

LUBRICATION SYSTEM

SERVICE TOOLS

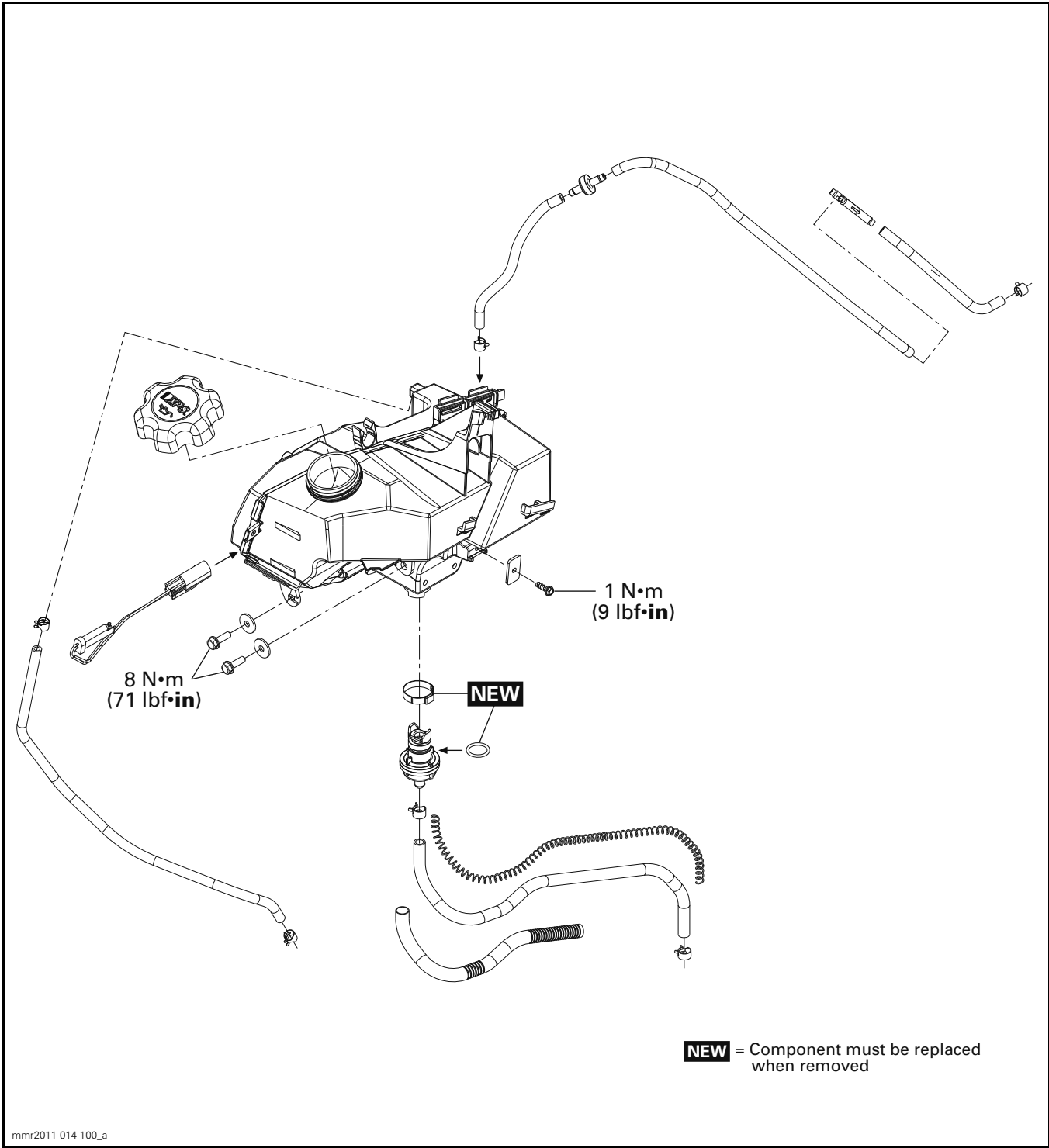
Description	Part Number	Page
DISTANCE GAUGE	529 036 042	100
ENGINE LIFTING HOOK.....	529 035 829	99
ENGINE LIFTING RING	529 035 830	99
FLUKE 115 MULTIMETER	529 035 868	111–112
LEAK TEST KIT	529 033 100	97
OIL PUMP CABLE JIG	529 036 045	101
SMALL HOSE PINCHER	295 000 076	97
VACUUM/PRESSURE PUMP	529 021 800	97–98, 114

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE).....	293 800 060	100
LOCTITE 648 (GREEN)	413 711 400	114
PULLEY FLANGE CLEANER	413 711 809	114
XPS INJECTION OIL.....	293 600 117	96
XPS SYNTHETIC 2-STROKE OIL.....	293 600 132	96
XPS SYNTHETIC BLEND 2-STROKE OIL	293 600 100	96

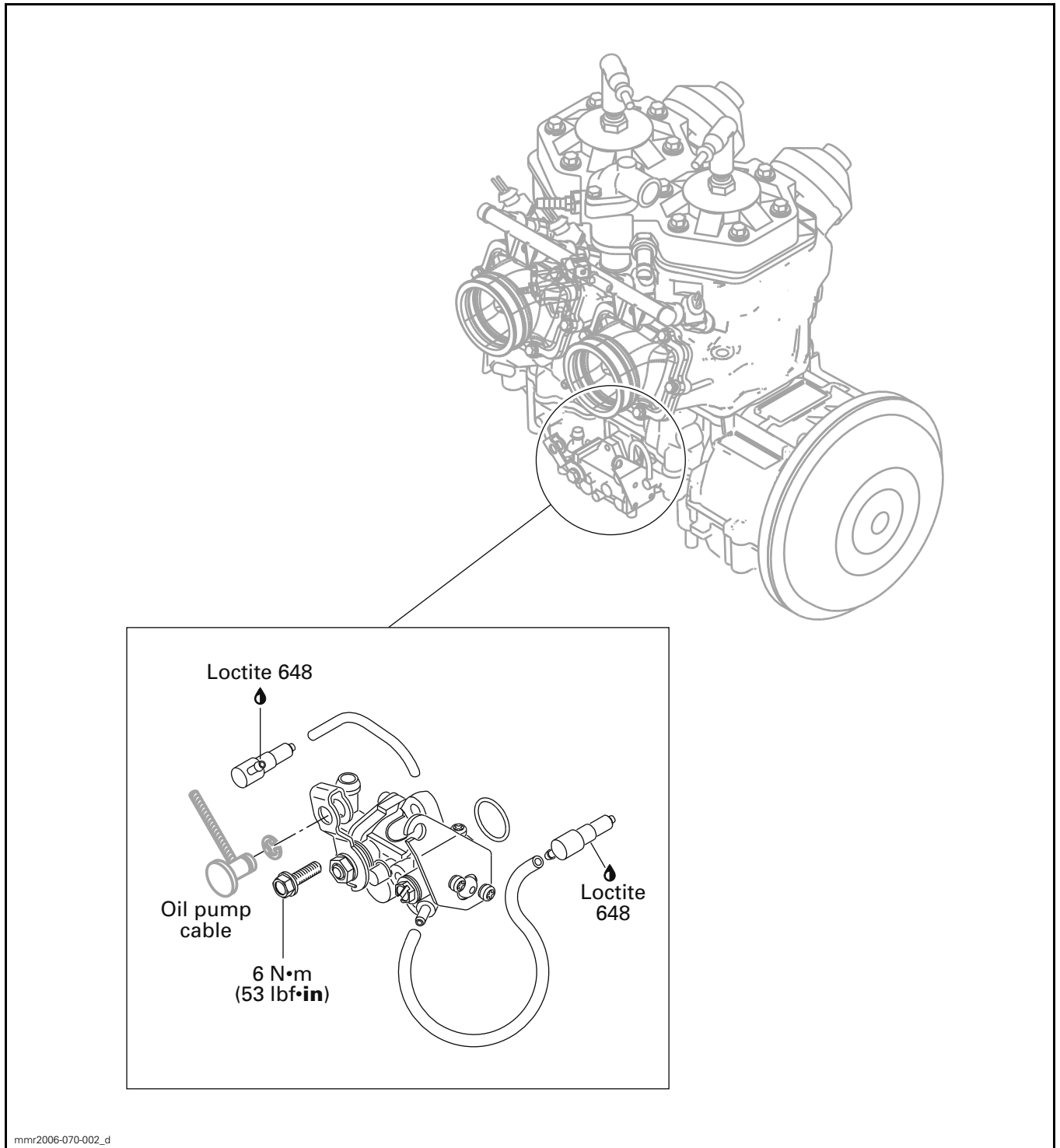
OIL INJECTION TANK

600 and 800R Power TEK



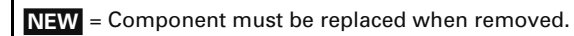
OIL INJECTION PUMP

600 and 800R Power TEK



Subsection 07 (LUBRICATION SYSTEM)

600 HO E-TEC and 800R E-TEC



GENERAL

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

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, self-locking fasteners, etc.) must be replaced with new ones.

⚠ WARNING

Wipe off any oil spills. Oil is highly flammable.

NOTICE Do not use a hose pincher on outlet hose. This would damage the spring inside hose.

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

SYSTEM DESCRIPTION

600 and 800R Power TEK

These engines employ a variable-rate plunger-type oil injection pump.

This variable-rate mechanical oil injection pump is directly driven by the crankshaft.

This pump delivers the right amount of oil at all engine RPM and at all throttle opening positions.

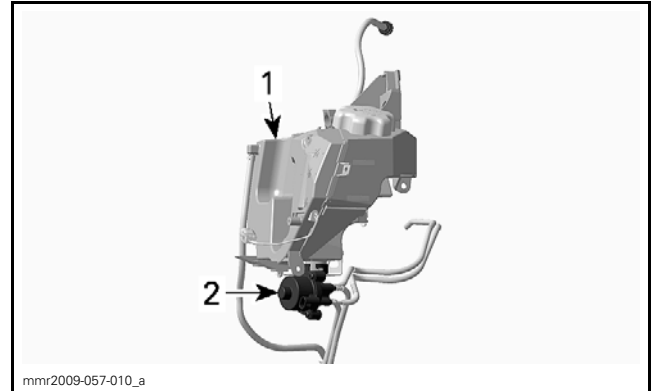
The pump stroke is variable and controlled by a cam, connected to the pump lever and cable (linked to the throttle cable). The wider the throttle is opened, the pump stroke increases and more oil is delivered.

This pump requires no or little maintenance.

600 HO E-TEC and 800R E-TEC

An electronic oil injection pump with a mechanical positive displacement type is used. An electronic pump is more accurate and injection rate can be changed according to engine requirements. This results in a greatly reduced oil consumption.

The electronic oil injection pump is directly attached under oil injection tank.

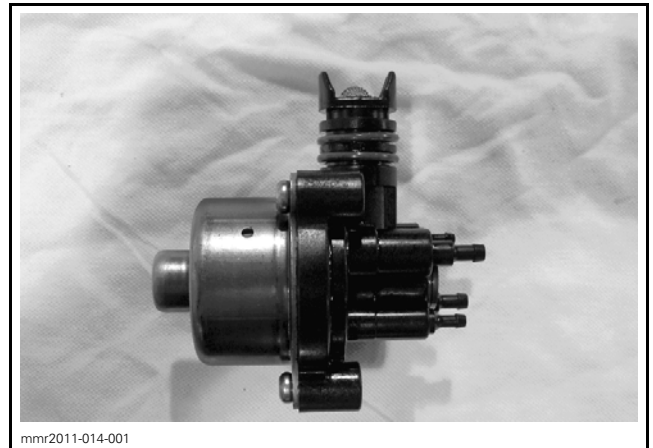


1. Oil injection tank
2. Electronic oil injection pump

The E-TEC pump features a total of 4 outlets:

- 2 large outlets to the crankcase to lubricate engine internal parts.
- 2 small outlets to the 3D RAVE valves to lubricate valves to prevent carbon deposits.

The 4 plungers in the pump work synchronized. They pump all at the same time.



TYPICAL

The ECM controls the pump to inject a variable amount of oil through the entire engine operating range and conditions.

Oil injection Pump Operation (E-TEC)

For the first 6 hours of engine break-in period, oil delivery is increased.

Oil/fuel ratio can go up to approximately 70:1 after the break-in period.

At idle, pump works at approximately less than 1 pulse per minute. A very low quantity of oil is injected to reduce engine smoke and to reduce engine emissions.

As engine speed increases, oil flow increases but not proportionally. It varies according to the specific engine requirements.

Section 02 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

At 8000 RPM, pump works at approximately 120 pulses per minute for 600 HO E-TEC engine and approximately 180 pulses per minute for 800R E-TEC engine.

When operating vehicle in high altitude area, oil flow is reduced proportionally as altitude increases.

Oil Warm-Up Mode

When injection oil is very cold and engine is above idle speed, the oil warm-up mode is active.

To warm-up the oil, the oil injection pump is kept ON after the oil delivery stroke, as long as possible, to then turn OFF for the return stroke. The extra time the pump is ON generates more heat that is dissipated through the oil.

NOTE: The premium gauge displays WARM UP whenever the oil warm-up or engine warm-up modes are active

600 HO E-TEC

To determine if injection oil is cold, the ECM (engine control module) monitors the ATS (air temperature sensor) and the fuel temperature.

The ECM uses a complex algorithm to vary the warm-up time and the rev limiter according to the monitored values. The lower the temperature, the longer the warm-up time and the lower the maximum allowed engine speed.

OIL WARM-UP MODE STRATEGY		
AIR TEMPERATURE	WARM-UP TIME	ENGINE REV LIMITER
Warm-up starts below -20°C (-4°F)	Within approximately 5 and 8 minutes	Within approximately 6000 - 7000 RPM

800R E-TEC

To determine if injection oil is cold, the ECM uses a feedback switch, located in oil injection pump, that closes at the end of the oil delivery stroke and opens when the oil injection pump coil is de-energized. Thus, the ECM can calculate the time it takes to deliver the oil which is related to the oil viscosity.

The ECM uses a complex algorithm to vary the warm-up time and the rev limiter according to oil pump requirements based on engine speed and TPS position. Therefore, the rev limiter is set dynamically as per the driver inputs.

NOTE: If a fault code related to the feedback switch is active (P1233, P1234), the oil injection warm-up mode falls back to the 600 HO E-TEC operation, based on the air temperature but it uses the parameter values of the 800R E-TEC. See table.

OIL WARM-UP MODE STRATEGY WHEN FEEDBACK SWITCH IS FAULTY		
AIR TEMPERATURE	WARM-UP TIME	ENGINE SPEED LIMITATION
Warm-up starts below -20°C (-4°F)	Within approximately 8 and 11 minutes	Within approximately 4000 - 6000 RPM

Automated Engine Oil Fogging (E-TEC)

An automated engine oil fogging has been implemented to automatically inject the required oil to protect the engine during vehicle storage. Engine speed will be increased to approximately 1600 RPM and excess oil will be injected for approximately 30 seconds then, the engine will automatically be stopped.

The storage mode can be activated either by using B.U.D.S. or the multifunction gauge on the vehicle. Refer to *STORAGE PROCEDURE* subsection.

RECOMMENDED INJECTION OIL

RECOMMENDED INJECTION OIL			
ENGINES	XPS INJECTION OIL (P/N 293 600 117)	XPS SYNTHETIC BLEND 2-STROKE OIL (P/N 293 600 100)	XPS SYNTHETIC 2-STROKE OIL (P/N 293 600 132)
600	-	✓	✓
600 HO E-TEC	-	✓	✓
800R Power TEK	-	✓	✓
800R E-TEC	-	✓	✓

NOTICE These engines have been developed and validated using the XPS™ 2-stroke oils. BRP strongly recommends the use of the applicable XPS 2-stroke oils at all times. Damages caused by oil which is not suitable for the engine will not be covered by the BRP limited warranty.

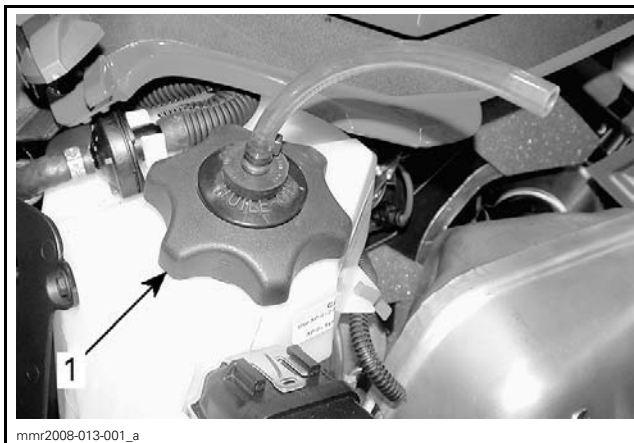
INSPECTION

OIL SYSTEM LEAK TEST

1. Use the LEAK TEST KIT (P/N 529 033 100).

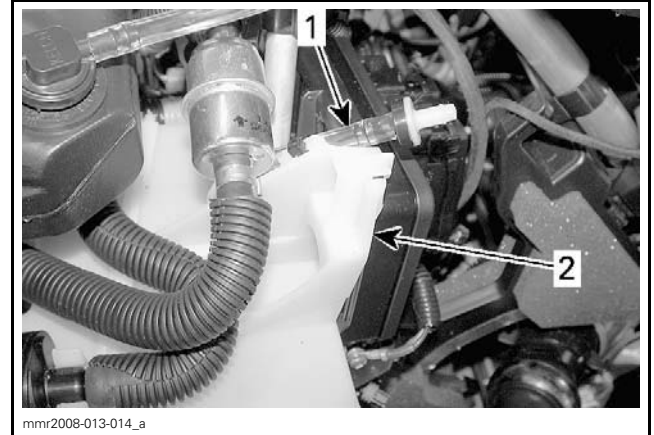
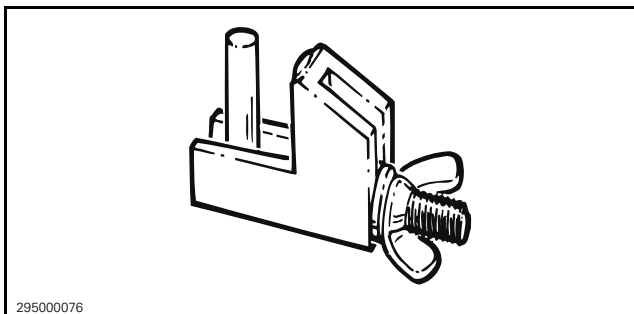


2. Install the test cap on oil tank.



TYPICAL
1. Test cap on tank

3. Install a SMALL HOSE PINCHER (P/N 295 000 076) on check valve outlet hose.



TYPICAL
1. Check valve outlet hose
2. Oil tank

4. Connect the VACUUM/PRESSURE PUMP (P/N 529 021 800) to test cap.



5. Pressurize oil system as follows.

PRESSURE	TIME TO HOLD PRESSURE
18 kPa (2.6 PSI)	3 minutes

If pressure drops, locate leak(s) and repair or replace leaking component(s).

- If no external leak can be found, check the engine pump shaft and the injector nozzles (except E-TEC engines).

If pressure does not drop, this validate the system for leakage (except for the oil injection pump hoses on E-TEC engines).

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Subsection 07 (LUBRICATION SYSTEM)

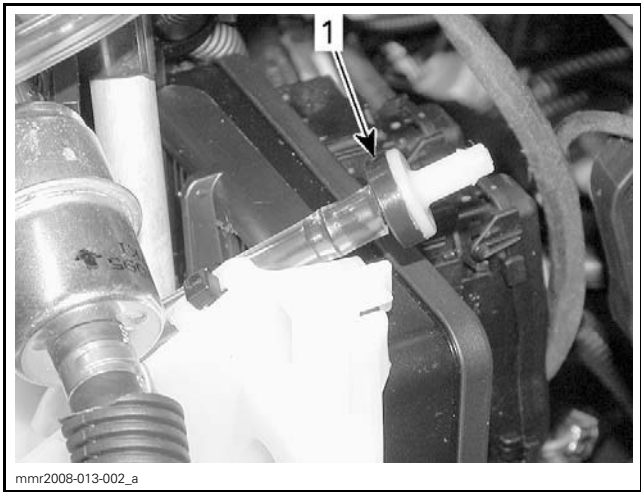
Check Valve Test

- 1. Use VACUUM/PRESSURE PUMP (P/N 529 021 800).
- 2. Pressurize check valve as follows.

CHECK VALVE TEST	
Air toward oil tank	Valve must let air to enter
Air toward outside	Valve must stop air to exit

NOTICE If check valve does not allow air to enter, serious engine damage will occur.

NOTE: When replacing one-way check valve, ensure that black side is positioned toward oil tank.



TYPICAL
1. Black side here

TROUBLESHOOTING

600 HO E-TEC and 800R E-TEC

SYMPTOM	CAUSE	ACTION
	Damaged or disconnected oil injection pump.	Check oil injection pump wires and connectors on oil injection pump.
	Circuit wires, connectors or ECM output pins.	Check WHITE/RED wire on oil injection pump connector for 55/60 volts.
		Check system circuit J1B-23.
		Repair or replace defective part(s).

SYMPTOM	CAUSE	ACTION
Engine seizure (PTO or MAG side)	Damaged, kinked or obstructed inlet hose.	Repair or replace hose and test oil injection pump (oil outflow).
	Damaged oil injection pump inner piston.	Replace oil injection pump.
	Mechanical engine problem.	Repair or replace engine defective part(s).

PROCEDURES

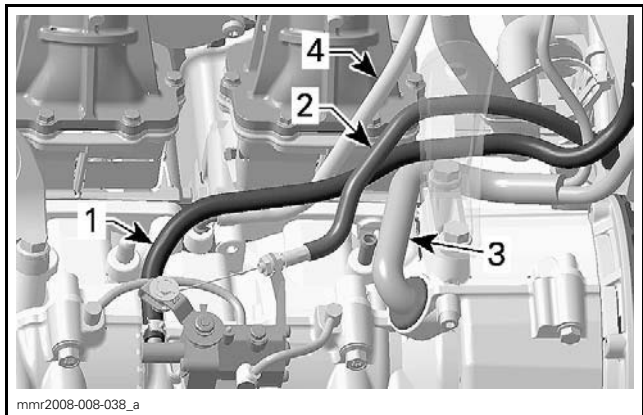
OIL INJECTION PUMP (600 AND 800R POWER TEK)

Oil Injection Pump Verification

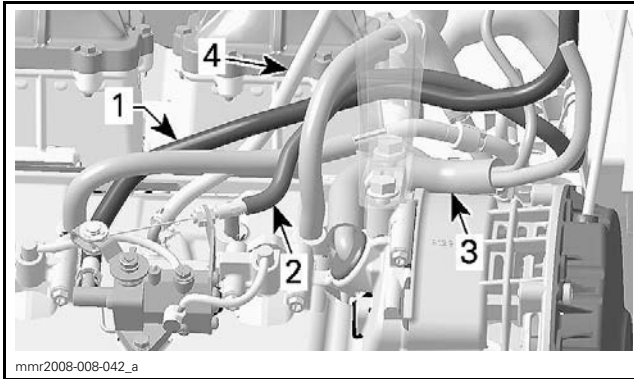
NOTE: Since pump is a piston type, it works when engine rotates in both forward and reverse.

- 1. Remove oil injection pump from engine. Refer to *OIL INJECTION PUMP REMOVAL* in this subsection.
- 2. Connect a hose filled with injection oil to main line fitting.
- 3. Insert other hoses end in an injection oil container.
- 4. Using a clockwise rotating drill, rotate pump shaft.
- 5. Oil must drip from hoses while holding lever in a fully open position. If not, replace pump.

Oil Injection Pump Hoses Connection



600 ENGINE
1. Oil injection inlet hose
2. Oil injection pump cable
3. Magneto harness
4. Crankcase vent hose



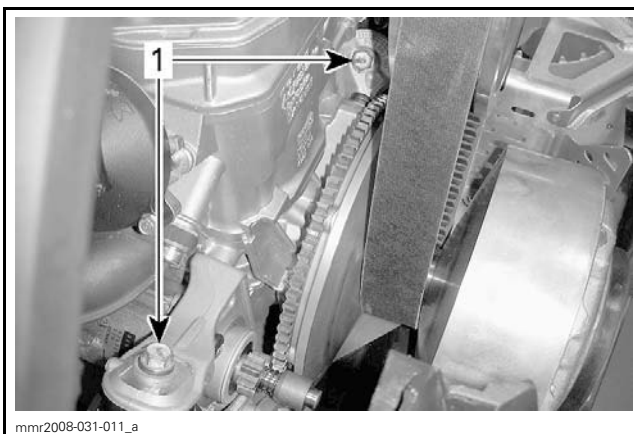
800R POWER TEK

1. Oil injection inlet hose
2. Oil injection pump cable
3. Magneto harness
4. Crankcase vent hose

Oil Injection Pump Removal

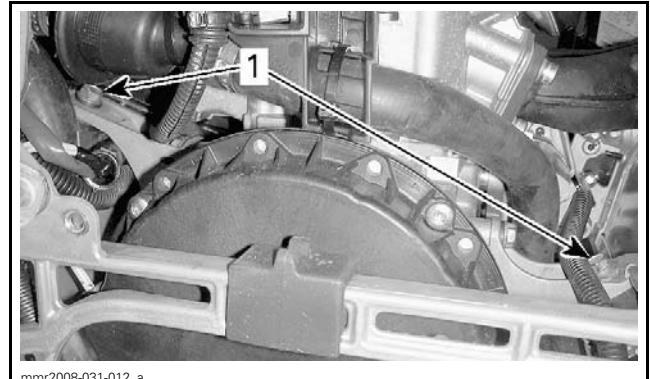
NOTE: To gain access to oil injection pump, engine must be lifted.

1. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.
2. Remove engine stopper support.
3. Remove primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.
4. Remove driven pulley. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.
5. Detach carburetors from engine. Refer to *TM CARBURETORS* subsection.
6. Unscrew bolts retaining fuel pump to frame.
7. Unscrew bolts retaining engine supports to rubber mounts.



TYPICAL — PTO SIDE

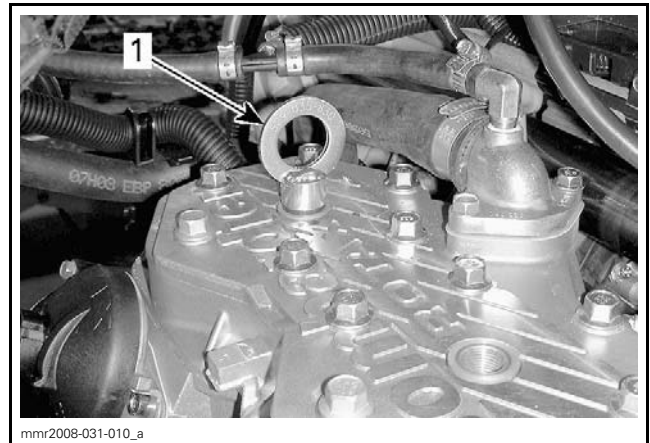
1. Remove hexagonal bolts



MAG SIDE

1. Remove hexagonal bolts

8. Remove spark plugs and install the ENGINE LIFTING RING (P/N 529 035 830) at the farthest spark plug hole.



1. Spark plug lift ring

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



Section 02 ENGINE

Subsection 07 (LUBRICATION SYSTEM)



10. Lift engine enough to gain access to oil injection pump.
 11. Remove screws retaining oil injection pump to engine.
 12. Unplug hoses connected to oil injection pump.
- NOTE:** Mark hose locations for installation.
13. Disconnect oil injection pump cable.

Oil Injection Pump Cleaning

Clean all metal components in a non-ferrous metal cleaner.

Oil Injection Pump Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Properly route and connect oil hoses. Refer to *OIL INJECTION PUMP HOSES CONNECTION* in this subsection.

During installation, always check for spring clip tightness on pump inlet hose.

Apply threadlocker on oil injection pump screws.

OIL INJECTION PUMP SCREWS THREADLOCKER
--

LOCTITE 243 (BLUE) (P/N 293 800 060)

Tighten oil injection pump screws to specification.

OIL INJECTION PUMP SCREWS TORQUE

6 N•m (53 lbf•in)

Make sure cable barrel is well seated in oil injection pump lever.

Secure barrel with plastic washer and circlip.

Install cable lock washer on left side of support.

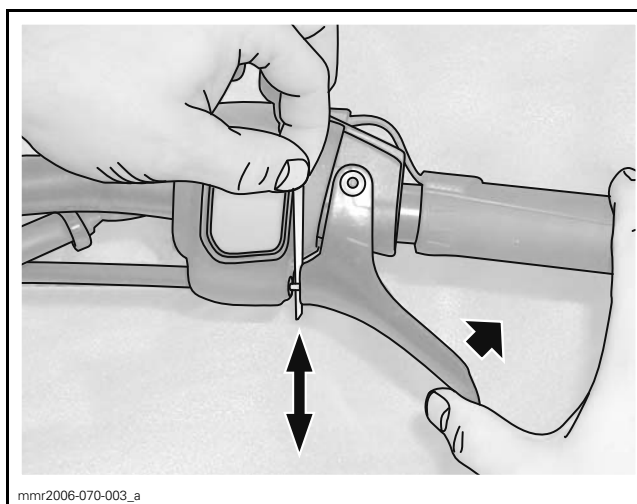
Bleed oil injection pump. See *OIL INJECTION PUMP BLEEDING* in this subsection.

NOTICE Always bleed oil injection pump when the system has been opened.

Adjust oil injection pump cable. See *OIL INJECTION PUMP ADJUSTMENT* in this subsection.

Oil Injection Pump Adjustment

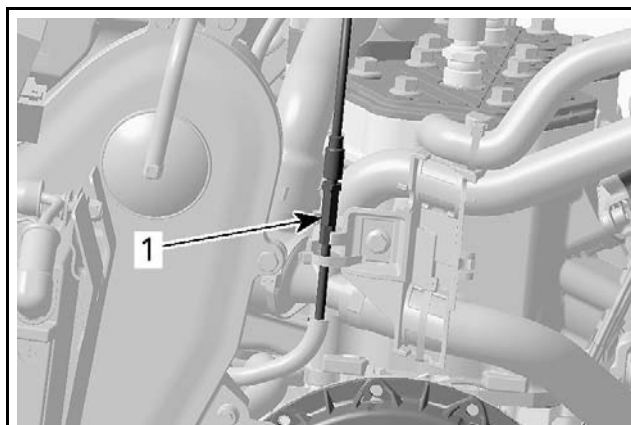
1. Slightly press on throttle lever to eliminate throttle cable free play.
2. Insert the DISTANCE GAUGE (P/N 529 036 042), between throttle lever and housing as shown.
 - 2.1 Slide tool up and down until all free-play is recovered.
 - 2.2 Stop recovering free-play before throttle cam just begins to move at carburetors.



TYPICAL

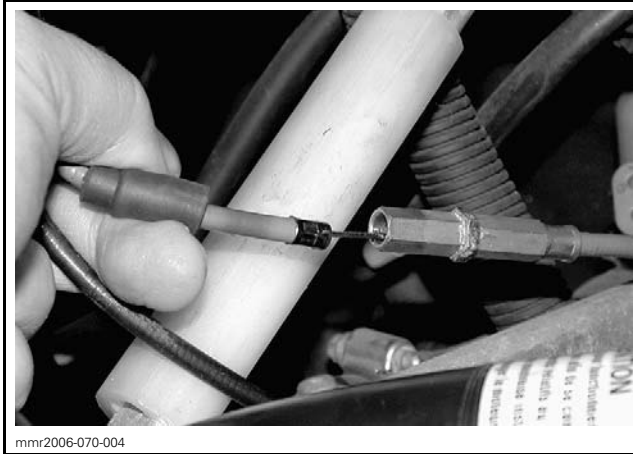
NOTICE Throttle slides must not move and remain in idle position.

3. Move adjuster boot away and stretch oil injection pump cable at adjuster.



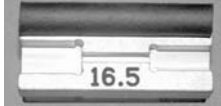
TYPICAL

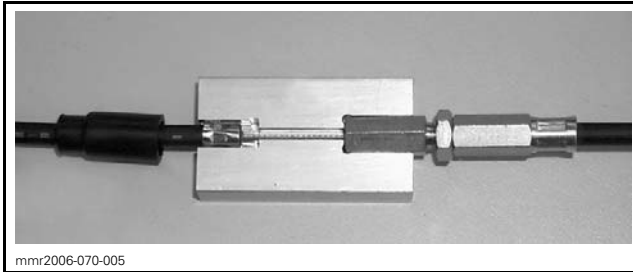
1. Oil pump cable adjuster



TYPICAL

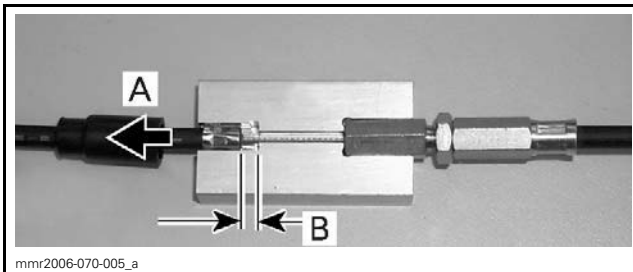
4. Insert cable in the appropriate slot of the OIL PUMP CABLE JIG (P/N 529 036 045).

MODEL	ADJUSTMENT SPECIFICATION
600 and 800R Power TEK	16.5 mm (.65 in) 



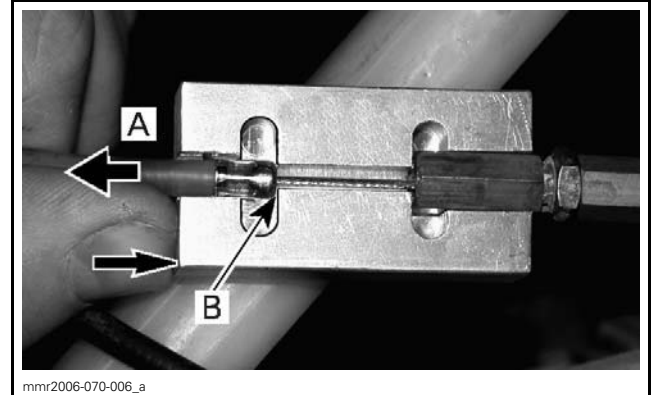
NOTE: If tool cannot be inserted, turn cable adjuster to shorten cable.

5. Pull cable with a force of 34 N (7.6 lbf) to recover all play in cable.
6. While still pulling, check if there is a gap as shown.



- A. Pull 34 N (7.6 lbf)
B. Remove gap here

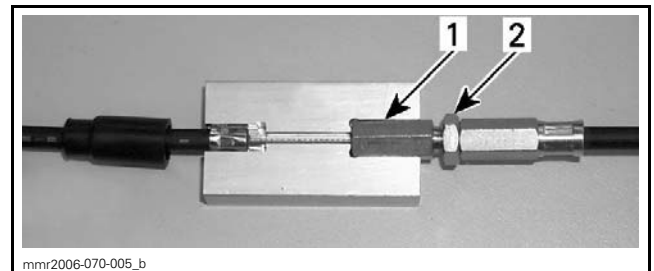
7. Turn cable adjuster to recover that gap.



FINAL ADJUSTMENT WITHOUT GAP

- A. Pull 34 N (7.6 lbf)
B. No gap

8. Secure adjustment in place with lock nut.



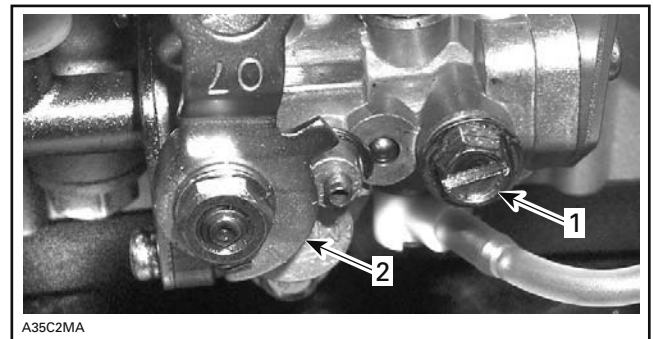
1. Cable adjuster
2. Lock nut

9. Remove the throttle free play wedge tool, push back cable in adjuster and slide adjuster boot in place.

Oil Injection Pump Bleeding

Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line.

Add injection oil if required.



TYPICAL

1. Bleeder screw
2. Oil pump lever

Ensure there are no air bubbles in small oil lines between pump and engine. If so, inject oil using a syringe into lines before connecting them to engine.

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OIL INJECTION PUMP (E-TEC)

Oil Injection Pump Identification (E-TEC)

Every pump is bench tested. Its electrical and flow characteristics are registered throughout all its operating range and are associated to a compensation number.

When a pump is replaced, the compensation number must be entered in B.U.D.S. so that the ECM properly controls the pump according to its optimized characteristics.

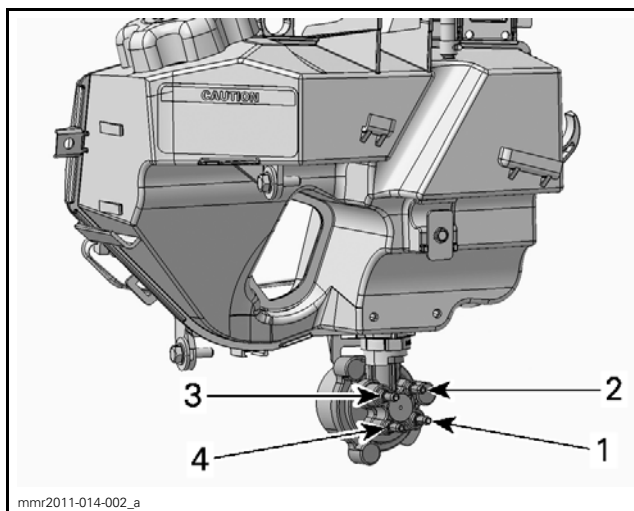
The compensation number is located on a label on the pump as shown.



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Oil injection pump bleeding is done with B.U.D.S. Refer to *OIL INJECTION PUMP BLEEDING* in this section.

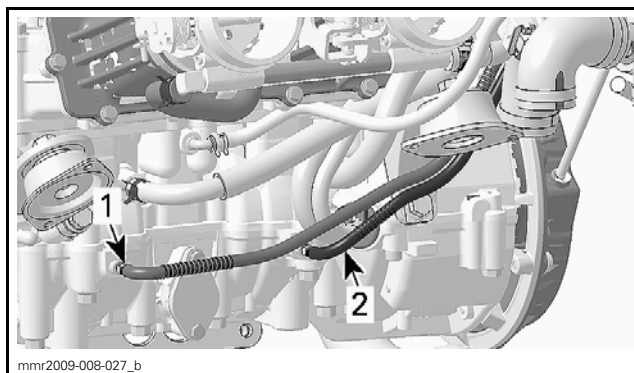
Oil Injection Pump Hoses Connection (E-TEC)



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600 HO E-TEC AND 800R E-TEC

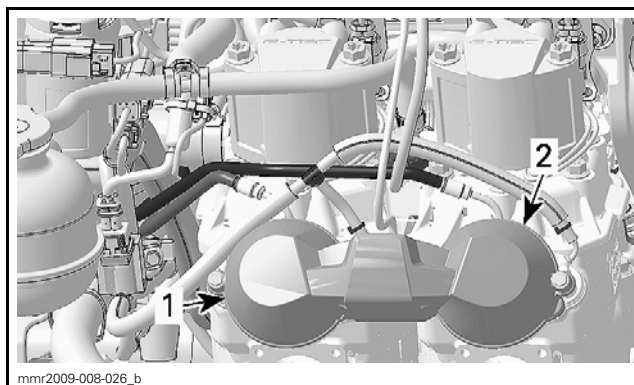
1. To engine PTO side
2. To 3D RAVE valve PTO side
3. To engine MAG side
4. To 3D RAVE valve MAG side



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TYPICAL - 600 HO E-TEC AND 800R E-TEC

1. Oil inlet hose (PTO side)
2. Oil inlet hose (MAG side)



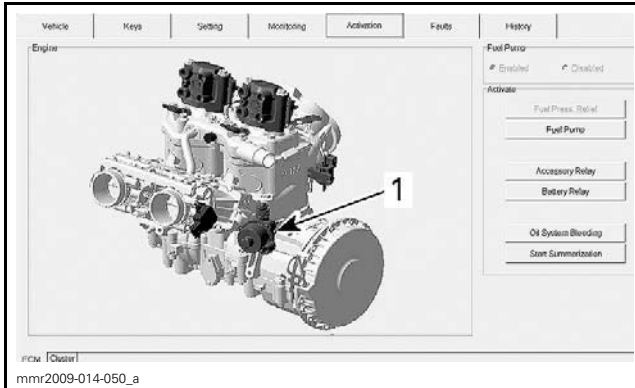
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TYPICAL - 600 HO E-TEC AND 800R E-TEC

1. MAG 3D RAVE valve
2. PTO 3D RAVE valve

Oil Injection Pump Test with B.U.D.S. (E-TEC)

1. Connect B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In B.U.D.S., press **Read Data**.
3. Select **Activation** tab then the **ECM** tab.
4. Start engine.
5. Press on oil pump.



1. Press here to activate oil pump

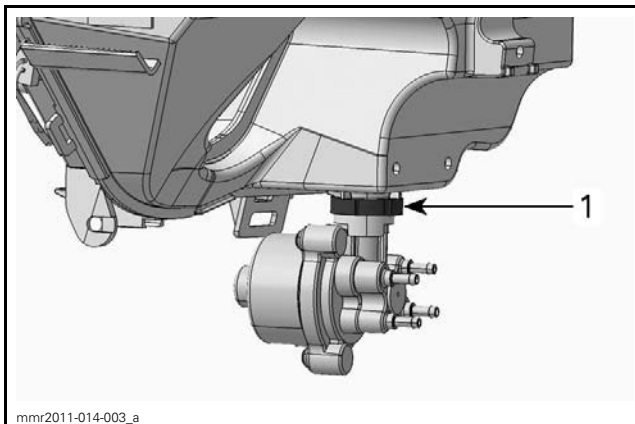
6. Listen if oil injection pump is activated.

NOTE: Touching the oil injection pump may help to feel if pump is activated.

7. If test fails, check wires and connector.

Oil Injection Pump Removal (E-TEC)

1. Remove oil tank from vehicle. Refer to *OIL TANK (E-TEC)* in this subsection.
2. Remove and discard Oetiker clamp securing oil injection pump to oil tank.



1. Oetiker clamp

3. Rotate oil injection pump from 90 degrees as illustrated.



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PUMP LOCKED INTO OIL TANK



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PUMP RELEASED FROM OIL TANK

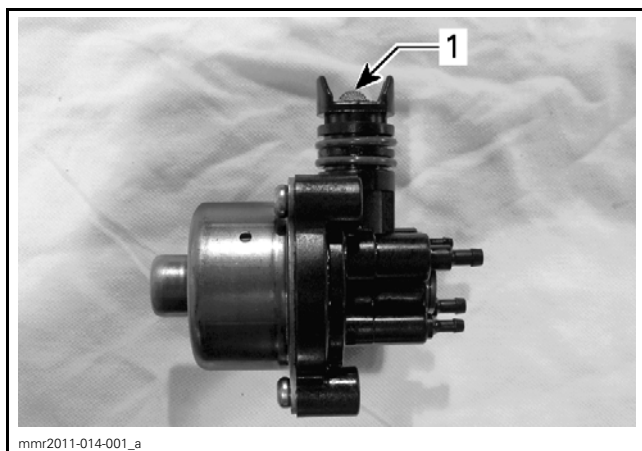
4. Move oil injection pump downward to remove it from oil tank.

Oil Injection Pump Inspection (E-TEC)

1. Check the strainer on the top of oil injection pump. Replace oil injection pump if the strainer is clogged.

Section 02 ENGINE

Subsection 07 (LUBRICATION SYSTEM)



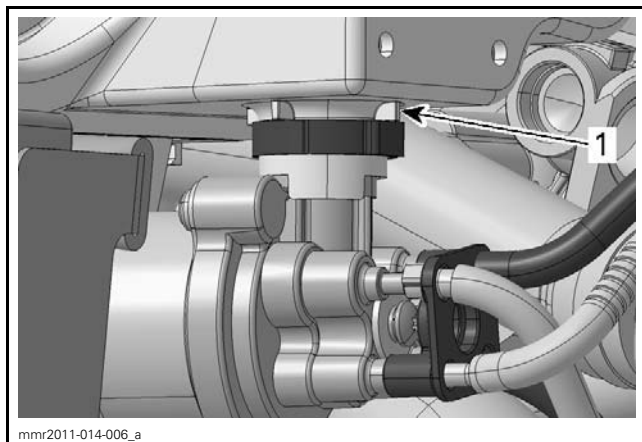
1. Oil injection pump strainer

NOTE: Do not replace oil injection pump needlessly. If strainer is slightly dented, oil injection pump is still functional.

Oil Injection Pump Installation (E-TEC)

The installation is the reverse of the removal procedure. However, pay attention to the following. Install **NEW** Oetiker clamp to secure oil injection pump.

Ensure Oetiker clamp makes contact with oil tank ribs.



1. Oil tank rib

Refer to *OIL TANK INSTALLATION* (E-TEC) to properly reinstall oil tank.

Oil Injection Pump Bleeding (E-TEC)

1. Connect B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In B.U.D.S., press **Read Data**.
3. Select **Setting** tab then the **ECM** tab.
4. Compare oil pump codes in B.U.D.S. and on oil injection pump sticker.



1. B.U.D.S. oil pump code



BACK OF OIL INJECTION PUMP

1. Oil injection pump code (0 to 9)

5. Correct oil injection pump code in B.U.D.S. if required.
6. Select **Activation** tab then **ECM** tab.
7. Press **Oil System Bleeding** button.
8. Start engine.
9. Check for air into hoses. If so, the bleeding procedure must be repeated once more.

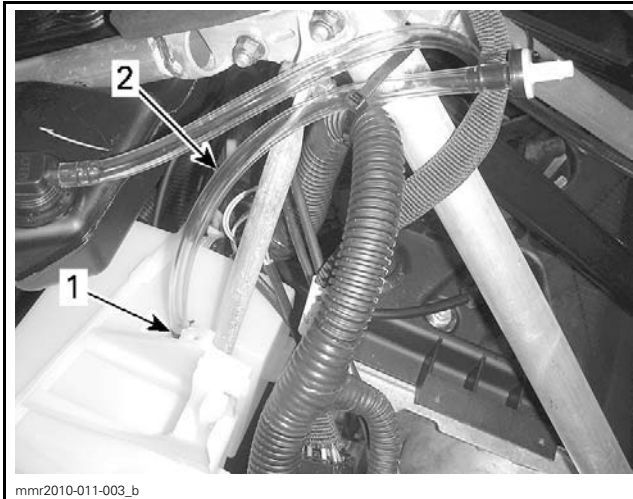
OIL TANK (600 AND 800R POWER TEK)

Oil Tank Removal

1. Refer to *BODY* subsection and remove:
 - Both side panels
 - Console
 - Rewind starter handle housing (if applicable).
2. Remove primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.
3. Empty oil tank completely by siphoning injection oil.
4. Remove muffler, refer to *EXHAUST SYSTEM* subsection.
5. Disconnect oil tank vent hose from the top of oil tank.

Section 02 ENGINE

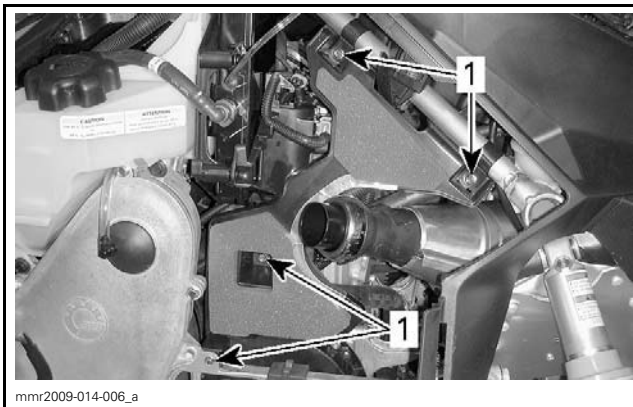
Subsection 07 (LUBRICATION SYSTEM)



TYPICAL

1. Disconnect hose here
2. Oil tank vent hose

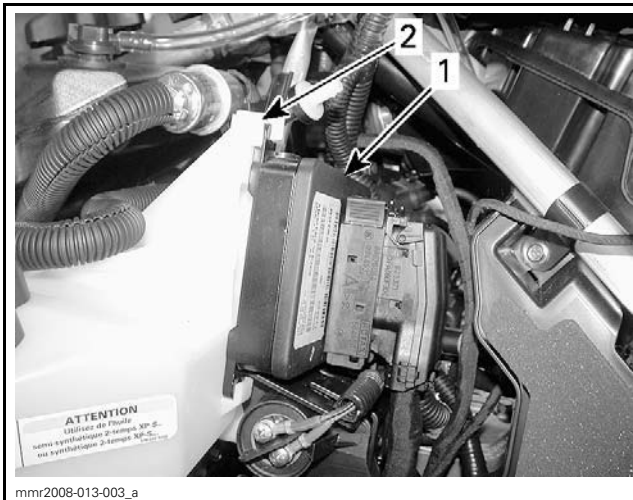
6. Remove acoustic panel.



TYPICAL

1. Acoustic panel screws

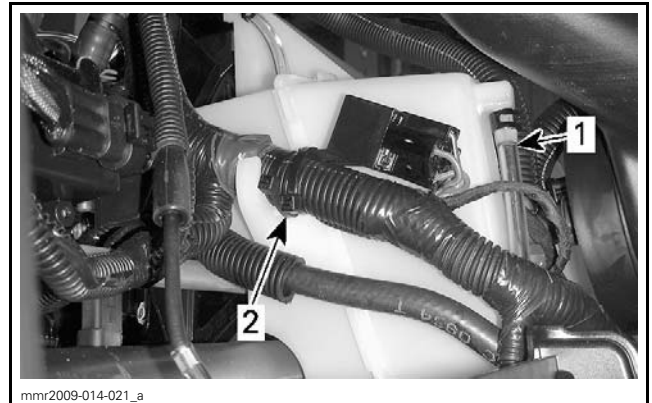
7. Detach ECM from oil tank.



TYPICAL

1. ECM
2. Push on tab to release

8. Cut locking tie securing wiring harness to oil tank.



TYPICAL

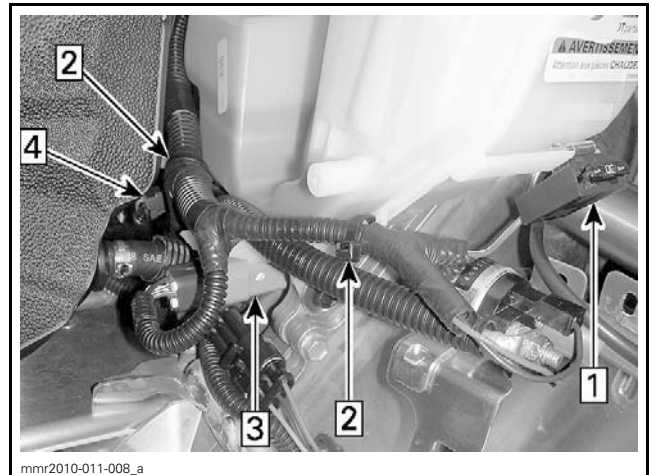
1. Cranks case vent hose
2. Cut this locking tie

9. Detach fuse holder(s) from oil tank.

10. Cut locking ties that secure wiring harness to aft portion of oil tank.

11. Detach diagnostic connector from oil tank.

12. Detach magneto starting winding connector (MA) from the oil tank.



TYPICAL

- Step 1: Remove fuse holder
- Step 2: Cut these locking ties
- Step 3: Remove diagnostic connector
- Step 4: Remove starting winding connector (MA)

13. Remove *OIL LEVEL SENSOR*, see procedure in this subsection.

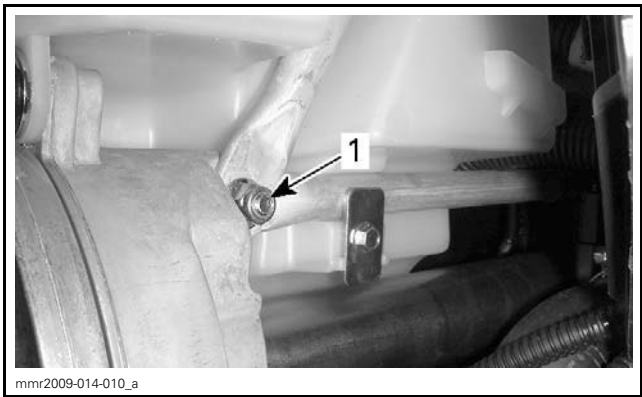
14. Disconnect cranks case vent hose on oil tank side.

Section 02 ENGINE
Subsection 07 (LUBRICATION SYSTEM)



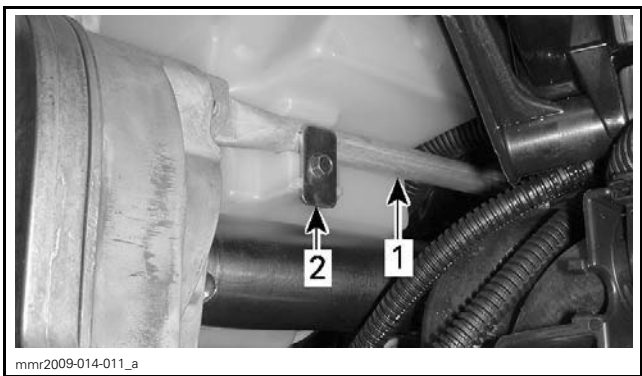
TYPICAL
1. Crankcase vent hose

15. Remove RH side frame member.



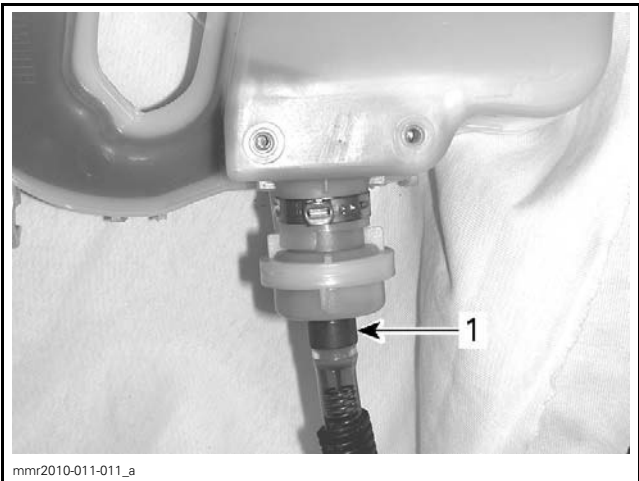
BEHIND THE TOP OF CHAINCASE
1. Lower bolt on side frame member

16. Remove holder retaining oil tank to side frame member brace.



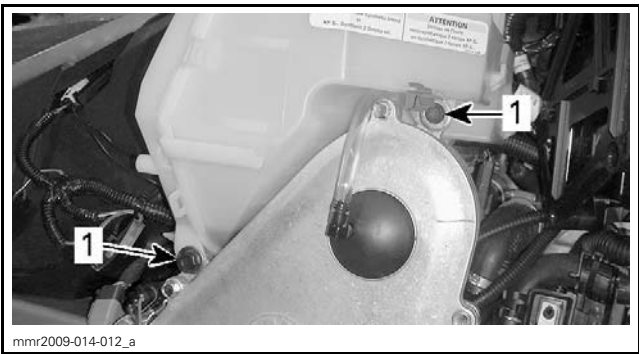
TYPICAL
1. Side frame member brace
2. Oil tank holder

17. Remove oil injection pump supply hose from the oil filter at the bottom of oil tank.



1. Disconnect oil injection pump supply hose here

18. Remove screws securing oil tank to chain-case.



TYPICAL
1. Oil tank screws

19. Remove oil tank from vehicle.

20. Remove oil filter. Refer to *OIL FILTER REMOVAL* in this subsection.

Oil Tank Installation

The installation is the reverse of the removal procedure. However, pay attention to the following. Tighten oil tank screws to specification.

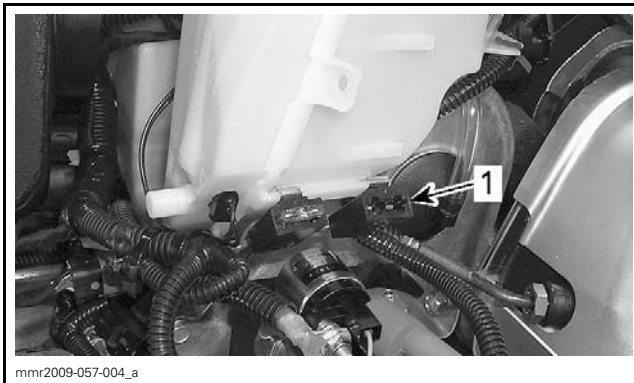
OIL TANK SIDE SCREWS TORQUE
8 N•m (71 lbf•in)
OIL TANK FRONT SCREW TORQUE
1 N•m (9 lbf•in)

Fill up oil tank using recommended oil. See *RECOMMENDED INJECTION OIL* in this subsection.

OIL TANK (E-TEC)

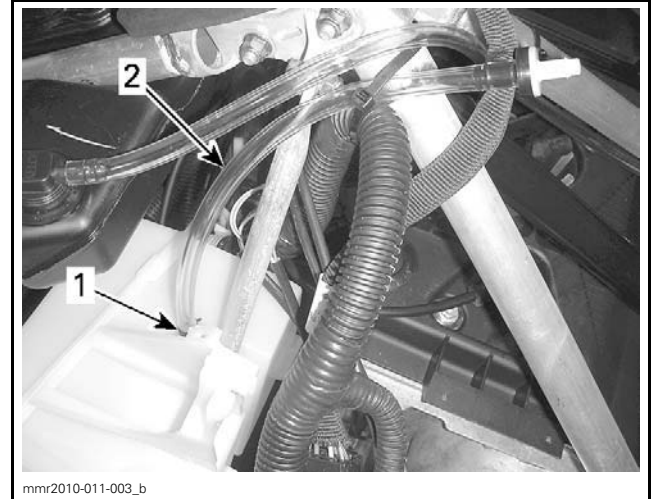
Oil Tank Removal (E-TEC)

1. Release fuel pressure using B.U.D.S. software. Refer to *ELECTRIC FUEL PUMP (E-TEC)* in *FUEL TANK AND FUEL PUMP* subsection.
2. Remove fuel tank. Refer to *FUEL TANK AND FUEL PUMP* subsection.
3. Remove driven pulley. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.
4. Remove primary air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.
5. Remove housing of rewind starter handle (if applicable). Refer to *BODY* subsection.
6. On **applicable models**, detach THCM module from oil tank. Refer to *EXHAUST SYSTEM* subsection.
7. Remove the 30 A fuse.



1. 30 A fuse location

8. Empty oil tank completely by siphoning injection oil.
9. Disconnect oil tank vent hose from the top of oil tank.



TYPICAL

1. Disconnect hose here
2. Oil tank vent hose

10. Disconnect crankcase vent hose on oil tank side.



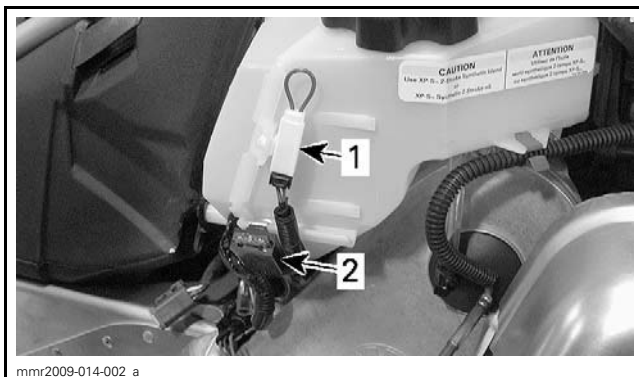
TYPICAL

1. Crankcase vent hose

11. Detach battery relay jumper from oil tank (**rewind starter equipped models**).
12. Detach fuse holders from oil tank.

Section 02 ENGINE

Subsection 07 (LUBRICATION SYSTEM)



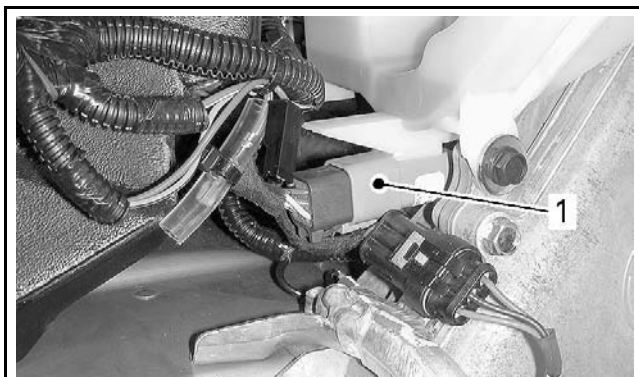
TYPICAL

1. Battery relay jumper
2. Fuse holder

13. Cut locking tie retaining wires as necessary.

14. Disconnect oil level sensor connector.

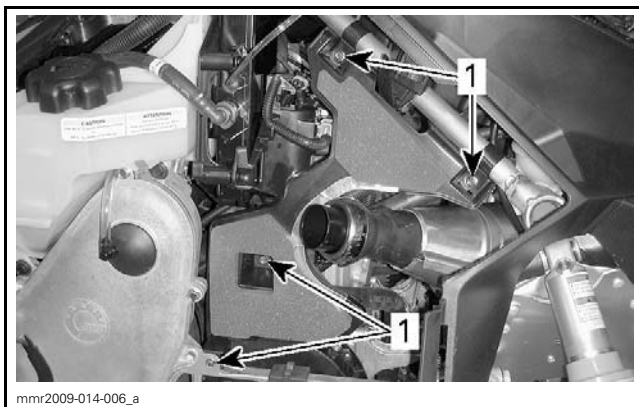
15. Detach diagnostic connector from oil tank.



TYPICAL

1. Diagnostic connector

16. Remove acoustic panel.

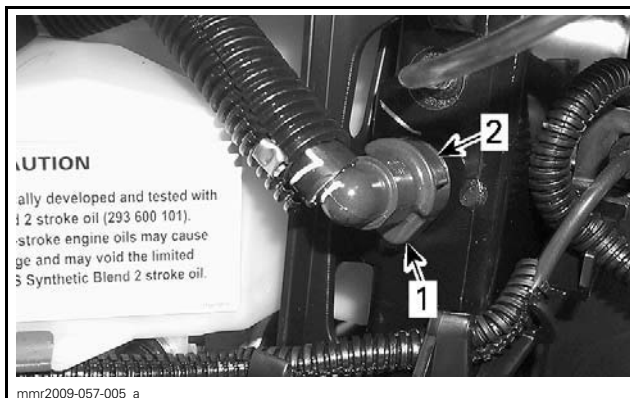


TYPICAL

1. Acoustic panel screws

17. Place a container under fuel inlet hose to recover residual fuel remaining in the system.

18. Disconnect fitting of the fuel inlet hose at ECM.

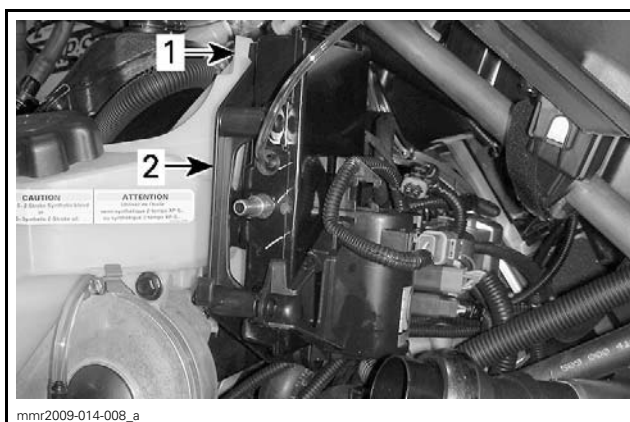


1. Fuel inlet hose fitting
2. Press here to disengage the fitting

⚠ WARNING

Use the B.U.D.S. software to release fuel pressure prior to removing a hose. Cover the fuel line connection with an absorbent shop rag. Slowly disconnect the fuel hose to minimize spilling. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Wipe off any fuel spillage in the engine compartment. Fuel is flammable and explosive under certain conditions. Always disconnect battery prior to working on the fuel system.

19. Detach ECM support from oil tank by pressing upper tab and sliding support outwards.



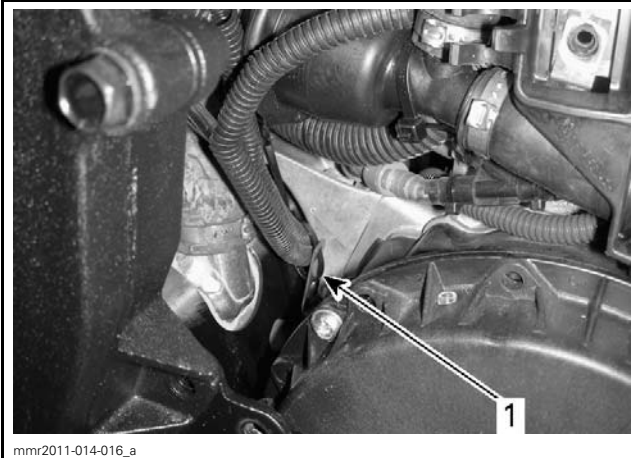
1. Upper tab
2. ECM support

20. Detach wires from capacitor.

21. Cut locking tie that secure oil hoses to engine.

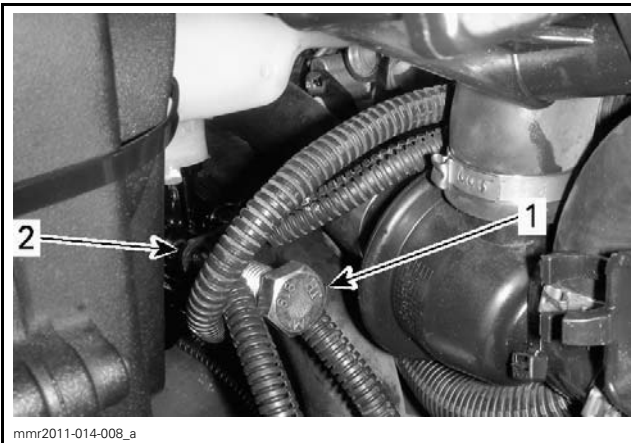
Section 02 ENGINE

Subsection 07 (LUBRICATION SYSTEM)



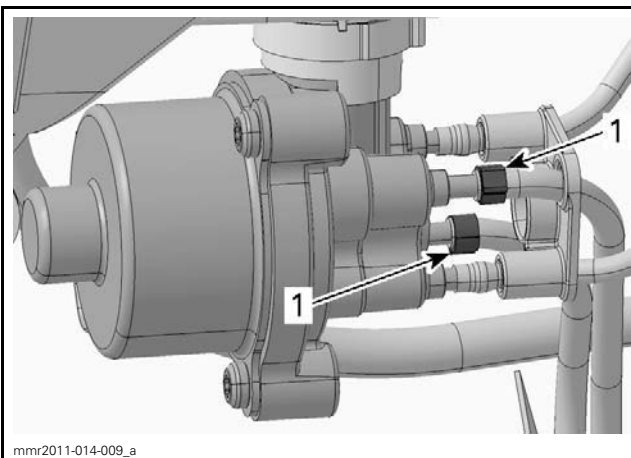
1. Locking tie

22. Pull pump hoses manifold by threading a M12 x 1.75 bolt.



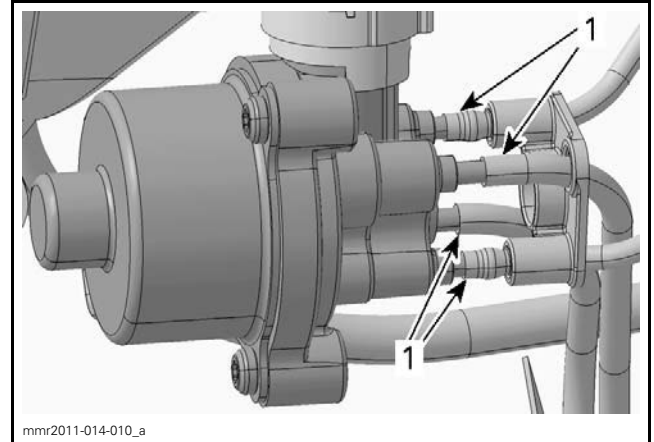
1. M12 x 1.75 bolt
2. Hoses manifold

23. Place a rag under oil injection pump to catch oil spillage.
24. Remove and discard Oetiker clamps securing oil hoses to oil injection pump fittings.



SOME PARTS REMOVED FOR CLARITY PURPOSE
1. Oetiker clamps (2x)

- NOTE:** Use metal scissors to cut clamps.
25. Carefully disconnect hoses from oil injection pump using a small screwdriver.

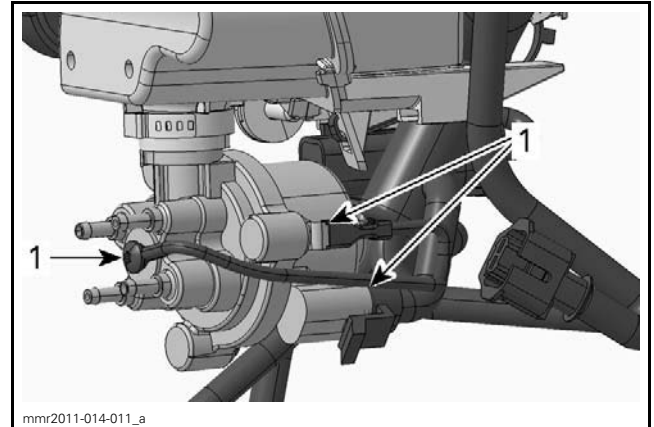


SOME PARTS REMOVED FOR CLARITY PURPOSE

1. Oil hoses (4x)

- NOTICE** oil injection pump fittings are very fragile, care must be taken when removing hoses from oil injection pump.

26. Disconnect oil injection pump connectors.



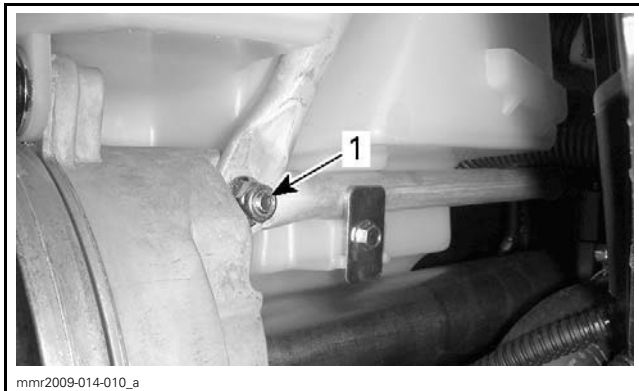
SOME PARTS REMOVED FOR CLARITY PURPOSE

1. Oil injection pump connectors

27. Remove RH side frame member.

Section 02 ENGINE

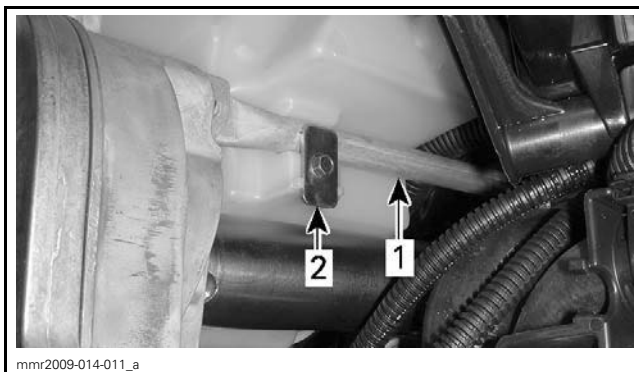
Subsection 07 (LUBRICATION SYSTEM)



BEHIND THE TOP OF CHAINCASE

1. Lower bolt on side frame member

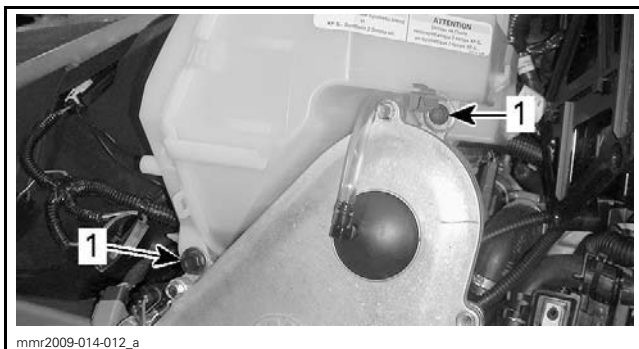
28. Remove holder retaining oil tank to side frame member brace.



TYPICAL

1. Side frame member brace
2. Oil tank holder

29. Remove screws securing oil tank to chaincase.



TYPICAL

1. Oil tank screws

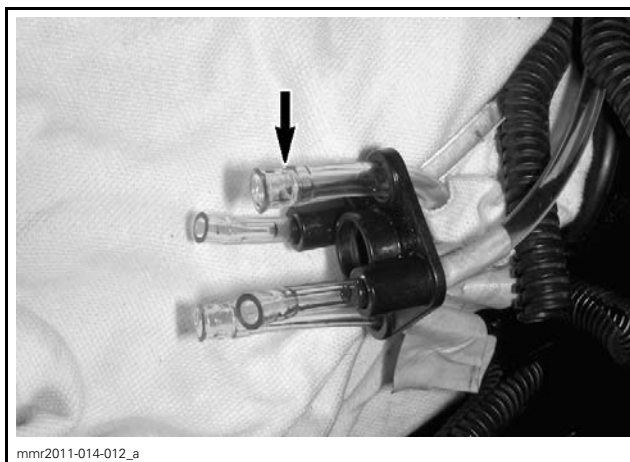
30. Remove oil tank from vehicle.

31. Remove oil injection pump from oil tank.
Refer to *OIL INJECTION PUMP REMOVAL (E-TEC)* in this subsection.

Oil Tank Installation (E-TEC)

Before tightening oil tank on vehicle, proceed as follows.

1. Ensure fuel tank is not installed on vehicle.
2. Install oil injection pump on oil tank. Refer to *OIL INJECTION PUMP INSTALLATION (E-TEC)*.
3. Apply injection oil on oil injection pump hoses.



APPLY INJECTION OIL

4. Install manifold sleeves onto both hoses routed towards 3D RAVE valves.
5. Properly route and connect oil hoses into oil injection pump. Refer to *OIL INJECTION PUMP HOSES CONNECTION* in this subsection.
6. Install **NEW** Oetiker clamp to secure hose routed towards PTO and MAG oil inlet.

NOTICE oil injection pump fittings are very fragile, care must be taken when installing hoses on oil injection pump.

7. Manually push hoses manifold against oil injection pump.
8. Use a large jaws locking pliers then **Carefully** push manifold until it clips onto oil injection pump.



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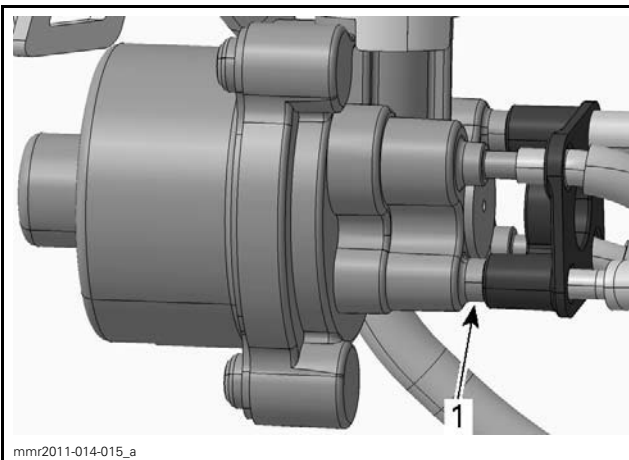
MANIFOLD INSTALLATION



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MANIFOLD INSTALLATION

9. Ensure hoses manifold is properly clipped onto oil injection pump.



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MANIFOLD PROPERLY CLIPPED

1. Normal gap

NOTE: A slight gap is normal between oil injection pump and hoses manifold.

Position oil tank on vehicle.

Tighten oil tank screws to specification.

OIL TANK SIDE SCREWS TORQUE

8 N•m (71 lbf•in)

OIL TANK FRONT SCREW TORQUE

1 N•m (9 lbf•in)

Reinstall all remaining components as the reverse of removal procedure.

Fill up oil tank using recommended oil. See *RECOMMENDED INJECTION OIL* in this subsection.

Bleed oil injection system. Refer to *OIL INJECTION PUMP BLEEDING* in this subsection.

⚠ WARNING

Make sure fitting of the fuel inlet hose at ECM is not leaking.

OIL LEVEL SENSOR

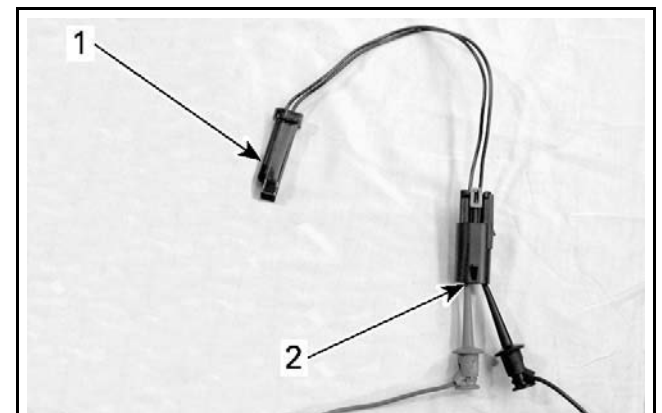
Oil Level Sensor Test (600 and 800R Power TEK)

1. Remove sensor from oil tank (except 600 HO E-TEC and 800R E-TEC models). See procedure in this subsection.
2. Measure resistance by probing sensor connector.

REQUIRED TOOL

FLUKE 115 MULTIMETER (P/N 529 035 868)

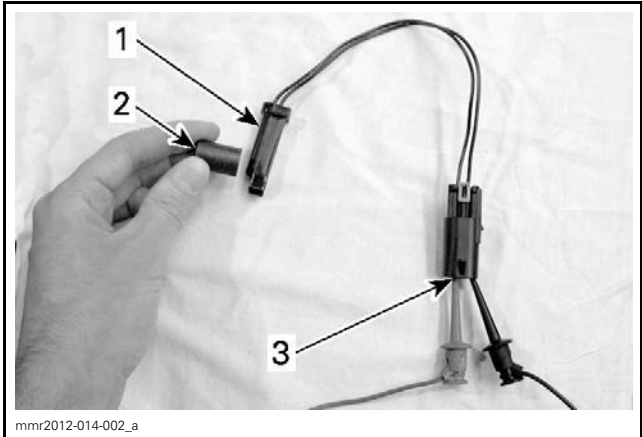
SENSOR TEST CONDITION	RESISTANCE
Free sensor (no magnet)	Open circuit infinite (OL)
Magnet close to sensor	Closed circuit (close to 0 Ω)



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1. Sensor
2. Probe here

Section 02 ENGINE
Subsection 07 (LUBRICATION SYSTEM)



- 1. Sensor
- 2. Magnet
- 3. Probe here

If test fails, replace sensor.

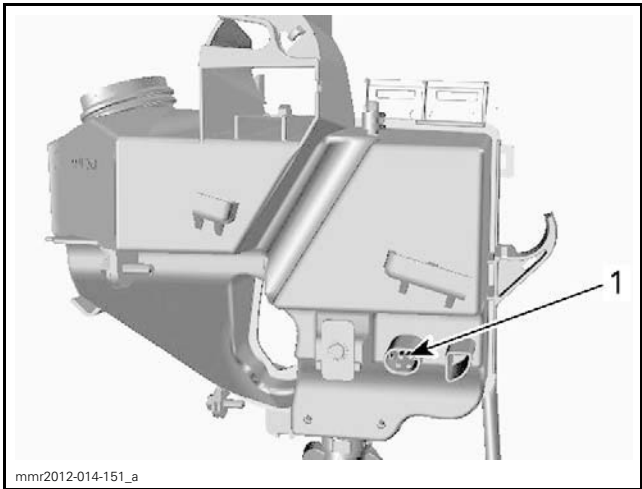
If test succeeds check float in oil tank:

- Float condition (damaged, jammed, fallen)
- Float magnet condition (strength and installation).

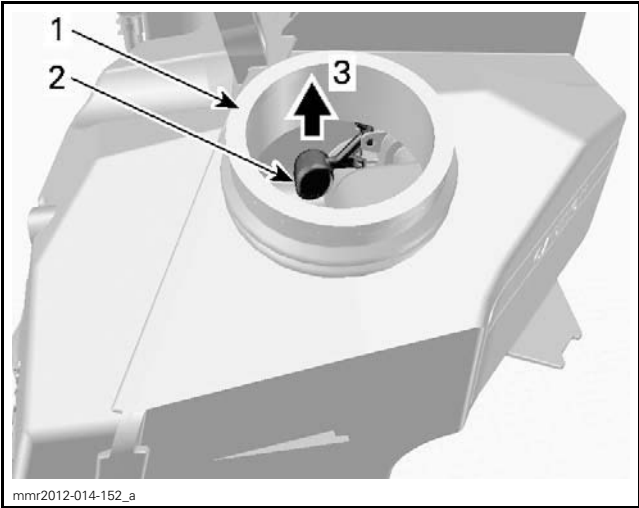
Oil Level Sensor Test (600 HO E-TEC and 800R E-TEC)

- 1. Measure resistance by probing sensor connector.

REQUIRED TOOL		
FLUKE 115 MULTIMETER (P/N 529 035 868)		
SENSOR TEST CONDITION		RESISTANCE
Empty oil tank	LOW float position	Closed circuit (close to 0 Ω)
	HIGH float position	Open circuit infinite (OL)



- 1. Probe sensor connector here



MEASURING RESISTANCE WITH FLOAT HELD IN HIGH POSITION

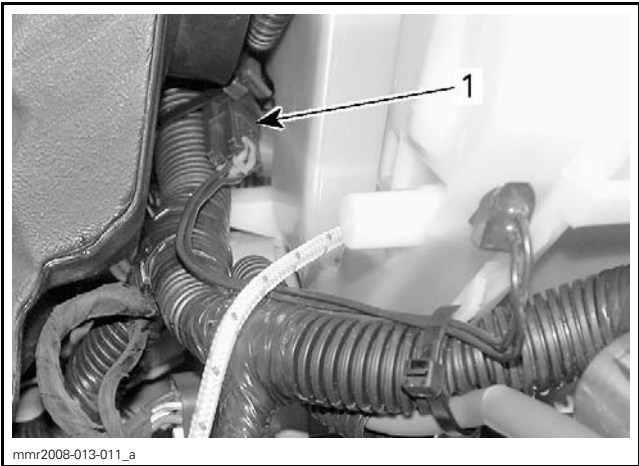
- 1. Oil tank cap removed
- 2. Float
- 3. Use a locking tie to lift float

If test fails, replace oil tank.

If test succeeds check float condition in oil tank.

Oil Level Sensor Removal (600 and 800R Power TEK)

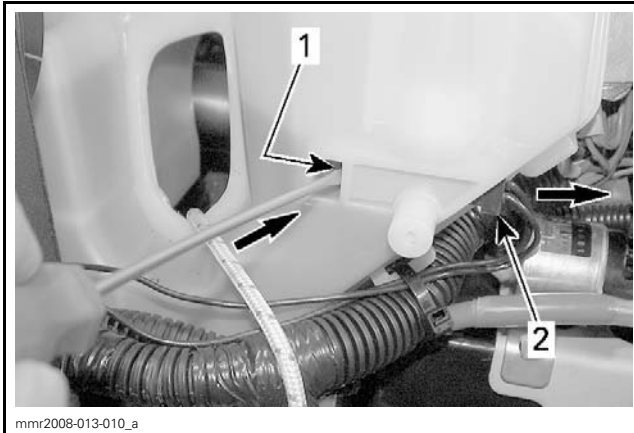
- 1. Remove rewind starter handle housing. Refer to *BODY* subsection.
- 2. Disconnect oil level sensor connector.



TYPICAL

- 1. Connector

- 3. Using a small screwdriver, push and hold tab to release then pull on sensor to remove.



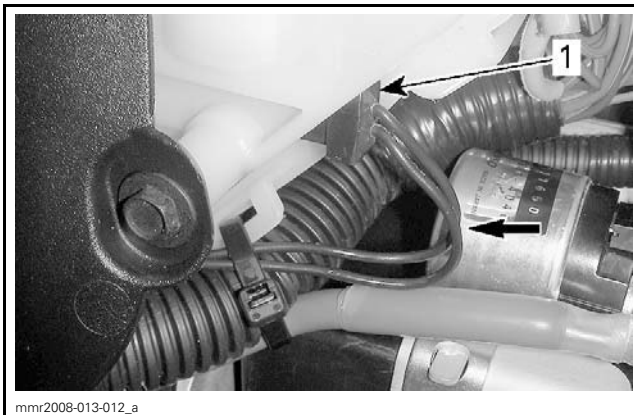
1. Tab
2. Sensor

Oil Level Sensor Installation (600 and 800R Power TEK)

For installation, reverse the removal procedure. However, pay attention to the following.

Ensure sensor wire is secured with a locking tie.

Ensure wire does not apply any tension on sensor. Wire must have a loop.



- TYPICAL**
1. Sensor

Oil Level Sensor Removal (600 HO E-TEC and 800R E-TEC)

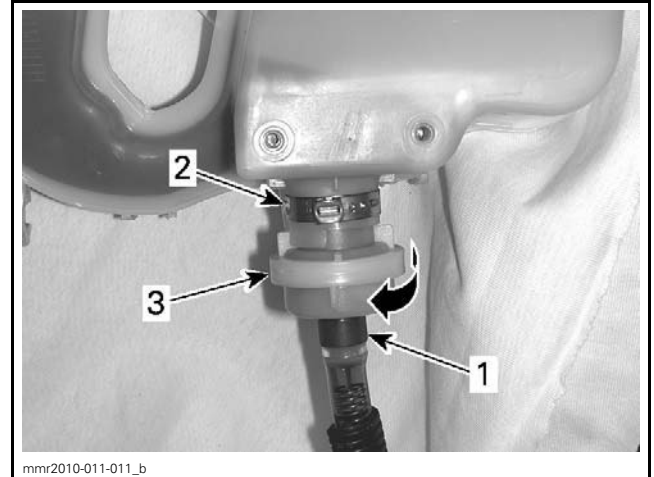
Oil level sensor is part of the oil tank and is not removable.

OIL FILTER (600 AND 800R POWER TEK)

Oil Filter Removal

1. Remove RH side panel. Refer to *BODY* subsection.
2. Remove oil injection pump supply hose from oil filter at the bottom of the tank.

3. Remove Oetiker clamp securing oil filter to tank.
4. Turn oil filter counterclockwise and pull.



1. Oil injection pump supply hose
2. Oetiker clamp
3. Oil filter

NOTE: If the spring clip on the oil supply hose cannot be accessed at the oil filter, disconnect the oil supply hose at the oil injection pump.

Oil Filter Installation

For installation, reverse the removal procedure. However, pay attention to the following:

Ensure circlip retaining oil supply line is in good condition. Replace if required.

Ensure filter is properly inserted and locked in before installing a **new** Oetiker clamp.

Ensure Oetiker clamp makes contact with oil tank ribs.

If oil supply hose was disconnected at the oil injection pump, bleed oil injection pump. See *OIL INJECTION PUMP BLEEDING* procedure in this subsection.

INJECTION NOZZLE

Injection Nozzle Inspection

600 and 800R Power TEK

Carry out the *OIL SYSTEM LEAK TEST* as described in this subsection.

If test is successful, repeat leak test but this time at 20.7 kPa (3 PSI).

- If the injector nozzle opens normally, it is in good condition.
- If the test is not successful, repeat test at injector nozzle as described in this topic.

Section 02 ENGINE
Subsection 07 (LUBRICATION SYSTEM)

All Engines

Lift engine to access the injector nozzles.
Use the VACUUM/PRESSURE PUMP (P/N 529 021 800).



Test check valve of injection nozzle as follows.

Table with 3 columns: PUMP SETTING, SET TO VACUUM, SET TO PRESSURE. It details the procedure for testing the check valve, including steps to activate the pump, expected results (no air flow), and actions for success or failure.

Injection Nozzle Removal

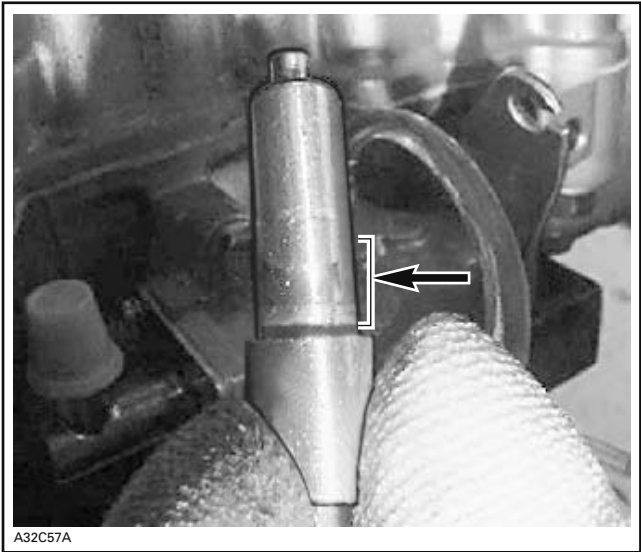
NOTICE Do not remove injection nozzle needlessly. It is likely to be damaged.

- 1. To gain access to the injector nozzles, engine must be lifted. Refer to ENGINE REMOVAL AND INSTALLATION subsection.
- 2. Clean injection nozzle area to remove oil or dirt.
- 3. Heat injection nozzle then pull it out of crankcase.

Injection Nozzle Installation

- 1. Prior to coating it with Loctite, make sure check valve body is clean and dry. If necessary, clean from dirt or oil, with PULLEY FLANGE CLEANER (P/N 413 711 809).

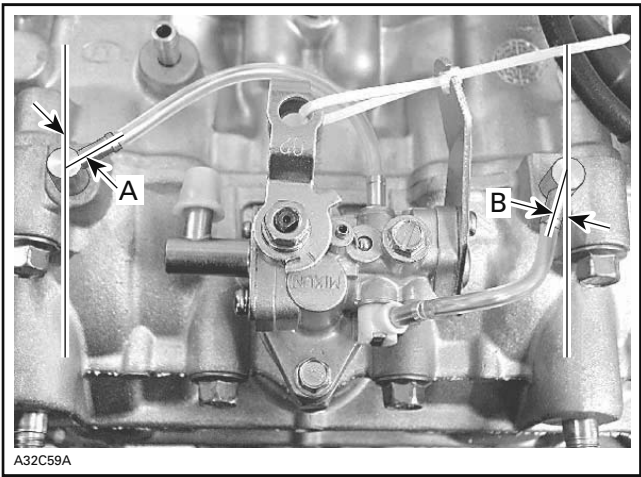
- 2. Apply LOCTITE 648 (GREEN) (P/N 413 711 400) on the outer diameter of the check valve (machined section). Take care that Loctite is ONLY in this area.



APPLY LOCTITE ON THIS AREA ONLY

600 and 800R Power TEK

- 3. Install check valve into the crankcase lower side.
- 4. Position check valves as per illustration.



TYPICAL
A. PTO side 45° ± 5° from cylinder axis to the top
B. MAG side 20° ± 5° from cylinder axis to the bottom

All Engines

- 5. Punch in the injection nozzle carefully with a plastic hammer.
- 6. Clean crankcase from surplus of Loctite 648 with a rag.
- 7. Reinstall engine into vehicle. Refer to ENGINE REMOVAL AND INSTALLATION subsection.