

ENGINE REMOVAL AND INSTALLATION

SERVICE TOOLS

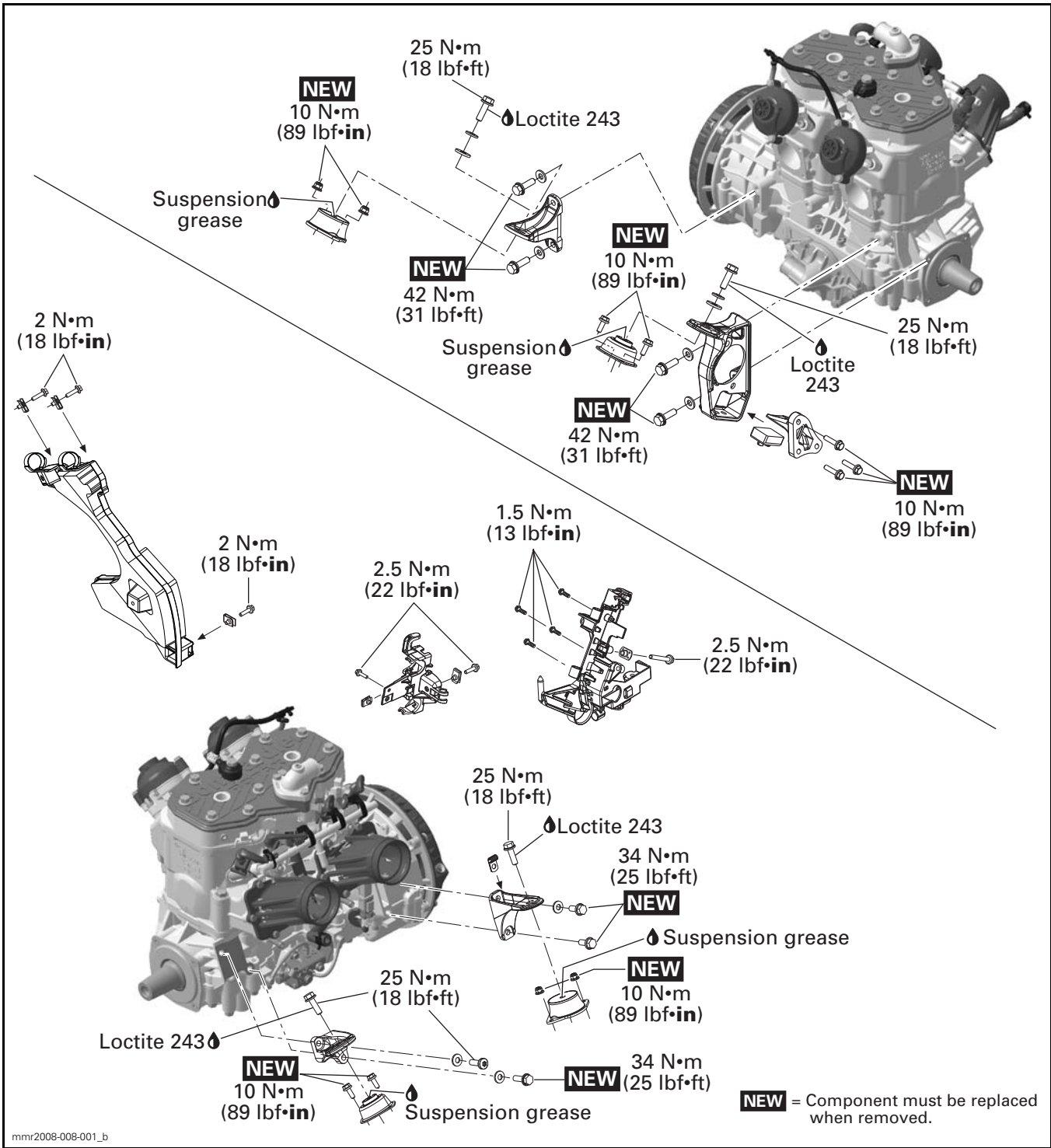
Description	Part Number	Page
ENGINE LIFTING HOOK.....	529 035 829	7, 12, 16–18
ENGINE LIFTING RING	529 035 830	7, 16–17
ENGINE LIFTING TOOL	529 036 131	12, 16, 18
SMALL HOSE PINCHER	295 000 076	6, 8, 13

SERVICE PRODUCTS

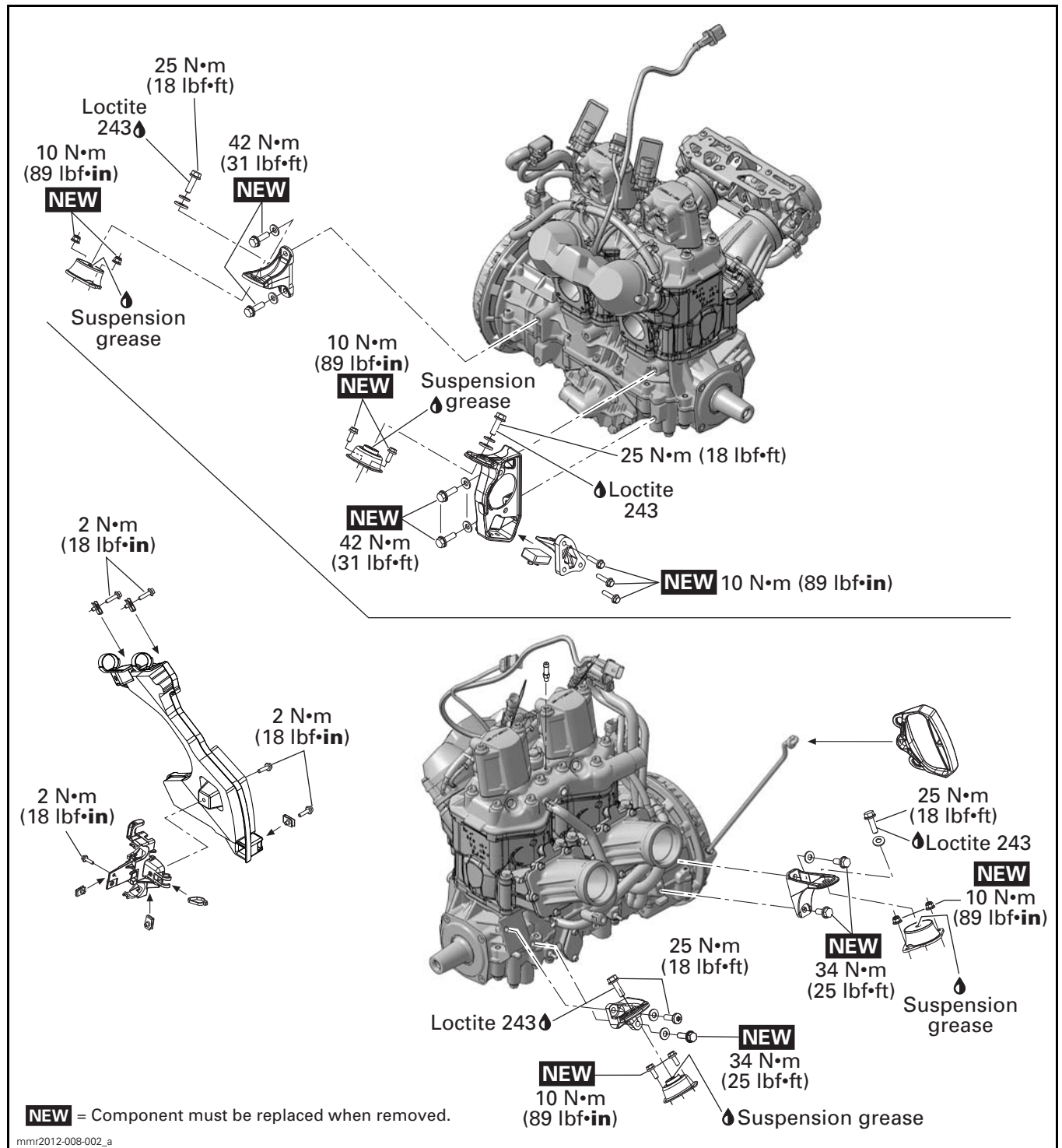
Description	Part Number	Page
LOCTITE 243 (BLUE).....	293 800 060	16

Subsection XX (ENGINE REMOVAL AND INSTALLATION)

600 and 800R Power TEK



600 HO E-TEC and 800R E-TEC



Subsection XX (ENGINE REMOVAL AND INSTALLATION)

GENERAL

During assembly/installation, use the torque values and service products as shown in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pin, etc.) must be replaced with new ones.

NOTICE Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

ENGINE

Engine Removal

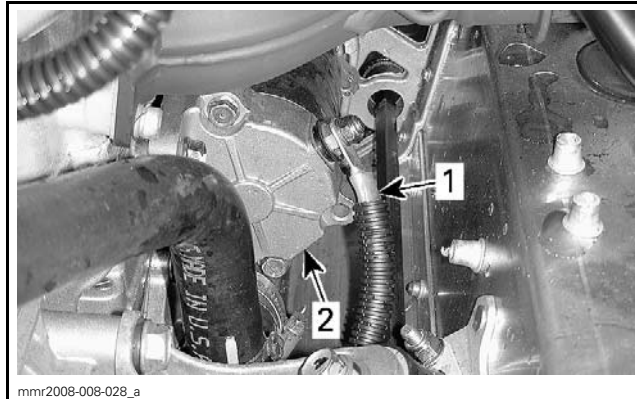
600 and 800R Power TEK

1. Place vehicle at workstation that will have access to an engine-lifting hoist.
2. Refer to *BODY* subsection and remove the following:
 - LH and RH side panels
 - Hood
 - Front bottom pan cover.
3. On **vehicle with electric starter**, remove the negative cable (–) from battery.



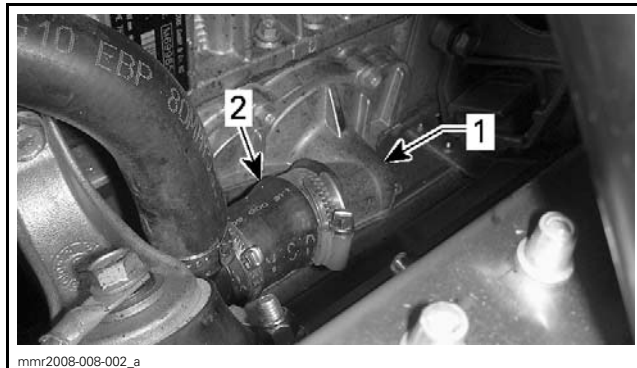
1. Negative cable

4. Remove muffler and tuned pipe. Refer to *EX-HAUST SYSTEM* subsection.
5. Remove the driven pulley. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.
6. On **vehicle with electric starter**, remove starter cable from starter.



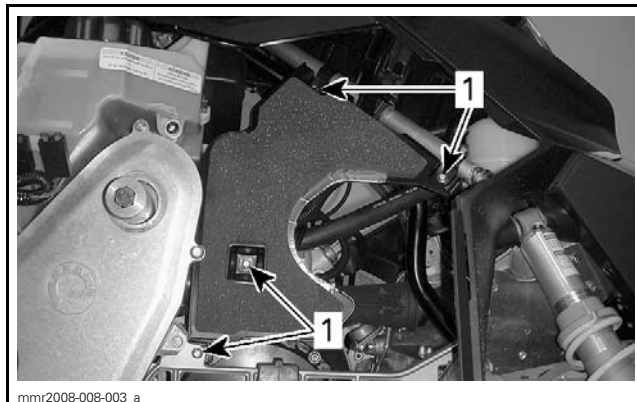
1. Starter cable
2. Starter

7. Disconnect water pump hose to drain engine.



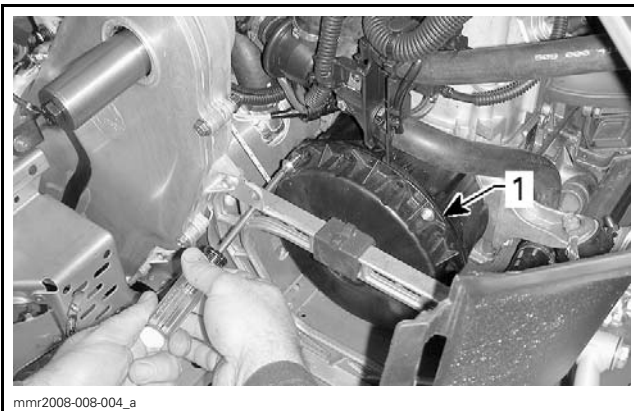
1. Water pump cover
2. Remove this hose

8. Remove the acoustic panel on the RH side of vehicle.



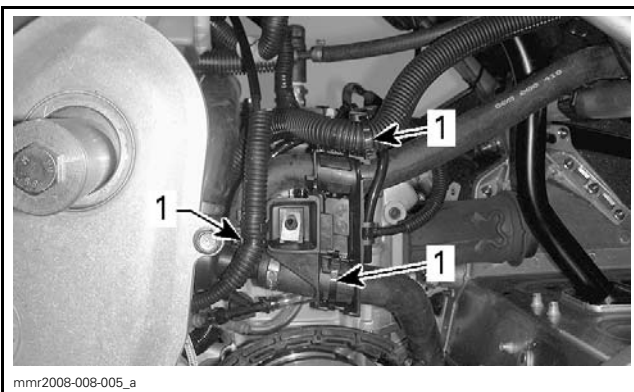
1. Acoustic panel screws

9. On **applicable models**, remove rewind starter cover screws and place rewind starter housing aside.



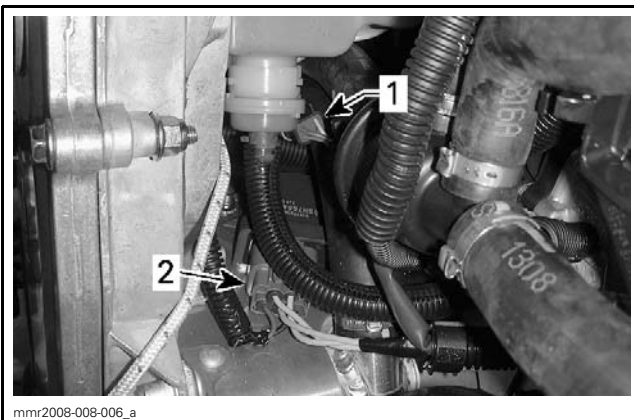
1. Rewind starter cover

10. Cut locking ties securing coolant hose and wiring harness to RAVE™ solenoid support.



1. Locking ties to remove

11. Detach hoses from support.
12. On **800R Power TEK models**, unplug RAVE solenoid connector.
13. Unplug trigger coil and magneto connectors.

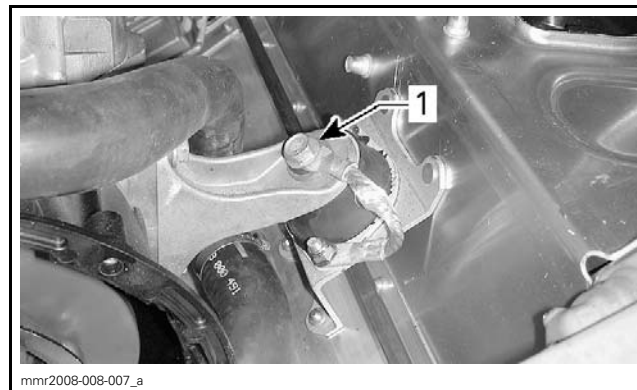


CONNECTORS LOCATED BEHIND CHAINCASE

1. Trigger coil connector
2. Magneto connector

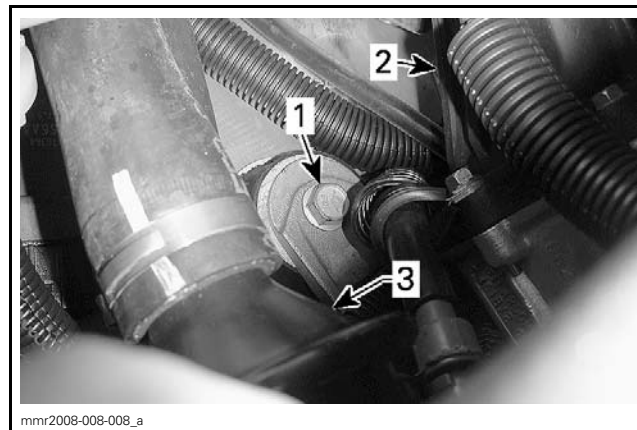
14. Remove **YELLOW** wires from the magneto connector.

15. Remove and discard screws securing MAG engine supports to front and rear rubber mounts.



FRONT MAG SUPPORT

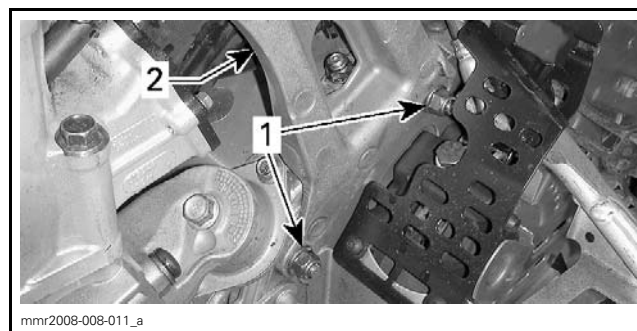
1. Front engine support screw



REAR MAG SUPPORT

1. Rear engine support screw
2. Intake adapter
3. Thermostat housing

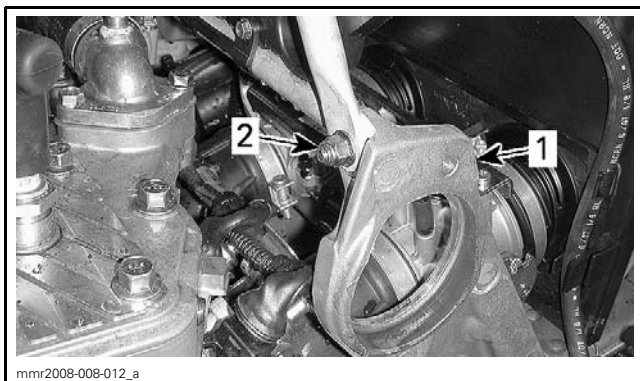
16. Remove nuts securing the bottom of counter-shaft bearing support.



1. Nuts to remove
2. Countershaft bearing support

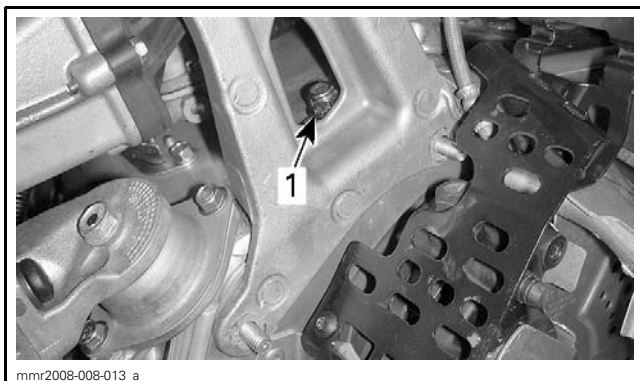
17. Remove bolt retaining the top of countershaft bearing support.

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



1. Countershaft bearing support
2. Upper bolt

18. Loosen lower nut located behind support.

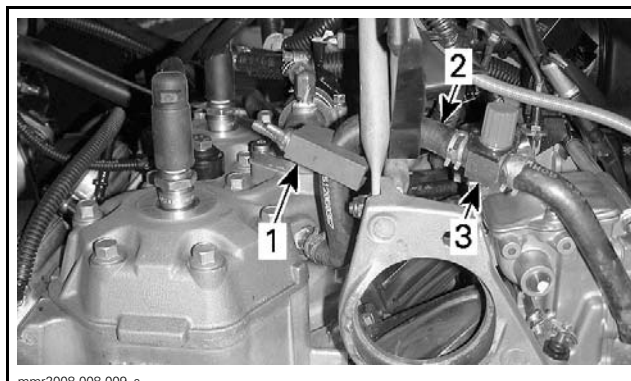
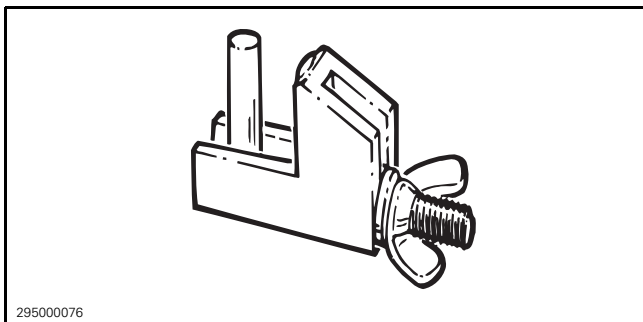


1. Loosen this nut

19. Remove the countershaft bearing support.

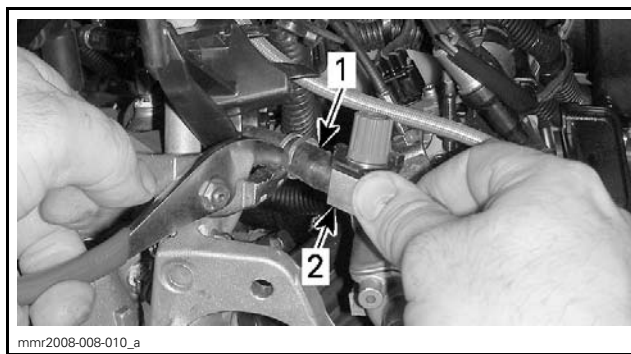
20. Remove the primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

21. Install a SMALL HOSE PINCHER (P/N 295 000 076) on heater hose.



1. Hose pincher
2. Heater hose
3. Heater valve

22. Disconnect heater hose from heater valve.



1. Heater hose
2. Heater valve

23. Unscrew clamps securing carburetors to intake adapters.

24. Move and attach carburetors aside.

25. Unplug the coolant temperature sensor (CTS) connector.



1. CTS connector

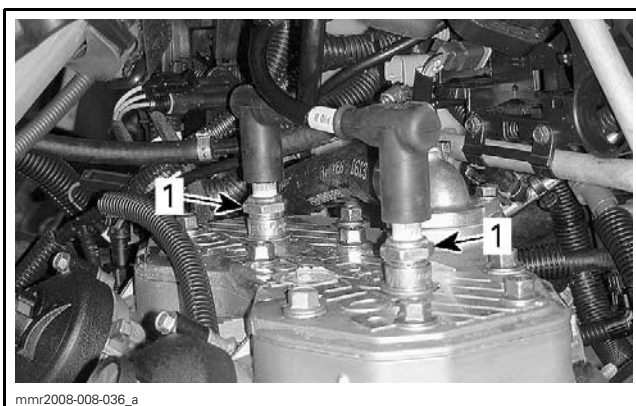
26. On **800R Power TEK** models, remove the knock sensor.

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



1. Knock sensor screw

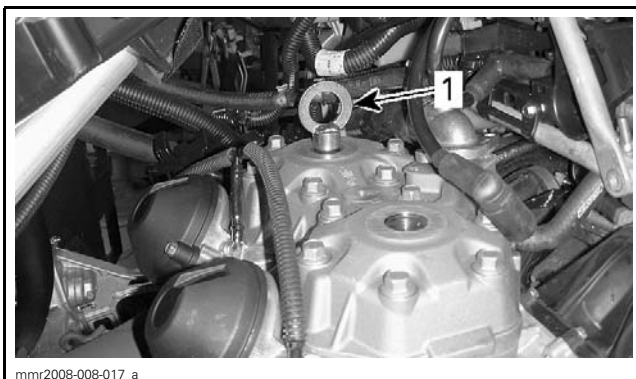
27. Remove both spark plugs.



1. Spark plugs

28. Remove the elbow on cylinder head cover.

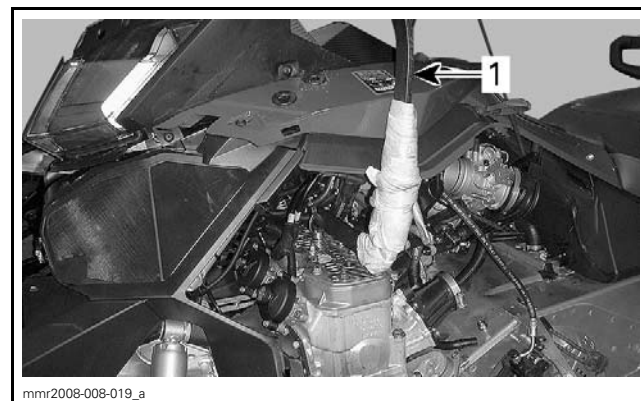
29. Install the ENGINE LIFTING RING (P/N 529 035 830) in spark plug hole (PTO side).



1. Spark plug lift ring

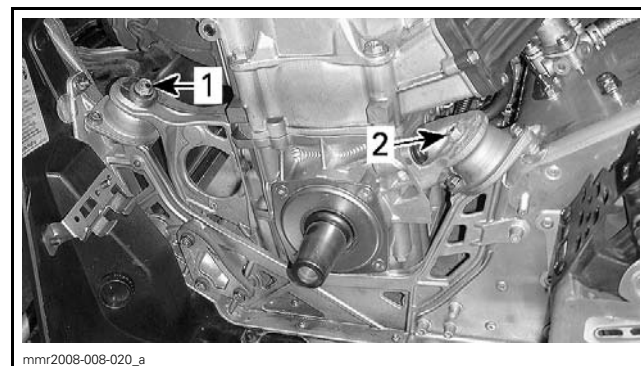
30. On models equipped with a high wind-shield, remove it to avoid scratches during engine removal.

31. Install the ENGINE LIFTING HOOK (P/N 529 035 829).



1. Engine removal hook

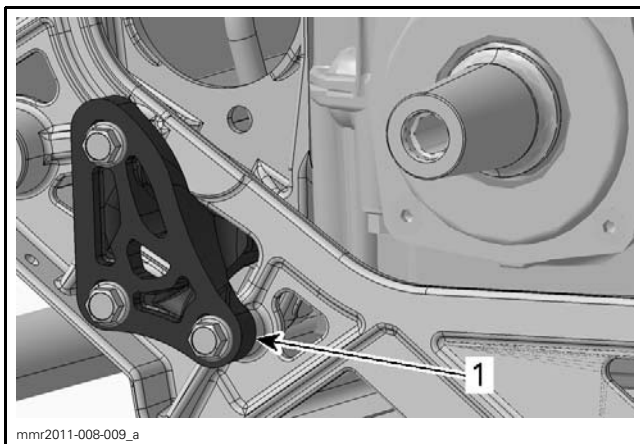
32. Remove and discard screws securing PTO engine supports to front and rear rubber mounts.



1. Front engine support screw
2. Rear engine support screw

33. Remove engine stopper. Discard screws.

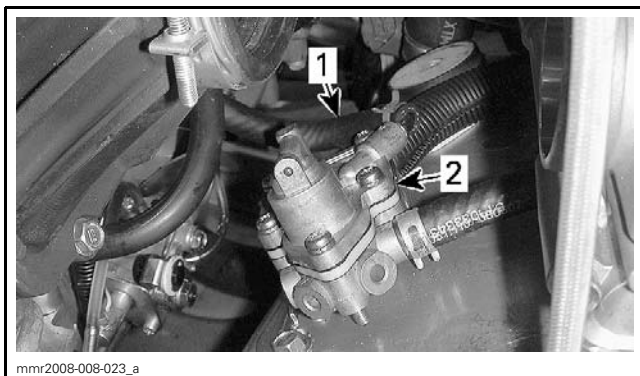
Subsection XX (ENGINE REMOVAL AND INSTALLATION)



1. Engine stopper

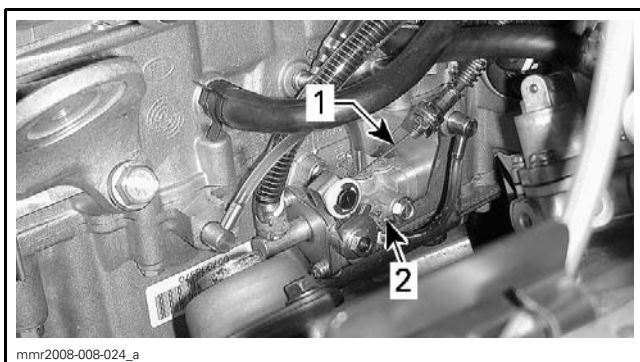
34. Slightly lift the engine.

35. Remove pulse line from fuel pump.



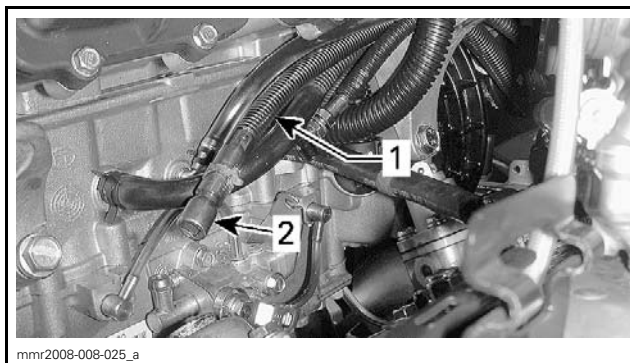
1. Pulse line
2. Fuel pump

36. Detach oil pump cable from oil injection pump.



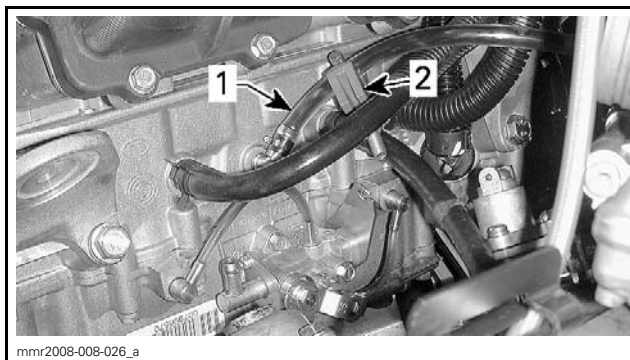
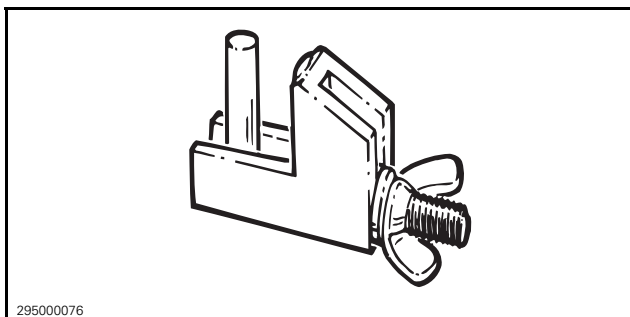
1. Oil pump cable
2. Oil injection pump

37. Unplug oil injection inlet hose (hose with a spring) and plug it with an extension (1/4" drive).



1. Inlet hose
2. Extension

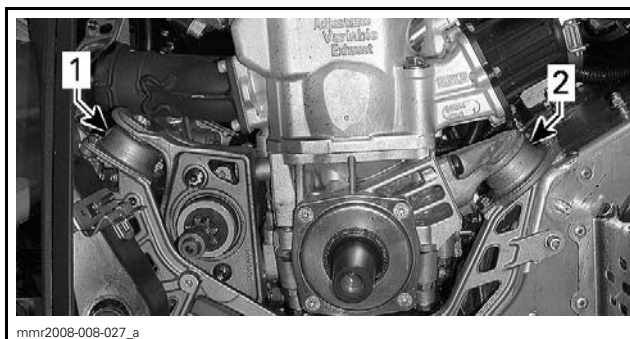
38. Install a SMALL HOSE PINCHER (P/N 295 000 076) on oil injection outlet hose.



1. Outlet hose
2. Hose pincher

39. Disconnect the outlet hose.

40. Remove PTO rubber mounts.



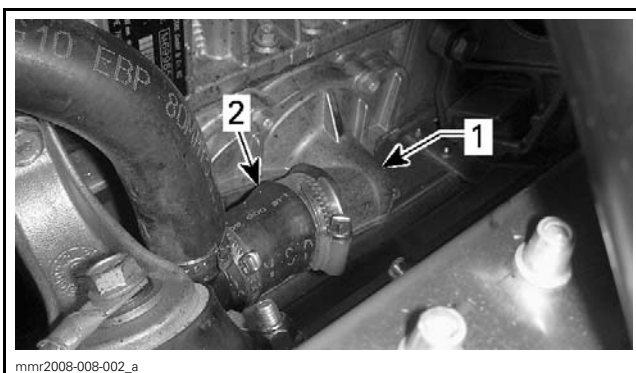
1. Front rubber mount
2. Rear rubber mount

41. Lift and slide out engine.

Engine Removal

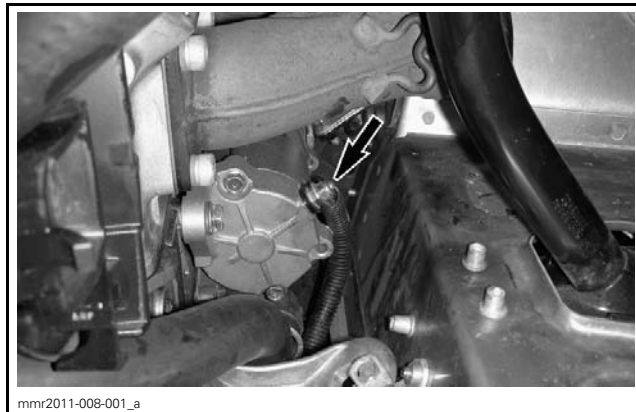
600 HO E-TEC and 800R E-TEC

1. Place vehicle at workstation that will have access to an engine-lifting hoist.
2. Remove fuel pressure using B.U.D.S. software. Refer to *ELECTRIC FUEL PUMP* in *FUEL TANK AND FUEL PUMP* subsection.
3. Refer to *BODY* subsection and remove:
 - LH and RH side panels
 - Hood
 - Front bottom pan cover.
4. Refer to *AIR INTAKE SYSTEM* subsection and remove:
 - Secondary air intake silencer
 - Primary air intake silencer.
5. Refer to *EXHAUST SYSTEM* subsection and remove:
 - Muffler
 - Tuned pipe.
6. Remove drive pulley. Refer to *DRIVE PULLEY* subsection.
7. Refer to *DRIVEN PULLEY AND COUNTER-SHAFT* subsection and remove:
 - Driven pulley
 - Countershaft bearing support.
8. Place a drain pan under engine compartment.
9. Disconnect water pump hose to drain engine coolant.

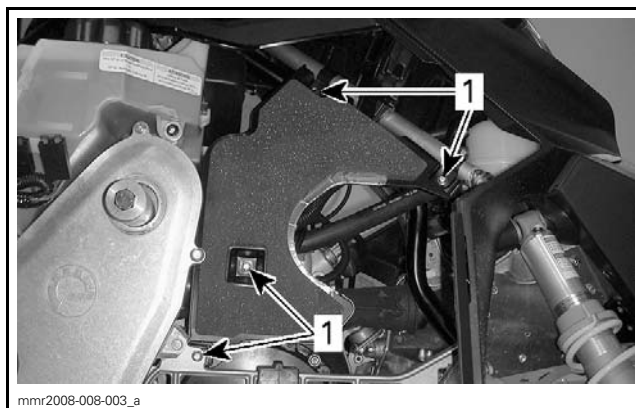


1. Water pump cover
2. Remove this hose

10. On **applicable models**, disconnect electric starter wire.



11. Remove acoustic panel on the RH side of vehicle.



1. Acoustic panel screws

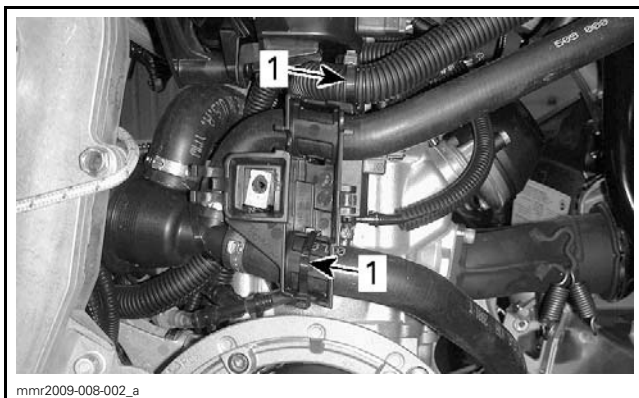
12. On **applicable models**, remove rewind starter cover screws and place rewind starter housing aside.



1. Rewind starter cover

13. Cut locking ties securing coolant hoses and wiring harness to 3D RAVE solenoid support.

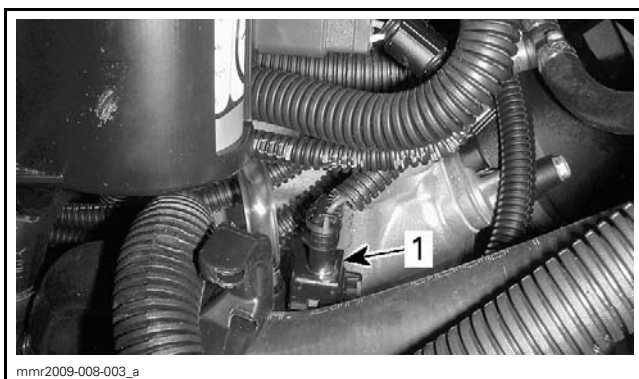
Subsection XX (ENGINE REMOVAL AND INSTALLATION)



1. Locking ties to remove

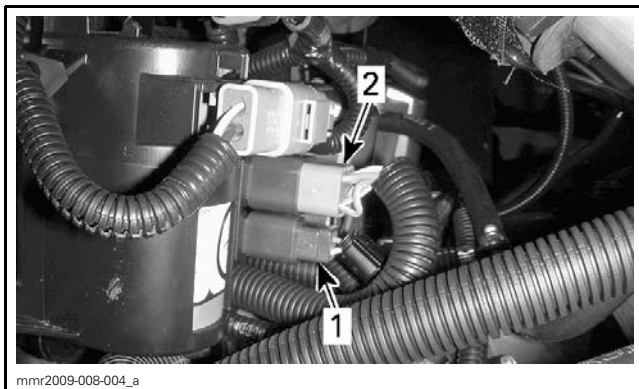
14. Detach hoses from support.

15. Disconnect 3D RAVE solenoid connector.



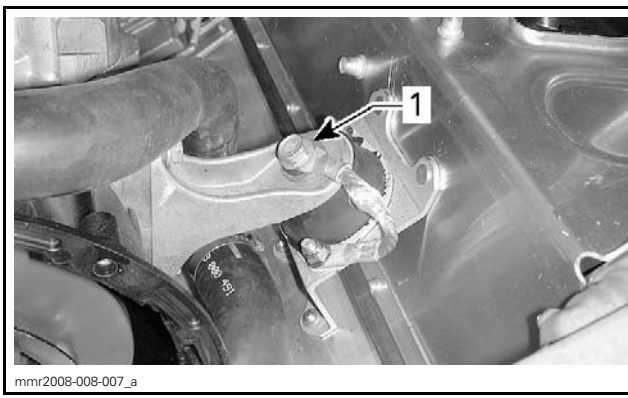
1. 3D RAVE solenoid connector

16. Disconnect CPS sensor and magneto connectors.



1. CPS sensor connector
2. Magneto connector

17. Remove and discard screw securing front MAG engine support to front rubber mount.



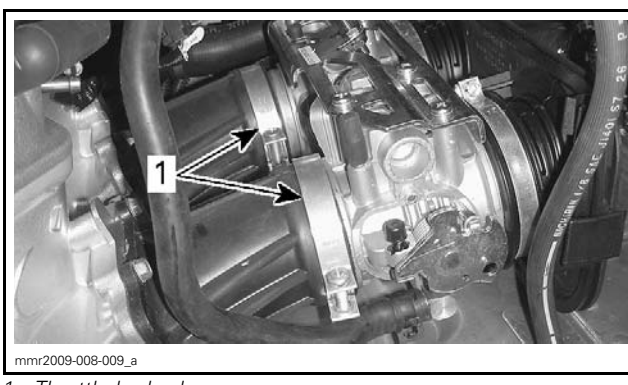
1. Front engine support screw

18. Remove throttle body heater hose from the cylinder head.



1. Heater hose

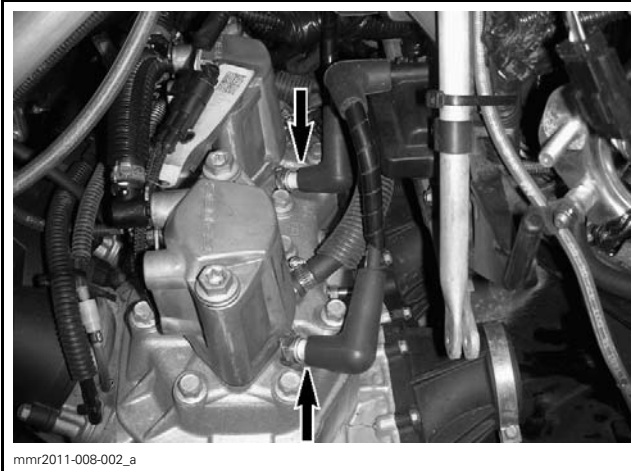
19. Unscrew clamps securing throttle body to intake adapters.



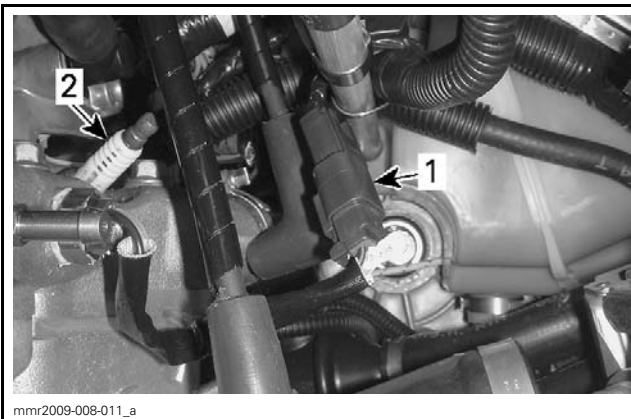
1. Throttle body clamps

20. Move and attach throttle body aside.

21. Disconnect spark plug cables.



22. Disconnect coolant temperature sensor (CTS) connector.



1. CTS connector
2. MAG spark plug

23. Remove and discard screw securing rear MAG engine support to rear rubber mount.



24. Disconnect coolant hose from cylinder head.



1. Coolant hose

25. Disconnect fuel injector connectors.



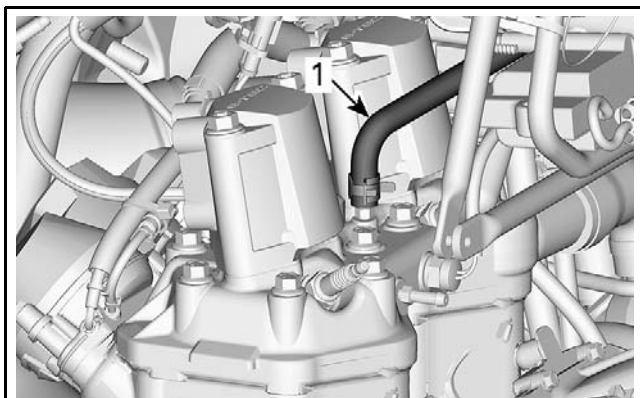
26. Remove screws that attach fuel injector hose retainers to fuel injectors.



27. Place a rag at the bottom of fuel injectors and unplug fuel hoses from fuel injectors.

28. Disconnect coolant hose(s) on the top of cylinder head.

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



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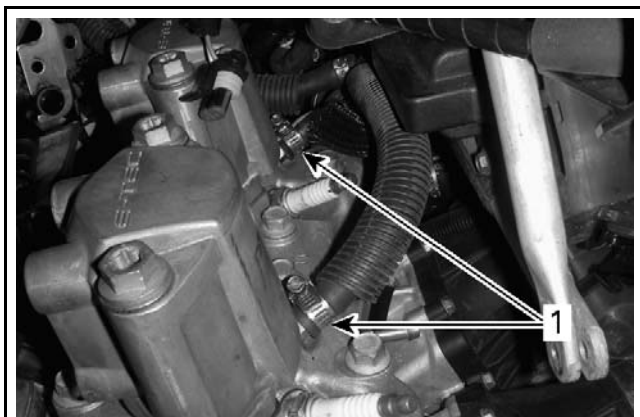
600 HO E-TEC

1. Coolant hose from coolant reservoir (1x)



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32. Disconnect oil hoses from 3D RAVE valves.



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800R E-TEC

1. Coolant hoses from coolant reservoir (2x)

29. Remove knock sensor from cylinder head.

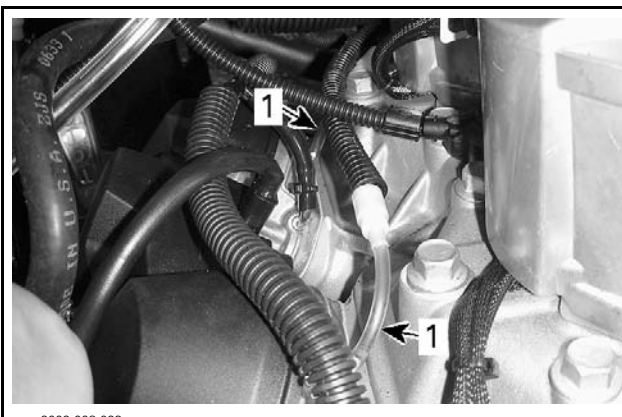


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1. Knock sensor

30. Remove spark plugs from engine.

31. Disconnect 3D RAVE connector.



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TYPICAL

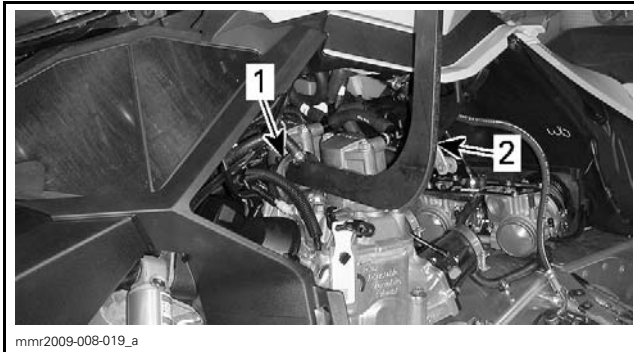
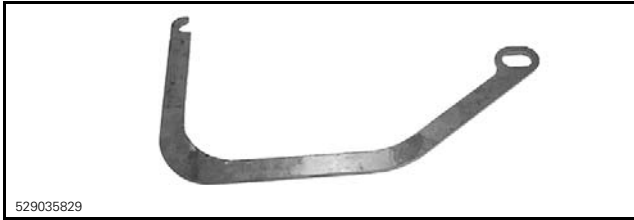
1. 3D RAVE valve oil hoses

33. Install ENGINE LIFTING TOOL (P/N 529 036 131) into knock sensor retaining hole.



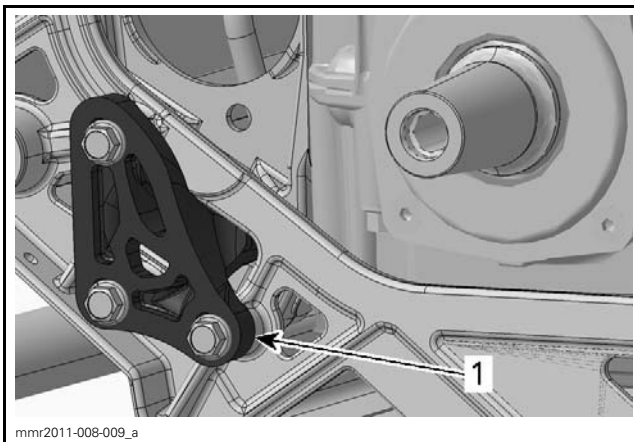
NOTE: Use knock sensor screw to secure lifting tool on cylinder head.

34. Place ENGINE LIFTING HOOK (P/N 529 035 829) into lifting tool rings.



1. Lifting tool
2. Engine removal hook

35. Remove engine stopper. Discard screws.



1. Engine stopper

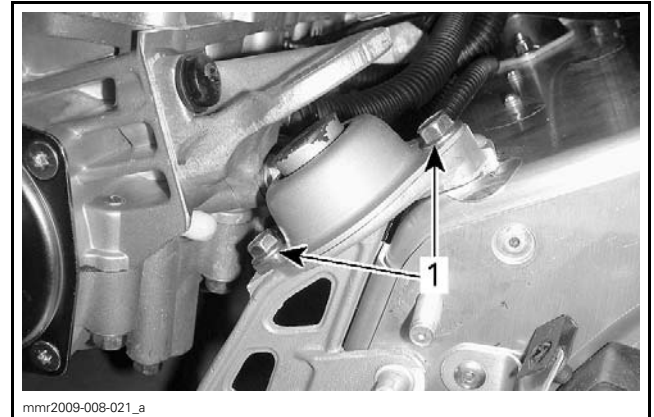
36. Remove and discard screws securing PTO engine supports to front and rear rubber mounts.



1. Front engine support screw
2. Rear engine support screw

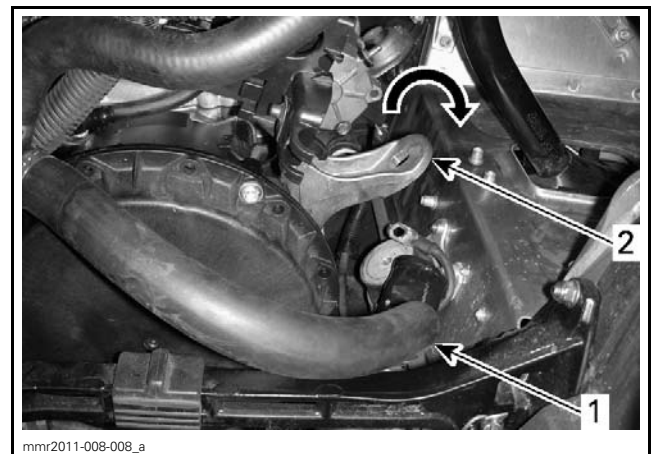
37. Slightly lift the engine.

38. Remove PTO rear rubber mount.



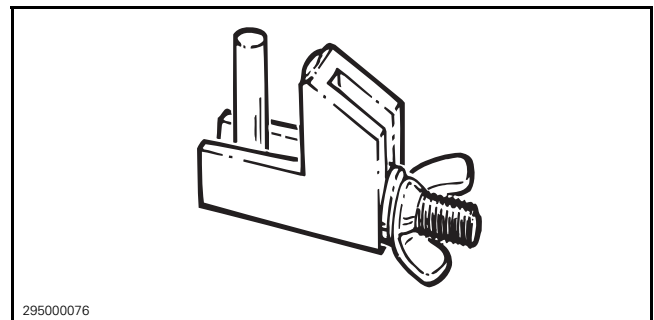
1. Rubber mount screws

39. Clear coolant hose from MAG front engine support.



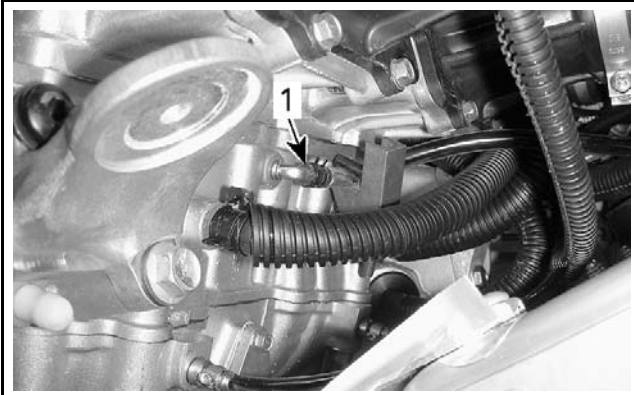
1. Coolant hose
2. Front MAG engine support

40. Install a SMALL HOSE PINCHER (P/N 295 000 076) on the oil return hose.



41. Disconnect oil return hose.

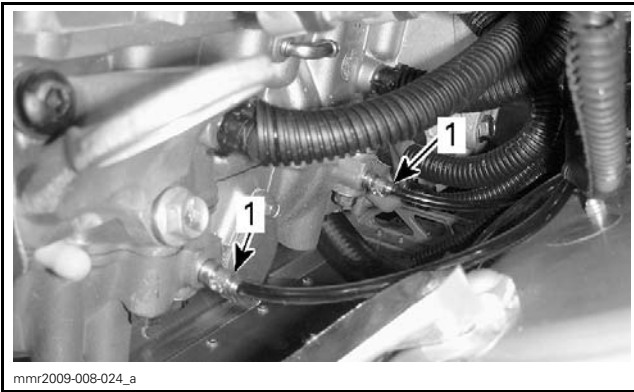
Subsection XX (ENGINE REMOVAL AND INSTALLATION)



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1. Oil return hose

42. Disconnect oil inlet hoses from crankcase. Discard Oetiker clamps.



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1. Inlet hoses

43. Lift engine and slide it out of vehicle.

NOTICE Pay attention not to damage fuel hoses or adapters.

Engine Installation

To install engine, reverse the removal procedure. However, pay attention to the following.

- Install **NEW** self-locking screws where required, refer to exploded views at the beginning of this subsection.
- Install **NEW** Oetiker clamps when installing oil inlet hoses.
- Install and tighten engine support bolts. Refer to *ENGINE SUPPORT INSTALLATION* in this subsection.
- Install and adjust engine stopper. Refer to *ENGINE STOPPER ADJUSTMENT* in this subsection.
- Oil hoses must be routed correctly to avoid lubrication problems. To route hoses correctly, refer to *OIL INJECTION PUMP HOSES CONNECTION* in *LUBRICATION SYSTEM* subsection.

- When engine installation is completed, bleed oil system. Refer to *LUBRICATION SYSTEM* subsection.
- If a new engine is installed or the engine was repaired, premix the fuel with oil (600 and 800R Power TEK) or restart the break-in procedure in B.U.D.S. for the 600 HO E-TEC and 800R E-TEC.

ENGINE STOPPER

Engine Stopper Adjustment

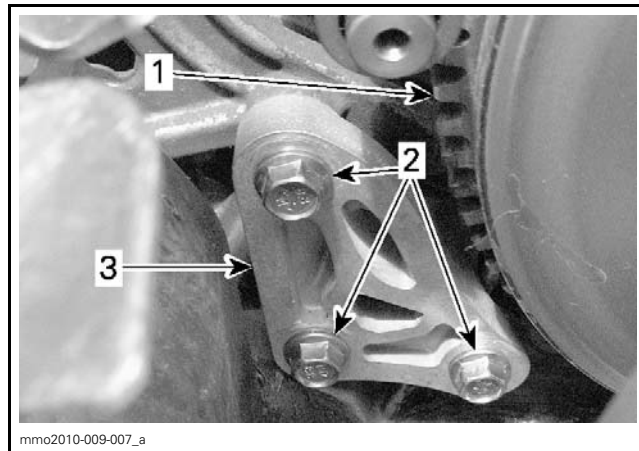
Freeride and Summit (800R E-TEC)

On these models, there is no play between engine stopper and rubber stop block (on engine).

All Other Models

The engine stopper is located on the LH front engine support, in front of the drive pulley.

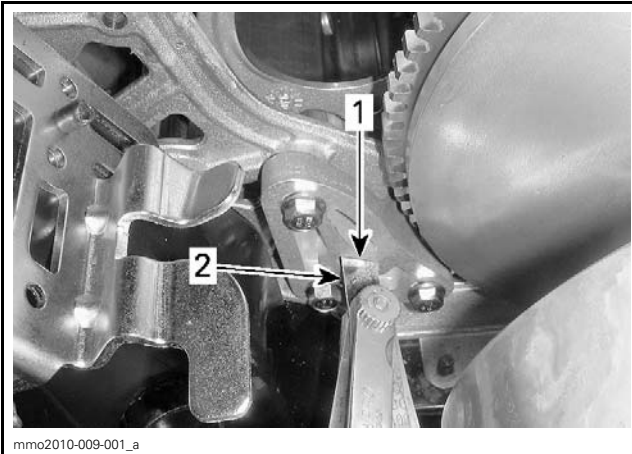
1. Remove LH side panel, refer to *BODY* subsection.
2. Remove drive belt guard, refer to *DRIVE BELT* subsection.
3. Loosen the three screws retaining engine stopper to engine support just enough to allow a vertical play (1/2 to one turn).



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1. Drive pulley
2. Engine stopper screws
3. Engine stopper

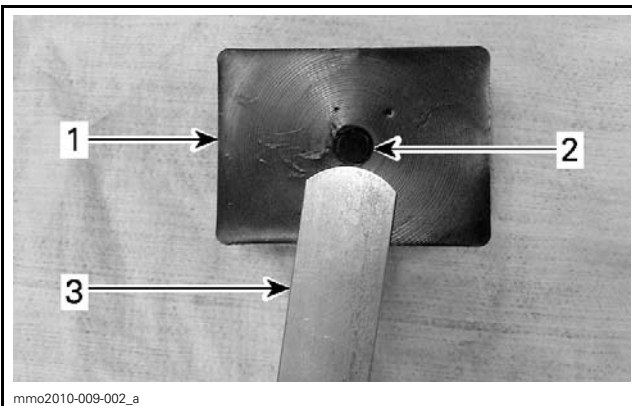
4. Insert a 0.5 mm (.02 in) feeler gauge in the engine stopper opening (see illustration).



1. Opening
2. Feeler gauge

5. Place feeler gauge between engine stopper and rubber stop block (on engine).

NOTE: Do not insert the feeler gauge too deep, as it will pass over the bump at the surface of the rubber stop block and alter adjustment. See illustration.

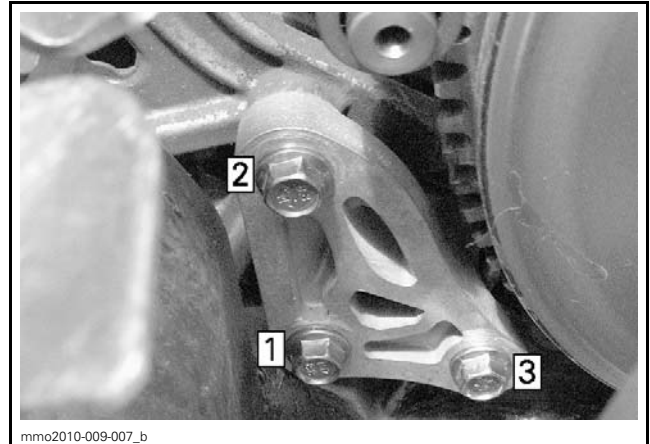


- TYPICAL**
1. Rubber stop block
 2. Bump
 3. Feeler gauge

6. Tighten engine stopper screws to specification following the illustrated sequence.

ENGINE STOPPER SCREWS TORQUE

10 N•m (89 lbf•in)



TIGHTENING SEQUENCE

NOTE: Take care not to pinch the feeler gauge.

NOTICE Serious pulley damage can occur if the engine stopper and its screws are not properly installed.

ENGINE SUPPORT

Engine Support Inspection

Check if engine supports are cracked, bent or damaged. Replace if necessary.

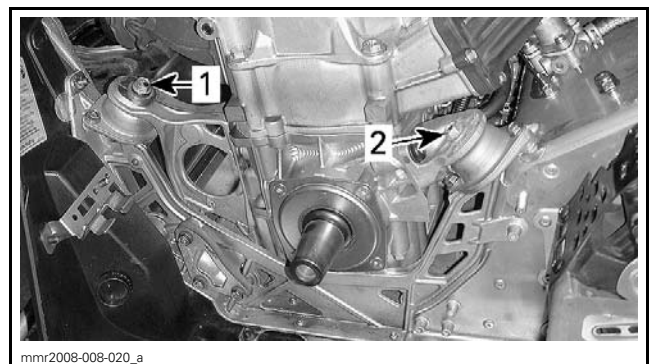
PTO Side Engine Support Removal (Engine not Removed)

NOTE: On vehicle with electric starter, remove the electric starter. Refer to *STARTING SYSTEM* subsection.

Remove drive and driven pulleys. Refer to *DRIVE PULLEY* and *DRIVEN PULLEY AND COUNTER-SHAFT* subsections.

Remove tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Remove and discard screws securing PTO engine supports to front and rear rubber mount adapters.



1. Front engine support screw
2. Rear engine support screw

Subsection XX (ENGINE REMOVAL AND INSTALLATION)

Insert a pry bar over the LH frame member and gently raise the engine just enough to remove engine weight from support.

Remove and discard screws retaining engine support to engine.

Remove engine support.

MAG Side Engine Support Removal (Engine not Removed)

Remove muffler and tuned pipe. Refer to *EXHAUST SYSTEM* subsection.

Remove driven pulley. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.

Remove primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

Unscrew clamps retaining throttle body or carburetors to intake adapters.

Move and attach throttle body or carburetors aside.

600 and 800R Power TEK

Remove spark plugs.

Install the ENGINE LIFTING RING (P/N 529 035 830) in spark plug hole (PTO side).



Install the ENGINE LIFTING HOOK (P/N 529 035 829).



Remove and discard screws securing engine supports to rubber mount adapters.

Lift engine.

Remove and discard screws retaining engine support to engine.

Remove engine support.

600 HO E-TEC and 800R E-TEC

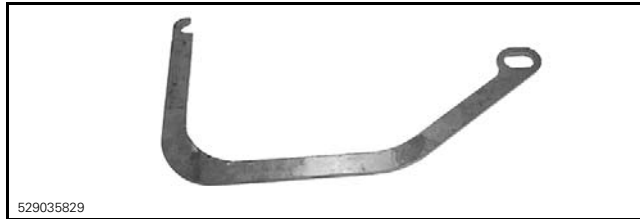
Remove knock sensor.

Install the ENGINE LIFTING TOOL (P/N 529 036 131) into knock sensor retaining hole.



NOTE: Use knock sensor screw to secure lifting tool on cylinder head.

Place the ENGINE LIFTING HOOK (P/N 529 035 829) into lifting tool rings.



Remove and discard screws securing engine supports to rubber mount adapters.

Lift engine.

Remove and discard screws retaining engine support to engine.

Remove engine support.

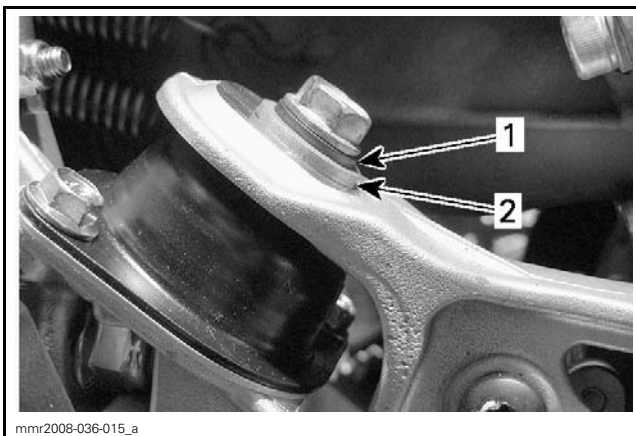
Engine Support Installation

The installation is the reverse of the removal procedure, however pay attention to the following.

NOTICE Engine stopper must be adjusted after installing engine support.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the first two threads of the engine support screws

Front engine supports (PTO and MAG sides) are secured using a conical washer and a flat washer.

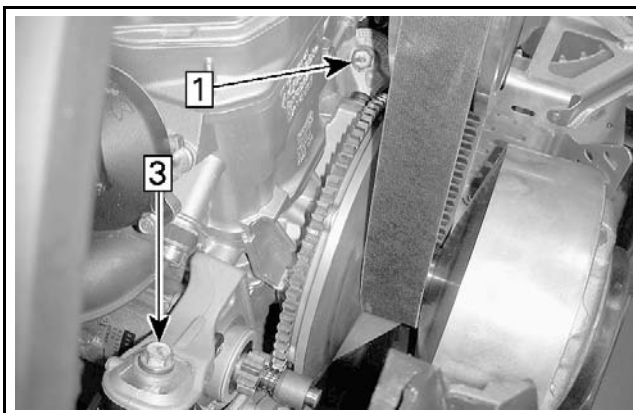


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FRONT ENGINE MOUNT (PTO SIDE)

1. Conical washer
2. Flat washer

Tighten engine supports bolts to specification.

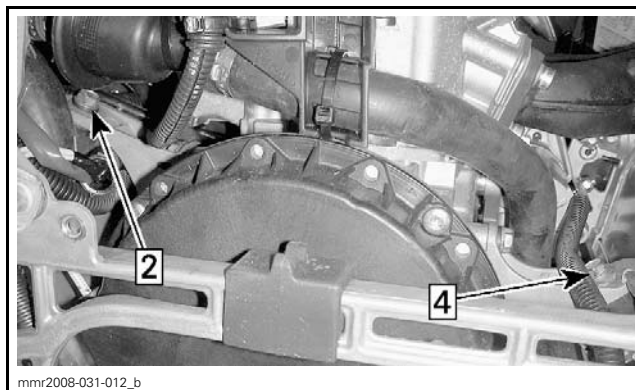
ENGINE SUPPORT BOLTS	
TORQUE	25 N•m (18 lbf•ft)
SEQUENCE	1 = Rear engine support (PTO side)
	2 = Front engine support (PTO side)
	3 = Rear engine support (MAG side)
	4 = Front engine support (MAG side)



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TYPICAL — PTO SIDE

- Step 1: Rear engine support (PTO side)
Step 3: Front engine support (PTO side)



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TYPICAL — MAG SIDE

- Step 2: Rear engine support (MAG side)
Step 4: Front engine support (MAG side)

Adjust engine stopper, refer to *ENGINE STOPPER ADJUSTMENT* in this subsection.

ENGINE RUBBER MOUNTS

Engine Rubber Mount Inspection

Check rubber mounts. Replace them if brittle, cracked or damaged.

Engine Rubber Mount Removal

Remove muffler and tuned pipe. Refer to *EX-HAUST SYSTEM* subsection.

Remove driven pulley. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.

Remove primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

Unscrew clamps retaining throttle body or carburetors to intake adapters.

Move and attach throttle body or carburetors aside.

600 and 800R Power TEK

Remove spark plugs.

Install the ENGINE LIFTING RING (P/N 529 035 830) in spark plug hole (PTO side).



Install the ENGINE LIFTING HOOK (P/N 529 035 829).

Subsection XX (ENGINE REMOVAL AND INSTALLATION)



Remove and discard screws securing engine supports to rubber mount adapters.

Lift engine.

Unscrew bolts or nuts securing engine rubber mounts to frame.

600 HO E-TEC and 800R E-TEC

Remove knock sensor.

Install the ENGINE LIFTING TOOL (P/N 529 036 131) into knock sensor retaining hole.



NOTE: Use knock sensor screw to secure lifting tool on cylinder head.

Place the ENGINE LIFTING HOOK (P/N 529 035 829) into lifting tool rings.



Remove and discard screws securing engine supports to rubber mount adapters.

Lift engine.

Unscrew bolts or nuts securing engine rubber mounts to frame.

Engine Rubber Mount Installation

The installation is the reverse of the removal procedure.