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SECTION CO

ENGINE COOLING SYSTEM

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PRECAUTION

PRECAUTIONS

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

INFOID:000000006628091

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. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

The vehicle may be equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate for certain types of collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

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 AIR BAG".
- 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.
- The vehicle may be equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate for certain types of collision. After SRS maintenance or repair, make sure the passenger air bag deactivation switch is in the same position (ON or OFF) as when the vehicle arrived for service.

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.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000006628096

NOTE:

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

PRECAUTIONS

[MR16DDT]

< PRECAUTION >

OPERATION PROCEDURE

1. Connect both battery cables. A
NOTE:
Supply power using jumper cables if battery is discharged.
2. Turn the ignition switch to ACC position. CO
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned. C
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.) D
6. Perform self-diagnosis check of all control units using CONSULT-III. E

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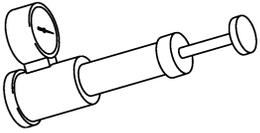
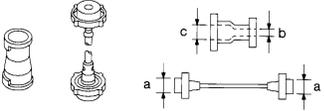
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PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000006356311

Tool name	Description
<p>Radiator cap tester</p>  <p>PBIC1982E</p>	<p>Checking radiator and radiator cap</p>
<p>Radiator cap tester adapter</p>  <p>S-NT564</p>	<p>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)</p>

SYSTEM DESCRIPTION

DESCRIPTION

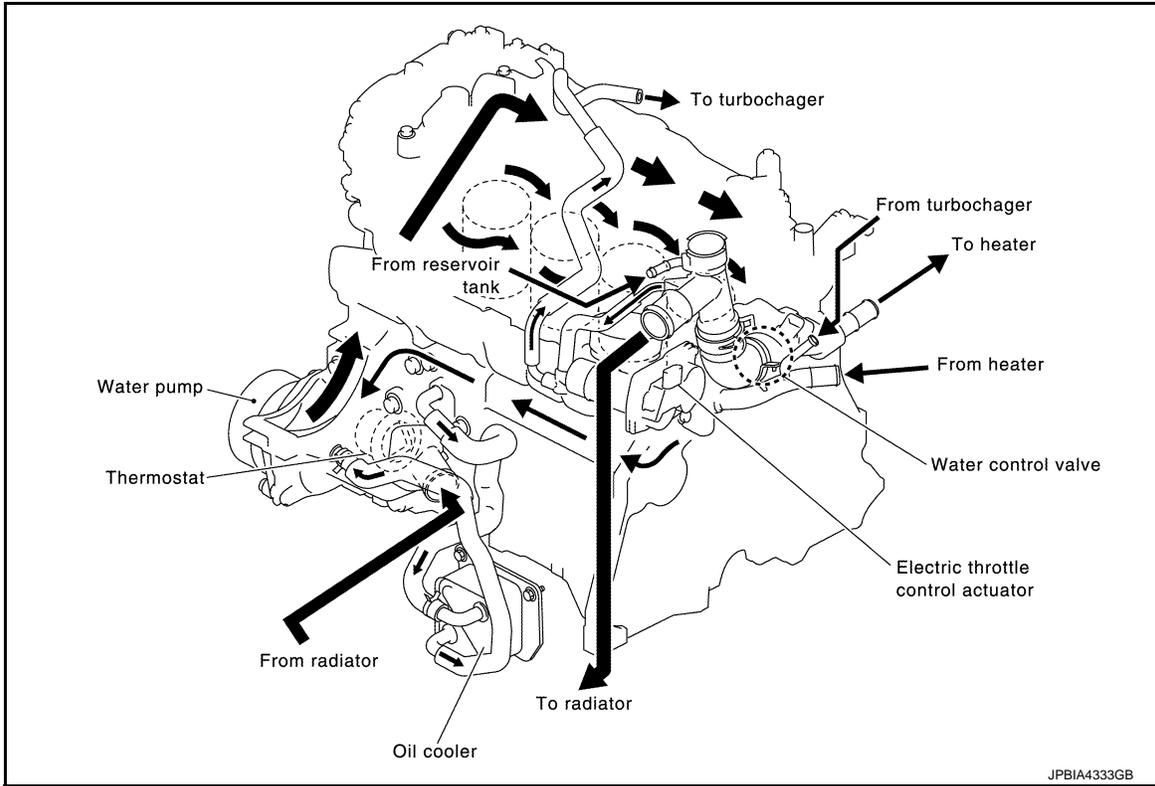
Engine Cooling System

INFOID:000000006356312

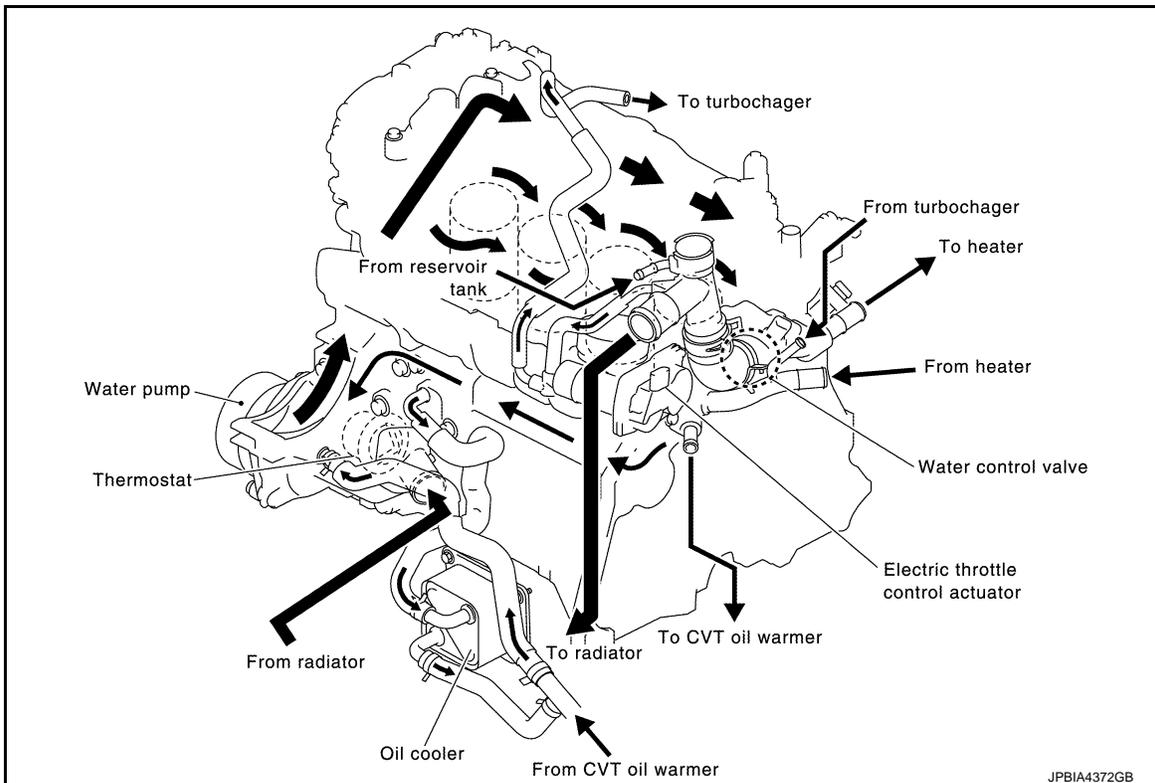
A

CO

M/T models



CVT models



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DESCRIPTION

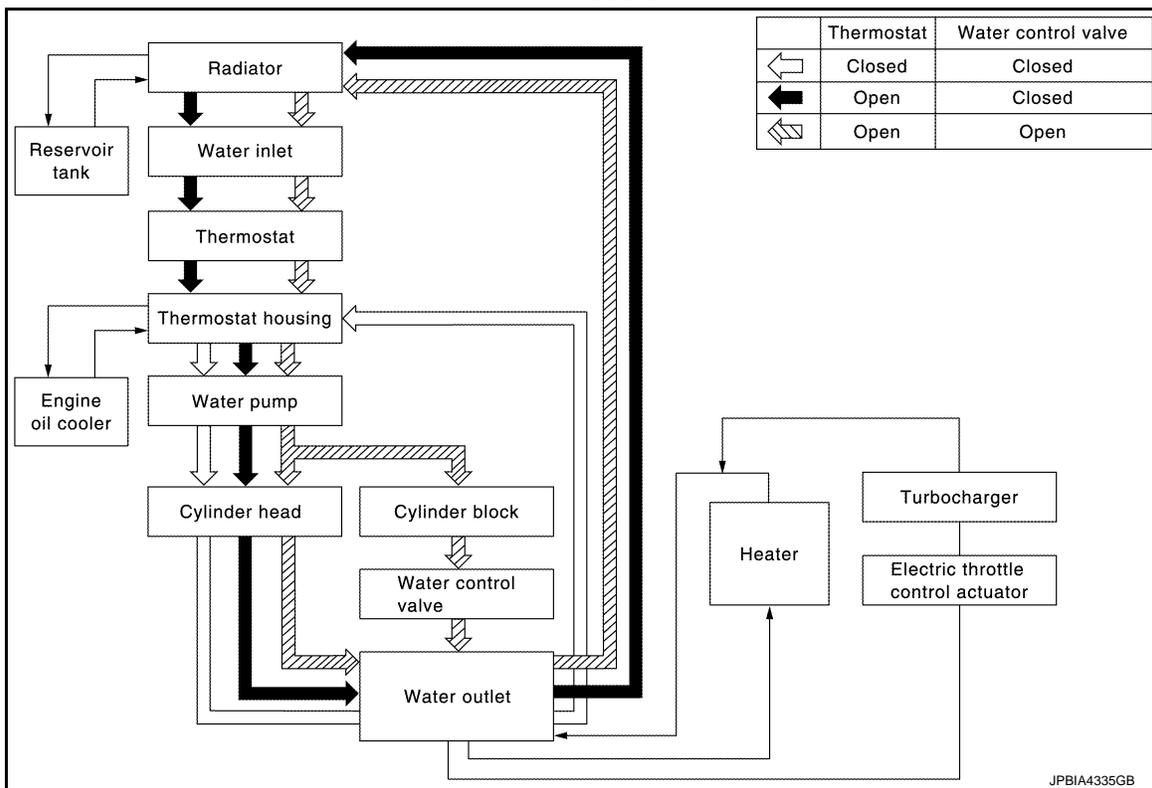
< SYSTEM DESCRIPTION >

[MR16DDT]

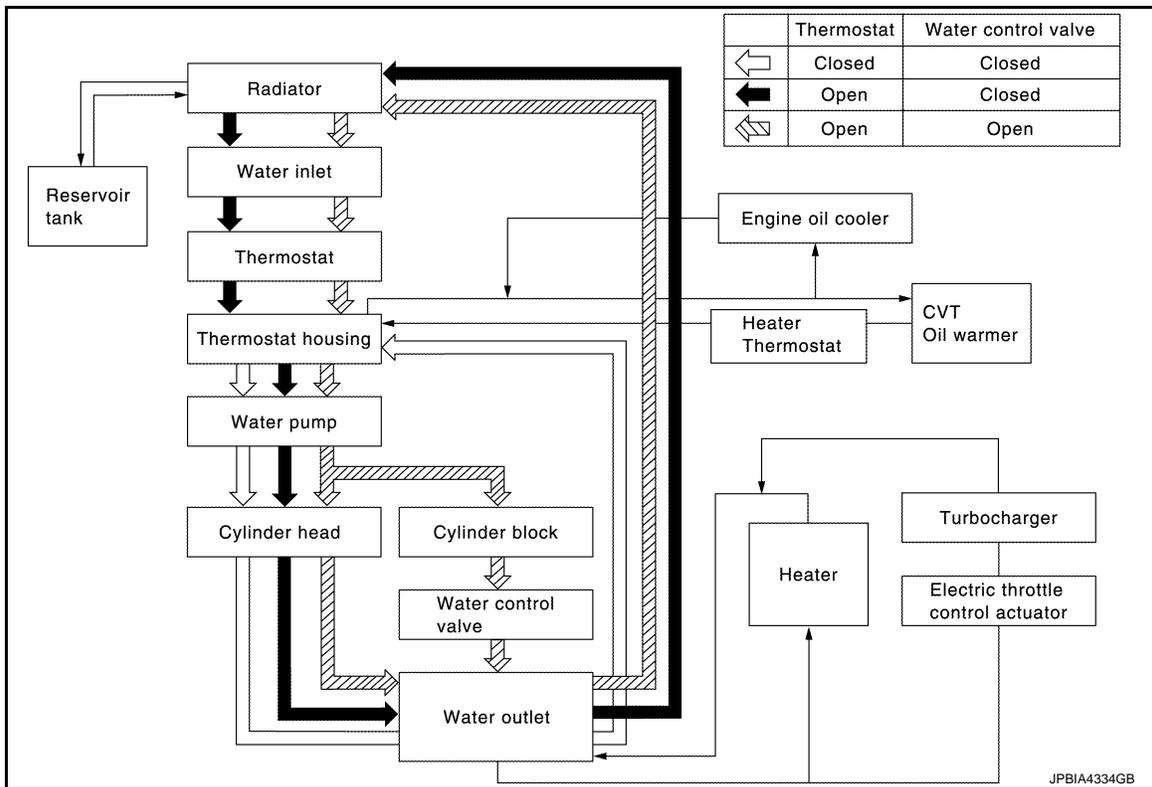
Engine Cooling System Schematic

INFOID:00000006356313

M/T models



CVT models



OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR16DDT]

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000006356314

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	Symptom		Check items		
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—	
		Thermostat and water control valve stuck closed	—		
		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	—	—	
		Poor engine coolant quality	—	—	
	Insufficient engine coolant	Engine coolant leakage	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 leakage into cooling system	Cylinder head deterioration			
		Cylinder head gasket deterioration			

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OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[MR16DDT]

	Symptom		Check items		
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load	
				Driving in low gear for extended time	
				Driving at extremely high speed	
			Power train system malfunction	—	
			Installed improper size wheels and tires		
			Dragging brakes		
	Blocked or restricted air flow	Blocked or restricted air flow	Blocked bumper	—	—
			Blocked radiator grille	Installed car brassiere	
				Mud contamination or paper clogging	
			Blocked radiator	—	
Blocked condenser			Blocked air flow		
Installed large fog lamp					

PERIODIC MAINTENANCE

ENGINE COOLANT

Inspection

INFOID:000000006356315

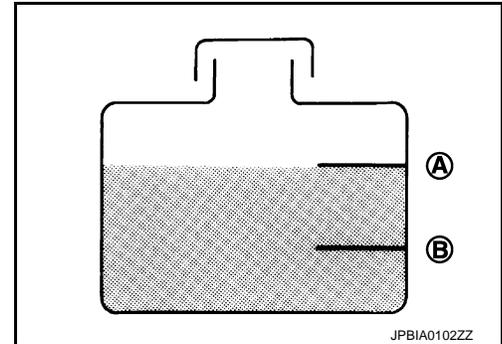
LEVEL

- Check that the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.

A : MAX

B : MIN

- Adjust the engine coolant level if necessary.



LEAKAGE

- To check for leakage, apply pressure to the cooling system with the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B).

Testing pressure: Refer to [CO-29, "Radiator"](#).

WARNING:

Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.

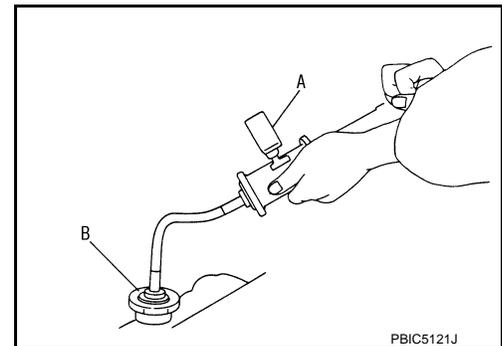
CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

In a case that engine coolant decreases, replenish radiator with engine coolant.

- If anything is found, repair or replace damaged parts.



Draining

INFOID:000000006356316

WARNING:

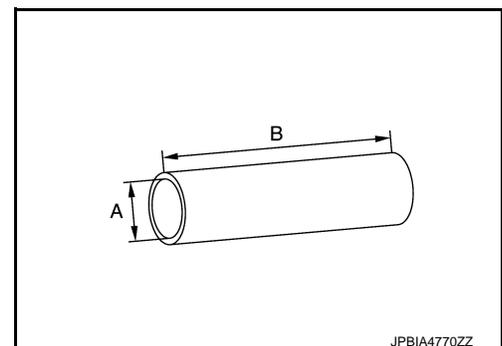
- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

1. Connect drain hose.

- Use a general-purpose hose with the dimensions shown in the figure.

A : ϕ 8 mm

B : 300 mm



ENGINE COOLANT

[MR16DDT]

< PERIODIC MAINTENANCE >

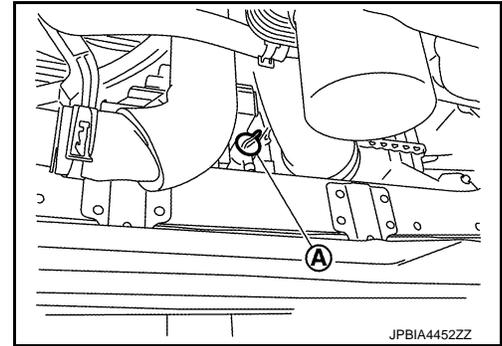
2. Open radiator drain plug (A) at the bottom of radiator, and then remove radiator cap.

↔ : Vehicle front

CAUTION:

Perform this step when engine is cold.

- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-63, "Setting"](#).



3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-17, "Exploded View"](#).
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-13, "Flushing"](#).

Refilling

INFOID:000000006356317

1. Install reservoir tank if removed, and install radiator drain plug.

CAUTION:

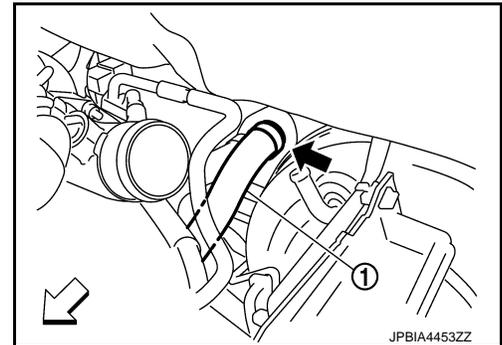
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug : Refer to [CO-17, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-63, "Setting"](#).
2. Check that each hose clamp has been firmly tightened.
 3. Remove air duct (between air cleaner cover assembly and turbocharger inlet tube). Refer to [EM-26, "Exploded View"](#).
 4. For LHD models, disconnect vacuum hose break booster side, and removal vacuum tube from clamp. Refer to [BR-49, "MR16DDT : Exploded View"](#) (LHD models).
 5. Disconnect heater hose (1) at position (↔) in the figure.

↔ : Vehicle front

- Enhance heater hose as high as possible.

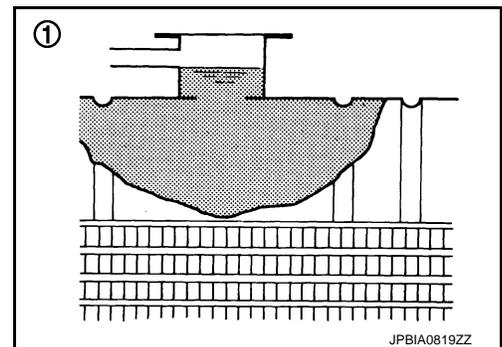


6. Fill radiator (1) to specified level.

CAUTION:

Never adhere the engine coolant to electronic equipments (alternator etc.).

- Pour coolant slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
- When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
- Use Genuine NISSAN Engine Coolant or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-13, "Fluids and Lubricants"](#).



Engine coolant capacity
(With reservoir tank at "MAX" level)

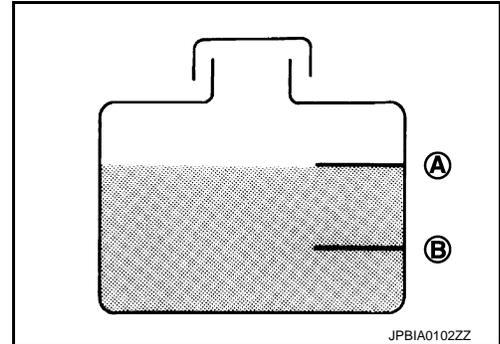
Refer to [CO-29, "Periodical Maintenance Specification"](#).

7. Refill reservoir tank to "MAX" level line with engine coolant.

- A : MAX
- B : MIN

Reservoir tank engine coolant capacity
(At "MAX" level)

Refer to [CO-29, "Periodical Maintenance Specification"](#).



8. Install air duct (between air cleaner cover assembly and turbocharger inlet tube). Refer to [EM-26, "Exploded View"](#).
9. Install radiator cap.
10. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
 - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

CAUTION:
Watch water temperature gauge so as not to overheat engine.
11. Stop the engine and cool down to less than approximately 50°C (122°F).
 - Cool down using fan to reduce the time.
 - If necessary, refill radiator up to filler neck with engine coolant.

CAUTION:
Never adhere the engine coolant to electronic equipments (alternator etc.).
12. Refill reservoir tank to "MAX" level line with engine coolant.
13. Repeat steps 6 through 11 two or more times with radiator cap installed until engine coolant level no longer drops.
14. Check cooling system for leakage with engine running.
15. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
 - Sound may be noticeable at heater unit.
16. Repeat step 15 three times.
17. If sound is heard, bleed air from cooling system by repeating step 6 through 11 until reservoir tank level no longer drops.

Flushing

INFOID:000000006356318

1. Install radiator drain plug.

CAUTION:
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug : Refer to [CO-17, "Exploded View"](#).

 - If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-63, "Setting"](#).
2. Remove air duct (between air cleaner cover assembly and turbocharger), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-26, "Exploded View"](#).
3. Disconnect vacuum hose break booster side, and remove vacuum tube from clamp. Refer to .

ENGINE COOLANT

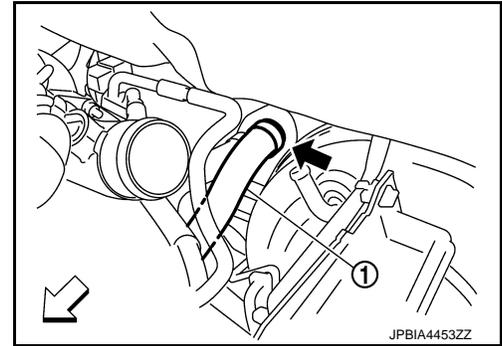
< PERIODIC MAINTENANCE >

[MR16DDT]

4. Disconnect heater hose (1) at position (◀) in the figure.

◀ : Vehicle front

- Enhance heater as high as possible.



5. Fill radiator and reservoir tank with water and reinstall radiator cap.
- When engine coolant over flows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
6. Connect vacuum hose, and install vacuum tube. Refer to .
7. Install air duct (between air cleaner cover and turbocharger), air cleaner cover assembly and air cleaner body assembly. Refer to [EM-26. "Exploded View"](#).
8. Run the engine and warm it up to normal operating temperature.
9. Rev the engine two or three times under no-load.
10. Stop the engine and wait until it cools down.
11. Drain water from the system. Refer to [CO-11. "Draining"](#).
12. Repeat steps 1 through 9 until clear water begins to drain from radiator.

RADIATOR RADIATOR CAP

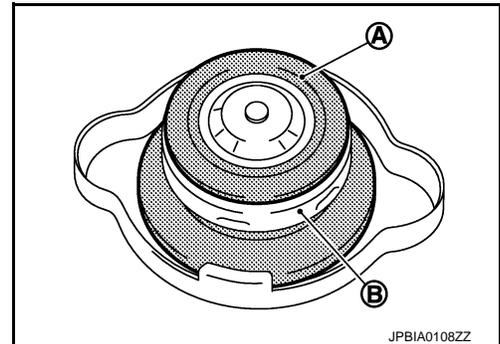
RADIATOR CAP : Inspection

INFOID:000000006356319

- Check valve seat (A) of radiator cap.

B : Metal plunger

- Check that valve seat is swollen to the extent that the edge of the plunger cannot be seen when watching it vertically from the top.
- Check that valve seat has no soil and damage.



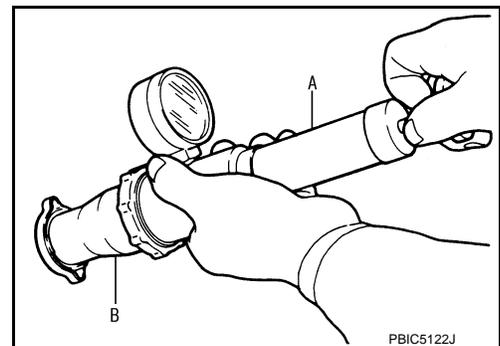
- Pull negative-pressure valve to open it, and that it close completely when released.
- Check that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

Standard and Limit : Refer to [CO-29, "Radiator"](#).

- When connecting radiator cap to the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B), apply engine coolant to the cap seal surface.



- Replace radiator cap if there is an unusualness related to the above three.

CAUTION:

When installing radiator cap, thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:000000006356320

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage radiator fins.**
 - **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and harness connectors to prevent water from entering.**
1. Apply water by hose to the back side of the radiator core vertically downward.
 2. Apply water again to all radiator core surfaces once per minute.
 3. Stop washing if any stains no longer flow out from radiator.

RADIATOR

< PERIODIC MAINTENANCE >

[MR16DDT]

4. Blow air into the back side of radiator core vertically downward.
 - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm², 71 psi) and keep distance more than 30 cm (11.81 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

RADIATOR

< REMOVAL AND INSTALLATION >

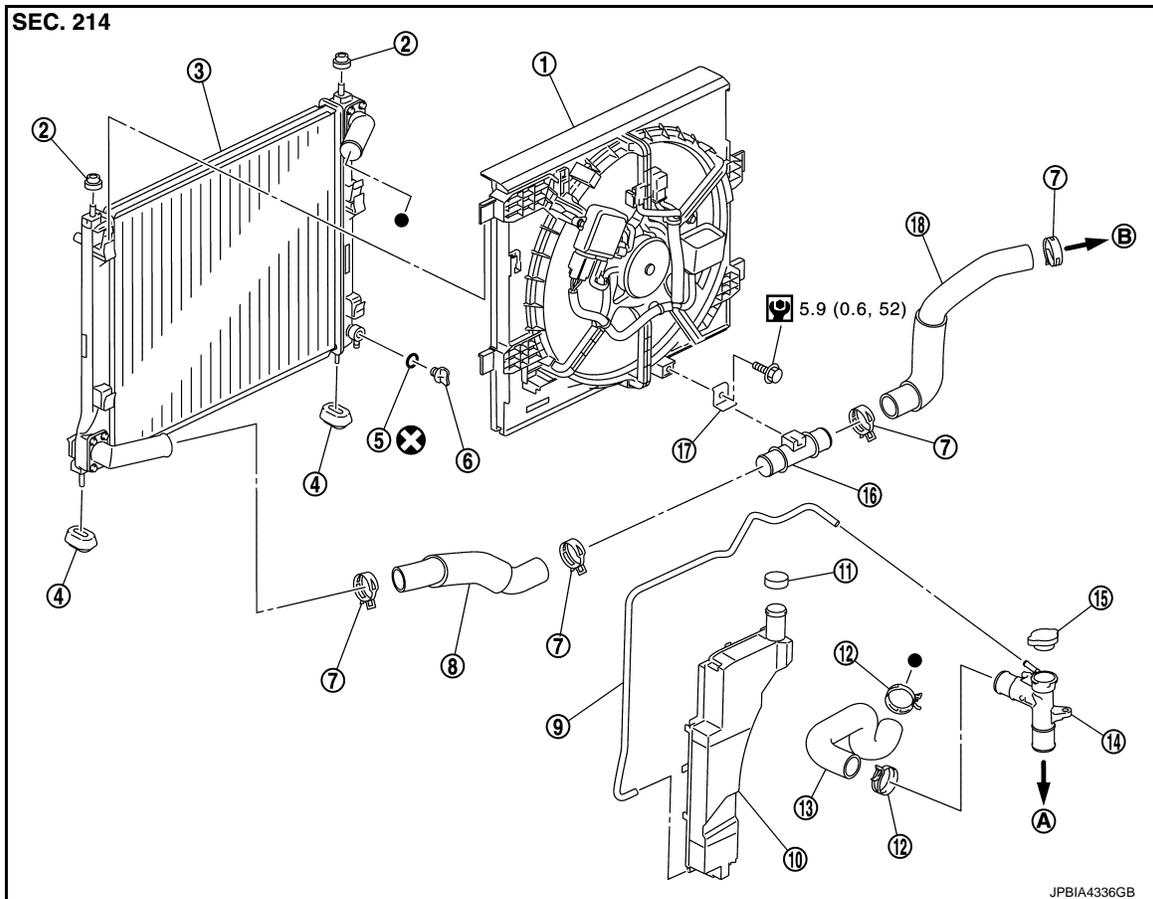
[MR16DDT]

REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:000000006356321



- | | | |
|----------------------------|-------------------------------|--------------------------------|
| 1. Cooling fan assembly | 2. Mounting rubber (upper) | 3. Radiator |
| 4. Mounting rubber (lower) | 5. O-ring | 6. Drain plug |
| 7. Clamp | 8. Radiator hose (lower) (LH) | 9. Reservoir tank hose |
| 10. Reservoir tank | 11. Reservoir tank cap | 12. Clamp |
| 13. Radiator hose (upper) | 14. Water outlet adaptor | 15. Radiator cap |
| 16. Radiator hose pipe | 17. Bracket | 18. Radiator hose (lower) (RH) |
| A. To water outlet | B. To water inlet | |

: N·m (kg-m, in-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:000000006356322

REMOVAL

WARNING:

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

1. Drain engine coolant from radiator. Refer to [CO-11. "Draining"](#).

CAUTION:

RADIATOR

[MR16DDT]

< REMOVAL AND INSTALLATION >

- Perform this step when the engine is cold.
 - Never spill engine coolant on drive belt.
2. Remove engine cover. Refer to [EM-25, "Exploded View"](#).
 3. Remove engine under cover.
 4. Remove radiator hose (upper and lower).
 5. Remove front bumper. Refer to [EXT-12, "Exploded View"](#).
 6. Remove radiator core support upper. Refer to [DLK-149, "MR16DDT : Exploded View"](#).
 7. Disconnect cooling fan harness connector.
 8. Remove reservoir tank.
 9. Remove cooling fan assembly.

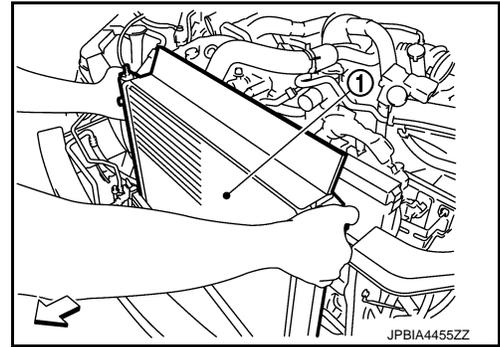
CAUTION:

Be careful not to damage or scratch the radiator core.

10. Remove condenser from radiator and temporarily fasten it on vehicle with a rope.
11. Pull up and remove the radiator assembly (1).

CAUTION:

Be careful not to damage radiator core and condenser assembly core.



INSTALLATION

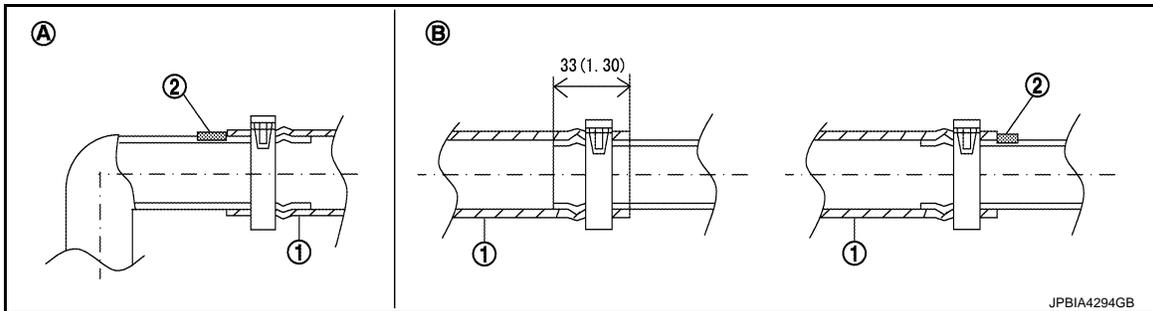
Install in the reverse order of removal.

INSTALLATION

Note the following, and install in the reverse order of removal.

NOTE:

- Insert the radiator hose (1) all the way to the stopper (2) or by 33 mm (1.30 in) (hose without a stopper).



Unit mm (in)

A. Radiator side

B. Engine side

- For the orientation of the hose clamp pawl, refer to the figure.

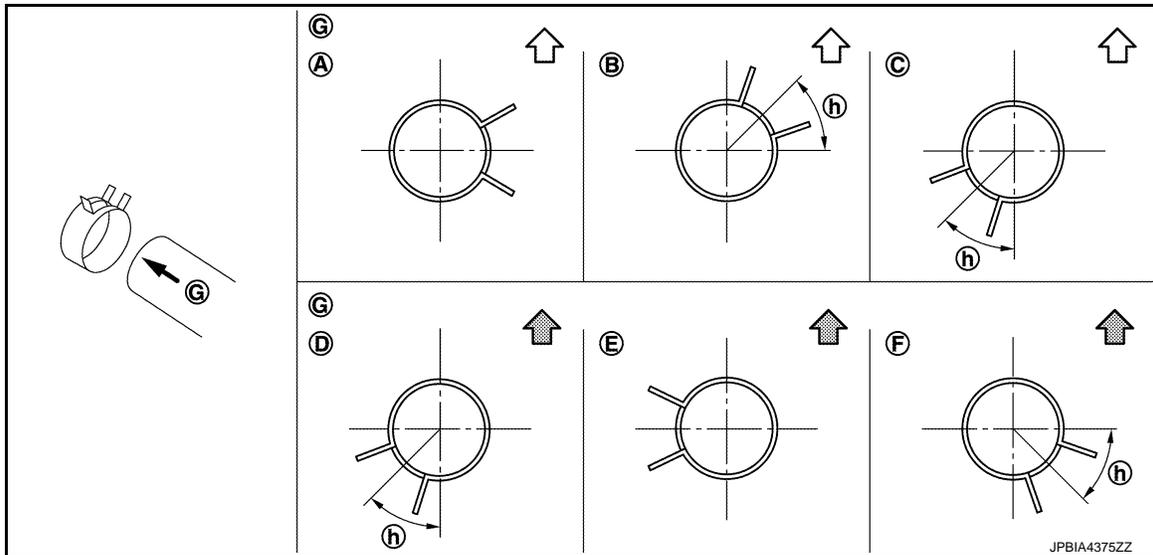
Radiator hose	Hose end	Paint mark	Position of hose clamp*
Radiator hose (upper)	Radiator side	Upper	A
	Engine side	Upper	B
Radiator hose (lower) (RH)	Radiator side	Upper	C
	Engine side	Front side	D
Radiator hose (lower) (LH)	Radiator side	Rear side	E
	Engine side	Rear side	F

RADIATOR

< REMOVAL AND INSTALLATION >

[MR16DDT]

*Refer to the illustrations for the specific position each hose clamp tab.



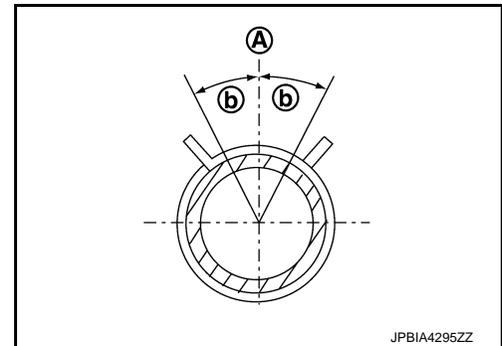
G. View G

h. 45°

↖ : Vehicle upper

↖ : Vehicle front

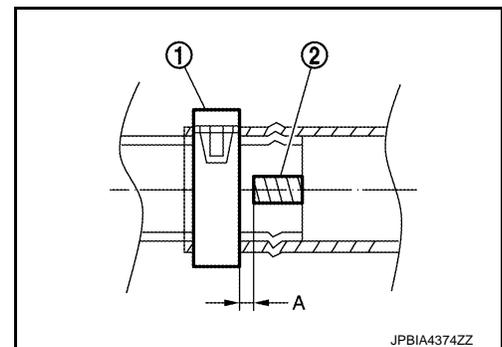
- The angle (b) created by the hose clamp pawl and the specified line (A) must be within $\pm 15^\circ$ as shown in the figure.



- To install hose clamps (1), check that the dimension (A) from the end of the paint mark (2) on the radiator hose to the hose clamp is within the reference value.

Dimension "A"

3 mm



INFOID:000000006356323

Inspection

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-11. "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

COOLING FAN

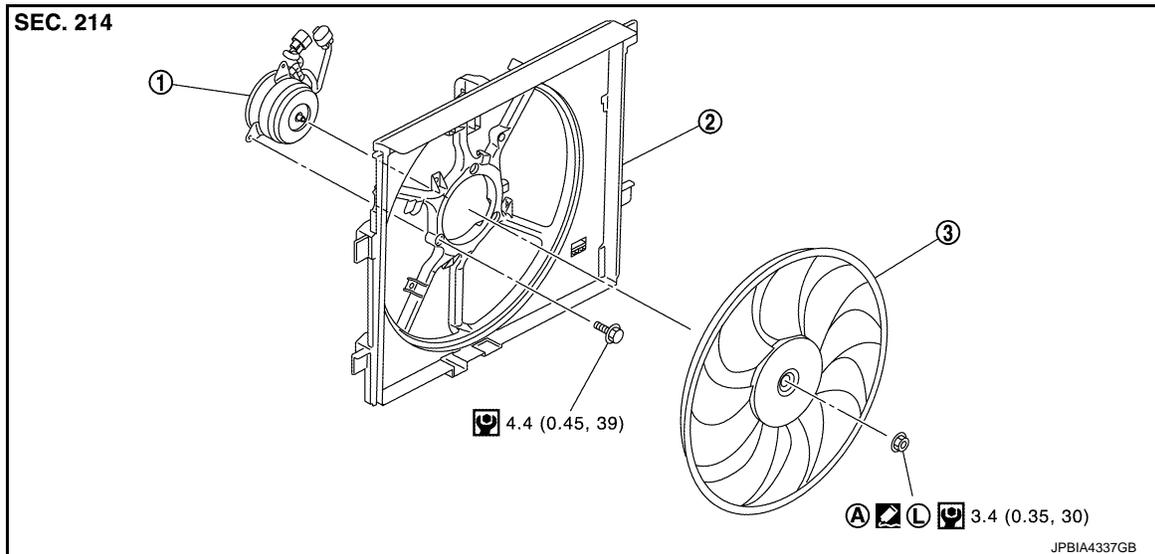
< REMOVAL AND INSTALLATION >

[MR16DDT]

COOLING FAN

Exploded View

INFOID:000000006356324



1. Fan motor
 2. Fan shroud
 3. Cooling fan
- A. Apply on fan motor shaft

: N·m (kg-m, in-lb)

: Apply genuine high strength thread locking sealant or equivalent.

Removal and Installation

INFOID:000000006356325

REMOVAL

1. Drain engine coolant. Refer to [CO-11, "Draining"](#).
CAUTION:
 - Perform this step engine is cold.
 - Never spill engine coolant on drive belt.
2. Remove engine cover.
3. Remove front bumper. Refer to [EXT-12, "Exploded View"](#).
4. Remove radiator core support upper. Refer to [DLK-149, "MR16DDT : Exploded View"](#).
5. Disconnect cooling fan harness connector.
6. Remove reservoir tank. Refer to [CO-17, "Exploded View"](#).
7. Remove radiator hose (upper). Refer to [CO-17, "Exploded View"](#).
8. Remove cooling fan assembly.
CAUTION:
Be careful not to damage or scratch on radiator core when removing.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

NOTE:

Cooling fan is controlled by ECM. For details, Refer to [EC-774, "Component Function Check"](#).

Disassembly and Assembly

INFOID:000000006356326

DISASSEMBLY

COOLING FAN

[MR16DDT]

< REMOVAL AND INSTALLATION >

1. Remove cooling fan mounting nut, and then remove the cooling fan.
2. Remove fan motor.

A

ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- Apply genuine high strength thread locking sealant on fan motor shaft.

CO

Inspection

INFOID:000000006356327

C

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

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WATER PUMP

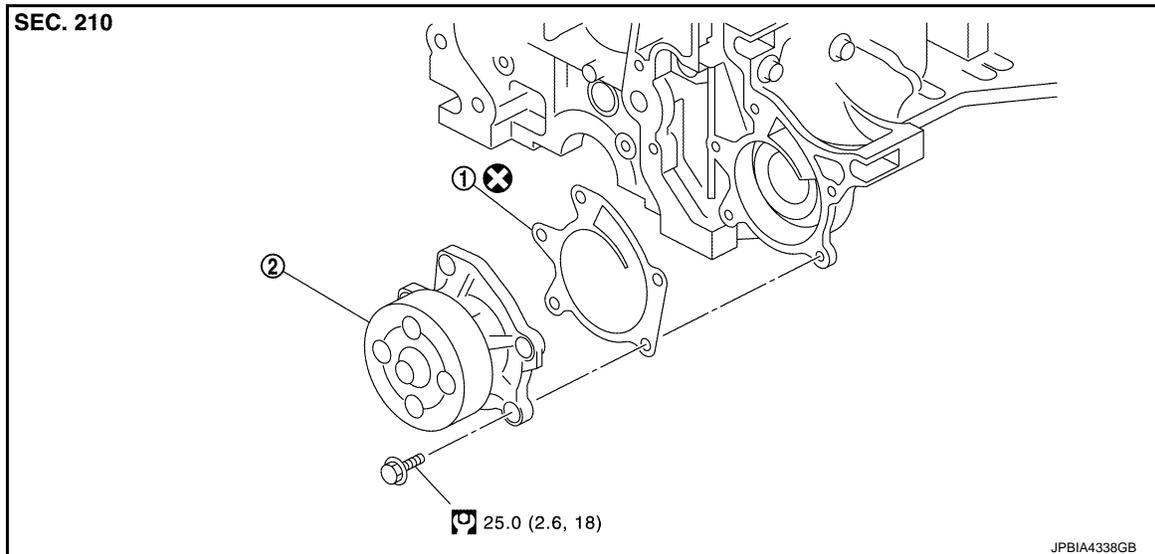
< REMOVAL AND INSTALLATION >

[MR16DDT]

WATER PUMP

Exploded View

INFOID:000000006356328



1. Gasket
2. Water pump

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:000000006356329

REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-11, "Draining"](#).
CAUTION:
 - Perform this step when the engine is cold.
 - Never spill engine coolant on drive belt.
2. Steer front wheel to the right.
3. Remove front fender protector (RH). Refer to [EXT-22, "Exploded View"](#).
4. Remove drive belt. Refer to [EM-155, "Removal and Installation"](#).
5. Remove water pump.
 - Engine coolant will leak from cylinder block, so have a receptacle ready below.**CAUTION:**
 - Handle water pump vane so that it does not contact any other parts.
 - Water pump cannot be disassembled and should be replaced as a unit.

INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:000000006356330

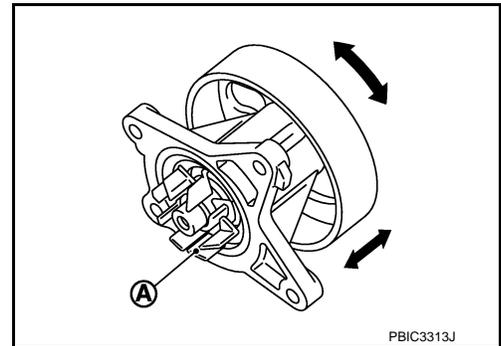
INSPECTION AFTER REMOVAL

WATER PUMP

[MR16DDT]

< REMOVAL AND INSTALLATION >

- Check visually that there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-11. "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

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THERMOSTAT

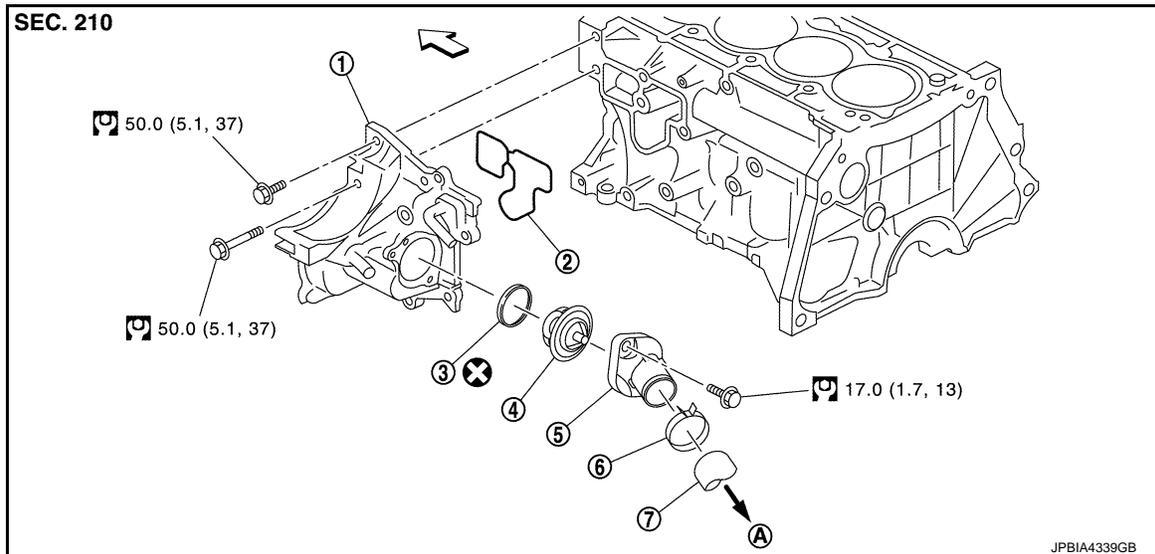
< REMOVAL AND INSTALLATION >

[MR16DDT]

THERMOSTAT

Exploded View

INFOID:000000006356331



- | | | |
|--------------------------|----------------|----------------|
| 1. Thermostat housing | 2. Gasket | 3. Rubber ring |
| 4. Thermostat | 5. Water inlet | 6. Clamp |
| 7. Radiator hose (upper) | | |
| A. To radiator | | |
| ← Engine front | | |

: N-m (kg-m, ft-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:000000006356332

REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-11. "Draining"](#).
CAUTION:
Perform this step when engine is cold.
2. Remove intake manifold. Refer to [EM-28. "Exploded View"](#).
3. Disconnect radiator hose (lower) (RH) from water inlet. Refer to [CO-17. "Exploded View"](#).
4. Remove water inlet and thermostat.
 - Engine coolant leakage from cylinder block, so have a receptacle ready below.

Thermostat housing

1. Drain engine coolant. Refer to [CO-11. "Draining"](#).
2. Remove alternator. Refer to [CHG-30. "MR16DDT : Exploded View"](#).
3. Remove water pump. Refer to [CO-22. "Exploded View"](#).
4. Disconnect water hose, and then remove thermostat housing.

INSTALLATION

Note the following, and install in the reverse order of removal.

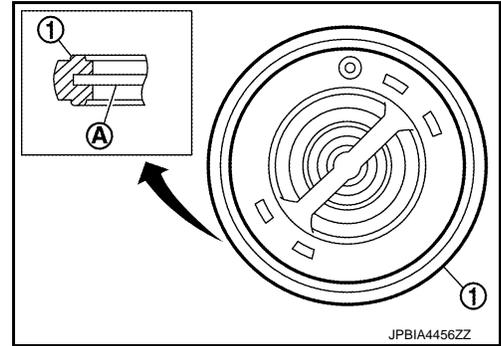
Thermostat

THERMOSTAT

[MR16DDT]

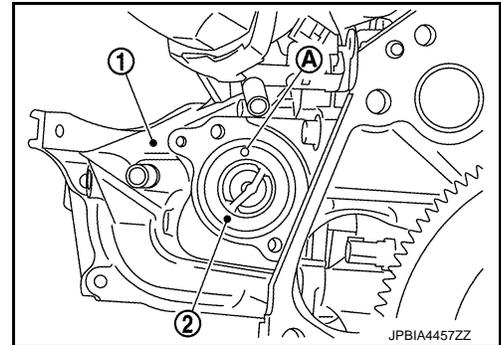
< REMOVAL AND INSTALLATION >

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



- Install thermostat (2) with jiggle valve (A) facing upwards.

1 : Thermostat housing



Thermostat housing

- Install in the reverse order of removal.

Inspection

INFOID:000000006356333

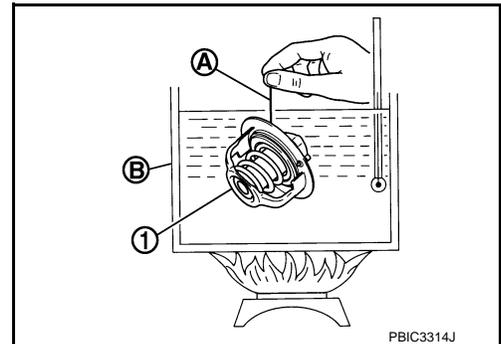
INSPECTION AFTER REMOVAL

Thermostat

- 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 maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to [CO-29, "Thermostat"](#).

- If out of the standard, replace thermostat.



INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-11, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

WATER OUTLET

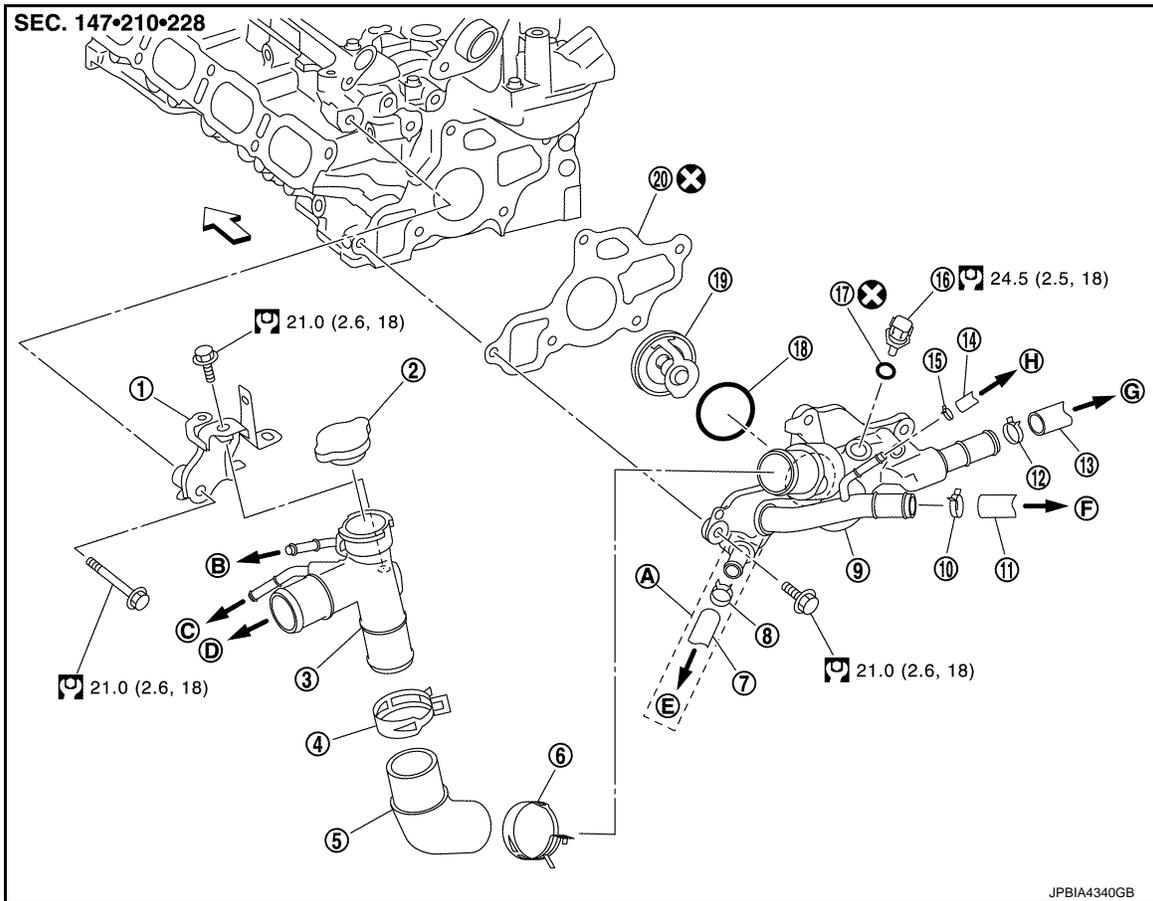
< REMOVAL AND INSTALLATION >

[MR16DDT]

WATER OUTLET

Exploded View

INFOID:000000006356334



- | | | |
|---------------------------------------|----------------------|-------------------------|
| 1. Heater pipe bracket | 2. Radiator cap | 3. Water outlet adaptor |
| 4. Clamp | 5. Water outlet hose | 6. Clamp |
| 7. Heater hose | 8. Clamp | 9. Water outlet |
| 10. Clamp | 11. Heater hose | 12. Heater hose |
| 13. Clamp | 14. Heater hose | 15. Clamp |
| 16. Engine coolant temperature sensor | 17. Gasket | 18. Rubber ring |
| 19. Water control valve | 20. Gasket | |

← Engine front

- | | | |
|-----------------------------|-------------------------------|-------------------|
| A. For CVT models | B. To reservoir tank | C. To heater hose |
| D. To radiator hose (upper) | E. To CVT oil warmer | F. To heater hose |
| G. To heater hose | H. To turbocharger inlet tube | |

: N·m (kg·m, ft·lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:000000006356335

REMOVAL

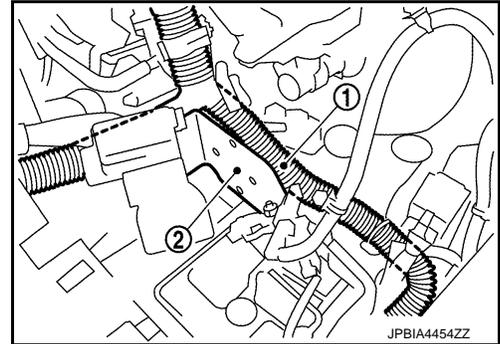
1. Drain engine coolant from radiator. Refer to [CO-11. "Draining"](#).
CAUTION:
• Perform this step when engine is cold.
2. Remove engine cover. Refer to [EM-25. "Exploded View"](#).

WATER OUTLET

[MR16DDT]

< REMOVAL AND INSTALLATION >

3. Remove battery. [PG-124. "Exploded View"](#).
4. Remove air duct (duct side) and air cleaner cover assembly and air cleaner body assembly.
5. Disconnect radiator hose (upper). Refer to [CO-17. "Exploded View"](#).
6. Remove water outlet adaptor.
7. Disconnect connectors of engine harness around the battery.
8. Remove bracket (2), and disconnect engine harness clip. (transmission side and water outlet side)
9. Disconnect crankshaft position sensor harness connector.
10. Move engine (1) harness, and keep a service area.
11. Remove water hose and heater hose.
12. Remove water outlet.
13. Remove engine coolant temperature sensor from water outlet, if necessary.

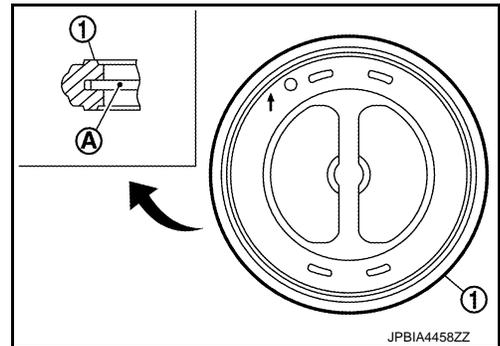


INSTALLATION

Note the following, and install in the reverse order of removal.

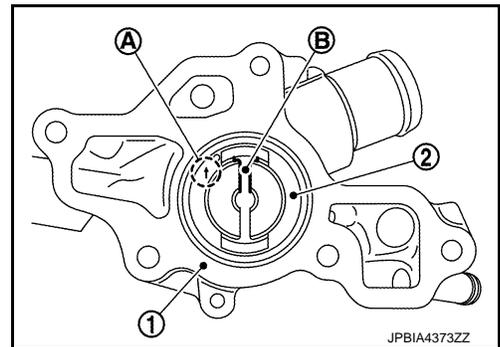
Water Control valve

- Install water control valve with making rubber ring (1) groove fit to water control valve flange (A) with the whole circumference.



- Install water control valve (2) with the arrow (A) facing up and the frame center part (B) facing upwards.

1 : Water control valve



INFOID:000000006356336

Inspection

INSPECTION AFTER REMOVAL

Water Control Valve

WATER OUTLET

[MR16DDT]

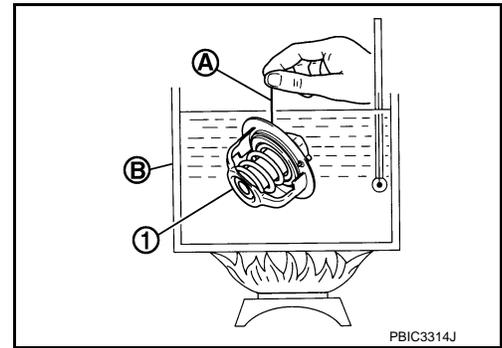
< REMOVAL AND INSTALLATION >

- 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 continuous valve lifting toward maximum valve lift.

NOTE:

The maximum valve lift amount standard temperature for water control valve is the reference value.

- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



Standard: Refer to [CO-29, "Water Control Valve"](#).

- If out of the standard, replace water control valve.

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-11, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR16DDT]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:000000006356337

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	CVT models	8.1 (7-1/8)
	M/T models	
Reservoir tank engine coolant capacity (At "MAX" level)		0.6 (1/2)

Radiator

INFOID:000000006356338

Unit: kPa (kg/cm², psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Leakage testing pressure		98 (1.0, 14)

Thermostat

INFOID:000000006356339

Standard

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

Water Control Valve

INFOID:000000006356340

Standard

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8.0 mm/108°C (0.315 in/226°F)
Valve closing temperature	90°C (194°F)

< PRECAUTION >

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

INFOID:000000006752513

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. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

The vehicle may be equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate for certain types of collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

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 AIR BAG".
- 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.
- The vehicle may be equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate for certain types of collision. After SRS maintenance or repair, make sure the passenger air bag deactivation switch is in the same position (ON or OFF) as when the vehicle arrived for service.

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.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000006492569

NOTE:

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

PRECAUTIONS

[HR16DE]

< PRECAUTION >

OPERATION PROCEDURE

1. Connect both battery cables.
NOTE:
Supply power using jumper cables if battery is discharged.
2. Turn the ignition switch to ACC position.
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

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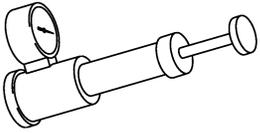
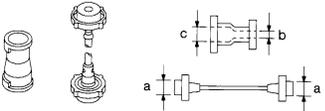
P

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000006492570

Tool name	Description
<p>Radiator cap tester</p>  <p>PBIC1982E</p>	<p>Checking radiator and radiator cap</p>
<p>Radiator cap tester adapter</p>  <p>S-NT564</p>	<p>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)</p>

SYSTEM DESCRIPTION

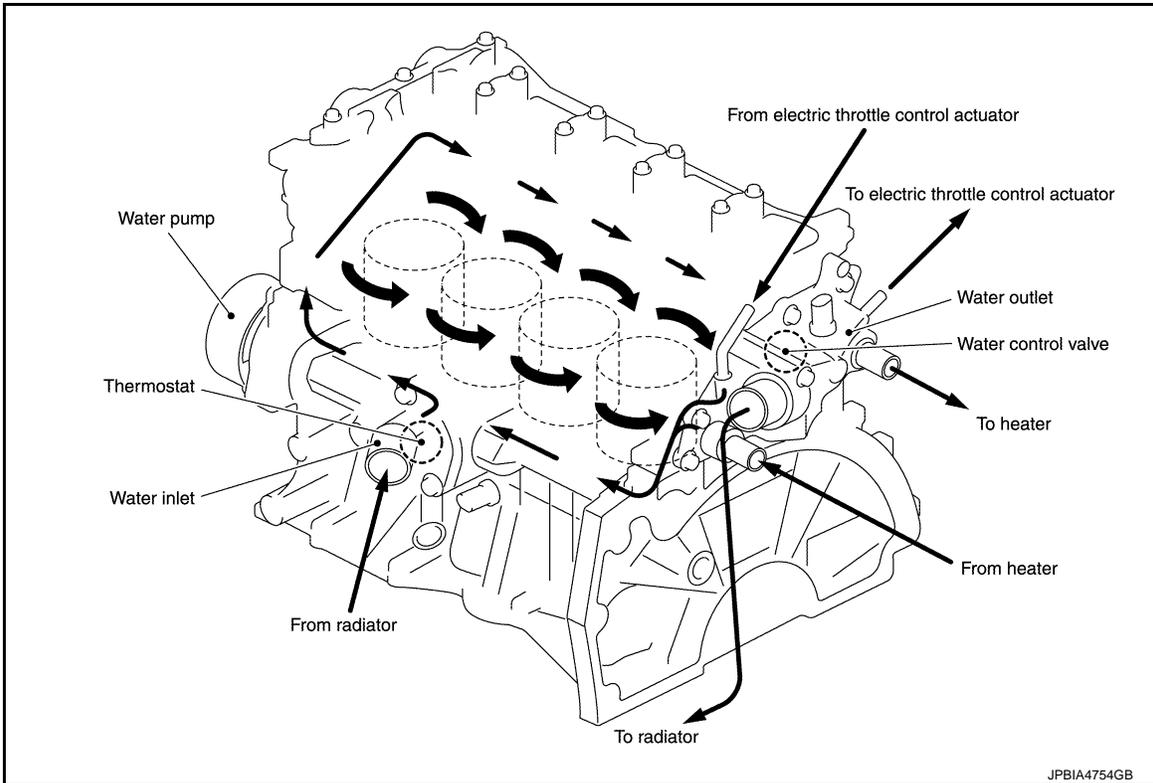
DESCRIPTION

Engine Cooling System

INFOID:000000006492571

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DESCRIPTION

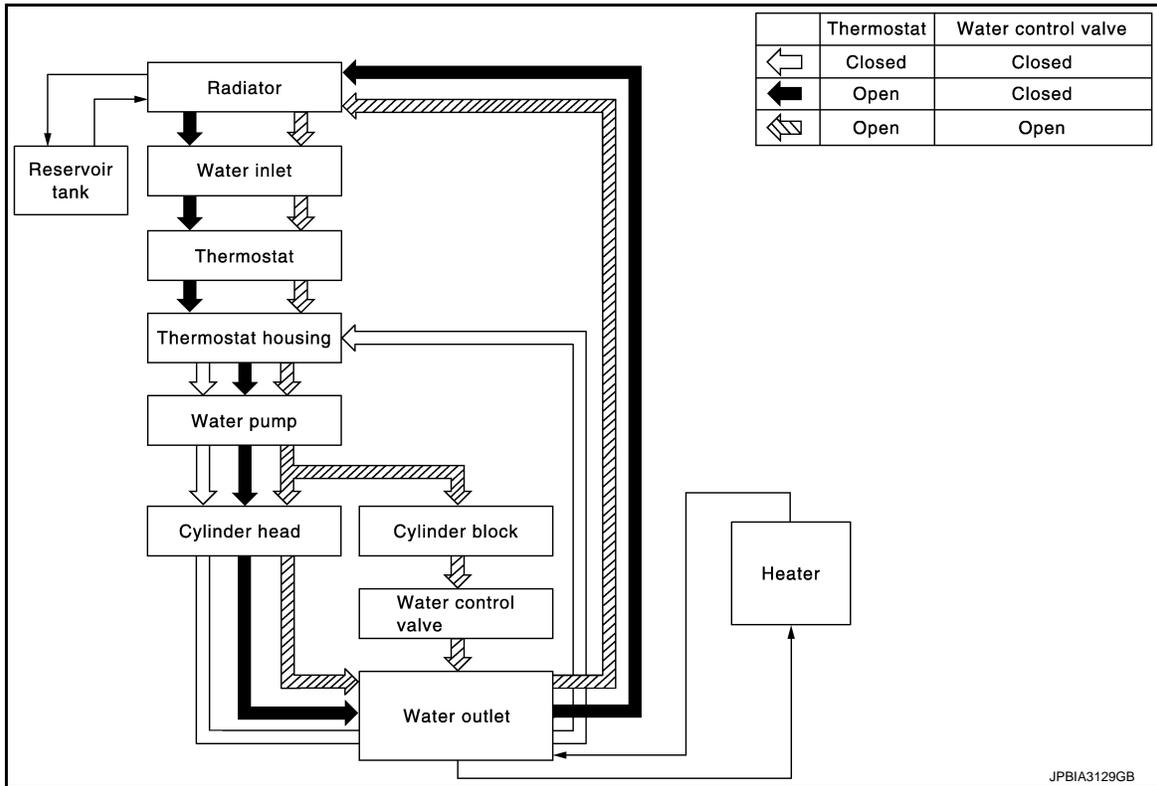
< SYSTEM DESCRIPTION >

[HR16DE]

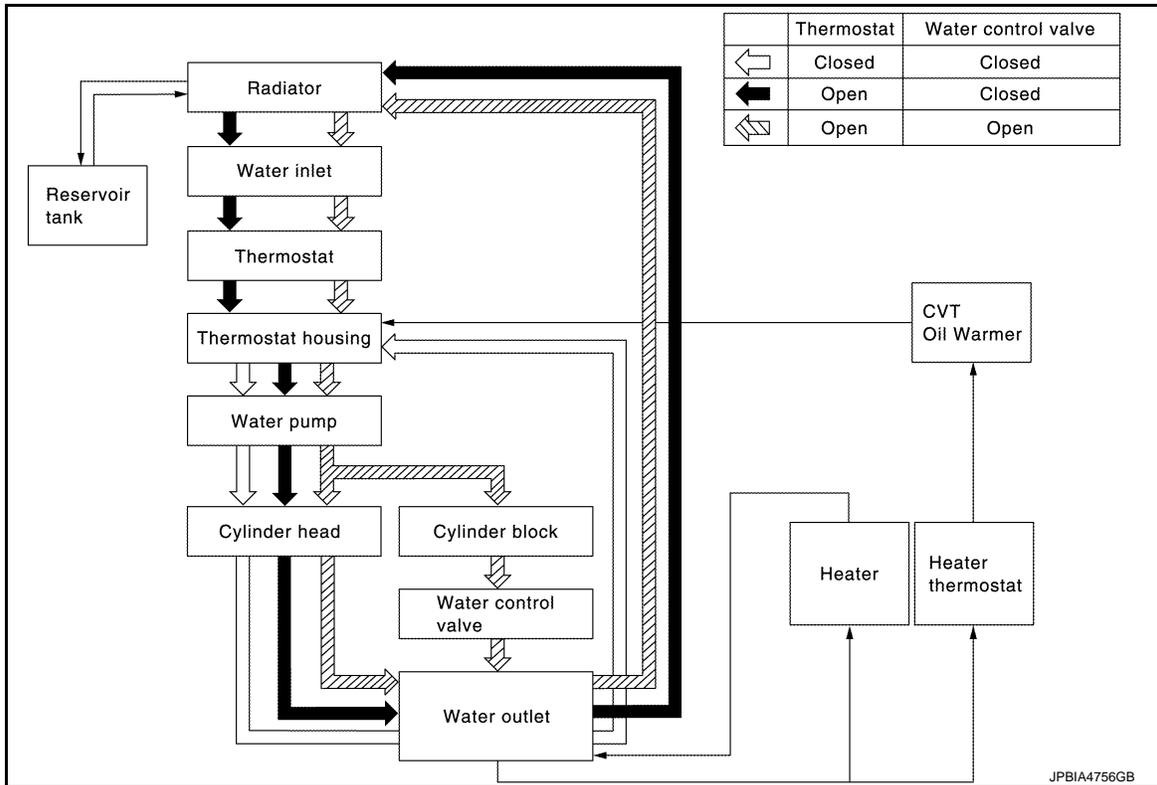
Engine Cooling System Schematic

INFOID:000000006492572

M/T models



CVT models



OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[HR16DE]

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000006492573

A

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		Symptom	Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		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	—	—
		Poor engine coolant quality	—	Engine coolant viscosity
	Insufficient engine coolant	Engine coolant leakage	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 leakage into cooling system	Cylinder head deterioration		
		Cylinder head gasket deterioration		

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OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[HR16DE]

	Symptom		Check items		
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load	
				Driving in low gear for extended time	
				Driving at extremely high speed	
			Power train system malfunction	—	
			Installed improper size wheels and tires		
			Dragging brakes		
	Blocked or restricted air flow	Blocked or restricted air flow	Blocked bumper	—	—
			Blocked radiator grille	Installed car brassiere	
				Mud contamination or paper clogging	
			Blocked radiator	—	
Blocked condenser			Blocked air flow		
Installed large fog lamp					

PERIODIC MAINTENANCE

ENGINE COOLANT

Inspection

INFOID:000000006492574

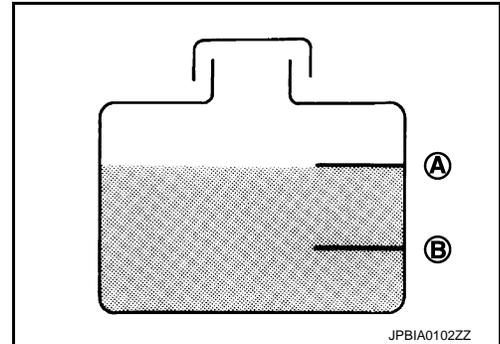
LEVEL

- Check that the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.

A : MAX

B : MIN

- Adjust the engine coolant level if necessary.



LEAKAGE

- To check for leakage, apply pressure to the cooling system with the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B).

Testing pressure: Refer to [CO-54, "Radiator"](#).

WARNING:

Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.

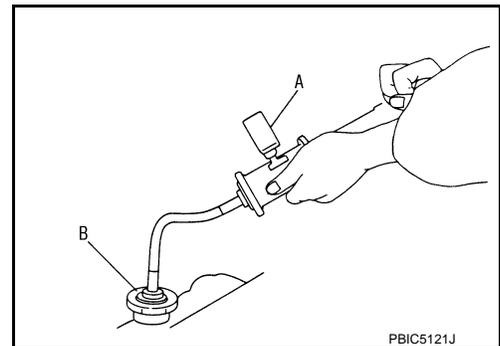
CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

In a case that engine coolant decreases, replenish radiator with engine coolant.

- If anything is found, repair or replace damaged parts.



Draining

INFOID:000000006492575

WARNING:

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

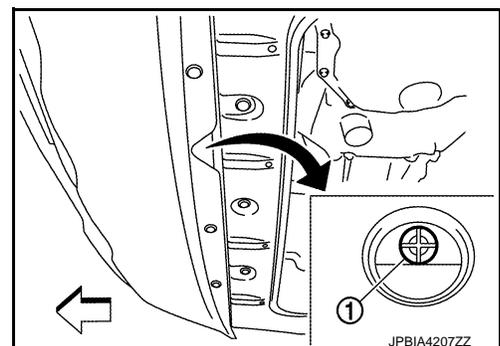
1. Remove engine under cover.
2. Open radiator drain plug (A) at the bottom of radiator, and then remove radiator cap.

← : Vehicle front

CAUTION:

Perform this step when engine is cold.

- When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-228, "Disassembly and Assembly"](#).



3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-42, "Exploded View"](#).

ENGINE COOLANT

[HR16DE]

< PERIODIC MAINTENANCE >

4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-39, "Flushing"](#).

Refilling

INFOID:000000006492576

1. Install reservoir tank if removed and radiator drain plug.

CAUTION:

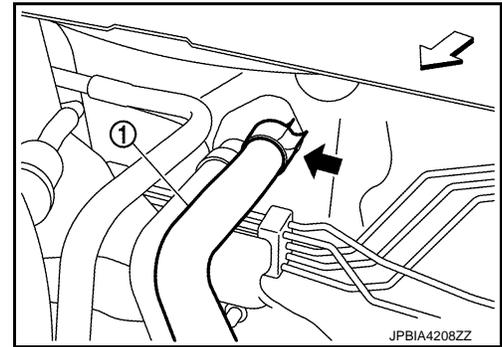
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug : Refer to [CO-42, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-228, "Disassembly and Assembly"](#).
2. Check that each hose clamp has been firmly tightened.
 3. Remove air duct (between air cleaner case and electric throttle control actuator). Refer to [EM-161, "Exploded View"](#).
 4. Disconnect heater hose (1) at position (←) in the figure.

← : Vehicle front

- Enhance heater hose as high as possible.

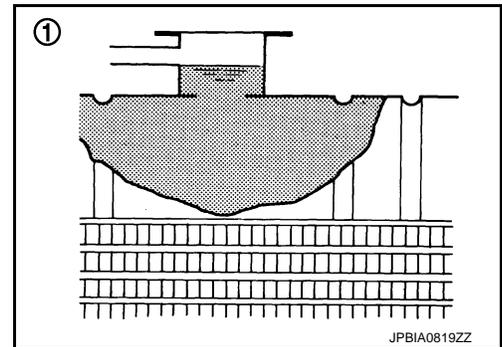


5. Fill radiator (1) to specified level.

CAUTION:

Never adhere the engine coolant to electronic equipments (alternator etc.).

- Pour coolant slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
- When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
- Use Genuine NISSAN Engine Coolant or equivalent in its quality mixed with water (distilled or demineralized). Refer to [MA-13, "Fluids and Lubricants"](#).



Engine coolant capacity

(With reservoir tank at "MAX" level)

Refer to [CO-54, "Periodical Maintenance Specification"](#).

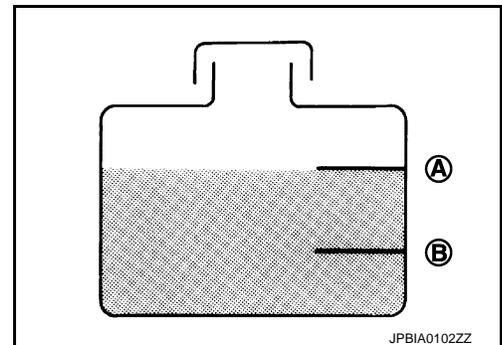
6. Refill reservoir tank to "MAX" level line with engine coolant.

A : MAX

B : MIN

Reservoir tank engine coolant capacity
(At "MAX" level)

Refer to [CO-54, "Periodical Maintenance Specification"](#).



7. Install air duct (between air cleaner case and electric throttle control actuator). Refer to [EM-161, "Exploded View"](#).

ENGINE COOLANT

[HR16DE]

< PERIODIC MAINTENANCE >

8. Install radiator cap.
9. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
 - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.**CAUTION:**
Watch water temperature gauge so as not to overheat engine.
10. Stop the engine and cool down to less than approximately 50°C (122°F).
 - Cool down using fan to reduce the time.
 - If necessary, refill radiator up to filler neck with engine coolant.**CAUTION:**
Never adhere the engine coolant to electronic equipments (alternator etc.).
11. Refill reservoir tank to "MAX" level line with engine coolant.
12. Repeat steps 5 through 10 two or more times with radiator cap installed until engine coolant level no longer drops.
13. Check cooling system for leakage with engine running.
14. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
 - Sound may be noticeable at heater unit.
15. Repeat step 14 three times.
16. If sound is heard, bleed air from cooling system by repeating step 5 through 10 until reservoir tank level no longer drops.

Flushing

INFOID:000000006492577

1. Install reservoir tank if removed and radiator drain plug.

CAUTION:

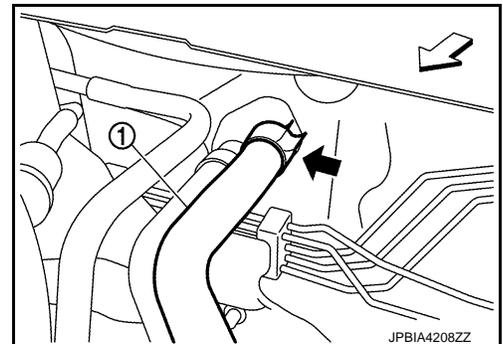
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug : Refer to [CO-42, "Exploded View"](#).

- If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-228, "Disassembly and Assembly"](#).
2. [EM-161, "Exploded View"](#) Remove air duct (between air cleaner case and electric throttle control actuator). Refer to .
 3. Disconnect heater hose (1) at position (◀) in the figure.

◀ : Vehicle front

- Enhance heater as high as possible.



4. Fill radiator and reservoir tank with water and reinstall radiator cap.
 - When engine coolant over flows disconnected heater hose, connect heater hose, and continue filling the engine coolant.
5. Install air duct (between air cleaner case and electric throttle control actuator). Refer to [EM-161, "Exploded View"](#).
6. Run the engine and warm it up to normal operating temperature.
7. Rev the engine two or three times under no-load.
8. Stop the engine and wait until it cools down.
9. Drain water from the system. Refer to [CO-37, "Draining"](#).
10. Repeat steps 1 through 9 until clear water begins to drain from radiator.

RADIATOR RADIATOR CAP

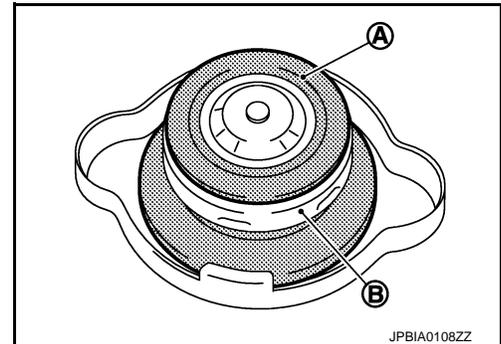
RADIATOR CAP : Inspection

INFOID:000000006492578

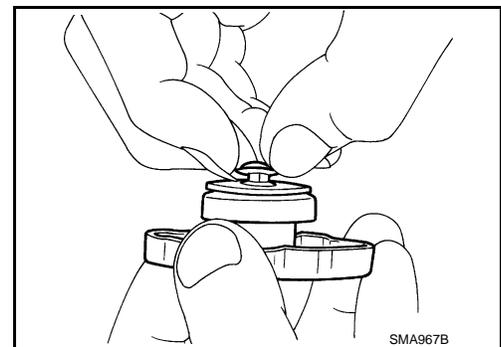
- Check valve seat (A) of radiator cap.

B : Metal plunger

- Check that valve seat is swollen to the extent that the edge of the plunger cannot be seen when watching it vertically from the top.
- Check that valve seat has no soil and damage.



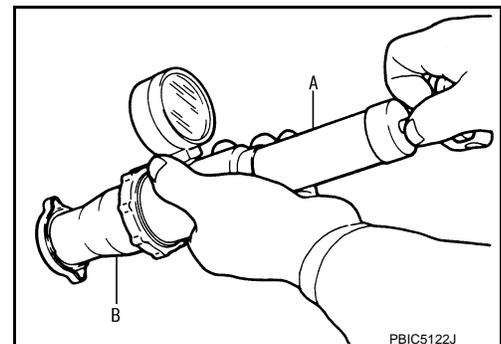
- Pull negative-pressure valve to open it, and that it close completely when released.
- Check that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

Standard and Limit : Refer to [CO-54, "Radiator"](#).

- When connecting radiator cap to the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B), apply engine coolant to the cap seal surface.



- Replace radiator cap if there is an unusualness related to the above three.

CAUTION:

When installing radiator cap, thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:000000006492579

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage radiator fins.**
 - **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and harness connectors to prevent water from entering.**
1. Apply water by hose to the back side of the radiator core vertically downward.
 2. Apply water again to all radiator core surfaces once per minute.
 3. Stop washing if any stains no longer flow out from radiator.

RADIATOR

< PERIODIC MAINTENANCE >

[HR16DE]

4. Blow air into the back side of radiator core vertically downward.
 - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm², 71 psi) and keep distance more than 30 cm (11.81 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

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RADIATOR

< REMOVAL AND INSTALLATION >

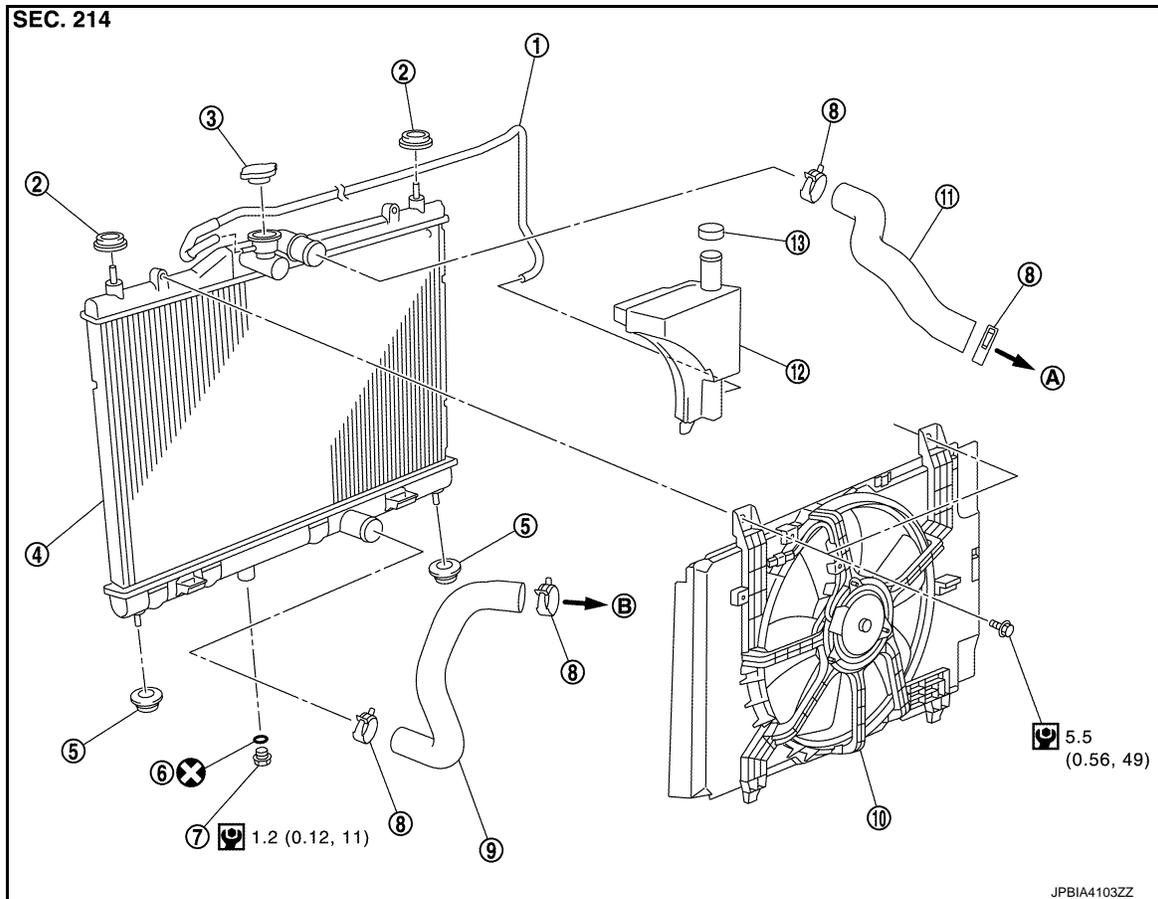
[HR16DE]

REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:000000006492580



- | | | |
|--------------------------|----------------------------|--------------------------|
| 1. Reservoir tank hose | 2. Mounting rubber (upper) | 3. Radiator tank cap |
| 4. Radiator | 5. Mounting rubber (lower) | 6. O-ring |
| 7. Drain plug | 8. Clamp | 9. Radiator hose (lower) |
| 10. Cooling fan assembly | 11. Radiator hose (upper) | 12. Reservoir tank |
| 13. Reservoir tank cap | | |
- A. To water outlet
B. To water inlet
C. To water inlet

⊗ : Always replace after every disassembly.

Ⓜ : N-m (kg-m, in-lb)

Removal and Installation

INFOID:000000006492581

REMOVAL

WARNING:

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

1. Drain engine coolant from radiator. Refer to [CO-37, "Draining"](#).

CAUTION:

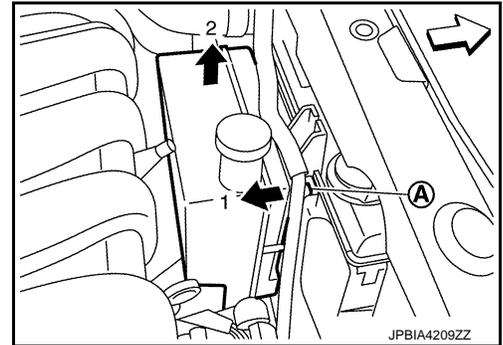
- Perform this step when the engine is cold.
- Never spill engine coolant on drive belt.

RADIATOR

[HR16DE]

< REMOVAL AND INSTALLATION >

2. Remove air duct (inlet). Refer to [EM-161, "Exploded View"](#).
3. 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 and remove the reservoir tank with tab released.



4. Remove radiator hose (upper and lower).
5. Disconnect harness connector from fan motor, and move harness aside.
6. Remove cooling fan assembly.
CAUTION:
Be careful not to damage or scratch the radiator core.
7. Remove the following parts.
 - Front grille assembly. Refer to [EXT-18, "Removal and Installation"](#).
 - Front bumper fascia assembly. Refer to [EXT-13, "Removal and Installation"](#)
 - Front combination lamp assembly (LH and RH). Refer to [EXL-91, "Removal and Installation"](#).
8. Remove radiator core support (upper). Refer to [DLK-147, "HR16DE : Removal and Installation"](#) (WITH I-KEY & SUPER LOCK) or [DLK-310, "HR16DE : Removal and Installation"](#) (WITH I-KEY WITHOUT SUPER LOCK) or [DLK-445, "HR16DE : Removal and Installation"](#) (WITHOUT I-KEY & WITH SUPER LOCK) [DLK-561, "HR16DE : Removal and Installation"](#) (WITHOUT I-KEY & SUPER LOCK).
9. Remove the radiator (1) from bottom of the vehicle.

2 : Condenser assembly

← : Vehicle front

CAUTION:

Be careful not to damage radiator core and condenser assembly core.

INSTALLATION

Install in the reverse order of removal.

Radiator

NOTE:

When installing radiator core support (upper), check that both upper and lower mounts of radiator and air conditioner condenser are inserted in the mounting holes of radiator core support (upper, lower).

CAUTION:

Use genuine mounting bolts for the cooling fan assembly and strictly observe the tightening torque. (Breakage prevention for radiator)

Reservoir tank

NOTE:

- Insert reservoir tank straight into the mounting location and check by the feel that the pawl is securely fastened.
- Pull reservoir tank upward to check that it does not come off.

Radiator hose

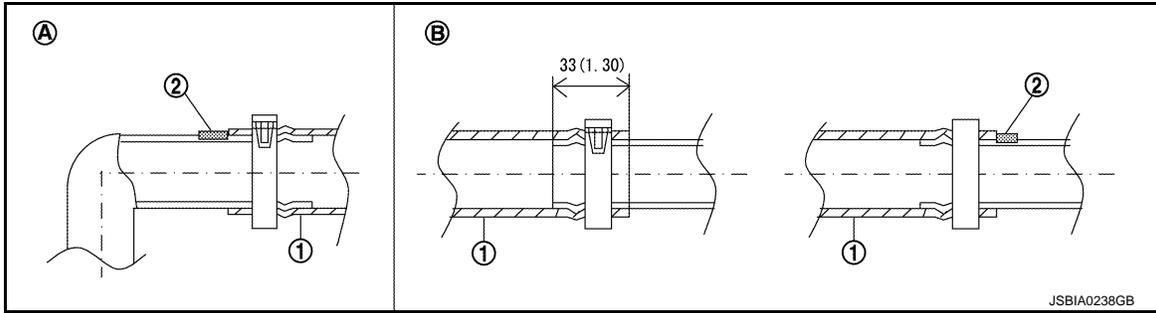
NOTE:

Insert the radiator hose (1) all the way to the stopper (2) or by 33 mm (1.30 in) (hose without a stopper).

RADIATOR

< REMOVAL AND INSTALLATION >

[HR16DE]



Unit: mm (in)

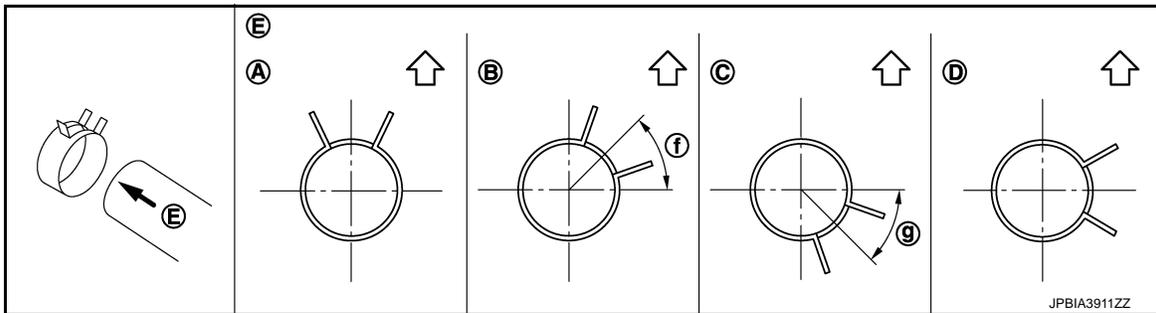
A. Radiator side

B. Engine side

- For the orientation of the hose clamp pawl, refer to the figure.

Radiator hose	Hose end	Paint mark	Position of hose clamp*
Radiator hose (upper)	Radiator side	Upper	A
	Engine side	Upper	B
Radiator hose (lower)	Radiator side	Lower	C
	Engine side	Upper	D

*: Refer to the illustrations for the specific position each hose clamp tab.



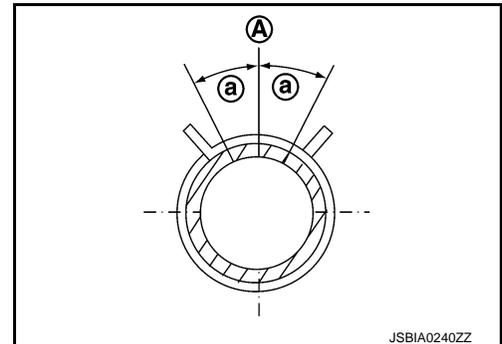
E. View E

f. 45°

g. 45°

↖ : Vehicle upper

- The angle (b) created by the hose clamp pawl and the specified line (A) must be within ± 30 as shown in the figure.



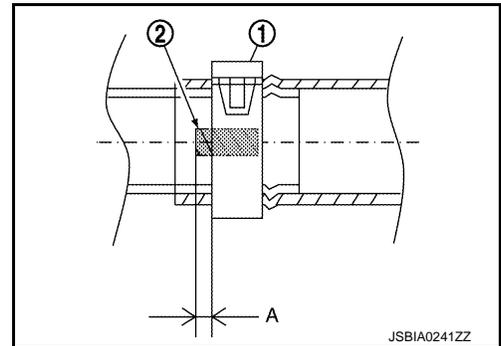
RADIATOR

[HR16DE]

< REMOVAL AND INSTALLATION >

- To install hose clamps (1), check that the dimension (A) from the end of the hose clamp on the radiator hose to the hose clamp is within the reference value.

Dimension "A" : (-1) – (+1) mm



Inspection

INFOID:000000006492582

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-37, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

COOLING FAN

< REMOVAL AND INSTALLATION >

[HR16DE]

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

NOTE:

Cooling fan is controlled by ECM. For details, Refer to [EC-774, "Component Function Check"](#).

Disassembly and Assembly

INFOID:000000006492585

DISASSEMBLY

1. Remove cooling fan mounting nut, and then remove the cooling fan.
2. Remove fan motor.

ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- Apply genuine high strength thread locking sealant on fan motor shaft.

Inspection

INFOID:000000006492586

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

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WATER PUMP

< REMOVAL AND INSTALLATION >

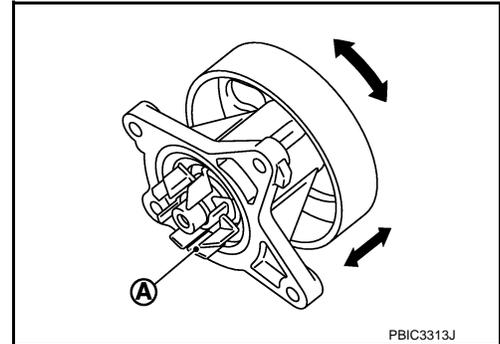
[HR16DE]

Inspection

INFOID:000000006492589

INSPECTION AFTER REMOVAL

- Check visually that there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-37, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

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THERMOSTAT

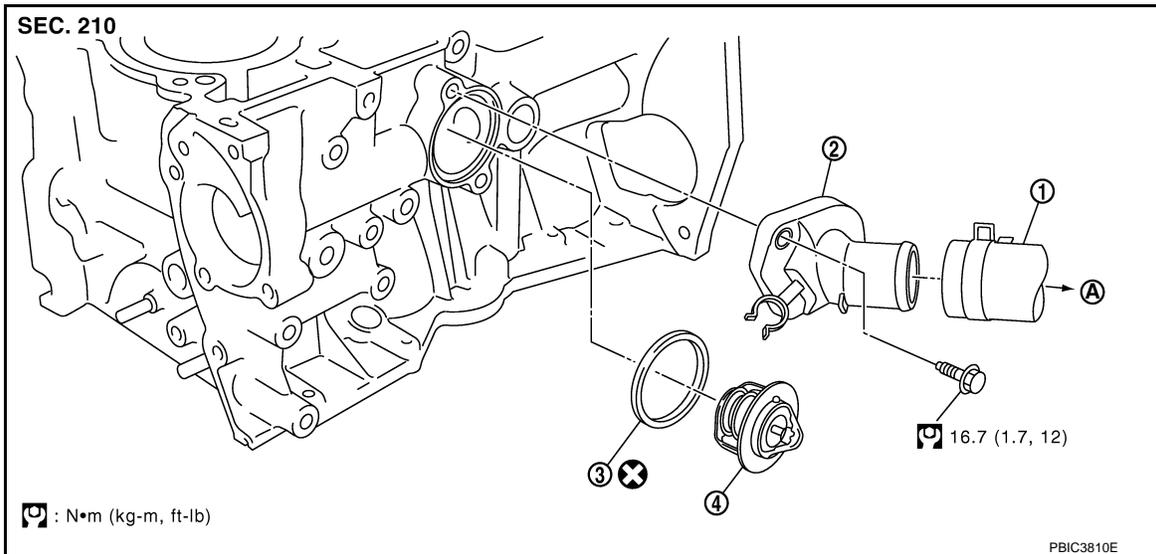
< REMOVAL AND INSTALLATION >

[HR16DE]

THERMOSTAT

Exploded View

INFOID:000000006492590



1. Radiator hose (upper) 2. Water inlet 3. Rubber ring

4. Thermostat

A. To radiator

⊗ : Always replace after every disassembly.

Ⓜ : N•m (kg-m, ft-lb)

Removal and Installation

INFOID:000000006492591

REMOVAL

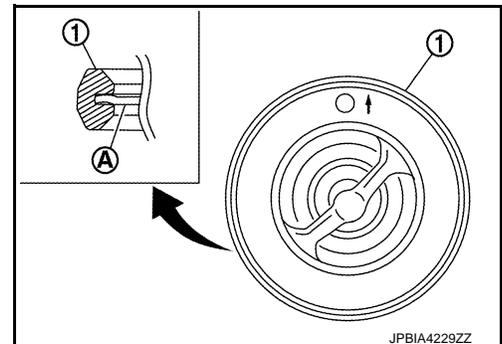
1. Drain engine coolant from radiator. Refer to [CO-37. "Draining"](#).
CAUTION:
Perform this step when engine is cold.
2. Remove air duct (inlet). Refer to [EM-161. "Removal and Installation"](#).
3. Disconnect radiator hose (lower) from water inlet. Refer to [CO-42. "Exploded View"](#).
4. Remove water inlet and thermostat.
 - Engine coolant leakage from cylinder block, so have a receptacle ready below.

INSTALLATION

Note the following, and install in the reverse order of removal.

Thermostat

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



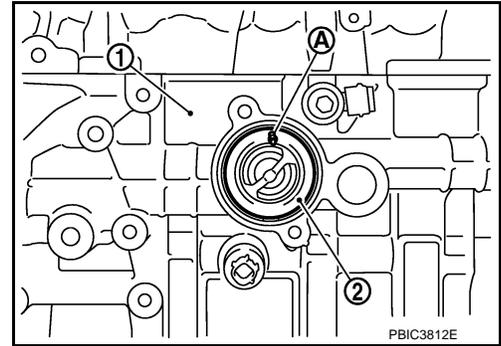
THERMOSTAT

[HR16DE]

< REMOVAL AND INSTALLATION >

- Install thermostat (2) with jiggle valve (A) facing upwards.

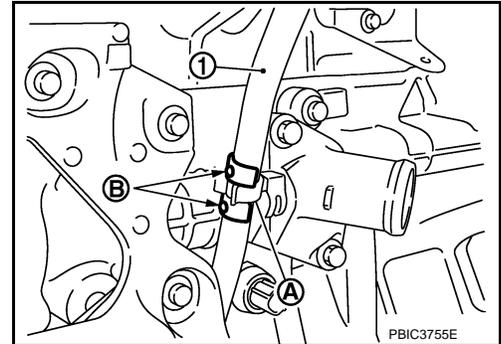
1 : Cylinder block



Water Inlet

After installation, fix water inlet clip (A) on the oil level gauge guide (1) as shown in the figure.

B : Positioning



Inspection

INFOID:000000006492592

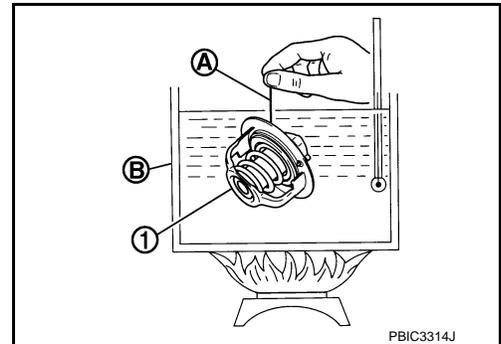
INSPECTION AFTER REMOVAL

Thermostat

- 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 maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to [CO-54](#). "Thermostat".

- If out of the standard, replace thermostat.



INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-37](#). "Inspection".
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

WATER OUTLET

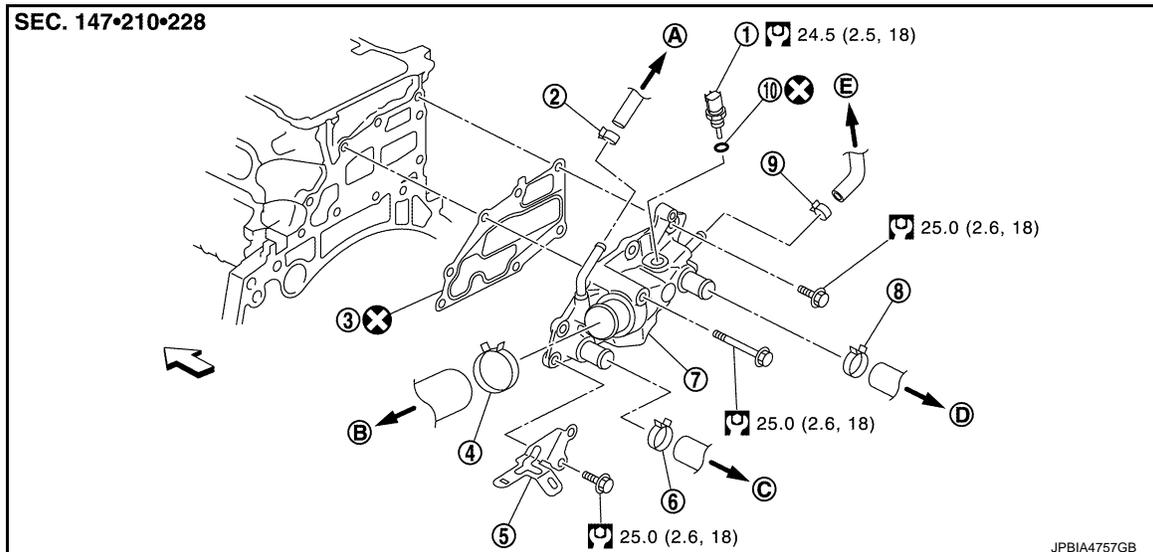
< REMOVAL AND INSTALLATION >

[HR16DE]

WATER OUTLET

Exploded View

INFOID:000000006492593



- | | | |
|--|--|----------------------|
| 1. Engine coolant temperature sensor | 2. Clamp | 3. Gasket |
| 4. Clamp | 5. Bracket | 6. Clamp |
| 7. Water outlet | 8. Clamp | 9. Clamp |
| 10. Washer | | |
| A. To electric throttle control actuator | B. To radiator | C. To CVT oil warmer |
| D. To heater core | E. To electric throttle control actuator | |

← : Engine front

⊗ : Always replace after every disassembly.

U : N·m (kg·m, ft·lb)

Removal and Installation

INFOID:000000006492594

REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-37. "Draining"](#).
CAUTION:
• Perform this step when engine is cold.
2. Remove air duct (inlet) and air ducts. Refer to [EM-161. "Removal and Installation"](#).
3. Disconnect radiator hose (upper). Refer to [CO-42. "Exploded View"](#).
4. Disconnect harness connector from engine coolant temperature sensor.
5. Remove water hoses and heater hoses.
6. Remove water outlet.
7. Remove engine coolant temperature sensor from water outlet, if necessary.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:000000006492595

INSPECTION AFTER REMOVAL

Water Control Valve

WATER OUTLET

[HR16DE]

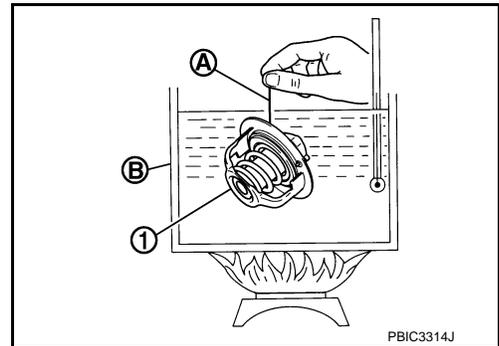
< REMOVAL AND INSTALLATION >

- 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 continuous valve lifting toward maximum valve lift.

NOTE:

The maximum valve lift amount standard temperature for water control valve is the reference value.

- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



Standard: Refer to [CO-54, "Water Control Valve"](#).

- If out of the standard, replace water control valve.

INSPECTION AFTER INSTALLATION

- Check for leakage of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-37, "Inspection"](#).
- Start and warm up the engine. Check visually that there is no leakage of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[HR16DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:000000006492596

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	CVT models	6.3 (6-2/3, 5-1/2)
	M/T models	
Reservoir tank engine coolant capacity (At "MAX" level)		0.7 (3/4, 5/8)

Radiator

INFOID:000000006492597

Unit: kPa (kg/cm², psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Leakage testing pressure		98 (1.0, 14)

Thermostat

INFOID:000000006492598

Standard

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

Heater Thermostat (CVT models)

INFOID:000000006710595

Standard

Valve lift	More than 4.5 mm (0.177 in)
------------	-----------------------------

Reference value

Valve opening temperature	72°C (162°F)
Maximum valve lift	5.0 mm/95°C (0.197 in/203°F)

Water Control Valve

INFOID:000000006492599

Standard

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8.0 mm/108°C (0.315 in/226°F)
Valve closing temperature	90°C (194°F)

PRECAUTION

PRECAUTIONS

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

INFOID:000000006492600

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 AIR BAG" and "SEAT BELT" 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 that 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 AIR BAG".
- 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.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000006492601

NOTE:

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation 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. Turn the ignition switch to ACC position.
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.

PRECAUTIONS

[K9K]

< PRECAUTION >

- When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
- Perform self-diagnosis check of all control units using CONSULT-III.

Precaution for Liquid Gasket

INFOID:000000006492602

REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

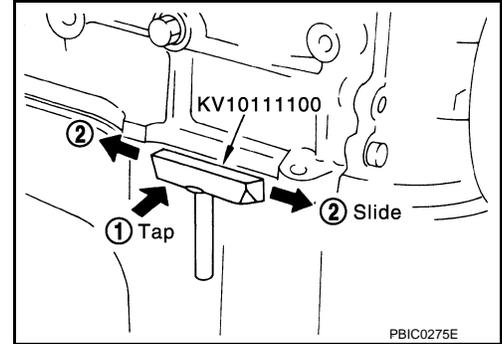
CAUTION:

Be careful not to damage the mating surfaces.

- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.

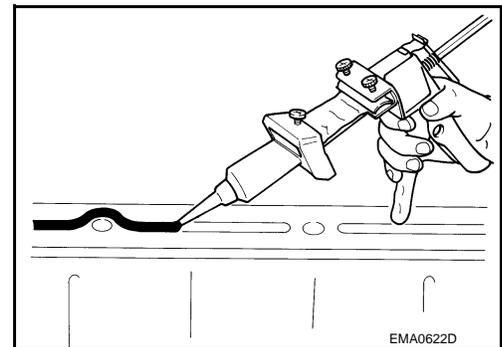
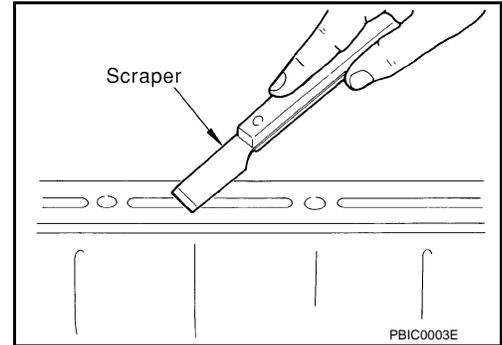
CAUTION:

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

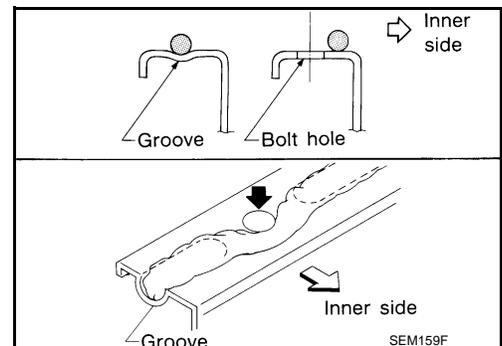
- Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
 - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
- Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
- Attach the liquid gasket to the tube presser.
Use Genuine Liquid Gasket or equivalent.
- Apply the gasket without breaks to the specified location with the specified dimensions.
 - If there is a groove for the liquid gasket application, apply the gasket to the groove.



- As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
- Within five minutes of gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

CAUTION:

If there are instructions in this manual, observe them.



PREPARATION

< PREPARATION >

[K9K]

PREPARATION

PREPARATION

Special Service Tool

INFOID:000000006492603

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NISSAN tool number (RENAULT too number) Tool name	Description
WS39930000 (—) Tube pressure	Pressing the tube of liquid gasket
— (M.S. 554_07) Tester	Leak checking Checking reservoir tank cap
— (M.S. 554_01) Reservoir tank cap tester adapter A	Adapting tester to reservoir tank
— (M.S. 554_06) Reservoir tank cap tester adapter B	Adapting tester to reservoir tank cap

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COOLING SYSTEM

< SYSTEM DESCRIPTION >

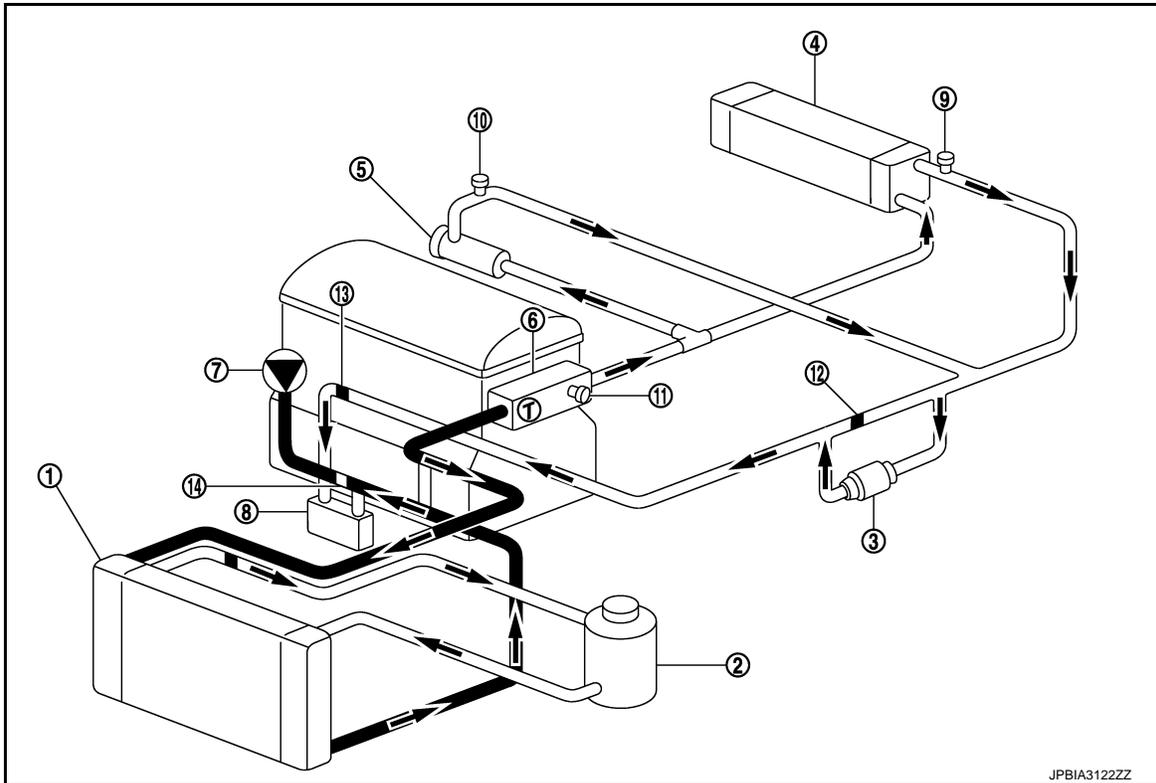
[K9K]

SYSTEM DESCRIPTION

COOLING SYSTEM

Cooling Circuit

INFOID:000000006492604



JPBIA3122ZZ

- | | | |
|-----------------|-----------------------------|---------------------------------------|
| 1. Radiator | 2. Reservoir tank | 3. Heating elements (Thermo plungers) |
| 4. Heater core | 5. Exhaust gas cooler | 6. Thermostat |
| 7. Water pump | 8. Water-oil heat exchanger | 9. Bleed screw |
| 10. Bleed screw | 11. Bleed screw | 12. Choke |
| 13. Choke | 14. Choke | |

BASIC INSPECTION

RADIATOR

Inspection

INFOID:000000006492605

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Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:

- **Be careful not to bend or damage the radiator fins.**
 - **When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.**
1. Apply water by hose to the back side of the radiator core vertically downwards.
 2. Apply water again to all radiator core surface once per minute.
 3. Stop washing if any stains no longer flow out from the radiator.
 4. Blow air into the back side of radiator core vertically downwards.
- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm², 71psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surface once per minute until no water sprays out.

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OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[K9K]

SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000006492606

		Symptom	Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn timing belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Mechanical 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 coolant mixture ratio	—	—
		Poor coolant quality	—	—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank 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		

OVERHEATING CAUSE ANALYSIS

< SYMPTOM DIAGNOSIS >

[K9K]

	Symptom		Check items				
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load	A		
				Driving in low gear for extended time	CO		
				Driving at extremely high speed			
					Powertrain system malfunction		C
					Installed improper size wheels and tires	—	D
					Dragging brakes		
			Improper ignition timing		E		
	Blocked or restricted air flow		Blocked bumper	—		E	
		Blocked radiator grille		Installed car brassiere			
				Mud contamination or paper clogging	—	F	
			Blocked radiator	—			
			Blocked condenser	—		G	
	Installed large fog lamp						

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PERIODIC MAINTENANCE

ENGINE COOLANT

Inspection

INFOID:000000006492607

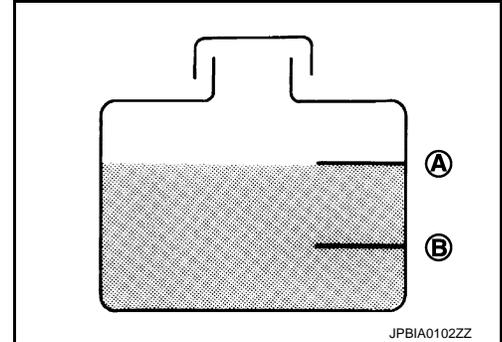
LEVEL

- Check that the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.

A : MAX

B : MIN

- Adjust the engine coolant level if necessary.



LEAKAGE

- To check for leakage, apply pressure to the cooling system with the radiator cap tester (commercial service tool) (A) and the radiator cap tester adapter (commercial service tool) (B).

Testing pressure: Refer to [CO-76, "Radiator"](#).

WARNING:

Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.

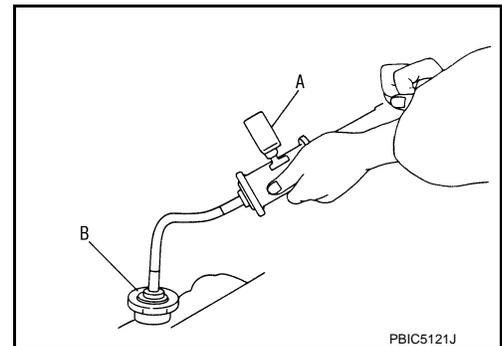
CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

In a case that engine coolant decreases, replenish radiator with engine coolant.

- If anything is found, repair or replace damaged parts.



Draining

INFOID:000000006492608

WARNING:

- Never remove radiator cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator.
- Wrap a thick cloth around the radiator cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.

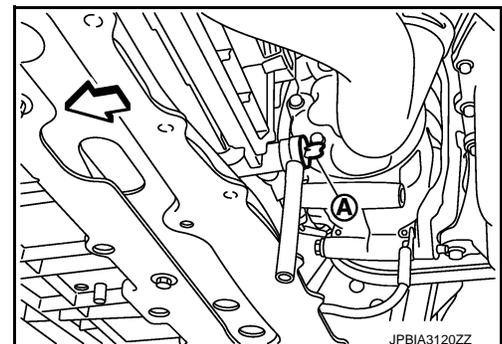
1. Remove engine under cover.
2. Open radiator drain plug (A) at the bottom of radiator, and then remove radiator cap.

← : Vehicle front

CAUTION:

Perform this step when engine is cold.

3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-66, "Exploded View"](#).
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-63, "Flushing"](#).
5. Remove air relief plug from water outlet. Refer to [CO-75, "Exploded View"](#).



ENGINE COOLANT

< PERIODIC MAINTENANCE >

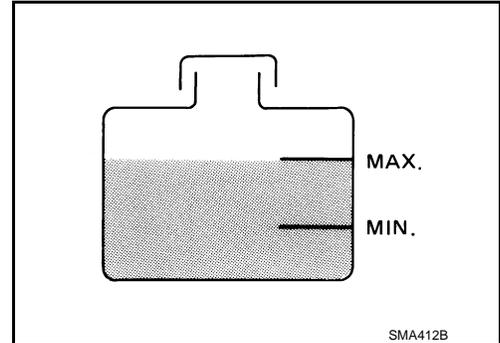
[K9K]

Refilling

INFOID:000000006492609

• **Before start working, turn off the automatic air conditioner and the blower motor.**

1. Install reservoir tank, radiator drain plug and air relief plug.
2. Fill reservoir tank slowly with coolant until coolant spills from the air relief hole. Refer to [CO-58, "Cooling Circuit"](#).
 - **Put a cloth under the air relief plug to prevent engine coolant to dampen the crankshaft position sensor.**
 - Fill coolant to the MAX level line of the reservoir tank at a rate of 2 liter (1-3/4 Imp qt)/min or lower.



3. Close the air relief plug.

CAUTION:

If the filling rate is too fast, this could lead to air being mixed in the coolant. Be sure to fill the coolant slowly according to the rate indicated above.

Use Genuine NISSAN Anti-freeze Coolant or equivalent mixed with water (distilled or demineralized). Refer to [MA-13, "Fluids and Lubricants"](#).

Engine coolant capacity Approx. 6.7 ℓ (5 - 7/8 Imp qt)

Reservoir tank capacity 0.7 ℓ (5/8 Imp qt)

4. Warm up the engine for approximately five minutes without reservoir tank cap installed, and then turn off the engine and loose air relief plug until coolant spills from air relief hole.
 - **If coolant overflows reservoir tank hole, install filler cap.**
 - **Watch engine coolant temperature warning light so as not overheat the engine during all of the operation.**
- WARNING:**
- **Be careful not be scalded with hot engine coolant or vacuum pump when operating.**
 - **Radiator fan blade can start at any time and make personal injuries.**
5. Close the air relief plug and run the engine at 2,000 rpm until the upper hose comes hot and radiator fan operates. Let the engine running approximately 5 minutes at idle speed and check for sound of coolant flow while running engine from idle up to 3,000 rpm.
 - Sound may be noticeable at heater water cock.
 6. If sound is heard, bleed air from cooling system by repeating steps 4 through 5 until coolant level no longer drops.
 - Check the radiator lower hose for any signs of leakage.
 7. Turn off the engine and let it cool down.
 - Cool down using a fan to reduce the time.
 8. After cooling period, loose the air relief plug and check if coolant spills from the air relief hole. In other case, remove the air relief plug until the coolant spills, and then close the relief air plug. Bleed air from cooling system by repeating steps 5 through 8 until the coolant spills immediately.
 9. Check the engine coolant level when engine is cool and refill to MAX level line if the level is lower.
 - Clean excess coolant from engine.

Flushing

INFOID:000000006492610

1. Fill reservoir tank with water until water spills from the air relief hole, then close air relief plug. Reinstall reservoir tank cap.
2. Run engine and warm it up to normal operating temperature.

ENGINE COOLANT

< PERIODIC MAINTENANCE >

[K9K]

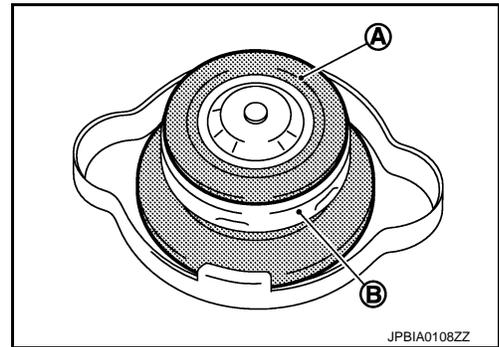
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.
7. Blow compressed air into cooling circuit through the reservoir tank valve hole to drain all the water.

RESERVOIR TANK CAP

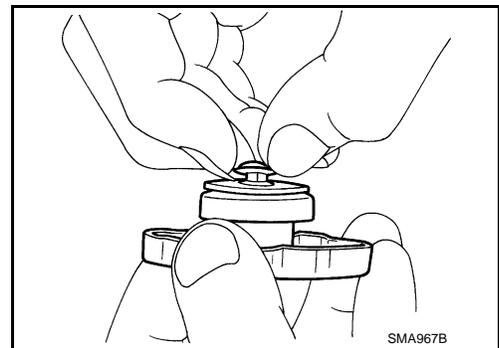
Inspection

INFOID:000000006492611

- Check valve seat of reservoir tank cap.
- Check if valve seat (A) is swollen to the extent that the edge of the metal plunger (B) cannot be seen when watching it vertically from the top.
- Check if valve seat has no soil and damage.

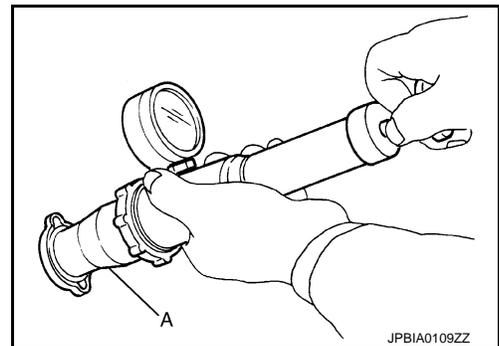


- Pull negative-pressure valve to open it, and check that it close completely when released.
- Check that there is no dirt or damage on the valve seat of reservoir tank cap negative-pressure valve.
- Check that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check reservoir tank cap relief pressure.
- When connecting reservoir tank cap to the radiator cap tester (commercial service tool) and the radiator cap tester adapter (commercial service tool) (A), apply engine coolant to the cap seal surface.

Standard and limit : Refer to [CO-76. "Radiator"](#).



- Replace reservoir tank cap if there is an unusualness related to the above three.

CAUTION:

When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

< REMOVAL AND INSTALLATION >

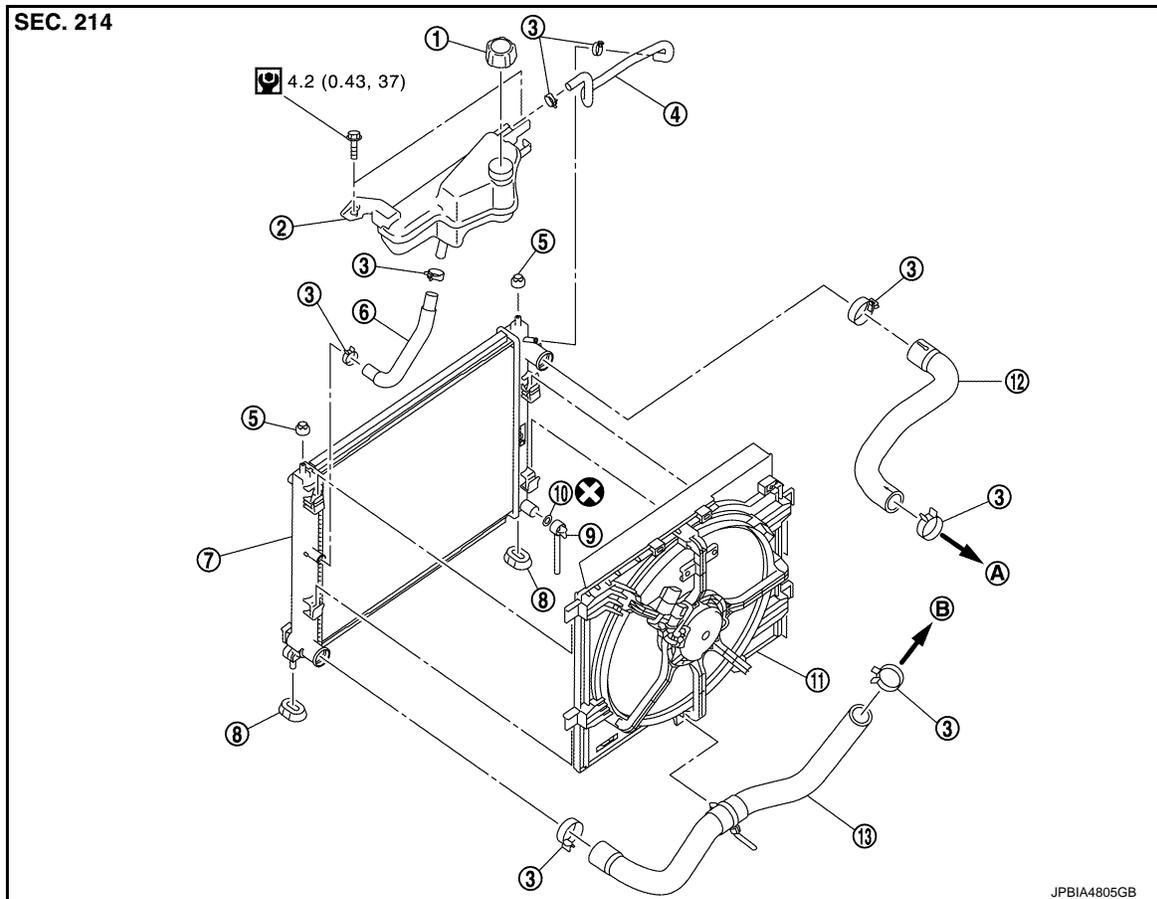
[K9K]

REMOVAL AND INSTALLATION

RADIATOR

Exploded View

INFOID:000000006492612



- | | | |
|---------------------------|----------------------------|---------------------------|
| 1. Reservoir tank cap | 2. Reservoir tank | 3. Clamp |
| 4. Reservoir tank hose | 5. Mounting rubber (upper) | 6. Reservoir tank hose |
| 7. Radiator | 8. Mounting rubber (lower) | 9. Drain plug |
| 10. O-ring | 11. Cooling fan assembly | 12. Radiator hose (upper) |
| 13. Radiator hose (lower) | | |
| A. To water outlet | B. To water inlet | |

: N·m (kg·m, in·lb)

Removal and Installation

INFOID:000000006492613

WARNING:

Never remove the reservoir tank cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by turning it all the way.

REMOVAL

1. Drain engine coolant. Refer to [CO-62, "Draining"](#).
CAUTION:
Perform when engine is cold.
2. Remove cooling fan shroud assembly. Refer to [CO-68, "Exploded View"](#).
CAUTION:
Be careful not to damage or scratch the radiator core.

RADIATOR

[K9K]

< REMOVAL AND INSTALLATION >

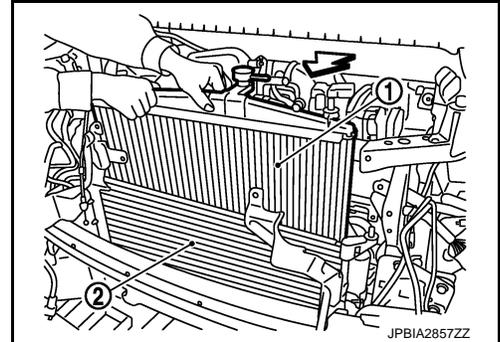
3. Remove the following parts.
 - Front grille assembly: Refer to [EXT-18, "Exploded View"](#).
 - Front bumper: Refer to [EXT-12, "Exploded View"](#).
 - Front combination lamp assembly (RH and LH): Refer to [EXL-91, "Exploded View"](#).
4. Remove radiator core support (upper).
5. Remove condenser fixing bolts upper.
6. Pull up and remove the radiator assembly (1).

2 : Condenser assembly

↔ : Vehicle front

CAUTION:

Be careful not to damage radiator core and condenser assembly core.



INSTALLATION

- Reinstall any parts removed in reverse order of removal.
- Check for engine coolant leaks. Refer to [CO-59, "Inspection"](#).

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COOLING FAN

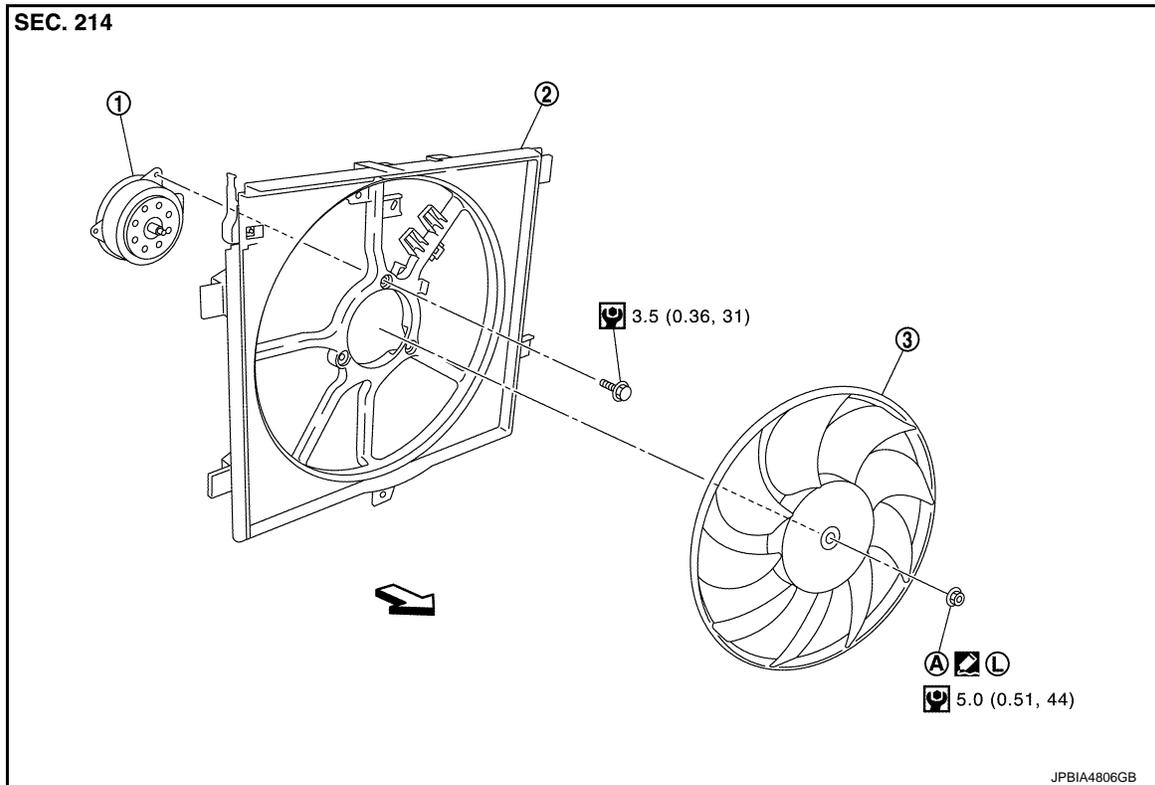
< REMOVAL AND INSTALLATION >

[K9K]

COOLING FAN

Exploded View

INFOID:000000006492614



1. Fan motorCooling fan 2. Fan shroud 3. Cooling fan

- A. Reverse screw

(L) : Apply thread locking sealant.

: Vehicle front

: N·m (kg·m, in·lb)

Removal and Installation

INFOID:000000006492615

REMOVAL

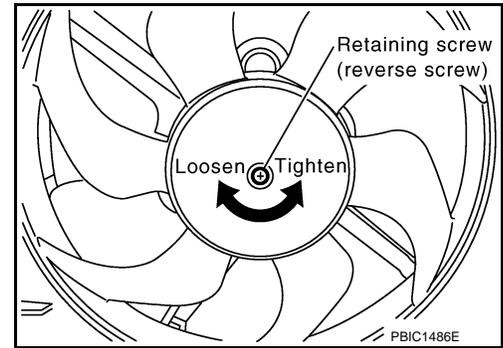
1. Drain engine coolant. Refer to [CO-62, "Draining"](#).
2. Disconnect radiator hose (lower) clip.
3. Remove battery. Refer to [PG-124, "Exploded View"](#)
4. Remove air duct (inlet). Refer to [EM-280, "Exploded View"](#).
5. Remove fusible link and relay box bracket, and put fusible link and relay box aside.
6. Remove reservoir tank.
7. Disconnect fan motor connector and boost pressure control valve harness connector, and put the connectors aside.
8. Remove boost pressure control valve assembly. Refer to [EC-825, "TURBOCHARGER BOOST CONTROL : Vacuum Hose Drawing"](#).
9. Remove radiator upper hose. Refer to [CO-66, "Exploded View"](#).
10. Remove radiator fan and shroud assembly.

COOLING FAN

[K9K]

< REMOVAL AND INSTALLATION >

11. Remove radiator fan reverse screw.
12. Remove fan motor from fan shroud.



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INSTALLATION

Install in the reverse order of removal.

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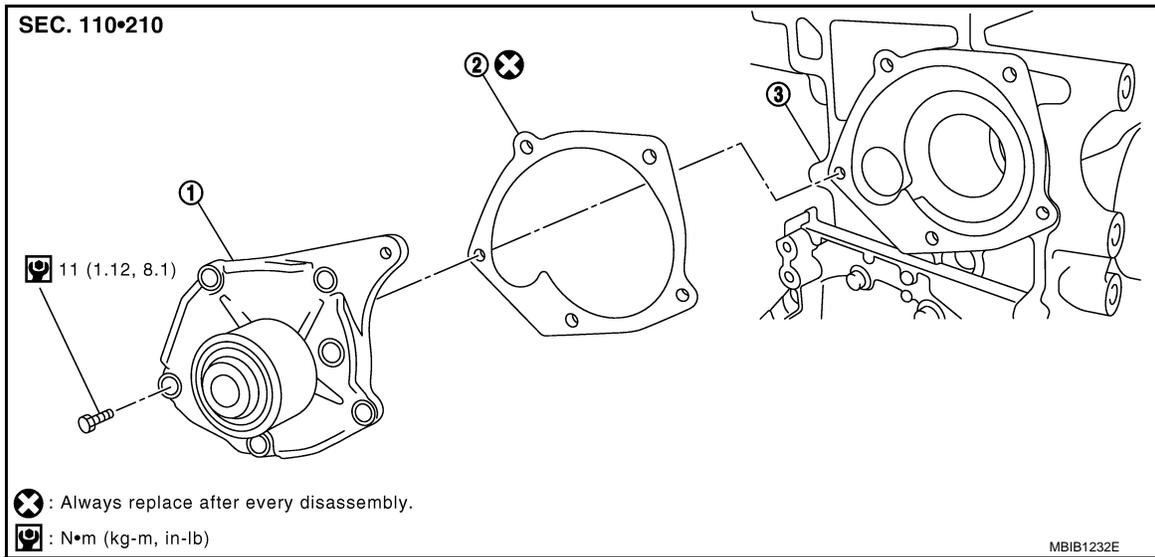
WATER PUMP

< REMOVAL AND INSTALLATION >

[K9K]

WATER PUMP

Exploded View



1. Water pump

2. Gasket

3. Cylinder block

Removal and Installation

INFOID:000000006492617

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

REMOVAL

1. Drain engine coolant. Refer to [CO-62, "Draining"](#).

CAUTION:

Perform when engine is cold.

2. Remove front wheel RH.
3. Remove fender protector (RH). Refer to [EXT-22, "Exploded View"](#)
4. Remove drive belt. Refer to [EM-276, "Removal and Installation"](#).
5. Remove timing belt and inner cover. Refer to [EM-302, "Exploded View"](#).

6. Remove the water pump.

- Coolant will leak from the cylinder block, so have a receptacle ready below.

CAUTION:

- **Handle the water pump vane so that it does not contact any other parts.**
- **Water pump cannot be disassembled and should be replaced as a unit.**

INSTALLATION

- Install in the reverse order of removal.

Inspection

INFOID:000000006492618

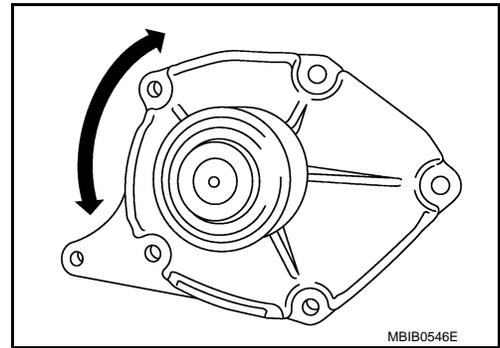
INSPECTION AFTER REMOVAL

WATER PUMP

[K9K]

< REMOVAL AND INSTALLATION >

- Visually make sure there is no significant dirt or rusting on the water pump body and vane.
- Make sure there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If there are any unusualness, replace the water pump assembly.



INSPECTION AFTER INSTALLATION

- Check for engine coolant leaks using reservoir tank cap tester. Refer to [CO-62, "Inspection"](#).

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THERMO PLUNGER UNIT

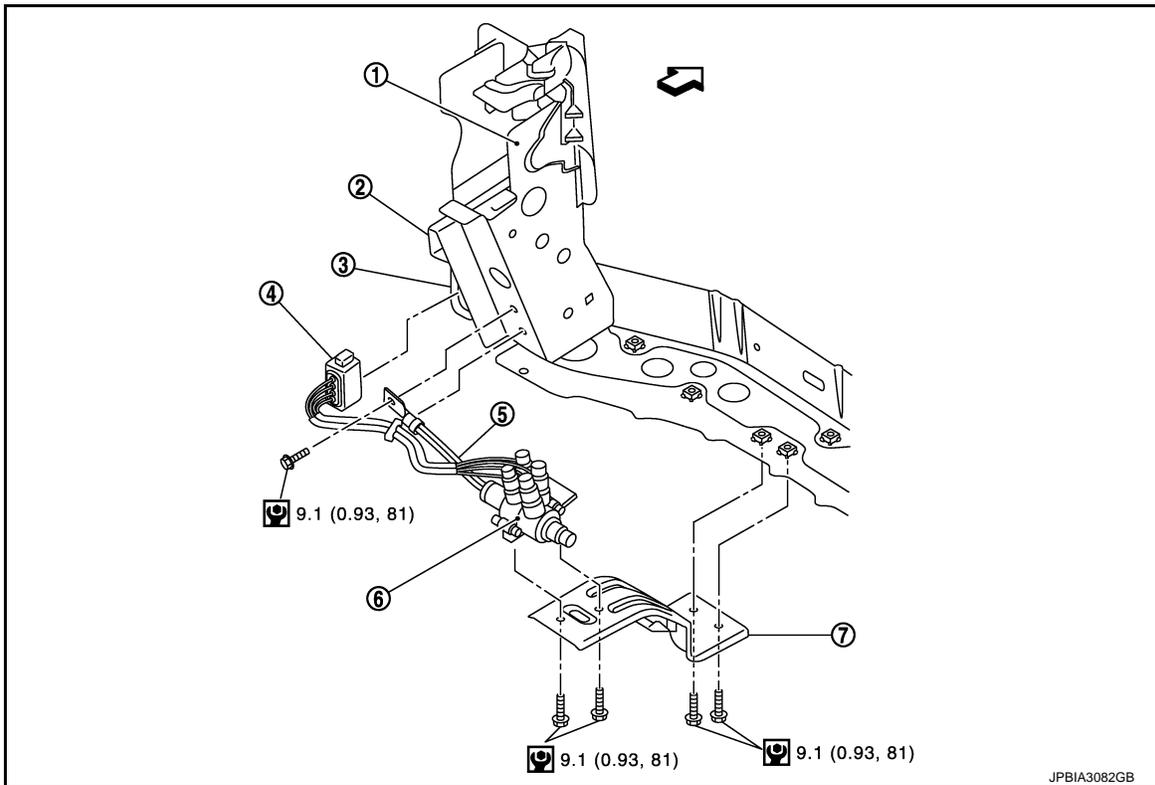
< REMOVAL AND INSTALLATION >

[K9K]

THERMO PLUNGER UNIT

Exploded View

INFOID:000000006492619



- | | | |
|-----------------------------|--------------------------------|-------------------------|
| 1. Side member LH | 2. Thermo plunger control unit | 3. Thermo plunger relay |
| 4. Thermo plunger connector | 5. Earth lead | 6. Thermo plunger unit |
| 7. Bracket stay | | |

← Vehicle front

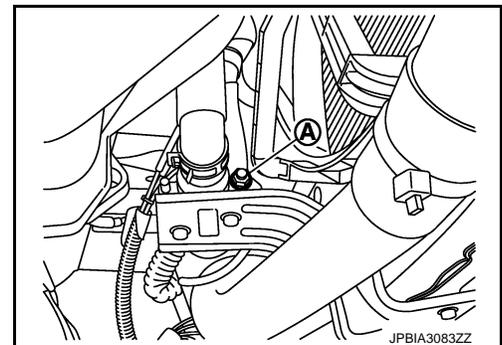
 : N·m (kg·m, in·lb)

Removal and Installation

INFOID:000000006492620

REMOVAL

1. Remove battery cable from the negative terminal.
2. Drain engine coolant. Refer to [CO-62, "Draining"](#).
3. Remove the fender protector (LH). Refer to [EXT-22, "Exploded View"](#).
4. Disconnect thermo plunger connector.
5. Remove the earth lead nut (A).



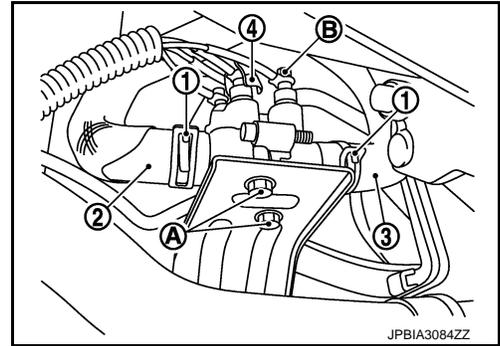
THERMO PLUNGER UNIT

[K9K]

< REMOVAL AND INSTALLATION >

6. Remove the thermo plunger connection caps (4).
7. Remove the thermo plunger connection nuts (B) using the appropriate tool.
8. Remove the LH and RH clamps (1) and hoses (2) and (3).
9. Remove the fixing bolts (A) of the thermo plunger from the bracket and remove the thermo plunger unit.

Tightening torque of bolt : 9.1 N.m



INSTALLATION

Installation is basically the reverse order of the removal.

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THERMOSTAT

< REMOVAL AND INSTALLATION >

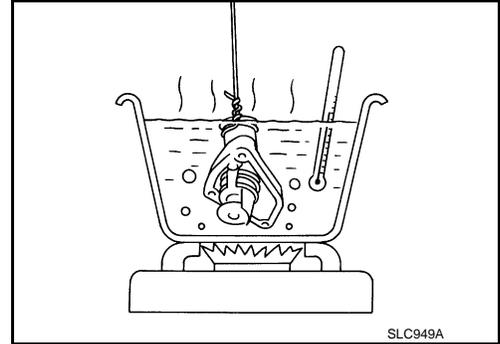
[K9K]

THERMOSTAT

Inspection

INFOID:000000006492621

- Place a thread so that it is caught in the valves of the thermostat. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows the thermostat.)
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open lift amount.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
- If the measured value is out of the standard value or unusual valve seating condition is found, replace water inlet and thermostat assembly.



Items	Temperature °C (°F)
Start of opening	89 (192)
End of opening	97 - 101 (207 - 214)

WATER OUTLET

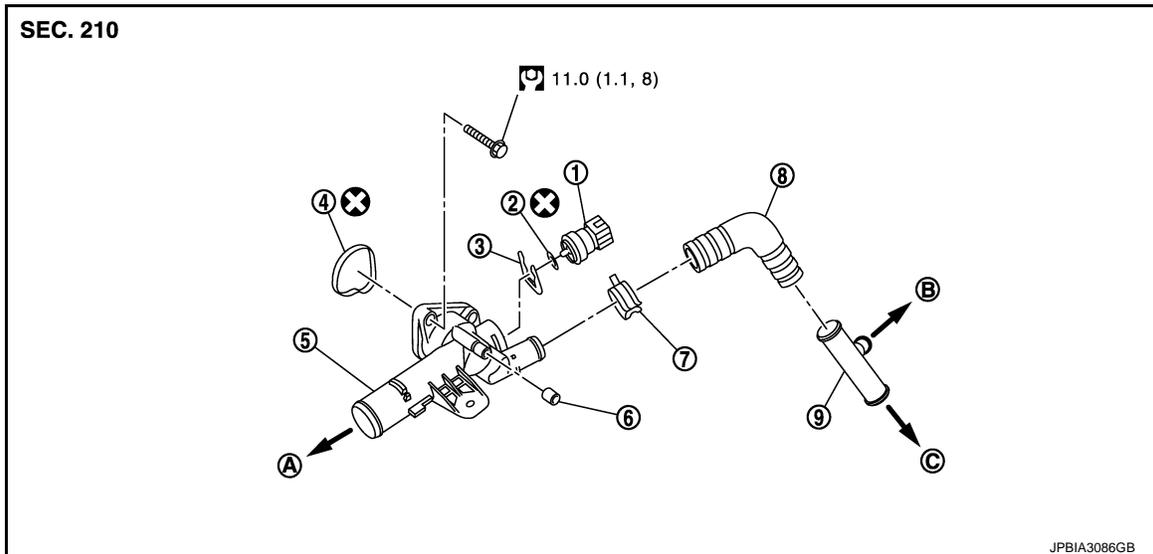
< REMOVAL AND INSTALLATION >

[K9K]

WATER OUTLET

Exploded View

INFOID:000000006492622



- | | | |
|--------------------------------------|---|--------------------|
| 1. Engine coolant temperature sensor | 2. O-ring | 3. Lock plate |
| 4. Gasket | 5. Water outlet and thermostat assembly | 6. Air relief plug |
| 7. Clamp | 8. Water hose | 9. Water pipe |
| A. To radiator hose upper | B. To EGR cooler hose | C. To heater hose |

: N-m (kg-m, ft-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:000000006492623

REMOVAL

1. Remove air cleaner case. Refer to [EM-280. "Exploded View"](#).
 2. Remove vacuum hose.
 3. Remove vacuum pump. Refer to [EM-293. "Exploded View"](#).
 4. Drain engine coolant. Refer to [CO-62. "Draining"](#).
- CAUTION:**
Perform when engine is cold.
5. Remove radiator upper hose. Refer to [CO-66. "Exploded View"](#).
 6. Remove water hose.
 7. Remove water outlet.

INSTALLATION

Install in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[K9K]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:000000006492624

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	6.7 (5-7/8)
Reservoir tank engine coolant capacity (At "MAX" level)	0.7 (5/8)

Radiator

INFOID:000000006492625

Unit: kPa (bar, kg/cm², psi)

Cap relief pressure	Standard	130 - 150 (1.3 - 1.5, 1.33 - 1.53, 18.9 - 21.8)
Leakage testing pressure		10 (0.1, 0.10, 1.5)

Thermostat

INFOID:000000006492626

Standard

Item	Temperature °C (°F)
Start of opening	89 (192°)
End of opening	97 - 101 (207 - 214)