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SECTION

ENGINE COOLING SYSTEM

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PRECAUTIONS

PRECAUTIONS

PFP:00001

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

NBS006SL

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

NBS002AE

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

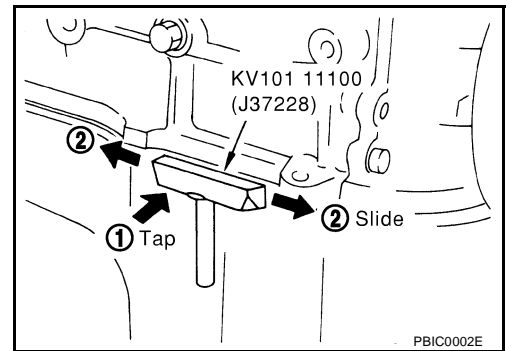
CAUTION:

Be careful not to damage the mating surfaces.

- Tap 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.

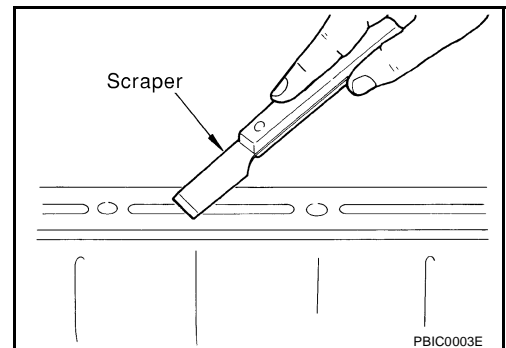
CAUTION:

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

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

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

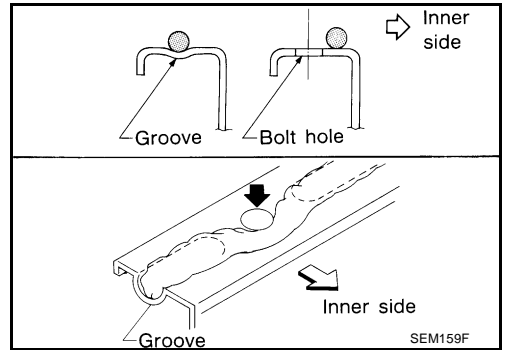
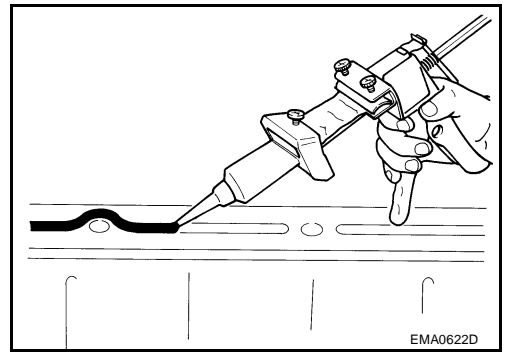
4. Apply liquid gasket without breaks to the specified location with the specified dimensions.

- 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 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.



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PREPARATION

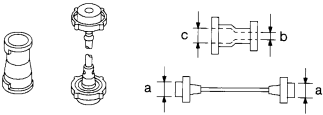

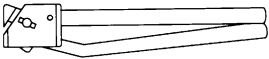
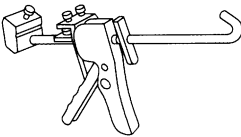
PREPARATION

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Special Service Tools

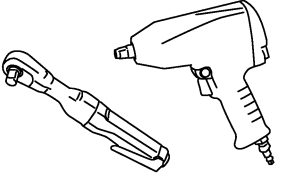
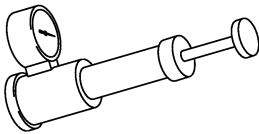
NBS002AF

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

Tool number (Kent-Moore No.) Tool name	Description
EG17650301 (J33984-A) Radiator cap tester adapter	 <p style="text-align: center;">S-NT564</p> 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	 <p style="text-align: center;">S-NT224</p> Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	 <p style="text-align: center;">S-NT225</p> Removing radiator upper and lower tanks
WS39930000 (—) Tube pressure	 <p style="text-align: center;">S-NT052</p> Pressing the tube of liquid gasket

Commercial Service Tools

NBS002AG

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

OVERHEATING CAUSE ANALYSIS

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

NBS002AH

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

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OVERHEATING CAUSE ANALYSIS

		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					
			Improper ignition timing					
			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								

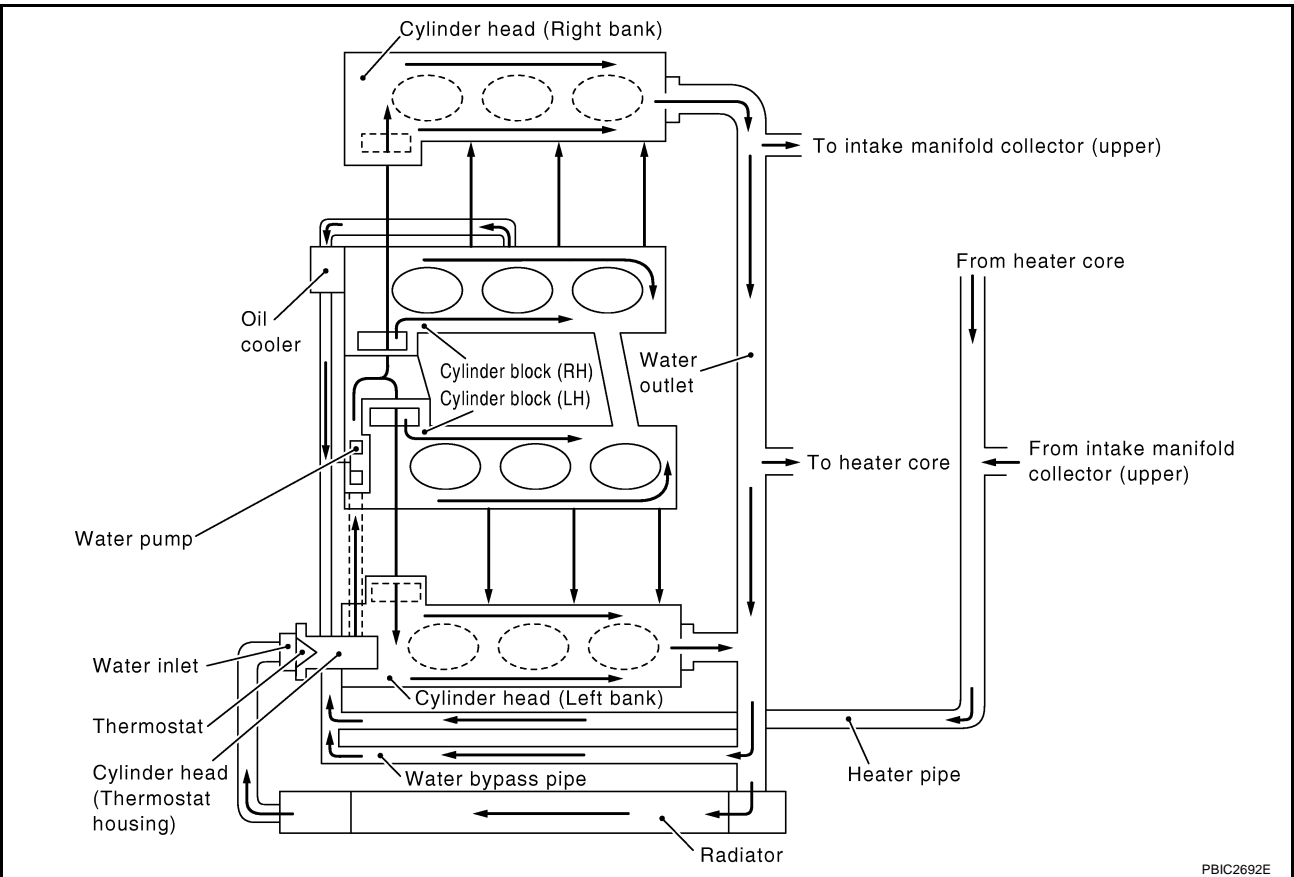
COOLING SYSTEM

COOLING SYSTEM

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Cooling Circuit

NBS002AI



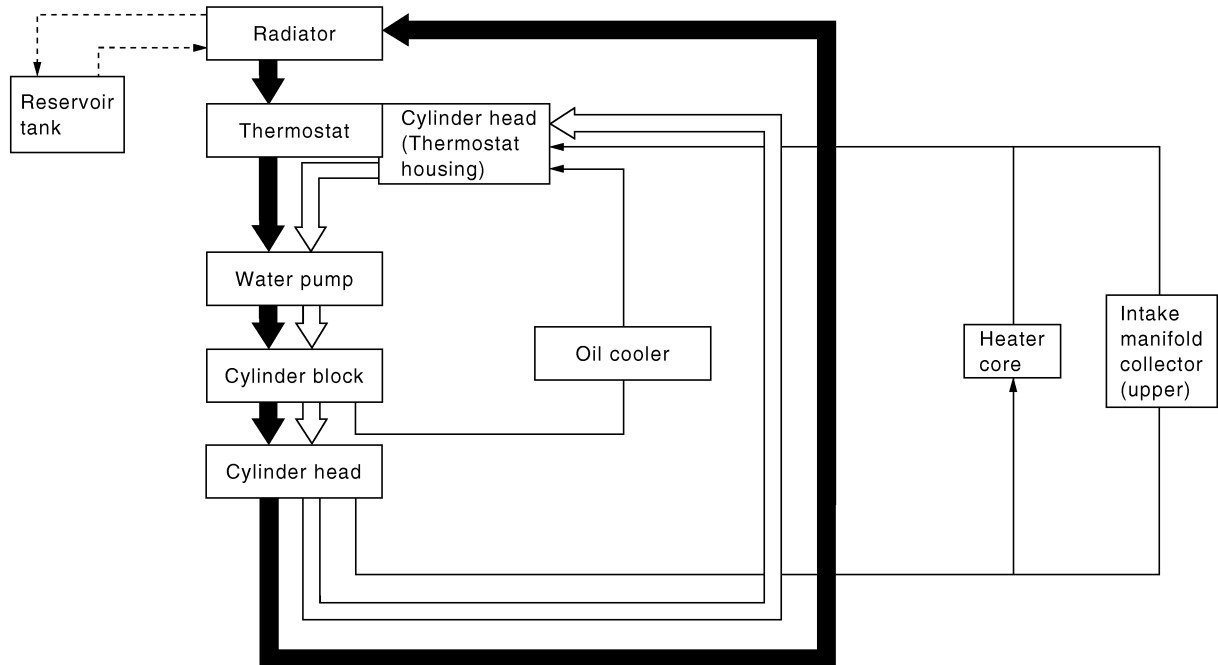
PBIC2692E

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COOLING SYSTEM

System Chart

NBS002AJ



	Thermostat
	Closed
	Open

PBIC2693E

ENGINE COOLANT

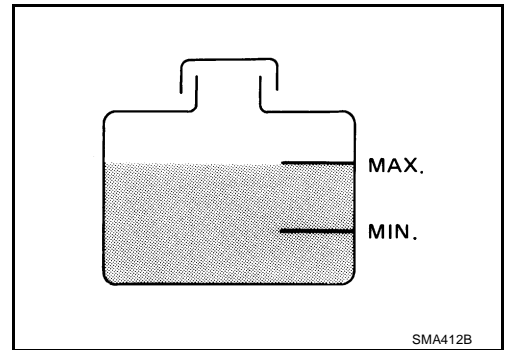
ENGINE COOLANT

PFP:KQ100

Inspection LEVEL CHECK

NBS002AK

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



LEAK CHECK

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

Testing pressure

: 157 kPa (1.6 kg/cm² , 23 psi)

WARNING:

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

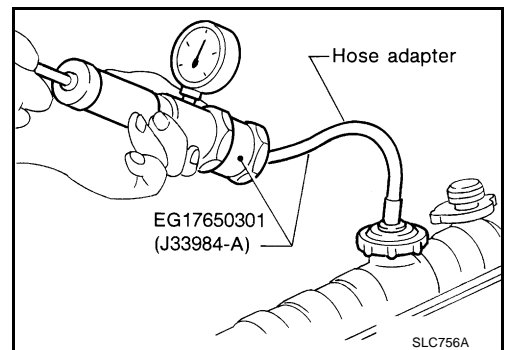
CAUTION:

Higher testing pressure than specified may cause radiator damage.

NOTE:

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

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



Changing Engine Coolant

NBS002AL

WARNING:

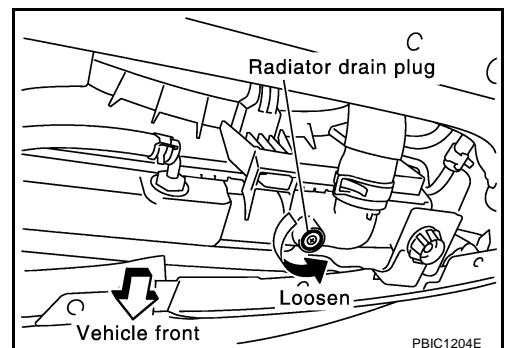
- To avoid being scalded, do not change engine coolant when the engine is hot.
- Wrap a thick cloth around radiator cap and carefully remove radiator cap. First, turn radiator cap a quarter of a turn to release built-up pressure. Then turn radiator cap all the way.

CAUTION:

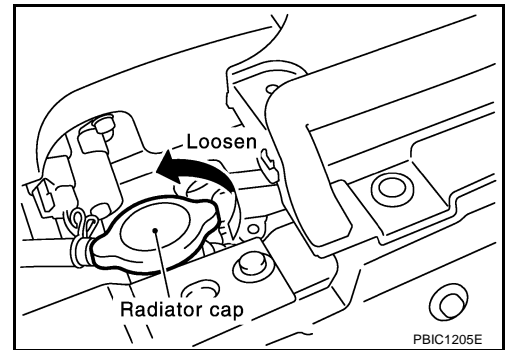
Be careful not to allow engine coolant to contact drive belts.

DRAINING ENGINE COOLANT

1. Remove radiator drain hole cap on undercover.
2. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.



ENGINE COOLANT



When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to [EM-115, "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-11, "FLUSHING COOLING SYSTEM"](#) .

REFILLING ENGINE COOLANT

NOTE:


When engine coolant is drained from radiator only, step 3, 4 and 6 are unnecessary.

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

CAUTION:

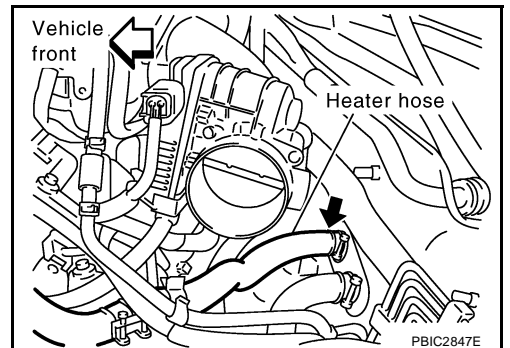
Be sure to clean drain plug and install with new O-ring.

Radiator drain plug:

: 0.78 - 1.56 N·m (0.08 - 0.16 kg-m, 7 - 14 in-lb)

If water drain plug on cylinder block are removed, close and tighten them. Refer to [EM-120, "ASSEMBLY"](#) .

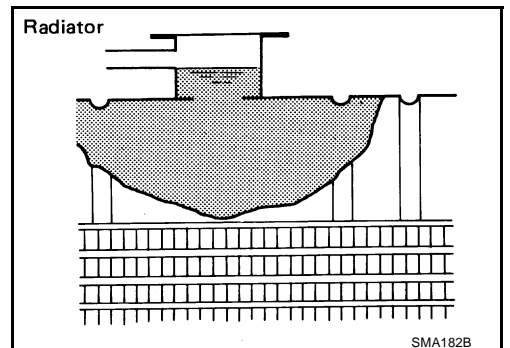
2. Make sure that each hose clamp has been firmly tightened.
3. Remove air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
4. Disconnect heater hose (right side of vehicle) at the position in the figure.
 - Enhance heater hose as high as possible.



5. 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-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

Engine coolant capacity
(With reservoir tank at "MAX" level)

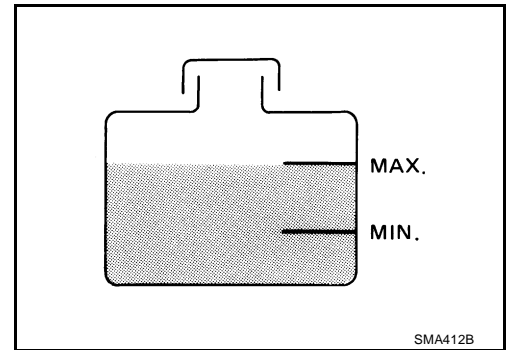
: Approximately 9.6 ℓ (10-1/8 US qt, 8-1/2 Imp qt)



ENGINE COOLANT

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

: 0.8 ℓ (7/8 US qt, 3/4 Imp qt)



- When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant, if heater hose is disconnected.
6. Install air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
 7. Install radiator cap.
 8. 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.
9. Stop the engine and cool down to less than approximately 50°C (122°F).
 - Cool down using fan to reduce the time.
 - If necessary, refill radiator up to filler neck with engine coolant.
 10. Refill reservoir tank to "MAX" level line with engine coolant.
 11. Repeat steps 5 through 9 two or more times with radiator cap installed until engine coolant level no longer drops.
 12. Check cooling system for leaks with engine running.
 13. 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.
 14. Repeat step 13 three times.
 15. If sound is heard, bleed air from cooling system by repeating step 5 through 9 until engine coolant level no longer drops.


FLUSHING COOLING SYSTEM

NOTE:

When engine coolant is drained from radiator only, step 2, 3 and 5 are unnecessary.

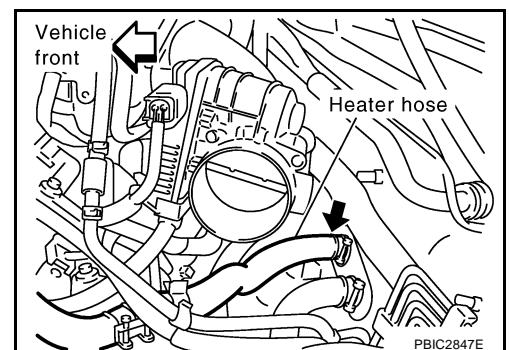
1. Install reservoir tank if removed, and radiator drain plug.

Radiator drain plug:

: 0.78 - 1.56 N·m (0.08 - 0.16 kg·m, 7 - 14 in·lb)

If water drain plug on cylinder block are removed, close and tighten them. Refer to [EM-120, "ASSEMBLY"](#) .

2. Remove air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
3. Disconnect heater hose (right side of vehicle) at the position in the figure.
 - Enhance heater hose as high as possible.



ENGINE COOLANT

4. Fill radiator and reservoir tank with water and install radiator cap.
 - When engine coolant overflows disconnected heater hose, connect heater hose, and continue filling the engine coolant, if heater hose is disconnected.
5. Install air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
6. Run the engine and warm it up to normal operating temperature.
7. Rev the engine two or three times under no-load.
8. Stop the engine and wait until it cools down.
9. Drain water from the system. Refer to [CO-9, "DRAINING ENGINE COOLANT"](#) .
10. Repeat steps 1 through 9 until clear water begins to drain from radiator.

RADIATOR

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RADIATOR

Removal and Installation

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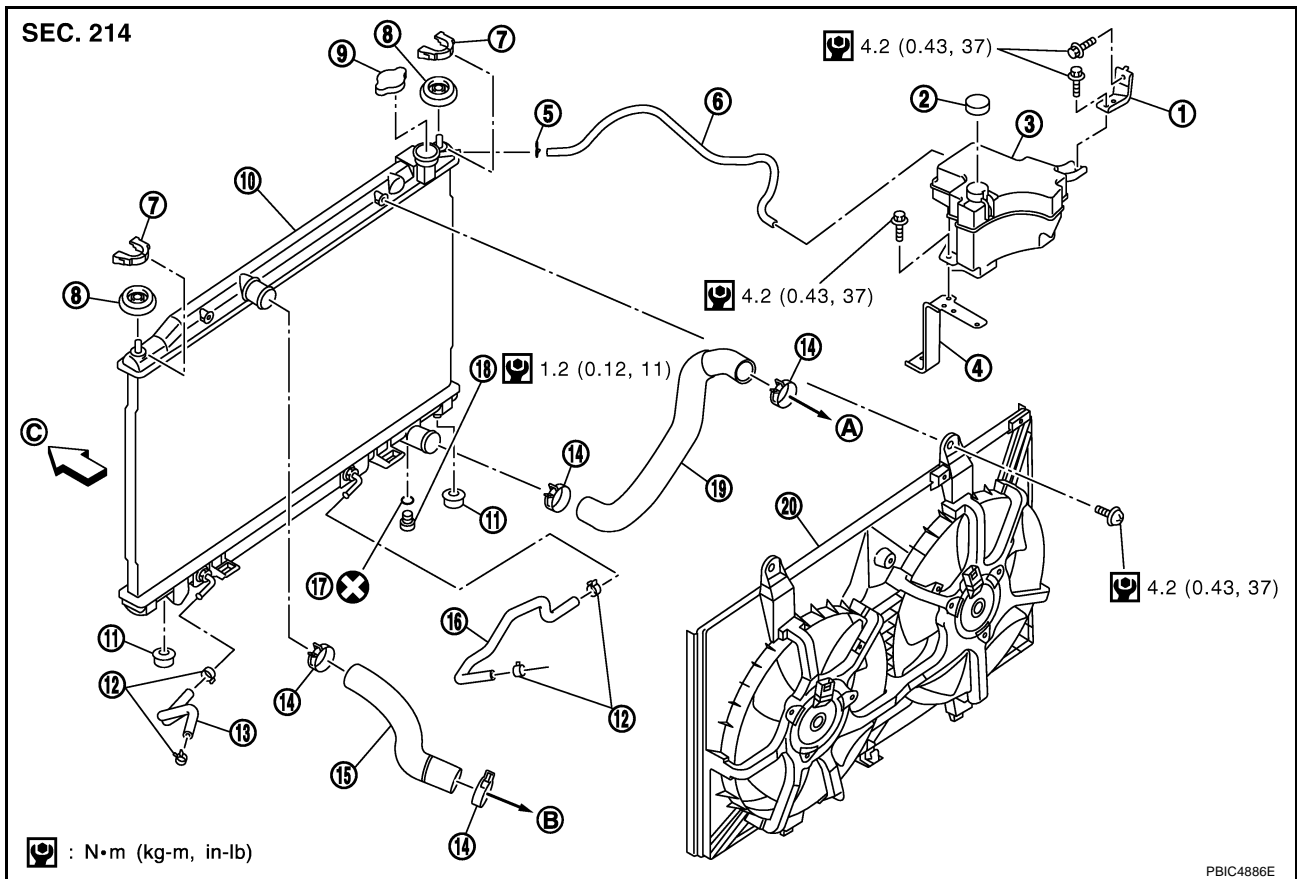
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- | | | |
|---------------------------|-----------------------------------|---------------------------|
| 1. Bracket | 2. Reservoir tank cap | 3. Reservoir tank |
| 4. Bracket | 5. Clamp | 6. Reservoir tank hose |
| 7. Radiator upper clip | 8. Mounting rubber | 9. Radiator cap |
| 10. Radiator | 11. Mounting rubber | 12. Clamp |
| 13. CVT fluid cooler hose | 14. Clamp | 15. Radiator hose (upper) |
| 16. CVT fluid cooler hose | 17. O-ring | 18. Drain plug |
| 19. Radiator hose (lower) | 20. Radiator cooling fan assembly | |
| A. To water inlet | B. To water outlet | C. Vehicle front |

- Refer to [GI-10, "Components"](#) for symbol marks in the figure.

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.

REMOVAL

1. Remove undercover.
2. Drain engine coolant. Refer to [CO-9, "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 radiator cover grills (right and left sides). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#).
 4. Disconnect harness connector from fan motors, and move harness to aside.
 5. Disconnect CVT fluid cooler hoses.
 - Install plug to avoid leakage of CVT fluid.

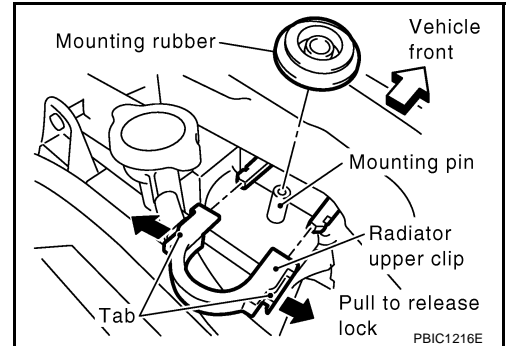
RADIATOR

- Remove radiator hoses (upper and lower) and reservoir tank hose.

CAUTION:

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

- Remove reservoir tank and bracket.
- Remove battery and battery tray, and move fuse and fusible link block to aside. Refer to [SC-4, "BATTERY"](#).
- Remove radiator upper clips by pulling the tabs outside to release the lock.
Do not pull the tabs outside excessively to prevent it from damaging.



- Remove mounting rubbers (upper) from mounting pins on radiator.
- Lift up and remove radiator and radiator cooling fan assembly.

CAUTION:

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

- Remove radiator cooling fan assembly from radiator.

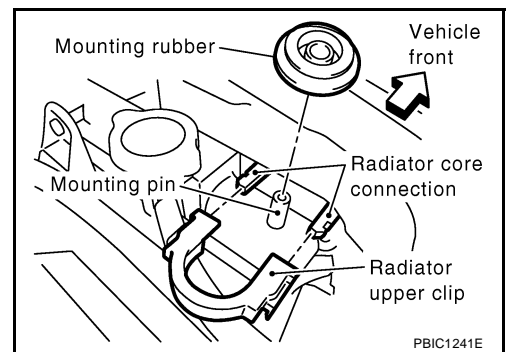
INSTALLATION

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

Radiator Upper Clip

Install radiator upper clip on radiator core connection as follows:

- Install mounting rubbers (upper) on mounting pins of radiator.



- Align radiator upper clip with radiator core connection, then insert radiator upper clip straight into radiator core connections until a click is heard.
- After connecting radiator upper clip, use the following method to make sure it is fully connected.
 - Visually confirm that two radiator upper clips are connected to radiator core connections.
 - Move radiator upper clip and the radiator forward and backward to make sure they are securely connected.

INSPECTION AFTER INSTALLATION

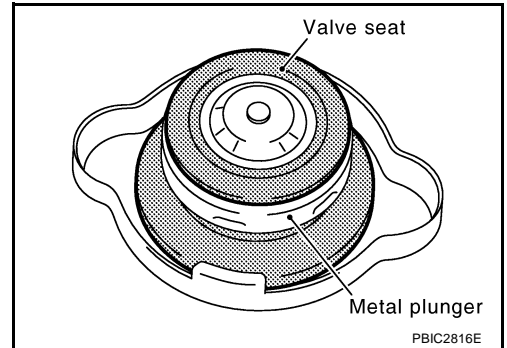
- Check for leaks of engine coolant using the radiator cap tester adapter [SST: EG17650301 (J33984-A)] and the radiator cap tester (commercial service tool). Refer to [CO-9, "LEAK CHECK"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant and CVT fluid.

RADIATOR

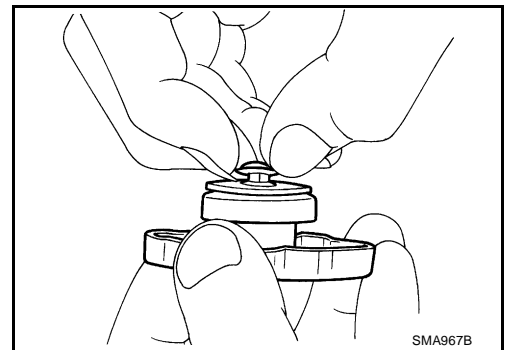
Checking Radiator Cap

NBS002AN

- 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.

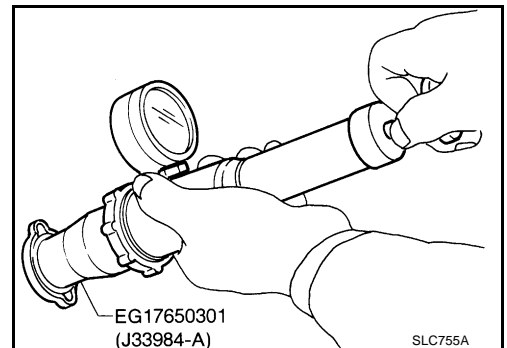
Standard:

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 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

NBS002AO

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

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

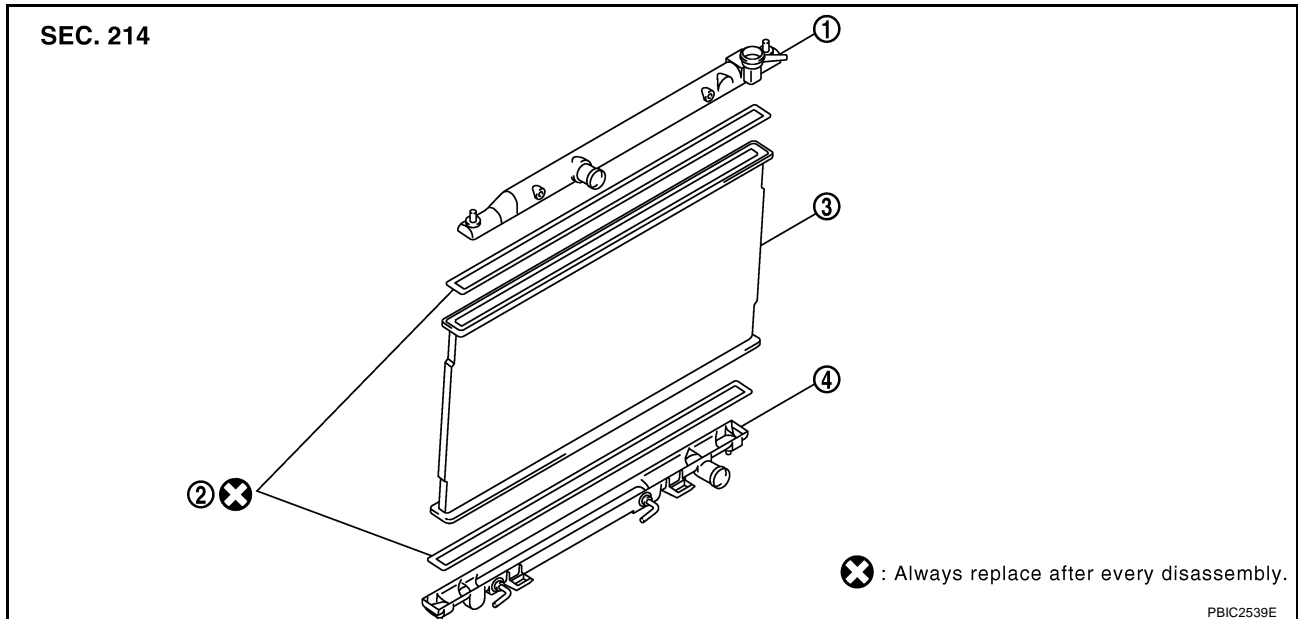
RADIATOR (ALUMINUM TYPE)

PFP:21460

RADIATOR (ALUMINUM TYPE)

Disassembly and Assembly

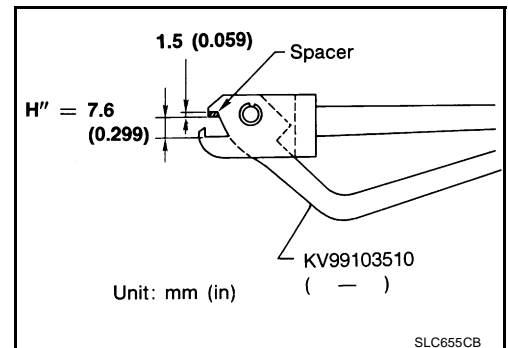
NBS002AP



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

PREPARATION

1. 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.



2. Make sure that when the 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

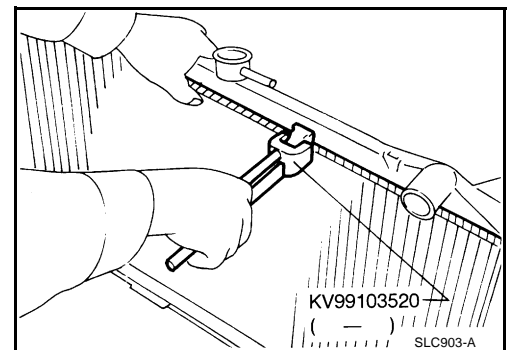
1. Remove upper and lower tanks with the radiator plate pliers B (SST).

CAUTION:

Do not disassemble lower tank and CVT fluid cooler.

NOTE:

Regard lower tank and CVT fluid cooler as an assembly.

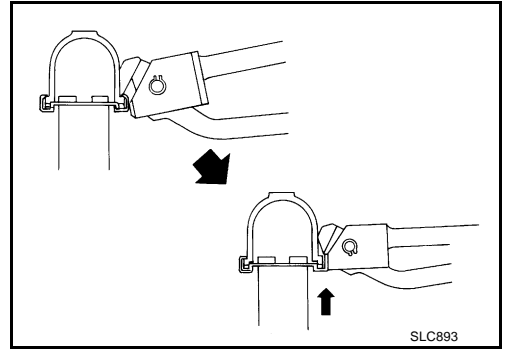


RADIATOR (ALUMINUM TYPE)

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

CAUTION:

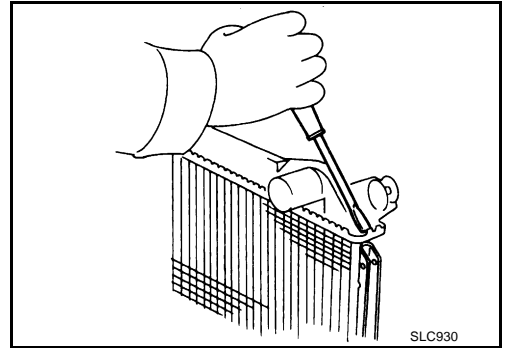
Do not bend excessively.



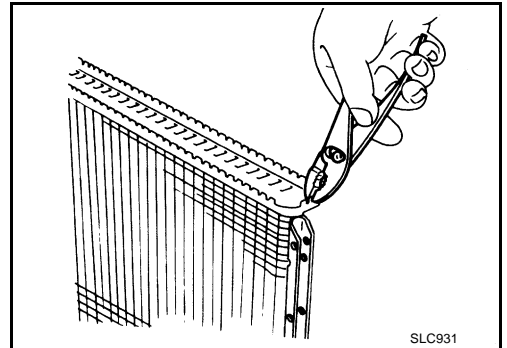
- In areas where the radiator plate pliers B [SST: KV99103520 (—)] cannot be used, use a screwdriver to bend the edge up.

CAUTION:

Be careful not to damage tank.

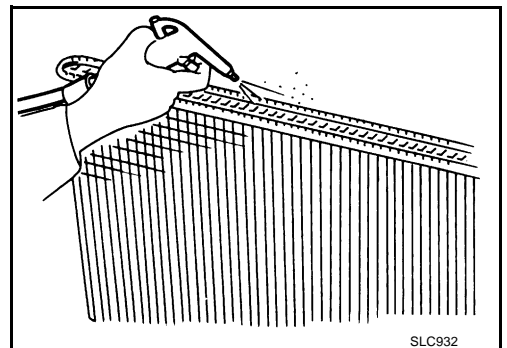


2. Remove sealing rubber.
3. Make sure the edge stands straight up.



ASSEMBLY

1. Clean contact portion of tank.



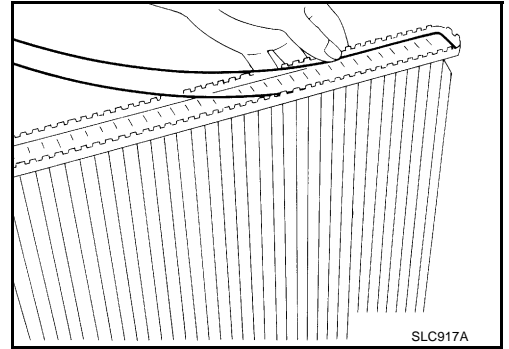
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RADIATOR (ALUMINUM TYPE)

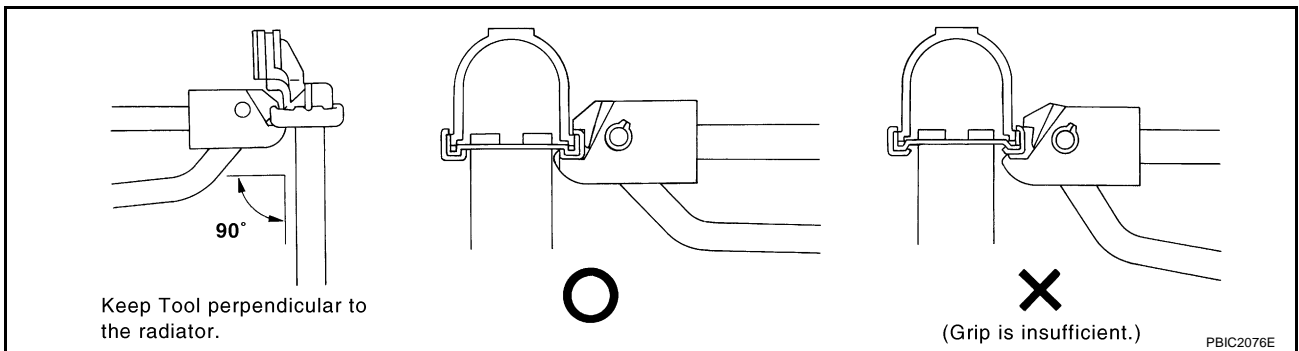
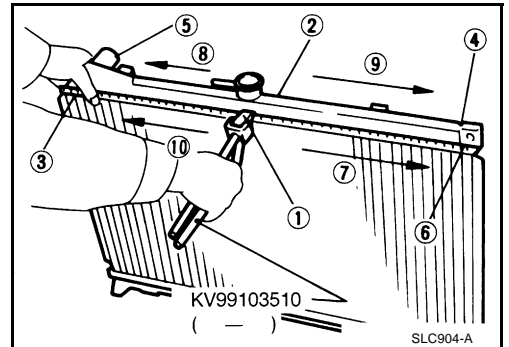
2. Install new sealing rubber while pushing it with fingers.

CAUTION:

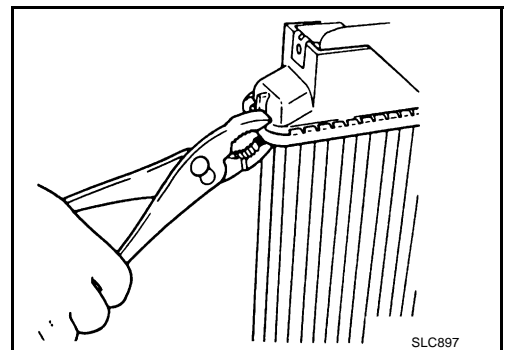
Be careful not to twist sealing rubber.



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



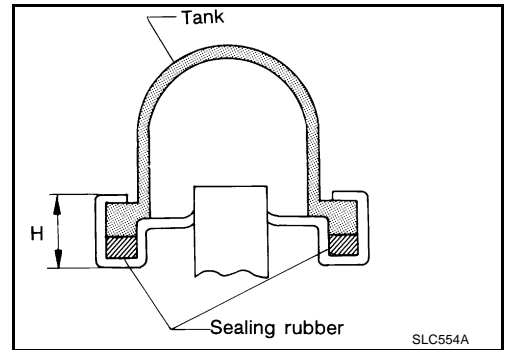
- Use pliers in the locations where the radiator plate pliers A [SST: KV99103510 (—)] cannot be used.



RADIATOR (ALUMINUM TYPE)

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-19, "INSPECTION"](#).

INSPECTION

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

Testing pressure

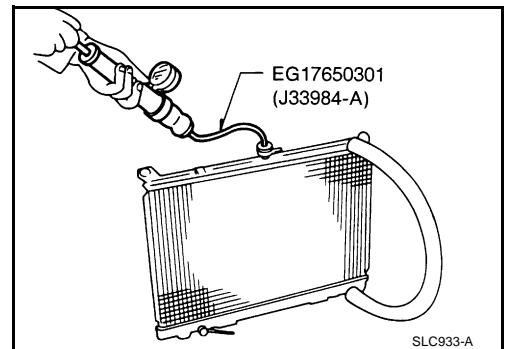
: 157 kPa (1.6 kg/cm² , 23 psi)

WARNING:

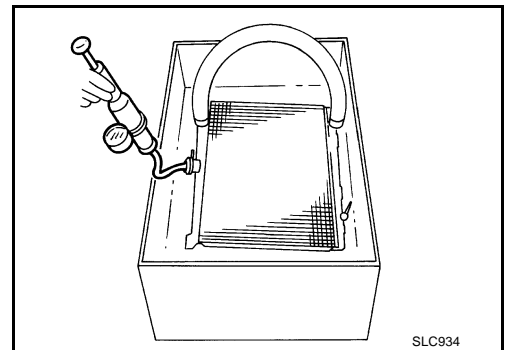
To prevent the risk of hose coming undone while under pressure, securely fasten it down with hose clamp.

CAUTION:

Attach hose to CVT 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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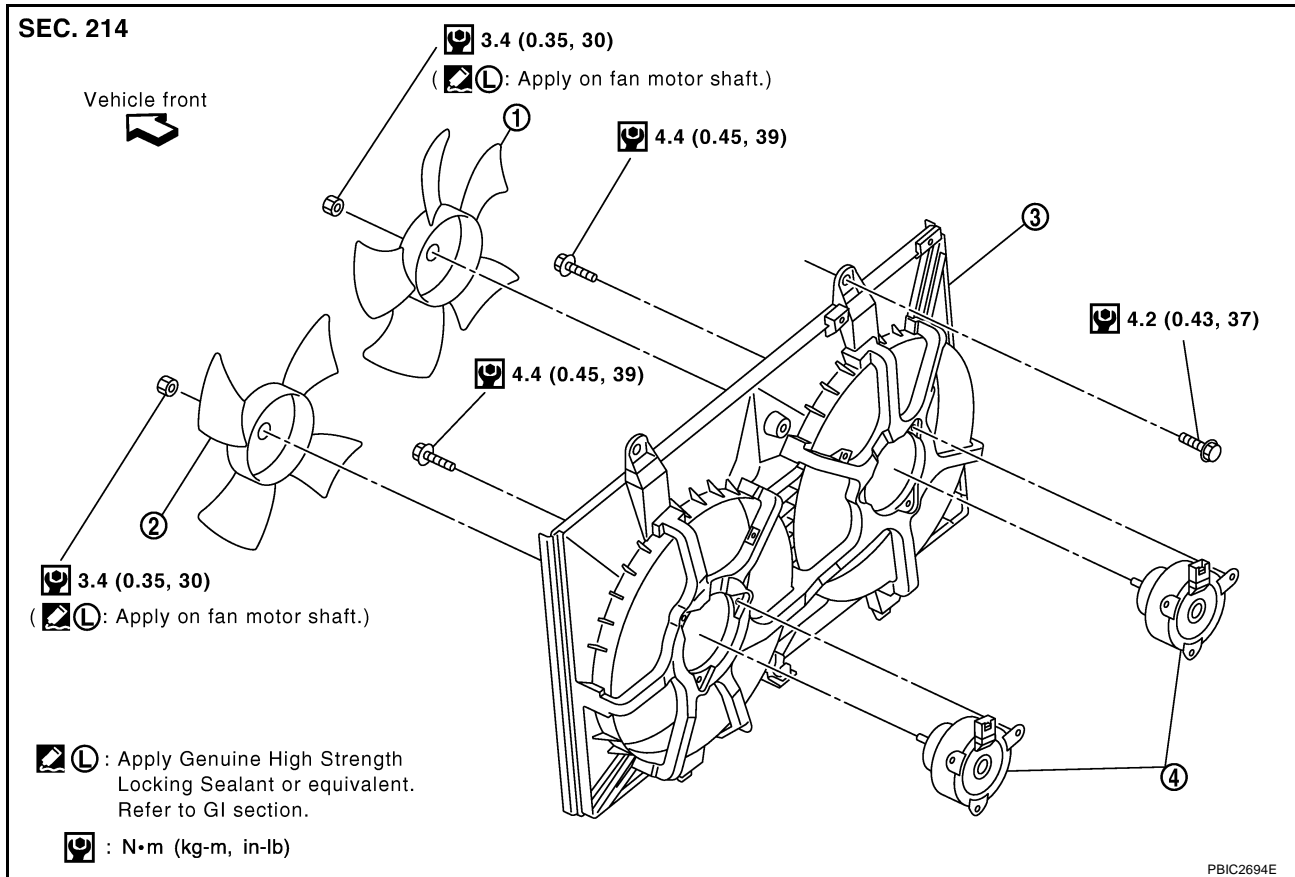
COOLING FAN

PFP:21140

NBS002A0

COOLING FAN

Removal and Installation



1. Cooling fan (RH)

2. Cooling fan (LH)

3. Fan shroud

4. Fan motor

REMOVAL

1. Drain engine coolant from radiator. Refer to [CO-9, "Changing Engine Coolant"](#) .

CAUTION:

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

2. Remove air duct (inlet) and radiator cover grills (right and left sides). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
3. Disconnect radiator hose (upper) at radiator side. Refer to [CO-13, "RADIATOR"](#) .
4. Disconnect harness connector from fan motors, and move harness to aside.
5. Remove battery and battery tray, and move fuse and fusible link block to aside. Refer to [SC-4, "BATTERY"](#) .
6. Remove mounting bolts to lift up and remove radiator cooling fan assembly.

CAUTION:

Be careful not to damage or scratch on radiator core.

INSTALLATION

Install in 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-502, "DTC P1217 ENGINE OVER TEMPERATURE"](#) .

COOLING FAN

NBS002AR

Disassembly and Assembly

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

Assemble in the reverse order of disassembly.

CAUTION:

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

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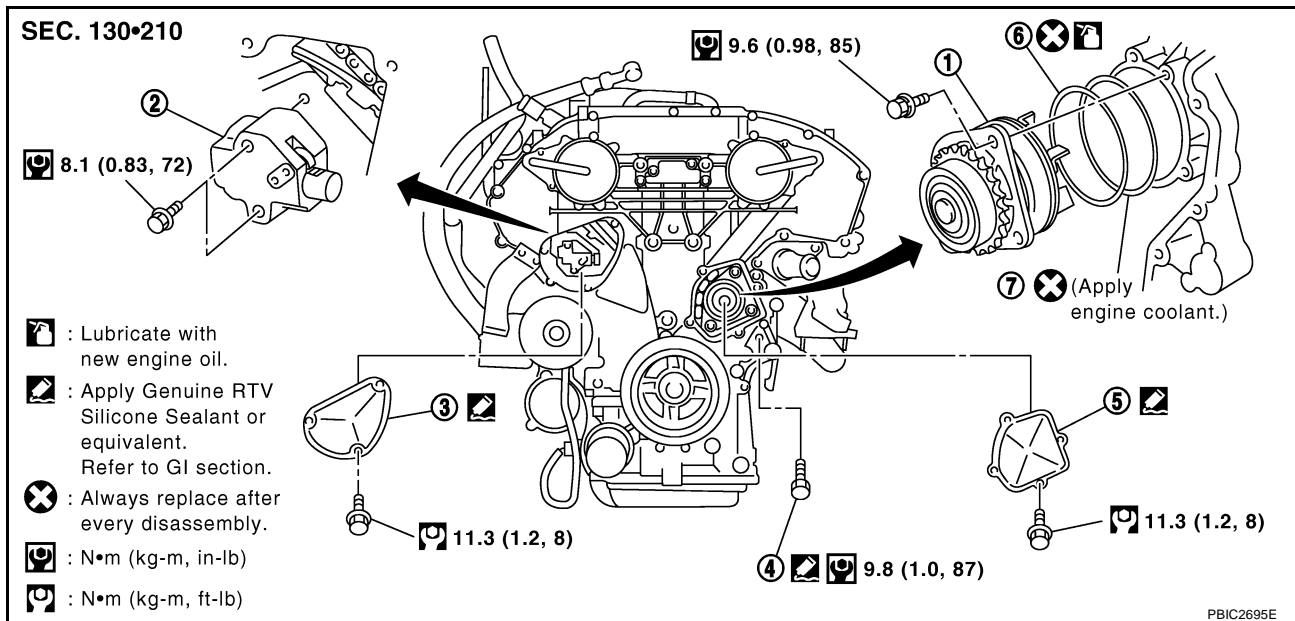
WATER PUMP

WATER PUMP

PFP:21020

Removal and Installation

NBS002AS



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

CAUTION:

- When removing water pump assembly, be careful not to get engine coolant on drive belt.
- Water pump cannot be disassembled and should be replaced as a unit.
- After installing water pump, connect hose and clamp securely, then check for leaks using the radiator cap tester (commercial service tool) and the radiator cap tester adapter [SST: EG17650301 (J33984-A)].

REMOVAL

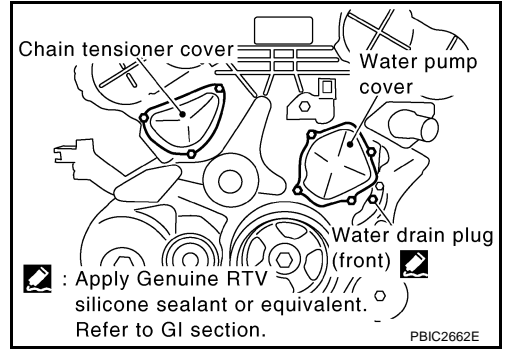
1. Remove engine cover. Refer to [EM-18, "INTAKE MANIFOLD COLLECTOR"](#) .
2. Remove air duct (inlet) and radiator cover grills (right and left sides). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
3. Remove undercover and splash guard (RH).
4. Drain engine coolant from radiator. Refer to [CO-9, "Changing Engine Coolant"](#) .

CAUTION:

- Perform this step when the engine is cold.
 - Do not spill engine coolant on drive belts.
5. Remove drive belts. Refer to [EM-13, "DRIVE BELTS"](#) .
 6. Remove reservoir tank of radiator. Refer to [CO-13, "RADIATOR"](#) .
 7. Remove reservoir tank of power steering oil pump with piping connected, and move it to aside. Refer to [PS-34, "HYDRAULIC LINE"](#) .
 8. Support oil pan (lower) bottom with transmission jack.
 9. Remove RH engine mounting insulator and RH engine mounting bracket. Refer to [EM-108, "ENGINE ASSEMBLY"](#) .

WATER PUMP

10. Remove water drain plug (front) on water pump side of cylinder block to drain engine coolant from engine inside.



11. 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.
12. Remove idler pulley and bracket. Refer to [EM-60, "TIMING CHAIN"](#).
13. Remove timing chain tensioner (primary) as follows:

- a. Remove lower mounting bolt.

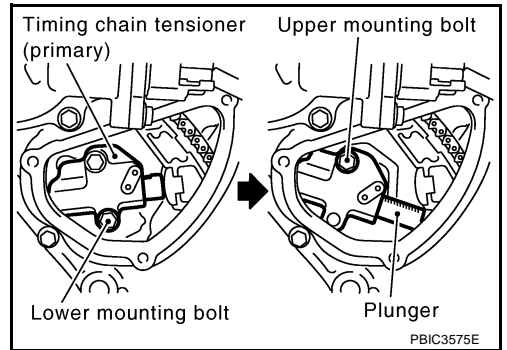
CAUTION:

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

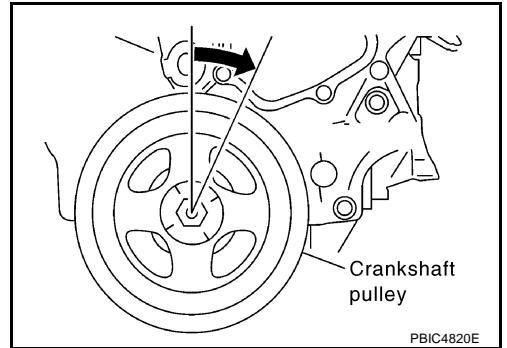
- b. Loosen upper mounting bolt slowly, and then turn chain tensioner (primary) on the mounting bolt so that plunger is fully expanded.

NOTE:

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



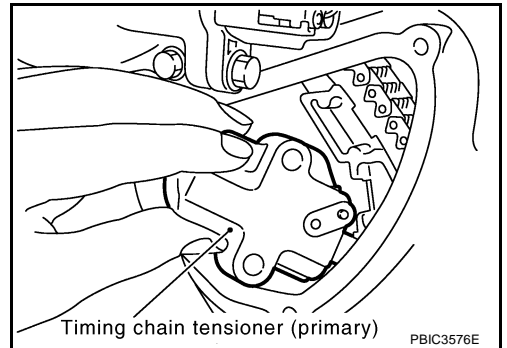
- c. Turn crankshaft pulley clockwise so that timing chain on the timing chain tensioner (primary) side is loose.



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

CAUTION:

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

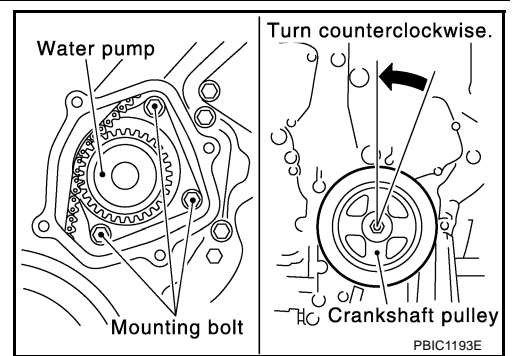


14. Remove water pump as follows:

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WATER PUMP

- 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.



- b. 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.

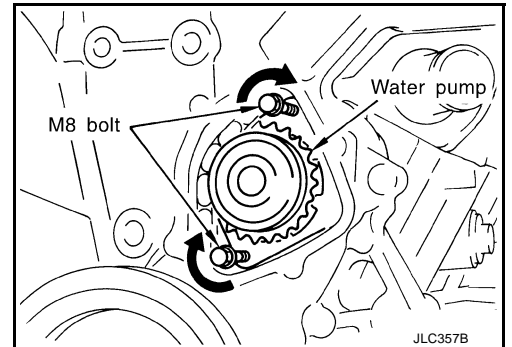
CAUTION:

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

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

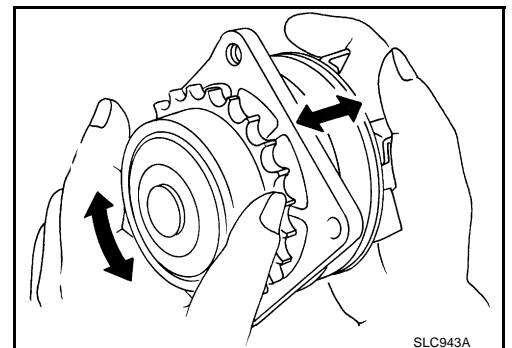
CAUTION:

Do not disassemble water pump.



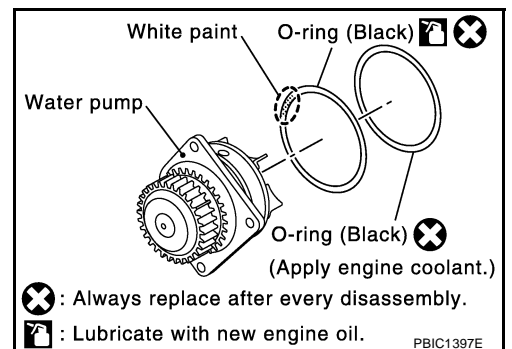
INSPECTION AFTER REMOVAL

- 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.



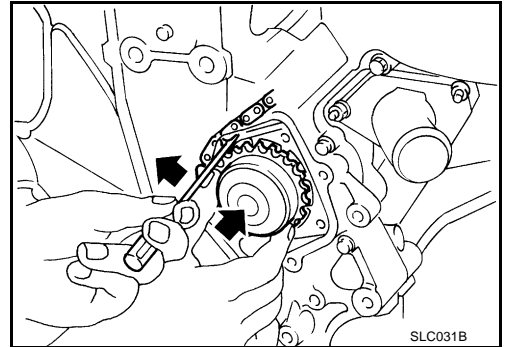
WATER PUMP

2. Install water pump.

CAUTION:

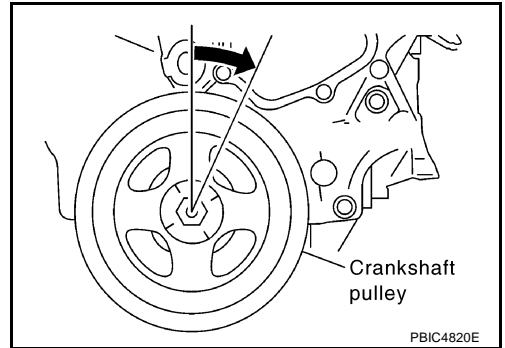
Do not allow cylinder block to nip O-rings when installing water pump.

- Check that 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:

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

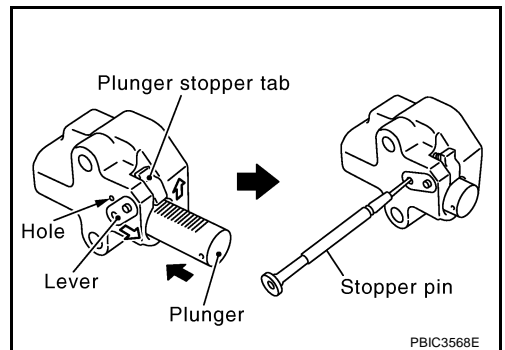


- b. Pull plunger stopper tab up (or turn lever downward) so as to remove plunger stopper tab from the ratchet of plunger.

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.

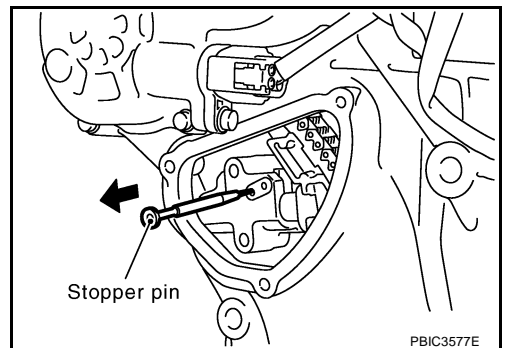
NOTE:

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.



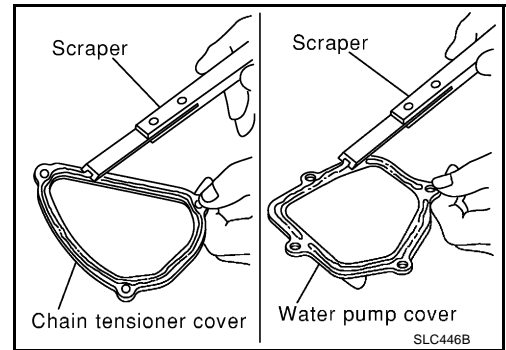
- h. Make sure again that timing chain and water pump sprocket are engaged.

4. Install chain tensioner cover and water pump cover as follows:

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WATER PUMP

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



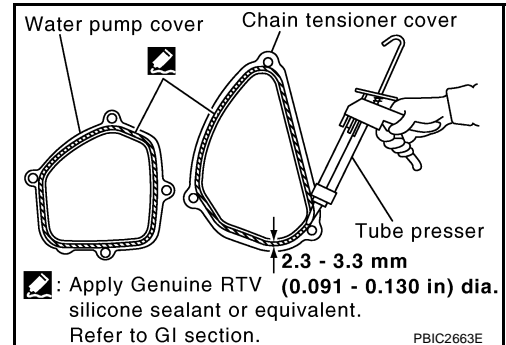
- b. Apply a continuous bead of liquid gasket with the tube presser [SST: WS39930000 (—)] to mating surface of chain tensioner cover and water pump cover.

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

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-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

6. Install in the reverse order of removal after this step.

- **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 [SST: EG17650301 (J33984-A)] and the radiator cap tester (commercial service tool). Refer to [CO-9, "LEAK CHECK"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

WATER INLET AND THERMOSTAT ASSEMBLY

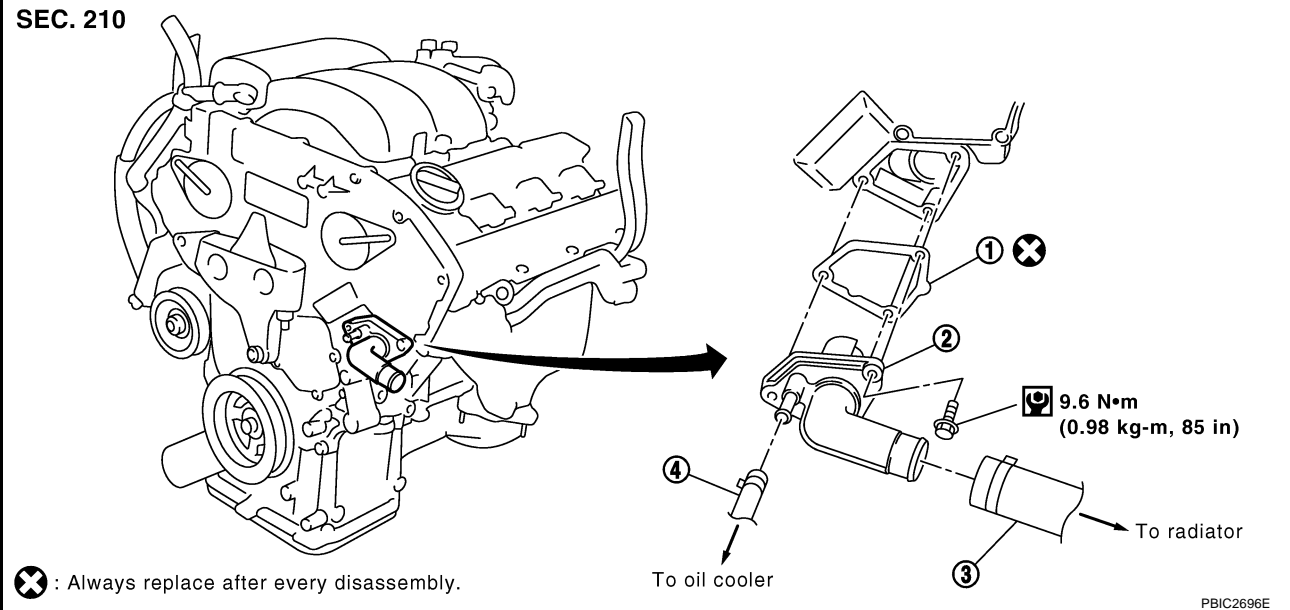
WATER INLET AND THERMOSTAT ASSEMBLY

PFP:21200

Removal and Installation

NBS002AT

SEC. 210



1. Gasket
2. Water inlet and thermostat assembly
3. Radiator hose (lower)
4. Water hose

REMOVAL

1. 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-9, "Changing Engine Coolant"](#) and [CO-22, "WATER PUMP"](#).

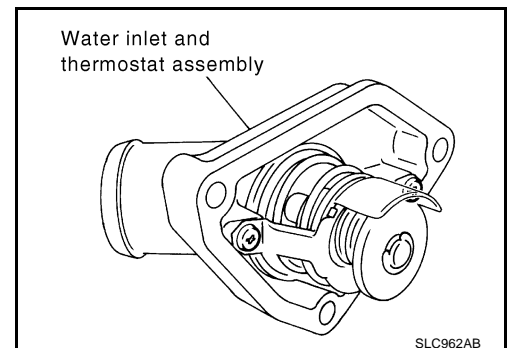
CAUTION:

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

2. Remove reservoir tank of radiator, and move it aside.
3. Disconnect radiator hose (lower) and oil cooler water hose from water inlet and thermostat assembly.
4. Remove water inlet and thermostat assembly.

CAUTION:

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



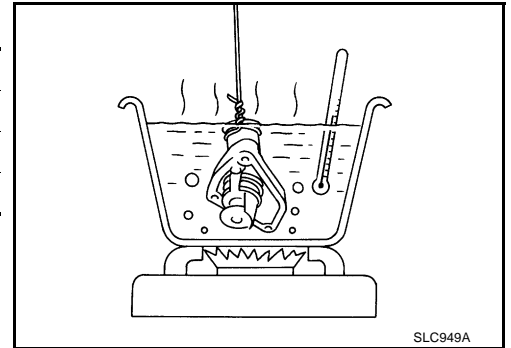
WATER INLET AND THERMOSTAT ASSEMBLY

INSPECTION AFTER REMOVAL

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

Thermostat	Standard
Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.6 mm/95°C (0.339 in/203°F)
Valve closing temperature	77°C (171°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 [SST: EG17650301 (J33984-A)] and the radiator cap tester (commercial service tool). Refer to [CO-9, "LEAK CHECK"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

WATER OUTLET AND WATER PIPING

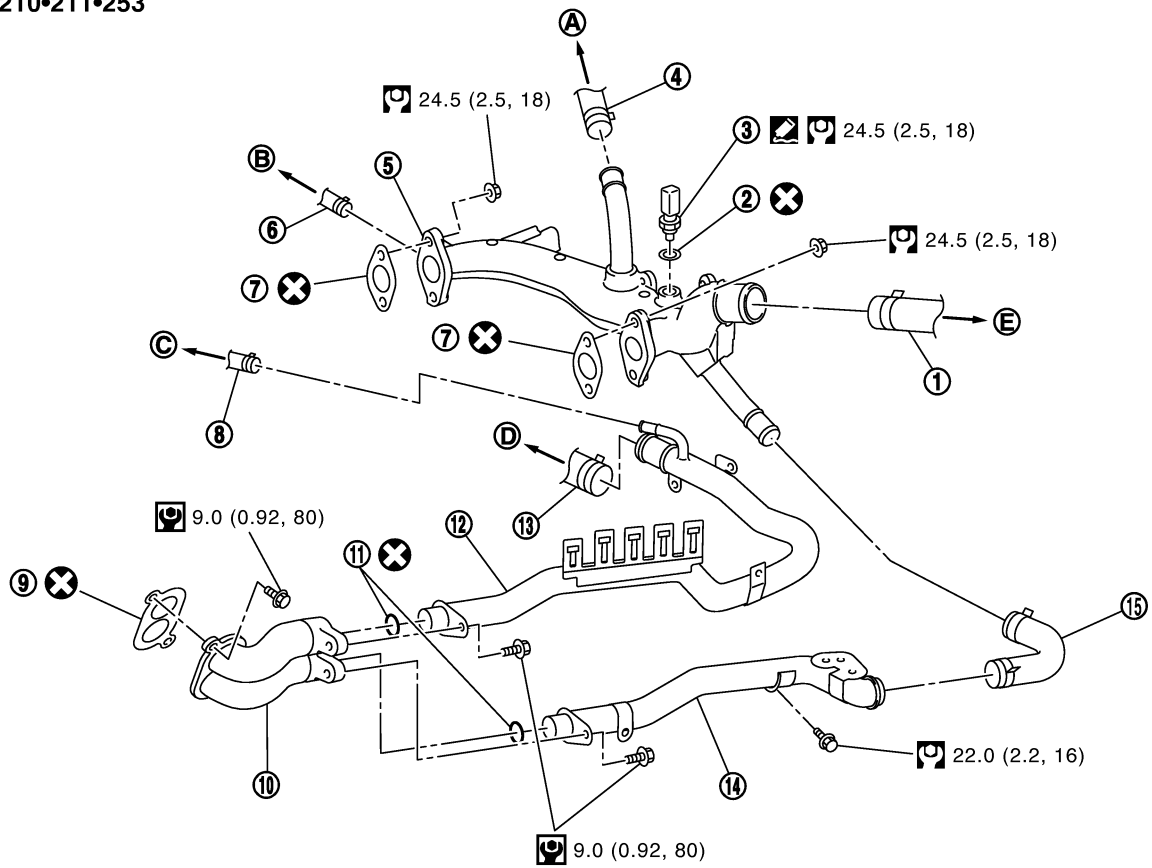
WATER OUTLET AND WATER PIPING

PF11060

Removal and Installation

NBS002AU

SEC. 210•211•253



: N•m (kg-m, in-lb)
 : N•m (kg-m, ft-lb)

PBIC4583J

- | | | |
|--------------------------|---|---|
| 1. Radiator hose (upper) | 2. Washer | 3. Engine coolant temperature sensor |
| 4. Heater hose | 5. Water outlet | 6. Water hose |
| 7. Gasket | 8. Water hose | 9. Gasket |
| 10. Water connector | 11. O-ring | 12. Heater pipe |
| 13. Heater hose | 14. Water bypass pipe | 15. Water hose |
| A. To heater core | B. To intake manifold collector (upper) | C. To intake manifold collector (upper) |
| D. To heater core | E. To radiator | |

- Refer to [GI-10, "Components"](#) for symbol marks in the figure.

REMOVAL

1. Remove engine cover. Refer to [EM-18, "INTAKE MANIFOLD COLLECTOR"](#).
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-9, "Changing Engine Coolant"](#) and [CO-22, "WATER PUMP"](#).

CAUTION:

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

3. Remove air duct (inlet), radiator cover grills (right and left sides), air cleaner case (upper) with mass air flow sensor and air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#).
4. Remove battery and battery tray. Refer to [SC-8, "Removal and Installation"](#).
5. Remove CVT fluid cooler control valve assembly. Refer to [CVT-229, "TRANSAXLE ASSEMBLY"](#).
6. Move CVT control cable aside. Refer to [CVT-208, "SHIFT CONTROL SYSTEM"](#).

WATER OUTLET AND WATER PIPING

7. Remove radiator hose (upper).
8. Remove water hoses and heater hoses.
9. Disconnect harness connectors, and move harness to aside.
10. Remove engine coolant temperature sensor as necessary.

CAUTION:

Be careful not to damage engine coolant temperature sensor.

11. Remove water outlet, heater pipe, water bypass pipe and water connector.

INSTALLATION

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 bypass pipe and heater pipe into water connector, apply neutral detergent to O-ring.

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter [SST: EG17650301 (J33984-A)] and the radiator cap tester (commercial service tool). Refer to [CO-9, "LEAK CHECK"](#).
- Start and warm up the engine. Visually make sure that there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00100

Standard and Limit ENGINE COOLANT CAPACITY (APPROXIMATE)

NBS002AV

Unit: ℓ (US qt, Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	9.6 (10-1/8, 8-1/2)
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

Thermostat	Standard
Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.6 mm/95°C (0.339 in/203°F)
Valve closing temperature	77°C (171°F)

A

CO

C

D

E

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G

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J

K

L

M

SERVICE DATA AND SPECIFICATIONS (SDS)
