

BOTTOM END

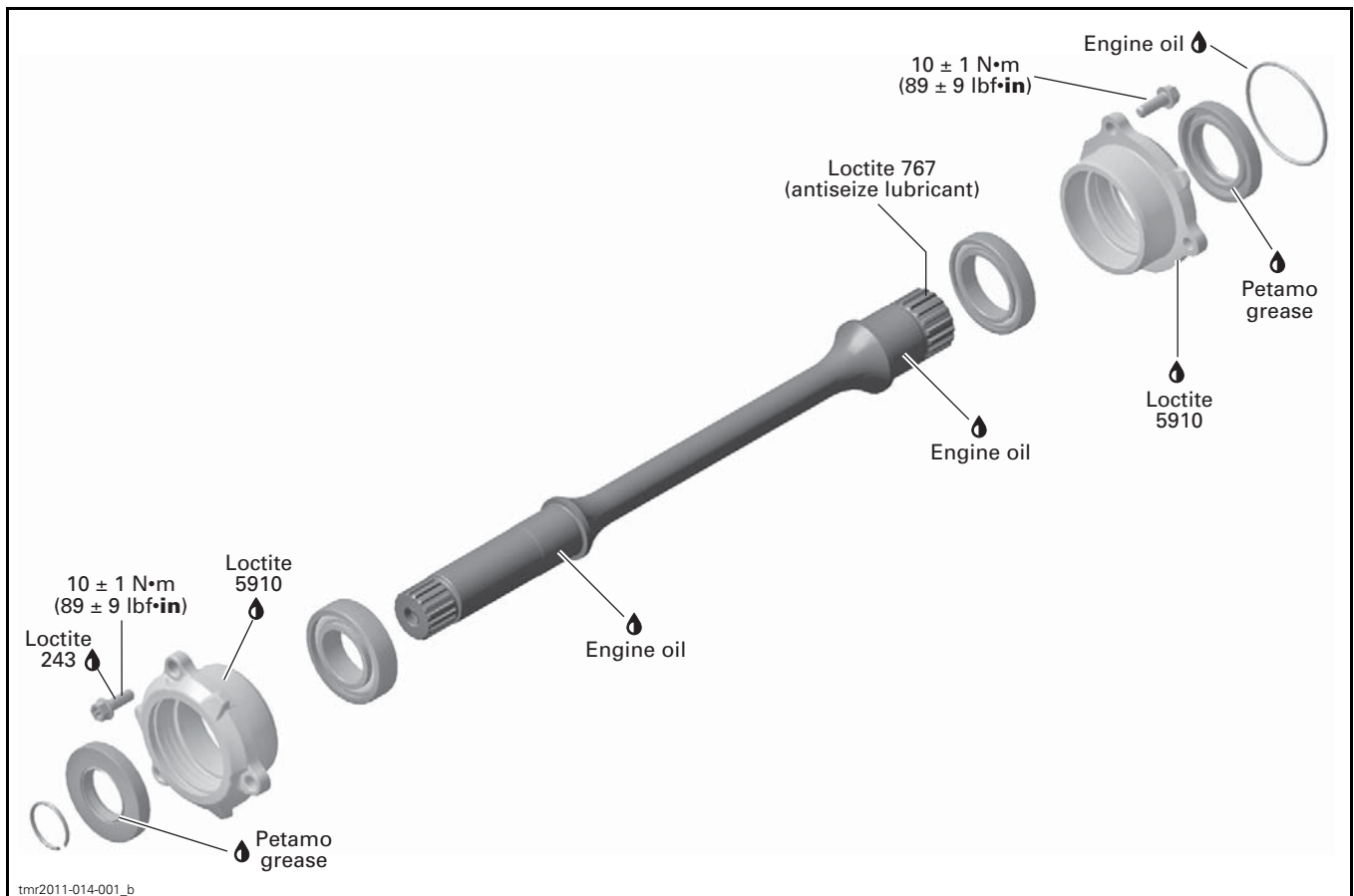
SERVICE TOOLS

Description	Part Number	Page
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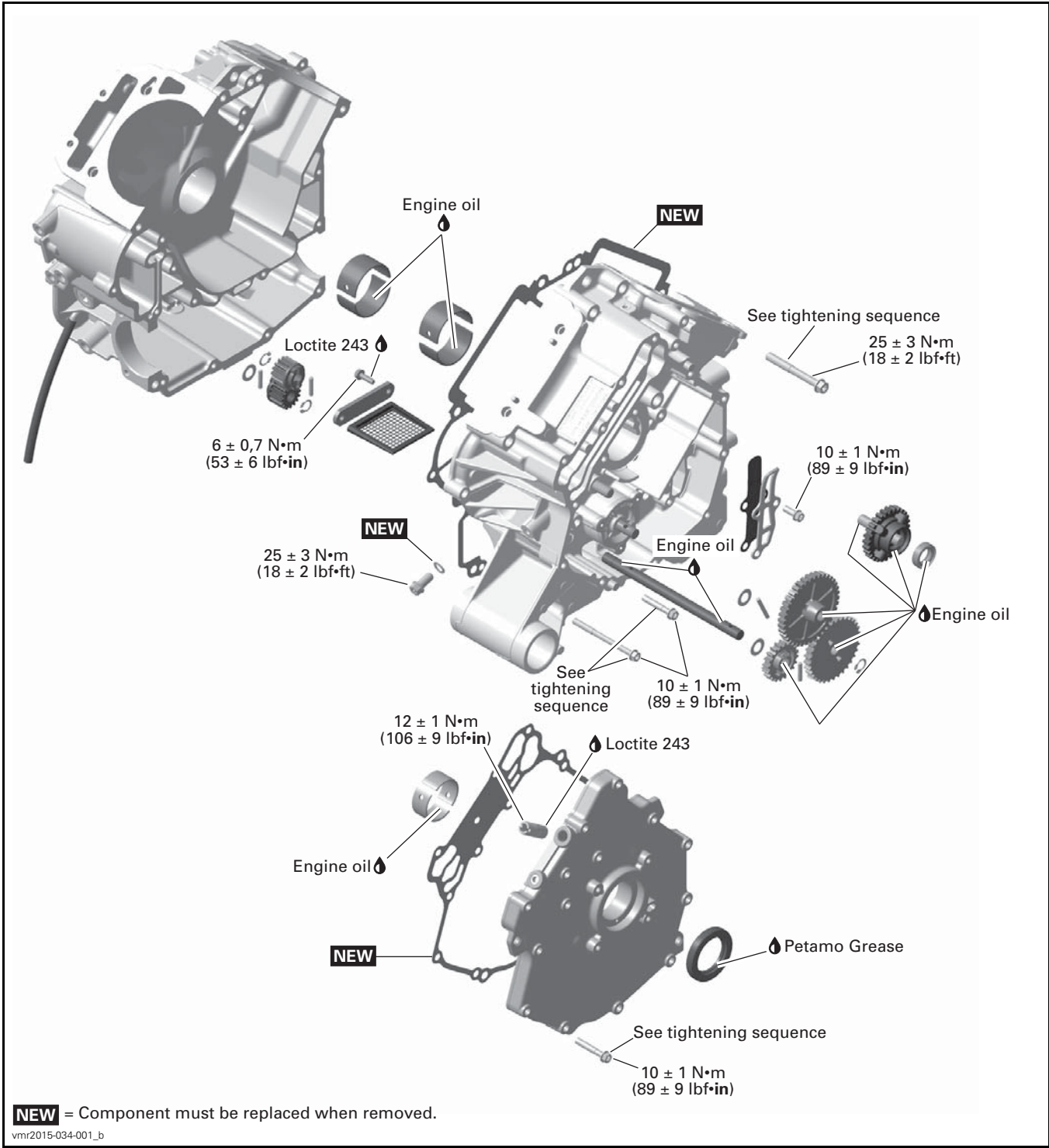
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	6
LOCTITE 5910	293 800 081	5
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	5

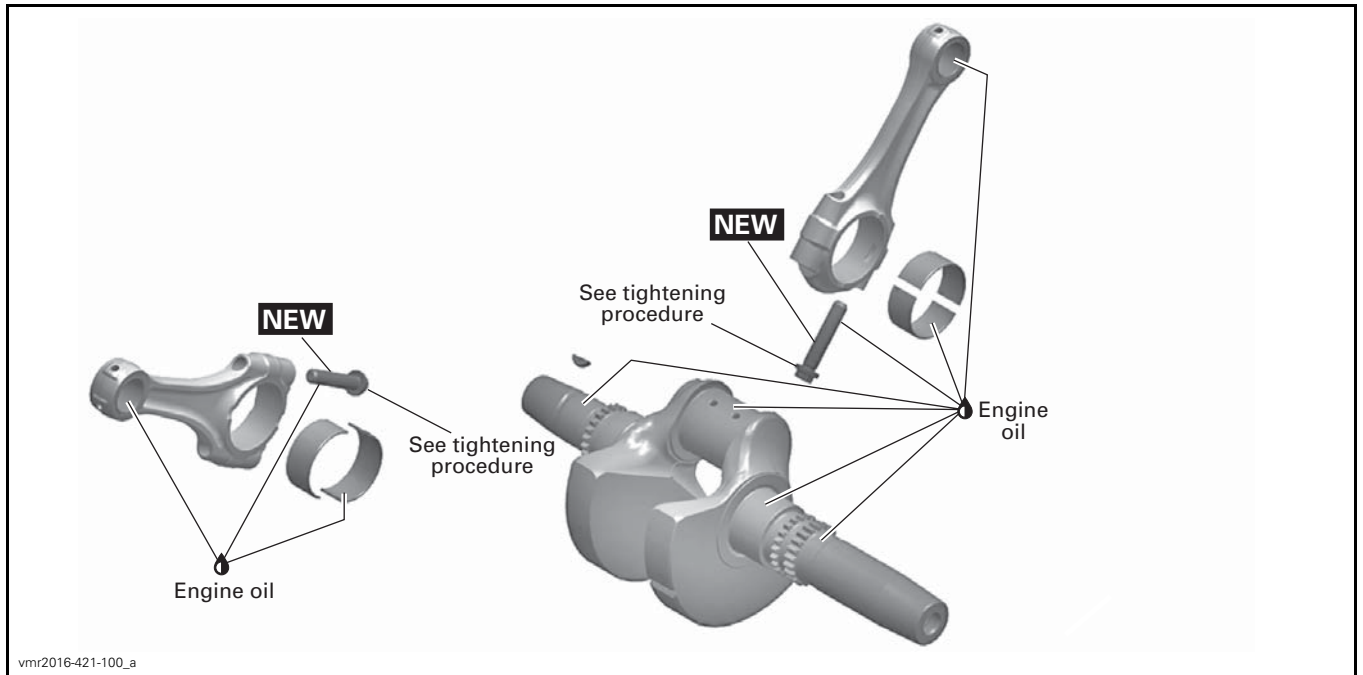
ENGINE DRIVE SHAFT



CRANKCASE AND PTO COVER



CRANKSHAFT



PROCEDURES

IMPORTANT: Note position of parts on disassembly. This may help to find the root cause of a problem. A component that is not replaced should be reinstalled in the same position as originally mounted.

ENGINE DRIVE SHAFT

NOTE: The engine drive shaft transmits the power from the gearbox to the front differential and is located inside the crankcase.

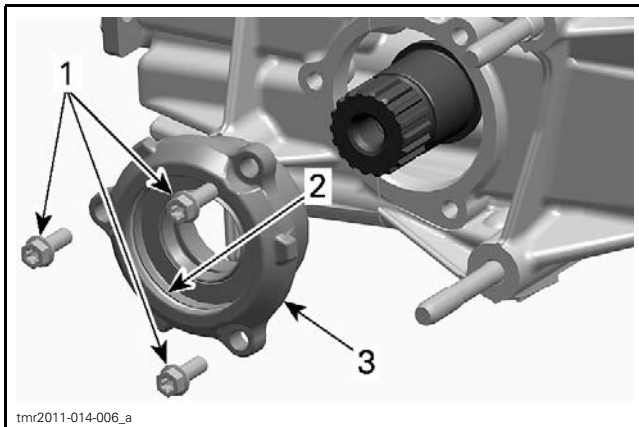
Removing the Engine Drive Shaft

Remove the engine. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.

Removing the Rear Bearing Cover

Detach gearbox from engine, refer to *GEARBOX AND 4X4 COUPLING UNIT* subsection.

At rear of engine, remove the bearing cover and its O-ring.

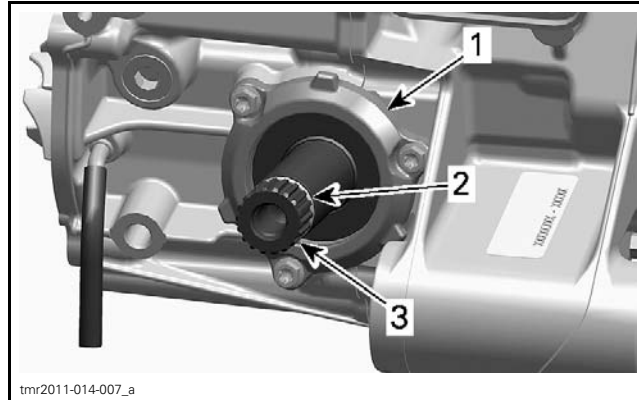


1. Bearing cover screws
2. O-ring
3. Bearing cover gearbox side

Removing the Front Bearing Cover

Remove the bearing cover at the front of the engine.

NOTICE Check ends of the circlip for sharp edges or burrs before removing the drive shaft, to avoid damaging the oil seal.



1. Bearing cover front drive side
2. Circlip
3. Drive shaft

Removing the Engine Drive Shaft

Split crankcase, refer to *CRANKCASE* in this subsection.

Remove engine drive shaft from the crankcase.

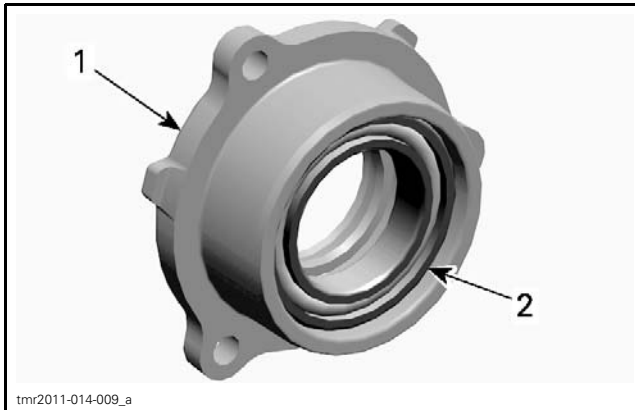


1. Crankcase MAG side
2. Engine drive shaft

Inspecting the Engine Drive Shaft

Replace oil seals and/or O-ring (bearing cover gearbox side) if they are brittle, hard or damaged.

Check drive shaft bearings for contamination and/or metal shavings. Check if bearings turn freely and smoothly. Replace if necessary.



1. Bearing cover
2. Drive shaft bearing

Check drive shaft for cracks, bend, pitting or other visible damages.

Check drive shaft splines for wear or damages.

Check oil seal running surface of the drive shaft for scratches. Replace if necessary.

Installing the Engine Drive Shaft

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

Clean all metal components in solvent.

Clean crankcase surfaces and bearing covers using a combination of LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500) and a brass brush. First brush in one direction then make the final brushing perpendicularly (90°) to the first pass.

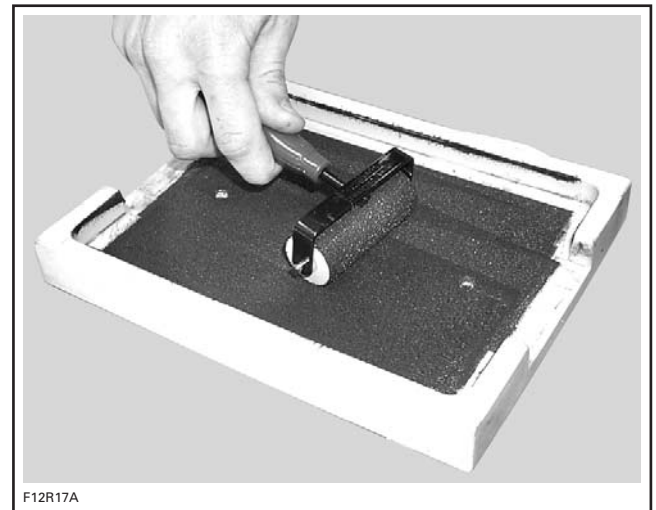
NOTICE Do not wipe with rags. Use a new clean hand towel only.

Use a suitable installer for installing bearings.

Use LOCTITE 5910 (P/N 293 800 081) on mating surfaces.

IMPORTANT: When beginning the application of the bearing cover sealant, the assembly and the first torquing should be done within 10 minutes. It is suggested to have all you need on hand to save time.

Use a plexiglass plate and apply some sealant on it. Use a soft rubber roller 50 mm - 75 mm (2 in - 3 in), available in arts products suppliers for printing, and roll the sealant to get a thin uniform coat on the plate (spread as necessary). When ready, apply the sealant on bearing cover surfaces.



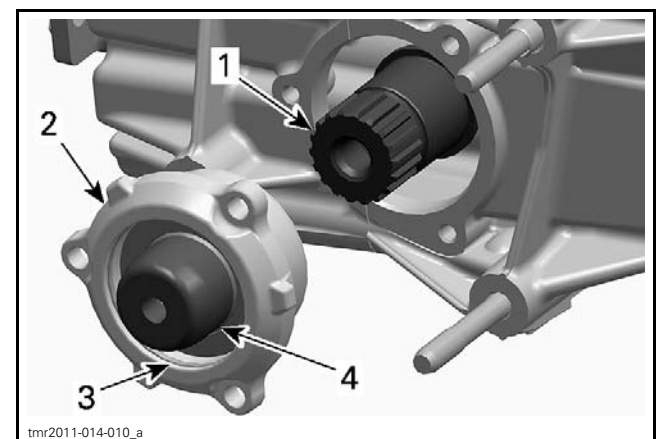
Do not apply in excess as it will spread out inside crankcase.

NOTE: It is recommended to apply this specific sealant as described here to get a uniform application without lumps. If you do not use the roller method, you may use your finger to uniformly distribute the sealant (using a finger will not affect the adhesion).

Installing the Rear Bearing Cover

For bearing cover installation on gearbox side, protect the oil seal to avoid damaging the sealing lip.

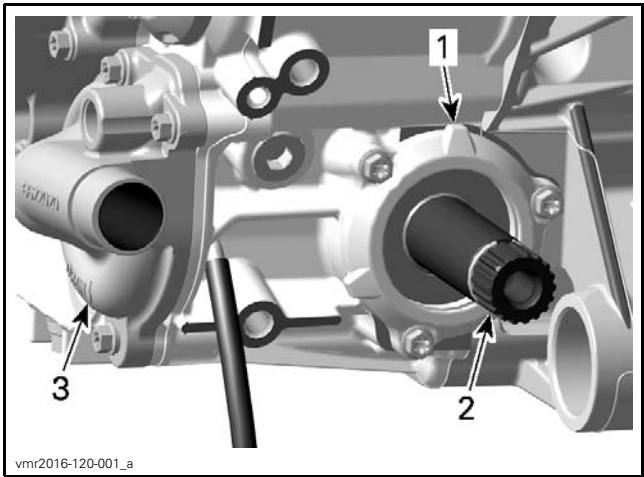
REQUIRED TOOL	
DRIVE SHAFT OIL SEAL PROTECTOR (P/N 529 036 029)	



1. Drive shaft
2. Bearing cover gearbox side
3. O-ring
4. Protection sleeve

TIGHTENING TORQUE	
Rear bearing cover screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

Installing the Front Bearing Cover



FRONT OF ENGINE
1. Bearing cover front side
2. Drive shaft
3. Water pump cover

TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Front bearing cover screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

Installing the Engine Drive Shaft

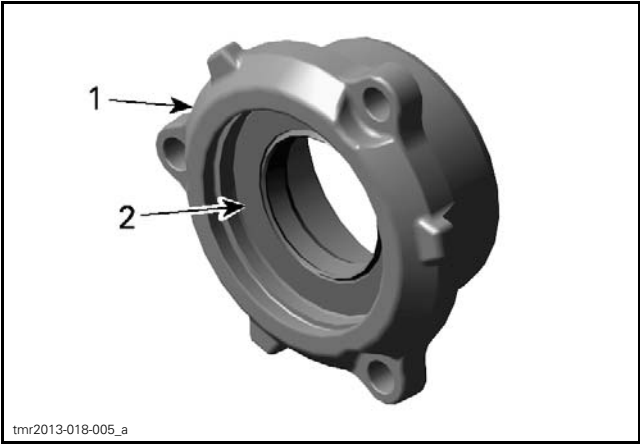
Finally check for axial play of the drive shaft.

FRONT OIL SEAL
(ENGINE DRIVE SHAFT)

Replacing the Front Oil Seal
(Engine Drive Shaft)

NOTE: The front oil seal can be replaced with the engine installed.

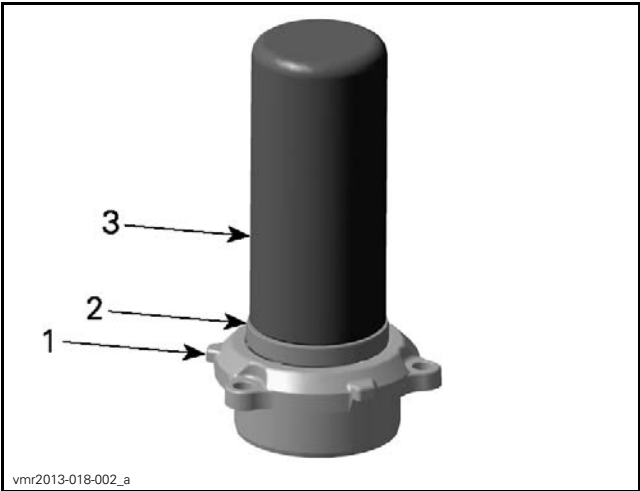
1. Remove front propeller shaft.
2. Remove adapter sleeve between propeller shaft and front engine drive shaft.
3. Remove the front bearing cover, refer to *ENGINE DRIVE SHAFT REMOVAL/INSTALLATION* in this subsection.
4. Remove drive shaft seal from bearing cover.



1. Bearing cover
2. Oil seal

5. Install drive shaft oil seal using the following tool.

REQUIRED TOOL	
DRIVE SHAFT OIL SEAL INSTALLER (P/N 529 036 028)	



1. Bearing cover
2. Oil seal
3. Oil seal installer

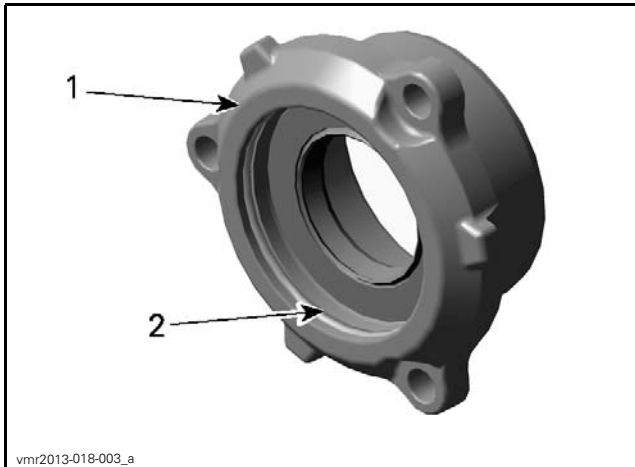
6. Reinstall remaining parts in the reverse order of removal.

REAR OIL SEAL
(ENGINE DRIVE SHAFT)

Replacing the Rear Oil Seal
(Engine Drive Shaft)

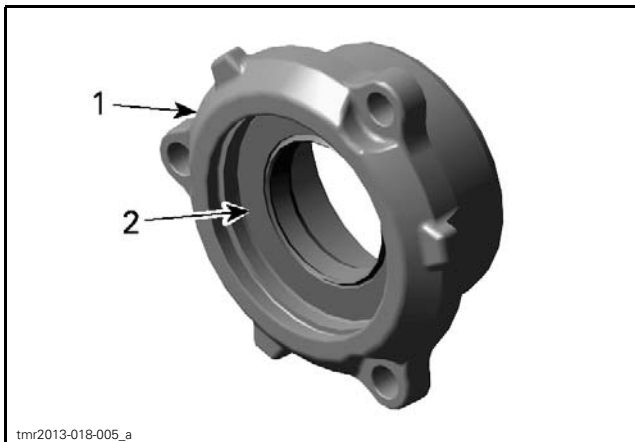
1. Remove gearbox from the engine, refer to *GEARBOX AND 4X4 COUPLING UNIT* subsection.

2. Remove rear bearing cover, refer to *ENGINE DRIVE SHAFT REMOVAL/INSTALLATION* in this subsection.
3. Remove O-ring from bearing cover.



1. Bearing cover
2. O-ring

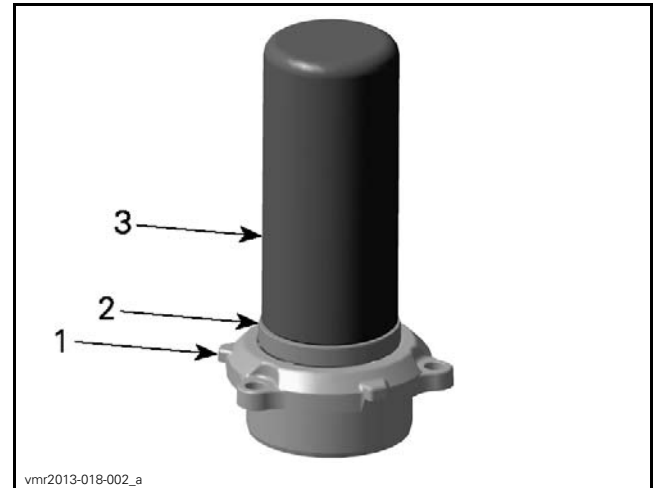
4. Remove drive shaft seal from bearing cover.



1. Bearing cover
2. Oil seal

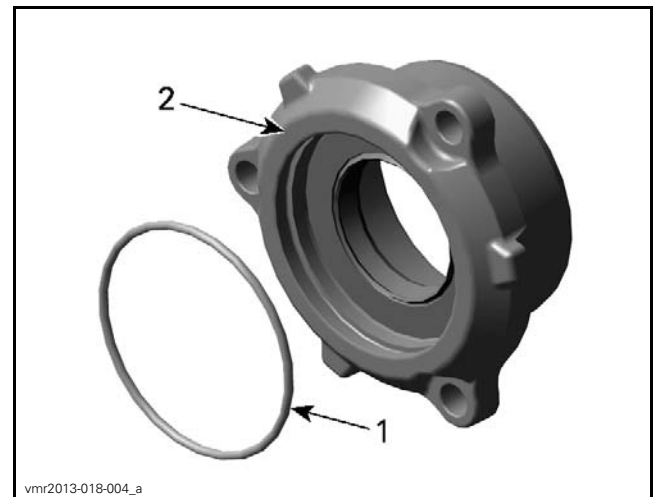
5. Install drive shaft oil seal using the following tool.

REQUIRED TOOL	
DRIVE SHAFT OIL SEAL INSTALLER (P/N 529 036 028)	



1. Bearing cover
2. Oil seal
3. Oil seal installer

6. Install O-ring in rear bearing cover.



1. O-ring
2. Bearing cover

7. Reinstall remaining parts in the reverse order of removal.

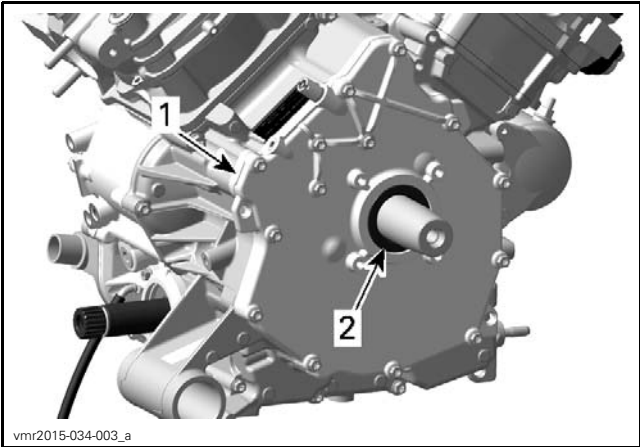
PTO COVER OIL SEAL

NOTE: To replace oil seal it is not necessary to remove engine from vehicle.

Removing the PTO Oil Seal

1. Refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT)* subsection and remove the following parts:
 - CVT cover
 - Drive pulley
 - Driven pulley
 - CVT air guide.
2. Remove oil seal using a small flat screwdriver.

NOTICE Avoid scoring surfaces with tool.



1. PTO cover
2. Oil seal

Inspecting the PTO Oil Seal

Check oil seal running surface of crankshaft PTO side for grooves. Replace if necessary.

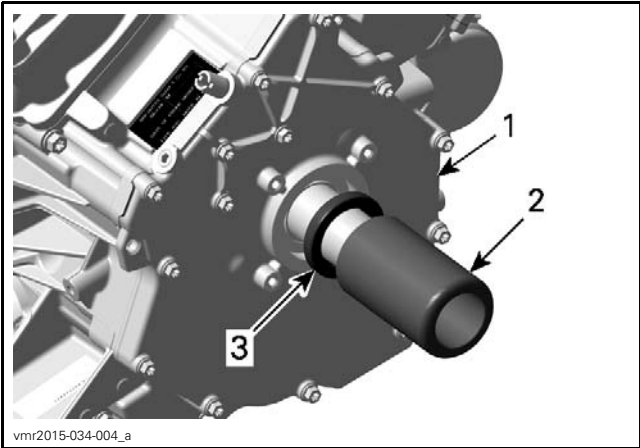
Installing the PTO Oil Seal

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

NOTICE Oil seal must be installed with sealing lip toward the engine.

Push oil seal in place using the following tool.

REQUIRED TOOL	
PTO COVER OIL SEAL INSTALLER (P/N 529 036 033)	

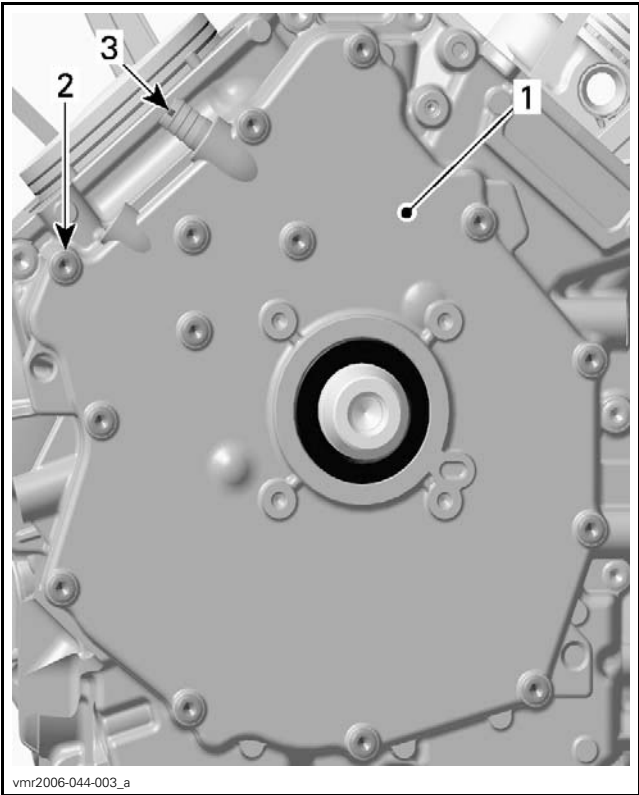


1. PTO cover
2. Oil seal installer
3. Oil seal

PTO COVER

Removing the PTO Cover

1. Refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT)* subsection to remove the following parts:
 - CVT cover
 - Drive pulley
 - Driven pulley
 - CVT air guide.
2. Disconnect vent hose.
3. Remove PTO cover screws and pull on PTO cover to remove it.



1. PTO cover
2. PTO cover screws
3. Vent hose nipple

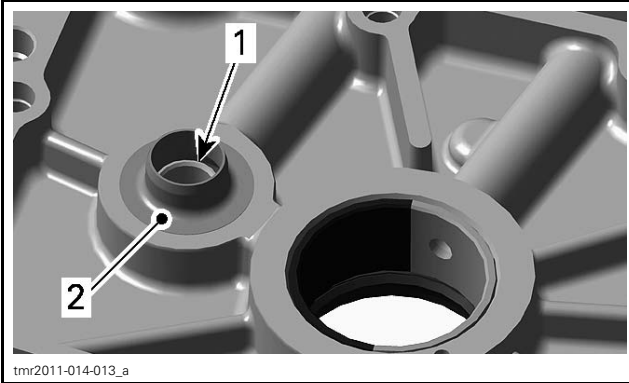
Inspecting the PTO Cover

1. Check the PTO cover for cracks or other damage.
2. Replace PTO cover if damaged.
3. Clean oil breather bore in PTO cover from contaminations with a parts cleaner then use pressurized air to dry it.

⚠ WARNING

Always wear skin and eye protection. Chemicals can cause skin rash, skin burns and severe eye injury.

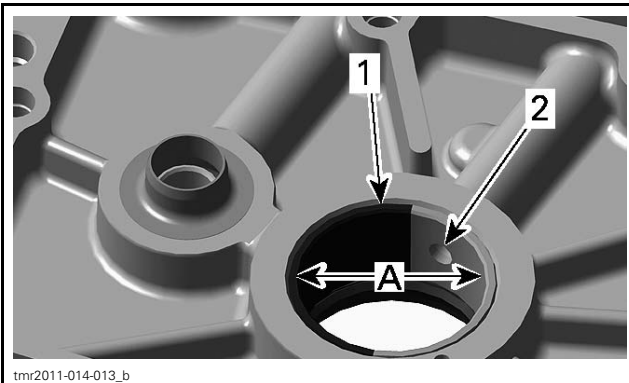
4. Check surface of sealing sleeve for wear or other damages. Replace PTO cover if damaged.



1. Oil breather bore
2. Surface of sealing sleeve

5. Check plain bearings for scoring or other damages.

NOTE: Measure plain bearing inside diameter (PTO cover) and compare to crankshaft bearing journal diameter (PTO cover bearing). Refer to *CRANKSHAFT* in this subsection. Replace if the measurement is out of specification.



1. Plain bearing
 2. Oil bore
- A. Measure plain bearing inside diameter

PLAIN BEARING INSIDE DIAMETER (PTO COVER)	
SERVICE LIMIT	34.120 mm (1.3433 in)

Replacing the Plain Bearing (PTO Cover)

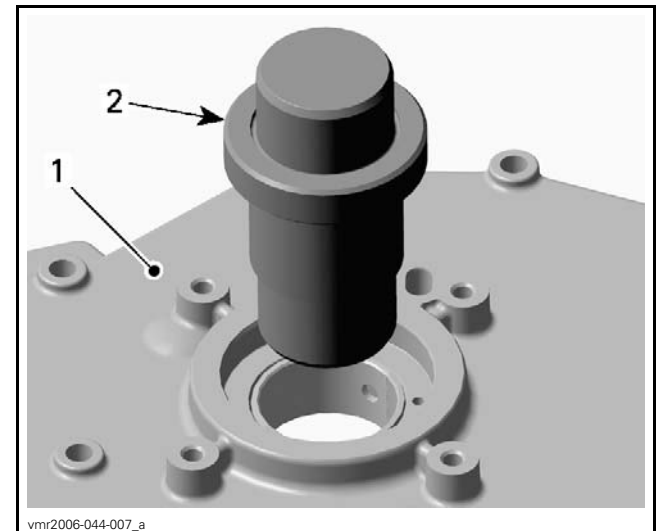
Removing the Plain Bearing

NOTICE Unless otherwise instructed, never use a hammer to install plain bearings. Always use a press.

1. Carefully remove the PTO oil seal with a screwdriver, without damaging the PTO cover.
2. Press out the plain bearings from the outside towards the inside.

REQUIRED TOOL	
PLAIN BEARING REMOVER/INSTALLER (P/N 529 036 032)	

NOTE: The PTO cover has to be supported from below on a suitable support with straight surface in order to prevent damage of the sealing surface.



1. PTO cover
2. Plain bearing remover/installer

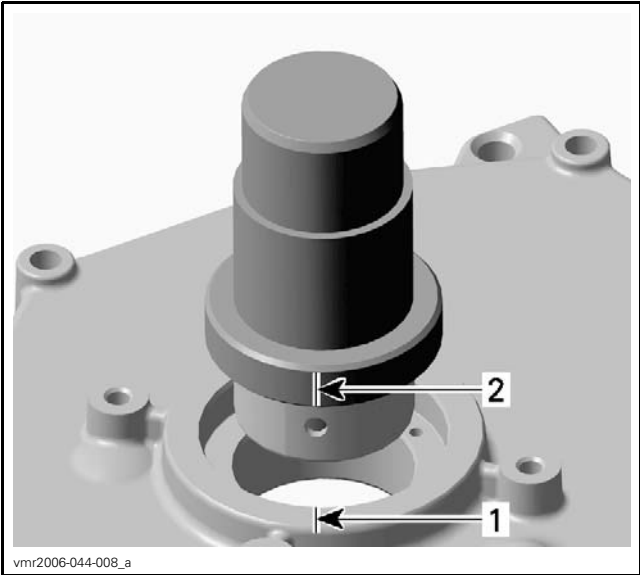
Installing the Plain Bearing

NOTE: Do not lubricate plain bearings or PTO cover for installation.

Install plain bearings in a cold PTO cover.

REQUIRED TOOL	
PLAIN BEARING REMOVER/INSTALLER (P/N 529 036 032)	

1. Mark position of oil bore on PTO cover and on plain bearing remover/installer.
2. Align mark on plain bearing remover/installer with mark on PTO cover.



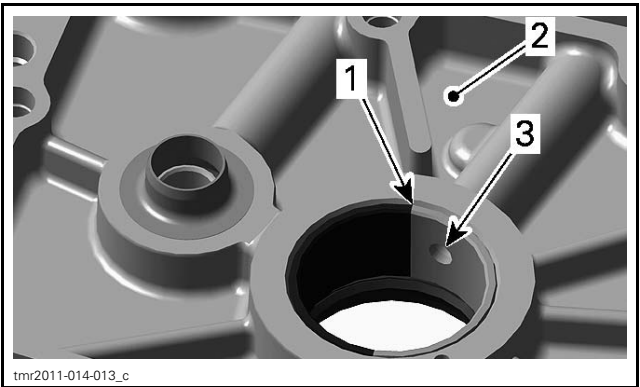
1. Mark position of oil bore on PTO cover
2. Mark position of oil bore on plain bearing remover/installer

NOTICE Misalignment of plain bearing and PTO cover oil bores will prevent proper oil supply to plain bearings.

3. Carefully press in the plain bearings in the same direction as during disassembly, from the outside towards the inside.

NOTE: Support PTO cover using a suitable support with a straight surface to prevent damage of the sealing surface.

NOTICE The joining surfaces of the plain bearings must be positioned near the oil bore in a counterclockwise direction.



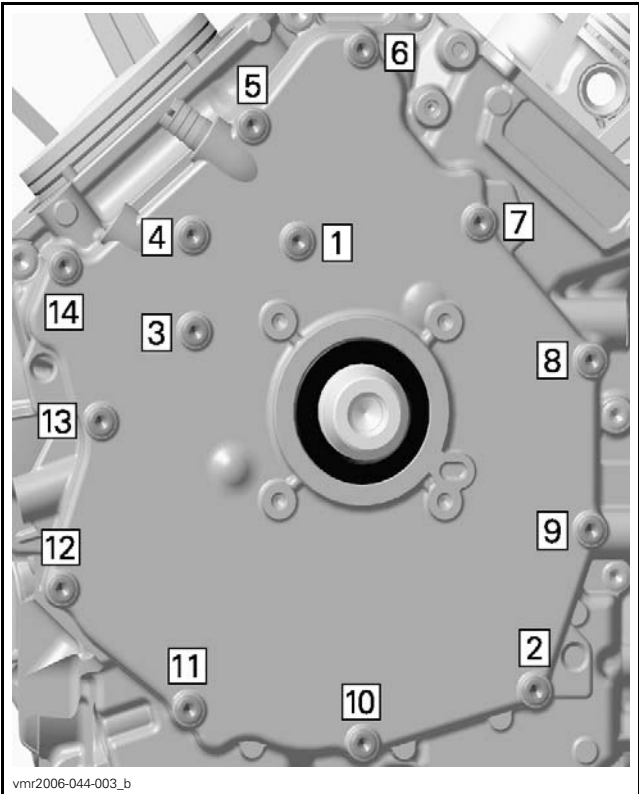
1. Plain bearing joint
2. PTO cover (inside surface)
3. Oil bore

Installing the PTO Cover

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

NOTE: At installation, replace PTO cover gasket and oil seal.

Tighten PTO cover screws following the sequence illustrated.



TIGHTENING SEQUENCE

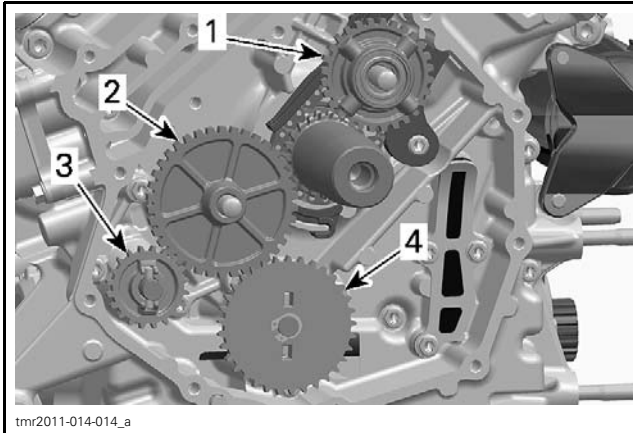
TIGHTENING TORQUE	
PTO cover screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

DRIVE GEARS

Drive Gears Location

The engine is equipped with a breather gear which prevents engine oil from seeping out through the breathing system into the air intake system.

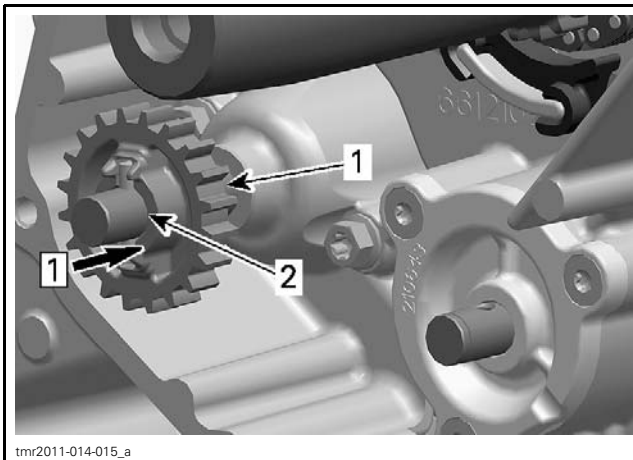
The drive gears are located on the engine PTO side behind the PTO cover.



1. Breather gear
2. Intermediate gear
3. Water pump drive gear
4. Oil pump drive gear

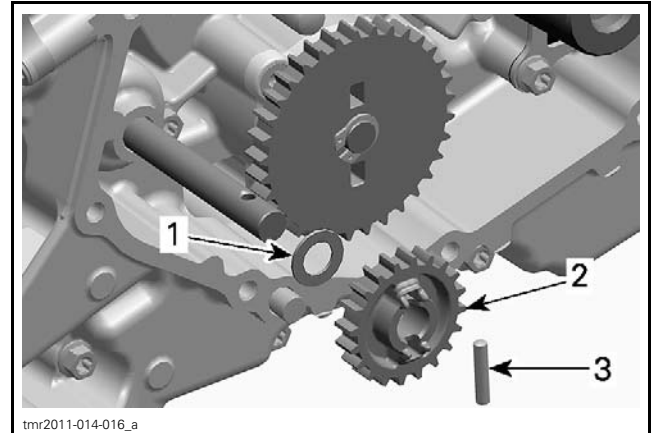
Removing the Drive Gears

1. Remove PTO cover, refer to *PTO COVER* in this subsection.
2. Withdraw intermediate gear and breather gear.
3. Remove oil pump drive gear, refer to *OIL PUMP* in the *LUBRICATION SYSTEM* subsection.
4. To remove water pump drive gear, pull the shaft assembly slightly out and turn it about one tooth until it stays out.
5. Then push water pump drive gear in.



- Step 1: Push gear in
1. Water pump drive gear
 2. Intermediate shaft

6. Remove needle pin and pull water pump drive gear out.
7. Remove thrust washer from intermediate shaft.



1. Thrust washer
2. Water pump drive gear
3. Needle pin

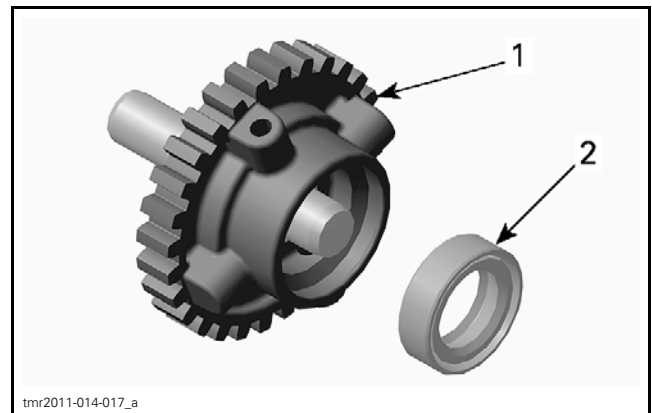
Inspecting the Drive Gears

Intermediate Gear/Oil Pump Drive Gear/Water Pump Drive Gear

Inspect gears for wear or other damage. Replace if damaged.

Breather Gear

Check if oil seal is brittle, hard or damaged. Replace if necessary.



1. Breather gear
2. Oil seal

Inspect gear for wear or other damage.

Check ball bearing for excessive play and smooth operation. Replace breather gear assembly if necessary.

Installing the Drive Gears

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

Adequately oil the ball bearing of the breather gear.

CRANKCASE

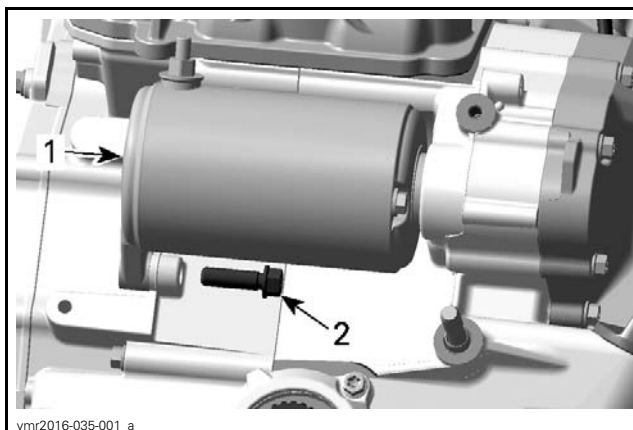
Disassembling the Crankcase

1. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection and carry out the following:
 - 1.1 Drain cooling system.
 - 1.2 Drain engine oil.
 - 1.3 Drain gearbox oil.
2. Lock crankshaft. Refer to *CRANKSHAFT LOCKING PROCEDURE* in the this subsection.
3. Refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT)* subsection and remove the following parts:
 - CVT cover
 - Drive pulley
 - Driven pulley
 - CVT air guide.
4. Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
5. Remove gearbox from engine.
6. Refer to *MAGNETO AND STARTER* subsection and remove the following parts:
 - Magneto cover
 - Rotor with sprag clutch gear
 - Starter drive gears.
7. Refer to applicable procedures in this subsection and remove the following parts:
 - PTO cover
 - Drive gears
 - Bearing covers of engine drive shaft.
8. Refer to *TIMING CHAIN* subsection and remove the following parts:
 - Chain tensioners
 - Camshaft timing gears
 - Timing chains
 - Timing chain guides.
9. Refer to *TOP END* subsection and remove the following parts:
 - Front cylinder head
 - Rear cylinder head
 - Cylinders.
10. Refer to *COOLING SYSTEM* subsection and remove the following parts:
 - Water pump housing.
11. Refer to *LUBRICATION SYSTEM* subsection and remove the following parts:
 - Oil filter

- Oil cooler (if applicable)
- Oil pump drive gear.

NOTE: Oil pump removal from crankcase is not necessary, but recommended to see condition of oil pump. Refer to *LUBRICATION SYSTEM* subsection.

12. Remove electric starter.

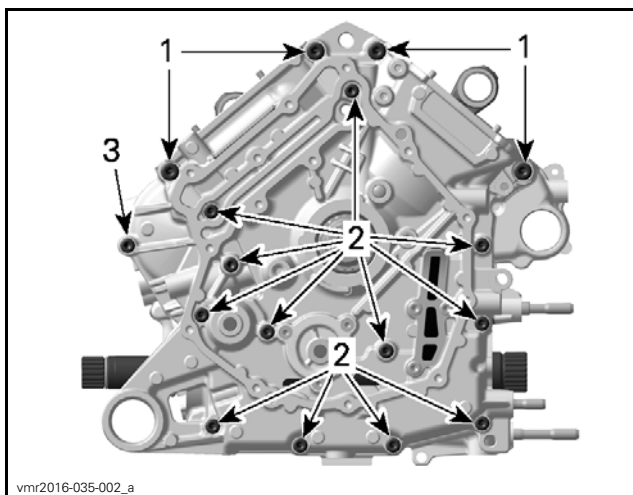


1. Electric starter
2. Screw

NOTE: Before splitting the crankcase, measure crankshaft axial play. Refer to *CRANKSHAFT* in this subsection.

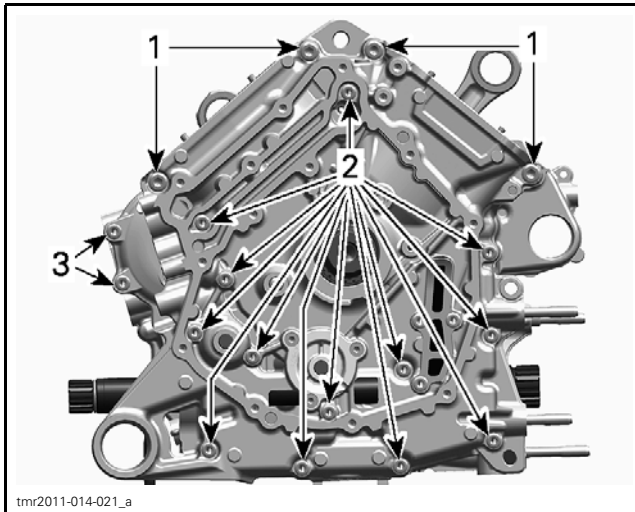
13. Remove crankcase retaining screws.

Models Without Oil Cooler



1. Four screws M8 x 65
2. 12 screws M6 x 75
3. One screw M6 x 25

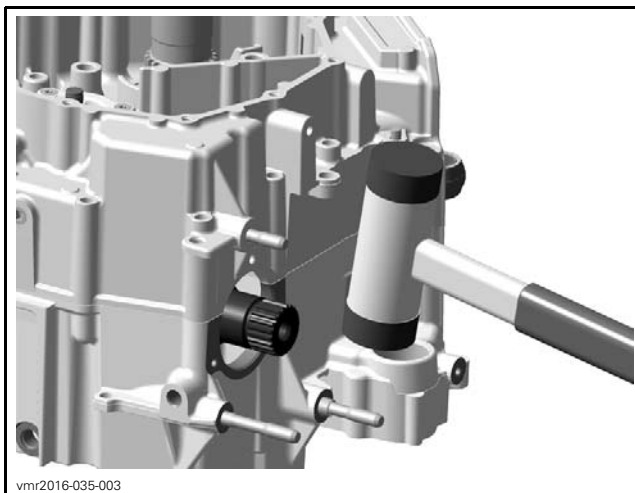
Models With Oil Cooler



1. Four screws M8 x 65
2. 13 screws M6 x 75
3. Two screw M6 x 25

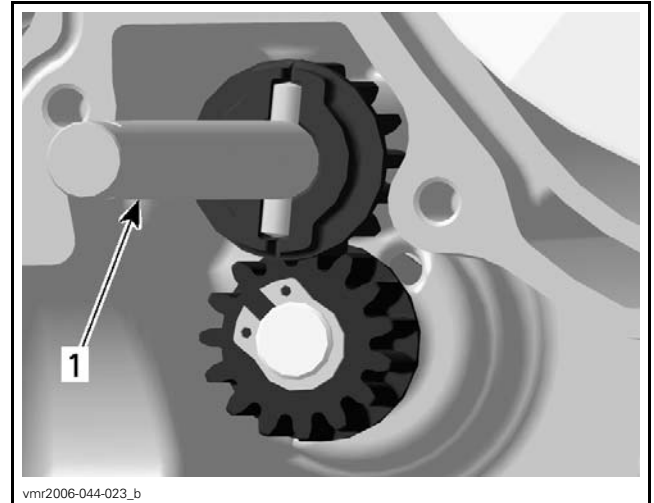
All Models

14. Carefully split crankcase halves using a screwdriver and a soft hammer.



NOTE: During disassembly, do not damage the sealing surfaces of the crankcase halves.

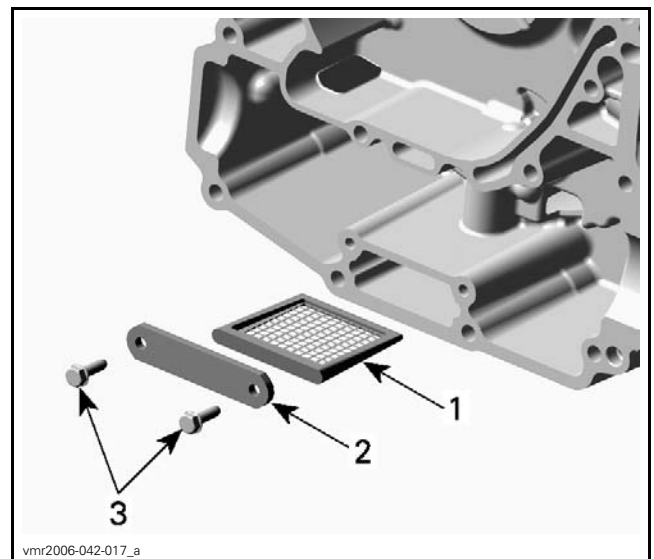
15. Pull crankshaft out of crankcase.
16. Remove the water pump intermediate shaft.



1. Water pump intermediate shaft

17. Remove engine oil strainer.

NOTE: Oil strainer removal for inspection and cleaning is recommended. Refer to *LUBRICATION SYSTEM* subsection.



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

Cleaning the Crankcase

⚠ WARNING

Use safety goggles to avoid eye injuries.

Clean crankcase using a part cleaner.

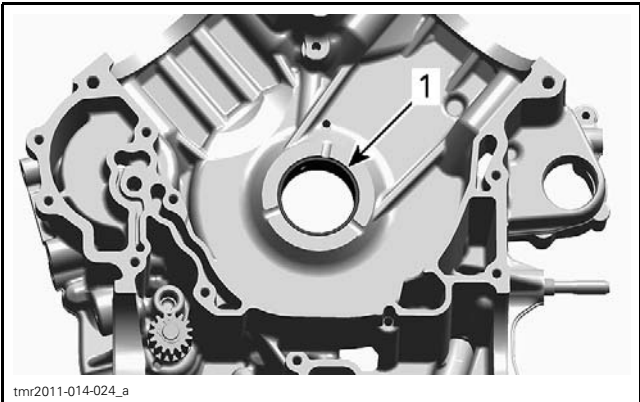
Dry crankcase using compressed air.

Blow low pressure filtered air through the oil supply lines.

Inspecting the Crankcase

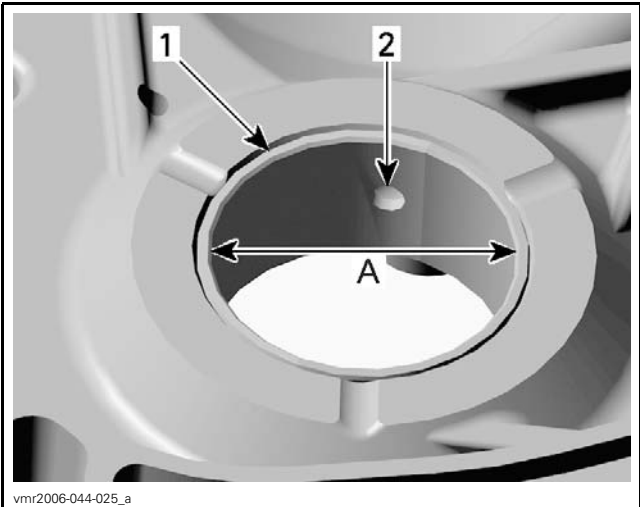
Check crankcase halves for cracks or other damage. Replace if damaged.

Check MAG and PTO plain bearings for scoring or other damages.



1. Plain bearing

Measure plain bearing inside diameter and compare to PTO/MAG main journal diameters of crankshaft, refer to *CRANKSHAFT* in this subsection. Replace if the measurements are out of specification.



1. Plain bearing
2. Oil bore

A. Measure plain bearing inside diameter

MAIN BEARING INSIDE DIAMETER (PTO/MAG)	
SERVICE LIMIT	42.100 mm (1.6575 in)

Replacing the Plain Bearing (Main)

Removing the Plain Bearing

NOTICE Always properly support crankcase halves when removing plain bearings. Damage to crankcase halves may occur if this procedure is not performed correctly.

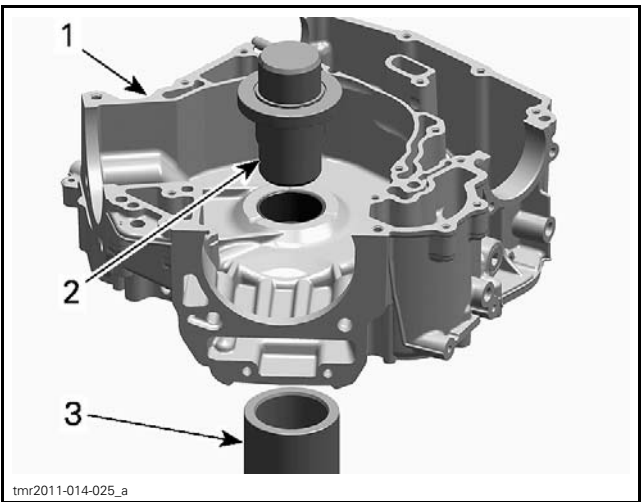
NOTE: Always use a press for removal of plain bearings.

Carefully press the plain bearings out from the crankcase half from the inside towards the outside.

NOTE: Place an appropriate support under crankcase halves before removing plain bearings.

REQUIRED TOOLS	
CRANKCASE SUPPORT MAG/PTO (P/N 529 036 031)	
PLAIN BEARING REMOVER/INSTALLER (P/N 529 035 917)	

NOTE: During disassembly, make sure not to damage the sealing surfaces of the crankcase halves.



PRESS PLAIN BEARINGS OUTSIDE
1. Crankcase half
2. Plain bearing remover/installer
3. Crankcase support sleeve (P/N 529 036 031)

Installing the Plain Bearing

NOTICE Unless otherwise instructed, never use a hammer to install plain bearings. Always use a press.

During reassembly, make sure not to damage the sealing surfaces of the crankcase halves.

NOTE: Place the proper crankcase support sleeve under crankcase halves before installing the plain bearings, refer to *PLAIN BEARING REMOVAL PROCEDURE* in this subsection.

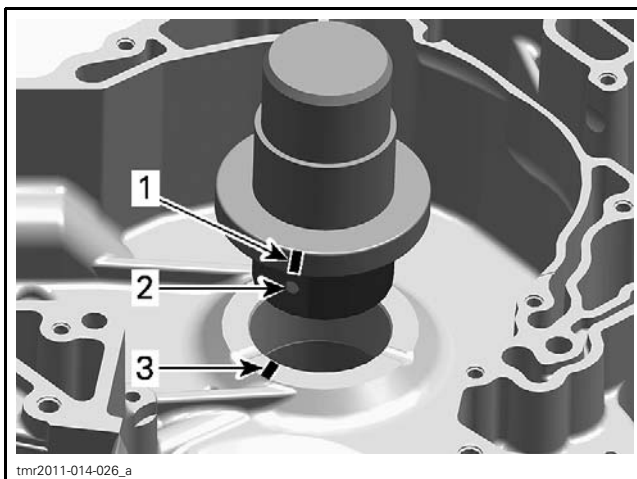
Install plain bearings in a cold crankcase.

NOTE: Do not lubricate plain bearings and/or crankcase for installation.

REQUIRED TOOL	
PLAIN BEARING REMOVER/INSTALLER (P/N 529 035 917)	

NOTE: Use an O-ring (Ø 42 x 1 mm to 1.5 mm (.04 in to .06 in) thickness) to hold plain bearings in place during installation. The O-ring will disappear in the groove of the plain bearing remover/installer.

1. Mark position of plain bearing oil bore on plain bearing remover/installer.
2. Mark position of oil bore on crankcase half.
3. Align mark on plain bearing remover/installer with mark on crankcase half.

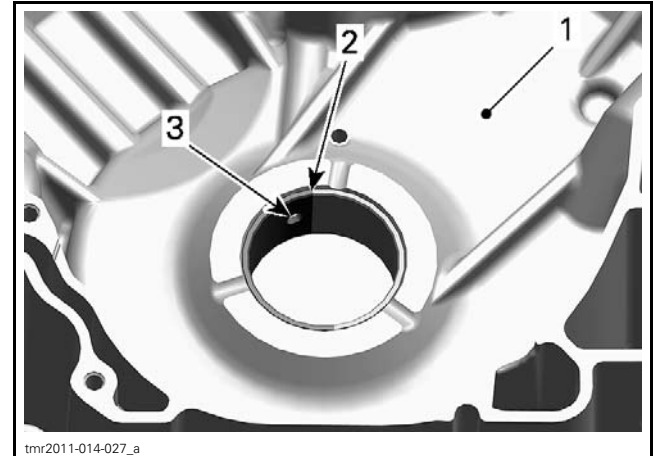


1. Oil bore position marked on plain bearing remover/installer
2. Plain bearing oil bore
3. Oil bore position marked on crankcase

NOTICE Misalignment of the plain bearing and crankcase oil bores will prevent proper oil supply to plain bearings.

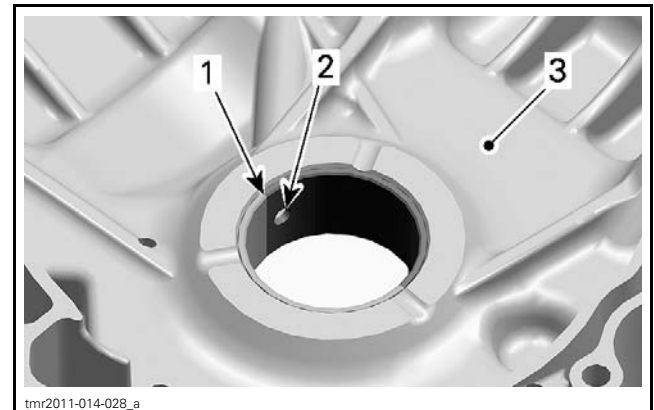
4. Carefully press in the plain bearings from inside the crankcase towards the outside.

NOTICE The joint of the plain bearings in crankcase half MAG side must be positioned near the oil bore in a clockwise direction.



1. Crankcase half MAG (inside surface)
2. Partition
3. Oil bore

NOTICE The joint of the plain bearings in the crankcase half PTO side must be positioned near the oil bore in the counterclockwise direction.



1. Plain bearing joint
2. Oil bore
3. Crankcase half PTO (inside surface)

Assembling the Crankcase

The assembly of crankcase is essentially the reverse of removal procedure. However, pay attention to the following details.

Clean oil passages and make sure they are not clogged.

Clean all metal components in a solvent.

Install a **NEW** crankcase gasket.

Oil the plain bearings before mounting the crankshaft.

Reinstall crankshaft, see procedure in this subsection

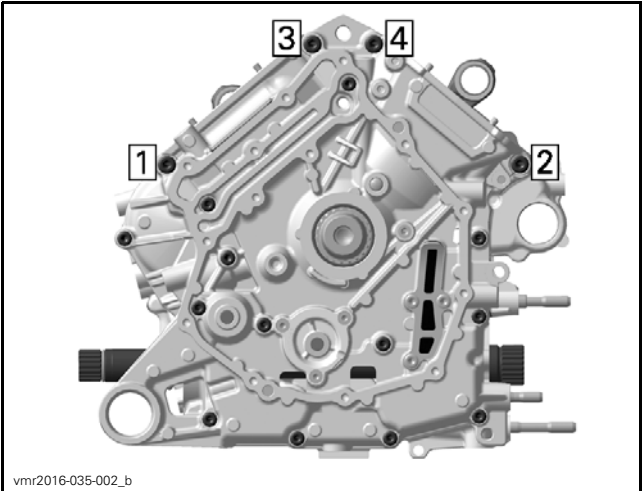
Properly reinstall engine oil strainer and screws. Refer to *LUBRICATION SYSTEM* subsection.

Subsection 10 (BOTTOM END)

Reinstall water pump intermediate shaft and gears, refer to *WATER PUMP GEARS* in the *COOLING SYSTEM* subsection.

Tighten crankcase retaining screws as per following sequence.

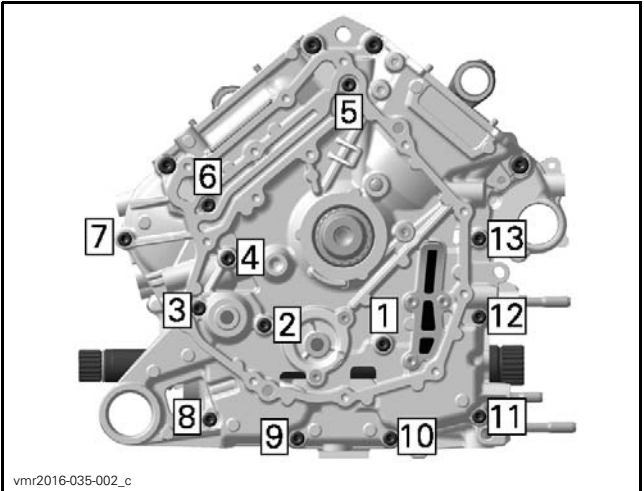
All Models



M8 SCREWS TIGHTENING SEQUENCE

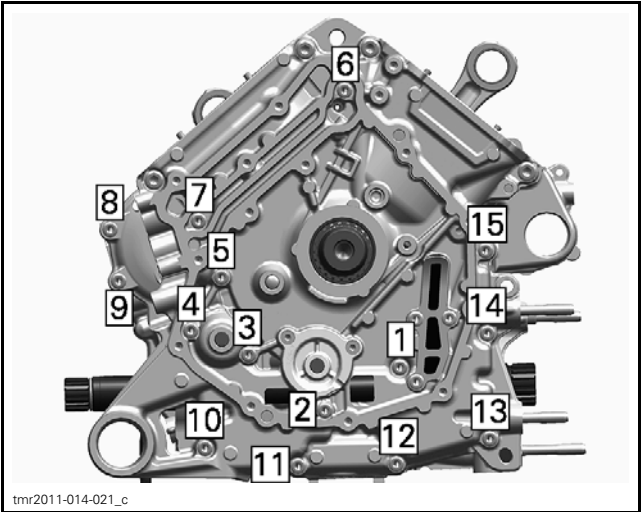
TIGHTENING TORQUE	
M8 crankcase screws	25 N•m ± 3 N•m (18 lbf•ft ± 2 lbf•ft)

Models Without Oil Cooler



M6 SCREWS TIGHTENING SEQUENCE

Models With Oil Cooler

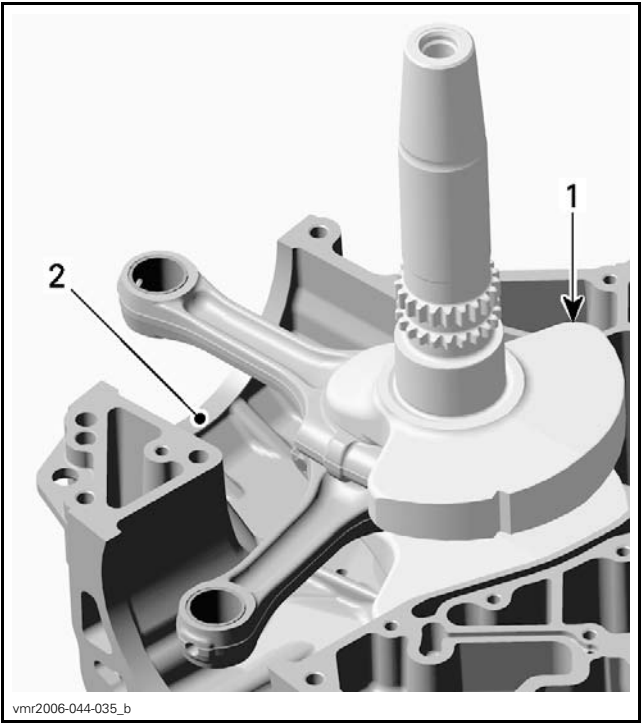


M6 SCREWS TIGHTENING SEQUENCE

All Models

TIGHTENING TORQUE	
M6 crankcase screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

CRANKSHAFT



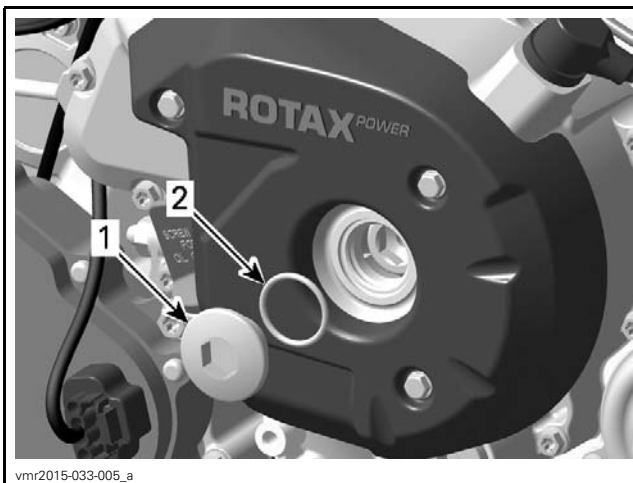
- 1. Crankcase MAG
- 2. Crankshaft

Crankshaft Locking Procedure

NOTE: When the crankshaft is locked, the rear piston no. 2 is at TDC (top dead center). The crankshaft cannot be locked with front piston no. 1 at TDC.

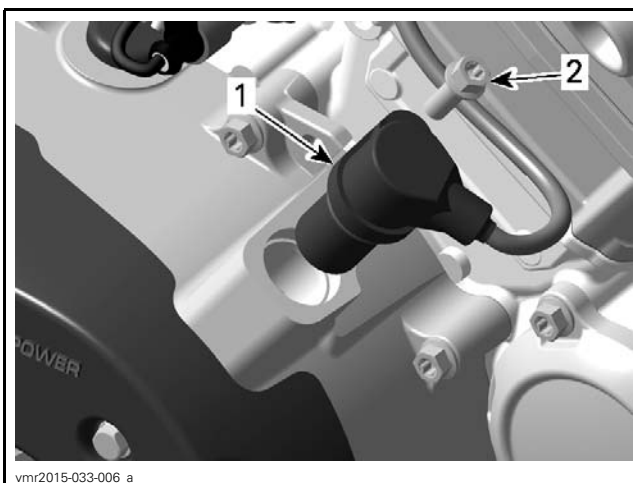
NOTICE To see if the rear piston no. 2 is at TDC ignition, refer to *CAMSHAFT TIMING GEAR* in the *TIMING CHAIN* subsection.

1. Remove spark plug cables and spark plugs from both cylinders.
2. Remove screw plug and O-ring from magneto cover.



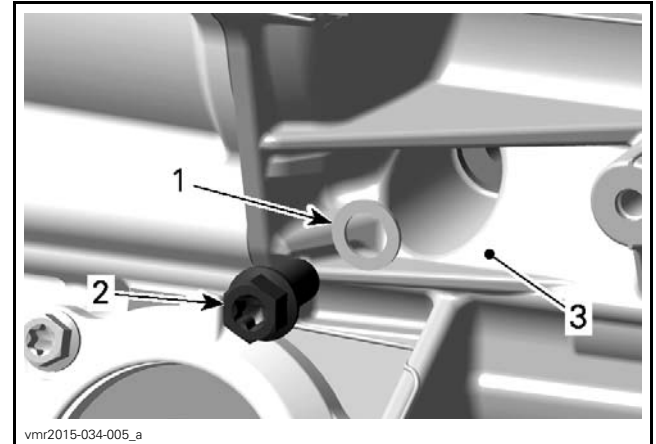
1. Plug screw
2. O-ring

3. Remove crankshaft position sensor.



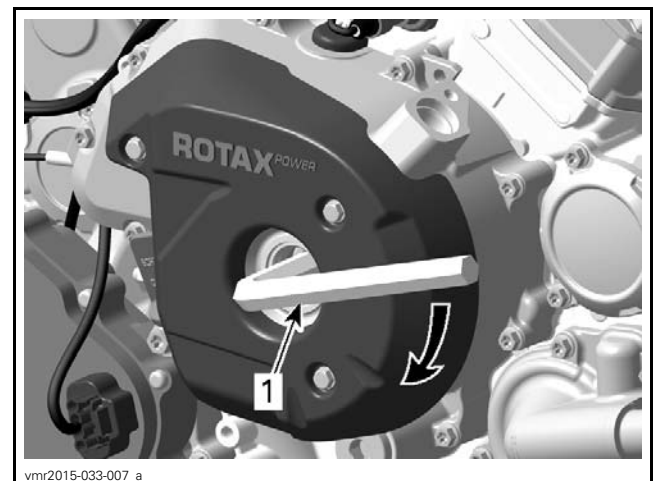
1. Crankshaft position sensor
2. Screw

4. Remove screw plug and discard sealing ring.



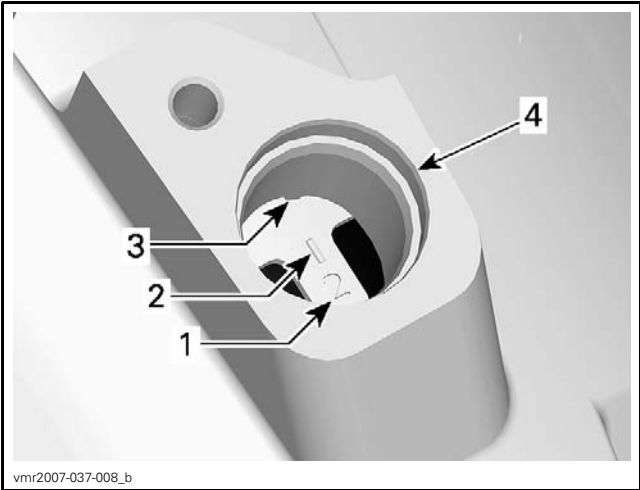
1. Sealing ring
2. Plug screw
3. Crankcase PTO side, front side

5. Use a 14 mm Allen key to turn crankshaft until the rear piston no. 2 is at TDC.



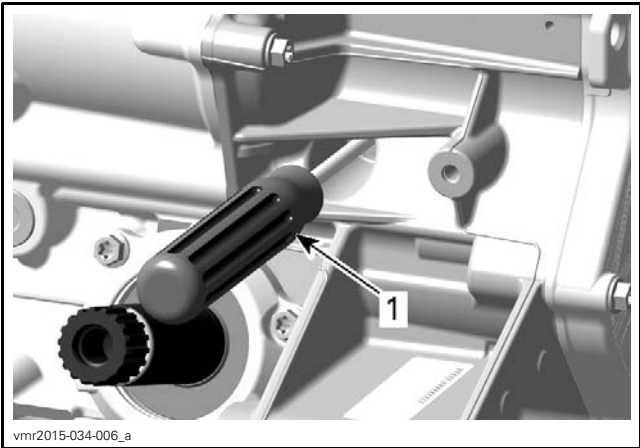
1. Allen key 14 mm

NOTE: When the piston no. 2 is at TDC, the number 2 piston index mark on the magneto flywheel and the notch on the magneto cover are aligned.



CYLINDER 2 AT TDC
1. Number 2 piston identifier
2. Index mark on magneto flywheel
3. Notch on magneto cover
4. CPS bore in magneto cover

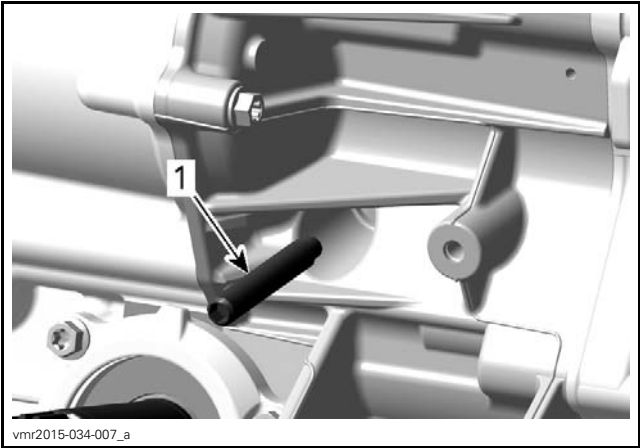
6. Use a screwdriver to check if the groove in the crankshaft is aligned with the crankshaft locking tool orifice.



1. Screwdriver

7. Lock crankshaft.

REQUIRED TOOL	
CRANKSHAFT LOCKING BOLT (P/N 529 035 617)	



1. Crankshaft locking bolt

8. Gradually insert the tool in the crankshaft groove. Make sure that the tool tip enters the groove and does not jam on the crankshaft balancer surface.

Removing the Crankshaft

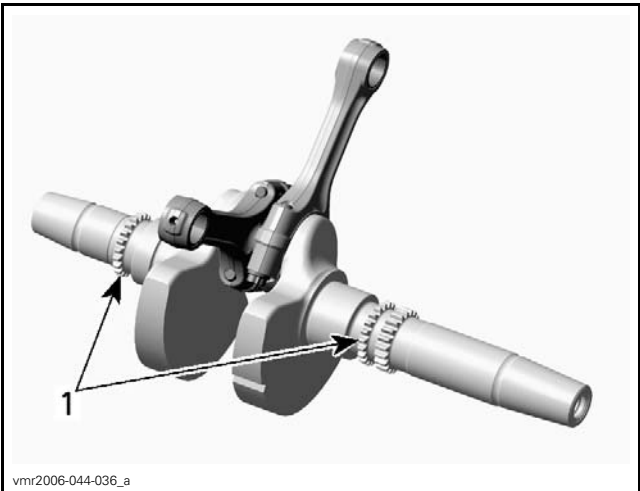
Refer to *CRANKCASE*.

Inspecting the Crankshaft

NOTE: Check each crankshaft bearing journal for scoring, scuffing, cracks or other signs of wear.

NOTE: Replace crankshaft if the crankshaft timing gears are worn or otherwise damaged.

NOTICE Components out of specifications must always be replaced. If this is not observed, severe damage may be caused to the engine.



1. Crankshaft timing gears

Crankshaft Axial Play

NOTE: Axial play must be measured before splitting the crankcase.

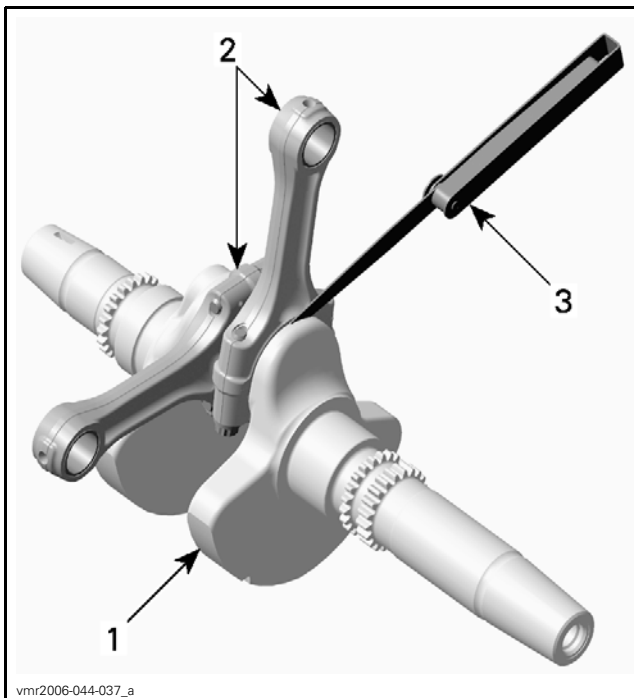
Measure axial play on PTO end of crankshaft using a dial indicator.

CRANKSHAFT AXIAL PLAY	
NEW	0.200 mm to 0.500 mm (.008 in to .02 in)
SERVICE LIMIT	0.600 mm (.024 in)

If axial play is out of specification, replace crankcase and/or crankshaft.

Connecting Rod Big End Axial Play

Using a feeler gauge, measure between face of connecting rods and crankshaft counterweight. If the measurement exceeds specified tolerance, replace the crankshaft.



1. Crankshaft
2. Connecting rods
3. Feeler gauge

CONNECTING ROD BIG END AXIAL PLAY		
570 AND 850 ENGINES	NEW	0.200 mm to 0.500 mm (.008 in to .02 in)
1000R ENGINE	NEW	0.250 mm to 0.550 mm (.0098 in to .0217 in)
All	SERVICE LIMIT	0.600 mm (.024 in)

Connecting Rod/Piston Pin Clearance

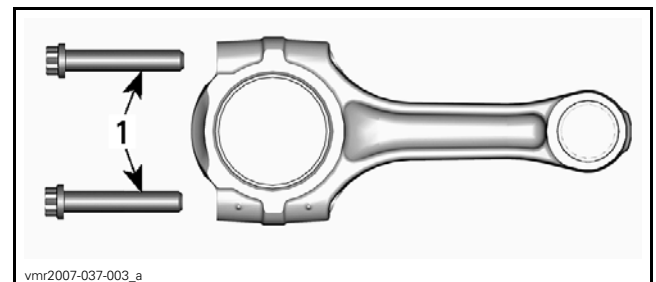
Refer to *TOP END* subsection.

Connecting Rod Big End Radial Play

NOTE: Prior to removing connecting rod from the crankshaft, mark big end halves together to ensure a correct reinstallation (cracked surface fits in only one position).

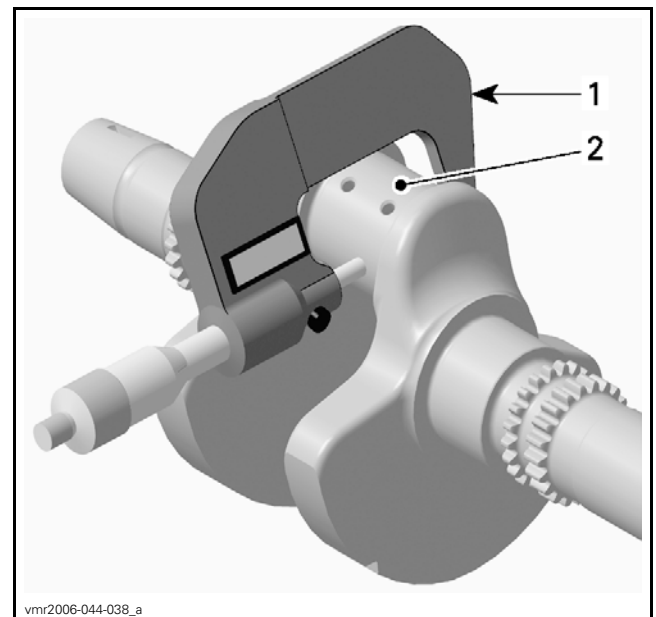
1. Remove connecting rods from crankshaft.

NOTICE Connecting rod screws are not reusable. Always discard screws and replace with NEW ones. It is recommended to install new plain bearings when reinstalling connecting rods.



1. Connecting rod screws

2. Measure crankpin. Compare to inside diameter of connecting rod big end.



1. Micrometer
2. Crankpin

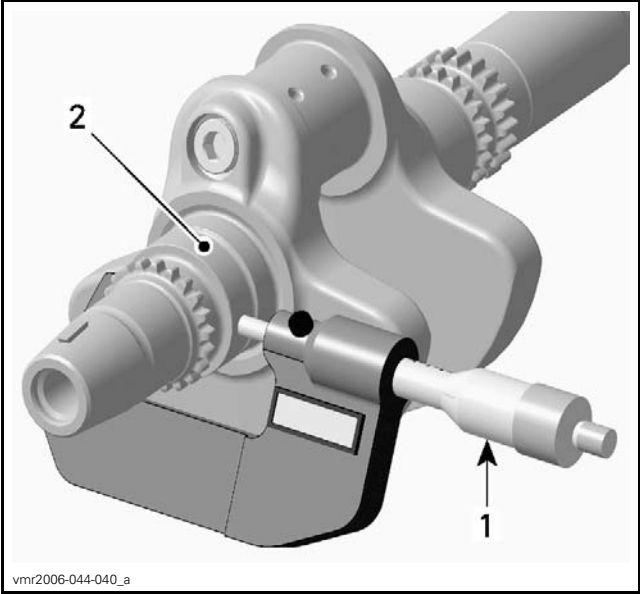
Subsection 10 (BOTTOM END)

CRANK PIN DIAMETER		
570 AND 850 ENGINES	NEW	40.001 mm to 40.025 mm (1.5748 in to 1.5758 in)
	SERVICE LIMIT	39.990 mm (1.5744 in)
1000R ENGINE	NEW	41.986 mm to 42.010 mm (1.653 in to 1.6539 in)
	SERVICE LIMIT	41.967 mm (1.6522 in)

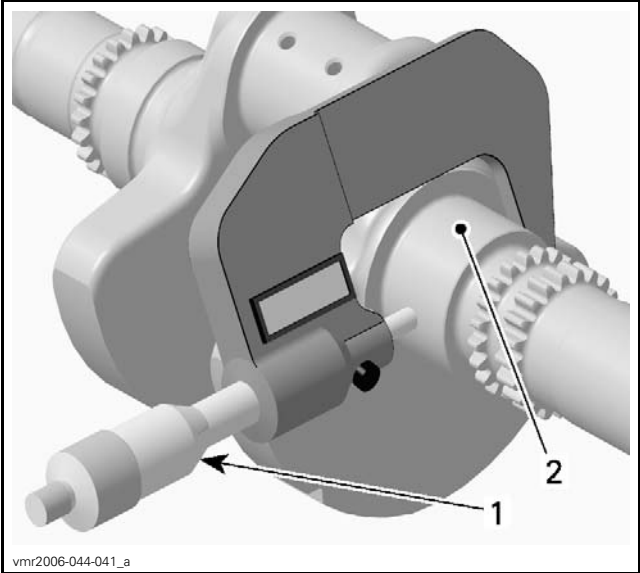
If the crank pin diameter is out of specification, replace crankshaft.

NOTE: To measure the connecting rod big end diameter, use the OLD connecting rod screws.

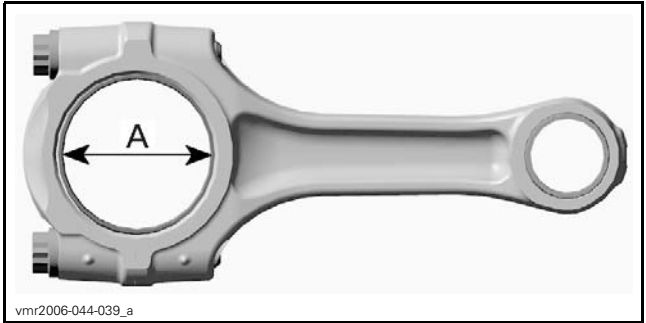
- 3. Install the OLD plain bearings as they were mounted initially.
- 4. Carry out the tightening procedure described in *CRANKSHAFT ASSEMBLY* in this subsection.



1. Micrometer
2. Crankshaft MAG side main bearing journal



1. Micrometer
2. Crankshaft PTO side main bearing journal



A. Connecting rod big end plain bearing

CONNECTING ROD BIG END DIAMETER		
570 AND 850 ENGINES	SERVICE LIMIT	40.100 mm (1.5787 in)
	SERVICE LIMIT	42.100 mm (1.6575 in)

If connecting rod big end diameter is out of specification, replace plain bearings and recheck.

CONNECTING ROD BIG END RADIAL CLEARANCE	
SERVICE LIMIT	0.09 mm (.0035 in)

If connecting rod big end radial clearance is out of specification, replace plain bearings and recheck.

Crankshaft Radial Play MAG/PTO Side

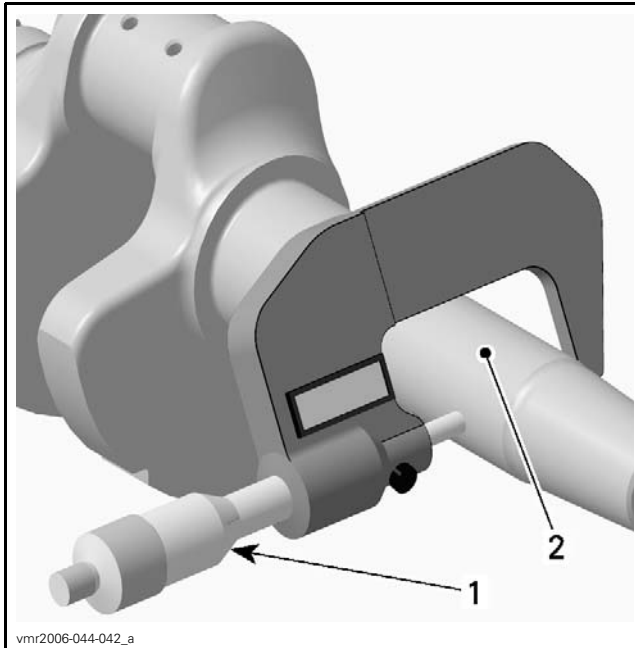
Measure crankshaft main bearing journals on MAG and PTO sides. Compare to inside diameter of MAG and PTO plain bearings, refer to *CRANKCASE* in this subsection.

CRANKSHAFT MAIN BEARING JOURNAL DIAMETER (MAG/PTO SIDE)	
NEW	42.016 mm to 42.040 mm (1.6542 in to 1.6551 in)
SERVICE LIMIT	42.000 mm (1.6535 in)

CRANKSHAFT RADIAL PLAY (MAG/PTO SIDE)	
SERVICE LIMIT	0.07 mm (.0028 in)

Crankshaft Radial Play (PTO Cover Bearing)

Measure crankshaft journal diameter (PTO cover bearing). Compare to plain bearing inside diameter (PTO cover). Refer to *PTO COVER* in this subsection.



1. Micrometer
2. Crankshaft journal (PTO support bearing)

CRANKSHAFT JOURNAL DIAMETER (PTO COVER BEARING)	
NEW	34.004 mm to 34.020 mm (1.3387 in to 1.3394 in)
SERVICE LIMIT	33.998 mm (1.3385 in)

CRANKSHAFT RADIAL PLAY (PTO COVER BEARING)	
SERVICE LIMIT	0.10 mm (.0039 in)

If crankshaft journal diameter is out of specification, replace crankshaft.

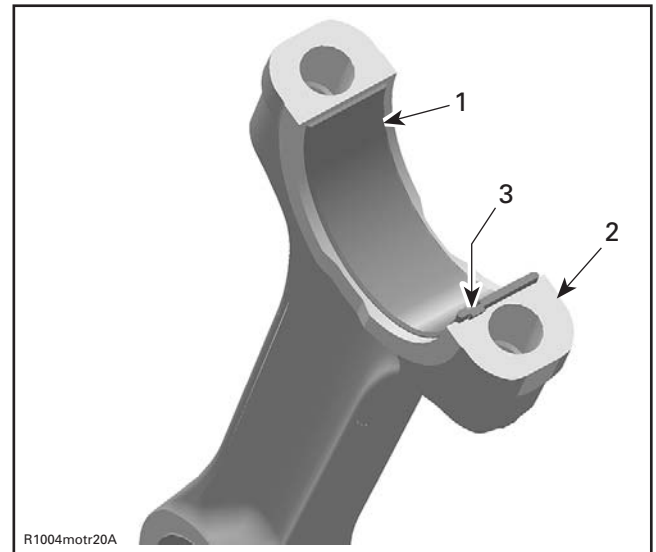
If crankshaft radial play (PTO cover bearing) is out of specification, replace plain bearings and recheck.

Assembling the Crankshaft

For assembly, reverse the disassembly procedure however, pay attention to following details.

Clean the split surface on both sides (cracked area) carefully with compressed air.

Insert plain bearings in the connecting rods as illustrated.



1. Half plain bearing of connecting rod big end
2. Mating surface of the connecting rod
3. Joining surface of plain bearing in line with connecting rod groove

Oil the plain bearing surface of the connecting rod and crankshaft pin before installation.

NOTICE Lower cap and rod must match together since there is a cracked surface.

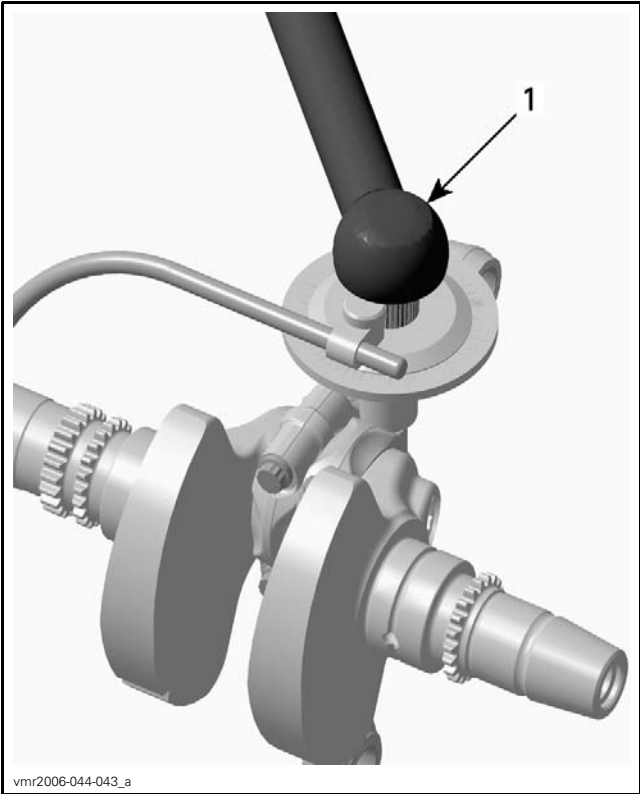
Oil NEW connecting rod screws.

Thread screws in the connecting rods, then tighten as per following procedure.

NOTICE Strictly adhere following instructions:

- Always use **NEW** connecting rod screws at final assembly. They are **not reusable**.
- Do not apply any thread locker.
- The running direction of the big end bearings and of the piston pins must not change.
- Always perform each step on both connecting rod screws before going to the next step.
- Failure to strictly follow procedure may cause connecting rod screws to loosen and lead to severe engine damage.

REQUIRED TOOLS
Torque wrench
Angle torque wrench



1. Angle torque wrench

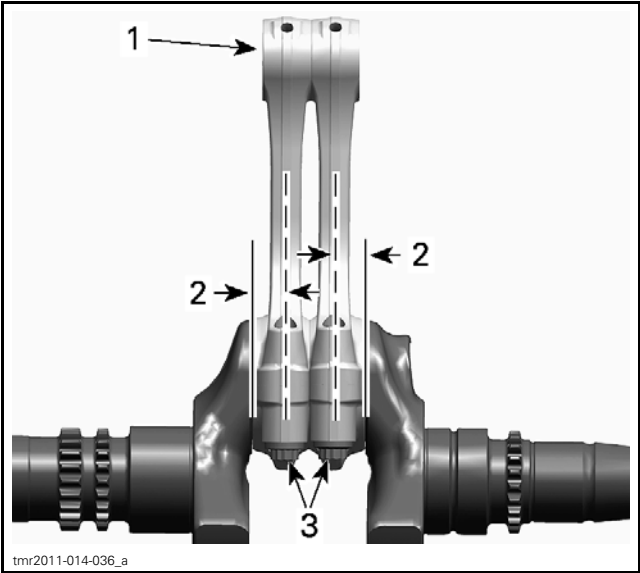
570 and 850 Engines

NEW connecting rods can be installed either way.

TIGHTENING TORQUE		
Connecting rod screws	Step A	Tighten to 1/2 of specified torque
	Step B	Tighten to 20 N•m ± 2 N•m (15 lbf•ft ± 1 lbf•ft)
	Step C	Torque an additional 60 ± 5° turn using an angle torque wrench

1000R Engine

NOTICE Connecting rods are asymmetrical. There must be no gap between the small ends when they face each other.



- 1. Connecting rod small ends
- 2. Connecting rod offset
- 3. Connecting rod screws

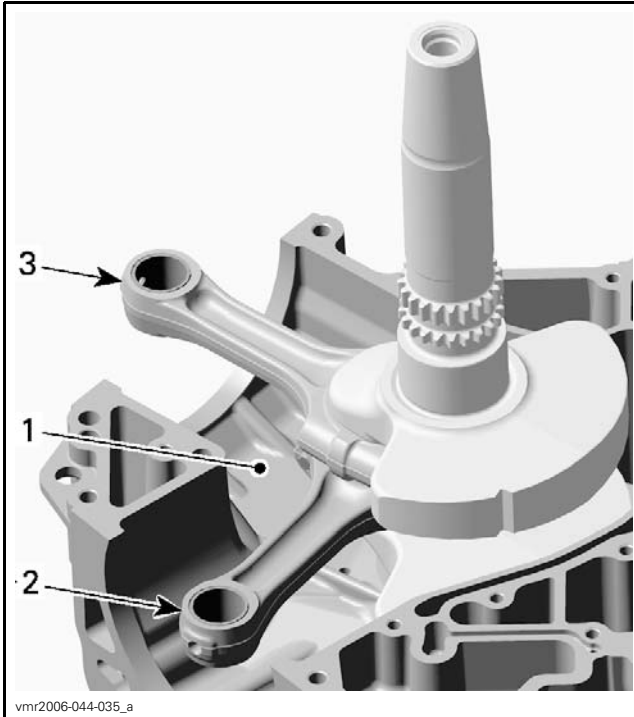
TIGHTENING TORQUE		
Connecting rod screws	Step A	Tighten to 1/2 of specified torque
	Step B	Tighten to 30 N•m ± 2 N•m (22 lbf•ft ± 1 lbf•ft)
	Step C	Torque an additional 90 ± 5° turn using an angle torque wrench

Installing the Crankshaft

For installation of crankshaft in crankcase reverse the removal procedure. However, pay attention to the following details.

Do not interchange the connecting rods of pistons 1 and 2 during installation.

NOTICE Observe the correct installation position when fitting the crankshaft with the connecting rods. The connecting rod MAG side has to face cylinder no. 1.



1. Crankcase half MAG side
2. Connecting rod cylinder 1
3. Connecting rod cylinder 2