

SECTION CS

Clutch System

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General Instructions

WARNING

Detailed information on standard workshop and safety procedures, and general servicing operations is not included in this manual, which has been prepared to assist qualified service personnel. ODG assumes no responsibility or liability for PERSONAL INJURY or VEHICLE DAMAGE which results from any servicing procedure performed, including those instructions outlined in this manual.

Automatic Torque Converter System

The torque converter system automatically regulates the torque delivered by the engine to the transmission. The System consists of a driver clutch located on the engine output shaft, a driven clutch located on the input shaft of the transmission, and a drive belt.

On acceleration, the driver clutch moveable face travels towards the fixed face as the weights in the clutch are pushed outwards due to centrifugal force. This in turn compresses the internal spring of the driver clutch. As the driver clutch faces narrow, they grip the drive belt moving it towards the top of the driver clutch. (Top No Load Speed). At the same time, the transmission's driven clutch plates spread apart as the belt rides down between the faces. The tension in this clutch is also regulated by a spring. As the vehicle comes under load, the spring loaded cam on the driven clutch forces the clutch plates together, causing the CVT to "Back Shift".

NOTE

At idle the belt should rest flush or a little beyond the edge of the driven clutch on the transmission. At top no load speed the belt should run near or to the top of the driver clutch.

CAUTION

Worn or dirty clutch components, or a worn drive belt will make the ARGO unreliable and unsafe to operate.

Maintenance Information

The maintenance information provided in this manual refers to an ARGO vehicle operating under normal conditions and use. Service more often when the vehicle is used under heavy duty applications.

Servicing of the Automatic Torque Converter system is necessary when:
a drop in vehicle performance occurs:

- the vehicle does not speed up or slow down smoothly
- the vehicle hesitates or sticks at one speed
- the vehicle vibrates severely during normal operations
- the vehicle does not move when placed in gear
- the vehicle creeps at idle when placed in gear
- the vehicle is hard to shift into gear or other ranges

Drive Belt Maintenance Schedule-Inspect every 25 hours

WARNING

Do not attempt to service any part of the torque converter system while the engine is running. Shut the engine off and disconnect the battery before servicing.

Drive Belt Inspection

NOTE

Drive belt tension and clutch alignment are fixed. No further adjustment is required.

- 1 Remove the engine access cover.
- 2 Perform the servicing procedure, Removing the Drive Belt.
- 3 Inspect the condition of the drive belt over it's full length.

Check the condition of the belt in the table below and perform the necessary servicing procedure.

Belt Condition	Problem	Servicing Procedure
Glazed Sides	Lubricant Contamination Clutch Malfunction	Replacing the Drive Belt Driver Clutch Servicing Driven Clutch Servicing
Torn Underchords	Wrong Drive Belt Old Drive Belt	Replacing the Drive Belt
Worn Prematurely	Driver or Driven Clutch Problem	Driver Clutch Servicing Driven Clutch Servicing Replacing the Drive Belt

Invance Driven Clutch

Replace the belt when:

- the top width of the belt has worn to 1-1/16" (27mm)
- cracks, fraying or shredding is apparent
- it becomes contaminated with oil or some other fluid

Refer to the ARGO Parts Manual for correct drive belt part number.

Remove the Drive Belt (Invance)

1. Make sure the ignition is turned off.
2. Remove the engine access cover
3. Perform the servicing procedure, **Removing the Firewall**, in section VB
4. Place the transmission in neutral

The Invance Driven Clutch (transmission clutch), is manufactured with a 6mm x 1.0 threaded hole in the clutch face. This hole is provided to assist in spreading the driven clutch pulleys apart by threading a 6mm x 1.0 thread bolt in through the face. This bolt should be a least 2" in length with full thread. Spreading the pulleys allows for easy removal and installation of the 127-137 (Avenger) or 127-159 (Frontier) drive belt. **Photo 1**

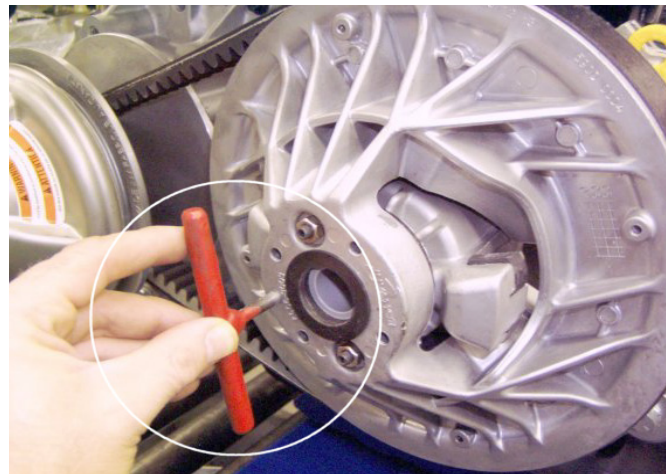


Photo 1

Install the Drive Belt (In Vance)

CAUTION

If this procedure is not carried out as described, the edge of the fixed face may cut or damage the drive belt.

1. Position the belt around the driver clutch first.
2. Ease the belt over the edge of the fixed face on the driven clutch. Remove the 6mm x 1.0 thread bolt to allow the pulley's to return to the closed position.

IMPORTANT

Drive Belt alignment and tension are pre-set at the factory and are not adjustable. They are critical for proper operation of the drive system.

Clutch Maintenance

Disassembly and repair of the driver and driven clutch requires special tools. The following indicates that clutch service might be required:

- ❑ a drop in vehicle performance
- ❑ the clutch does not shift smoothly
- ❑ the clutch sticks during vehicle operation
- ❑ the drive belt wears rapidly
- ❑ the vehicle vibrates severely during operation
- ❑ the vehicle does not accelerate when the engine speed is increased with the transmission in gear
- ❑ transmission will not shift smoothly into gear at engine idle.

Clutch Inspection

Inspect the nylon sliders every 50 hours. The nylon sliders are mounted in the driven clutch moveable pulley. **Photo 2**. When the clutch shifts, the cam moves on the nylon sliders. Replace the nylon sliders before there is aluminum to aluminum contact between the cam and the movable pulley. Driven clutch disassembly is required to replace the nylon sliders properly.

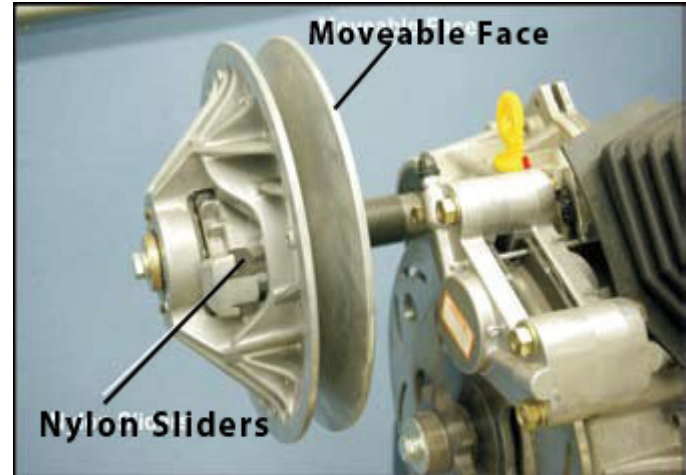


Photo 2

Removing the Drive Belt (non-Invince Clutches)

1. Make sure the ignition is turned off.
2. Remove the engine access cover.
3. Perform the servicing procedure, Removing the Firewall, in section VB
4. Place the transmission in neutral
5. Ease the belt over the fixed half pulley of the driven clutch starting from the bottom of the sheave until the belt is off.

Photo 3

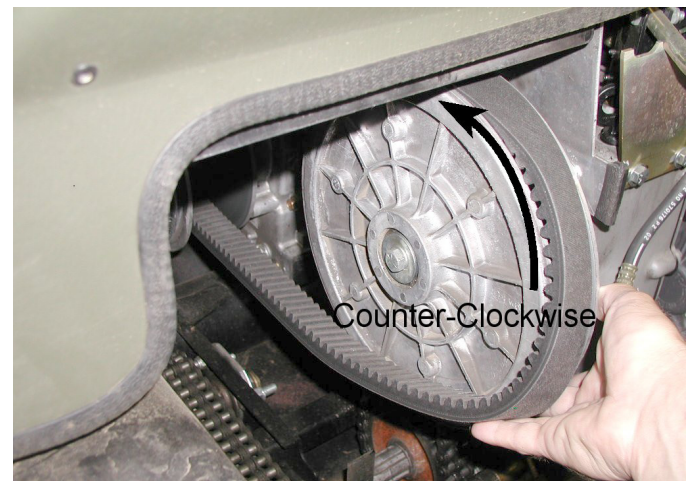


Photo 3

6. Remove the belt from the driver clutch.

Installing Drive Belt

NOTE

Use only ARGO quality replacement drive belts.

CAUTION

If this procedure is not carried out as described, the edge of the fixed face may cut or damage the drive belt.

1. Position the belt around the driver clutch first.

- Ease the belt over the edge of the fixed face on the driven clutch and at the same time, turn the inside moveable face clockwise. *Photo 4.*

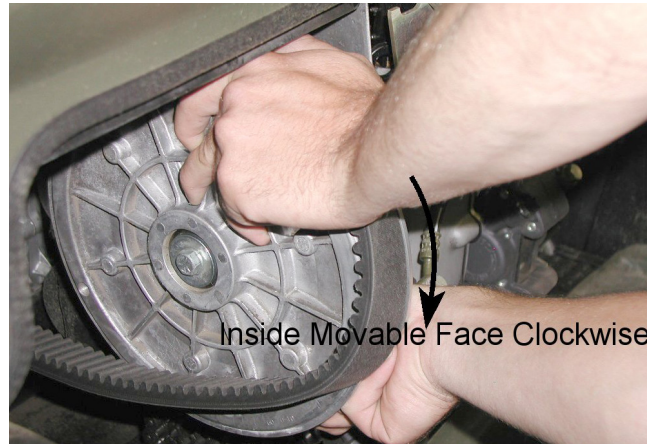


Photo 4

Driver Clutch Inspection

If the vehicle is not shifting speeds smoothly, if the vehicle hesitates or sticks at one speed, or if the vehicle creeps at idle or is hard to shift into gear, remove and inspect the driver clutch. Service as necessary.

Remove and service the driver clutch if:

- the clutch plates have tracking grooves caused by drive belt action
- the clutch plates are bent or cracked
- the weight blocks are damaged or missing

Driver Clutch Removal

- Remove the engine access cover.
- Perform the servicing procedure, **Removing the Firewall**,
- Perform the servicing procedure, **Removing the Drive Belt**, in this section of the service guide.
- Remove the fastener securing the Driver Clutch to the PTO and slide the clutch from the shaft. Depending on the model and year of the vehicle, the fastener securing the Driver Clutch will vary. **See Chart on following Page.** The PTO has a keyed shaft.

IMPORTANT

There are either 5 Spacers (1.19x1.50x.04) or 1 thick Spacer equivalent to the thickness of the 5 Spacers behind the Driver Clutch. This will depend on the age of the vehicle. Earlier models utilized 5 spacers.

All 750 EFI Models	HHCS 7/16-20x5.0 LG & WASHER 47x1.37x.12 HI-CARBON (5/8" Socket)
700 Models prior to S/N 28833	FHSC 7/16-20x4.0" LG only (1/4" Hex Head)
700 Models from S/N 28833	HHCS 7/16-20x5.0 LG & WASHER 47x1.37x.12 HI-CARBON (5/8" Socket)

NOTE

All Carbureted LH685-0015, LH690-0011 & LH690-0014 were built with a longer crankshaft PTO than the LH775-0012 EFI. This changed in May of 2009 when the crankshaft PTO was shortened and standardized to the same specification as the LH775-0012 EFI. The new LH690-0017 specification uses the shorter PTO Shaft on the Carbureted models.

- Slide the driver clutch off the PTO of the engine. (See note.)

NOTE

The driver clutch must be slid from the PTO with the mounting bolt hardware within the clutch. The mounting bolt is too long to remove first.

The driver clutch may contact the lower body first before completely being free of the PTO, however the lower body will flex enough in that area to free the clutch.

- Remove the clutch to a clean work area for further disassembly.

Disassembling the Driver Clutch

- Remove the large hex nut, flat washer and cap. *Photo 1*
- Remove the (3) nylon blocks and weights (275g 700 models or 240g 750 EFI models). *Photo 2*
- Remove the (3) fasteners securing spring cover to the sliding flange. *Photo 3*

CAUTION

Cap is under spring tension. Slowly unthread each fastener uniformly and a little at a time until the cap is freed from the sliding flange.

- Remove the cap, spring and spring guide washer. *Photo 4*



Photo 1

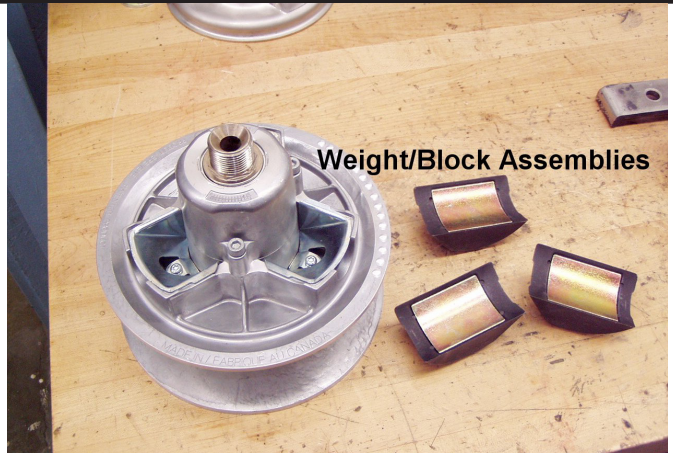


Photo 2



Photo 3

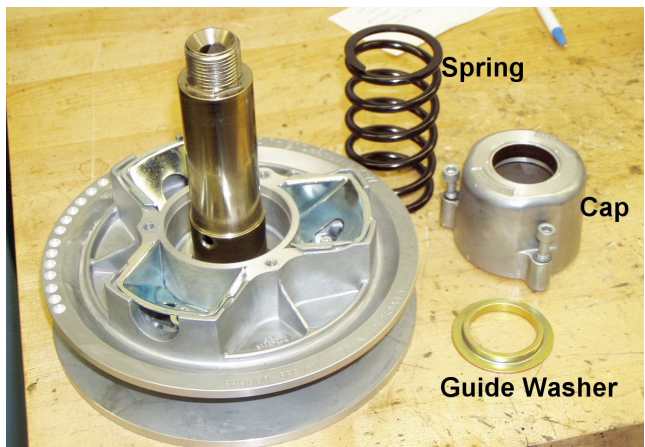


Photo 4

5. Slip off the Sliding Flange. *Photo 5*



Photo 5

Re-assembling the Driver Clutch (Avenger Models)

1. Slip on the Sliding Flange followed by the spring guide washer. *Photo 6*
2. Install the spring. *Photo 7*
3. Install the spring cap and secure with the (3) fasteners. Torque to Specifications

IMPORTANT

There are (3) small lockwashers on these (3) fasteners. Ensure that they are still in place before re-installing and torquing the spring cap back down. *Photo 8*

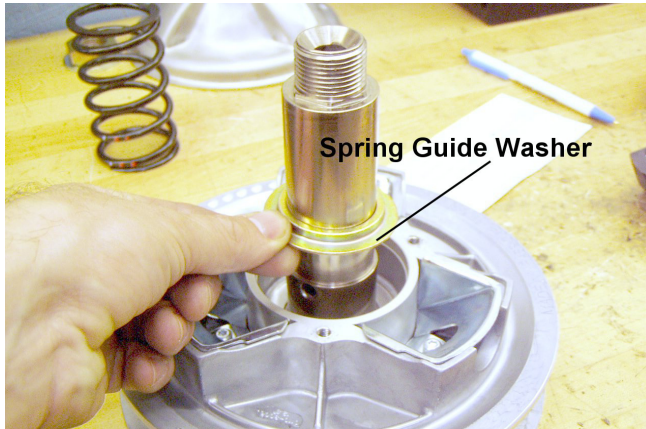


Photo 6



Photo 7

4. Re-install the nylon block and weight assemblies into the sliding flange. Orient the block with the rounded side up. *Photo 9*
5. Re-install the cap and secure with flat washer and nut. Torque to specifications. *Photo 10*



Photo 8

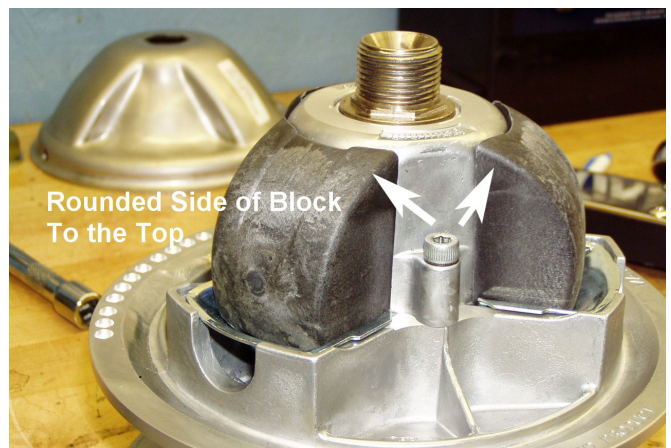


Photo 9

NOTE

To properly torque, re-install the driver to the engine PTO and lock flywheel while using the torque wrench to achieve proper torque.

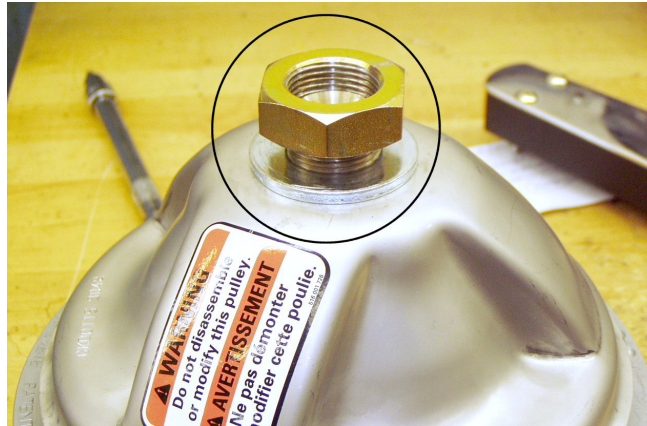


Photo 10

Driven Clutch Lubrication

Lubrication of Driven Clutches is not necessary

Driven Clutch Inspection

Maintenance Schedule-Inspect every 50 hours of vehicle operation

Inspect the nylon sliders every 50 hours. The nylon sliders are mounted in the driven clutch moveable pulley. When the clutch shifts, the cam moves on the nylon sliders.

Replace the nylon sliders before there is aluminum to aluminum contact between the cam and the moveable pulley. Driven clutch disassembly is required to replace the nylon sliders properly.

1. Remove the engine access cover.
2. Perform the servicing procedure, **Removing the Firewall**, in section VB of this service guide.
3. Inspect the clutch. Perform the servicing procedure, **Driven Clutch Removal/Disassembly**, if:
 - the clutch plates have tracking grooves caused by drive belt action
 - the clutch plates are cracked or bent
 - the nylon cam slider shoes are missing, melted, or worn through
 - the spring is broken or has come loose from the cam or moveable face

4. Perform the servicing procedure, **Driven Clutch Removal/Disassembly** if the vehicle:
 - is not changing speed smoothly
 - hesitates or sticks at one speed
 - lacks turning power
 - won't move when the engine is accelerated in gear and brakes are disengaged
 - does not backshift under load

Driven Clutch Disassembly (127-136)

1. Place the clutch in a Specialized Clutch Assembly/Disassembly Tool (as illustrated below in **Photo 12**). Gently apply pressure to the spring cam by threading the handle downward against the cam until the retaining ring can be removed. **Photo 12A & 12 B**

NOTE

*If using an arbor press, the use of an old discarded 34-08 ARGO transmission cage is a useful tool to employ between arbor press and clutch. **Photo 11***

2. With the retaining ring removed, slowly release the spring tension off the cam until the cam is free of the fixed pulley's shaft and the spring has unwound. **Photo 13**

CAUTION

Spring Cam is under tension and could fly apart if precaution is not taken to slowly and carefully release the cam once the retaining ring has been removed.



Photo 11



Photo 12

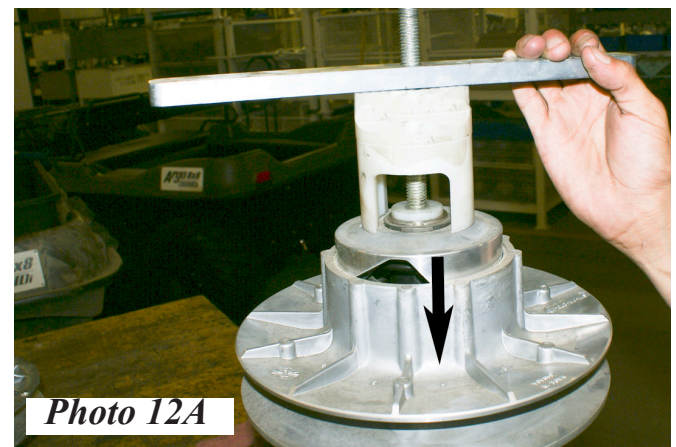


Photo 12A

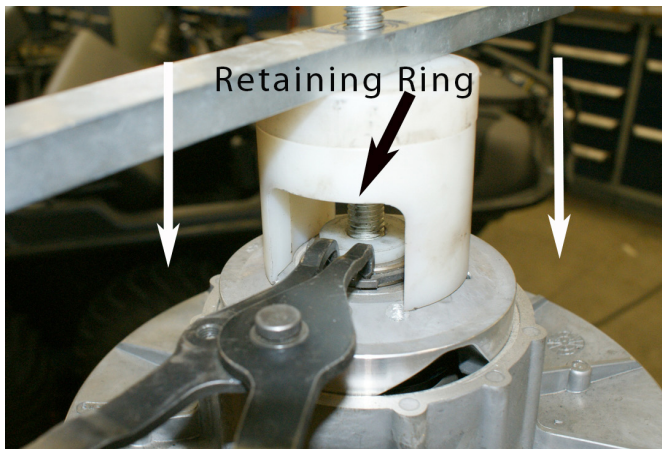


Photo 12B

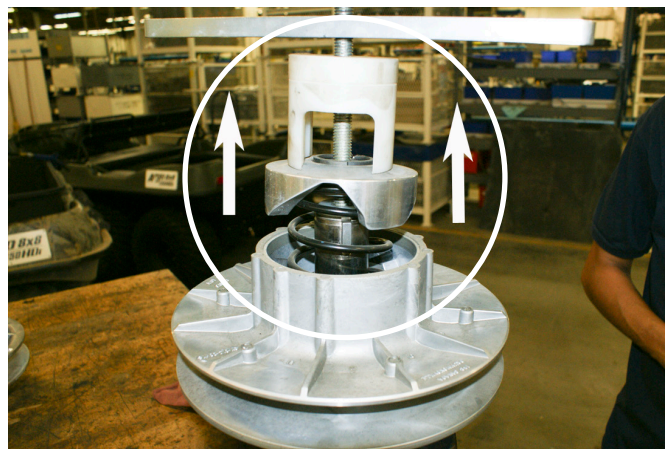


Photo 13

3. Remove the Cam & Spring. *Photo 14*
4. Remove the Moveable Face. *Photo 15*



Photo 14

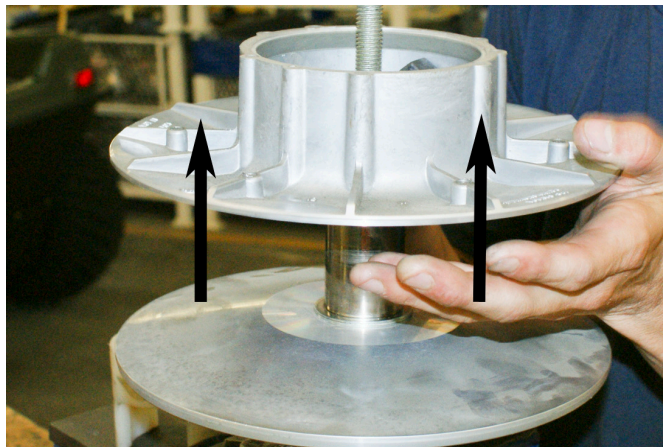


Photo 15

5. Remove the key from the keyway. *Photo 16*
6. Remove any spacers that may be present. *Photo 17*



Photo 16



Photo 17

7. Lay out all clutch components on a clean work surface for inspection. *Photo 18*

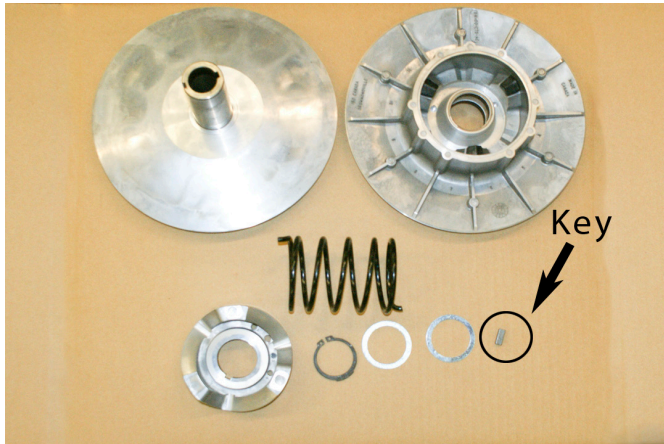


Photo 18



Photo 19

8. To remove the bushing(s) from the moveable face pulley, pry the retaining ring from the end. *Photo 19*
9. Using an arbor press and bearing remover, push the bushing(s) from the moveable face. *Photo 20 & 21*

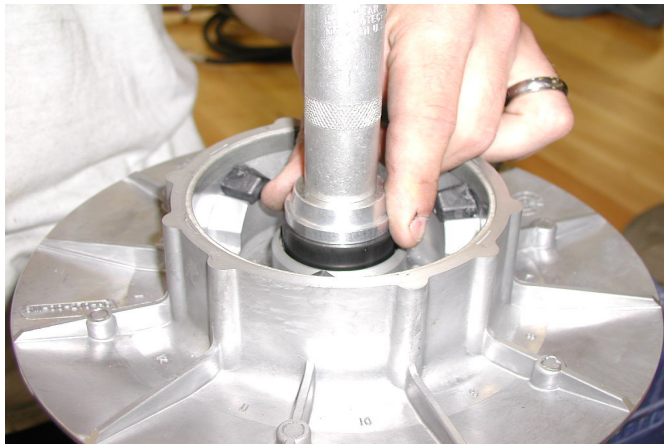


Photo 20



Photo 21

10. Using a “ladies foot” style pry bar and hammer, remove the cam bushing from the moveable face. *Photo 22 & 23* ****This is not a reusable part.***
11. Using a pencil grinder, lightly grind the area that was staked when the cam bushing was initially installed. *Photo 24*
12. Remove each of the cam shoes by prying on them. They are press fitted into the pulley. *Photo 25*



Photo 22



Photo 23

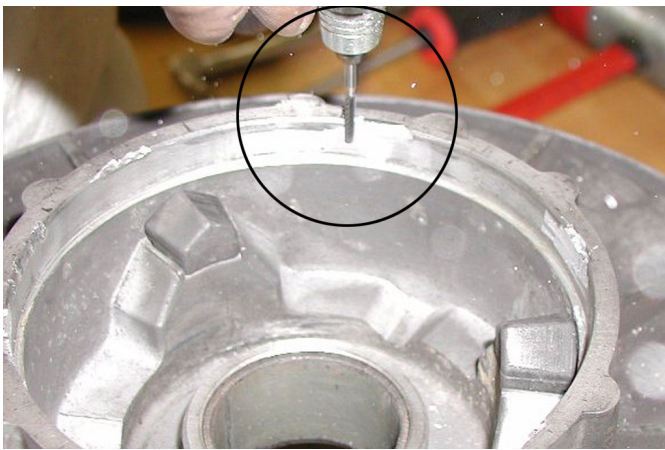


Photo 24



Photo 25

Driven Clutch Assembly (127-136)

1. Reinstall each cam shoe back into the moveable face. Apply some blue LOCTITE to the stems of each shoe before pressing into place.
2. Install the new cam bushing by gently tapping back into position on the moveable face. *Photo 26.* Stake cam bushing at 4 locations around the perimeter.
3. Press bushing(s) into moveable face using an arbor press. *Photo 25.*



Photo 24

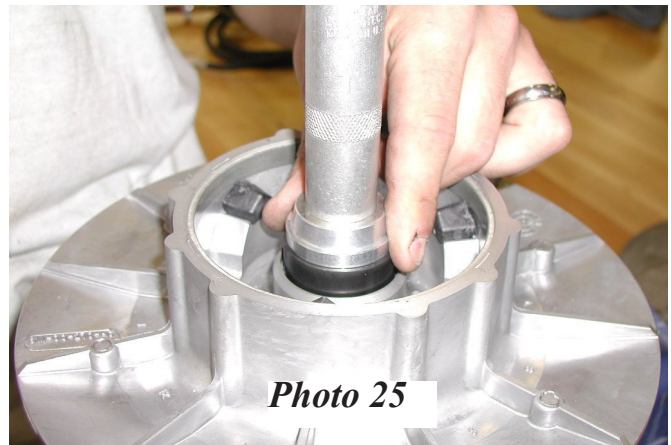


Photo 25

4. Reinstall the retaining ring to secure bushing(s). *Photo 26*
5. Reinstall the spacers to the shaft of the fixed pulley. *Photo 27*

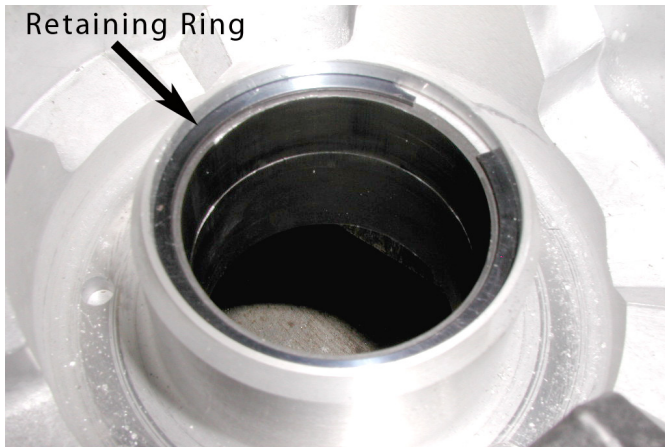


Photo 26

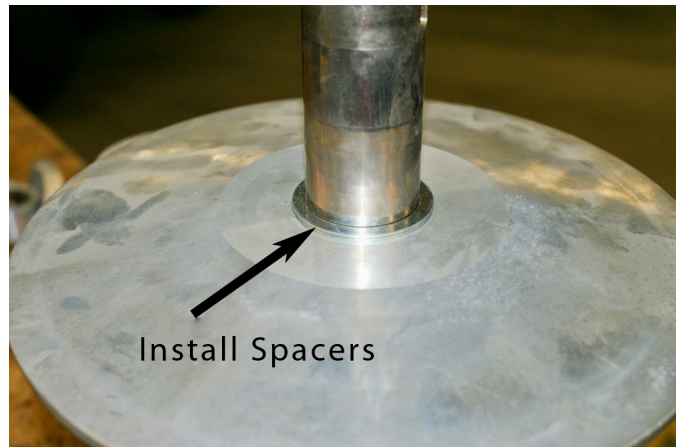


Photo 27

6. Place the fixed face into the specialized clutch tool holder (shaft facing up) and slip the moveable face on to the shaft. *Photo 28*
7. Install the key to the shaft. *Photo 29*



Photo 28



Photo 29

8. Locate the cam and insert one end of spring into the number 2 hole. *Photo 30*

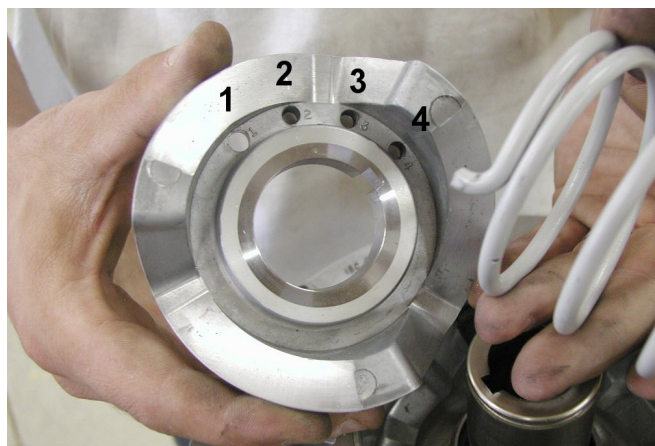


Photo 30

9. Slip the cam and spring assembly over the fixed pulley shaft and place the other end of the spring into the hole across from the number 10 mark on the clutch sheave.
Photo 31 & 32



Photo 31

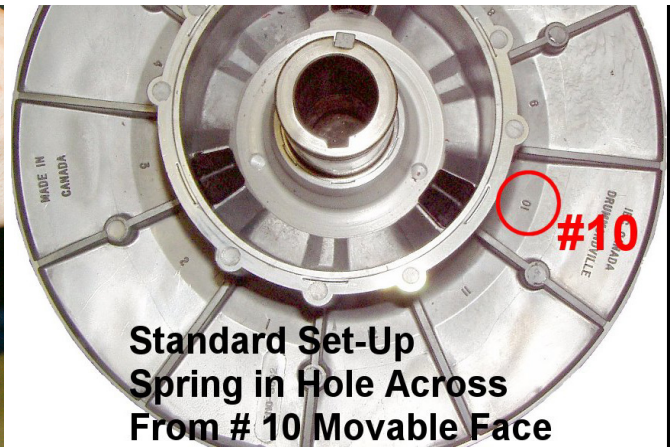


Photo 32

10. Place the nylon fork to the top of the cam. *Photo 33*

IMPORTANT

Slip the retaining ring over the threaded stud to place into position **BEFORE** placing the nylon fork. *Photo 33*

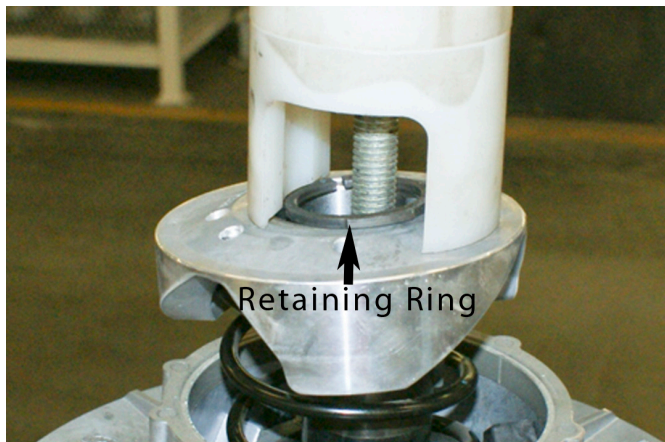


Photo 33

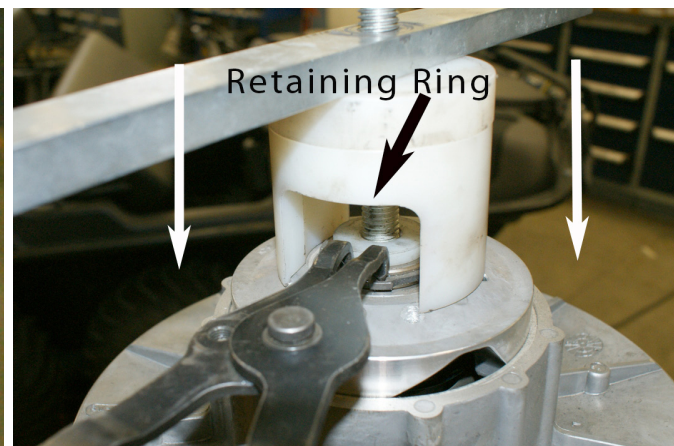


Photo 34

11. Push the cam onto the shaft by threading the handle down on the specialized clutch tool. **ENSURE THE KEY IS ALIGNED WITH THE KEYWAY.** At the same time, turn the moveable face counter clockwise 120 degrees, or one cam notch past the first cam shoe. Push the cam down until the retaining ring groove is visible and install retaining ring. *Photo 34*

WARNING

Make sure that the retaining ring is seated to the groove. Failure to guarantee that it is seated, could result in personal injury while handling the clutch or damage to the vehicle once installed.

Testing the Spring Load of the Driven Clutch

1. Place the driven clutch in a soft faced aluminum jawed vise and clamp so that the moveable face is free to turn. Clamp a good digital or regular spring fish scale to the edge of the moveable pulley. Pull and note the lbs. force while pulling and the sheave is moving. Note the force while releasing. Average the two numbers. That average number should fall between 12.6 and 19.8 lbs. *Photo 35*

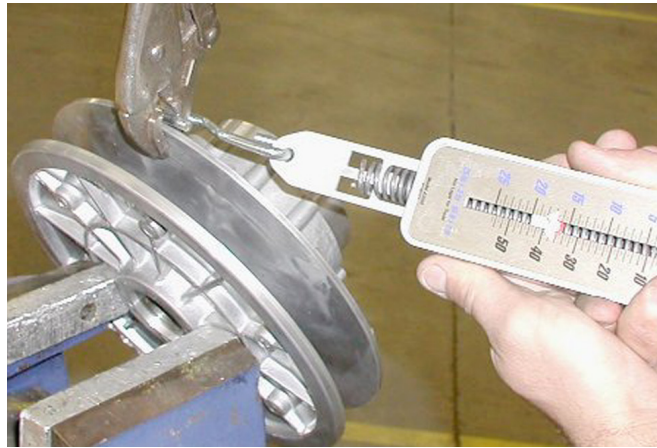


Photo 35

Disassembling the Driven Clutch (INVANCE)

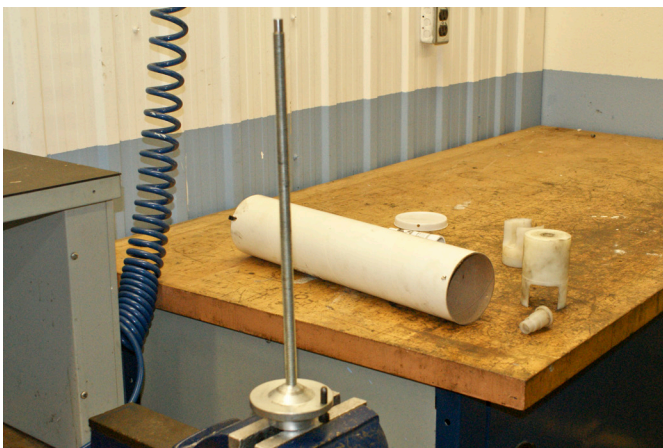


Photo 36

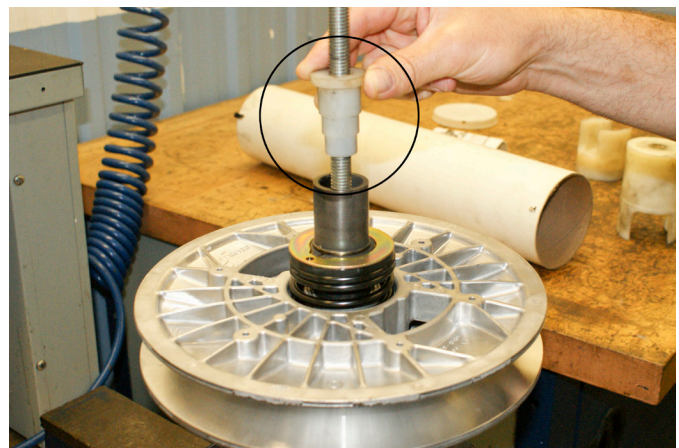


Photo 37

1. Place the Specialized Clutch Tool into an aluminum jawed vise. *Photo 36*
2. Place nylon bushing into clutch shaft to centre the clutch on the threaded rod. *Photo 37 & 38*

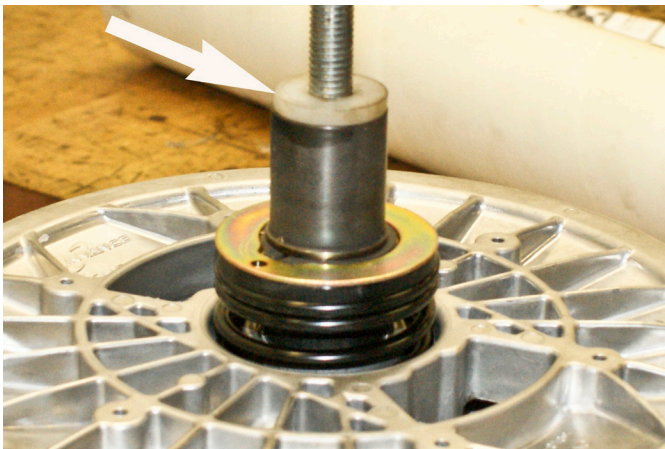


Photo 38



Photo 39

3. Slip the nylon fork over threaded rod to rest up against steel washer on top of spring. **Photo 39.** Thread handle down until it makes contact with fork and begins to compress the spring below. **Photo 40** Thread the handle just enough to compress spring for retaining ring removal. **Photo 41 & 42**
4. Back off handle to release tension on spring. **Photo 43**

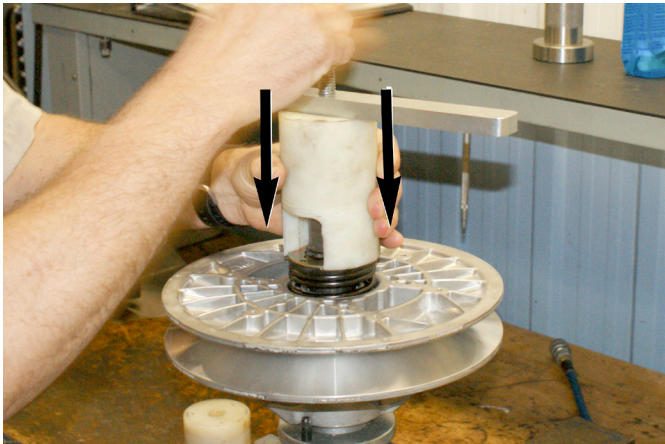


Photo 40

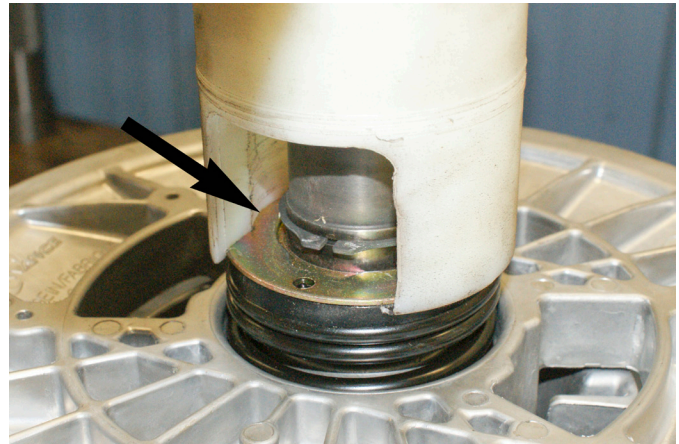


Photo 41



Photo 42



Photo 43

5. Remove nylon fork, steel washer and spring. *Photo 44, 45 and 46*

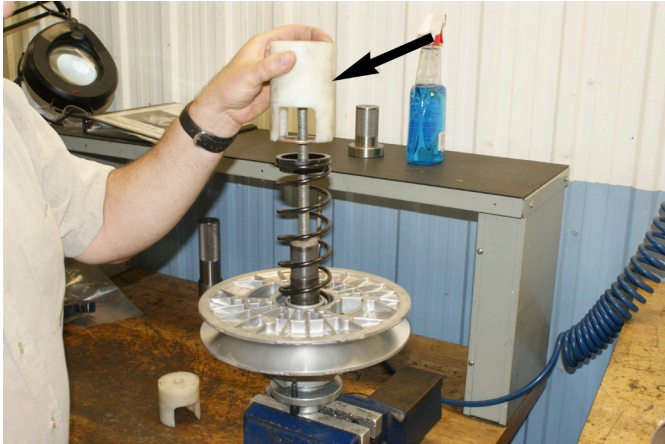


Photo 44

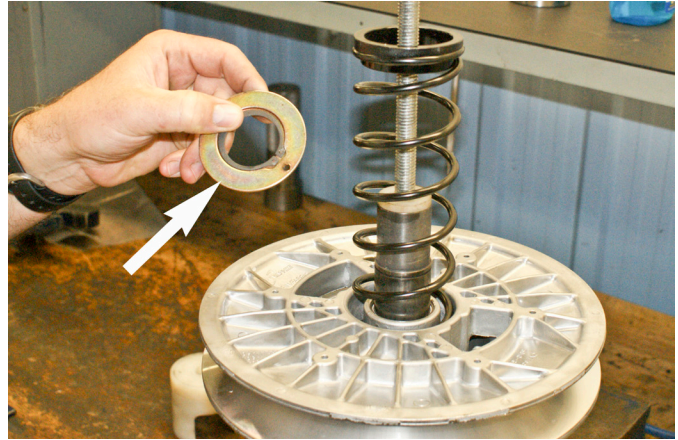


Photo 45



Photo 46



Photo 47

6. Be aware of Plastic Spring Protector assembled to top of spring. *Photo 47*

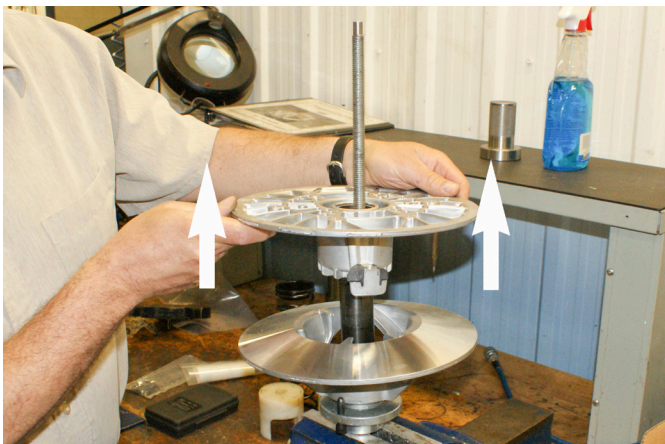


Photo 48



Photo 49

7. Remove the moveable face. *Photo 48*

8. Bushings are non-replaceable in moveable face. *Photo 49*

9. Locate cam shoes for inspection. Each one is secured by 1 screw. *Photo 50*

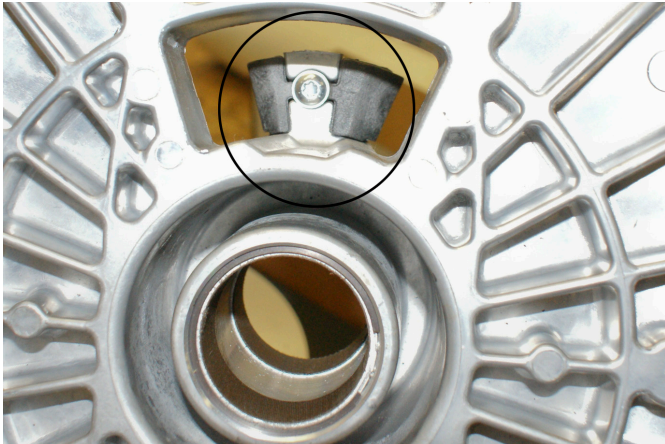


Photo 50

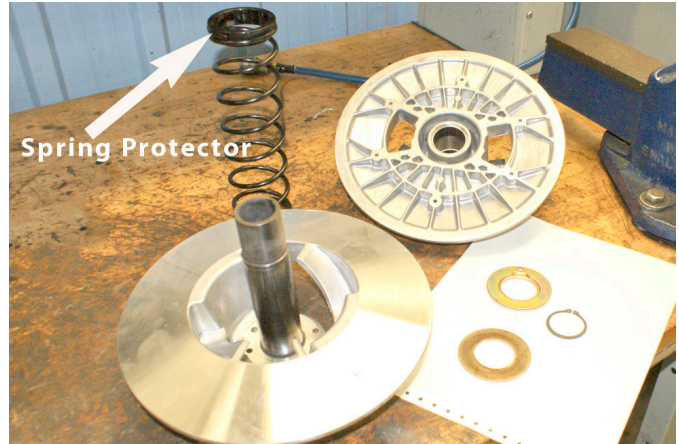


Photo 51

10. Components of disassembled Invince Clutch. **Shim Washer, Spring Support Washer, Retaining Ring and Nylon Spring Protector.** *Photo 51*

Invince Clutch Reassembly

1. Place Fixed Face to Specialized Clutch Tool, shaft facing up. *Photo 52*
2. Assemble Shim Washer over shaft of fixed face. *Photo 53*



Photo 52



Photo 53

3. Slip the moveable sheave over the fixed sheave shaft and let come to rest on the lower sheave. *Photo 54*

NOTE

Align the cam shoes with the slots provided in the lower fixed face

4. Place the nylon centering tool into the top of the fixed shaft. *Photo 55*



Photo 54

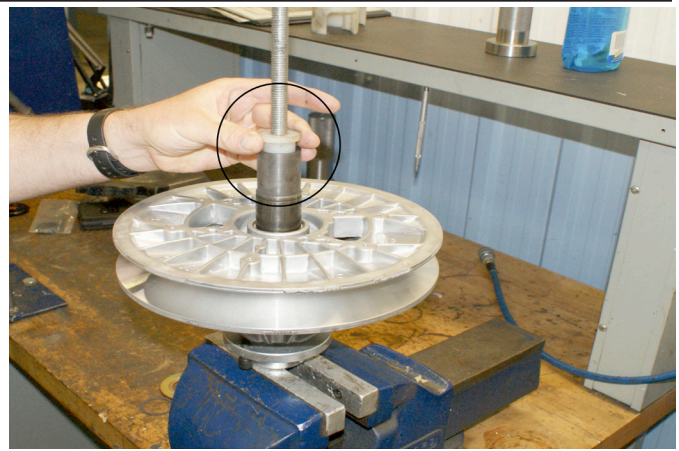


Photo 55

5. Install clutch spring with plastic spring protector assembly to the top. *Photo 56*
6. Place steel washer to top of plastic spring protector. *Photo 57*



Photo 56

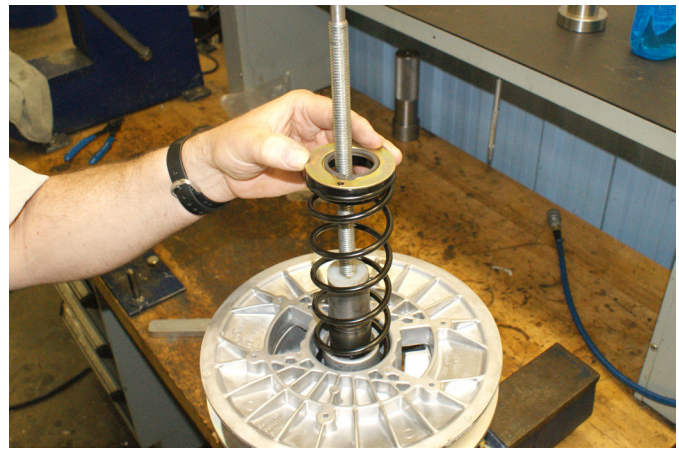


Photo 57

7. Place retaining ring into position over threaded rod before nylon assembly fork *Photo 58*
8. Compress the spring by turning the handle clockwise on the threaded rod. *Photo 59*

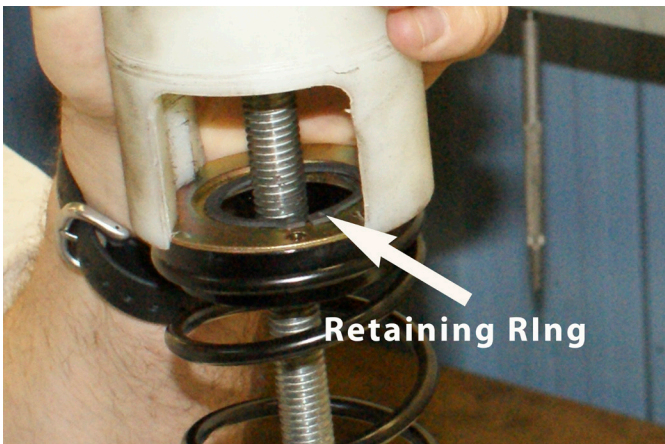


Photo 58

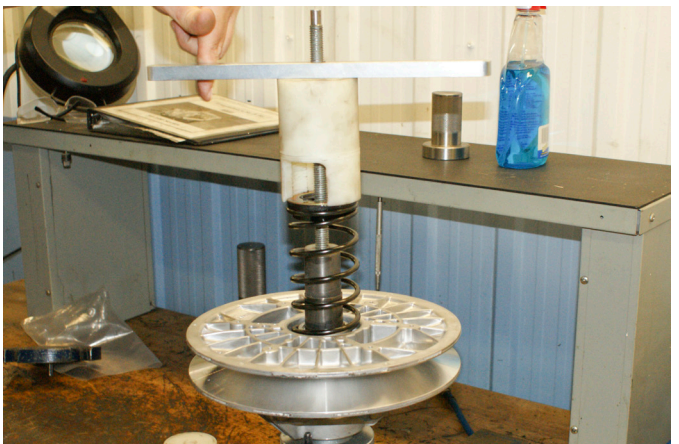


Photo 59

9. Install retaining ring into ring groove of fixed pulley shaft. *Photo 60.*

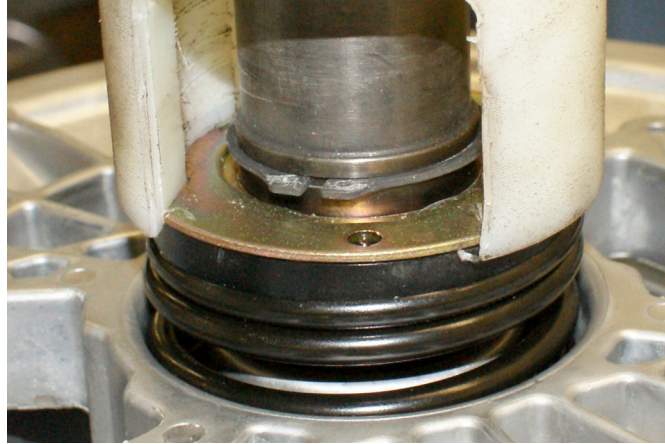


Photo 60

