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## SECTION

# ENGINE COOLING SYSTEM

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# PRECAUTIONS

## PRECAUTIONS

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

ABS00401

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

ABS00402

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

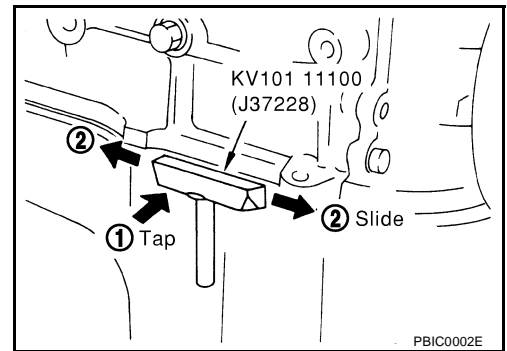
#### **CAUTION:**

**Be careful not to damage the mating surfaces.**

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

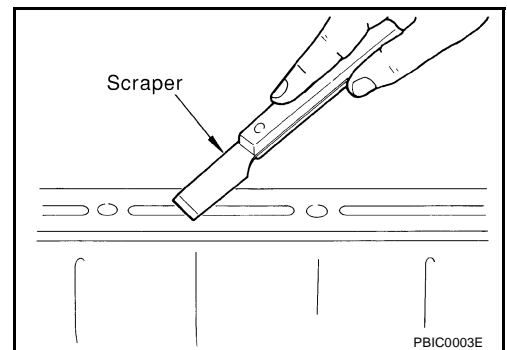
#### **CAUTION:**

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



### LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the 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.

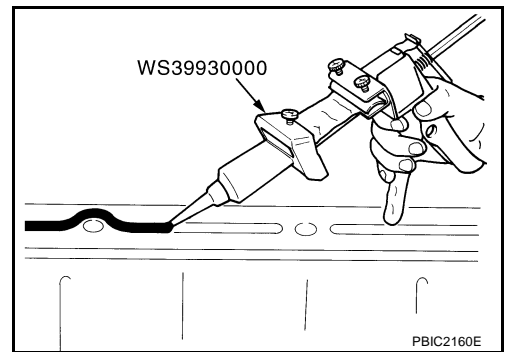


## PRECAUTIONS

3. Attach the liquid gasket tube to the tube presser (SST).  
**Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-46, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).**

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

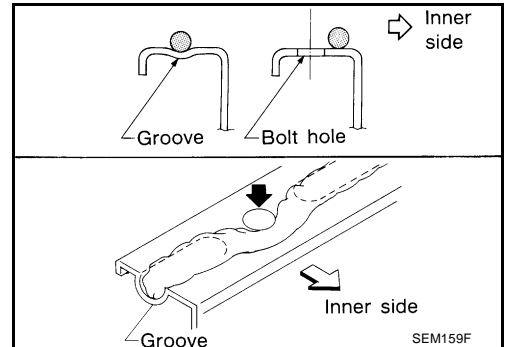
- If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.



- As for the bolt holes, normally apply the liquid gasket inside the holes. 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 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 specific instructions in this manual, observe them.**



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# PREPARATION

## PREPARATION

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### Special Service Tools

ABS004Q3

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

Tool number (Kent-Moore No.) Tool name	Description
WS39930000 (   -   ) Tube pressure	Pressing the tube of liquid gasket
EG17650301 (J33984-A) Radiator cap tester adapter	Adapting radiator cap tester to radiator cap and radiator filler neck <b>a: 28 (1.10) dia.</b> <b>b: 31.4 (1.236) dia.</b> <b>c: 41.3 (1.626) dia.</b> Unit: mm (in)
KV99103510 (   -   ) Radiator plate pliers A	Installing radiator upper and lower tanks
KV99103520 (   -   ) Radiator plate pliers B	Removing radiator upper and lower tanks

## Commercial Service Tools

ABS004Q4

Tool name	Description
Power tool	Loosening bolts and nuts
Radiator cap tester	Checking radiator and radiator cap

# OVERHEATING CAUSE ANALYSIS

## OVERHEATING CAUSE ANALYSIS

PFP:00012

### Troubleshooting Chart

ABS004R1

	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 density	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp	H
				Cracked hose	
			Water pump	Poor sealing	
			Radiator cap	Loose	I
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

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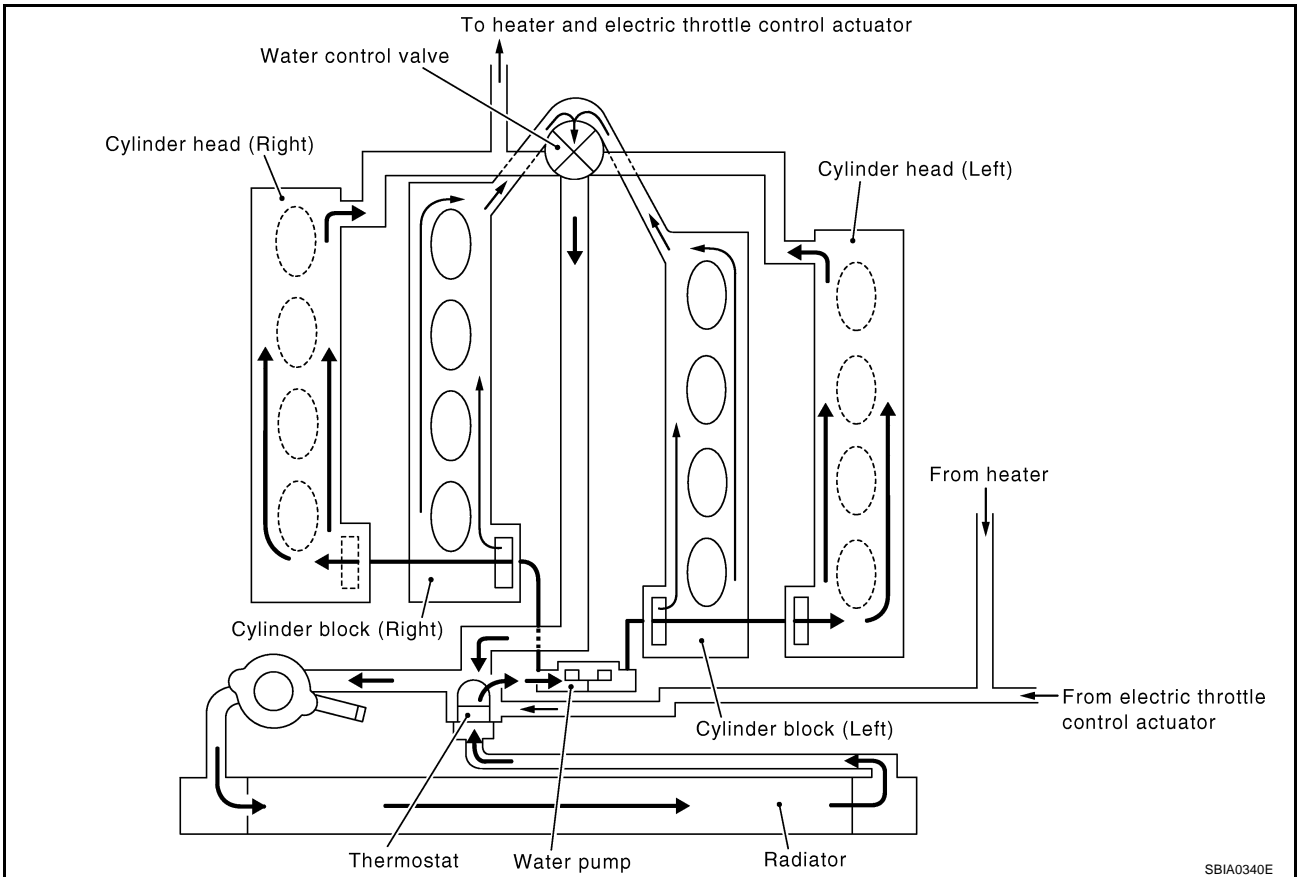
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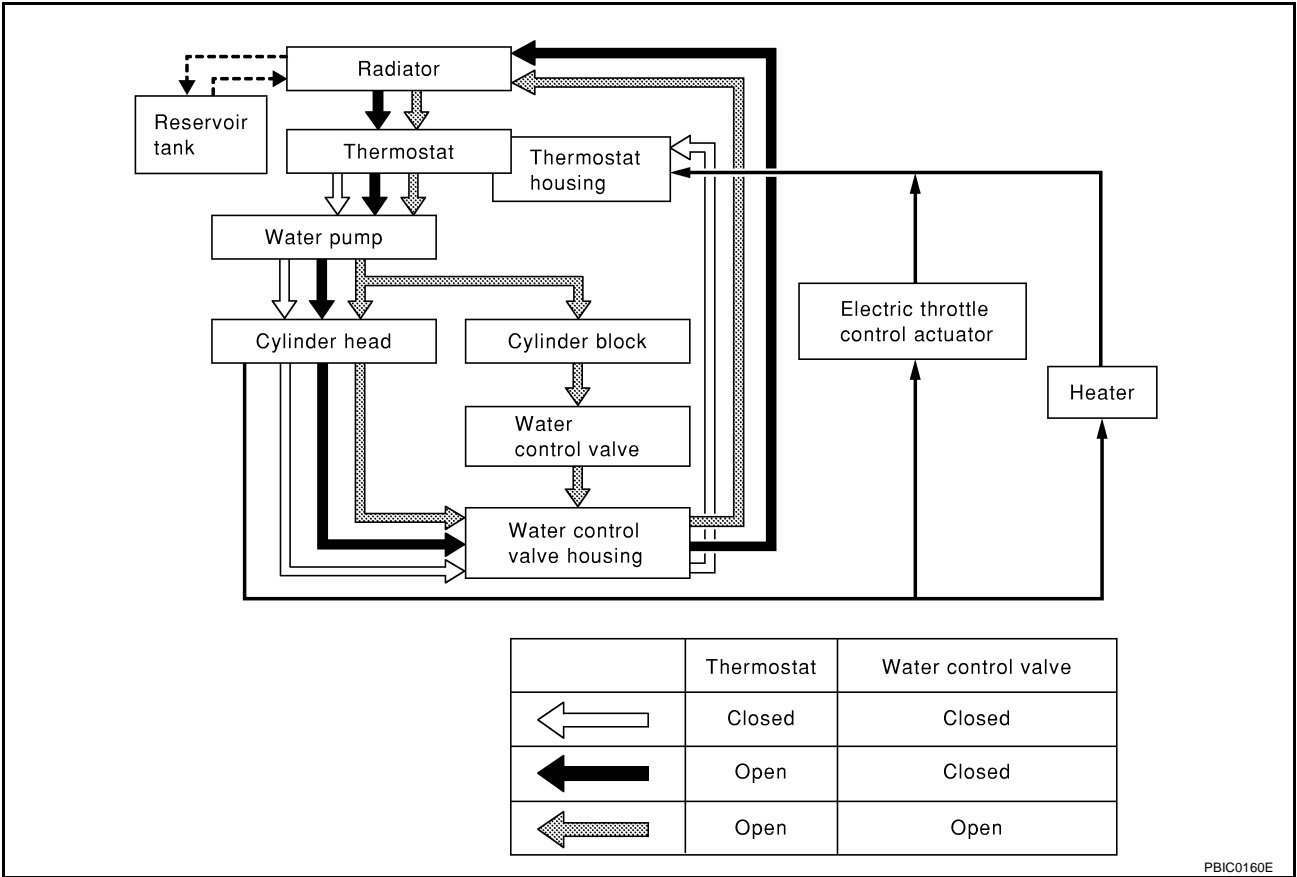


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# COOLING SYSTEM

## System Drawing

ABS004R3



PBIC0160E



# ENGINE COOLANT

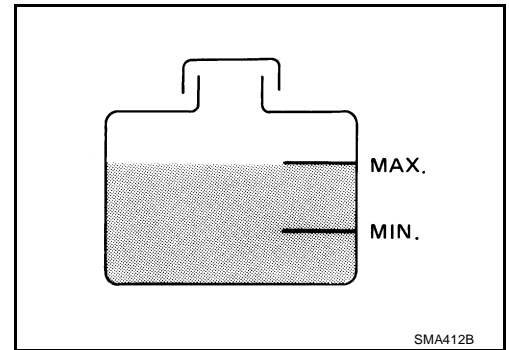
## ENGINE COOLANT

PFP:KQ100

### Inspection LEVEL CHECK

ABS004R4

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



### CHECKING COOLING SYSTEM FOR LEAKS

To check for leakage, 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/cm<sup>2</sup> , 23 psi)

#### WARNING:

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

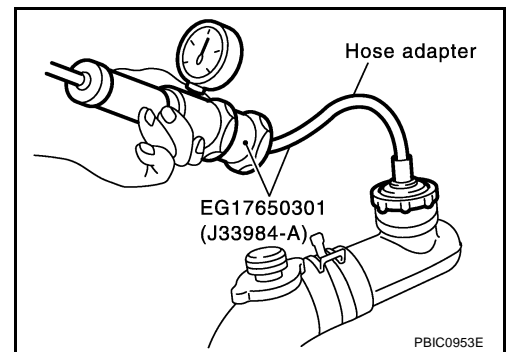
#### CAUTION:

Higher pressure than specified may cause radiator damage.

#### NOTE:

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

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



### Changing Engine Coolant

ABS004R5

#### WARNING:

- To avoid being scalded, never change engine coolant when 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. Remove engine undercover with power tool.
2. Open radiator drain plug at the bottom of radiator, and remove radiator cap.
  - Be careful not to allow engine coolant to contact drive belts.

When draining all of engine coolant in the system, open water drain plugs on engine cylinder block. Refer to [EM-81, "DISASSEMBLY"](#) .
3. 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"](#) .
4. Remove reservoir tank, drain engine coolant and clean reservoir tank before installing.


### REFILLING ENGINE COOLANT

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

#### CAUTION:

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

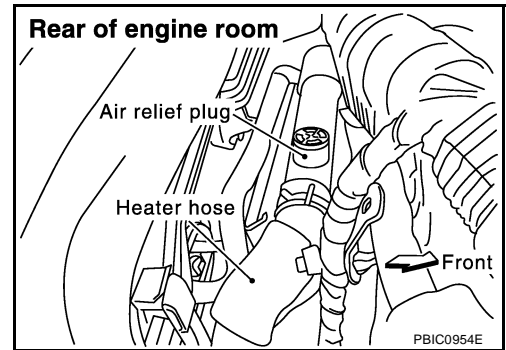
Radiator drain plug:

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

If cylinder block water drain plugs are removed, close and tighten them. Refer to [EM-85, "ASSEMBLY"](#) .

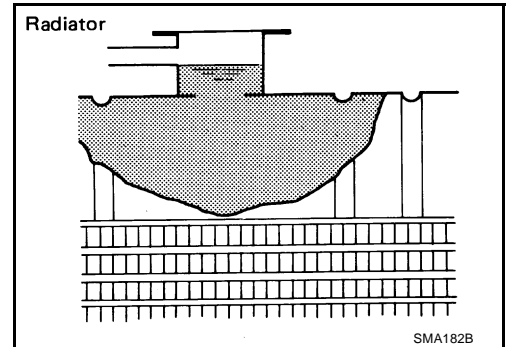
# ENGINE COOLANT

- Remove air relief plug on heater hose.



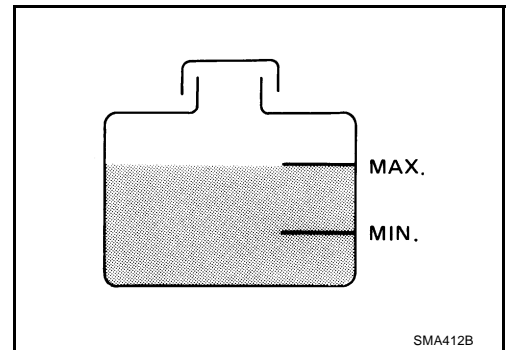
- Fill radiator and reservoir tank to specified level.
  - Use genuine Nissan anti-freeze engine coolant or equivalent mixed with water (distilled or demineralized). Refer to [MA-10. "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

Engine coolant capacity  
(with reservoir tank at "MAX" level):  
Approximately 9.8 ℓ (10-3/8 US qt, 8-5/8 Imp qt)



Reservoir tank engine coolant capacity  
(at "MAX" level):  
0.8 ℓ (7/8 US qt, 3/4 Imp qt)

- Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.
  - When engine coolant overflows air relief hole on heater hose, install air relief plug.
- Warm up engine to normal operating temperature with radiator cap installed.
  - Run engine at 3,000 rpm for 10 seconds and return to idle speed.
    - Repeat two or three times.




- CAUTION:**  
Watch engine coolant temperature gauge so as not to overheat the engine.
- Stop engine and cool down to less than approximately 50°C (122°F).
    - Cool down using a fan to reduce the time.
    - If necessary, refill radiator up to filler neck with engine coolant.
  - Refill reservoir tank to MAX level line with engine coolant.
  - Repeat steps 3 through 6 two or more times with radiator cap installed until the engine coolant level no longer drops.
  - Check cooling system for leaks with engine running.
  - 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.
  - Repeat step 10 three times.
  - If sound is heard, bleed air from cooling system by repeating steps 3 through 6 until engine coolant level no longer drops.
    - Clean excess engine coolant from engine.

# ENGINE COOLANT

## FLUSHING COOLING SYSTEM

1. Install reservoir tank, and radiator drain plug. A

### Radiator drain plug:

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

If cylinder block water drain plugs are removed, close and tighten them. Refer to [EM-85. "ASSEMBLY"](#).

2. Fill thermostat housing with water until water spills from the air relief hole, then close air relief plug. Fill thermostat housing and reservoir tank with water and reinstall radiator cap. C
3. Run engine and warm it up to normal operating temperature.
4. Rev engine two or three times under no-load. D
5. Stop engine and wait until it cools down.
6. Drain water from the system. Refer to [CO-9. "DRAINING ENGINE COOLANT"](#). E
7. Repeat steps 2 through 6 until clear water begins to drain from radiator. F

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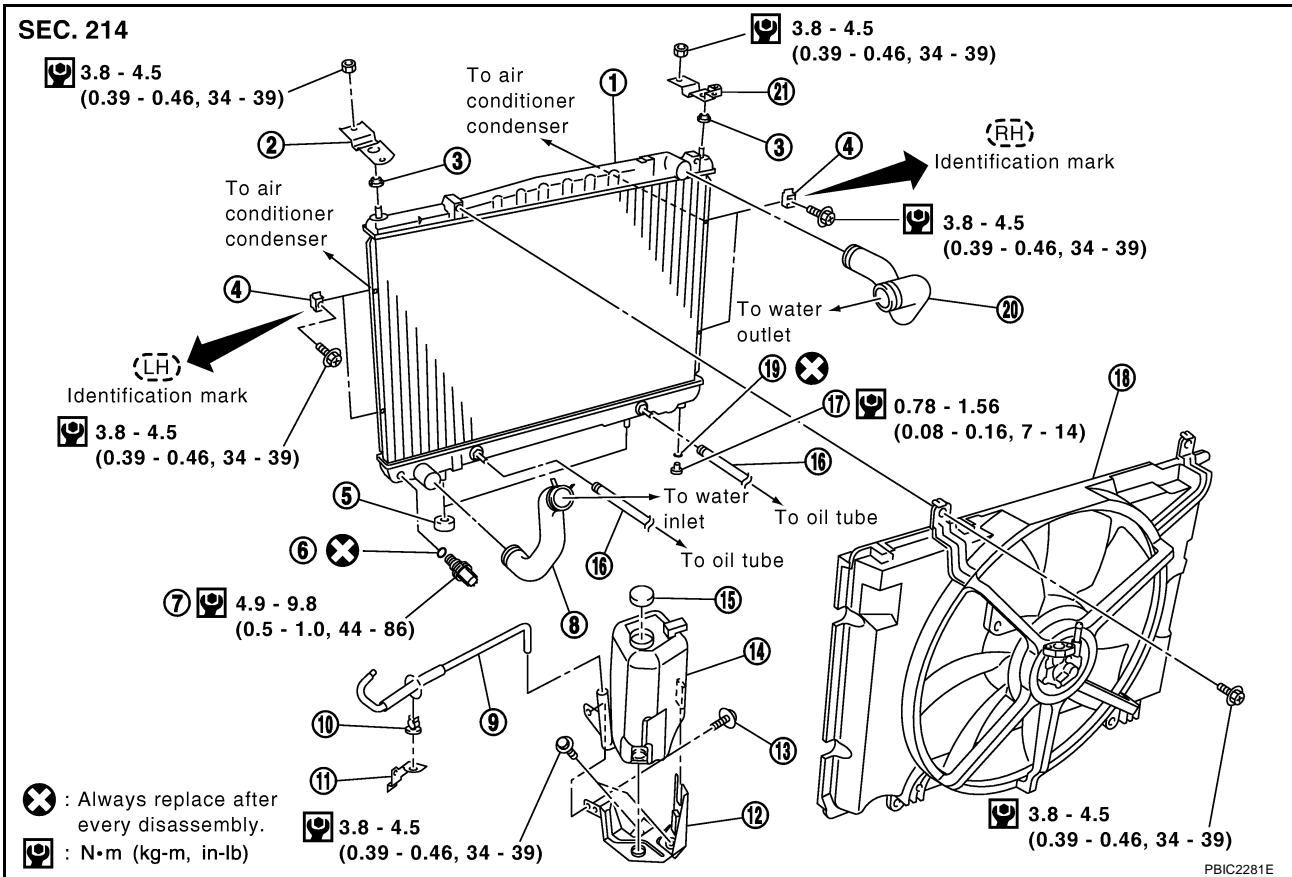
# RADIATOR

PFP:21400

ABS004R6

## RADIATOR

### Removal and Installation



### WARNING:

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

### REMOVAL

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

### CAUTION:

- Perform when the engine is cold.
  - Do not spill engine coolant on drive belts.
2. Remove cooling fan shroud. Refer to [CO-19, "Removal and Installation"](#) .
  3. Remove A/T oil cooler hoses.
    - Install blind plug to avoid leakage of A/T oil.
  4. Remove bolts of both right and left end of radiator core (2 bolts for each).

# RADIATOR

- Lift A/C condenser up approximately 2 cm (0.79 in). Remove the clips from the right and left flange parts of A/C condenser.

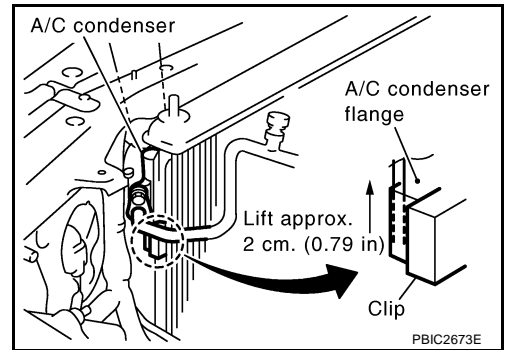
**CAUTION:**

To avoid putting a load on A/C piping, be careful not to lift too much.

- Lift up and remove radiator.

**CAUTION:**

- Do not damage or scratch radiator core when removing.
- After removing radiator, fix A/C condenser on the vehicle side with a rope or similar means. This is to prevent a load being applied to A/C piping.

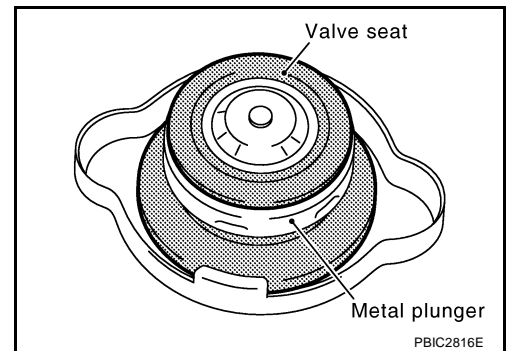


## INSTALLATION

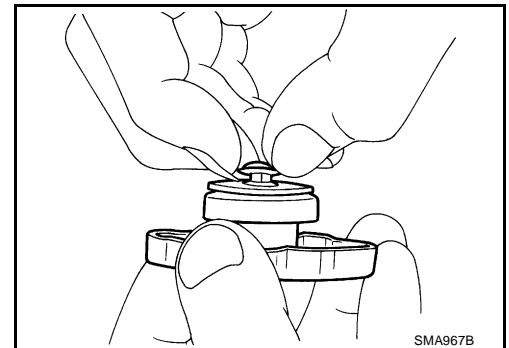
- Install in the reverse order of removal.
- Align identification marks to install clips of both right and left end of radiator core. Refer to radiator component illustration on top page.

## CHECKING RADIATOR CAP

- Valve seat of radiator cap inspection.
  - 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.

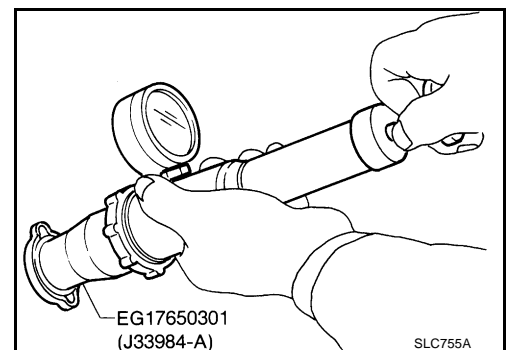


- Check radiator cap relief pressure.

**Standard : 78 - 98 kPa (0.8 - 1.0 kg/cm<sup>2</sup> , 11 - 14 psi)**

**Limit : 59 kPa (0.6 kg/cm<sup>2</sup> , 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.

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# RADIATOR

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**CAUTION:**

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

## CHECKING RADIATOR

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

**CAUTION:**

- **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 the harness and electrical connectors to prevent water from entering.**
1. Apply water by hose to the back side of 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/cm<sup>2</sup> , 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.

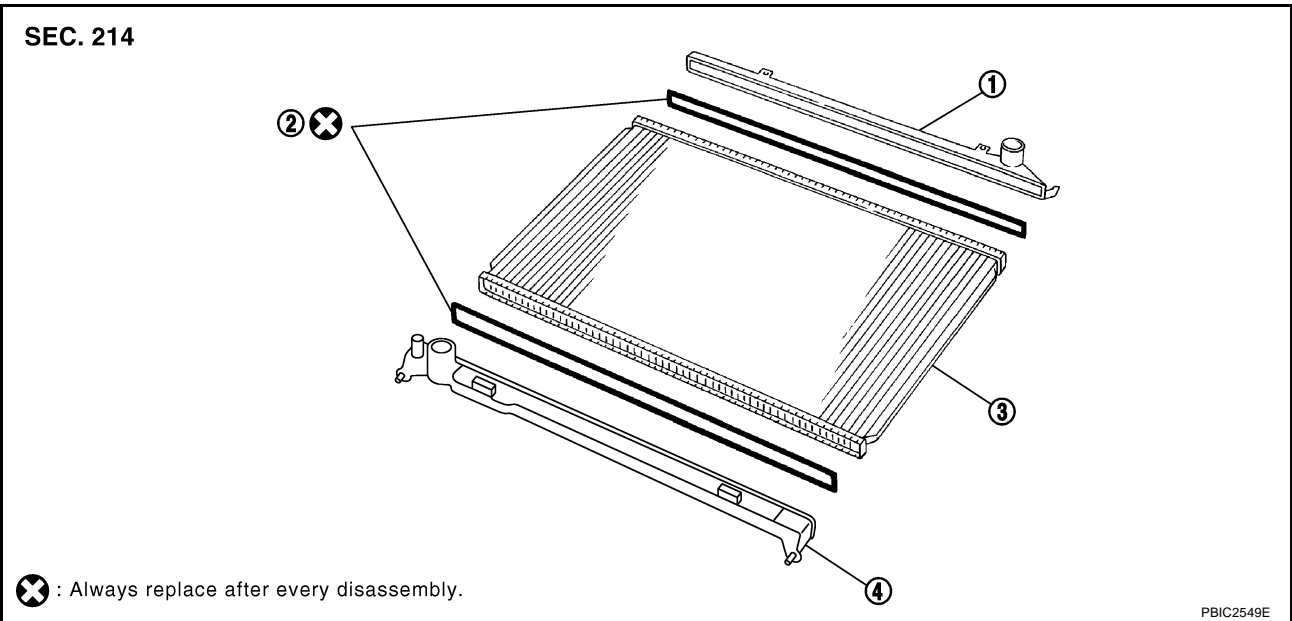
# RADIATOR (ALUMINUM TYPE)

## RADIATOR (ALUMINUM TYPE)

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### Disassembly and Assembly

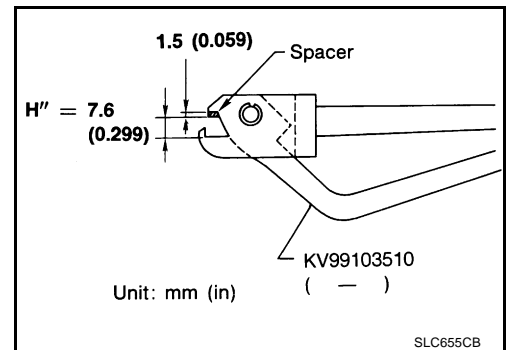
ABS004R7



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

### PREPARATION

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



### DISASSEMBLY

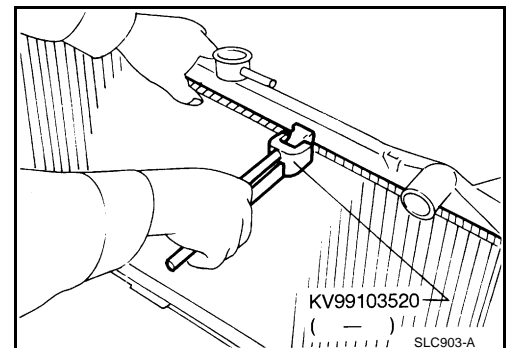
1. Remove upper and lower tanks with the radiator plate pliers B (SST).

#### CAUTION:

**Do not disassemble lower tank and A/T oil cooler.**

#### NOTE:

Lower tank and A/T oil cooler from a single part are handled as an assembly.

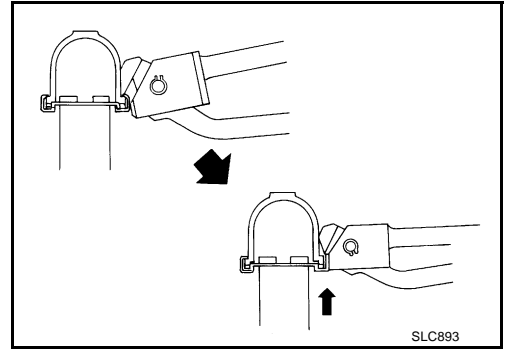


## RADIATOR (ALUMINUM TYPE)

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

**CAUTION:**

**Do not bend excessively.**

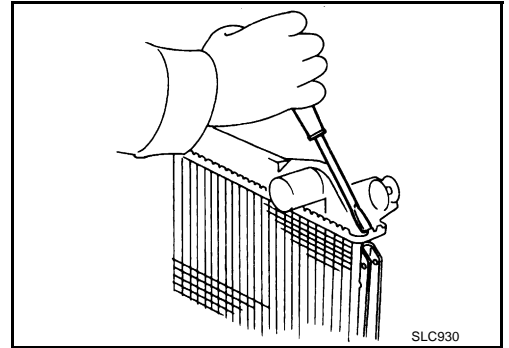


- In areas where the radiator plate pliers B cannot be used, use a screwdriver to bend the edge up.

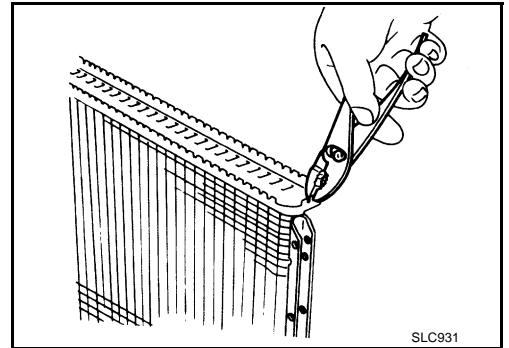
**CAUTION:**

**Be careful not to damage tank.**

2. Remove sealing rubber.

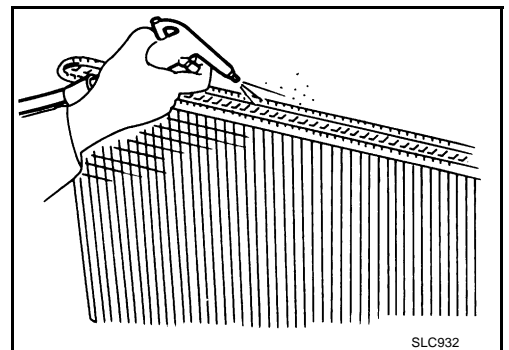


3. Make sure the edge stands straight up.



### ASSEMBLY

1. Clean contact portion of tank.



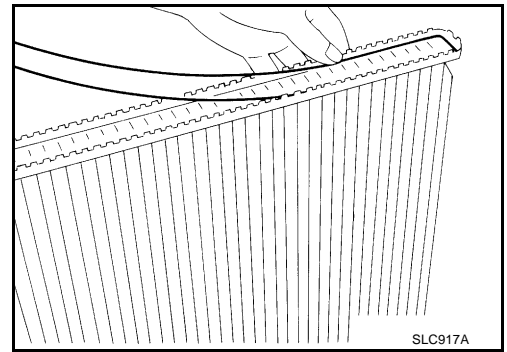


# RADIATOR (ALUMINUM TYPE)

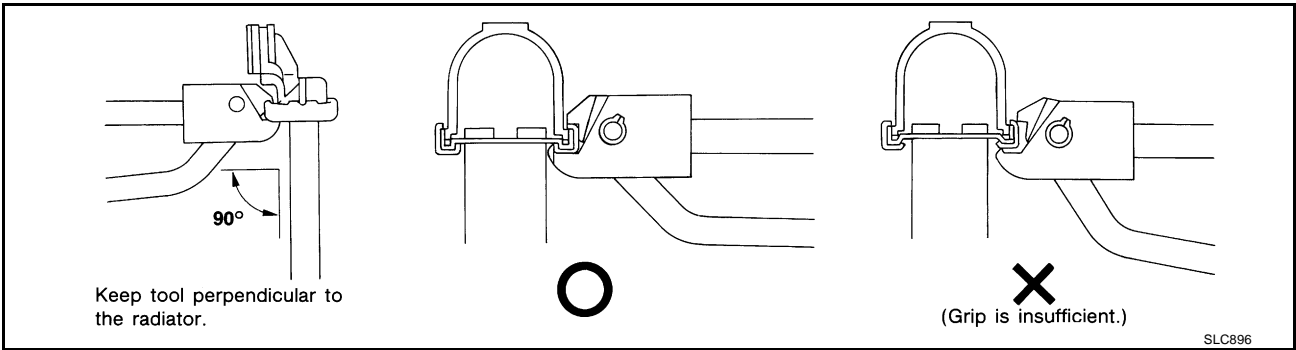
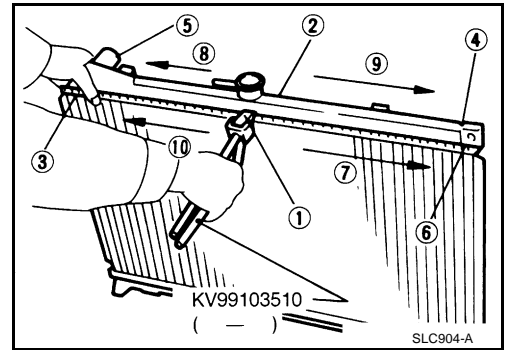
2. Install sealing rubber.

**CAUTION:**

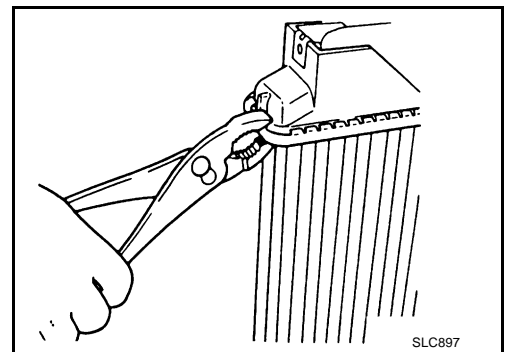
- Push it in with fingers.
- Be careful not to twist sealing rubber.



3. Caulk upper and lower tanks in numerical order as shown in the figure with radiator plate pliers A (SST).



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



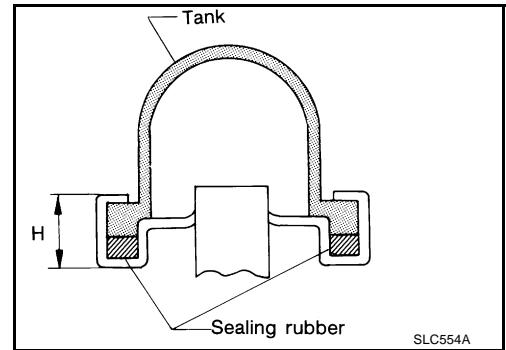
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# RADIATOR (ALUMINUM TYPE)

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

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

5. Confirm that there is no leakage. Refer to [CO-18, "INSPECTION"](#).



## INSPECTION

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

### NOTE:

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

### Testing pressure

**: 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)**

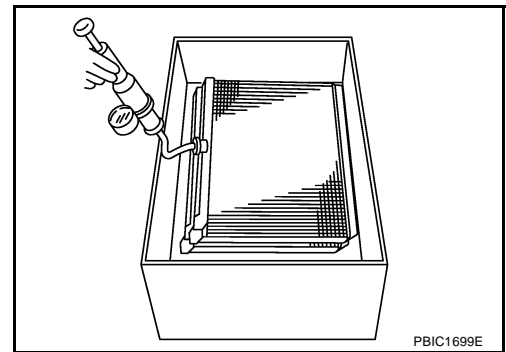
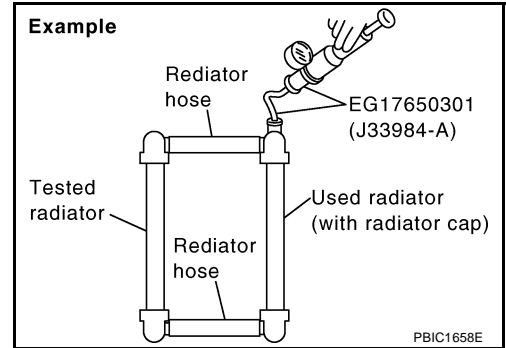
### WARNING:

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

### CAUTION:

Attach a hose to oil cooler to seal its inlet and outlet.

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

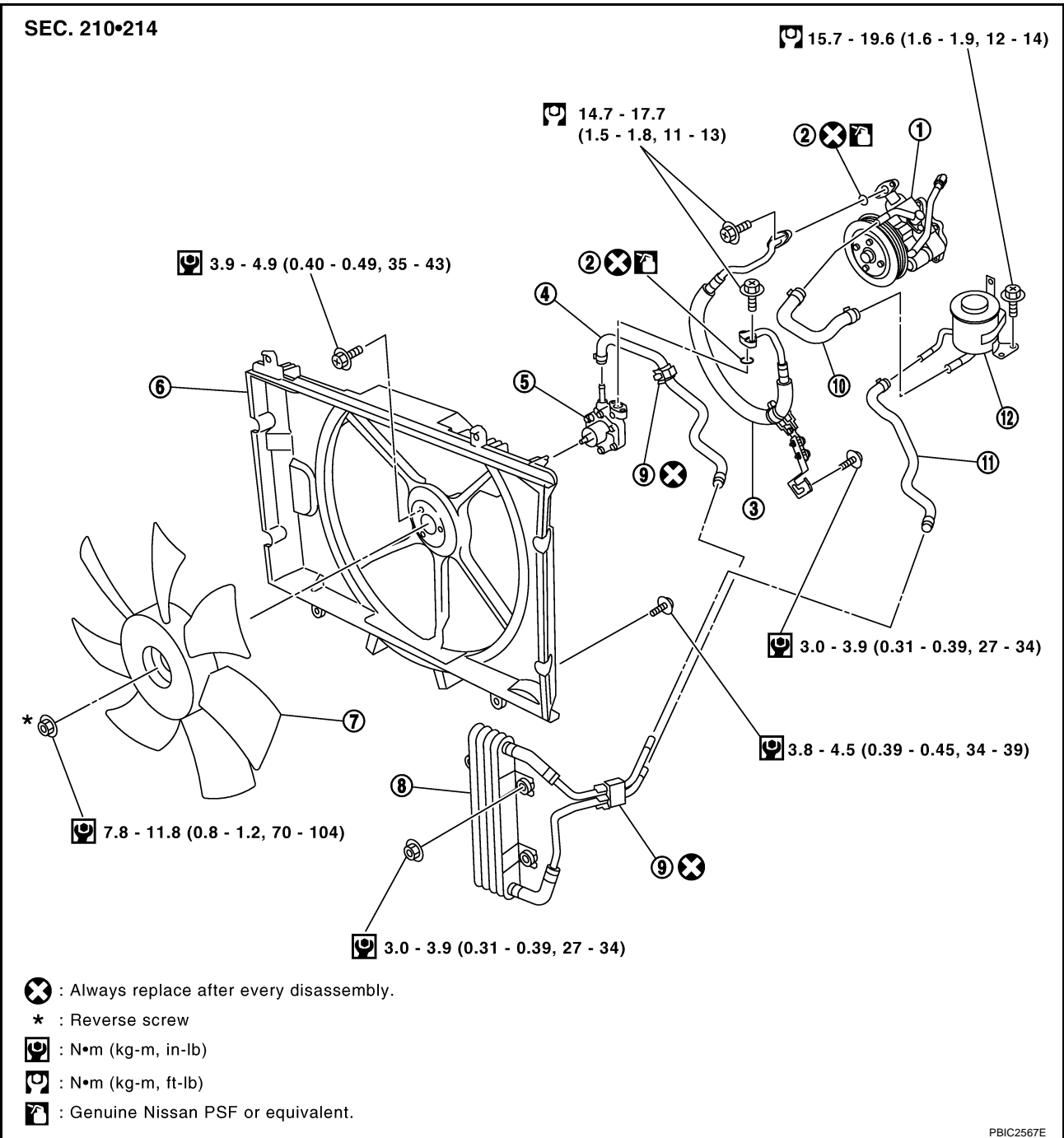


## COOLING FAN

PPF:21140

### Removal and Installation

ABS004R8



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- |                                                                |                                               |                       |
|----------------------------------------------------------------|-----------------------------------------------|-----------------------|
| 1. Cooling fan pump (with water pump)<br>(Do not disassemble.) | 2. O-ring                                     | 3. Fluid hose         |
| 4. Fluid hose                                                  | 5. Cooling fan motor<br>(Do not disassemble.) | 6. Cooling fan shroud |
| 7. Fan                                                         | 8. Cooling fan fluid cooler                   | 9. Clip               |
| 10. Fluid hose                                                 | 11. Fluid hose                                | 12. Reservoir tank    |

### REMOVAL

1. Remove air duct and air cleaner case. Refer to [EM-16, "Removal and Installation"](#) .
2. Remove engine undercover with power tool.
3. Drain engine coolant from radiator. Refer to [CO-9, "Changing Engine Coolant"](#) .

# COOLING FAN

## CAUTION:

- Perform when engine is cold.
  - Never remove radiator cap when engine is hot. Serious burns could occur from high pressure fluid escaping from radiator.
4. Disconnect radiator hoses (upper/lower).
  5. Remove the following parts from fan shroud: engine coolant temperature sensor harness, engine coolant reservoir tank hose, A/T oil cooler hose, mounting bolts for the cooling fan fluid hose bracket.
  6. Drain the cooling fan fluid.
    - Because there is no drain plug on reservoir tank or piping, drain the fluid from reservoir tank oil inlet and pipe division points.
    - Prepare a container with a volume of approximately 1 ℓ (2-1/8 US pt, 1-3/4 Imp pt) to drain the fluid into.
  7. Remove cooling fan fluid reservoir tank.
  8. Disconnect the hoses between cooling fan motor and cooling fan pump (joined with the water pump), and the hose between cooling fan motor and cooling fan fluid cooler.
    - Fluid will leak, so have shop cloths ready.
  9. Remove cooling fan shroud mounting bolts.
  10. Remove radiator mounting bracket. With radiator moved toward the vehicle front, lift up and remove cooling fan.

## CAUTION:

- Be careful not to scratch or damage radiator core.
- When removing cooling fan pump, remove it together with water pump. (They can not be separated.) Refer to [CO-22, "Removal and Installation"](#) .
- When removing cooling fan fluid cooler, be careful not to scratch or damage air conditioner condenser core.

## INSPECTION AFTER REMOVAL

- Turning oil cooling fan motor shaft by hands check if it rotates smoothly without looseness.
- Check visually for fluid leakage from cooling fan motor.
- For water pump inspection, refer to [CO-22, "WATER PUMP"](#) .

## INSTALLATION

Install in the reverse order of removal referring the following.

- For bleeding the air from the cooling system, refer to [CO-9, "REFILLING ENGINE COOLANT"](#) .

### Attaching the fluid pipe fixing clip

If fluid pipe fixing clip has been removed from the installation holes, it must be replaced with a new clip.

### Adding cooling fan fluid and bleeding air

The procedure below is for adding cooling fan fluid and bleeding air from the piping.

## CAUTION:

- Do not reuse the used fluid which was drained out.
- Use genuine Nissan PSF or equivalent. Refer to [MA-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

## NOTE:

The total fluid volume is 777 ml (26.3 US floz, 27.4 Imp floz) (with the cold maximum on level gauge when engine is cold).

1. Add fluid to reservoir tank until the fluid reaches the upper limit of the "HOT" level on level gauge. For the fluid level, refer to [CO-21, "INSPECTION AFTER INSTALLATION"](#) .
2. Start engine.
3. Run engine at idle speed for a few minutes. Then check the fluid level. If the level has decreased, add fluid.

## CAUTION:

- Be careful not to touch the fan while it is rotating.
- Be sure to add the fluid as necessary. If the fluid runs out in reservoir tank, air will be taken in.

## NOTE:

- With engine operating, reservoir tank cap can be removed to check the fluid level.

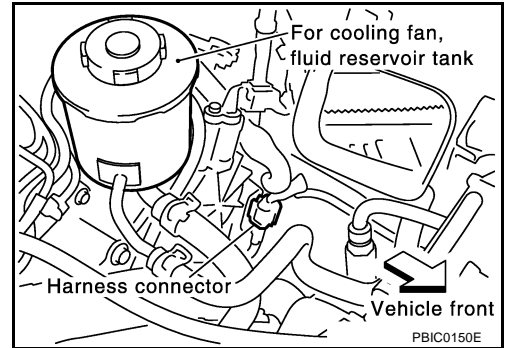
# COOLING FAN

- Immediately after starting, certain noise will come from the cooling fan pump. This is caused by air taken in to the piping and will gradually disappear.
4. Continue with step 3 until the level of the fluid stops decreasing.
  5. Stop engine and disconnect the harness connector for cooling fan speed control solenoid valve.

## NOTE:

When the solenoid valve harness is disconnected, fan will operate at full speed.

6. Start engine. Repeat step 3 until the fluid level stops decreasing and air bubbles stop coming out.
7. Stop engine. Connect the harness connector for cooling fan speed control solenoid valve.



## INSPECTION AFTER INSTALLATION

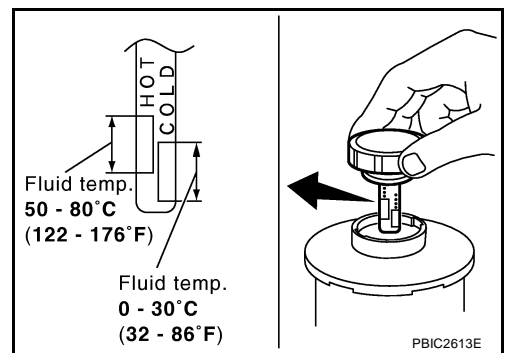
- Check that there is no fluid leakage from any hose connection or any other part.
- Check the fluid level with level gauge on reservoir tank cap. If there is too much or too little, adjust the amount of fluid.
- Check that under the fluid temperature conditions below, the fluid level is within the "COLD" or "HOT" range on level gauge.

**COLD** : Fluid temperature 0 - 30 °C (32 - 86 °F)

**HOT** : Fluid temperature 50 - 80 °C (122 - 176 °F)

## NOTE:

- There is no specified timing for replacing the fluid.
- Refer to [EC-578, "DTC P1480 COOLING FAN SPEED CONTROL SOLENOID VALVE"](#) for control of cooling fan.



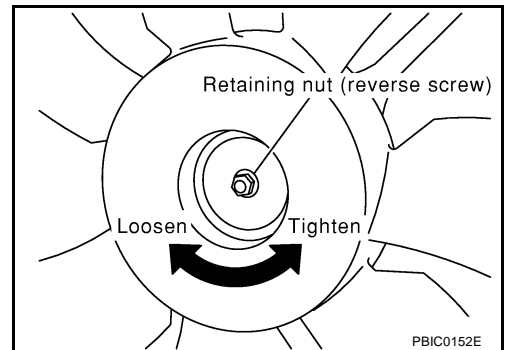
## Disassembly and Assembly

### DISASSEMBLY

1. Remove fan.

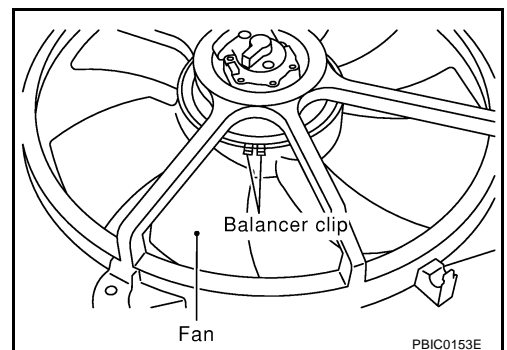
## CAUTION:

- **Reverse screws are used for the fan attachment nuts. When removing or attaching, turn the nut the opposite way as for a normal screw.**



- **Do not remove balancer clip from fan.**
- **For the case if the balancer clip is removed, make an alignment mark for the installation position on the fan side.**

2. Remove cooling fan motor from cooling fan shroud.



## ASSEMBLY

Assemble in the reverse order of disassembly.

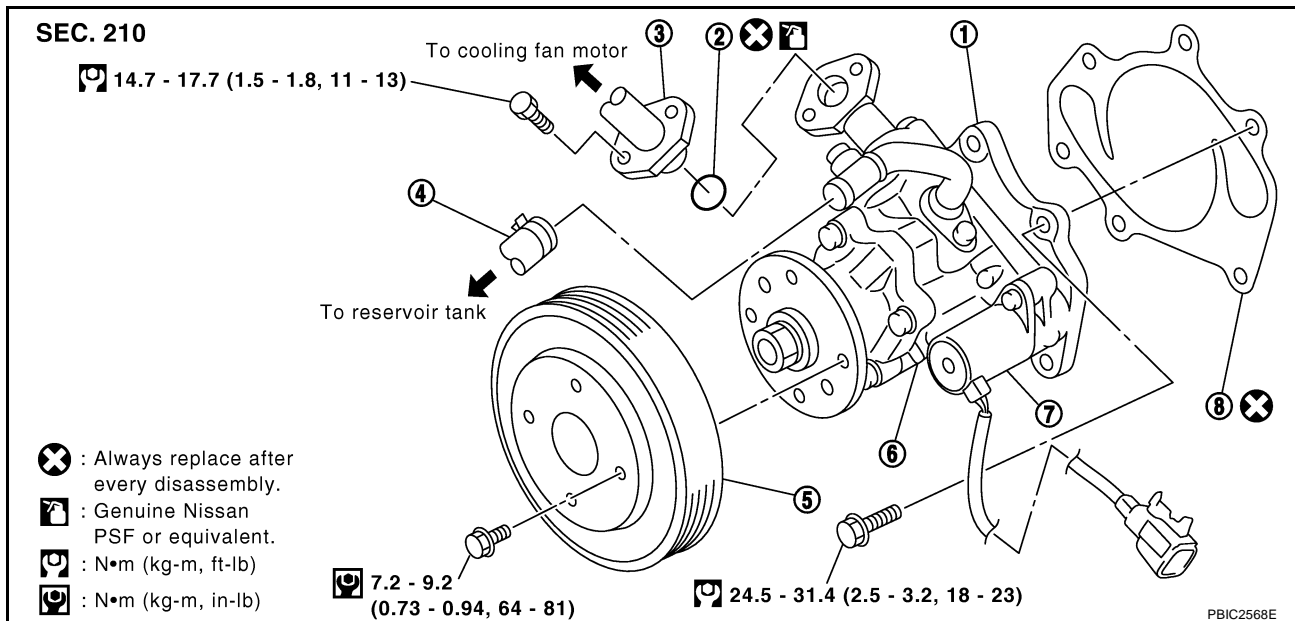
# WATER PUMP

## WATER PUMP

PFP:21020

### Removal and Installation

ABS004RA



- |                                                                      |                      |                                              |
|----------------------------------------------------------------------|----------------------|----------------------------------------------|
| 1. Water pump<br>(Do not disassemble.)                               | 2. O-ring            | 3. Fluid hose (feed side)                    |
| 4. Fluid hose (return side)                                          | 5. Water pump pulley | 6. Cooling fan pump<br>(Do not disassemble.) |
| 7. Cooling fan speed control solenoid valve<br>(Do not disassemble.) | 8. Gasket            |                                              |

### WARNING:

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

### REMOVAL

1. Drain engine coolant so that no engine coolant comes out from water pump fitting hole. Refer to [CO-9, "ENGINE COOLANT"](#).

### CAUTION:

Perform when engine is cold.

2. Remove below the parts.
  - Engine undercover
  - Air duct and engine cover; Refer to [EM-12, "Removal and Installation"](#).
  - Alternator, water pump and A/C compressor belt  
For removing drive belt, refer to [EM-13, "Removal and Installation"](#).

### CAUTION:

Leave auto tensioner pulley in its fixed position when removing drive belt.

3. Disconnect the harness connector for cooling fan speed control solenoid valve (joined with water pump).
4. Remove water pump pulley.
5. Disconnect cooling fan fluid hose.
  - Because there is no drain plug, drain the fluid from the hose separation point.
  - Prepare a receptacle with a volume of approximately 1 ℓ (2-1/8 US pt, 1-3/4 Imp pt).
6. Remove water pump.
  - Engine coolant will leak from cylinder block, so have a receptacle ready below.

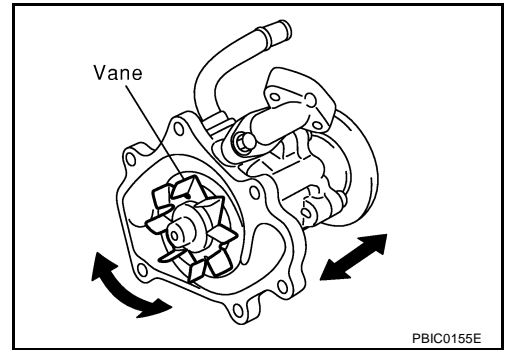
### CAUTION:

- Handle water pump vane so that it does not contact any other parts.
- Do not disassemble water pump (including cooling fan pump and cooling fan speed control solenoid valve).

# WATER PUMP

## INSPECTION AFTER REMOVAL

- Visually check that there is no significant dirt or rusting on water pump body and vane.
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Visually check that there is no fluid leakage from cooling fan pump part and cooling fan speed control solenoid valve part.
- If there are any unusualness, replace water pump assembly.



## INSTALLATION

- Install in the reverse order of removal.
- Apply Genuine Nissan PSF (the cooling fan fluid) or equivalent to O-ring of cooling fan fluid hose (on the feed side). Then insert O-ring to water pump so that it does not come out of the attachment groove.
- For bleeding the air from the cooling system, refer to [CO-9, "REFILLING ENGINE COOLANT"](#) .
- For bleeding the air from the cooling fan fluid, refer to [CO-20, "INSTALLATION"](#) .

## 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, "CHECKING COOLING SYSTEM FOR LEAKS"](#) .
- Start engine. Visually check that there is no leaks of engine coolant and cooling fan fluid.

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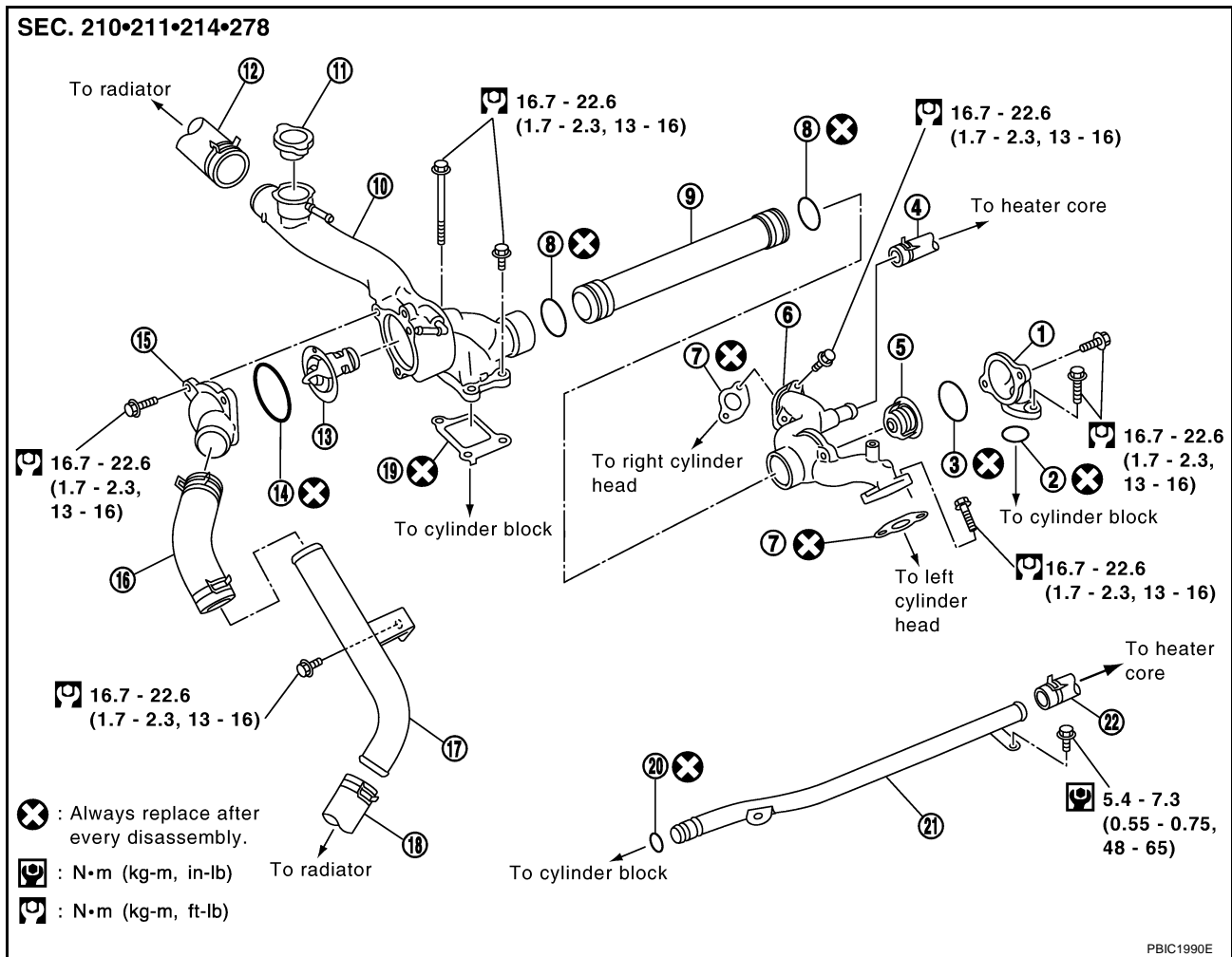
# THERMOSTAT AND WATER CONTROL VALVE

PFP:21200

ABS004RB

## THERMOSTAT AND WATER CONTROL VALVE

### Removal and Installation



PBIC1990E

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

### WARNING:

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

### REMOVAL

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

### CAUTION:

Perform when engine is cold.

2. Remove air duct and engine cover. Refer to [EM-16, "Removal and Installation"](#) .
3. Remove water suction hose from water inlet side.
4. Remove water inlet and thermostat.
5. Remove intake manifold upper and intake manifold lower. Refer to [EM-18, "INTAKE MANIFOLD"](#) .
6. Remove thermostat housing, water outlet pipe, water control valve, rear water outlet and heater pipe (between left and right banks).



# THERMOSTAT AND WATER CONTROL VALVE

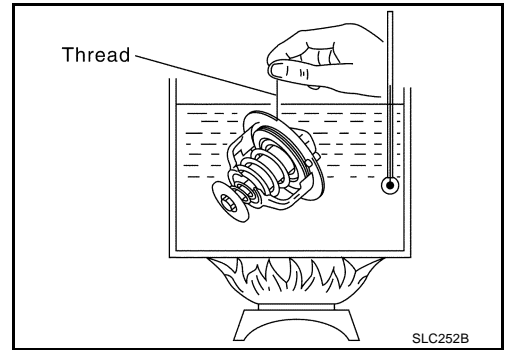
## INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves of 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 falls from the thread.
- Continue heating. Check the full-open lift amount.

### NOTE:

The full-open lift amount standard temperature for 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

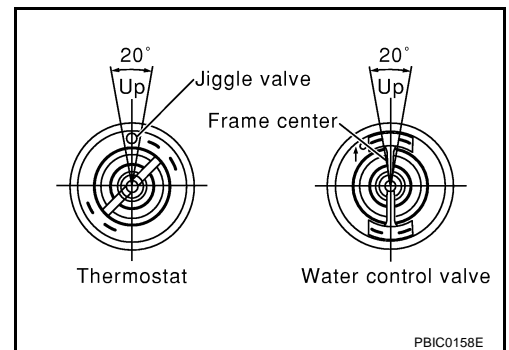
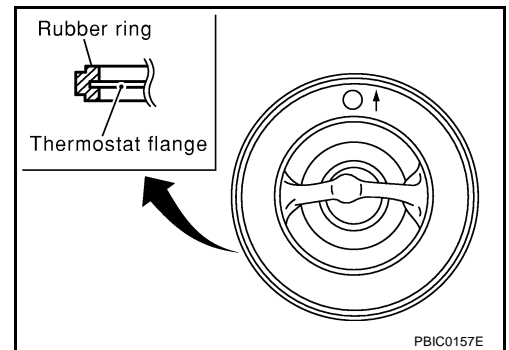
	Thermostat	Water control valve
Valve opening temperature	80 - 84°C (176 - 183° F)	93.5 - 96.5°C (200 - 206°F)
Full-open lift amount	More than 10 mm/ 95°C (0.39 in/ 203 °F)	More than 8 mm/ 108°C (0.315 in/ 226 ° F)
Valve closing temperature	77°C (171°F)	90°C (194° F)

## INSTALLATION

Install in the reverse order of removal.

### Installation of Thermostat and Water Control Valve

- Install thermostat and water control valve with the whole circumference of each flange part fit securely inside rubber ring. (The example in the figure shows thermostat.)
- Install thermostat with the jiggle-valve facing upwards. (The position deviation may be within the range of  $\pm 10$  degrees.)
- Install water control valve with the up-mark facing up and the frame center part facing upwards. (The position deviation may be within the range of  $\pm 10$  degrees.)



# THERMOSTAT AND WATER CONTROL VALVE

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## Installation of Water Outlet Pipe and Heater Pipe

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

## INSPECTION AFTER INSTALLATION

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

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PPF:00030

### Standard and Limit CAPACITY

ABS004RC

Engine coolant capacity (With reservoir tank at "MAX" level)	Approximately 9.8 ℓ (10-3/8 US qt, 8-5/8 Imp qt)
Reservoir tank engine coolant capacity (at "MAX" level)	0.8 ℓ (7/8 US qt, 3/4 Imp qt)
Cooling fan fluid capacity	777 m ℓ (26.3 US floz, 27.4 Imp floz)

### 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	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 (kg/cm<sup>2</sup>, psi)

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

### Tightening Torque

ABS004RD

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

Radiator mounting bracket	3.8 - 4.5 (0.39 - 0.46, 34 - 39)*
Radiator drain plug	0.78 - 1.56 (0.08 - 0.16, 7 - 14)*
Radiator coolant temperature sensor	4.9 - 9.8 (0.5 - 1.0, 44 - 86)*
Cooling fan shroud	3.8 - 4.5 (0.39 - 0.46, 34 - 39)*
Reservoir tank bracket	3.8 - 4.5 (0.39 - 0.46, 34 - 39)*
Fan	7.8 - 11.8 (0.8 - 1.2, 70 - 104)*
Cooling fan motor	3.9 - 4.9 (0.40 - 0.49, 35 - 43)*
Cooling fan fluid cooler	3.0 - 3.9 (0.31 - 0.39, 27 - 34)*
Fluid hose	14.7 - 17.7 (1.5 - 1.8, 11 - 13)
Reservoir tank	15.7 - 19.6 (1.6 - 1.9, 12 - 14)
Water pump pulley	7.2 - 9.2 (0.73 - 0.94, 64 - 81)*
Water pump	24.5 - 31.4 (2.5 - 3.2, 18 - 23)
Water inlet	16.7 - 22.6 (1.7 - 2.3, 13 - 16)
Thermostat housing	16.7 - 22.6 (1.7 - 2.3, 13 - 16)
Rear water outlet	16.7 - 22.6 (1.7 - 2.3, 13 - 16)
Water connector	16.7 - 22.6 (1.7 - 2.3, 13 - 16)
Water suction pipe	16.7 - 22.6 (1.7 - 2.3, 13 - 16)
Heater pipe	5.4 - 7.3 (0.55 - 0.75, 48 - 65)*

# SERVICE DATA AND SPECIFICATIONS (SDS)

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