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SECTION

ENGINE COOLING SYSTEM

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PRECAUTIONS

PFP:00001

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

ABS00B4K

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

WARNING:

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

Precautions for Liquid Gasket REMOVAL OF LIQUID GASKET SEALING

ABS00B4L

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

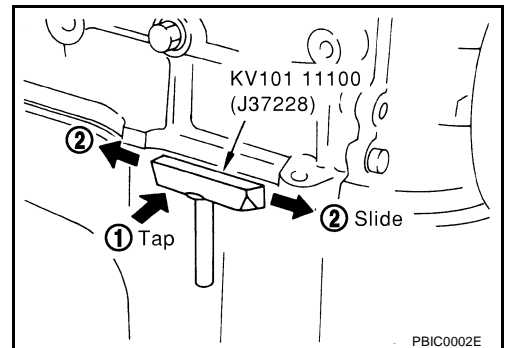
CAUTION:

Be careful not to damage the mating surfaces.

- In areas where seal cutter (SST) is difficult to use, use a plastic hammer to lightly tap (1) seal cutter where liquid gasket is applied. Use a plastic hammer to slide seal cutter (2) by tapping on the side.

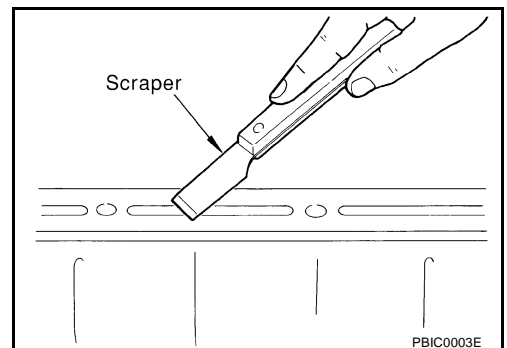
CAUTION:

If for some unavoidable reason a tool such as a flat-bladed 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

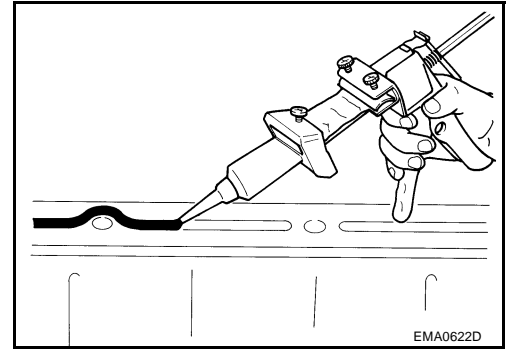
[VQ35DE]

3. Attach liquid gasket tube to tube presser [SST: WS39930000 (–)].

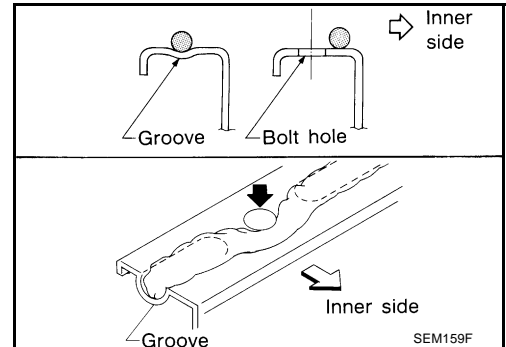
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#) .

4. Apply liquid gasket without breaks to the specified location with the specified dimensions.

- If there is a groove for the liquid gasket application, apply liquid gasket to the groove.



- As for the bolt holes, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of service manual.
- Within five minutes of liquid gasket application, install the mating component.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten 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

[VQ35DE]

PREPARATION

PFP:00002

Special Service Tools

ABS004T4

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

Tool number (Kent-Moore No.) Tool name	Description
WS39930000 (-) Tube presser	Pressing tube of liquid gasket
KV10111100 (J37228) Seal cutter	Removing chain tensioner cover and water pump cover
EG17650301 (J33984-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)
KV99103510 (-) Radiator plate pliers A	Installing radiator upper and lower tanks
KV99103520 (-) Radiator plate pliers B	Removing radiator upper and lower tanks

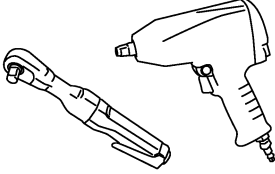
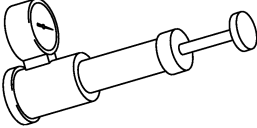
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PREPARATION

[VQ35DE]

Commercial Service Tools

ABS004T5

Tool name	Description
<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

[VQ35DE]

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

ABS004UZ

	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

[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 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

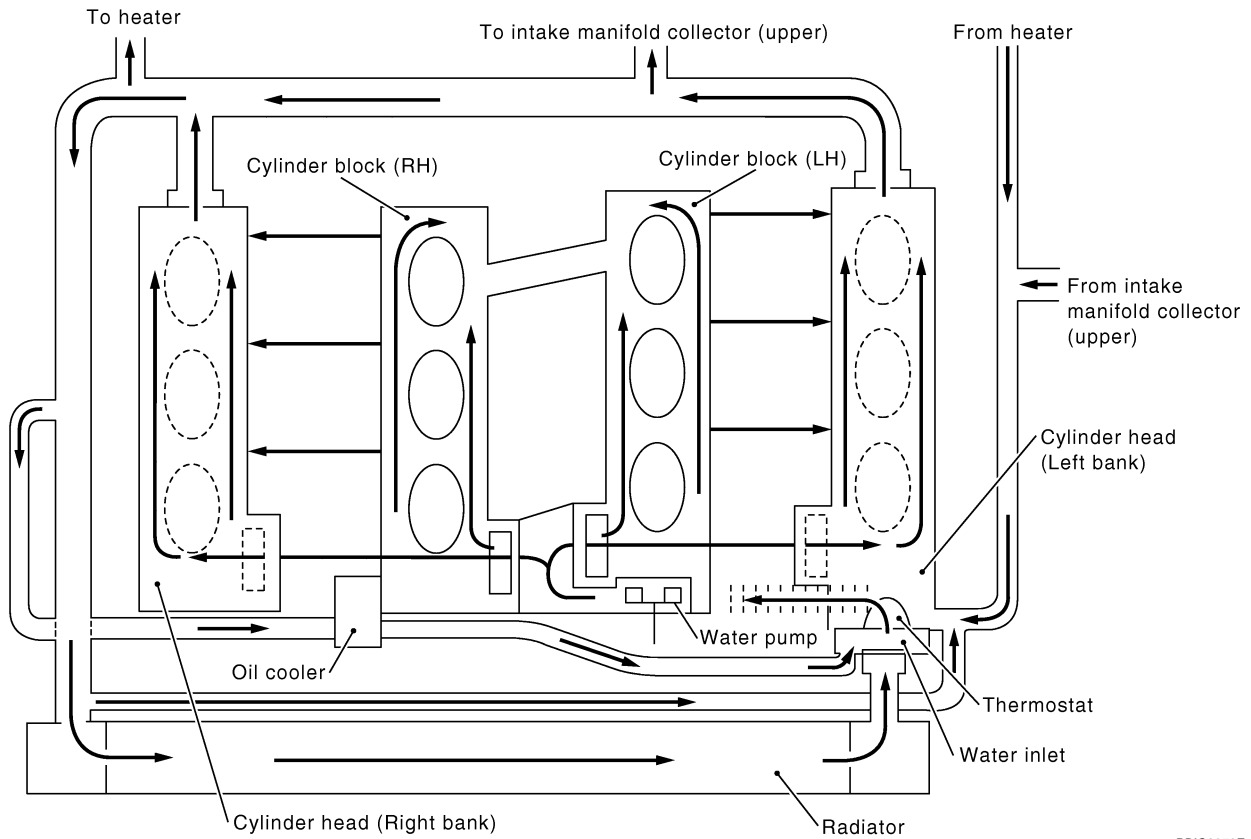
[VQ35DE]

COOLING SYSTEM

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Cooling Circuit

ABS004T7



PBIC2073E

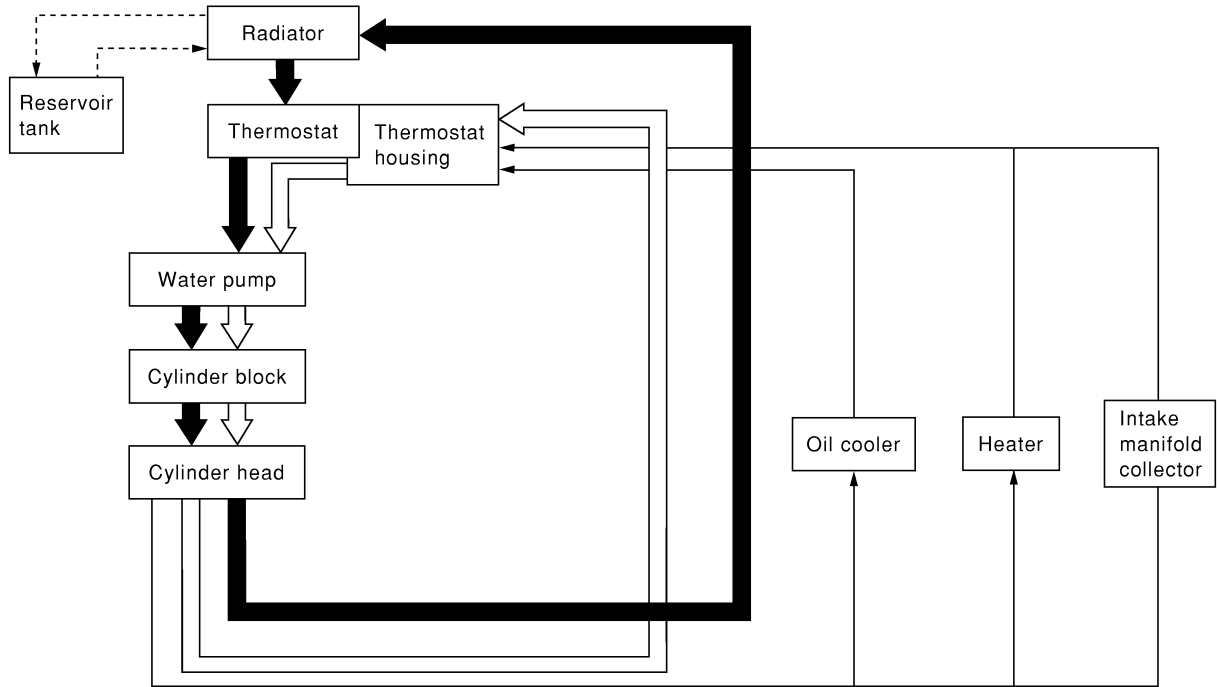
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COOLING SYSTEM

[VQ35DE]

System Drawing

ABS004VY



	Thermostat
	Closed
	Open

PBIC0847E

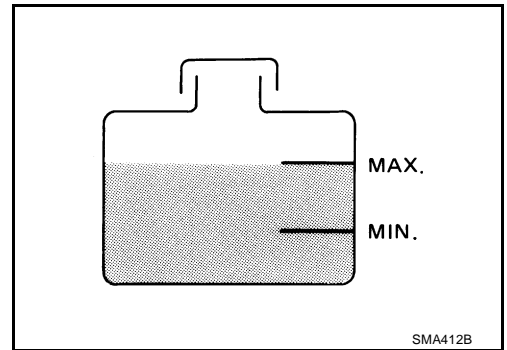
ENGINE COOLANT

PFP:KQ100

Inspection
LEVEL CHECK

ABS004T8

- 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.



CHECKING COOLING SYSTEM FOR LEAKS

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

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.

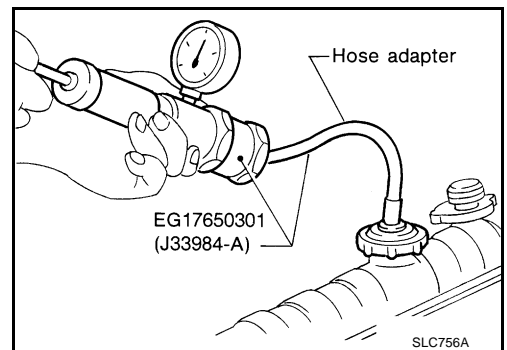
CAUTION:

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

ABS004T9

WARNING:

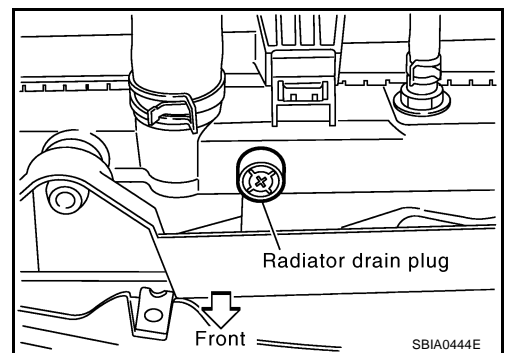
- To avoid being scalded, never change engine coolant when engine is hot.
- Wrap a thick cloth around cap and carefully remove cap. First, turn cap a quarter of a turn to release built-up pressure. Then turn cap all the way.

DRAINING ENGINE COOLANT

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

CAUTION:

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



When drain all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-121, "DISASSEMBLY"](#).

3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.

If contaminated, flush the engine cooling system. Refer to [CO-13, "FLUSHING COOLING SYSTEM"](#) .

- Remove reservoir tank, drain engine coolant and clean reservoir tank before installing.

REFILLING ENGINE COOLANT

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

CAUTION:

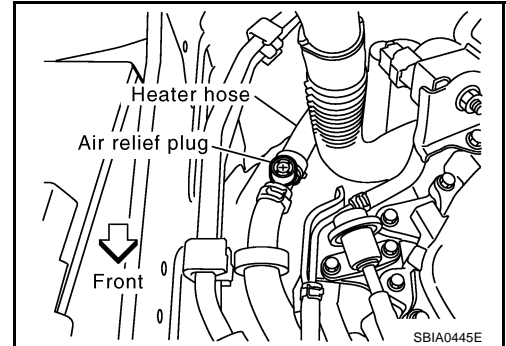
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug:

 : 1.18 N·m (0.12 kg·m, 10 in·lb)

If water drain plugs are removed, close and tighten them. Refer to [EM-126, "ASSEMBLY"](#) .

- Remove air relief plug on heater hose.

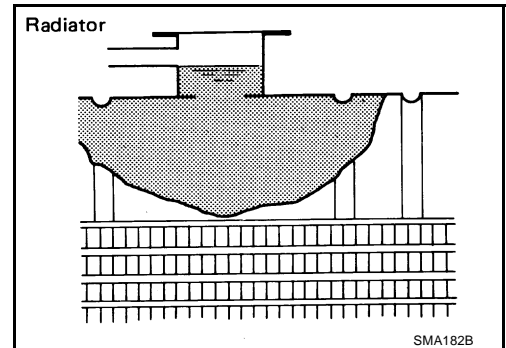


- Fill radiator and reservoir tank to specified level.

- Use Genuine Nissan Long Life Antifreeze/ Coolant or equivalent mixed with water (distilled or demineralized). Refer to [MA-12, "RECOMMENDED 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)



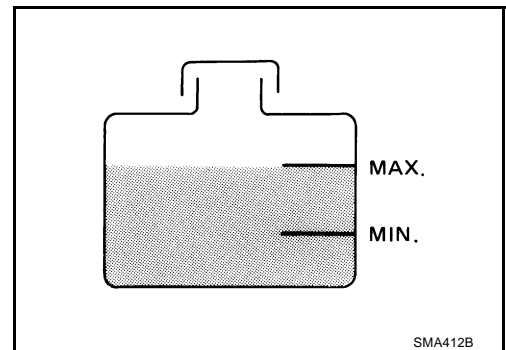
Reservoir tank engine coolant capacity (at "MAX" level)

: 0.8 ℓ (7/8 US qt, 3/4 Imp qt)

- 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.
- 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, 10 ft·lb)



- Warm up engine to normal operating temperature with radiator cap installed.
- Run engine at 3,000 rpm for 10 seconds and return to idle speed.
 - Repeat two or three times.
 - Watch engine coolant temperature gauge so as not to overheat engine.**
- 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 radiator up to filler neck with engine coolant.
- Refill reservoir tank to "MAX" level line with engine coolant.
- Repeat steps 3 through 6 two or more times with radiator cap installed until engine coolant level no longer drops.

9. Check cooling system for leaks with engine running.
10. 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.
11. Repeat step 10 three times.
12. If sound is heard, bleed air from cooling system by repeating step 3 through 6 until engine coolant level no longer drops.
 - **Clean excess engine coolant from engine.**

FLUSHING COOLING SYSTEM

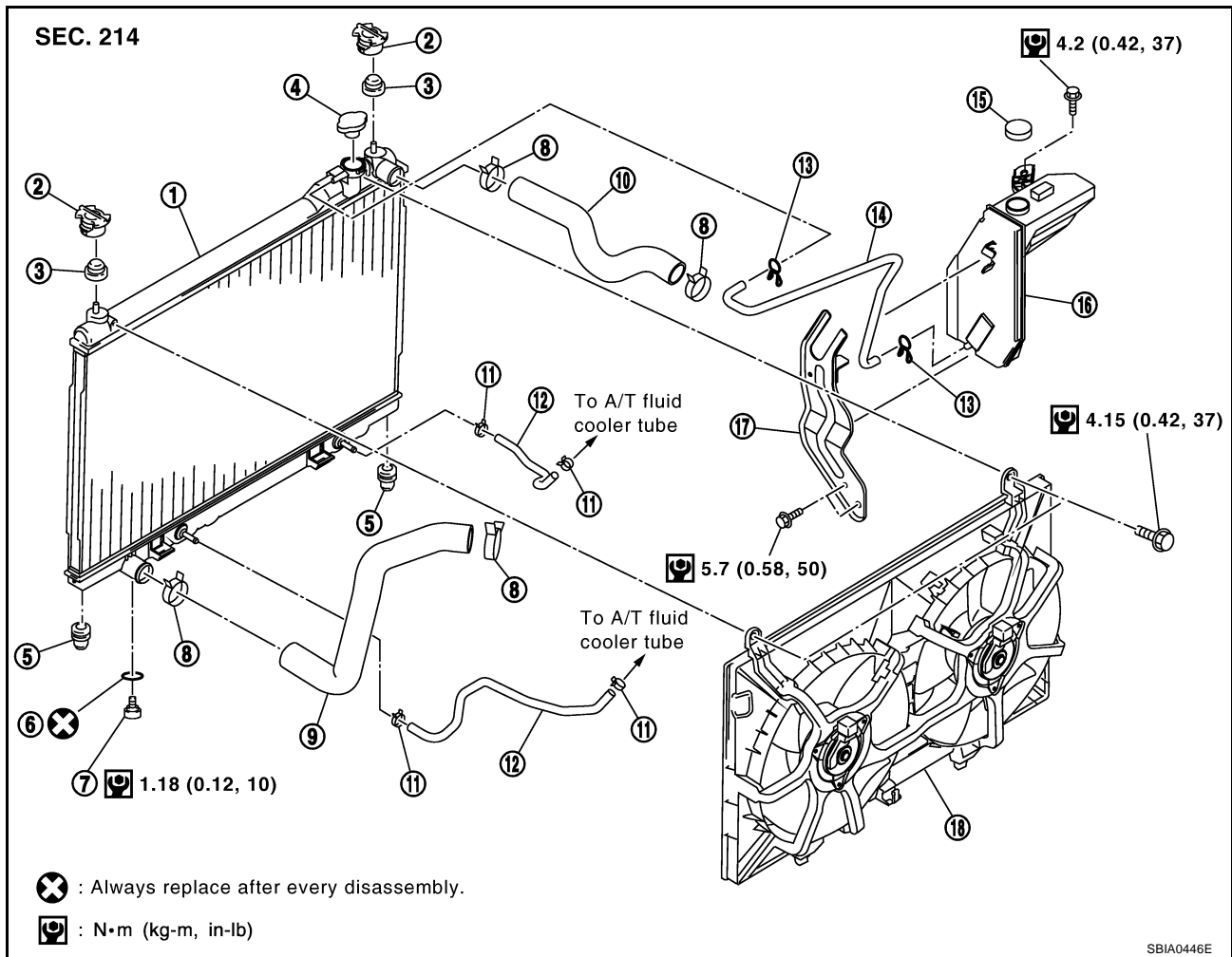
1. Fill radiator with water until water spills from the air relief hole, then close air relief plug. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water from the system. Refer to [CO-11, "DRAINING ENGINE COOLANT"](#) .
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.

RADIATOR

PF21400

Removal and Installation

ABS004WE



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

WARNING:

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

REMOVAL

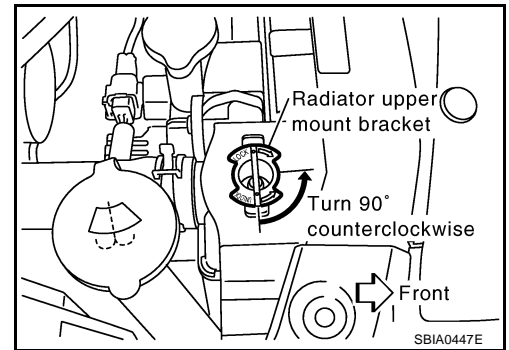
1. Remove front engine undercover with power tool.
2. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#) .

CAUTION:

Perform when engine is cold.

3. Remove air duct and air cleaner case assembly. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#) .
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. Disconnect radiator upper and lower hoses from radiator.
7. Remove radiator cooling fan assembly. Refer to [CO-21, "COOLING FAN"](#) .

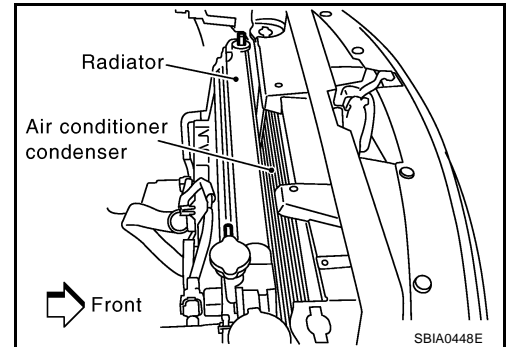
- Rotate two radiator upper mount brackets 90 degrees in the direction shown in the figure, and remove them.



- Lift up and remove radiator.

CAUTION:

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



INSTALLATION

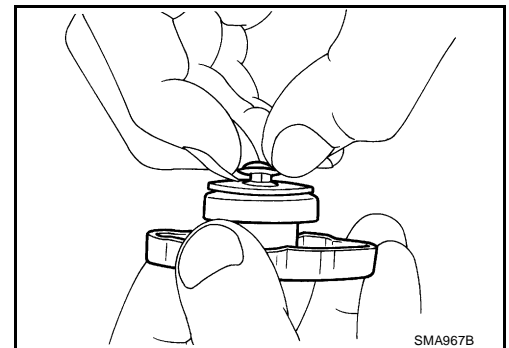
Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-11, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up engine. Visually make sure that there is no leaks of engine coolant and A/T fluid.

Checking Radiator Cap

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



- Check radiator cap relief pressure.

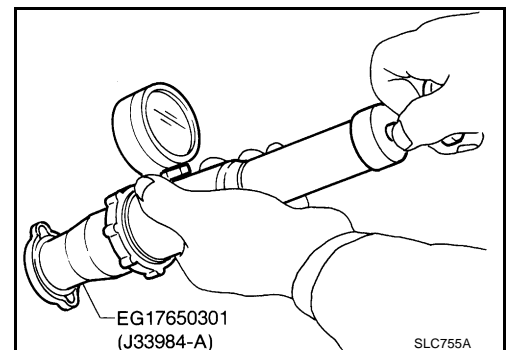
Standard

: 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 radiator cap tester adapter (SST) and radiator cap tester (commercial service tool), apply engine coolant to the cap seal part.
- Replace radiator cap if there is an unusualness in radiator cap negative-pressure valve, or if the open-valve pressure is outside of the standard values.



Checking Radiator

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

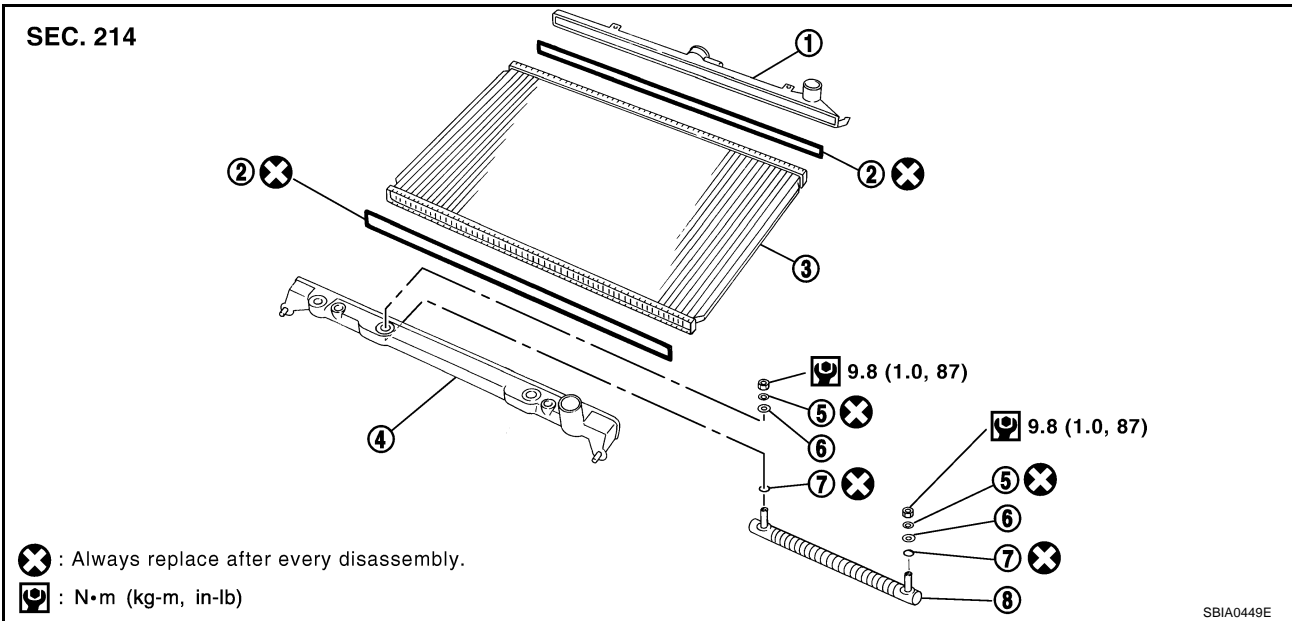
- Be careful not to bend or damage radiator fins.
 - When radiator is cleaned without removal, remove all surrounding parts such as cooling fan shroud and horns. Then tape harness and connectors to prevent water from entering.
1. Apply water by hose to the back side of the radiator core vertically downward.
 2. Apply water again to all radiator core 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 (11.8 in).
 5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

RADIATOR (ALUMINUM TYPE)

PFP:21460

Disassembly and Assembly

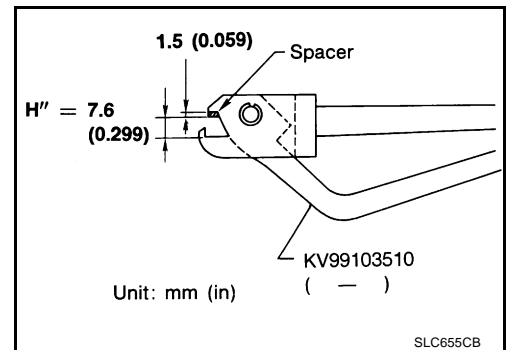
ABS004VZ



- | | | |
|---------------|---------------------|-----------|
| 1. Upper tank | 2. Sealing rubber | 3. Core |
| 4. Lower tank | 5. Conical washer | 6. Washer |
| 7. O-ring | 8. A/T fluid cooler | |

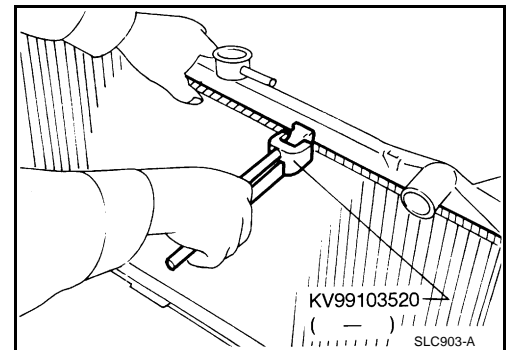
PREPARATION

- Attach spacer to the tip of radiator plate pliers A (SST).
Spacer specification: 1.5 mm (0.059 in) thick x 18 mm (0.71 in) wide x 8.5 mm (0.335 in) long.
- Make sure that when radiator plate pliers A (SST) are closed dimension H'' is approx. 7.6 mm (0.299 in).
- Adjust dimension H'' with spacer, if necessary.



DISASSEMBLY

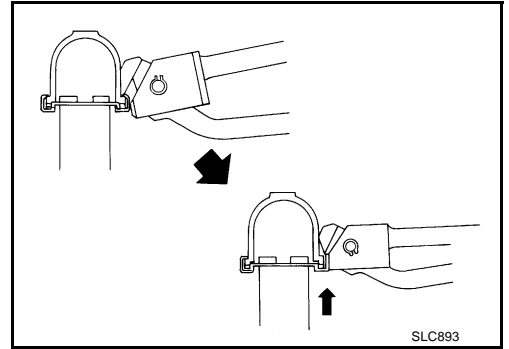
- Remove upper or lower tanks with radiator plate pliers B (SST).



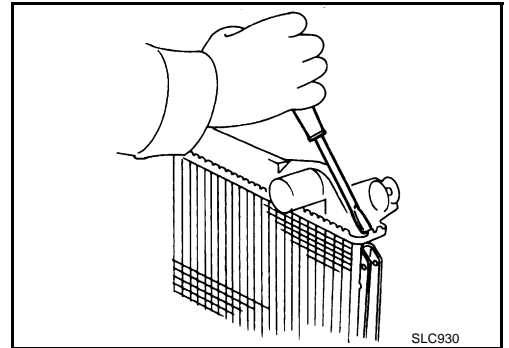
RADIATOR (ALUMINUM TYPE)

[VQ35DE]

- Grip the crimped edge and bend it upwards so that radiator plate pliers B slips off.
Do not bend excessively.

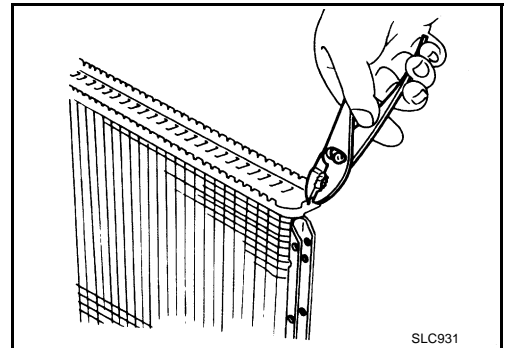


- In areas where radiator plate pliers B cannot be used, use a screwdriver to bend the edge up.
Be careful not to damage tank.



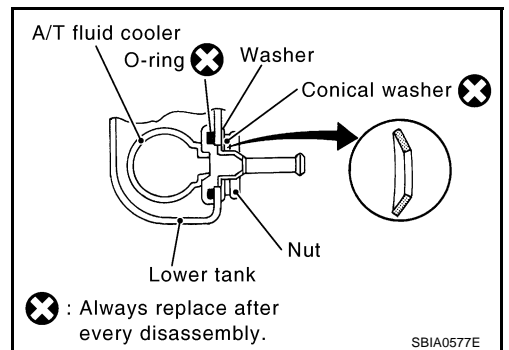
2. Remove sealing rubber.

3. Make sure the edge stands straight up.
4. Remove A/T fluid cooler from lower tank.



ASSEMBLY

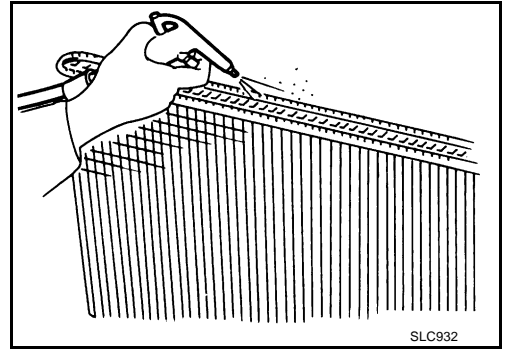
1. Install A/T fluid cooler.
Pay attention to direction of conical washer.



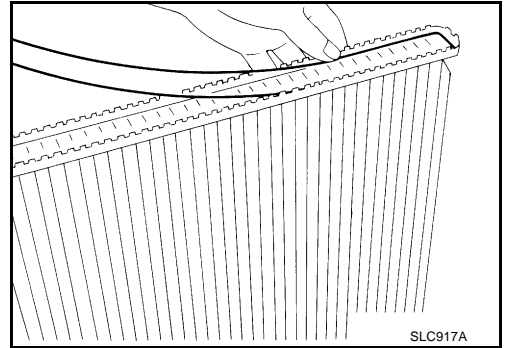
RADIATOR (ALUMINUM TYPE)

[VQ35DE]

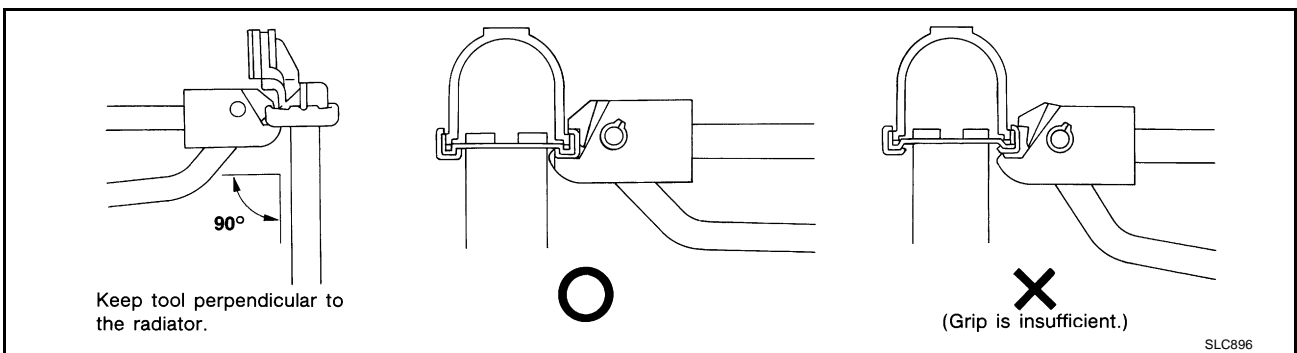
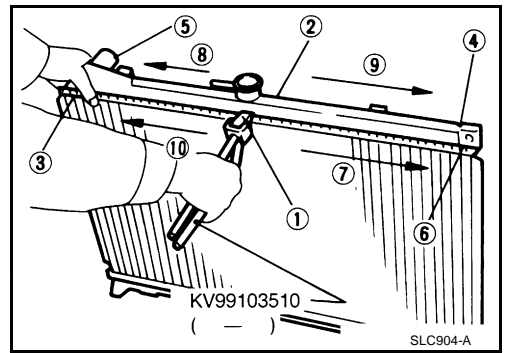
2. Clean contact portion of tank.



3. Install sealing rubber.
Push it in with fingers.
Be careful not to twist sealing rubber.



4. Caulk tank in specified sequence with radiator plate pliers A (SST).

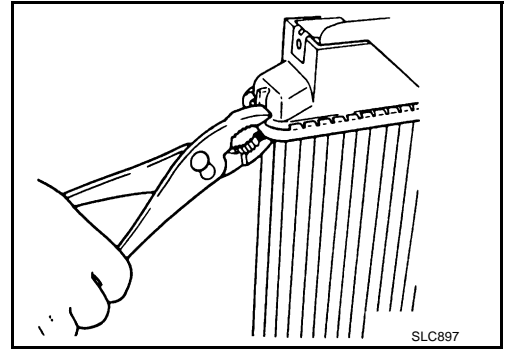


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RADIATOR (ALUMINUM TYPE)

[VQ35DE]

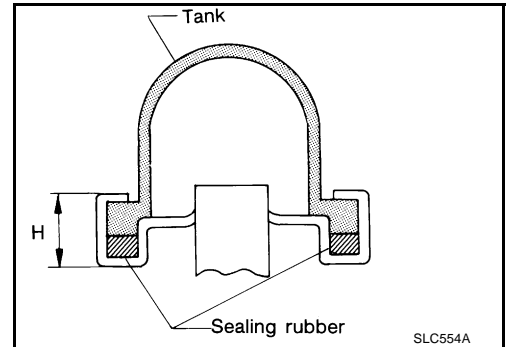
- Use pliers in the locations where plate pliers A cannot be used.



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

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

6. Confirm that there is no leakage.
Refer to [CO-20, "INSPECTION"](#) .



INSPECTION

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

Testing pressure

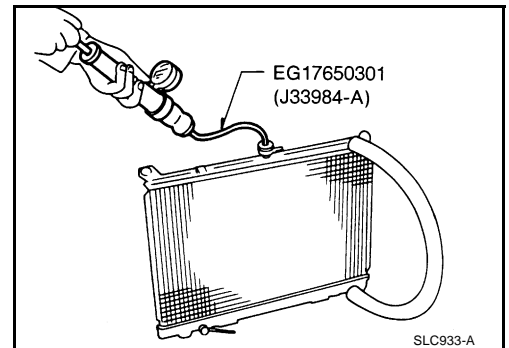
: 157 kPa (1.6 kg/cm² , 23 psi)

WARNING:

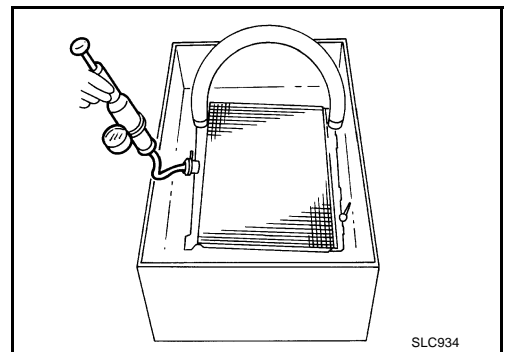
To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.

CAUTION:

Attach a 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.

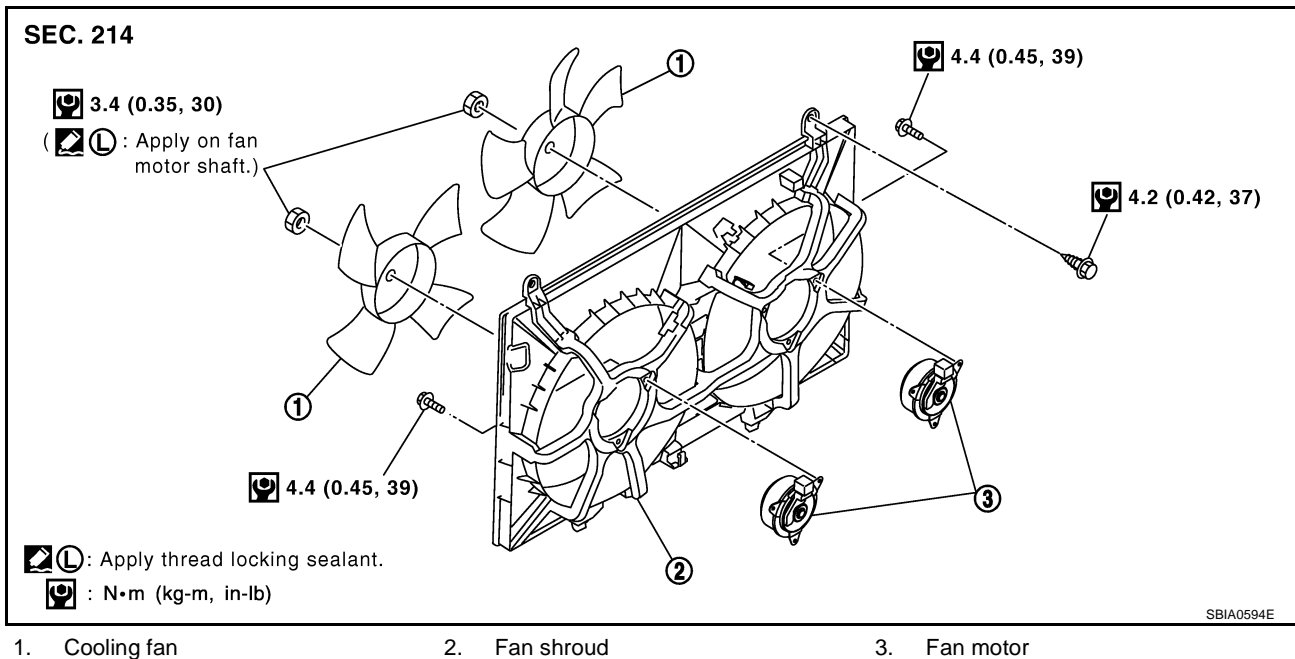


COOLING FAN

PFP:21140

Removal and Installation

ABS005GR



REMOVAL

1. Remove air duct (inlet), power duct and air cleaner case assembly. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#).
2. Disconnect fan motor connectors.
3. Remove radiator cooling fan assembly.

CAUTION:

Be careful not to damage or scratch on radiator core.

INSTALLATION

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

- Cooling fan is controlled by ECM. For details, refer to [EC-425, "DTC P1217 ENGINE OVER TEMPERATURE"](#).

Disassembly and Assembly

DISASSEMBLY

ABS004WG

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

ASSEMBLY

Install in the reverse order of disassembly.

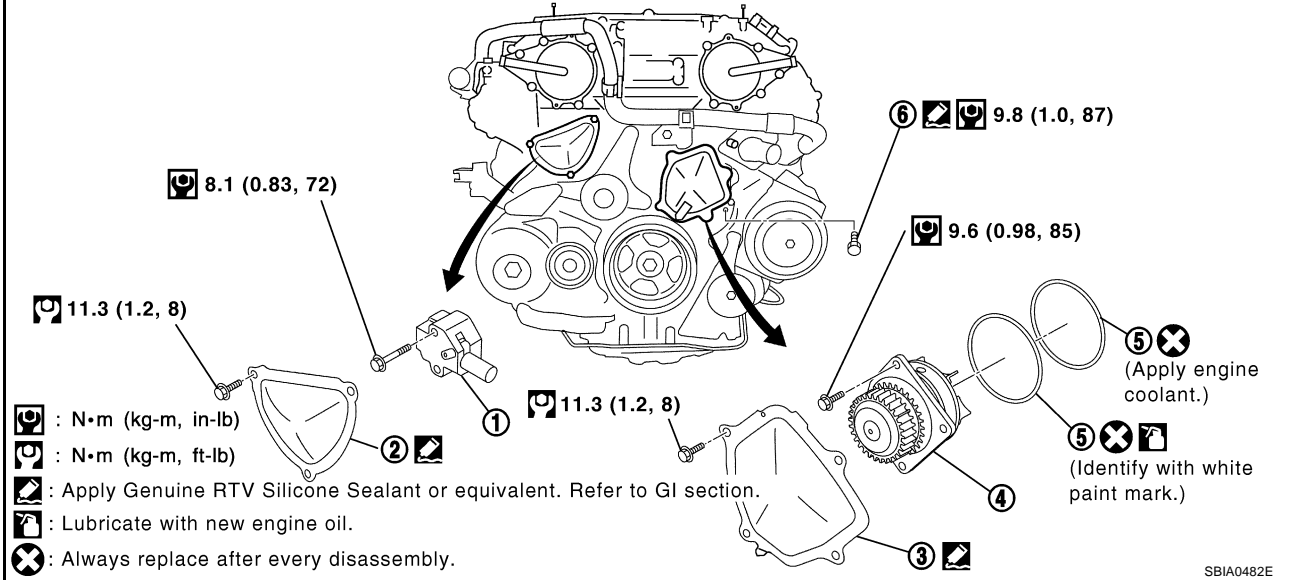
WATER PUMP

PFP:21020

Removal and Installation

ABS009RE

SEC. 130•135•210



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

CAUTION:

- When removing water pump, be careful not to get engine coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.

REMOVAL

1. Remove front engine undercover with power tool.
2. Remove drive belts. Refer to [EM-15, "DRIVE BELTS"](#).
3. Drain engine coolant from radiator. Refer to [CO-11, "Changing Engine Coolant"](#).

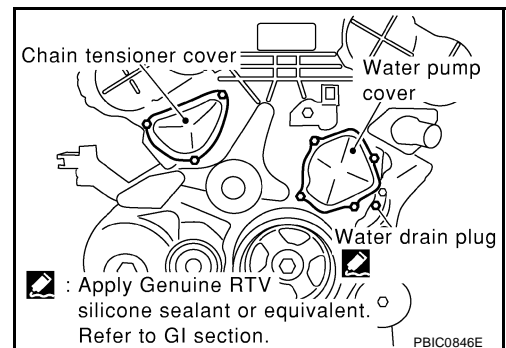
CAUTION:

Perform when engine is cold.

4. Remove air duct (inlet), power duct and air cleaner case assembly. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#).
5. Remove water drain plug (front) of cylinder block.
6. Remove chain tensioner cover and water pump cover separating the mating surface with a seal cutter [SST: KV1011100 (J37228)].

CAUTION:

Be careful not to damage the mating surfaces.



WATER PUMP

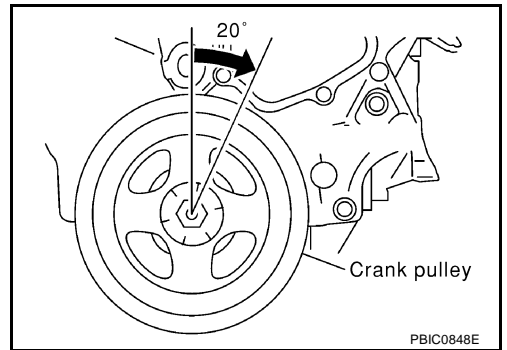
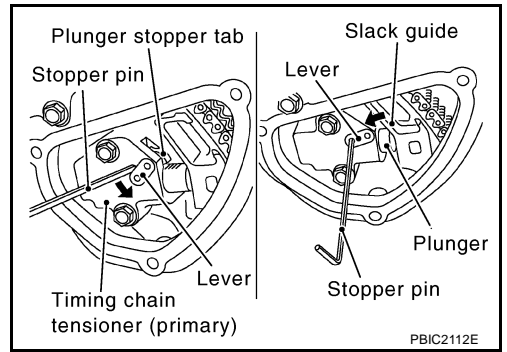
[VQ35DE]

7. Remove timing chain tensioner (primary) with the following procedure.
 - a. Pull the lever down and release plunger stopper tab.
 - Plunger stopper tab can be pushed up to release (coaxial structure with lever).
 - b. Insert stopper pin into the tensioner body hole to hold lever and keep the plunger stopper tab released.

NOTE:

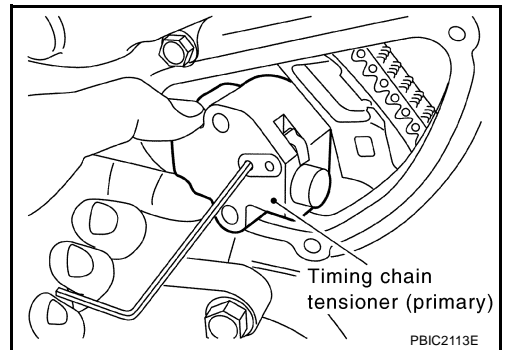
An Allen wrench [2.5 mm (0.098 in)] is used for a stopper pin as an example.

- c. Insert plunger into the tensioner body by pressing timing chain slack guide.
- d. Keep slack guide pressed and hold plunger in by pushing stopper pin deeper through lever and into the tensioner body hole.
- e. Turn crankshaft pulley approximately 20° clockwise so that timing chain on the timing chain tensioner (primary) side is loose.

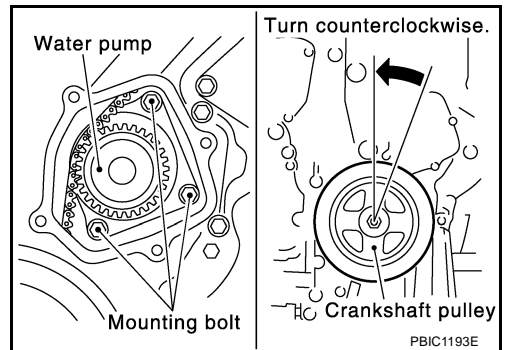


- f. Remove mounting bolts and timing chain tensioner (primary).

CAUTION:
Be careful not to drop mounting bolts inside chain case.



8. Remove three water pump fixing 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]

- Screw M8 bolts [pitch: 1.25 mm (0.049 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.

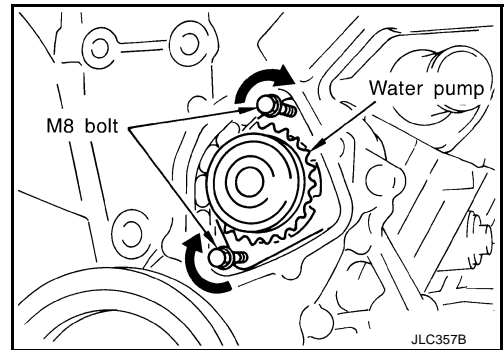
CAUTION:

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

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

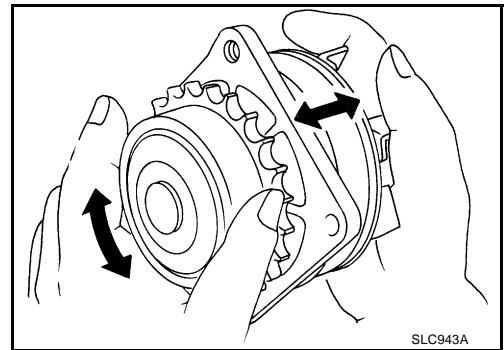
CAUTION:

Do not disassembly water pump.



INSPECTION AFTER REMOVAL

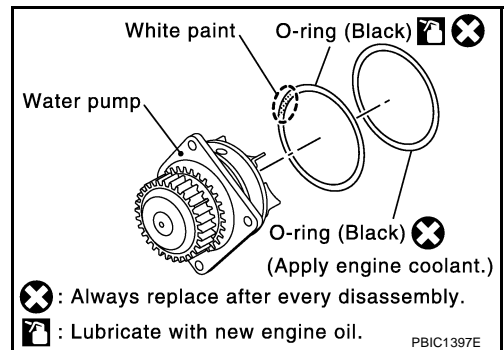
- Check for badly rusted or corroded water pump body assembly.
- Check for rough operation due to excessive end play.
- If anything is found, replace water pump.



INSTALLATION

- 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.

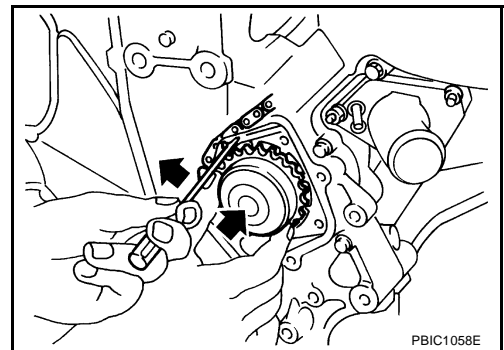


- Install water pump.

CAUTION:

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

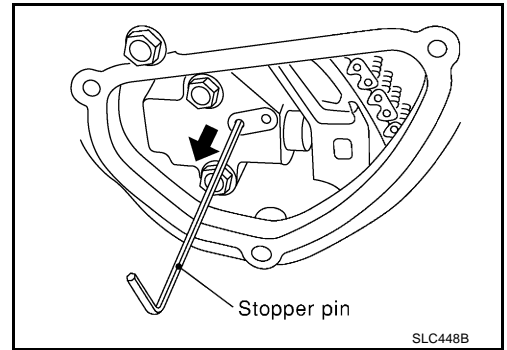
- Make sure timing chain and water pump sprocket are engaged.
- Insert water pump by tightening mounting bolts alternately and evenly.



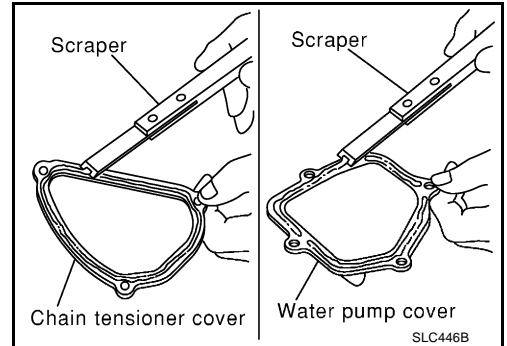
- Install timing chain tensioner (primary) as the following:

- Remove dust and foreign material completely from backside of chain tensioner and from installation area of rear timing chain case.
- Turn crankshaft pulley clockwise so that timing chain on the timing chain tensioner (primary) side is loose.
 - Apply engine oil should be applied to the oil hole and tensioner, when installing timing chain tensioner.

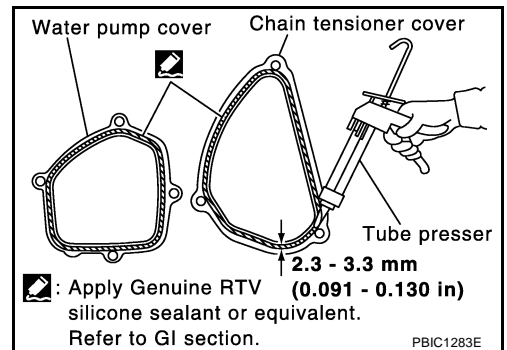
- c. Install timing chain tensioner (primary).
- d. Remove stopper pin.



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



- b. Apply a continuous bead of liquid gasket to mating surface of chain tensioner cover and water pump cover with tube presser [SST: WS39930000 (-)].
Use Genuine RTV Silicone Sealant or equivalent. [GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).



- 5. Install water drain plug (front) of cylinder block.
 - Apply liquid gasket to the thread of water drain plug (front).
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).
- 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

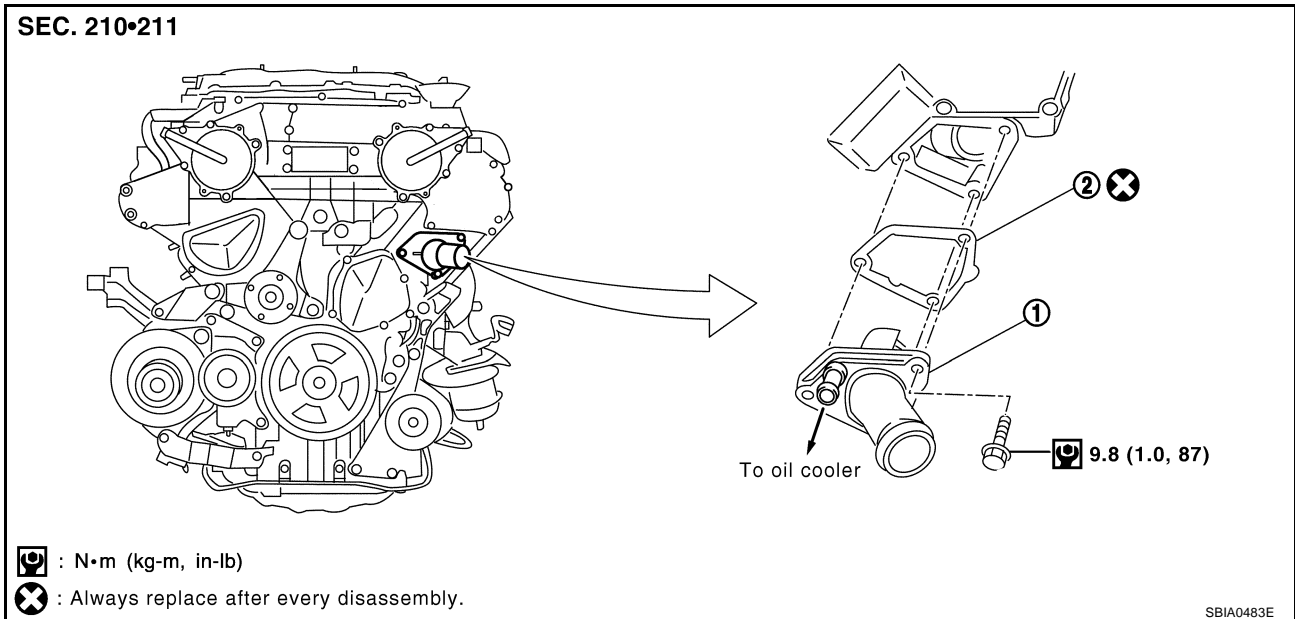
- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-11, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up engine. Visually make sure that there is no leaks of engine coolant and A/T fluid.

WATER INLET AND THERMOSTAT ASSEMBLY

PFP:21200

Removal and Installation

ABS009RF



1. Gasket

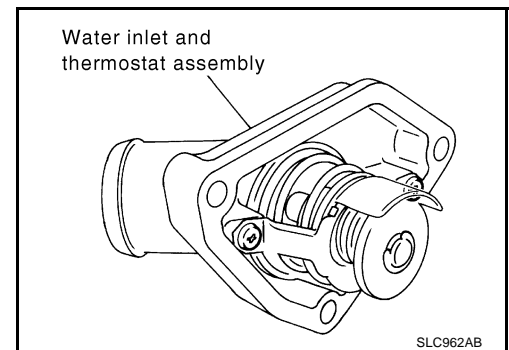
2. Water inlet and thermostat assembly

REMOVAL

1. Remove front engine undercover using power tool.
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 belts.
3. Remove air duct and air cleaner case. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#) .
 4. Remove water drain plug (front) of cylinder block.
 5. Disconnect radiator hose (upper) and oil cooler hose from water inlet and thermostat assembly.
 6. Remove water inlet and thermostat assembly.
 - Do not disassemble water inlet and thermostat assembly. Replace them as a unit, if necessary.



INSPECTION AFTER REMOVAL

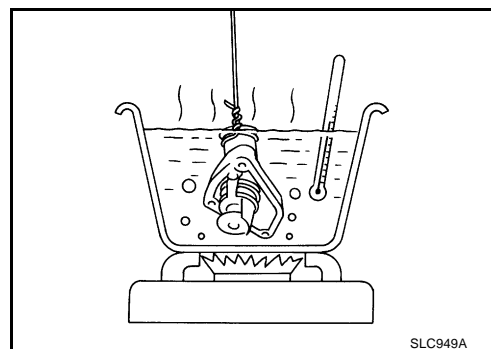
1. Check valve seating condition at ordinary room temperatures. It should seat tightly.

WATER INLET AND THERMOSTAT ASSEMBLY

[VQ35DE]

2. Check valve operation.

Thermostat	Standard
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	More than 71 °C (160 °F)



INSTALLATION

Note to 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.**
- Install water drain plug (front) of cylinder block.
- Apply liquid gasket to the thread of water drain plug (front).
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

INSPECTION AFTER INSTALLATION

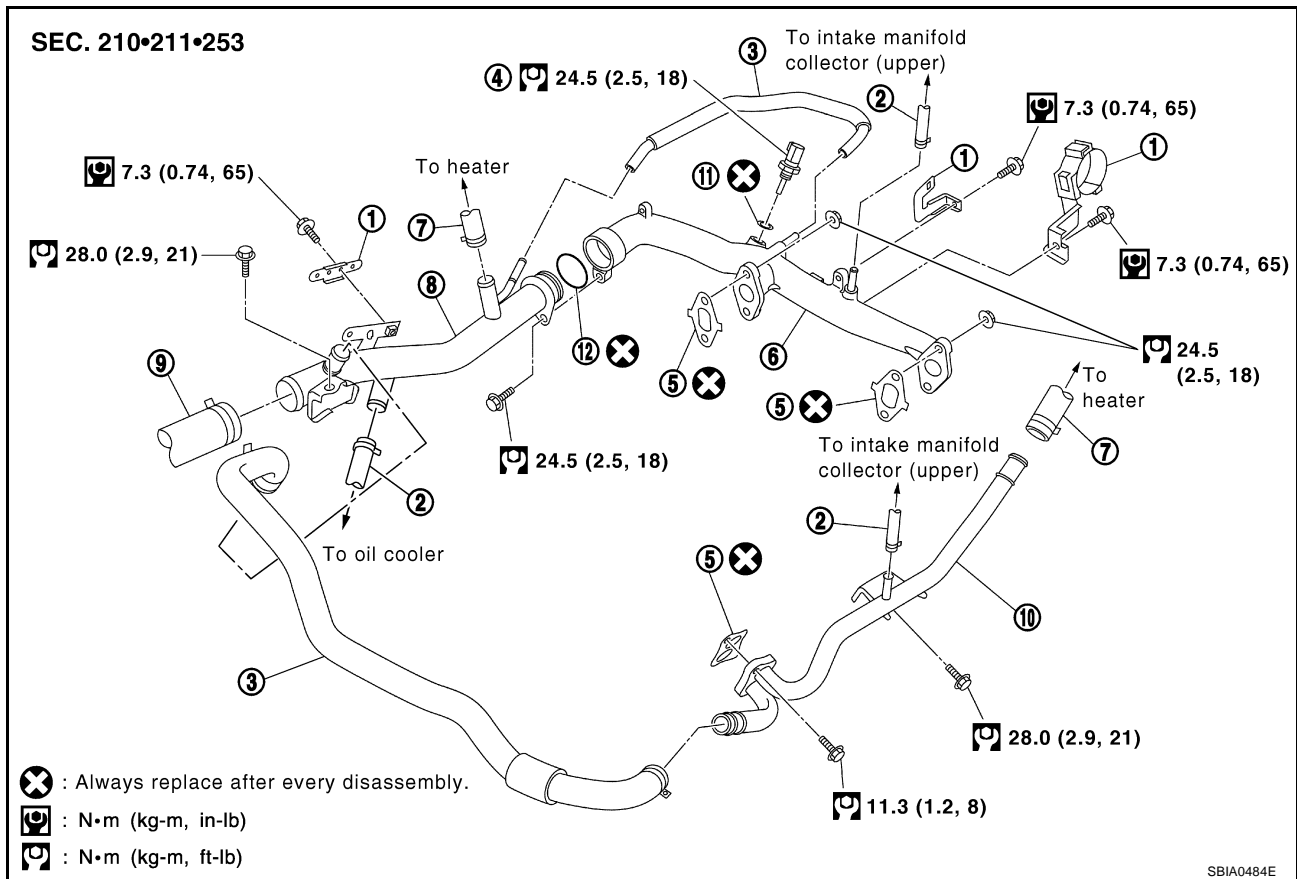
- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-11, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up engine. Visually make sure that there is no leaks of engine coolant.

WATER OUTLET AND WATER PIPING

PFP:11060

Removal and Installation

ABS007ZU



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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 upper hose |
| 10. Heater pipe | 11. Washer | 12. O-ring |

REMOVAL

1. Remove front engine undercover with power tool.
2. Drain engine coolant from drain plug and water drain plugs on radiator and both sides of cylinder block. Refer to [CO-11, "Changing Engine Coolant"](#).

CAUTION:

Perform when engine is cold.

3. Remove engine cover with power tool. Refer to [EM-19, "INTAKE MANIFOLD COLLECTOR"](#).
4. Remove air duct and air cleaner case assembly. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#).
5. Disconnect radiator upper hose, heater hose and water hose.
6. Remove water outlet and water piping.

INSTALLATION

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

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

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-11, "CHECKING COOLING SYSTEM FOR LEAKS"](#).
- Start and warm up engine. Visually make sure that there is no leaks of engine coolant and A/T fluid.

SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ35DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00100

Standard and Limit

ABS004W0

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)

THERMOSTAT

Thermostat	Standard
Valve opening temperature	76.0 - 79.0°C (169 - 174°F)
Maximum valve lift	8.6 mm / 90°C (0.339 in / 194°F)
Valve closing temperature	More than 71°C (160°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)

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PRECAUTIONS

PFP:00001

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

ABS008FV

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.

PREPARATION

[VK45DE]

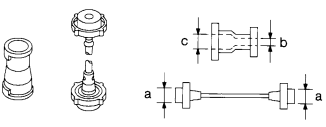


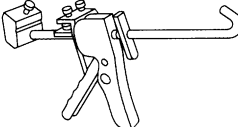
PREPARATION

PF0:00002

Special Service Tools

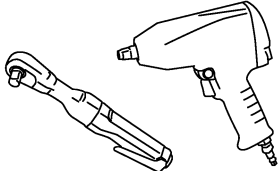
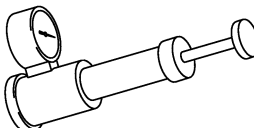
ABS006JD

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
EG17650301 (J33984-A) Radiator cap tester adapter <div style="text-align: center;">  <p>S-NT564</p> </div>	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)
KV99103510 (—) Radiator plate pliers A <div style="text-align: center;">  <p>S-NT224</p> </div>	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B <div style="text-align: center;">  <p>S-NT225</p> </div>	Removing radiator upper and lower tanks
WS39930000 (—) Tube pressure <div style="text-align: center;">  <p>S-NT052</p> </div>	Pressing the tube of liquid gasket

Commercial Service Tools

ABS006JE

Tool name	Description
Power tool <div style="text-align: center;">  <p>PBIC0190E</p> </div>	Loosening nuts and bolts
Radiator cap tester <div style="text-align: center;">  <p>PBIC1982E</p> </div>	Checking radiator and radiator cap

OVERHEATING CAUSE ANALYSIS

[VK45DE]

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

ABS006JF

		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			

OVERHEATING CAUSE ANALYSIS

[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			
					Powertrain system malfunction	—	C
					Installed improper size wheels and tires	—	D
					Dragging brakes		
			Improper ignition timing		E		
	Blocked or restricted air flow	Blocked bumper	—				
		Blocked radiator grille	Installed car brassiere				
			Mud contamination or paper clogging	—	F		
		Blocked radiator	—				
		Blocked condenser		Blocked air flow		G	
		Installed large fog lamp					

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COOLING SYSTEM

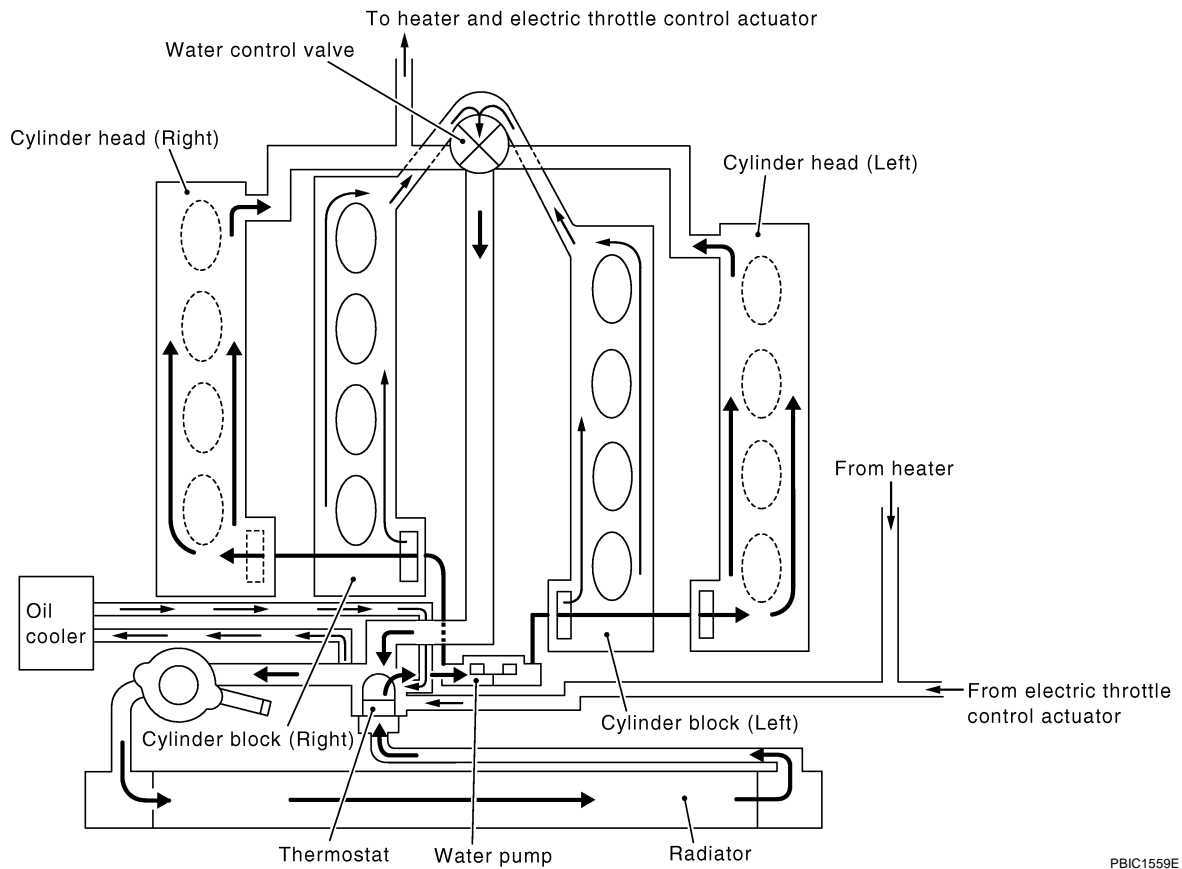
[VK45DE]

COOLING SYSTEM

PFP:21020

Cooling Circuit

ABS006JG



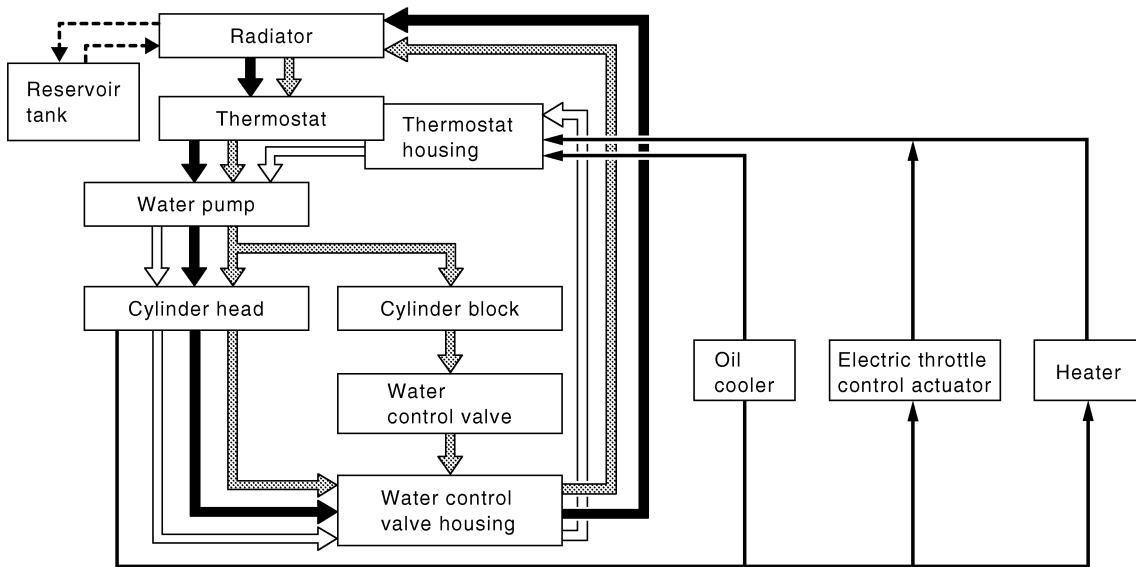
PBIC1559E

COOLING SYSTEM

[VK45DE]

System Chart

ABS006JH



	Thermostat	Water control valve
	Closed	Closed
	Open	Closed
	Open	Open

PBIC1560E

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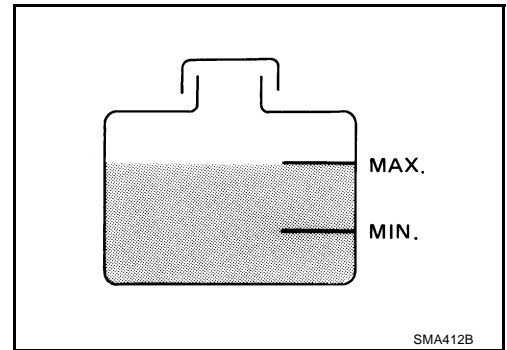
ENGINE COOLANT

PFPP:KQ100

Inspection LEVEL CHECK

ABS006JJ

- 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 (SST).

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.

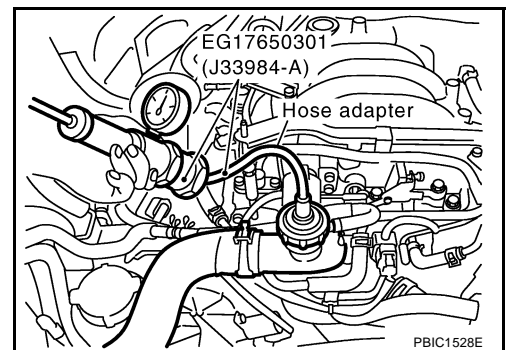
CAUTION:

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

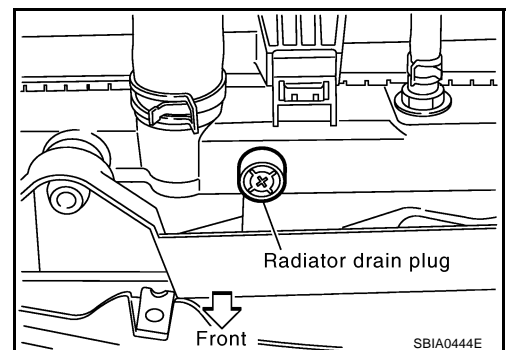
ABS006JJ

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

DRAINING ENGINE COOLANT

1. Remove engine front 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-243, "DISASSEMBLY"](#).

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 [CO-38. "FLUSHING COOLING SYSTEM"](#).

REFILLING ENGINE COOLANT

1. Install reservoir tank, and radiator drain plug.

CAUTION:

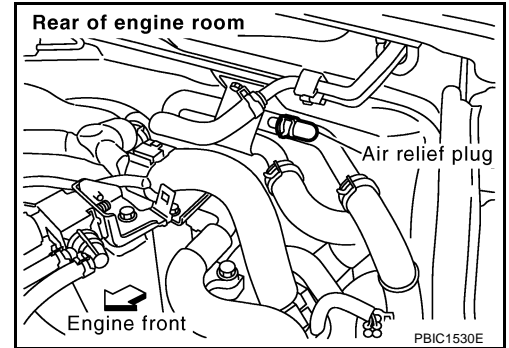
Be sure to clean radiator drain plug and install with new O-ring.

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-246. "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-12. "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

Engine coolant capacity

(With reservoir tank at "MAX" level):

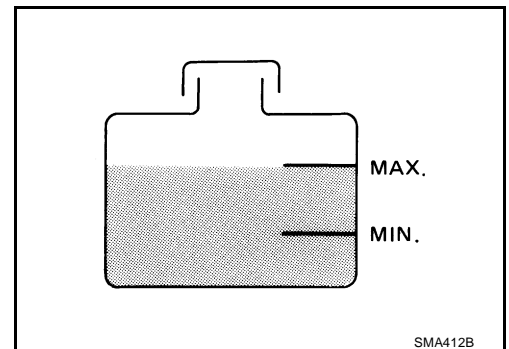
Approx. 10.0 ℓ (10-5/8 US qt, 8-3/4 Imp qt)

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.
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.
 - **Clean excess engine coolant from engine.**

FLUSHING COOLING SYSTEM

1. Install reservoir tank, and radiator drain plug.

CAUTION:

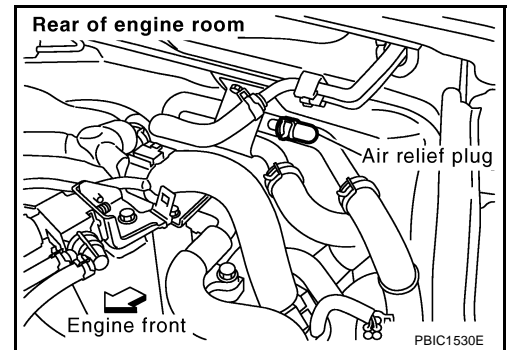
Be sure to clean drain plug and install with new O-ring.

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-246, "ASSEMBLY"](#).

2. Remove air relief plug on heater hose.



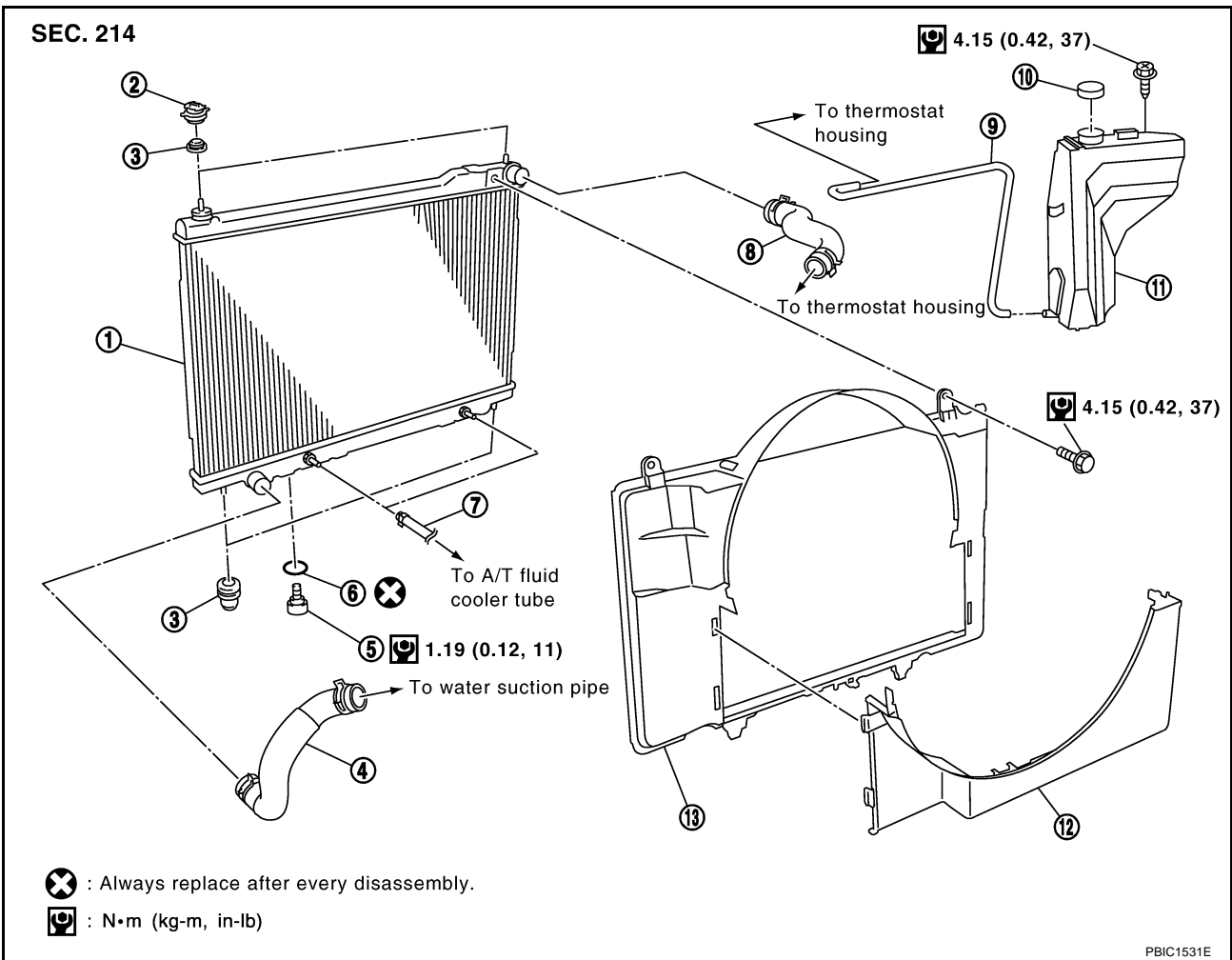
3. Fill thermostat housing with water until water spills from the air relief hole, then close air relief plug. Fill thermostat housing and reservoir tank with water and reinstall radiator cap.
4. Run engine and warm it up to normal operating temperature.
5. Rev engine two or three times under no-load.
6. Stop engine and wait until it cools down.
7. Drain water from the system. Refer to [CO-36, "DRAINING ENGINE COOLANT"](#).
8. Repeat steps 1 through 7 until clear water begins to drain from radiator.

RADIATOR

PFP:21400

Removal and Installation

ABS006JS



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

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.

REMOVAL

1. Remove engine cover with power tool. Refer to [EM-169, "ENGINE ROOM COVER"](#).
2. Remove engine front undercover with power tool.
3. Drain engine coolant from radiator. Refer to [CO-36, "Changing Engine Coolant"](#).

CAUTION:

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

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

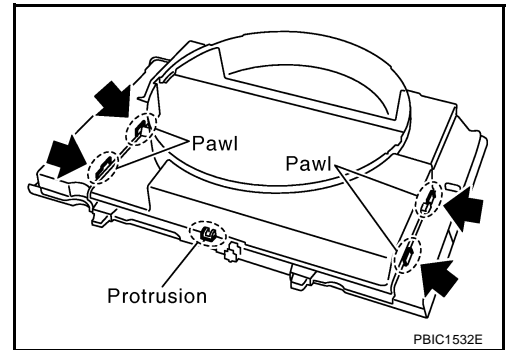
CAUTION:

- Do not spill engine coolant on drive belts.

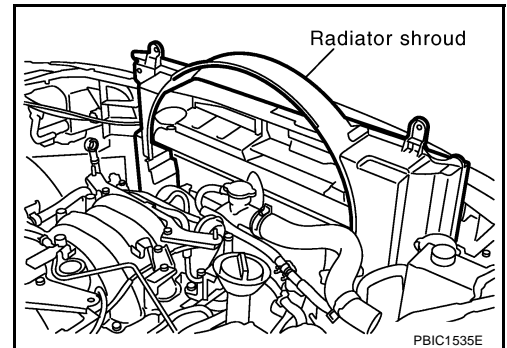
RADIATOR

[VK45DE]

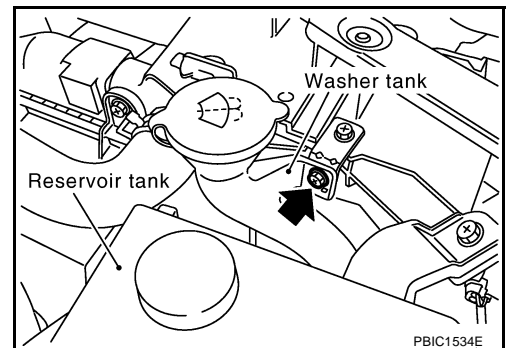
6. Disconnect A/T fluid cooler hoses.
 - Install blind plug to avoid leakage of A/T fluid.
7. Remove radiator shroud (lower).
 - While pressing left and right pawls in direction indicated by arrows, pull radiator shroud (lower) rearwards to remove.



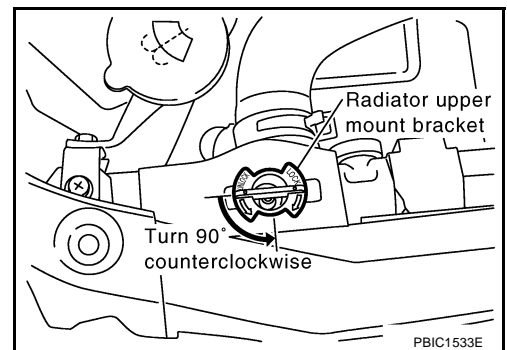
8. Lift up and remove radiator shroud.



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.



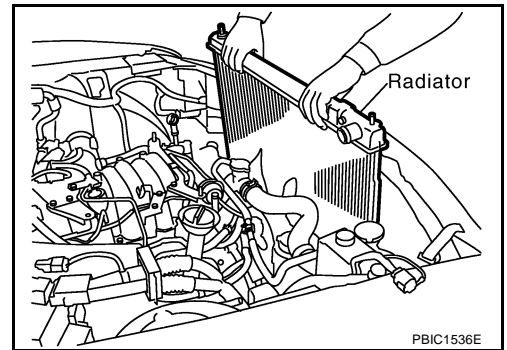
RADIATOR

[VK45DE]

11. Lift up and remove radiator.

CAUTION:

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



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INSTALLATION

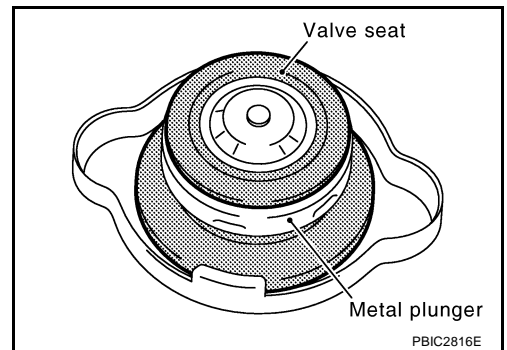
Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

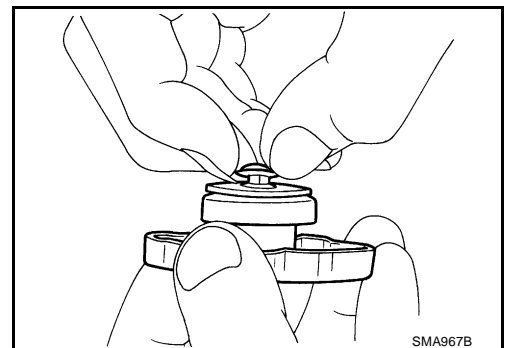
- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-36, "LEAK CHECK"](#).
- Start and warm up engine. Visually Check if there is no leaks of engine coolant and A/T fluid.

Checking Radiator Cap

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



- Pull negative-pressure valve to open it, and make sure that it 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.

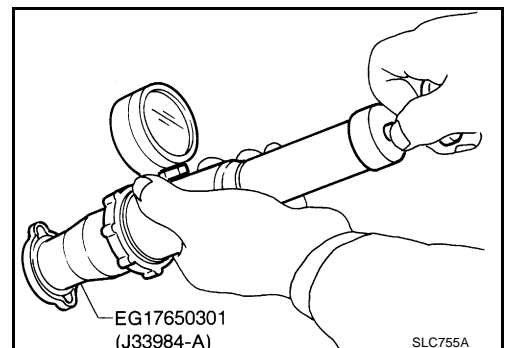


- Check radiator cap relief pressure.

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 (SST) and the radiator cap tester (Commercial service tool), apply engine coolant to the cap seal surface.



- Replace radiator cap if there is an unusualness.

CAUTION:

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

Checking Radiator

ABS008FZ

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

CAUTION:

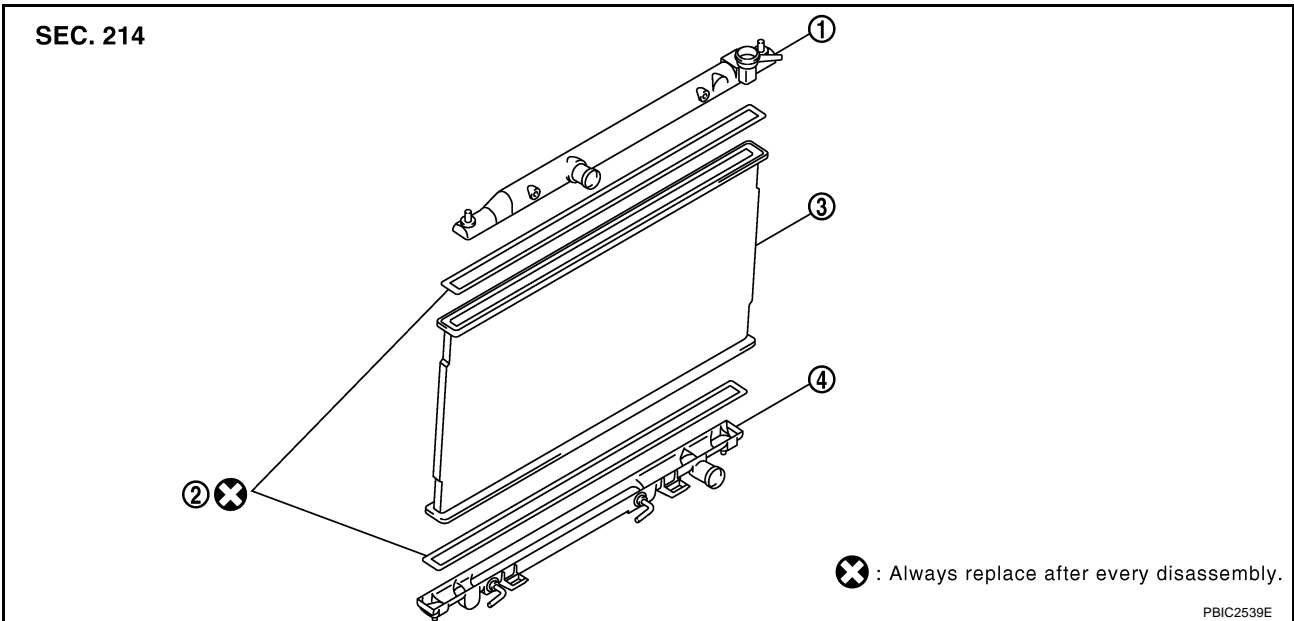
- **Be careful not to bend or damage the radiator fins.**
 - **When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape the harness and electrical connectors to prevent water from entering.**
1. Apply water by hose to the back side 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.

RADIATOR (ALUMINUM TYPE)

PF2:21460

Disassembly and Assembly

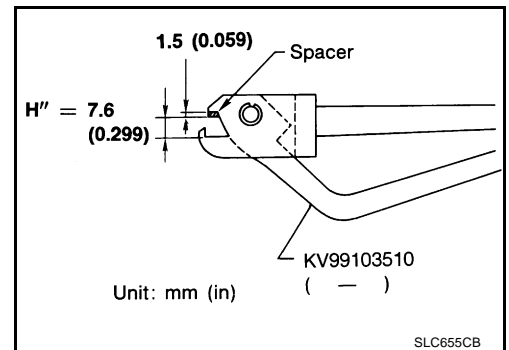
ABS006JL



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

PREPARATION

- 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.



- Make sure that when 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

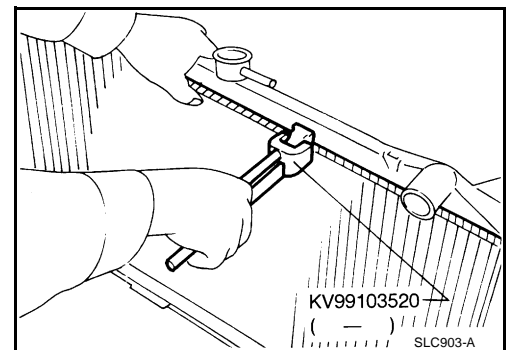
- Remove upper and lower tanks with radiator plate pliers B (SST).

CAUTION:

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

NOTE:

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



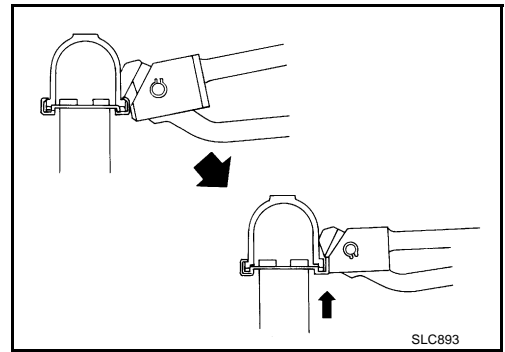
RADIATOR (ALUMINUM TYPE)

[VK45DE]

- Grip the crimped edge and bend it upwards so that radiator plate pliers B slips off.

CAUTION:

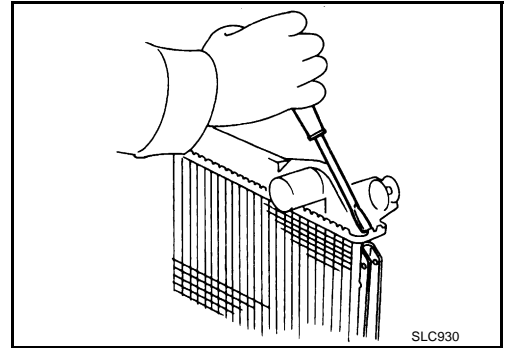
Do not bend excessively.



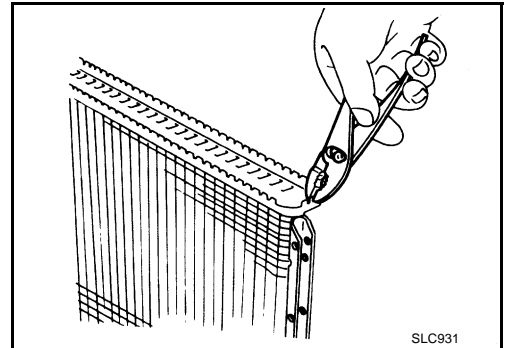
- In areas where radiator plate pliers B cannot be used, use flat-blade screwdriver to bend the edge up.

CAUTION:

Be careful not to damage tank.

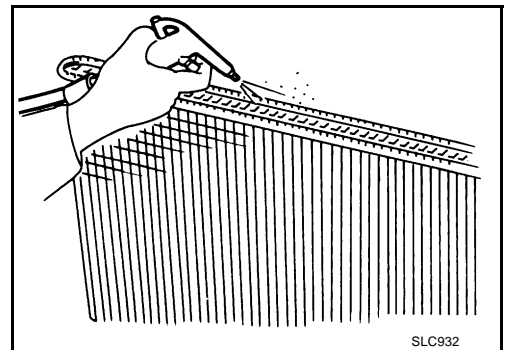


2. Remove sealing rubber.
3. Make sure the edge stands straight up.



ASSEMBLY

1. Clean contact portion of tank.

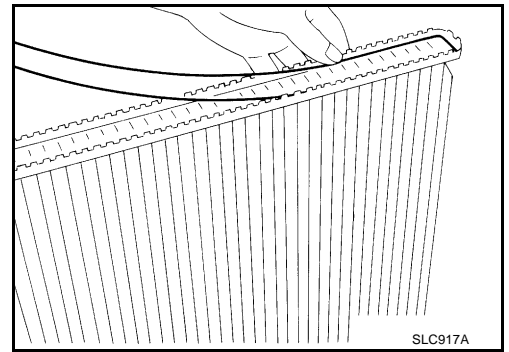


RADIATOR (ALUMINUM TYPE)

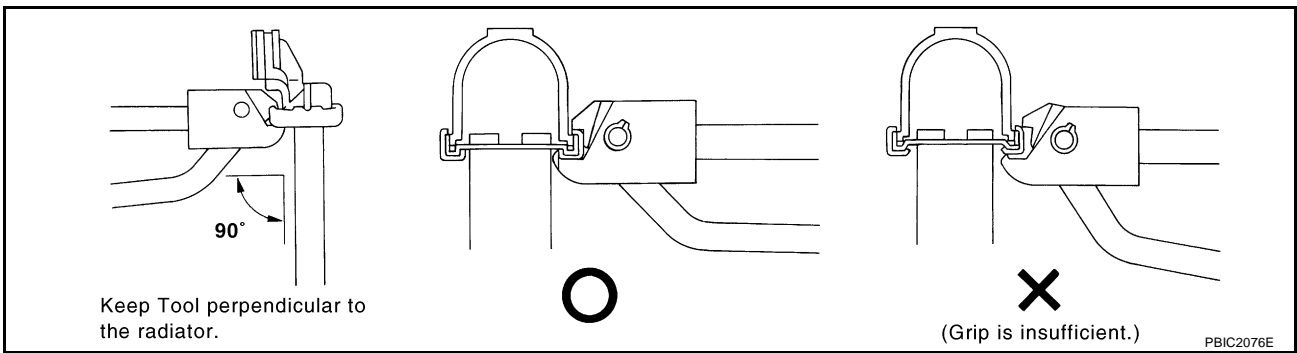
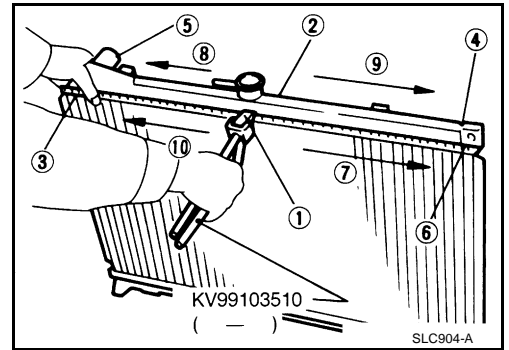
[VK45DE]

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

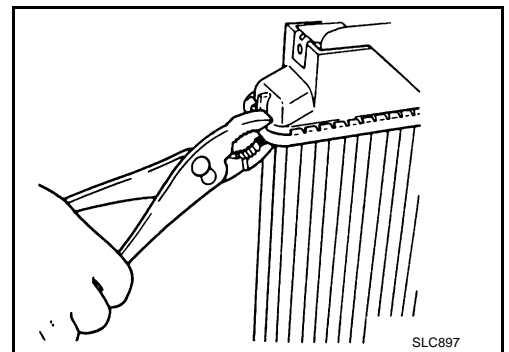
CAUTION:
Be careful not to twist sealing rubber.



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 cannot be used.



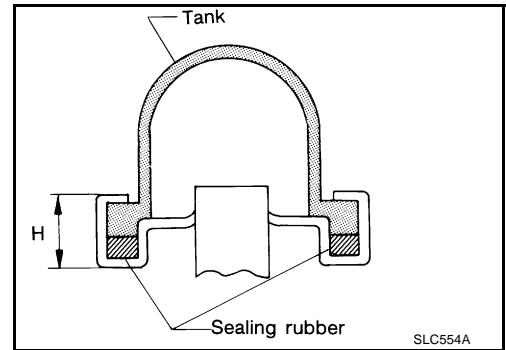
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RADIATOR (ALUMINUM TYPE)

[VK45DE]

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

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



5. Make sure that there is no leakage.
Refer to **CO-46, "INSPECTION"** .

INSPECTION

1. Apply pressure with radiator cap tester adapter (SST) 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)

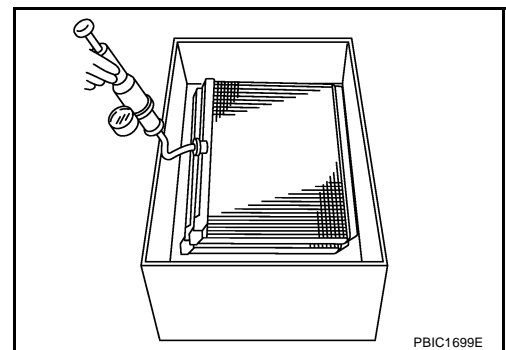
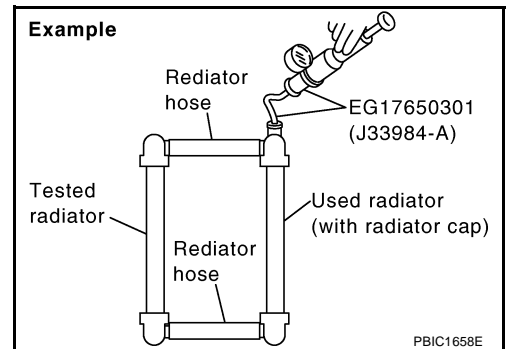
WARNING:

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.

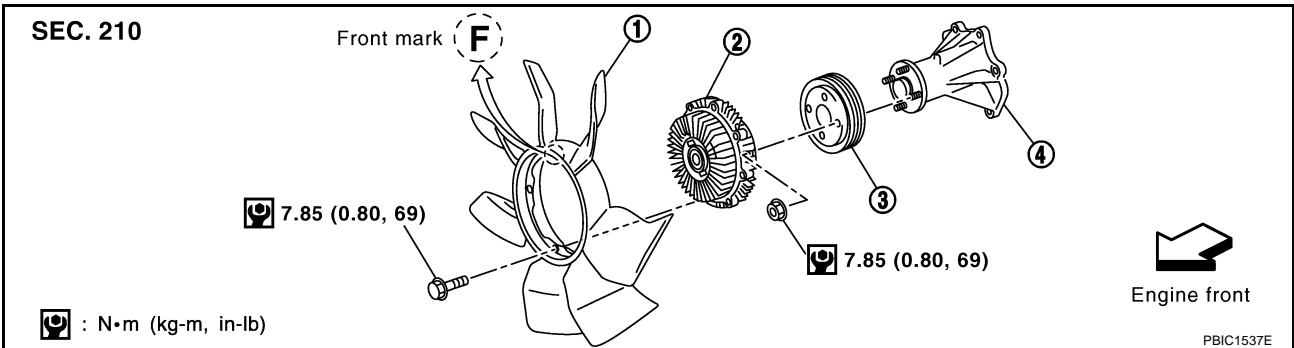
2. Check for leakage by soaking radiator in water container with the testing pressure applied.



COOLING FAN

Removal and Installation (Crankshaft Driven Type)

ABS006JT



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

REMOVAL

1. Remove air duct (inlet). Refer to [EM-173, "AIR CLEANER AND AIR DUCT"](#) .
2. Remove engine front undercover with power tool.
3. Remove radiator shroud (lower). Refer to [CO-39, "RADIATOR"](#) .
4. Remove drive belts. Refer to [EM-170, "DRIVE BELTS"](#) .
5. Remove fan coupling and cooling fan assembly.

CAUTION:

Do not damage or scratch radiator core when removing.

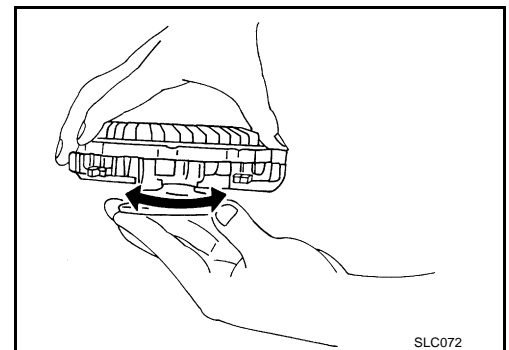
6. Remove cooling fan from fan coupling.

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.

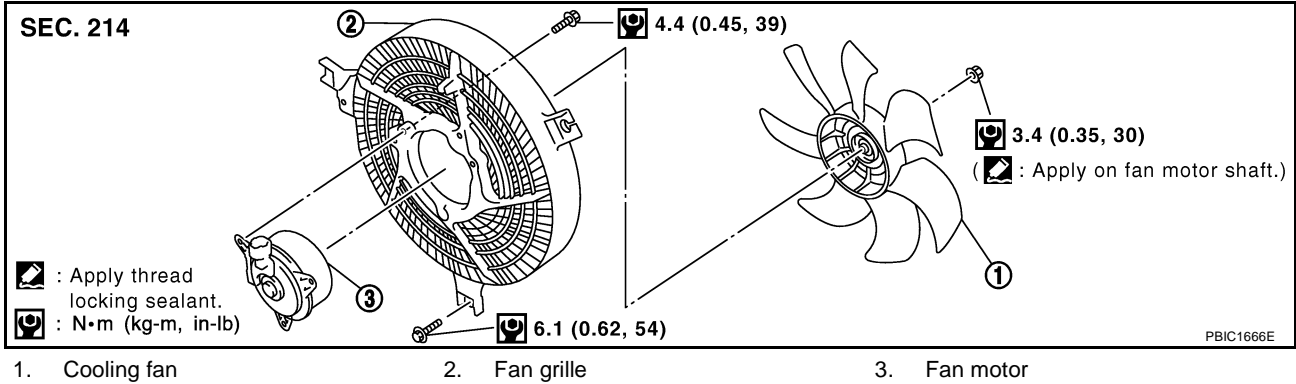
- If anything is found, replace cooling fan.

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 [CO-47, "Removal and Installation \(Crankshaft Driven Type\)"](#) .

Removal and Installation (Motor Driven Type)



REMOVAL

1. Remove front grille. Refer to [EI-23, "FRONT GRILLE"](#).
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-1165, "DTC P1217 ENGINE OVER TEMPERATURE"](#).

Disassembly and Assembly (Motor Driven Type)

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

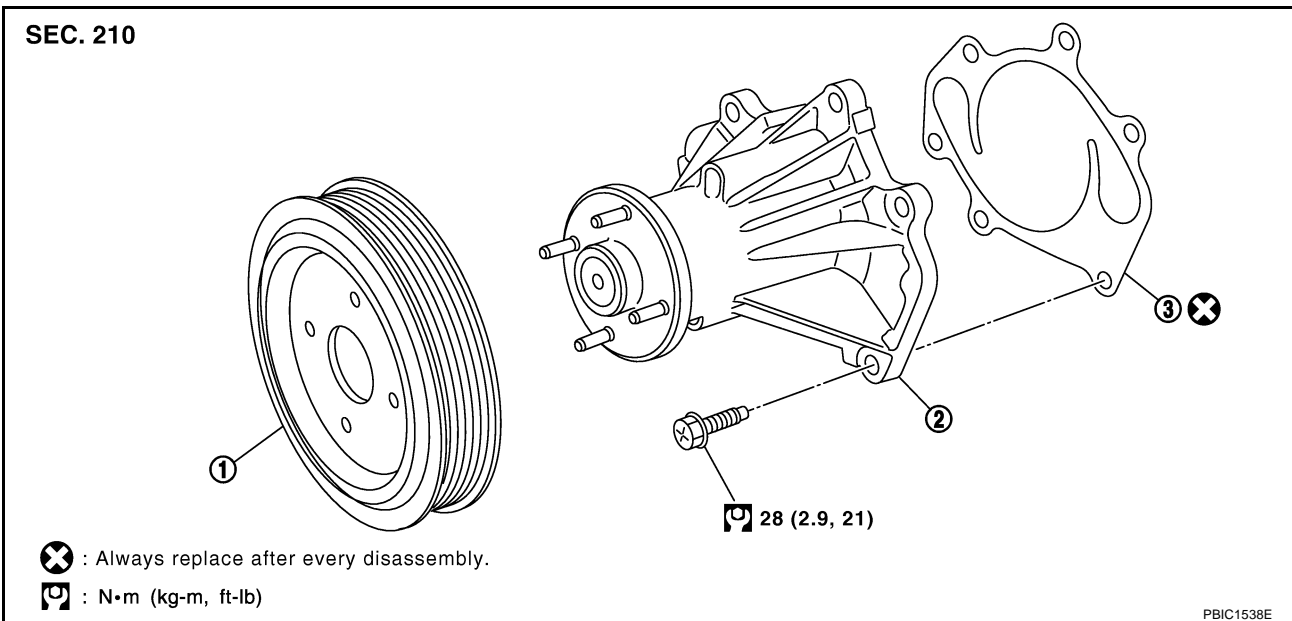
Assemble in the reverse order of disassembly.

WATER PUMP

PFP:21020

Removal and Installation

ABS006JO



1. Water pump pulley

2. Water pump

3. Gasket

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 [SST: EG17650301 (J33984-A)].

REMOVAL

1. Drain engine coolant from drain plugs on radiator and both side of cylinder block. Refer to [CO-36, "Changing Engine Coolant"](#) and [EM-243, "DISASSEMBLY"](#).

CAUTION:

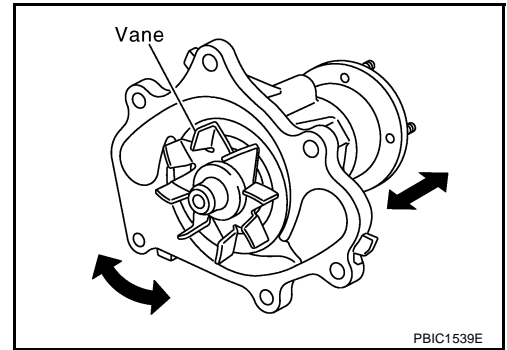
- Perform this step when engine is cold.
 - Do not spill engine coolant on drive belts.
2. Remove following parts:
 - Engine front undercover
 - Air duct (inlet); Refer to [EM-173, "AIR CLEANER AND AIR DUCT"](#).
 - Alternator, water pump and A/C compressor belt; Refer to [EM-170, "DRIVE BELTS"](#).
 3. Remove fan coupling with cooling fan, and then 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

- 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

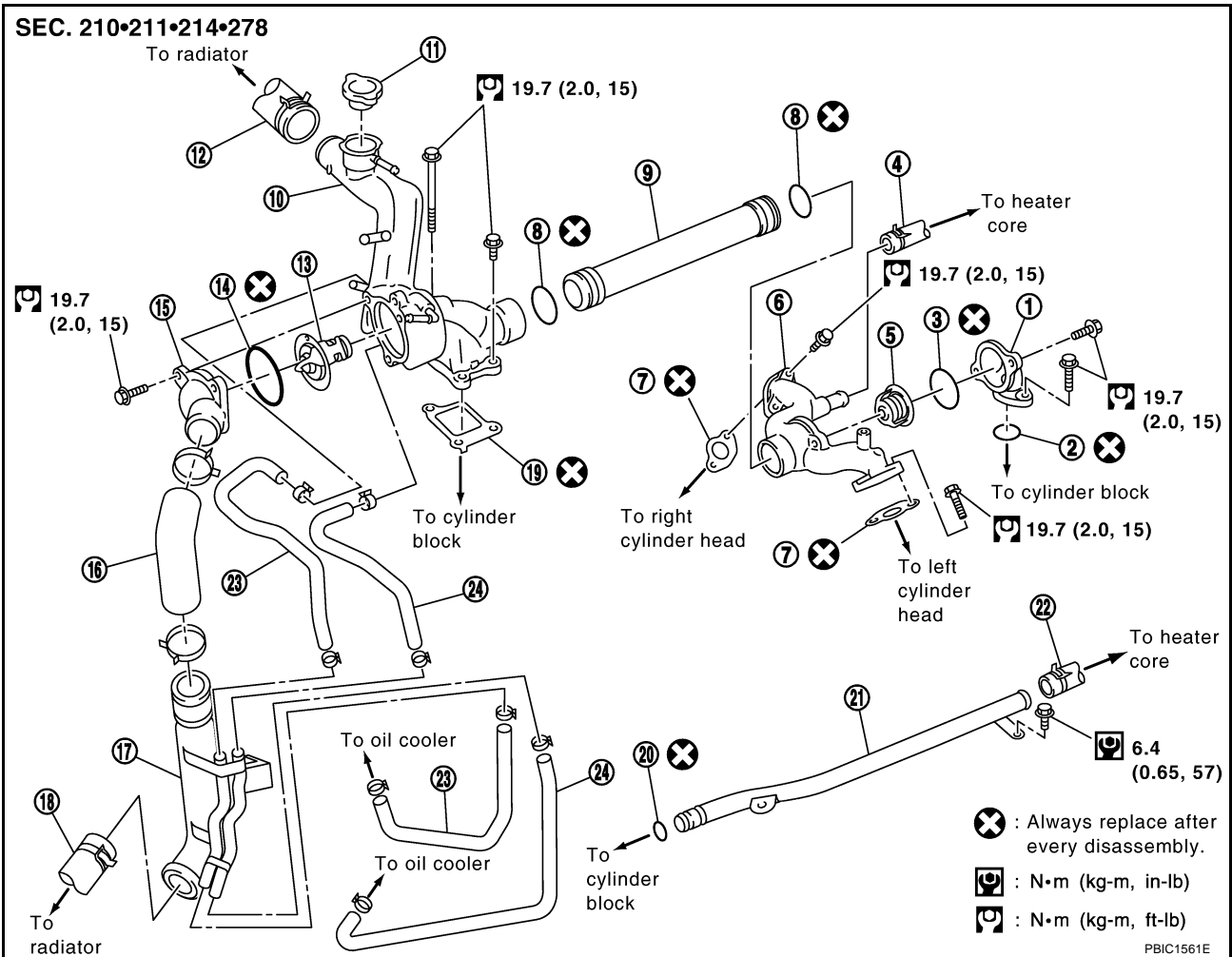
- Check for leaks of engine coolant using radiator cap tester adapter [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-36, "LEAK CHECK"](#).
- Start and warm up engine. Visually check if there is no leaks of engine coolant.

THERMOSTAT AND WATER CONTROL VALVE

PFP:21200

Removal and Installation

ABS006JP



- | | | |
|------------------------|------------------------|---------------------------|
| 1. Water connector | 2. O-ring | 3. Rubber ring |
| 4. Heater hose | 5. Water control valve | 6. Water outlet |
| 7. Gasket | 8. O-ring | 9. Water outlet pipe |
| 10. Thermostat housing | 11. Radiator cap | 12. Radiator hose (upper) |
| 13. Thermostat | 14. Rubber ring | 15. Water inlet |
| 16. Water suction hose | 17. Water suction pipe | 18. Radiator hose (lower) |
| 19. Gasket | 20. O-ring | 21. Heater pipe |
| 22. Heater hose | 23. Water hose | 24. Water hose |

REMOVAL

1. Drain engine coolant from drain plugs on radiator and both side of cylinder block. Refer to [CO-36, "Changing Engine Coolant"](#) and [EM-243, "DISASSEMBLY"](#).

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, "ENGINE ROOM COVER"](#).
3. Remove air duct (inlet). Refer to [EM-173, "AIR CLEANER AND AIR DUCT"](#).
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, "INTAKE MANIFOLD"](#).

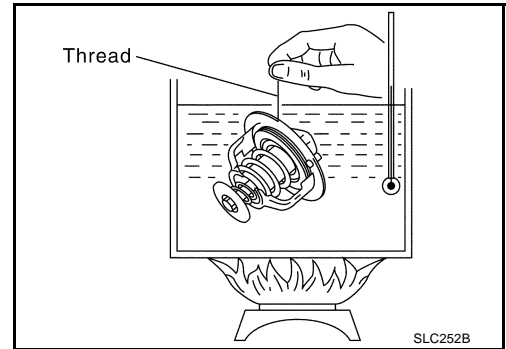
7. Disconnect radiator hose (upper) and water hoses from thermostat housing.
8. Disconnect heater hoses from water outlet and heater pipe.
9. Remove thermostat housing, water outlet pipe, water connector, water control valve, water outlet and heater pipe.

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

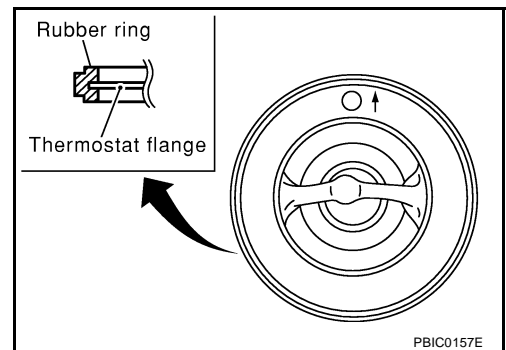
Note the following, and install in the reverse order of removal.

CAUTION:

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

Thermostat and Water Control Valve

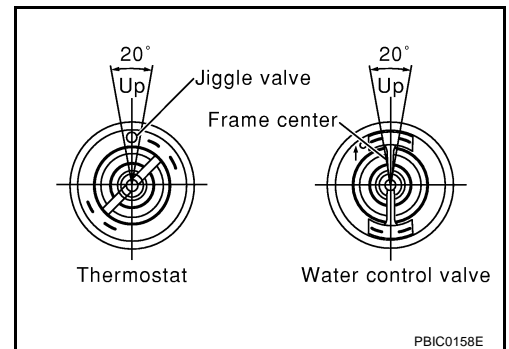
- Install thermostat and water control valve with the whole circumference of each flange part fit securely inside rubber ring. (The example in the figure shows thermostat.)



THERMOSTAT AND WATER CONTROL VALVE

[VK45DE]

- 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 [SST: EG17650301 (J33984-A)] and radiator cap tester (commercial service tool). Refer to [CO-36, "LEAK CHECK"](#).
- Start and warm up engine. Visually check if there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

[VK45DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit ENGINE COOLANT CAPACITY (APPROXIMATE)

ABS006JQ

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)