# Fabco TC-180 Transfer Case Service Manual

Pro Gear Fabco TC-180 Transfer Case Service Manual to assist in identifying your Fabco unit.

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# FABCO TC–180 TRANSFER CASE

# SERVICE MANUAL

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# 1.0 MODEL TC-180, Transfer Case

## 1.1 INTRODUCTION

AUTOMOTIVE CORPORATION

### FABCO Model 180 Transfer Case & Split Shaft PTO

The Fabco Model 180 is a family of Transfer Case and Split Shat Power Take offs with single-speed, three-shaft, constant mesh design. The new Model 180 is the latest generation design replacing the Fabco Model 170 and 175. The Model 180 features increased oil capacity, higher strength main housing, increased torque capacity helical gearing, ultra-high temperature seals and gaskets, revised declutching gearing and a proprietary Fabco lubrication pump, yet retains same installation envelope of previous Fabco designs.

| | |
|---|---|
| **Ratings – Nominal *** | |
| Torque | 15,000 Lb. Ft.<br>18,000 Lb. Ft (Through Shaft) |
| Horsepower | 600 HP. |
| Input Speed | 3,000 RPM |
| **Ratio** | 1:1 Standard, Contact Fabco for Optional Ratios |
| **Gear Type** | Helical, Case Hardened |
| **Shaft Sizes** | |
| Input/Front & Rear Output | 2.50 Inches, 10 Parallel Spline |
| **Shaft Spacing (Drop)** | 16.25 Inches |
| **Shift Mechanism** | Integral Air Cylinders |
| **Bearings** | Tapered Roller |
| **Lubrication System** | Pressurized & Splash |
| **Lubricant** | SAE 50 or 75W90 GL4 MT-1 Synthetic Gear Oil |
| **Oil Capacity, Nominal** | 12.0 Quarts |
| **Weight – Dry** | 470 Lbs. approx. |
| **Housing** | Precision Cast |

* All ratings nominal. Actual capacities determined based upon review of application data by Fabco Engineering

## 1.2 ASSEMBLY VIEWS

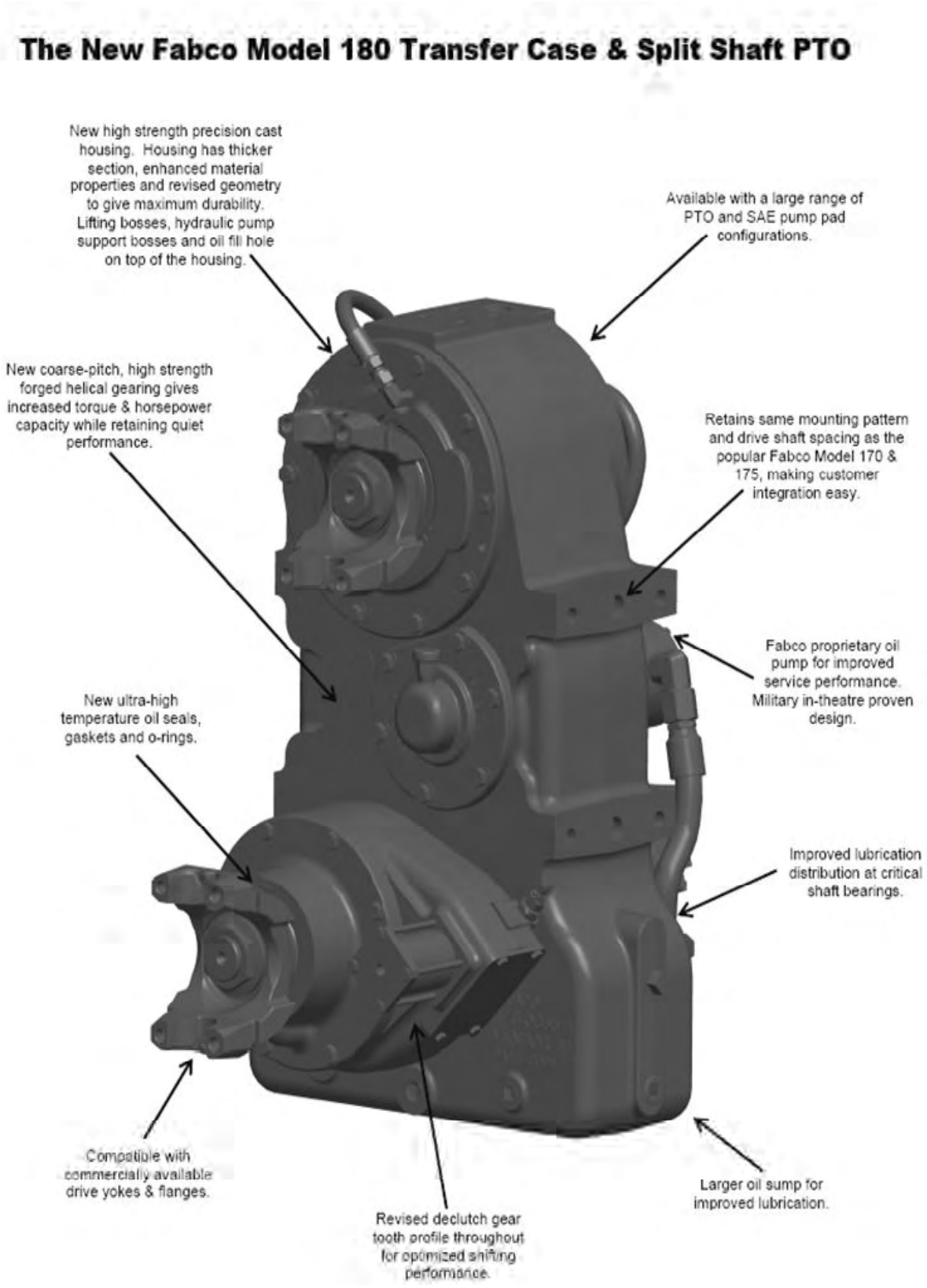
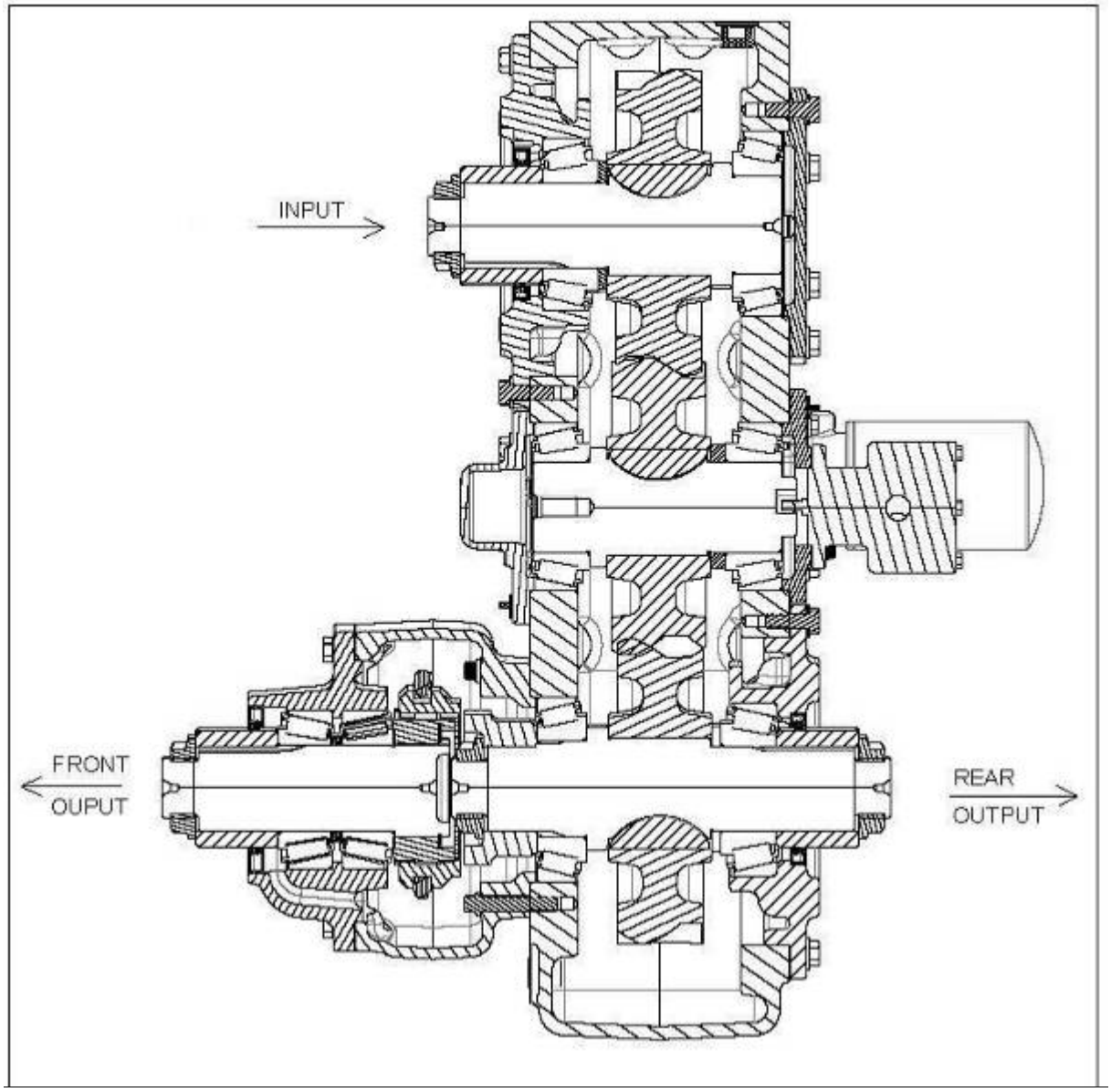


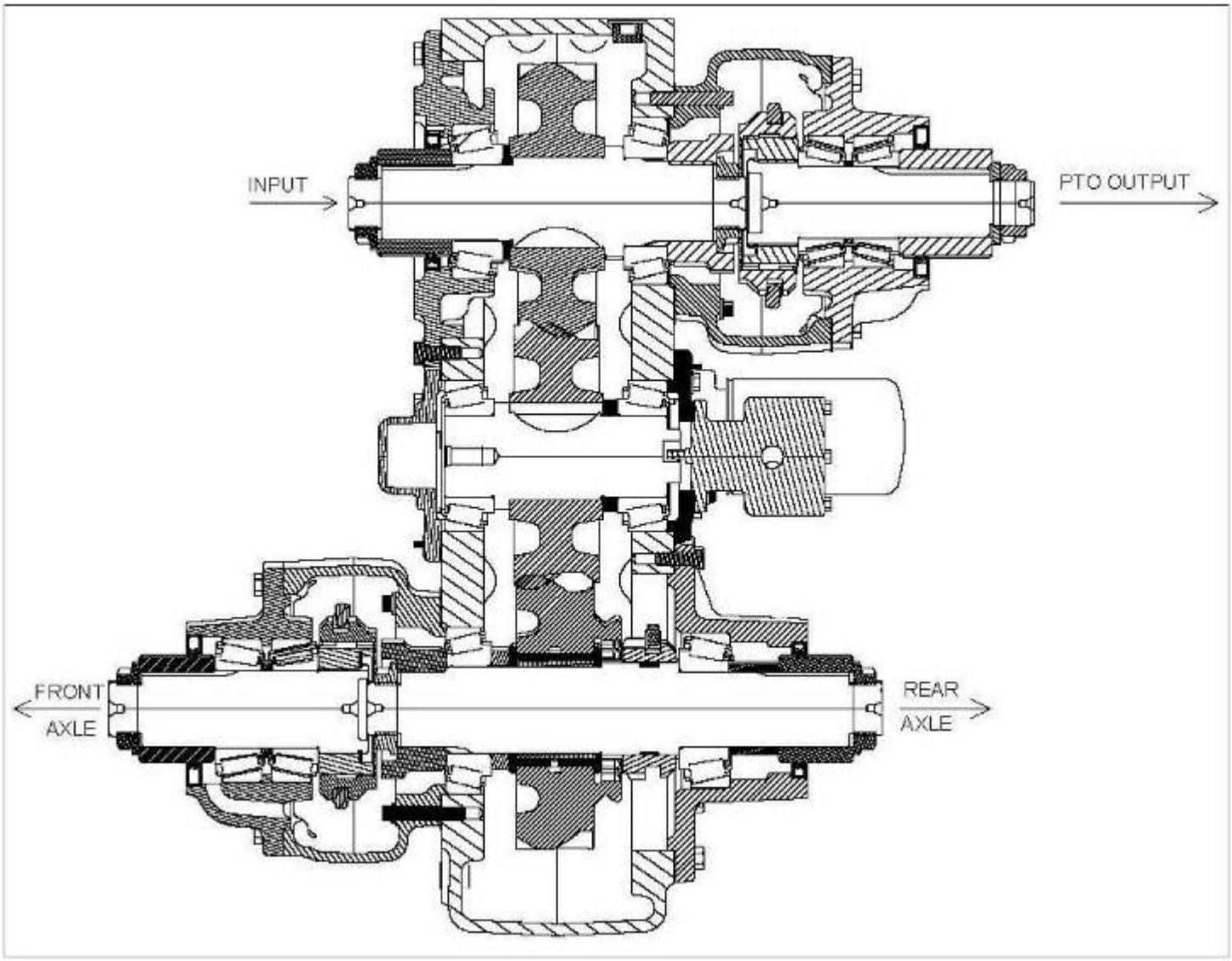

**Figure 1**




TC-180 Transfer Case

**SECTIONAL VIEW**

**Figure 2**




TC-180 Transfer Case with Upper Rear PTO

**SECTIONAL VIEW**

**Figure 3**

# 2.0 LUBRICATION

## 2.1 RECOMMENDED LUBRICANTS

SAE 50 synthetic is recommended for on/off-highway operation.

**NOTE:** EXTREME PRESSURE (EP) OILS ARE NO LONGER RECOMMENDED FOR USE IN FABCO TRANSFER CASES. UNDER CERTAIN OPERATING CONDITIONS THESE OILS MIGHT FORM CARBON DEPOSITS ON GEARS AND SHAFTS.

## 2.2 INSPECTION

The oil is to be maintained at the level of the fill plug at all times. Check at the following intervals:

Highway Service ……..……...1,000 Miles

Off-Highway Service ……..……....40 Hours

With every oil change, the shift cylinder air lines and valves should be inspected for leaks and possible malfunctioning. Low pressure conditions can cause partial clutch engagement which may result in premature wear or damage.

## 2.3 OIL CHANGE

The transfer case lubricant should be changed on all new transfer cases after the first 3,000 to 5,000 miles (on-highway), or the first 40 hours (off-highway); thereafter oil changes should be done at the following intervals:

On-Highway Service……...10,000-15,000 Miles

Off-Highway Service……....500-700 Hours

The recommended oil change and inspection periods are based on average use and operating conditions that the unit may encounter. It is suggested that the individual owner make a periodic lab analysis of the lubricant to determine contamination based on the units specific operating conditions. With this data, the oil change and inspection periods can be better determined.

## 2.4 DRAINING THE OIL

Draining is best accomplished after the vehicle has been operated briefly, allowing the oil to become warm and flow more freely. Remove both drain and fill plugs. Allow the housing to empty completely. Before the unit is refilled, it should be thoroughly flushed with clean flushing oil or kerosene.

The lube oil filter should be replaced whenever the oil is changed. The filter element is of a spin-on type. A film of clean oil should be applied to the rubber gasket of the new filter element before installing. Do not over tighten.

## 2.5 REFILLING THE OIL

If the transfer case has been removed from the vehicle for service, it is the best to refill the oil after the unit has been reinstalled into the vehicle.

Clean and replace the drain plug and fill the transfer case with the appropriate oil with the vehicle on level ground. Fill the transfer case to the level of the sight glass.

## 2.6 OPERATING TEMPERATURE

The operating temperature of the transfer case should not exceed 250°F (120°C). Extensive operation at temperatures exceeding 250°F will result in rapid brake down of the oil and may shorten the transfer case life. If reduction of operating speeds is not acceptable then the case may have to be equipped with external oil cooler to maintain the operating temperature below 250°F.

The following conditions may contribute to excessive oil temperatures:

1. A vehicle which is used in tropical or desert conditions.

2. A vehicle where extended body work or an accumulation of dirt and plant material may shield the case from air ventilation and circulation.

3. A vehicle that is operated for extended distances at high speed with the main transmission in overdrive.

# 3.0 CLEANING AND INSPECTION

## 3.1 CLEANING

Steam may be used for external cleaning of completely assembled units. Care must be taken to ensure that water is kept out of the assembly by sealing breather caps and other openings.

The transfer case housing which, is too large to conveniently clean with solvents, may be immersed in a hot solution tank containing a mild alkaline solution. Aluminum parts such as the carriers, caps, declutch housing, and air shift cylinder components must never be cleaned in any type of alkaline solution. Parts clean in a hot solution tank must be rinsed thoroughly to prevent damage by traces of alkaline material.

Parts with ground or polished surfaces, such as bearings, gears, shafts, and oil pump components should be clean with emulsion cleaners or petroleum solvents. An alkaline solution may damage the machined surfaces and such cleaning methods should be avoided.

## 3.2 DRY AND CORROSION INHIBITION

Dry compressed air or clean, soft shop towels should be used to dry parts after cleaning. Bearings should never be spun dry with compressed air.

Dried parts should be immediately coated with a light oil or corrosion inhibitor to prevent corrosion damage. Parts which are to be stored should also be wrapped in heavy waxed paper or plastic bags and kept dust-free.

## 3.3 INSPECTION

Prior to reassembly, parts which are to be reused must be carefully inspected for signs of wear or damage. Replacement of such parts can prevent costly downtime at a future date.

All bearing surfaces, including roller bearings cups and cones, should be examined for pitting, wear, or overheating. Gears may also show pits, as well as scoring and broken teeth. Shafts may be nicked or marked, or have damage threads. Parts which show any signs of damage should be repaired or replaced.

Inspect the oil pump. If any damage is noted, the pump assembly should be replaced as a unit.

Check all shift forks and slots in sliding clutches for wear or discoloration due to heat. Check the engaging teeth for a partial engagement wear pattern.

**NOTES**

# 4.0 GENERAL INSTRUCTIONS

## 4.1 SAFETY

The servicing and maintenance of components from any automotive vehicle present possible hazards, every endeavor should be made to minimize the risk taken to successfully complete the task. For your protection we offer these warnings and suggestions.

1. When working on, around, or under the vehicle the parking brake should be securely applied and all wheels should be blocked to prevent wheel movement. Do not rely on the vehicle being in gear with a dead engine to prevent movement. All work should be performed on a flat level surface free of loose material.

2. When working under a vehicle, it should be raised and supported with the appropriate frame stands or very secure blocking.

**WARNING:** NEVER WORK UNDER A VECHILE WHILE SUPPORTED ONLY ON A FLOOR JACK OR HOIST.

3. Be sure any lifting equipment has adequate capacity to raise the vehicle or component being lifted. This includes hydraulic floor jacks, and axle support dollies, etc. The weight of Fabco components is given in the front of the applicable service manual.

4. Caution must be exercised when cleaning the component or underside of the vehicle. Compressed air should not be used to blow dirt away as any harmful contaminant material on the bottom of the vehicle will be spread around the work area.

Appropriate solvents and cleaning solutions can be used in accordance with their labeling instructions or by referring to the Material Safety Data Sheet (MSDS) that is available for each cleaner. Approved protective eyewear, gloves, masks, and clothing should always be worn.

## 4.2 ASSEMBLY PRECAUTIONS

1. Read these instructions completely before starting reassemble. Refer to the appropriate exploded view in the parts manual.

2. All parts must be cleaned. The gasket surfaces must be free of oil gasket material. Do not reuse old gaskets.

3. Bearing cups bores, shaft splines and bearing mounting surface, should be coated with Lubriplate or equivalent. This is necessary to reduce the possibility of galling.

4. All used oil seals must be replaced and the new oil seals should be coated with Loctite 601 or equivalent on their outer diameter prior to being installed in their bores. The sealing lips should be coated with Lubriplate or the equivalent to provide initial lubrication.

5. All external cap screw should have there threads coated with loctite.

6. All threaded fasteners should be tightened to the torque specified in the torque specification section.

7. Any sharp edges on the seal diameter of the universal joint yoke or companion flanges should be removed with emery cloth and should be coated with Lubriplate or the equivalent on the seal operating area prior to installation.

8. In many of the procedures, when a part is assembled with a press fit, it is recommended that the part be heated prior to installation. The part should be placed in an oven and heated to no more that 300°F. Excessive heat my change the metallurgical properties of the part. Heated components should be allowed to cool to room temperature before end float measurements are made.

**CAUTION:** ALTHOUGH FABCO DOES NOT RECOMMEND ITS USE IN TRANSFER CASES, IF FORMED-IN-PLACE GASKET IS USED FOR REPAIRS. EXTREME CAUTION MUST BE EXERCISED TO PREVENT THE COMPOUND FROM ENTERING BEARINGS, OIL GALLERIES, AND PASSAGES OR TAPPED HOLES. ALL BEADS MUST BE KEPT SMALLER THAN 1/8 INCH DIAMTER.

## 4.3 REMOVAL

1. Remove fill and lower drain plugs and drain gear lubricant.

2. Disconnect wire leading to indicator light switch and temperature sensor, if used.

3. Disconnect and tag shift cylinder air lines.

4. Disconnect speedometer cable.

5. Disconnect drivelines at flanges or yokes.

6. Position a transmission jack of suitable capacity beneath the transfer case. The transfer case must be seated on the jack in a safe and firm position.

7. Disconnect transfer case mounting at the rubber shock insulators. Since mounting designs vary, consult the vehicle service manual.

8. After making sure that **all** mounting and connections to the transfer case are disconnected, lower the transfer case gradually to the floor. It is imperative that the transfer case is **ALWAYS** safely positioned on the transmission jack to safeguard the transfer case from falling off the jack. Remove the transfer case from beneath the vehicle. It may be necessary to jack the truck up to allow room to remove the transfer case.

## 4.4 INSTALLATION

1. Place the transfer case onto the transmission jack, preferably lifting by means of the eye bolts.

2. Position the transmission jack underneath the vehicle. Some vehicles may require that one side be jacked up in order to achieve sufficient clearance to place the transfer case between the frame rails.

3. Raise the transmission jack to properly locate the transfer case.

4. Connect transfer case mounting. Since mounting designs vary, consult vehicle service manual.

5. Connect the drivelines, the speedometer cable, and the shift cylinder air lines.

6. Connect the indicator light and temperature sensor wires.

7. Fill the housing with the appropriate lubrication to the correct level and install the oil fill plug.

8. Road test the vehicle and check the transfer case for leaks around seals and gaskets.

**NOTES**

## 5.0 DISASSEMBLY

Disassembly and assembly of the Fabco TC-180 Transfer Case with PTO is a relatively simple procedure which can be made easier by the use of some very simple tooling. Details of all tooling required are given in the tooling section (9.0) for manufacture in your own facilities or Fabco Automotive may be contacted for a price and availability.

### 5.1 GENERAL DISASSEMBLY

1. After removing the transfer case from the vehicle, thoroughly clean the exterior.

2. Remove the drain plug and drain the oil.

3. Mount the transfer case in a suitable fixture. The fixture should be such that the case can be rotated so that either its front or its rear is facing upward. A transfer case mounted in a typical fixture is shown in **Figure 4**.

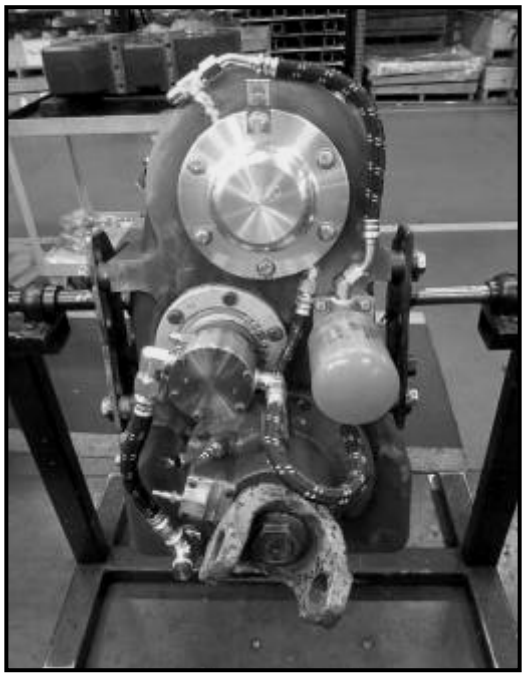


**Figure 4**

4. Remove the oil pump assembly, and gasket.

### 5.2 TRANSFER CASE COMPONENT REMOVAL

For purposes of this manual, a TC-180 with PTO contains five shaft assemblies: Input, Intermediate, Front Output, Rear Output, and PTO shaft assembly.

Be sure to use the correct procedure for each shaft assembly. In some procedures, a similar procedure for a different shaft is called out.

1. Remove oil strainer. See **Figure 5**.

**Figure 5**

2. Remove the four hoses. Remove oil filter from the oil filter bracket. See **Figure 6.**

**Figure 6**

3. Remove the four bolts securing the filter bracket, then the filter bracket itself. See **Figure 7**.

**Figure 7**

4. Remove the three indictor light switches and washers located on the front side of the transfer case attached to the housing on the FRONT OUPUT SHAFT, the transfer case's back side on the declutch housing, and the rear output carrier. See **Figure 8.**

**Figure 8**

5. Remove the three switch actuating pins with a pencil magnet. See **Figure 9.**

**Figure 9**

6. See Section 5.8.5 for removal of the air shift cylinders from the declutch housings.

**5.3 PTO Shaft removal**

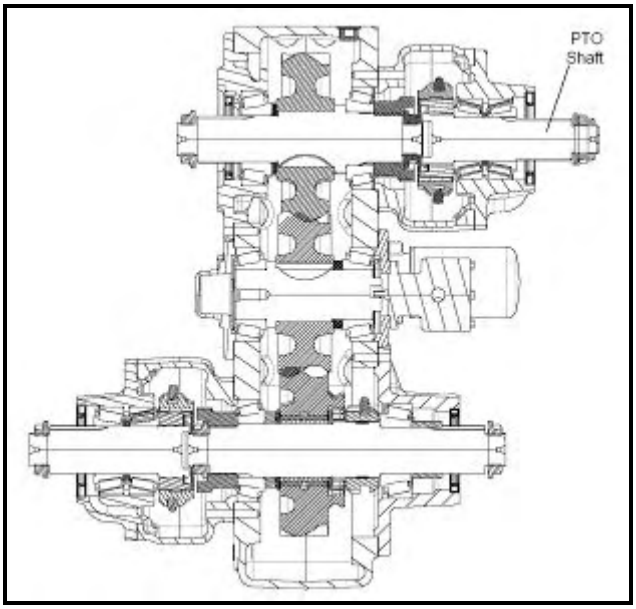



**Figure 10**

To remove the PTO shaft assembly and declutch housing, refer to section 5.6 "Front Output Shaft Removal" for similar procedure.

## 5.4 INPUT SHAFT REMOVAL

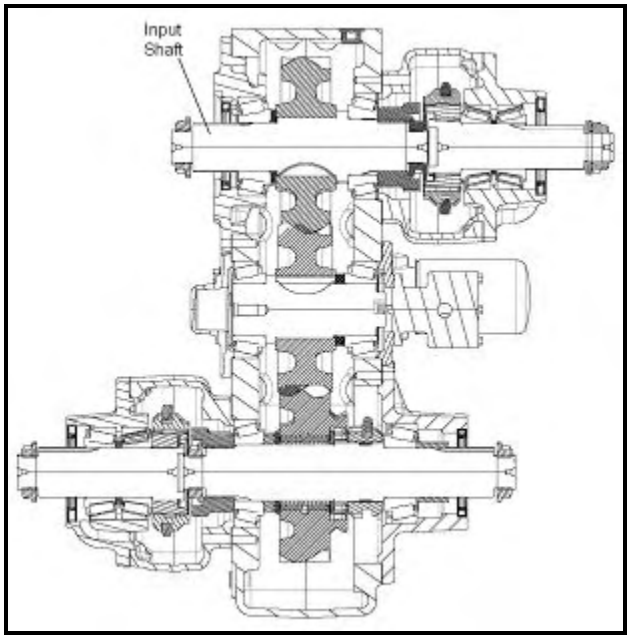



**Figure 11**

1. If PTO declutch housing or cap has been removed, also remove shim pack on rear side. Keep the shims together with the PTO declutch housing or cap to facilitate reassembly.

2. Carefully rotate the TC over so that the front side is facing upward. The input shaft can slide downwards as it has some play between the housing and the gear, and it is only held by the bearing cup that is no longer constraint by the PTO declutch housing or cap.

3. Remove the ten cap screws and washers securing the front input carrier to the housing.

4. Remove the input carrier and shaft assembly by lifting on the shaft yoke. Discard the gasket.

## 5.5 REAR OUTPUT SHAFT REMOVAL

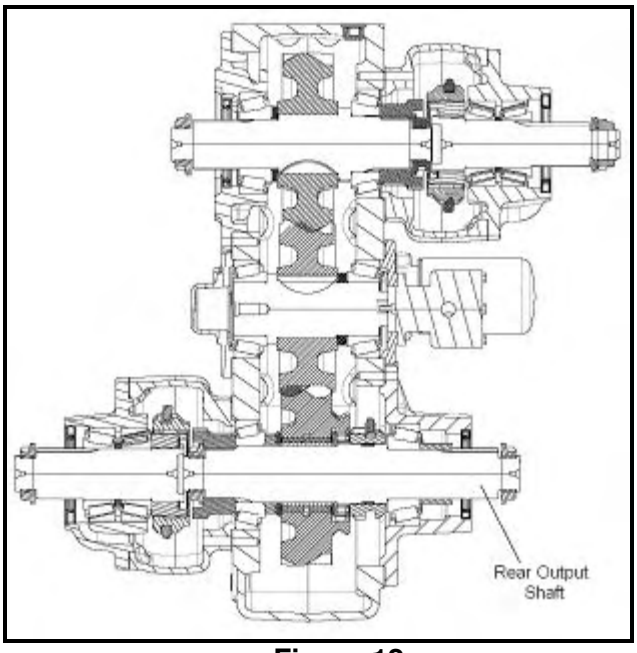



**Figure 12**

1. Position the transfer case with its rear end facing upward.

2. Remove the ten cap screws and washers securing the rear output carrier to the transfer case housing.

3. Mark the position of the carrier to housing with chalk as it needs to be reassembled in the same position.

4. Remove the carrier and shaft assembly by lifting on the shaft yoke. Discard the gasket. See **Figure 13**.

**Figure 13**

## 5.6 FRONT OUTPUT SHAFT REMOVAL

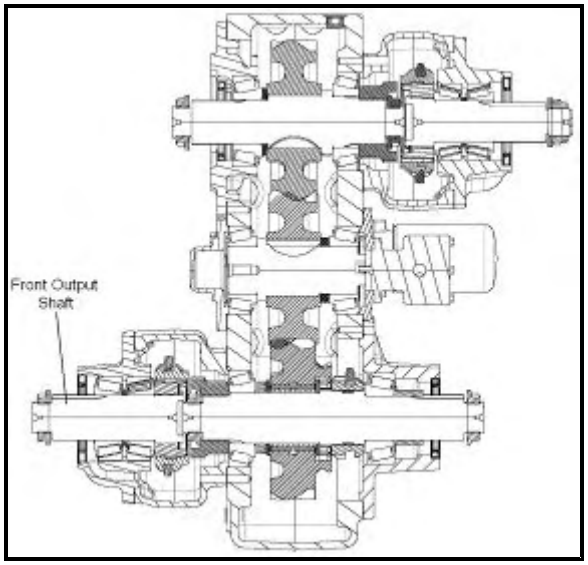



**Figure 14**

1. Position the transfer case with its front end facing upward.

2. Remove the four cap screws securing the declutch housing cover plate.

3. Remove the eight cap screws and washers securing the carrier to the declutch housing.

4. Mark the position of the carrier to housing with chalk as it needs to be reassembled in the same position.

5. Lift off the shaft assembly. Discard the carrier gasket. See **Figure 15**.

**Figure 15**

6. Remove the air shift piston nut. Exercise caution as the piston is spring loaded. Remove the washer, piston, spring, and the nylon stop ring.

7. Cut and remove the safety wire on the shift fork bolts and remove the bolts. See **Figure 16**.

**Figure 16**

8. Remove the shift shaft. It may be necessary to carefully pry open slightly the slot in the shift fork to free the shaft. Lift out the shift collar and the shift fork. See **Figure 17.**

**Figure 17**

9. Remove the six 12-point cap screws securing the declutch housing to the transfer case housing. Retain shims together with the housing to facilitate reassembly. Remove the bearing cup from the transfer case housing.

10. Do not remove the freeze plug from the shift shaft bore in the declutch housing unless necessary.

## 5.7 INTERMEDIATE SHAFT REMOVAL

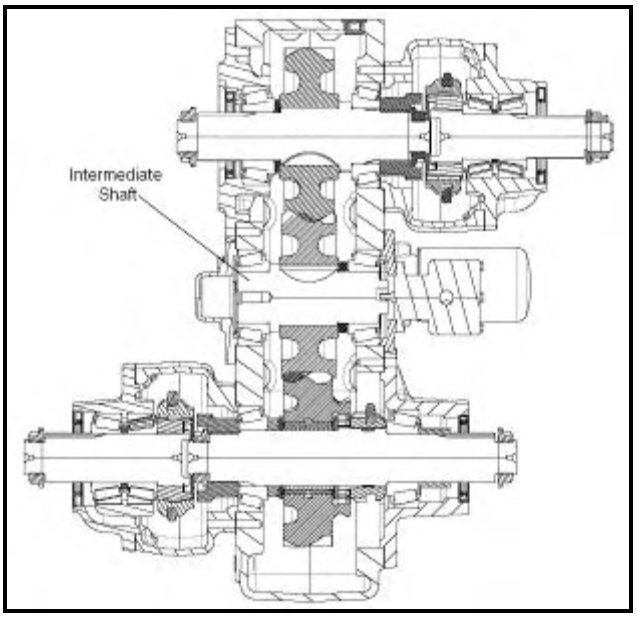



**Figure 18**

On Models not equipped with a lubrication pump, begin the procedure at Step 4.

1. Position the transfer case with its rear end facing upward.

2. Remove the four cap screws and washers securing the oil pump and remove it. Discard the gasket.

3. Remove six cap screws securing the intermediate shaft cap. Remove cap. See **Figure 19.**

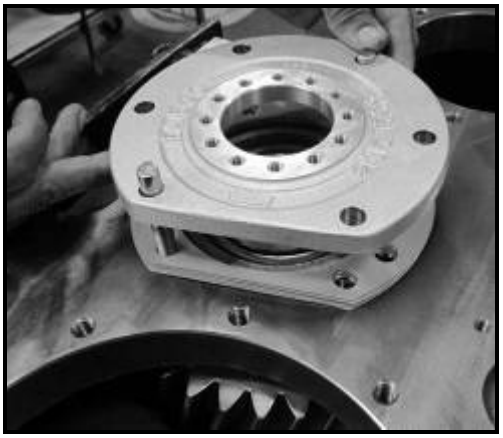


**Figure 19**

4. Position the transfer case with its front end facing upward.

5. Remove the six cap screws and washers securing the front intermediate cap. Remove the cap and discard the gasket.

6. Remove the front bearing cup by pulling upwards on the intermediate shaft assembly.

7. The gear and the rear bearing cone both have a press fit to the intermediate shaft. Therefore, a puller will be necessary to remove the shaft if damage is to be avoided. (A sketch depicting a suitable fabricated puller is illustrated in **Figure 20**.)

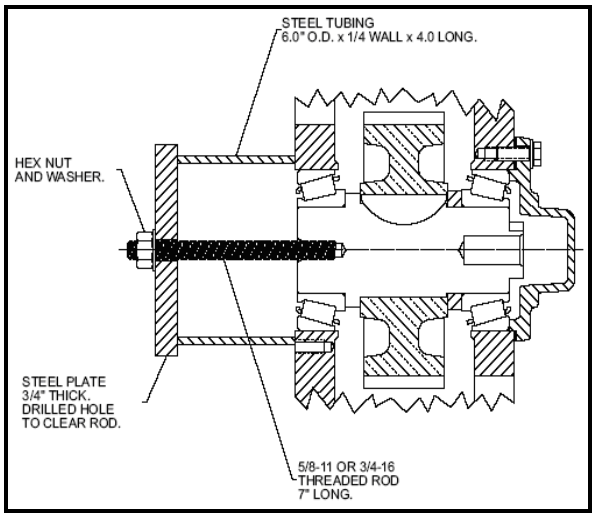



**Figure 20**

8. To prevent damage, do not allow the bearing cone assembly or the gear to drop inside the case as the shaft is being pulled out. Remove the shaft, gear, spacer, and bearing cone assembly.

9. Rotate the transfer case over so that its rear end is facing upward.

10. Remove the six cap screws and washers securing the rear cap to the transfer case. Remove the cap, shim pack, and rear bearing cup. Keep the shims together with the cap to facilitate reassembly.

This concludes the general disassembly.

## 5.8 SUBASSEMBLIES

During a normal overhaul, it is neither necessary nor desirable to completely disassemble the shaft assemblies. The bearing cone assemblies and the drive train gears are installed with a press fit to the shaft and their unnecessary removal only increases the likelihood of damage. The same applies to the bearing cups installed in the carriers.

Parts should be cleaned with emulsion cleaners or petroleum solvents. To avoid damage, alkaline solutions should not be used.

### 5.8.1 INPUT SHAFT DISASSEMBLY

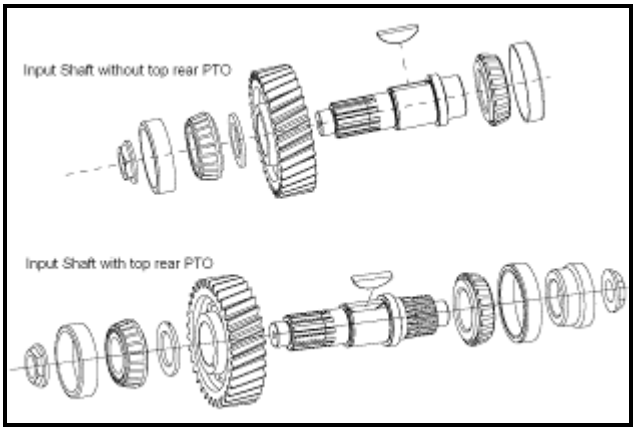



**Figure 21**

1. Remove the input yoke (or companion flange) retaining locknut with an impact wrench. Slide off the clutch gear if provided on the rear side. Slide the input yoke (or flange) off the shaft on the input side.

2. Lift off the input carrier assembly. Remove the oil seal from the carrier and discard. Remove the bearing cup from the carrier only if it is to be replaced. It is not necessary to disassemble the shaft assembly any further unless one or more of the components remaining are to be replaced.

3. Place the shaft assembly in a press so that the rear of the gear is supported and the press arbor bears against the threaded end of the shaft. See **Figure 22**. Remove the front bearing cone assembly, the spacer washer, and the gear.

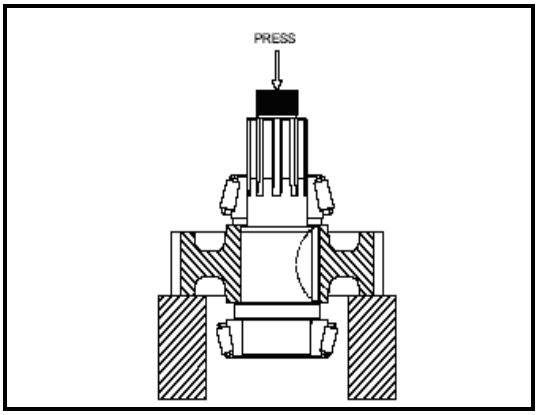



**Figure 22**

4. To remove the rear bearing cone assembly, support under the cone with a bearing separator and press the shaft through the cone. See **Figure 23**. Remove the shaft key only if necessary.

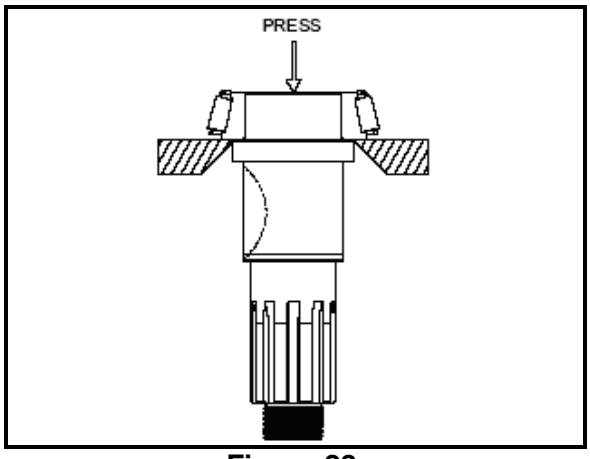



**Figure 23**

### 5.8.2 INTERMEDIATE SHAFT DISASSEMBLY

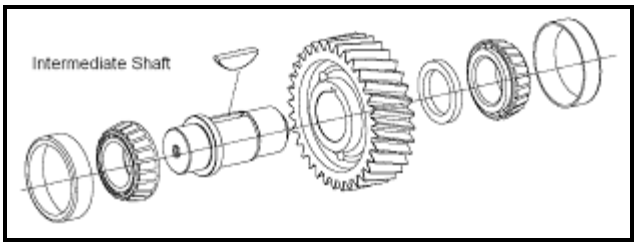



**Figure 24**

It is not necessary to disassemble the intermediate shaft assembly unless a component is to be replaced.

1. To remove the bearing cone assembly, support under the cone with a bearing separator and press to shaft through the cone. See **Figure 25**.

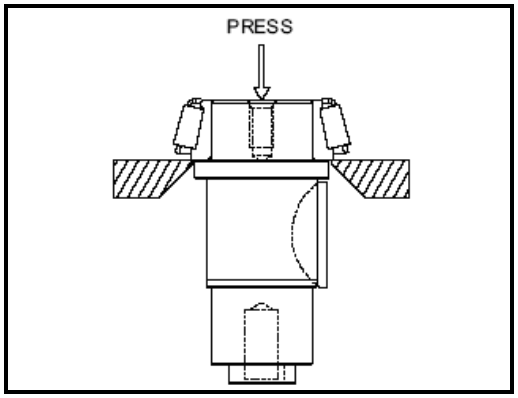



**Figure 25**

2. Remove the shaft key only if necessary.

### 5.8.3 FRONT OUTPUT AND PTO SHAFT DISASSEMBLY

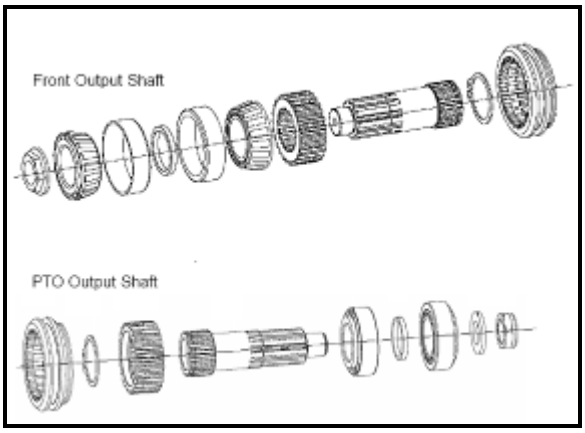



**Figure 26**

1) To facilitate reassembly, the end float of the shaft should be checked prior to disassembly. Install a dial indicator with a magnetic base as pictured in **Figure 27**. Lift upward on the carrier and note the amount of end float.

**Figure 27**

2) Remove the yoke (or companion flange) retaining locknut with an impact wrench. Slide the yoke (or flange) off the shaft.

3) Place the shaft assembly in a press such that the face of the clutch gear is supported and the press arbor bears against the threaded end of the shaft. See **Figure 28**. Be sure that the outer diameter of the snap ring will clear the support. Remove the carrier assembly, the inner bearing cone assembly, the bearing spacer ring, and the clutch gear.

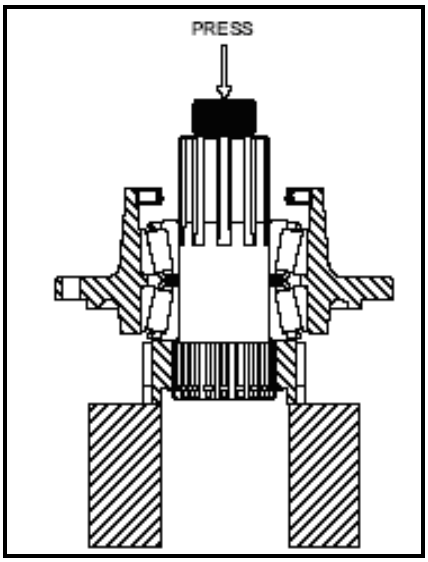



**Figure 28**

4) Remove the oil seal from the carrier and discard. Lift out the remaining bearing cone assembly. Remove the bearing cups from the carrier only if they are to be replaced.

5) Remove the snap ring from the shaft only if it or the shaft is to be replaced.

### 5.8.4 REAR OUTPUT SHAFT DISASSEMBLY WITHOUT NEUTRAL

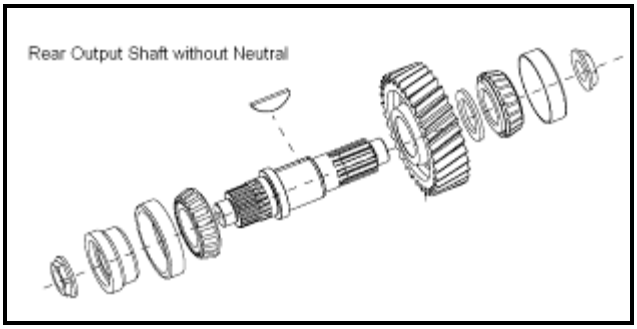



**Figure 29**

1) Remove the yoke (or companion flange) locknut with an impact wrench. Slide the yoke (or flange) off the shaft.

2) Lift off the rear carrier assembly. Remove the oil seal from the carrier and discard. Remove the bearing cup from the carrier only if it is to be replaced.

Steps 3, 4 and 5 are necessary only if one or more components remaining are to be replaced.

3) Remove the front clutch gear retaining locknut with an impact wrench. See **Figure 30**. Slide off the clutch gear.

**Figure 30**

4) Place the shaft assembly in a press so that the gear is supported and the press arbor bears against the yoke-end of the shaft. See **Figure 31**. Remove the bearing cone assembly, the spacer washer, and the gear. Remove the shaft key only if necessary.

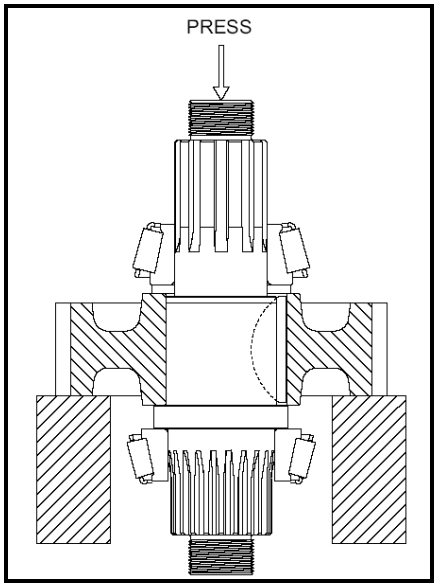



**Figure 31**

5) To remove the remaining bearing cone assembly, support under the cone with a bearing separator and press the shaft through the cone. See **Figure 32**.

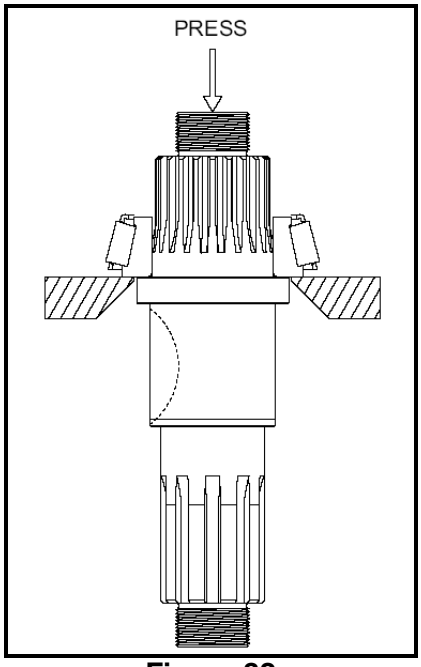



**Figure 32**

## 5.8.5 REAR OUTPUT SHAFT DISASSEMBLY WITH NEUTRAL

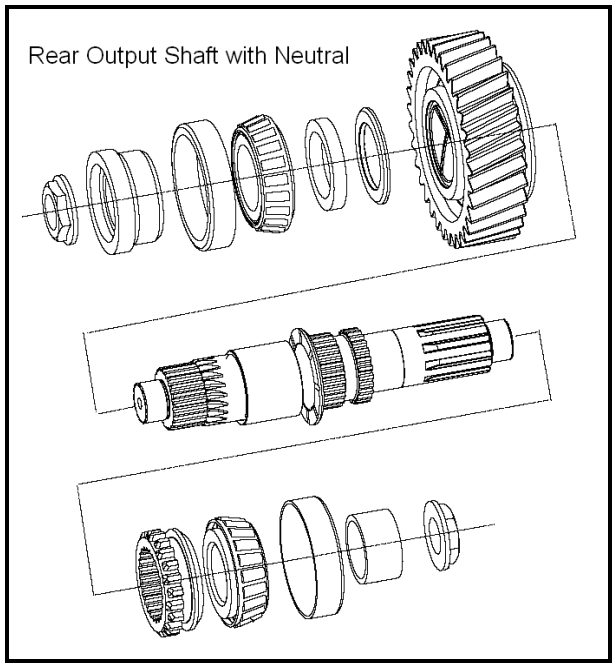



**Figure 33**

1) Remove the yoke (or companion flange) locknut on output side with an impact wrench. Slide the yoke (or flange) off the shaft.

2) Remove the four cap screws securing the shift cylinder cap to the carrier. Remove the cap and the nylon piston ring. Discard the cap O-ring.

3) Remove the piston retaining locknut and washer. A wrench on the shift fork may be necessary to prevent the shaft from turning.

4) Lift the rear carrier assembly off the shaft and slide the shift fork from the clutch gear. Remove the oil seal from the carrier and discard. Remove the bearing cup from the carrier only if it is to be replaced.

5) Remove the piston and the nylon stop ring from the carrier. Discard all O-rings.

6) To facilitate reassembly, the gear end float on the shaft should be checked prior to further disassembly. Install a dial indicator with a magnetic base as pictured in **Figure 34**. Lift upward on the gear and note the amount of end float.

**Figure 34**

7) Remove the clutch gear retaining locknut on the other side of the shaft with an impact wrench and slide off the clutch gear. See **Figure 35**.

**Figure 35**

Steps 8, 9, and 10 are necessary only if one or more components remaining are to be replaced.

8) Place the shaft assembly in a press so that the gear is supported and press arbor bears against the yoke-end of the shaft to remove the bearing cone

assembly, the spacer washer, and the gear. See **Figure 36.**

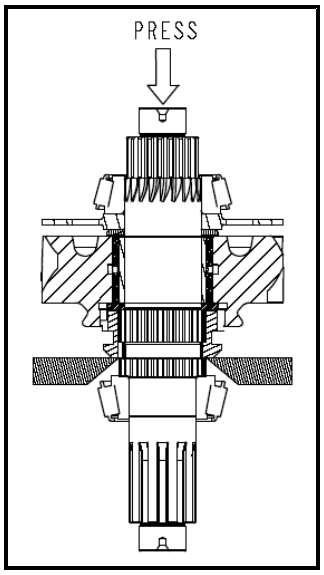



**Figure 36**

9) To remove the remaining bearing cone assembly, slide the clutch collar towards the thrust washer and support under the cone with a bearing separator and press the shaft through the cone. See **Figure 37**.

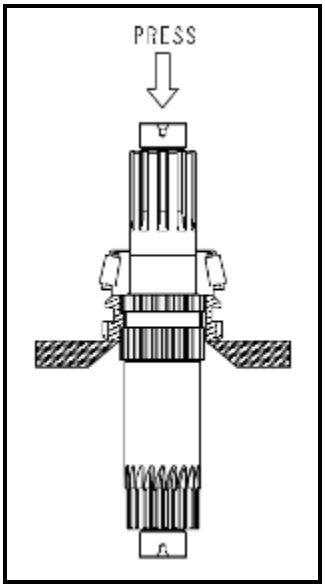



**Figure 37**

10) Slide off clutch collar gear.

### 5.8.6 SHIFT SHAFT DISASSEMBLY (PTO AND FRONT OUTPUT)

1. Remove the four plate screws holding the plate to the declutch housing. Then remove the plate and gasket. See **Figure 38.**

**Figure 38**

2. Remove bolt safety wire and bolts. See **Figure 39.**

**Figure 39**

3. Remove four Cap Screws, then the shift shaft cap. See **Figure 40.**

**Figure 40**

For steps 4-8, use **Figure 41** for reference.

1.

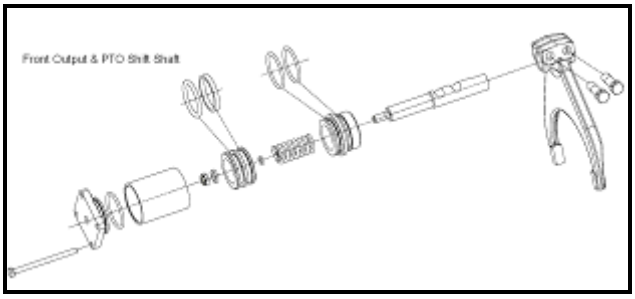



**Figure 41**

4. Remove the nut and washer.

5. Take out the piston shift and stop.

6. Remove compression spring.

7. Uncase the shift cylinder adapter. See **Figure 42.**

**Figure 42**

8. Take out the shift shaft.

9. Remove the fork shift together with the clutch collar gear.

## 6.0 ASSEMBLY

Make sure all parts are clean, dry and lint free. Any traces of storage wax or paper should be removed. Leave bearings and cups in their wrapper, until ready to use. Do not handle parts any more than necessary.

Unless indicated otherwise, part mating surfaces should be given a light coat of lubricant. Lubriplate is acceptable. A substitute may be used using a mixture of chassis grease and 30W engine oil. The mix should be thin enough to apply with a small brush.

### 6.1 ASSEMBLY OF SUBASSEMBLIES

In the following assembly procedures, it is assumed that the various shaft assemblies were completely disassembled. Skip any step that refers to a part that is already assembled. Refer to section 4.2 in this manual for assembly precautions.

### 6.2 ASSEMBLY OF THE INPUT SHAFT

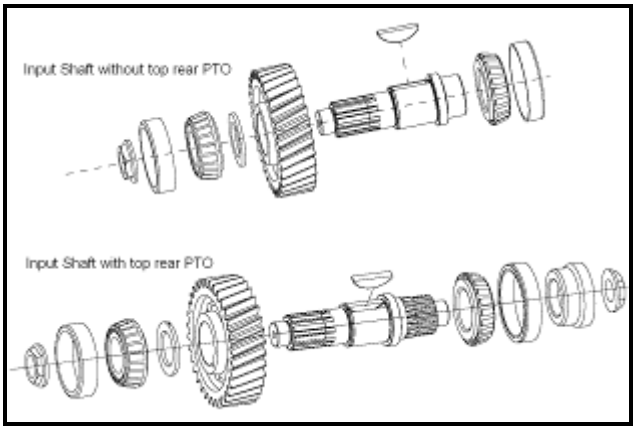



**Figure 43**

1. Install a new oil seal and bearing cup in the input shaft carrier. If removed, install a new key in the input shaft.

2. Heat and install the bearing cone assembly against the shoulder on the non-threaded end of the input shaft. See **Figure 44**.

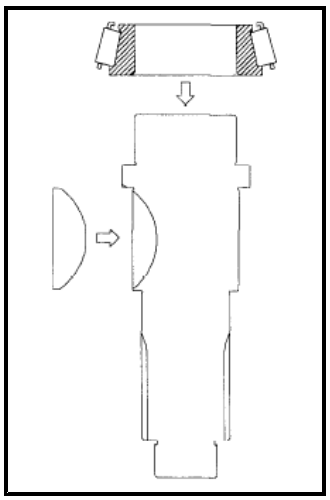


**Figure 44**

**CAUTION:** WHEN A PART IS ASSEMBLED WITH A PRESS FIT, IT IS RECOMMENDED THAT THE PART BE HEATED PRIOR TO INSTALLATION IN A SUITABLE OVEN AT A TEMPERATURE NO GREATER THAN 300°F.

3. Invert the input shaft and install the heated gear, the spacer, and the heated bearing cone. See **Figure 45**.

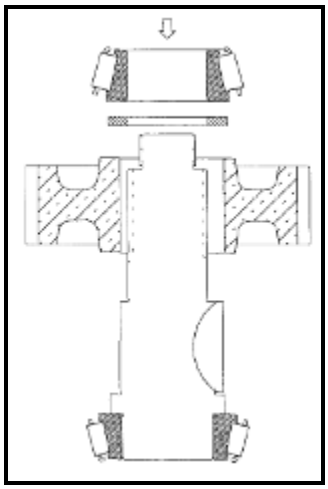


**Figure 45**

4. Place the carrier into position and slide the yoke (or companion flange) onto the shaft. Install the yoke retaining locknut. For convenience, the nut may be torqued after the shaft assembly has been installed in the transfer case housing.

**THIS CONCLUDES THE ASSEMBLY OF THE INPUT SHAFT.**

## 6.3 ASSEMBLY OF THE INTERMEDIATE SHAFT

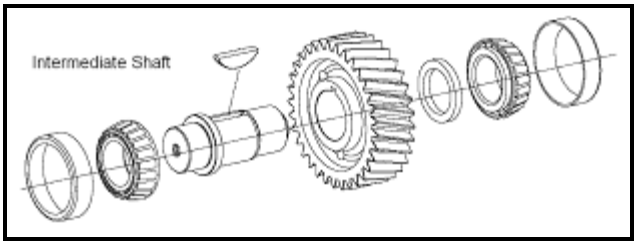



**Figure 46**

1. If removed, reinstall the keys into the key-ways of the intermediate shaft.

2. Heat the bearing cones and intermediate gear and press onto the intermediate shaft. See **Figure 47**.

**Figure 47**

The remainder of the intermediate shaft assembly must be done inside of the transfer case housing during the shaft installation procedure.

**CAUTION:** WHEN A PART IS ASSEMBLED WITH A PRESS FIT, IT IS RECOMMENDED THAT THE PART BE HEATED PRIOR TO INSTALLATION IN A SUITABLE OVEN AT A TEMPERATURE NO GREATER THAN 300°F.

**THIS CONCLUDES THE ASSEMBLY OF THE INTERMEDIATE SHAFT.**

## 6.4 ASSEMBLY OF THE FRONT OUTPUT AND PTO SHAFT

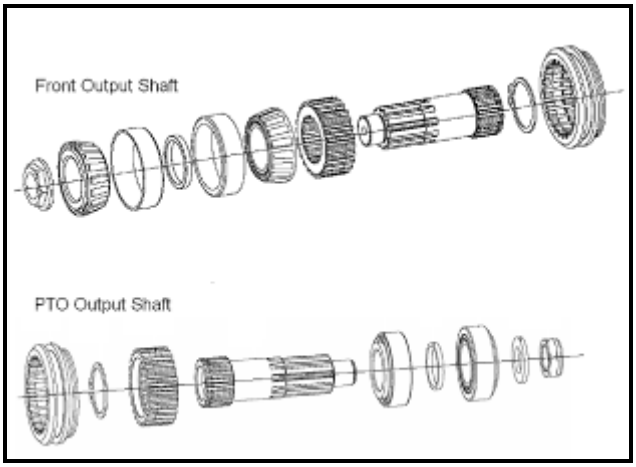



**Figure 48**

1. Install the snap ring on the shaft.

2. Place the shaft in an upright position, with the fine-threaded end up, to protect the shaft threads and splines.

3. Install the clutch collar gear onto the shaft such that the counter bore in the gear fits over the snap ring. Ensure clutch collar gear is mated against snap ring before installing bearing cone.

4. Heat the inner bearing cone and install it against clutch gear.

**CAUTION:** WHEN A PART IS ASSEMBLED WITH A PRESS FIT, IT IS RECOMMENDED THAT THE PART BE HEATED PRIOR TO INSTALLATION IN A SUITABLE OVEN AT A TEMPERATURE NO GREATER THAN 300°F. HEATED COMPONENTS **MUST** BE ALLOWED TO COOL BEFORE END FLOAT MEASUREMENTS ARE MADE.

5. Install the inner bearing spacer ring. The bearing cone spacer ring is a select-fit part that is used to adjust the shaft end float. If the end float checked prior to disassembly was within specification (.003 to .008 in.) and no parts were replaced, the original bearing spacer ring should provide the correct end float on reassembly. See **Figure 49**.

**Figure 49**

6. Press the bearing cups into the carrier.

7. Put the carrier onto the shaft and then the heated outer bearing cone. See **Figure 50**.

**Figure 50**

8. Do not install oil seal at this time. Slide the yoke (or companion flange) onto the shaft. Install and torque the locknut.

9. Mount a dial indicator on the shaft as shown in **Figure 51.**

**Figure 51**

10. Lift the carrier up and note the indicated shaft end float on the dial indicator. If the end float is not within specification (.003 to .008 in), it will be necessary to disassemble the shaft and repeat steps 5-8 using a bearing spacer ring of a different thickness.

11. Remove the yoke (or companion flange) and install the oil seal.

**CAUTION:** WHEN A PART IS ASSEMBLED WITH A PRESS FIT, IT IS RECOMMENDED THAT THE PART BE HEATED, PRIOR TO INSTALLATION, IN A SUITABLE OVEN AT A TEMPERATURE NO GREATER THAN 300°F. HEATED COMPONENTS **MUST** BE ALLOWED TO COOL BEFORE END FLOAT MEASUREMENTS ARE MADE.

**THIS CONCLUDES THE ASSEMBLY OF THE FRONT OUTPUT AND PTO SHAFT.**

## 6.5 ASSEMBLY OF THE REAR OUTPUT SHAFT WITH NEUTRAL AND CARRIER

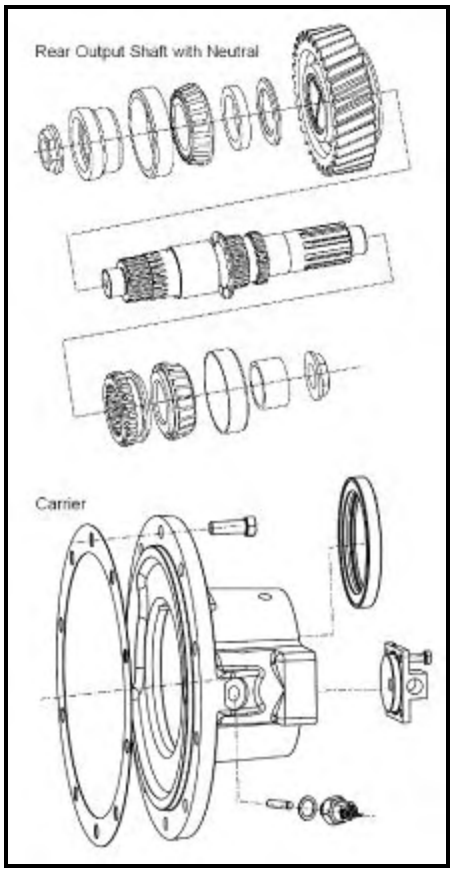



**Figure 52**

1. Install the clutch collar gear onto the shaft. See **Figure 53.**

**Figure 53**

**CAUTION:** WHEN A PART IS ASSEMBLED WITH A PRESS FIT, IT IS RECOMMENDED THAT THE PART BE HEATED, PRIOR TO INSTALLATION, IN A SUITABLE OVEN AT A TEMPERATURE NO GREATER THAN 300°F. HEATED COMPONENTS **MUST** BE ALLOWED TO COOL BEFORE END FLOAT MEASUREMENTS ARE MADE.

2. Lubricate the thickest part of the shaft and the inner surface of the gear. See **Figures 54 and 55**.

**Figure 54**

**Figure 55**

3. Then align and install the gear on the shaft. See **Figure 56.**

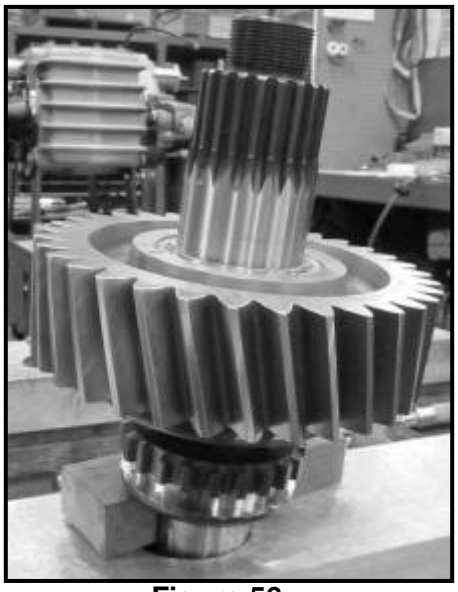


**Figure 56**

4. Install a thrust washer against the gear assembly followed by the small spacer.

5. Heat and install the bearing cone assembly on the shaft against the spacer. Then place the clutch gear on top of the bearing assembly. See **Figure 57.**

**Figure 57**

6. Apply Loctite 290 or equal to the locknut and tighten to the required torque.

7. Invert shaft assembly and install the other bearing cone on top of the clutch collar. Place the large spacer above the bearing. See **Figure 58**.

**Figure 58**

8. Start creating the shift-fork assembly by sliding shift-fork onto the shorter side of the shifter-shaft. Place a flat washer on top of the fork and screw in a locknut using Loctite 272 or equal. See **Figure 59**.

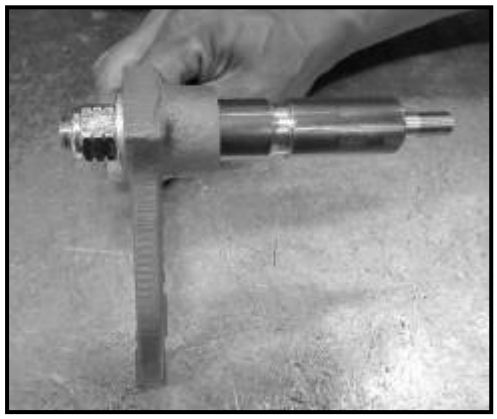


**Figure 59**

9. Place an O-ring on the 3/8 threaded side of the shifter-shaft and attach the shift-fork assembly onto the clutch collar. See **Figure 60**.

**Figure 60**

10. Press the bearing cup into the carrier. See **Figure 61**.

**Figure 61**

11. Place an O-ring into the insert on the carrier. See **Figure 62.**

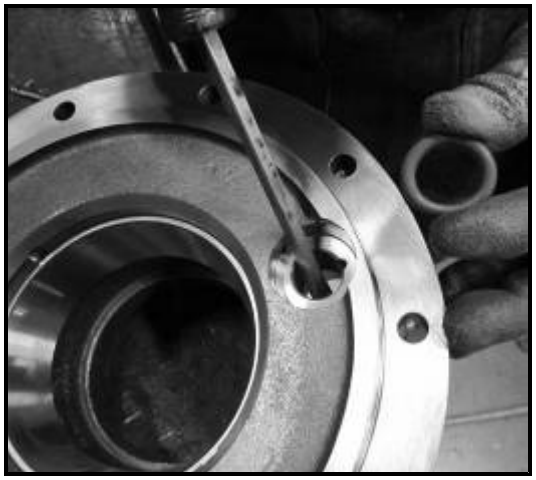


**Figure 62**

12. Use Loctite 620 or equal on the outer diameter of the oil seal and press it into the carrier. See **Figure 63**.

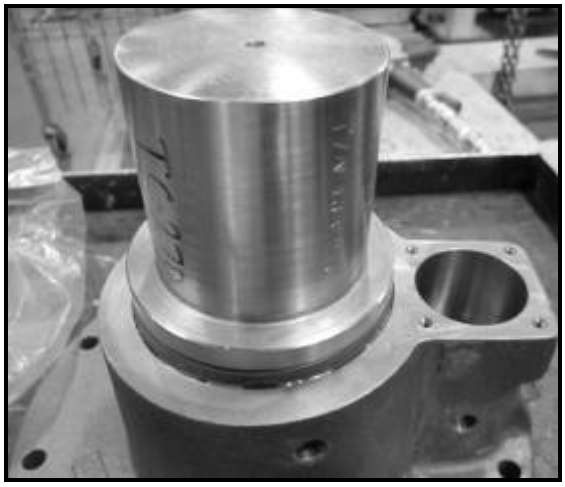


**Figure 63**

13. Align the carrier and place it on top of the bearing cone. Grease up the area between the shift-shaft and the carrier.

14. Place a nylon washer on to the shift-fork assembly. Soak the felt strip in gear oil and install it in the inner groove of the piston. Slip an O-ring around the outer groove before sliding it onto the nylon washer. The end of the piston with the counterbore should be facing outward. Place a washer on top of the piston and screw in a locknut using loctite 272 or equal. Place another nylon washer above the piston. Put an O-ring onto the shift cylinder cap. See **Figure 64**.

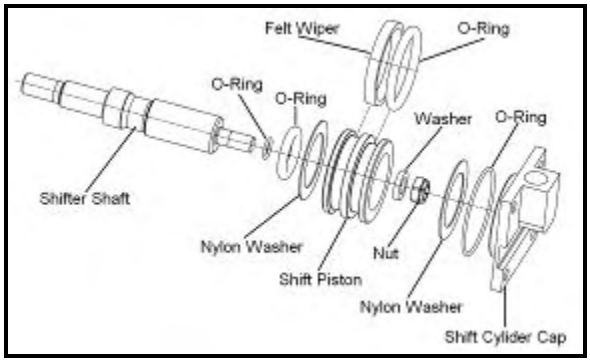



**Figure 64**

15. Screw in the shift cylinder cap using four cap screws again using Loctite 272 or equal. See **Figure 65.**

**Figure 65**

16. Slip the yoke (or companion flange) onto the shaft and secure it with a locknut.

17. Insert the indicator switch actuation pin into place. The rounded end of the pin must face inward. See **Figure 66**.

**Figure 66**

18. Install the switch using a new copper washer. Torque to specification. See **Figure 67.**

**Figure 67**

19. Screw in a fitting onto the shift cylinder cap. See **Figure 68.**

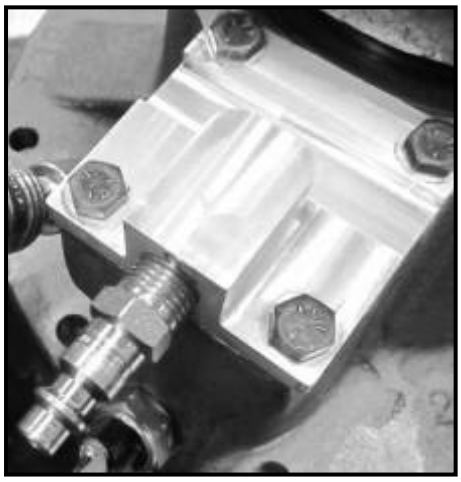


**Figure 68**

**THIS CONCLUDES THE ASSEMBLY OF THE REAR OUTPUT SHAFT WITH NEUTRAL.**

## 6.6 GENERAL ASSEMBLY

### 6.6.1 INTERMEDIATE SHAFT INSTALLATION

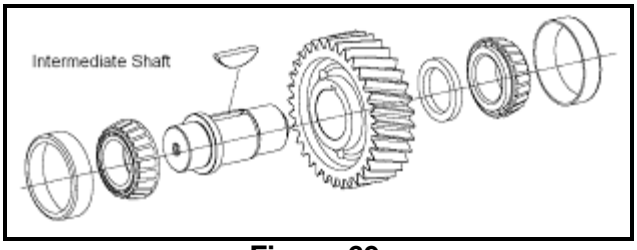



**Figure 69**

1. Position the transfer case with its front end (nameplate) facing upward.

2. Heat the intermediate shaft gear and lower it into the transfer case housing through the lower or upper shaft bore. Position the gear against the rear of the housing in line with the intermediate shaft bores. See **Figure 70.**

**Figure 70**

3. Quickly lower the intermediate shaft assembly through the gear. Be sure that the gear is firmly seated against the shaft shoulder.

4. Place one of the bearing cups into its bore in the front of the housing. Install the front intermediate shaft cap with a new gasket. See **Figure 71**.

**Figure 71**

5. Install the six cap screws and washers. Torque to specification. See **Figure 72**.

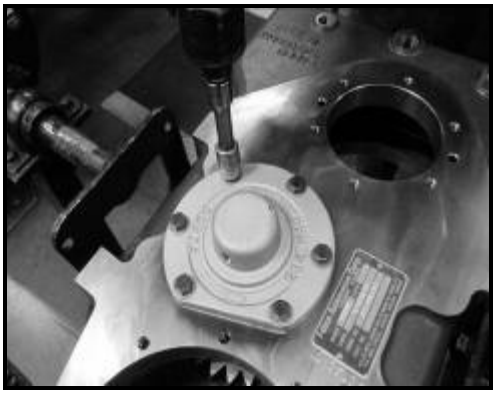


**Figure 72**

6. Rotate the TC over so that its rear end is facing upward. To prevent damage, reach in the case and support the intermediate shaft assembly as the unit is rotated.

7. Slip the spacer washer over the intermediate shaft against the gear. Heat and install the remaining bearing cone assembly against the spacer washer. See **Figure 73.**

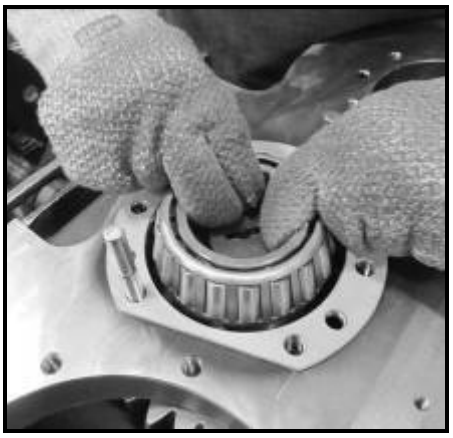


**Figure 73**

8. Place the bearing cup into its bore. Install the rear cap with the original shim pack. See **Figure 74.**

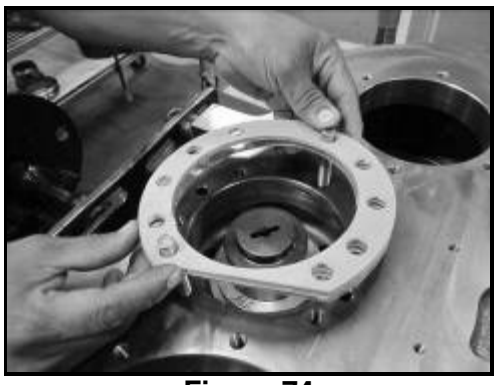


**Figure 74**

9. Install the six cap screws and washers. Torque to specification.

10. Rotate transfer case over such that its shafts are horizontal. Mount a dial indicator such that the indicator tip rests against the end of the shaft. See **Figure 75.**

**Figure 75**

11. Pry the gear up and down several times to be sure that the bearing cups are seated. Note the indicated shaft end float on the dial indicator. If the end float is not within specification (.003 to .008 in), the shim pack should be removed and replaced with a combination of shims which will provide the proper end float. Be sure to recheck the end float after replacing with new shims.

12. Install the oil pump using a gasket and four bolts. Torque to specifications. See **Figure 76.**

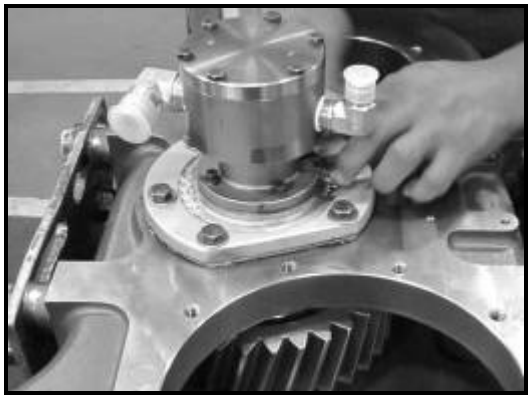


**Figure 76**

### 6.6.2 REAR OUTPUT SHAFT INSTALLATION

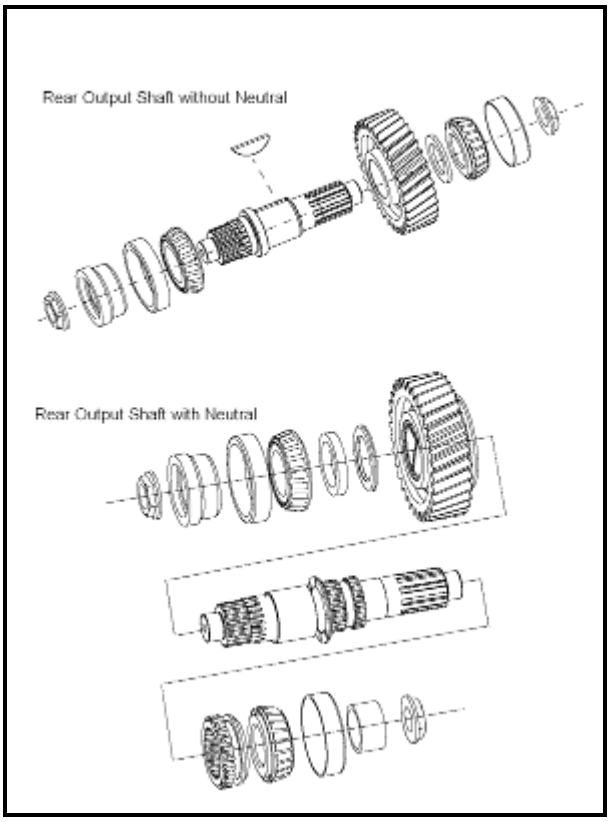
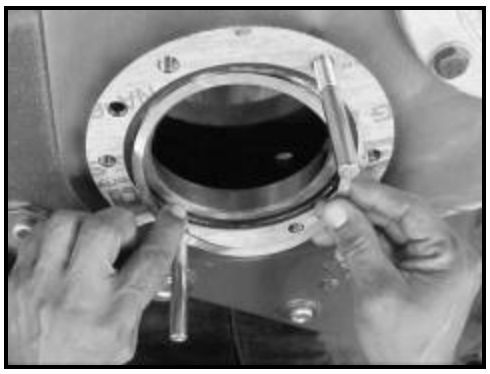



**Figure 77**

1. Position the transfer case with its front end (nameplate) facing upward.

2. If removed, install the freeze plug into the shifter shaft bore of the front declutch housing. Use non-hardening sealer to prevent an oil leak.

3. Insert the front bearing cup into its bore and place the original shim pack on top of the bearing cup. Ensure that the declutch in the next step compresses the bearing cup and shims into place. See **Figure 78.**



4. Position the front declutch housing on the transfer case such that the shifter shaft bores are directly to the left of the lower shaft bore (as viewed when the unit is installed in the vehicle). See **Figure 79.**

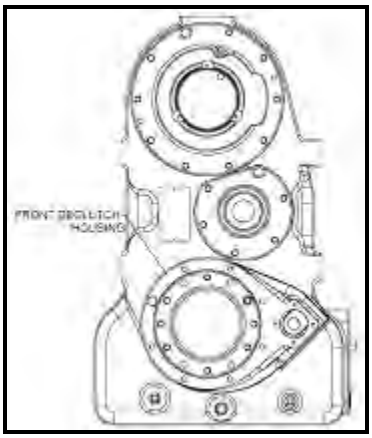



**Figure 79**

5. Install the six 12-point cap screws and torque to specification.

6. Rotate the TC over so that its rear end is facing upward.

7. Position a new gasket on the TC housing and lower the rear output shaft assembly into place .See **Figure 80.**

**Figure 80**

8. The word “TOP” on the rear carrier must be toward the top of the transfer case as installed in the vehicle as in **Figure 79**. Install the ten cap screws and washers to secure the carrier to the TC housing. Torque to specification.

9. Rotate transfer case over such that its shafts are horizontal. Mount a dial indicator on the shaft as shown in **Figure 81.** Pry the rear output shaft up and down several times to be sure that the front bearing cup is seated. Note the indicated shaft end float on the dial indicator. If the end float is not within specification (.003 to .008 in.), the shim pack should be removed and replaced with a combination of shims which will provide the specified end float. Be sure to recheck the end float after replacing with new shims.

**Figure 81**

### 6.6.3 FRONT OUTPUT AND PTO SHAFT INSTALLATION

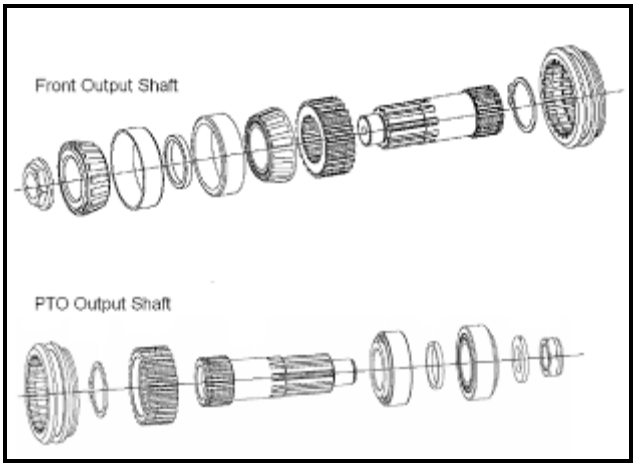



**Figure 82**

1. In order to install the Front output shaft it is necessary to reinstall the shift shaft assembly.

2. Position the transfer case with its front end (name plate) upward. The front declutch housing should already be installed. See **Figure 79**.

3. Slide the shift fork onto the clutch collar and place the two parts, as a unit, into the declutch housing. See **Figure 83**

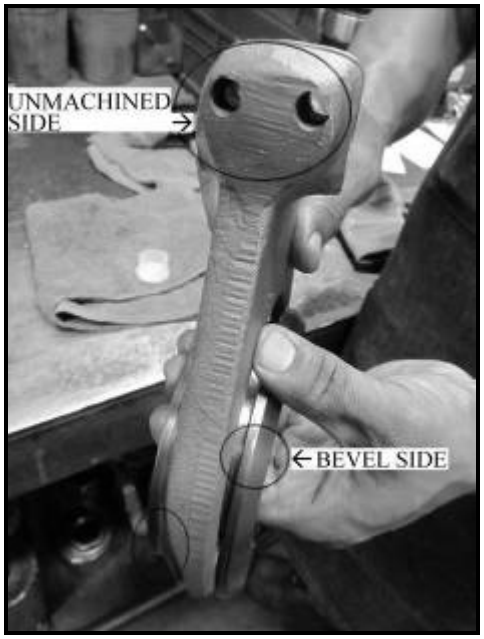



**Figure 83**

4. The clutch collar and fork must be installed in the right direction, so that the shift fork bolts can be installed on the machined side. See **Figure 84.**

**Figure 84**

5. Insert the shift shaft into position. Rotate the shift shaft so that the slots lineup with the bolt holes in the shift fork. Install the (2) shift fork bolts and torque to specification. Install the lock wire between the two bolt heads. See **Figure 85**.

**Figure 85**

6. Install a new piston-to-shaft O-ring over the threaded portion of the shaft. Slide the spring over the shaft. Place the nylon stop ring over the shaft and spring. Install a new piston O-ring in the outer groove in the piston. Soak the air shift piston felt strip in gear oil and install it in the inner groove. See **Figure 86.**

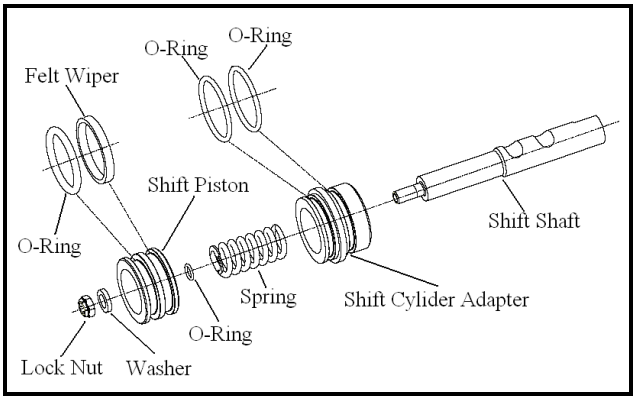



**Figure 86**

7. Position the piston on the shifter shaft. The end of the piston with the counterbore should be facing outward. Push the piston down to compress the spring and install the shifter shaft washer and locknut. Torque the nut to specification. See **Figure 87.**

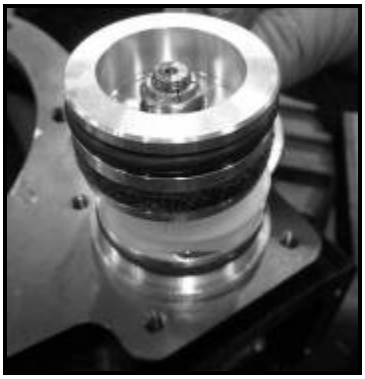


**Figure 87**

8. Install the declutch housing cover with a new gasket. Torque the four cap screws to specification. See **Figure 88**.

**Figure 88**

9. Slip the air shift cylinder into position over the piston. Install a new O-ring on the shift cylinder cap and insert into the cylinder. See **Figure 89.**

**Figure 89**

10. Secure the assembly with the four long cap screws. Torque to specification. See **Figure 90.**

**Figure 90**

11. Insert the indicator switch actuation pin into place. The rounded end of the pin must face inward. See **Figure 91.**

**Figure 91**

12. Install the switch using a new copper washer. Torque to specification. See **Figure 92.**

**Figure 92**

13. Using a new gasket and eight cap screws, install the front output shaft assembly to the declutch housing. Torque to specification. See **Figure 93.**

**Figure 93**

### 6.6.4 INPUT SHAFT INSTALLATION

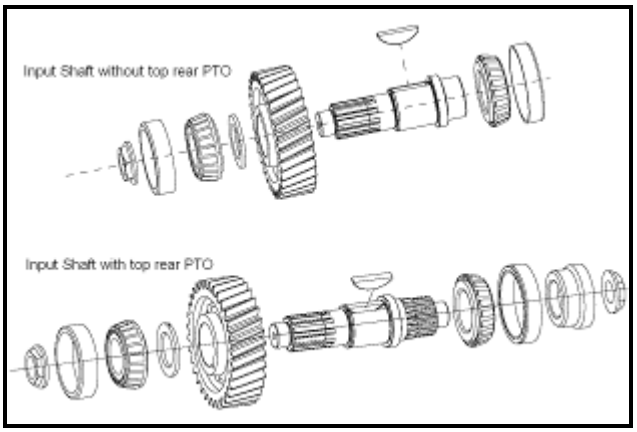



**Figure 94**

1. Position the transfer case with its rear end facing upward.

2. Insert the rear bearing cup into the bore on the housing. Use the original shim pack. See **Figure 95.**

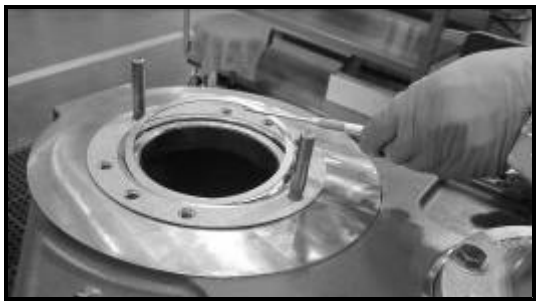


**Figure 95**

3. Align and install the PTO declutch housing or cap on to the transfer case housing. See **Figure 96.**

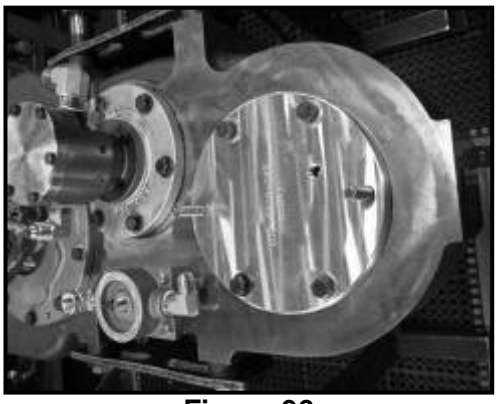


**Figure 96**

4. Install the six 12-point cap screws and torque to specification.

5. Rotate the transfer case over so that its front end is facing upward.

6. Make sure that the rear bearing cup is still in place. Position a new gasket on the transfer case housing and lower the shaft assembly into place. See **Figure 97**

**Figure 97**

7. Align and install the carrier. The word “TOP” on the carrier must be toward the top of the transfer case as installed in the vehicle. Torque the ten cap screws and washers to specification. See **Figure 98**.

**Figure 98**

8. Rotate transfer case such that the shafts are horizontal. Mount a dial indicator on the shaft as shown in **Figure 99.**

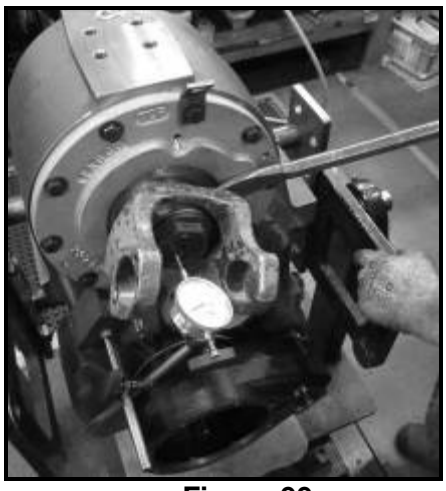
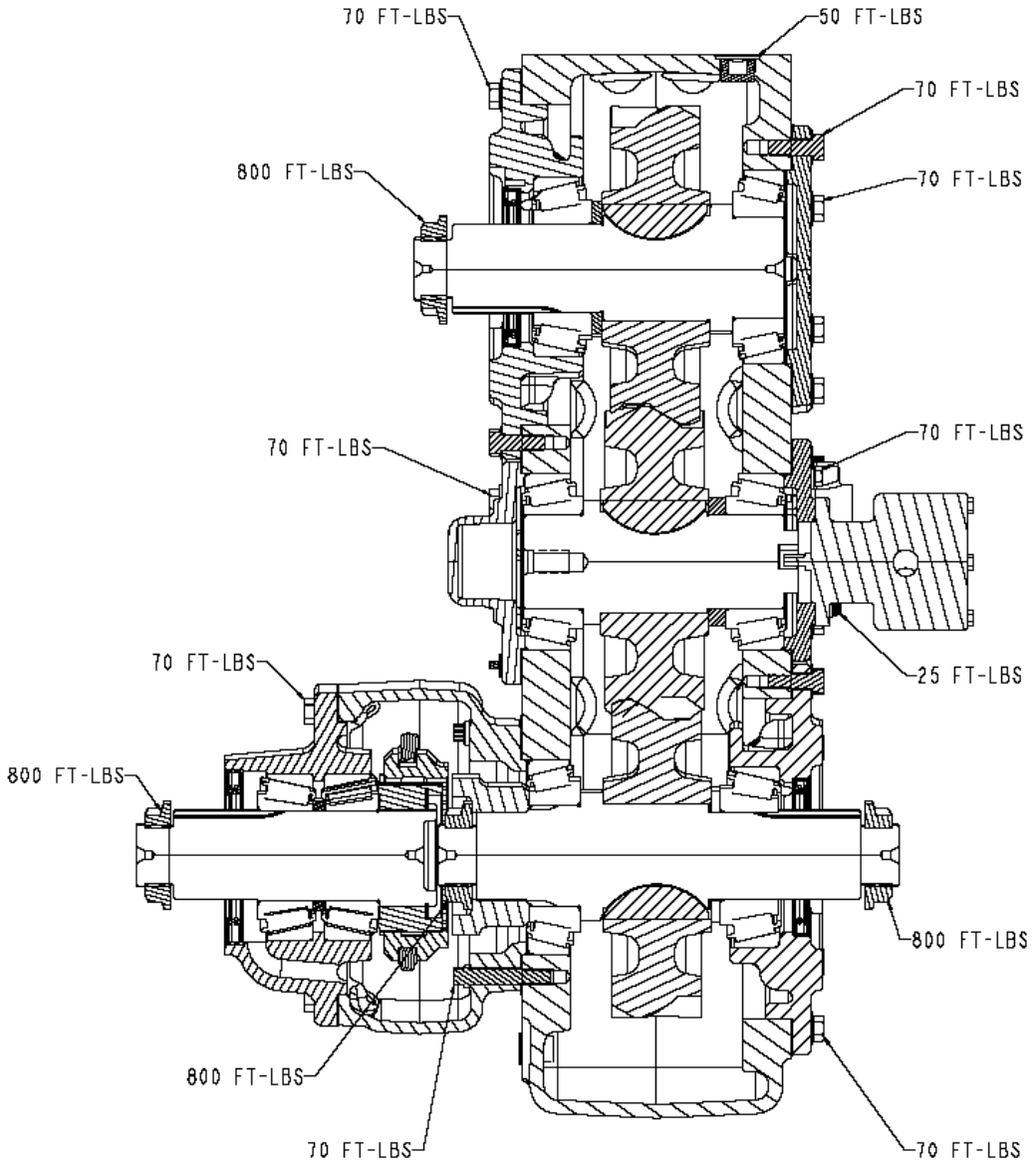


**Figure 99**

9. Pry the gear up and down several times to be sure that the bearing cups are seated. Note the indicated shaft end float on the dial indicator. If the end float is not within specification (.003 to .008 in), the shim pack should be removed and replaced with a combination of shims which will provide the proper end float. Be sure to recheck the end float after replacing with new shims.

10. To install the PTO Shaft turn the TC housing so its rear is facing up and follow steps in section 6.6.3, starting with step 3.

## 7.TORQUE SPECIFICATIONS




ALL TORQUE (LB.-FT.) VALUES ARE FOR DRY UNLUBRICATED THREADS, AND SHOULD BE WITH IN 10% OF THE VALUES SHOWN.

**Figure 100**

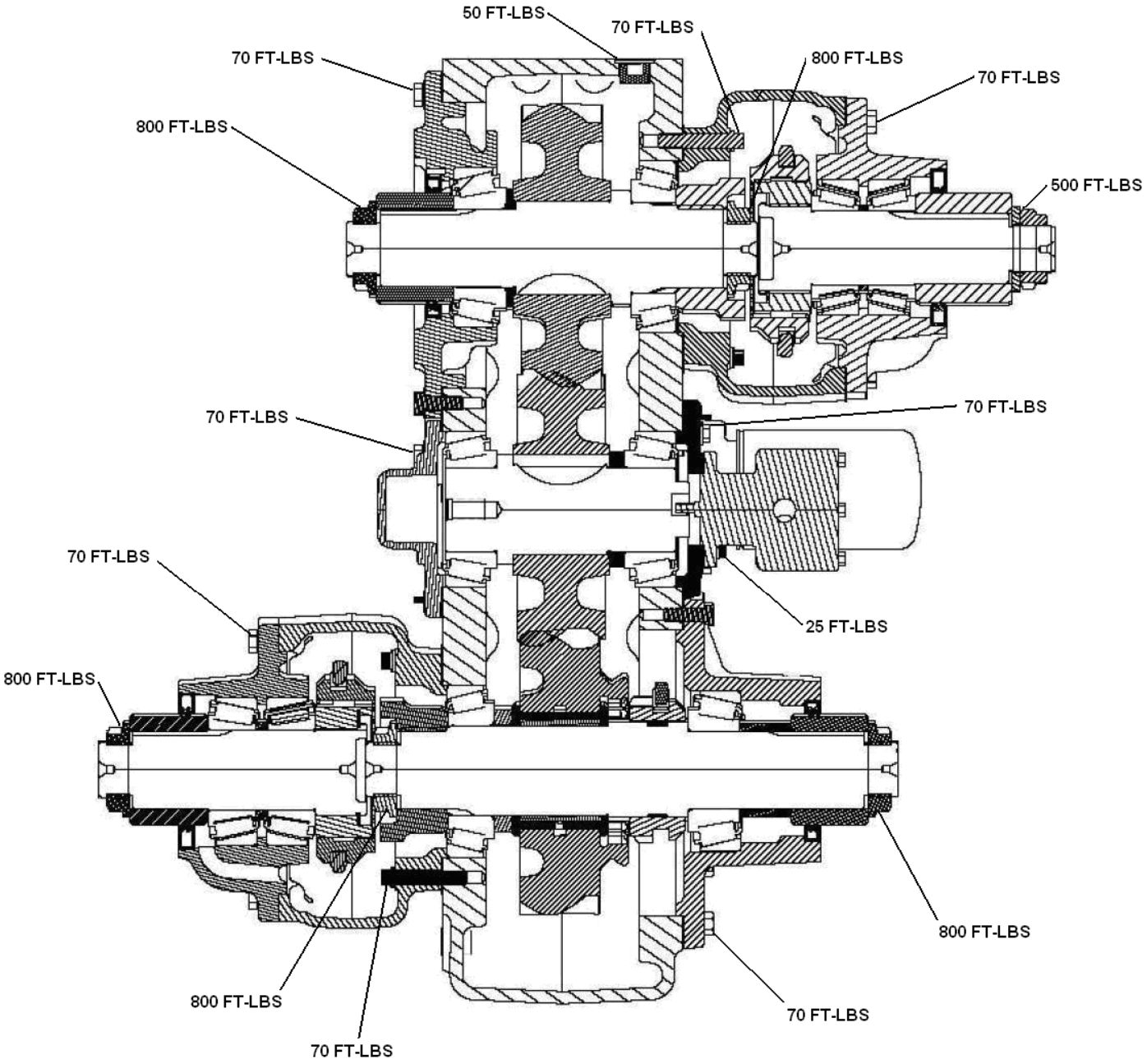
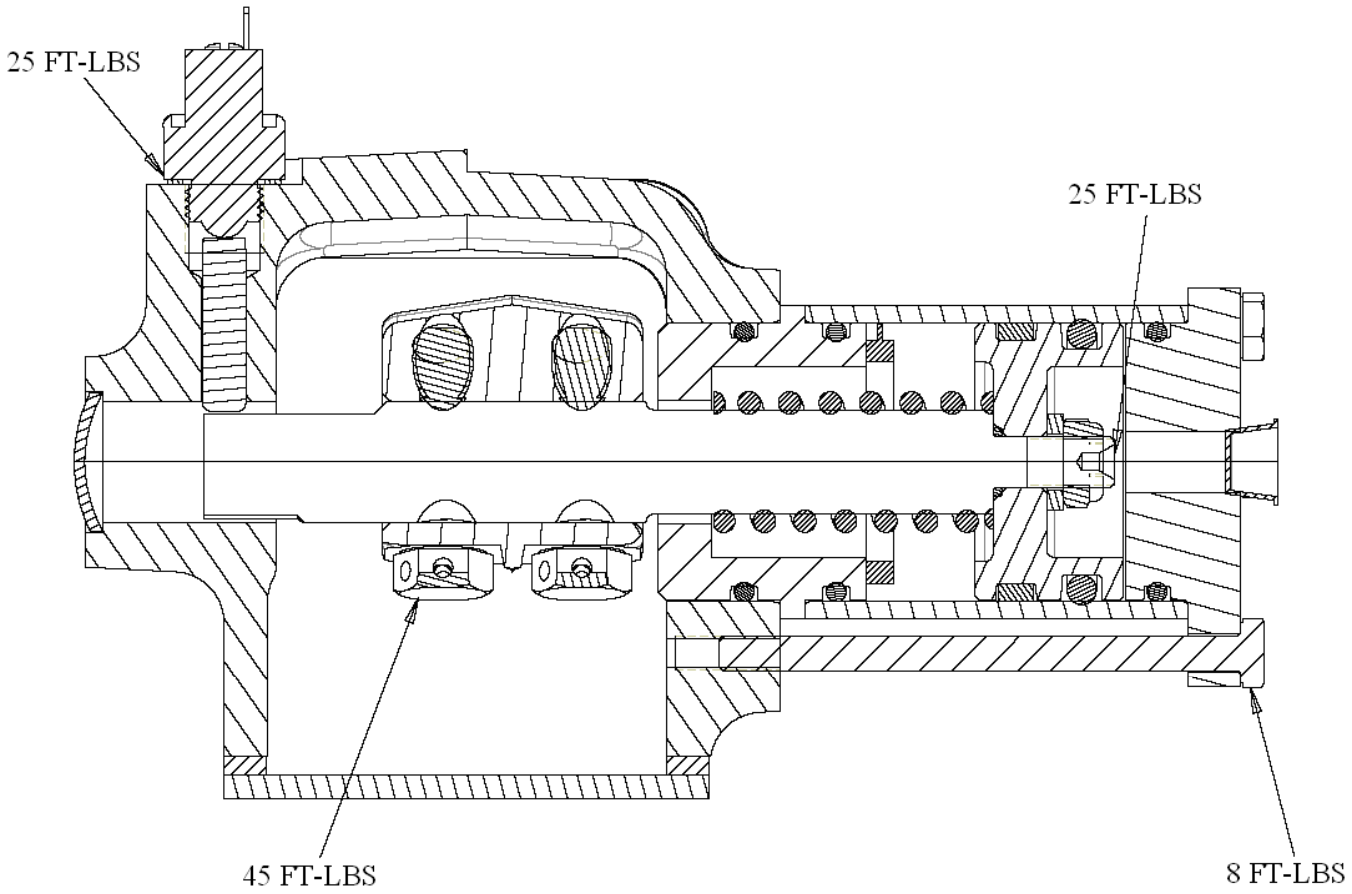

50 FT-LBS
70 FT-LBS
70 FT-LBS
800 FT-LBS
70 FT-LBS
800 FT-LBS
500 FT-LBS
70 FT-LBS
70 FT-LBS
70 FT-LBS
25 FT-LBS
800 FT-LBS
800 FT-LBS
800 FT-LBS
70 FT-LBS
70 FT-LBS
ALL TORQUE (LB-FT) VALUES ARE FOR DRY UNLUBRICATED THREADS
AND SHOULD BE WITH IN 10% OF THE VALUES SHOWN.

**Figure 101**




ADDITIONAL TORQUE SPECIFICATIONS

OIL FILL PLUG.....50 FT-LBS

OIL LEVEL SIGHT PLUG.....50 FT-LBS

TEMPERATURE SENSOR PLUG.....25 FT-LBS

OIL FILTER BRACKET.....15 FT-LBS

ALL TORQUE (FT-LBS) VALUES ARE FOR DRY UNLUBRICATED THREADS, AND SHOULD BE WITH IN 10% OF THE VALUES SHOWN.

**Figure 102**

## 8.0 SEAL INSTALLATION INSTRUCTIONS

1. Drop driveline to access the yoke or flange retaining nut.

2. Remove the retaining nut from the shaft. Input sectional view shown in **Figure 103**.

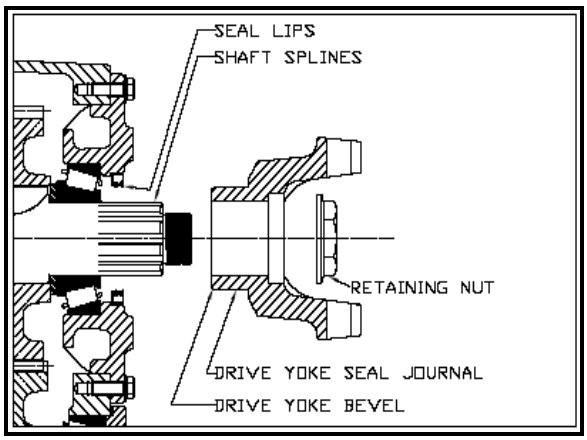



**Figure 103**

3. Pull the yoke straight off the shaft. Inspect yoke to verify it is in good condition. If excessive wear is noted, the yoke should be replaced. If any burrs are found on the seal journal or beveled corner they should be removed if the yoke is to be reinstalled.

**CAUTION: CARE MUST BE EXERCISED TO AVOID DRIVE YOKE DAMAGE.**

4. Pull the old seal from the housing carrier. For the input location, remove three screws and washers prior to seal removal.

5. Clean the seal bore in the housing carrier where the old seal had been located.

6. Inspect the new seal to verify that the lip material is intact and in good condition free of any nicks or marks. Also check the outside diameter of the new seal for any dents or burrs. If any are found the seal should not be installed.

7. Place seal on seal driver tool as shown in **Figure 104** below, ensuring the spring side is facing away from the seal driver tool. For top input and rear output locations, use seal (732-0467), and seal driver (866-0888). For Front output location, use seal (732-0466), and seal driver (866-0861).

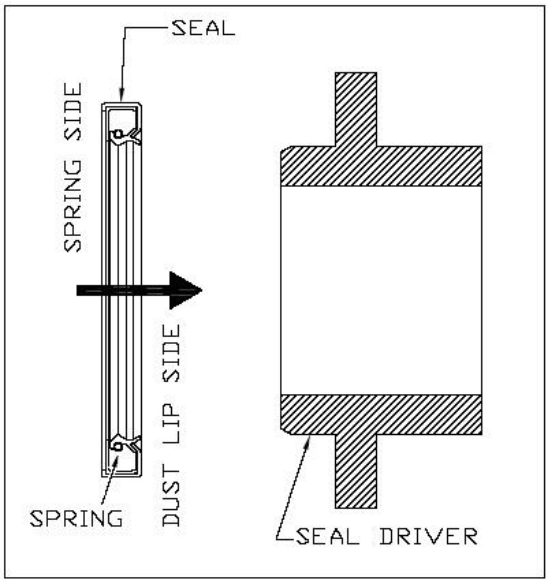



**Figure 104**

8. Place seal driver on shaft. For input location, drive seal into bore with old nut (688-0738). For Front and Rear output locations, drive seal into bore with old retaining nut. Seal driver will stop when seal is fully seated against shoulder on housing carrier bore. Input installation shown in **Figure 105.**

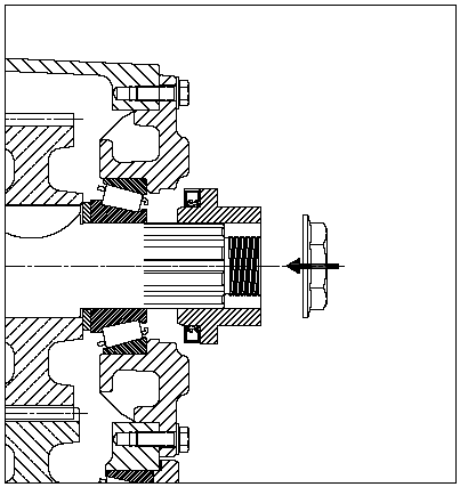


**Figure 105**

9. For input location, remove old nut and seal driver. Re-install screws and washers. For Front and Rear output locations, remove old nut and seal driver.

10. Lubricate the shaft splines, seal lips, drive yoke seal journal, and drive yoke bevel with transfer case fluid.

11. Start the drive yoke on the shaft, ensuring the splines are properly engaged and slide freely. Push the drive yoke onto the shaft until it seats.

12. Check dust lip to ensuring that it is not folded under and is facing out. If dust lip is folded under pull out drive yoke ½ to 1 inch, rotate and push-in reseating drive yoke. Repeat until dust lip is correctly installed.

13. For input location, install a new unused retaining locknut. Torque the nut to 800 lb-ft. For Front and Rear output locations, install a new unused retaining locknut. Torque the nut to 800 lb-ft.

14. Rotate the drive yoke by hand to check for binding or interference.

15. Recheck oil level and fill as necessary.

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# 9.0 TOOLS

**Details of tooling to facilitate the servicing of the Fabco TC-180 Transfer Case.**

Service tools may be manufactured to these drawings or Fabco Automotive may be contacted for pricing and availability.

The manufacture of these tools should be carried out by professional machinists and certified welders, following typical and good workmanship procedures and safe practices.

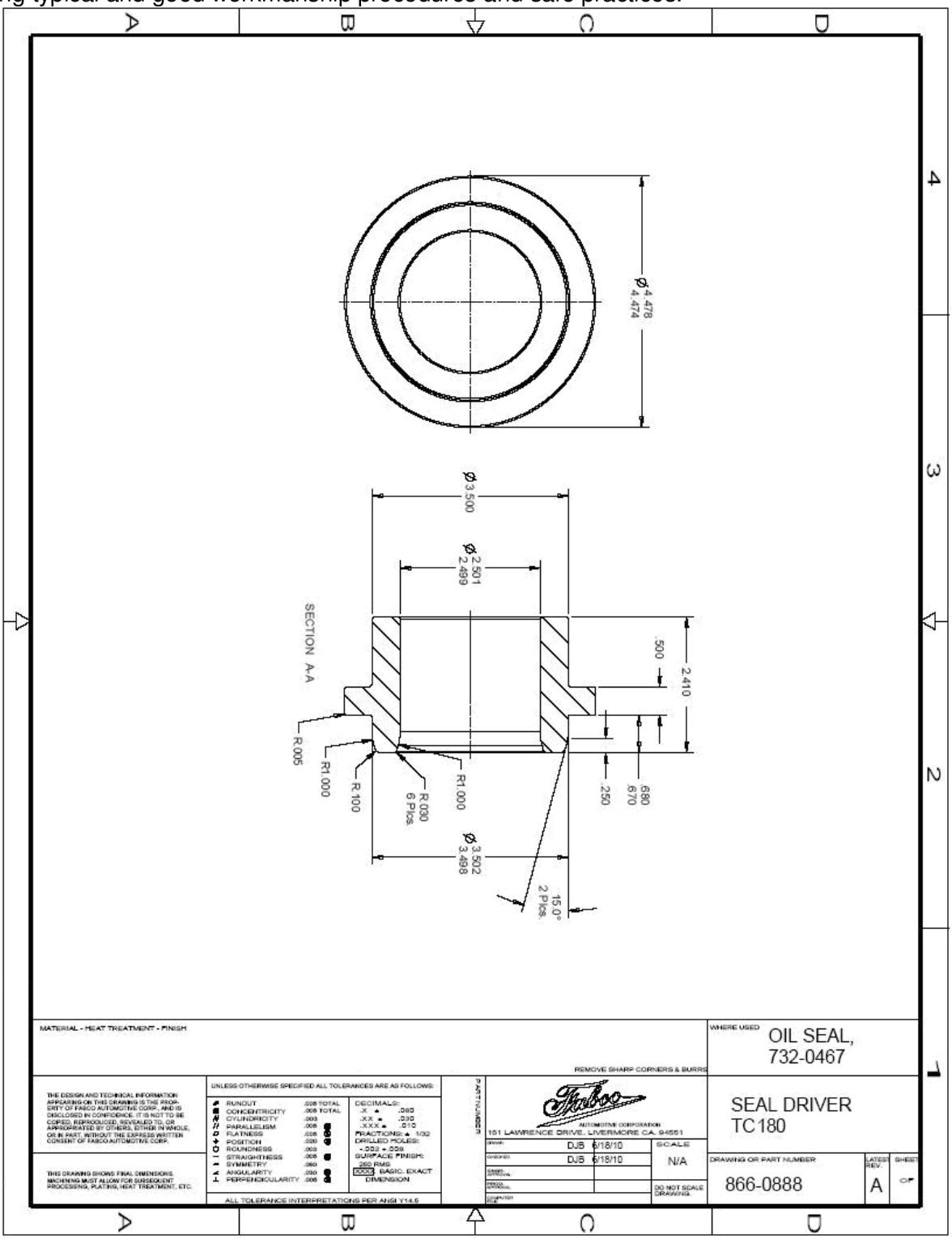
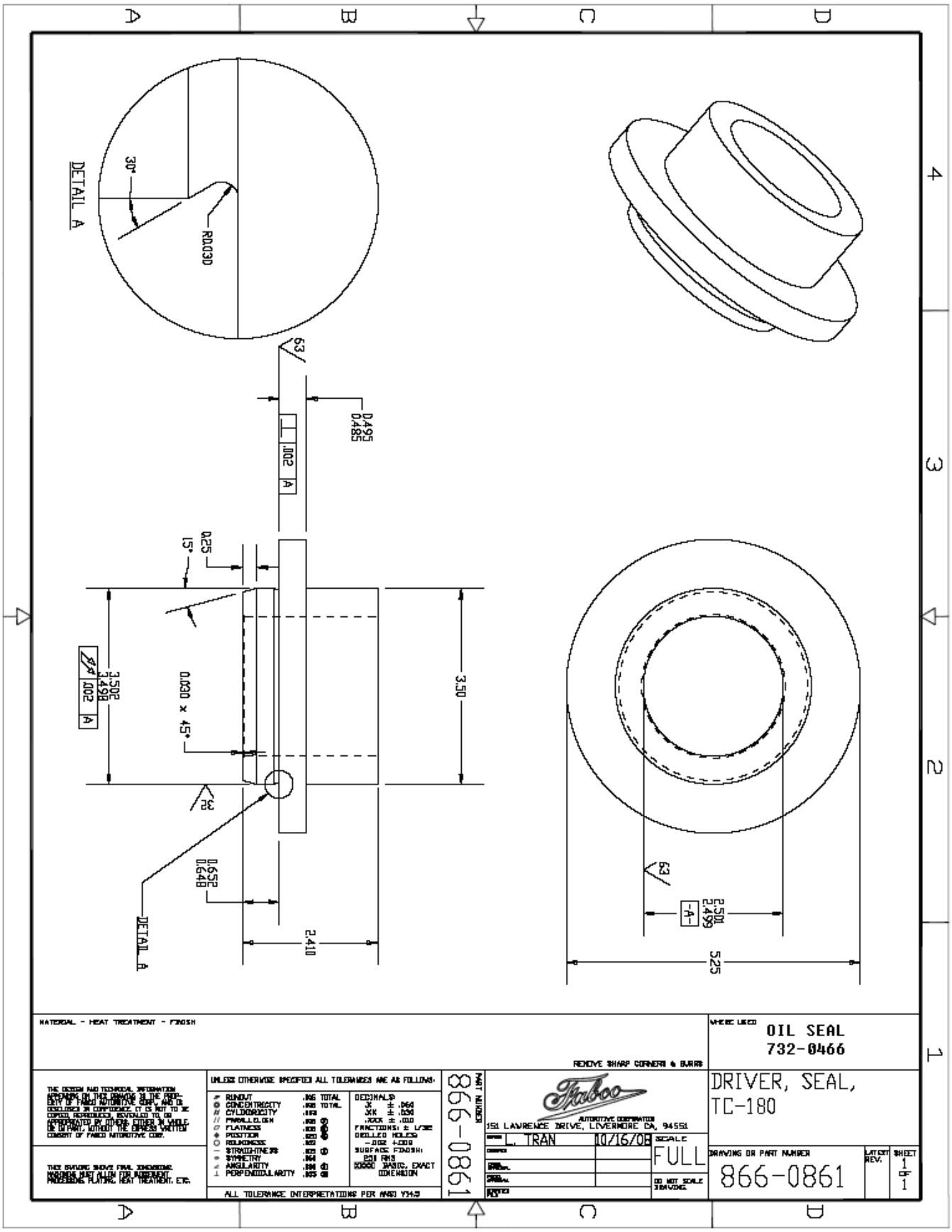



**Figure 106**


DETAIL A
30°
R0.030
63
.002 A
0.495
0.485
0.25
15°
3.502
3.498
.002 A
0.030 x 45°
3.50
63
0.652
0.648
DETAIL A
2.410
63
3.501
3.499
-A-
5.25
MATERIAL - HEAT TREATMENT - FINISH
REMOVE SHARP CORNERS & BURRS
UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE AS FOLLOWS:
RUNOUT .005 TOTAL
CONCENTRICITY .005 TOTAL
CYLINDRICITY .002
PARALLELISM .005
FLATNESS .005
POSITION .005 Ⓜ
ROUNDNESS .003
STRAIGHTNESS .005 Ⓜ
SYMMETRY .005
ANGULARITY .005 Ⓜ
PERPENDICULARITY .005 Ⓜ
DECIMALS
X ± .060
.XX ± .030
.XXX ± .010
FRACTIONS: ± 1/32
DRILLED HOLES
-.002 +.003
SURFACE FINISH:
125 RMS
XXXXX BASIC, EXACT DIMENSION
ALL TOLERANCE INTERPRETATIONS PER ANSI Y14.5
PART NUMBER
866-0861
Faboo
AUTOMOTIVE CORPORATION
151 LAWRENCE DRIVE, LIVERMORE CA, 94551
DRAWN L. TRAN 10/16/08
SCALE FULL
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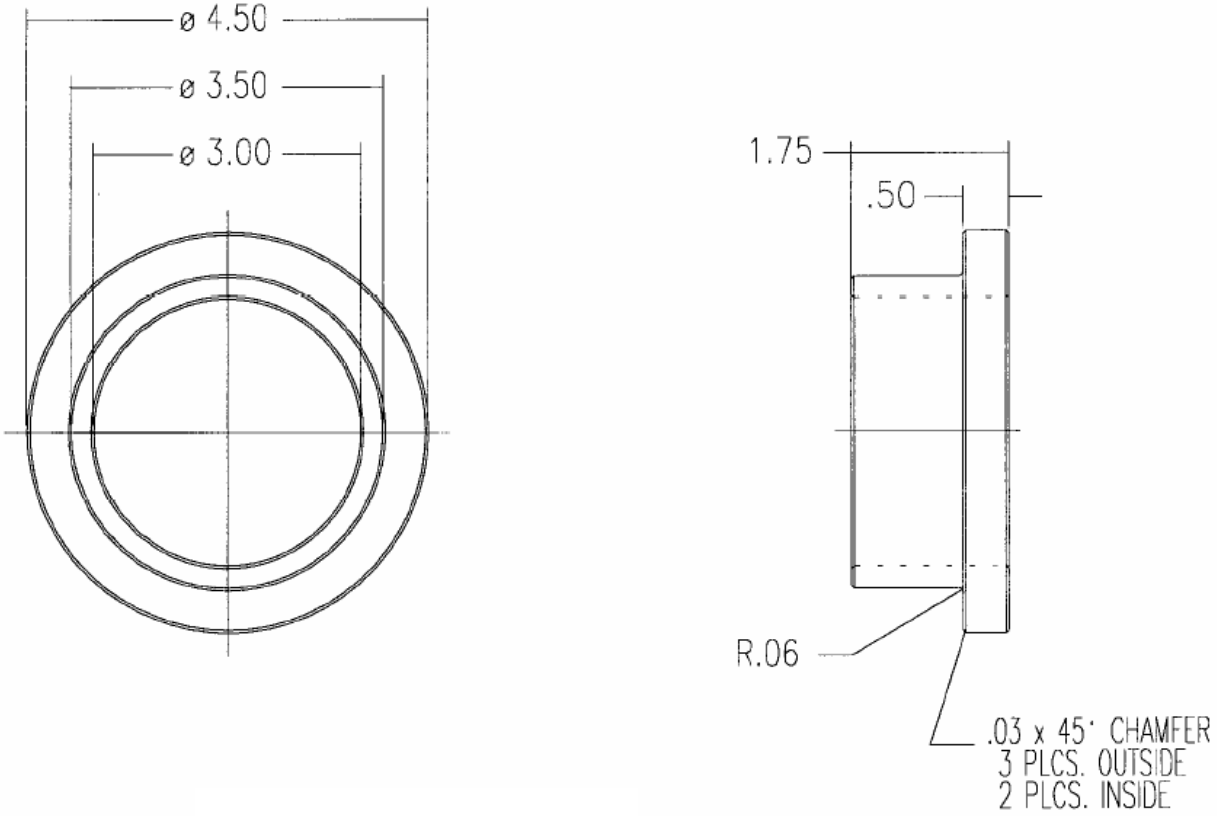
WHERE USED
OIL SEAL
732-0466
DRIVER, SEAL, TC-180
DRAWING OR PART NUMBER
866-0861
LATEST REV.
SHEET 1 OF 1

**Figure 107**




866-0751 SETUP SLEEVE, REAR OUTPUT SHAFT

**Figure 108**