

Fabco

AUTOMOTIVE CORPORATION

TC-143 TRANSFER CASE

PARTS & SERVICE MANUAL

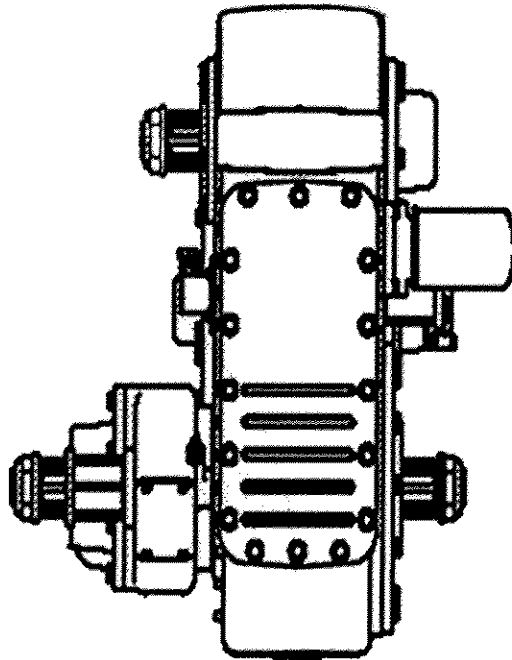


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1.0 TC-143 TRANSFER CASE

1.1 INTRODUCTION

The Fabco TC-143 single speed transfer case is designed for use in all wheel drive vehicles. The transfer case provides drive to the front axle(s) and can be used in any configuration of rear driven axles. The front drive axle declutch can be engaged at any vehicle speed, provided the rear wheels are not spinning.

1.2 SPECIFICATIONS

The TC-143 transfer case is a single speed, three-shaft, constant-mesh design featuring a declutch mechanism for front axle engagement.

NOMINAL RATING

Input Torque	20,000 lb-ft
Input Horsepower	600 hp
Input Speed	3,000 RPM

RATIOS

Direct	1:1
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GEAR TYPE	Helical, Case Hardened
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SHAFT SIZES

Input, Front & Rear Output	2.75 inches, 10 Parallel Spline
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SHAFT SPACING (DROP)	16.0 inches
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SHIFT MECHANISM	Integral Air Cylinders
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BEARINGS	Tapered Roller
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LUBRICATION	Gear Pump- 30 psi, 4 gpm
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LUBRICANT	See Lubrication Section
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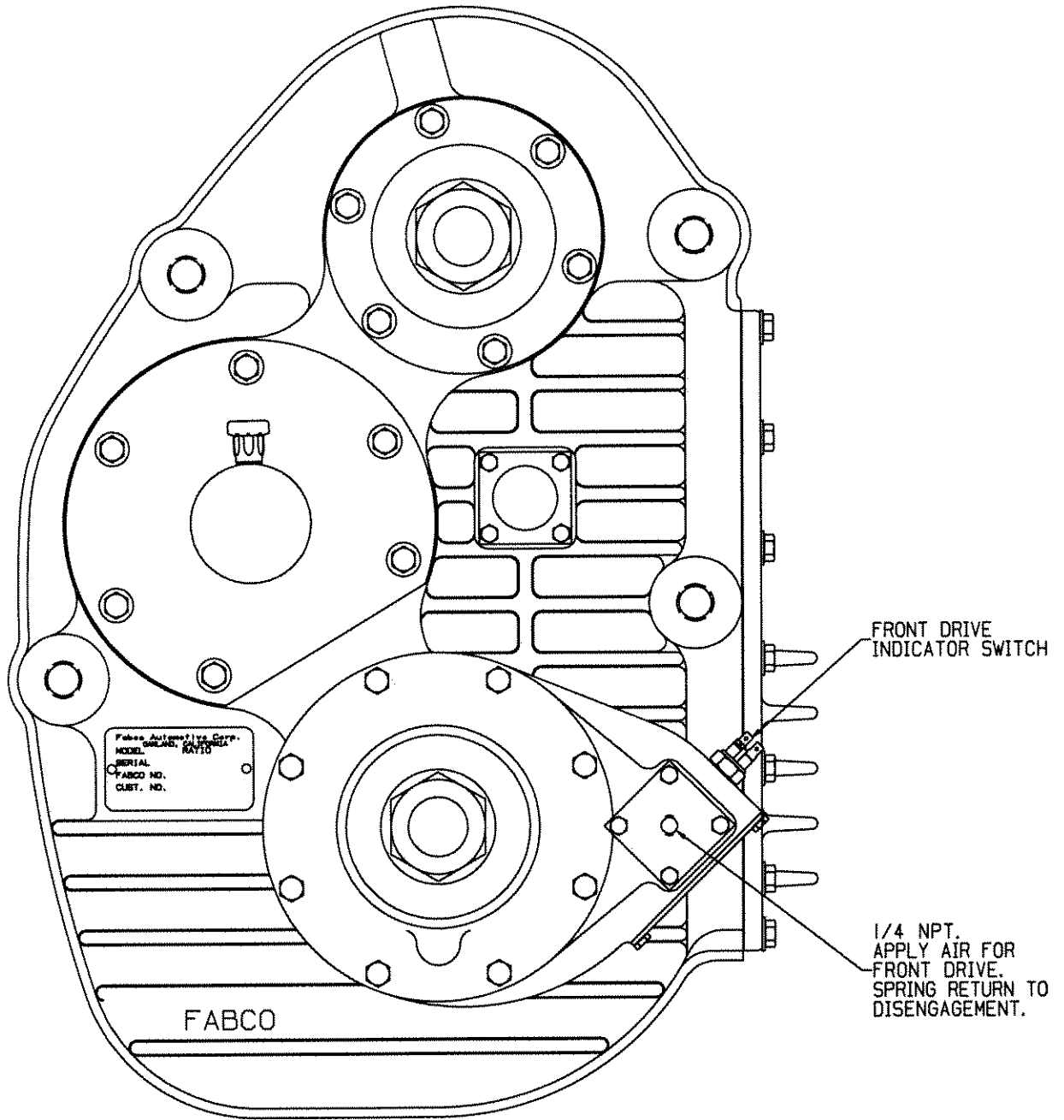
OIL CAPACITY	15.5 quarts (U.S.)
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DRY WEIGHT	825 lbs
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HOUSING	Cast Iron
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OPTIONS	Full Power Air-Shifted PTO Direct Mount SAE B&C Hydraulic Pump Pad
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1.3 ASSEMBLY VIEWS



FABCO TC-143 TRANSFER CASE
FRONT VIEW

OIL FILTER

OIL PUMP

OIL LEVEL AND
FILL PLUG

LUBRICATION OIL
PICKUP PORT

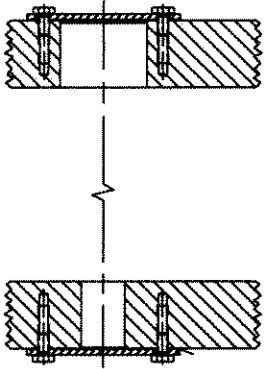
1/4 NPT. FOR
TEMP. SENDER

MAGNETIC
DRAIN PLUG

1/4 NPT
APPLY AIR FOR NEUTRAL.
SPRING RETURN TO
ENGAGEMENT.
(AVAILABLE ON NEUTRAL EQUIPPED CASES)

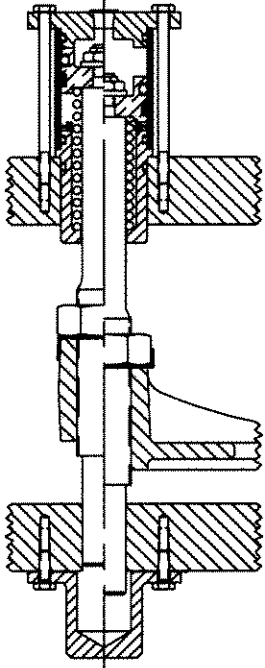
FABCO TC-143 TRANSFER CASE
REAR VIEW

STANDARD



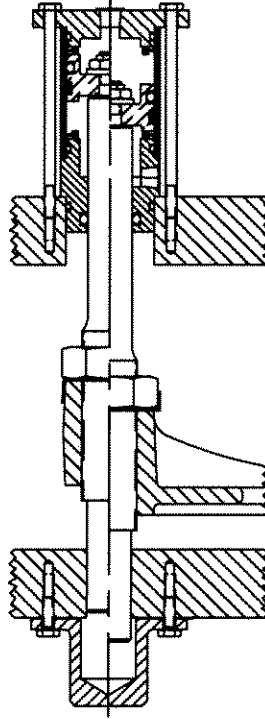
W/O NEUTRAL

OPTIONAL



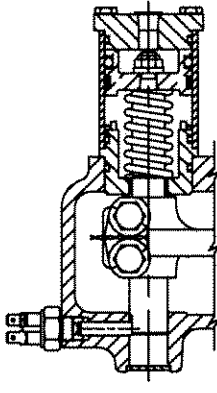
SINGLE ACTING NEUTRAL SHIFT CYLINDER

OPTIONAL



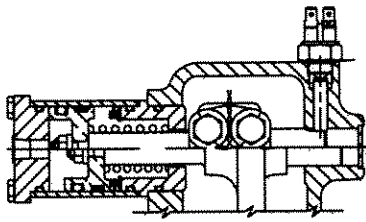
DUAL ACTING NEUTRAL SHIFT CYLINDER

OPTIONAL

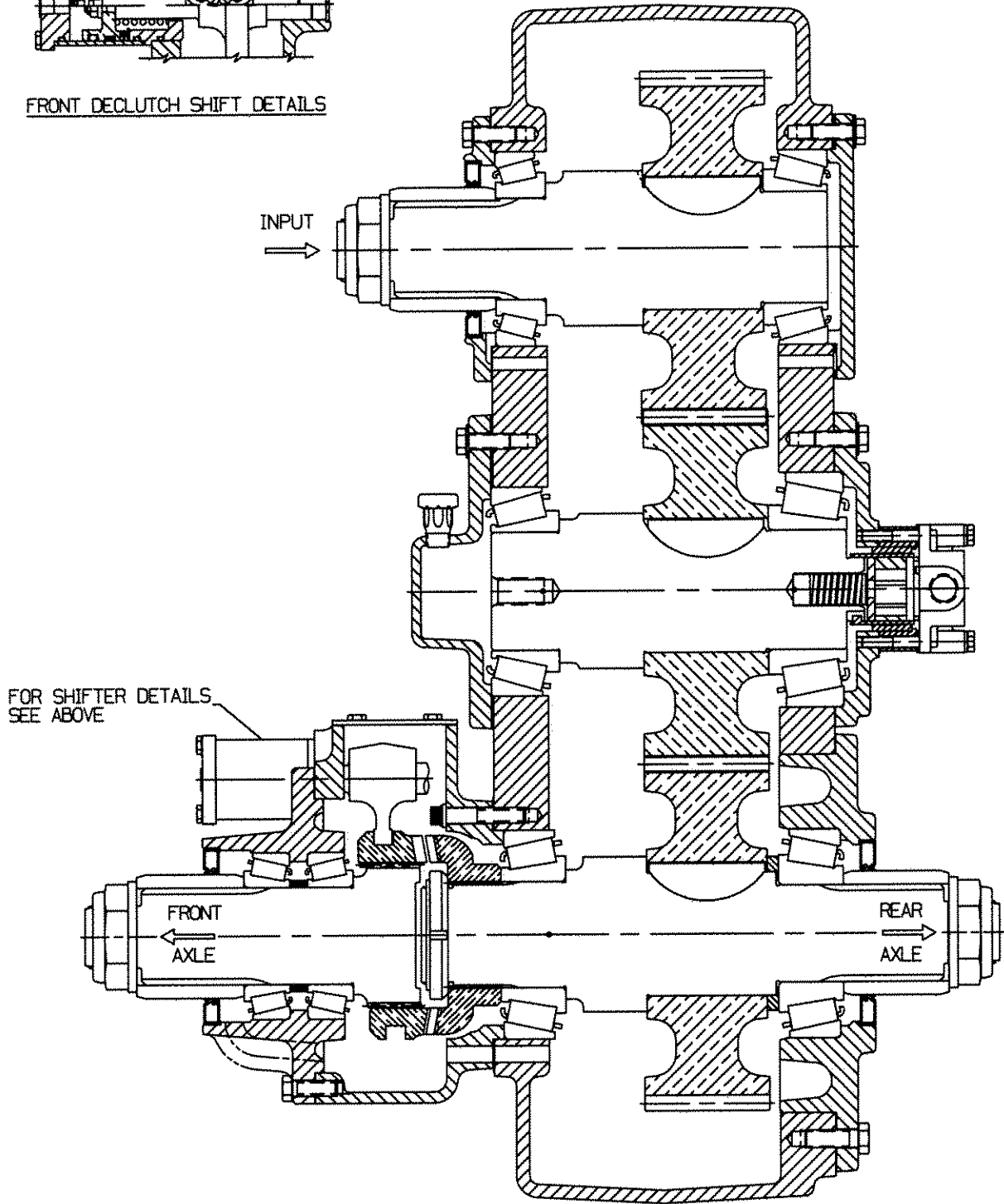


PTO SHIFT CYLINDER

SHIFT DETAILS

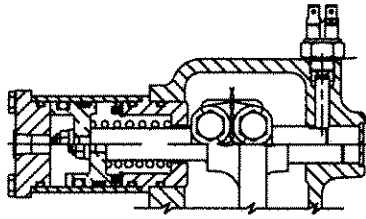


FRONT DECLUTCH SHIFT DETAILS

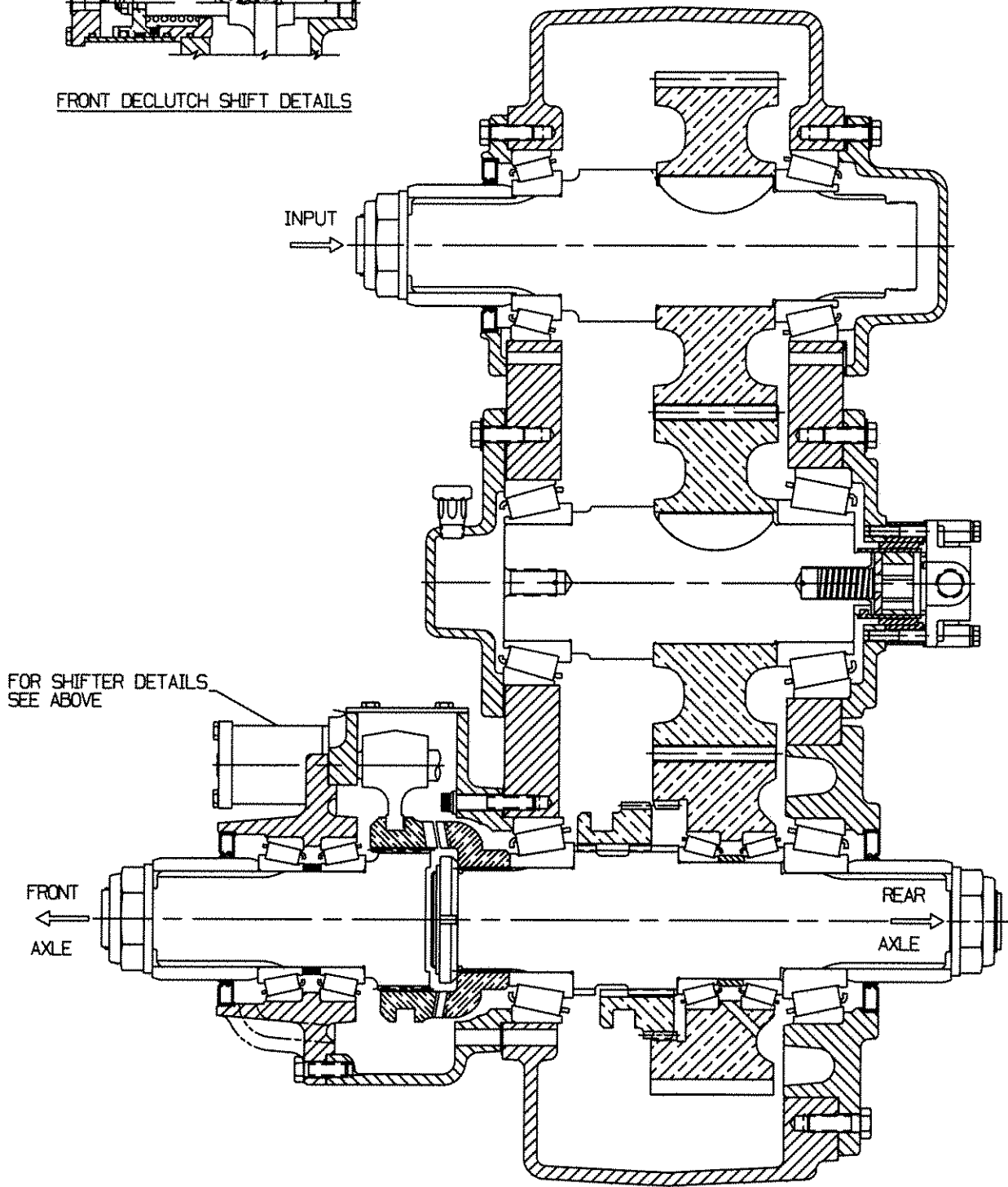


FABCO TC-143 TRANSFER CASE WITH LUBRICATION PUMP

873-0031-006

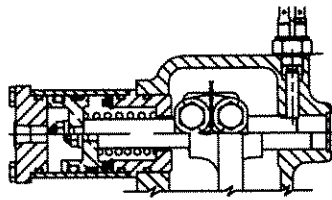


FRONT DECLUTCH SHIFT DETAILS

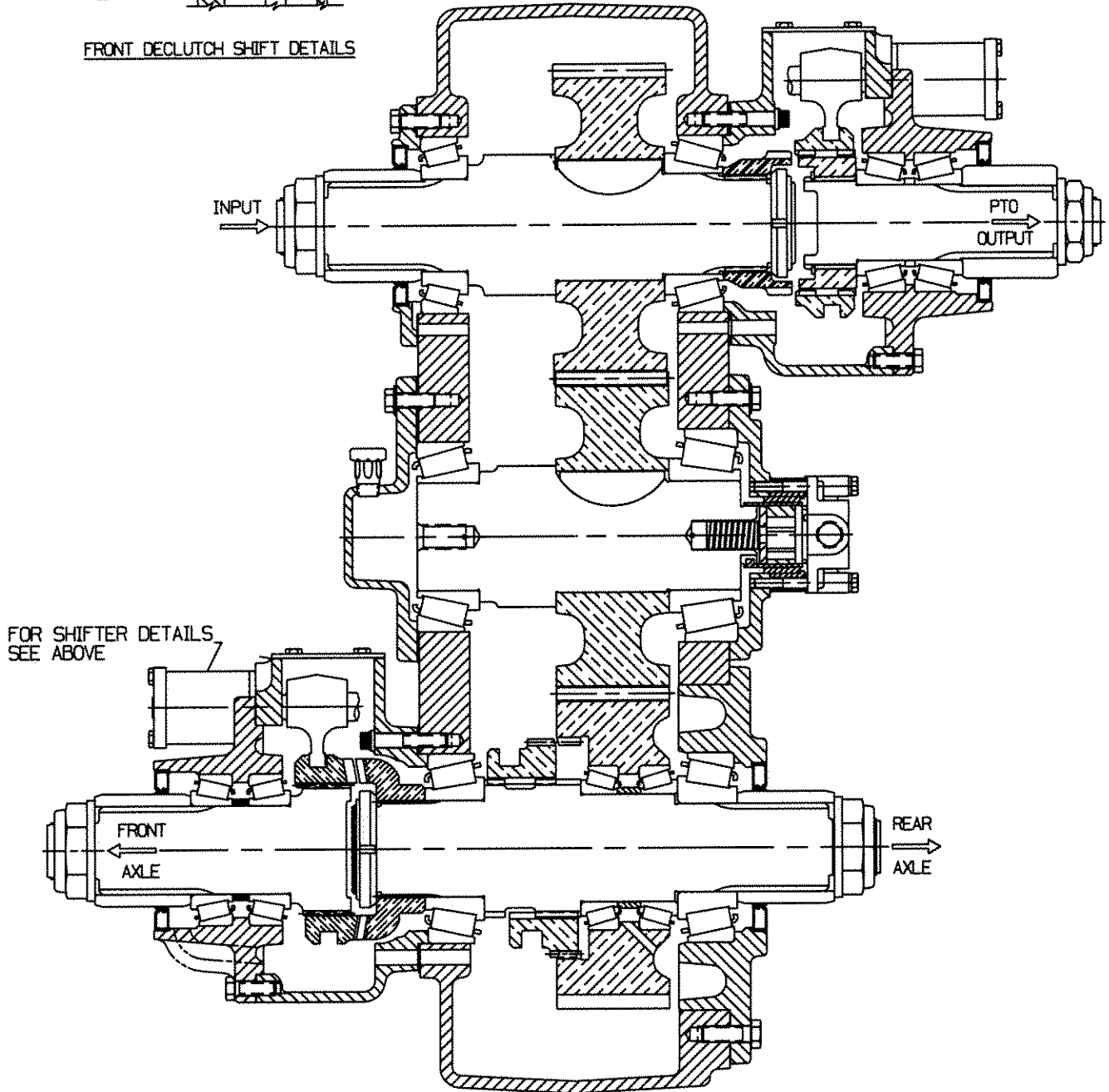


FABCO TC-143 TRANSFER CASE WITH LUBRICATION PUMP
& NEUTRAL

873-0031-007



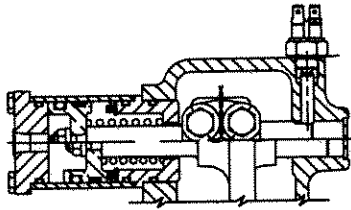
FRONT DECLUTCH SHIFT DETAILS



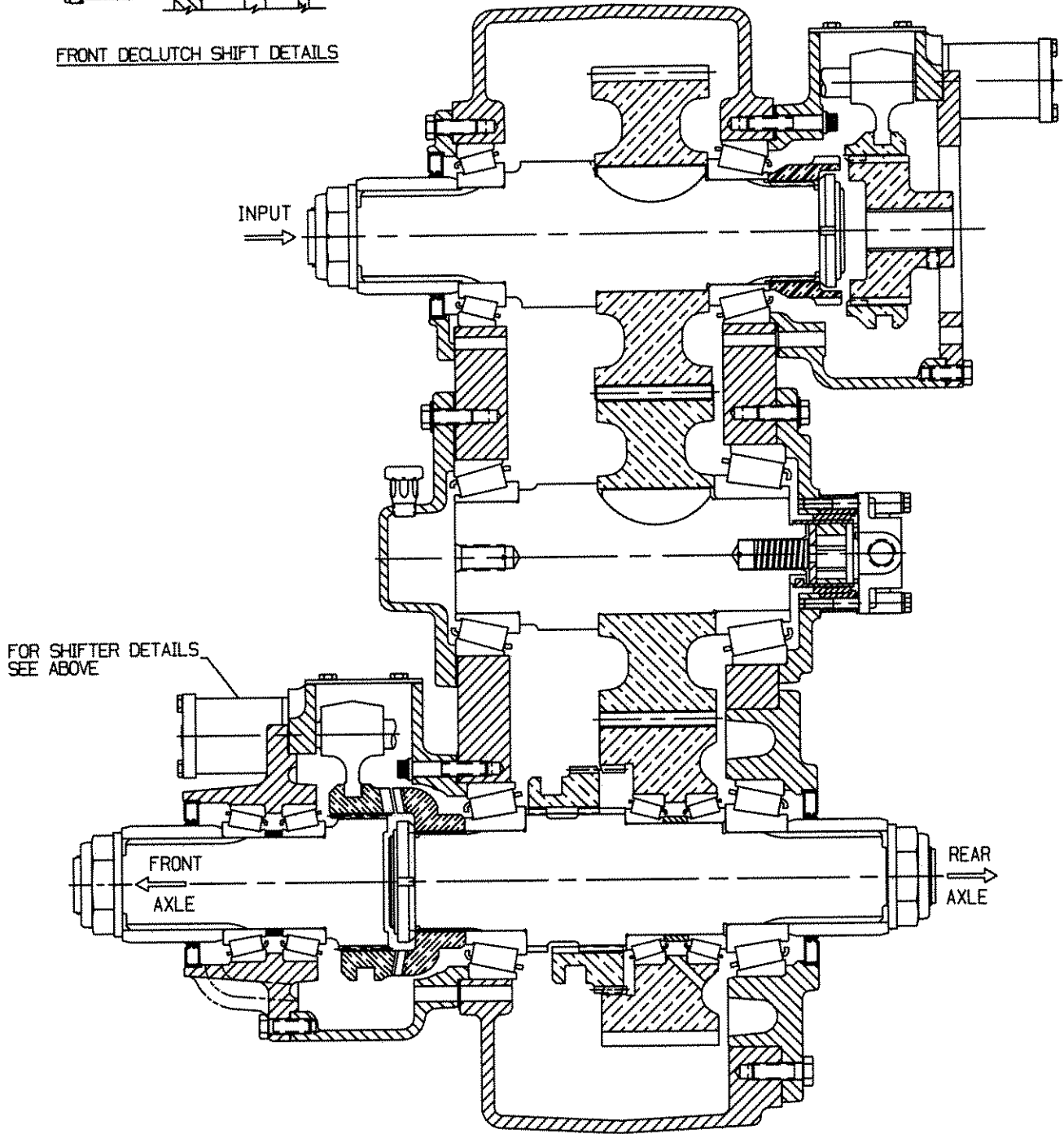
FABCO TC-143 TRANSFER CASE WITH LUBRICATION PUMP

NEUTRAL & PTO INSTALLED

873-0031-004



FRONT DECLUTCH SHIFT DETAILS



FABCO TC-143 TRANSFER CASE WITH LUBRICATION PUMP, NEUTRAL

& HYDRAULIC PUMP PAD

873-0031-005

2.0 LUBRICATION

2.1 RECOMMENDED LUBRICANTS

On-Highway Vehicles

1. Heavy Duty Engine Oil:

Temperature	Grade
Above +10° F	SAE 50
Below +10° F	SAE 30

Engine oil must meet MIL-L-2104B specifications.

2. Mineral Gear Oil:

Temperature	Grade
Above +10° F	SAE 90
Below +10° F	SAE 80

Must be inhibited against corrosion, oxidation, and foam.

Off-Highway Vehicles & Mining Equipment

1. Heavy Duty Engine Oil:

Temperature	Grade
Above +10° F	SAE 50
Below +10° F	SAE 30

NOTE: For extreme cold weather conditions where temperature is consistently below 0° F, use SAE 20W heavy-duty engine oil meeting MIL-L-2104B specifications.

NOTE: Extreme pressure (EP) oils are not recommended for use in Fabco transfer cases. Under certain operating conditions these oils might form carbon deposits on gears & shafts.

2.2 INSPECTION

The oil must be maintained at the level of the fill plug at all times. Oil level should be checked at the following intervals:

On-Highway Service 1000 miles

Off-Highway Service 40 hours

At every oil change, the shift cylinder air lines and valves should be inspected for

leaks and possible malfunction. Damaged components can cause partial clutch engagement leading to premature wear and possible 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 for on-highway vehicles, or after the first 40 hours of use for off-highway and mining vehicles. Thereafter, oil changes should be performed at the following intervals:

On-Highway Service 10,000-
15,000 miles

Off-Highway Service 500-750 hours

The recommended oil change and inspection periods are based on estimates of average use under typical operating conditions.

It is suggested that the individual owner perform a periodic lab analysis of the lubricant to determine oil change and inspection schedules based on the unit's specific operating conditions.

2.4 DRAINING THE OIL

Draining is best accomplished after the vehicle has been operated briefly, allowing the oil to warm and flow more freely. Remove both drain and fill plugs. Allow the housing to empty completely. Flush unit thoroughly with clean flushing oil or kerosene before refilling.

If the unit is equipped with an oil pump, the spin-on oil filter should be replaced whenever the oil is changed. A film of clean oil should be applied to the rubber gasket of the new element before installation. Do not over tighten.

2.5 REFILLING THE OIL

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

Clean and replace the drain plug. With the vehicle on level ground, fill the transfer case with oil appropriate to its operating conditions. The plug should be installed only after the oil level has stabilized. Always fill to the level of the fill plug, allow time for oil

level to stabilize, and then top off. Do not overfill. Inspect for leaks.

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 breakdown of the oil and may shorten the transfer case life. If reduction of operating speed is not acceptable then the case should be equipped with an external oil cooler.

The following conditions may contribute to excessive oil temperature:

1. A vehicle remaining stationary for extended periods while operating the power take-off.
2. A vehicle used in tropical or desert conditions.
3. A vehicle where extended body work or an accumulation of dirt and debris inhibits adequate air flow to the case.
4. A vehicle operated for extended distances at high speed with main transmission in overdrive.

3.0 CLEANING AND INSPECTION

3.1 CLEANING

Steam may be used for external surface 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 should be immersed in a hot solution tank containing a mild alkaline solution. Carriers, caps, declutch housing, air shift cylinder components, and other aluminum parts must not be cleaned in any type of alkaline solution. Parts with ground or polished surfaces, such as bearings, gears, shafts, and oil pump components also should not be cleaned with alkaline solutions. Emulsion cleaners or petroleum solvents should be used to clean these parts. All parts should be thoroughly rinsed to prevent damage by trace residues.

3.2 DRYING & CORROSION PROTECTION

Dry compressed air or clean, soft shop towels should be used to dry parts after they are cleaned and rinsed. Bearings should never be "spun dry" with compressed air.

Dried parts should be immediately coated with a light grease or corrosion inhibitor to protect from corrosion. 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 that are to be reused must be carefully inspected for signs of wear or damage. Parts that exhibit signs of damage should be repaired or replaced to prevent costly future downtime. Particular attention should be paid to the following:

1. All bearing surfaces, including roller bearing cups and cones, should be examined for pitting, wear, or overheating. Gears should be examined for pits, scoring and broken teeth. Shafts should be examined for nicks or damaged threads.
2. Inspect the rotor, housing, and idler of the oil pump for scoring. Inspect the

drive tang of the rotor assembly. If any damage is noted, the pump cartridge assembly should be replaced as a unit.

3. Check all shift forks and slots in sliding clutches for wear or discoloration due to extreme temperature. Check the engaging teeth for partial engagement patterns.

4.0 GENERAL INSTRUCTIONS

4.1 SAFETY

The servicing and maintenance of components from any automotive vehicle presents possible hazards. Every effort should be made to minimize the potential risks to yourself and others. These general safety guidelines should be read and understood before work commences:

1. When servicing the vehicle, the parking brake should be securely engaged and all wheels blocked to prevent the vehicle from shifting. Never rely solely on the parking brake. All work should be performed on a flat level surface free of loose material.
2. When working underneath the vehicle, it should be supported with a frame stand or very secure blocking.

WARNING: Never work under a vehicle that is supported solely on a floor jack.

3. Be sure any jacks, crane hoists, axle support dollies, and other lifting equipment is able to support the loads being lifted. The weight of the TC-143 transfer case is given in section 1.2 of this manual.
4. Proper precautionary measures should be taken to contain any hazardous contaminants on the transfer case or underside of vehicle. Using compressed air for debris removal is not recommended. Read all labels and refer to a respective material safety data sheet (MSDS) before using any solvent or cleaning solution. Protective eyewear, gloves, masks and clothing should always be worn.
5. Fabco has not used asbestos in any of its products manufactured since May of 1989 and was used only in axle brake linings prior to that time. See the asbestos warning on the following page for special precautions if you believe you will be exposed to asbestos while servicing the vehicle.

4.2 ASSEMBLY PRECAUTIONS

1. Read the instructions completely before reassembling. Study the appropriate exploded view diagrams in the parts manual.
2. All parts must be clean, dry, and lint free. The gasket surfaces must be free of any residual gasket material. Do not reuse old gaskets.
3. Bearing cup bores, shaft splines and bearing mounting surfaces should be coated with Lubriplate or an equivalent lubricant.
4. All used oil seals must be replaced. The outer diameter surface of all new oil seals should be coated with Loctite 601 prior to reinstallation. Sealing lips should be coated with Lubriplate.
5. Any external cap screw that is not installed in a blind hole should have its threads coated with Permatex Form-A-Gasket #2 or an equivalent non-hardening sealer to prevent an oil leak.
6. All threaded fasteners should be tightened to the values specified in the torque chart.
7. Any sharp edges and burrs on the seal diameter of the universal joint yoke or companion flanges should be removed with emery cloth. The seal operating area should be coated with Lubriplate prior to installation.
8. 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 than 300° F. Temperatures in excess of 300° F may change the metallurgical properties of the component. All heated components should be allowed to cool to room temperature before end float tolerances are checked.

CAUTION: Although Fabco does not recommend its use in transfer cases, if formed-in-place gaskets are used for repairs, extreme caution must be exercised to prevent the compound from entering bearings, oil galleries, passages, or tapped holes. All beads must be kept smaller than 1/8-inch diameter.

4.3 REMOVAL & INSTALLATION

4.3.1 REMOVAL

1. Remove fill and lower drain plugs and drain gear lubricant.
 2. Disconnect wires leading to indicator light switch, and temperature sensor, if used.
 3. Disconnect and tag shift cylinder air lines.
 4. Disconnect drivelines at flanges or yokes.
 5. If the transfer case is equipped with a PTO mounted hydraulic pump, remove the four cap screws and slide pump out of PTO. Secure the pump to the frame to avoid damage to hydraulic lines. The pump should be secured in a position that will not hinder the removal of the transfer case.
 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 mountings at rubber shock insulators. Since mounting designs vary, consult vehicle service manual.
 8. After all mountings and connections to the transfer case are disconnected, slowly lower the transfer case to the floor. Secure the transfer case on the transmission jack to prevent it from falling off.
 9. Remove the transfer case from under the vehicle. It may be necessary to jack up the vehicle for adequate clearance.
3. Raise the transmission jack and properly align transfer case with mounting holes on vehicle.
 4. Connect transfer case mountings. Since mounting designs vary, consult vehicle service manual.
 5. Connect shift cylinder air lines.
 6. Connect indicator light and temperature sensor wires.
 7. Fill housing with proper lubricant according to section 2.0 of this manual. Install level plug.
 8. Check transfer case for leaks around gaskets and seals.

4.3.2 INSTALLATION INTO VEHICLE

1. Attach eye-bolts to mounting bores on the transfer case and use them with proper hoist to position transfer case on the transmission jack.
2. Position transmission jack underneath the vehicle. Some vehicles may require that one side be jacked up to provide adequate clearance and access to the frame rails.

ASBESTOS WARNING

SUGGESTED PROCEDURES FOR WORKING WITH COMPONENTS SUSPECTED OF CONTAINING ASBESTOS

Asbestos has been found to be a primary cause of various forms of respiratory disease and cancer of several vital body organs. Primary ingestion is by breathing or swallowing dust containing fibers and can place smokers at a greater risk than those who do not smoke. The onset of disease can be at an extended period of time, (several years) after the exposure. The Occupational and Safety Health Administration (OSHA) has established very stringent limitations for exposure to asbestos fibers by workers using the material, and every precaution should be taken to minimize the risks involved. The following are some suggested procedures to adopt when working with material that has, or may be suspected of containing, asbestos.

1. Approved protective clothing, gloves, eye shield and aprons should be worn whenever working around the suspected material. NIOSH & OSHA approved respirator masks suitable for asbestos dust should be worn at all times. Disposable dust face masks are not allowed by OSHA.
2. Do not smoke while working on any asbestos related material or wearing protective apparel.
3. Do not eat or drink food while wearing protective clothing. Always wash before eating or drinking.
4. Do not use compressed air for any dirt removal. Use only approved high efficiency vacuum cleaners suitable for use with asbestos. Do not dry brush deposits or accumulations of dirt from components. What cannot be removed with the high efficiency vacuum cleaner should be washed with a water soaked rag. The rag should not be wrung dry but should be disposed of, together with other wastes containing asbestos in specially sealed and marked containers in accordance with EPA and OSHA regulations.
5. Do not wear protective clothing away from the working area, vacuum clean clothing before removal. Shower, if possible, before going home.

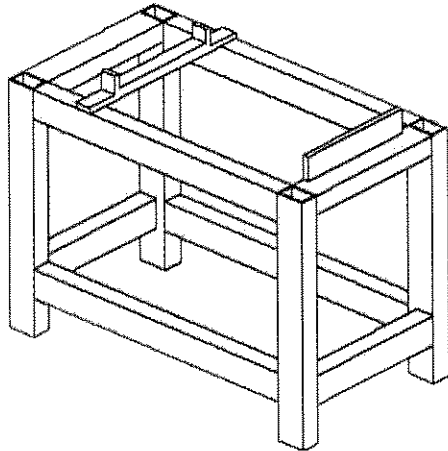
These suggestions are neither complete nor authoritative on the subject of working with asbestos but are meant as a warning of possible risk. It is the responsibility of the supervising authority to be aware of the possible dangers involved and to provide suitable training, precaution and protection for those working in an asbestos environment.

5.0 DISASSEMBLY

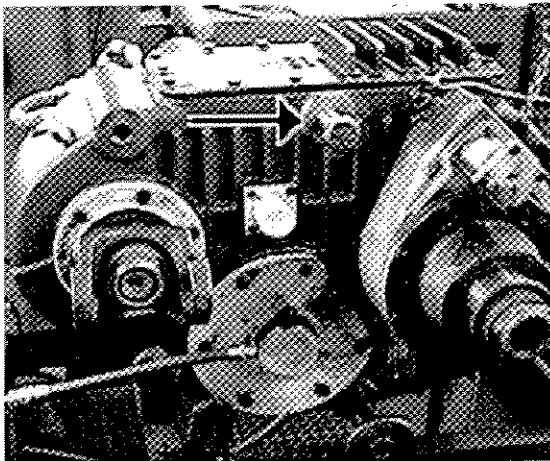
Disassembly of the Fabco TC-143 transfer case is a relatively simple procedure made easier by the use of proper tools. These tools are detailed in section 9.0 for manufacture in your own facilities. You may also contact Fabco Automotive for a price and delivery quotation.

5.1 GENERAL DISASSEMBLY

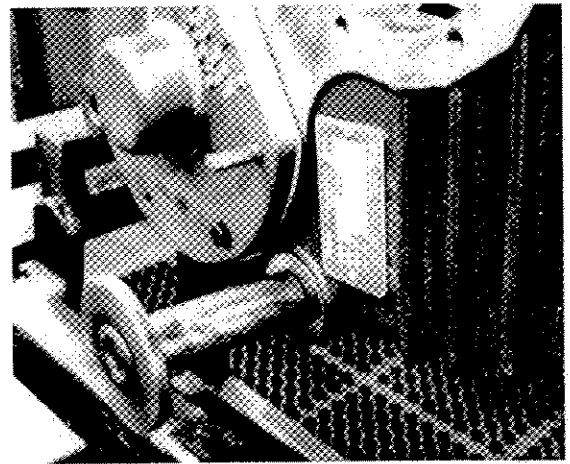
Before beginning, remove the transfer case from the vehicle following the steps outlined in section 4.3.1 and thoroughly clean the exterior of all surface debris.



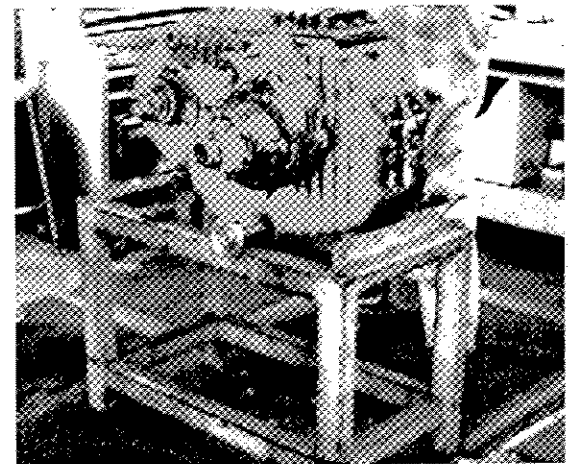
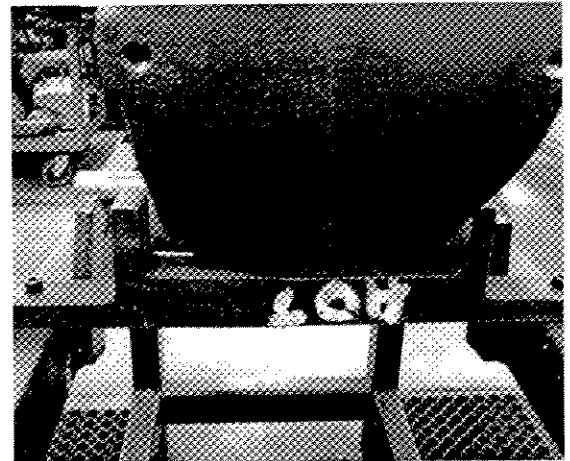
1. Construct a sturdy work stand as described in section 9.0 to support the transfer case.



2. Attach a mounting bolt to mounting bores on both sides of case housing.
3. Use a crane to support the weight of the case housing through the bolts.

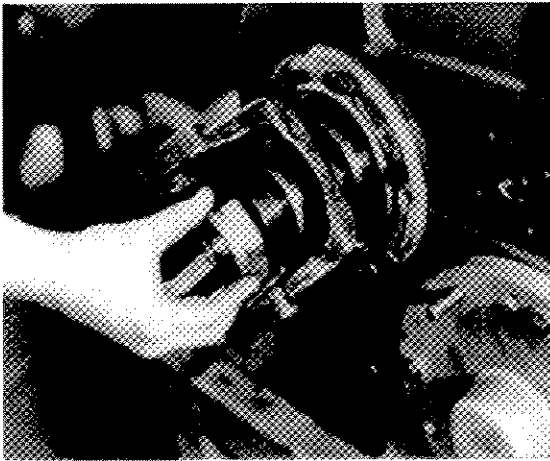


4. Attach tool #866-0792 to mounting bores on both sides of the case housing as shown.

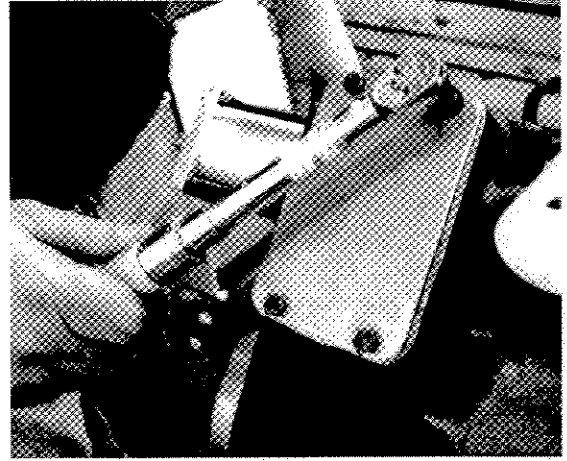


5. Mount case housing on work stand as shown.

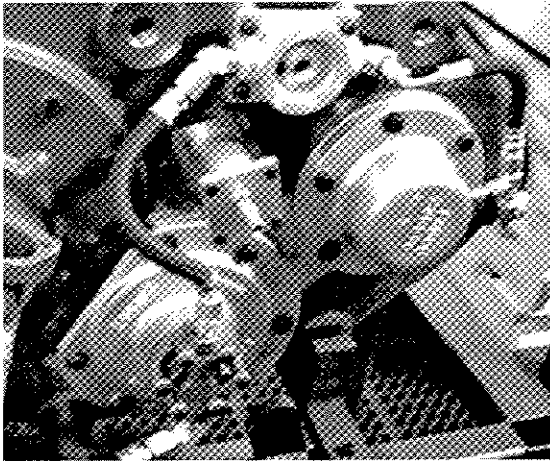
NOTE: Versions of this transfer case can weigh up to 1,000 lbs.



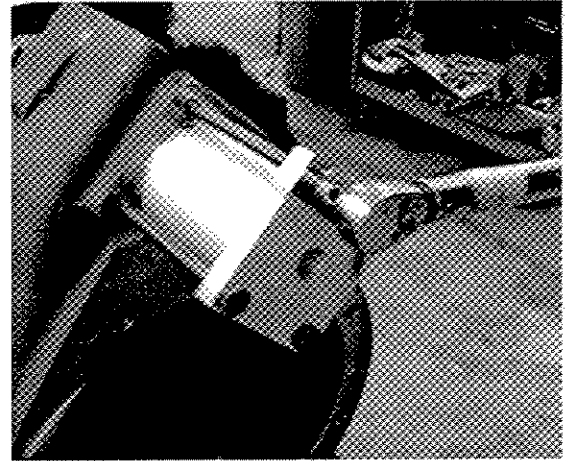
6. Remove yoke or companion flange as well as the seal carrier from input shaft.



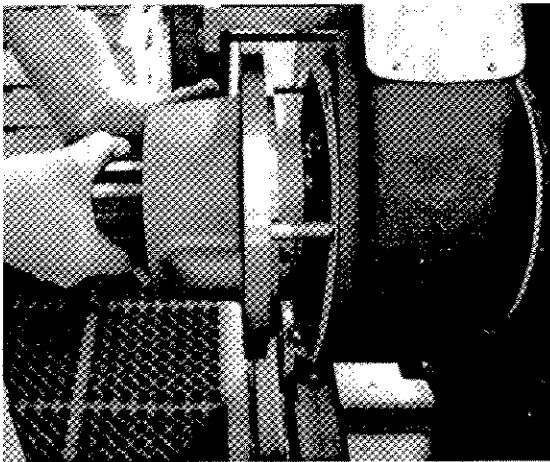
9. Remove access panel on front declutch housing.



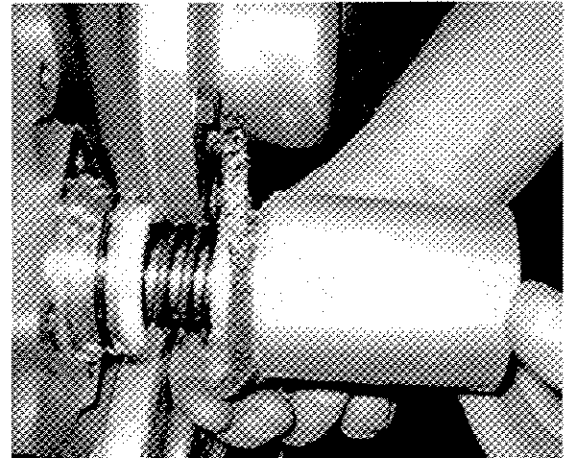
7. Remove oil filter, pump assembly, and attached plumbing.



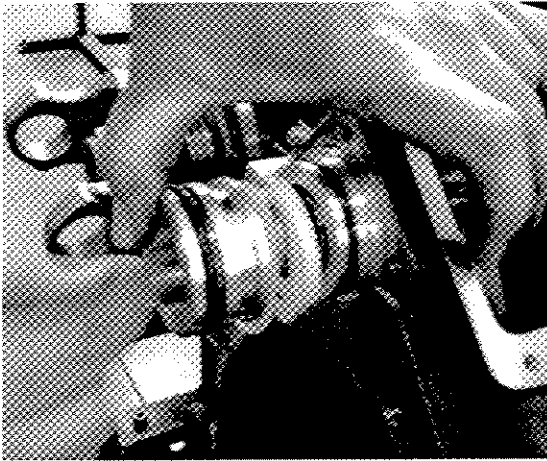
10. Remove front declutch-shift cap.



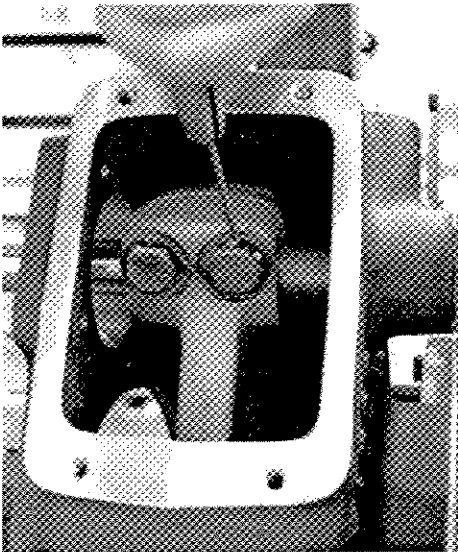
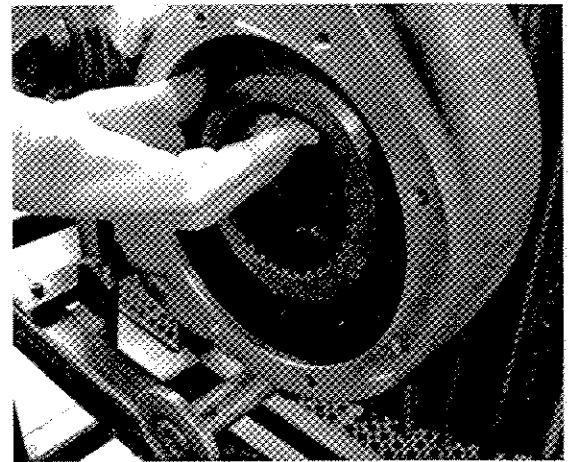
8. Unbolt and remove front declutch carrier. See section 5.2.3 for front output carrier and shaft disassembly instructions.



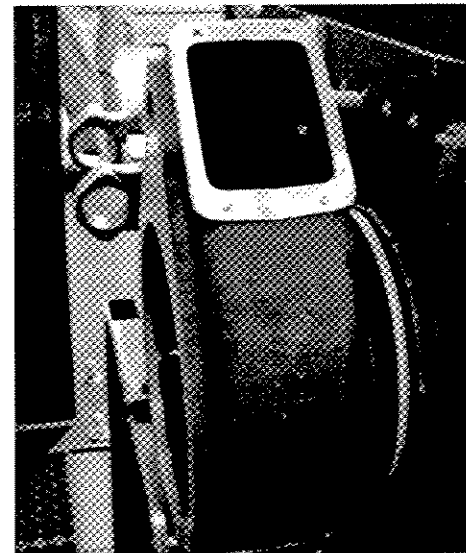
11. Gently rock front declutch airshift cylinder to and fro until it is free from shifter assembly.



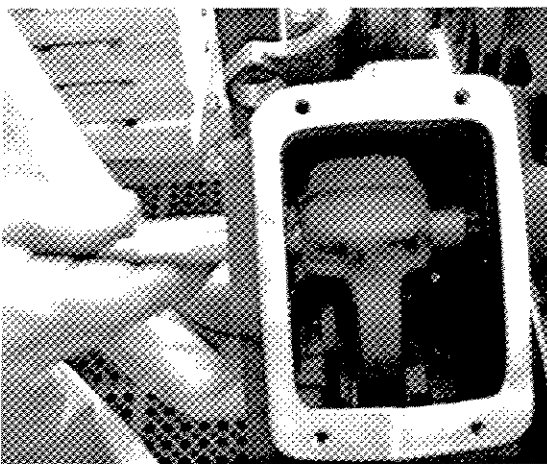
12. Remove front declutch airshift piston, felt seal, spring, and stops from shift shaft.



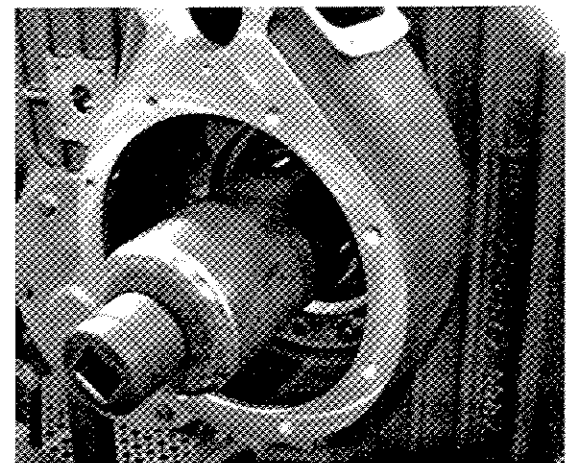
13. Detach and discard lockwire. Remove the two pinch bolts on shift fork.

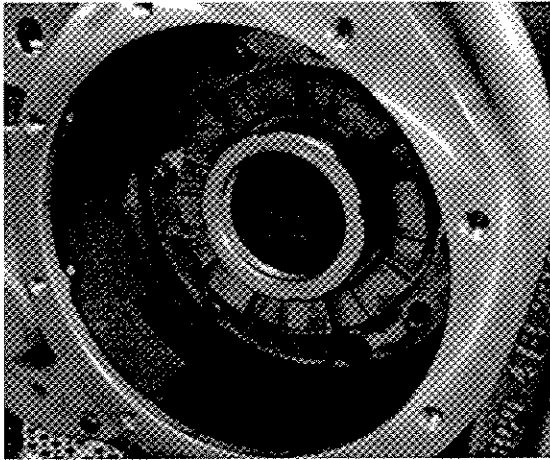


15. Remove shift fork and clutch collar from housing.

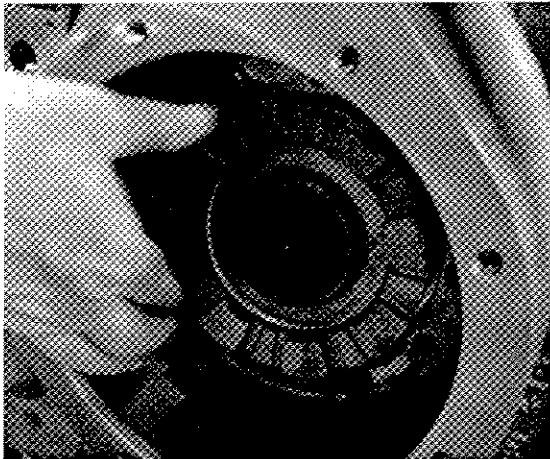


14. Remove shift shaft.





16. Use tool #866-687-006 to remove output shaft locknut.

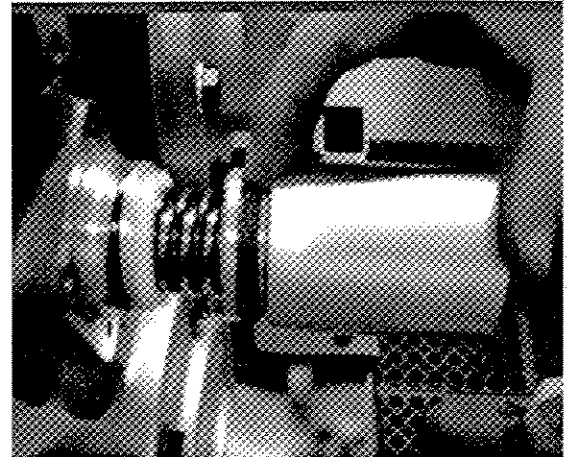


17. Remove front declutch gear from front declutch housing.

NOTE: Do not detach declutch housing from case.

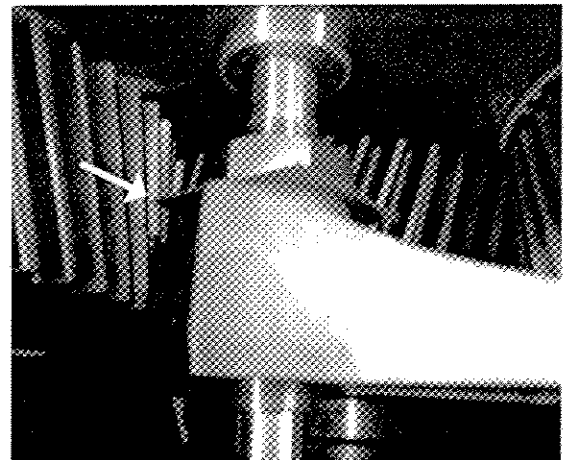


18. Remove case access panel.

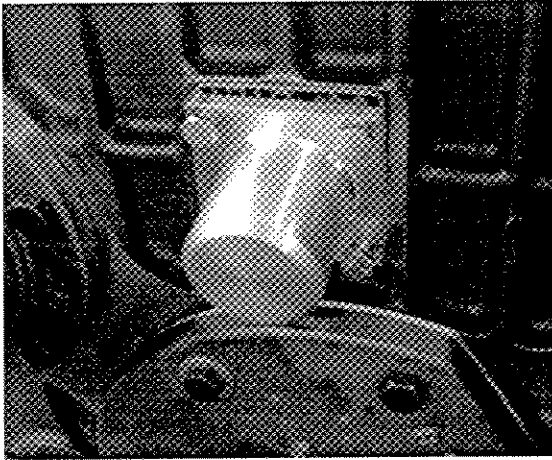


NOTE: For transfer cases without neutral, skip steps 20-22.

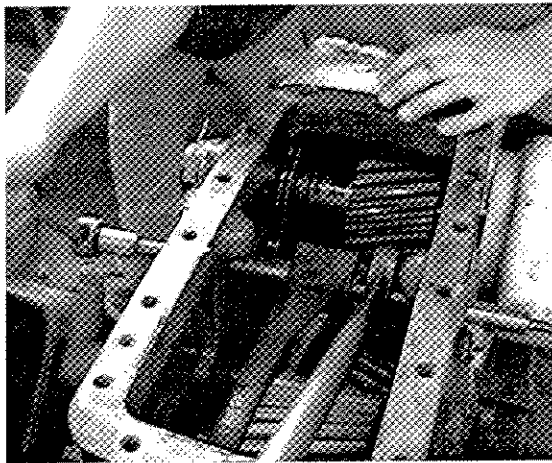
19. Remove neutral shift cap, shift cylinder, piston, spring and stops following the same procedures used to remove front declutch shifter.



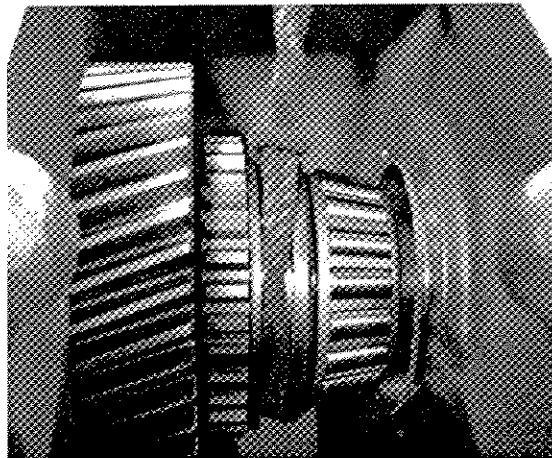
20. Disengage lock-plate tabs on neutral shift shaft. Loosen adjustment nut.



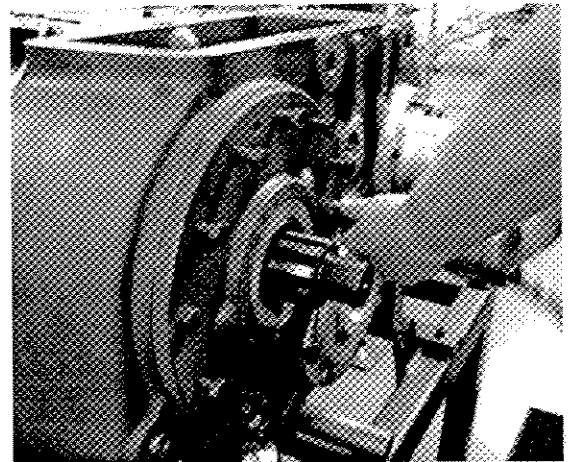
21. Unbolt and remove shifter end cap.



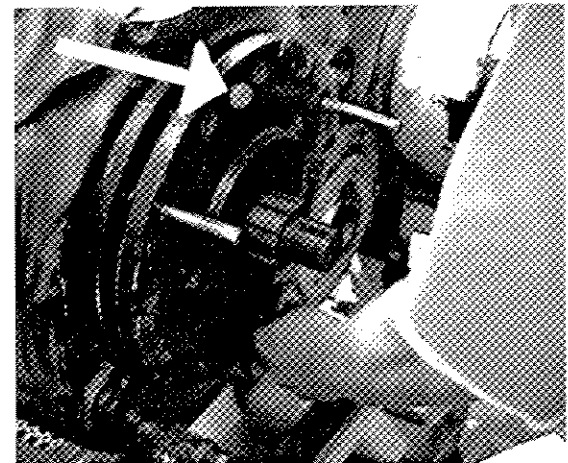
22. Use a 9/16-inch Allen wrench to remove neutral shift shaft. Remove neutral shift fork.



23. Attach a sling to support the weight of the rear output shaft assembly at its clutch collar.

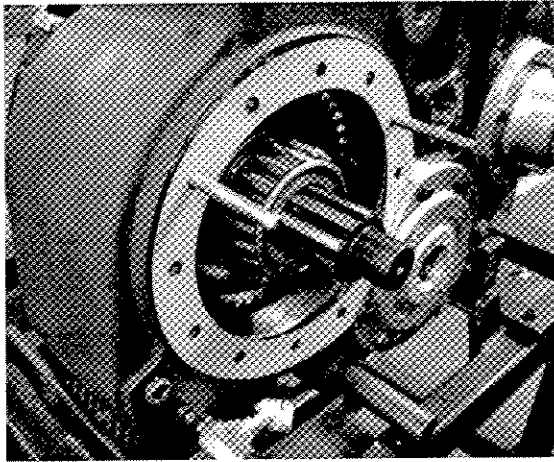


24. Examine the rear output carrier and note the position of the two empty boltholes. Proceed to remove the bolts securing the rear output carrier to the transfer case housing.

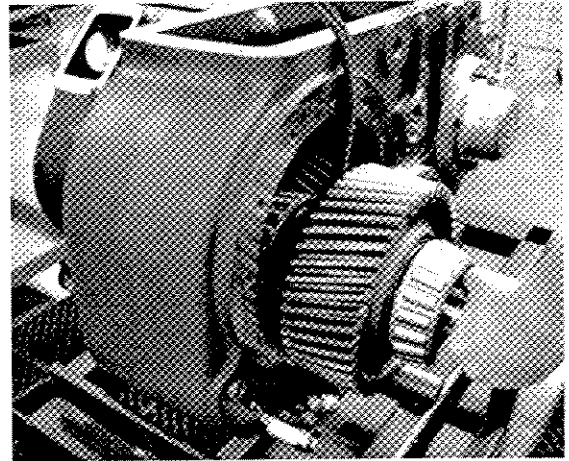


25. Screw 7/16-14 NC bolts into each of the two boltholes noted in step 24. Tighten evenly to loosen carrier from transfer case housing.

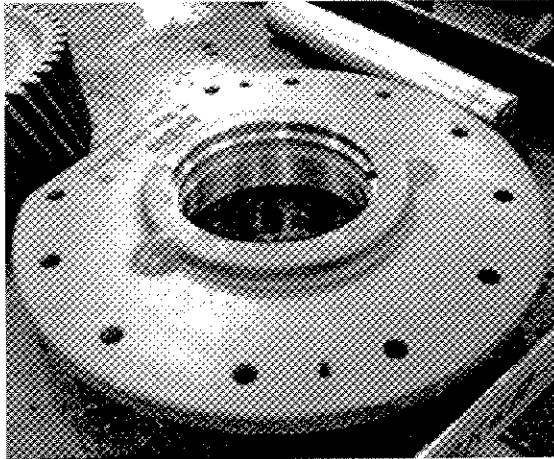
NOTE: Do not use screwdrivers or pry bars to lift cover away from the transfer case housing as they can damage machined seal surfaces and cause leaks.



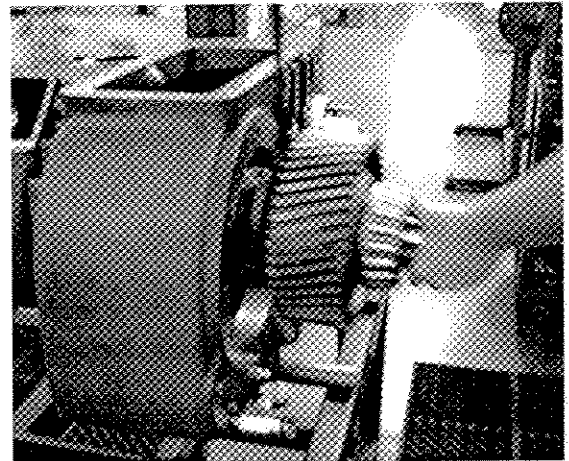
26. Remove rear output carrier and gasket from transfer case housing.



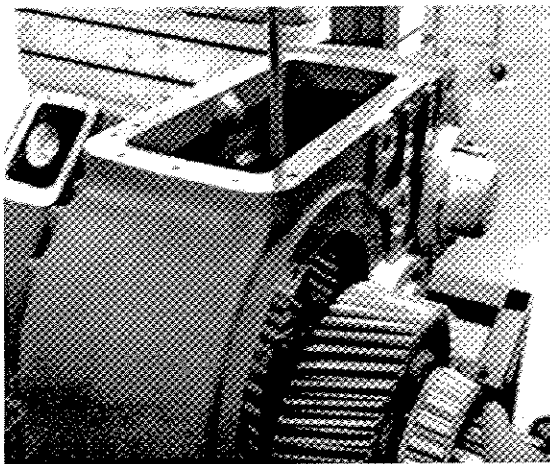
29. When clutch collar is free from case housing, properly support shaft while repositioning the sling.



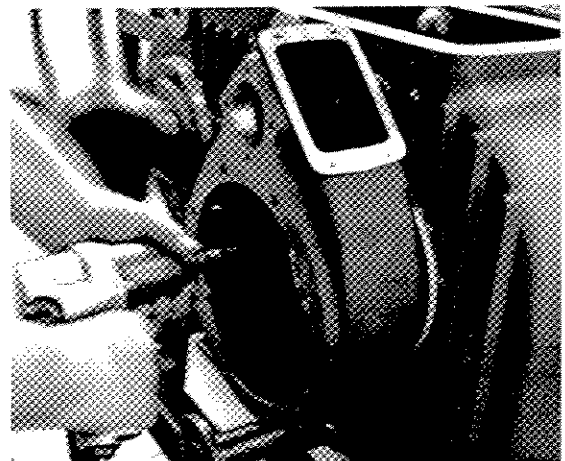
27. Remove oil seal from the rear output carrier and discard. Remove bearing cup from carrier only if necessary.



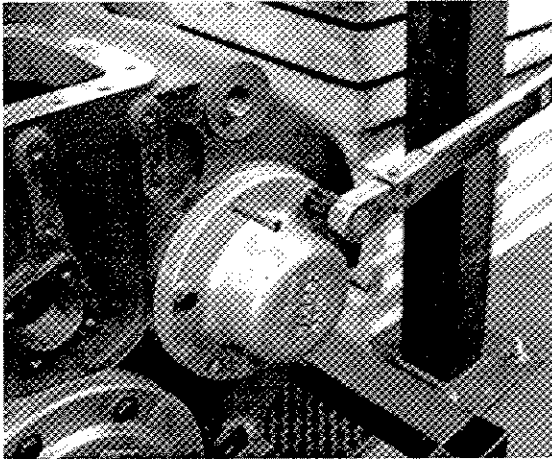
30. Remove output shaft assembly from case housing. See section 5.2 for rear output shaft disassembly instructions.



28. Continuing to support the rear output shaft assembly on its clutch collar, begin to pull shaft out through carrier bore.



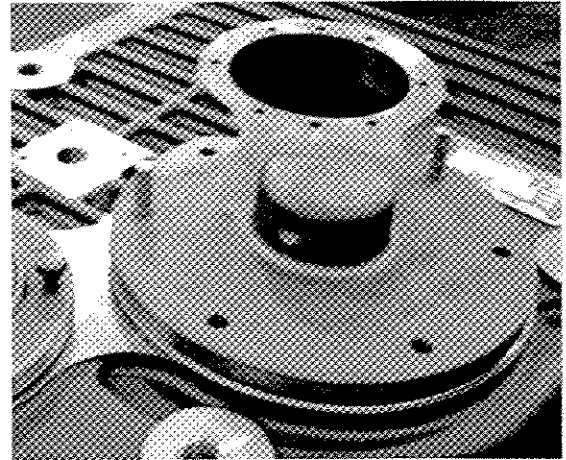
31. Unbolt and remove the front declutch housing.



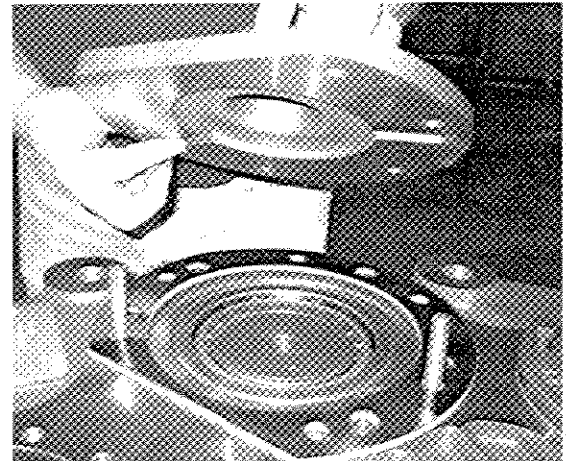
32. Unbolt and remove the input shaft rear end-cap from transfer case housing.



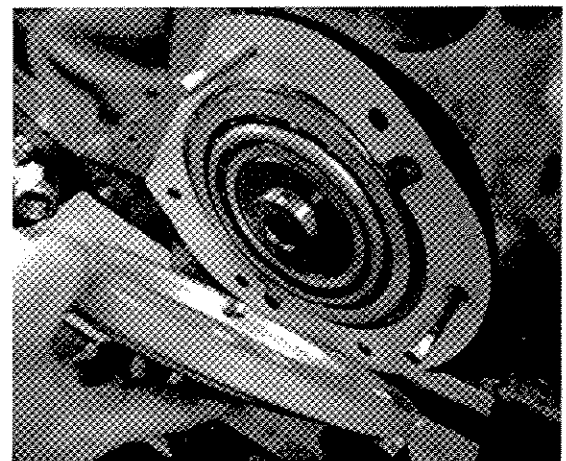
NOTE: If case is fitted with a PTO, an input shaft rear end cap will not be present. Instead, remove the PTO declutch assembly from the rear of the input shaft using the same procedures used to remove front declutch assembly.



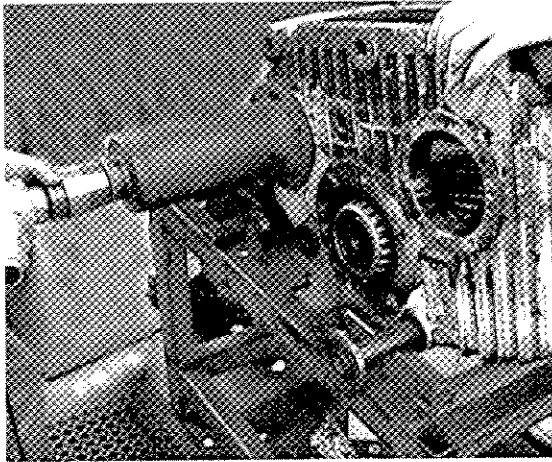
33. Remove the bolts securing intermediate shaft front end-cap to transfer case housing.



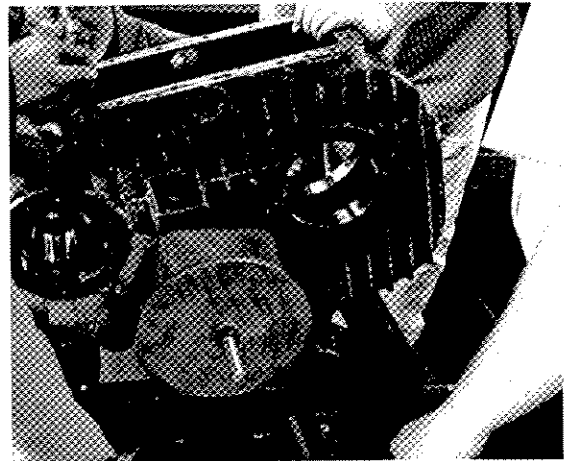
34. Remove intermediate shaft front end-cap and bearing cup.



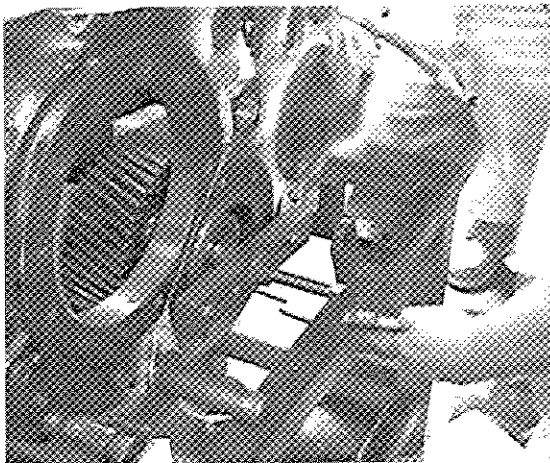
35. Remove the bolts securing pump carrier to case housing. Remove pump carrier and gasket.



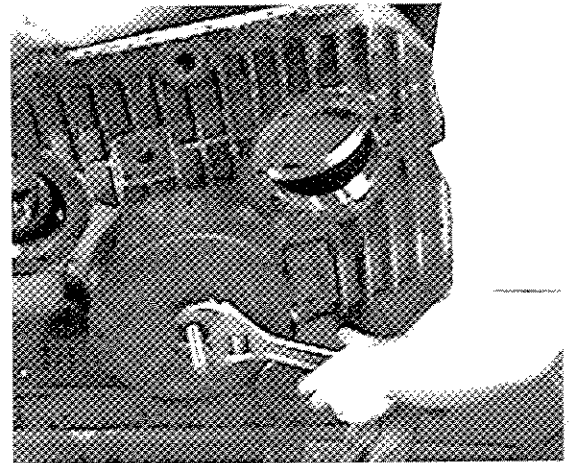
36. Attach tool #866-0747 to threads on front of input shaft. Use a 2.25-inch wrench with tool to pull upper shaft from gear and housing.



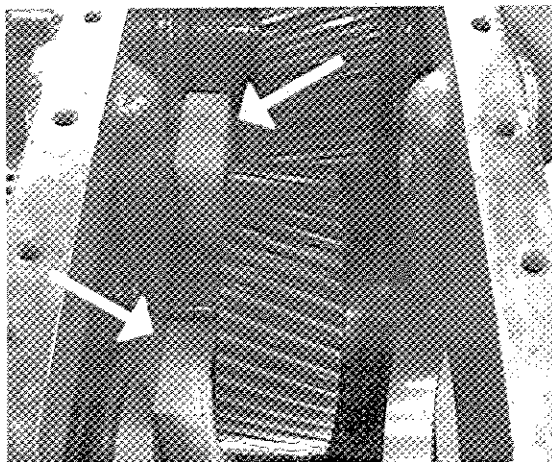
39. Attach tool #866-0748 to front of case and intermediate shaft as shown.



37. Attach tool #866-0748 to rear of case with two bolts as shown. End of rod should fit into the spring cavity.



40. Use wrench to tighten nut, pulling the intermediate shaft from gear and housing.



38. Place 2x4 woodblocks inside case housing to brace gears as shown.

NOTES

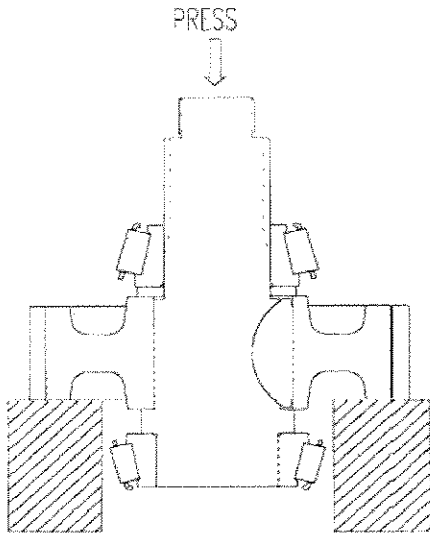
Remove other components as required. Clean and dry all parts using precautions indicated in sections 4.1 and 4.2 of this manual. Examine all parts for wear or damage from misuse or poor handling. Discard and replace any parts that appear to have any damage. All bearings that have supported disassembly loads through their rollers or races must be replaced with new bearings.

THIS COMPLETES GENERAL DISASSEMBLY

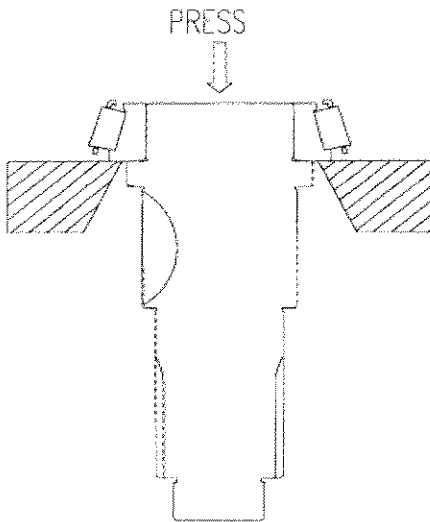
5.2 DISASSEMBLY OF SUBASSEMBLIES

During a normal overhaul, complete disassembly of the shaft and carrier subassemblies is not necessary. The bearing cones and the drive train gears are installed with a press fit and their removal only increases the likelihood of damage.

5.2.1 INPUT/INTERMEDIATE SHAFT



1. Position the shaft assembly in a press such that the front face of the gear is supported.
2. Press the shaft through rear bearing cone, spacer and gear. Remove the shaft key only if necessary.



3. To remove the front bearing cone, support the bearing cone with a separator and press the shaft through the cone.

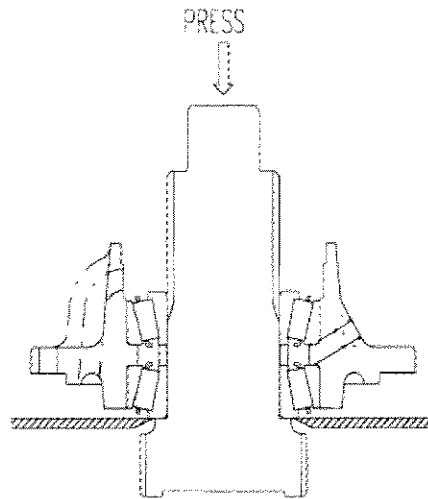
5.2.2 REAR OUTPUT SHAFT

Disassembly of the rear output shaft follows the same procedure as disassembly of the input and intermediate shaft subassemblies except on neutral equipped transfer cases, which disassemble according to the following procedure:

1. Engage clutch collar.
2. Support subassembly on clutch collar.
3. Press shaft through gear, spacer, and bearing.
4. To remove the front bearing cone, support the bearing cone with a separator and press the shaft through the cone.
5. Press remaining bearing cone out from output gear.

5.2.3 FRONT OUTPUT SHAFT/CARRIER

1. Remove the oil seal from the front output shaft carrier and discard.



2. Place the shaft assembly in a press such that the rear face of the bearing is supported by the separator and the press arbor is against the threaded end of the shaft.
3. Press the shaft through the carrier, bearings and spacer.
4. Remove the bearing cups from the carrier only if necessary.

THIS COMPLETES DISASSEMBLY OF SUBASSEMBLIES

6.0 ASSEMBLY

All parts should be clean, dry, and lint free. Any traces of storage wax or paper should be removed. Leave bearings and cups in their protective wrappers until ready to use. Do not handle any parts more than is necessary. See **section 9.0** for details of all special tools required for assembly.

Unless otherwise indicated:

All mating surfaces should be lightly coated with a thin mixture of chassis grease and 30W engine oil. The mixture should be thin enough to apply with a small brush.

All bolt threads should be coated with 272 Loctite before use

Extended length bolts with the heads removed can be used as simple guides to support and locate all gaskets, shims, and end caps as required.

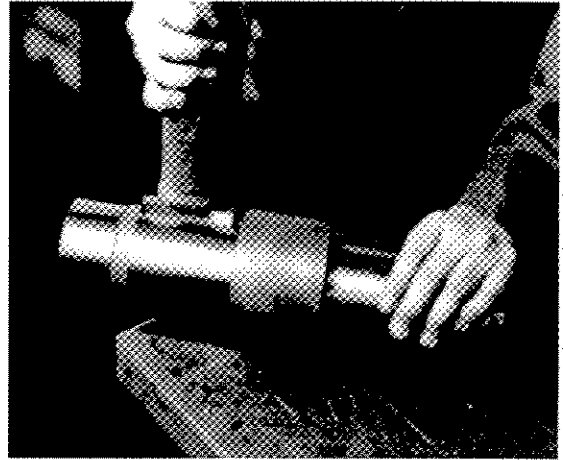
6.1 INTERMEDIATE & INPUT SHAFT SUBASSEMBLY & INSTALLATION



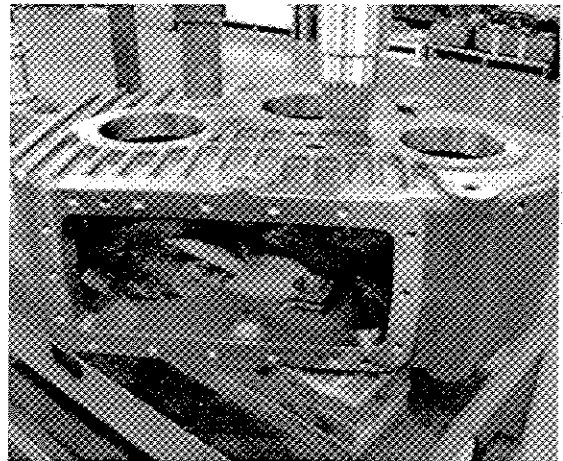
1. Place input and intermediate gears in a domestic electric oven or other suitable heater at 300°F for 30 minutes.

NOTE: Gear temperature should not be allowed to exceed 300° F.

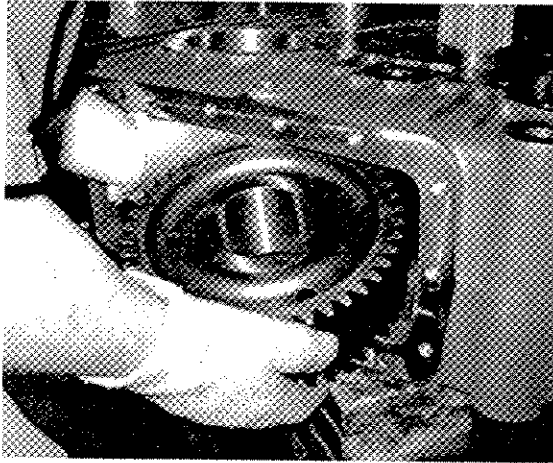
NOTE: Do not heat with an acetylene torch as parts can easily be damaged.



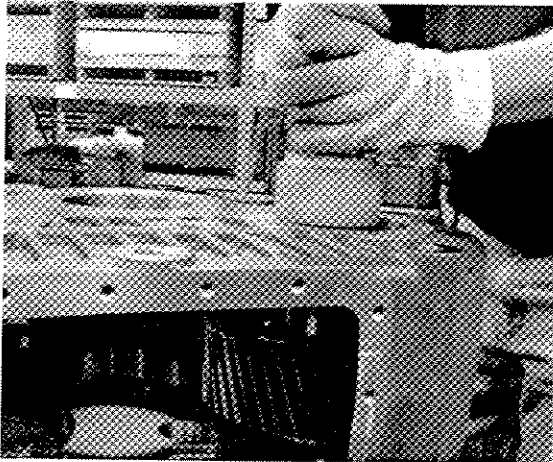
2. While gears are warming, attach keys to intermediate and input shafts using a soft drift.



3. Rest the transfer case on its side supported by two wooden beams so that the front of the case faces up. Be sure input and intermediate bores are not obstructed.
4. Place intermediate and input bearing cones in heater during final 3 minutes of heating.



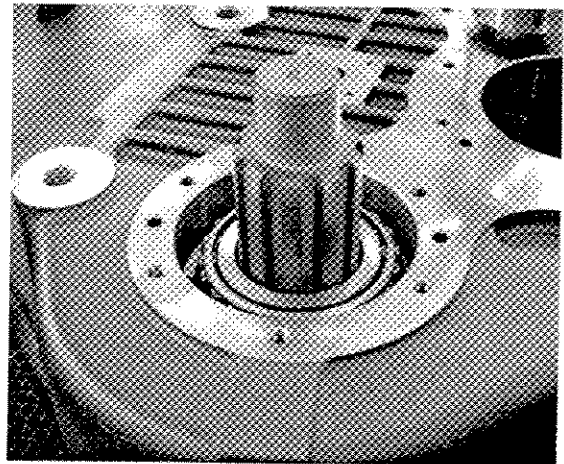
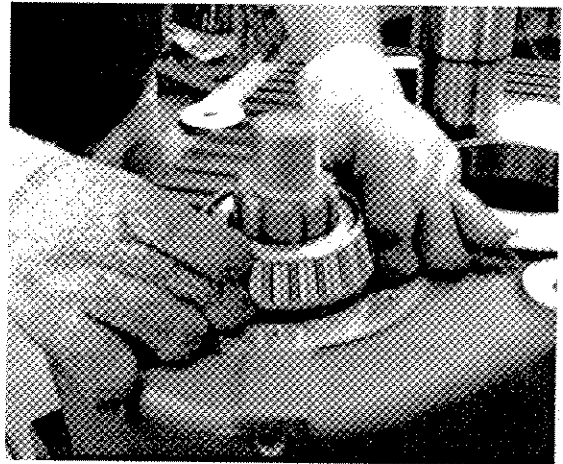
5. Remove input gear from heater with protective gloves. Place horizontally inside case housing over the input bore. Be sure to note the orientation of the keyway.



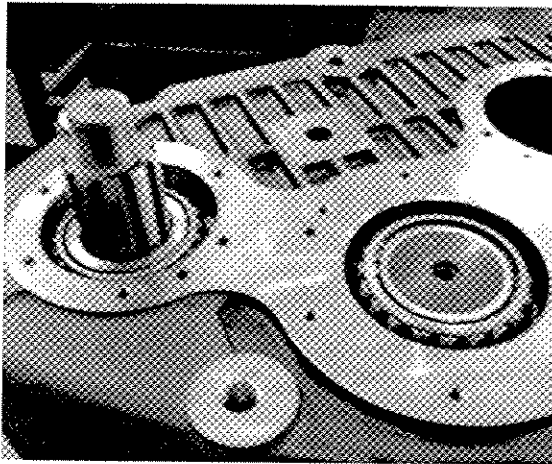
6. Lower the input shaft through the input bore and input gear, being sure to align the key with the keyway.



7. Use a brass drift to drive the shaft until the gear is flush against the shoulder.

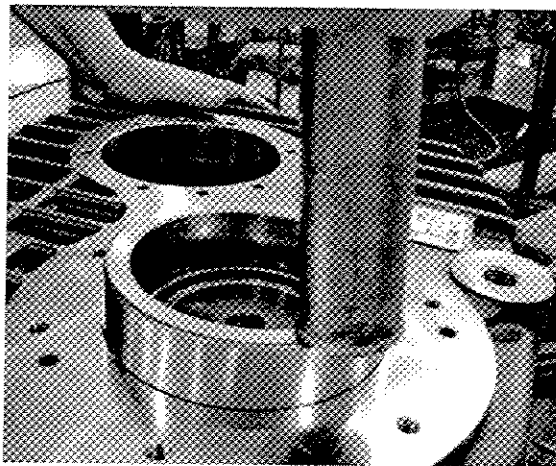


8. Remove input shaft bearing cone from oven and slide it onto the input shaft.

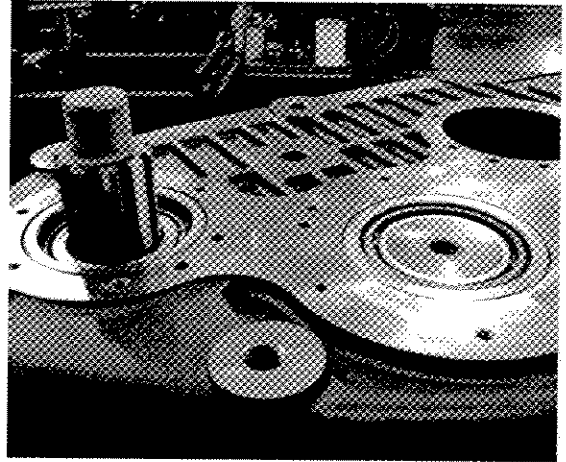


9. Repeat steps 5-8 with the intermediate gear. Be sure intermediate gear meshes with input gear.

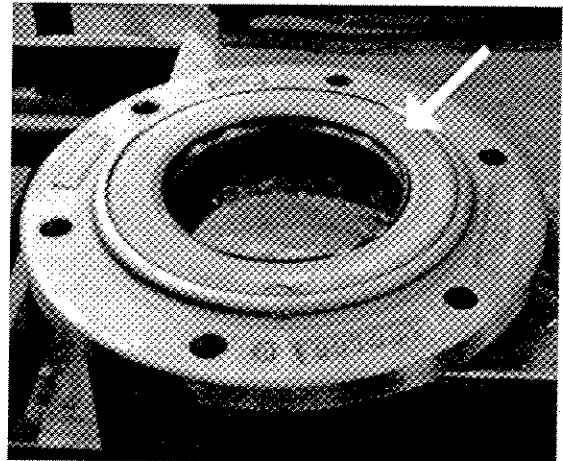
10. Grease input and intermediate bores.



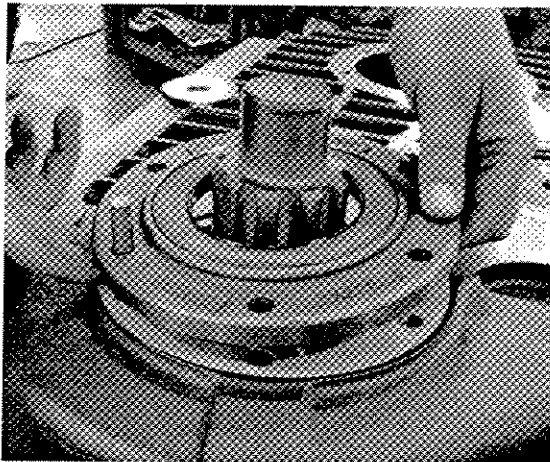
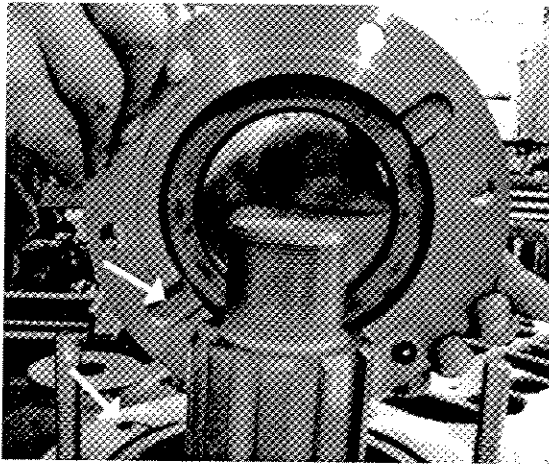
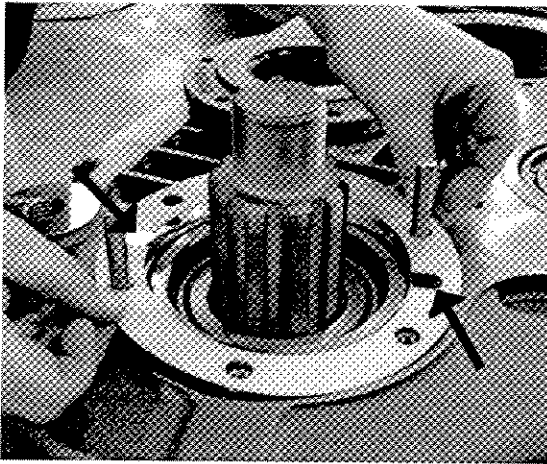
11. Position bearing cups over bearings.



12. Use a soft drift to drive into place.



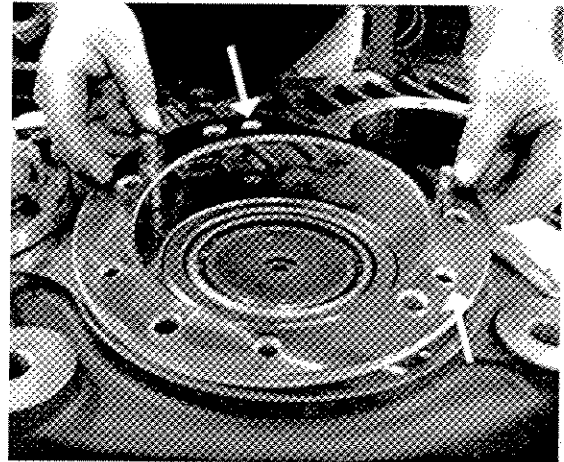
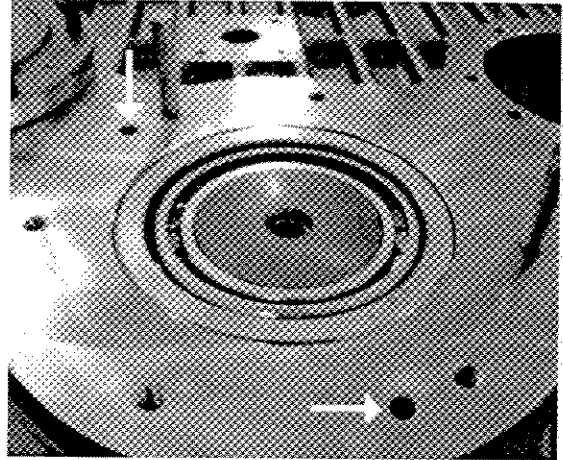
13. Use drift to press oil seal into input carrier.



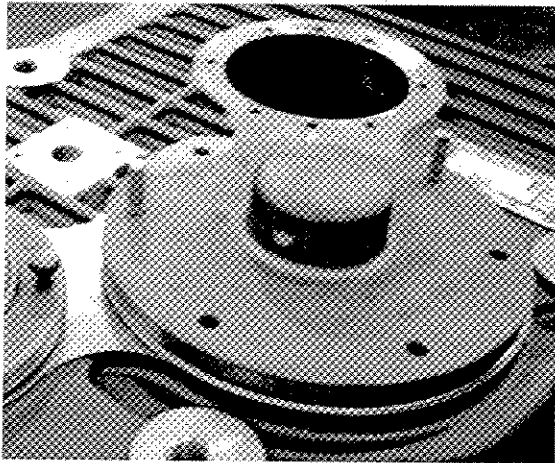
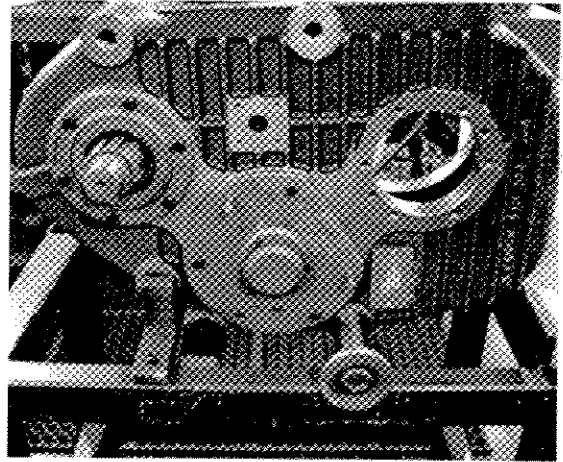
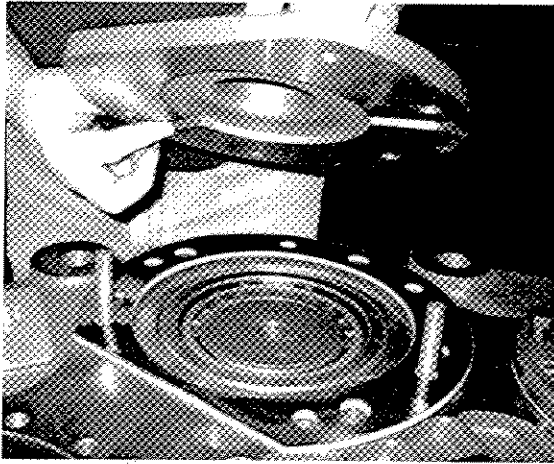
14. Place the input carrier gasket and input carrier over the input bore being sure to align the oil grooves on carrier and gasket with the oil gallery holes on the case housing. Tighten but do not torque carrier bolts. End float tolerance adjustment will be discussed in section 6.4.

NOTE: Oil gallery holes are unthreaded.

NOTE: Failure to properly align input carrier will inhibit lubricant flow to input shaft.

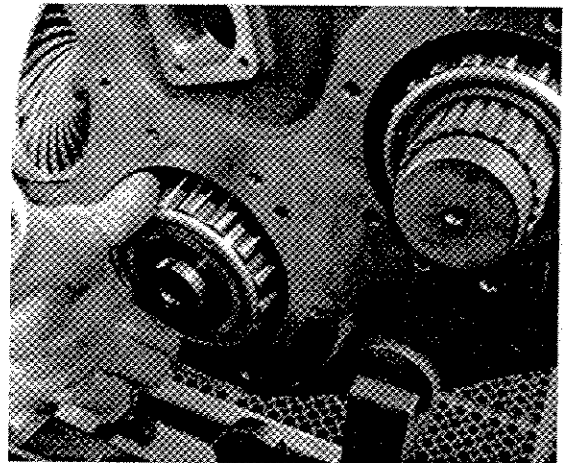


15. Attach a 0.100-inch shim stack to intermediate bore. Be sure to align the oil grooves with the oil gallery holes.



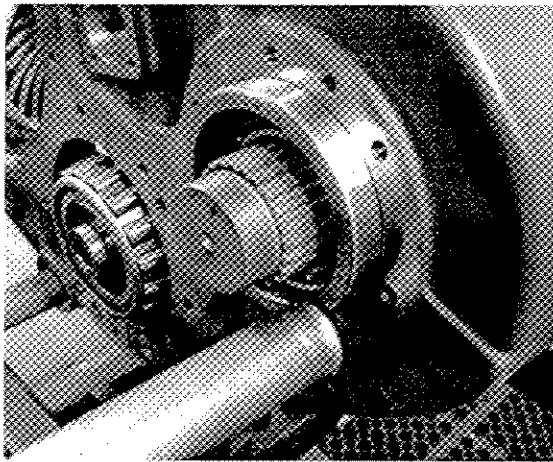
16. Attach intermediate end cap to housing being sure to align oil grooves with the oil gallery holes. Tighten but do not torque bolts.

NOTE: Failure to properly align intermediate end cap will inhibit lubricant flow to intermediate shaft.

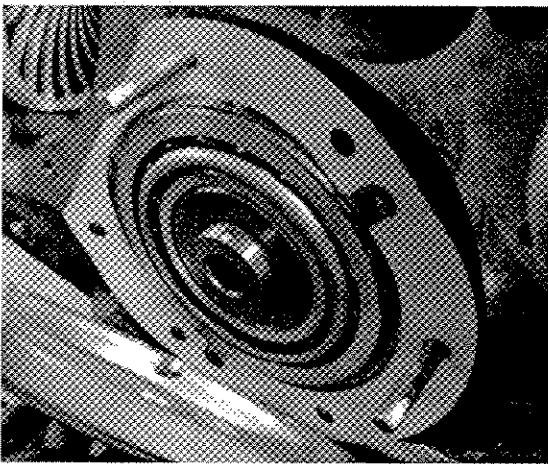


18. Heat the rear input and intermediate shaft bearings for about 3 minutes before inserting them into rear end of respective shafts.

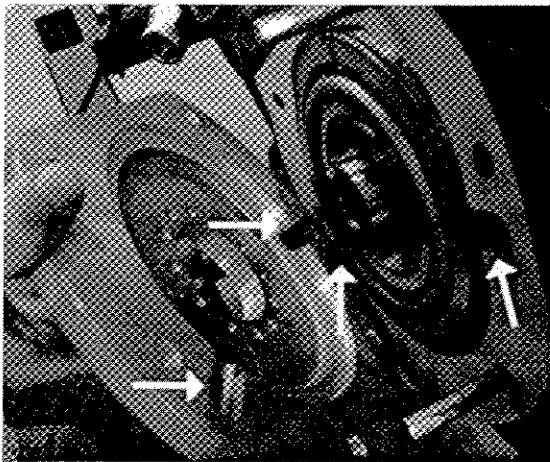
19. Grease the rear input and intermediate bores.



20. Tap in rear bearing cups.

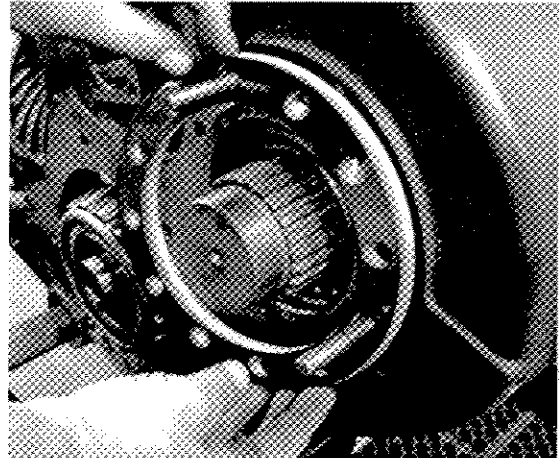


21. Attach gasket to rear intermediate bore. Be sure to align oil grooves with oil gallery holes.

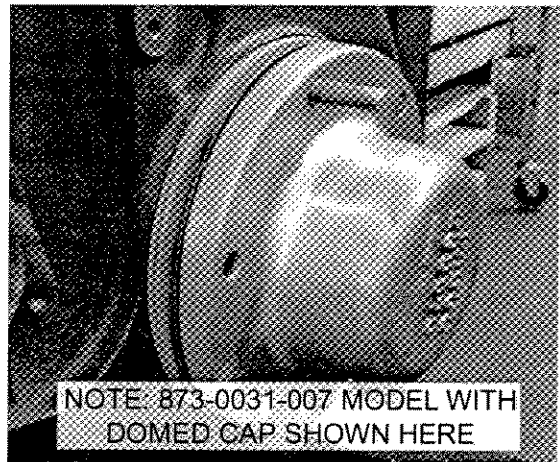


22. Bolt oil carrier to the housing. Be sure to align oil grooves with oil gallery holes.

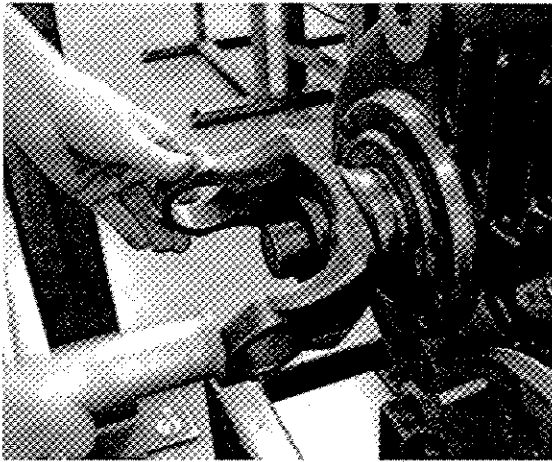
NOTE: Failure to properly align intermediate end cap will inhibit lubricant flow to intermediate shaft.



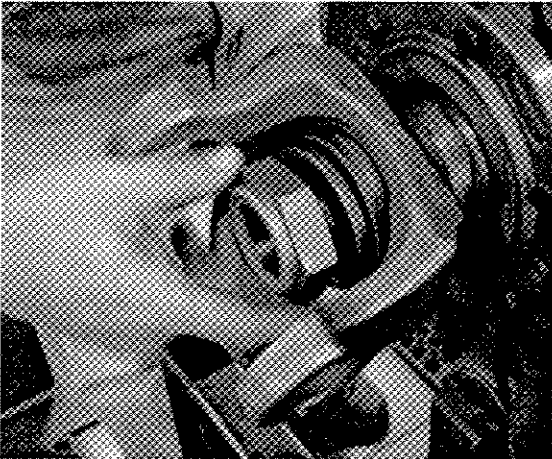
23. Attach 0.125-inch shim stack to rear input bore.



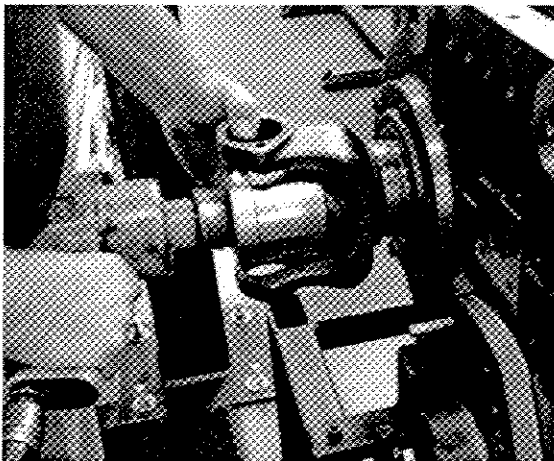
24. Attach rear input shaft cap to housing (actual cap may differ from the one depicted here). If fitted with a PTO, temporarily mount PTO declutch housing to case, in place of the shaft cap, and torque locknut to specifications.



25. Attach front input yoke. Tap firmly with a drift to seat yoke on shaft.



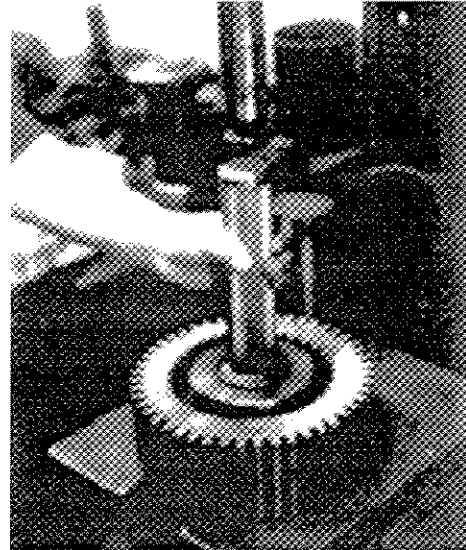
26. Attach washer and locknut.



27. Use tool #866-0687-004 to torque locknut to specifications.

**THIS COMPLETES THE INTERMEDIATE AND
INPUT SHAFT SUBASSEMBLY AND
INSTALLATION**

6.2 REAR OUTPUT SHAFT SUBASSEMBLY



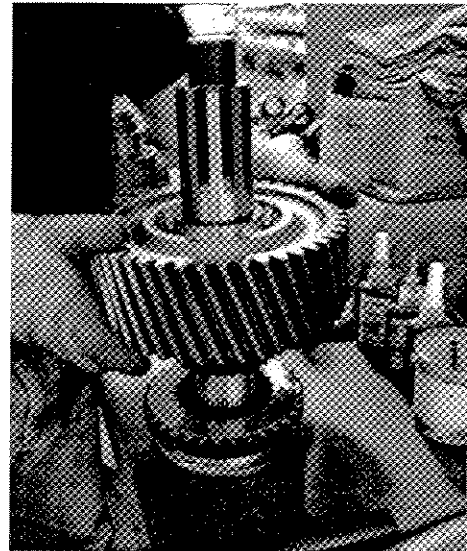
1. Press bearings cups into both sides of output gear.



2. Slide clutch collar over splines. If transfer case is not neutral-equipped, skip this step.



3. Position gear bearing cone over shaft. Once aligned, the cone should slide easily down.



5. Slide output gear onto shaft.



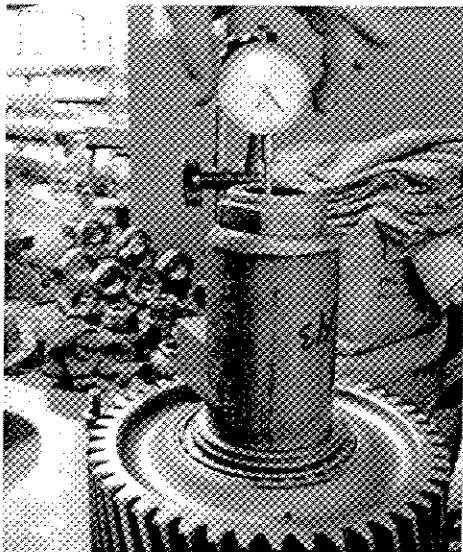
4. Slip the inner bearing spacer onto the shaft.



6. Slide second gear bearing onto shaft and tap lightly to seat in the bearing cup. Be sure the gear can rotate freely.



7. Attach tool #866-0711 to shaft with a locknut. Tighten locknut to specifications.



8. Attach a magnetic base dial indicator to assembly as shown. Lift gear with both hands to check for proper clearance. Total end float should be between 0.000 to 0.002 inches.

NOTE: The sub-assembly components must be allowed to cool before gear end float tolerances can be checked.

9. If end float is not within tolerances, swap the bearing spacers to achieve proper end float conditions.
10. Remove locknut and tool #866-0711.



11. Place shaft bearing in heater for 3 minutes and then slide onto shaft. Be sure the bearing is seated against inner bearing cone, as this will hold the assembly together.



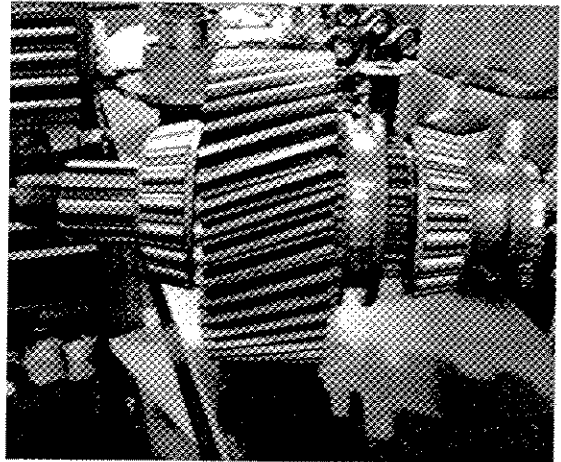
12. When the bearing is cool, flip the sub-assembly over and repeat step 11.



14. Use tool #866-687-006 to tighten output shaft nut.

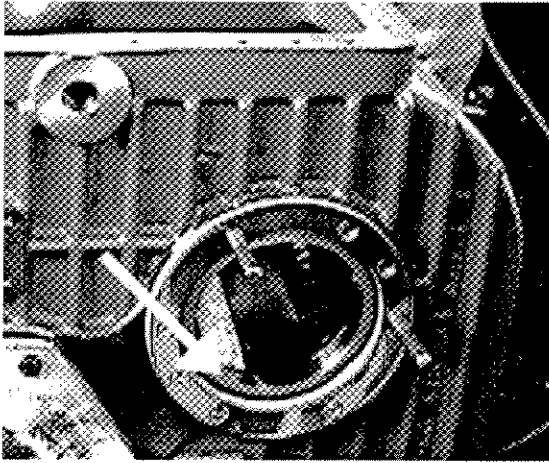


13. Attach tool #866-0810 and output shaft locknut to end of shaft.

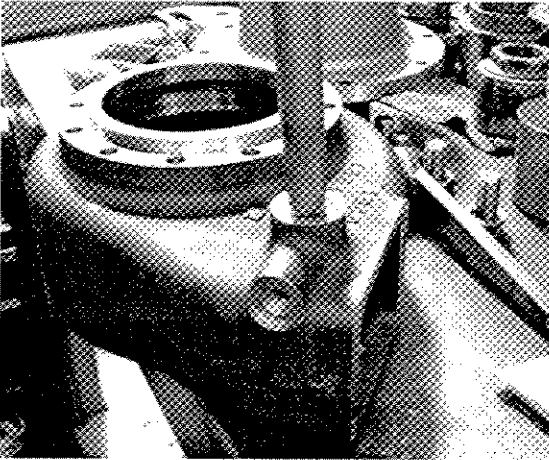


**THIS COMPLETES THE OUTPUT SHAFT
SUBASSEMBLY**

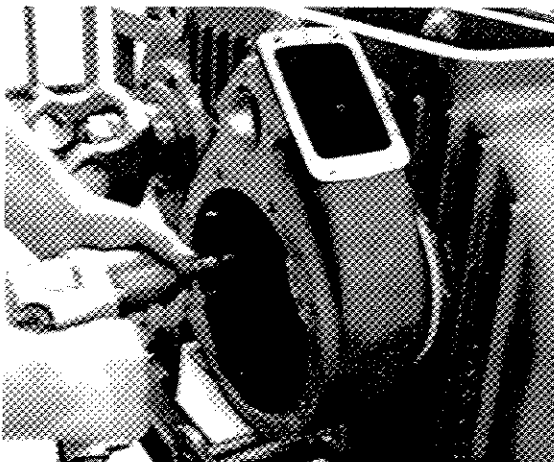
6.3 REAR OUTPUT SHAFT INSTALLATION



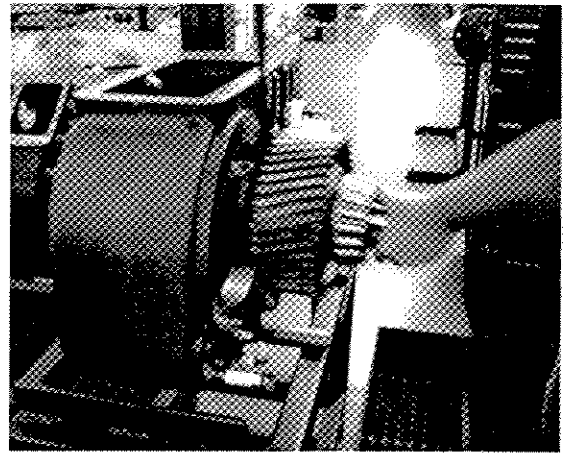
1. Tap bearing cup into front output bore.



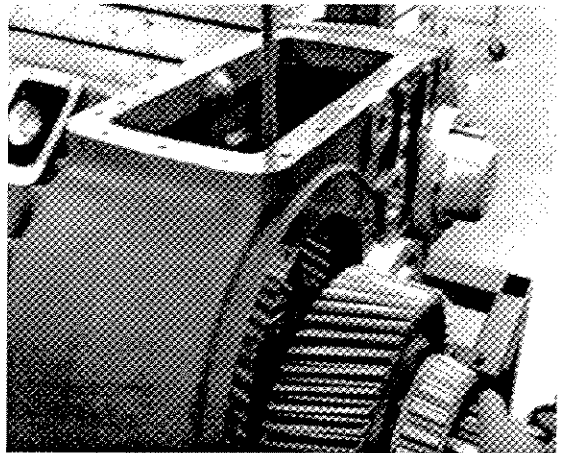
2. Tap Welch plug into front declutch housing.



3. Attach the front declutch housing with a 0.120-inch shim stack to the case housing.



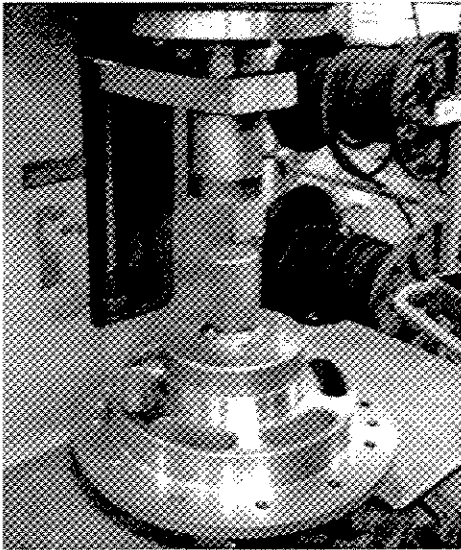
4. Support the output shaft subassembly with a sling at the clutch collar groove. Ease the subassembly through the bore.



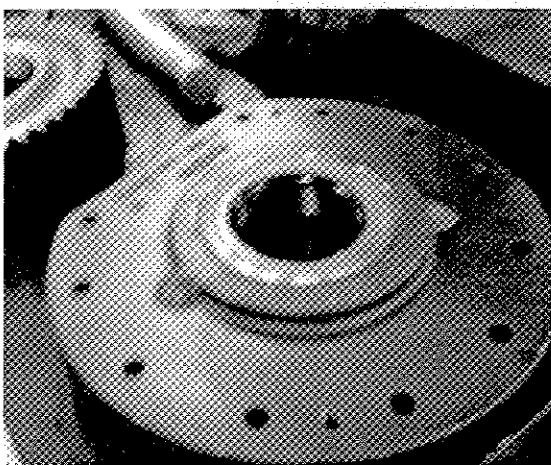
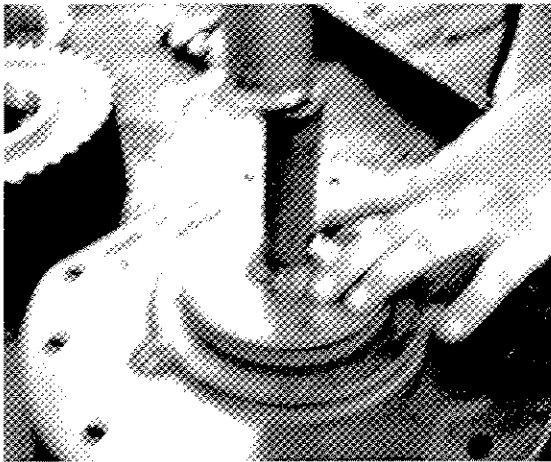
5. Rest output gear on bore and transfer sling to the collar now located inside the case housing.



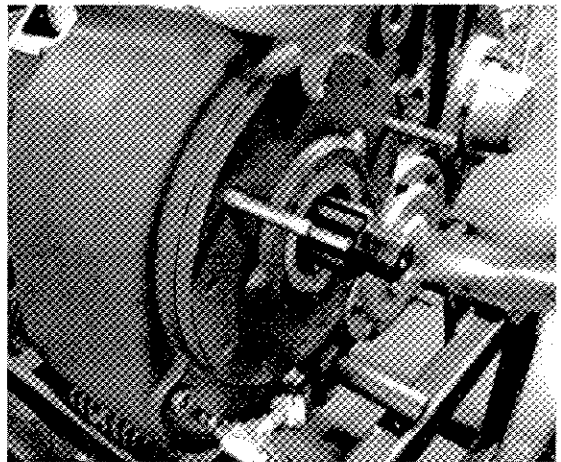
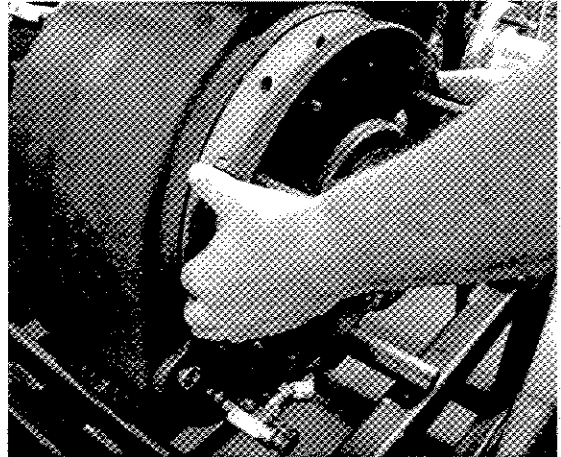
6. Mesh output gear with intermediate gear and continue to slide shaft through until other end protrudes through front output bore.



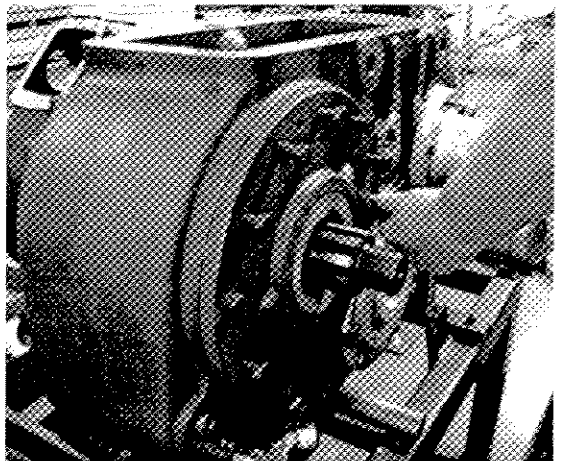
7. Press bearing cups into rear output carrier.



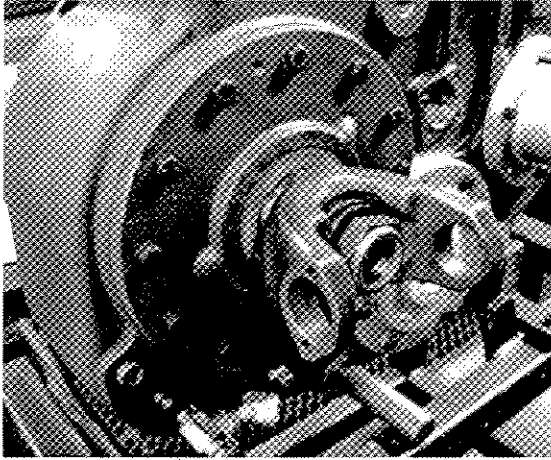
8. Tap rear output oil seal into rear output carrier.



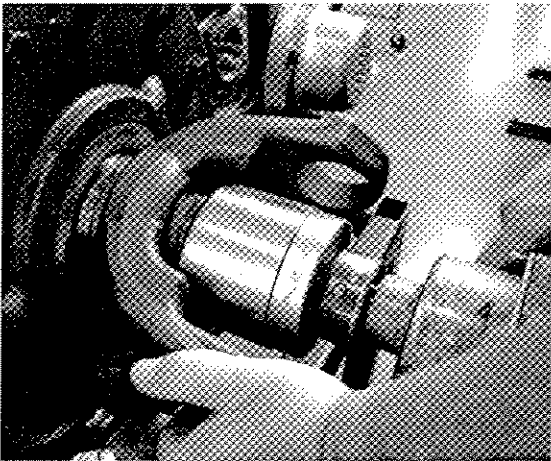
9. Mount rear output carrier with gasket on guide bolts and tap into place.



10. Bolt carrier to housing and torque to specifications.



11. Attach rear output yoke and shaft nut.



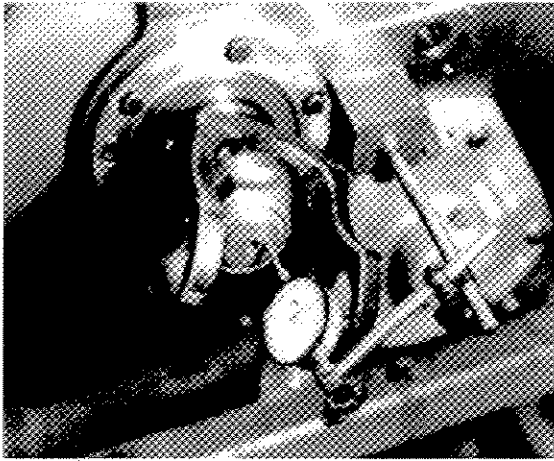
12. Torque rear output shaft nut to specifications.

**THIS COMPLETES THE REAR OUTPUT
SHAFT INSTALLATION**

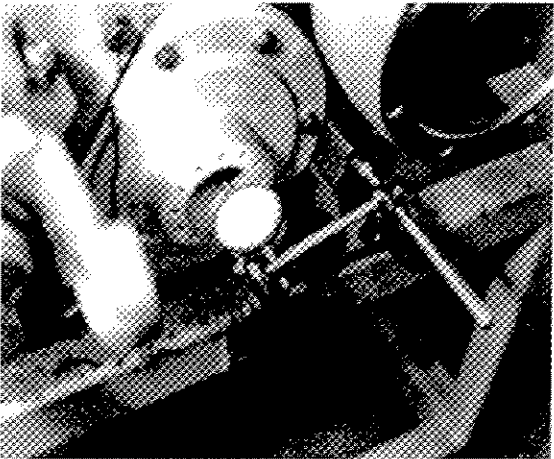
6.4 SHAFT & BEARING END FLOAT ADJUSTMENT

All the bearings in the TC-143 Transfer Case are adjusted to allow end float of the shaft in its bearings. Absolutely no preload or tight bearings should be used. The bearing and shaft assemblies must be allowed to cool to room temperature before making any adjustments.

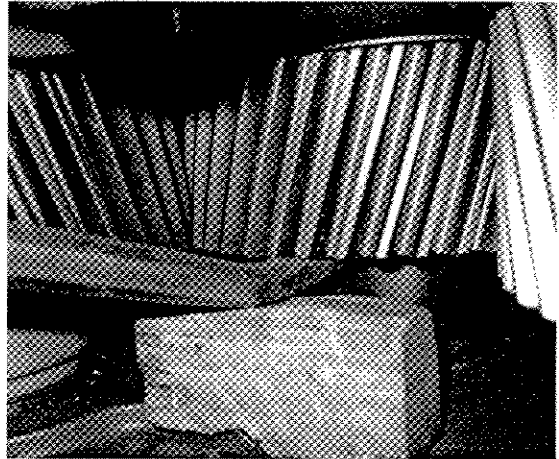
1. At this point the specified number of shims should have been assembled between their respective cap, carrier, or declutch housing as indicated in the pertinent sections.
2. Tap all shaft ends and yokes with a soft drift to ensure that they are fully seated.



3. Attach a magnetic base dial test indicator to the housing in a suitable position near the shaft being checked with the spindle of the dial indicator touching the end of the shaft.



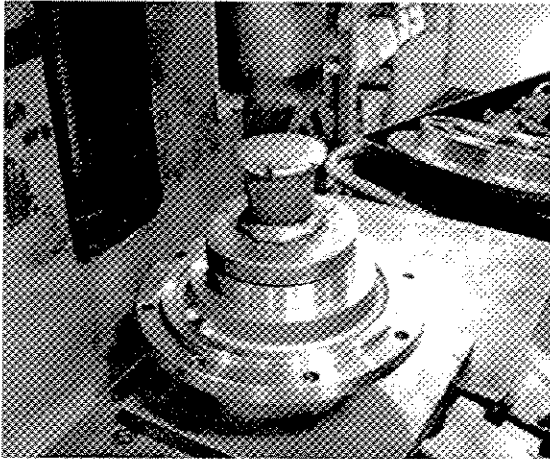
4. Be sure dial indicator is long enough to reach the intermediate shaft through the pump carrier.



5. With a pry bar or other suitable tool leveraged against a woodblock situated against the housing wall, apply a moderate amount of force to the respective gear to shift the shaft assembly back and forth while reading the dial indicator. Be sure the entire shaft assembly is moving and not just the gear on the shaft.
6. Vary the number of shims until end float comes within tolerance. All bearings on the TC-143 must have between 0.003 and 0.008 inches of end float.
7. After all shaft end floats are within tolerance, tighten and torque all carrier and cap bolts to specifications.

**THIS COMPLETES THE SHAFT & BEARING
END FLOAT ADJUSTMENT**

6.5 PTO/FRONT DECLUTCH ASSEMBLY



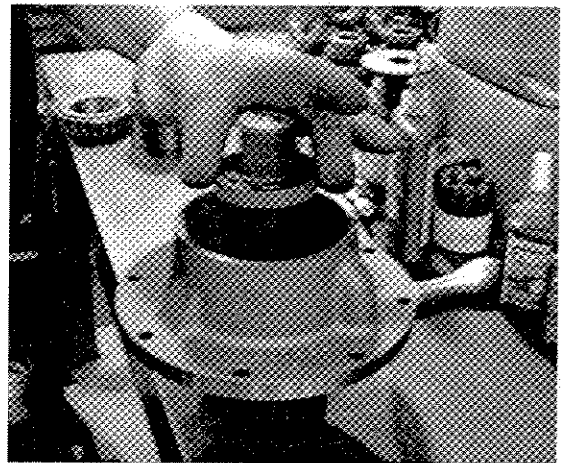
1. Press bearing cups into front output carrier.
2. Heat shaft bearing cones for approximately 3 minutes.



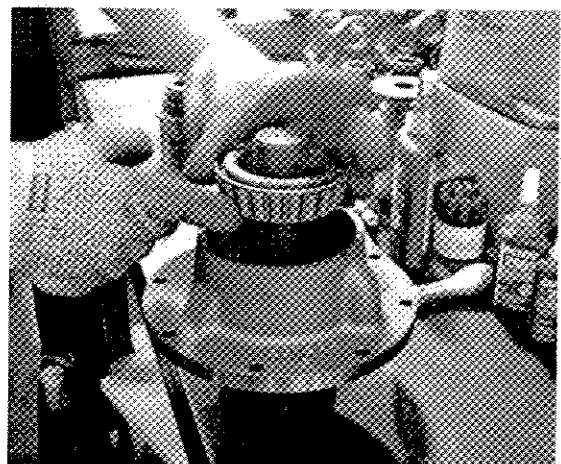
3. Slide first bearing cone onto front output shaft.



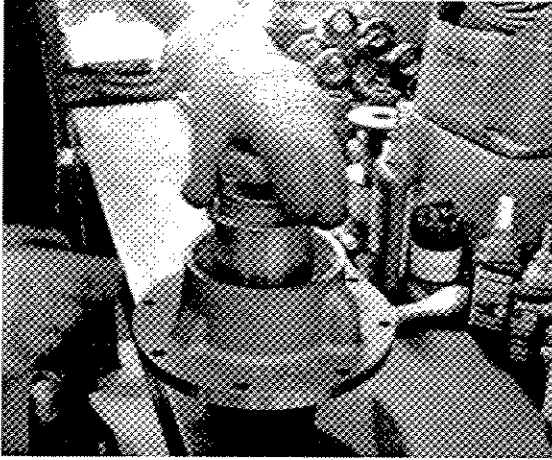
4. Slide carrier onto front output shaft. Seat bearing on shaft in bearing cup on front output carrier.



5. Slide spacer onto front output shaft.



6. Slide second bearing cone onto front output shaft.

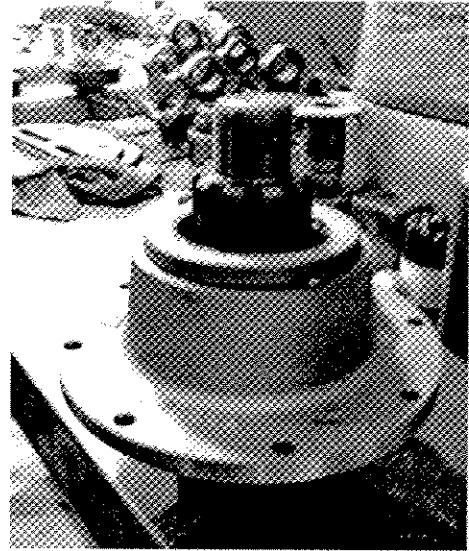


7. Attach set up sleeve and tighten with locknut.

8. Allow bearings and sub-assembly to cool.

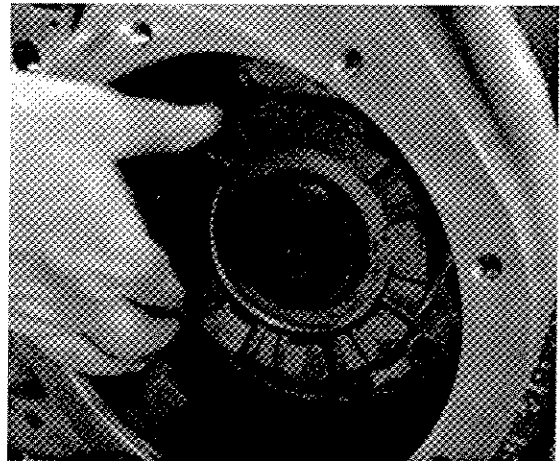


9. Invert declutch assembly. Attach magnetic base dial indicator to end of shaft as shown and shift the carrier up and down on the shaft to check bearing end float. End float should be between 0.003 and 0.008 inches. Machine or replace spacer to bring bearing end float within tolerances.

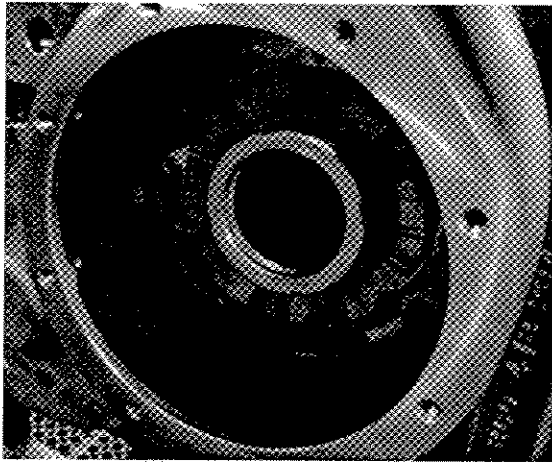


10. Invert declutch assembly. Remove locknut and set-up sleeve. Tap in declutch carrier oil seal.

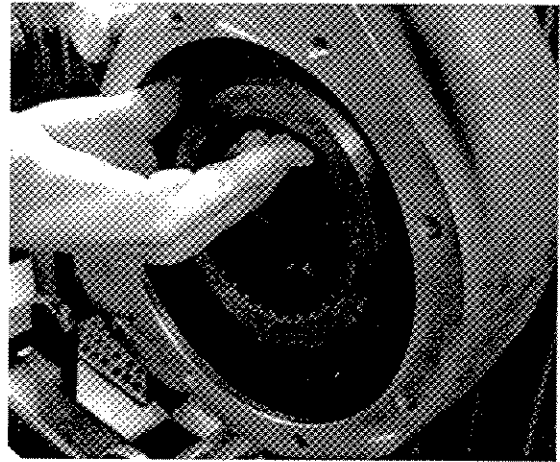
11. Apply 290 Loctite to the threads on the front declutch side of the rear output shaft.



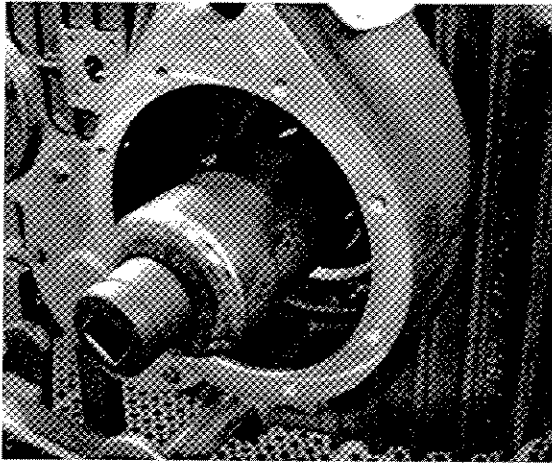
12. Slide the front declutch gear through front declutch housing onto the rear output shaft.



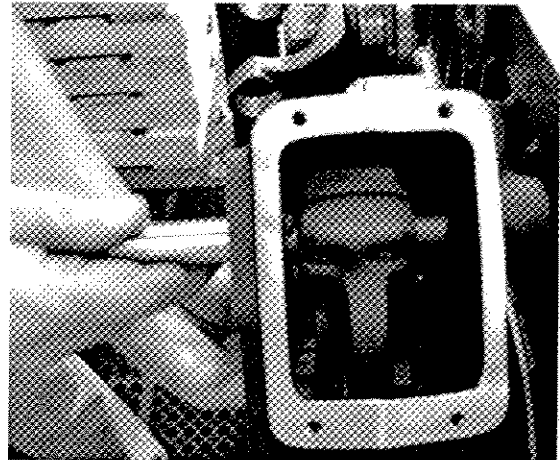
13. Attach lock-nut.



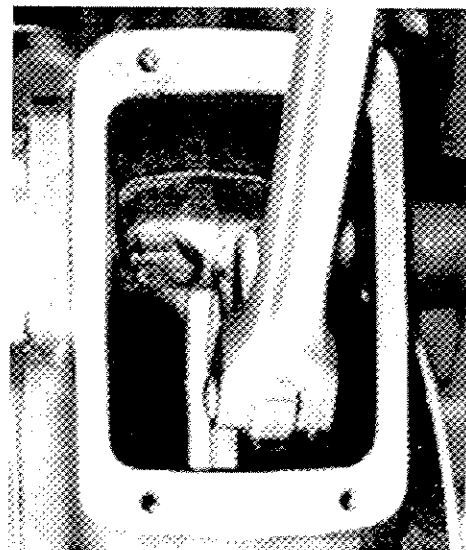
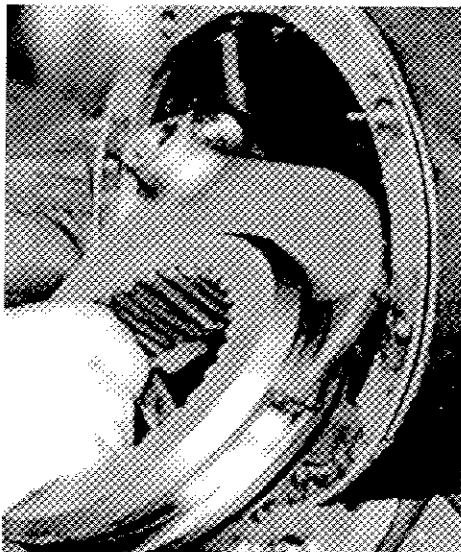
15. Slide shift fork into clutch collar groove and place assembly inside declutch housing.



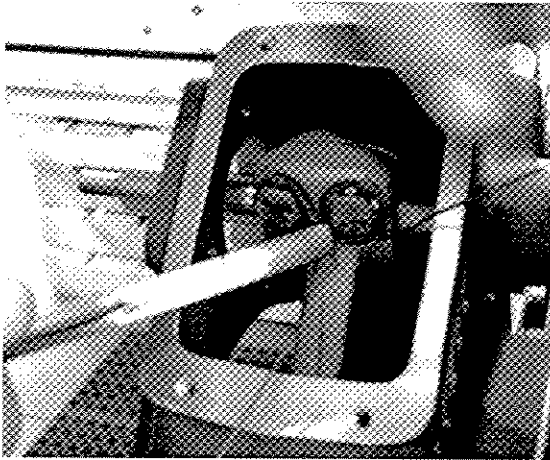
14. Use tool #866-0687-006 to tighten nut. Be sure shaft end float tolerances are met according to section 6.4 before continuing.



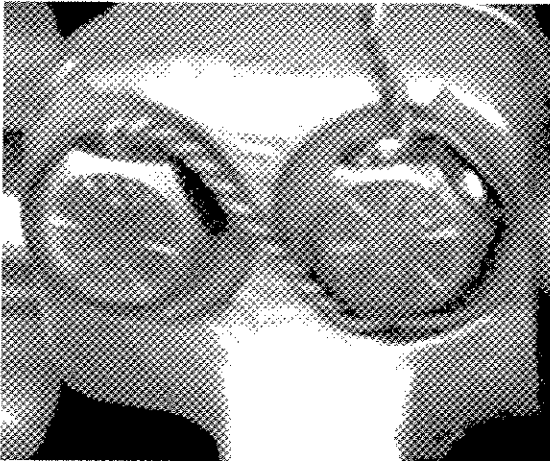
16. Slide shift shaft into shift fork through shifter bore.



17. Attach and torque the two (2) pinch bolts to specifications.



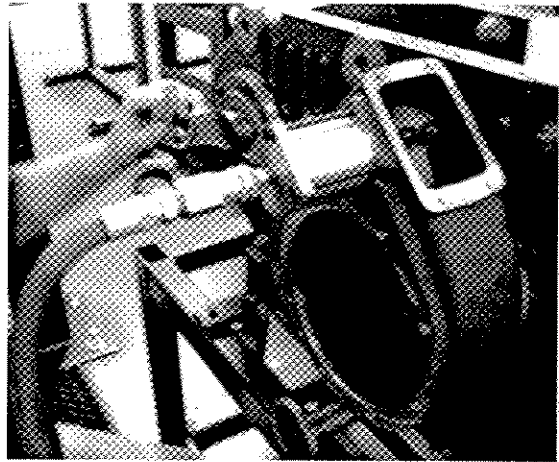
18. Attach lock-wire.



19. Secure bolts and trim excess.

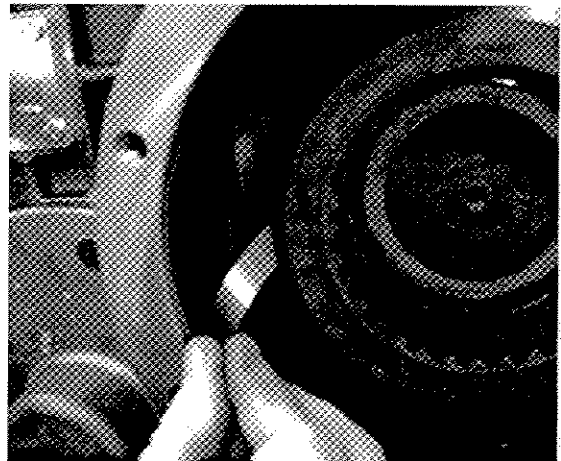


20. Assemble shifter components according to section 6.6.

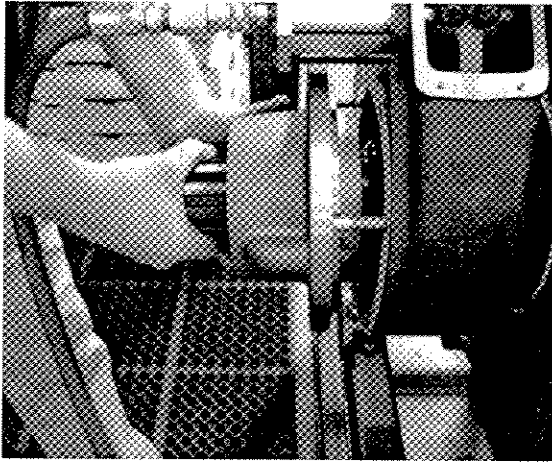


21. Attach air hose to shifter and engage the clutch. Turn input yoke until the clutch gears fully engage.

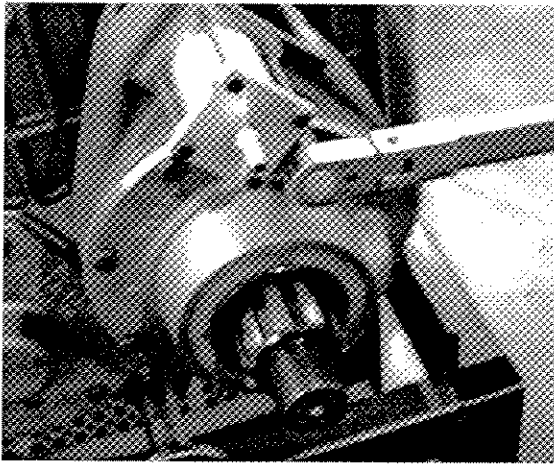
NOTE: Do not put hands inside front declutch housing while adjusting clutch collar.



22. Check to make sure there is 0.002-inch clearance between the fork and clutch gear along both prongs. If clearance is insufficient, adjust the number of PN #927-822 stops in shifter assembly until adequate clearance is achieved.



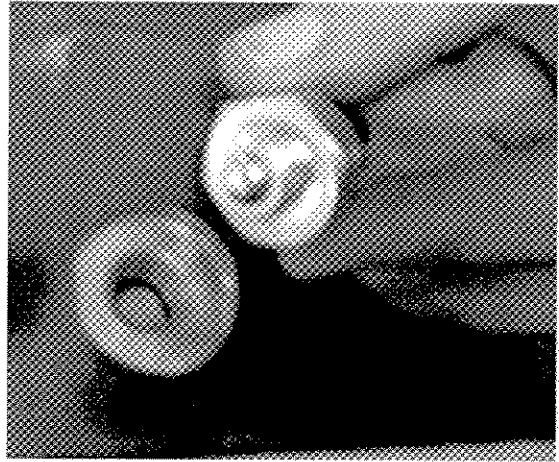
23. Leave clutch engaged while the front declutch carrier is mounted with gasket. Be sure front output shaft engages the clutch collar.



24. Bolt on the front declutch housing carrier
Torque to specifications.



25. Drop sensor pin into indicator bore, rounded end first.



26. Attach copper washer to indicator light switch housing and screw into bore.

27. Test for sensor lead continuity with a continuity tester. Tester should indicate a closed circuit when airshift is engaged.

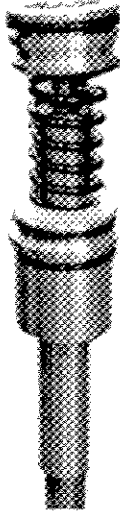


28. Bolt on the declutch housing inspection plate. Torque to specifications.

29. PTO declutch assembly follows the same general procedure.

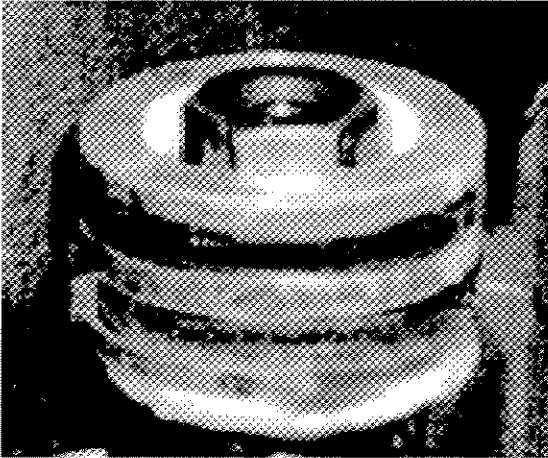
**THIS COMPLETES THE PTO/FRONT
DECLUTCH ASSEMBLY**

6.6 SHIFT SHAFT ASSEMBLY

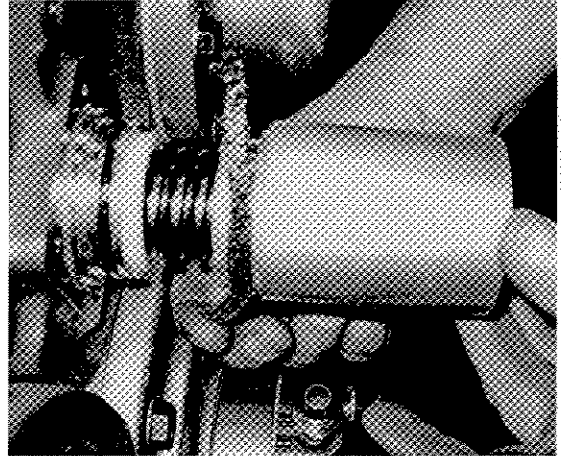


1. Slide the shaft O-ring, adapter tube fitted with O-rings, spring, stop rings, and the piston fitted with O-rings onto the shift shaft as shown.

NOTE: Do not forget small O-ring on 0.375 diameter threaded portion of shaft.

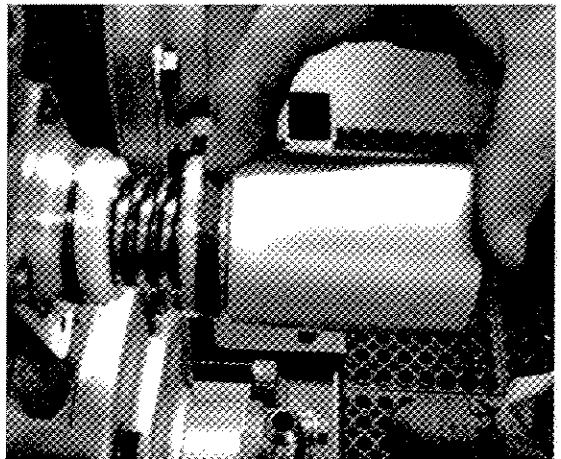


2. Slide on lockwasher and screw in locknut. Torque to specifications.
3. Install shaft in housing through shifter fork.
4. Grease O-ring areas of adapter tube and piston.



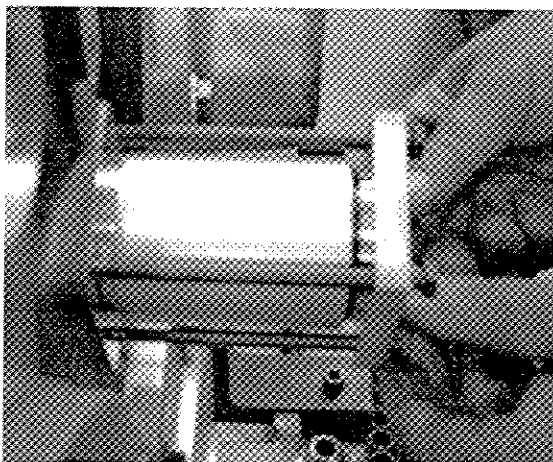
5. Wrap an oil-soaked felt piston seal around piston seal groove.

NOTE: Felt piston seal should be soaked in 30W oil overnight or until thoroughly saturated.



6. Holding the felt-seal in place with fingers, slide shift cylinder tube onto shaft and gently tap into place. Tube should be flush against housing.

NOTE: When sliding shift cylinder tube into place, be careful not to pinch/nick the O-rings or distort the felt washer.

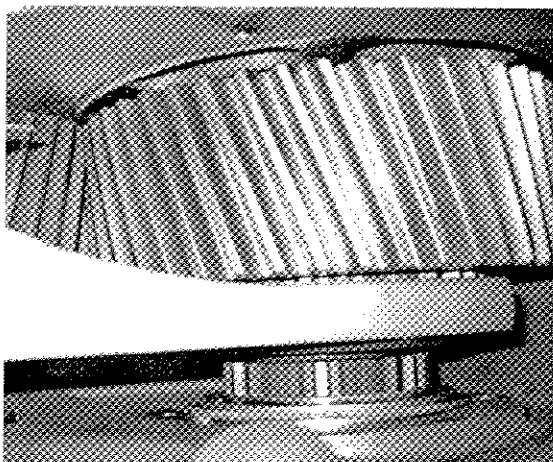


7. Mount shift cap to TC housing with extended length bolts. Torque bolts to specifications.

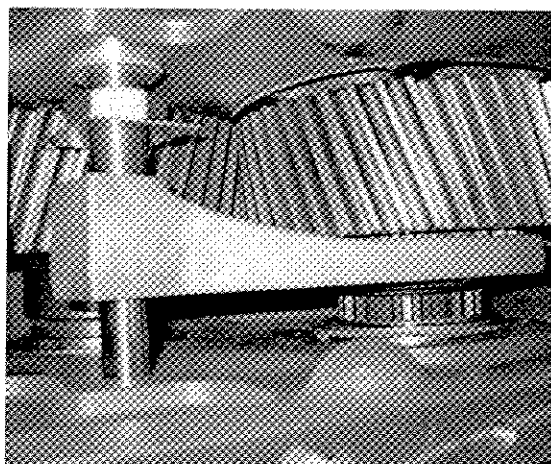
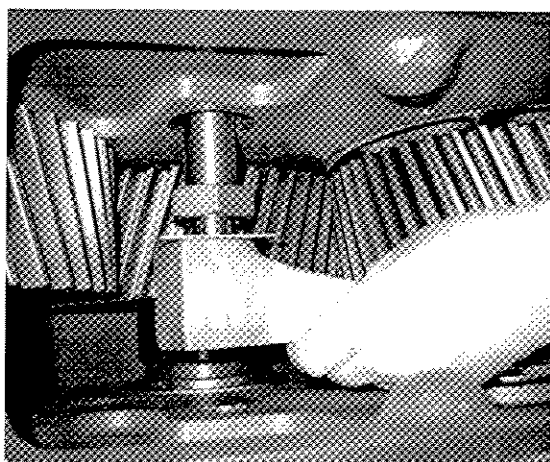
THIS COMPLETES THE SHIFT SHAFT ASSEMBLY

6.7 NEUTRAL SHIFTER INSTALLATION

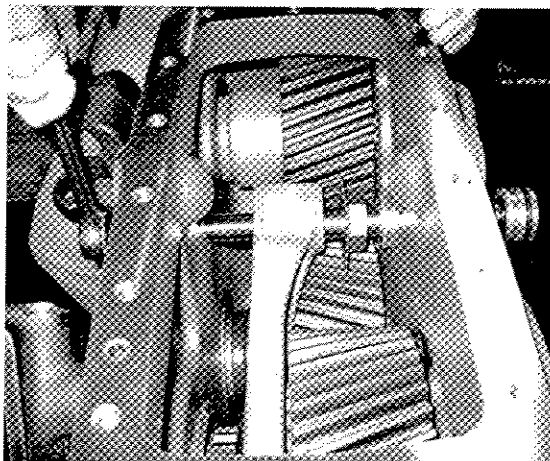
For transfer cases that are not neutral equipped, this section should be skipped.

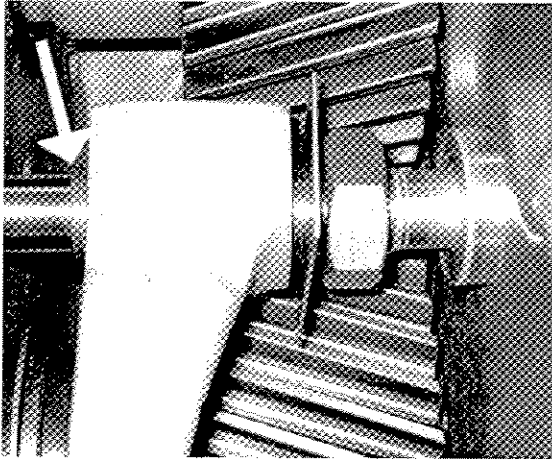


1. Slide shift fork into groove of clutch collar.

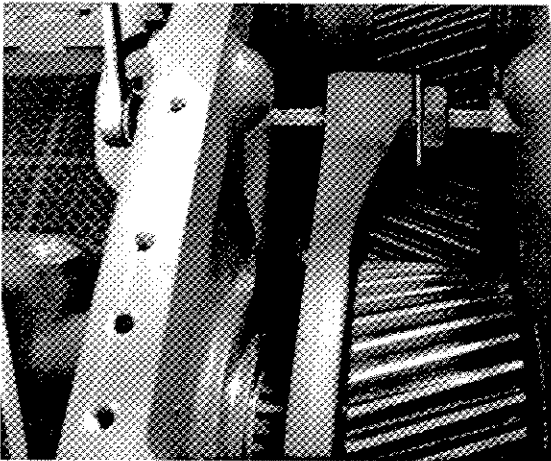


2. Slide shaft assembly in through the shift bore, hexagon nut, lockwasher, and shift fork and out through opposite bore.

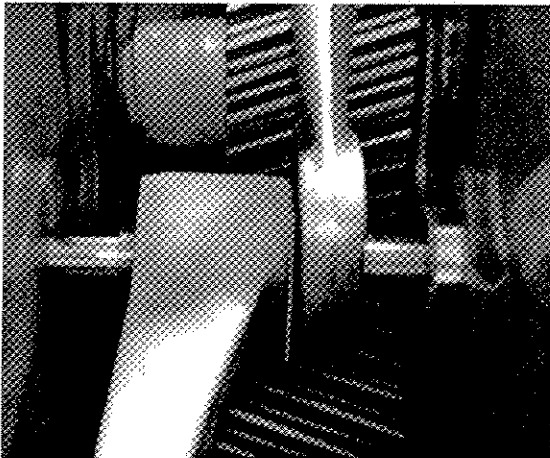




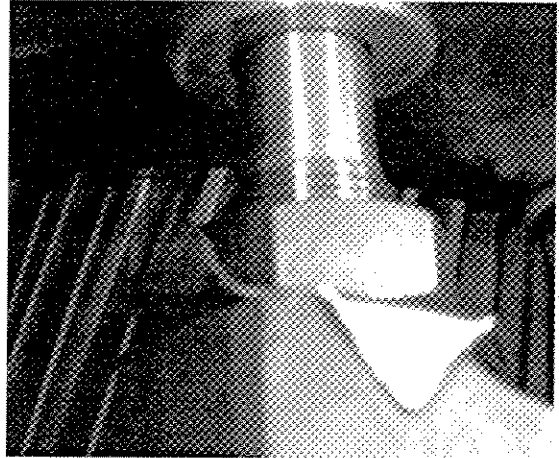
3. Use a 9/16 Allen wrench to advance shaft through shift fork until threads are visible on both sides of fork.



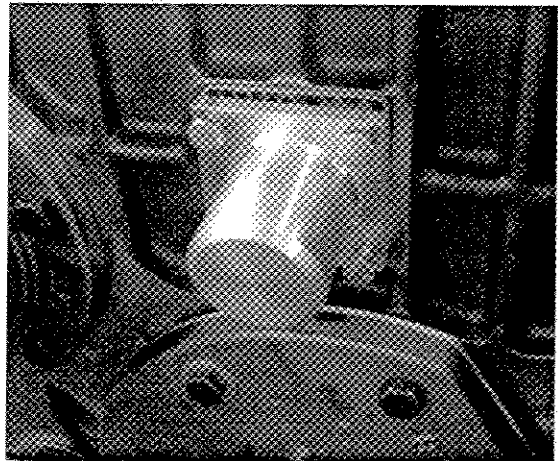
4. Use a 9/16 Allen wrench to adjust shaft until clutch gear comes into contact with the output shaft's inner gear bearing.
5. Back off one revolution.



6. Using Allen wrench to lock shaft in place, tighten shift fork lock-nut to specified torque.
7. Attach air hose to shifter and check for proper clutch teeth engagement and clearance. Adjust if necessary.



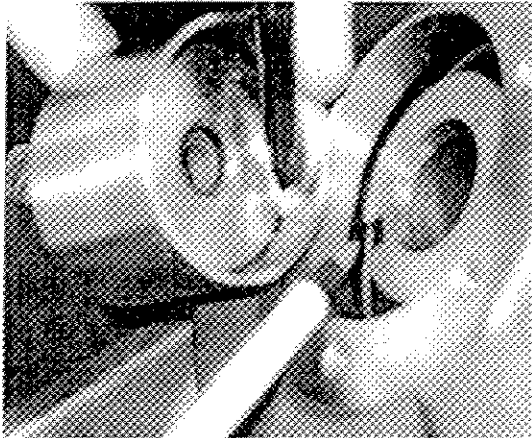
8. Bend one corner of lockplate over shift fork lock-nut and another corner over the shift fork.



9. Attach gasket and end cap to housing and tighten cap screws to the specified torque.

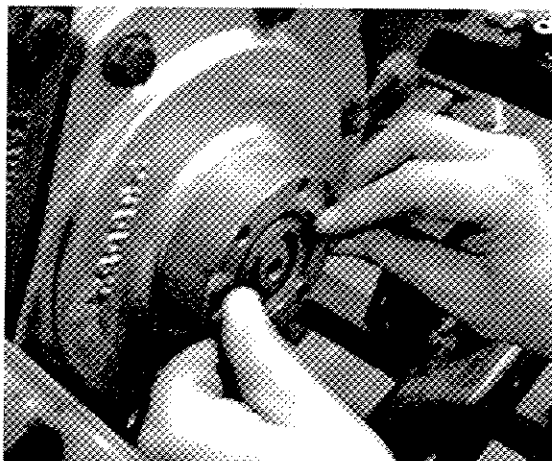
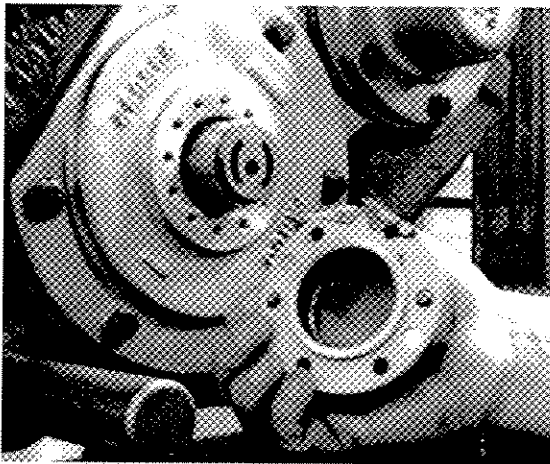
**THIS COMPLETES THE NEUTRAL SHIFTER
INSTALLATION**

6.8 LUBRICATION PUMP AND PLUMBING ASSEMBLY



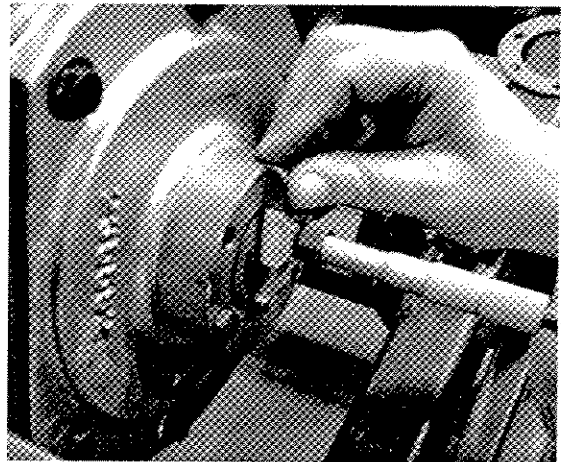
1. Without the pressure relief spring installed, position the pump cartridge assembly onto the end of the intermediate shaft.

NOTE: The cartridge pin must mate with the slot on the intermediate shaft.



2. Place the spacer ring assembly, with gasket, around the pump cartridge and against the sealing face of the rear carrier. Using two (2) 5/16-18 x 1 1/2" long bolts, secure the spacer ring assembly to the pump carrier.

NOTE: To avoid damage to the pump cartridge assembly, spacer bolts should only be finger tightened.

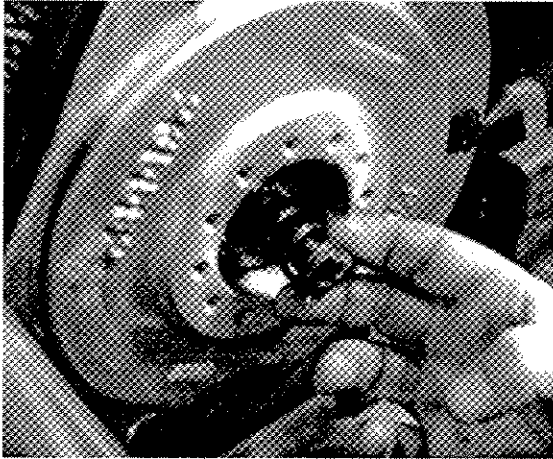


3. Using a depth micrometer, measure the distance between the outer face of the spacer ring and the pump cartridge assembly. Record this measurement.
4. Consult the following chart to determine the proper number of shims to use.

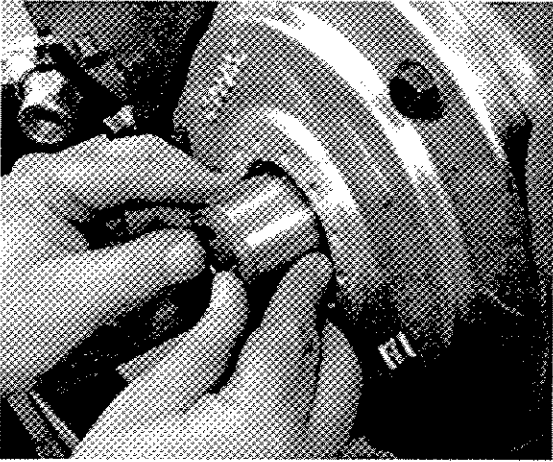
NEGATIVE GAP MEASUREMENT	SHIM QUANTITY
- .079 and Greater	Consult Fabco Engineering
-.048 to -.078	1 Shim
-.017 to -.047	2 Shims
-.001 to -.016	3 Shims

NO GAP MEASUREMENT	SHIM QUANTITY
.000	3 Shims

POSITIVE GAP MEASUREMENT	SHIM QUANTITY
.001 to .016	3 Shims
.017 to .047	4 Shims
.048 to .078	5 Shims
.079 to .109	6 Shims
.110 to .140	7 Shims
.141 and Greater	Consult Fabco Engineering

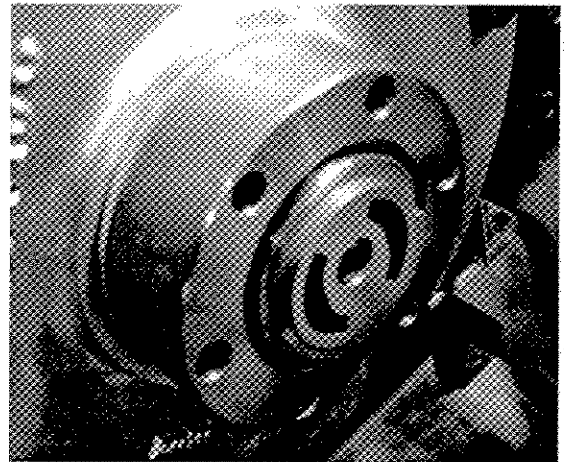
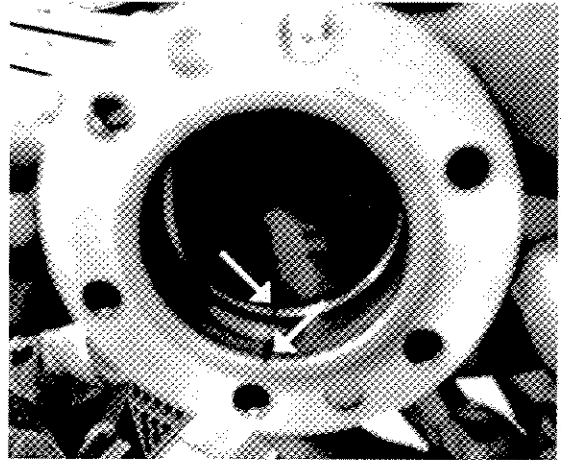


5. After shim measurements are taken and noted, remove the spacer ring and pump cartridge assembly from the end of the intermediate shaft. Install the pressure relief spring into the cavity at the end of the intermediate shaft.



6. Liberally grease all of the components of the pump cartridge assembly and reinstall. Seat the pressure relief spring by pushing down on it several times.

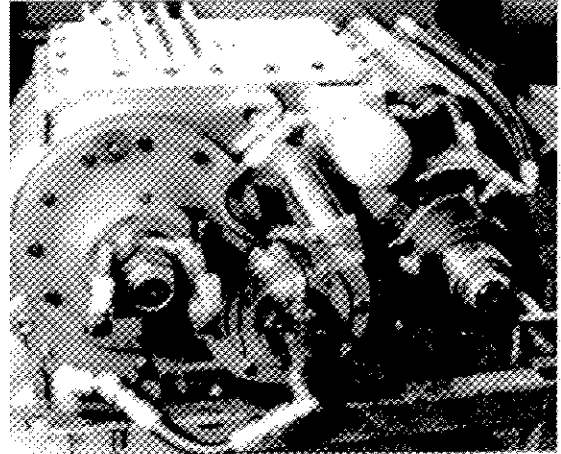
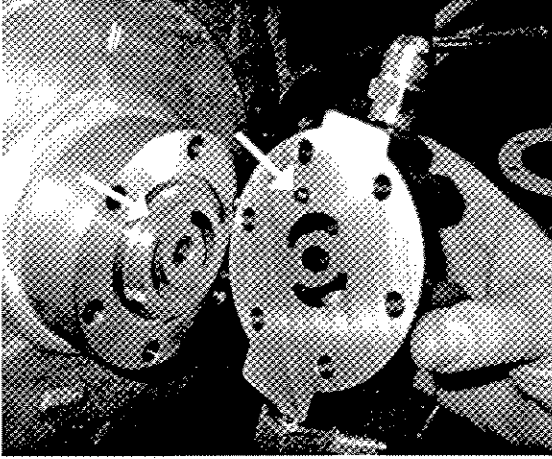
NOTE: The cartridge pin must mate with the slot on the intermediate shaft.



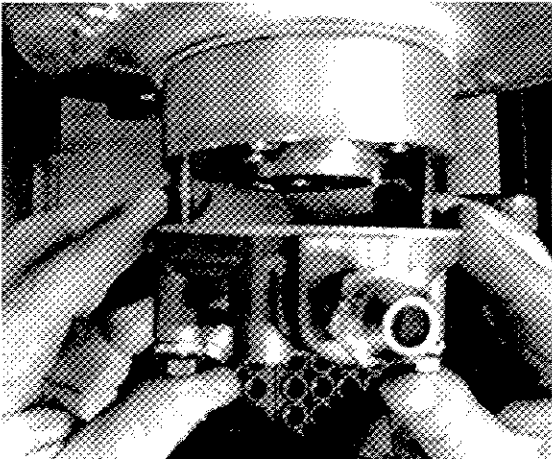
7. Reinstall the spacer ring assembly, with the gasket, onto the end of the intermediate shaft. Be sure to align the oil groove.

NOTE: The oil groove of the spacer ring assembly must be in the 6 O'Clock position towards the bottom of the case.

8. Place the number of shims, determined from step 4, on top of the spacer ring.



10. Attach all hoses and fittings as shown.

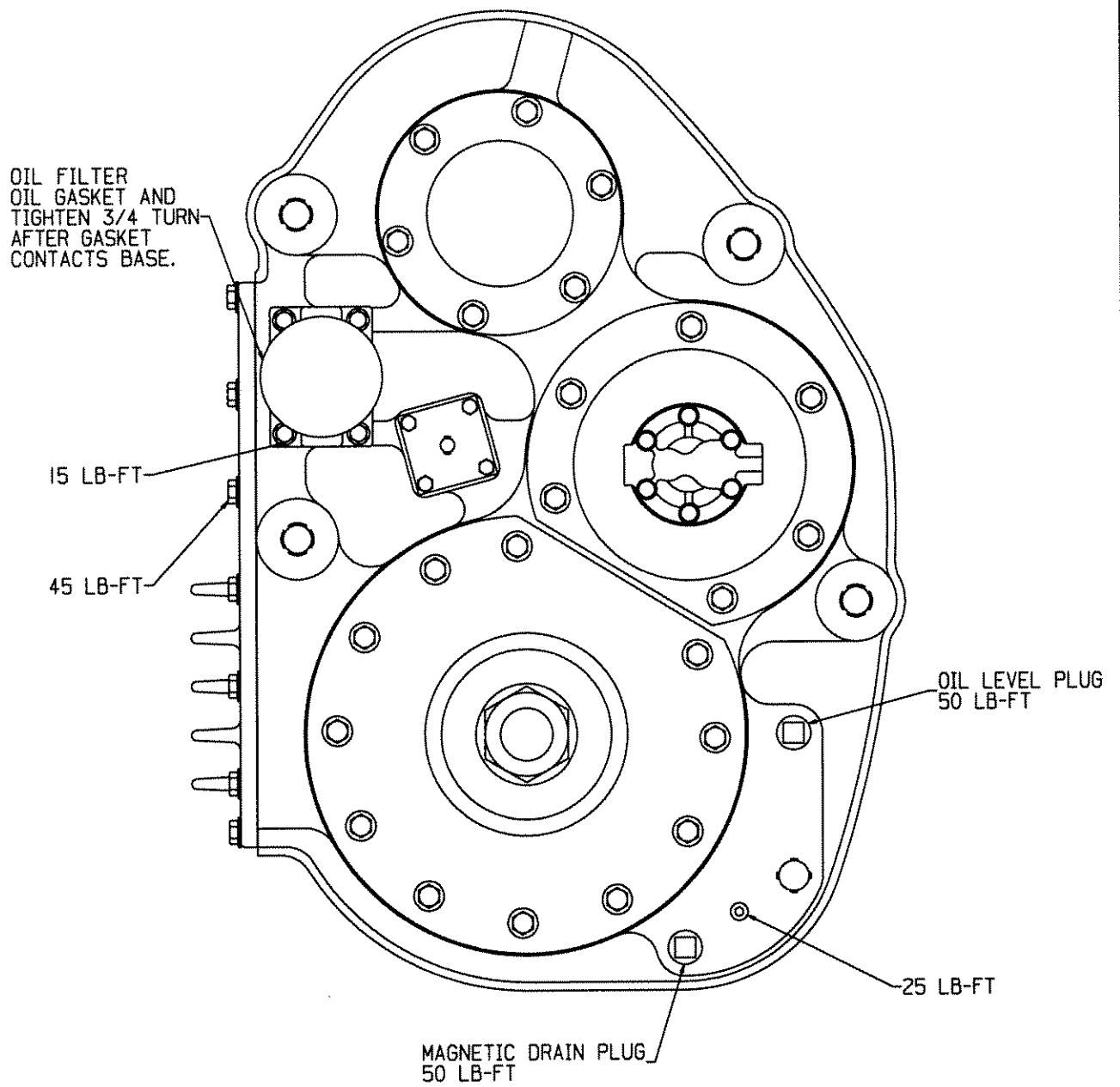


9. Install the oil pump cap onto the spacer ring and pump cartridge assembly.

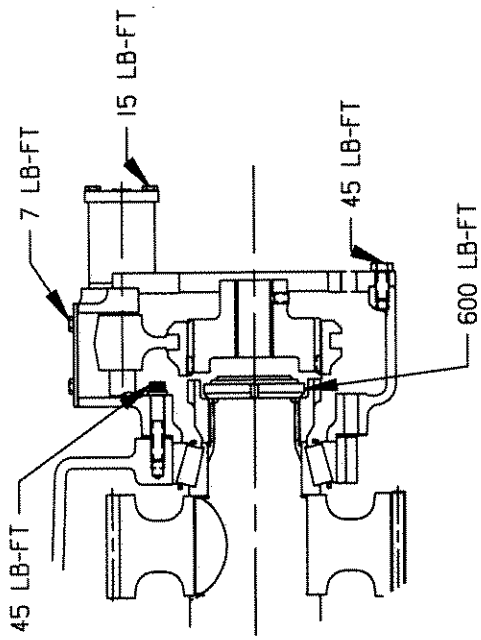
NOTE: The pin in the oil pump cap must be positioned to contact the cutout groove on the pump cartridge assembly.

THIS COMPLETES THE LUBRICATION PUMP ASSEMBLY AND PLUMBING INSTALLATION

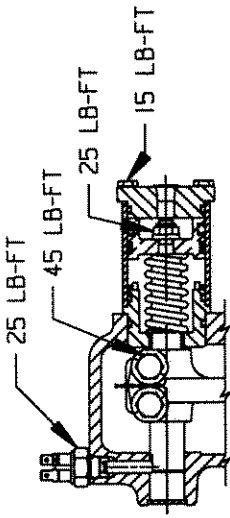
7.0 TORQUE SPECIFICATIONS



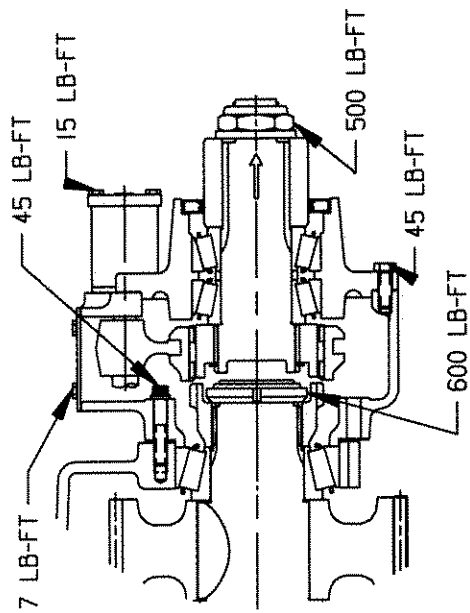
REAR VIEW



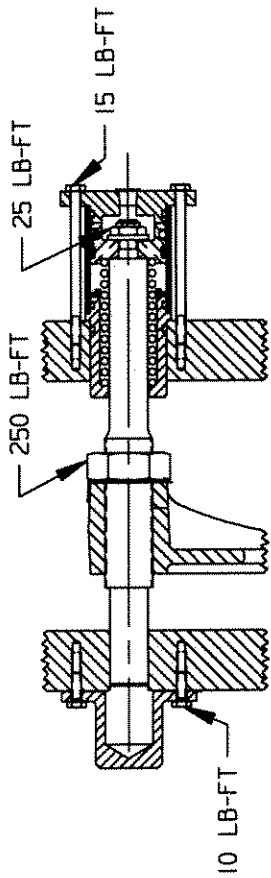
OPTIONAL DIRECT PUMP DRIVE



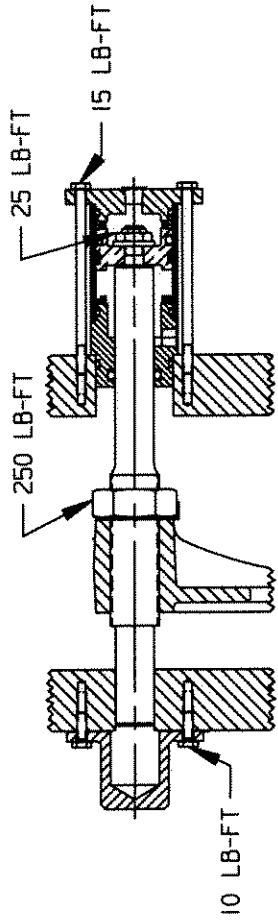
PTO DECLUTCH SHIFT CYLINDER



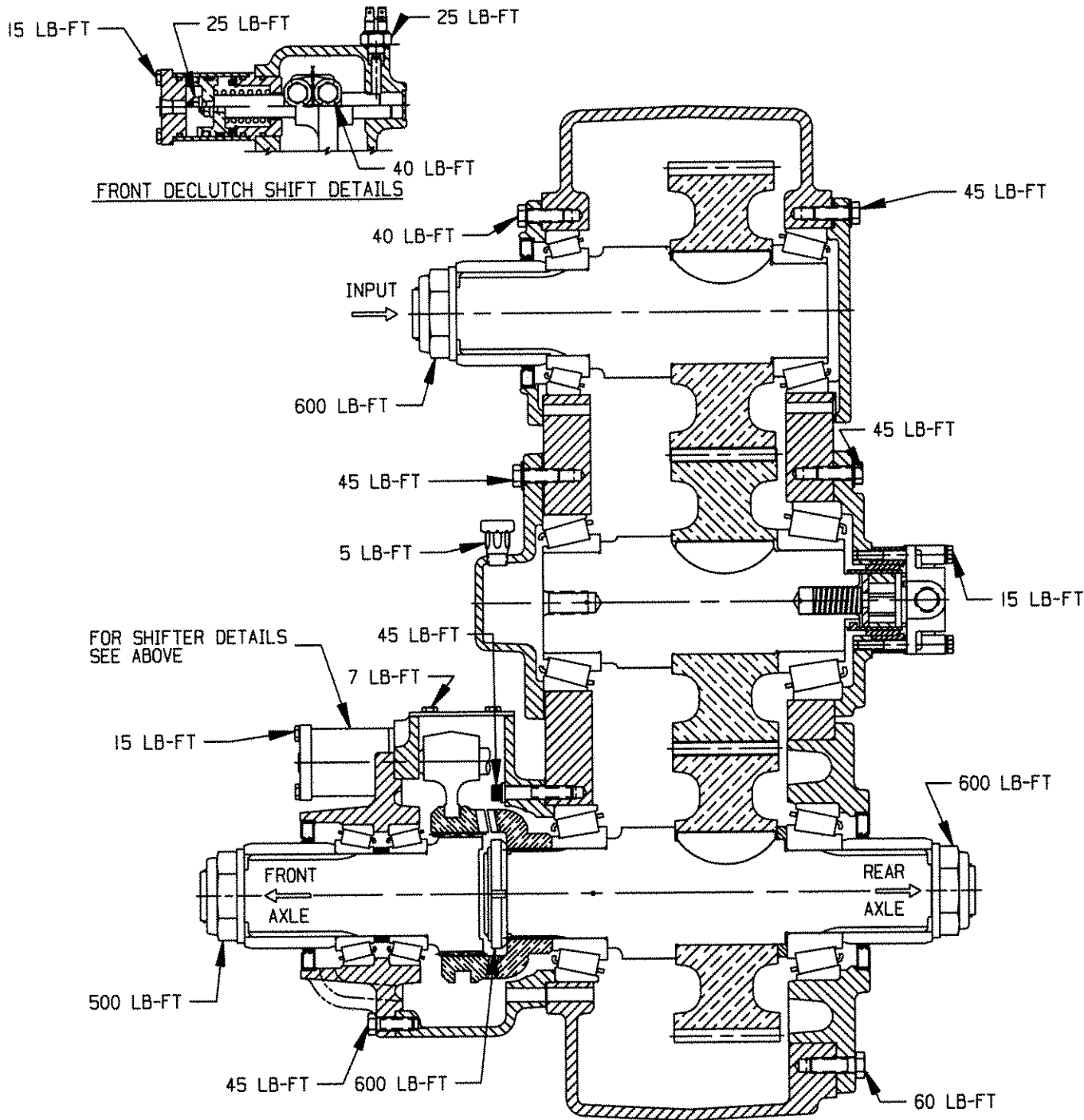
OPTIONAL PTO ASSEMBLY



SINGLE ACTING NEUTRAL SHIFT CYLINDER



DUAL ACTING NEUTRAL SHIFT CYLINDER



ALL TORQUE VALUES ARE FOR DRY NON-LUBRICATED THREADS
AND SHOULD BE WITHIN 10% OF VALUES SHOWN

9.0 TOOLS

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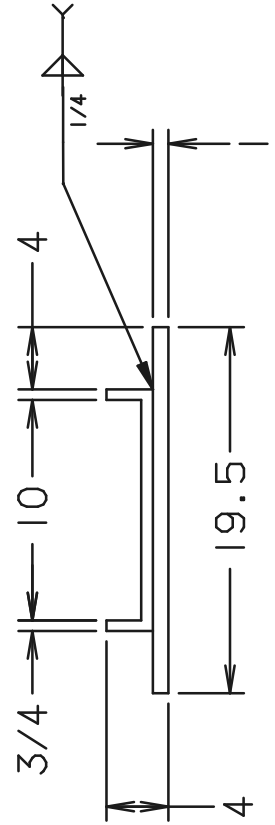
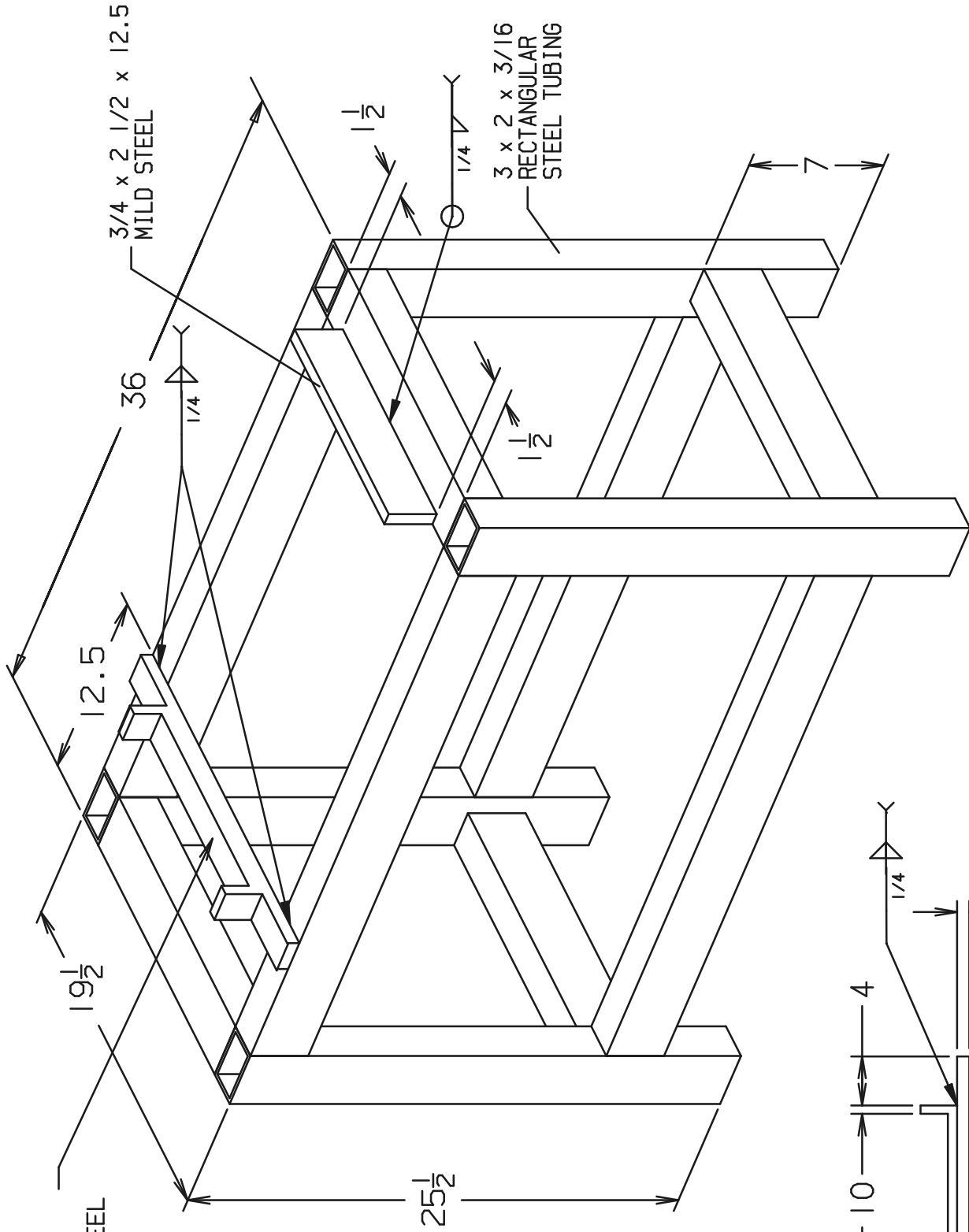
DETAILS OF ALL TOOLS ARE PROVIDED IN THIS SECTION FOR MANUFACTURE IN YOUR OWN FACILITIES. THE MANUFACTURING OF THESE TOOLS SHOULD BE CARRIED OUT BY PROFESSIONAL MACHINISTS AND CERTIFIED WELDERS OBSERVING PROPER PROCEDURES TO ENSURE QUALITY AND SAFETY.

YOU MAY ALSO CONTACT FABCO AUTOMOTIVE FOR A PRICE AND DELIVERY QUOTATION.

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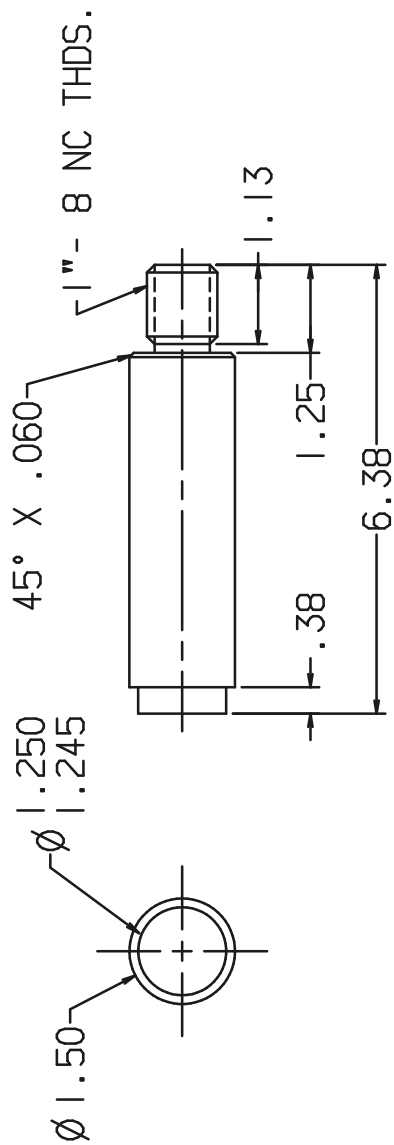
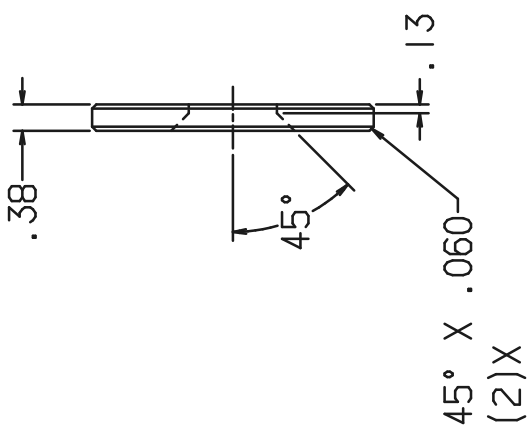
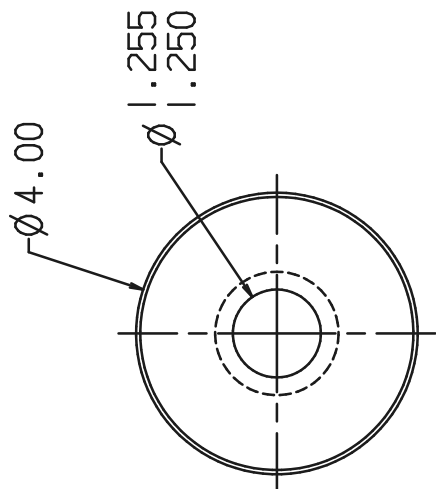
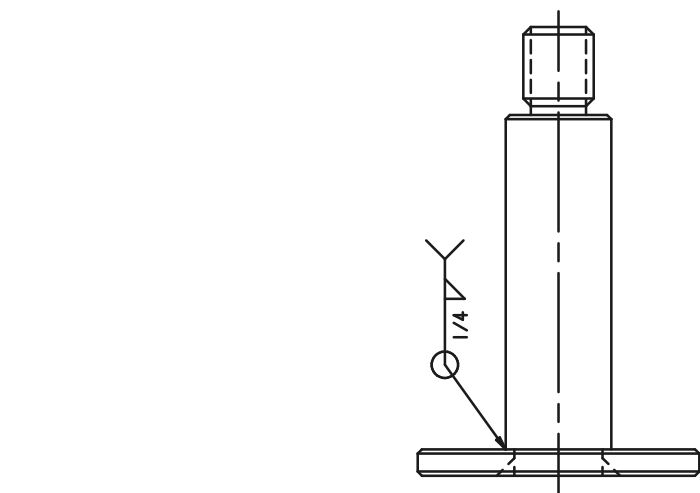
ASSEMBLY FIXTURE
DIMENSIONS SHOWN
BELOW
3/4" THICK MILD STEEL

WELD ALL JOINTS
AS REQUIRED



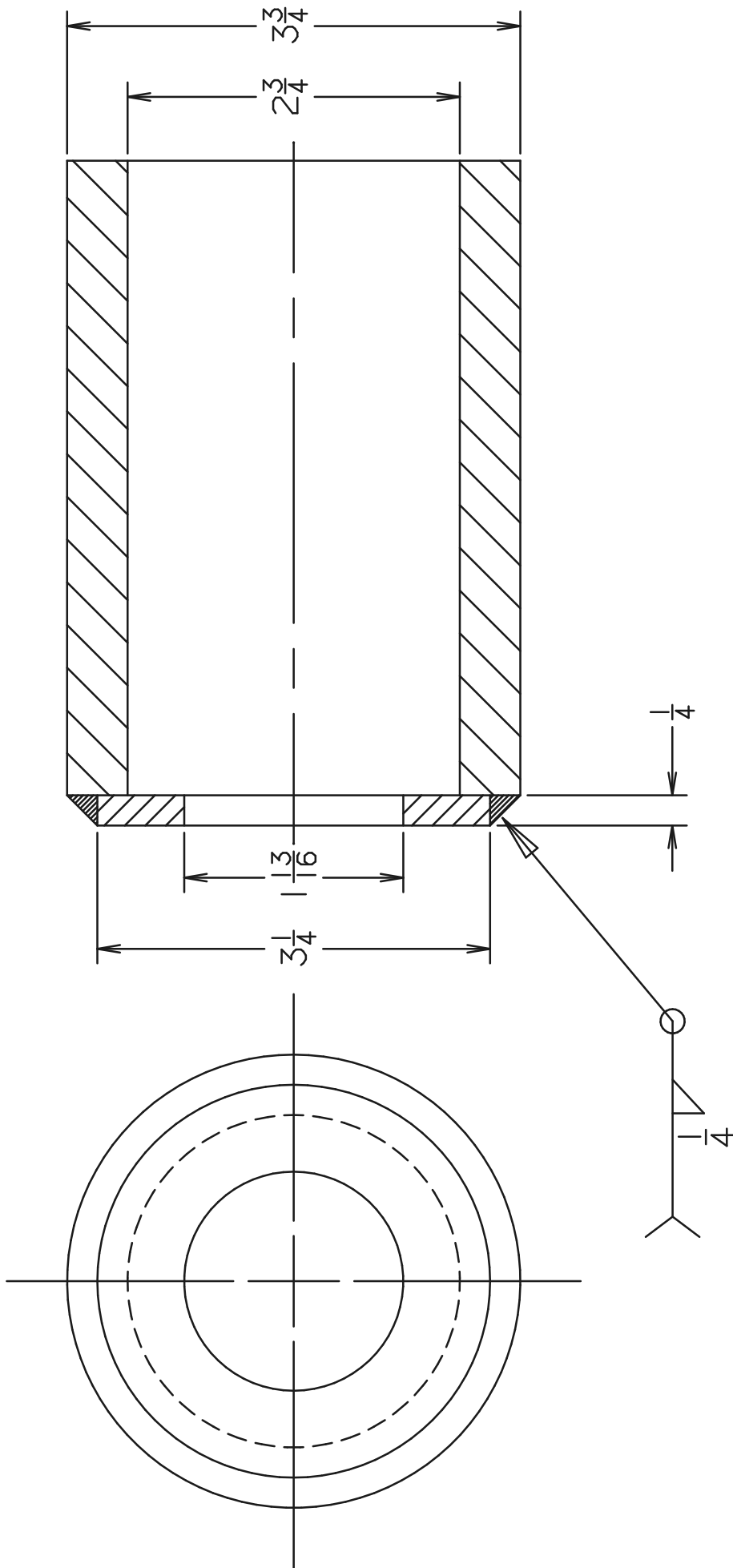
TO BE USED WITH ANTI-SWAY BAR P/N 866-0792 (X2)

SUGGESTED DESIGN FOR WORKSTAND



MILD STEEL, (2) REQUIRED

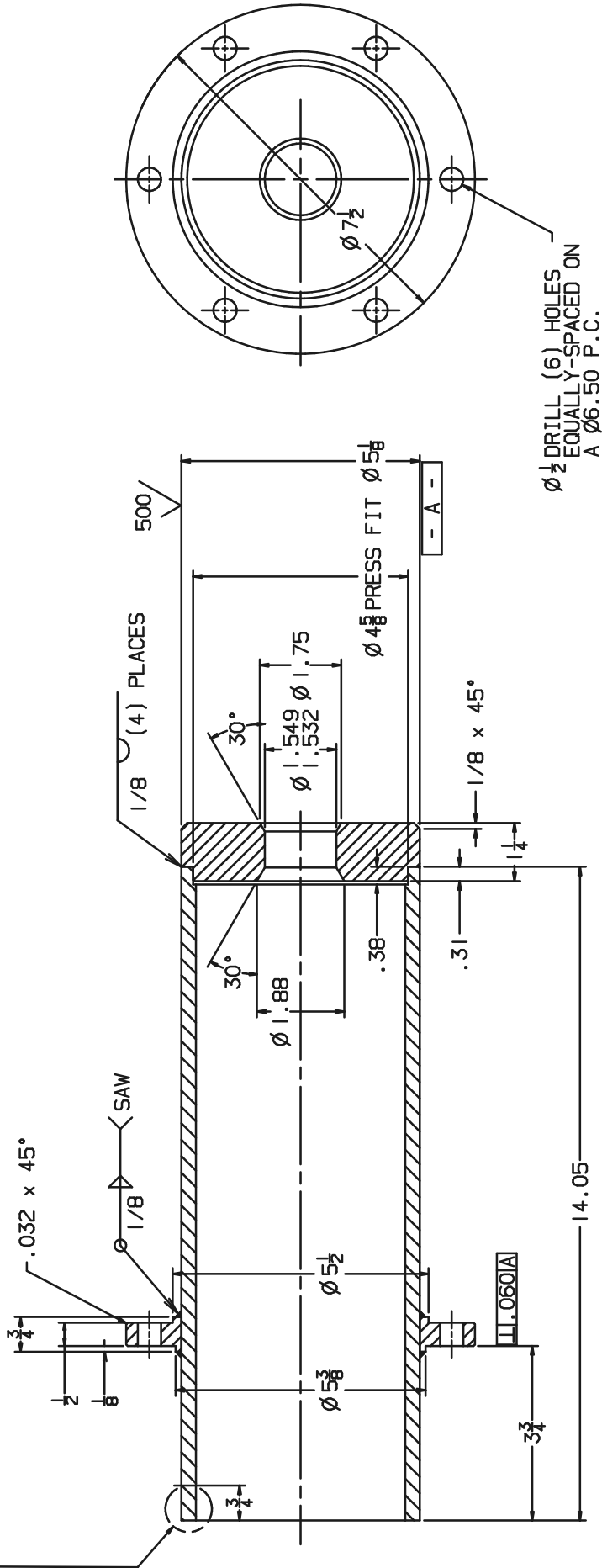
866-0792 - ASSEMBLY FIXTURE, ANTI-SWAY BAR



MILD STEEL, (1) REQUIRED

866-0711 - DIRECT DRIVE PUSHER

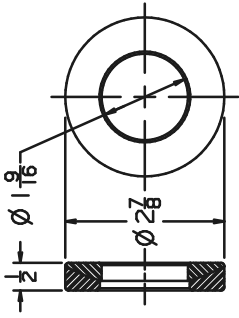
CARBURIZE AND HARDEN END
 .03 DEEP - Rc 38/42.



ø 1/2 DRILL (6) HOLES
 EQUALLY-SPACED ON
 A ø6.50 P.C.

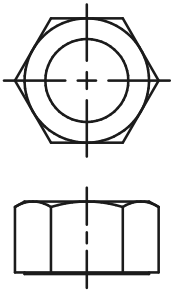
① TUBE, SHAFT PULLER

- {1} 5 1/8 O.D. x 4 1/2 I.D. - DOM 1026 STEEL
- {1} 3/4 UM PLATE - BURN - 7 7/8 O.D. x 4 5/8 I.D.
- {1} 1 1/4 UM PLATE - BURN - 5 1/8 DIA.



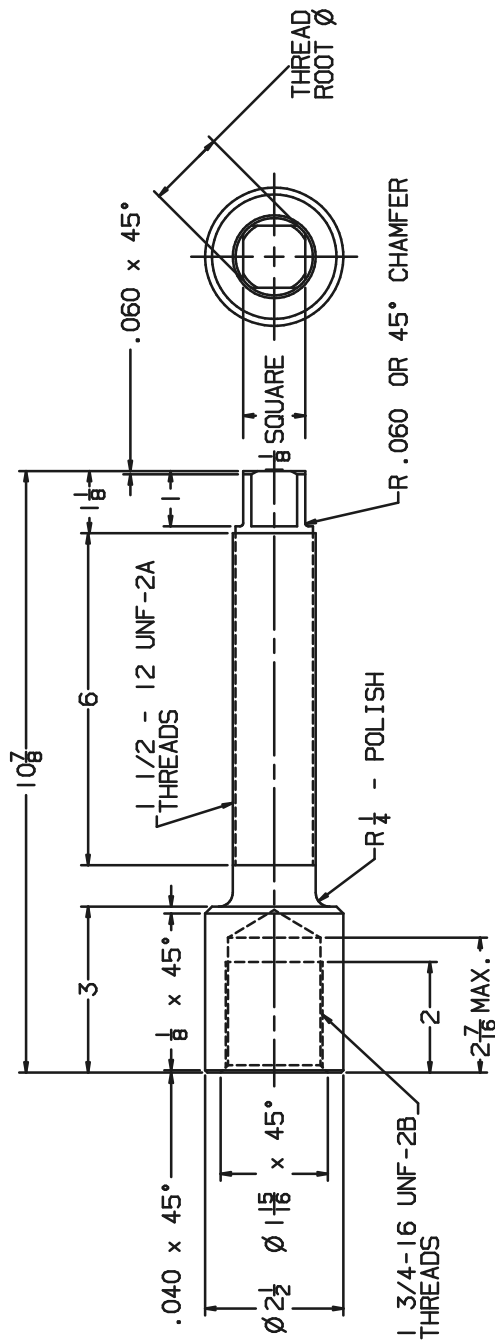
④ SPHERICAL WASHER

(1) REQUIRED:
CARR-LANE #CL-10-SW
OR EQUAL.



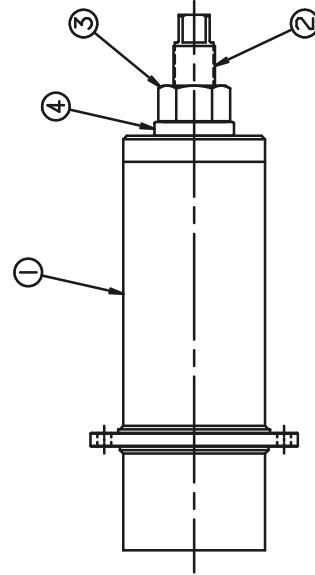
③ 1 1/2-12 HEX NUT - GRADE 8

(1) REQUIRED.

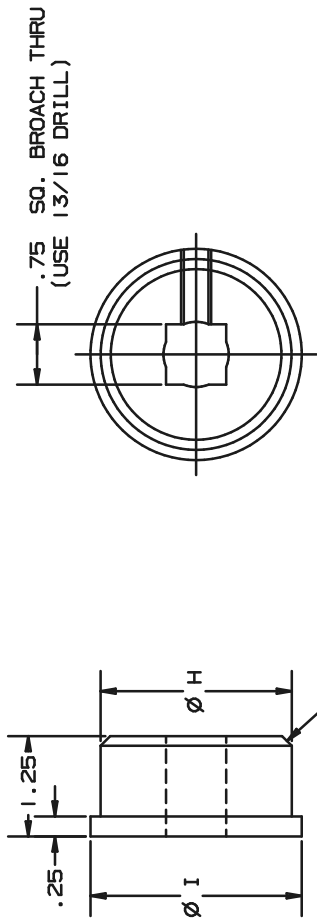


② SHAFT, THREADED EXTENSION

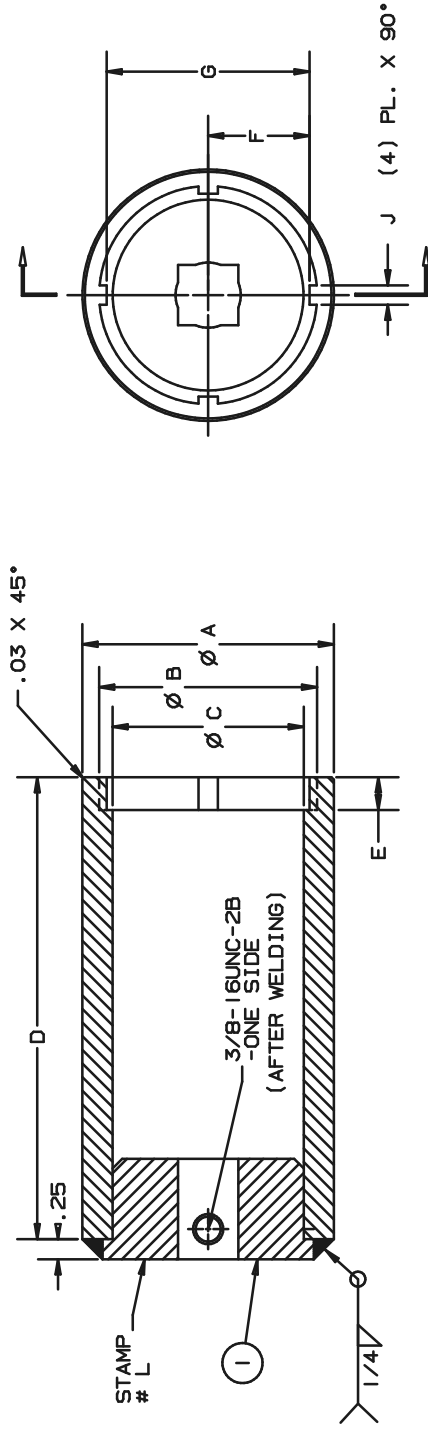
(1) REQUIRED:
Ø2 3/4 4140 HR
HT Rc 38-42



ASSEMBLED TOOL

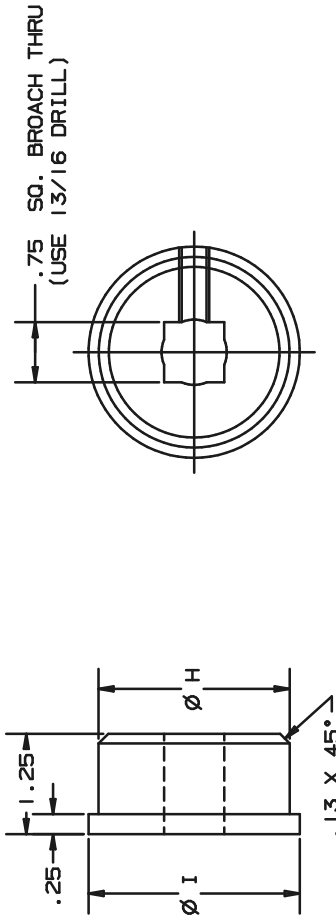


DETAIL I

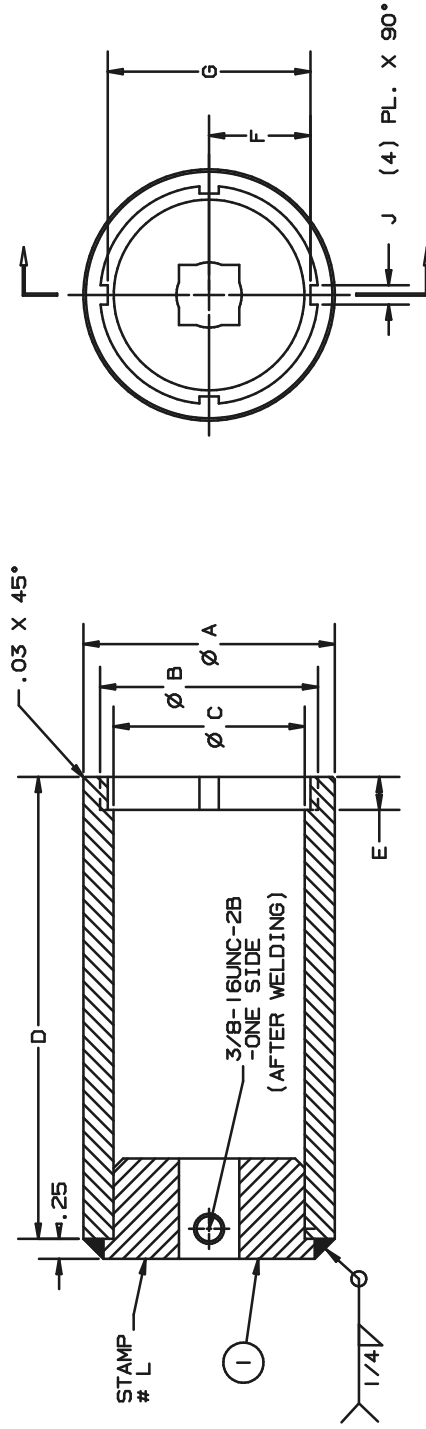


PART NO.	BEARING LOCKNUT												
	ϕA	ϕB	ϕC	D	E	F	G	H	I	J	L	SIZE	PART NO.
866-0687-006	3.870	3.655	2.980	5.75	.535	1.713	3.395	2.980	3.37	2.10	866-0687-006	TN14	688 744
		3.275	3.020			1.698	3.405			2.42			

866-0687-006 - BEARING LOCKNUT WRENCH

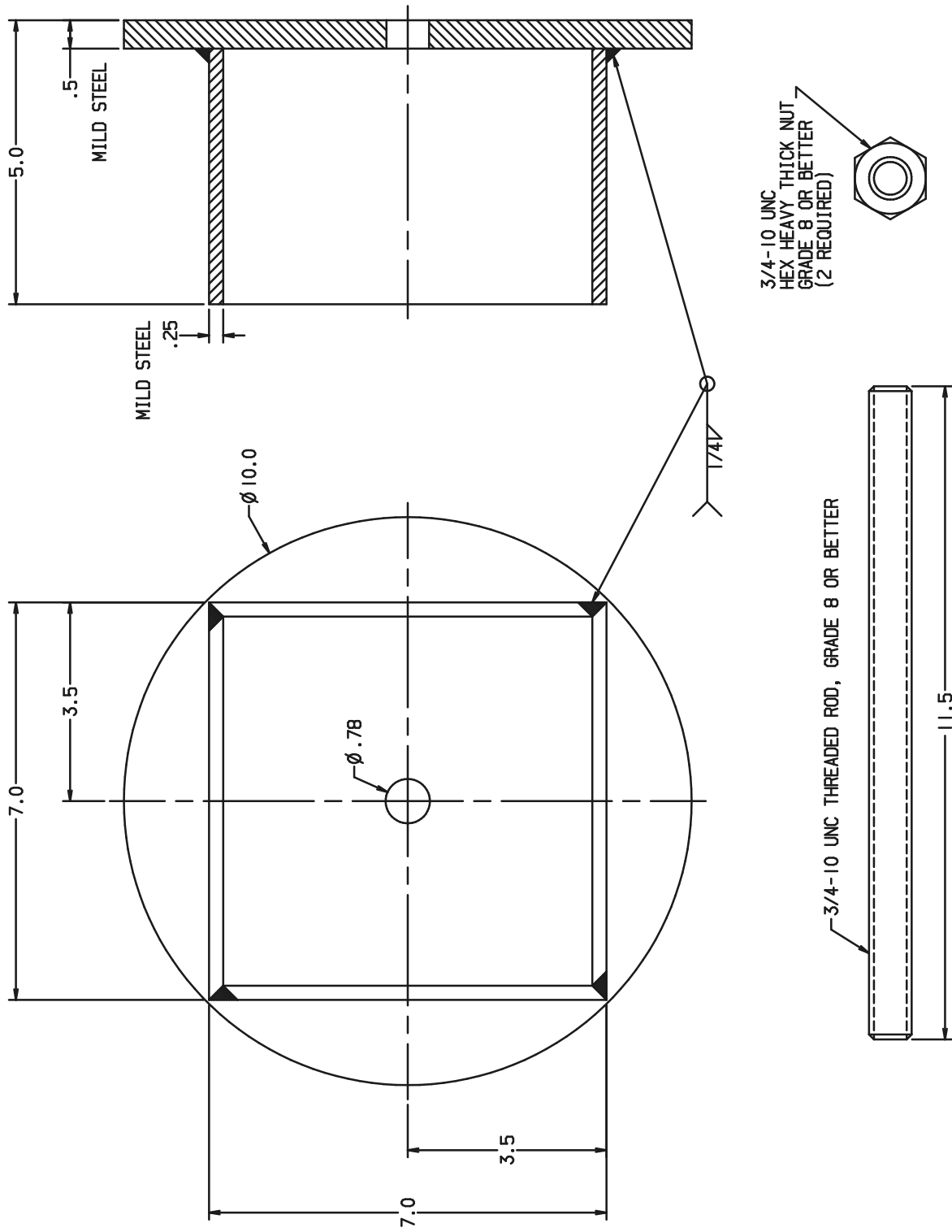


DETAIL I



		BEARING LOCKNUT											
PART NO.	ØA	ØB	ØC	D	E	F	G	H	I	J	L	SIZE	PART NO.
866-0687-004	3.615	3.395	2.740	5.75	.535	1.578	3.156	2.740	3.25	.240	866-0687-004	N13	688 645
		3.405	2.760			1.573	3.146		.242				688 746

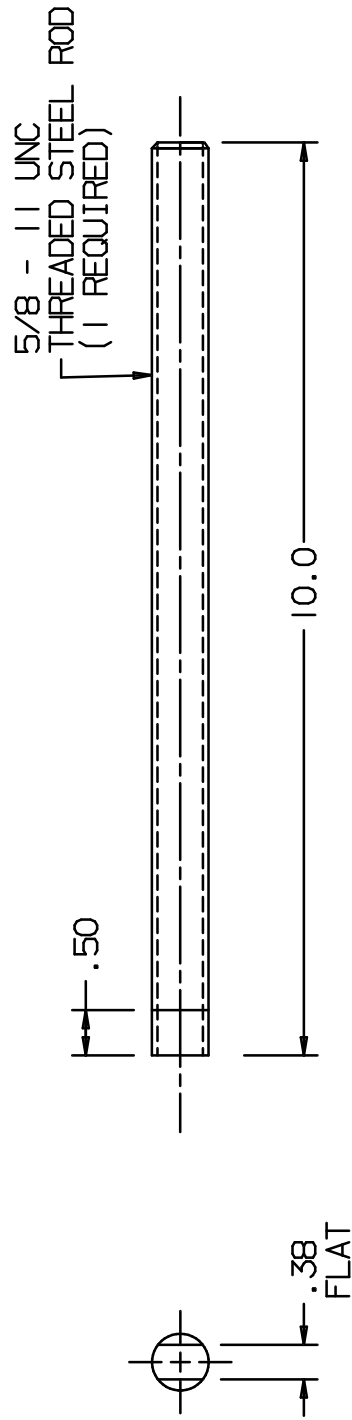
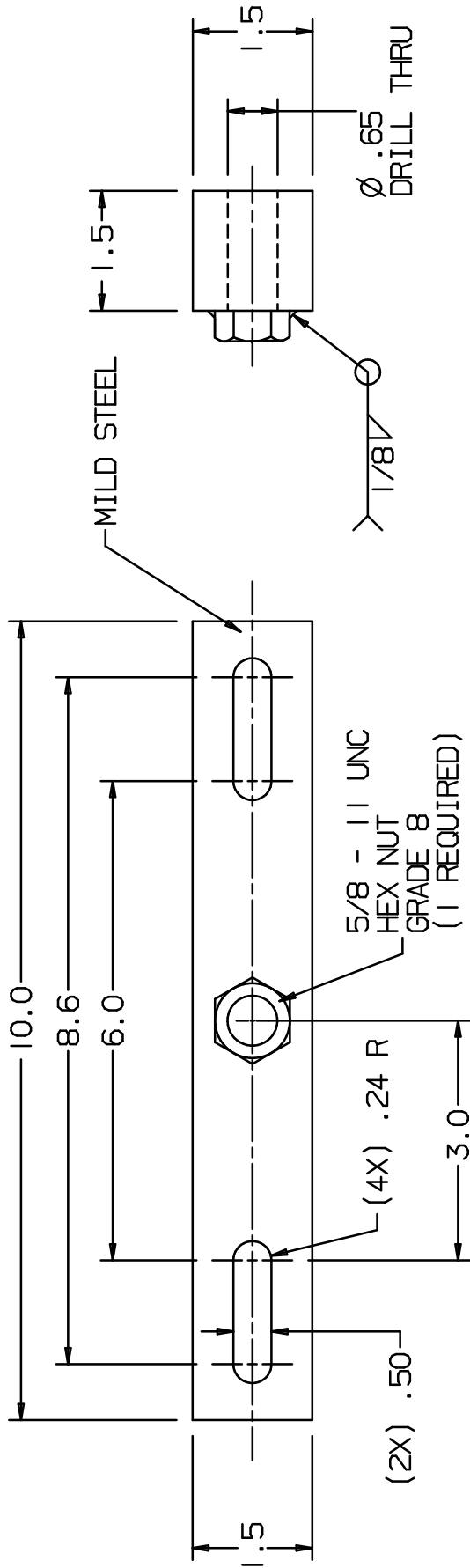
866-0687-004 - BEARING LOCKNUT WRENCH



3/4-10 UNC
 HEX HEAVY THICK NUT
 GRADE 8 OR BETTER
 (2 REQUIRED)

3/4-10 UNC THREADED ROD, GRADE 8 OR BETTER

866-0748 - INTERMEDIATE SHAFT PULLER



866-0815 - INTERMEDIATE SHAFT PUSHER