

7. ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

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7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A floor jack or other adjustable support is required to support and maneuver the engine.
Be careful not to damage the machine body, cables and wires during engine removal.
- Use shop towels to protect the machine body during engine removal.
- The following components require engine removal for serviced with the engine installed in the frame.
 - Oil pump (Chapter 4)
 - Water pump (Chapter 6)
 - Cylinder head (Chapter 8)
 - Cylinder/Piston (Chapter 9)
 - Drive and driven pulleys/clutch (Chapter 10)
 - Alternator/Starter clutch (Chapter 17 and 19)
- The following components require engine removal for service.
 - Transmission (Chapter 11)
 - Crankshaft/Crankcase/Balance shaft (Chapter 12)

TORQUE VALUES

Engine mounting bolt/nut	6 kgf-m (60 N-m, 43.5 lbf-ft)
Engine hanger nut	3.5 kgf-m (35 N-m, 25 lbf-ft)
Front propeller shaft bolt	4.5 kgf-m (45 N-m, 32.5 lbf-ft)

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Drain engine oil (refer to the “**ENGINE OIL**” section in the chapter 3).

Remove frame covers and exhaust pipe (refer to the “**FRAME COVERS**” section in the chapter 2).

Drain the engine coolant (refer to the “**COOLANT REPLACEMENT**” section in this chapter).

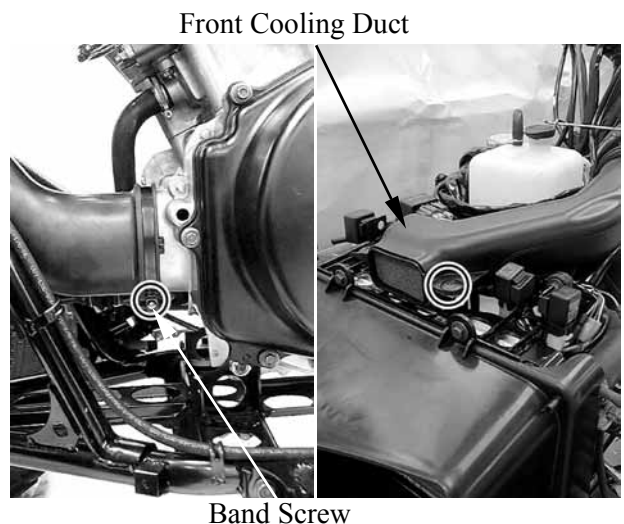
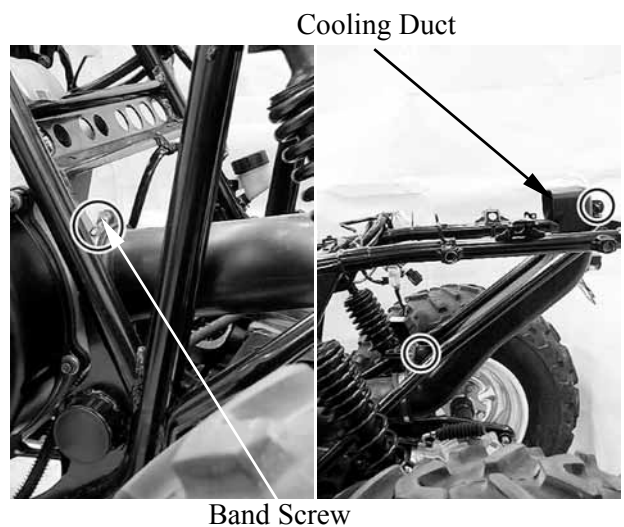
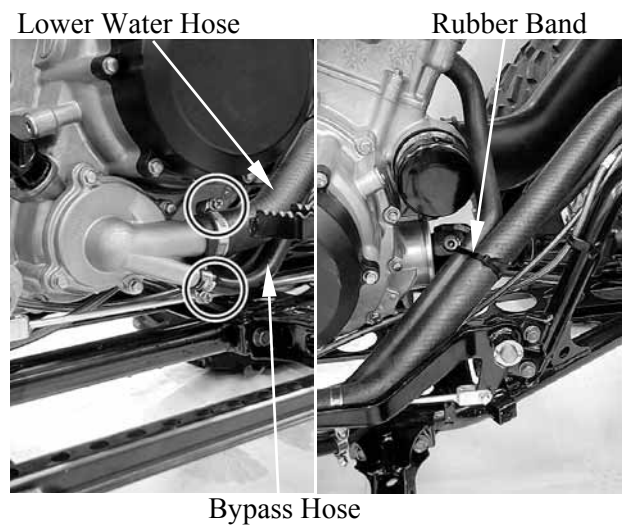
Remove the air cleaner housing and carburetor (refer to the “**CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION**” and “**AIR CLEANER HOUSING**” sections in the chapter 5).

Disconnect the lower water hose and bypass hose from water pump cover.

Cut the rubber band off on the water hose.

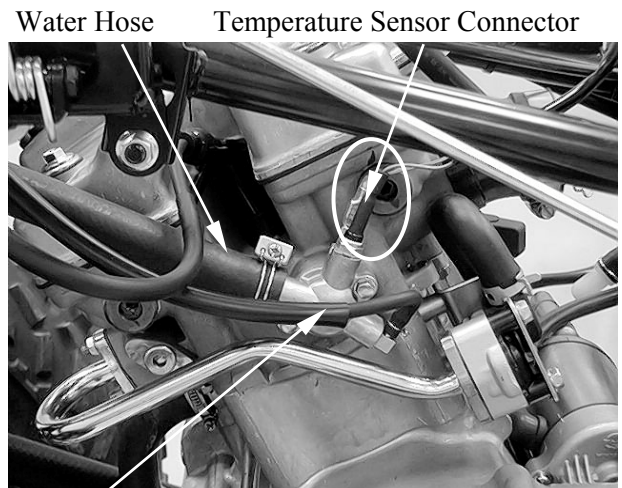
Loosen the band screw and remove the two mounting bolts from the rear cooling duct, then remove the rear cooling duct.

Loosen the band screw and remove the fastener from the front cooling duct, then remove the front cooling duct.



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Disconnect the water hose, bleed hose and water temperature sensor connectors from water joint.



Bleed Hose

Remove the spark plug cap and disconnect the AICV air supply hose from cylinder head.



AICV Air Supply Hose

Remove the bolt/nut from drive select rod. Remove the mounting nuts from the drive select lever guide, then remove the guide and rod.



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Disconnect the breather hose from cylinder head cover and remove the mounting nut from breather housing holder, then remove the breather housing.

Breather Hose



Disconnect the vacuum hose from intake pipe.
Slide the rubber sleeve back to expose the starter motor wire nut.
Remove the starter motor cable nut for disconnect the starter motor cable.
Remove the bolt and then disconnect the engine ground cable from starter motor.

Vacuum Hose Starter Cable

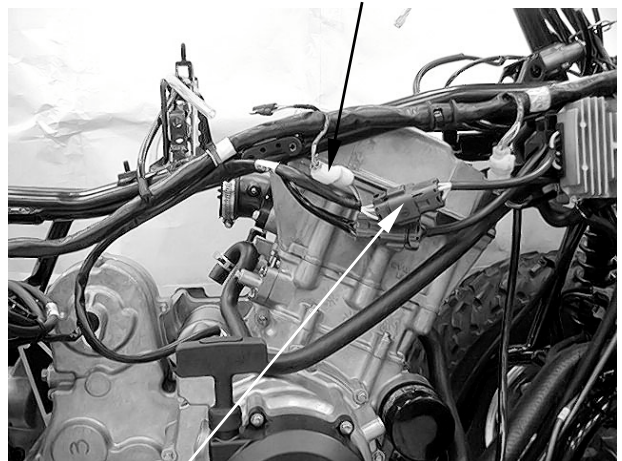


Rubber Sleeve

Engine Ground Cable

Remove the A.C. Generator and ignition pulse generator connectors.

Ignition Pulse Generator



A.C. Generator Connector

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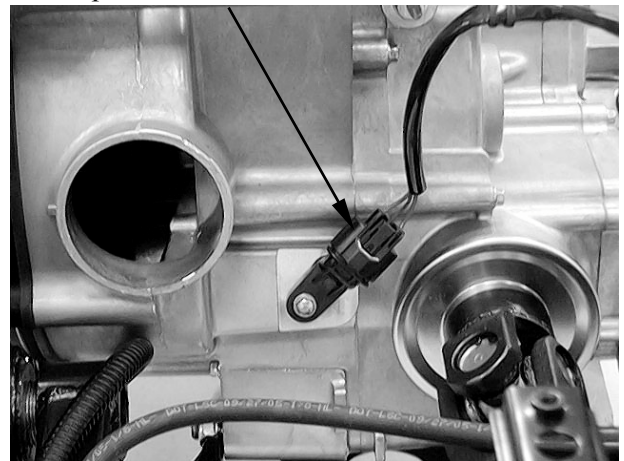
Disconnect the gear indicator light switch connector.



Gear Indicator Light Switch Connector

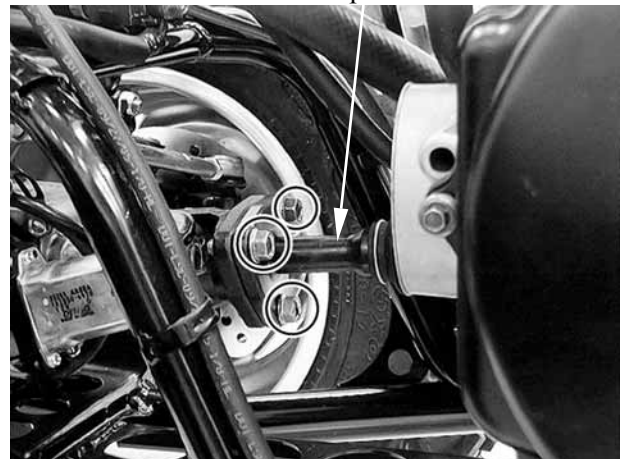
Disconnect the speed sensor connector.

Speed Sensor Connector



Remove the bolts and then remove the front propeller shaft from the engine assembly.

Front Propeller Shaft



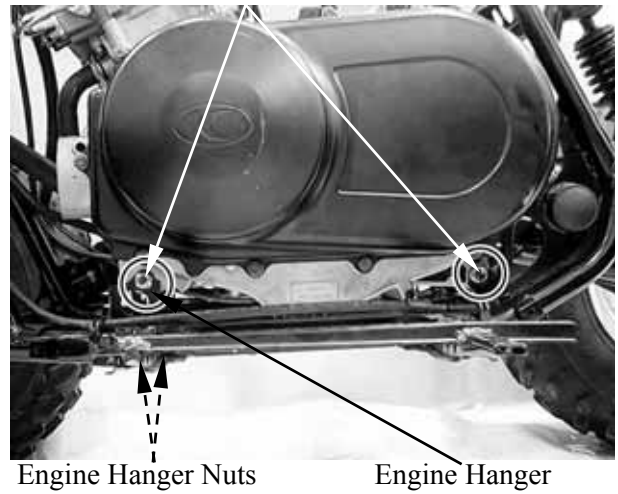
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Remove the front lower engine mounting bolt/nut.

Remove the four nuts under right and left engine hangers, then remove the engine hangers.

Remove the rear lower engine mounting bolt/nut.

Lower Engine Mounting Bolt/Nut



Remove the upper engine mounting bolt/nut.



Rise the engine front side and move the engine forward, then remove the engine from the frame by disengaging the rear drive gear case.



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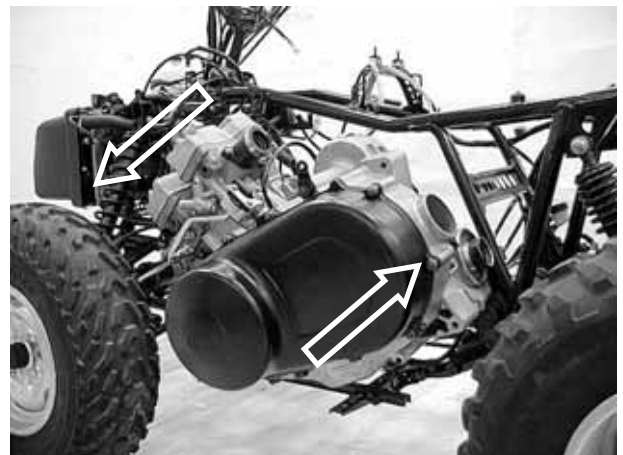
Tap the rear propeller shaft with rubber hammer and remove the rear propeller shaft from the engine assembly.

* Take care not to lose the compression spring in the rear drive gear case end.

Rear Propeller Shaft



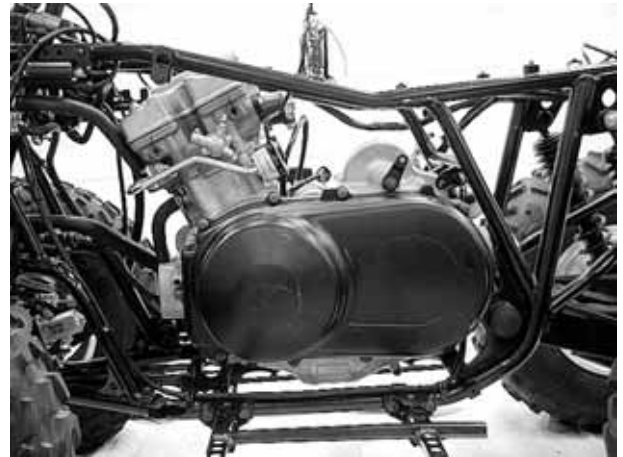
Lower the cylinder head and rise the engine rear side, then move the engine from the frame left side.



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ENGINE INSTALLATION

Install the engine assembly into the frame.

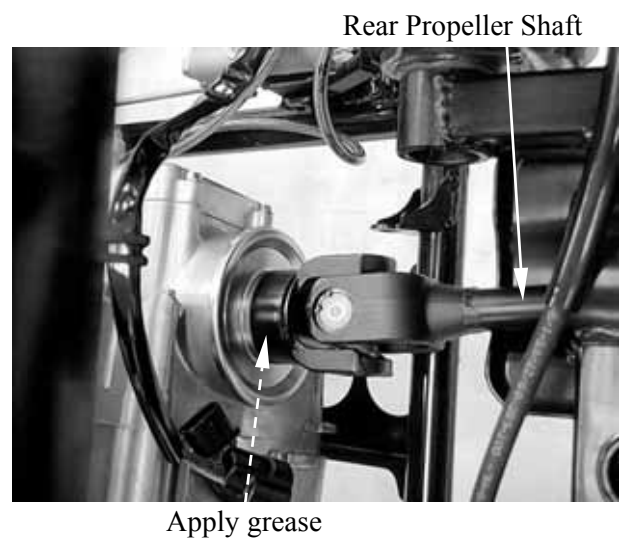


Apply lightweight lithium-soap base grease to the rear propeller shaft splines.



Install the rear propeller shaft into the engine assembly.

* Apply lightweight lithium-soap base grease to the rear output shaft splines.



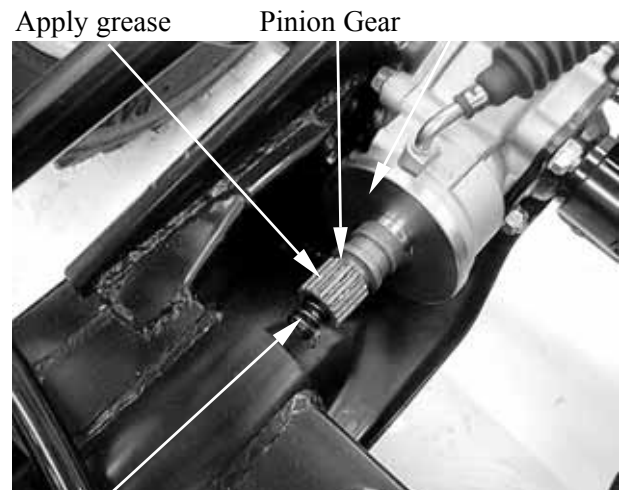
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Install the compression spring into the pinion gear.

- * Apply lightweight lithium-soap base grease to the pinion gear splines.

Move the engine rearward and engage the rear propeller shaft into the pinion gear.

- * Install the joint boot securely.



Compression Spring

Install the upper engine mounting bolt and nut loosely.



Lower Engine Mounting Bolt/Nut

Install the rear lower engine mounting bolt and nut loosely.

Install the engine hangers and four engine hanger nuts loosely.

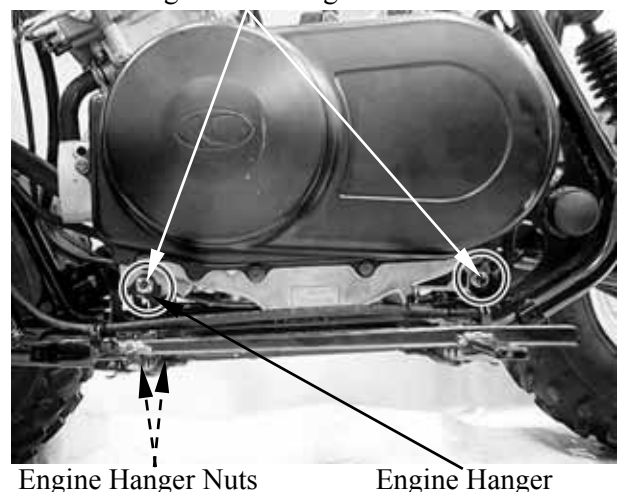
Install the front lower engine mounting bolt and nut loosely.

Tighten the four engine hanger nuts to the specified torque.

Torque: 3.5 kgf-m (35 N-m, 25 lbf-ft)

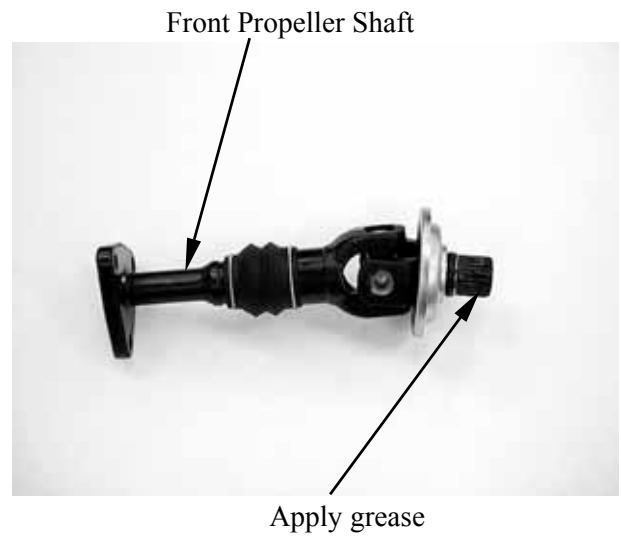
Tighten the all engine mounting bolts and nuts to the specified torque.

Torque: 6 kgf-m (60 N-m, 43.5 lbf-ft)



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Apply lightweight lithium-soap base grease to the front propeller shaft splines and front output splines.



Install the front propeller shaft into the engine assembly.
Install and tighten the three new bolts to specified torque.

- * Always install the bolts with the new ones.

Torque: 4.5 kgf-m (45 N-m, 32.5 lbf-ft)



Install the front cooling duct.

- * Make sure the lug on the left crankshaft case into the cutout on the front cooling duct.



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Install the rear cooling duct.

- * Make sure the lug on the left crankshaft case into the cutout on the rear cooling duct.

Install the removed parts in the reverse order of removal.

Route the water hoses, wire and cable properly (refer to the “**CABLE & HARNESS ROUTING**” section in the chapter 1).

Adjusting the following items:

- Engine oil (refer to the “**ENGINE OIL**” section in the chapter 3).
- Engine coolant (refer to the “**COOLANT REPLACEMENT**” section in this chapter).

