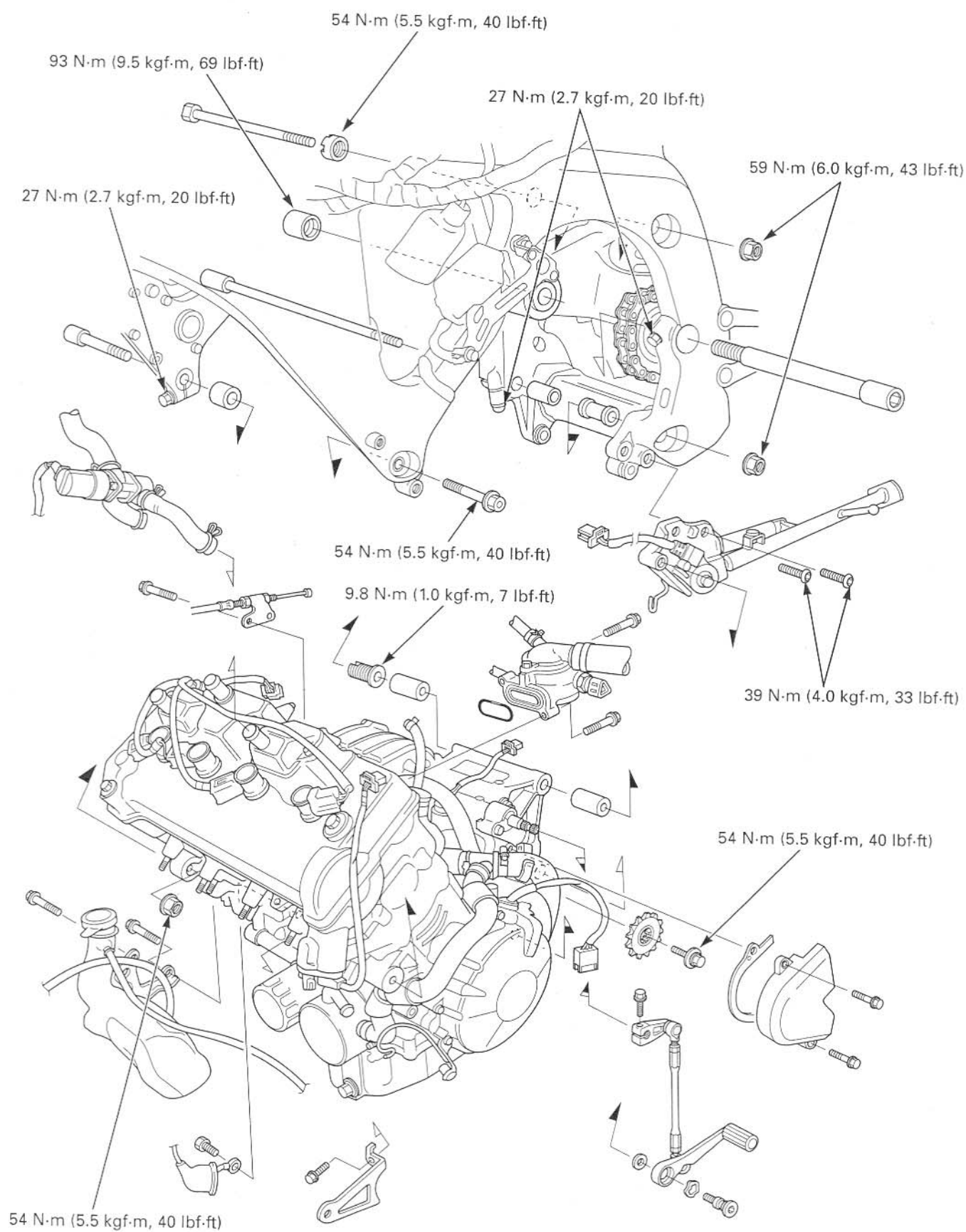


8. ENGINE REMOVAL/INSTALLATION

COMPONENT LOCATION	8-2	ENGINE REMOVAL	8-5
SERVICE INFORMATION	8-3	ENGINE INSTALLATION	8-10

ENGINE REMOVAL/INSTALLATION

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.
- Do not use the oil filter and oil cooler as a jacking point.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following components can be serviced with the engine installed in the frame.
 - Alternator (page 11-4)
 - Clutch (page 10-7)
 - Camshaft (page 9-8)
 - Gearshift linkage (page 10-22)
 - Oil cooler (page 5-12)
 - Oil pump (page 5-8)
 - Water pump (page 7-15)
- The following components require engine removal for service.
 - Cylinder head (page 9-13)
 - Crankshaft (page 13-5)
 - Piston/cylinder (page 13-13)
 - Shift fork/shift drum/Transmission (page 12-7)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the 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		58.3 kg (128.5 lbs)
Engine oil capacity	After disassembly	3.5 liter (3.7 US qt, 3.1 Imp qt)
Coolant capacity	Radiator and engine	3.2 liter (3.4 US qt, 2.8 Imp qt)

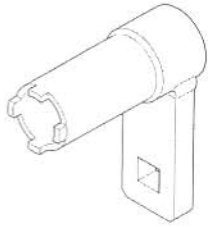
TORQUE VALUES

Front engine hanger bolt (left side)	54 N·m (5.5 kgf·m, 40 lb·ft)	
Front engine hanger nut (right side)	54 N·m (5.5 kgf·m, 40 lb·ft)	
Front engine hanger pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear engine hanger adjusting bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lb·ft)	
Rear engine hanger nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Lower engine hanger pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Lower engine hanger nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Swingarm pivot pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lb·ft)	
Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand bracket socket bolt	39 N·m (4.0 kgf·m, 33 lbf·ft)	ALOC bolt
Oil pressure switch wire terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	

ENGINE REMOVAL/INSTALLATION

TOOLS

Lock nut wrench
07VMA-MBB0100



or 07VMA-MBB0101

ENGINE REMOVAL

Remove the following:

- Lower cowls (page 3-6)
- Middle cowls (page 3-7)
- Exhaust pipe (page 3-24)
- Fuel tank (page 6-61)
- Radiator (page 7-10)
- Radiator reserve tank (page 7-17)
- Air cleaner housing (page 6-64)
- Throttle body (page 6-72)
- Regulator/rectifier (page 17-11)

Remove the pinch bolt and disconnect the gear shift arm from the gear shift spindle.

Remove the bolt, washer, wave washer and gear shift pedal assembly.

Remove the two bolts, drive sprocket cover and guide plate.

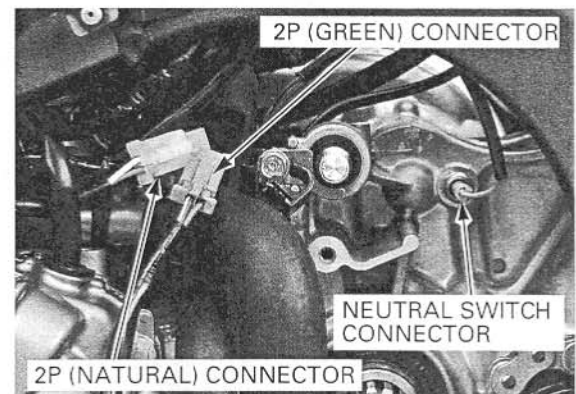
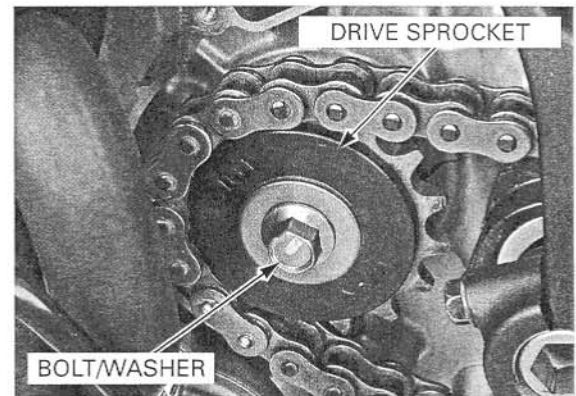
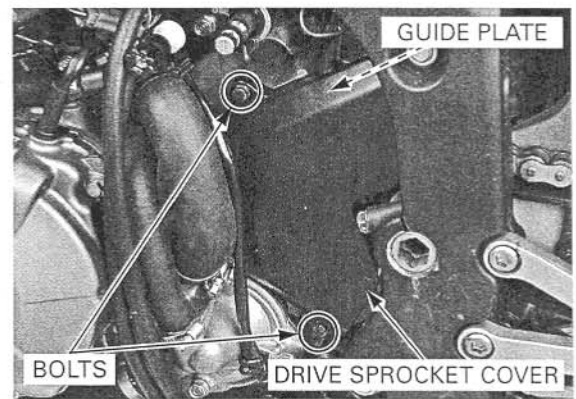
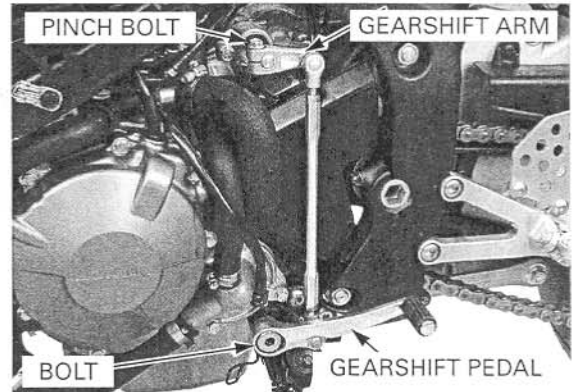
Loosen the rear axle nut.

Turn the drive chain adjusting bolts make the drive chain slack fully.

Remove the drive sprocket special bolt, washer and drive sprocket.

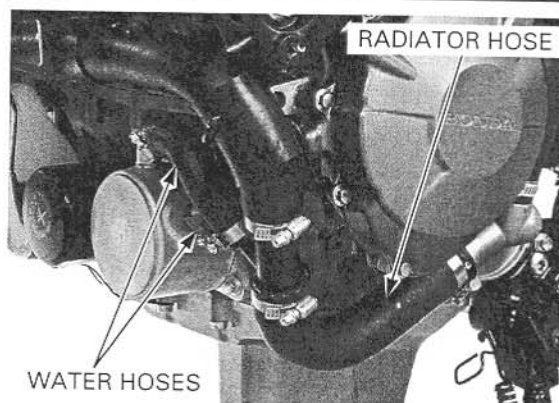
Disconnect the following:

- Neutral switch connector
- Side stand switch 2P (Green) connector
- Cam pulse generator 2P (Natural) connector

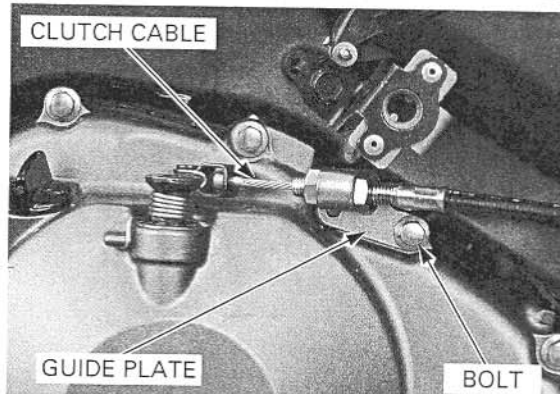


ENGINE REMOVAL/INSTALLATION

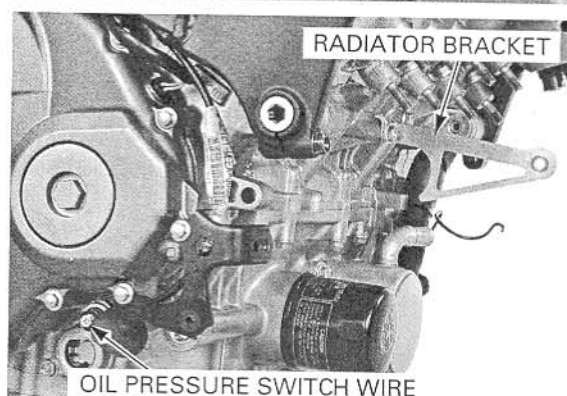
Loosen the hose clamp screw and disconnect the radiator hose from the water pump.
Loosen the hose clamp screws and disconnect the water hoses from the oil cooler.



Remove the bolt, clutch cable guide plate, then disconnect the clutch cable from the clutch lifter lever.



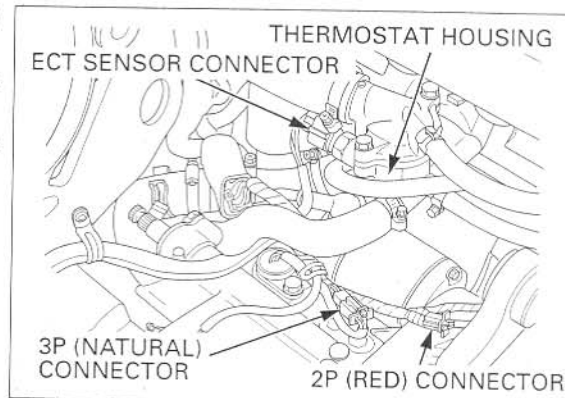
Remove the radiator reserve tank (page 7-17).
Remove the dust cover, terminal screw and oil pressure wire terminal.
Remove the bolt and radiator bracket.



Disconnect the ignition pulse generator 2P (Red) connector.

Disconnect the ECT sensor connector and vehicle speed sensor 3P (Natural) connector.

Remove the thermostat housing from the crankcase (page 7-9).

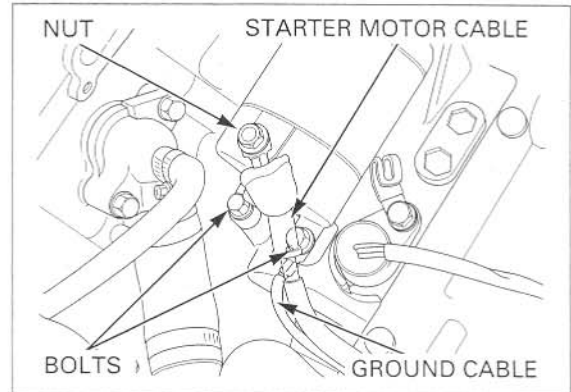


ENGINE REMOVAL/INSTALLATION

Remove the nut and disconnect the starter motor cable from the starter motor.

Remove the starter motor mounting bolts and disconnect the ground cable.

Pull the starter motor out of the crankcase.

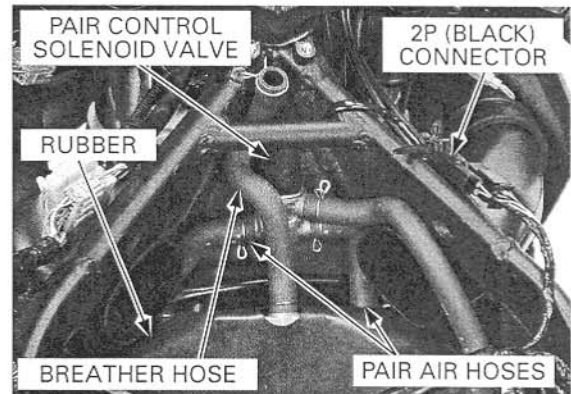


Remove the crankcase breather hose from the cylinder head.

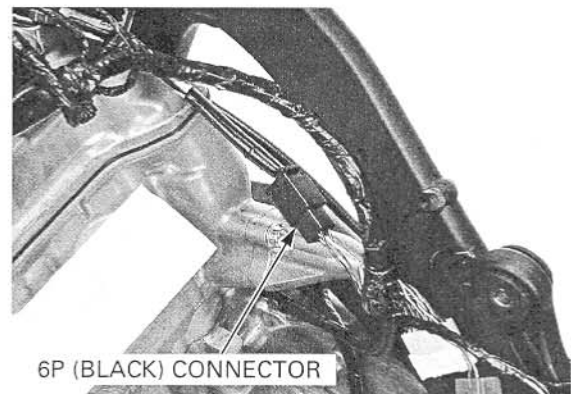
Disconnect the PAIR control solenoid valve 2P (Black) connector.

Disconnect the PAIR air hoses from the cylinder head and remove the PAIR control solenoid valve.

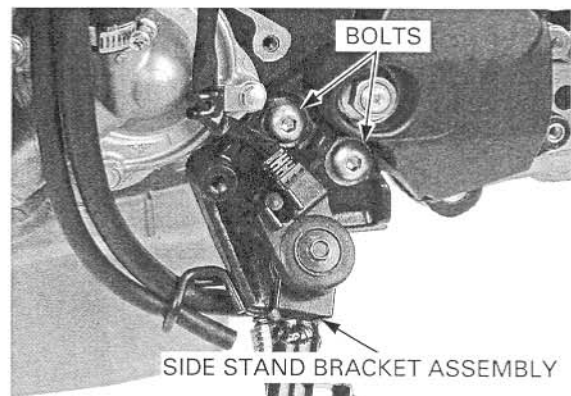
Remove the heat guard rubber.



Disconnect the direct ignition coil 6P (Black) connector.

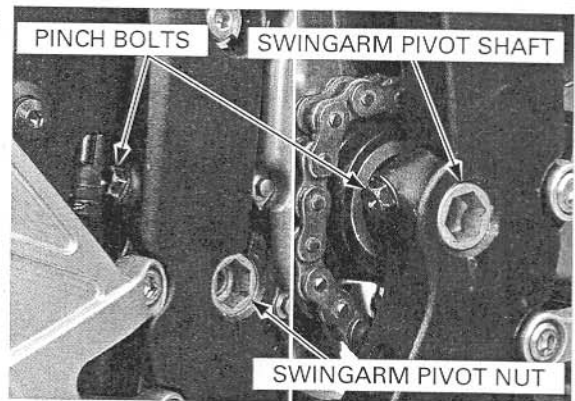


Remove the socket bolts and side stand bracket assembly.

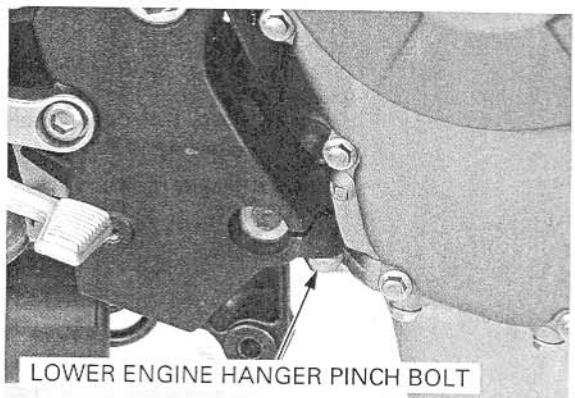


ENGINE REMOVAL/INSTALLATION

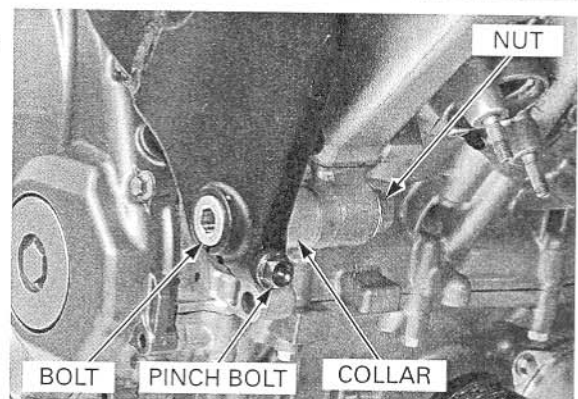
Loosen the pinch bolts and remove the swingarm pivot nut while holding the swingarm pivot shaft.



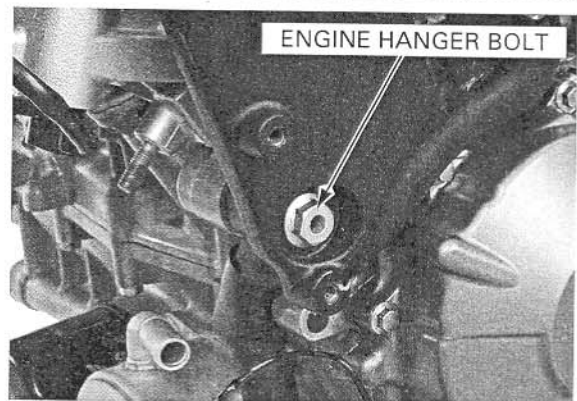
Loosen the lower engine hanger pinch bolt.



Loosen the front engine hanger pinch bolt. Remove the right side front engine hanger bolt, nut and collar.



Remove the left side front engine hanger bolt.



ENGINE REMOVAL/INSTALLATION

Remove the rear engine hanger nut.

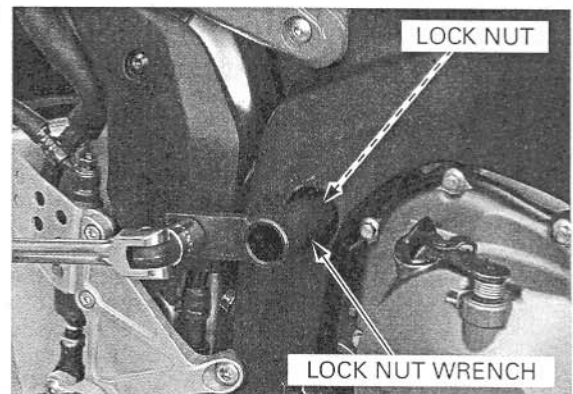


Remove the rear engine hanger lock nut using the special tool.

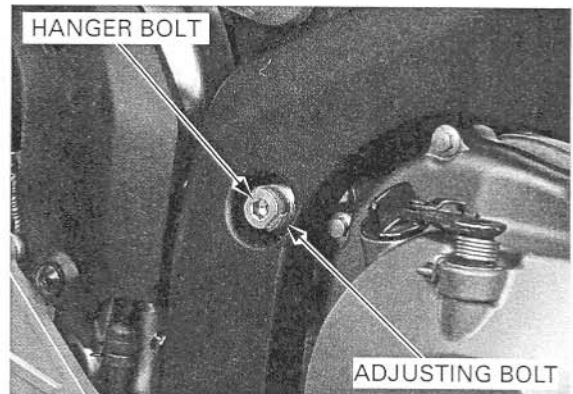
TOOL:

Lock nut wrench

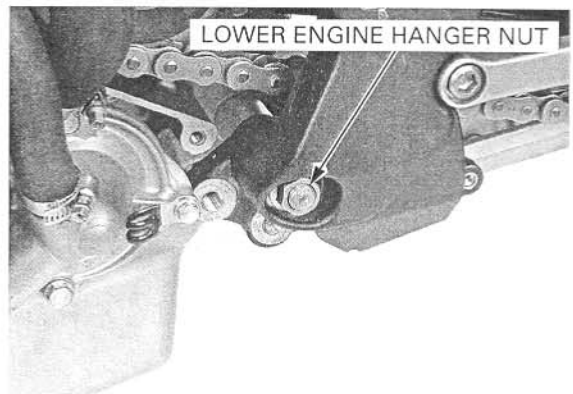
07VMA-MBB0100 or
07VMA-MBB0101



Turn the engine hanger adjusting bolt counterclockwise fully by loosening the rear engine hanger bolt.



Remove the lower engine hanger nut.



ENGINE REMOVAL/INSTALLATION

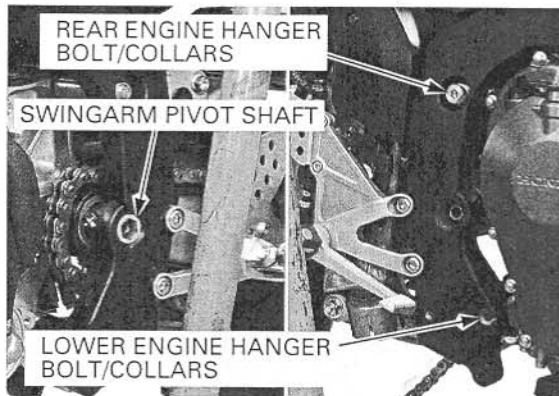
Support the engine using a jack or other adjustable support to ease engine hanger bolts removal.

Remove the following:

- Swingarm pivot shaft
- Lower engine hanger bolt and collars
- Rear engine hanger bolt and collars

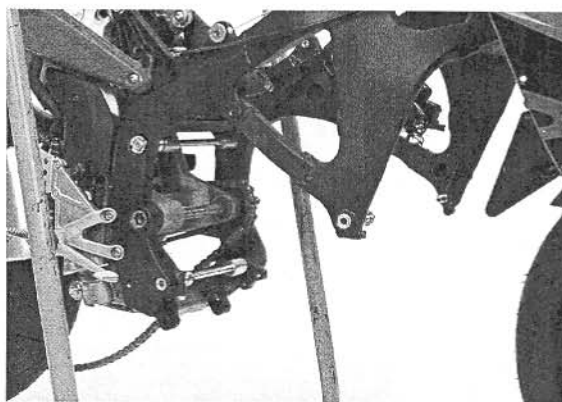
Carefully lower the adjustable support, then remove the engine from the frame.

- A hoist or equivalent is required to support the swingarm when removing the engine.
- Install the swingarm pivot shaft to allow the chassis to be moved and stored during engine service.

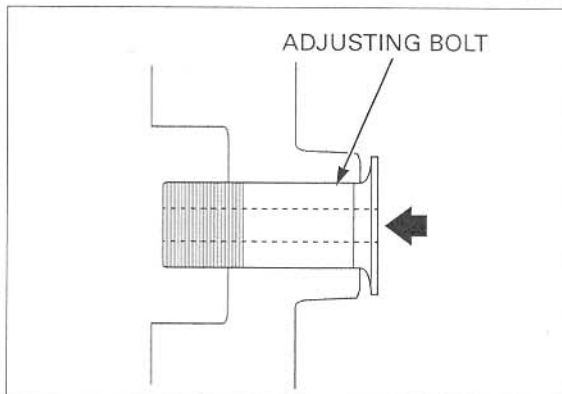


ENGINE INSTALLATION

- Note the direction of the hanger bolts/collars.
- When tighten the lock nut with the lock nut wrench, refer to the torque wrench reading information in "SERVICE INFORMATION" (page 8-3).
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-22).
- 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.



Install the rear engine hanger adjusting bolt fully from the right rear inside of the frame.



Carefully install the engine into the frame.

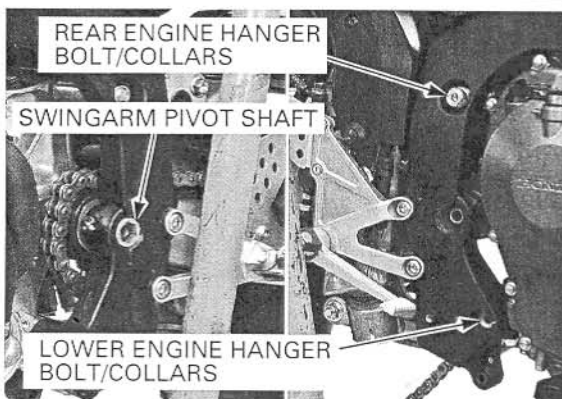
- A hoist or equivalent is required to support the swingarm when installing the engine.

Temporarily install the collars, rear and lower engine hanger bolts from the right side.

California type:

Temporarily install the collars, rear and lower engine hanger bolts from the right side, then install the joint pipe between the rear engine hanger left side collar and engine.

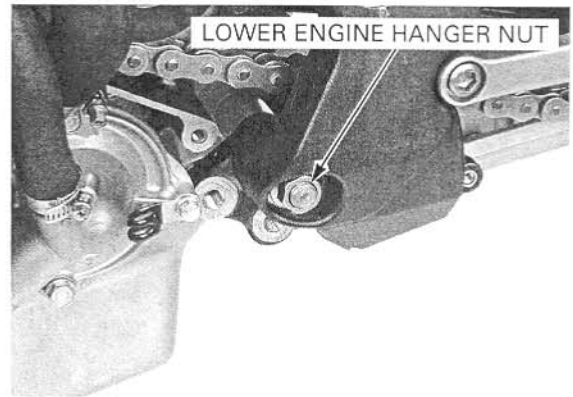
Temporarily install the swingarm pivot shaft from the left side.



ENGINE REMOVAL/INSTALLATION

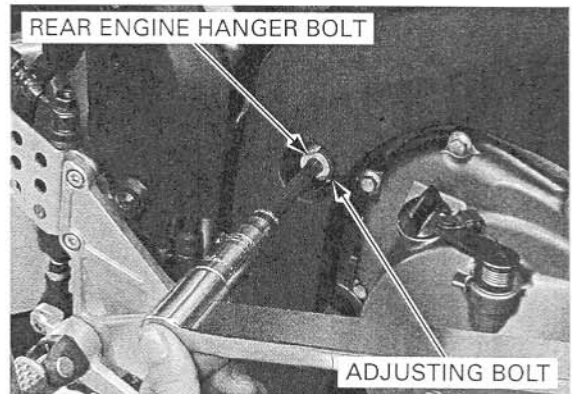
Tighten the lower engine hanger nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Tighten the rear engine hanger bolt with the adjusting bolt to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Install and tighten the rear engine hanger lock nut to the specified torque, while holding the rear engine hanger bolt.

TOOL:

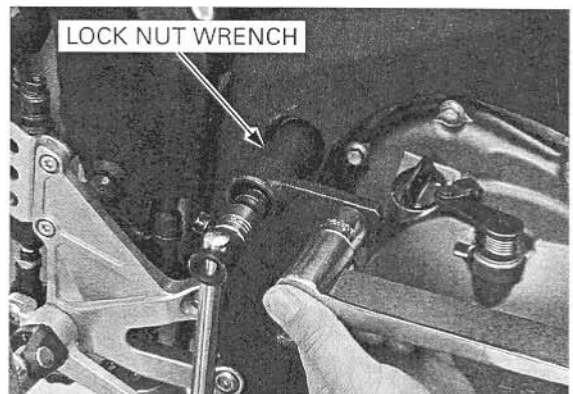
Lock nut wrench

07VMA-MBB0100 or
07VMA-MBB0101

TORQUE:

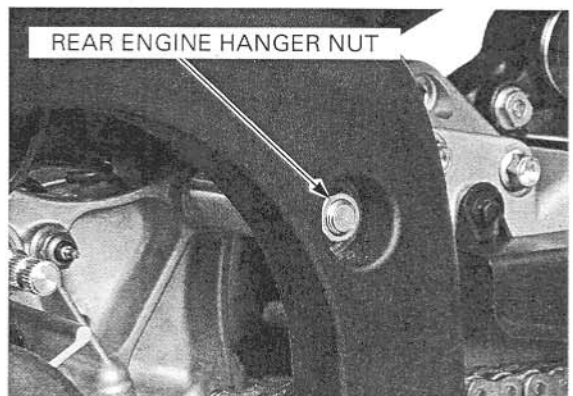
Actual: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Indicated: 49 N·m (5.0 kgf·m, 39 lbf·ft)



Tighten the rear engine hanger nut to the specified torque while holding the rear engine hanger bolt.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



ENGINE REMOVAL/INSTALLATION

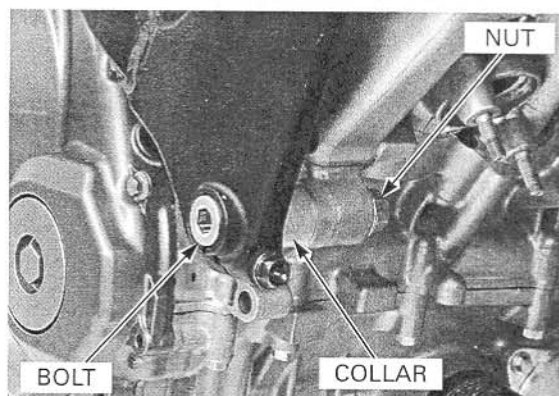
Install and tighten the left side front engine hanger bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



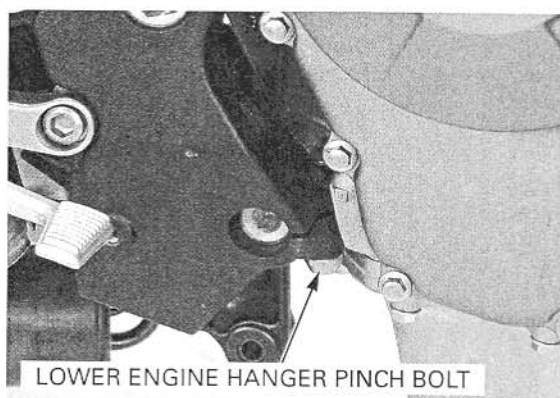
Install the right side front engine hanger bolt, collar and nut. Tighten the nut to the specified torque while holding the bolt.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



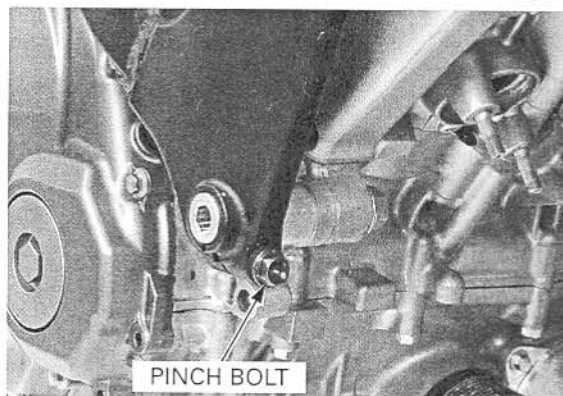
Tighten the lower engine hanger pinch bolt.

TORQUE: 27 N·m (2.7 kgf·m, 20 lbf·ft)



Tighten the front engine hanger pinch bolt to the specified torque.

TORQUE: 27 N·m (2.7 kgf·m, 20 lbf·ft)



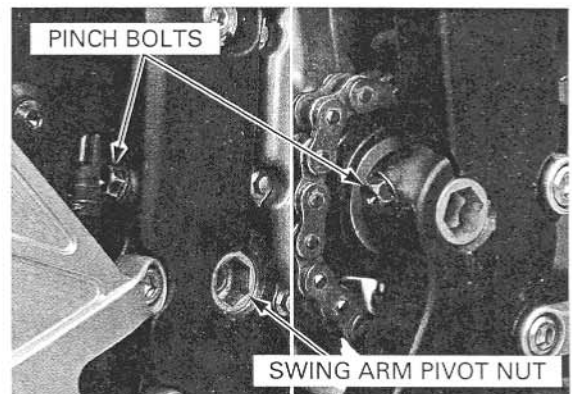
ENGINE REMOVAL/INSTALLATION

Install and tighten the swingarm pivot nut while holding the pivot shaft to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

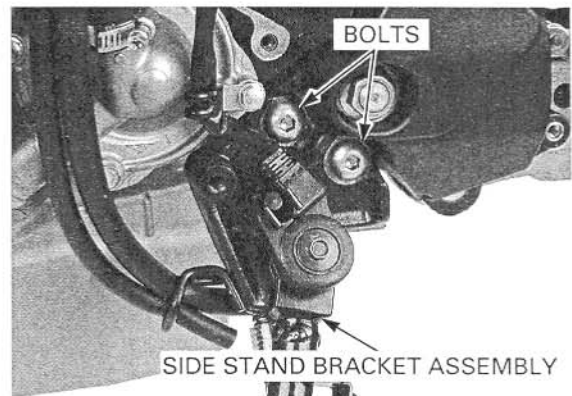
Tighten the pinch bolts to the specified torque.

TORQUE: 27 N·m (2.7 kgf·m, 20 lbf·ft)

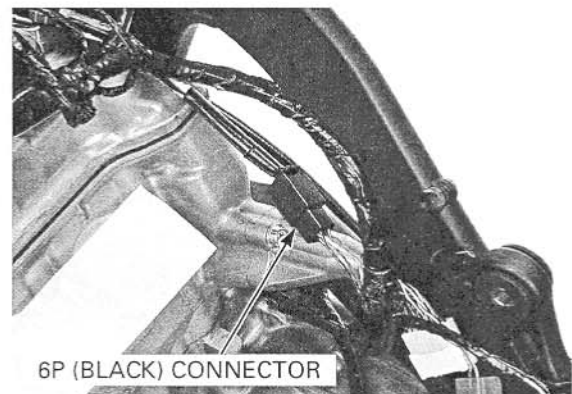


Install the side stand bracket assembly and tighten the socket bolts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 33 lbf·ft)



Connect the direct ignition coil 6P (Black) connector.

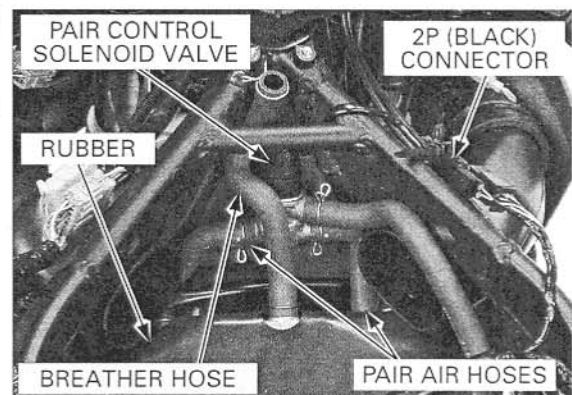


Connect the PAIR control solenoid valve 2P (Black) connector.

Install the heat guard rubber.

Connect the PAIR air hoses into the cylinder head and install the PAIR control solenoid valve.

Install the crankcase breather hose.



ENGINE REMOVAL/INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.

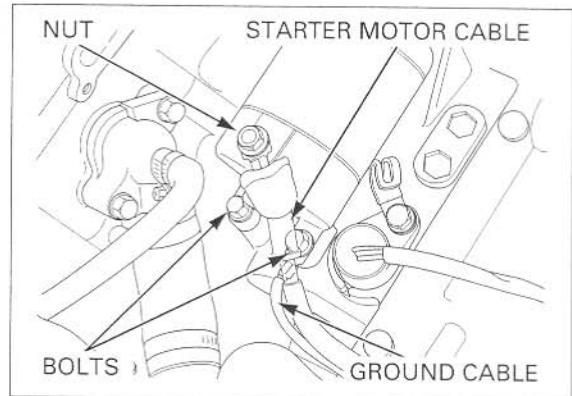
Install the starter motor into the crankcase.

Route the starter motor cable and ground cable. Connect the ground cable, then tighten the mounting bolts.

Connect the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

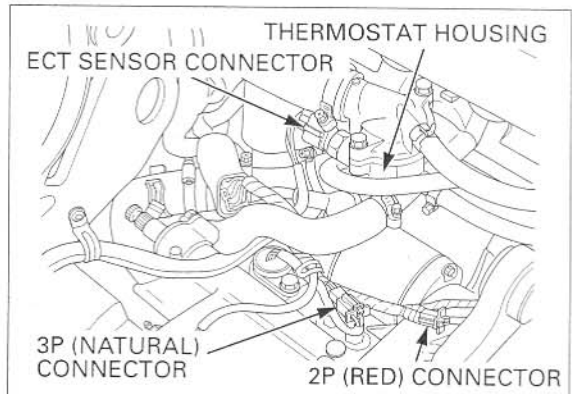
Install the rubber cap securely.



Install the thermostat housing (page 7-9).

Connect the ECT sensor connector and vehicle speed sensor 3P (Natural) connector.

Connect the ignition pulse generator 2P (Red) connector.

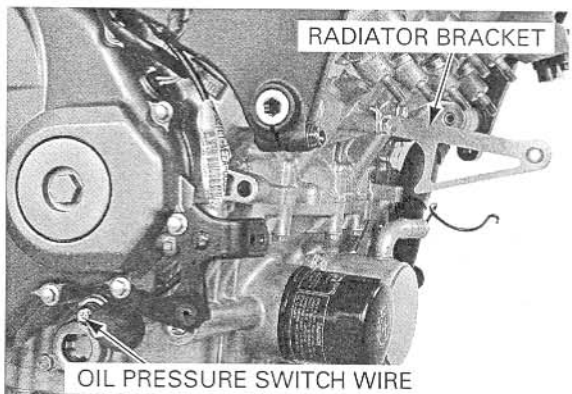


Install the radiator reserve tank (page 7-18).

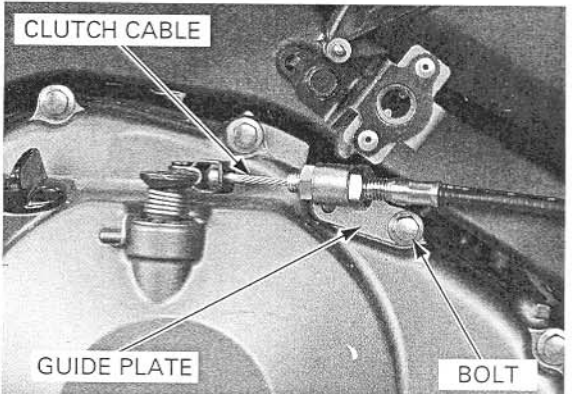
Connect the oil pressure switch wire and tighten the screw to the specified torque.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the dust cover over the oil pressure switch.

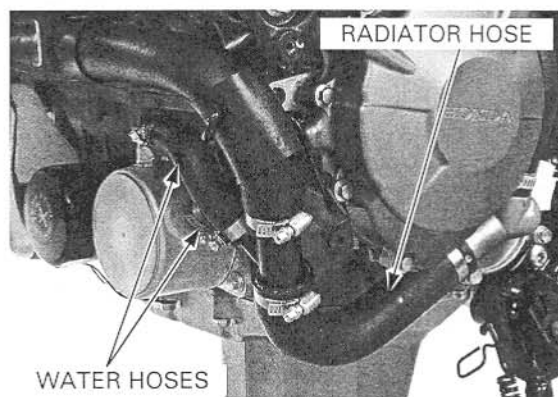


Connect the clutch cable to the clutch lifter lever. Install the clutch cable guide plate to the right crankcase cover and tighten the mounting bolt.



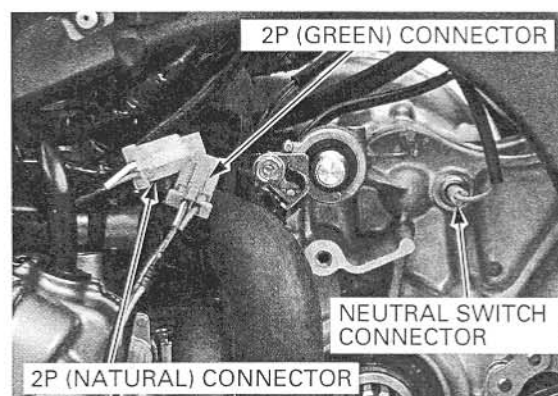
ENGINE REMOVAL/INSTALLATION

Connect the radiator hose into the water pump and water hoses into the oil cooler. Tighten the hose clamp screws.



Connect the following:

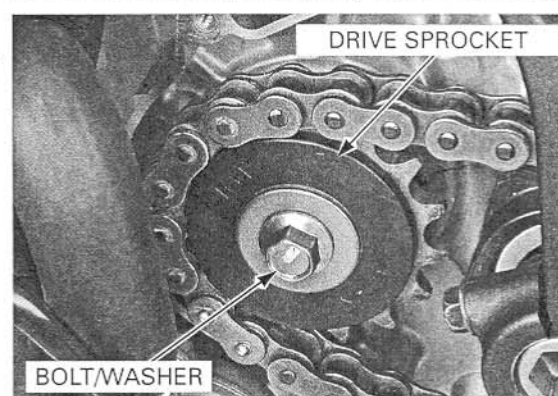
- Cam pulse generator 2P (Natural) connector
- Side stand switch 2P (Green) connector
- Neutral switch connector



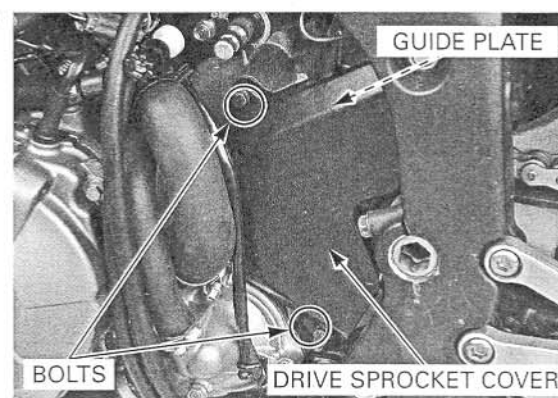
Install the drive sprocket, special bolt and washer.

Tighten the drive sprocket special bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



Install the guide plate, drive sprocket cover and tighten the bolts securely.



ENGINE REMOVAL/INSTALLATION

Install the gearshift arm to the gearshift spindle, aligning the arm slit with the punch mark on the spindle.

Install and tighten the pinch bolt.

Install the bolt, wave washer, washer and gear shift pedal.

Tighten the gearshift pedal pivot bolt securely.

Install the following:

- Regulator/rectifier (page 17-11)
- Throttle body (page 6-77)
- Air cleaner housing (page 6-66)
- Radiator (page 7-13)
- Fuel tank (page 6-62)
- Exhaust pipe (page 3-26)
- Middle cowls (page 3-8)
- Lower cowls (page 3-6)

Adjust the drive chain slack (page 4-21).

Pour recommended engine oil up to the proper level (page 4-16).

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

