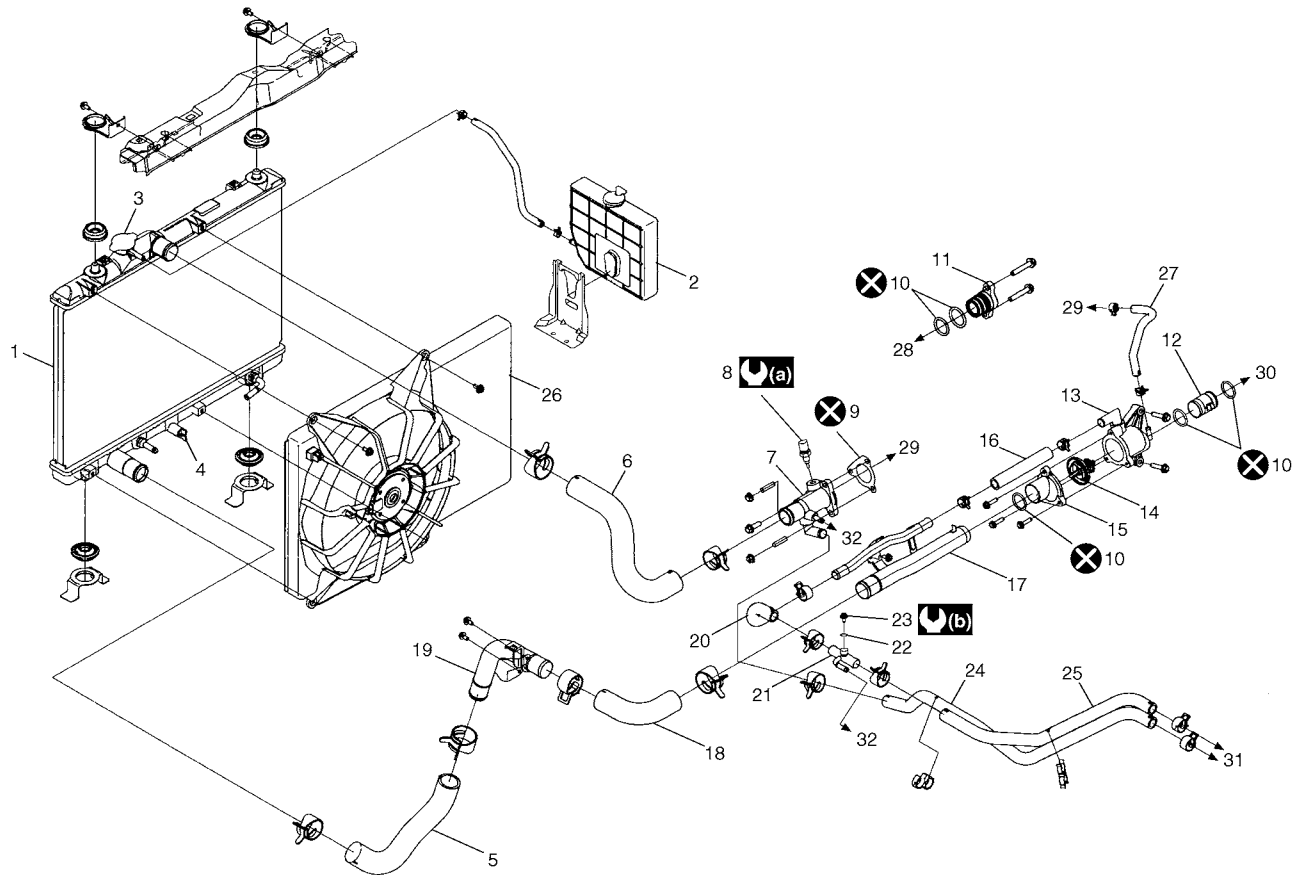


Repair Instructions

Cooling System Components

S4RS0A1606001



I4RS0A160001-

1. Radiator	13. Thermostat case	25. Heater outlet No.1 hose
2. Reservoir	14. Thermostat	26. Engine cooling fan assembly
3. Radiator cap	15. Thermostat cap	27. Water bypass No.2 hose
4. Drain plug	16. Water bypass No.1 hose	28. To timing chain cover
5. Radiator outlet hose	17. Water inlet No.1 pipe	29. To cylinder head
6. Radiator inlet hose	18. Water inlet hose	30. To water pump
7. Water outlet cap	19. Water inlet No.2 pipe	31. To heater core
8. ECT sensor	20. Heater outlet No.2 hose	32. To throttle body
9. Water outlet cap gasket	21. Heater union	(a) : 15 N·m (1.5 kg-m, 11.0 lb-ft)
10. O-ring	22. Heater union gasket	(b) : 4.5 N·m (0.45 kg-m, 3.5 lb-ft)
11. Water outlet plug	23. Air ventilation bolt	: Do not reuse.
12. Thermostat case water outlet pipe	24. Heater inlet hose	

1F-5 Engine Cooling System:

Coolant Level Check

S4RS0A1606002

WARNING:

To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if radiator cap is taken off too soon.

To check level, lift hood and look at “see-through” coolant reservoir.

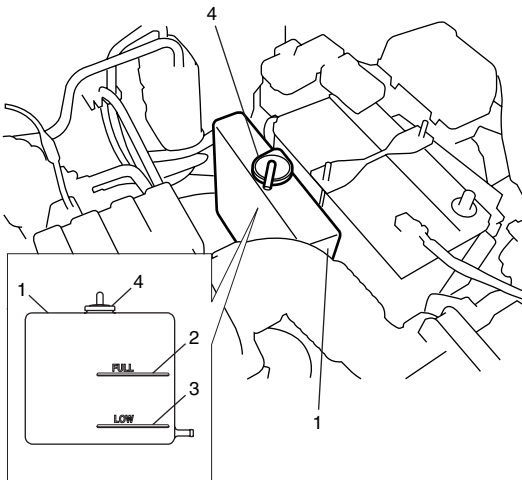
It is not necessary to remove radiator cap to check coolant level.

When engine is cool, check coolant level in reservoir (1). A normal coolant level should be between FULL mark (2) and LOW mark (3) on reservoir (1).

If coolant level is below LOW mark (3), remove reservoir cap (4) and add proper coolant to reservoir to bring coolant level up to FULL mark (2).

NOTE:

If proper quality antifreeze is used, there is no need to add extra inhibitors or additives that claim to improve system. They may be harmful to proper operation of system, and are unnecessary expense.



I4RS0A160002-

Engine Cooling System Inspection and Cleaning

S4RS0A1606003

WARNING:

To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

- 1) Check cooling system for leakage or damage.
- 2) Wash radiator cap and filler neck with clean water by removing radiator cap when engine is cold.

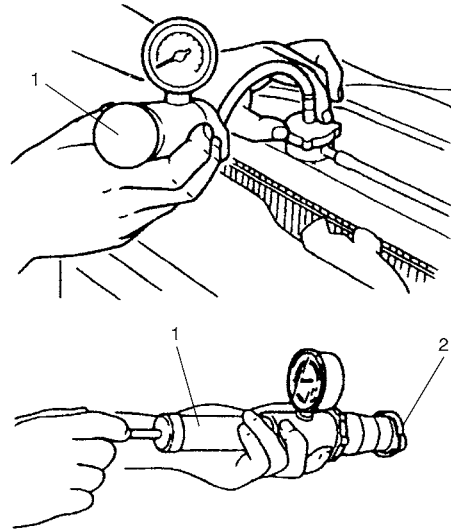
- 3) Check coolant for proper level and freeze protection.
- 4) Using a pressure tester (1), check system and radiator cap (2) for proper pressure holding capacity. If replacement of cap is required, use a proper cap for this vehicle.

NOTE:

After installing radiator cap to radiator, make sure that the ear of cap lines is parallel to radiator.

Cooling system and radiator cap holding pressure (for inspection)

110 kPa (1.1 kg/cm², 15.6 psi)



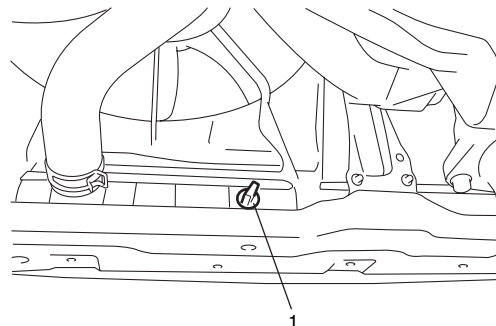
I5RH01160001-

- 5) Tighten hose clamps and inspect all hoses. Replace hoses whenever cracked, swollen or otherwise deteriorated.
- 6) Clean frontal area of radiator core.

Cooling System Draining

S4RS0A1606019

- 1) Remove radiator cap.
- 2) Drain coolant from radiator drain plug (1).
- 3) After draining coolant, be sure to tighten drain plug (1) securely.



I4RS0A160003-

Cooling System Flush and Refill

S4RS0A1606004

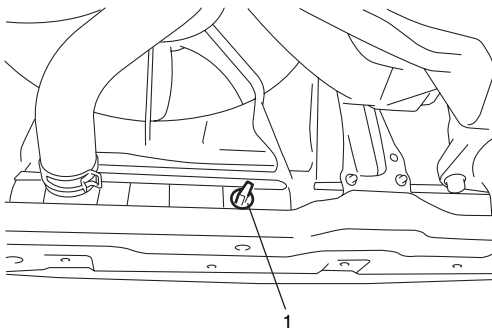
WARNING:

To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

NOTE:

For detail of coolant specification, refer to "Coolant Description: ".

- 1) Remove radiator cap when engine is cool as follows.
 - a) Turn cap counterclockwise slowly until it reaches a "stop" (Do not press down while turning it).
 - b) Wait until pressure is relieved (indicated by a hissing sound) then press down on cap and continue to turn it counterclockwise.
- 2) With radiator cap removed, run engine until upper radiator hose is hot (this shows that thermostat is open and coolant is flowing through system).
- 3) Stop engine and drain coolant from radiator drain plug (1).
- 4) Close radiator drain plug. Add water until system is filled and run engine until upper radiator hose is hot again.
- 5) Repeat Steps 3) and 4) several times until drained liquid is nearly colorless.
- 6) Close radiator drain plug (1) tightly.



I4RS0A160003-

- 7) Remove reservoir (1) and remove cap (2) from reservoir (1).
- 8) Pour out any fluid, scrub and clean inside of reservoir with soap and water. Flush it well with clean water and drain, Reinstall reservoir.
- 9) Fill reservoir with coolant up to "Full" level mark (3).
- 10) Install reservoir cap (2) on reservoir.
- 11) Loosen air ventilation bolt (4) one and a half turns.
- 12) Fill radiator with coolant up to spilling coolant from air ventilation bolt (4).

- 13) Tighten air ventilation bolt (4) to specified torque.

Tightening torque

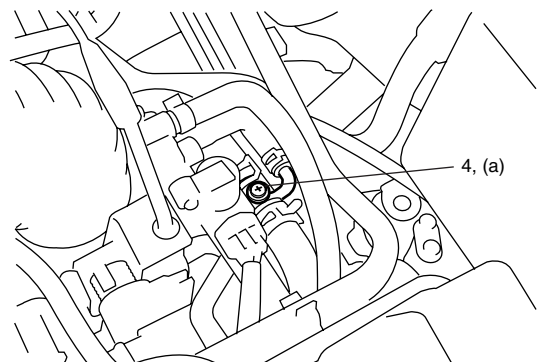
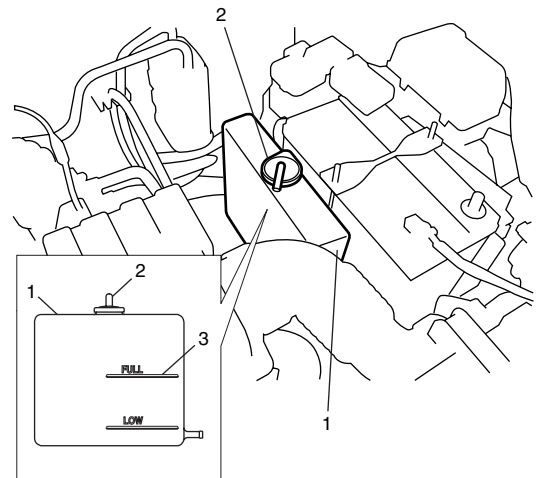
Air ventilation bolt (a): 4.5 N·m (0.45 kg-m, 3.5 lb-ft)

- 14) Fill radiator with coolant up to bottom of radiator filler neck and install radiator cap, making sure that the ear of cap lines is parallel to radiator.
- 15) Run engine at idle speed.
- 16) Loosen air ventilation bolt (4) one and a half turns.
- 17) Run engine at 2000 – 3000 rpm, and tighten air ventilation bolt (4) to specified torque after spilling coolant from air ventilation bolt (4).

Tightening torque

Air ventilation bolt (a): 4.5 N·m (0.45 kg-m, 3.5 lb-ft)

- 18) Run engine until radiator fan motor is operated.
- 19) Stop engine and wait until engine comes cooled down to help avoid danger of being burned.
- 20) Add coolant to radiator up to bottom of radiator filler neck, and install radiator cap, making sure that the ear of cap lines is parallel to radiator.
- 21) Repeat Step 15) through 20).
- 22) Confirm that reservoir coolant level is "Full" level mark (3). If coolant is insufficient, repeat Step 9) and 10).



I4RS0A160004-

1F-7 Engine Cooling System:

Cooling Water Pipes or Hoses Removal and Installation

S4RS0A1606005

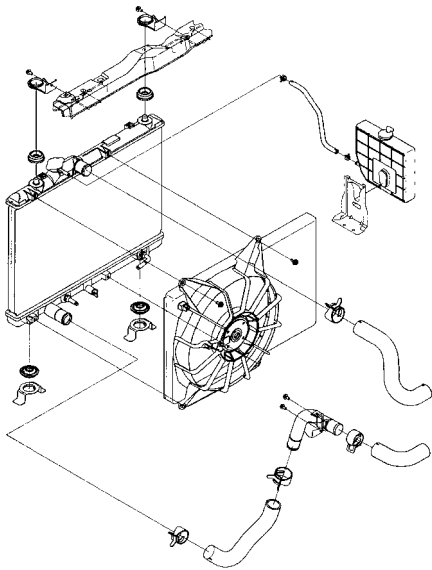
Removal

- 1) Drain coolant referring to "Cooling System Draining: ".
- 2) To remove these pipes or hoses, loosen clamp on each hose and pull hose end off.

Installation

Install removed parts in reverse order of removal procedure, noting the following.

- Tighten each clamp securely.
- Refill cooling system referring to Step 7) to 22) of "Cooling System Flush and Refill: ".



I4RS0A160005-

Thermostat Removal and Installation

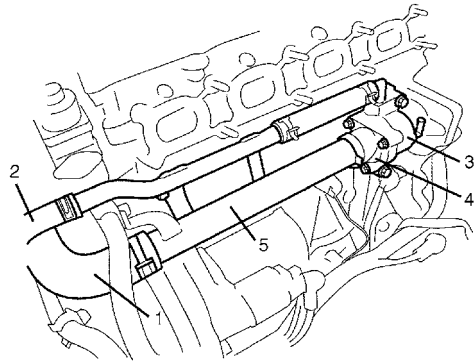
S4RS0A1606006

Removal

- 1) Drain coolant referring to "Cooling System Draining: ".
- 2) Remove intake manifold referring to "Intake Manifold Removal and Installation: in Section 1D".
- 3) Remove generator referring to "Generator Dismounting and Remounting: in Section 1J".
- 4) Disconnect water hose (1) and heater hose (2) from each pipe.
- 5) Remove thermostat case (3) with thermostat cap (4) and water inlet pipe (5).

6) Remove water inlet pipe with thermostat cap from thermostat case.

7) Remove thermostat from thermostat case (3).

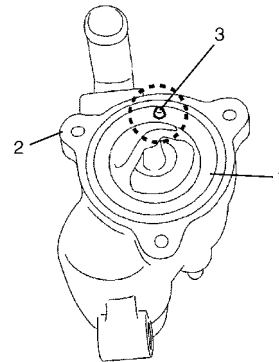


I3RM0A160007-

Installation

Reverse removal procedure for installation noting the following points.

- When positioning thermostat (1) on thermostat case (2), be sure to position it so that air bleed valve (3) comes at position as shown in the figure.



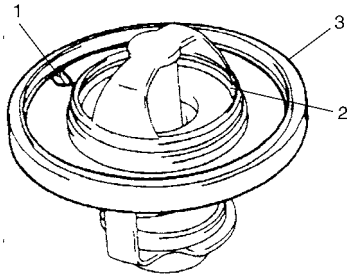
I2RH0B160006-

- Use new O-rings when installing.
- Adjust water pump belt tension referring to "Water Pump / Generator Drive Belt Tension Inspection and Adjustment: ".
- Adjust A/C compressor belt tension referring to "Compressor Drive Belt Inspection and Adjustment: in Section 7B".
- Refill cooling system referring to Step 7) to 22) of "Cooling System Flush and Refill: ".
- Verify that there is no coolant leakage at each connection.

Thermostat Inspection

S4RS0A1606007

- Make sure that air bleed valve (1) of thermostat is clean.
Should this valve be clogged, engine would tend to overheat.
- Check to make sure that valve seat (2) is free from foreign matters which would prevent valve from seating tight.
- Check thermostat seal (3) for breakage, deterioration or any other damage.



I3RM0A160008-

- Check thermostatic movement of wax pellet as follows:
 - a. Immerse thermostat (1) in water, and heat water gradually.
 - b. Check that valve starts to open at specific temperature.

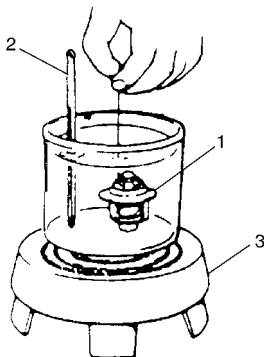
Temperature at which valve begins to open
80 – 84 °C (176 – 183 °F)

Temperature at which valve become fully open
95 – 97 °C (203 °F)

Valve lift

More than 8 mm at 95 °C (203 °F)

If valve starts to open at a temperature substantially below or above specific temperature, thermostat unit should be replaced with a new one. Such a unit, if reused, will bring about overcooling or overheating tendency.



I2RH01160012-

2. Thermometer

3. Heater

Radiator Cooling Fan Motor On-Vehicle Inspection

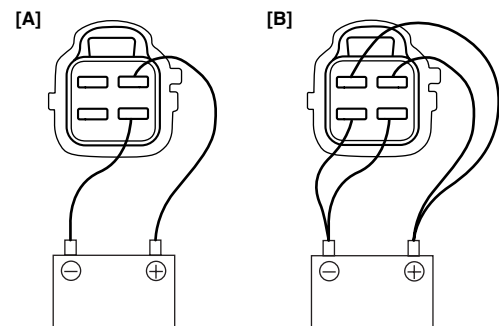
S4RS0A1606010

- 1) Check low speed operation of radiator cooling fan as follows.
 - a) Connect battery to fan motor coupler as shown in figure.
 - b) Check that radiator cooling fan rotates smoothly. If any abnormality is found, replace fan motor.
- 2) Check high speed operation of radiator cooling fan as follows.
 - a) Connect battery to fan motor coupler as shown in figure.
 - b) Check that radiator cooling fan rotates smoothly and its rotational speed is faster than low speed operation. If any abnormality is found, replace fan motor.

Reference: Fan motor specified current at 12 V

Low speed operation: 14.0 A maximum

High speed operation: 18.0 A maximum



I4RS0A160006-

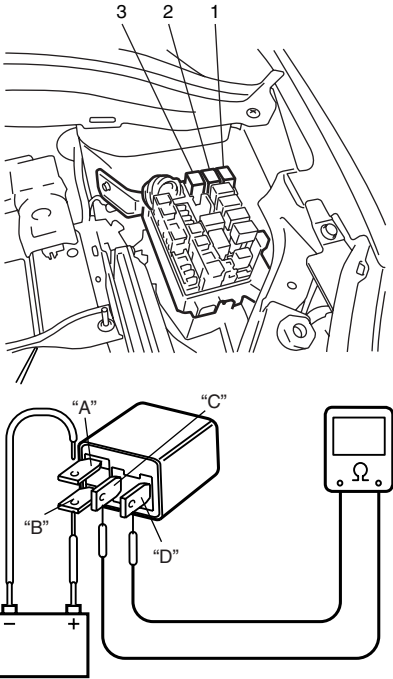
[A]: Low speed operation

[B]: High speed operation

Radiator Cooling Fan Relay Inspection

S4RS0A1606020

- 1) Disconnect negative (–) cable at battery.
- 2) Remove radiator cooling fan relay No.1 (1), No.2 (2) and/or No.3 (3) from relay box.
- 3) Check that there is no continuity between terminal “C” and “B”. If there is continuity, replace relay.
- 4) Connect battery positive (+) terminal to terminal “B” of relay.
- 5) Connect battery negative (–) terminal “A” of relay.
- 6) Check continuity between terminal “C” and “D”. If there is no continuity when relay is connected to the battery, replace relay.



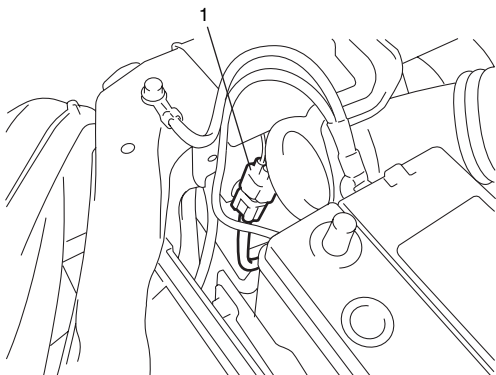
I4RS0A160007-

Radiator Cooling Fan Removal and Installation

S4RS0A1606021

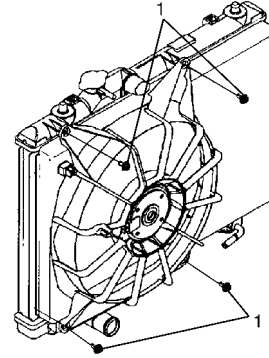
Removal

- 1) Disconnect negative (–) cable at battery.
- 2) Disconnect connector (1) of cooling fan motor.



I4RS0A160008-

- 3) Drain coolant.
- 4) Remove front bumper, front bumper upper absorber and upper member referring to “Front Bumper and Rear Bumper Components: in Section 9K”.
- 5) Remove radiator inlet hose and reservoir hose.
- 6) Remove cooling fan mounting bolts (1).



I4RS0A160009-

- 7) Slide condenser with radiator, and then remove radiator cooling fan.

CAUTION:

Be sure not to damage condenser outlet pipe.

Installation

Reverse removal procedure for installation noting the following.

- Refill cooling system referring to Step 7) to 22) of “Cooling System Flush and Refill: ”.
- After installation, verify there is no coolant leakage at each connection.

Radiator On-Vehicle Inspection and Cleaning

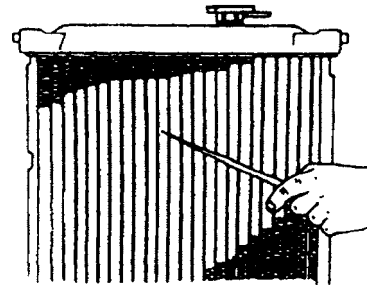
S4RS0A1606013

Inspection

Check radiator for leakage or damage. Straighten bent fins, if any.

Cleaning

Clean frontal area of radiator cores.



I2RH01160014-

Radiator Removal and Installation

S4RS0A1606014

Removal

- 1) Disconnect negative cable at battery.
- 2) Drain A/T fluid.
- 3) Drain coolant.
- 4) Remove cooling fan assembly referring to "Radiator Cooling Fan Removal and Installation: ".
- 5) Remove A/T fluid cooler inlet and outlet hoses.
- 6) Remove radiator outlet hose from radiator.
- 7) Remove radiator from vehicle.

Installation

Reverse removal procedures, noting the following.

- Refill cooling system referring to Step 7) to 22) of "Cooling System Flush and Refill: ".
- After installation, verify there is no coolant leakage each connection.
- Refill A/T fluid referring to "A/T Fluid Change: in Section 5A".

Water Pump / Generator Drive Belt Tension Inspection and Adjustment

S4RS0A1606015

WARNING:

- **Disconnect negative cable at battery before checking and adjusting belt tension.**
- **To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.**

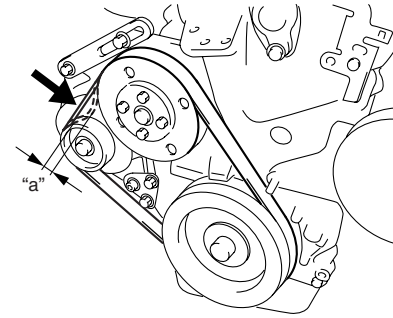
- 1) Inspect belt for cracks, cuts, deformation, wear and cleanliness. If it is necessary to replace belt, refer to "Water Pump / Generator Drive Belt Removal and Installation: ".
- 2) Check belt for tension. Belt is in proper tension when it deflects the following specification under thumb pressure (about 10 kg or 22 lb.).

Water pump / generator drive belt tension

"a": 4.5 – 5.5 mm (0.18 – 0.22 in.) as deflection / 10 kg (22 lbs)

NOTE:

When replacing belt with a new one, adjust belt tension to 3 – 4 mm (0.12 – 0.16 in.).



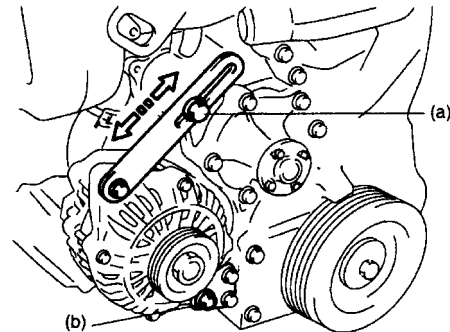
I2RH0B160012-

- 3) If belt is too tight or too loose, adjust it to proper tension by displacing generator position.
- 4) Tighten generator adjusting bolt and pivot bolts as specified torque.

Tightening torque

Generator adjusting bolt (a): 23 N·m (2.3 kg-m, 17.0 lb-ft)

Generator pivot bolt (b): 50 N·m (5.0 kg-m, 36.0 lb-ft)



I2RH0B160013-

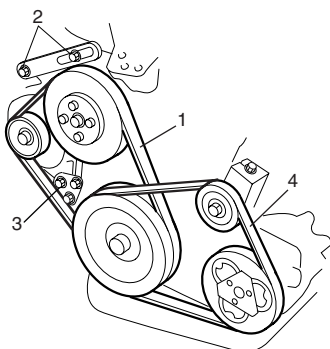
- 5) Connect negative cable at battery.

Water Pump / Generator Drive Belt Removal and Installation

S4RS0A1606016

Removal

- 1) Disconnect negative cable at battery.
- 2) If vehicle equipped with A/C, remove compressor drive belt (4) before removing water pump belt (1). Refer to "Compressor Drive Belt Removal and Installation: in Section 7B".
- 3) Loosen drive belt adjusting bolt (2) and generator pivot bolt (3).

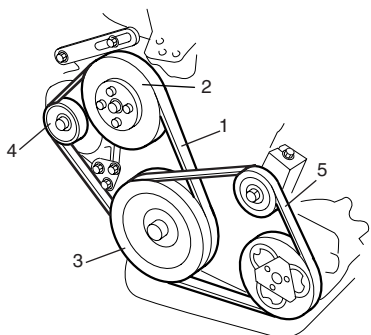


I3RM0A160014-

- 4) Slacken belt by displacing generator and then remove it.

Installation

- 1) Install belt (1) to water pump pulley (2), crankshaft pulley (3) and generator pulley (4).
- 2) Adjust belt tension by referring to "Water Pump / Generator Drive Belt Tension Inspection and Adjustment: ".
- 3) If vehicle equipped with A/C, install compressor drive belt (5) referring to "Compressor Drive Belt Removal and Installation: in Section 7B".



I3RM0A160015-

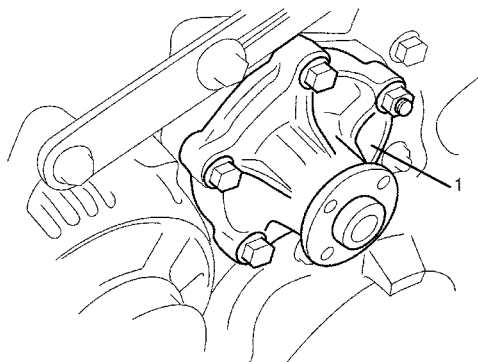
- 4) Connect negative cable at battery.

Water Pump Removal and Installation

S4RS0A1606017

Removal

- 1) Disconnect negative cable at battery.
- 2) Drain coolant.
- 3) Remove water pump / generator drive belt referring to "Water Pump / Generator Drive Belt Removal and Installation: ".
- 4) Remove water pump assembly (1).



I2RH0B160016-

Installation

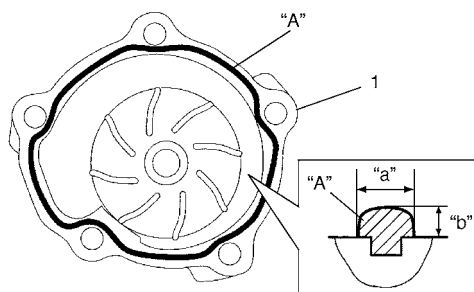
- 1) Apply sealant to mating surface of water pump (1) as shown in the figure.

"A": Water tight sealant 99000-31250

Sealant quantity (to mating surface of water pump)

Width "a": 3 mm (0.12 in.)

Height "b": 2 mm (0.08 in.)

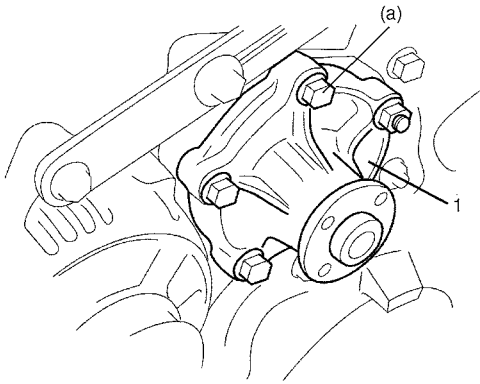


I3RM0A160016-

- 2) Install water pump assembly (1) to cylinder block and tighten bolts and nut to specified torque.

Tightening torque

Water pump bolt and nut (a): 25 N·m (2.5 kg-m, 18.0 lb-ft)



I2RH0B160018-

- 3) Install water pump pulley.
- 4) Install water pump / generator drive belt referring to "Water Pump / Generator Drive Belt Removal and Installation: ".
- 5) Install A/C compressor belt (if equipped) referring to "Compressor Drive Belt Removal and Installation: in Section 7B".
- 6) Refill cooling system referring to Step 7) to 22) of "Cooling System Flush and Refill: ".

7) Connect negative cable at battery.

8) Check each part for leakage.

Water Pump Inspection

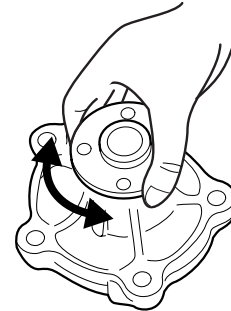
S4RS0A1606018

CAUTION:

Do not disassemble water pump.

If any repair is required on pump, replace it as assembly.

Rotate water pump by hand to check for smooth operation. If pump does not rotate smoothly or makes abnormal noise, replace it.



I2RH0B160019-

Specifications

Tightening Torque Specifications

S4RS0A1607001

Fastening part	Tightening torque			Note
	N·m	kg-m	lb-ft	
Air ventilation bolt	4.5	0.45	3.5	⌚ / ⌚
Generator adjusting bolt	23	2.3	17.0	⌚
Generator pivot bolt	50	5.0	36.0	⌚
Water pump bolt and nut	25	2.5	18.0	⌚

NOTE:

The specified tightening torque is also described in the following.

"Cooling System Components: "

Reference:

For the tightening torque of fastener not specified in this section, refer to "Fasteners Information: in Section 0A".

Special Tools and Equipment

Recommended Service Material

S4RS0A1608001

Material	SUZUKI recommended product or Specification		Note
Water tight sealant	SUZUKI Bond No.1207F	P/No.: 99000-31250	⌚