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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:000000007332013

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:000000007332014

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

[MR18DE]

< 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:000000007332015

REMOVAL OF LIQUID GASKET

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

Tool number : KV10111100 (J-37228)

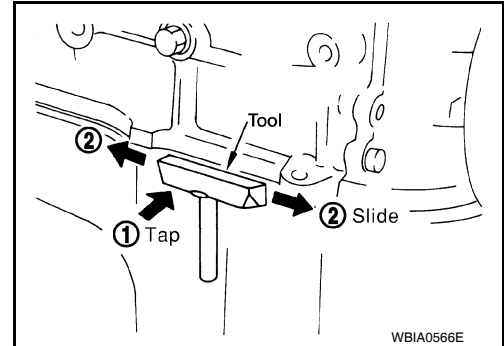
CAUTION:

Be careful not to damage the mating surfaces.

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

CAUTION:

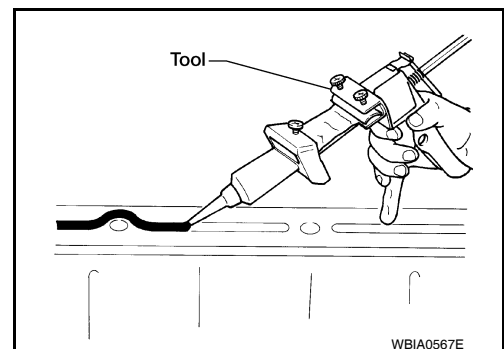
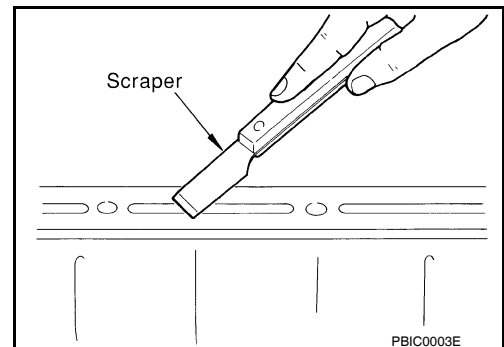
Do not damage the mating surfaces.



LIQUID GASKET APPLICATION PROCEDURE

- 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-42, "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.

PRECAUTIONS

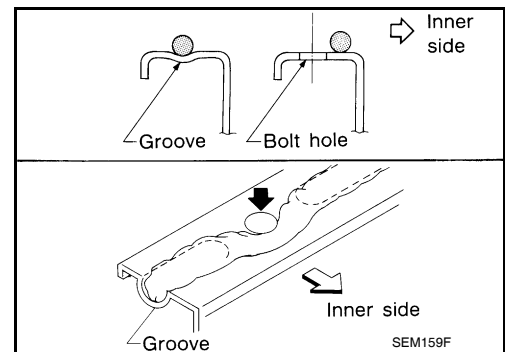
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< SERVICE INFORMATION >

- Apply the liquid gasket to the inner side of the bolt holes unless the procedure instructions indicate to apply to the outer side of the bolt holes.
- Install the mating component within five minutes of the liquid gasket application.
- Then allow 30 minutes for the liquid gasket to set before filling the engine with oil or coolant.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten nuts or bolts after the five minutes have elapsed.

CAUTION:

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



PREPARATION

< SERVICE INFORMATION >

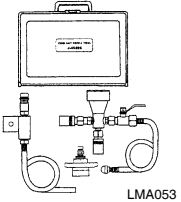
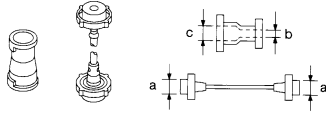
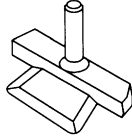
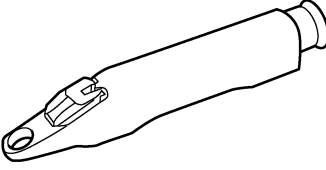
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PREPARATION

Special Service Tool

INFOID:000000007332016

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

Tool number (Kent-Moore No.) Tool name	Description
KV991J0070 (J-45695) Coolant Refill Tool	Refilling engine cooling system
 <p>LMA053</p>	
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)
 <p>S-NT564</p>	
KV10111100 (J-37228) Seal cutter	Removing chain tensioner cover and water pump cover
 <p>NT046</p>	
— (J-23688) Engine coolant refractometer	Checking concentration of ethylene glycol in engine coolant
 <p>WBIA0539E</p>	

Commercial Service Tool

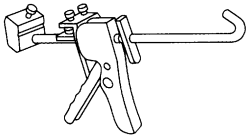
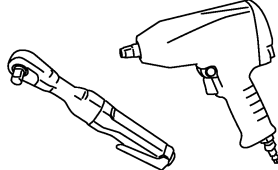
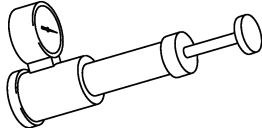
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PREPARATION

< SERVICE INFORMATION >

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Tool name	Description
<p>WS39930000 (—) Tube presser</p>  <p>S-NT052</p>	<p>Pressing the tube of liquid gasket</p>
<p>Power tool</p>  <p>PBIC0190E</p>	<p>Loosening bolts and nuts</p>
<p>Radiator cap tester</p>  <p>PBIC1982E</p>	<p>Checking radiator and radiator cap</p>

OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[MR18DE]

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000007332018

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

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OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[MR18DE]

		Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load	—
				Driving in low gear for extended time	
				Driving at extremely high speed	
			Power train system malfunction		
			Installed improper size wheels and tires		
			Dragging brakes		
	Blocked or restricted air flow	Blocked or restricted air flow	Blocked bumper	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 >

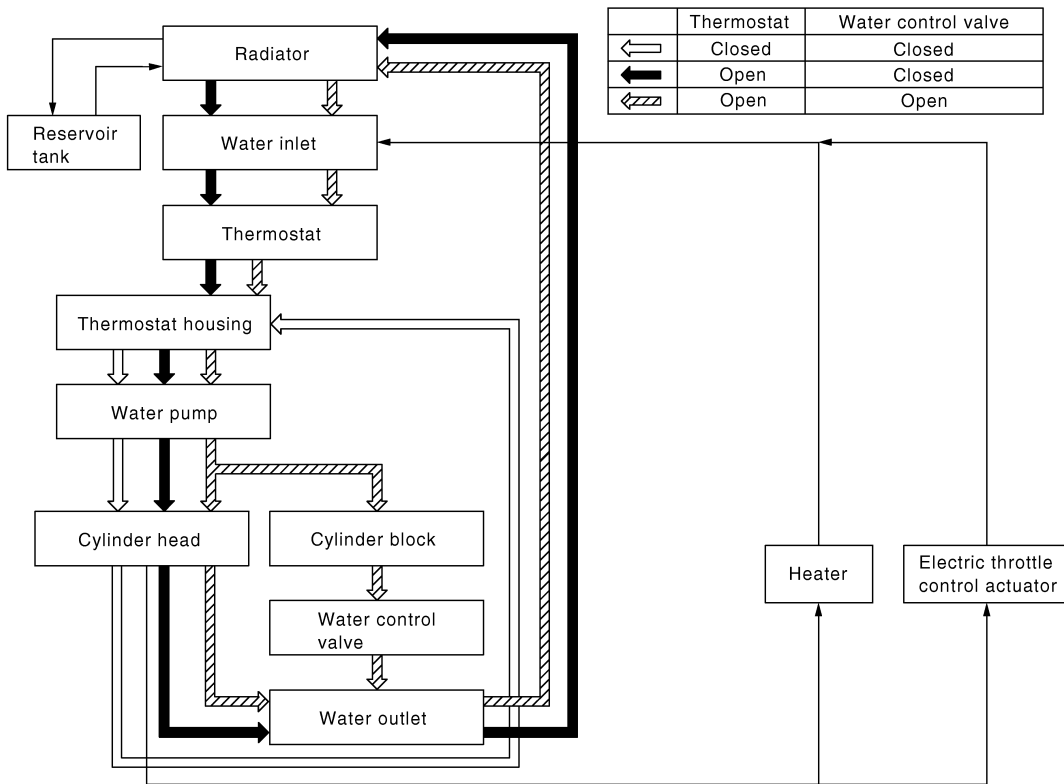
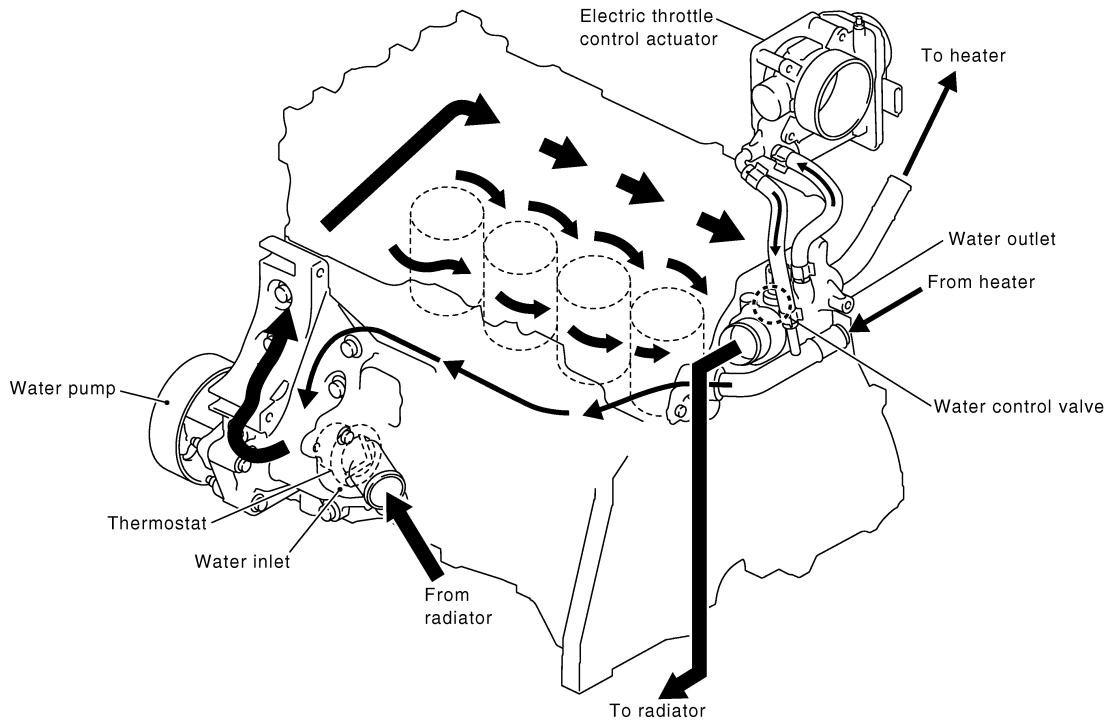
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COOLING SYSTEM

Cooling Circuit

INFOID:000000007332019

A/T MODELS



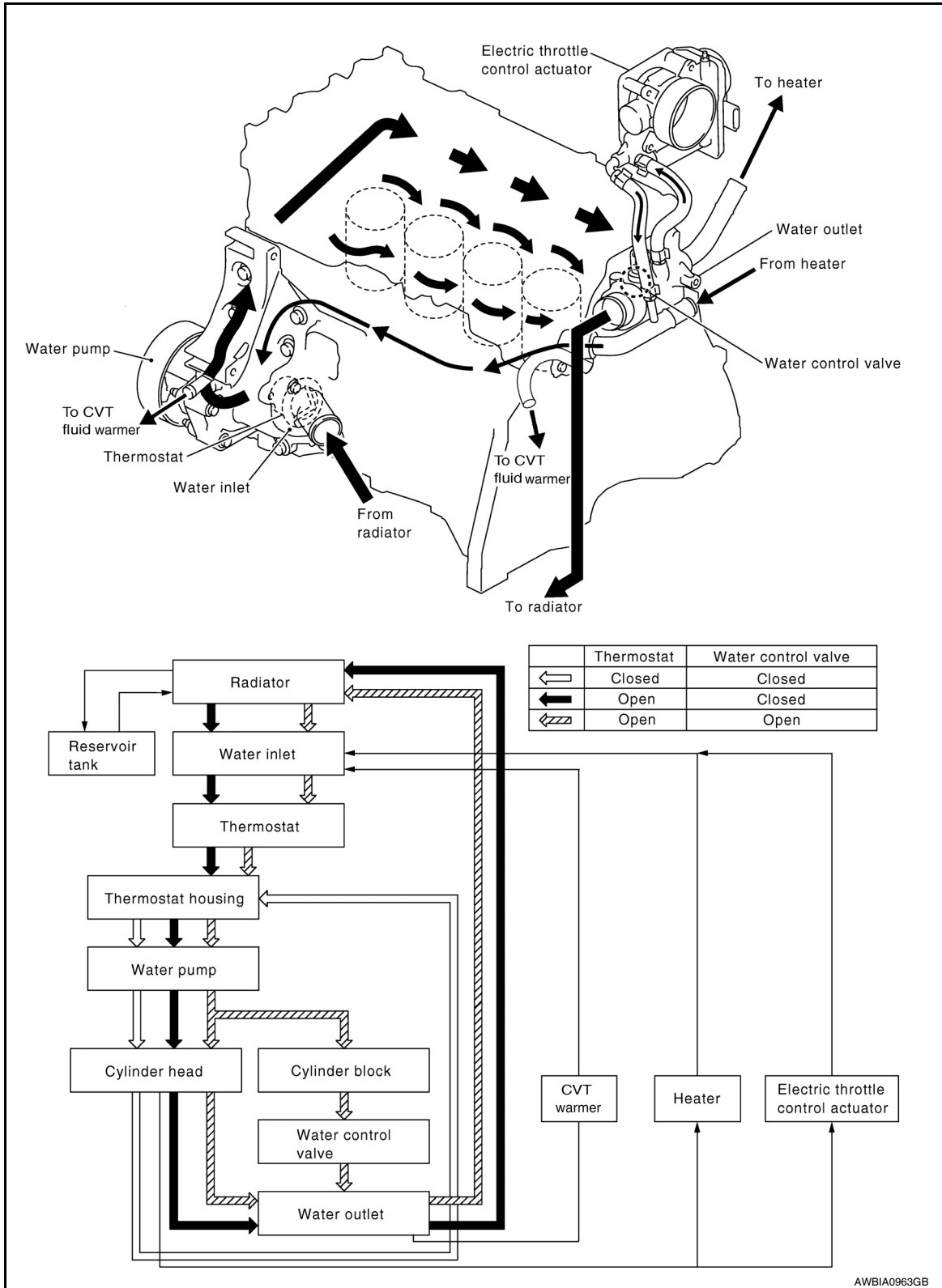
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COOLING SYSTEM

< SERVICE INFORMATION >

[MR18DE]

CVT MODELS



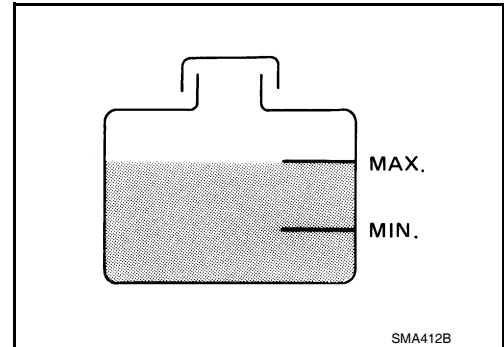
ENGINE COOLANT

Inspection

INFOID:000000007332020

LEVEL CHECK

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



CHECKING COOLING SYSTEM FOR LEAKS

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

Tool number : EG17650301 (J-33984-A)

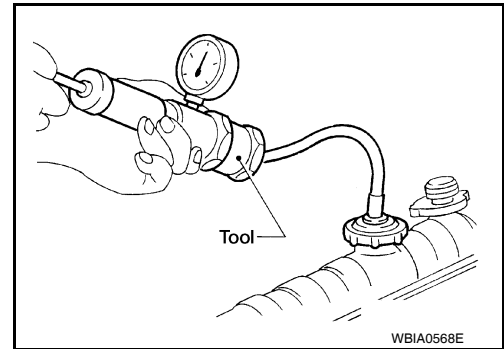
Testing pressure : 157 kPa (1.6 kg/cm², 23 psi)

WARNING:

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

CAUTION:

Higher pressure than specified may cause radiator damage.



Changing Engine Coolant

INFOID:000000007332021

WARNING:

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

CAUTION:

- Do not spill engine coolant on drive belt.

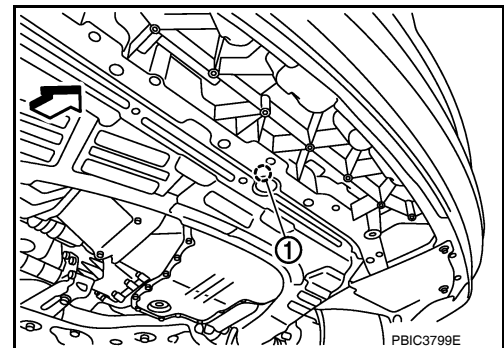
DRAINING ENGINE COOLANT

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

When draining all of engine coolant in the system, open water drain plug on cylinder block. Refer to [EM-84](#).

CAUTION:

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



2. Remove reservoir tank as necessary. Clean reservoir tank before installing. Refer to [CO-15. "Component"](#).
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system.

ENGINE COOLANT

[MR18DE]

< SERVICE INFORMATION >

REFILLING ENGINE COOLANT

1. Install the radiator drain plug. Install the reservoir tank and cylinder block drain plug, (if removed).
 - **The radiator must be completely empty of coolant and water.**
 - **Apply sealant to the threads of the cylinder block drain plugs. Use Genuine High Performance Thread Sealant or equivalent. Refer to [GI-42, "Recommended Chemical Product and Sealant"](#).**

Radiator drain plug : Refer to [CO-15, "Component"](#).

Cylinder block drain plug : 9.8 N·m (1.0 kg·m, 87 in·lb)

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

Tool number : KV991J0070 (J-45695)

5. Insert the refill hose into the coolant mixture container that is placed at floor level. Make sure the ball valve is in the closed position.
 - **Use recommended coolant or equivalent.****Refer to [MA-13, "Fluids and Lubricants"](#).**

Engine coolant capacity (with reservoir tank) : Refer to [MA-13, "Fluids and Lubricants"](#).

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

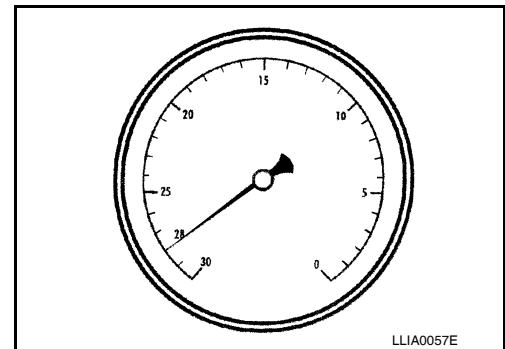
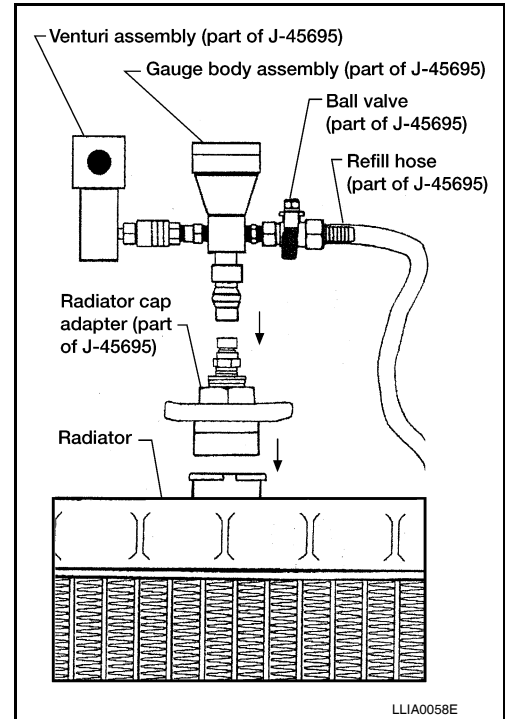
Compressed air supply pressure : 549 - 824 kPa (5.6 - 8.4 kg/cm², 80 - 119 psi)

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 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.

ENGINE COOLANT

< SERVICE INFORMATION >

[MR18DE]

CAUTION:

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

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

FLUSHING COOLING SYSTEM

1. Install reservoir tank if removed. Refer to [CO-15, "Component"](#).
2. Install radiator drain plug.
 - **Install the water drain plug on cylinder block if removed. Refer to [EM-84, "Disassembly and Assembly"](#).**

CAUTION:

- **Be sure to clean radiator drain plug and use a new O-ring. Refer to [CO-15, "Component"](#).**
- **Do not reuse O-ring.**

3. Fill radiator and reservoir tank with water and reinstall radiator cap.
4. Run engine and warm it up to normal operating temperature.
5. Rev engine two or three times under no-load.
6. Stop engine and wait until it cools down.
7. Drain water from the cooling system.
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

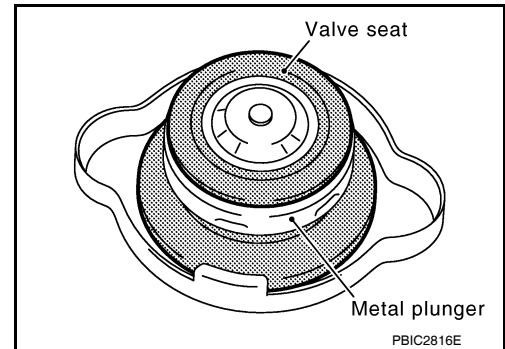
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RADIATOR

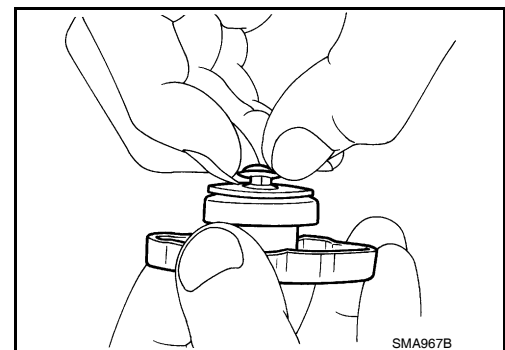
Checking Radiator Cap

INFOID:000000007332022

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



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



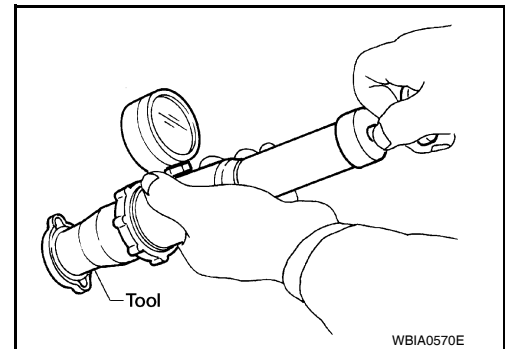
- Check radiator cap relief pressure using suitable tool and Tool.

Tool number : EG17650301 (J-33984-A)

Standard: 78 – 98 kPa (0.8 – 1.0 kg/cm², 11 – 14 psi)

Limit: 59 kPa (0.6 kg/cm², 9 psi)

- When connecting the radiator cap to the tester, apply water or coolant to the cap seal surface.
- Replace the radiator cap if there is an abnormality in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.
- Replace radiator cap if it is not within specifications.



CAUTION:

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

Checking Radiator

INFOID:000000007332023

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

CAUTION:

- **Be careful not to bend or damage radiator fins.**
 - **When the radiator is cleaned on-vehicle, remove the surrounding parts in order to access the radiator core.**
 - **Then tape the harness and electrical connectors to prevent water from entering.**
1. Spray water to the back side of the radiator core using a side-to-side motion from the top down.
 2. Stop spraying when debris no longer flows from radiator core.
 3. Blow air into the back side of radiator core using a side-to-side motion from the top down.
 - Use compressed air lower than 490 kPa (5 kg/cm², 71 psi) and keep distance more than 30 cm (11.81 in).

RADIATOR

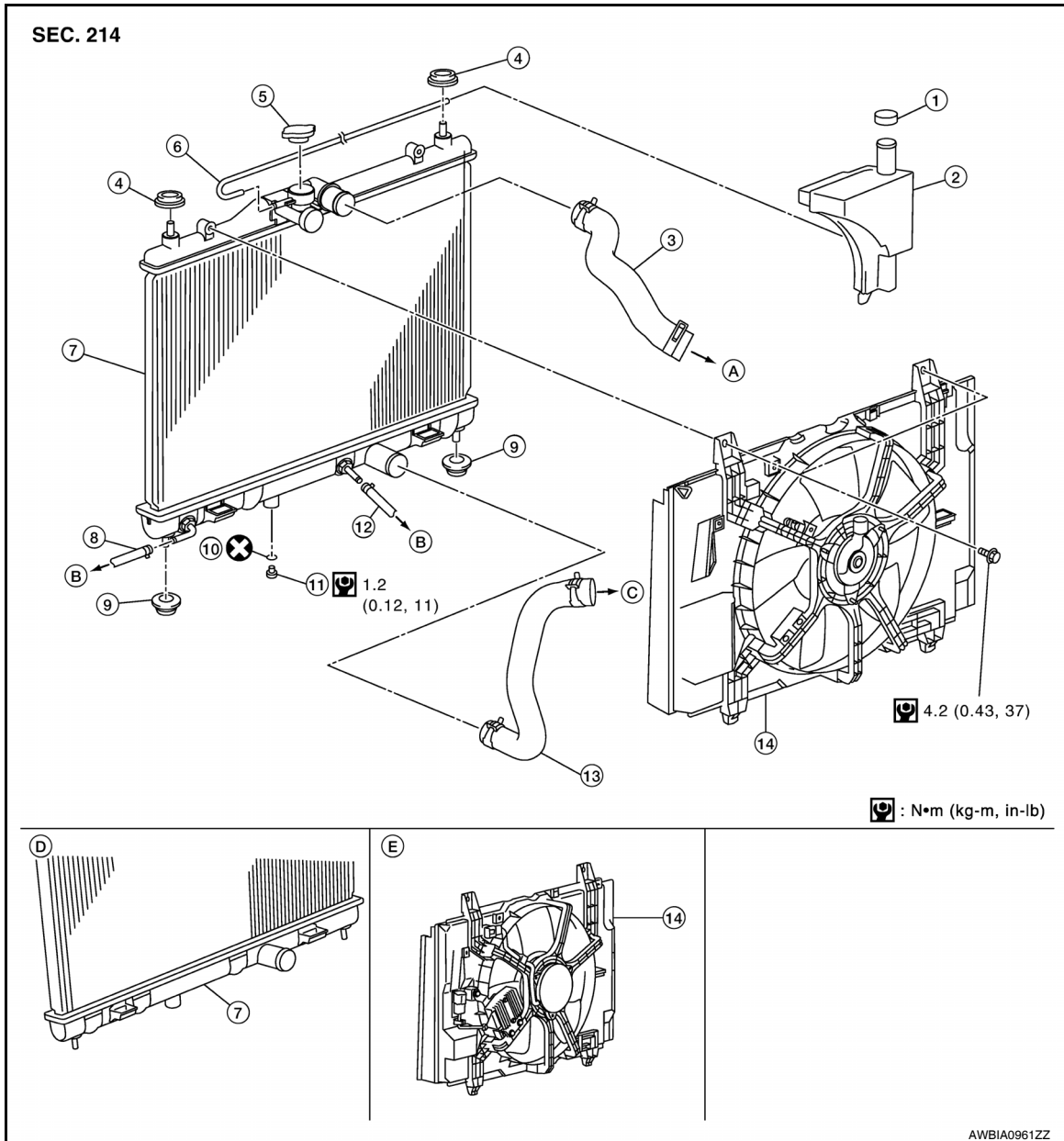
[MR18DE]

< SERVICE INFORMATION >

4. Continue to blow air until no water sprays out.
5. Check for coolant leaks. Repair as necessary.

Component

INFOID:000000007332024



- | | | |
|----------------------------|--------------------------|----------------------------|
| 1. Reservoir tank cap | 2. Reservoir tank | 3. Radiator hose (upper) |
| 4. Mounting rubber (upper) | 5. Radiator cap | 6. Reservoir tank hose |
| 7. Radiator | 8. A/T fluid cooler hose | 9. Mounting rubber (lower) |
| 10. O-ring | 11. Radiator drain plug | 12. A/T fluid cooler hose |
| 13. Radiator hose (lower) | 14. Cooling fan assembly | A. To water outlet |
| B. To A/T | C. To water inlet | D. M/T models |
| E. Models with A/C | | |

Removal and Installation

INFOID:000000007332025

WARNING:

RADIATOR

[MR18DE]

< SERVICE INFORMATION >

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

NOTE:

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

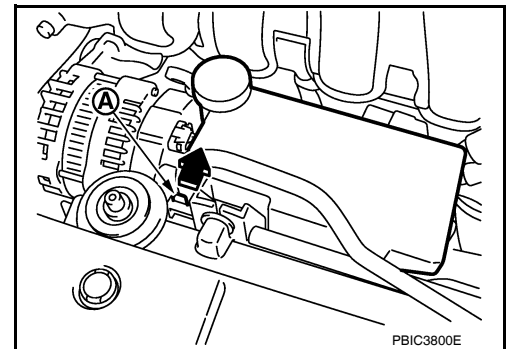
REMOVAL

1. Remove engine undercover. Refer to [EI-15, "Removal and Installation"](#).
2. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

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

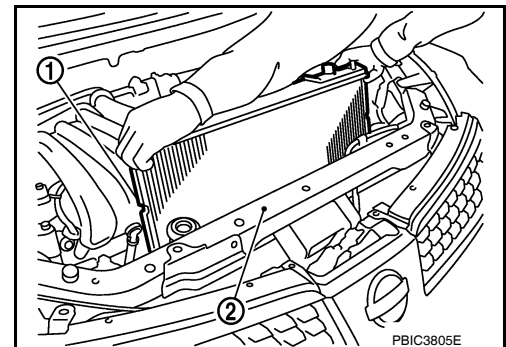
3. Remove air duct (inlet). Refer to [EM-16](#).
4. Remove reservoir tank as follows:
 - a. Disconnect reservoir tank hose.
 - b. Release the tab (A) in the direction shown by the arrow (←).
 - c. Lift up while removing the reservoir tank hose, and remove it.



5. Disconnect harness connector from fan motor, and move harness aside.
6. Disconnect CVT or A/T fluid cooler hoses if equipped.
 - Install plug to avoid leakage of CVT or A/T fluid, (if equipped).
7. Remove radiator hoses (upper and lower).
8. Remove radiator core support cover. Refer to [BL-20](#).
9. Remove cooling fan assembly.
10. Remove radiator core support (upper) bolts, bolts of stationary part on the radiator core support side and clip. Lift radiator from radiator (upper) mount part of radiator core support (upper) (2).
11. Move radiator assembly (1) to the rearward direction of vehicle, and then lift it upward to remove.

CAUTION:

When removing do not damage or scratch radiator core or A/C condenser (if equipped).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

When removing do not damage or scratch radiator core or A/C condenser (if equipped).

Inspection

INFOID:000000007332026

INSPECTION AFTER INSTALLATION

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

RADIATOR

[MR18DE]

< SERVICE INFORMATION >

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

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

*Power steering fluid, brake fluid, etc.

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COOLING FAN

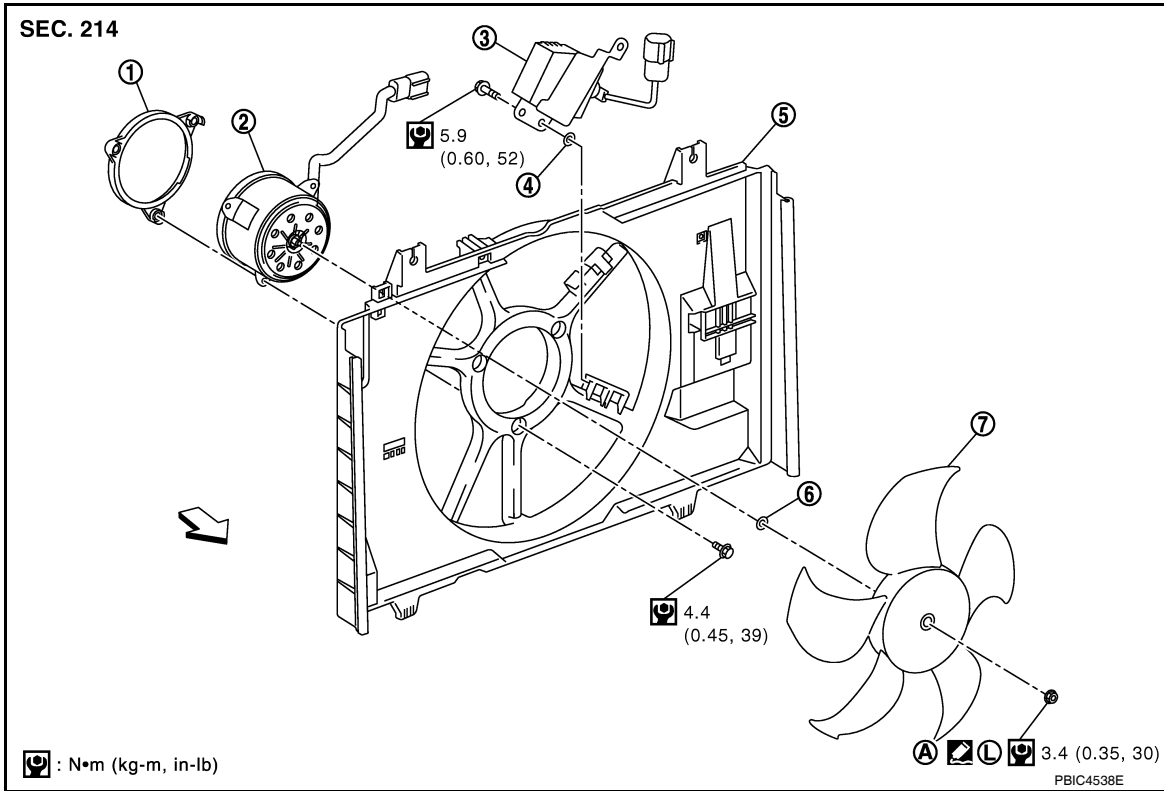
< SERVICE INFORMATION >

[MR18DE]

COOLING FAN

Component (Models with A/C)

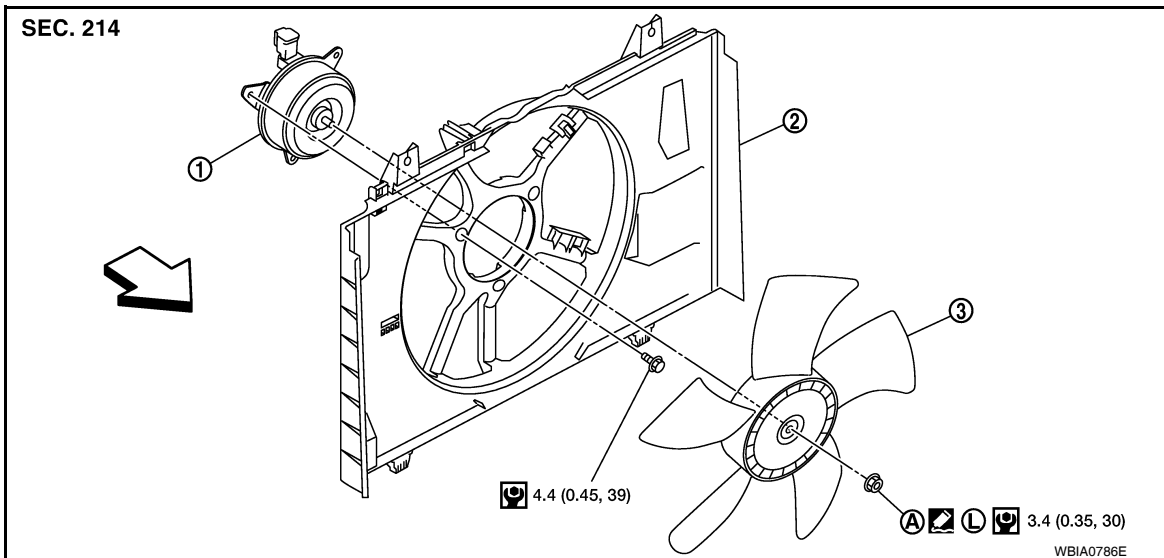
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|--------------------|-----------------------------|-------------------------------|
| 1. Fan motor cover | 2. Fan motor | 3. Cooling fan control module |
| 4. Washer | 5. Fan shroud | 6. Washer |
| 7. Cooling fan | A. Apply on fan motor shaft | ← Front |

Component (Models without A/C)

INFOID:000000007332028



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

Removal and Installation

INFOID:000000007332029

A

REMOVAL

CAUTION:

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

NOTE:

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

1. Partially drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

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

2. Remove air duct (inlet). Refer to [EM-16, "Component"](#).
3. Remove reservoir tank. Refer to [CO-15, "Component"](#).
4. Disconnect radiator hose (upper) at radiator side. Refer to [CO-15, "Component"](#).
5. Disconnect harness connectors from fan motor, and move harness aside.
6. Remove cooling fan assembly.

CAUTION:

When removing do not damage or scratch radiator core or A/C condenser (if equipped).

INSTALLATION

Installation is in the reverse order of removal.

- Cooling fans are controlled by ECM. For details, refer to [EC-407, "On Board Diagnosis Logic"](#).

CAUTION:

When installing do not damage or scratch radiator core or A/C condenser (if equipped).

Disassembly and Assembly

INFOID:000000007332030

DISASSEMBLY

1. Remove cooling fan from fan motor.
2. Remove fan motor from fan shroud.

INSPECTION AFTER DISASSEMBLY

Inspect cooling fan for cracks or warps.

- Replace cooling fan as necessary.

ASSEMBLY

Assembly is in the reverse order of disassembly.

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WATER PUMP

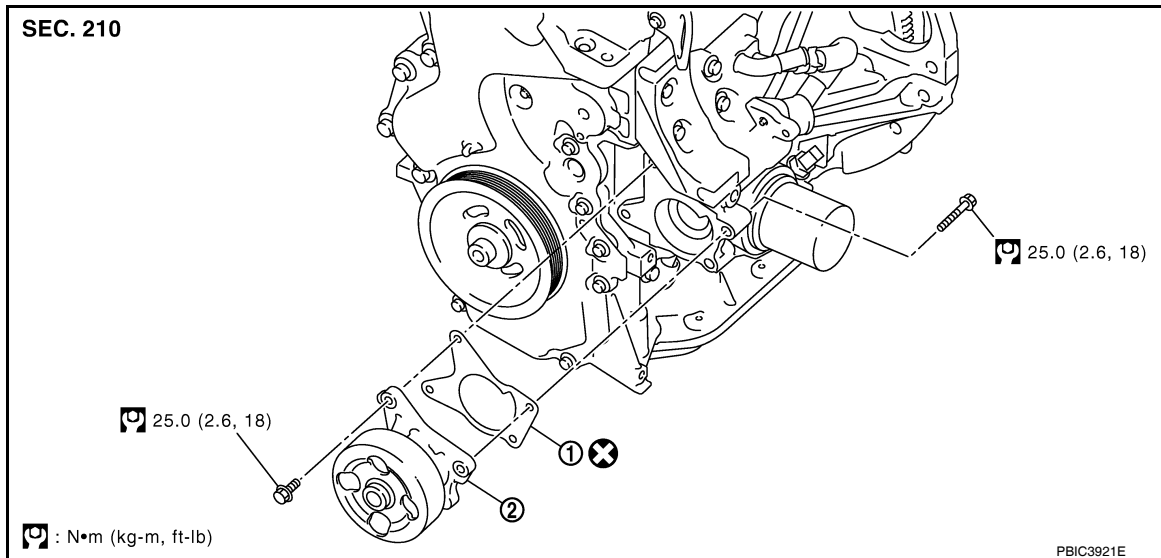
< SERVICE INFORMATION >

[MR18DE]

WATER PUMP

Component

INFOID:000000007332031



1. Gasket

2. Water pump

Removal and Installation

INFOID:000000007332032

WARNING:

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

NOTE:

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

REMOVAL

1. Disconnect battery negative terminal. Refer to [SC-7, "Removal and Installation"](#).
2. Remove reservoir tank. Refer to [CO-15, "Component"](#).
3. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

Perform this step when the engine is cold.

4. Remove front fender protector (RH). Refer to [EI-24, "Removal and Installation"](#).
5. Remove drive belt. Refer to [EM-13, "Removal and Installation"](#).
6. Remove generator. Refer to [SC-25, "Removal and Installation"](#).
7. Remove radiator hose (lower). Refer to [CO-15, "Component"](#).
8. Remove water pump.

CAUTION:

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

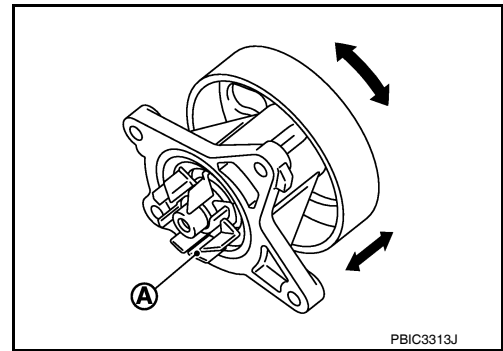
INSPECTION AFTER REMOVAL

WATER PUMP

[MR18DE]

< 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.

INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for engine coolant leaks. Refer to [CO-11, "Inspection"](#).
- Start and warm up the engine.
- Visually check for engine coolant leaks.

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THERMOSTAT

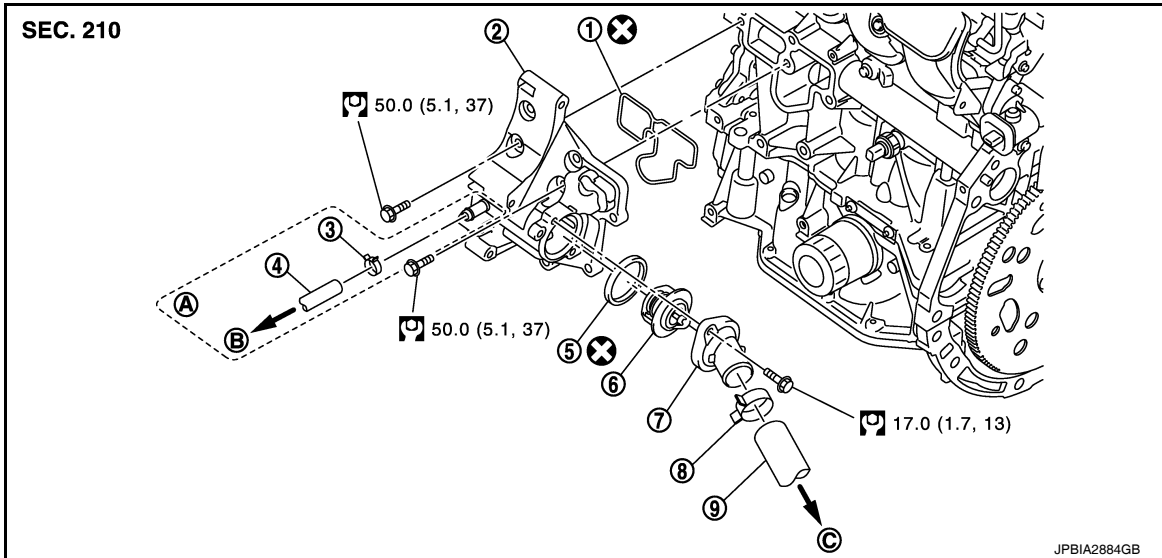
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[MR18DE]

THERMOSTAT

Component

INFOID:000000007332033



- | | | |
|----------------|------------------------|--------------------------|
| 1. Gasket | 2. Thermostat housing | 3. Clamp |
| 4. Water hose | 5. O-ring | 6. Thermostat |
| 7. Water inlet | 8. Clamp | 9. Radiator hose (lower) |
| A. CVT models | B. To CVT fluid warmer | C. To radiator |

Removal and Installation

INFOID:000000007332034

REMOVAL

WARNING:

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

NOTE:

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

1. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

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

2. Remove the air duct (inlet). Refer to [EM-16, "Component"](#).
3. Remove the radiator hose (lower) from the engine. Refer to [CO-15, "Component"](#).
4. Remove water inlet.
5. Remove thermostat.
6. Remove water pump, if necessary. Refer to [CO-20](#).
7. Remove thermostat housing, if necessary.

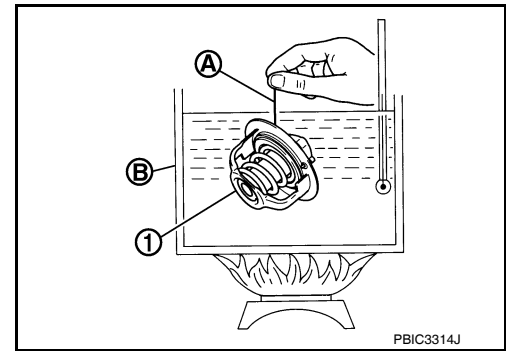
INSPECTION AFTER REMOVAL

THERMOSTAT

[MR18DE]

< SERVICE INFORMATION >

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



Standard : Refer to [CO-30, "Standard and Limit"](#)

- Replace thermostat if it is out of the specification range.

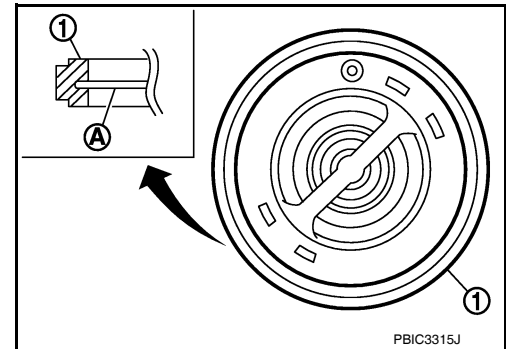
INSTALLATION

Installation is in the reverse order of removal.

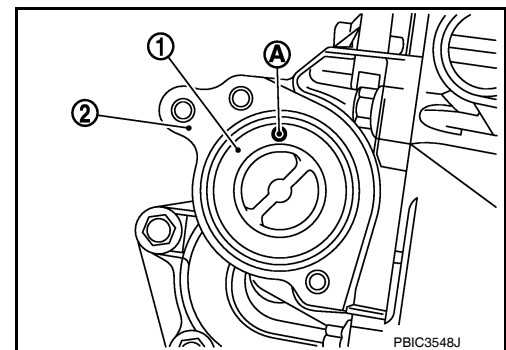
- Use the following procedure to install the thermostat.
- Install thermostat making sure O-ring (1) groove fits securely to thermostat flange (A).

CAUTION:

Replace the O-ring with a new one.



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



- Use the following procedure to install the thermostat housing.
- Securely insert the O-ring into the mating groove of thermostat housing and install it.

CAUTION:

- **Replace the O-ring with a new one.**
- **Do not reuse O-ring.**
- Install the thermostat housing to the cylinder block without displacing the gasket from the gasket position.

Inspection

INFOID:000000007332035

INSPECTION AFTER INSTALLATION

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to [MA-13, "Fluids and Lubricants"](#).
- Use procedure below to check for fuel leakage.
- Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
- Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gas, or any oils/fluids including engine oil and engine coolant.
- Bleed air from passages in lines and hoses, such as in cooling system.

THERMOSTAT

[MR18DE]

< SERVICE INFORMATION >

- 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 >

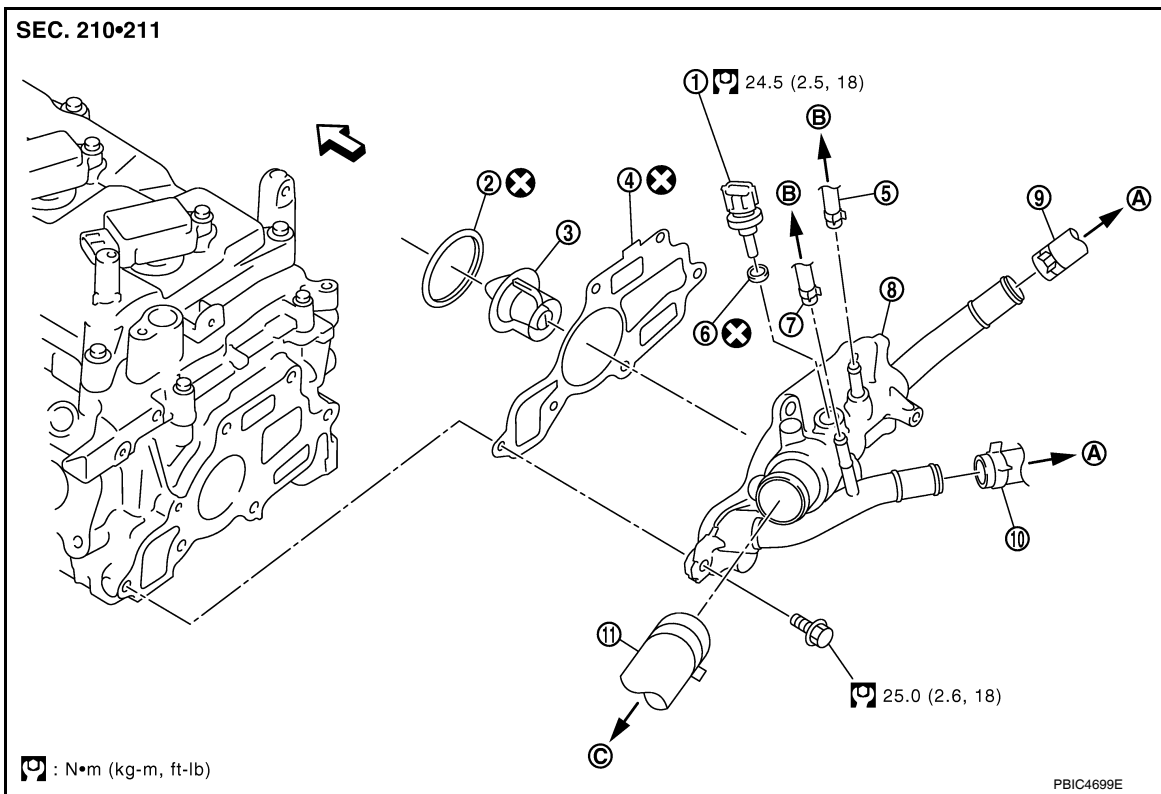
[MR18DE]

WATER OUTLET AND WATER CONTROL VALVE

Component

INFOID:000000007332036

A/T and M/T MODELS



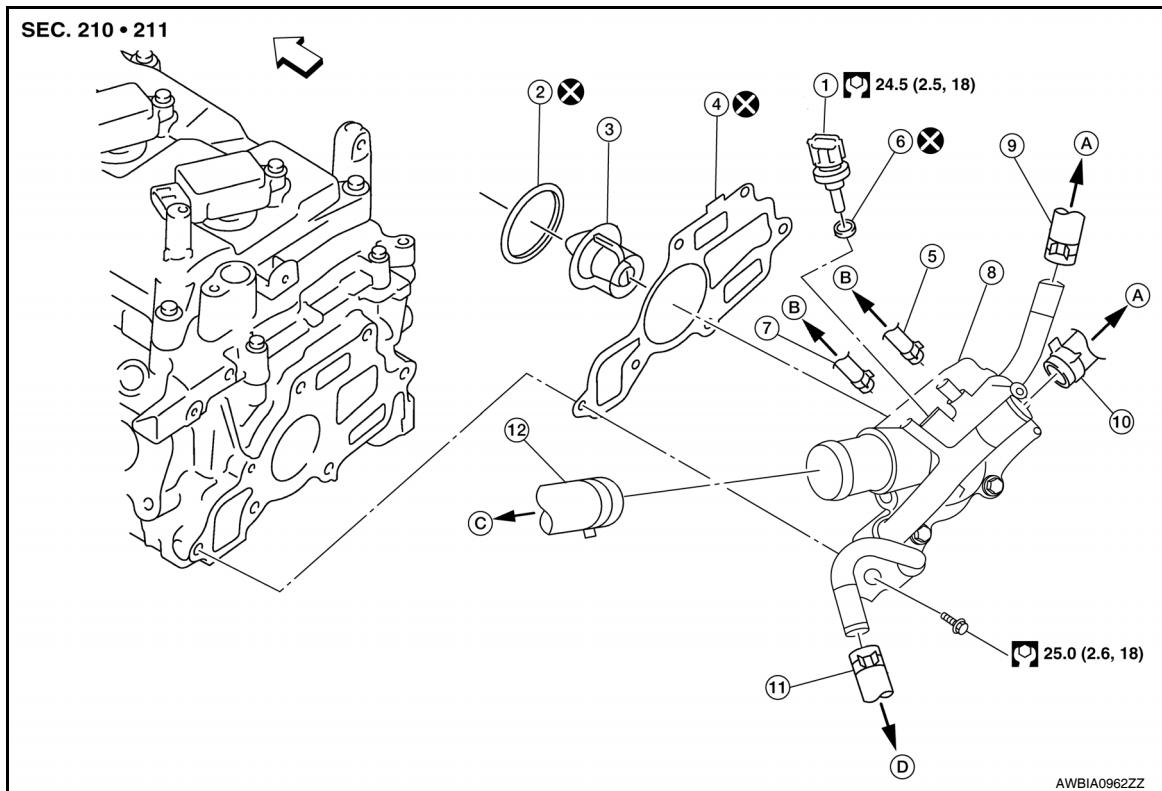
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|--------------------------------------|--|------------------------|
| 1. Engine coolant temperature sensor | 2. O-ring | 3. Water control valve |
| 4. Gasket | 5. Water hose | 6. Gasket |
| 7. Water hose | 8. Water outlet | 9. Heater hose |
| 10.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

[MR18DE]

CVT MODELS



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

Removal and Installation

INFOID:000000007332037

REMOVAL

WARNING:

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

NOTE:

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

1. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

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

2. Remove battery and battery tray. Refer to [SC-7, "Removal and Installation"](#).
3. Remove air cleaner and air duct. Refer to [EM-16, "Component"](#).
4. Remove radiator hose (lower) from engine. Refer to [CO-15, "Component"](#).
5. Remove heater hoses and water hoses.
6. Remove CVT warmer hose (CVT models only).
7. Remove water outlet.
8. Remove water control valve.
9. Remove engine coolant temperature sensor from the water outlet, if necessary.

WATER OUTLET AND WATER CONTROL VALVE

< SERVICE INFORMATION >

[MR18DE]

CAUTION:

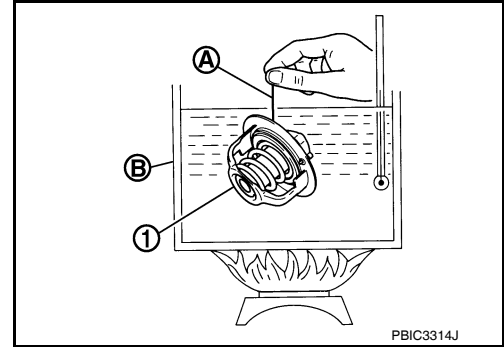
- Be careful not to damage engine coolant temperature sensor.
- Replace the gasket with a new one.

INSPECTION AFTER REMOVAL

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

Standard : Refer to [CO-30, "Standard and Limit"](#)

- Replace the water control valve if it is out of the specification range.



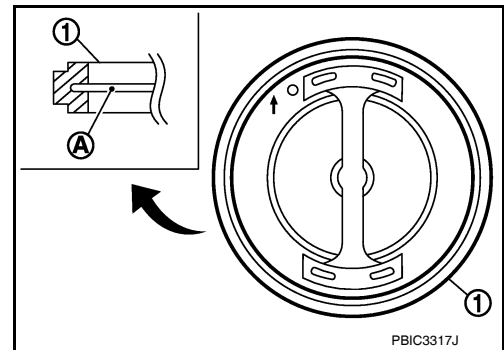
INSTALLATION

Installation is in the reverse order of removal.

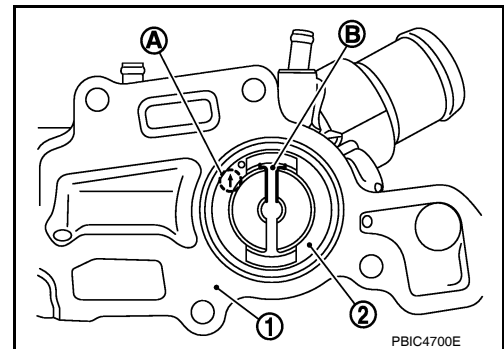
- Use the following procedure to install the water control valve.
- Install water control valve making sure O-ring (1) groove fits securely to water control valve flange (A).

CAUTION:

- Replace the O-ring with a new one.
- Do not reuse O-ring.



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



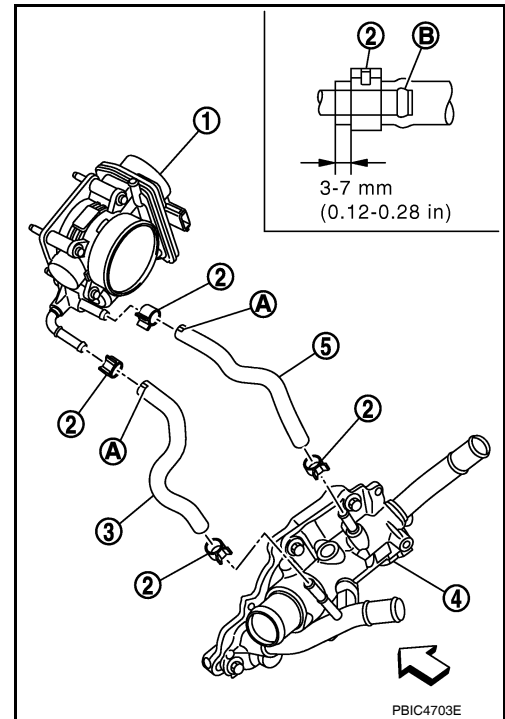
- Use the following procedure to install the water outlet.
- Install the water outlet to the cylinder head without displacing the water control valve from the valve position.
- Use the following procedure to install the water hoses.

WATER OUTLET AND WATER CONTROL VALVE

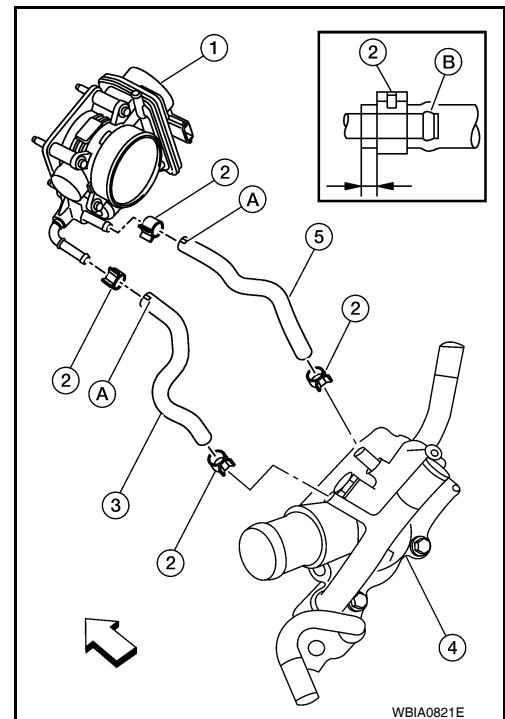
[MR18DE]

< 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

INSPECTION AFTER INSTALLATION

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

WATER OUTLET AND WATER CONTROL VALVE

[MR18DE]

< 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.

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR18DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:000000007332039

CAPACITY

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (with reservoir tank at "MAX" level)	Approx. 6.8 (7 1/4, 6)
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THERMOSTAT

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

WATER CONTROL VALVE

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

RADIATOR

Unit: kPa (kg/cm², psi)

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