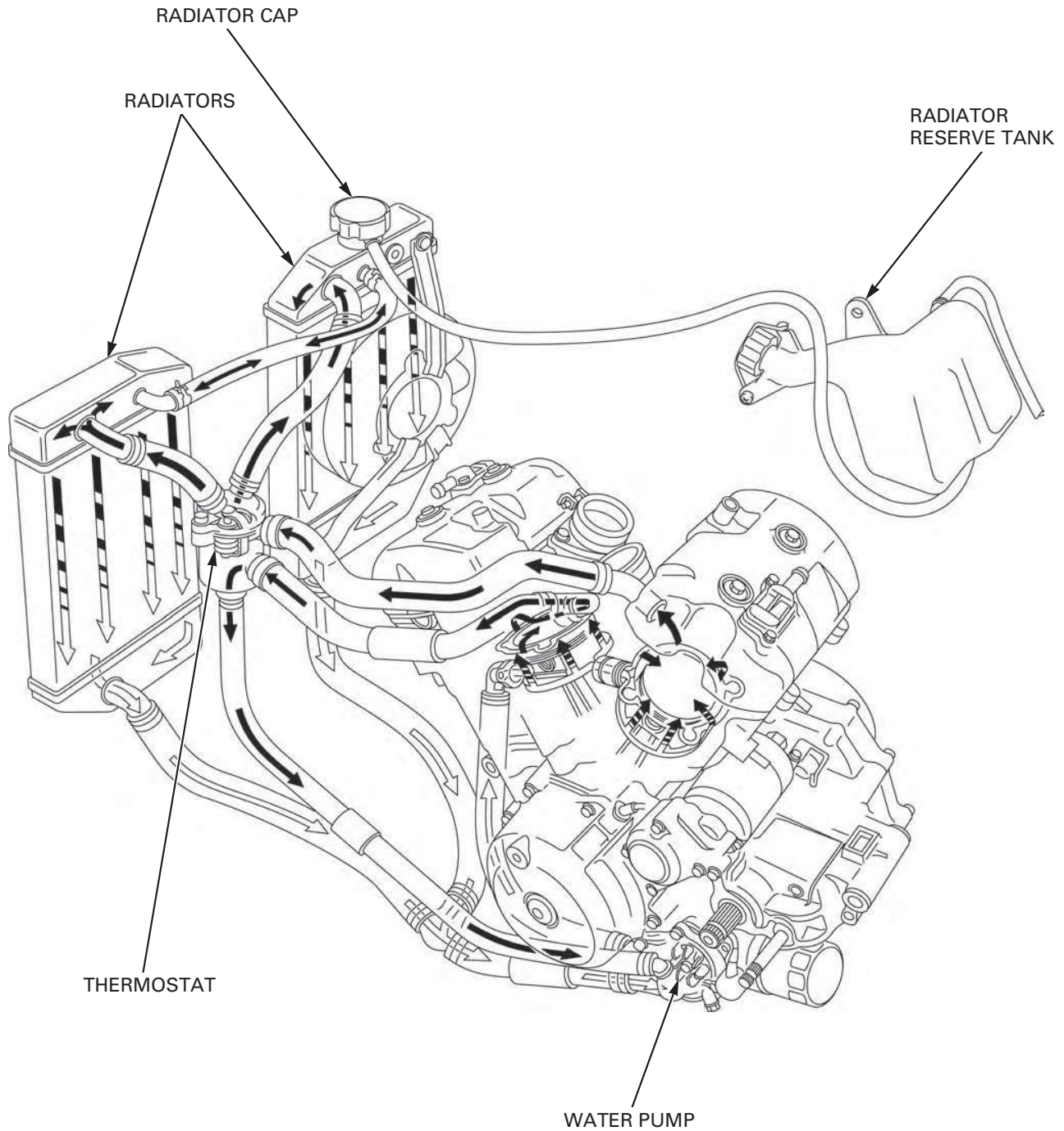


6. COOLING SYSTEM

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SERVICE INFORMATION	6-3	RADIATOR	6-10
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COOLING SYSTEM

SYSTEM FLOW PATTERN



SERVICE INFORMATION

GENERAL

⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

- 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 service 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 the ECT sensor inspection (page 20-14).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.35 liters (2.48 US qt, 2.07 Imp qt)
	Reserve tank	0.6 liter (0.63 US qt, 0.53 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum at 95°C (203°F)
Recommended antifreeze		High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	CT bolt
Thermostat housing cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Water hose band screw	–	See page 6-10
Fan motor mounting nut	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Cooling fan nut	2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)	Apply a locking agent.
Fan motor assembly mounting bolt	8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)	
Water pump drain bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	CT bolt

COOLING SYSTEM

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature indicator
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty water pump
- Faulty fan motor relay
- Blown fuse (FAN MOTOR 20 A)

Engine temperature too low

- Thermostat stuck open
- Faulty fan motor relay

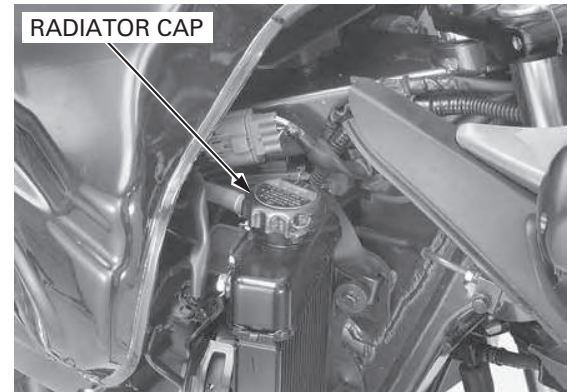
Coolant leaks

- 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 hoses

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

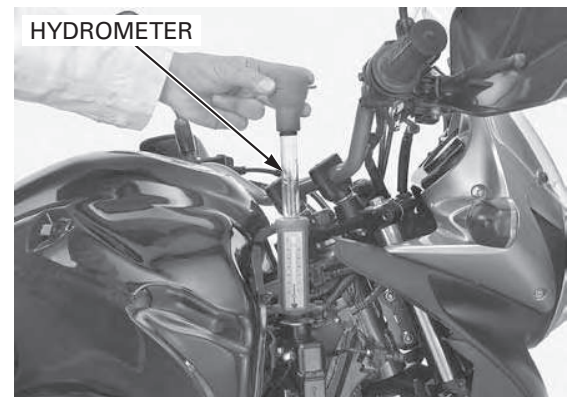
Remove the right front side cowl (page 2-9).
Remove the radiator cap.



Test the coolant specific gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION:
1:1 (distilled water and the recommended antifreeze)

Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio %	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	

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

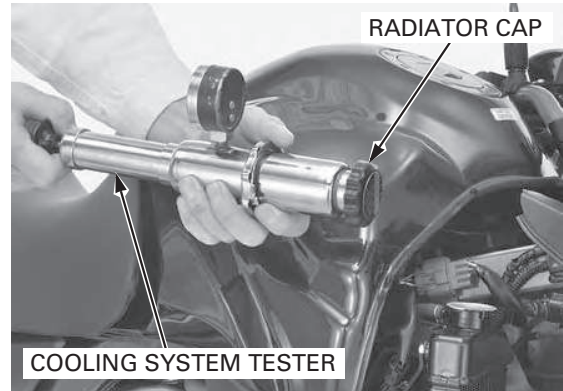
Remove the radiator cap (page 6-5).

Wet the sealing surfaces of the cap, then install the cap onto the tester.

Pressurize the radiator cap using the tester. 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 using the tester, 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.

Remove the tester and install the radiator cap.



COOLANT REPLACEMENT

PREPARATION

NOTE:

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.

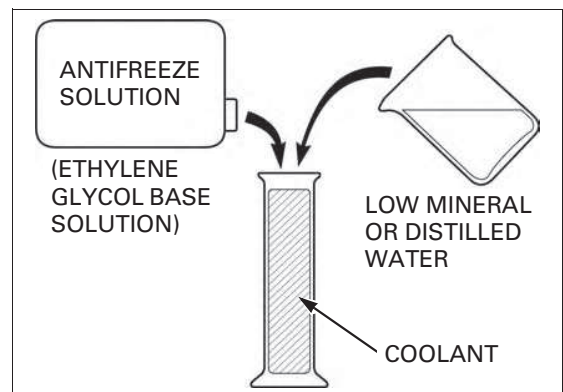
Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:

High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

RECOMMENDED MIXTURE:

1:1 (mixture with distilled water)



REPLACEMENT/AIR BLEEDING

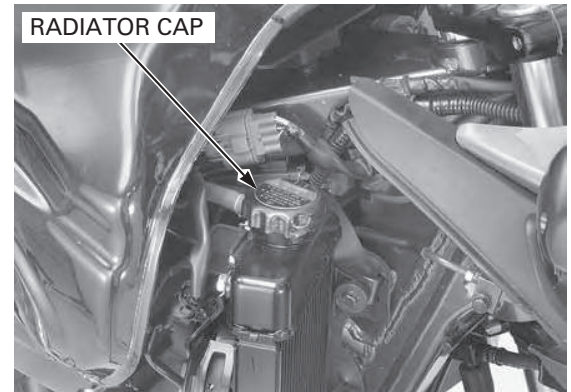
NOTE:

When filling the system or reserve tank with coolant, or checking the coolant level, hold the motorcycle in an upright position.

Remove the following:

- Right front side cowl (page 2-9)
- Under cowl (page 2-13)

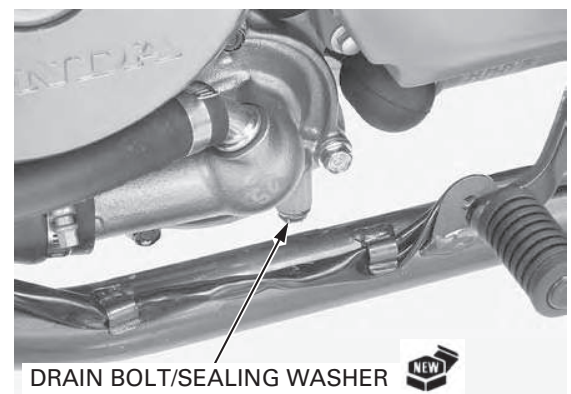
Remove the radiator cap.



Drain the coolant from the system by removing the drain bolt and sealing washer.

Reinstall the drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)

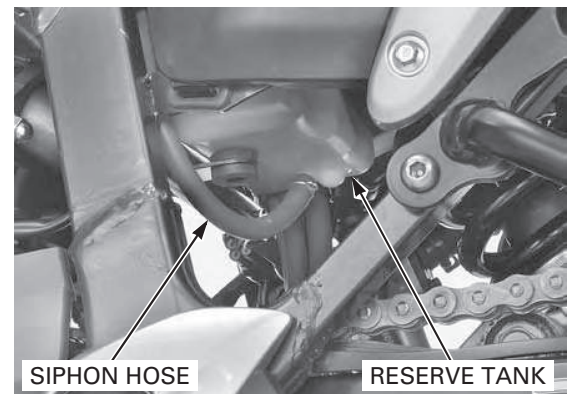


Disconnect the siphon hose from the reserve tank and drain the coolant.

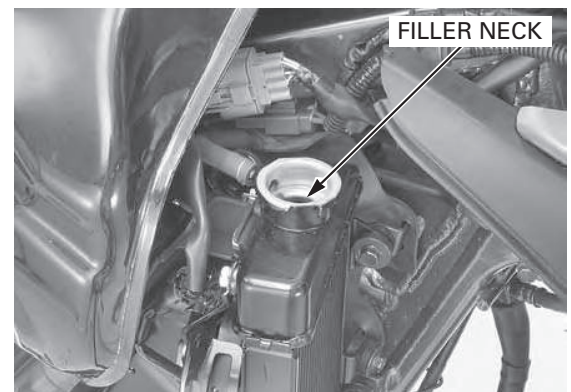
Empty the coolant by removing the reserve tank (page 6-16).

Rinse the inside of the reserve tank with water.

Install the reserve tank (page 6-16).



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



COOLING SYSTEM

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

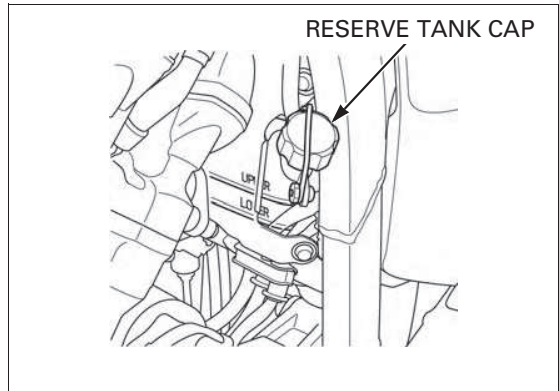
Bleed air from the system as follows:

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 filler neck.
4. Install the radiator cap.

Install the radiator reserve tank cap.
After installation, check that there are no coolant leaks.

Install the following:

- Under cowl (page 2-13)
- Right front side cowl (page 2-9)



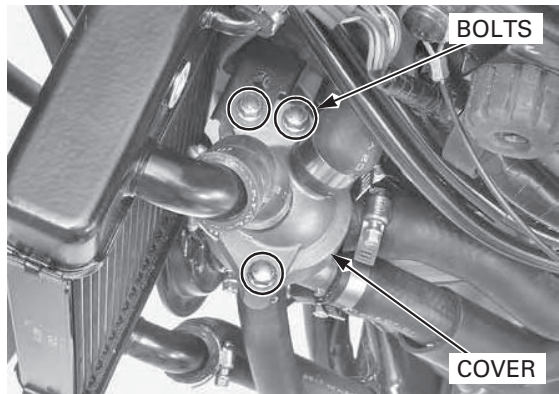
THERMOSTAT

REMOVAL

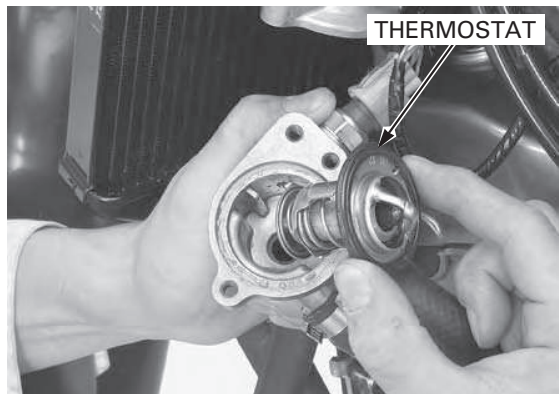
Remove the left air guard (page 2-10).

Drain the coolant by removing the water pump drain bolt (page 6-7).

Place a shop towel under the thermostat housing.
Remove the bolts and thermostat cover.

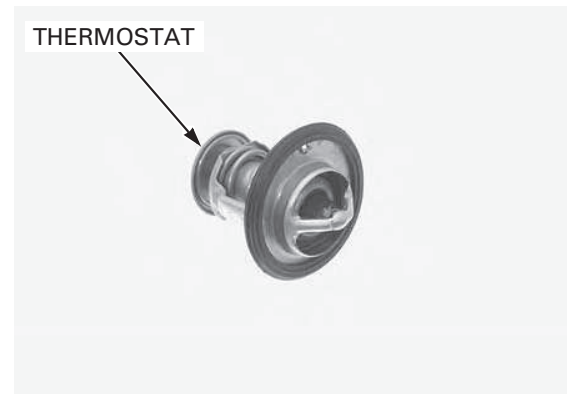


Remove the thermostat.



THERMOSTAT INSPECTION

Visually inspect the thermostat for damage. Replace the thermostat if the valve stays open at room temperature.



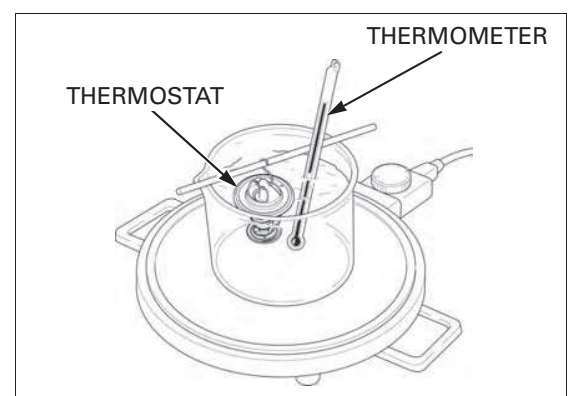
Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer touch the pan, or you will get false readings.

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

THERMOSTAT BEGINS TO OPEN:
80 – 84 °C (176 – 183 °F)

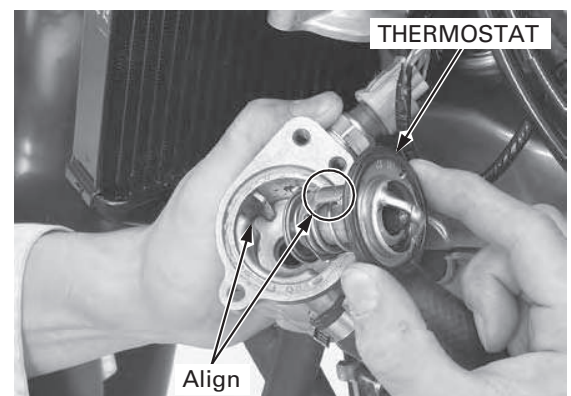
VALVE LIFT:
8 mm (0.3 in) minimum at 95 °C (203 °F)

Replace the thermostat if the valve opens at a temperature other than those specified.



INSTALLATION

Install the thermostat by aligning its rib with the thermostat housing groove.



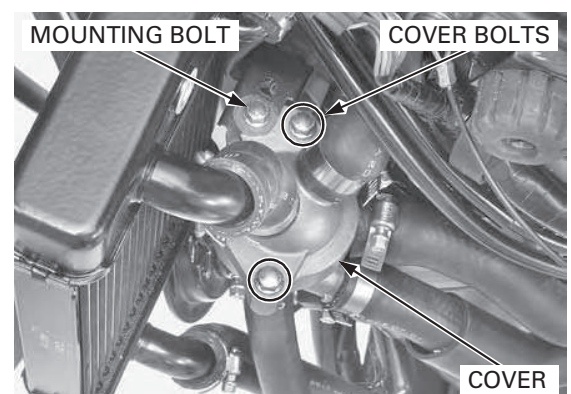
Install the thermostat cover to the housing and tighten the cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install and tighten the thermostat housing mounting bolt securely.

Fill and bleed the cooling system (page 6-7).

Install the left air guard (page 2-10).



COOLING SYSTEM

THERMOSTAT HOUSING

REMOVAL/INSTALLATION

Remove the left air guard (page 2-10).

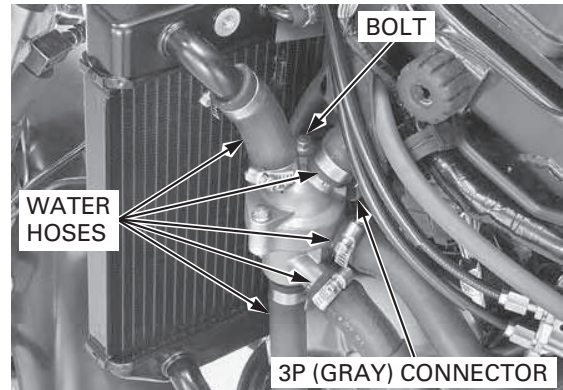
Drain the coolant from by removing the water pump drain bolt (page 6-7).

Loosen the band screws and disconnect the water hoses.

Remove the thermostat housing mounting bolt.

Disconnect the ECT sensor 3P (Gray) connector.

Remove the thermostat housing.

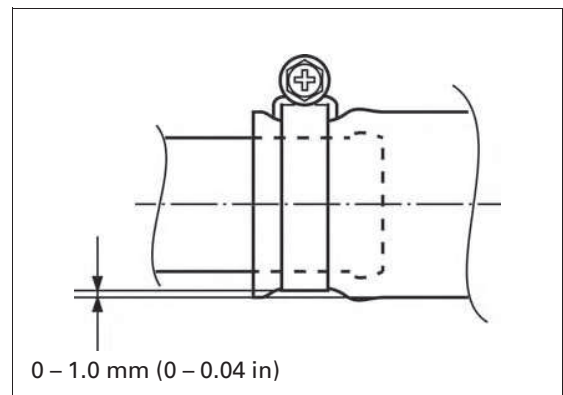


Route the hoses and wires properly (page 1-21).

Install the thermostat housing assembly in the reverse order of removal.

NOTE:

Tighten the water hose band screws to the specified range as shown.



RADIATOR

REMOVAL

Be careful not to damage the radiator fins while servicing the radiator and fan motor.

Drain the coolant from by removing the water pump drain bolt (page 6-7).

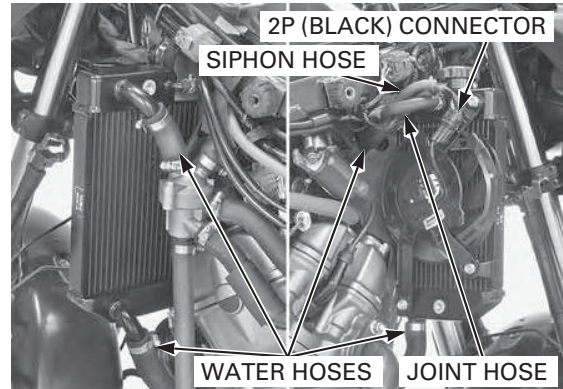
Lift and support the fuel tank (page 3-5).

Remove the right and left air guard (page 2-10).

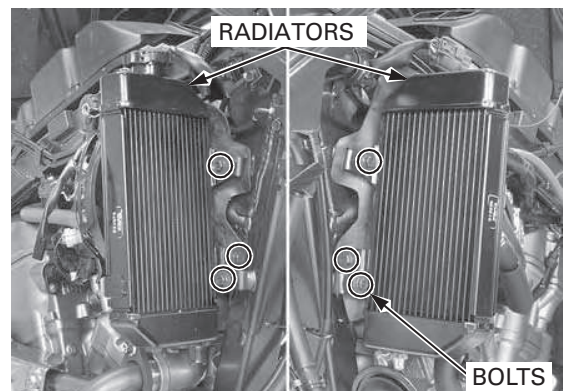
Loosen the band screws and disconnect the water hoses.

Disconnect the siphon hose and joint hose.

Disconnect the fan motor 2P (Black) connector.

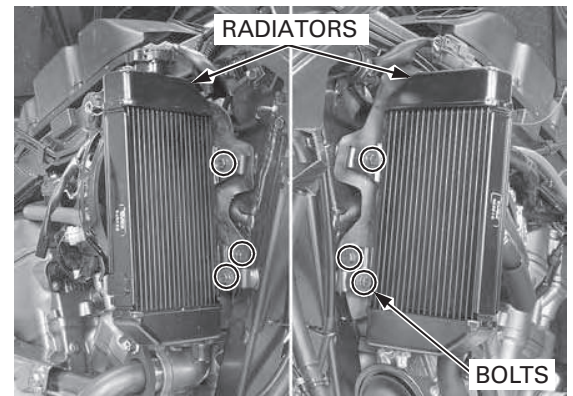


Remove the bolts and radiators.



INSTALLATION

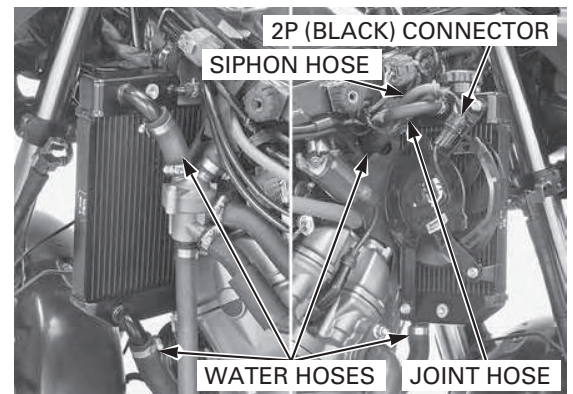
Install the radiators and bolts.
Tighten the bolts securely.



Connect the fan motor 2P (Black) connector.
Connect the siphon hose and joint hose.
Connect the water hoses and tighten the band screws specified range (page 6-10).

Install the right and left air guard (page 2-10).
Lowering the fuel tank (page 3-5).

Fill and bleed the cooling system (page 6-7).

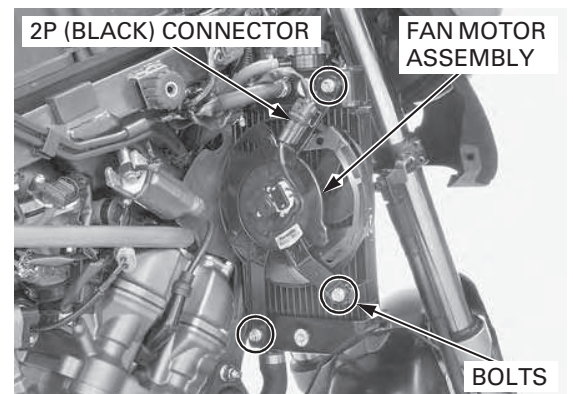


COOLING FAN

REMOVAL

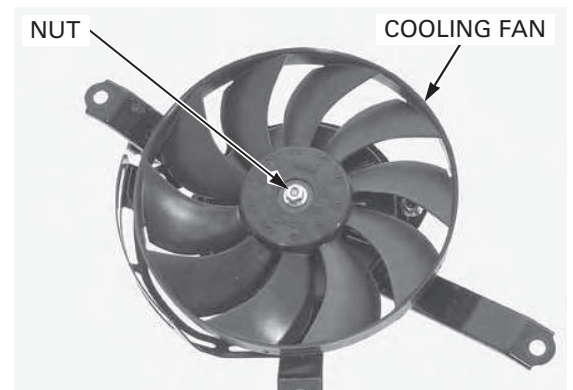
Lift and support the fuel tank (page 3-5).
Remove the right air guard (page 2-10).

Disconnect the fan motor 2P (Black) connector.
Remove the bolts and fan motor assembly.



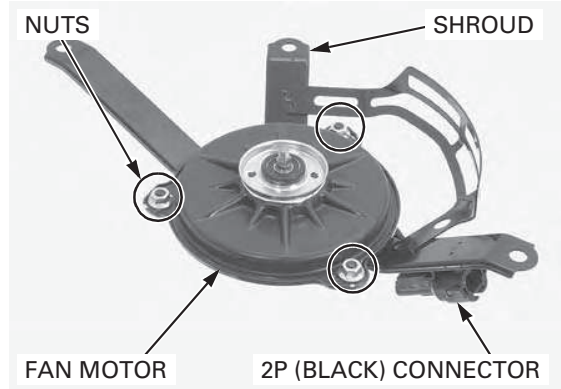
DISASSEMBLY

Remove the nut and cooling fan.

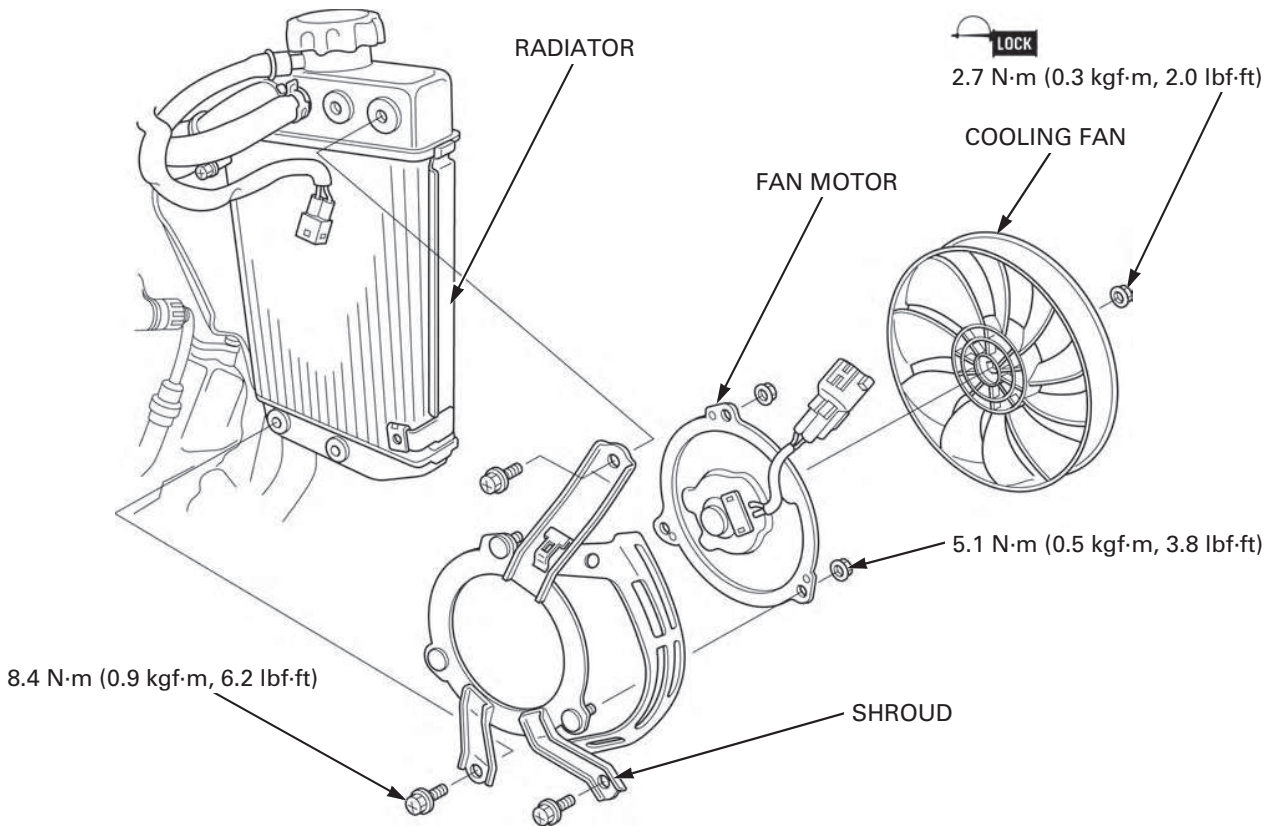


COOLING SYSTEM

Remove the fan motor 2P (Black) connector from the shroud.
Remove the nuts and fan motor from the shroud.



ASSEMBLY

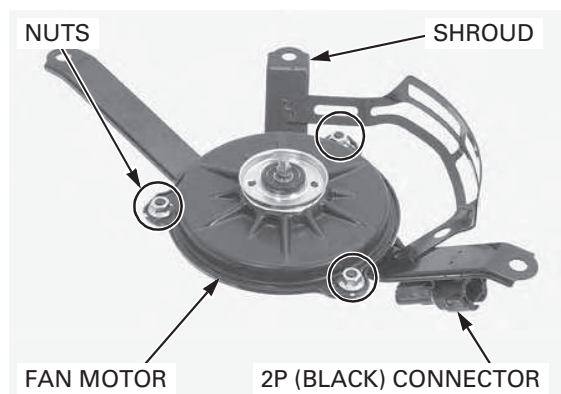


Install the fan motor on the shroud and mounting nuts.

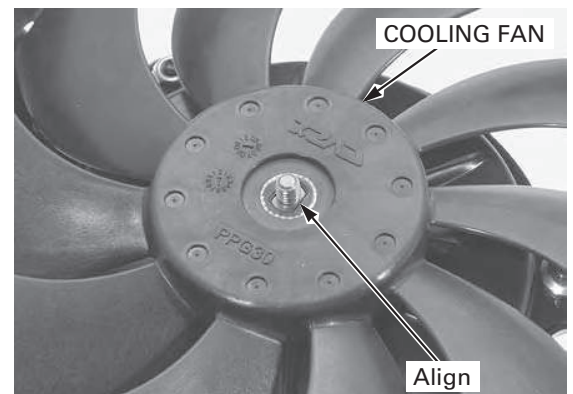
Tighten the mounting nuts to the specified torque.

TORQUE: 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)

Install the fan motor 2P (Black) connector to the shroud.

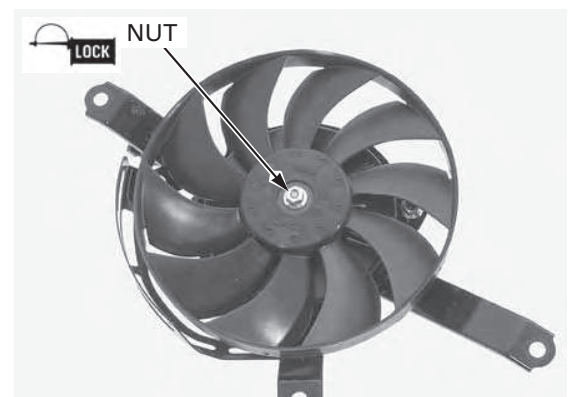


Install the cooling fan onto the motor shaft, aligning the flat surfaces.



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

TORQUE: 2.7 N·m (0.3 kgf·m, 2.0 lbf·ft)



INSTALLATION

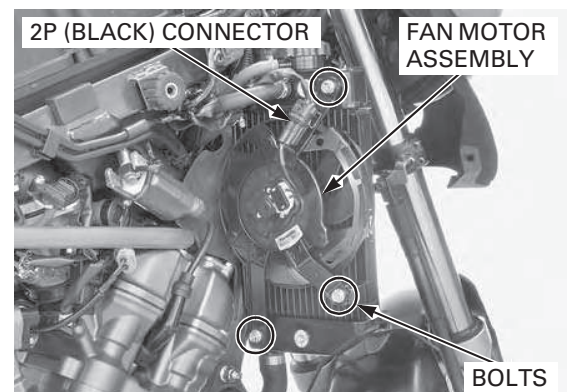
Install the fan motor assembly on the radiator and tighten the bolts to the specified torque.

TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)

Connect the fan motor 2P (Black) connector.

Install the right air guard (page 2-10).

Lowering the fuel tank (page 3-5).

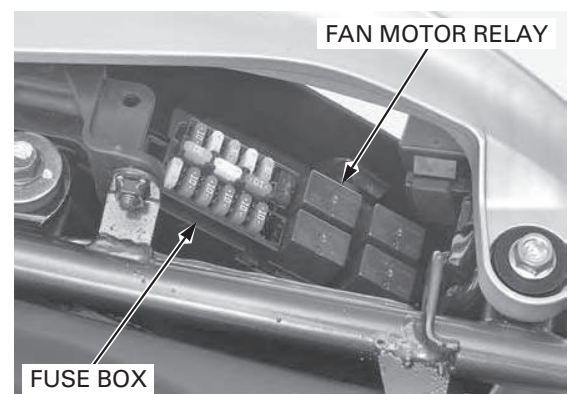


FAN MOTOR RELAY

INSPECTION

Remove the seat (page 2-4).

Open the fuse box and remove the fan motor relay.



COOLING SYSTEM

Connect the ohmmeter to the fan control relay connector terminals.

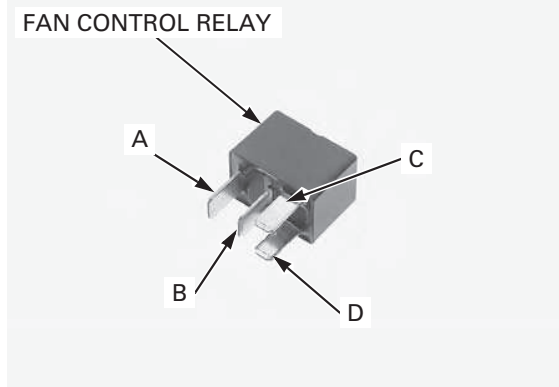
Connection: A – B

Connect the 12 V battery to the following fuel pump relay connector terminals.

Connection: C – D

There should be continuity only when the 12 V battery is connected.

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



WATER PUMP

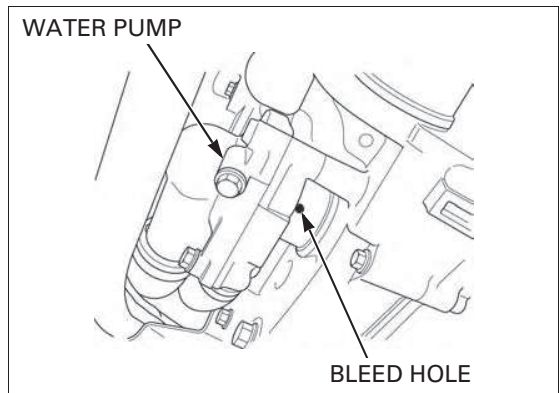
MECHANICAL SEAL INSPECTION

Remove the under cowl (page 2-13).

Check for signs of seal leakage.

A small amount of "weeping" from the bleed hole is normal.

Install the under cowl (page 2-13).

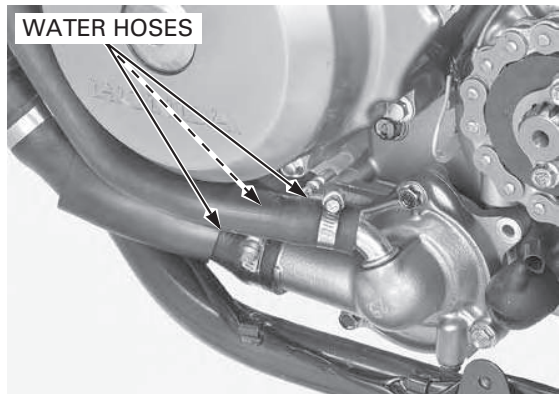


REMOVAL

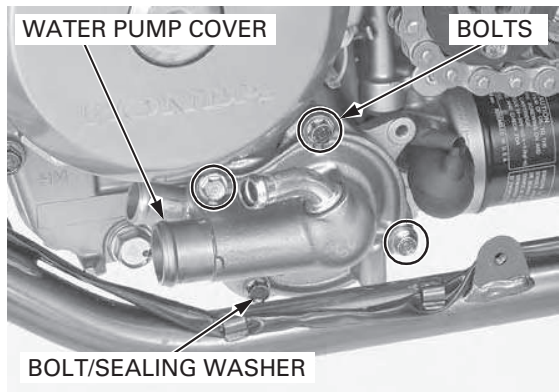
Drain the coolant from by removing the water pump drain bolt (page 6-7).

Remove the drive sprocket cover (page 7-4).

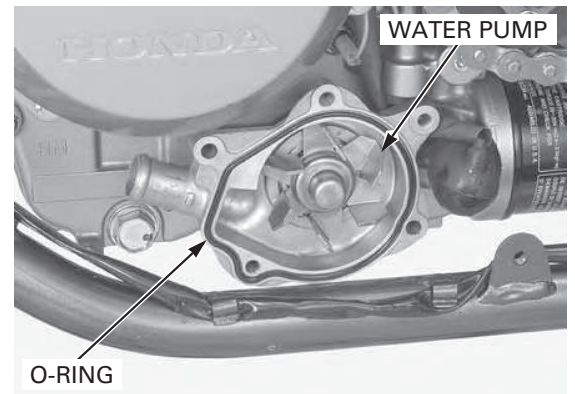
Loosen the band screw and disconnect the water hoses.



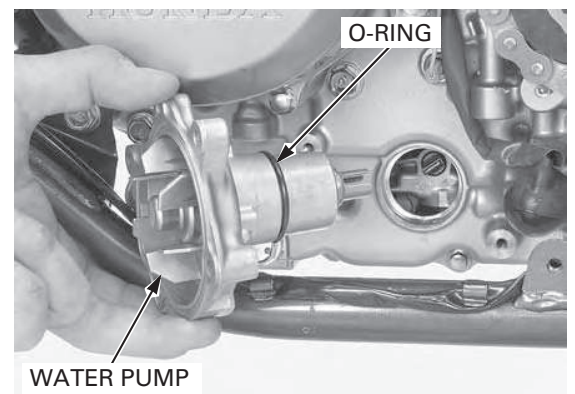
Remove the bolts, sealing washer and water pump cover.



Remove the O-ring from the water pump groove.



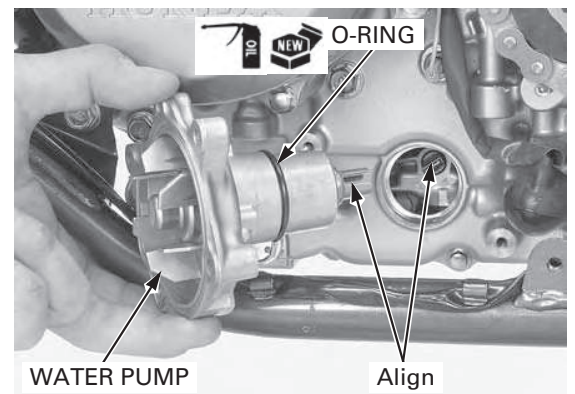
Remove the water pump and O-ring



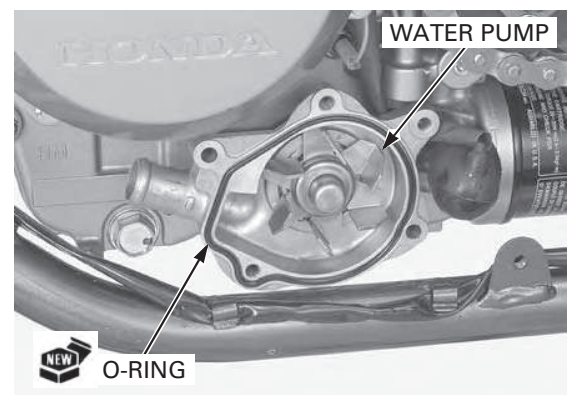
INSTALLATION

Coat a new O-ring with engine oil and install it onto the stepped section of the water pump.

Install the water pump while aligning its groove with the projection of the oil pump shaft.



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

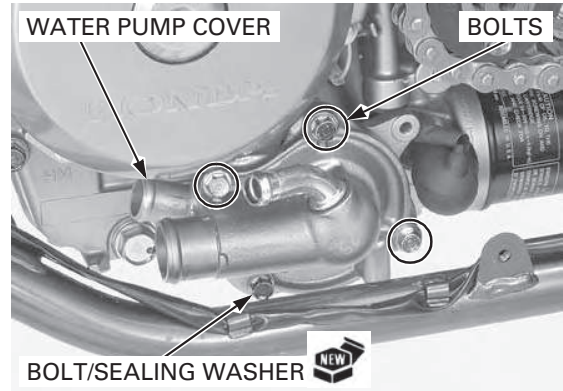


COOLING SYSTEM

Align the bolt holes in the pump and crankcase, and install the water pump cover with the bolts and a new sealing washer.

Tighten the bolts in a crisscross pattern in several steps.

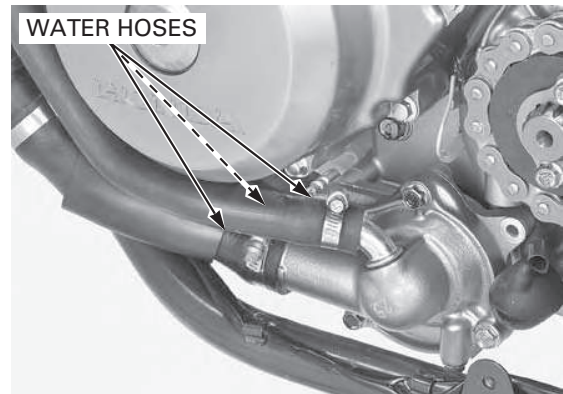
TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



Connect the water hoses.

Tighten the band screws to the specified range (page 6-10).

Fill and bleed the cooling system (page 6-7).
Install the drive sprocket cover (page 7-13).



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the shock absorber (page 14-13).

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

Remove the bolt and release the boss from the grommet.

Installation is in the reverse order of removal.

Route the hoses properly (page 1-21).

