

# 5. COOLING SYSTEM

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## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

- Use only distilled water and ethylene glycol in the cooling system. A 50—50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill, or drain the system, or to test the coolant mixture.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For temperature sensor and thermostatic switch inspection, refer to section 18.

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Radiator cap relief pressure	88—127 kPa (0.9—1.3 kg/cm <sup>2</sup> , 13—18 psi)
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: -32°C (-25°F) 50% Distilled water + 50% ethylene glycol: -37°C (-34°F) 45% Distilled water + 55% ethylene glycol: -44.5°C (-48°F)
Coolant capacity:      Coolant change: Total system:	1.60 lit (1.51 US qt, 1.28 Imp qt) 2.20 lit (2.32 US qt, 1.94 Imp qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.3 in at 203°F)
Boiling point (with 50—50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)

## TROUBLESHOOTING

### Engine temperature too high

- Faulty temperature gauge or sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant or coolant level too low
- Passages blocked in radiator, hoses or water jacket
- Cooling fan motor does not turn
  - Burned or loose sub-fuse
  - Faulty fan motor
  - Faulty thermostatic switch
  - Poor connector contact or open circuit in harness
- Faulty water pump

### Engine temperature too low

- Thermostat stuck open

### Coolant leaks

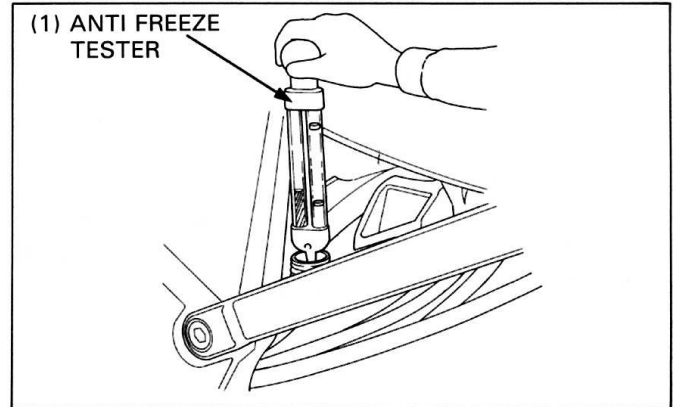
- Faulty pump mechanical seal
- Deteriorated O-rings

## COOLING SYSTEM

### SYSTEM TESTING

#### COOLANT MIXTURE

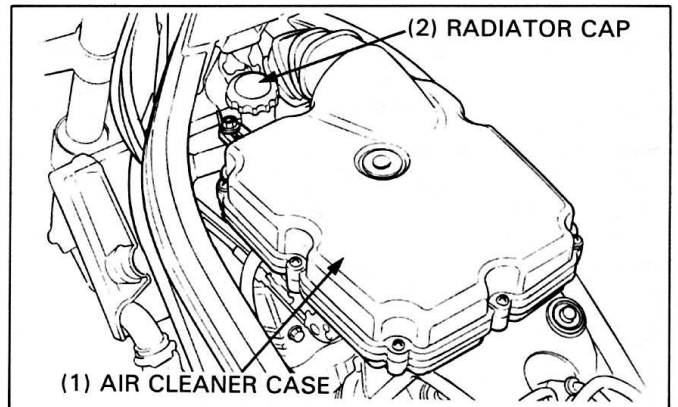
Remove the reserve tank cap.  
Test the coolant mixture with an antifreeze tester.  
For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



Remove the fuel tank (page 4-3).  
Remove the radiator cap.

#### ⚠ WARNING

- *Be sure the engine is cool before removing the cap or you may be severely scalded.*



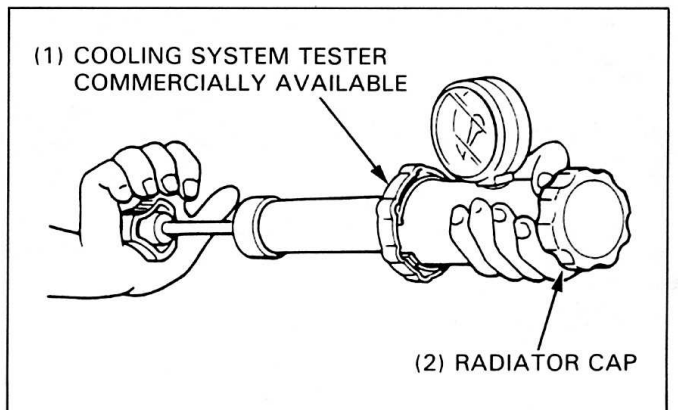
#### RADIATOR CAP

Wet the radiator cap sealing surface, install the cap on the tester, and apply pressure.

Replace the radiator cap if it does not hold pressure, or if it's relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

#### RADIATOR CAP RELIEF PRESSURE:

88–127 kPa (0.9–1.3 kg/cm<sup>2</sup>, 13–18 psi)



#### SYSTEM PRESSURE TEST

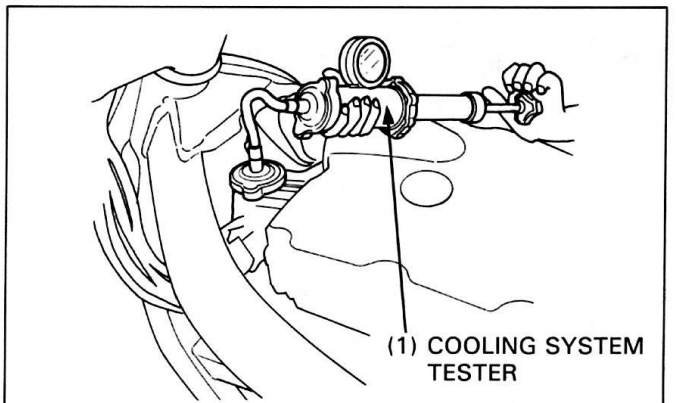
Remove the fuel tank and radiator cap.

Attach the tester to the radiator and apply enough pressure to test the radiator, engine and hoses, check for leaks.

#### CAUTION

- *Excessive pressure can damage the radiator. Do not exceed 125 kPa (1.25 kg/cm<sup>2</sup>, 18 psi)*

Repair or replace components if the system will not hold specified pressure for at least six seconds.



## COOLANT REPLACEMENT

### ⚠ WARNING

- *The engine must be cool before replacing the coolant or severe scalding may result.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.*
- *The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

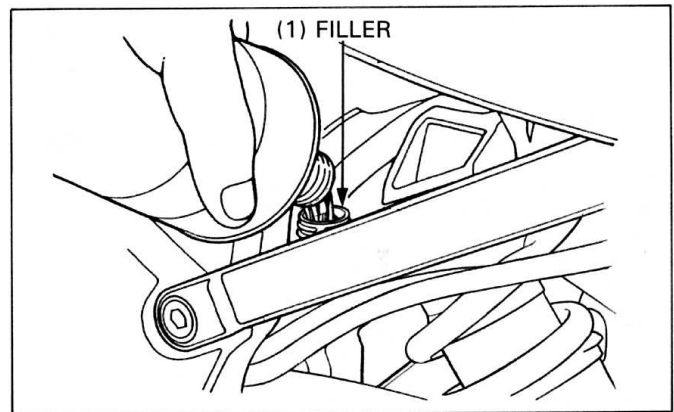
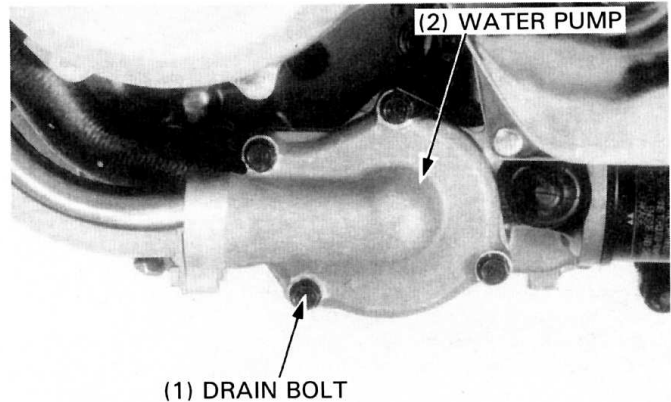
Remove the radiator cap (page 5-2).

Drain the coolant from the system by removing the drain bolt on the water pump cover.  
Reinstall the drain bolt.

Fill the system with 50—50 mixture of distilled water and ethylene glycol.

Bleed air from the cooling system.

- Support the motorcycle on its center stand and shift the transmission into neutral.
- Start the engine and snap the throttle grip, 3—4 times at 4,000—5,000 rpm. Then add coolant up to the radiator filler neck.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if the level is low.



## THERMOSTAT

### REMOVAL

Remove the following:

- fuel tank (page 4-3)
- air cleaner case (page 4-3)

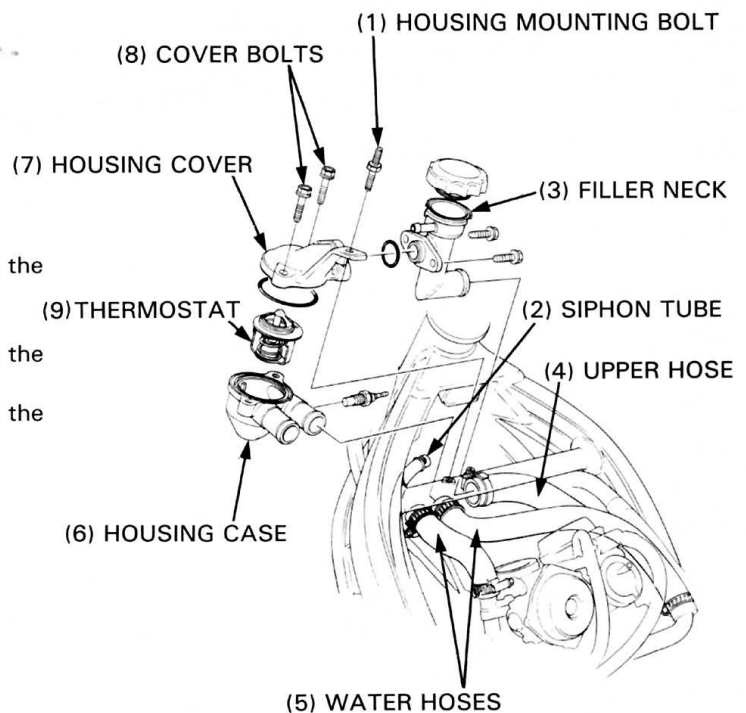
Remove the thermostat housing mounting bolts.

Disconnect the siphon tube from the filler neck.  
Disconnect the upper radiator hose at the filler neck and the water hoses at the thermostat housing.

Remove the thermostat housing case and filler neck from the frame.

Remove the housing cover attaching bolts and separate the case from the cover.

Remove the thermostat from the housing case.



## COOLING SYSTEM

### INSPECTION

Inspect the thermostat visually for damage.  
Suspend the thermostat in heated water to check its operation.

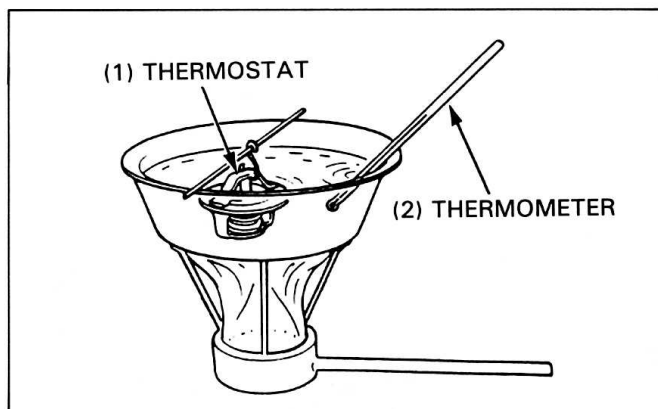
#### NOTE

- If the thermostat or thermometer touches the pan, you'll get a false reading.

Replace thermostat if valve stays open at room temperature, or if it responds at temperatures other than those specified.

#### Data:

Start to open	80° to 84°C (176–183°F)
Valve lift	8 mm (0.3 in) minimum when heated to 95°C (203°F) for five minutes.



### INSTALLATION

Install the following:

- the thermostat into the housing case.
- the new O-ring into the case groove.
- the cover onto the case, with the bolts.

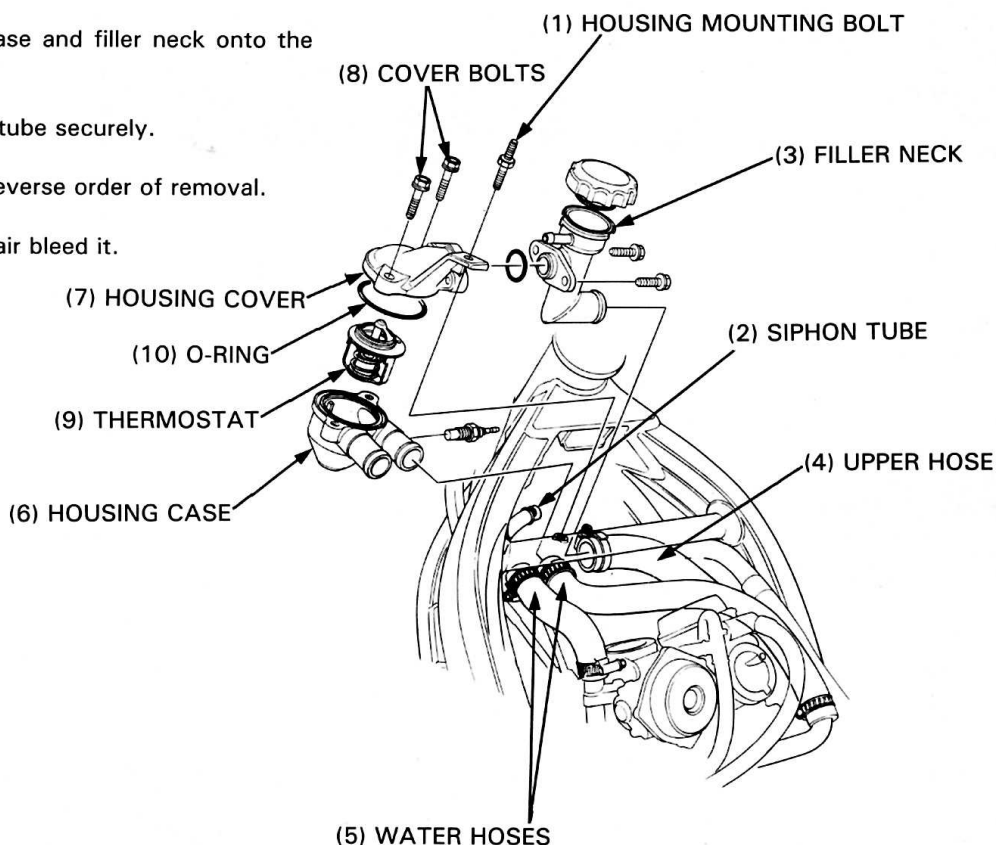
Assemble the case and filler neck with the new O-ring.  
Tighten the bolts.

Install the thermostat housing case and filler neck onto the frame.

Connect the removed hoses and tube securely.

Install the removed parts in the reverse order of removal.

Fill the system with coolant and air bleed it.



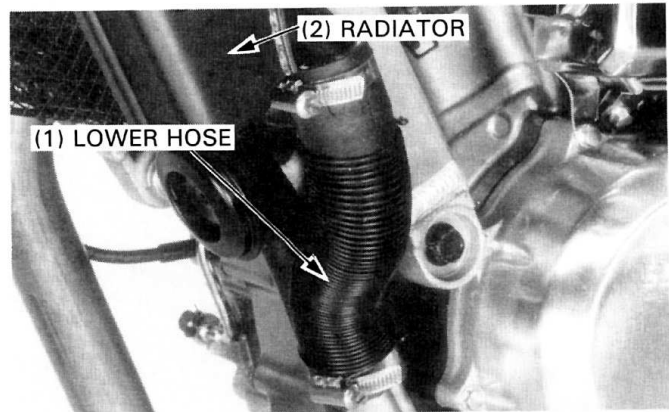
## RADIATOR/COOLING FAN

### REMOVAL

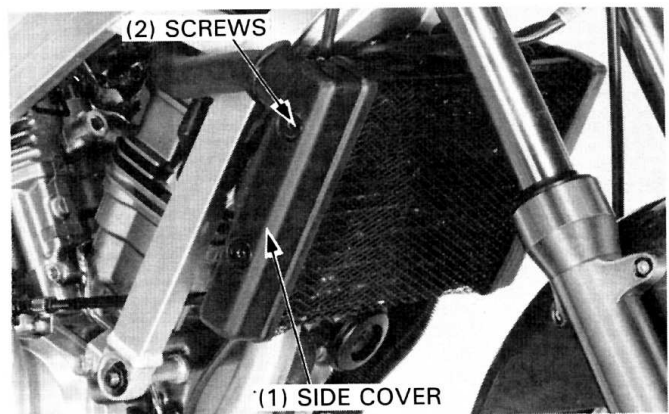
Drain the coolant (page 5-3).

Disconnect the cooling fan motor connector.

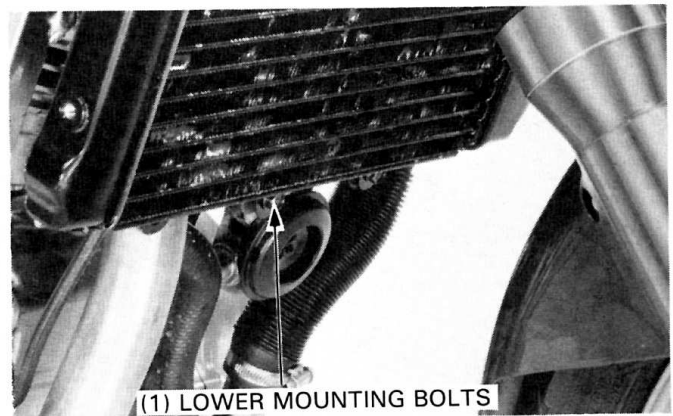
Disconnect the lower radiator hose at the radiator.



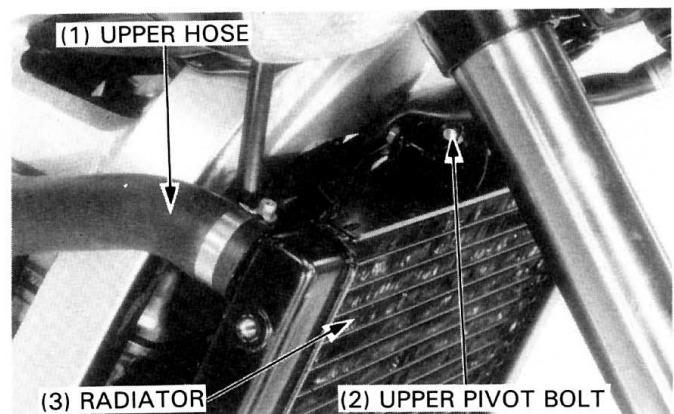
Remove the radiator side covers by removing mounting screws.



Remove the radiator lower mounting bolts.



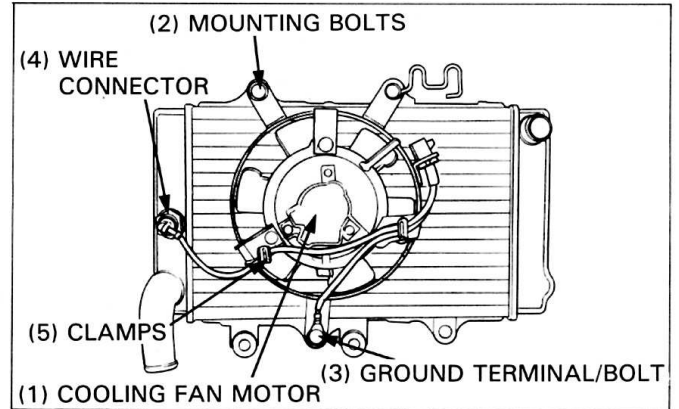
Disconnect the upper radiator hose at the radiator.  
Remove the radiator upper pivot bolt and radiator from the frame.



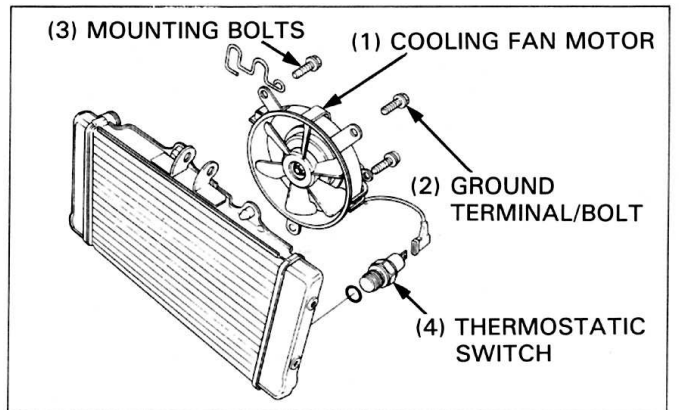
## COOLING SYSTEM

### DISASSEMBLY

Disconnect the cooling fan motor wire connector from the thermostatic switch and remove the wire from the clamp. Remove the ground wire terminal bolt.



Remove the cooling fan motor mounting bolts and cooling fan motor.



### RADIATOR INSPECTION

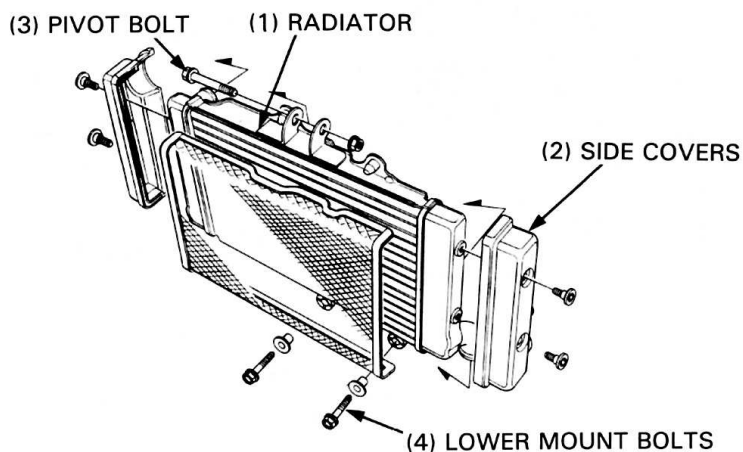
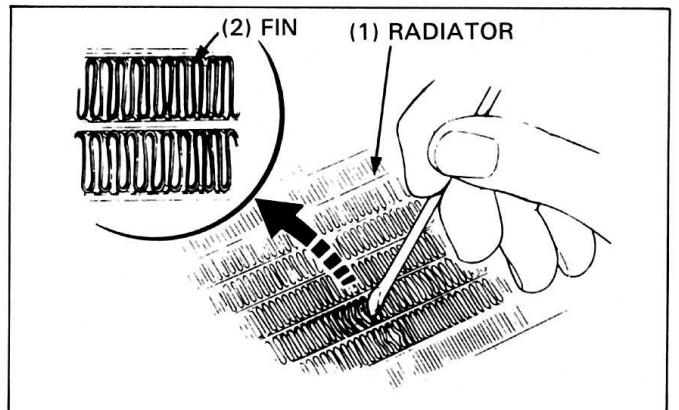
#### NOTE

- See section 18 for thermostatic switch inspection.

Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

Carefully straighten any bent fins.

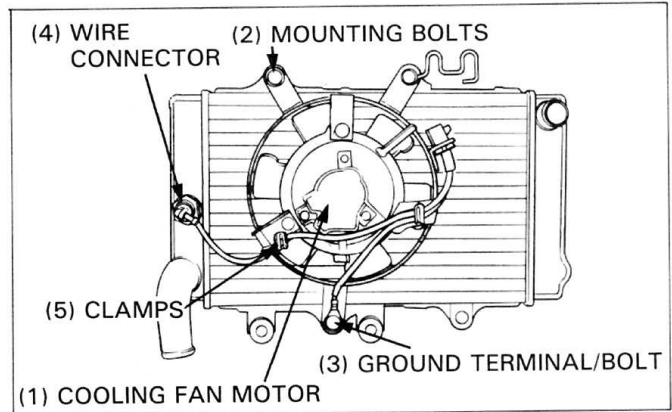




## ASSEMBLY/INSTALLATION

Install the cooling fan motor.

Connect the ground terminal and thermostatic switch wire connector.

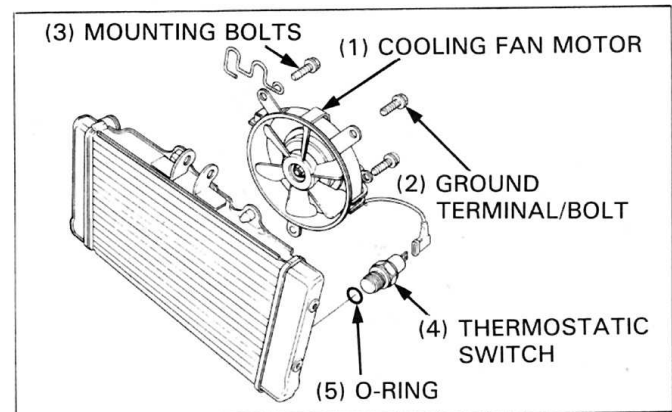


Install the mounting bolts.

If the thermostatic switch was removed, install a new O-ring and tighten to the specified torque.

**THERMOSTATIC SWITCH:**  
**TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)**

Install the radiator in the reverse order of removal.

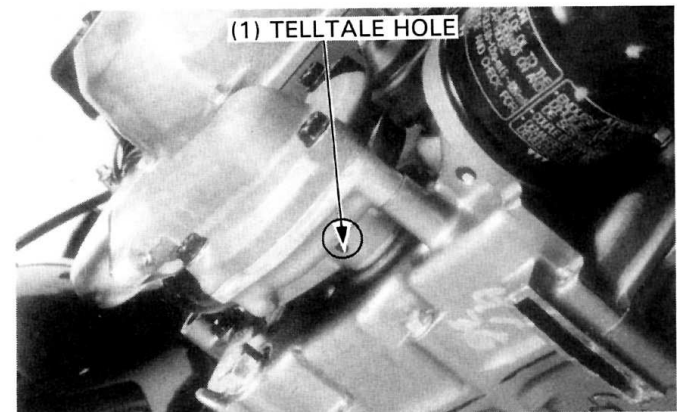


## WATER PUMP

### MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of mechanical seal coolant leakage.

Replace the water pump as an assembly if the mechanical seal is leaking.



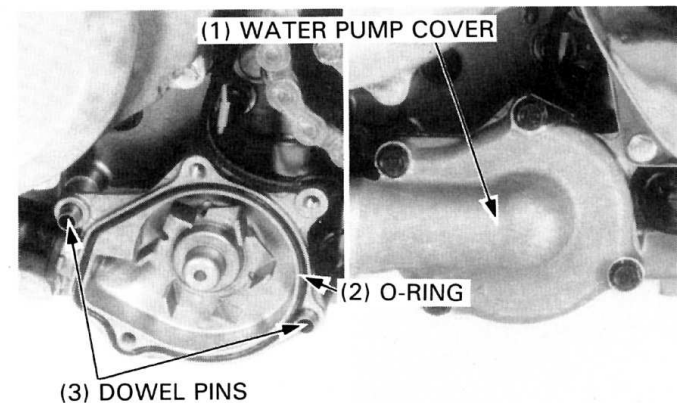
### REMOVAL

Drain the engine oil (page 2-3).

Remove the water pump cover mounting bolts and cover.

Remove the O-ring and dowel pins from the water pump assembly and disconnect the water hose.

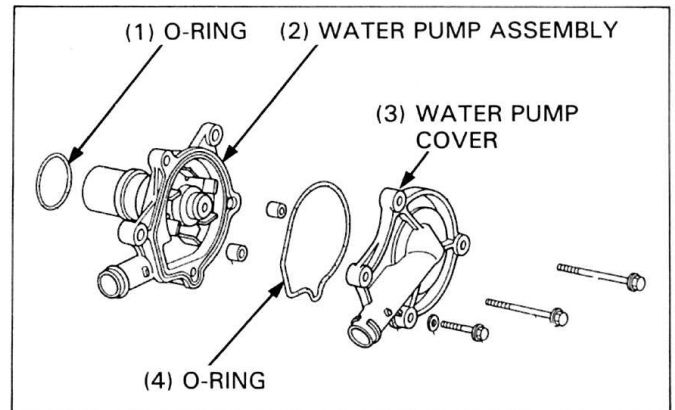
Remove the water pump from the crankcase.



## COOLING SYSTEM

### INSPECTION

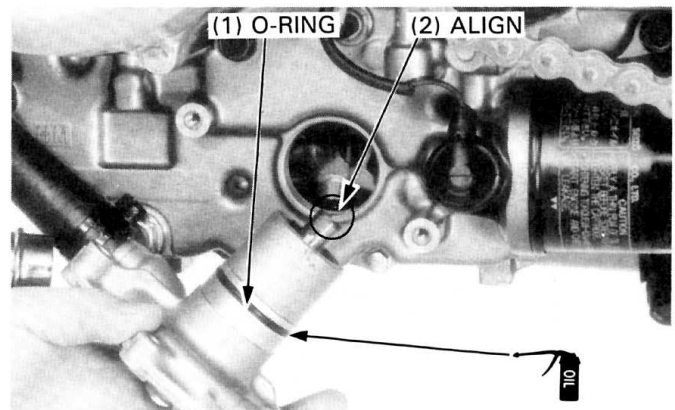
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.



### INSTALLATION

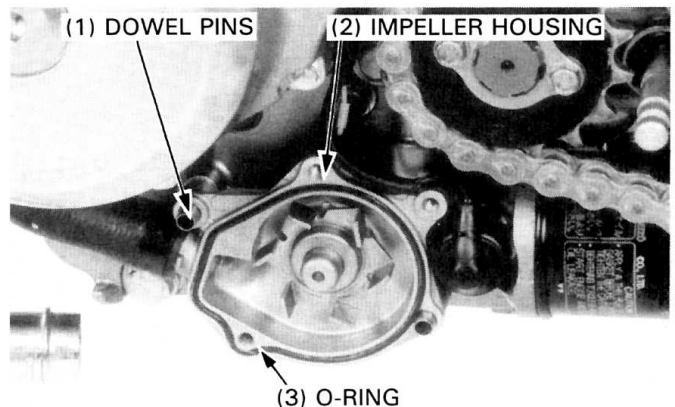
Connect the water hose with the clamp.  
Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.



Apply a coat of engine oil to a new O-ring and install it around the impeller housing.

Install the two dowel pins.



Install the water pump cover and tighten the cover mounting bolts.

Fill the system with coolant (page 5-3).  
Fill the engine with the recommended engine oil (page 2-3).  
Check the cooling system for leakage.

