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SECTION CO

ENGINE COOLING SYSTEM

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SERVICE INFORMATION

PRECAUTIONS

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

INFOID:000000007402750

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

WARNING:

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

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

WARNING:

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000007402751

NOTE:

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

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

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

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

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

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PRECAUTIONS

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- 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.)
- Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Liquid Gasket

INFOID:000000007402752

REMOVAL OF LIQUID GASKET SEALANT

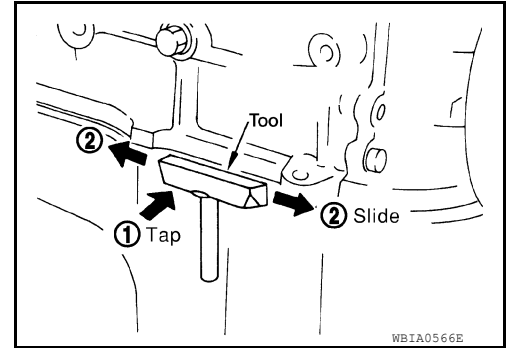
- After removing nuts and bolts, separate the mating surface, using Tool and remove old liquid gasket sealant.

Tool number : KV10111100 (J-37228)

CAUTION:

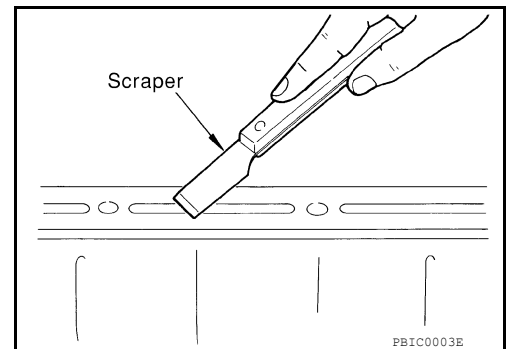
Do not damage the mating surfaces.

- Tap the seal cutter to insert it (1).
- In areas where the Tool is difficult to use, lightly tap to slide it (2).



LIQUID GASKET APPLICATION PROCEDURE

- 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.
- Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.

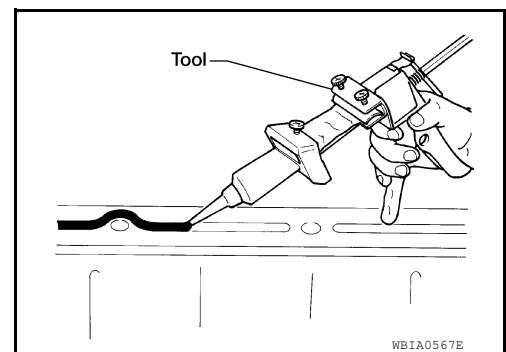


- Attach liquid gasket tube to Tool.

Tool number : WS39930000 (—)

Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-44, "Recommended Chemical Product and Sealant".

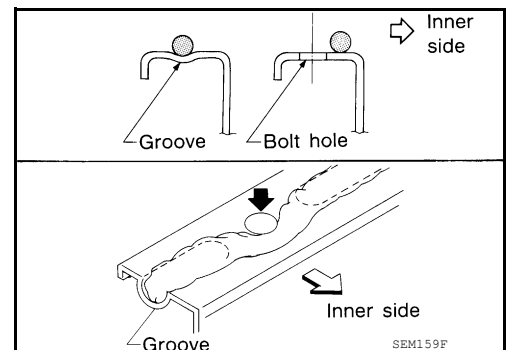
- Apply liquid gasket without breaks to the specified location with the specified dimensions.
 - If there is a groove for the liquid gasket application, apply liquid gasket to the groove.



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

CAUTION:

Carefully follow all of the warnings, cautions, notes, and procedures contained in this manual.



PREPARATION

< SERVICE INFORMATION >

[MR20DE]

PREPARATION

Special Service Tool

INFOID:000000007402753

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

Tool number (Kent-Moore No.) Tool name	Description
WS39930000 (—) Tube pressure	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 a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)
KV10111100 (J-37228) Seal cutter	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


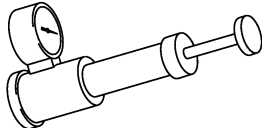
Commercial Service Tool

INFOID:000000007402754

PREPARATION

< SERVICE INFORMATION >

[MR20DE]

Tool name	Description
<p data-bbox="159 197 272 222">Power tool</p>  <p data-bbox="824 415 901 432">PIIB1407E</p>	<p data-bbox="1008 197 1344 222">Loosening nuts, screws and bolts</p>
<p data-bbox="159 449 354 474">Radiator cap tester</p>  <p data-bbox="824 667 901 684">PBIC1982E</p>	<p data-bbox="1008 449 1360 474">Checking radiator and radiator cap</p>

OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[MR20DE]

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000007402755

		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	Engine cooling fans	—	
		High resistance to fan rotation			
		Damaged fan blades			
		Damaged radiator shroud	—	Radiator shroud	—
		Improper engine coolant mixture ratio	—	Engine coolant viscosity	—
		Poor engine coolant quality	—	Periodic maintenance	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp	
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	
Poor sealing					
Radiator		O-ring for damage, deterioration or improper fitting			
		Cracked radiator tank			
		Cracked radiator core			
	Reservoir tank	Cracked reservoir tank			
Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration			
		Cylinder head gasket deterioration			

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OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[MR20DE]

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

COOLING SYSTEM

< SERVICE INFORMATION >

[MR20DE]

COOLING SYSTEM

Cooling Circuit

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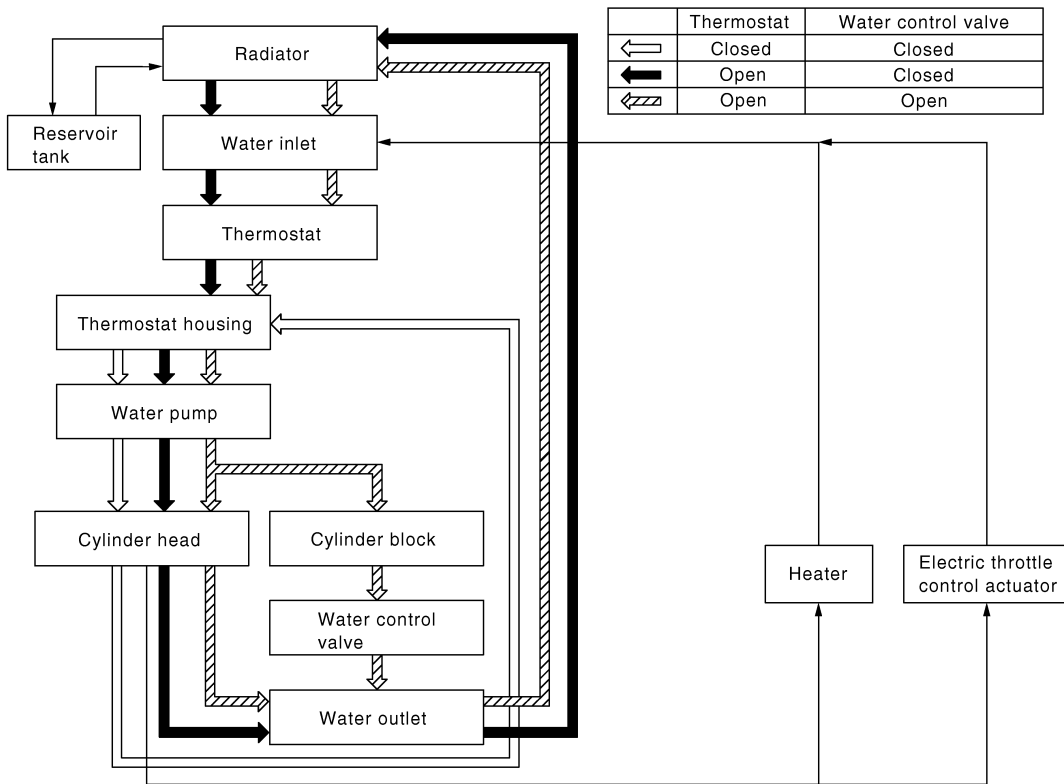
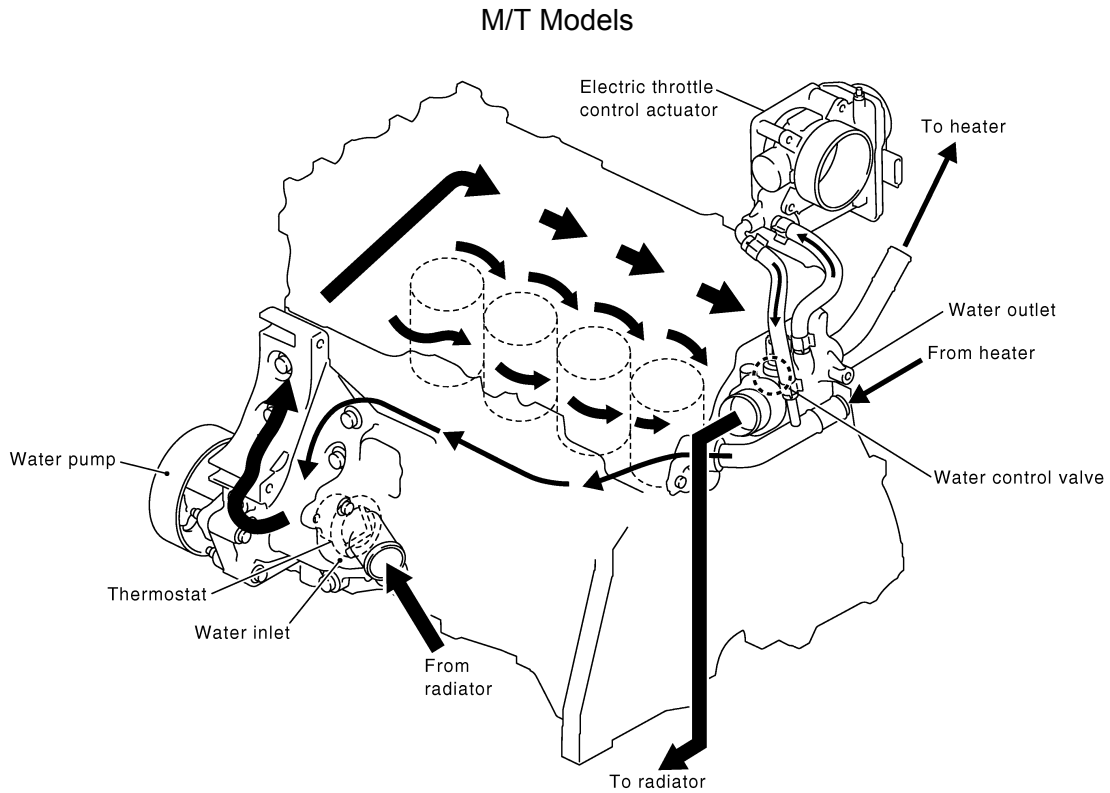
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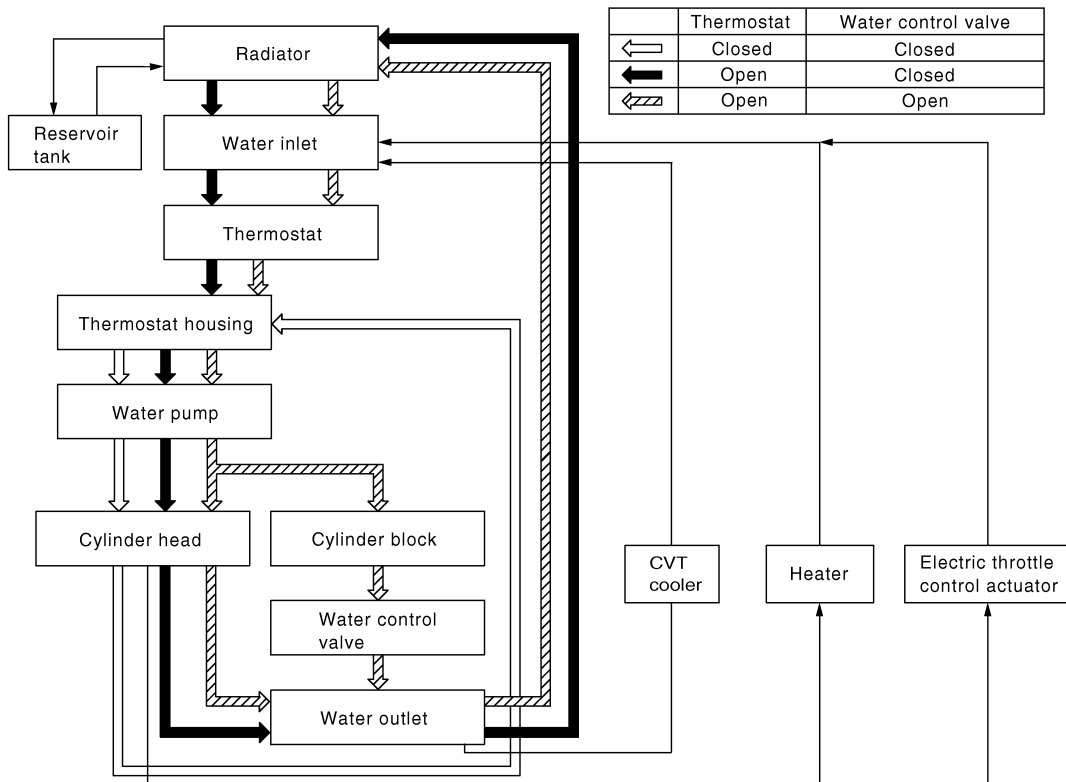
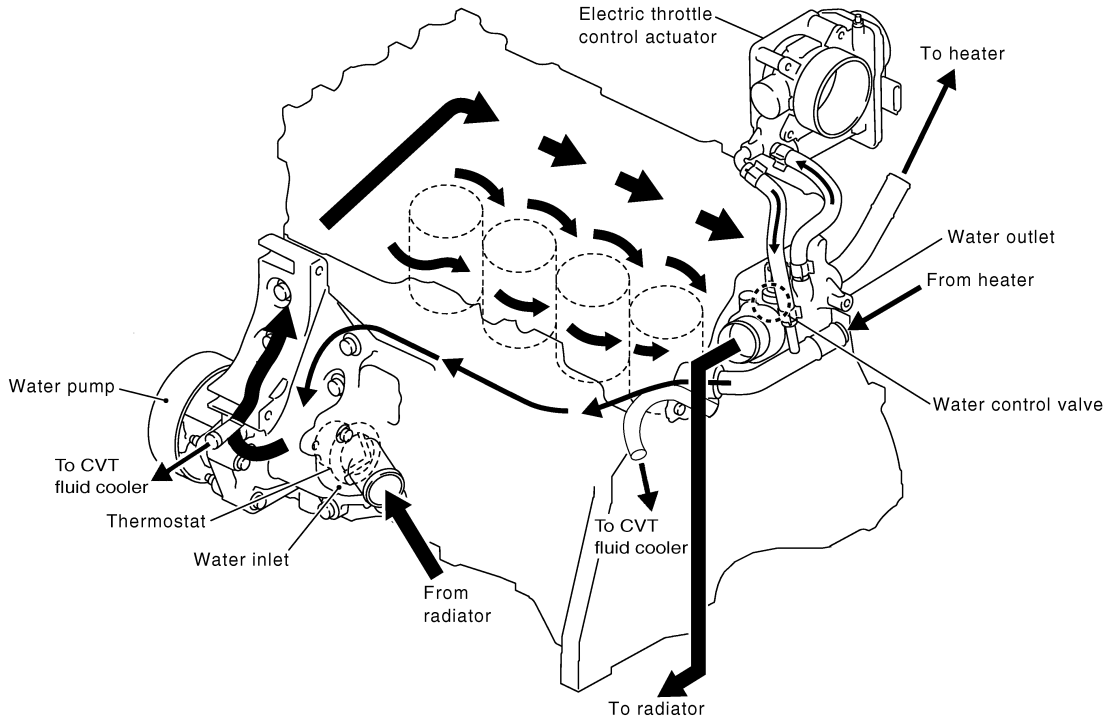
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COOLING SYSTEM

< SERVICE INFORMATION >

[MR20DE]

CVT Models



ENGINE COOLANT

Inspection

INFOID:000000007402757

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.

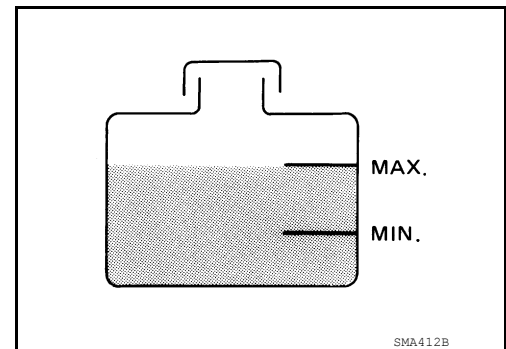
CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

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

CHECKING RESERVOIR LEVEL

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



CHECKING COOLING SYSTEM FOR LEAKS

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

Tool number : EG17650301 (J-33984-A)

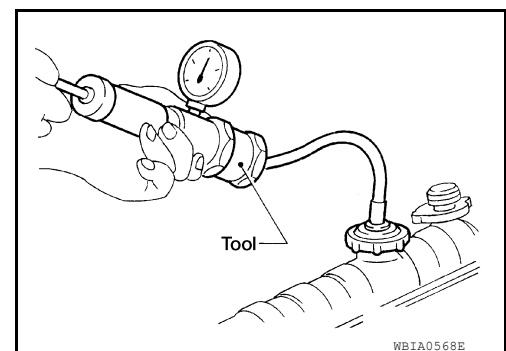
Testing pressure : 88 kPa (0.9 kg/cm², 12.8 psi)

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.

CAUTION:

Higher pressure than specified may cause radiator damage.



CHECKING RADIATOR CAP

ENGINE COOLANT

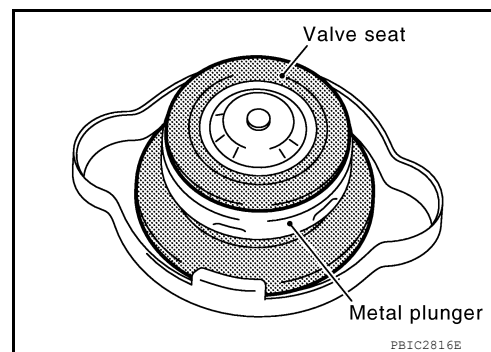
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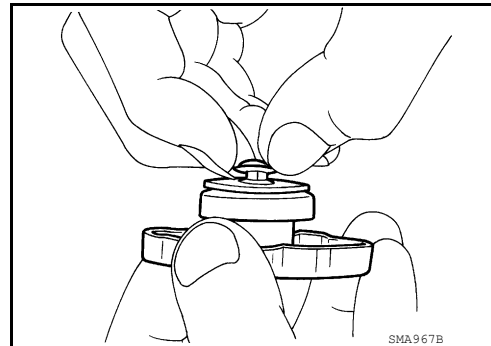
1. Inspect the radiator cap.
 - Replace the cap if the metal plunger cannot be seen around the edge of the black rubber gasket.
 - Replace the cap if deposits of waxy residue or other foreign material are on the black rubber gasket or the metal retainer.

CAUTION:

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

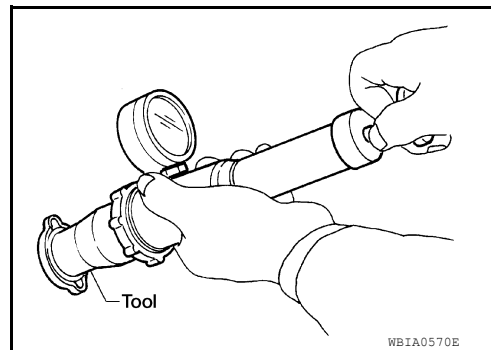


2. Pull the negative-pressure valve to open it and check that it closes completely when released.
 - Check that there is no dirt or damage on the valve seat of the radiator cap negative-pressure valve.
 - Check that there are no abnormalities in the opening and closing conditions of the negative-pressure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



3. Check radiator cap relief pressure using suitable tool.
 - When connecting the radiator cap to the tester, apply water or coolant to the cap seal surface.
 - Replace the radiator cap if there is any damage in the negative-pressure valve, or if the open-valve pressure is outside of the standard specifications.

Standard: 88 kPa (0.9 kg/cm², 12.8 psi)



CHECKING RADIATOR

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

CAUTION:

- **Be careful not to bend or damage the radiator fins.**
- **When radiator is cleaned on-vehicle, remove surrounding parts in order to access the radiator core. Tape the harness and electrical connectors to prevent water from entering.**

1. Spray water to the back side of the radiator core using a side to side motion from the top down.
2. Stop spraying when debris no longer flows from radiator core.
3. Blow air into the back side of radiator core using a side to side motion from the top down.
 - Use compressed air lower than 490 kPa (5 kg/cm², 71 psi) and keep distance more than 30 cm (11.8 in).
4. Continue to blow air until no water sprays out.
5. Check for coolant leaks. Repair as necessary.

Changing Engine Coolant

INFOID:000000007402758

WARNING:

- **To avoid being scalded, do not change the engine coolant when the 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 push down and turn the cap all the way to remove.**
- **Be careful not to allow engine coolant to contact drive belt.**

DRAINING ENGINE COOLANT

1. Remove the engine undercover. Refer to [EI-15. "Removal and Installation"](#).

ENGINE COOLANT

[MR20DE]

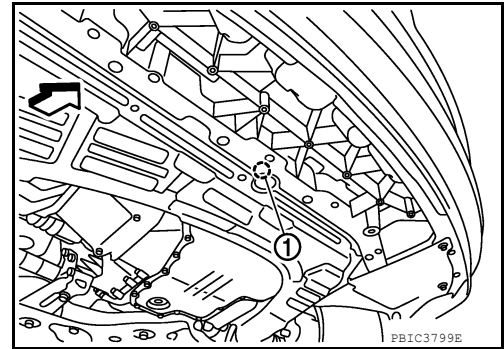
< SERVICE INFORMATION >

2. Open the radiator drain plug (1) 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).

- ← Front

CAUTION:

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



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/cm²) 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.
CAUTION:
Do not allow the coolant to contact drive belt.
5. When draining all of the coolant in the system for engine removal or repair, open the drain plug on the cylinder block. Refer to [EM-80, "Component"](#).
6. Check the drained engine coolant for contaminants such as rust, corrosion or discoloration. Flush the engine cooling system if the coolant is contaminated. Follow the "FLUSHING COOLING SYSTEM" procedure.

REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug as necessary.
 - **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 Product and Sealant"](#).**

Radiator drain plug : Refer to [DRAINING ENGINE COOLANT](#).

Cylinder block drain plug : Refer to [EM-186, "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.

ENGINE COOLANT

[MR20DE]

< SERVICE INFORMATION >

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.

CAUTION:

Do not use any cooling system additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission and/or cooling system.

NOTE:

Use recommended coolant or equivalent. Refer to [MA-16, "Anti-Freeze Mixture Ratio"](#).

Engine coolant capacity (with reservoir tank) : Refer to [MA-15, "MR20DE"](#).

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

Compressed air supply pressure : 549 - 824 kPa (5.6 - 8.4 kg/cm², 80 - 119 psi)

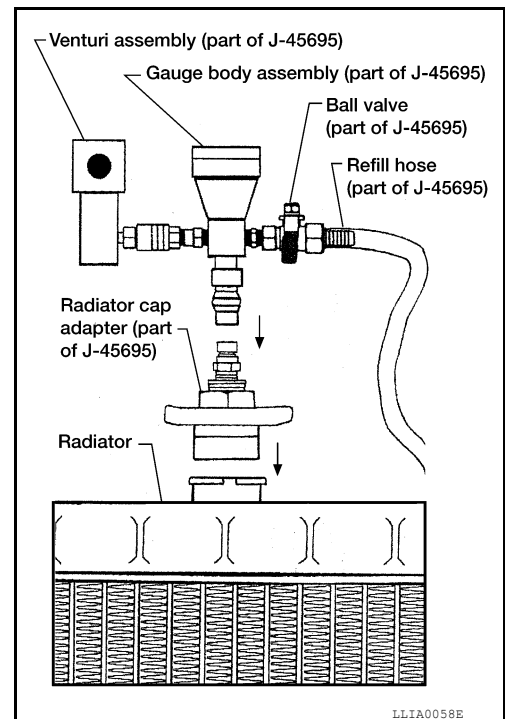
CAUTION:

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

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

8. Continue to draw the vacuum until the gauge reaches 28 inches of vacuum. The gauge may not reach 28 inches in high altitude locations, use the vacuum specifications 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



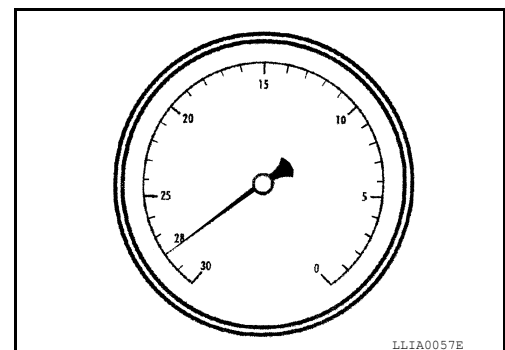
9. When the vacuum gauge has reached the specified amount, disconnect the air hose and wait 20 seconds to see if the system loses any vacuum. If the vacuum level drops, perform any necessary repairs to the system and repeat steps 6 - 8 to bring the vacuum to the specified amount. Recheck for any leaks.
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.
13. Install the engine undercover. Refer to [EI-15, "Removal and Installation"](#).

FLUSHING COOLING SYSTEM



ENGINE COOLANT

[MR20DE]

< SERVICE INFORMATION >

1. Fill radiator and reservoir tank with water and install radiator cap.
2. Run engine until it reaches normal operating temperature.
3. Rev the engine two or three times under no-load.
4. Stop the engine and wait until it cools down.
5. Drain water from the cooling system.
6. Repeat steps 1 through 5 until clear water begins to drain from the radiator.

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RADIATOR

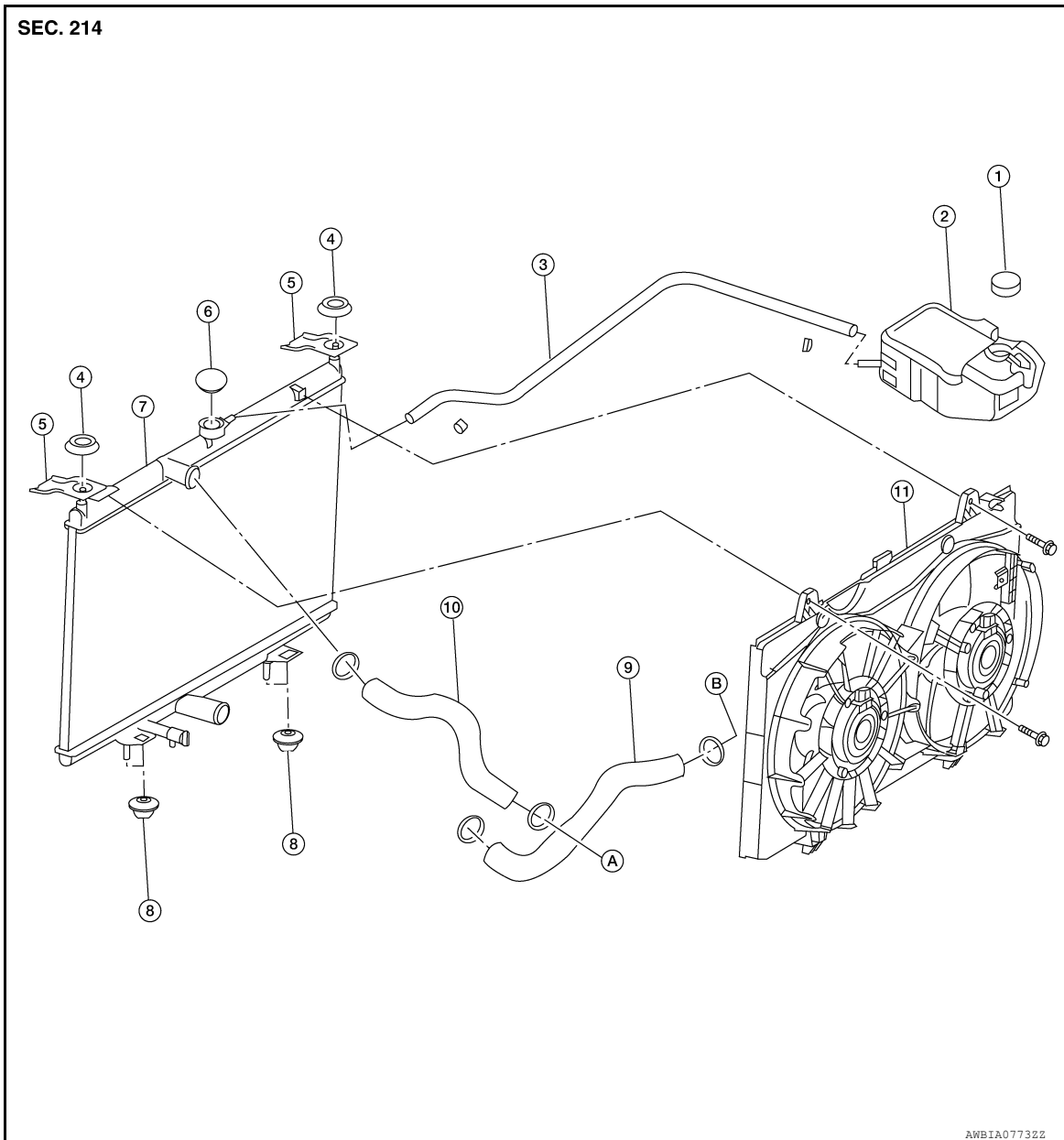
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[MR20DE]

RADIATOR

Component

INFOID:000000007402759



- | | | |
|----------------------------|----------------------------|--------------------------|
| 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

INFOID:000000007402760

WARNING:

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

NOTE:

RADIATOR

[MR20DE]

< SERVICE INFORMATION >

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-12. "Changing Engine Coolant"](#).
CAUTION:
 - Perform this step when engine is cold.
 - Do not spill engine coolant on drive belt.
2. Remove air duct (inlet). Refer to [EM-16](#).
3. Disconnect the reservoir tank hose.
4. Remove radiator hoses (upper and lower).
5. Disconnect harness connectors from fan motors, and position harness aside.
6. Remove the cooling fan assembly to radiator bolts and remove cooling fan assembly.
7. Remove radiator upper mounts.
8. Move the 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.

INSPECTION AFTER REMOVAL

Inspect radiator for leaks as follows:

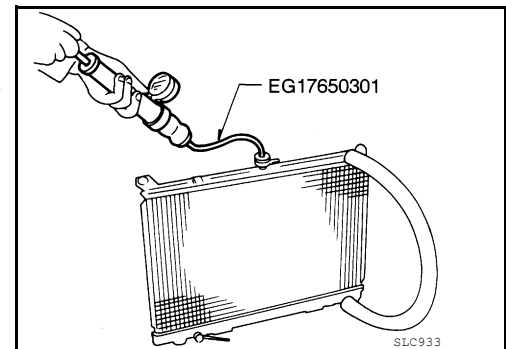
- Apply pressure using suitable tool and Tool.

Specified pressure value : 157 kPa (1.6 kg/cm², 23 psi)

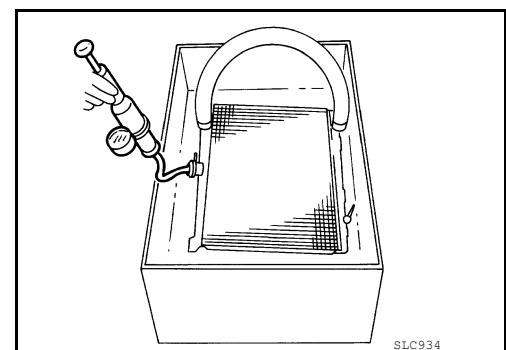
Tool number : EG17650301 (J-33984-A)

WARNING:

To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.



- Check for leakage.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

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

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15. "MR20DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

RADIATOR

[MR20DE]

< SERVICE INFORMATION >

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

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

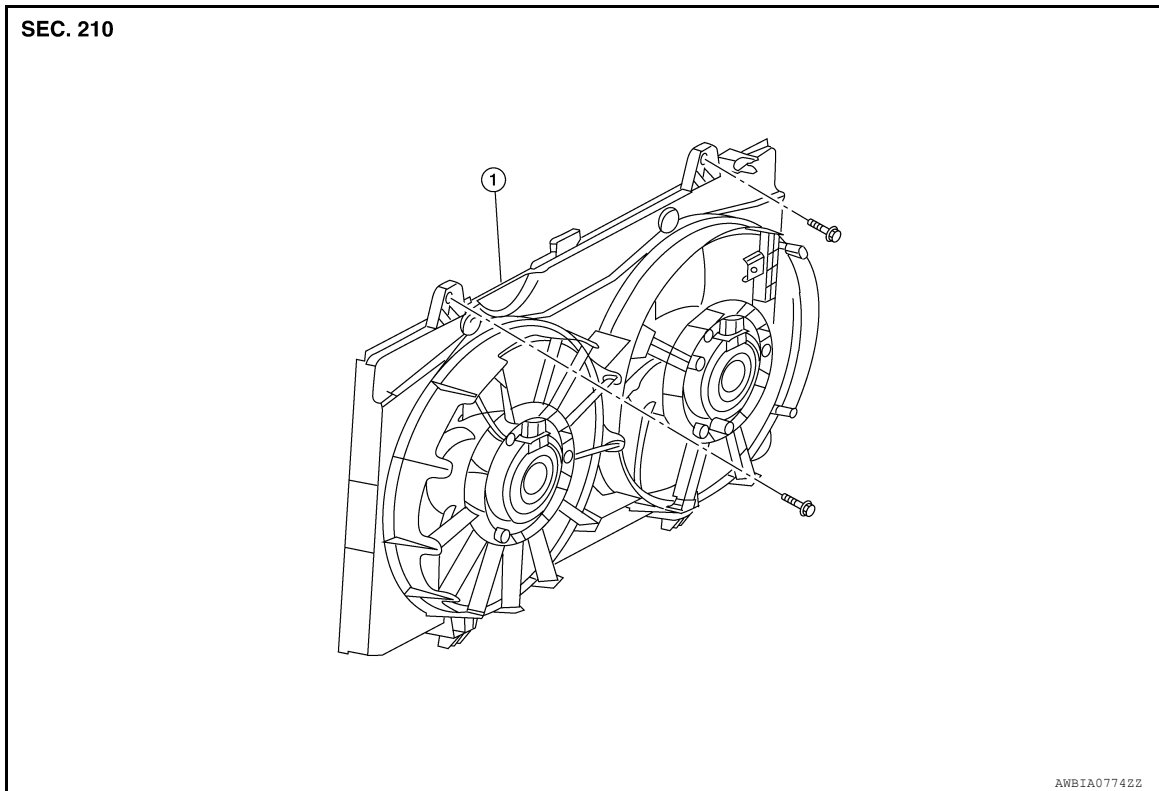
Item		Before starting engine	Engine running	After engine stopped
Engine coolant		Level	Leakage	Level
Engine oil		Level	Leakage	Level
Transmission/ transaxle fluid	A/T and CVT Models	Leakage	Level/Leakage	Leakage
	M/T Models	Level/Leakage	Leakage	Level/Leakage
Other oils and fluids*		Level	Leakage	Level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

*Power steering fluid, brake fluid, etc.

COOLING FAN

Component

INFOID:000000007402761



1. Cooling fan assembly

Removal and Installation

INFOID:000000007402762

WARNING:

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

NOTE:

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

REMOVAL

1. Partially drain engine coolant from radiator. Refer to [CO-12, "Changing Engine Coolant"](#).

CAUTION:

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

2. Remove air duct (inlet). Refer to [EM-16](#).
3. Disconnect radiator hose (upper) at radiator side. Refer to [CO-16](#).
4. Disconnect harness connectors from fan motor, and position harness aside.
5. Remove cooling fan assembly.

CAUTION:

Be careful not to damage or scratch the radiator core.

INSTALLATION

Installation is in the reverse order of removal.

- Cooling fans are controlled by ECM. For details, refer to [EC-601, "System Description"](#).

CAUTION:

COOLING FAN

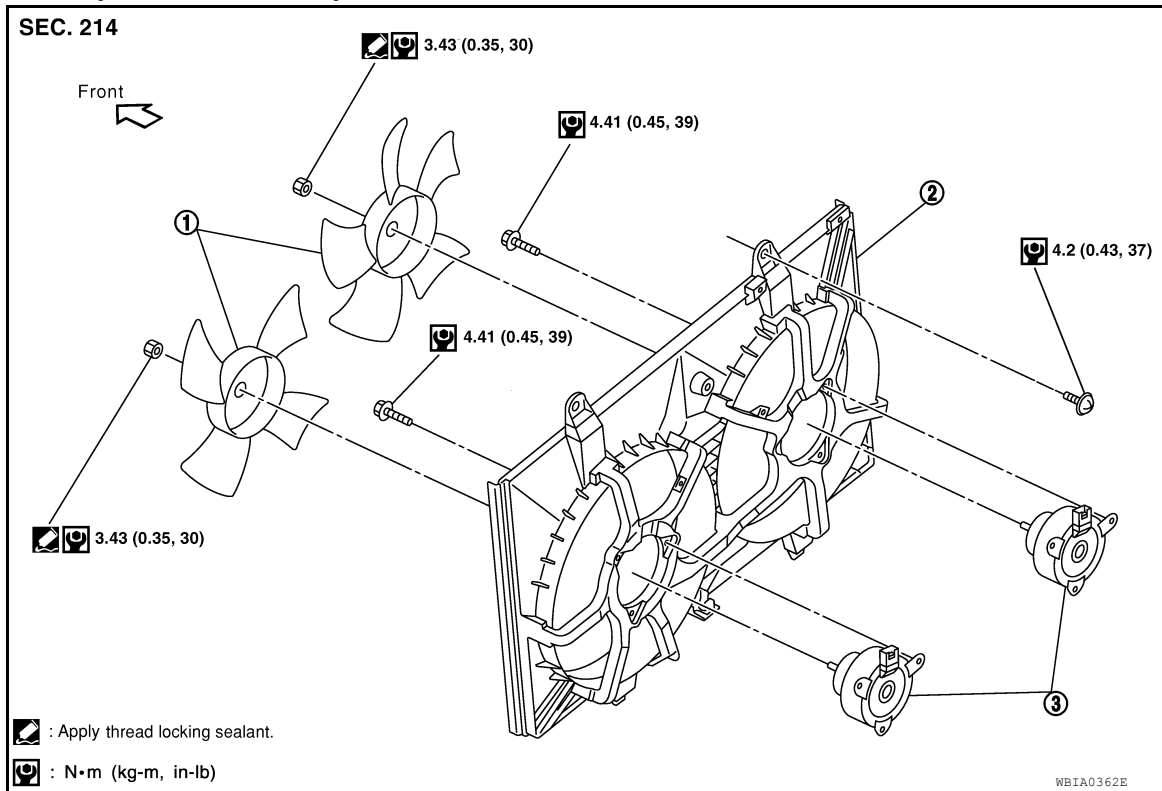
< SERVICE INFORMATION >

[MR20DE]

Be careful not to damage or scratch the radiator core.

Disassembly and Assembly

INFOID:000000007402763



1. Fan blade

2. Fan shroud

3. Fan motor

DISASSEMBLY

1. Remove fan blades from fan motors.
2. Remove fan motors from fan shroud.

ASSEMBLY

Assembly is in the reverse order of disassembly.

WATER PUMP

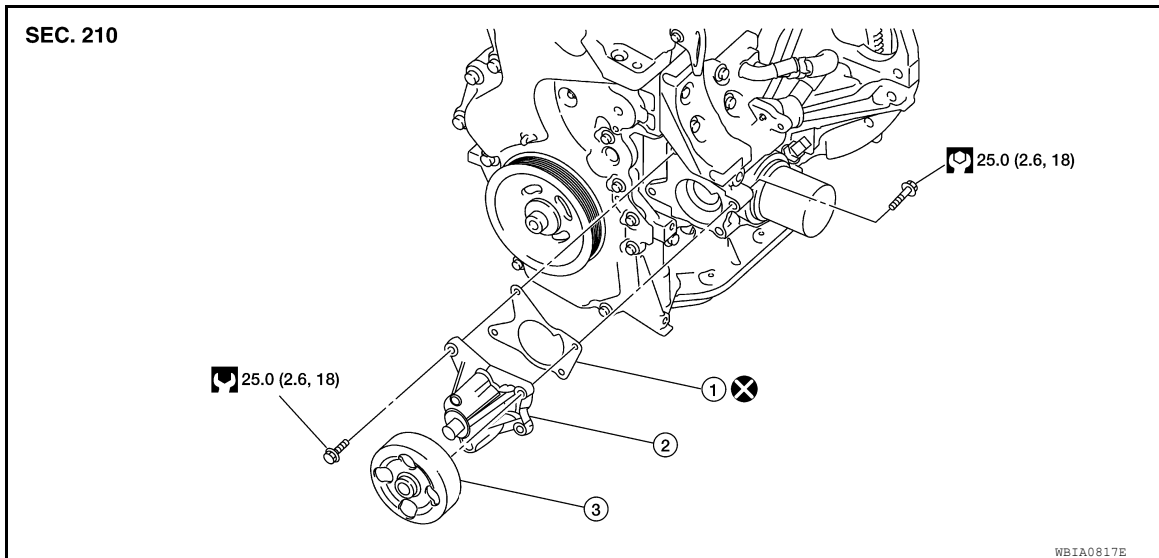
< SERVICE INFORMATION >

[MR20DE]

WATER PUMP

Component

INFOID:000000007402764



1. Gasket

2. Water pump

3. Pulley

Removal and Installation

INFOID:000000007402765

WARNING:

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

CAUTION:

- When removing water pump assembly, be careful not to get coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using a radiator cap tester.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-12, "Changing Engine Coolant"](#).

CAUTION:

Perform this step when the engine is cold.

2. Remove the generator. Refer to [SC-41, "Removal and Installation MR20DE"](#).
3. Remove radiator hose (lower). Refer to [CO-16, "Component"](#).
4. Disconnect the CVT fluid cooler hose from the thermostat housing (CVT models).
5. Remove 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.

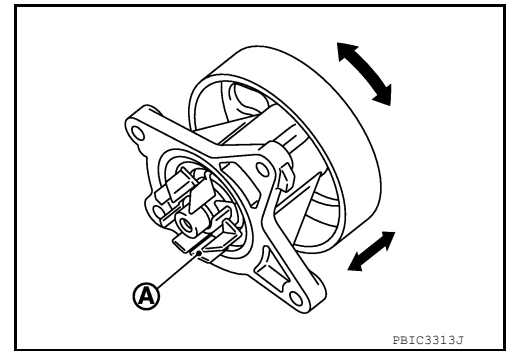
INSPECTION AFTER REMOVAL

WATER PUMP

[MR20DE]

< SERVICE INFORMATION >

- Visually check for significant dirt or rust on the water pump body and vane (A).
- Check that the vane shaft turns smoothly by hand and is not excessively loose.
- Replace the water pump assembly if the water pump does not perform properly.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Do not reuse gasket.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15, "MR20DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

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

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

*Power steering fluid, brake fluid, etc.

THERMOSTAT

< SERVICE INFORMATION >

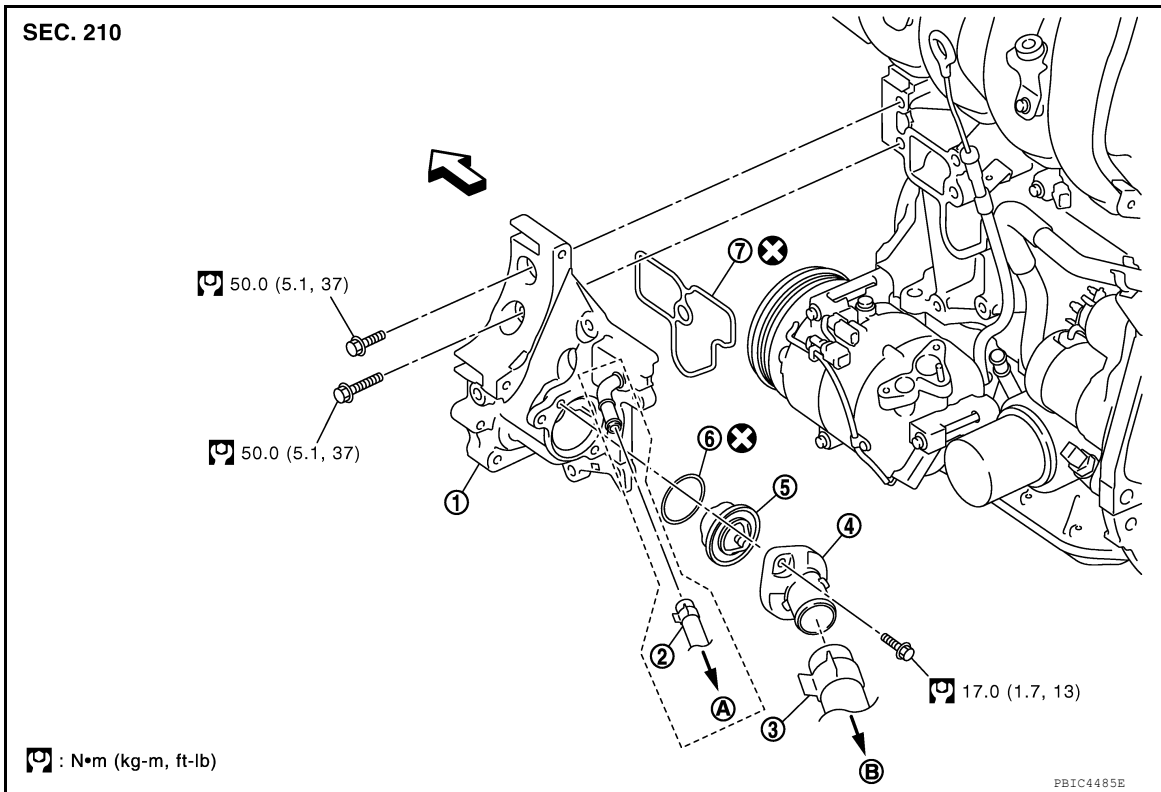
[MR20DE]

THERMOSTAT

Component

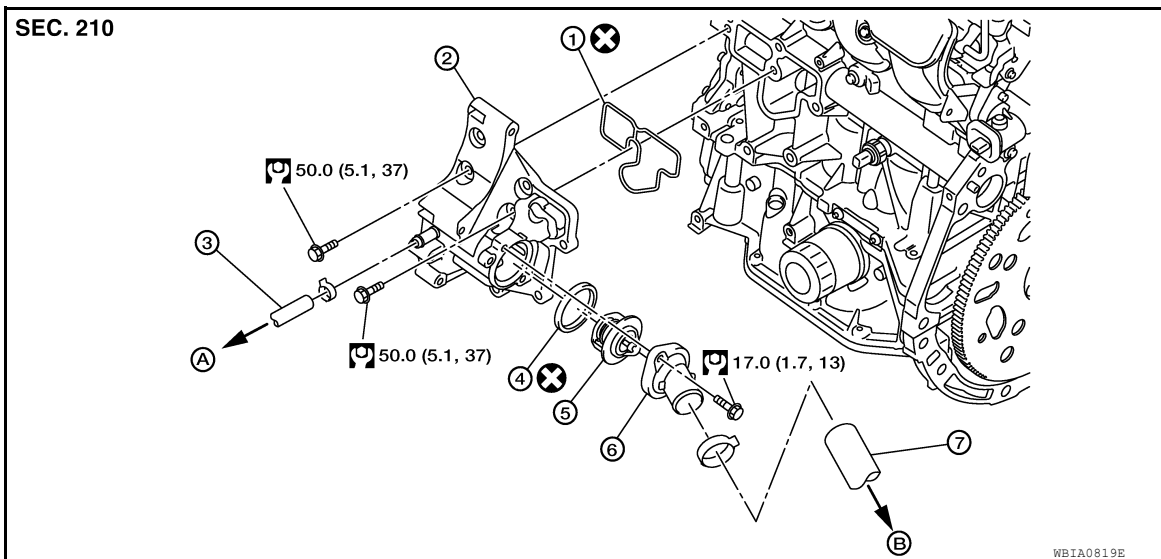
INFOID:000000007402766

M/T Models



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

CVT Models



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

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THERMOSTAT

< SERVICE INFORMATION >

[MR20DE]

INFOID:000000007402767

Removal and Installation

WARNING:

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

CAUTION:

Perform when the engine is cold.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-12, "Changing Engine Coolant"](#).
2. Remove the cooler hose (CVT only).
3. Disconnect radiator hose (lower) and remove water inlet.
4. Remove the thermostat. Discard the O-ring.

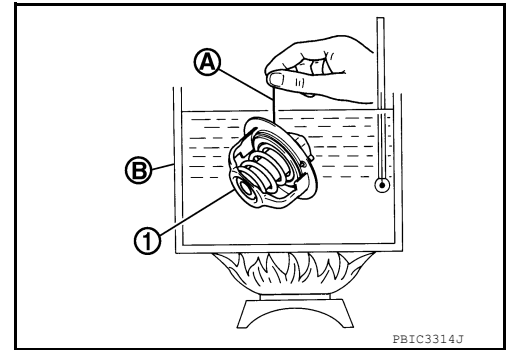
CAUTION:

Do not reuse O-ring.

5. Remove thermostat housing, if necessary.

INSPECTION AFTER REMOVAL

1. Check valve seating condition at room temperature. It should seat tightly.
2. Check valve operation.
 - Place a thread (A) so that it is caught in the valve of the thermostat (1). Immerse fully in a container filled with water (B). 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 lift amount.
 - After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
 - If the thermostat is out of specification, replace it.



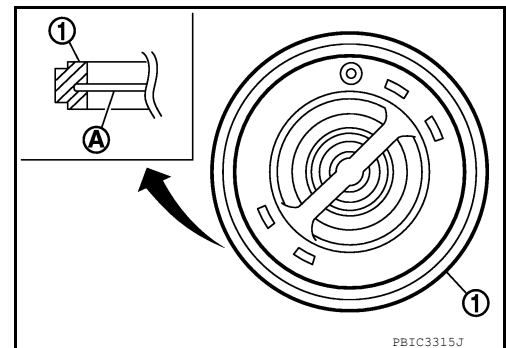
Items	Thermostat
Valve opening temperature	Refer to CO-31, "Standard and Limit" .
Full-open valve lift amount	Refer to CO-31, "Standard and Limit" .
Valve closing temperature	Refer to CO-31, "Standard and Limit" .

INSTALLATION

Installation is in the reverse order of removal.

Thermostat

- Install thermostat with the whole circumference of the flange (A) fitting securely inside of the O-ring (1).



THERMOSTAT

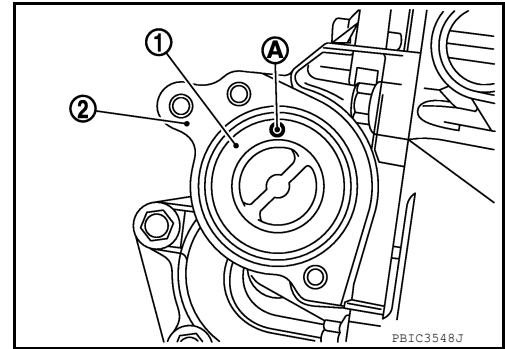
[MR20DE]

< SERVICE INFORMATION >

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

CAUTION:

Do not reuse O-ring.



Thermostat Housing

- 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.

CAUTION:

Do not reuse O-rings.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15, "MR20DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

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

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

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

*Power steering fluid, brake fluid, etc.

WATER OUTLET AND WATER CONTROL VALVE

< SERVICE INFORMATION >

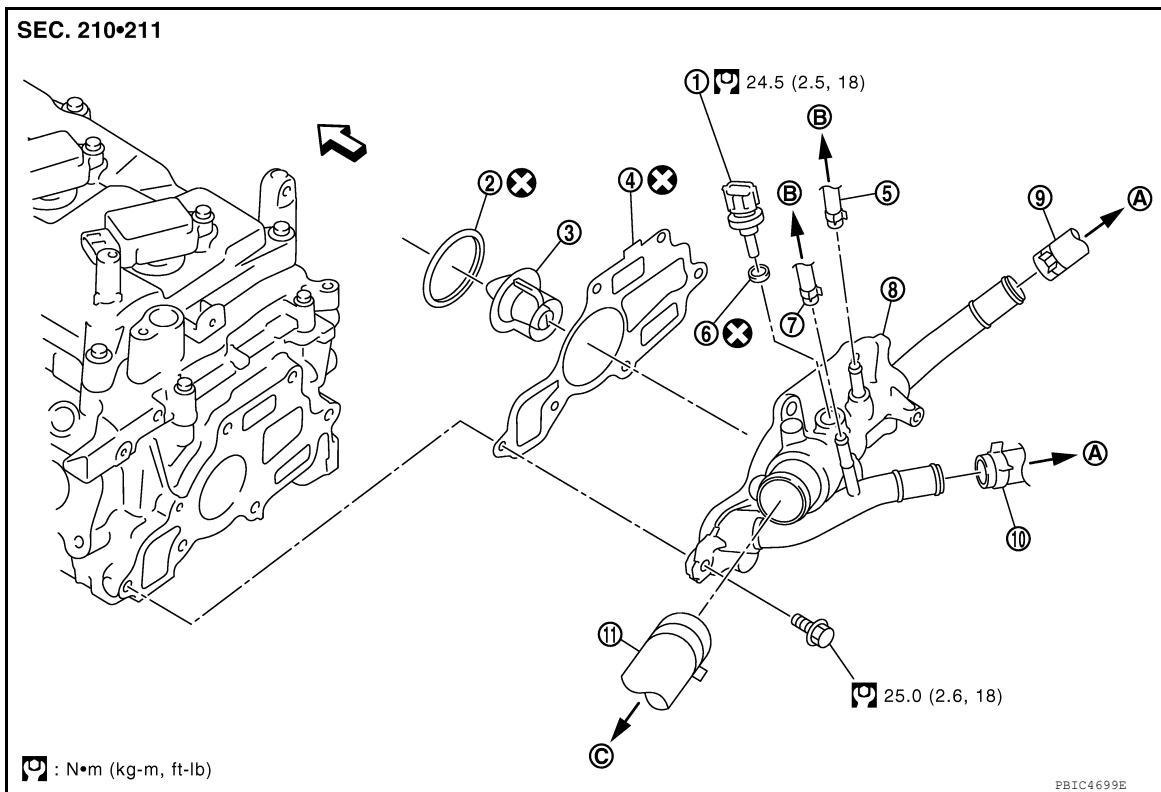
[MR20DE]

WATER OUTLET AND WATER CONTROL VALVE

Component

INFOID:000000007402768

M/T Models



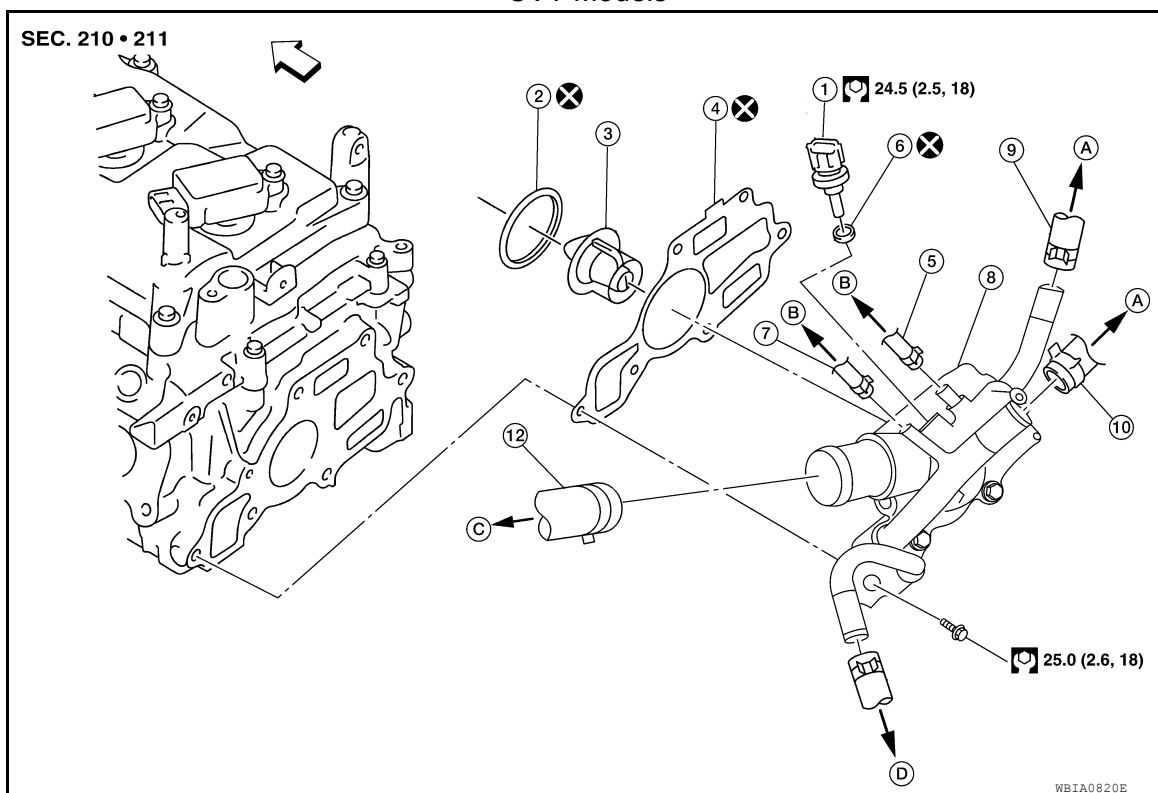
- | | | |
|--------------------------------------|--|------------------------|
| 1. Engine coolant temperature sensor | 2. O-ring | 3. Water control valve |
| 4. Gasket | 5. Water hose | 6. Gasket |
| 7. Water hose | 8. Water outlet | 9. Heater hose |
| 10. Heater hose | 11. Radiator hose (upper) | ⇐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

WATER OUTLET AND WATER CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE]

CVT Models



- | | | |
|--------------------------------------|-----------------------------------|--|
| 1. Engine coolant temperature sensor | 2. O-ring | 3. Water control valve |
| 4. Gasket | 5. Water hose | 6. Gasket |
| 7. Water hose | 8. Water outlet | 9. Heater hose |
| 10. Heater hose | 11. 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

INFOID:000000007402769

WARNING:

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

CAUTION:

Perform when the engine is cold.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-12. "Changing Engine Coolant"](#).
2. Remove air cleaner and air duct assembly. Refer to [EM-16](#).
3. Remove battery. Refer to [SC-7. "Removal and Installation \(MR20DE Battery\)"](#).
4. Remove radiator hose (upper). Refer to [CO-16](#).
5. Remove heater hoses and water hoses, (if equipped).
6. Disconnect engine coolant temperature sensor.
7. Remove water outlet.
8. Remove water control valve.
9. Remove engine coolant temperature sensor, if necessary.

CAUTION:

WATER OUTLET AND WATER CONTROL VALVE

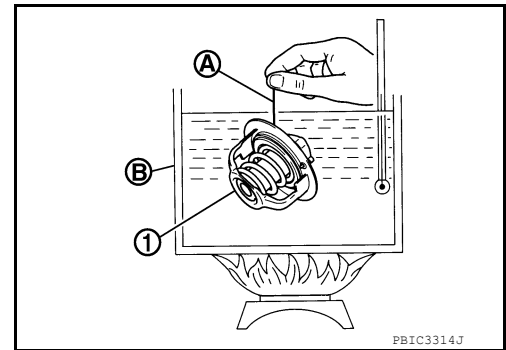
[MR20DE]

< SERVICE INFORMATION >

- Handle carefully to avoid any shock to engine coolant temperature sensor.
- Do not reuse O-ring or gasket.

INSPECTION AFTER REMOVAL

1. Check valve seating condition at room temperature. It should seat tightly.
2. Check valve operation.
 - Place a thread (A) so that it is caught in the valve of the water control valve(1). Immerse fully in a container filled with water (B). 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 lift amount.
 - After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
 - If the water control valve is out of specification, replace it.



Items	Water control valve
Valve opening temperature	Refer to CO-31, "Standard and Limit" .
Full-open valve lift amount	Refer to CO-31, "Standard and Limit" .
Valve closing temperature	Refer to CO-31, "Standard and Limit" .

INSTALLATION

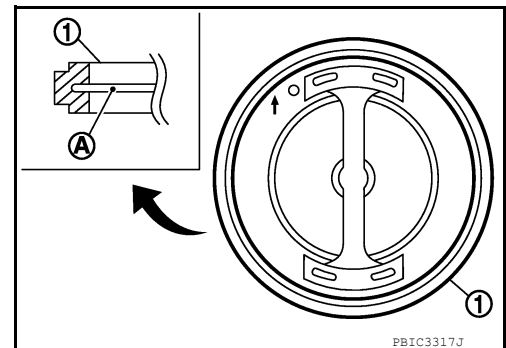
Installation is in the reverse order of removal.

Water Control Valve

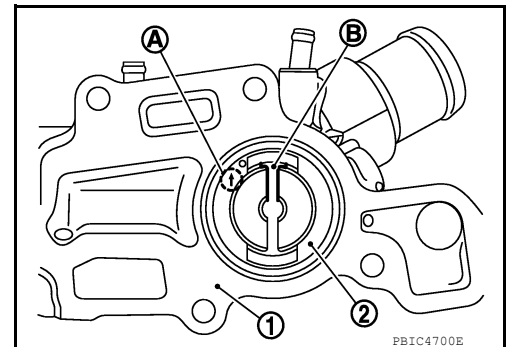
- Install water control valve with the whole circumference of the flange (A) fitting securely inside of the O-ring (1).

CAUTION:

Do not reuse O-ring.



- Install the water control valve (2) with the frame center (B) facing the water outlet (1), ensuring that mark (A) points up.



Water Outlet

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

CAUTION:

Do not reuse O-ring or gasket.

Water Hoses (M/T Models)

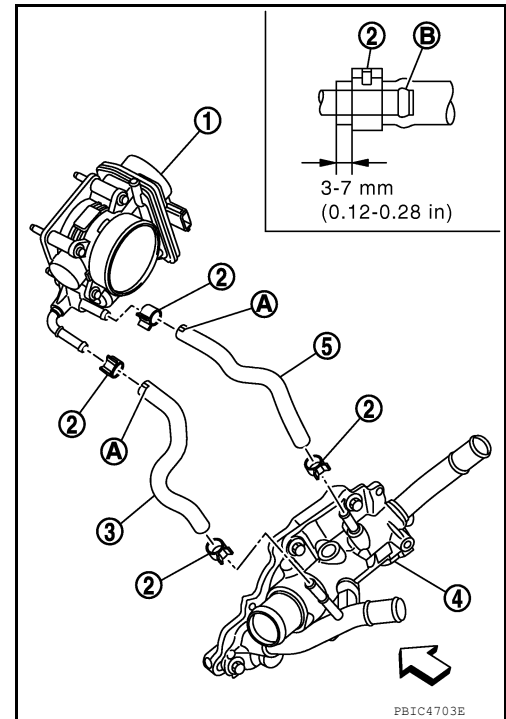
WATER OUTLET AND WATER CONTROL VALVE

[MR20DE]

< SERVICE INFORMATION >

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

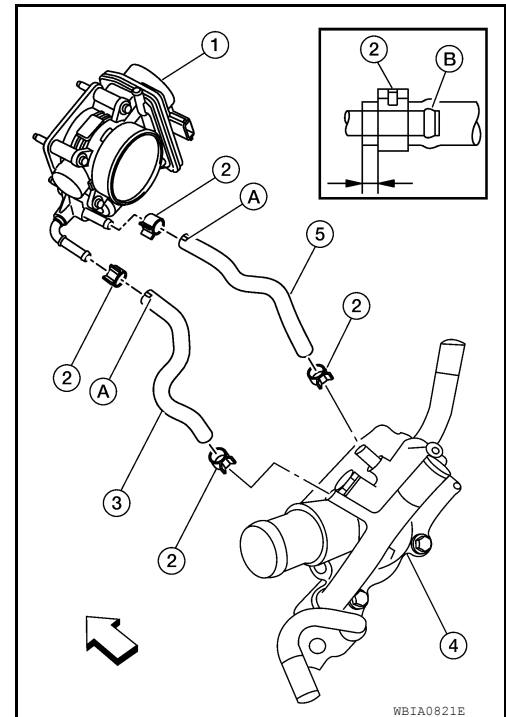
- Electric throttle control actuator (1)
- Clamp (2)
- Water outlet (4)
- Paint mark (A)
- Clamp shall not interfere with the bulged area (B)
- ⇐: Engine front



Water Hoses (CVT Models)

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

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



INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-15, "MR20DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

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

WATER OUTLET AND WATER CONTROL VALVE

[MR20DE]

< SERVICE INFORMATION >

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

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

*Power steering fluid, brake fluid, etc.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR20DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:000000007402770

CAPACITY

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (with reservoir tank at MAX level)	Approx. 7.0 (7 3/8, 6 1/8)
--	----------------------------

THERMOSTAT

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

WATER CONTROL VALVE

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

RADIATOR

Unit: kPa (kg / cm², psi)

Cap relief pressure	Standard	88 (0.9 - 1.0, 12.8)
Leakage test pressure		157 (1.6, 23)

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SERVICE INFORMATION

PRECAUTIONS

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

INFOID:000000007402771

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

WARNING:

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

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

WARNING:

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000007402772

NOTE:

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

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

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

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

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

PRECAUTIONS

[QR25DE]

< SERVICE INFORMATION >

- 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.)
- Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Liquid Gasket

INFOID:000000007402773

REMOVAL OF LIQUID GASKET SEALANT

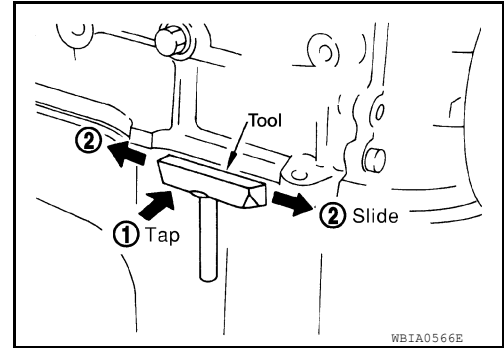
- After removing nuts and bolts, separate the mating surface and remove old liquid gasket sealant using Tool.

Tool number : KV10111100 (J-37228)

CAUTION:

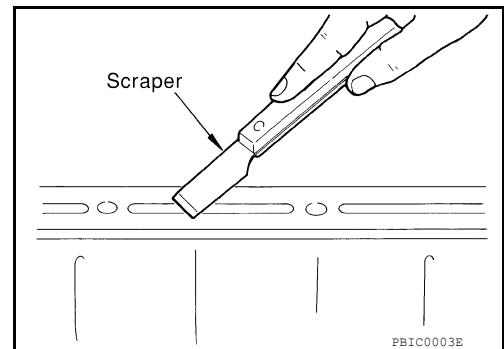
Do not damage the mating surfaces.

- Tap the seal cutter to insert it (1).
- In areas where the Tool is difficult to use, lightly tap to slide it (2).



LIQUID GASKET APPLICATION PROCEDURE

- 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.
- Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.

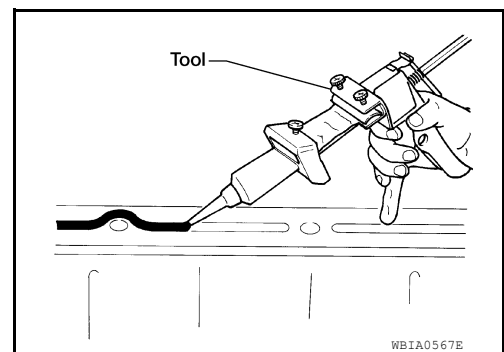


- Attach liquid gasket tube to Tool.

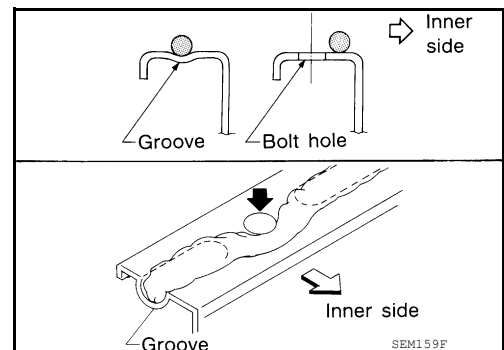
Tool number : WS39930000 (—)

Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-44, "Recommended Chemical Product and Sealant".

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



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



CAUTION:

Carefully follow all of the warnings, cautions, notes, and procedures contained in this manual.

PREPARATION

< SERVICE INFORMATION >

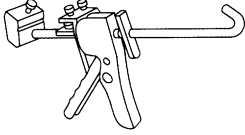
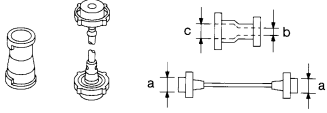
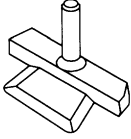
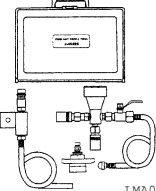
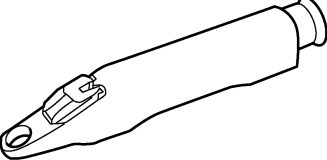
[QR25DE]

PREPARATION

Special Service Tool

INFOID:000000007402774

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

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


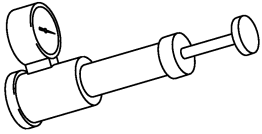
Commercial Service Tool

INFOID:000000007402775

PREPARATION

< SERVICE INFORMATION >

[QR25DE]

Tool name	Description
<p>Power tool</p>  <p style="text-align: center;">PIIB1407E</p>	<p>Loosening nuts, screws and bolts</p>
<p>Radiator cap tester</p>  <p style="text-align: center;">PBIC1982E</p>	<p>Checking radiator and radiator cap</p>

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OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[QR25DE]

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000007402776

		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	Engine cooling fans	—	
		High resistance to fan rotation			
		Damaged fan blades			
		Damaged radiator shroud	—	Radiator shroud	—
		Improper engine coolant mixture ratio	—	Engine coolant viscosity	—
		Poor engine coolant quality	—	Periodic maintenance	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp	
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	
Poor sealing					
Radiator			O-ring for damage, deterioration or improper fitting		
		Cracked radiator tank			
		Cracked radiator core			
	Reservoir tank	Cracked reservoir tank			
Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration			
		Cylinder head gasket deterioration			

OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[QR25DE]

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

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COOLING SYSTEM

[QR25DE]

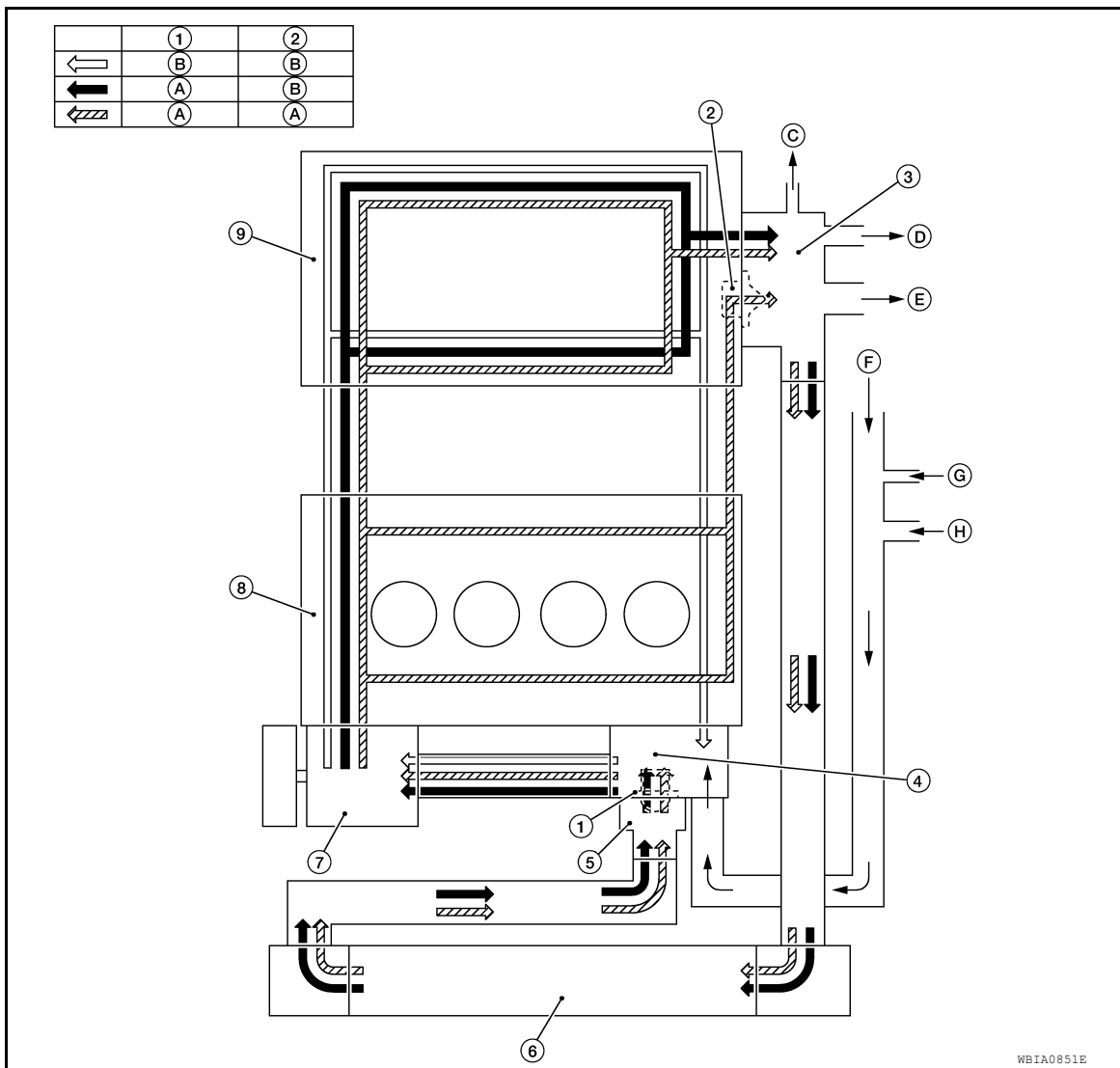
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COOLING SYSTEM

Cooling Circuit

INFOID:000000007402777

M/T Models



WBIA0851E

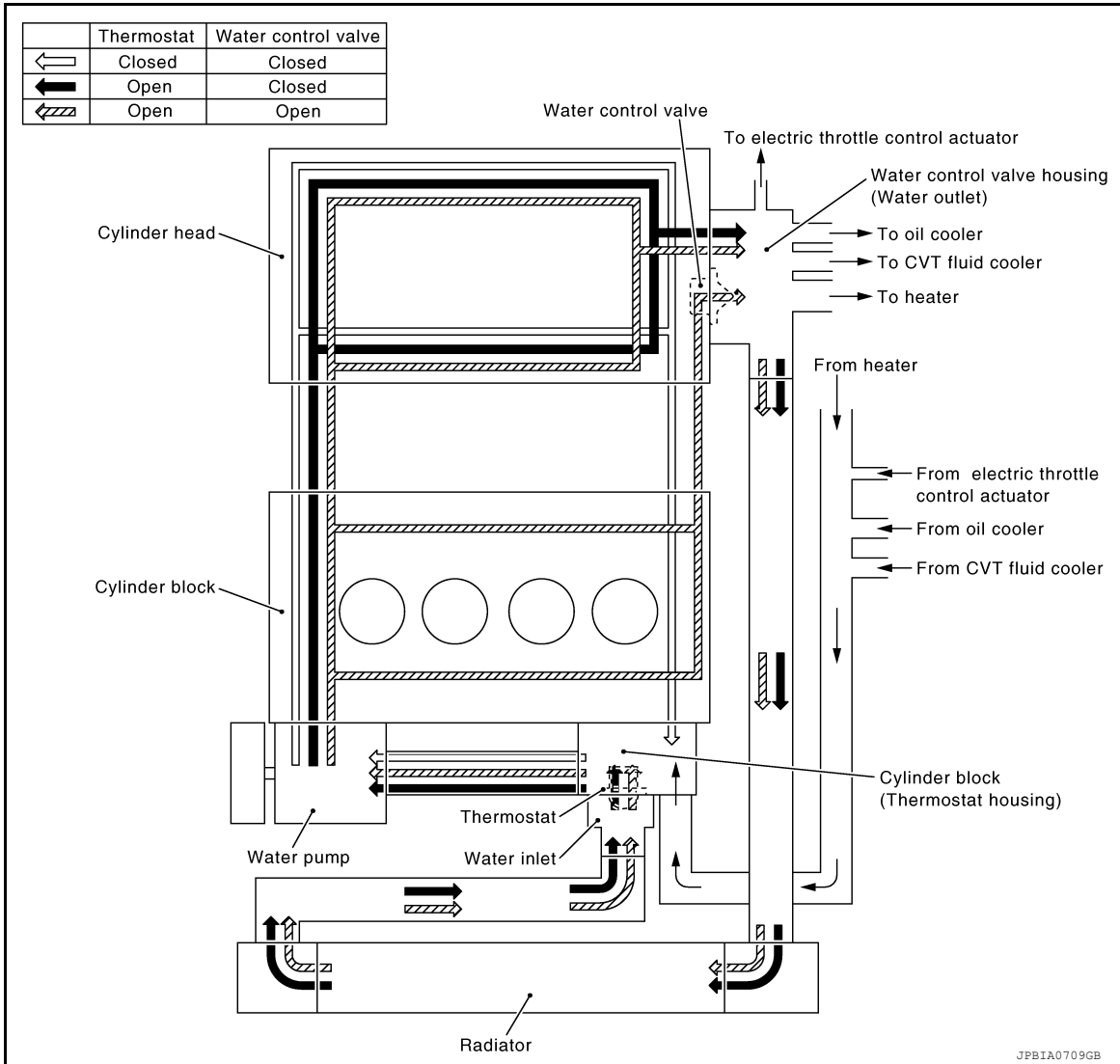
- | | | |
|--|------------------------|---|
| 1. Thermostat | 2. Water control valve | 3. Water control valve housing (Water outlet) |
| 4. Cylinder block (Thermostat housing) | 5. Water inlet | 6. Radiator |
| 7. Water pump | 8. Cylinder block | 9. Cylinder head |
| A. Open | B. Closed | C. To electric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

COOLING SYSTEM

< SERVICE INFORMATION >

[QR25DE]

CVT Models



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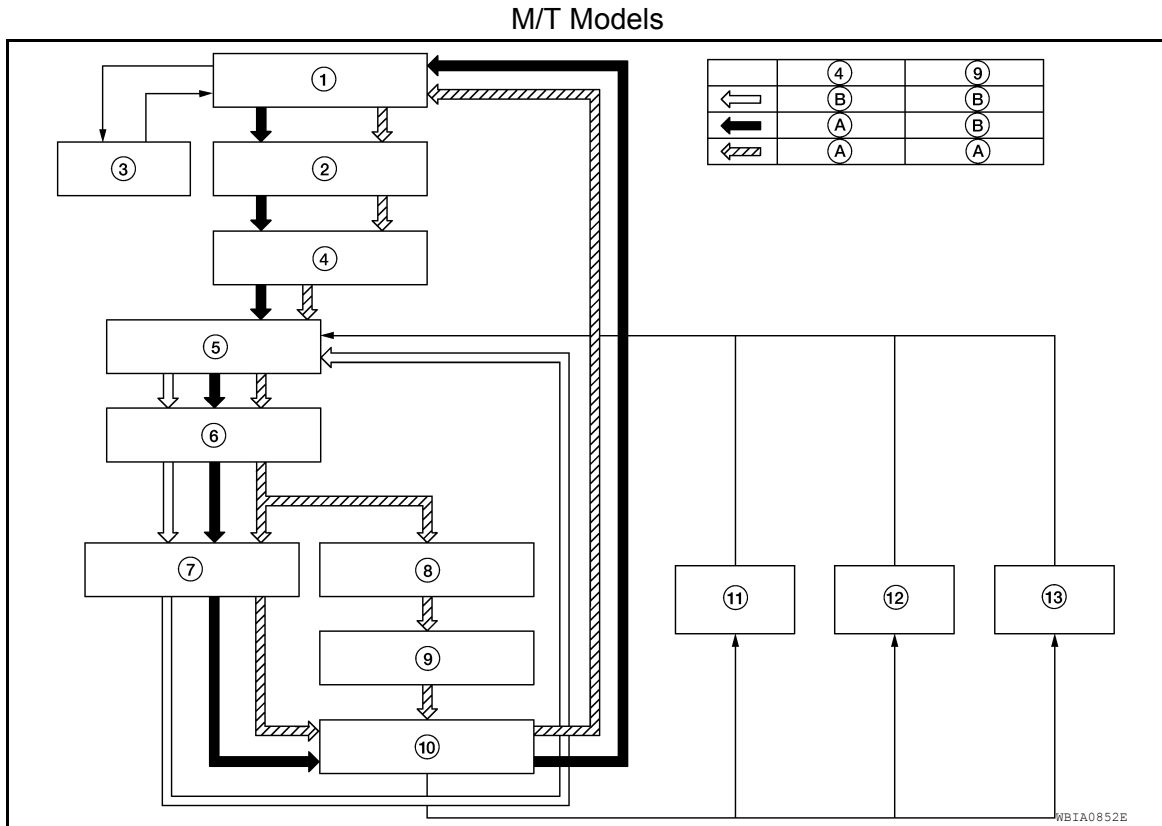
COOLING SYSTEM

< SERVICE INFORMATION >

[QR25DE]

Schematic

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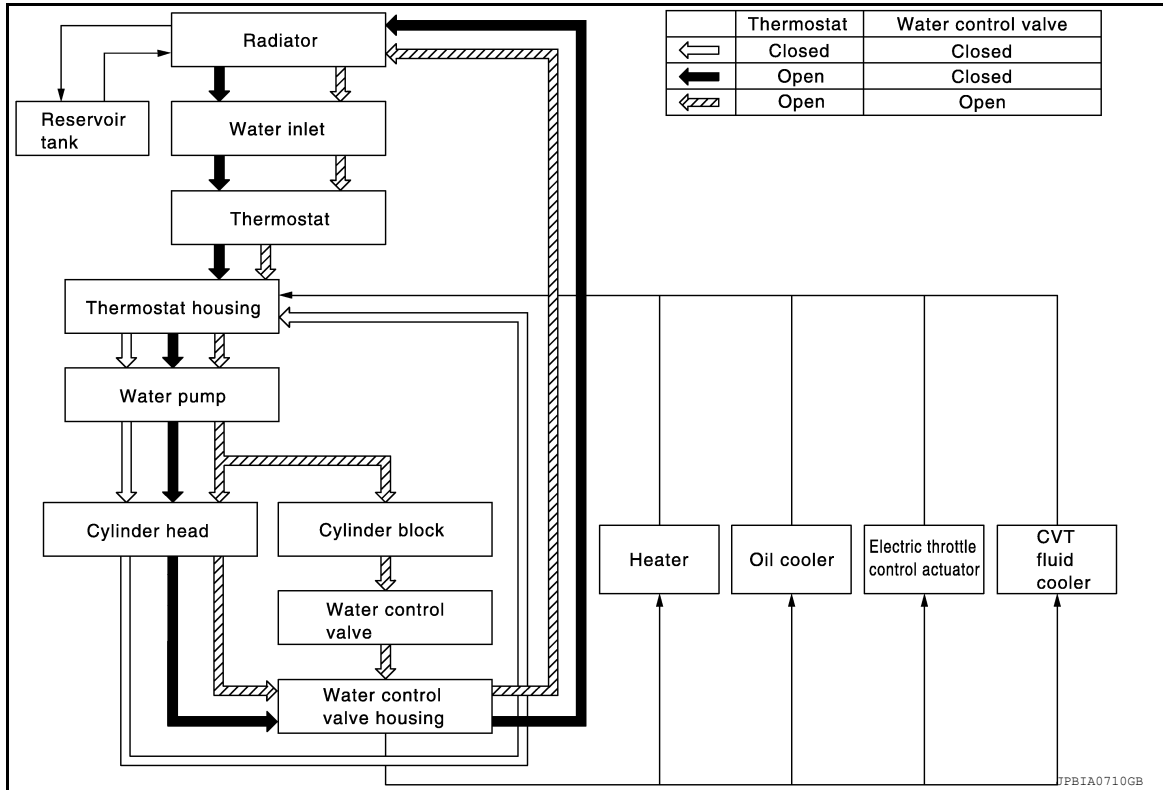
- | | | |
|--|-----------------------|------------------------|
| 1. Radiator | 2. Water inlet | 3. Reservoir tank |
| 4. Thermostat | 5. Thermostat housing | 6. Water pump |
| 7. Cylinder head | 8. Cylinder block | 9. Water control valve |
| 10. Water control valve housing | 11. Heater | 12. Oil cooler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

COOLING SYSTEM

< SERVICE INFORMATION >

[QR25DE]

CVT Models



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ENGINE COOLANT

Inspection

INFOID:000000007402779

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.

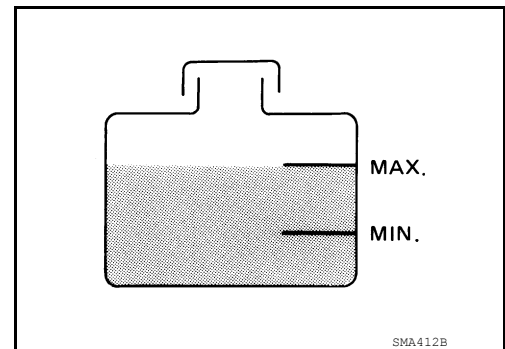
CHECKING COOLING SYSTEM HOSES

Check hoses for the following:

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

CHECKING RESERVOIR LEVEL

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



CHECKING COOLING SYSTEM FOR LEAKS

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

Tool number : EG17650301 (J-33984-A)

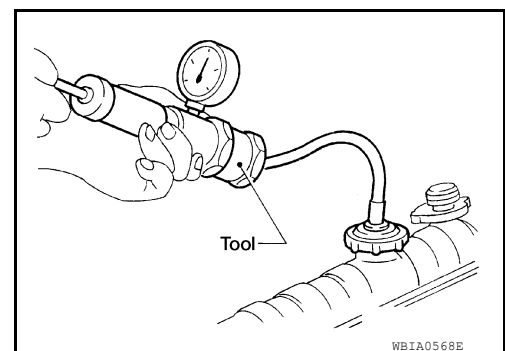
Testing pressure : 88 kPa (0.9 kg/cm², 12.8 psi)

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.

CAUTION:

Higher pressure than specified may cause radiator damage.



CHECKING RADIATOR CAP

ENGINE COOLANT

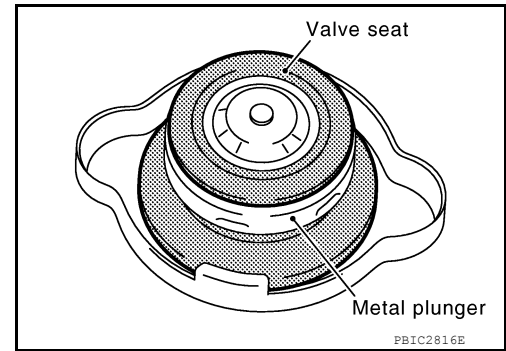
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< SERVICE INFORMATION >

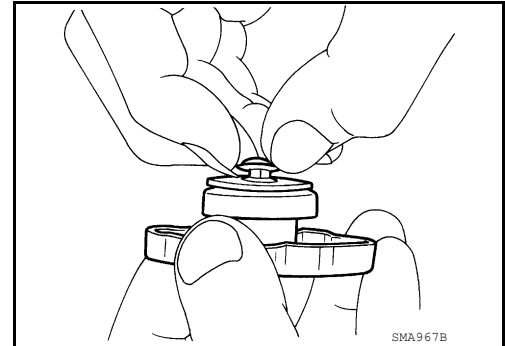
1. Inspect the radiator cap.
 - Replace the cap if the metal plunger cannot be seen around the edge of the black rubber gasket.
 - Replace the cap if deposits of waxy residue or other foreign material are on the black rubber gasket or the metal retainer.

CAUTION:

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

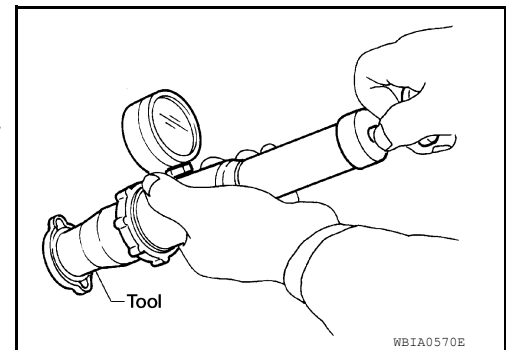


2. Pull the negative-pressure valve to open it and check that it closes completely when released.
 - Check that there is no dirt or damage on the valve seat of the radiator cap negative-pressure valve.
 - Check that there are no abnormalities in the opening and closing conditions of the negative-pressure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



3. Check radiator cap relief pressure using suitable tool.
 - When connecting the radiator cap to the tester, apply water or coolant to the cap seal surface.
 - Replace the radiator cap if there is any damage in the negative-pressure valve, or if the open-valve pressure is outside of the standard specifications.

Standard: 88 kPa (0.9 kg/cm², 12.8 psi)



CHECKING RADIATOR

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

CAUTION:

- **Be careful not to bend or damage the radiator fins.**
- **When radiator is cleaned on-vehicle, remove surrounding parts in order to access the radiator core. Tape the harness and electrical connectors to prevent water from entering.**

1. Spray water to the back side of the radiator core using a side to side motion from the top down.
2. Stop spraying when debris no longer flows from radiator core.
3. Blow air into the back side of radiator core using a side to side motion from the top down.
 - Use compressed air lower than 490 kPa (5 kg/cm², 71 psi) and keep distance more than 30 cm (11.8 in).
4. Continue to blow air until no water sprays out.
5. Check for coolant leaks. Repair as necessary.

Changing Engine Coolant

INFOID:000000007402780

WARNING:

- **To avoid being scalded, do not change the engine coolant when the 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 push down and turn the cap all the way to remove.**
- **Be careful not to allow engine coolant to contact drive belt.**

DRAINING ENGINE COOLANT

ENGINE COOLANT

[QR25DE]

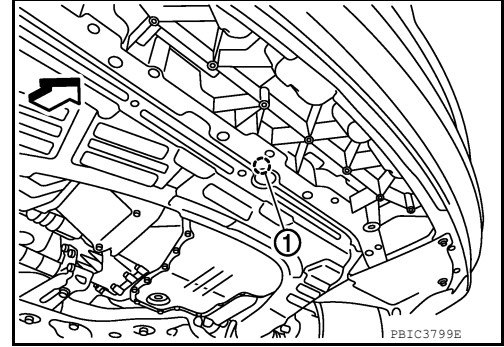
< SERVICE INFORMATION >

1. Remove the engine undercover. Refer to [EI-15, "Removal and Installation"](#).
2. Open the radiator drain plug (1) 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).

• ← Front

CAUTION:

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

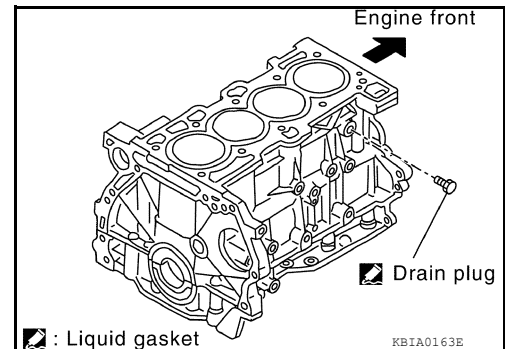


3. Follow this step for heater core removal/replacement only. Disconnect the upper heater hose at the engine side and apply moderate air pressure [103.46 kPa (15 psi, 1.055 kg/cm²) maximum air pressure] into the hose for 30 seconds to blow the excess coolant out of the heater core.
4. When draining all of the coolant in the system, remove the reservoir tank and drain the coolant, then clean the reservoir tank before installation.

CAUTION:

Do not allow the coolant to contact drive belt.

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



6. Check the drained engine coolant for contaminants such as rust, corrosion or discoloration. Flush the engine cooling system if the coolant is contaminated. Follow the "FLUSHING COOLING SYSTEM" procedure.

REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug as necessary.
 - 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 Product and Sealant"](#).

Radiator drain plug : Refer to **DRAINING ENGINE COOLANT**.

Cylinder block drain plug : Refer to [EM-190](#).

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.

ENGINE COOLANT

[QR25DE]

< SERVICE INFORMATION >

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.

CAUTION:

Do not use any cooling system additives such as radiator sealer. Additives may clog the cooling system and cause damage to the engine, transmission and/or cooling system.

NOTE:

Use the recommended coolant or equivalent. Refer to [MA-16, "Anti-Freeze Mixture Ratio"](#).

Engine coolant capacity : Refer to [MA-15, "MR20DE"](#).
(with reservoir tank)

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

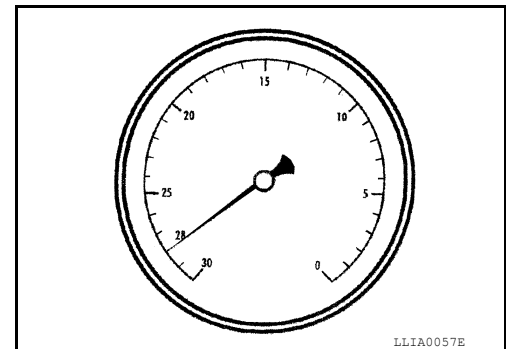
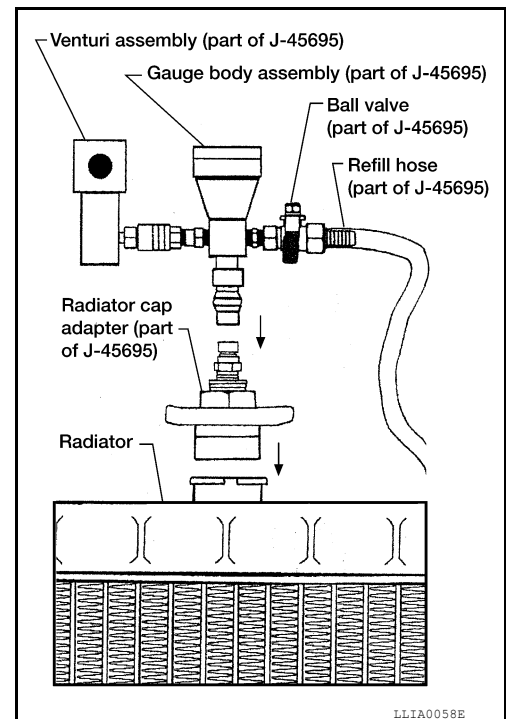
Compressed air supply pressure : 549 - 824 kPa (5.6 - 8.4 kg/cm²,
80 - 119 psi)

CAUTION:

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

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



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.
13. Install the engine undercover. Refer to [EI-15, "Removal and Installation"](#).

FLUSHING COOLING SYSTEM

ENGINE COOLANT

[QR25DE]

< SERVICE INFORMATION >

1. Fill radiator and reservoir tank with water and install radiator cap.
2. Run engine until it reaches normal operating temperature.
3. Rev the engine two or three times under no-load.
4. Stop the engine and wait until it cools down.
5. Drain water from the cooling system.
6. Repeat steps 1 through 5 until clear water begins to drain from the radiator.

RADIATOR

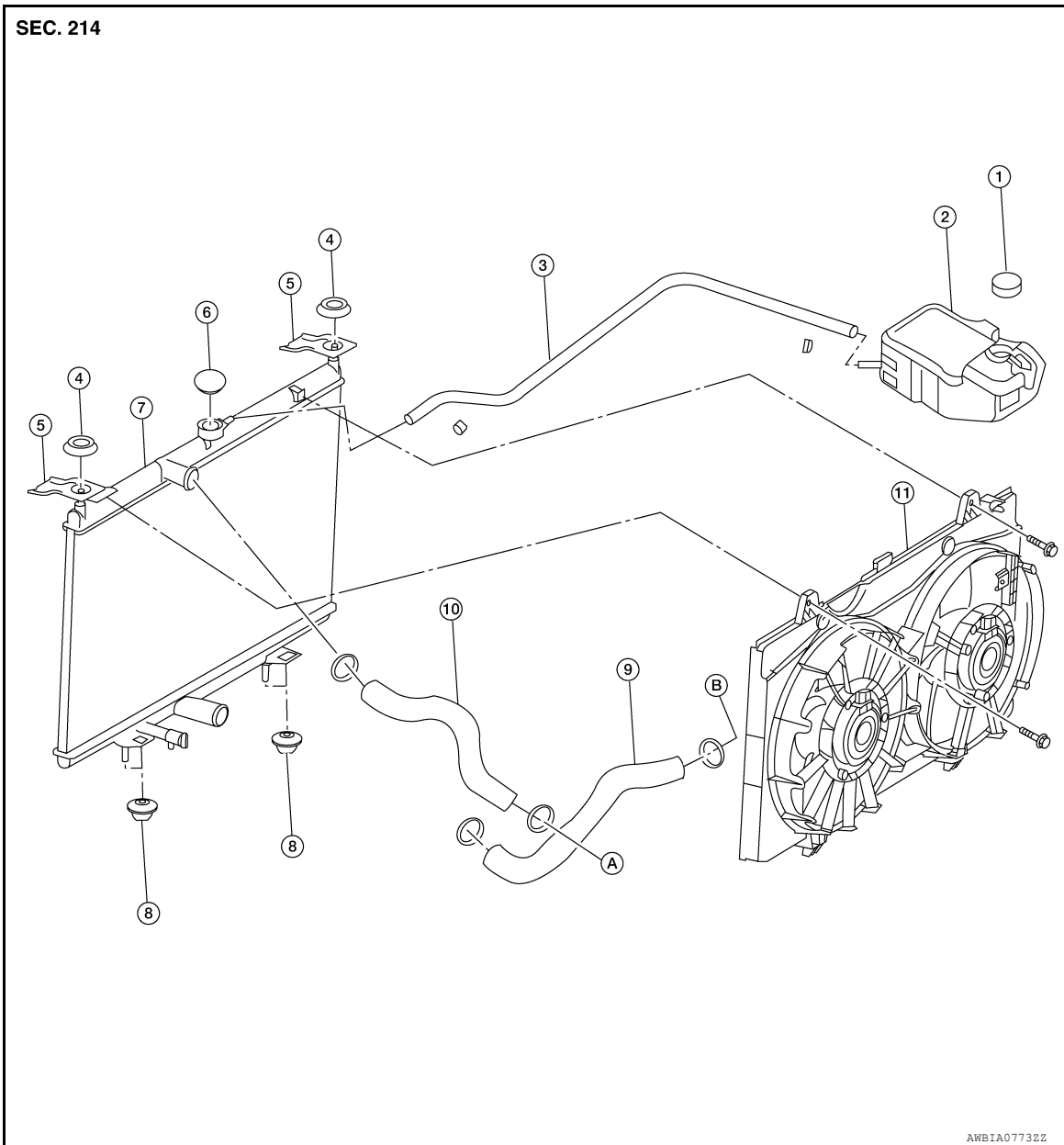
< SERVICE INFORMATION >

[QR25DE]

RADIATOR

Component

INFOID:000000007402781



- | | | |
|----------------------------|----------------------------|--------------------------|
| 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

INFOID:000000007402782

WARNING:

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

NOTE:

RADIATOR

[QR25DE]

< SERVICE INFORMATION >

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-43. "Changing Engine Coolant"](#).
CAUTION:
 - Perform this step when engine is cold.
 - Do not spill engine coolant on drive belt
2. Remove front air duct. Refer to [EM-133. "Removal and Installation"](#).
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 cooling fan assembly.
7. Remove radiator upper mounts.
8. Move the radiator assembly to the rearward direction of vehicle, and then lift it upward to remove.
CAUTION:
 - Do not damage or scratch A/C condenser and radiator core when removing.

INSPECTION AFTER REMOVAL

Inspect radiator for leaks as follows:

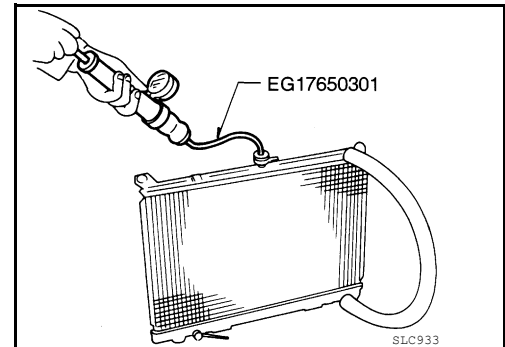
- Apply pressure using suitable tool and Tool.

Specified pressure value : 157 kPa (1.6 kg/cm², 23 psi)

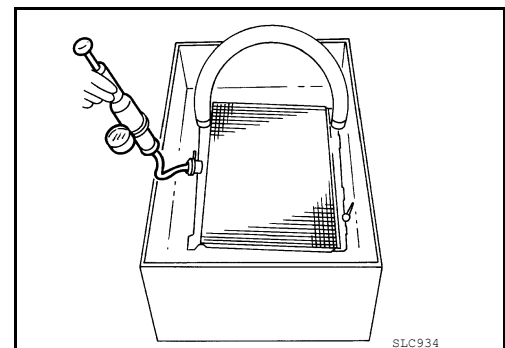
Tool number : EG17650301 (J-33984-A)

WARNING:

To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.



- Check for leakage.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Do not damage or scratch A/C condenser and radiator core when installing.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-16. "Anti-Freeze Mixture Ratio"](#) and [MA-15. "QR25DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

RADIATOR

[QR25DE]

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

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

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

*Power steering fluid, brake fluid, etc.

COOLING FAN

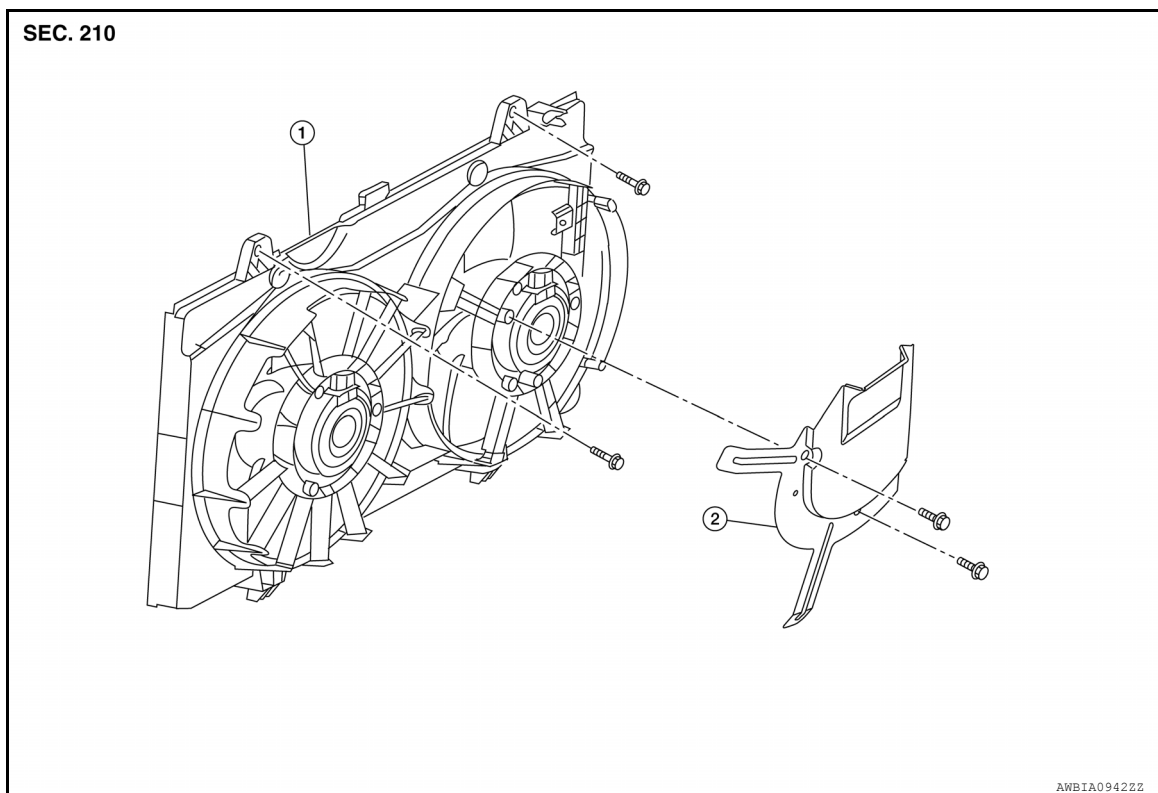
< SERVICE INFORMATION >

[QR25DE]

COOLING FAN

Component

INFOID:000000007402783



1. Cooling fan assembly
2. Radiator shroud (if equipped)

Removal and Installation

INFOID:000000007402784

WARNING:

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

NOTE:

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

REMOVAL

1. Partially drain engine coolant from radiator. Refer to [CO-43, "Changing Engine Coolant"](#).
CAUTION:
 - Perform this step when engine is cold.
 - Do not spill engine coolant on drive belt.
2. Remove front air duct. Refer to [EM-133, "Removal and Installation"](#).
3. Disconnect radiator hose (upper) at radiator side. Refer to [CO-47, "Component"](#).
4. Disconnect harness connectors from fan motor, and position harness aside.
5. Remove cooling fan assembly.
CAUTION:
Be careful not to damage or scratch the radiator core.

INSTALLATION

Installation is in the reverse order of removal.

- Cooling fans are controlled by ECM. For details, refer to [EC-1566](#).

CAUTION:

COOLING FAN

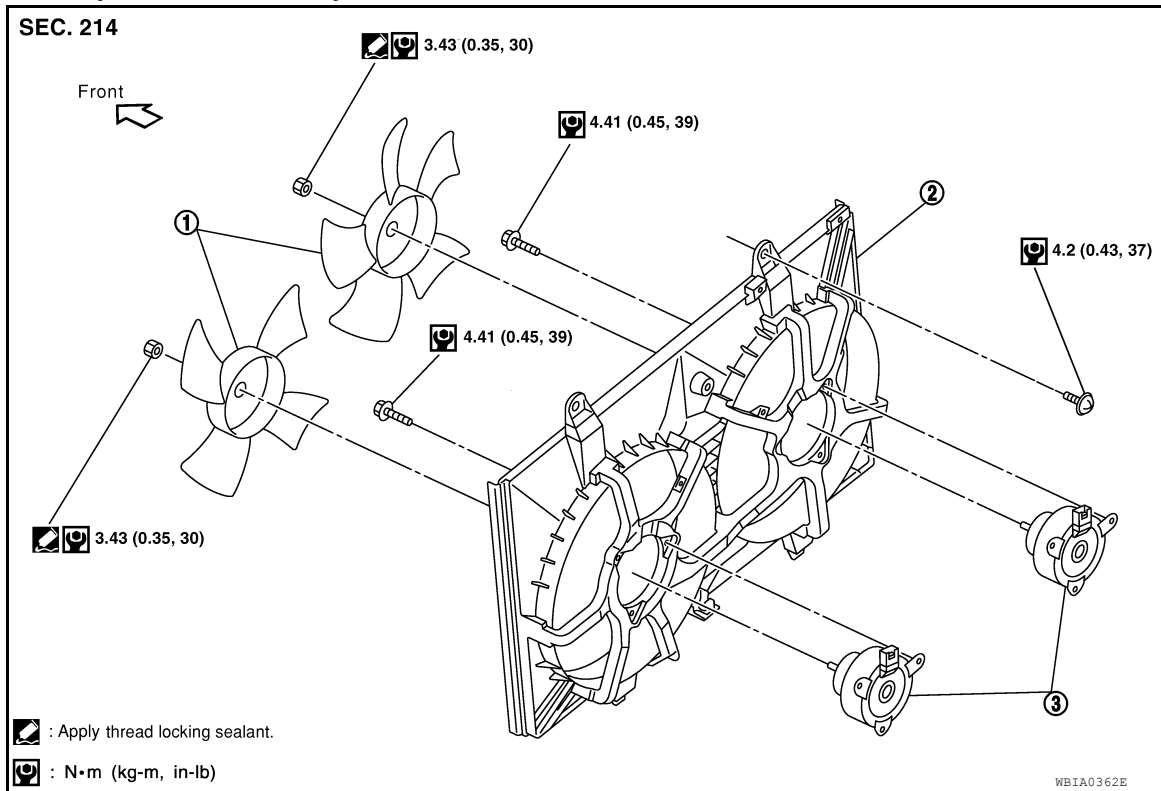
< SERVICE INFORMATION >

[QR25DE]

Be careful not to damage or scratch the radiator core.

Disassembly and Assembly

INFOID:000000007402785



1. Fan blade

2. Fan shroud

3. Fan motor

DISASSEMBLY

1. Remove fan blades from fan motors.
2. Remove fan motors from fan shroud.

ASSEMBLY

Assembly is in the reverse order of disassembly.

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WATER PUMP

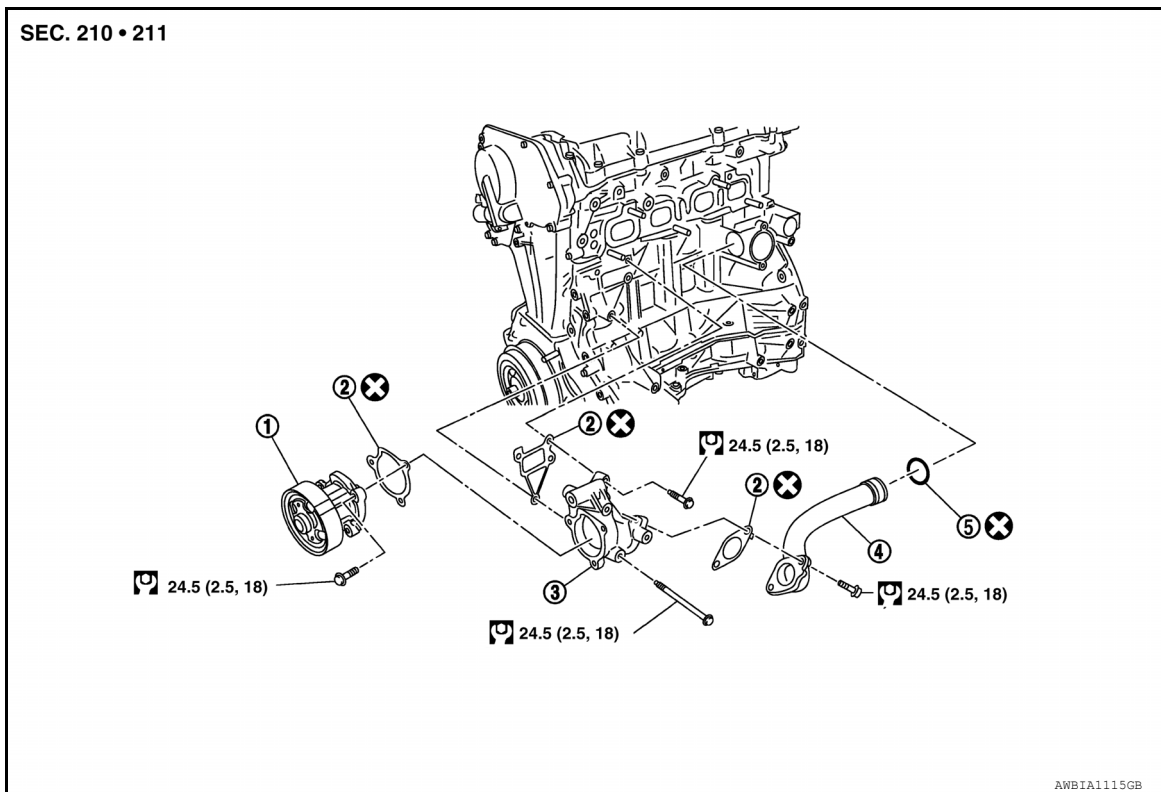
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[QR25DE]

WATER PUMP

Component

INFOID:000000007402786



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

Removal and Installation

INFOID:000000007402787

WARNING:

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

CAUTION:

- When removing water pump assembly, be careful not to get coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using a radiator cap tester.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-43, "Changing Engine Coolant"](#).

CAUTION:

Perform this step when the engine is cold.

2. Remove RH wheel and tire assembly. Refer to [WT-7, "Adjustment"](#).
3. Remove the front air duct. Refer to [EM-133, "Removal and Installation"](#).
4. Remove the generator and bracket. Refer to [SC-42, "Removal and Installation QR25DE"](#).
5. Remove engine ground strap.
6. Remove the water pump.

WATER PUMP

[QR25DE]

< SERVICE INFORMATION >

CAUTION:

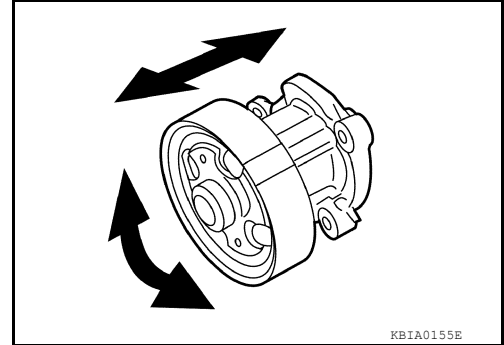
- Handle the water pump vane so that it does not contact any other parts.
- Water pump cannot be disassembled and should be replaced as an assembly.

NOTE:

If necessary, the exhaust manifold catalytic convertor assembly must be removed to remove the water pipe.

INSPECTION AFTER REMOVAL

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



INSTALLATION

- Installation is in the reverse order of removal.
- When inserting water pipe end to cylinder block, apply a mild soap to the O-ring. Then insert it immediately.

CAUTION:

Do not reuse O-ring or gaskets.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-16, "Anti-Freeze Mixture Ratio"](#) and [MA-15, "QR25DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

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

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

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

*Power steering fluid, brake fluid, etc.

THERMOSTAT AND THERMOSTAT HOUSING

< SERVICE INFORMATION >

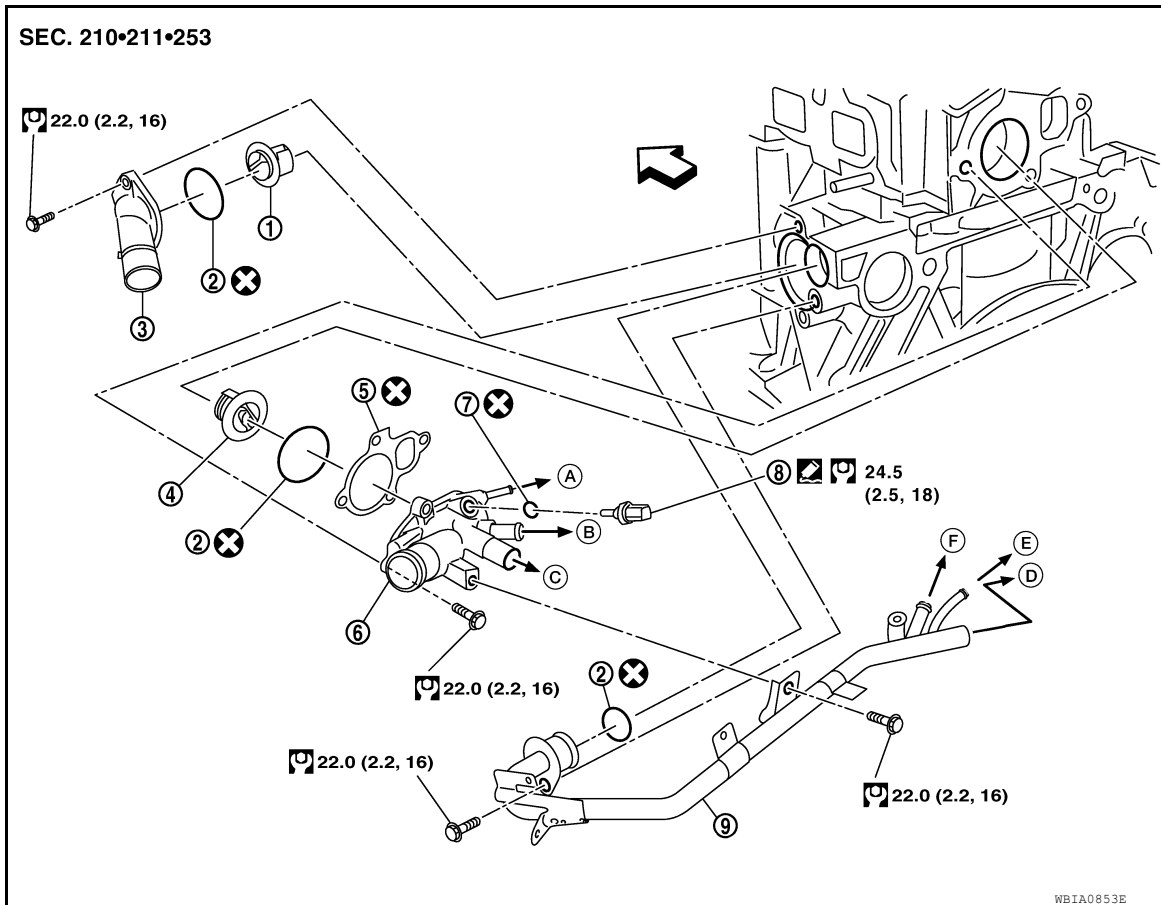
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THERMOSTAT AND THERMOSTAT HOUSING

Component

INFOID:000000007402788

M/T Models



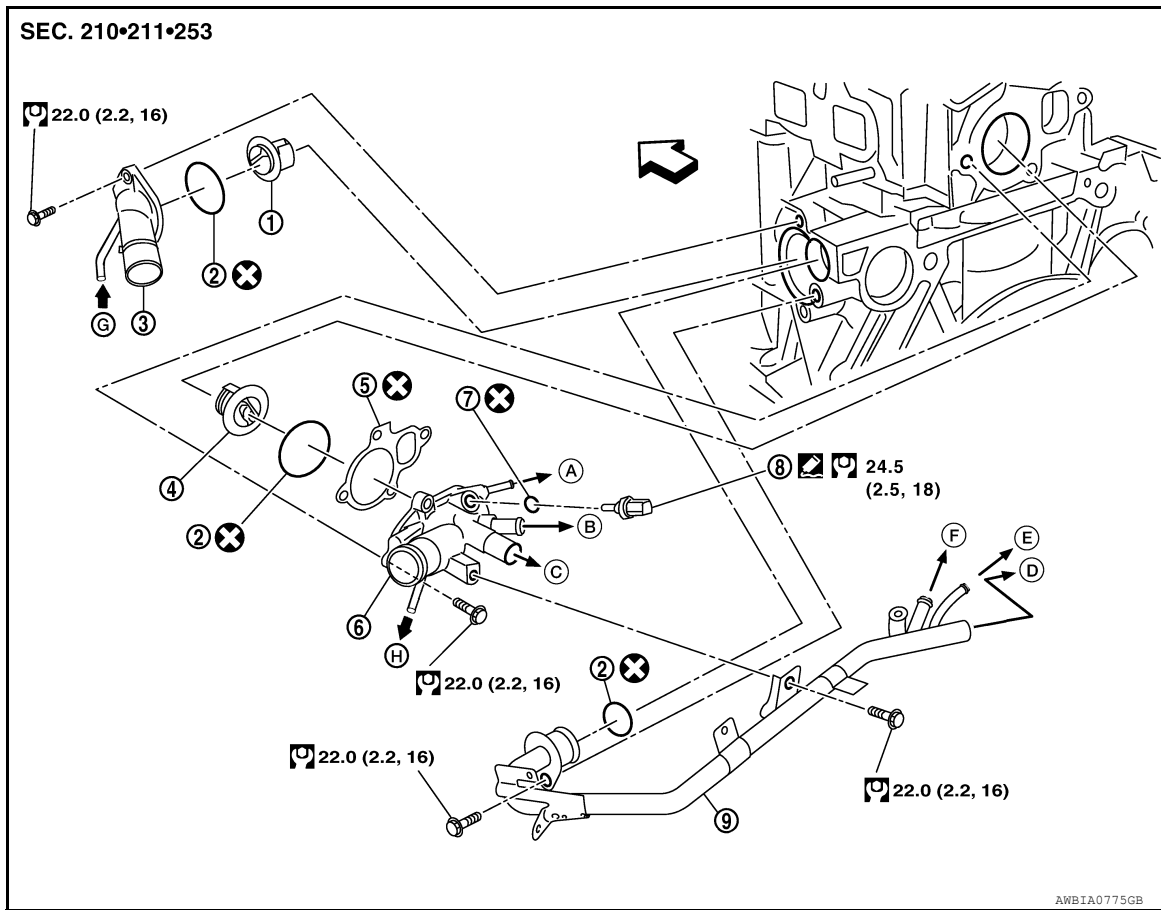
- | | | |
|--|--|--------------------------|
| 1. Thermostat | 2. O-ring | 3. Engine coolant inlet |
| 4. Water control valve | 5. Gasket | 6. Engine coolant outlet |
| 7. Copper washer | 8. Engine coolant temperature sensor | 9. Heater pipe |
| A. To electric throttle control actuator | B. To oil cooler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

THERMOSTAT AND THERMOSTAT HOUSING

< SERVICE INFORMATION >

[QR25DE]

CVT Models



- | | | |
|--|--|--------------------------|
| 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 electric throttle control actuator | B. To oil cooler | C. To heater core |
| D. To heater core | E. To electric throttle control actuator | F. To oil cooler |
| G. From CVT oil cooler | H. To CVT oil cooler | ⇐ Engine front |

Removal and Installation

INFOID:000000007402789

WARNING:

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

CAUTION:

Perform when the engine is cold.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-43, "Changing Engine Coolant"](#).
2. Remove front air duct. Refer to [EM-133, "Removal and Installation"](#).
3. Remove radiator hose (lower) from the engine coolant inlet side.
4. Remove engine coolant inlet, O-ring, gasket and thermostat. Discard the o-ring and gasket.

CAUTION:

Do not reuse O-ring or gasket.

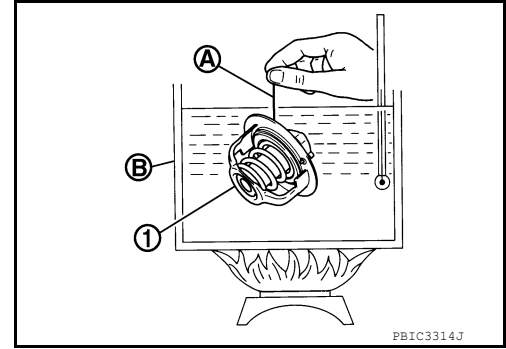
INSPECTION AFTER REMOVAL

THERMOSTAT AND THERMOSTAT HOUSING

[QR25DE]

< SERVICE INFORMATION >

1. Check valve seating condition at room temperature. It should seat tightly.
2. Check valve operation.
 - Place a thread (A) so that it is caught in the valve of the thermostat (1). Immerse fully in a container filled with water (B). 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 lift amount.
 - After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
 - If the thermostat is out of specification, replace it.



PB1C3314J

Items	Thermostat
Valve opening temperature	Refer to CO-62. "Thermostat" .
Full-open valve lift amount	Refer to CO-62. "Thermostat" .
Valve closing temperature	Refer to CO-62. "Thermostat" .

INSTALLATION

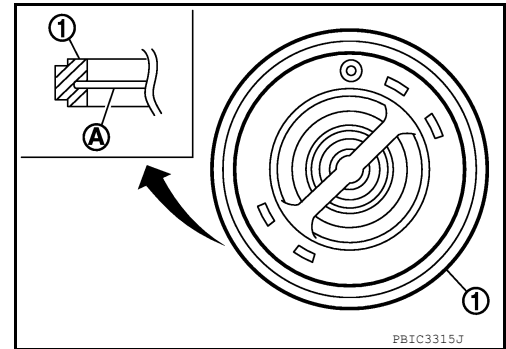
Installation is in the reverse order of removal.

Thermostat

- Install thermostat with the whole circumference of the flange (A) fitting securely inside of the O-ring (1).

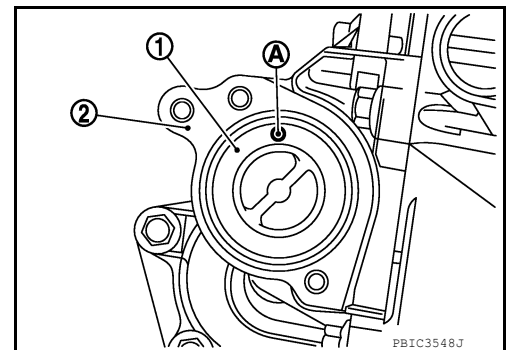
CAUTION:

Do not reuse O-ring.



PB1C3315J

- Install thermostat (1) into the thermostat housing (2) with jiggle valve (A) facing upwards.
- Install the heater pipe by first applying a mild soap to the O-ring and then insert the pipe into the housing.



PB1C3548J

Thermostat Housing

- Securely insert the O-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.

CAUTION:

Do not reuse O-ring.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-16. "Anti-Freeze Mixture Ratio"](#) and [MA-15. "QR25DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.

THERMOSTAT AND THERMOSTAT HOUSING

< SERVICE INFORMATION >

[QR25DE]

- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

A

NOTE:

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

CO

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

C

D

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

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*Power steering fluid, brake fluid, etc.

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WATER CONTROL VALVE

< SERVICE INFORMATION >

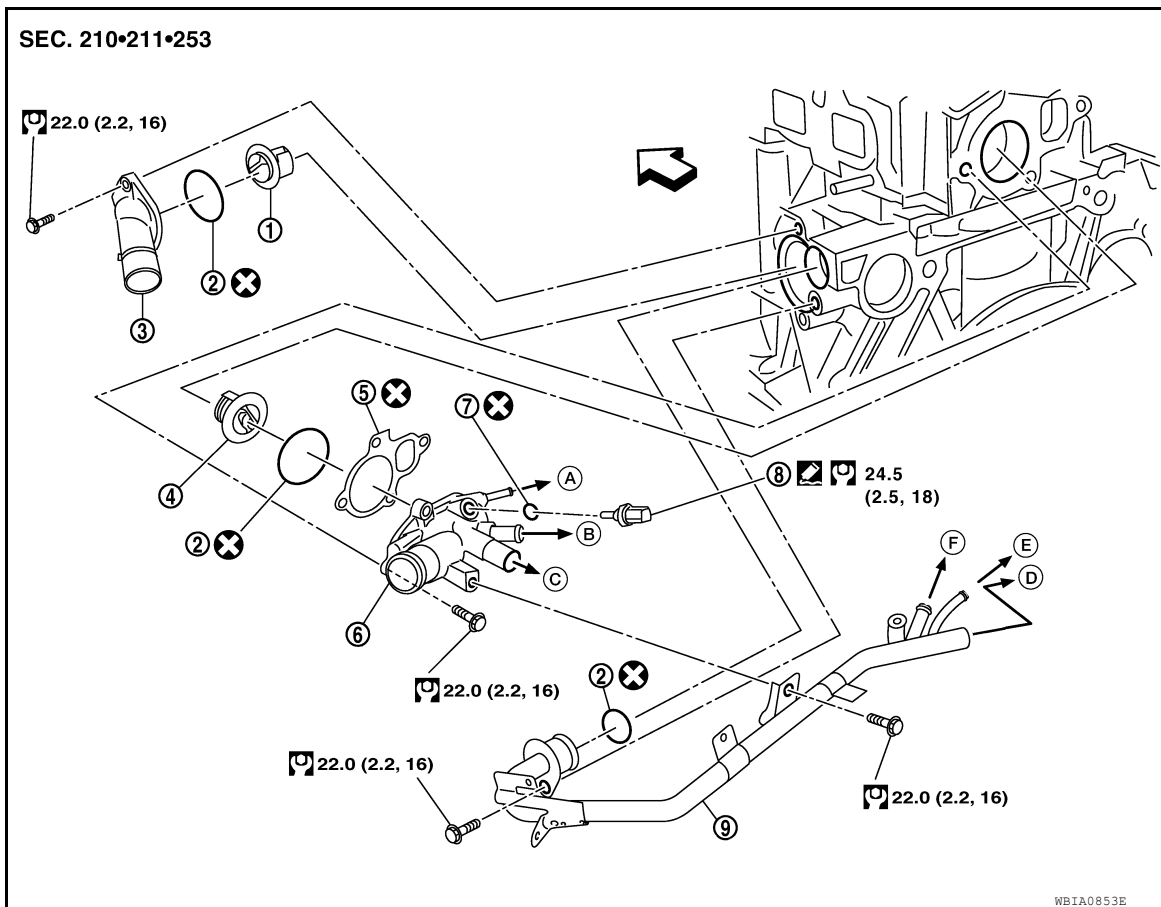
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WATER CONTROL VALVE

Component

INFOID:000000007402790

M/T Models



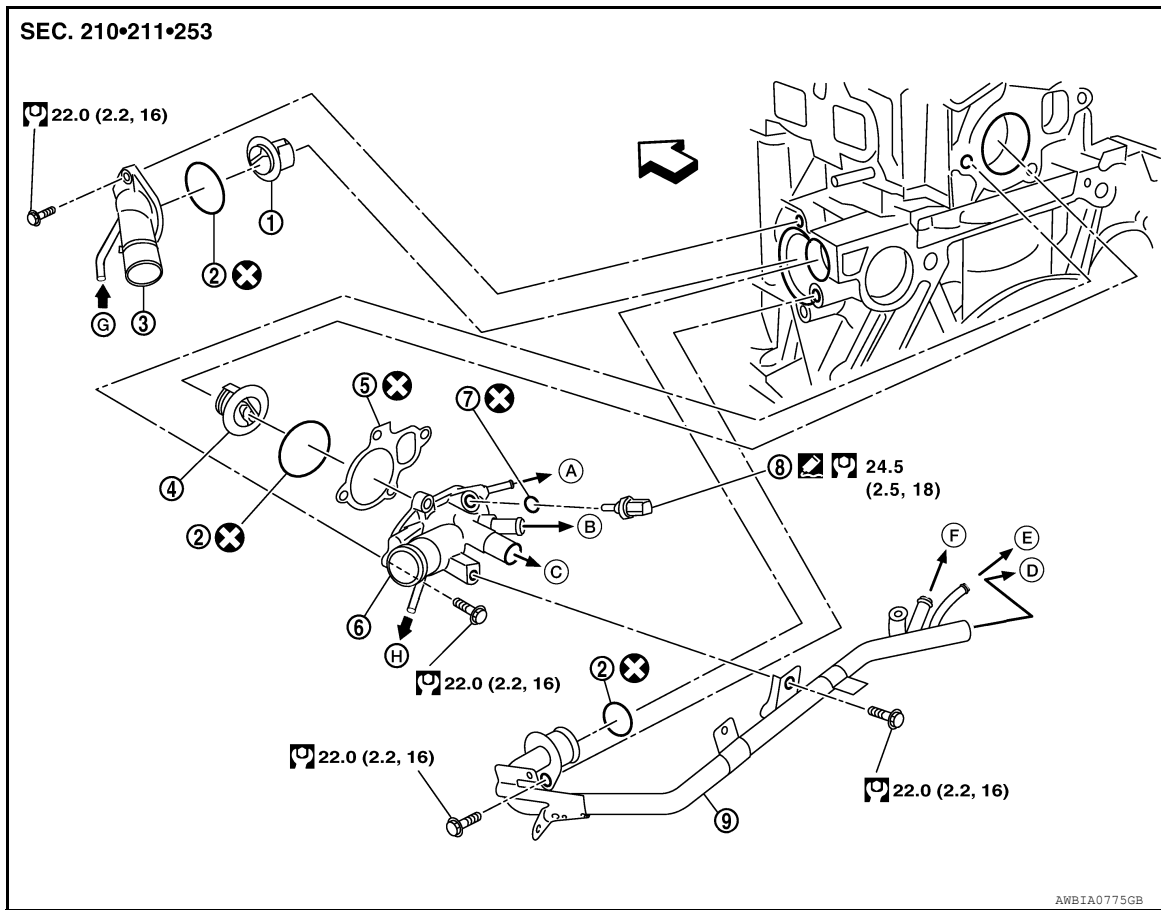
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|--|--|--------------------------|
| 1. Thermostat | 2. O-ring | 3. Engine coolant inlet |
| 4. Water control valve | 5. Gasket | 6. Engine coolant outlet |
| 7. Copper washer | 8. Engine coolant temperature sensor | 9. Heater pipe |
| A. To electric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

WATER CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

CVT Models



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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 electric throttle control actuator | B. To oil cooler | C. To heater core |
| D. To heater core | E. To electric throttle control actuator | F. To oil cooler |
| G. From CVT oil cooler | H. To CVT oil cooler | ⇐ Engine Front |

Removal and Installation

INFOID:000000007402791

WARNING:

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

CAUTION:

Perform when the engine is cold.

NOTE:

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

REMOVAL

1. Drain engine coolant from the radiator. Refer to [CO-43, "Changing Engine Coolant"](#).
2. Remove the air cleaner and air duct assembly. Refer to [EM-133, "Removal and Installation"](#).
3. Remove the radiator hose (upper), heater pipe, electric throttle control actuator inlet hose, CVT fluid cooler hoses (if equipped), heater hose and oil cooler hoses.
4. Disconnect engine coolant temperature sensor and mass airflow sensor.
5. Remove the engine coolant outlet.
6. Remove the water control valve and O-ring. Discard the O-ring and gasket.

WATER CONTROL VALVE

[QR25DE]

< SERVICE INFORMATION >

CAUTION:

Do not reuse O-ring or gasket.

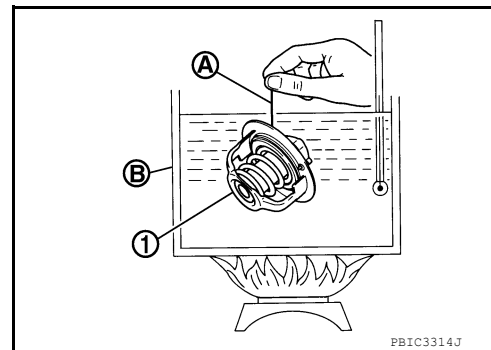
7. Remove engine coolant temperature sensor, if necessary.

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

1. Check valve seating condition at room temperature. It should seat tightly.
2. Check valve operation.
 - Place a thread (A) so that it is caught in the valve of the water control valve(1). Immerse fully in a container filled with water (B). 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 lift amount.
 - After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
 - If the water control valve is out of specification, replace it.



Items	Water control valve
Valve opening temperature	Refer to CO-62, "Water Control Valve" .
Full-open valve lift amount	Refer to CO-62, "Water Control Valve" .
Valve closing temperature	Refer to CO-62, "Water Control Valve" .

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 Product and Sealant"](#).
- Install water control valve with the whole circumference of the flange (A) fitting securely inside of the O-ring.
- Install the water control valve with the frame center facing the water outlet ensuring that the up mark points up.

CAUTION:

Do not reuse O-ring or gaskets.

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-16, "Anti-Freeze Mixture Ratio"](#) and [MA-15, "QR25DE"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

NOTE:

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

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

WATER CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

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

*Power steering fluid, brake fluid, etc.

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[QR25DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Capacity

INFOID:000000007402792

Unit: ℓ (US qt, Imp qt)

Application	M/T models	CVT models
Engine coolant capacity (With reservoir tank at MAX level)	6.9 (7 1/4, 6 1/8)	7.1 (7 1/2, 6 1/4)

Thermostat

INFOID:000000007402793

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

Water Control Valve

INFOID:000000007402794

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

Radiator

INFOID:000000007402795

Unit: kPa (kg / cm², psi)

Cap relief pressure	Standard	88 (0.9, 12.8)
Leakage test pressure		157 (1.6, 23)