

LUBRICATION SYSTEM

SERVICE TOOLS

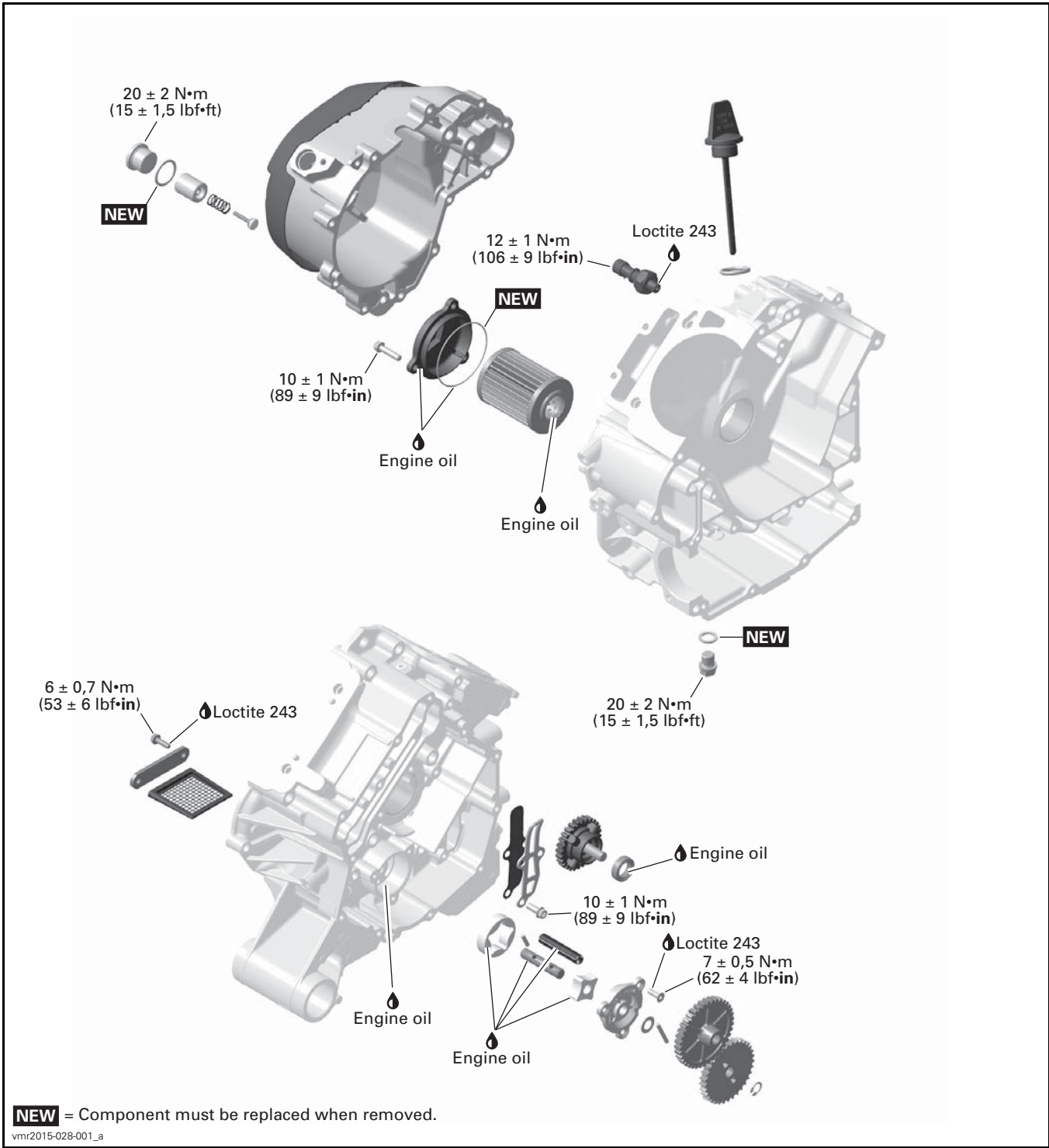
Description	Part Number	Page
ADAPTER HOSE	529 035 652	5
DISCONNECT TOOL	529 035 714	5
PRESSURE GAUGE.....	529 035 709	5

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE).....	293 800 060	7, 11

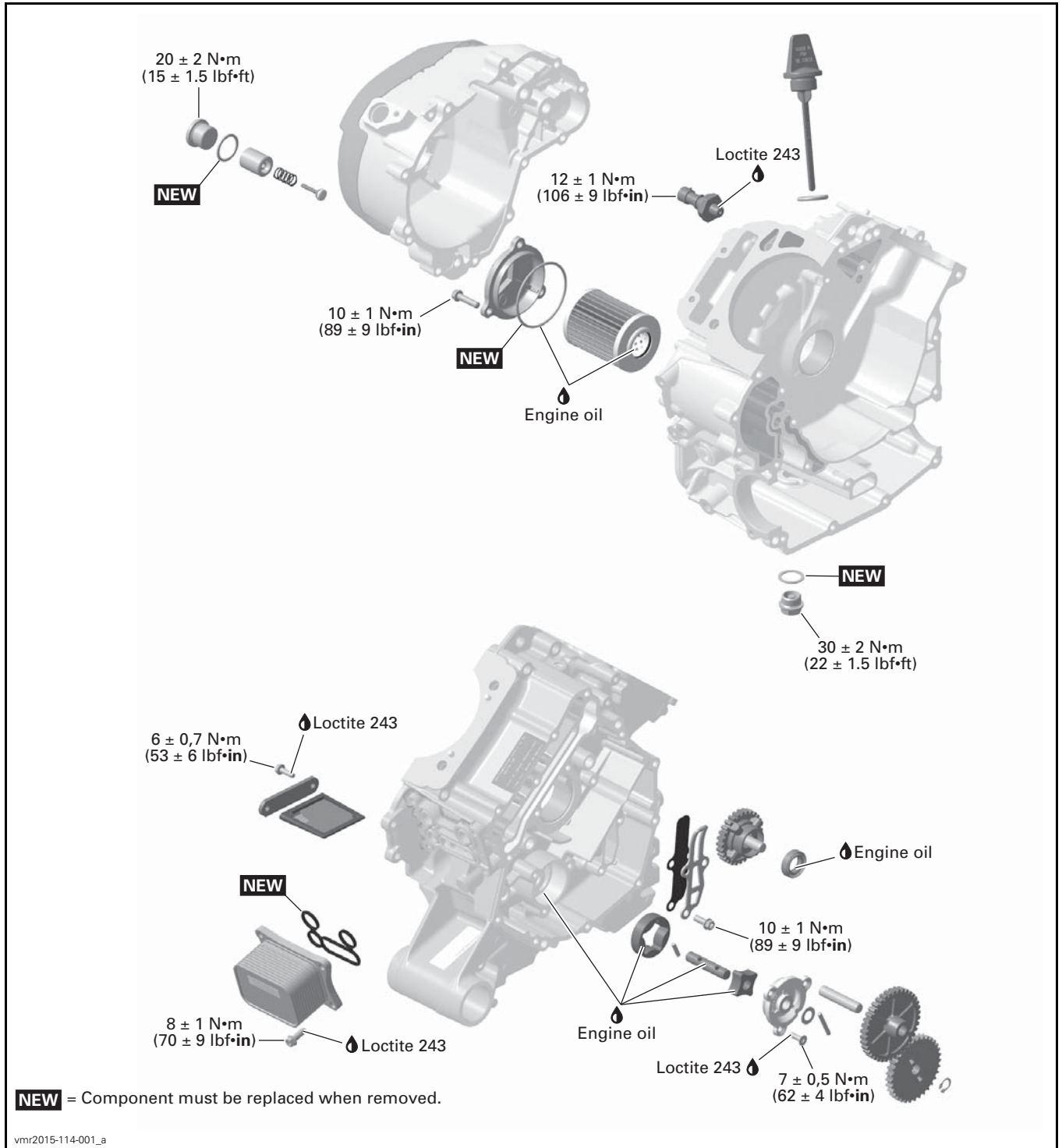
COMPONENTS

570 Engine

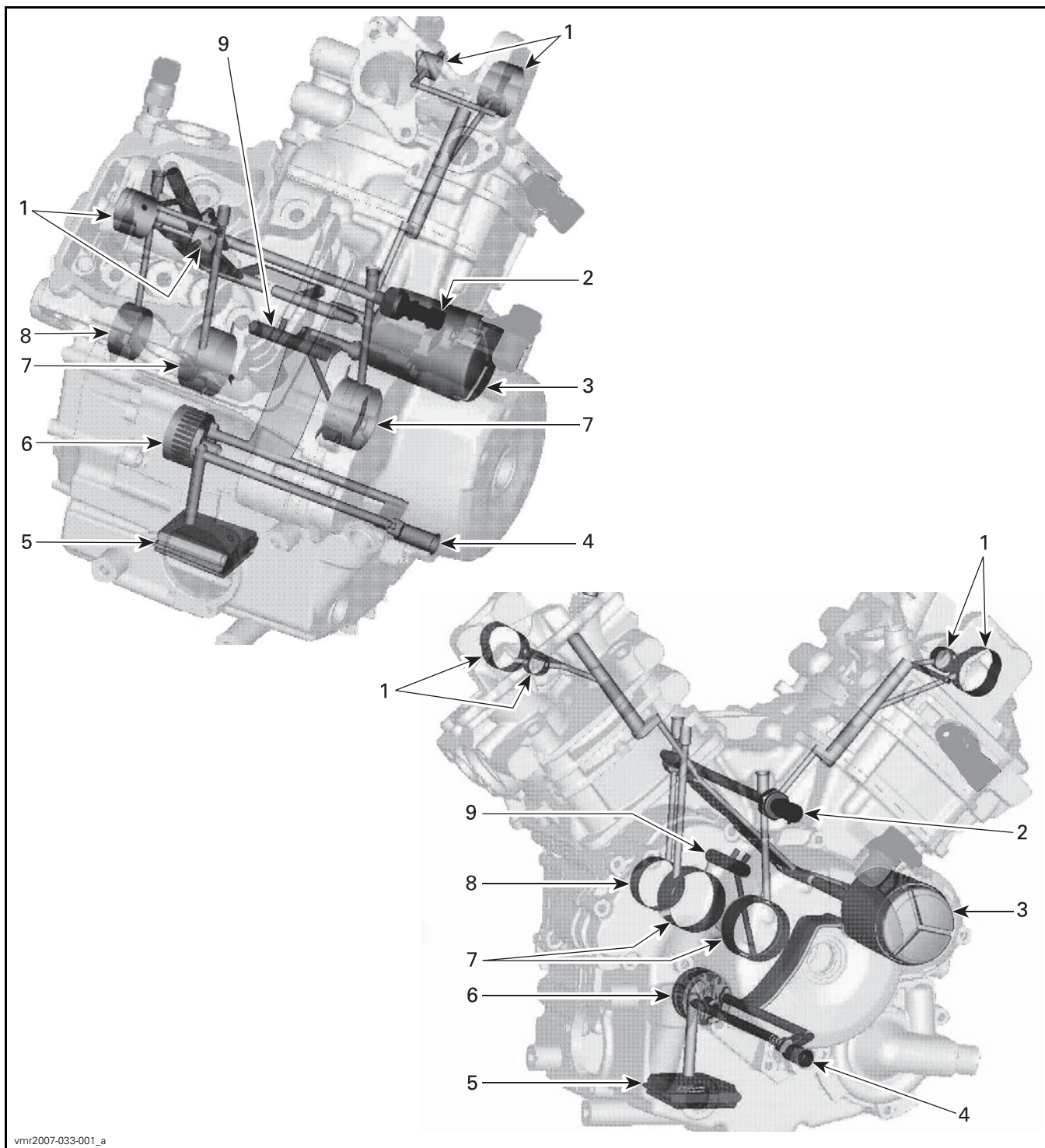


COMPONENTS

850 and 1000R Engines



ENGINE LUBRICATION CIRCUIT



vmr2007-033-001_a

1. Camshaft bearings
2. Oil pressure switch
3. Oil filter
4. Oil pressure regulator valve
5. Oil strainer
6. Oil pump
7. Crankshaft main bearings
8. Crankshaft support bearing
9. Connecting rod bearings

INSPECTION

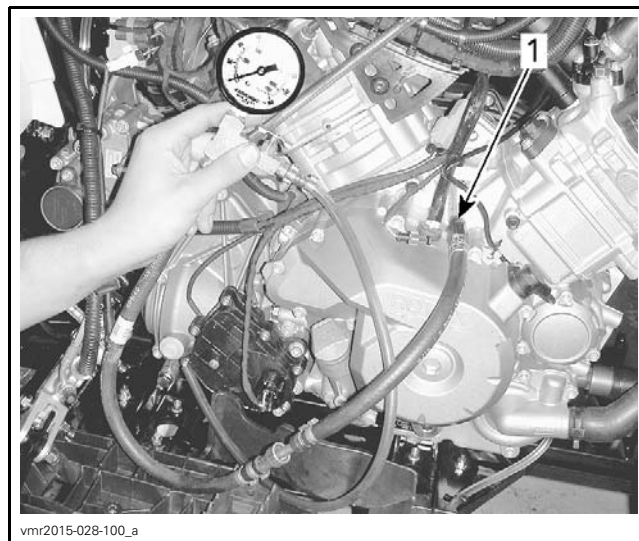
TESTING THE ENGINE OIL PRESSURE

NOTE: The engine oil pressure test should be done with a warm engine 100°C (212°F) and the recommended oil.

Remove the oil pressure switch. Refer to *OIL PRESSURE SWITCH* in this subsection.

Install the pressure test gauge with the proper adapter hose in the OPS engine bore.

REQUIRED TOOL	
PRESSURE GAUGE (P/N 529 035 709)	
ADAPTER HOSE (P/N 529 035 652)	



TYPICAL

1. Gauge connected in OPS engine bore

The engine oil pressure should be within the following values.

OIL PRESSURE	1250 RPM	6000 RPM
MINIMAL	70 kPa (10 PSI)	300 kPa (44 PSI)
NOMINAL	150 kPa (22 PSI)	350 kPa (51 PSI)
MAXIMAL	250 kPa (36 PSI)	450 kPa (65 PSI)

If the engine oil pressure is out of specifications, check the points described in *TROUBLESHOOTING* in this subsection.

Remove oil pressure gauge and adapter hose.

NOTE: To remove adapter hose from oil pressure gauge, use the disconnect tool.

REQUIRED TOOL	
DISCONNECT TOOL (P/N 529 035 714)	

Reinstall the oil pressure switch and remaining components.

TROUBLESHOOTING

LOW OR NO OIL PRESSURE

1. Oil level is too low.

- Refill engine with recommended engine oil. Refer to *OIL LEVEL VERIFICATION* in the *PERIODIC MAINTENANCE PROCEDURES* subsection.
- Check for high oil consumption, refer to *HIGH OIL CONSUMPTION* in this *TROUBLESHOOTING*.
- Check for engine oil leaks. For leak indicator hose and leak indicator hole, refer to *COOLING SYSTEM INSPECTION* in the *PERIODIC MAINTENANCE PROCEDURES* subsection. Repair if necessary.

2. Use of unsuitable engine oil type.

- Replace engine oil by the recommended engine oil.

3. Clogged oil filter.

- Replace oil and oil filter at the same time.

4. Defective oil pressure switch.

- Test oil pressure switch, see procedure in this subsection.

5. Defective or worn oil pump.

- Check oil pump, see procedure in this subsection.

6. Defective engine oil pressure regulator.

- Check engine oil pressure regulator, see procedure in this subsection.

7. Worn plain bearings in crankcase.

- Check plain bearing clearance, refer to *BOTTOM END* subsection.

8. Clogged engine oil strainer.

- Clean engine oil strainer, see procedure in this subsection.

OIL CONTAMINATION

1. Defective water pump seal ring or rotary seal.

- Check for oil or coolant leak from indicator near water pump, refer to *COOLING SYSTEM INSPECTION* in the *PERIODIC MAINTENANCE PROCEDURES* subsection. Replace seal if necessary.

Subsection 04 (LUBRICATION SYSTEM)

2. Cylinder head or cylinder base gasket leak.
 - Retighten cylinder head to specified torque, refer to TOP END subsection. Replace gasket if tightening does not solve the problem.
3. Engine internal damage.
 - Repair engine.
4. Oil cooler gasket leak.
 - Replace oil cooler gasket and change engine oil.

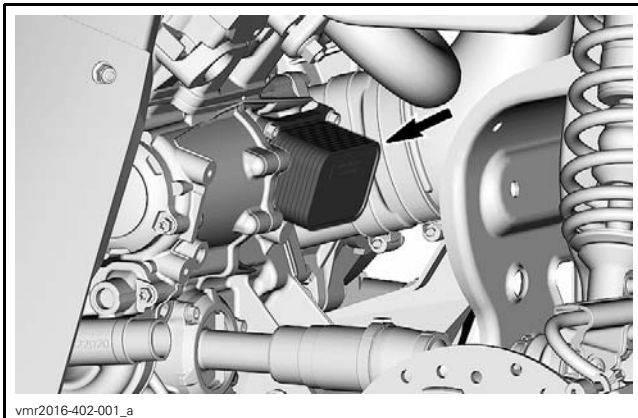
HIGH OIL CONSUMPTION

1. Leaking breather oil seal.
 - Check if the oil seal of the breather is brittle, hard or damaged. Refer to BOTTOM END subsection.
2. Valve stem seals worn or damaged.
 - Replace valve stem seals.
3. Worn piston rings (blue exhaust smoke).
 - Replace piston rings.

PROCEDURES

OIL COOLER (850 AND 1000R ENGINES)

Oil Cooler Location

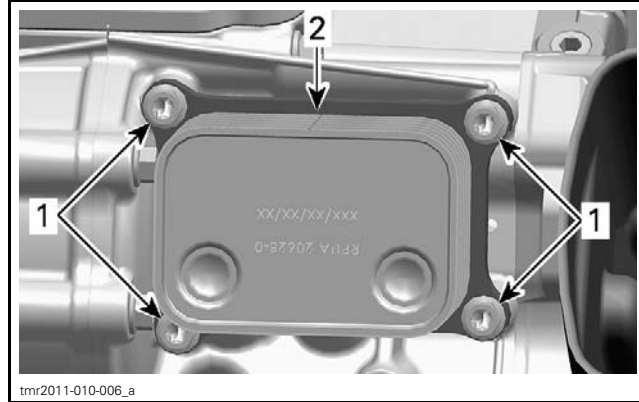


Removing the Oil Cooler

Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection to:

- Drain engine oil. Refer to *ENGINE OIL CHANGE*
- Drain coolant. Refer to *ENGINE COOLANT REPLACEMENT*.

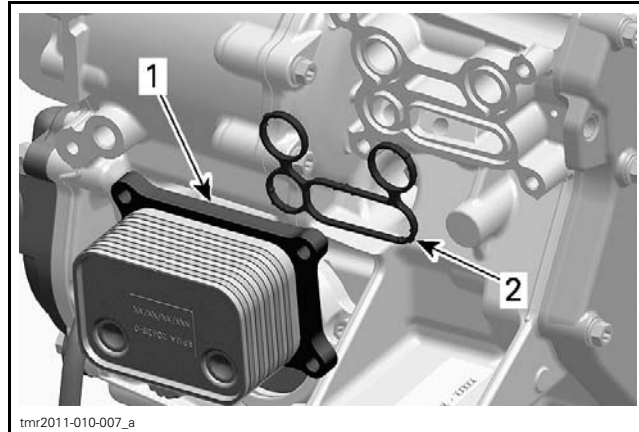
Remove oil cooler retaining screws.



1. Retaining screws
2. Oil cooler

Place rags or towels under oil cooler to catch remaining oil and coolant.

Remove oil cooler and discard gasket.



1. Oil cooler
2. Gasket

Inspecting the Oil Cooler

Check oil cooler for cracks or other damage.

Replace if necessary.

Installing the Oil Cooler

For installation, reverse the removal procedure. Pay attention to the following details.

Wipe off any oil and coolant spillage.

Install a NEW gasket.

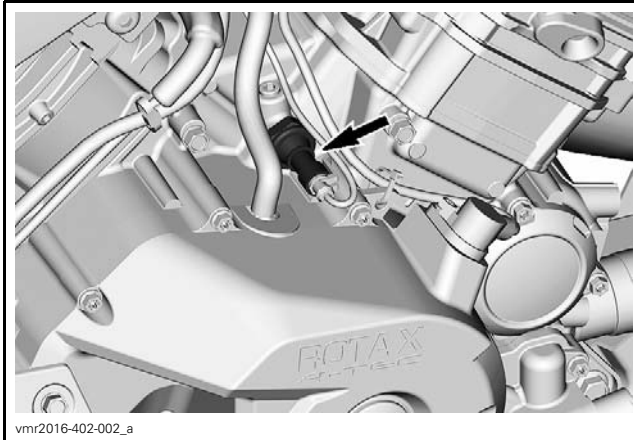
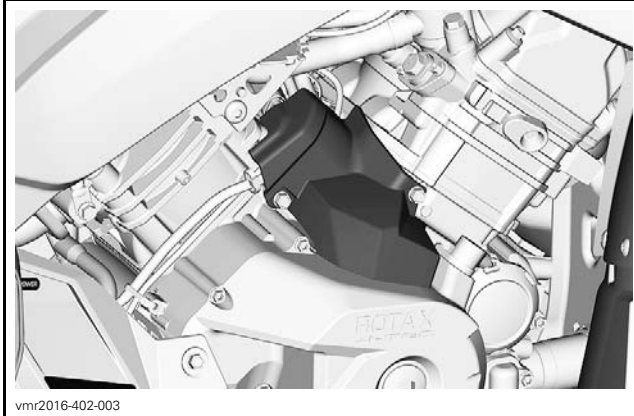
Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection and carry out the following:

- Refill engine with recommended oil. See *ENGINE OIL CHANGE*.
- Refill and bleed cooling system. See *ENGINE COOLANT REPLACEMENT*.

OIL PRESSURE SWITCH (OPS)

Oil Pressure Switch Access

Remove OPS cover.



Oil Pressure Switch Activation

The oil pressure switch activates when the engine oil pressure is lower than following specified pressure range.

OIL PRESSURE SWITCH ACTIVATION RANGE

30 kPa $\pm$ 10 kPa (4.35 PSI $\pm$ 1.45 PSI)

To check the function of the oil pressure switch, an oil pressure test has to be performed. Refer to *ENGINE OIL PRESSURE* in this subsection.

If the engine oil pressure is good, perform the oil pressure switch resistance test.

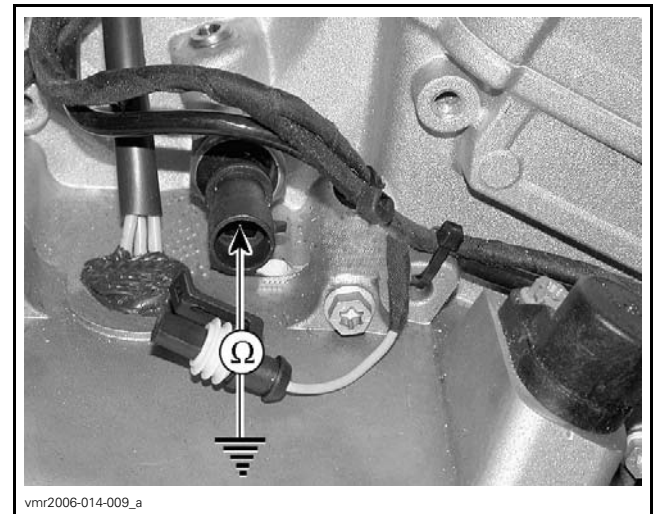
Testing the Oil Pressure Switch Resistance

Disconnect the connector from the oil pressure switch.

Check resistance as per following tables.

OPS CONNECTOR	ENGINE	ENGINE NOT RUNNING
PIN		RESISTANCE (Ω)
1	Engine ground	Close to 0 Ω (normally closed switch)

OPS CONNECTOR	ENGINE	ENGINE RUNNING
PIN		RESISTANCE (Ω)
1	Engine ground	Infinite (open) when pressure reaches 30 kPa $\pm$ 10 kPa (4.35 PSI $\pm$ 1.45 PSI)



If resistance values are incorrect, replace the oil pressure switch.

If the values are correct, check wiring.

Removing the Oil Pressure Switch

Unplug the oil pressure switch connector.

Unscrew and remove oil pressure switch.

Installing the Oil Pressure Switch

Apply required service product on threads of oil pressure switch.

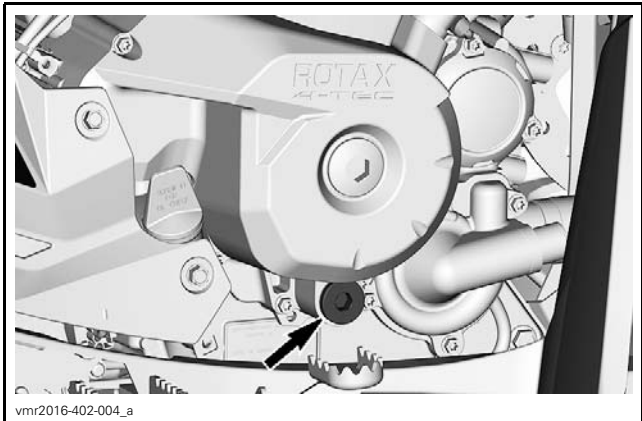
Tighten oil pressure switch to specification.

TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Oil pressure switch	12 N•m $\pm$ 1 N•m (106 lbf•in $\pm$ 9 lbf•in)

ENGINE OIL PRESSURE
REGULATOR

Oil Pressure Regulator Location

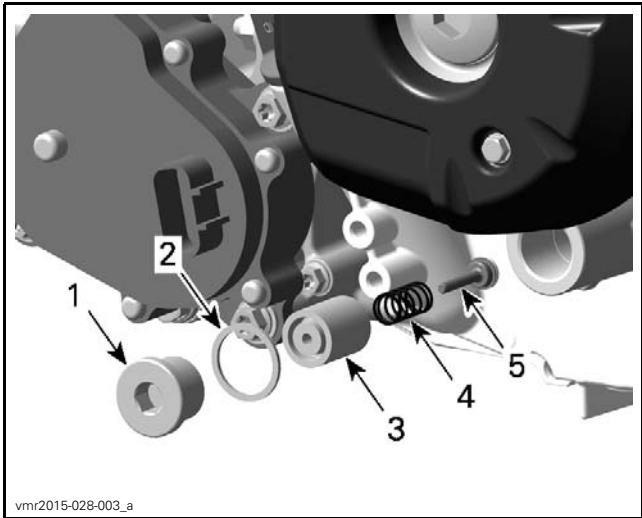
The oil pressure regulator is located on the engine magneto side, integrated in the magneto cover.



NOTE: The oil pressure regulator system works when the oil pressure exceeds 400 kPa (58 PSI).

Removing the Oil Pressure Regulator

Remove plug screw and pull oil pressure regulator out.



- 1. Plug screw
- 2. Gasket ring
- 3. Pressure regulator housing
- 4. Spring
- 5. Pressure regulator valve

Inspecting the Oil Pressure Regulator

Inspect pressure regulator housing and valve for scoring or other damages.

Check spring for free length.

SPRING FREE LENGTH	
NEW NOMINAL	39 mm (1.535 in)
SERVICE LIMIT	37 mm (1.457 in)

NOTE: Replace worn or damaged components.
Clean bore and thread in the magneto housing from metal shavings and other contaminations.

Installing the Oil Pressure Regulator

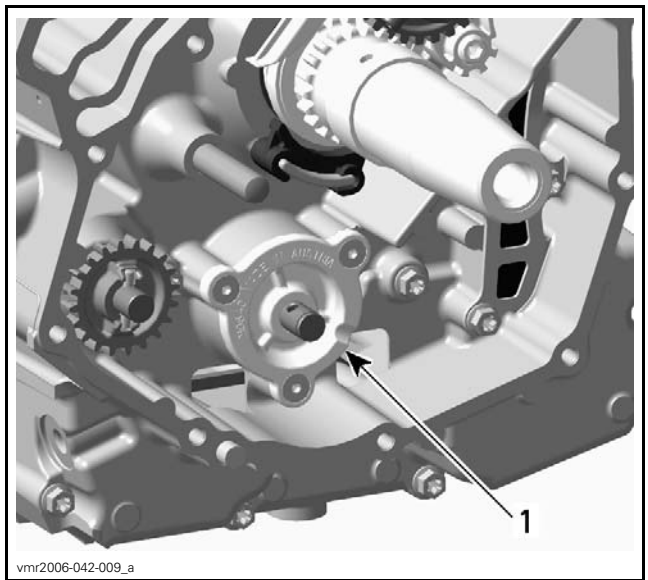
For installation, reverse the removal procedure. Pay attention to the following details.

NOTE: At installation always replace the gasket ring of the plug screw by a NEW one.

OIL PUMP

Oil Pump Location

The oil pump is located on the engine PTO side (behind PTO cover).

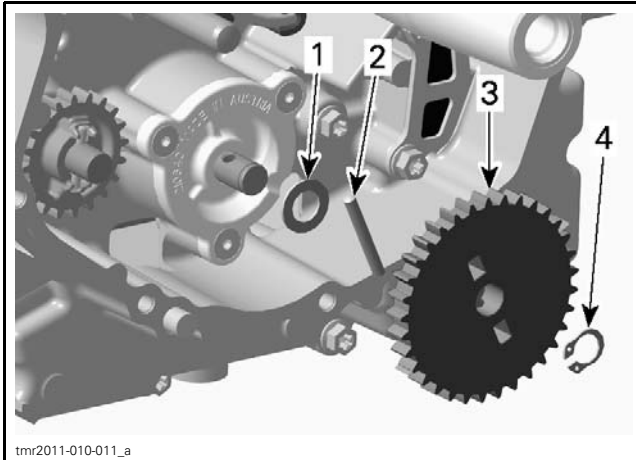


1. Oil pump

Removing the Oil Pump

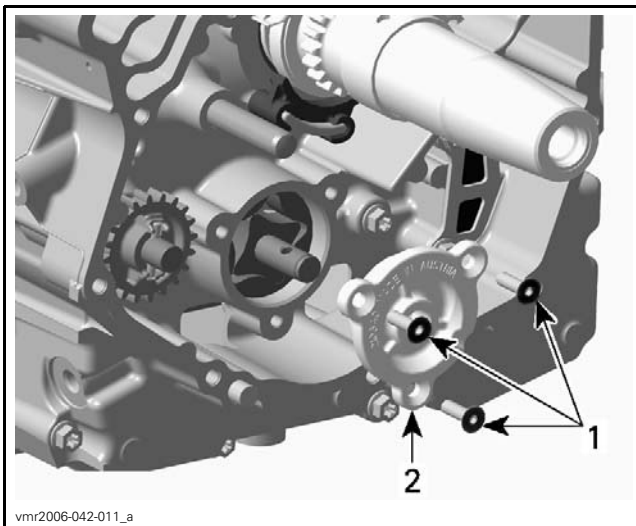
Remove the PTO cover. Refer to *PTO COVER* in the *BOTTOM END* subsection.

- 1. Remove:
 - Retaining ring
 - Oil pump gear
 - Needle pin
 - Thrust washer.



1. Thrust washer
2. Needle pin
3. Oil pump gear
4. Retaining ring

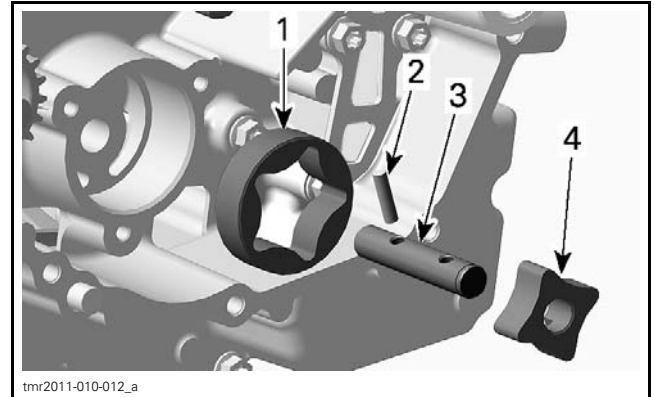
2. Remove oil pump cover screws and pull oil pump cover out.



1. Retaining screws
2. Oil pump cover

3. Remove oil pump shaft with needle pin and inner rotor.

4. Remove outer rotor.

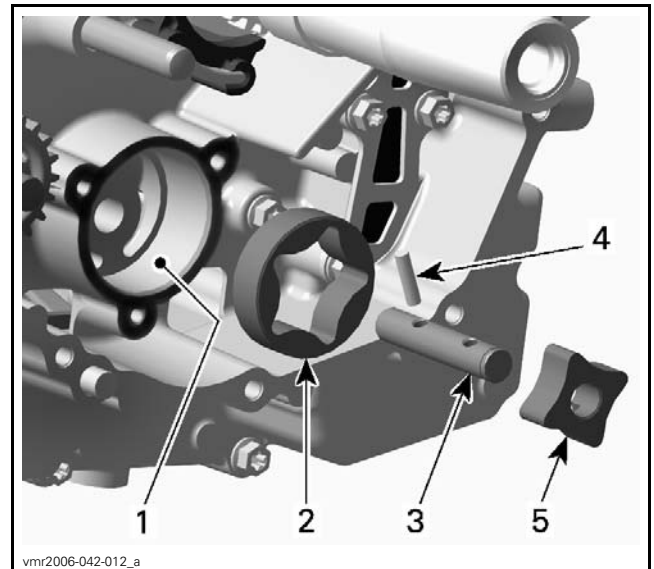


1. Outer rotor
2. Needle pin
3. Oil pump shaft
4. Inner rotor

Inspecting the Oil Pump

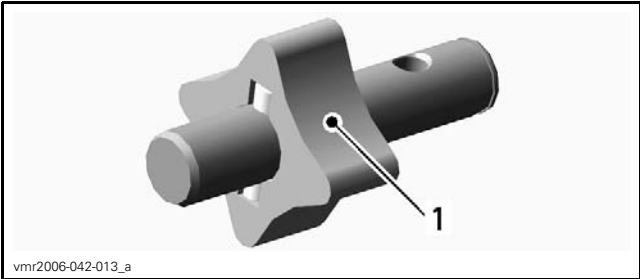
Inspect oil pump and oil pump cover bore for marks, scratches or other damages. Check for scratches in crankcase between outer rotor and oil pump bore. If so, replace damaged parts.

Check oil pump cover for damages and for surface straightness with a straightedge.



1. Oil pump bore
2. Outer rotor
3. Oil pump shaft
4. Needle pin
5. Inner rotor

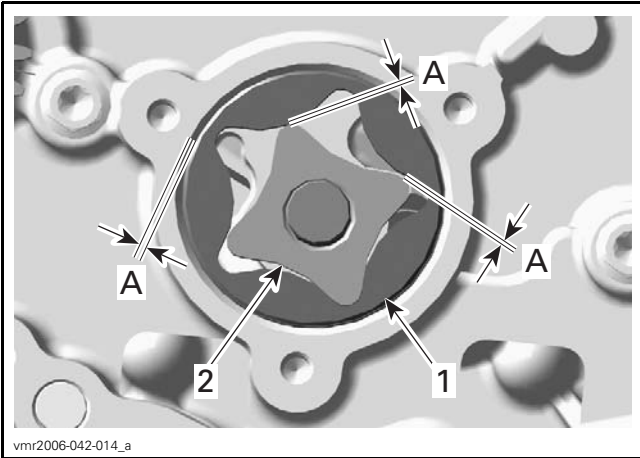
Check inner rotor for corrosion pin holes or other damages. If so, replace oil pump shaft assembly.



1. Pittings on the teeth

Using a feeler gauge, measure the clearance of inner and outer rotors as shown.

CLEARANCE OF INNER AND OUTER ROTOR	
SERVICE LIMIT	0.25 mm (.0098 in)

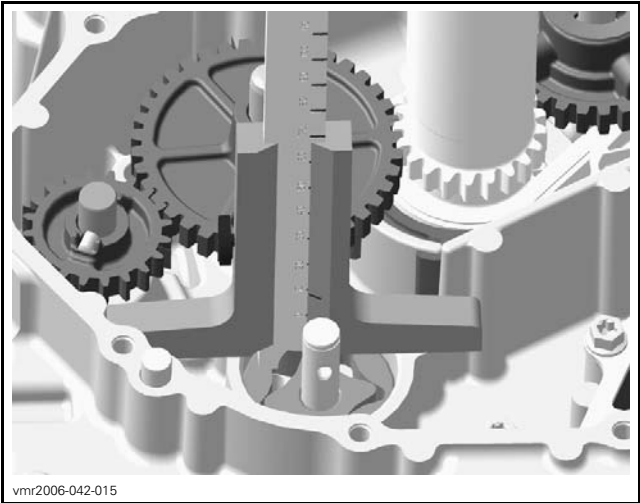


1. Outer rotor
2. Inner rotor
A. 0.25 mm (.0098 in)

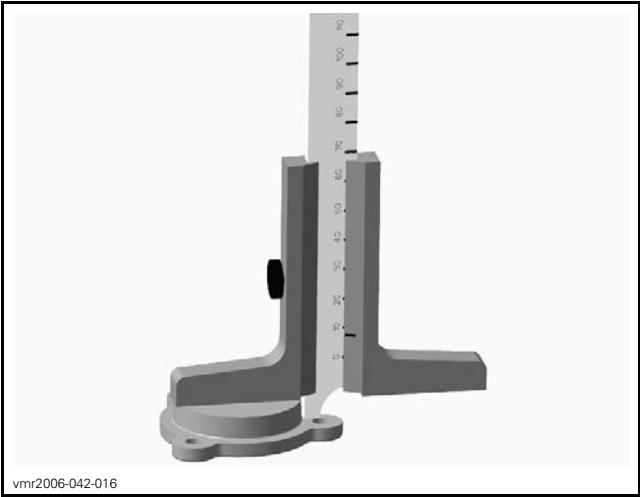
If clearance of inner and outer rotors exceeds the tolerance, replace oil pump rotors. Ensure to also check oil pump cover. If damaged, replace the complete oil pump assembly.

If clearance between outer rotor and its bore in crankcase exceeds the tolerance, replace the complete oil pump rotors and/or the crankcase.

Using a depth gauge, measure the axial clearance of the oil pump as shown.



OIL PUMP — MEASUREMENT “A”



OIL PUMP COVER — MEASUREMENT “B”

Substract measurement B from measurement A to obtain axial clearance.

OIL PUMP AXIAL CLEARANCE	
SERVICE LIMIT	0.20 mm (.008 in)

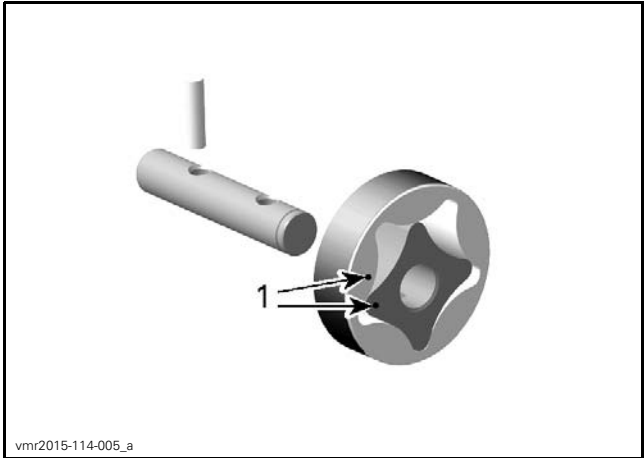
NOTE: When the axial clearance of the oil pump assembly increases, the oil pressure decreases.

Installing the Oil Pump

For installation, reverse the removal procedure.

Pay attention to the following details.

NOTE: When installing the oil pump rotors, make sure both markings are on the outer side.



1. Markings

After reinstallation of the remaining parts, check for smooth operation of the oil pump assembly.

Testing the Oil Pump Function

After engine is completely reassembled, start engine and make sure oil pressure is within specifications (refer to *ENGINE OIL PRESSURE* in this subsection).

ENGINE OIL STRAINER

Oil Strainer Location

The engine oil strainer is located between both crankcase halves.

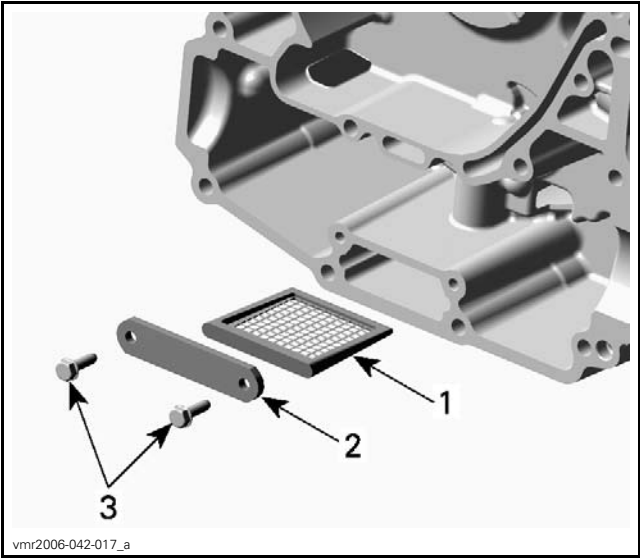
Removing the Oil Strainer

Remove engine from vehicle.

Separate crankcase halves. Refer to *BOTTOM END* subsection.

Remove screws and retaining plate.

Pull out engine oil strainer.



- 1. Engine oil strainer
- 2. Retaining plate
- 3. Screws

Cleaning and Inspecting the Oil Strainer

Clean engine oil strainer with a part cleaner then use an air gun to dry it.

⚠ WARNING

Always wear eye protector. Chemicals can cause a rash break out and injure your eyes.

Check engine oil strainer for cracks or other damage. Replace if damaged.

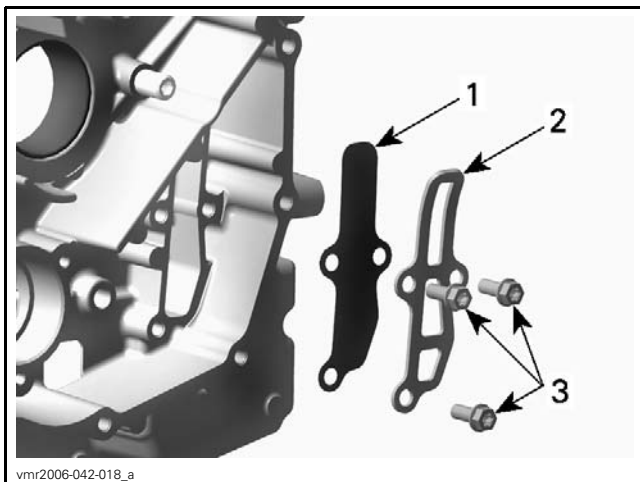
Installing the Oil Strainer

The installation is the reverse of the removal procedure.

SERVICE PRODUCT	
Oil Strainer screws	LOCTITE 243 (BLUE) (P/N 293 800 060)
TIGHTENING TORQUE	
Oil strainer screws	6 N•m ± 0.7 N•m (53 lbf•in ± 6 lbf•in)

REED VALVE

The engine is equipped with a reed valve which prevents accumulation of larger oil quantities in the crankcase. The reed valve is fitted into the crankcase.



- 1. Reed valve
- 2. Stopper
- 3. Screws

Removing the Reed Valve

Remove:

- Engine from vehicle
- PTO cover (refer to *PTO COVER* in the *BOTTOM END* subsection)
- Reed valve retaining screws
- Stopper plate
- Reed valve.

Inspecting the Reed Valve

Check reed valve for cracks or other damage.

Replace reed valve if damaged.

Installing the Reed Valve

The installation is the reverse of the removal procedure.