

COOLING

CONTENTS

110003053

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GENERAL INFORMATION

11000305

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 on 1.8L engines or by the V ribbed belt on 1.5L engines from the crankshaft.

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

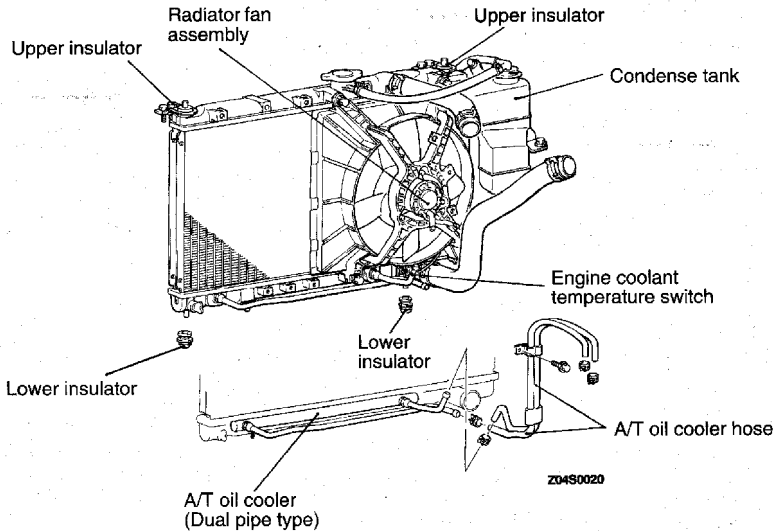
SPECIFICATIONS

11000306

Items		Specifications
Cooling method		Water-cooled, pressurized, forced circulation with electrical fan
Radiator type		Pressurized corrugated fin type
Radiator fan motor type		Direct current ferrite type
Water pump type		Centrifugal impeller type
Thermostat	Type	Wax type with jiggle valve
	Identification mark (Stamped on flange)	1.5L Engine: 88, 1.8L Engine: 82

CONSTRUCTION DIAGRAM

11000307



SERVICE SPECIFICATIONS

110003057

Items			Standard value	Limit	
Range of coolant antifreeze concentration %			30–60	–	
Thermostat	Valve opening temperature °C (°F)	1.5L Engine	88 (190)	–	
		1.8L Engine	82 (180)	–	
	Full-opening temperature °C (°F)	1.5L Engine	100 (212)	–	
		1.8L Engine	95 (203)	–	
Radiator cap pressure range kPa (psi)			75–105 (11–15)	–	
Opening pressure radiator cap high pressure valve kPa (psi)			–	65 (9.2)	
Thermo sensor (on radiator) operating temperature °C (°F)	For radiator fan	OFF → ON	1.5L Engine	82–88 (180–190)	–
			1.8L Engine	81–89 (178–192)	–
		ON → OFF	1.5L Engine	78 (172) or less	–
			1.8L Engine	77 (171) or less	–

LUBRICANT

110003058

Items		Specified lubricant	Quantity dm ³ (qts)
Engine coolant	1.5L Engine	High quality ethylene glycol antifreeze coolant	5.0 (5.3)
	1.8L Engine		6.0 (6.3)

SEALANT

110003059

Items	Specified sealant
Cylinder block drain plug	3M Nut Locking Part No. 4171 or equivalent
Engine coolant temperature gauge unit	
Engine coolant temperature sensor	
Engine coolant temperature switch	
Water pump	Mitsubishi Genuine Part No. 970389 or equivalent
Thermostat case	

TROUBLESHOOTING

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Symptom	Probable cause	Remedy		
Overheat	Insufficient engine coolant	Refill		
	Too high anti-freeze concentration	Correct anti-freeze concentration		
	Loose or broken drive belt	Replace		
	Damaged or blocked (insufficiently ventilated) radiator fins	Correct		
	Faulty thermostat operation	Replace		
	Faulty water pump operation	Replace		
	Water passage clogged with slime or rust deposit or foreign substance	Clean		
Overheat	Inoperative electric cooling fan	Faulty thermosensor	Replace	
		Faulty electrical motor		
		Faulty radiator fan relay		
	Water leaks	Damaged radiator core joint	Replace	
		Corroded or cracked hoses (radiator hose, heater hose, etc.)		
		Faulty radiator cap valve or setting of spring		
		Cracked intake manifold		
		Cracked thermostat housing		
		Loose bolt or leaking gasket in water outlet fitting		Correct or replace
		Loose bolt or leaking gasket in water inlet fitting		
		Loose water pump mounting bolt or leaking gasket		
		Faulty radiator cap valve or setting of spring		Replace
		Loose intake manifold bolts or leaking from gasket		Retorque bolts or replace gasket
	Loose thermostat housing bolts or leaking from gasket			
Faulty automatic transaxle oil cooler operation	Blocked or collapsed hose and pipe	Replace		
	Loose hose and pipe connection	Correct		
No rise in temperature	Faulty thermostat	Replace		

SERVICE ADJUSTMENT PROCEDURES

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ENGINE COOLANT LEAK CHECK

1. Loosen cap.
2. Confirm that the engine coolant level is up to the filler neck.
3. Install an adapter and cap adapter to the water outlet fitting and apply 160 kPa (23 psi) pressure. Hold pressure for two minutes, while checking for leakage from the radiator, hose of connections.

Caution

Be sure to completely clean away any moisture from the places checked.

When the tester is removed, be careful not to spill any engine coolant from it.

Be careful, when installing and removing the tester and when testing, not to deform the water outlet fitting.

4. If there is leakage, replace the appropriate part.

RADIATOR CAP PRESSURE TEST

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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 (9.2 psi.)

Standard value: 75–105 kPa (11–15 psi.)

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 leak, causing an improper reading.

ENGINE COOLANT REPLACEMENT

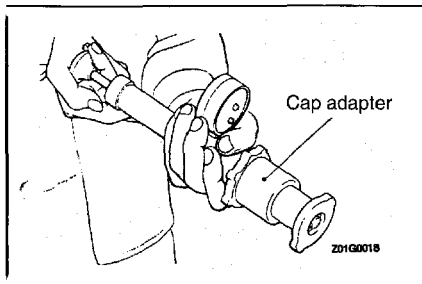
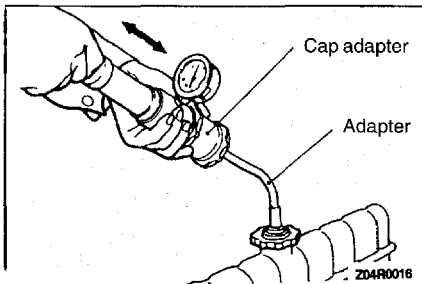
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Refer to GROUP 00 – Engine Coolant.

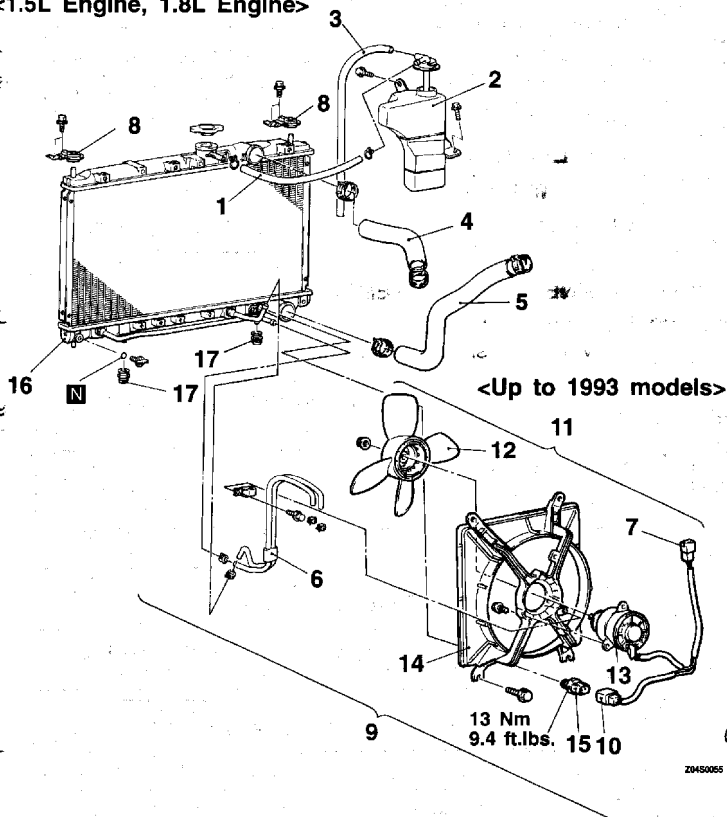
ENGINE COOLANT CONCENTRATION TEST

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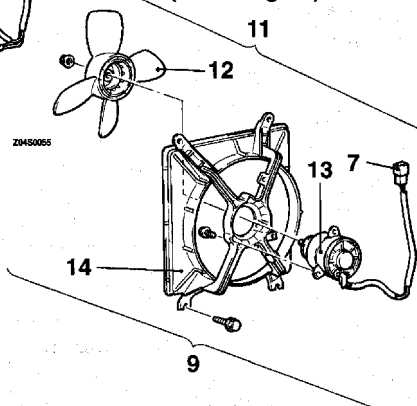
Refer to GROUP 00 – Coolant Selection.



Other models
<1.5L Engine, 1.8L Engine>



<From 1994 models>
(1.8L Engine)



Z04S0051

Radiator removal steps

1. Overflow hose
2. Reserve tank
3. Drain hose
14. Radiator, upper hose
5. Radiator lower hose
6. Transmission fluid cooler hose <A/T>
7. Radiator fan motor connector
8. Upper insulator
9. Radiator and radiator fan motor assembly
10. Engine coolant temperature switch connector (Up to 1993 models)
11. Radiator fan motor assembly

15. Engine coolant temperature switch (Up to 1993 models)
16. Radiator
17. Lower insulator

Radiator fan motor removal steps

1. Overflow hose
4. Radiator upper hose
6. Transmission fluid cooler hose <A/T>
7. Radiator fan motor connector
10. Engine coolant temperature switch connector (Up to 1993 models)
11. Radiator fan motor assembly
12. Fan
13. Radiator fan motor
14. Shroud



REMOVAL SERVICE POINT**◀▶ TRANSMISSION FLUID COOLER HOSE REMOVAL**

After removing the hose from the radiator, plug the hose and the radiator nipple to prevent dust or foreign particles from getting in.

INSPECTION**TRANSMISSION FLUID COOLER HOSE CHECK**

Check the hose and pipe for crack, damage or clog.

ENGINE COOLANT TEMPERATURE SWITCH CHECK

- (1) Immerse the engine coolant temperature switch into warm water as shown in the illustration.
- (2) Check for continuity as the temperature of the liquid changes. The condition is normal if it is within the following ranges.

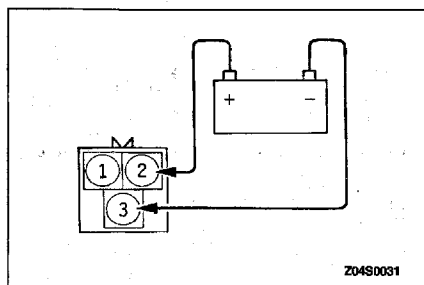
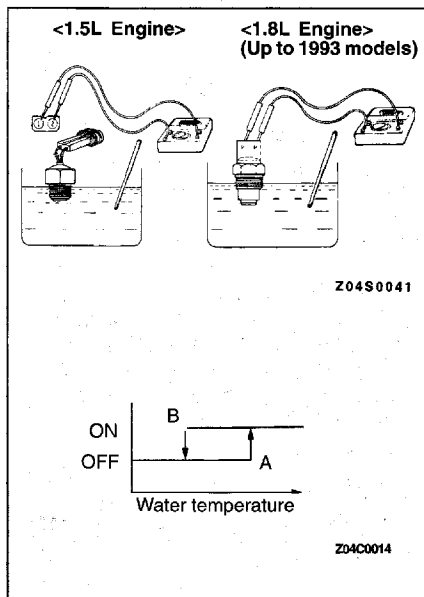
Standard value:

<1.5L Engine>

Items	For radiator fan
Temperature at point A (OFF → ON)	82–88°C (180–190°F)
Temperature at point B (ON → OFF)	78°C (172°F) or less

<1.8L Engine> (Up to 1993 models)

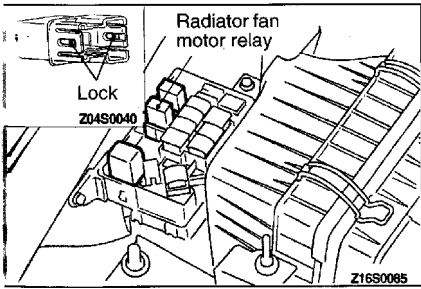
Items	For radiator fan
Temperature at point A (OFF → ON)	81–88°C (178–190°F)
Temperature at point B (ON → OFF)	77°C (171°F) or less

**RADIATOR FAN MOTOR INSPECTION**

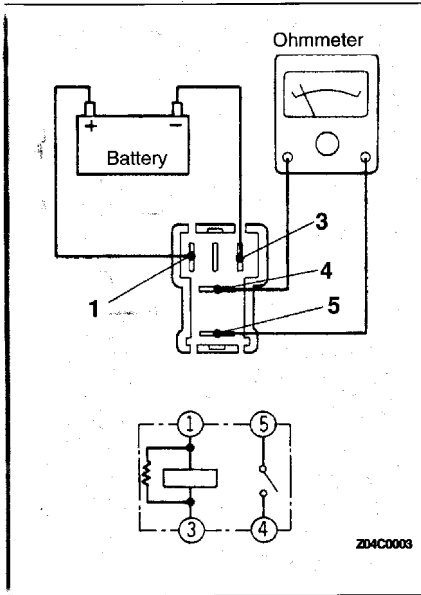
- (1) Check to be sure that the radiator fan rotates when battery voltage is applied between terminals (as shown in the figure).
- (2) Check for abnormal noises, while motor is turning. Replace if motor/bearings are noisy.

RADIATOR FAN MOTOR RELAY CHECK

- (1) Remove the radiator fan motor relay from the relay box inside the engine compartment.



- (2) Check the continuity between terminals 4–5 when battery voltage is applied between terminals 1–3.

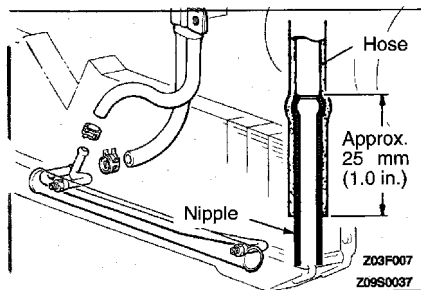


When current is flowing	Between terminals 4–5	Continuity
When current is not flowing	Between terminals 1–3	Continuity
	Between terminals 4–5	No continuity

INSTALLATION SERVICE POINTS

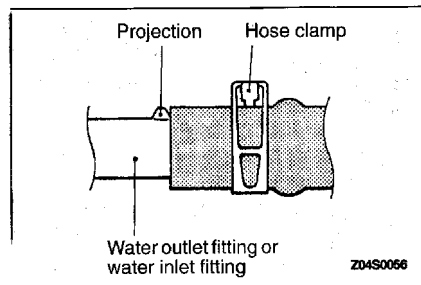
▶A◀ TRANSMISSION FLUID COOLER HOSE INSTALLATION <From 1994 models>

When connecting the hose assembly on the radiator side, be sure to keep the overlapping length specified in the illustration. Secure the hose firmly, using care that the hose clip does not ride on the bulge of the nipple.



▶B◀ RADIATOR LOWER HOSE AND RADIATOR UPPER HOSE INSTALLATION

- (1) Insert each hose as far as the projection of the radiator or water outlet fitting.
- (2) If the hose is reused, the hose clamp should always be installed at the previous position.



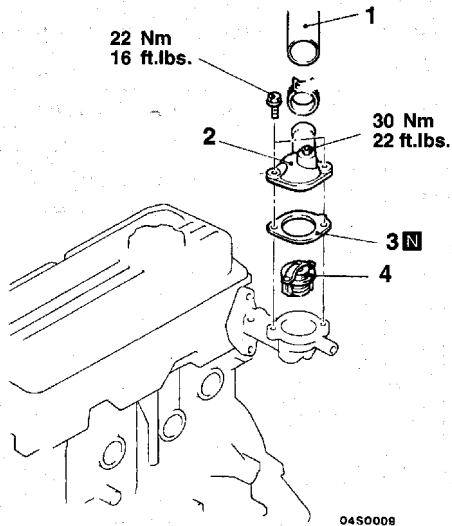
THERMOSTAT

REMOVAL AND INSTALLATION

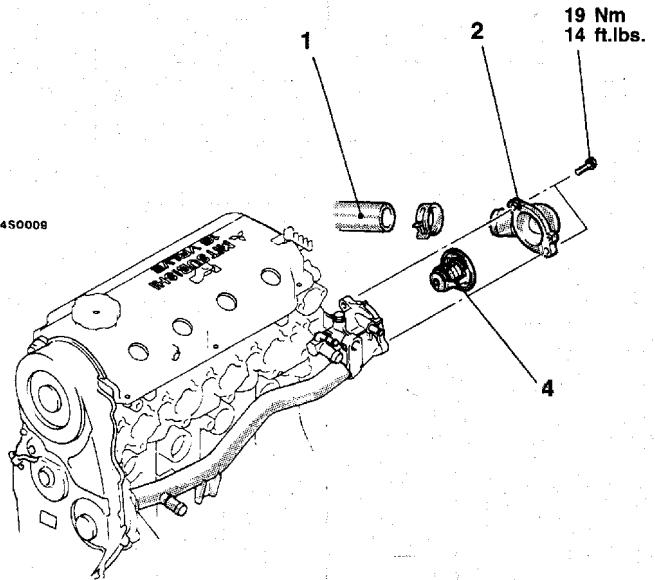
Pre-removal and Post-installation Operation

- Engine Coolant Draining and Refilling
- Air Intake Hose and Air Cleaner Body Removal and Installation

<1.5L Engine>



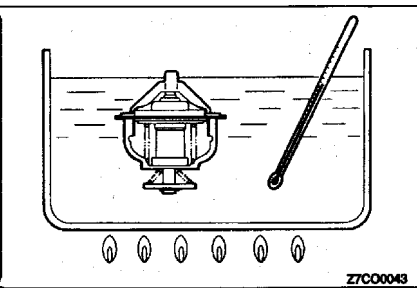
<1.8L Engine>

**Removal steps <1.5L Engine>**

- B◄ 1. Radiator upper hose
2. Water outlet fitting
3. Water outlet fitting gasket
4. Thermostat

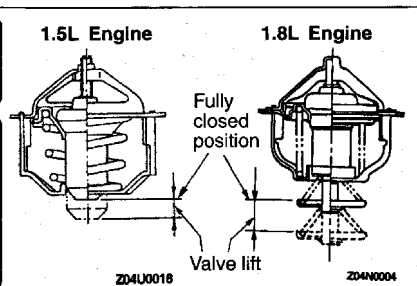
Removal steps <1.8L Engine>

- B◄ 1. Radiator lower hose
2. Water inlet fitting
►A◄ 4. Thermostat



INSPECTION

- Check that valve closes tightly at room temperature.
- Check for defects or damage.
- Check for rust or encrustation on valve. Remove if any.
- Immerse thermostat in container of water. Raise water temperature and check that thermostat opens and is fully open [valve lift-over 8 mm (.31 in.)] as listed below.



Standard value:

▶ Valve opening temperature

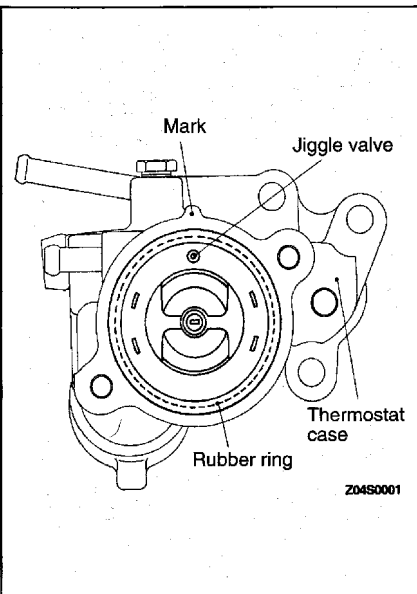
1.5L Engine 88°C (190°F)

1.8L Engine 82°C (180°F)

Full-open temperature

1.5L Engine 100°C (212°F)

1.8L Engine 95°C (203°F)



INSTALLATION SERVICE POINTS

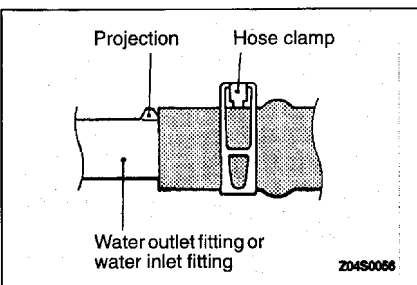
▶A◀ THERMOSTAT INSTALLATION <1.8L Engine>

- (1) Install the thermostat so that the jiggle valve of the thermostat is facing straight up (mark position shown in the illustration).

Caution

Be sure that there is no oil adhering to the rubber ring of the thermostat.

- (2) Install the thermostat so that the rubber ring is not curled or damaged.



▶B◀ RADIATOR UPPER HOSE <1.5L Engine> OR RADIATOR LOWER HOSE <1.8L Engine> INSTALLATION

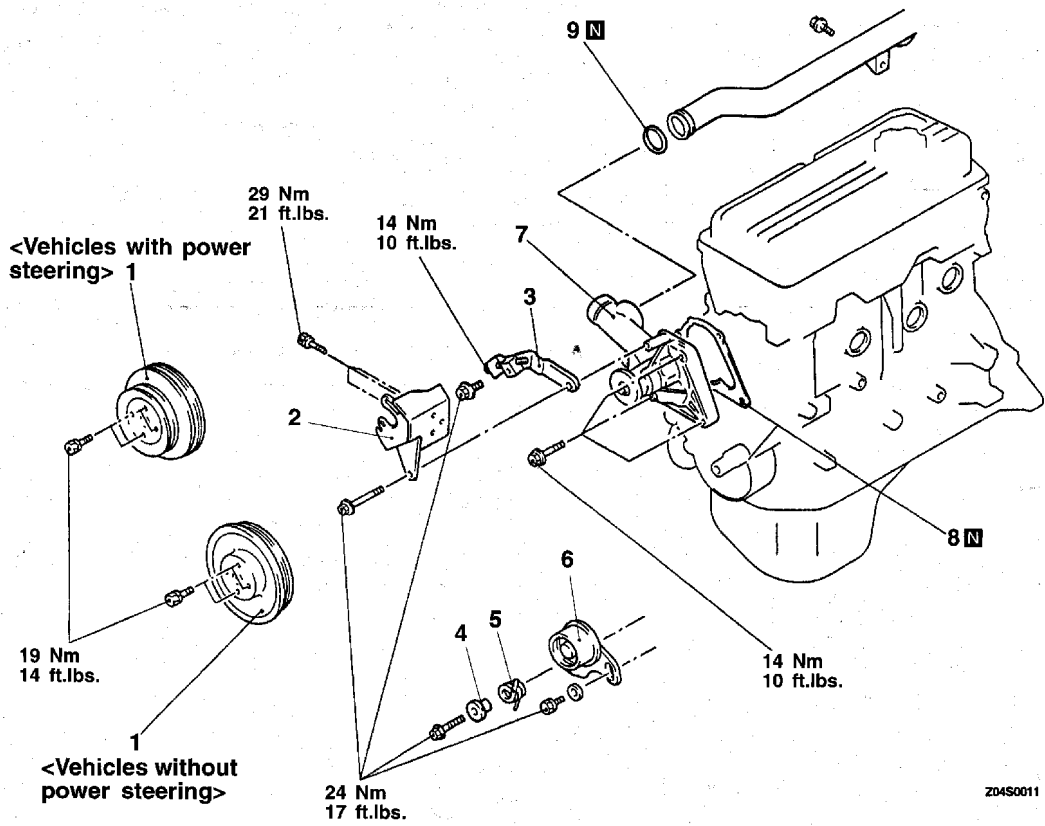
- (1) Insert each hose as far as the projection of the water outlet fitting or water inlet fitting.
- (2) If the hose is reused, the hose clamp should always be installed at the previous position.

WATER PUMP <1.5L Engine>

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

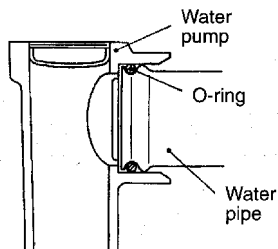
- Engine Coolant Draining and Refilling
- Timing Belt Removal and Installation
(Refer to GROUP 11 – Timing Belt.)
- Power Steering Oil Pump Removal and Installation
(Refer to GROUP 37A – Power Steering Oil Pump.)



Removal steps

1. Water pump pulley
2. Power steering oil pump bracket
<Vehicles with power steering>
3. Generator brace
4. Tensioner spacer

5. Tensioner spring
6. Timing belt tensioner
- ▶B◀ 7. Water pump
- ▶A◀ 8. Water pump gasket
9. O-ring



Z04P0028

INSTALLATION SERVICE POINTS

▶A◀ O-RING INSTALLATION

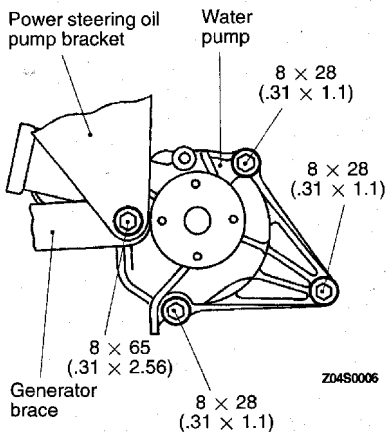
Insert the O-ring to the water inlet pipe, and coat the O-ring with water for easier installation.

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 INSTALLATION

Water pump installation bolt sizes are different and caution must be paid to ensure that they are properly installed.



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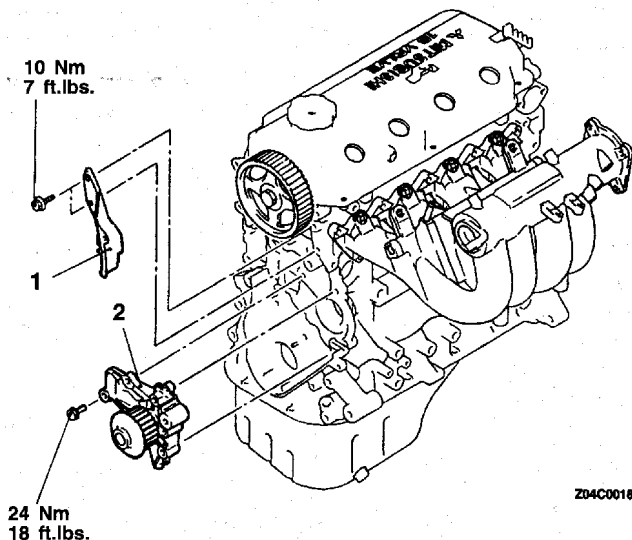
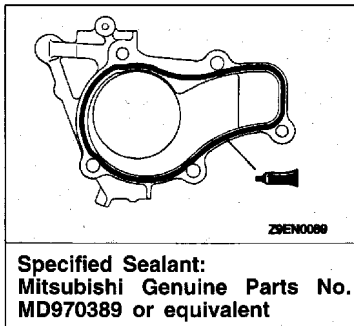
Screw diameter × length: mm (in.)

WATER PUMP <1.8L Engine>

REMOVAL AND INSTALLATION

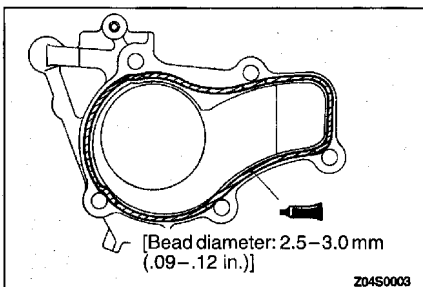
Pre-removal and Post-installation Operation

- Engine Coolant Draining and Refilling
- Timing Belt Removal and Installation
(Refer to GROUP 11 – Timing Belt.)



Removal steps

1. Timing belt rear cover
2. Water pump



INSTALLATION SERVICE POINT

▶◀ WATER PUMP INSTALLATION

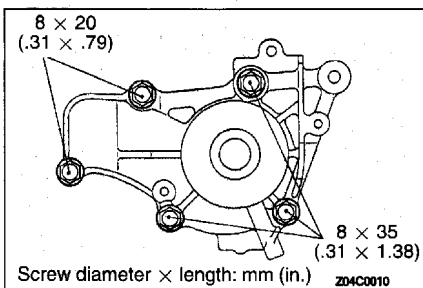
- (1) Squeeze out the sealant from the tube evenly and apply it so that there is not too much sealant and no places without sealant.

Specified sealant:

Mitsubishi Genuine Parts No. MD970389 or equivalent

NOTE

- (1) Install the water pump within 15 minutes after applying the sealant, or the sealant will be weakened.
- (2) Wait at least 1 hour after installing the water pump. Do not start the engine or let engine oil or coolant touch the adhesion surface for 1 hour.
- (2) Water pump installation bolt sizes are different and caution must be paid to ensure that they are properly installed.

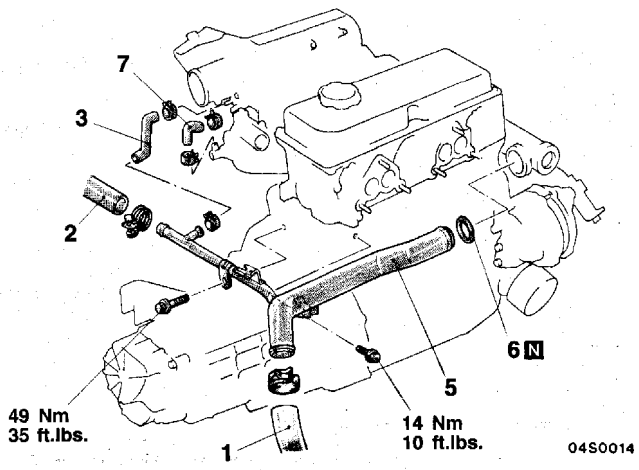


WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

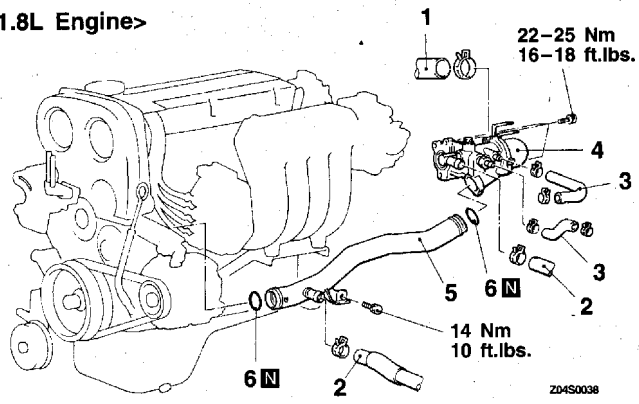
Pre-removal and Post-installation Operation
 • Engine Coolant Draining and Refilling

<1.5L Engine>

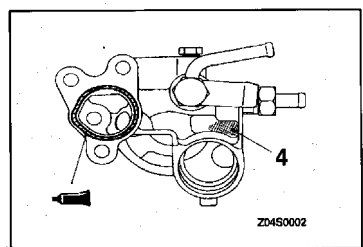


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<1.8L Engine>



ZD4S0038



ZD4S0002

Specified Sealant:
 Mitsubishi Genuine Parts No.
 MD970389 or equivalent

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Removal steps

- ▶A◀ 1. Radiator lower hose connection
- ▶A◀ 2. Heater hose connection
- ▶A◀ 3. Water hose
- ▶B◀ 4. Thermostat case, thermostat and water inlet fitting assembly
 <1.8L Engine>
- 5. Water inlet pipe
- 6. O-ring (Refer to P. 14-13.)
- ▶A◀ 7. Bypass hose <1.5L Engine>

INSTALLATION SERVICE POINTS

▶A◀ HOSES INSTALLATION

Install the hose clamp at the previous hose clamp installation position.

▶B◀ THERMOSTAT CASE, THERMOSTAT AND WATER INLET FITTING ASSEMBLY

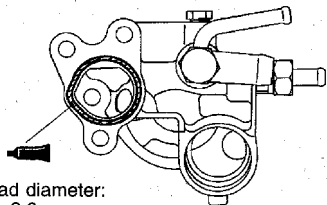
Squeeze out the sealant from the tube evenly and apply it so that there is not too much sealant and no places without sealant.

Specified sealant:

Mitsubishi Genuine Parts No. MD970389 or equivalent

NOTE

- (1) Install the water pump within 15 minutes after applying the sealant, or the sealant will be weakened.
- (2) Wait at least 1 hour after installing the water pump. Do not start the engine or let engine oil or coolant touch the adhesion surface for 1 hour.



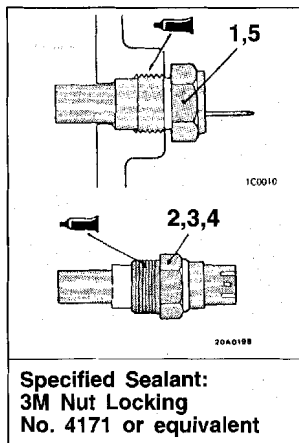
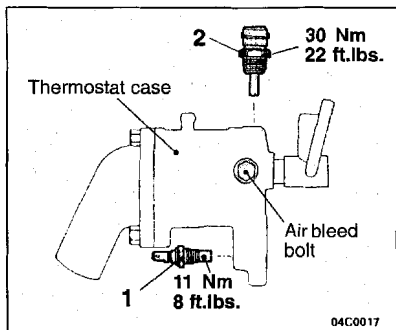
[Bead diameter:
2.5–3.0 mm
(.09–.12 in.)]

Y04S0002

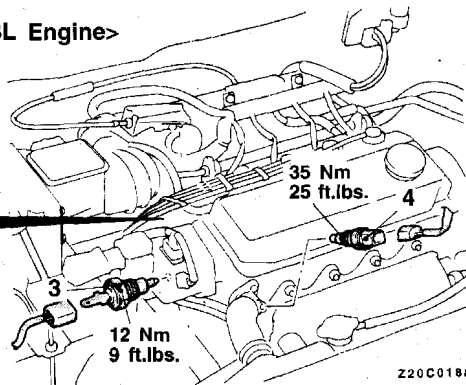
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ENGINE COOLANT TEMPERATURE GAUGE UNIT, ENGINE COOLANT TEMPERATURE SENSOR AND ENGINE COOLANT TEMPERATURE SWITCH

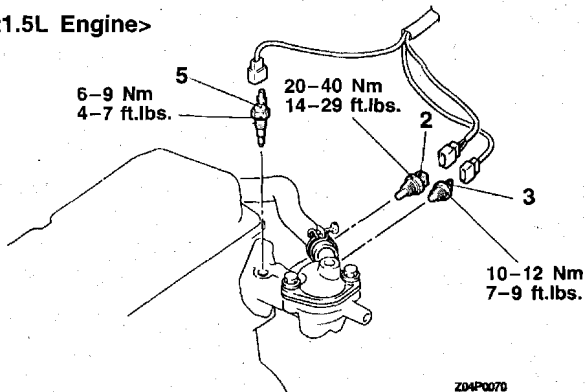
REMOVAL AND INSTALLATION



<1.8L Engine>



<1.5L Engine>



Removal steps

1. Engine coolant temperature gauge unit
2. Engine coolant temperature sensor (Engine control)
3. Engine coolant temperature switch (for condenser fan)

4. Air conditioning engine coolant temperature switch (Up to 1993 models)
5. Engine coolant temperature switch (for 3 A/T)

INSPECTION

ENGINE COOLANT TEMPERATURE GAUGE UNIT

Refer to GROUP 54 – Meters and Gauges.

ENGINE COOLANT TEMPERATURE SENSOR (Engine control)

Refer to GROUP 13A – MFI System Inspection.