

# 8. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION

COMPONENT LOCATION .....	8-2	ENGINE REMOVAL .....	8-5
SERVICE INFORMATION .....	8-3	ENGINE INSTALLATION .....	8-8
DRIVE SPROCKET REMOVAL .....	8-4	DRIVE SPROCKET INSTALLATION .....	8-12

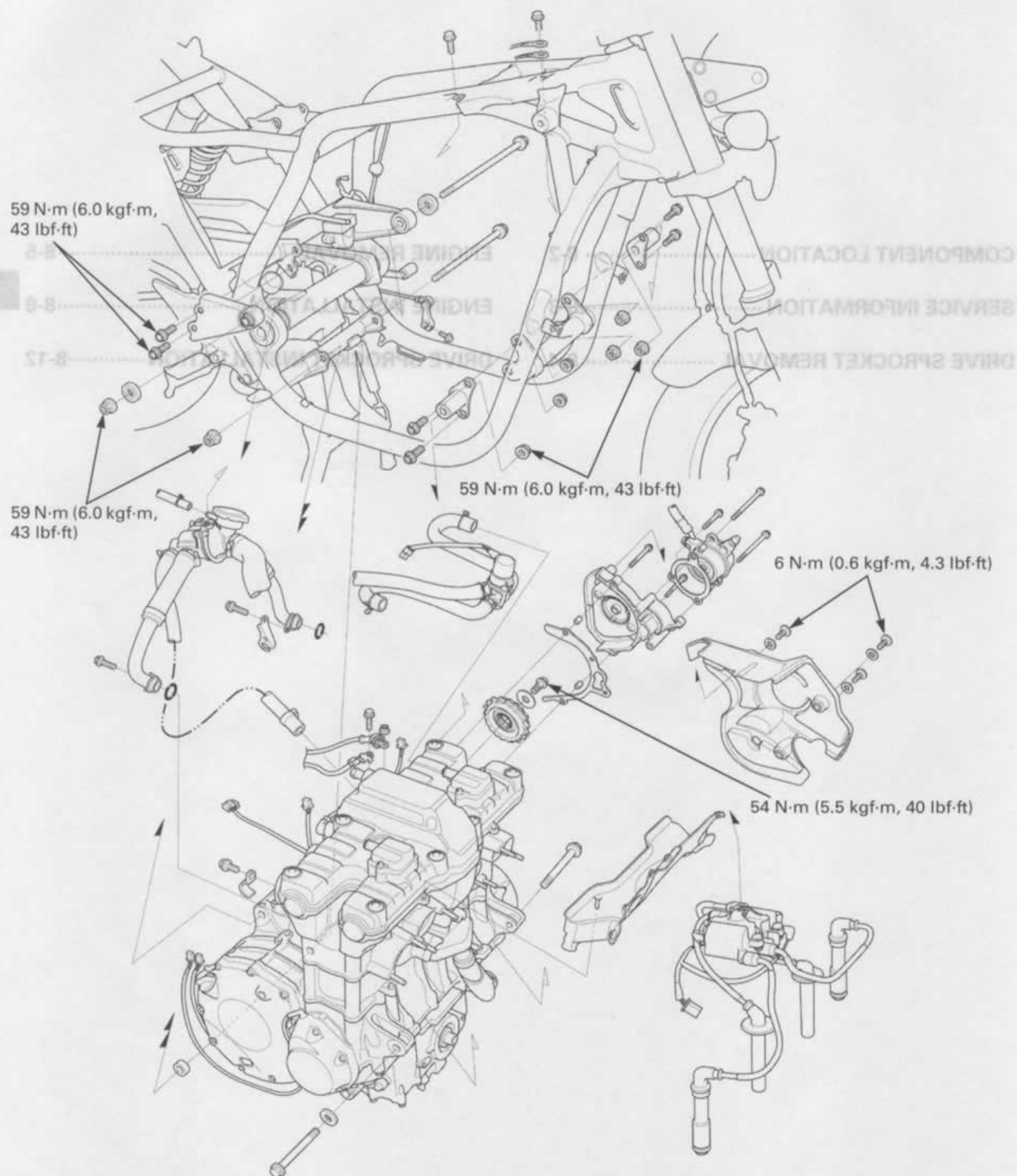
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## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

### NOTICE

*Do not use the oil filter as a jacking point.*

- The following components require engine removal for service.
  - Crankshaft (page 12-5)
  - Transmission (page 12-15)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tighten torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

### SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		87.8 kg (193.6 lbs)
Engine oil capacity	After disassembly	4.8 liter (5.1 US qt, 4.2 Imp qt)
Coolant capacity	Radiator and engine	2.74 liter (2.90 US qt, 2.41 Imp qt)

### TORQUE VALUES

Left crankcase side cover mounting special bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)
Front engine hanger bolt (engine side)	59 N·m (6.0 kgf·m, 43 lbf·ft)
Front engine hanger bolt (frame side)	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear upper engine hanger plate bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear upper engine hanger bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Rear lower engine hanger bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Gearshift pedal pivot bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Gearshift pedal link pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)



## DRIVE SPROCKET REMOVAL

Remove the pinch bolt and then remove the gearshift pedal link from the gearshift spindle.



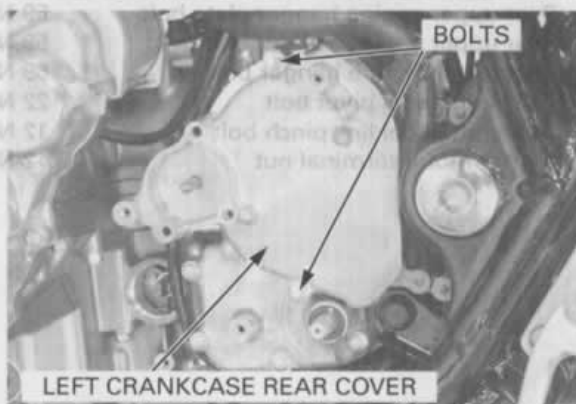
Remove the bolts and left crankcase side cover.



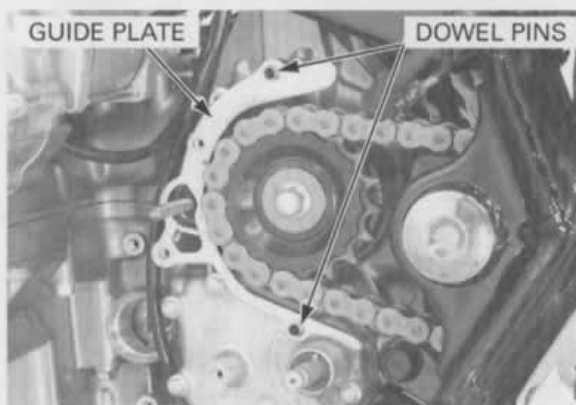
Remove the clutch slave cylinder (page 10-13).

Remove the water pump assembly (page 7-15).

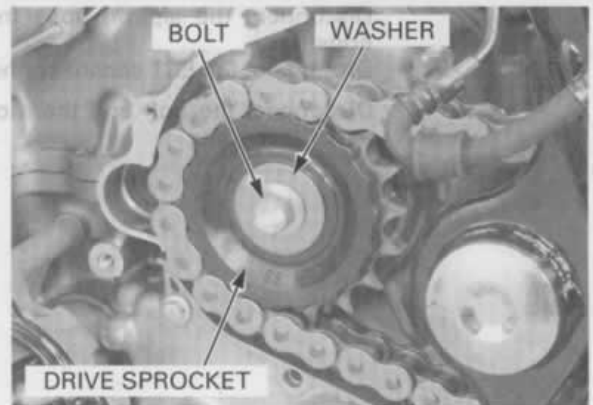
Remove the bolts and left crankcase rear cover.



Remove the drive chain guide plate and dowel pins.



Remove the bolt, washer and drive sprocket.

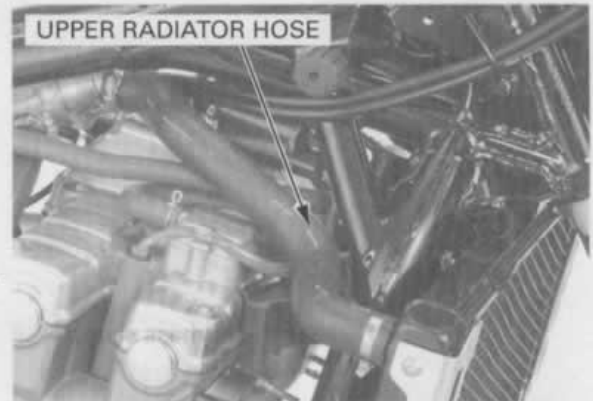


## ENGINE REMOVAL

Remove the following:

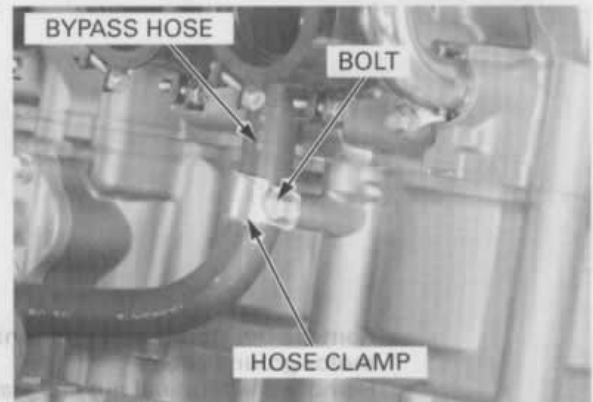
- Fuel tank (page 6-48)
- Throttle body (page 6-57)
- Muffler/exhaust pipe (page 3-12)
- Radiator (page 7-10)
- Oil cooler (page 5-14)
- Ignition coil (page 17-7)
- PAIR solenoid valve (page 6-86)
- Drive sprocket (page 8-4)

Disconnect the upper radiator hose from the radiator.

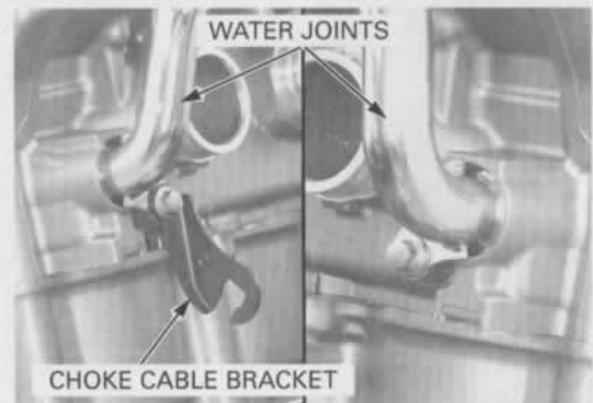


Remove the bolt and bypass hose clamp from the cylinder.

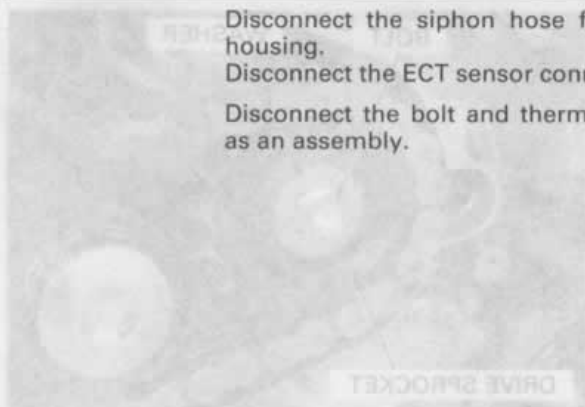
Remove the bypass hose between the insulators.



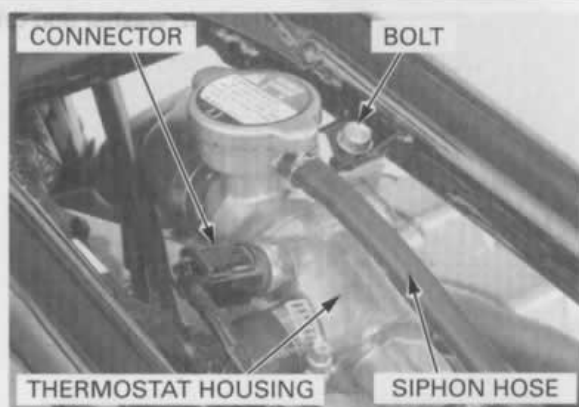
Remove the bolts, water joints and choke cable bracket from the cylinder head.



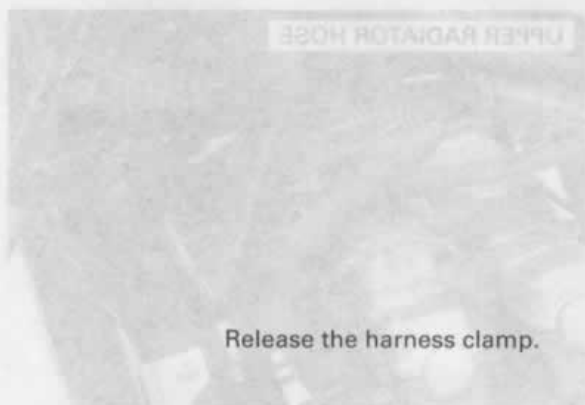
## ENGINE REMOVAL/INSTALLATION



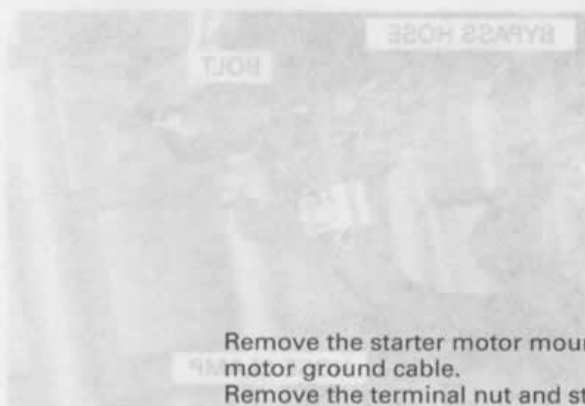
Disconnect the siphon hose from the thermostat housing.  
Disconnect the ECT sensor connector.  
Disconnect the bolt and thermostat housing/hoses as an assembly.



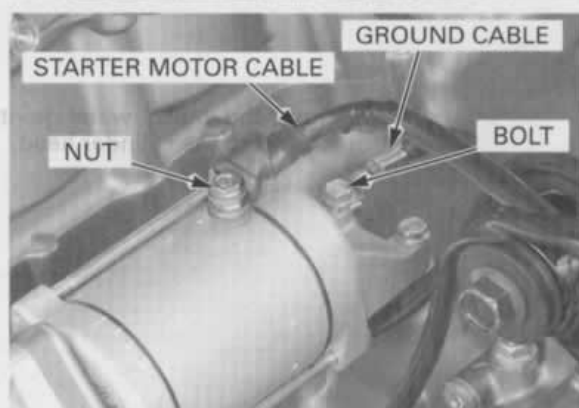
Remove the heat guard rubber from the cylinder head.



Release the harness clamp.

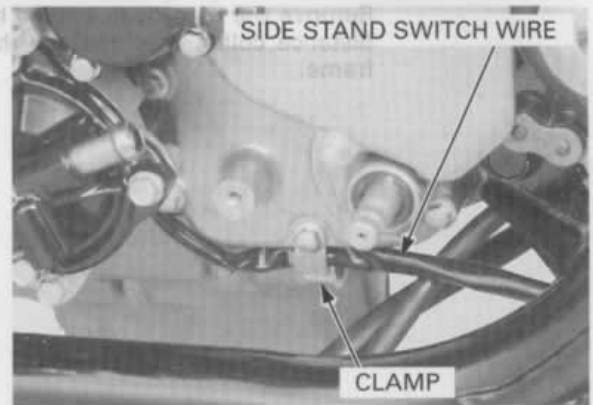


Remove the starter motor mounting bolt and starter motor ground cable.  
Remove the terminal nut and starter motor cable.

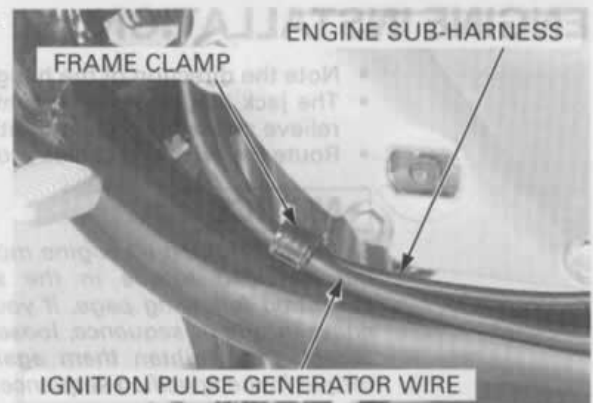




Release the side stand switch wire from the gear-shift linkage cover.



Release the engine sub-harness and ignition pulse generator wire from the frame clamp.



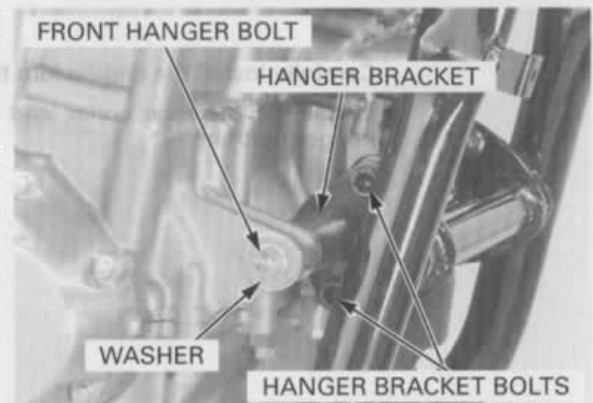
For ease of engine removal, remove the following items before removing the engine:

- Oil pan, oil strainer and oil pipes (page 5-6)
- Cylinder head cover (page 9-7)

Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

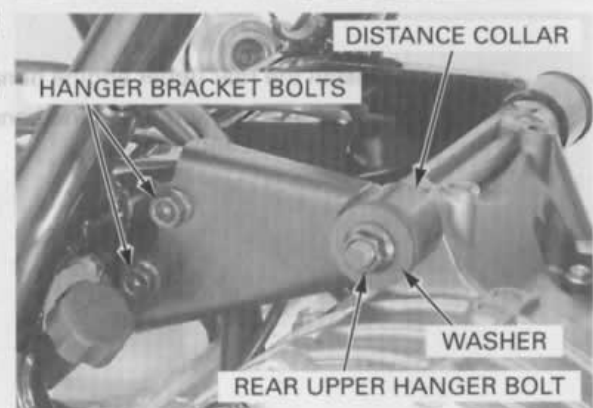
Remove the front engine hanger bolts/nuts and washers.

Remove the nuts, bolts and front engine hanger brackets.



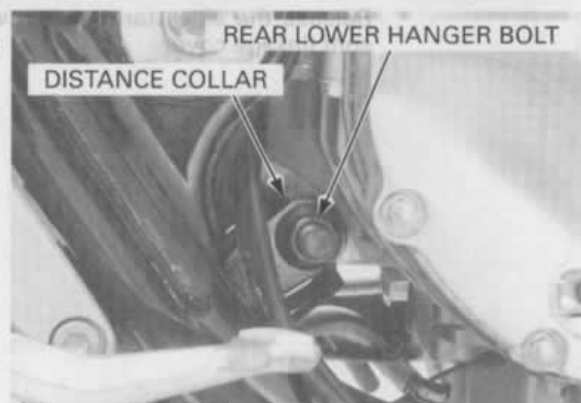
Remove the rear upper engine hanger bolt/nut and special washers.

Remove the bolts and rear upper engine hanger plate.



## ENGINE REMOVAL/INSTALLATION

Remove the rear lower engine hanger bolt/nut and distance collar, then remove the engine from the frame.

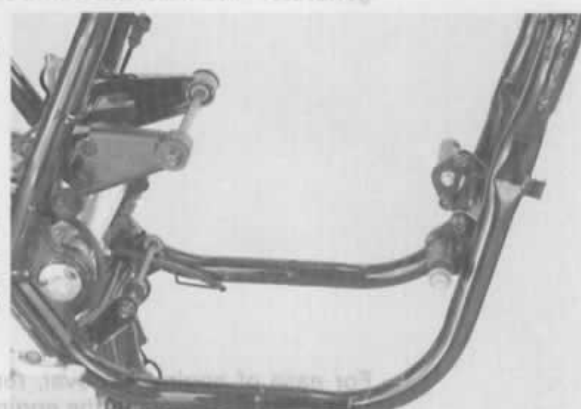


## ENGINE INSTALLATION

- Note the direction of the hanger bolts.
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-23).

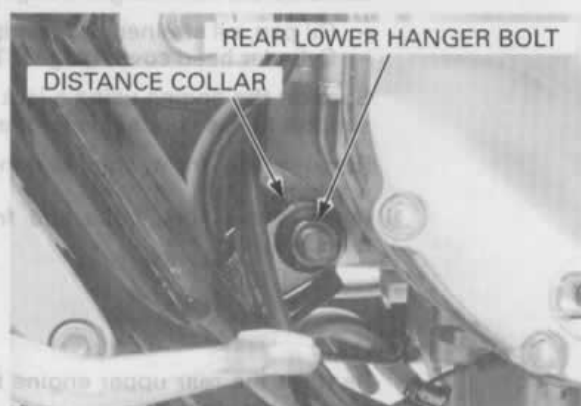
### NOTICE

*Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described following page. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.*



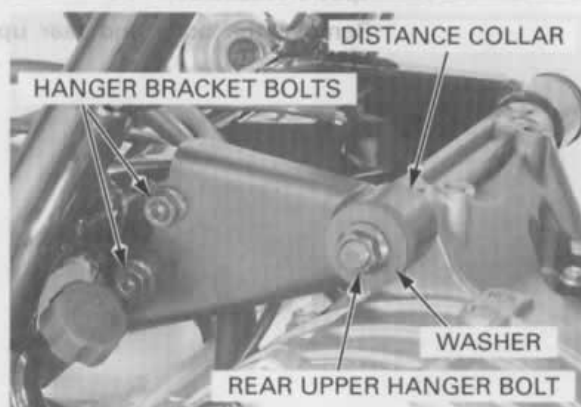
Carefully install the engine into the frame.

Install the distance collar and rear lower engine hanger bolt/nut.



Install the rear upper engine hanger plate and bolt.

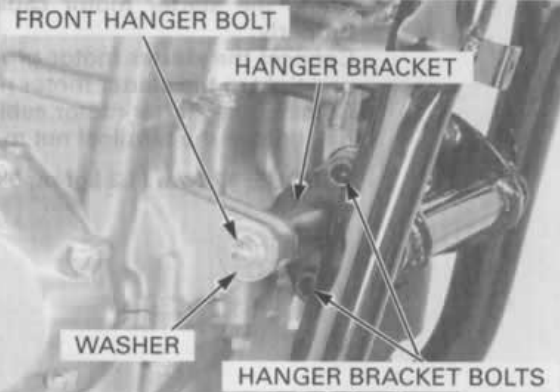
Install the rear upper engine hanger special washer, hanger bolt and nut.





Install the front engine hanger brackets, mounting bolts and nuts.

Install the front engine hanger washers, bolts and nuts.



First tighten the front engine hanger plate bolts and nuts to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)**

Tighten the rear upper engine hanger plate bolt to the specified torque.

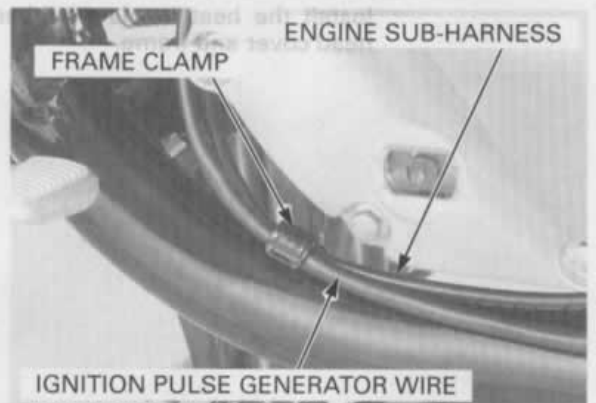
**TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)**

Remove the engine support, then tighten all engine hanger bolt/nut to the specified torque.

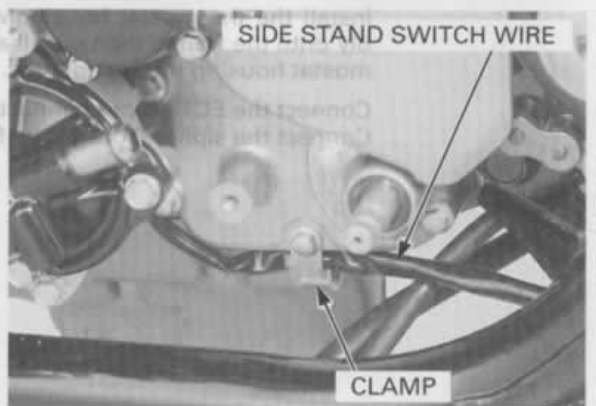
**TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)**



Route the engine sub-harness and ignition pulse generator wire properly, clamp them with wire clamp.



Route the side stand switch wire properly, clamp it wire clamp on the gearshift linkage cover.

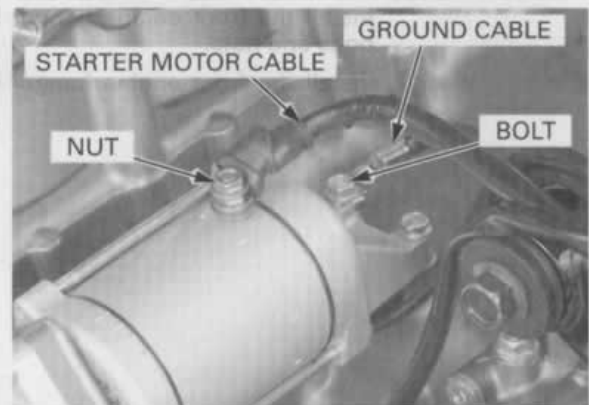


## ENGINE REMOVAL/INSTALLATION

Route the starter motor cable and ground cable properly.

Connect the starter motor ground cable and install and tighten the starter motor mounting bolt. Connect the starter motor cable to the motor terminal, tighten the terminal nut to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Clamp the starter motor cable, ground cable and side stand switch wire with a wire clamp.

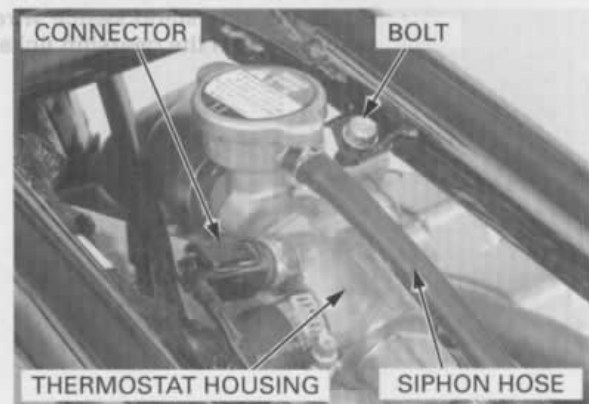


Install the heat insulate rubber onto the cylinder head cover and frame.



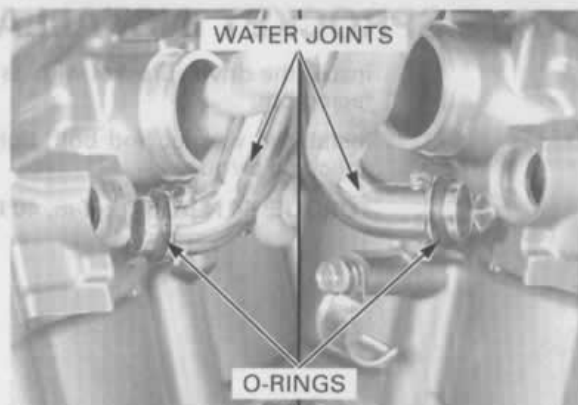
Install the thermostat housing/water hoses assembly onto the frame, then install and tighten the thermostat housing mounting bolts.

Connect the ECT sensor connector.  
Connect the siphon hose to the filler neck.

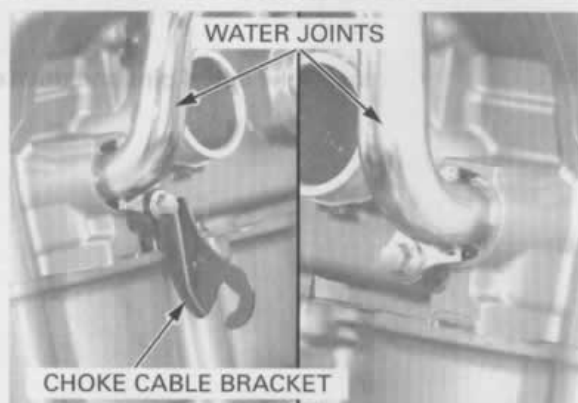


Install new O-rings onto the flange of the water joints.

Install the water joint to the cylinder head.

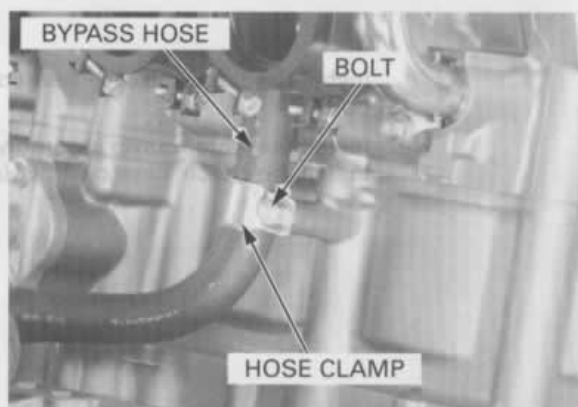


For the left water joint, install the choke bracket. Install and tighten the water joint mounting bolt securely.



Route the bypass hose between the No.3 and No.4 insulator.

Install the water hose clamp and tighten the bolt.



Connect the upper radiator hose to the radiator and tighten the hose band screw securely.

Install the following:

- Drive sprocket (page 8-12)
- PAIR solenoid valve (page 6-86)
- Ignition coil (page 17-7)
- Oil cooler (page 5-14)
- Radiator (page 7-14)
- Muffler/exhaust pipe (page 3-12)
- Throttle body (page 6-63)
- Fuel tank (page 6-48)

Pour recommended engine oil up to the proper level (page 4-14).

Fill the cooling system with recommended coolant and bleed the air (page 7-6).

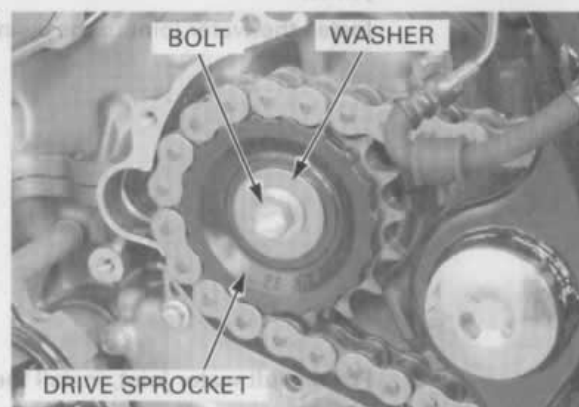


## DRIVE SPROCKET INSTALLATION

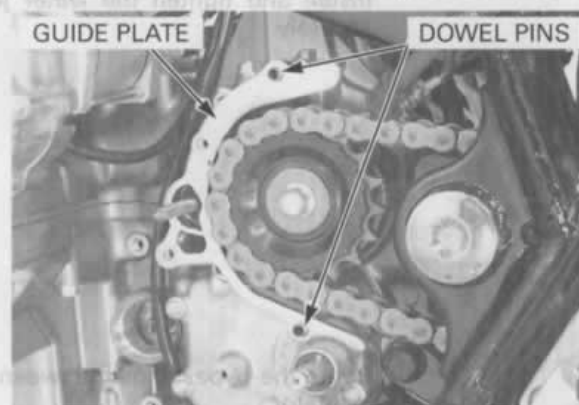
Install the drive sprocket with its teeth number mark facing out.

Install the washer and bolt, tighten the bolt to the specified torque.

**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)**

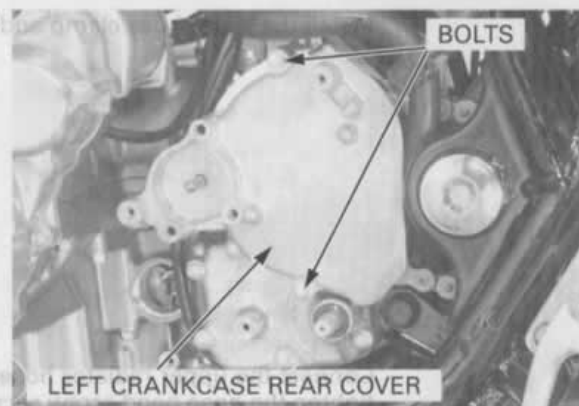


Install the dowel pins and drive chain guide plate.



Install the left crankcase rear cover and tighten the bolts.

Install the water pump assembly (page 7-16).  
Install the clutch slave cylinder (page 10-14).



Install the left crankcase side cover and tighten the screws to the specified torque.

**TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)**



Install the gearshift pedal link to the gearshift spindle while aligning the punch marks.

Install and tighten the pinch bolt to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

