

The logo for Cub Cadet, featuring the brand name in a white, stylized script font on a blue rectangular background.

# Service Manual



## 4x2 Utility Vehicle Poly Bed and Steel Bed

**NOTE:** These materials are prepared for use by trained technicians who are experienced in the service and repair of equipment of the kind described in this publication, and are not intended for use by untrained or inexperienced individuals. Such individuals should seek the assistance of an authorized service technician or dealer. Read, understand, and follow all directions when working on this equipment. This includes the contents of the Operators Manual, which came with your equipment. No liability can be accepted for any inaccuracies or omission in this publication, although every care has been taken to make it as complete and accurate as possible. The right is reserved to make changes at any time to this document without prior notice and without incurring an obligation to make such changes to previously published documents. All information contained in this publication is based on product information available at the time of publication. Photographs and illustrations used in this publication are for reference use only and may not depict actual model and component parts.

***MTD Products Inc. - Product Training and Education Department***

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## Poly Bed 4 X 2 Drive System

### Differential Lock Control

In normal operation, a differential allows the two rear wheels to rotate at different speeds. In a turning maneuver, the wheels toward the outside of the turn follow a path that describes a greater circumference than the wheels toward the inside of the turn. Because the outside wheels must turn faster than the inside wheels, a differential is necessary.

Because it allows the rear wheels to rotate at different speeds, a standard differential can only provide drive to one wheel. One method of getting more traction is to provide a manual device that over-rides the differential feature by locking the two sides of the differential together, providing drive to both rear wheels at the same time.

It is not desirable to lock the differential together all the time because it limits the turning radius of the vehicle:

- The two wheels driving at the same speed tend to want to push the vehicle straight ahead.
- When the vehicle does turn, the two rear wheels will fight against each-other for traction. In the process they will apply exaggerated loads to the drive train.

4.28. In normal use:

- The differential lock should engage when the differential lock lever is pulled-up.
- There are five engagement dogs on the differential. The rear wheels must rotate at most 72 degrees relative to one-another before the engagement dogs align, allowing them to lock together.
- Pulling-up on the differential lock lever extends the spring at the front of the differential lock control cable. The spring applies force to the cable and the differential lock lever on the transaxle. When the engagement dogs align, the spring force will push them into engagement.
- Once engaged, the lever may be released, and the differential will remain locked until the drive load on the left and right wheels is equalized.
- When the drive load between the rear wheels is equalized, the load on the differential lock dogs is relieved. When the load is relieved, torsion spring on the differential lock lever will overcome the friction between the differential lock dogs, and cause them to disengage.

- 4.29. If the Big Country vehicle exhibits symptoms indicating that the differential lock is not engaging or disengaging properly, investigation should begin with the control cable.
- 4.30. The differential lock control lever pivots on a large clevis pin. The clevis pin is secured to the frame by a hairpin clip.
- 4.31. The spring on the end of the differential lock control cable connects to one arm of the differential lock control lever, and a return spring connects to the other arm. The other end of the return spring hooks to the console support bracket.
- 4.32. To reach the differential lock control and cable: See Figure 4.32.

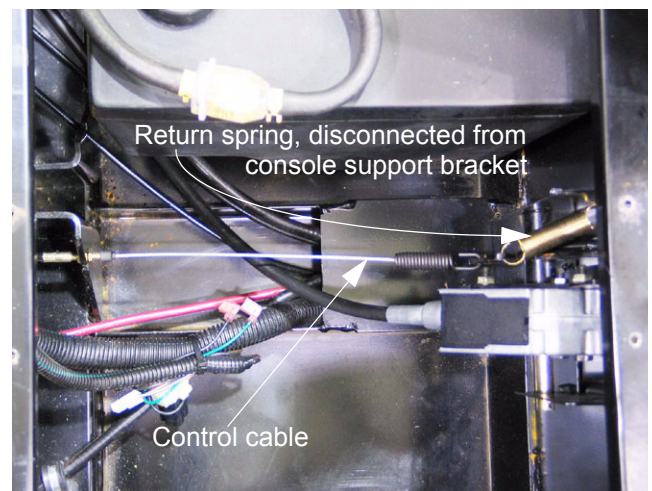


Figure 4.32

- Fold the seats forward.
  - Remove the tool box from beneath the passenger seat, if so equipped.
  - Remove the cup holder/console using a 7/16" wrench.
  - Unbolt the console support bracket using a 3/8" wrench.
  - Unhook the differential lock control return spring, and move the console support bracket aside.
- 4.33. Operate the differential lock control lever, and observe the movement of the cable and differential lock lever on the transaxle.
- NOTE:** It may be necessary to rotate one of the rear wheels to align the differential lock dogs before full engagement will occur. This is normal.

## Poly Bed 4 X 2 Drive System

- 5.35. As the driving pulley compresses the belt, it is forced outward in the tapered sheave.

**NOTE:** As the effective diameter of the driving pulley increases, the belt is drawn deeper into the sheave of the spring loaded driven pulley, reducing its effective diameter. The combined effect changes the drive ratio as speed goes up.

**NOTE:** Because the outer sheave of the driving pulley is fully extended by around 3,300 RPM, any vehicle speed increase beyond 3,300 RPM engine speed is due directly to increases in engine RPM, not to shifts in the effective drive ratio.

- 5.36. If the vehicle fails to reach full speed (20 MPH) or has lost performance, and the belt is good, confirm that the engine still achieves its specified top-no-load speed and that the CVT responds accordingly.
- 5.37. Top-no-load engine speed should be  $4,000 \pm 50$  RPM. Confirm this with a tachometer. See Figure 5.37.

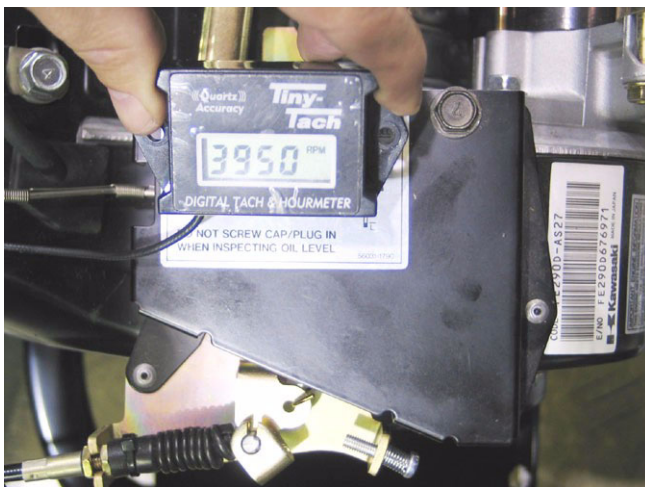


Figure 5.37

**NOTE:** The governor cover is riveted to the control plate. It is not adjustable.

- 5.38. If the engine fails to reach the specified top no-load speed, or lacks performance under a light load, check engine performance factors as described in the Engine section of this manual:
- Ignition function and spark plug condition.
  - Fuel system condition (fuel pump and lines, fuel filter, air filter, carburetor, linkages).
  - Engine mechanical condition (valve lash adjustment, cylinder compression, cylinder leakdown).

### CVT Removal: Belt and Pulleys

- 5.39. Remove the exhaust pipe and CVT cover as described previously in this section.

**NOTE:** If the belt is to be removed, but the pulleys are to be left in-place, it is not necessary to remove the exhaust pipe. The CVT cover can be moved aside, and the belt slipped-out. The CVT cover does not need to be completely removed to change a belt.

- 5.40. Disconnect and ground the spark plug H.T. lead.
- 5.41. If the pulleys are to be removed, loosen the bolts that hold the pulleys to their respective shafts before removing the belt.

**NOTE:** The bolts securing both CVT pulleys are **left hand thread**. Turn them clockwise to loosen them.

- 5.42. The driven pulley on the input shaft of the transaxle can be removed using a 12 mm wrench. Use an adjustable face pin spanner with reach of at least 3" (7.62 cm) and a 1/4" (6 cm) pin size (Snap-On stock number AFS483 is suitable) to keep the pulley from rotating. See Figure 5.42.



Figure 5.42

- Setting the parking brake will also help.
  - If no other means are available, the pulley can be held with a 2" (50 mm) wrench on the large nut.
- 5.43. The bolt holding the driving pulley to the engine crankshaft can be loosened using a 14 mm wrench.

## Poly Bed 4 X 2 Drive System

- 9.5. After the wheels and brake drums are removed from the axle shafts, remove the brake shoes as described in the "Brakes" section of this manual. See Figure 9.5.

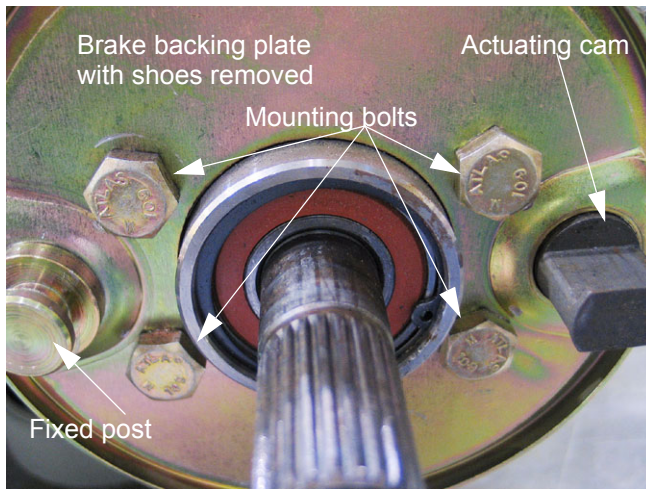


Figure 9.5

- 9.6. Remove the Brake backing plate assembly from the transaxle using a 17 mm wrench. See Figure 9.6.

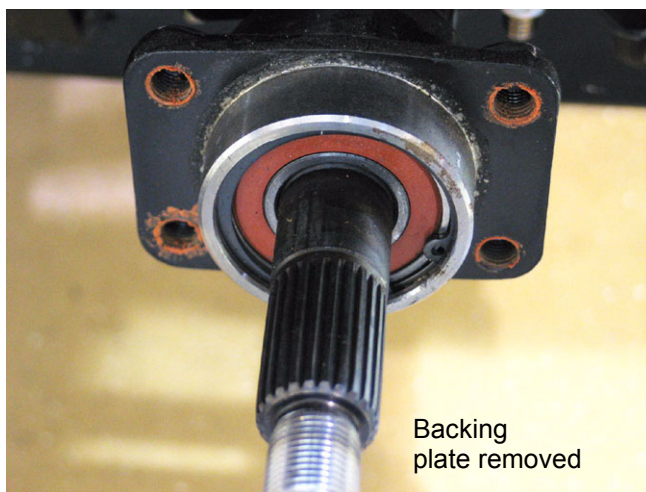


Figure 9.6

**NOTE:** This step is not strictly necessary, depending on the repairs that are to be performed, but makes the transaxle easier to maneuver on the bench.

- 9.7. Though it is not likely to require disassembly during brake or transaxle service, it is worth noting that the backing plate is an assembly. See Figure 9.7.

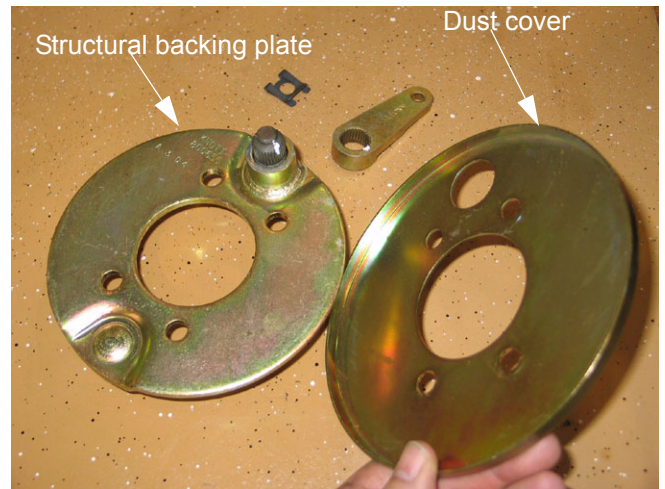


Figure 9.7

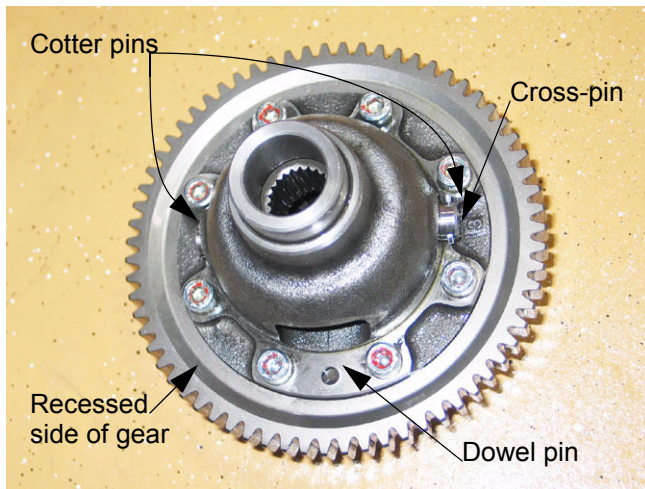
- 9.8. The cam can be removed from the backing plate. See Figure 9.8.



Figure 9.8

## Poly Bed 4 X 2 Drive System

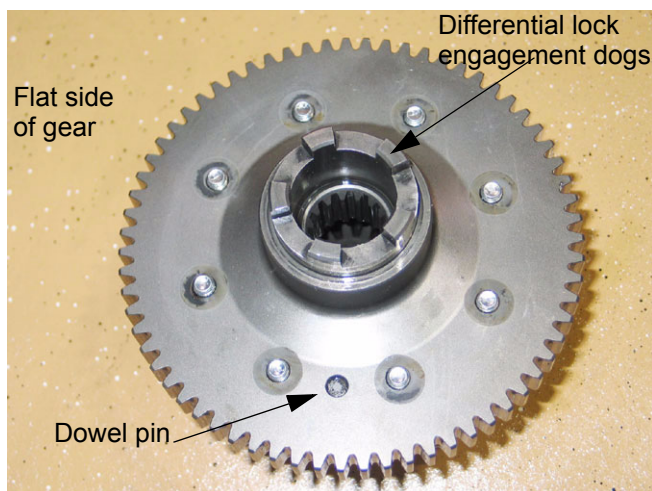
9.56. Clean and inspect the differential assembly. See Figure 9.56.



**Figure 9.56**

- The ring gear teeth should not show wear or damage.
- Differential action should be smooth.
- Cross-pin may be removed for bearing surface inspection by removing the cotter pins that secure it.
- The differential housing can be removed from the ring gear using an 8mm allen wrench.

9.57. If the ring gear is separated from the differential housing, alignment is maintained by a single solid dowel pin. See Figure 9.57.



**Figure 9.57**

- Differential lock dogs should not have worn or damaged teeth.

9.58. With the differential housing separated from the ring gear, and the cross-pin removed the miter gears can be removed from the differential.

9.59. With the cross-pin and miter gears removed, the bevel gear and the thrust washer can be removed for inspection or service.

### Assembly notes:

9.60. Hardware:

- Replace all o-rings and seals with new ones.
- Replace any removed cotter pins with new ones.
- Replace any removed circlips with new ones.
- Refer to the torque table for fastener assembly tightness.

9.61. Order of assembly: reverse of disassembly.

- Drive or press bearings by applying force to the race nearest the greatest resistance.
- Apply a small amount of grease or gear-lube to any friction bearing surfaces on assembly.
- Confirm proper fit, orientation, and function during the assembly process.
- Ensure that the Transaxle is filled with 2.0L (within marked range on dipstick when inserted but not tightened) of API "GL-5" hypoid gear oil {SAE 90 above 41 deg. f.(5 deg. c.)} or {SAE 80 below 41 deg. f. (5 deg. c.)} prior to operation.

9.62. Sealing:

- Clean all mating surfaces thoroughly before assembly.
- Mating surfaces should be free of burrs or gouges.
- Apply a thin bead of sealant such as Loctite 515 (Flange Sealant) or Kawasaki Bond (Liquid Gas-ket-silver): 92104-002
- Do not apply sealant to the O.D. of seals.
- Protect the lips of seals during installation.
- Drive or press seals using a tool that will not damage the seal.
- Apply a small amount of grease or gear lube to o-rings and seal lips.

# 4 X 2 Drive System - (Steel Bed)

### ABOUT THIS SECTION:

This section covers the drive system and transaxle used in the Big Country utility vehicle model series 420 and 430. There was also a low-volume series 410 that used the same transaxle without the differential lock feature. The information in this section does not specifically cover series 410, but is applicable to it. No other manual has been written by Cub Cadet specifically for the non-locking differential version.

### 1. CUSTOMER RESPONSIBILITIES

- Housing, axle, bearing, or axle tube damage caused by impact or over-loading constitutes customer abuse, and is not covered under the warranty.
- Damaged caused by shock-loading the transmission is not covered under the warranty. Shock-loading is primarily caused by shifting between forward and reverse gears without allowing the vehicle to come to a full stop. This is only possible if the vehicle is operated abusively AND the brake interlock switch is out of adjustment.
- Damage caused by a lubrication failure is not covered under the warranty.
- It is the customer's responsibility to have any leaks repaired in a timely fashion.
- The lug nuts should be inspected for looseness after the first ten hours of operation. Lug nuts should be tightened to a torque of 55-60 ft.-lbs.
- The brakes are not self-adjusting. It is the customer's responsibility to maintain them in good working order and proper adjustment, whether directly or through an authorized Cub Cadet Servicing Dealer.
- It is the customer's responsibility to maintain the vehicle in accordance with the Operator's Manual. This includes an initial gear lube change after 50 hours of operation, and changes every 500 hours of operation (or 2 years) thereafter.
- The gear lube level should be checked every 100 hours of operation. At this time a visual inspection should be made for leaks or damage.

### 2. GEAR LUBE

- 2.1. **Service intervals:** Initial change: 50 hours  
Subsequent changes: 500 hours of 2 years  
Check level: every 100 hours.
- 2.2. The transaxle should contain between 20 and 24 fluid ounces of 80-90 gear lube or SAE 30 engine oil. 80-90 weight gear lube should be installed at the factory. Cub Cadet Hydraulic drive system fluid plus is an acceptable premium alternative.
- 2.3. To **check the gear lube** level, park the vehicle on a flat level surface.
- 2.4. Clean the area around the rubber fill plug on top of the transaxle housing.
- 2.5. Remove the plug.
- 2.6. Insert and withdraw a clean steel rule or improvised dipstick. See Figure 2.6.

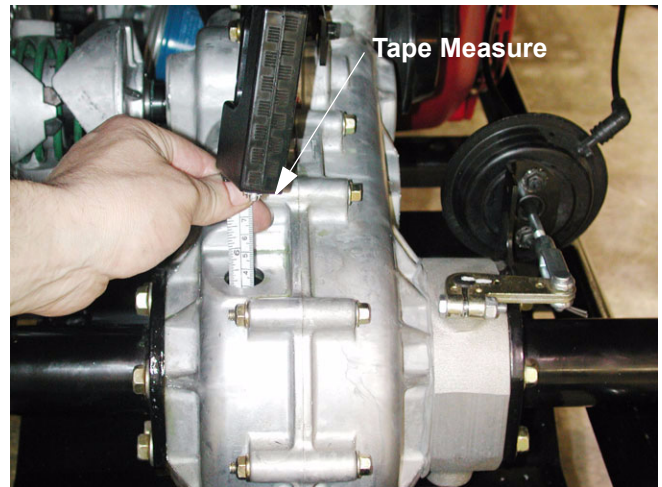


Figure 2.6

- 2.7. The oil level should be 4 1/2" to 5" down from the top surface of the housing adjacent to the hole.
- 2.8. If additional lube is needed, confirm the current contents of the transaxle, and add more of the same to reach the specified level.
- 2.9. If additional fluid is needed, inspect the transaxle for leaks or damage. If leakage is found, make any necessary repairs before returning the vehicle to service.

## 4 X 2 Drive System - (Steel Bed)

- 7.21. Lift up on the bracket to remove it from the transaxle, complete with the actuator and the vacuum reservoir (the black sphere mounted to the top of the bracket). It is not necessary to disconnect the vacuum lines from the reservoir or the actuator.
- 7.22. Install the drain and fill plugs, remove the drain pan and lower the bed.
- 7.23. Lift and safely support the rear of the vehicle. See Figure 7.23.

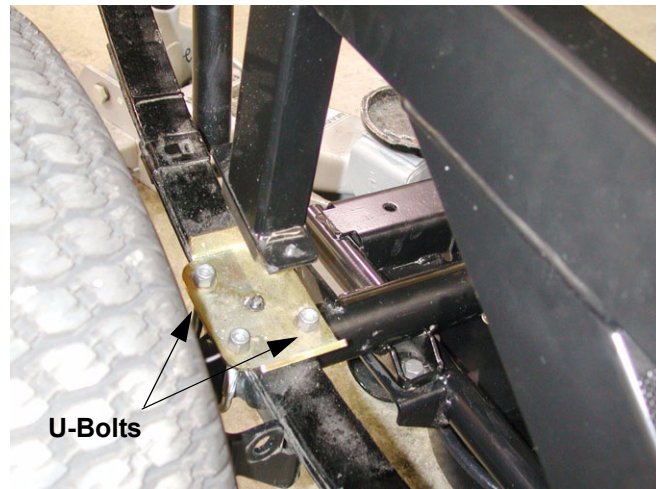


**Figure 7.23**

**NOTE:** Jackstands must be placed under the frame, not the engine/transaxle cradle.

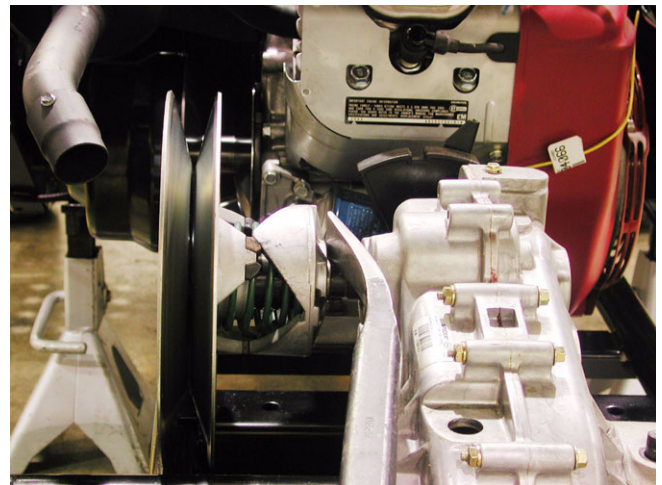
**NOTE:** The cross member that the bracket for the dog-bone joint is attached to provides a convenient place for jackstands. It is near the center of gravity: the entire vehicle will usually balance on two jackstands at this location. Because of the teeter-totter effect, the rear wheels will be left on until the transaxle is removed.

- 7.24. Remove the U-bolts holding each spring to each axle tube using a 9/16" wrench. See Figure 7.24.



**Figure 7.24**

- 7.25. Lower the transaxle, engine, and cradle to the ground, so that they rest on the rear wheels. Leave the jack in position.
- 7.26. Remove the previously loosened bolt that holds the driven pulley to the input shaft of the transaxle.
- 7.27. Carefully pry the driven pulley off of the shaft. See Figure 7.27.



**Figure 7.27**

- 7.28. Remove the key from the keyway in the input shaft.

## 4 X 2 Drive System - (Steel Bed)

12.16. Careful application of a propane torch (NOT oxy-acetelene), or heating the housing in an oven for about ten minutes at 250 deg. F. will expand the alloy housing faster than the steel bearing, allowing for easy removal of the bearing.

**NOTE:** An oven that is to be used for food preparation should not be used for transmission preparation.

12.17. Clean and inspect the gears, shafts, shift collar, and housings. See Figure 12.17.



Figure 12.17

- Visually check the gears for: worn or damaged teeth, worn holes that engage the dogs on the shift collar, discoloration, scoring or metal transfer on the recessed surface, or damaged inner bushings. The gear should be replaced if the inner bushing is discolored, scored, or non-circular.
- Visually check the shafts for: worn or damaged teeth, discoloration, or damage to any bearing surfaces.
- Visually check the shift collar for worn or rounded dogs, cracks, or discoloration. If there is significant damage to the shift collar or the shift collar's engagement points on the forward and reverse gears, shift linkage maladjustment or improper use may be the core problem.
- Inspect the differential assembly. Differential repair, if necessary, is covered in a separate section.

12.18. Replace any suspect parts and assemble the transaxle.

- If the input shaft or the bearings that carry it have been replaced, test-assemble the housing without sealant and check shaft end-play with a dial indicator. Shim it as necessary to obtain .002 to .006 end play. There is a shim kit described in the Illustrated Parts List.
- Warming the transaxle housings, or chilling the bearings prior to installation will ease the process.
- Seal the two halves of the housing together with a non-silicone based gasket material such as Loctite 518 (red) sealant.
- On the bolts securing the housing halves together, use new self-locking nuts or apply a thread locking compound such as Loctite 242 (blue) to the threads, and tighten them to a torque of  $95 \pm 10$  in.-lbs.
- Protect seal lips during shaft installation, and press them flush with the housings using a seal driver. See Figure 12.18.

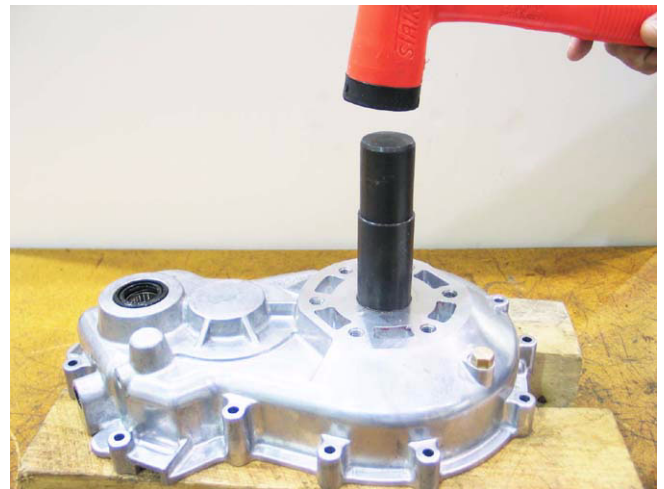


Figure 12.18

- Install new "O" ring on the drain plug, and tighten it securely.
- Install the detent ball, spring, and set screw in their bore. A small quantity of Teflon thread sealant may be used on the set screw. Tighten it until a shift torque of 8 to 14 ft.-lbs. is achieved at the shift actuator assembly.

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