
COOLING

CONTENTS

120002145

GENERAL INFORMATION	2	Concentration Measurement	5
SERVICE SPECIFICATIONS	2	COOLING FAN	6
LUBRICANT	2	THERMOSTAT	8
SEALANTS	3	WATER PUMP	11
SERVICE ADJUSTMENT PROCEDURES	3	WATER HOSE AND WATER PIPE	13
Radiator Cap Valve Opening Pressure	3	RADIATOR	16
Engine Coolant Replacement	3		

GENERAL INFORMATION

120002146

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 drive belt from the crankshaft.

The radiator is the corrugated fin, down flow type.

Items			Specifications
Radiator	Performance kJ/h	4G63	167,442
		4G64	184,186
		4D56	221,861
Automatic transmission oil cooler	Performance kJ/h		5,233

SERVICE SPECIFICATIONS

120002147

Items	Standard value	Limit
High pressure valve opening pressure of radiator cap kPa	75–105	65
Range of coolant antifreeze concentration of radiator %	30–60	–
Valve opening temperature of thermostat °C	82 <4G63, 4G64> 76.5 <4D56>	–
Full-opening temperature of thermostat °C	95 <4G63, 4G64> 90 <4D56>	–
Amount of thermostat valve lift mm	8.5 or more <4G63,4G64, 4D56–Wagon>	–
	8 or more <4D56 – Panel van and window van>	–

LUBRICANT

120002148

Item		Quantity dm ³
HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT	4G63, 4G64	8 (9)
	4D56	9 (10)

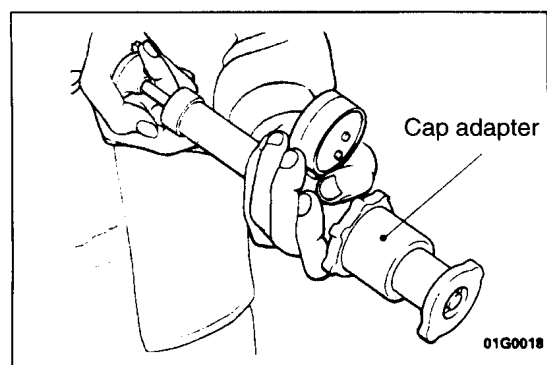
NOTE

() indicates figure with rear heater.

SEALANTS

120000210

Items	Specified sealant	Remarks
Cylinder block drain plug	3M Nut Locking Part No. 4171 or equivalent	Drying sealant
Water by-pass fitting <4G63, 4G64>	Mitsubishi Genuine Parts No. MD970389 or equivalent	Semi-Drying sealant



SERVICE ADJUSTMENT PROCEDURES

120000211

RADIATOR CAP VALVE OPENING PRESSURE

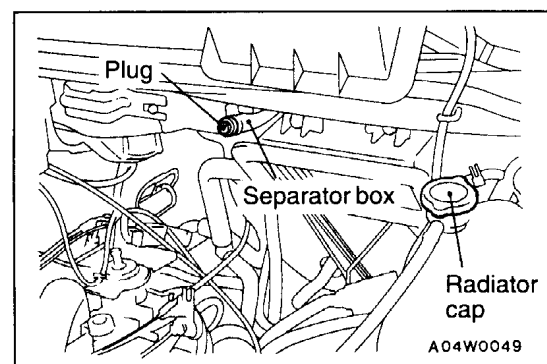
1. Use a cap adapter to attach the cap to the tester.
2. Increase the pressure until the indicator of the gauge stops moving.

Limit: 65 kPa**Standard value: 75–105 kPa**

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

NOTE

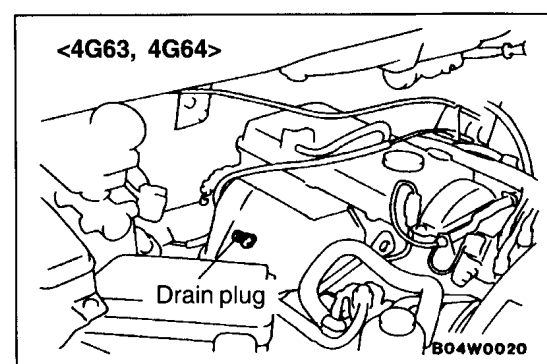
Be sure that the cap is clean before testing, since rust or other foreign material on the cap seal will cause an improper indication.



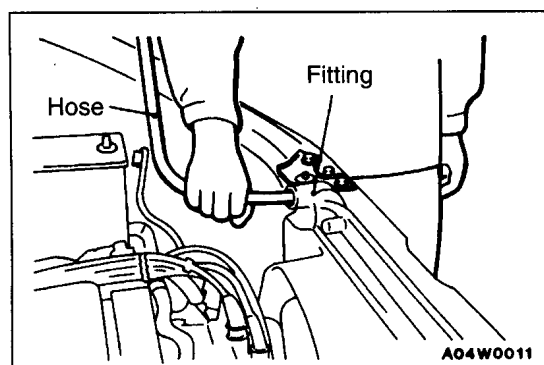
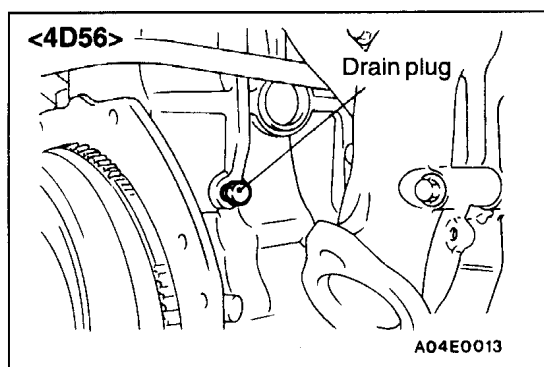
ENGINE COOLANT REPLACEMENT

120002149

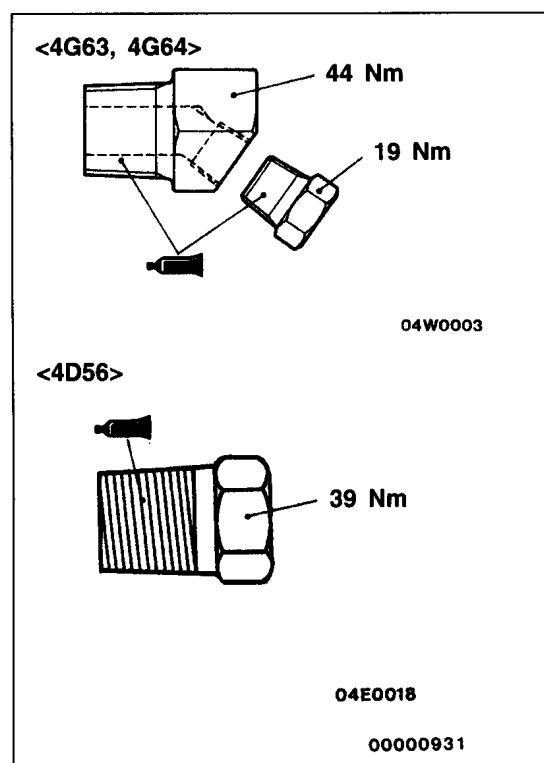
1. Remove the drain plug to drain the coolant from inside the radiator.
2. Remove the separator box plug, radiator cap. Then drain the coolant from inside the heater and engine reserve tank.



3. Remove the drain plug from the cylinder block to drain the engine coolant.



4. Disconnect the hose from the radiator and pour water in through the fitting 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. Slowly pour coolant into the reserve tank until it overflows from the separator box plug hole without any bubbles. Then install the plug.
8. Pour engine coolant into the reserve tank until the level reaches the FULL line.

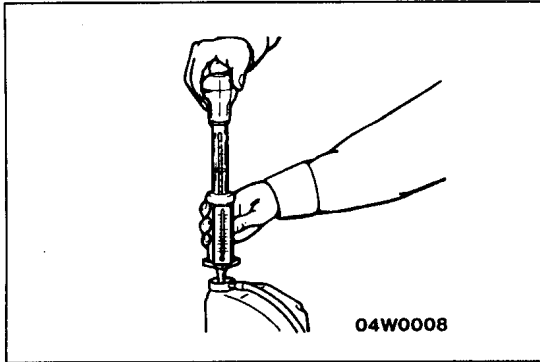
Recommended antifreeze: HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT

Items	Quantity dm ³
4G63, 4G64	8 (9)
4D56	9 (10)

NOTE

() indicates figure with rear heater.

9. Install the radiator cap securely.
10. Start the engine and warm the engine until the thermostat opens. (Touch the radiator hose with your fingers 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 9.



CONCENTRATION MEASUREMENT

120000213

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%

Caution

If the concentration of the antifreeze is below 30%, the anti-corrosion property will be adversely affected. In addition, if the concentration is above 60%, both the anti-freezing and engine cooling properties will decrease, affecting the engine adversely. For these reasons, be sure to maintain the concentration level within the specified range.

COOLING FAN

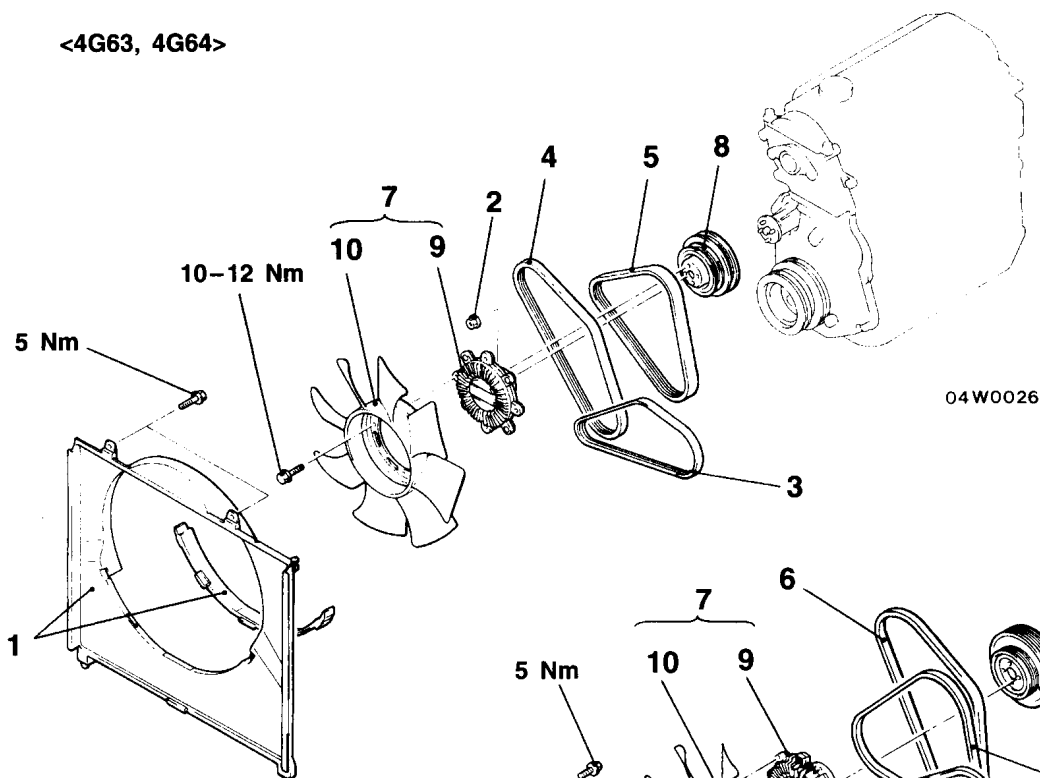
120000214

REMOVAL AND INSTALLATION

Pre-removal and Post-Installation Operation

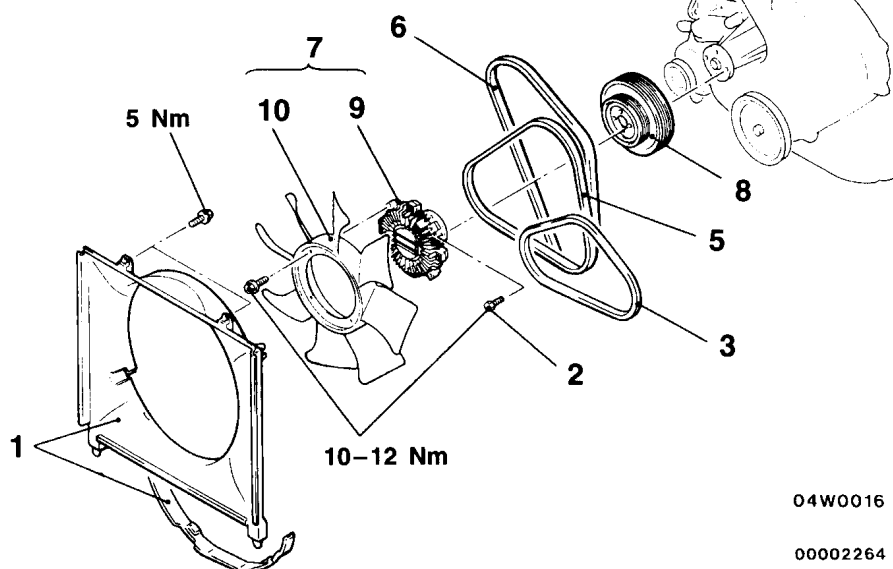
1. Engine Coolant Draining and Supplying
(Refer to P.14-3.)
2. Radiator Upper Hose Removal and Installation
(Refer to P.14-16.)

<4G63, 4G64>



04W0026

<4D56>

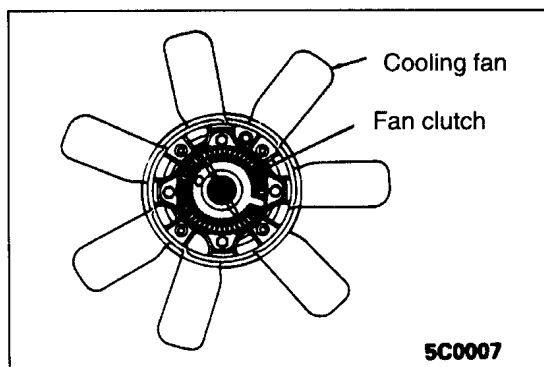


04W0016

00002264

Removal steps

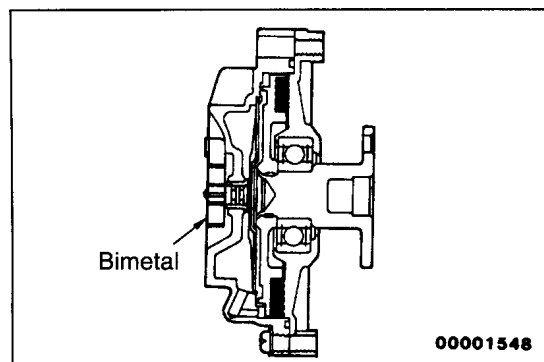
1. Shroud assembly
2. Bolt or nut
3. Drive belt (A/C)
4. Drive belt (Power steering)
<4G63, 4G64>
5. Drive belt (Alternator)
6. Drive belt (Power steering) <4D56>
7. Cooling fan and fan clutch assembly
8. Pulley
9. Fan clutch
10. Cooling fan



INSPECTION

COOLING FAN

- Check blades for damage and cracks.
- Check for cracks and damage around bolt holes in fan hub.
- If any portion of fan is damaged or cracked, replace cooling fan.



FAN CLUTCH

- Check to ensure that fluid in fan clutch is not leaking at case joint and seals. If fluid quantity decreases due to leakage, fan speed will decrease and engine overheating might result.
- When a fan attached to an engine is turned by hand, it should give a sense of some resistance. If fan turns lightly, it is faulty.
- Check bimetal strip for damage.

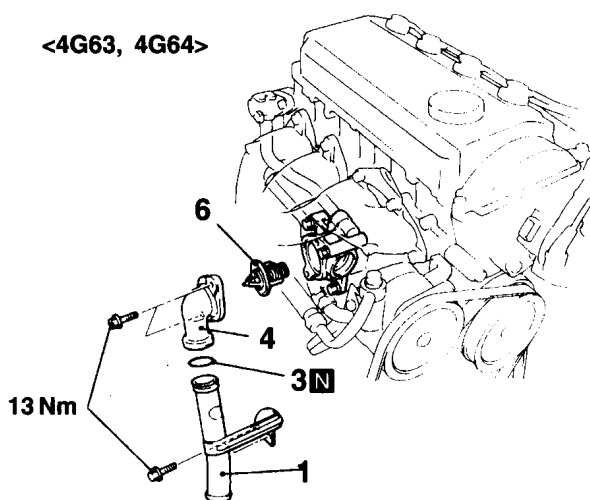
THERMOSTAT

120002151

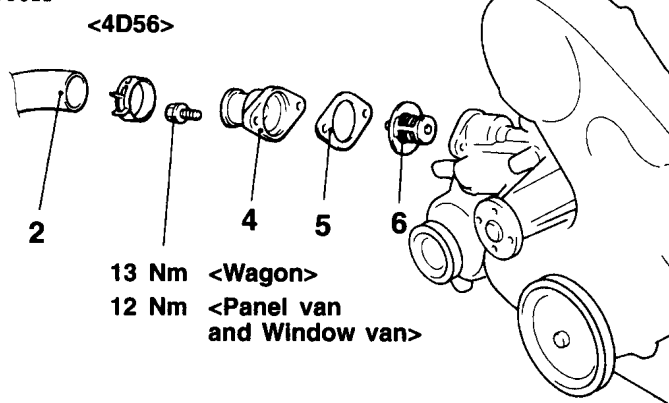
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

1. Engine Coolant Draining and Supplying
(Refer to P.14-3.)
2. Air Intake Hose Removal and Installation
<4G63, 4G64> (Refer to GROUP 15 – Air Cleaner.)



04W0022

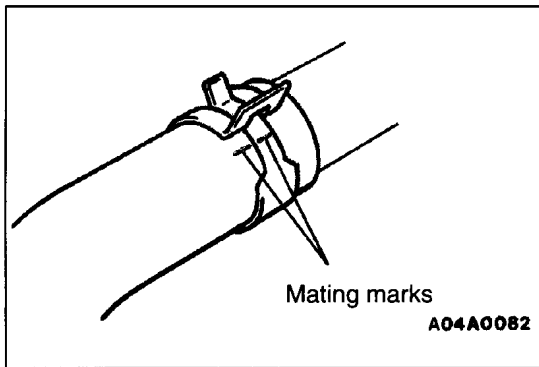


04W0007

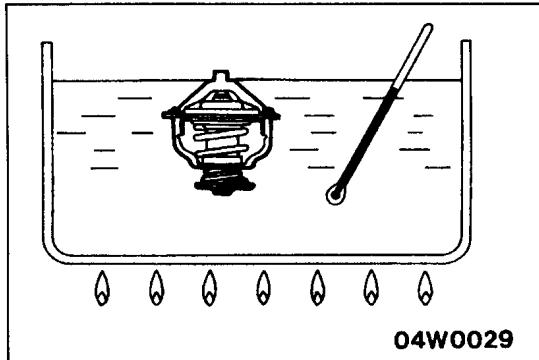
00002265

Removal steps

1. Radiator lower pipe assembly
<4G63, 4G64>
 2. Radiator lower hose connection
<4D56>
 3. O-ring <4G63, 4G64>
 4. Water inlet fitting
 5. Water inlet fitting gasket <4D56>
 6. Thermostat
- ◀A▶ ▶C▶
▶B▶
▶A▶

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

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

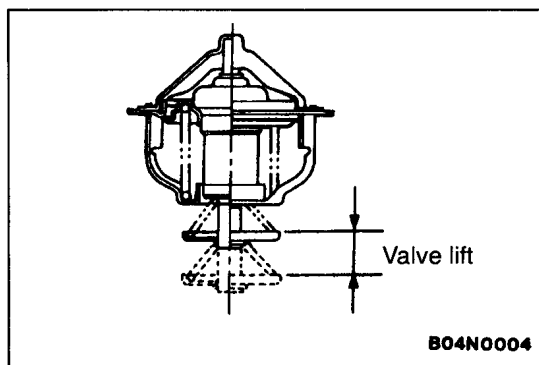
**INSPECTION****THERMOSTAT INSPECTION**

Immerse the thermostat in water, and heat the water while stirring. Check that the thermostat valve opening and fully open temperatures.

Standard value:

Items	4G63, 4G64	4D56
Valve opening temperature °C	82	76.5
Full-opening temperature °C	95	90
Amount of valve lift mm	8.5 or more	8 or more <Panel van and Window van> 8.5 or more <Wagon>

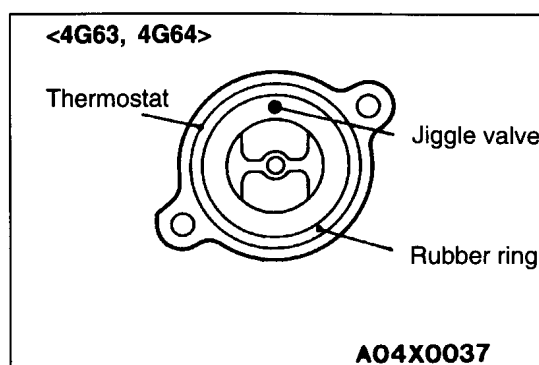
1. Measure valve height when fully closed. Calculate lift by measuring the height when fully open.
2. If valve opens even a little at normal temperature, the thermostat should be replaced.
3. If there is any serious warping, visible damage or breakage, the thermostat should be replaced.
4. Remove any rust or deposits if present.

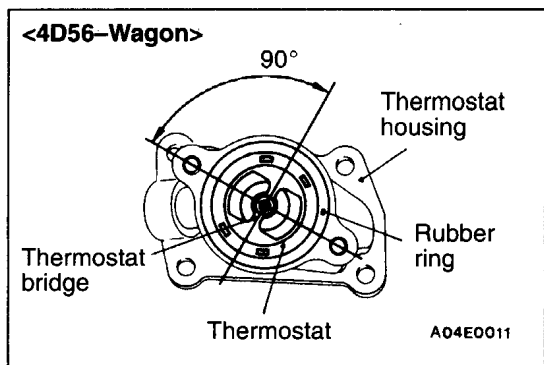
**INSTALLATION SERVICE POINTS****▶A◀ THERMOSTAT INSTALLATION****<4G63, 4G64>**

Install the thermostat so that the jiggle valve is facing straight up, while being careful not to fold over or scratch the rubber ring.

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.

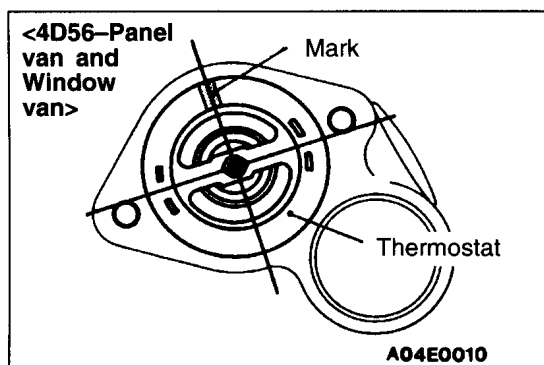


**<4D56–Wagon>**

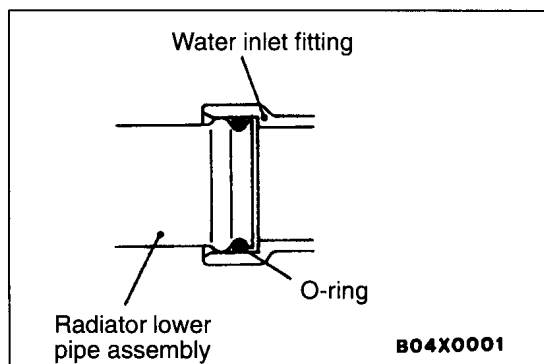
Hold the thermostat at the angle shown in the illustration, and install it while being careful not to wrinkle or damage the rubber ring.

Caution

- Do not apply any oil or grease to the rubber ring of the thermostat under any circumstances.

**<4D56–Panel van and Window van>**

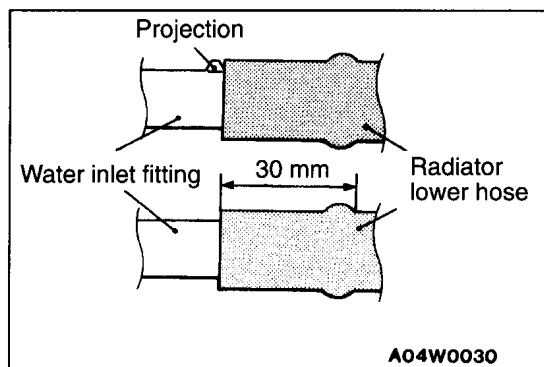
Install the thermostat so that the mark is facing straight up.

**►B◄ O-RING INSTALLATION**

Insert the O-ring into the groove in the radiator lower pipe assembly, and then apply water to the outer inside diameter of the O-ring.

Caution

1. Do not apply oil and grease to water pipe O-ring.
2. Keep the water pipe connections free of sand, dust, etc.

**►C◄ 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.

WATER PUMP

120002152

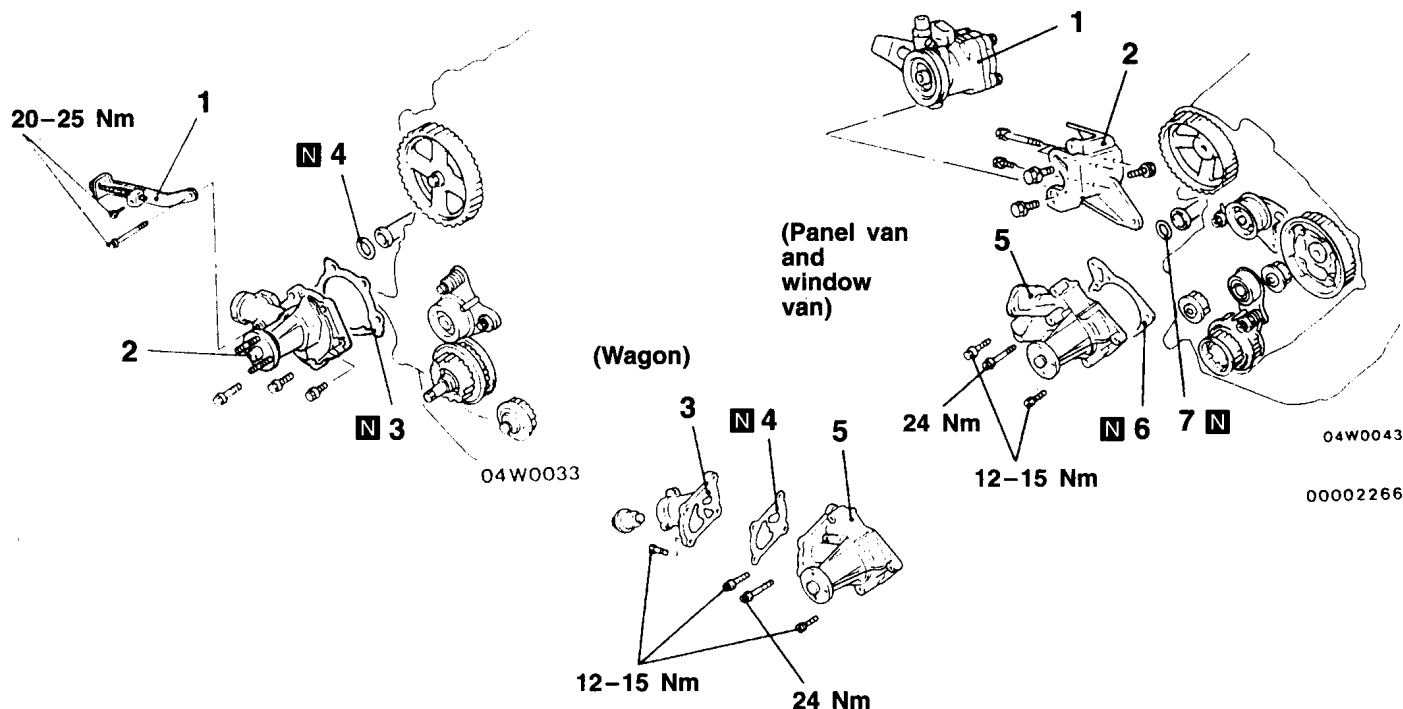
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

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

<4G63, 4G64>

<4D56>

**Removal steps**

<4G63, 4G64>

- ▶B◀ 1. Alternator brace
- ▶A◀ 2. Water pump assembly
- ▶A◀ 3. Water pump gasket
- ▶A◀ 4. O-ring

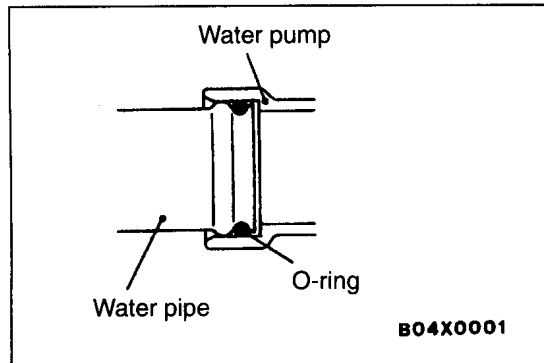
<4D56>

◀A▶

- Air intake hose
(Refer to GROUP 15 – Air Cleaner)
- Thermostat (Refer to P.14-8.)
- 1. Power steering oil pump
- 2. Power steering oil pump bracket
- 3. Thermostat housing <Wagon>
- 4. Thermostat housing gasket <Wagon>
- ▶B◀ 5. Water pump assembly
- ▶A◀ 6. Gasket
- ▶A◀ 7. O-ring

◀A▶ POWER STEERING OIL PUMP REMOVAL

- (1) Remove the power steering oil pump from the bracket with the hose still attached.
- (2) Place the power steering oil pump somewhere where it will not be a hindrance to working, being careful not to put too much strain on the hose.



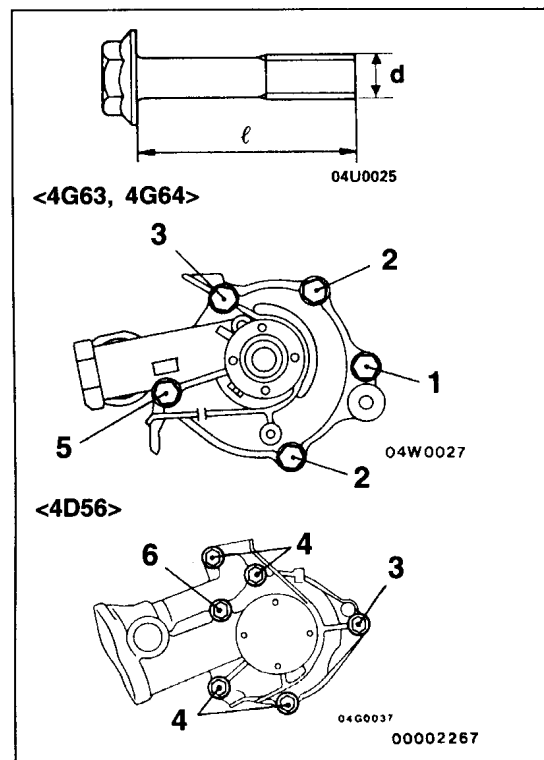
INSTALLATION SERVICE POINTS

▶A◀ O-RING INSTALLATION

Rinse the mounting location of the O-ring and water pipe with water, and install the O-ring and water pipe.

Caution

1. Care must be taken not to permit engine oil or other greases to adhere to the O-ring.
2. When inserting the pipe, check to be sure that there is no sand, dirt, etc. on its inner surface.



▶B◀ WATER PUMP ASSEMBLY INSTALLATION

No.	Hardness category (Head mark)	d × ℓ mm
1	4T	8×14
2		8×22
3		8×25
4		8×40
5	7T	8×65
6		8×70

WATER HOSE AND WATER PIPE

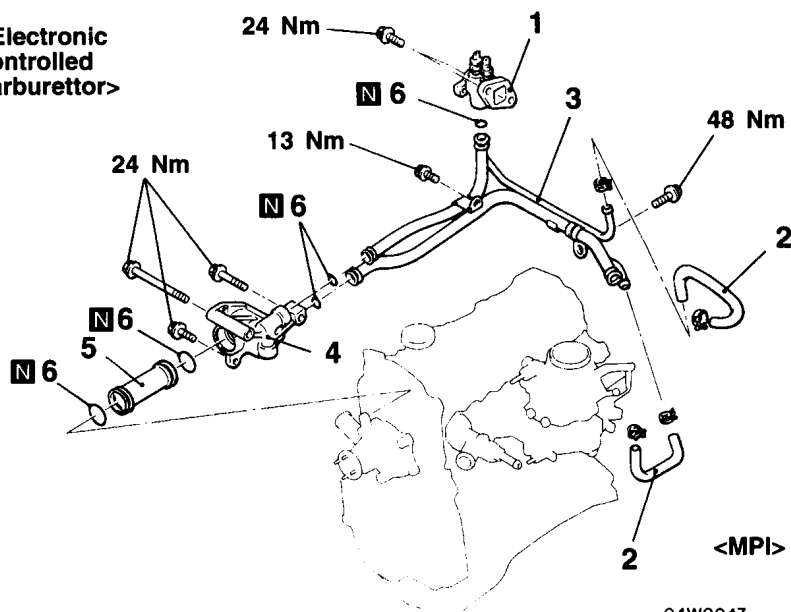
REMOVAL AND INSTALLATION

<4G63, 4G64>

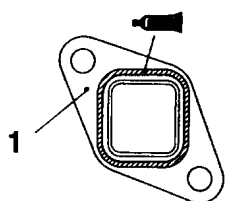
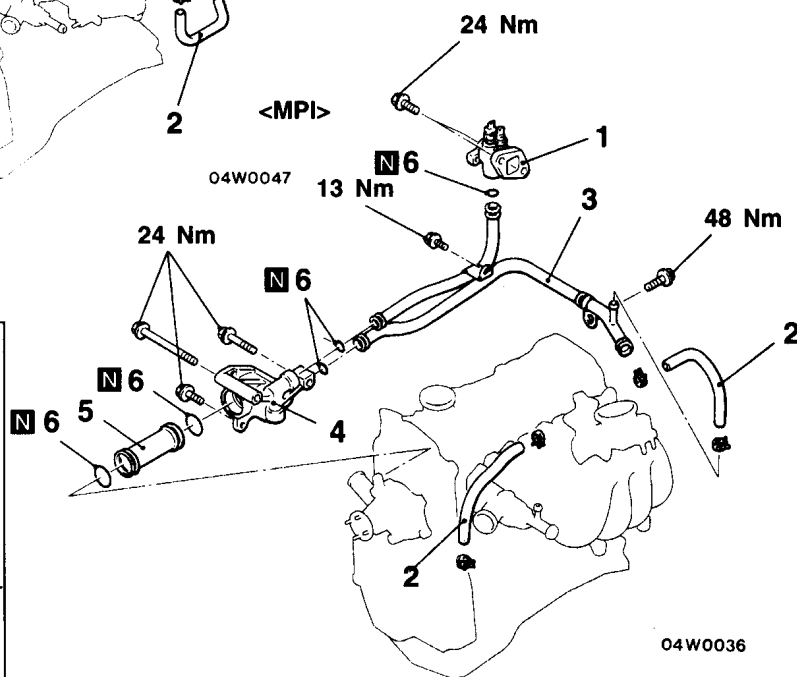
Pre-removal and Post-installation Operation

1. Engine Coolant Draining and Supplying
(Refer to P.14-3.)
2. Thermostat Removal and Installation
(Refer to P.14-8.)
3. Exhaust Manifold Removal and Installation
(Refer to GROUP 15 – Exhaust Manifold.)

<Electronic
controlled
carburettor>



<MPI>



04W0038

Specified Sealant:
Mitsubishi Genuine Parts No.
MD970389 or equivalent

04W0036

00002277

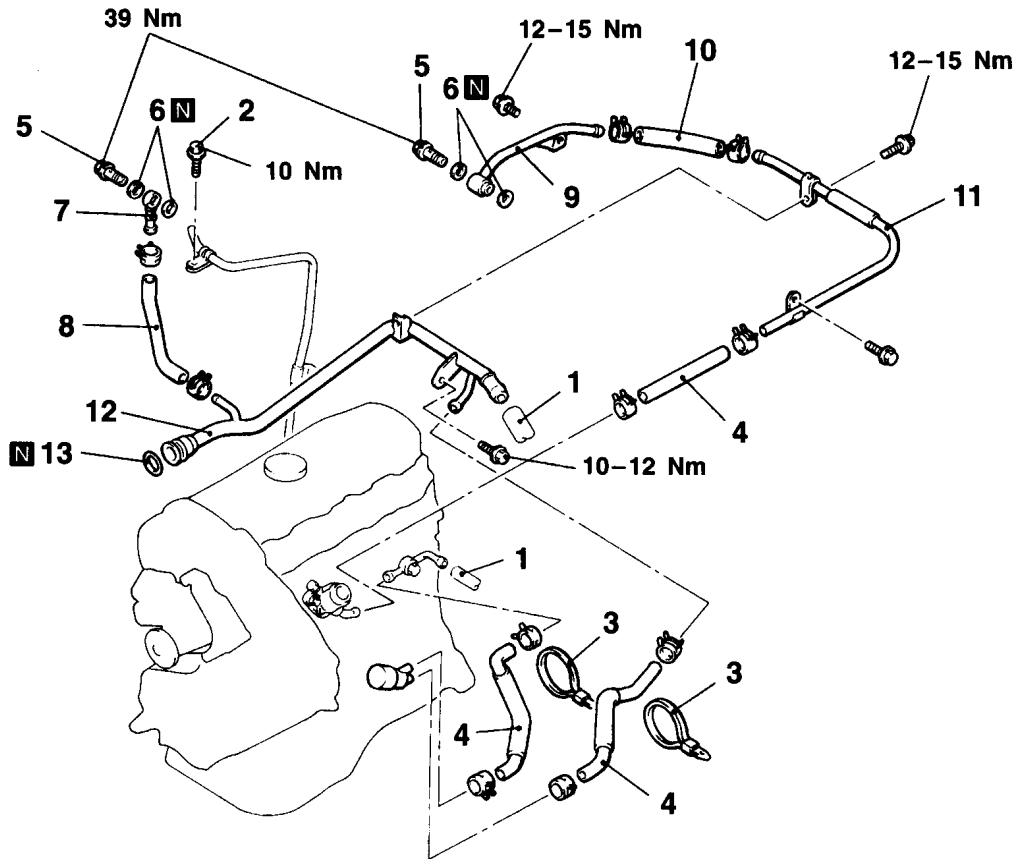
Removal steps

- ◀A▶ ▶B▶
1. Water bypass fitting
 2. Water hose
 3. Water pipe assembly
 4. Thermostat housing assembly
 5. Water inlet pipe
 - ▶A▶ 6. O-ring

<4D56>

Pre-removal and Post-Installation Operation

1. Engine Coolant Draining and Supplying (Refer to P.14-3.)
2. Injection Pipe Removal and Installation (Refer to GROUP 13E – Injection Nozzle.)
3. Intake, Exhaust Manifold Removal and Installation (Refer to GROUP 15 – Intake Exhaust Manifold, Turbocharger.)



A04W0018

Removal steps

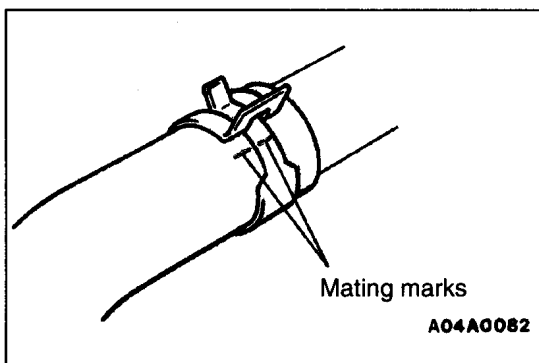
1. Heater hose connection (Refer to GROUP 55 – Heater Hose.)
2. Vacuum pipe installation bolt
3. Cable band
4. Water hose
5. Eye bolt
6. Gasket

◀A▶ ▶B▶

◀A▶ ▶B▶

7. Water pipe assembly A
8. Water hose
9. Water pipe assembly B
10. Water hose
11. Water pipe assembly C
12. Water pipe assembly
13. O-ring

▶A▶

**REMOVAL SERVICE POINT****◀A▶ WATER HOSE DISCONNECTION**

To reuse the hose, make a mating marks on the hose and the hose clamp and then disconnect the hose.

INSPECTION**WATER PIPE AND HOSE INSPECTION**

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

INSTALLATION SERVICE POINTS**►A◄ O-RING INSTALLATION**

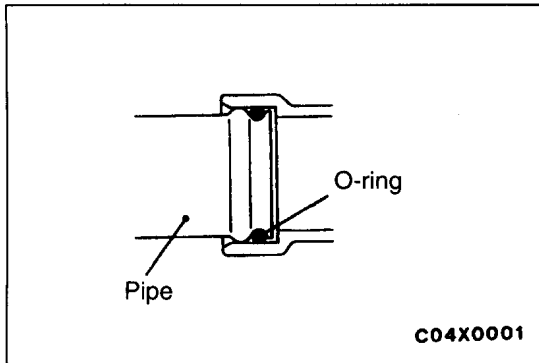
Insert the O-ring to pipe, and coat the outer circumference of the O-ring with water.

Caution

Care must be taken not to permit engine oil or other greases to adhere to the O-ring.

►B◄ WATER HOSE CONNECTION

To reuse the water hose, align the mating marks that were made during removal, and then install the hose clamp.



RADIATOR

120002154

REMOVAL AND INSTALLATION

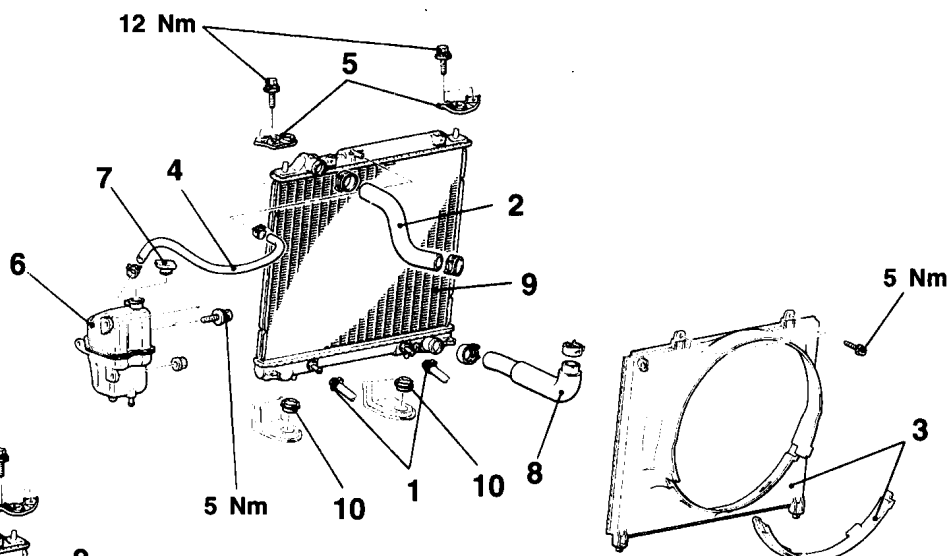
Pre-removal Operation

1. Under Cover Removal (Refer to GROUP 42 – Under Cover.)
2. Engine Coolant Draining (Refer to P.14-3.)

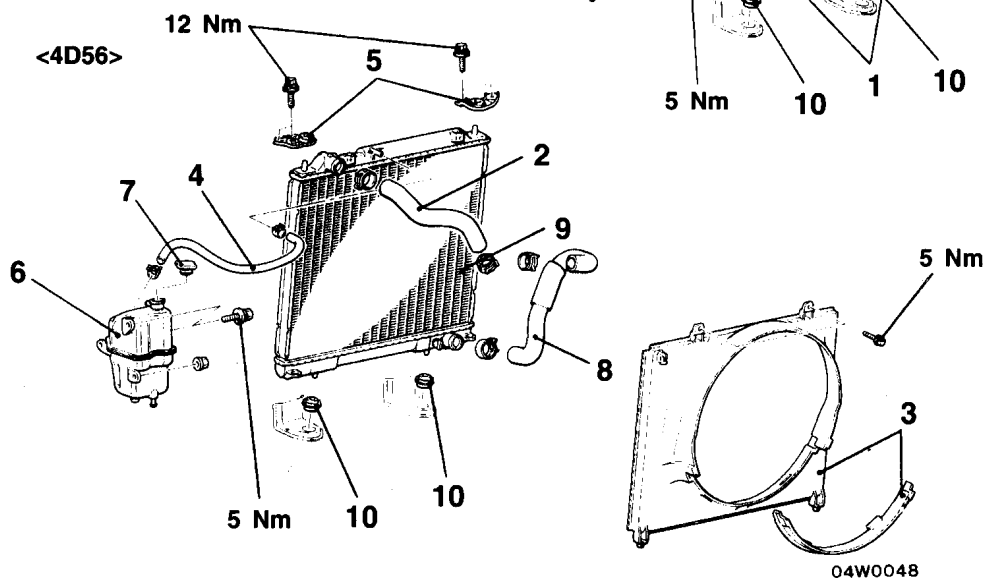
Post-installation Operation

1. Engine Coolant Supplying and Checking (Refer to P.14-3.)
2. Under Cover Installation (Refer to GROUP 42 – Under Cover.)
3. A/T Fluid Supplying and Checking <A/T> (Refer to GROUP 23 – Service Adjustment Procedures.)

<4G63, 4G64>



<4D56>



04W0039

04W0048

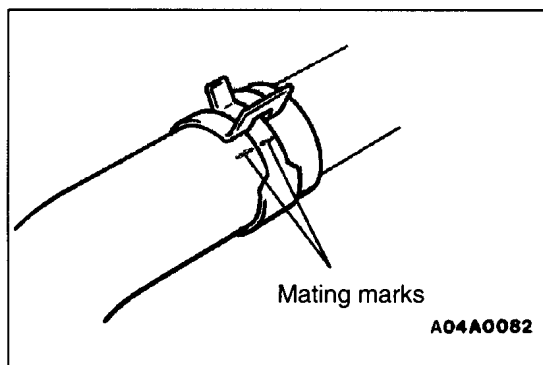
00002268

Removal steps

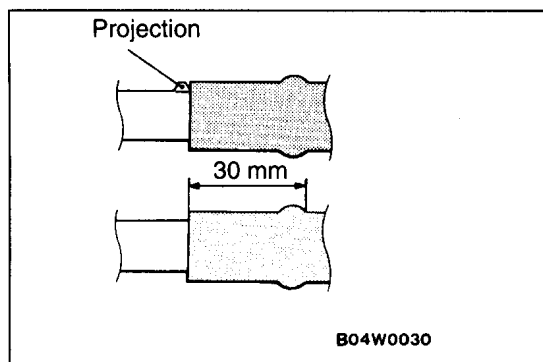
1. Transmission fluid cooler hose <A/T>
2. Radiator upper hose
3. Shroud
4. Rubber hose
5. Radiator support assembly
6. Reserve tank assembly



7. Radiator cap
8. Radiator lower hose
9. Radiator assembly
10. Lower insulator

**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 UPPER HOSE/RADIATOR LOWER HOSE CONNECTION**

- (1) Insert the hose as far as the projections on both the radiator side and engine side. If there is no projection, insert by the amount shown in the illustration.
- (2) Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.