

# 01-12 COOLING SYSTEM

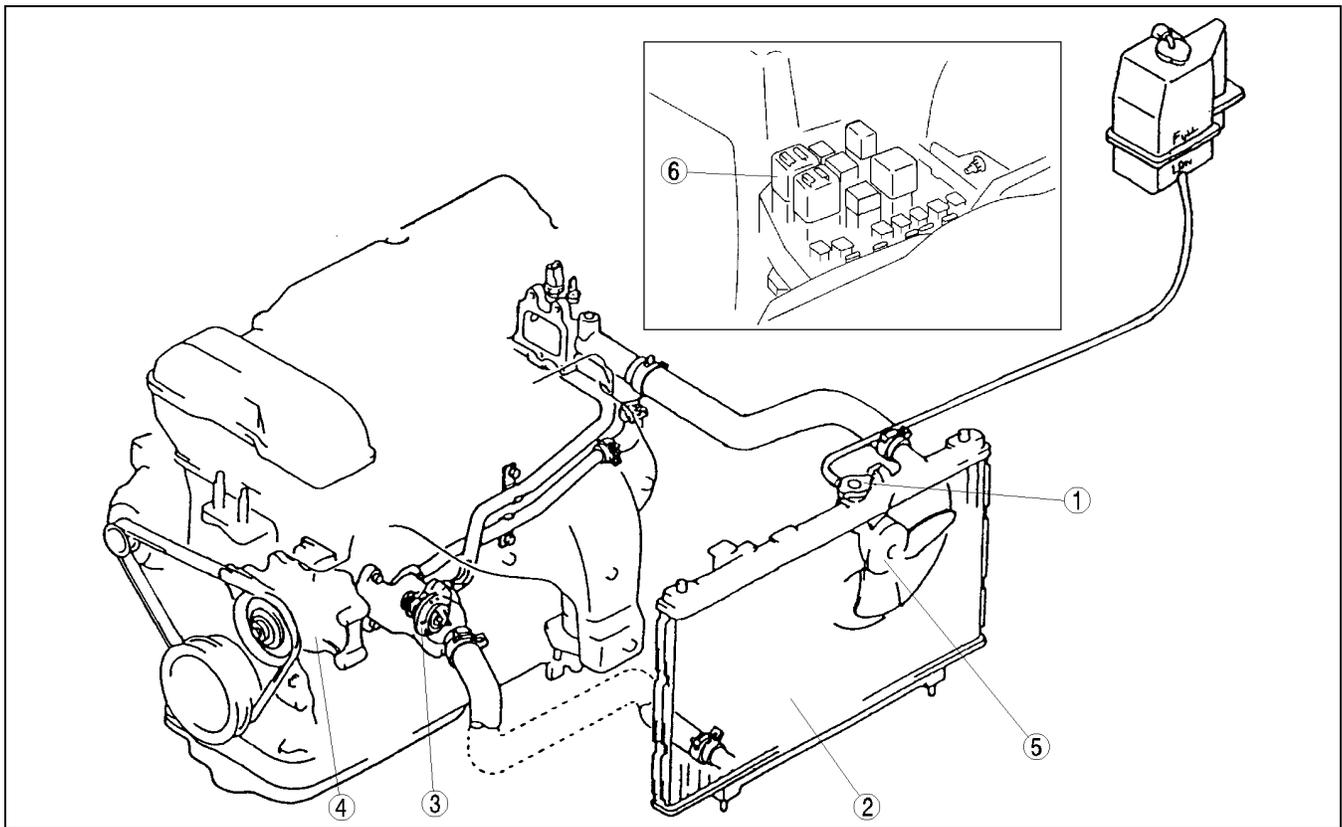
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## COOLING SYSTEM LOCATION INDEX

A3U011201004W01



Z3U0112W100

1	Radiator cap (See 01-12-4 RADIATOR CAP INSPECTION)
2	Radiator (See 01-12-4 RADIATOR REMOVAL/ INSTALLATION)
3	Thermostat (See 01-12-5 THERMOSTAT REMOVAL/ INSTALLATION) (See 01-12-7 THERMOSTAT INSPECTION)

4	Water pump (See 01-12-8 WATER PUMP REMOVAL/ INSTALLATION)
5	Cooling fan motor (See 01-12-9 COOLING FAN MOTOR INSPECTION) (See 01-12-9 COOLING FAN MOTOR REMOVAL/ INSTALLATION)
6	Cooling fan relay (See 09-21-5 RELAY INSPECTION)

# COOLING SYSTEM

## COOLING SYSTEM SERVICE WARNINGS

A3U011201004W02

### Warning

- Never remove the radiator cap or the coolant filler cap. Do not 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 while still using the cloth, turn it, and remove it.
- Hot engines and engine coolant can cause severe burns. Turn off the engine and wait until it and the coolant are cool before draining the engine coolant.

## ENGINE COOLANT LEVEL INSPECTION

A3U011215001W01

1. Remove the radiator cap.
2. Verify that the coolant level is near the radiator filler neck.
3. Verify that the coolant level in the coolant reservoir is between the FULL and LOW marks.
  - Add coolant if necessary.

## ENGINE COOLANT PROTECTION INSPECTION

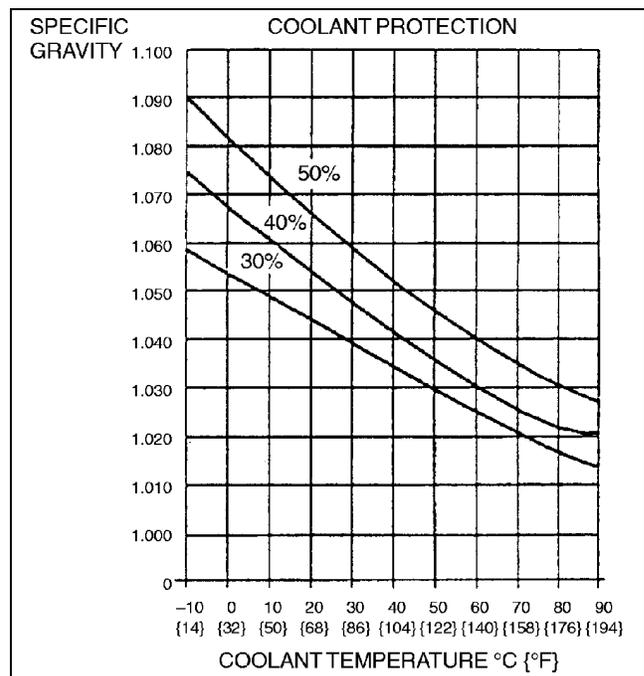
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1. Measure the coolant temperature and specific gravity with a thermometer and a hydrometer.

### 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 on the coolant's effectiveness.

2. Determine the coolant protection by referring to the graph shown.
  - If the coolant protection is not correct, add water or coolant.



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# COOLING SYSTEM

## ENGINE COOLANT REPLACEMENT

A3U011215001W03

1. Drain the coolant in the coolant reservoir.
2. Remove the radiator cap and loosen the radiator drain plug.
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.

### 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 on the coolant's effectiveness.
- Engine coolant will damage paint. Rinse it off quickly.

7. Referring to the following chart, select proper volume percentage of the water and coolant. 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]

### Antifreeze solution mixture percentage

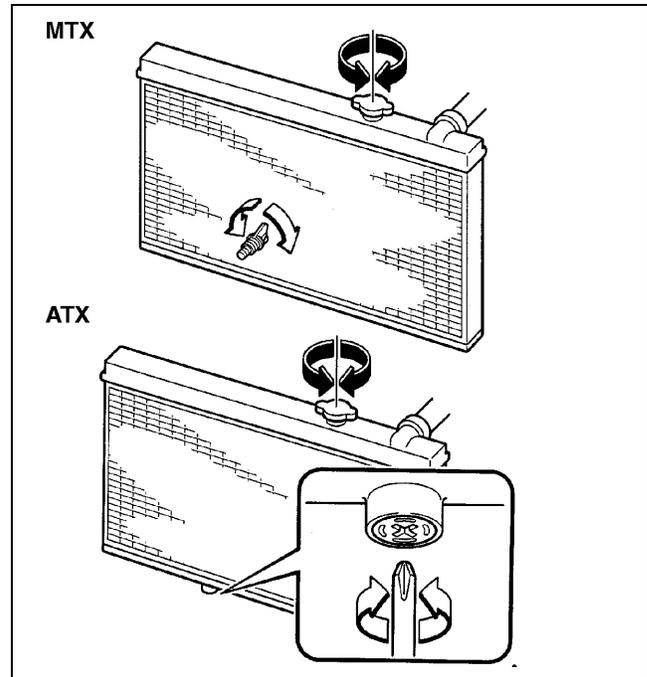
Coolant protection	Volume percentage		Gravity at 20 °C {68 °F}
	Water	Coolant	
Above -16 °C {4 °F}	65	35	1.054
Above -26 °C {-15 °F}	55	45	1.066
Above -40 °C {-40 °F}	45	55	1.078

8. Pour coolant into the reservoir up to the FULL mark on the coolant reservoir.
9. Fully install the radiator cap.

### Caution

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

10. Start the engine and let it idle for **approx. 10 min.**
11. 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 s**; then return to idling. Repeat this several times.
12. Stop the engine and wait until it is cool.
13. Inspect the coolant level. If it is low, repeat Step 7—12.
14. Verify there is no leakage.



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# COOLING SYSTEM

## ENGINE COOLANT LEAKAGE INSPECTION

A3U011215001W04

1. Inspect the coolant level.
2. Remove the radiator cap.
3. Connect a radiator cap tester and the **SST** to the radiator filler neck.

### Caution

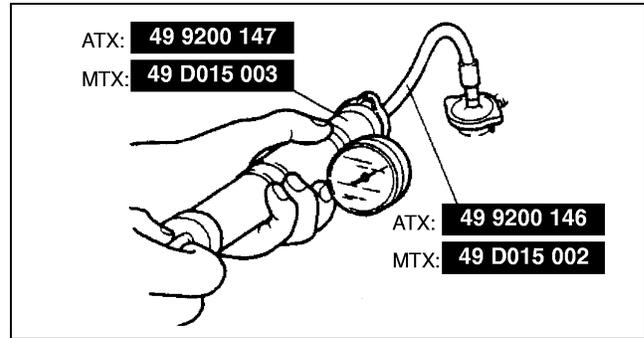
- Applying more than 123 kPa {1.25 kgf/cm<sup>2</sup>, 17.8 psi} can damage the hoses, fittings, and other components, and cause leaks.

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.



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## RADIATOR CAP INSPECTION

A3U011215201W01

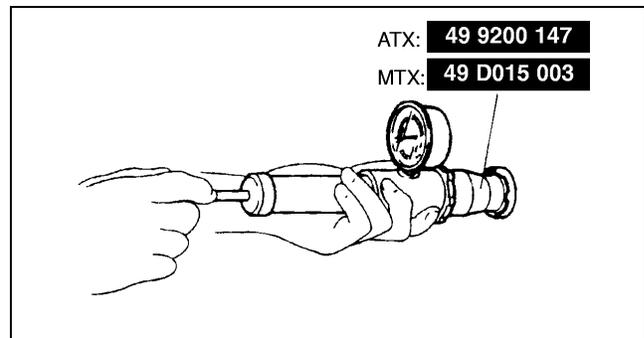
### Warning

- 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're sure all the pressure is gone, press down on the cap while still 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}



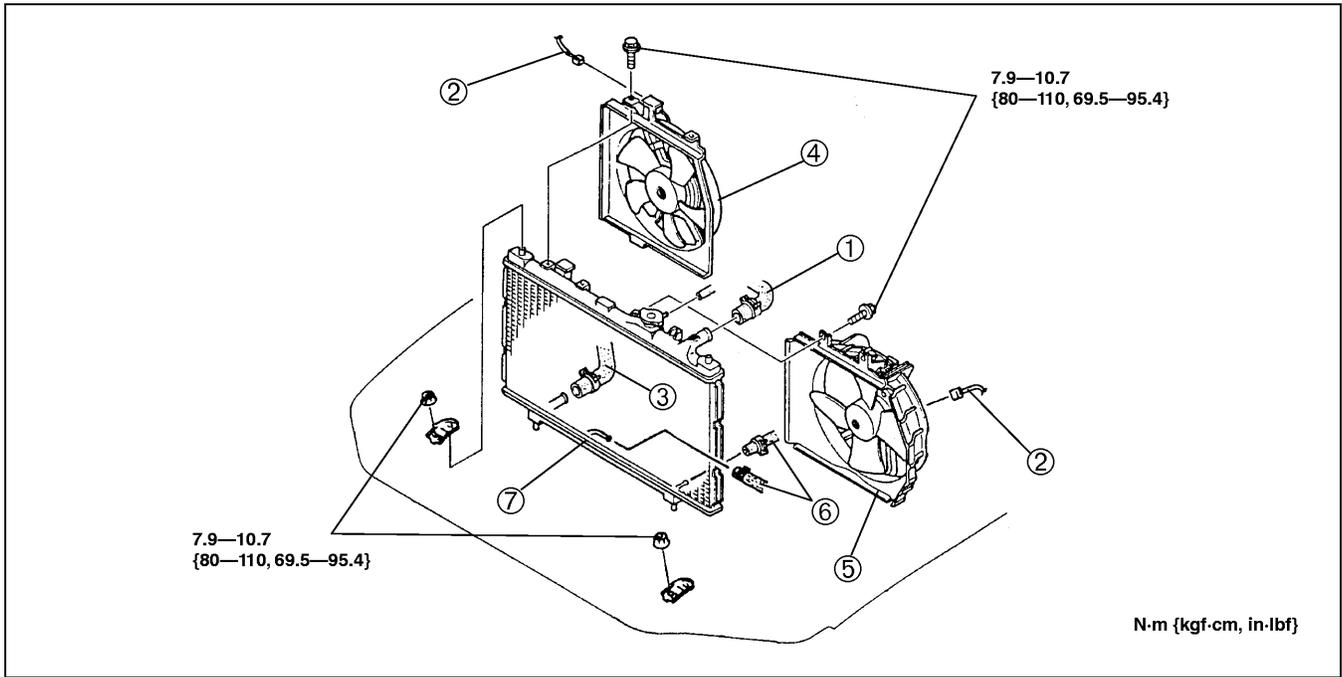
X3U112WA4

## RADIATOR REMOVAL/INSTALLATION

A3U011215200W01

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

# COOLING SYSTEM



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X3U112WA5

1	Upper radiator hose
2	Cooling fan motor connector, condenser fan motor connector
3	Lower radiator hose
4	Condenser fan

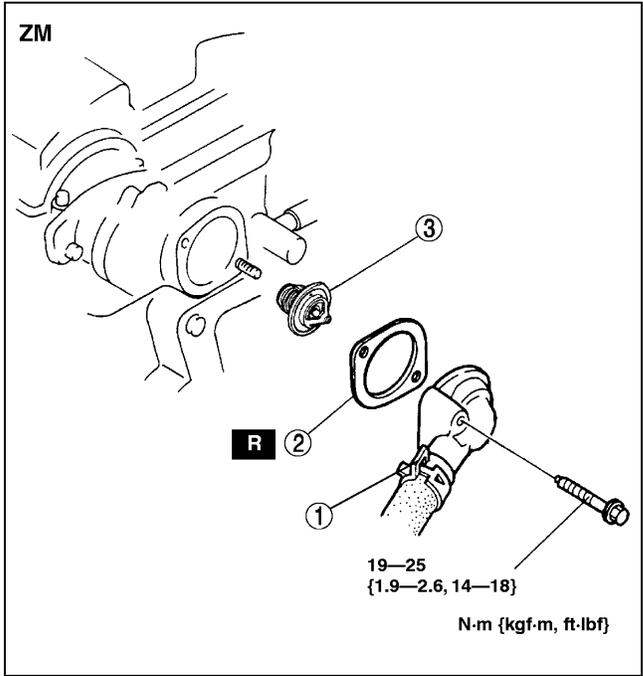
5	Cooling fan
6	Oil hose (ATX) (See 05-17-41 OIL COOLER REMOVAL/INSTALLATION)
7	Radiator

## THERMOSTAT REMOVAL/INSTALLATION

A3U011215171W01

1. Disconnect the negative battery cable.
2. Remove the fresh air duct.
3. Remove the air cleaner. (ZM model)
4. Drain the engine coolant. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-3 ENGINE COOLANT REPLACEMENT.)
5. Remove in the order indicated in the table.

1	Thermostat cover
2	Thermostat cover gasket (See 01-12-7 Thermostat Cover Gasket Installation Note)
3	Thermostat (See 01-12-6 Thermostat Installation Note)

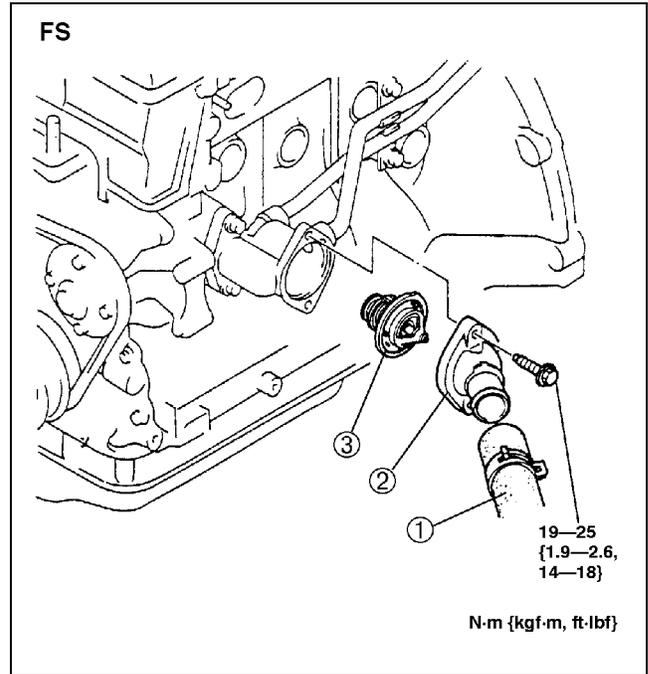


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# COOLING SYSTEM

1	Lower radiator hose
2	Thermostat cover
3	Thermostat (See 01-12-6 Thermostat Installation Note)

6. Install in the reverse order of removal.

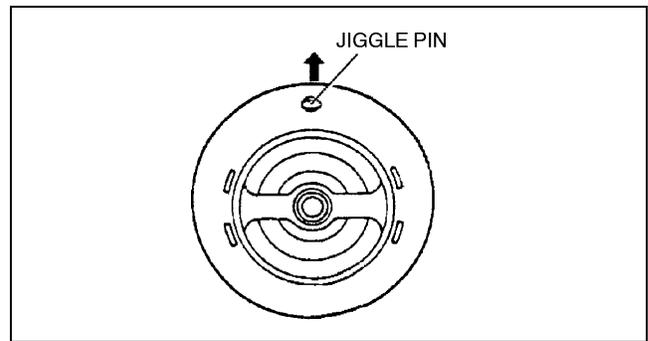


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## Thermostat Installation Note

### ZM

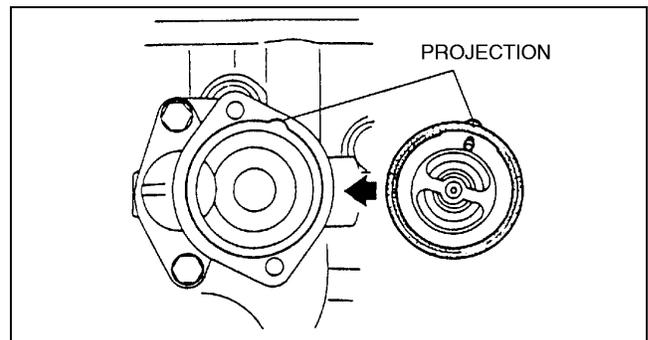
1. Install the thermostat into the cylinder head with the jiggle pin at the top.



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### FS

1. Install the thermostat into the thermostat case with the jiggle pin and projection at the top.
2. Install the thermostat into the thermostat case, aligning the projection on the gasket to the thermostat case.



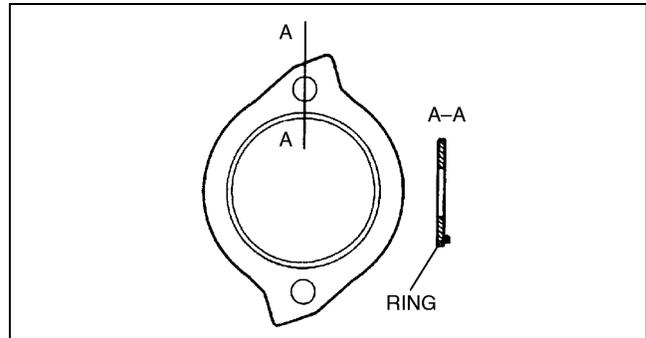
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# COOLING SYSTEM

## Thermostat Cover Gasket Installation Note

ZM

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



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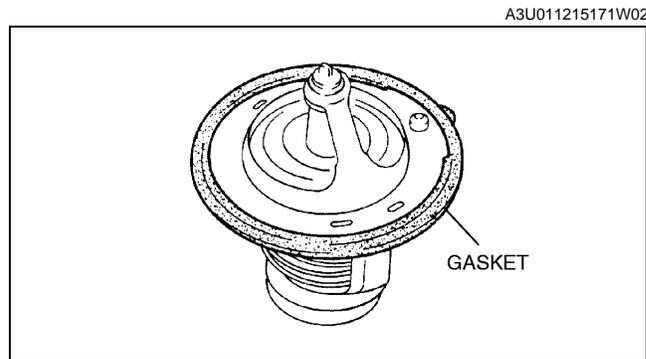
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## THERMOSTAT INSPECTION

1. If the gasket of the thermostat is damaged, replace the thermostat assembly. (FS model)
2. Visually check that the thermostat valve is closed.
3. Place the thermostat and a thermometer in water.

### Warning

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

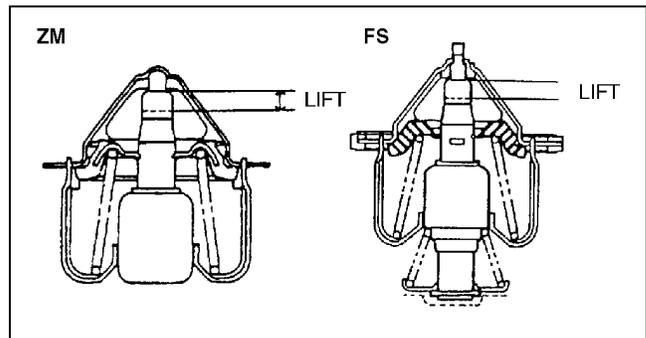


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X3U112WAK

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

Item	Engine	
	ZM	FS
Initial-opening temperature (°C {°F})	83.5—88.0 {183—190}	80—84 {176—183}
Full-open temperature (°C {°F})	100 {212}	95 {203}
Full-open lift (mm {in})	8.5 {0.33} min.	



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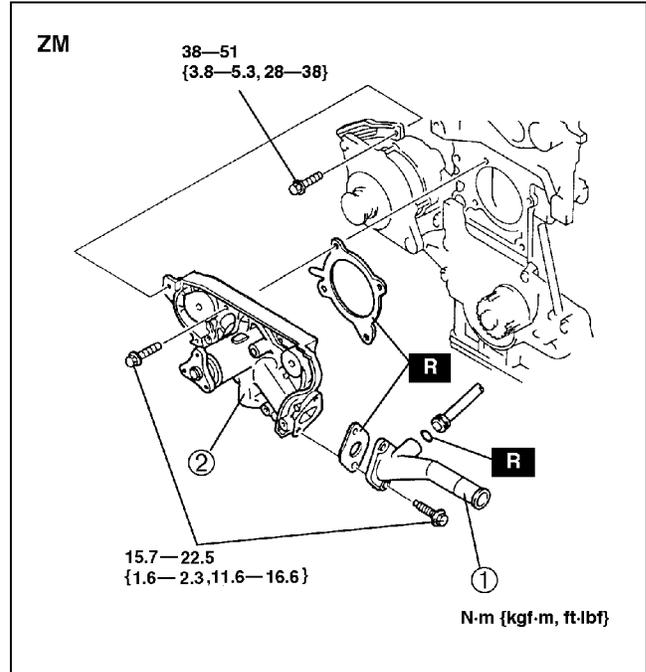
# COOLING SYSTEM

## WATER PUMP REMOVAL/INSTALLATION

A3U011215010W01

1. Drain the engine coolant. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-3 ENGINE COOLANT REPLACEMENT.)
2. Remove the fresh air duct and air cleaner. (ZM model)
3. Remove the exhaust manifold insulator. (ZM model)
4. Remove the timing belt. (See 01-10A-9 TIMING BELT REMOVAL/INSTALLATION [ZM].) (See 01-10B-8 TIMING BELT REMOVAL/INSTALLATION [FS].)
5. Remove the P/S oil pump with the oil hose still connected. Position the P/S oil pump so that it is out of the way. (ZM model)
6. Remove the A/C compressor and A/C compressor bracket with the pipe still connected. Position the A/C compressor so that it is out of the way. (ZM model)
7. Remove in the order indicated in the table.

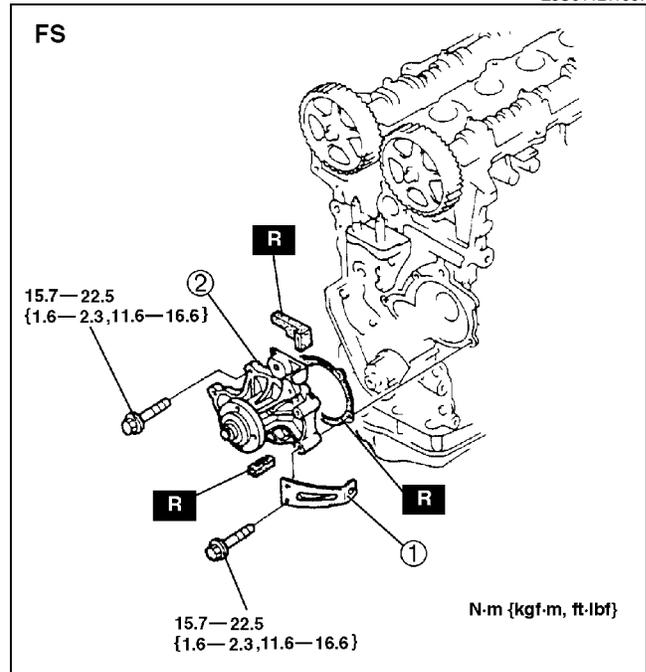
1	Water inlet pipe
2	Water pump (See 01-12-9 Water Pump Installation Note)



Z3U0112W997

1	P/S oil pump adjuster
2	Water pump

8. Install in the reverse order of removal.



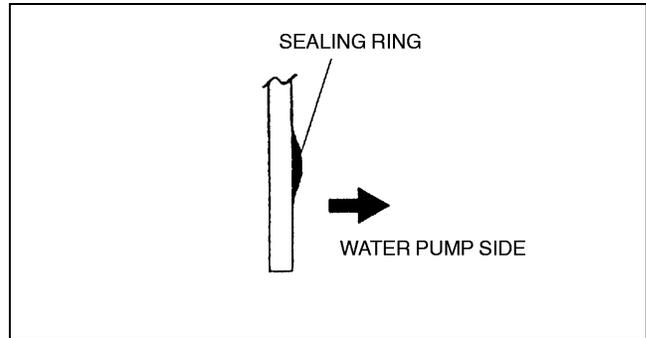
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# COOLING SYSTEM

## Water Pump Installation Note

ZM

1. Install a new gasket with the sealing ring facing the water pump.



X3U112WAD

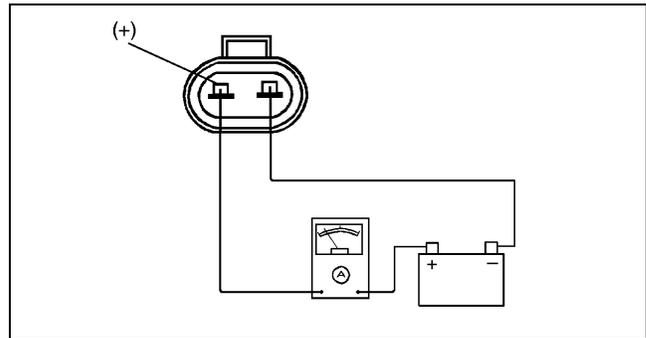
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## COOLING FAN MOTOR INSPECTION

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

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Item		Transaxle	
		MTX	ATX
Current	(A)	2.4—4.4	5.2—7.2



X3U112WAF

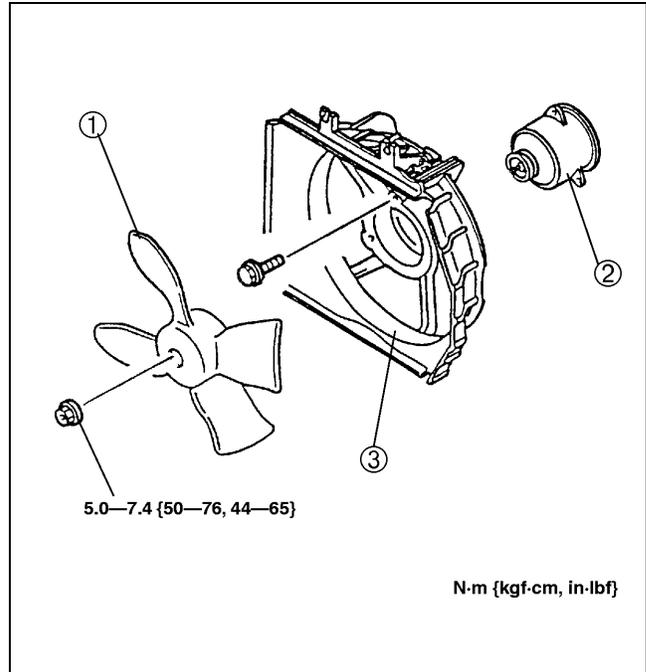
## COOLING FAN MOTOR REMOVAL/INSTALLATION

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

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1	Cooling fan blade
2	Cooling fan motor
3	Radiator cowling

3. Install in the reverse order of removal.



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