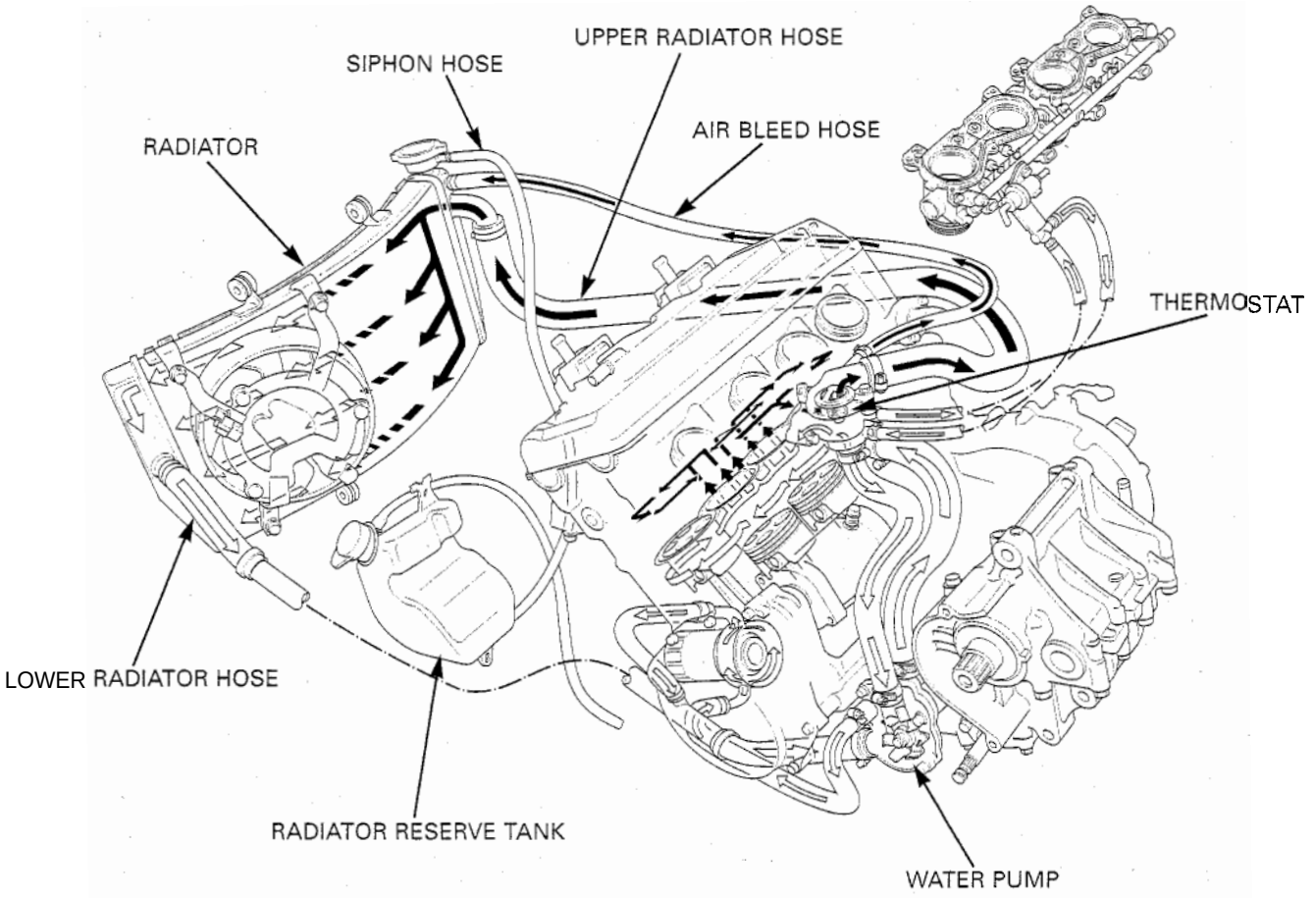
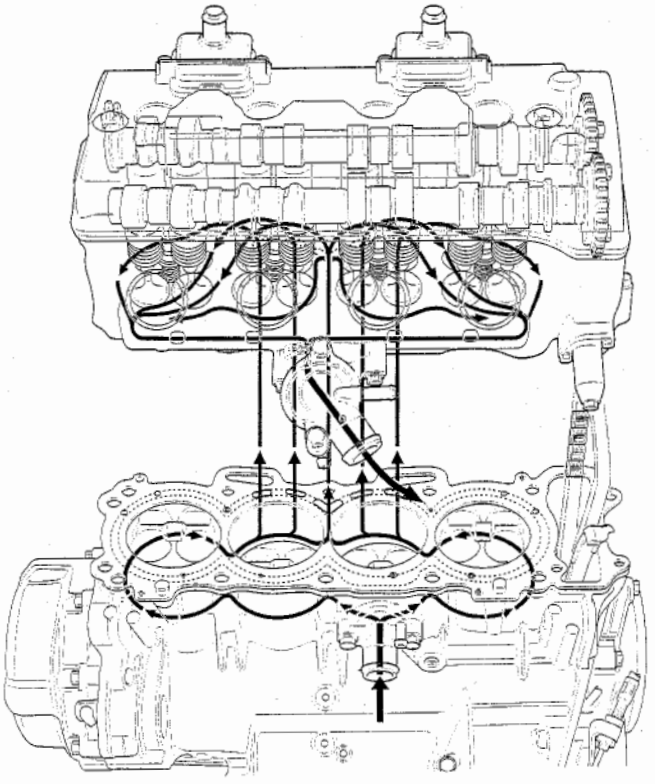
SYSTEM FLOW PATTERN





6. COOLING SYSTEM

SERVICE INFORMATION

GENERAL

⚠ WARNING

Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you.

Always let the engine and radiator cool down before removing the radiator cap.

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 cooling system 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 coolant temperature sensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.1 liter (3.3 US qt, 2.7 Imp qt)
	Reserve tank	0.4 liter (0.4 US qt, 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80.5 – 83.5°C (177 – 182°F)
	Fully open	95°C (203°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		1:1 mixture of antifreeze and soft water

TORQUE VALUES

Water pump cover bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt
ECT (Engine Coolant Temperature)/thermo sensor	23 N•m (2.3 kgf•m, 17 lbf•ft)	Apply sealant to the threads.
Thermostat cover flange bolt	12 N•m (1.2 kgf•m, 9 lbf•ft)	CT bolt
Cooling fan nut	3 N•m (0.27 kgf•m, 2.0 lbf•ft)	Apply a locking agent to the threads.
Fan motor nut	5 N•m (0.5 kgf•m, 3.6 lbf•ft)	
Fan motor shroud mounting bolt	8 N•m (0.8 kgf•m, 5.8 lbf•ft)	

TROUBLESHOOTING

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

Engine temperature too low
- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty fan control relay

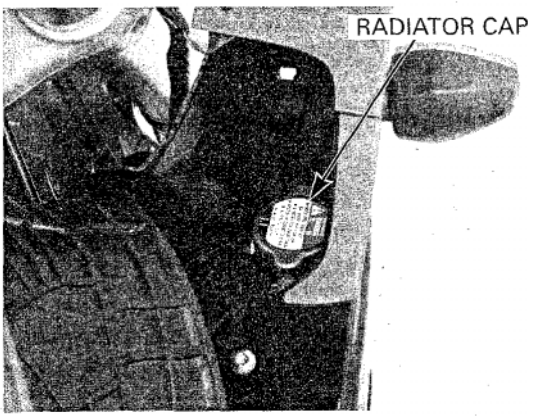
Coolant leak
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Damaged or deteriorated gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap

SYSTEM TESTING

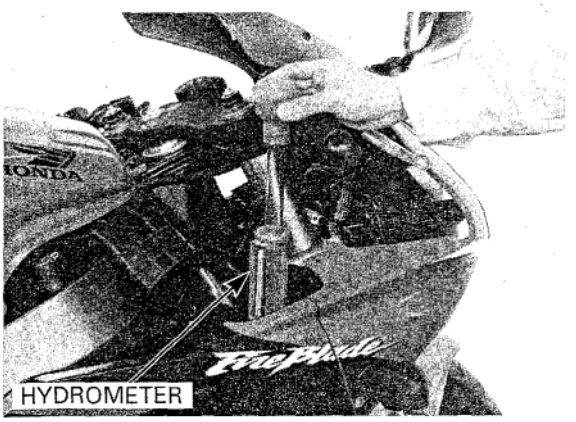
COOLANT (HYDROMETER TEST)

Remove the right duct cover (page 2-4).

Remove the radiator cap.



Test the coolant specific 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

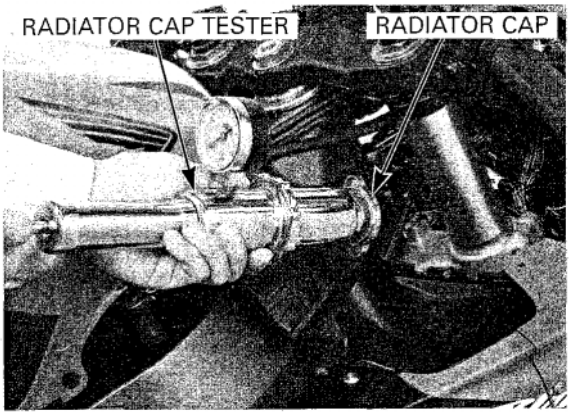
RADIATOR CAP/SYSTEM PRESSURE INSPECTION

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

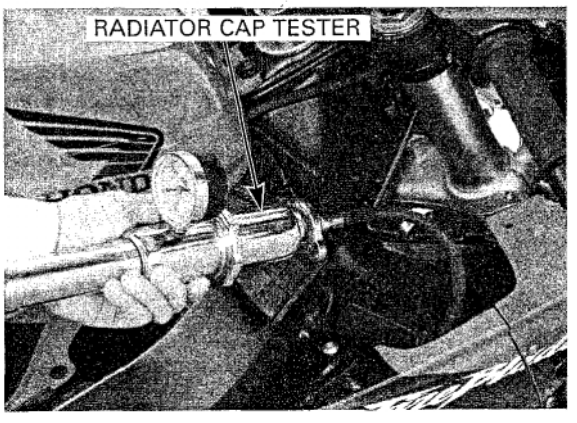
Remove the radiator cap (page 6-3).

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.

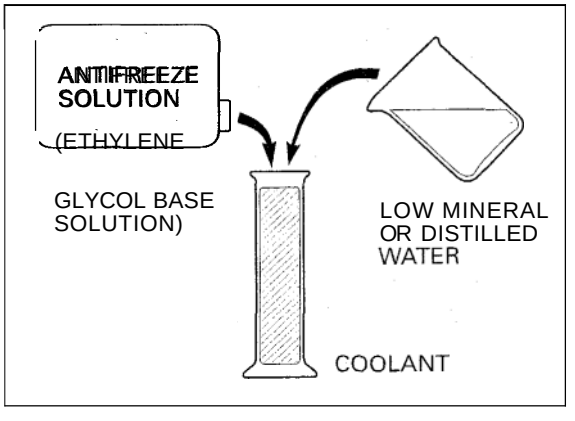
COOLANT REPLACEMENT

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

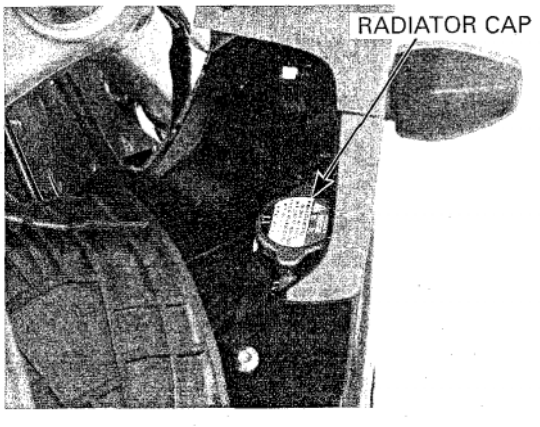
RECOMMENDED MIXTURE:
1:1 **(Distilled water and antifreeze)**



REPLACEMENT/AIR BLEEDING

When filling the system or reserve tank with coolant (checking cooiant level), place the rnotorcycie in a verticai position on a flat, level surface

Remove the radiator cap.



Remove the lower cowl (page 2-7)

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

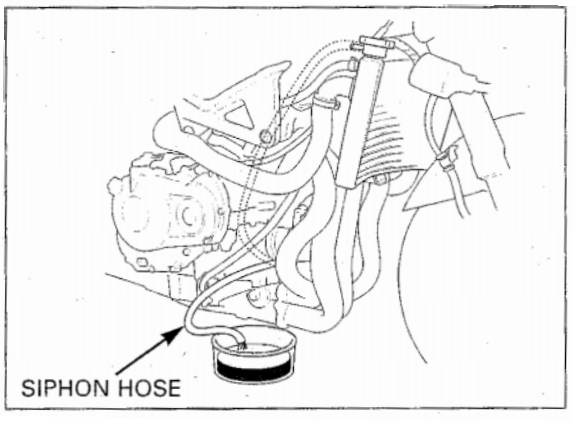
Remove the cylinder drain bolt and drain the coolant from the cylinder.

Reinstall the drain bolt with a new sealing washer.

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.

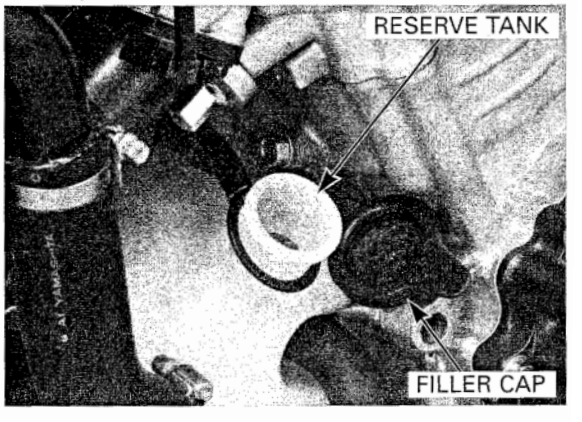


Fill the system with the recommended coolant through the filler opening up to the filler neck.

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 up 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.

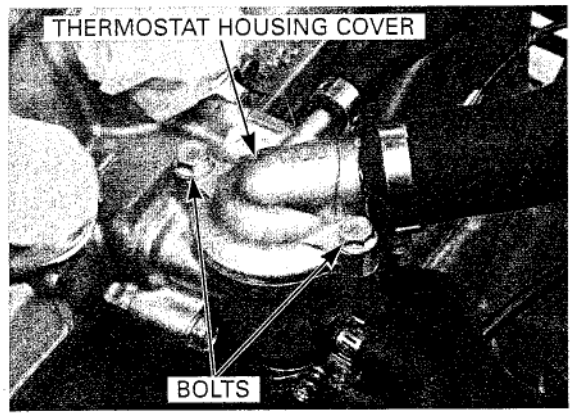


THERMOSTAT

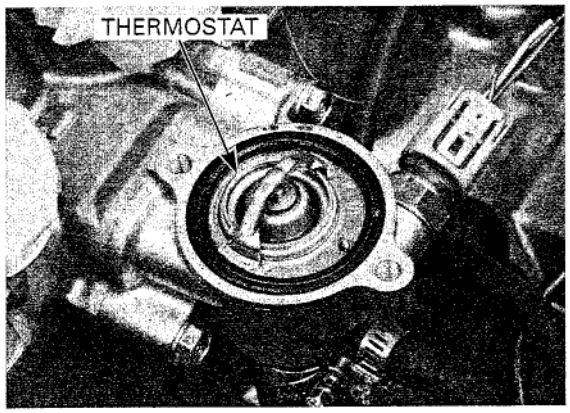
THERMOSTAT REMOVAL

Drain the coolant (page 6-4).
Remove the throttle body (page *5-67*).

Remove the bolts and thermostat housing cover.



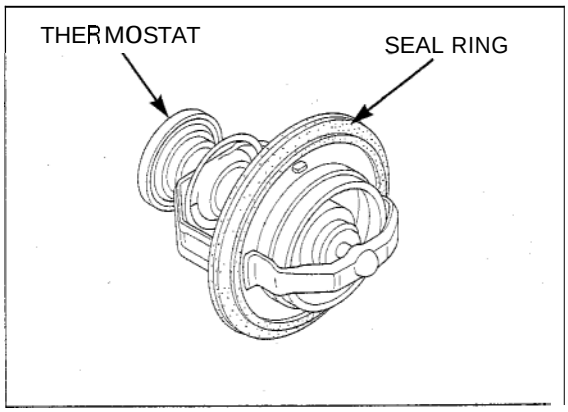
Remove the thermostat from the housing.



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.

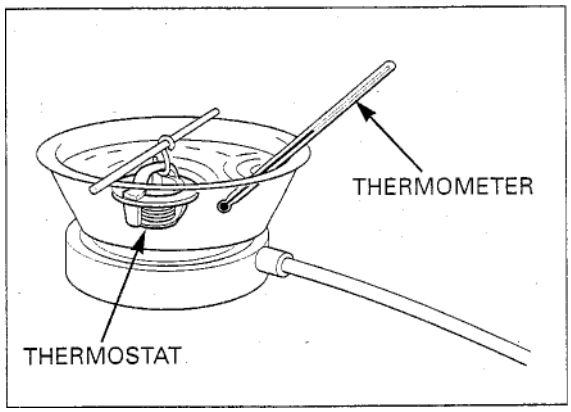


Do not let the thermostat or thermometer touch the pan, or you will get false reading

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.

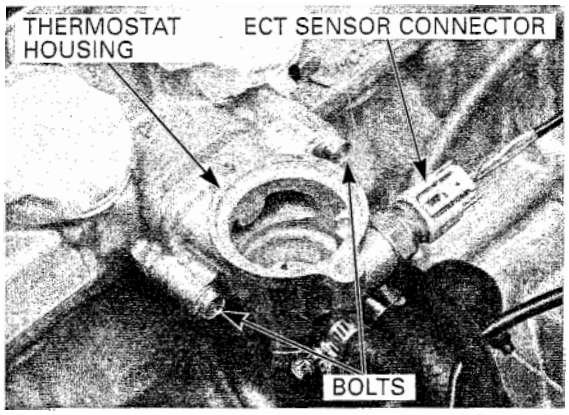
THERMOSTAT BEGIN TO OPEN:
80.5– 83.5°C (177 – 182 °F)
VALVE LIFT:
8 mm (0.3 in) minimum at 95 °C (203 °F)



THERMOSTAT HOUSING REMOVAL

Disconnect the ECT sensor connector.

Remove the bolts and thermostat housing from the cylinder head.

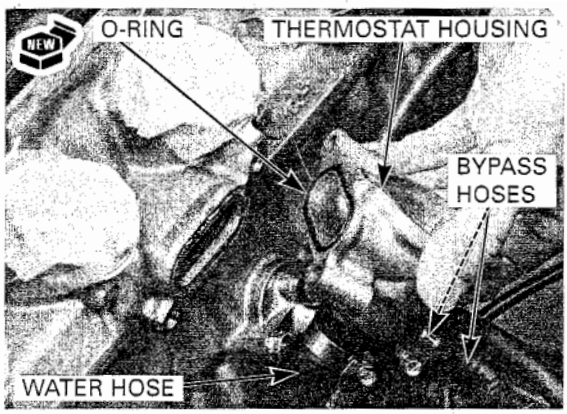


Disconnect the fast idle wax unit water hose and bypass hoses from the thermostat housing.

THERMOSTAT HOUSING INSTALLATION

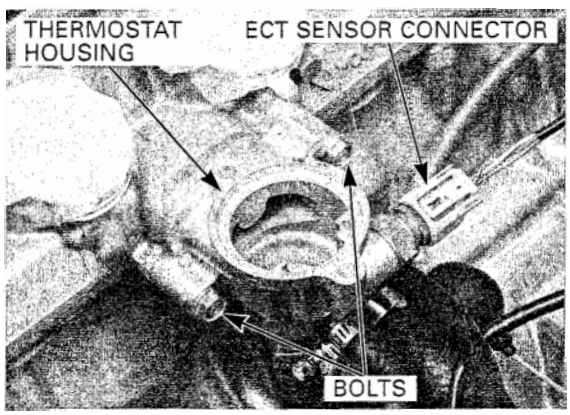
Connect the fast idle wax unit water hose and bypass hoses.

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



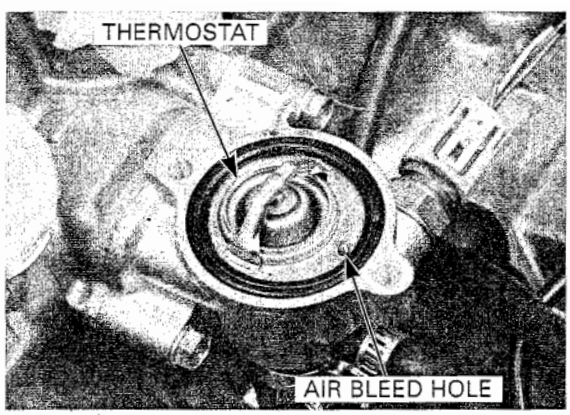
Install and tighten the thermostat housing mounting bolts.

Connect the ECT sensor connector.



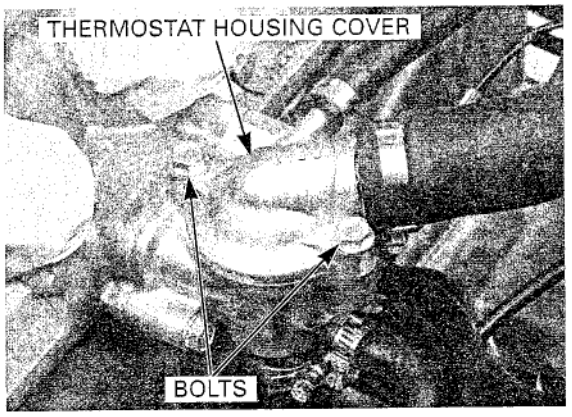
THERMOSTAT INSTALLATION

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.

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



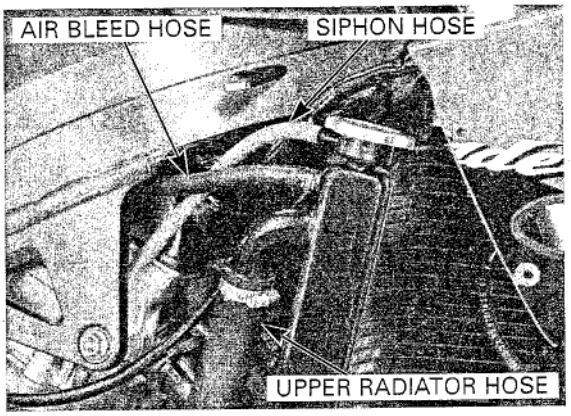
RADIATOR

REMOVAL

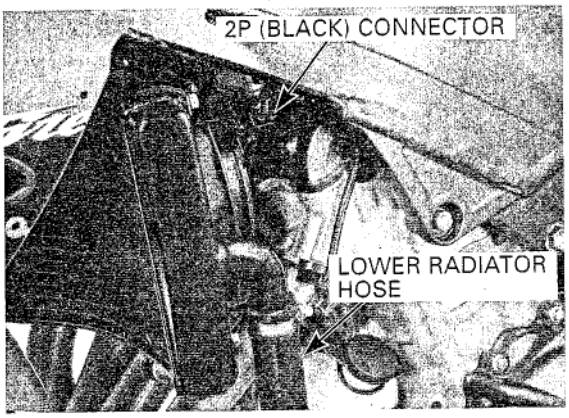
Remove the following:
- Lower cowl (page 2-7)
- Inner middle cowl (page *2-7)*

Drain the coolant (page 6-4).

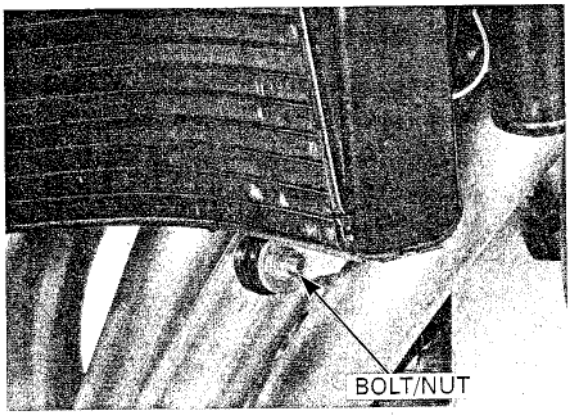
Disconnect the siphon hose and air bleed hose from the radiator.
Disconnect the upper radiator hose.



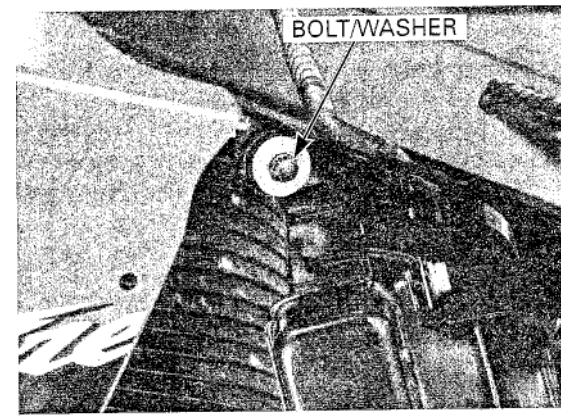
Disconnect the radiator fan motor 2P (Black) connector.
Disconnect the lower radiator hose.



Remove the radiator lower mounting bolt/nut

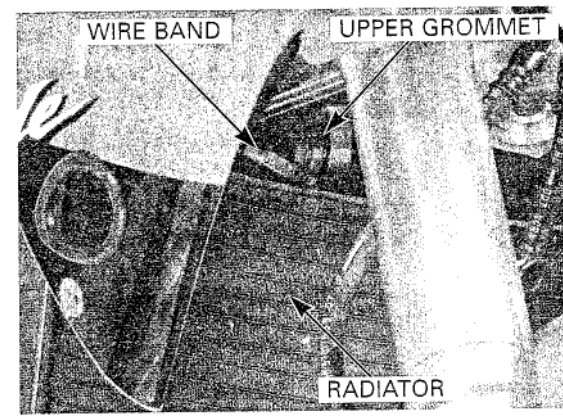


Remove the radiator upper mounting bolt and washer.



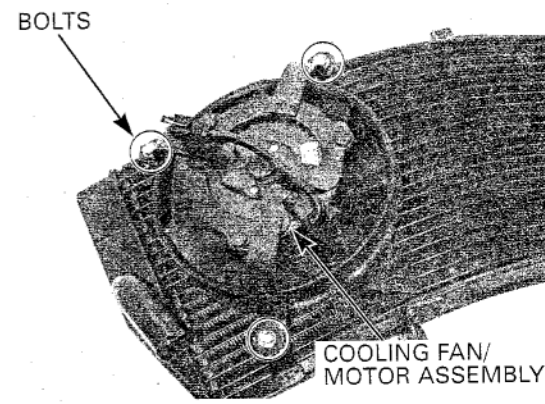
Slide the radiator to the right, then release the upper grommet from the frame boss.
Remove the radiator assembly.

Be careful not to damage the radiator core

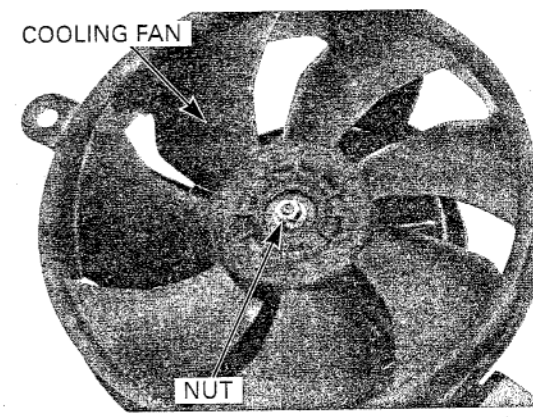


DISASSEMBLY

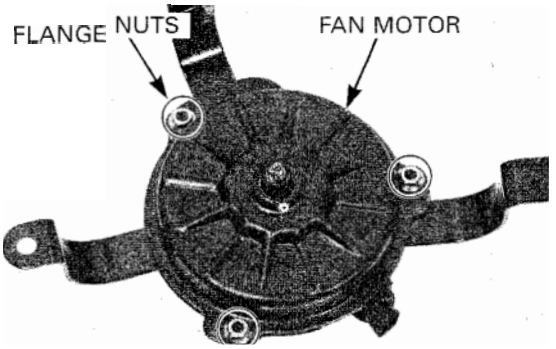
Remove the three bolts and cooling fan/motor assembly.



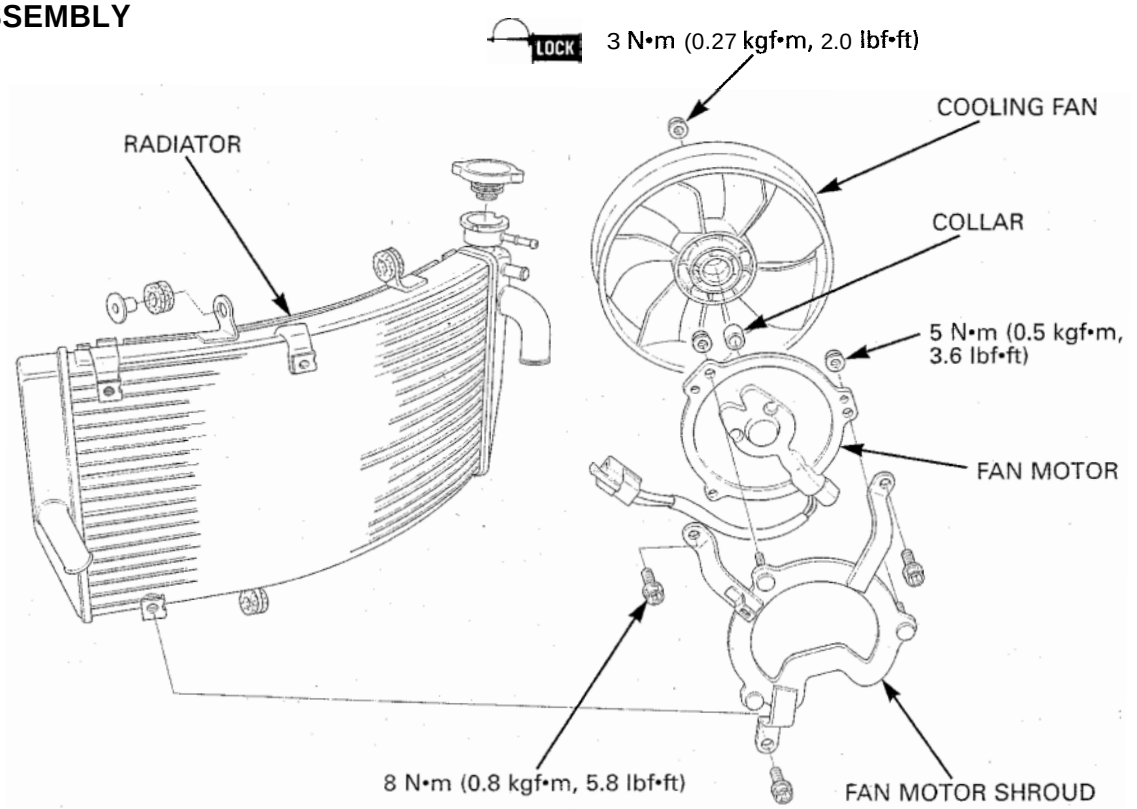
Remove the nut, cooling fan and distance collar.



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

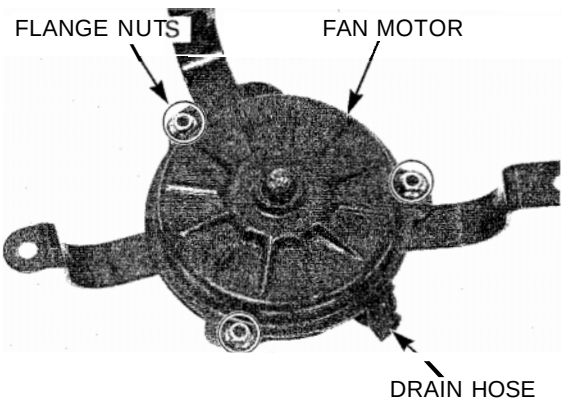


ASSEMBLY

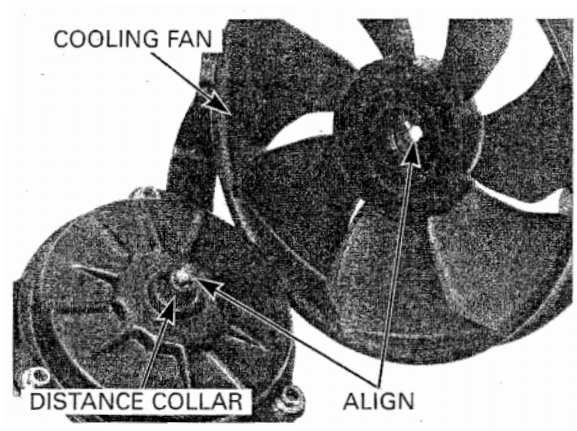


Install the fan motor onto the fan motor shroud with the drain hose facing as shown.
Tighten the flange nuts to the specified torque.

TORQUE: 5 N•m (0.5 kgf•m, 3.6 lbf•ft)

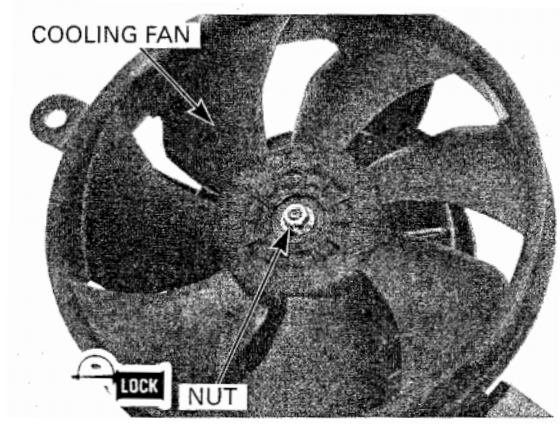


Install the distance collar onto the fan motor shaft. Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



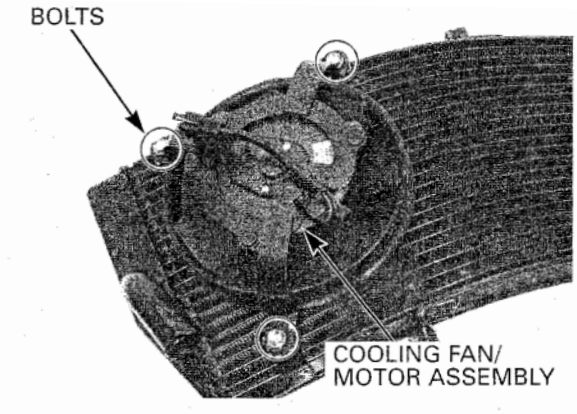
Apply a locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.

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



Install the cooling fan/motor assembly onto the radiator. Install and tighten the bolts to the specified torque.

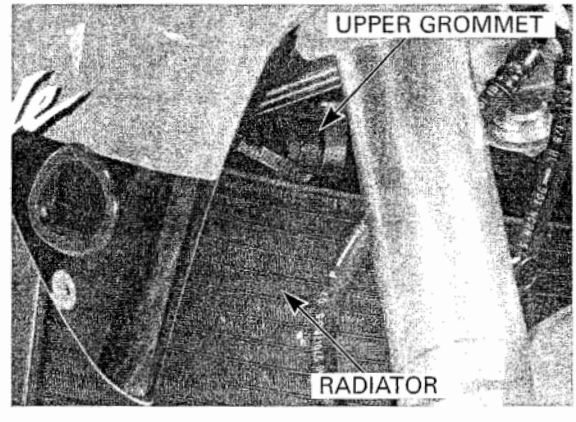
TORQUE: 8 N•m (0.8 kgf•m, 5.8 lbf•ft)



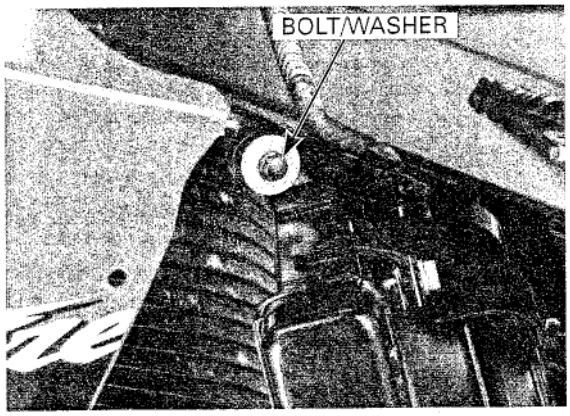
INSTALLATION

Be careful not to damage the radiator core.

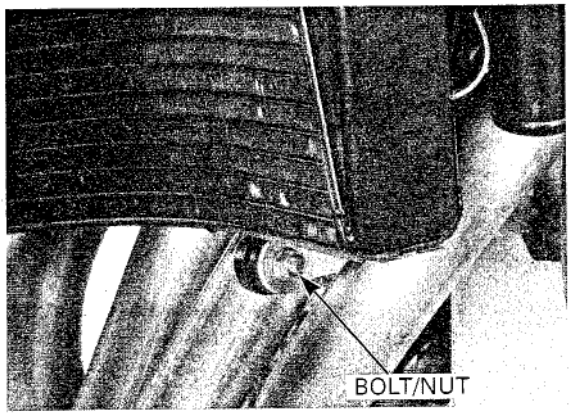
install the radiator assembly, aligning its grommet with the frame boss.



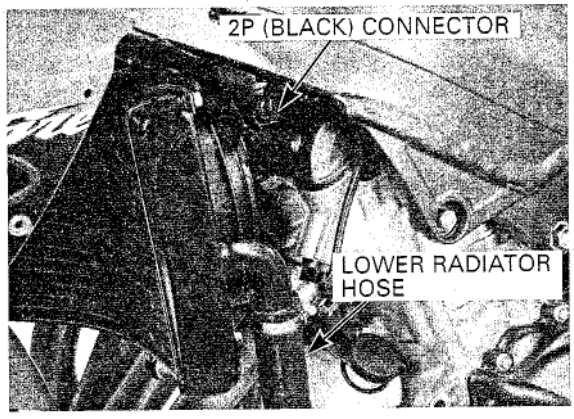
Install the washer and upper mounting bolt, then tighten the bolt.



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



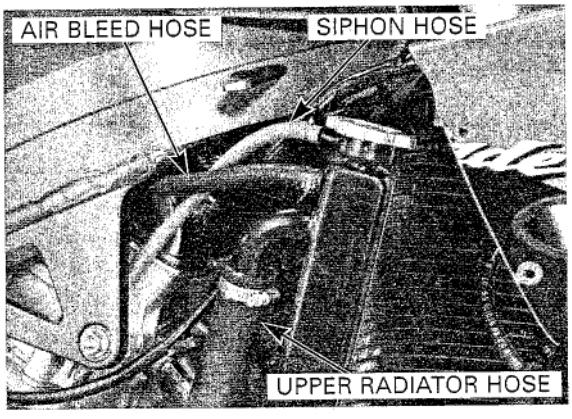
Connect the fan motor **2P** (Black) connector.
Connect the lower radiator hose and tighten the clamp screw securely.



Connect the upper radiator hose and tighten the clamp screw securely.
Connect the siphon hose and air bleed hose to the radiator.

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

Install the following:
- Inner middle cowl (page 2-7)
- Lower cowl (page 2-7)

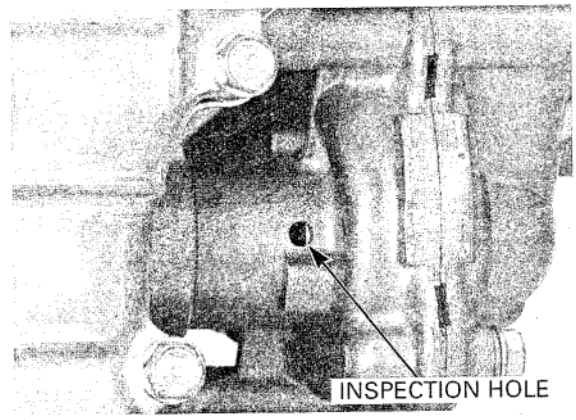


WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the lower cowl (page 2-7).

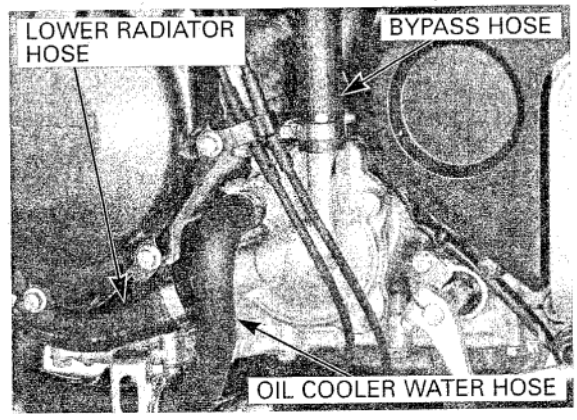
Inspect the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



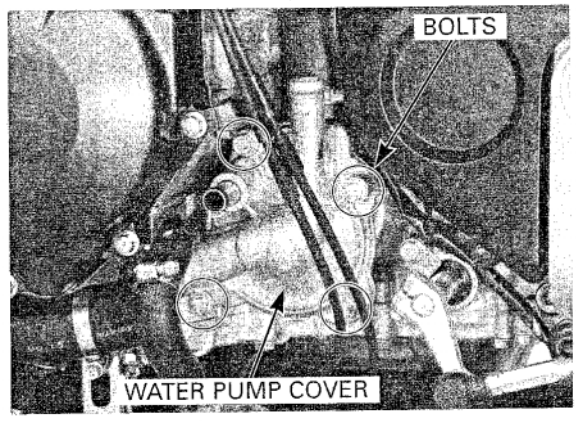
REMOVAL

Drain the coolant (page 6-4).

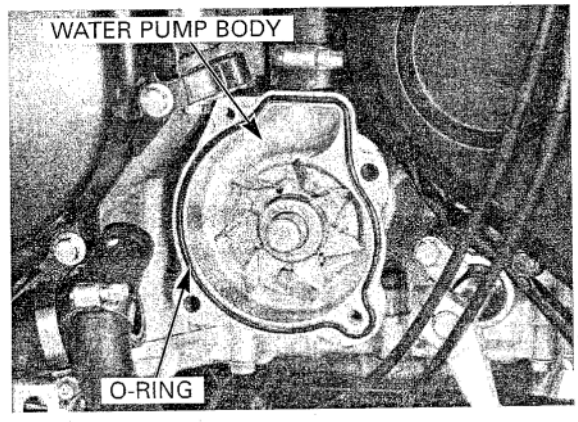
Disconnect the lower radiator hose, bypass hose and oil cooler water hose from the water pump cover.



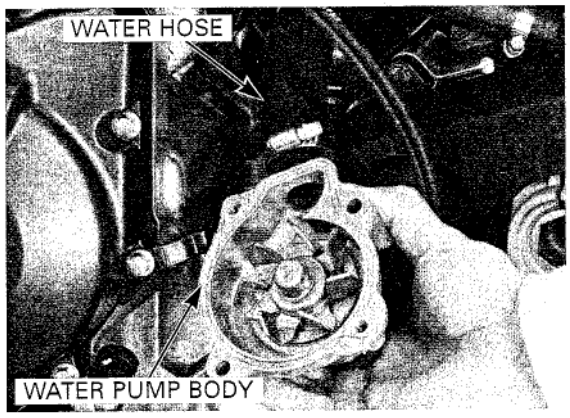
Remove the two SH bolts, two flange bolts and water pump cover.



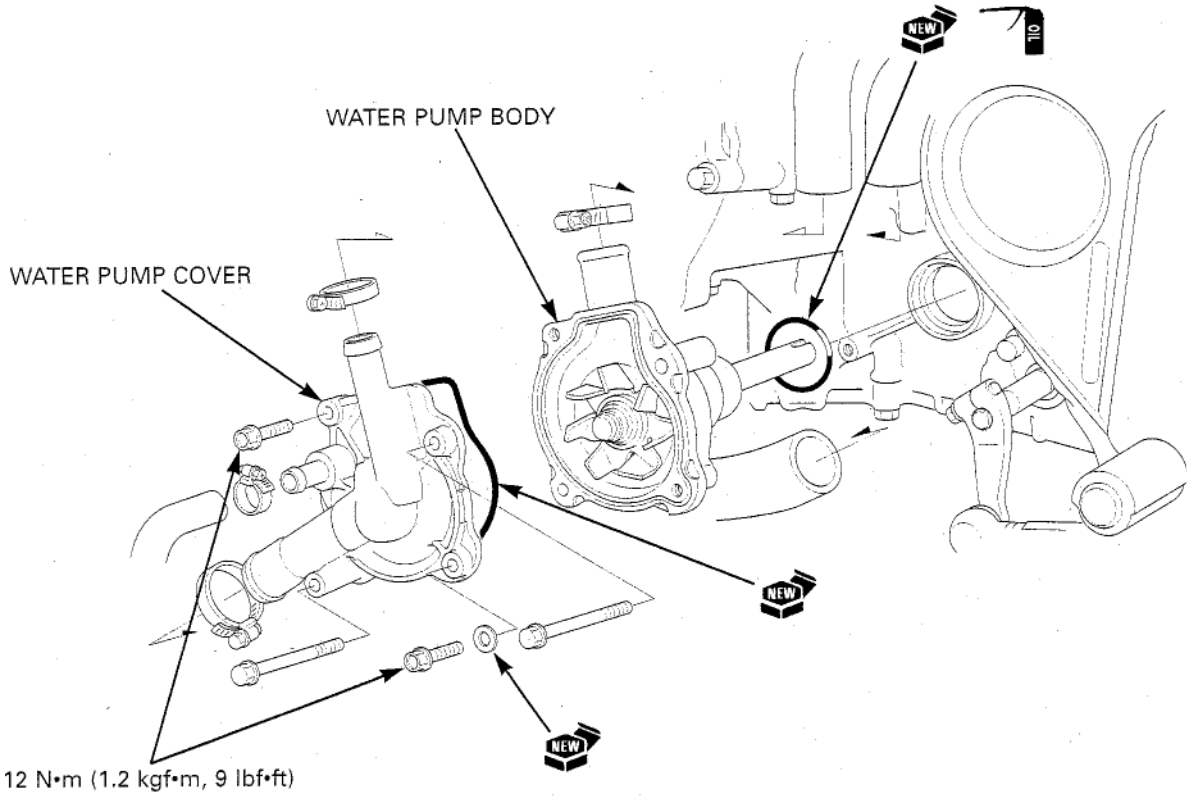
Remove the O-ring from the water pump body.
Remove the water pump body from the crankcase.



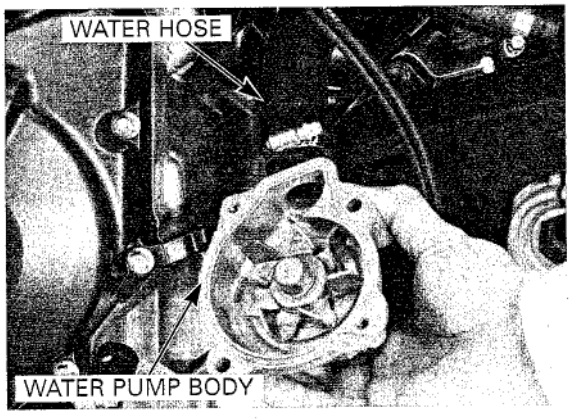
Disconnect the water pump-to-water joint hose from the water pump body.



INSTALLATION

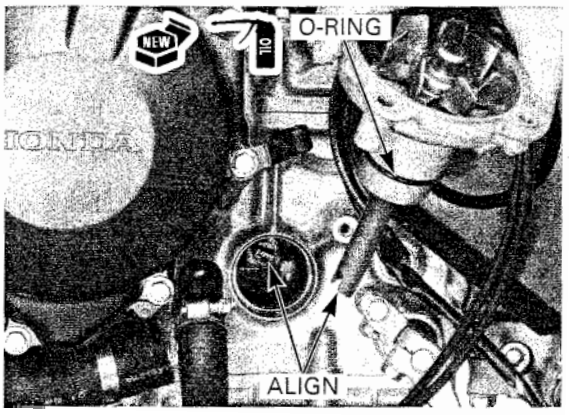


Connect the water pump-to-water joint hose to the water pump and tighten the clamp screw.



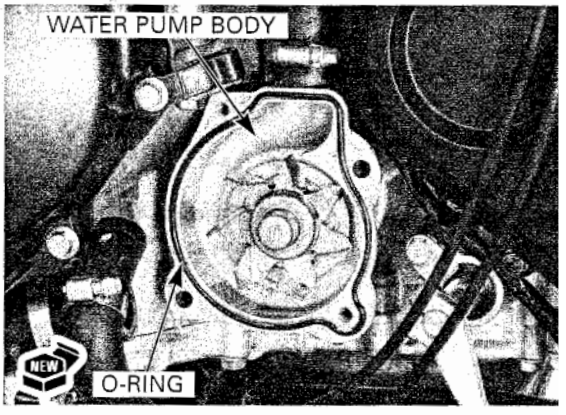
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

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



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

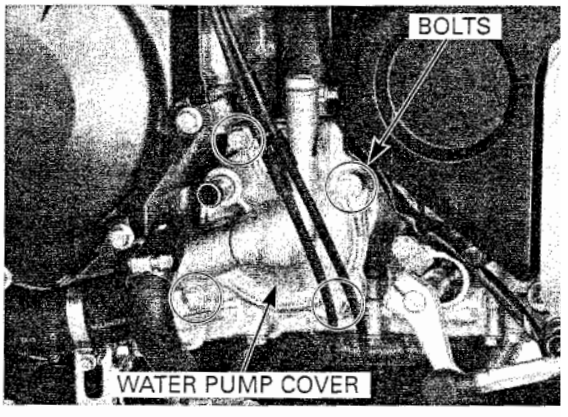
Install a new O-ring into the groove in the water pump body.



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

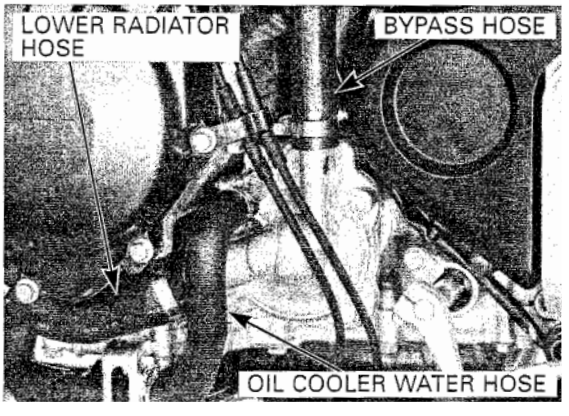
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Tighten the two **SH** bolts.



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

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

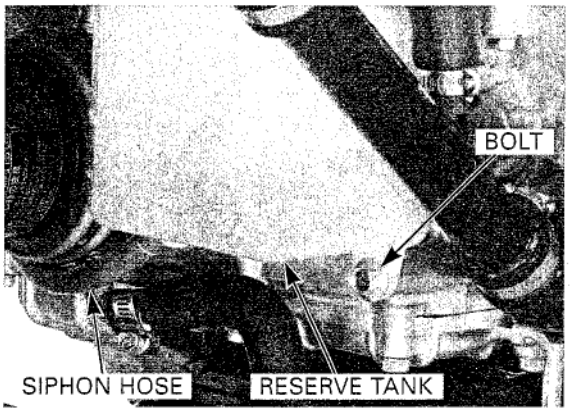


RADIATOR RESERVE TANK

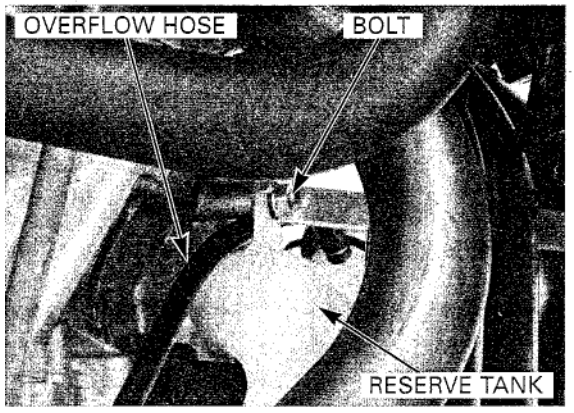
REMOVAL

Remove the lower cowl (page 2-7).

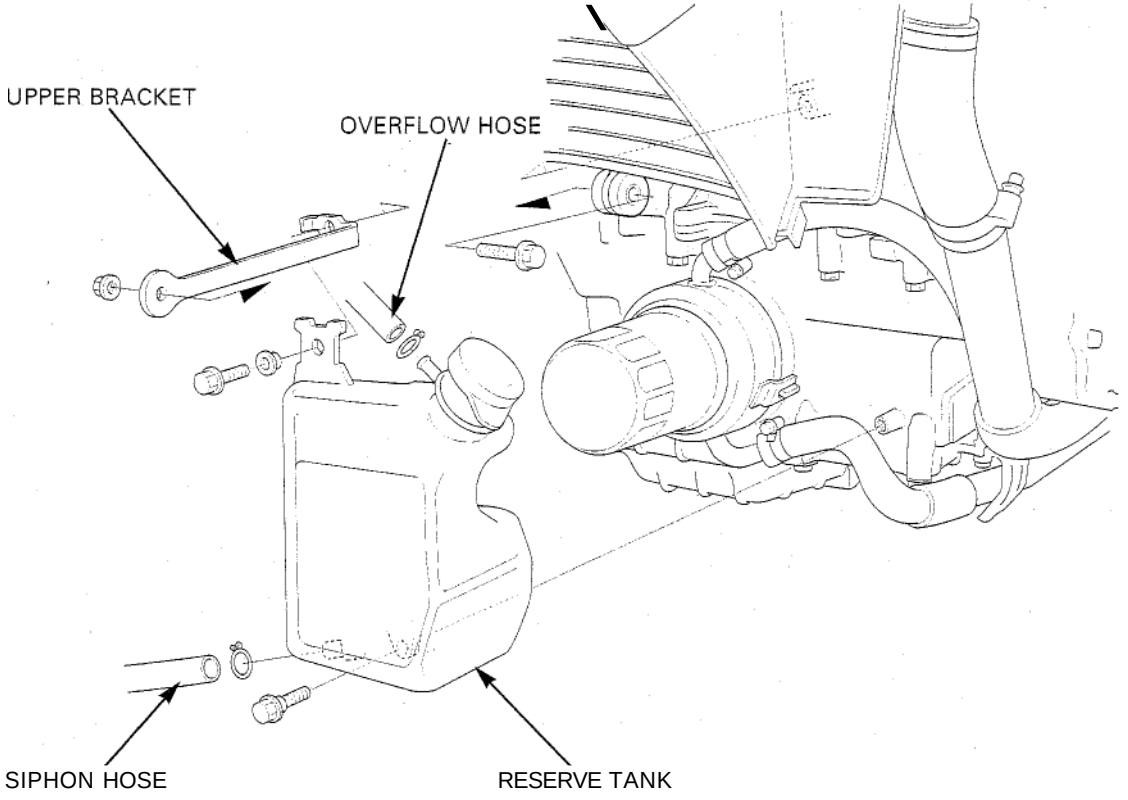
Disconnect the siphon hose and drain coolant from the reserve tank.
Remove the radiator reserve tank lower mounting bolt.



Remove the reserve tank upper mounting bolt and reserve tank.
Disconnect the overflow hose.

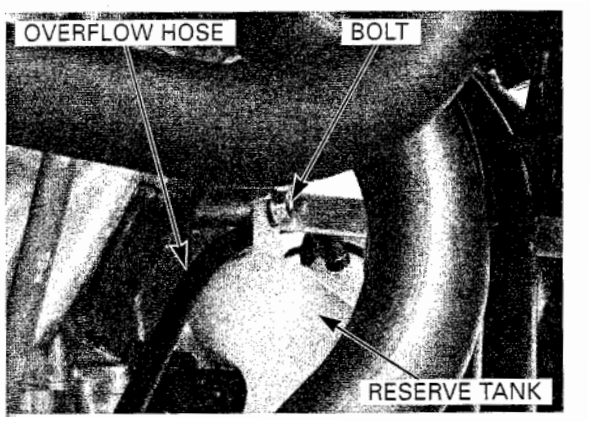


INSTALLATION



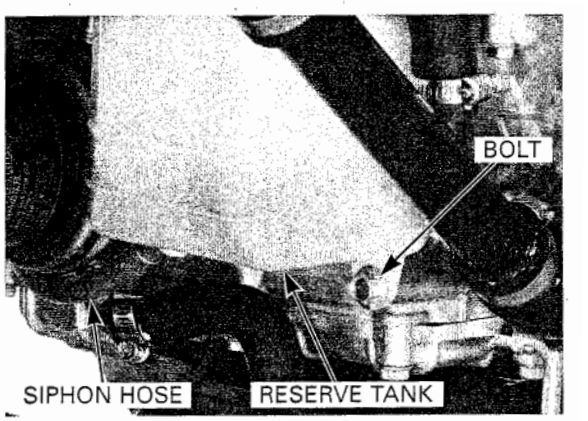
Route the overflow hose properly (page 1-29).

Install and tighten the reserve tank upper mounting bolt.



Install and tighten the lower mounting bolt.
Connect the siphon hose to the reserve tank

Install the removed parts in the reverse order of removal.

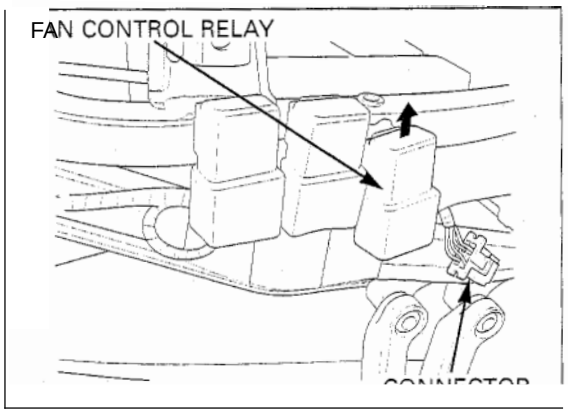


FAN CONTROL RELAY

INSPECTION

Remove the rear cowl (page 2-2).

Disconnect the fan control relay connector.
Remove the fan control relay.



Connect the ohmmeter to the fan control relay connector terminals.

CONNECTION: Green/Yellow – Black/White

Connect the 12V battery to the following fan control relay connector terminals.

CONNECTION: Red/Green – Black/Blue

There should be continuity only when 12V battery is connected.
If there is no continuity when the 12V battery is connected, replace the fan control relay.