
ENGINE COOLING

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14109000093

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GENERAL INFORMATION

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The cooling system is designed to keep every part of the engine at appropriate temperature in whatever condition the engine may be operated.

The cooling method is of the water-cooled, pressure forced circulation type in which the water pump pressurizes coolant and circulates it throughout the engine. If the coolant temperature exceeds the prescribed temperature, the thermostat opens to circulate the coolant through the radiator as well so

that the heat absorbed by the coolant may be radiated into the air.

The water pump is of the centrifugal type and is driven by the timing belt or the drive belt from the crankshaft.

The radiator is the corrugated fin, down flow type and is cooled by the electrical radiator fan.

Items		Specifications
Radiator	Performance kJ/h	146,510

SERVICE SPECIFICATIONS

14100030084

Items		Standard value	Limit
Valve opening pressure of radiator cap kPa		75–105	65
Range of coolant antifreeze concentration of radiator %		30–60	–
Thermostat	Valve opening temperature of thermostat °C	82±1.5	–
	Full-opening temperature of thermostat °C	95	–
	Valve lift (at 95°C) mm	8 or more	–

LUBRICANT

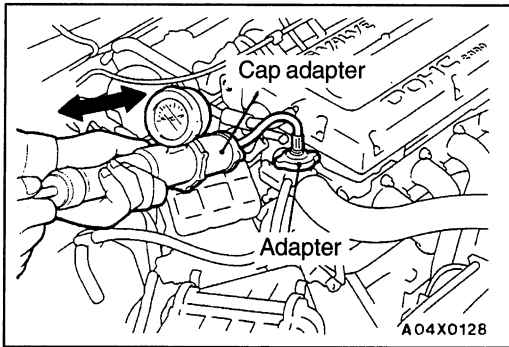
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Items	Quantity ℓ
HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT	7.0

SEALANTS

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Items	Specified sealant	Remarks
Cylinder block drain plug	3M Nut Locking Part No. 4171 or equivalent	Drying sealant
Thermostat case	Mitsubishi Genuine Parts No. MD970389 or equivalent	Semi-drying sealant



ON-VEHICLE SERVICE

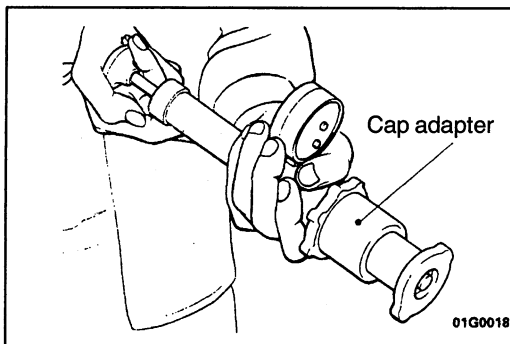
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ENGINE COOLANT LEAK CHECK

1. Confirm that the coolant level is up to the filler neck. Install a radiator cap tester and apply 160 kPa pressure, and then check for leakage from the radiator hose or connections.

Caution

1. After testing, clean up all coolant seepage from areas of leakage.
 2. When the tester is removed, be careful not to spill any coolant.
 3. During tester usage, do not deform the filler neck of the radiator.
2. If leakage is present, repair or replace the appropriate part.



RADIATOR CAP VALVE OPENING PRESSURE CHECK

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1. Use a cap adapter to attach the radiator cap to the tester.
2. Increase the pressure until the indicator of the gauge stops moving.

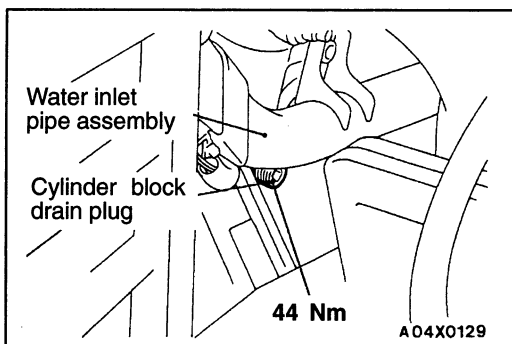
Standard value: 75–105 kPa

Limit: 65 kPa

3. Replace the radiator cap if the reading does not remain at or above the limit.

NOTE

Be sure that the radiator cap is clean before testing, since rust or other foreign material on the radiator cap seal may cause an improper reading.



ENGINE COOLANT REPLACEMENT

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1. Drain the engine coolant by removing the drain plug and then the radiator cap.
2. Remove the drain plug from the cylinder block to drain the engine coolant.
3. Remove the reserve tank to drain the engine coolant.
4. When the engine coolant has drained, pour in water from the radiator cap to clean the engine coolant line.

5. Coat the thread of the cylinder block drain plug with the specified sealant and tighten to the specified torque.

Specified sealant:**3M Nut Locking Part No. 4171 or equivalent**

6. Securely tighten the radiator drain plug.
7. Install the reserve tank.
8. Slowly pour the engine coolant into the mouth of the radiator until the radiator is full, and pour also into the reserve tank up to the FULL line.

Recommended antifreeze:**HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT****Quantity: 7.0 ℓ**

9. Install the radiator cap securely.
10. Start the engine and warm the engine until the thermostat opens. (Touch the radiator hose with your hand to check that warm water is flowing.)
11. After the thermostat opens, race the engine several times, and then stop the engine.
12. Cool down the engine, and then pour engine coolant into the reserve tank until the level reaches the FULL line. If the level is low, repeat the operation from step 11.

CONCENTRATION MEASUREMENT

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Measure the temperature and specific gravity of the engine coolant to check the antifreeze concentration.

Standard value: 30–60% (allowable concentration range)

RECOMMENDED ANTIFREEZE

Antifreeze	Allowable concentration
HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT	30–60%

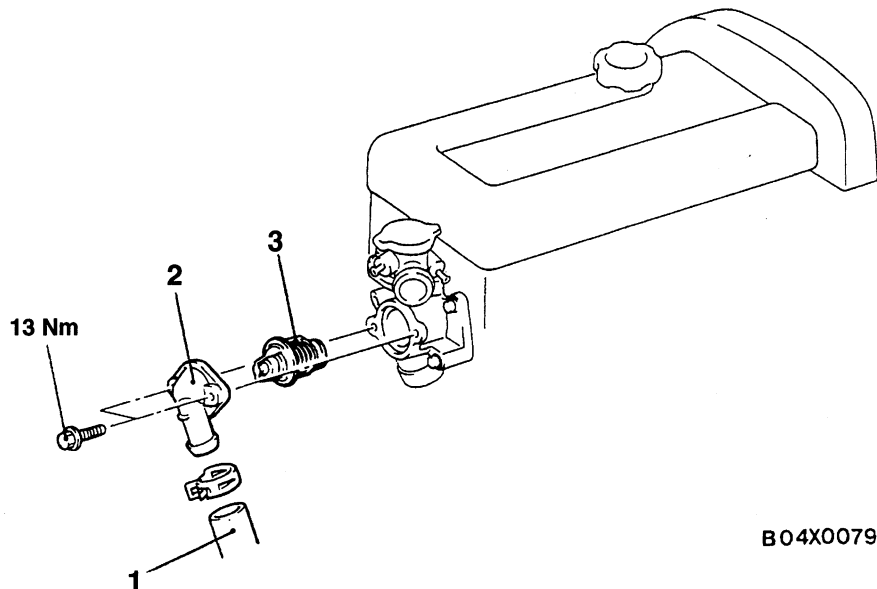
THERMOSTAT

14100240111

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying (Refer to P.14-3.)
- Air Cleaner Assembly and Air Intake Hose Removal and Installation

**Removal steps**

- ◀A▶ ▶B▶ 1. Radiator lower hose connection
 ▶A▶ 2. Water inlet fitting
 ▶A▶ 3. Thermostat

REMOVAL SERVICE POINT**◀A▶ RADIATOR LOWER HOSE DISCONNECTION**

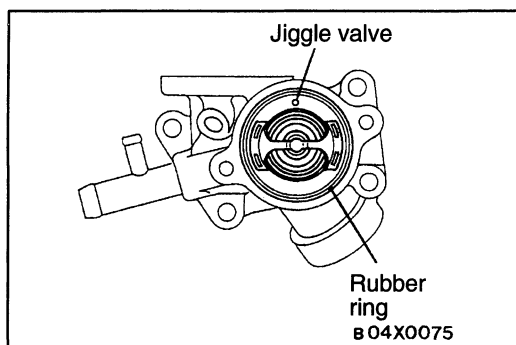
Place a mating mark on the radiator hose and the hose clamp. Then, disconnect the radiator hose.

INSTALLATION SERVICE POINTS**▶A▶ THERMOSTAT INSTALLATION**

Install the thermostat so that the jiggle valve is facing straight up.

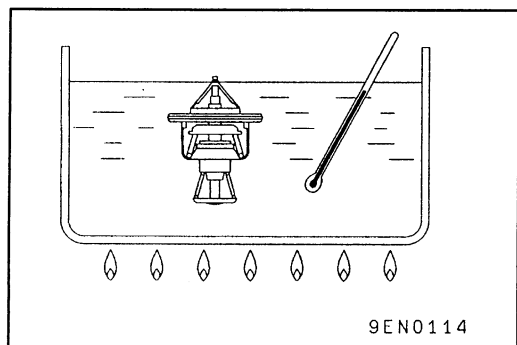
Caution

Make absolutely sure that no oil is adhering to the rubber ring of the thermostat. In addition, be careful not to fold over or scratch the rubber ring when inserting.



►B◄ RADIATOR LOWER HOSE CONNECTION

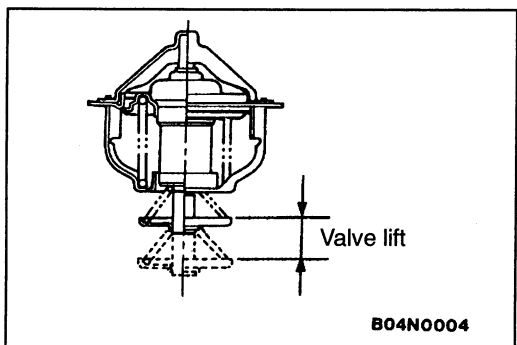
- (1) Insert each hose as far as the projection of the water inlet fitting.
- (2) Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

**INSPECTION**

14100250121

THERMOSTAT CHECK

1. Immerse the thermostat in water, and heat the water while stirring. Check the thermostat valve opening temperature.

Standard value:**Valve opening temperature: $82 \pm 1.5^\circ\text{C}$** 

2. Check that the amount of valve lift is at the standard value when the water is at the full-opening temperature.

Standard value:

Full-opening temperature $^\circ\text{C}$	Amount of valve lift mm
95	8 or more

NOTE

Measure the valve height when the thermostat is fully closed, and use this measurement to calculate the valve height when the thermostat is fully open.

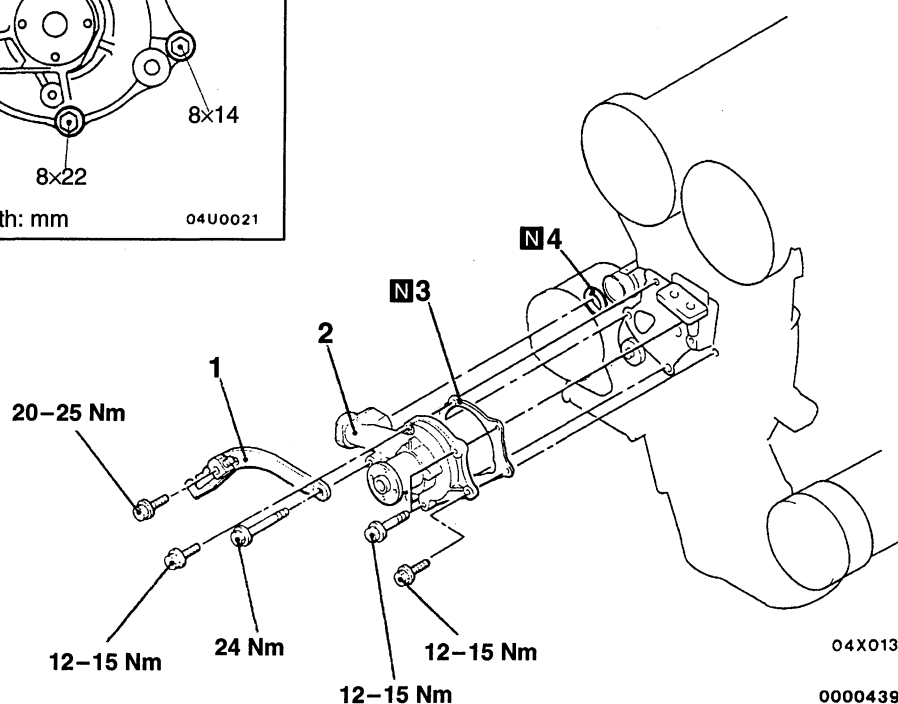
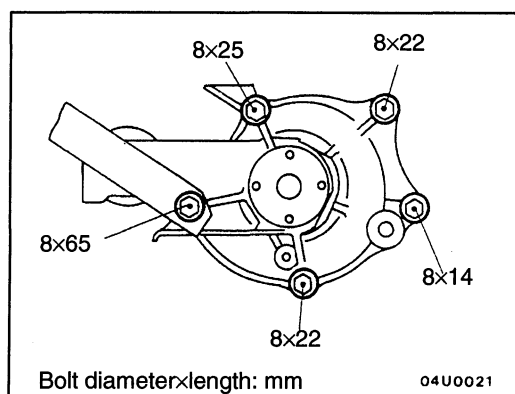
WATER PUMP

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REMOVAL AND INSTALLATION

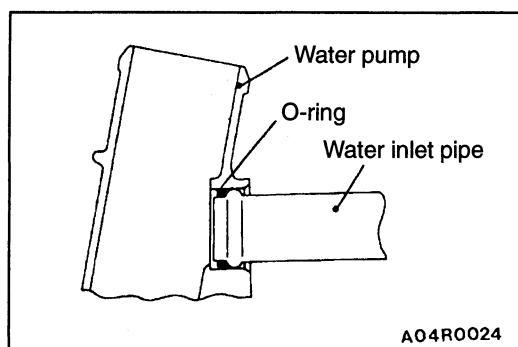
Pre-removal and Post-installation Operation

- (1) Engine Coolant Draining and Supplying (Refer to P.14-3.)
- (2) Timing Belt Removal and Installation (Refer to GROUP 11A.)



Removal steps

1. Alternator brace
2. Water pump
3. Water pump gasket
4. O-ring



INSTALLATION SERVICE POINT

▶◀O-RING INSTALLATION

Insert the O-ring to the water inlet pipe, and coat the outer circumference of the O-ring with water or engine coolant. By coating with water or engine coolant, the insertion to the water pump will become easier.

Caution

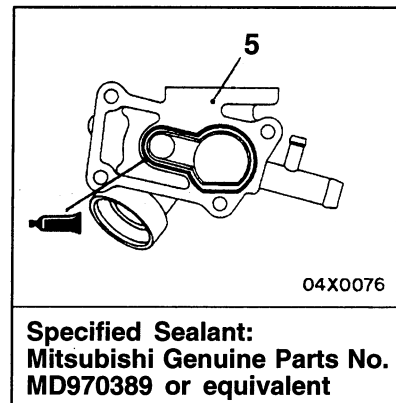
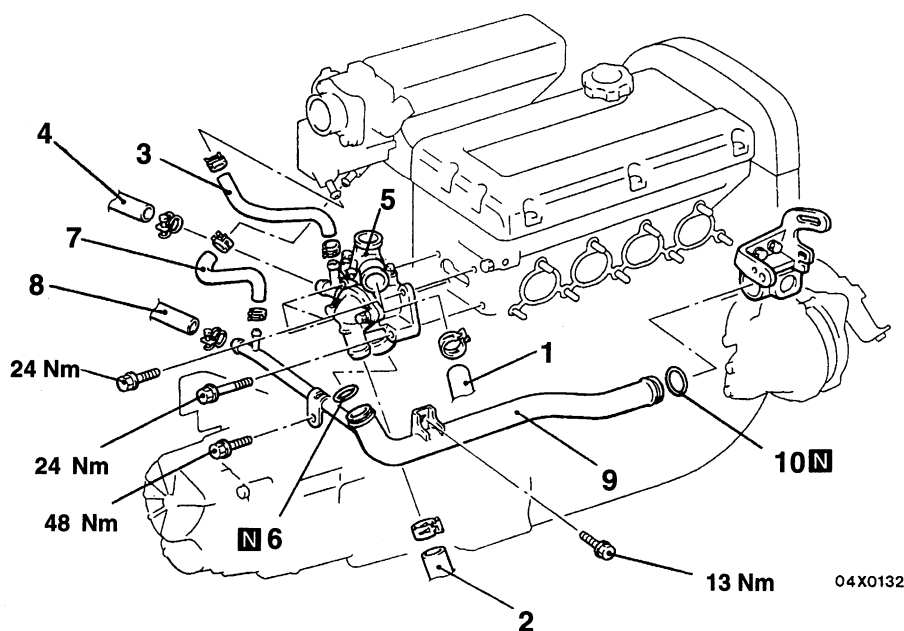
1. Do not allow engine oil or other grease to adhere to the O-ring.
2. When inserting the pipe, check that there is no sand, dirt, etc. on its inner surface.

WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

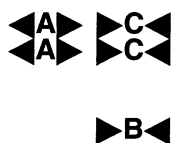
- (1) Engine Coolant Draining and Supplying (Refer to P.14-3.)
- (2) Air Cleaner Assembly and Air Intake Hose Removal and Installation
- (3) Exhaust Manifold Removal and Installation



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Removal steps



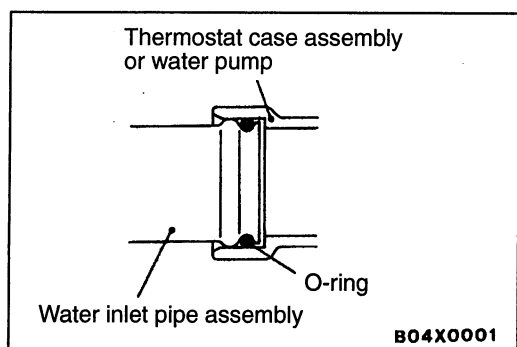
1. Radiator upper hose connection
2. Radiator lower hose connection
3. Water hose
4. Heater hose connection
5. Thermostat case assembly



6. O-ring
7. Water hose
8. Heater hose connection
9. Water inlet pipe assembly
10. O-ring

REMOVAL SERVICE POINT**◀A▶ RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION**

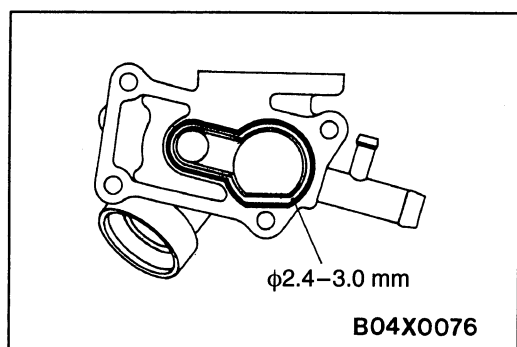
After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.

**INSTALLATION SERVICE POINTS****▶A◀ O-RING INSTALLATION**

Insert the O-ring to the water inlet pipe, and coat the outer circumference of the O-ring with water or engine coolant.

Caution

Do not allow engine oil or other grease to adhere to the O-ring.

**▶B◀ THERMOSTAT CASE ASSEMBLY INSTALLATION**

Squeeze out the sealant from the tube evenly and apply it so that there is not too much sealant and no places without sealant.

Specified Sealant:

Mitsubishi Genuine Parts No. MD970389 or equivalent

▶C◀ RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION

- (1) Insert each hose as far as the projection of the water outlet fitting or water inlet fitting.
- (2) Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

INSPECTION

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WATER PIPE AND HOSE CHECK

Check the water pipe and hose for cracks, damage, clogs and replace them if necessary.

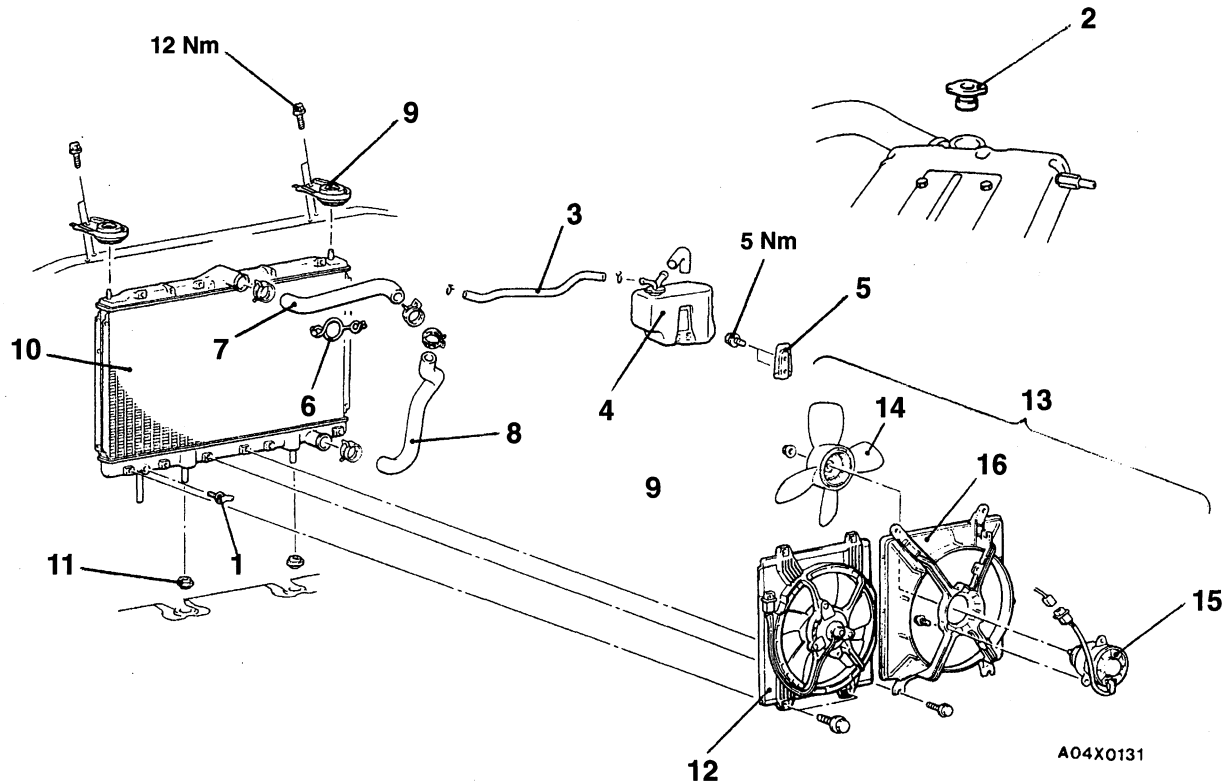
RADIATOR

14100150117

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying (Refer to P.14-3)

**Radiator removal steps**

1. Drain plug
2. Radiator cap
3. Overflow tube
4. Reserve tank
5. Reserve tank bracket
6. Clip
7. Radiator upper hose
8. Radiator lower hose
9. Upper insulator
10. Radiator assembly
11. Lower insulator
12. Condenser fan motor assembly
<Vehicles with A/C>
13. Radiator fan motor assembly
14. Fan
15. Radiator fan motor
16. Shroud

Radiator fan motor removal steps

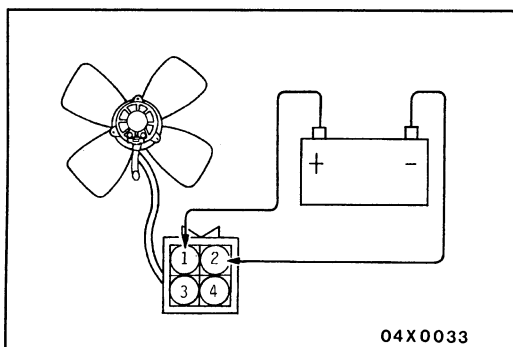
13. Radiator fan motor assembly
14. Fan
15. Radiator fan motor
16. Shroud

REMOVAL SERVICE POINT**◀A▶ RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION**

After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.

INSTALLATION SERVICE POINT**▶A◀ RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION**

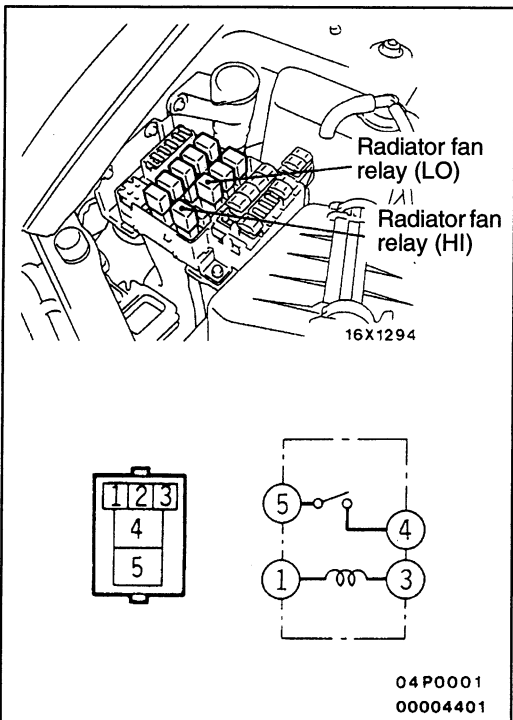
- (1) Insert each hose as far as the projection of the water inlet fitting.
- (2) Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

**INSPECTION**

14100190089

RADIATOR FAN MOTOR CHECK

- (1) Check to be sure that the radiator fan rotates when battery voltage is applied between terminals (as shown in the figure).
- (2) Check to see that abnormal noises are not produced, while motor is turning.

**RADIATOR FAN RELAY CONTINUITY CHECK**

14100440085

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

NOTES