

COOLING SYSTEM

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5-1 COOLING SYSTEM

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	0.8 ℓ
Water	0.8 ℓ

Anti-freeze density	Freezing point
50%	-31°C (-24°F)
55%	-40°C (-40°F)
60%	-55°C (-67°F)

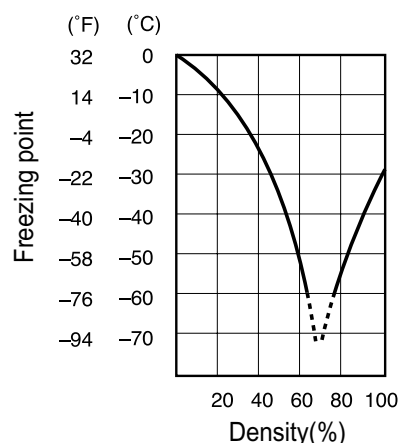


Fig.1 Engine coolant density-freezing point curve.

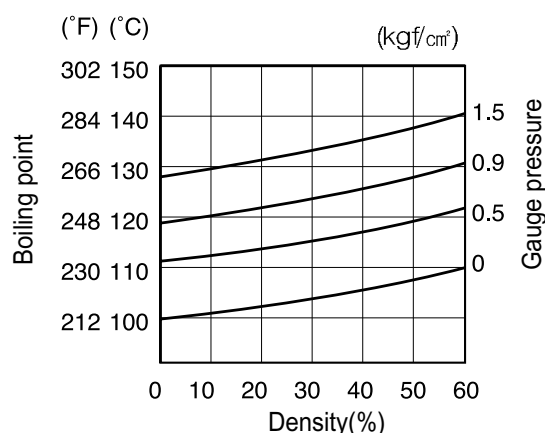


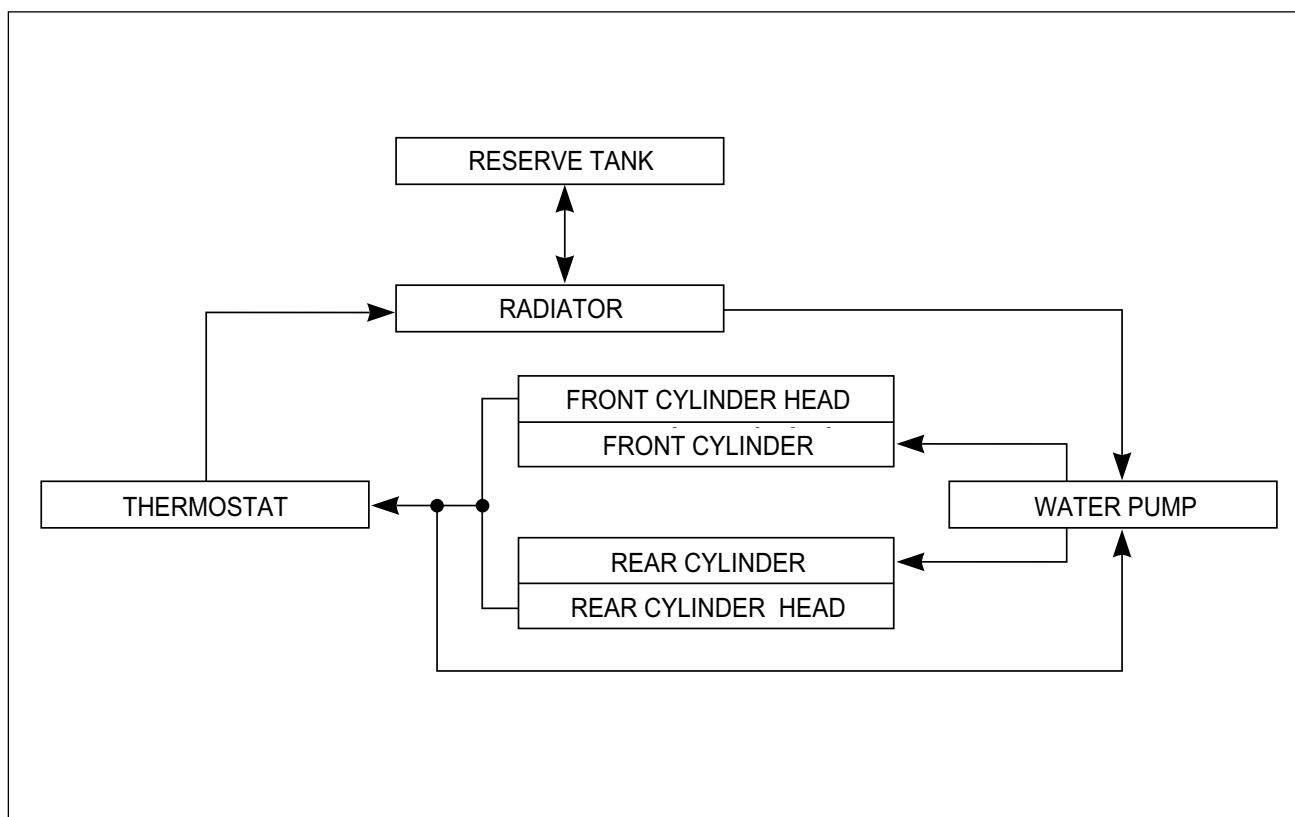
Fig.2 Engine coolant density-boiling point curve.



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.

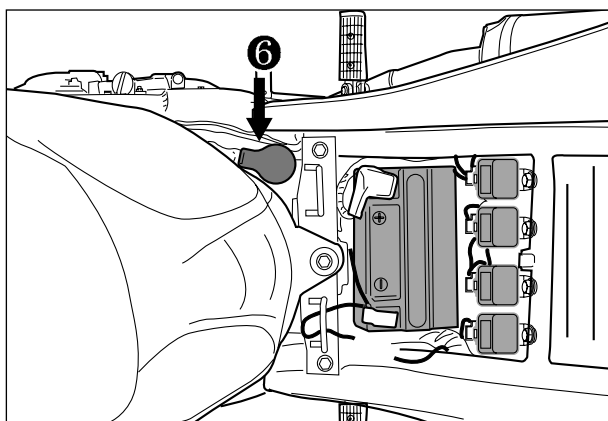
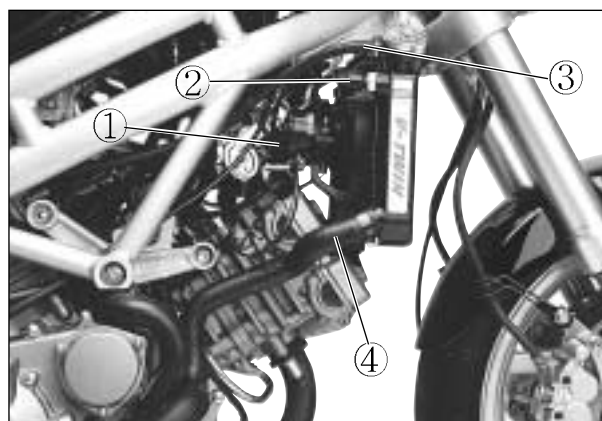
COOLING CIRCUIT



RADIATOR

REMOVAL

- Drain engine coolant. (Refer to page 2-20)
- Disconnect the cooling fan motor lead wire coupler ① and its thermo-switch lead wire coupler ②.
- Remove the water hose ③, ④, ⑤ and reserve tank ⑥ from the radiator.



5-3 COOLING SYSTEM

- Remove the radiator by mounting bolt.
- Remove the 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.



⦿ INSPECTION OF WATER HOSE

Any water hose found in a cracked condition or flattened or water leaked must be replaced.

Any leakage from the connecting section should be corrected by proper tightening.



⦿ INSTALLATION

The radiator reassembly can be performed in the reverse order of disassembly procedures.

However, the following points must be observed in the reassembly operation.

- Install the radiator with the specified torque.



Radiator mounting bolt

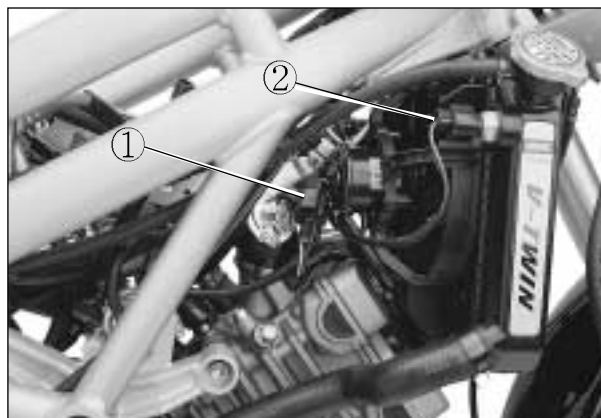
: 8~12N · m (0.8~1.2kg · m)

- * Pour engine coolant Refer to page 2-20
- * Bleed air from the cooling circuit Refer to page 2-21

COOLING FAN

⦿ INSPECTION

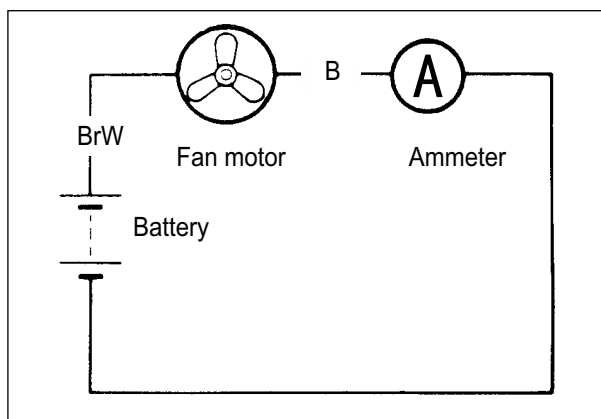
- Disconnect the cooling fan motor lead wire coupler ① and its thermo-switch lead wire coupler ②.
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



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.

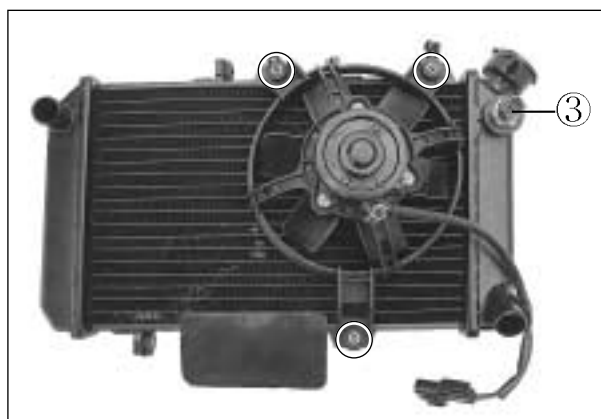
NOTE

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



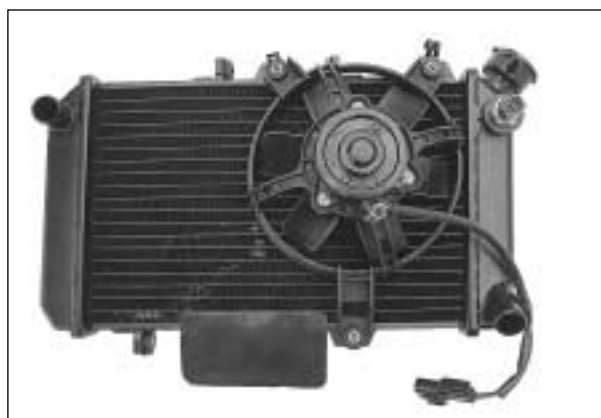
⦿ REMOVAL

- Drain engine coolant. (Refer to page 2-20)
- Remove the radiator. (Refer to page 5-2)
- Disconnect the cooling fan thermo-switch ③.
- Remove the cooling fan.



⦿ INSTALLATION

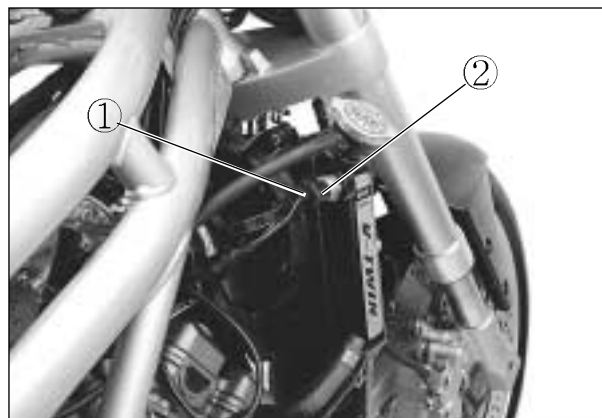
- Install the cooling fan to the radiator.
 - ⦿ **Cooling fan mounting bolt**
: 8~12 N · m (0.8~1.2 kg · m)
 - Cooling fan motor mounting bolt**
: 8 N · m (0.8 kg · m)
- Install the radiator.
- Route the radiator hoses properly.
- Pour engine coolant. (Refer to page 2-20)
- Bleed the air from the cooling circuit. (Refer to page 2-21)



COOLING FAN THERMO-SWITCH

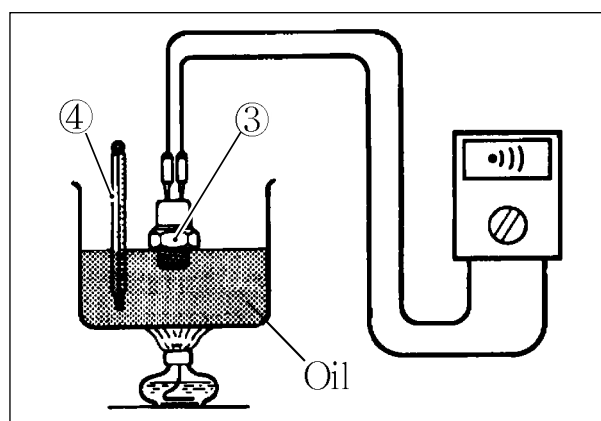
⊙ REMOVAL

- Drain engine coolant. (Refer to page 2-20)
- Disconnect the cooling fan thermo-switch lead wire coupler ①.
- Remove the cooling fan thermo-switch ②.



⊙ INSPECTION

- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch ③ 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 ④ when the switch closes or opens.



Cooling fan thermo-switch operating temperature	Standard
ON → OFF	Over 88 °C (190 °F)
OFF → ON	Approx. 95 °C (203 °F)


 Multi circuit tester set : 09900-25008

CAUTION

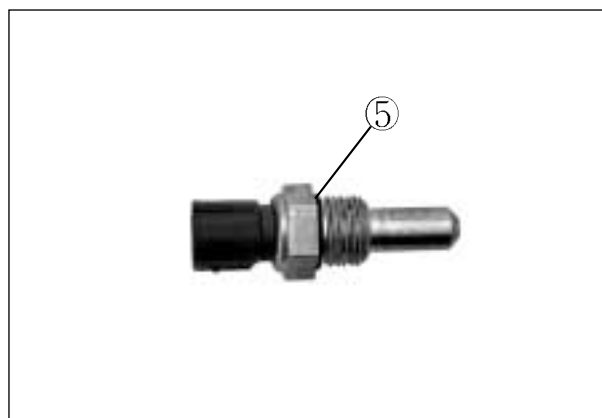
- Take special care when handling the thermo-switch.
It may cause damage if it gets a sharp impact.
- Do not contact the cooling fan thermo-switch ③ and the column thermometer ④ with a pan.

⊙ INSTALLATION

- Install a new O-ring ⑤ and apply engine coolant to the O-ring.
- Tighten the cooling fan thermo-switch to the specified torque.

 Cooling fan thermo-switch
: 13 N · m (1.3 kg · m)

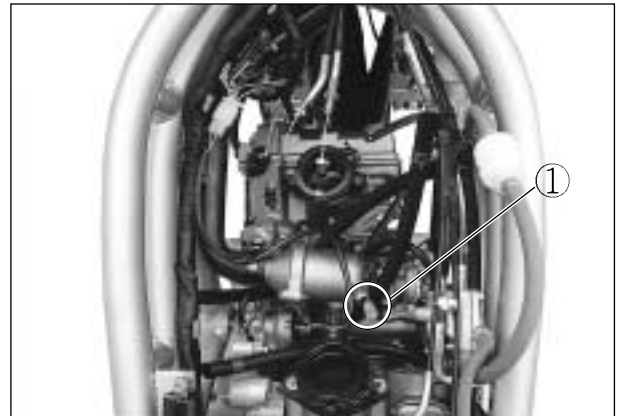
- Pour engine coolant. (Refer to page 2-20)
- Bleed air from the cooling circuit. (Refer to page 2-21)



ENGINE COOLANT TEMPERATURE SENSOR

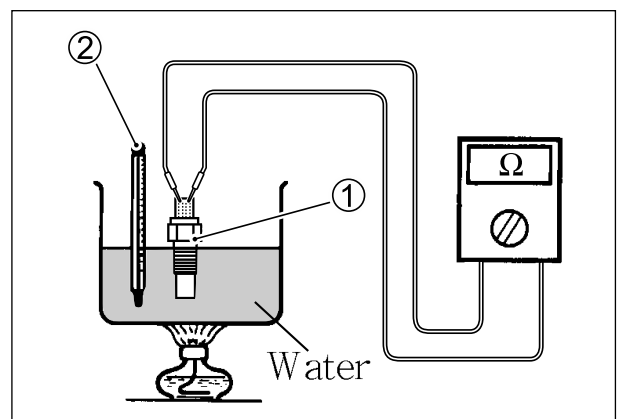
REMOVAL

- Drain engine coolant. (Refer to page 2-20)
- Remove the front and rear seat. (Refer to page 7-1)
- Remove the fuel tank. (Refer to page 4-1)
- Disconnect the engine coolant temperature sensor lead wire coupler.
- Place a rag under the sensor and remove the engine coolant temperature sensor ①.



INSPECTION

- Check the engine coolant temperature by testing it at the bench as shown in the figure. Connect the temperature sensor ① to a circuit tester and place it in the WATER contained in a pan, which is placed on a stove.
- Heat the water to raise its temperature slowly and read the column thermometer ② and the ohmmeter.



Temperature sensor specification

Temperature	Standard resistance
60 °C	Approx. 125 Ω
85 °C	Approx. 48.5 Ω
110 °C	Approx. 24 Ω
125 °C	Approx. 15 Ω


 Multi circuit tester set : 09900-25008

If the resistance noted to show infinity or too much different resistance value, replace the temperature sensor with a new one.

CAUTION

- Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.
- Do not contact the engine coolant temperature sensor ① and the column thermometer ② with a pan.

INSTALLATION

- Tighten the engine coolant temperature sensor to the specified torque.
 -  Engine coolant temperature sensor : 18 N · m (1.8 kg · m)
- Pour engine coolant. (Refer to page 2-20)
- Bleed air from the cooling circuit. (Refer to page 2-21)



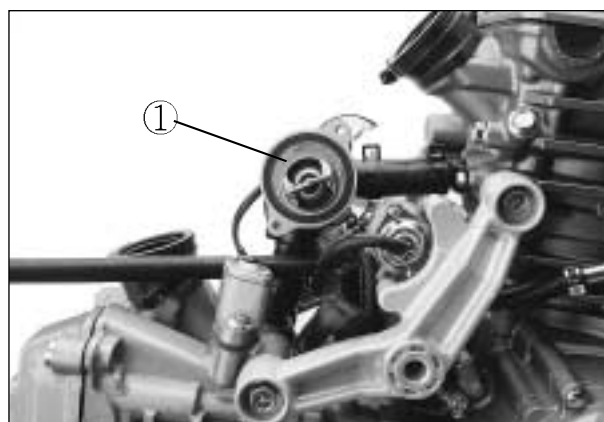
THERMOSTAT

⊙ REMOVAL

- Drain engine coolant. (Refer to page 2-20)
- Place a rag under the thermostat case.
- Remove the thermostat case cap.



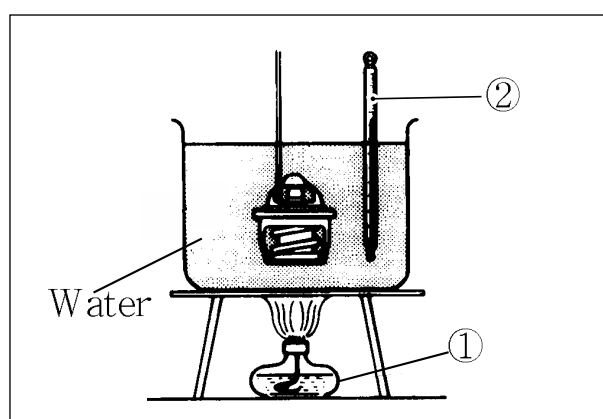
- Remove the thermostat ①.



⊙ 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 photograph.
- 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 ① and observe the rising temperature on a thermometer ②.
- 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.



Thermostat valve operation temperature	Standard
Valve opening	88 °C (190 °F)
Valve full open	100 °C (212 °F)
Valve closing	83 °C (181 °F)

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- 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 8.0 mm (0.31 in).

Thermostat valve lift ①	Standard
	Over 8.0mm at 100℃ (Over 0.31in at 212°F)

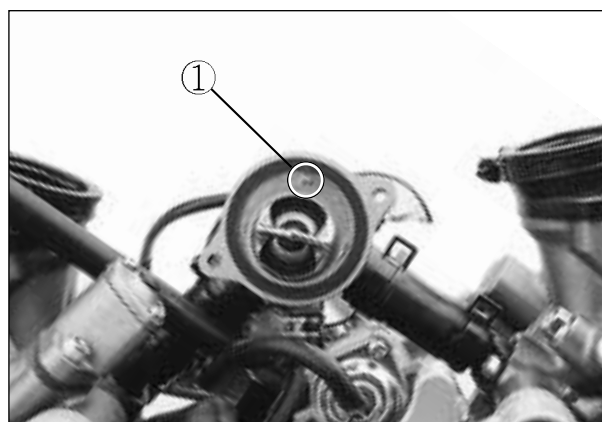
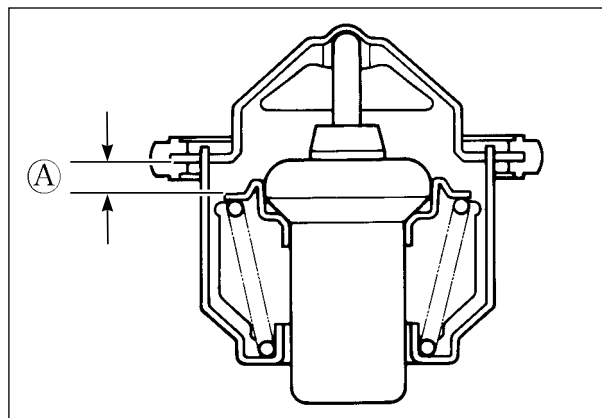
- A thermostat failing to satisfy either of the two requirements, start-to-open temperature and valve lift, must be replaced.

⊙ INSTALLTION

- Apply engine coolant to the rubber seal on the thermostat.
- Install the thermostat.

NOTE

The jiggle valve ① of the thermostat faces upside.



- Install the thermostat case cap ②.

NOTE

The rib of the thermostat case cap ② should be faced upward.

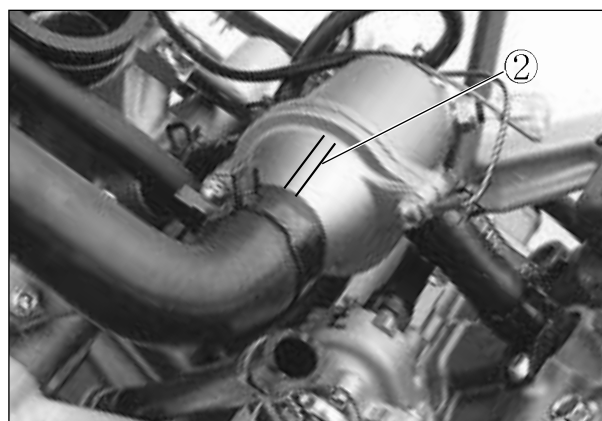
- Tighten the thermostat case bolts to the specified torque.



Thermostat case bolt

: 10 N · m (1.0 kg · m)

- Pour engine coolant. (Refer to page 2-20)
- Bleed air from the cooling circuit. (Refer to page 2-21)



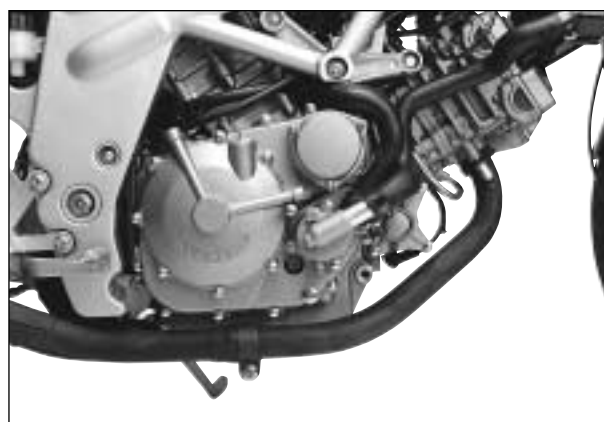
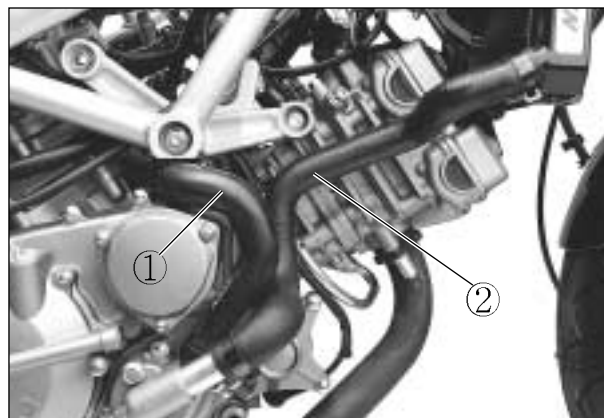
WATER PUMP

⦿ REMOVAL AND DISASSEMBLY

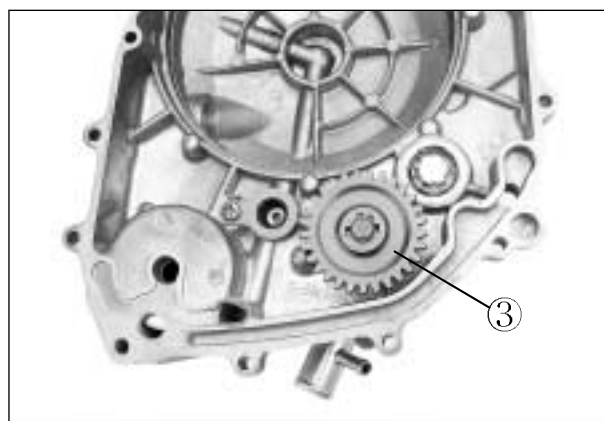
- Drain engine coolant. (Refer to page 2-20)
- Drain engine oil. (Refer to page 2-10)
- Disconnect the water hoses ①, ②.
- Remove the water pump case and clutch cover. (Refer to page 3-16)

NOTE

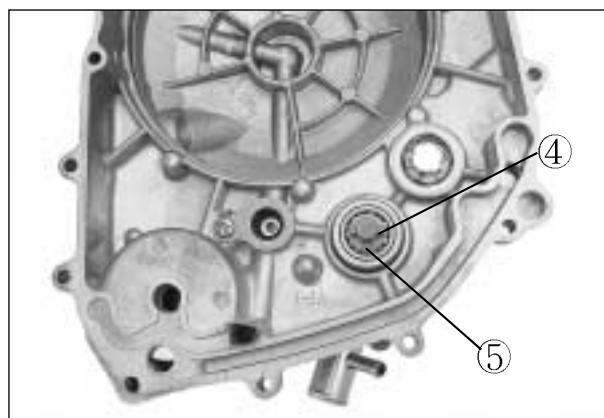
Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and clutch cover. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the O-ring



- Remove the snap ring and water pump driven gear ③.

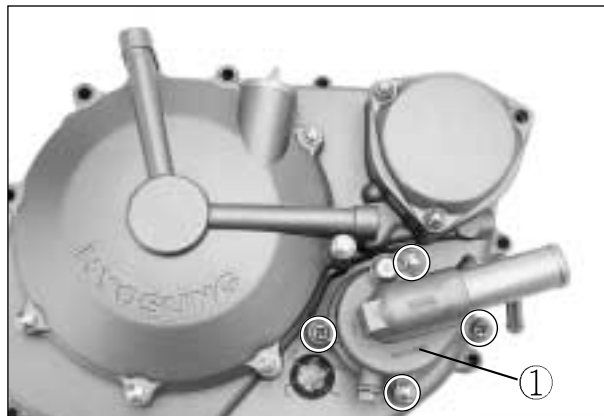


- Remove the pin ④ and washer ⑤.

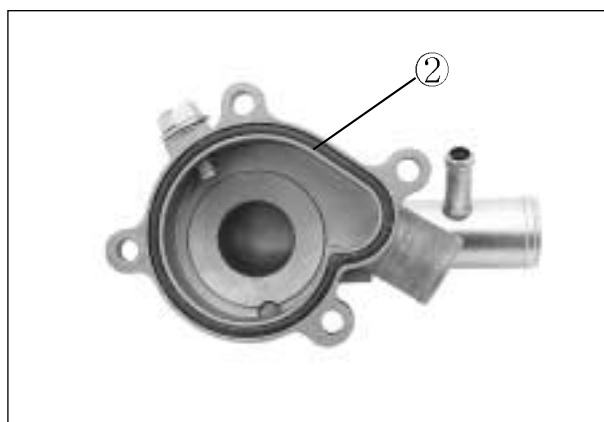


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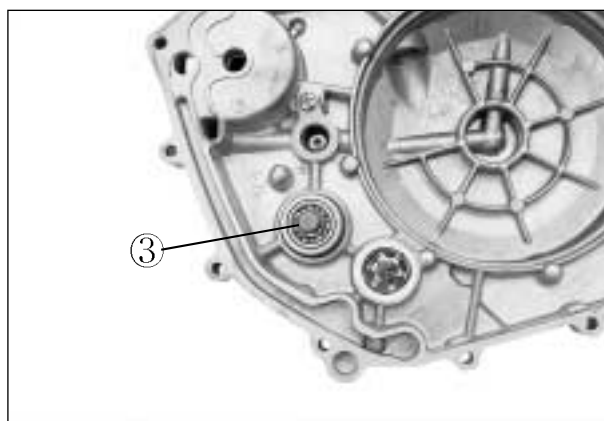
- Remove the water pump ① from the clutch cover.



- Remove the O-rings ②.



- Remove the E-ring ③ from the impeller shaft.



- Remove the impeller ④ from the other side.



- Remove the bearing.

NOTE

If there is no abnormal noise, bearing removal is not necessary.



⊙ 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.



■ BEARING CASE

Visually inspect the bearing case for damage.

Replace the water pump body if necessary.



⊙ REASSEMBLY AND INSTALLATION

- Install the bearing.

NOTE

The stamped mark on the bearing faces to the crankcase side.

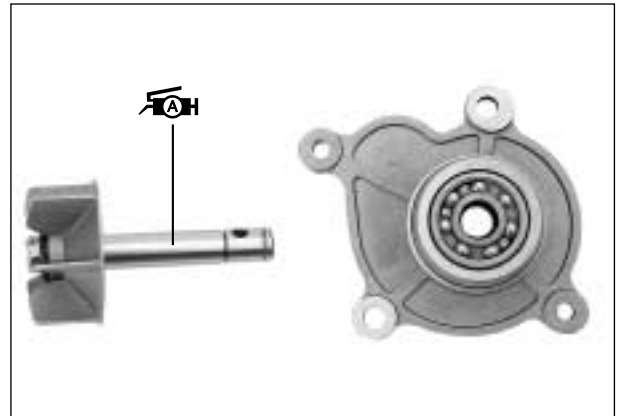


5-13 COOLING SYSTEM

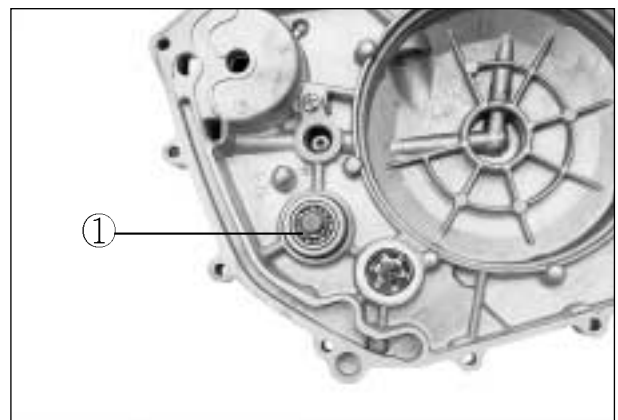
- Apply SUPER GREASE “A” to the impeller shaft.

 **SUPER GREASE “A”**

- Install the impeller to the water pump body.



- Fix the impeller shaft with the E-ring ①.
- Fill the bearing with engine oil until engine oil comes out from the hole of the bearing housing.



- Apply engine coolant to the O-ring ②.
- Install a new O-ring.

CAUTION

Use a new O-ring to prevent engine coolant leakage.

- Connect the water hoses.
- Pour engine coolant. (Refer to page 2-20)
- Pour engine oil. (Refer to page 2-10)

