

CHAINCASE AND REVERSE

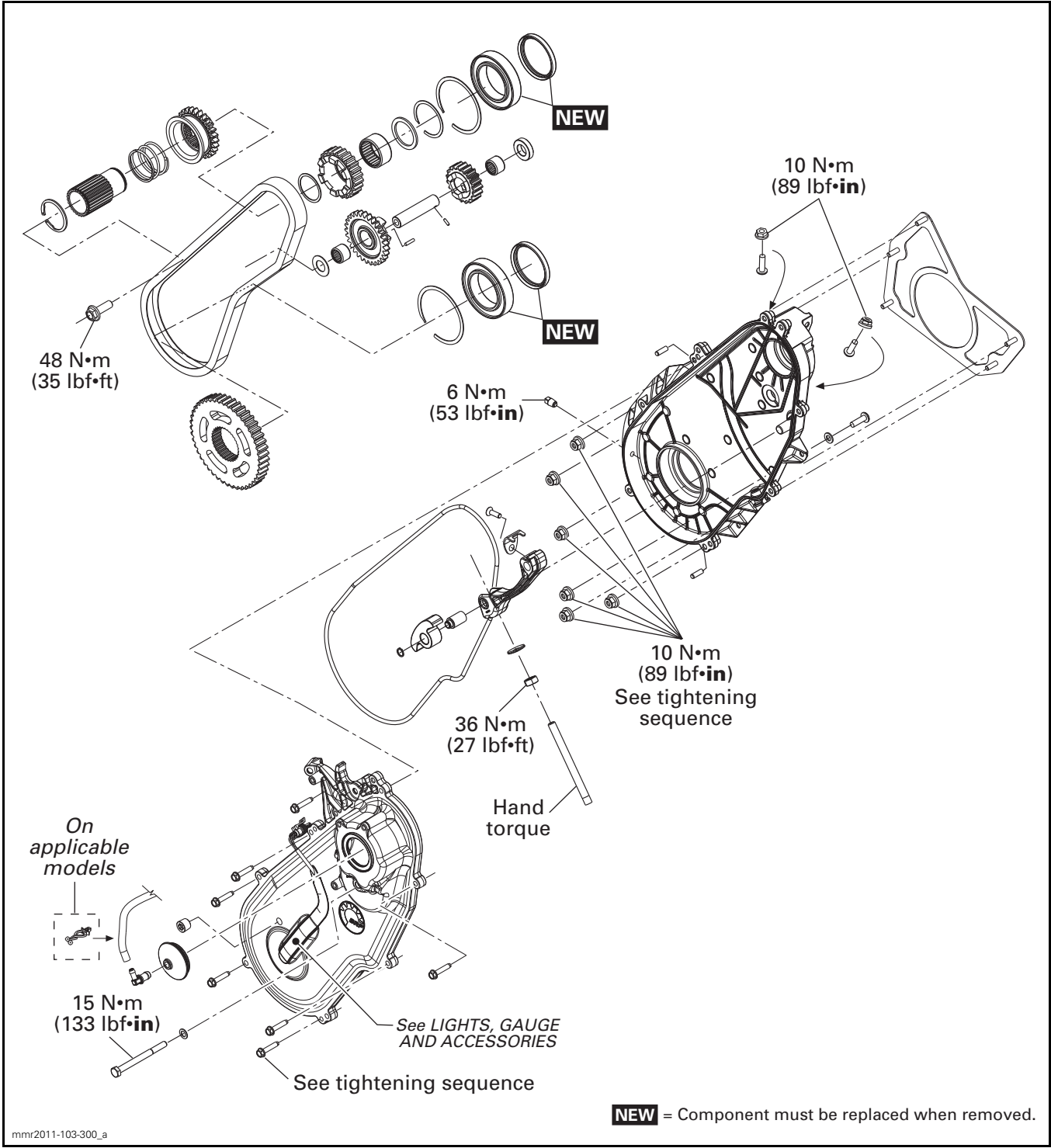
SERVICE TOOLS

Description	Part Number	Page
BEARING PULLER/PUSHER	529 036 111	21
BEARING PULLER/PUSHER	529 036 112	21
ECM ADAPTER TOOL.....	420 277 010	15
FLUKE 115 MULTIMETER	529 035 868	13-16

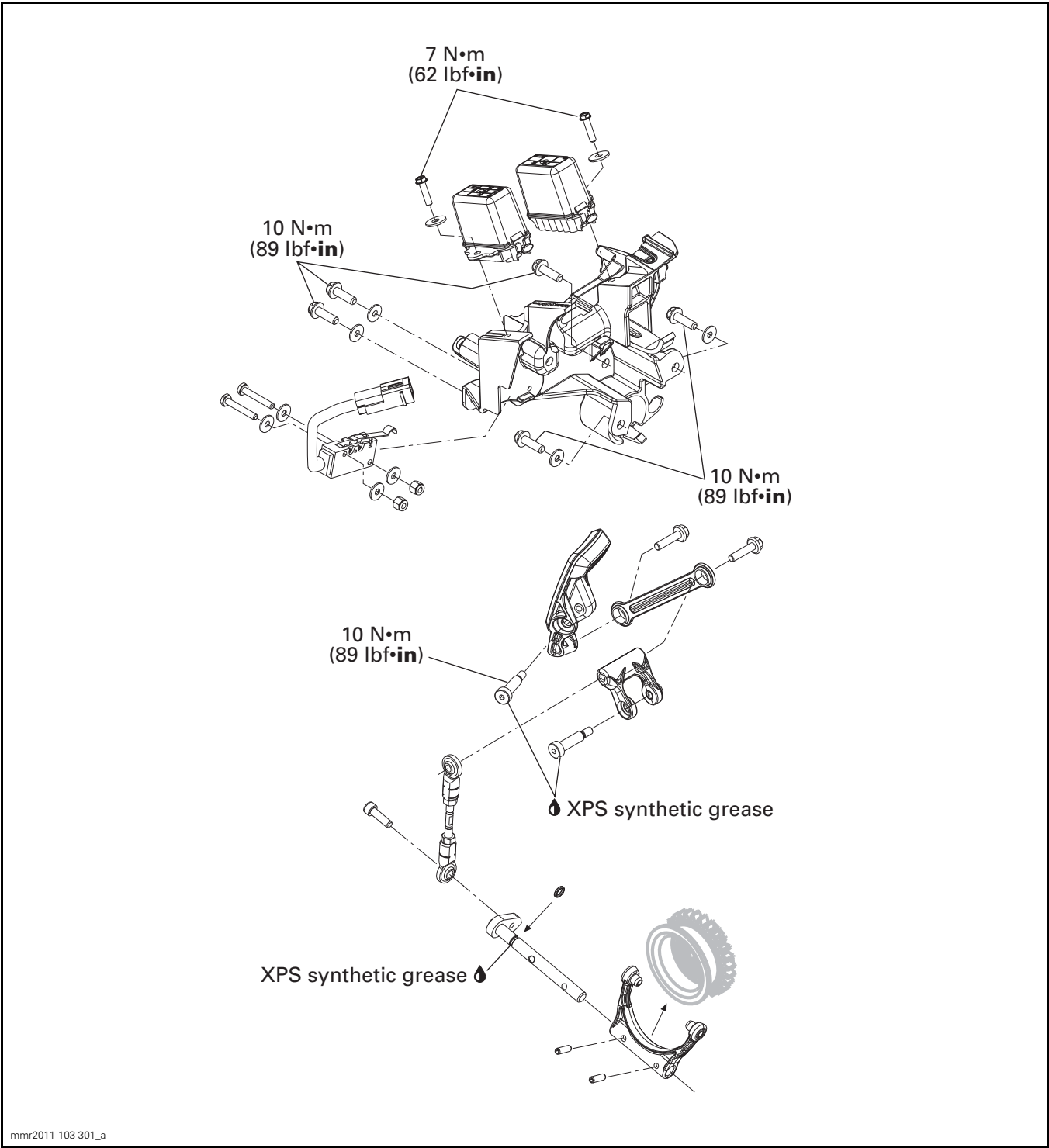
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON SEAL PULLER	YA105	21

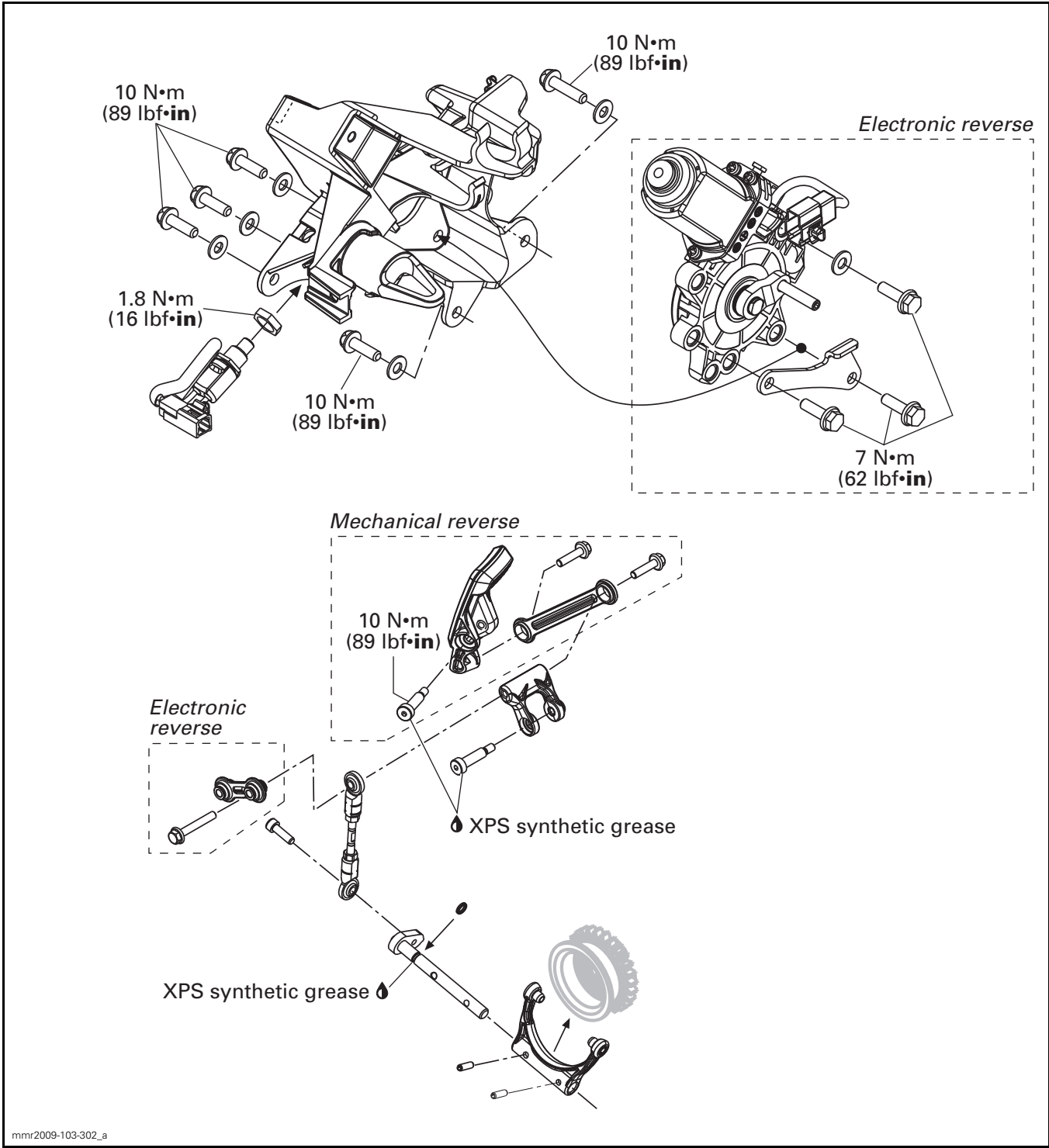
Subsection XX (CHAINCASE AND REVERSE)



600 ACE



1200 4-TEC



GENERAL

During assembly/installation, use the torque values and service products as 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, cotter pin, etc.) must be replaced with new ones.

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

SYSTEM DESCRIPTION

Mechanical Reverse

This reverse system integrated in the chaincase is controlled mechanically by link rods. When reverse handle is engaged, the shift fork moves sliding gear and switches its power to the reverse sprocket. This reverse sprocket turns backwards and transmits its power to the lower sprocket. When the mechanism is engaged forward, it works like a normal chaincase with the upper sprocket giving its power to the lower sprocket.

Electronic Reverse

This system works mechanically the same way as the mechanical reverse, except that the sliding gear is controlled electrically by the ECM and the electrical motor. When the START/REVERSE button is pressed, the ECM transmits its signal through either the reverse or forward relay to the electric motor. The ECM will not engage the reverse if the engine RPM is above 2000 or the vehicle speed is above 1 km/h.

ADJUSTMENT

SHIFT LINKAGE ADJUSTMENT

NOTICE It is of the uppermost importance for the adjustment reliability to follow entirely this procedure.

Mechanical Reverse

1. Remove support attached to chaincase. See proper procedure in this subsection:
 - *SHIFT LEVER (600 ACE)* or
 - *SHIFT LEVER (1200 4-TEC WITH MECHANICAL REVERSE)*

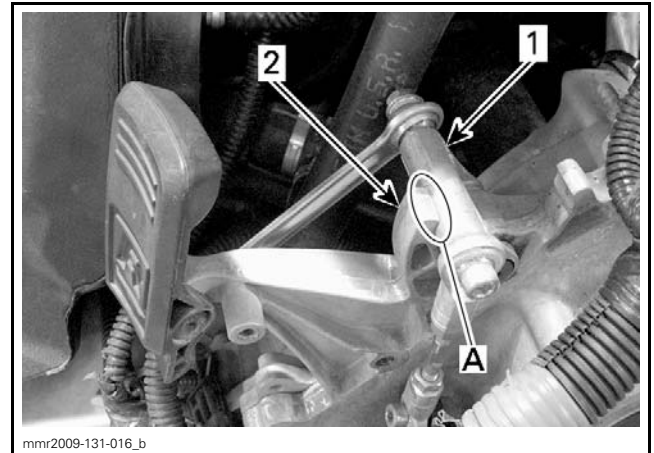
Electronic Reverse

1. Remove electronic shift unit. Refer to *ELECTRONIC SHIFT UNIT* in this subsection.

Mechanical and Electronic Reverse

1. Lift rear of vehicle and support it off the ground.
2. Rotate driven pulley a few turns to ensure reverse mechanism is properly engaged.
3. Verify gap between shifter lever and chaincase front stopper using a feeler gauge. Refer to the following table.

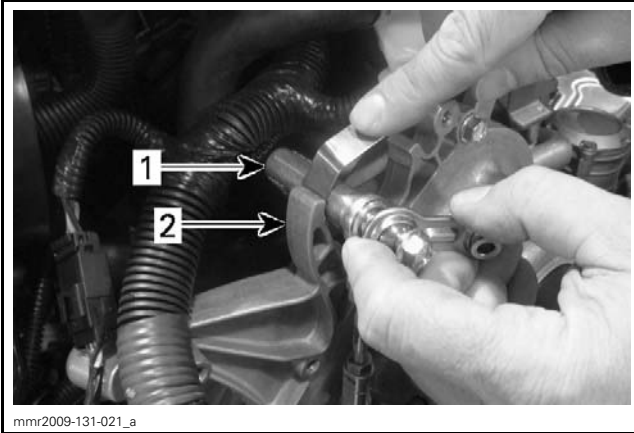
SHIFT LINKAGE ADJUSTMENT	
Gap no. A	0.4 mm to 0.6 mm (.016 in to .024 in)



MECHANICAL REVERSE

1. Shifter lever
 2. Chaincase front stopper
- A. Gap = 0.4 mm to 0.6 mm (.016 in to .024 in)

Subsection XX (CHAINCASE AND REVERSE)

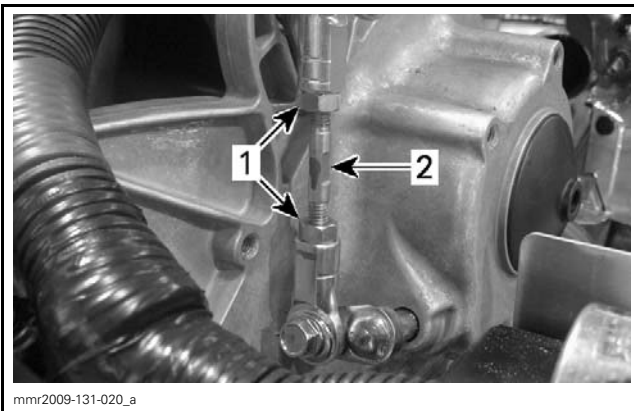


ELECTRONIC REVERSE

1. Shifter lever
2. Chaincase front stopper

4. If gap is out of specification, adjust shifter link rod as follows.

4.1 Unscrew link rod lock nuts.



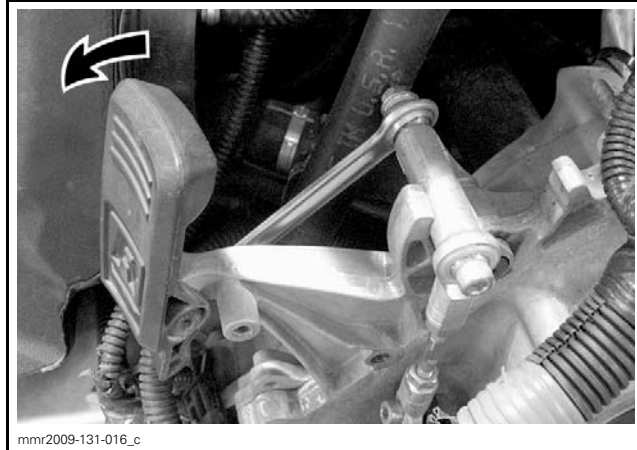
1. Lock nuts
2. Link rod

4.2 Turn link rod accordingly.

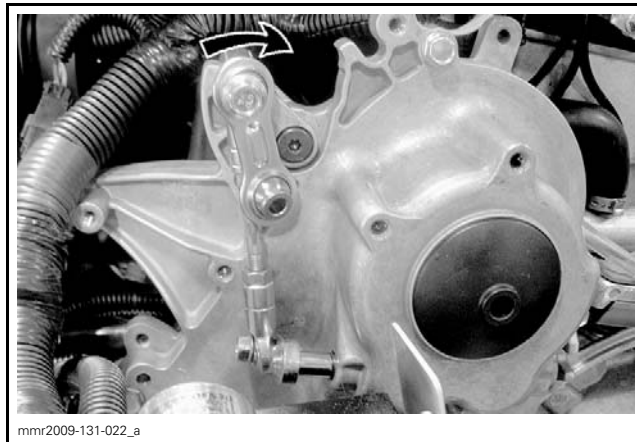
NOTE: Turn the link rod clockwise to reduce the gap and counterclockwise to increase the gap.

4.3 Tighten link rod lock nuts.

5. Engage and release reverse mechanism 10 times using reverse handle or shifter lever.



REVERSE HANDLE (MECHANICAL REVERSE)



SHIFTER LEVER (ELECTRONIC REVERSE)

6. Rotate driven pulley a few turns to ensure reverse mechanism is properly engaged.

7. Verify again adjustment gap. Readjust if necessary.

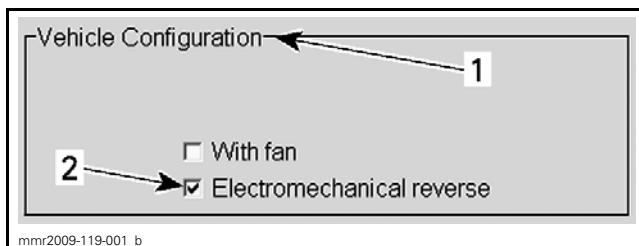
TROUBLESHOOTING

DIAGNOSTIC TIPS (ELECTRONIC REVERSE)

B.U.D.S. Configuration

If the electronic reverse is not working, make sure the required option is selected in B.U.D.S. Otherwise, the electronic reverse will not work and no fault code will be set.

1. Connect and start B.U.D.S. to check the **Electromechanical reverse** option.



1200 4-TEC SETTING AND ECM TABS

1. Vehicle Configuration area

2. Check Electromechanical reverse

NOTE: If the option is checked in B.U.D.S. and the vehicle is not equipped with the electronic reverse, false fault code(s) will be set.

Fault Code P0736

The fault code P0736 can appear for different reasons that are not necessarily a failure of the electronic reverse. It can appear for the following reasons:

- Reverse gears are not aligned in chaincase to engage properly.

If fault code appears:

- Clear the fault using B.U.D.S.
- Lift rear of vehicle and support it off the ground.
- Rotate driven pulley a few turns to move gears in chaincase.
- Retry changing gears.

If fault code appears again:

- Check drive belt height. (Refer to *DRIVE BELT* subsection)
- Check shift linkage adjustment. (see procedure in this subsection).

If fault code persists:

- Refer to *TESTING SEQUENCE* below.

TESTING SEQUENCE (ELECTRONIC REVERSE)

Electronic Reverse Does Not Engage

First, make sure the following settings are as per specifications:

- Drive belt height
- Shift linkage adjustment.

If B.U.D.S. is properly configured, drive belt and shift linkage are properly adjusted, follow this testing sequence to diagnose problem:

1. Check reverse position switch (RVPS) continuity.
2. Check electronic reverse fuse.
3. Check engine connector.
4. Check electronic reverse relays continuity.

5. Check electronic reverse motor operation.
6. Check input voltage to electronic reverse motor.
7. Check input voltage to electronic reverse relays.
8. Check electronic reverse relays ground (motor actuation).
9. Check electronic reverse relays ground signal.
10. Check ECM ground continuity (relay).

Refer to the appropriate topic to see the complete testing procedures.

PROCEDURES

SHIFT LEVER (600 ACE)

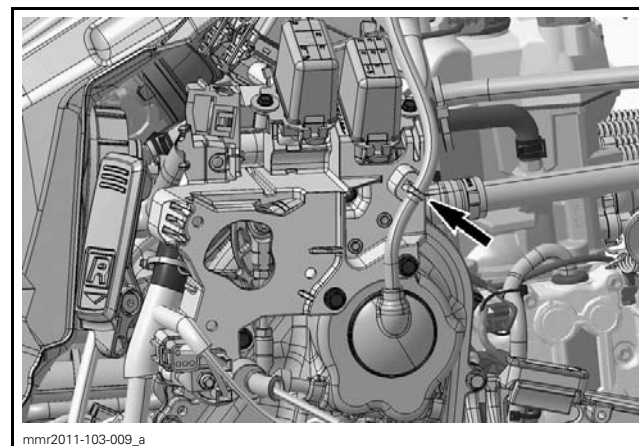
Shift Lever Removal

1. Disconnect negative (-) cables from battery.



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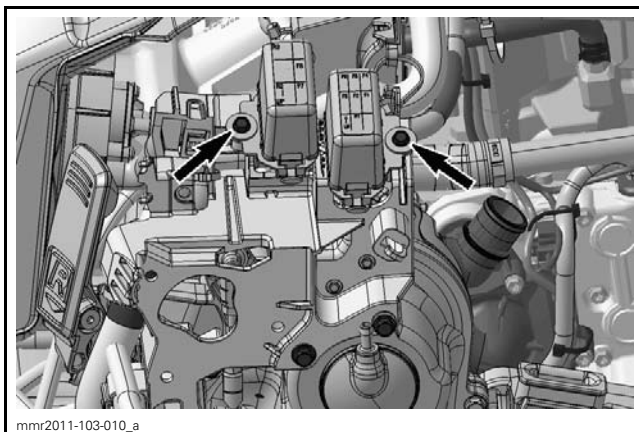
2. Detach vent hose from support.



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3. Remove both fuse boxes from support.

Subsection XX (CHAINCASE AND REVERSE)

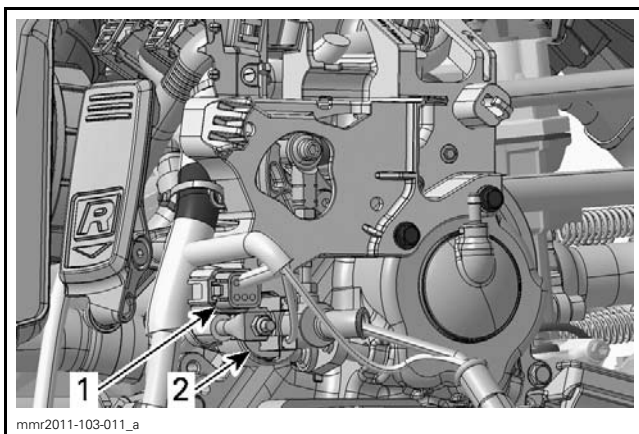


FUSE BOXES RETAINING SCREWS

4. Remove communication connector from its housing.
5. Disconnect starter solenoid wires.

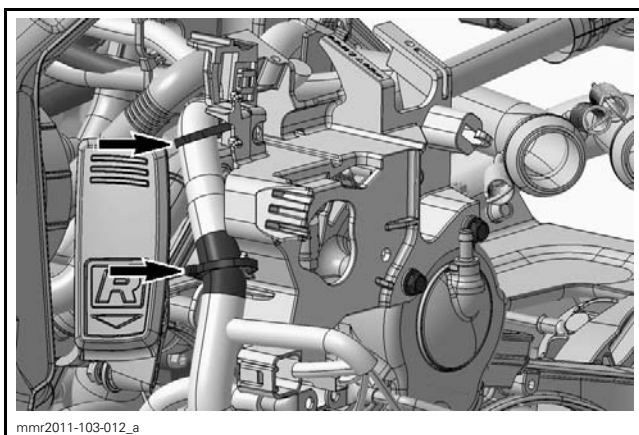
⚠ WARNING

Ensure that negative (-) cables are disconnected from battery prior to disconnecting starter solenoid wires.

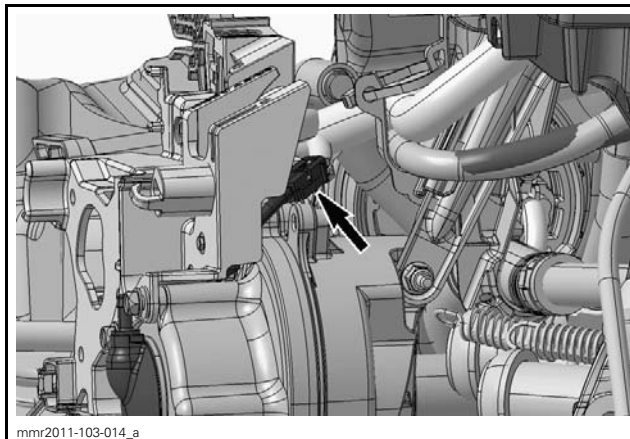


1. Communication connector
2. Starter solenoid

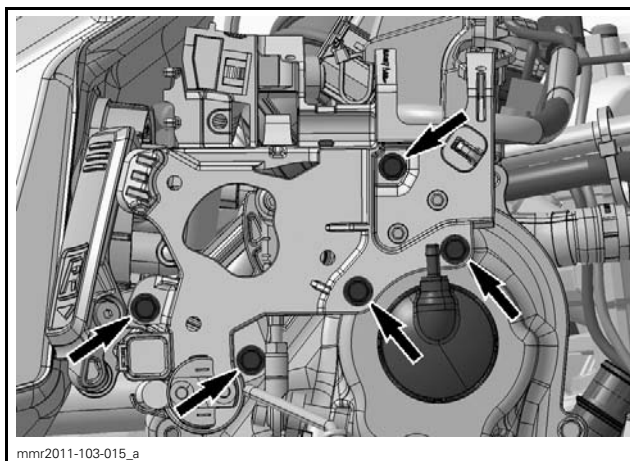
6. Cut main harness locking ties.



7. Move main harness aside.
8. Disconnect RVPS switch connector (behind support).

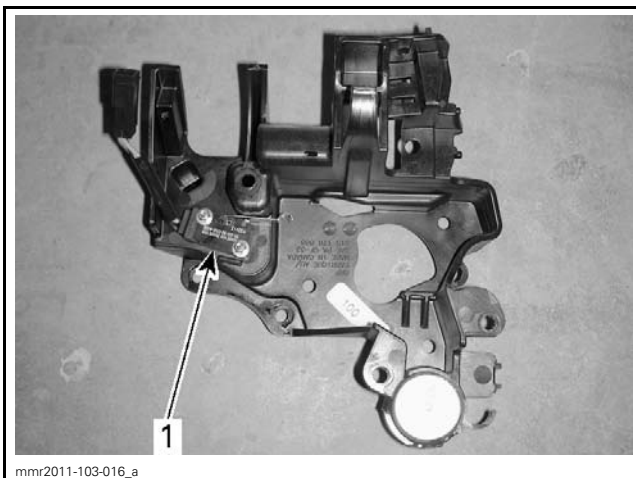


9. Remove retaining screws from support.



10. Remove reverse handle trim from support.
11. Ensure that reverse handle is positioned to **forward** position.
12. Carefully remove support from vehicle.

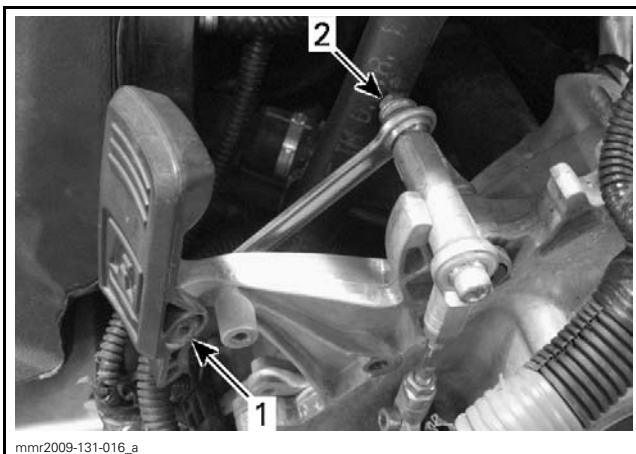
NOTICE Be careful not to damage RVPS switch during support removal.



1. RVPS switch

13. Remove retaining screw from handle.

14. Remove shift lever screw.



1. Handle retaining screw
2. Shift lever screw

15. Remove shift lever from vehicle.

Shift Lever Installation

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

Lubricate shift lever pivots and moving parts.

Ensure that reverse handle is positioned to forward position.

NOTICE Be careful not to damage RVPS switch during support installation.

Tighten support retaining screws to specification.

SUPPORT RETAINING SCREWS TORQUE
10 N•m (89 lbf•in)

Tighten fuse boxes retaining screws to specification.

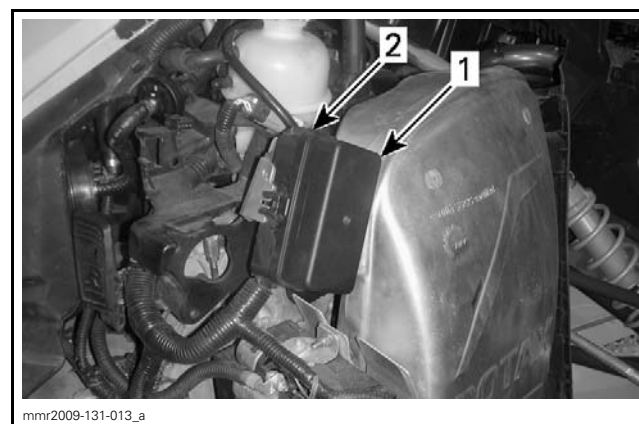
FUSE BOXES RETAINING SCREWS TORQUE

7 N•m (62 lbf•in)

SHIFT LEVER (1200 4-TEC WITH MECHANICAL REVERSE)

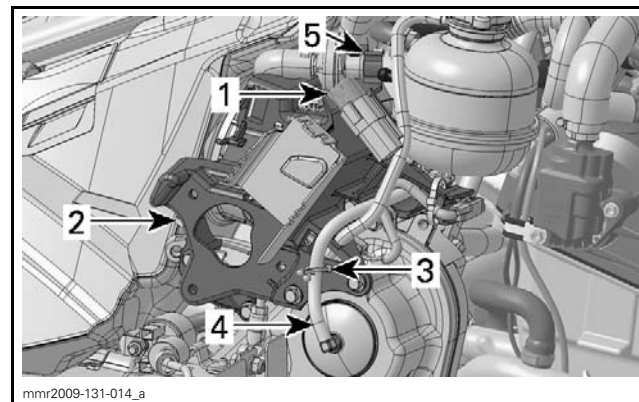
Shift Lever Removal

1. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.
2. Remove fuse box from fuse box holder using upper retaining clip.



1. Fuse box
2. Upper retaining clip

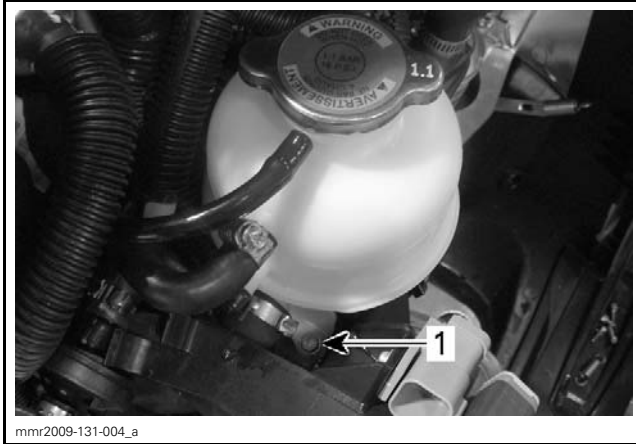
3. Remove communication connector from its housing.
4. Cut main harness locking tie.
5. Detach retaining tie from chaincase vent hose.
6. Remove chaincase vent hose from filling plug.
7. Detach fuel pressure regulator hose from support.



1. Communication connector
2. Main harness locking tie
3. Retaining tie
4. Chaincase vent hose
5. Fuel pressure regulator hose

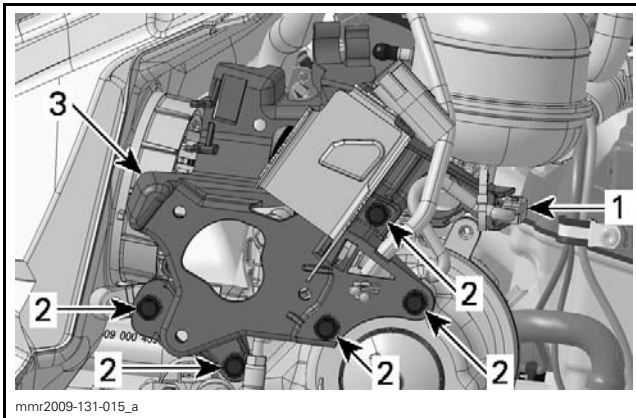
8. Remove coolant reservoir retaining screw.

Subsection XX (CHAINCASE AND REVERSE)



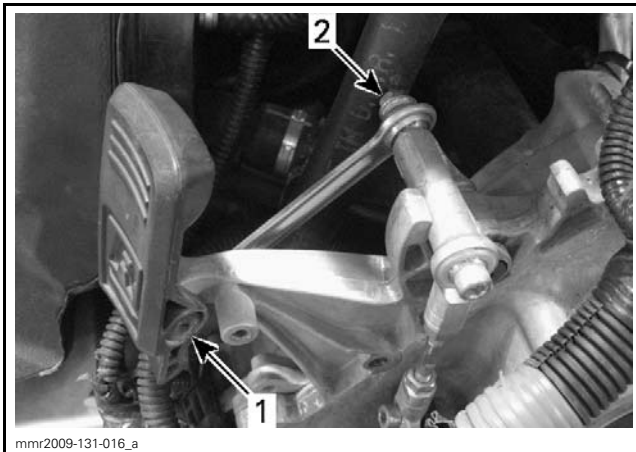
1. Coolant reservoir retaining screw

9. Disconnect RVPS switch connector.
10. Remove retaining screws from support.
11. Remove support from vehicle.



1. RVPS switch connector
2. Support retaining screws
3. Support

12. Remove retaining screw from handle.
13. Remove shift lever screw.



1. Handle retaining screw
2. Shift lever screw

14. Remove shift lever from vehicle.

Shift Lever Installation

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

Lubricate shift lever pivots and moving parts.

Tighten support retaining screws to specification.

SUPPORT RETAINING SCREWS TORQUE

10 N•m (89 lbf•in)

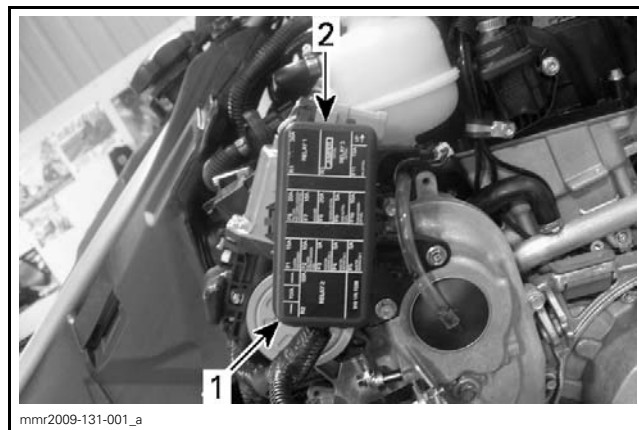
ELECTRONIC SHIFT UNIT

Electronic Shift Unit Removal

⚠ WARNING

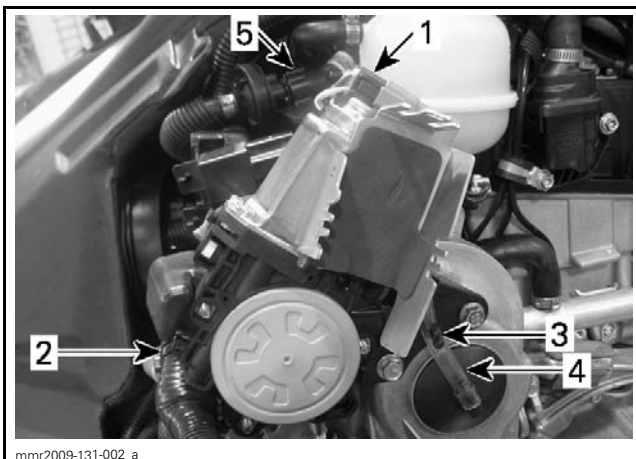
Battery BLACK (–) cable must always be disconnected first and connected last.

1. Disconnect BLACK negative cable from battery.
2. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.
3. Remove fuse box from fuse box holder using upper retaining clip.



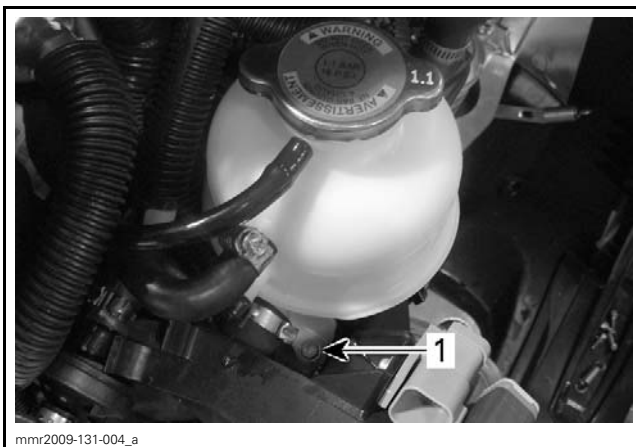
1. Fuse box
2. Upper retaining clip

4. Remove communication connector from its housing.
5. Cut main harness locking tie.
6. Detach retaining tie from chaincase vent hose.
7. Remove chaincase vent hose from filling plug.
8. Detach fuel pressure regulator hose from support.



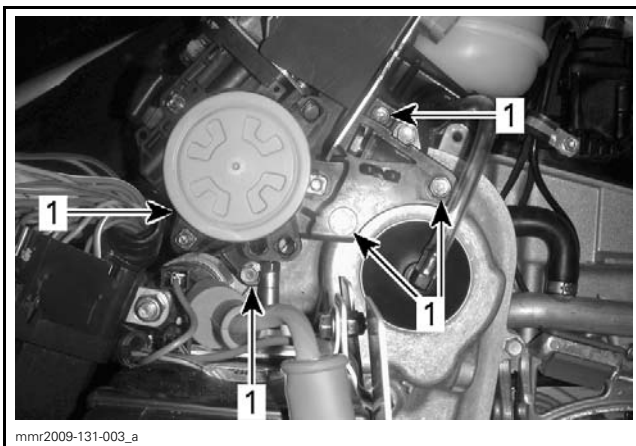
1. Communication connector
2. Main harness locking tie
3. Retaining tie
4. Chaincase vent hose
5. Fuel pressure regulator hose

9. Remove coolant reservoir retaining screw.



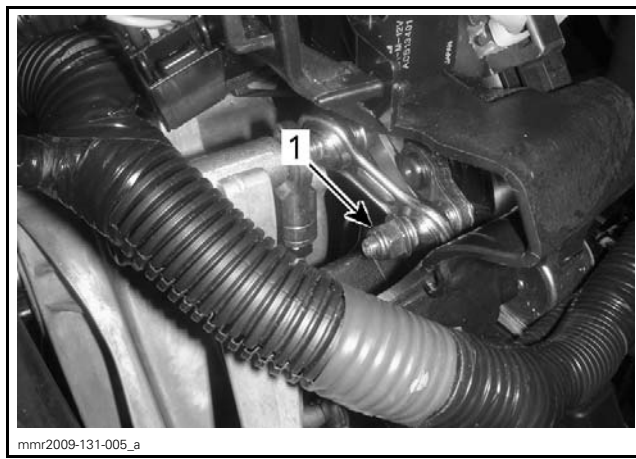
1. Coolant reservoir retaining screw

10. Remove retaining screws from support.



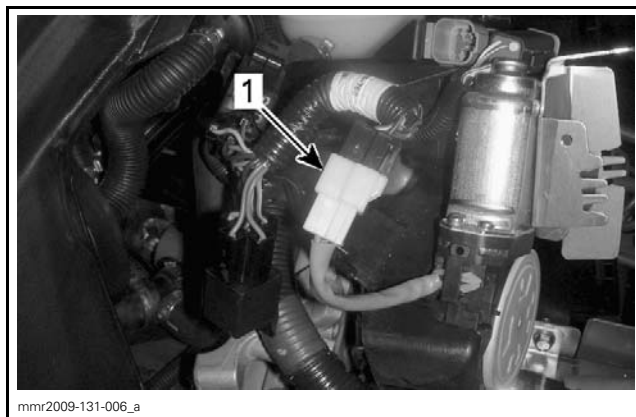
1. Support retaining screws

11. Remove nut from coupling shaft.



1. Coupling shaft nut

12. Disconnect motor connector.



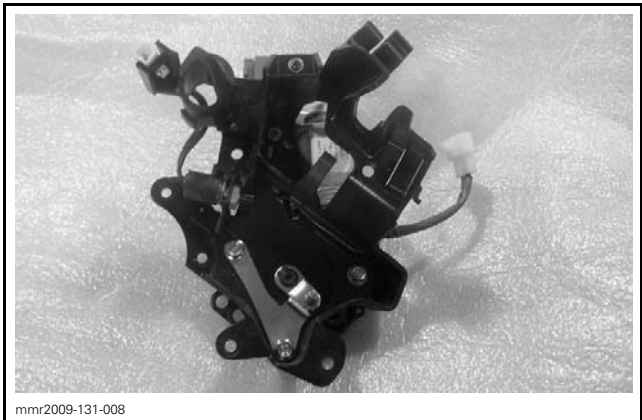
1. Motor connector

13. Disconnect RVPS switch connector.



1. RVPS switch connector

14. Remove electronic shift unit from vehicle.



ELECTRONIC SHIFT UNIT REMOVED

Electronic Shift Unit Inspection

Inspect motor connectors for corrosion, clean if necessary.

Inspect RVPS switch for correct spring tension when pressed and released, replace if necessary.

Inspect motor coupling shaft for straightness, replace if necessary.

Inspect stopping bracket of electronic shift unit for straightness, replace if necessary.

Electronic Shift Unit Installation

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

Lubricate shifter pivots and moving parts.

Tighten coupling shaft nut to specification.

COUPLING SHAFT NUT TORQUE	
7 N•m (62 lbf•in)	

Tighten support retaining screws to specification.

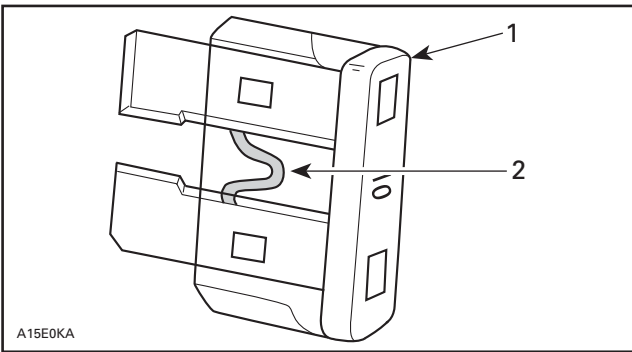
SUPPORT RETAINING SCREWS TORQUE	
10 N•m (89 lbf•in)	

ELECTRONIC REVERSE MOTOR

Fuse Inspection (Motor)

1. Check motor fuse (F8) located in the fuse box.
Replace if necessary.

MOTOR FUSE	
F8	20 A



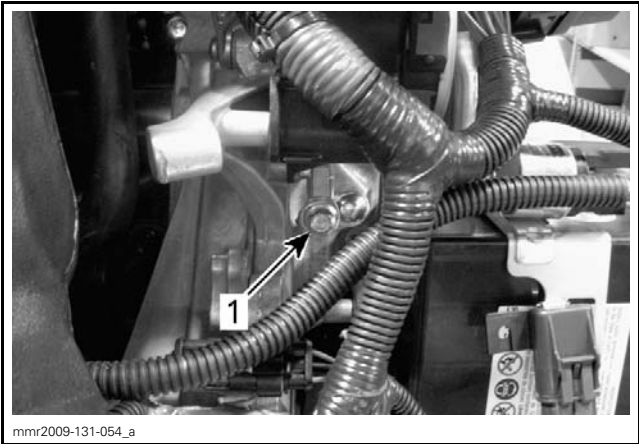
1. Fuse
2. Check if melted

NOTICE If fuse has burnt out, the cause of the malfunction should be determined and corrected before restarting.

Motor Operation Test (Electronic Reverse)

NOTICE Do not power motor directly with the battery for a long period. Apply voltage quickly to ensure that the motor will not overheat at the end of its stroke.

1. Remove lower retaining screw from shifter link rod.

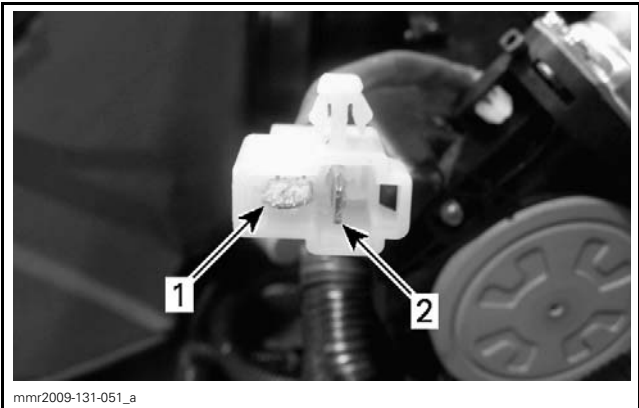


1. Link rod lower retaining screw
2. Disconnect motor connector.



1. Motor connector

3. Connect motor connector pin 2 (BLACK wire) to a 20 A suitable fuse jumper and then directly to the positive battery post.
4. Connect motor connector pin 1 (RED wire) directly to the negative battery post.



1. Pin 1 (red wire)
2. Pin 2 (black wire)

5. Verify if motor works properly and engages the reverse mechanism (link rod moves upwards).
6. Invert battery polarities and verify if motor works properly and disengages the reverse mechanism (link rod moves downwards).

Motor Input Voltage Test (Electronic Reverse)

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
2. Disconnect motor connector.



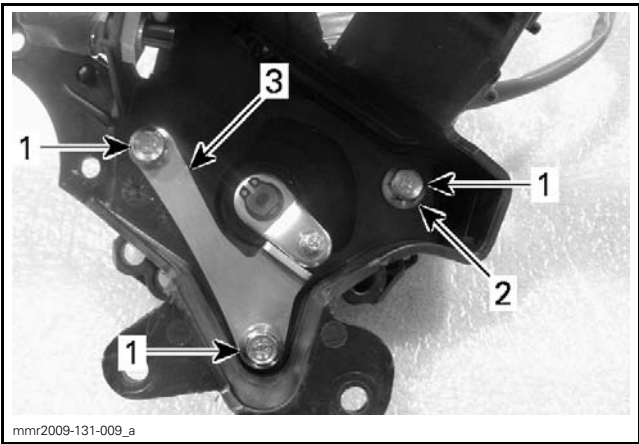
1. Motor connector

3. Start engine.
4. Press on START/REVERSE button while engine runs at idle.
5. Measure voltage between motor harness connector terminals as per the following table.

TEST PROBES	VOLTAGE
RD/YL	Battery voltage (± 12 Vdc)
BK/BU	

Motor Removal (Electronic Reverse)

1. Remove electronic shift unit. Refer to *ELECTRONIC SHIFT UNIT* in this subsection.
2. Remove motor retaining screws.



1. Motor retaining screws
2. Washer
3. Stopping bracket

3. Remove motor from unit.

Motor Installation (Electronic Reverse)

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

Subsection XX (CHAINCASE AND REVERSE)

Install washer onto retaining screw which is in contact with support.

Tighten motor retaining screws to specification.

MOTOR RETAINING SCREWS TORQUE
7 N•m (62 lbf•in)

Ensure that the stopping bracket is positioned with the stopping surface toward the motor coupling shaft.

NOTE: Do not install washers onto screws which are in contact with stopping bracket.

FORWARD AND REVERSE RELAYS (ELECTRONIC REVERSE)

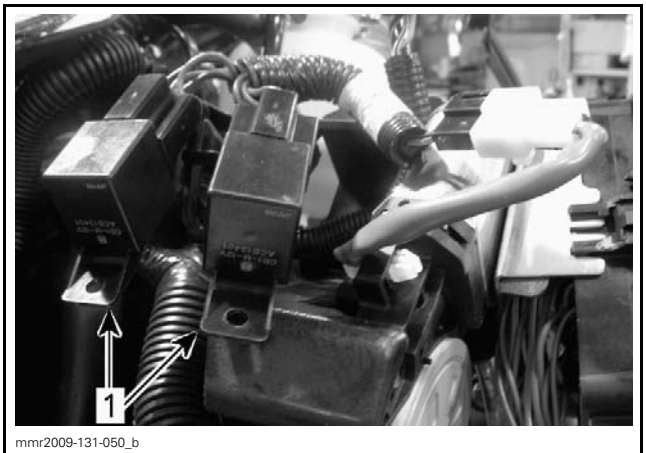
NOTE: Forward and reverse relays work together to control motor. Make sure to test both relays to ensure proper diagnostic.

Refer to the following table to identify forward and reverse relays.

RELAY PIN	FORWARD RELAY WIRE COLOR	REVERSE RELAY WIRE COLOR
85	BE/YL	BE/RD
30	RD/YL	BK/BU

Relay Continuity Test

1. Remove relay.

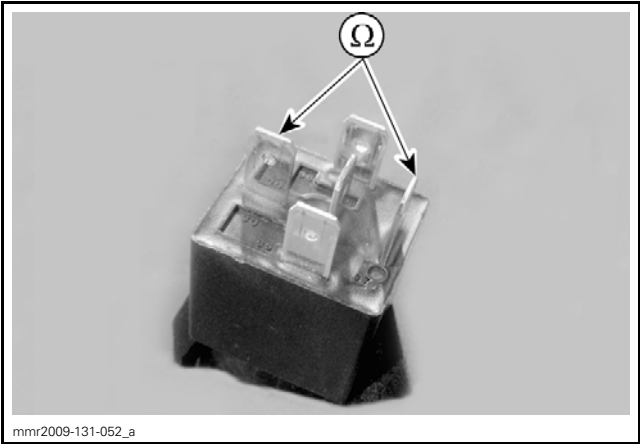


1. Forward and reverse relays

2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω .

3. Measure resistance as per the following table.

TEST PROBES	RESISTANCE
Terminal 30	Open (OL)
Terminal 87	



PROBE TERMINAL 30 AND TERMINAL 87

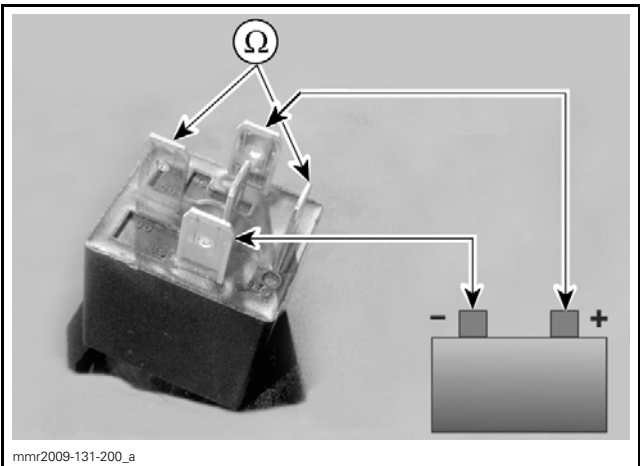
4. Measure resistance as per the following table.

TEST PROBES	RESISTANCE
Terminal 30	Close to 0 Ω
Terminal 87a	

5. Apply 12 volts on terminals 85 and 86.

6. Measure resistance again as per the following table.

TEST PROBES	RESISTANCE
Terminal 30	Close to 0 Ω
Terminal 87	



APPLY VOLTAGE AND PROBE TERMINAL 30 AND 87

7. Apply 12 volts on terminals 85 and 86.

8. Measure resistance again as per the following table.

TEST PROBES	RESISTANCE
Terminal 30	Open (OL)
Terminal 87a	

If results are not as per the above tables, replace relay.

Relay Input Voltage Test

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
2. Start engine.
3. Measure voltage as per the following tables.

FORWARD AND REVERSE RELAYS	
TEST PROBES	VOLTAGE
Pin 86 (RD)	Battery voltage (± 12 Vdc)
Battery negative (-) post	

FORWARD AND REVERSE RELAYS	
TEST PROBES	VOLTAGE
Pin 87 (RD)	Battery voltage (± 12 Vdc)
Battery negative (-) post	

If voltage is not as specified, repair open circuit in wiring. Refer to *WIRING DIAGRAM*.

Relay Ground Test (Motor Actuation)

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
2. Start engine.
3. Measure voltage as per the following table.

FORWARD AND REVERSE RELAYS	
TEST PROBES	VOLTAGE
Pin 87a (BK)	Battery voltage (± 12 Vdc)
Battery positive (+) post	

If voltage is not as specified, repair open circuit in wiring. Refer to *WIRING DIAGRAM*.

Relay Ground Signal Test

Forward Relay

NOTE: For this test, electronic reverse must be set in reverse position.

NOTE: The measured voltage will be transmitted during a short period of time.

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
2. Start engine and let it run at idle.

3. Press on START/REVERSE button while measuring voltage as per the following table.

FORWARD RELAY	
TEST PROBES	VOLTAGE
Pin 85 (BE/YL)	Battery voltage (± 12 Vdc)
Battery positive (+) post	

If voltage is not as specified, repair open circuit in wiring. Refer to *WIRING DIAGRAM*.

Reverse Relay

NOTE: For this test, electronic reverse must be set in forward position.

NOTE: The measured voltage will be transmitted during a short period of time.

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
2. Start engine and let it run at idle.
3. Press on START/REVERSE button while measuring voltage as per the following table.

REVERSE RELAY	
TEST PROBES	VOLTAGE
Pin 85 (BE/RD)	Battery voltage (± 12 Vdc)
Battery positive (+) post	

If voltage is not as specified, repair open circuit in wiring. Refer to *WIRING DIAGRAM*.

ECM Ground Continuity Test (Relay)

Forward Relay

1. Disconnect ECM connector A.
2. Install connector A on ECM ADAPTER TOOL (P/N 420 277 010).
3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω .
4. Measure resistance as per the following table.

FORWARD RELAY	
TEST PROBES	RESISTANCE
ECM pin A-13	Close to 0 Ω
Relay pin 85 (BE/YL)	

Reverse Relay

1. Disconnect ECM connector B.
2. Install connector B on ECM ADAPTER TOOL (P/N 420 277 010).
3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω .

Subsection XX (CHAINCASE AND REVERSE)

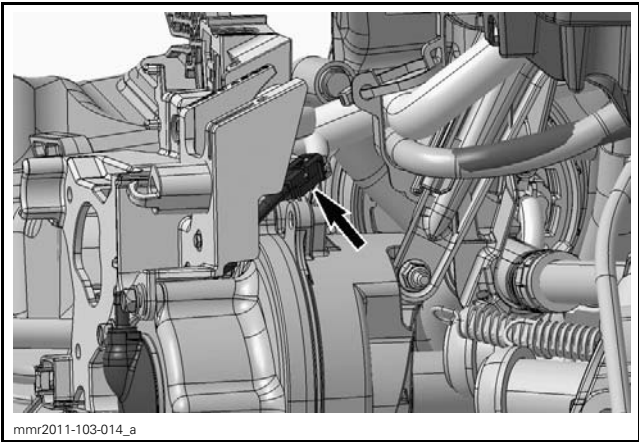
4. Measure resistance as per the following table.

REVERSE RELAY	
TEST PROBES	RESISTANCE
ECM pin B-33	Close to 0 Ω
Relay pin 85 (BE/RD)	

REVERSE POSITION SWITCH
(600 ACE)

RVPS Switch Continuity Test

1. Disconnect RVPS switch connector (behind support).



2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω.

3. Release RVPS switch.

4. Measure resistance as per the following table.

TEST PROBES	RESISTANCE
Pin 1	Open (OL)
Pin 2	

5. Press RVPS switch.

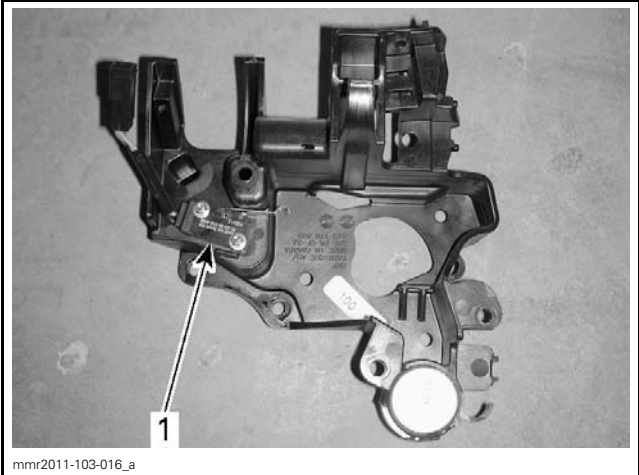
6. Measure resistance again as per the following table.

TEST PROBES	RESISTANCE
Pin 1	Close to 0 Ω
Pin 2	

If results are not as per the above tables, replace RVPS switch.

RVPS Switch Replacement

1. Remove support attached to chaincase. Refer to *SHIFT LEVER (600 ACE)* in this subsection.
2. Replace RVPS switch.



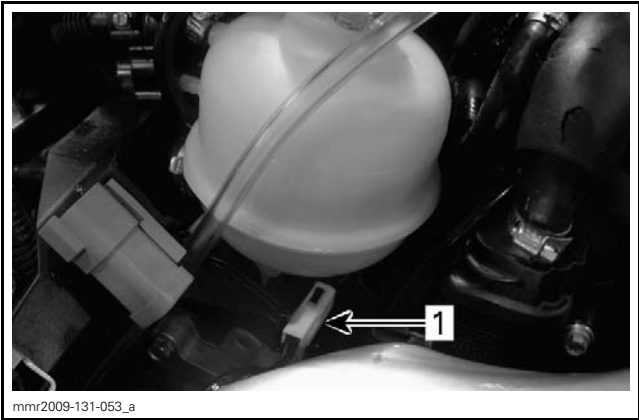
1. RVPS switch

3. Install support on chaincase. Refer to *SHIFT LEVER (600 ACE)* in this subsection.

REVERSE POSITION SWITCH
(1200 4-TEC)

RVPS Switch Continuity Test

1. Disconnect RVPS switch connector.



1. RVPS switch connector

2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω.

3. Release RVPS switch.

4. Measure resistance as per the following table.

TEST PROBES	RESISTANCE
Pin 1	Open (OL)
Pin 2	

5. Press RVPS switch.

6. Measure resistance again as per the following table.

TEST PROBES	RESISTANCE
Pin 1	Close to 0 Ω
Pin 2	

If results are not as per the above tables, replace RVPS switch.

RVPS Switch Removal

Mechanical Reverse

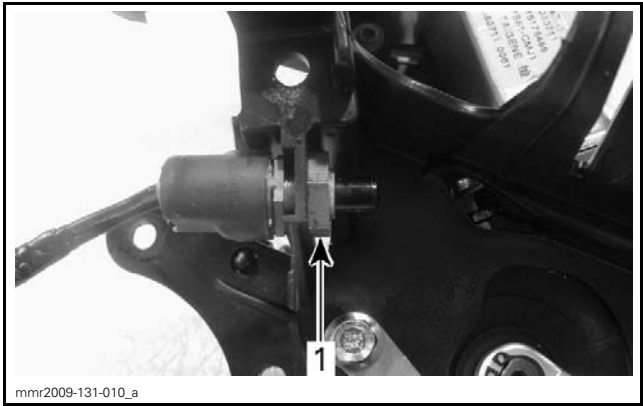
1. Remove support attached to chaincase. Refer to *SHIFT LEVER (1200 4-TEC WITH MECHANICAL REVERSE)* in this subsection.

Electronic Reverse

1. Remove electronic shift unit. Refer to *ELECTRONIC SHIFT UNIT* in this subsection.

Mechanical and Electronic Reverse

1. Remove RVPS switch lock nut.

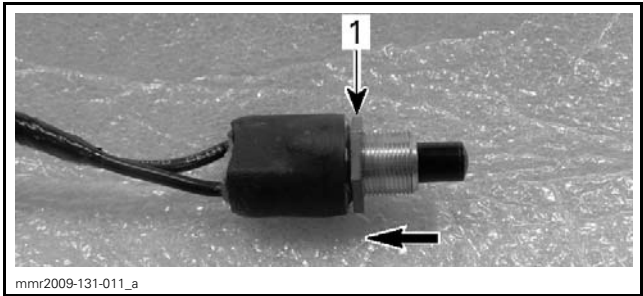


1. RVPS switch lock nut

2. Remove RVPS switch from unit.

RVPS Switch Installation

1. Remove lock nut from threaded shaft.
2. Screw adjusting nut completely onto threaded shaft.



1. Adjusting nut

3. Install RVPS switch into electronic shift unit hole.

4. Tighten RVPS switch lock nut to specification.

RVPS SWITCH LOCK NUT TORQUE
1.8 N•m (16 lbf•in)

CHAINCASE

Chaincase Cover Removal

Mechanical Reverse

1. Remove support attached to chaincase. See proper procedure in this subsection:
 - *SHIFT LEVER (600 ACE)* or
 - *SHIFT LEVER (1200 4-TEC WITH MECHANICAL REVERSE)*

Electronic Reverse

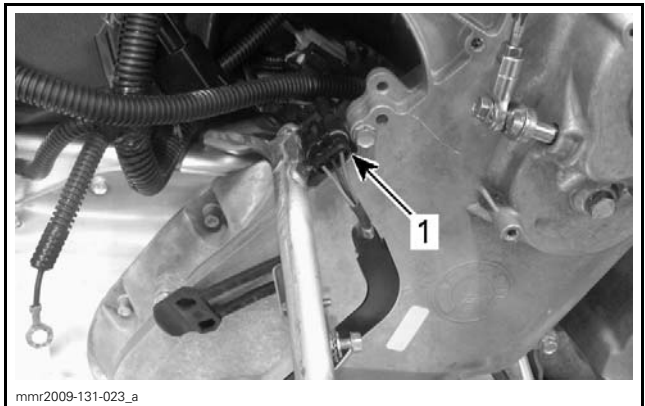
1. Remove electronic shift unit. Refer to *ELECTRONIC SHIFT UNIT* in this subsection.

Mechanical and Electronic Reverse

1. Apply parking brake.
2. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.
3. Remove battery. Refer to *CHARGING SYSTEM* subsection.
4. Remove battery rack.

NOTE: To properly remove the battery rack for a 600 ACE model, refer to *BATTERY RACK* in *FRAME* subsection.

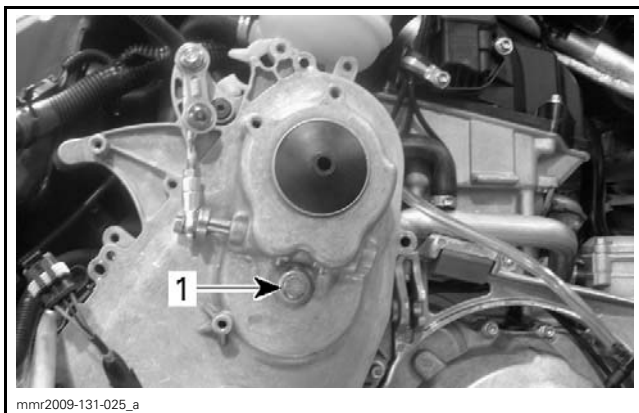
5. Disconnect speed sensor connector.



1. Speed sensor connector

6. Remove reverse gear retaining screw.

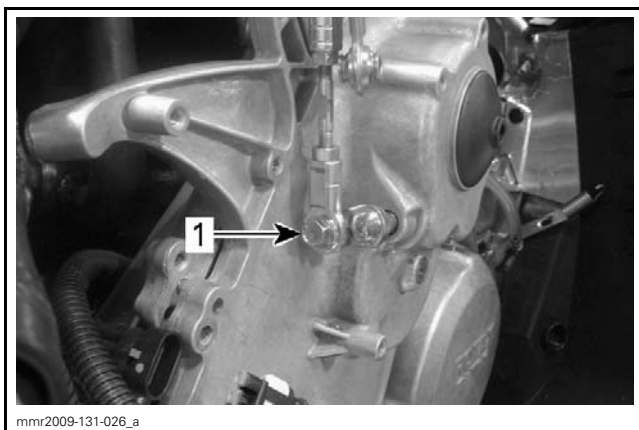
Subsection XX (CHAINCASE AND REVERSE)



TYPICAL

1. Reverse gear retaining screw

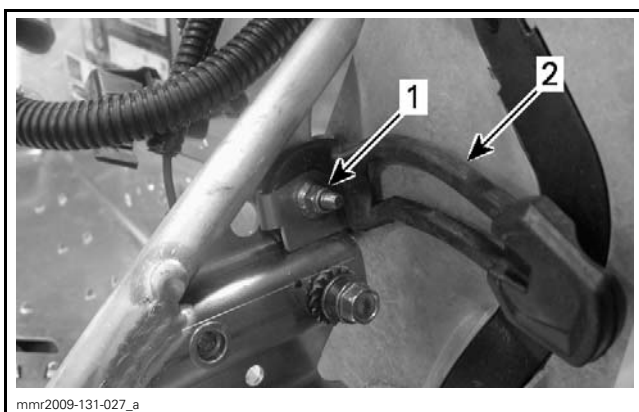
7. Remove lower retaining screw from shifter link rod.



TYPICAL

1. Shifter link rod lower retaining screw

8. On applicable models, remove RH side panel strap from frame.

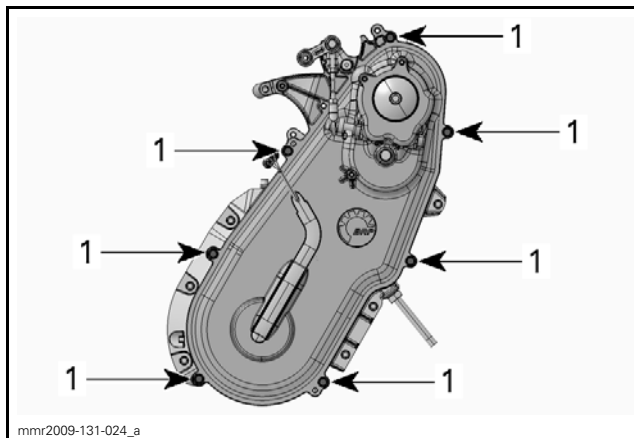


1200 4-TEC SHOWN

1. Retaining nut
2. Side panel strap

9. Place a container under vehicle in line with chaincase to catch chaincase oil.

10. Unscrew and remove chaincase cover screws.

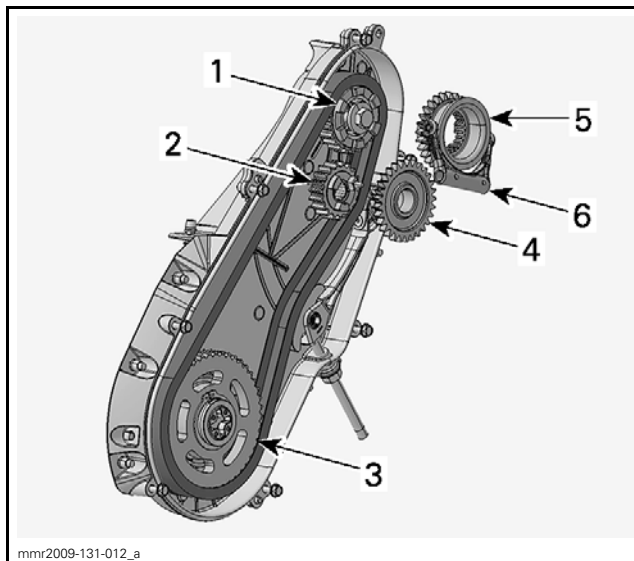


1. Chaincase cover screws

11. Pull the bottom of chaincase cover to drain oil.
12. Wait a moment then remove the cover completely.

Chaincase Disassembly

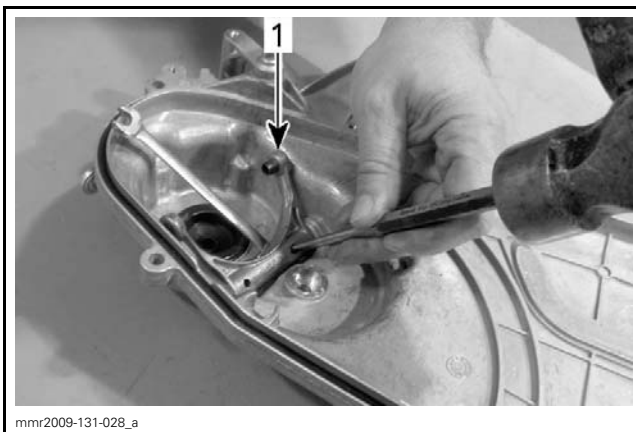
1. Apply parking brake.
2. Remove chaincase cover. Refer to *CHAINCASE COVER REMOVAL* in this subsection.



1. Upper sprocket
2. Reverse sprocket
3. Lower sprocket
4. Reverse gear
5. Sliding gear
6. Shift fork

Shift Fork (in Chaincase Cover)

1. Remove spring pins using a punch as shown.



1. Shift fork

2. Pull out shift rod from chaincase cover.
3. Remove shift fork.

Gears and Sprockets

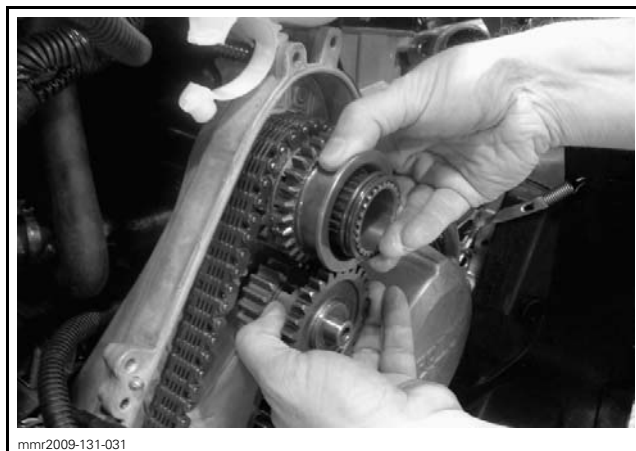
NOTE: Do not remove tension on drive chain for the moment.

1. Remove upper screw that hold sliding gear assembly.



UPPER SCREW REMOVAL

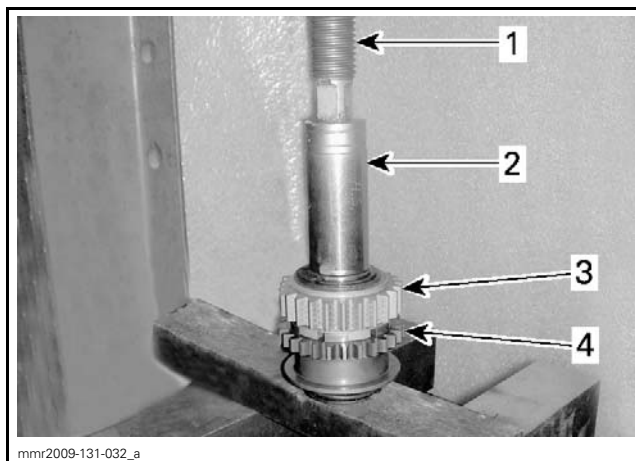
2. Remove chain tensioner from chaincase.
3. Remove sliding gear assembly, reverse sprocket and reverse gear simultaneously.



Sliding Gear Disassembly

NOTICE Do not use the press to compress the sliding gear while disassembling. Use the press **ONLY** as a guide to ensure that the spring tension will be released safely.

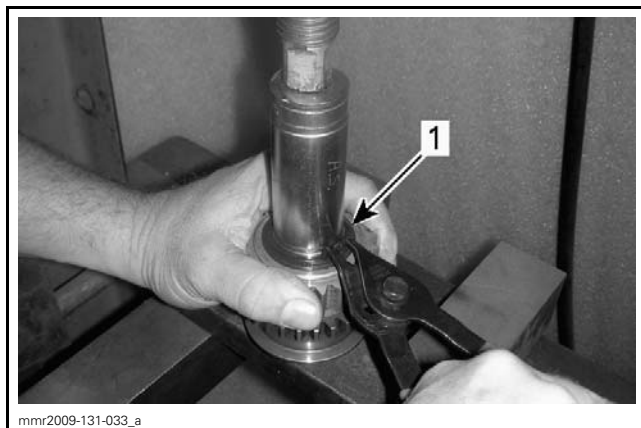
1. Install sliding gear assembly on a press.
2. Position a 25 mm (1 in) deep socket on the upper sprocket side.
3. Adjust press rod on the socket, do not apply pressure on the assembly.



1. Press rod
2. Deep socket (1 in)
3. Upper sprocket
4. Sliding gear

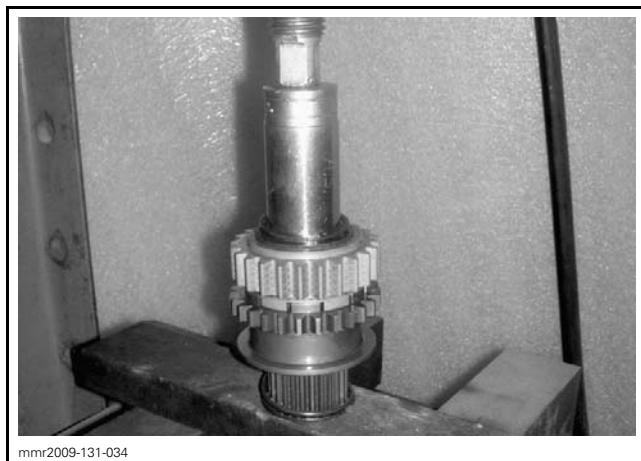
4. Firmly retain upper sprocket with one hand.
5. Remove circlip from coupling shaft.

Subsection XX (CHAINCASE AND REVERSE)



1. Circlip

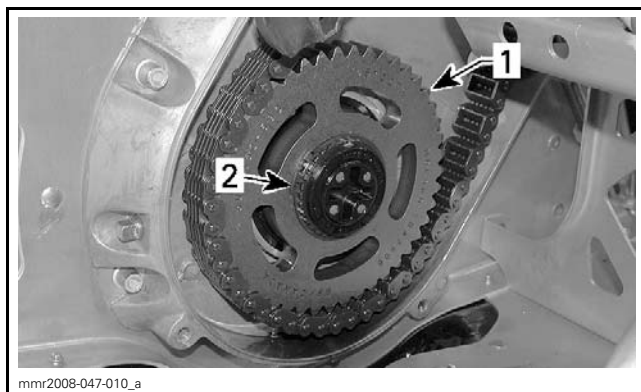
6. Carefully release spring tension.



7. Remove upper sprocket and sliding gear from press.

Chain and Lower Sprocket

1. Remove the lower sprocket circlip.

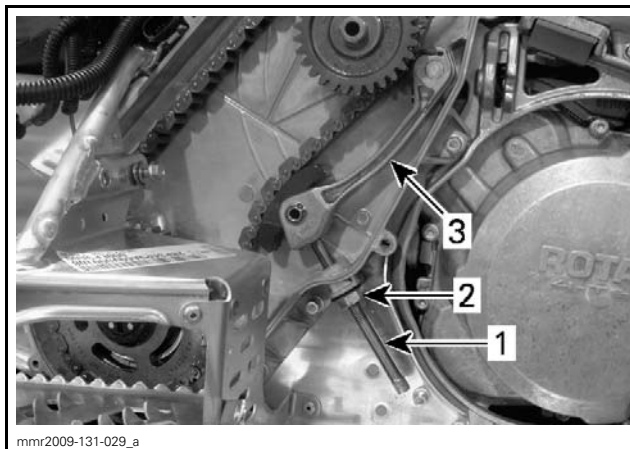


1. Lower sprocket
2. Circlip

2. Remove lower sprocket and drive chain simultaneously.

Chain Tensioner

1. Unscrew lock nut from tensioner adjustment screw.
2. Remove tensioner adjustment screw from tensioner arm.
3. Remove tensioner arm from chaincase.

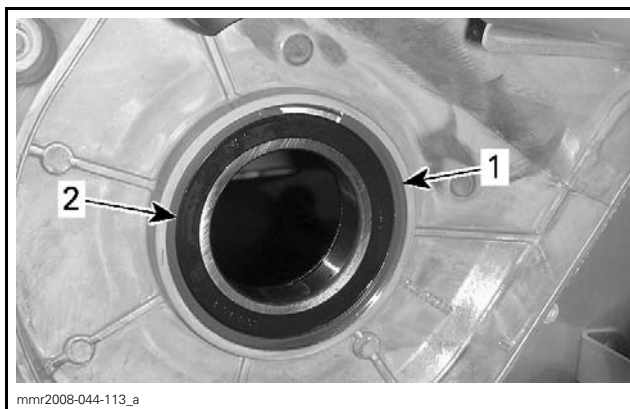


1. Lock nut
2. Tensioner adjustment screw
3. Tensioner arm

Chaincase Bearings

NOTE: This procedure can be applied either for the countershaft bearing or the drive shaft bearing.

1. Remove the countershaft or the drive axle, depending which bearing is replaced. Refer to appropriate subsection, *DRIVEN PULLEY AND COUNTERSHAFT* or *DRIVE AXLE*.
2. Remove the snap ring securing bearing into chaincase.

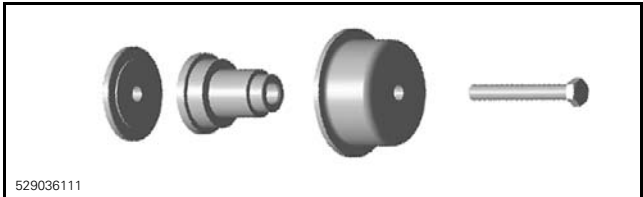


DRIVE AXLE BEARING SHOWN

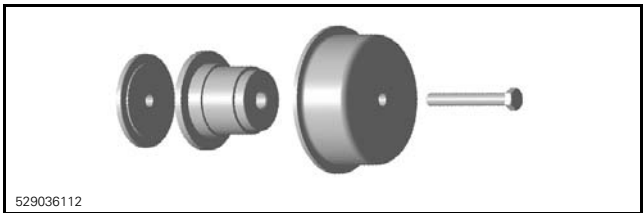
1. Snap ring
2. Bearing

3. Install the appropriate bearing extractor:

BEARING	TOOL
Countershaft	BEARING PULLER/PUSHER (P/N 529 036 111)
Drive axle	BEARING PULLER/PUSHER (P/N 529 036 112)

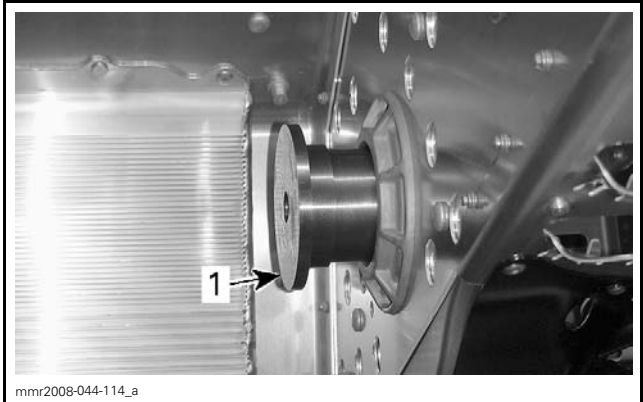


COUNTERSHAFT



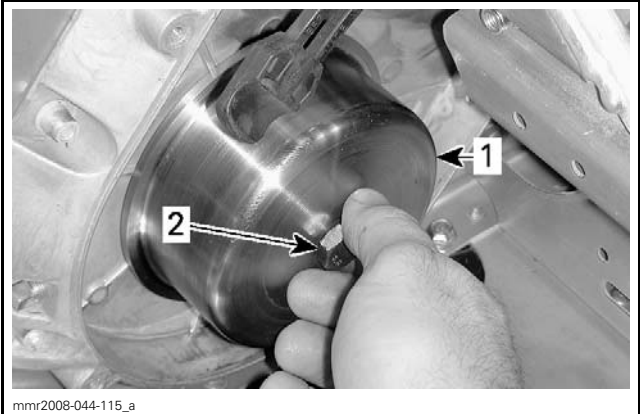
DRIVE AXLE

4. Install the extractor/installer tool behind the bearing.



1. Extractor/installer tool

5. Install the extractor cup over bearing.
6. Tighten the extractor/installer tool screw to remove the bearing.



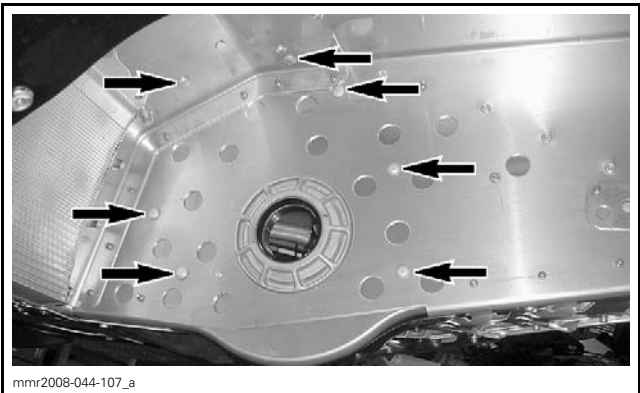
1. Extractor cup
2. Tighten to remove bearing

7. Using a seal puller such as the SNAP-ON SEAL PULLER (P/N YA105), remove and discard the oil seal.



Chaincase Removal

1. Disassemble chaincase. Refer to *CHAINCASE DISASSEMBLY* in this subsection.
2. Remove drive axle. Refer to *DRIVE AXLE* subsection.
3. Remove countershaft. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.
4. Using a small angle grinder, remove the following rivet heads.

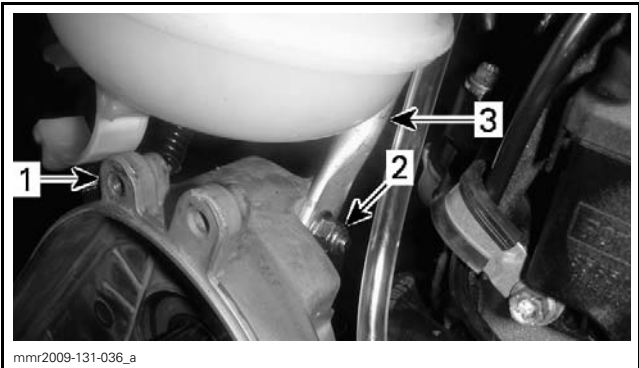


Subsection XX (CHAINCASE AND REVERSE)

5. Using a 1/4 in drill bit, remove rivet located on right side of chaincase.



6. Unscrew bolt behind the top of chaincase.



- 1. Chaincase
- 2. Retaining bolt
- 3. RH side frame member

7. Using 2 large pry bars inserted between chaincase and frame, pry chaincase out of vehicle.

Chaincase Inspection

Chaincase Cover

Inspect cover for cracks or other damages, replace if necessary.

Inspect cover front and rear stopper for crack, replace if necessary.

Inspect O-ring inside cover is brittle, hard or damaged, replace if necessary.

Shift Fork, Lever and Link Rod

Inspect shift fork for straightness, replace if necessary.

Inspect shift fork wear or other damages, replace if necessary.

Inspect shift lever for straightness and for rotation movement, replace if necessary.

Inspect link rod for straightness and other damages, replace if necessary.

Spring

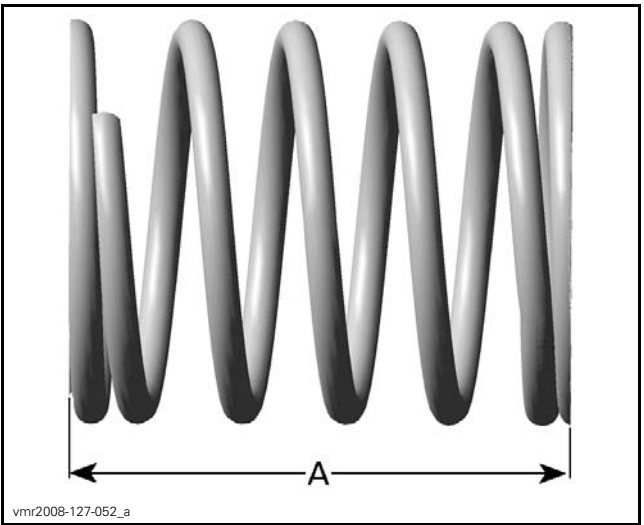
Measure spring free length, replace if out of specification.

All Models Except MX Z with 1200 4-TEC

SPRING FREE LENGTH	
SERVICE LIMIT	50 mm ± 1 mm (1.969 in ± .039 in)

MX Z with 1200 4-TEC

SPRING FREE LENGTH	
SERVICE LIMIT	48 mm ± 1 mm (1.89 in ± .039 in)



TYPICAL
A. Free length

Chain, Gears and Sprockets

Inspect the chain, gears and sprockets for:

- Wear
- Cracks
- Damages teeth
- Missing links.

If a problem is detected:

- Replace drive chain and sprockets as an assembly.
- Replace upper sprocket and sliding gear as an assembly.
- Replace reverse sprocket and reverse gear as an assembly.

Chain Tensioner

Inspect chain tensioner sliders for wear or other damages, replace if necessary.

Inspect threads of tensioner adjustment screw for damages or wear, replace if necessary.

Inspect rubber washer condition, replace if necessary.

Bearings

Inspect all bearings for smooth operation:

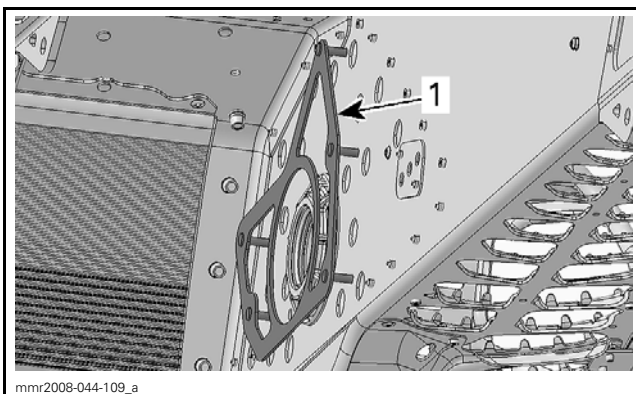
- If rough or excessive play is detected, replace bearing.

Chaincase Installation

To install the chaincase, have the following parts in hands:

PARTS TO INSTALL CHAINCASE		
QTY	FASTENERS	P/N
1	Mounting plate	518 325 816
3	M6 x 20 hexagonal flanged bolt	207 662 034
8	M6 elastic flanged nut	233 261 434

1. Install mounting plate.



UNDERNEATH FRAME

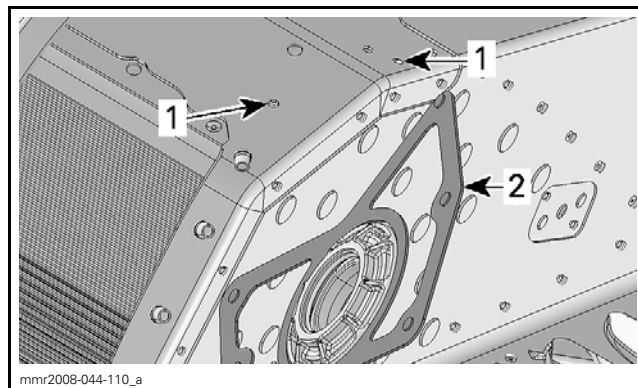
1. Mounting plate

2. Install chaincase.

3. Install 5 elastic flanged nuts to secure chaincase.

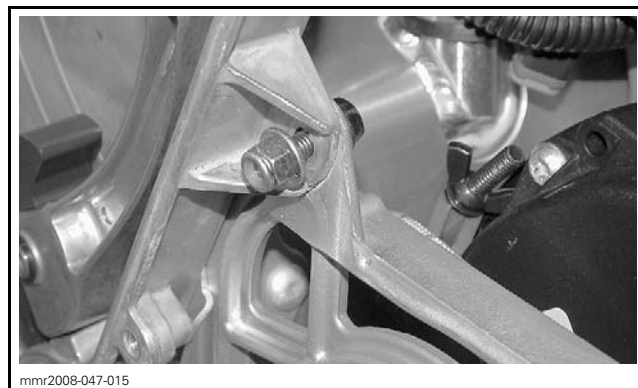
NOTE: Unless otherwise noted, bolts and nuts holding the chaincase must be installed loosely **FIRST**.

4. Install 2 flanged bolts and secure with elastic flanged nuts.



1. Install bolt here
2. Mounting plate

5. Install a flange bolt to secure chaincase to RH side member.



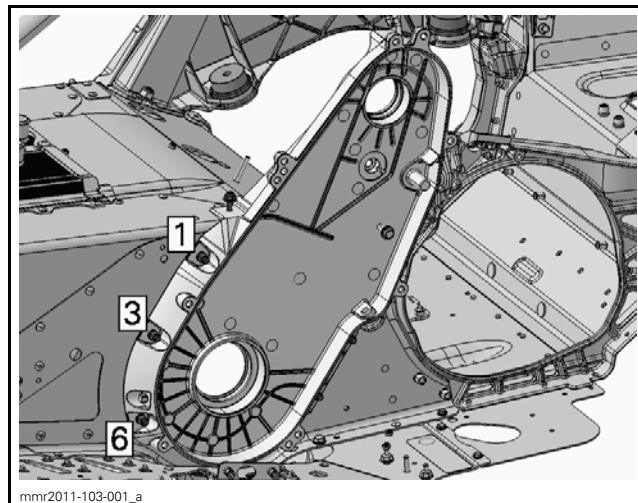
NUT LOCATED OUTSIDE

6. Install bolt behind the top of chaincase.

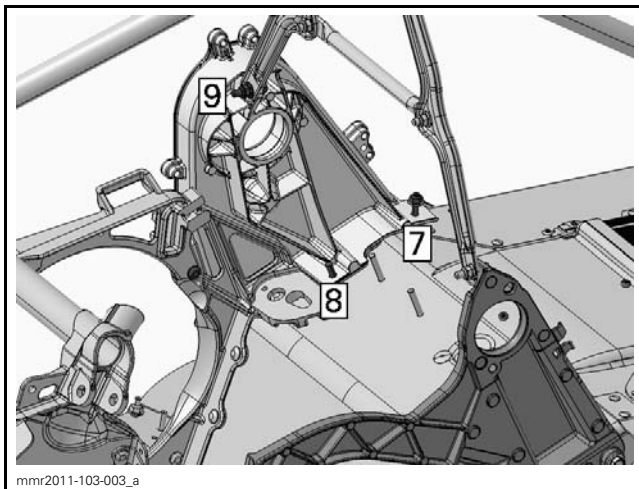
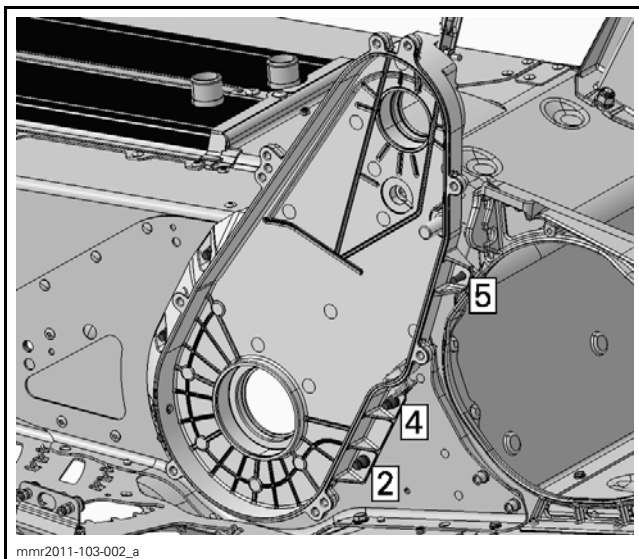
7. Tighten all nuts to specification as per the following sequence.

CHAINCASE RETAINING NUTS TORQUE

10 N•m (89 lbf•in)



Subsection XX (CHAINCASE AND REVERSE)



8. Install countershaft. Refer to *DRIVEN PULLEY AND COUNTERSHAFT* subsection.

9. Install drive axle. Refer to *DRIVE AXLE* subsection.

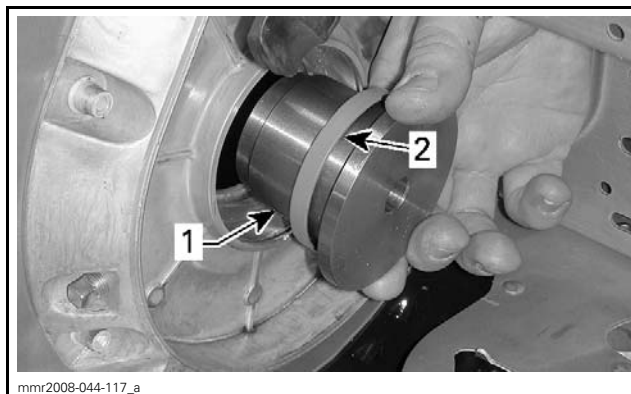
10. Assemble chaincase. Refer to *CHAINCASE ASSEMBLY* in this subsection.

Chaincase Assembly

Chaincase Bearings

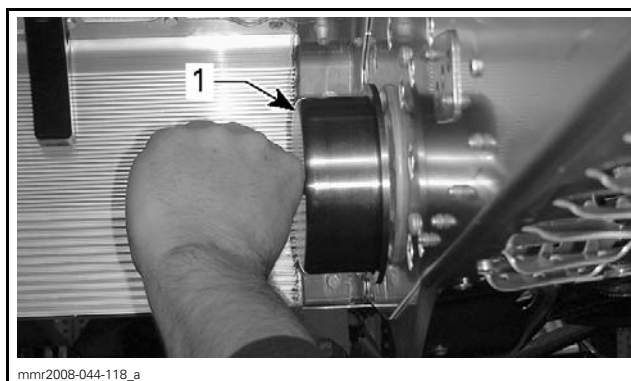
NOTE: This procedure can be applied either for the countershaft bearing or the drive shaft bearing.

1. Install the **NEW** oil seal on the extractor/installer tool. Position the lips toward bearing.



1. Extractor/installer tool
2. Oil seal lips on this side

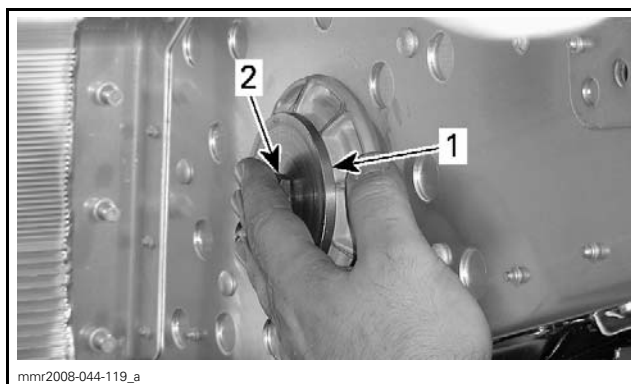
2. Install extractor cup inside frame.



1. Extractor cup

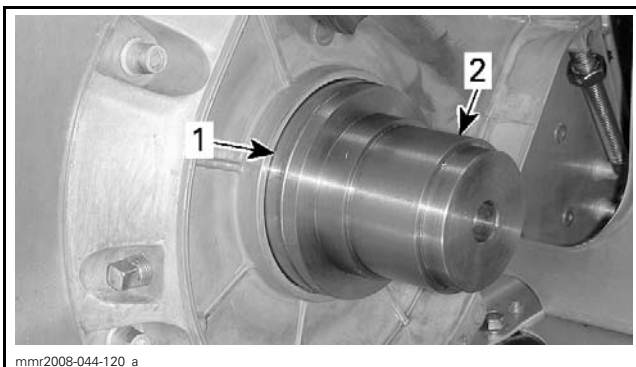
3. Tighten extractor/installer tool screw to install the oil seal.

4. Install large washer and extractor/installer tool screw inside frame.



1. Large washer
2. Extractor/installer tool screw

5. In chaincase, install **NEW** bearing and extractor/installer tool.



1. Bearing
2. Extractor/installer tool

6. Tighten extractor/installer tool screw to install the bearing.

7. Remove tool.

Chain Tensioner

The installation procedure is the reverse of removal.

Chain and Lower Sprocket

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

Install sprocket with its inscription outward.

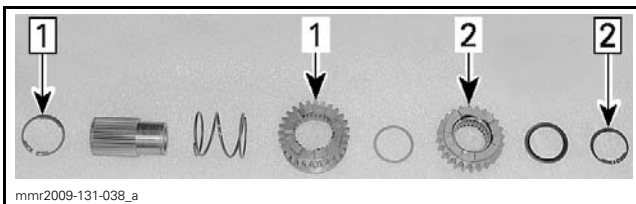
Sliding Gear

NOTICE Do not use the press to compress the sliding gear while assembling. Use the press **ONLY** as a guide to ensure that the spring tension will be applied safely.

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

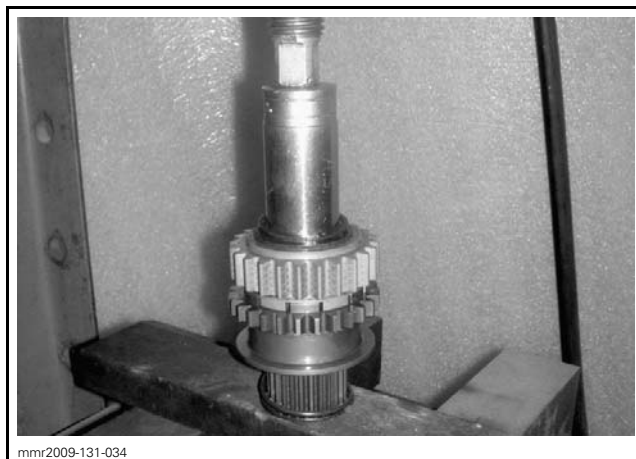
Install coupling shaft circlip on the splines side.

Install upper sprocket circlip on a press.



Step 1: Install splines circlip
Step 2: Install upper sprocket circlip on a press

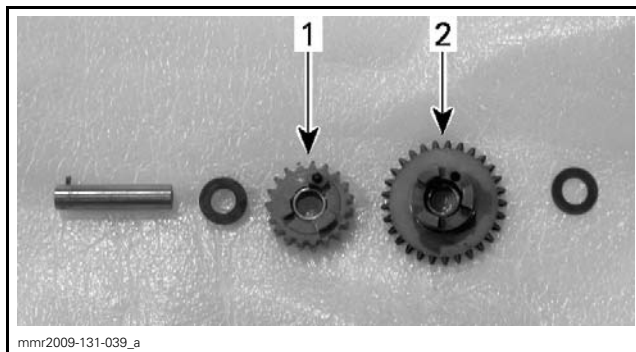
1. Sliding gear
2. Upper sprocket



Gears and Sprockets

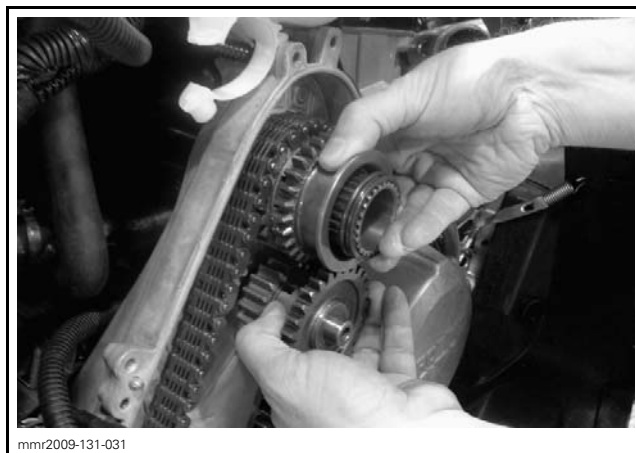
The installation procedure is the reverse of removal, however pay attention to the following.

Assemble reverse sprocket and reverse gear as per the following illustration.



1. Reverse sprocket
2. Reverse gear

Install sliding gear assembly, reverse sprocket and reverse gear simultaneously.



Install upper screw that hold sliding gear assembly. (do not tighten for the moment).

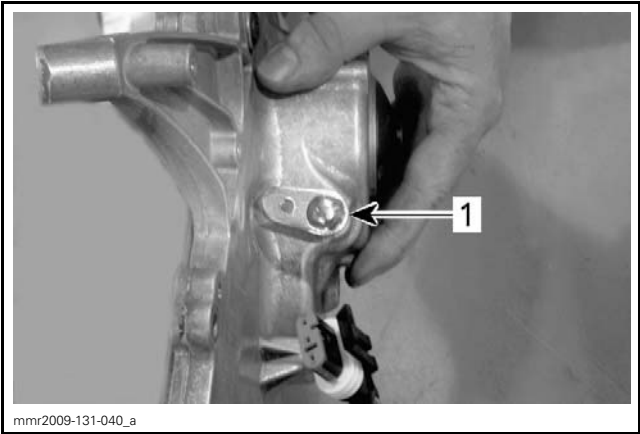
Adjust tension on the drive chain. Refer to *DRIVE CHAIN ADJUSTMENT* in this subsection.

Subsection XX (CHAINCASE AND REVERSE)

Apply parking brake.
Torque upper screw to 48 N•m (35 lbf•ft).

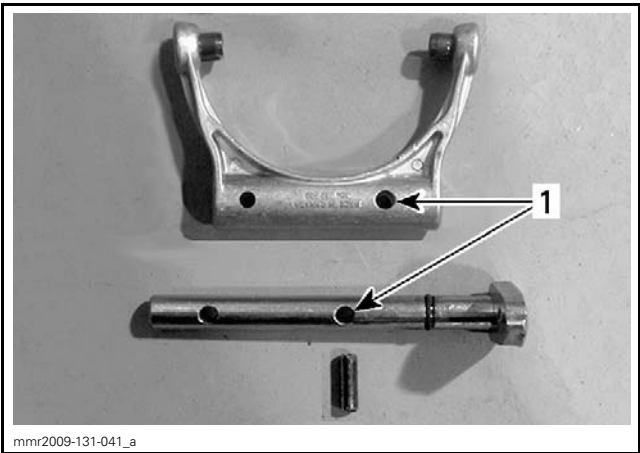
Shift Fork (in Chaincase Cover)

The installation procedure is the reverse of removal, however pay attention to the following.
Position shift fork lever toward the inside.



1. Shift fork lever

Install spring pins into both holes.



TYPICAL
1. Large hole

Ensure that seal is properly seated on the chaincase cover.

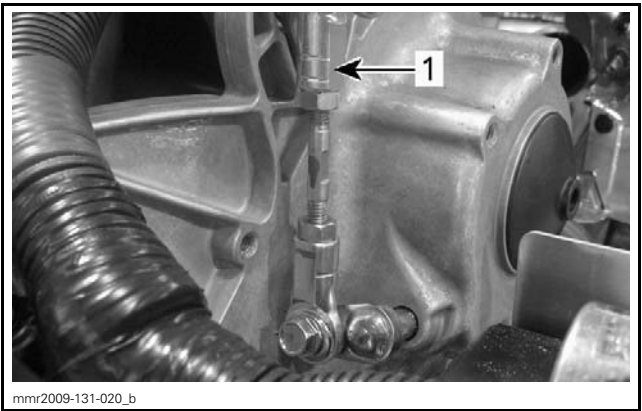
Chaincase Cover

Install chaincase cover. Refer to *CHAINCASE COVER* in this subsection.

Chaincase Cover Installation

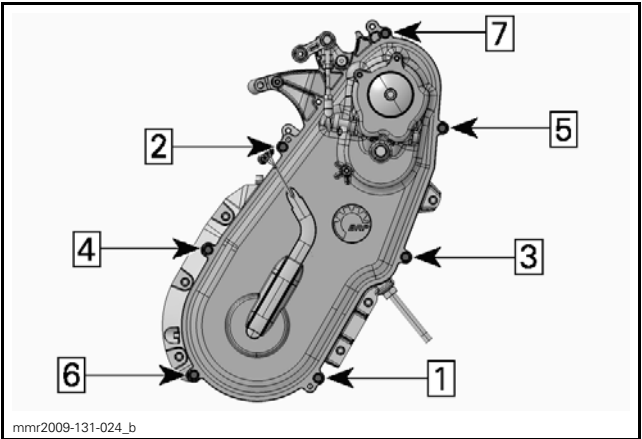
The installation procedure is the reverse of removal, however pay attention to the following.
Ensure cover O-ring is positioned correctly in its groove.

Ensure that link rod is positioned with the double reference marks upwards.



1. Double reference marks

Torque chaincase cover screws in accordance with the following sequence.



CHAINCASE COVER SCREWS TORQUE	
SAME CHAINCASE	10 N•m (89 lbf•in)
NEW CHAINCASE	15 N•m (133 lbf•in)

Torque reverse gear retaining screw to 15 N•m (133 lbf•in).

Install the shift lever (mechanical reverse) or electronic shift unit depending on the type of vehicle. See procedure in this subsection.

Adjust shift linkage, refer to *SHIFT LINKAGE (MECHANICAL AND ELECTRONIC REVERSE)* in this subsection.

Install battery and battery rack. Refer to *CHARGING SYSTEM* subsection.

Install muffler. Refer to *EXHAUST SYSTEM* subsection.

Refill chaincase. Refer to *CHAINCASE OIL* in *PERIODIC MAINTENANCE PROCEDURES* subsection.