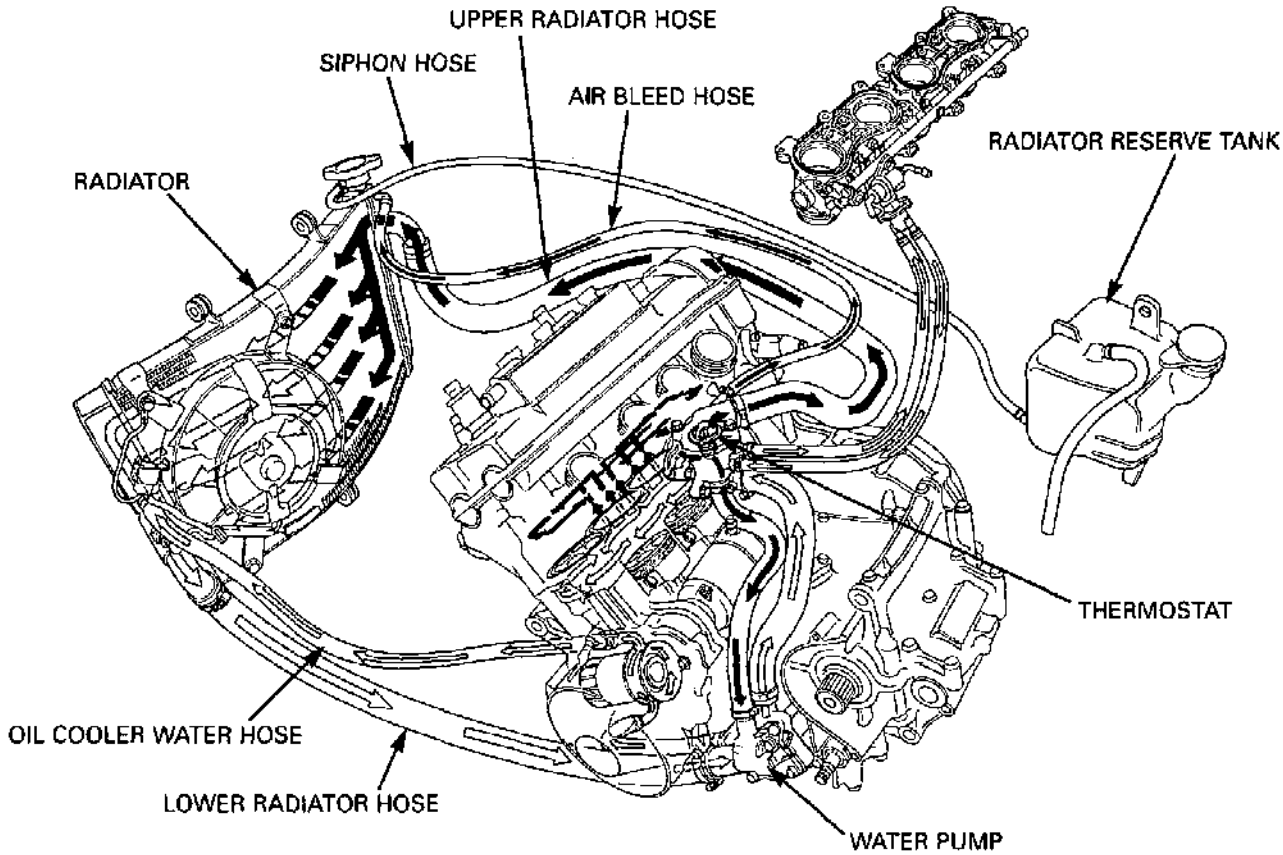
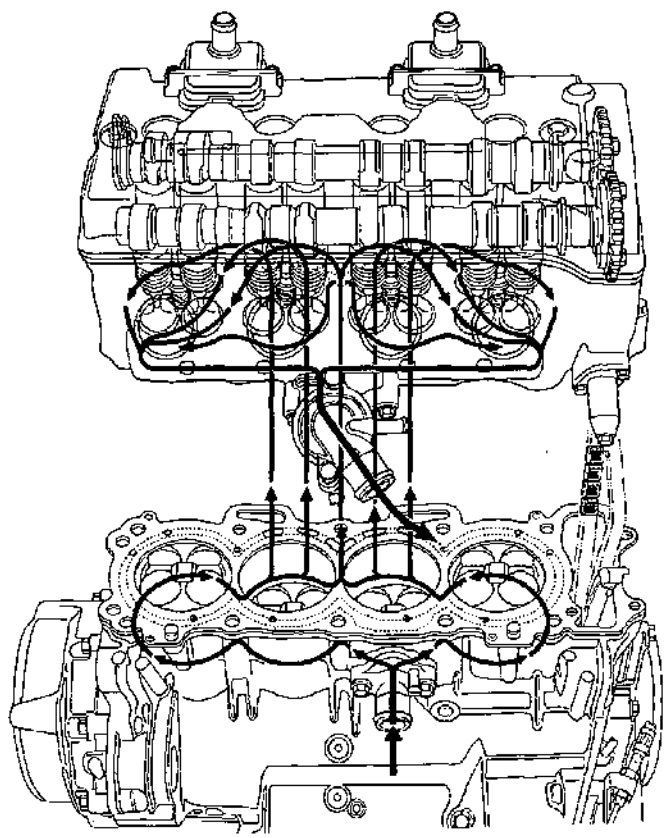
SYSTEM FLOW PATTERN





6. COOLING SYSTEM

SERVICE INFORMATION

GENERAL

⚠ WARNING

Wait until the engine is cool before slowly removing the radiator cap.

Removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding.

⚠ CAUTION

Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

NOTICE

Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for fan motor switch and coolant temperature sensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.7 liter (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.31 liter (0.33 US qt, 0.27 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		50% mixture with soft water

TORQUE VALUES

Water pump cover flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt.
Thermostat cover flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt.
ECT/thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	
Cooling fan mounting nut	3 N•m (0.27 kgf•m, 2.0 lbf•ft)	Apply a locking agent to the threads.
Fan motor mounting nut	5 N•m (0.5 kgf•m, 3.6 lbf•ft)	
Fan motor switch	18 N•m (1.8 kgf•m, 13 lbf•ft)	Apply sealant to the threads.

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty cooling fan motor switch

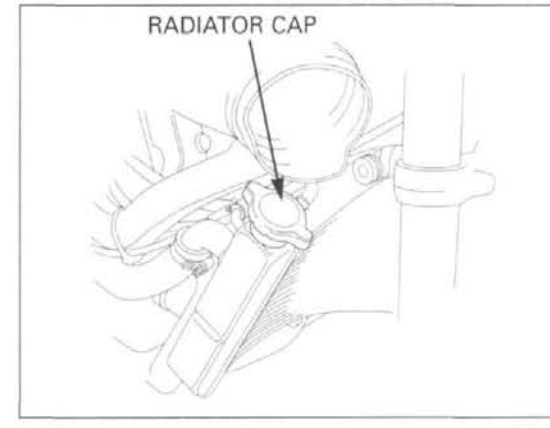
Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

SYSTEM TESTING

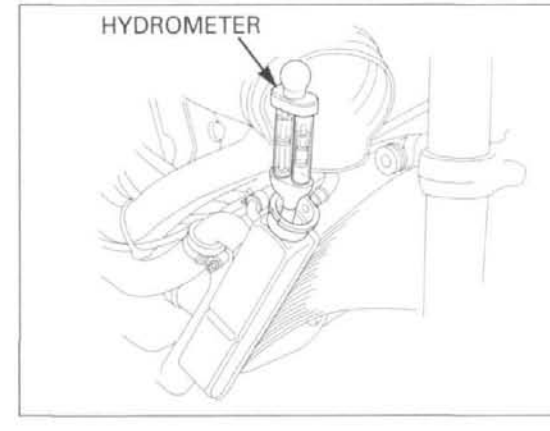
COOLANT (HYDROMETER TEST)

Remove the right air intake duct (page 2-9).

Remove the radiator cap.



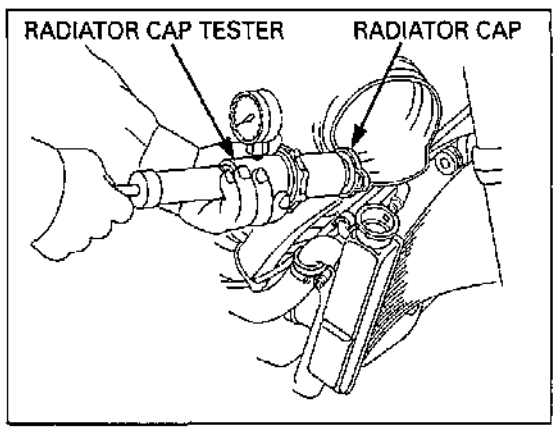
Test the coolant gravity using a hydrometer (see below for "COOLANT GRAVITY CHART").
For maximum corrosion protection, a 1:1 solution of ethylene glycol and distilled water is recommended (page 6-4).
Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

Coolant temperature °C (°F) / Coolant ratio %	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

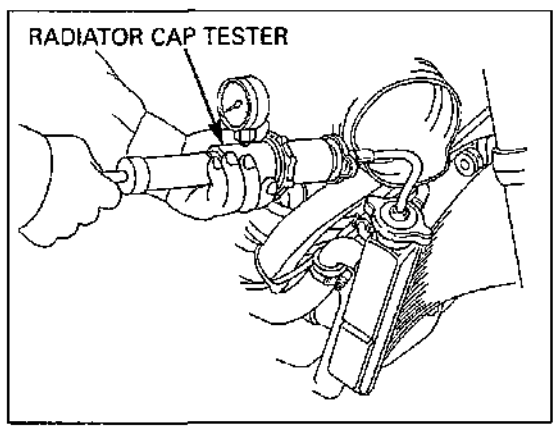


Before installing the cap in the tester, wet the sealing surfaces.

Remove the radiator cap (see previous page).

Pressure test the radiator cap.
Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.
It must hold the specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)



Pressurize the radiator, engine and hoses, and check for leaks.

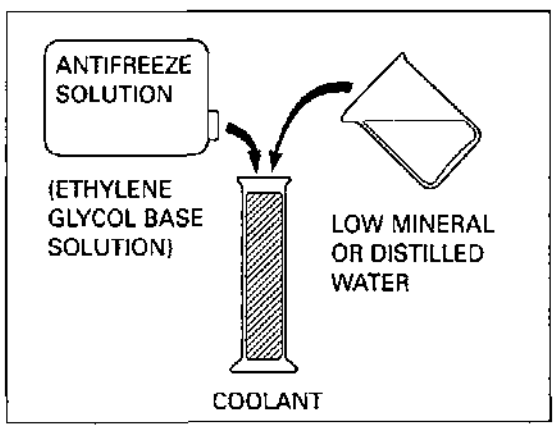
NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

COOLANT REPLACEMENT

PREPARATION

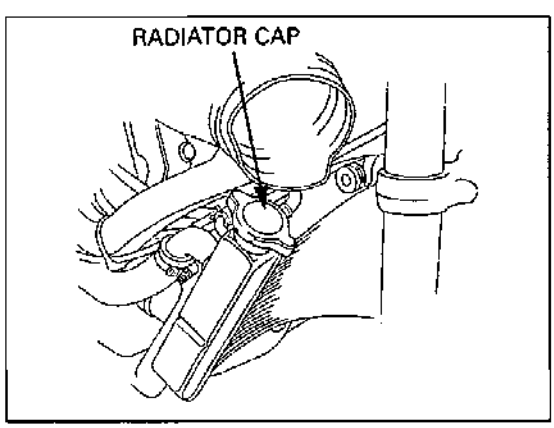


- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

RECOMMENDED ANTIFREEZE:
Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors

RECOMMENDED MIXTURE:
1:1 (distilled water and antifreeze)

REPLACEMENT/AIR BLEEDING



When filling the system or reserve tank with coolant (checking the coolant level), place the motorcycle in a vertical position on a flat, level surface.

Remove the radiator cap.

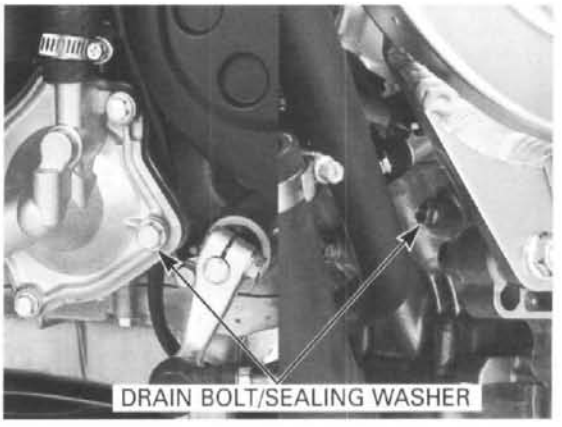
Remove the lower cowl (page 2-6).

Remove the drain bolt on the water pump cover and drain the coolant.

Remove the cylinder drain bolt and drain the coolant from the cylinder.

Reinstall the drain bolt with the new sealing washer. Tighten the water pump drain bolt to the specified torque.

TORQUE: 12 N•m (1.2 kgf•m, 9 lbf•ft)

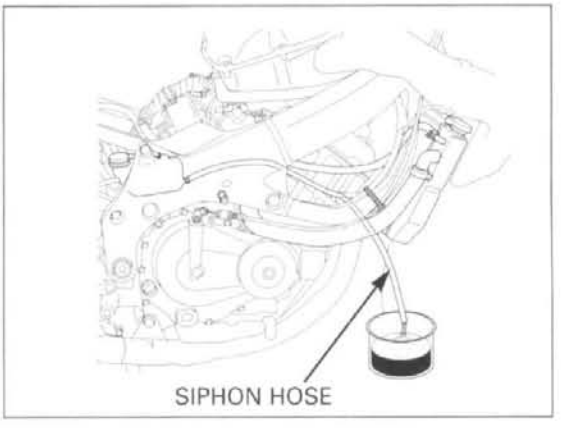


Remove the right air duct (page 2-9).

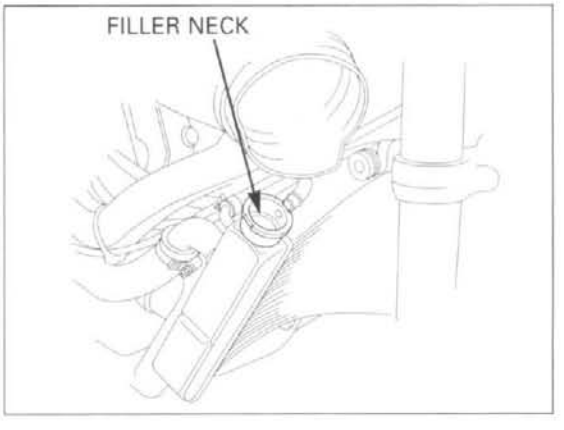
Disconnect the siphon hose from the radiator.

Drain the reserve tank coolant.
Empty the coolant and rinse the inside of the reserve tank with water.

Reinstall the radiator siphon hose.



Fill the system with the recommended coolant through the filler opening up to the filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

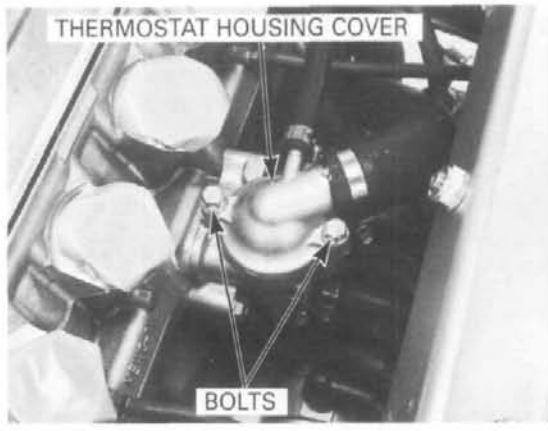
Bleed air from the system as follow:
1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

THERMOSTAT

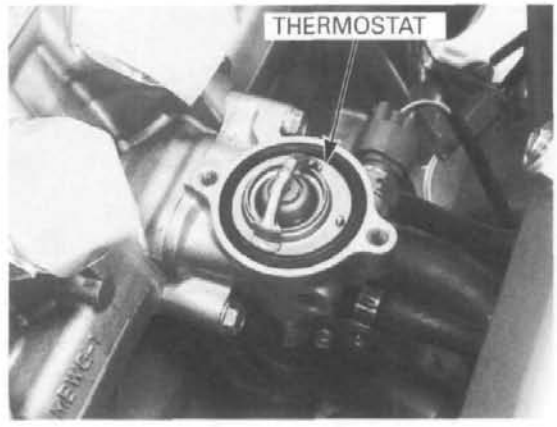
THERMOSTAT REMOVAL

Drain the coolant (page 6-5).
Remove the throttle body (page 5-62).

Remove the bolts and thermostat housing cover.



Remove the thermostat from the housing.



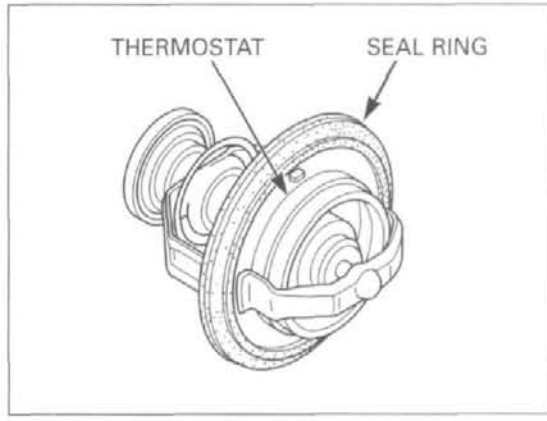
INSPECTION

Wear insulated gloves and adequate eye protection.
Keep flammable materials away from the electric heating element.

Visually inspect the thermostat for damage.
Check for damage of the seal ring.

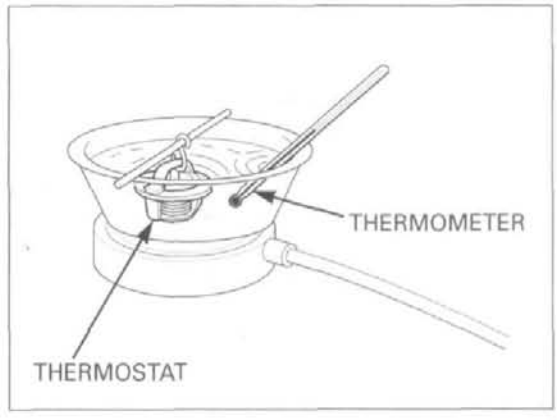
Do not let the thermostat or thermometer touch the pan, or you will get false readings.

Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.



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

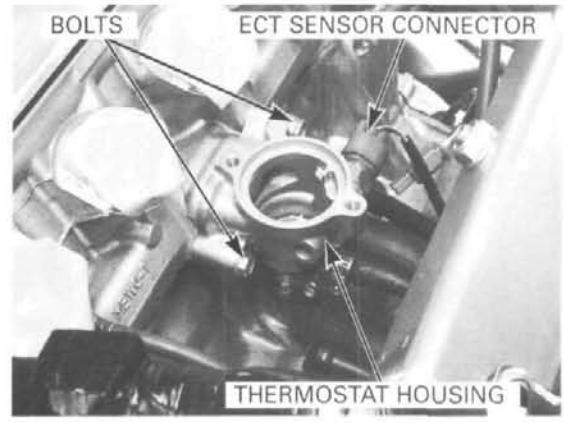
THERMOSTAT BEGIN TO OPEN:
80 – 84 °C (176 – 183 °F)
VALVE LIFT:
8 mm (0.3 in) minimum at 95 °C (203 °F)



THERMOSTAT HOUSING REMOVAL

Disconnect the ECT sensor connector.
Disconnect the fast idle wax unit water hose and bypass hose from the thermostat housing.

Remove the bolts and thermostat housing from the cylinder head.

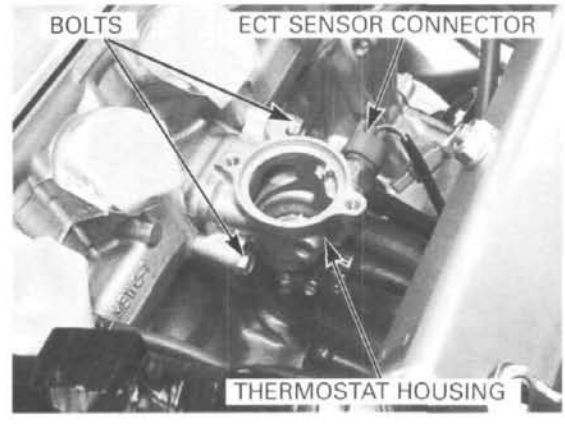


THERMOSTAT HOUSING INSTALLATION

Install a new O-ring into the groove of the thermostat body.
Install the thermostat housing onto the cylinder head.

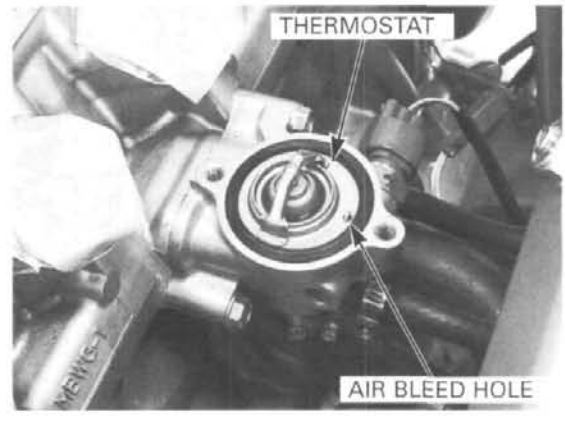
Install and tighten the thermostat housing mounting bolts.

Connect the fast idle wax unit water hose and bypass hose.
Connect the ECT sensor connector.



THERMOSTAT INSTALLATION

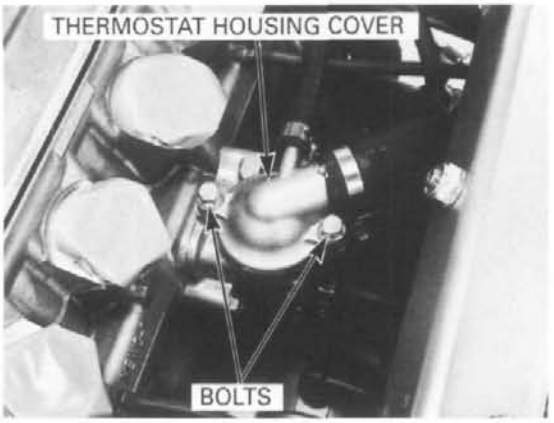
Install the thermostat into the housing with its air bleed hole facing rearward.



Install the thermostat housing cover onto the housing.
Install and tighten the housing cover bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill the system with the recommended coolant and bleed any air (page 6-5).

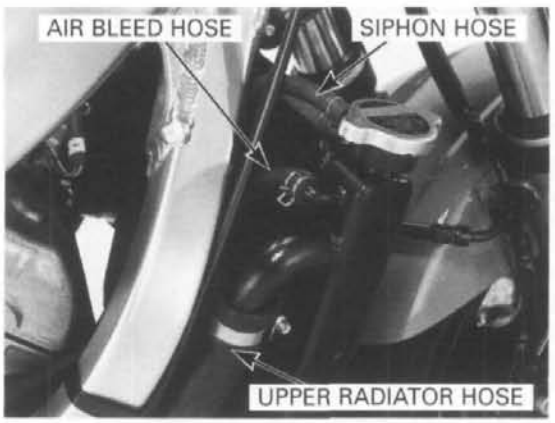


RADIATOR

REMOVAL

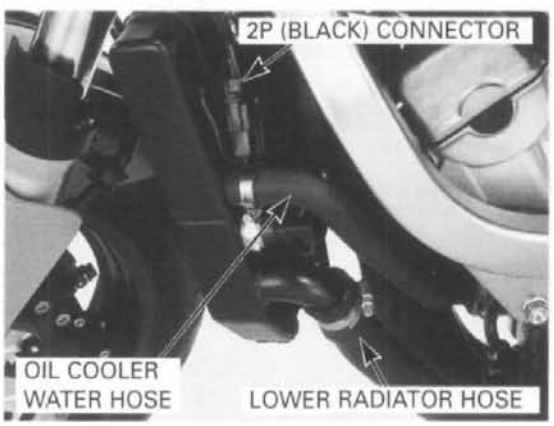
Remove the lower cowl and inner half cowl (page 2-6).
Drain the coolant (page 6-4).

Disconnect the siphon hose and air bleed hose from the radiator.
Disconnect the upper radiator hose.



Disconnect the radiator sub-harness 2P (Black) connector.

Disconnect the lower radiator hose and oil cooler water hose.

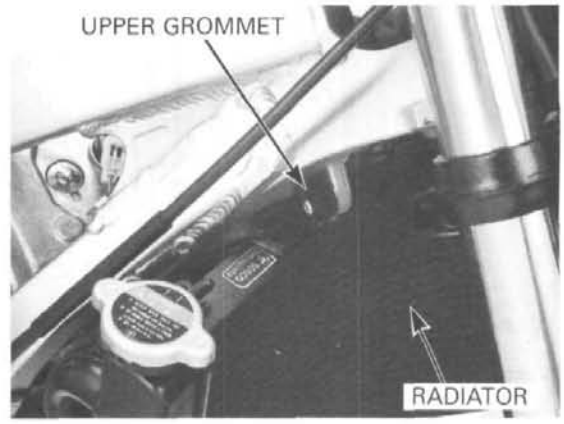


Remove the radiator lower mounting bolt/nut and washer.

Remove the radiator upper mounting bolt and washer.

Slide the radiator to the right, then release the upper grommet from the frame boss.
Remove the radiator assembly.

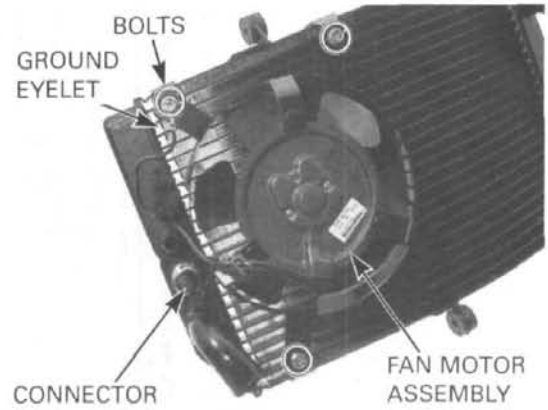
Be careful not to damage the radiator core.



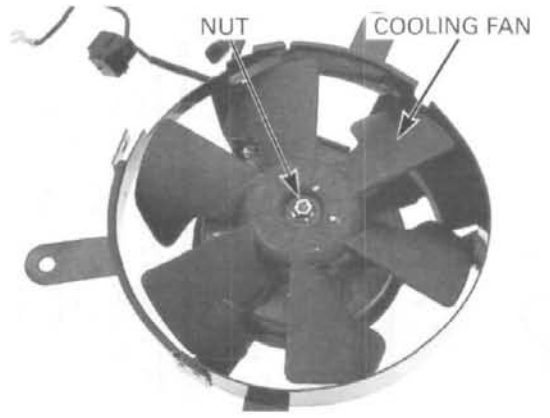
DISASSEMBLY

Disconnect the fan motor switch connector.

Remove the three bolts, ground eyelet and cooling fan motor assembly.

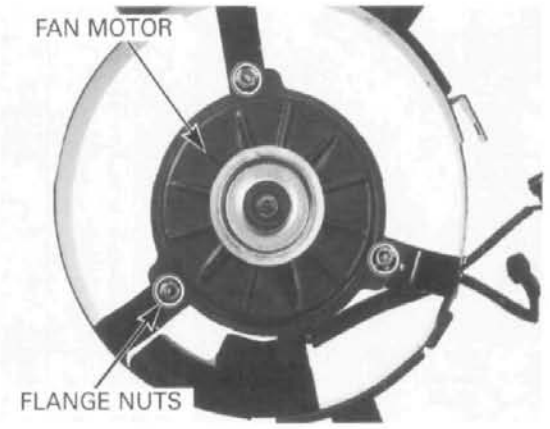


Remove the nut and cooling fan.

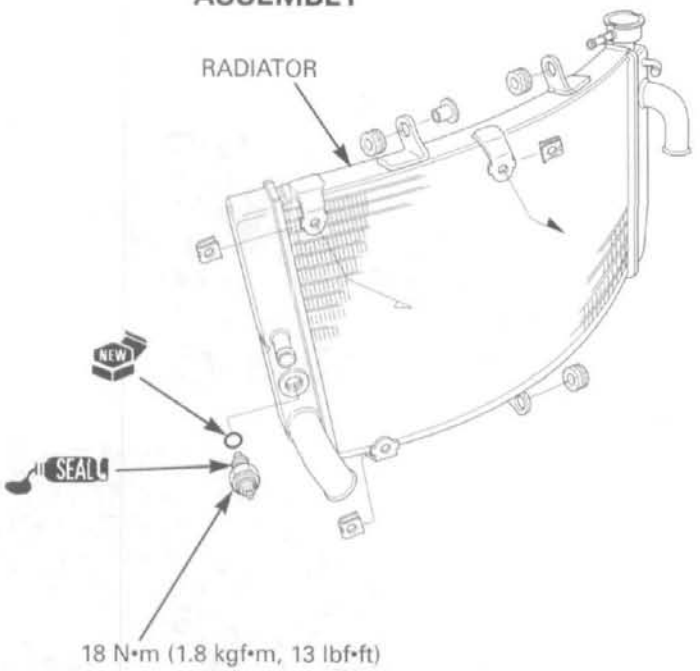


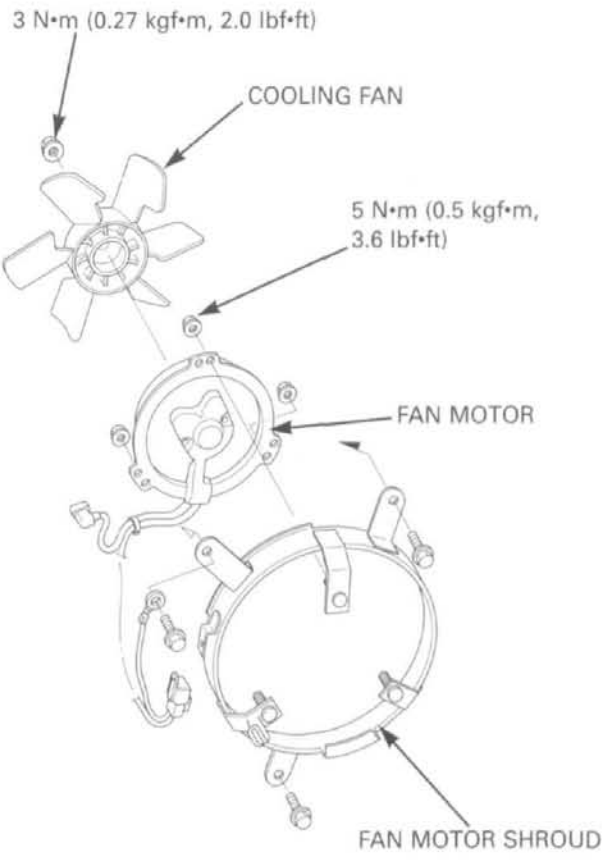
Remove the flange nuts and fan motor from the fan motor shroud.

For fan motor switch information, refer to page 19-15.



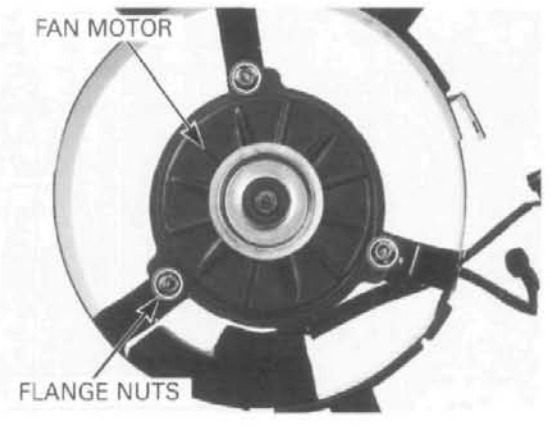
ASSEMBLY



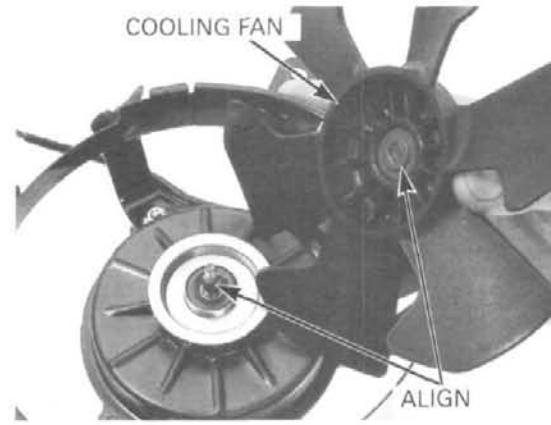


Install the fan motor onto the fan motor shroud and tighten the flange nuts to the specified torque.

TORQUE: 5 N•m (0.5 kgf•m, 3.6 lbf•ft)

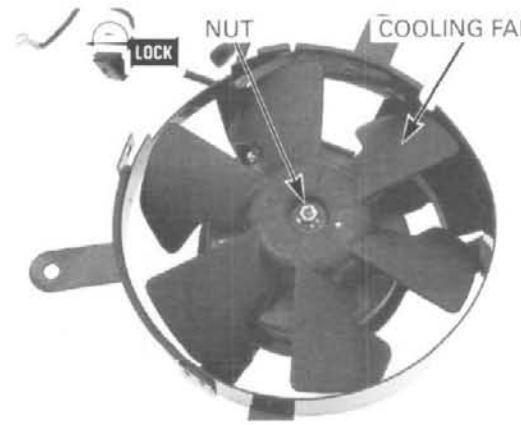


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



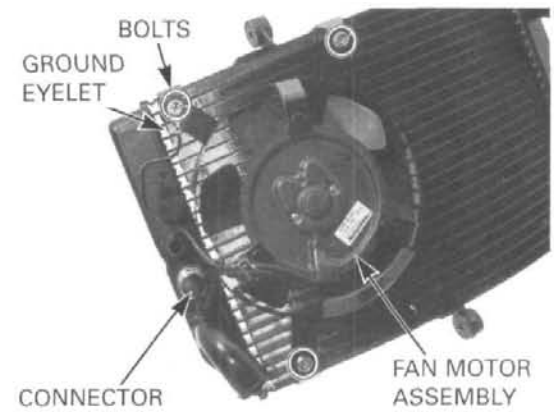
Apply a locking agent to the cooling fan nut threads.
Install and tighten the nut to the specified torque.

TORQUE: 3 N•m (0.27 kgf•m, 2.0 lbf•ft)



Install the cooling fan motor assembly onto the radiator.
Route the ground eyelet properly.
Install and tighten the bolts.

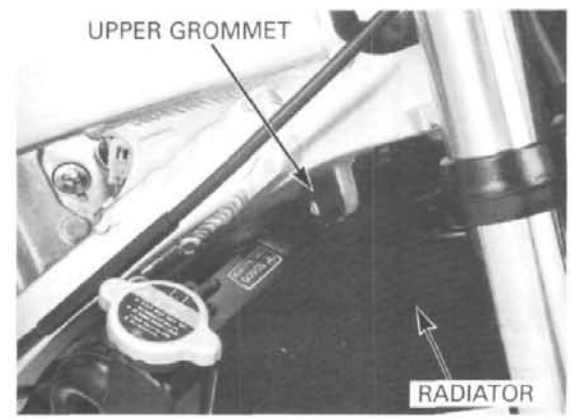
Install the radiator sub-harness connector to the fan motor bracket.
Connect the fan motor switch connector.



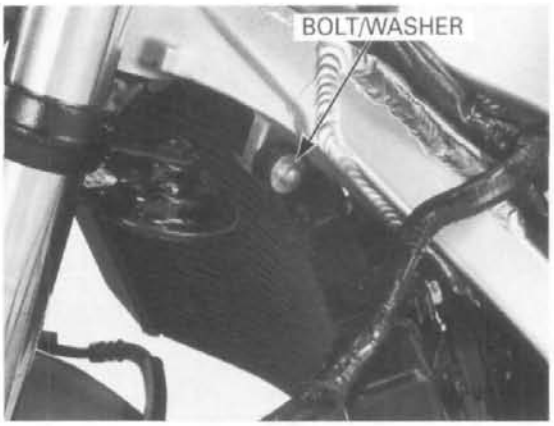
INSTALLATION

Be careful not to damage the radiator core.

Install the radiator assembly, aligning its grommet with the frame boss.

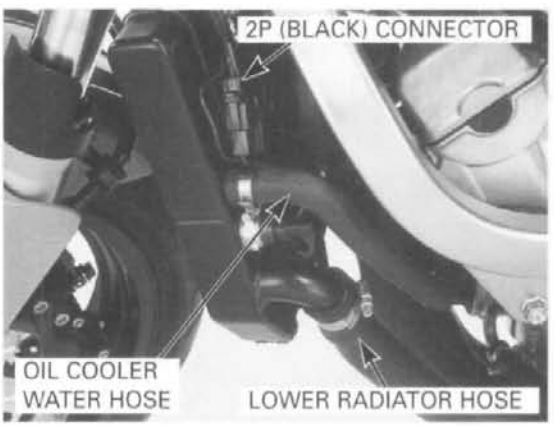


Install the washer and upper mounting bolt, then tighten the bolt.



Install the radiator lower mounting bolt/nut, tighten the nut securely.

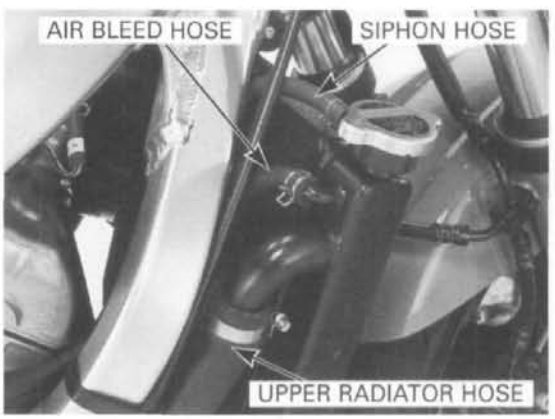
Connect the fan motor sub-harness 2P (Black) connector.
Connect the lower radiator hose and oil cooler water hose.



Connect the upper radiator hose.
Connect the siphon hose and air bleed hose to the radiator.

Fill the system with the recommended coolant (page 6-5).

Install the inner half cow/lower cowl (page 2-8).

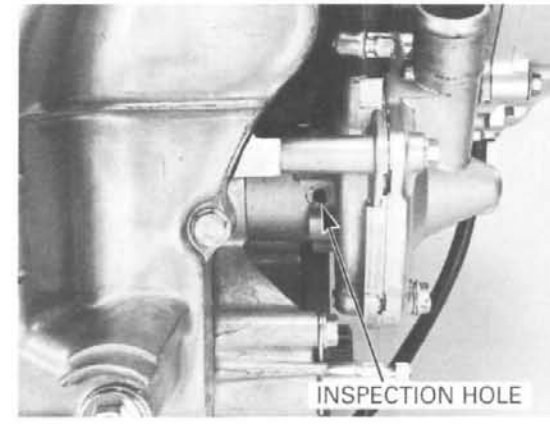


WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the lower cowl (page 2-6).

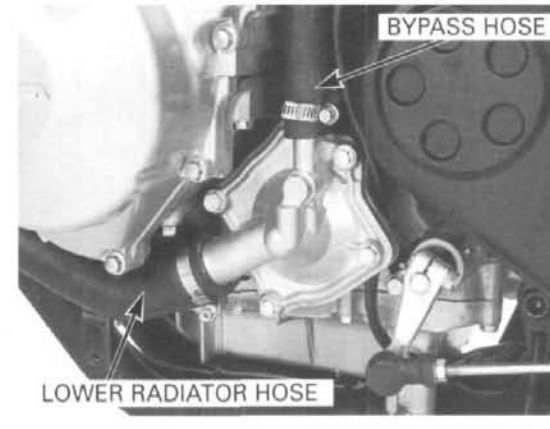
Inspect the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



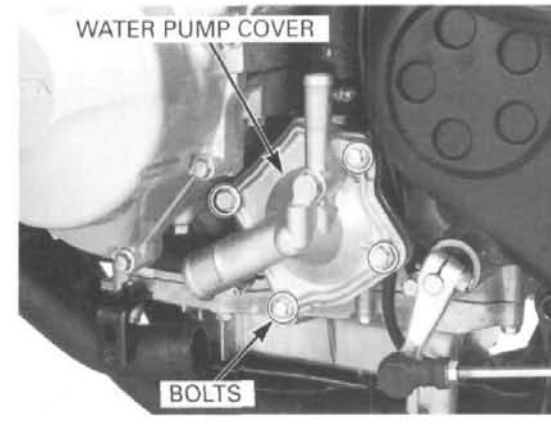
REMOVAL

Drain the coolant (page 6-4).

Disconnect the lower radiator hose and bypass hose from the water pump cover.



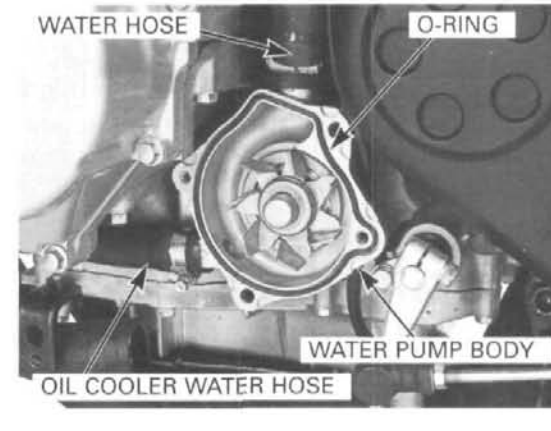
Remove the two SH bolts, two flange bolts and water pump cover.



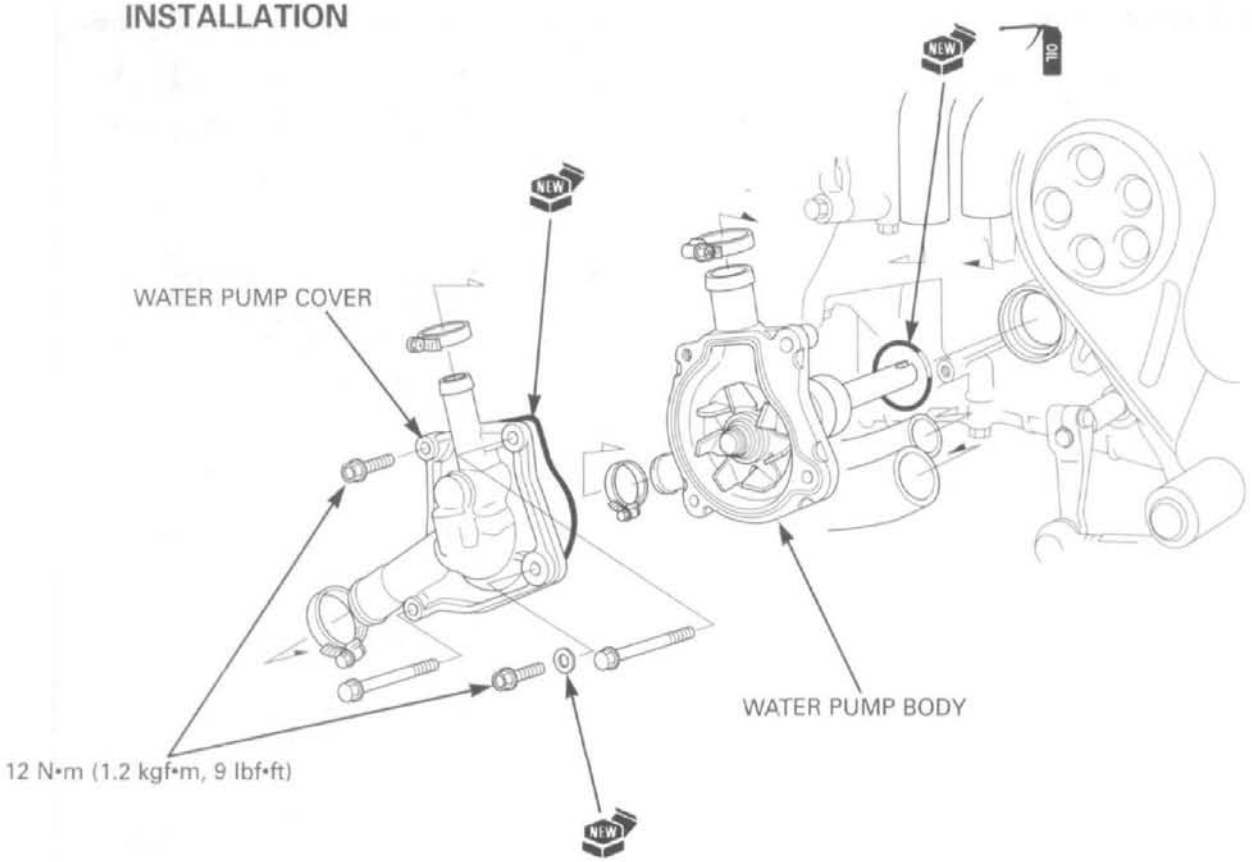
Remove the O-ring from the water pump body.

Disconnect the water pump-to-water joint hose and oil cooler water hose from the water pump body.

Remove the water pump body from the crankcase.

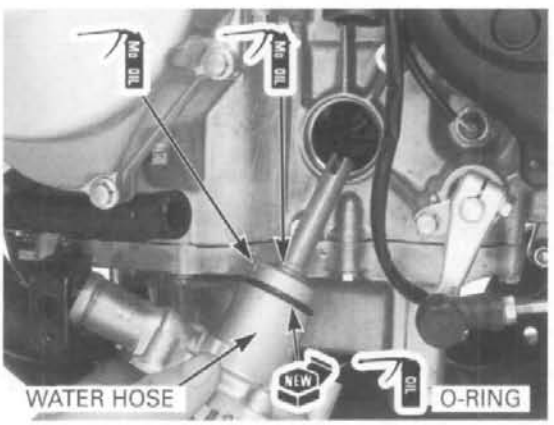


INSTALLATION



Pour molybdenum oil solution into the hole in the water pump as shown.
Apply molybdenum oil solution to the thrust washer.

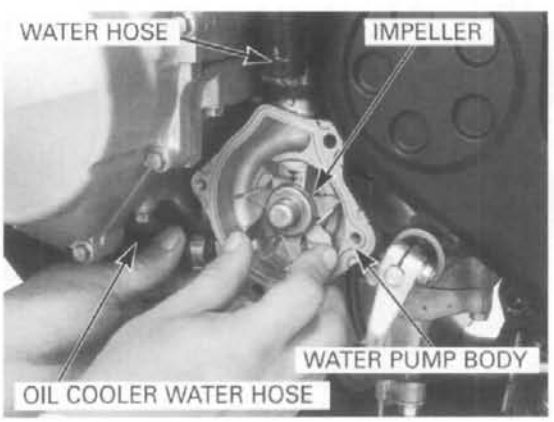
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.



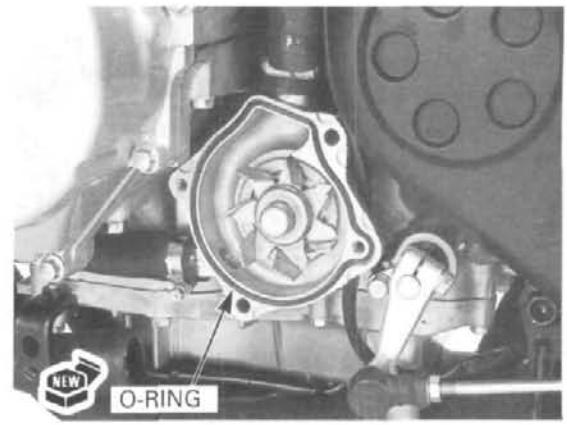
Connect the water pump-to-water joint hose and oil cooler water hose to the water pump and tighten the clamp screws.

Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft end by turning the water pump impeller.

Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.



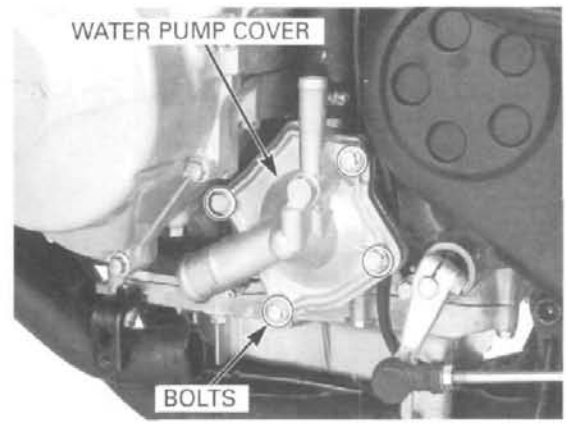
Install a new O-ring into the groove in the water pump body.



Install the water pump cover, two SH bolts and two flange bolts.
Tighten the flange bolts to the specified torque.

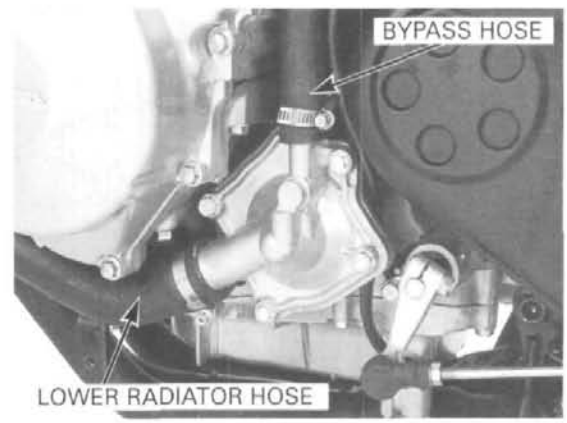
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Tighten the two SH bolts.



Connect the lower radiator hose and bypass hose, then tighten the clamp screws.

Fill the system with the recommended coolant (page 6-5).
Install the lower cowl (page 2-8).

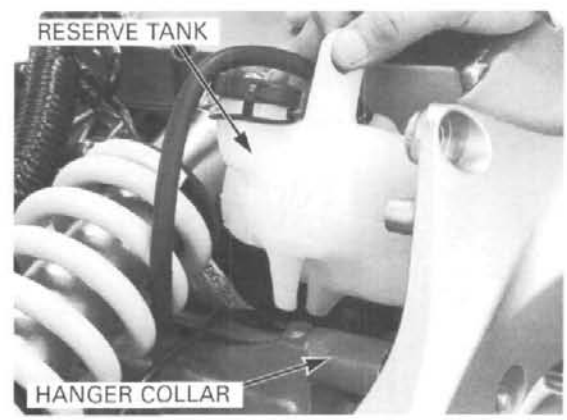


RADIATOR RESERVE TANK

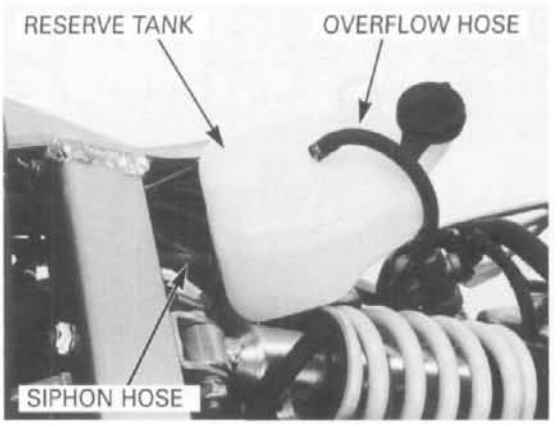
REMOVAL

Remove the seat rail (page 2-22).

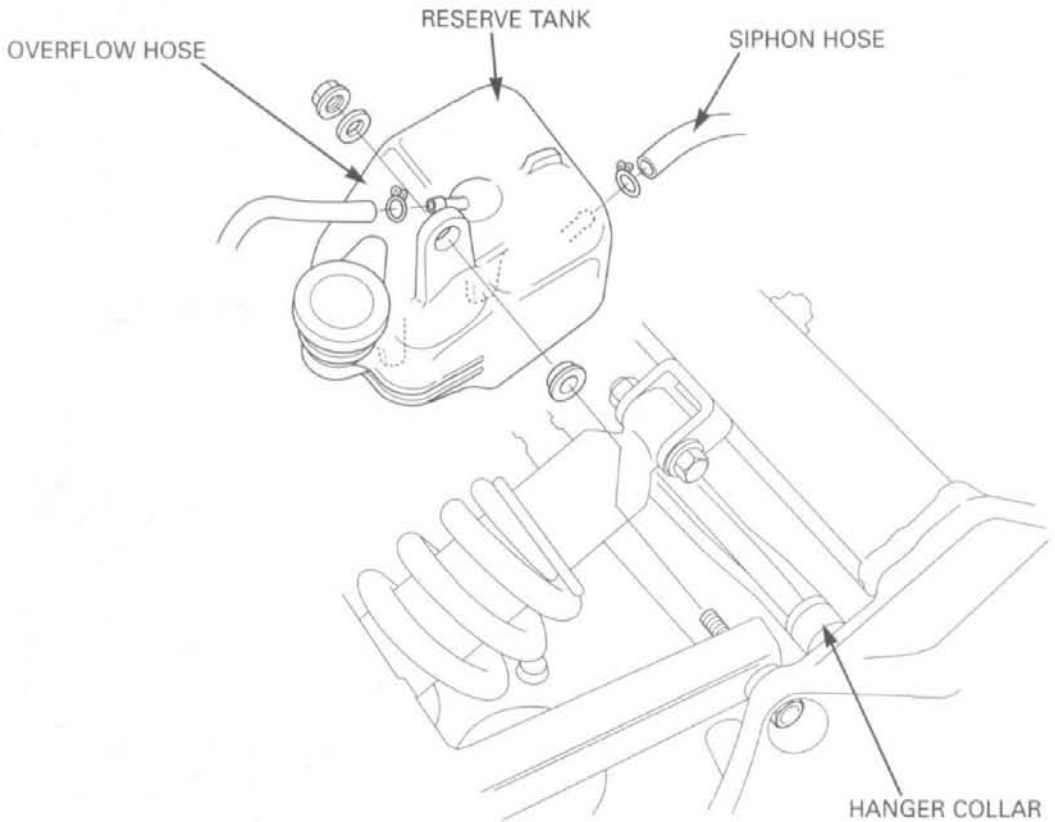
Remove the radiator reserve tank from the engine hanger collar.



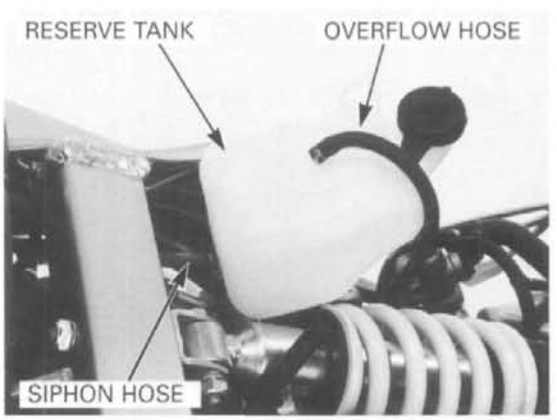
Disconnect the siphon hose and drain the coolant from the reserve tank, then remove the reserve tank. Disconnect the overflow hose from the reserve tank.



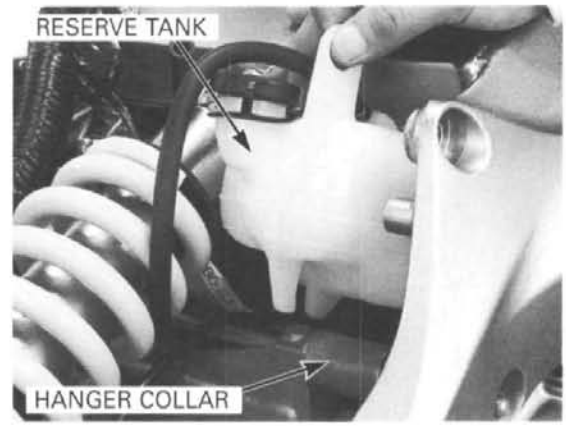
INSTALLATION



Connect the siphon hose and overflow hose to the reserve tank.



Install the reserve tank onto the engine hanger collar.



Install the seat rail (page 2-23).

Install the flange collar and washer as shown.

Tighten the seat rail mounting nuts (page 2-23).