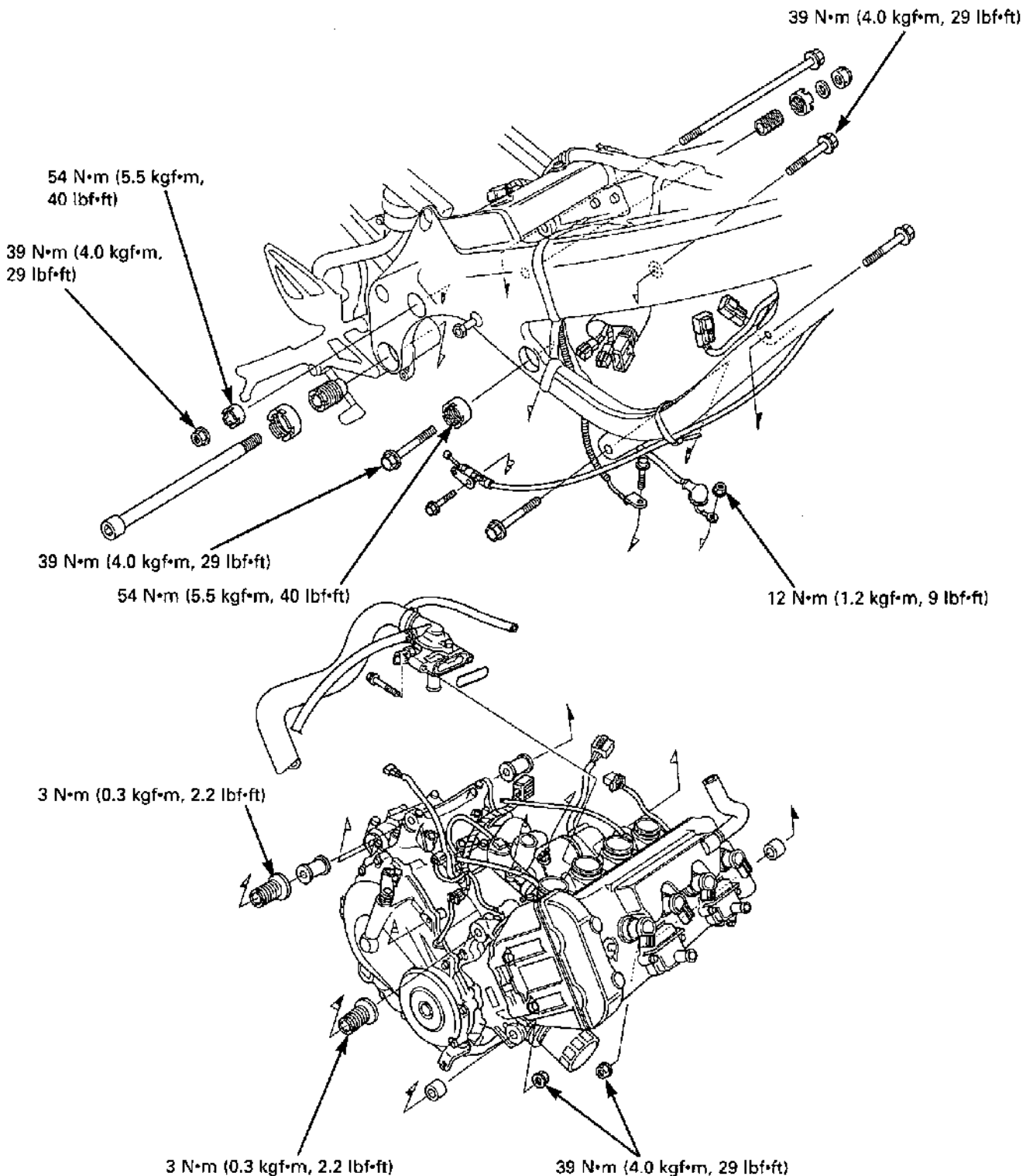


7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-2	ENGINE INSTALLATION	7-10
SHOCK LINK LOWER BRACKET REMOVAL	7-3	SHOCK LINK LOWER BRACKET INSTALLATION	7-16
ENGINE REMOVAL	7-5		



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.

- When using the lock nut wrench for the adjusting bolt lock nut, use a 20-inch long deflecting beam type torque wrench. 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 torque values.
- The following components require engine removal for service.
 - Crankshaft piston/cylinder (Section 12)
 - Transmission (Section 11)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you do not tighten to the proper torque or to in the proper sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		59 kg (130 lbs)
Engine oil capacity	After disassembly	3.7 liter (3.9 US qt, 3.3 Imp qt)
Coolant capacity	Radiator and engine	2.7 liter (2.9 US qt, 2.4 Imp qt)

TORQUE VALUES

Front engine hanger bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Center engine hanger bolt	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Center engine hanger adjusting bolt (right side)	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	
Center engine hanger lock nut (right side)	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Rear engine hanger nut	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Rear engine hanger adjusting bolt (right side)	3 N•m (0.3 kgf•m, 2.2 lbf•ft)	
Rear engine hanger lock nut (right side)	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Shock link bracket nut	39 N•m (4.0 kgf•m, 29 lbf•ft)	
Shock link-to-bracket nut	44 N•m (4.5 kgf•m, 33 lbf•ft)	
Drive sprocket special bolt	54 N•m (5.5 kgf•m, 40 lbf•ft)	
Starter motor terminal nut	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Side stand bracket bolt	44 N•m (4.5 kgf•m, 33 lbf•ft)	ALOC bolt.

TOOL

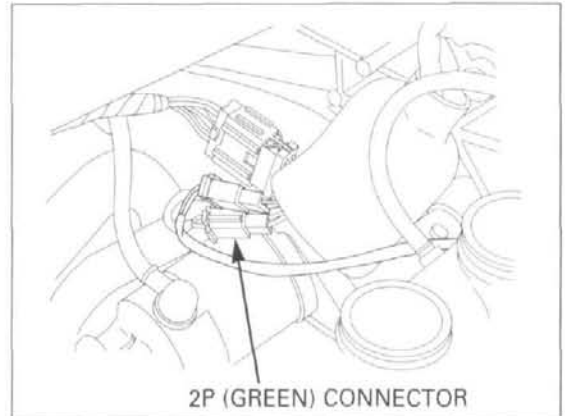
Lock nut wrench	07VMA-MBB0100 or 07VMA-MBB0101
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SHOCK LINK LOWER BRACKET REMOVAL

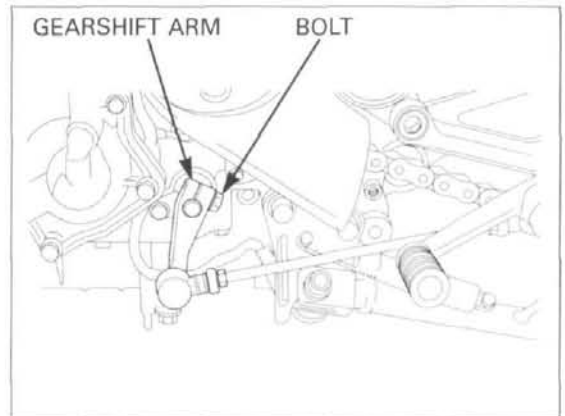
Remove the following:

- Muffler/exhaust pipe (page 2-28)
- Throttle body (page 5-62)

Disconnect the side stand switch 2P (Green) connector.

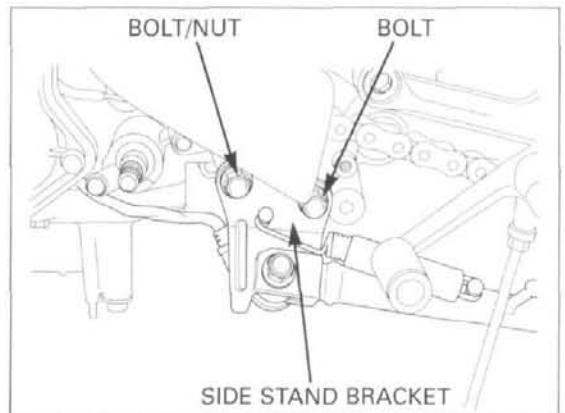


Remove the gearshift arm pinch bolt, then remove the gearshift arm from the gearshift spindle.

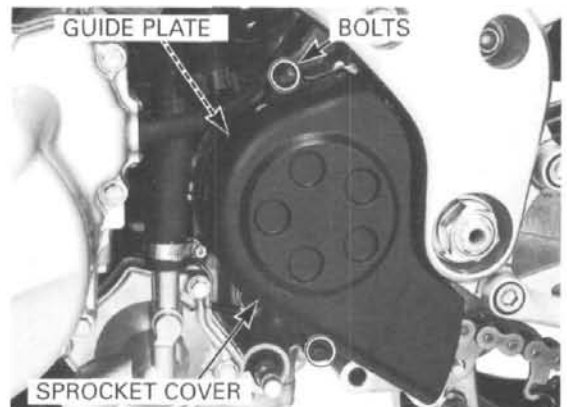


Remove the shock link lower bracket/side stand bracket mounting bolt/nut.

Remove the bolt and side stand bracket assembly.



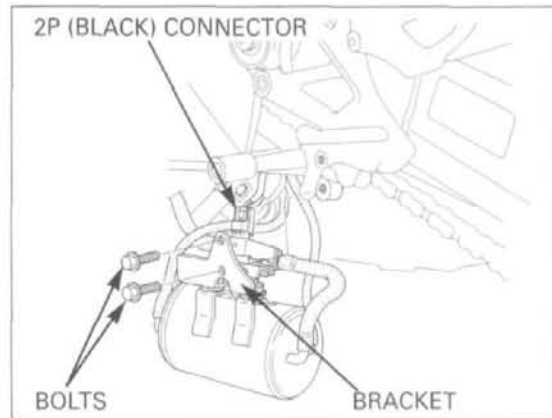
Remove the two bolts, drive sprocket cover and guide plate.



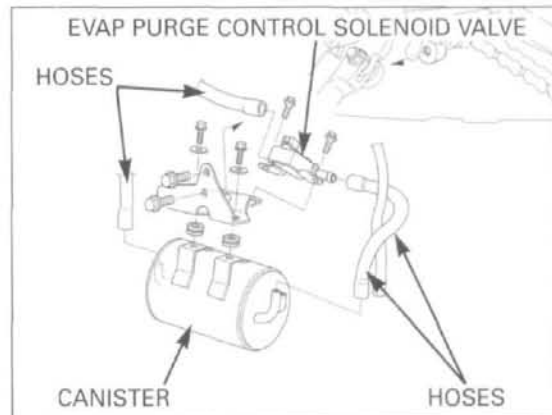
ENGINE REMOVAL/INSTALLATION

California type only: Remove the bolt and EVAP canister bracket assembly from the shock link bracket.

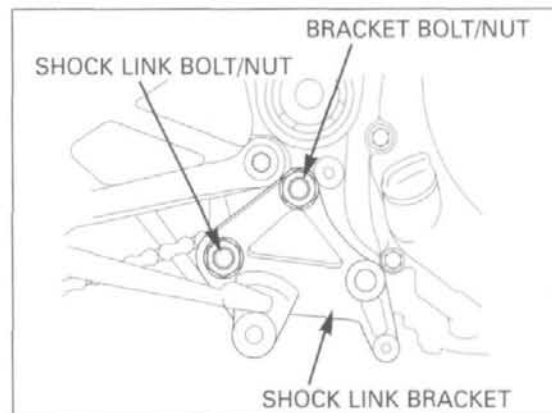
Disconnect the EVAP purge control solenoid valve 2P (Black) connector.



Disconnect the EVAP canister hoses and EVAP purge control solenoid valve hoses.



Remove the shock link lower mounting socket bolt/nut.
Remove the shock link lower bracket mounting bolt/nut, then remove the right and left lower brackets.



Remove the dowel pins.



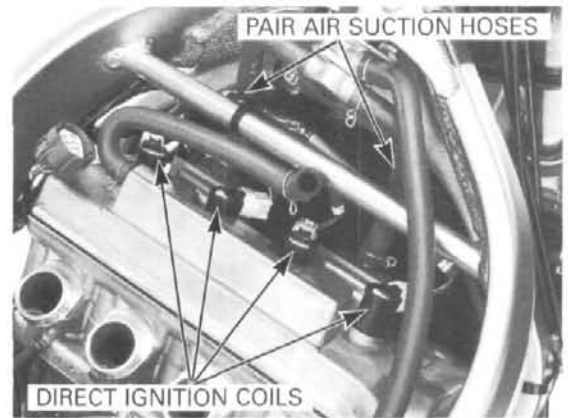
ENGINE REMOVAL

Remove the following:

- Fuel tank (page 5-55)
- Lower bracket (page 7-3)

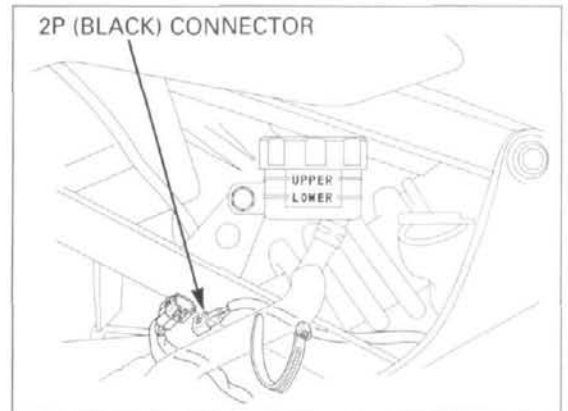
Disconnect the PAIR air suction hoses from the reed valve covers.

Disconnect the ignition coil connectors, then remove the direct ignition coils.

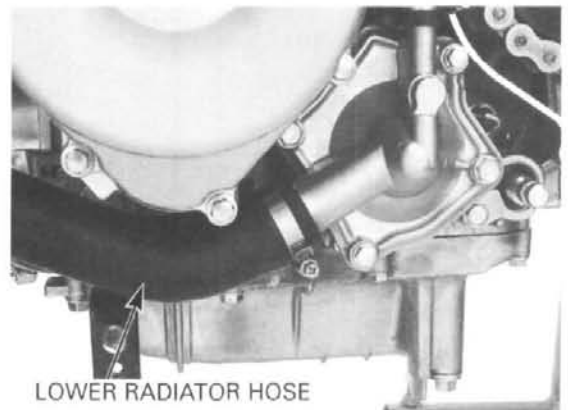


Remove the wire band and release the brake light wire from the seat rail.

Disconnect the brake light switch 2P (Black) connector.



Disconnect the lower radiator hose from the water pump cover.



Disconnect the oil cooler water hose from the oil cooler.



ENGINE REMOVAL/INSTALLATION

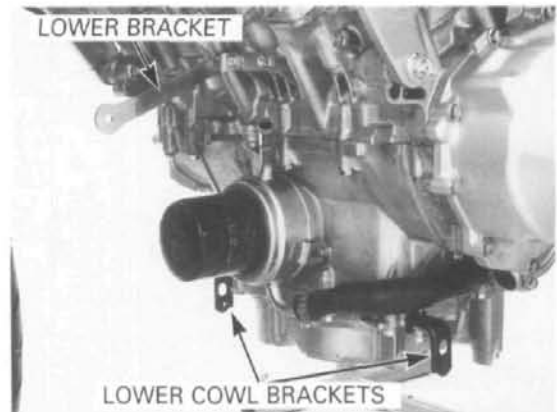
Disconnect the air bleed hose and upper radiator hose from the thermostat housing cover.

Remove the radiator (page 6-8).

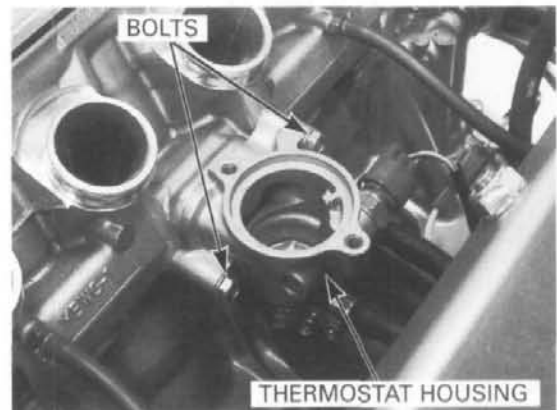


*Avoid damaging
the oil pan.*

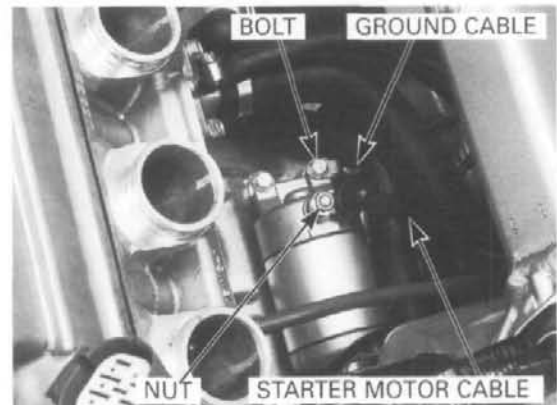
Remove the bolt and radiator lower bracket.
Remove the bolts and lower cowl brackets from the oil pan.



Remove the bolts and thermostat housing from the cylinder head.



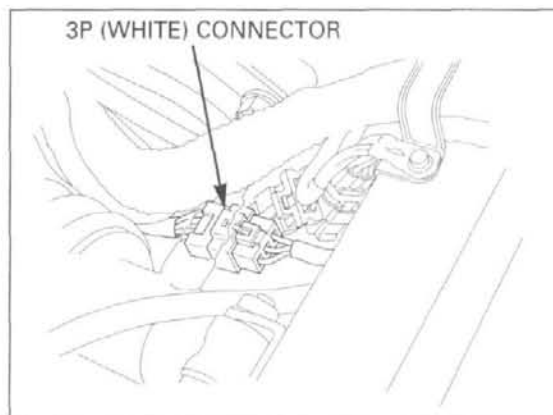
Remove the starter motor mounting bolt and starter motor ground cable.
Remove the terminal nut and starter motor cable.



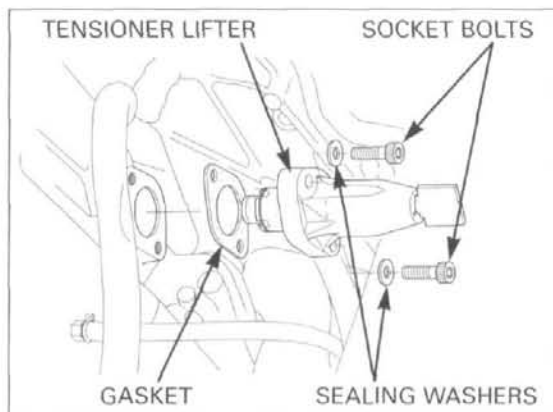
Disconnect the engine sub-harness 12P (Gray) and CMP sensor 2P (Natural) connectors.



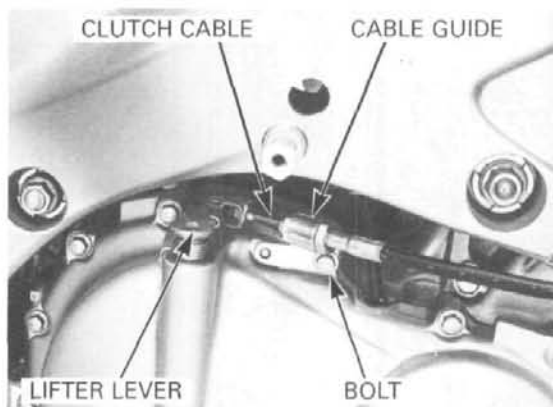
Disconnect the alternator 3P (White) connector.



Remove the socket bolts, sealing washers and cam chain tensioner lifter from the cylinder head.



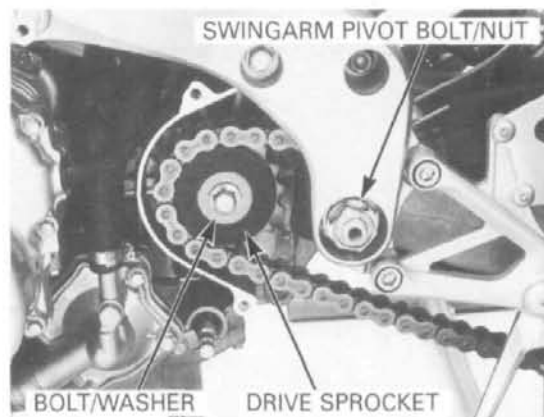
Remove the bolts and clutch cable guide, then disconnect the clutch cable from the clutch lifter lever.



ENGINE REMOVAL/INSTALLATION

Remove the drive sprocket, washer and the drive sprocket with the drive chain from the countershaft.

Remove the swingarm pivot nut and bolt, then loosen the adjusting bolts (page 14-14).



Support the engine using a jack or another adjustable support to ease engine hanger bolt removal.

Remove the right side of the center hanger bolt.
Remove the right side of the rear hanger nut.

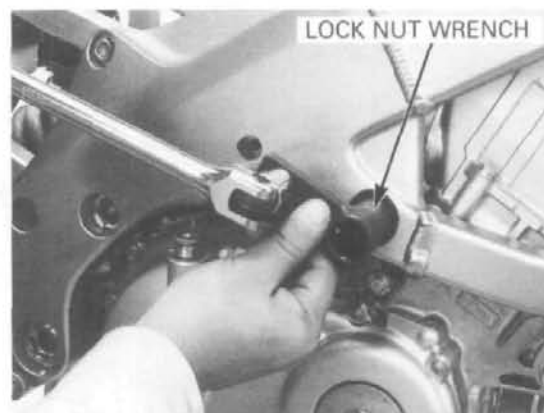


Loosen the center engine hanger adjusting bolt lock nut using the special tool.

TOOL:

Lock nut wrench

07VMA-MBB0100 or
07VMA-MBB0101

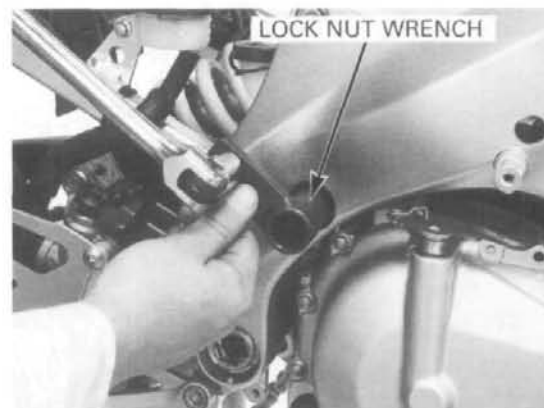


Loosen the rear engine hanger adjusting bolt lock nut using the special tool.

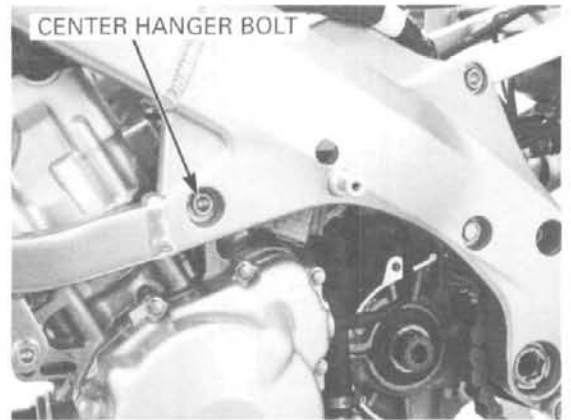
TOOL:

Lock nut wrench

07VMA-MBB0100 or
07VMA-MBB0101

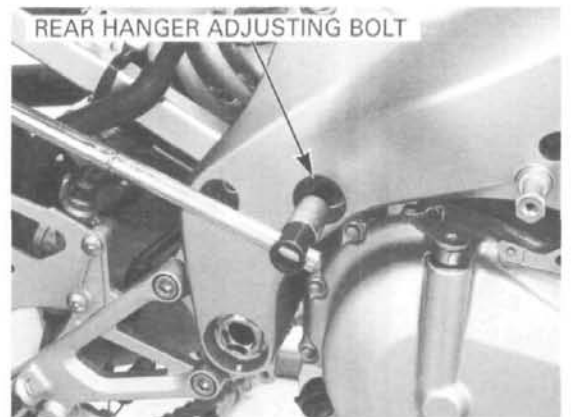


Remove the left side of the center hanger bolt.



Push the right side of the rear hanger bolt until the adjusting bolt can be loosened.

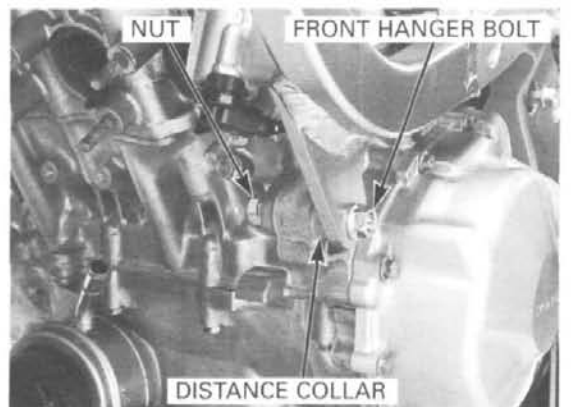
Loosen the rear hanger adjusting bolt.



Loosen the center hanger adjusting bolt.

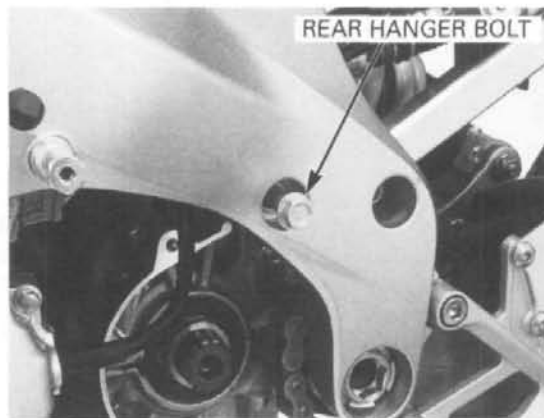


Remove the front engine hanger bolt and distance collar on both sides.



ENGINE REMOVAL/INSTALLATION

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



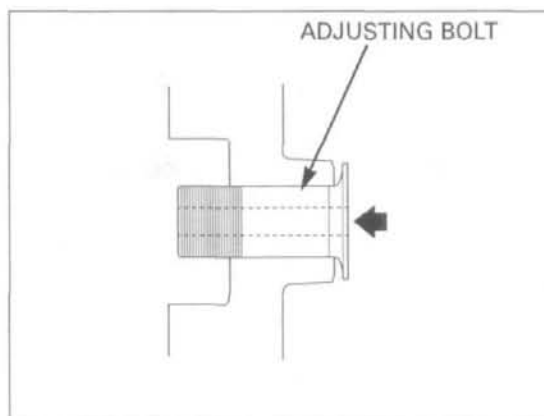
ENGINE INSTALLATION

- Note the direction of the hanger bolts.
- When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 7-2 "SERVICE INFORMATION".
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-23).

NOTICE

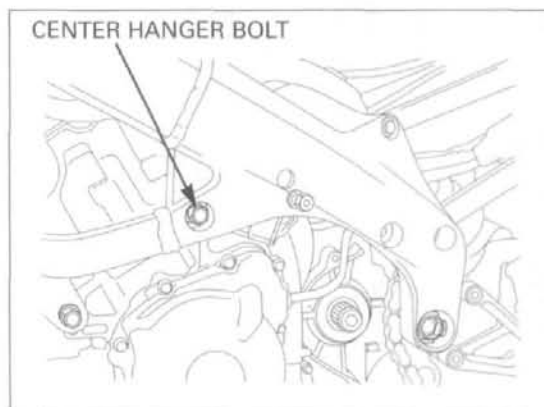
Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described following page. If you make a mistake during the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

Install the engine hanger adjusting bolts fully in from the inside of the frame.

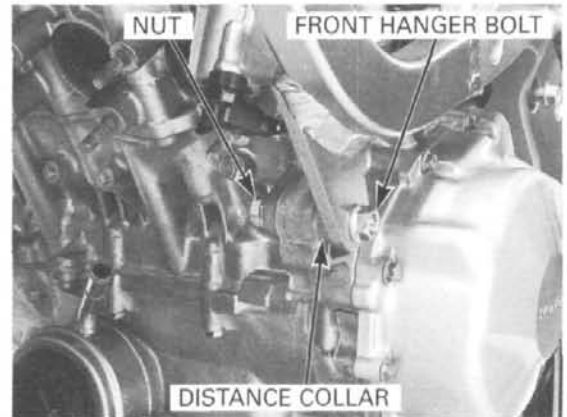


Carefully install the engine into the frame.

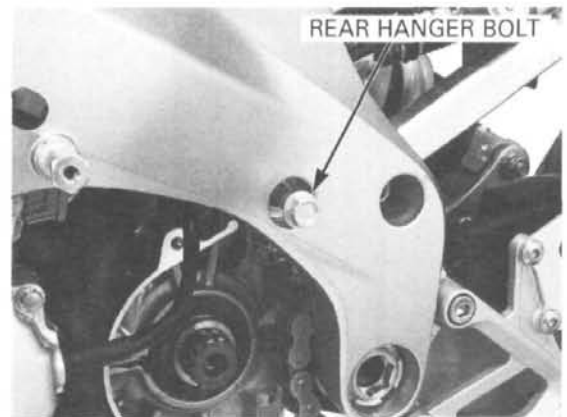
Install the left side of the center hanger bolt.



Install the front hanger distance collar and hanger bolt on both sides.

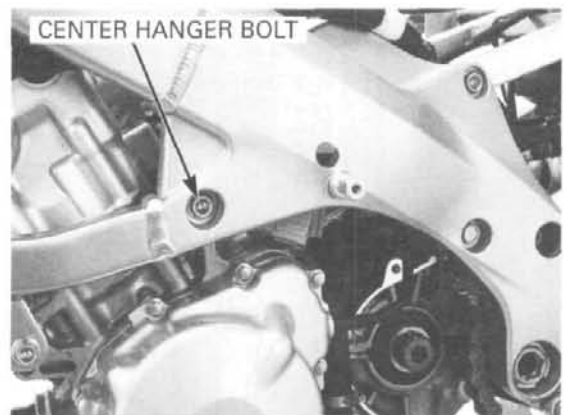


Install the rear engine hanger distance collars and temporarily install the rear engine hanger bolt from the left side.



Tighten the left side center hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

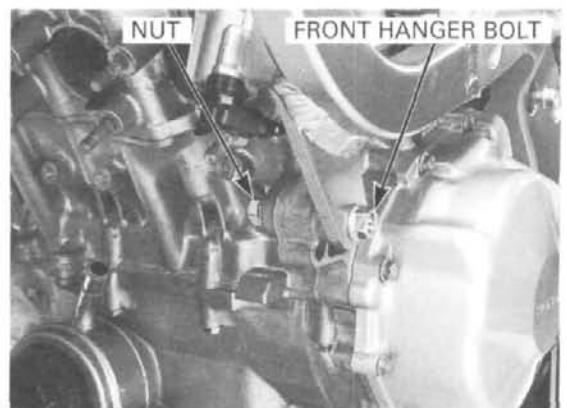


Tighten the left side front engine hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Tighten the right side front engine hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



ENGINE REMOVAL/INSTALLATION

Tighten the right side center hanger adjusting bolt to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

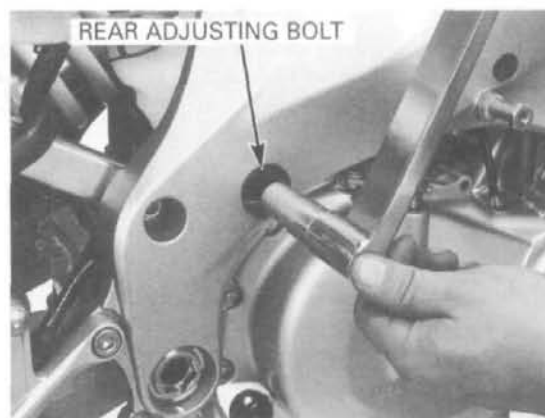
Turn the adjusting bolt out 180° and check that there is no clearance between the adjusting bolt and the engine.



Tighten the right side rear hanger adjusting bolt to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

Turn the adjusting bolt out 180° and check that there is no clearance between the adjusting bolt and the distance collar.



Install and tighten the right side center hanger adjusting bolt lock nut to the specified torque, while holding the adjusting bolt.

TOOL:

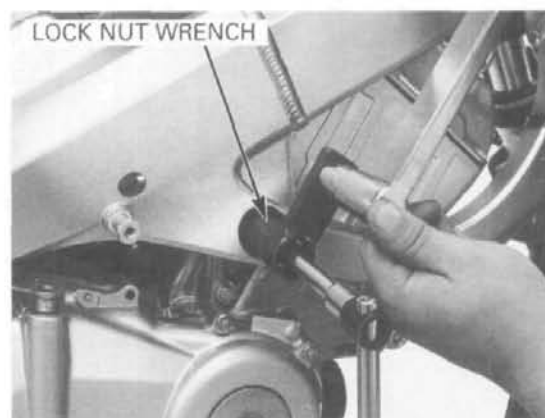
Lock nut wrench

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)



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

TOOL:

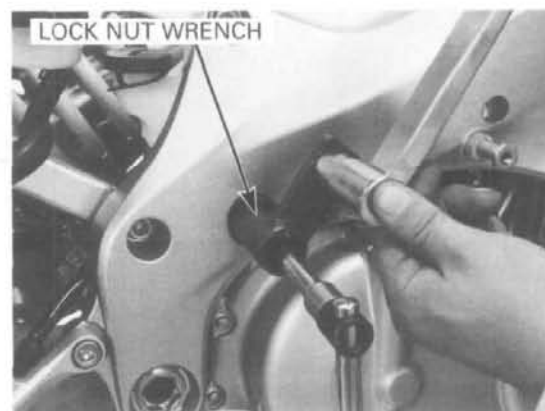
Lock nut wrench

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)



Install and tighten the right side center hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Fully install the rear engine hanger bolt. Install and tighten the rear engine hanger nut to the specified torque.

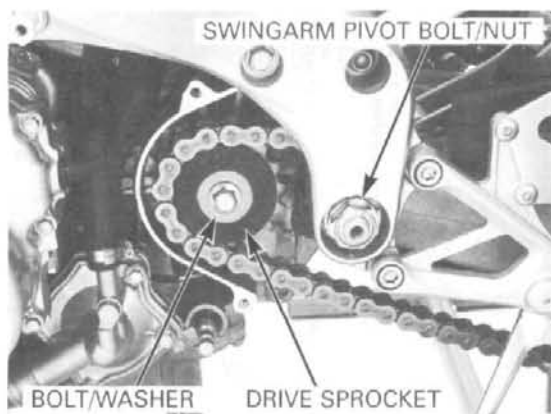
TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install the swingarm between the engine and frame, install and tighten the pivot components (page 14-22).

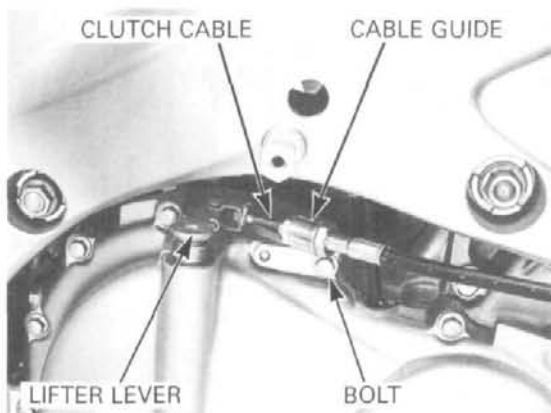
Install the drive sprocket with the drive chain onto the countershaft with the "MT4F" mark facing out. Install the washer and bolt, tighten the bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



Connect the clutch cable to the clutch lifter lever.

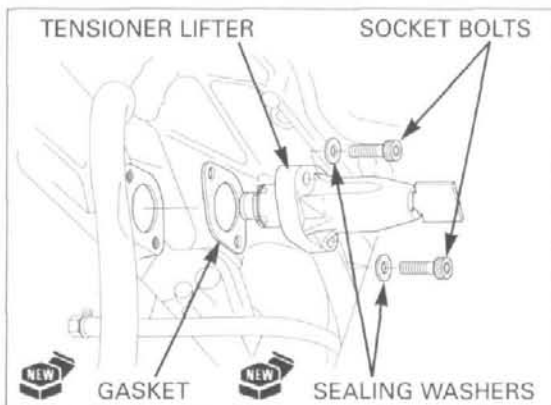
Install the clutch cable guide to the right crankcase cover and tighten the mounting bolts securely.



Install the cam chain tensioner lifter onto the cylinder head.

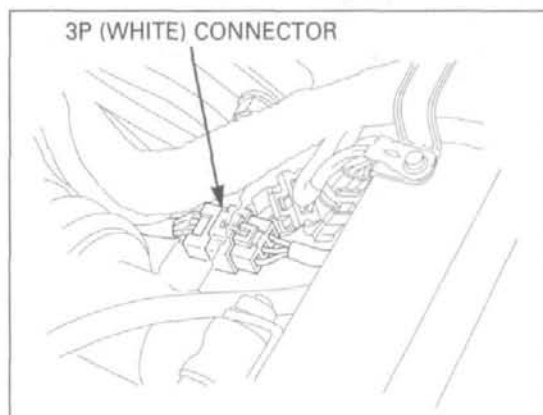
Install the sealing washers and bolts, tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



ENGINE REMOVAL/INSTALLATION

Route the alternator wire properly, connect the alternator 3P (White) connector.

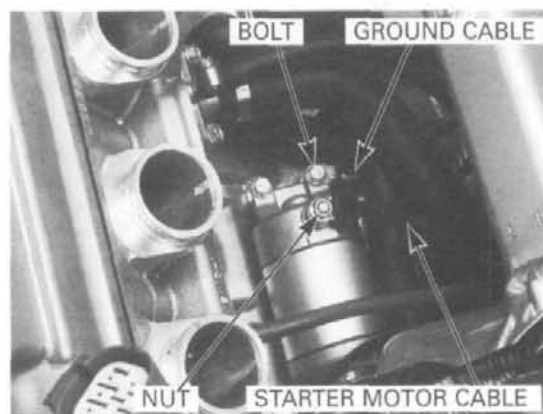


Connect the engine sub-harness 12P (Gray) connector and CMP sensor 2P (Natural) connector.



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)

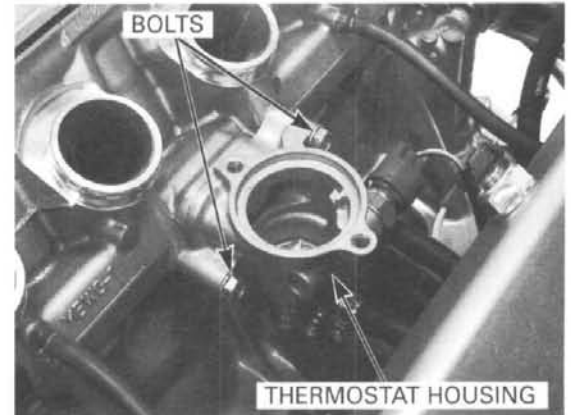


Install a new O-ring into the thermostat housing groove. Install the thermostat housing to the cylinder head.



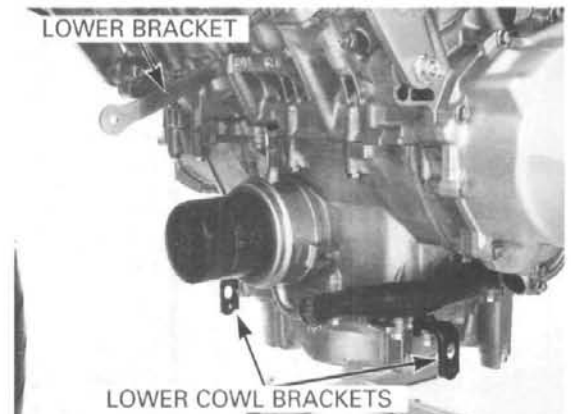
Install and tighten the thermostat housing mounting bolts.

Install the thermostat and thermostat housing cover (page 6-7).



Install the lower cowl brackets onto the oil pan, tighten the bolts.

Install the radiator lower bracket to the cylinder block, tighten the bolts securely.



Install the radiator assembly (page 6-11).

Connect the air bleed hose and upper radiator hose to the thermostat housing cover and tighten the hose band screw.

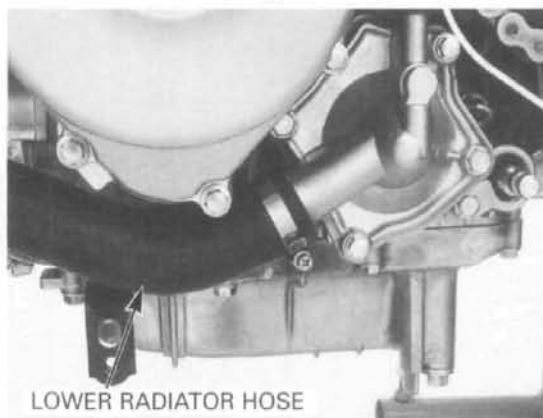


Connect the oil cooler water hose to the oil cooler, tighten the hose band screw securely.



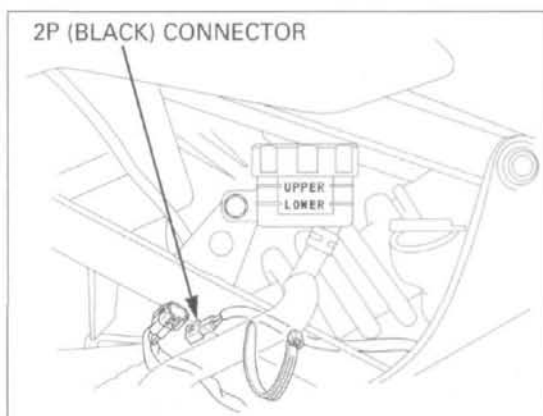
ENGINE REMOVAL/INSTALLATION

Connect the lower radiator hose to the water pump cover and tighten the hose band screw securely.



LOWER RADIATOR HOSE

Connect the rear brake light switch 2P (Black) connector.
Clamp the brake light switch wire with the wire band.



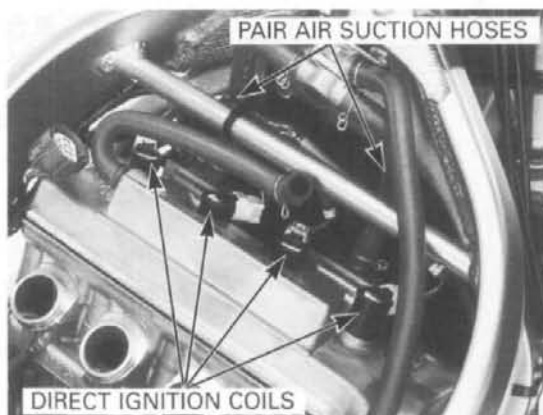
2P (BLACK) CONNECTOR

Install the direct ignition coils into the spark plug holes and connect the ignition coil connectors.
Connect the PAIR air suction hoses to the reed valve covers.

Install the fuel tank (page 5-57).

Add the recommended engine oil to the proper level (page 3-14).

Fill the cooling system with the recommended coolant and bleed any air (page 6-4).

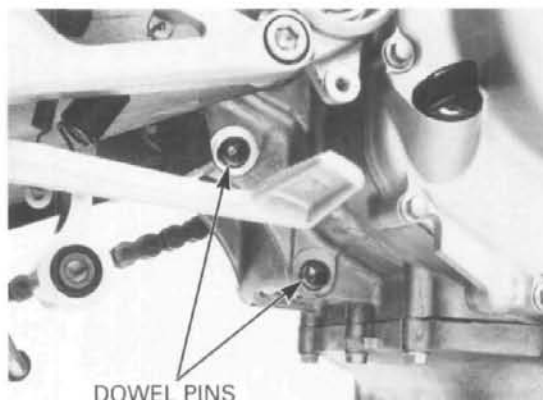


PAIR AIR SUCTION HOSES

DIRECT IGNITION COILS

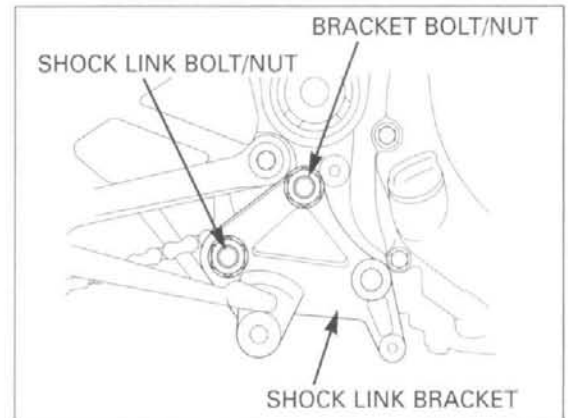
SHOCK LINK LOWER BRACKET INSTALLATION

Install the four dowel pins into the shock link bracket bolt holes in the engine.



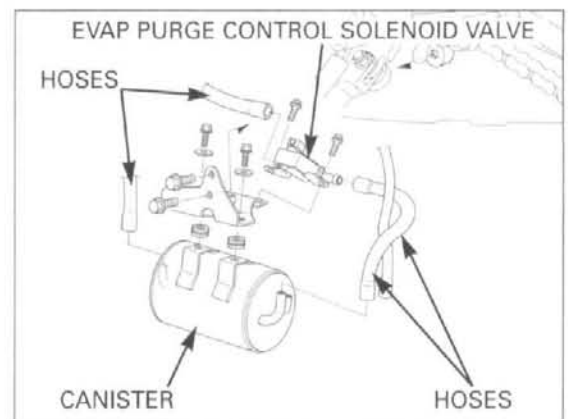
DOWEL PINS

Install the right and left shock link lower brackets onto the engine.
Install the shock link lower bracket bolt and nut.
Install the shock link lower mounting socket bolt and nut.



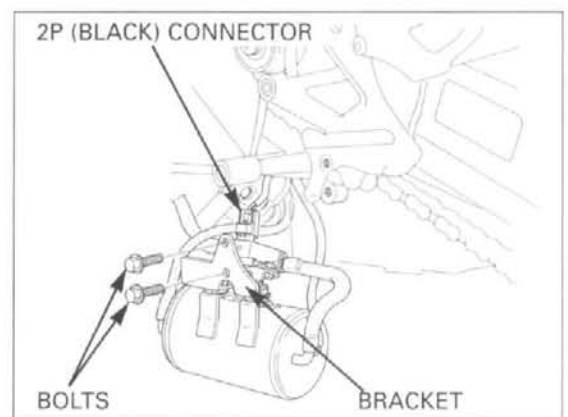
California type only:

Connect the EVAP canister hose and EVAP purge control solenoid valve hoses.

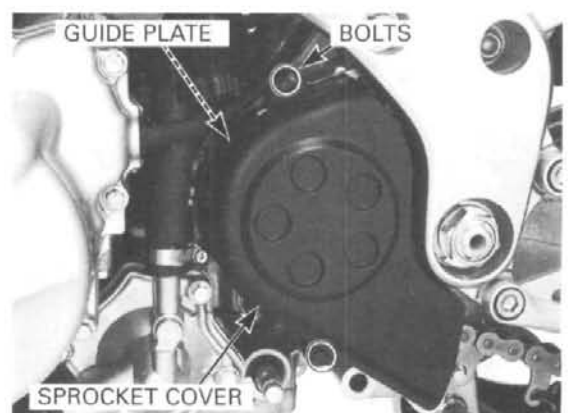


Connect the EVAP purge control solenoid valve 2P (Black) connector.

Install the EVAP canister bracket assembly to the shock link bracket and tighten the bolt securely.



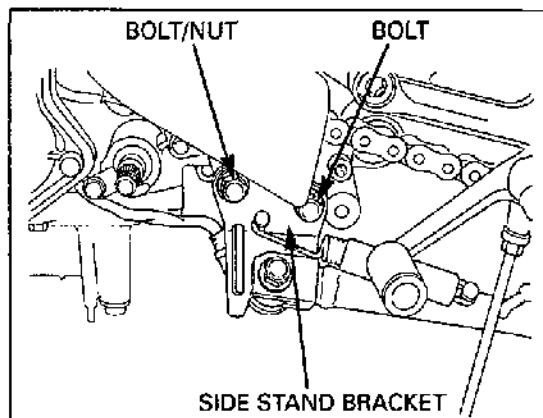
Install the drive chain guide plate and drive sprocket cover, tighten the bolts securely.



ENGINE REMOVAL/INSTALLATION

Install the side stand bracket and then install the side stand bracket/shock link lower bracket mounting bolt from the left side.
Install the nut.

Install the side stand bracket mounting bolt.

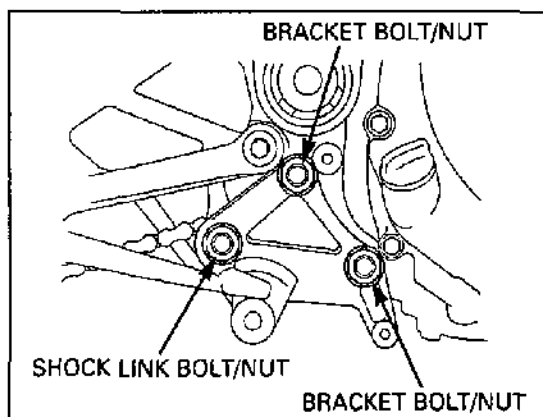


Tighten the shock link lower bracket nuts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

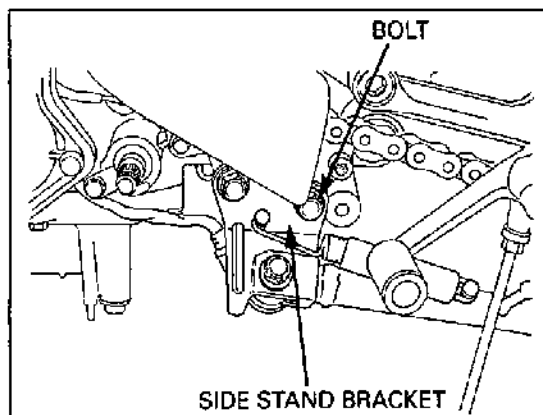
Tighten the shock link-to-lower bracket nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

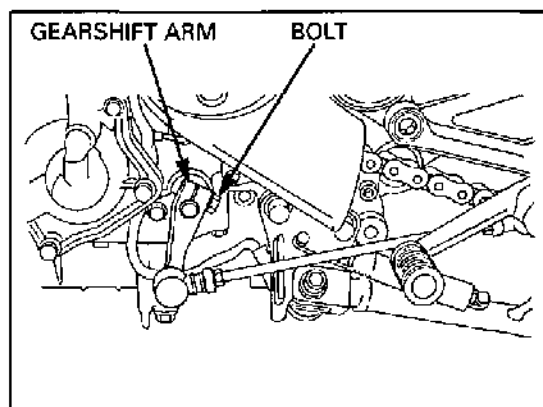


Tighten the side stand bracket bolt to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



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.



Route the side stand wire properly, connect the side stand switch 2P (Green) connector.

Install the following:

- Throttle body (page 5-86)
- Muffler/exhaust pipe (page 2-29)

Install the removed parts in the reverse order of removal.

