

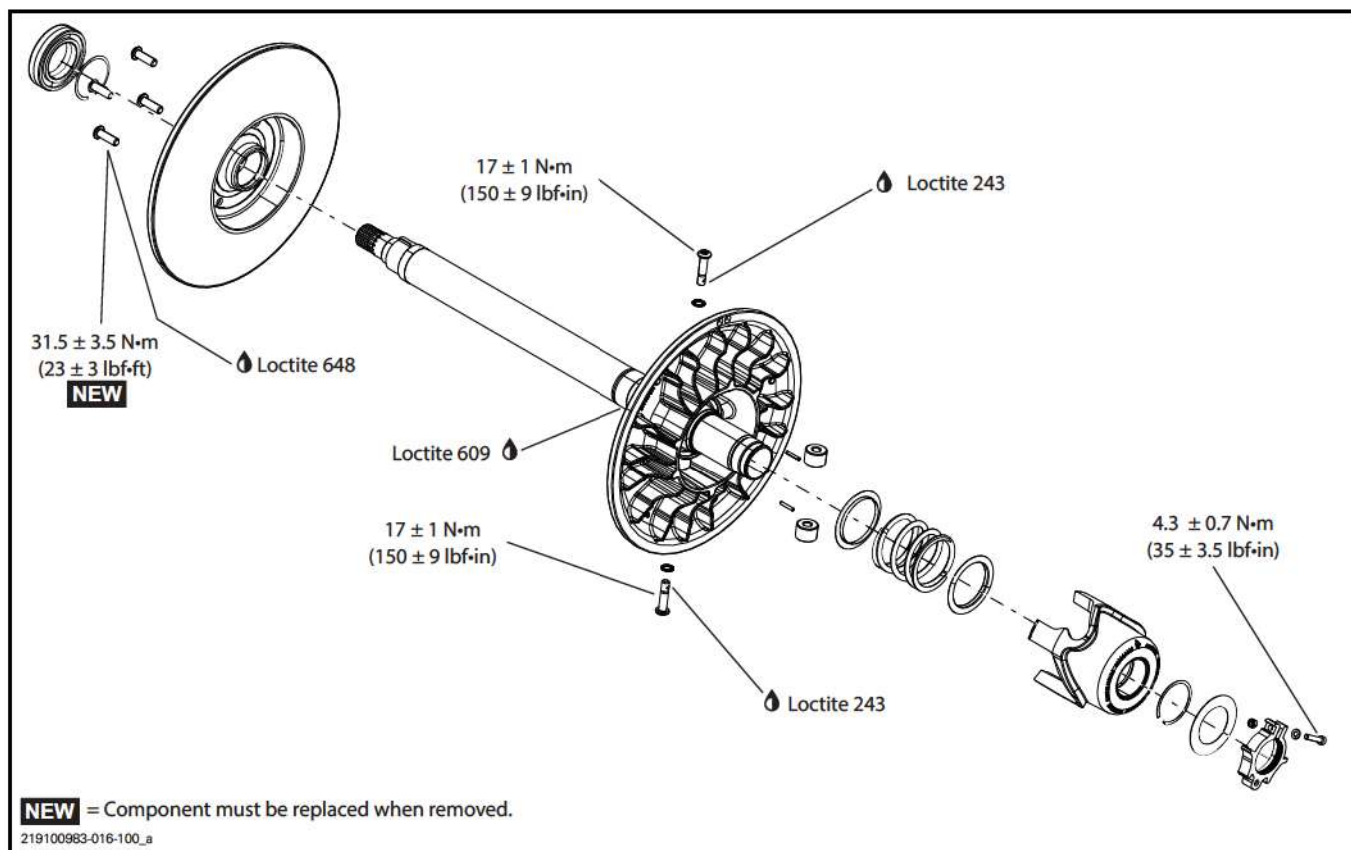
DRIVEN PULLEY AND COUNTERSHAFT

SERVICE TOOLS

Description	Part Number	Page
BEARING PULLER DRIVEN SUPPORT	529 036 485	225
COUNTERSHAFT ADAPTER	529 036 424	231
COUNTERSHAFT BEARING INSTALLER	529 036 066	232
COUNTERSHAFT BEARING REMOVER	529 036 065	231
COUNTERSHAFT SUPPORT	529 036 067	231
DRIVEN PULLEY SPRING COMPRESSOR	529 036 182	225
UPPER GEAR RETAINING TOOL	529 036 110	224

SERVICE PRODUCTS

Description	Part Number	Page
CLUTCH AND PULLEY FLANGE CLEANER PRO S1	779244	229, 232
LOCTITE 243 (BLUE)	293 800 060	229
LOCTITE 609	413 703 100	232
LOCTITE 648 (GREEN)	413 711 400	230
LOCTITE 7649 (F)	619 600 100	232
LOCTITE 7649 (PRIMER)	293 800 041	232
LOCTITE 767 (ANTI-SEIZE LUBRICANT)	293 800 070	231
PULLEY FLANGE CLEANER (F)	619 600 022	229, 232



Section 06 DRIVE SYSTEM AND BRAKE

Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)

GENERAL

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

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 (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced with new ones.

⚠ WARNING

Never start engine when the pulley guard is removed.

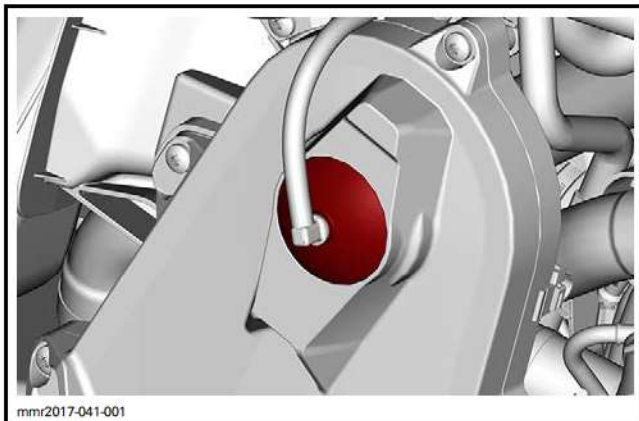
PROCEDURES

DRIVEN PULLEY

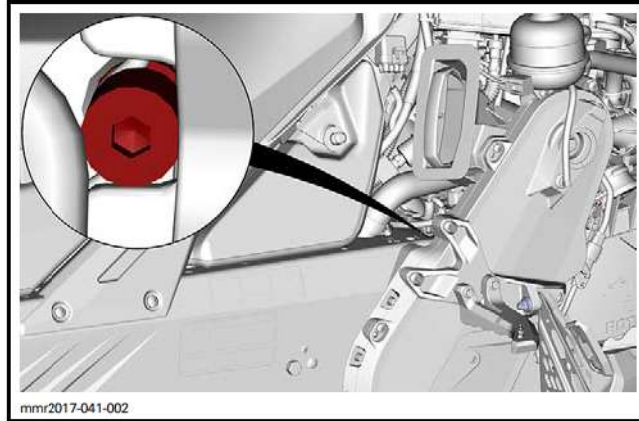
Removing the Driven Pulley

NOTE: The driven pulley is removed with the countershaft.

1. Remove the muffler. Refer to *EXHAUST SYSTEM* subsection.
2. Remove the filling plug on the chaincase cover.

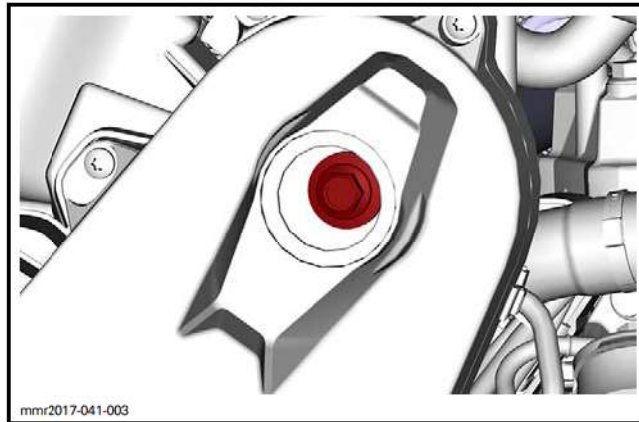


3. Release drive chain tension by unscrewing tensioner adjustment screw.



4. Remove the upper gear screw and the conical spring washer.

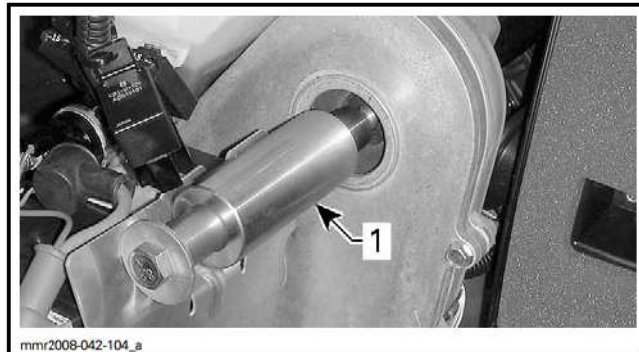
NOTE: Slightly tilt the bolt to avoid dropping washer inside chaincase.



5. Install the gear retaining tool on countershaft end.

REQUIRED TOOL

UPPER GEAR
RETAINING TOOL
(P/N 529 036 110)



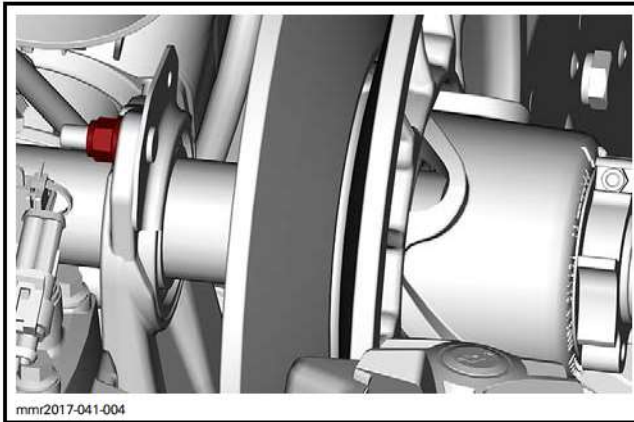
TYPICAL

1. Upper gear retaining tool


6. Remove the drive belt. Refer to *DRIVE BELT* subsection.

Section 06 DRIVE SYSTEM AND BRAKE
Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)

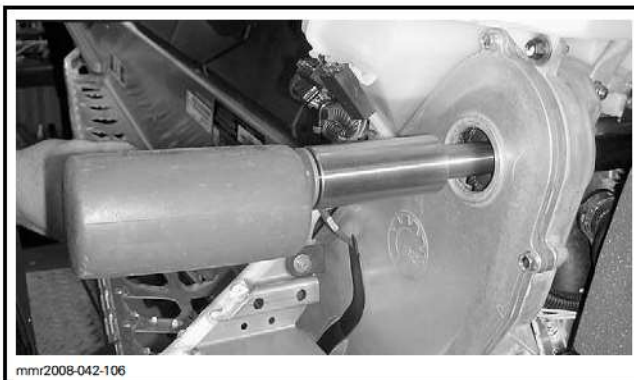
7. Behind driven pulley, remove nut securing the countershaft bearing flange.



8. Pull out bearing flange.
 9. Use the bearing puller to extract the bearing from the support.

REQUIRED TOOL	
BEARING PULLER DRIVEN SUPPORT (P/N 529 036 485)	

10. Pull the driven pulley to disengage countershaft and upper gear.
NOTE: If necessary, tap the upper gear retaining tool with a plastic hammer.



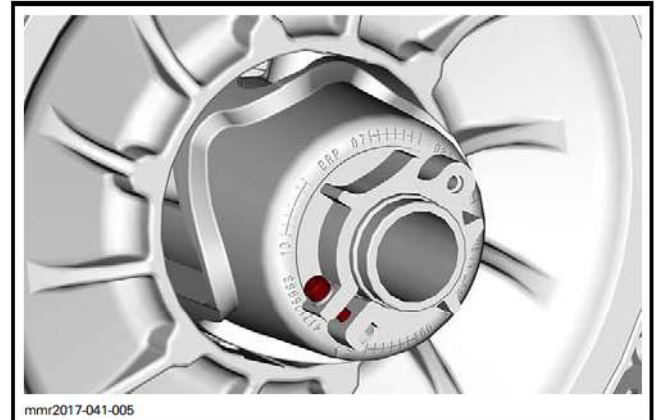
TYPICAL

11. Unscrew countershaft from the upper gear retaining tool. **Do not remove tool.**
NOTE: While countershaft is removed from vehicle, the upper gear retaining tool maintains the drive chain and the upper gear in position inside chaincase.

Driven Pulley Disassembly

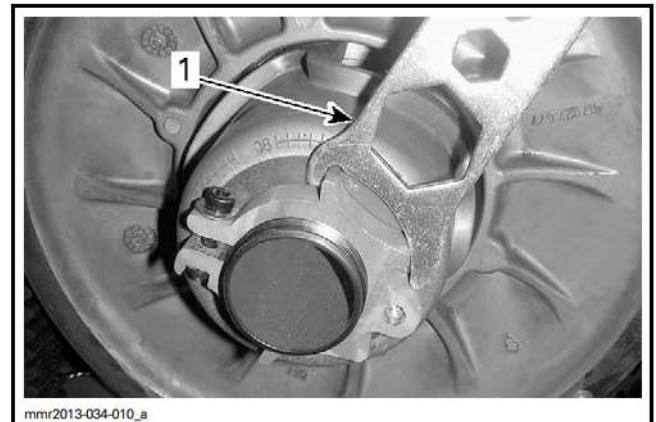
Removing Cam and Spring

1. Loosen the clamping screw.




2. Unscrew the adjuster hub clockwise using the suspension adjustment tool provided in the vehicle tool kit.

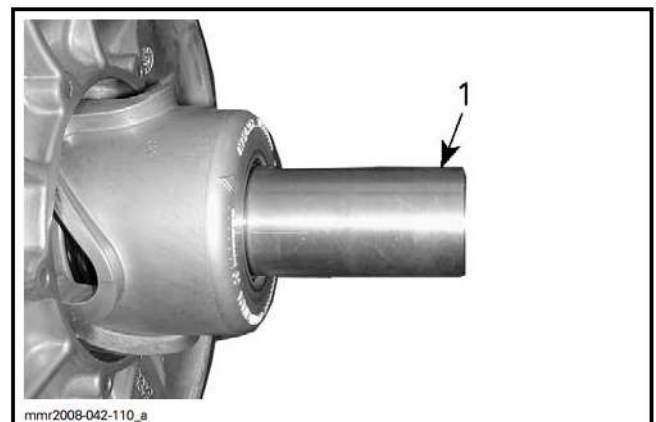
NOTE: The adjuster hub has LH treads.



1. *Suspension adjustment tool shown*

REQUIRED TOOL	
DRIVEN PULLEY SPRING COMPRESSOR (P/N 529 036 182)	

3. Install the threaded adapter of the spring compressor on the countershaft.

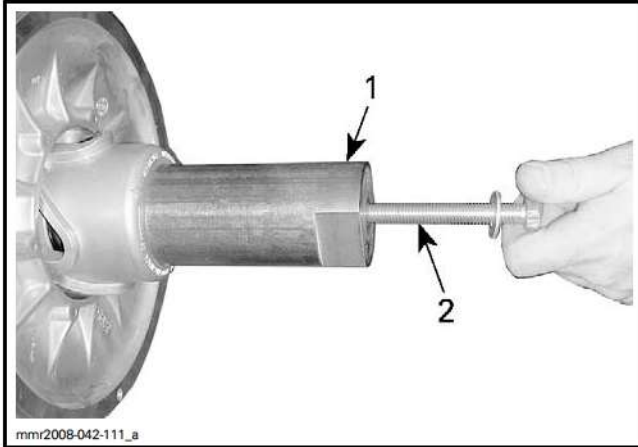


1. *Threaded adapter*

Section 06 DRIVE SYSTEM AND BRAKE

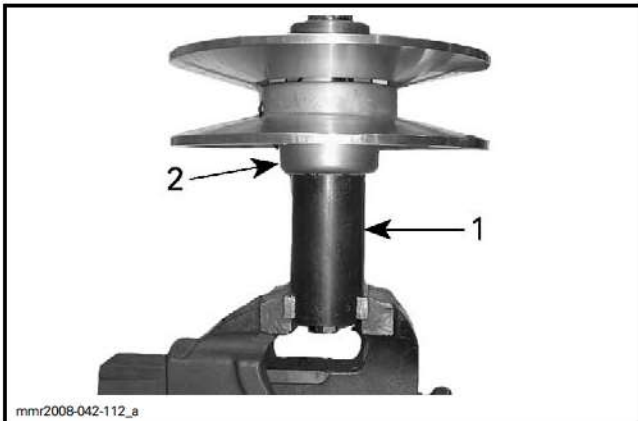
Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)

4. Install the external sleeve over the threaded adapter and secure sleeve with the tool screw.



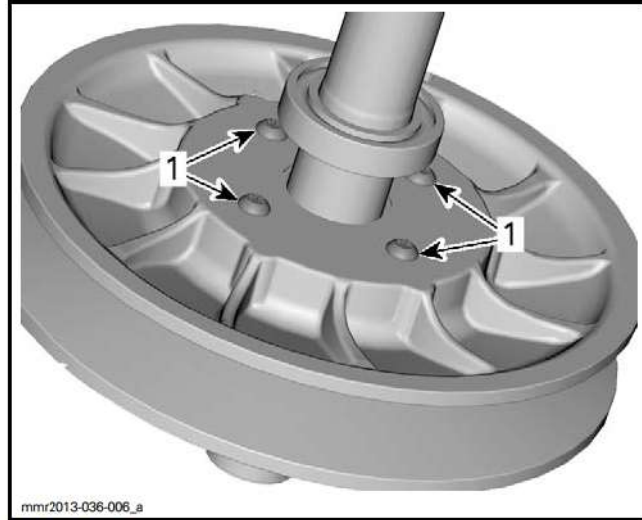
1. External sleeve
2. Driven pulley spring compressor screw

5. Tighten the tool screw to compress the cam.
6. Install the tool in a vice.



1. Driven pulley spring compressor
2. Driven pulley

7. Using a heat gun, heat cam screws to break the thread locker.

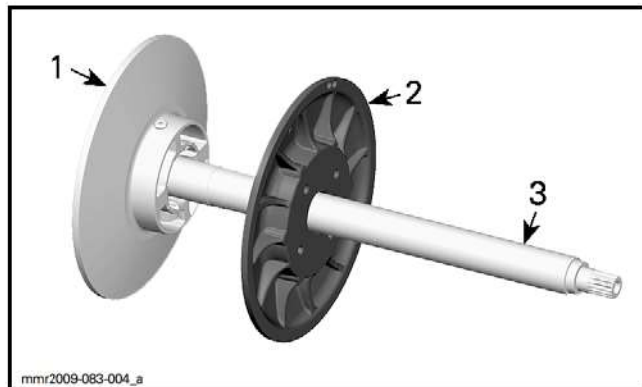


1. Heat cam screws

8. Remove and discard cam screws.
9. Unscrew the tool screw completely.
10. Remove cam, spring stoppers and spring.

Removing the Sliding Sheave

1. Remove the cam and spring. Refer to procedure in this subsection.
2. Remove the countershaft bearing. Refer to procedure in this subsection.
3. Remove sliding sheave.



1. Fixed sheave
2. Sliding sheave
3. Countershaft

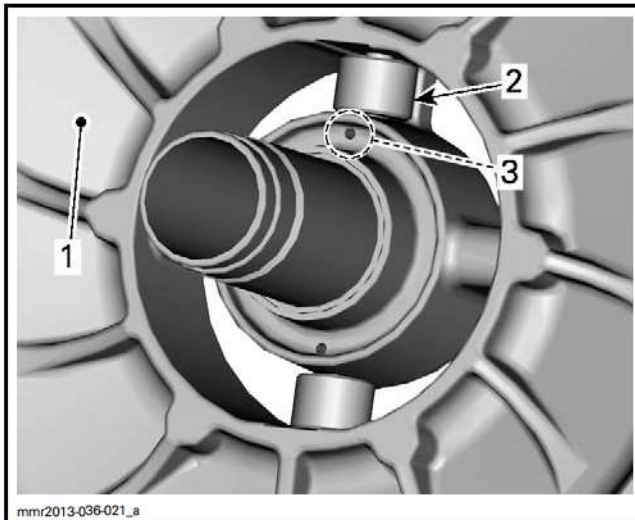
Removing the Fixed Sheave

The fixed sheave and countershaft are sold as an assembly. They are not available separately.

Removing the Driven Pulley Rollers

1. Move sliding and fixed sheaves apart.
2. Remove spring pins used to lock pivot screws.
 - 2.1 Use tap wrench to start removing spring pin.

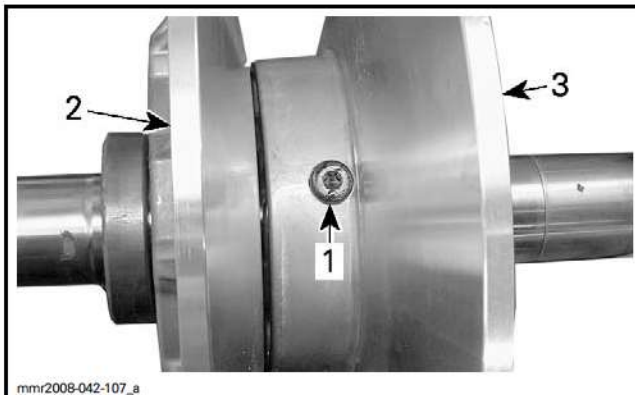
2.2 Once spring pin is accessible to pliers, pull pin out using pliers.



- 1. Fixed sheave outer face
- 2. Roller
- 3. Spring pin location

3. Identify pivot screws location before removal.
4. Remove pivot screw and ribbed lock washer; keep both for reuse.

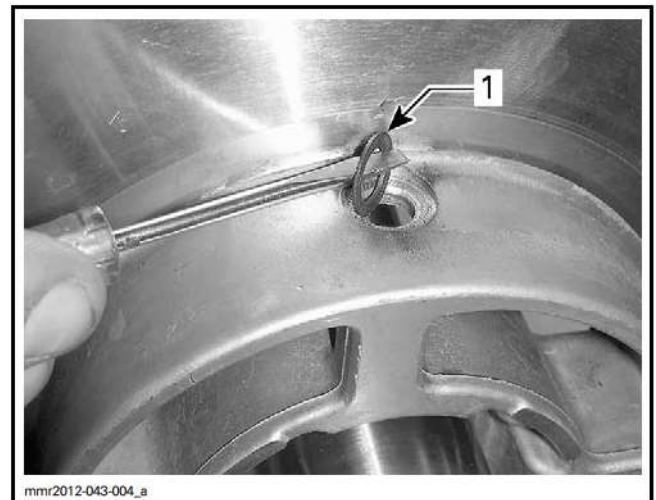
NOTICE Make sure not to damage or lose pivot screws. If screws need to be replaced, replace fixed sheave assembly.



- 1. Pivot screw
- 2. Sliding sheave
- 3. Fixed sheave



mmr2012-043-003
PIVOT SCREW REMOVAL



mmr2012-043-004_a
1. Ribbed lock washer

5. Remove roller.
6. Proceed with removal of other roller.

IMPORTANT: For proper fit, each pivot screw must be reinstalled where originally mounted in the fixed sheave.

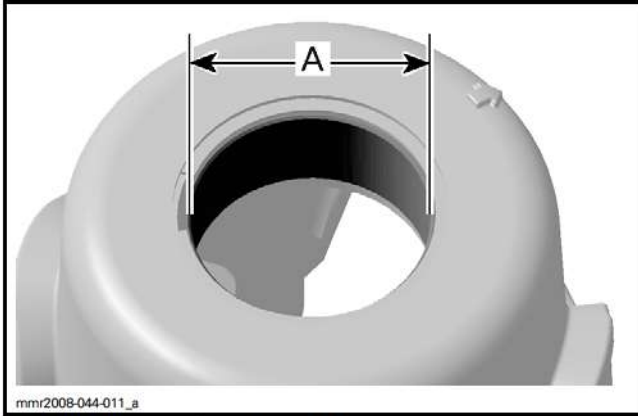
Inspecting the Driven Pulley

Inspecting Cam and Spring

1. Verify contact surfaces of cam for visible damages. Ensure circlip properly locks the inner bushing. Replace part if necessary.
2. Using a dial bore gauge, measure the inner diameter of cam bushing. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

Section 06 DRIVE SYSTEM AND BRAKE

Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)



mnr2008-044-011_a

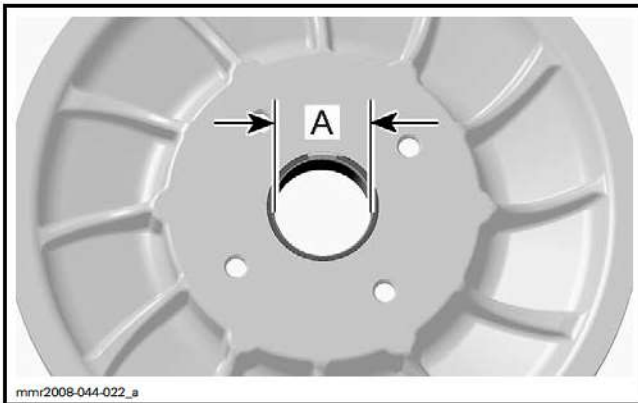
A. Inner diameter of cam bushing

CAM BUSHING	SERVICE LIMIT
Inner diameter	41.5 mm (1.634 in)

3. Replace the cam if the inner diameter of bushing is out of specification.

Inspecting the Sliding Sheave

1. Inspect pulley sheave for marks or scratches.
2. Ensure circlip properly locks the inner bushing. Replace part if necessary.
3. Using a dial bore gauge, measure the inner diameter of sliding sheave bushing. Measuring point must be at least 5 mm (1/4 in) from bushing edge.



mnr2008-044-022_a

A. Inner diameter of sliding sheave bushing

SLIDING SHEAVE BUSHING	SERVICE LIMIT
Inner diameter	41.5 mm (1.634 in)

4. Replace the sliding sheave if the inner diameter of bushing is out of specification.

Inspecting the Fixed Sheave

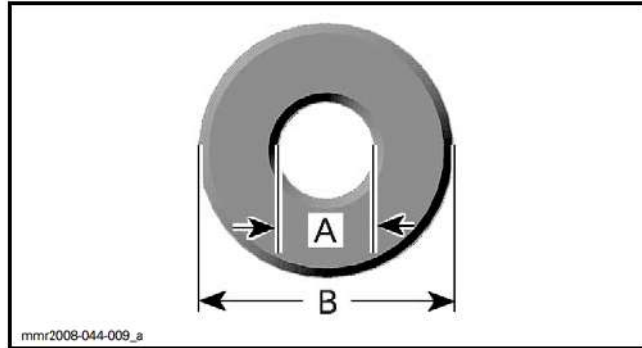
Replace fixed sheave and countershaft if one of the following problem is detected:

- Marks or scratches on pulley sheave

- Bent, twisted or otherwise damaged countershaft
- Defective splines and threads at the end of countershaft.

Inspecting the Driven Pulley Roller

1. Check the rollers for flat spots, cracks or other visible damages. Replace if necessary (as a set).
2. Measure inner and outer diameter of rollers.

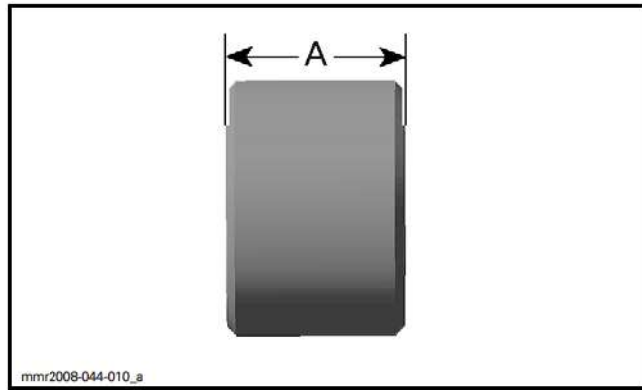


mnr2008-044-009_a

A. Inner diameter
B. Outer diameter

DRIVEN PULLEY ROLLER	SERVICE LIMIT
Inner diameter	8.5 mm (.335 in)
Outer diameter	21.5 mm (.846 in)

3. Measure the roller thickness.



mnr2008-044-010_a

A. Thickness of roller

DRIVEN PULLEY ROLLER	SERVICE LIMIT
Thickness	14.75 mm (.581 in)

4. If a roller is out of specifications, replace both rollers at the same time.

Cleaning the Driven Pulley

Use the a clean rag to clean pulley sheaves.

Section 06 DRIVE SYSTEM AND BRAKE
Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)

SERVICE PRODUCT	
Scandinavia	PULLEY FLANGE CLEANER (F) (P/N 619 600 022)
Other Countries	CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)

Cleaning Cam and Spring

During break-in period, teflon from bushing moves to cam or countershaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or countershaft. Do not remove this deposit.

When a dust deposit has to be removed from the cam or the countershaft, use dry cloth to avoid removing transferred teflon.

Driven Pulley Assembly

Installing the Driven Pulley Roller

NOTE: Exceptionally, do NOT clean threaded hole to avoid changing the screw position when torqued.

1. Using a hand wire brush, clean pivot screw threads.

IMPORTANT: Do not use a thread die to clean pivot screw of threadlocker as this may alter the screw threads.

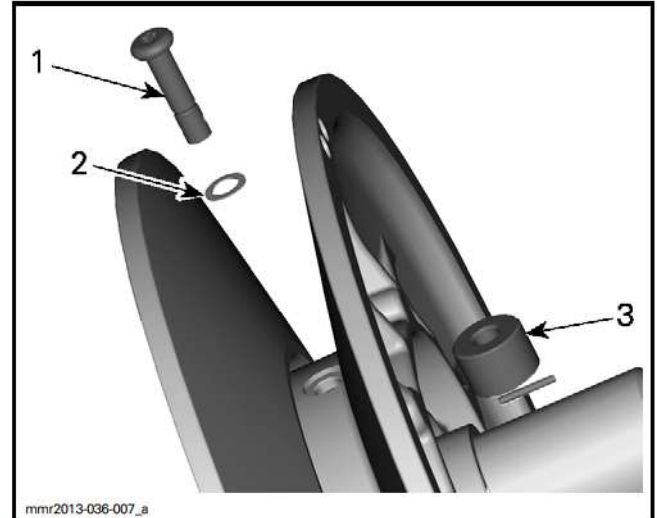
NOTE: Pivot screw and ribbed lock washer must be reused if in good condition. If damaged, replace fixed sheave assembly.

2. Apply the following threadlocker to the pivot screw threads.

SERVICE PRODUCT	
Pivot screw threads	LOCTITE 243 (BLUE) (P/N 293 800 060)

3. Insert roller in fixed sheave, thread in pivot screw with ribbed lock washer.

NOTE: The ribbed locked washer must be installed with the concave side towards the fixed sheave.



1. Pivot screw
2. Ribbed lock washer (concave side towards fixed sheave)
3. Roller

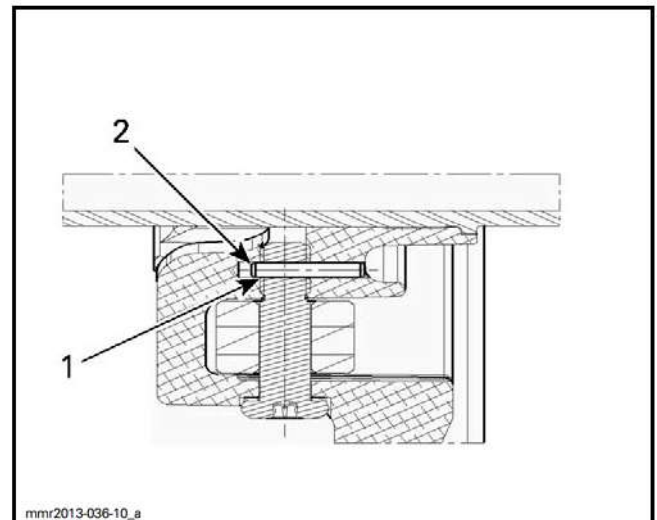
IMPORTANT: For proper fit, each pivot screw must be reinstalled where originally mounted in the fixed sheave.

4. Torque pivot screw as specified.

TIGHTENING TORQUE	
Pivot screws	17 N•m ± 1 N•m (150 lbf•in ± 9 lbf•in)

NOTE: Spring pin hole in the fixed sheave and pivot screw must perfectly line up when torque is applied.

NOTICE If not properly aligned, spring pin will not insert in pivot screw hole and spring pin threads in fixed sheave will be damaged.



1. Hole in pivot screw
2. Spring pin

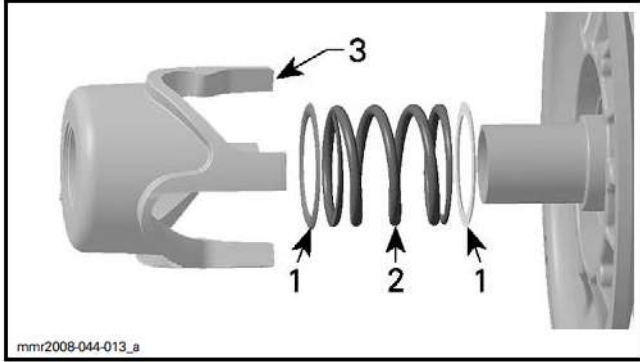
5. Install spring pin.

Section 06 DRIVE SYSTEM AND BRAKE

Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)

Installing Cam and Spring

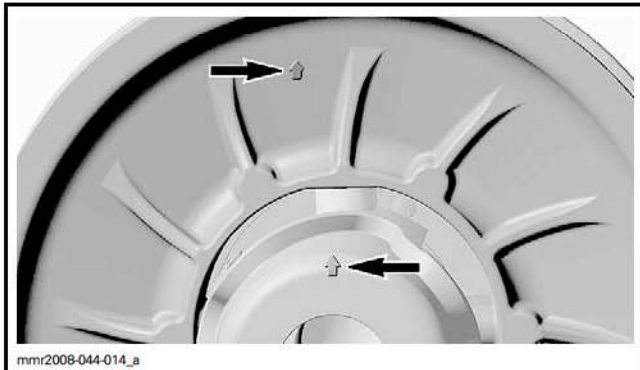
1. Install a spring stopper, the spring, the other spring stopper and the cam.



1. Spring stopper
2. Spring
3. Cam

2. Align the arrow on the cam with the arrow on the fixed sheave.

NOTE: On completion of cam installation, the arrow on the cam should have moved clockwise (approximately 30°).



3. Install the driven pulley spring compressor sleeve and tighten the tool screw until the cam is completely pressed against the sliding sheave.
4. Apply threadlocker on the thread of 4 new cam screws.

RECOMMENDED SERVICE PRODUCT

LOCTITE 648 (GREEN) (P/N 413 711 400)

5. From the back of the sliding sheave, install the 4 new cam screws.
6. Torque cam screws as specified.

TIGHTENING TORQUE

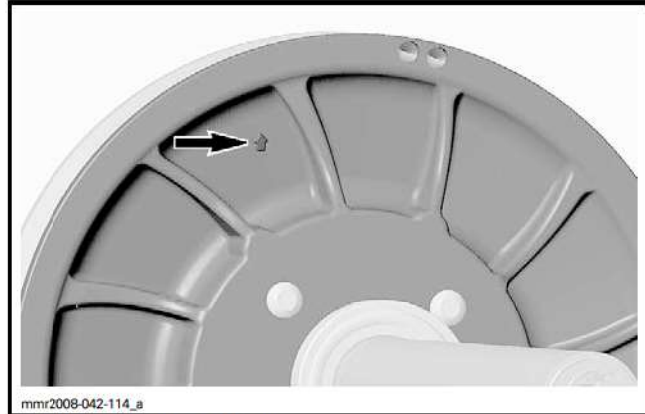
Cam screw	31.5 N•m ± 3.5 N•m (23 lbf•ft ± 3 lbf•ft) + LOCTITE 648 (GREEN) (P/N 413 711 400)
-----------	---

7. Remove the tool.

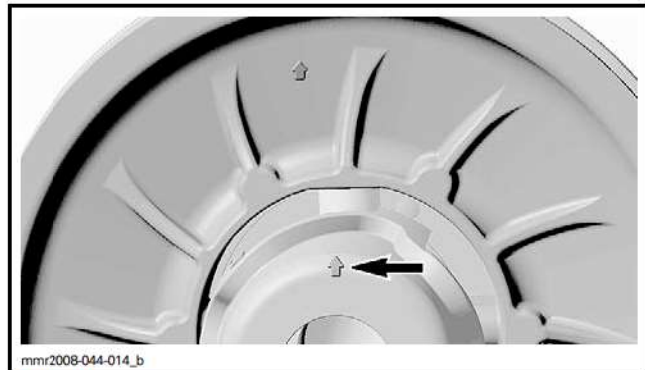
Installing the Sliding Sheave

The assembly of sliding sheave is the reverse of the disassembly. However, pay attention to the following.

When installing sliding sheave, make sure to align its arrow with the arrow on cam.



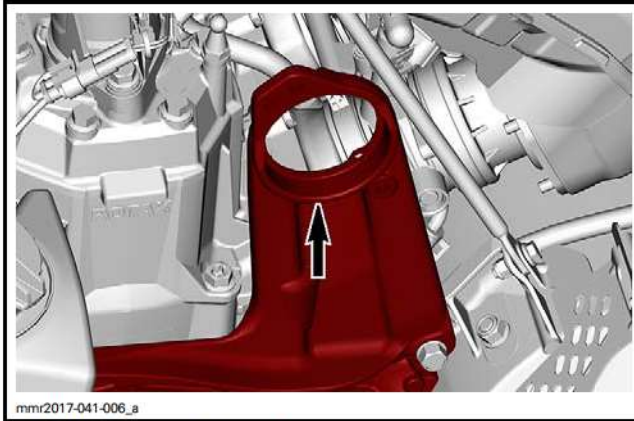
SLIDING SHEAVE ARROW



CAM ARROW

Installing the Driven Pulley

1. Using sand paper (600-grit or 1000-grit) or steel wool, remove any rust on bearing shoulder of countershaft bearing support.



mmr2017-041-006_a

BEARING SUPPORT SHOULDER

2. Apply a thin layer of antiseize lubricant on bearing shoulder.

SERVICE PRODUCT
LOCTITE 767 (ANTI-SEIZE LUBRICANT) (P/N 293 800 070)

3. Insert countershaft through countershaft bearing support.
 4. Fasten the end of countershaft to upper gear retaining tool.
 5. Align countershaft splines with upper gear splines.
 6. Using the upper gear retaining tool as a puller, Engage countershaft splines in upper gear splines. Ensure countershaft bearing is installed properly in countershaft bearing support.
 7. Remove the upper gear retaining tool.
 8. Install the upper gear screw and the conical spring washer.
- NOTE:** The conical spring washer must be installed with its concave side towards upper gear.
9. Torque upper gear screw.
 10. Install chaincase filler plug.
 11. On LH side, install the bearing flange. Torque nut as specified.

TIGHTENING TORQUE	
Bearing flange nut	15.5 N•m ± 1.5 N•m (137 lbf•in ± 13 lbf•in)

12. Install the adjuster hub onto the countershaft end and temporarily tighten.
13. Install and adjust drive belt. Refer to *DRIVE BELT* subsection.
14. Install all other removed parts.

COUNTERSHAFT

The countershaft and the fixed sheave are sold as an assembly. They are not available separately.

Removing and Installing the Countershaft

Refer to *DRIVEN PULLEY* in this subsection for the procedures.

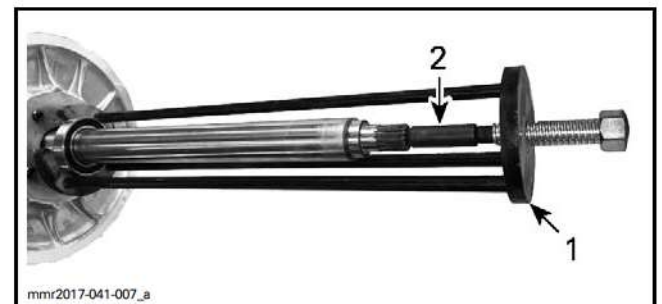
COUNTERSHAFT BEARING

Removing the Countershaft Bearing

Remove the driven pulley. Refer to procedure in this subsection.

Install the bearing remover on countershaft.

REQUIRED TOOL	
COUNTERSHAFT BEARING REMOVER (P/N 529 036 065)	
COUNTERSHAFT ADAPTER (P/N 529 036 424)	



mmr2017-041-007_a

1. Countershaft adapter
2. Countershaft bearing remover

Tighten the screw at the end of tool to extract the bearing. Discard bearing.

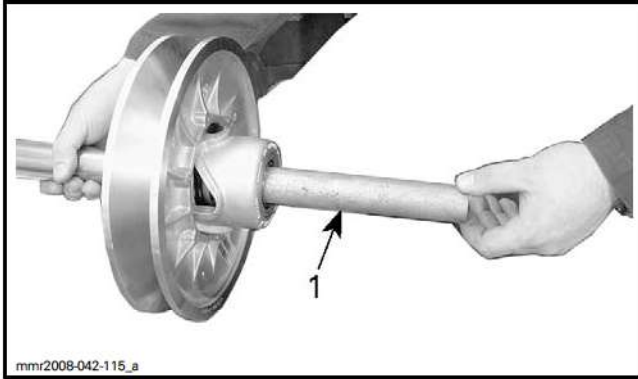
Installing the Countershaft Bearing

1. Remove the adjuster hub from the cam.
2. Insert the countershaft support in the countershaft.

REQUIRED TOOL
COUNTERSHAFT SUPPORT (P/N 529 036 067)

Section 06 DRIVE SYSTEM AND BRAKE

Subsection 04 (DRIVEN PULLEY AND COUNTERSHAFT)



1. Countershaft support

NOTICE The countershaft support is mandatory to avoid damaging the countershaft threaded end and the cam during bearing installation.

3. Clean residues on countershaft bearing surface.

SERVICE PRODUCT	
Scandinavia	PULLEY FLANGE CLEANER (F) (P/N 619 600 022)
Other Countries	CLUTCH AND PULLEY FLANGE CLEANER PRO S1 (P/N 779244)

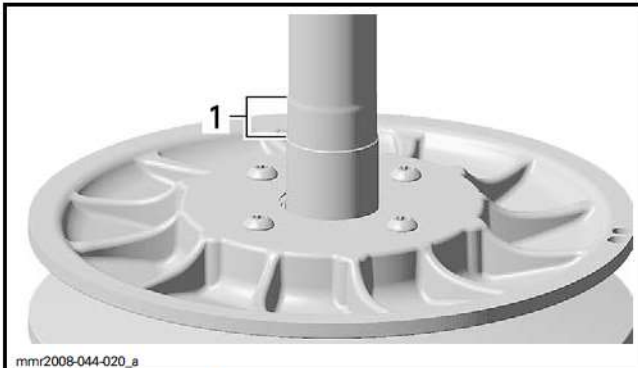
4. Check countershaft bearing surface for wear.

5. Apply Loctite 7649 on countershaft bearing surface and let dry 5 minutes.

SERVICE PRODUCT	
Scandinavia	LOCTITE 7649 (F) (P/N 619 600 100)
Other Countries	LOCTITE 7649 (PRIMER) (P/N 293 800 041)

6. Apply Loctite 609 on primer.

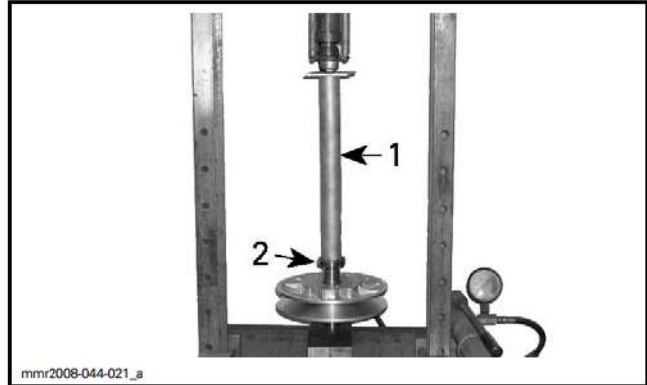
SERVICE PRODUCT	
LOCTITE 609 (P/N 413 703 100)	



1. Apply Loctite 7649 (Primer) before Loctite 609 in this region

7. Using a press and the bearing installer, install the new bearing on countershaft.

REQUIRED TOOL
COUNTERSHAFT BEARING INSTALLER (P/N 529 036 066)



1. Countershaft bearing installer
2. New bearing

NOTICE Use a press only, never tap on countershaft bearing installer with an hammer to avoid damaging bearing and countershaft.

8. Clean the surplus Loctite with a rag to avoid having Loctite on sliding sheave bushing.

COUNTERSHAFT BEARING SUPPORT

For countershaft bearing support removal and installation, refer to *COUNTERSHAFT BEARING SUPPORT* in *FRAME*.