COOLING SYSTEM

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ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –31°C (–24°F).
If the motorcycle is to be exposed to temperatures below –31°C (–24°F), this mixing ratio should be increased up to 55% or 60% according to the figure.

⚠ CAUTION

- **Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.**
- **Do not put in more than 60% anti-freeze or less than 50%. (Refer to Right figure.)**
- **Do not use a radiator anti-leak additive.**

50% Engine coolant including reserve tank capacity

Anti-freeze	750 ml (1.6/1.3 US/Imp. pt)
Water	750 ml (1.6/1.3 US/Imp. pt)

Anti-freeze density	Freezing point
50%	–30°C (–24°F)
55%	–40°C (–44°F)
60%	–55°C (–67°F)

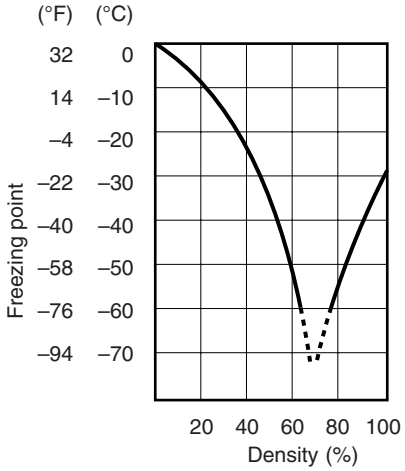


Fig.1 Engine coolant density-freezing point curve.

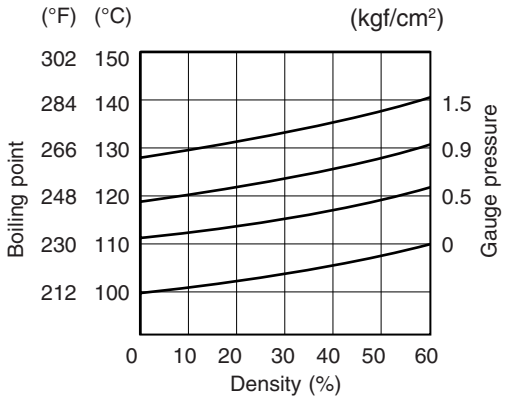


Fig.2 Engine coolant density-boiling point curve.

⚠ WARNING

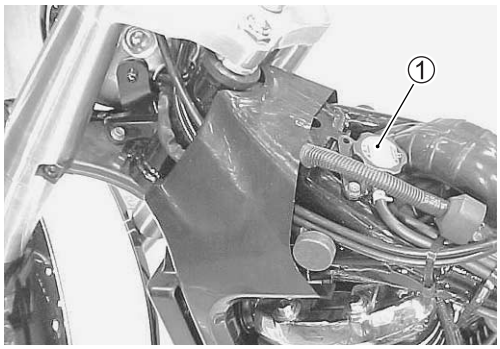
- **You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.**
- **The engine must be cool before servicing the cooling system.**
- **Coolant is harmful;**
  - **If it comes in contact with skin or eyes, flush with water.**
  - **If swallowed accidentally, induce vomiting and call physician immediately.**
  - **Keep it away from children.**

RADIATOR AND WATER HOSE

COOLING CIRCUIT INSPECTION

Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.

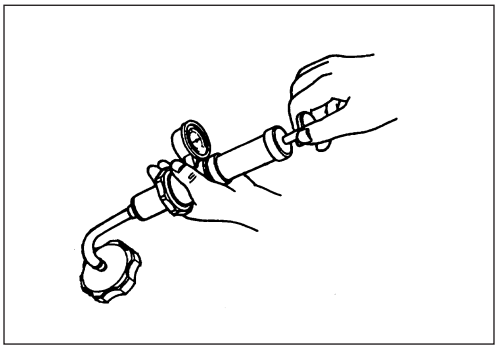
- Remove the fuel tank. (☞5-3)
- Remove the radiator cap ① and connect the tester to the filler.



⚠ WARNING

Do not remove the radiator cap when the engine is hot.

- Give a pressure of about 120 kPa (1.2 kgf/cm², 17 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.

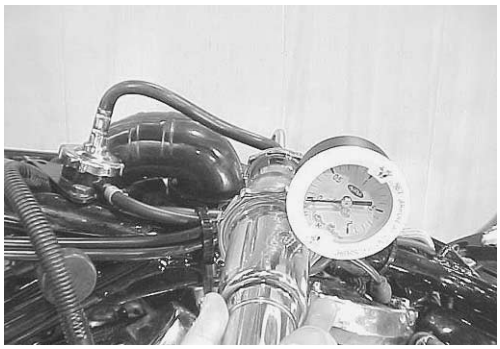


⚠ WARNING

When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

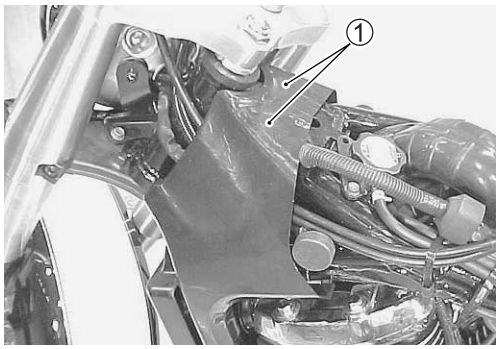
⚠ CAUTION

Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.

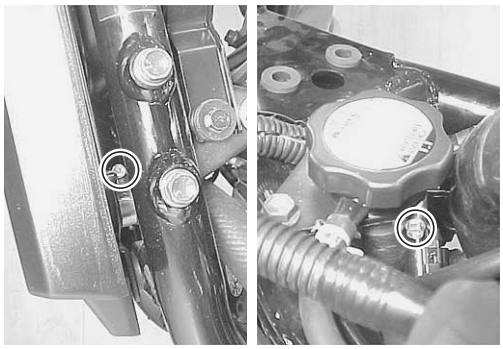


RADIATOR REMOVAL

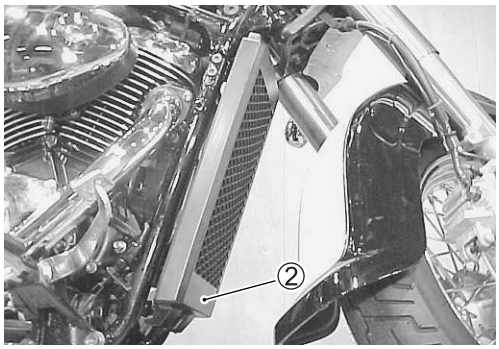
- Remove the fuel tank. (☞5-3)
- Remove the frame head covers ①.



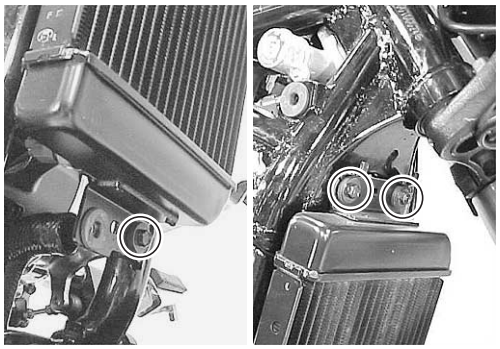
- Disconnect the water hoses.
- Drain engine coolant.



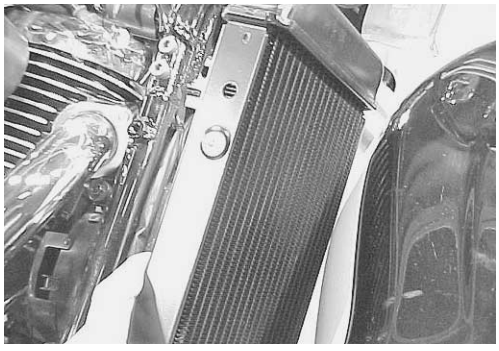
- Remove the radiator cover ②.



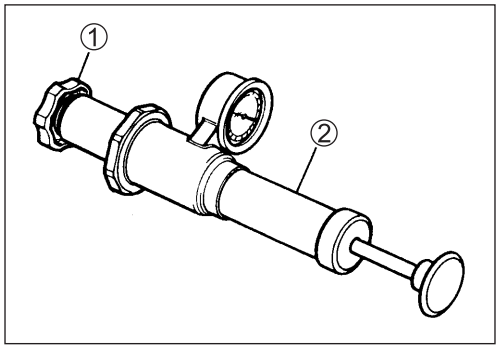
- Remove the radiator mounting bolts.



- Remove the radiator.



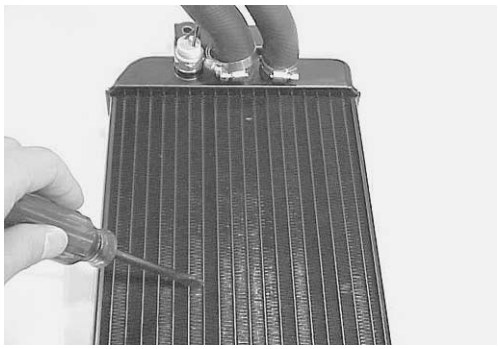
RADIATOR CAP INSPECTION



- Fit the cap ① to the radiator cap tester ②.
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 95–125 kPa (0.95–12.5 kgf/cm², 13.5–17.8 psi) and that, with the tester held standstill, the cap is capable of holding that pressure for at least 10 seconds.
- Replace the cap if it is found not to satisfy either of these two requirements.

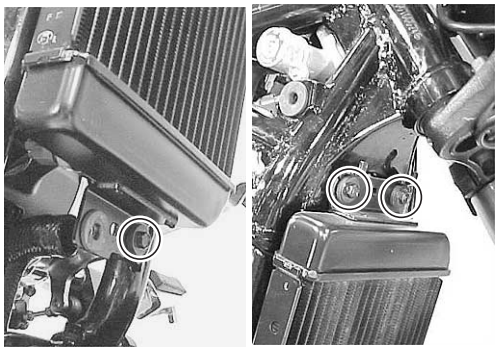
DATA Radiator cap valve opening pressure
Standard: 95 – 125 kPa
(0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

RADIATOR INSPECTION AND CLEANING



- Road dirt or trash stuck to the fins must be removed. Use of compressed air is recommended for this cleaning.
- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.

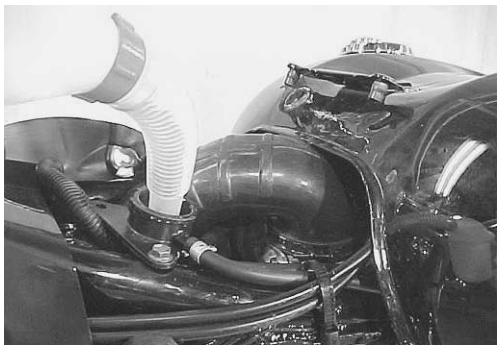
RADIATOR REMOUNTING



The radiator is to be installed in the reverse order of the removal procedure.

- Install the radiator.
- Route the radiator hoses. (☞9-18)

- Pour engine coolant and bleed the air from the cooling circuit.
- Install the frame head covers and fuel tank. (☞5-5)



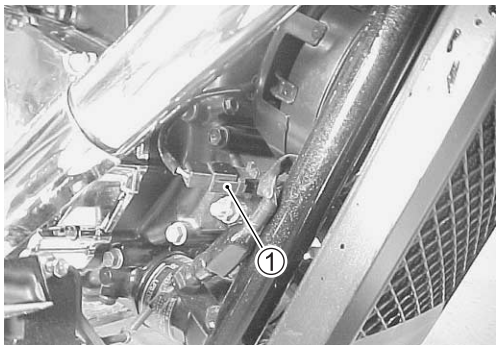
WATER HOSE INSPECTION

- Any water hose found in a cracked condition or flattened must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.

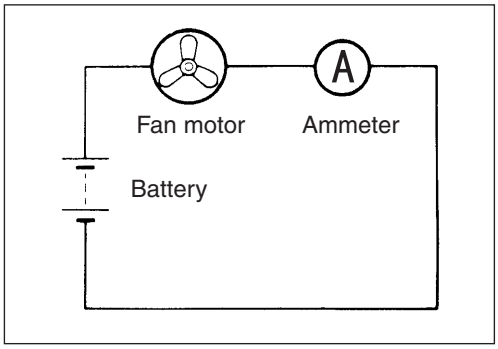
COOLING FAN

INSPECTION

- Disconnect the cooling fan lead wire coupler ①.
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



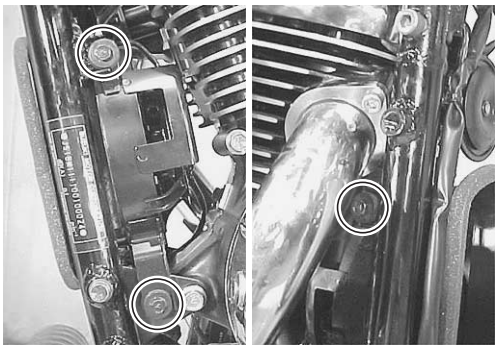
- The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.
- If the fan motor does not turn, replace the motor assembly with a new one.



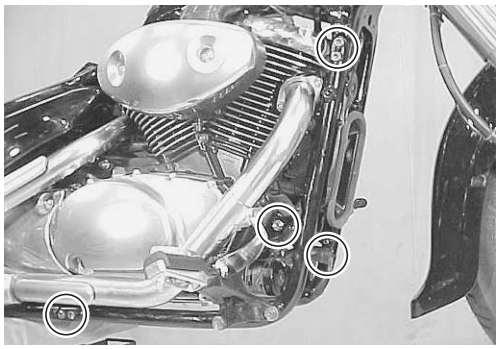
NOTE:
When making above test, it is not necessary to remove the cooling fan.

REMOVAL

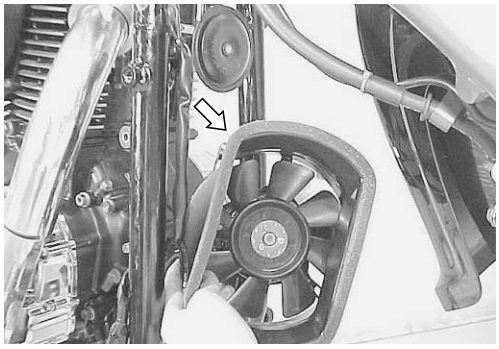
- Remove the radiator. (☞6-4)
- Remove the cooling fan mounting bolts.



- Slightly move the down tube by removing its mounting bolts.

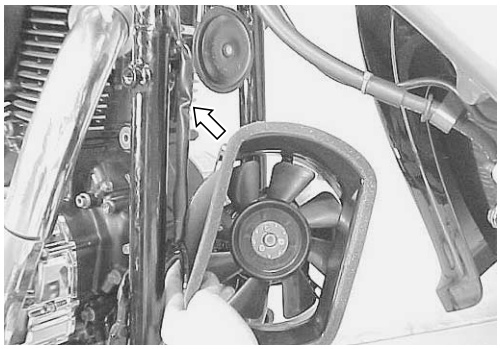


- Remove the cooling fan by disconnecting the cooling fan lead wire.

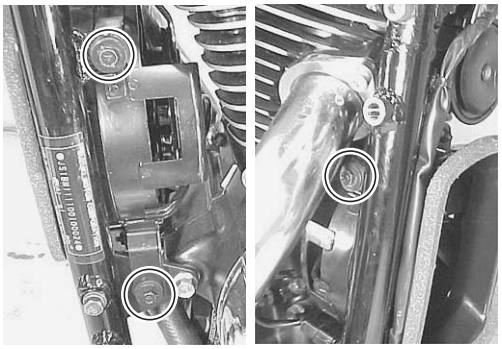


INSTALLATION

- Put the cooling fan between the down tube and the engine.
- Tighten the down tube mounting bolts. (☞3-9)



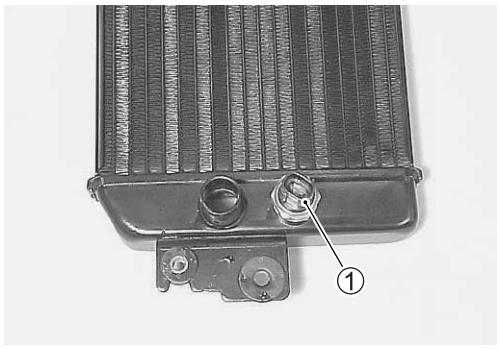
- Tighten the cooling fan mounting bolts.
- Install the radiator. (☞6-5)



COOLING FAN THERMO-SWITCH

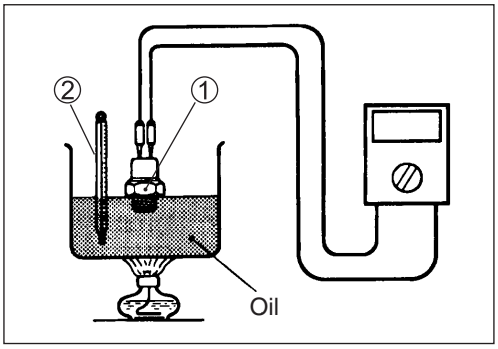
REMOVAL

- Remove the radiator. (☞6-4)
- Remove the cooling fan thermo-switch ①.



INSPECTION

- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch to a circuit tester and place it in the oil contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly, and read the column thermometer when the switch closes or opens.



DATA Cooling fan thermo-switch operating temperature
Standard (OFF→ON): Approx. 105°C (221°F)
(ON→OFF): Approx. 100°C (212°F)

Tester knob indication: Continuity test (•))))

TOOL 09900-25008: Multi circuit tester set

⚠ CAUTION

*** Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact.**
*** Do not contact the cooling fan thermo-switch ① and the column thermometer ② with a pan.**

INSTALLATION

- Install the O-ring ①.
- Tighten the cooling fan thermo-switch to the specified torque.

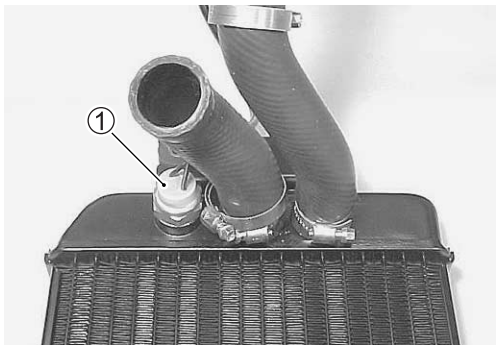
Cooling fan thermo-switch: 17 N·m (1.7 kgf·m, 12.5 lb-ft)

- Install the radiator.

ENGINE COOLANT TEMPERATURE SWITCH

REMOVAL

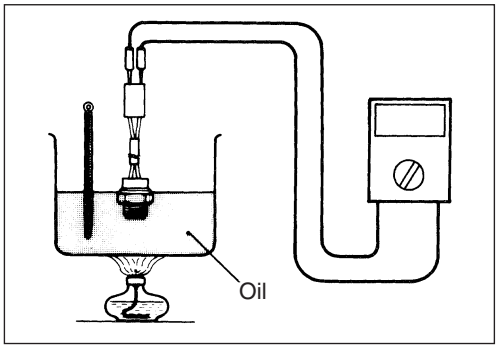
- Remove the radiator. (☞6-4)
- Remove the engine coolant temperature switch ①.



INSPECTION

- Inspect the engine coolant temperature switch in the same manner of the cooling fan thermo-switch inspection.

DATA Engine coolant temp. switch operating temperature
Standard (OFF → ON): Approx. 120°C (248°F)
(ON → OFF): Approx. 113°C (235.4°F)

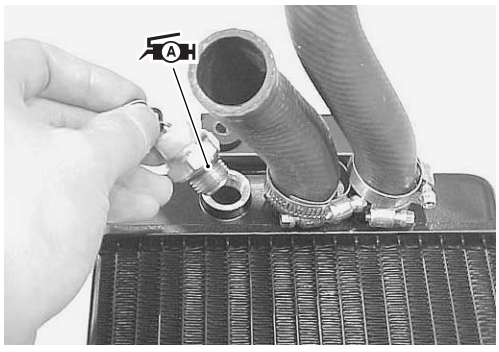


⚠ CAUTION

Do not allow the switch to touch the pan, or false reading will result.

- Apply grease to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)



- Tighten the engine coolant temperature switch to the specified torque.

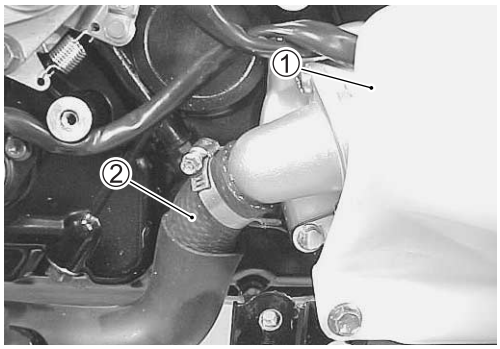
Engine coolant temperature switch: 12 N·m (1.2 kgf·m, 8.5 lb-ft)

- Install the radiator. (☞6-5)

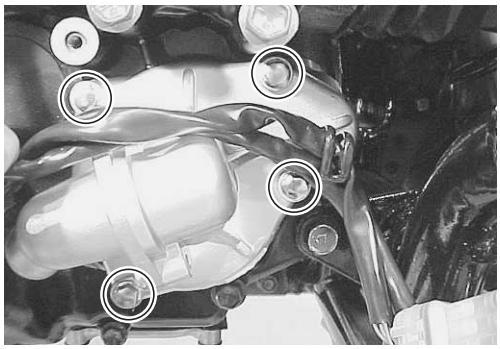
THERMOSTAT

REMOVAL

- Drain engine coolant. (☞2-13)
- Remove the secondary gear case cover.
- Remove the reserve tank ① and water hose ②.



- Remove the water pump case.



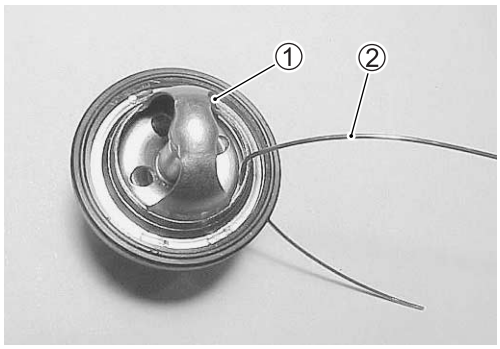
- Remove the thermostat case.
- Remove the thermostat.

INSPECTION

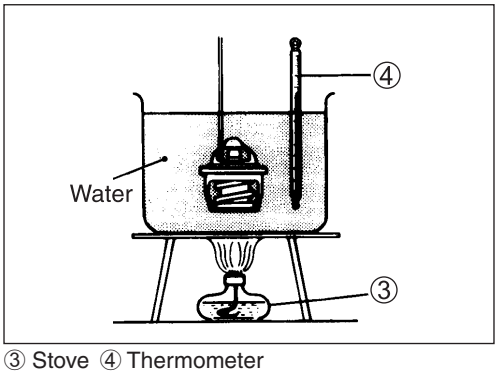
Inspect the thermostat pellet for signs of cracking.
Test the thermostat at the bench for control action, in the following manner.

- Pass a string between flange, as shown in the illustration.
- Immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should be within the standard value.

DATA Thermostat valve opening temperature
Standard: Approx. 75°C (167°F)



① Thermostat ② String

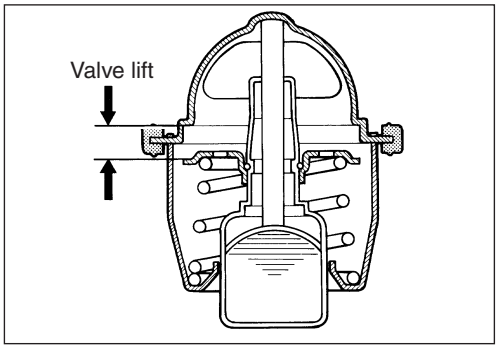


③ Stove ④ Thermometer

- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 6.0 mm (0.24 in).

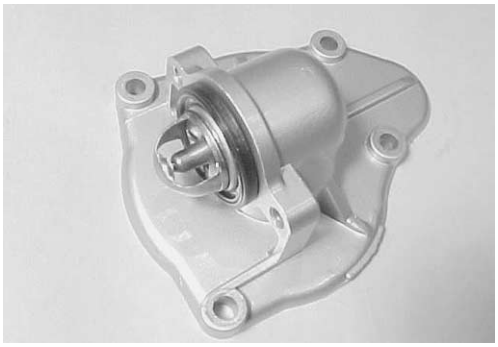
DATA Thermostat valve lift
Standard: Over 6.0 mm at 90°C (Over 0.24 in at 194°F)

- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.



INSTALLATION

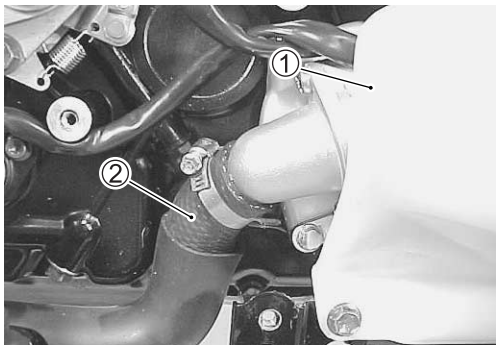
Install the thermostat in the reverse order of removal.



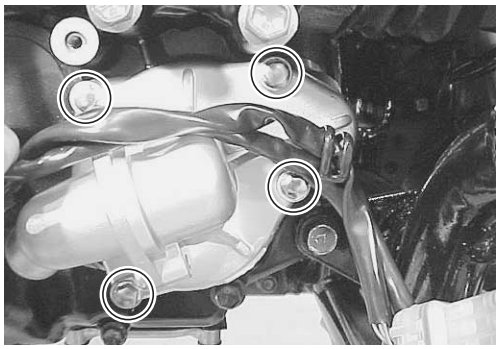
WATER PUMP

REMOVAL AND DISASSEMBLY

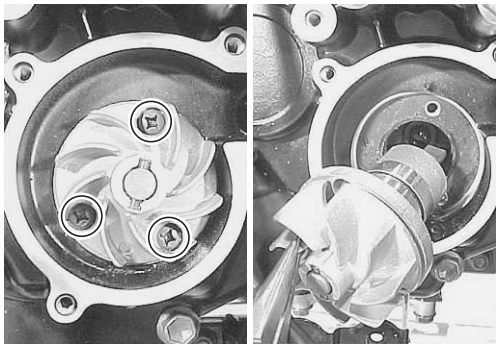
- Drain engine coolant. (☞2-13)
- Remove the secondary gear case cover.
- Remove the reserve tank ① and the water hose ②.



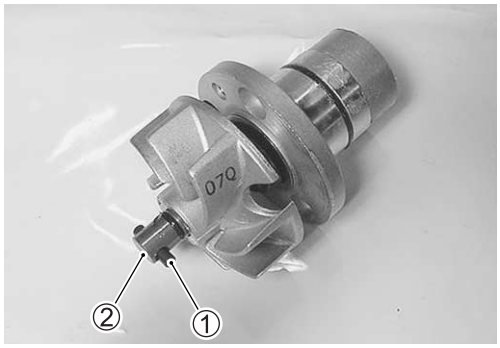
- Remove the water pump case.



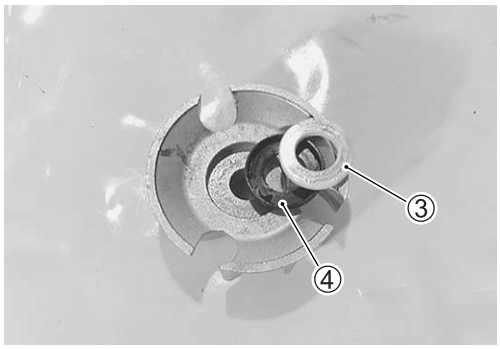
- Remove the water pump.



• Remove the pin ① and draw out the impeller shaft ②.



• Remove the mechanical seal ring ③ and rubber seal ④.



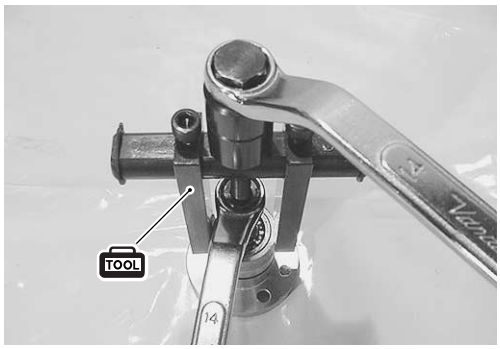
• Remove the bearing with the special tool.

TOOL 09921-20220: Bearing remover set

NOTE:
If no abnormal noise, bearing removal is not necessary.

⚠ CAUTION

The removed bearing must be replaced with a new one.



• Remove the mechanical seal with the special tool.

TOOL 09921-20220: Bearing remover set

NOTE:
If no abnormal noise, bearing removal is not necessary.

⚠ CAUTION

The removed mechanical seal must be replaced with a new one.

• Remove the oil seal with a suitable bar.

NOTE:
If no abnormal, the oil seal removal is not necessary.

⚠ CAUTION

The removed oil seal must be replaced with a new one.

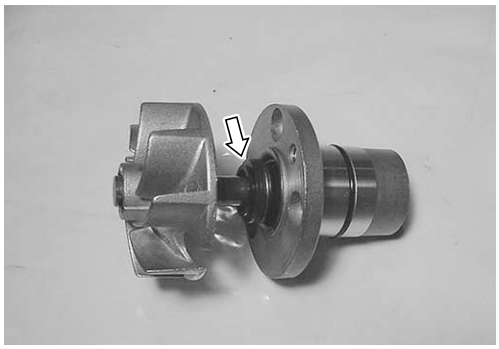
INSPECTION

BEARING

- Inspect the play of the bearing by hand while it is in the water pump case.
- Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
- Replace the bearing if there is anything unusual.

MECHANICAL SEAL

- Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
- Replace the mechanical seal that shows indications of leakage. Also replace the seal ring if necessary.



OIL SEAL

- Visually inspect the oil seal for damage, with particular attention given to the lip.
- Replace the oil seal that shows indications of leakage.

REASSEMBLY AND INSTALLATION

- Install the oil seal.

NOTE:
The stamped mark on the oil seal faces outside.

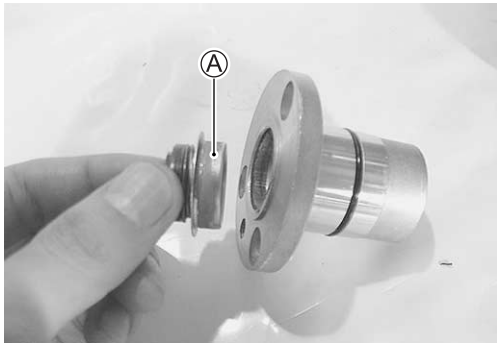
- Apply a small quantity of the SUZUKI SUPER GREASE “A” to the oil seal lip.

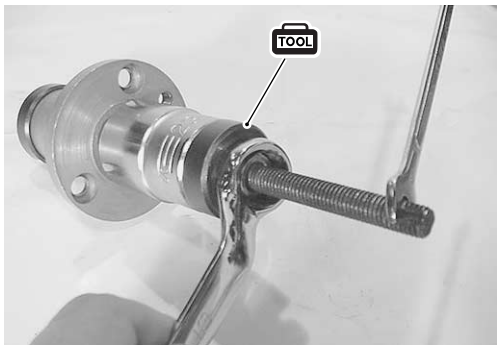
99000-25030: SUZUKI SUPER GREASE “A” (For USA)
99000-25010: SUZUKI SUPER GREASE “A”
(For the others)

- Install the new mechanical seal with a suitable size socket wrench and the special tool.

NOTE:
The new mechanical seal has been applied the sealer Ⓐ.

TOOL 09924-84521: Bearing installer





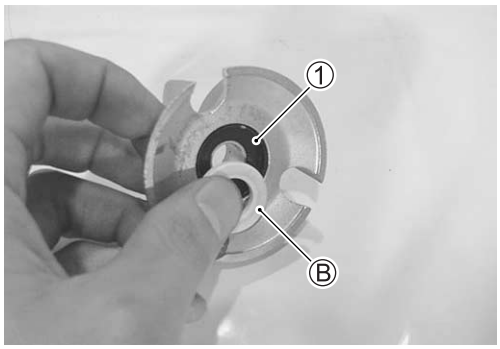
- Install the new bearing with the special tool.

TOOL 09924-84521: Bearing installer

NOTE:
The stamped mark on the bearing faces crankcase side.

- Install the rubber seal ① into the impeller.
- After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.

NOTE:
The marked side Ⓑ of the mechanical seal ring faces the impeller.



- Install the impeller and impeller shaft to the water pump body.
- Install the pin ②.

- Apply grease to the O-ring.
- Set the water pump shaft end Ⓐ to the oil pump shaft Ⓑ.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
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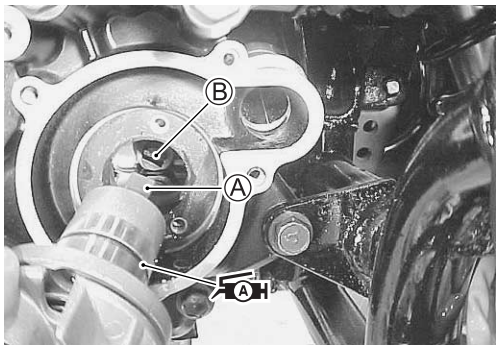
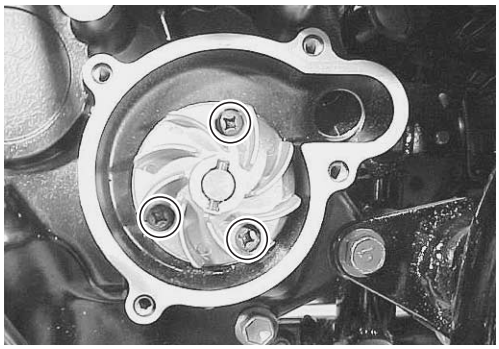
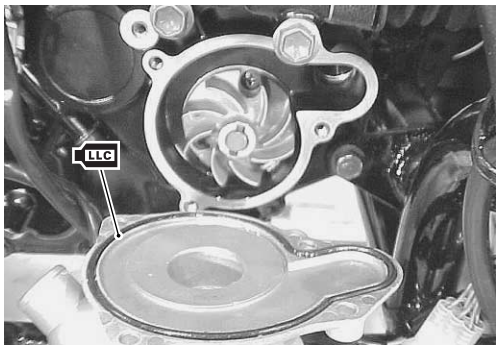
(For the others)



- Install the water pump screws.

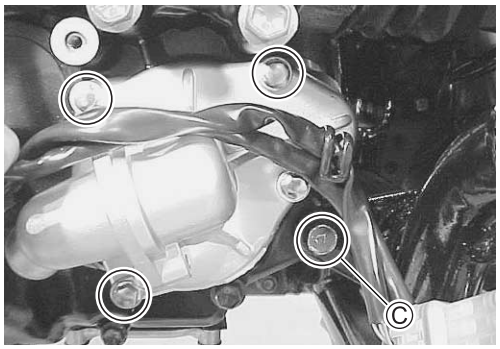


- Apply engine coolant to the O-ring and install the water pump cover.



- Tighten the water pump cover bolts.

NOTE:
Fit the clamp to the bolt Ⓒ.



- Connect the water hose.
- Install the reserve tank.
- Install the secondary gear case cover.
- Pour engine coolant. (☞2-13)