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# SECTION CO

## ENGINE COOLING SYSTEM

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**PRECAUTIONS**

**Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”**

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

**WARNING:**

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

**Precautions Necessary for Steering Wheel Rotation After Battery Disconnect**

EBS00Z5O

**NOTE:**

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

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

**OPERATION PROCEDURE**

1. Connect both battery cables.

**NOTE:**

Supply power using jumper cables if battery is discharged.

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

**Precautions for Liquid Gasket  
REMOVAL OF LIQUID GASKET SEALING**

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

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# PRECAUTIONS

[MR20DE]

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

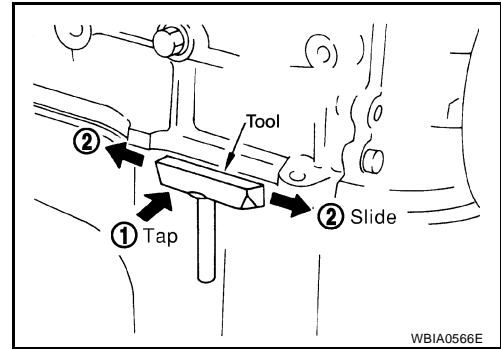
**CAUTION:**

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

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

**CAUTION:**

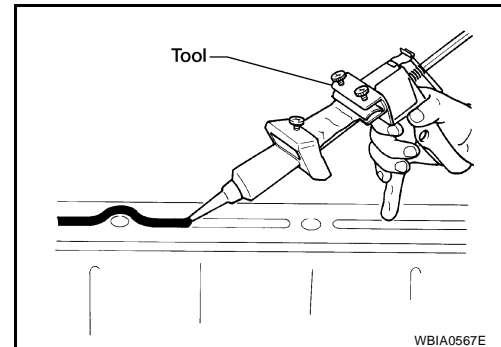
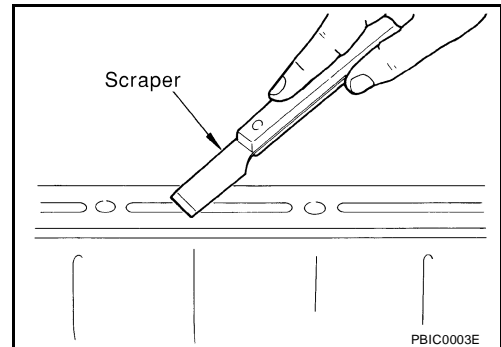
**If for some unavoidable reason suitable tool such as screwdriver is used, be careful not to damage the mating surfaces.**



## LIQUID GASKET APPLICATION PROCEDURE

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

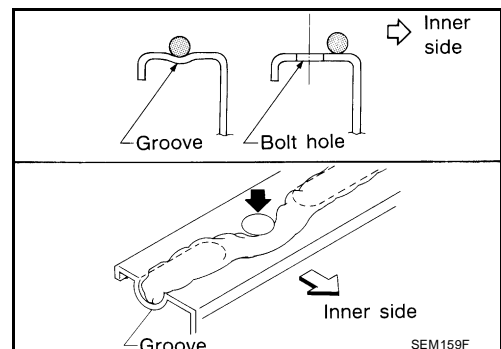
**Tool number** : WS39930000 ( — )



**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-44, "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

[MR20DE]

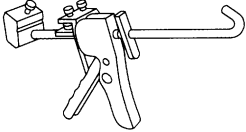
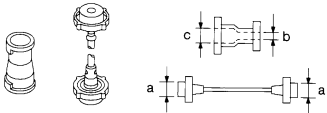
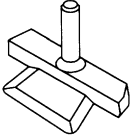
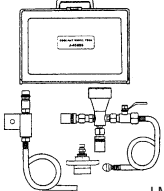
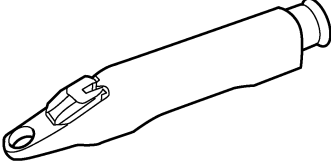
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## PREPARATION

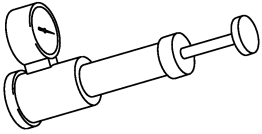
### Special Service Tools

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

| Tool number<br>(Kent-Moore No.)<br>Tool name             | Description  |
|--|--|
| WS39930000<br>( — )<br>Tube pressure                     | Pressing the tube of liquid gasket<br><br><br>S-NT052   |
| EG17650301<br>(J-33984-A)<br>Radiator cap tester adapter | Adapting radiator cap tester to radiator cap and radiator filler neck<br><b>a: 28 (1.10) dia.</b><br><b>b: 31.4 (1.236) dia.</b><br><b>c: 41.3 (1.626) dia.</b><br>Unit: mm (in)<br><br><br>S-NT564 |
| KV10111100<br>(J-37228)<br>Seal cutter                   | Removing chain tensioner cover and water pump cover<br><br><br>NT046   |
| KV991J0070<br>(J-45695)<br>Coolant Refill Tool           | Refilling engine cooling system<br><br><br>LMA053   |
| —<br>(J-23688)<br>Engine coolant refractometer           | Checking concentration of ethylene glycol in engine coolant<br><br><br>WBIA0539E  |

## Commercial Service Tools

EBS00Z5R

| Tool name           | Description  |
|---------------------|--|
| Radiator cap tester | Checking radiator and radiator cap<br><br><br>PBIC1982E |

# OVERHEATING CAUSE ANALYSIS

[MR20DE]

## OVERHEATING CAUSE ANALYSIS

PFP:00012

### Troubleshooting Chart

EBS00Z5S

|                                  |                                       | Symptom  | Check items                          |                       |
|----------------------------------|---------------------------------------|--|--------------------------------------|-----------------------|
| Cooling system parts malfunction | Poor heat transfer                    | Water pump malfunction                               | Worn or loose drive belt             | —                     |
|                                  |                                       | Thermostat stuck closed                              | Thermostat                           |                       |
|                                  |                                       | Damaged fins   | Dust contamination or paper clogging |                       |
|                                  |                                       |  | Physical damage                      |                       |
|                                  | Clogged radiator cooling tube         | Excess foreign material (rust, dirt, sand, etc.)     |                                      |                       |
|                                  | Reduced air flow                      | Cooling fan does not operate                         | Fan assembly                         | —                     |
|                                  |                                       | High resistance to fan rotation                      |                                      |                       |
|                                  |                                       | Damaged fan blades                                   |                                      |                       |
|                                  | Damaged radiator shroud               | —  |                                      | —                     |
|                                  | Improper engine coolant mixture ratio | —  | —                                    | —                     |
|                                  | Poor engine coolant quality           | —  | Engine coolant viscosity             | —                     |
|                                  | Insufficient engine coolant           | Engine coolant leaks                                 | Cooling hose                         | Loose clamp           |
|                                  |                                       |  |                                      | Cracked hose          |
|                                  |                                       |  | Water pump                           | Poor sealing          |
|                                  |                                       |  | Radiator cap                         | Loose<br>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

**[MR20DE]**

|   | 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       | C  |   |   |
|   |                                |                    |                          |                                       | Power train system malfunction           | — | D |
|   |                                |                    |                          |                                       | Installed improper size wheels and tires |   | D |
|   |                                |                    |                          |                                       | Dragging brakes                          |   | E |
|   |                                |                    | Improper ignition timing | E                                     |  |   |   |
|   | Blocked or restricted air flow | Blocked bumper     | Blocked radiator grille  | —                                     | —  | F |   |
|   |                                |                    |                          | Installed front bumper fascia cover   |  | F |   |
|   |                                |                    |                          | Mud contamination or paper clogging   |  | F |   |
|   |                                | Blocked radiator   | Blocked air flow         | —                                     |  | G |   |
|   |                                | Blocked condenser  |                          |                                       |  | G |   |
| Installed large fog lamp                |                                | G                  |                          |                                       |  |   |   |

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# COOLING SYSTEM

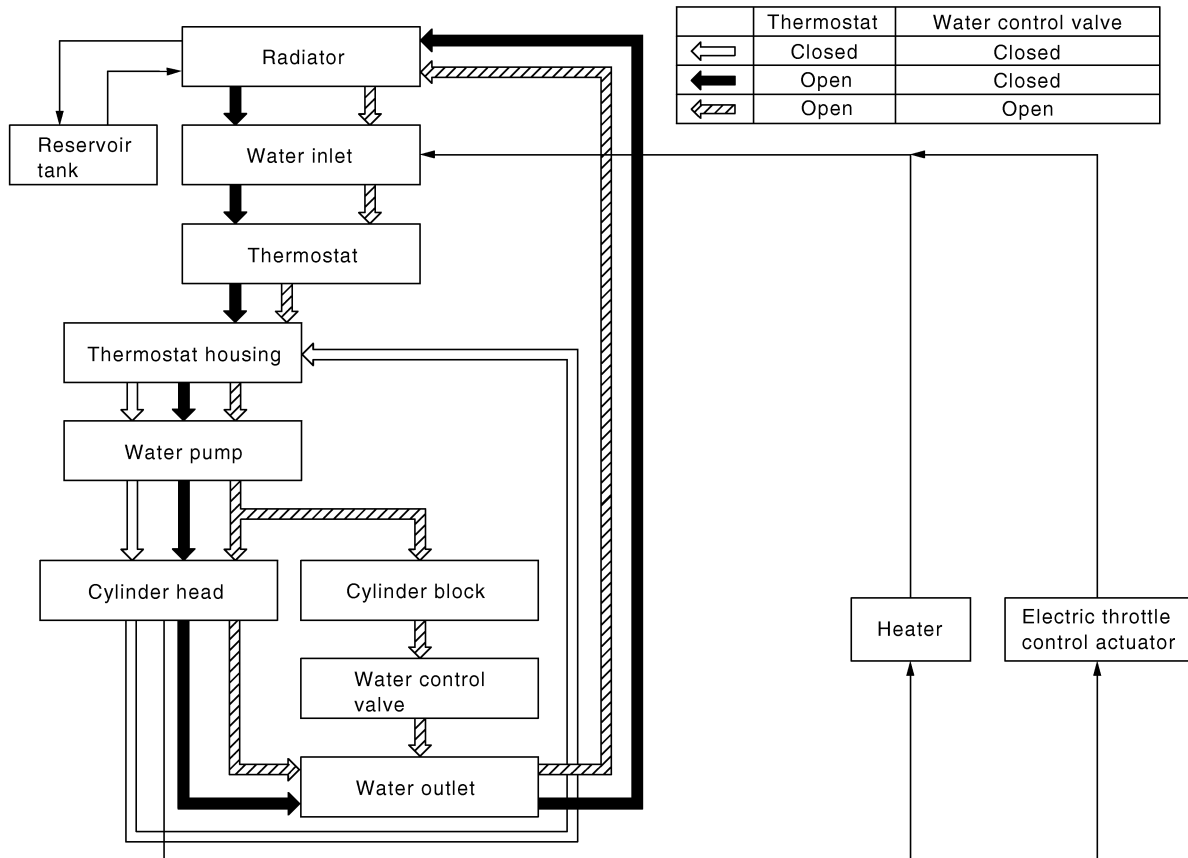
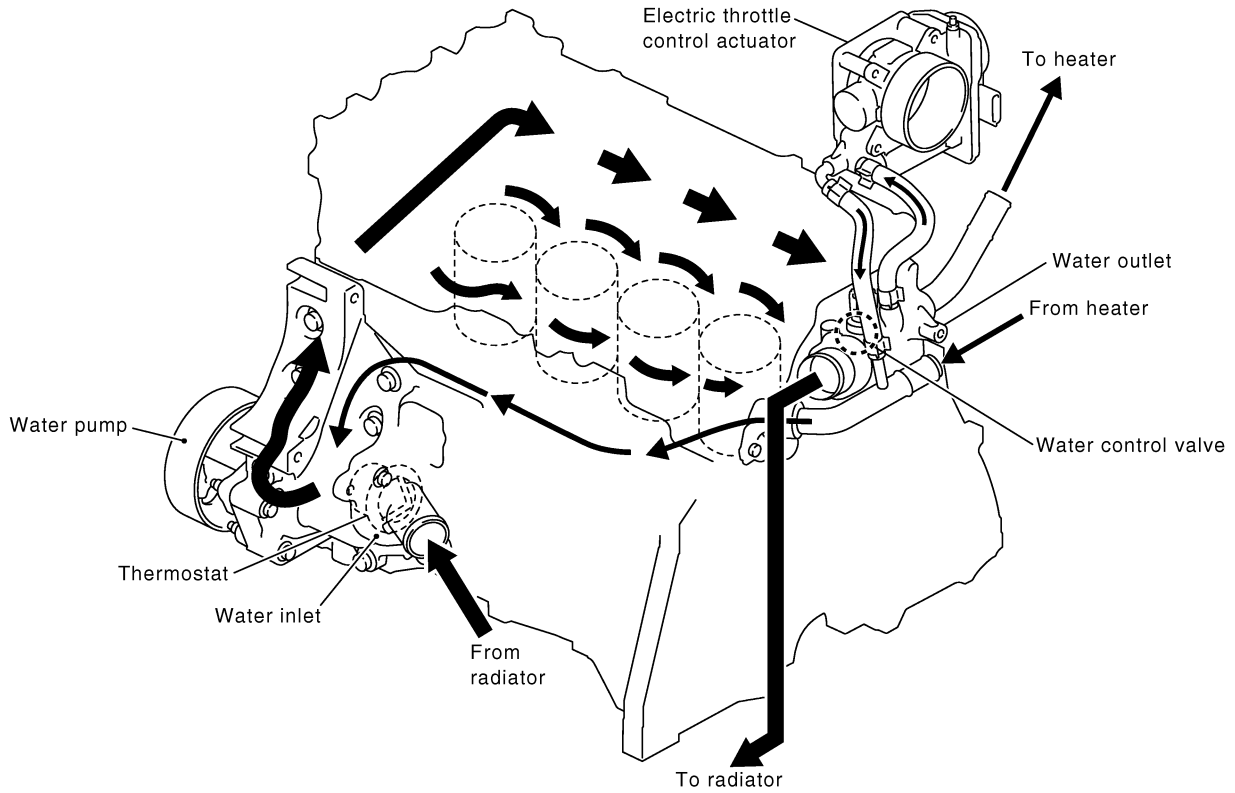
[MR20DE]

## COOLING SYSTEM

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### Cooling Circuit (M/T models)

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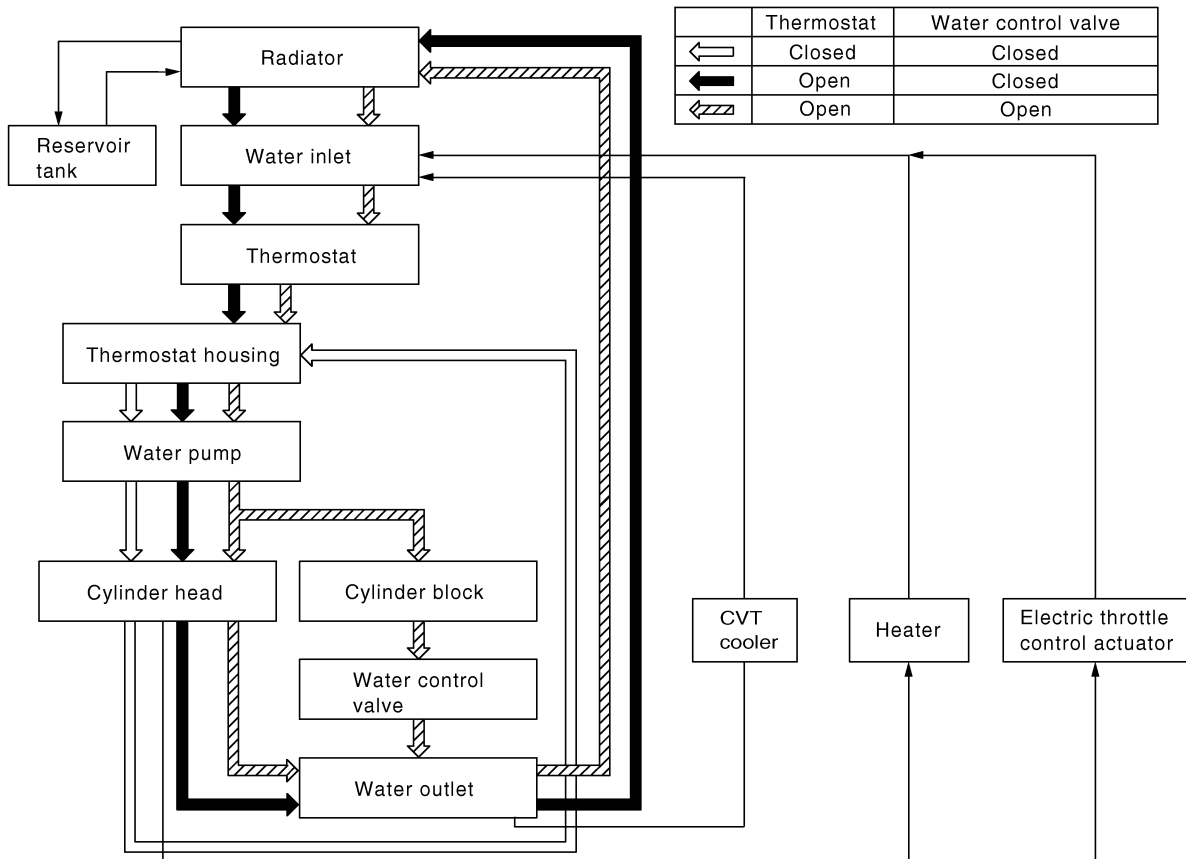
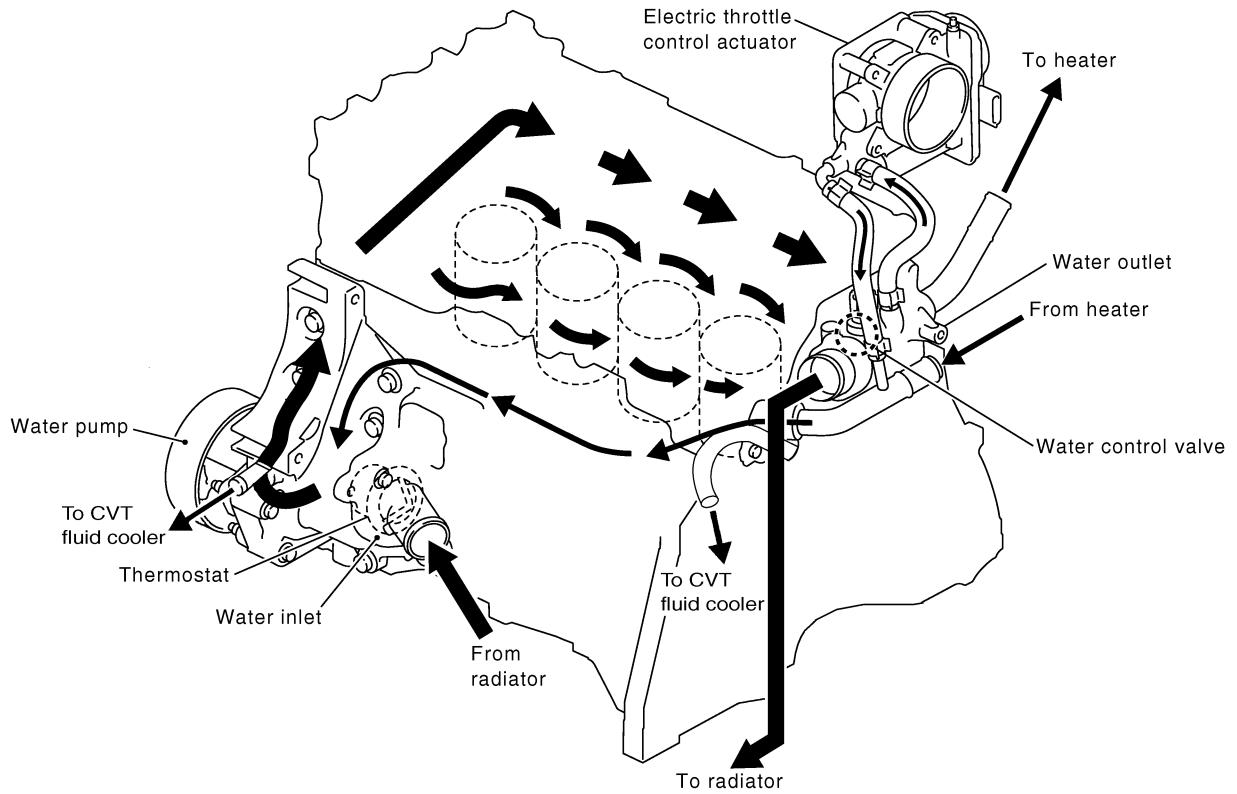
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# COOLING SYSTEM

[MR20DE]

(CVT models)

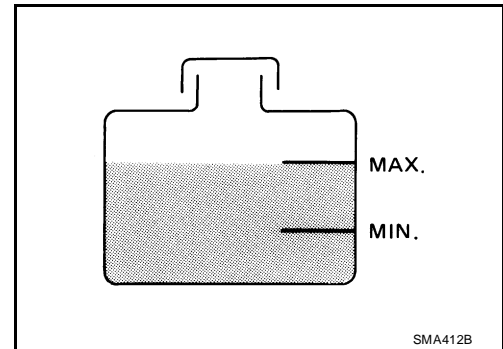


WBIA0815E

## ENGINE COOLANT

### Inspection LEVEL CHECK

- Check if the reservoir tank engine coolant level is within the "MIN" to "MAX" range when engine is cool.
- Adjust the engine coolant level as necessary.



### CHECKING COOLING SYSTEM FOR LEAKS

To check for leaks, apply pressure to the cooling system using Tool.

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

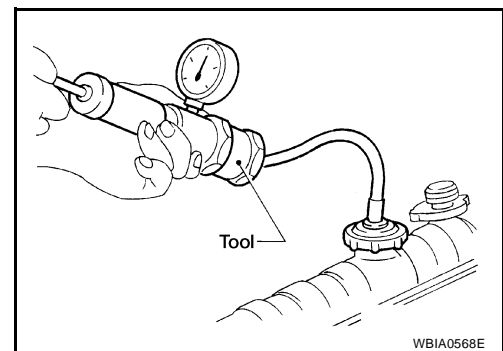
**Testing pressure** : 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)

#### **WARNING:**

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

#### **CAUTION:**

Higher pressure than specified may cause radiator damage.



### Changing Engine Coolant

#### **WARNING:**

- To avoid being scalded, do not change engine coolant when engine is hot.
- Wrap a thick cloth around radiator cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.
- Be careful not to allow engine coolant to contact drive belt.

### DRAINING ENGINE COOLANT

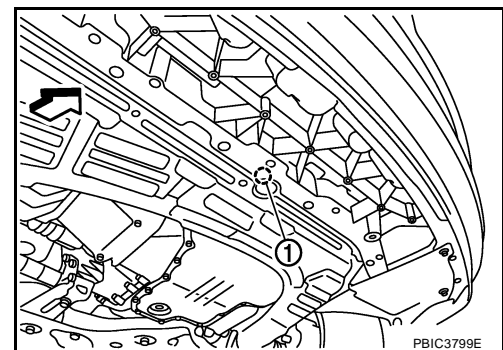
1. Open radiator drain plug (1) at the bottom of radiator, and then remove radiator cap.

- ↵ Front

When drain all of engine coolant in the system, open water drain plug on cylinder block. Refer to [EM-74, "CYLINDER BLOCK"](#).

#### **CAUTION:**

- Perform this step when engine is cold.
- Do not spill engine coolant on drive belt.



2. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing. Refer to [CO-13, "RADIATOR"](#).
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to [CO-12, "FLUSHING COOLING SYSTEM"](#).

### REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug, if removed for a total system drain or for engine removal or repair.
  - The radiator must be completely empty of coolant and water.

# ENGINE COOLANT

[MR20DE]

- Apply sealant to the threads of the cylinder block drain plugs. Use Genuine High Performance Thread Sealant or equivalent. Refer to [GI-44, "Recommended Chemical Products and Sealants"](#)

**Radiator drain plug** : Refer to [CO-13, "Components"](#) .

**Cylinder block drain plug** : Refer to [EM-181, "Removal and Installation"](#) .

2. If disconnected, reattach the upper radiator hose at the engine side.
3. Set the vehicle heater controls to the full HOT and heater ON position. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.
4. Install the Tool by installing the radiator cap adapter onto the radiator neck opening. Then attach the gauge body assembly with the refill tube and the venturi assembly to the radiator cap adapter.

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

5. Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.

- Use Genuine NISSAN Long Life Anti-freeze coolant or equivalent, mixed 50/50 with distilled water or demineralized water. Refer to [MA-16, "Anti-freeze Coolant Mixture Ratio"](#).

**Engine coolant capacity (with reservoir tank)** : Refer to [MA-14, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

6. Install an air hose to the venturi assembly, 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)

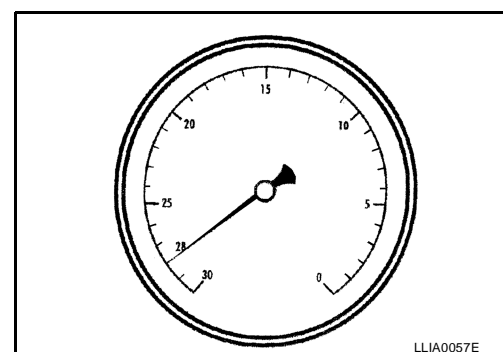
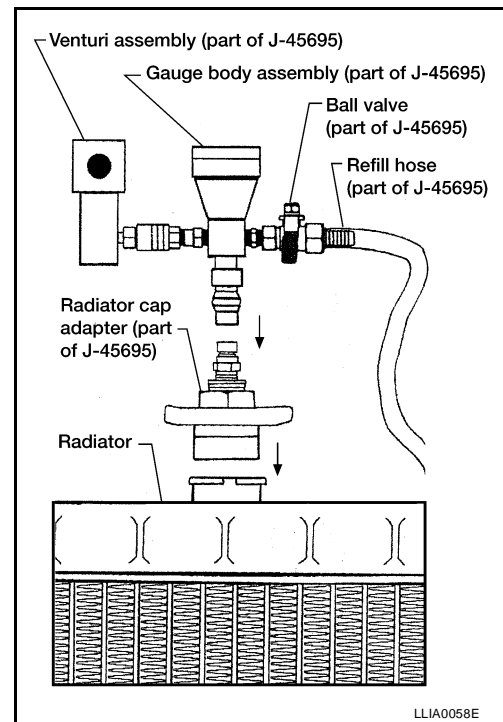
### CAUTION:

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

7. The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve on the refill hose slightly. Coolant will be visible rising in the refill hose. Once the refill hose is full of coolant, close the ball valve. This will purge any air trapped in the refill hose.

8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, refer to the vacuum specifications based on the altitude above sea level.

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



9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
10. Place the coolant container (with the refill hose inserted) at the same level as the top of the radiator. Then open the ball valve on the refill hose so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.

### CAUTION:

**Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.**

11. Remove the Tool from the radiator neck opening.
12. Fill the cooling system reservoir tank to the specified level and install the radiator cap. Run the engine to warm up the cooling system and top up the system as necessary.

## FLUSHING COOLING SYSTEM

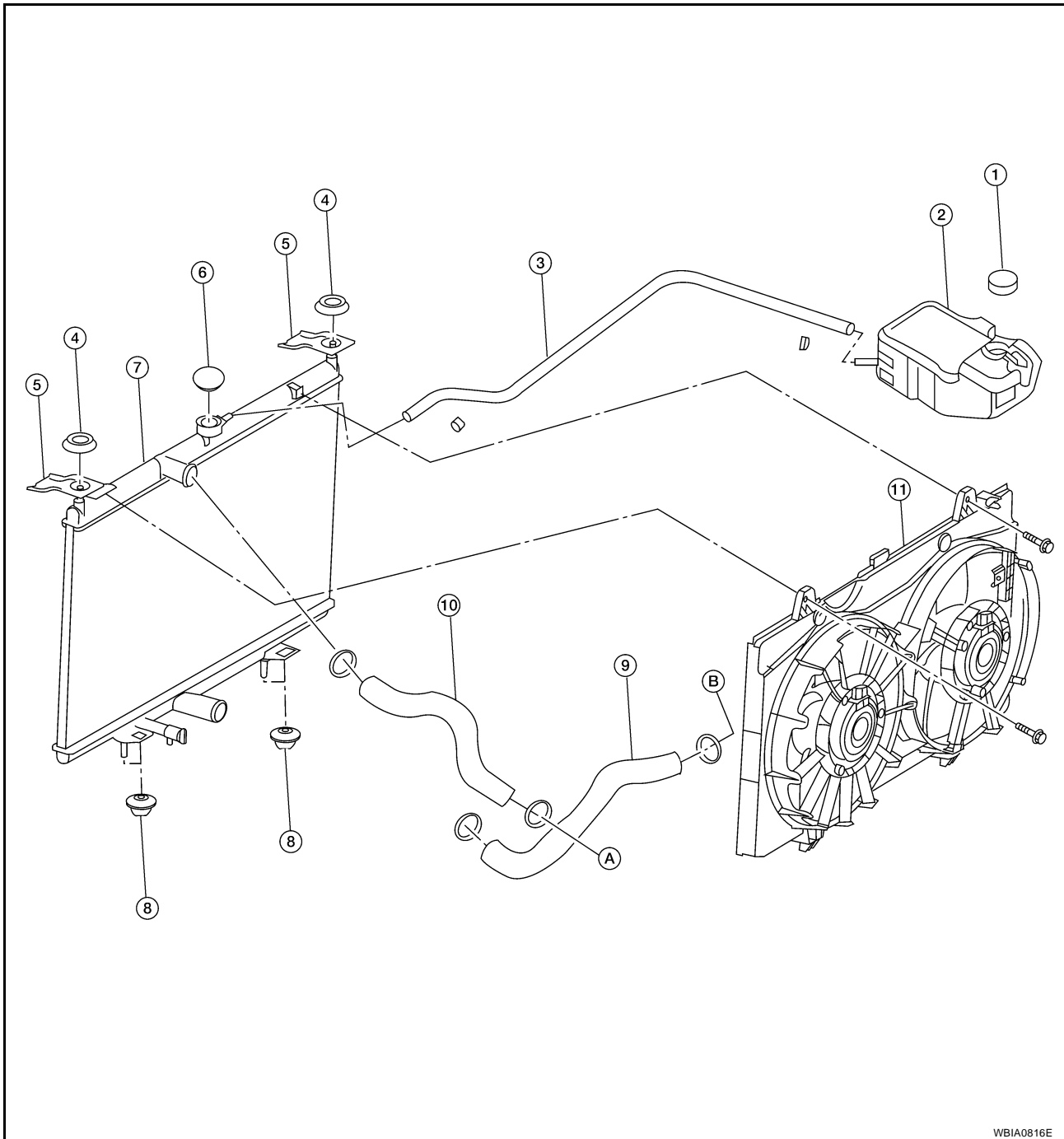
1. Install reservoir tank if removed. Refer to [CO-13, "RADIATOR"](#) .
2. Install radiator drain plug.
  - **If water drain plug on cylinder block is removed, close and tighten it. Refer to [EM-74, "CYLINDER BLOCK"](#) .**

### **CAUTION:**

**Be sure to clean radiator drain plug and install with new O-ring. Refer to [CO-13, "Components"](#) .**

3. Fill radiator and reservoir tank with water and reinstall radiator cap.
4. Run engine and warm it up to normal operating temperature.
5. Rev engine two or three times under no-load.
6. Stop engine and wait until it cools down.
7. Drain water from the cooling system. Refer to [CO-10, "DRAINING ENGINE COOLANT"](#) .
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

### RADIATOR Components



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

### Removal and Installation

#### **WARNING:**

Do not remove radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

## REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-10, "Changing Engine Coolant"](#) .

**CAUTION:**

- Perform this step when engine is cold.
- Do not spill engine coolant on drive belt.

2. Remove air duct (inlet). Refer to [EM-18, "AIR CLEANER AND AIR DUCT"](#) .
3. Disconnect reservoir tank hose.

4. Disconnect harness connector from fan motors, and move harness to aside.
5. Remove radiator hoses (upper and lower).
6. Remove radiator upper mounts.
7. Move radiator assembly to the rearward direction of vehicle, and then lift it upward to remove.

**CAUTION:**

Do not damage or scratch A/C condenser if equipped and radiator core when removing.

## INSTALLATION

Installation is the reverse order of removal.

**CAUTION:**

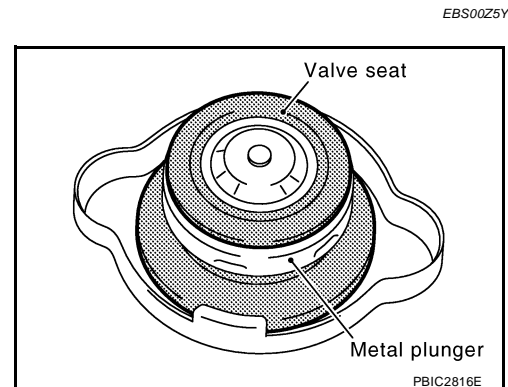
Do not damage or scratch A/C condenser if equipped and radiator core when removing.

## INSPECTION AFTER INSTALLATION

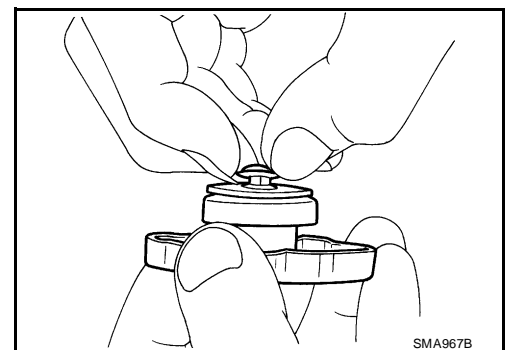
- Check for leaks of engine coolant. Refer to [CO-10, "LEVEL CHECK"](#) .
- Start and warm up engine. Visually check if there is no leaks of engine coolant and CVT fluid if equipped. Refer to [CVT-15, "CVT FLUID"](#) .

## Checking Radiator Cap

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



- Pull negative-pressure valve to open it, and make sure that it is completely closed when released.
  - Make sure that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
  - Make sure that the valve operates properly in the opening and closing conditions.



# RADIATOR

[MR20DE]

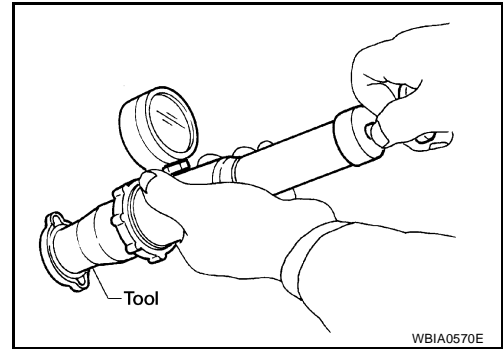
- Check radiator cap relief pressure using Tool.

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

**Standard: 78 – 98 kPa (0.78 - 0.98 bar, 0.8 – 1.0 kg/cm<sup>2</sup> , 11 – 14 psi)**

**Limit: 59 kPa (0.59 bar, 0.6 kg/cm<sup>2</sup> , 9 psi)**

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



- Replace radiator cap if there it does not comply to specifications to the above three checks.

## **CAUTION:**

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

## **Checking Radiator**

EBS00Z5Z

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

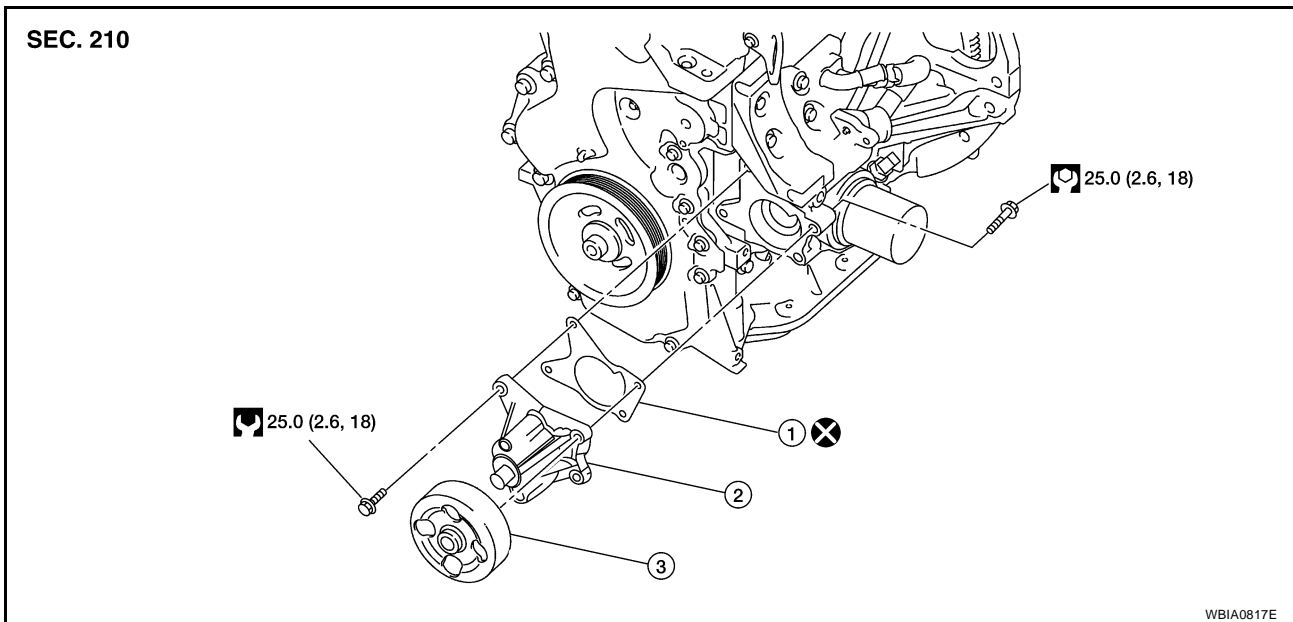
- Be careful not to bend or damage radiator fins.
  - When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape harness and connectors to prevent water from entering.
1. Apply water by hose to the back side of the radiator core vertically downward.
  2. Apply water again to all radiator core surface once per minute.
  3. Stop washing if any stains no longer flow out from radiator.
  4. Blow air into the back side of radiator core vertically downward.
    - Use compressed air lower than 490 kPa (4.9 bar, 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.

## WATER PUMP

PFP:21020

### Components

EBS00Z62



1. Gasket

2. Water pump

3. Pulley

### Removal and Installation

EBS00Z63

#### REMOVAL

1. Drain engine coolant. Refer to [CO-10, "Changing Engine Coolant"](#).

**CAUTION:**

**Perform this step when the engine is cold.**

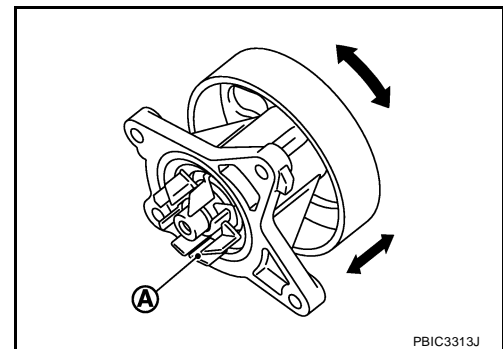
2. Remove drive belt auto-tensioner. Refer to [EM-15, "REMOVAL"](#).
3. Remove water pump.

**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.

#### INSPECTION AFTER REMOVAL

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



#### INSTALLATION

Installation is in the reverse order of removal.

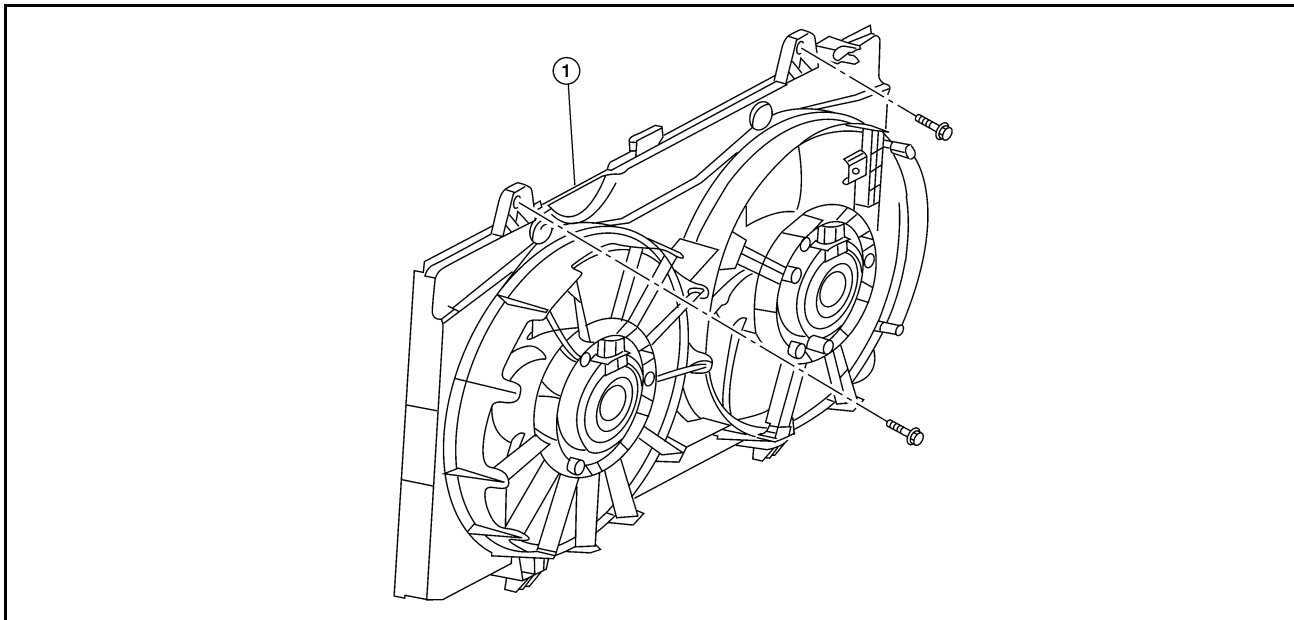
#### INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant. Refer to [CO-10, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up the engine. Visually check if there is no leaks of engine coolant.



## COOLING FAN

## Components



1. Cooling fan assembly

## Removal and Installation

EBS00Z61

## REMOVAL

- Partially drain engine coolant from radiator. Refer to [CO-10, "DRAINING ENGINE COOLANT"](#) .

**CAUTION:**

- Perform this step when engine is cold.
- Do not spill engine coolant on drive belt.

- Remove air duct (inlet). Refer to [EM-18, "AIR CLEANER AND AIR DUCT"](#) .
- Disconnect radiator hose (upper) at radiator side. Refer to [CO-13, "RADIATOR"](#) .
- Disconnect harness connectors from fan motor, and move harness to aside.
- Remove cooling fan assembly.

**CAUTION:**

Be careful not to damage or scratch the radiator core.

## INSTALLATION

Installation is the reverse order of removal.

- Cooling fans are controlled by ECM. For details, refer to [EC-420, "DTC P1217 ENGINE OVER TEMPERATURE"](#) .

**CAUTION:**

Be careful not to damage or scratch the radiator core.

# THERMOSTAT

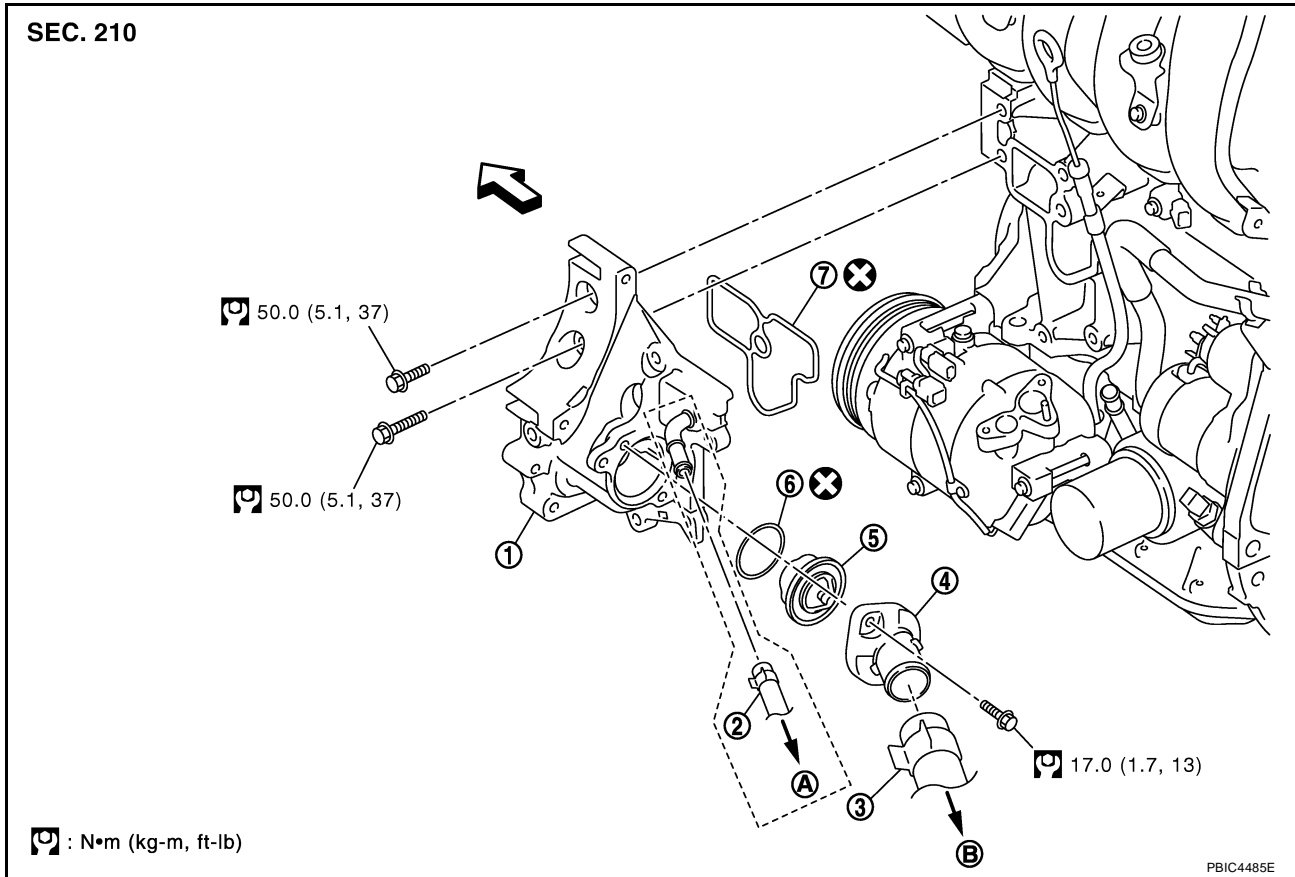
[MR20DE]

PF201200

EBS00Z64

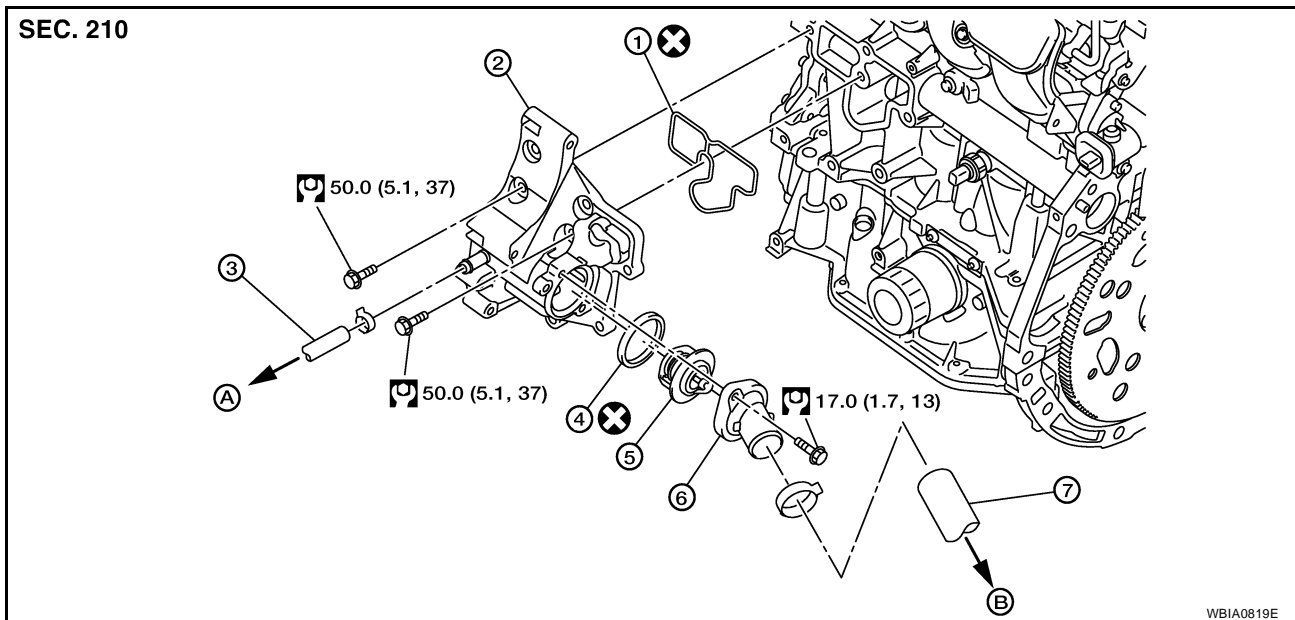
## THERMOSTAT Components

### M/T models



- |                       |  |                          |
|-----------------------|--|--------------------------|
| 1. Thermostat housing | 2. Water hose (models with oil cooler) | 3. Radiator hose (lower) |
| 4. Water inlet        | 5. Thermostat                          | 6. Rubber ring           |
| 7. Gasket             | A. To oil cooler                       | B. To radiator           |
- ← Engine front

### CVT models



# THERMOSTAT

[MR20DE]

- |                          |                        |                            |
|--------------------------|------------------------|----------------------------|
| 1. Gasket                | 2. Thermostat housing  | 3. Water hose (CVT models) |
| 4. Rubber ring           | 5. Thermostat          | 6. Water inlet             |
| 7. Radiator hose (lower) | A. To CVT fluid cooler | B. To radiator             |
- ⇐ Engine front

A

CO

EBS00Z65

## Removal and Installation REMOVAL

1. Drain engine coolant. Refer to [CO-10, "DRAINING ENGINE COOLANT"](#).
2. Remove engine under cover.
3. Remove front air duct. Refer to [EM-18, "REMOVAL"](#).
4. Disconnect radiator hose (lower) and remove water inlet.
5. Remove thermostat.
6. Remove thermostat housing, if necessary.

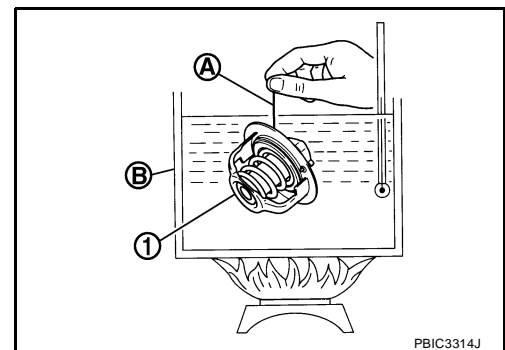
C

D

E

## INSPECTION AFTER REMOVAL

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



F

G

H

I

J

K

L

M

| Items                     | Thermostat                   |
|---------------------------|------------------------------|
| Valve opening temperature | 80.5 - 83.5°C (177 - 182°F)  |
| Maximum valve lift        | 8 mm/ 95°C (0.315 in/ 203°F) |
| Valve closing temperature | 77°C (171°F)                 |

- If out of the specification, replace thermostat.

## INSTALLATION

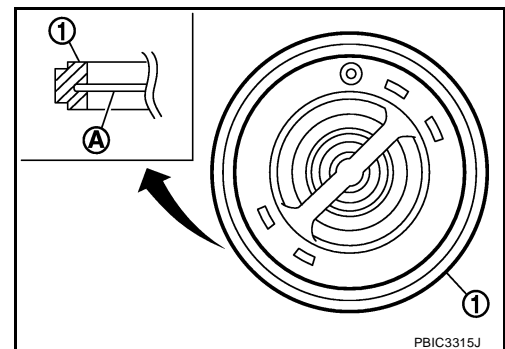
Installation is in the reverse order of removal.

### Thermostat

#### CAUTION:

Replace the rubber ring with a new one.

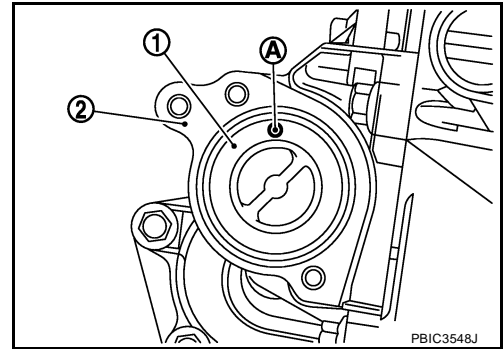
- Install thermostat while making rubber ring (1) groove fit to thermostat flange (A) around the whole circumference.



# THERMOSTAT

[MR20DE]

- Install thermostat (1) into the thermostat housing (2) with jiggle valve (A) facing upwards.



## Thermostat Housing

### **CAUTION:**

**Replace the rubber ring with a new one.**

- Securely insert the rubber ring into the mating groove of thermostat housing and install it.
- Install the thermostat housing to the cylinder block without displacing the gasket from the gasket position.

### **INSPECTION AFTER INSTALLATION**

- Check for leaks of engine coolant. Refer to [CO-10. "CHECKING COOLING SYSTEM FOR LEAKS"](#) .
- Start and warm up the engine. Visually check for engine coolant leaks.

# WATER OUTLET AND WATER CONTROL VALVE

[MR20DE]

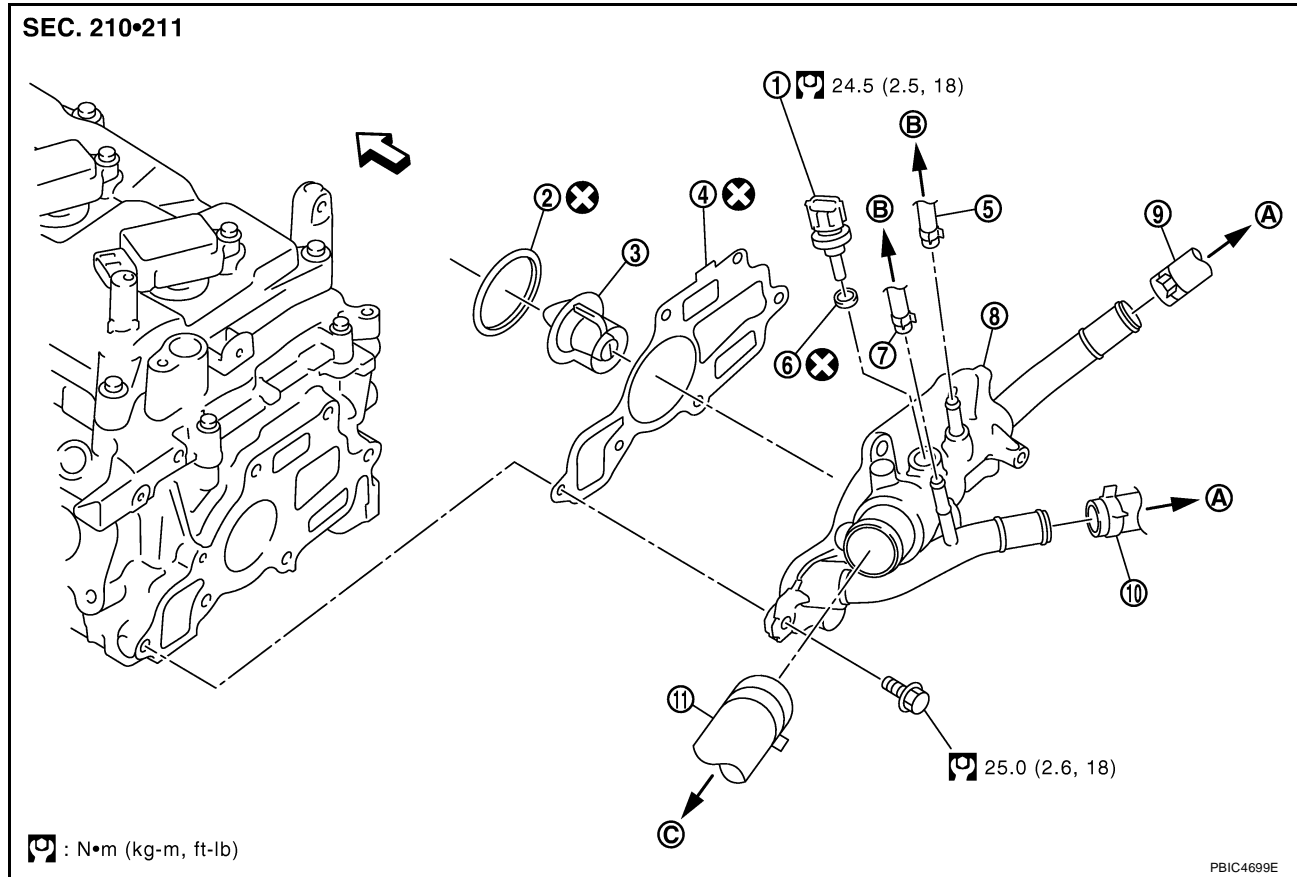
PF1:11060

EBS00Z66

## WATER OUTLET AND WATER CONTROL VALVE

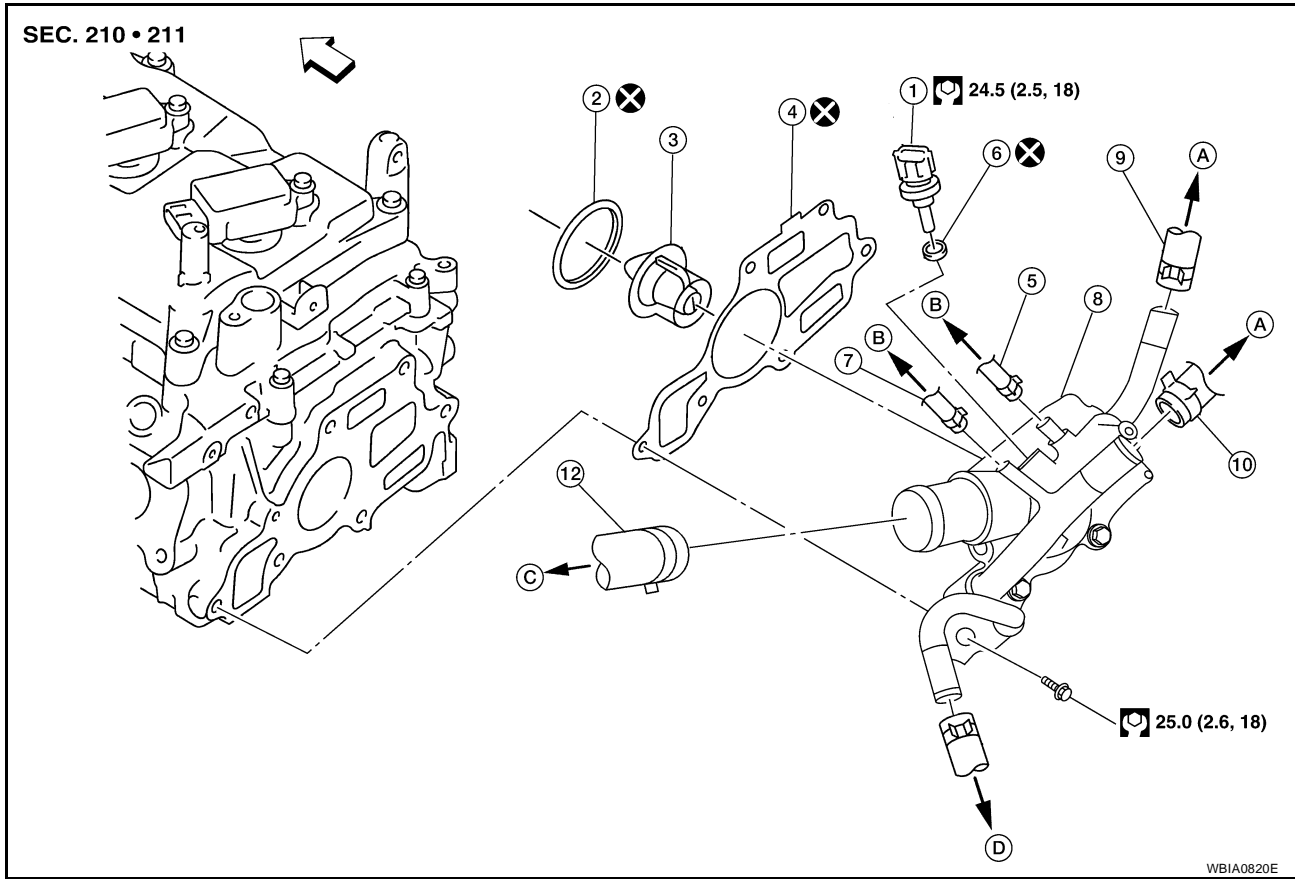
### Components

M/T models



- |                                      |  |                        |
|--------------------------------------|--|------------------------|
| 1. Engine coolant temperature sensor | 2. Rubber ring                           | 3. Water control valve |
| 4. Gasket                            | 5. Water hose                            | 6. Gasket              |
| 7. Water hose                        | 8. Water outlet                          | 9. Heater hose         |
| 10. Heater hose                      | 11. Radiator hose (upper)                | ⇐ Front                |
| A. To heater                         | B. To electric throttle control actuator | C. To radiator         |

(CVT models)



- |                                      |                                   |  |
|--------------------------------------|-----------------------------------|--|
| 1. Engine coolant temperature sensor | 2. Rubber ring                    | 3. Water control valve                   |
| 4. Gasket                            | 5. Water hose                     | 6. Gasket                                |
| 7. Water hose                        | 8. Water outlet                   | 9. Heater hose                           |
| 10. Heater hose                      | 11. Water hose (CVT fluid cooler) | 12. Radiator hose (upper)                |
| ← Front                              | A. To heater                      | B. To electric throttle control actuator |
| C. To radiator                       | D. To CVT fluid cooler            |  |

## Removal and Installation

### REMOVAL

EBS00Z67

1. Drain engine coolant. Refer to [CO-10, "Changing Engine Coolant"](#).

**CAUTION:**

**Perform this step when the engine is cold.**

2. Remove air duct and cleaner. Refer to [EM-18, "AIR CLEANER AND AIR DUCT"](#).
3. Remove radiator hose (upper). Refer to [CO-13, "RADIATOR"](#).
4. Remove heater hoses and water hoses.
5. Remove water outlet.
6. Remove water control valve.
7. Remove engine coolant temperature sensor, if necessary.

**CAUTION:**

- Handle carefully to avoid any shock to engine coolant temperature sensor.
- Replace the gaskets and rubber rings with a new ones.

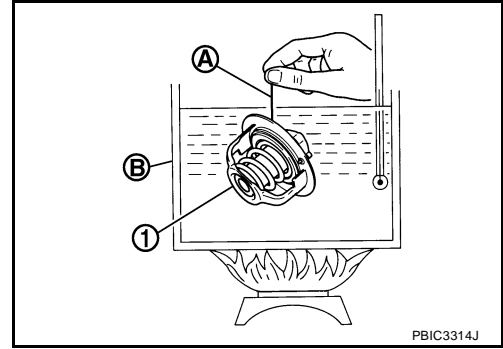
## INSPECTION AFTER REMOVAL

- Place a thread (A) so that it is caught in the valves of water control valve (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.

**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.



|                           |                               |
|---------------------------|-------------------------------|
| Valve opening temperature | 93.5 - 96.5°C (200 - 206°F)   |
| Maximum valve lift        | 8 mm/ 108°C (0.315 in/ 226°F) |
| Valve closing temperature | 90°C (194°F)                  |

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

## INSTALLATION

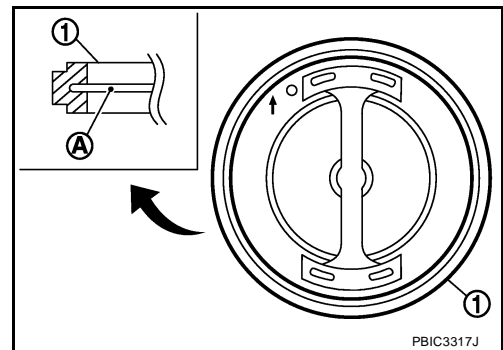
Installation is in the reverse order of removal.

### Water Control Valve

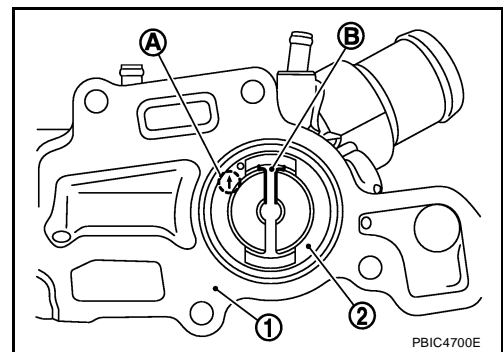
**CAUTION:**

Replace the rubber ring with a new one.

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



- While the mark (A) points to up, install water control valve (2) with frame center (B) facing straight upward into water outlet (1).



### Water Outlet

Install the water control valve to the cylinder head without displacing the valve from the valve position.

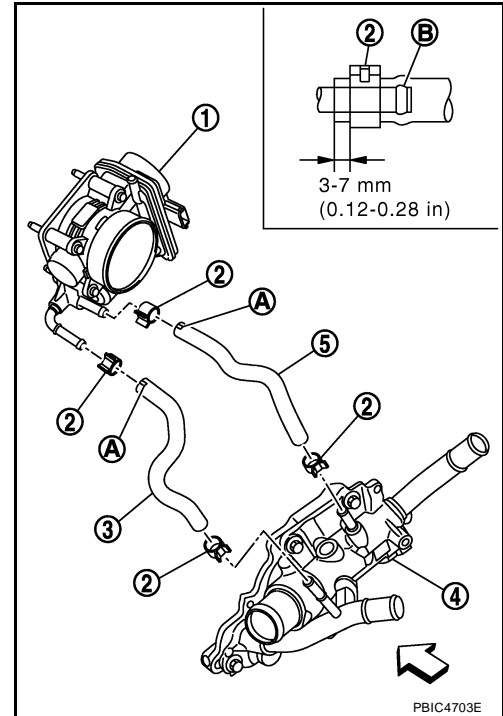
# WATER OUTLET AND WATER CONTROL VALVE

[MR20DE]

## Water Hoses (M/T models)

Install water hoses (3),(5) as shown.

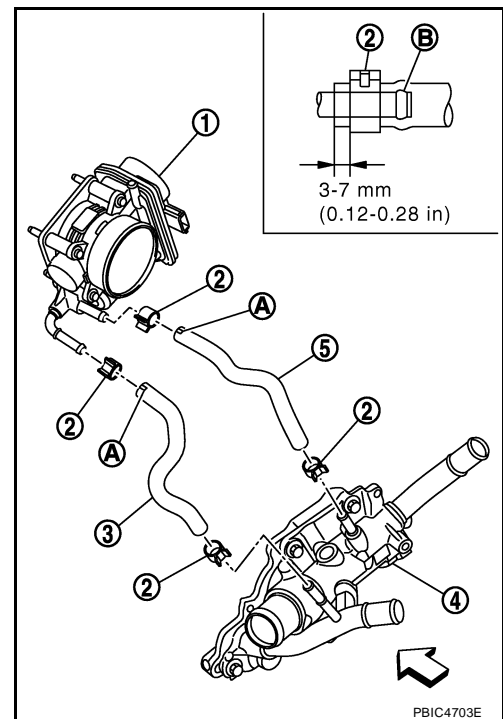
- Electric throttle control actuator (1)
- Clamp (2)
- Water outlet (4)
- Paint mark (A)
- Clamp shall not interfere with the bulged area (B)



## Water hoses (CVT models)

Install water hoses (3),(5) as shown.

- Electric throttle control actuator (1)
- Clamp (2)
- Water outlet (4)
- Paint mark (A)
- Clamp shall not interfere with the bulged area (B)



## INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant. Refer to [CO-10, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up the engine. Visually check if there is no leaks of engine coolant.



# SERVICE DATA AND SPECIFICATIONS (SDS)

[MR20DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Standard and Limit CAPACITY

EBS00Z68

Unit: ℓ (US gal, Imp gal)

|  |                            |
|--|----------------------------|
| Engine coolant capacity (with reservoir tank at "MAX" level) | Approx. 7.0 (1 7/8, 1 1/2) |
|--|----------------------------|

### THERMOSTAT

|                           |                              |
|---------------------------|------------------------------|
| Valve opening temperature | 80.5 - 83.5°C (177 - 182°F)  |
| Maximum valve lift        | 8 mm/ 95°C (0.315 in/ 203°F) |
| Valve closing temperature | 77°C (171°F)                 |

### WATER CONTROL VALVE

|                           |                               |
|---------------------------|-------------------------------|
| Valve opening temperature | 93.5 - 96.5°C (200 - 206°F)   |
| Maximum valve lift        | 8 mm/ 108°C (0.315 in/ 226°F) |
| Valve closing temperature | 90°C (194°F)                  |

### RADIATOR

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

|                       |          |  |
|-----------------------|----------|--|
| Cap relief pressure   | Standard | 78 - 98 (0.78 - 0.98, 0.8 - 1.0, 11- 14) |
|                       | Limit    | 59 (0.59, 0.6, 9)                        |
| Leakage test pressure |          | 157 (1.57, 1.6, 23)                      |

## PRECAUTIONS

PFP:00001

### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EBS00Z54

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

**WARNING:**

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

### Precautions for Liquid Gasket REMOVAL OF LIQUID GASKET SEALING

EBS00Z55

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

Tool number : KV10111100 (J-37228)

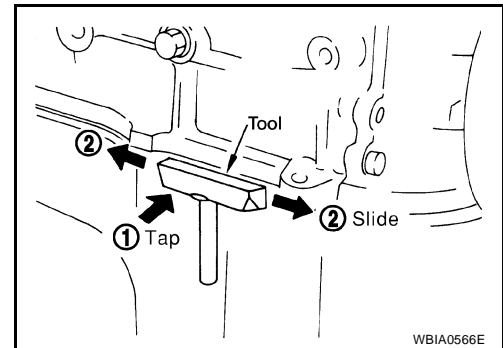
**CAUTION:**

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

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

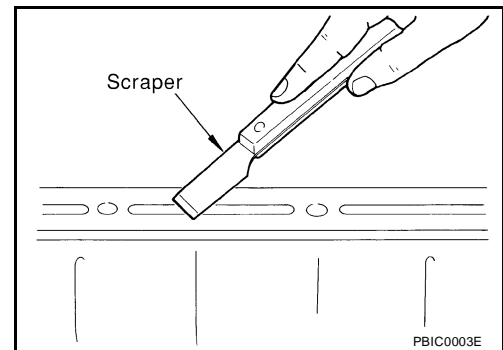
**CAUTION:**

**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.



# PRECAUTIONS

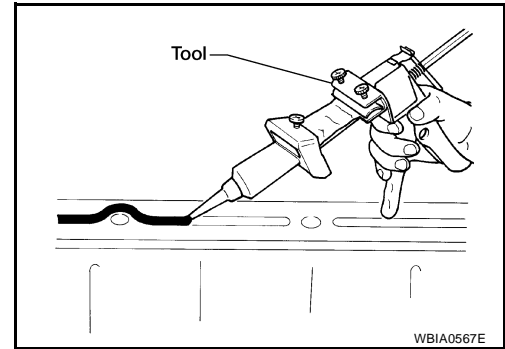
[QR25DE]

3. Attach liquid gasket tube to Tool.

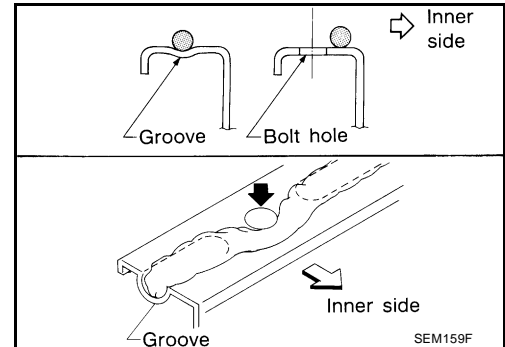
**Tool number** : WS39930000 ( — )

**Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-44, "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

[QR25DE]

PF0:00002

EBS00Z56

## PREPARATION

### Special Service Tools

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

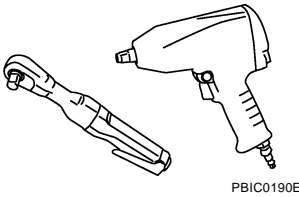
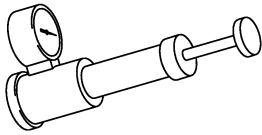
| Tool number<br>(Kent-Moore No.)<br>Tool name             | Description  |
|--|--|
| WS39930000<br>( — )<br>Tube presser                      | Pressing the tube of liquid gasket   |
| EG17650301<br>(J-33984-A)<br>Radiator cap tester adapter | Adapting radiator cap tester to radiator filler neck:<br>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

### Commercial Service Tools

EBS00Z57

# PREPARATION

[QR25DE]

| Tool name   | Description   |
|---|---|
| <p data-bbox="162 197 272 224">Power tool</p>  <p data-bbox="852 401 922 420">PBIC0190E</p>          | <p data-bbox="1015 197 1266 224">Loosening bolts and nuts</p>           |
| <p data-bbox="162 432 357 459">Radiator cap tester</p>  <p data-bbox="852 632 922 651">PBIC1982E</p> | <p data-bbox="1015 432 1360 459">Checking radiator and radiator cap</p> |

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# OVERHEATING CAUSE ANALYSIS

[QR25DE]

## OVERHEATING CAUSE ANALYSIS

PFP:00012

### Troubleshooting Chart

EBS00Z58

|                                  | 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               | —  | —  | —            |
|                                  | Improper coolant mixture ratio        | —  | —  | —            |
|                                  | Poor coolant quality                  | —  | Periodic maintenance                                 | —            |
|                                  | Insufficient coolant                  | Coolant leaks                            | Cooling hose   | Loose clamp  |
|                                  |                                       |  |  | Cracked hose |
|                                  |                                       |  | Water pump   | Poor sealing |
|                                  |                                       |  |  | Radiator cap |
| Poor sealing                     |                                       |  |  |              |
| Radiator                         |                                       |  | O-ring for damage, deterioration or improper fitting |              |
|                                  |                                       | Cracked radiator tank                    |  |              |
| Reservoir tank                   |                                       | Cracked radiator core                    |  |              |
|                                  | Cracked reservoir tank                |  |  |              |
| Overflowing reservoir tank       | Exhaust gas leaks into cooling system | Cylinder head deterioration              |  |              |
|                                  |                                       | Cylinder head gasket deterioration       |  |              |
|                                  | Abusive driving                       | High engine rpm under no load            |  |              |
|                                  |                                       | Driving in low gear for extended time    |  |              |
|                                  |                                       | Driving at extremely high speed          |  |              |
|                                  |                                       | Powertrain system malfunction            | —  |              |
|                                  |                                       | Installed improper size wheels and tires |  |              |
| Dragging brakes                  |                                       |  |  |              |
| Improper ignition timing         |                                       |  |  |              |
| Blocked or restricted air flow   | Blocked radiator grille               | Installed car brassiere                  | —  |              |
|                                  | Blocked bumper                        | Mud contamination or paper clogging      |  |              |
|                                  | Blocked radiator                      |  |  |              |
|                                  | Blocked condenser                     |  |  |              |
|                                  | Installed large fog lamp              |  |  |              |

# COOLING SYSTEM

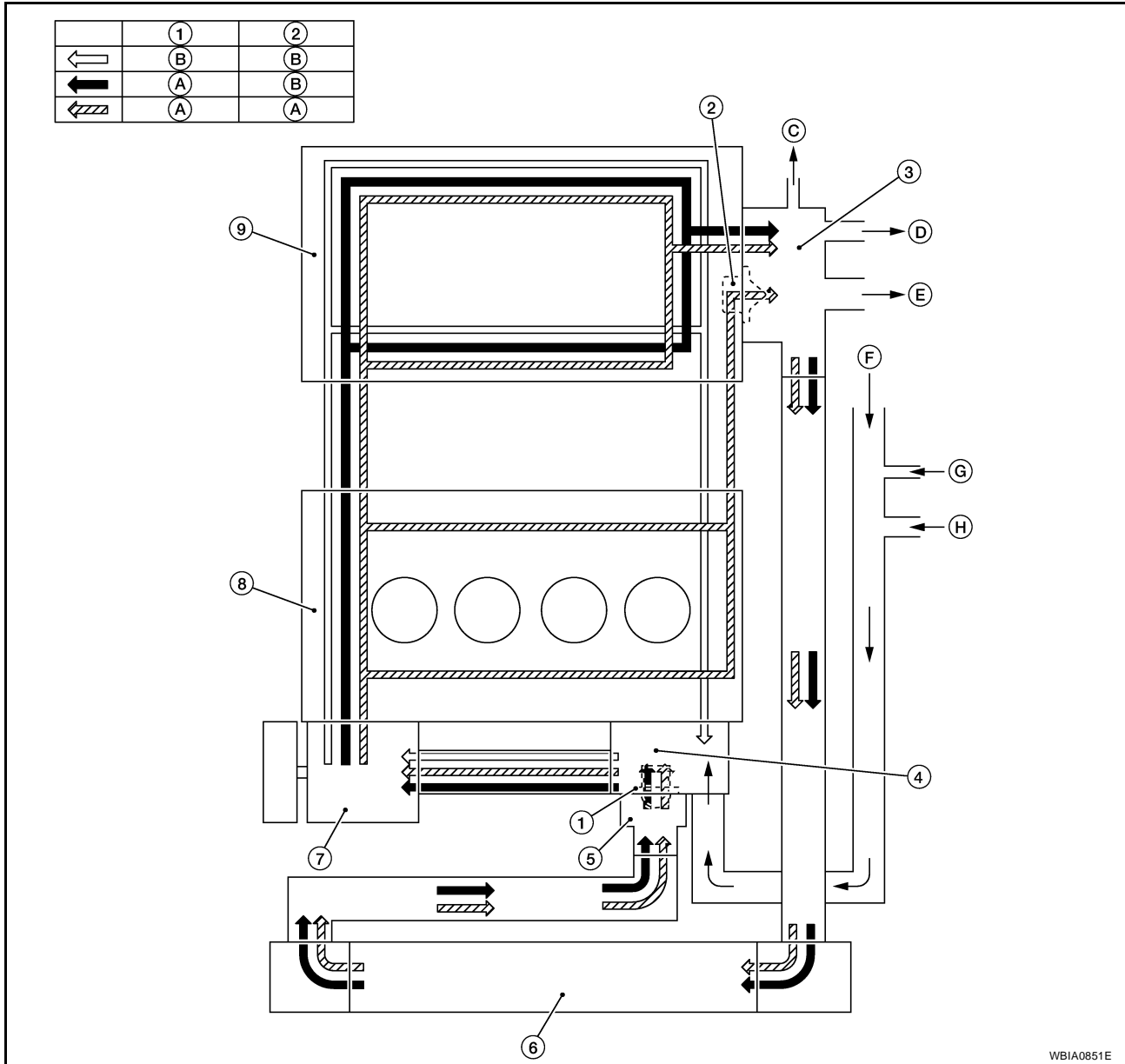
[QR25DE]

PFP:21020

EBS00Z59

## COOLING SYSTEM

### Cooling Circuit



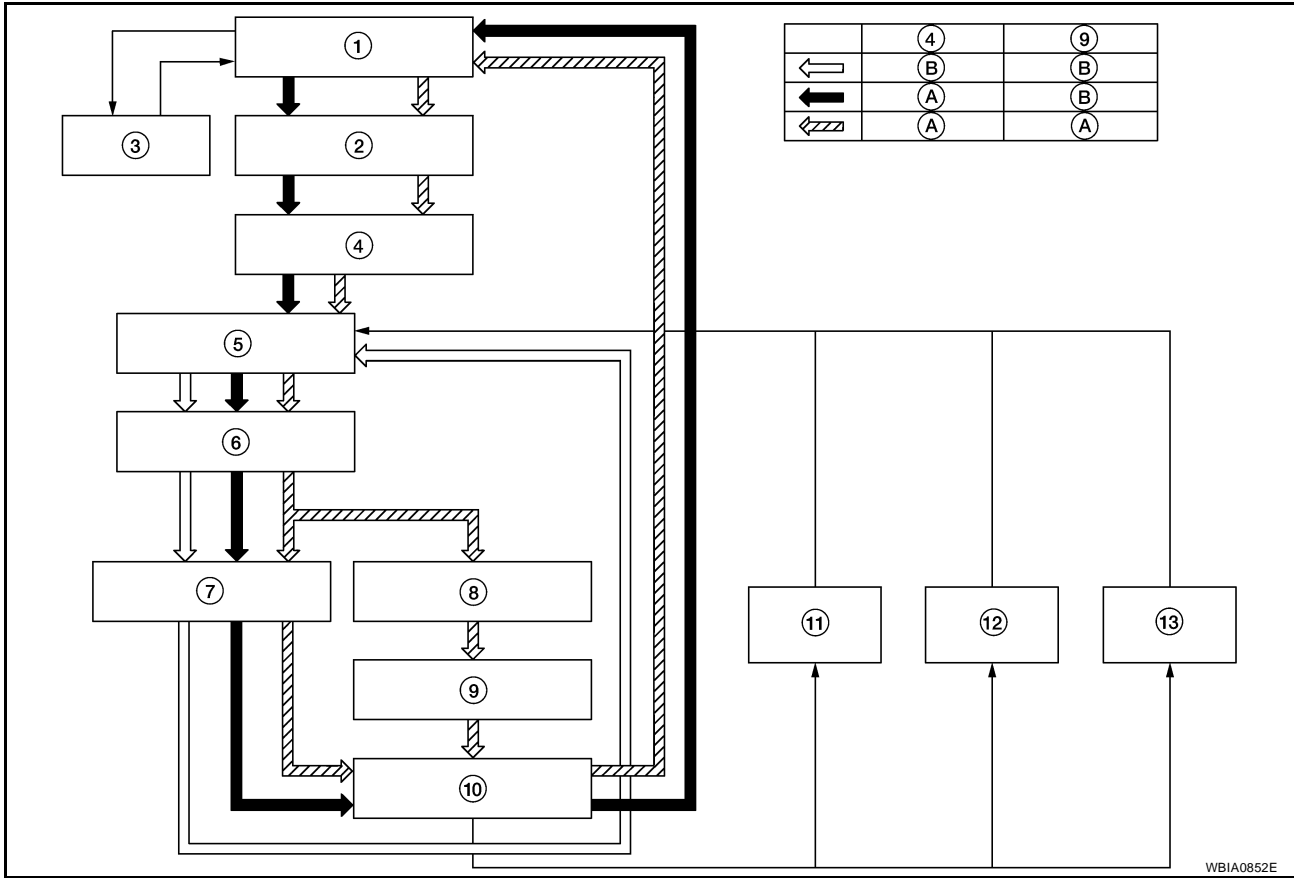
- |  |                        |   |
|--|------------------------|---|
| 1. Thermostat                                | 2. Water control valve | 3. Water control valve housing (Water outlet) |
| 4. Cylinder block (Thermostat housing)       | 5. Water inlet         | 6. Radiator                       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

# COOLING SYSTEM

[QR25DE]

## System Drawing

EBS00Z5A



- |  |                       |                        |
|--|-----------------------|------------------------|
| 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. Electronic throttle control actuator | A. Open               | B. Closed              |



**ENGINE COOLANT****System Check****WARNING:**

- Never remove the radiator cap when the engine is 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.

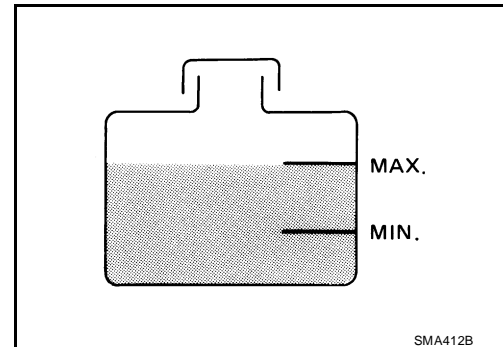
**CHECKING COOLING SYSTEM HOSES**

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 is 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 Tool.

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

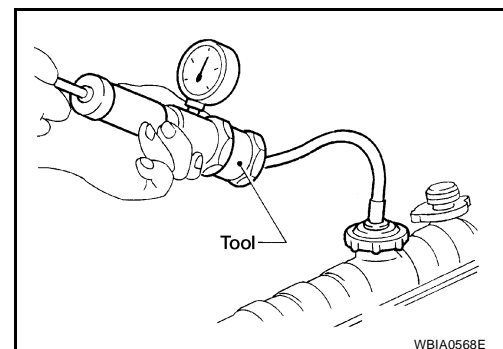
**Testing pressure** : 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)

**WARNING:**

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

**CAUTION:**

Higher pressure than specified may cause radiator damage.

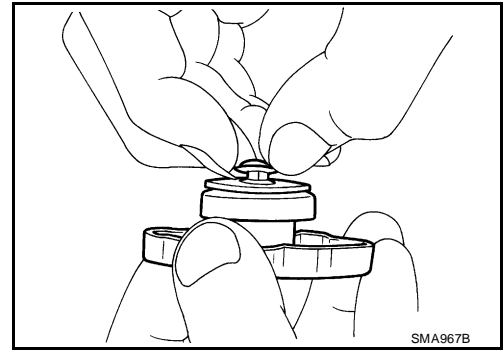
**CHECKING RADIATOR CAP**

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.

2. Pull the negative-pressure valve to open it and check that it closes completely 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.



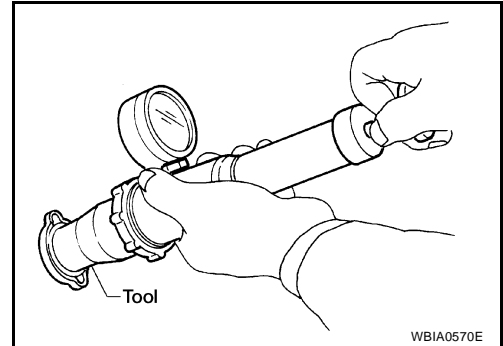
3. Check radiator cap relief pressure using Tool.

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

**Standard: 78 – 98 kPa (0.8 – 1.0 kg/cm<sup>2</sup> , 11 – 14 psi)**

**Limit: 59 kPa (0.6 kg/cm<sup>2</sup> , 9 psi)**

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



## 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

EBS00Z5C

### WARNING:

- To avoid being scalded, never change the coolant when the engine is 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.

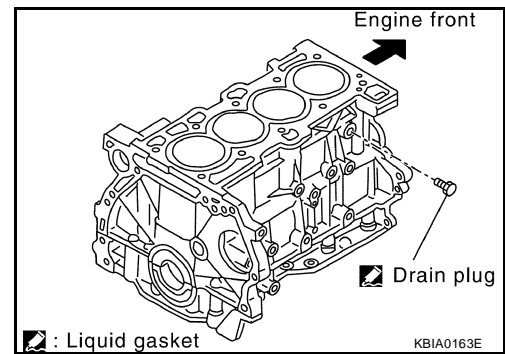
## DRAINING ENGINE COOLANT

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).
  - 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

[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. Refer to [CO-36, "FLUSHING 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-44, "Recommended Chemical Products and Sealants"](#).

**Radiator drain plug** : Refer to [CO-38, "REMOVAL"](#) .

**Cylinder block drain plug** : Refer to [EM-184, "CYLINDER BLOCK"](#) .

- If disconnected, reattach the upper radiator hose at the engine side.
- Set the vehicle heater controls to the full HOT and heater ON position. Turn the vehicle ignition ON with the engine OFF as necessary to activate the heater mode.

- Install the Tool by installing the radiator cap adapter onto the radiator neck opening. Then attach the gauge body assembly with the refill tube and the venturi assembly to the radiator cap adapter.

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

- Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.

- Use Genuine NISSAN Long Life Anti-freeze coolant or equivalent, mixed 50/50 with distilled water or demineralized water. Refer to .

**Engine coolant capacity (with reservoir tank)** : Refer to [MA-14, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

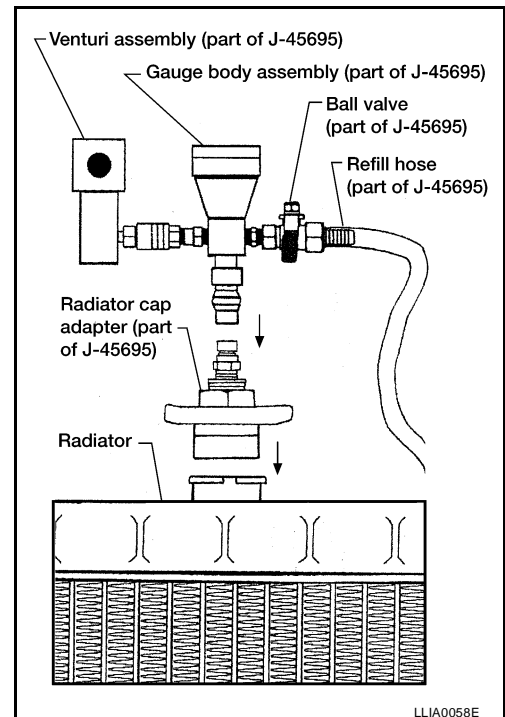
- Install an air hose to the venturi assembly, the air pressure must be within specification.

**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.

- The vacuum gauge will begin to rise and there will be an audible hissing noise. During this process open the ball valve on the refill hose slightly. Coolant will be visible rising in the refill hose. Once the refill hose is full of coolant, close the ball valve. This will purge any air trapped in the refill hose.

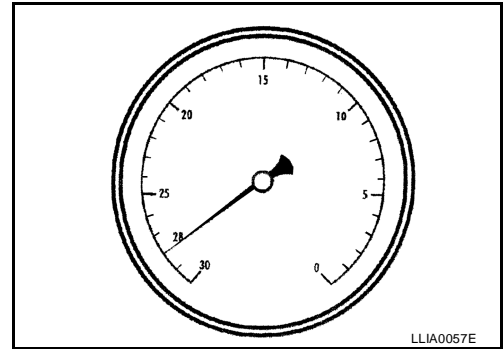


# ENGINE COOLANT

[QR25DE]

8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, refer to the vacuum specifications based on the altitude above sea level.

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



9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
10. Place the coolant container (with the refill hose inserted) at the same level as the top of the radiator. Then open the ball valve on the refill hose so the coolant will be drawn up to fill the cooling system. The cooling system is full when the vacuum gauge reads zero.

**CAUTION:**

**Do not allow the coolant container to get too low when filling, to avoid air from being drawn into the cooling system.**

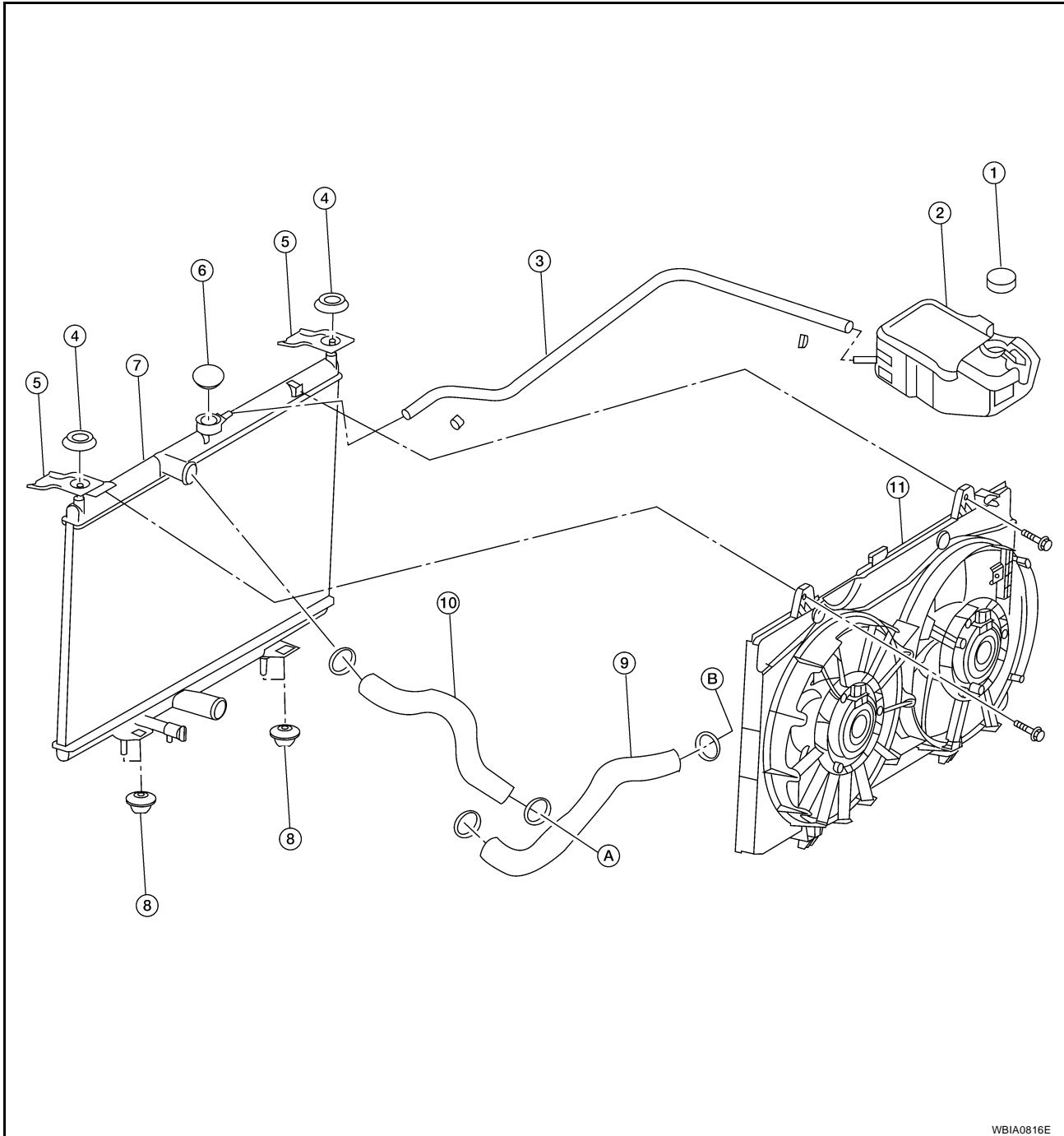
11. Remove the Tool from the radiator neck opening.
12. Fill the cooling system reservoir tank to the specified level and install the radiator cap. Run the engine to warm up the cooling system and top up the system as necessary.

## FLUSHING COOLING SYSTEM

1. 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.
2. Run the engine until it reaches normal operating temperature.
3. Press the engine accelerator two or three times under no-load.
4. Stop the engine and wait until it cools down.
5. Drain the water.
6. Repeat steps 1 through 5 until clear water begins to drain from the radiator.

## RADIATOR

### Removal and Installation



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

**WARNING:**

Never remove the radiator 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.

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## REMOVAL

1. Drain the coolant from the radiator. Refer to [CO-34, "DRAINING ENGINE COOLANT"](#) .

**CAUTION:**

**Perform when engine is cold.**

2. Remove front air duct. Refer to [EM-130, "REMOVAL"](#) .
3. Disconnect radiator upper and lower hoses.
4. Disconnect the reservoir tank hose
5. Disconnect harness connectors from fan motors, and position harness aside
6. Remove the cooling fan assembly to radiator bolts, and remove coolant fan assembly.
7. Remove the radiator.

**CAUTION:**

**Do not damage or scratch air conditioner condenser and radiator core when removing.**

## INSTALLATION

Installation is in the reverse order of removal.

## INSPECTION

### Radiator

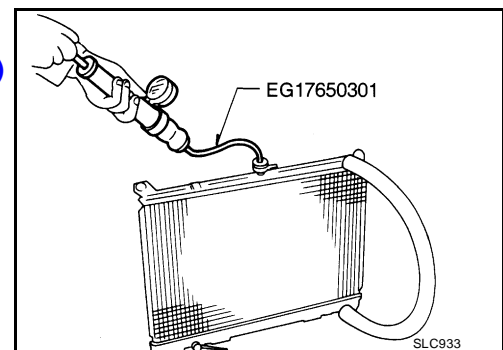
1. Check radiator for mud or clogging. If necessary, clean radiator as follows:
  - Be careful not to bend or damage the radiator fins.
  - When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape the harness and electrical connectors to prevent water from entering.
- a. Apply water by hose to the back side of the radiator core, point the hose vertically downward.
- b. Apply water again to all radiator core surfaces once per minute.
- c. Stop washing when no more dirt flows off the radiator.
- d. Blow air into the back side of radiator 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 core surfaces once per minute until no water sprays out.
2. Inspect radiator for leaks as follows:
  - a. Apply pressure using Tool.

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

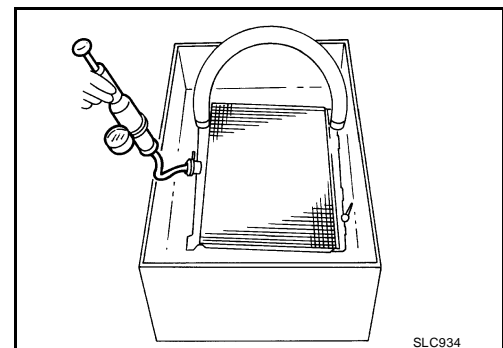
**Tool number** : EG17650301 (J-33984-A)

**WARNING:**

**To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp. Attach a hose to the oil cooler as well (A/T model only).**



- b. Check for leakage.



## COOLINGFAN

### Removal and Installation

**WARNING:**

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

#### REMOVAL

- Partially drain engine coolant from radiator. Refer to [CO-34, "DRAINING ENGINE COOLANT"](#) .

**CAUTION:**

Perform when engine is cold.

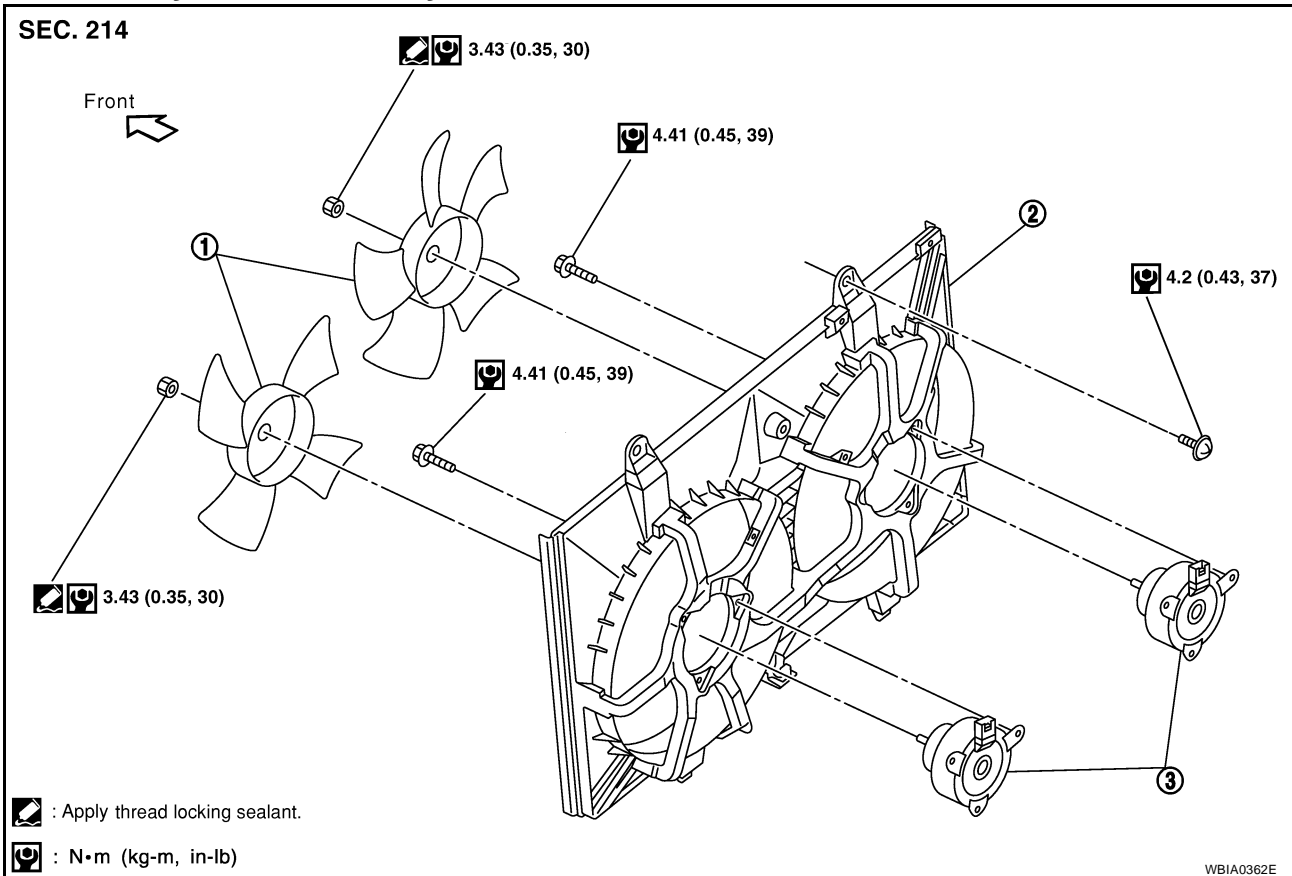
- Remove Front air duct. Refer to [EM-130, "REMOVAL"](#) .
- Disconnect radiator upper hose.
- Disconnect fan motor connectors.
- Remove radiator cooling fan assembly.

#### INSTALLATION

Installation is in the reverse order of removal.

- Cooling fan is controlled by ECM. For details, refer to [EC-1012, "DTC P1217 ENGINE OVER TEMPERATURE"](#) .

### Disassembly and Assembly



- Fan blade
- Fan shroud
- Fan motor

#### DISASSEMBLY

- Remove fans from fan motors.
- Remove fan motors from fan shroud.

#### ASSEMBLY

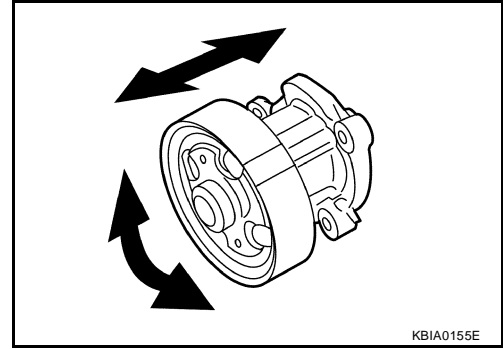
Assembly is in the reverse order of disassembly.





## INSPECTION AFTER REMOVAL

- 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-38, "INSPECTION"](#).

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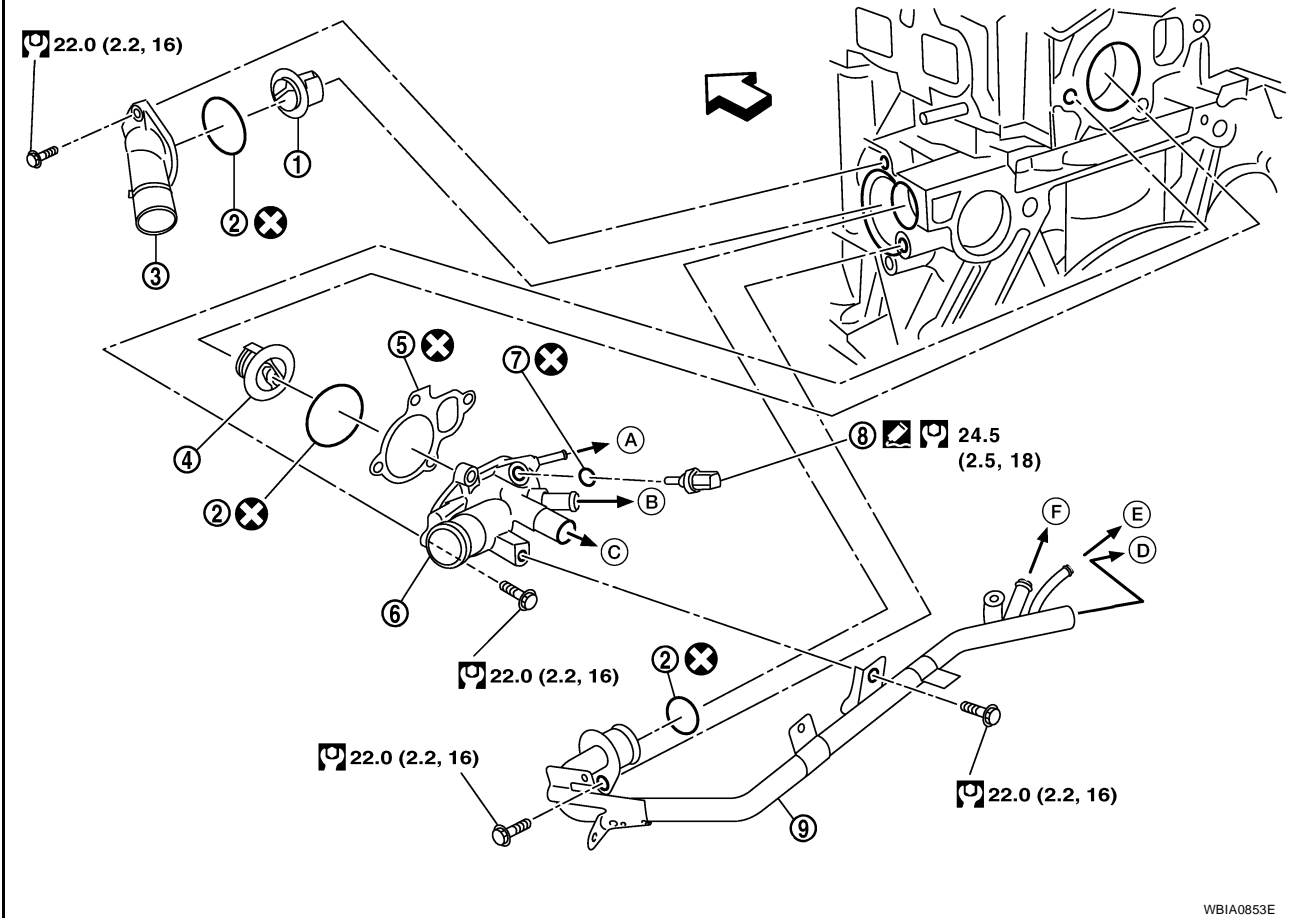
THERMOSTAT AND THERMOSTAT HOUSING

PF2:21200

Removal and Installation

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- |  |  |                          |
|--|--|--------------------------|
| 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 actuator | B. To oil cooler                           | C. To heater core        |
| D. To heater core                          | E. To electronic throttle control actuator | 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. Refer to [CO-34, "Changing Engine Coolant"](#) .
2. Remove front air duct. Refer to [EM-130, "REMOVAL"](#) .
3. Remove engine undercover.
4. Remove radiator lower hose from the engine coolant inlet side.
5. Remove engine coolant inlet and thermostat.

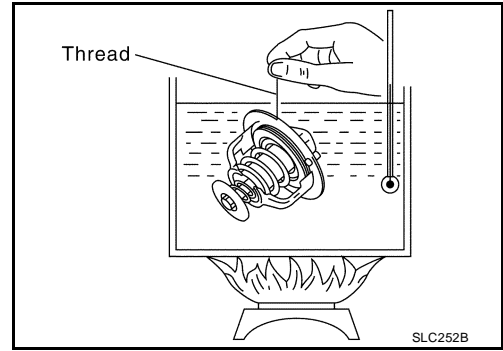
## INSPECTION AFTER REMOVAL

- 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.

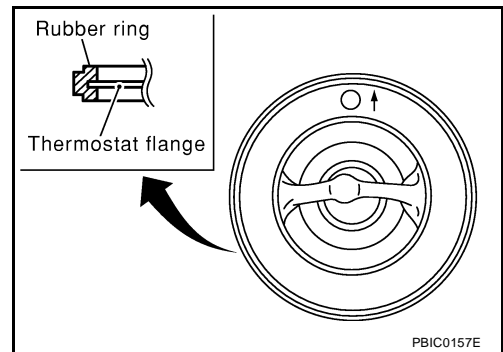


| Thermostat                | Standard Values                          |
|---------------------------|--|
| Valve opening temperature | 80.5 – 83.5°C (177 – 182°F)              |
| Valve lift                | More than 8 mm / 95°C (0.315 in / 203°F) |
| Valve closing temperature | 77°C (171°F)      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

## INSTALLATION

Installation is in the reverse order of removal.

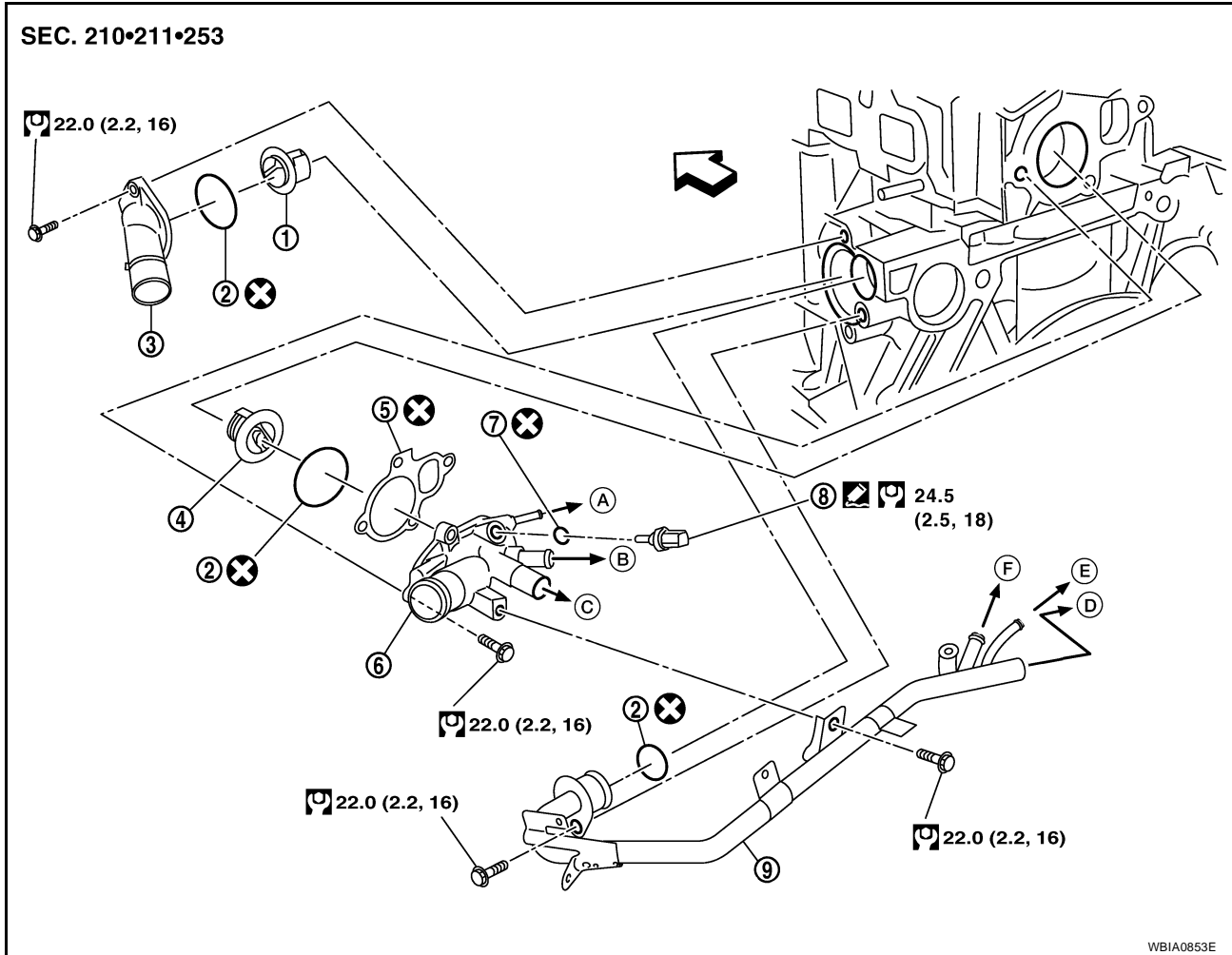
- Install the engine coolant temperature sensor.  
**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-44. "Recommended Chemical Products and Sealants"](#) .**
- Install the thermostat with the whole circumference of the flange part fitting securely inside the rubber ring.
- Install the thermostat 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.



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## WATER CONTROL VALVE

### Removal and Installation



- |  |  |                          |
|--|--|--------------------------|
| 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 actuator | B. To oil cooler                           | C. To heater core        |
| D. To heater core                          | E. To electronic throttle control actuator | 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 cold.**

1. Remove engine undercover.
2. Drain the engine coolant. Refer to [CO-34, "Changing Engine Coolant"](#).
3. Remove the air cleaner and duct assembly. Refer to [EM-130, "REMOVAL"](#).
4. Remove battery tray with brackets. Refer to [SC-7, "REMOVAL"](#).
5. Remove the upper radiator hose, heater pipe, electric throttle control actuator inlet hose, CVT cooler hoses if equipped, heater hose and oil cooler hoses.
6. Remove the engine coolant outlet.
7. Remove the water control valve.

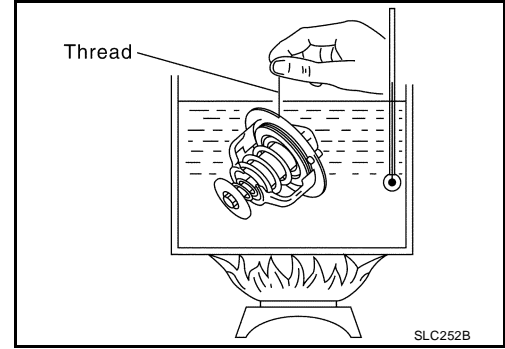
## INSPECTION AFTER REMOVAL

- 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)                              |

## 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-44, "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  $\pm 10^\circ$ .

A  
CO  
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M

# SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

### Capacity

EBS00Z5J

ℓ (US gal, Imp gal)

|   |                |
|---|----------------|
| Coolant capacity (With reservoir tank at MAX level) | 7.6 (2, 1 5/8) |
|---|----------------|

### Thermostat

EBS00Z5K

|                           |  |
|---------------------------|--|
| Valve opening temperature | 80.5 - 83.5°C (177 - 182°F)              |
| Valve lift                | More than 8 mm / 95°C (0.315 in / 203°F) |

### Water Control Valve

EBS00Z5L

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

### Radiator

EBS00Z5M

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

|                       |          |                              |
|-----------------------|----------|------------------------------|
| Cap relief pressure   | Standard | 78 - 98 (0.8 - 1.0, 11 - 14) |
|                       | Limit    | 59 (0.6, 9)                  |
| Leakage test pressure |          | 157 (1.6, 23)                |