SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

QR

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PRECAUTIONS

PFP:00001

Precautions For Liquid Gasket

EBS00MRX

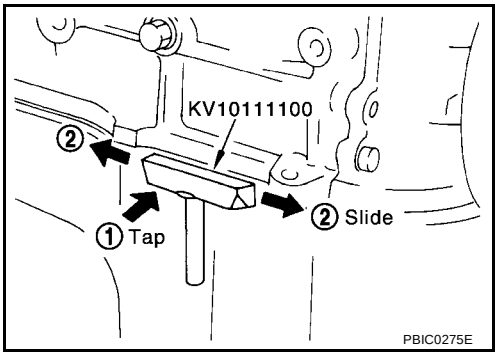
REMOVAL OF LIQUID GASKET

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

  CAUTION:
  Be careful not to damage the mating surfaces.

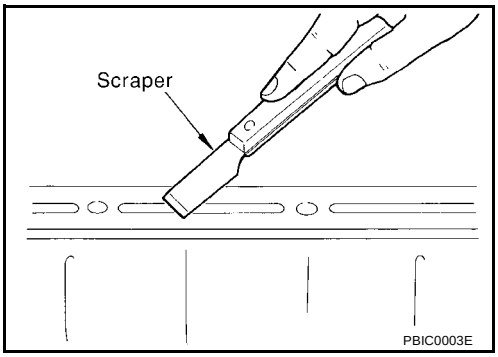
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the areas where the liquid gasket is applied.

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

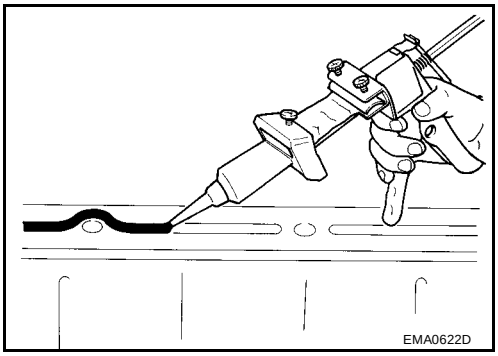


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove the 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.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

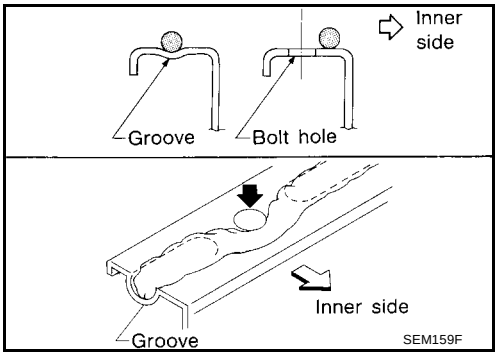


4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.



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

     CAUTION:
     If there are instructions in this manual, observe them.

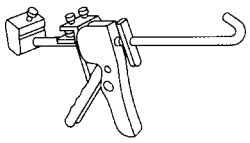
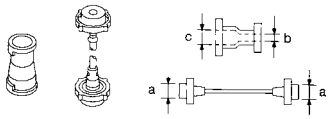


PREPARATION

PFP:00002

Special Service Tools

EBS00KOC

Tool number Tool name	Description
WS39930000 Tube presser  S-NT052	Pressing the tube of liquid gasket
EG17650301 Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV99103510 Radiator plate pliers A  S-NT224	Installing radiator upper and lower tanks
KV99103520 Radiator plate pliers B  S-NT225	Removing radiator upper and lower tanks

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

EBS00KOD

	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 viscosity	—
	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

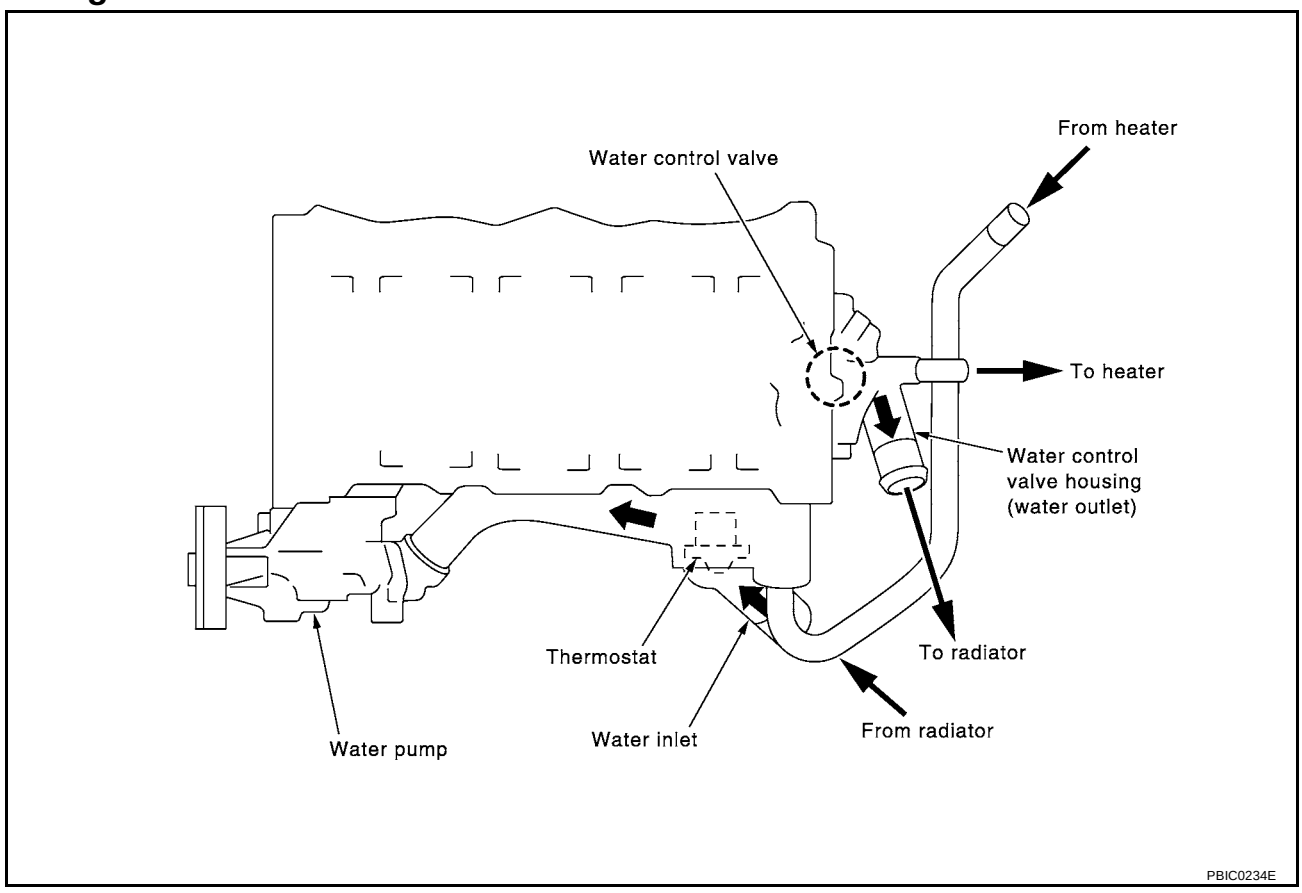
	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Powertrain system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes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

PFP:21020

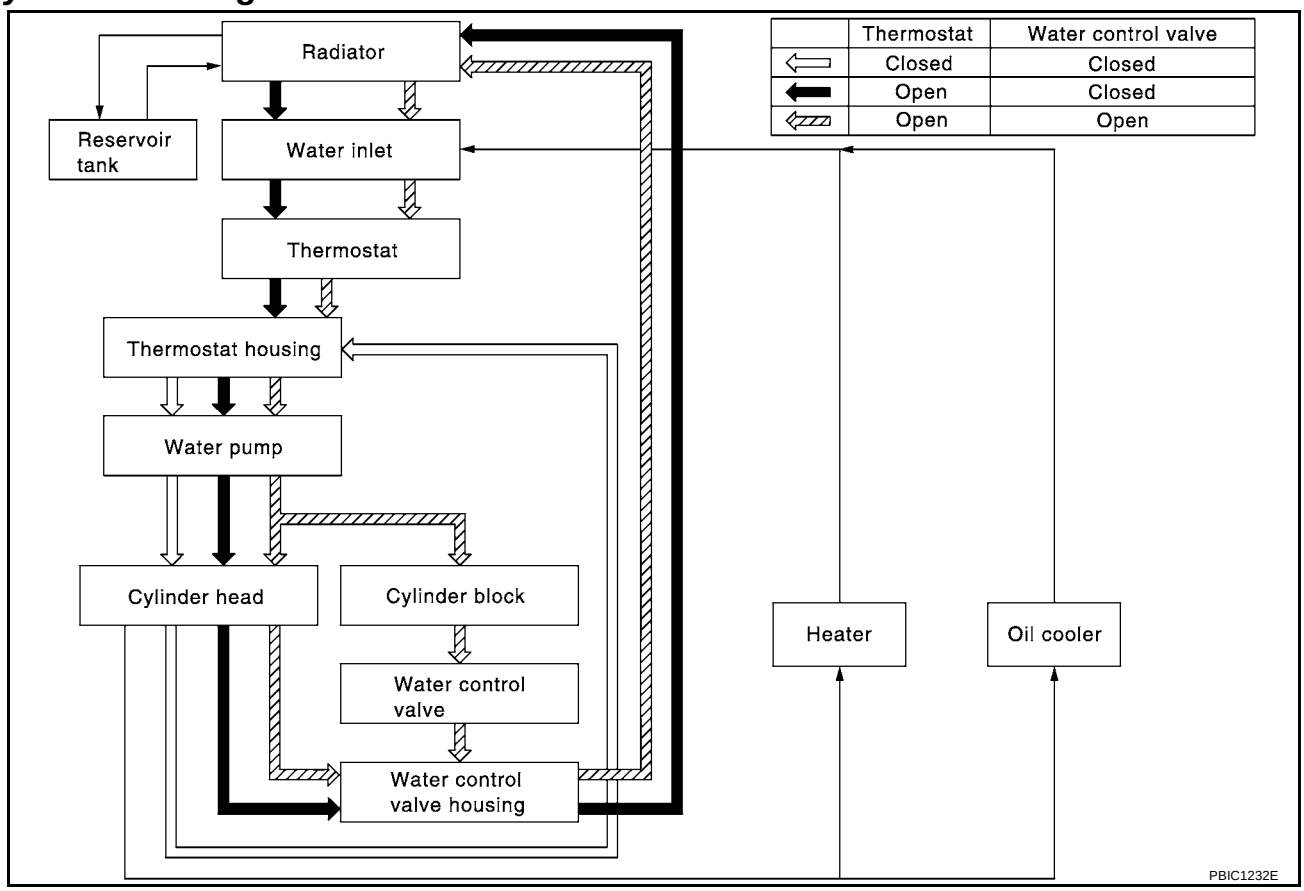
Cooling Circuit

EBS00KOE



System Drawing

EBS00KOF



ENGINE COOLANT

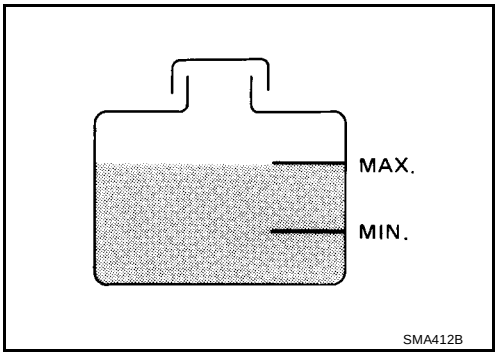
PFP:KQ100

Inspection

EBS00KOG

LEVEL CHECK

- Check if the reservoir tank engine coolant level within MIN to MAX when engine is cool.
- Adjust engine coolant if too much or too little.



CHECKING RADIATOR SYSTEM FOR LEAKS

To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:

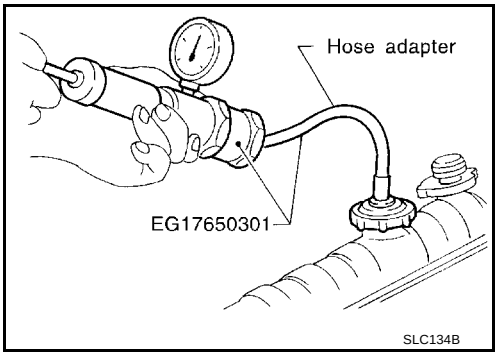
157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)

WARNING:

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

CAUTION:

Higher pressure than specified may cause radiator damage.



Changing Engine Coolant

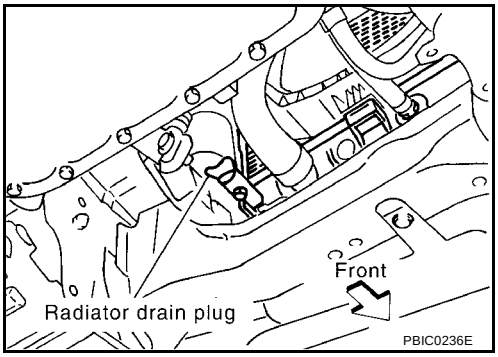
EBS00KOH

WARNING:

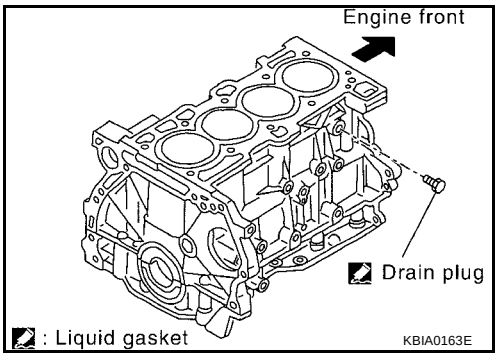
- **To avoid being scalded, never change the engine coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

DRAINING ENGINE COOLANT

1. Open radiator drain plug at the bottom of radiator, and remove radiator cap.
   - Be careful not to allow engine coolant to contact drive belts.



2. Open drain plug on cylinder block.
3. Remove reservoir tank and drain engine coolant.
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-10, "FLUSHING COOLING SYSTEM" .



REFILLING ENGINE COOLANT

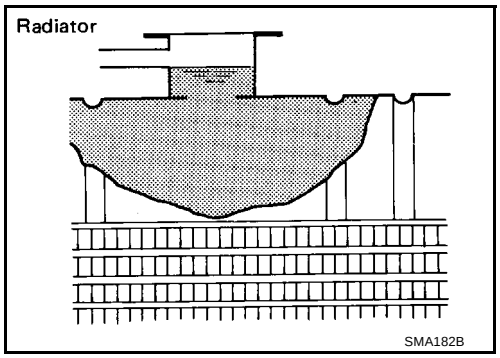
1. Install reservoir tank, radiator drain plug and cylinder block drain plug.
   - **Apply sealant to the thread of cylinder block drain plug. Use Genuine Liquid Gasket or equivalent.**

   Cylinder block drain plug:

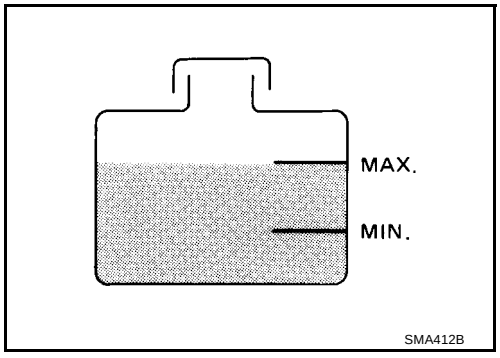
   : 7.8 - 11.8 N·m (0.8 -1.2 kg-m , 69 - 104 in-lb)
2. Fill radiator and reservoir tank to specified level.
   - **Use genuine Nissan engine coolant or equivalent in its quality. Refer to MA-16, "RECOMMENDED FLUIDS AND LUBRICANTS" .**

   Engine coolant capacity (With reservoir tank):

   Approx. 7.1 ℓ (6-1/4 Imp qt)



   Reservoir tank: 0.6 ℓ (1/2 Imp qt)



   - **Pour engine coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**
3. Warm up engine to normal operating temperature without radiator cap installed.
   - **If engine coolant overflows radiator filler hole, install radiator cap.**
4. Run engine at 3,000 rpm for 10 seconds and return to idle speed with radiator cap installed.
   - Repeat two or three times.

   Watch engine coolant temperature gauge so as not to overheat the engine.
5. 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.
6. Refill reservoir tank to MAX level line with engine coolant.
7. Repeat steps 4 through 6 two or more times with radiator cap installed until engine coolant level no longer drops.
8. Check cooling system for leaks with engine running.
9. 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.
10. If sound is heard, bleed air from cooling system by repeating steps 4 through 6 until engine coolant level no longer drops.
    - **Clean excess engine coolant from engine.**

FLUSHING COOLING SYSTEM

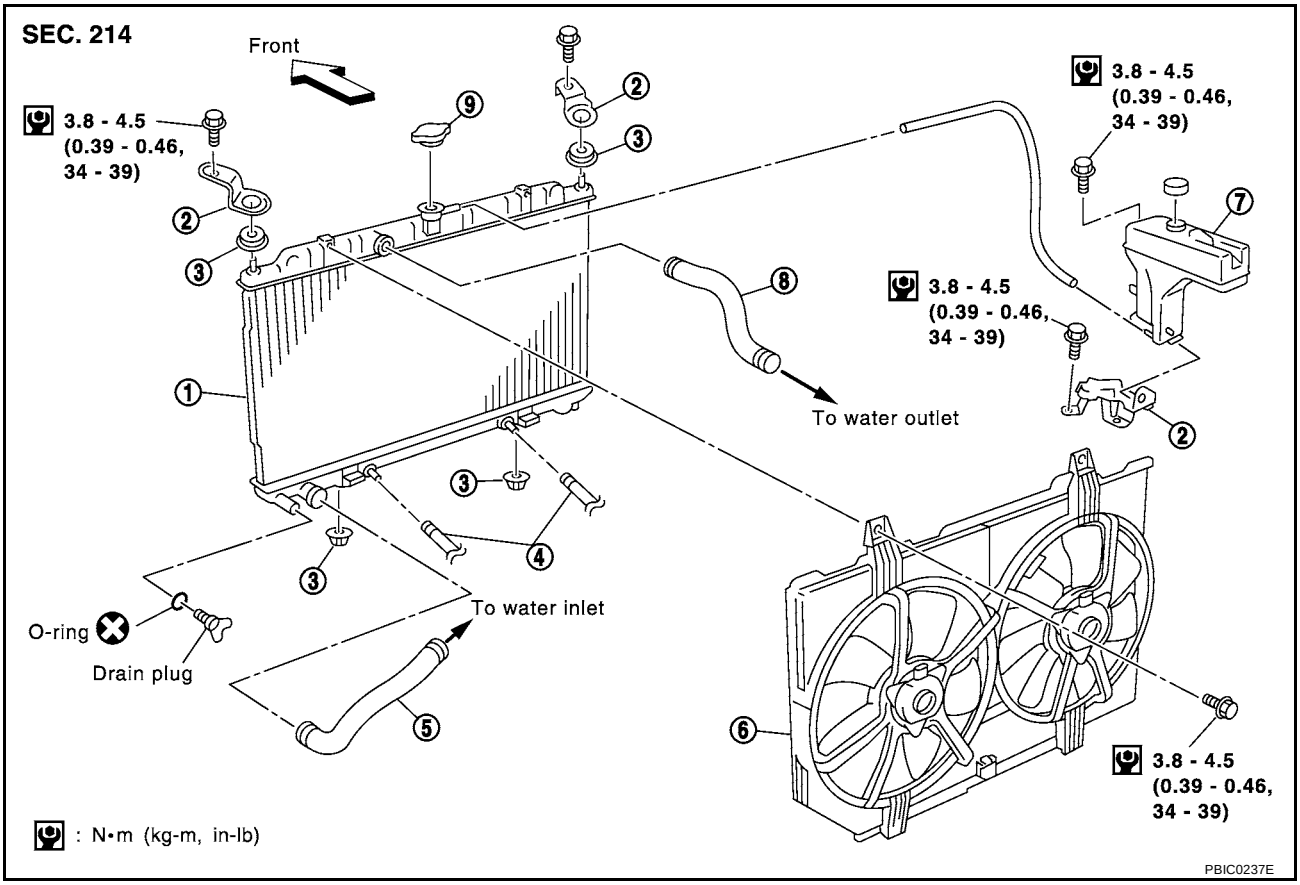
1. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to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

RADIATOR

PFP:21400

Removal and Installation

EBS00KOI



1. Radiator
2. Bracket
3. Mounting rubber
4. A/T oil cooler hose
5. Radiator hose (lower)
6. Radiator fan assembly
7. Reservoir tank
8. Radiator hose (upper)
9. Radiator cap

WARNING:

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

REMOVAL

1. Drain engine coolant. Refer to CO-9, "DRAINING ENGINE COOLANT" .
2. Remove air duct with air cleaner assembly.
3. Remove A/T oil cooler hose.
   - Install blind plug to avoid leakage of A/T fluid.
4. Disconnect radiator upper hose, lower hose and mounting bracket.
5. Remove radiator and radiator fan assembly

   CAUTION:

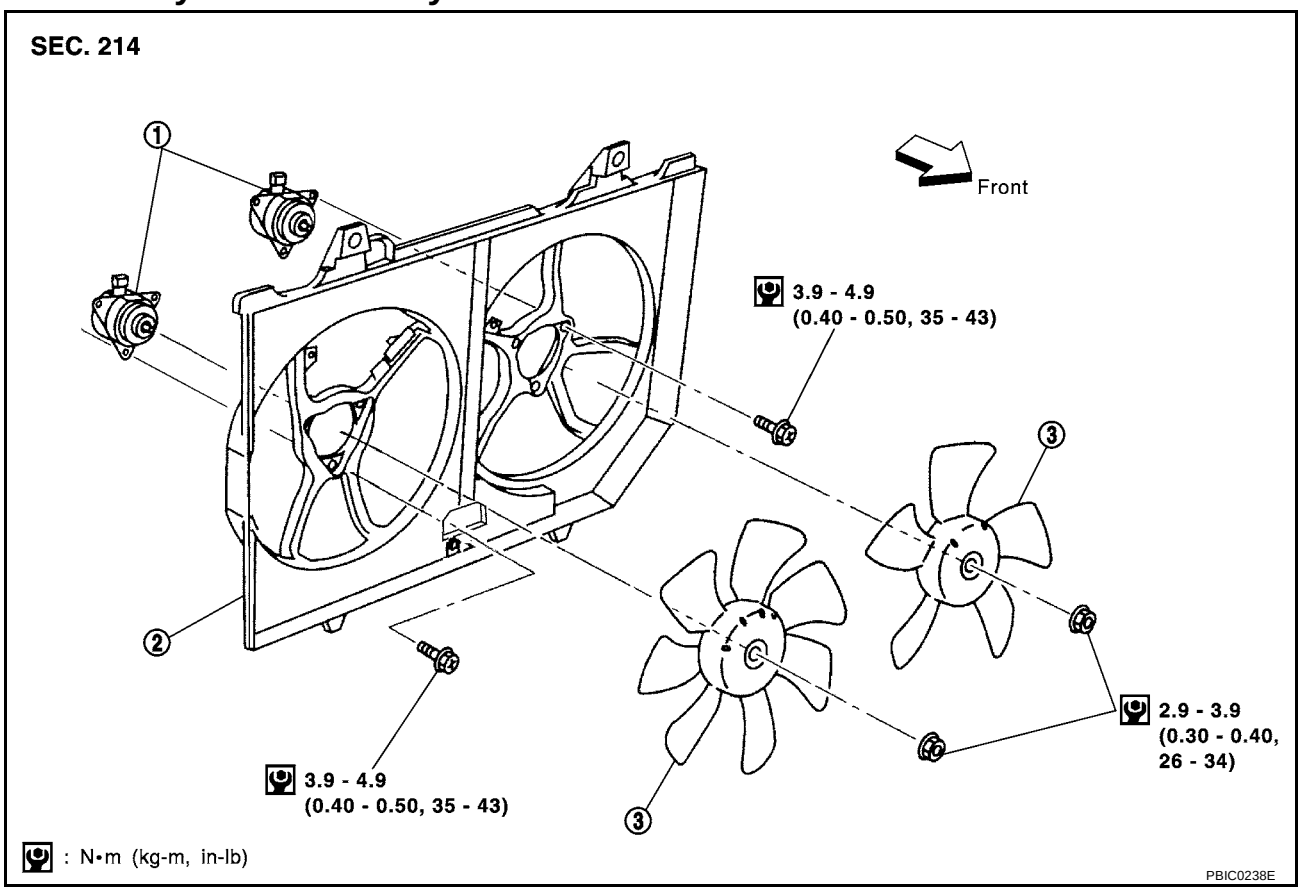
   Do not damage or scratch radiator core when removing.

INSTALLATION

- Reinstall any parts removed in reverse order of removal.
- Check for engine coolant leaks. Refer to CO-9, "CHECKING RADIATOR SYSTEM FOR LEAKS" .

Disassembly and Assembly Radiator Fan

EBS00KOJ



1. Radiator fan motors
2. Radiator fan shroud
3. Radiator fan

DISASSEMBLY

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

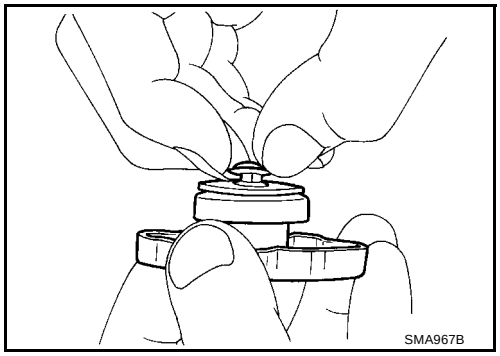
ASSEMBLY

Install in the reverse order of removal.

Checking Radiator Cap

EBS00KOK

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



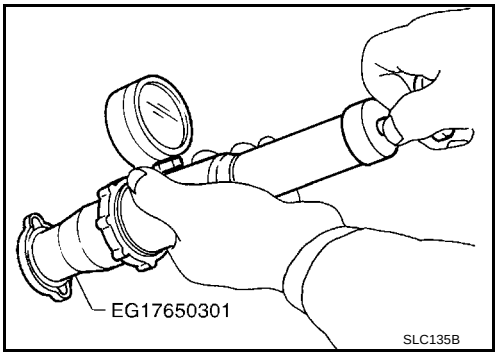
- Check radiator cap relief pressure.

  Standard:

  78 - 98 kPa (0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2 , 11 - 14 psi)

  Limit:

  59 kPa (0.59 bar, 0.6 kg/cm^2 , 9 psi)



- When connecting the radiator cap to the tester, apply engine coolant to the cap seal part.
- Replace the radiator cap if there is an unusualness in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.

Checking Radiator

EBS00KOL

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

- 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 connectors to prevent water from entering.

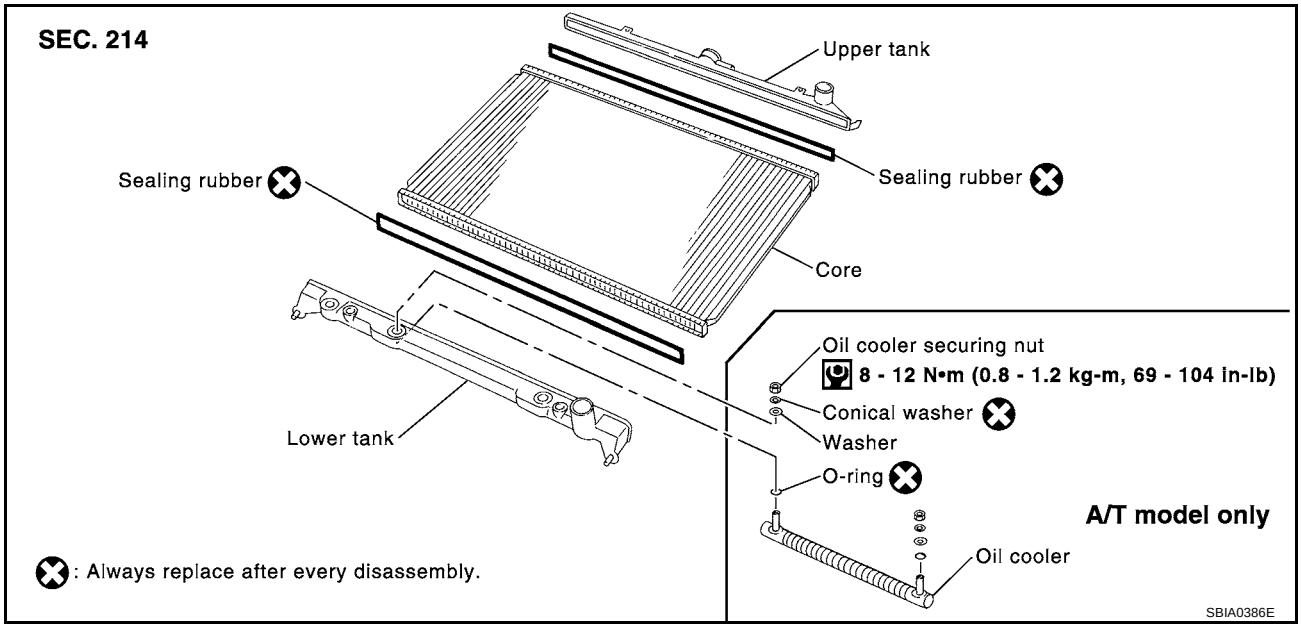
1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2 , 71psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surface once per minute until no water sprays out.

RADIATOR (ALUMINUM TYPE)

PFP:21460

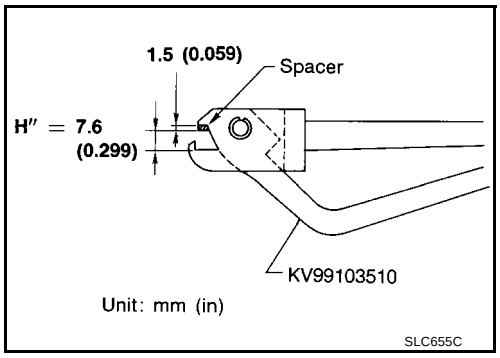
Disassembly and Assembly

EBS00KOM



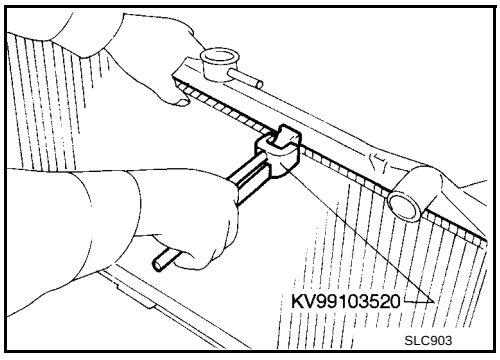
PREPARATION

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



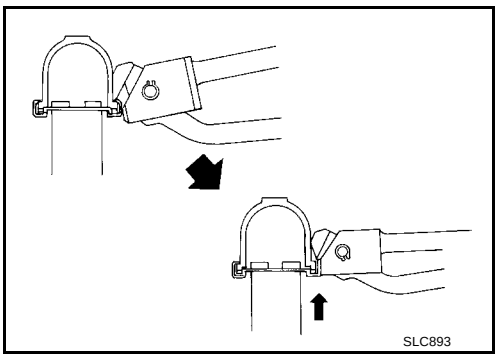
DISASSEMBLY

1. Remove upper or lower tanks with Tool.



- Grip the crimped edge and bend it upwards so that Tool slips off.

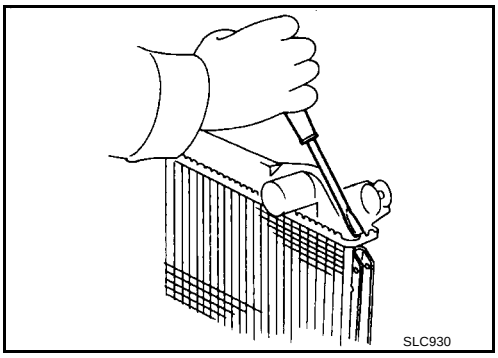
Do not bend excessively.



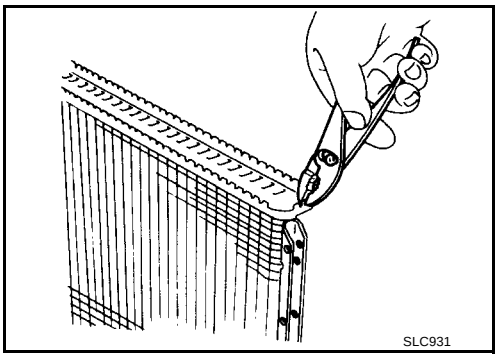
- In areas where Tool cannot be used, use a screwdriver to bend the edge up.

Be careful not to damage tank.

2. Remove sealing rubber.



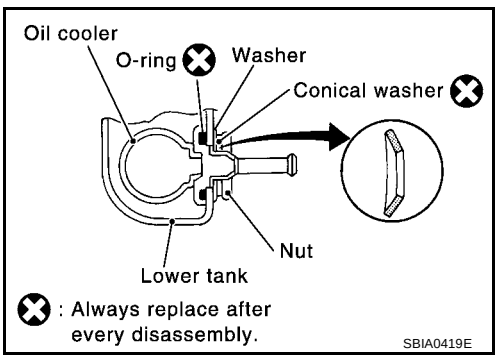
3. Make sure the edge stands straight up.
4. Remove oil cooler from tank. (A/T model only)



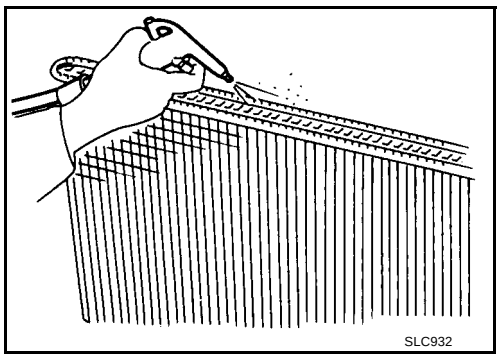
ASSEMBLY

1. Install oil cooler. (A/T model only)

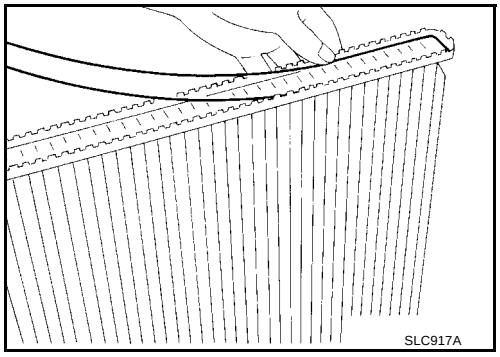
Pay attention to direction of conical washer.



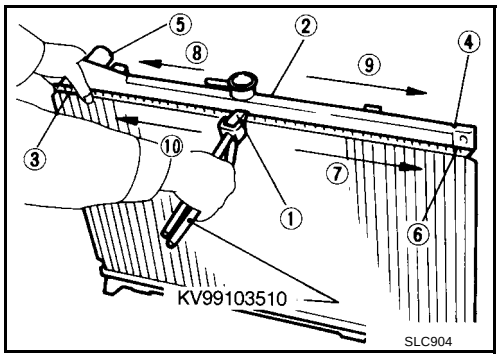
2. Clean contact portion of tank.

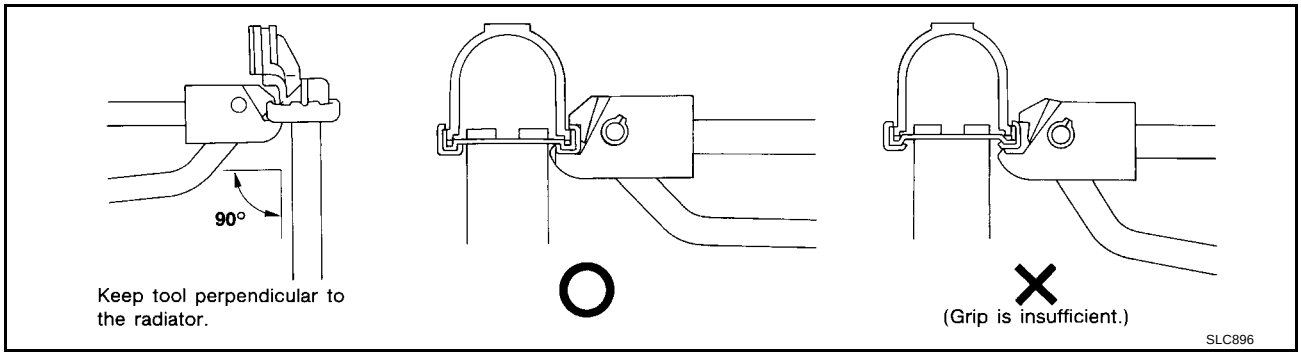


3. Install sealing rubber.
Push it in with fingers.
Be careful not to twist sealing rubber.

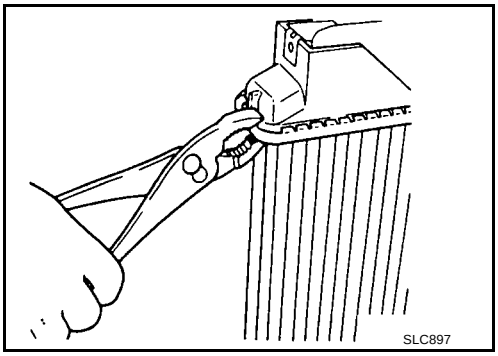


4. Caulk tank in specified sequence with Tool.





- Use pliers in the locations where Tool cannot be used.

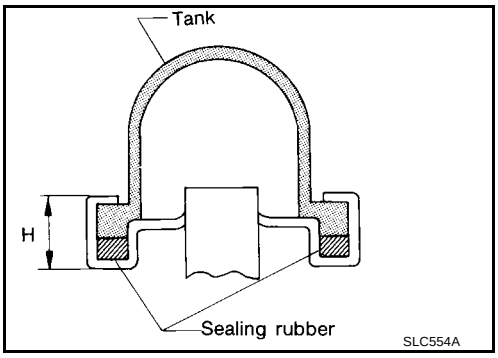


5. Make sure that the rim is completely crimped down.

Standard height “H”:

8.0 - 8.4 mm (0.315 - 0.331 in)

6. Confirm that there is no leakage.
Refer to CO-17, "INSPECTION" .



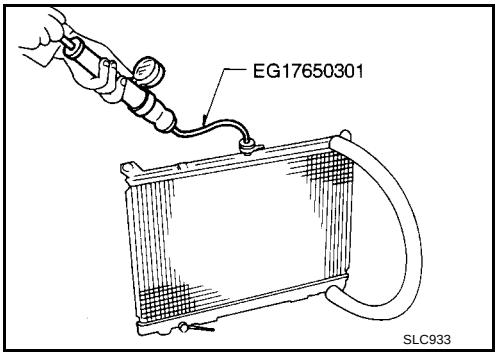
INSPECTION

1. Apply pressure with Tool.

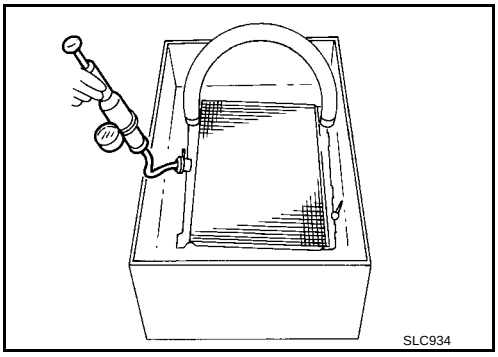
Specified pressure value:

157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)

WARNING:
To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.
Attach a hose to the oil cooler to seal its inlet and outlet. (A/T model only)



2. Check for leakage by soaking radiator in water container.

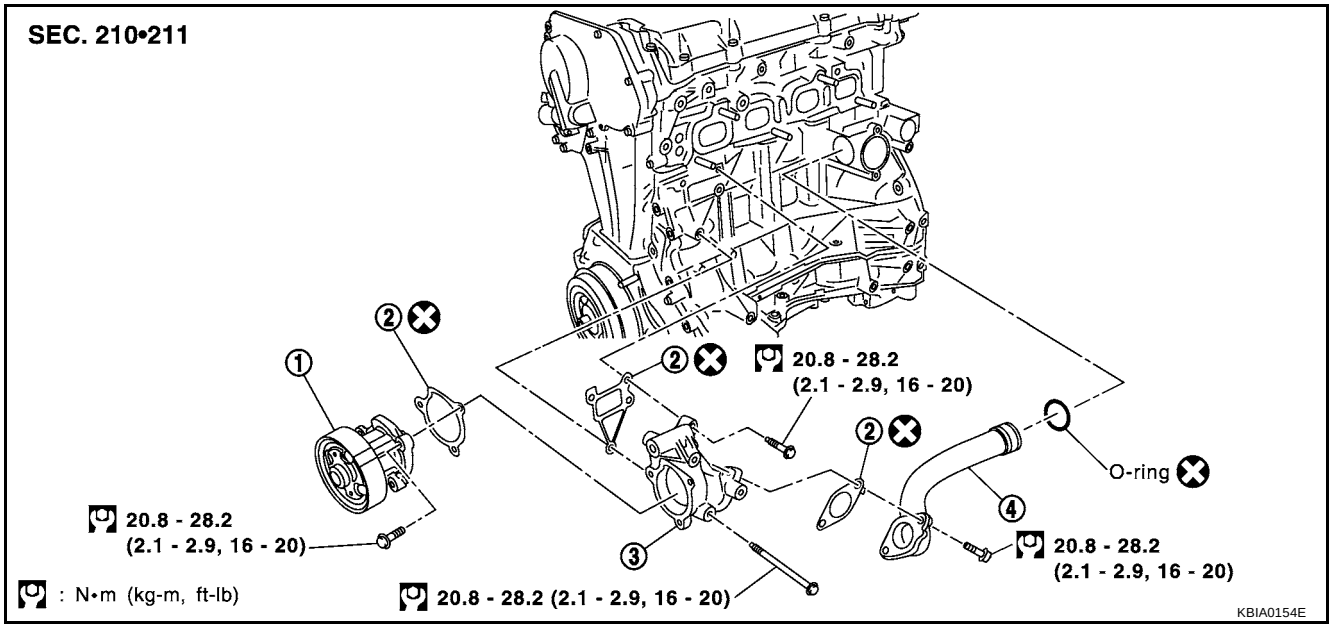


WATER PUMP

PFP:21020

Removal and Installation

EBS00KON



1. Water pump
2. Gasket
3. Water pump housing
4. Water pipe

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

REMOVAL

Water Pump Removal

1. Drain engine coolant. Refer to CO-9, "DRAINING ENGINE COOLANT" .
   CAUTION:
   Perform when the engine is cold.
2. Remove the following parts.
   - Engine undercover
   - Alternator, water pump and air compressor belt. Refer to EM-12, "DRIVE BELTS" .
3. Remove water pump.
   - Engine coolant will leak from the cylinder block, so have a receptacle ready below.

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

Water Pump Housing Removal

1. Perform step 1 and 2 of “Water Pump Removal”.
2. Remove alternator.
3. Remove oil level gauge.
   CAUTION:
   Plug the oil level gauge guide opening to prevent oil pan from entering foreign materials.
4. Remove bolts mounting water pipe.
5. Remove water pump housing.

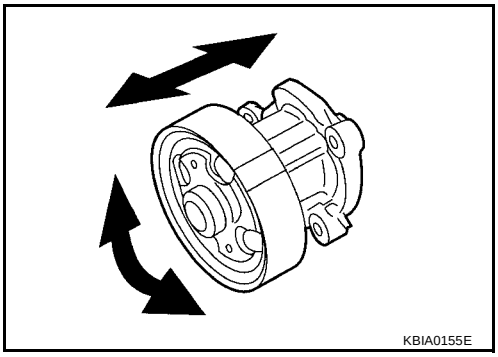
Water Pipe Removal

1. Remove water pump housing.
2. Remove exhaust manifold and three way catalyst assembly. Refer to EM-24, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

3. Remove water pipe.

INSPECTION AFTER REMOVAL

- Visually check that there is no significant dirt or rusting on the water pump body and vane.
- Check that there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If there are any unusualness, replace the water pump assembly.


KBIA0155E

INSTALLATION

- Install in the reverse order of removal
- When inserting water pipe end to cylinder block, apply a neutral detergent to o-ring. Then insert it immediately.

INSPECTION AFTER INSTALLATION

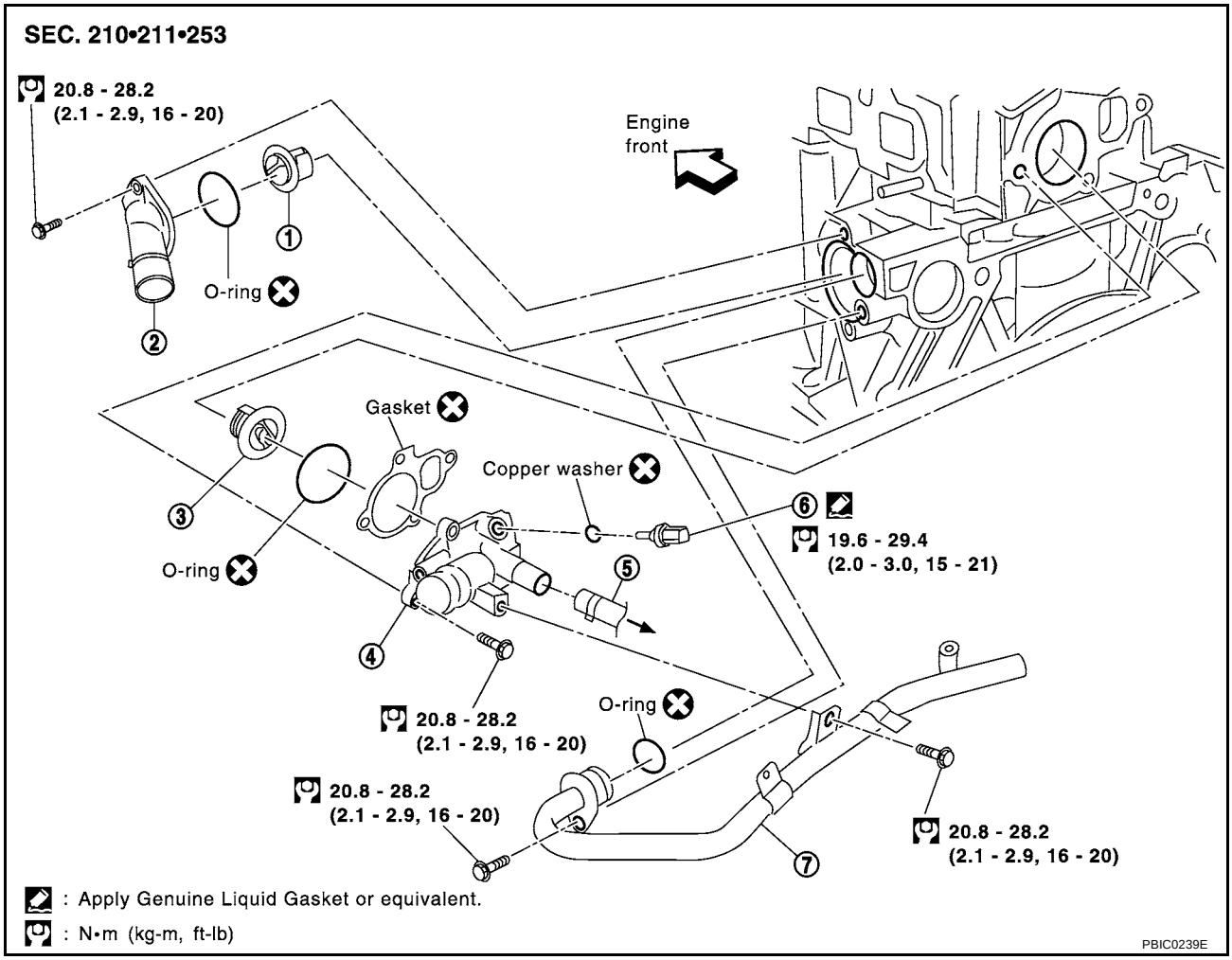
Check for engine coolant leaks using radiator cap tester. Refer to CO-9, "CHECKING RADIATOR SYSTEM FOR LEAKS" .

THERMOSTAT AND WATER CONTROL VALVE

PFP:21200

Removal and Installation

EBS00KOO



1. Thermostat
2. Water inlet
3. Water control valve
4. Water outlet
5. Heater hose
6. Engine coolant temperature sensor
7. Heater pipe

WARNING:

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

REMOVAL

Thermostat Removal

1. Drain engine coolant. Refer to CO-9, "DRAINING ENGINE COOLANT" .

   CAUTION:

   Perform when the engine cold.
2. Disconnect radiator lower hose at water inlet side.
3. Remove water inlet and thermostat.

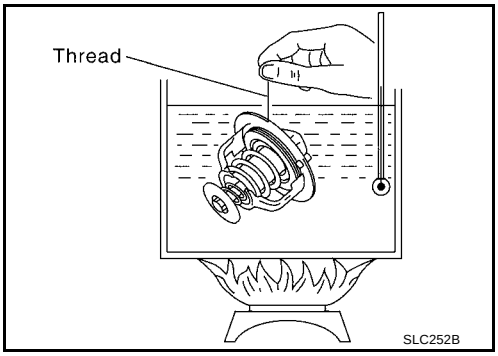
Water Control Valve Removal

1. Drain engine coolant. Refer to CO-9, "DRAINING ENGINE COOLANT" .
2. Disconnect upper radiator hose, heater pipe and heater hose at water outlet side.
3. Remove water outlet.
4. Remove water control valve.

INSPECTION AFTER REMOVAL

- Place a string 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 the thermostat.)
- The valve opening temperature is the temperature at which the valve opens and the falls from the thread.
- Continue heating. Check the full-open lift amount.

  NOTE:
  The full-open lift amount standard temperature for the water control valve is the reference value.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.



Standard values

	Thermostat	Water control valve
Valve opening temperature	80.5 - 83.5°C (177 - 182° F)	93.5 - 96.5°C (200 - 206°F)
Full-open lift amount	More than 8 mm/ 95°C (0.315 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)

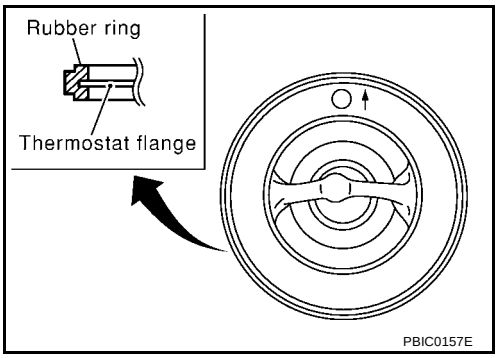
INSTALLATION

Install in the reverse order of removal paying attention to the following.

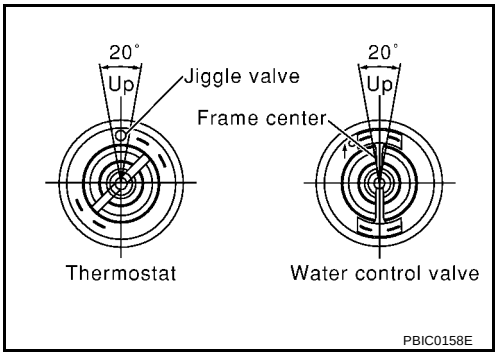
- Install the engine coolant temperature sensor.
  Use Genuine Liquid Gasket or equivalent.

Installation of Thermostat and Water Control Valve

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



- Install the thermostat with the jiggle valve facing upwards. (The position deviation may be within the range of ±10°)
- Install the 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°)



Heater Pipe Installation

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

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00KOP

CAPACITY

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (MAX level)]	Approximately 7.1 (6-1/4)
Reservoir tank	0.6 (1/2)

THERMOSTAT

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

WATER CONTROL VALVE

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

RADIATOR

Unit: kPa (bar, kg/cm^2 , psi)

Cap relief pressure	Standard	78 - 98 (0.78 - 0.98, 0.8 - 1.0, 11- 14)
	Limit	59 (0.59, 0.6, 9)
Leakage test pressure		157 (1.57, 1.6, 23)

Tightening Torque

EBS00KOQ

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*

Cylinder block drain plug	7.8 - 11.8 (0.8 - 1.2, 69 - 104)*
Radiator mounting bracket	3.8 - 4.5 (0.39 - 0.46, 34 - 39)*
Radiator fan assembly	3.8 - 4.5 (0.39 - 0.46, 34 - 39)*
Radiator fan	2.9 - 3.9 (0.30 - 0.40, 26 - 34)*
Radiator fan motor	3.9 - 4.9 (0.40 - 0.50, 35 - 43)*
Water pump	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Water pump housing	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Water inlet	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Water outlet	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Water pipe	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Hater pipe	20.8 - 28.2 (2.1 - 2.9, 16 - 20)
Engine coolant temperature sensor	19.6 - 29.4 (2.0 - 3.0, 15 - 21)

PRECAUTIONS

PFP:00001

Precautions For Liquid Gasket

EBS00MRY

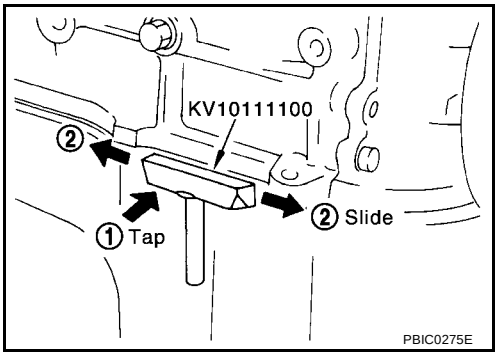
REMOVAL OF LIQUID GASKET

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

  CAUTION:
  Be careful not to damage the mating surfaces.

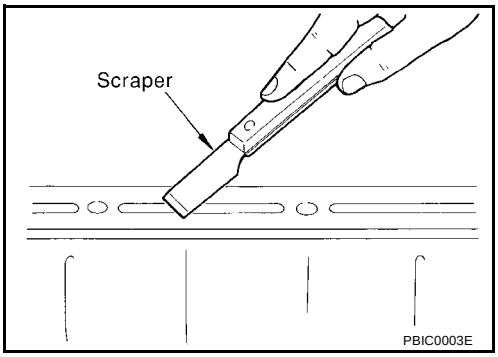
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the areas where the liquid gasket is applied.

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

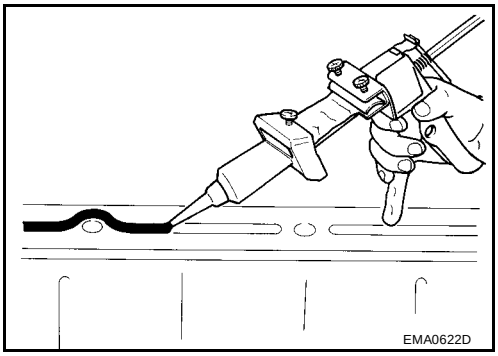


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove the 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.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

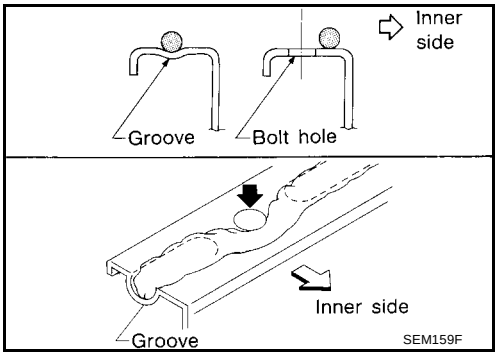


4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.



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

     CAUTION:
     If there are instructions in this manual, observe them.

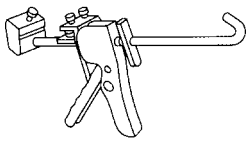
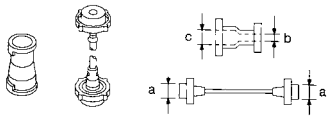


PREPARATION

PFP:00002

Special Service Tools

EBS00BAV

Tool number Tool name	Description
WS39930000 Tube pressure  S-NT052	Pressing the tube of liquid gasket
EG17650301 Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV99103510 Radiator plate pliers A  S-NT224	Installing radiator upper and lower tanks
KV99103520 Radiator plate pliers B  S-NT225	Removing radiator upper and lower tanks

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

EBS00BAW

	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 viscosity	—
	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

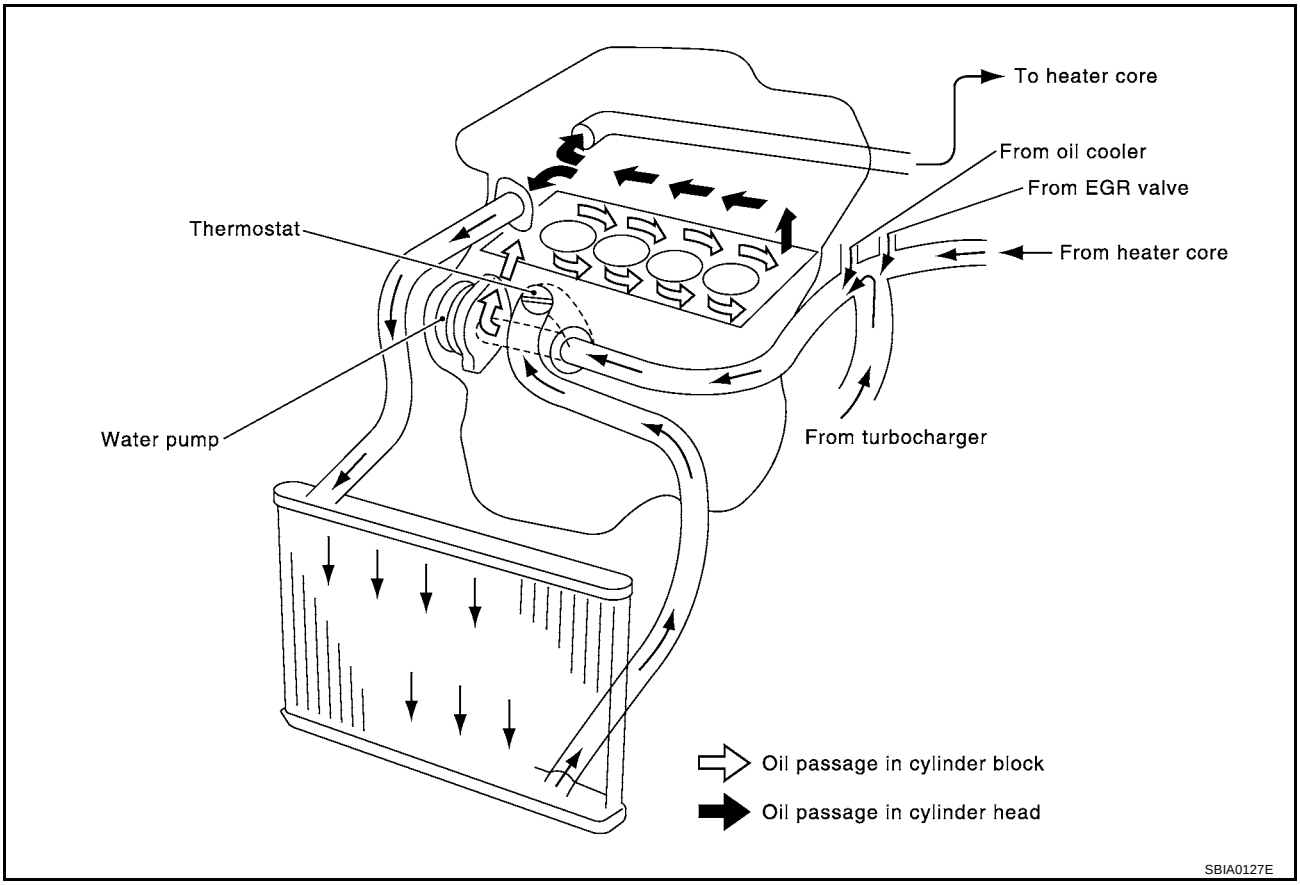
	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Powertrain system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes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

PFP:21020

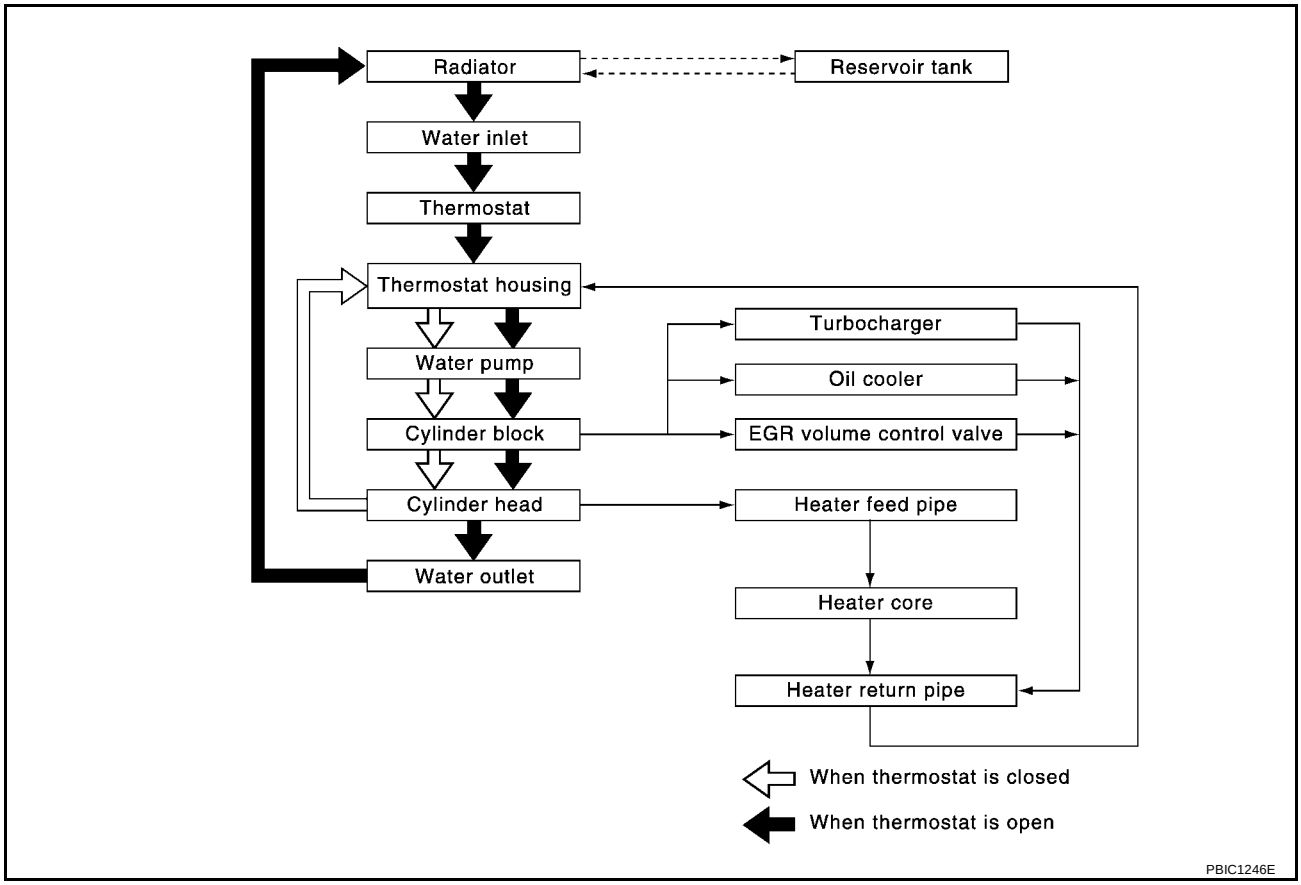
Cooling Circuit

EBS00BAX



System Drawing

EBS00LS1



ENGINE COOLANT

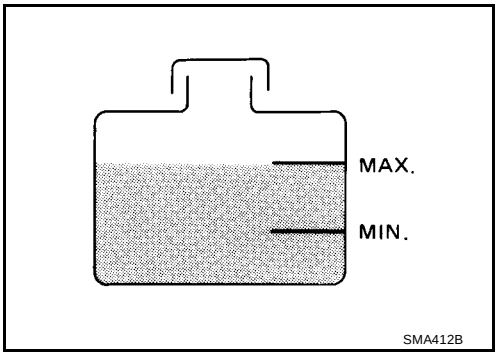
PFP:KQ100

Inspection

EBS00BAY

LEVEL CHECK

- Check if the reservoir tank engine coolant level within MIN to MAX when engine is cool.
- Adjust engine coolant if too much or too little.



CHECKING RADIATOR SYSTEM FOR LEAKS

To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:

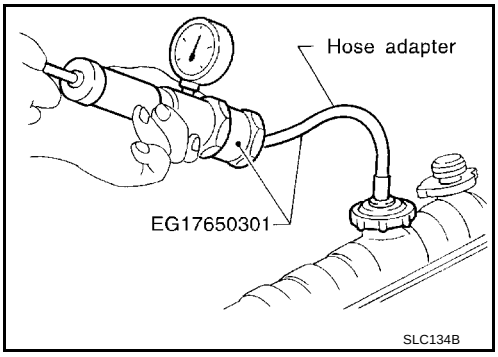
157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)

WARNING:

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

CAUTION:

Higher pressure than specified may cause radiator damage.



Changing Engine Coolant

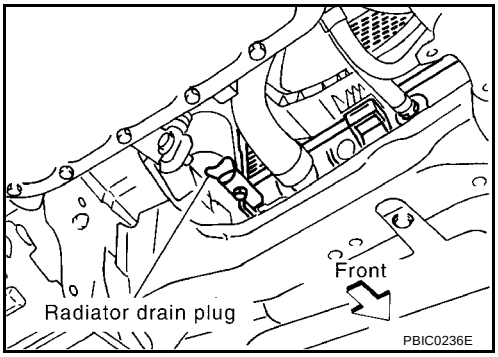
EBS00BAZ

WARNING:

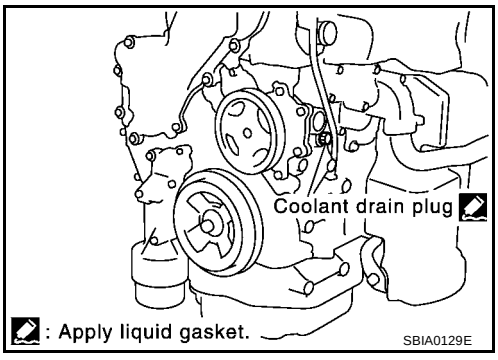
- **To avoid being scalded, never change the engine coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

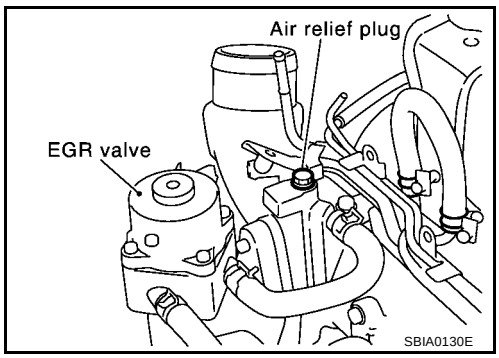
DRAINING ENGINE COOLANT

1. Open radiator drain plug at the bottom of radiator, and remove radiator cap.
   - **Be careful not to allow engine coolant to contact drive belts.**
   - Cover the exhaust tube heat shield to prevent from splashing engine coolant.



2. Open drain plugs on cylinder block and air relief plug.
3. Remove reservoir tank, drain engine coolant, then clean reservoir tank.
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-31, "FLUSHING COOLING SYSTEM" .





REFILLING ENGINE COOLANT

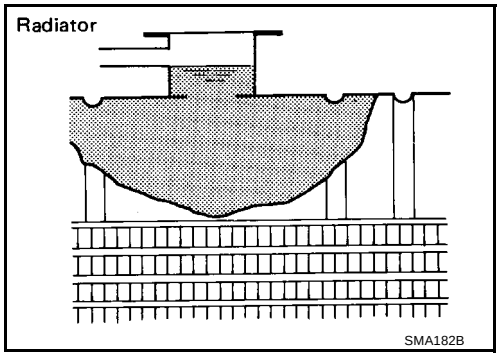
1. Install reservoir tank, radiator drain plug and cylinder block drain plug.
   - Apply sealant to the thread of cylinder block drain plug.
     Use Genuine Liquid Gasket or equivalent.

     Cylinder block drain plug:

     : 7.8 - 11.8 N·m (0.8 -1.2 kg-m , 69 - 104 in-lb)

2. Fill radiator slowly with engine coolant until engine coolant spills from the air relief plugs, then install air relief plugs.

   CAUTION:
   If the filling rate is too fast, this could lead to air being mixed in the engine coolant. Be sure to fill the engine coolant slowly according to the rate indicated above.

   - Replace the copper washer of the air bleeding plug.

     Air relief plug:

     : 6.7 - 7.9 N·m (0.68 - 0.81 kg-m, 59 - 70 in-lb)

   - **Use genuine Nissan anti-freeze engine coolant or equivalent mixed with water (distilled or demineralized).**
     Refer to MA-16, "RECOMMENDED FLUIDS AND LUBRICANTS".

     Engine coolant capacity (With reservoir tank):

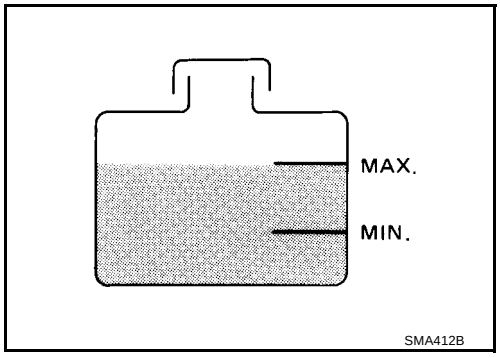
     9.5 ℓ (8-3/8 Imp qt)

     Reservoir tank : 0.6 ℓ (1/2 Imp qt)

   - **Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**

3. Fill reservoir tank to specified level.
4. Warm up engine to normal operating temperature without radiator cap installed.
   - **If engine coolant overflows radiator filler hole, install radiator cap.**
5. Run engine at 3,000 rpm for 10 seconds and return to idle speed with radiator cap installed.
   - Repeat two or three times.

Watch engine coolant temperature gauge so as not to overheat the engine.



6. 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.
7. Refill reservoir tank to MAX level line with engine coolant.

8. Repeat steps 5 through 7 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. If sound is heard, bleed air from cooling system by repeating steps 5 through 7 until engine coolant level no longer drops.
    - **Clean excess engine coolant from engine.**

FLUSHING COOLING SYSTEM

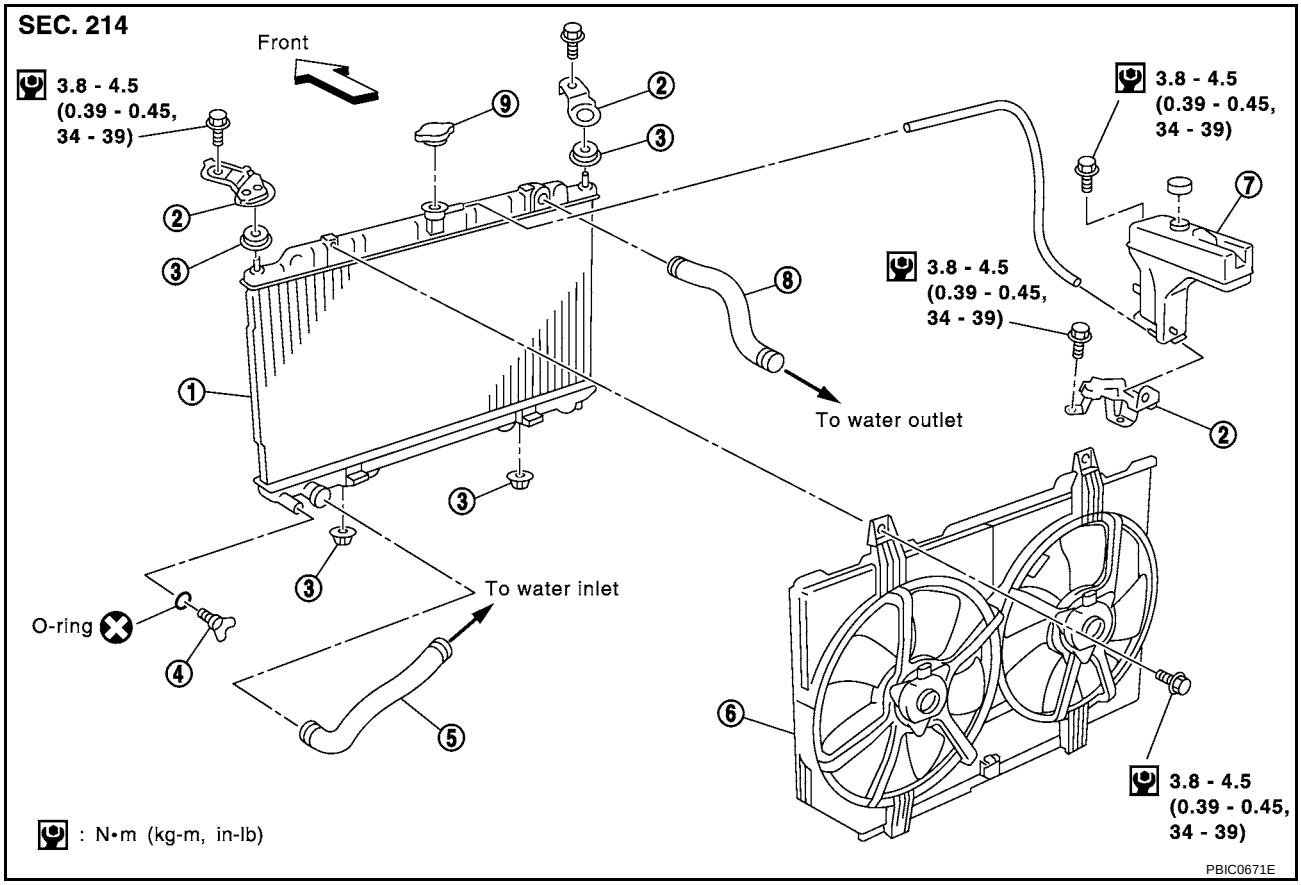
1. Fill radiator with water until water spills from the air relief hole, then close air relief flag. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.

RADIATOR

PFP:21400

Removal and Installation

EBS00BB0



1. Radiator
2. Bracket
3. Mounting rubber
4. Drain plug
5. Radiator hose (lower)
6. Radiator fan assembly
7. Reservoir tank
8. Radiator hose (upper)
9. Radiator cap

WARNING:

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

REMOVAL

1. Drain engine coolant. Refer to CO-29, "DRAINING ENGINE COOLANT" .
2. Remove undercover.
3. Disconnect radiator upper hose, lower hose, reservoir tank hose and mounting bracket.
4. Remove radiator and radiator fan assembly

CAUTION:

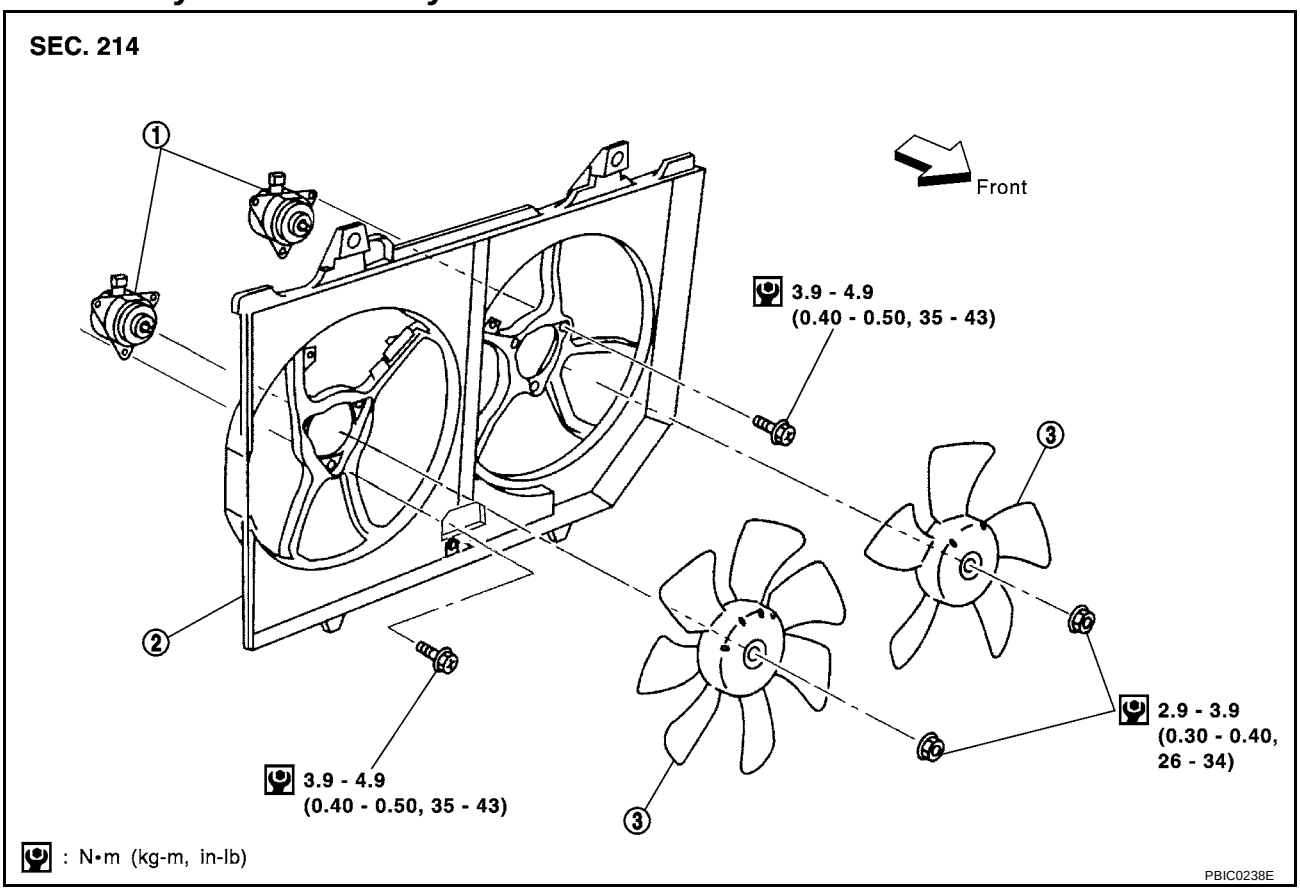
Do not damage or scratch radiator core when removing.

INSTALLATION

- Reinstall any parts removed in reverse order of removal.
- Check for engine coolant leaks. Refer to CO-29, "CHECKING RADIATOR SYSTEM FOR LEAKS" .

Disassembly and Assembly Radiator Fan

EBS00BB1



1. Radiator fan motors
2. Radiator fan shroud
3. Radiator fan

DISASSEMBLY

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

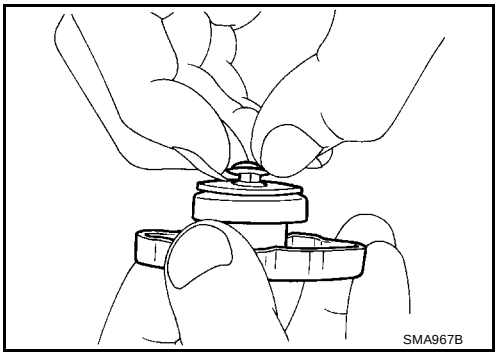
ASSEMBLY

Install in the reverse order of removal.

Checking Radiator Cap

EBS00BB2

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

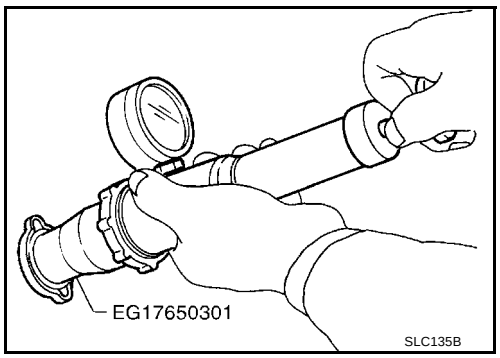


- Check radiator cap relief pressure.

  Standard : 78 - 98 kPa (0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2 , 11 - 14 psi)

  Limit : 59 kPa (0.59 bar, 0.6 kg/cm^2 , 9 psi)

- When connecting the radiator cap to the tester, apply engine coolant to the cap seal part.
- Replace the radiator cap if there is an unusualness in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.



Checking Radiator

EBS00BRH

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

- 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 connectors to prevent water from entering.

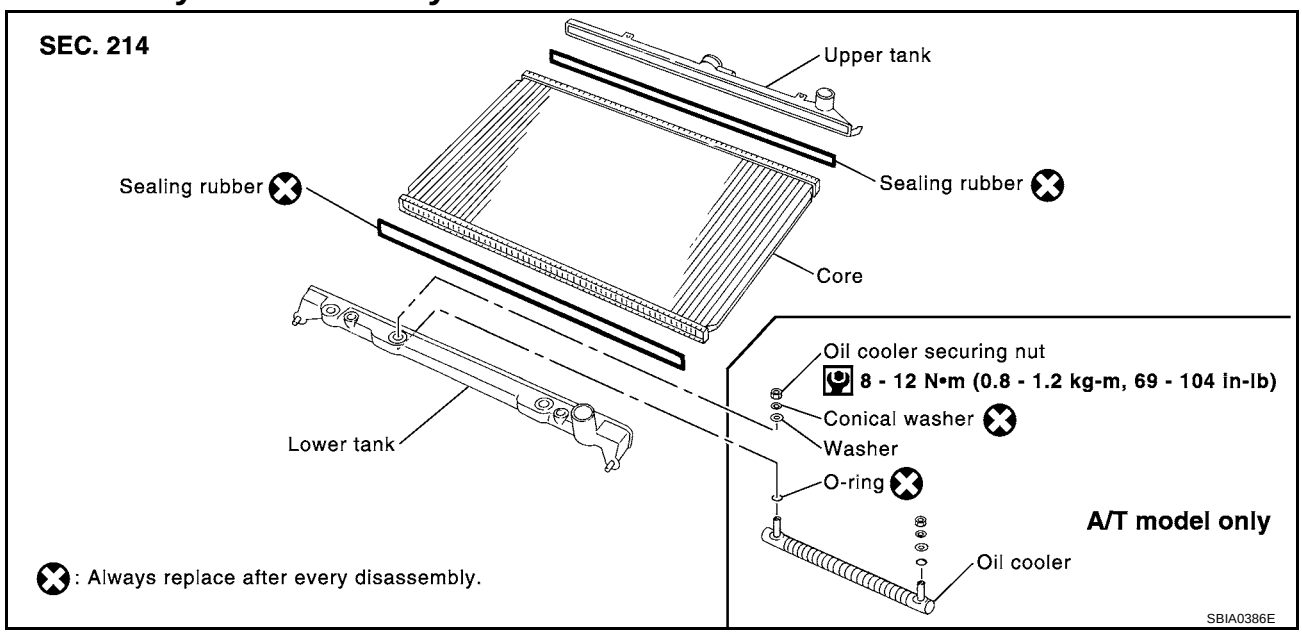
1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.
   - Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2 , 71psi) and keep distance more than 30 cm(11.8 in).
5. Blow air again into all the radiator core surface once per minute until no water sprays out.

RADIATOR (ALUMINUM TYPE)

PFP:21460

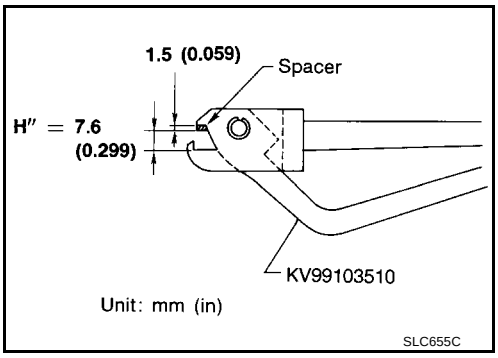
Disassembly and Assembly

EBS00BB3



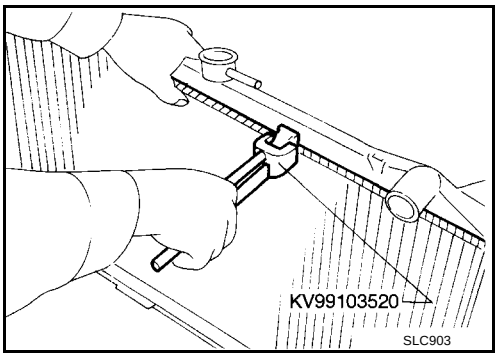
PREPARATION

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

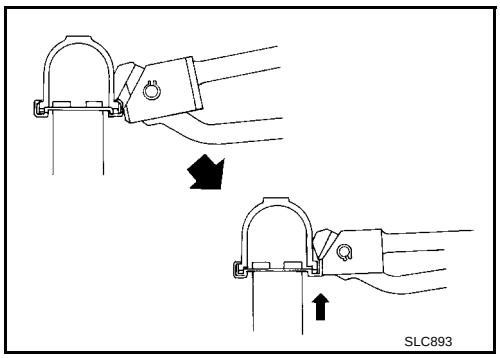


DISASSEMBLY

1. Remove upper or lower tanks with Tool.

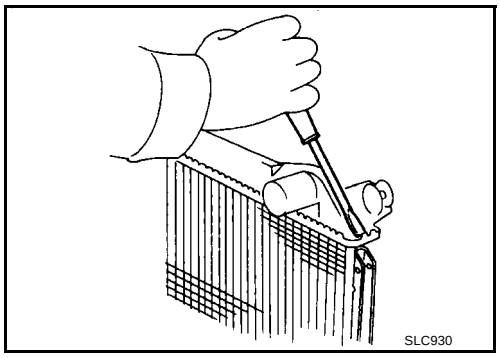


- Grip the crimped edge and bend it upwards so that Tool slips off.
  Do not bend excessively.

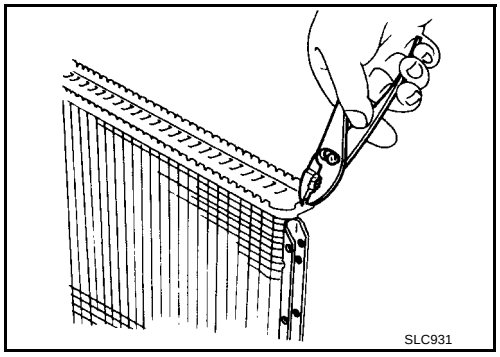


- In areas where Tool cannot be used, use a screwdriver to bend the edge up.
  Be careful not to damage tank.

2. Remove sealing rubber.

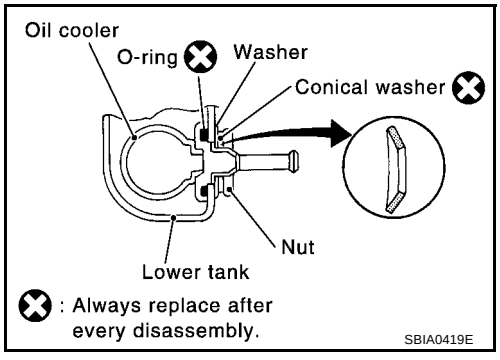


3. Make sure the edge stands straight up.
4. Remove oil cooler from tank. (A/T model only)

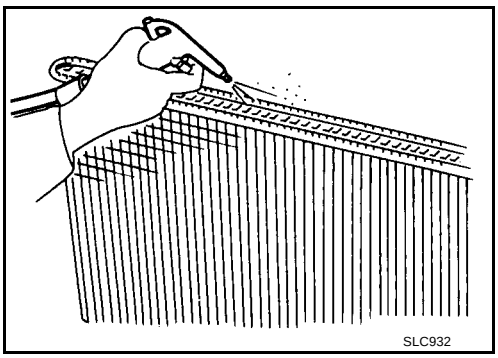


ASSEMBLY

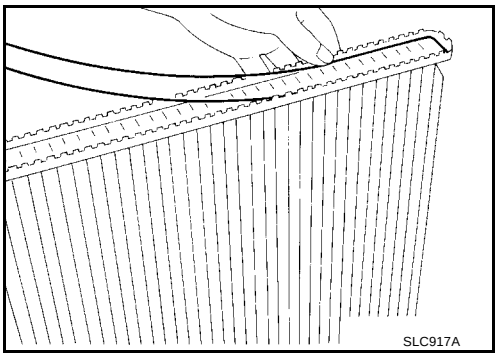
1. Install oil cooler. (A/T model only)
   Pay attention to direction of conical washer.



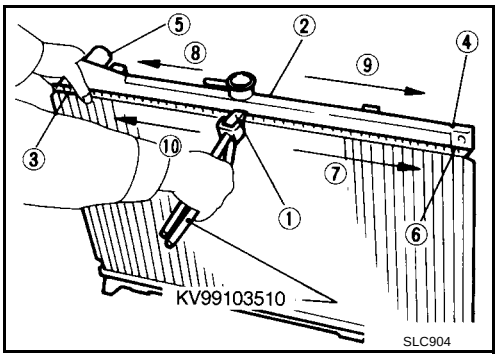
2. Clean contact portion of tank.

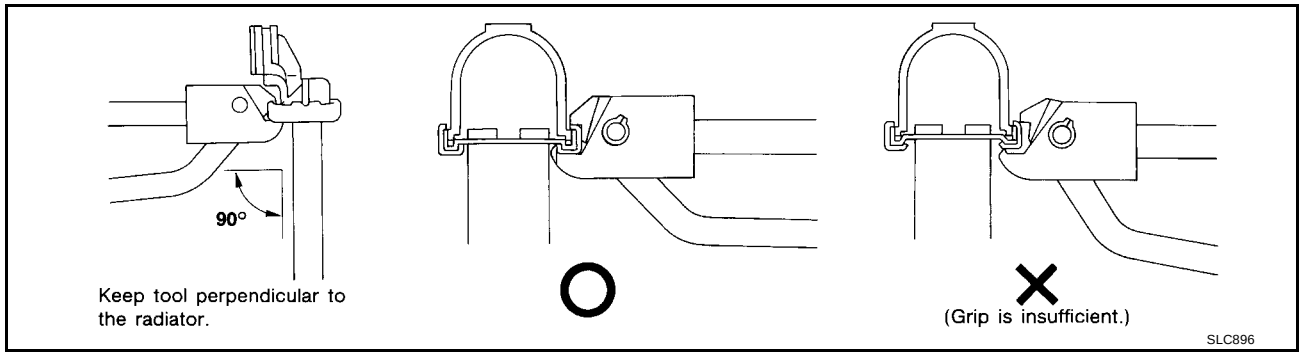


3. Install sealing rubber.
Push it in with fingers.
Be careful not to twist sealing rubber.

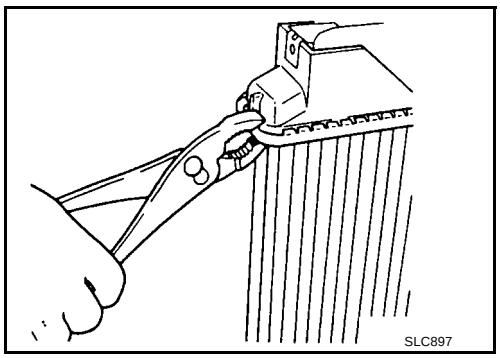


4. Caulk tank in specified sequence with Tool.





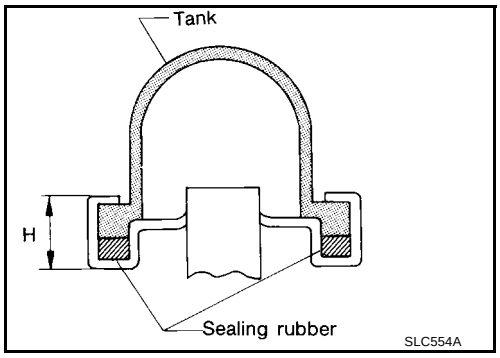
- Use pliers in the locations where Tool cannot be used.



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 Inspection.



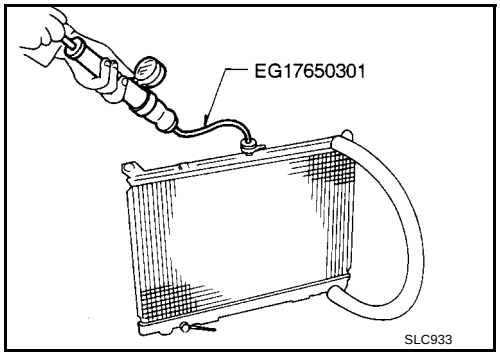
INSPECTION

1. Apply pressure with Tool.

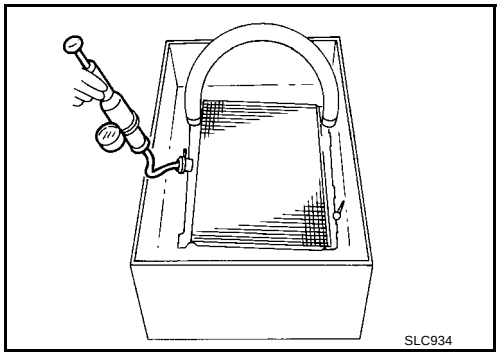
   Specified pressure value:

   157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)

   WARNING:
   To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.
   Attach a hose to the oil cooler to seal its inlet and outlet. (A/T model only)



2. Check for leakage by soaking radiator in water container.

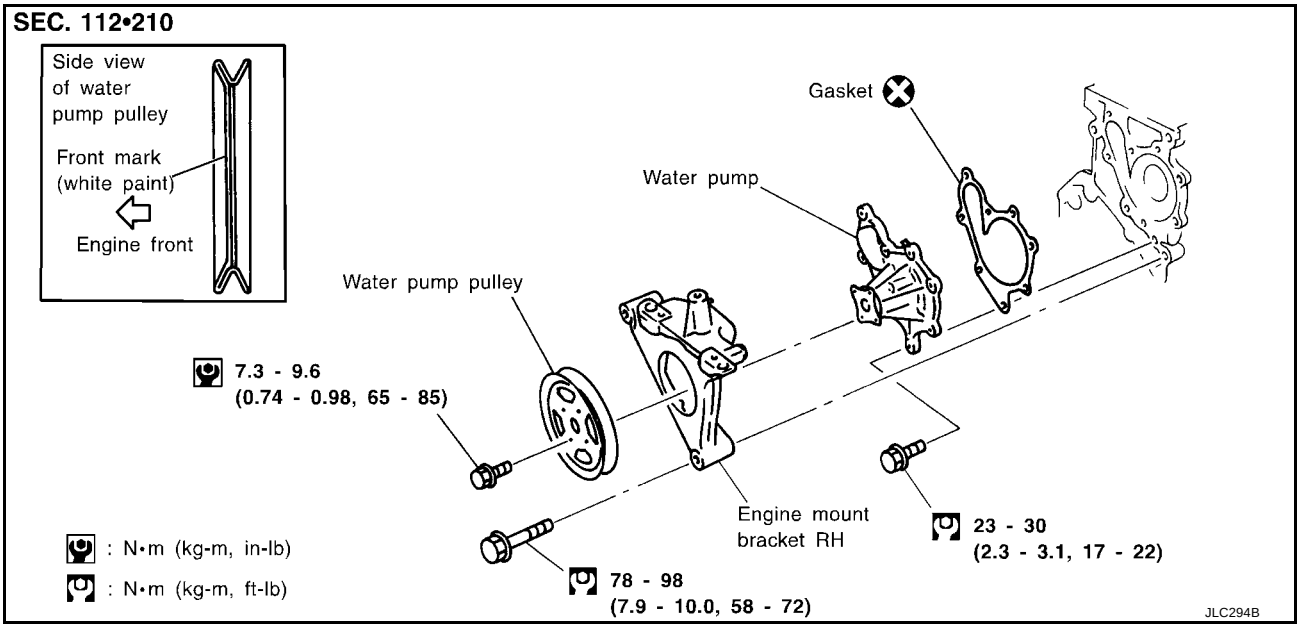


WATER PUMP

PFP:21020

Removal and Installation

EBS00BB4



WARNING:

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

REMOVAL

1. Remove the under cover, splash cover (right), and drive belt.
2. Drain engine coolant. Refer to CO-29, "DRAINING ENGINE COOLANT" .

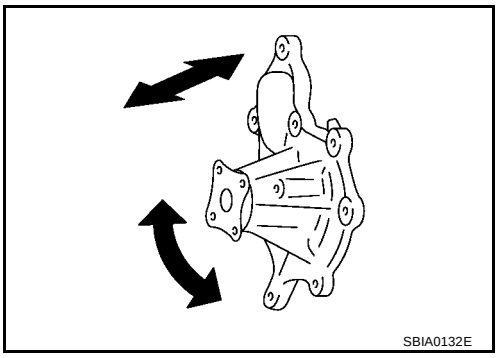
   CAUTION:

   Perform when the engine is cold.
3. Support the bottom of the oil pan with a floor jack etc, and remove the right engine mount bracket (front side of the engine).
4. Remove the water pump pulley.
   - Loosen the pulley bolts after fixing the pulley using a screwdriver etc.
5. Remove engine mount bracket.
6. Remove the water pump.
   - Engine coolant will leak from the cylinder block, so have a receptacle ready below.

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

INSPECTION AFTER REMOVAL

- Visually check that there is no significant dirt or rusting on the water pump body and vane.
- Check that there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If there are any unusualness, replace the water pump assembly.



INSTALLATION

- Install in the reverse order of removal
- Install the water pump pulley with the front mark (painted white, used to prevent errors during assembly) facing the front of the engine. Refer to the figure above.

INSPECTION AFTER INSTALLATION

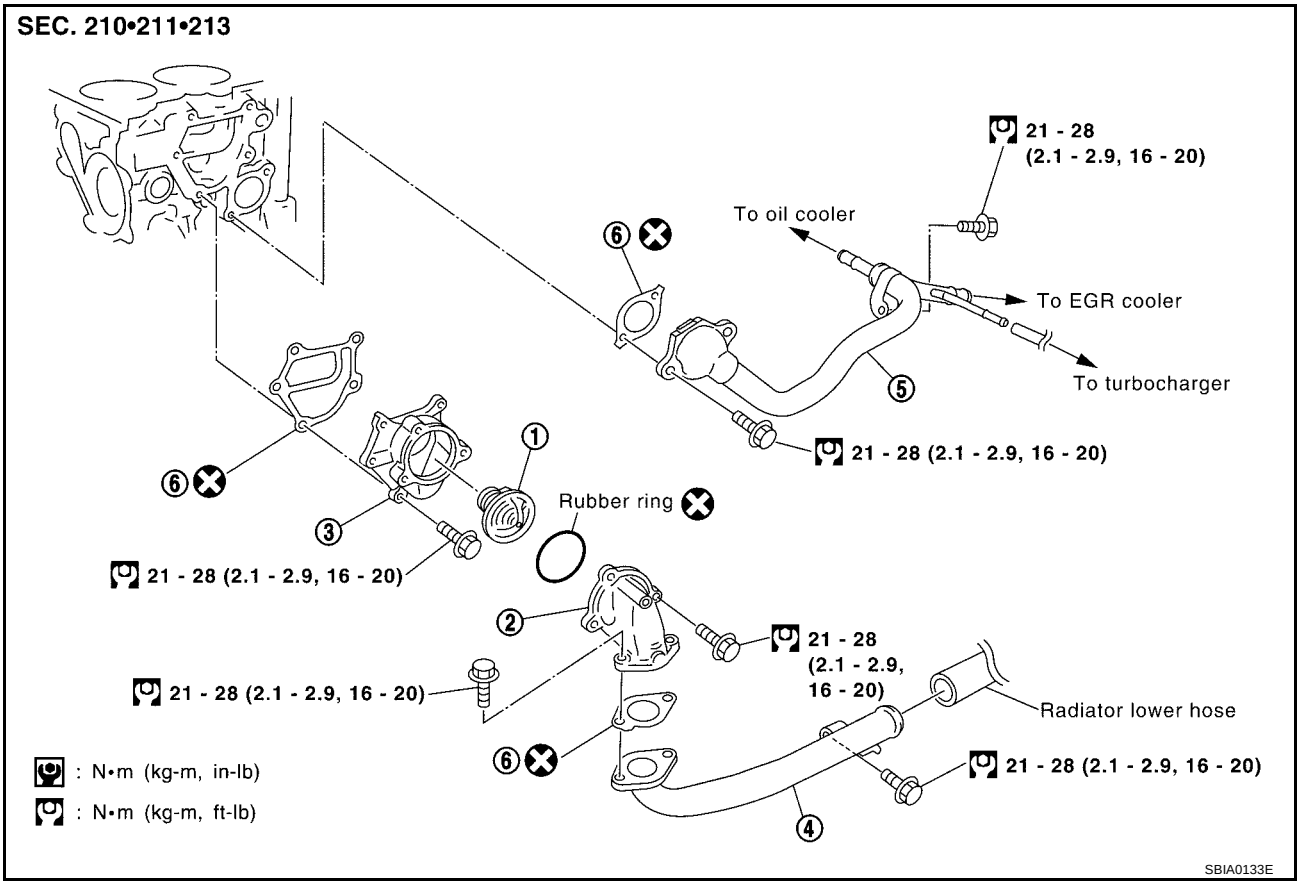
Check for engine coolant leaks using radiator cap tester. Refer to CO-29, "CHECKING RADIATOR SYSTEM FOR LEAKS" .

THERMOSTAT AND WATER PIPING

PFP:21200

Removal and Installation

EBS00BK9



1. Thermostat
2. Water inlet
3. Thermostat housing
4. Water inlet pipe
5. Heater return pipe
6. Gasket

WARNING:

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

REMOVAL

1. Remove the engine undercover and splash cover (right and left).
2. Drain engine coolant. Refer to CO-29, "DRAINING ENGINE COOLANT" .

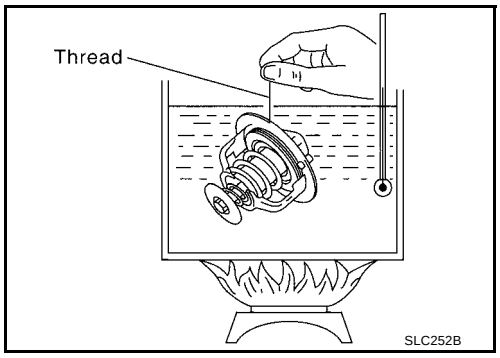
   CAUTION:

   Perform when the engine cold.
3. Remove radiator lower hose from water inlet side.
4. Remove water inlet and thermostat.
5. Remove thermostat housing.

INSPECTION AFTER REMOVAL

Thermostat

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



Standard values

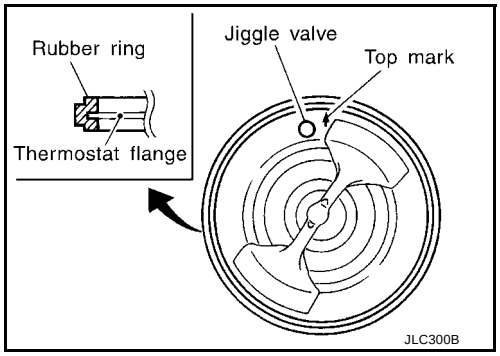
Item	Thermostat
Valve opening temperature	80 - 84°C (176 - 183° F)
Full-open lift amount	More than 10 mm/ 95°C (0.39 in/ 203 °F)
Valve closing temperature	Approximately 77°C (171°F)

INSTALLATION

Install in the reverse order of removal paying attention to the following.

Thermostat

- Install the thermostat with the whole circumference of each flange part fit securely inside the rubber ring.
- Install the thermostat with the jiggle valve facing upwards.



Heater Pipe

First apply a neutral detergent to the O-ring, then quickly insert the insertion parts oft he heater pipe into the installation holes.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00CU0

CAPACITY

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank (MAX level)]	9.5 (8-3/8)
Reservoir tank	0.6 (1/2)

THERMOSTAT

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

RADIATOR

Unit: kPa (bar, kg/cm^2 , psi)

Cap relief pressure	Standard	78 - 98 (0.78 - 0.98, 0.8 - 1.0, 11 - 14)
	Limit	59 (0.59, 0.6, 9)
Leakage test pressure		157 (1.57, 1.6, 23)

Tightening Torque

EBS00BKE

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*

Cylinder block drain plug	7.8 - 11.8 (0.8 - 1.2, 69 - 104)*
Air relief plug	6.7 - 7.9 (0.68 - 0.81, 59 - 70)*
Radiator mounting bracket	3.8 - 4.5 (0.39 - 0.45, 34 - 39)*
Radiator fan assembly	3.8 - 4.5 (0.39 - 0.45, 34 - 39)*
Radiator fan	2.9 - 3.9 (0.30 - 0.40, 26 - 34)*
Radiator fan motor	3.9 - 4.9 (0.40 - 0.50, 35 - 43)*
Water pump	23.0 - 30.0 (2.3 - 3.1, 17 - 22)
Water pump pulley	7.3 - 9.6 (0.74 - 0.98, 65 - 85)*
Water inlet	21.0 - 28.0 (2.1 - 2.9, 16 - 20)
Thermostat housing	21.0 - 28.0 (2.1 - 2.9, 16 - 20)
Water inlet pipe	21.0 - 28.0 (2.1 - 2.9, 16 - 20)
Hater return pipe	21.0 - 28.0 (2.1 - 2.9, 16 - 20)