

MAGNETO AND STARTER

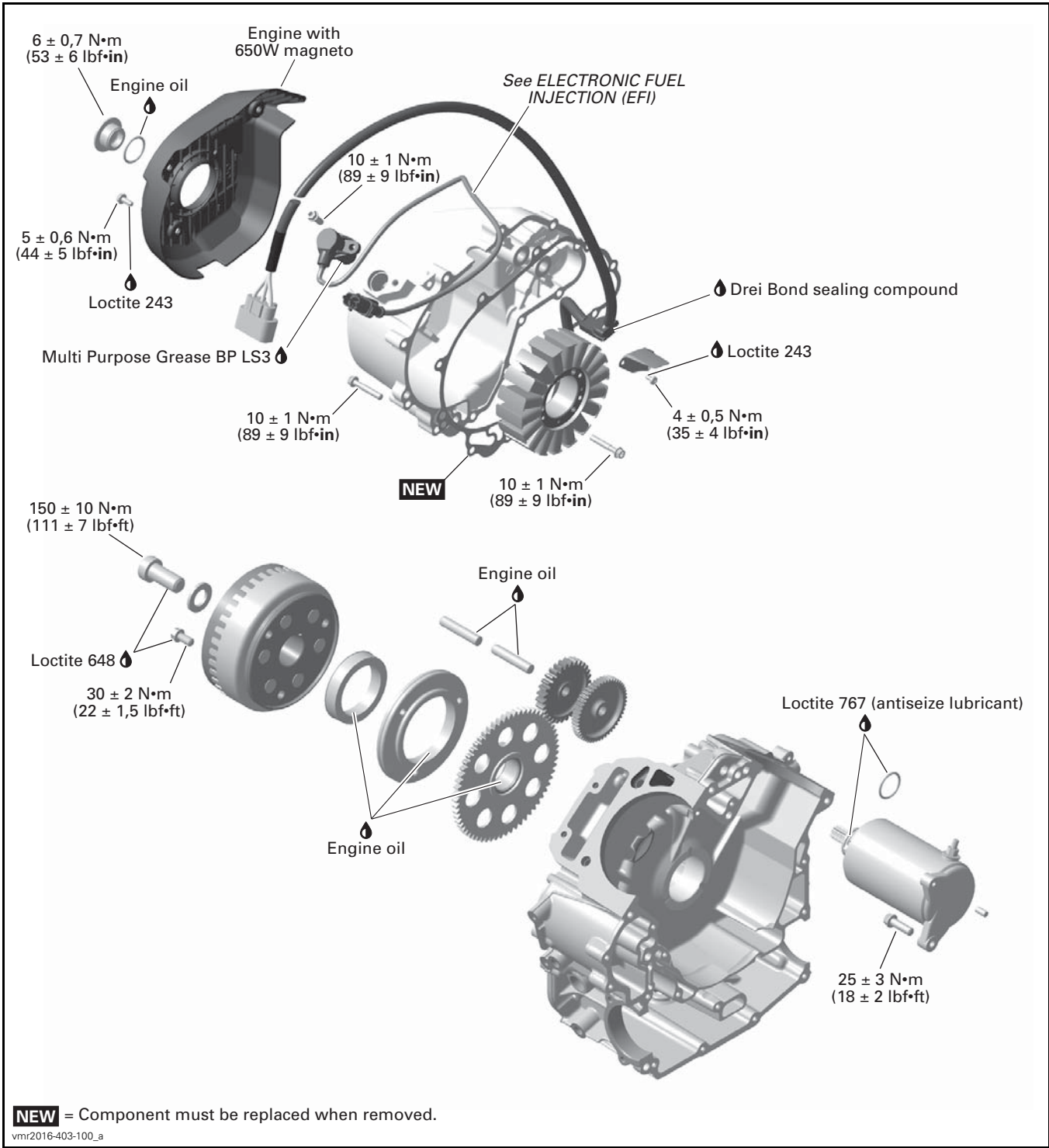
SERVICE TOOLS

Description	Part Number	Page
CRANKSHAFT LOCKING BOLT	529 035 617	6
CRANKSHAFT PROTECTOR	529 036 034	6
FLUKE 115 MULTIMETER	529 035 868	4
MAGNETO PULLER	529 035 748	6

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	11
DREI BOND SEALING COMPOUND	420 297 906	4
LOCTITE 243 (BLUE)	293 800 060	6
LOCTITE 648 (GREEN)	413 711 400	8
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	10–11
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	3
PULLEY FLANGE CLEANER	413 711 809	7–8

Subsection XX (MAGNETO AND STARTER)

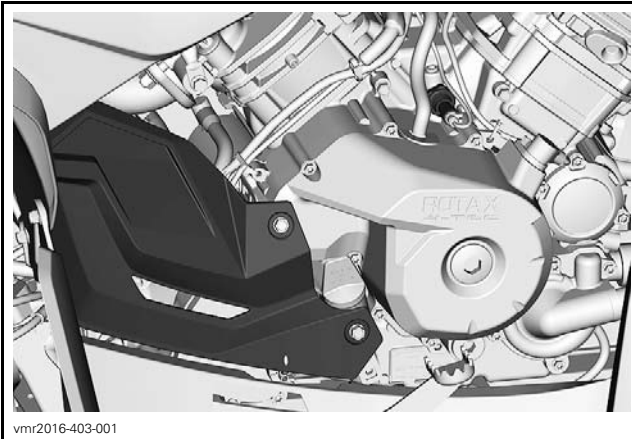


PROCEDURES

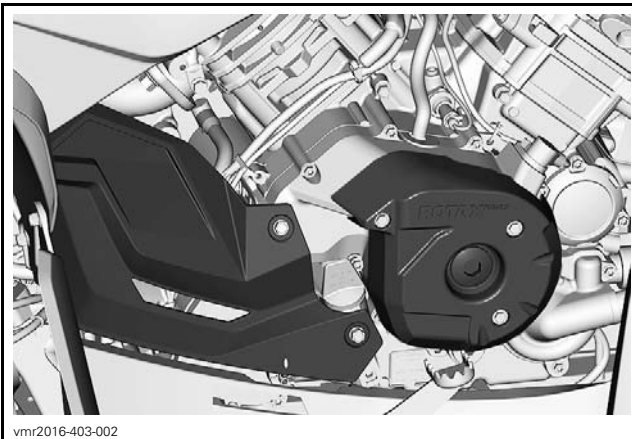
MAGNETO COVER

Magneto Cover Access

Refer to the *BODY* subsection and remove the following part.



ENGINE WITH 420W MAGNETO



ENGINE WITH 650W MAGNETO

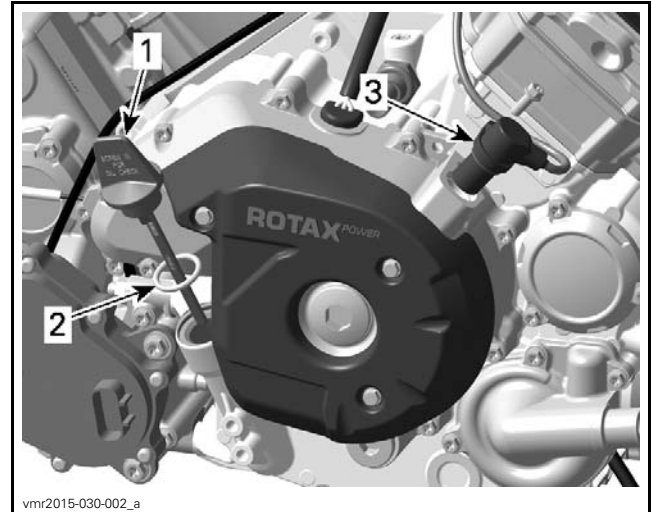
Removing the Magneto Cover

Drain engine oil (refer to *ENGINE OIL CHANGE* in the *PERIODIC MAINTENANCE PROCEDURES* subsection).

Remove crankshaft position sensor (CPS) and cut tie raps.

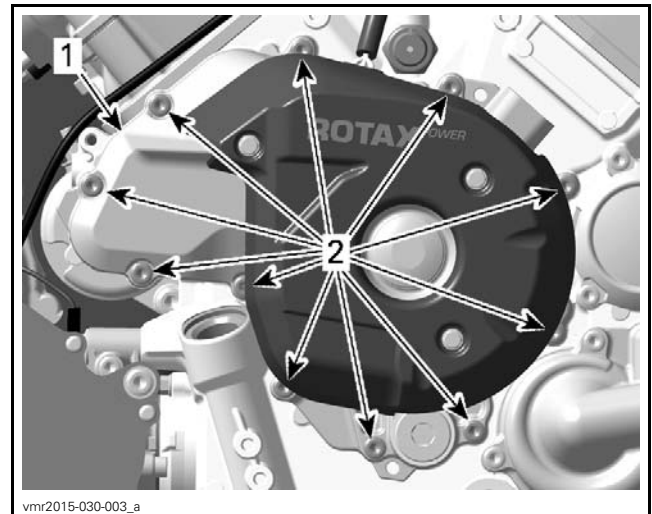
Disconnect the stator connector on the voltage regulator/rectifier, refer to *STATOR CONNECTOR ACCESS* in this subsection.

Remove dipstick with O-ring.



1. Dipstick
2. O-ring
3. Crank position sensor (CPS)

Remove magneto cover retaining screws.



1. Magneto cover
2. Retaining screws

Pull out magneto cover.

Inspecting and Cleaning the Magneto Cover

Check magneto cover for cracks or other damage. Replace if necessary.

NOTE: Clean all metal components in a non-ferrous metal cleaner. Use LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500), or suitable equivalent.

⚠ WARNING

Wear safety glasses and work in a well ventilated area when working with strong chemical products. Also wear suitable non-absorbent gloves to protect your hands.

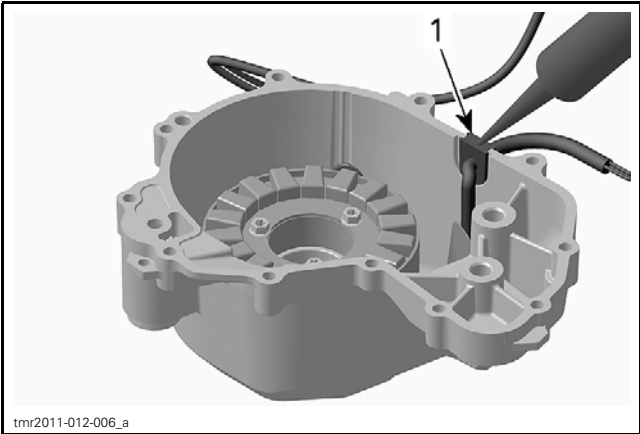
Subsection XX (MAGNETO AND STARTER)

Installing the Magneto Cover

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

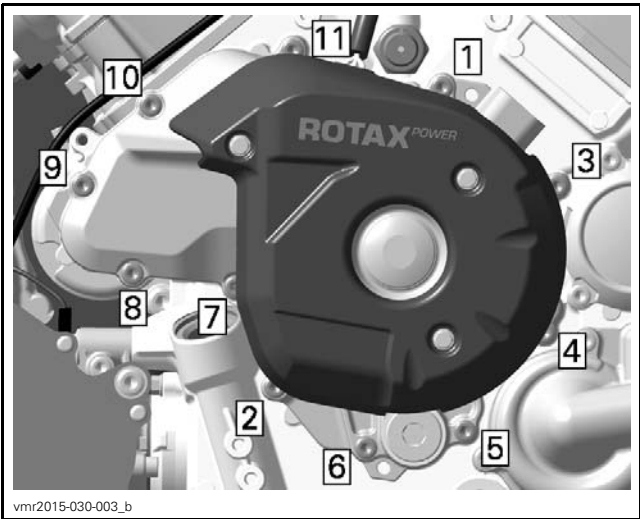
Install a **NEW** magneto cover gasket.

Apply DREI BOND SEALING COMPOUND (P/N 420 297 906) on stator cable grommet as shown in next illustration.



1. Stator cable grommet (apply Drei Bond sealing compound)

Tighten screws using the following sequence.



TIGHTENING SEQUENCE

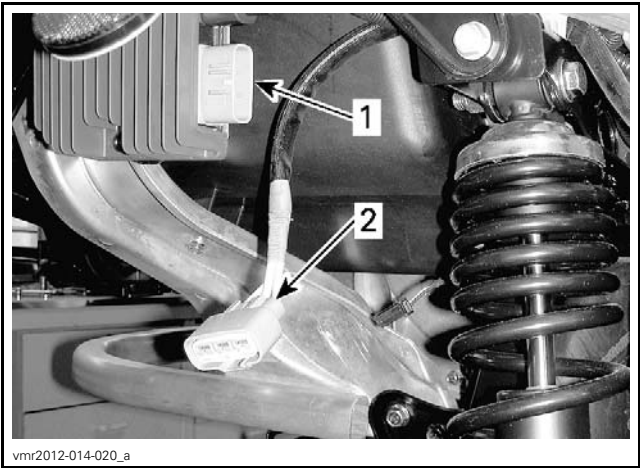
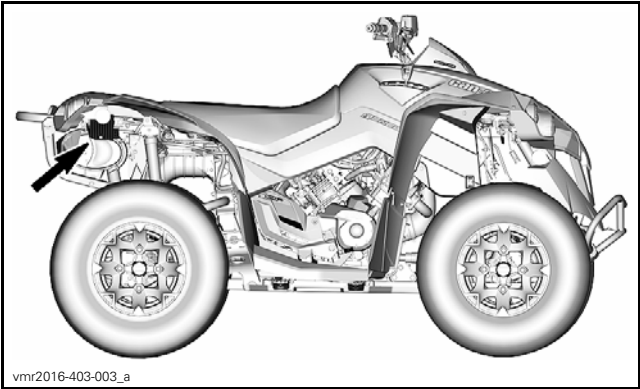
TIGHTENING TORQUE	
Magneto cover screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

Refill engine with recommended oil.

STATOR

Stator Connector Access

NOTE: The stator is directly connected to the voltage regulator/rectifier.



1. Voltage regulator/rectifier
2. Three YELLOW wires

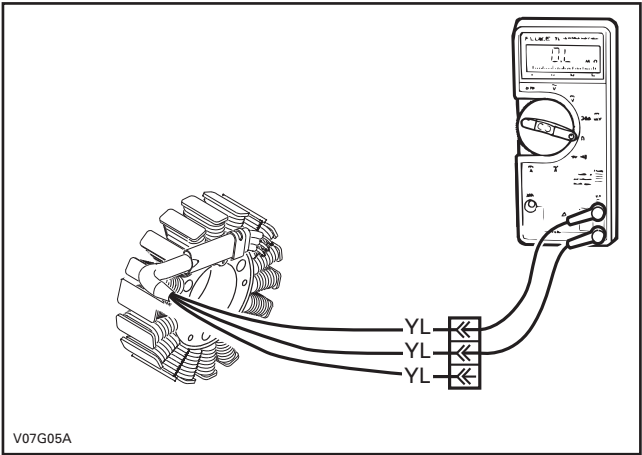
Testing the Stator Static Continuity

1. Disconnect the stator connector on the voltage regulator/rectifier.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

2. Set multimeter to Ω .
3. Connect multimeter between YELLOW wires.
4. Read resistance.

TERMINAL	RESISTANCE @ 20°C (68°F)
1 and 2	0.15 - 0.30 Ω
1 and 3	
2 and 3	



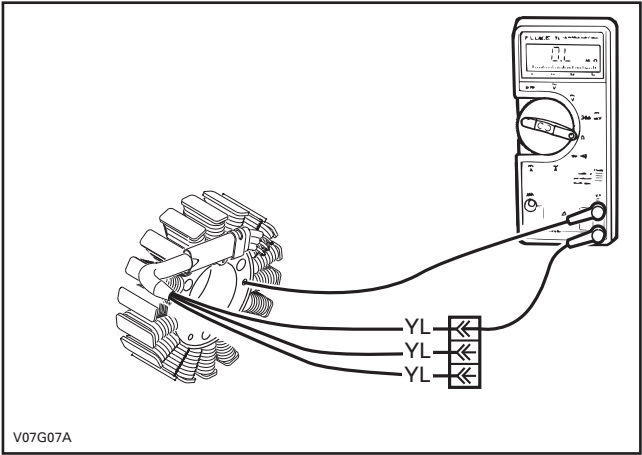
TYPICAL

5. If any reading is out of specification, replace stator.
6. Re-plug connectors properly.

Testing the Stator Insulation

1. Set multimeter to Ω .
2. Connect multimeter between any YELLOW wire (on stator connector) and engine ground.
3. Read resistance.

TEST PROBES	RESISTANCE @ 20°C (68°F)
Any YELLOW wire and engine ground	Infinite (open circuit)



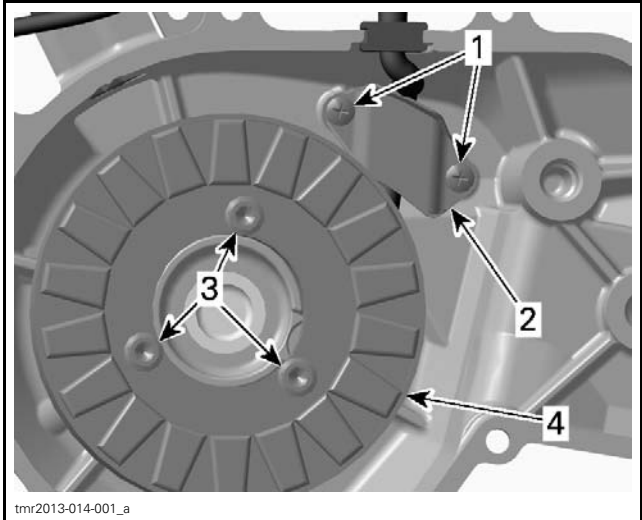
TYPICAL

4. If there is a resistance or continuity, the stator coils and/or the wiring is shorted to ground and needs to be repaired or replaced.
5. Re-plug connectors properly.

Removing the Stator

Remove *MAGNETO COVER*. See procedure in this subsection.

Remove screws securing the wire holding strip.
Remove stator retaining screws then the stator.



1. Holding strip screws
2. Wire holding strip
3. Stator retaining screws
4. Stator

Inspecting the Stator

Check stator windings and insulation for cracks or other damages. If damaged replace it.

Check if stator wires are brittle, hard or otherwise damaged.

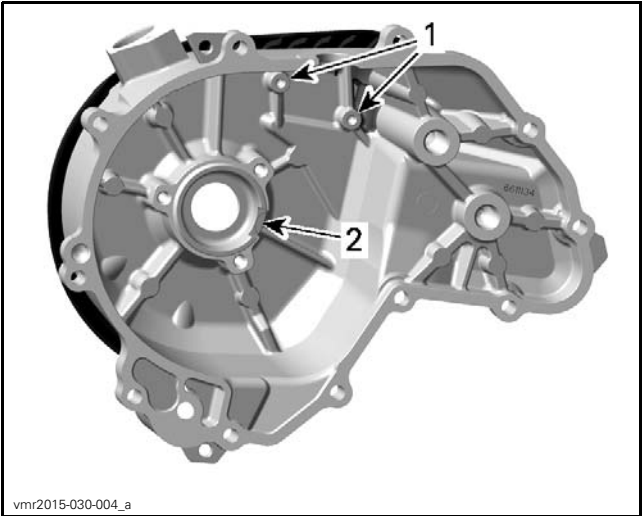
Installing the Stator

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

NOTICE When installing the stator take care to route wires properly and install retaining strip.

NOTE: There is only one position for the stator (notch in the magneto housing cover).

Subsection XX (MAGNETO AND STARTER)



- 1. Threads for cable holding strip
- 2. Notch for stator

TIGHTENING TORQUE	
Holding strip screws	4 N•m ± 0.5 N•m (35 lbf•in ± 4 lbf•in) + LOCTITE 243 (BLUE) (P/N 293 800 060)
Stator retaining screws	10 N•m ± 1 N•m (89 lbf•in ± 9 lbf•in)

ROTOR

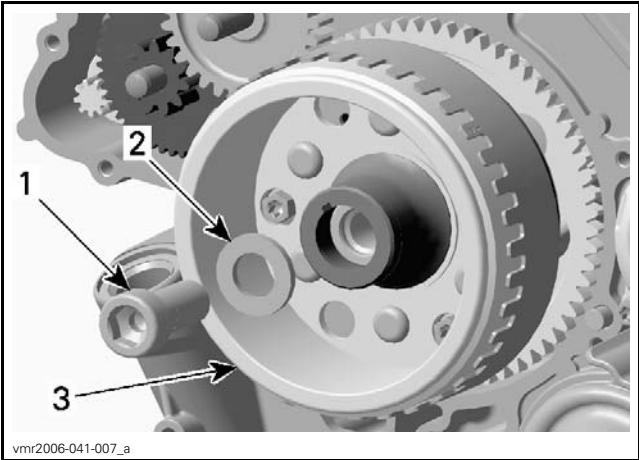
Removing the Rotor

Remove *MAGNETO COVER*. See procedure in this subsection.

Lock crankshaft (refer to *CRANKSHAFT LOCKING PROCEDURE* in the *BOTTOM END* subsection).

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

Heat screw in order to break the Loctite.
Remove screw and washer securing rotor to crankshaft.

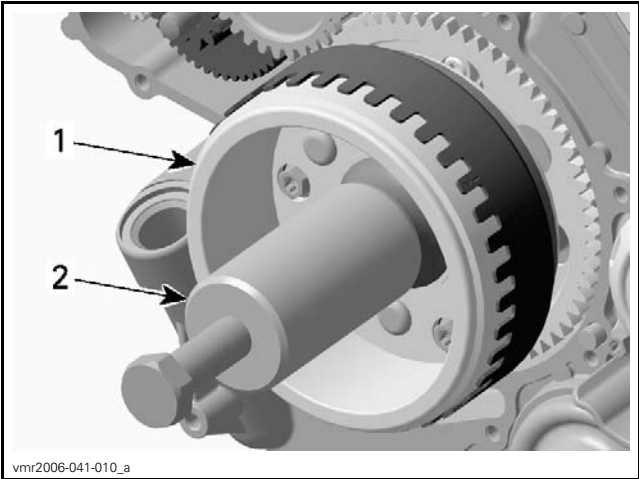


- 1. Screw M16
- 2. Washer
- 3. Rotor

Remove rotor.

REQUIRED TOOL	
CRANKSHAFT PROTECTOR (P/N 529 036 034)	
MAGNETO PULLER (P/N 529 035 748)	

NOTE: Use grease to place protector on crankshaft end prior to screw on the magnet puller.



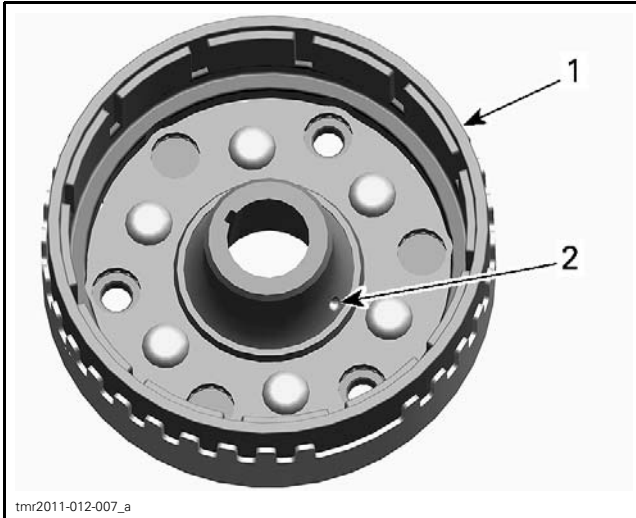
- 1. Rotor
- 2. Magneto puller

Screw magnet puller bolt to remove rotor.

Inspecting the Rotor

Check inner side of rotor for scratches or other damage.

Blow pressurized air in the rotor oil bore and make sure it is not clogged.



1. Rotor
2. Oil bore

Check keyway of the rotor for wear or damages.
 Check if trigger wheel teeth are bent or otherwise damaged.
 Check woodruff key and keyway on the crankshaft for wear or damages.
 Replace parts as necessary.

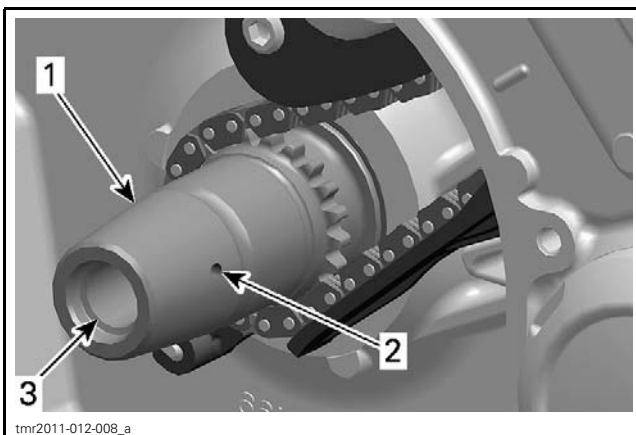
Installing the Rotor

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

Use PULLEY FLANGE CLEANER (P/N 413 711 809) to clean following parts:

- Crankshaft taper
- Oil passage in crankshaft taper
- Thread in crankshaft
- Rotor taper
- Oil bore in rotor.

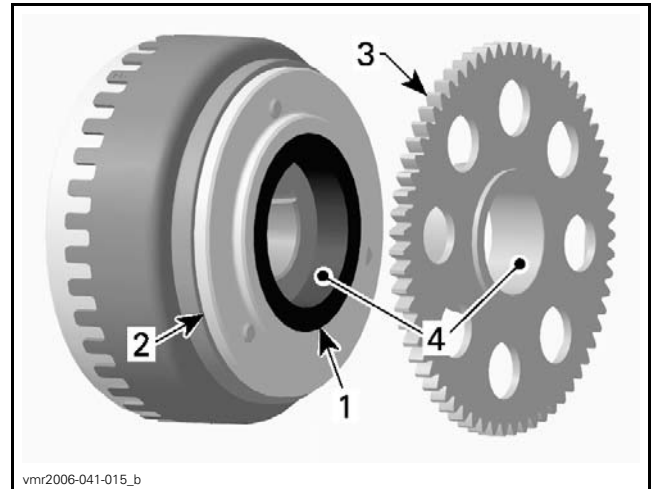
NOTICE Taper on crankshaft and rotor must be free of grease.



1. Crankshaft (MAG side)
2. Oil passage
3. Threads

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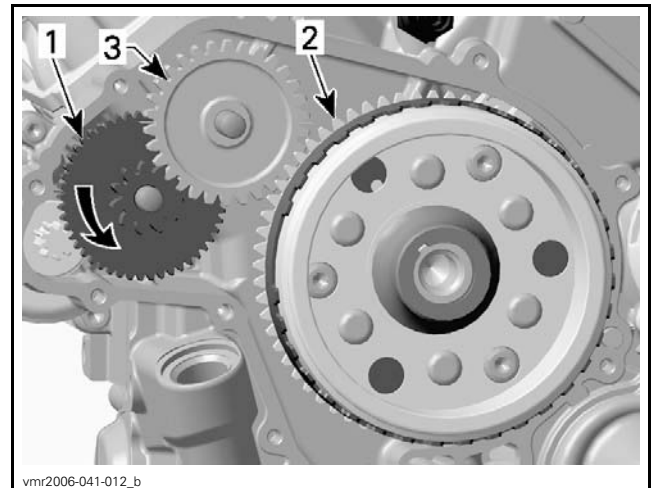
Oil sprag clutch and install sprag clutch gear.



1. Sprag clutch
2. Sprag clutch housing
3. Sprag clutch gear
4. Apply engine oil here

Slide rotor onto crankshaft. The woodruff key and the keyway must be aligned.

Rotate starter double gear counterclockwise to align intermediate gear teeth with sprag clutch gear.



1. Starter double gear
2. Sprag clutch gear
3. Intermediate gear

TIGHTENING TORQUE	
Rotor retaining screw	150 N•m ± 10 N•m (111 lbf•ft ± 7 lbf•ft) + LOCTITE 648 (GREEN) (P/N 413 711 400)

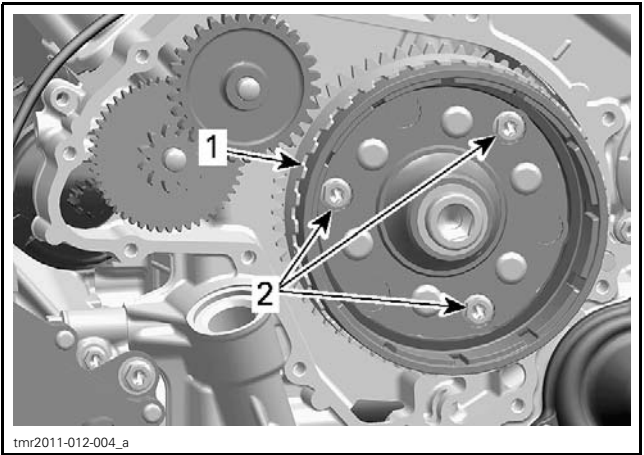
SPRAG CLUTCH

Removing the Sprag Clutch

Remove *MAGNETO COVER*. See procedure in this subsection.

Heat screws in order to break the Loctite.

Loosen sprag clutch housing screws located inside rotor.

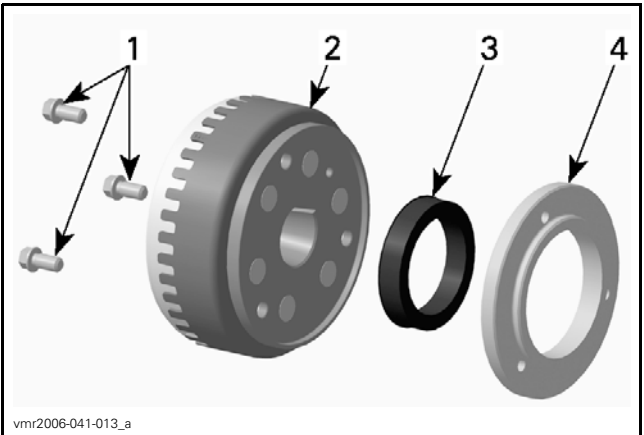


- 1. Rotor
- 2. Sprag clutch housing screws

Remove rotor (refer to *ROTOR* in this subsection).

Remove sprag clutch gear.

Remove sprag clutch housing screws and sprag clutch housing.



- 1. Sprag clutch housing screws
- 2. Rotor
- 3. Sprag clutch
- 4. Sprag clutch housing

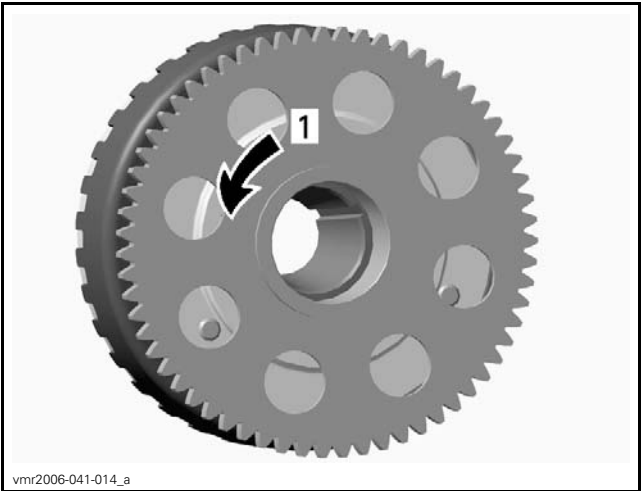
Inspecting the Sprag Clutch

Inspect sprag clutch and sprag clutch housing for wear and damage.

Also check the collar of the sprag clutch gear.

Rotate sprag clutch gear in sprag clutch.

NOTE: Sprag clutch must lock in counterclockwise direction.



SPRAG CLUTCH FUNCTIONAL TEST
1. Lock

NOTE: Sprag clutch, housing and gear must be replaced at the same time, if damaged.

Installing the Sprag Clutch

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

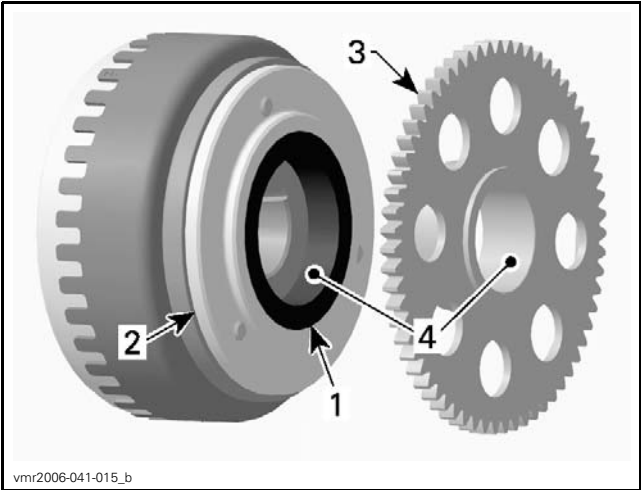
Use PULLEY FLANGE CLEANER (P/N 413 711 809) to clean following:

- Threads in sprag clutch housing
- Threads of sprag clutch housing screws.

Apply LOCTITE 648 (GREEN) (P/N 413 711 400) on threads of sprag clutch housing screws.

Install screws but do not torque yet.

Apply engine oil on sprag clutch and sprag clutch gear needle bearing.



- 1. Sprag clutch
- 2. Sprag clutch housing
- 3. Sprag clutch gear
- 4. Apply engine oil here

Install rotor, refer to *ROTOR* in this subsection.
Tighten sprag clutch housing screws to specification.

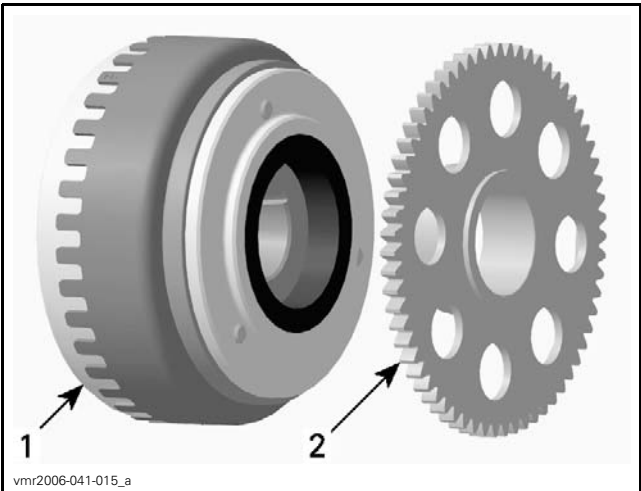
TIGHTENING TORQUE	
Sprag clutch housing screws	30 N•m ± 2 N•m (22 lbf•ft ± 1 lbf•ft)

SPRAG CLUTCH GEAR

Removing the Sprag Clutch Gear

Remove *ROTOR*. See procedure in this subsection.

Pull sprag clutch gear out of the rotor.

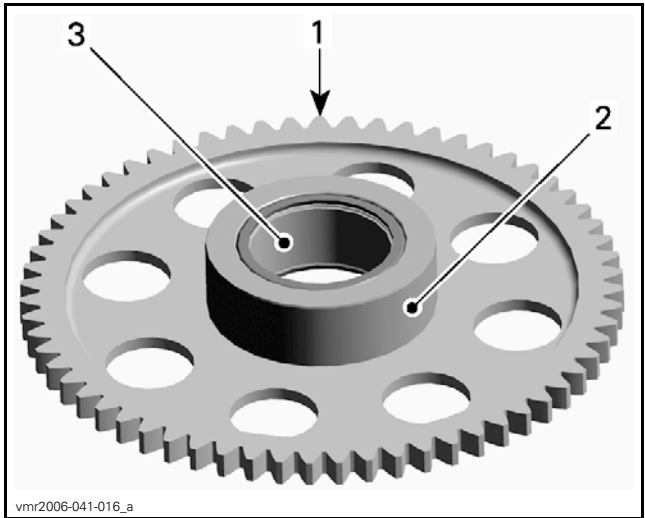


- 1. Rotor
- 2. Sprag clutch gear

Inspecting the Sprag Clutch Gear

Inspect gear, especially teeth and sprag clutch collar, for wear and other damage.

Check needle bearing condition. Replace sprag clutch gear if necessary.



- INSPECT**
- 1. Teeth
 - 2. Collar
 - 3. Needle bearing

Installing the Sprag Clutch Gear

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

NOTE: Apply engine oil on needle bearing and collar of sprag clutch gear.

STARTER DRIVE GEARS

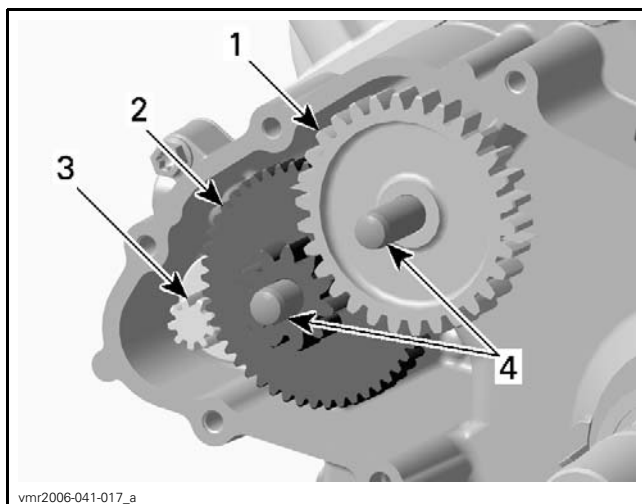
Starter Drive Gear Location

The starter drive gears are located on the engine *MAG* side behind the magneto cover.

Removing the Starter Drive Gear

Remove *MAGNETO COVER*. See procedure in this subsection.

Remove location pins, starter double gear and intermediate gear.



1. Intermediate gear
2. Starter double gear
3. Starter gear
4. Location pins

Inspecting the Starter Drive Gear

Inspect gears and location pins for wear and damage.

Replace parts as necessary.

Installing the Starter Drive Gear

The installation is the reverse of the removal procedure. Pay attention to the following details.

Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on starter gear before installing the starter double gear.

Apply engine oil on location pins.

ELECTRIC STARTER

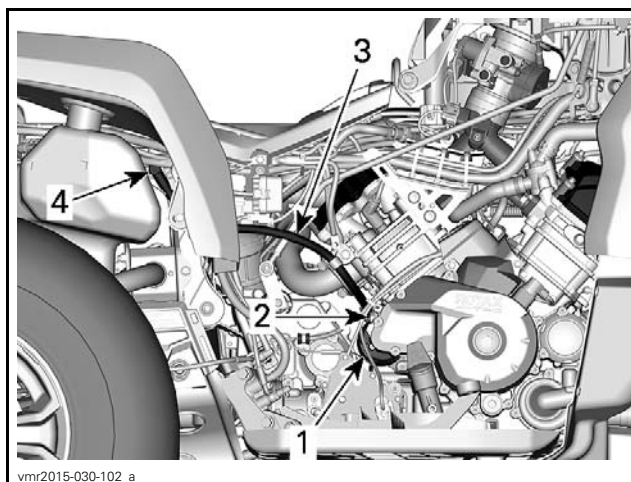
Starter Access for Testing

Refer to *BODY* subsection and remove:

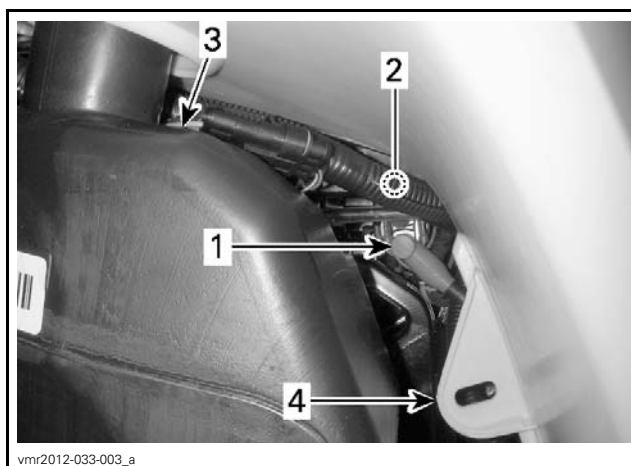
- RH engine panel.

Testing the Starter Operation

1. Disconnect starter power cable from starter solenoid and pull cable out to RH side of the vehicle.



1. Starter
2. Starter power cable connection at starter
3. Starter power cable
4. Starter power cable connection at solenoid



1. Power cable from starter solenoid to starter
2. Power cable from battery to starter solenoid (not visible)
3. Fuel tank
4. RH rear fender

2. Using booster cables, carefully supply current from a 12 volt battery directly to the starter power cable.

NOTICE First connect the red jumper cable from the booster battery to the starter cable. Momentarily connect the BLACK (-) cable from the booster battery to engine ground last.

If the starter turns, test other starting system components.

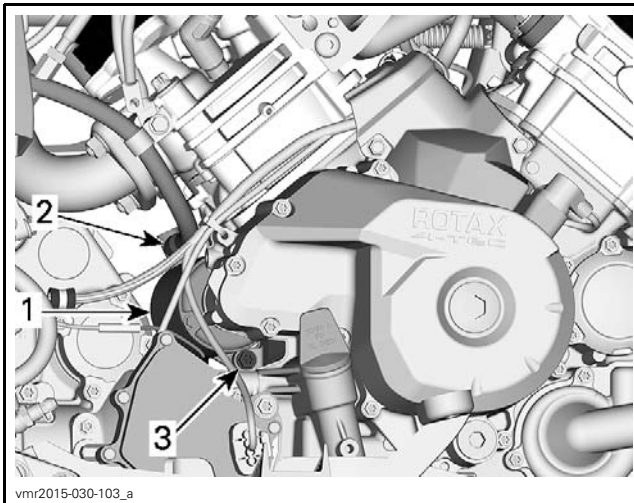
Removing the Starter

1. Ensure ignition switch is set to OFF.
2. Disconnect BLACK (-) cable from battery.

⚠ WARNING

Always disconnect BLACK (-) cable first and reconnect last.

3. Remove body parts as listed in *STARTER ACCESS*.
4. For models using the gearbox with GBPS, refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT)* subsection and remove the:
 - Drive pulley
 - Driven pulley
 - CVT back cover.
5. Disconnect RED (+) cable from starter.
6. Clean starter area.
7. Remove starter retaining screw (from RH side of engine).



1. Starter
2. Starter power cable to disconnect
3. Starter retaining screw to remove

8. Carefully pry the starter from the engine crankcase.

Installing the Starter

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

Make sure the starter and engine mating surfaces are free of debris. Serious problems may arise if the starter is not properly aligned.

Lubricate starter O-ring.

STARTER O-RING AND MATING SURFACE	
Service product	LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070)

Bring starter close to its location. Rotate it so that its mounting ear allows installation in engine crankcase and on its alignment pin.

Push starter in place and align mounting ear to install screw.

TIGHTENING TORQUE

Starter mounting screw	25 N•m ± 3 N•m (18 lbf•ft ± 2 lbf•ft)
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NOTICE When connecting the RED (+) cable to the starter motor, make sure the battery cables are disconnected.

TIGHTENING TORQUE

Starter terminal retaining nut	6 N•m ± 0.5 N•m (53 lbf•in ± 4 lbf•in)
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Apply DIELECTRIC GREASE (P/N 293 550 004) the starter terminal retaining nut.

Connect battery cables.

⚠ WARNING

Always connect RED (+) cable first then BLACK (-) cable last.

Test starter operation.