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# DAIHATSU

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# G202

CB-Engine

**CO**

## COOLING SYSTEM

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G2CO00001-00000

## 1. PRECAUTIONS

- As regards water to be used as cooling water, use soft water which does not contain salts of minerals, calcium, magnesium and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant using water.
- Never open the radiator cap when the cooling water is still hot.
- The inside of the radiator is under a pressurized condition when the cooling water is hot. Therefore, if the radiator cap should be removed, the cooling water will blow off, possibly causing injuries such as scald.

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## 2. CHECK & CHANGE OF ENGINE COOLANT

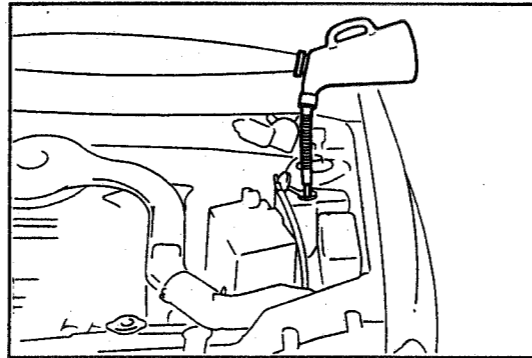
### (1) Check of coolant level

Check to see if the coolant level is between the LOW and FULL lines of the reserve tank.

If the coolant level is near the low level or below the low level, add the coolant up to the full level.

#### NOTE:

- If no coolant is present in the reserve tank or the coolant level is very low, check for water leakage, using a radiator cap tester. (See page CO-11.)
- Here, the coolant refers to the mixture of water and antifreeze of a reliable brand that has been mixed in accordance with the instructions of the antifreeze manufacturer.



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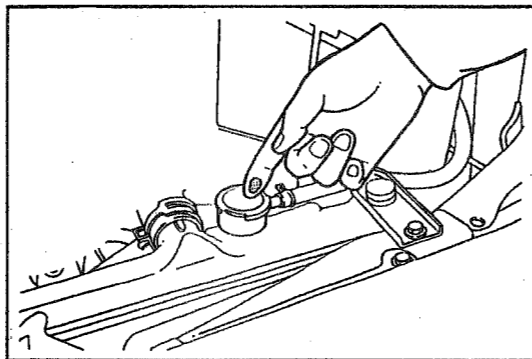
### (2) Check of coolant quality

There should be no excessive deposits of rust or water scales around the radiator cap or the radiator filler hole. Also, the coolant should be free of oil.

Change the coolant if it is excessively dirty.

#### CAUTION:

- Never open the radiator cap when the engine is still hot.
- Failure to observe this caution will cause you to get scalded.



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### (3) Change of engine coolant

- ① Remove the radiator cap.

#### CAUTION:

- Never open the radiator cap and/or the drain plug when the engine is still hot. Failure to observe this caution will cause you to get scalded.

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- ② Place a suitable container below the radiator drain plug. Drain the coolant by loosening the drain plug.
- ③ Close the drain plug.
- ④ Fill the system with water.
- ⑤ Start the engine, and stop it.
- ⑥ Repeat the steps ① through ⑤.

#### NOTE:

- Before tightening the drain plug finally, be sure to replace the O-ring of the drain plug with a new one.

- ⑦ Drain the coolant from reserve tank.
- ⑧ Fill the radiator and reserve tank with antifreeze solution in accordance with the instructions of the manufacturer of the antifreeze solution.

#### CAUTION:

- Use a reliable brand of ethylene-glycol base antifreeze solution.

Coolant Capacity: 3.8 liter

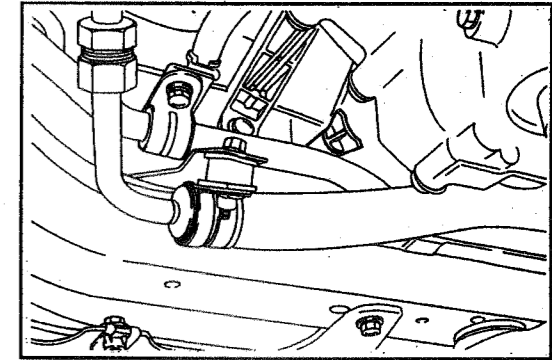
- ⑨ Fill the system with water.
- ⑩ Start the engine. Check to see if the coolant level in radiator drops. If the coolant level drops, replenish water.
- ⑪ Install the radiator cap and reserve tank cap.

- ⑫ Warm up engine until the radiator fan motor starts to rotate. Afterwards, allow the coolant to cool down to the atmospheric temperature. Recheck the coolant level at the reserve tank. Add coolant to the full level, as required.
- If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required. Replenish the reserve tank with coolant up to the full level.

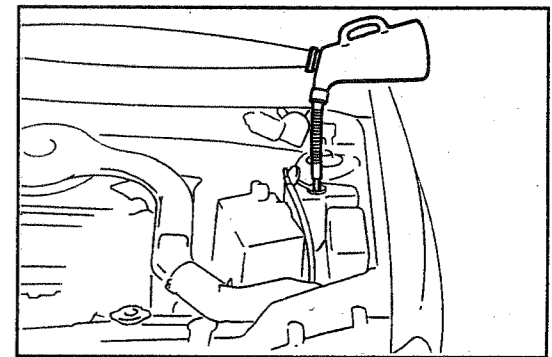
#### NOTE:

- Here, the coolant refers to the mixture of water and antifreeze that has been mixed in accordance with the instructions of the antifreeze manufacturer.

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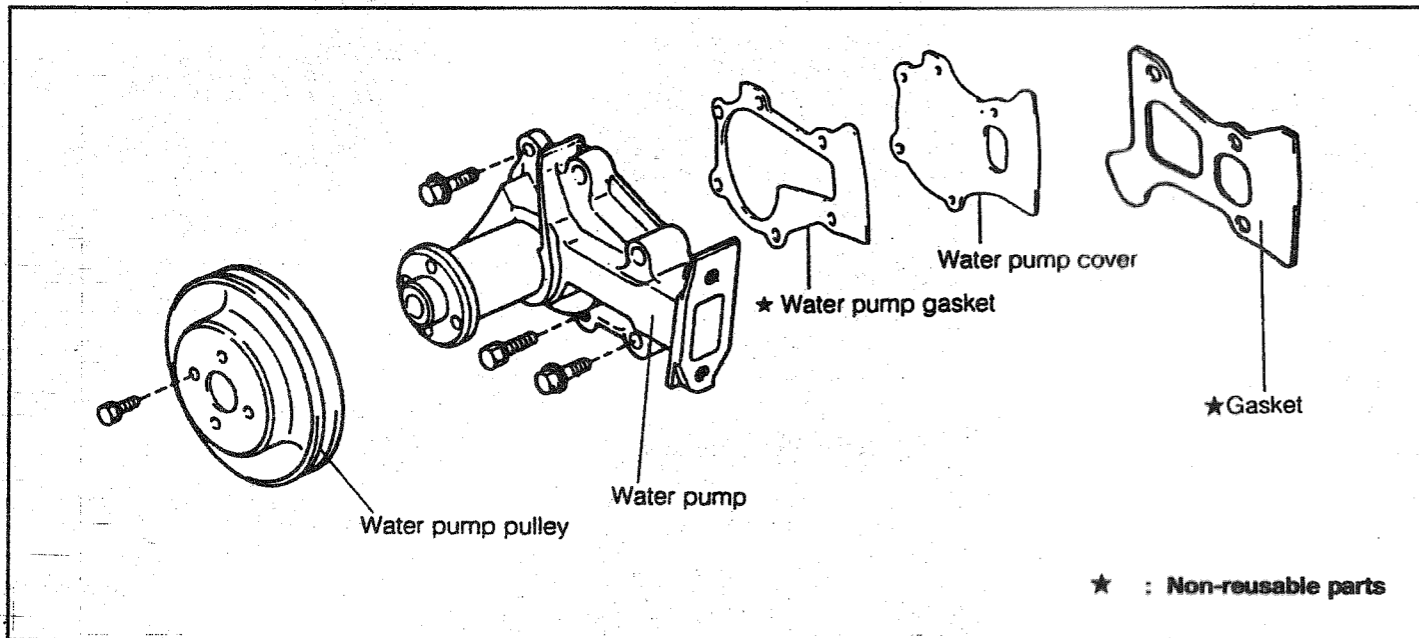
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### 3. WATER PUMP

#### (1) COMPONENTS



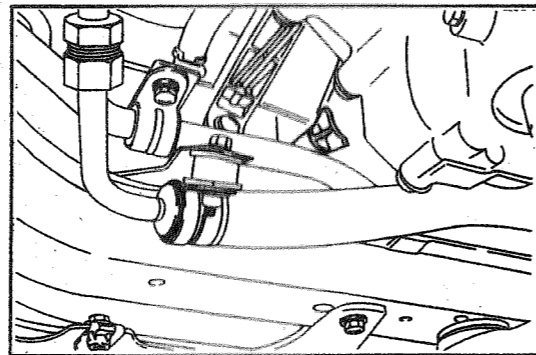
G2CO0010-99999

#### (2) REMOVAL OF WATER PUMP

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
2. Drain the coolant as follows.  
Open the radiator cap and drain plug, and allow the coolant to drain into a clean container.

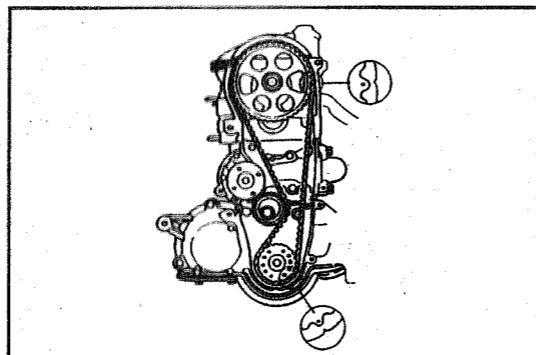
**CAUTION:**

- Never open the radiator cap and/or drain plug. When the engine is still hot.



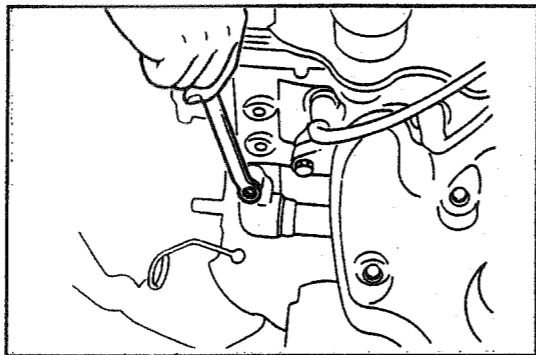
G2CO0011-99999

3. Remove the timing belt.  
(Refer to the MA section of the service manual.)



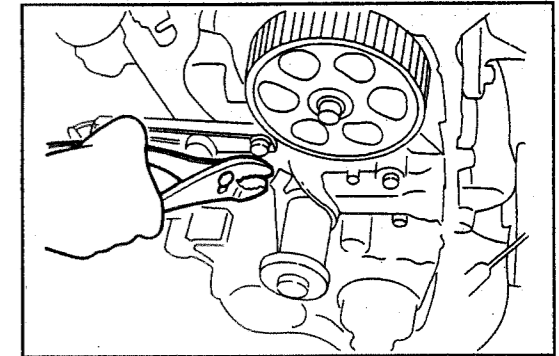
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4. Remove the water inlet.



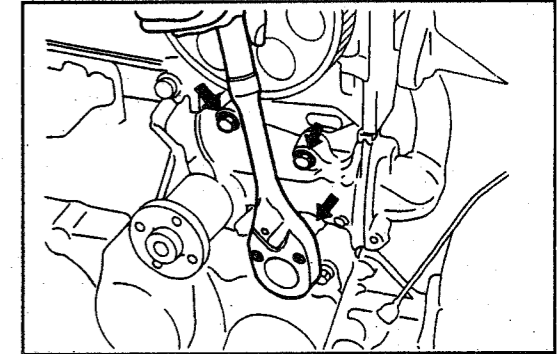
G2CO0013-99999

5. Remove the water hose from water pump.



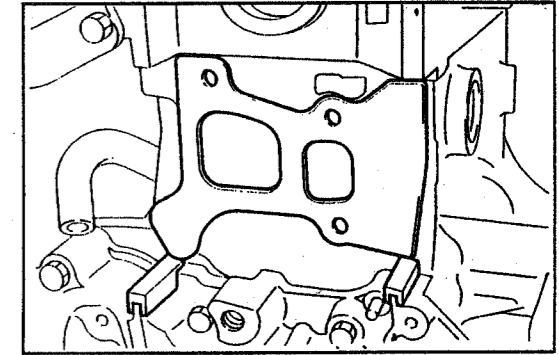
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6. Removal of water pump  
Remove the water pump by removing the bolts.



G2CO0015-99999

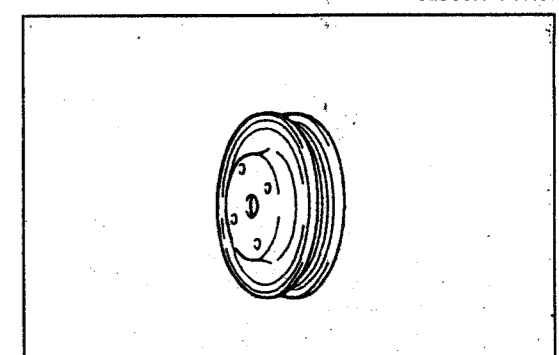
7. Remove the dust seal.
8. Remove the gasket material from cylinder block.



G2CO0016-99999

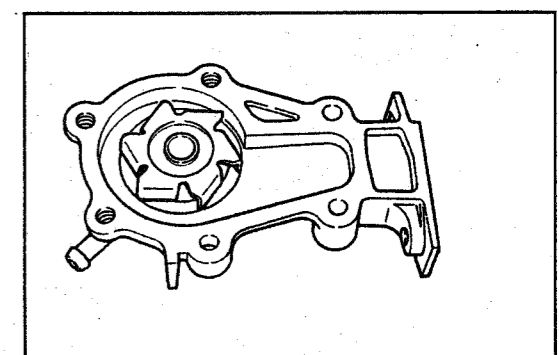
#### (3) INSPECTION OF WATER PUMP-RELATED PARTS

1. Check the water pump pulley for damage or deformation.  
Replace the water pump if it exhibits damage or deformation.



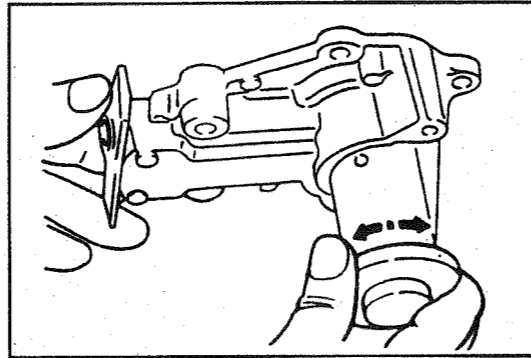
G2CO0017-99999

2. Remove the water pump cover.
3. Visually inspect the water pump rotor for damage or deformation.  
Replace the water pump if the water pump rotor exhibits damage or deformation.
4. Install the water pump cover to the water pump with a new gasket.



G2CO0018-99999

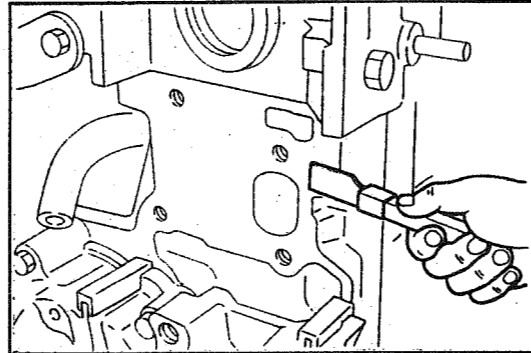
5. Ensure that the water pump rotates smoothly by hand. Replace the water pump if it will not rotate smoothly.



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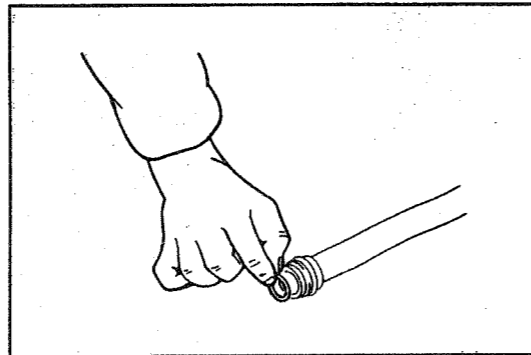
**(4) INSTALLATION OF WATER PUMP**

1. Remove the gasket material from the water pump installing surface of the cylinder block, using a gasket scraper.
2. Remove the gasket material from the water pump, using a gasket scraper.
3. Install a new gasket to the cylinder block.



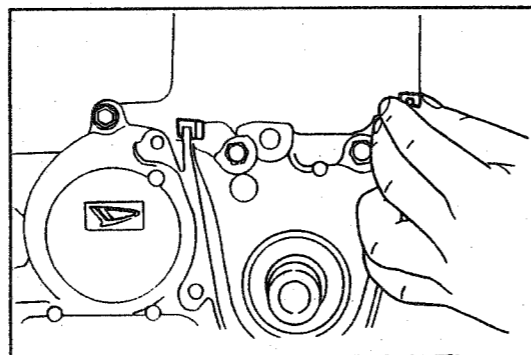
G2CO00020-99999

4. Replace the O-ring of the water inlet pipe with a new one.



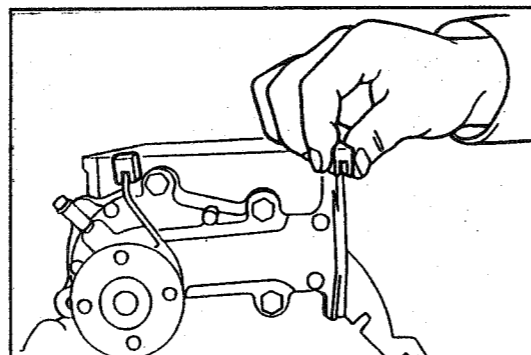
G2CO00021-99999

5. Install the dust seal to the balance shaft gear cover.



G2CO00022-99999

6. Install the dust seal to the water pump.



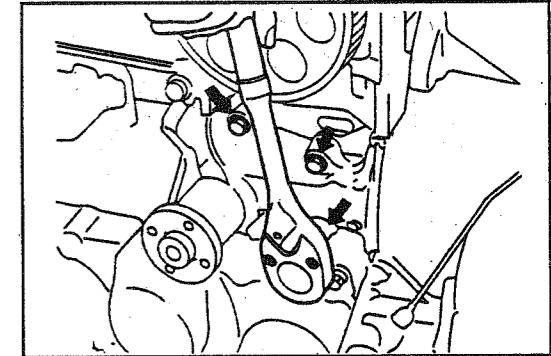
G2CO00000-99999

7. Install the water pump on the cylinder block with a new gasket interposed.

Tightening Torque: 14.7 - 21.6 N·m  
(1.5 - 2.2 kgf-m,  
10.8 - 15.9 ft-lb)

**NOTE:**

- Before the new gasket is installed, be sure to remove any remaining trace of the old gasket from the gasket surfaces of the cylinder block and water pump.



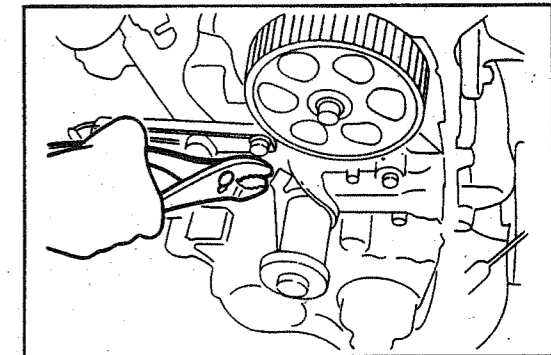
G2CO00023-99999

8. Install the water inlet to the water pump with a new gasket interposed. At the same time, insert the water inlet into the water inlet pipe.

**NOTE:**

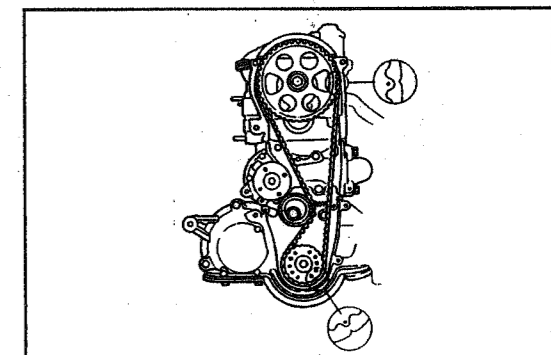
- Before the new gasket is installed, be sure to remove any remaining trace of the old gasket from the gasket surfaces of the water pump and water inlet. Be very careful not to scratch the O-ring.

9. Connect the water hose to the water pump.



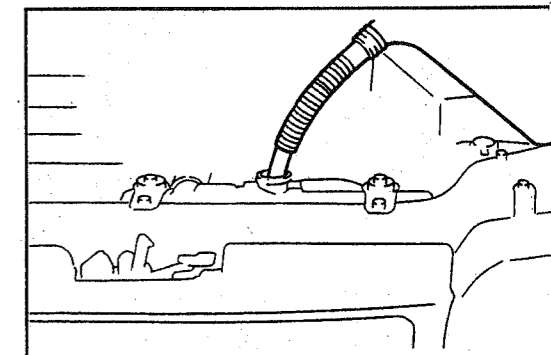
G2CO00024-99999

10. Install the timing belt.  
(Refer to the MA section of the service manual.)



G2CO00025-99999

11. Fill coolant.  
(See page CO-3.)



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## 4. THERMOSTAT

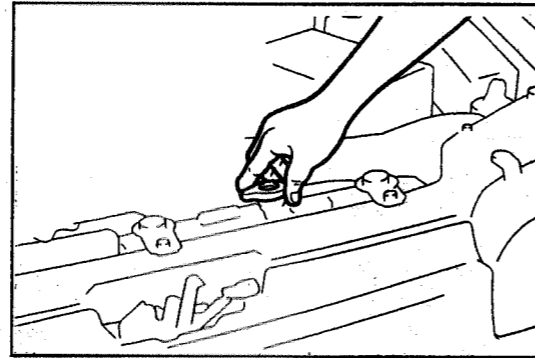
### (1) REMOVAL OF THERMOSTAT

1. Drain the coolant as follows:
  - ① Remove the radiator cap.

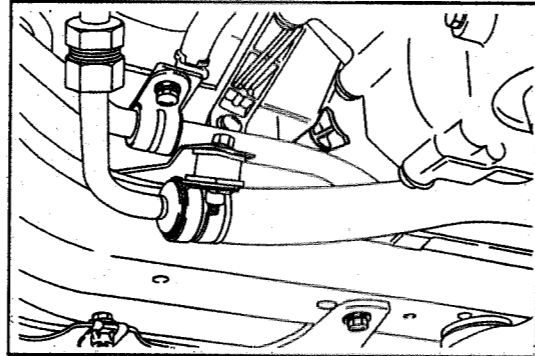
#### WARNING:

- Never open the radiator cap and/or drain plug when the engine is still hot. Failure to observe this caution will cause you to get scalded.

- ② Place a suitable container below the radiator drain plug. Drain the coolant by loosening the drain plug.
- ③ Tighten the drain plug.
- ④ Remove the air cleaner case.

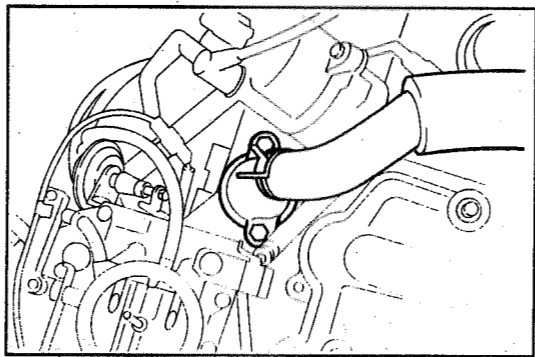


G2CO00027-99999



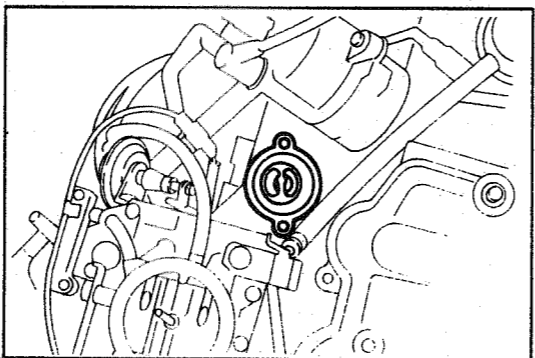
G2CO00028-99999

2. Disconnect the radiator upper hose from the water outlet.



G2CO00029-99999

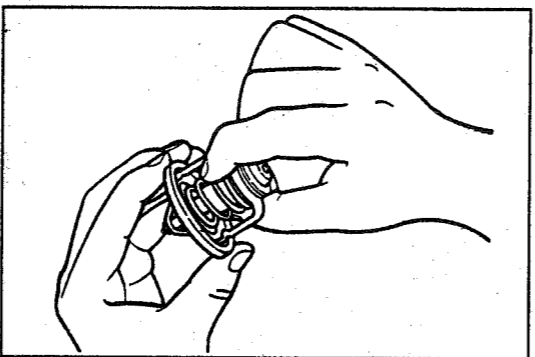
3. Remove the water outlet.
4. Remove the thermostat.



G2CO00030-99999

### (2) INSPECTION OF THERMOSTAT

1. Ensure that the thermostat valve is closed completely at room temperature 20°C (68°F) and the spring has no play. Replace the thermostat if the valve is open or the spring has a play.

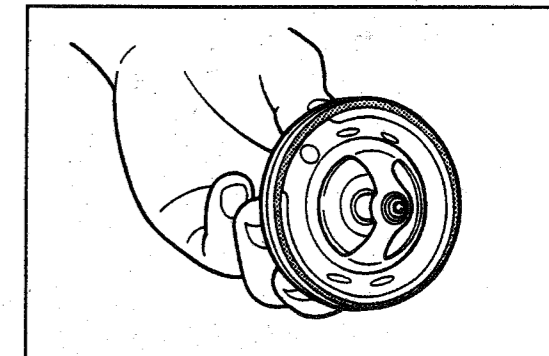


G2CO00031-99999

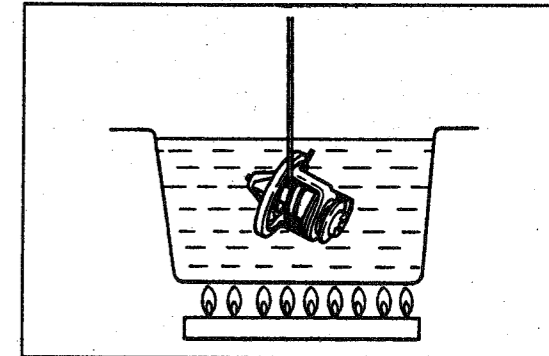
2. Check the rubber grommet of the thermostat for damage or crack. Replace the thermostat if the rubber grommet exhibits damage or crack.
3. Immerse the thermostat in water, and check the valve opening temperature by heating the water gradually.

Specifications	Valve opening temperature °C (°F)	Valve lift
Standard specifications	80.5 - 83.5 (176.9 - 182.3)	8.0 mm or more at 95°C (0.31 inch or more at 203.0°F)
Cold area specifications	86.5 - 89.5 (187.7 - 193.1)	8.0 mm or more at 100°C (0.31 inch or more at 212.0°F)

Replace the thermostat if the valve operation fails to conform to the specifications.



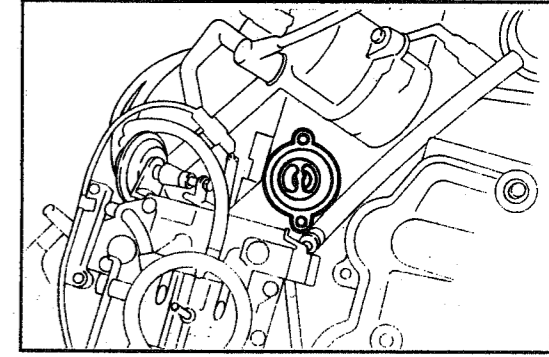
G2CO00032-99999



G2CO00033-99999

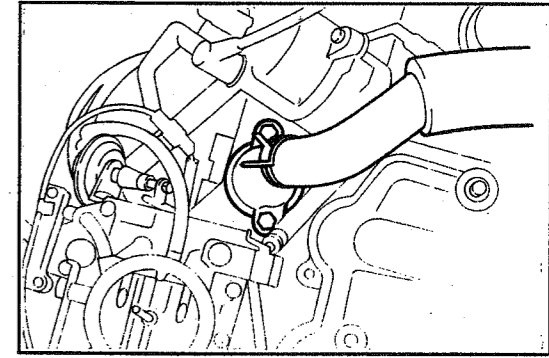
### (3) INSTALLATION OF THERMOSTAT

1. Install the thermostat.



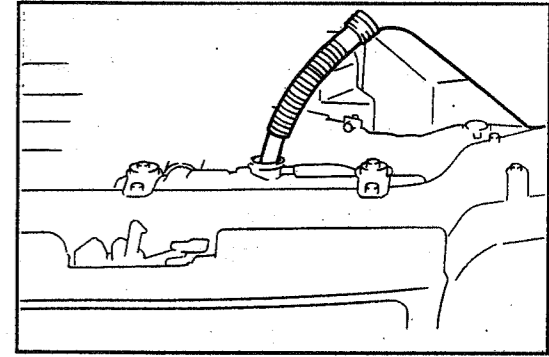
G2CO00034-99999

2. Install the water outlet with a new gasket.  
Tightening Torque: 14.7 - 21.6 N·m  
(1.5 - 2.2 kgf·m,  
10.8 - 15.9 ft·lb)



G2CO00035-99999

3. Connect the radiator upper hose to the water outlet.



G2CO00036-99999

4. Fill coolant.  
(See page CO-3.)
5. Start the engine and check it for leakage. Repair the leaky point if the leakage exists.

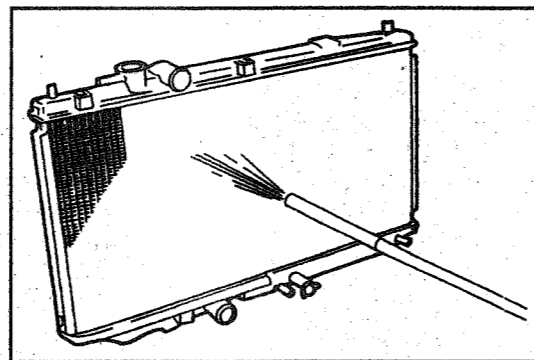
## 5. RADIATOR

### (1) CLEANING OF RADIATOR

Using water or steam cleaner, remove mud and dirt from the radiator core.

#### CAUTION:

- When using a high-pressure type cleaner, be very careful not to deform the radiator core fins.
- Keep a distance of more than 40 - 50 cm (15.75 - 19.69 inches) between the radiator core and the cleaner nozzle when the cleaner nozzle pressure is 2.9 - 4.9 MPa (30 - 50 kgf/cm<sup>2</sup>, 427 - 711 psi).
- Also, the injection angle of pressurized water should be right angles to the radiator.
- Failure to observe this caution will cause the radiator fins to be deformed.



G2CO00037-99999

### (2) INSPECTION OF RADIATOR

#### 1. Check of radiator cap

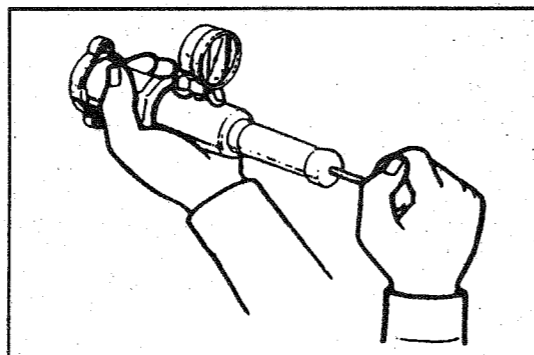
- ① Check the radiator cap by means of a radiator cap tester to see if the relief valve opens at a pressure of 58.8 - 103 kPa (0.6 - 1.05 kgf/cm<sup>2</sup>, 8.53 - 14.9 psi). If the radiator cap fails to conform to the specification, replace the radiator cap.

#### CAUTION:

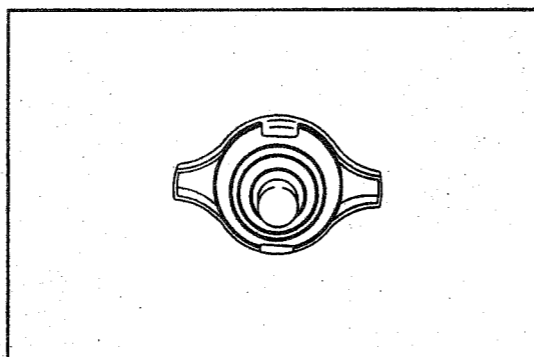
- Never open the radiator cap when the engine is still hot.
- Failure to observe this caution will cause you to get scalded.

- ② Check the seal packing of the radiator cap for damage. Replace the radiator cap with a new one, if any damage exists.

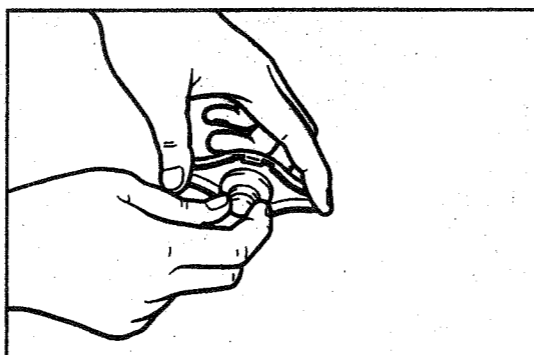
- ③ Lift the valve at the vacuum side with your fingers. Ensure that the valve is functioning properly. Replace the radiator cap with a new one, if the valve fails to function.



G2CO00038-99999



G2CO00039-99999



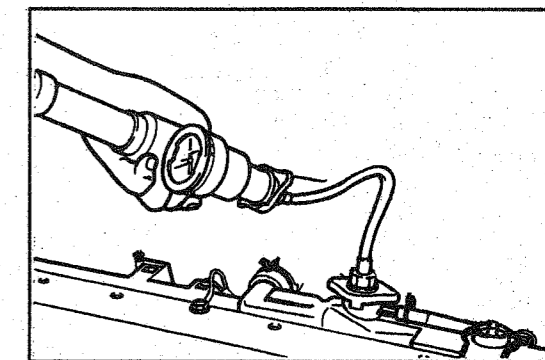
G2CO00040-99999

#### 2. Check of cooling system for leakage

- ① Fill the radiator with coolant. Attach a radiator cap tester.
- ② Warm up the engine.
- ③ Apply a pressure of 118 kPa (1.2 kgf/cm<sup>2</sup>, 17 psi) to the cooling system by means of a radiator tester. If the pressure drops, check the hoses, radiator, water pump and heater for evidence of leakage. If no external leakage is found, check the heater core, cylinder block, cylinder head, oil cooler and throttle body for evidence of leakage. Check the hoses for deterioration, cracks, bulge or damage. Replace the defective part(s) if necessary.
- ④ Remove the radiator cap tester from the radiator.

#### CAUTION:

- Never open the radiator cap and/or drain cap when the coolant is still hot. Failure to observe this caution will cause you to get scalded.



G2CO00041-99999

### (3) REMOVAL OF RADIATOR

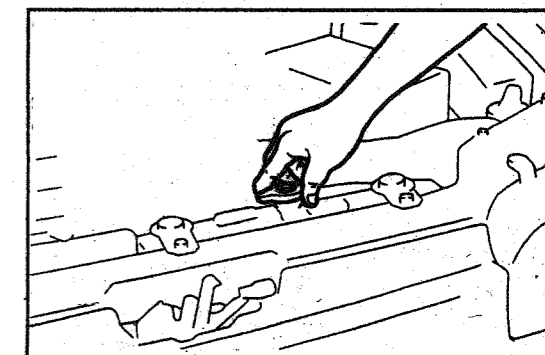
1. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
2. Drain the coolant as follows:
  - ① Remove the radiator cap.

#### CAUTION:

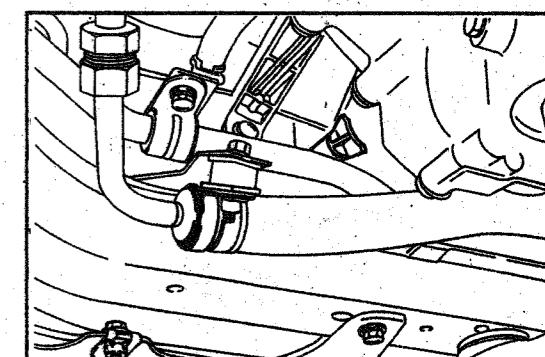
- Never open the radiator cap and/or drain cap when the coolant is still hot. Failure to observe this caution will cause you to get scalded.

- ② Place a suitable container below the radiator drain plug. Drain the coolant by loosening the drain plug.
- ③ Tighten the drain plug.

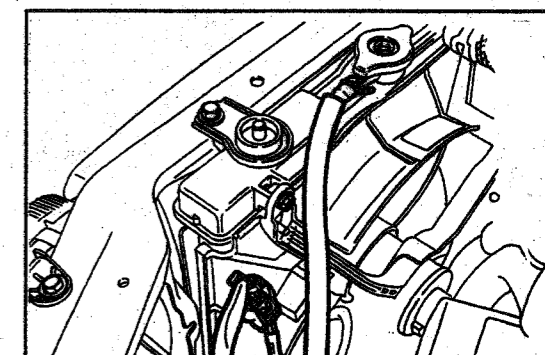
3. Disconnect the coolant reservoir hose and radiator upper and lower hoses.
4. Disconnect the fan motor connector.



G2CO00042-99999



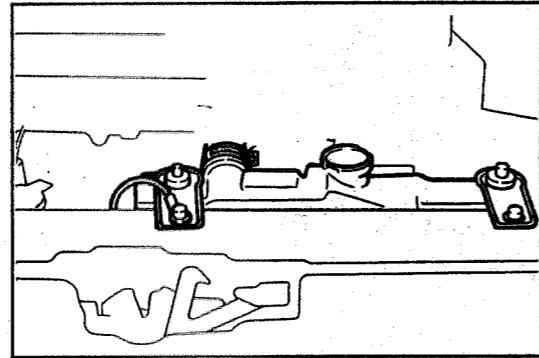
G2CO00043-99999



G2CO00044-99999

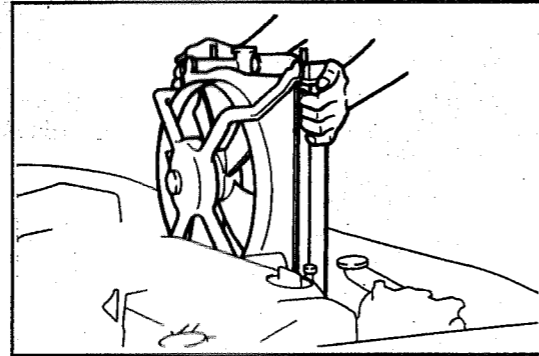


5. Remove the radiator upper bracket.



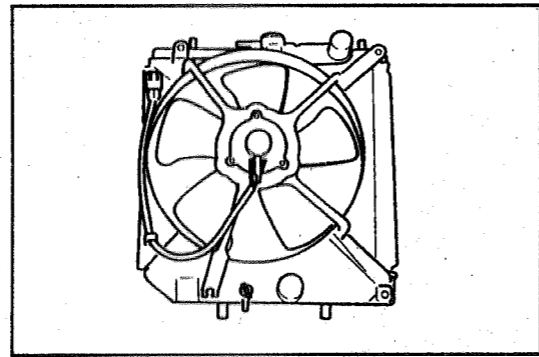
G2CO00045-99999

6. Remove the radiator together with the fan shroud from the vehicle.



G2CO00046-99999

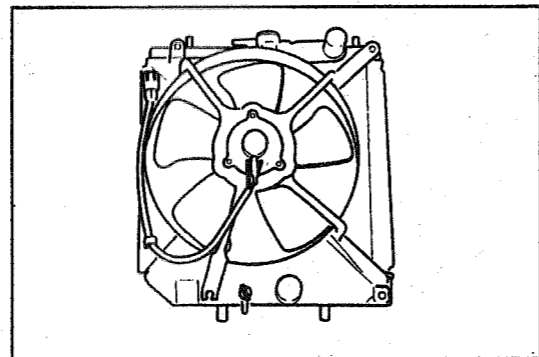
7. Remove the fan shroud from the radiator.



G2CO00047-99999

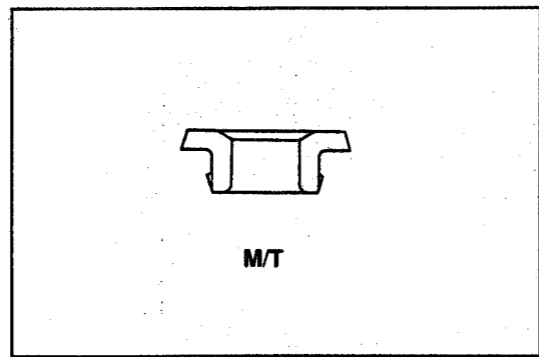
**(4) INSTALLATION OF RADIATOR**

1. Install the fan shroud together with the fan motor on the radiator.



G2CO00048-99999

2. Ensure that the rubber grommet of the radiator lower mounting is in position.

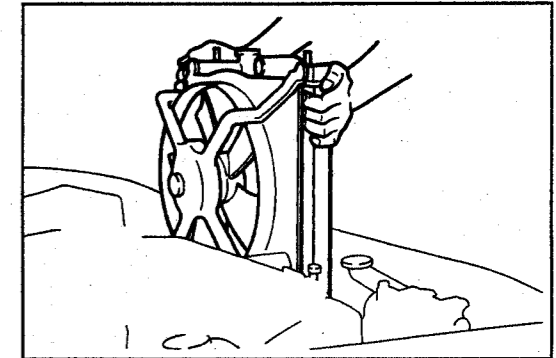


G2CO00049-99999

3. Install the radiator to the lower mounting.

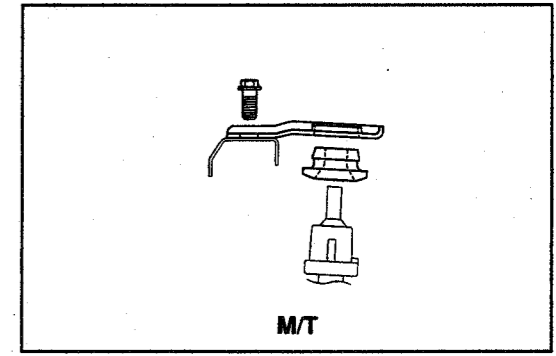
**NOTE:**

- Ensure that the rubber grommet exhibits no deformation.



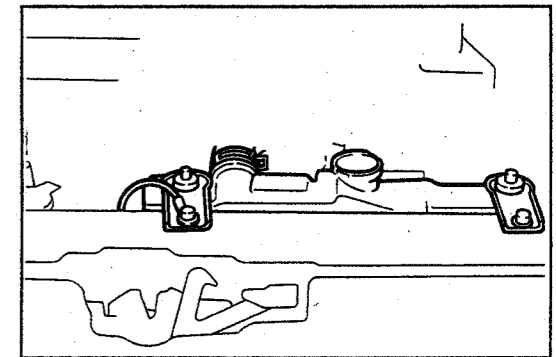
G2CO00050-99999

4. Check the rubber grommet of the radiator bracket for damage or crack. Replace the rubber grommet if it exhibits damage or crack.



G2CO00051-99999

5. Install the radiator bracket. Secure the radiator.

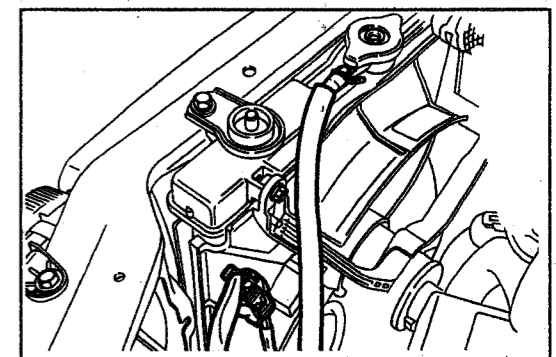


G2CO00052-99999

6. Connect the fan motor connector.

7. Connect the radiator upper and lower hoses to the radiator. Install the hose bands.

8. Connect the coolant reservoir hose.

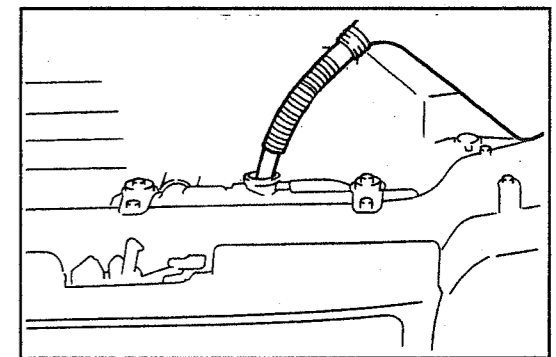


G2CO00053-99999

9. Connect the battery ground cable to the negative (-) terminal of the battery.

10. Fill coolant.  
(See page CO-3.)

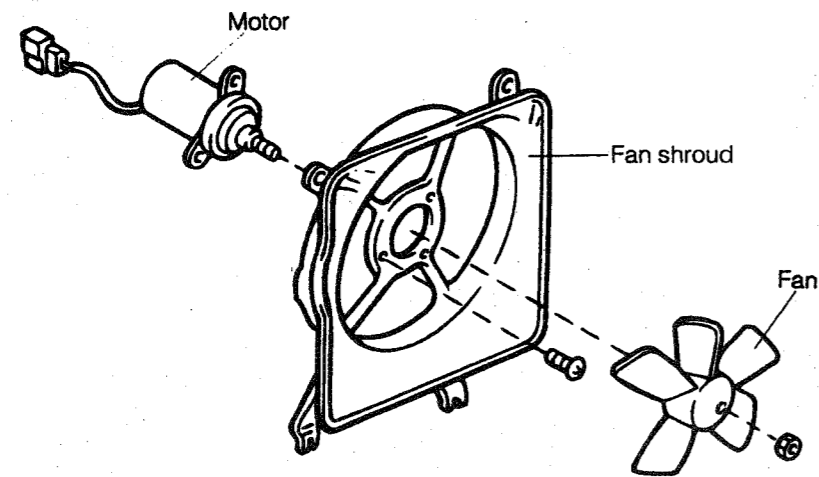
11. Start the engine and check it for leakage. Repair the leaky point if leakage exists.



G2CO00054-99999

## 6. ELECTRIC COOLING FAN

### (1) COMPONENTS



G2C00055-99999

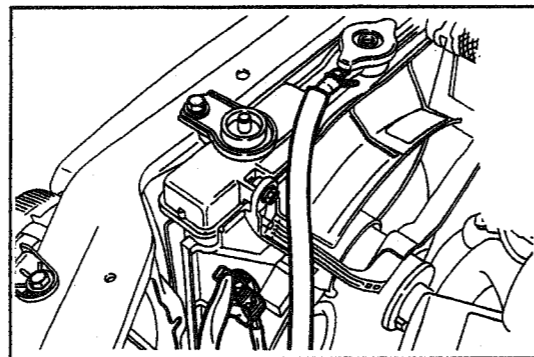
### (2) IN-VEHICLE INSPECTION

- Turn ON the ignition key switch.  
Ensure that the fan is not rotating when coolant is cold [below 85°C (185°F)].  
If the fan motor is rotating, check the radiator thermo control switch and wiring for short.
- Disconnect the radiator fan motor connector and short the disconnected connector to the engine ground.
- Ensure that the fan is rotating.
- Turn OFF the ignition switch and reconnect the disconnected connector to the radiator fan motor switch.
- Start the engine.
- Ensure that the fan motor is rotating when coolant temperature rises above 92°C ± 2°C (197.6°F ± 35.6°F) incase of general specifications, 98°C ± 2°C (208.4°F ± 35.6°F) incase of cold specifications.  
If the fan motor is not rotating, replace the radiator thermo control switch.

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### (3) INSPECTION OF RADIATOR FAN MOTOR

- Disconnect the radiator fan motor connector. Then, detach it from the body clamp.



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- Connect an ammeter in series between the radiator fan motor connector and the battery. Ensure that the fan motor is rotating.  
Read the amperage.

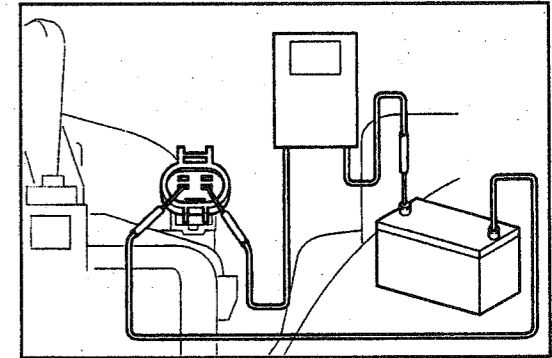
#### Amperage

45 Watt Motor: 2.7 - 4.7 A  
80 Watt Motor: 5.2 - 8.2 A

#### NOTE:

- Make sure that the battery voltage is 13V or more.
- If the motor will not rotate or the amperage fails to conform to the specification, replace the fan motor.

- Connect the radiator fan motor connector. Clamp it to the body hole.

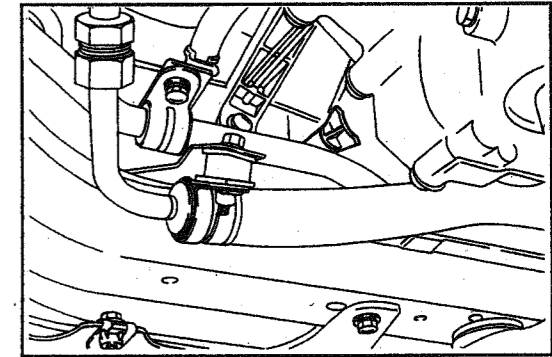


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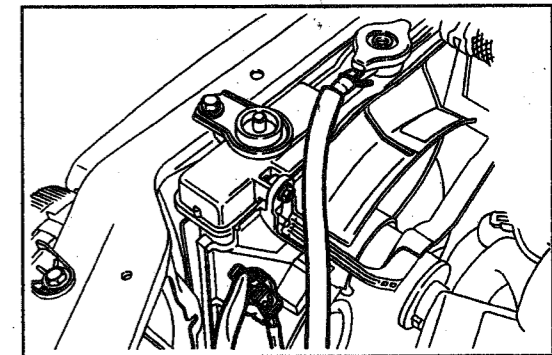
### (4) REPLACEMENT OF RADIATOR FAN MOTOR

#### REMOVAL OF RADIATOR FAN MOTOR

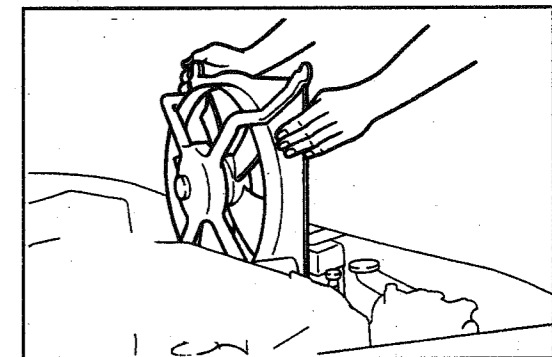
- Drain the coolant.  
(See page CO-2.)
- Disconnect the radiator upper hose.
- Disconnect the radiator fan motor connector.
- Remove the radiator fan shroud.



G2C00059-99999



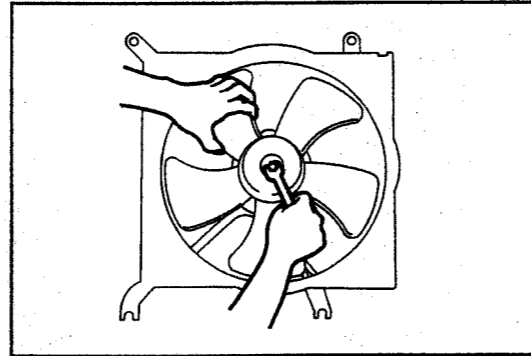
G2C00060-99999



G2C00061-99999

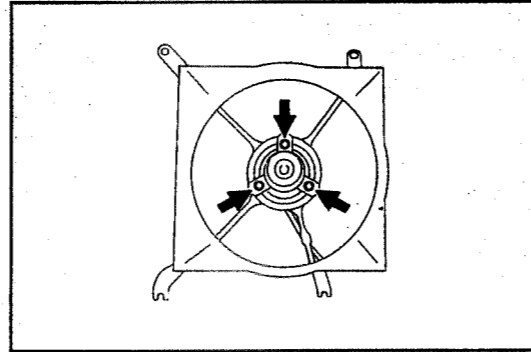


5. Remove the fan from the fan motor.



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6. Remove the fan motor from the fan shroud.



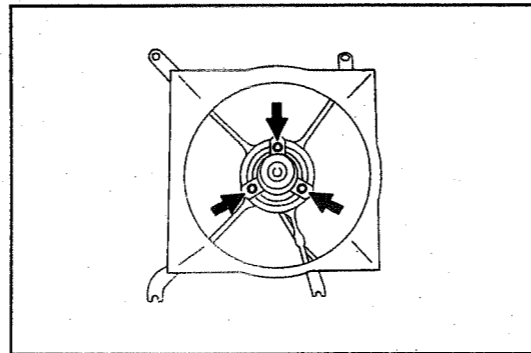
G2C00063-99999

**(5) INSTALLATION OF RADIATOR FAN MOTOR**

1. Install the radiator fan motor to the fan shroud.

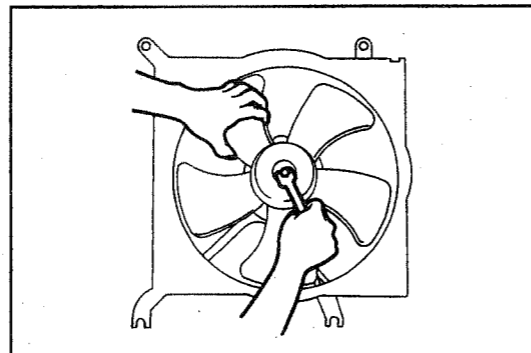
NOTE:

- Install the radiator fan motor in such a way that the drain hose comes at the lower side of the vehicle.



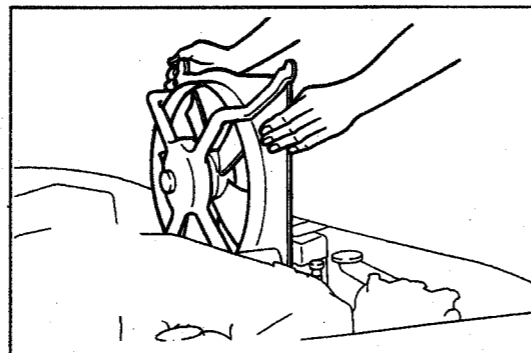
G2C00064-99999

2. Install the fan to the fan motor.



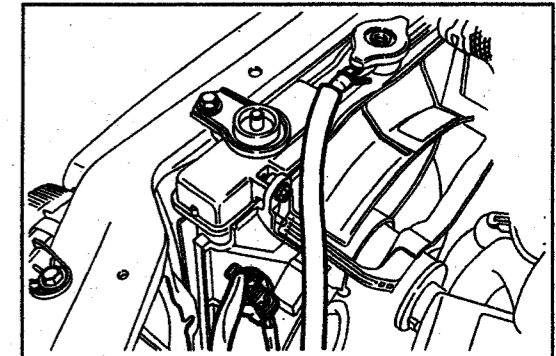
G2C00065-99999

3. Install the radiator fan shroud to the radiator.



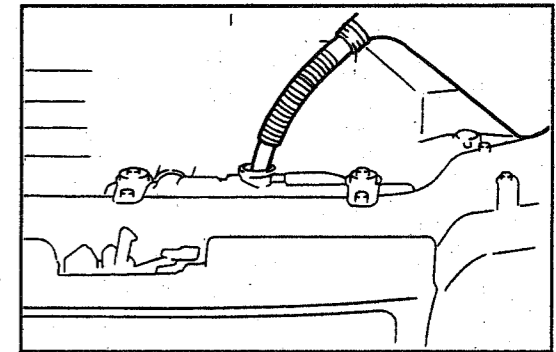
G2C00066-99999

4. Connect the radiator fan motor connector.
5. Connect the radiator upper hose. Install the hose bands.



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6. Fill coolant.  
(See page CO-3.)



G2C00068-99999

7. Start the engine and check for water leakage.

NOTE:

- Repair the leaky point if leakage exists.

G2C00069-00000

**(6) INSPECTION OF RADIATOR THERMO CONTROL SWITCH**

1. In-vehicle inspection

- ① Disconnect the thermo control switch connector.



G2C00070-99999

② Connect an ohmmeter, as shown in the right figure.

③ Ensure that no continuity exists when the coolant is below 89°C (192.2°F).

If continuity exists, replace the radiator thermo control switch.

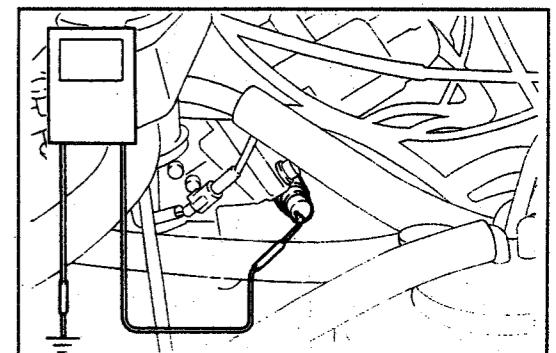
④ Start the engine.

⑤ Ensure that continuity exists when the coolant temperature rises above 100°C (212.0°F).

If no continuity exists, replace the radiator thermo control switch.

⑥ Stop the engine.

⑦ Connect the thermo control switch connector.



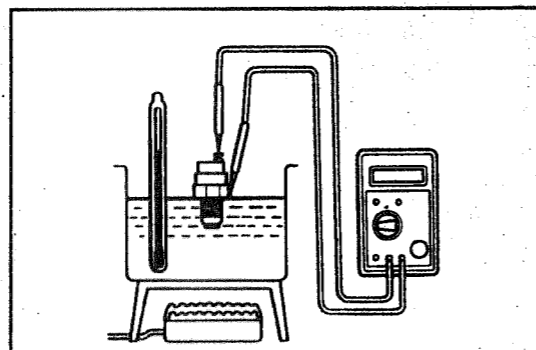
G2C00071-99999

## 2. Unit inspection

- ① Disconnect the ground cable terminal from the negative terminal of the battery.
- ② Drain the coolant.  
(See the procedure of coolant replacement.)
- ③ Disconnect the radiator thermo control switch connector.
- ④ Remove the radiator thermo control switch.

G2CO00072-00000

- ⑤ Connect the an ohmmeter to the radiator thermo control switch.
- ⑥ Submerge the heat sensing section of the radiator thermo control switch into water whose temperature is below 89°C (192.2°F).
- ⑦ Ensure that no continuity exists.  
If continuity exists, replace the radiator thermo control switch.
- ⑧ When the temperature of the water into which the heat sensing section of the radiator thermo control switch is submerged is raised above  $98 \pm 2^\circ\text{C}$  ( $208.4 \pm 35.6^\circ\text{F}$ ) cold spec.,  $92^\circ\text{C} \pm 2^\circ\text{C}$  ( $197.6^\circ\text{F} \pm 35.6^\circ\text{F}$ ) general spec., ensure that continuity exists.  
If no continuity exists, replace the radiator thermo control switch.



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## 3. Installation of radiator thermo control switch

- ① Clean the threaded portion of the radiator thermo control switch.
- ② Wind seal tape around the threaded portion.

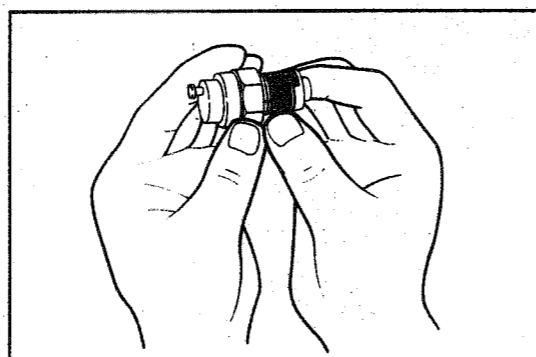
## NOTE:

- A new thermo control switch is coated with sealer. Therefore, when replace the thermo control switch with new one, remove the sealer thoroughly before winding seal tape.

- ③ Install the radiator thermo control switch to the water inlet and tighten it by specified torque.

**Tightening Torque:** 24.5 - 34.3 N·m  
(2.5 - 3.5 kgf·m,  
18.1 - 25.3 ft·lb)

- ④ Connect the radiator thermo control switch connector.
- ⑤ Fill the coolant.
- ⑥ Connect the ground cable terminal to the negative terminal of the battery.
- ⑦ Start the engine.
- ⑧ Ensure that no water leakage is exists.



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## 7. RADIATOR FAN MOTOR RELAY

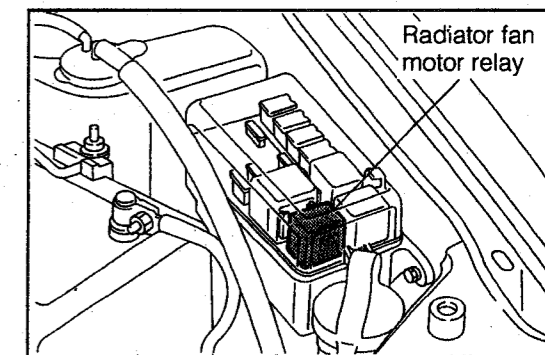
## (1) INSPECTION OF RADIATOR FAN MOTOR RELAY

## NOTE:

- The radiator fan motor relay is installed in the relay block inside the engine compartment.

G2CO00076-00000

1. Remove the fan motor relay from the relay block.



G2CO00077-99999

2. Inspection of relay continuity

- ① Check that there is the specified resistance between the terminals ① and ②.

Resistance: 40 - 100 Ω

- ② Check that there is no continuity between the terminals ③ and ④.

- ③ Check that there is no continuity between the terminals ① and ③ and also between the terminals ① and ④.

- ④ Check that there is no continuity between the terminals ② and ③ and also between the terminals ② and ④.

If the continuity test results do not conform to specifications, replace the relay.

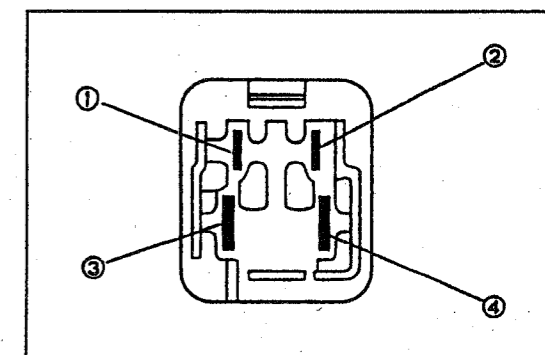
3. Inspection of relay operation

- ① Apply the battery voltage across the terminals ① and ②.

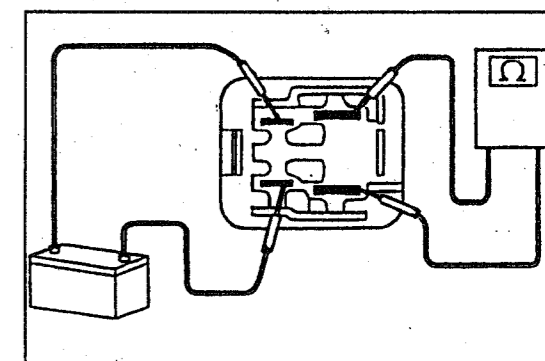
- ② Check that there is continuity between the terminals ③ and ④.

If the operation test results do not conform to specifications, replace the relay.

4. Install the radiator fan motor relay in the relay block.



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G2CO00079-99999

G2CO00080-00000

8. SERVICE SPECIFICATIONS

Radiator cap	Relief valve opening pressure	58.8 - 103 kPa (0.6 - 1.05 kgf/cm <sup>2</sup> , 8.53 - 14.9 psi)	
	Standard	58.8 kPa (0.6 kgf/cm <sup>2</sup> , 8.5 psi)	
Thermo control switch	Operating temperature		
	General specifications		
	Australian specifications		
	ON	92°C ± 2°C (197.6°F ± 35.6°F)	
	OFF	87°C ± 2°C (188.6°F ± 35.6°F)	
	European specifications		
	ON	98°C ± 2°C (208.4°F ± 35.6°F)	
	OFF	93°C ± 2°C (199.4°F ± 35.6°F)	
Radiator fan motor	Output	45 Watt	80 Watt
	Amperage	2.7 - 4.7 A	5.2 - 8.2 A
Thermostat	Valve opening temperature		
	General specifications		
	Australian specifications	80.5 - 83.5°C (176.9 - 182.3°F)	
	European specifications	86.5 - 89.5°C (187.7 - 193.1°F)	
	Valve lift		
	General specifications	8.0 mm or more at 95°C (0.31 inch or more at 203.0°F)	
	European with tropical specifications		
	Australian specifications		
	European specifications	8.0 mm or more at 100°C (0.31 inch or more at 212.0°F)	

G2CO0081-00000

9. TIGHTENING TORQUE

Tightening components	Tightening torque		
	N·m	kgf·m	ft·lb
Water pump × Cylinder block	14.7 - 21.6	1.5 - 2.2	10.8 - 15.9
Water outlet × Cylinder block	14.7 - 21.6	1.5 - 2.2	10.8 - 15.9
Radiator thermo control switch	24.5 - 34.3	2.5 - 3.5	18.1 - 25.3

G2CO0082-00000

10. TROUBLE SHOOTING

Problem	Possible cause	Remedies	Page
Engine overheats	Poor quality coolant	Replenish coolant.	CO-3
	Water pump drive belt loose or missing	Adjust or replace belt.	CH section
	Dirt, leaves or insects on radiator	Clean radiator.	CO-10
	Leaky hoses, water pump, thermostat housing, radiator, heater, core plugs or head gasket	Repair as necessary.	
	Thermostat faulty	Check thermostat.	CO-8
	Ignition timing retarded	Set timing.	IG section
	Electric cooling system faulty	Inspect electric cooling system	CO-14
	Radiator hose plugged or deteriorated	Replace hose.	
	Water pump faulty	Replace water pump.	CO-4
	Radiator plugged or cap faulty	Check radiator.	CO-10
Cylinder head or block cracked or plugged	Repair as necessary.	CO-10	

G2CO0083-00000