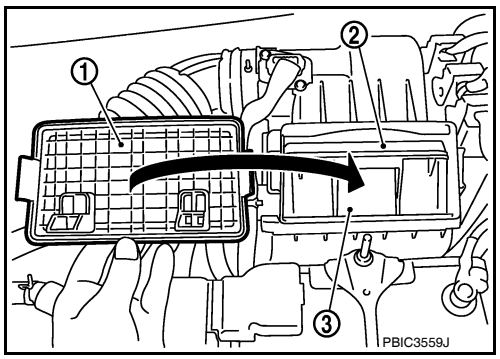
INSPECTION AFTER REMOVAL

It is necessary to replace the air cleaner filter at the recommended intervals, more often under dusty driving conditions. Refer to MA-8, "Introduction of Periodic Maintenance".

INSTALLATION

Installation is in the reverse order of removal.

- Install the air cleaner cover (1) in the direction shown.
- Air cleaner filter (2)
- Holder (3)



ENGINE OIL

ENGINE OIL : Inspection

INFOID:0000000007329155

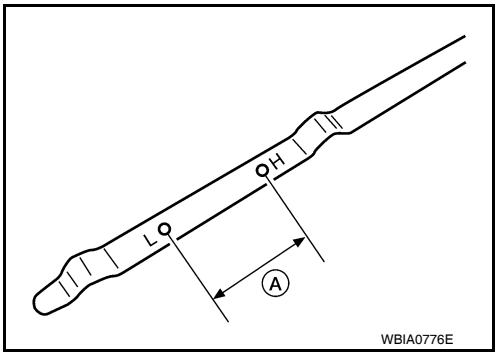
ENGINE OIL LEVEL

NOTE:

Park vehicle on a level surface, wait 10 minutes and check the engine oil level.

1. Pull out oil level gauge and wipe it clean.

2. Insert oil level gauge and make sure the engine oil level is within the range (A) as shown.
3. If it is out of range, adjust it.



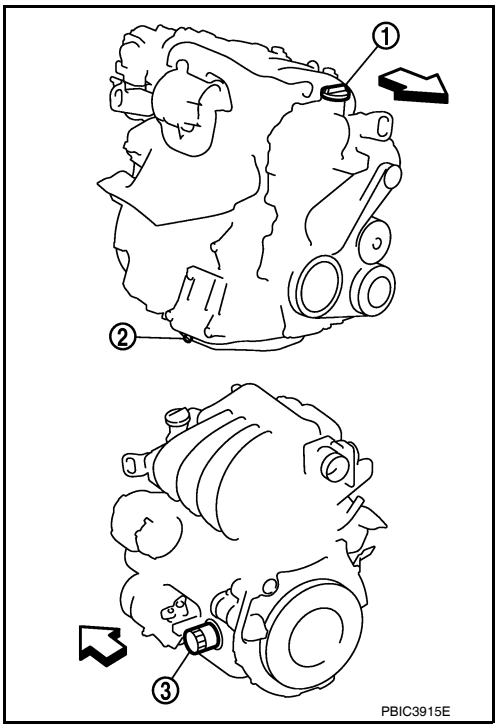
ENGINE OIL : Changing Engine Oil

INFOID:0000000007329156

WARNING:

- **Be careful not to burn yourself, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, park vehicle on a level surface and check for engine oil leakage from engine components. Refer to MA-19, "ENGINE OIL : Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap (1) and then remove drain plug (2).
   - Oil filter (3)
   - ⇦: Engine front
4. Drain engine oil.
5. Install drain plug (2) with new washer. Refer to EM-25, "Component".
   CAUTION:
   Be sure to clean drain plug (2) and install with new washer.
6. Refill with new engine oil.
   Refer to MA-13.
   CAUTION:
   - **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
   - **Always use oil level gauge to determine the proper amount of engine oil in the engine.**
7. Warm up engine and check area around drain plug (2) and oil filter (3) for engine oil leakage.
8. Stop engine and wait for 10 minutes.
9. Check the engine oil level. Refer to MA-19, "ENGINE OIL : Inspection".



OIL FILTER

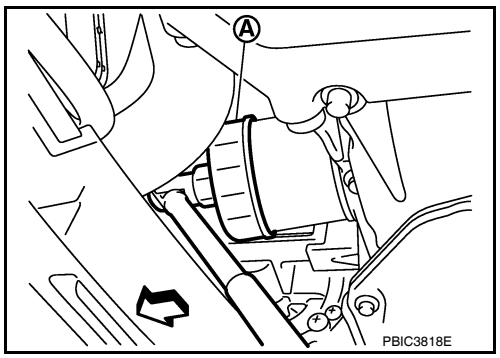
OIL FILTER : Removal and Installation

INFOID:0000000007329157

REMOVAL

1. Remove engine under cover. Refer to EI-15, "Removal and Installation".
2. Drain engine oil. Refer to MA-20, "ENGINE OIL : Changing Engine Oil".

3. Remove oil filter using Tool (A).
   • ⇦: Front



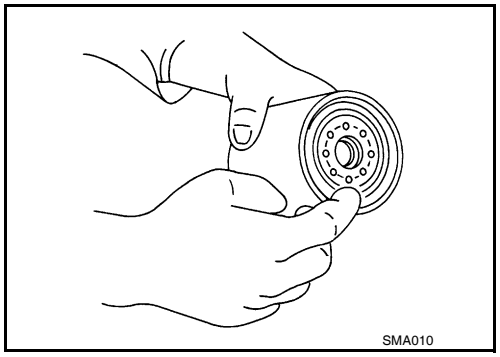
Tool number : KV10115801 (J-38956)

WARNING:
- **Be careful not to get burned when engine and engine oil may be hot.**

CAUTION:
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Do not spill engine oil on drive belt.**
- **Completely wipe off any engine oil that spills on engine and vehicle.**

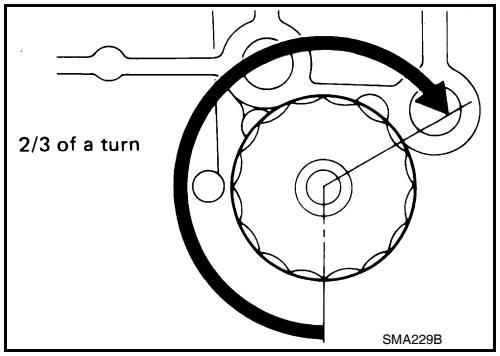
INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification.

Oil filter: : 17.7 N·m (1.8 kg-m, 13 ft-lb)



4. Refill engine with new engine oil. Refer to MA-20, "ENGINE OIL : Changing Engine Oil".
5. Install engine under cover. Refer to EI-15, "Removal and Installation".

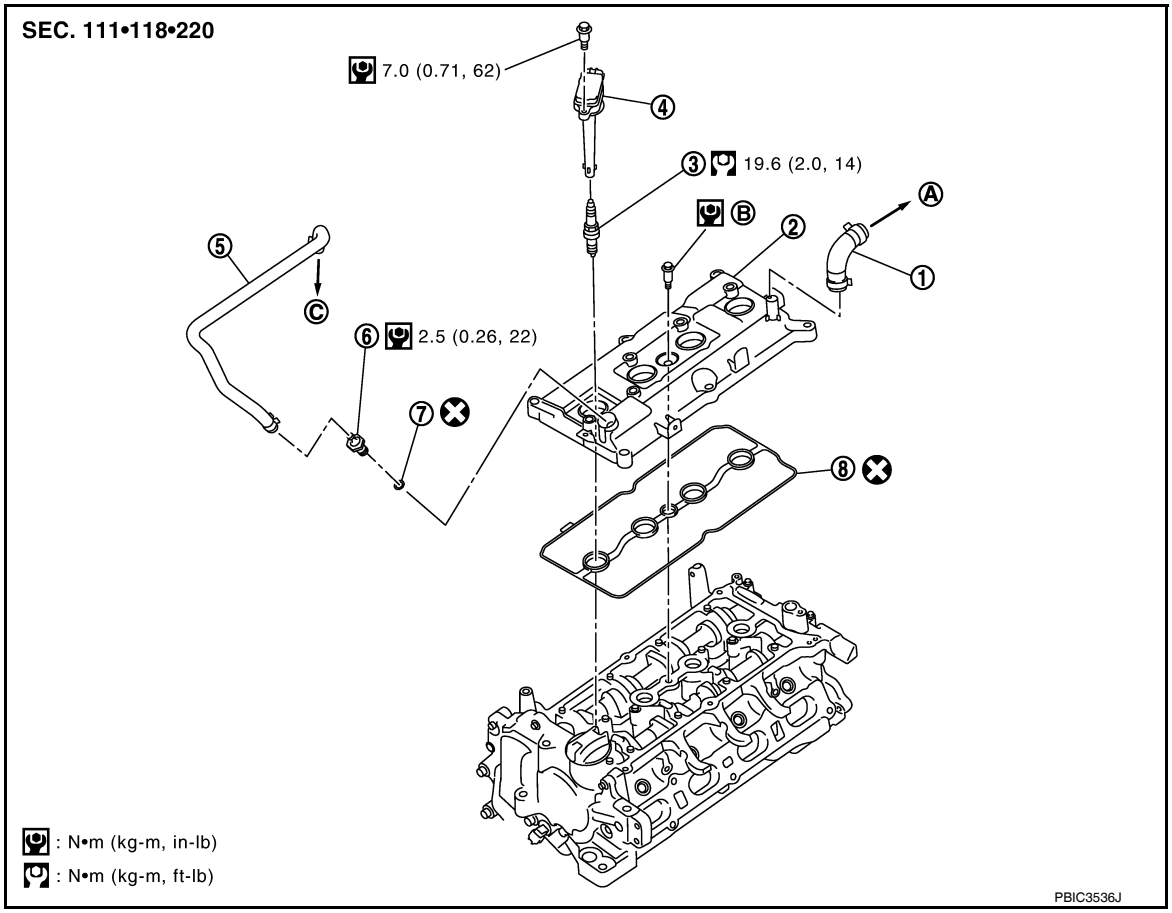
INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to MA-19, "ENGINE OIL : Inspection".
2. Start engine, and make sure there are no leaks of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level and adjust as necessary. Refer to MA-19, "ENGINE OIL : Inspection".

SPARK PLUG

SPARK PLUG : Component

INFOID:0000000007329158



1. PCV hose	2. Rocker cover	3. Spark plug
4. Ignition coil	5. PCV hose	6. PCV valve
7. O-ring	8. Gasket	
A. To air duct	B. Refer to MA-22.	C. To intake manifold

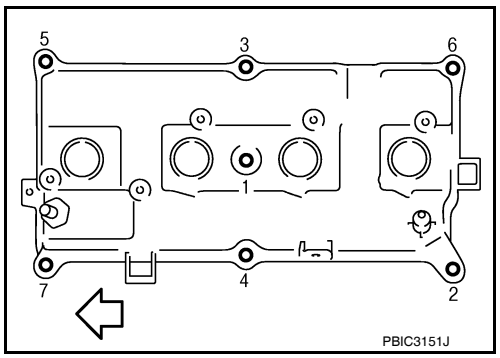
SPARK PLUG : Removal and Installation

INFOID:0000000007329159

REMOVAL

1. Remove intake manifold. Refer to EM-18.
2. Remove ignition coil.
   CAUTION:
   - **Handle ignition coil carefully and avoid impacts.**
   - **Never disassemble.**
3. Remove spark plug using suitable tool.
   CAUTION:
   Never drop or shock it.

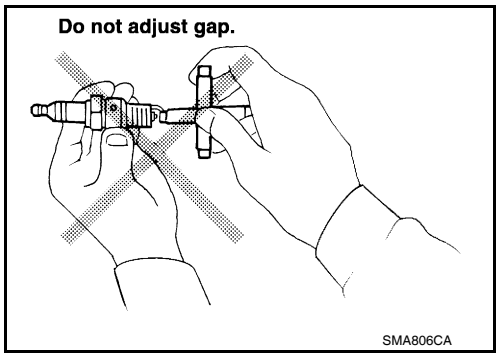
4. Remove rocker cover.
   - Loosen bolts in reverse order as shown.
   - ⇦ Engine front



INSPECTION AFTER REMOVAL

CAUTION:

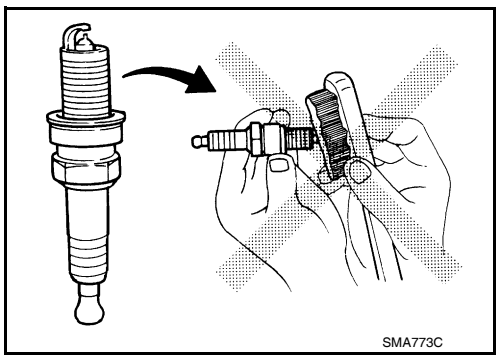
- **Never drop or shock spark plug.**
- **Checking and adjusting spark plug gap is not required between change intervals.**



- **If spark plug tip is covered with carbon, a spark plug cleaner may be used.**

Cleaner air pressure	**: Less than 588 kPa (5.88 bar, 6 kg/cm^2, 85 psi)**
Cleaning time	**: Less than 20 seconds**

- **Never use wire brush for cleaning spark plug.**



INSTALLATION

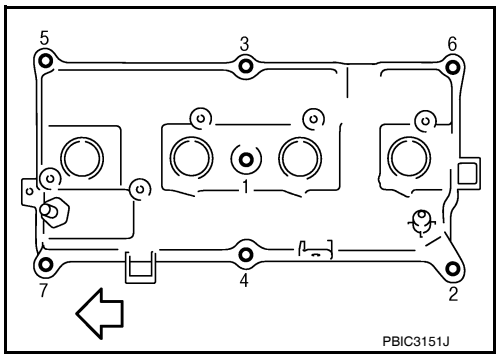
1. Install the rocker cover gasket to the rocker cover.
2. Install rocker cover.
   - Tighten bolts in two steps separately in numerical order as shown.

1st step	**: 1.96 N·m (0.20 kg-m, 17 in-lb)**
2nd step	**: 8.33 N·m (0.85 kg-m, 73 in-lb)**

   - ⇦ Engine front

CAUTION:

Check if rocker cover gasket is not dropped from the installation groove of rocker cover.



3. Install spark plug using suitable tool.

Make	**: DENSO**
Part number	**: FXE20HR11**
Gap (nominal)	**: 1.1 mm (0.043 in)**

CAUTION:
Never drop or shock it.

4. Install ignition coil.
CAUTION:
- **Handle it carefully and avoid impacts.**
- **Never disassemble.**

5. Install intake manifold. Refer to EM-18.

EVAP VAPOR LINES

EVAP VAPOR LINES : Checking EVAP Vapor Line

INFOID:0000000007329160

1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

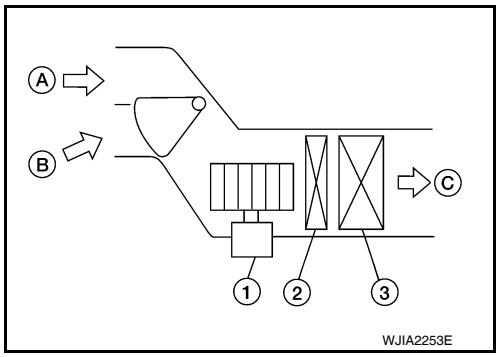
CHASSIS AND BODY MAINTENANCE
IN-CABIN MICROFILTER

IN-CABIN MICROFILTER : Changing Air Conditioner Filter

INFOID:0000000007794048

FUNCTION

The fresh air (A) and the recirculated air (B) drawn inside the passenger compartment by the front blower motor (1) is kept clean (C) on either mode by the air conditioner filter (2), located before the evaporator (3), in the A/C unit assembly.



REPLACEMENT TIMING

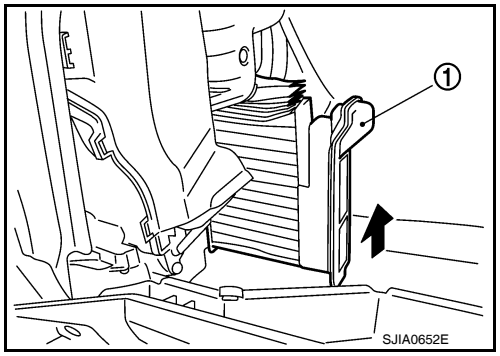
Replace the air conditioner filter according to the maintenance schedules. Refer to MA-6, "General Maintenance".

NOTE:

The air conditioner filter caution label is located inside the glove box door.

REPLACEMENT PROCEDURES

1. Remove the glove box assembly. Refer to IP-11, "Component Parts".
2. Compress the air conditioner filter (1) downward while sliding it to the RH side of the vehicle to release the upper pawl.
3. Move the bottom of air conditioner filter (1) upward as shown to release the bottom tab, then remove it.



4. Replace the air conditioner filter with new one and install the new filter in the A/C unit assembly.
   CAUTION:
   Make sure that the air conditioner filter lower tab is fully seated, and that the air conditioner upper pawl is locked into place securing the new filter into the A/C unit assembly.
5. Install the glove box assembly. Refer to IP-11, "Component Parts".

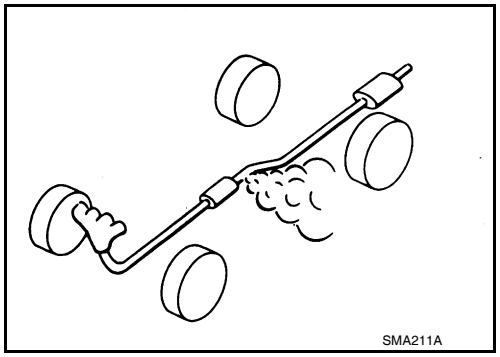
EXHAUST SYSTEM

EXHAUST SYSTEM : Checking Exhaust System

INFOID:0000000007329162

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.

- If necessary, repair or replace damaged parts.



CVT FLUID

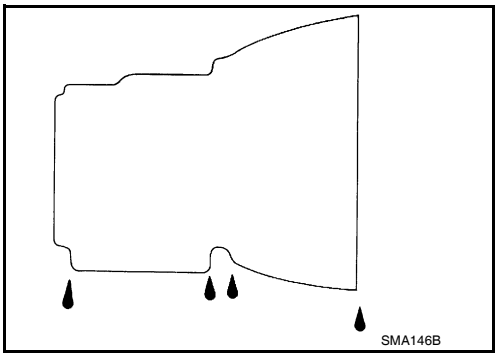
CVT FLUID : Checking CVT Fluid

INFOID:0000000007329163

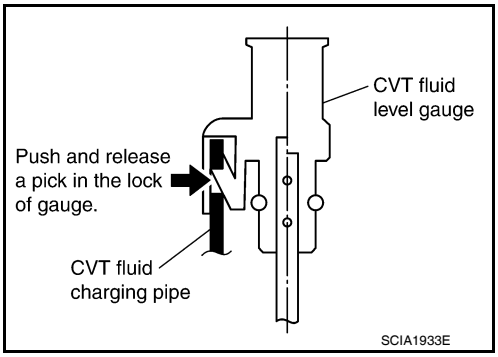
FLUID LEVEL CHECK

Fluid level should be checked with the fluid warmed up to 50° to 80°C (122° to 176°F).

1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle to warm up the CVT fluid. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50° to 80°C (122° to 176°F).
3. Park the vehicle on a level surface and set the parking brake.
4. With engine at idle, while depressing brake pedal, move the shift selector throughout the entire shift range and return it to the “P” position.



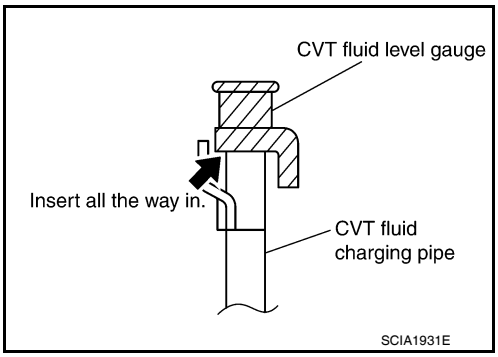
5. Press the tab on the CVT fluid level gauge to release the lock and pull out the CVT fluid level gauge from the CVT fluid charging pipe.



6. Wipe fluid off the CVT fluid level gauge. Then rotate the CVT fluid level gauge 180° and re-insert it into the CVT charging pipe as far as it will go.

CAUTION:

Always use lint free paper towels to wipe fluid off the CVT fluid level gauge.

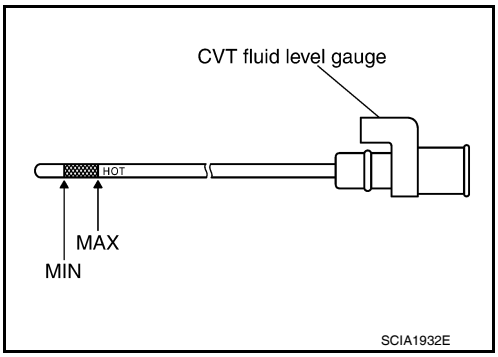


7. Remove the CVT fluid level gauge and check that the fluid level is within the specified range as shown. If the fluid level is at or below the low side of the range, add the necessary specified NISSAN CVT fluid through the CVT charging pipe.

Fluid grade : Refer to MA-13, "Fluids and Lubricants".

CAUTION:

- **Only use specified NISSAN CVT fluid.**
- **Do not overfill the CVT.**



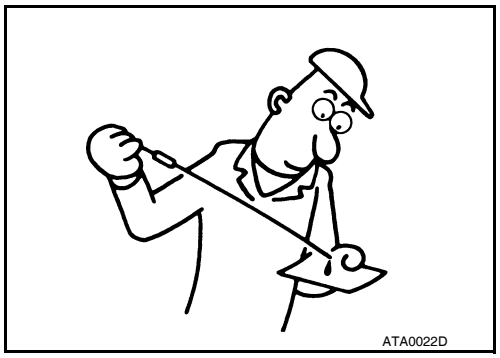
8. Install the CVT fluid level gauge to the CVT fluid charging pipe until it locks.

CAUTION:

When CVT fluid level gauge is installed into the CVT fluid charging pipe, make sure that the CVT fluid level gauge is securely locked in place.

FLUID CONDITION CHECK

Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harness, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in fluid	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

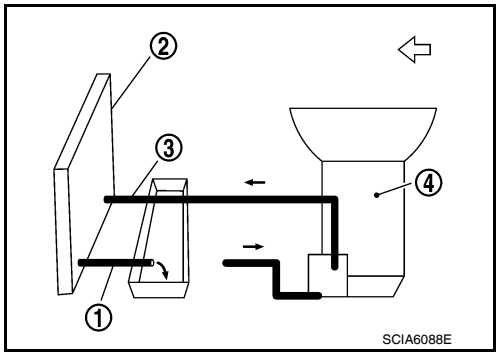


CVT FLUID : Changing CVT Fluid

INFOID:0000000007329164

1. Warm up CVT fluid by driving the vehicle for 10 minutes.

- ⇦: Vehicle front
- Radiator (2)
- CVT fluid cooler hose [inlet side (3)]
- Transaxle assembly (4)



2. Drain CVT fluid from CVT fluid cooler hose [outlet side (1)] and refill with new specified NISSAN CVT fluid in the CVT fluid charging pipe with the engine running at idle speed.

Fluid capacity and grade : Refer to MA-13, "Fluids and Lubricants".

CAUTION:
Only use the specified NISSAN CVT fluid.

3. Refill until new CVT fluid comes out from CVT fluid cooler hose [outlet side (1)].
NOTE:
About 30 to 50% extra fluid will be required for this procedure.
4. Check fluid level and condition. Refer to MA-26, "CVT FLUID : Checking CVT Fluid".
CAUTION:
Delete CVT fluid deterioration date with CONSULT after changing CVT fluid. Refer to CVT-48, "CONSULT Function (TRANSMISSION)".

CLUTCH FLUID

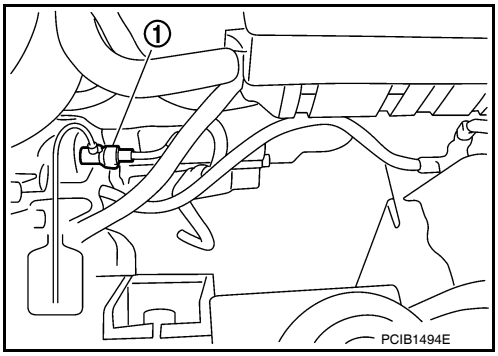
CLUTCH FLUID : Air Bleeding Procedure

INFOID:0000000007329165

CAUTION:
Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
NOTE:
- Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.
- Carefully monitor fluid level in reservoir tank during bleeding operation.

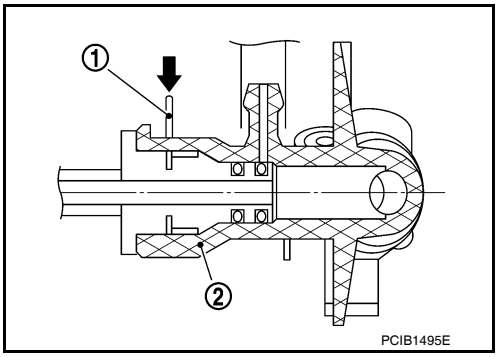
1. Fill master cylinder reservoir tank with new clutch fluid.

2. Connect a transparent vinyl tube and container to the bleeding connector (1) on the CSC.
3. Depress and release the clutch pedal slowly and fully 15 times at an interval of two to three seconds and release the clutch pedal.



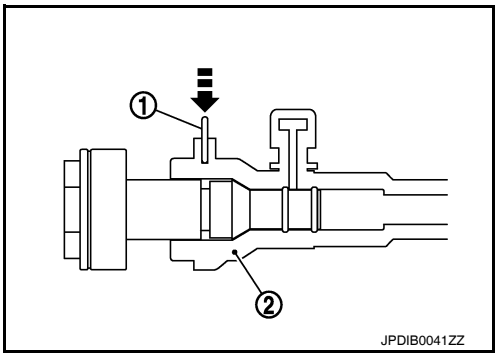
4. Push in the lock pin (1) of the bleeding connector (2), and maintain the position.
   • RS5F91R transaxle models

CAUTION:
Hold the lock pin in to prevent the bleeding connector from separating when fluid pressure is applied.



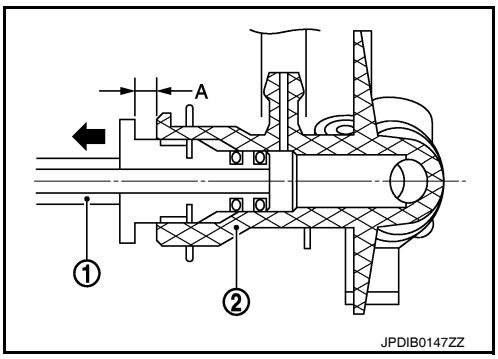
   • RS6F94R transaxle models

CAUTION:
Hold the lock pin in to prevent the bleeding connector from separating when fluid pressure is applied.



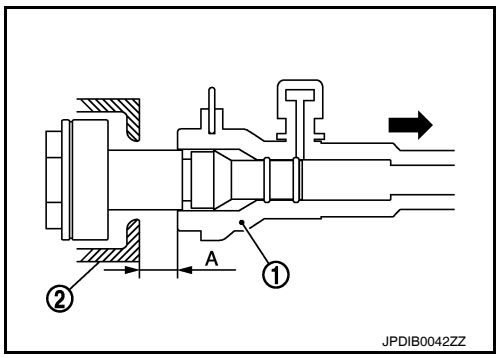
5. Slide the clutch tube (1) in the direction of the arrow as shown to the dimension (A). (For RS5F91R transaxle models)
   2: bleeding connector

Dimension (A) : 5 mm (0.20 in)



6. Slide bleeding connector (1) in the direction of the arrow as shown to the dimension (A). (For RS6F94R transaxle models)
2: clutch housing

Dimension (A) : 10 mm (0.39 in)



7. Depress the clutch pedal soon and hold it, and then bleed air from the piping. wait for 5 seconds.
CAUTION:
Hold the clutch pedal down to prevent air from getting back into the clutch system.
8. Return the clutch tube and lock pin to their original positions.
9. Release clutch pedal and wait for 5 seconds.
10. Repeat steps 3 to 8 until no bubbles are observed in the clutch fluid.

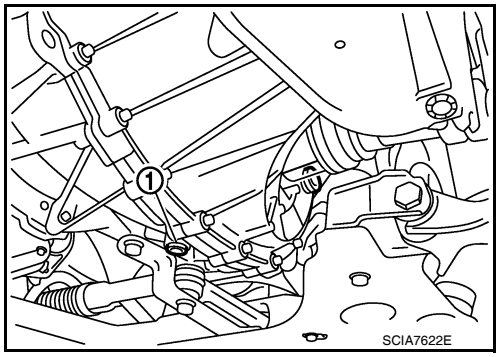
M/T OIL

M/T OIL : Changing M/T Oil (RS6F94R)

INFOID:0000000007329169

DRAINING

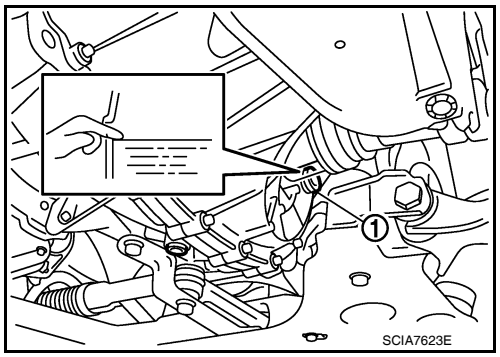
1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Install a new gasket onto drain plug (1) and install it into transaxle. Tighten drain plug to specification. Refer to MT-19, "Disassembly and Assembly".
CAUTION:
Do not reuse gasket.



FILLING

1. Remove filler plug (1). Fill with new oil until oil level reaches the specified limit at filler plug hole as shown.

Oil grade and capacity
: Refer to MA-13, "Fluids and Lubricants"



2. After refilling oil, check oil level. Install a new gasket on filler plug (1), then install it into transaxle. Tighten filler plug to specification. Refer to MT-19, "Disassembly and Assembly".
CAUTION:
Do not reuse gasket.

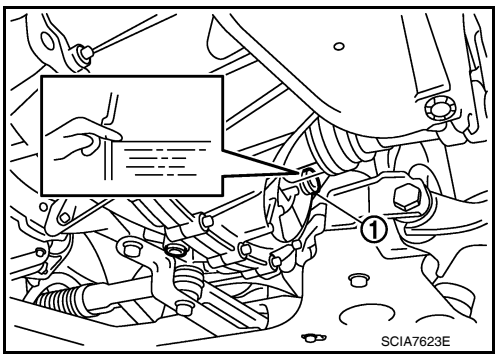
M/T OIL : Checking M/T Oil (RS6FF94R)

INFOID:0000000007329170

OIL LEAKAGE AND OIL LEVEL

1. Make sure that oil is not leaking from transaxle or around it.

2. Remove filler plug (1) and check oil level at filler plug hole as shown.
CAUTION:
Do not start engine while checking oil level.



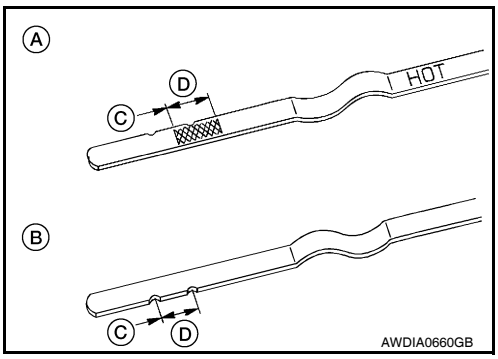
3. Install a new gasket onto filler plug (1) and install it into transaxle. Tighten filler plug to specification. Refer to MT-19, "Disassembly and Assembly".
CAUTION:
Do not reuse gasket.

A/T FLUID

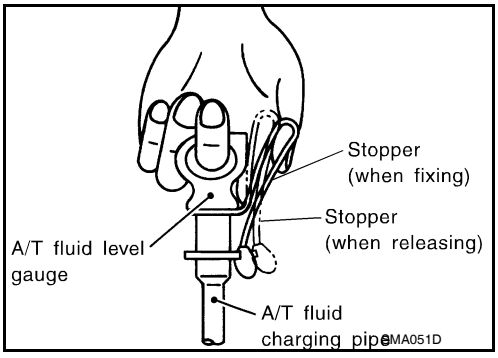
A/T FLUID : Checking A/T Fluid

INFOID:0000000007329171

1. Warm up engine.
2. Check for A/T fluid leakage.
3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30° to 50°C (86° to 122°F) using the “COLD” range on A/T fluid level gauge.
   - A : Front side
   - B : Reverse side
   - C : Add
   - D : OK



a. Park vehicle on level surface and set parking brake.
b. Start engine and move shift selector through each gear position. Leave shift selector in “P” position.
c. Check A/T fluid level with engine idling.
d. Remove A/T fluid level gauge and wipe clean with lint-free cloth.
CAUTION:
When wiping the A/T fluid level gauge, always use lint-free cloth.
e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.
CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.
f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.
CAUTION:
Do not overfill.



4. Drive vehicle for approximately 5 minutes.
5. Re-check A/T fluid level at A/T fluid temperatures of 50° to 80°C (122° to 176°F) using “HOT” range on A/T fluid level gauge.
CAUTION:
   - **When wiping the A/T fluid level gauge, always use lint-free cloth.**
   - **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.**
6. Check A/T fluid condition and make any necessary repairs. Refer to AT-49, "Inspections Before Trouble Diagnosis". If the A/T fluid contains frictional material (clutches, bands, etc.), or if the A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator. Refer to AT-17, "A/T Fluid Cooler Cleaning".
7. Install the removed A/T fluid level gauge into the A/T fluid charging pipe.
CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

A/T FLUID : Changing A/T Fluid

INFOID:0000000007329172

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid by removing the drain plug. Reinstall the drain plug to the specified torque.
   CAUTION:
   Do not reuse drain plug gasket.

   Drain plug : Refer to AT-234, "Component".
4. Refill the transaxle with new specified A/T fluid through the A/T fluid charging pipe. Always refill the transaxle with the same volume of A/T fluid that was drained out.

   Fluid grade and capacity : Refer to MA-13.
5. Run engine at idle speed for 5 minutes.
6. Check A/T fluid level and condition. Refer to MA-30, "A/T FLUID : Checking A/T Fluid".

WHEELS

WHEELS : Adjustment

INFOID:0000000007329173

BALANCING WHEELS (ADHESIVE WEIGHT TYPE)

Preparation Before Adjustment

Remove inner and outer balance weights from the road wheel using releasing agent. Remove double-faced adhesive tape from the road wheel.

CAUTION:

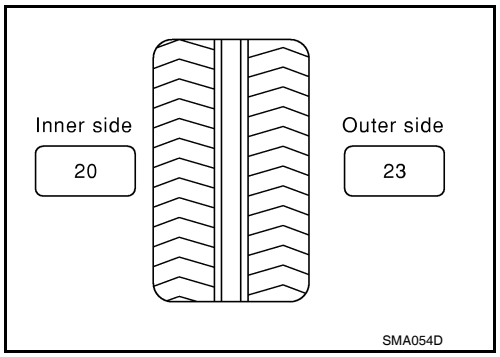
- **Be careful not scratch the road wheel during removal.**
- **After removing double-faced adhesive tape, wipe clean traces of releasing agent from the road wheel.**

Wheel Balance Adjustment

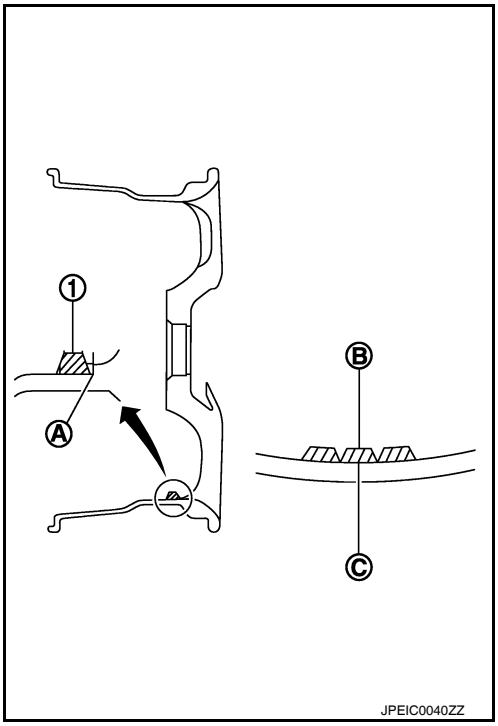
- If a balancer machine has an adhesive weight mode setting, select the adhesive weight mode setting and skip Step 2. below. If a balancer machine only has the clip-on (rim flange) weight mode setting, follow Step 2. to calculate the correct size adhesive weight.

1. Set road wheel on balancer machine using the center hole as a guide. Start the balancer machine.
2. For balancer machines that only have a clip-on (rim flange) weight mode setting, follow this step to calculate the correct size adhesive weight to use. When inner and outer imbalance values are shown on the balancer machine indicator, multiply outer imbalance value by 5/3 (1.67) to determine balance weight that should be used. Select the outer balance weight with a value closest to the calculated value above and install in to the designated outer position of, or at the designated angle in relation to the road wheel.

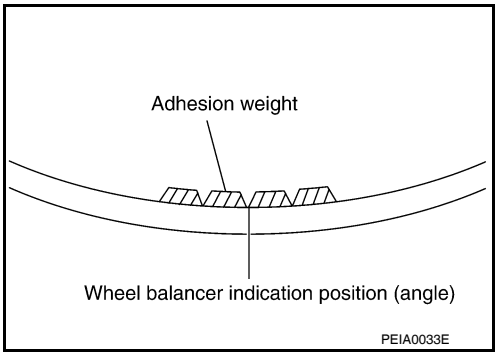
a. Indicated imbalance value × 5/3 (1.67) = balance weight to be installed
   Calculation example:
   23 g (0.81 oz) × 5/3 (1.67) = 38.33 g (1.35 oz) ⇒ 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
   NOTE:
   Note that balance weight value must be closer to the calculated balance weight value.
   Example:
   37.4 ⇒ 35 g (1.23 oz)
   37.5 ⇒ 40 g (1.41 oz)



3. Install balance weight in the position shown.
   CAUTION:
   - **Do not install the inner balance weight before installing the outer balance weight.**
   - **Before installing the balance weight, be sure to clean the mating surface of the road wheel.**
   - When installing balance weight (1) to road wheel, set it into the grooved area (A) on the inner wall of the road wheel as shown so that the balance weight center (B) is aligned with the balancer machine indication position (angle) (C).
     CAUTION:
     - **Always use genuine NISSAN adhesive balance weights.**
     - **Balance weights are non-reusable; always replace with new ones.**
     - **Do not install more than three sheets of balance weight.**



4. If calculated balance weight value exceeds 50 g (1.76 oz), install two balance weight sheets in line with each other as shown.
   CAUTION:
   Do not install one balance weight sheet on top another.
5. Start balancer machine again.
6. Install balance weight on inner side of road wheel in the balancer machine indication position (angle).
   CAUTION:
   Do not install more than two balance weights.
7. Start balancer machine. Make sure that inner and outer residual imbalance values are 5 g (0.17 oz) each or below.

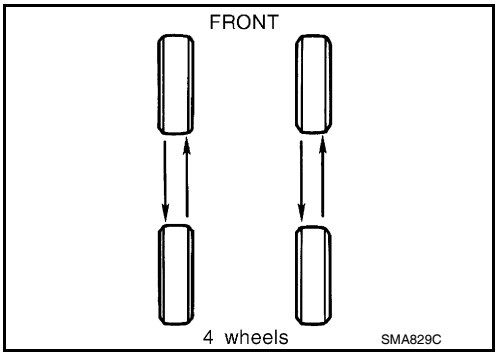


8. If either residual imbalance value exceeds 5 g (0.17 oz), repeat installation procedures.

Wheel balance	Dynamic (At flange)	Static (At flange)
Maximum allowable imbalance	Refer to WT-30, "Road Wheel".	

TIRE ROTATION

- Follow the maintenance schedule for tire rotation service intervals. Refer to MA-6, "General Maintenance".
- When installing the wheel, tighten wheel nuts to the specified torque.
  CAUTION:
  - **Do not include the T-type spare tire when rotating the tires.**
  - **When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.**
  - **Be careful not to tighten wheel nut at torque exceeding the criteria for preventing strain of disc rotor.**
  - **Use NISSAN genuine wheel nuts for aluminum wheels.**



Wheel nut tightening torque : 113 N·m (12 kg-m, 83 ft-lb)

- Perform the ID registration, after tire rotation. Refer to WT-13, "ID Registration Procedure".

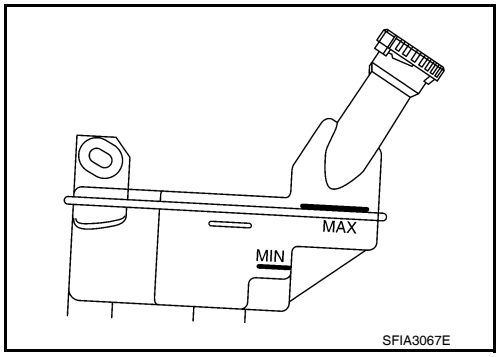
BRAKE FLUID LEVEL AND LEAKS

BRAKE FLUID LEVEL AND LEAKS : On Board Inspection

INFOID:0000000007329174

CHECKING BRAKE FLUID LEVEL

- Make sure the fluid level in the reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around the reservoir tank for fluid leaks.
- If fluid level is excessively low, check brake system for fluid leaks.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for fluid leaks.



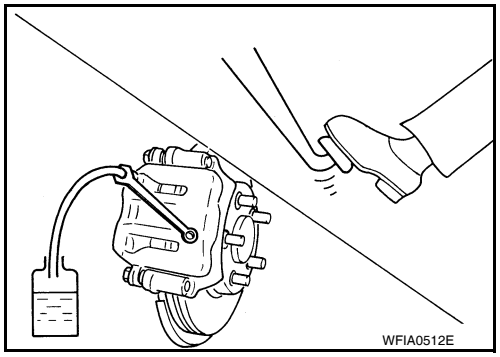
BRAKE FLUID LEVEL AND LEAKS : Drain and Refill

INFOID:0000000007329175

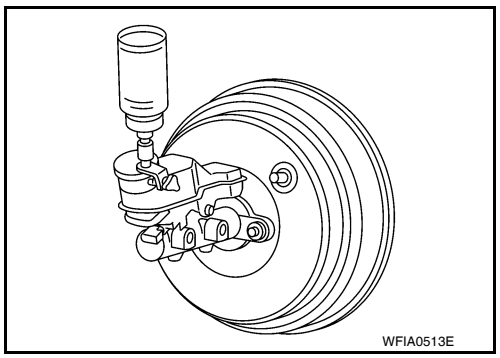
CAUTION:

- **Refill using recommended brake fluid. Refer to MA-13, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, immediately wipe them with cloth and wash it away with water.**
- **Before working, disconnect connectors of ABS actuator and electric unit (control unit) or battery negative terminal.**

1. Connect a vinyl tube to bleed valve.
2. Depress the brake pedal, loosen the bleed valve, and gradually remove the brake fluid.



3. Clean inside of reservoir tank, and refill with new brake fluid.
4. Loosen bleed valve, depress brake pedal slowly to full stroke and then release it. Repeat the procedure every 2 or 3 seconds until the new brake fluid comes out, then close the bleed valve while depressing the brake pedal. Repeat the same procedure for each wheel.
5. Bleed the air from the brake hydraulic system. Refer to BR-9, "Bleeding Brake System" .

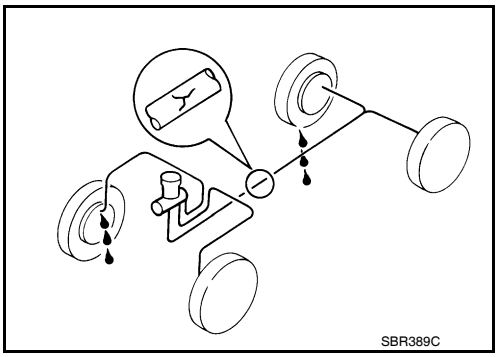


BRAKE LINES AND CABLES

BRAKE LINES AND CABLES : Checking Brake Line and Cables

INFOID:0000000007329176

- Check brake fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasions, deterioration, etc.



DISC BRAKE

DISC BRAKE : On Board Inspection

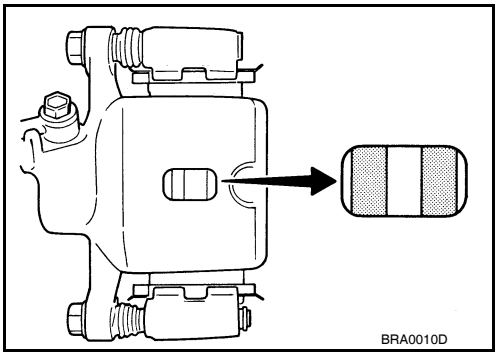
INFOID:0000000007329177

PAD WEAR INSPECTION

- Check pad thickness from check hole on cylinder body.

Standard thickness : Refer to BR-39, "Front Disc Brake".

Repair limit thickness : Refer to BR-39, "Front Disc Brake".



DRUM BRAKE

DRUM BRAKE : Inspection

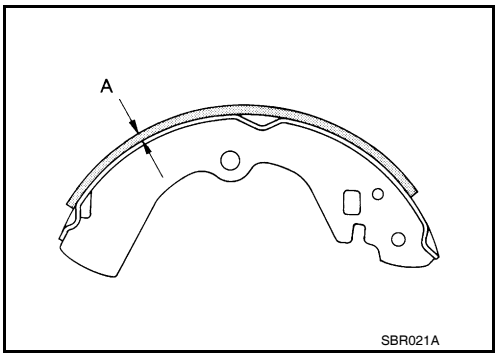
INFOID:0000000007329178

INSPECTION

Lining Thickness Inspection
Check lining thickness.

Standard thickness (A) : Refer to BR-39, "Rear Drum Brake"

Repair limit thickness (A) : Refer to BR-39, "Rear Drum Brake"

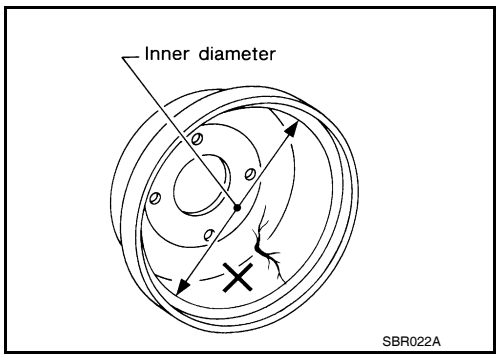


Drum Inner Diameter Inspection

Check inner diameter of brake drum.
Measurement area: lining contact surface (center)

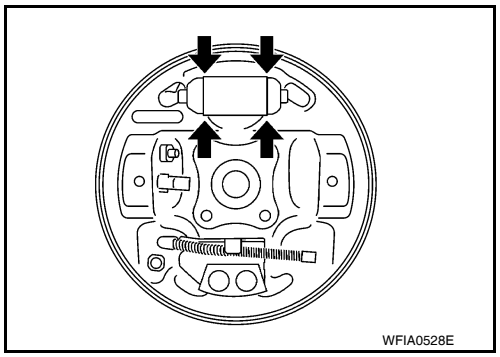
Standard inner diameter : Refer to BR-39, "Rear Drum Brake"

Repair limit inner diameter : Refer to BR-39, "Rear Drum Brake"



Wheel Cylinder Leakage Inspection

- Check wheel cylinder for brake fluid leakage.
- Check for wear, damage, and looseness. If any non-standard condition is found, replace it.



Other Inspections

Check the following:

- Inside of the drum for excessive wear, damage, and cracks.
- Lining for excessive wear, damage, and peeling.
- Shoe sliding surface for excessive wear and damage.
- Return spring for sagging.
- Check back plate for damage, cracks, and deformation. Replace back plate as necessary.

Replace applicable part as necessary.

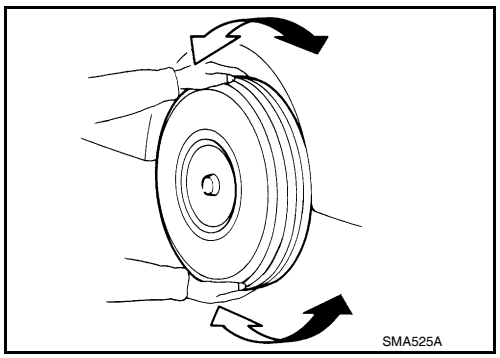
AXLE AND SUSPENSION PARTS

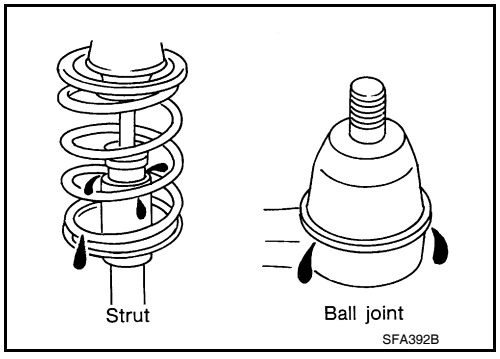
AXLE AND SUSPENSION PARTS : Axle and Suspension Parts

INFOID:0000000007329179

Check front and rear axle and suspension parts for excessive play, cracks, wear or other damage.

- Shake each wheel to check for excessive play.
- Check wheel bearings for smooth operation.
- Check axle and suspension nuts and bolts for looseness.
- Check strut (shock absorber) for oil leakage or other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks or other damage.



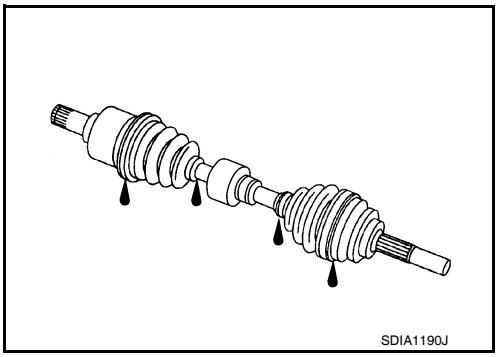


DRIVE SHAFT

DRIVE SHAFT : Drive Shaft

INFOID:0000000007329180

Check boot and drive shaft for cracks, wear, damage and grease leakage.



LOCKS, HINGES AND HOOD LATCH

LOCKS, HINGES AND HOOD LATCH : Lubricating Locks, Hinges and Hood Latch

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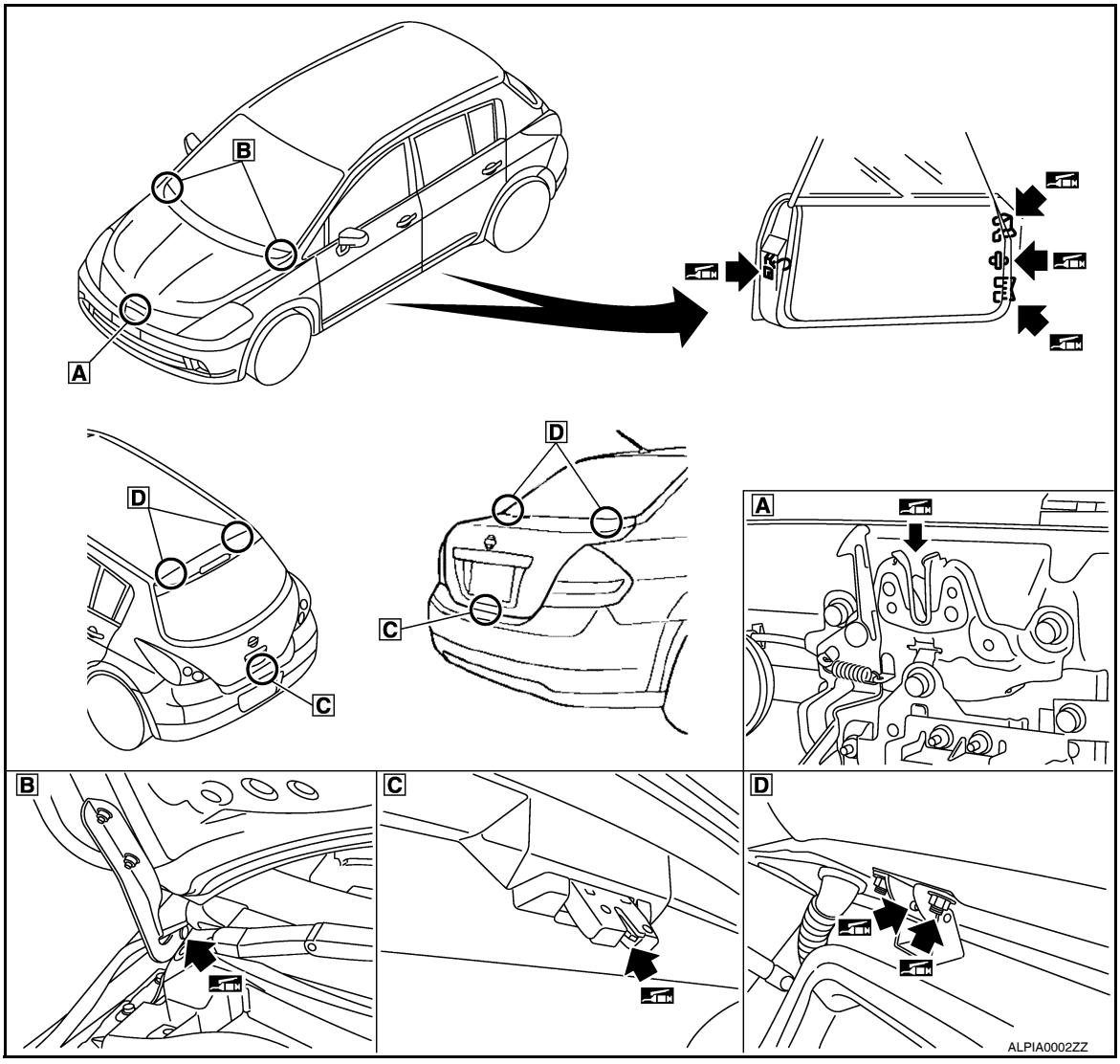

SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS

SEAT BELT, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS : Checking

Seat Belts, Buckles, Retractors, Anchors and Adjusters

INFOID:0000000007329182

Check the seat belt buckles, webbing, retractors, anchors and adjusters. Replace any seat belt assembly as necessary. Refer to SB-7, "Seat Belt Inspection" .

- Check the seat belt anchors for loose bolts, damage, or excessive wear.
- Check the seat belt webbing for any damage, cuts, fraying, or excessive wear.
- Check the retractor for smooth operation.
- Check the function of the buckles by inserting the seat belt tongue and checking for proper engagement of the buckle and press the button on the buckle to check for proper release of the seat belt tongue.

CAUTION:

- **After any collision, inspect all seat belt assemblies, including retractors and other attached components, such as the guide rail set. NISSAN recommends replacing all seat belt assemblies in use during a collision, unless they are not damaged and are inspected to confirm they are operating properly after a minor collision.**
  Also inspect all seat belt assemblies that are not in use during a collision, and replace any components if damaged or not operating properly. The seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision where the driver and passenger air bags have been deployed.
- **If any component of the seat belt assembly is suspected of being damaged or not operating properly, do not repair the component. Replace the components as an assembly.**
- **If the seat belt webbing is cut, frayed, or damaged then replace the seat belt assembly.**
- **Never lubricate the seat belt buckle or tongue.**
- **When replacing any seat belt assembly always use a Genuine NISSAN seat belt assembly.**

SECTION PG

POWER SUPPLY, GROUND & CIRCUIT ELEMENTS

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SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000007329528

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000007329529

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

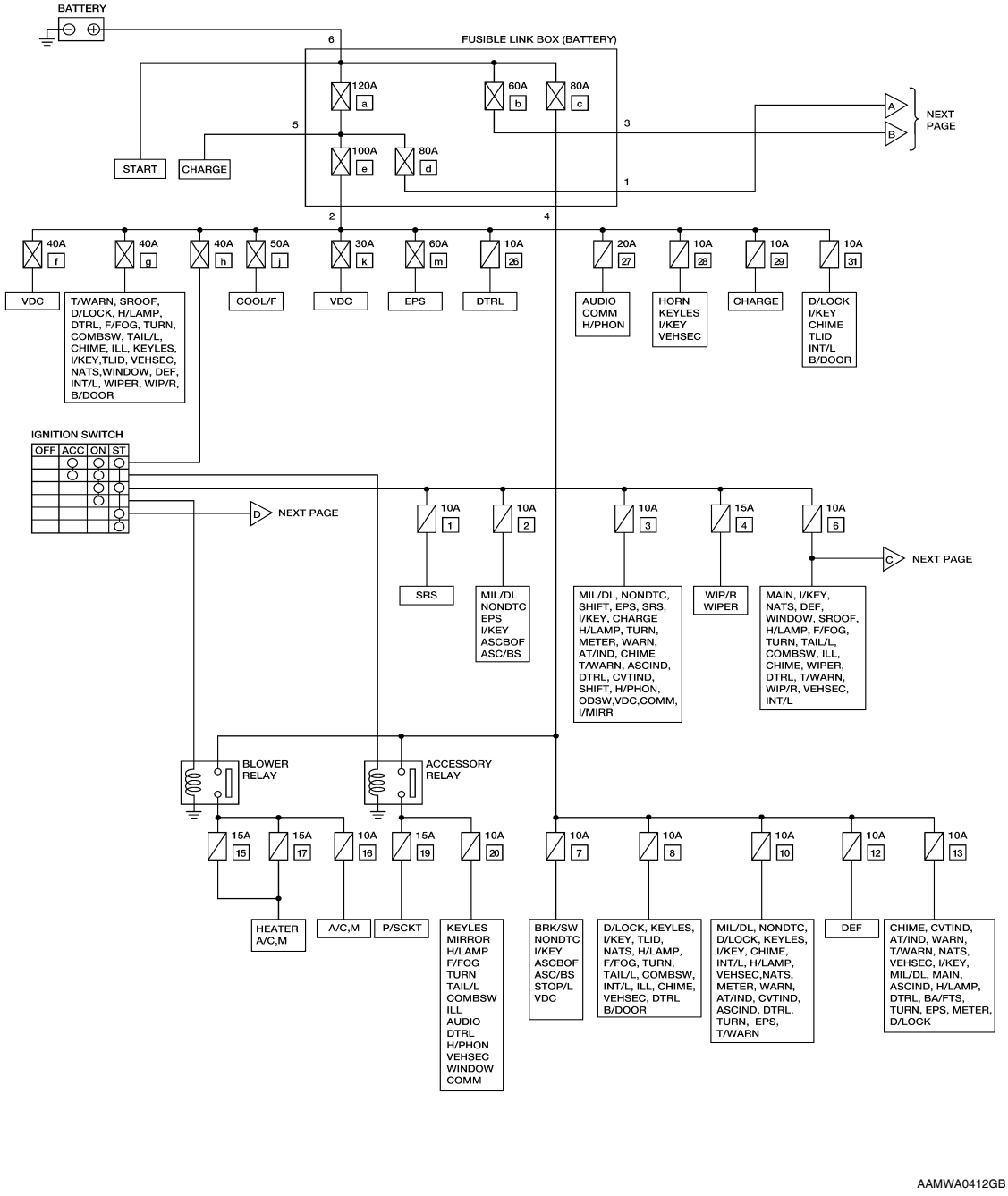
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

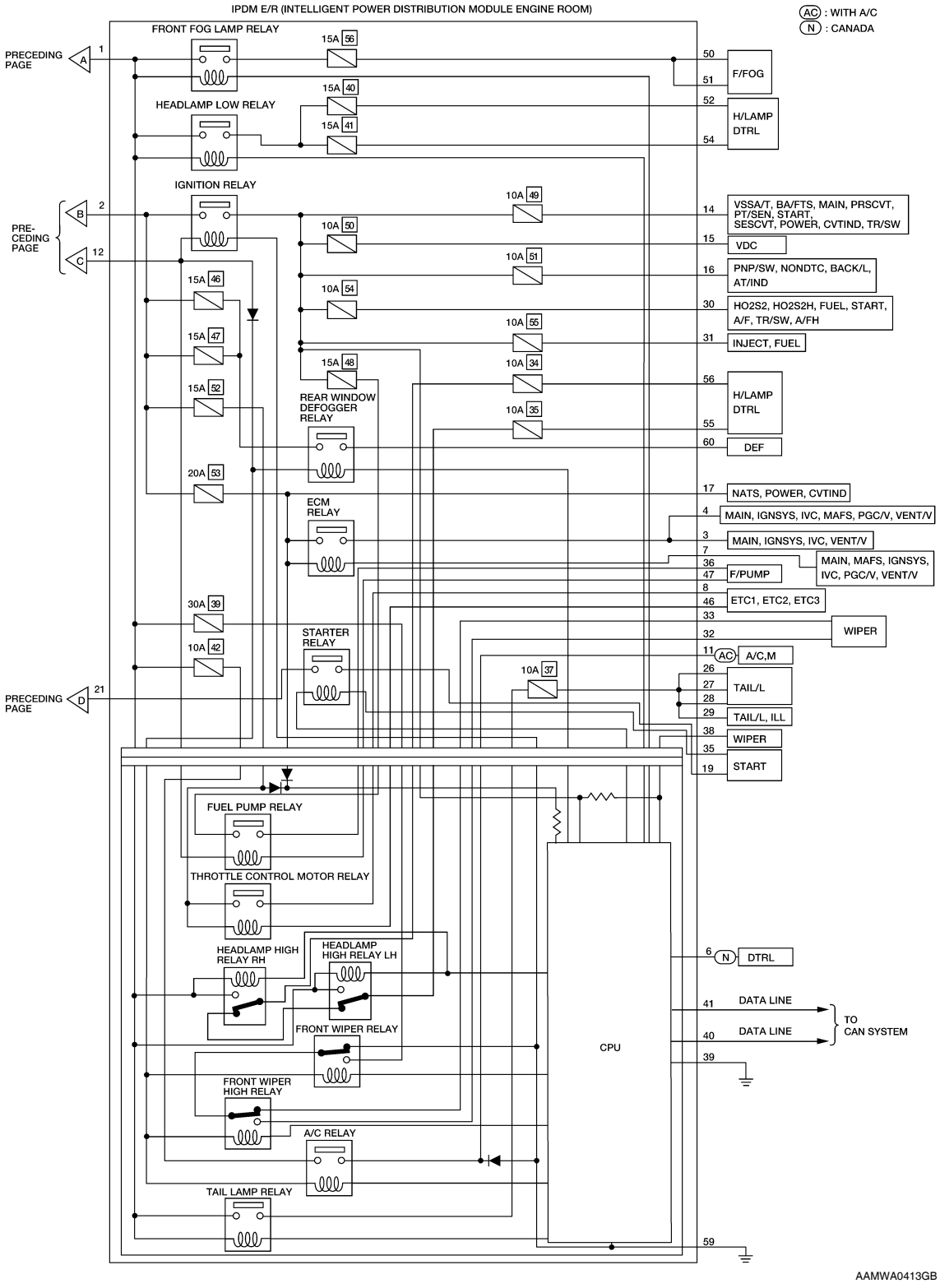
POWER SUPPLY ROUTING CIRCUIT

Schematic

INFOID:0000000007329530

For detailed ground distribution, refer to PG-29, "Ground Distribution" .

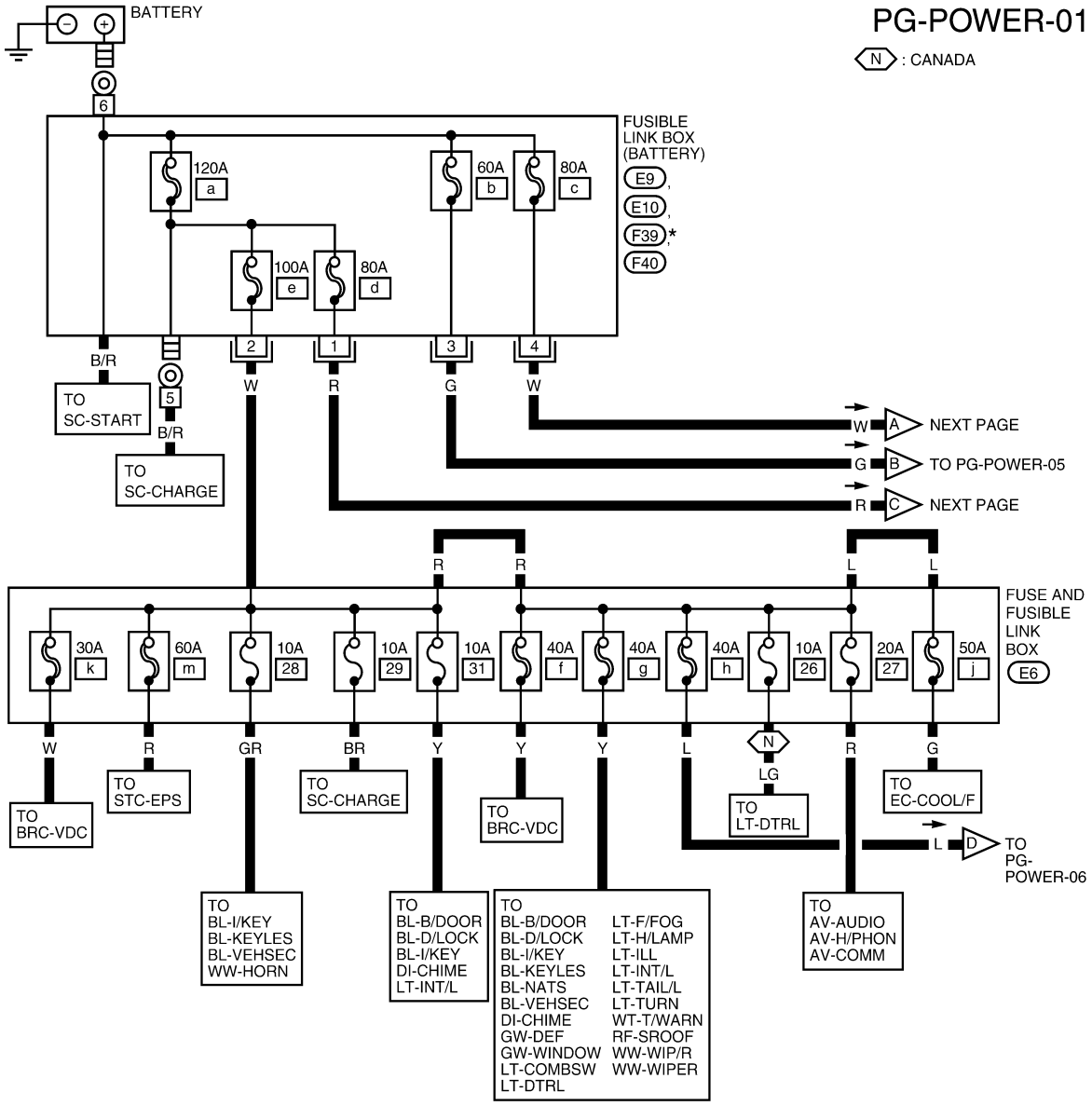


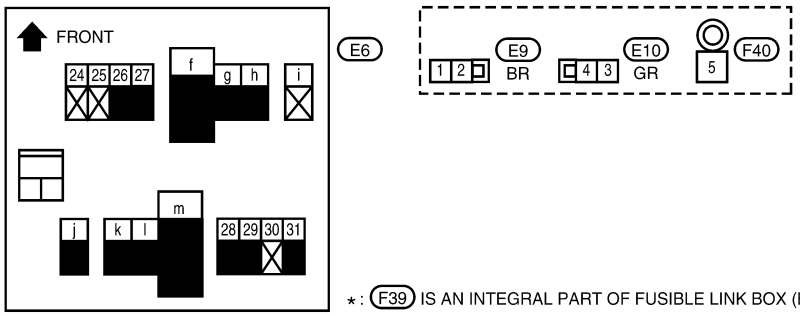

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
AC : WITH A/C
N : CANADA
FRONT FOG LAMP RELAY
HEADLAMP LOW RELAY
IGNITION RELAY
REAR WINDOW DEFOGGER RELAY
ECM RELAY
STARTER RELAY
FUEL PUMP RELAY
THROTTLE CONTROL MOTOR RELAY
HEADLAMP HIGH RELAY RH
HEADLAMP HIGH RELAY LH
FRONT WIPER RELAY
FRONT WIPER HIGH RELAY
A/C RELAY
TAIL LAMP RELAY
CPU
PRECEDING PAGE
PRE-CEDING PAGE
F/FOG
H/LAMP DTRL
VSSA/T, BA/FTS, MAIN, PRSCVT, PT/SEN, START, SESCVT, POWER, CVTIND, TR/SW
VDC
PNP/SW, NONDTC, BACK/L, AT/IND
HO2S2, HO2S2H, FUEL, START, A/F, TR/SW, A/FH
INJECT, FUEL
H/LAMP DTRL
DEF
NATS, POWER, CVTIND
MAIN, IGNSYS, IVC, MAFS, PGC/V, VENT/V
MAIN, IGNSYS, IVC, VENT/V
MAIN, MAFS, IGNSYS, IVC, PGC/V, VENT/V
F/PUMP
ETC1, ETC2, ETC3
WIPER
A/C,M
TAIL/L
TAIL/L, ILL
WIPER
START
DTRL
DATA LINE
DATA LINE
TO CAN SYSTEM
AAMWA0413GB

Wiring Diagram - POWER -

INFOID:0000000007329531

BATTERY POWER SUPPLY — IGNITION SWITCH IN ANY POSITION

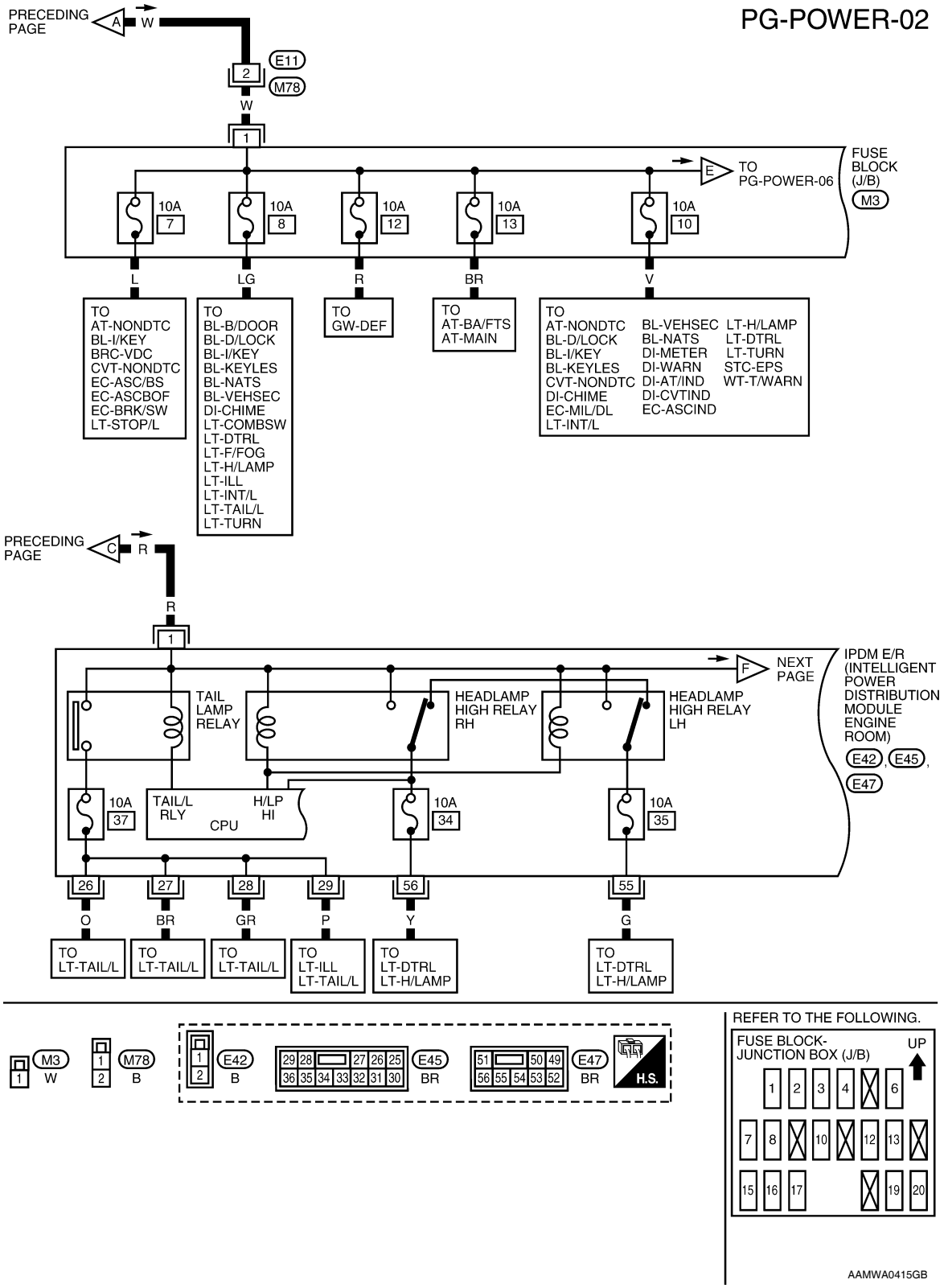




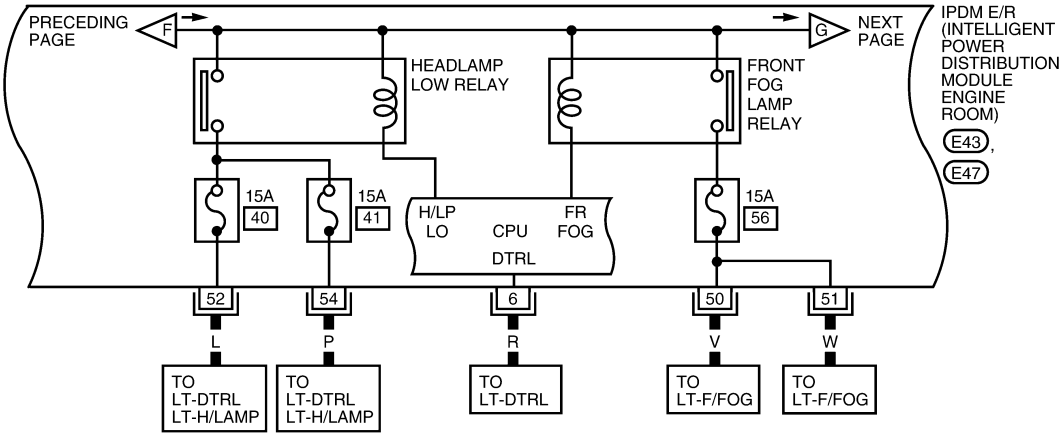
*: F39 IS AN INTEGRAL PART OF FUSIBLE LINK BOX (BATTERY) ASSEMBLY.

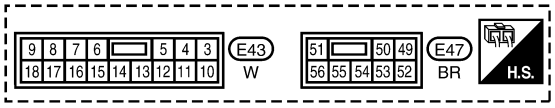
AAMWA0414GB

PG-POWER-02


PRECEDING PAGE
A
W
E11
2
M78
W
1
FUSE BLOCK (J/B)
M3
E
TO PG-POWER-06
10A 7
10A 8
10A 12
10A 13
10A 10
L
LG
R
BR
V
TO AT-NONDTC BL-I/KEY BRC-VDC CVT-NONDTC EC-ASC/BS EC-ASCBOF EC-BRK/SW LT-STOP/L
TO BL-B/DOOR BL-D/LOCK BL-I/KEY BL-KEYLES BL-NATS BL-VEHSEC DI-CHIME LT-COMBSW LT-DTRL LT-F/FOG LT-H/LAMP LT-ILL LT-INT/L LT-TAIL/L LT-TURN
TO GW-DEF
TO AT-BA/FTS AT-MAIN
TO AT-NONDTC BL-D/LOCK BL-I/KEY BL-KEYLES CVT-NONDTC DI-CHIME EC-MIL/DL LT-INT/L BL-VEHSEC BL-NATS DI-METER DI-WARN DI-AT/IND DI-CVTIND EC-ASCIND LT-H/LAMP LT-DTRL LT-TURN STC-EPS WT-T/WARN
PRECEDING PAGE
C
R
R
1
F
NEXT PAGE
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E42, E45, E47
TAIL LAMP RELAY
HEADLAMP HIGH RELAY RH
HEADLAMP HIGH RELAY LH
10A 37
TAIL/L RLY
H/LP HI
CPU
10A 34
10A 35
26
27
28
29
56
55
O
BR
GR
P
Y
G
TO LT-TAIL/L
TO LT-TAIL/L
TO LT-TAIL/L
TO LT-ILL LT-TAIL/L
TO LT-DTRL LT-H/LAMP
TO LT-DTRL LT-H/LAMP
M3 W
M78 B
E42 B
E45 BR
E47 BR
H.S.
REFER TO THE FOLLOWING.
FUSE BLOCK-JUNCTION BOX (J/B)
UP
AAMWA0415GB

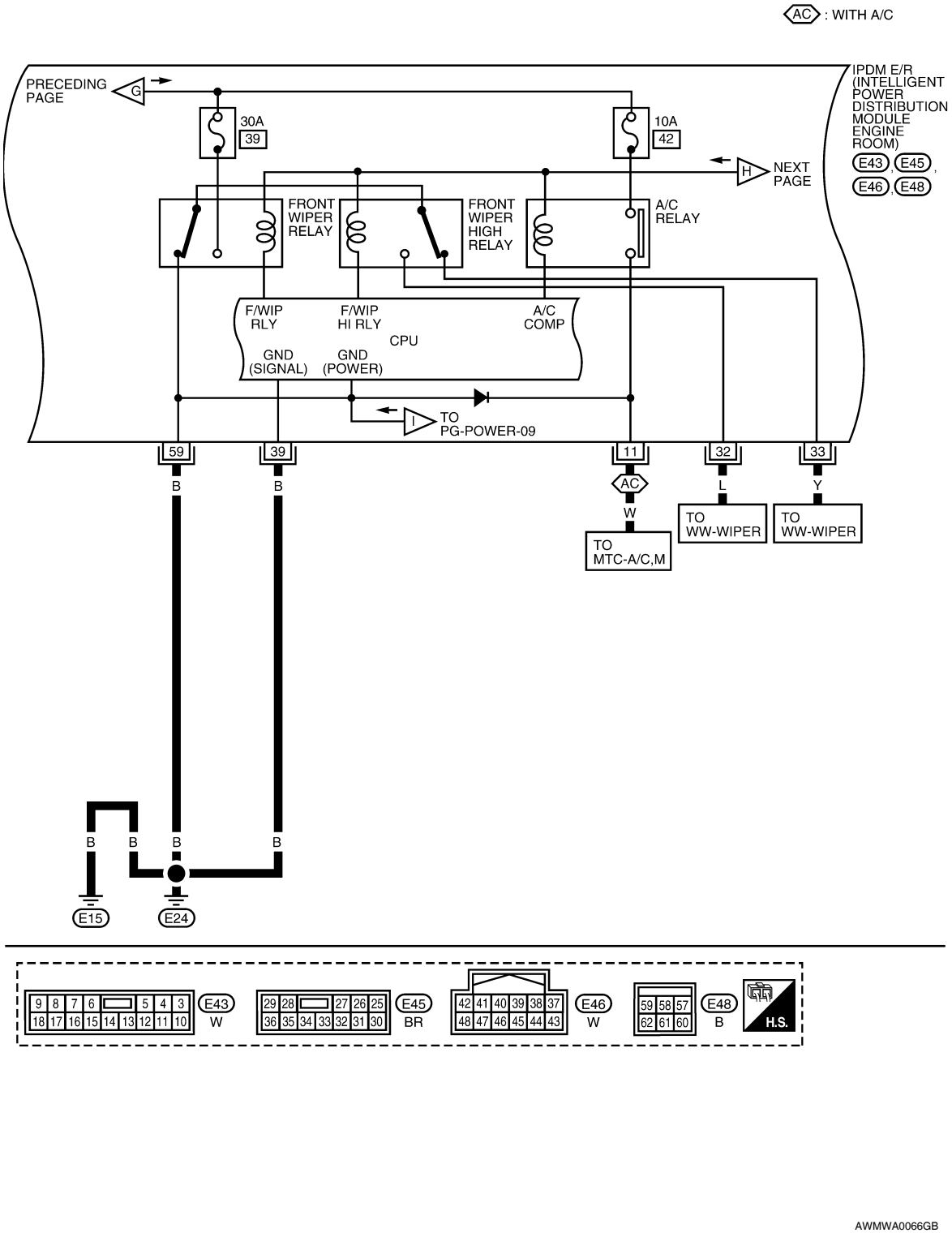
PG-POWER-03



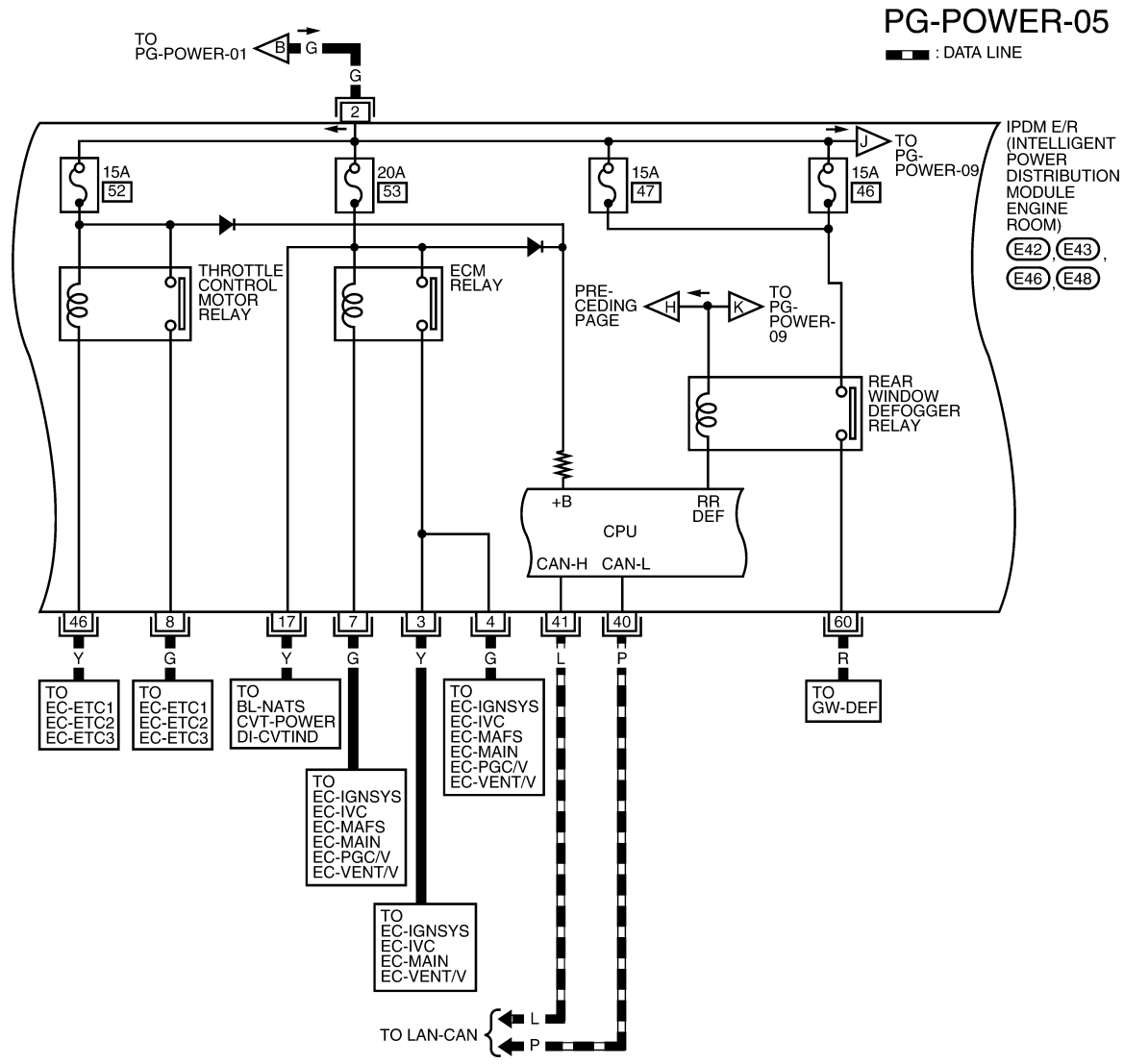


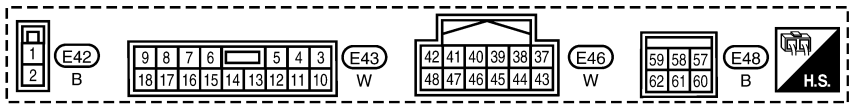
LKWA0374E

PG-POWER-04



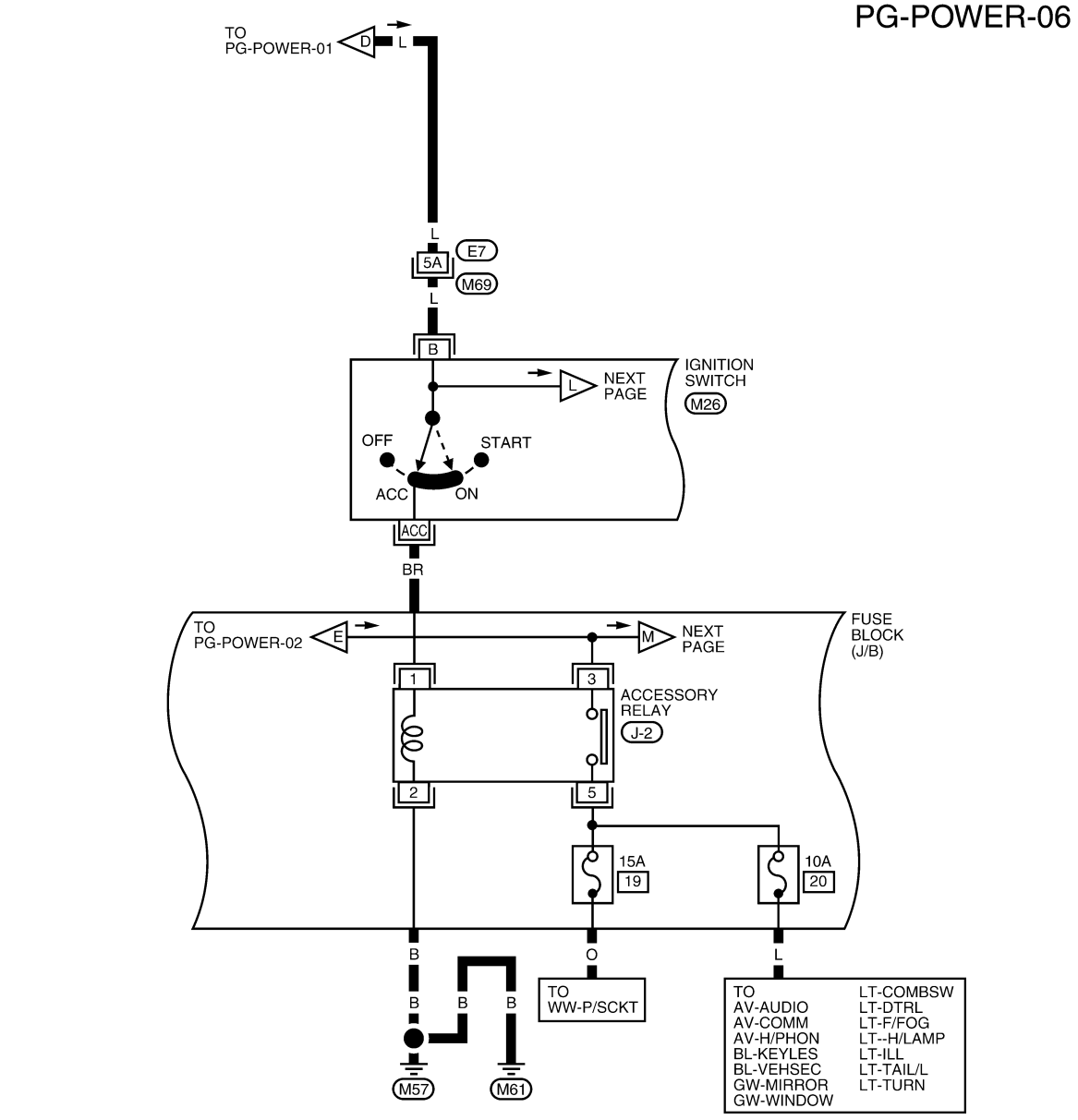
AWMWA0066GB

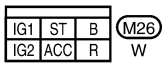

PG-POWER-05
: DATA LINE
TO PG-POWER-01
B
G
G
2
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E42, E43, E46, E48
15A 52
20A 53
15A 47
15A 46
J
TO PG-POWER-09
THROTTLE CONTROL MOTOR RELAY
ECM RELAY
PRE-CEDING PAGE
H
K
TO PG-POWER-09
REAR WINDOW DEFOGGER RELAY
+B
RR DEF
CPU
CAN-H
CAN-L
46
8
17
7
3
4
41
40
60
Y
G
Y
G
Y
G
L
P
R
TO EC-ETC1 EC-ETC2 EC-ETC3
TO EC-ETC1 EC-ETC2 EC-ETC3
TO BL-NATS CVT-POWER DI-CVTIND
TO EC-IGNSYS EC-IVC EC-MAFS EC-MAIN EC-PGC/V EC-VENT/V
TO EC-IGNSYS EC-IVC EC-MAFS EC-MAIN EC-PGC/V EC-VENT/V
TO EC-IGNSYS EC-IVC EC-MAIN EC-VENT/V
TO GW-DEF
TO LAN-CAN
L
P


E42
B
E43
W
E46
W
E48
B
H.S.

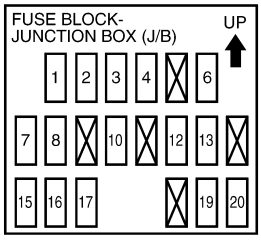
LKWA0376E

PG-POWER-06



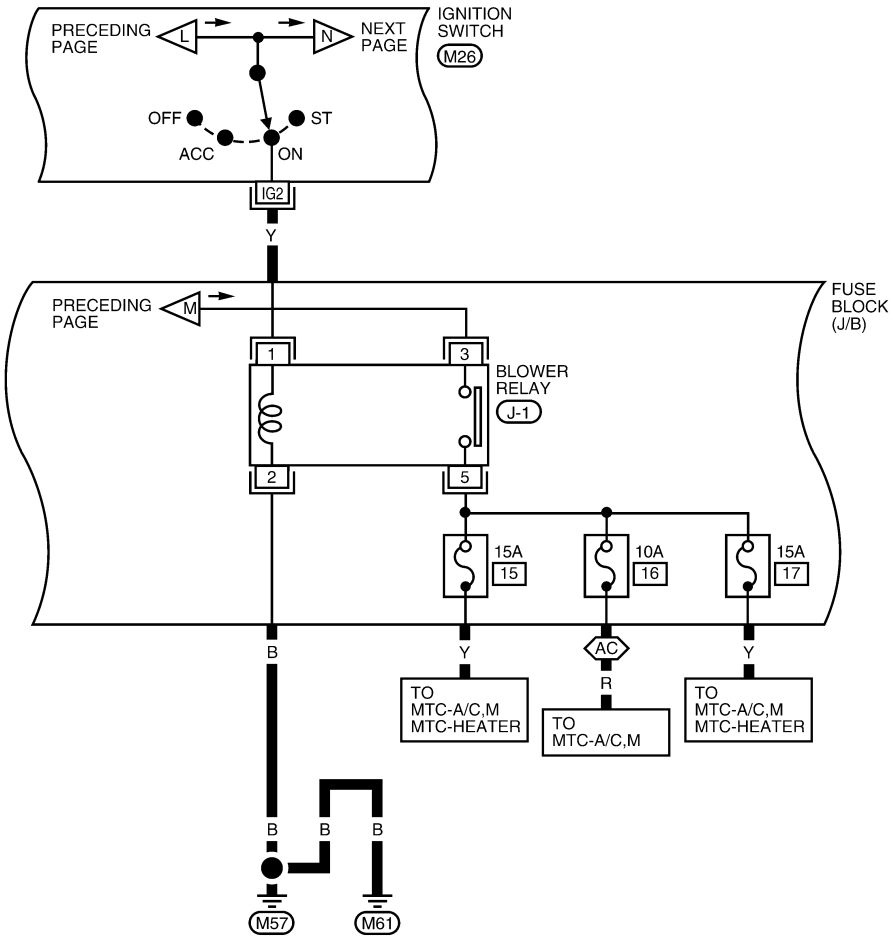


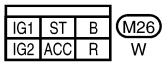
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)



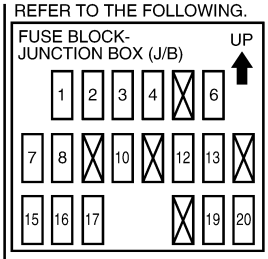
AAMWA0416GB

AC : WITH A/C





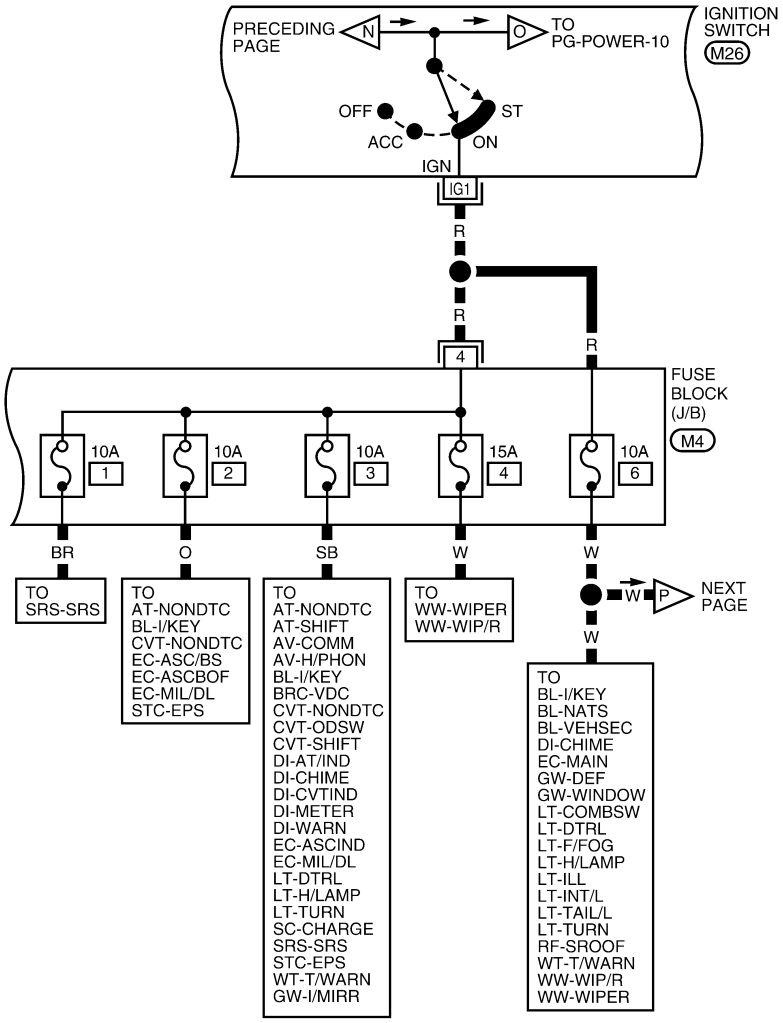
REFER TO THE FOLLOWING.

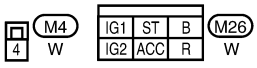


AAMWA0417GB

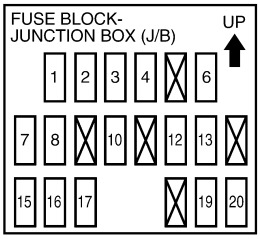
IGNITION POWER SUPPLY — IGNITION SWITCH IN ON AND/OR START.

PG-POWER-08

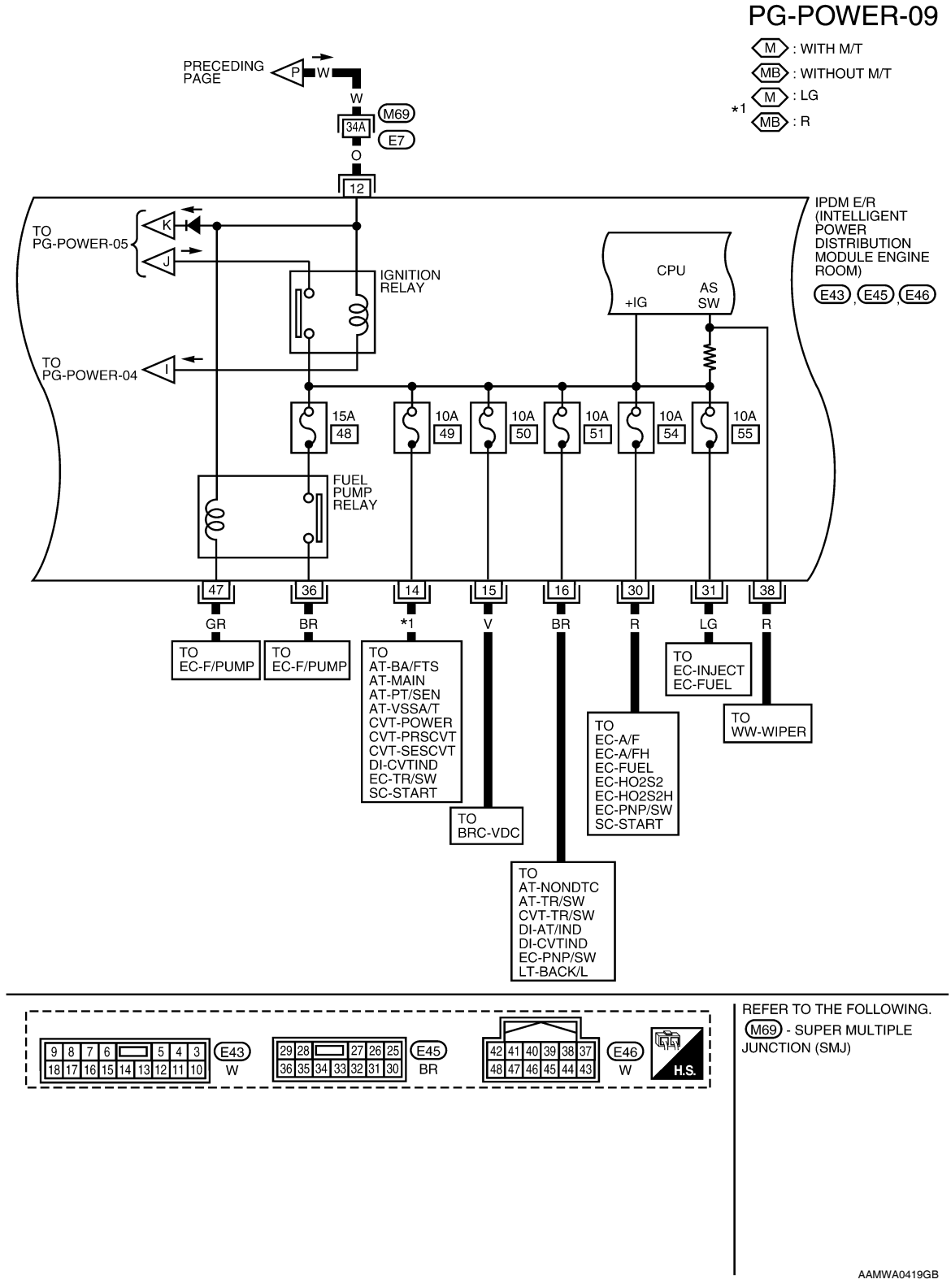


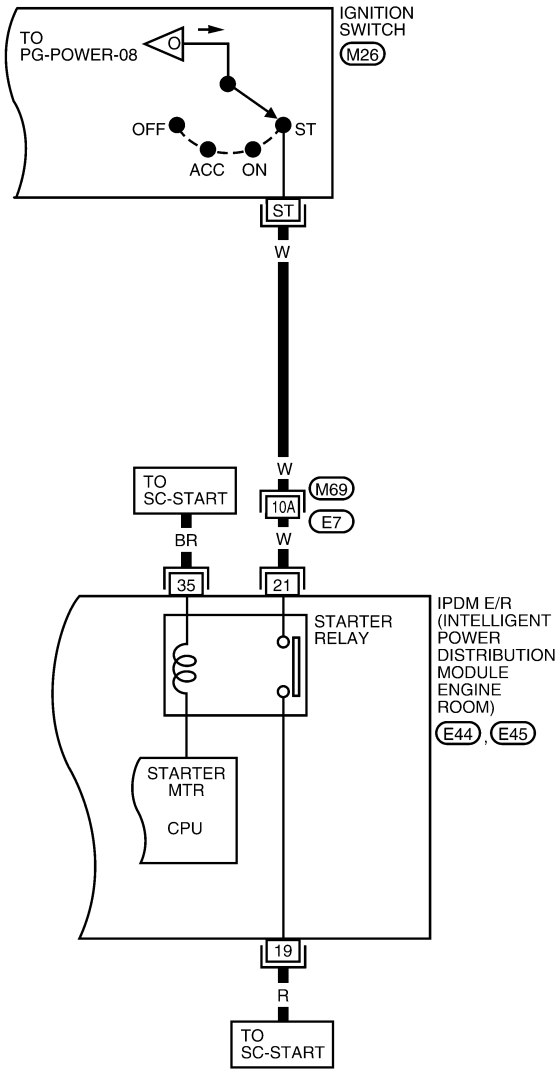


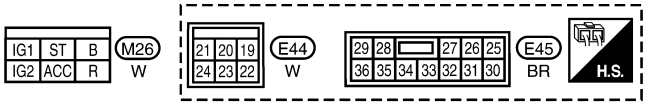
REFER TO THE FOLLOWING.



AAMWA0418GB


PG-POWER-09
M : WITH M/T
MB : WITHOUT M/T
*1 M : LG
MB : R
PRECEDING PAGE
P
W
W
34A
M69
E7
O
12
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E43, E45, E46
TO PG-POWER-05
K
J
IGNITION RELAY
CPU
+IG
AS SW
TO PG-POWER-04
I
15A 48
10A 49
10A 50
10A 51
10A 54
10A 55
FUEL PUMP RELAY
47
36
14
15
16
30
31
38
GR
BR
*1
V
BR
R
LG
R
TO EC-F/PUMP
TO EC-F/PUMP
TO AT-BA/FTS AT-MAIN AT-PT/SEN AT-VSSA/T CVT-POWER CVT-PRSCVT CVT-SESCVT DI-CVTIND EC-TR/SW SC-START
TO BRC-VDC
TO AT-NONDTC AT-TR/SW CVT-TR/SW DI-AT/IND DI-CVTIND EC-PNP/SW LT-BACK/L
TO EC-A/F EC-A/FH EC-FUEL EC-HO2S2 EC-HO2S2H EC-PNP/SW SC-START
TO EC-INJECT EC-FUEL
TO WW-WIPER
9 8 7 6 5 4 3
18 17 16 15 14 13 12 11 10
E43
W
29 28 27 26 25
36 35 34 33 32 31 30
E45
BR
42 41 40 39 38 37
48 47 46 45 44 43
E46
W
H.S.
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)
AAMWA0419GB





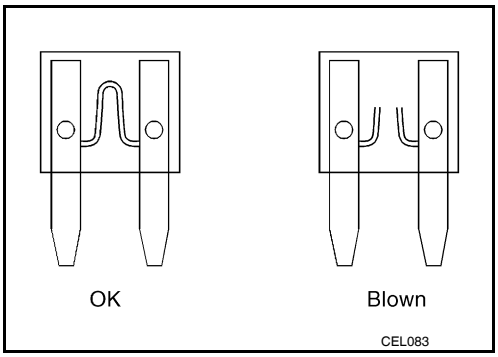
REFER TO THE FOLLOWING.
M69 - SUPER MULTIPLE JUNCTION (SMJ)

ABMWA0599GB

Fuse

INFOID:0000000007329532

- If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.
- Use fuse of specified rating. Never use fuse of more than specified rating.
- Do not partially install fuse; always insert it into fuse holder properly.
- Remove fuse for “ELECTRICAL PARTS (BAT)” if vehicle is not used for a long period of time.



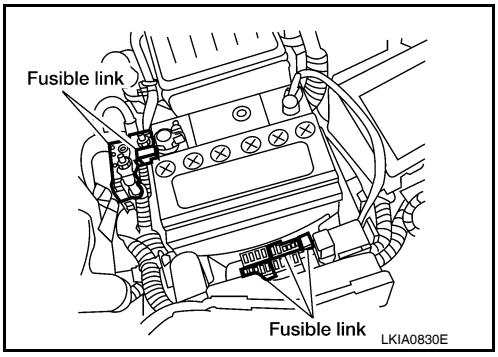
Fusible Link

INFOID:0000000007329533

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.

CAUTION:

- **If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of malfunction.**
- **Never wrap outside of fusible link with vinyl tape. Important: Never let fusible link touch any other wiring harness, vinyl or rubber parts.**



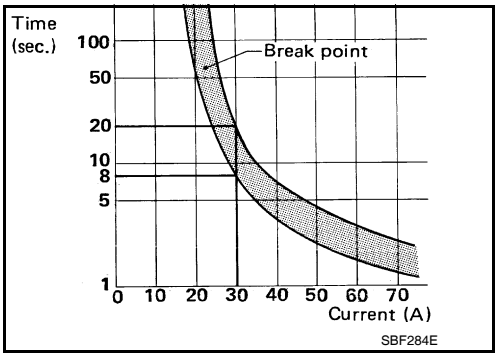
Circuit Breaker (Built Into BCM)

INFOID:0000000007329534

For example, when current is 30A, the circuit is broken within 8 to 20 seconds.

A circuit breaker is used for the following systems:

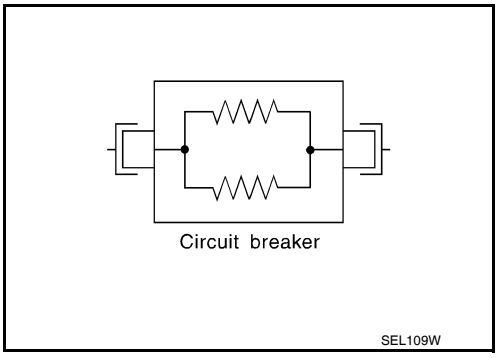
- Power windows
- Power sunroof



Circuit Breaker

INFOID:0000000007329535

The PTC thermistor generates heat in response to current flow. The temperature (and resistance) of the thermistor element varies with current flow. Excessive current flow will cause the element's temperature to rise. When the temperature reaches a specified level, the electrical resistance will rise sharply to control the circuit current. Reduced current flow will cause the element to cool. Resistance falls accordingly and normal circuit current flow is allowed to resume.



IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

System Description

INFOID:0000000007329536

- IPDM E/R (Intelligent Power Distribution Module Engine Room) integrates the relay box and fuse block which were originally placed in engine compartment. It controls integrated relays via IPDM E/R control circuits.
- IPDM E/R-integrated control circuits perform ON-OFF operation of relays, CAN communication control, oil pressure switch signal reception, etc.
- It controls operation of each electrical component via ECM, BCM and CAN communication lines.

CAUTION:

None of the IPDM E/R integrated relays can be removed.

SYSTEMS CONTROLLED BY IPDM E/R

1. Lamp control
   Using CAN communication lines, it receives signals from the BCM and controls the following lamps:
   - Headlamps (High, Low)
   - Parking lamps
   - Tail and license plate lamps
   - Front fog lamps
2. Wiper control
   Using CAN communication lines, it receives signals from the BCM and controls the front wipers.
3. Rear window defogger relay control
   Using CAN communication lines, it receives signals from the BCM and controls the rear window defogger relay.
4. A/C compressor control
   Using CAN communication lines, it receives signals from the ECM and controls the A/C compressor (magnet clutch).
5. Starter control
   Using CAN communication lines, it receives signals from the BCM and controls the starter relay.
6. Cooling fan control
   Using CAN communication lines, it receives signals from the ECM and controls the cooling fan relays.
7. Horn control
   Using CAN communication lines, it receives signals from the BCM and controls the horn relay.
8. Daytime light system control (Canada only)
   Using CAN communication lines, it receives signals from the BCM and controls the daytime light relay.

CAN COMMUNICATION LINE CONTROL

With CAN communication, by connecting each control unit using two communication lines (CAN L-line, CAN H-line), it is possible to transmit a maximum amount of information with minimum wiring. Each control unit can transmit and receive data, and reads necessary information only.

1. Fail-safe control
   - When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. After CAN communication returns to normal operation, it also returns to normal control.
   - Operation of control parts by IPDM E/R during fail-safe mode is as follows:

Controlled system	Fail-safe mode
Headlamp	• With the ignition switch ON, headlamp low relay is ON, headlamp high relays are OFF, and daytime light system (Canada only) is OFF. • With the ignition switch OFF, the headlamp relays are OFF.
Tail, license plate and parking lamps	• With the ignition switch ON, the tail lamp relay is ON. • With the ignition switch OFF, the tail lamp relay is OFF.
Cooling fan	• With the ignition switch ON, cooling fan relay-1, relay-2, and relay-3 are ON. • With the ignition switch OFF, all cooling fan relays are OFF.
Front wiper	Until the ignition switch is turned off, the front wiper relays remain in the same status they were in just before fail−safe control was initiated.

Controlled system	Fail-safe mode
Rear window defogger	Rear window defogger relay OFF
A/C compressor	A/C relay is OFF
Front fog lamps	Front fog lamp relay OFF

IPDM E/R STATUS CONTROL

In order to save power, IPDM E/R switches status by itself based on each operating condition.

1. CAN communication status
   - CAN communication is normally performed with other control units.
   - Individual unit control by IPDM E/R is normally performed.
   - When sleep request signal is received from BCM, mode is switched to sleep waiting status.
2. Sleep waiting status
   - Process to stop CAN communication is activated.
   - All systems controlled by IPDM E/R are stopped. When 1 second has elapsed after CAN communication with other control units is stopped, mode switches to sleep status.
3. Sleep status
   - IPDM E/R operates in low current-consumption mode.
   - CAN communication is stopped.
   - When a change in CAN communication signal is detected, mode switches to CAN communication status.
   - When a change in ignition switch signal is detected, mode switches to CAN communication status.

CAN Communication System Description

INFOID:0000000007329537

Refer to LAN-5, "System Diagram".

Function of Detecting Ignition Relay Malfunction

INFOID:0000000007329538

- When the integrated ignition relay is stuck in a "closed contact" position and cannot be turned OFF, IPDM E/R turns ON tail and parking lamps for 10 minutes to indicate IPDM E/R malfunction.
- When the state of the integrated ignition relay does not agree with the state of the ignition switch signal received via CAN communication, the IPDM E/R activates the tail lamp relay.

Ignition switch signal	Ignition relay status	Tail lamp relay
ON	ON	—
OFF	OFF	—
ON	OFF	—
OFF	ON	ON (10 minutes)

NOTE:
When the ignition switch is turned ON, the tail lamps are OFF.

CONSULT Function (IPDM E/R)

INFOID:0000000007329539

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

IPDM E/R diagnostic Mode	Description
SELF-DIAG RESULTS	Displays IPDM E/R self-diagnosis results.
DATA MONITOR	Displays IPDM E/R input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.

SELF-DIAGNOSTIC RESULTS

Display Item List

Display items	CONSULT display code	Malfunction detection	TIME		Possible causes
			CRNT	PAST	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—	—	—
CAN COMM CIRC	U1000	• If CAN communication reception/transmission data has a malfunction, or if any of the control units fail, data reception/transmission cannot be confirmed. • When the data in CAN communication is not received before the specified time.	X	X	Any of items listed below have errors: • TRANSMIT DIAG • ECM • BCM/SEC
IGN RELAY ON	—	When the ignition switch is not in the ON position, the ignition relay in the IPDM E/R is ON.	X	X	Ignition relay (integrated in IPDM E/R)
IGN RELAY OFF	—	When the ignition switch is not in the ON position, the ignition relay in the IPDM E/R is OFF.	X	X	Ignition relay (integrated in IPDM E/R)
EEPROM	—	Malfunction is detected with the integrated EEPROM memory diagnosis.	X	X	IPDM E/R

x: Applicable

NOTE:

The details for display of the period are as follows:

- CRNT: Error currently detected with IPDM E/R.
- PAST: Error detected in the past and placed in IPDM E/R memory.

DATA MONITOR

All Signals, Main Signals, Selection From Menu

Item name	CONSULT screen display	Display or unit	Monitor item selection			Description
			ALL SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
Motor fan request	MOTOR FAN REQ	1/2/3/4	X	X	X	Signal status input from ECM
Compressor request	AC COMP REQ	ON/OFF	X	X	X	Signal status input from ECM
Parking, license, and tail lamp request	TAIL & CLR REQ	ON/OFF	X	X	X	Signal status input from BCM
Headlamp low beam request	HL LO REQ	ON/OFF	X	X	X	Signal status input from BCM
Headlamp high beam request	HL HI REQ	ON/OFF	X	X	X	Signal status input from BCM
Front fog request	FR FOG REQ	ON/OFF	X	X	X	Signal status input from BCM
FR wiper request	FR WIP REQ	STOP/1LO/LO/HI	X	X	X	Signal status input from BCM
Wiper auto stop	WIP AUTO STOP	ACT P/STOP P	X	X	X	Output status of IPDM E/R
Wiper protection	WIP PROT	OFF/LS/HS/Block	X	X	X	Control status of IPDM E/R
Starter request	ST RLY REQ	ON/OFF	X		X	Status of input signal (*1)
Ignition relay status	IGN RLY	ON/OFF	X	X	X	Ignition relay status monitored with IPDM E/R
Rear defogger request	RR DEF REQ	ON/OFF	X	X	X	Signal status input from BCM
Oil pressure switch	OIL P SW	OPEN/CLOSE	X		X	Signal status input from IPDM E/R
Hood switch	HOOD SW (*2)	OFF	X		X	Signal status input from IPDM E/R

Item name	CONSULT screen display	Display or unit	Monitor item selection			Description
			ALL SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
Theft warning horn request	THFT HRN REQ	ON/OFF	X		X	Signal status input from BCM
Horn chirp	HORN CHIRP	ON/OFF	X		X	Output status of IPDM E/R
Daytime light request	DTRL REQ	ON/OFF	X		X	Signal status input from BCM

*1 Perform monitoring of IPDM E/R data with the ignition switch ON. When the ignition switch is in ACC position, display may not be correct.

*2 This item is displayed, but does not function.

CAN DIAG SUPPORT MNTR

Refer to LAN-7, "Description" .

ACTIVE TEST

Display Item List

Test name	CONSULT screen display	Description
Head, tail, fog lamp output	EXTERNAL LAMPS	With a certain ON-OFF operation (OFF, TAIL, LO, HI, FOG), the front fog lamp, headlamp low, headlamp high RH, headlamp high LH, and tail lamp relays can be operated.
Rear defogger output	REAR DEFOGGER	With a certain ON-OFF operation, the rear defogger relay can be operated.
Front wiper (HI, LO) output	FRONT WIPER	With a certain operation (OFF, HI ON, LO ON), the front wiper relays (Lo, Hi) can be operated.
Cooling fan output	MOTOR FAN	With a certain operation (1, 2, 3, 4), the cooling fan relays can be operated.
Horn output	HORN	With a certain ON-OFF operation, the horn relay can be operated.

Auto Active Test

INFOID:0000000007329540

DESCRIPTION

- In auto active test mode, operation inspection can be performed when IPDM E/R sends a drive signal to the following systems:

- Rear window defogger
- Front wipers
- Tail, license and parking lamps
- Daytime lamp system (Canada only)
- Front fog lamps
- Headlamps (High, Low)
- A/C compressor (magnet clutch)
- Cooling fan

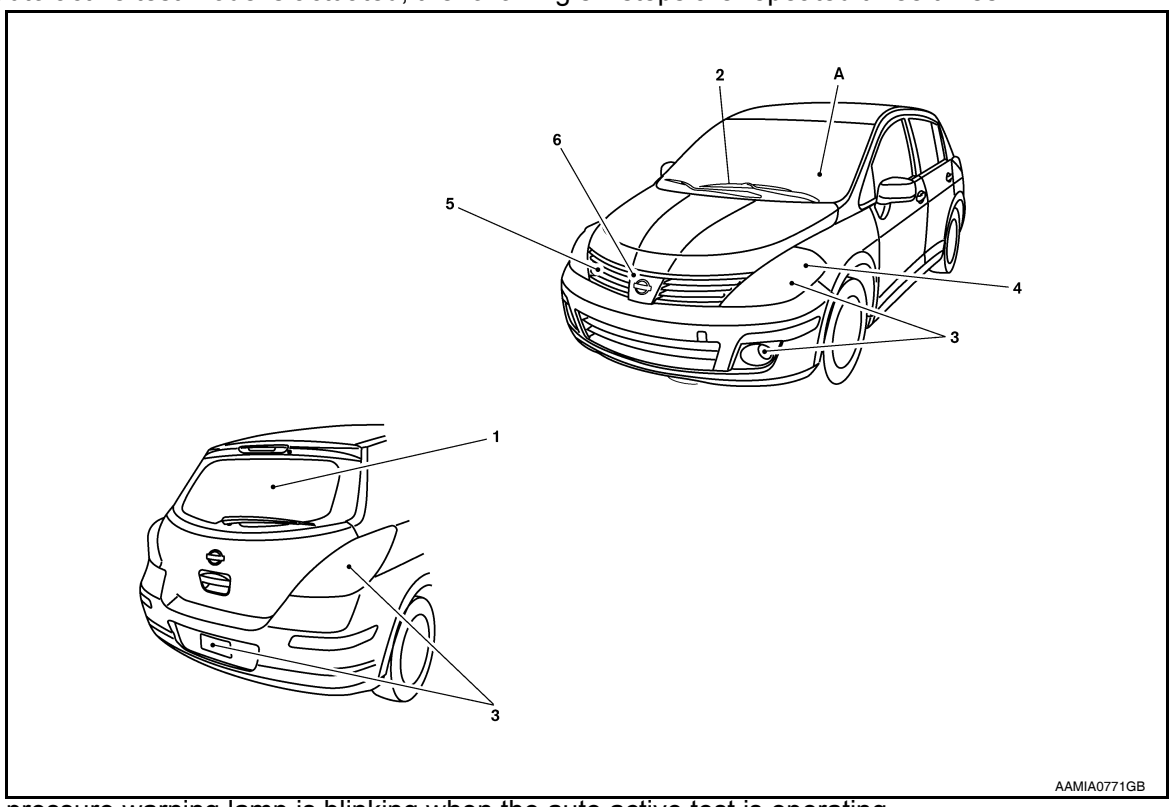
OPERATION PROCEDURE

1. Close hood and front door RH, and lift wiper arms away from windshield (to prevent glass damage by wiper operation).
   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn ignition switch ON and, within 20 seconds, press front door switch LH 10 times. Then turn ignition switch OFF.
4. Turn ignition switch ON within 10 seconds after ignition switch OFF.
5. When auto active test mode is actuated, horn chirps once.
6. After a series of operations is repeated three times, auto active test is completed.

NOTE:
When auto active test mode has to be cancelled halfway, turn ignition switch OFF.
CAUTION:
Be sure to perform BL-45, "Door Switch Check" or when the auto active test cannot be performed.

INSPECTION IN AUTO ACTIVE TEST MODE

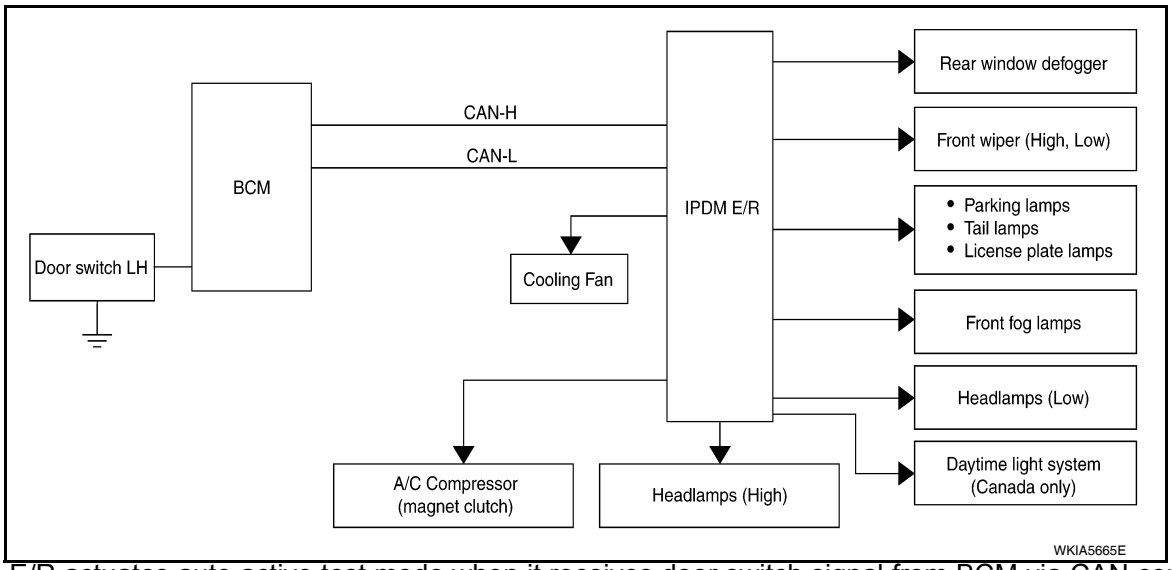
When auto active test mode is actuated, the following six steps are repeated three times.



(A): Oil pressure warning lamp is blinking when the auto active test is operating.

Item Number	Test Item	Operation Time/Frequency
1	Rear window defogger	10 seconds
2	Front wipers	LOW 5 seconds then HIGH 5 seconds
3	Daytime light system (Canada only)	10 seconds
3	Tail, license, and parking lamps	10 seconds
3	Front fog lamps	10 seconds
4	Headlamps (low)	20 seconds
4	Headlamps (high)	ON-OFF 5 times
5	A/C compressor (magnet clutch)	ON-OFF 5 times
6	Cooling fan	LOW 5 seconds then HIGH 5 seconds

Concept of Auto Active Test



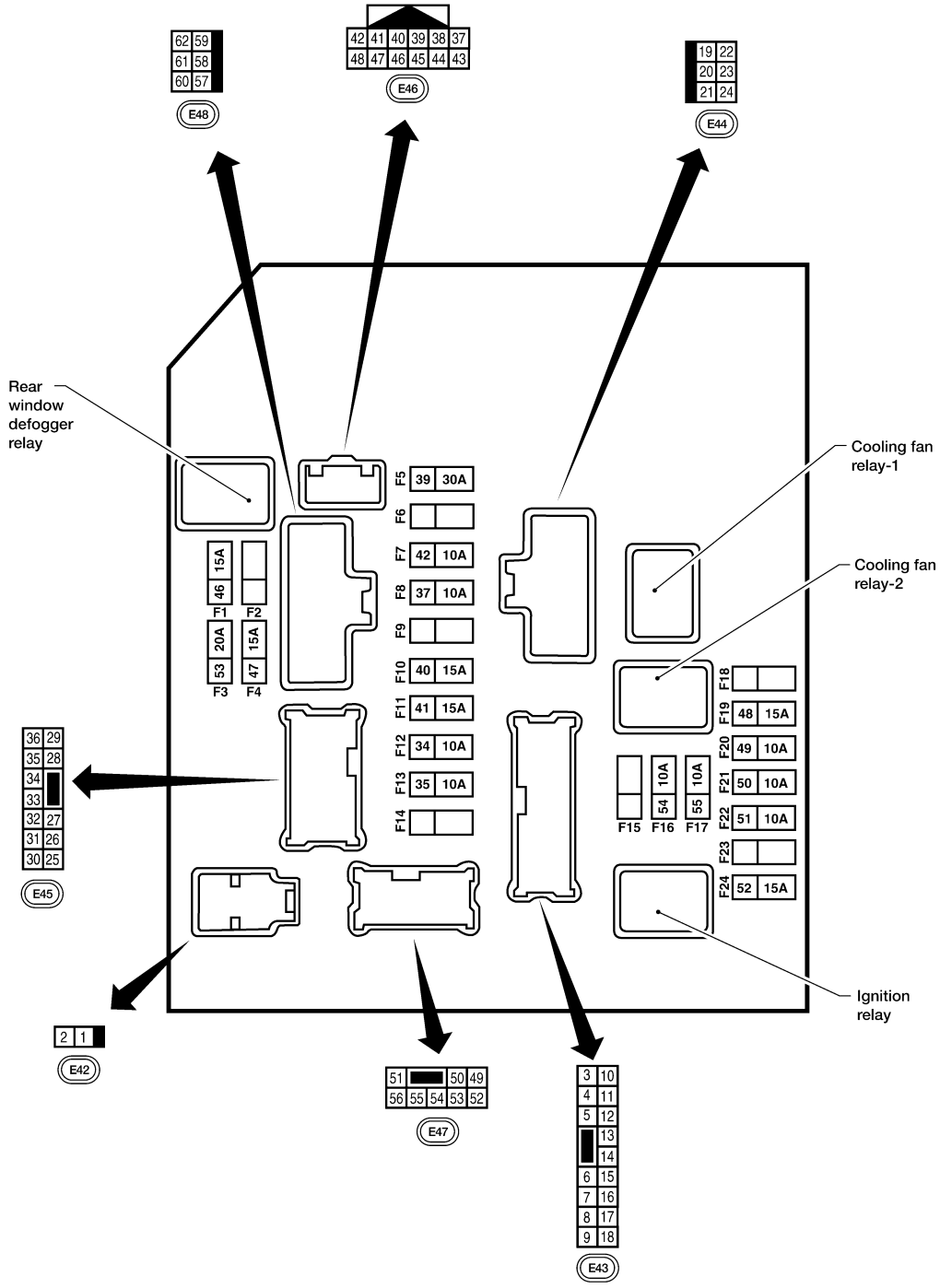
- IPDM E/R actuates auto active test mode when it receives door switch signal from BCM via CAN communication line. Therefore, when auto active test mode is activated successfully, CAN communication between IPDM E/R and BCM is normal.
- If any of the systems controlled by IPDM E/R cannot be operated, possible cause can be easily diagnosed using auto active test.

Diagnosis chart in auto active test mode

Symptom	Inspection contents		Possible cause
Rear window defogger does not operate.	Perform auto active test. Does rear window defogger operate?	YES	• BCM signal input circuit
		NO	• Rear window defogger relay • Open circuit of rear window defogger • IPDM E/R malfunction • Harness or connector malfunction between IPDM E/R and rear window defogger
Any of front wipers, tail and parking lamps, front fog lamps, daytime light system (Canada only), and headlamps (High, Low) do not operate.	Perform auto active test. Does system in question operate?	YES	• BCM signal input system
		NO	• Lamp/wiper motor malfunction • Lamp/wiper motor ground circuit malfunction • Harness/connector malfunction between IPDM E/R and system in question • IPDM E/R (integrated relay) malfunction
A/C compressor does not operate.	Perform auto active test. Does magnet clutch operate?	YES	• BCM signal input circuit • CAN communication signal between BCM and ECM • CAN communication signal between ECM and IPDM E/R
		NO	• Magnet clutch malfunction • Harness/connector malfunction between IPDM E/R and magnet clutch • IPDM E/R (integrated relay) malfunction
Cooling fan does not operate.	Perform auto active test. Does cooling fan operate?	YES	• ECM signal input circuit • CAN communication signal between ECM and IPDM E/R
		NO	• Cooling fan motor malfunction • Harness/connector malfunction between IPDM E/R and cooling fan motor • IPDM E/R (integrated relay) malfunction
Oil pressure warning lamp does not operate.	Perform auto active test. Does oil pressure warning lamp blink?	YES	• Harness/connector malfunction between IPDM E/R and oil pressure switch • Oil pressure switch malfunction • IPDM E/R
		NO	• CAN communication signal between BCM and combination meter • Combination meter

IPDM E/R Terminal Arrangement

INFOID:0000000007329542



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NOTE:
Numbers preceded by an "F" represent the fuse numbers imprinted on the IPDM E/R. The other numbers represent the fuse numbers as they appear in the wiring diagrams.

Terminal and Reference Value for IPDM E/R

INFOID:0000000007329543

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value (Approx.)
				Ignition switch	Operation or condition	
1	R	Battery power supply	Input	OFF	—	Battery voltage
2	G	Battery power supply	Input	OFF	—	Battery voltage
3	Y	ECM Relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
4	G	ECM relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
6	R	Daytime light relay control	Input	ON	Daytime light system active.	Less than battery voltage
					Daytime light system inactive.	Battery voltage
7	G	ECM relay control	Input	—	Ignition switch ON or START	0V
					Ignition switch OFF or ACC	Battery voltage
8	G	Throttle control motor relay	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
11	W	A/C compressor	Output	ON or START	A/C switch ON or defrost A/C switch	Battery voltage
					A/C switch OFF or defrost A/C switch	0V
12	O	Ignition switch supplied power	Input	—	OFF or ACC	0V
					ON or START	Battery voltage
14	LG (M/T) R (A/T or CVT)	Fuse 49	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
15	V	Fuse 50	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
16	BR	Fuse 51	Output	—	Ignition switch ON or START	Battery voltage
					Ignition switch OFF or ACC	0V
17	Y	Battery power supply	Output	—	—	Battery voltage
19	R	Starter motor	Output	START	—	Battery voltage
20	L (with A/C) LG (without A/C)	Cooling fan relay-1	Output	—	Conditions correct for cooling fan low operation.	Battery voltage
					Conditions not correct for cooling fan low operation.	0V
22	G	Battery power supply	Input	—	—	Battery voltage
23	L	Cooling fan relay-2	Input	—	Conditions correct for cooling fan high operation	Battery voltage
					Conditions not correct for cooling fan high operation	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition			Reference value (Approx.)
				Ignition switch	Operation or condition		
24	Y	Cooling fan relay-3	Output	—	Conditions correct for cooling fan high operation		Battery voltage
					Conditions not correct for cooling fan high operation		0V
26	O	Tail lamp relay (parking lamps)	Output	—	Lighting switch in 2nd position		Battery voltage
27	BR	Tail lamp relay (parking lamps)	Output	—	Lighting switch in 2nd position		Battery voltage
28	GR	Tail lamp relay (parking lamps)	Output	—	Lighting switch in 2nd position		Battery voltage
29	P	Tail lamp relay (parking lamps)	Output	—	Lighting switch in 2nd position		Battery voltage
30 (A/T only)	R	Fuse 54	Output	—	Ignition switch ON or START		Battery voltage
					Ignition switch OFF or ACC		0V
31	O	Fuse 55	Output	—	Ignition switch ON or START		Battery voltage
					Ignition switch OFF or ACC		0V
32	L	Wiper high speed signal	Output	ON or START	Wiper switch	OFF, LO, INT	0V
						HI	Battery voltage
33	Y	Wiper low speed signal	Output	ON or START	Wiper switch	OFF	0V
						LO or INT	Battery voltage
35	BR	Starter relay (inhibit switch)	Input	ON or START	Selector lever in "P" or "N" (CVT or A/T) or clutch pedal depressed (M/T)		Battery voltage
					Selector lever any other position (CVT or A/T) or clutch pedal released (M/T)		0V
36	BR	Fuel pump relay	Output	—	Ignition switch ON or START		Battery voltage
					Ignition switch OFF or ACC		0V
37	G	Oil pressure switch	Input	ON or START	Engine running and oil pressure within specification		Battery voltage
					Engine not running or oil pressure below specification		0V
38	R	Wiper auto stop signal	Input	ON or START	Wipers not in park position		Battery voltage
					Wipers in park position		0V
39	B	Ground	Input	—	—		0V
40	P	CAN-L	—	ON	—		—
41	L	CAN-H	—	ON	—		—
45	R	Horn relay control	Input	—	Horn switch PUSHED, alarm switch activated or door lock/ unlock is confirmed when operating lock system via the keyfob		0V
					Horn switch released, alarm not active, keyfob not active		Battery voltage
46	Y	Throttle control motor relay control	Input	—	Ignition switch ON or START		0V
					Ignition switch OFF or ACC		Battery voltage
47	GR	Fuel pump relay control	Input	—	Ignition switch ON or START		0V
					Ignition switch OFF or ACC		Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition			Reference value (Approx.)
				Ignition switch	Operation or condition		
50	V	Front fog lamp (LH)	Output	ON or START	Lighting switch must be in the 2ND position (LOW beam is ON) and the front fog lamp switch	OFF	0V
						ON	Battery voltage
51	W	Front fog lamp (RH)	Output	ON or START	Lighting switch must be in the 2ND position (LOW beam is ON) and the front fog lamp switch	OFF	0V
						ON	Battery voltage
52	L	LH Low beam headlamp	Output	—	Lighting switch in 2nd position		Battery voltage
54	P	RH Low beam headlamp	Output	—	Lighting switch in 2nd position		Battery voltage
55	G	LH High beam headlamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position		Battery voltage
56	Y	RH High beam headlamp	Output	—	Lighting switch in 2nd position and placed in HIGH or PASS position		Battery voltage
59	B	Ground	Input	—	—		0V
60	R	Rear window defogger relay	Output	ON or START	Rear defogger Switch ON		Battery voltage
					Rear defogger Switch OFF		0V

IPDM E/R Power/Ground Circuit Inspection

INFOID:0000000007329544

1.FUSE AND FUSIBLE LINK INSPECTION

Check that the following fusible links or IPDM E/R fuses are not blown.

Terminal No.	Signal name	Fuse, fusible link No.
1, 2	Battery power	a, b, d

OK or NG

OK >> GO TO 2.
NG >> Replace fuse or fusible link.

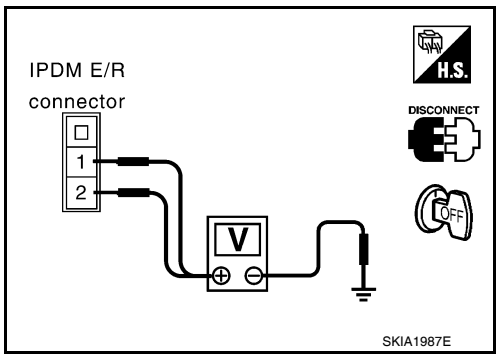
2.POWER CIRCUIT INSPECTION

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E42.
3. Check voltage between IPDM E/R harness connector E42 terminals 1, 2 and ground.

Battery voltage should exist.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace IPDM E/R power circuit harness.



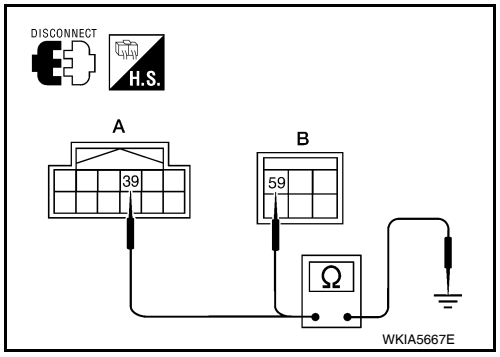
3. GROUND CIRCUIT INSPECTION

1. Disconnect IPDM E/R harness connectors E46 and E48.
2. Check continuity between IPDM E/R harness connector E46 (A) terminal 39, E48 (B) terminal 59 and ground.

Continuity should exist.

OK or NG

OK >> Inspection End.
NG >> Repair or replace IPDM E/R ground circuit harness.



Inspection with CONSULT (Self-Diagnosis)

INFOID:0000000007329545

1. SELF-DIAGNOSIS RESULT CHECK

1. Connect CONSULT and select "IPDM E/R" on the "SELECT SYSTEM" screen.
2. Select "SELF-DIAG RESULTS" on the "SELECT DIAG MODE" screen.
3. Check display content in self-diagnosis results.

CONSULT Display	CONSULT display code	TIME		Details of diagnosis result
		CRNT	PAST	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—	No malfunction
CAN COMM CIRC	U1000	X	X	Any of items listed below have errors: • TRANSMIT DIAG • ECM • BCM/SEC

NOTE:
The Details for Display for the Period are as follows:
- CRNT: Error currently detected by IPDM E/R.
- PAST: Error detected in the past and stored in IPDM E/R memory.

Contents displayed

NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.>>Inspection End.
CAN COMM CIRC>>Print out the self-diagnosis result and refer to LAN-14, "Trouble Diagnosis Flow Chart".

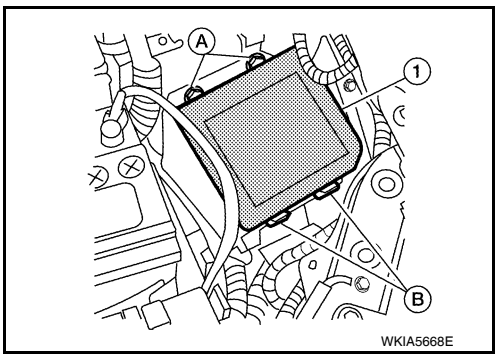
Removal and Installation of IPDM E/R

INFOID:0000000007329546

REMOVAL

1. Disconnect the negative battery cable.

2. Lift up the IPDM E/R (1) while pushing and opening pawls (A) or (B), and remove the IPDM E/R while pushing and opening the other side pawls.
3. Disconnect harness connector.



INSTALLATION

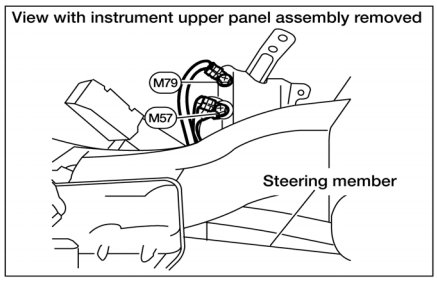
Installation is the reverse order of removal.

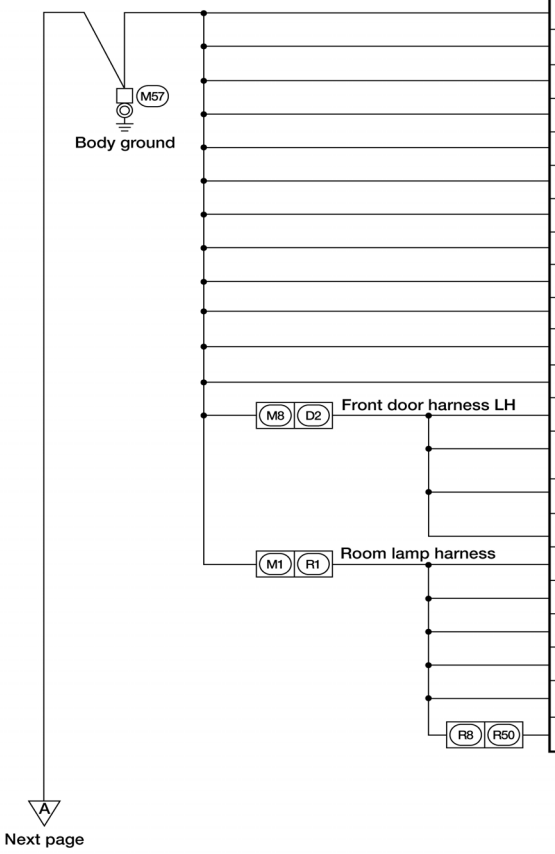
GROUND CIRCUIT

Ground Distribution

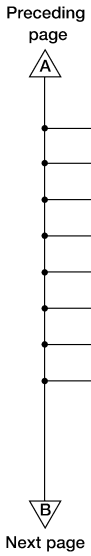
INFOID:0000000007329547

MAIN HARNESS





CONNECTOR NUMBER	CONNECT TO
J1	Blower relay
M5	Illumination control switch
M7	Door mirror remote control switch (Terminal No. 12)
M20	BCM (body control module) (Terminal No. 67)
M22	Data link connector (Terminal No. 4)
M22	Data link connector (Terminal No. 5)
M33	Front air control (Terminal No. 8)
M33	Front air control (Terminal No. 9)
M34	VDC OFF switch
M35	Air bag diagnosis sensor unit (Terminal No. 2)
M42	Thermo control amp.
M64	Steering angle sensor
D5	Front door request switch LH
D8	Main power window and door lock/unlock switch (Terminal No. 17)
D14	Front door lock assembly LH
D114	Front door lock actuator RH
R2	Map lamp
R4	Sunroof motor assembly
R6	Sunroof switch
R9	Vanity mirror LH
R10	Vanity mirror RH
R51	Interior room lamp



CONNECTOR NUMBER	CONNECT TO
M36	Front passenger airbag OFF indicator
M38	A/T shift selector (Terminal No. 2)
M38	A/T shift selector (Terminal No. 6)
M38	CVT shift selector (Terminal No. 6)
M38	CVT shift selector (Terminal No. 2)
M52	Intelligent Key unit (Terminal No. 12)
M55	Hazard switch
M73	Key switch and ignition knob switch

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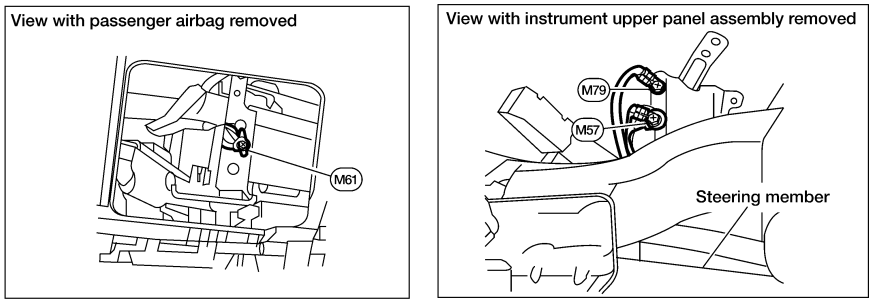

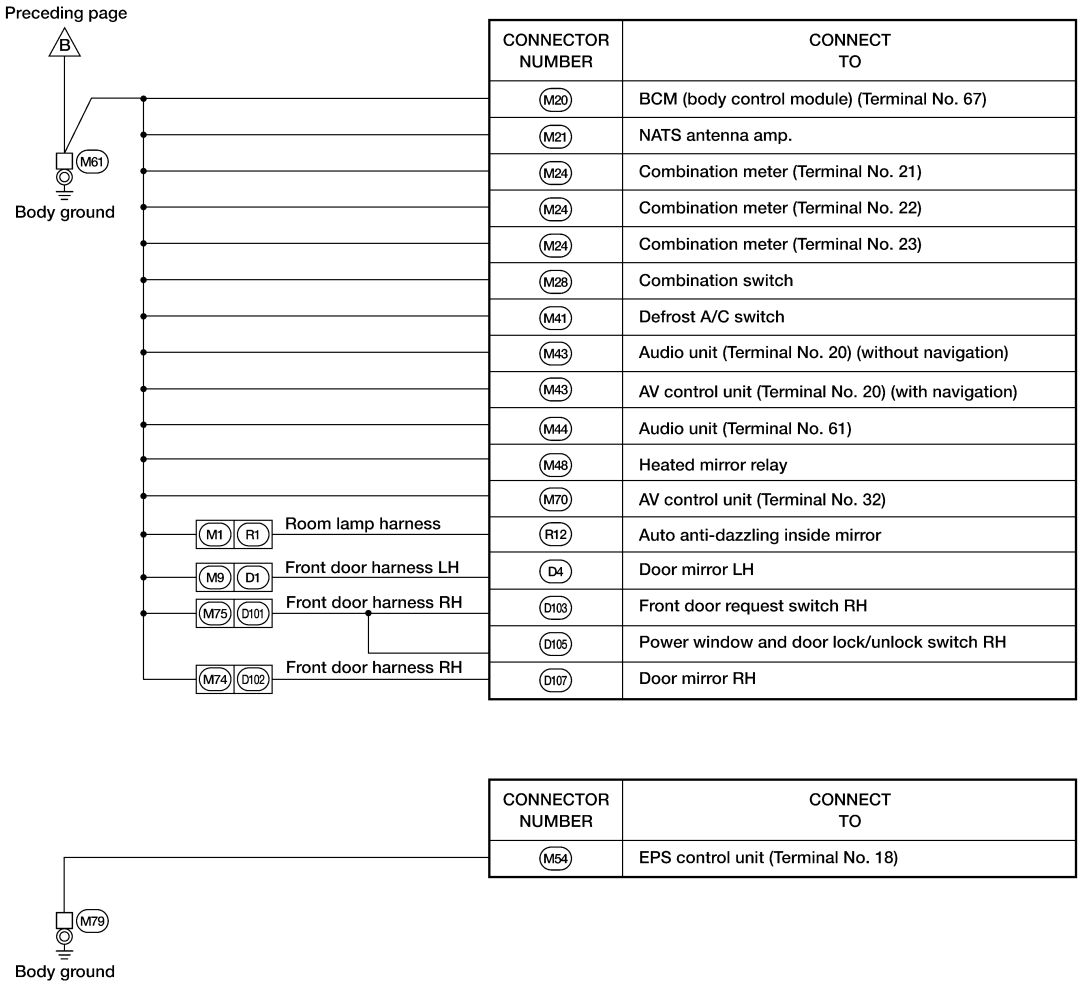

CONNECTOR NUMBER	CONNECT TO
M20	BCM (body control module) (Terminal No. 67)
M21	NATS antenna amp.
M24	Combination meter (Terminal No. 21)
M24	Combination meter (Terminal No. 22)
M24	Combination meter (Terminal No. 23)
M28	Combination switch
M41	Defrost A/C switch
M43	Audio unit (Terminal No. 20) (without navigation)
M43	AV control unit (Terminal No. 20) (with navigation)
M44	Audio unit (Terminal No. 61)
M48	Heated mirror relay
M70	AV control unit (Terminal No. 32)
R12	Auto anti-dazzling inside mirror
D4	Door mirror LH
D103	Front door request switch RH
D105	Power window and door lock/unlock switch RH
D107	Door mirror RH

CONNECTOR NUMBER	CONNECT TO
M54	EPS control unit (Terminal No. 18)

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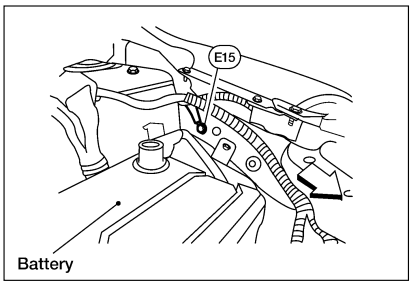

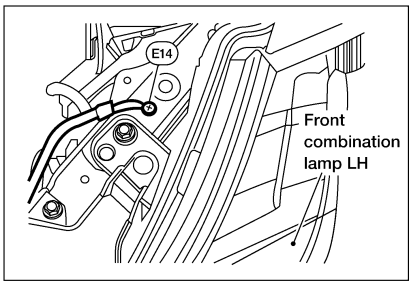

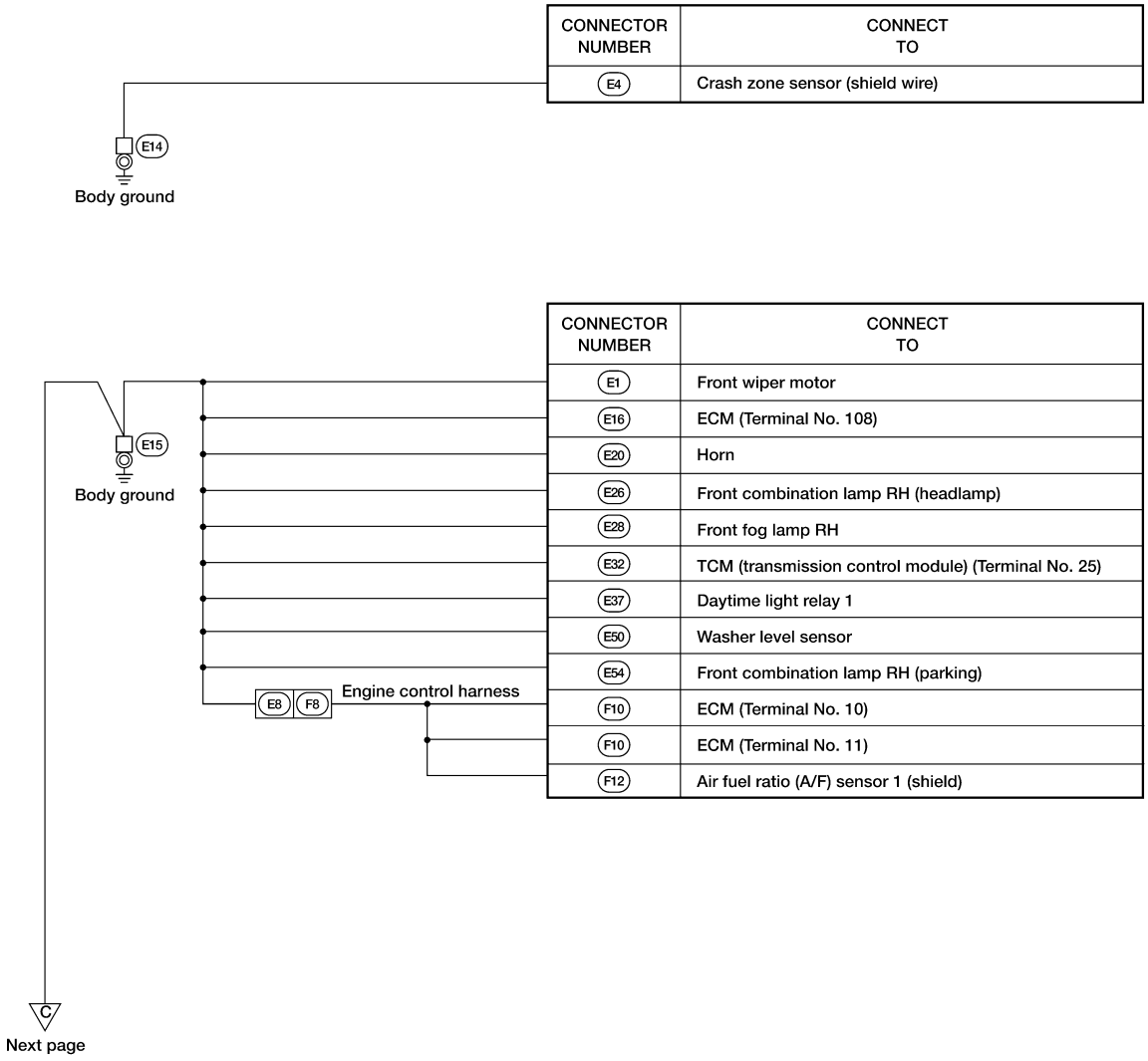

CONNECTOR NUMBER	CONNECT TO
E4	Crash zone sensor (shield wire)

CONNECTOR NUMBER	CONNECT TO
E1	Front wiper motor
E16	ECM (Terminal No. 108)
E20	Horn
E26	Front combination lamp RH (headlamp)
E28	Front fog lamp RH
E32	TCM (transmission control module) (Terminal No. 25)
E37	Daytime light relay 1
E50	Washer level sensor
E54	Front combination lamp RH (parking)
F10	ECM (Terminal No. 10)
F10	ECM (Terminal No. 11)
F12	Air fuel ratio (A/F) sensor 1 (shield)

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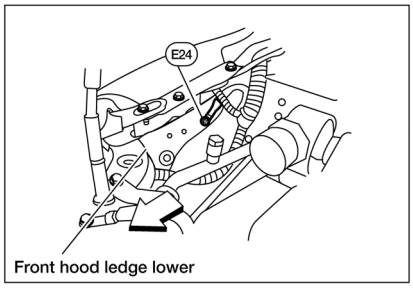
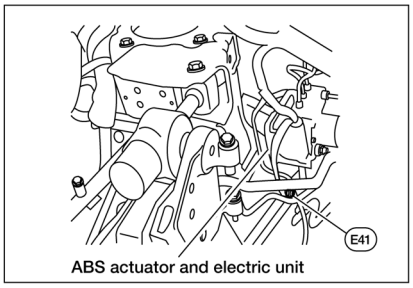


Front hood ledge lower



ABS actuator and electric unit

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C

E24

Body ground

CONNECTOR NUMBER	CONNECT TO
E3	Cooling fan motor (Terminal No. 2) (with A/C)
E3	Cooling fan motor (Terminal No. 4) (without A/C)
E25	Front combination lamp LH
E27	Front fog lamp LH
E29	Front combination lamp LH
E30	Front combination lamp RH
E32	TCM (transmission control module) (Terminal No. 48)
E38	Daytime light relay 2
E40	Brake fluid level switch
E46	IPDM E/R (intelligent power distribution module engine room) (Terminal No. 39)
E48	IPDM E/R (intelligent power distribution module engine room) (Terminal No. 59)
E53	Front combination lamp LH (parking)

CONNECTOR NUMBER	CONNECT TO
E33	ABS actuator and electric unit (control unit) (Terminal No. 1)
E33	ABS actuator and electric unit (control unit) (Terminal No. 4)

E41

Body ground

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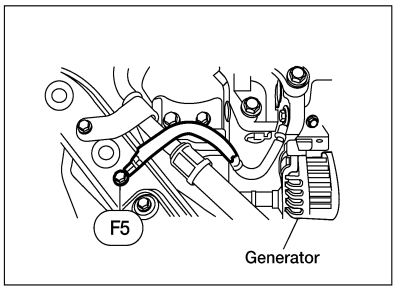

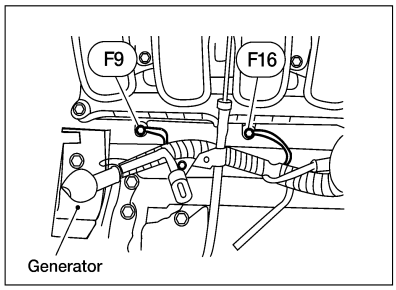

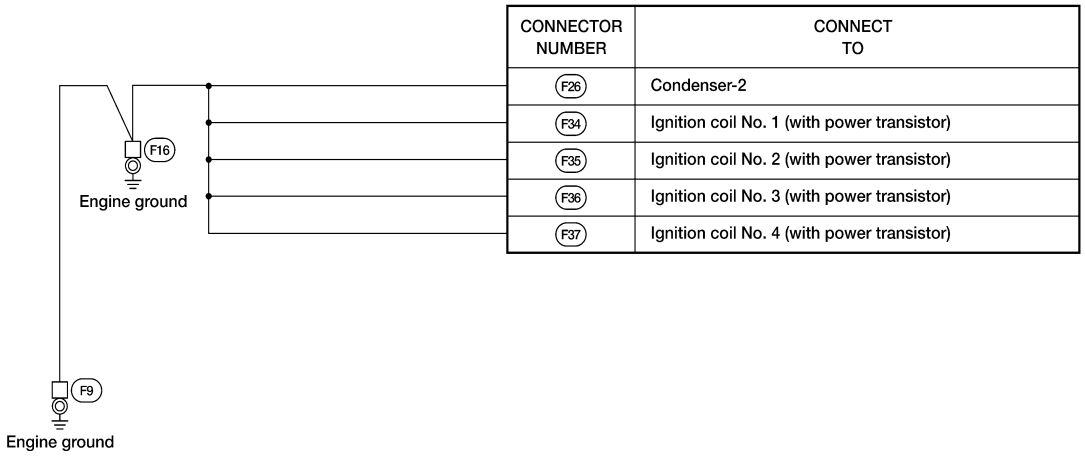

CONNECTOR NUMBER	CONNECT TO
F26	Condenser-2
F34	Ignition coil No. 1 (with power transistor)
F35	Ignition coil No. 2 (with power transistor)
F36	Ignition coil No. 3 (with power transistor)
F37	Ignition coil No. 4 (with power transistor)

CONNECTOR NUMBER	CONNECT TO
F4	Generator

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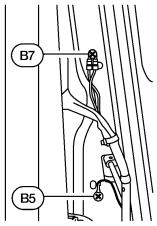
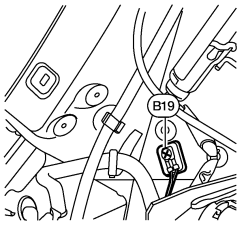
View with LH center pillar upper garnish removed



View with LH luggage side lower finisher removed



CONNECTOR NUMBER	CONNECT TO
B15	LH side air bag (satellite sensor) (shield)

B5
Body ground

CONNECTOR NUMBER	CONNECT TO
B3	Yaw rate/side/decel G sensor

B7
Body ground

CONNECTOR NUMBER	CONNECT TO
B13	Seat belt buckle switch LH

CONNECTOR NUMBER	CONNECT TO
B16	License plate lamp LH
B17	License plate lamp RH
B25	Rear combination lamp LH

B19
Body ground

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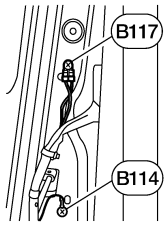
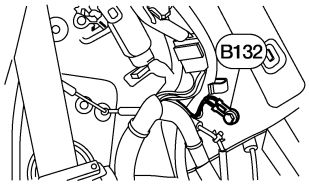
View with RH center pillar upper garnish removed



View with RH luggage side lower finisher removed



CONNECTOR NUMBER	CONNECT TO
B111	RH side air bag (satellite sensor) (shield)

B114
Body ground

CONNECTOR NUMBER	CONNECT TO
B100	Fuel level sensor unit and fuel pump (fuel pump)

B117
Body ground

CONNECTOR NUMBER	CONNECT TO
B103	Console power socket
B107	Rear combination lamp RH
B112	Seat belt buckle switch RH
B121	Bluetooth control unit (Terminal No. 4)
B121	Bluetooth control unit (Terminal No. 20)
B121	Bluetooth control unit (Terminal No. 21) (without navigation)
B121	Bluetooth control unit (Terminal No. 23) (without navigation)
B121	Bluetooth control unit (Terminal No. 27) (with navigation)
B125	Front console antenna
B301	Occupant classification system control unit (Terminal No. 5)

B110 B300

B132
Body ground

D
Next page

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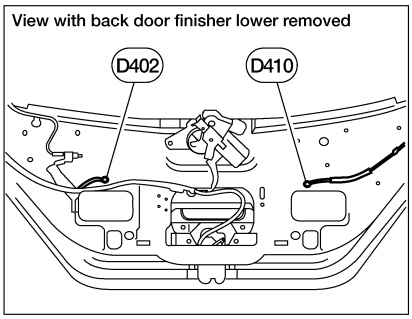
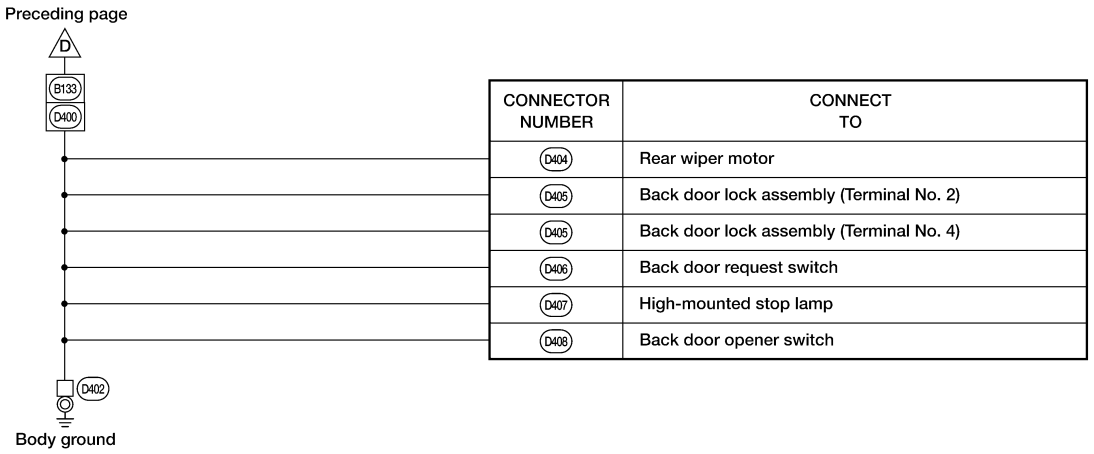
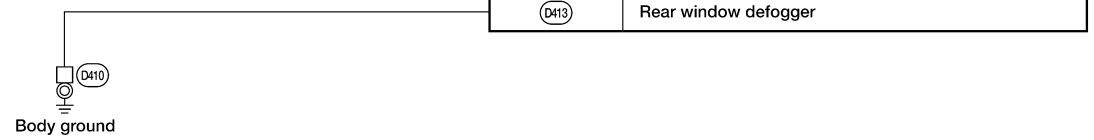




CONNECTOR NUMBER	CONNECT TO
D404	Rear wiper motor
D405	Back door lock assembly (Terminal No. 2)
D405	Back door lock assembly (Terminal No. 4)
D406	Back door request switch
D407	High-mounted stop lamp
D408	Back door opener switch



CONNECTOR NUMBER	CONNECT TO
D413	Rear window defogger

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HARNESS

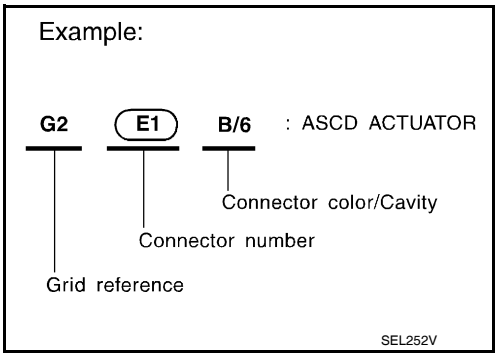
Harness Layout

INFOID:0000000007329548

HOW TO READ HARNESS LAYOUT

The following Harness Layouts use a map style grid to help locate connectors on the drawings:

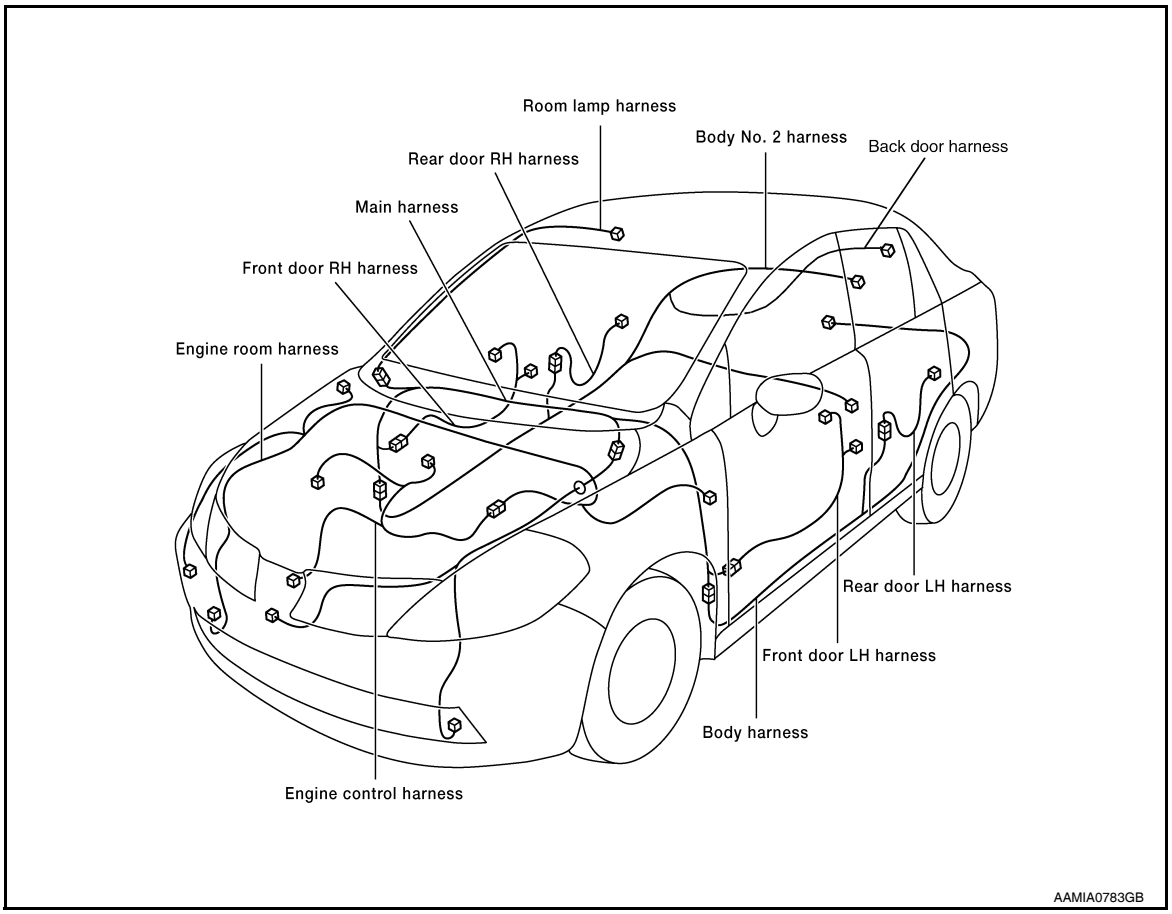
- Main Harness
- Engine Room Harness (LH View)
- Engine Room Harness (RH View)
- Engine Control Harness
- Body Harness
- Body No. 2 Harness
- Room Lamp Harness
- Back Door Harness

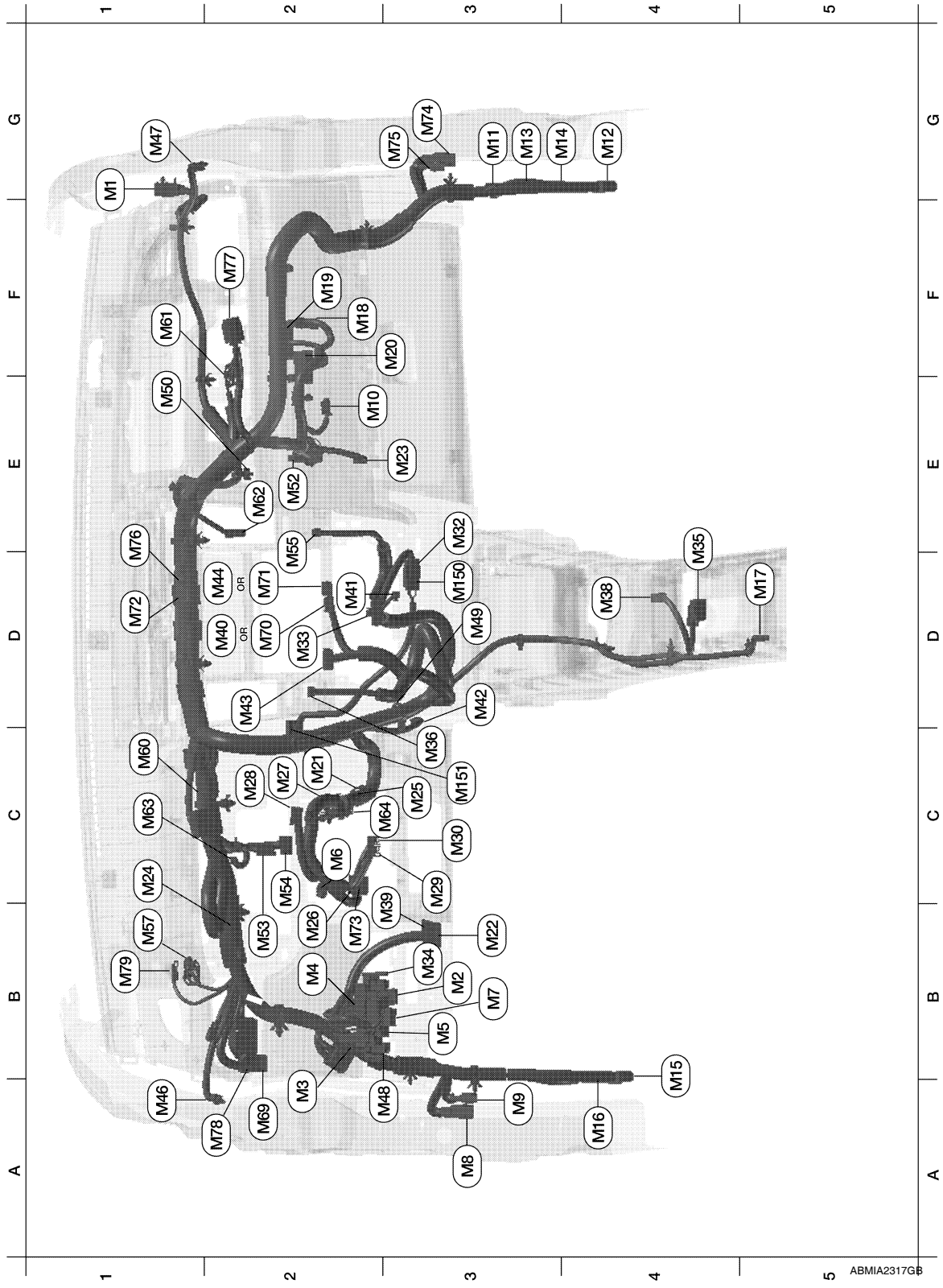


To use the grid reference

1. Find the desired connector number on the connector list.
2. Find the grid reference.
3. On the drawing, find the crossing of the grid reference letter column and number row.
4. Find the connector number in the crossing zone.
5. Follow the line to the connector.

OUTLINE

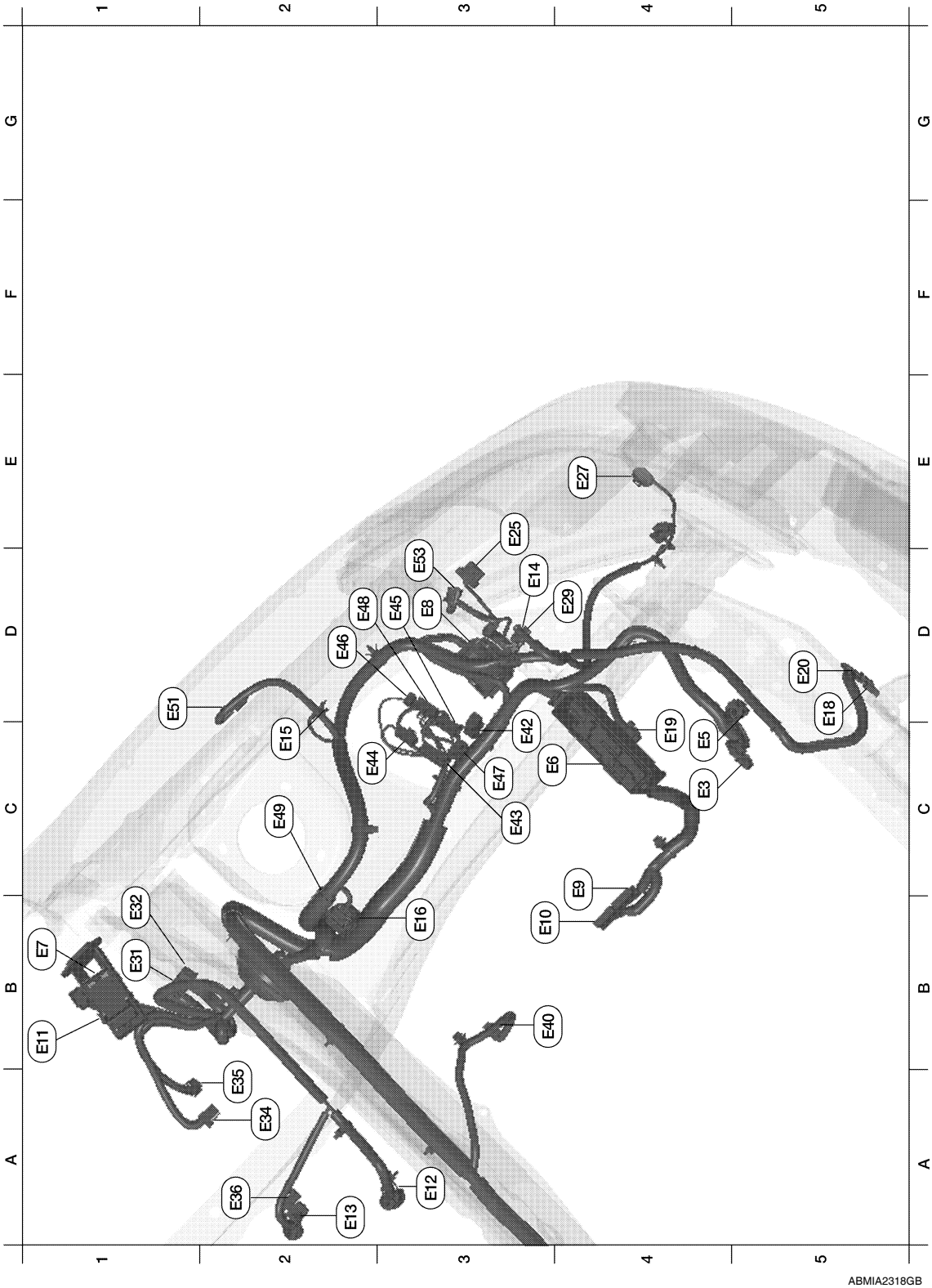




G1	M1	W/16	: To R1	D4	M38	W/8	: CVT shift selector (with Intelligent Key system)
B3	M2	B/5	: Passenger select unlock relay	B3	M39	W/2	: Tire pressure warning check connector
B2	M3	W/1	: Fuse block (J/B)	D2	M40	W/8	: Audio unit
B3	M4	W/1	: Fuse block (J/B)	D2	M41	W/2	: Defrost A/C switch
B3	M5	W/3	: Illumination control switch	D3	M42	W/3	: Thermo control amp.

C2	M6	W/4	: Steering lock solenoid	D2	M43	W/20	: Audio unit
B3	M7	W/16	: Door mirror remote control switch	D2	M44	W/16	: Audio unit
A3	M8	W/16	: To D2	D2	M45	W/12	: Audio unit
A3	M9	W/16	: To D1	A1	M46	BR/2	: Front tweeter LH
E2	M10	GR/2	: Instrument panel antenna	G1	M47	BR/2	: Front tweeter RH
G3	M11	W/4	: To B106	B2	M48	L/4	: Heated mirror relay
G4	M12	W/16	: To B101	D3	M49	W/24	: iPod ® adapter
G3	M13	W/24	: To B102	E1	M50	GR/16	: iPod ® side
G3	M14	W/24	: To B120	E2	M52	W/40	: Intelligent Key unit
B4	M15	W/16	: To B23	B2	M53	W/16	: EPS control unit
B4	M16	W/24	: To B24	B3	M54	B/2	: EPS control unit
D5	M17	B/1	: Parking brake switch	D2	M55	W/4	: Hazard switch
F2	M18	W/40	: BCM (body control module)	B2	M57	—	: Body ground
F2	M19	W/15	: BCM (body control module)	C1	M60	L/2	: EPS control unit
F3	M20	B/15	: BCM (body control module)	F1	M61	—	: Body ground
C2	M21	W/4	: NATS antenna amp.	E2	M62	W/2	: Front blower motor
B3	M22	W/16	: Data link connector	C1	M63	W/4	: Torque sensor
E3	M23	W/4	: Remote keyless entry receiver	C3	M64	W/8	: Steering angle sensor
C1	M24	W/40	: Combination meter	A2	M69	SMJ	: To E7
C3	M25	/2	: Diode-1	D2	M70	W/24	: AV control unit
B2	M26	W/6	: Ignition switch	D2	M71	W/9	: AV control unit
C2	M27	GR/6	: Key switch and key lock solenoid	D1	M72	B/5	: USB interface and aux jack
C2	M28	W/16	: Combination switch	B2	M73	GR/6	: Key switch and ignition knob switch
C3	M29	Y/6	: Combination switch	G3	M74	W/12	: To D102
C3	M30	GR/8	: Combination switch	G3	M75	W/12	: To D101
E3	M32	W/4	: To M150	E1	M76	B/4	: USB interface and aux jack
D2	M33	B/15	: Front air control	F2	M77	Y/4	: Front passenger air bag module
B3	M34	GR/6	: VDC OFF switch	A2	M78	B/2	: To E11
D4	M35	Y/28	: Air bag diagnosis sensor unit	B1	M79	—	: Body ground
C3	M36	W/3	: Front passenger air bag OFF indicator	D3	M150	W/4	: To M32
D4	M38	W/6	: A/T shift selector (with A/T)	C3	M151	W/4	: Front blower motor resistor
D4	M38	W/6	: CVT shift selector (without Intelligent Key system)				

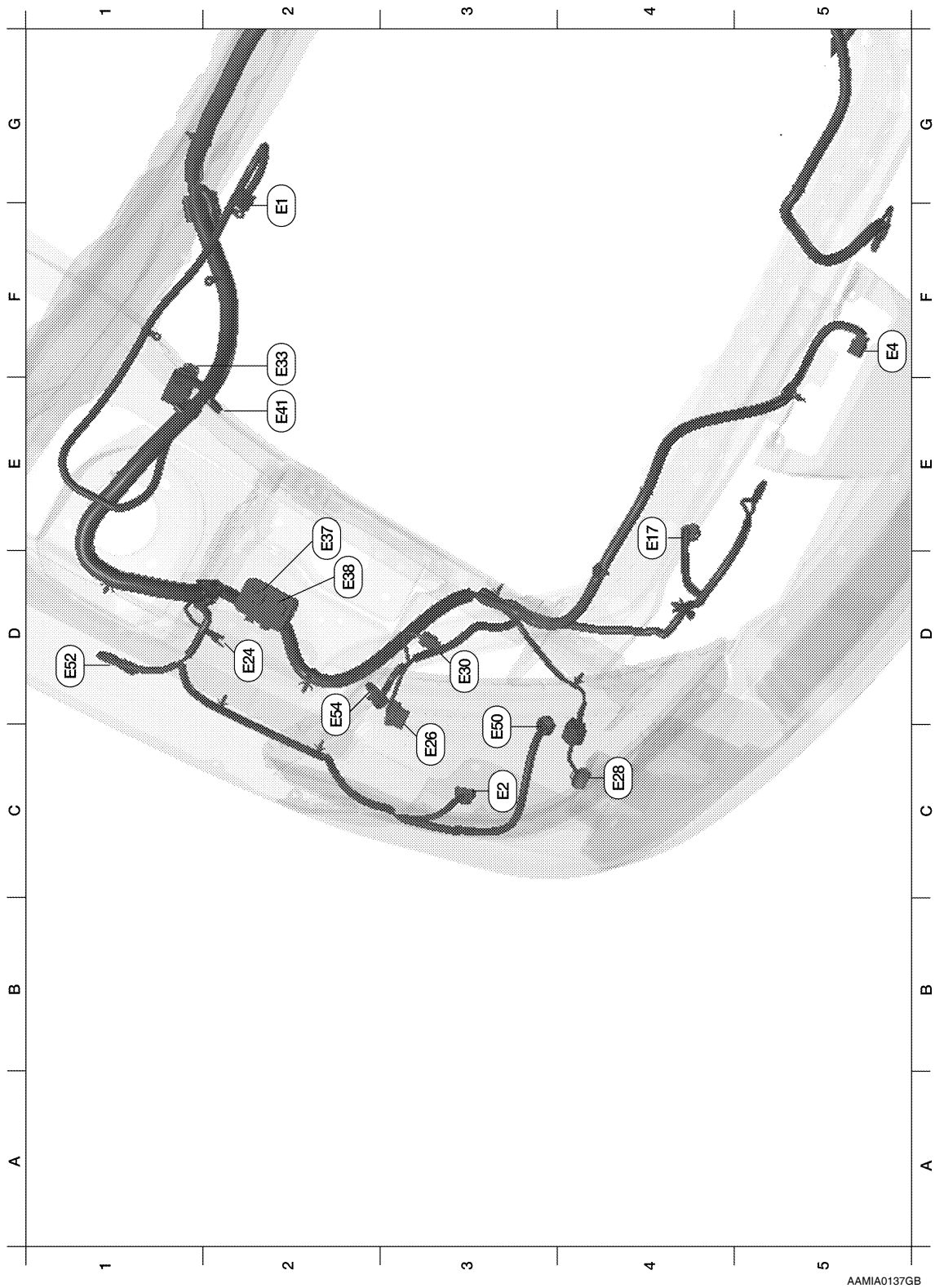
ENGINE ROOM HARNESS (LH VIEW)



Refer to "ENGINE ROOM HARNESS (RH VIEW)" for continuation of engine room harness.

C4	E3	GR/4	: Cooling fan motor (without A/C)	E4	E27	B/2	: Front fog lamp LH
C4	E3	B/2	: Cooling fan motor (with A/C)	D4	E29	B/2	: Front combination lamp LH
C4	E5	GR/3	: Resistor	B1	E31	W/24	: TCM
C3	E6	—	: Fuse and fusible link box	B1	E32	GR/24	: TCM
B1	E7	SMJ	: To M69	A2	E34	BR/2	: Clutch interlock switch

D3	E8	SMJ	: To F8	A2	E35	BR/2	: ASCD clutch switch
B4	E9	BR/2	: Fusible link box (battery)	A2	E36	BR/2	: ASCD brake switch
B3	E10	GR/2	: Fusible link box (battery)	B4	E40	GR/2	: Brake fluid level switch
B1	E11	B/2	: To M78	D3	E42	B/2	: IPDM E/R (intelligent power distribution module engine room)
A3	E12	B/6	: Accelerator pedal position sensor	C3	E43	W/16	: IPDM E/R (intelligent power distribution module engine room)
A2	E13	B/2	: Stop lamp switch (with M/T)	C3	E44	W/6	: IPDM E/R (intelligent power distribution module engine room)
A2	E13	W/4	: Stop lamp switch (without M/T)	D3	E45	BR/12	: IPDM E/R (intelligent power distribution module engine room)
D3	E14	—	: Body ground	D2	E46	W/12	: IPDM E/R (intelligent power distribution module engine room)
C2	E15	—	: Body ground	C3	E47	BR/8	: IPDM E/R (intelligent power distribution module engine room)
B2	E16	B/32	: ECM	D3	E48	B/6	: IPDM E/R (intelligent power distribution module engine room)
C5	E18	B/1	: Horn	C2	E49	GR/2	: Dropping resistor
C4	E19	GR/6	: To F33	D1	E51	B/2	: Front wheel sensor LH
D5	E20	B/1	: Horn	D3	E53	B/2	: Front combination lamp LH
D3	E25	B/3	: Front combination lamp LH				

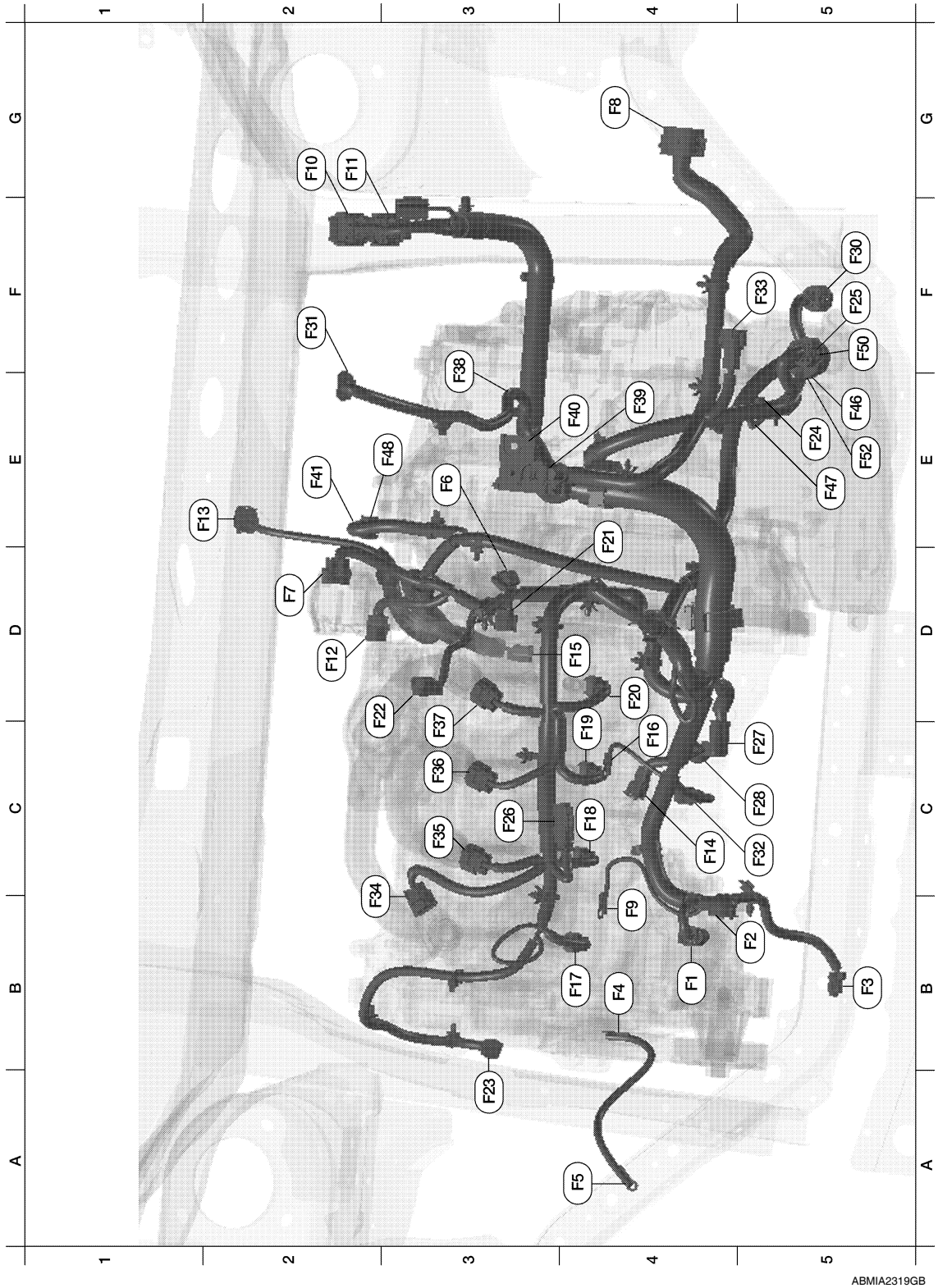


Refer to "ENGINE ROOM HARNESS (LH VIEW)" for continuation of engine room harness.

G2	E1	GR/5	: Front wiper motor	F2	E33	B/26	: ABS actuator and electric unit (control unit)
C3	E2	B/2	: Front and rear washer motor	E2	E37	B/5	: Daytime light relay 1
F5	E4	Y/2	: Crash zone sensor	D2	E38	L/5	: Daytime light relay 2
E4	E17	B/3	: Refrigerant pressure sensor	E2	E41	—	: Ground (ABS)
D2	E24	—	: Engine ground	C3	E50	W/2	: Washer fluid level switch

C3	E26	B/3	: Front combination lamp RH	D1	E52	B/2	: Front wheel sensor RH
C4	E28	B/2	: Front fog lamp RH	D2	E54	B/2	: Front combination lamp RH
D3	E30	B/2	: Front combination lamp RH				

ENGINE CONTROL HARNESS

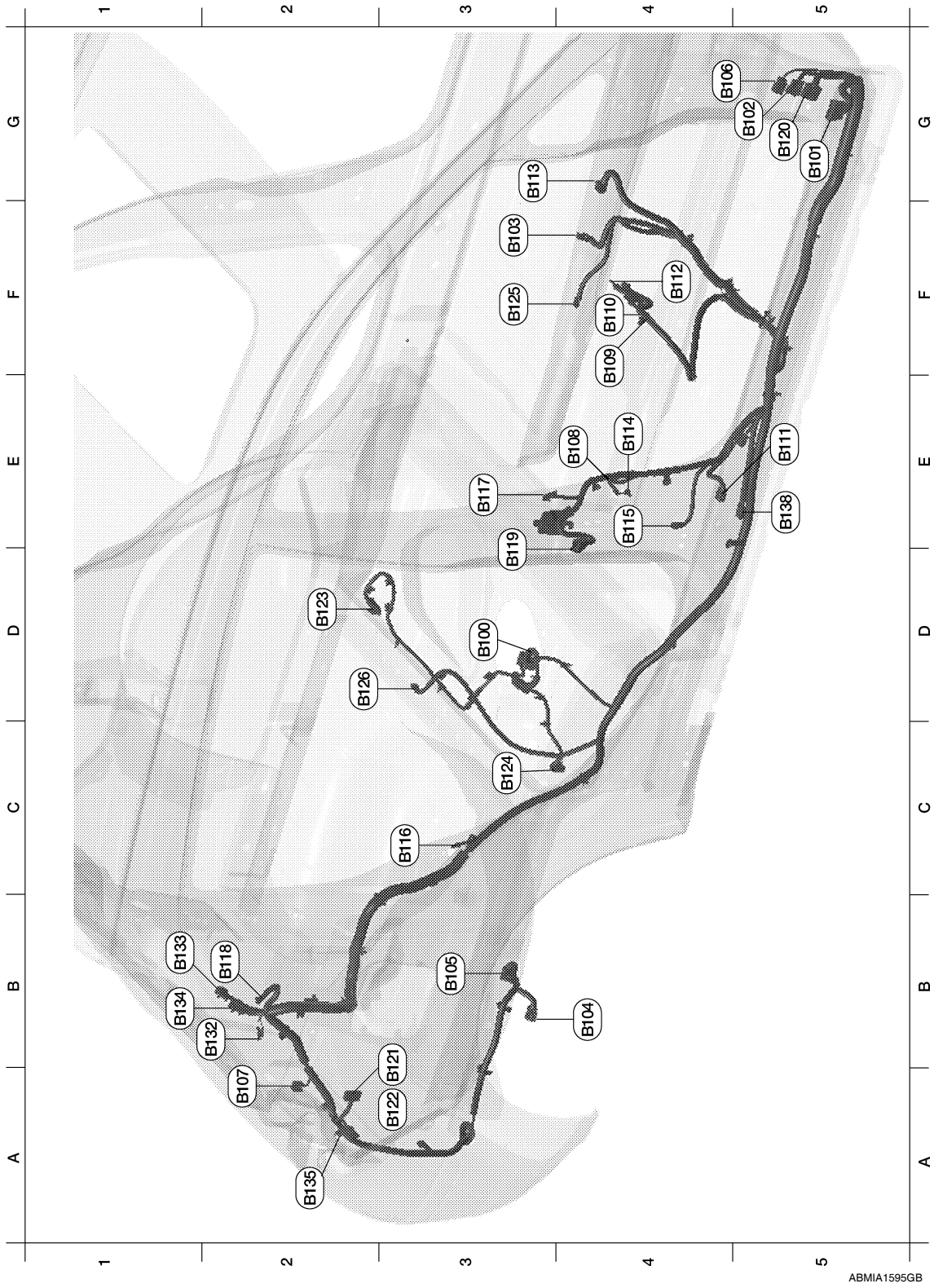


B4	F1	B/3	: Generator	E5	F24	G/3	: Park/neutral position (PNP) switch (with M/T)
B5	F2	—	: Generator	F5	F25	B/10	: Transmission range switch (with A/T)
B5	F3	B/1	: A/C compressor	C3	F26	W/2	: Condenser-2
B4	F4	—	: Generator	C5	F27	—	: Starter motor
A4	F5	—	: Body ground	C5	F28	—	: Starter motor
E3	F6	GR/2	: Engine coolant temperature sensor	F5	F30	B/8	: Terminal cord assembly
D2	F7	B/6	: Electric throttle control actuator	F2	F31	B/6	: Mass air flow sensor
G4	F8	SMJ	: To E8	C5	F32	GR/1	: Oil pressure switch
B4	F9	—	: Engine ground	F5	F33	GR/6	: To E19
G2	F10	GR/32	: ECM	C3	F34	GR/3	: Ignition coil No. 1 (with power transistor)
G2	F11	BR/48	: ECM	C3	F35	GR/3	: Ignition coil No. 2 (with power transistor)
D3	F12	GR/4	: Air fuel ratio (A/F) sensor 1	C3	F36	GR/3	: Ignition coil No. 3 (with power transistor)
E2	F13	B/4	: Heated oxygen sensor 2	C3	F37	GR/3	: Ignition coil No. 4 (with power transistor)
C4	F14	B/2	: Knock sensor	E3	F38	BR/3	: Output Speed sensor
D3	F15	B/3	: Crankshaft position sensor (POS)	E4	F39	—	: Fusible link box (battery)
C4	F16	—	: Engine ground	E4	F40	—	: Fusible link box (battery)
B4	F17	GR/2	: Fuel injector No. 1	E2	F41	GR/2	: Vehicle speed sensor
C4	F18	GR/2	: Fuel injector No. 2	E5	F46	GR/22	: CVT unit
C4	F19	GR/2	: Fuel injector No. 3	E5	F47	B/3	: Input speed sensor
D4	F20	GR/2	: Fuel injector No. 4	E3	F48	B/3	: Secondary speed sensor (with M/T)
D4	F21	B/3	: Camshaft position sensor (PHASE)	E5	F50	B/3	: Primary speed sensor
C3	F22	L/2	: EVAP canister purge volume control solenoid valve	E5	F52	G/8	: Transmission range switch (with CVT)
B3	F23	G/2	: Intake valve timing control solenoid valve				

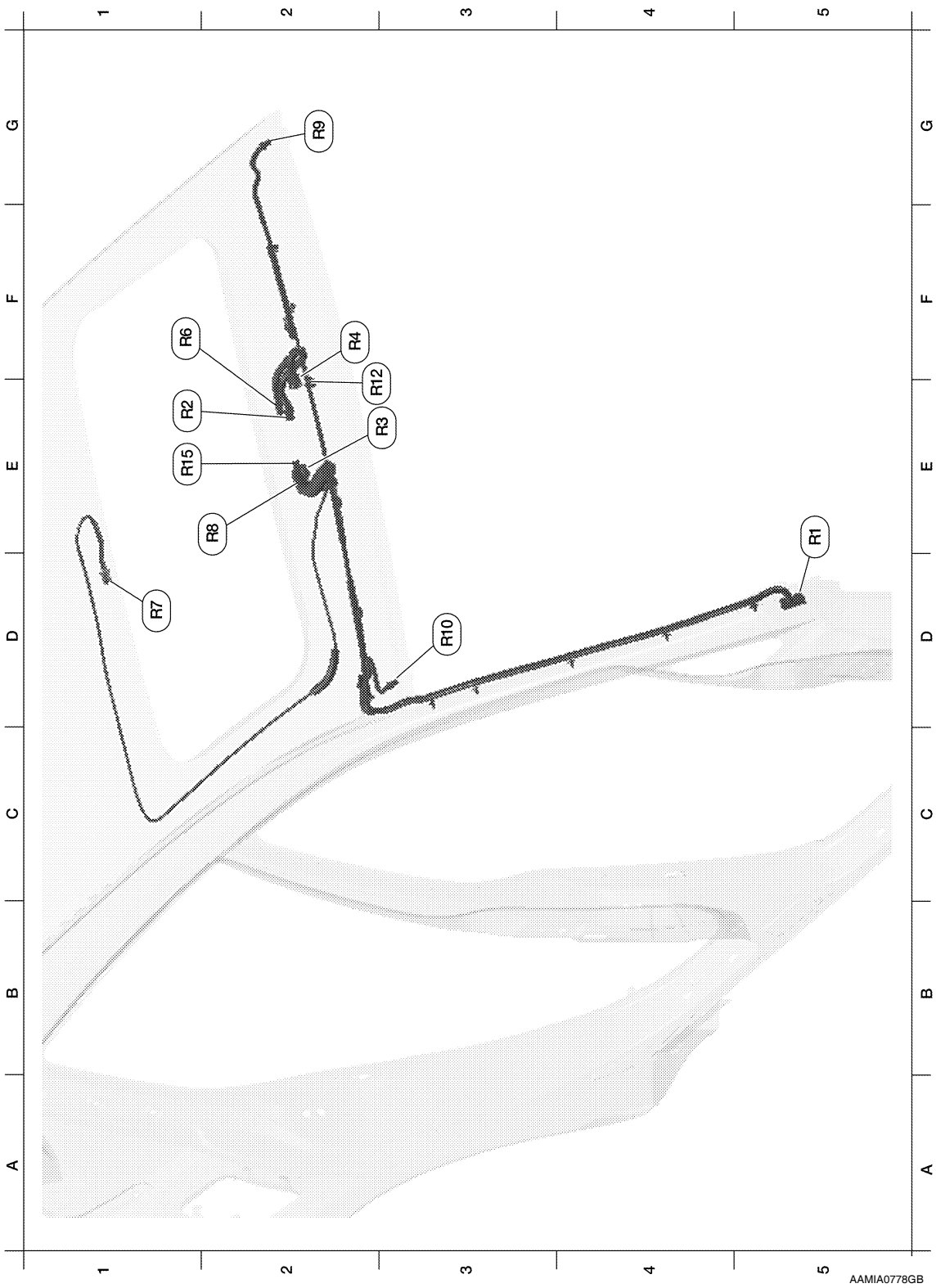
G4	B2	GR/2	: Rear bumper antenna	C4	B14	Y/2	: Front LH seat belt pre-tensioner
B4	B3	B/4	: Yaw rate/ side/ decel G sensor	C5	B15	Y/2	: LH side air bag (satellite) sensor
C4	B4	W/8	: To D201	G4	B16	BR/2	: License plate lamp LH
C4	B5	—	: Body ground	G4	B17	BR/2	: License plate lamp RH
E4	B6	W/1	: Rear door switch LH	F3	B19	—	: Body ground

C4	B7	—	: Body ground	F3	B21	W/2	: Luggage room lamp
C4	B8	W/3	: Front door switch LH	A4	B23	W/16	: To M15
C4	B9	Y/12	: Air bag diagnosis sensor unit	A4	B24	W/24	: To M16
C4	B10	Y/2	: Front LH side air bag module	F3	B25	BR/6	: Rear combination lamp LH
B4	B13	W/4	: Seat belt buckle switch LH	F3	B26	Y/2	: LH side curtain air bag module

BODY NO. 2 HARNESS



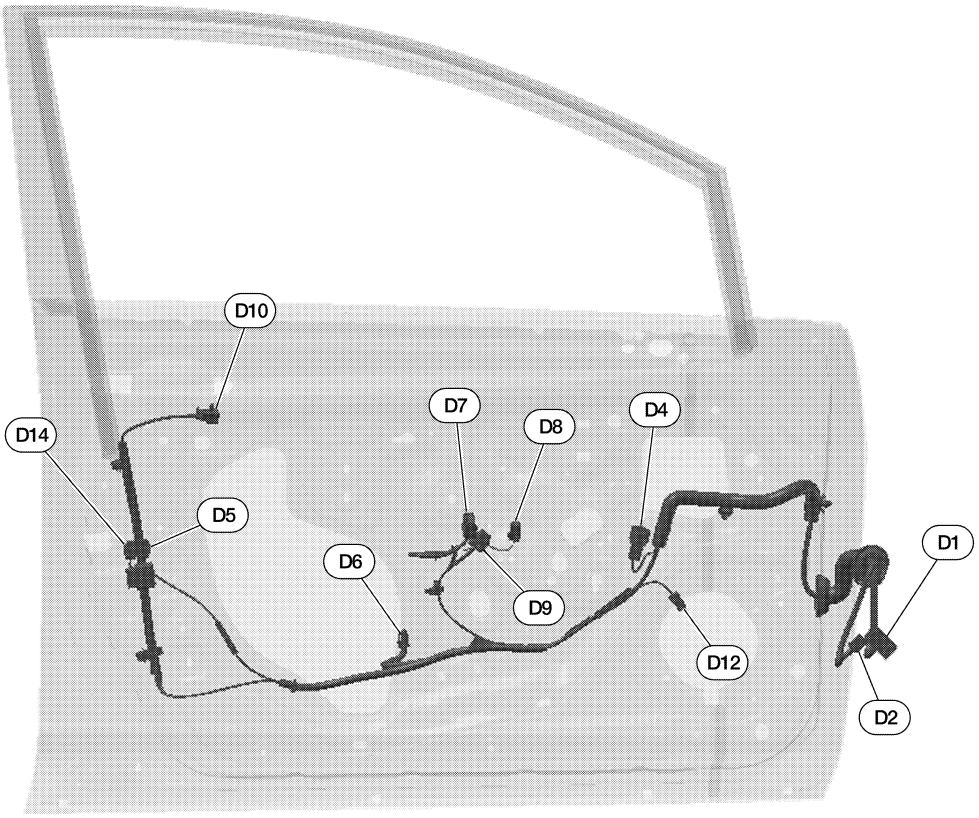
D3	B100	GR/5	: Fuel level sensor unit and fuel pump	C3	B116	W/1	: Rear door switch RH
G5	B101	W/16	: To M12	E3	B117	—	: Body ground
G5	B102	W/24	: To M13	B2	B118	Y/2	: RH side curtain air bag module
F3	B103	B/2	: Console power socket	D3	B119	W/8	: To D301
A4	B104	GR/3	: EVAP control system pressure sensor	G5	B120	W/24	: To M14
B3	B105	B/2	: EVAP canister vent control valve	A3	B121	W/32	: Bluetooth control unit
G5	B106	W/4	: To M11	A3	B122	GR/1	: Bluetooth control unit
A2	B107	BR/6	: Rear combination lamp RH	D2	B123	B/2	: Rear wheel sensor LH
E4	B108	W/3	: Front door switch RH	C3	B124	B/2	: Rear wheel sensor RH
F4	B109	Y/2	: Front RH side air bag module	F3	B125	GR/2	: Front console antenna
F4	B110	W/8	: To B300	C3	B126	GR/2	: Rear floor antenna
E5	B111	Y/2	: RH side air bag (satellite) sensor	A2	B132	—	: Body ground
F4	B112	W/4	: Seat belt buckle switch RH	B2	B133	W/2	: To D400
F3	B113	Y/12	: Air bag diagnosis sensor unit	B2	B134	W/12	: To D401
E4	B114	—	: Body ground	A2	B135	W/8	: Bluetooth control unit
E4	B115	Y/2	: Front RH seat belt pre-tensioner	E5	B138	B/3	: Belt tension sensor



D5	R1	W/16	: To M1	E2	R8	W/3	: To R50 (without map lamps)
F2	R2	GR/4	: Map lamp	G2	R9	W/2	: Vanity mirror lamp LH
E3	R3	W/3	: Map lamp	D3	R10	W/2	: Vanity mirror lamp RH
F2	R4	GR/10	: Sunroof motor assembly	E2	R12	B/7	: Auto anti-dazzling inside mirror

F2	R6	W/3	: Sunroof switch	E1	R15	W/4	: Microphone
D1	R7	W/3	: Interior room lamp				

FRONT DOOR LH HARNESS



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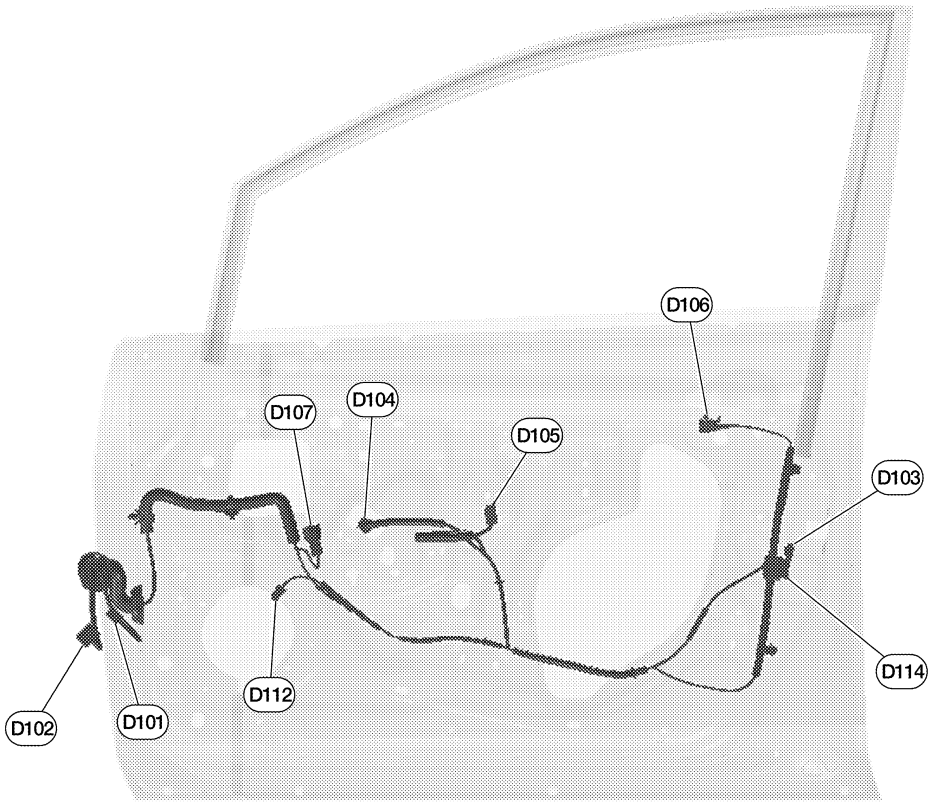
D1	W/16	: To M9	D8	W/3	: Main power window and door lock/unlock switch
D2	W/16	: To M8	D9	B/6	: Front power window motor LH
D4	BR/8	: Door mirror LH	D10	GR/2	: Front outside antenna LH
D5	GR/2	: Front door request switch LH	D12	W/2	: Front door speaker LH
D6	BR/2	: Intelligent Key warning buzzer	D14	GR/6	: Front door lock assembly LH
D7	W/16	: Main power window and door lock/unlock switch			

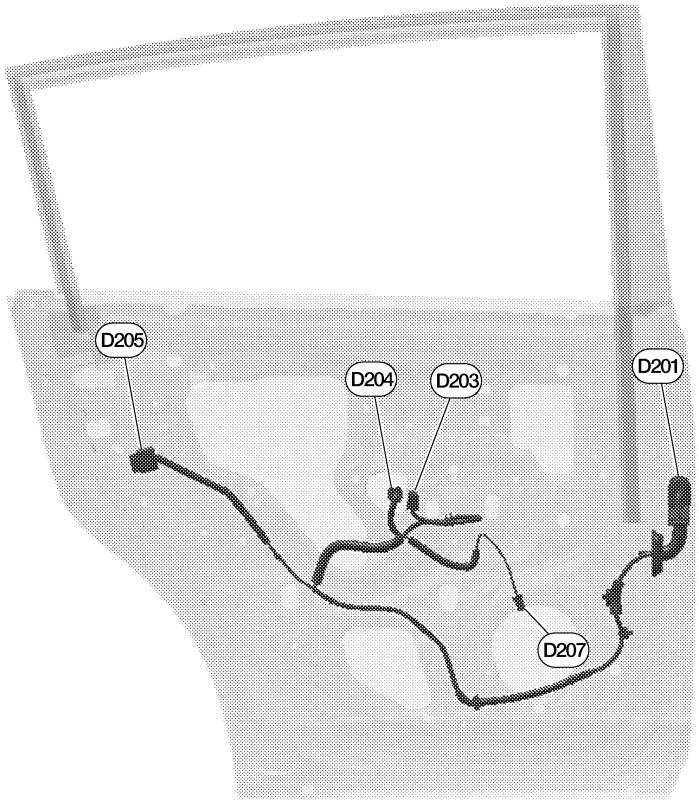
FRONT DOOR RH HARNESS



LKIA0822E

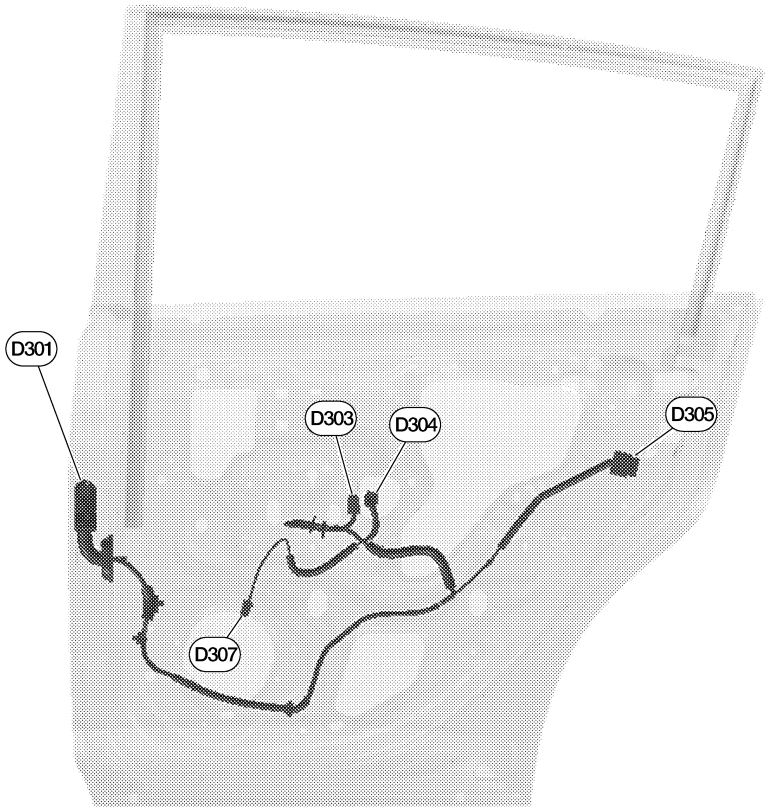
D101	W/12	: To M75	D106	GR/2	: Front outside antenna RH
D102	W/12	: To M74	D107	BR/8	: Door mirror RH
D103	GR/2	: Front door request switch RH	D112	W/2	: Front door speaker RH
D104	BR/2	: Front power window motor RH	D114	GR/6	: Front door lock assembly RH
D105	W/12	: Power window and door lock/unlock switch RH			

REAR DOOR LH HARNESS



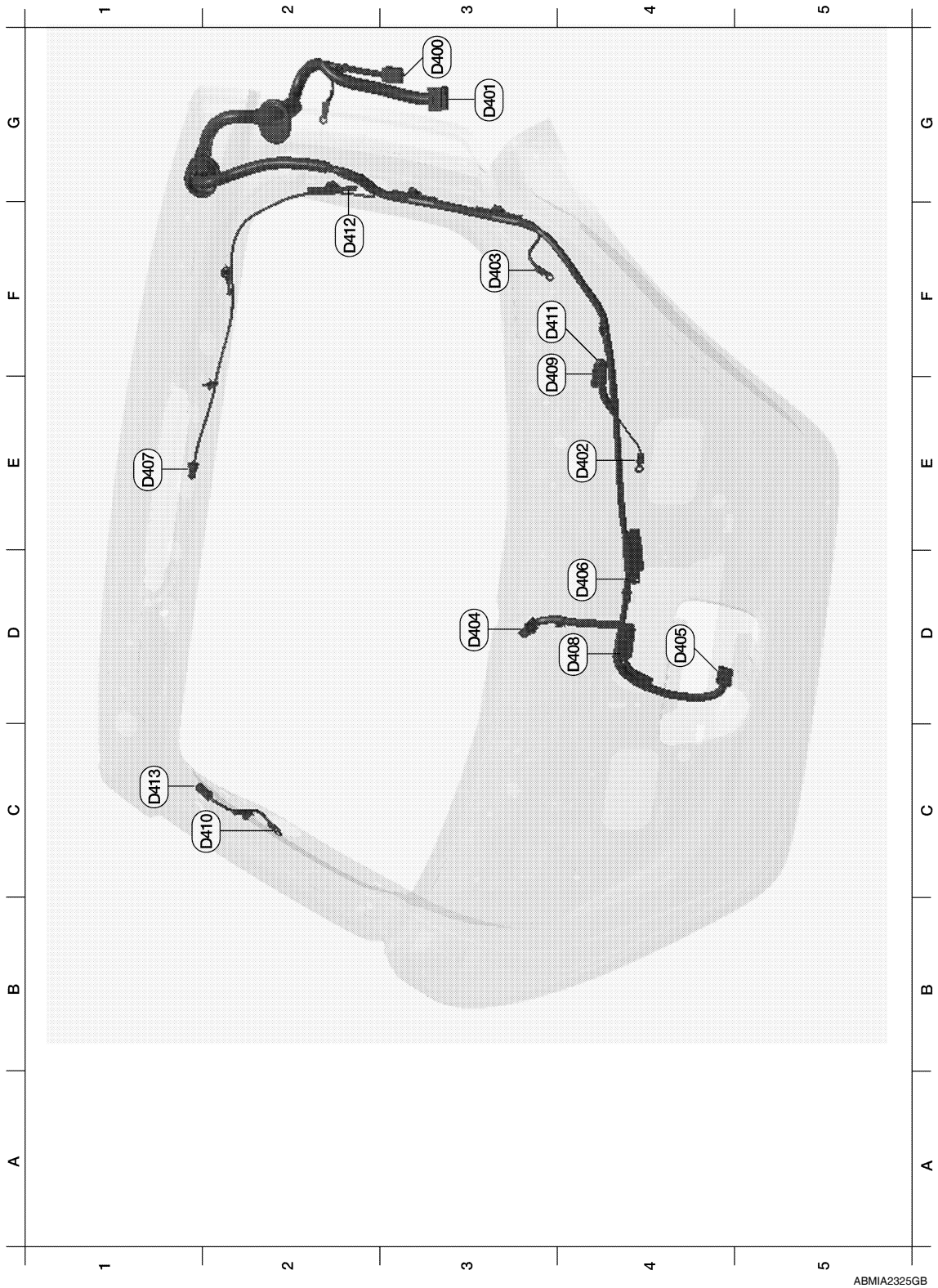
LKIA0824E

D201	W/8	: To B4	D205	B/6	: Rear door lock actuator LH
D203	W/8	: Rear power window switch LH	D207	W/2	: Rear door speaker LH
D204	BR/2	: Rear power window motor LH			



LKIA0823E

D301	W/8	: To B119	D305	B/6	: Rear door lock actuator RH
D303	W/8	: Rear power window switch RH	D307	W/2	: Rear door speaker RH
D304	BR/2	: Rear power window motor RH			



G3	D400	W/2	: To B133	D4	D408	BR/2	: Back door opener switch
G3	D401	W/12	: To B134	E4	D409	B/1	: Condenser-1
E4	D402	—	: Body ground	C2	D410	—	: Body ground
D3	D404	W/3	: Rear wiper motor	E3	D411	B/1	: Condenser-1
D4	D405	W/4	: Back door lock assembly	E1	D412	B/1	: Rear window defogger

D4	D406	W/2	: Back door request switch	C2	D413	B/1	: Rear window defogger (-)
E2	D407	W/2	: High mounted stop lamp				

Wiring Diagram Codes (Cell Codes)

INFOID:0000000007329549

Use the chart below to find out what each wiring diagram code stands for.
Refer to the wiring diagram code in the alphabetical index to find the location (page number) of each wiring diagram.

Code	Section	Wiring Diagram Name
A/C,M	MTC	Manual Air Conditioner
APPS1	EC	Accelerator Pedal Position Sensor
A/F	EC	Air Fuel Ratio Sensor 1
A/FH	EC	Air Fuel Ratio Sensor 1 Heater
APPS2	EC	Accelerator Pedal Position Sensor
APPS3	EC	Accelerator Pedal Position Sensor
ASC/BS	EC	ASCD Brake Switch
ASC/SW	EC	ASCD Steering Switch
ASCBOF	EC	ASCD Brake Switch
ASCIND	EC	ASCD Indicator
AT/IND	DI	A/T Indicator Lamp
AUDIO	AV	Audio
BACK/L	LT	Back-up Lamp
BA/FTS	AT	A/T Fluid Temperature Sensor and TCM Power Supply
B/DOOR	BL	Back Door Opener
BRK/SW	EC	Brake Switch
CAN	AT	CAN Communication Line
CAN	CVT	CAN Communication Line
CAN	EC	CAN Communication Line
CAN	LAN	CAN System
CHARGE	SC	Charging System
CHIME	DI	Warning Chime
COOL/F	EC	Cooling Fan Control
COMBSW	LT	Combination Switch
COMM	AV	Audio Visual Communication System
CVTIND	DI	CVT Indicator Lamp
D/LOCK	BL	Power Door Lock
DEF	GW	Rear Window Defogger
DTRL	LT	Headlamp - With Daytime Light System
ECTS	EC	Engine Coolant Temperature Sensor
ENGSS	AT	Engine Speed Signal
EPS	STC	Electronic Controlled Power Steering
ETC1	EC	Electric Throttle Control Function
ETC2	EC	Throttle Control Motor Relay
ETC3	EC	Throttle Control Motor
F/FOG	LT	Front Fog Lamp
F/PUMP	EC	Fuel Pump
FTS	AT	A/T Fluid Temperature Sensor
FTS	CVT	CVT Fluid Temperature Sensor Circuit
FTTS	EC	Fuel Tank Temperature Sensor
FUEL	EC	Fuel Ignition System Function
HEATER	MTC	Heater System
H/LAMP	LT	Headlamp

H/PHON	AV	Hands Free Telephone
HORN	WW	Horn
HO2S2	EC	Heated Oxygen Sensor 2
HO2S2H	EC	Heated Oxygen Sensor 2 Heater
IATS	EC	Intake Air Temperature Sensor
IGNSYS	EC	Ignition System
I/KEY	BL	Intelligent Key System
ILL	LT	Illumination
INJECT	EC	Injector
INT/L	LT	Room/Map, Vanity and Luggage Lamps
IVC	EC	Intake Valve Timing Control Solenoid Valve
KEYLES	BL	Remote Keyless Entry System
KS	EC	Knock Sensor
LPSV	AT	Line Pressure Solenoid Valve
LPSV	CVT	Line Pressure Solenoid Valve
L/USSV	CVT	Lock-up Select Solenoid Valve
MAFS	EC	Mass Air Flow Sensor
MAIN	AT	Main Power Supply and Ground Circuit
MAIN	EC	Main Power Supply and Ground Circuit
METER	DI	Speedometer, Tachometer, Temp. and Fuel Gauges
MIL/DL	EC	Malfunction Indicator Lamp
MIRROR	GW	Door Mirror
NATS	BL	Nissan Anti-Theft System
NONDTC	AT	Non-detectable Item
NONDTC	CVT	Non-detectable Item
ODSW	CVT	Overdrive Control Switch
OVRCSV	AT	Over Run Clutch Solenoid Valve
P/SCKT	WW	Power Socket
PGC/V	EC	EVAP Canister Purge Volume Control Solenoid Valve
PHASE	EC	Camshaft Position Sensor (PHASE)
PNP/SW	EC	Park/Neutral Position Switch
POS	EC	Crankshaft Position Sensor (POS)
POWER	CVT	Transmission Control Module (Power Supply)
PRE/SE	EC	EVAP Control System Pressure Sensor
PRIPS	CVT	Primary Pressure Sensor
PRSCVT	CVT	Primary Speed Sensor CVT (Input Speed Sensor)
PT/SEN	AT	Powertrain Revolution Sensor
RP/SEN	EC	Refrigerant Pressure Sensor
SECPS	CVT	Secondary Pressure Sensor
SECPSV	CVT	Secondary Speed Sensor CVT (Input Speed Sensor)
SEN/PW	EC	Sensor Power Supply
SESCVT	CVT	Secondary Pressure Sensor Solenoid Valve
SHIFT	AT	A/T Shift Lock System
SHIFT	CVT	CVT Shift Lock System
SROOF	RF	Sunroof
SRS	SRS	Supplemental Restraint System
SSV/A	AT	Shift Solenoid Valve A
SSV/B	AT	Shift Solenoid Valve B
START	SC	Starting System
STM	CVT	Step Motor
STOP/L	LT	Stop Lamp
TCV	AT	Torque Converter Clutch Solenoid Valve

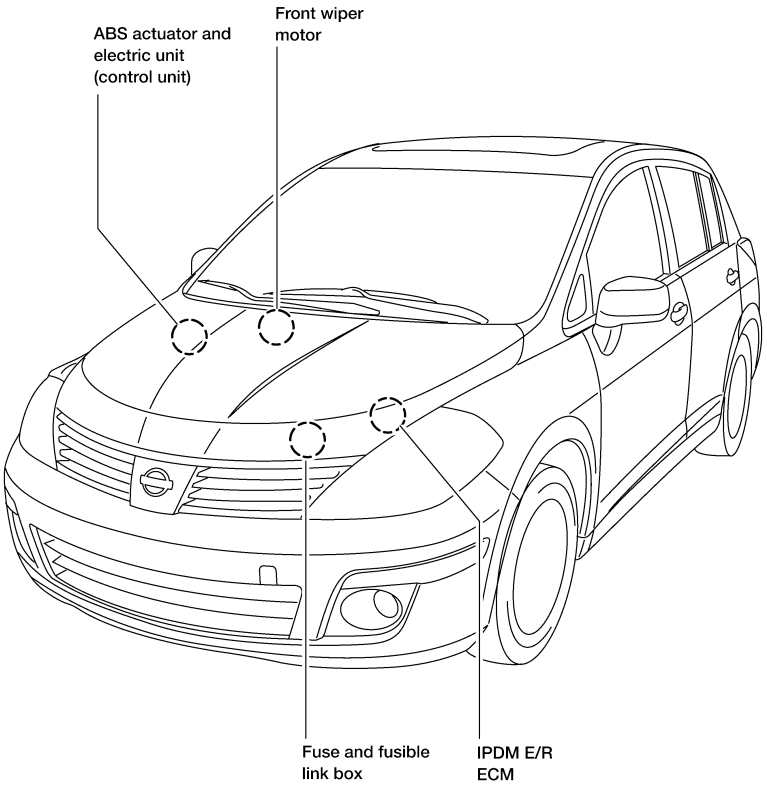
TCV	CVT	Torque Converter Clutch Solenoid Valve
T/LID	BL	Trunk Lid Opener
T/WARN	WT	Low Tire Pressure Warning System
TAIL/L	LT	Parking, License and Tail Lamps
TPS1	EC	Throttle Position Sensor
TPS2	EC	Throttle Position Sensor
TPS3	EC	Throttle Position Sensor
TR/SW	AT	Transmission Range Switch
TR/SW	CVT	Transmission Range Switch
TURN	LT	Turn Signal and Hazard Warning Lamps
VDC	BRC	Vehicle Dynamic Control System
VEHSEC	BL	Vehicle Security (Theft Warning) System
VENT/V	EC	EVAP Canister Vent Control Valve
VSSA/T	AT	Vehicle Speed Sensor A/T (Input Speed Sensor)
VSSMTR	AT	Vehicle Speed Sensor MTR
WARN	DI	Warning Lamps
WINDOW	GW	Power Window
WIP/R	WW	Rear Wiper and Washer
WIPER	WW	Front Wiper and Washer

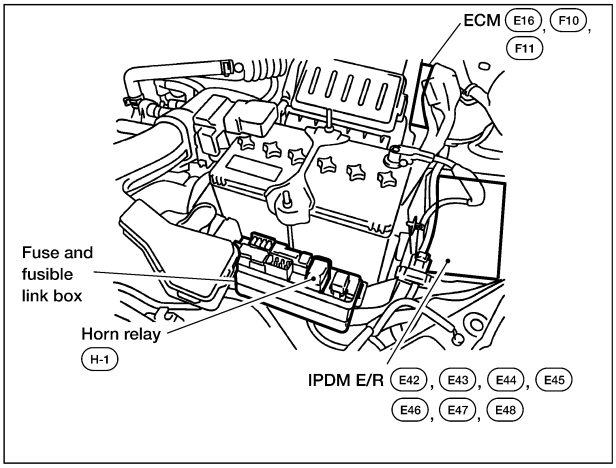
ELECTRICAL UNITS LOCATION

Electrical Units Location

INFOID:0000000007329550

ENGINE COMPARTMENT





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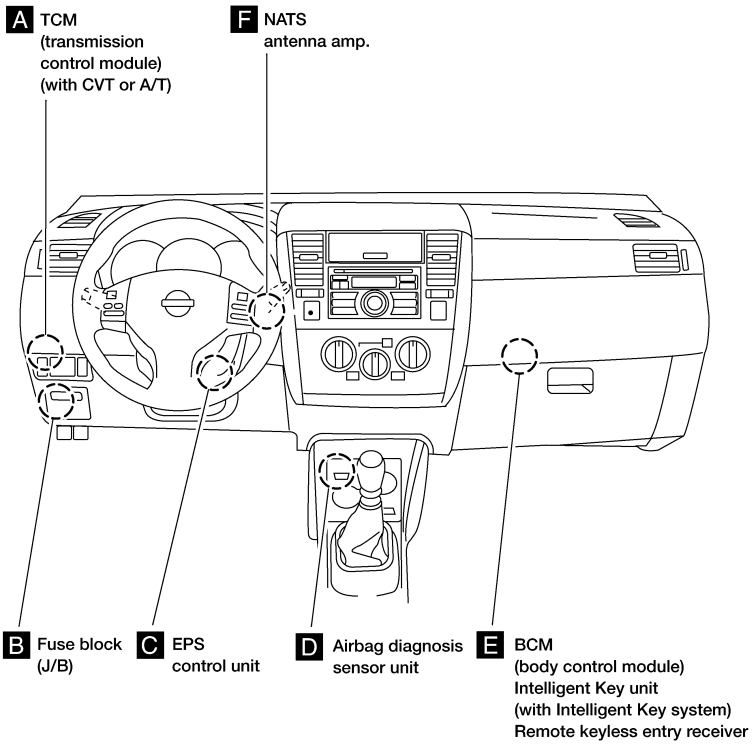

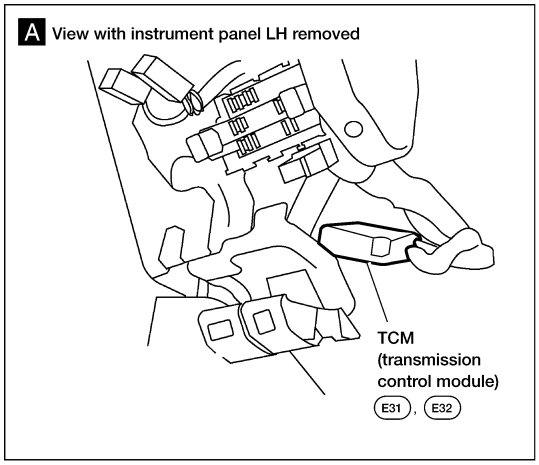

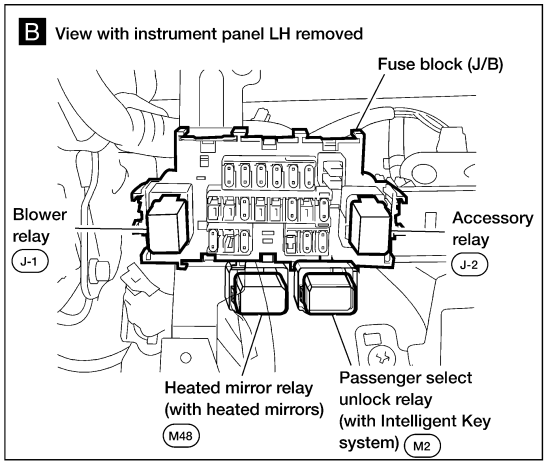

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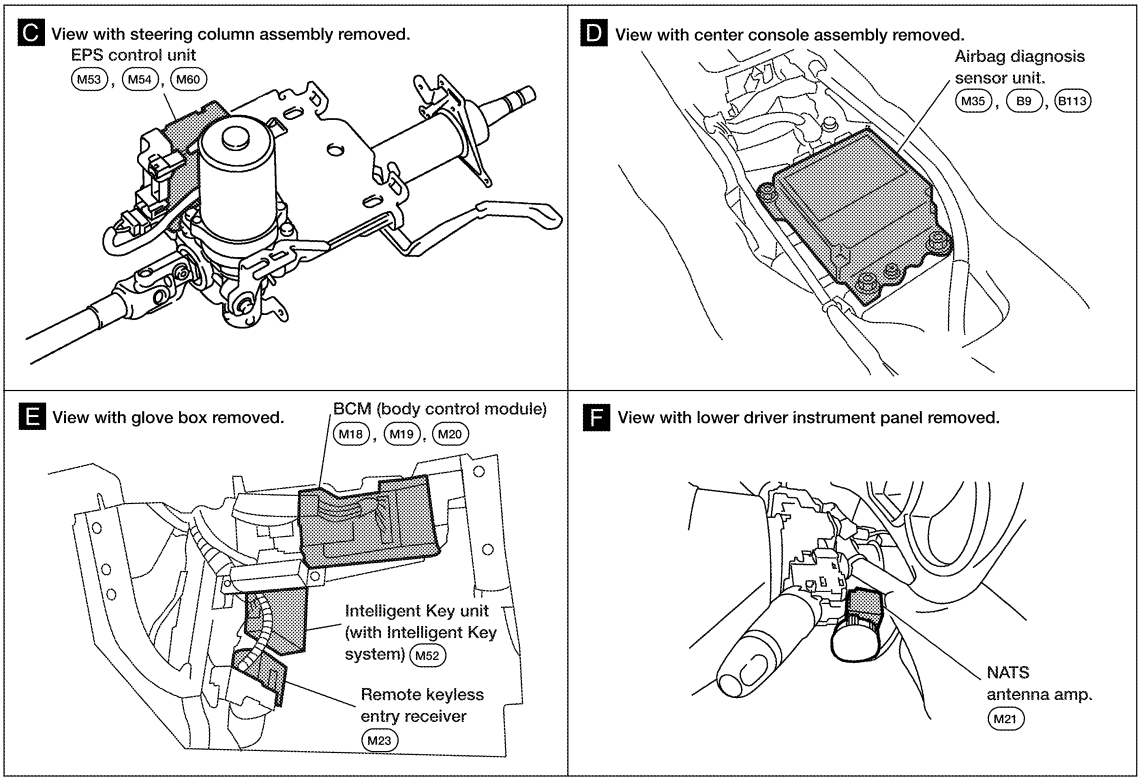

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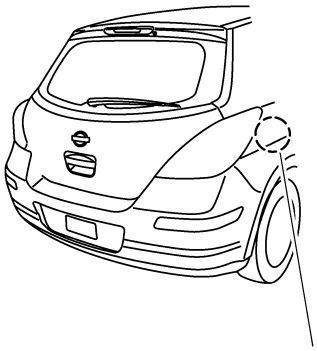

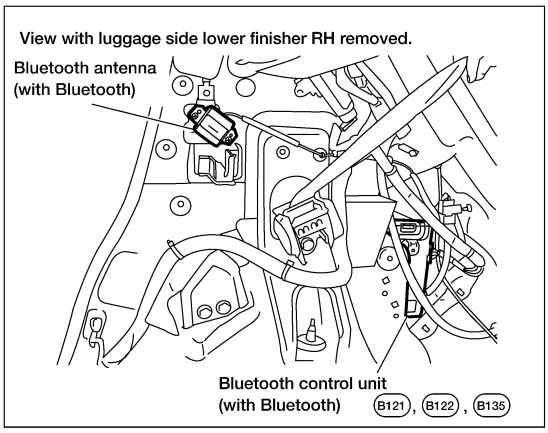

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HARNESS CONNECTOR

Description

INFOID:0000000007329551

HARNESS CONNECTOR (TAB-LOCKING TYPE)

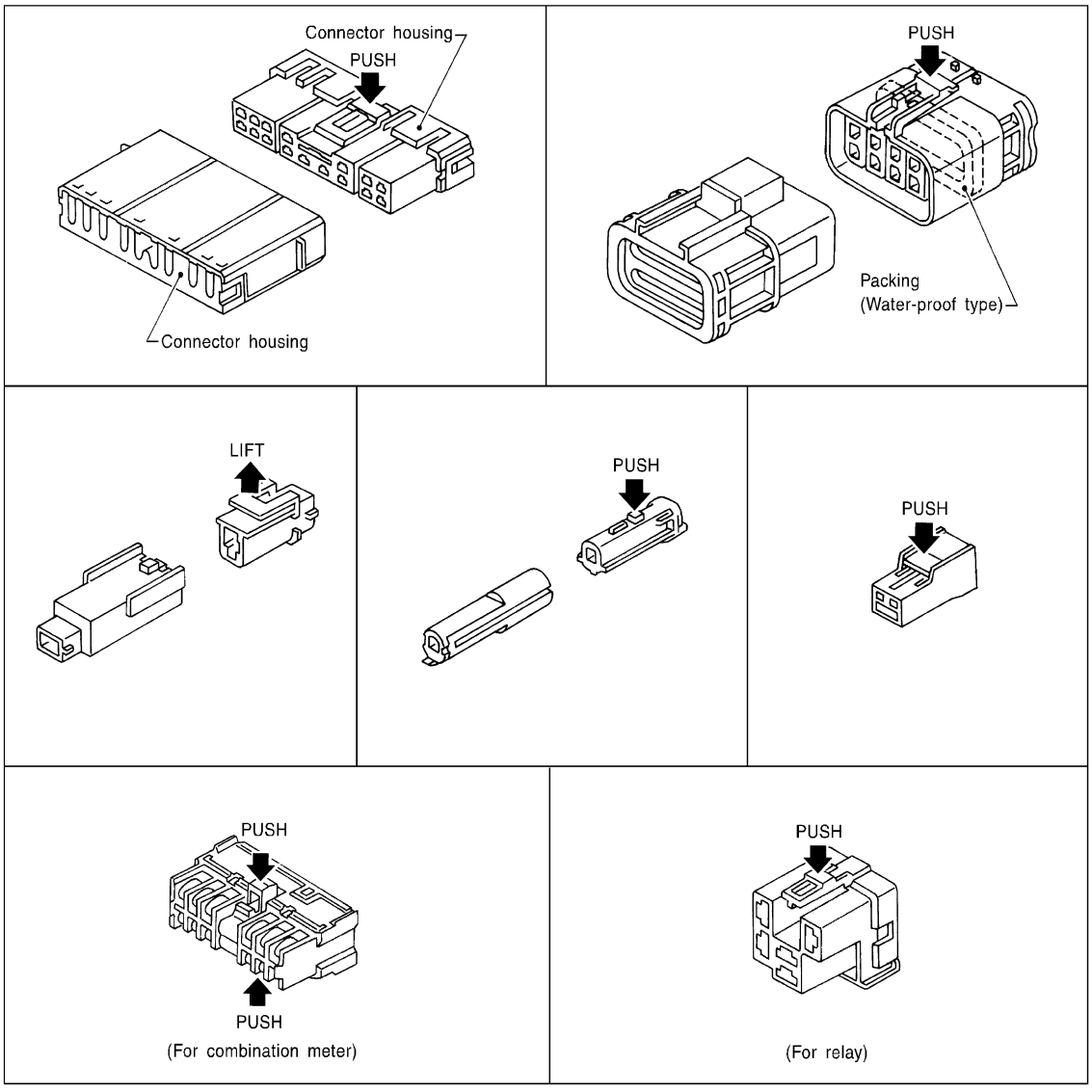
- The tab-locking type connectors help prevent accidental looseness or disconnection.
- The tab-locking type connectors are disconnected by pushing or lifting the locking tab(s). Refer to the illustration below.

Refer to the next page for description of the slide-locking type connector.

CAUTION:

Do not pull the harness or wires when disconnecting the connector.

[Example]



SEL769DA

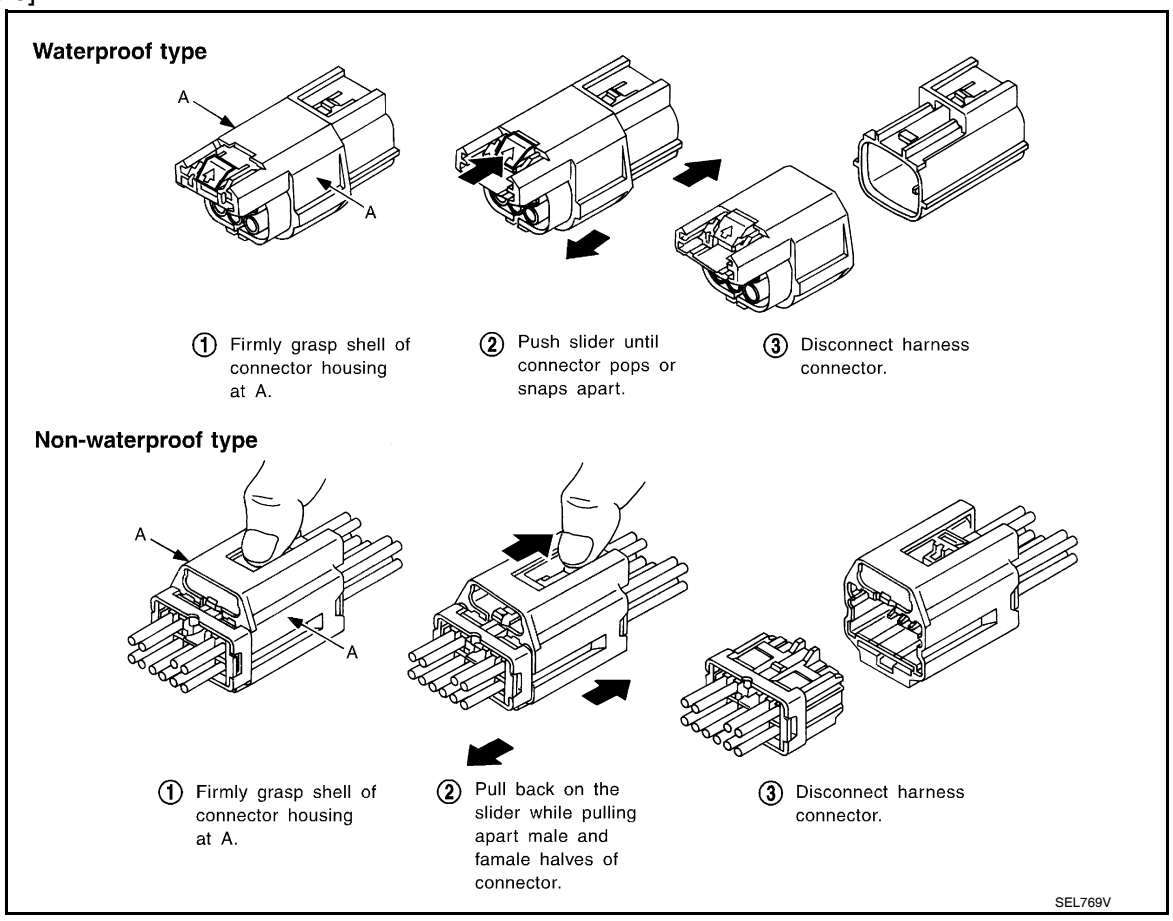
HARNESS CONNECTOR (SLIDE-LOCKING TYPE)

- A new style slide-locking type connector is used on certain systems and components, especially those related to OBD.
- The slide-locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide-locking type connectors are disconnected by pushing or pulling the slider. Refer to the figure below.

CAUTION:

- **Do not pull the harness or wires when disconnecting the connector.**
- **Be careful not to damage the connector support bracket when disconnecting the connector.**

[Example]

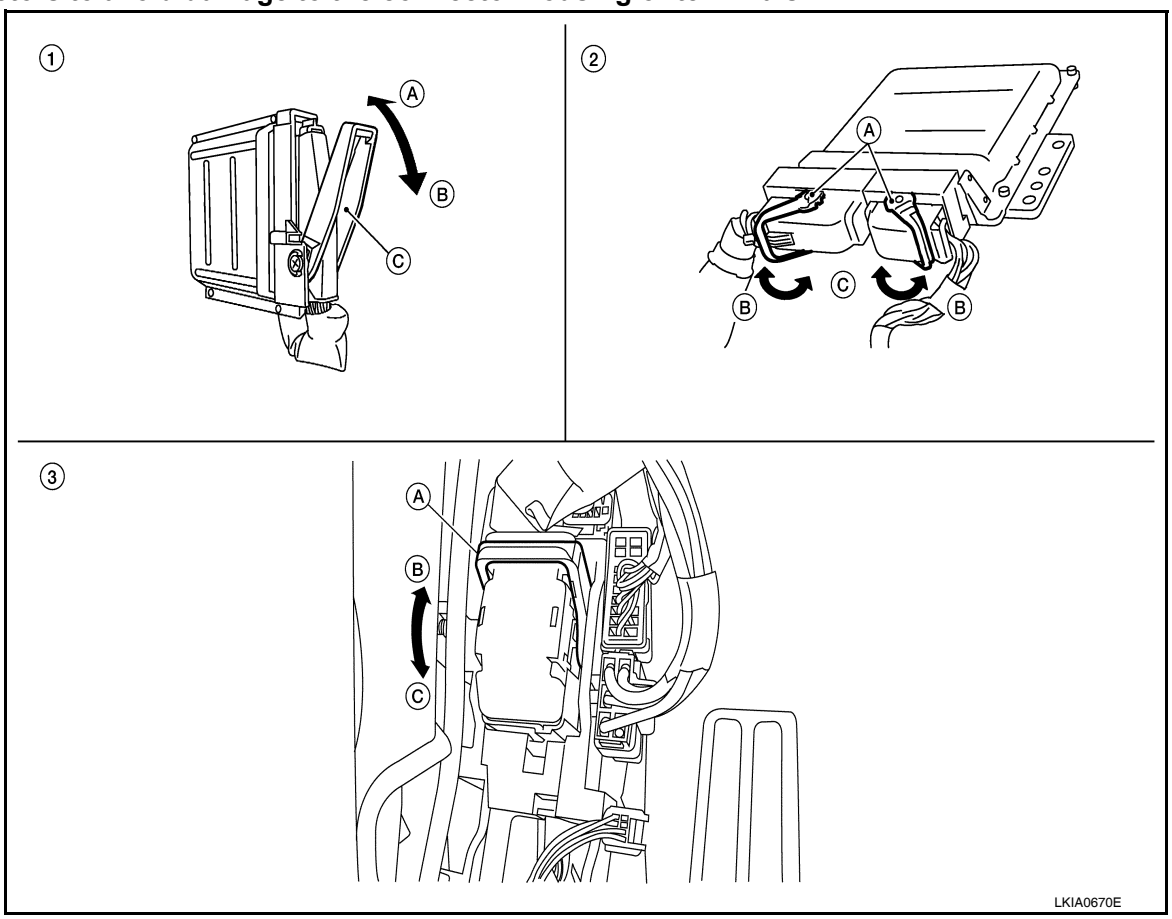


HARNESS CONNECTOR (LEVER LOCKING TYPE)

- Lever locking type harness connectors are used on certain control units and control modules such as ECM, ABS actuator and electric unit (control unit), etc.
- Lever locking type harness connectors are also used on super multiple junction (SMJ) connectors.
- Always confirm the lever is fully locked in place by moving the lever as far as it will go to ensure full connection.

CAUTION:

Always confirm the lever is fully released (loosened) before attempting to disconnect or connect these connectors to avoid damage to the connector housing or terminals.



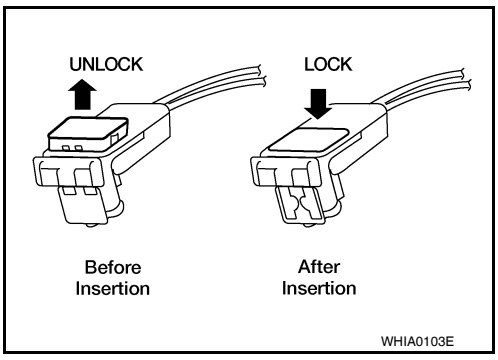
1. Control unit with single lever
   A. Fasten
   B. Loosen
   C. Lever
2. Control unit with dual levers
   A. Levers
   B. Fasten
   C. Loosen
3. SMJ connector
   A. Lever
   B. Fasten
   C. Loosen

HARNESS CONNECTOR (DIRECT-CONNECT SRS COMPONENT TYPE)

- SRS direct-connect type harness connectors are used on certain SRS components such as air bag modules and seat belt pre-tensioners.
- Always pull up to release black locking tab prior to removing connector from SRS component.
- Always push down to lock black locking tab after installing connector to SRS component. When locked, the black locking tab is level with the connector housing.

CAUTION:

- **Do not pull the harness or wires when removing connectors from SRS components.**

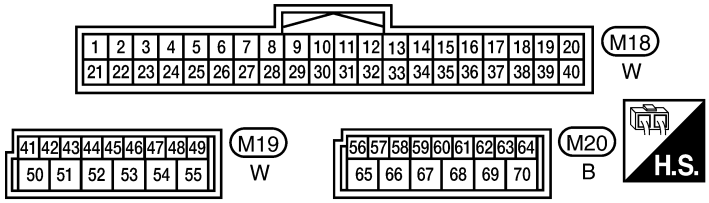


ELECTRICAL UNITS

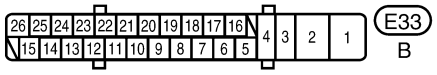
Terminal Arrangement

INFOID:0000000007329552

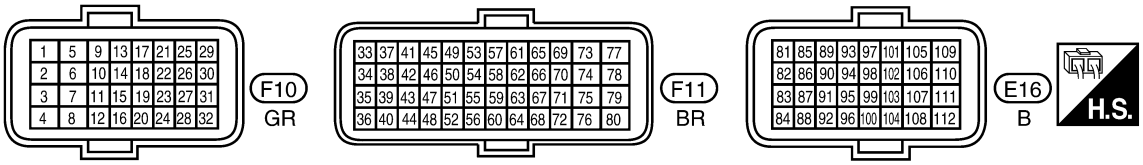
BCM (BODY CONTROL MODULE)



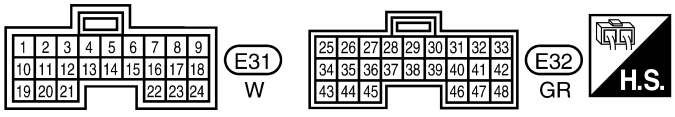
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)



ECM



TCM (TRANSMISSION CONTROL MODULE)



LKIA0810E

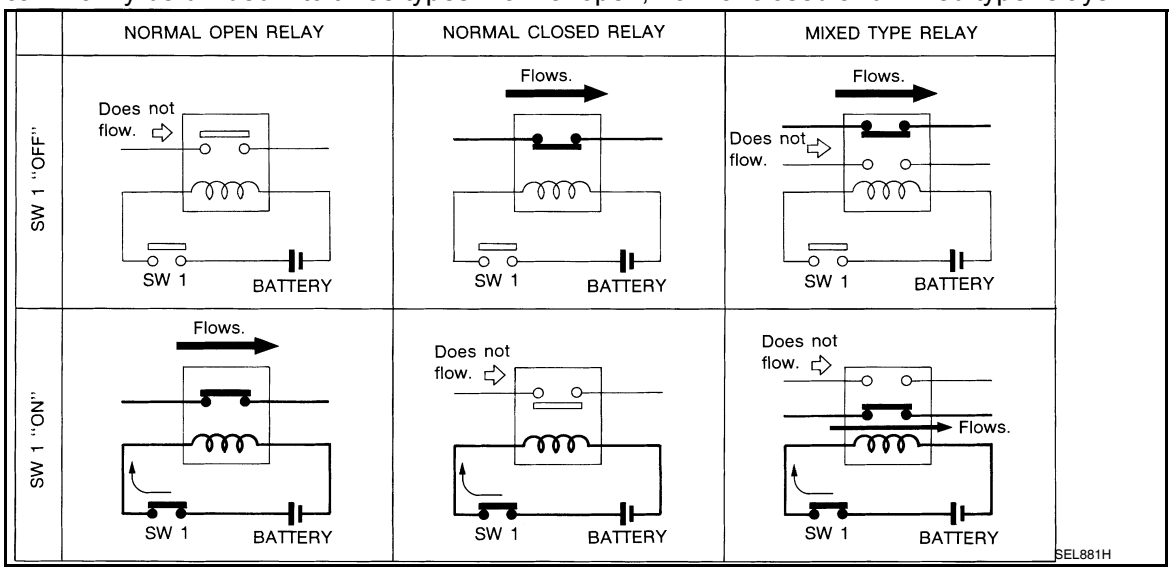
STANDARDIZED RELAY

Description

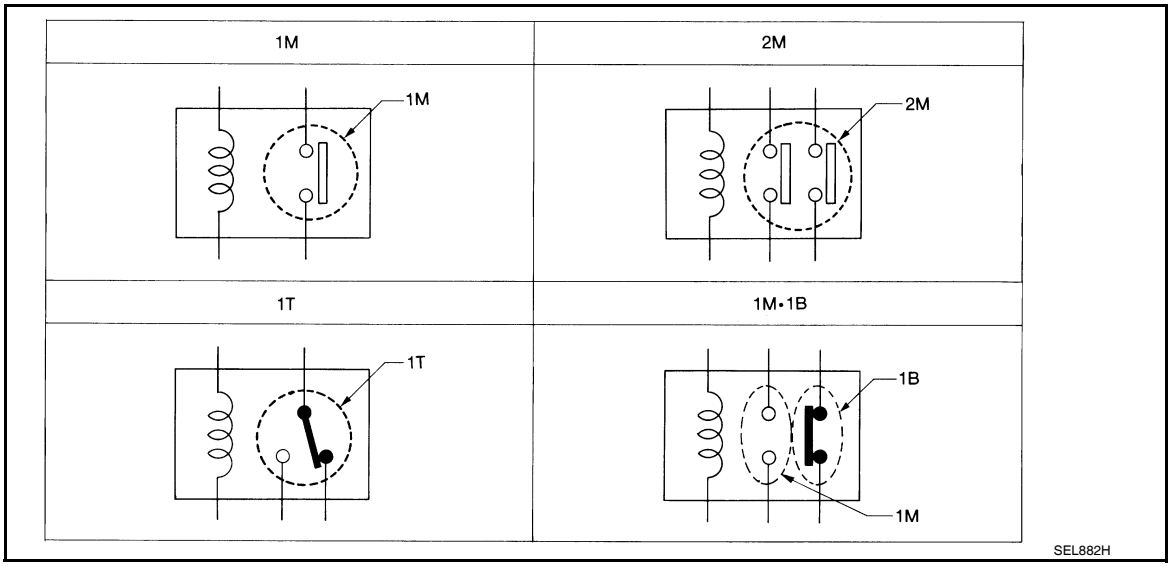
INFOID:0000000007329553

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

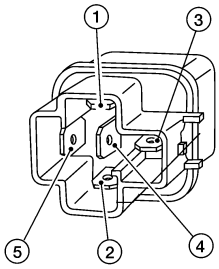
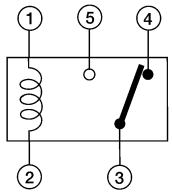
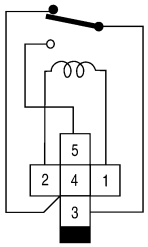
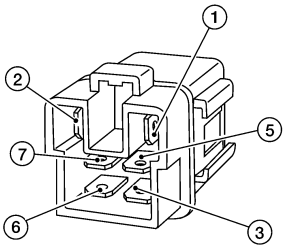
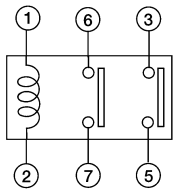
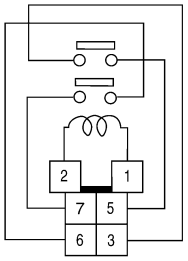
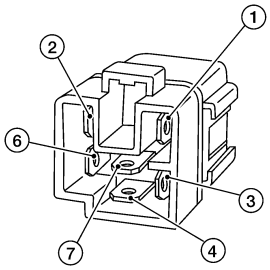
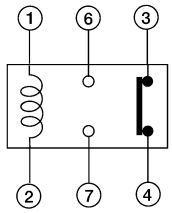
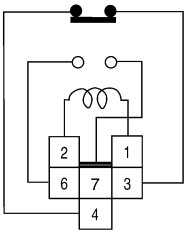
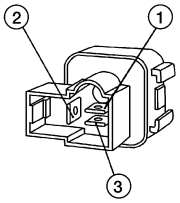
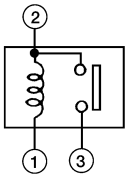
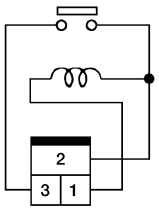
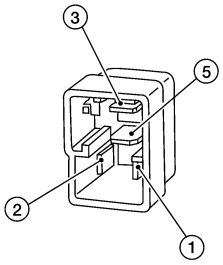
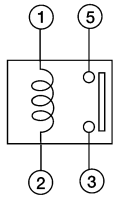
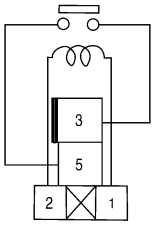
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



TYPE OF STANDARDIZED RELAYS



1M	1 Make		2M	2 Make
1T	1 Transfer		1M·1B	1 Make 1 Break

Type	Outer view	Circuit	Connector Symbol and connection	Case color
1T				BLACK
2M				BROWN
1M ·1B				GRAY
1M				BLACK
				BLUE

The arrangement of terminal numbers on the actual relays may differ from those shown above.

WKIA0253E

SUPER MULTIPLE JUNCTION (SMJ)

Terminal Arrangement

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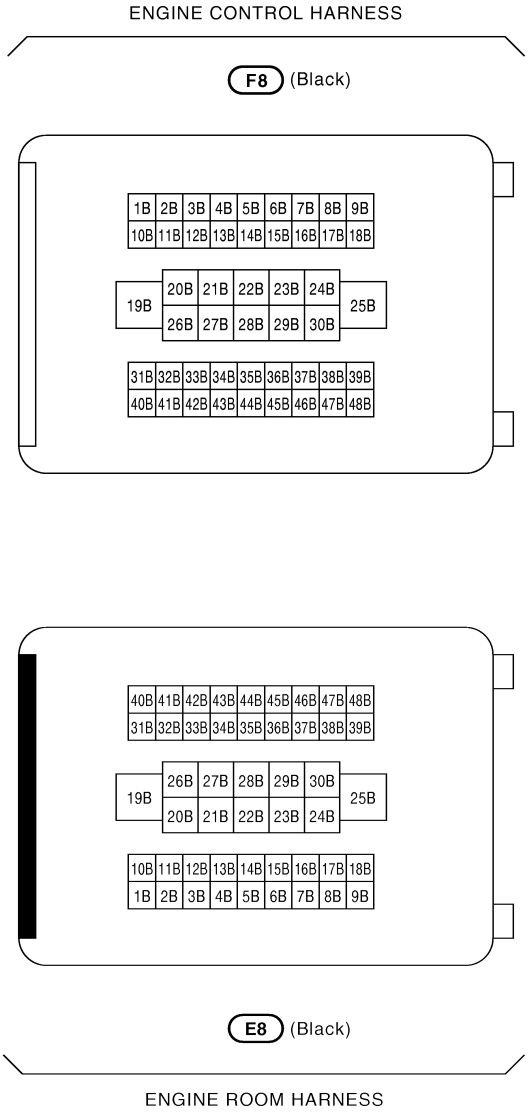
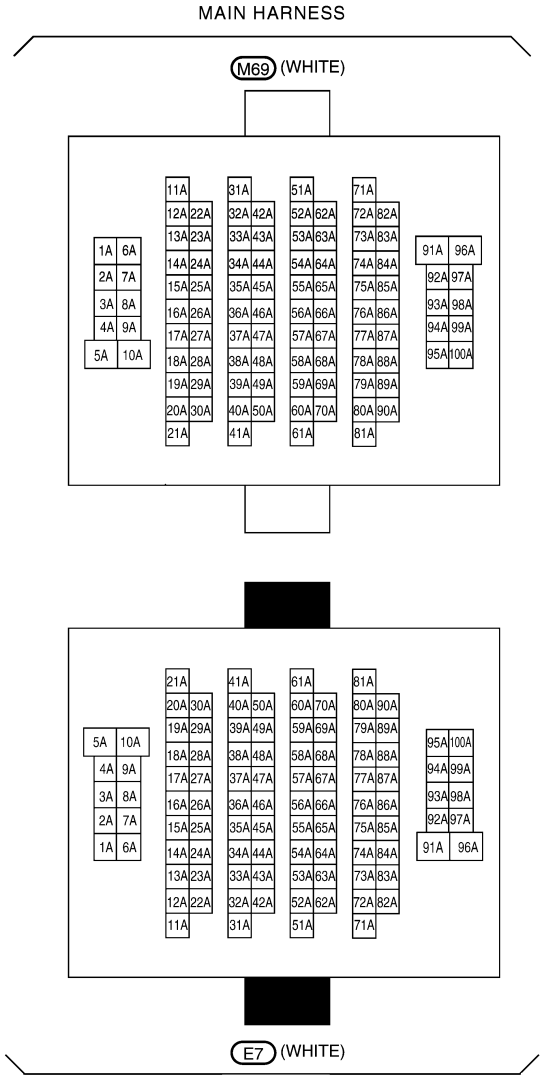


ABMIA1599GB

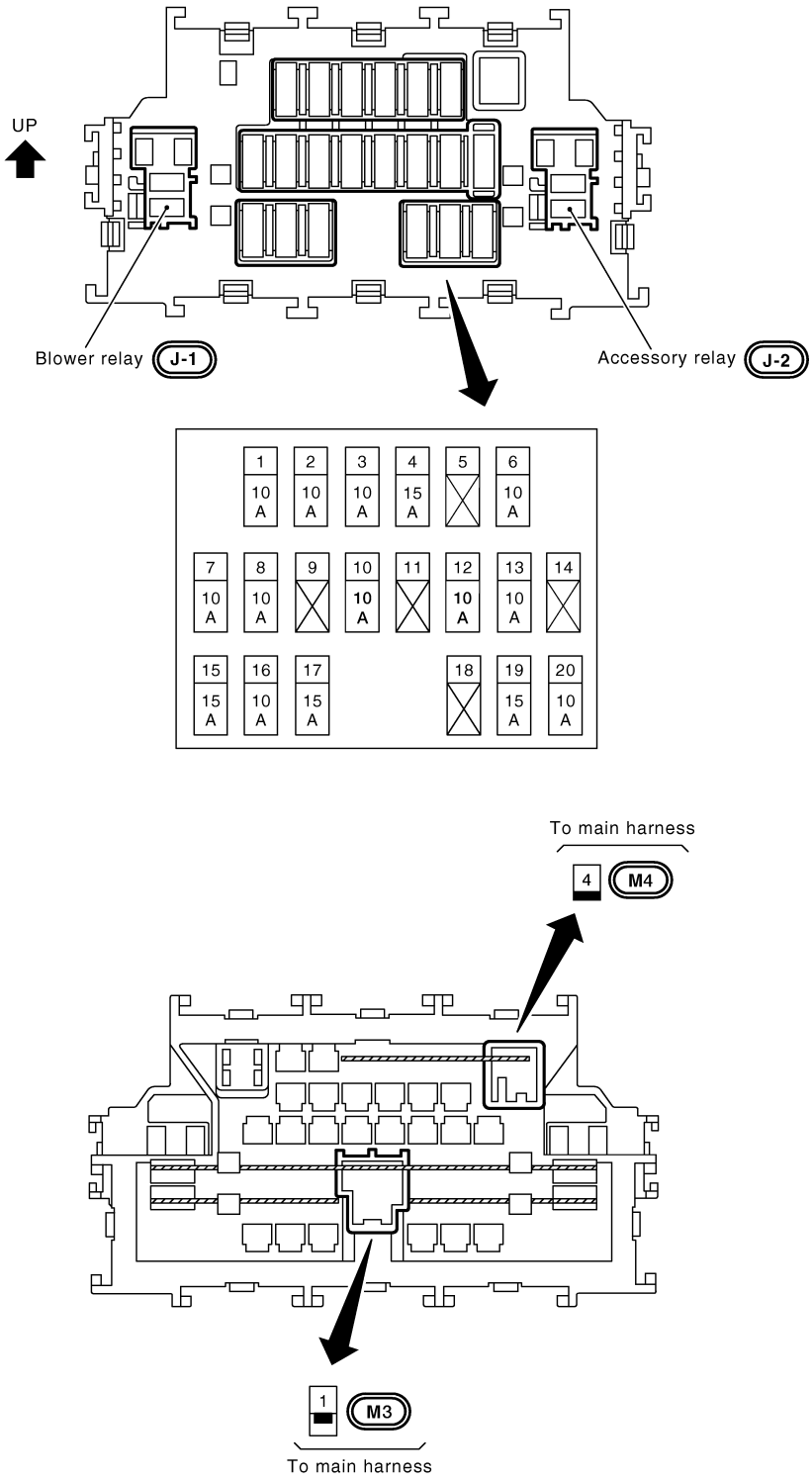


ABMIA1600GB

FUSE BLOCK-JUNCTION BOX (J/B)

Terminal Arrangement

INFOID:0000000007329555



AAMIA0782GB

FUSE AND FUSIBLE LINK BOX

Terminal Arrangement

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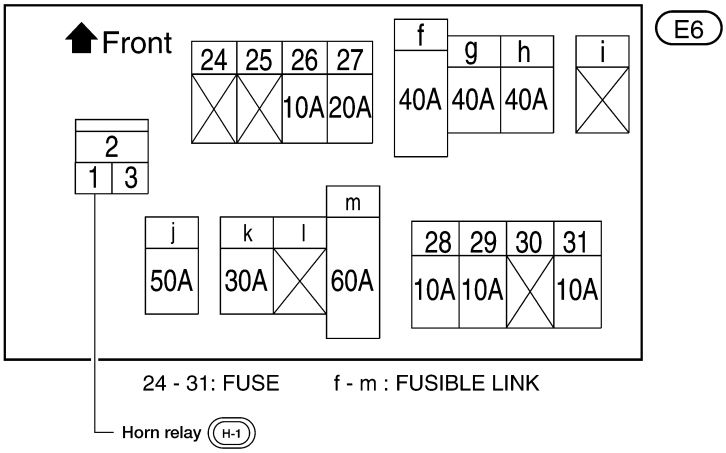
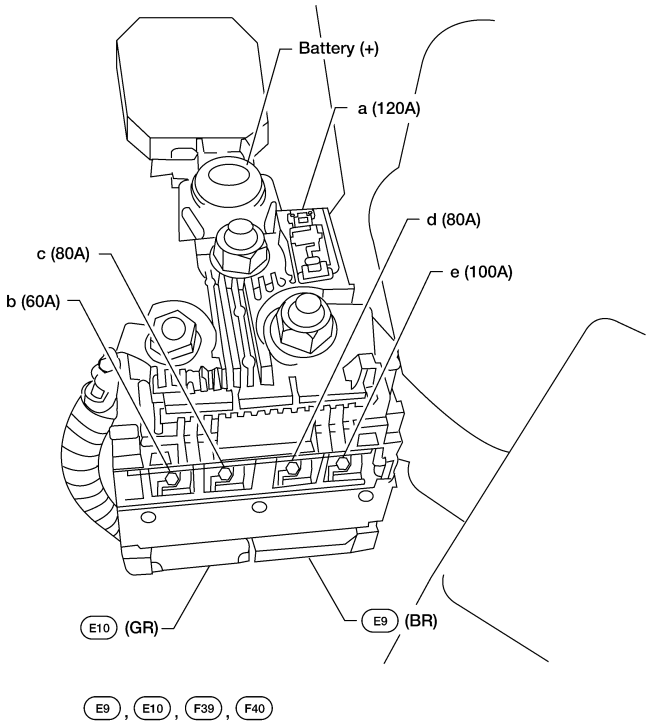


FUSIBLE LINK BOX (BATTERY)



ABMIA2441GB

SECTION ADP
AUTOMATIC DRIVE POSITIONER

CONTENTS

BASIC INSPECTION 4

DIAGNOSIS AND REPAIR WORKFLOW 4
Work Flow 4

INSPECTION AND ADJUSTMENT 7
Preliminary Check 7
Special Repair Requirement 7

PRE-INSPECTION FOR DIAGNOSTIC 8
Basic Inspection 8

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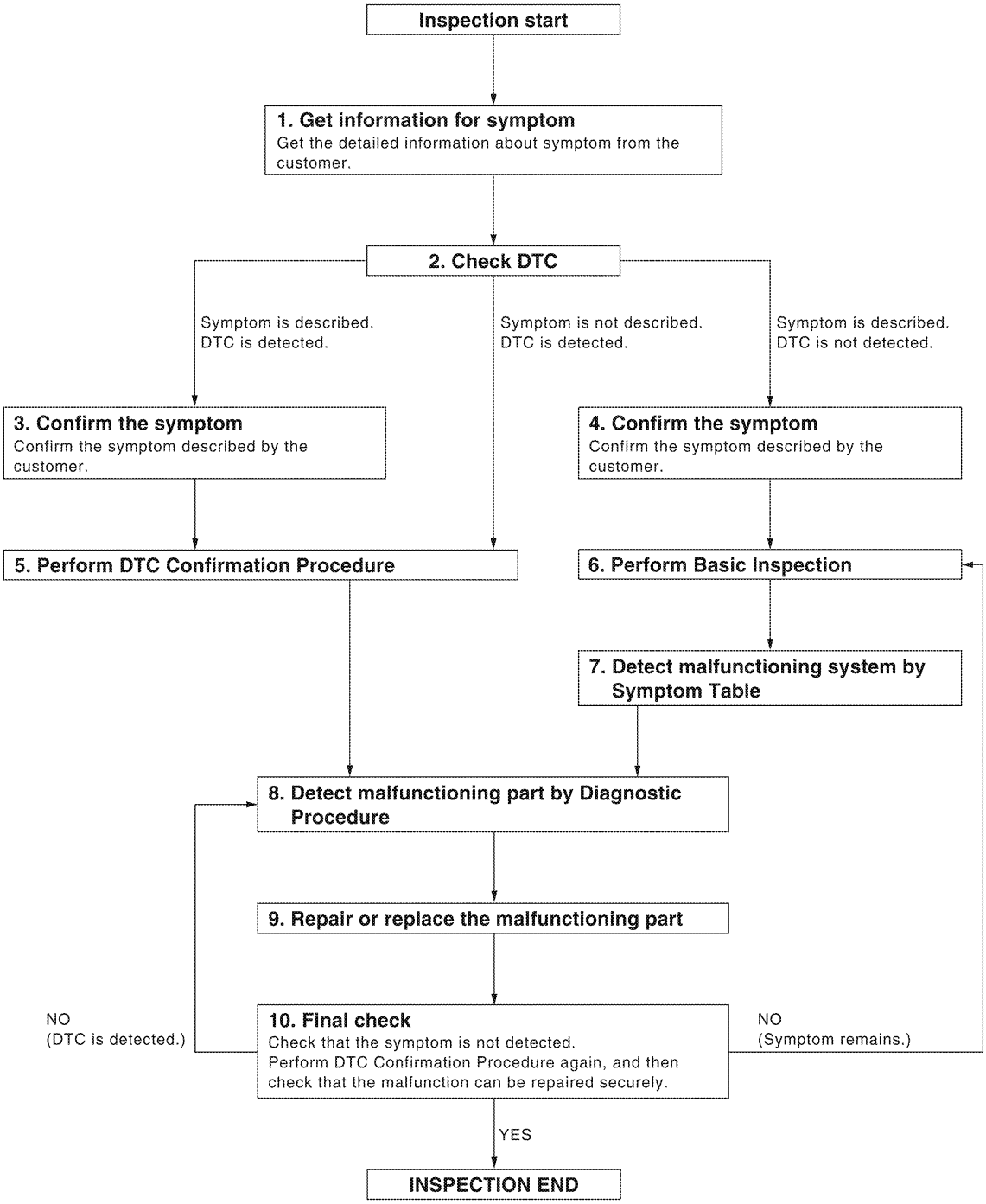
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000009882021

WORK FLOW



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DETAILED FLOW

1. GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred).

>> GO TO 2

2. CHECK DTC WITH AUTOMATIC DRIVE POSITIONER SYSTEM

Check “Self Diagnostic Result” with CONSULT.
Refer to ADP-112, "DTC Index".

Is any symptom described and any DTC is displayed?

Symptom is described, DTC is displayed.>>GO TO 3
Symptom is not described, DTC is displayed.>>GO TO 7
Symptom is described, DTC is not displayed.>>GO TO 4

3. CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

>> GO TO 7

4. CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

>> GO TO 5

5. CHECK NORMAL OPERATING CONDITION

Check normal operating condition. Refer to ADP-144, "Description".

Is the incident normal operation?

YES >> Inspection End.
NO >> GO TO 6

6. PERFORM BASIC INSPECTION

Isolate the malfunctioning point with the basic inspection. Refer to ADP-7, "Preliminary Check".

>> GO TO 8

7. PERFORM DTC CONFIRMATION PROCEDURE

Perform the confirmation procedure for the detected DTC.

Is the DTC displayed?

YES >> GO TO 9
NO >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

8. PERFORM COMPONENT FUNCTION CHECK

Perform the component function check for the isolated malfunctioning point.

>> GO TO 9

9. DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Isolate the malfunctioning point by performing the diagnosis procedure relevant to the symptom during the component diagnosis.

>> GO TO 10

10. REPAIR OR REPLACE

Repair or replace the malfunctioning part.

>> GO TO 11

11. FINAL CHECK

Perform the DTC confirmation procedure (if DTC is detected) or component function check (if no DTC is detected) again, and then check that the malfunction can be repaired securely.

Are all malfunctions corrected?

YES >> Inspection End.
Symptom is detected.>> GO TO 4
DTC is detected.>> GO TO 7

INSPECTION AND ADJUSTMENT

Preliminary Check

INFOID:0000000009882022

1. FOREIGN OBJECTS

Check the following:
- objects on or behind the seats that could cause binding
- objects under the seats that may be interfering with the seat's moving parts
- objects under pedals that may interfere with movement

Are there any foreign objects that could be causing interference?

YES >> Remove objects.
NO >> GO TO 2

2. WIRING CONNECTIONS

1. Disconnect harness connectors.
2. Check terminals for damage or loose connections.
3. Reconnect harness connectors.

Are any connectors damaged or loose?

YES >> Repair or replace damaged parts.
NO >> GO TO 3

3. POWER AND GROUND

Check power supply and ground circuits for control unit. Refer to ADP-47, "DRIVER SEAT CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES >> Refer to ADP-112, "DTC Index".
NO >> Repair or replace as necessary.

Special Repair Requirement

INFOID:0000000009882023

Refer to Owner's Manual for Automatic Drive Positioner system operating instructions.

PRE-INSPECTION FOR DIAGNOSTIC

Basic Inspection

INFOID:0000000009882024

1. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and ground circuit as shown below.
- Driver seat control unit: Refer to ADP-47, "DRIVER SEAT CONTROL UNIT : Diagnosis Procedure".
- Automatic drive positioner control unit: Refer to ADP-48, "AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace the malfunctioning part.

2. CHECK MANUAL FUNCTION

Check the manual function operations by operating the relevant switches as shown below.
- Seat (slide, reclining, lifting front, lifting rear)
- Pedal assembly (forward, backward)
- Door mirror

Do all manual functions operate normally?

YES >> GO TO 3
NO (Seat, pedal, door mirror)>>Go to SYMPTOM 1, refer to ADP-142, "Symptom Table". And, GO TO 4 if the result of SYMPTOM 1 is OK.

3. CHECK MEMORY FUNCTION 1

Register the seat positions (refer to Owner's Manual) and check that all parts of the seat, pedals, steering wheel and door mirrors move to their memory positions correctly.

Are the operations normal?

YES >> Check each malfunction according to the instruction of the SYMPTOM 4, refer to ADP-142, "Symptom Table".
No (memory indicator operates normally)>> Go to SYMPTOM 2, refer to ADP-142, "Symptom Table".
No (memory indicator does not operate normally either)>> GO TO 5

4. CHECK MEMORY FUNCTION 2

Register the seat positions (refer to Owner's Manual) and check that all parts of the seat, pedals and door mirrors move to their memory positions correctly.

Are the operations normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
NO >> GO TO 7

5. CHECK SEAT MEMORY SWITCH/MEMORY INDICATOR

Check the seat memory switch/memory switch indicator of the SYMPTOM 5, refer to ADP-142, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 6
NO >> Repair or replace the malfunctioning part.

6. CHECK OPERATION CONDITION

Check the memory operation conditions (refer to ADP-11, "AUTOMATIC DRIVE POSITIONER SYSTEM : System Description").

Are all operation conditions fulfilled?

YES >> Go to SYMPTOM 6, refer to ADP-142, "Symptom Table".
NO >> Fulfill the operation conditions. Refer to ADP-11, "AUTOMATIC DRIVE POSITIONER SYSTEM : System Description".

7. CHECK MECHANISM

Check for the following.
- Mechanism deformation or pinched foreign materials.

• Interference with other parts because of poor installation.

Is any malfunction present in the relevant parts?

YES >> Go to SYMPTOM 3, refer to ADP-142, "Symptom Table".
NO >> Repair or replace the malfunctioning part.

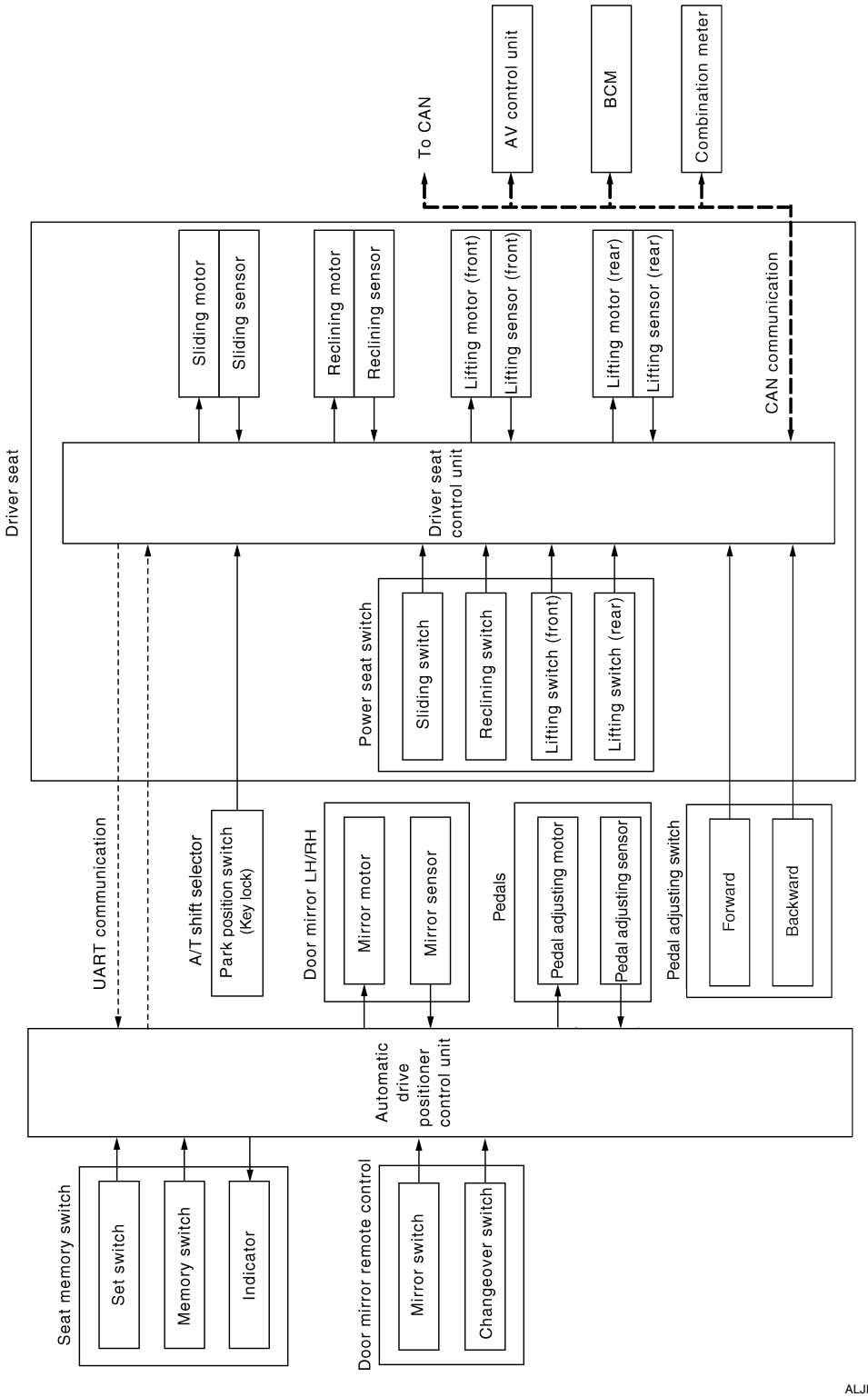
SYSTEM DESCRIPTION

AUTOMATIC DRIVE POSITIONER SYSTEM

AUTOMATIC DRIVE POSITIONER SYSTEM

AUTOMATIC DRIVE POSITIONER SYSTEM : System Diagram

INFOID:0000000009882025



AUTOMATIC DRIVE POSITIONER SYSTEM : System Description

INFOID:0000000009882026

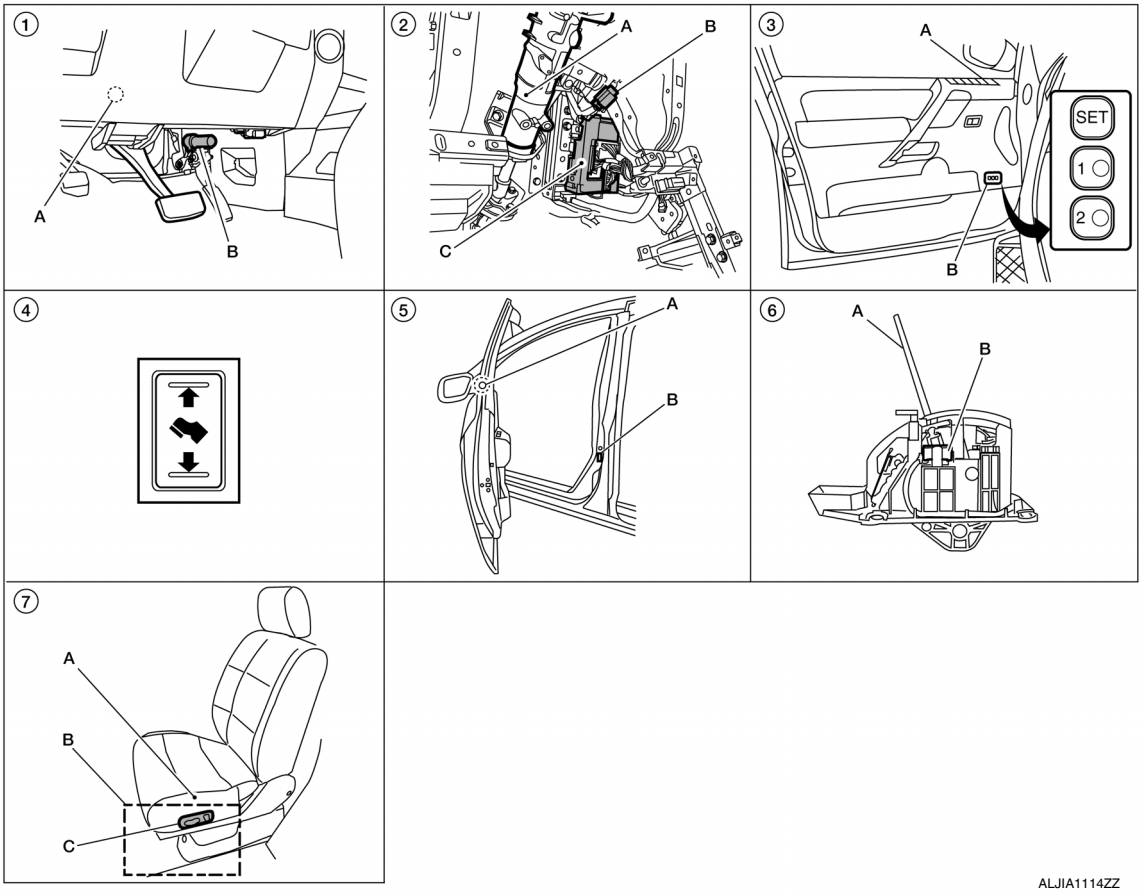
OUTLINE

The system automatically moves the driver seat, pedal assembly and door mirror position by the driver seat control unit and the automatic drive positioner control unit. The driver seat control unit corresponds with the automatic drive positioner control unit by UART communication.

Function		Description
Manual function		The driving position (seat, pedal assembly and door mirror position) can be adjusted by using the power seat switch, pedal adjusting switch or door mirror remote control switch.
Memory function		The seat, pedal assembly and outside mirror move to the stored driving position by pressing seat memory switch (1 or 2).
Entry/Exit assist function	Exit	On exit, the seat moves backward.
	Entry	On entry, the seat returns from exiting position to the previous driving position.

AUTOMATIC DRIVE POSITIONER SYSTEM : Component Parts Location

INFOID:0000000009882027



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1. A. Automatic drive positioner control unit M33, M34
   B. Pedal adjusting motor assembly E109, E110
2. A. Steering column
   B. Key switch and key lock solenoid M27
   C. BCM M18, M19, M20 (view with instrument panel removed)
3. A. Door mirror remote control switch D10
   B. Seat memory switch D5

4. Pedal adjusting switch M96
5. A. Door mirror LH D4, RH D107
   B. Front door switch LH B8
6. A. A/T selector lever (floor shift)
   B. A/T shift selector (park position switch) M203
7. A. Sliding motor LH B204 (driver seat view), reclining motor LH B205, lifting motor (front) B206, lifting motor (rear) B207
   B. Driver seat control unit B202, B203
   C. Power seat switch LH B208

AUTOMATIC DRIVE POSITIONER SYSTEM : Component Description

INFOID:0000000009882028

CONTROL UNITS

Item	Function
Driver seat control unit	• Main unit of automatic drive positioner system • It is connected to the CAN. • It communicates with the automatic drive positioner control unit via UART communication.
Automatic drive positioner control unit	• It communicates with the driver seat control unit via UART communication. • Perform various controls with the instructions of driver seat control unit. • Perform the controls of the pedal adjusting, door mirror and the seat memory switch.
BCM	Transmit the following status to the driver seat control unit via CAN communication. • Front door LH: OPEN/CLOSE • Ignition switch position: ACC/ON • Door lock: UNLOCK (remote keyless entry request switch operation) • Key ID • Key switch: Insert/Pull out ignition key • Starter: CRANKING/OTHER
Combination meter	Transmit the vehicle speed signal to the driver seat control unit via CAN communication.
AV control unit	The setting change of auto drive positioner system can be performed on the display.
A/T shift selector (park position switch)	Transmit the shift position signal (P range) to the driver seat control unit.

INPUT PARTS

Switches

Item	Function
Key switch and key lock solenoid	The key switch is installed to detect the key inserted/removed status.
Front door switch LH	Detect front door (driver side) open/close status.
A/T shift selector (park position switch)	Detect the P range position of A/T selector lever.
Set switch	The registration and system setting can be performed with its operation.
Seat memory switch 1/2	The registration and operation can be performed with its operation.
Power seat switch	The following switch is installed. • Reclining switch • Lifting switch (front) • Lifting switch (rear) • Sliding switch The specific parts can be operated with the operation of each switch.

Item	Function
Pedal adjusting switch	The following switch is installed. • Pedal forward • Pedal backward The specific parts can be operated with the operation of each switch.
Door mirror remote control switch	The following switch is installed. • Mirror switch • Changeover switch The specific parts can be operated with the operation of each switch.

Sensors

Item	Function
Door mirror sensor (LH/RH)	Detect the up/down and left/right position of outside mirror face.
Pedal adjusting sensor	Detect the forward/backward position of pedal assembly.
Lifting sensor (front)	Detect the up/down position of seat lifting (front).
Lifting sensor (rear)	Detect the up/down position of seat lifting (rear).
Reclining sensor	Detect the tilt of seatback.
Sliding sensor	Detect the front/rear position of seat.

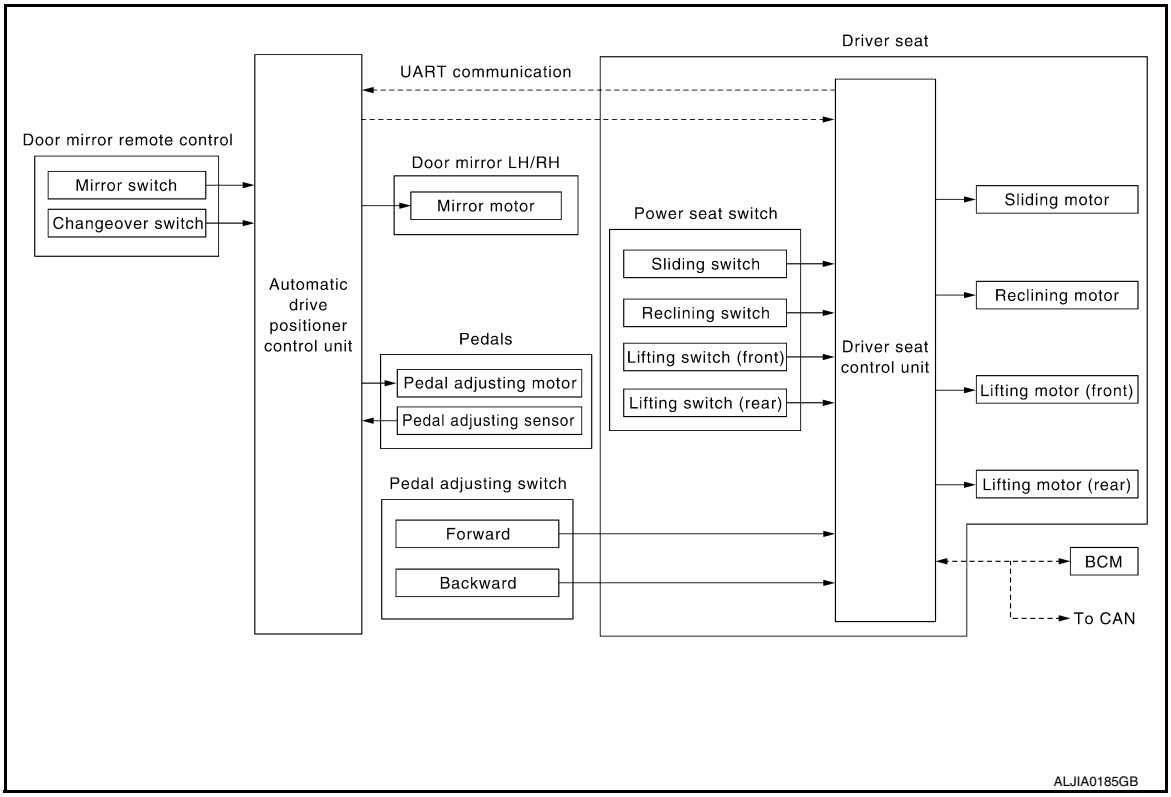
OUTPUT PARTS

Item	Function
Door mirror motor (LH/RH)	Move the outside mirror face upward/downward and left/right.
Pedal adjusting motor	Move the pedal assembly forward/backward.
Lifting motor (front)	Move the seat lifting (front) upward/downward.
Lifting motor (rear)	Move the seat lifting (rear) upward/downward.
Reclining motor	Tilt and raise up the seatback.
Sliding motor	Slide the seat forward/backward.
Seat memory indicator	Illuminates or flashes according to the registration/operation status.

MANUAL FUNCTION

MANUAL FUNCTION : System Diagram

INFOID:0000000009882029



MANUAL FUNCTION : System Description

INFOID:0000000009882030

OUTLINE

The driving position (seat, pedal assembly and door mirror position) can be adjusted manually with power seat switch, pedal adjusting switch and door mirror remote control switch.

OPERATION PROCEDURE

1. Turn ignition switch ON.
2. Operate power seat switch, pedal adjusting switch or door mirror remote control switch.
3. The driver seat, pedal assembly or door mirror operates according to the operation of each switch.

DETAIL FLOW

Seat

Order	Input	Output	Control unit condition
1	Power seat switch (sliding, lifting, reclining)	—	The power seat switch signal is inputted to the driver seat control unit when the power seat switch is operated.
2	—	Motors (sliding, lifting, reclining)	The driver seat control unit outputs signals to each motor according to the power seat switch input signal.

Adjustable pedals

Order	Input	Output	Control unit condition
1	Pedal adjusting switch	—	The pedal adjusting switch signal is input to the automatic drive positioner control unit when the pedal adjusting switch is operated.

Order	Input	Output	Control unit condition
2	—	Motor	The automatic drive positioner control unit actuates the motor according to the operation of the pedal adjusting switch signal from the driver seat control unit.
3	Sensors (forward, backward)	—	The automatic drive positioner control unit recognizes any operation limit of each actuator via each sensor and will not operate the actuator anymore at that time.

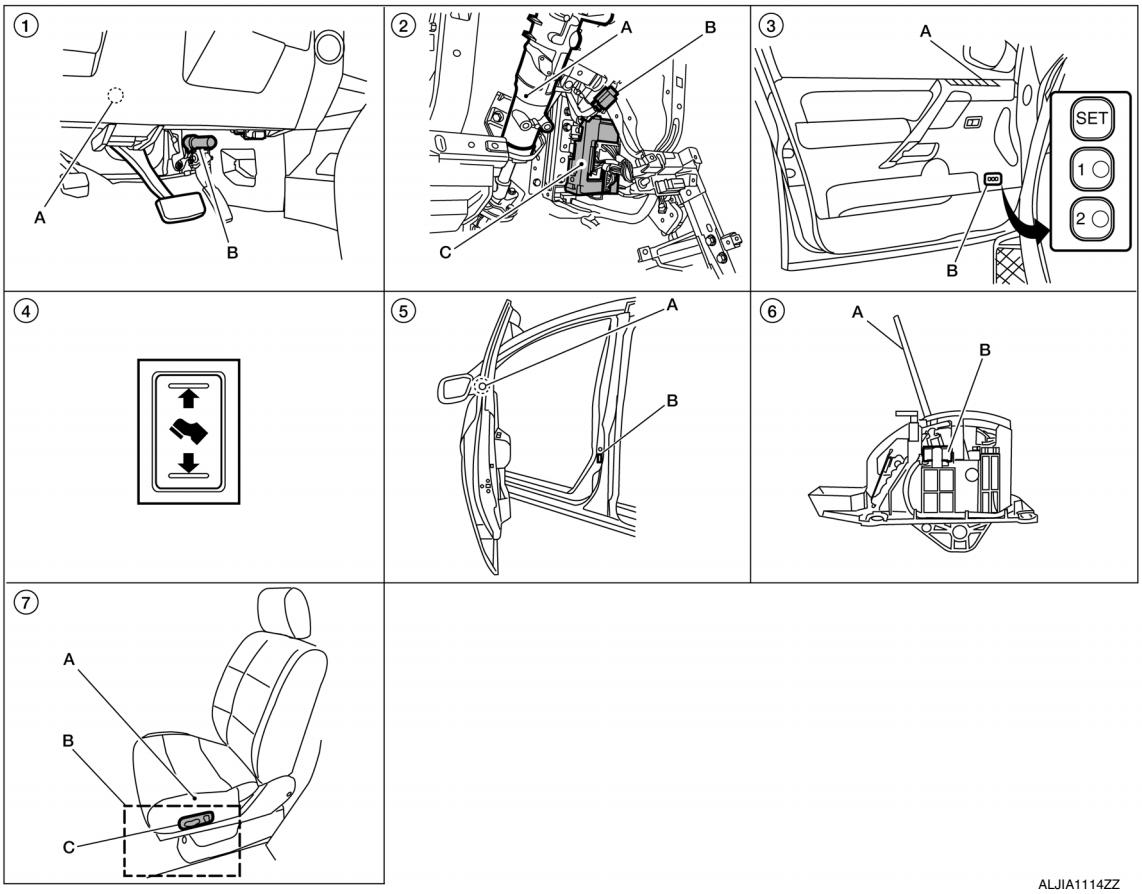
Door Mirror

Order	Input	Output	Control unit condition
1	Door mirror remote control switch	—	The door mirror remote control switch signal is inputted to the automatic drive positioner control unit when the door mirror remote control switch is operated.
2	—	Motors (Door mirror motor)	The automatic drive positioner control unit actuates each motor according to the operation of the door mirror remote control switch.

NOTE:
The door mirrors can be operated manually when ignition switch is in either ACC or ON position. The ignition switch signal (ACC/ON) is transmitted from BCM to the driver seat control unit via CAN communication and from the driver seat control unit to the automatic drive positioner control unit via UART communication.

MANUAL FUNCTION : Component Parts Location

INFOID:0000000009882031



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1. A. Automatic drive positioner control unit M33, M34
   B. Pedal adjusting motor assembly E109, E110
2. A. Steering column
   B. Key switch and key lock solenoid M27
   C. BCM M18, M19, M20 (view with instrument panel removed)
3. A. Door mirror remote control switch D10
   B. Seat memory switch D5

4. Pedal adjusting switch M96
5. A. Door mirror LH D4, RH D107
   B. Front door switch LH B8
6. A. A/T selector lever (floor shift)
   B. A/T shift selector (park position switch) M203
7. A. Sliding motor LH B204 (driver seat view), reclining motor LH B205, lifting motor (front) B206, lifting motor (rear) B207
   B. Driver seat control unit B202, B203
   C. Power seat switch LH B208

MANUAL FUNCTION : Component Description

INFOID:0000000009882032

CONTROL UNITS

Item	Function
Driver seat control unit	• Operates the specific seat motor with the signal from the power seat switch. • Transmits the ignition switch signal (ACC/ON) via UART communication to the automatic drive positioner control unit. • Transmits the pedal adjusting switch signal via UART communication to the automatic drive positioner control unit.
Automatic drive positioner control unit	Operates the specific motor with the signal from driver seat control unit or door mirror remote control switch.
BCM	Recognizes the following status and transmits it to the driver seat control unit via CAN communication. • Ignition position: ACC/ON

INPUT PARTS

Switches

Item	Function
Power seat switch	The following switch is installed. • Reclining switch • Lifting switch (front) • Lifting switch (rear) • Sliding switch The specific parts can be operated with the operation of each switch.
Pedal adjusting switch	The following switch is installed. • Pedal forward • Pedal backward The specific parts can be operated with the operation of each switch.
Door mirror remote control switch	The following switch is installed. • Mirror switch • Changeover switch The specific parts can be operated with the operation of each switch.

Sensors

Item	Function
Pedal adjusting sensor	Detect the forward/backward position of pedal assembly.

OUTPUT PARTS

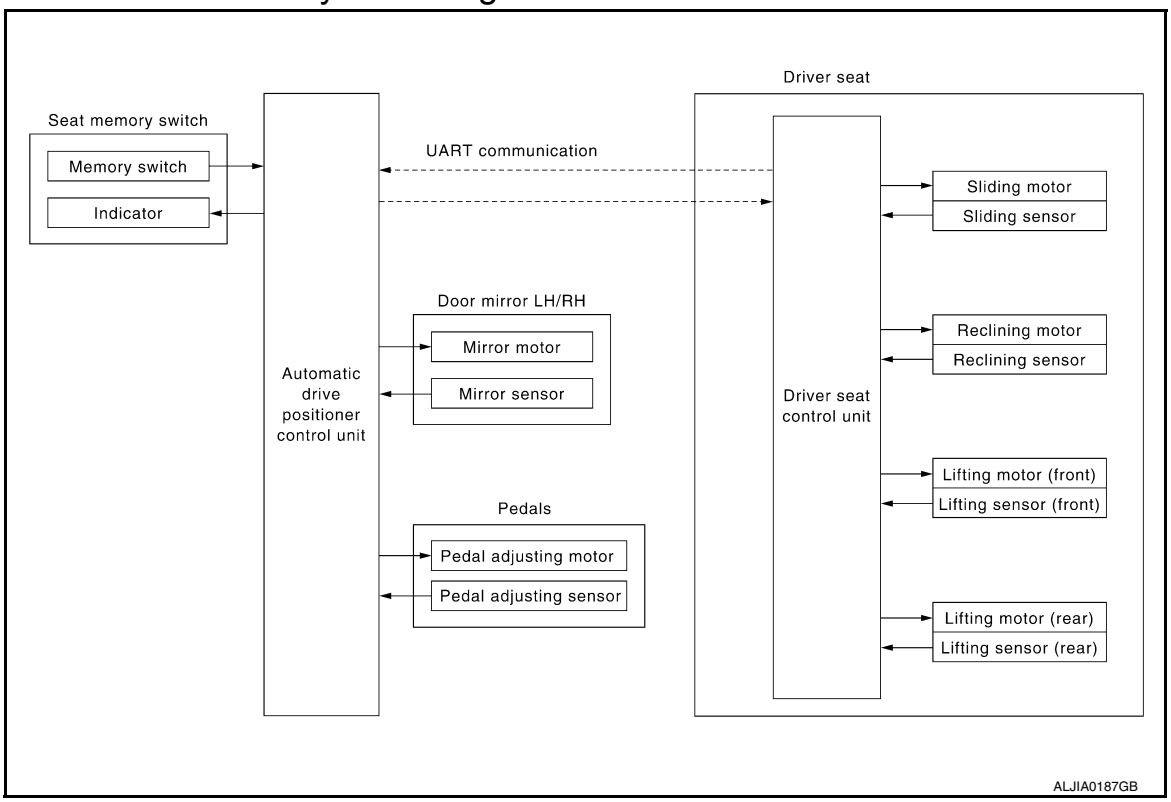
Item	Function
Door mirror motor (LH/RH)	Move the outside mirror face upward/downward and left/right.
Pedal adjusting motor	Move the pedal assembly forward/backward.
Lifting motor (front)	Move the seat lifter (front) upward/downward.
Lifting motor (rear)	Move the seat lifter (rear) upward/downward.

Item	Function
Reclining motor	Tilt and raise up the seatback.
Sliding motor	Slide the seat forward/backward.

MEMORY FUNCTION

MEMORY FUNCTION : System Diagram

INFOID:0000000009882033



MEMORY FUNCTION : System Description

INFOID:0000000009882034

OUTLINE

The driver seat control unit can store the optimum driving positions (seat, pedal assembly and door mirror position) for 2 people. If the front seat position is changed, one-touch (pressing desired memory switch for more than 0.5 second) operation allows changing to the other driving position.

NOTE:

Further information for the memory storage procedure. Refer to Owner's Manual.

OPERATION PROCEDURE

1. Turn ignition switch ON.
2. Press desired memory switch for more than 0.5 second.
3. Front seat LH, pedal assembly and door mirror will move to the memorized position.

OPERATION CONDITION

Satisfy all of the following items. The memory function is not performed if these items are not satisfied.

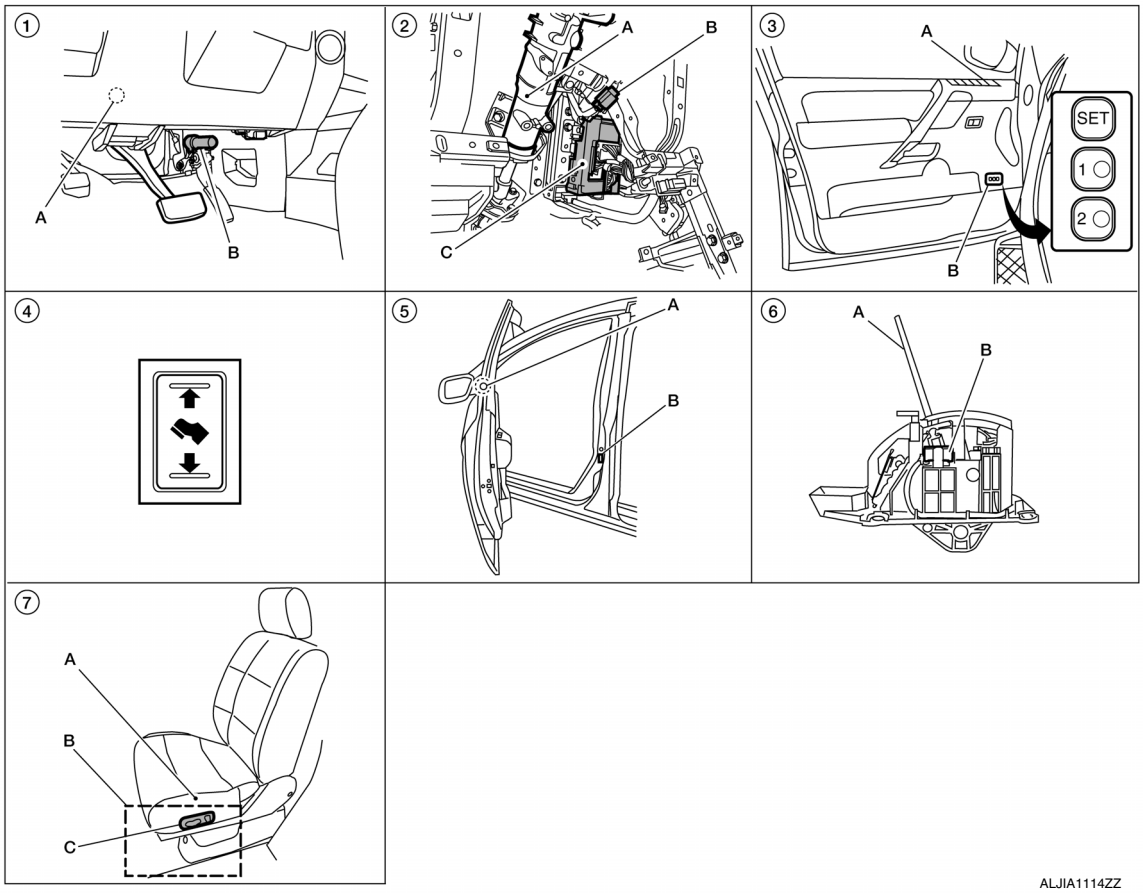
Item	Request status
Ignition position	ON
Switch inputs • Power seat switch • Pedal adjusting switch • Door mirror control switch • Set switch • Seat memory switch	OFF (Not operated)
A/T selector lever	P position

DETAIL FLOW

Order	Input	Output	Control unit condition
1	Memory switch	—	The memory switch signal is inputted to the automatic drive positioner control unit when memory switch 1 or 2 is operated. Memory switch signal is input to driver seat control unit via UART communication.
2	—	Motors (seat, pedal adjusting, door mirror)	Driver seat control unit operates each motor of seat when it recognizes the memory switch pressed for 0.5 second or more and requests each motor operation to automatic drive positioner control unit via UART communication. The automatic drive positioner control unit operates each motor.
		Memory switch Indicator	Driver seat control unit requests the flashing of memory indicator to automatic drive positioner control unit via UART communication while either of the motors is operating. The automatic drive positioner control unit illuminates the memory indicator.
3	Sensors (seat, pedal adjusting, door mirror)	—	Driver seat control unit judges the operating seat position with each seat sensor input. The positions of the adjustable pedals and outside mirror are monitored with each sensor signal that is input from auto drive positioner control unit via UART communication. Driver seat control unit stops the operation of each motor when each part reaches the recorded address.
4	—	Memory switch Indicator	Driver seat control unit requests the illumination of memory indicator to auto drive positioner control unit via UART communication after all motors stop. The auto driving positioner control unit illuminates the memory indicator for 5 seconds.

MEMORY FUNCTION : Component Parts Location

INFOID:0000000009882035



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1. A. Automatic drive positioner control unit M33, M34
   B. Pedal adjusting motor assembly E109, E110
2. A. Steering column
   B. Key switch and key lock solenoid M27
   C. BCM M18, M19, M20 (view with instrument panel removed)
3. A. Door mirror remote control switch D10
   B. Seat memory switch D5
4. Pedal adjusting switch M96
5. A. Door mirror LH D4, RH D107
   B. Front door switch LH B8
6. A. A/T selector lever (floor shift)
   B. A/T shift selector (park position switch) M203
7. A. Sliding motor LH B204 (driver seat view), reclining motor LH B205, lifting motor (front) B206, lifting motor (rear) B207
   B. Driver seat control unit B202, B203
   C. Power seat switch LH B208

MEMORY FUNCTION : Component Description

INFOID:0000000009882036

CONTROL UNITS

Item	Function
Driver seat control unit	• The address of each part is recorded. • Operates each motor of seat to the registered position. • Requests the operations of pedal assembly and door mirror to automatic drive positioner control unit.
Automatic drive positioner control unit	Operates the pedal adjusting motor and door mirror with the instructions from the driver seat control.

INPUT PARTS

Switches

Item	Function
Memory switch 1/2	The registration and memory function can be performed with its operation.

Sensors

Item	Function
Door mirror sensor (LH/RH)	Detect the up/down and left/right position of outside mirror face.
Pedal adjusting sensor	Detect the forward/backward position of pedal assembly.
Lifting sensor (front)	Detect the up/down position of seat lifting (front).
Lifting sensor (rear)	Detect the up/down position of seat lifting (rear).
Reclining sensor	Detect the tilt of seatback.
Sliding sensor	Detect the front/rear position of seat.

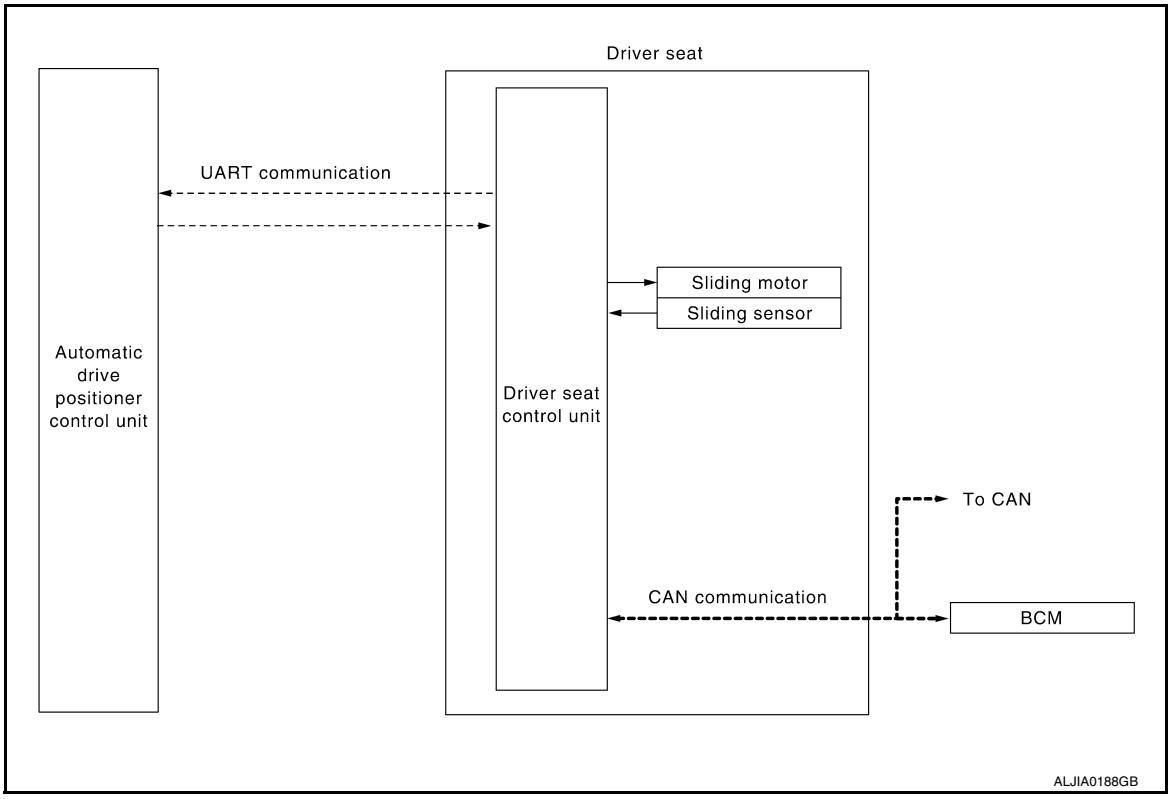
OUTPUT PARTS

Item	Function
Door mirror motor (LH/RH)	Move the outside mirror face upward/downward and left/right.
Pedal adjusting motor	Move the pedal assembly forward/backward.
Lifting motor (front)	Move the seat lifter (front) upward/downward.
Lifting motor (rear)	Move the seat lifter (rear) upward/downward.
Reclining motor	Tilt and raise up the seatback.
Sliding motor	Slide the seat forward/backward.
Memory indicator	Illuminates or blinks according to the registration/operation status.

EXIT ASSIST FUNCTION

EXIT ASSIST FUNCTION : System Diagram

INFOID:0000000009882037



EXIT ASSIST FUNCTION : System Description

INFOID:0000000009882038

OUTLINE

When exiting, if the conditions are satisfied, the seat is moved backward from normal sitting position.
The seat slide amount at entry/exit operation can be changed.

NOTE:

- This function is set to OFF before delivery (initial setting).
- Further information for the system setting procedure. Refer to Owner's Manual.

OPERATION PROCEDURE

1. Open the driver door with ignition switch in OFF position.
2. Front seat LH will move to the exiting position.

OPERATION CONDITION

Satisfy all of the following items. The exit assist function is not performed if these items are not satisfied.

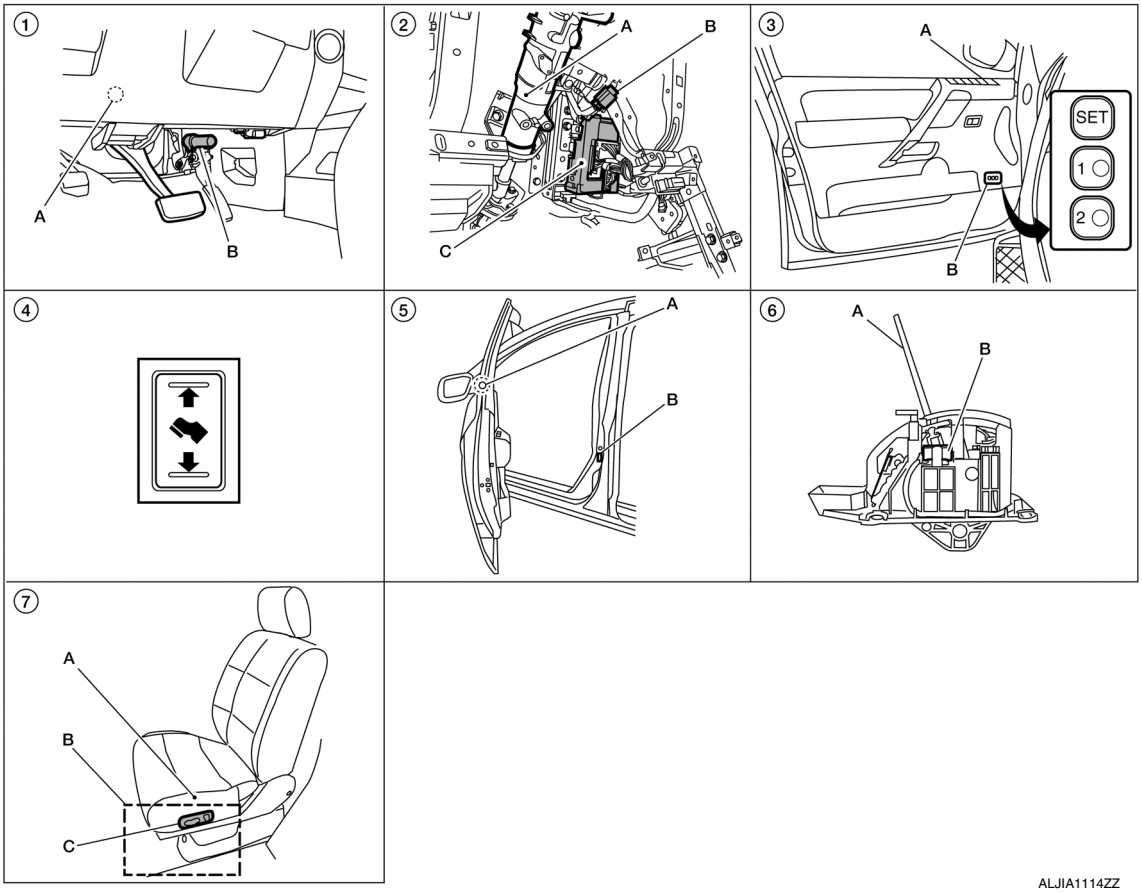
Item	Request status
Ignition switch	OFF
System setting [Entry/exit assist function]	ON
Initialization	Done
Switch inputs • Power seat switch • Pedal adjusting switch • Door mirror remote control switch • Set switch • Seat memory switch	OFF (Not operated)
A/T selector lever	P position

DETAIL FLOW

Order	Input	Output	Control unit condition
1	Front door switch LH	—	Driver seat control unit receives front door switch LH signal (open) from BCM via CAN communication.
2	—	Motor (seat sliding)	Driver seat control unit operates the seat sliding motor, which recognizes that the front door LH is opened with ignition switch OFF.

EXIT ASSIST FUNCTION : Component Parts Location

INFOID:0000000009882039



ALJIA1114ZZ

1. A. Automatic drive positioner control unit M33, M34
   B. Pedal adjusting motor assembly E109, E110
2. A. Steering column
   B. Key switch and key lock solenoid M27
   C. BCM M18, M19, M20 (view with instrument panel removed)
3. A. Door mirror remote control switch D10
   B. Seat memory switch D5
4. Pedal adjusting switch M96
5. A. Door mirror LH D4, RH D107
   B. Front door switch LH B8
6. A. A/T selector lever (floor shift)
   B. A/T shift selector (park position switch) M203
7. A. Sliding motor LH B204 (driver seat view), reclining motor LH B205, lifting motor (front) B206, lifting motor (rear) B207
   B. Driver seat control unit B202, B203
   C. Power seat switch LH B208

EXIT ASSIST FUNCTION : Component Description

INFOID:0000000009882040

CONTROL UNITS

Item	Function
Driver seat control unit	Operates the seat sliding motor for a constant amount.
BCM	Recognizes the following status and transmits it to the driver seat control unit via CAN communication. • Front door LH: OPEN/CLOSE

INPUT PARTS

Switches

Item	Function
Front door switch LH	Detect front door LH open/close status.

Sensors

Item	Function
Sliding sensor	Detect the front/rear position of seat.

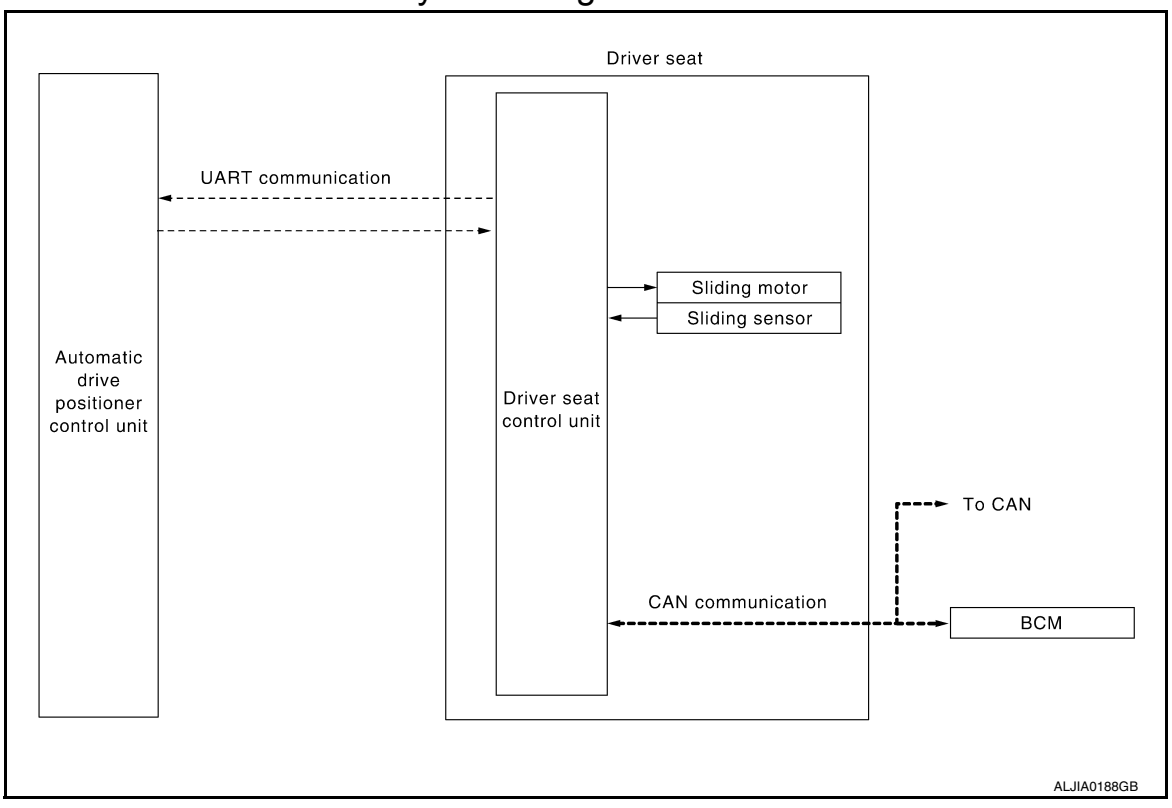
OUTPUT PARTS

Item	Function
Sliding motor	Slide the seat forward/backward.

ENTRY ASSIST FUNCTION

ENTRY ASSIST FUNCTION : System Diagram

INFOID:0000000009882041



ENTRY ASSIST FUNCTION : System Description

INFOID:0000000009882042

OUTLINE

The seat is in the exiting position when either following condition (A or B) is satisfied, the seat returns from exiting position to the previous driving position.

NOTE:

- This function is set to OFF before delivery (initial setting).
- Further information for the system setting procedure. Refer to Owner's Manual.

OPERATION PROCEDURE

1. A: Turn the ignition switch ON.
   B: Turn the ignition switch from OFF to ACC after closing the driver door.
2. Front seat LH will return from the exiting position to entry position.

OPERATION CONDITION

Satisfy all of the following items. The entry assist function is not performed if these items are not satisfied.

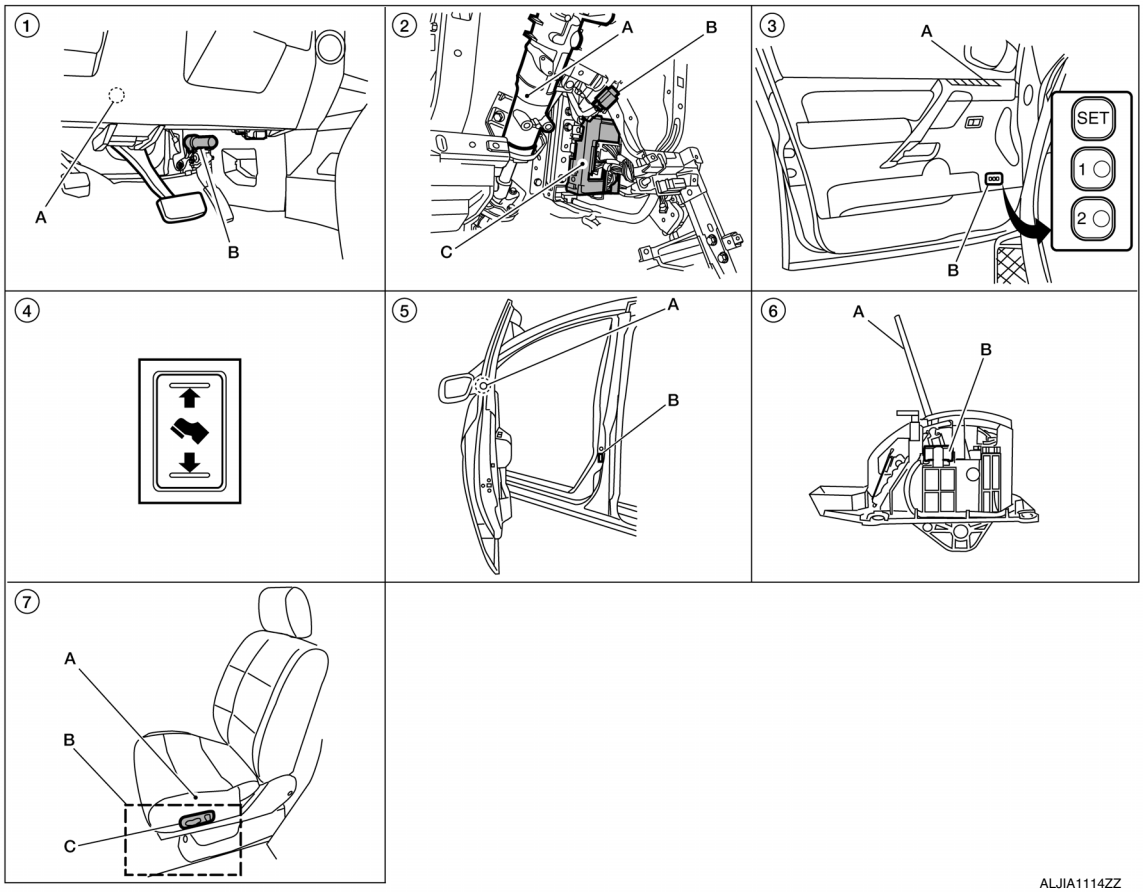
Item	Request status
Seat	The vehicle is not moved after performing the exit assist function.
Switch inputs • Power seat switch • Pedal adjusting switch • Door mirror control switch • Set switch • Memory switch	OFF (Not operated)
A/T selector lever	P position

DETAIL FLOW

Order	Input	Output	Control unit condition
1	Door switch/Ignition switch	—	Driver seat control unit receives the signals of ignition switch signal and front door switch from BCM via CAN communication.
2	—	Motor (sliding)	Driver seat control unit operates the sliding motor when the operating conditions are satisfied.
	Sensor (sliding)	—	Sensor monitors the operating positions of seat and then stops the operation of motor when seat reaches the recorded address.

ENTRY ASSIST FUNCTION : Component Parts Location

INFOID:0000000009882043



ALJIA1114ZZ

1. A. Automatic drive positioner control unit M33, M34
   B. Pedal adjusting motor assembly E109, E110
2. A. Steering column
   B. Key switch and key lock solenoid M27
   C. BCM M18, M19, M20 (view with instrument panel removed)
3. A. Door mirror remote control switch D10
   B. Seat memory switch D5
4. Pedal adjusting switch M96
5. A. Door mirror LH D4, RH D107
   B. Front door switch LH B8
6. A. A/T selector lever (floor shift)
   B. A/T shift selector (park position switch) M203
7. A. Sliding motor LH B204 (driver seat view), reclining motor LH B205, lifting motor (front) B206, lifting motor (rear) B207
   B. Driver seat control unit B202, B203
   C. Power seat switch LH B208

ENTRY ASSIST FUNCTION : Component Description

INFOID:0000000009882044

CONTROL UNITS

Item	Function
Driver seat control unit	According to the ignition signal and front door switch LH signal from BCM, • Operates the seat sliding motor for a constant amount.
BCM	Recognizes the following status and transmits it to the driver seat control unit via CAN communication. • Front door LH: OPEN/CLOSE • Ignition switch position: ACC/ON

INPUT PARTS

Switches

Item	Function
Front door switch LH	Detect front door LH open/close status.

Sensors

Item	Function
Sliding sensor	Detect the front/rear position of seat.

OUTPUT PARTS

Item	Function
Sliding motor	Slide the seat forward/backward.

DIAGNOSIS SYSTEM (DRIVER SEAT C/U)

Diagnosis Description

INFOID:0000000009882045

The auto drive positioner system can be checked and diagnosed for component operation with CONSULT.

DIAGNOSTIC MODE

Diagnostic mode [AUTO DRIVE POS.]	Description
WORK SUPPORT	Changes the setting of each function.
SELF DIAGNOSTIC RESULT	Performs self-diagnosis for the auto drive positioner system and displays the results.
DATA MONITOR	Displays input signals transmitted from various switches and sensors to driver seat control unit in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Drive each output device.
ECU IDENTIFICATION	Displays part numbers of driver seat control unit parts.

CONSULT Function

INFOID:0000000009882046

SELF-DIAGNOSIS RESULTS

Refer to ADP-112, "DTC Index".

DATA MONITOR

Monitor Item	Unit	Main Signals	Selection From Menu	Contents
SET SW	“ON/OFF”	×	×	ON/OFF status judged from the setting switch signal.
MEMORY SW1	“ON/OFF”	×	×	ON/OFF status judged from the seat memory switch 1 signal.
MEMORY SW2	“ON/OFF”	×	×	ON/OFF status judged from the seat memory switch 2 signal.
SLIDE SW–FR	“ON/OFF”	×	×	ON/OFF status judged from the sliding switch (forward) signal.
SLIDE SW–RR	“ON/OFF”	×	×	ON/OFF status judged from the sliding switch (backward) signal.
RECLN SW–FR	“ON/OFF”	×	×	ON/OFF status judged from the reclining switch (forward) signal.
RECLN SW–RR	“ON/OFF”	×	×	ON/OFF status judged from the reclining switch (backward) signal.
LIFT FR SW–UP	“ON/OFF”	×	×	ON/OFF status judged from the lifting switch front (up) signal.
LIFT FR SW–DN	“ON/OFF”	×	×	ON/OFF status judged from the lifting switch front (down) signal.
LIFT RR SW–UP	“ON/OFF”	×	×	ON/OFF status judged from the lifting switch rear (up) signal.
LIFT RR SW–DN	“ON/OFF”	×	×	ON/OFF status judged from the lifting switch rear (down) signal.
MIR CON SW–UP	“ON/OFF”	×	×	ON/OFF status judged from the mirror switch (up) signal.
MIR CON SW–DN	“ON/OFF”	×	×	ON/OFF status judged from the mirror switch (down) signal.
MIR CON SW–RH	“ON/OFF”	×	×	ON/OFF status judged from the door mirror remote control switch (passenger side) signal.
MIR CON SW–LH	“ON/OFF”	×	×	ON/OFF status judged from the door mirror remote control switch (driver side) signal.

Monitor Item	Unit	Main Signals	Selection From Menu	Contents
MIR CHNG SW–R	“ON/OFF”	×	×	ON/OFF status judged from the door mirror remote control switch (switching to right) signal.
MIR CHNG SW–L	“ON/OFF”	×	×	ON/OFF status judged from the door mirror remote control switch (switching to left) signal.
PEDAL SW-FR	“ON/OFF”	×	×	ON/OFF status judged from the pedal adjusting switch (forward) signal.
PEDAL SW-RR	“ON/OFF”	×	×	ON/OFF status judged from the pedal adjusting switch (backward) signal.
DETENT SW	“ON/OFF”	×	×	The selector lever position “OFF (P position) / ON (other than P position)” judged from the park position switch signal.
STARTER SW	“ON/OFF”	×	×	Ignition key switch ON (START, ON) /OFF (ACC, OFF) status judged from the ignition switch signal.
SLIDE PULSE	—	–	×	Value (32768) when battery connections are standard. If it moves backward, the value increases. If it moves forward, the value decreases.
RECLN PULSE	—	–	×	Value (32768) when battery connections are standard. If it moves backward, the value increases. If it moves forward, the value decreases.
LIFT FR PULSE	—	–	×	Value (32768) when battery connections are standard. If it moves DOWN, the value increases. If it moves UP, the value decreases.
LIFT RR PULSE	—	–	×	Value (32768) when battery connections are standard. If it moves DOWN, the value increases. If it moves UP, the value decreases.
MIR/SEN RH U–D	“V”	–	×	Voltage input from door mirror sensor (passenger side) up/down is displayed.
MIR/SEN RH R–L	“V”	–	×	Voltage input from door mirror sensor (passenger side) left/right is displayed.
MIR/SEN LH U–D	“V”	–	×	Voltage input from door mirror sensor (driver side) up/down is displayed.
MIR/SEN LH R–L	“V”	–	×	Voltage input from door mirror sensor (driver side) left/right is displayed.
PEDAL SEN	“V”	–	×	Pedal position (voltage) judged from the pedal adjusting sensor signal is displayed.

ACTIVE TEST

CAUTION:

When driving vehicle, do not perform active test.

Test item	Description
SEAT SLIDE	Activates/deactivates the sliding motor.
SEAT RECLINING	Activates/deactivates the reclining motor.
SEAT LIFTER FR	Activates/deactivates the lifting motor (front).
SEAT LIFTER RR	Activates/deactivates the lifting motor (rear).
PEDAL MOTOR	Activates/deactivates the pedal adjusting motor.
MIRROR MOTOR RH	Activates/deactivates the mirror motor (passenger side).
MIRROR MOTOR LH	Activates/deactivates the mirror motor (driver side).
MEMORY SW INDCTR	Turns ON/OFF the memory indicator.

WORK SUPPORT

Work item	Content	Item
SEAT SLIDE VOLUME SET	The amount of seat sliding for entry/exit assist can be selected from 3 items.	40 mm
		80 mm
		150 mm
EXIT SEAT SLIDE SETTING	Entry/exit assist (seat) can be selected: ON (operated) – OFF (not operated)	ON
		OFF

DTC/CIRCUIT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000009882047

Refer to BCS-27, "Description".

DTC Logic

INFOID:0000000009882048

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000	CAN COMM CIRCUIT	• Driver seat control unit cannot communicate to other control units. • Driver seat control unit cannot communicate for more than the specified time.	• Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON and wait at least 3 seconds.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to BCS-27, "Diagnosis Procedure".
NO >> Inspection End.

Special Repair Requirement

INFOID:0000000009882049

Refer to Owner’s Manual.

B2112 SLIDING MOTOR

Description

INFOID:0000000009882050

- The seat sliding motor is installed to the power seat frame assembly.
- The seat sliding motor is installed with the driver seat control unit.
- Slides the seat frontward/rearward by changing the rotation direction of sliding motor.

DTC Logic

INFOID:0000000009882051

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2112	SEAT SLIDE	The driver seat control unit detects the output of sliding motor output terminal for 0.1 second or more even if the sliding switch is not input.	• Driver seat control unit

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-30, "Diagnosis Procedure".
NO >> Inspection End.

NOTE:
First perform diagnosis for B2126 if B2126 is detected. Refer to ADP-42, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009882052

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT.
3. Erase the DTC.
4. Perform DTC confirmation procedure. Refer to ADP-30, "DTC Logic".

Is the DTC displayed again?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

2. CHECK SLIDING MOTOR CIRCUIT (POWER SHORT)

1. Turn ignition switch OFF.
2. Disconnect sliding motor and driver seat control unit connector.
3. Check voltage between sliding motor harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Sliding motor			
Connector	Terminals		
B204	1	Ground	0
	5		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair circuit for short to voltage.

3.CHECK DRIVER SEAT CONTROL UNIT OUTPUT SIGNAL

1. Connect driver seat control unit connector.
2. Check voltage between driver seat control unit harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Driver seat control unit			
Connector	Terminals		
B203	35	Ground	0
	42		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> Inspection End.

B2113 RECLINING MOTOR

Description

INFOID:0000000009882053

- The seat reclining motor is installed to the seatback assembly.
- The seat reclining motor is activated with the driver seat control unit.
- Tilts the seatback frontward/rearward by changing the rotation direction of reclining motor.

DTC Logic

INFOID:0000000009882054

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2113	SEAT RECLINING	The driver seat control unit detects the output of reclining motor output terminal for 0.1 second or more even if the reclining switch is not input.	• Driver seat control unit

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-32, "Diagnosis Procedure".
NO >> Inspection End.

NOTE:
First perform diagnosis for B2126 if B2126 is detected. Refer to ADP-42, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009882055

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT.
3. Erase the DTC.
4. Perform DTC confirmation procedure. Refer to ADP-32, "DTC Logic".

Is the DTC displayed again?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

2. CHECK RECLINING MOTOR CIRCUIT (POWER SHORT)

1. Turn ignition switch OFF.
2. Disconnect reclining motor and driver seat control unit connector.
3. Check voltage between reclining motor harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Reclining motor			
Connector	Terminals		
B205	2	Ground	0
	3		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair circuit for short to voltage.

3.CHECK DRIVER SEAT CONTROL UNIT OUTPUT SIGNAL

1. Connect driver seat control unit connector.
2. Check voltage between driver seat control unit harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Driver seat control unit			
Connector	Terminals		
B203	36	Ground	0
	44		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> Inspection End.

B2114 SEAT LIFTER FR

Description

INFOID:0000000009882056

- The lifting motor (front) is installed to the power seat frame assembly.
- The lifting motor (front) is activated with the driver seat control unit.
- Tilts the seat front up/down by changing the rotation direction of lifting motor (front).

DTC Logic

INFOID:0000000009882057

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2114	SEAT LIFTER FR	The driver seat control unit detects the output of lifting motor (front) output terminal for 0.1 second or more even if the lifting switch is not input.	• Driver seat control unit

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-34, "Diagnosis Procedure".
NO >> Inspection End.

NOTE:
First perform diagnosis for B2126 if B2126 is detected. Refer to ADP-42, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009882058

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT.
3. Erase the DTC.
4. Perform DTC confirmation procedure. Refer to ADP-34, "DTC Logic".

Is the DTC displayed again?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

2. CHECK LIFTING MOTOR (FRONT) CIRCUIT (POWER SHORT)

1. Turn ignition switch OFF.
2. Disconnect driver seat control unit and lifting motor (front) connector.
3. Check voltage between lifting motor (front) harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Lifting motor (front)			
Connector	Terminals		
B206	1	Ground	0
	5		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair circuit for short to voltage.

3.CHECK DRIVER SEAT CONTROL UNIT OUTPUT SIGNAL

1. Connect driver seat control unit connector.
2. Check voltage between driver seat control unit harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Driver seat control unit			
Connector	Terminals		
B203	37	Ground	0
	45		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> Inspection End.

B2115 SEAT LIFTER RR

Description

INFOID:0000000009882059

- The lifting motor (rear) is installed to the power seat frame assembly.
- The lifting motor (rear) is activated with the driver seat control unit.
- Tilts the seat rear up/down by changing the rotation direction of lifting motor (rear).

DTC Logic

INFOID:0000000009882060

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2115	SEAT LIFTER RR	The driver seat control unit detects the output of lifting motor (rear) output terminal for 0.1 second or more even if the lifting switch is not input.	• Driver seat control unit

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-36, "Diagnosis Procedure".
NO >> Inspection End.

NOTE:
First perform diagnosis for B2126 if B2126 is detected. Refer to ADP-42, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009882061

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check “Self diagnostic result” with CONSULT.
3. Erase the DTC.
4. Perform DTC confirmation procedure. Refer to ADP-36, "DTC Logic".

Is the DTC displayed again?

YES >> GO TO 2.
NO >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

2. CHECK LIFTING MOTOR (REAR) CIRCUIT (POWER SHORT)

1. Turn ignition switch OFF.
2. Disconnect lifting motor (rear) and driver seat control unit connector.
3. Check voltage between lifting motor (rear) harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Lifting motor (rear)			
Connector	Terminals		
B207	1	Ground	0
	5		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair circuit for short to voltage.

3.CHECK DRIVER SEAT CONTROL UNIT OUTPUT SIGNAL

1. Connect driver seat control unit connector.
2. Check voltage between driver seat control unit harness connector and ground.

(+)		(–)	Voltage (V) (Approx.)
Driver seat control unit			
Connector	Terminals		
B203	38	Ground	0
	39		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> Inspection End.

B2117 ADJ PEDAL MOTOR

Description

INFOID:0000000009882062

- The pedal adjusting sensor is installed to pedal adjusting motor assembly.
- The resistance of pedal adjusting sensor is changed according to the forward/backward position of pedal assembly.
- The terminal voltage of automatic drive positioner control unit will be changed according to a change of pedal adjusting sensor resistance. Automatic drive positioner control unit calculates the pedal position from the voltage.

DTC Logic

INFOID:0000000009882063

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2117	ADJ PEDAL MOTOR	When any manual or automatic operations are not performed, if motor operation is detected for 0.1 second or more, status is judged "Output error".	• Harness and connectors (pedal adjusting sensor circuit is opened/shorted, pedal adjusting sensor power supply circuit is opened/shorted.) • Pedal adjusting sensor

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-38, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000009882064

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK PEDAL ADJUSTING MECHANISM

Check the following.
- Operation malfunction caused by pedal adjusting mechanism deformation or pinched harness or other foreign materials
- Operation malfunction and interference with other parts by poor installation

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace the malfunctioning part and check again.

2. CHECK FUNCTION

1. Turn ignition switch ON.
2. Check “PEDAL MOTOR” in "Active test" mode with CONSULT.

Test item	Description
PEDAL MOTOR	The pedal adjusting motor is activated by receiving the drive signal.

Is the inspection result normal?

YES >> Pedal adjusting motor assembly circuit is OK.
NO >> GO TO 3

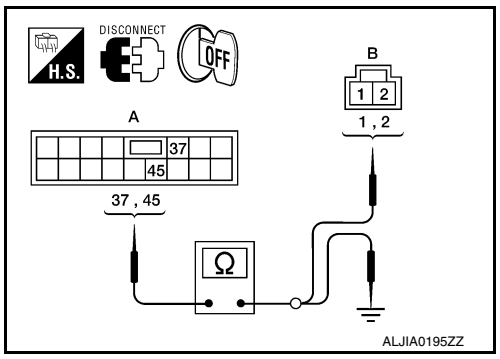
3. CHECK PEDAL ADJUSTING MOTOR ASSEMBLY CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and pedal adjusting motor assembly.
3. Check continuity between automatic drive positioner control unit connector M34 (A) terminals 37, 45 and pedal adjusting motor assembly connector E109 (B) terminals 1, 2.

37 - 1 : Continuity should exist.
45 - 2 : Continuity should exist.

4. Check continuity between automatic drive positioner control unit connector M34 (A) terminals 37, 45 and ground.

37 - Ground : Continuity should not exist.
45 - Ground : Continuity should not exist.



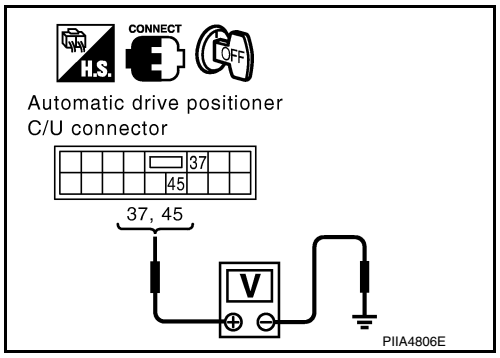
Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK AUTOMATIC DRIVE POSITIONER CONTROL UNIT OUTPUT SIGNAL

1. Connect the automatic drive positioner control unit and pedal adjusting motor assembly.
2. Check voltage between automatic drive positioner control unit connector and ground.

Connector	Terminals (+)	Terminals (-)	Condition	Voltage (V) (Approx.)
M34	37	Ground	Pedal adjusting switch ON (FORWARD operation)	Battery voltage
			Other than above	0
	45		Pedal adjusting switch ON (BACKWARD operation)	Battery voltage
			Other than above	0



Is the inspection result normal?

YES >> Replace pedal adjusting motor assembly. Refer to ADP-151, "Removal and Installation".
NO >> GO TO 5

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

B2120 ADJ PEDAL SENSOR

Description

INFOID:0000000009882065

- The pedal adjusting sensor is installed in the pedal adjusting motor assembly.
- The resistance of pedal adjusting sensor is changed according to the forward/backward position of pedal adjusting motor assembly.
- The terminal voltage of automatic drive positioner control unit will be changed according to a change of pedal adjusting sensor resistance. Automatic drive positioner control unit calculates the pedal assembly position from the voltage.

DTC Logic

INFOID:0000000009882066

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2120	ADJ PEDAL SENSOR	The input voltage of pedal adjusting sensor is 0.5V or less or 4.5V or higher, for 0.5 seconds or more.	• Harness and connectors (Pedal adjusting sensor circuit is opened/shorted, pedal adjusting sensor power supply circuit is opened/shorted.) • Pedal adjusting sensor

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC is detected?

YES >> Perform diagnosis procedure. Refer to ADP-40, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000009882067

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK PEDAL ADJUSTING SENSOR SIGNAL

1. Turn ignition switch ON.
2. Select “PEDAL SEN” in “Data monitor” mode with CONSULT.
3. Check the pedal adjusting sensor signal under the following condition.

Monitor item	Condition		Value
PEDAL SEN	Pedal position	Forward	0.5V
		Backward	4.5V

Is the value normal?

YES >> Pedal adjusting circuit is OK.
NO >> GO TO 2

2. CHECK PEDAL ADJUSTING MOTOR ASSEMBLY CIRCUIT HARNESS CONTINUITY

1. Disconnect automatic drive positioner control unit and pedal adjusting motor assembly.
2. Check continuity between automatic drive positioner connector M33 (A) terminal 8, M34 (C) terminals 33 and 41 and pedal adjusting motor assembly connector E110 (B) terminals 3, 4, 5.

8 - 4	**: Continuity should exist.**
33 - 3	**: Continuity should exist.**
41 - 5	**: Continuity should exist.**

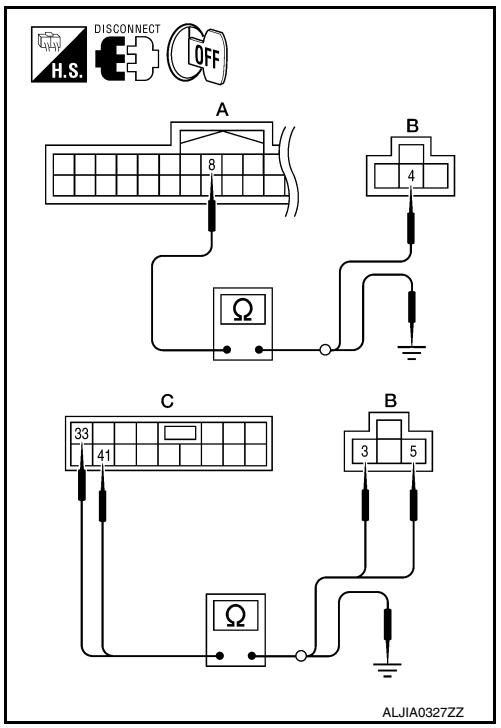
3. Check continuity between automatic drive positioner control unit connector M33 (A) terminal 8, M34 (C) terminals 33 and 41 and ground.

8 - Ground	**: Continuity should not exist.**
33 - Ground	**: Continuity should not exist.**
41 - Ground	**: Continuity should not exist.**

Is the inspection result normal?

YES >> Replace pedal adjusting motor assembly. Refer to ADP-151, "Removal and Installation".

NO >> Repair or replace harness.



B2126 DETENT SW

Description

INFOID:0000000009882068

- The park position switch is installed on A/T shift selector. It is turned OFF when the A/T shift selector is in P position.
- The driver seat control unit judges that the A/T shift selector is in P position if continuity does not exist in this circuit.

DTC Logic

INFOID:0000000009882069

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2126	DETENT SW	A/T shift selector is in P position and the vehicle speed of 4±2 MPH (7±4 km/h) is detected.	• Harness and connectors (Park position switch circuit is opened/shorted.) • A/T shift selector (park position switch) • Combination meter (CAN communication)

DTC CONFIRMATION PROCEDURE

1. STEP 1

Drive the vehicle at 4±2 MPH (7±4 km/h) or more.

>> GO TO 2

2. STEP 2

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-42, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000009882070

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK DTC

Check “Self diagnostic result” for BCM with CONSULT.

Are other DTCs detected?

YES >> Check the DTC.
NO >> GO TO 2

2. CHECK PARK POSITION SWITCH SIGNAL

1. Turn ignition switch ON.
2. Select “DETENT SW” in “Data Monitor” mode with CONSULT.
3. Check park position switch signal under the following condition.

Monitor item	Condition		Status
DETENT SW	A/T shift selector	P position	OFF
		Other than above	ON

Is the status normal?

YES >> A/T shift selector (park position switch) circuit is OK.
NO >> GO TO 3

3. CHECK A/T SHIFT SELECTOR (PARK POSITION SWITCH) HARNESS

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector and driver seat control unit.
3. Check continuity between A/T shift selector connector M203 terminal 6 and driver seat control unit connector B202 terminal 21.

6 - 21 : Continuity should exist.

4. Check continuity between A/T shift selector connector M203 terminal 6 and ground.

6 - Ground : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK A/T SHIFT SELECTOR (PARK POSITION SWITCH)

Check continuity between A/T shift selector (park position switch) terminals as follows.

Terminals		Condition	Continuity
5	6	P position	No
		Other than P position	Yes

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace A/T shift selector. Refer to TM-189, "A/T Shift Selector Removal and Installation".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

B2128 UART COMMUNICATION LINE

Description

INFOID:0000000009882071

Driver seat control unit performs UART communication with the automatic drive positioner control unit using 2 communication lines, TX and RX line. Driver seat control unit receives the operation signals of pedal adjusting switch, door mirror remote control switch, set switch and memory switch and the position signals of adjustable pedal sensor and door mirror sensor from the automatic drive positioner control unit and transmits the operation request signal.

DTC Logic

INFOID:0000000009882072

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
B2128	UART COMM	The communication between driver seat control unit and automatic drive positioner control unit is interrupted for a period of time.	• UART communication line (UART communication line is open or shorted) • Driver seat control unit • Automatic drive positioner control unit

DTC CONFIRMATION PROCEDURE

1. STEP 1

Turn ignition switch ON.

>> GO TO 2

2. STEP 2

Operate pedal adjusting switch for more than 2 seconds.

>> GO TO 3

3. PROCEDURE 3

Check “Self diagnostic result” with CONSULT.

Is the DTC detected?

YES >> Perform diagnosis procedure. Refer to ADP-44, "Diagnosis Procedure".
NO >> Inspection End.

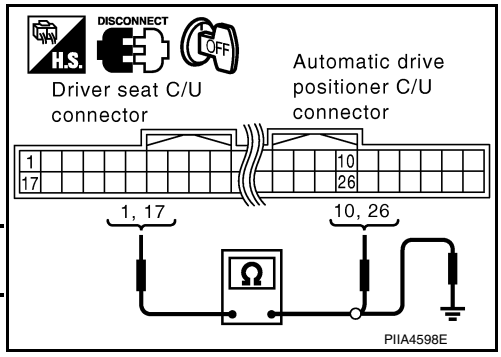
Diagnosis Procedure

INFOID:0000000009882073

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK UART COMMUNICATION LINE CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect driver seat control unit and automatic drive positioner control unit.
3. Check continuity between driver seat control unit harness connector and automatic drive positioner control unit harness connector.



Driver seat control unit connector	Terminal	Automatic drive positioner control unit connector	Terminal	Continuity

B202	1	M33	10	Yes
	17		26	

4. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B202	1		No
	17		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
NO >> Repair or replace harness.

POWER SUPPLY AND GROUND CIRCUIT
BCM
BCM : Diagnosis Procedure

INFOID:0000000009882074

Regarding Wiring Diagram information, refer to BCS-44, "Wiring Diagram".

1. CHECK FUSES AND FUSIBLE LINK

Check that the following fuses and fusible link are not blown.

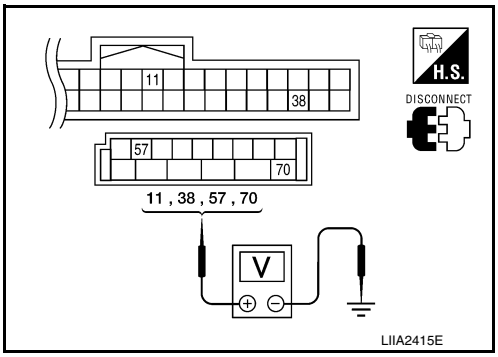
Terminal No.	Signal name	Fuses and fusible link No.
57	Battery power supply	22 (15A)
70		F (50A)
11	Ignition ACC or ON	4 (10A)
38	Ignition ON or START	59 (10A)

Is the fuse blown?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit.
NO >> GO TO 2

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM.
3. Check voltage between BCM harness connector and ground.



Connector	Terminals (+)	Terminals (-)	Power source	Condition	Voltage (V) (Approx.)
M18	11	Ground	ACC power supply	Ignition switch ACC or ON	Battery voltage
	38	Ground	Ignition power supply	Ignition switch ON or START	Battery voltage
M20	57	Ground	Battery power supply	Ignition switch OFF	Battery voltage
	70	Ground	Battery power supply	Ignition switch OFF	Battery voltage

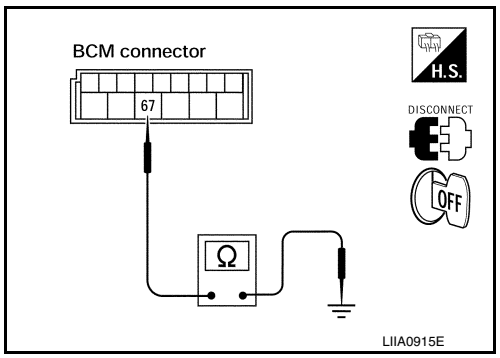
Is the measurement value normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

BCM		Ground	Continuity
Connector	Terminal		
M20	67		Yes



Does continuity exist?

YES >> Inspection End.
NO >> Repair or replace harness.

DRIVER SEAT CONTROL UNIT

DRIVER SEAT CONTROL UNIT : Diagnosis Procedure

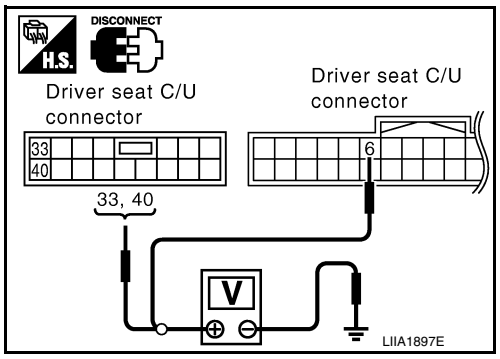
INFOID:0000000009882075

NOTE:
Do not disconnect the battery negative terminal and the driver seat control unit connector until DTC is confirmed with CONSULT.

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect driver seat control unit.
3. Check voltage between driver seat control unit harness connector and ground.



Terminals			Power source	Condition	Voltage (V) (Approx.)
(+)		(–)			
Driver seat control unit connector	Terminal				
B202	6	Ground	START power supply	Ignition switch START	Battery voltage
B203	33		Battery power supply	Ignition switch OFF	
	40				

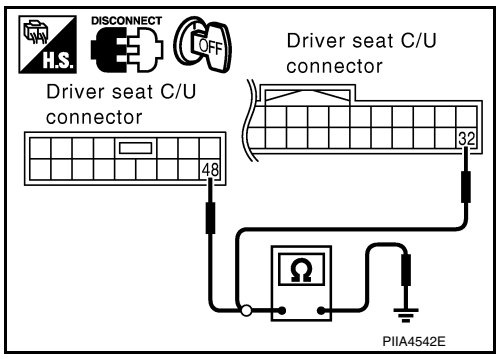
Is the inspection result normal?

YES >> GO TO 2
NO >> Check the following.
- Repair or replace harness.
- Circuit breaker.

2. CHECK GROUND CIRCUIT

Check continuity between the driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B202	32		Yes
B203	48		



Is the inspection result normal?

YES >> Driver seat control unit power supply and ground circuit are OK.

NO >> Repair or replace harness.

DRIVER SEAT CONTROL UNIT : Special Repair Requirement

INFOID:0000000009882076

1. PERFORM ADDITIONAL SERVICE

Perform additional service when removing battery negative terminal.

>> Refer to Owner's Manual.

AUTOMATIC DRIVE POSITIONER CONTROL UNIT

AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Diagnosis Procedure

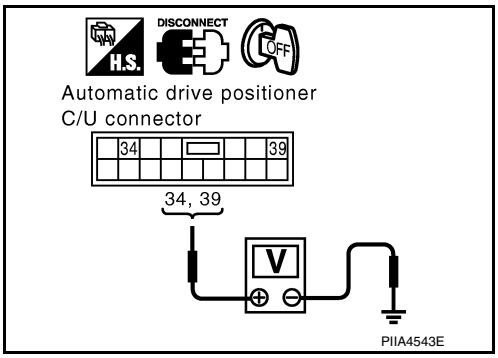
INFOID:0000000009882077

NOTE:
Do not disconnect the battery negative terminal and the driver seat control unit connector until DTC is confirmed with CONSULT.

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the automatic drive positioner control unit.
3. Check voltage between automatic drive positioner control unit harness connector and ground.



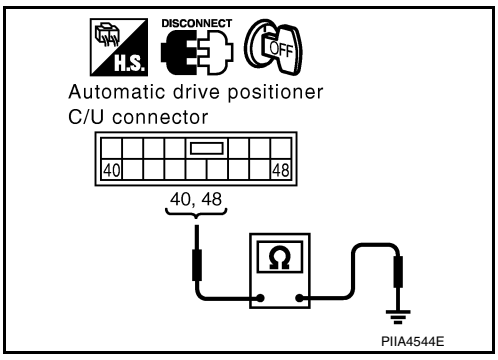
Terminals			Voltage (V) (Approx.)
(+)		(–)	
Automatic drive positioner control unit connector	Terminal		
M34	34	Ground	Battery voltage
	39		

Is the inspection result normal?

YES >> GO TO 2
NO >> Check the following.
- Repair or replace harness.
- Circuit breaker.

2. CHECK GROUND CIRCUIT

Check continuity between the automatic drive positioner control unit harness connector and ground.



Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M34	40		Yes
	48		

Is the inspection result normal?

YES >> Automatic drive positioner control unit power supply and ground circuit are OK.
NO >> Repair or replace harness.

AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Special Repair Requirement

INFOID:0000000009882078

1. PERFORM ADDITIONAL SERVICE

Perform additional service when removing battery negative terminal.

>> Refer to Owner's Manual.

SLIDING SWITCH

Description

INFOID:0000000009882079

Sliding switch is equipped to the power seat switch LH on the seat cushion trim cover. The operation signal is input to the driver seat control unit when the sliding switch is operated.

Component Function Check

INFOID:0000000009882080

1. CHECK FUNCTION

1. Select “SLIDE SW-FR”, “SLIDE SW-RR” in “Data monitor” mode with CONSULT.
2. Check sliding switch signal under the following conditions.

Monitor item	Condition		Status
SLIDE SW-FR	Sliding switch (forward)	Operate	ON
		Release	OFF
SLIDE SW-RR	Sliding switch (backward)	Operate	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-50, "Diagnosis Procedure".

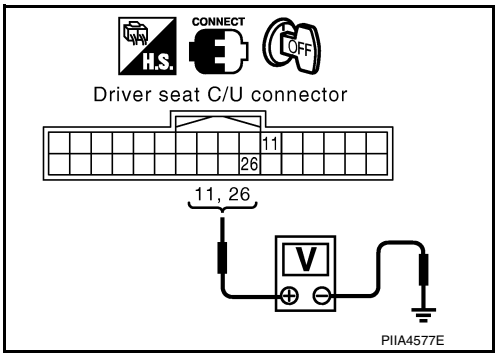
Diagnosis Procedure

INFOID:0000000009882081

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK SLIDING SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between driver seat control unit harness connector and ground.



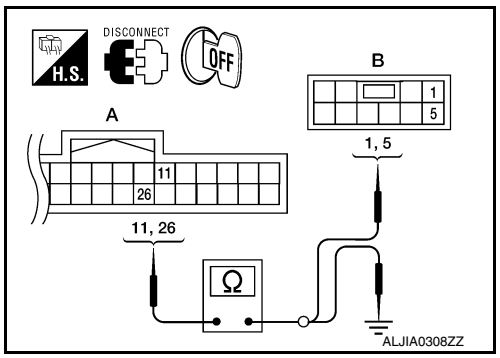
Driver seat control unit connector	Terminals (+)	Terminals (–)	Condition		Voltage (V) (Approx.)
B202	11	Ground	Sliding switch	Operate (backward)	0
				Release	Battery voltage
	26			Operate (forward)	0
				Release	Battery voltage

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK SLIDING SWITCH CIRCUIT

1. Disconnect driver seat control unit and power seat switch LH.
2. Check continuity between driver seat control unit harness connector and power seat switch LH harness connector.



Driver seat control unit connector	Terminal	Power seat switch LH connector	Terminal	Continuity
B202 (A)	11	B208 (B)	1	Yes
	26		5	

3. Check continuity between driver seat control unit harness connector and ground.

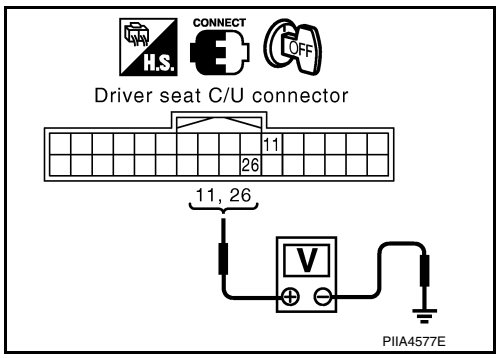
Driver seat control unit connector	Terminal	Ground	Continuity
B202 (A)	11		No
	26		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DRIVER SEAT CONTROL UNIT OUTPUT

1. Connect the driver seat control unit.
2. Turn ignition switch ON.
3. Check voltage between driver seat control unit harness connector and ground.



Driver seat control unit connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
B202	11	Ground	Battery voltage
	26		

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace driver seat control unit. Refer to SE-34, "Removal and Installation - Front Seat Assembly".

4. CHECK SLIDING SWITCH

Refer to ADP-51, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

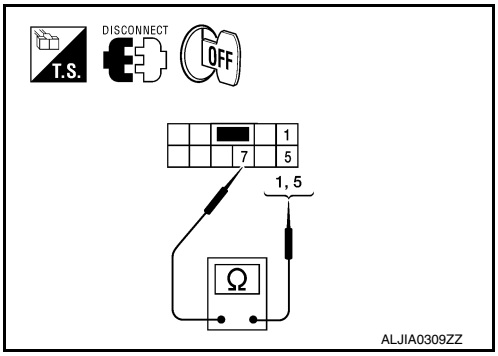
YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace malfunctioning part.

Component Inspection

INFOID:0000000009882082

1. CHECK SLIDING SWITCH

1. Turn ignition switch OFF.
2. Disconnect power seat switch LH.
3. Check continuity between power seat switch LH terminals.



Terminal		Condition		Continuity
Power seat switch LH				
7	1	Sliding switch (backward)	Operate	Yes
			Release	No
	5	Sliding switch (forward)	Operate	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

RECLINING SWITCH

Description

INFOID:0000000009882083

Reclining switch is equipped to the power seat switch LH on the seat cushion trim cover. The operation signal is input to the driver seat control unit when the reclining switch is operated.

Component Function Check

INFOID:0000000009882084

1. CHECK FUNCTION

1. Select “RECLN SW-FR”, “RECLN SW-RR” in “Data monitor” mode with CONSULT.
2. Check reclining switch signal under the following conditions.

Monitor item	Condition		Status
RECLN SW-FR	Reclining switch (forward)	Operate	ON
		Release	OFF
RECLN SW-RR	Reclining switch (backward)	Operate	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-53, "Diagnosis Procedure".

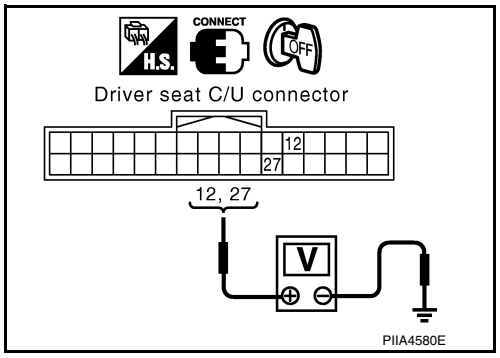
Diagnosis Procedure

INFOID:0000000009882085

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK RECLINING SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between driver seat control unit harness connector and ground.



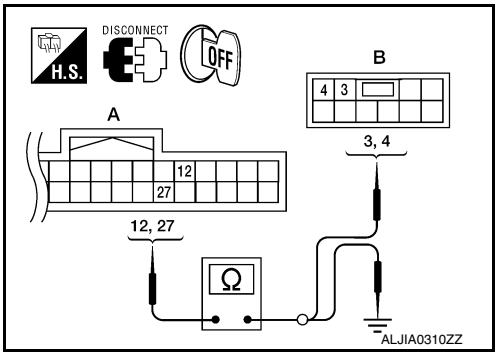
Driver seat control unit connector	Terminals (+)	Terminals (–)	Condition		Voltage (V) (Approx.)
B202	12	Ground	Reclining switch	Operate (backward)	0
				Release	Battery voltage
	27			Operate (forward)	0
				Release	Battery voltage

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK RECLINING SWITCH CIRCUIT

1. Disconnect driver seat control unit and power seat switch LH.
2. Check continuity between driver seat control unit harness connector and power seat switch LH harness connector.



Driver seat control unit connector	Terminal	Power seat switch LH connector	Terminal	Continuity
B202 (A)	12	B208 (B)	3	Yes
	27		4	

3. Check continuity between driver seat control unit harness connector and ground.

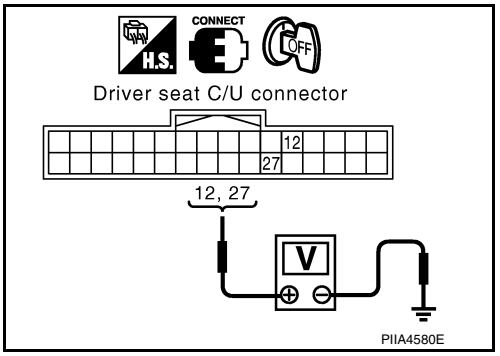
Driver seat control unit connector	Terminal	Ground	Continuity
B202 (A)	12		No
	27		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DRIVER SEAT CONTROL UNIT OUTPUT

1. Connect the driver seat control unit.
2. Turn ignition switch OFF.
3. Check voltage between driver seat control unit harness connector and ground.



Driver seat control unit connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
B202	12	Ground	Battery voltage
	27		

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK RECLINING SWITCH

Refer to ADP-54, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

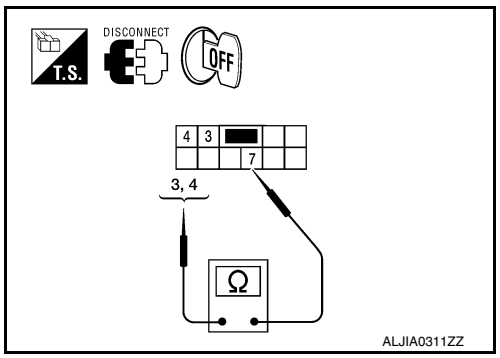
YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882086

1. CHECK RECLINING SWITCH

1. Turn ignition switch OFF.
2. Disconnect power seat switch LH.
3. Check continuity between power seat switch LH terminals.



Terminals		Condition		Continuity
Power seat switch LH				
7	3	Reclining switch (backward)	Operate	Yes
			Release	No
	4	Reclining switch (forward)	Operate	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

LIFTING SWITCH (FRONT)

Description

INFOID:0000000009882087

Lifting switch (front) is equipped to the power seat switch LH on the seat cushion trim cover. The operation signal is input to the driver seat control unit when the lifting switch (front) is operated.

Component Function Check

INFOID:0000000009882088

1. CHECK FUNCTION

1. Select “LIFT FR SW-UP”, “LIFT FR SW-DN” in “DATA MONITOR” mode with CONSULT.
2. Check lifting switch (front) signal under the following conditions.

Monitor item	Condition		Status
LIFT FR SW-UP	Lifting switch front (up)	Operate	ON
		Release	OFF
LIFT FR SW-DN	Lifting switch front (down)	Operate	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-56, "Diagnosis Procedure".

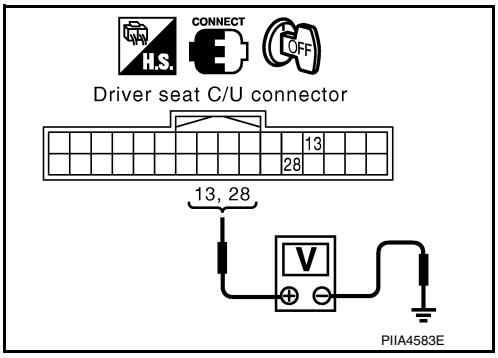
Diagnosis Procedure

INFOID:0000000009882089

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between driver seat control unit harness connector and ground.



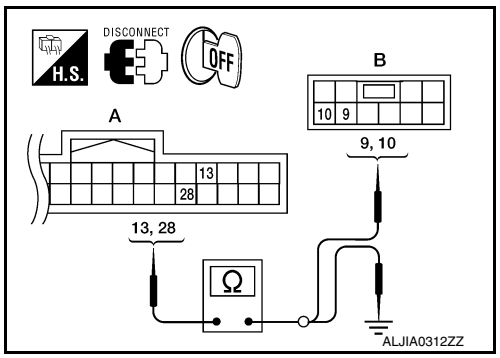
Driver seat control unit connector	Terminals (+)	Terminals (–)	Condition		Voltage (V) (Approx.)
B202	13	Ground	Lifting switch (front)	Operate (down)	0V
				Release	Battery voltage
	28			Operate (up)	0V
				Release	Battery voltage

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK LIFTING SWITCH (FRONT) CIRCUIT

1. Disconnect driver seat control unit and power seat switch LH.
2. Check continuity between driver seat control unit harness connector and power seat switch LH harness connector.



Driver seat control unit connector	Terminal	Power seat switch LH connector	Terminal	Continuity
B202 (A)	13	B208 (B)	9	Yes
	28		10	

3. Check continuity between driver seat control unit harness connector and ground.

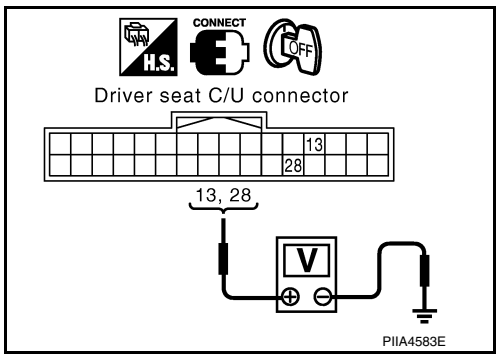
Driver seat control unit connector	Terminal	Ground	Continuity
B202 (A)	13		No
	28		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DRIVER SEAT CONTROL UNIT OUTPUT

1. Connect the driver seat control unit.
2. Turn ignition switch OFF.
3. Check voltage between driver seat control unit harness connector and ground.



Driver seat control unit connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
B202	13	Ground	Battery voltage
	28		

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK LIFTING SWITCH (FRONT)

Refer to ADP-57, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

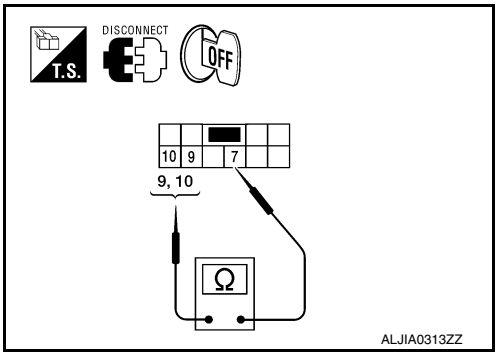
YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882090

1. CHECK LIFTING SWITCH (FRONT)

1. Turn ignition switch OFF.
2. Disconnect power seat switch LH.
3. Check continuity between power seat switch LH terminals.



Terminal		Condition		Continuity
Power seat switch LH				
7	9	Lifting switch front (down)	Operate	Yes
			Release	No
	10	Lifting switch front (up)	Operate	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

LIFTING SWITCH (REAR)

Description

INFOID:0000000009882091

Lifting switch (rear) is equipped to the power seat switch LH on the seat cushion trim cover. The operation signal is inputted to the driver seat control unit when the lifting switch (rear) is operated.

Component Function Check

INFOID:0000000009882092

1. CHECK FUNCTION

1. Select “LIFT RR SW-UP”, “LIFT RR SW-DN” in “Data monitor” mode with CONSULT.
2. Check lifting switch (rear) signal under the following conditions.

Monitor item	Condition		Status
LIFT RR SW-UP	Lifting switch rear (up)	Operate	ON
		Release	OFF
LIFT RR SW-DN	Lifting switch rear (down)	Operate	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-59, "Diagnosis Procedure".

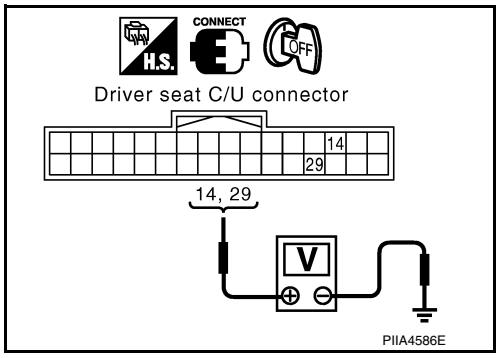
Diagnosis Procedure

INFOID:0000000009882093

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING SWITCH (REAR) SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between driver seat control unit harness connector and ground.



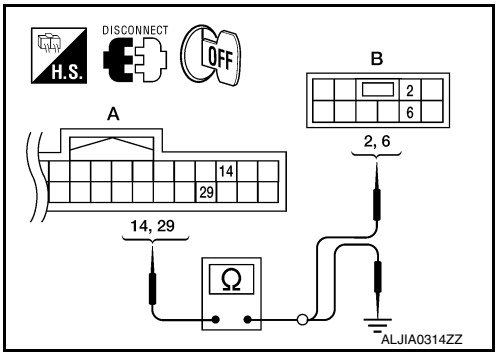
Driver seat control unit connector	Terminals (+)	Terminals (–)	Condition		Voltage (V) (Approx.)
B202	14	Ground	Lifting switch (rear)	Operate (down)	0
				Release	Battery voltage
	29			Operate (up)	0
				Release	Battery voltage

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK LIFTING SWITCH (REAR) CIRCUIT

1. Disconnect driver seat control unit and power seat switch LH.
2. Check continuity between driver seat control unit harness connector and power seat switch LH harness connector.



Driver seat control unit connector	Terminal	Power seat switch LH connector	Terminal	Continuity
B202 (A)	14	B208 (B)	2	Yes
	29		6	

3. Check continuity between driver seat control unit harness connector and ground.

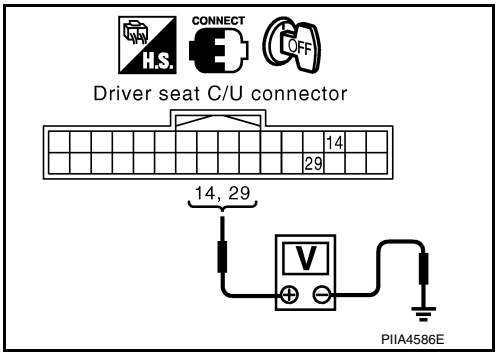
Driver seat control unit connector	Terminal	Ground	Continuity
B202 (A)	14		No
	29		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DRIVER SEAT CONTROL UNIT OUTPUT

1. Connect the driver seat control unit.
2. Turn ignition switch OFF.
3. Check voltage between driver seat control unit harness connector and ground.



Driver seat control unit connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
B202	14	Ground	Battery voltage
	29		

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK LIFTING SWITCH (REAR)

Refer to ADP-60, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

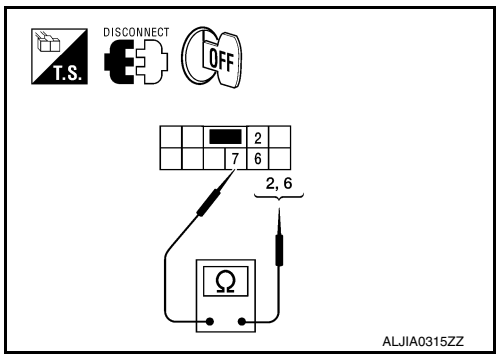
YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882094

1. CHECK LIFTING SWITCH (REAR)

1. Turn ignition switch OFF.
2. Disconnect power seat switch LH.
3. Check continuity between power seat switch LH terminals.



Terminal		Condition		Continuity
Power seat switch LH				
7	2	Lifting switch rear (down)	Operate	Yes
			Release	No
	6	Lifting switch rear (up)	Operate	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace power seat switch LH. Refer to SE-48, "Disassembly and Assembly".

PEDAL ADJUSTING SWITCH

Description

INFOID:0000000009882095

Pedal adjusting switch is on the instrument panel. The operation signal is input to the driver seat control unit when the pedal adjusting switch is operated. The pedal adjusting switch signal is sent to the automatic drive positioner control unit via UART communication.

Component Function Check

INFOID:0000000009882096

1. CHECK FUNCTION

1. Select “PEDAL SW-FR”, “PEDAL SW-RR” in “Data monitor” mode with CONSULT.
2. Check pedal adjusting switch signal under the following conditions.

Monitor item	Condition		Status
PEDAL SW-FR	Pedal adjusting switch (forward)	Operate	ON
		Release	OFF
PEDAL SW-RR	Pedal adjusting switch (backward)	Operate	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-62, "Diagnosis Procedure".

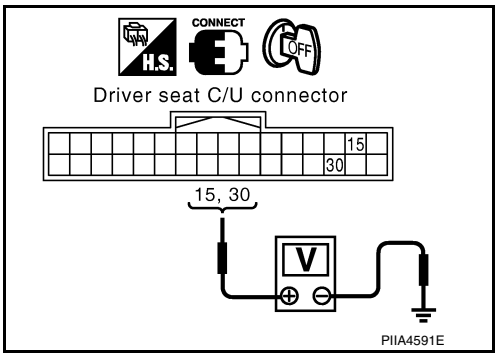
Diagnosis Procedure

INFOID:0000000009882097

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK PEDAL ADJUSTING SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between driver seat control unit harness connector and ground.



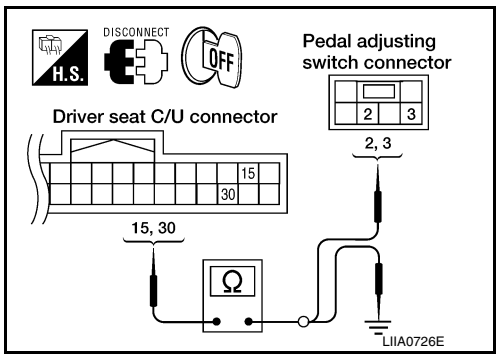
Driver seat control unit connector	Terminals (+)	Terminals (–)	Condition		Voltage (V) (Approx.)
B202	15	Ground	Pedal adjusting switch	Operate (forward)	0
				Release	Battery voltage
	30			Operate (backward)	0
				Release	Battery voltage

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK PEDAL ADJUSTING SWITCH CIRCUIT

1. Disconnect driver seat control unit and pedal adjusting switch.
2. Check continuity between driver seat control unit harness connector and pedal adjusting switch harness connector.



Driver seat control unit connector	Terminal	Pedal adjusting switch connector	Terminal	Continuity
B202	15	M96	2	Yes
	30		3	

3. Check continuity between driver seat control unit harness connector and ground.

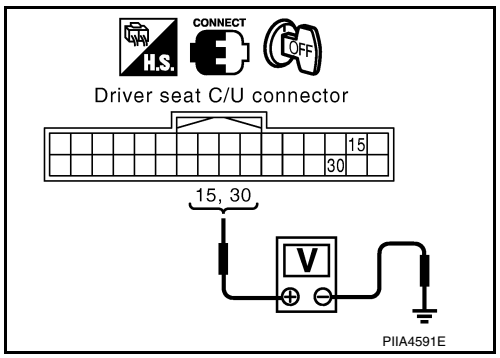
Driver seat control unit connector	Terminal	Ground	Continuity
B202	15		No
	30		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DRIVER SEAT CONTROL UNIT OUTPUT

1. Connect the driver seat control unit.
2. Turn ignition switch OFF.
3. Check voltage between driver seat control unit harness connector and ground.



Driver seat control unit connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
B202	15	Ground	Battery voltage
	30		

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK PEDAL ADJUSTING SWITCH

Refer to ADP-64, "Component Inspection".

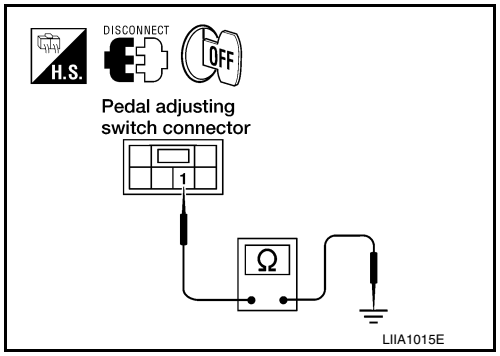
Is the inspection result normal?

YES >> GO TO 5
NO >> Replace pedal adjusting switch. Refer to IP-10, "Exploded View".

5. CHECK PEDAL ADJUSTING SWITCH GROUND CIRCUIT

Check continuity between pedal adjusting switch connector M96 terminal 1 and ground.

1 - Ground : Continuity should exist.



Is the inspection result normal?

YES >> GO TO 6
NO >> Repair or replace harness.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

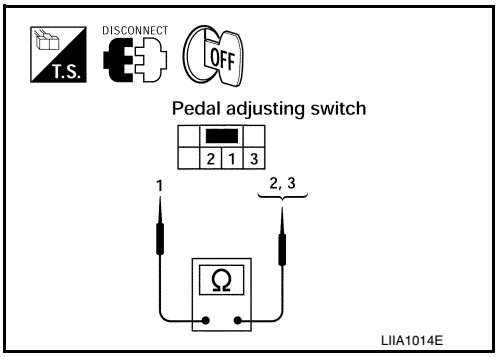
YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882098

1. CHECK PEDAL ADJUSTING SWITCH

1. Turn ignition switch OFF.
2. Disconnect pedal adjusting switch.
3. Check continuity between pedal adjusting switch terminals.



Terminal		Condition		Continuity
Pedal adjusting switch				
1	2	Pedal adjusting switch (backward)	Operate	Yes
			Release	No
	3	Pedal adjusting switch (forward)	Operate	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace pedal adjusting switch. Refer to IP-10, "Exploded View".

SEAT MEMORY SWITCH

Description

INFOID:0000000009882099

The seat memory switch is installed on the front door LH trim. The operation signal is input to the automatic drive positioner control unit when the memory switch is operated.

Component Function Check

INFOID:0000000009882100

1. CHECK FUNCTION

1. Select “MEMORY SW 1”, “MEMORY SW 2”, "SET SW" in “Data monitor” mode with CONSULT.
2. Check seat memory switch signal under the following conditions.

Monitor item	Condition		Status
MEMORY SW1	Memory switch 1	Push	ON
		Release	OFF
MEMORY SW2	Memory switch 2	Push	ON
		Release	OFF
SET SW	Set switch	Push	ON
		Release	OFF

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-65, "Diagnosis Procedure".

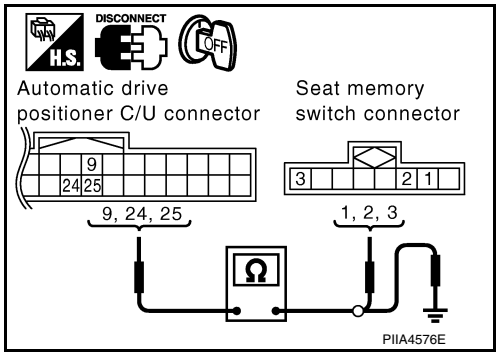
Diagnosis Procedure

INFOID:0000000009882101

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK MEMORY SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and seat memory switch.
3. Check continuity between automatic drive positioner control unit harness connector and seat memory switch harness connector.



Automatic drive positioner control unit connector	Terminal	Seat memory switch connector	Terminal	Continuity
M33	9	D5	1	Yes
	24		3	
	25		2	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit connector	Terminal		Continuity
M33	9	Ground	No
	24		
	25		

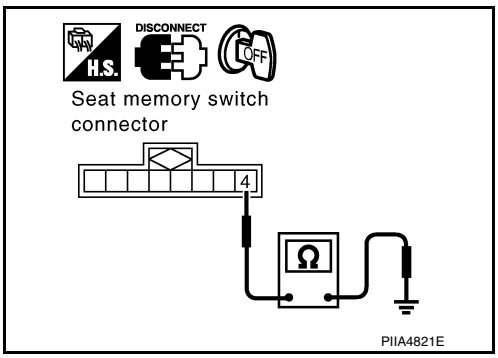
Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace harness.

2. CHECK MEMORY SWITCH GROUND CIRCUIT

Check continuity between seat memory switch harness connector and ground.

Seat memory switch connector	Terminal	Ground	Continuity
D5	4		Yes



Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK SEAT MEMORY SWITCH

Refer to ADP-66, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace seat memory switch. Refer to ADP-149, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

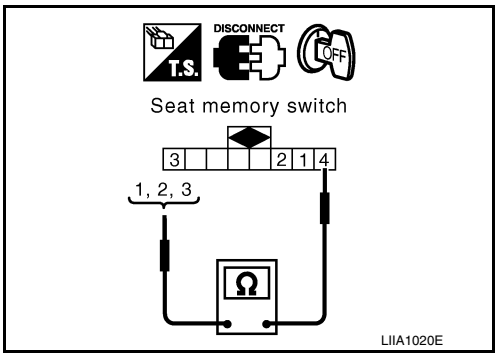
YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882102

1. CHECK SEAT MEMORY SWITCH

1. Turn ignition switch OFF.
2. Disconnect seat memory switch.
3. Check continuity between seat memory switch terminals.



Terminal		Condition		Continuity
Seat memory switch				
4	1	Memory switch 1	Push	Yes
			Release	No
	2	Memory switch 2	Push	Yes
			Release	No
	3	Set switch	Push	Yes
			Release	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace seat memory switch. Refer to ADP-149, "Removal and Installation".

DOOR MIRROR REMOTE CONTROL SWITCH
CHANGEOVER SWITCH

CHANGEOVER SWITCH : Description

INFOID:0000000009882103

Changeover switch is integrated into door mirror remote control switch.
Changeover switch has three positions (L, N and R).
It changes door mirror motor operation by transmitting control signal to automatic drive positioner control unit.

CHANGEOVER SWITCH : Component Function Check

INFOID:0000000009882104

1. CHECK CHANGEOVER SWITCH FUNCTION

Check the operation on “MIR CHNG SW-R” or “MIR CHNG SW-L” in “DATA MONITOR” mode with CONSULT.
Refer to ADP-26, "CONSULT Function".

Is the inspection result normal?

YES >> Changeover switch function is OK.
NO >> Refer to ADP-67, "CHANGEOVER SWITCH : Diagnosis Procedure".

CHANGEOVER SWITCH : Diagnosis Procedure

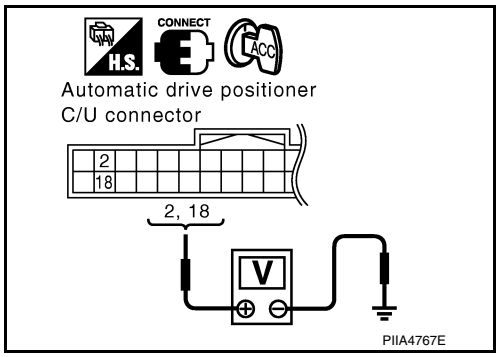
INFOID:0000000009882105

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK CHANGEOVER SWITCH SIGNAL

1. Turn ignition switch to ACC.
2. Check voltage between automatic drive positioner control unit connector and ground.

Terminals			Change over switch condition	Voltage (V) (Approx.)
(+)		(-)		
Automatic drive positioner control unit connector	Terminal			
M33	2	Ground	RIGHT	0
			Other than above	5
	18		LEFT	0
			Other than above	5



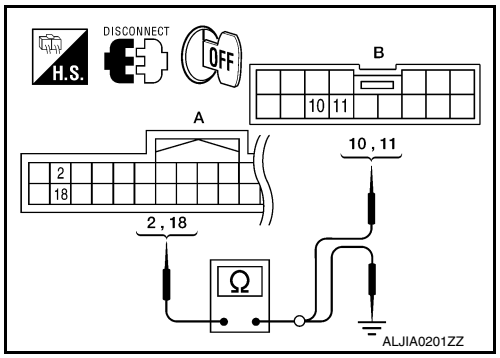
Is the inspection result normal?

YES >> GO TO 6
NO >> GO TO 2

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and door mirror remote control switch.
3. Check continuity between automatic drive positioner control unit connector and door mirror remote control switch connector.

Automatic drive positioner control unit connector	Terminal	Door mirror remote control switch connector	Terminal	Continuity
M33 (A)	2	D10 (B)	11	Yes
	18		10	



4. Check continuity between automatic drive positioner control unit connector and ground.

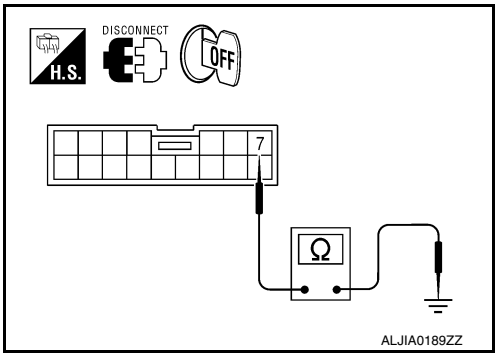
Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33 (A)	2		No
	18		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DOOR MIRROR REMOTE CONTROL SWITCH GROUND CIRCUIT

Check continuity between door mirror remote control switch connector and ground.



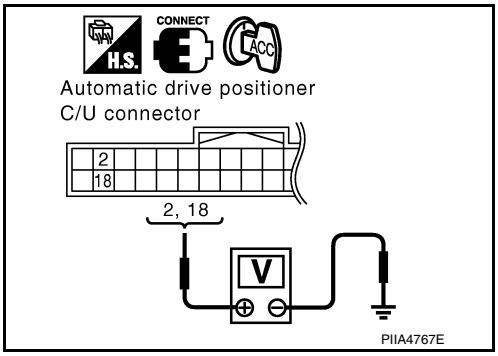
Door mirror remote control switch connector	Terminal	Ground	Continuity
D10	7		Yes

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK AUTOMATIC DRIVE POSITIONER CONTROL UNIT OUTPUT SIGNAL

1. Connect automatic drive positioner control unit.
2. Turn ignition switch to ACC.
3. Check voltage between automatic drive positioner control unit connector and ground.



Terminals			Voltage (V) (Approx.)
(+)		(-)	
Automatic drive positioner control unit connector	Terminal		
M33	2	Ground	5
	18		

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

5. CHECK CHANGEOVER SWITCH

Check changeover switch.
Refer to ADP-69, "CHANGEOVER SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-42, "Intermittent Incident".
NO >> Replace door mirror remote control switch. Refer to ADP-150, "Removal and Installation".

6. CHECK INTERMITTENT INCIDENT

Check intermittent incident.
Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

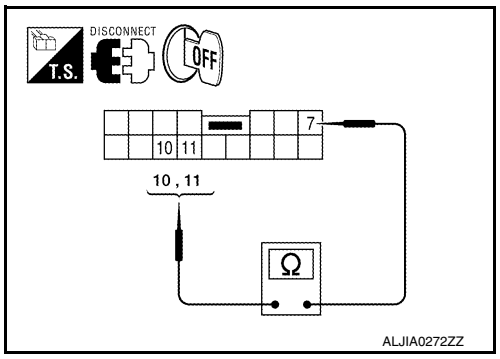
CHANGEOVER SWITCH : Component Inspection

INFOID:0000000009882106

1. CHECK CHANGEOVER SWITCH

Check door mirror remote control switch.

Terminal		Change over switch condition	Continuity
Door mirror remote control switch			
10	7	LEFT	Yes
		Other than above	No
11		RIGHT	Yes
		Other than above	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace door mirror remote control switch. Refer to ADP-150, "Removal and Installation".

MIRROR SWITCH

MIRROR SWITCH : Description

INFOID:0000000009882107

It operates angle of the door mirror face.
It transmits mirror face adjust operation to automatic drive positioner control unit.

MIRROR SWITCH : Component Function Check

INFOID:0000000009882108

1. CHECK MIRROR SWITCH FUNCTION

Check the operation on “MIR CON SW–UP/DN” and “MIR CON SW–RH/LH” in “DATA MONITOR” mode with CONSULT.
Refer to ADP-26, "CONSULT Function".

Is the inspection result normal?

YES >> Mirror switch function is OK.
NO >> Refer to ADP-69, "MIRROR SWITCH : Diagnosis Procedure".

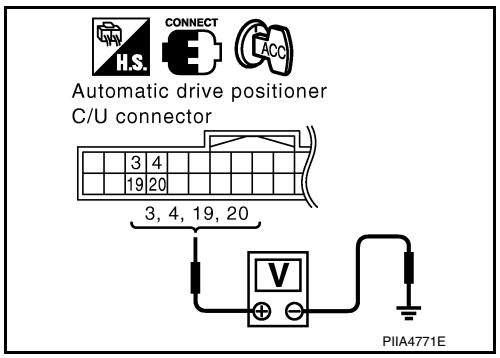
MIRROR SWITCH : Diagnosis Procedure

INFOID:0000000009882109

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK MIRROR SWITCH FUNCTION

1. Turn ignition switch to ACC.
2. Check voltage between automatic drive positioner control unit connector and ground.



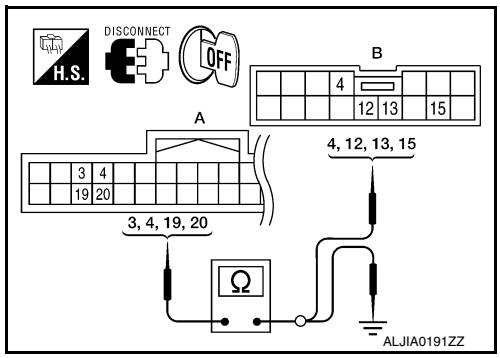
Terminals			Mirror switch Condition	Voltage (V) (Approx.)
(+)		(–)		
Automatic drive positioner control unit connector	Terminal			
M33	3	Ground	UP	0
			Other than above	5
	4		LEFT	0
			Other than above	5
	19		DOWN	0
			Other than above	5
	20		RIGHT	0
			Other than above	5

Is the inspection result normal?

YES >> GO TO 6
NO >> GO TO 2

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and door mirror remote control switch.
3. Check continuity between automatic drive positioner control unit connector and door mirror remote control switch connector.



Automatic drive positioner control unit connector	Terminal	Door mirror remote control switch connector	Terminal	Continuity
M33 (A)	3	D10 (B)	15	Yes
	4		13	
	19		12	
	20		4	

4. Check continuity between automatic drive positioner control unit connector and ground.

Automatic drive positioner control unit connector	Terminal		Continuity
M33 (A)	3	Ground	No
	4		
	19		
	20		

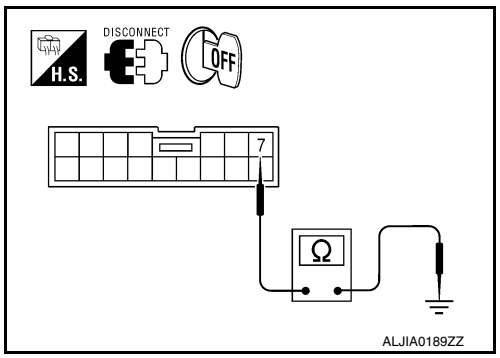
Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DOOR MIRROR REMOTE CONTROL SWITCH GROUND CIRCUIT

Check continuity between door mirror remote control switch connector and ground.

Door mirror remote control switch connector	Terminal	Ground	Continuity
D10	7		Yes

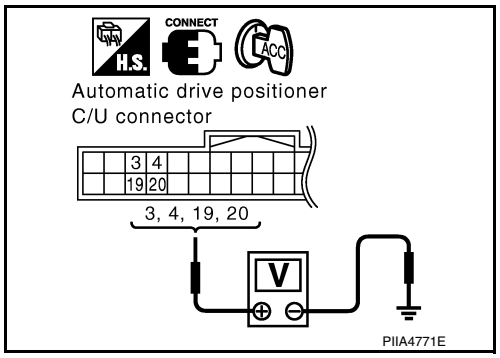


Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK AUTOMATIC DRIVE POSITIONER CONTROL UNIT OUTPUT SIGNAL

1. Connect automatic drive positioner control unit.
2. Turn ignition switch to ACC.
3. Check voltage between automatic drive positioner control unit and ground.



Terminals			Voltage (V) (Approx.)
(+)		(-)	
Automatic drive positioner control unit connector	Terminal		
M33	3	Ground	5
	4		
	19		
	20		

Is the inspection result normal?

YES >> GO TO 5
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

5. CHECK MIRROR SWITCH

Check mirror switch.
Refer to ADP-71, "MIRROR SWITCH : Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-42, "Intermittent Incident".
NO >> Replace door mirror remote control switch. Refer to ADP-150, "Removal and Installation".

6. CHECK INTERMITTENT INCIDENT

Check intermittent incident.
Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

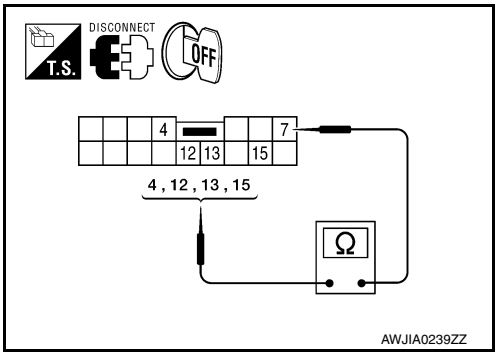
MIRROR SWITCH : Component Inspection

INFOID:0000000009882110

1. CHECK MIRROR SWITCH

Check door mirror remote control switch.

Terminal		Mirror switch condition	Continuity
Door mirror remote control switch			
4	7	RIGHT	Yes
		Other than above	No
13		LEFT	Yes
		Other than above	No
15		UP	Yes
		Other than above	No
12		DOWN	Yes
		Other than above	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace door mirror remote control switch. Refer to ADP-150, "Removal and Installation".

POWER SEAT SWITCH GROUND CIRCUIT

Diagnosis Procedure

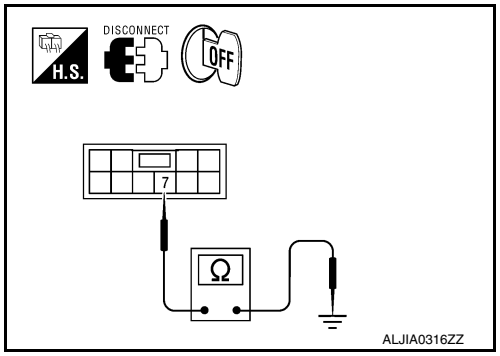
INFOID:0000000009882111

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK POWER SEAT SWITCH LH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power seat switch LH.
3. Check continuity between power seat switch LH connector and ground.

Power seat switch LH connector	Terminal	Ground	Continuity
B208	7		Yes



Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Repair or replace harness.

PARK POSITION SWITCH

Description

INFOID:0000000009882112

The park position switch is installed on the A/T shift selector. It is turned OFF when the A/T selector lever is in P position. The driver seat control unit judges that the A/T shift selector is in P position if continuity does not exist in this circuit.

Component Function Check

INFOID:0000000009882113

1. CHECK FUNCTION

1. Select “DETENT SW” signal in “Data monitor” mode with CONSULT.
2. Check park position switch (key lock) signal under the following conditions.

Monitor item	Condition		Status
DETENT SW	A/T shift selector	P position	OFF
		Other than above	ON

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-74, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009882114

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK DTC WITH “BCM”

Check “Self Diagnostic Result” for BCM with CONSULT.

Is any DTC detected?

YES >> Check the DTC.
NO >> GO TO 2

2. CHECK A/T SHIFT SELECTOR [PARK POSITION SWITCH (KEY LOCK)] INPUT SIGNAL

1. Turn ignition switch OFF.
2. Disconnect driver seat control unit.
3. Mechanical key must be inserted into the key switch and key lock solenoid.
4. Check voltage between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal		Condition		Voltage (V) (Approx.)
	(+)	(-)			
B202	21	Ground	A/T shift selector	P position	0
				Other than above	Battery voltage

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 3

3. CHECK A/T SHIFT SELECTOR [PARK POSITION SWITCH (KEY LOCK)] CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect driver seat control unit and A/T shift selector.
3. Check continuity between driver seat control unit harness connector and A/T shift selector harness connector.

Connector	Terminal	Connector	Terminal	Continuity
B202	21	M203	6	Yes

4. Check continuity between driver seat control unit harness connector and ground.

Connector	Terminal	Ground	Continuity
B202	21		No

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

FRONT DOOR SWITCH (DRIVER SIDE)

Description

INFOID:0000000009882115

Detects front door LH open/close condition.

Component Function Check

INFOID:0000000009882116

1. CHECK FUNCTION

1. Select “DOOR SW-DR” in “Data monitor” mode with CONSULT.
2. Check the front door switch LH signal under the following conditions.

Monitor item	Condition		Status
DOOR SW-DR	Front door switch LH	Open	ON
		Close	OFF

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-76, "Diagnosis Procedure".

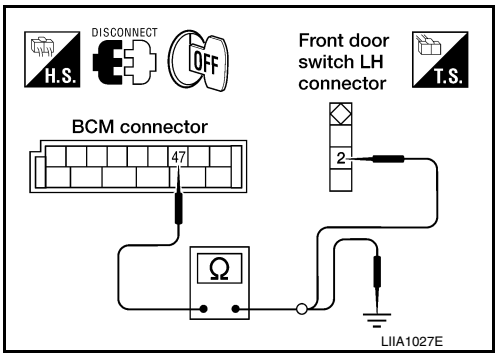
Diagnosis Procedure

INFOID:0000000009882117

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK FRONT DOOR SWITCH LH CIRCUIT

1. Disconnect BCM and front door switch LH.
2. Check continuity between BCM connector and front door switch LH connector.



BCM connector	Terminal	Front door switch LH connector	Terminal	Continuity
M19	47	B8	2	Yes

3. Check continuity between BCM connector and ground.

BCM connector	Terminal	Ground	Continuity
M19	47		No

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace harness.

2. CHECK FRONT DOOR SWITCH LH

Refer to ADP-77, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3
NO >> Replace front door switch LH.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

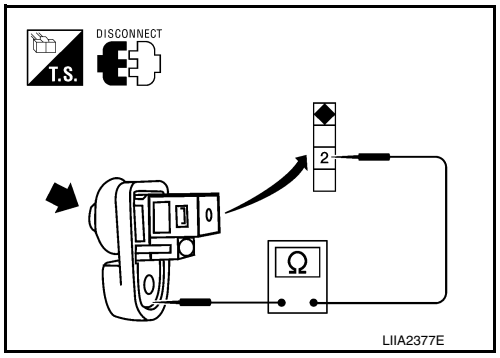
YES >> Replace BCM. Refer to BCS-52, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882118

1. CHECK FRONT DOOR SWITCH LH

1. Turn ignition switch OFF.
2. Disconnect front door switch LH.
3. Check continuity between front door switch LH terminals.



Terminal		Condition		Continuity
Front door switch LH				
2	Ground part of door switch	Front door switch LH	Pushed	No
			Released	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace front door switch LH.

SLIDING SENSOR

Description

INFOID:0000000009882119

- The sliding sensor is installed to the power seat frame assembly.
- The pulse signal is input to the driver seat control unit when sliding is performed.
- The driver seat control unit counts the pulse and calculates the sliding amount of the seat.

Component Function Check

INFOID:0000000009882120

1. CHECK FUNCTION

1. Select “SLIDE PULSE” in “Data monitor” mode with CONSULT.
2. Check sliding sensor signal under the following conditions.

Monitor item	Condition		Valve
SLIDE PULSE	Seat sliding	Operate (forward)	Change (increase)
		Operate (backward)	Change (decrease)
		Release	No change

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-78, "Diagnosis Procedure".

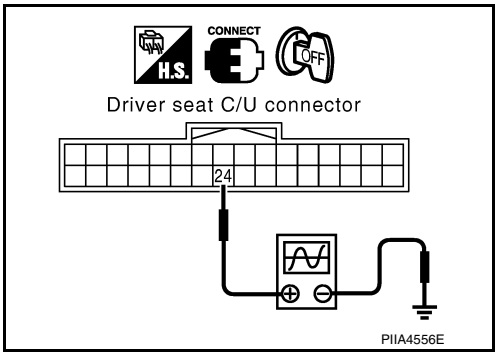
Diagnosis Procedure

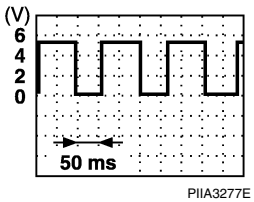
INFOID:0000000009882121

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK SLIDING SENSOR SIGNAL

1. Turn ignition switch OFF.
2. Read voltage signal between driver seat control unit harness connector and ground with oscilloscope.



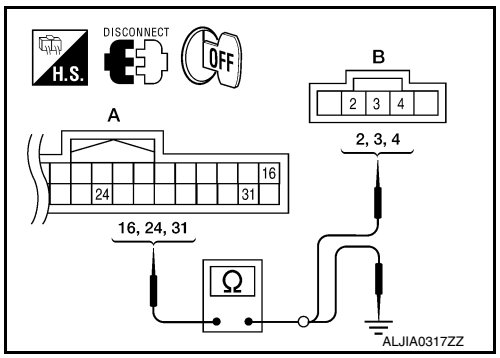
Terminals			Condition		Voltage signal
(+)		(–)			
Driver’s seat control unit	Terminal				
B202	24	Ground	Seat sliding	Operate	
				Other than above	0 or 5

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 2

2. CHECK SLIDING SENSOR CIRCUITS

1. Disconnect driver seat control unit and sliding motor LH.
2. Check continuity between driver seat control unit harness connector and sliding motor LH harness connector.



Driver seat control unit connector	Terminal	Sliding motor LH connector	Terminal	Continuity
B202 (A)	16	B204 (B)	3	Yes
	24		4	
	31		2	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal		Continuity
B202 (A)	16	Ground	No
	24		
	31		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK SEAT OPERATION

1. Connect driver seat control unit and sliding motor LH.
2. Check seat operation (except sliding operation) with memory function.

Is the inspection result normal?

YES >> Replace sliding motor LH. (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

RECLINING SENSOR

Description

INFOID:0000000009882122

- The reclining motor is installed to the seatback assembly.
- The pulse signal is inputted to the driver seat control unit when the reclining is operated.
- The driver seat control unit counts the pulse and calculates the reclining amount of the seat.

Component Function Check

INFOID:0000000009882123

1. CHECK FUNCTION

1. Select “RECLN PULSE” in “Data monitor” mode with CONSULT.
2. Check reclining sensor signal under the following conditions.

Monitor item	Condition		Value
RECLN PULSE	Seat reclining	Operate (forward)	Change (increase)
		Operate (backward)	Change (decrease)
		Release	No change

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-80, "Diagnosis Procedure".

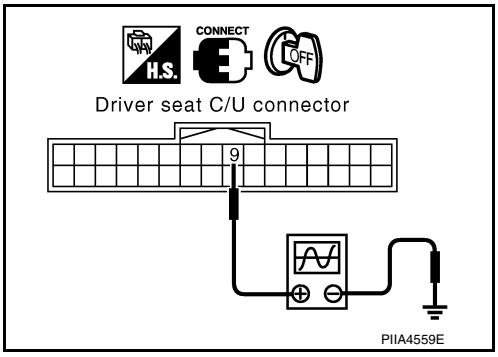
Diagnosis Procedure

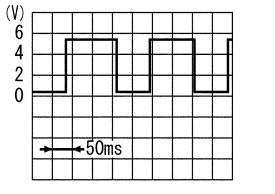
INFOID:0000000009882124

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK RECLINING SENSOR SIGNAL

1. Turn ignition switch OFF.
2. Read voltage signal between driver seat control unit harness connector and ground with oscilloscope.



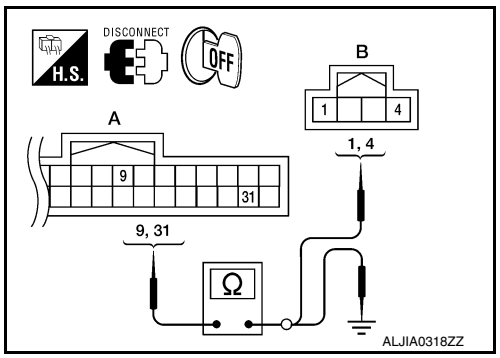
Terminals			Condition		Voltage signal
(+)		(–)			
Driver seat control unit	Terminal				
B202	9	Ground	Seat reclining	Operate	
				Other than above	0 or 5

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 2

2. CHECK RECLINING SENSOR CIRCUIT

1. Disconnect driver seat control unit and reclining motor LH.
2. Check continuity between driver seat control unit harness connector and reclining motor LH harness connector.



Driver seat control unit connector	Terminal	Reclining motor connector	Terminal	Continuity
B202 (A)	9	B205 (B)	1	Yes
	31		4	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B202 (A)	9		No
	31		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK SEAT OPERATION

1. Connect driver seat control unit and reclining motor LH connector.
2. Check seat operation (except reclining operation) with memory function.

Is the operation normal?

YES >> Replace reclining motor LH. (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

LIFTING SENSOR (FRONT)

Description

INFOID:0000000009882125

- The lifting sensor (front) is installed to the power seat frame assembly.
- The pulse signal is input to the driver seat control unit when the lifting (front) is operated.
- The driver seat control unit counts the pulse and calculates the lifting (front) amount of the seat.

Component Function Check

INFOID:0000000009882126

1. CHECK FUNCTION

1. Select “LIFT FR PULSE” in “Data monitor” mode with CONSULT.
2. Check the lifting sensor (front) signal under the following conditions.

Monitor item	Condition		Value
LIFT FR PULSE	Seat lifting (front)	Operate (up)	Change (increase)
		Operate (down)	Change (decrease)
		Release	No change

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-82, "Diagnosis Procedure".

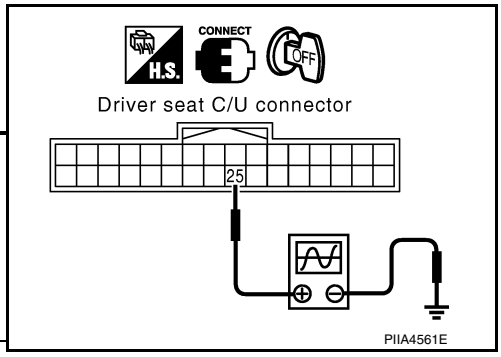
Diagnosis Procedure

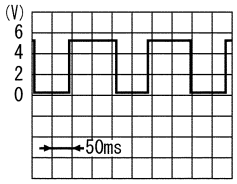
INFOID:0000000009882127

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING SENSOR (FRONT) SIGNAL

1. Turn ignition switch OFF.
2. Read the voltage signal between driver seat control unit harness connector and ground with an oscilloscope.



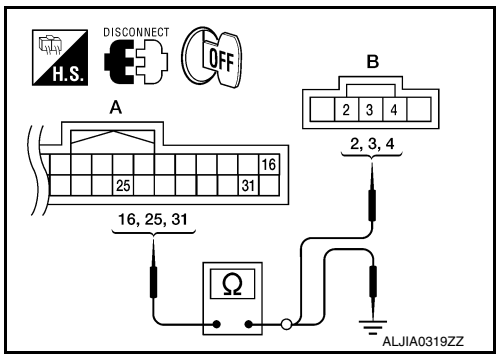
Terminals (+) Driver seat control unit connector	Terminals (+) Terminal	Terminals (–)	Condition		Voltage signal
B202	25	Ground	Seat lifting (front)	Operate	
				Other than above	0 or 5

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 2

2. CHECK LIFTING SENSOR (FRONT) CIRCUIT

1. Disconnect driver seat control unit and lifting motor (front).
2. Check continuity between driver seat control unit harness connector and lifting motor (front) harness connector.



Driver seat control unit connector	Terminal	Lifting motor (front) connector	Terminal	Continuity
B202 (A)	16	B206 (B)	3	Yes
	25		4	
	31		2	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal		Continuity
B202 (A)	16	Ground	No
	25		
	31		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK SEAT OPERATION

1. Connect driver seat control unit and lifting motor (front) connector.
2. Check seat operation [except lifting (front) operation] with memory function.

Is the operation normal?

YES >> Replace lifting motor (front). (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

LIFTING SENSOR (REAR)

Description

INFOID:0000000009882128

- The lifting sensor (rear) is installed to the power seat frame assembly.
- The pulse signal is input to the driver seat control unit when the lifting (rear) is operated.
- The driver seat control unit counts the pulse and calculates the lifting (rear) amount of the seat.

Component Function Check

INFOID:0000000009882129

1. CHECK FUNCTION

1. Select “LIFT RR PULSE” in “Data monitor” mode with CONSULT.
2. Check lifting sensor (rear) signal under the following conditions.

Monitor item	Condition		Value
LIFT RR PULSE	Seat lifting (rear)	Operate (up)	Change (increase)
		Operate (down)	Change (decrease)
		Release	No change

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-84, "Diagnosis Procedure".

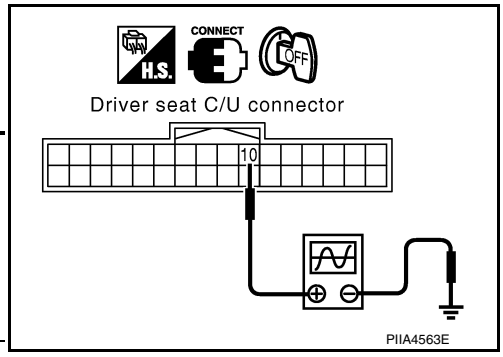
Diagnosis Procedure

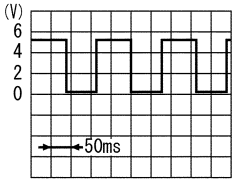
INFOID:0000000009882130

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING SENSOR (REAR) SIGNAL

1. Turn ignition switch OFF.
2. Read voltage signal between driver seat control unit harness connector and ground with oscilloscope.



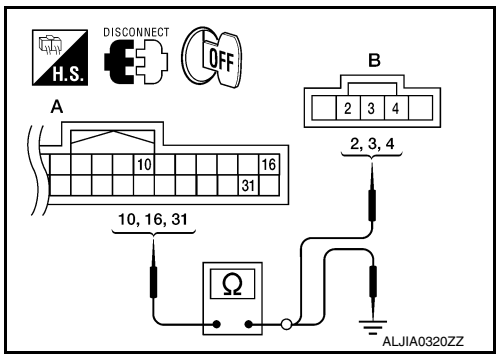
Terminals (+) Driver seat control unit connector	Terminals (+) Terminal	Terminals (–)	Condition		Voltage signal
B202	10	Ground	Seat lifting (rear)	Operate	
				Other than above	0 or 5

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 2

2. CHECK LIFTING SENSOR (REAR) CIRCUIT

1. Disconnect driver seat control unit and lifting motor (rear).
2. Check the continuity between driver seat control unit harness connector and lifting motor (rear) harness connector.



Driver seat control unit connector	Terminal	Lifting motor (rear) connector	Terminal	Continuity
B202 (A)	10	B207 (B)	4	Yes
	16		3	
	31		2	

3. Check the continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal		Continuity
B202 (A)	10	Ground	No
	16		
	31		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK SEAT OPERATION

1. Connect driver seat control unit and lifting motor (rear) connector.
2. Check the seat operation [except lifting (rear) operation] with memory function.

Is the operation normal?

YES >> Replace lifting motor (rear). (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

PEDAL ADJUSTING SENSOR

Description

INFOID:0000000009882131

- The pedal adjusting sensor is installed to the pedal adjusting motor assembly.
- The resistance of pedal adjusting sensor is changed according to the forward/backward position of pedal assembly.
- The terminal voltage of automatic drive positioner control unit will be changed according to a change of pedal adjusting sensor resistance. Automatic drive positioner control unit calculates the pedal assembly position from the voltage.

Component Function Check

INFOID:0000000009882132

1. CHECK FUNCTION

1. Select “PEDAL SEN” in “Data monitor” mode with CONSULT.
2. Check the pedal sensor signal under the following condition.

Monitor item	Condition		Value
PEDAL SEN	Pedal position	Forward	0.5V
		Backward	4.5V

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-86, "Diagnosis Procedure".

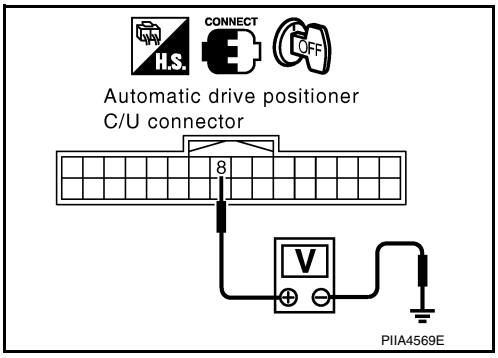
Diagnosis Procedure

INFOID:0000000009882133

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK PEDAL ADJUSTING SENSOR SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between automatic drive positioner control unit harness connector and ground.



Terminal			Condition		Voltage (V) (Approx.)
(+)		(-)			
Automatic drive positioner control unit	Terminal				
M33	8	Ground	Pedal assembly position	Forward	0.5
				Backward	4.5

Is the inspection result normal?

YES >> GO TO 4
NO >> GO TO 2

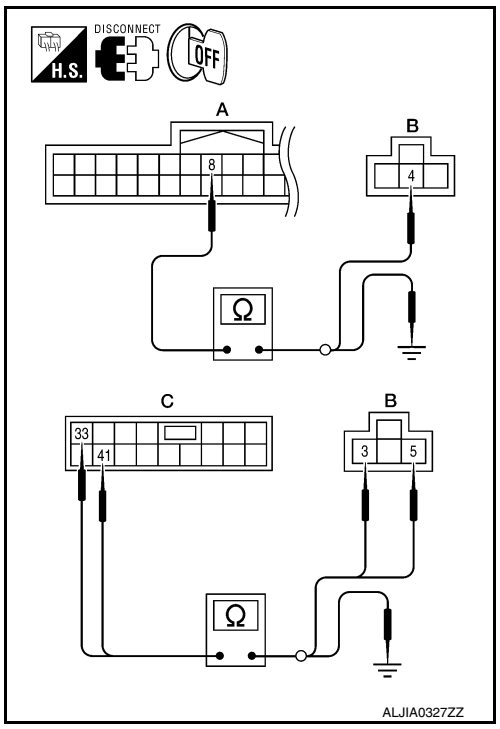
2. CHECK PEDAL ADJUSTING SENSOR CIRCUIT

1. Disconnect automatic drive positioner control unit and pedal adjusting motor assembly.
2. Check continuity between automatic drive positioner control unit harness connector and pedal adjusting motor assembly harness connector.

Automatic drive positioner control unit connector	Terminal	Pedal adjusting motor assembly connector	Terminal	Continuity
M33 (A)	8	E110 (B)	4	Yes
M34 (C)	33		3	
	41		5	

3. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33 (A)	8		No
M34 (C)	33		
	41		



Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK DOOR MIRROR OPERATION

1. Connect automatic drive positioner control unit and pedal adjusting motor assembly.
2. Turn ignition switch ON.
3. Check door mirror operation with memory function.

Is the operation normal?

YES >> Replace pedal adjusting motor assembly. Refer to ADP-151, "Removal and Installation".
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

MIRROR SENSOR
DRIVER SIDE

DRIVER SIDE : Description

INFOID:0000000009882134

- The mirror sensor LH is installed to the door mirror LH.
- The resistance of 2 sensors (horizontal and vertical) is changed when the door mirror LH is operated.
- Automatic drive positioner control unit calculates the door mirror position according to the change of the voltage of 2 sensor input terminals.

DRIVER SIDE : Component Function Check

INFOID:0000000009882135

1. CHECK FUNCTION

1. Select “MIR/SEN LH U-D”, “MIR/SEN LH R-L” in “Data monitor” with CONSULT.
2. Check mirror sensor (driver side) signal under the following condition.

Monitor item	Condition		Value
MIR/SEN LH U-D	Door mirror LH	Close to peak	3.4V
		Close to valley	0.6V
MIR/SEN LH R-L		Close to right edge	3.4V
		Close to left edge	0.6V

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-88, "DRIVER SIDE : Diagnosis Procedure".

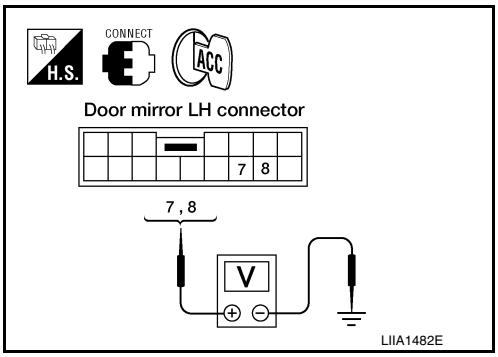
DRIVER SIDE : Diagnosis Procedure

INFOID:0000000009882136

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK DOOR MIRROR LH SENSOR SIGNAL

1. Turn ignition switch to ACC.
2. Check voltage between door mirror LH harness connector and ground.



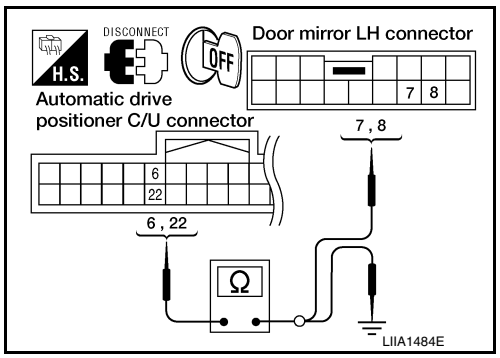
Terminals			Condition		Voltage (V) (Approx.)
(+)		(–)			
Door mirror LH connector	Terminal				
D4	7	Ground	Door mirror LH	Close to peak	3.4
				Close to valley	0.6
	8			Close to right edge	3.4
				Close to left edge	0.6

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2. CHECK DOOR MIRROR LH SENSOR CIRCUIT 1

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and door mirror LH connector.
3. Check continuity between automatic drive positioner control unit harness connector and door mirror LH harness connector.



Automatic drive positioner control unit connector	Terminal	Door mirror LH connector	Terminal	Continuity
M33	6	D4	7	Yes
	22		8	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

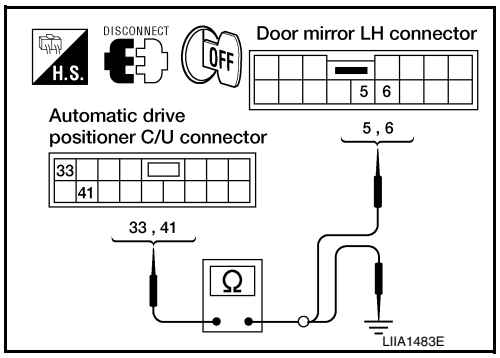
Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33	6		No
	22		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3. CHECK DOOR MIRROR LH SENSOR CIRCUIT 2

1. Check continuity between automatic drive positioner control unit harness connector and door mirror LH harness connector.



Automatic drive positioner control unit connector	Terminal	Door mirror LH connector	Terminal	Continuity
M34	33	D4	5	Yes
	41		6	

2. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M34	33		No
	41		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4. CHECK PEDAL ADJUSTING OPERATION

1. Connect driver seat control unit connector and door mirror LH connector.
2. Turn ignition switch ON.
3. Check pedal adjusting operation with memory function.

Is the operation normal?

YES >> Replace door mirror actuator LH. Refer to MIR-18, "Mirror Actuator".
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

PASSENGER SIDE

PASSENGER SIDE : Description

INFOID:0000000009882137

- The mirror sensor RH is installed to the door mirror RH.
- The resistance of 2 sensors (horizontal and vertical) is changed when the door mirror RH is operated.
- Automatic drive positioner control unit calculates the door mirror position according to the change of the voltage of 2 sensor input terminals.

PASSENGER SIDE : Component Function Check

INFOID:0000000009882138

1.CHECK FUNCTION

1. Select “MIR/SEN RH U-D”, “MIR/SEN RH R-L” in “Data monitor” with CONSULT.
2. Check the mirror sensor RH signal under the following conditions.

Monitor item	Condition		Value
MIR/SEN RH U-D	Door mirror RH	Close to peak	3.4V
		Close to valley	0.6V
MIR/SEN RH R-L		Close to right edge	3.4V
		Close to left edge	0.6V

Is the indication normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-90, "PASSENGER SIDE : Diagnosis Procedure".

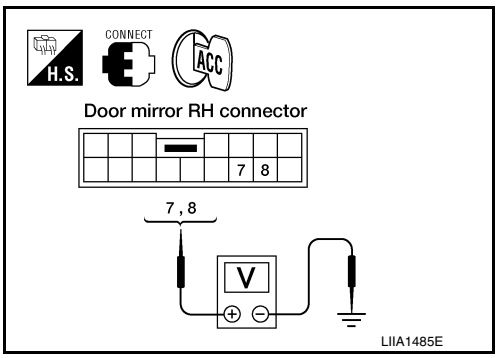
PASSENGER SIDE : Diagnosis Procedure

INFOID:0000000009882139

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK DOOR MIRROR RH SENSOR SIGNAL

1. Turn ignition switch to ACC.
2. Check voltage between door mirror RH harness connector and ground.



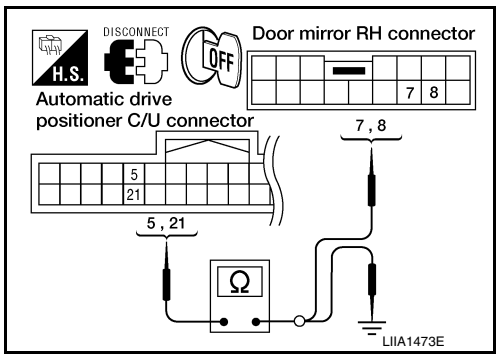
Terminals			Condition		Voltage (V) (Approx.)
(+)		(–)			
Door mirror RH connector	Terminal				
D107	7	Ground	Door mirror RH	Close to peak	3.4
				Close to valley	0.6
	8			Close to right edge	3.4
				Close to left edge	0.6

Is the inspection result normal?

YES >> GO TO 5
NO >> GO TO 2

2. CHECK DOOR MIRROR RH SENSOR HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and door mirror RH.
3. Check continuity between automatic drive positioner control unit harness connector and door mirror RH harness connector.



Automatic drive positioner control unit connector	Terminal	Door mirror RH connector	Terminal	Continuity
M33	5	D107	7	Yes
	21		8	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

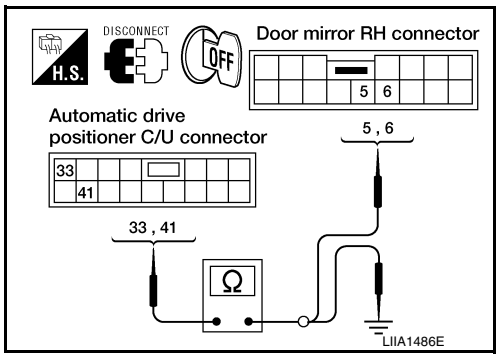
Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33	5		No
	21		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3.CHECK DOOR MIRROR RH SENSOR POWER SUPPLY CIRCUIT

1. Check continuity between automatic drive positioner control unit harness connector and door mirror RH harness connector.



Automatic drive positioner control unit connector	Terminal	Door mirror RH connector	Terminal	Continuity
M34	33	D107	5	Yes
	41		6	

2. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M34	33		No
	41		

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4.CHECK PEDAL ADJUSTING OPERATION

1. Connect driver seat control unit connector and door mirror RH connector.
2. Turn ignition switch ON.
3. Check pedal adjusting operation with memory function.

Is the operation normal?

YES >> Replace door mirror actuator. Refer to MIR-18, "Mirror Actuator".
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

5.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

SLIDING MOTOR

Description

INFOID:0000000009882140

- The sliding motor LH is installed to the power seat frame assembly.
- The sliding motor LH is installed with the driver seat control unit.
- The seat is slid forward/backward by changing the rotation direction of sliding motor LH.

Component Function Check

INFOID:0000000009882141

1. CHECK FUNCTION

1. Select “SEAT SLIDE” in “Active test” mode with CONSULT.
2. Check the sliding motor LH operation.

Test Item		Description	
SEAT SLIDE	OFF	Seat sliding	Stop
	FR		Forward
	RR		Backward

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-92, "Diagnosis Procedure".

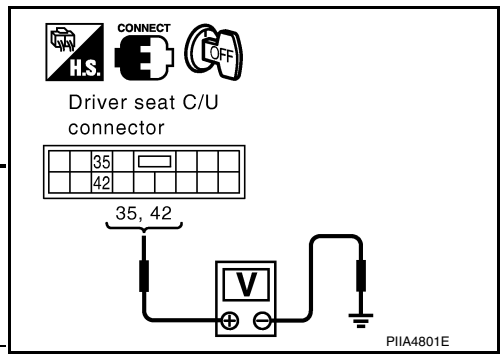
Diagnosis Procedure

INFOID:0000000009882142

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK SLIDING MOTOR LH POWER SUPPLY

1. Turn the ignition switch OFF.
2. Perform “Active test” (“SEAT SLIDE”) with CONSULT
3. Check voltage between driver seat control unit harness connector and ground.



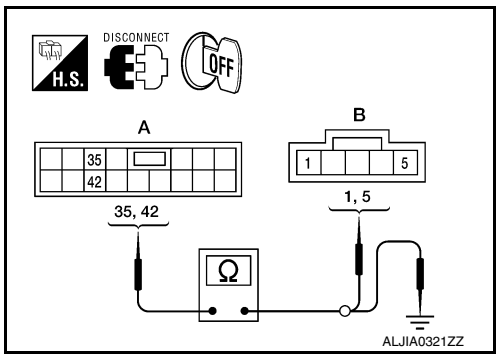
Terminal			Test Item		Voltage (V) (Approx.)
(+)		(-)			
Driver seat control unit connector	Terminal				
B203	35	Ground	SEAT SLIDE	OFF	0
				FR (forward)	Battery voltage
				RR (backward)	0
	42			OFF	0
				FR (forward)	0
				RR (backward)	Battery voltage

Is the inspection result normal?

YES >> Replace sliding motor LH. (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> GO TO 2

2. CHECK SLIDING MOTOR LH CIRCUIT

1. Disconnect driver seat control unit and sliding motor LH.
2. Check continuity between driver seat control unit harness connector and sliding motor LH harness connector.



Driver seat control unit connector	Terminal	Sliding motor LH connector	Terminal	Continuity
B203 (A)	35	B204 (B)	5	Yes
	42		1	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B203 (A)	35		No
	42		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

RECLINING MOTOR

Description

INFOID:0000000009882143

- The reclining motor LH is installed to the seatback assembly.
- The reclining motor LH is activated with the driver seat control unit.
- The seatback is reclined forward/backward by changing the rotation direction of reclining motor LH.

Component Function Check

INFOID:0000000009882144

1. CHECK FUNCTION

1. Select “SEAT RECLINING” in “Active test” mode with CONSULT.
2. Check the reclining motor LH operation.

Test Item		Description	
SEAT RECLINING	OFF	Seat reclining	Stop
	FR		Forward
	RR		Backward

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-94, "Diagnosis Procedure".

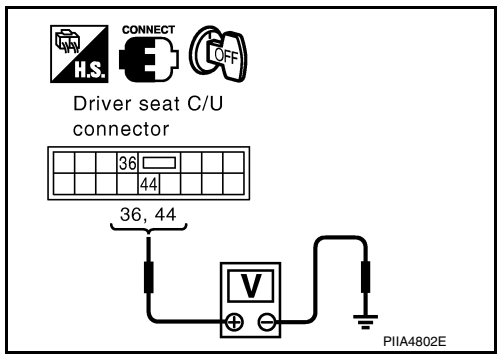
Diagnosis Procedure

INFOID:0000000009882145

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK RECLINING MOTOR LH POWER SUPPLY

1. Turn the ignition switch OFF.
2. Perform “Active test” (“SEAT RECLINING”) with CONSULT.
3. Check voltage between driver seat control unit harness connector and ground.



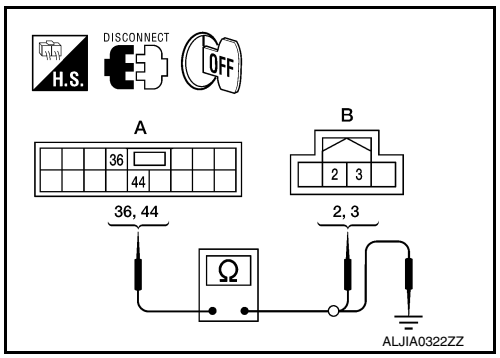
Terminal			Test Item		Voltage (V) (Approx.)
(+)		(-)			
Driver seat control unit connector	Terminal				
B203	36	Ground	SEAT RECLINING	OFF	0
				FR (forward)	Battery voltage
				RR (backward)	0
	44			OFF	0
				FR (forward)	0
				RR (backward)	Battery voltage

Is the inspection result normal?

YES >> Replace reclining motor LH. (Built in seatback assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> GO TO 2

2. CHECK RECLINING MOTOR LH CIRCUIT

1. Disconnect driver seat control unit connector and reclining motor LH.
2. Check continuity between driver seat control unit harness connector and reclining motor harness connector.



Driver seat control unit connector	Terminal	Reclining motor LH connector	Terminal	Continuity
B203 (A)	36	B205 (B)	2	Yes
	44		3	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B203 (A)	36		No
	44		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

LIFTING MOTOR (FRONT)

Description

INFOID:0000000009882146

- The lifting motor (front) is installed to the power seat frame assembly.
- The lifting motor (front) is activated with the driver seat control unit.
- The lifter (front) is moved upward/downward by changing the rotation direction of lifting motor (front).

Component Function Check

INFOID:0000000009882147

1. CHECK FUNCTION

1. Select “SEAT LIFTER FR” in “Active test” mode with CONSULT.
2. Check the lifting motor (front) operation.

Test Item		Description	
SEAT LIFTER FR	OFF	Seat lifting (front)	Stop
	UP		Upward
	DWN		Downward

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-96, "Diagnosis Procedure".

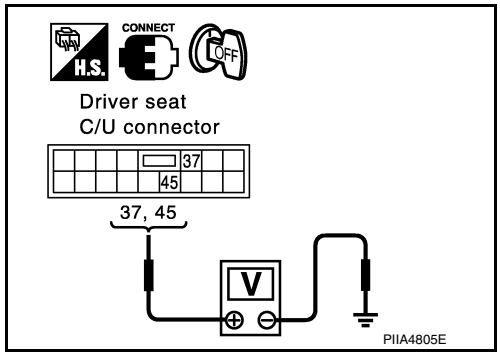
Diagnosis Procedure

INFOID:0000000009882148

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING MOTOR (FRONT) POWER SUPPLY

1. Turn the ignition switch OFF.
2. Perform “Active test” (“SEAT LIFTER FR”) with CONSULT.
3. Check voltage between driver seat control unit harness connector and ground.



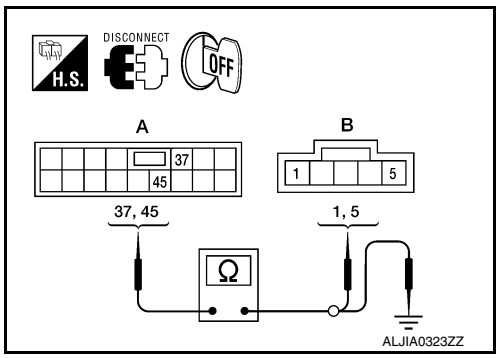
Terminal (+)		Terminal (-)	Test Item		Voltage (V) (Approx.)
Driver seat control unit connector	Terminal				
B203	37	Ground	SEAT LIFTER FR	OFF	0
				UP	0
				DWN (down)	Battery voltage
	45			OFF	0
				UP	Battery voltage
				DWN (down)	0

Is the inspection result normal?

YES >> Replace lifting motor (front). (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> GO TO 2

2. CHECK LIFTING MOTOR (FRONT) CIRCUIT

1. Disconnect driver seat control unit and lifting motor (front) connectors.
2. Check continuity between driver seat control unit harness connector and lifting motor (front) harness connector.



Driver seat control unit connector	Terminal	Lifting motor (front) connector	Terminal	Continuity
B203 (A)	37	B206 (B)	1	Yes
	45		5	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B203 (A)	37		No
	45		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

LIFTING MOTOR (REAR)

Description

INFOID:0000000009882149

- The lifting motor (rear) is installed to the power seat frame assembly.
- The lifting motor (rear) is activated with the driver seat control unit.
- The seat lifter (rear) is moved upward/downward by changing the rotation direction of lifting motor (rear).

Component Function Check

INFOID:0000000009882150

1. CHECK FUNCTION

1. Select “SEAT LIFTER RR” in “Active test” mode with CONSULT.
2. Check the lifting motor (rear) operation.

Test Item		Description	
SEAT LIFTER RR	OFF	Seat lifting (rear)	Stop
	UP		Upward
	DWN		Downward

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-98, "Diagnosis Procedure".

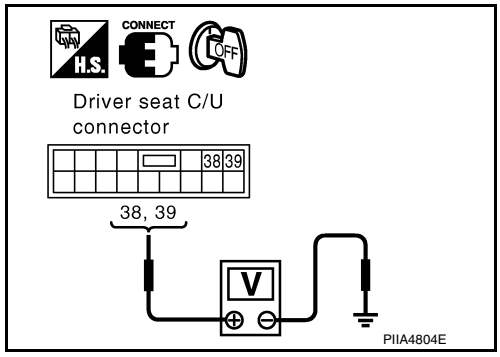
Diagnosis Procedure

INFOID:0000000009882151

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK LIFTING MOTOR (REAR) POWER SUPPLY

1. Turn the ignition switch OFF.
2. Perform “Active test” (“SEAT LIFTER RR”) with CONSULT.
3. Check voltage between driver seat control unit harness connector and ground.



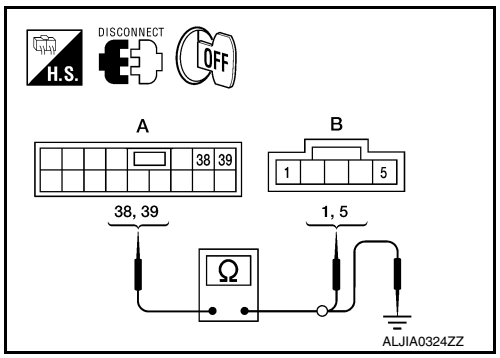
Terminal			Test Item		Voltage (V) (Approx.)
(+)		(-)			
Driver seat control unit connector	Terminal				
B203	38	Ground	SEAT LIFTER RR	OFF	0
				UP	Battery voltage
				DWN (down)	0
	39			OFF	0
				UP	0
				DWN (down)	Battery voltage

Is the inspection result normal?

YES >> Replace lifting motor (rear). (Built in power seat frame assembly). Refer to SE-48, "Disassembly and Assembly".
NO >> GO TO 2

2. CHECK LIFTING MOTOR (REAR) CIRCUIT

1. Disconnect driver seat control unit and lifting motor (rear).
2. Check continuity between driver seat control unit harness connector and lifting motor (rear) harness connector.



Driver seat control unit connector	Terminal	Lifting motor (rear) connector	Terminal	Continuity
B203 (A)	38	B207 (B)	5	Yes
	39		1	

3. Check continuity between driver seat control unit harness connector and ground.

Driver seat control unit connector	Terminal	Ground	Continuity
B203 (A)	38		No
	39		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace driver seat control unit. Refer to ADP-147, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

PEDAL ADJUSTING MOTOR

Description

INFOID:0000000009882152

- The pedal adjusting motor is installed to the pedal adjusting motor assembly.
- The pedal adjusting motor is activated with the automatic drive positioner control unit.
- The pedal assembly is adjusted forward/backward by changing the rotation direction of pedal adjusting motor.

Component Function Check

INFOID:0000000009882153

1. CHECK FUNCTION

1. Select “PEDAL MOTOR” in “Active test” mode with CONSULT.
2. Check the pedal adjusting motor operation.

Test item		Description	
PEDAL MOTOR	OFF	Pedal adjusting motor	Stop
	FR		Forward
	RR		Backward

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-100, "Diagnosis Procedure".

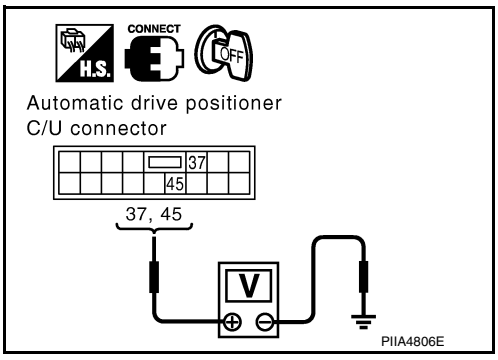
Diagnosis Procedure

INFOID:0000000009882154

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK PEDAL ADJUSTING MOTOR POWER SUPPLY

1. Turn the ignition switch OFF.
2. Perform “Active test” (“PEDAL MOTOR”) with CONSULT.
3. Check voltage between automatic drive positioner control unit harness connector and ground.



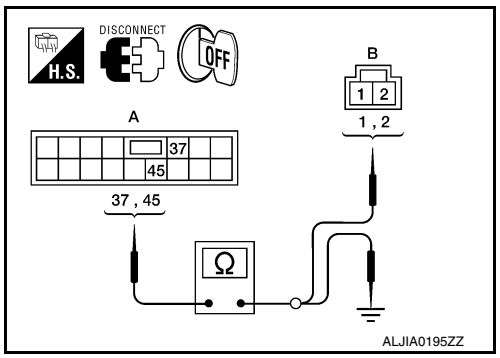
Terminal			Test Item		Voltage (V) (Approx.)
(+)		(-)			
Automatic drive positioner control unit connector	Terminal				
M34	37	Ground	PEDAL MOTOR	OFF	0
				RR (backward)	0
				FR (forward)	Battery voltage
	45			OFF	0
				RR (backward)	Battery voltage
				FR (forward)	0

Is the inspection result normal?

YES >> Replace pedal adjusting motor assembly. Refer to ADP-151, "Removal and Installation".
NO >> GO TO 2

2. CHECK PEDAL ADJUSTING MOTOR CIRCUIT

1. Disconnect automatic drive positioner control unit and pedal adjusting motor assembly.
2. Check continuity between automatic drive positioner control unit harness connector and pedal adjusting motor assembly harness connector.



Automatic drive positioner control unit connector	Terminal	Pedal adjusting motor assembly connector	Terminal	Continuity
M34 (A)	37	E109 (B)	1	Yes
	45		2	

3. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M34 (A)	37		No
	45		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

DOOR MIRROR MOTOR

Description

INFOID:0000000009882155

It makes mirror face operate from side to side and up and down with the electric power that automatic drive positioner control unit supplies.

Component Function Check

INFOID:0000000009882156

1. CHECK DOOR MIRROR MOTOR FUNCTION

Check the operation with “MIRROR MOTOR RH” and “MIRROR MOTOR LH” in “ACTIVE TEST” mode with CONSULT.
Refer to ADP-26, "CONSULT Function".

Is the inspection result normal?

YES >> Door mirror motor function is OK.
NO >> Refer to ADP-102, "Diagnosis Procedure".

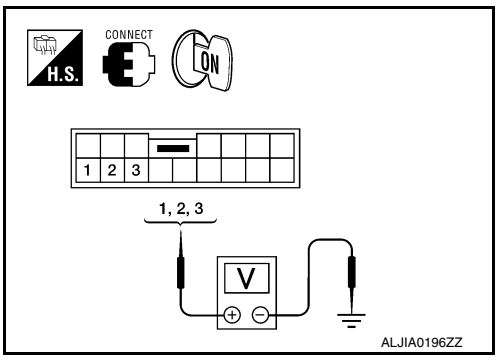
Diagnosis Procedure

INFOID:0000000009882157

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK DOOR MIRROR MOTOR INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between door mirror connector and ground.



Terminals			Door mirror remote control switch condition	Voltage (V) (Approx.)
(+)		(–)		
Door mirror connector	Terminal			
D4 (LH) D107 (RH)	1	Ground	UP	Battery voltage
			Other than above	0
	2		LEFT	Battery voltage
			Other than above	0
	3		DOWN / RIGHT	Battery voltage
			Other than above	0

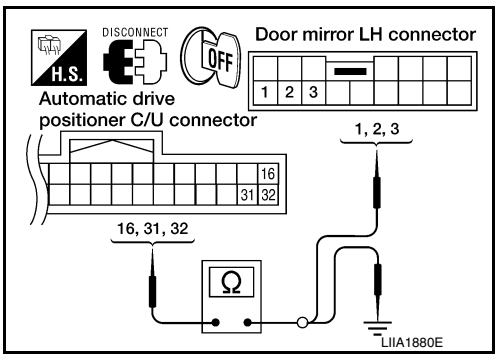
Is the inspection result normal?

YES >> Refer to ADP-104, "Component Inspection".
NO >> GO TO 2

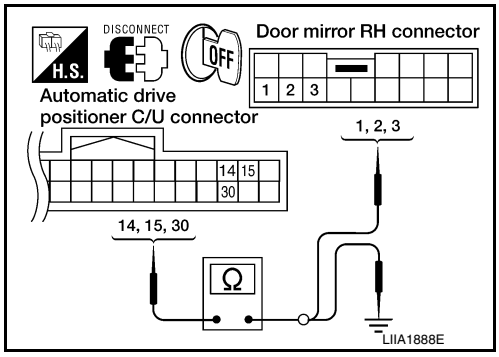
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and door mirror.
3. Check continuity between automatic drive positioner control unit connector and door mirror connector.

Door mirror LH



Automatic drive positioner control unit connector	Terminal	Door mirror LH connector	Terminal	Continuity
M33	16	D4	3	Yes
	31		1	
	32		2	



Door mirror RH

Automatic drive positioner control unit connector	Terminal	Door mirror RH connector	Terminal	Continuity
M33	14	D107	1	Yes
	15		2	
	30		3	

4. Check continuity between automatic drive positioner control unit connector and ground.

Door mirror LH

Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33	16		No
	31		
	32		

Door mirror RH

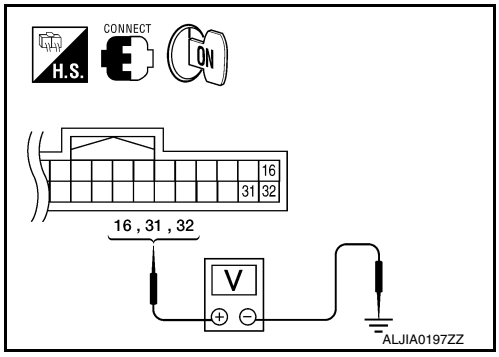
Automatic drive positioner control unit connector	Terminal	Ground	Continuity
M33	14		No
	15		
	30		

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3. CHECK AUTOMATIC DRIVE POSITIONER CONTROL UNIT OUTPUT SIGNAL

1. Connect automatic drive positioner control unit.
2. Turn ignition switch ON.
3. Check voltage between automatic drive positioner control unit connector and ground.

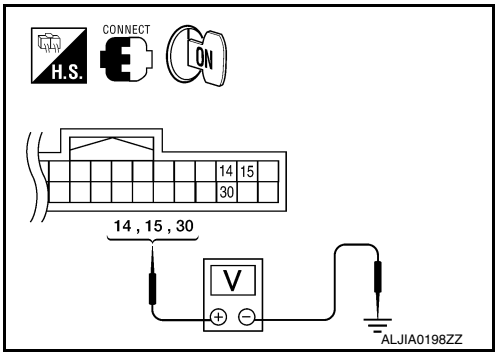


Door mirror LH

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Automatic drive positioner control unit connector	Terminal			
M33	16	Ground	DOWN / RIGHT	Battery voltage
			Other than above	0
	31		UP	Battery voltage
			Other than above	0
	32		LEFT	Battery voltage
			Other than above	0

Door mirror RH

Terminals			Mirror switch condition	Voltage (V) (Approx.)
(+)		(-)		
Automatic drive positioner control unit connector	Terminal			
M33	14	Ground	UP	Battery voltage
			Other than above	0
	15		LEFT	Battery voltage
			Other than above	0
	30		DOWN / RIGHT	Battery voltage
			Other than above	0



Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".

4. CHECK DOOR MIRROR MOTOR

Check door mirror motor.
Refer to ADP-104, "Component Inspection".

Is the inspection result normal?

YES >> Refer to GI-42, "Intermittent Incident".
NO >> Replace door mirror actuator. Refer to MIR-18, "Mirror Actuator".

Component Inspection

INFOID:0000000009882158

1. CHECK DOOR MIRROR MOTOR-I

Check that door mirror motor does not trap foreign objects and does not have any damage.
Refer to MIR-15, "Door Mirror Assembly".

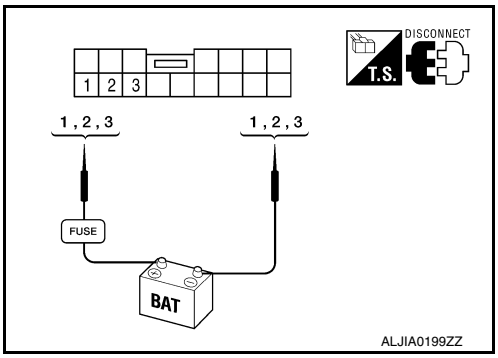
Is the inspection result normal?

YES >> GO TO 2
NO >> Replace door mirror actuator. Refer to MIR-18, "Mirror Actuator".

2. CHECK DOOR MIRROR MOTOR-II

1. Turn ignition switch OFF.
2. Disconnect door mirror.
3. Apply 12V to each power supply terminal of door mirror motor.

Door mirror connector	Terminal		Operational direction
	(+)	(–)	
D4 (LH) D107 (RH)	3	2	RIGHT
	2	3	LEFT
	1	3	UP
	3	1	DOWN



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace door mirror actuator. Refer to MIR-18, "Mirror Actuator".

SEAT MEMORY INDICATOR LAMP

Description

INFOID:0000000009882159

- The seat memory switch is installed on the driver side door trim. The operation signal is inputted to the automatic drive positioner control unit when the memory switch is operated.
- The status of automatic drive positioner system can be checked according to the illuminating/flashing status.

Component Function Check

INFOID:0000000009882160

1. CHECK FUNCTION

1. Select “MEMORY SW INDCTR” in “Active test” mode with CONSULT.
2. Check the memory indicator operation.

Test item		Description	
MEMORY SW INDCTR	OFF	Memory switch indicator	OFF
	ON-1		Indicator 1: ON
	ON-2		Indicator 2: ON

Is the operation of relevant parts normal?

YES >> Inspection End.
NO >> Perform diagnosis procedure. Refer to ADP-105, "Diagnosis Procedure".

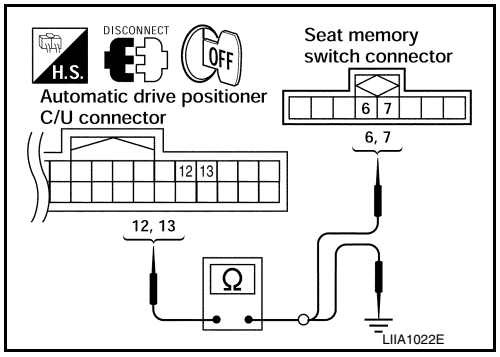
Diagnosis Procedure

INFOID:0000000009882161

Regarding Wiring Diagram information, refer to ADP-127, "Wiring Diagram".

1. CHECK SEAT MEMORY INDICATOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit and seat memory switch.
3. Check continuity between automatic drive positioner control unit harness connector and seat memory switch harness connector.



Automatic drive positioner control unit connector	Terminal	Seat memory switch connector	Terminal	Continuity
M33	12	D5	6	Yes
	13		7	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

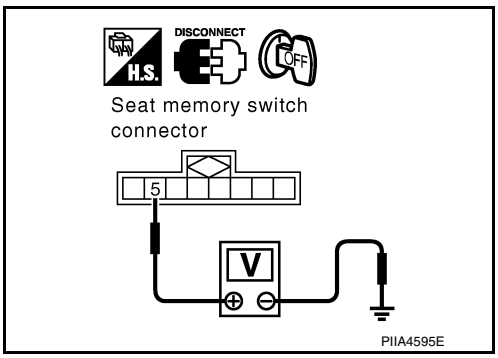
Automatic drive positioner connector	Terminal	Ground	Continuity
M33	12		No
	13		

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace harness.

2. CHECK MEMORY INDICATOR POWER SUPPLY

Check voltage between seat memory switch harness connector and ground.



Seat memory switch connector	Terminals		Voltage (V) (Approx.)
	(+)	(–)	
D5	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Check the following.
- Fuse
- Harness for open or short between memory indicator and fuse.

3. CHECK MEMORY INDICATOR

Refer to ADP-106, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4
NO >> Replace seat memory switch. Refer to ADP-149, "Removal and Installation".

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

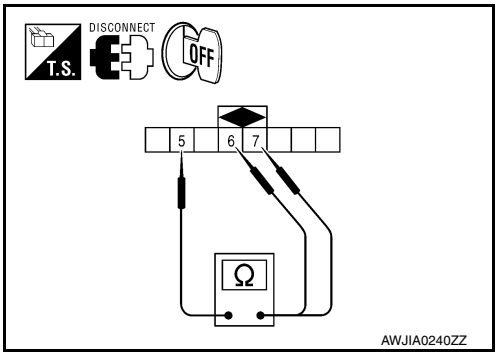
YES >> Replace automatic drive positioner control unit. Refer to ADP-148, "Removal and Installation".
NO >> Repair or replace the malfunctioning part.

Component Inspection

INFOID:0000000009882162

1. CHECK SEAT MEMORY INDICATOR

1. Disconnect seat memory switch.
2. Check continuity between seat memory switch terminals.



Terminal		Continuity
Seat memory switch		
(+)	(-)	
6	5	Yes
7		

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace seat memory switch. Refer to ADP-149, "Removal and Installation".

ECU DIAGNOSIS INFORMATION

DRIVER SEAT CONTROL UNIT

Reference Value

INFOID:0000000009882163

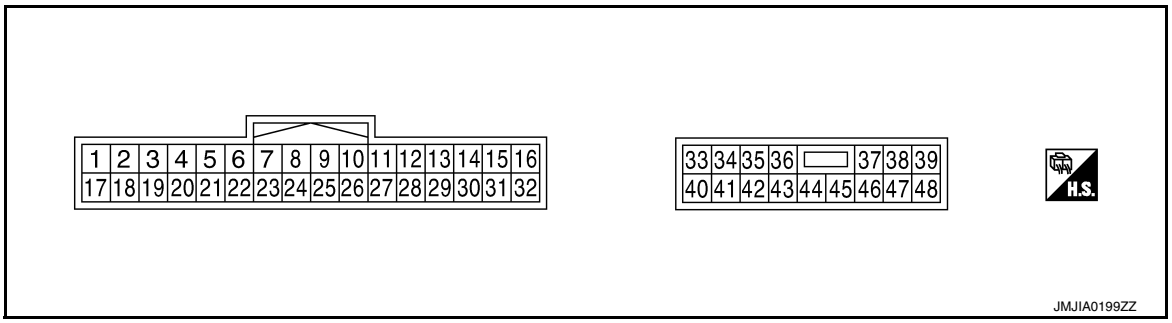
VALUES ON THE DIAGNOSIS TOOL

CONSULT MONITOR ITEM

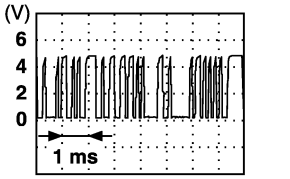
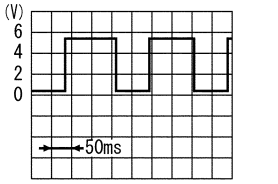
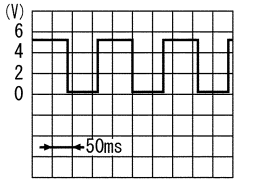
Monitor Item	Condition		Value/Status
SET SW	Set switch	Push	ON
		Release	OFF
MEMORY SW1	Memory switch 1	Push	ON
		Release	OFF
MEMORY SW2	Memory switch 2	Push	ON
		Release	OFF
SLIDE SW–FR	Sliding switch (front)	Operate	ON
		Release	OFF
SLIDE SW–RR	Sliding switch (rear)	Operate	ON
		Release	OFF
RECLN SW–FR	Reclining switch (front)	Operate	ON
		Release	OFF
RECLN SW–RR	Reclining switch (rear)	Operate	ON
		Release	OFF
LIFT FR SW–UP	Lifting switch front (up)	Operate	ON
		Release	OFF
LIFT FR SW–DN	Lifting switch front (down)	Operate	ON
		Release	OFF
LIFT RR SW–UP	Lifting switch rear (up)	Operate	ON
		Release	OFF
LIFT RR SW–DN	Lifting switch rear (down)	Operate	ON
		Release	OFF
MIR CON SW–UP	Mirror switch	Up	ON
		Other than above	OFF
MIR CON SW–DN	Mirror switch	Down	ON
		Other than above	OFF
MIR CON SW–RH	Mirror switch	Right	ON
		Other than above	OFF
MIR CON SW–LH	Mirror switch	Left	ON
		Other than above	OFF
MIR CHNG SW–R	Changeover switch	Right	ON
		Other than above	OFF
MIR CHNG SW–L	Changeover switch	Left	ON
		Other than above	OFF
PEDAL SW-FR	Pedal adjusting switch	Forward	ON
		Other than above	OFF
PEDAL SW-RR	Pedal adjusting switch	Backward	ON
		Other than above	OFF

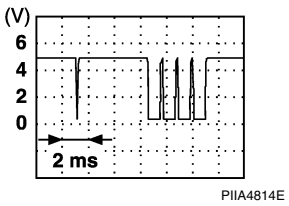
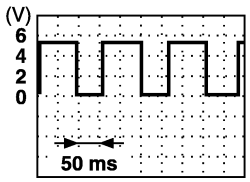
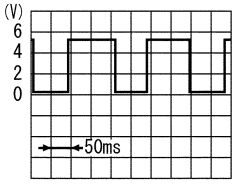
Monitor Item	Condition		Value/Status
DETENT SW	AT selector lever	P position	OFF
		Other than above	ON
STARTER SW	Ignition position	Cranking	ON
		Other than above	OFF
SLIDE PULSE	Seat sliding	Forward	The numeral value decreases
		Backward	The numeral value increases
		Other than above	No change to numeral value
RECLN PULSE	Seat reclining	Forward	The numeral value decreases
		Backward	The numeral value increases
		Other than above	No change to numeral value
LIFT FR PULSE	Seat lifter (front)	Up	The numeral value decreases
		Down	The numeral value increases
		Other than above	No change to numeral value
LIFT RR PULSE	Seat lifter (rear)	Up	The numeral value decreases
		Down	The numeral value increases
		Other than above	No change to numeral value
MIR/SEN RH U–D	Door mirror (passenger side)	Close to peak	3.4
		Close to valley	0.6
MIR/SEN RH R–L	Door mirror (passenger side)	Close to left edge	3.4
		Close to right edge	0.6
MIR/SEN LH U–D	Door mirror (driver side)	Close to peak	3.4
		Close to valley	0.6
MIR/SEN LH R–L	Door mirror (driver side)	Close to left edge	0.6
		Close to right edge	3.4
PEDAL SEN	pedal position	Forward	0.5
		Backward	4.5

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx)
+	-		Signal name	Input/ Output			
1	Ground	W	UART LINE (RX)	Input	Ignition switch ON		 PIIA4813E
3	—	L/B	CAN-H	—	—		—
6	Ground	R	Ignition switch (START)	Input	Ignition switch	OFF	0
						START	Battery voltage
9	Ground	R/B	Reclining sensor signal	Input	Seat reclining	Operate	 SIIA0692J
						Stop	0 or 5
10	Ground	B/R	Lifting sensor (rear) signal	Input	Seat lifting (rear)	Operate	 SIIA0693J
						Stop	0 or 5
11	Ground	Y/R	Sliding switch backward signal	Input	Sliding switch	Operate (backward)	0
						Release	Battery voltage
12	Ground	L/W	Reclining switch backward signal	Input	Reclining switch	Operate (backward)	0
						Release	Battery voltage
13	Ground	V	Lifting switch (front) down signal	Input	Lifting switch (front)	Operate (down)	0
						Release	Battery voltage
14	Ground	P/L	Lifting switch (rear) down signal	Input	Lifting switch (rear)	Operate (down)	0
						Release	Battery voltage
15	Ground	SB	Pedal switch backward signal	Input	Pedal switch	Operate (backward)	0
						Release	Battery voltage
16	Ground	R/W	Sensor power supply	Output	—		5

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx)
+	-		Signal name	Input/ Output			
17	Ground	Y/R	UART LINE (TX)	Output	Ignition switch ON		 PIIA4814E
19	—	G	CAN-L	—	—		—
21	Ground	L	A/T shift selector (park position switch)	Input	A/T selector lever	P position	0
						Except P position	Battery voltage
24	Ground	R/L	Sliding sensor signal	Input	Seat sliding	Operate	 PIIA3277E
						Stop	0 or 5
25	Ground	Y/G	Lifting sensor (front) signal	Input	Seat lifting (front)	Operate	 SIIA0691J
						Stop	0 or 5
26	Ground	L/R	Sliding switch forward signal	Input	Sliding switch	Operate (forward)	0
						Release	Battery voltage
27	Ground	V/W	Reclining switch forward signal	Input	Reclining switch	Operate (forward)	0
						Release	Battery voltage
28	Ground	BR/Y	Lifting switch (front) up signal	Input	Seat lifting switch (front)	Operate (up)	0
						Release	Battery voltage
29	Ground	G/R	Lifting switch (rear) up signal	Input	Seat lifting switch (rear)	Operate (up)	0
						Release	Battery voltage
30	Ground	L/Y	Pedal switch forward signal	Input	Pedal switch	Operate (forward)	0
						Release	Battery voltage
31	Ground	GR/R	Sensor ground	—	—		0
32	Ground	G/W	Ground (signal)	—	—		0
33	Ground	W/B	Battery power source (C/B)	Input	—		Battery voltage

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx)
+	-		Signal name	Input/ Output			
35	Ground	R/G	Sliding motor forward output signal	Output	Seat sliding	Operate (forward)	Battery voltage
						Release	0
36	Ground	L	Reclining motor forward output signal	Output	Seat reclining	Operate (forward)	Battery voltage
						Release	0
37	Ground	B	Lifting motor (front) down output signal	Output	Seat lifting (front)	Operate (down)	Battery voltage
						Stop	0
38	Ground	GR	Lifting motor (rear) up output signal	Output	Seat lifting (rear)	Operate (up)	Battery voltage
						Stop	0
39	Ground	R	Lifting motor (rear) down output signal	Output	Seat lifting (rear)	Operate (down)	Battery voltage
						Stop	0
40	Ground	G	Power source (Fuse)	Input	—		Battery voltage
42	Ground	R/Y	Sliding motor backward output signal	Output	Seat sliding	Operate (backward)	Battery voltage
						Stop	0
44	Ground	G/B	Reclining motor backward output signal	Output	Seat reclining	Operate (backward)	Battery voltage
						Stop	0
45	Ground	G/Y	Lifting motor (front) up output signal	Output	Seat lifting (front)	Operate (up)	Battery voltage
						Stop	0
48	Ground	B	Ground (power)	—	—		0

Fail Safe

INFOID:0000000009882164

The fail-safe mode may be activated if the following symptoms are observed.

FAIL-SAFE MODE

When any manual and automatic operations are not performed, if any motor operations of front seat LH or pedals are detected for T2 or more, status is judged “Output error”.

OPERATED PORTION	T2
Seat sliding	Approx. 0.1 sec.
Seat reclining	Same as above
Seat lifting (Front)	Same as above
Seat lifting (Rear)	Same as above
Pedal adjust	Same as above

NOTE:
The front seat LH position and pedal adjustment functions (see the following table) operate simultaneously in the order of priority.

Priority	Function	Priority	Function
1	Seat sliding, (door mirror LH/RH)*	4	Seat lifter-FR
2	Pedal	5	Seat lifter-RR
3	Seat reclining		

*: In conjunction with sliding the seat, the door mirrors are positioned.

CANCEL OF FAIL-SAFE MODE

The mode is cancelled when the A/T selector lever is shifted to P position from any other position.

DTC Index

INFOID:0000000009882165

CONSULT display	Timing*1		Item	Reference page
	Current malfunction	Previous malfunction		
CAN COMM CIRCUIT [U1000]	0	1-39	CAN communication	ADP-29
SEAT SLIDE [B2112]	0	1-39	Seat slide motor output	ADP-30
SEAT RECLINING [B2113]	0	1-39	Seat reclining motor output	ADP-32
SEAT LIFTER FRONT [B2114]	0	1-39	Seat lifting motor front output	ADP-34
SEAT LIFTER REAR [B2115]	0	1-39	Seat lifting motor rear output	ADP-36
ADJ PEDAL MOTOR [B2117]	0	1-39	Pedal adjusting motor output	ADP-38
ADJ PEDAL SENSOR [B2120]	0	1-39	Pedal adjusting sensor input	ADP-40
DETENT SW [B2126]	0	1-39	T. R. switch condition	ADP-42
UART COMM [B2128]	0	1-39	UART communication	ADP-44

*1:

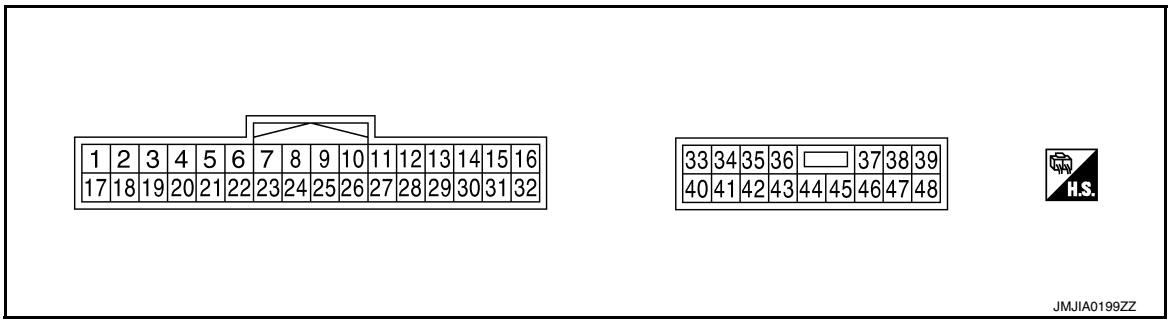
- 0: Current malfunction is present
- 1-39: Displayed if any previous malfunction is present when current condition is normal. The numeral value increases by one at each IGN ON to OFF cycle from 1 to 39. The counter remains at 39 even if the number of cycles exceeds it. However, the counter is reset to 1 if any malfunction is detected again, the normal operation is resumed and the ignition switch is turned from OFF to ON.

AUTOMATIC DRIVE POSITIONER CONTROL UNIT

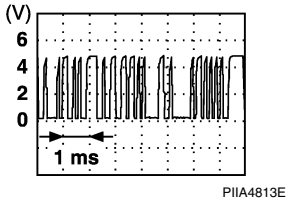
Reference Value

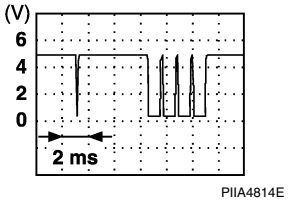
INFOID:0000000009882166

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx.)
+	-		Signal name	Input/ Output			
2	Ground	LG	Changeover switch RH signal	Input	Changeover switch position	RH	0
						Neutral or LH	5
3	Ground	Y/B	Mirror switch up signal	Input	Mirror switch	Operated (up)	0
						Other than above	5
4	Ground	V/W	Mirror switch left signal	Input	Mirror switch	Operated (left)	0
						Other than above	5
5	Ground	R/B	Door mirror sensor (RH) up/down signal	Input	Door mirror RH position	Peak	3.4
						Valley	0.6
6	Ground	L/Y	Door mirror sensor (LH) up/down signal	Input	Door mirror LH position	Peak	3.4
						Valley	0.6
8	Ground	BR/Y	Pedal sensor input signal	Input	Pedal sensor	Forward	0.5
						Backward	4.5
9	Ground	LG/B	Memory switch 1 signal	Input	Memory switch 1	Push	0
						Other than above	5
10	Ground	L	UART LINE (TX)	Output	Ignition switch ON		 PIIA4813E
12	Ground	P	Memory indictor 1 signal	Output	Memory indictor 1	Illuminate	0
						Other than above	Battery voltage

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx.)
+	-		Signal name	Input/ Output			
13	Ground	Y/G	Memory indictor 2 signal	Output	Memory indictor 2	Illuminate	0
						Other than above	Battery voltage
14	Ground	GR/R	Door mirror motor (RH) up output signal	Output	Door mirror RH	Operate (up)	1.5 - Battery voltage
						Other than above	0
15	Ground	V/R	Door mirror motor (RH) left output signal	Output	Door mirror RH	Operate (left)	1.5 - Battery voltage
						Other than above	0
16	Ground	O	Door mirror motor (LH) down output signal	Output	Door mirror (LH)	Operate (down)	1.5 - Battery voltage
						Other than above	0
			Door mirror motor (LH) right output signal			Operate (right)	1.5 - Battery voltage
						Other than above	0
18	Ground	BR/W	Changeover switch LH signal	Input	Changeover switch position	LH	0
						Neutral or RH	5
19	Ground	SB	Mirror switch down signal	Input	Mirror switch	Operate (down)	0
						Other than above	5
20	Ground	GR	Mirror switch right signal	Input	Mirror switch	Operate (right)	0
						Other than above	5
21	Ground	L/W	Door mirror sensor (RH) left/right signal	Input	Door mirror RH position	Left edge	3.4
						Right edge	0.6
22	Ground	G	Door mirror sensor (LH) left/right signal	Input	Door mirror LH position	Left edge	0.6
						Right edge	3.4
24	Ground	G/O	Set switch signal	Input	Set switch	Push	0
						Other than above	5
25	Ground	P/L	Memory switch 2 signal	Input	Memory switch 2	Push	0
						Other than above	5
26	Ground	W	UART LINE (RX)	Input	Ignition switch ON		 PIIA4814E

Terminal No.		Wire color	Description		Condition		Voltage (V) (Approx.)
+	-		Signal name	Input/ Output			
30	Ground	Y	Door mirror motor (RH) down output signal	Output	Door mirror (RH)	Operate (down)	1.5 - Battery voltage
						Other than above	0
			Door mirror motor (RH) right output signal			Operate (right)	1.5 - Battery voltage
						Other than above	0
31	Ground	R	Door mirror motor (LH) up output signal	Output	Door mirror (LH)	Operate (up)	1.5 - Battery voltage
						Other than above	0
32	Ground	BR	Door mirror motor (LH) left output signal	Output	Door mirror (LH)	Operate (left)	1.5 - Battery voltage
						Other than above	0
33	Ground	W/L	Sensor power supply	Input	—		5
34	Ground	Y/R	Battery power source	Input	—		Battery voltage
37	Ground	G	Pedal adjusting motor forward output signal	Output	Pedal adjusting motor	Operate (forward)	Battery voltage
						Other than above	0
39	Ground	L/B	Battery power source		—		Battery voltage
40	Ground	B/W	Ground	—	—		0
41	Ground	W/G	Sensor ground	—	—		0
45	Ground	R	Pedal adjusting motor backward output signal	Output	Pedal adjusting motor	Operate (backward)	Battery voltage
						Other than above	0
48	Ground	B	Ground	—	—		0

BCM (BODY CONTROL MODULE)

Reference Value

INFOID:0000000009882167

NOTE:
The Signal Tech II Tool (J-50190) can be used to perform the following functions. Refer to the Signal Tech II User Guide for additional information.

- Activate and display TPMS transmitter IDs
- Display tire pressure reported by the TPMS transmitter
- Read TPMS DTCs
- Register TPMS transmitter IDs
- Test remote keyless entry keyfob relative signal strength

VALUES ON THE DIAGNOSIS TOOL

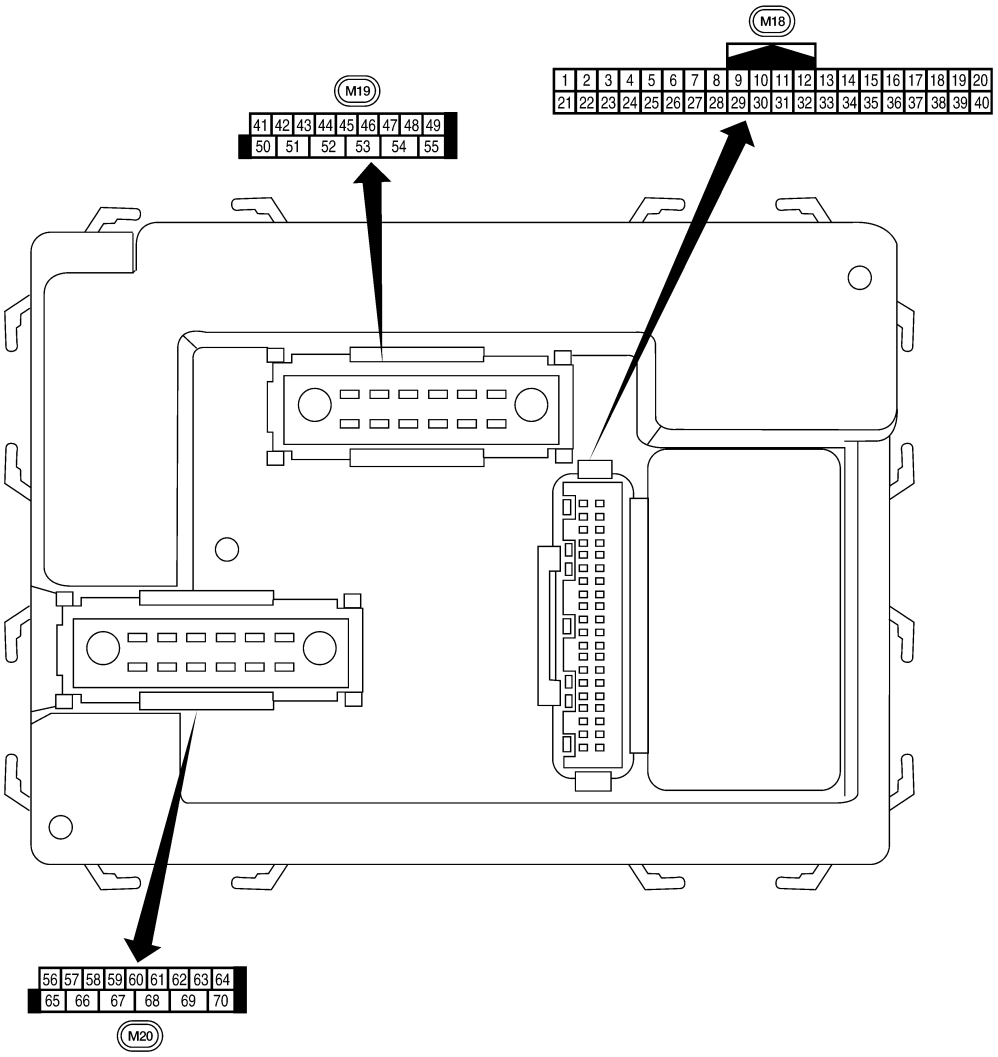
Monitor Item	Condition	Value/Status
ACC ON SW	Ignition switch OFF or ON	Off
	Ignition switch ACC	On
AIR COND SW	A/C switch OFF	Off
	A/C switch ON	On
AIR PRESS FL	Front left tire air pressure value	kPa, kg/cm^2, psi
AIR PRESS FR	Front right tire air pressure value	kPa, kg/cm^2, psi
AIR PRESS RL	Rear left tire air pressure value	kPa, kg/cm^2, psi
AIR PRESS RR	Rear right tire air pressure value	kPa, kg/cm^2, psi
AUTO LIGHT SW	Lighting switch OFF	Off
	Lighting switch AUTO	On
BRAKE SW	Brake pedal released	Off
	Brake pedal applied	On
BUCKLE SW	Seat belt buckle unfastened	Off
	Seat belt buckle fastened	On
BUZZER	Buzzer in combination meter OFF	Off
	Buzzer in combination meter ON	On
CARGO LAMP SW	Cargo lamp switch OFF	Off
	Cargo lamp switch ON	On
CDL LOCK SW	Door lock/unlock switch does not operate	Off
	Press door lock/unlock switch to the LOCK side	On
CDL UNLOCK SW	Door lock/unlock switch does not operate	Off
	Press door lock/unlock switch to the UNLOCK side	On
DOOR SW-AS	Front door RH closed	Off
	Front door RH opened	On
DOOR SW-DR	Front door LH closed	Off
	Front door LH opened	On
DOOR SW-RL	Rear door LH closed	Off
	Rear door LH opened	On
DOOR SW-RR	Rear door RH closed	Off
	Rear door RH opened	On
FAN ON SIG	Blower motor fan switch OFF	Off
	Blower motor fan switch ON	On

Monitor Item	Condition	Value/Status
FR FOG SW	Front fog lamp switch OFF	Off
	Front fog lamp switch ON	On
FR WASHER SW	Front washer switch OFF	Off
	Front washer switch ON	On
FR WIPER LOW	Front wiper switch OFF	Off
	Front wiper switch LO	On
FR WIPER HI	Front wiper switch OFF	Off
	Front wiper switch HI	On
FR WIPER INT	Front wiper switch OFF	Off
	Front wiper switch INT	On
FR WIPER STOP	Any position other than front wiper stop position	Off
	Front wiper stop position	On
HAZARD SW	When hazard switch is not pressed	Off
	When hazard switch is pressed	On
HEAD LAMP SW1	Headlamp switch OFF	Off
	Headlamp switch 1st	On
HEAD LAMP SW2	Headlamp switch OFF	Off
	Headlamp switch 1st	On
HI BEAM SW	High beam switch OFF	Off
	High beam switch HI	On
ID REGST FL1	ID registration of front left tire incomplete	YET
	ID registration of front left tire complete	DONE
ID REGST FR1	ID registration of front right tire incomplete	YET
	ID registration of front right tire complete	DONE
ID REGST RL1	ID registration of rear left tire incomplete	YET
	ID registration of rear left tire complete	DONE
ID REGST RR1	ID registration of rear right tire incomplete	YET
	ID registration of rear right tire complete	DONE
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On
IGN SW CAN	Ignition switch OFF or ACC	Off
	Ignition switch ON	On
INT VOLUME	Wiper intermittent dial is in a dial position 1 - 7	1 - 7
KEY CYL LK-SW	Door key cylinder LOCK position	Off
	Door key cylinder other than LOCK position	On
KEY CYL UN-SW	Door key cylinder UNLOCK position	Off
	Door key cylinder other than UNLOCK position	On
KEY ON SW	Mechanical key is removed from key cylinder	Off
	Mechanical key is inserted to key cylinder	On
KEYLESS LOCK	LOCK button of key fob is not pressed	Off
	LOCK button of key fob is pressed	On
KEYLESS PANIC	PANIC button of key fob is not pressed	Off
	PANIC button of key fob is pressed	On

Monitor Item	Condition	Value/Status
KEYLESS UNLOCK	UNLOCK button of key fob is not pressed	Off
	UNLOCK button of key fob is pressed	On
LIGHT SW 1ST	Lighting switch OFF	Off
	Lighting switch 1st	On
OIL PRESS SW	• Ignition switch OFF or ACC • Engine running	Off
	Ignition switch ON	On
OPTICAL SENSOR	Bright outside of the vehicle	Close to 5V
	Dark outside of the vehicle	Close to 0V
PASSING SW	Other than lighting switch PASS	Off
	Lighting switch PASS	On
REAR DEF SW	Rear window defogger switch OFF	Off
	Rear window defogger switch ON	On
TURN SIGNAL L	Turn signal switch OFF	Off
	Turn signal switch LH	On
TURN SIGNAL R	Turn signal switch OFF	Off
	Turn signal switch RH	On
VEHICLE SPEED	While driving	Equivalent to speedometer reading
WARNING LAMP	Low tire pressure warning lamp in combination meter OFF	Off
	Low tire pressure warning lamp in combination meter ON	On

Terminal Layout

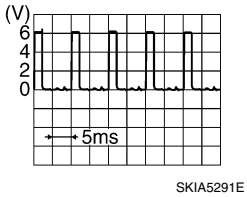
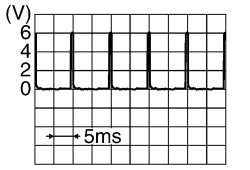
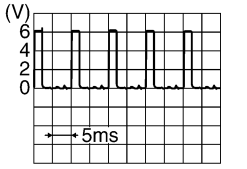
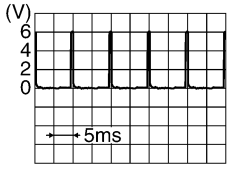
INFOID:0000000009882168

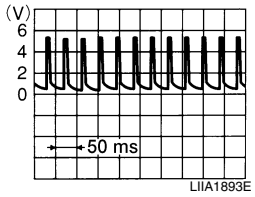
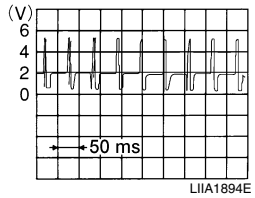
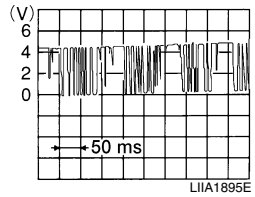
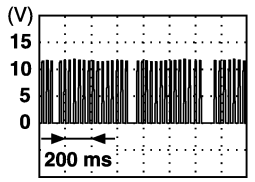


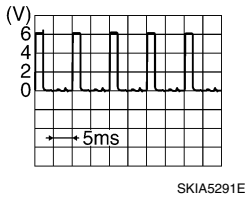
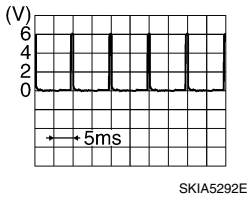
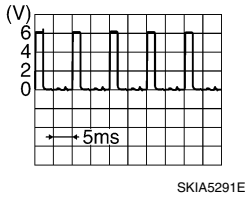
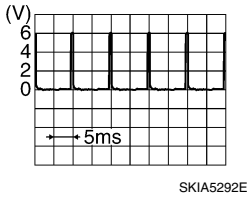
LIIA2443E

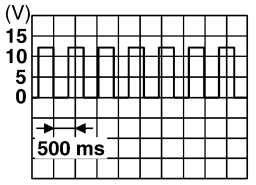
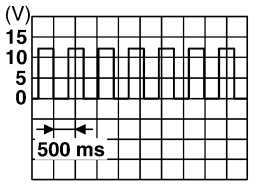
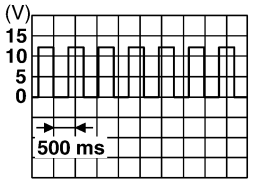
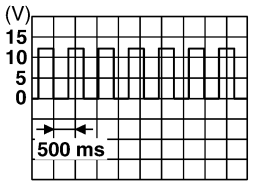
Physical Values

INFOID:0000000009882169

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
1	BR/W	Key ring output	Output	OFF	ON (driver door open)	0V
					OFF (driver door closed)	Battery voltage
2	SB	Combination switch input 5	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
3	G/Y	Combination switch input 4	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
4	Y	Combination switch input 3	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
5	G/B	Combination switch input 2	Input	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
6	V	Combination switch input 1				
9	R/G	Brake switch	Input	ON	Brake pedal depressed	Battery voltage
					Brake pedal released	0V
11	O	Ignition switch (ACC or ON)	Input	ACC or ON	Ignition switch ACC or ON	Battery voltage
12	R/L	Front door switch RH (All)	Input	OFF	ON (open)	0V
		Rear door switch lower RH (King Cab)				
		Rear door switch upper RH (King Cab)			OFF (closed)	Battery voltage
13	GR	Rear door switch RH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
15	L/W	Tire pressure warning check connector	Input	OFF	—	5V
16	SB	MR output	Output	—	—	—
18	P	Remote keyless entry receiver and optical sensor (ground)	Output	OFF	—	0V

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
19	V/W	Remote keyless entry receiver (power supply)	Output	OFF	Ignition switch OFF	 LIIA1893E
20	G/W	Remote keyless entry receiver (signal)	Input	OFF	Stand-by (keyfob buttons released)	 LIIA1894E
					When remote keyless entry receiver receives signal from keyfob (keyfob buttons pressed)	 LIIA1895E
21	G	NATS antenna amp.	Input	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
22	G	BUS	—	—	Ignition switch ON or power window timer operates	 PIIA2344E
23	G/O	Security indicator lamp	Output	OFF	Goes OFF → illuminates (Every 2.4 seconds)	Battery voltage → 0V
25	BR	NATS antenna amp.	Input	OFF → ON	Ignition switch (OFF → ON)	Just after turning ignition switch ON: Pointer of tester should move for approx. 1 second, then return to battery voltage.
27	W/R	Compressor ON signal	Input	ON	A/C switch OFF	5V
					A/C switch ON	0V
28	L/R	Front blower monitor	Input	ON	Front blower motor OFF	Battery voltage
					Front blower motor ON	0V
29	W/B	Hazard switch	Input	OFF	ON	0V
					OFF	5V
31	P/L	Cargo lamp switch	Input	OFF	Cargo lamp switch ON	0
					Cargo lamp switch OFF	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
32	R/G	Combination switch output 5	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
33	R/Y	Combination switch output 4	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
34	L	Combination switch output 3	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5291E
35	O/B	Combination switch output 2	Output	ON	Lighting, turn, wiper OFF Wiper dial position 4	 SKIA5292E
36	R/W	Combination switch output 1				
37	B/R	Key switch and key lock solenoid	Input	OFF	Key inserted	Battery voltage
					Key removed	0V
38	W/L	Ignition switch (ON)	Input	ON	—	Battery voltage
39	L	CAN-H	—	—	—	—
40	P	CAN-L	—	—	—	—
41	Y/B	Rear defogger switch	Input	ON	Rear defogger switch ON	0V
					Rear defogger switch OFF	5V
47	SB	Front door switch LH (All)	Input	OFF	ON (open)	0V
		Rear door switch lower LH (King Cab)				
		Rear door switch upper LH (King Cab)			OFF (closed)	Battery voltage
48	R/Y	Rear door switch LH (Crew Cab)	Input	OFF	ON (open)	0V
					OFF (closed)	Battery voltage
50	R/Y	Cargo bed lamp control	Output	OFF	Cargo lamp switch (ON)	0V
					Cargo lamp switch (OFF)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
51	Y/B	Trailer turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
52	G/B	Trailer turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
56	R/G	Battery saver output	Output	OFF	15 minutes after ignition switch is turned OFF	0V
				ON	—	Battery voltage
57	Y/R	Battery power supply	Input	OFF	—	Battery voltage
58	W/R	Optical sensor	Input	ON	When optical sensor is illuminated	3.1V or more
					When optical sensor is not illuminated	0.6V or less
59	G	Front door lock assembly LH actuator (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage
60	G/B	Turn signal (left)	Output	ON	Turn left ON	 SKIA3009J
61	G/Y	Turn signal (right)	Output	ON	Turn right ON	 SKIA3009J
62	R/W	Step lamp LH and RH	Output	OFF	ON (any door open)	0V
					OFF (all doors closed)	Battery voltage
63	L	Interior room/map lamp	Output	OFF	Any door switch: ON (open)	0V
					Any door switch: OFF (closed)	Battery voltage
65	V	All door lock actuators (lock)	Output	OFF	OFF (neutral)	0V
					ON (lock)	Battery voltage
66	G/Y	Front door lock actuator RH and rear door lock actuators LH/RH (unlock)	Output	OFF	OFF (neutral)	0V
					ON (unlock)	Battery voltage

Terminal	Wire color	Signal name	Signal input/ output	Measuring condition		Reference value or waveform (Approx.)
				Ignition switch	Operation or condition	
67	B	Ground	Input	ON	—	0V
68	W/L	Power window power supply (RAP)	Output	—	Ignition switch ON	Battery voltage
					Within 45 seconds after ignition switch OFF	Battery voltage
					More than 45 seconds after ignition switch OFF	0V
					When front door LH or RH is open or power window timer operates	0V
69	W/R	Power window power supply	Output	—	—	Battery voltage
70	W/B	Battery power supply	Input	OFF	—	Battery voltage

Fail Safe

INFOID:0000000009882170

Fail-safe index

BCM performs fail-safe control when any DTC listed below is detected.

Display contents of CONSULT	Fail-safe	Cancellation
U1000: CAN COMM CIRCUIT	Inhibit engine cranking	When the BCM re-establishes communication with the other modules.

DTC Inspection Priority Chart

INFOID:0000000009882171

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	• U1000: CAN COMM CIRCUIT
2	• B2190: NATS ANTENNA AMP • B2191: DIFFERENCE OF KEY • B2192: ID DISCORD BCM-ECM • B2193: CHAIN OF BCM-ECM

Priority	DTC
3	• C1729: VHCL SPEED SIG ERR • C1735: IGNITION SIGNAL
4	• C1704: LOW PRESSURE FL • C1705: LOW PRESSURE FR • C1706: LOW PRESSURE RR • C1707: LOW PRESSURE RL • C1708: [NO DATA] FL • C1709: [NO DATA] FR • C1710: [NO DATA] RR • C1711: [NO DATA] RL • C1712: [CHECKSUM ERR] FL • C1713: [CHECKSUM ERR] FR • C1714: [CHECKSUM ERR] RR • C1715: [CHECKSUM ERR] RL • C1716: [PRESSDATA ERR] FL • C1717: [PRESSDATA ERR] FR • C1718: [PRESSDATA ERR] RR • C1719: [PRESSDATA ERR] RL • C1720: [CODE ERR] FL • C1721: [CODE ERR] FR • C1722: [CODE ERR] RR • C1723: [CODE ERR] RL • C1724: [BATT VOLT LOW] FL • C1725: [BATT VOLT LOW] FR • C1726: [BATT VOLT LOW] RR • C1727: [BATT VOLT LOW] RL

DTC Index

INFOID:0000000009882172

NOTE:

Details of time display

- CRNT: Displays when there is a malfunction now or after returning to the normal condition until turning ignition switch OFF → ON again.
- 1 - 39: Displayed if any previous malfunction is present when current condition is normal. It increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON. The counter remains at 39 even if the number of cycles exceeds it. It is counted from 1 again when turning ignition switch OFF → ON after returning to the normal condition if the malfunction is detected again.

CONSULT display	Fail-safe	Tire pressure monitor warning lamp ON	Reference page
No DTC is detected. further testing may be required.	—	—	—
U1000: CAN COMM CIRCUIT	—	—	BCS-27
B2190: NATS ANTTENA AMP	—	—	SEC-18
B2191: DIFFERENCE OF KEY	—	—	SEC-21
B2192: ID DISCORD BCM-ECM	—	—	SEC-22
B2193: CHAIN OF BCM-ECM	—	—	SEC-24
C1708: [NO DATA] FL	—	—	WT-14
C1709: [NO DATA] FR	—	—	WT-14
C1710: [NO DATA] RR	—	—	WT-14
C1711: [NO DATA] RL	—	—	WT-14
C1712: [CHECKSUM ERR] FL	—	—	WT-16
C1713: [CHECKSUM ERR] FR	—	—	WT-16
C1714: [CHECKSUM ERR] RR	—	—	WT-16
C1715: [CHECKSUM ERR] RL	—	—	WT-16

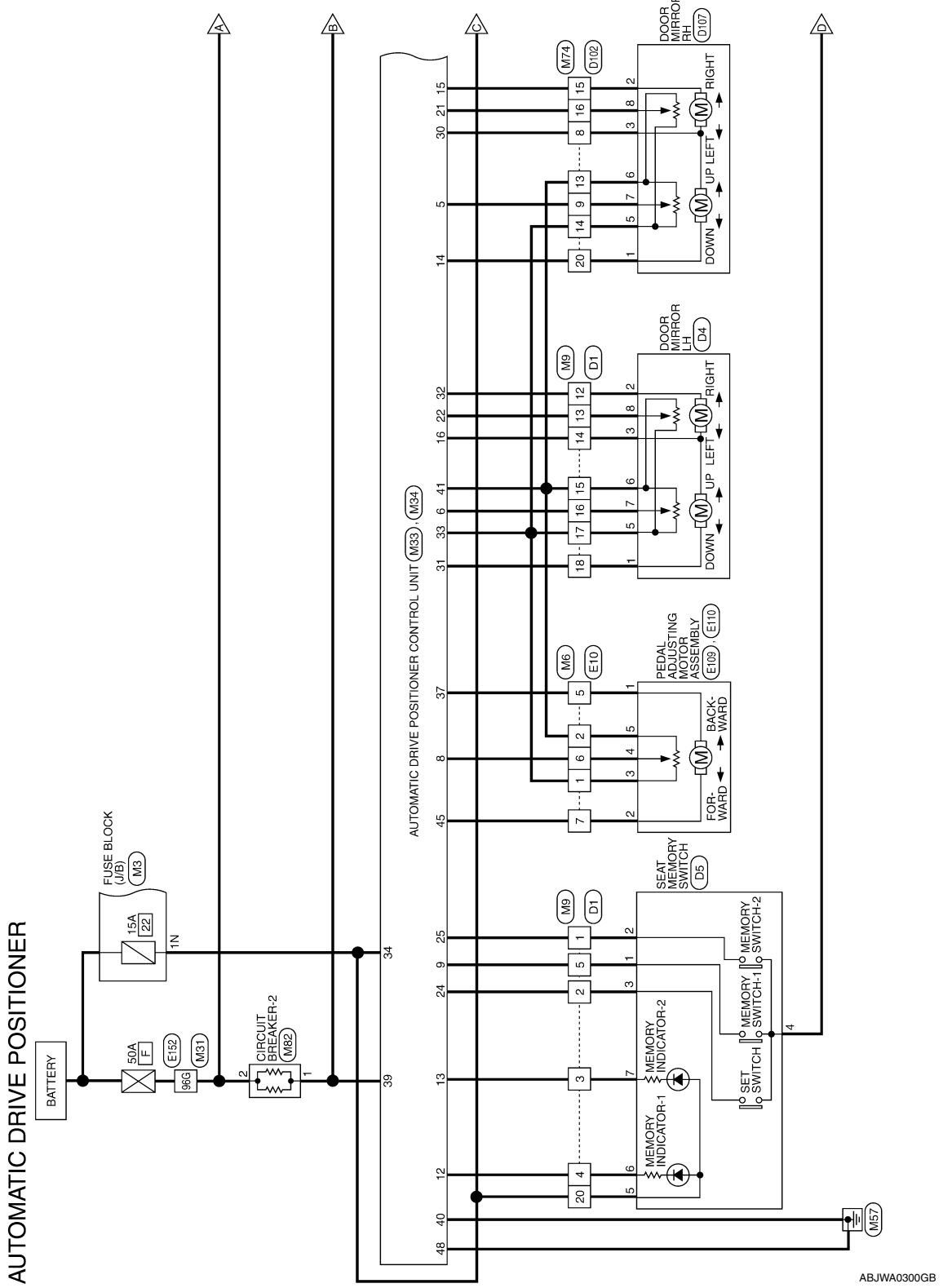
CONSULT display	Fail-safe	Tire pressure monitor warning lamp ON	Reference page
C1716: [PRESSDATA ERR] FL	—	—	WT-18
C1717: [PRESSDATA ERR] FR	—	—	WT-18
C1718: [PRESSDATA ERR] RR	—	—	WT-18
C1719: [PRESSDATA ERR] RL	—	—	WT-18
C1720: [CODE ERR] FL	—	—	WT-16
C1721: [CODE ERR] FR	—	—	WT-16
C1722: [CODE ERR] RR	—	—	WT-16
C1723: [CODE ERR] RL	—	—	WT-16
C1724: [BATT VOLT LOW] FL	—	—	WT-16
C1725: [BATT VOLT LOW] FR	—	—	WT-16
C1726: [BATT VOLT LOW] RR	—	—	WT-16
C1727: [BATT VOLT LOW] RL	—	—	WT-16
C1729: VHCL SPEED SIG ERR	—	—	WT-20
C1735: IGNITION SIGNAL	—	—	WT-21

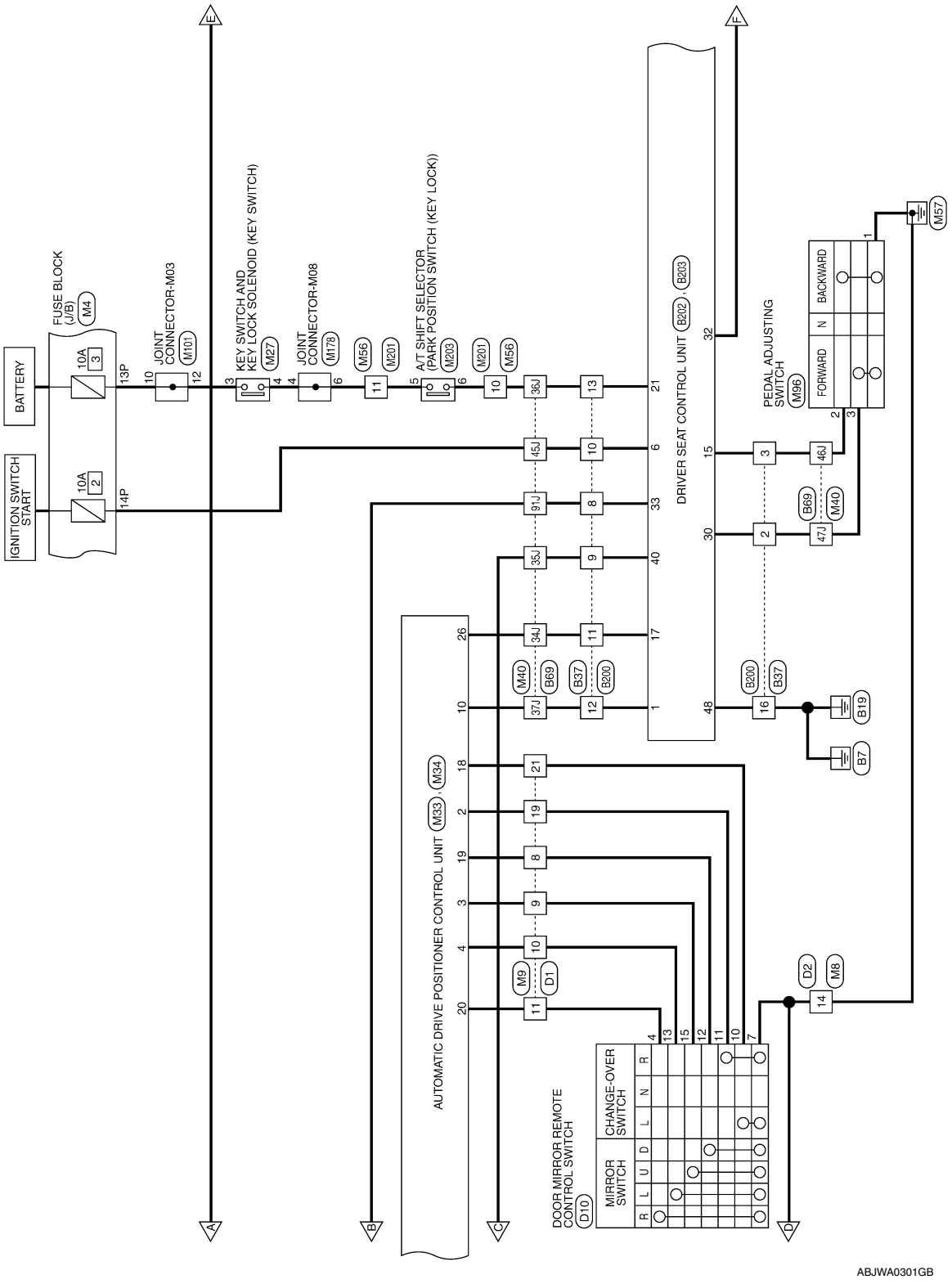
WIRING DIAGRAM

AUTOMATIC DRIVE POSITIONER

Wiring Diagram

INFOID:0000000009882173





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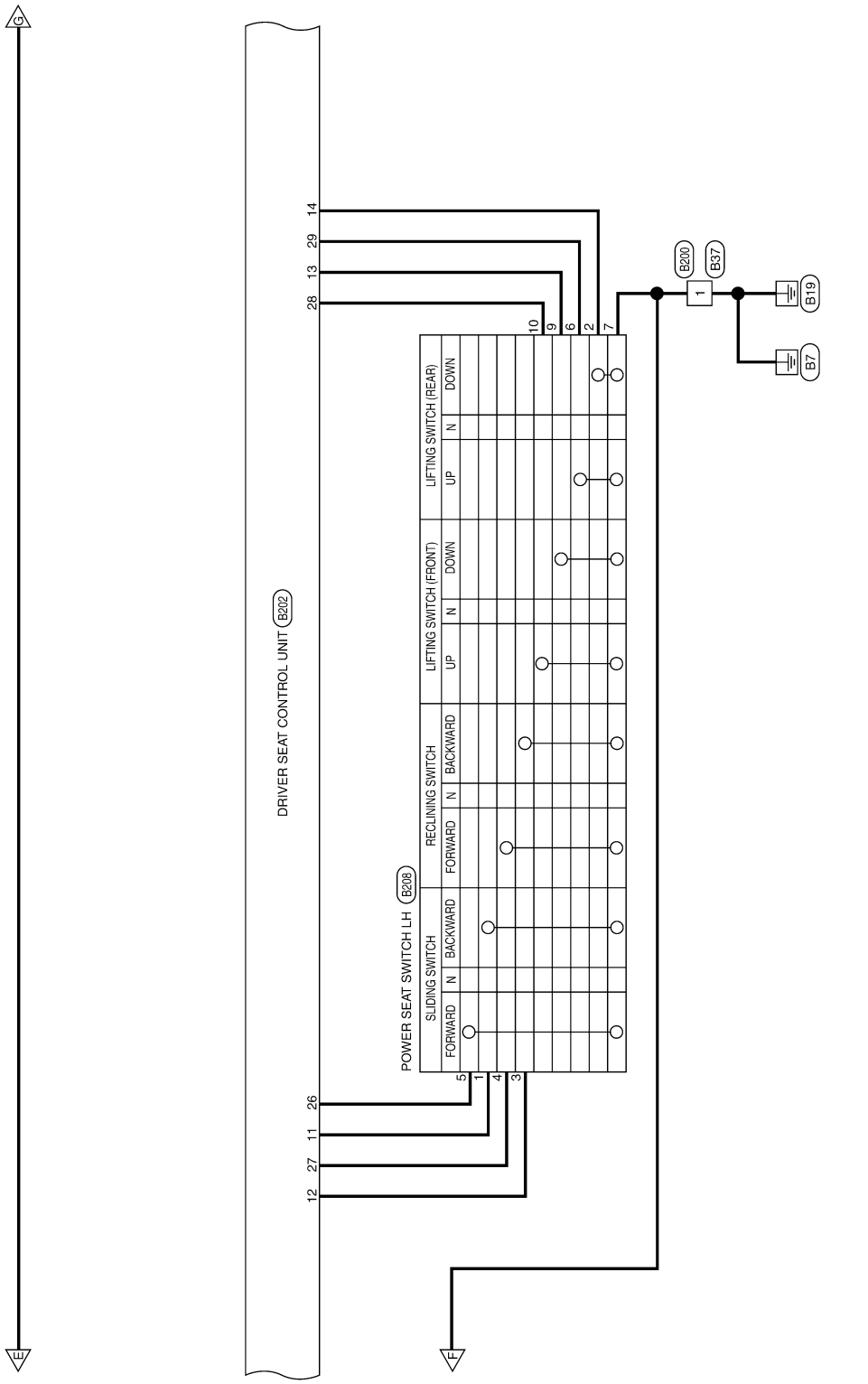

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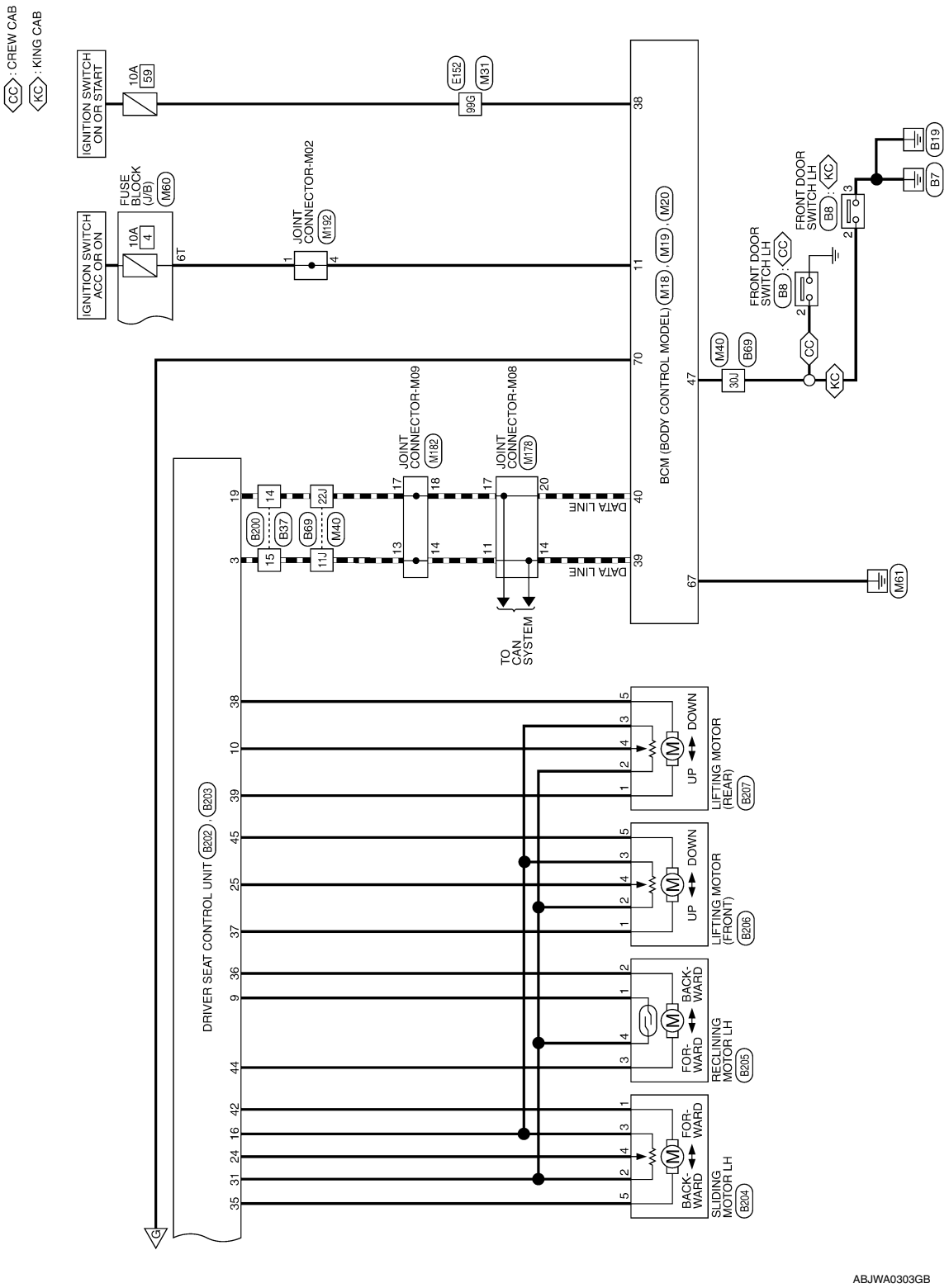
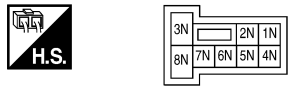


ABJWA0303GB

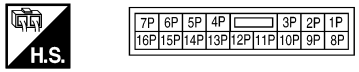
AUTOMATIC DRIVE POSITIONER CONNECTORS

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



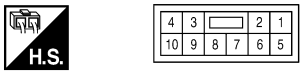
Terminal No.	Color of Wire	Signal Name
1N	Y/R	–

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



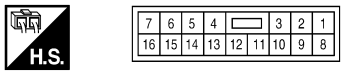
Terminal No.	Color of Wire	Signal Name
13P	P	–
14P	O	–

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE



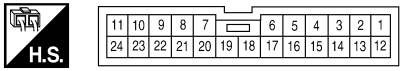
Terminal No.	Color of Wire	Signal Name
1	W/L	–
2	W/G	–
5	G	– (WITH AUTOMATIC DRIVE POSITIONER)
6	BR/Y	–
7	R	– (WITH AUTOMATIC DRIVE POSITIONER)

Connector No.	M8
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
14	B	–

Connector No.	M9
Connector Name	WIRE TO WIRE
Connector Color	BROWN



Terminal No.	Color of Wire	Signal Name
1	P/L	–
2	G/O	–
3	Y/G	–
4	P	–
5	LG/B	–

Terminal No.	Color of Wire	Signal Name
8	SB	–
9	Y/B	–
10	V/W	–
11	GR	–
12	BR	–
13	G	–
14	O	–
15	W/G	–
16	L/Y	–
17	W/L	–
18	R	–
19	LG	–
20	Y/R	–
21	BR/W	–

ABJIA0512GB

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
11	O	ACC SW
38	W/L	IGN SW
39	L	CAN-H
40	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

41	42	43	44	45	46	47	48	49
50	51	52	53	54	55			

Terminal No.	Color of Wire	Signal Name
47	SB	DOOR SW (DR)

Connector No.	M20
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	BLACK

H.S.

56	57	58	59	60	61	62	63	64
65	66	67	68	69	70			

Terminal No.	Color of Wire	Signal Name
67	B	GND (POWER)
70	W/B	BAT (F/L)

Connector No.	M27
Connector Name	KEY SWITCH AND KEY LOCK SOLENOID
Connector Color	WHITE

H.S.

4	3	2	1

Terminal No.	Color of Wire	Signal Name
3	P	–
4	B/R	–

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1G	2G	3G	4G	5G
6G	7G	8G	9G	10G

11G	12G	13G	14G	15G	16G	17G	18G	19G	20G	21G
22G	23G	24G	25G	26G	27G	28G	29G	30G		

31G	32G	33G	34G	35G	36G	37G	38G	39G	40G	41G
42G	43G	44G	45G	46G	47G	48G	49G	50G		

51G	52G	53G	54G	55G	56G	57G	58G	59G	60G	61G
62G	63G	64G	65G	66G	67G	68G	69G	70G		

71G	72G	73G	74G	75G	76G	77G	78G	79G	80G	81G
82G	83G	84G	85G	86G	87G	88G	89G	90G		

91G	92G	93G	94G	95G
96G	97G	98G	99G	100G

Terminal No.	Color of Wire	Signal Name
96G	W/B	–
99G	W/L	–

ABJIA0692GB

Connector No.	M33
Connector Name	AUTOMATIC DRIVE POSITIONER CONTROL UNIT
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name
1	–	–
2	LG	MIR SELECT SW RH
3	Y/B	MIR MANU SW UP
4	V/W	MIR MANU SW LH
5	R/B	VERTICAL SENS RH
6	L/Y	VERTICAL SENS LH
7	–	–
8	BR/Y	PEDAL POTENTION
9	LG/B	MEMORY1 SW
10	L	TX
11	–	–
12	P	MEMORY1 IND
13	Y/G	MEMORY2 IND
14	GR/R	RH MTR (UP-DN)
15	V/R	RH MTR (LT)
16	O	LH MTR (COM)
17	–	–
18	BR/W	MIR SELECT SW LH
19	SB	MIR MANU SW DN
20	GR	MIR MANU SW RH
21	L/W	HORIZONTAL SENS
22	G	HORIZONTAL SENS
23	–	–
24	G/O	SET SW
25	P/L	MEMORY2 SW
26	W	RX
27	–	–
28	–	–
29	–	–
30	Y	RH MTR (COM)
31	R	LH MTR (UP-DWN)
32	BR	LH MTR (LT)

Connector No.	M34
Connector Name	AUTOMATIC DRIVE POSITIONER CONTROL UNIT
Connector Color	WHITE

H.S.

33	34	35	36		37	38	39
40	41	42	43	44	45	46	47	48

Terminal No.	Color of Wire	Signal Name
33	W/L	MEMORY (POT FEED)
34	Y/R	BAT (FUSE)
35	–	–
36	–	–
37	G	FORWARD
38	–	–
39	L/B	BAT (PTC)
40	B/W	GND (SIG)
41	W/G	MEMORY (POT-RET)
42	–	–
43	–	–
44	–	–
45	R	PEDAL RR OUT
46	–	–
47	–	–
48	B	GND (POWER)

ABJIA0693GB

Connector No.	M56
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
10	L/R	–
11	B/R	–

Connector No.	M82
Connector Name	CIRCUIT BREAKER-2
Connector Color	WHITE

H.S.

1
2

Terminal No.	Color of Wire	Signal Name
1	L/B	–
2	W/B	–

Connector No.	M40
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1J	2J	3J	4J	5J
6J	7J	8J	9J	10J

11J	12J	13J	14J	15J	16J	17J	18J	19J	20J	21J
	22J	23J	24J	25J	26J	27J	28J	29J	30J	
31J	32J	33J	34J	35J	36J	37J	38J	39J	40J	41J
	42J	43J	44J	45J	46J	47J	48J	49J	50J	
51J	52J	53J	54J	55J	56J	57J	58J	59J	60J	61J
	62J	63J	64J	65J	66J	67J	68J	69J	70J	
71J	72J	73J	74J	75J	76J	77J	78J	79J	80J	81J
	82J	83J	84J	85J	86J	87J	88J	89J	90J	
91J	92J	93J	94J	95J						
	96J	97J	98J	99J	100J					

Terminal No.	Color of Wire	Signal Name
11J	L	–
22J	P	–
30J	SB	–
34J	W	–
35J	Y/R	–
36J	L/R	–
37J	L	–
45J	O	–
46J	L/Y	–
47J	R	–
91J	L/B	–

Connector No.	M74
Connector Name	WIRE TO WIRE
Connector Color	BROWN

H.S.

9	8	7	6		5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
8	Y	– (WITH AUTOMATIC DRIVE POSITIONER)
9	R/B	– (WITH AUTOMATIC DRIVE POSITIONER)
13	W/G	–
14	W/L	–
15	V/R	–
16	L/W	–
20	GR/R	– (WITH AUTOMATIC DRIVE POSITIONER)

Connector No.	M60
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

2T		1T
6T	5T	4T	3T

Terminal No.	Color of Wire	Signal Name
6T	O	–

ABJIA0694GB

Connector No.	M178
Connector Name	JOINT CONNECTOR-M08
Connector Color	WHITE

H.S.

9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
4	B/R	–
6	B/R	–
11	L	–
14	L	–
17	P	–
20	P	–

Connector No.	M101
Connector Name	JOINT CONNECTOR-M03
Connector Color	BLUE

H.S.

9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
10	P	–
12	P	–

Connector No.	M96
Connector Name	PEDAL ADJUSTING SWITCH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	BROWN

H.S.

5		6
4	2	1	3

Terminal No.	Color of Wire	Signal Name
1	B	–
2	L/Y	–
3	R	–

Connector No.	M201
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

7	6	5	4		3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name
10	L/R	–
11	B/R	–

Connector No.	M192
Connector Name	JOINT CONNECTOR-M02
Connector Color	GREEN

H.S.

9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
1	O	–
4	O	–

Connector No.	M182
Connector Name	JOINT CONNECTOR-M09
Connector Color	GREEN

H.S.

9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
13	L	–
14	L	–
17	P	–
18	P	–

ABJIA0695GB

Connector No.	M203
Connector Name	A/T SHIFT SELECTOR (FLOOR SHIFT)
Connector Color	WHITE

H.S.

1	2	3	4	5
6	7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name
5	B/R	–
6	L/R	–

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4
5	6	7	8	9	10

Terminal No.	Color of Wire	Signal Name
1	W/L	–
2	W/G	–
5	G	–
6	BR/Y	–
7	R	–

Connector No.	E109
Connector Name	PEDAL ADJUSTING MOTOR ASSEMBLY
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	–
2	R	–

Connector No.	E110
Connector Name	PEDAL ADJUSTING MOTOR ASSEMBLY
Connector Color	GRAY

H.S.

3	4	5

Terminal No.	Color of Wire	Signal Name
3	W/L	–
4	BR/Y	–
5	W/G	–

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

5G	4G	3G	2G	1G
10G	9G	8G	7G	6G

21G	20G	19G	18G	17G	16G	15G	14G	13G	12G	11G
30G	29G	28G	27G	26G	25G	24G	23G	22G		

41G	40G	39G	38G	37G	36G	35G	34G	33G	32G	31G
50G	49G	48G	47G	46G	45G	44G	43G	42G		

61G	60G	59G	58G	57G	56G	55G	54G	53G	52G	51G
70G	69G	68G	67G	66G	65G	64G	63G	62G		

81G	80G	79G	78G	77G	76G	75G	74G	73G	72G	71G
90G	89G	88G	87G	86G	85G	84G	83G	82G		

95G	94G	93G	92G	91G
100G	99G	98G	97G	96G

Terminal No.	Color of Wire	Signal Name
96G	W/B	–
99G	L/W	–

ABJIA0696GB

Terminal No.	Color of Wire	Signal Name
9	Y/R	–
10	O	–
11	W	–
12	L	–
13	L/R	–
14	P	–
15	L	–
16	B/W	–

Connector No.	B37
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	–
2	R	–
3	L/Y	–
8	L/B	–

Connector No.	B200
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	G/W	–
2	L/Y	–
3	SB	–
8	W/B	–
9	G	–
10	R	–
11	Y/R	–
12	W	–
13	L	–
14	G	–
15	L/B	–
16	B	–

Connector No.	B8
Connector Name	FRONT DOOR SWITCH LH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
2	SB	–
3	B	–

Terminal No.	Color of Wire	Signal Name
11J	L	–
22J	P	–
30J	SB	–
34J	W	–
35J	Y/R	–
36J	L/R	–
37J	L	–
45J	O	–
46J	L/Y	–
47J	R	–
91J	L/B	–

Connector No.	B69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

ABJIA0697GB

Connector No.	B202
Connector Name	DRIVER SEAT CONTROL UNIT
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name
1	W	RX (UART)
2	–	–
3	L/B	CAN-H
4	–	–
5	–	–
6	R	START SW
7	–	–
8	–	–
9	R/B	PULSE (RECLINER)
10	B/R	PULSE (REAR LIFTER)
11	Y/R	SLIDE SW (BACKWARD)
12	L/W	RECLINER SW (BACKWARD)
13	V	FRONT LIFTER SW (DOWNWARD)
14	P/L	REAR LIFTER SW (DOWNWARD)
15	SB	PEDAL SW (BACKWARD)
16	R/W	PEDAL SUPPLY (ENCODER)
17	Y/R	TX (UART)
18	–	–
19	G	CAN-L
20	–	–
21	L	P RANGE SW
22	–	–
23	–	–
24	R/L	PULSE (SLIDE)
25	Y/G	PULSE (FRONT LIFTER)
26	L/R	SLIDE SW (FORWARD)
27	V/W	RECLINER SW (FORWARD)
28	BR/Y	FRONT LIFTER SW (UPWARD)
29	G/R	REAR LIFTER SW (UPWARD)
30	L/Y	PEDAL SW (FORWARD)
31	GR/R	GND (SENSOR GND)
32	G/W	GND (SIGNAL)

Connector No.	B203
Connector Name	DRIVER SEAT CONTROL UNIT
Connector Color	WHITE

H.S.

33	34	35	36		37	38	39
40	41	42	43	44	45	46	47	48

Terminal No.	Color of Wire	Signal Name
33	W/B	BAT (PTC)
34	–	–
35	R/G	SLIDE MOTOR (FORWARD)
36	L	RECLINER MOTOR (FORWARD)
37	B	FRONT LIFTER MOTOR (DOWNWARD)
38	GR	REAR LIFTER MOTOR (UPWARD)
39	R	REAR LIFTER MOTOR (DOWNWARD)
40	G	BAT (FUSE)
41	–	–
42	R/Y	SLIDE MOTOR (BACKWARD)
43	–	–
44	G/B	RECLINER MOTOR (BACKWARD)
45	G/Y	FRONT LIFTER MOTOR (UPWARD)
46	–	–
47	–	–
48	B	GND (POWER)

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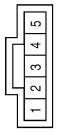
Connector No.	B206
Connector Name	LIFTING MOTOR (FRONT) (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	WHITE

H.S.

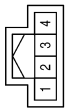


Terminal No.	Color of Wire	Signal Name
1	R	–
2	GR/R	–
3	R/W	–
4	B	–
5	GR	–

Terminal No.	Color of Wire	Signal Name
9	V	–
10	BR/Y	–

Connector No.	B205
Connector Name	RECLINING MOTOR LH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	WHITE

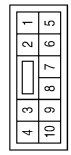
H.S.



Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	L	–
3	G/B	–
4	GR/R	–

Connector No.	B208
Connector Name	POWER SEAT SWITCH LH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	WHITE

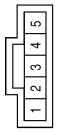
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y/R	–
2	P/L	–
3	L/W	–
4	V/W	–
5	L/R	–
6	G/R	–
7	B/W	–
8	–	–

Connector No.	B204
Connector Name	SLIDING MOTOR LH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	GRAY

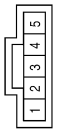
H.S.



Terminal No.	Color of Wire	Signal Name
1	R/Y	–
2	GR/R	–
3	R/W	–
4	R/L	–
5	R/G	–

Connector No.	B207
Connector Name	LIFTING MOTOR (REAR) (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1	B	–
2	GR/R	–
3	R/W	–
4	Y/G	–
5	G/Y	–

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Connector No.	D1
Connector Name	WIRE TO WIRE
Connector Color	BROWN

H.S.

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
1	P/L	–
2	G/O	–
3	Y/G	–
4	P	–
5	LG/B	–
8	SB	–

Connector No.	D2
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
14	B	–

Terminal No.	Color of Wire	Signal Name
9	Y/B	–
10	V/W	–
11	GR	– (WITH AUTOMATIC DRIVE POSITIONER)
12	BR	–
13	G	–
14	O	–
15	W/G	–
16	L/Y	–
17	W/L	–
18	R	–
19	LG	–
20	Y/R	–
21	BR/W	–

Connector No.	D4
Connector Name	DOOR MIRROR LH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	WHITE

H.S.

10	11	12	13	14	15	16
1	2	3	4	5	6	7	8	9

Terminal No.	Color of Wire	Signal Name
1	R	–
2	BR	–
3	O	–
5	W/L	–
6	W/G	–
7	L/Y	–
8	G	–

Connector No.	D5
Connector Name	SEAT MEMORY SWITCH
Connector Color	WHITE

H.S.

3	5	6	7	2	1	4

Terminal No.	Color of Wire	Signal Name
1	LG/B	–
2	P/L	–
3	G/O	–
4	B	–
5	Y/R	–
6	P	–
7	Y/G	–

Connector No.	D10
Connector Name	DOOR MIRROR REMOTE CONTROL SWITCH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	BROWN

H.S.

1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
4	GR	–
7	B	–
10	BR/W	–
11	LG	–
12	SB	–
13	V/W	–
15	Y/B	–

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Connector No.	D102
Connector Name	WIRE TO WIRE
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
8	Y	– (WITH AUTOMATIC DRIVE POSITIONER)
9	R/B	– (WITH AUTOMATIC DRIVE POSITIONER)
13	W/G	–
14	W/L	–
15	V/R	–
16	L/W	–
20	GR/R	– (WITH AUTOMATIC DRIVE POSITIONER)

Connector No.	D107
Connector Name	DOOR MIRROR RH (WITH AUTOMATIC DRIVE POSITIONER)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	GR/R	–
2	V/R	–
3	Y	–
5	W/L	–
6	W/G	–
7	R/B	–
8	L/W	–

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SYMPTOM DIAGNOSIS

ADP SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000009882174

NOTE:
Always perform the “Basic Inspection” before performing diagnosis in the following table. Refer to ADP-4, "Work Flow".

SYMPTOM 1

Symptom		Diagnosis procedure	Reference page
Manual functions (for specific part) do not operate	Sliding operation	Check sliding switch.	ADP-50
	Reclining operation	Check reclining switch.	ADP-53
	Lifting operation (front)	Check lifting switch (front).	ADP-56
	Lifting operation (rear)	Check lifting switch (rear).	ADP-59
	Pedal operation	1. Check pedal adjusting switch.	ADP-62
		2. Check pedal adjusting sensor.	ADP-86
	Door mirror operation	1. Changeover switch.	ADP-67
		2. Mirror switch	ADP-69
	All parts of seat	Check power seat switch ground circuit.	ADP-73

SYMPTOM 2

Symptom		Diagnosis procedure	Reference page
Memory functions (for specific part) do not operate	Sliding operation	Check sliding sensor.	ADP-78
	Reclining operation	Check reclining sensor.	ADP-80
	Lifting operation (front)	Check lifting sensor (front).	ADP-82
	Lifting operation (rear)	Check lifting sensor (rear).	ADP-84
	Pedal operation	Check pedal adjusting sensor.	ADP-86
	Door mirror operation	Check door mirror sensor.	Driver side: ADP-88 Passenger side: ADP-90

SYMPTOM 3

Symptom		Diagnosis procedure	Reference page
Memory functions and manual functions (for specific part) do not operate	Sliding operation	Check sliding motor.	ADP-92
	Reclining operation	Check reclining motor.	ADP-94
	Lifting operation (front)	Check lifting motor (front).	ADP-96
	Lifting operation (rear)	Check lifting motor (rear).	ADP-98
	Pedal operation	Check pedal adjusting motor.	ADP-100
	Door mirror operation	Check door mirror motor.	ADP-102

SYMPTOM 4

Symptom	Diagnosis procedure	Reference page
Entry/Exit assist function does not operate.	1. Check system setting.	ADP-11
	2. Perform initialization.	ADP-7
	3. Check front door switch (driver side).	ADP-76

SYMPTOM 5

Symptom	Diagnosis procedure	Reference page
Memory indicators 1 and/or 2 do not illuminate.	1. Check seat memory switch.	ADP-65
	2. Check seat memory indicator.	ADP-105

SYMPTOM 6

Symptom	Diagnosis procedure	Reference page
Memory operation does not operate.	Check A/T shift selector (park position switch).	ADP-74

NORMAL OPERATING CONDITION

Description

INFOID:0000000009882175

The following symptoms are normal operations, and they do not indicate a malfunction.

Symptom	Cause	Action to take	Reference page
Entry/Exit assist function does not operate.	No initialization has been performed.	Perform initialization.	ADP-7
	Entry/exit assist function is disabled. **NOTE:** The entry/exit assist function is disabled before delivery (initial setting).	Change the settings.	ADP-22
Entry assist function does not operate.	Manual operation with power seat switch was performed after exit assist function execution.	Perform the memory function.	ADP-22
Memory function, entry/exit assist function does not operate.	The operation conditions are not fulfilled.	Fulfill the operation conditions.	Memory function: ADP-17
			Exit assist function: ADP-20
			Entry assist function: ADP-22

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000009882176

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution for Work

INFOID:0000000009882177

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:

- Water soluble dirt:
- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.

- Oily dirt:
- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

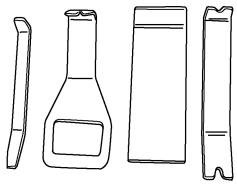
PREPARATION

PREPARATION

Special Service Tool

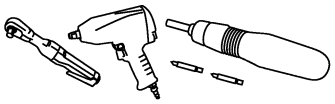
INFOID:0000000009882178

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46534) Trim tool set  AWJIA0483ZZ	Removing trim components

Commercial Service Tools

INFOID:0000000009882179

Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

UNIT REMOVAL AND INSTALLATION

DRIVER SEAT CONTROL UNIT

Removal and Installation

INFOID:0000000009882180

REMOVAL

NOTE:

The driver seat control unit is part of the driver seat.

1. Remove the driver seat. Refer to SE-34, "Removal and Installation - Front Seat Assembly".
2. Disconnect the harness connector from the driver seat control unit.
3. Remove driver seat control unit from driver seat.

INSTALLATION

Installation is in the reverse order of removal.

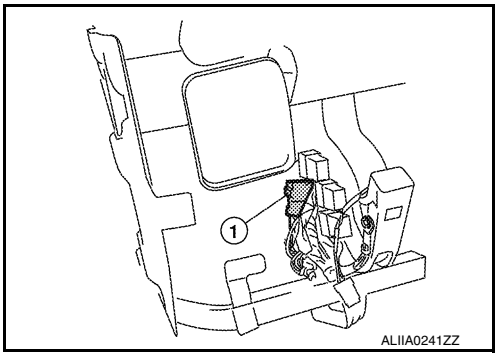
AUTOMATIC DRIVE POSITIONER CONTROL UNIT

Removal and Installation

INFOID:0000000009882181

REMOVAL

1. Remove the instrument lower panel LH. Refer to IP-17, "Removal and Installation".
2. Disconnect the harness connector from the sonar switch (if equipped).
3. Disconnect the harness connector from the adjustable pedal switch (if equipped).
4. Remove the lower knee protector.
5. Remove the screw from the automatic drive positioner control unit (1).
6. Disconnect the harness connectors from the automatic drive positioner control unit (1).
7. Remove automatic drive positioner control unit (1) from bracket.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Clamp the harness in position.

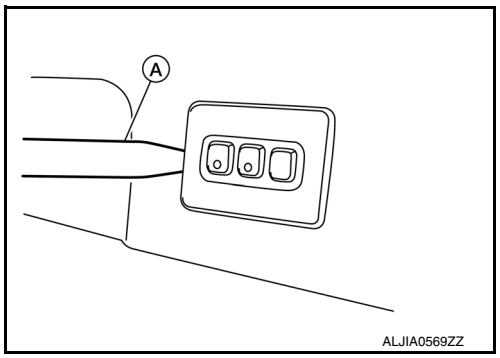
SEAT MEMORY SWITCH

Removal and Installation

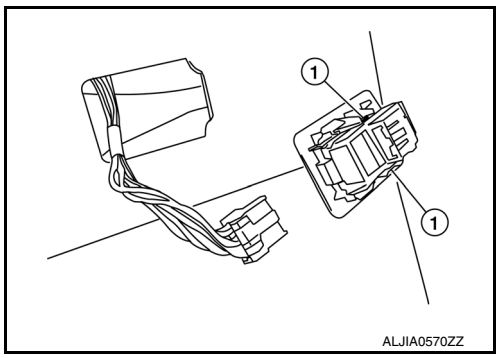
INFOID:0000000009882182

REMOVAL

1. Remove the seat memory switch from the front door finisher by using a suitable tool (A).



2. Disconnect the seat memory switch harness connector.
3. Release the clips (1) and separate the seat memory switch from the finish panel using a suitable tool.



INSTALLATION

Install in the reverse order of removal.

DOOR MIRROR REMOTE CONTROL SWITCH

Removal and Installation

INFOID:0000000009882183

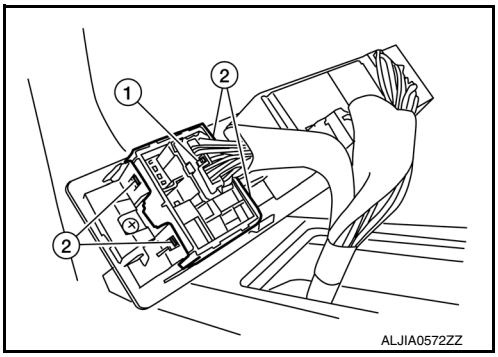
REMOVAL

1. Remove the main power window, door lock/unlock and door mirror remote control switch finisher from the front door finisher (LH). Refer to INT-10, "Removal and Installation".
2. Remove the door mirror remote control switch.

a. Disconnect the harness connector (1) from the door mirror control switch.

b. Release the retaining tabs (2).

c. Separate the door mirror remote control switch from the finisher panel.



INSTALLATION

Installation is in the reverse order of removal.

PEDAL ADJUSTING MOTOR

Removal and Installation

INFOID:0000000009882184

The pedal adjusting motor is serviced as a part of the accelerator pedal. Refer to ACC-3, "Removal and Installation" for accelerator pedal and BR-19, "Removal and Installation" for brake pedal when removing pedal adjusting motors.