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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:000000001612910

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 "SUPPLEMENTAL RESTRAINT SYSTEM" and "SEAT BELTS" 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 "SUPPLEMENTAL RESTRAINT SYSTEM".
- 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.

Precaution for Liquid Gasket

INFOID:000000001325839

REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter (SST) and remove old liquid gasket sealing.

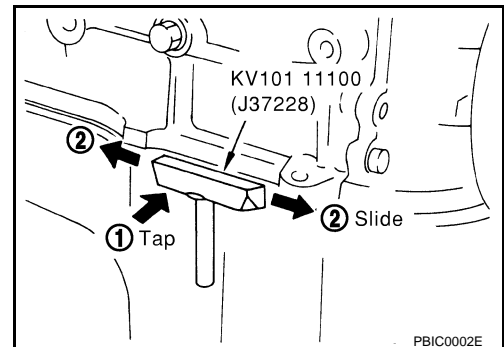
CAUTION:

Be careful not to damage the mating surfaces.

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

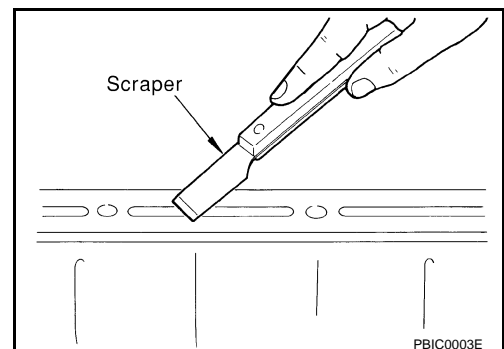
CAUTION:

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



LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
 - Remove liquid gasket completely from the groove of the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.

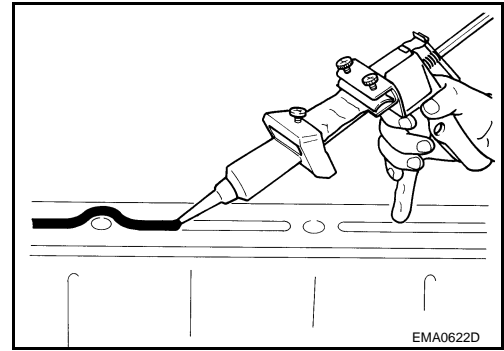


PRECAUTIONS

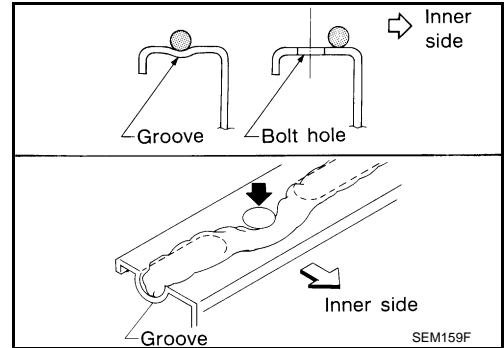
[VQ35DE]

< SERVICE INFORMATION >

3. Attach liquid gasket tube to the tube presser (commercial service tool).
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-44, "Recommended Chemical Product and Sealant".
4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
 - If there is a groove for the liquid gasket application, apply liquid gasket to the groove.



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



CAUTION:

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

PREPARATION

< SERVICE INFORMATION >

[VQ35DE]

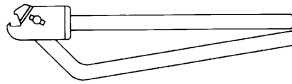
PREPARATION

Special Service Tool

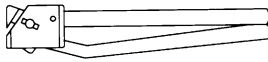
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

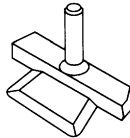
Tool number (Kent-Moore No.) Tool name	Description
KV99103510 (—) Radiator plate pliers A	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	Removing radiator upper and lower tanks
KV10111100 (J37228) Seal cutter	Removing chain tensioner cover and water pump cover



S-NT224



S-NT225

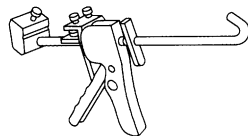


NT046

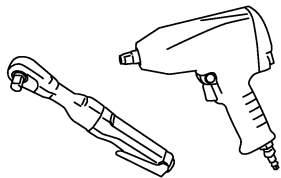
Commercial Service Tool

INFOID:000000001325841

Tool name	Description
Tube presser (—)	Pressing the tube of liquid gasket
Power tool	Loosening nuts and bolts



S-NT052

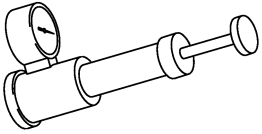
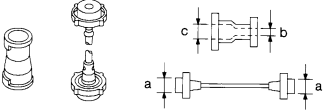


PBIC0190E

PREPARATION

< SERVICE INFORMATION >

[VQ35DE]

Tool name	Description
<p>Radiator cap tester</p>  <p style="text-align: right;">PBI1982E</p>	<p>Checking radiator and radiator cap</p>
<p>Radiator cap tester adapter (J33984-A)</p>  <p style="text-align: right;">S-NT564</p>	<p>Adapting radiator cap tester to radiator cap and radiator filler neck</p> <p>a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)</p>

OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[VQ35DE]

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000001325842

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

[VQ35DE]

		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	
			Powertrain system malfunction		
			Installed improper size wheels and tires		
			Dragging brakes		
	Blocked or restricted air flow	Blocked or restricted air flow	Blocked bumper	—	—
			Blocked radiator grille	Installed car brassiere	
				Mud contamination or paper clogging	
			Blocked radiator	—	
Blocked condenser			Blocked air flow		
Installed large fog lamp					

COOLING SYSTEM

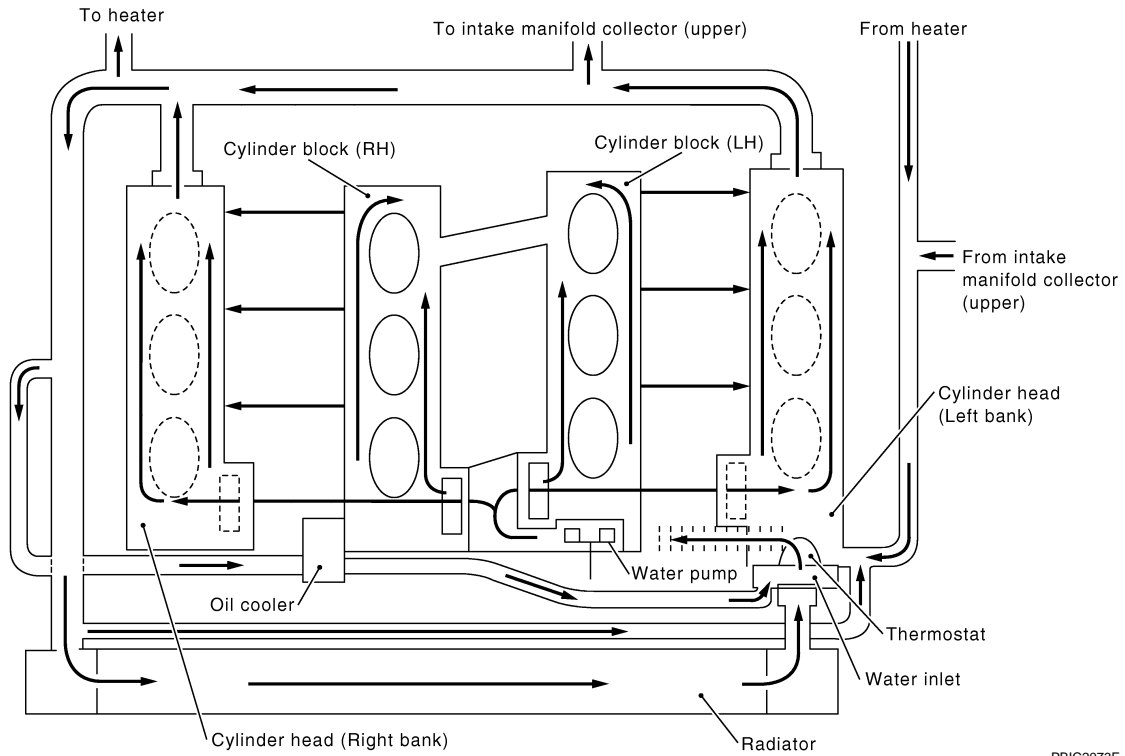
< SERVICE INFORMATION >

[VQ35DE]

COOLING SYSTEM

Cooling Circuit

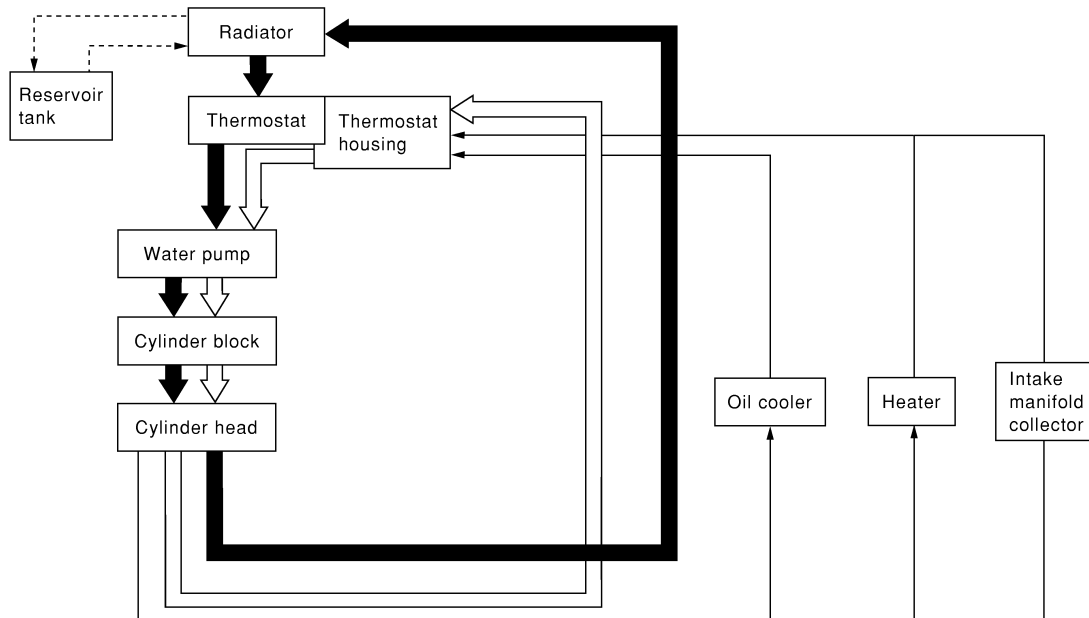
INFOID:000000001325843



PBIC2073E

System Chart

INFOID:000000001325844



	Thermostat
	Closed
	Open

PBIC0847E

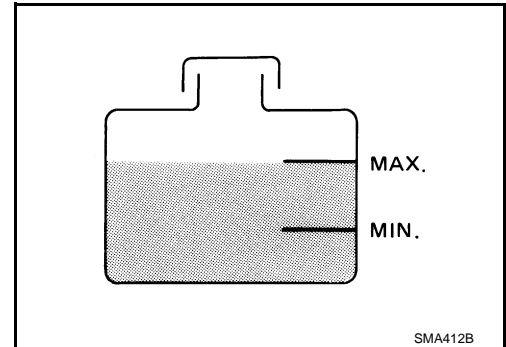
ENGINE COOLANT

Inspection

INFOID:000000001325845

LEVEL CHECK

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



LEAK CHECK

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

Testing pressure

: 157 kPa (1.6 kg/cm², 23 psi)

WARNING:

Do not remove radiator cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator.

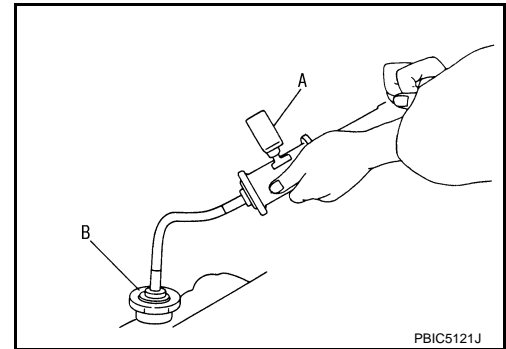
CAUTION:

Higher test pressure than specified may cause radiator damage.

NOTE:

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

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



Changing Engine Coolant

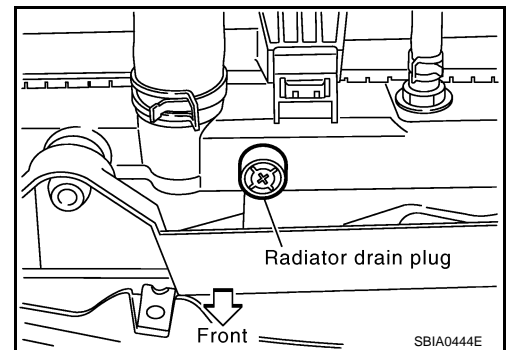
INFOID:000000001325846

WARNING:

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

DRAINING ENGINE COOLANT

1. Remove front engine undercover with power tool.
2. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.



When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-123, "Disassembly and Assembly"](#).

ENGINE COOLANT

[VQ35DE]

< SERVICE INFORMATION >

3. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing.
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
If contaminated, flush the engine cooling system. Refer to "FLUSHING COOLING SYSTEM".

REFILLING ENGINE COOLANT

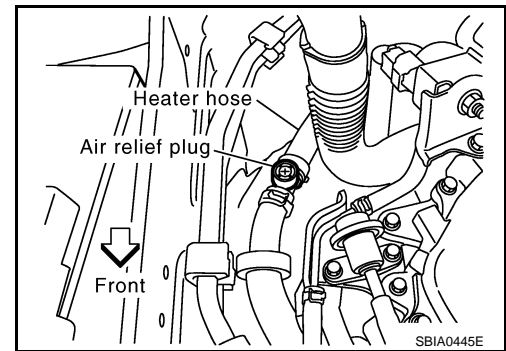
1. Install reservoir tank if removed, and radiator drain plug.
CAUTION:
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug:

 : 1.18 N·m (0.12 kg·m, 10 in·lb)

If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-123, "Dis-assembly and Assembly"](#).

2. Make sure that each hose clamp has been firmly tightened.
3. Remove air relief plug on heater hose.



4. Fill radiator, and reservoir tank if removed, to specified level.
 - Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
 - Use Genuine NISSAN Long Life Antifreeze/Coolant or equivalent mixed with water (distilled or demineralized). Refer to [MA-9, "Fluids and Lubricants"](#).

Engine coolant capacity

(With reservoir tank at "MAX" level)

: Approximately 8.6 ℓ (9-1/8 US qt, 7-5/8 Imp qt)

Reservoir tank engine coolant capacity

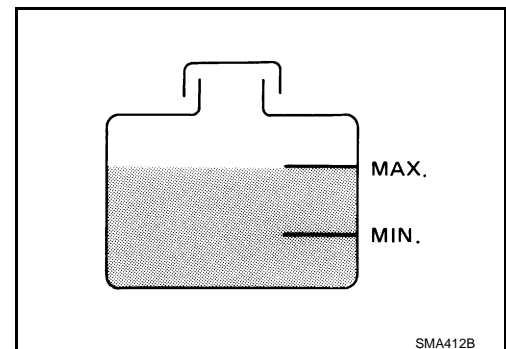
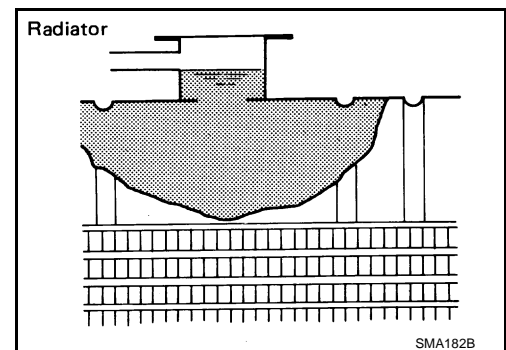
(At "MAX" level)

: 0.8 ℓ (7/8 US qt, 3/4 Imp qt)

- When engine coolant overflows air relief hole on heater hose, install air relief plug with new O-ring.

Air relief plug:

 : 1.19 N·m (0.12 kg·m, 11 in·lb)



5. Install radiator cap.
6. Warm up until opening thermostat. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
 - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.**CAUTION:**
Watch water temperature gauge so as not to overheat engine.
7. Stop the engine and cool down to less than approximately 50°C (122°F).

ENGINE COOLANT

[VQ35DE]

< SERVICE INFORMATION >

- Cool down using fan to reduce the time.
 - If necessary, refill radiator up to filler neck with engine coolant.
8. Refill reservoir tank to "MAX" level line with engine coolant.
 9. Repeat steps 4 through 7 two or more times with radiator cap installed until engine coolant level no longer drops.
 10. Check cooling system for leaks with engine running.
 11. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
 - Sound may be noticeable at heater unit.
 12. Repeat step 11 three times.
 13. If sound is heard, bleed air from cooling system by repeating step 4 through 7 until engine coolant level no longer drops.

FLUSHING COOLING SYSTEM

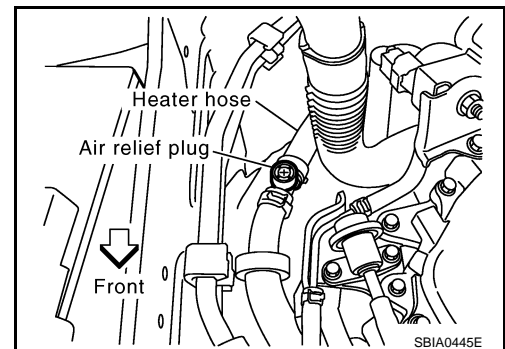
1. Install reservoir tank if removed, and radiator drain plug.

Radiator drain plug:

 : 1.18 N·m (0.12 kg·m, 10 in-lb)

If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-123, "Dis-assembly and Assembly"](#).

2. Remove air relief plug on heater hose.



3. Fill radiator with water until water spills from the air relief hole, then close air relief plug. Fill radiator and reservoir tank with water and reinstall radiator cap.

Air relief plug:

 : 1.19 N·m (0.12 kg·m, 11 in-lb)

4. Run the engine and warm it up to normal operating temperature.
5. Rev the engine two or three times under no-load.
6. Stop the engine and wait until it cools down.
7. Drain water from the system. Refer to "DRAINING ENGINE COOLANT".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

RADIATOR

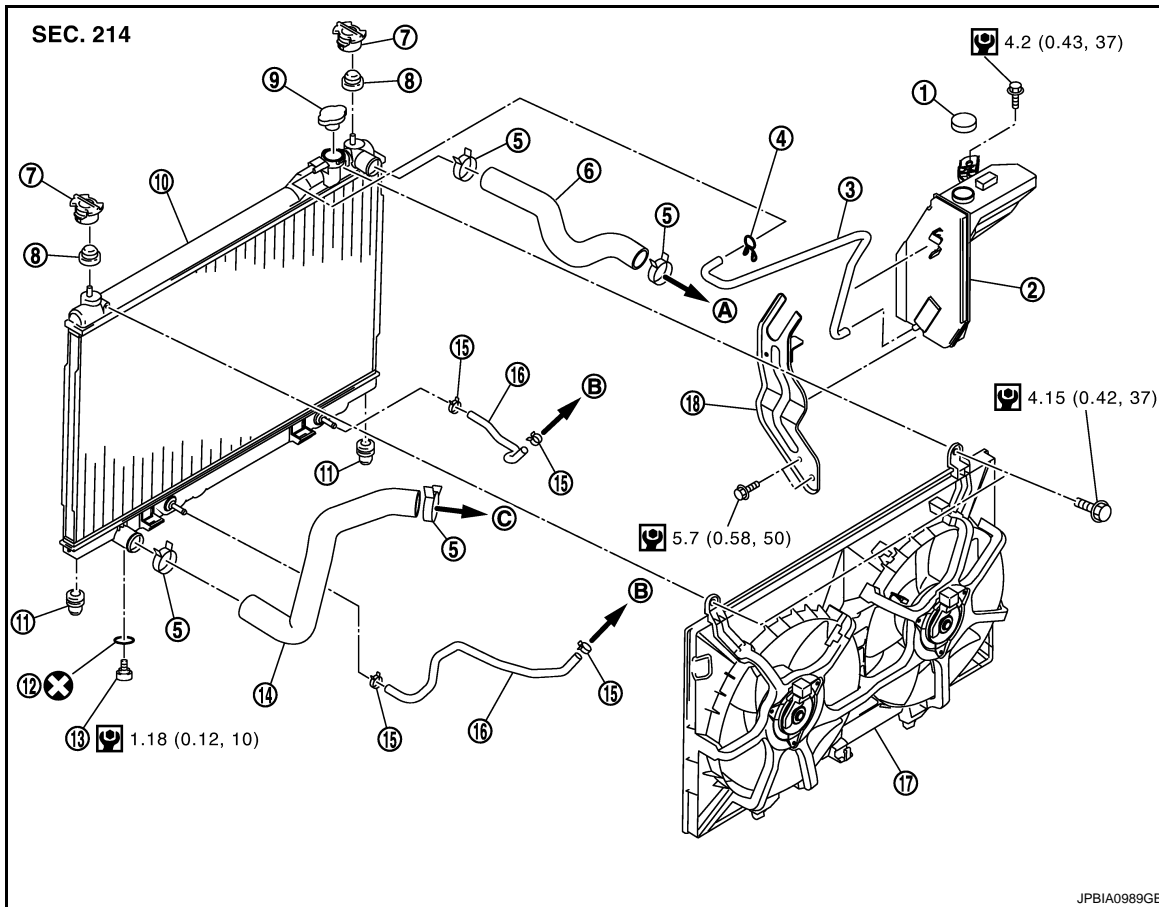
< SERVICE INFORMATION >

[VQ35DE]

RADIATOR

Component

INFOID:000000001325847



- | | | |
|---------------------------------|-----------------------------------|-----------------------------------|
| 1. Reservoir tank cap | 2. Reservoir tank | 3. Reservoir tank hose |
| 4. Clamp (reservoir tank hose) | 5. Clamp (radiator hose) | 6. Radiator hose (upper) |
| 7. Radiator upper mount bracket | 8. Mounting rubber (upper) | 9. Radiator cap |
| 10. Radiator | 11. Mounting rubber (lower) | 12. O-ring |
| 13. Drain plug | 14. Radiator hose (lower) | 15. Clamp (A/T fluid cooler hose) |
| 16. A/T fluid cooler hose | 17. Radiator cooling fan assembly | 18. Reservoir tank bracket |
| A. To water outlet | B. To A/T fluid cooler tube | C. To water inlet |

- Refer to [GI-8, "Component"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001325848

REMOVAL

WARNING:

Do not remove radiator cap when 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.

1. Remove front engine undercover with power tool.
2. Drain engine coolant from radiator. Refer to [CO-10, "Changing Engine Coolant"](#).

CAUTION:

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

3. Remove air duct (inlet) and air cleaner case assembly. Refer to [EM-17, "Component"](#).

RADIATOR

[VQ35DE]

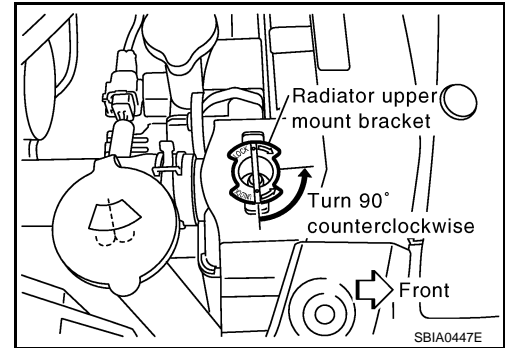
< SERVICE INFORMATION >

4. Remove reservoir tank and reservoir tank bracket.
5. Disconnect A/T fluid cooler hoses from radiator.
 - Install blind plug to avoid leakage of A/T fluid.
6. Removal radiator hoses (upper and lower) and reservoir tank hose.

CAUTION:

Be careful not to allow engine coolant to contact drive belts.

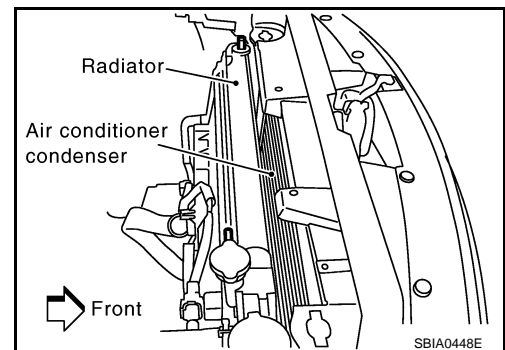
7. Remove radiator cooling fan assembly. Refer to [CO-20. "Component"](#).
8. Rotate two radiator upper mount brackets 90 degrees in the direction shown in the figure, and remove them.



9. Lift up and remove radiator.

CAUTION:

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



INSTALLATION

Installation is the reverse order of removal.

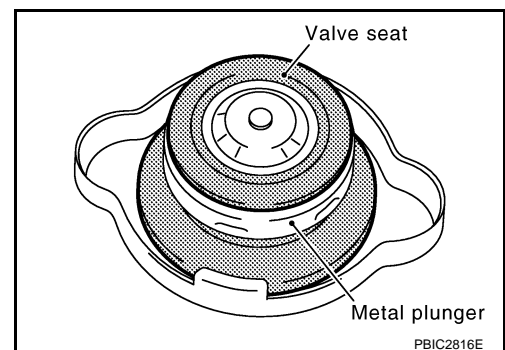
INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10. "Inspection"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant and A/T fluid.

Checking Radiator Cap

INFOID:000000001325849

- 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.

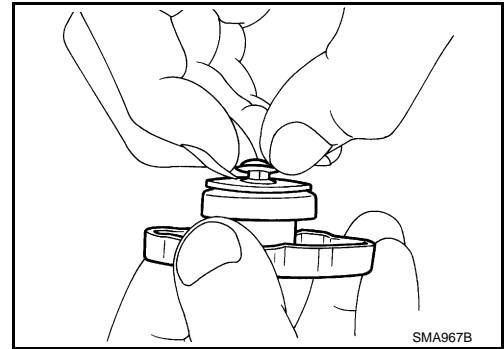


RADIATOR

[VQ35DE]

< SERVICE INFORMATION >

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



- Check radiator cap relief pressure.

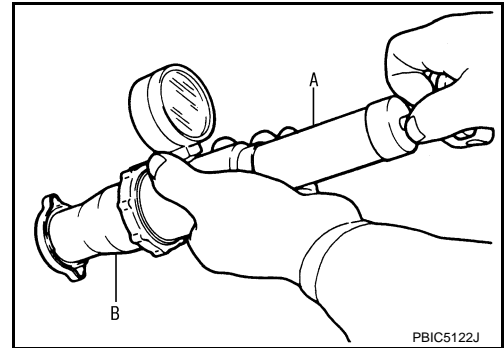
Standard:

78 - 98 kPa (0.8 - 1.0 kg/cm², 11 - 14 psi)

Limit:

59 kPa (0.6 kg/cm², 9 psi)

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



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

CAUTION:

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

Checking Radiator

INFOID:000000001325850

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

- Be careful not to bend or damage radiator fins.
 - When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.
1. Apply water by hose to the back side of the radiator core vertically downward.
 2. Apply water again to all radiator core surfaces once per minute.
 3. Stop washing if any stains no longer flow out from radiator.
 4. Blow air into the back side of radiator core vertically downward.
 - Use compressed air lower than 490 kPa (5 kg/cm², 71 psi) and keep distance more than 30 cm (11.81 in).
 5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

RADIATOR (ALUMINUM TYPE)

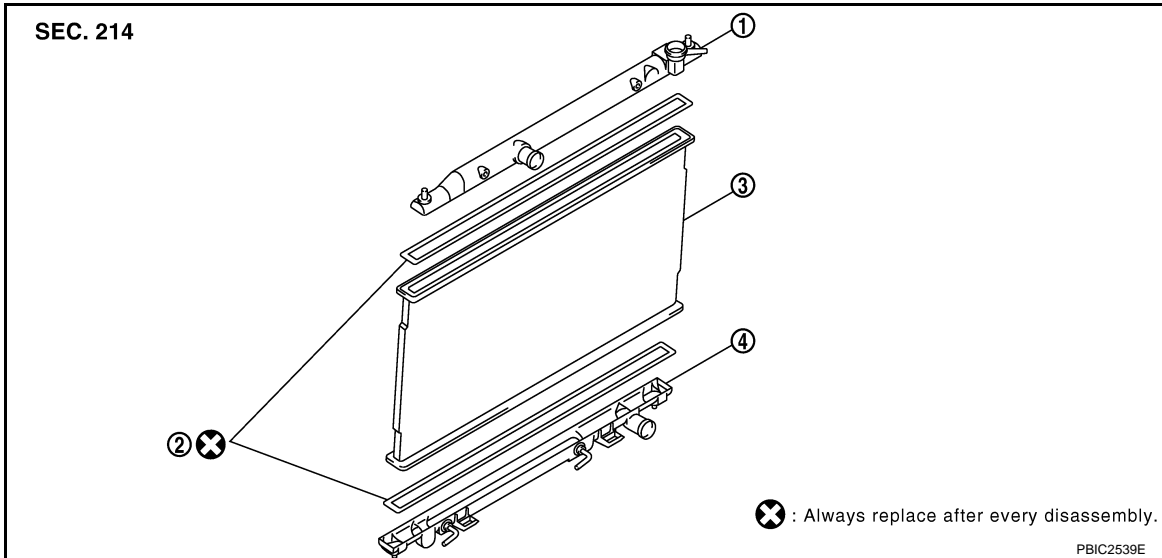
< SERVICE INFORMATION >

[VQ35DE]

RADIATOR (ALUMINUM TYPE)

Component

INFOID:000000001325851



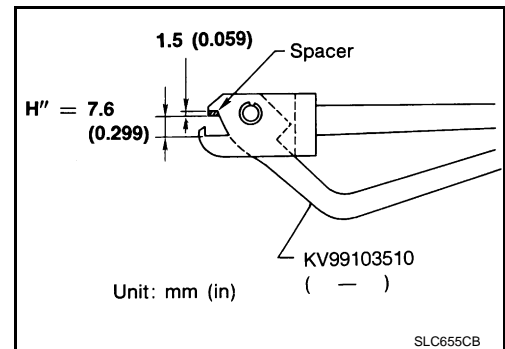
- 1. Upper tank
- 2. Sealing rubber
- 3. Core
- 4. Lower tank (with A/T fluid cooler)

Disassembly and Assembly

INFOID:000000001325852

PREPARATION

- Attach spacer to tip of the radiator plate pliers A (SST).
Spacer specification: 18 mm (0.71 in) wide × 8.5 mm (0.335 in) long × 1.5 mm (0.059 in) thick.



- Make sure that when the radiator plate pliers A [SST: KV99103510 (—)] are closed dimension H'' is approx. 7.6 mm (0.299 in).
- Adjust dimension H'' with spacer, if necessary.

DISASSEMBLY

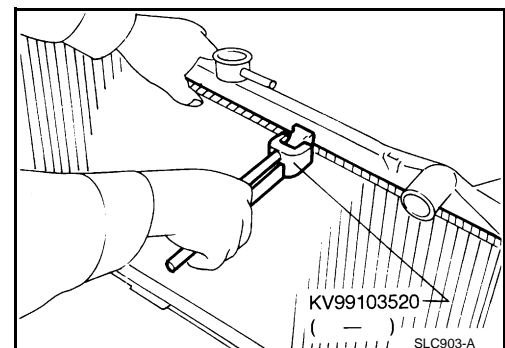
- Remove upper and lower tanks with the radiator plate pliers B (SST).

CAUTION:

Do not disassemble lower tank and A/T fluid cooler.

NOTE:

Regard lower tank and A/T fluid cooler as an assembly.



RADIATOR (ALUMINUM TYPE)

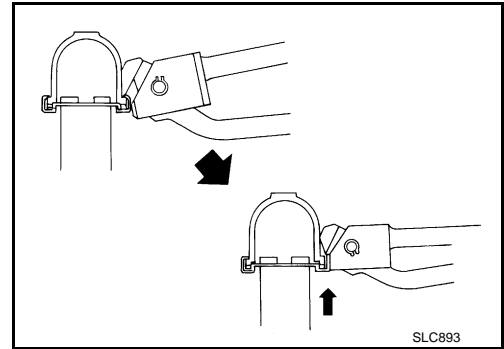
[VQ35DE]

< SERVICE INFORMATION >

- Grip the crimped edge and bend it upwards so that the radiator plate pliers B [SST: KV99103520 (—)] slips off.

CAUTION:

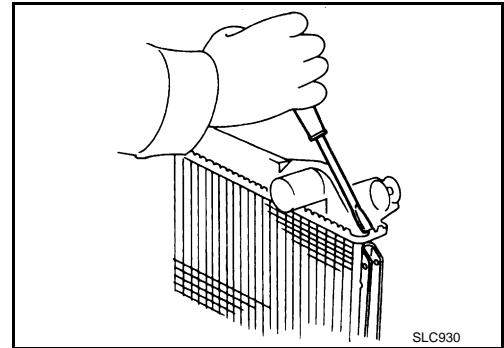
Do not bend excessively.



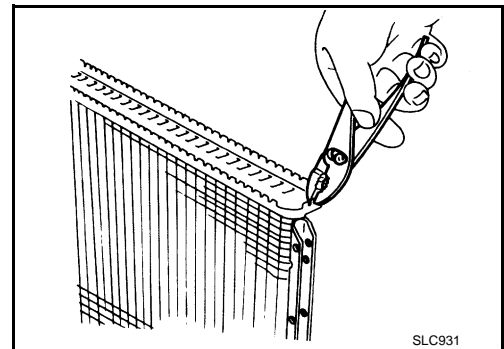
- In areas where the radiator plate pliers B [SST: KV99103520 (—)] cannot be used, use a screwdriver to bend the edge up.

CAUTION:

Be careful not to damage tank.

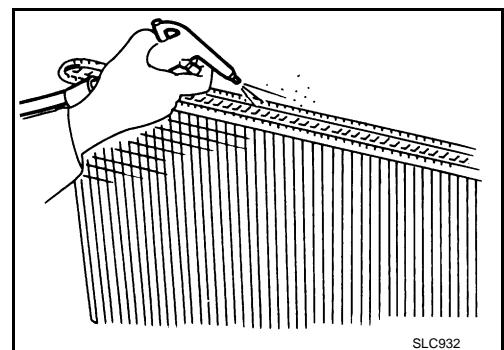


2. Remove sealing rubber.
3. Make sure the edge stands straight up.



ASSEMBLY

1. Clean contact portion of tank.



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RADIATOR (ALUMINUM TYPE)

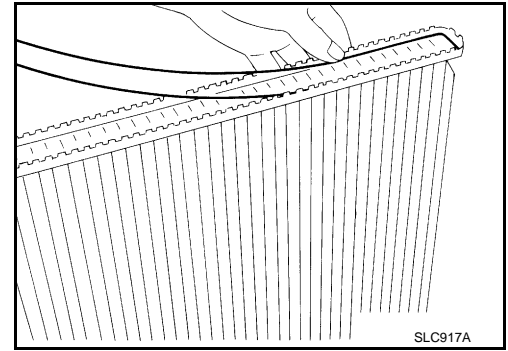
[VQ35DE]

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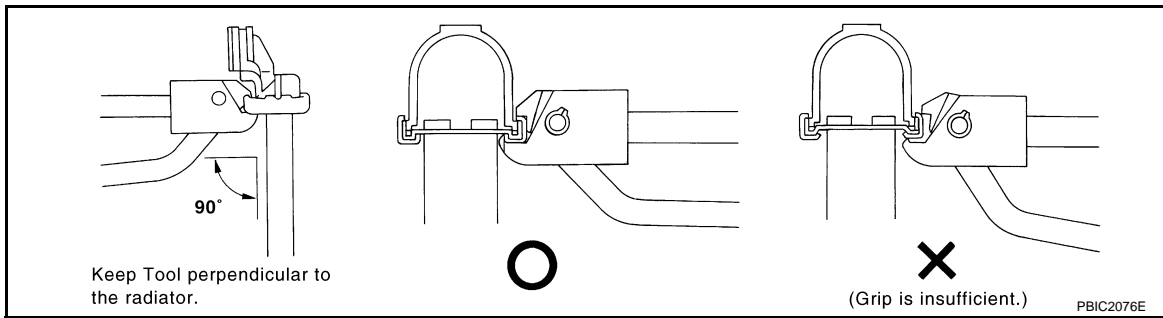
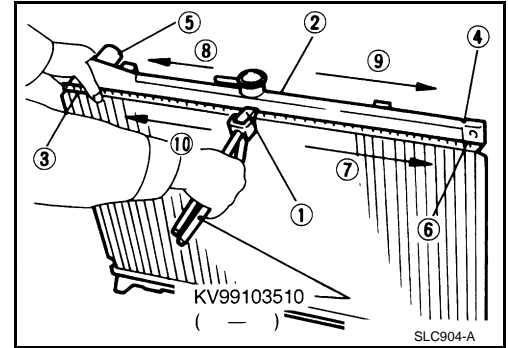
2. Install new sealing rubber while pushing it with fingers.

CAUTION:

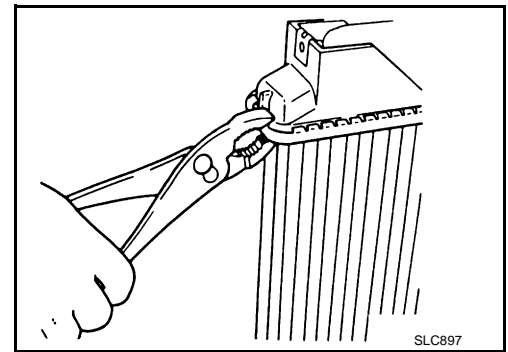
Be careful not to twist sealing rubber.



3. Caulk tank in numerical order as shown in the figure with the radiator plate pliers A (SST).

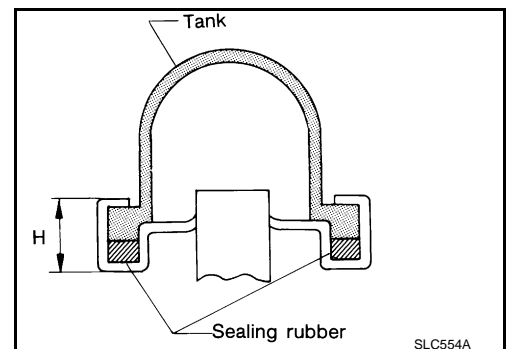


• Use pliers in the locations where the radiator plate pliers A [SST: KV99103510 (-)] cannot be used.



4. Make sure that the rim is completely crimped down.

Standard height "H" : 8.0 - 8.4 mm (0.315 - 0.331 in)



RADIATOR (ALUMINUM TYPE)

[VQ35DE]

< SERVICE INFORMATION >

5. Make sure that there is no leakage.
Refer to "INSPECTION".

INSPECTION

1. Apply pressure with the radiator cap tester adapter (commercial service tool) (A) and the radiator cap tester (commercial service tool).

Testing pressure

: 157 kPa (1.6 kg/cm², 23 psi)

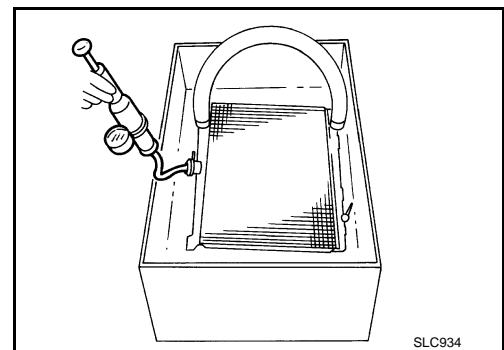
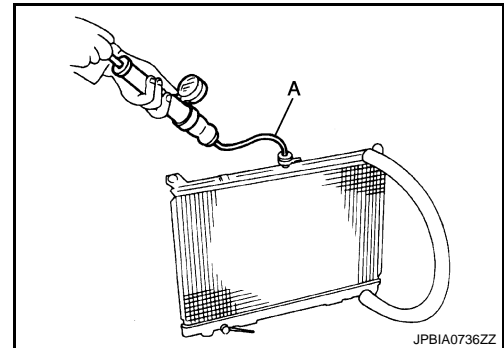
WARNING:

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

CAUTION:

Attach hose to A/T fluid cooler to seal its inlet and outlet.

2. Check for leakage by soaking radiator in water container with the testing pressure applied.



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COOLING FAN

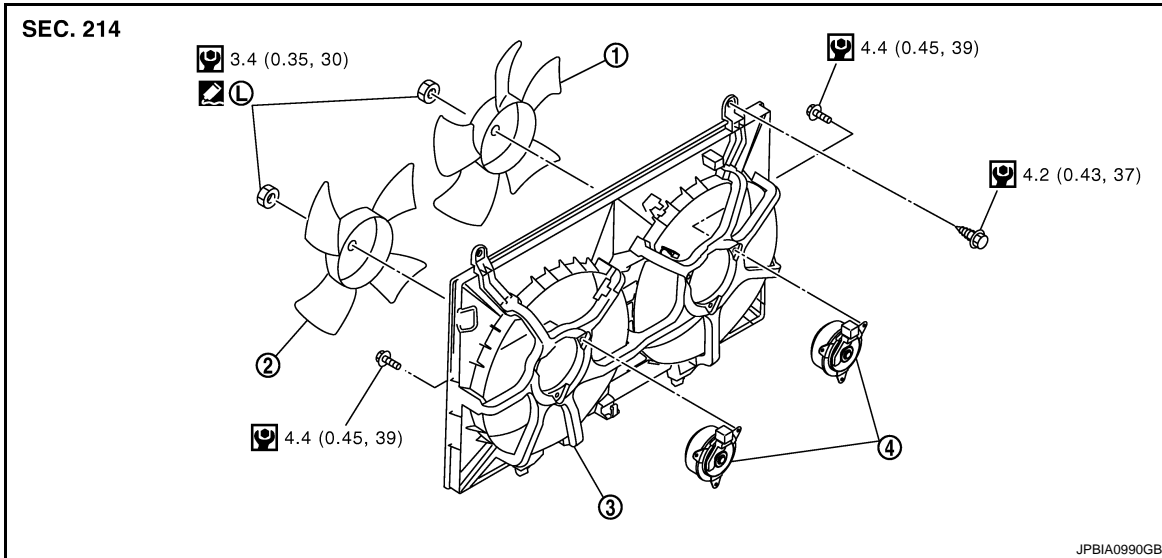
< SERVICE INFORMATION >

[VQ35DE]


COOLING FAN

Component

INFOID:000000001325853



1. Cooling fan (RH)
2. Cooling fan (LH)
3. Fan shroud
4. Fan motor

 : Apply Genuine High Strength Locking Sealant or equivalent

- Refer to [GI-8. "Component"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001325854

REMOVAL

1. Remove air duct (inlet), power duct and air cleaner case assembly. Refer to [EM-17. "Component"](#).
2. Disconnect harness connector from fan motors, and move harness to aside.
3. Remove radiator cooling fan assembly.

CAUTION:

Be careful not to damage or scratch on radiator core.

INSTALLATION

Installation is the reverse order of removal.

INSPECTION AFTER INSTALLATION

Make sure that fan motors operate normally.

NOTE:

Cooling fans are controlled by ECM. For details, refer to [EC-437. "Description"](#).

Disassembly and Assembly

INFOID:000000001325855

DISASSEMBLY

1. Remove cooling fans (RH and LH) from fan motors.
2. Remove fan motors from fan shroud.

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

ASSEMBLY

COOLING FAN

< SERVICE INFORMATION >

[VQ35DE]

Assemble in the reverse order of disassembly.

CAUTION:

Cooling fans and fan motors are different between RH and LH. Be careful not to misassemble them.

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WATER PUMP

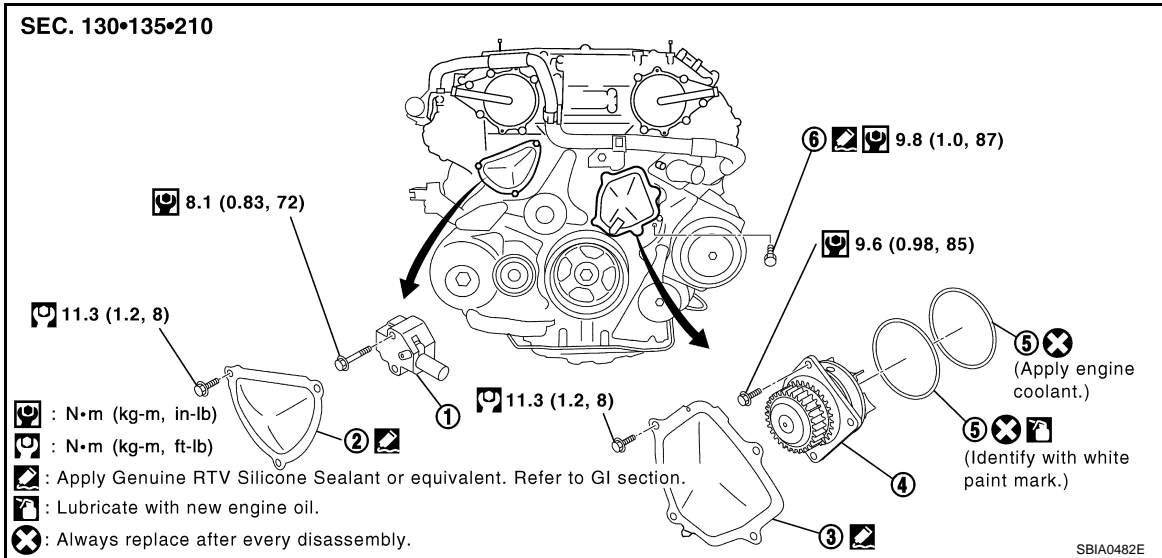
< SERVICE INFORMATION >

[VQ35DE]

WATER PUMP

Component

INFOID:000000001325856



- | | | |
|-------------------------------------|--------------------------|-----------------------------|
| 1. Timing chain tensioner (primary) | 2. Chain tensioner cover | 3. Water pump cover |
| 4. Water pump | 5. O-rings | 6. Water drain plug (front) |

Removal and Installation

INFOID:000000001325857

CAUTION:

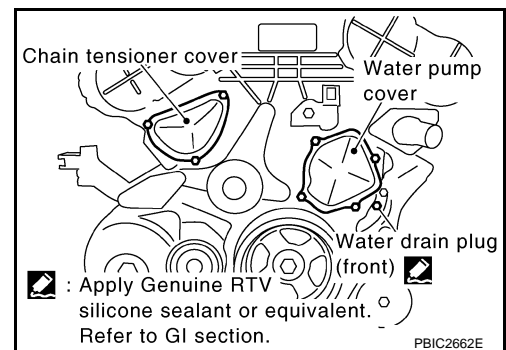
- When removing water pump assembly, be careful not to get engine coolant on drive belts.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using the radiator cap tester (commercial service tool) and the radiator cap tester adapter (commercial service tool).

REMOVAL

1. Remove front engine undercover with power tool.
2. Remove drive belts. Refer to [EM-15, "Removal and Installation"](#).
3. Drain engine coolant from radiator. Refer to [CO-10, "Changing Engine Coolant"](#).

CAUTION:

- Perform this step when the engine is cold.
 - Do not spill engine coolant on drive belts.
4. Remove air duct (inlet), power duct and air cleaner case assembly. Refer to [EM-17, "Component"](#).
 5. Remove water drain plug (front) on water pump side of cylinder block to drain engine coolant from engine inside.



6. Remove chain tensioner cover and water pump cover from front timing chain case.
 - Use the seal cutter [SST: KV10111100 (J37228)] to cut liquid gasket for removal.
7. Remove timing chain tensioner (primary) as follows:

WATER PUMP

[VQ35DE]

< SERVICE INFORMATION >

- a. Remove lower mounting bolt.

CAUTION:

Be careful not to drop mounting bolt inside timing chain case.

- b. Loosen upper mounting bolt slowly, and then turn chain tensioner (primary) on the mounting bolt so that plunger is fully expanded.

NOTE:

Even if plunger is fully expanded, it is not dropped from the body of timing chain tensioner (primary).

- c. Turn crankshaft pulley clockwise so that timing chain on the timing chain tensioner (primary) side is loose.

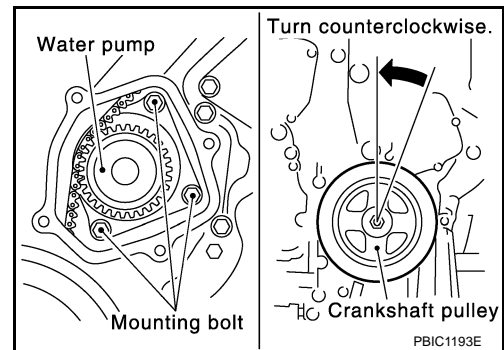
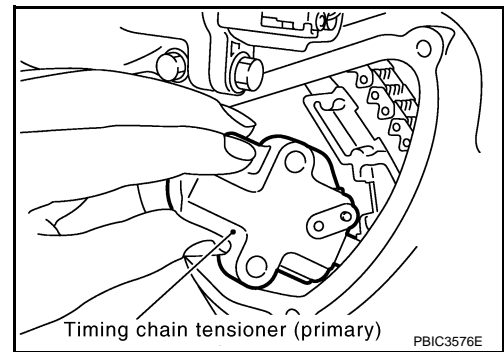
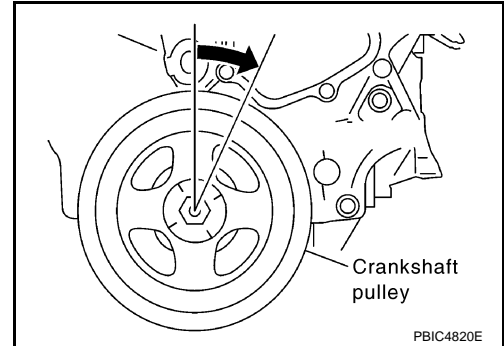
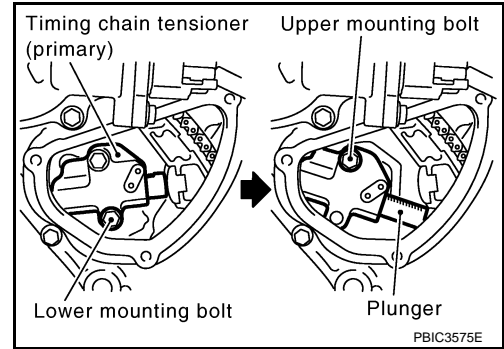
- d. Remove upper mounting bolt, and then remove timing chain tensioner (primary).

CAUTION:

Be careful not to drop mounting bolt inside timing chain case.

8. Remove water pump as follows:

- a. Remove three water pump mounting bolts. Secure a gap between water pump gear and timing chain, by turning crankshaft pulley counterclockwise until timing chain looseness on water pump sprocket becomes maximum.



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WATER PUMP

[VQ35DE]

< SERVICE INFORMATION >

- b. Screw M8 bolts [pitch: 1.25 mm (0.0492 in) length: approx. 50 mm (1.97 in)] into water pumps upper and lower mounting bolt holes until they reach timing chain case. Then, alternately tighten each bolt for a half turn, and pull out water pump.

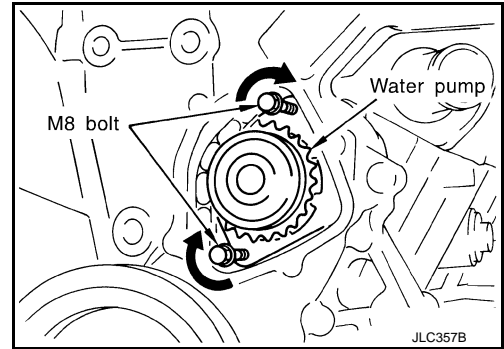
CAUTION:

- Pull straight out while preventing vane from contacting socket in installation area.
- Remove water pump without causing sprocket to contact timing chain.

- c. Remove M8 bolts and O-rings from water pump.

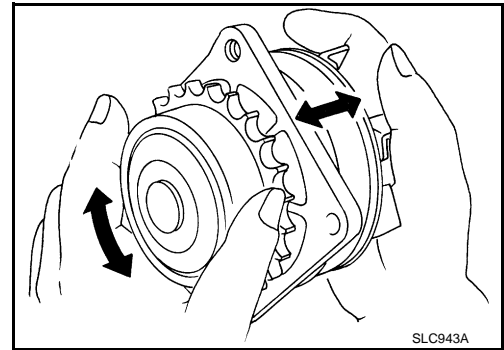
CAUTION:

Do not disassemble water pump.



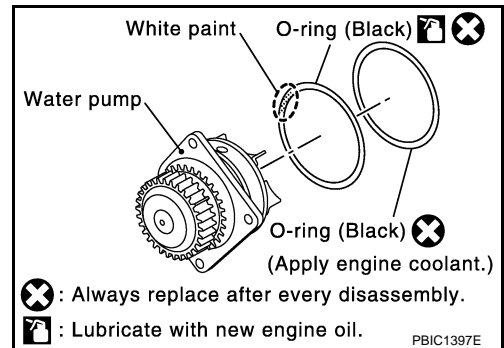
INSPECTION AFTER REMOVAL

- Check for badly rusted or corroded water pump body assembly.
- Check for rough operation due to excessive end play.
- If anything is found, replace water pump.



INSTALLATION

1. Install new O-rings to water pump.
- Apply engine oil and engine coolant to O-rings as shown in the figure.
 - Locate O-ring with white paint mark to engine front side.

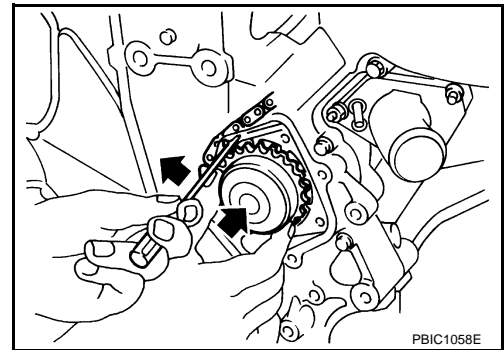


2. Install water pump.

CAUTION:

Do not allow cylinder block to nip O-rings when installing water pump.

- Make sure timing chain and water pump sprocket are engaged.
- Insert water pump by tightening mounting bolts alternately and evenly.



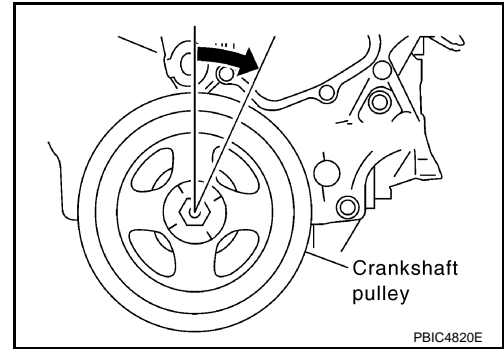
3. Install timing chain tensioner (primary) as follows:

WATER PUMP

[VQ35DE]

< SERVICE INFORMATION >

- a. Turn crankshaft pulley clockwise so that timing chain on the timing chain tensioner (primary) side is loose.

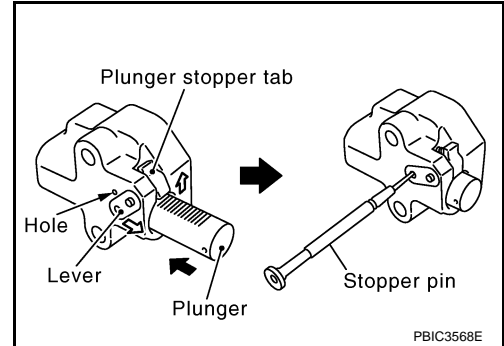


- b. Pull plunger stopper tab up (or turn lever downward) so as to remove plunger stopper tab from the ratchet of plunger.

NOTE:

Plunger stopper tab and lever are synchronized.

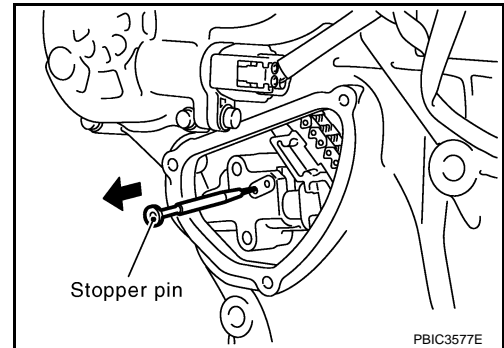
- c. Push plunger into the inside of tensioner body.
d. Hold plunger in the fully compressed position by engaging plunger stopper tab with the tip of ratchet.
e. To secure lever, insert stopper pin through hole of lever into tensioner body hole.
• The lever parts and the tab are synchronized. Therefore, the plunger will be secured under this condition.



NOTE:

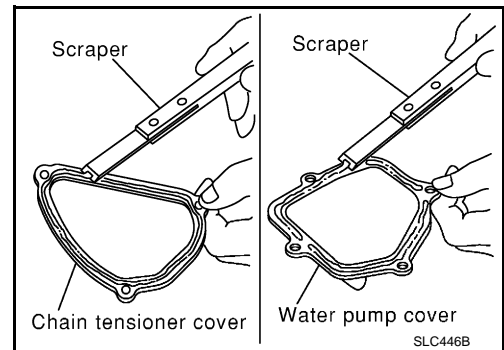
Figure shows the example of 1.2 mm (0.047 in) diameter thin screwdriver being used as the stopper pin.

- f. Install timing chain tensioner (primary).
• Remove dust and foreign material completely from backside of timing chain tensioner (primary) and from installation area of rear timing chain case.
g. Remove stopper pin.



- h. Make sure again that timing chain and water pump sprocket are engaged.
4. Install chain tensioner cover and water pump cover as follows:

- a. Before installing, remove all traces of old liquid gasket from mating surface of water pump cover and chain tensioner cover using a scraper. Also remove traces of old liquid gasket from the mating surface of front timing chain case.



WATER PUMP

[VQ35DE]

< SERVICE INFORMATION >

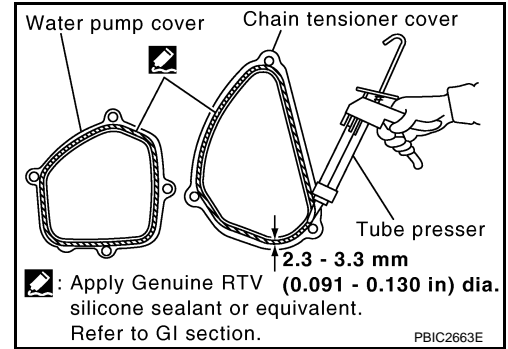
- b. Apply a continuous bead of liquid gasket with the tube presser (commercial service tool) to mating surface of chain tensioner cover and water pump cover.

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-44, "Recommended Chemical Product and Sealant"](#).

CAUTION:

Attaching should be done within 5 minutes after coating.

- c. Tighten mounting bolts.



5. Install water drain plug (front) on water pump side of cylinder block.
- Apply liquid gasket to the thread of water drain plug (front).
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-44, "Recommended Chemical Product and Sealant"](#).
6. Install in the reverse order of removal for remaining parts.
- **After starting engine, let idle for three minutes, then rev engine up to 3,000 rpm under no load to purge air from the high-pressure chamber of chain tensioner. Engine may produce a rattling noise. This indicates that air still remains in the chamber and is not a matter of concern.**

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

WATER INLET AND THERMOSTAT ASSEMBLY

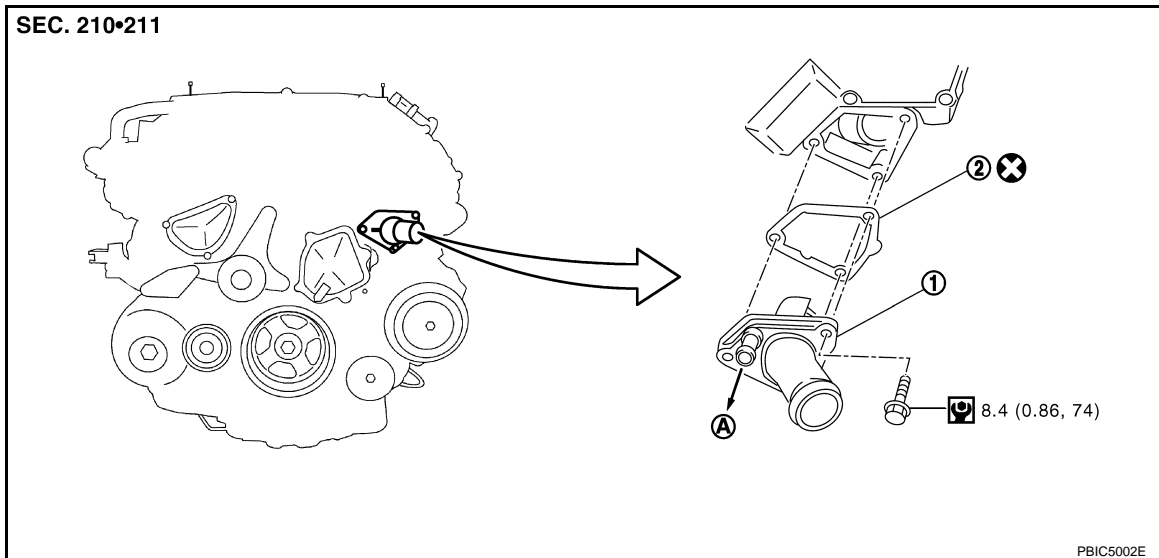
< SERVICE INFORMATION >

[VQ35DE]

WATER INLET AND THERMOSTAT ASSEMBLY

Component

INFOID:000000001325858



1. Water inlet and thermostat assembly 2. Gasket

- Refer to [GI-8. "Component"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001325859

REMOVAL

1. Remove front engine undercover using power tool.
2. Drain engine coolant from radiator drain plug at the bottom of radiator, and from water drain plug at the front of cylinder block. Refer to [CO-10. "Changing Engine Coolant"](#) and [CO-22. "Component"](#).

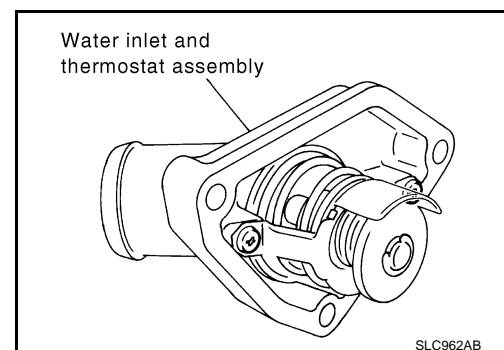
CAUTION:

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

3. Remove air duct (inlet). Refer to [EM-17. "Component"](#).
4. Disconnect radiator hose (lower) and oil cooler water hose from water inlet and thermostat assembly.
5. Remove water inlet and thermostat assembly.

CAUTION:

- Do not disassemble water inlet and thermostat assembly.
- Replace them as a unit, if necessary.



INSPECTION AFTER REMOVAL

1. Check valve seating condition at ordinary room temperatures. It should seat tightly.

WATER INLET AND THERMOSTAT ASSEMBLY

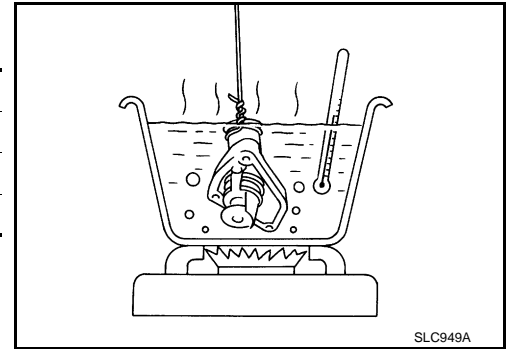
[VQ35DE]

< SERVICE INFORMATION >

2. Check valve operation.

	Thermostat
Valve opening temperature	76 - 79°C (169 - 174°F)
Maximum valve lift	8.6 mm/90°C (0.339 in/194°F)
Valve closing temperature	71 °C (160 °F)

- If the malfunctioning condition, when valve seating at ordinary room temperature, or measured values are out of the standard, replace water inlet and thermostat assembly.



INSTALLATION

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

- **Be careful not to spill engine coolant over engine room. Use rag to absorb engine coolant.**

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

WATER OUTLET AND WATER PIPING

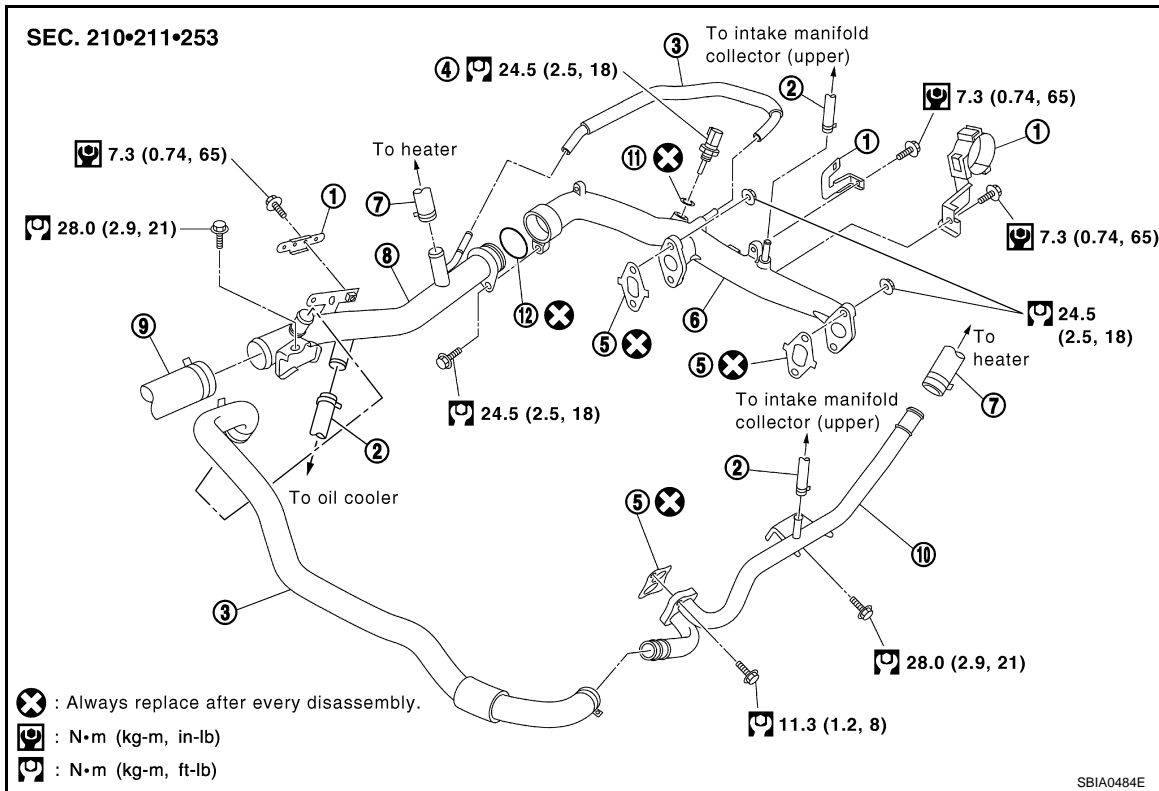
< SERVICE INFORMATION >

[VQ35DE]

WATER OUTLET AND WATER PIPING

Component

INFOID:000000001325860



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| 1. Harness bracket | 2. Water hose | 3. Water bypass hose |
| 4. Engine coolant temperature sensor | 5. Gasket | 6. Water outlet |
| 7. Heater hose | 8. Water pipe | 9. Radiator hose (upper) |
| 10. Heater pipe | 11. Washer | 12. O-ring |

Removal and Installation

INFOID:000000001325861

REMOVAL

1. Remove front engine undercover with power tool.
2. Drain engine coolant from radiator drain plug at the bottom of radiator, and from water drain plug at the front of cylinder block. Refer to [CO-10. "Changing Engine Coolant"](#) and [CO-22. "Component"](#).
CAUTION:
 - Perform this step when the engine is cold.
 - Do not spill engine coolant on drive belts.
3. Remove engine cover with power tool. Refer to [EM-19. "Component"](#).
4. Remove air duct (inlet), air duct and air cleaner case assembly. Refer to [EM-17. "Component"](#).
5. Remove radiator hose (upper) and heater hose.
6. Remove the following parts, when remove water outlet.
 - A/T fluid charging pipe: Refer to [AT-241. "Removal and Installation \(2WD Models\)"](#).
 - Intake manifold collectors (upper and lower). Refer to [EM-19. "Component"](#).
 - Rocker cover (right bank). Refer to [EM-51. "Component"](#).
7. Remove engine coolant temperature sensor as necessary.
CAUTION:
Be careful not to damage engine coolant temperature sensor.
8. Remove water outlet, heater pipe, water bypass hoses and water pipe.

INSTALLATION

WATER OUTLET AND WATER PIPING

[VQ35DE]

< SERVICE INFORMATION >

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

- Securely insert each hose, and install clamp at a position where it does not interfere with the pipe bulge.
- When inserting water pipe into water outlet, apply neutral detergent to O-ring.

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter (commercial service tool) and the radiator cap tester (commercial service tool). Refer to [CO-10, "Inspection"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[VQ35DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:000000001325862

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity [With reservoir tank ("MAX" level)]	8.6 (9-1/8, 7- 5/8)
Reservoir tank engine coolant capacity (At "MAX" level)	0.8 (7/8, 3/4)

RADIATOR

Unit: kPa (kg/cm², psi)

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

THERMOSTAT

Valve opening temperature	76 - 79°C (169 - 174°F)
Maximum valve lift	8.6 mm/90°C (0.339 in/194°F)
Valve closing temperature	71°C (160°F)

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SERVICE INFORMATION

PRECAUTIONS

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

INFOID:000000001612913

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 "SUPPLEMENTAL RESTRAINT SYSTEM" and "SEAT BELTS" 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 "SUPPLEMENTAL RESTRAINT SYSTEM".
- 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.

PREPARATION

< SERVICE INFORMATION >

[VK45DE]

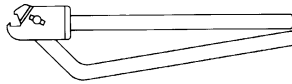
PREPARATION

Special Service Tool

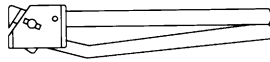
INFOID:000000001325864

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

Tool number (Kent-Moore No.) Tool name	Description
KV99103510 (—) Radiator plate pliers A	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	Removing radiator upper and lower tanks



S-NT224

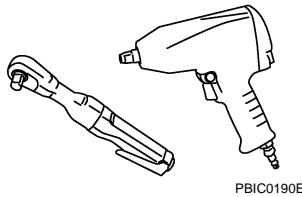


S-NT225

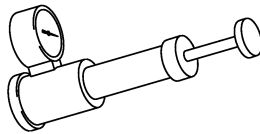
Commercial Service Tool

INFOID:000000001325865

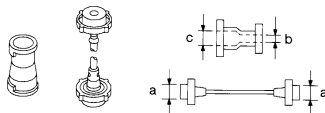
Tool name	Description
Power tool	Loosening nuts and bolts
Radiator cap tester	Checking radiator and radiator cap
Radiator cap tester adapter (J33984-A)	Adapting radiator cap tester to radiator cap and thermostat housing filler neck a: 28 (1.10) dia. b: 31.4 (1.236) dia. c: 41.3 (1.626) dia. Unit: mm (in)



PBIC0190E



PBIC1982E



S-NT564

OVERHEATING CAUSE ANALYSIS

< SERVICE INFORMATION >

[VK45DE]

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:000000001325866

		Symptom	Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
	Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)		
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant density	—
	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		
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 >

[VK45DE]

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

COOLING SYSTEM

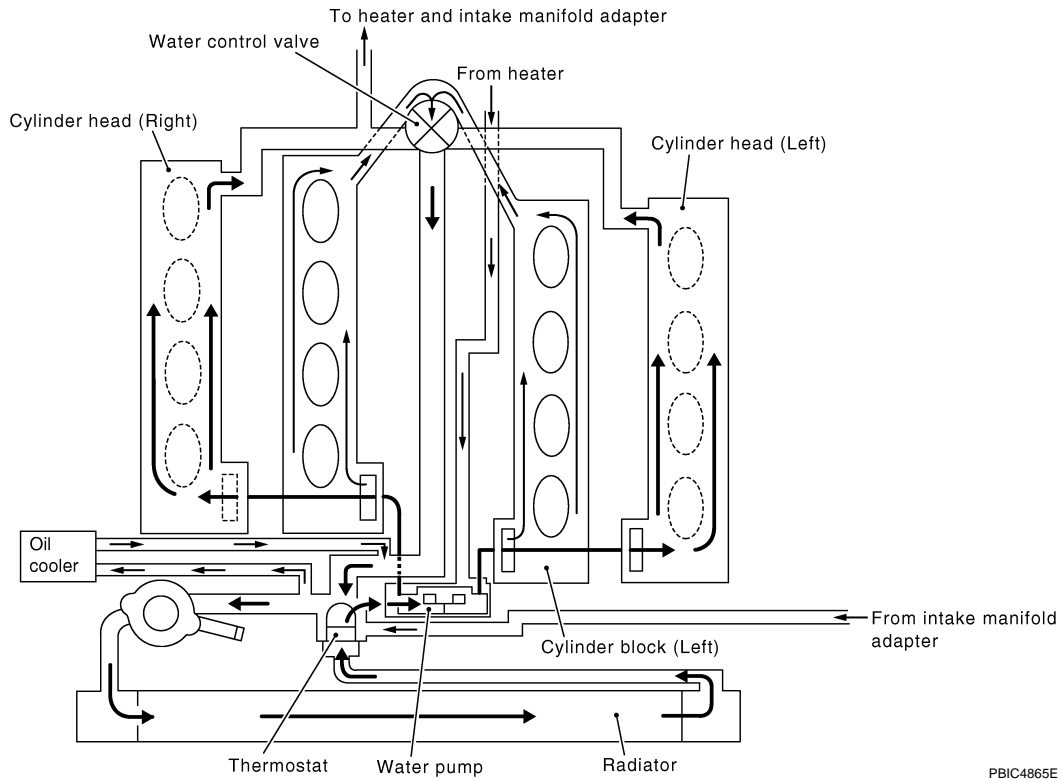
< SERVICE INFORMATION >

[VK45DE]

COOLING SYSTEM

Cooling Circuit

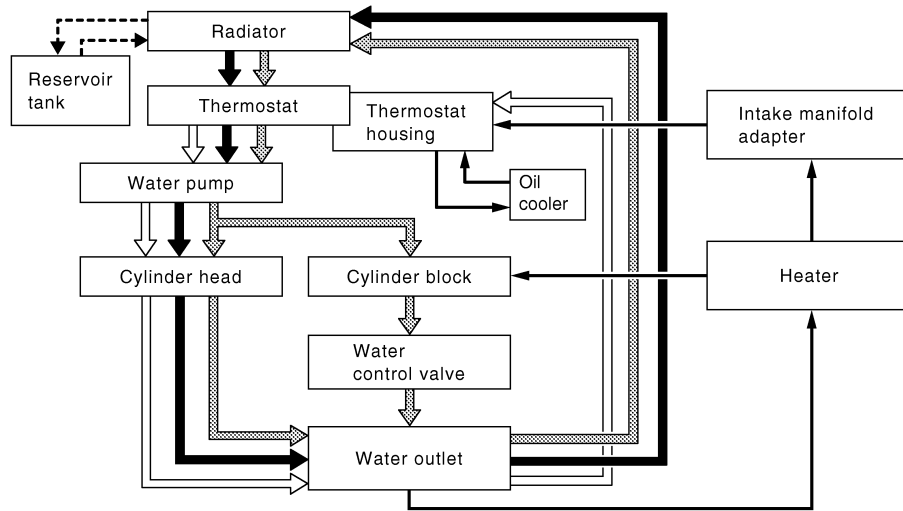
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PBIC4865E

System Chart

INFOID:000000001325868



	Thermostat	Water control valve
	Closed	Closed
	Open	Closed
	Open	Open

PBIC4866E

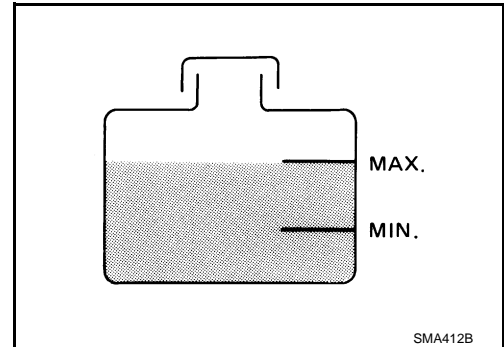
ENGINE COOLANT

Inspection

INFOID:000000001325869

LEVEL CHECK

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



LEAK CHECK

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

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

WARNING:

Do not remove radiator cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from thermostat housing.

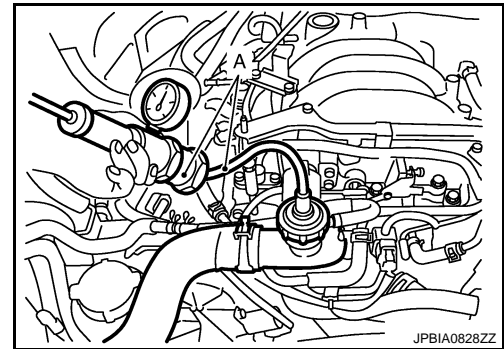
CAUTION:

Higher testing pressure than specified may cause radiator damage.

NOTE:

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

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



Changing Engine Coolant

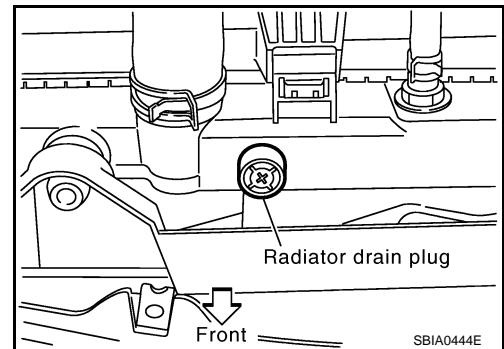
INFOID:000000001325870

WARNING:

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

DRAINING ENGINE COOLANT

1. Remove front engine undercover with power tool.
2. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.



When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-242, "Disassembly and Assembly"](#).

3. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing.

ENGINE COOLANT

[VK45DE]

< SERVICE INFORMATION >

4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
If contaminated, flush the engine cooling system. Refer to "FLUSHING COOLING SYSTEM".

REFILLING ENGINE COOLANT

1. Install reservoir tank, and radiator drain plug.

CAUTION:

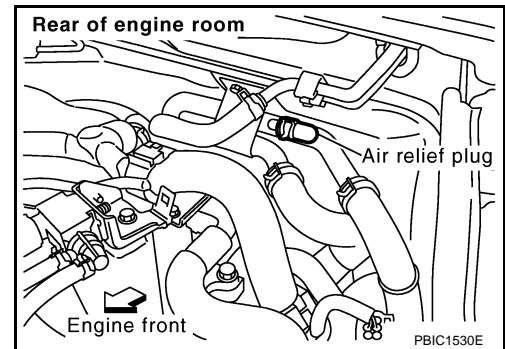
Be sure to clean radiator drain plug and install with new O-ring.

Radiator drain plug:

 : 1.19 N·m (0.12 kg·m, 11 in·lb)

If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-242, "Disassembly and Assembly"](#).

2. Make sure that each hose clamp has been firmly tightened.
3. Remove air relief plug on heater hose.



4. Fill thermostat housing and reservoir tank to specified level.
 - Refill engine coolant up to filler neck of thermostat housing.
 - Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
 - Use Genuine NISSAN Long Life Antifreeze/Coolant or equivalent mixed with water (distilled or demineralized). Refer to [MA-9, "Fluids and Lubricants"](#).

Engine coolant capacity

(With reservoir tank at "MAX" level):

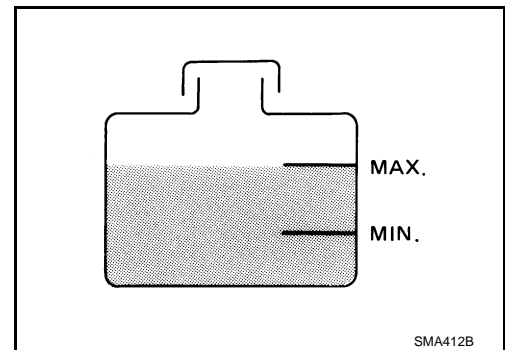
Approx. 10.0 ℓ (10-5/8 US qt, 8-3/4 Imp qt)

Reservoir tank engine coolant capacity

(At "MAX" level):

0.8 ℓ (7/8 US qt, 3/4 Imp qt)

- When engine coolant overflows air relief hole on heater hose, install air relief plug.



5. Install radiator cap.
6. Warm up until opening thermostat. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
 - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.**CAUTION:**
Watch water temperature gauge so as not to overheat engine.
7. Stop engine and cool down to less than approximately 50°C (122°F).
 - Cool down using a fan to reduce the time.
 - If necessary, refill engine coolant up to filler neck of thermostat housing.

ENGINE COOLANT

[VK45DE]

< SERVICE INFORMATION >

8. Refill reservoir tank to "MAX" level line with engine coolant.
9. Repeat steps 4 through 7 two or more times with radiator cap installed until engine coolant level no longer drops.
10. Check cooling system for leaks with engine running.
11. Warm up engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
 - Sound may be noticeable at heater unit.
12. Repeat step 11 three times.
13. If sound is heard, bleed air from cooling system by repeating steps 4 through 7 until engine coolant level no longer drops.

FLUSHING COOLING SYSTEM

1. Install reservoir tank, and radiator drain plug.

CAUTION:

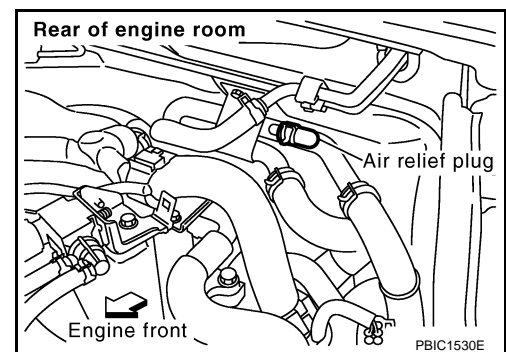
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug:

 : 1.19 N·m (0.12 kg·m, 11 in·lb)

If water drain plugs on cylinder block are removed, close and tighten them. Refer to [EM-242, "Disassembly and Assembly"](#).

2. Remove air relief plug on heater hose.



3. Fill thermostat housing with water until water spills from the air relief hole, then close air relief plug. Fill thermostat housing 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 system. Refer to "DRAINING ENGINE COOLANT".
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

RADIATOR

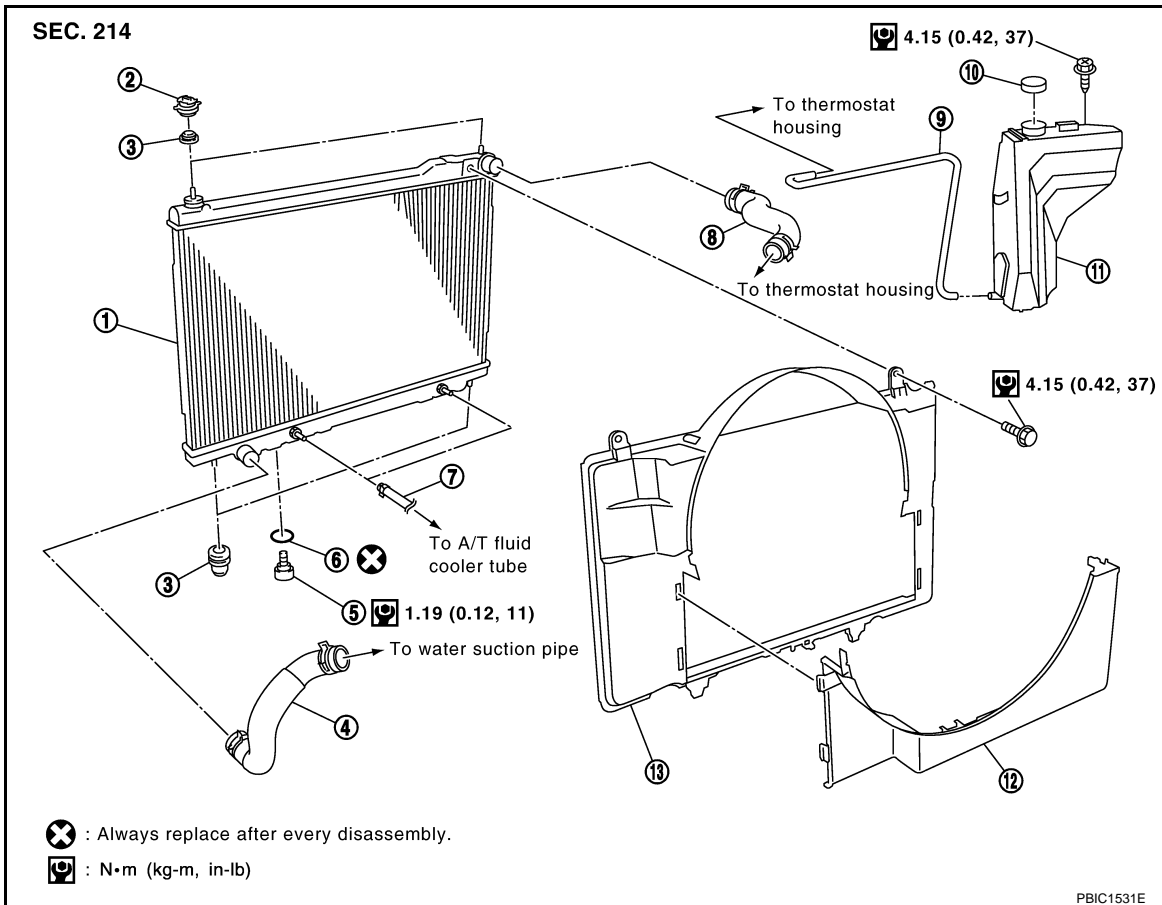
< SERVICE INFORMATION >

[VK45DE]

RADIATOR

Component

INFOID:000000001325871



- | | | |
|--------------------------|--------------------------|-----------------------------|
| 1. Radiator | 2. Upper mount bracket | 3. Mounting rubber |
| 4. Radiator hose (lower) | 5. Radiator drain plug | 6. O-ring |
| 7. A/T fluid cooler hose | 8. Radiator hose (upper) | 9. Reservoir tank hose |
| 10. Reservoir tank cap | 11. Reservoir tank | 12. Radiator shroud (lower) |
| 13. Radiator shroud | | |

Removal and Installation

INFOID:000000001325872

REMOVAL

WARNING:

Do not remove radiator cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator. Wrap a thick cloth around 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.

1. Remove engine cover with power tool. Refer to [EM-169, "Component"](#).
2. Remove engine front undercover with power tool.
3. Drain engine coolant from radiator. Refer to [CO-37, "Changing Engine Coolant"](#).

CAUTION:

Perform this step when engine is cold.

4. Remove air duct (inlet), air cleaner case and mass air flow sensor assembly. Refer to [EM-173, "Component"](#).
5. Remove radiator hoses (upper and lower).

CAUTION:

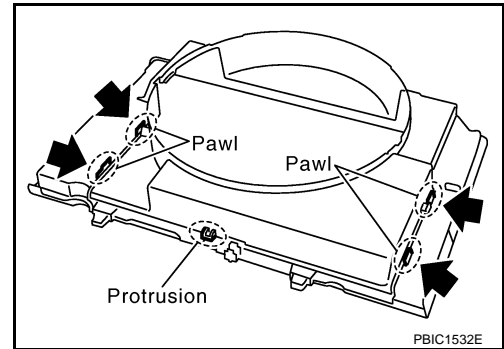
Do not spill engine coolant on drive belts.

RADIATOR

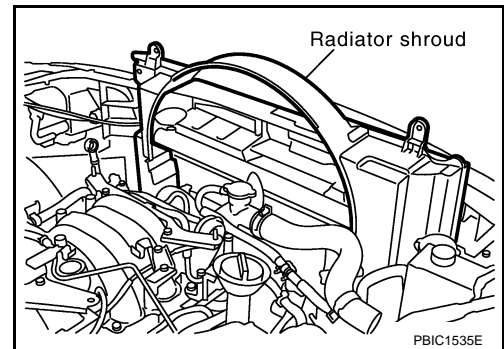
[VK45DE]

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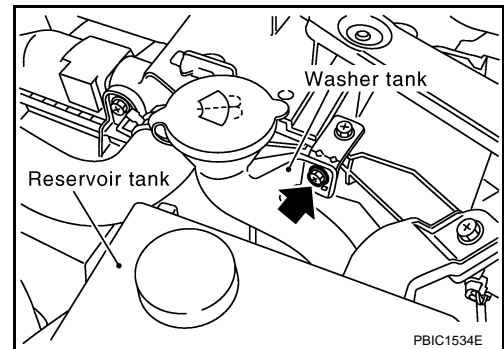
6. Disconnect A/T fluid cooler hoses.
 - Install blind plug to avoid leakage of A/T fluid.
7. Remove radiator shroud (lower).
 - While pressing left and right pawls in direction indicated by arrows, pull radiator shroud (lower) rearwards to remove.



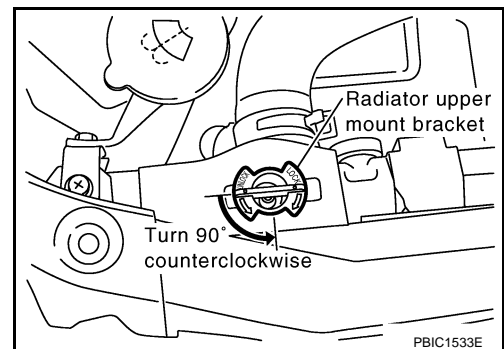
8. Lift up and remove radiator shroud.



9. Remove washer tank mounting bolts.



10. Rotate two radiator upper mount brackets 90 degrees in the direction as shown in the figure, and remove them.



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RADIATOR

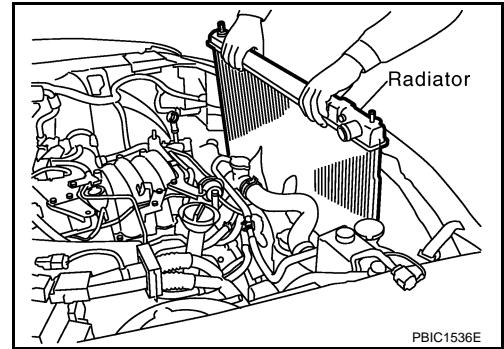
[VK45DE]

< SERVICE INFORMATION >

11. Lift up and remove radiator.

CAUTION:

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



INSTALLATION

Install in the reverse order of removal.

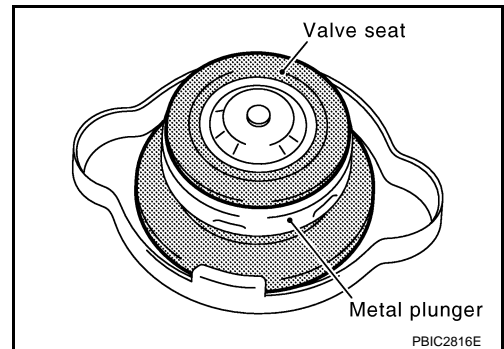
INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using radiator cap tester adapter (commercial service tool) and radiator cap tester (commercial service tool). Refer to [CO-37, "Inspection"](#).
- Start and warm up engine. Visually Check if there is no leaks of engine coolant and A/T fluid.

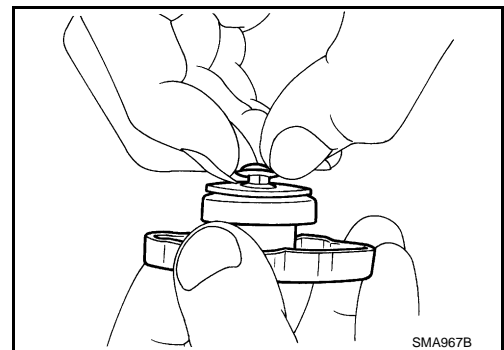
Checking Radiator Cap

INFOID:000000001325873

- 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 close completely when released.
 - Make sure that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
 - Make sure that there are no unusualness in the opening and closing conditions of negative-pressure valve.

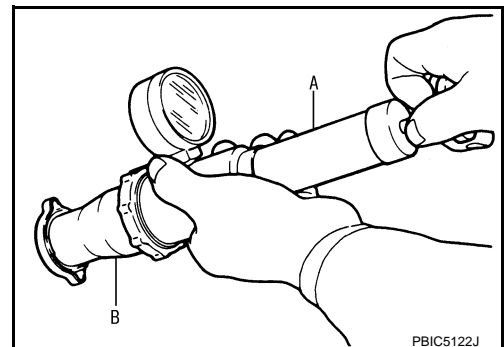


- Check radiator cap relief pressure.

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

Limit : 59 kPa (0.6 kg/cm², 9 psi)

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



- Replace radiator cap if there is an unusualness.

RADIATOR

< SERVICE INFORMATION >

[VK45DE]

CAUTION:

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

A

Checking Radiator

INFOID:000000001325874

CO

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

CAUTION:

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

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RADIATOR (ALUMINUM TYPE)

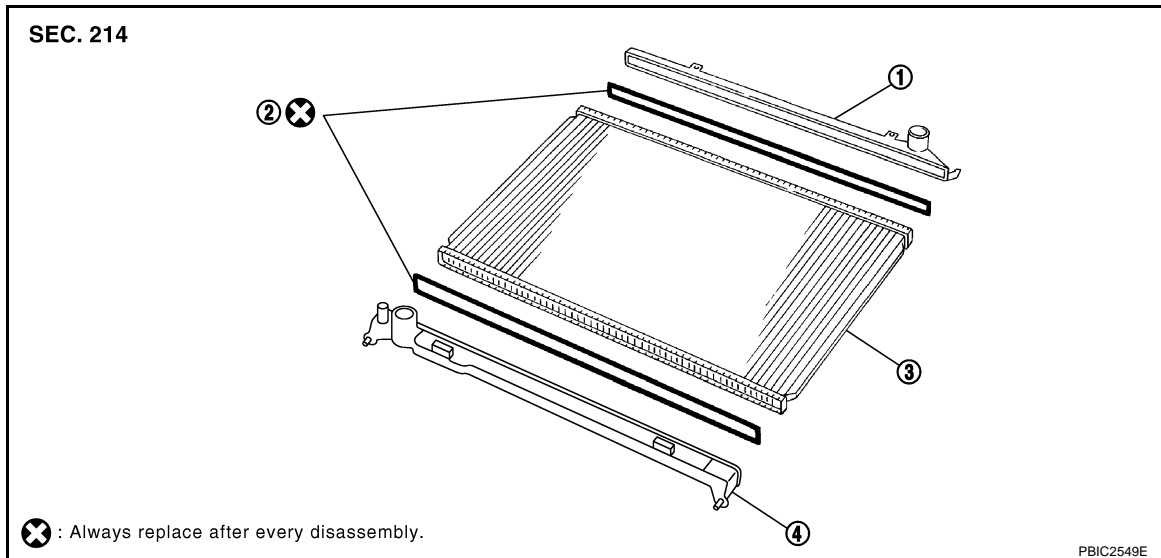
< SERVICE INFORMATION >

[VK45DE]

RADIATOR (ALUMINUM TYPE)

Component

INFOID:000000001325875



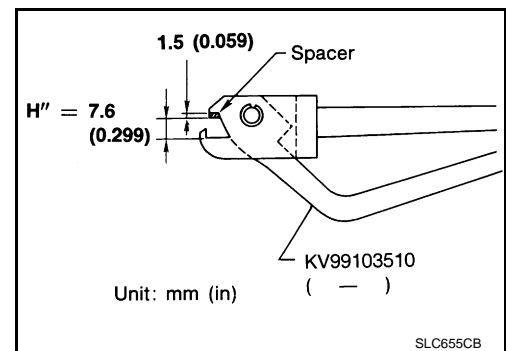
1. Upper tank
2. Sealing rubber
3. Core
4. Lower tank (with A/T fluid cooler)

Disassembly and Assembly

INFOID:000000001325876

PREPARATION

1. Attach spacer to tip of radiator plate pliers A (SST).
Spacer specification: 18 mm (0.71 in) wide × 8.5 mm (0.335 in) long × 1.5 mm (0.059 in) thick.



2. Make sure that when radiator plate pliers A [SST: KV99103510 (—)] are closed dimension H'' is approx. 7.6 mm (0.299 in).
3. Adjust dimension H'' with spacer, if necessary.

DISASSEMBLY

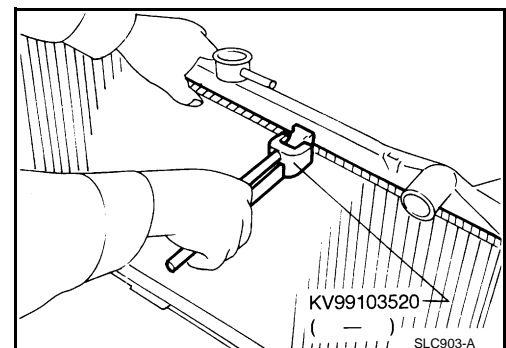
1. Remove upper and lower tanks with radiator plate pliers B (SST).

CAUTION:

Do not disassemble lower tank and A/T fluid cooler.

NOTE:

Regard lower tank and A/T fluid cooler as an assembly.



RADIATOR (ALUMINUM TYPE)

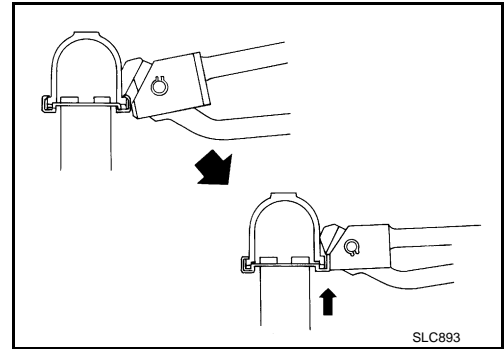
[VK45DE]

< SERVICE INFORMATION >

- Grip the crimped edge and bend it upwards so that radiator plate pliers B [SST: KV99103520 (—)] slips off.

CAUTION:

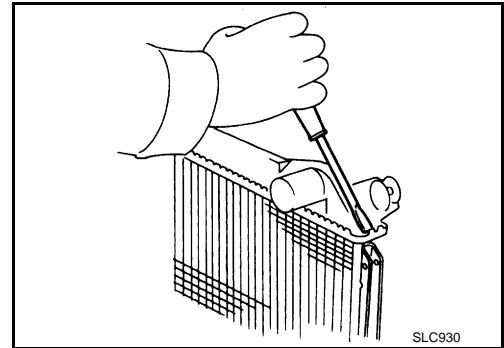
Do not bend excessively.



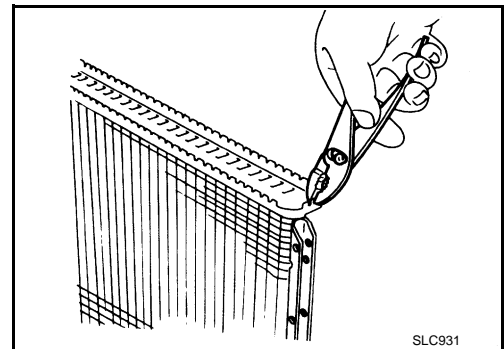
- In areas where radiator plate pliers B [SST: KV99103520 (—)] cannot be used, use flat-blade screwdriver to bend the edge up.

CAUTION:

Be careful not to damage tank.

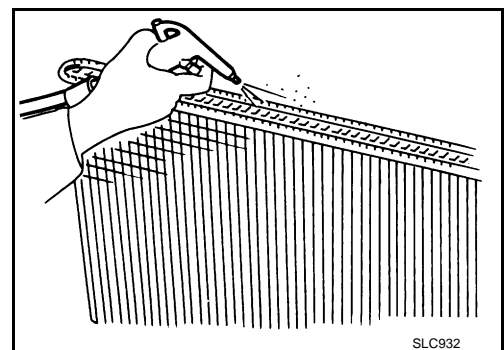


2. Remove sealing rubber.
3. Make sure the edge stands straight up.



ASSEMBLY

1. Clean contact portion of tank.



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RADIATOR (ALUMINUM TYPE)

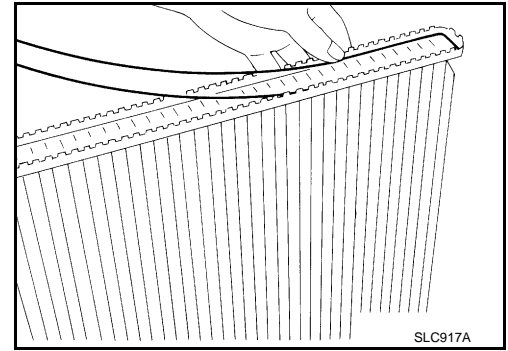
[VK45DE]

< SERVICE INFORMATION >

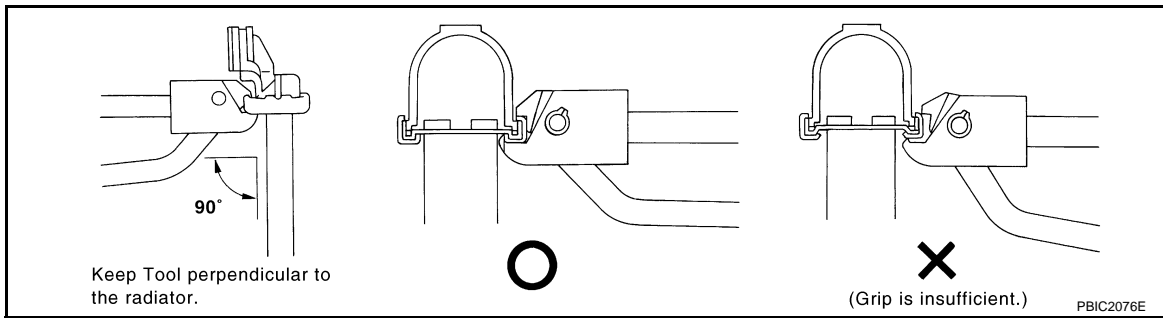
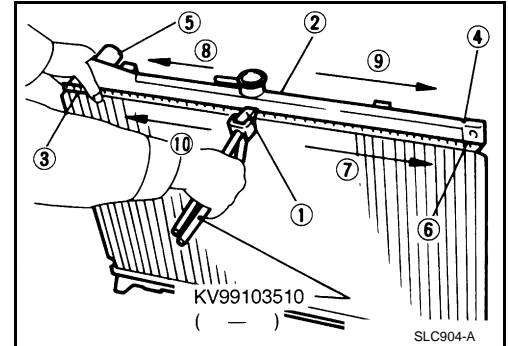
2. Install new sealing rubber while pushing it with fingers.

CAUTION:

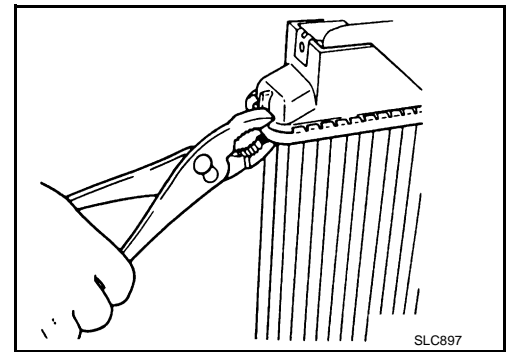
Be careful not to twist sealing rubber.



3. Caulk tank in numerical order as shown in the figure with radiator plate pliers A (SST).

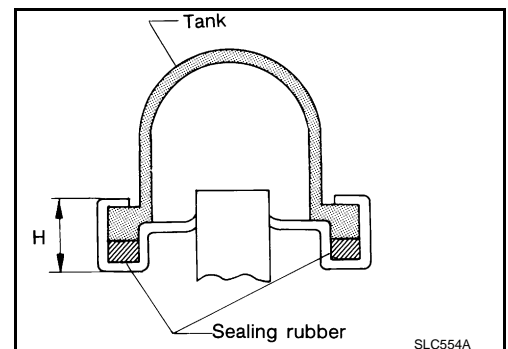


• Use pliers in the locations where radiator plate pliers A [SST: KV99103510 (—)] cannot be used.



4. Make sure that the rim is completely crimped down.

Standard height "H" : 8.0 - 8.4 mm (0.315 - 0.331 in)



RADIATOR (ALUMINUM TYPE)

[VK45DE]

< SERVICE INFORMATION >

5. Make sure that there is no leakage. Refer to "INSPECTION".

INSPECTION

1. Apply pressure with radiator cap tester adapter (commercial service tool) and radiator cap tester (commercial service tool).
 - provide used radiator and connect it to tested radiator using radiator hoses as shown in the figure.

NOTE:

The used radiator should be tested beforehand to confirm it has no leakage. If used one is not available, it is possible to use new service part as a radiator testing tool.

Testing pressure

: 157 kPa (1.6 kg/cm², 23 psi)

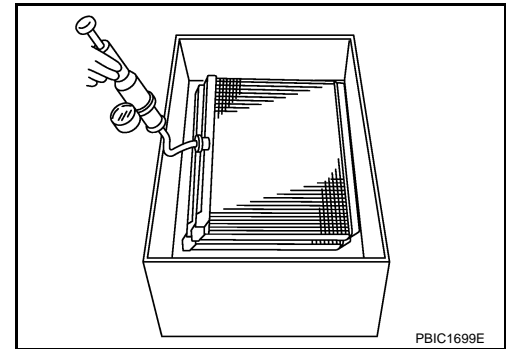
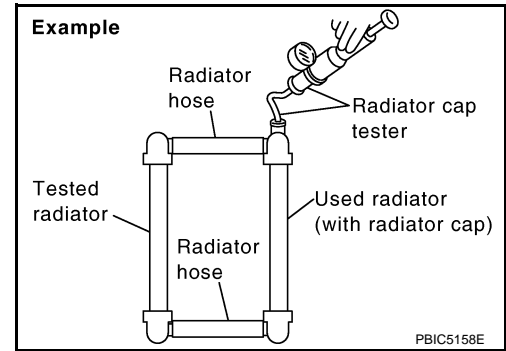
WARNING:

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

CAUTION:

Attach hose to A/T fluid cooler to seal its inlet and outlet.

2. Check for leakage by soaking radiator in water container with the testing pressure applied.



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COOLING FAN

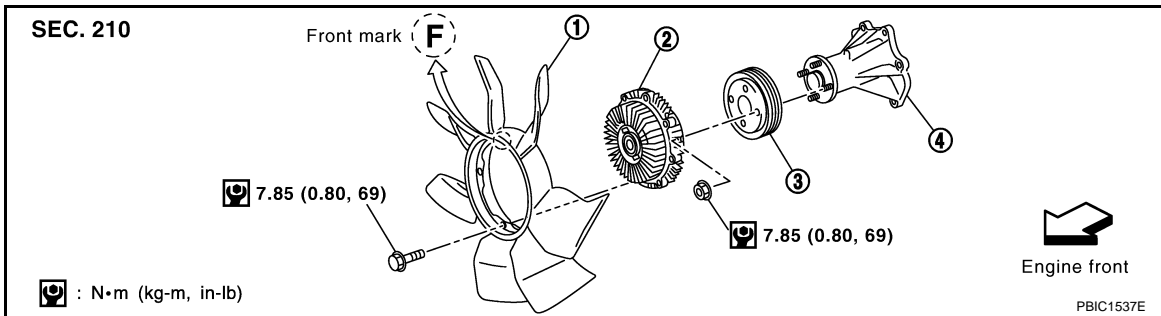
< SERVICE INFORMATION >

[VK45DE]

COOLING FAN

Component (Crankshaft Driven type)

INFOID:000000001325877



1. Cooling fan
2. Fan coupling
3. Fan and water pump pulley
4. Water pump

Removal and Installation

INFOID:000000001325878

REMOVAL

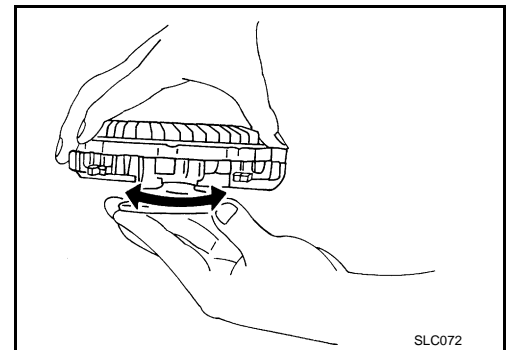
1. Remove air duct (inlet). Refer to [EM-173. "Component"](#).
2. Remove engine front undercover with power tool.
3. Remove radiator shroud (lower). Refer to [CO-40. "Component"](#).
4. Remove drive belts. Refer to [EM-170. "Component"](#).
5. Remove fan coupling and cooling fan assembly.
CAUTION:
Do not damage or scratch radiator core when removing.
6. Remove cooling fan from fan coupling.

INSPECTION AFTER REMOVAL

Fan Coupling

Inspect fan coupling for oil leakage and bimetal conditions.

- If anything is found, replace fan coupling.



Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

INSTALLATION

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

- Install cooling fan with its front mark "F" facing front of vehicle. Refer to "Removal and Installation".

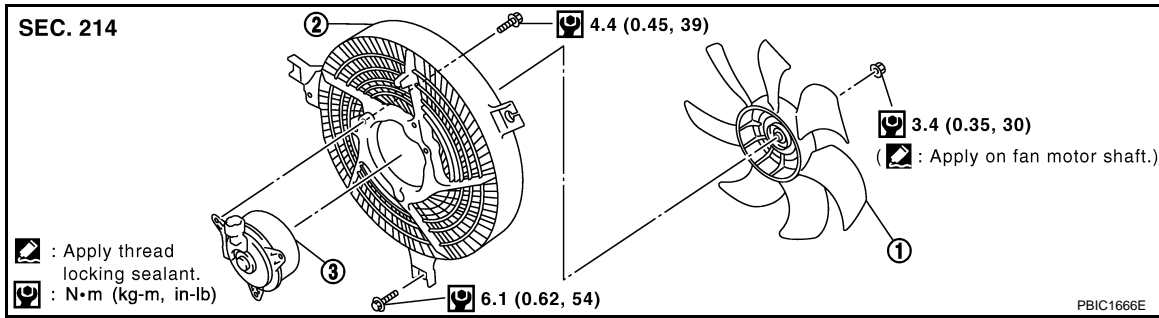
COOLING FAN

< SERVICE INFORMATION >

[VK45DE]

Component (Motor Driven Type)

INFOID:000000001325879



1. Cooling fan

2. Fan grille

3. Fan motor

Removal and Installation

INFOID:000000001325880

REMOVAL

1. Remove front grille. Refer to [EI-22. "Component Parts Location"](#).
2. Disconnect harness connector from fan motor.
3. Remove cooling fan assembly.

CAUTION:

Do not damage or scratch A/C condenser when removed.

INSTALLATION

Install in the reverse order of removal.

- Cooling fan is controlled by ECM. For details. Refer to [EC-1030. "Description"](#).

Disassembly and Assembly (Motor Driven Type)

INFOID:000000001325881

DISASSEMBLY

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

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

ASSEMBLY

Assemble in the reverse order of disassembly.

WATER PUMP

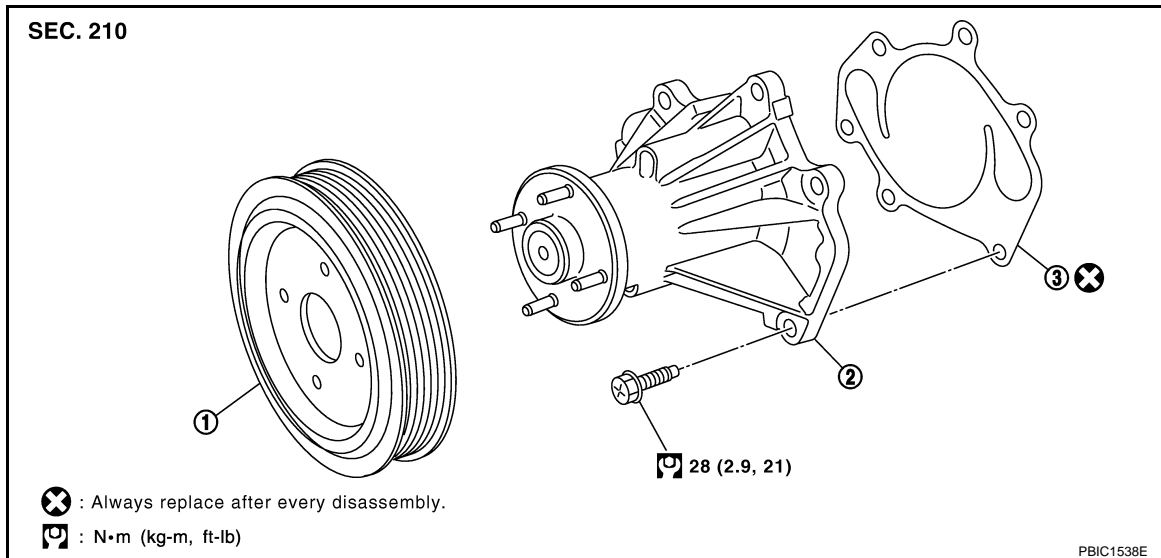
< SERVICE INFORMATION >

[VK45DE]

WATER PUMP

Component

INFOID:000000001325882



1. Fan and water pump pulley

2. Water pump

3. Gasket

Removal and Installation

INFOID:000000001325883

CAUTION:

- When removing water pump, be careful not to get engine coolant on drive belts.
- Water pump can not be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using radiator cap tester (commercial service tool) and radiator cap tester adapter (commercial service tool).

REMOVAL

1. Drain engine coolant from drain plugs on radiator and both side of cylinder block. Refer to [CO-37, "Changing Engine Coolant"](#) and [EM-242, "Disassembly and Assembly"](#).

CAUTION:

- Perform this step when engine is cold.
 - Do not spill engine coolant on drive belts.
2. Remove following parts:
 - Engine front undercover
 - Air duct (inlet): Refer to [EM-173, "Component"](#).
 - Alternator, water pump and A/C compressor belt: Refer to [EM-170, "Component"](#).
 3. Remove fan coupling with cooling fan, and then fan and water pump pulley.
 4. Remove water pump.
 - Engine coolant will leak from cylinder block, so have a receptacle ready under vehicle.

CAUTION:

- Handle the water pump vane so that it does not contact any other parts.
- Do not disassemble water pump.

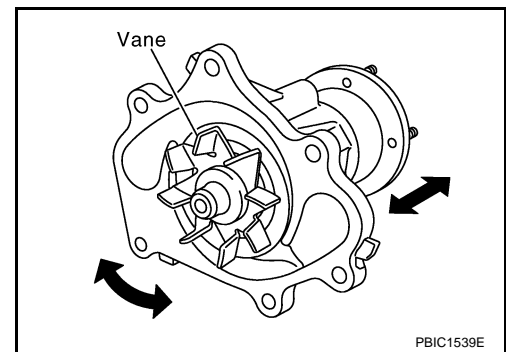
INSPECTION AFTER REMOVAL

WATER PUMP

[VK45DE]

< SERVICE INFORMATION >

- Visually check that there is no significant dirt or rusting on water pump body and vane.
- Make sure there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- If anything is found, replace water pump.



INSTALLATION

Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

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

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THERMOSTAT AND WATER CONTROL VALVE

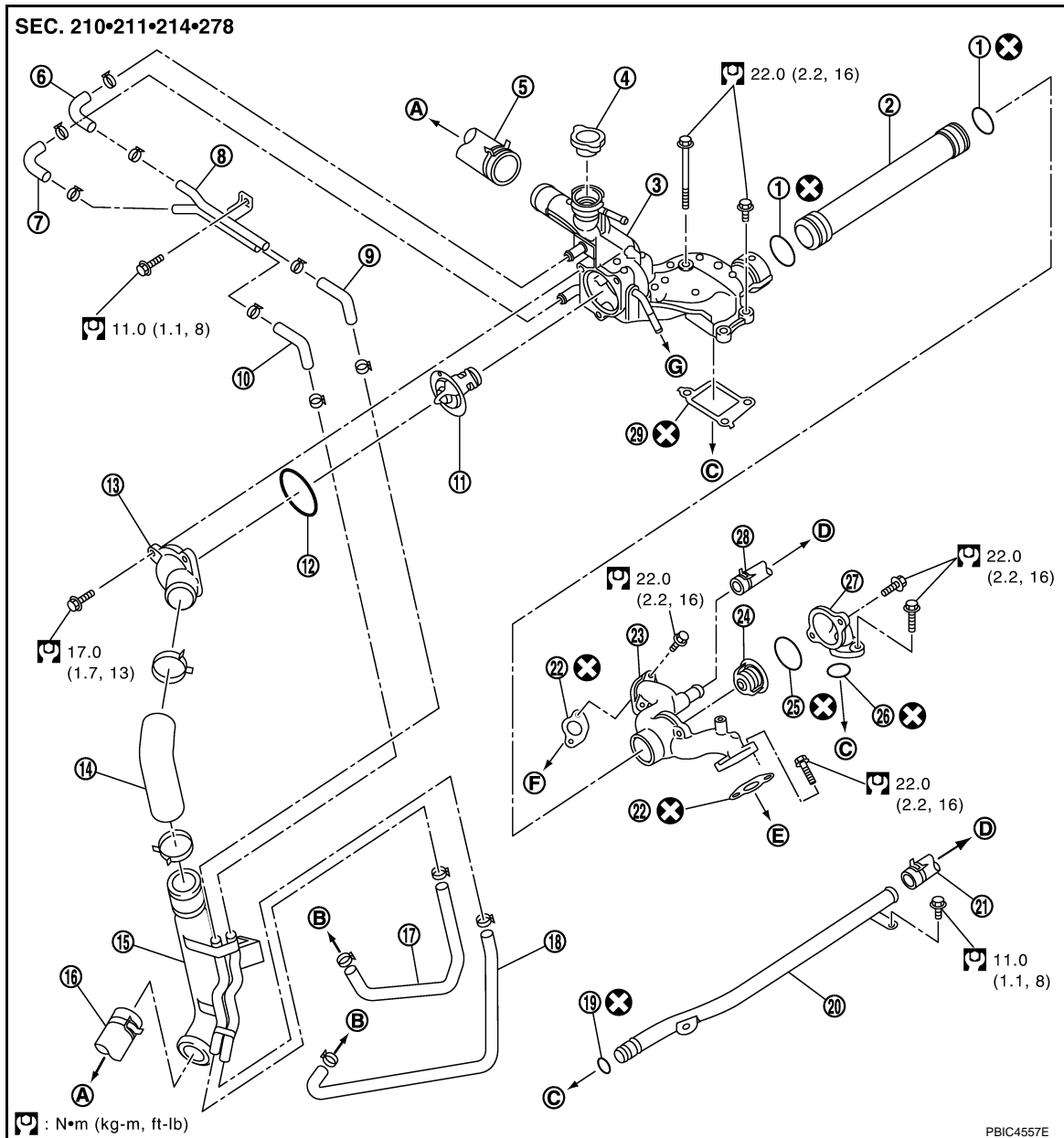
< SERVICE INFORMATION >

[VK45DE]

THERMOSTAT AND WATER CONTROL VALVE

Component

INFOID:000000001325884



- | | | |
|---------------------------|--------------------------|-------------------------|
| 1. O-ring | 2. Water outlet pipe | 3. Thermostat housing |
| 4. Radiator cap | 5. Radiator hose (upper) | 6. Water hose |
| 7. Water hose | 8. Water pipe | 9. Water hose |
| 10. Water hose | 11. Thermostat | 12. Rubber ring |
| 13. Water inlet | 14. Water suction hose | 15. Water suction pipe |
| 16. Radiator hose (lower) | 17. Water hose | 18. Water hose |
| 19. O-ring | 20. Heater pipe | 21. Heater hose |
| 22. Gasket | 23. Water outlet | 24. Water control valve |
| 25. Rubber ring | 26. O-ring | 27. Water connector |
| 28. Heater hose | 29. Gasket | |
| A. To radiator | B. To oil cooler | C. To cylinder block |

THERMOSTAT AND WATER CONTROL VALVE

[VK45DE]

< SERVICE INFORMATION >

- D. To heater core
- E. To cylinder head (left bank)
- F. To cylinder head (right bank)
- G. To intake manifold adapter

• Refer to [GI-8, "Component"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001325885

REMOVAL

1. Drain engine coolant from drain plugs on radiator and both side of cylinder block. Refer to [CO-37, "Changing Engine Coolant"](#) and [EM-242, "Disassembly and Assembly"](#).

CAUTION:

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

2. Remove engine cover with power tool. Refer to [EM-169, "Component"](#).

3. Remove air duct (inlet). Refer to [EM-173, "Component"](#).

4. Disconnect water suction hose from water inlet.

5. Remove water inlet and thermostat.

CAUTION:

Do not disassemble thermostat.

6. Remove intake manifolds (upper and lower). Refer to [EM-175, "Component"](#).

7. Disconnect radiator hose (upper) and water hoses from thermostat housing.

8. Disconnect heater hoses from water outlet and heater pipe.

9. Remove thermostat housing, water outlet pipe, water connector, water control valve, water outlet and heater pipe.

CAUTION:

Do not disassemble water control valve.

INSPECTION AFTER REMOVAL

- Make sure that valves both in thermostat and water control valve are completely closing at normal temperature.

- Place a thread so that it is caught in the valves of the thermostat and water control valve. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows thermostat.)

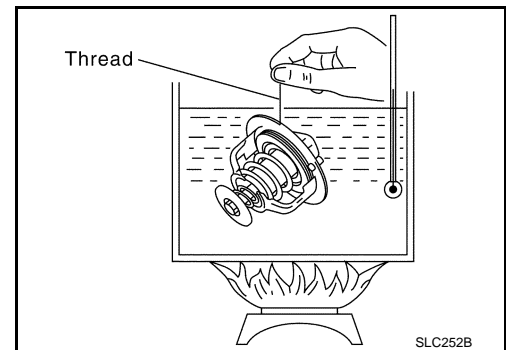
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.

- Continue heating. Check the maximum valve lift.

NOTE:

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

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



Standard values:

	Thermostat	Water control valve
Valve opening temperature	80 - 84°C (176 - 183°F)	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	More than 10 mm/95°C (0.39 in/203°F)	More than 8 mm/108°C (0.315 in/226°F)
Valve closing temperature	77°C (171°F)	90°C (194°F)

- If the malfunctioning condition, when closing valve at normal temperature, or measured values are out of the standard, replace thermostat and/or water control valve.

INSTALLATION

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

CAUTION:

Be careful not to spill engine coolant over engine room. Use rag to absorb engine coolant.

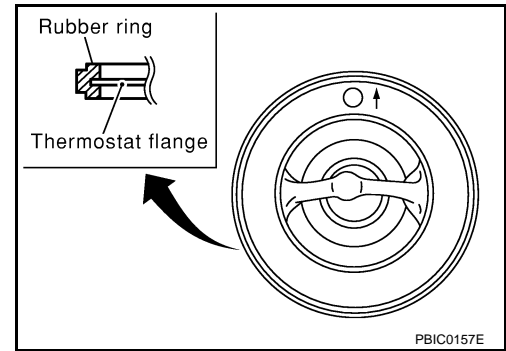
Thermostat and Water Control Valve

THERMOSTAT AND WATER CONTROL VALVE

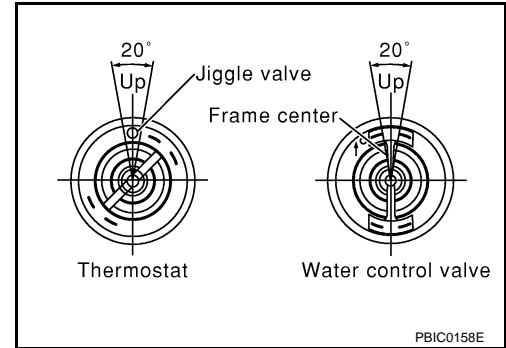
[VK45DE]

< SERVICE INFORMATION >

- Install thermostat and water control valve with the whole circumference of each flange part fit securely inside rubber ring. (The example in the figure shows thermostat.)



- Install thermostat with jiggle valve facing upwards. (The position deviation may be within the range of ± 10 degrees)
- Install water control valve with the up-mark facing up and the frame center part facing upwards. (The position deviation may be within the range of ± 10 degrees)



Water Outlet Pipe and Heater Pipe

First apply a neutral detergent to O-rings, then quickly insert the insertion parts of the water outlet pipe and heater pipe into the installation holes.

INSPECTION AFTER INSTALLATION

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

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[VK45DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

INFOID:000000001325886

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity [With reservoir tank at ("MAX" level)]	10.0 (10-5/8, 8-3/4)
Reservoir tank engine coolant capacity (at "MAX" level)	0.8 (7/8, 3/4)

RADIATOR

Unit: kPa (kg/cm², psi)

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

THERMOSTAT

Valve opening temperature	80 - 84°C (176 - 183°F)
Maximum valve lift	More than 10 mm/95°C (0.39 in/203°F)
Valve closing temperature	77°C (171°F)

WATER CONTROL VALVE

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

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