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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:000000004211281

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

**WARNING:**

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

#### Precautions For High-Voltage System

INFOID:000000004211282

Refer to [GI-24, "Precautions For High-Voltage System"](#).

#### Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000004507219

**NOTE:**

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both 12-volt battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both 12-volt 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.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.

If the 12-volt battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the 12-volt battery disconnected or discharged, follow the procedure below before starting the repair operation.

#### OPERATION PROCEDURE

1. Connect both 12-volt battery cables.
 

**NOTE:**  
Supply power using jumper cables if 12-volt battery is discharged.
2. Carry the Intelligent Key or insert it to the key slot and turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
3. Disconnect both 12-volt battery cables. The steering lock will remain released with both 12-volt 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 12-volt battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

#### Precaution for Liquid Gasket

INFOID:000000004211283

#### REMOVAL OF LIQUID GASKET SEALING

# PRECAUTIONS

[QR25DE]

## < PRECAUTION >

- After removing nuts and bolts, separate the mating surface, using Tool and remove old liquid gasket sealing.

**Tool number : KV10111100 (J-37228)**

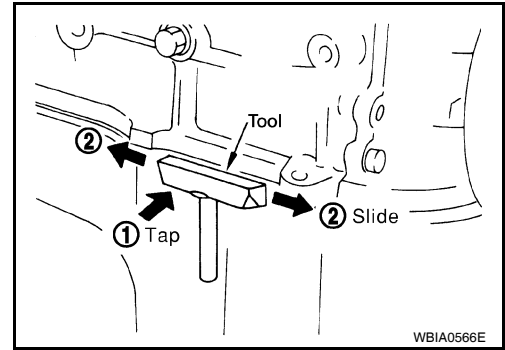
### CAUTION:

**Be careful not to damage the mating surfaces.**

- Tap (1) Tool to insert it, and then slide (2) it by tapping on the side as shown.
- In areas where Tool is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

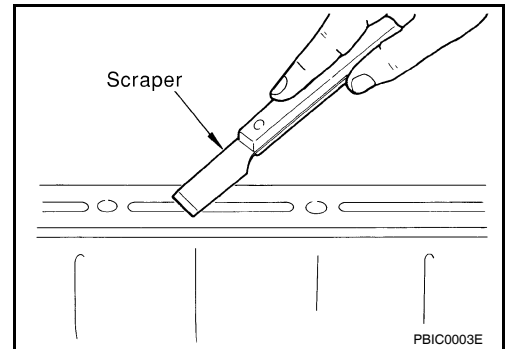
### CAUTION:

**If for some unavoidable reason suitable tool such as screwdriver is used, be careful not to damage the mating surfaces.**



## LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface, Using scraper.
  - Remove liquid gasket completely from the groove of the liquid gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.

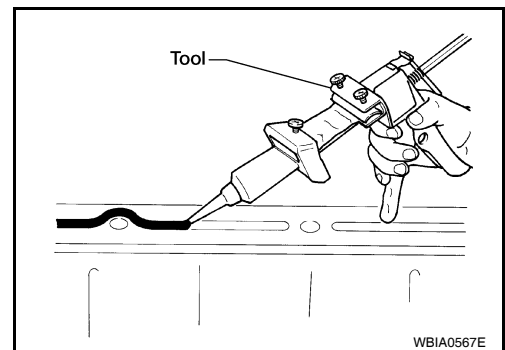


3. Attach liquid gasket tube to Tool.

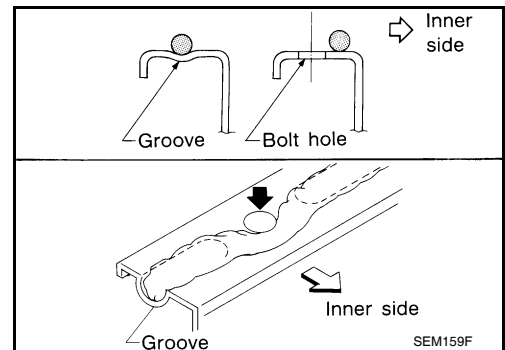
**Tool number : WS39930000 ( — )**

**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-15, "Recommended Chemical Products and Sealants"](#).**

4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
  - If there is a groove for the liquid gasket application, apply liquid gasket to the groove.



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



### CAUTION:

**If there are specific instructions in this manual, observe them.**

# PREPARATION

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[QR25DE]

## PREPARATION

### PREPARATION

#### Special Service Tool

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The actual shape of the Kent-Moore tools may differ from those tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
WS39930000 ( — ) Tube presser	Pressing the tube of liquid gasket
EG17650301 (J-33984-A) Radiator cap tester adapter	Adapting radiator cap tester to radiator cap and radiator filler neck <b>a: 28 (1.10) dia.</b> <b>b: 31.4 (1.236) dia.</b> <b>c: 41.3 (1.626) dia.</b> Unit: mm (in)
KV10111100 (J-37228) Seal cutter	Removing chain tensioner cover and water pump cover
KV991J0070 (J-45695) Coolant Refill Tool	Refilling engine cooling system
— (J-23688) Engine coolant refractometer	Checking concentration of ethylene glycol in engine coolant

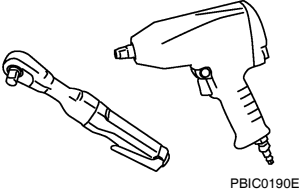
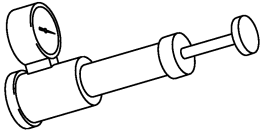
#### Commercial Service Tool

INFOID:000000004211285

# PREPARATION

< PREPARATION >

[QR25DE]

Tool name	Description
<p data-bbox="162 197 272 222">Power tool</p>  <p data-bbox="852 415 922 432">PBIC0190E</p>	<p data-bbox="1015 197 1263 222">Loosening bolts and nuts</p>
<p data-bbox="162 449 357 474">Radiator cap tester</p>	 <p data-bbox="852 667 922 684">PBIC1982E</p> <p data-bbox="1015 449 1209 474">Testing radiator cap</p>

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# COOLING SYSTEM

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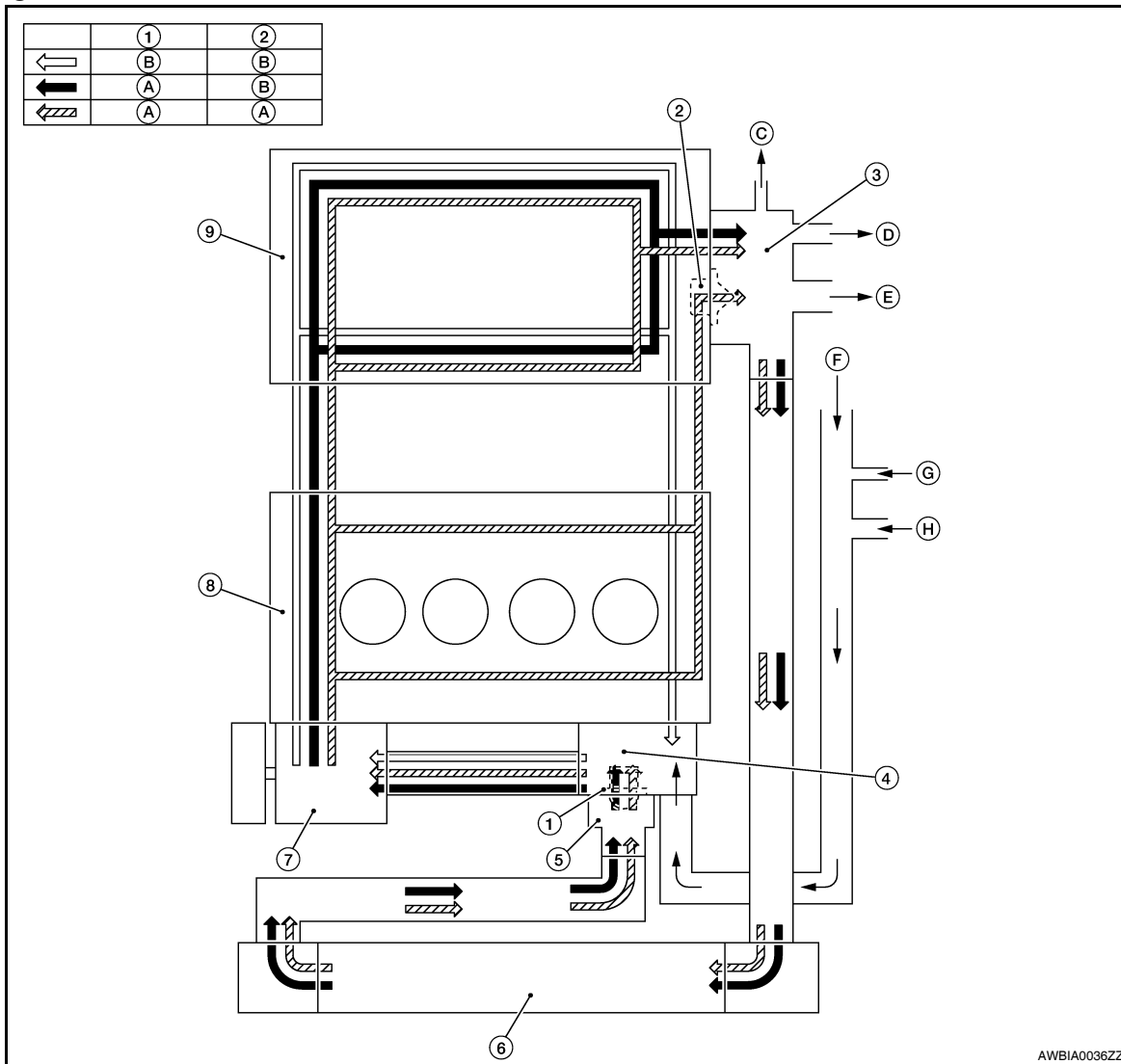
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## FUNCTION DIAGNOSIS

### COOLING SYSTEM

#### Cooling Circuit

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- |  |                         |   |
|--|-------------------------|---|
| 1. Thermostat                          | 2. Water control valve  | 3. Water control valve housing (Water outlet) |
| 4. Cylinder block (Thermostat housing) | 5. Water inlet          | 6. Radiator                                   |
| 7. Water pump                          | 8. Cylinder block       | 9. Cylinder head                              |
| A. Open                                | B. Closed               | C. To electric throttle control               |
| D. To oil cooler                       | E. To heater water pump | F. From heater core                           |
| G. From electric throttle control      | H. From oil cooler      |   |

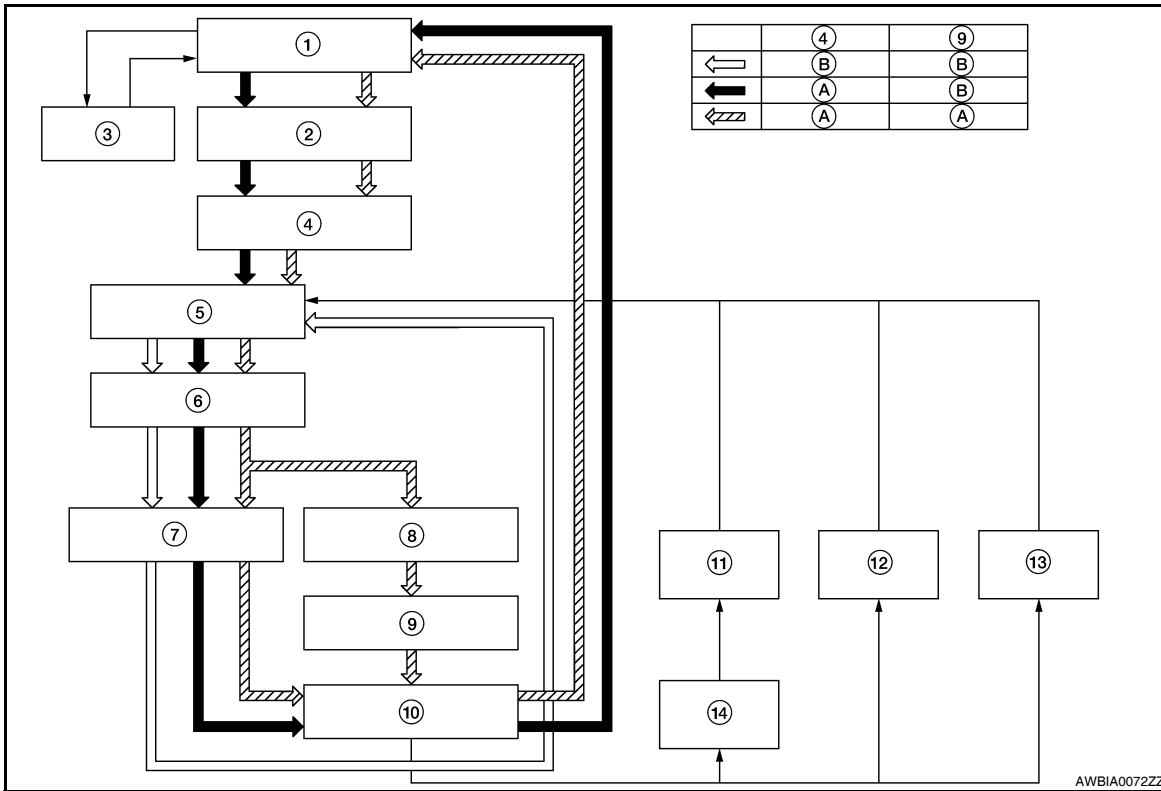
# COOLING SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE]

## Schematic

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- |                                 |                       |                        |
|---------------------------------|-----------------------|------------------------|
| 1. Radiator                     | 2. Water inlet        | 3. Reservoir tank      |
| 4. Thermostat                   | 5. Thermostat housing | 6. Water pump          |
| 7. Cylinder head                | 8. Cylinder block     | 9. Water control valve |
| 10. Water control valve housing | 11. Heater            | 12. Oil cooler         |
| 13. Electric throttle control   | 14. Heater water pump | A. Open                |
| B. Closed                       |                       |                        |

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# OVERHEATING CAUSE ANALYSIS

< FUNCTION DIAGNOSIS >

[QR25DE]

## OVERHEATING CAUSE ANALYSIS

### Troubleshooting Chart

INFOID:000000004211288

		Symptom	Check items		
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—	
		Thermostat stuck closed	Coolant circulation		
		Damaged fins	Dust contamination or rock clogging		
			Mechanical damage		
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)		
	Reduced air flow	Cooling fan does not operate	Engine cooling fans	—	
		High resistance to fan rotation			
		Damaged fan blades			
		Damaged radiator shroud	—	Radiator shroud	—
		Improper coolant mixture ratio	—	Coolant viscosity	—
		Poor coolant quality	—	Periodic maintenance	—
	Insufficient coolant	Coolant leaks		Cooling hose	Loose clamp
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	
Poor sealing					
Radiator			O-ring for damage, deterioration or improper fitting		
		Cracked radiator tank			
		Cracked radiator core			
	Reservoir tank	Cracked reservoir tank			
Overflowing reservoir tank		Exhaust gas leaks into cooling system	Cylinder head deterioration		
			Cylinder head gasket deterioration		



# OVERHEATING CAUSE ANALYSIS

< FUNCTION DIAGNOSIS >

[QR25DE]

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

### ENGINE COOLANT

#### System Inspection

INFOID:000000004211289

**WARNING:**

- Never remove the radiator cap when the engine and inverter are hot. Serious burns could occur from high pressure fluid escaping from the radiator.
- Wrap a thick cloth around the cap. Slowly push down and turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by pushing down and turning it all the way.

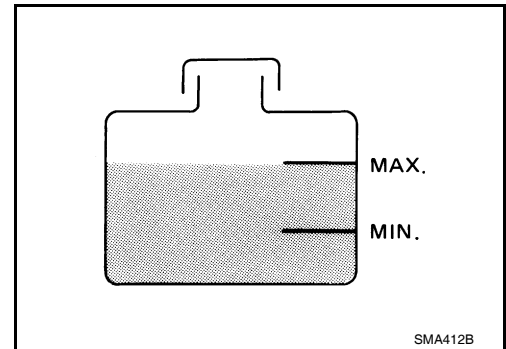
#### CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

- Improper attachment
- Leaks
- Cracks
- Damage
- Loose connections
- Chafing
- Deterioration

#### CHECKING RESERVOIR LEVEL

- Check if the reservoir tank coolant level is within MIN to MAX when the engine and inverter are cool.
- Adjust coolant level if it is too much or too little.



#### CHECKING COOLING SYSTEM FOR LEAKS

To check for leakage, apply pressure to the cooling system using suitable tool (A) and Tool (B).

**Tool number** : EG17650301 (J-33984-A)

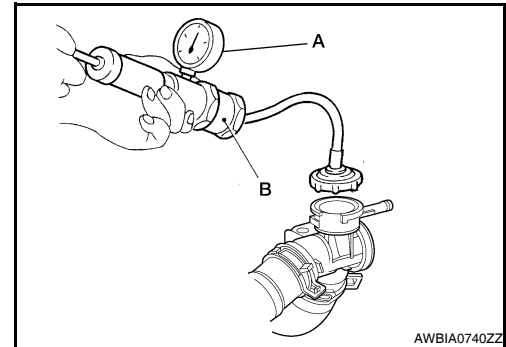
**Testing pressure** : 157 kPa (1.6 kg/cm<sup>2</sup>, 23 psi)

**WARNING:**

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

**CAUTION:**

Higher pressure than specified may cause radiator damage.



#### CHECKING RADIATOR CAP

**CAUTION:**

Use only specified radiator cap. If radiator cap other than specified is used, engine overheating is likely to occur.

1. Inspect the radiator cap.
  - Replace the cap if the metal plunger cannot be seen around the edge of the black rubber gasket.
  - Replace the cap if deposits of waxy residue or other foreign material are on the black rubber gasket or the metal retainer.

**NOTE:**

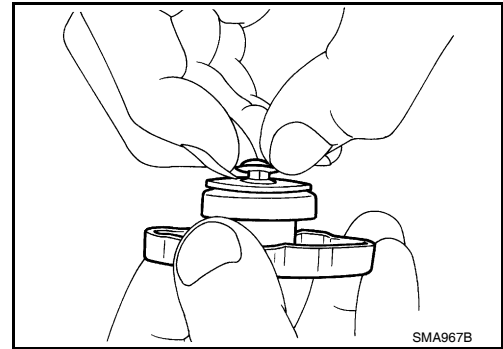
Thoroughly wipe out the radiator filler neck to remove any waxy residue or foreign material.

# ENGINE COOLANT

< ON-VEHICLE MAINTENANCE >

[QR25DE]

2. Pull the negative-pressure valve to open it and check that it moves smoothly when released.
  - Check that there is no dirt or damage on the valve seat of the radiator cap negative-pressure valve.
  - Check that there are no abnormalities in the opening and closing conditions of the negative-pressure valve.



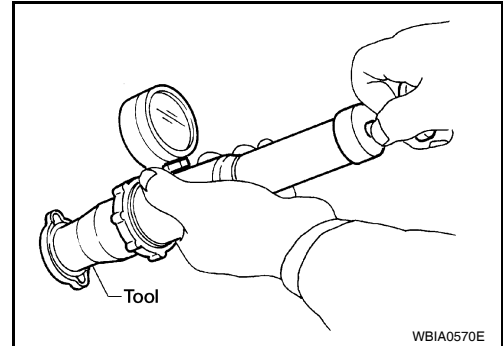
3. Check radiator cap relief pressure using suitable tool and Tool.

**Tool number : EG17650301 (J-33984-A)**

**Standard: 122 - 152 kPa (1.2 - 1.5 kg/cm<sup>2</sup>, 18 - 22 psi)**

**Limit: 107 kPa (1.1 kg/cm<sup>2</sup>, 16 psi)**

- When connecting the radiator cap to the tester, apply water or coolant to the cap seal surface.
- Replace the radiator cap if there is an abnormality in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.



## CHECKING RADIATOR

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

- Be careful not to bend or damage the radiator fins.
  - When radiator is cleaned without removal, remove all surrounding parts such as cooling fan shroud and horns. Then tape the harness and electrical connectors to prevent water from entering.
1. Apply water by hose to the back side of the radiator core, with the hose pointed 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 the radiator.
  4. Blow air into the back side of radiator core, with the air hose pointed vertically downward.
    - Use compressed air lower than 490 kPa (5 kg/cm<sup>2</sup>, 71 psi) and keep distance more than 30 cm (11.8 in).
  5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.
  6. Check for leaks.

## Changing Engine Coolant

INFOID:000000004211290

### **WARNING:**

- To avoid being scalded, never change the coolant when the engine and inverter are hot.
- Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then push down and turn the cap all the way to remove.

## DRAINING ENGINE COOLANT

1. Remove the engine undercover using power tool.
2. Open the radiator drain plug at the bottom of the radiator, and remove the radiator filler cap. This is the only step required when partially draining the cooling system (radiator only).

### **CAUTION:**

**Do not to allow the coolant to contact the drive belts.**

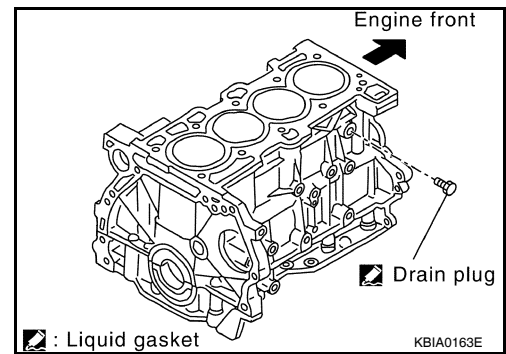
3. Follow this step for heater core removal/replacement only. Disconnect the upper heater hose at the engine side and apply moderate air pressure [103.46 kPa (15 psi, 1.055 kg/cm<sup>2</sup>) maximum air pressure] into the hose for 30 seconds to blow the excess coolant out of the heater core.
4. When draining all of the coolant in the system, remove the reservoir tank and drain the coolant, then clean the reservoir tank before installation.

# ENGINE COOLANT

< ON-VEHICLE MAINTENANCE >

[QR25DE]

- When draining all of the coolant in the system for engine removal or repair, open the drain plug on the cylinder block.



- Check the drained coolant for contaminants such as rust, corrosion or discoloration. If the coolant is contaminated, flush the engine cooling system.

## REFILLING ENGINE COOLANT

- Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug, if removed for a total system drain or for engine removal or repair.
  - The radiator must be completely empty of coolant and water.
  - Apply sealant to the threads of the cylinder block drain plugs. Use Genuine High Performance Thread Sealant or equivalent. Refer to [GI-15, "Recommended Chemical Products and Sealants"](#).

**Radiator drain plug** : Refer to [CO-14, "Removal and Installation"](#).

**Cylinder block drain plug** : Refer to [EM-75, "Disassembly and Assembly"](#).

- If disconnected, reattach the upper radiator hose at the engine side.
- Set the vehicle heater controls to the full HOT and heater ON position. Push the ignition switch twice to the ON position with the Hybrid system and engine OFF as necessary to activate the heater mode.
- Install the Tool by installing the radiator cap adapter (E) onto the radiator tee opening (F). Then attach the gauge body assembly (B) with the refill hose (D) and the venturi assembly (A) to the radiator cap adapter.

**Tool number** : KV991J0070 (J-45695)

- A: Venturi assembly
- B: Gauge body assembly
- C: Ball valve
- D: Refill hose
- E: Radiator cap adapter
- F: Radiator tee

- Insert the refill hose (D) into the coolant mixture container that is placed at floor level. Make sure the ball valve (C) is in the closed position.
  - Use Genuine NISSAN Long Life Anti-freeze coolant or equivalent, mixed 50/50 with distilled water or demineralized water.
  - Refer to [MA-10, "Engine Oil Recommendation"](#).

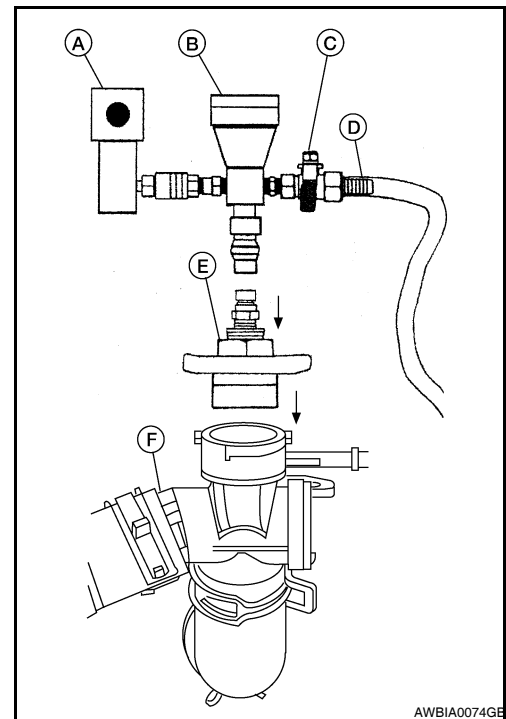
**Engine coolant capacity (with reservoir tank)** : Refer to [MA-10, "Fluids and Lubricants"](#).

- Install an air hose to the venturi assembly (A), the air pressure must be within specification.

**Compressed air supply pressure** : 5.7 - 8.5 kPa (5.6 - 8.4 kg/cm<sup>2</sup>, 80 - 120 psi)

### CAUTION:

The compressed air supply must be equipped with an air dryer.



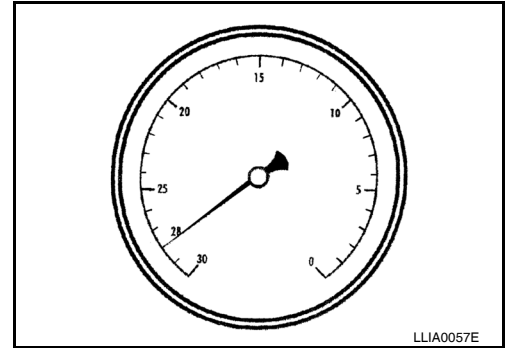
# ENGINE COOLANT

< ON-VEHICLE MAINTENANCE >

[QR25DE]

- The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve (C) on the refill hose (D) slightly. Coolant will be visible rising in the refill hose (D). Once the refill hose (D) is full of coolant, close the ball valve (C). This will purge any air trapped in the refill hose.
- Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, use the vacuum specifications below based on the altitude above sea level.

Altitude above sea level	Vacuum gauge reading
0 - 100 m (328 ft)	: 28 inches of vacuum
300 m (984 ft)	: 27 inches of vacuum
500 m (1,641 ft)	: 26 inches of vacuum
1,000 m (3,281 ft)	: 24 - 25 inches of vacuum



- When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
- Place the coolant container [with the refill hose (D) inserted] at the same level as the top of the radiator. Then open the ball valve (C) on the refill hose (D) so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.  
**CAUTION:**  
**Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.**
- Remove the Tool from the radiator neck opening.
- Fill the cooling system reservoir tank to the specified level and install the radiator cap. Turn the Hybrid system ON to the engine to warm up the cooling system and top up the system as necessary.

## FLUSHING COOLING SYSTEM

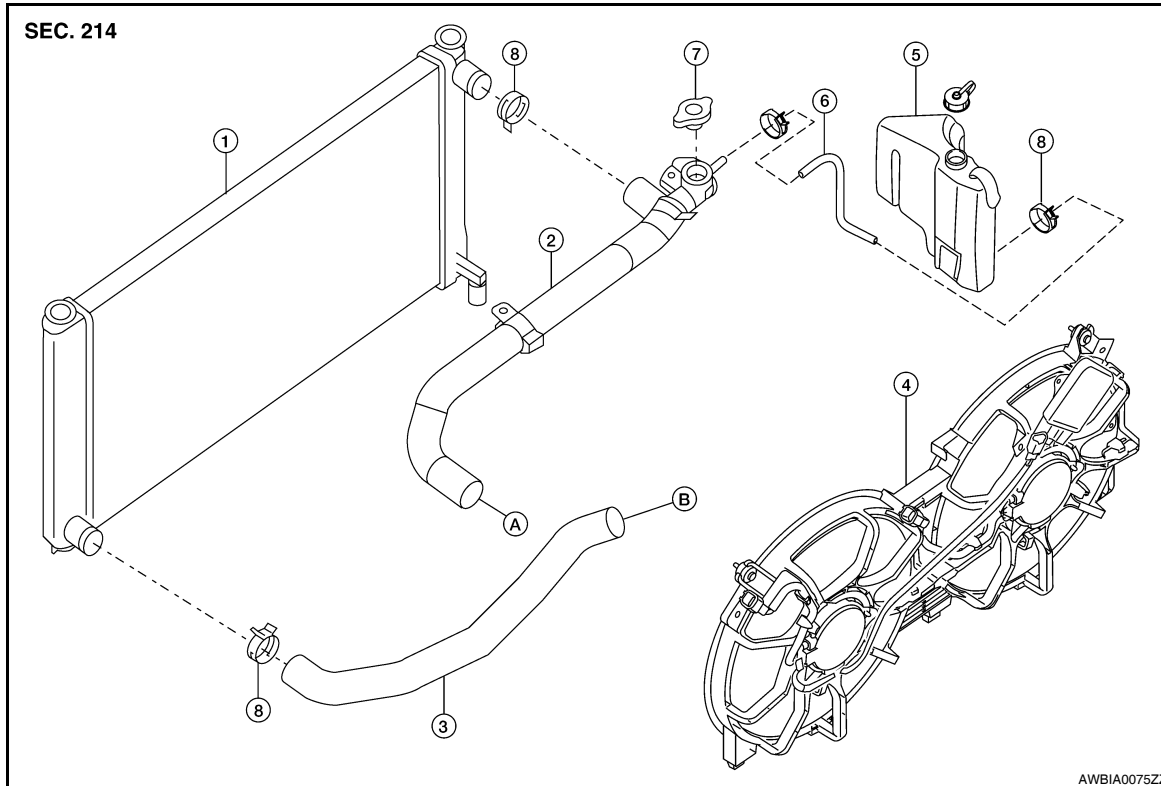
- Fill the radiator from the filler cap above the radiator upper hose and reservoir tank, with water and reinstall the filler cap above the radiator upper hose.
- Turn the Hybrid system ON to the engine until it reaches normal operating temperature.
- Press the engine accelerator two or three times under no-load.
- Turn the Hybrid system off and wait until it cools down.
- Drain the water.
- Repeat steps 1 through 5 until clear water begins to drain from the radiator.

## ON-VEHICLE REPAIR

### RADIATOR

#### Removal and Installation

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- |   |                          |                          |
|---|--------------------------|--------------------------|
| 1. Radiator, condenser and liquid tank assembly | 2. Radiator hose (upper) | 3. Radiator hose (lower) |
| 4. Radiator fan assembly                        | 5. Reservoir tank        | 6. Reservoir hose        |
| 7. Radiator filler cap                          | 8. Clamps                | A. To water outlet       |
| B. To water inlet                               |                          |                          |

#### **WARNING:**

Never remove the radiator cap when the engine and inverter are hot. Serious burns could occur from high pressure coolant escaping from the radiator, condenser and liquid tank assembly. 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. Remove engine under cover.
2. Drain engine coolant from radiator, condenser and liquid tank assembly. Refer to [CO-11, "Changing Engine Coolant"](#).
3. Remove air cleaner duct (front). Refer to [EM-24, "Removal and Installation"](#).
4. Remove radiator, condenser and liquid tank assembly upper hose and lower hose.
5. Remove coolant reservoir hose.
6. Drain inverter coolant from sub-radiator. Refer to [HBC-636, "Replacement"](#).
7. Remove front bumper reinforcement. Refer to [EXT-12, "Removal and Installation"](#).
8. Remove sub radiator. Refer to [HBC-646, "Removal and Installation"](#).
9. Discharge A/C system. Refer to [HA-28, "HFC-134a \(R-134a\) Service Procedure"](#).
10. Remove high side junction pipe assembly. Refer to [HA-36, "Removal and Installation for Junction Pipe"](#).

# RADIATOR

[QR25DE]

< ON-VEHICLE REPAIR >

11. Remove the refrigerant pressure sensor for installation on new radiator, condenser and liquid tank assembly. Refer to [HA-38. "Removal and Installation for Refrigerant Pressure Sensor"](#).
12. Remove both radiator, condenser and liquid tank assembly clips.
13. Remove radiator, condenser and liquid tank assembly.

**CAUTION:**

- Do not damage or scratch the radiator, condenser and liquid tank assembly and sub radiator core when removing.
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system

## INSTALLATION

Installation is in the reverse order of removal.

## INSPECTION

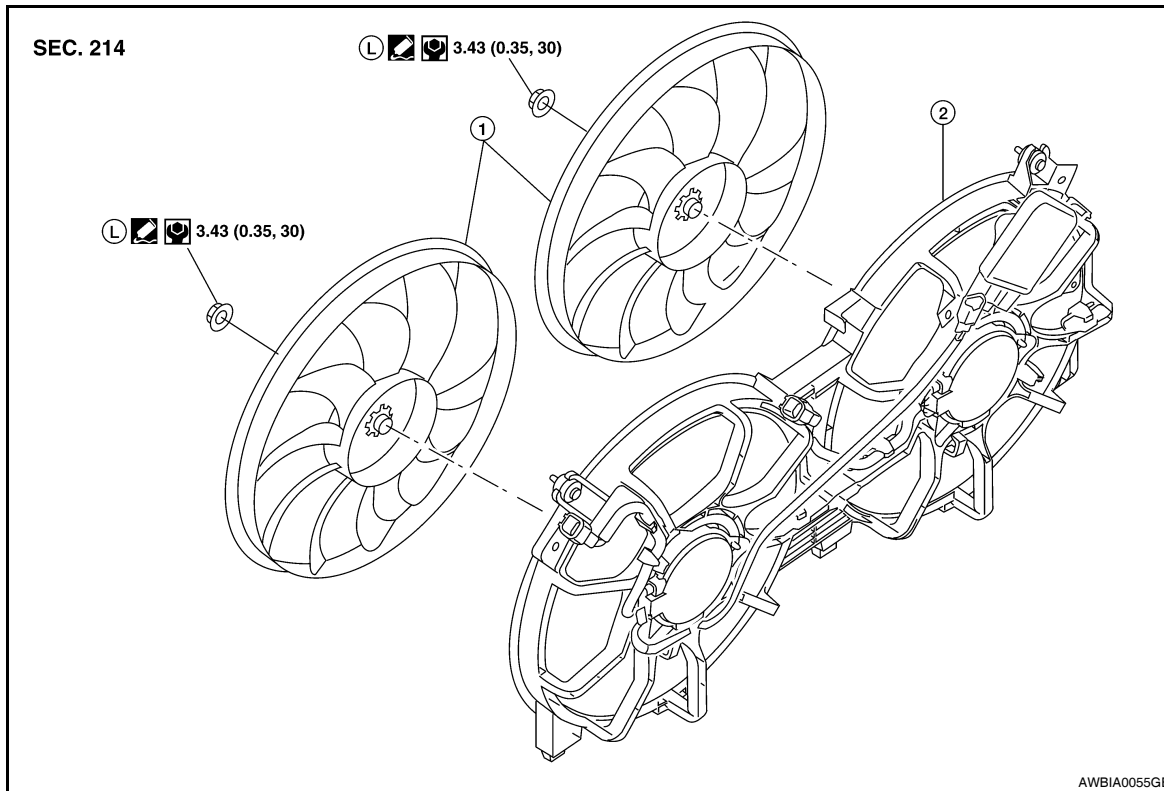
Radiator, Condenser and Liquid Tank Assembly

1. Check radiator, condenser and liquid tank assembly for mud or clogging. If necessary, clean radiator, condenser and liquid tank assembly as follows:
  - Be careful not to bend or damage the radiator, condenser and liquid tank assembly fins.
  - When radiator, condenser and liquid tank assembly is cleaned without removal, remove all surrounding parts such as radiator fan assembly and horns. Then tape the harness and electrical connectors to prevent water from entering.
- a. Apply water by hose to the back side of the radiator, condenser and liquid tank assembly core, point the hose vertically downward.
- b. Apply water again to all radiator, condenser and liquid tank assembly core surfaces once per minute.
- c. Stop washing when no more dirt flows off the radiator, condenser and liquid tank assembly.
- d. Blow air into the back side of radiator, condenser and liquid tank assembly core, point the air hose vertically downward.
  - Use compressed air lower than 490 kPa (5 kg/cm<sup>2</sup>, 71 psi) and keep distance more than 30 cm (11.8 in).
- e. Blow air again into all the radiator, condenser and liquid tank assembly core surfaces once per minute until no water sprays out.

## COOLING FAN

### Removal and Installation

INFOID:000000004211292



1. Fan blade
2. Radiator cooling fan shroud and motor assembly

### REMOVAL

1. Disconnect the 12-volt battery negative terminal.
2. Drain engine coolant from radiator, condenser and liquid tank assembly. Refer to [CO-11, "Changing Engine Coolant"](#).
- CAUTION:**  
**Perform when engine and inverter are cold.**
3. Remove inverter upper bracket.
4. Drain inverter coolant from sub-radiator. Refer to [HBC-636, "Replacement"](#).
5. Remove air cleaner duct (front). Refer to [EM-24, "Removal and Installation"](#).
6. Disconnect radiator upper hose.
7. Remove sub radiator coolant reservoir tank.
8. Disconnect ECM.
9. Remove ECM and bracket assembly.
10. Disconnect radiator cooling fan controller.
11. Remove radiator cooling fan assembly.

### INSTALLATION

Installation is in the reverse order of removal.

- Radiator cooling fan is controlled by ECM. For details, refer to [EC-55, "System Description"](#).

### Disassembly and Assembly

INFOID:000000004211293

### DISASSEMBLY

1. Remove fan blades from fan motors.



# COOLING FAN

< ON-VEHICLE REPAIR >

[QR25DE]

2. Remove the fan motors from the shroud.

## ASSEMBLY

Assembly is in the reverse order of disassembly.

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# WATER PUMP

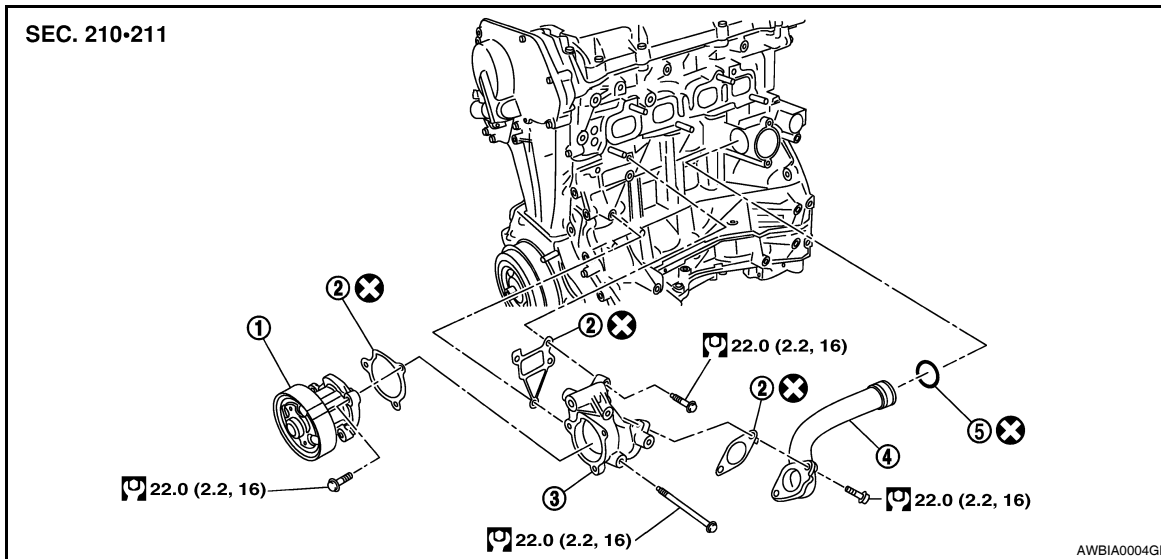
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## WATER PUMP

### Removal and Installation

INFOID:000000004211294



- |               |            |                       |
|---------------|------------|-----------------------|
| 1. Water pump | 2. Gaskets | 3. Water pump housing |
| 4. Water pipe | 5. O-ring  |                       |

#### **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 from radiator, condenser and liquid tank assembly. Refer to [CO-11, "Changing Engine Coolant"](#).

#### **CAUTION:**

**Perform when the engine is cold.**

2. Remove drive belt. Refer to [EM-14, "Removal and Installation of Drive Belt"](#).
3. Remove engine cover using power tools.
4. Remove air cleaner duct (front). Refer to [EM-24, "Removal and Installation"](#).
5. Remove engine coolant reservoir.
6. Remove RH wheel and tire assembly. Refer to [WT-62, "Adjustment"](#).
7. Remove fender protector. Refer to [EXT-18, "Removal and Installation"](#).
8. Remove engine ground strap.
9. Remove idler pulley bracket.
10. Remove the water pump.

#### **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 an assembly.

#### **NOTE:**

If necessary, the exhaust manifold and three way catalyst assembly must be removed to remove the water pipe. Refer to [EM-29, "Removal and Installation"](#).

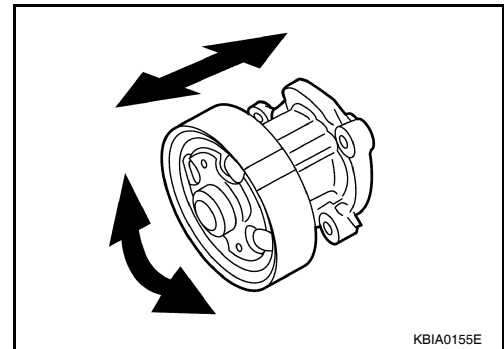
#### INSPECTION AFTER REMOVAL

# WATER PUMP

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## < ON-VEHICLE REPAIR >

- Visually check that there is no significant dirt or rusting on the water pump body and vane.
- Check that there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If the water pump does not perform properly, replace the water pump assembly.



## INSTALLATION

Installation is in the reverse order of removal.

- When inserting water pipe end to cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

## INSPECTION AFTER INSTALLATION

- After installing the water pump, check for leaks using the radiator cap tester. Refer to [CO-10, "System Inspection"](#).

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# THERMOSTAT AND THERMOSTAT HOUSING

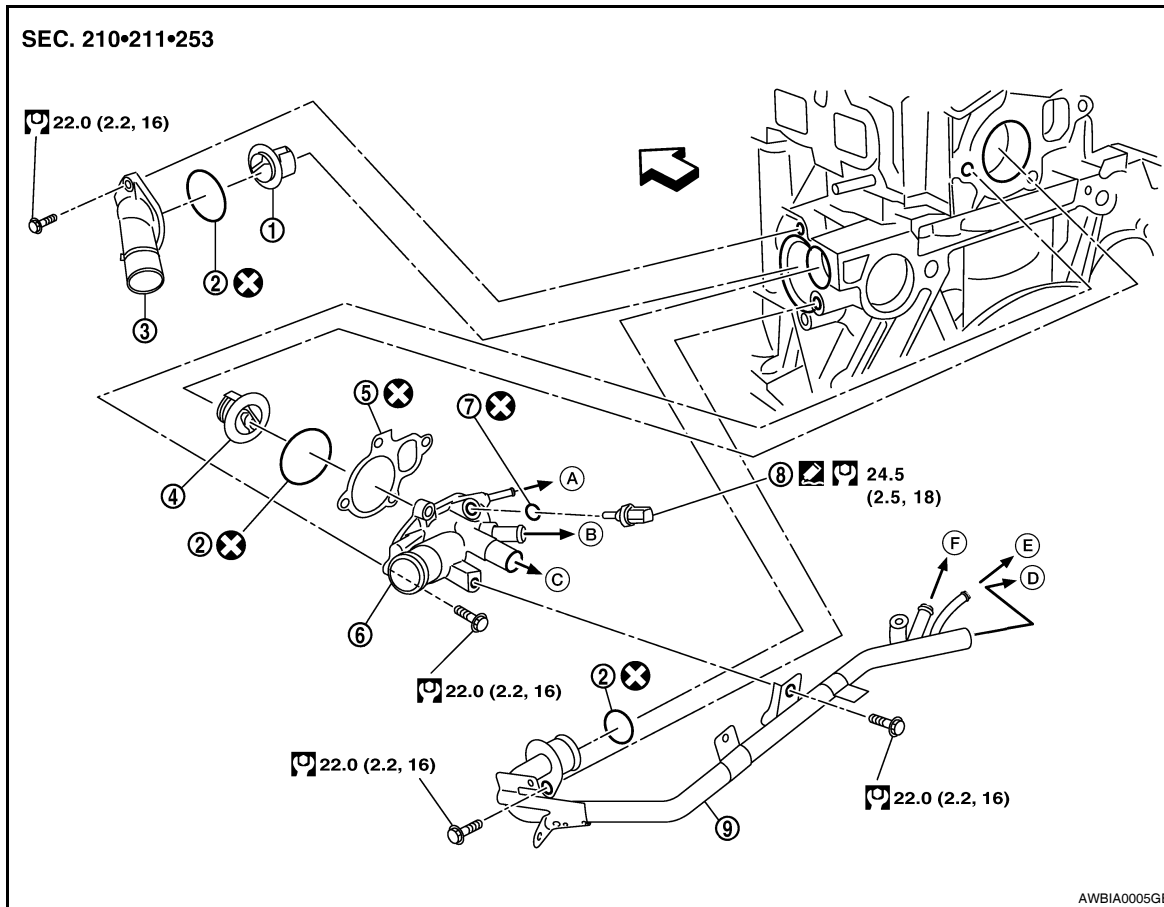
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## THERMOSTAT AND THERMOSTAT HOUSING

### Removal and Installation

INFOID:000000004211295



- |                                   |                                      |                          |
|-----------------------------------|--------------------------------------|--------------------------|
| 1. Thermostat                     | 2. O-ring                            | 3. Engine coolant inlet  |
| 4. Water control valve            | 5. Gasket                            | 6. Engine coolant outlet |
| 7. Copper washer                  | 8. Engine coolant temperature sensor | 9. Heater pipe           |
| A. To electronic throttle control | B. To oil cooler                     | C. To heater             |
| D. To heater                      | E. To electronic throttle control    | F. To oil cooler         |
| ← Engine front                    |                                      |                          |

#### **WARNING:**

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

#### REMOVAL

#### **CAUTION:**

Perform when the engine is cold.

1. Drain engine coolant from radiator, condenser and liquid tank assembly. Refer to [CO-11, "Changing Engine Coolant"](#).
2. Remove air cleaner duct (front). Refer to [EM-24, "Removal and Installation"](#).
3. Remove radiator lower hose from the engine coolant inlet side.
4. Remove engine coolant inlet and thermostat.

#### INSPECTION AFTER REMOVAL

# THERMOSTAT AND THERMOSTAT HOUSING

[QR25DE]

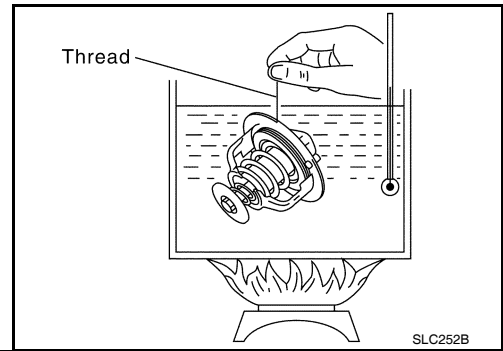
## < ON-VEHICLE REPAIR >

- 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 valve opening temperature is the temperature at which the valve opens and the falls from the thread.
- Continue heating. Check the full-open lift amount.

### NOTE:

The full-open lift amount standard temperature for the thermostat is the reference value.

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



Thermostat	Standard Values
Valve opening temperature	80.5 – 83.5°C (177 – 182°F)
Full-open lift amount	More than 8 mm / 95°C (0.315 in / 203°F)
Valve closing temperature	77°C (171°F) or higher

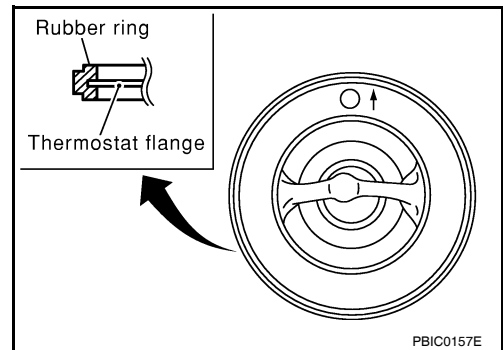
## INSTALLATION

Installation is in the reverse order of removal.

- Install the engine coolant temperature sensor.

**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-15, "Recommended Chemical Products and Sealants"](#).**

- Install the thermostat with the whole circumference of the flange part fitting securely inside the rubber ring.
- Install the thermostat with the jiggle valve facing upwards. The position deviation may be within the range of  $\pm 10^\circ$ .
- If necessary, to install the heater pipe, first apply a mild detergent to the O-ring and then quickly insert the pipe into the housing.
- Use a new gasket and O-ring for installation.



# WATER CONTROL VALVE

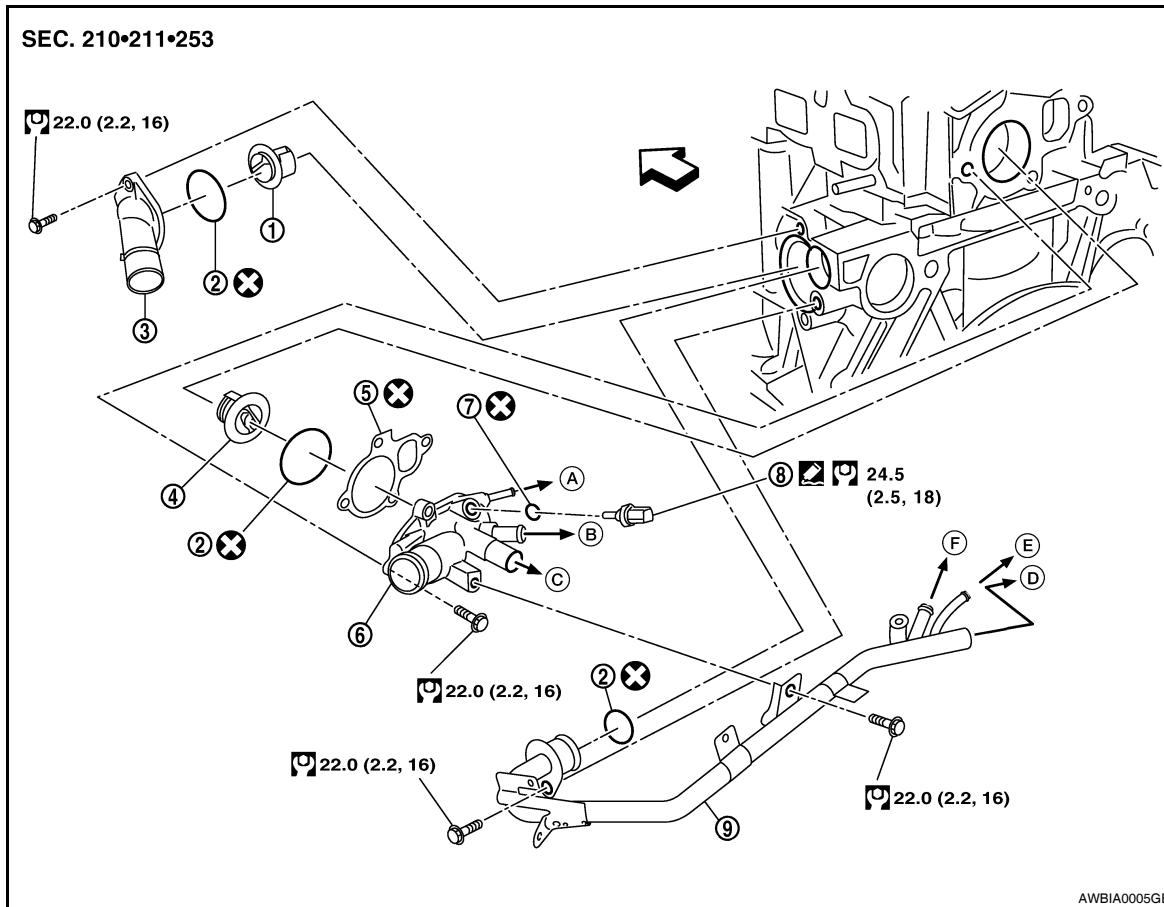
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[QR25DE]

## WATER CONTROL VALVE

### Removal and Installation

INFOID:000000004211296



- |                                   |                                      |                          |
|-----------------------------------|--------------------------------------|--------------------------|
| 1. Thermostat                     | 2. O-ring                            | 3. Engine coolant inlet  |
| 4. Water control valve            | 5. Gasket                            | 6. Engine coolant outlet |
| 7. Copper washer                  | 8. Engine coolant temperature sensor | 9. Heater pipe           |
| A. To electronic throttle control | B. To oil cooler                     | C. To heater             |
| D. To heater                      | E. To electronic throttle control    | F. To oil cooler         |
| ← Engine front                    |                                      |                          |

#### **WARNING:**

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator, condenser and liquid tank assembly.

#### REMOVAL

#### **CAUTION:**

Perform when the engine cold.

1. Drain the engine coolant from radiator, condenser and liquid tank assembly. Refer to [CO-11. "Changing Engine Coolant"](#).
2. Remove air cleaner assembly. Refer to [EM-24. "Removal and Installation"](#).
3. Remove engine room cover, using power tools.
4. Disconnect the upper radiator, condenser and liquid tank assembly hose, heater pipe, electric throttle control actuator inlet hose, oil cooler hose and heater hoses.
5. Remove the engine coolant temperature sensor.
6. Remove the engine coolant outlet.
7. Remove the water control valve.

# WATER CONTROL VALVE

< ON-VEHICLE REPAIR >

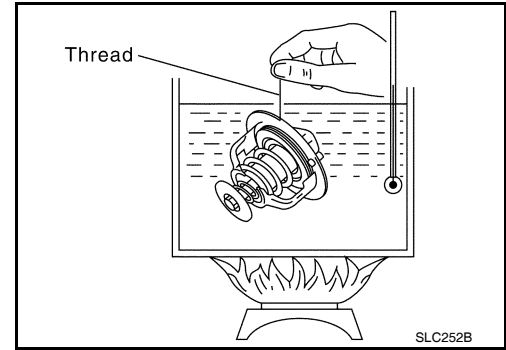
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## INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valve of the water control valve. Immerse fully in a container filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and the falls from the thread.
- Continue heating. Check the full-open lift amount.

### NOTE:

- The full-open lift amount standard temperature for the water control valve is the reference value.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.



### Standard values

Water Control Valve	Standard Value
Valve opening temperature	93.5° - 96.5°C (200° - 206°F)
Full-open lift amount	More than 8 mm / 108°C (0.315 in / 226° F)
Valve closing temperature	90°C (194° F) or higher

## INSTALLATION

Installation is in the reverse order of removal.

- Install the engine coolant temperature sensor.  
**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-15, "Recommended Chemical Products and Sealants"](#).**
- Install the water control valve with the whole circumference of the flange part fitting securely inside the rubber ring.
- Install the water control valve with the up-mark facing up and the frame center part facing upwards. The position deviation may be within the range of  $\pm 10^\circ$ .
- Use a new gasket and O-ring for installation.

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Capacity

INFOID:0000000004211297

ℓ (US qt, Imp qt)

Coolant capacity (With reservoir tank at MAX level)	7.7 (8 1/8, 6 3/4)
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#### Thermostat

INFOID:0000000004211298

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Full-open lift amount	More than 8 mm / 95°C (0.315 in / 203°F)
Valve closing temperature	77°C (171°F) or higher

#### Water Control Valve

INFOID:0000000004211299

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Full-open lift amount	More than 8 mm / 108°C (0.315 in / 226°F)
Valve closing temperature	90°C (194°F) or higher

#### Radiator

INFOID:0000000004211300

Unit: kPa (kg / cm<sup>2</sup>, psi)

Cap relief pressure	Standard	122 - 152 (1.2 - 1.5, 18 - 22)
	Limit	107 (1.1, 16)
Leakage test pressure		157 (1.6, 23)