

## 01-12 COOLING SYSTEM

### COOLING SYSTEM

LOCATION INDEX ..... 01-12-1

### COOLING SYSTEM

SERVICE WARNINGS ..... 01-12-2

### ENGINE COOLANT LEVEL

INSPECTION ..... 01-12-2

ENGINE COOLANT REPLACEMENT .. 01-12-2

### ENGINE COOLANT LEAKAGE

INSPECTION ..... 01-12-3

RADIATOR CAP INSPECTION ..... 01-12-4

### RADIATOR

REMOVAL/INSTALLATION ..... 01-12-4

### THERMOSTAT

REMOVAL/INSTALLATION ..... 01-12-5

Thermostat Installation Note ..... 01-12-5

Thermostat Cover Gasket

Installation Note ..... 01-12-6

THERMOSTAT INSPECTION ..... 01-12-6

### WATER PUMP

REMOVAL/INSTALLATION ..... 01-12-6

P/S Oil Pump Removal Note ..... 01-12-7

Water Pump Installation Note ..... 01-12-7

### COOLING FAN MOTOR

INSPECTION ..... 01-12-7

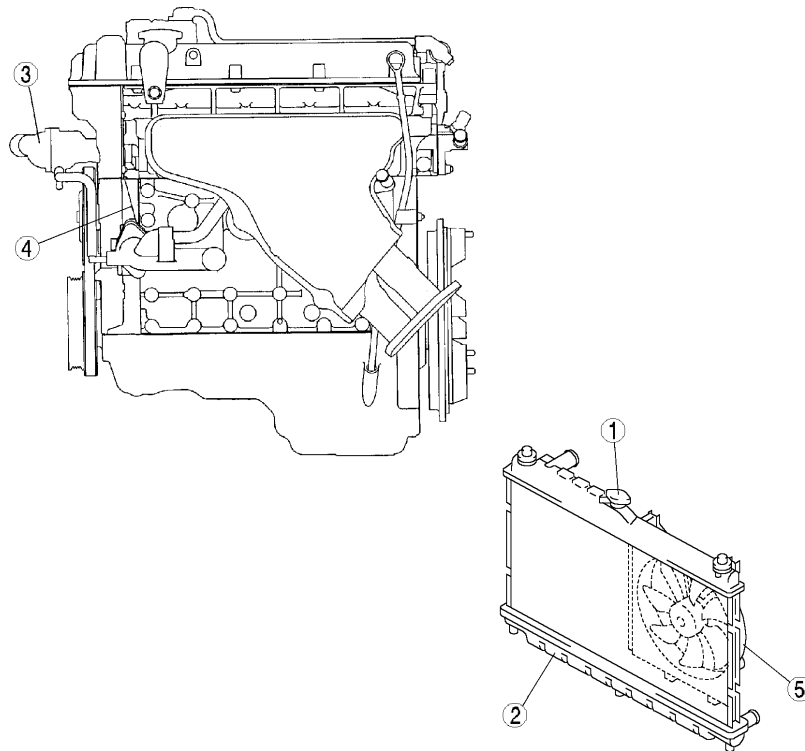
### COOLING FAN MOTOR

REMOVAL/INSTALLATION ..... 01-12-7

01-12

### COOLING SYSTEM LOCATION INDEX

A5U011201004W01



Z5U0112WA0

|   |  |
|---|--|
| 1 | Radiator cap<br>(See 01-12-4 RADIATOR CAP INSPECTION)  |
| 2 | Radiator<br>(See 01-12-4 RADIATOR REMOVAL/<br>INSTALLATION)  |
| 3 | Thermostat<br>(See 01-12-5 THERMOSTAT REMOVAL/<br>INSTALLATION)<br>(See 01-12-6 THERMOSTAT INSPECTION) |

|   |  |
|---|--|
| 4 | Water pump<br>(See 01-12-6 WATER PUMP REMOVAL/<br>INSTALLATION)  |
| 5 | Cooling fan motor<br>(See 01-12-7 COOLING FAN MOTOR<br>INSPECTION)<br>(See 01-12-7 COOLING FAN MOTOR REMOVAL/<br>INSTALLATION) |

# COOLING SYSTEM

## COOLING SYSTEM SERVICE WARNINGS

A5U011201004W02

### Warning

- Never remove the radiator cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.
- Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes. When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.
- Hot engines and the engine coolant can cause severe burns. Turn off the engine and wait until it and the engine coolant have cooled before draining the engine coolant.

## ENGINE COOLANT LEVEL INSPECTION

A5U011215001W01

1. Remove the radiator cap. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)
2. Verify that the coolant level is near the radiator filler neck.
3. Verify that the coolant level on the coolant reservoir is between the FULL and LOW marks.
  - If the engine coolant level is below LOW, remove the radiator cap and add coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)

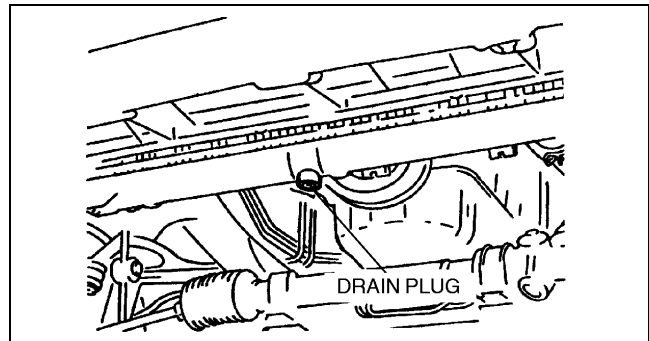
## ENGINE COOLANT REPLACEMENT

A5U011215001W02

1. Drain the coolant in the coolant reservoir.
2. Remove the radiator cap and the radiator drain plug. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.)
3. Drain the coolant into a container.
4. Flush the cooling system with water until all traces of color are gone.
5. Let the system drain completely.
6. Tighten the radiator drain plug.

### Tightening torque

0.7—1.1 N·m {7—12 kgf·cm, 7—10 in·lbf}



X5U112WA0

### Caution

- The engine has aluminum parts that can be damaged by alcohol or methanol antifreeze. Do not use alcohol or methanol in the cooling system. Use only ethylene-glycol-based coolant.
- Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down the coolant effectiveness.
- Engine coolant will damage paint. If engine coolant does get on a painted surface, rinse it off quickly.

## COOLING SYSTEM

7. Referring to the following graph and chart, select proper gravity of the coolant.

### Antifreeze solution mixture percentage

| Coolant protection  | Volume percentage |         | Gravity at 20°C {68°F} |
|---------------------|-------------------|---------|------------------------|
|                     | Water             | Coolant |                        |
| Above -16°C {3°F}   | 65                | 35      | 1.054                  |
| Above -26°C {-15°F} | 55                | 45      | 1.066                  |
| Above -40°C {-40°F} | 45                | 55      | 1.078                  |

8. Slowly pour the coolant into the radiator up to the coolant filler port.

### Filling pace

1.0 L {1.1 US qt, 0.9 Imp qt}/min. [max]

9. Fill the coolant into the reservoir up to the FULL mark on the coolant reservoir.  
10. Fully install the radiator cap.  
11. Start the engine and warm it up.

### Caution

- If the coolant temperature becomes too high, stop the engine to prevent it from overheating.

12. After engine warms up, perform the following steps.  
(1) Run the engine at **2,500 rpm** for **5 min.**  
(2) Run the engine at **3,000 rpm** for **5 min.**  
(3) Repeat steps (1) and (2) several times.  
13. Stop the engine and wait until it is cool.  
14. Inspect the coolant level.  
• If it is low, repeat Steps 7-12.  
15. Verify there is no coolant leakage.

### ENGINE COOLANT LEAKAGE INSPECTION

1. Inspect the coolant level. (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION.)  
2. Remove the radiator cap.  
3. Connect a radiator cap tester and the **SST** to the radiator filler neck.

### Caution

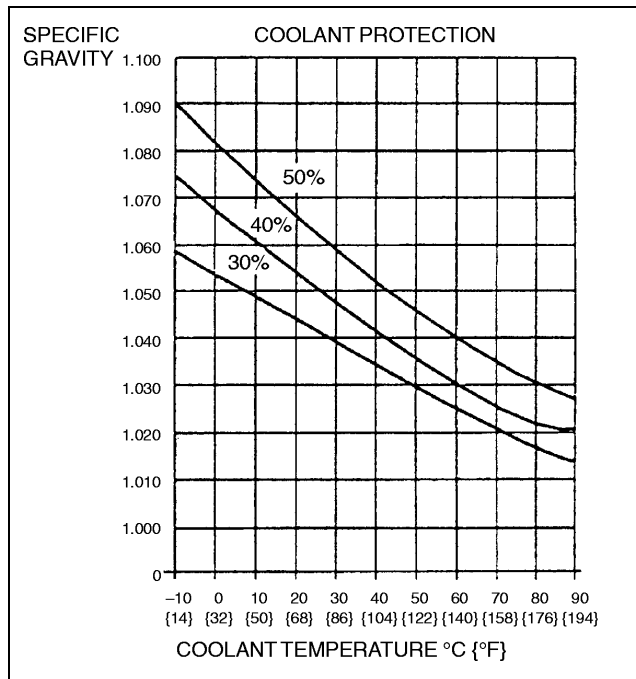
- Applying more than 123 kPa {1.25 kgf/cm<sup>2</sup>, 17.8 psi} can damage the hoses, fittings, and other components, and cause leakage.

4. Apply pressure to the radiator.

### Pressure

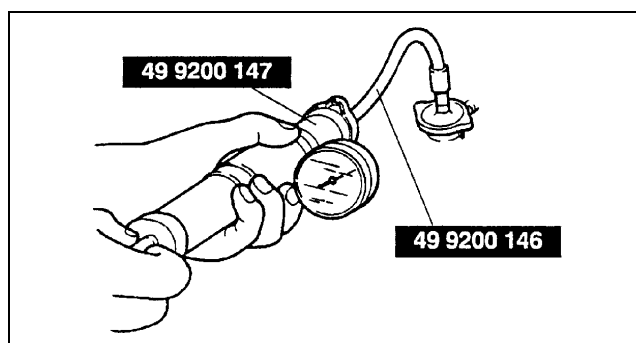
123 kPa {1.25 kgf/cm<sup>2</sup>, 17.8 psi}

5. Verify that the pressure is held.  
• If not, inspect the system for coolant leakage.



X5U112WA1

A5U011215001W03



X5U112WA2

# COOLING SYSTEM

## RADIATOR CAP INSPECTION

A5U011215201W01

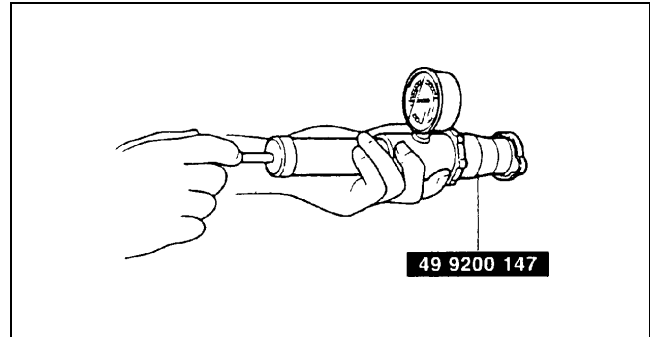
### Warning

- Never remove the radiator cap while the engine is running, or when the engine and radiator are hot. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.
- Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes. When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.

1. Attach the radiator cap to a radiator cap tester with the **SST**. Apply pressure gradually.
2. Verify that the pressure becomes stable within the specification.
  - If the pressure is held for **10 s**, the radiator cap is normal.

### Pressure

94—122 kPa {0.95—1.25 kgf/cm<sup>2</sup>, 13.5—17.7 psi}

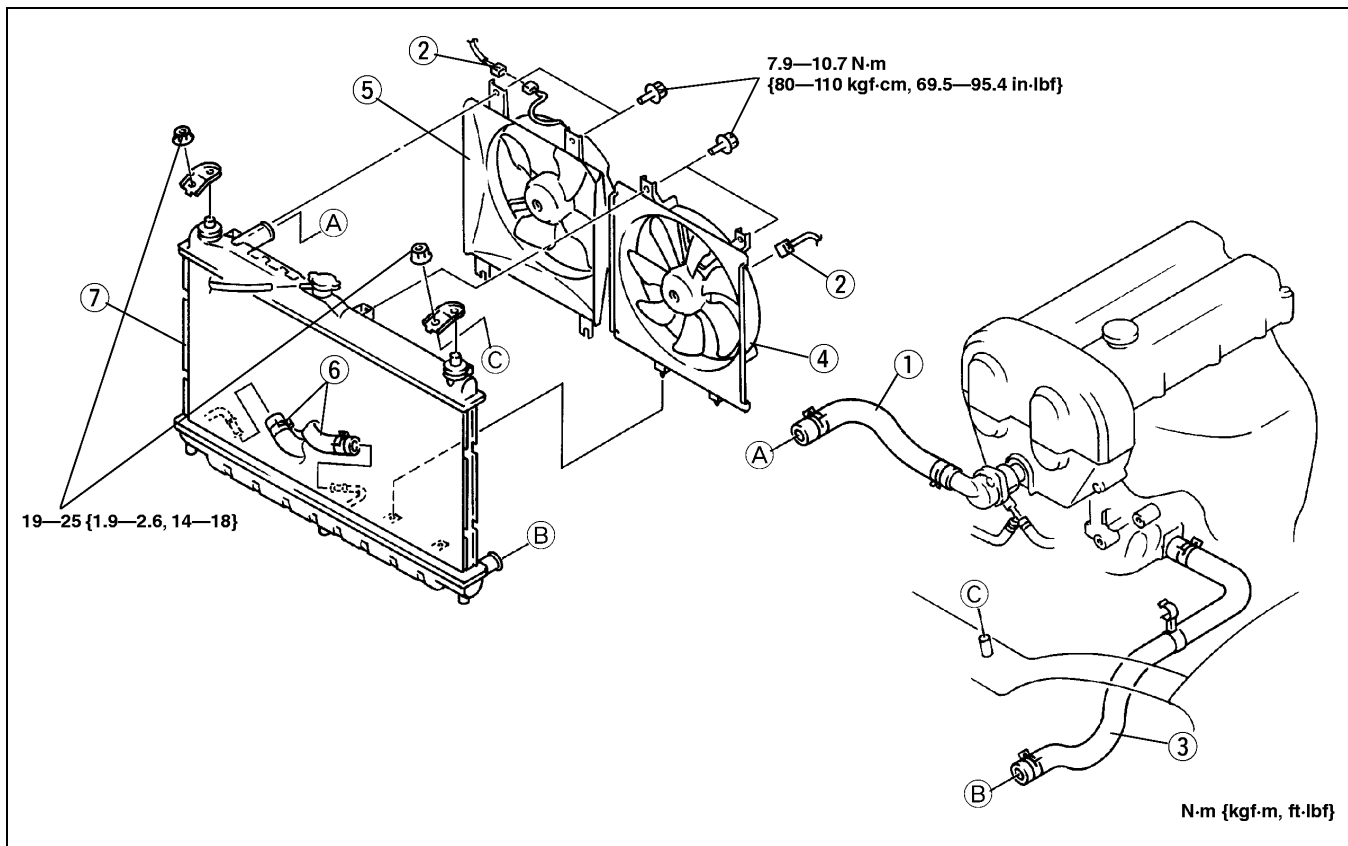


X5U112WA3

## RADIATOR REMOVAL/INSTALLATION

A5U011215200W01

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove the air hose.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



X5U112WA4

## COOLING SYSTEM

|   |   |
|---|---|
| 1 | Upper radiator hose   |
| 2 | Cooling fan motor connector and condenser fan motor connector |
| 3 | Lower radiator hose   |
| 4 | Cooling fan   |

|   |  |
|---|--|
| 5 | Condenser fan  |
| 6 | Oil hose (AT)<br>(See 01-11-4 OIL COOLER REMOVAL/<br>INSTALLATION) |
| 7 | Radiator   |

01-12

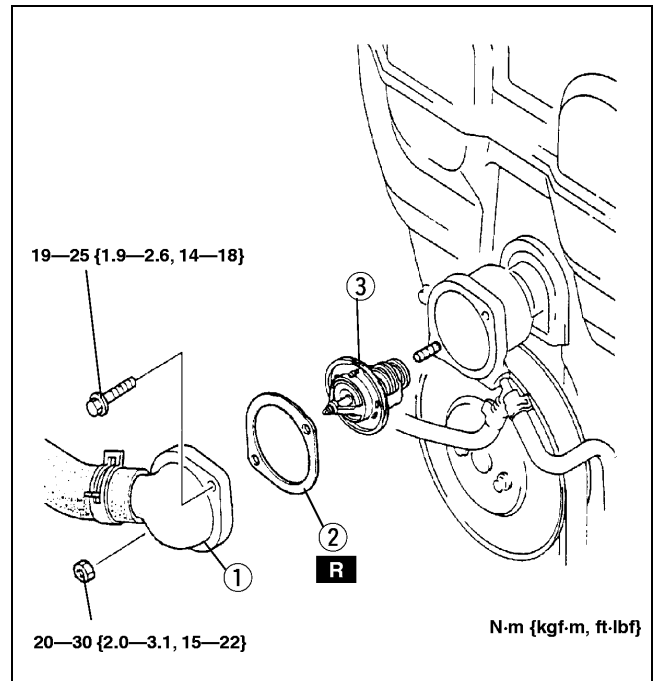
### THERMOSTAT REMOVAL/INSTALLATION

A5U011215171W01

1. Disconnect the negative battery cable.
2. Remove the air hose.
3. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
4. Remove in the order indicated in the table.

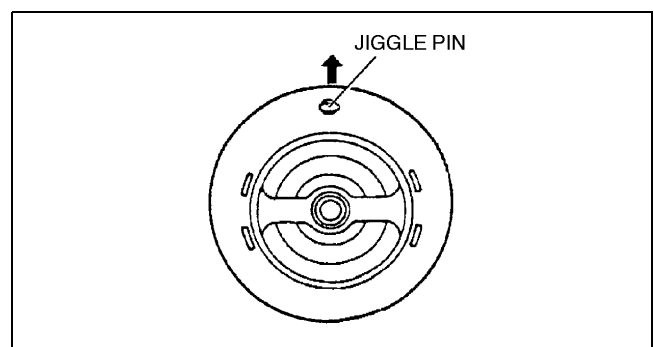
|   |  |
|---|--|
| 1 | Thermostat cover   |
| 2 | Thermostat cover gasket<br>(See 01-12-6 Thermostat Cover Gasket Installation Note) |
| 3 | Thermostat<br>(See 01-12-5 Thermostat Installation Note)                           |

5. Install in the reverse order of removal.



### Thermostat Installation Note

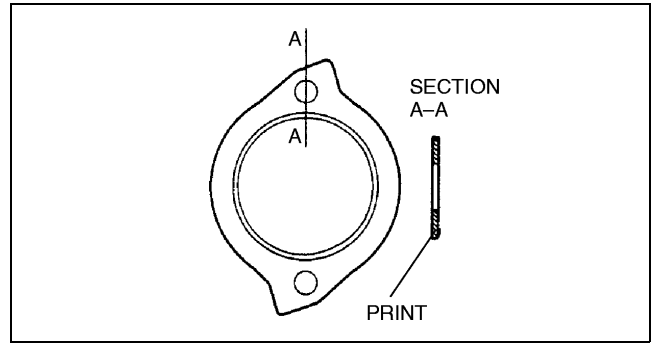
1. Install the thermostat into the cylinder head with the jiggle pin at the top.



## COOLING SYSTEM

### Thermostat Cover Gasket Installation Note

1. Install a new gasket with the seal print side facing the cylinder head.



X5U112WA7

### THERMOSTAT INSPECTION

A5U011215171W02

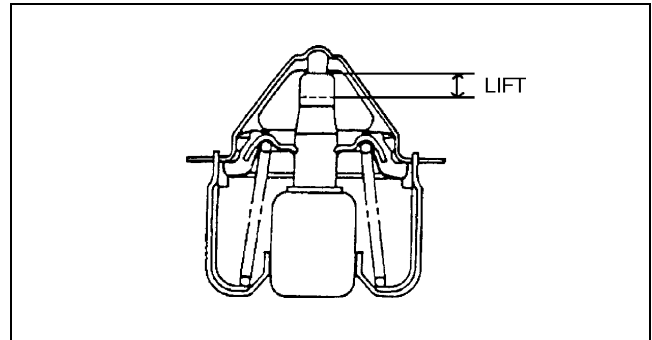
1. Visually check that the thermostat valve is closed.
2. Place the thermostat and a thermometer in water.

#### Warning

- During inspection, the thermostat and water are extremely hot and they can cause burns. Do not touch the thermostat and water directly.

3. Heat the water and check the following.  
If not as specified, replace the thermostat.

| Condition                              | Specification       |
|--|---------------------|
| Initial-opening temperature<br>°C {°F} | 86.5—89.5 {188—193} |
| Full-open temperature<br>°C {°F}       | 100 {212}           |
| Full-open lift<br>mm {in}              | 8.5 {0.33}          |



X5U112WA8

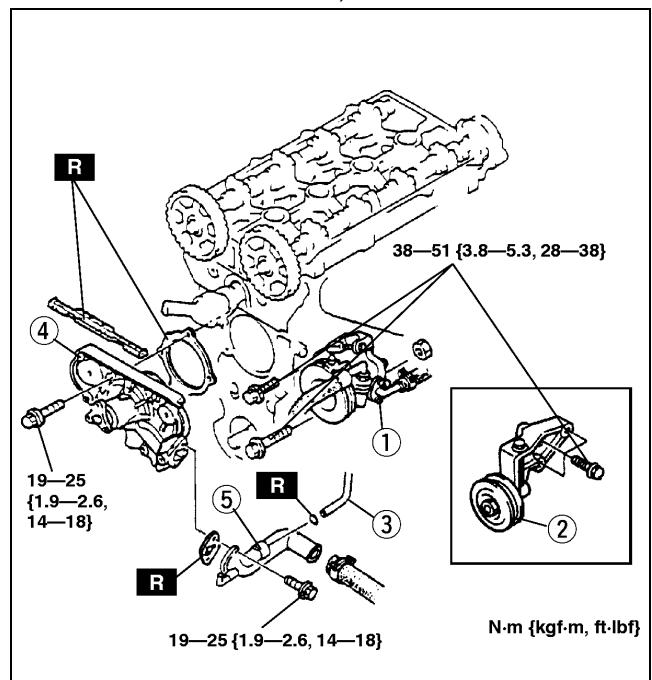
### WATER PUMP REMOVAL/INSTALLATION

A5U011215010W01

1. Remove the air cleaner.
2. Remove the timing belt. (See 01-10-10 TIMING BELT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

|   |  |
|---|--|
| 1 | P/S oil pump<br>(See 01-12-7 P/S Oil Pump Removal Note)  |
| 2 | Idler (without P/S oil pump)                             |
| 3 | Water hose   |
| 4 | Water pump<br>(See 01-12-7 Water Pump Installation Note) |
| 5 | Water inlet pipe   |

4. Install in the reverse order of removal.



X5U112WA9

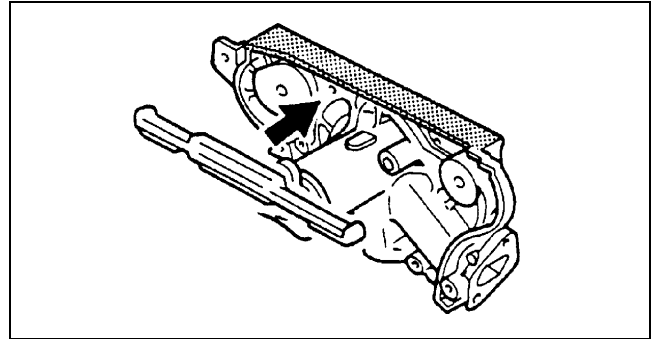
## COOLING SYSTEM

### P/S Oil Pump Removal Note

1. Remove the P/S oil pump with the oil hose still connected.
2. Position the P/S oil pump so that it is out of the way.

### Water Pump Installation Note

Install the new rubber seal with the bonding agent.



X5U112WAA

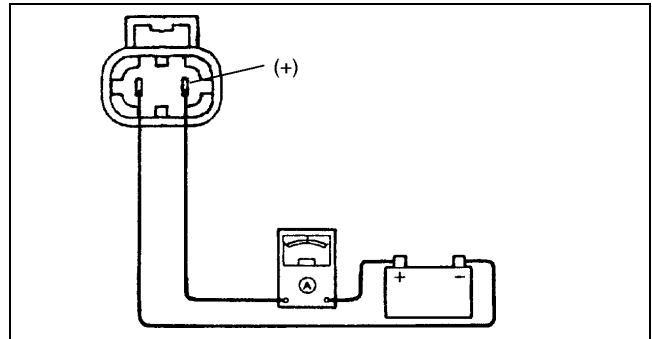
01-12

### COOLING FAN MOTOR INSPECTION

1. Verify that the battery is fully charged. (See 01-17-2 BATTERY INSPECTION.)
2. Disconnect the cooling fan motor connector.
3. Connect battery positive voltage and an ammeter to the cooling fan motor connector.
4. Verify that the cooling fan motor operates smoothly at the standard current draw.
  - If not as specified, replace the cooling fan motor.

A5U011215025W01

**Standard current**  
**4.50—6.49 (A) [12V]**



X5U112WAB

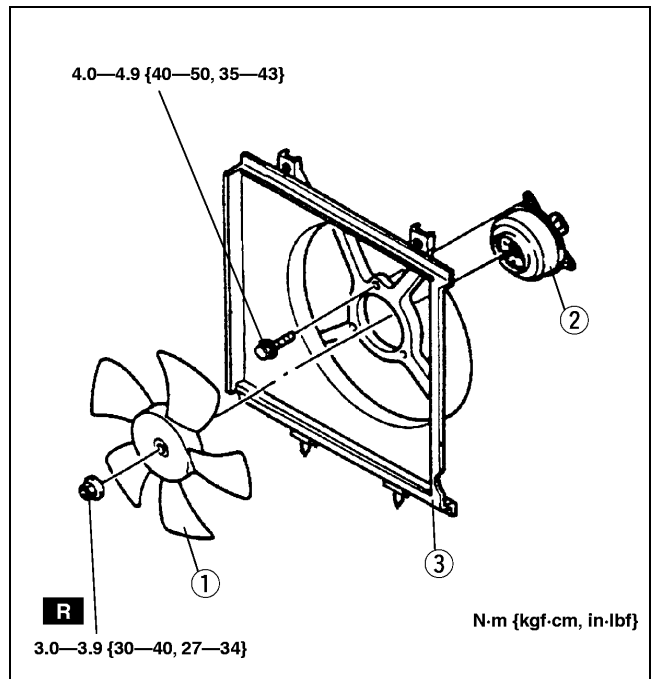
### COOLING FAN MOTOR REMOVAL/INSTALLATION

1. Remove the cooling fan. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

A5U011215025W02

|   |                   |
|---|-------------------|
| 1 | Cooling fan blade |
| 2 | Cooling fan motor |
| 3 | Radiator cowl     |

3. Install in the reverse order of removal.



X5U112WAC