

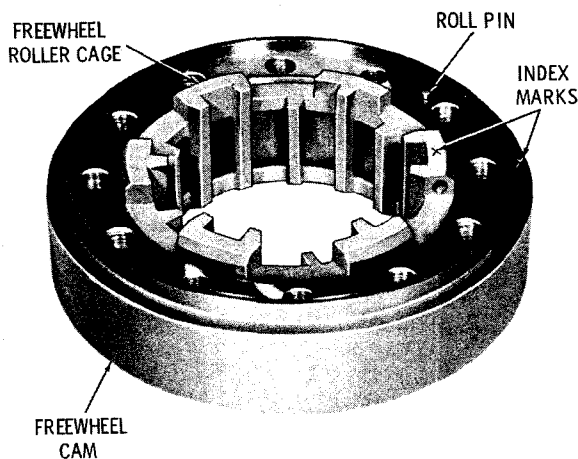


Fig. 6-9. Freewheel roller cage installed in freewheel cam

S2570

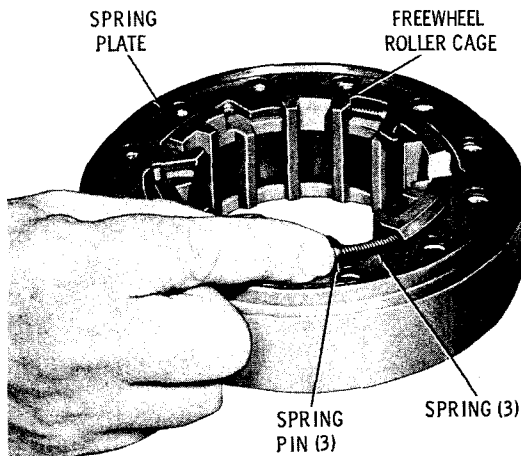


Fig. 6-10. Installing spring and spring pin into roller cage

S2571

(6) Secure the assembled parts with twelve self-locking nuts (fig. 6-12). To prevent rotation of the bolt heads, use the tool shown in figure 4-3, or an open-end wrench and tighten the nuts to 41 to 49 pound feet (56 to 66 Nm) torque.

(7) Install fifteen rollers into the cam pockets; use oil-soluble grease to retain the rollers in the cage (fig. 6-13).

(8) Install the first-turbine driven gear by placing the lead chamfer on the gear hub against rollers, and while pressing downward, rotate the first turbine driven gear in a counterclockwise direction (fig. 6-14).

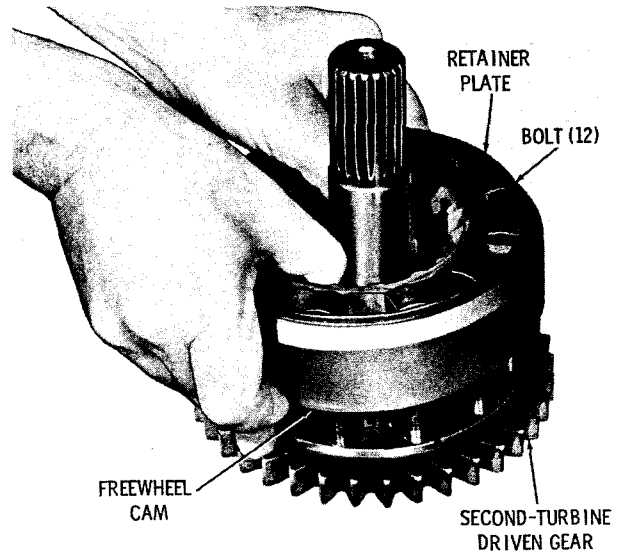


Fig. 6-11. Installing assembled cam onto assembled second-turbine driven gear

S2572

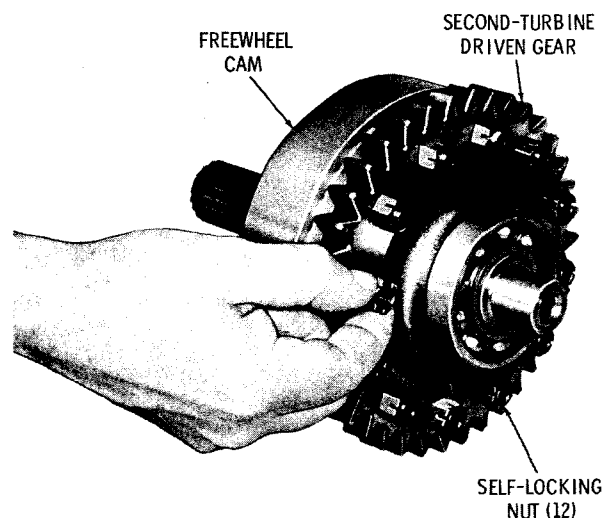


Fig. 6-12. Installing self-locking nut onto freewheel cam bolt

S2573

(9) Install the bearing spacer onto the shaft of the second-turbine driven gear (fig. 6-15).

(10) Install the remaining bearings and spacer, as shown in figure 6-16, onto the shaft of the second-turbine driven gear. Accurately center the spacer to prevent it from getting caught on the shaft shoulder. Press the bearings and spacer firmly into place while supporting the second-turbine driven gear.

SERIES TT, TTB 2001 POWERSHIFT TRANSMISSIONS

Para 6-10

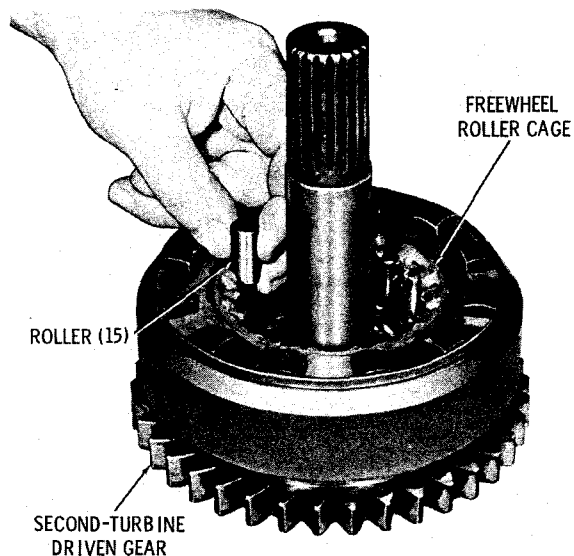


Fig. 6-13. Installing roller into roller cage

S2574

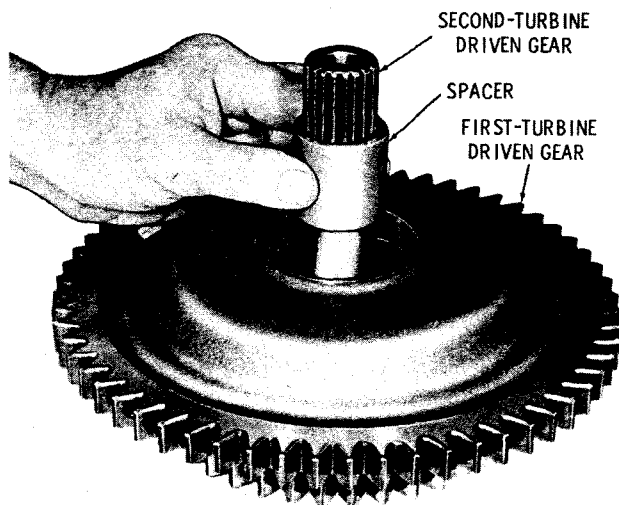


Fig. 6-15. Installing bearing spacer onto second-turbine driven gear

S2576

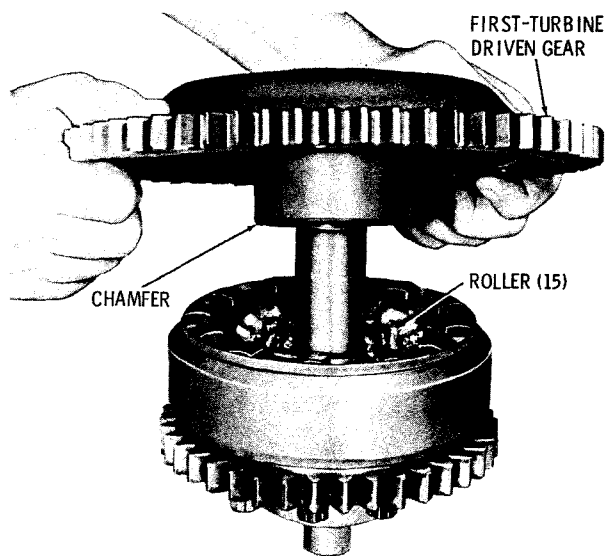


Fig. 6-14. Installing first-turbine driven gear

S2575

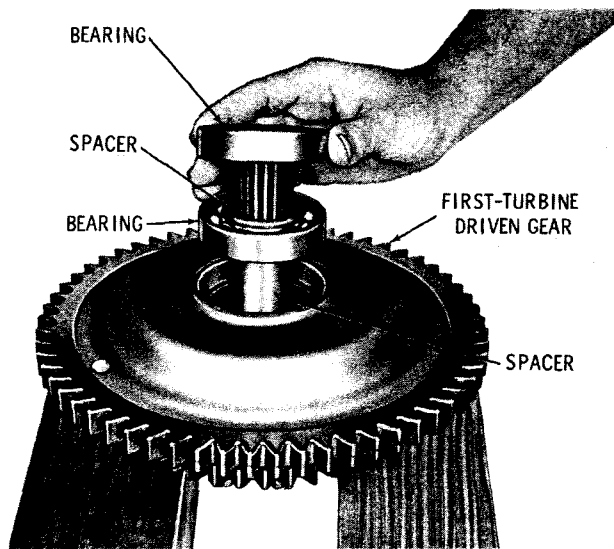


Fig. 6-16. Installing bearings and spacer onto second-turbine driven gear

S1448

6-10. FIRST-TURBINE DRIVE GEAR AND BEARING ASSEMBLY

Note: Not all bearings are installed with Loctite. If the bearing can be easily pressed from the drive gear, remove the bearing. If unusual resistance is encountered, refer to a, below.

a. Disassembly (B, foldout 3)

(1) Heat the inner race of bearing 29 to 450°F (232°C) and press first-turbine drive gear 28 from the bearing.

(2) Discard bearing 29 and clean the journal of gear 28.

Note: Refer to paragraph 6-2, above.

REBUILD OF SUBASSEMBLIES

Para 6-10/6-12

b. Assembly (B, foldout 3)

(1) Apply Loctite Retaining Compound (Loctite Corp., Newington, Conn.) or equivalent to the ID of new bearing 29 and its journal on first-turbine drive gear 28.

(2) Press bearing 29 firmly against its seat on first-turbine drive gear 28. Allow assembled parts to cure for 2 hours at room temperature.

6-11. HIGH-RANGE CLUTCH PISTON HOUSING (TT without PTO)

a. Disassembly (A, foldout 6)

(1) If the transmission is equipped with a speedometer drive assembly, remove seal-rings 27 and 29, and drive pin 25 from the hub of high-range clutch piston housing 24. Remove speedometer drive shaft 26 and bearing 28 from the high-range clutch piston housing. Remove bushing 23 from high-range clutch piston housing 24 only if replacement is necessary.

(2) If the transmission is not equipped with a speedometer drive assembly, remove bearing 28 from high-range clutch piston housing 34.

(3) Position the high-range clutch piston and housing, piston side up, in a press. Use care to prevent damage to sleeve 35. Depress piston return spring 17 and remove snapring 16.

(4) Remove piston 19, sealring 20, and expander 21 from high-range clutch piston housing 34. Refer to paragraph 6-19 for clutch piston rebuild instructions.

(5) Remove hook-type sealring 18 (A, foldout 6) from the inner hub of high-range clutch piston housing 24 or 34. Remove bushing 33 and sleeve 35 from high-range clutch piston housing 34 only if replacement is necessary.

Note: Refer to paragraph 6-2, above.

b. Assembly (A, foldout 6)

(1) If bushing 23 or 33 was removed from high-range clutch piston housing 24 or 34, install a new bushing. Press the new bushing to 0.040 to 0.080 inch (1.01 to 2.03 mm) below the face of the hub. If sleeve 35 was removed, install a new sleeve. Press the new sleeve against the shaft shoulder.

(2) Install hook-type sealring 18 onto the inner hub of high-range piston housing 24 or 34. Install piston 19, expander 21, and sealring 20 (as assembled in para 6-19) into the piston housing.

(3) Install piston return spring 17, convex side up, onto piston 19. Place the assembled parts, piston side upward, in a press. Depress the piston return spring and install snapring 16.

(4) Install bearing 28 onto the rear hub of high-range clutch piston housing 24 or 34.

(5) If the transmission is equipped with a speedometer drive assembly, install speedometer drive shaft 26 into the rear hub of high-range piston housing 24. Install pin 25 through the hub of the piston housing and drive shaft. Press the pin to 0.020 to 0.040 inch (0.50 to 1.01 mm) below the surface of the piston housing hub.

6-12. REAR PTO COVER (TT)

a. Disassembly (B, foldout 6)

(1) Tap PTO shaft assembly 17 forward from rear PTO cover assembly 22. Remove snapring 16 from the shaft assembly. Do not remove pin 18 from shaft 19 unless replacement is necessary.

(2) Remove snapring 20 from rear PTO cover 24 and remove bearing 21. Remove sleeve 23 only if replacement is necessary.

(3) Remove dust shield 26 and lip-type sealring 25 from rear of cover 24, and remove plug 32.

Note: Refer to paragraph 6-2, above.

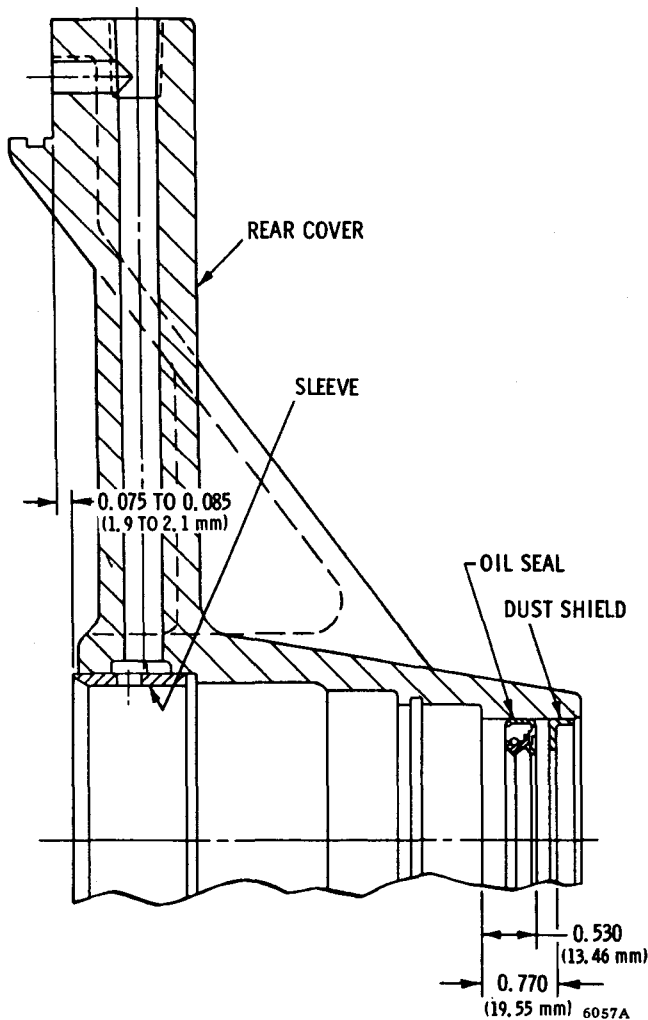


Fig. 6-17. Oil and dust shield installation diagram for TT model with PTO

b. Assembly (B, foldout 6)

(1) Install the PTO shaft lip-type seal-ring and dust shield as shown in figure 6-17. Install plug 32 (B, foldout 6). Tighten the plug sufficiently to prevent leakage.

(2) If sleeve 23 was removed, install a new sleeve, beveled OD first, into PTO cover 24. Press the sleeve to the dimension shown in figure 6-17. Install bearing 21 (B, foldout 6) and snapping 20 into PTO cover 24.

(3) If pin 18 was removed from shaft 19, install a new pin, straight outer diameter first, into the shaft. Press the pin into the shaft until it projects 0.810 to 0.830 inch (20.57 to 21.08 mm) from the front end surface of the shaft.

(4) Install snapping 16 onto shaft assembly 17, and install the shaft, threaded end first, into bearing 21 in PTO cover assembly 22. Seat the shaft in the bearing.

6-13. HIGH-RANGE CLUTCH PISTON HOUSING (TT with PTO)

a. Disassembly (A, foldout 6)

(1) Remove bearing 38 from high-range clutch piston housing 36.

(2) Position the high-range clutch piston and housing, piston side up in a press. Depress piston return spring 17 and remove snapping 16.

(3) Remove piston 19, sealring 20, and expander 21 from high-range clutch piston housing 36. Refer to paragraph 6-19 for clutch piston rebuild instructions.

(4) Remove hook-type sealring 18 from the inner hub of piston housing 36.

Note: Refer to paragraph 6-2, above.

b. Assembly (A, foldout 6)

(1) Install hook-type sealring 18 onto the inner hub of piston housing 36.

(2) Install piston 19, sealring 20 and expander 21 (as assembled in para 6-19) into piston housing 36.

(3) Install piston return spring 17, convex side up, onto piston 19. Place the assembled parts, piston side upward, in a press. Depress the piston return spring, and install snapping 16.

(4) Install bearing 38 onto rear hub of high-range clutch piston housing 36.

6-14. REAR COVER ASSEMBLY (TTB)

**a. Disassembly (B, foldout 7)
(with power takeoff)**

(1) Position the rear cover assembly on its side on a bench, and remove flange

retaining self-locking nut 43, flange retaining washer 42, and output flange 41.

(2) Tap the PTO shaft forward, and remove it from the rear cover assembly (fig. 6-18). Remove the snapping from the shaft. Remove the pin only if replacement is necessary.

(3) Position the rear cover so that the mounting flange is upward, and remove the snapping that retains the brake apply plate assembly (fig. 6-19). Remove the brake apply plate assembly. Do not disassemble the apply plate assembly unless it does not meet the minimum pressforce of 400 pounds during the readjustment procedure described in (4), below.

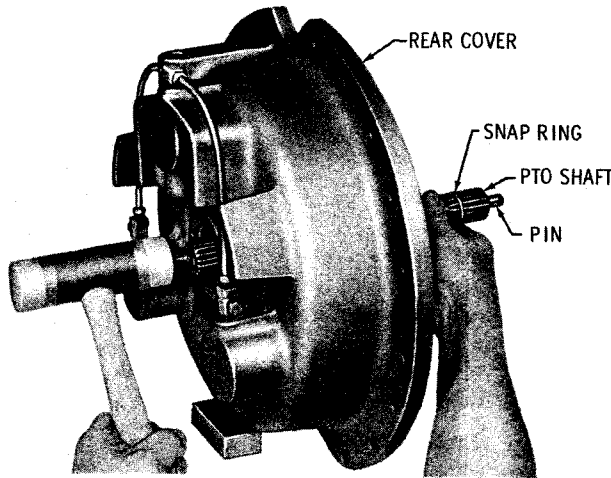


Fig. 6-18. Removing PTO shaft from TTB model rear cover

S2577

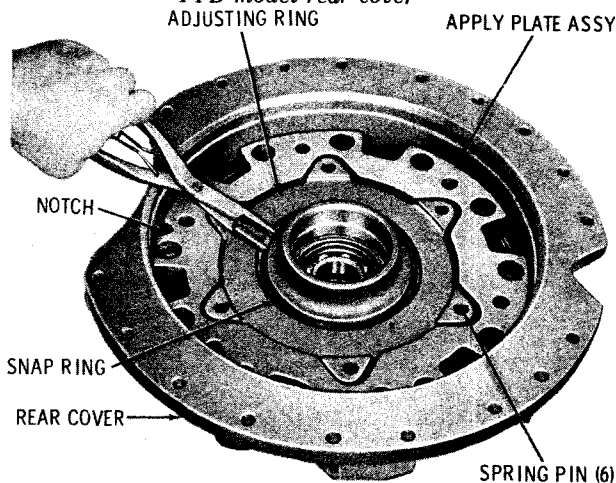


Fig. 6-19. Removing snapping from brake apply plate assembly

S2578

(4) The brake apply plate assembly (fig. 6-20) must be readjusted to the setting established when the transmission was new, so that the automatic adjustment for brake wear and proper release clearance are provided. This adjustment is made by positioning the apply plate assembly, front downward, in a press on a smooth, flat plate (fig. 6-20). Press the brake adjusting ring 21 (B, foldout 7) downward until its front surface is flush with the front surface of brake apply plate 23.

Note: If the adjusting ring moves with the application of less than 400 pounds (1779.3 N) force, (not psi hydraulic force) heat breakdown of spring pins 22 is indicated and the pins must be replaced.

(5) If replacement of spring pins 22 is necessary, press adjusting ring 21 from brake apply plate 23. Remove six spring pins 22 from adjusting ring 21.

(6) Remove the snapping that retains the ball bearing and remove the bearing from the rear cover (fig. 6-21). Remove the Teflon sealing from the inner hub only if replacement is necessary. Note the three brake pistons.

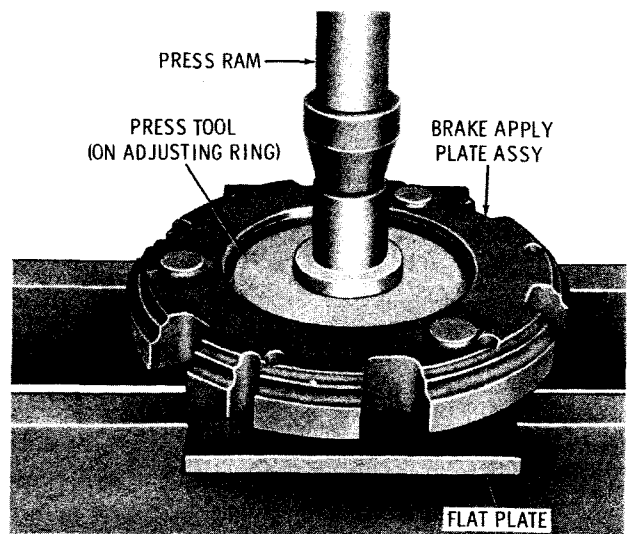


Fig. 6-20. Pressing brake adjusting ring flush with apply plate surface

S2579

(7) Position the rear cover so that it rests on the mounting flange and remove the dust shield and oil seal (fig. 6-22). Remove the brake fluid lines and fittings

(8) Using an air gun at each brake fluid port, force the brake pistons and related parts from their bores (fig. 6-23). Each piston bore contained a piston 26 (B, foldout 7), sealring 25, piston cup 27, and expander assembly 28. Remove sealrings 25 from pistons 26.

Note: Refer to paragraph 6-2, above.

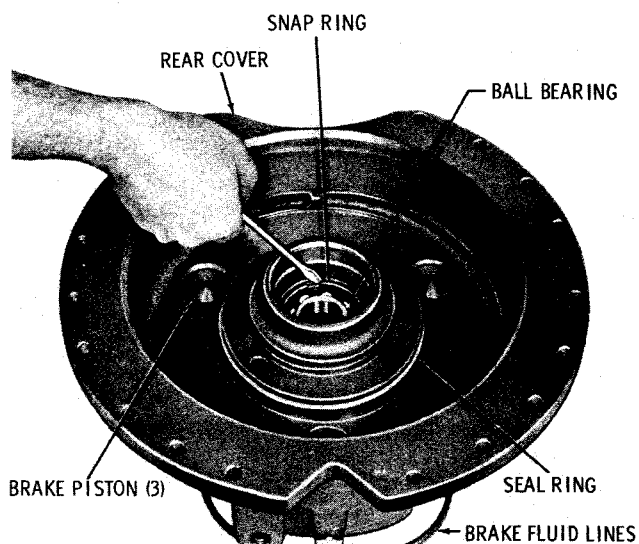


Fig. 6-21. Removing snapring from TTB model rear bearing bore

S2580

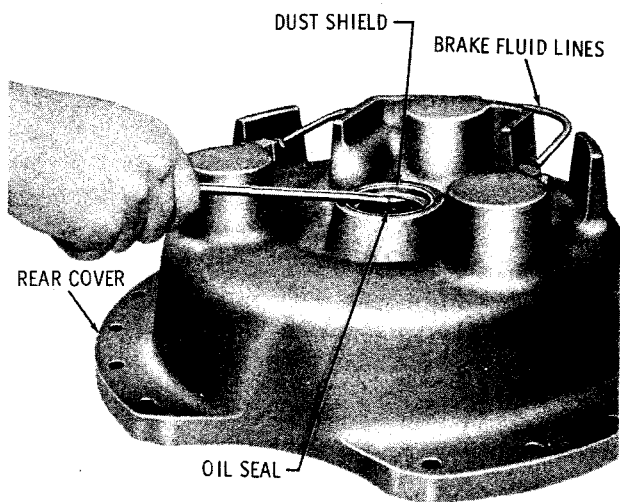


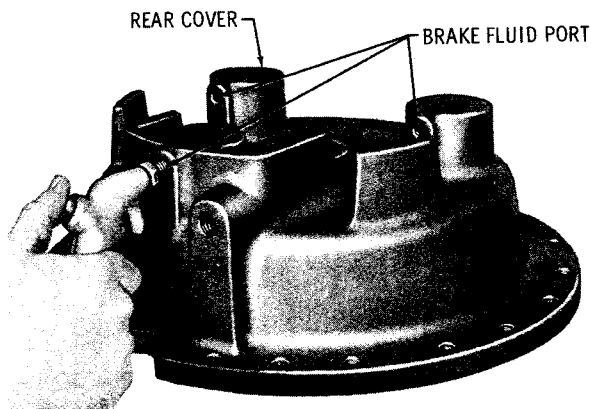
Fig. 6-22. Removing dust shield from TTB model rear cover

S2581

b. Assembly (B, foldout 7)
(with power takeoff)

(1) Install the PTO shaft oil seal and dust shield into the rear cover in the positions shown in figure 6-24. Pack the inside diameter groove of the oil seal with high temperature grease, MIL-G-3545A or equivalent.

(2) Lubricate the brake piston components with hydraulic brake fluid prior to installation in their bores. Install the three expander assemblies, brake piston cups (flat side upward) and brake pistons (flat side first), with sealrings assembled, into the three bores in the rear cover (fig. 6-25).



S2582

Fig. 6-23. Removing brake pistons from TTB model rear cover

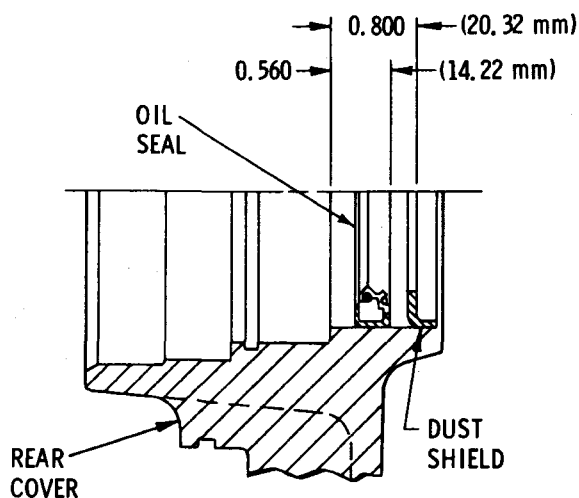


Fig. 6-24. Oil and dust shield installation diagram for TTB model with PTO

6056A

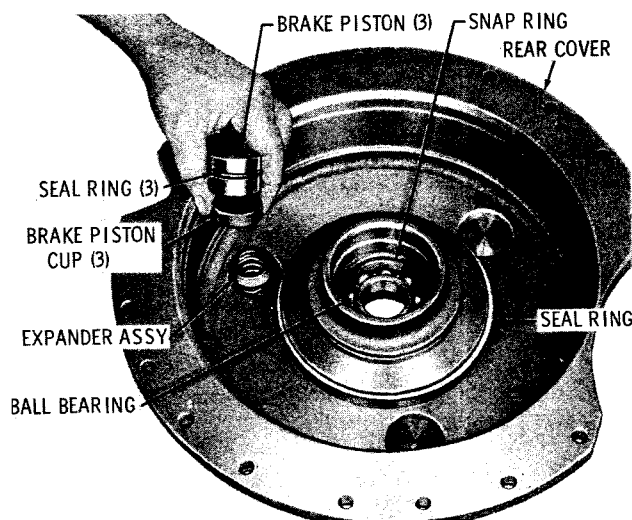


Fig. 6-25. Installing brake piston components in TTB model rear cover

(3) If the Teflon sealing was removed from the inner hub of the rear cover, install a new sealring, outer lip upward, into the groove in the inner hub (fig. 6-25). Install the bearing and snapping into the rear cover.

(4) If removal of six spring pins 22 (B, foldout 7) was not necessary, install brake apply plate assembly 20 into rear cover 38. Align the small notch in the plate with the cast lug located at the bottom of the cover bore (fig. 6-19). Install the snapping to retain the brake apply plate in the rear cover.

(5) If removal of six spring pins 22 (B, foldout 7) was necessary, install six new pins into apply plate 23. Press the pins until they bottom in their bores. Press adjusting ring 21 onto pins 22 until the front surface of ring 21 is within 0.010 inch (0.25 mm) above, to flush with, the front surface of apply plate 23.

Note: It is essential that ring 21 be parallel to plate 23 and that pins 22 not be distorted or damaged during installation.

(6) Install brake apply plate assembly 20 into rear cover 38, as described in (4).

(7) Install the brake fluid lines and fittings (fig. 6-22). Tighten the fittings sufficiently to prevent leakage.

(8) If pin 29 (A, foldout 7) was removed from PTO shaft 30, install a new pin, straight outer diameter first, into the shaft. Press the pin into the shaft until it projects 0.810 to 0.830 inch (20.57 to 21.08 mm) from the front end surface of the shaft. Install snapping 27 onto PTO shaft assembly 28.

(9) Install PTO shaft assembly 28, threaded end first, into the assembled rear cover, and seat the shaft in bearing 32 within the assembled rear cover.

(10) Install output flange 41 (B, foldout 7) and flange retaining washer 42 onto output shaft assembly 28 (A, foldout 7). Apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the threads of flange retaining nut 43 (B, foldout 7) and install the nut. Do not tighten the nut at this time.

c. Disassembly (B, foldout 7) (without power takeoff)

(1) Position the rear cover assembly, mounting flange upward, and remove the snapping that retains the brake apply plate assembly (fig. 6-20). Remove the brake apply plate assembly. Do not disassemble the apply plate assembly unless it fails to meet the minimum press force of 400 pounds (1779.3 N) (not psi) during the readjustment procedure.

(2) Conduct the readjustment procedure described in a(4), above. If the readjustment procedure indicates that replacement of the spring pins is necessary, refer to the disassembly procedures described in a(5), above.

(3) Remove the Teflon sealing from the inner hub of the rear cover (fig. 6-22) only if replacement is necessary. Note the three brake pistons.

(4) Position the rear cover so that it rests on its mounting flange (fig. 6-23). Remove plug 44 (B, foldout 7) from the center bore of rear cover 38 only if replacement is necessary. Remove brake fluid lines and fittings 30 through 36 from rear cover 38.

(5) Remove the three brake pistons and related parts in the manner described in a(8), above.

Note: Refer to paragraph 6-2, above.

d. Assembly (B, foldout 7)
(without power takeoff)

(1) Install the three brake pistons and related parts in the manner described in b(2), above.

(2) Install the brake fluid lines and fittings 30 through 36 (B, foldout 7) onto rear cover 38. Tighten the fitting sufficiently to prevent leakage. If plug 44 was removed, install a new plug.

(3) If Teflon sealring 24 was removed from the inner hub of cover 38, install a new sealring, outer lip upward, into the groove in the inner hub.

(4) If removal of six spring pins 22 was not necessary, refer to b(4), above. However, if the six pins required replacement, refer to b(5) and (6), above.

6-15. INTERNAL BRAKE
DIAPHRAGM (TTB)

a. Disassembly (B, foldout 7)

(1) Remove plug 3 from diaphragm 4.

(2) Position diaphragm assembly 2, pins upward, in a press. Support the area of the hub surrounding sleeve 5, and press the sleeve from the hub of the diaphragm.

Note: Refer to paragraph 6-2, above.

b. Assembly (B, foldout 7)

(1) Position diaphragm 4, rear side downward, in a press. (Rear side of diaphragm has the recess for two bolts.) Support the hub area around the center bore on a sleeve having a slightly larger inside diameter than the bore of the diaphragm.

(2) Install sleeve 5, chamfered inside diameter end last, into the hub bore of diaphragm 4. Press the sleeve until the chamfered inside diameter end is 0.075 to 0.085 inch (1.90 to 2.15 mm) below the front mounting surface (outer bolt circle) of the diaphragm.

(3) Install plug 3 into diaphragm assembly 2, and tighten the plug sufficiently to prevent leakage.

6-16. HIGH-RANGE CLUTCH PISTON
HOUSING (TTB)

a. Disassembly (A, foldout 7)

(1) Position the high-range clutch piston and housing, piston side up, in a press. Depress piston return spring 17 and remove snapping 16.

(2) Remove piston 19, sealring 20, and expander 21 from high-range clutch piston housing 22 (or 35). Refer to paragraph 6-19 for clutch piston rebuild instructions.

(3) Remove hook-type sealring 18 from the inner hub of piston housing 22 (or 35).

(4) If high-range clutch piston housing assembly 33 is used (brake only, no power takeoff), remove bushing 34 from piston housing 35 only if replacement is necessary.

Note: Refer to paragraph 6-2, above.

b. Assembly (A, foldout 7)

(1) If bushing 34 was removed from high-range clutch piston housing 35 (no power takeoff), install a new bushing. Press the new bushing to 0.04 to 0.08 inch (1 to 2 mm) below the front surface of the housing hub.

(2) Install hook-type sealring 18 onto the inner hub of piston housing 22 (or 35).

(3) Install piston 19, sealring 20, and expander 21 (as assembled in para 6-19) into piston housing 22 (or 35).

(4) Place piston return spring 17, convex side up, onto piston 19. Place the assembled parts, piston side up, in a press. Depress the piston return spring, and install snapping 16.

REBUILD OF SUBASSEMBLIES

Para 6-17/6-19

6-17. HIGH-RANGE CLUTCH HUB

- a. Disassembly (A, foldout 6 on TT; or A, foldout 7 on TTB)

Note: Models equipped with a power takeoff use clutch hub 10 (internal splines). Models which are not equipped with a power takeoff use hub 12 (splined shaft). The other parts of the assembly are identical.

(1) Position the assembly so that nut 6 and lockstrips 7 are upward. If the transmission is not equipped with a power takeoff, remove snapping 11 from hub 12.

(2) Flatten the corners of six lockstrips 7 and remove twelve nuts 6. Remove twelve bolts 15 and washers 14.

(3) Separate hub 10 (or 12) from clutch plates 8, 9, and 13.

Note: Refer to paragraph 6-2, above.

- b. Assembly (A, foldout 6 on TT; or A, foldout 7 on TTB)

(1) Assemble twelve washers 14 onto twelve 5/16-24 x 7/8-inch, self-locking bolts 15. Install bolts 15 into clutch plate 13.

(2) Install clutch hub 10 (or 12) onto the bolt and clutch plate assembly. Note that the long end of hub 10, or the unsplined end of hub 12 should be at the same side of clutch plate 13 as washers 14.

(3) Install external-tanged plate 9 onto the front side of clutch plate 13. Install clutch plate 8 onto the front side of external-tanged plate 9, engaging bolts 15.

(4) Install six lockstrips 7 and twelve 5/16-24 nuts 6. Tighten the nuts to 14 to 18 pound feet (19 to 24 Nm) torque, and bend the lockstrip corners against the bolt heads.

(5) On models using hub 12 (without power takeoff), install snapping 11 into its groove on the splined shaft.

6-18. TRANSFER DRIVE GEAR

- a. Disassembly (A, foldout 6 on TT; or A, foldout 7 on TTB)

(1) Remove bearing 1 and six pins 4 from transfer drive gear 3 only if replacement is necessary.

(2) If bearing replacement is necessary, pull bearing 1 from transfer drive gear assembly 2. If drive pins require replacement, press pins 4 from transfer drive gear 3.

Note: Refer to paragraph 6-2, above.

- b. Assembly (A, foldout 6 on TT; or A, foldout 7 on TTB)

(1) If pins 4 were removed, place transfer drive gear 3, hub downward, in a press and install new pins. Press the pins until they project 0.74 to 0.76 inch (18.8 to 19.3 mm) above the surface into which they are pressed.

(2) If bearing 1 was removed from transfer drive gear assembly 2, install a new bearing, outer snapping first, onto the gear hub. Seat bearing firmly against the shoulder on the gear hub.

6-19. CLUTCH PISTON ASSEMBLIES

Note: Warming the Teflon sealrings in oil at 150°F (65°C) will make them easier to remove and install.

- a. Disassembly

(1) Do not use sharp-edged or pointed tools to remove Teflon seal rings. Rather, slip a very thin, flat blade into piston groove, between the sealring and side of the groove and work the seal out of the groove until it can be grasped with the fingers.

(2) Remove the sealrings. Do not stretch or deform sealrings more than necessary, if they are to be reused.

(3) Remove expanders from grooves in the high-range clutch piston.

(4) Check three holes in reverse- and low-range clutch pistons. One hole should be clear. The other two holes have ball check valves. The balls should be clean and seat properly.

Note: Refer to paragraph 6-2, above.

b. Assembly

(1) Install the sealring expanders into the grooves in the high-range clutch piston. Make sure the free ends of the expander turn away from the sealring. The ends of some expanders may require additional bending to insure they turn toward the bottom of the groove.

(2) Oil the installed expander and sealring. Start the sealring into the piston groove at a point directly opposite the gap in the expander.

(3) Carefully work the sealring into the groove, compressing the expander while moving both directions from the starting point to the expander gap location. Do not stretch or distort the sealring more than absolutely necessary.

(4) Install lip-type sealrings (no expanders required) into the grooves of the low-range and reverse clutch pistons. Make sure that the lip of each sealring is toward the oil-pressure side of the piston. Refer also to foldout 5 for illustration of lip direction.

Caution: Improperly installed sealrings (lip in wrong direction) will cause improper clutch application or leakage.

(5) After installation, adjust the sealrings in their grooves to center them radially in the piston.

6-20. LOW-RANGE PLANETARY CARRIER ASSEMBLY

Note: Do not disassemble low-range planetary carrier assembly 3 (B, foldout 5) or 10 unless there is evidence of undue wear or failure. The failure of one pinion requires replacement of all pinions in the carrier assembly.

a. Disassembly—Four-Pinion Carrier (B, foldout 5)

(1) Drill into the ends of four pinion spindles 12 to weaken the swage. Use a 3/4-

inch (19 mm) drill at spindle ends near the smaller, splined hub (rear) of the carrier.

Caution: Do not drill into the carrier. The diameter of the spindles is slightly more than 3/4 inch (19 mm). Centering the drill accurately will prevent drilling into the carrier.

(2) Place carrier assembly 10, small hub upward, in a press, and press out four spindles 12.

(3) Remove the two thrust washers 13 and 16, pinion 15, and twenty-two pinion rollers 14.

(4) Repeat step (3), above, for removal of the remaining three pinion assemblies.

Note: Refer to paragraph 6-2, above.

b. Assembly—Four-Pinion Carrier (B, foldout 5)

(1) If facilities are available, chill four new spindles 12 in dry ice for one hour, or heat carrier 11 in an oil bath or oven to 300-350°F (150-176°C)

(2) Install thrust washer 13 on a spindle alining tool.

Note: An alining tool can be made by grinding a used spindle to 0.005-inch (0.13 mm) undersize.

(3) Coat the bore of pinion 15 with oil-soluble grease, and install the pinion onto the alining tool.

(4) Install twenty-two pinion rollers 14 into the space between the alining tool and the pinion bore. Install the second thrust washer 16 onto the pinion.

(5) Remove the alining tool, and install the assembled pinion parts into low-range planetary carrier 11. Insert the alining tool to center the assembled pinion parts with the spindle pin bore in the carrier.

(6) Place the carrier assembly, hub end upward, into a press, remove the alining tool, and start spindle pin 12 into spindle bore.

(7) Press the spindle into the bore, to 0.180 inch (4.57 mm) below the shoulder surface near the hub end. Refer to figure 6-26.

(8) Support the spindle and swage it securely at both ends with an octagon punch. The pinion must rotate freely after assembly. Refer to figure 6-27 for swaging tool information.

(9) Install the remaining three pinion assemblies in the same manner as described in (2) through (8), above.

(10) If chilled spindles were installed into the rebuilt carrier, and the carrier will not be installed into a transmission in the near future, apply a coating of oil around spindle locations to avoid rust.

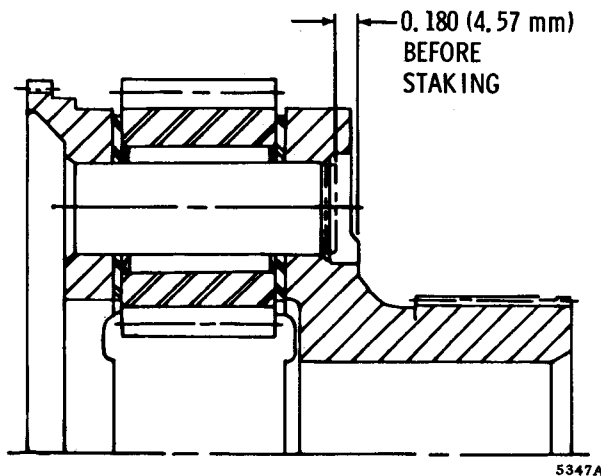


Fig. 6-26. Four-pin, low-range planetary carrier assembly—cross-section view

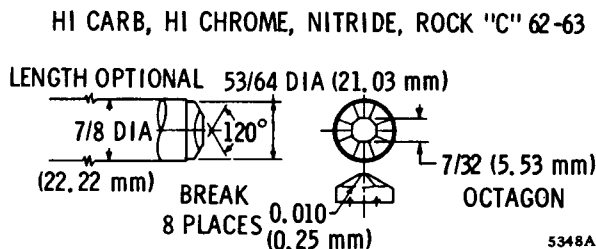
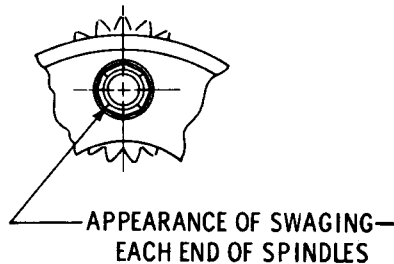


Fig. 6-27. Swaging tool for four-pin low-range and reverse-range pinion spindles

c. Disassembly—Six-Pinion Carrier (B, foldout 5)

(1) Drill into the ends of six pinion spindles 5 to weaken the swage. Use a 1/2-inch (12.7 mm) drill at the spindle end near the smaller, splined hub (rear) of the carrier.

Caution: Do not drill into the carrier. The diameter of spindles is slightly more than 1/2 inch (12.7 mm). Centering the drill accurately will prevent drilling into the carrier.

(2) Place carrier assembly 3, small hub upward, in a press, and press out six spindles 5.

(3) Remove two thrust washers 6 and 9, pinion 8, and twenty pinion rollers 7.

(4) Repeat step (3), above, for removal of the remaining five pinion assemblies.

Note: Refer to paragraph 6-2, above.

d. Assembly—Six-Pinion Carrier (B, foldout 5)

(1) If facilities are available, chill six new spindles 5 in dry ice for one hour, or heat carrier 4 in an oil bath or oven to 300-350°F. (150 to 176°C).

(2) Install thrust washer 6 on a spindle alining tool.

Note: An alining tool can be made by grinding a used spindle to 0.005-inch (0.13 mm) undersize.

(3) Coat the bore of a pinion 8 with oil-soluble grease, and install the pinion onto the alining tool.

(4) Install twenty pinion rollers 7 into the space between the alining tool and the pinion bore. Install the second thrust washer 9 onto the pinion.

(5) Remove the alining tool, and install the assembled pinion parts into low-range planetary carrier 4. Insert the alining tool to center the assembled pinion parts with the spindle pin bore in the carrier.

(6) Place the carrier assembly, hub end upward, into a press, remove the alining tool, and start spindle 5 into the spindle bore in the carrier.

(7) Press the spindle into the bore, until it projects 0.092 inch (2.33 mm) above the small diameter of the bore chamfer (fig. 6-28).

(8) Support the spindle and swage it securely at both ends with an octagon punch. The pinion must rotate freely after assembly. Refer to figure 6-29 for swaging tool information.

(9) Install the remaining five pinion assemblies in the same manner as described in (2) through (8), above.

(10) If chilled spindles were installed into the rebuilt carrier, and the carrier will not be installed into a transmission in the near future, apply a coating of oil around the spindle locations to prevent rust.

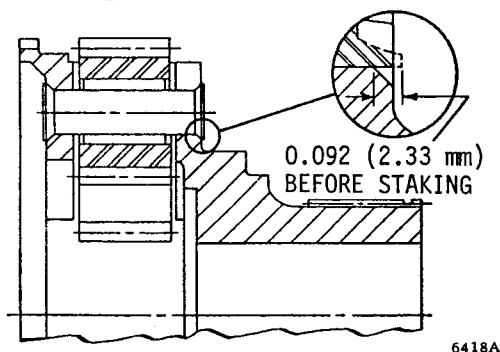
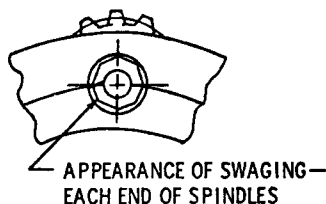


Fig. 6-28. Six-pinion, low-range planetary carrier assembly—cross-section view



HI CARB, HI CHROME, NITRIDE, ROCK "C" 62-63

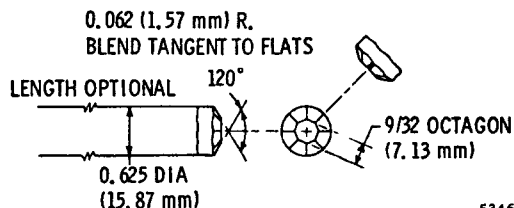


Fig. 6-29. Swaging tool for six-pinion, low-range pinion spindles

6-21. REVERSE-RANGE PLANETARY CARRIER ASSEMBLY

Note: Do not disassemble reverse-range planetary carrier assembly 9 (A, foldout 5) unless there is evidence of undue wear or failure. The failure of one pinion requires replacement of all pinions in the carrier assembly.

a. Disassembly (A, foldout 5)

(1) Drill into the ends of four pinion spindles 14 to weaken the swage. Use a 3/4-inch (19 mm) drill at the ends, which are swaged to hub of carrier 15.

Caution: Do not drill into the carrier. The diameter of spindles is slightly more than 3/4 inch (19 mm). Centering the drill accurately will prevent drilling into the carrier.

(2) Place carrier assembly 9, hub upward, in a press, and press out four spindles 14.

(3) Remove two thrust washers 10 and 13, pinion 11 and twenty-two rollers 12.

(4) Repeat step (3), above, for removal of the remaining three pinion assemblies.

Note: Refer to paragraph 6-2, above.

b. Assembly (A, foldout 5)

(1) If facilities are available, chill four new spindles 14 in dry ice for one hour, or heat carrier 15 in an oil bath or oven to 300-350°F (150-176°C).

(2) Install thrust washer 10 onto a spindle alining tool.

Note: An alining tool can be made by grinding a used spindle to 0.005-inch (0.13 mm) undersize.

(3) Coat the bore of a pinion 11 with oil-soluble grease, and install the pinion onto the alining tool.

(4) Install twenty-two pinion rollers 12 into the space between the alining tool and the pinion bore. Install the second thrust washer 13 onto the pinion.

(5) Position carrier 15, hub upward, on a level surface. Remove the alining tool and install the assembled pinion parts into the carrier. Insert the alining tool to align the assembled pinion parts with the spindle pin bore in the carrier.

(6) Repeat step (1) through (5), above, for installation of the remaining three pinion assemblies.

(7) Start spindle 14 into the chamfered spindle bore of carrier 15. Press the spindle into the bore until it projects 0.130 to 0.150 inch (3.30 to 3.81 mm) below the location shown in figure 6-30.

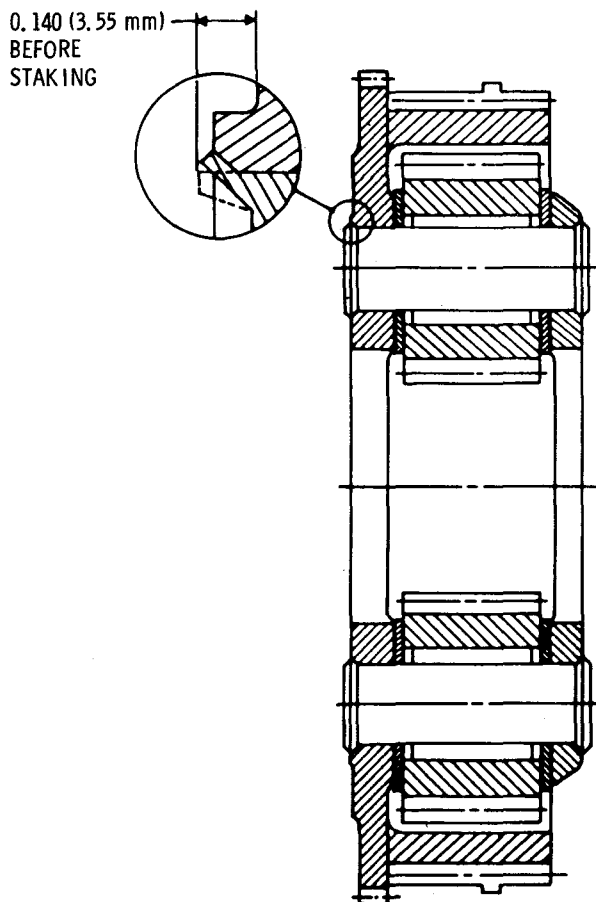


Fig. 6-30. Reverse-range planetary carrier assembly—cross-section view

9596A

(8) Repeat steps (7) and (8), above, for installation of the remaining three spindles.

(9) Support one of spindle 15 (A, fold-out 5) and swage it securely with an octagon punch. The pinion must rotate freely after assembly. Refer to figure 6-27 for swaging tool information.

(10) Swage the remaining three spindles in the manner described in (9), above.

(11) If chilled spindles were installed into the rebuilt carrier, and the carrier will not be installed into a transmission in the near future, apply a coating of oil around the spindle locations to prevent rust.

6-22. OIL PUMP

a. Disassembly (fig. 6-31)

(1) Remove the pump cover and cover gasket.

(2) Remove the drive gear and driven gear assembly.

(3) Inspect the needle bearings. If replacement is necessary, remove them from the driven gear.

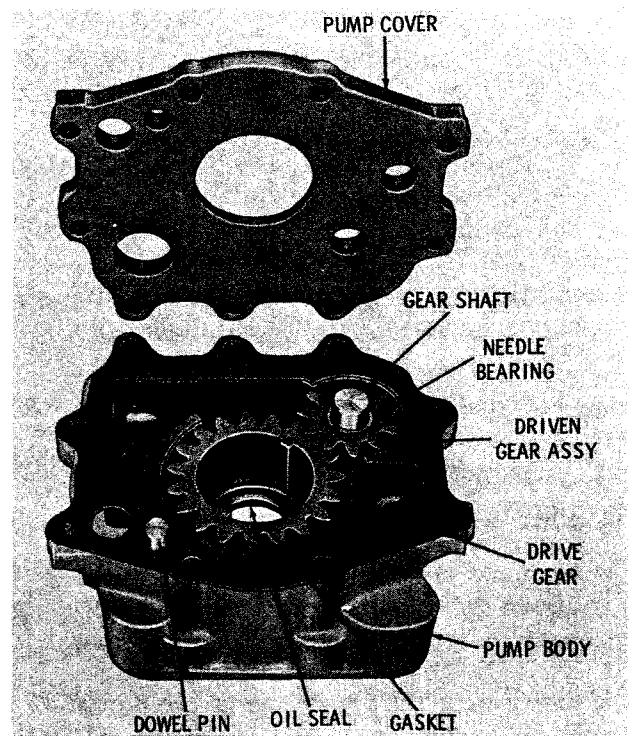


Fig. 6-31. Oil pump assembly

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(4) Inspect dowel pin which is pressed into the pump body. Remove it only if replacement is necessary.

Note: The dowel pin can be removed by clamping it in a vise and twisting the pump body.

(5) If an oil seal is used with the assembly, inspect the oil seal. If replacement is necessary, remove the seal by driving or pressing it toward the rear (accessory mounting face) of the pump. If the driven gear shaft, pump body, drive gear or driven gear require replacement, a new pump assembly must be used.

Note: Refer to paragraph 6-2, above.

b. Assembly (fig. 6-31)

(1) If the oil seal was removed, coat the outer circumference of the new seal with non-hardening sealer. Install the seal, spring-loaded lip first, into the rear of the pump body. Press the seal until it seats lightly on the shoulder in the body bore.

(2) If the dowel pin was removed, press a new pin into pump body. The pin is properly installed when it projects 0.41 to 0.43 inch (1.04 to 1.09 mm) above the front surface of the pump body.

(3) If the needle bearings were removed from the driven gear, install new bearings so that the replacer tool rests against the part number end of bearing race. Press each bearing flush with, to 0.020 inch (0.50 mm) below, the end surface of the driven gear.

(4) Install the driven gear assembly over the gear shaft and into the pump body. Also install the drive gear into the pump body.

Note: When properly installed, end faces of both gears will project 0.002 to 0.003 inch (0.05 to 0.07 mm) above the front surface of the pump body (measured before gasket is installed). If end faces of the gears are below the flush line of the pump body, the pump will not perform satisfactorily and should be replaced.

(5) Apply a liberal amount of oil onto the pump gears, and install the cover gasket and cover. Position the pump assembly front upward, until ready for installation onto the transmission housing.

6-23. TRANSMISSION HOUSING

a. Disassembly (B, foldout 4)

(1) Remove six bolts 13 and lockwashers 14, and remove core hole cover 15 and gasket 16.

(2) Remove plug 7, but do not remove filter plug 6 unless replacement is necessary. If necessary, measure and record the depth of installed plug 6, prior to removal of the plug.

(3) Remove breather 9.

(4) If the transmission is equipped with an accessory drive gear, remove lip-type oil seal 11. If the transmission is not equipped with an accessory drive gear, remove cup plug 12 only if replacement is necessary.

(5) Remove oil level plugs 26 and 27 from the front face of housing 8.

b. Assembly (B, foldout 4)

(1) If oil level plugs 26 and 27 were removed, replace them. Tighten the plugs sufficiently to prevent leakage.

(2) If cup plug 12 was removed, install a new cup, closed end first, into the rear face of housing 8. Press the cup against the shoulder in the bore. If lip-type oil seal 11 was removed, install a new seal, spring-loaded lip first, into the rear face of housing 8. Press the seal until it is 0.270 ± 0.015 inch (6.86 $\pm$ 0.38 mm) below surface adjacent to the bore.

(3) Install breather 9 and tighten it sufficiently to prevent leakage.

(4) If plug 6 was removed, apply non-hardening sealant onto the outside diameter of the new plug. Install the new plug, closed end

REBUILD OF SUBASSEMBLIES

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first, into the passage. Press the plug to the exact depth recorded prior to removal (a(2), above). Install plug 7 and tighten it sufficiently to prevent leakage.

(5) Install core hole cover 15 and gasket 16, and retain them with six 3/8-16 x 7/8-

inch bolts 13 and lockwashers 14. Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

6-24. TORQUE VALUES—ILLUSTRATED

Figure 6-32, which follows, shows the torque values for the threaded fasteners visible in the illustration.

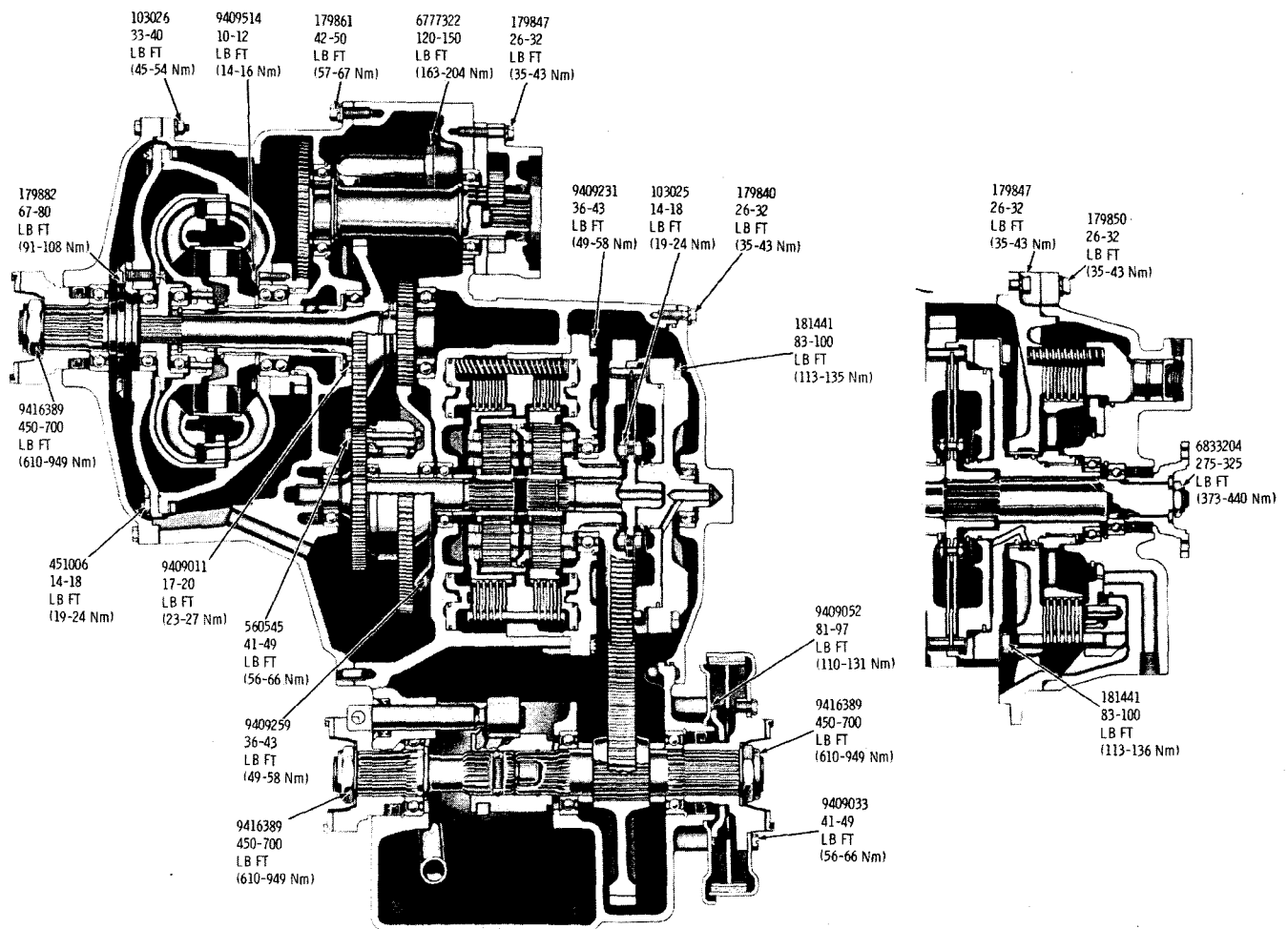


Fig. 6-32. Torque values for threaded fasteners

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Section 7. ASSEMBLY OF TRANSMISSION FROM SUBASSEMBLIES

7-1. SCOPE OF SECTION 7

a. The procedures in this section describe the assembly of the transmission from the parts removed in Section 5 and the subassemblies rebuilt in Section 6.

b. Whenever possible, the sequence of assembly is presented in reverse order of the removal sequence in Section 5. Techniques also are presented for installation of components in a vehicle-mounted transmission.

7-2. GENERAL INFORMATION FOR FINAL ASSEMBLY

a. Tools, Parts, Methods. Refer to paragraphs 4-3 through 4-5.

b. Cleaning, Inspection. Refer to paragraph 4-6.

c. Torque Specifications. The specific torque value for each threaded fastener installed in this section is stated in the applicable paragraph. Torque values are also presented in paragraphs 4-10 and 6-24.

d. Lubrication

(1) Soak each friction (faced) clutch plate in transmission fluid prior to assembly.

(2) Use oil-soluble grease with a low melting point (petroleum jelly) when it is required to facilitate assembly.

(3) Pack the inside diameter groove of the metal-encased, lip-type oil seals with high-temperature grease (MIL-G-3545A or equivalent).

(4) During final assembly, lubricate all moving parts with transmission fluid. The lubricant film will protect the friction surfaces and ferrous metals until the transmission is in service.

e. Component Cleanliness. Continually check each of the components during assembly

to insure that they are free of lint, dirt, or foreign particles.

7-3. INSTALLATION OF OUTPUT COMPONENTS, TRANSFER DRIVEN GEAR

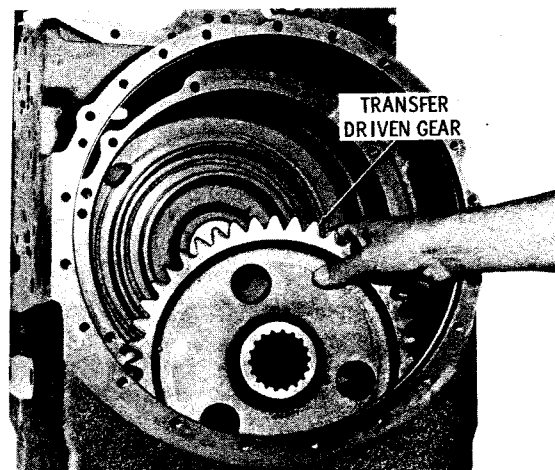
a. One-piece Output Shaft

(1) Install the transfer driven gear into the rear of the housing (fig. 7-1).

(2) If shifter shaft hole plug was removed, install a new plug (fig. 7-2). Apply nonhardening sealant onto the outside diameter of the new plug. Install the plug, closed end first, and seat it against the shoulder in the housing bore.

(3) Install the output shaft, double-splined end first, through the front of the housing and the splined hub of the transfer driven gear (fig. 7-2).

(4) Start bearing 9 (A, foldout 8), the shield side last, into front bore of the housing.



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Fig. 7-1. Installing transfer driven gear

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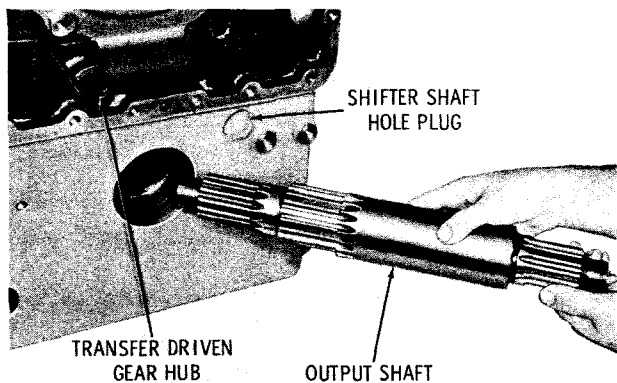


Fig. 7-2. Installing one-piece output shaft

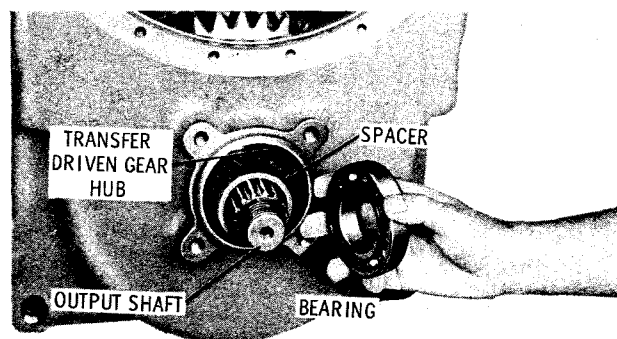


Fig. 7-3. Installing output shaft rear bearing and spacer

(5) Install the spacer onto the rear end of the output shaft (fig. 7-3). Start the rear bearing, loading groove first, into its bore in the housing, pushing the spacer toward the transfer gear hub.

(6) Supporting the shaft at the front end surface, drive the rear bearing and spacer forward until they are firmly seated against the transfer gear hub.

(7) At the front of the transmission housing, drive the bearing rearward and seat it firmly against the shoulder in the bore. Install the snapping to retain the bearing (fig. 7-4).

(8) Reseat the rear bearing, if necessary.

(9) Apply nonhardening sealant onto the outside diameter of lip-type oil seal 7, and

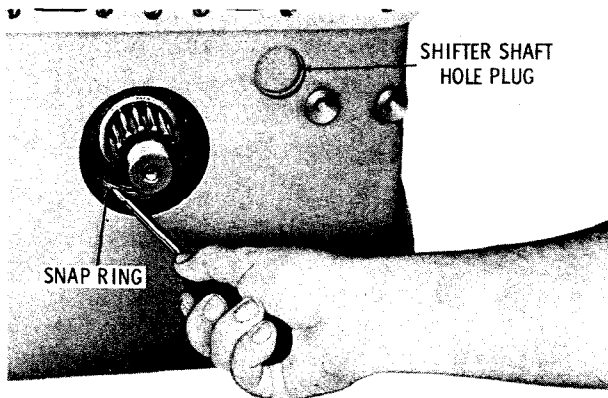


Fig. 7-4. Installing output shaft front bearing snapping

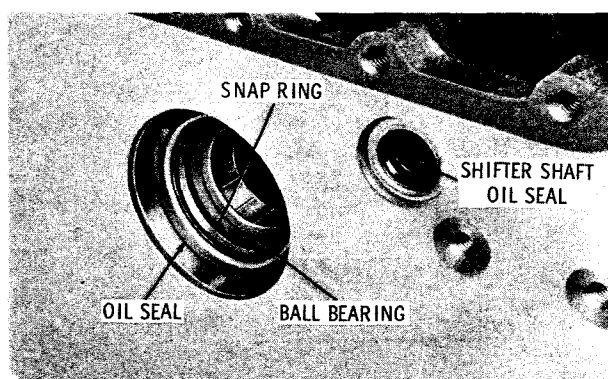


Fig. 7-5. Output shaft front bearing and sealring

install the seal, spring-loaded lip first into the front output bore. Press or drive the seal squarely and lightly against the counterbore in the housing.

(10) Apply nonhardening sealant onto the outside diameter of lip-type oil seal 27, and install the seal, spring-loaded lip first, into the rear output bore. Press or drive the seal squarely and lightly against the counterbore in the housing.

b. Two-piece Output Shaft

(1) If the front output shaft bearing was removed, replace the bearing, shield side last, into the housing bore (fig. 7-5). Seat the front bearing firmly against the shoulder in the bore, and install the snapping against the bearing outer race.

(2) If the lip-type oil seal was removed, apply nonhardening sealant onto the outside diameter of a new seal. Install the seal, spring-loaded lip first, and press it squarely into the bore until it is lightly seated against the counterbore shoulder (fig. 7-5).

(3) If the shifter shaft oil seal was removed, apply nonhardening sealant onto the outside diameter of a new seal. Install the seal, spring-loaded lip first, and press it squarely into the bore at the front of the housing, until it is lightly seated against the counterbore shoulder.

(4) Install one ball 11 (A, foldout 8), spring 12, and other ball 11 into front output shaft 10. While holding these balls against the spring pressure, slide disconnect coupling 13, grooved end first, onto shaft 10 until the rear end of the coupling is flush with the shaft rear splines (disengaged position) (fig. 7-6).

(5) Install the front output shaft and assembled disconnect coupling, threaded end first into the rear output shaft bearing bore (fig. 7-6). Support the inner race of the front output bearing (fig. 7-5), and seat the shoulder of the front output shaft against the bearing.

(6) Install the output shaft center bearing, shield side first, into the web of the transmission housing (fig. 7-7). Press or tap on the bearing outer race to seat it against the shoulder in the housing web bore.

(7) Install the transfer driven gear (fig. 5-42).

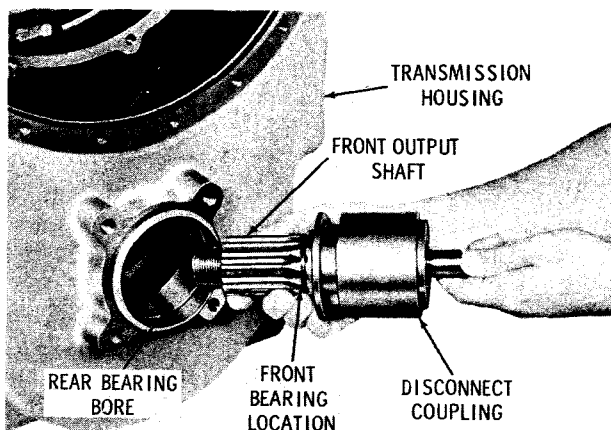


Fig. 7-6. Installing front output shaft and disconnect coupling

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(8) If bushing 22 (A, foldout 8) was removed from rear output shaft 23, install a new bushing. Press the bushing into the front bore of the shaft until it is recessed 0.160 to 0.200 inch (4.06 to 5.08 mm) below the shaft end surface.

(9) If bearing 25 or spacer 24 were removed from rear output shaft assembly 21, replace them. Install spacer 24 and bearing 25, shield side last, onto the shaft. Seat the bearing firmly against the spacer.

(10) Place the spacer at the front side of the transfer driven gear hub (fig. 7-8). Install the assembled rear output shaft, splined end first, through the splined hub of the gear, the spacer, and the center support bearing.

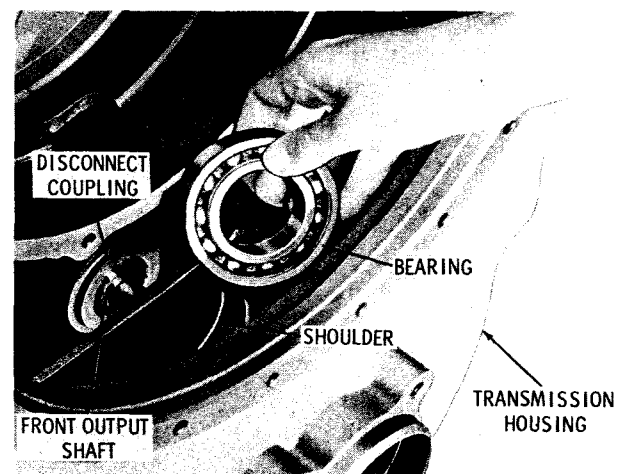


Fig. 7-7. Installing output shaft center bearing

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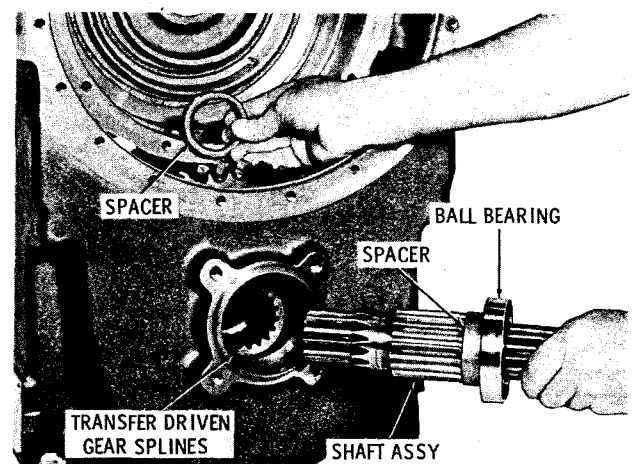
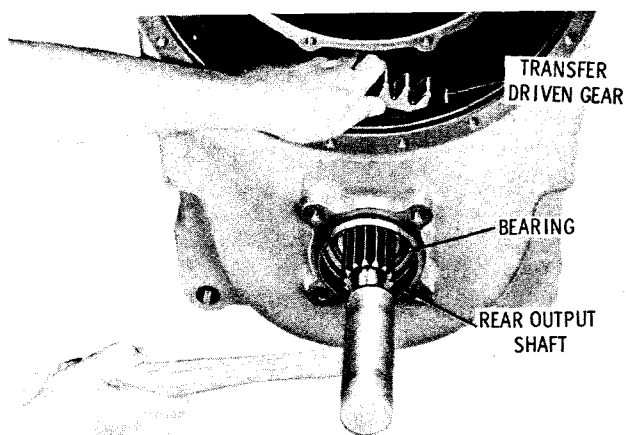


Fig. 7-8. Installing rear output shaft assembly

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Para 7-3



S2590

Fig. 7-9. Seating rear output shaft in housing

(11) Support the transfer driven gear and drive the rear output shaft assembly and bearing forward (fig. 7-9). If necessary, reseat the rear bearing by driving on its inner race until the outer race clears the snapping groove in the bore.

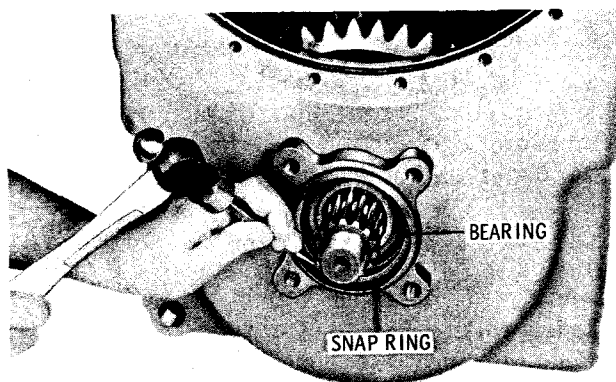
(12) Install the snapping, and tap progressively around its circumference until it snaps into place against the bearing (fig. 7-10).

(13) Apply nonhardening sealant onto the outside diameter of a new lip-type oil seal. Install the new seal, spring-loaded lip first, and press it squarely into the bore until it is lightly seated against the counterbore shoulder (fig. 7-11).

(14) Position the disconnect shifter fork in the groove of the disconnect coupling (fig. 7-11). While holding the fork in position, install the shifter fork shaft, threaded end first, through the oil seal in the front of the housing and fully engage the threads in the shifter fork. Refer to paragraph 3-8c for final adjustment of the shifter fork shaft.

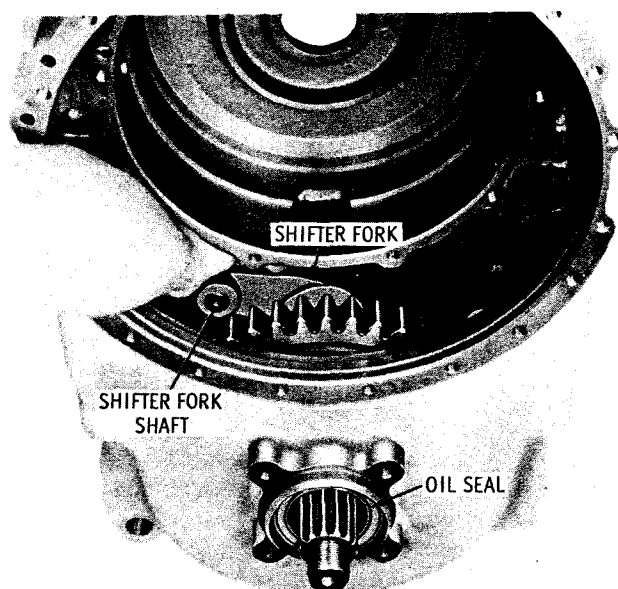
c. Rear Output Shaft (when no front shaft is used)

(1) Install bearing 18 (A, foldout 8), shield side first, into the web of the transmission housing (fig. 7-7). Press or tap on the bearing outer race to seat it against shoulder in the housing web bore.



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Fig. 7-10. Installing rear output shaft snapping



S2592

Fig. 7-11. Installing disconnect shifter fork and shaft

(2) Install the transfer driven gear (fig. 5-42).

(3) If bearing 25 (A, foldout 8) or spacer 24 were removed from rear output shaft 23, replace them. Install spacer 24 and bearing 25, shield side last, onto the shaft. Seat the bearing firmly against the spacer.

(4) Place the spacer at the front side of the transfer driven gear hub (fig. 7-8). Install the assembled rear output shaft, splined end first, through the splined hub of the gear, the spacer, and the bearing installed in the housing web.

(5) Support the transfer driven gear, and drive the assembled rear output shaft forward (fig. 7-9). If necessary, reseal the rear bearing by driving on its inner race until the outer race clears the snapping groove in the bore.

(6) Install the snapping, and tap progressively around its circumference until it snaps into place against the bearing (fig. 7-10).

(7) Apply nonhardening sealant onto the outside diameter of a new lip-type oil seal. Install the new seal, spring-loaded lip first, and press it squarely into the bore until it is lightly seated against counterbore shoulder (fig. 7-11).

(8) Apply nonhardening sealant onto the smaller outside diameter of plug 29 (A, fold-out 8) and install the plug into the front output orifice. Press the plug into the bore until its flange is firmly seated against the front surface of the housing.

(9) If shifter shaft hole plug 28 was removed, replace it. Apply nonhardening sealant onto the outside diameter of the plug. Install the plug, closed end first, and seat it against the shoulder in the housing bore.

7-4. INSTALLATION OF RANGE CLUTCHES, GEARING

a. Reverse-range Clutch, Planetary

(1) Position the transmission housing on blocks on its front splintline (fig. 7-12). Install the reverse-range clutch piston (as assembled in para 6-19) into the transmission housing.

(2) Beginning with an external-tanged clutch plate, alternately install four external-tanged clutch plates and four internal-splined clutch plates onto the reverse-range piston (fig. 7-13). Install the reverse-range planetary carrier assembly, long splines first, into the reverse-range plates stacked on the piston.

(3) Install one external-tanged plate and one internal-splined plate onto the reverse-range planetary carrier assembly (fig. 7-14).

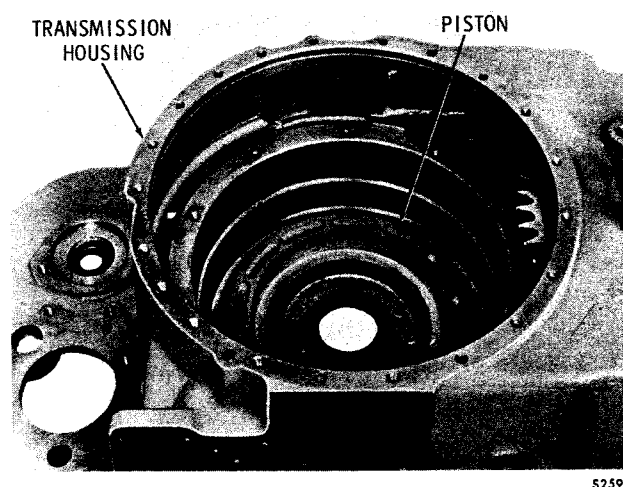


Fig. 7-12. Reverse-range clutch piston installed

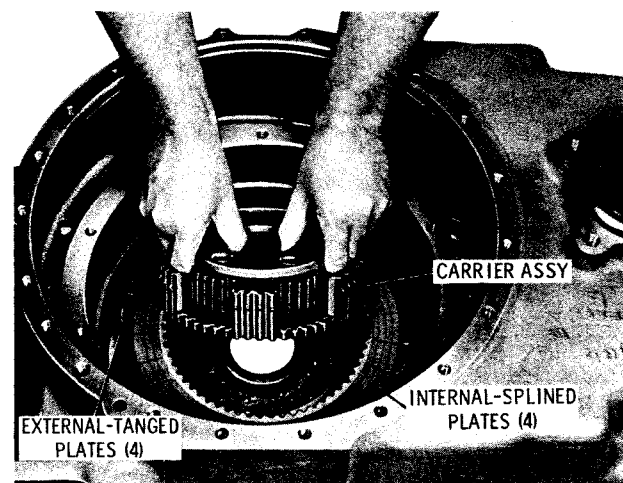


Fig. 7-13. Installing reverse-range planetary carrier assembly

Note: If transmission is equipped with a high-speed, low-gear ratio, install sun gear 16 (A, foldout 5), small end first, into the reverse-range planetary carrier assembly.

(4) Aline the slots of the five reverse-range, external-tanged clutch plates to receive the pins in the clutch anchor assembly (fig. 7-14). Install the clutch anchor pin into the control valve mounting pad on the left side of the transmission housing. Aline the anchor pin slot with the clutch anchor pinhole within the transmission housing, install the reverse-and-low-range clutch anchor assembly, longer ends of pins downward, and engage the slots of the five external-tanged clutch

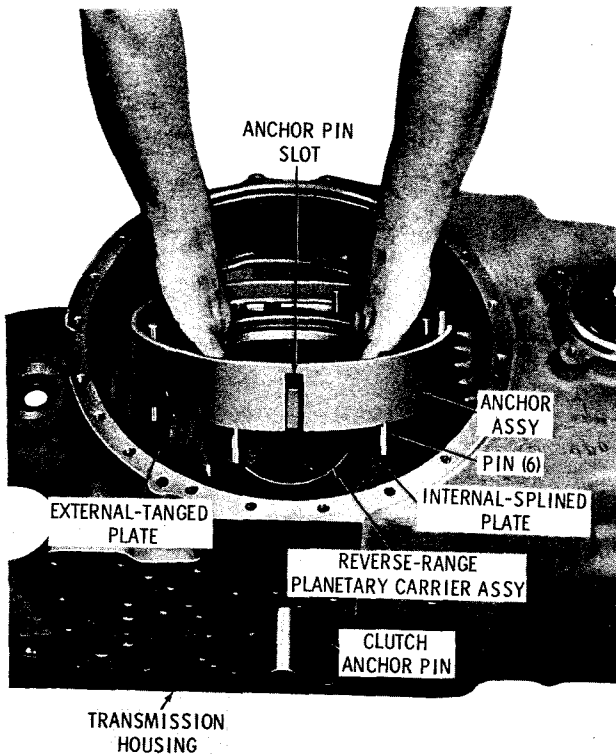


Fig. 7-14. Installing reverse-and-low-range clutch anchor assembly

plates. Be sure that the six notches of the five external-tanged plates are engaged by the six anchor pins in the anchor assembly.

(5) Push the clutch anchor pin into the slot in the reverse-and-low-range clutch anchor assembly (fig. 7-15). Temporarily install a 3/8-16 x 1-inch bolt and a flat washer to retain the anchor pin during subsequent assembly operations.

b. Low-range Clutch and Planetary

(1) Assemble the low-range planetary carrier assembly onto the reverse-range ring gear (fig. 5-28).

Note: If the transmission is equipped with a high-speed, low-gear ratio, install thrust washer 2 (B, foldout 5) into the inner hub of six-pinion, low-range carrier 3. Apply oil-soluble grease to retain the washer during installation of the carrier.

(2) Install the assembled reverse-range ring gear and low-range planetary carrier, engaging the reverse-range ring gear teeth with the planetary pinion teeth (fig. 7-15).

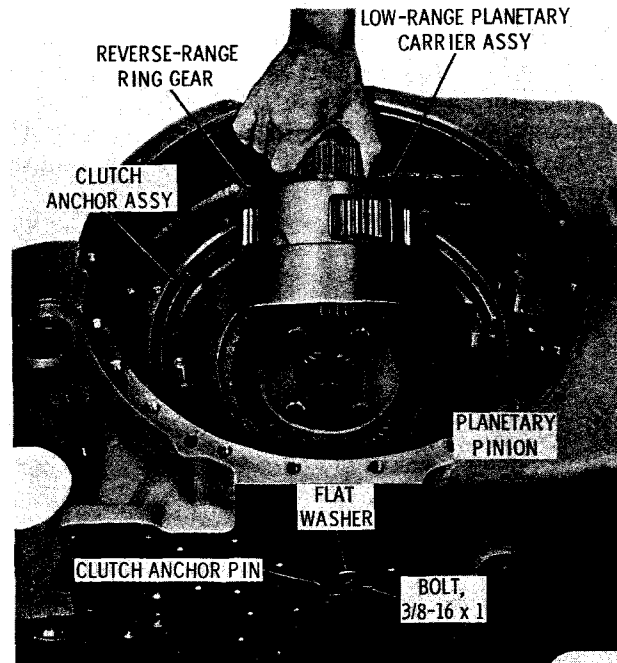


Fig. 7-15. Installing low-range planetary carrier assembly and reverse-range ring gear

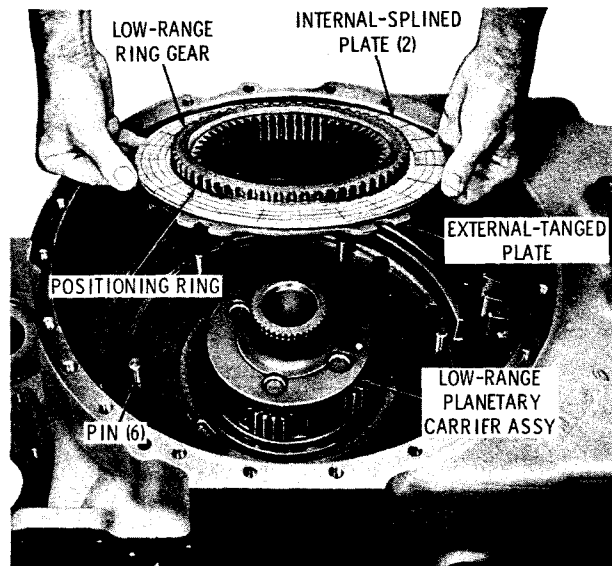
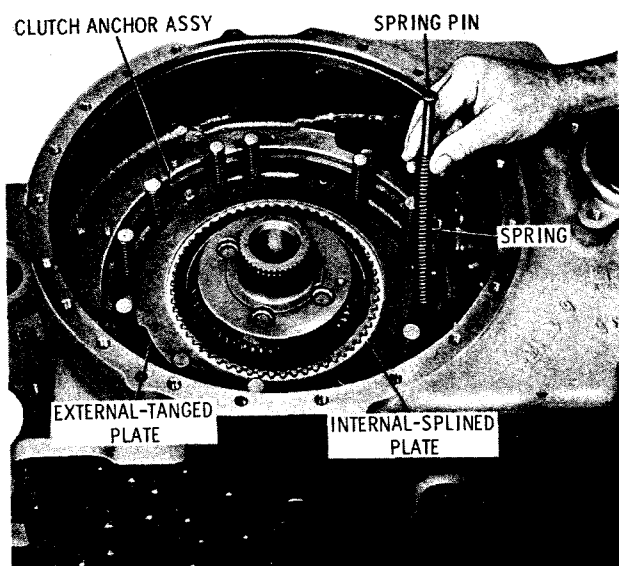


Fig. 7-16. Installing low-range ring gear and three clutch plates

(3) Place an external-tanged plate between two internal-splined plates and install them as a unit onto the flat side of the low-range ring gear (fig. 7-16). Install the assembled clutch plates and ring gear, flat side first, onto the low-range planetary carrier assembly, and engage the slots of the external-tanged plate onto the six clutch anchor pins.



S2598

Fig. 7-17. Installing piston return springs and guide pins

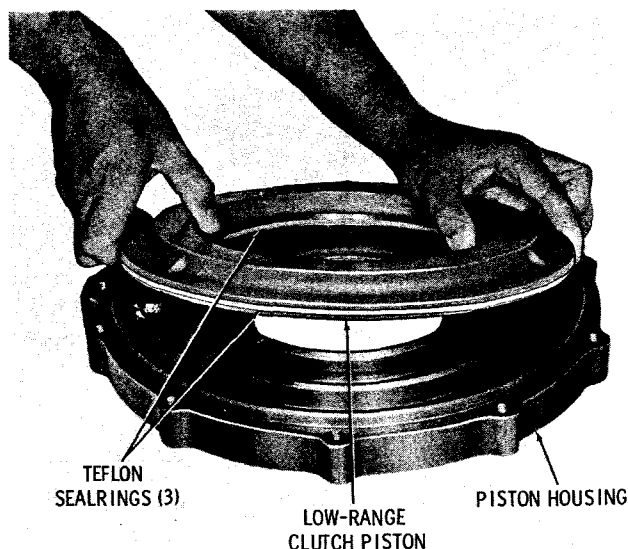
(4) Starting with an external-tanged clutch plate, alternately install three external-tanged clutch plates and two internal-splined clutch plates onto the low-range ring gear (fig. 7-17).

(5) Install the 12 piston return springs and spring guide pins into the holes in the clutch anchor assembly (fig. 7-17).

(6) If plug 31 (B, foldout 5) was removed from low-range clutch piston housing 29, replace it. Apply nonhardening sealant onto the plug threads, and install the plug into the housing. Tighten the plug sufficiently to prevent leakage.

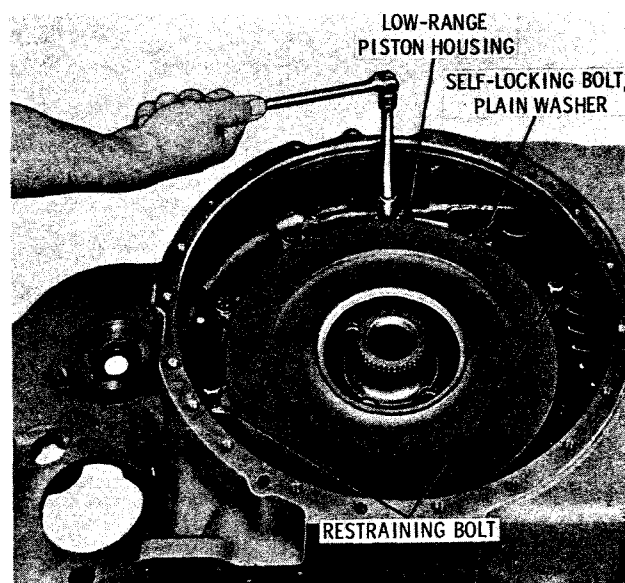
(7) Install the low-range clutch piston (as assembled in para 6-19), flat side first, into the low-range clutch piston housing (fig. 7-18).

(8) Install the low-range clutch piston housing and piston assembly and attach it with ten 3/8-16 x 1 1/2-inch self-locking bolts (fig. 7-19). Use two of the longer valve body mounting bolts (3/8-16 x 2 1/2) to draw the piston housing down sufficiently to engage the 3/8-16 x 1 1/2-inch self-locking bolts. Remove the two draw bolts, and install the two remaining 3/8-16 x 1 1/2-inch, self-locking bolts. Tighten the bolts to 36 to 43 pound feet (49 to 58 Nm) torque.



S2600

Fig. 7-18. Installing low-range clutch piston into piston housing



S2554

Fig. 7-19. Installing low-range clutch piston housing bolts

c. Transfer Drive Gear, High-range Clutch Assembly

(1) Install the transfer drive gear (as assembled in para 6-18), bearing first, onto the splined hub of the low-range planetary carrier (fig. 7-20).

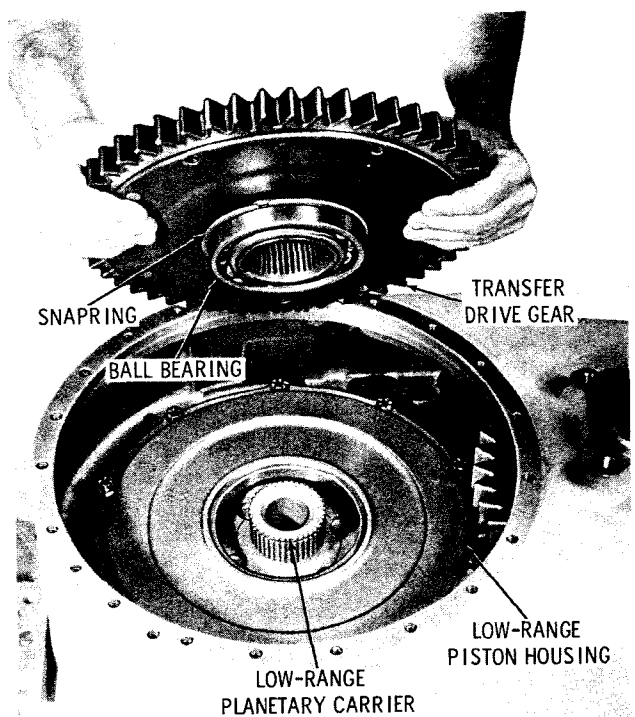


Fig. 7-20. Installing transfer drive gear assembly

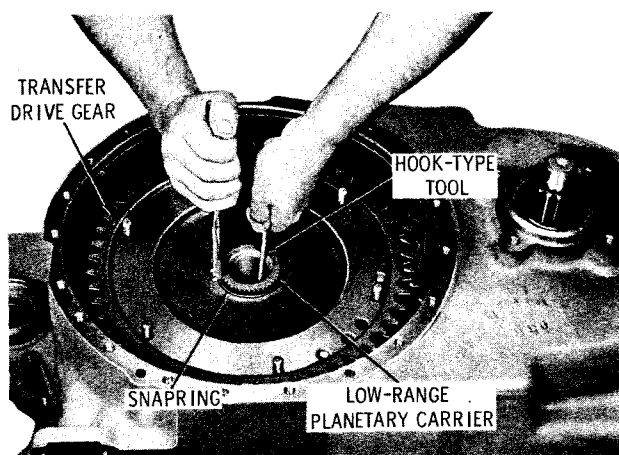


Fig. 7-21. Installing transfer drive gear snapping

(2) Using a suitable hook-type tool, raise the low-range planetary carrier sufficiently to expose the snapping groove in the splined hub, and install the snapping (fig. 7-21).

(3) Install the high-range clutch hub (as assembled in para 6-17) onto the transfer drive gear (fig. 7-22). If the model is equipped with a power takeoff, install the high-range clutch hub as illustrated in figure 7-22. If the model is not equipped with a power takeoff, install

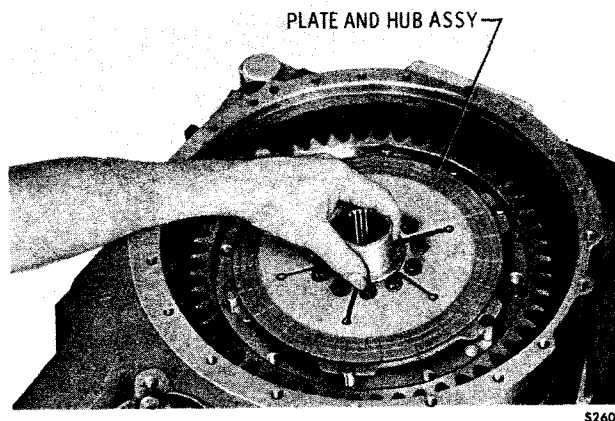


Fig. 7-22. Installing high-range clutch plate and hub assembly

the high-range clutch hub assembly, splined end of shaft first, into the hub of the transfer drive gear (fig. 5-24).

7-5. INSTALLATION OF HIGH-RANGE CLUTCH PISTON HOUSING, INTERNAL BRAKE, REAR COVER – TTB

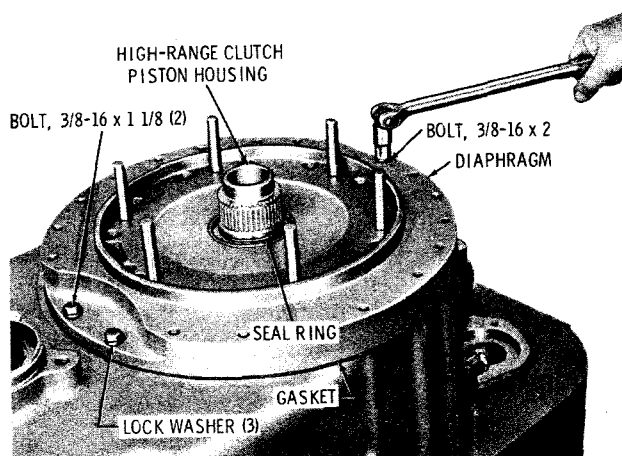
a. High-range Clutch Piston Housing

(1) Align the bolt holes in the piston housing with those in the transfer drive gear and install the high-range clutch piston housing (as assembled in para 6-16) onto the transfer drive gear (fig. 5-23). Using a soft hammer, seat the piston housing in the counter-bore of the gear.

(2) Install the six 1/2-20 x 2 3/4-inch bolts and locktabs to retain the piston housing (fig. 5-23). Tighten the bolts to 83 to 100 pound feet (113 to 135 Nm) torque. Bend the locktabs against the bolt heads. Install the two stepjoint sealrings and one O-ring onto the hub of the piston housing.

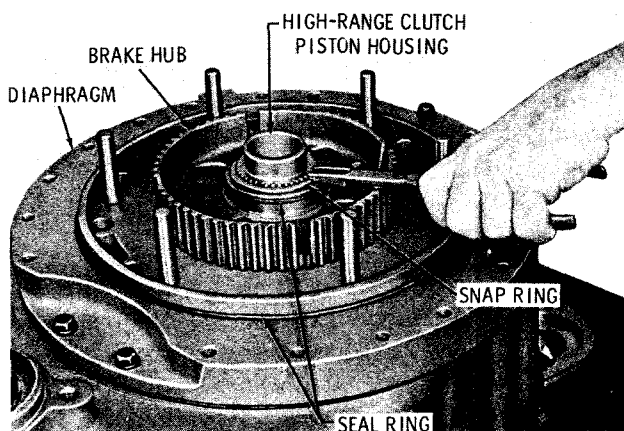
b. Internal Brake Components

(1) Install the gasket onto the diaphragm (as assembled in para 6-15) and install the diaphragm onto the transmission housing (fig. 7-23). Install two 3/8-16 x 1 1/8-inch bolts, one 3/8-16 x 2-inch bolt, and three lockwashers to retain the diaphragm. Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque.



S2604

Fig. 7-23. Installing diaphragm bolts



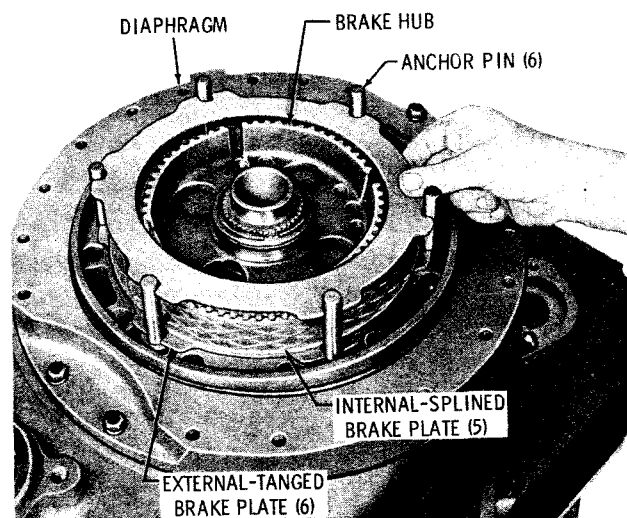
S2605

Fig. 7-24. Installing brake hub snapping

(2) Install the sealring onto the diaphragm (fig. 7-24). Install the step-joint sealring onto the brake hub. Install the brake hub onto the splined hub of the high-range clutch piston housing. Retain the brake hub with a snapping.

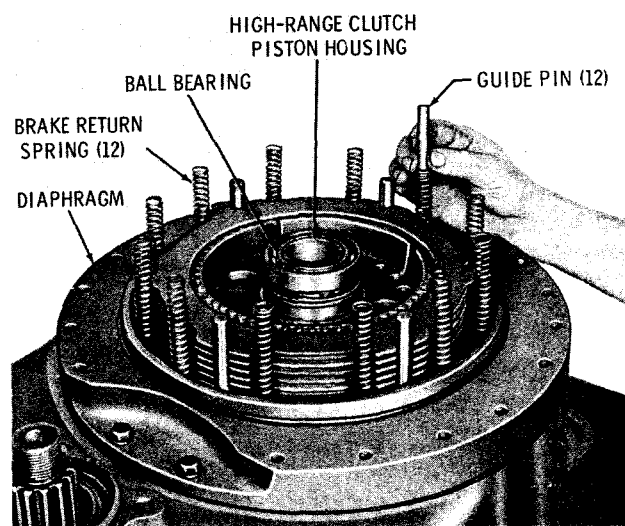
(3) Beginning with an external-tanged brake plate, alternately install six external-tanged plates and five internal-splined plates onto the diaphragm and brake hub (fig. 7-25). Be sure that the slots of the external-tanged plates engage the six anchor pins in the diaphragm.

(4) Install the ball bearing onto the hub of the high-range clutch piston housing (fig. 7-26).



S2606

Fig. 7-25. Installing brake plates



S2607

Fig. 7-26. Installing brake return spring guide pins

(5) Install the twelve brake return springs, flared end first, into the recesses in the diaphragm. Twist the springs counter-clockwise to seat them in the recesses, and drop the twelve guide pins into the springs.

c. Rear Cover (without PTO)

(1) Attach a sling to the bolt circle flange of the rear cover assembly (as assembled in para 6-14c and d). Hoist the assembly into position over the transmission in a manner similar to that shown in figure 7-27.

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Para 7-5/7-6

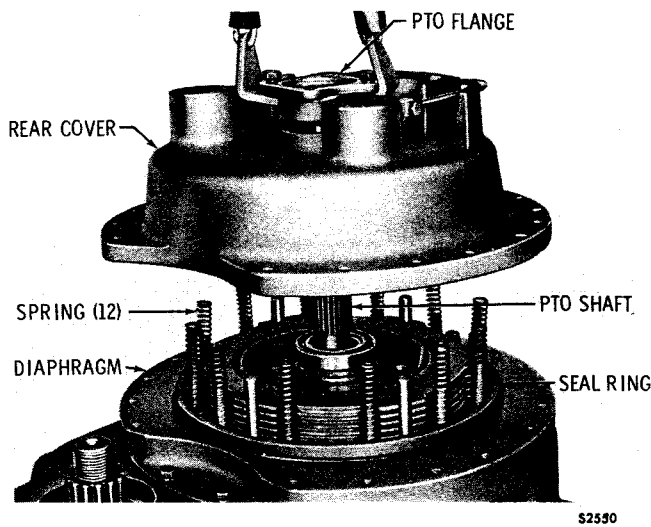


Fig. 7-27. Installing rear cover assembly

(2) Check to insure that all of the brake return springs are straight and alined, and that the sealring is in place on the diaphragm (fig. 7-27).

(3) Lower the assembly to within approximately 1-1/4 inches (32 mm) of the diaphragm and check "by feel" to insure that each brake return spring will enter its recess in the brake apply plate.

(4) Continue lowering the assembly until it stops its downward travel and its weight is supported by the brake return springs. Remove the sling. Using two 3/8-16 x 3-inch bolts, draw the rear cover assembly down sufficiently to allow the engagement of the proper bolts. Install sixteen 3/8-16 x 2 3/4-inch bolts and lockwashers, remove the two draw bolts, and install remaining two 3/8-16 x 2 3/4-inch bolts and lockwashers. Tighten the eighteen bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

d. Rear Cover (with PTO)

(1) Attach a sling to the PTO flange of the rear cover assembly (as assembled in para 6-14a and b). Hoist the assembly into position over the transmission, as shown in figure 7-27.

(2) Check to insure that all of the brake return springs are straight and alined, and that the sealring is in place on the diaphragm (fig. 7-27).

(3) As rear cover assembly is lowered, rotate the PTO flange, so that the shaft splines will engage the high-range clutch hub and the reverse-and-low-range sun gear.

(4) Check the alinement of the brake return springs as described in c(3), above. Attach the rear cover assembly as described in c(4), above.

7-6. INSTALLATION OF HIGH-RANGE CLUTCH PISTON HOUSING, REAR COVER - TT

a. High-range Clutch Piston Housing (with PTO)

(1) Install high-range clutch piston housing 36 (A, foldout 6) and attached parts (as assembled in para 6-13) onto transfer drive gear assembly 2. Aline the drive pin holes in the piston with the drive pins in the transfer drive gear. Using a soft hammer, seat the piston housing in the counterbore of the transfer drive gear.

(2) Attach the piston housing to transfer drive gear with six 1/2-20 x 2 3/4-inch bolts 39 and locktabs 40. Tighten the bolts to 83 to 100 pound feet (113-135 Nm) torque. Bend the locktabs against the bolt heads.

(3) Install two step-joint sealrings 37 into the grooves in the hub of piston housing 36.

b. Rear Cover Assembly (with PTO)

(1) Lubricate sealring 2 (B, foldout 6) and install it into its groove in rear PTO cover assembly 22 (and attached parts as assembled in para 6-12). Apply oil-soluble grease onto gasket 1 and install the gasket onto the mounting flange of the rear PTO cover assembly.

(2) Install PTO output flange 27 and flange retaining washer 28 onto the threaded end of PTO shaft 17. Apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the threads of 7/8-14 self-locking nut 29 and install the nut onto PTO shaft assembly 17. Do not bring the nut to full torque at this time.

(3) Attach a sling to PTO output flange 27 and hoist the rear PTO cover assembly

and attached parts into position over the transmission. While lowering the cover assembly into the transmission, rotate the PTO output flange so that the PTO shaft splines will engage the high-range clutch hub and reverse-and-low-range sun gear.

(4) Retain the rear PTO cover assembly with nineteen 3/8-16 x 1 1/8-inch bolts 30 and lockwashers 31. Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

c. High-range Clutch Piston Housing (without PTO)

(1) Install the high-range clutch piston housing and attached parts (as assembled in para 6-11) onto the transfer drive gear (fig. 7-28). During installation, align and engage the recesses in the piston with the drive pins in the transfer drive gear.

(2) Using a soft hammer, seat the piston housing in the counterbore of the drive gear, and install the six locktabs and six 1/2-20 x 2 3/4-inch bolts (fig. 7-29). Tighten the bolts to 83 to 100 pound feet (113 to 135 Nm) torque. Bend the locktabs against the bolt heads.

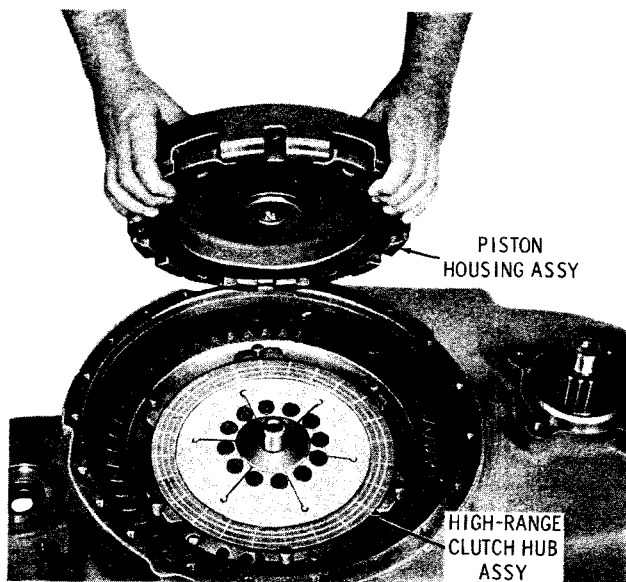


Fig. 7-28. Installing high-range clutch piston housing assembly

S2608

d. Rear Cover (without PTO)

(1) If the transmission is equipped with a speedometer drive assembly, install washer 12 (B, foldout 6) into drive sleeve 13. Install lip-type oil seal 11, metal side first, into drive sleeve 13. Press the seal to 0.035 to 0.065 inch (0.88 to 1.65 mm) below the front surface of the drive sleeve.

(2) Install gasket 7, speedometer drive adapter 8, gasket 9, and sleeve assembly 10 onto rear cover 4. Retain the speedometer components with two 5/16-18 x 2 1/4-inch bolts 15 and lockwashers 14. Tighten the bolts to 13 to 16 pound feet (18 to 21 Nm) torque.

(3) If the pipe plug was removed from the rear cover, replace it (fig. 7-29). Apply nonhardening sealant onto the plug threads and install the plug into the rear cover. Tighten the plug sufficiently to prevent leakage.

(4) Lubricate the sealring and install it into the groove in the rear cover pilot diameter (fig. 7-29). Apply oil-soluble grease onto the gasket and install the gasket onto the rear cover pilot diameter. Install the rear cover onto the transmission housing and retain it with nineteen 3/8-16 x 1 1/8-inch bolts and lockwashers. Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

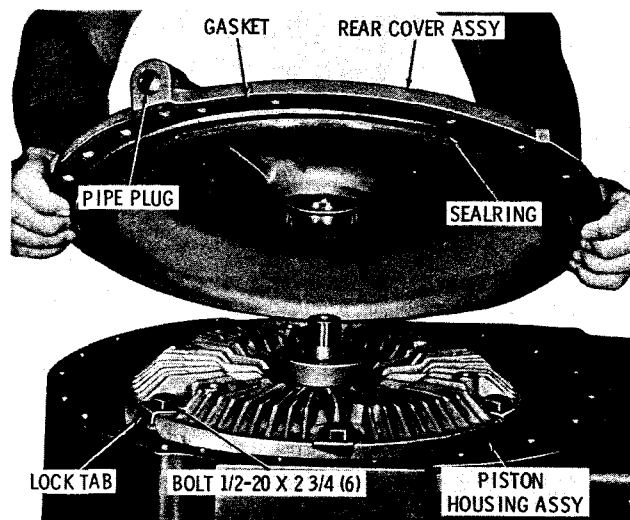


Fig. 7-29. Installing transmission rear cover

S2609

Para 7-7

SERIES TT, TTB 2001 POWERSHIFT TRANSMISSIONS

7-7. INSTALLATION OF TURBINE GEARING AND OIL SUCTION TUBE

a. Accessory drive shaft assembly

(1) If bearing 9 (B, foldout 3) was removed from accessory drive shaft 8, replace it.

(2) Install bearing 9 onto drive shaft 8 and seat the bearing firmly against the shaft shoulder. Apply Molykote Type G, or equivalent into the drive splines of the shaft.

(3) Install the accessory drive shaft and bearing into the transmission housing (fig. 7-30).

b. Turbine Gears, Freewheel Clutch

(1) If the transmission is equipped with a standard-speed, low-gear ratio, install the reverse-and-low-range sun gear, as shown in figure 7-30. If the transmission is equipped with a high-speed, low-gear ratio, install spacer 8 (A, foldout 5) into the sun gear cavity in the housing wall.

(2) Install the first-turbine drive gear and bearing (as assembled in paragraph 6-10) as a unit (fig. 7-31). Install the step-joint sealing into the groove in the drive gear hub. Use oil-soluble grease to retain the sealing in its groove. Install the rear thrust bearing race (flat) and the needle roller bearing onto the drive gear.

(3) Install the turbine-driven gears and freewheel clutch assembly (as assembled in para 6-9) as a unit (fig. 7-32). Rotate the assembly to engage the second-turbine driven gear splines with those of the reverse-and-low-range sun gear.

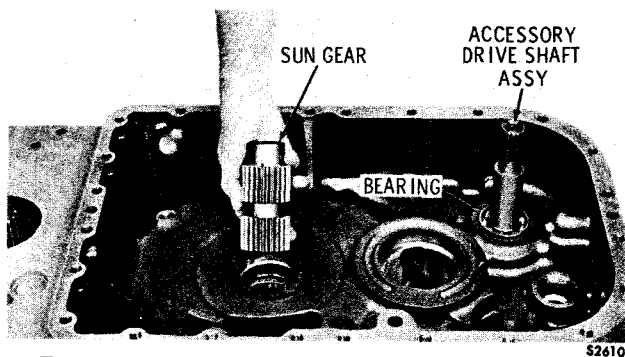


Fig. 7-30. Installing reverse-and-low-range sun gear

(4) Lubricate the compression sealing with transmission fluid (fig. 7-32). Install the 1-3/4-14 male nut and compression seal ring onto the pump end of the oil suction tube. Insert the suction end of the tube into the sump area, and the pump end into the threaded hole at the pump intake. Make sure the seal ring is squarely seated in the intake boss. Install the nut into the boss but do not tighten at this time.

(5) Install one 3/8-16 x 5/8-inch, self locking bolt to secure the suction tube to the housing but do not tighten at this time. Install the oil strainer and gasket (fig. 5-2). Secure the oil strainer with six 3/8-16 x 7/8-inch bolts 20 (B, foldout 4) and lockwashers 21. Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque. Install oil drain plug 17 and tighten it sufficiently to prevent leakage.

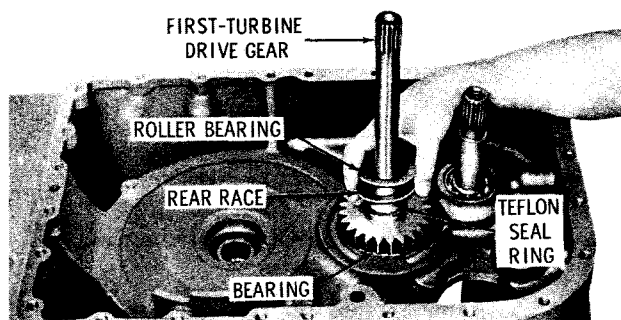


Fig. 7-31. Installing first-turbine drive gear components

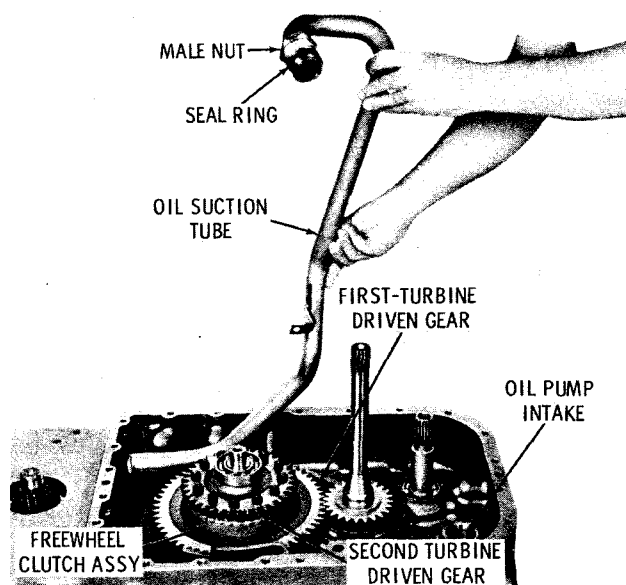


Fig. 7-32. Installing oil suction tube

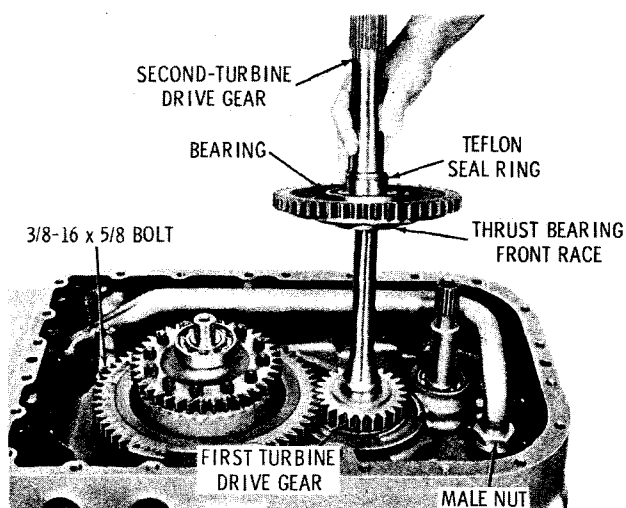


Fig. 7-33. Installing second-turbine drive gear

Tighten the self-locking bolt to the 36 to 43 pound feet (49 to 58 Nm) torque. Then, while holding the suction tube flush with the oil pump mounting surface, tighten the male nut to 120 to 150 pound feet (163 to 204 Nm) torque.

(6) If the ball bearing was removed from the second-turbine drive gear, install a new bearing (fig. 7-33). Install the step-joint sealring into its groove near the bearing. Install the front thrust bearing race, flange first, onto the bottom (rear) of the drive gear. Use oil-soluble grease to retain the bearing race on the drive gear. Install the second-turbine drive gear and assembled parts onto the first-turbine drive gear.

7-8. INSTALLATION OF CONVERTER HOUSING, CONVERTER COMPONENTS

a. Converter Housing

(1) If roller bearing 45 (B, foldout 3) is used with the accessory driven gear, install the outer race, lip toward the rear, into the main housing bore. It may be necessary to temporarily install the charging pump to maintain bearing race alignment. Install the gasket onto the converter housing splitline. Use oil-soluble grease to retain the gasket during installation of the housing (fig. 7-34). Attach a sling to the housing front flange and, while lowering the converter housing (as assembled in para 6-8) onto the transmission

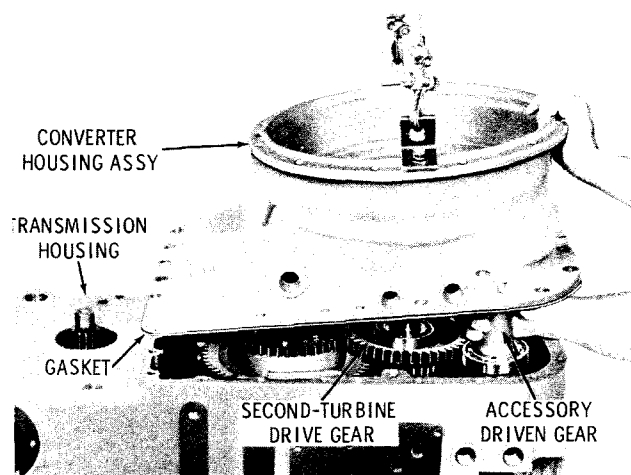


Fig. 7-34. Installing torque converter housing assembly

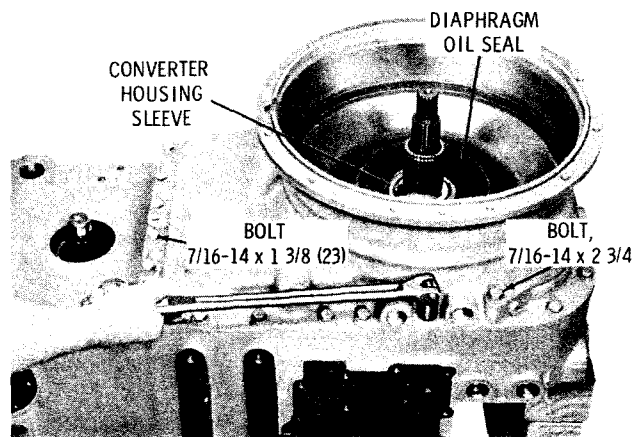


Fig. 7-35. Installing torque converter housing bolts

housing, guide the accessory driven gear past the second-turbine drive gear. Seat the converter housing and remove the sling.

(2) To attach the converter housing, install one 7/16-14 x 2 3/4-inch bolt, twenty-three 7/16-14 x 1 3/8-inch bolts, twenty-four 7/16-inch flatwashers, and twenty-four 7/16-inch lockwashers (fig. 7-35). Tighten the bolts to 42 to 50 pound feet (57 to 67 Nm) torque.

b. Converter Components

(1) Check to insure that the step-joint sealring (installed in para 6-8) is firmly seated in the converter housing sleeve, and that the diaphragm oil seal is packed with high-temperature grease (fig. 7-35).

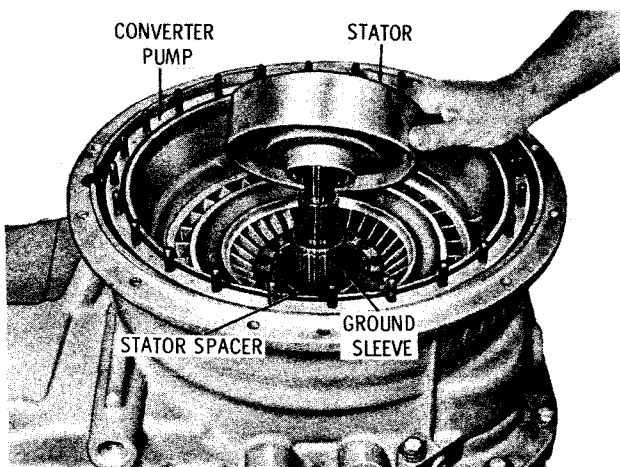


Fig. 7-36. Installing torque converter stator

S1498

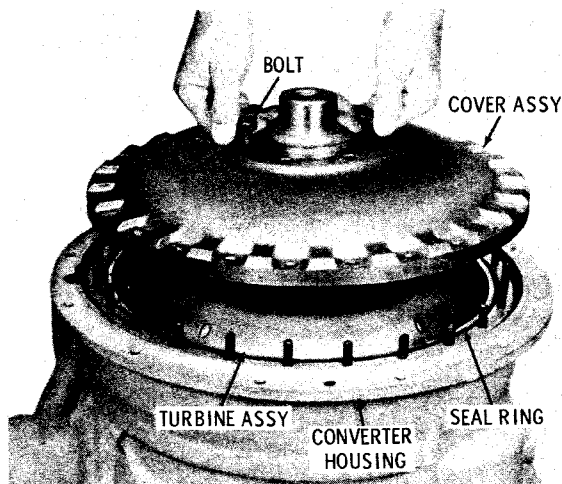


Fig. 7-38. Installing torque converter drive cover—direct mount

S1500

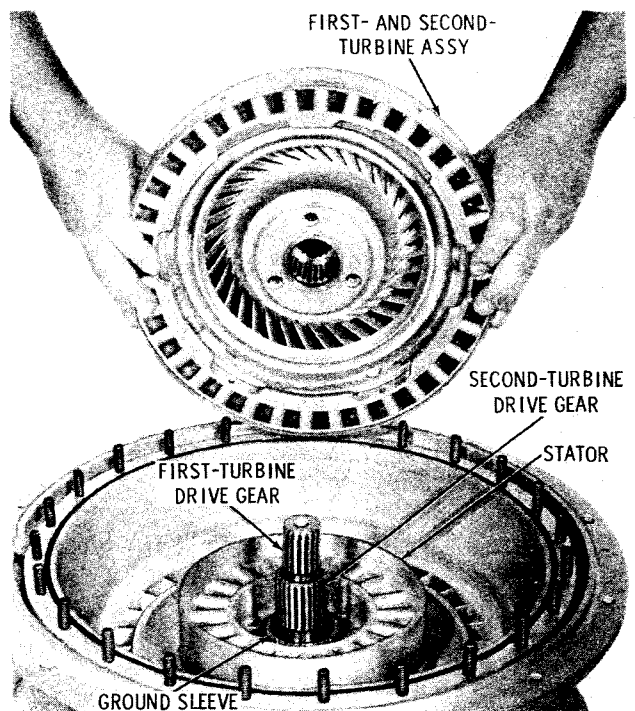


Fig. 7-37. Installing first-and-second-turbine assembly

S1499

(4) If the transmission is equipped with a dry converter housing, install the sealing into the groove in the converter pump split-line (fig. 7-38).

7-9. INSTALLATION OF INPUT COMPONENTS

a. Direct Mount (flex disk)

(1) Install the torque converter drive cover (fig. 7-38).

(2) Install twenty-four 5/16-24, self-locking nuts to retain the cover (fig. 7-39). Tighten the nuts to 14 to 18 pound feet (19 to 24 Nm) torque.

(3) Install the flex disk and washer assembly, washer side first, onto the hub of the converter cover (fig. 7-39). Assemble the three flex disks so that the cone of each will be parallel to the flex disk and washer assembly and install the three disks as a unit. Install the diskplate and align all the disk holes with the tapped holes in the converter drive cover. Install six 1/2-13 x 7/8-inch, self-locking bolts and tighten them to 81 to 97 pound feet (110 to 131 Nm) torque.

(4) If the transmission is equipped with a wet converter housing, gasket 17 (B, fold-out 2) must be used when the transmission is attached to the engine housing.

(2) Install the torque converter pump (as assembled in para 6-7) onto the converter ground sleeve (fig. 7-36). Install the splined, flat stator spacer and stator, hub projection first, onto the ground sleeve.

(3) Install the snapping onto the converter ground sleeve to retain the stator (fig. 7-37). Install the first- and second-turbine assembly (as assembled in para 6-6) onto the turbine drive gear shafts.

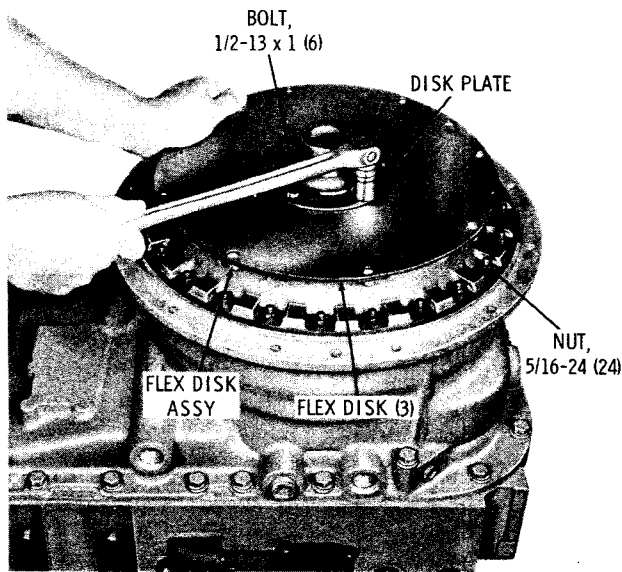


Fig. 7-39. Installing flex disk assembly (direct mount)

S2615

b. Direct Mount (drive ring)

(1) Install torque converter drive cover 16 (B, foldout 2). Install twenty-four 5/16-24, self-locking nuts 15 to retain torque converter cover 16. Tighten the nuts to 14 to 18 pound feet (19 to 24 Nm) torque.

(2) Lubricate sealring 14 with grease specified in note below, and install it into the groove behind the splines on converter drive cover 16.

(3) If converter drive ring 12 and bolts 13 were removed from the engine, replace them. Apply sealer (Permatex no. 3, or equivalent) to drive ring 12 and to drive ring mounting face on the engine flywheel or drive disk (also to gasket, if used). Install converter drive ring 12 and attach it with eight 3/8-16 x 1 1/4-inch, 12-point bolts 13. Tighten the bolts to 36 to 43 pound feet (49 to 58 Nm) torque. Pack the spaces between the internal teeth of drive ring 12 with a high quality molybdenum disulphide grease (Allison P/N 6769877 or equivalent). Fill the spaces between the teeth completely, but do not use an excessive amount of grease.

Note: The grease must not attack the Buna or Polyacrylate (seal material). Mobil-Grease Special with molybdenum disulphide, or equivalent, is recommended.

c. Remote Mount (A, foldout 2)

(1) Install torque converter drive cover 19 or 23 and attached part (as assembled in para 6-5) onto the converter pump. Install twenty-four 5/16-24, self-locking nuts 18 to retain the cover. Tighten the nuts to 14 to 18 pound feet (19 to 24 Nm) torque.

(2) Install gasket 13 onto the converter housing front splitline. Install transmission front cover 12 and oil seal 10 (as assembled in para 6-4) and secure it with twelve 3/8-24 x 2-inch bolts 11, lockwashers 20, and 3/8-24 nuts 21. Tighten the nuts to 33 to 40 pound feet (45 to 54 Nm) torque.

(3) Install coupling assembly 6 or input flange 7, 8, or 9 onto input shaft 17 or 22. Refer to paragraph 4-8b.

(4) The input flanges are retained with either two self-locking bolts (used with input shaft 22) or one self-locking nut and washer (used with input shaft 17). If input shaft 22 is used, retain the input flange with flange retaining washer 3, lockstrip 2, and two self-locking bolts 1. Tighten the bolts to 41 to 49 pound feet (56 to 66 Nm) torque, and bend the ears of the lockstrip against the bolt heads. If input shaft 17 is used, apply molybdenum disulfide grease (Molykote Type G, or equivalent) onto the shaft threads and install flange washer 5 and self-locking nut 4. Tighten the nut to 450 to 700 pound feet (610 to 949 Nm) torque while holding the flange or coupling to prevent it from rotating (fig. 7-45).

7-10. INSTALLATION OF EXTERIOR COMPONENTS

a. Oil Pump

(1) Install the oil pump assembly and oil pump gasket onto the pump mounting pad (fig. 7-40).

(2) Retain the pump with two 3/8-16 x 3-inch bolts, seven 3/8-16 x 2-inch bolts and nine lockwashers (fig. 5-32). Tighten the bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

Note: If the pump assembly has a 2-bolt, SAE C mounting pad, install six 3/8-16 x 2-inch bolts, three 3/8-16 x 3-inch bolts, and nine lockwashers. Tighten these bolts to 26 to 32 pound feet (35 to 43 Nm) torque.

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Para 7-10

b. Oil Pump Drive Coupling. If the transmission is equipped with adapter drive coupling 18 (A, foldout 9), replace the coupling. Apply molybdenum disulfide grease (Molykote Type G or equivalent) onto the coupling splines and the mating splines of the pump. Install the drive coupling into the pump and retain it temporarily with a strip of tape.

c. Control Valve Body

(1) Remove the temporarily installed bolt and washer from the valve body mounting pad (fig. 7-15). Install the valve body gasket and retain it with oil-soluble grease (fig. 7-41). Install the control valve body assembly.

(2) Install fifteen 3/8-16 x 2 1/2-inch bolts, one 3/8-16 x 1-inch bolt, and sixteen 3/8-inch lockwashers (fig. 5-5). Progressing from the center of the valve body outward, tighten the bolts evenly to 26 to 32 pound feet (35 to 43 Nm) torque.

d. Parking Brake, Output Flanges

(1) Install the brake back plate onto its mounting pad (fig. 7-42). On TTB models, install brake back plate 17 (B, foldout 8). Secure the back plate with four 1/2-13 x 7/8-inch, self-locking bolts. Tighten the bolts to 81 to 97 pound feet (110 to 131 Nm) torque.

(2) Install the spacer roller onto the back plate lever, and install the brake apply arm (fig. 7-43).

(3) Install two brake shoes and two springs (fig. 7-44). Install the two springs

into the brake shoe holes nearer the back plate. Install spacer 15 (B, foldout 8) if used, onto the output shaft, and install the rear output flange. Install shaft sealring 19 making sure that it is well seated in the cavity between the shaft and flange. (Sealring not used in earlier models.) (Refer to para 4-8b for flange installation procedure.)

Note: For transmissions equipped with output flanges similar to 14 or 16 (B, foldout 8), install the flange into brake drum 7 and retain it with four 3/8-24 x 5/8-inch, self-locking bolts 13. Tighten the bolts to 41 to 49 pound feet (56 to 66 Nm) torque and install the assembly onto the output shaft.

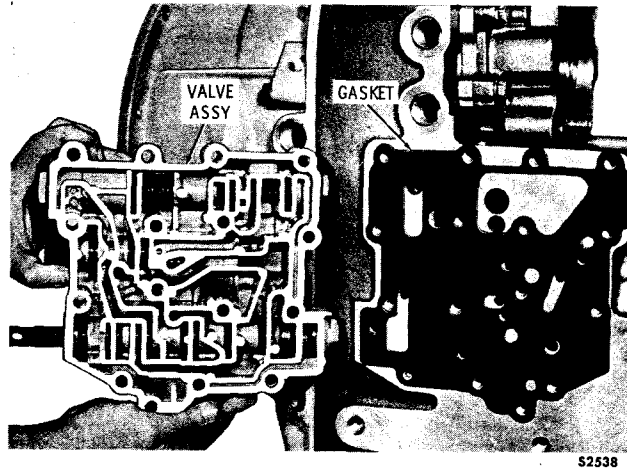


Fig. 7-41. Installing control valve body assembly

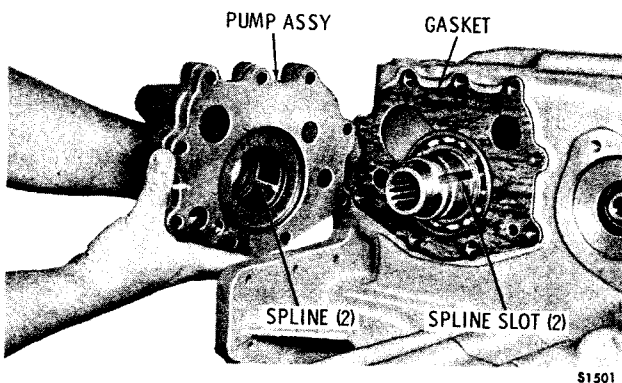


Fig. 7-40. Installing oil pump assembly

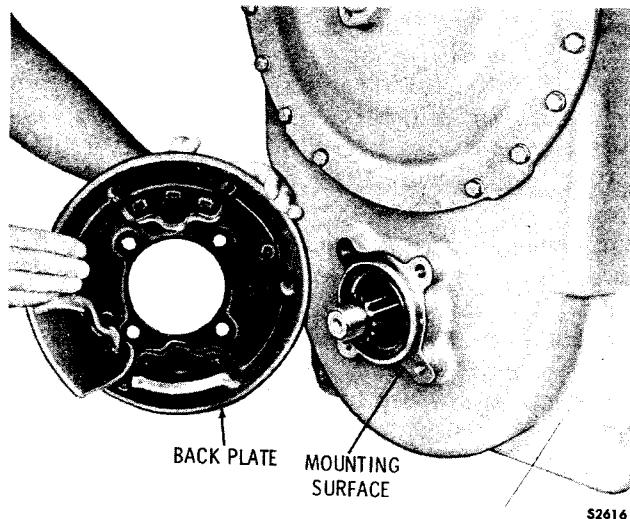


Fig. 7-42. Installing parking brake back plate

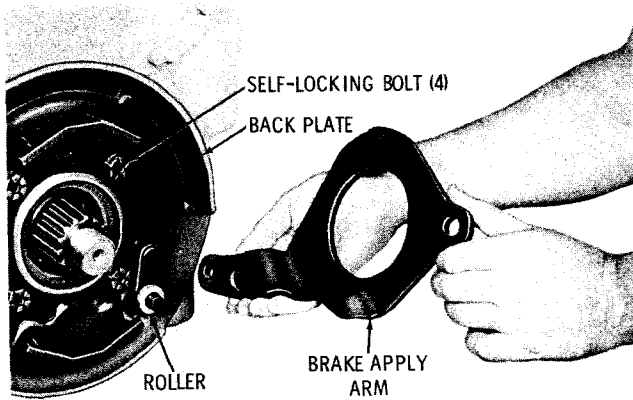


Fig. 7-43. Installing brake apply arm

S2617

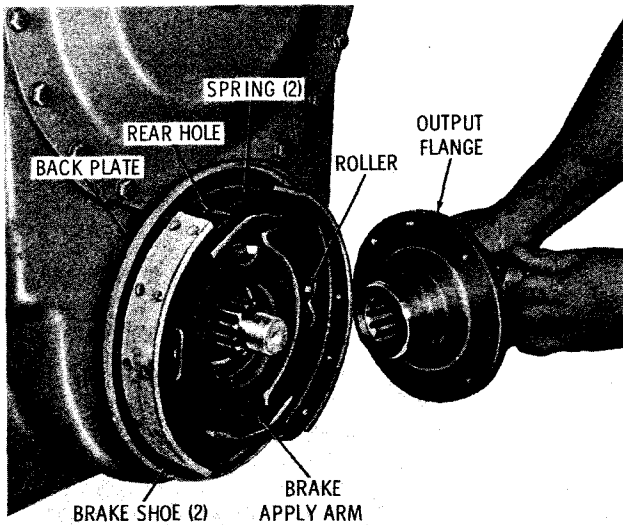


Fig. 7-44. Installing rear output flange

S2618

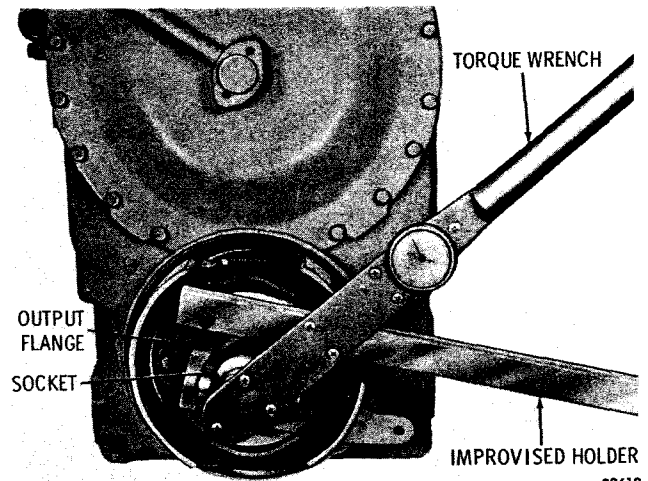


Fig. 7-45. Tightening rear output flange nut

S2619

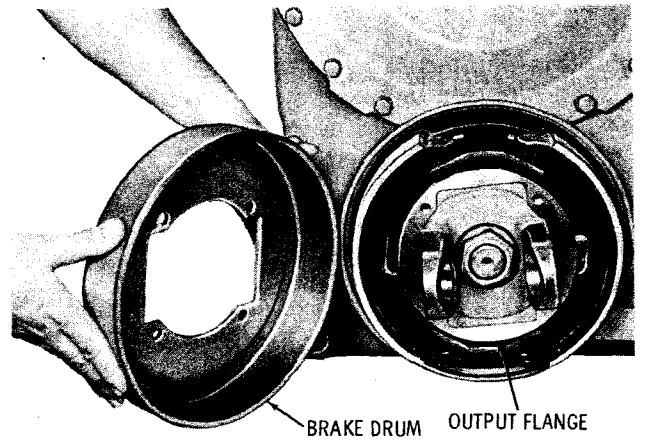


Fig. 7-46. Installing parking brake drum

S2620

(4) Apply molybdenum disulfide grease (Molykote Type G, or equivalent) onto the threads of 1 1/4-12 flange retaining nut 10 (B, foldout 8) and install washer 9 and nut 10 onto the output shaft. Attach an improvised holder to the flange ears as shown in figure 7-45, and tighten the nut to 450 to 700 pound feet (610 to 949 Nm) torque.

(5) Install the brake drum onto the output flange (fig. 7-46), then rotate the drum 90° (refer also to fig. 5-3). Attach the brake drum with four 3/8-24 x 5/8-inch, self-locking bolts. Tighten the bolts to 41 to 49 pound feet (56 to 66 Nm) torque.

(6) Install spacer 4 (A, foldout 8) if used, onto the output shaft, and install the

front output flange (fig. 7-47). Install shaft sealing 30 (A, foldout 8) making sure that it is well seated in the cavity between the shaft and flange. (Sealring is not used in earlier models.) Apply molybdenum disulfide grease (Molykote Type G, or equivalent) onto the threads of 1 1/4-12 flange retaining nut 1 and install washer 2 and nut 1 onto the output shaft.

(7) Using an improvised holder and torque wrench in a manner similar to that shown in figure 7-45, tighten the nut to 450 to 700 pound feet (610 to 949 Nm) torque.

(8) Using an improvised holder and torque wrench (1 1/4-inch socket) in a manner similar to that shown in figure 7-45, tighten PTO flange retaining nut 29 (B, foldout 6) to 275 to 325 pound feet (373-440 Nm) torque.

SERIES TT, TTB 2001-POWERSHIFT TRANSMISSIONS

Para 7-11

7-11. ASSEMBLY TECHNIQUES FOR VEHICLE-MOUNTED TRANSMISSION

a. Similar Procedures. Components are installed into the transmission in the vehicle by methods similar to those used when the transmission is removed. The methods and sequence outlined in the manual are a general guide but may require some variation because of positioning and space limitations.

b. Clutch Installation

(1) Special care is required to install clutch assemblies into a transmission mounted in the vehicle. Make sure that all clutch plates are properly engaged with their mating components, and that all clutch springs are properly positioned.

(2) The reverse-range clutch requires that the clutch components be installed as an assembled unit. The assembly of the reverse-range clutch components described in paragraph 7-4a(2) through (4) results in a clutch and planetary unit similar to that shown in figure 7-48.

(3) Using two wires or cords, tie the clutch plates to the clutch anchor assembly by passing the wires or cords over opposite tangs of the clutch plates, around the inner side of the anchor pins, and through the adjacent holes in the anchor (fig. 7-48). Secure the wire or cord ends at the under (rear) side of the clutch anchor.

(4) Install the entire assembly, clutch plates first, into the rear of the transmission, engaging the anchor pin slot with the anchor in the transmission housing. Remove the wires or cords and continue with the assembly procedures as applicable.

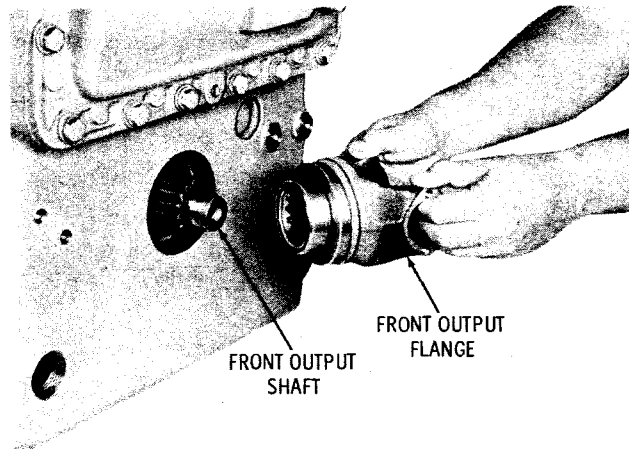


Fig. 7-47. Installing front output flange

S2621

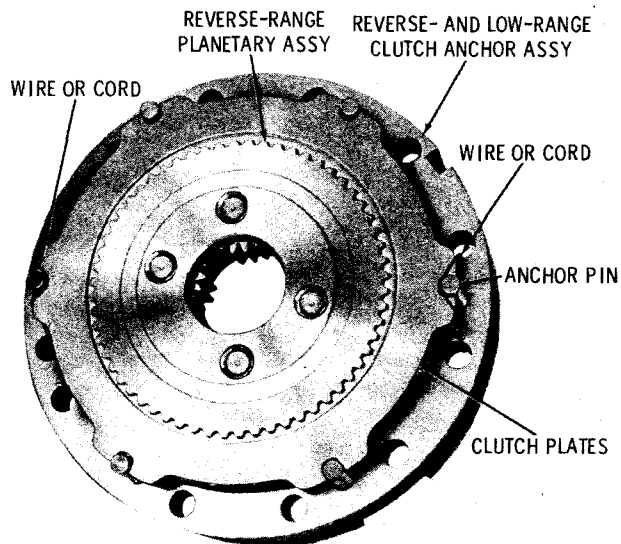


Fig. 7-48. Reverse-range clutch plates and planetary wired in position on reverse-and-low-range clutch anchor

S1504

Section 8. WEAR LIMITS AND SPRING DATA

8-1. WEAR LIMITS DATA

a. Maximum Variations. The wear limits information in this section shows the maximum wear at which components are expected to function satisfactorily.

b. Cleaning, Inspection. Parts must be clean to permit effective inspection for wear or damage. Refer to paragraph 4-6, above.

c. Bearings, Bearing Journals, Bores. The application of bearings to any product is based on the recommendations of the bearing manufacturer and, therefore, no diametral dimensional deviation should be permitted in the bearing or mated parts. Bearings should be carefully checked for signs of distress before reinstalling in the transmission.

d. Gears. Gears should be inspected for load pattern and signs of distress. Any distress indicates a possible future failure, and the reuse of such gears should be the decision of the individual customer, based on experience. Backlash cannot be used to establish critical wear of a gear. The backlash tolerances are of such nature that a gear usually pits, scuffs, scores, or galls long before the gear wear becomes critical.

e. Splines. Unless severe, spline wear is not considered detrimental except where it affects tightness of an assembly such as drive-line flanges. Here, again, backlash cannot be used to establish critical wear because both mating parts must be concentrically located to obtain accurate measurement of backlash.

f. Hook-type Sealrings. Sides of the sealring should be smooth (maximum wear 0.005 inch [0.12 mm]). The sides of the groove into which the sealrings fit should be smooth (50 microinch [1.25 μ m]) equivalent, and square with the axis of rotation within 0.002 inch (0.05 mm). A new sealring should be installed if grooves are reworked, or sealring outside diameter wear causes the possibility of a closed gap between sealring hooks when the ring is installed.

8-2. WEAR LIMITS CHART

The chart which follows lists the wear limits data and is referenced to the exploded views (foldouts 3 through 9) in the back of the manual. The millimeter equivalent is shown parenthetically after the inch value.

8-3. SPRING DATA

Springs must be clean to permit effective inspection. Springs should be replaced if there are signs of overheating, wear due to rubbing adjacent parts, or permanent set. Discard springs which do not meet the load-height specifications in the spring chart.

8-4. SPRING CHART

Inspection criteria (load versus height) and identification characteristics of the springs are presented in the chart following the wear limits chart. The spring chart data are keyed to the exploded views (foldouts 3 through 9) in the back of the manual.

SERIES TT, TTB 2001 POWERSHIFT TRANSMISSIONS

WEAR LIMIT CHARTS

Illustration	Description	Part Number	Wear Limit in.	Wear Limit (mm)
B, foldout 3	TORQUE CONVERTER HOUSING AND TURBINE DRIVE GEARS			
25	Thrust bearing race thickness	8619652	0.028	(0.71)
27	Thrust bearing race thickness	8619650	0.120	(3.04)
A, foldout 4	TURBINE DRIVEN GEARS AND FREEWHEEL CLUTCH			
9	*Freewheel roller diameter	7451288	0.4980	(12.65)
10	*Freewheel cam surface wear	6838275	0.005	(0.12)
		6834629	0.005	(0.12)
15	*First-turbine driven gear hub outside diameter	6774671	3.0327	(77.02)
A, foldout 5	REVERSE-RANGE CLUTCH AND PLANETARY			
6, 17	Clutch plate thickness	6837690	0.097	(2.46)
	Cone		0.030	(0.76)
7, 18	Clutch plate thickness	6830221	0.130	(3.30)
	Cone		0.012	(0.30)
	**Minimum clutch pack thickness		1.185	(30.09)
11	Pinion end play in carrier 15	6769716	0.055	(1.39)
20	Clutch anchor face wear	6773498		
	reverse-range face		0.020	(0.50)
	low-range face		0.020	(0.50)
B, foldout 5	LOW-RANGE CLUTCH AND PLANETARY			
2	Thrust washer thickness	6776578	0.125	(3.17)
8	Pinion end play in carrier 4	6769715	0.055	(1.39)
15	Pinion end play in carrier 11	6769716	0.055	(1.39)
18, 21	Clutch plate thickness	6830221	0.130	(3.30)
	Cone		0.012	(0.30)
19, 22	Clutch plate thickness	6837690	0.097	(2.46)
	Cone		0.030	(0.76)
	**Minimum clutch pack thickness			
	6-plate pack		0.681	(17.29)
	8-plate pack		0.908	(23.06)

*Total wear of freewheel parts (2 x roller wear + sum of cam surface wear at two opposing points + gear hub wear) must not exceed 0.010 inch (0.25 mm). (Determine cam surface wear by measuring depth of groove caused by roller contact in the cam pocket.)

**Total of individual plate thicknesses. Replace plates having the most wear with new plates to increase pack thickness.

WEAR LIMITS AND SPRING DATA

WEAR LIMITS CHART (cont'd)

Illustration	Description	Part Number	Wear Limit in. (mm)	
A, foldout 6 HIGH-RANGE CLUTCH AND PISTON HOUSING—TT MODEL				
3	Transfer gear clutch face wear	6836335	0.020	(0.50)
		6836457	0.020	(0.50)
8, 13	Clutch plate thickness	6777592	0.130	(3.30)
	Cone		0.012	(0.30)
9	Clutch plate thickness	6837690	0.097	(2.46)
	Cone		0.030	(0.76)
	**Minimum clutch pack thickness		0.357	(9.06)
12	Diametral Clearance between: high-range clutch hub	6777591, 6839156		
	bushing in piston housing 24	6757034	0.005	(0.12)
18	Sealring thickness	6754823	0.0880	(2.23)
19	Piston face wear	6773476	0.020	(0.50)
		6830730	0.020	(0.50)
27, 29	Sealring thickness	6770432	0.0875	(2.22)
A, foldout 7 HIGH-RANGE CLUTCH AND PISTON HOUSING—TTB MODEL				
3	Transfer gear clutch face wear	6836335	0.020	(0.50)
		6836457	0.020	(0.50)
8, 13	Clutch plate thickness	6777592	0.130	(3.30)
	Cone		0.012	(0.30)
9	Clutch plate thickness	6837690	0.097	(2.46)
	Cone		0.030	(0.76)
	**Minimum clutch pack thickness		0.357	(9.06)
18	Sealring thickness	6754823	0.0880	(2.23)
19	Piston face wear	6773476	0.020	(0.50)
12	Diametral Clearance between: high-range clutch hub and	6777591		
34	bushing in piston housing 35	6757034	0.005	(0.12)
B, foldout 7 INTERNAL BRAKE AND REAR COVER —TTB Model				
14	Brake plate thickness	6837690	0.097	(2.46)
	Cone		0.030	(0.76)
15	Brake plate thickness	6830368	0.130	(3.30)
	Cone		0.012	(0.30)
	**Minimum brake pack thickness		1.232	(31.29)
38	Brake cylinder bores	6831925	1.6290	(41.37)
A, foldout 8 OUTPUT SHAFTS AND DISCONNECT ASSEMBLY				
10	Diametral clearance between: front output shaft and	6773471, 6880098		
22	bushing in output shaft 23	6756835	0.010	(0.25)

**Total of individual plate thicknesses. Replace plates having the most wear with new plates to increase pack thickness.

SERIES TT, TTB 2001 POWERSHIFT TRANSMISSIONS

WEAR LIMITS CHART (cont'd)

Illustration	Description	Part Number	Wear Limit in.	Wear Limit (mm)
A, foldout 9	OIL PUMP ASSEMBLIES			
3	Cover (no scoring or wear permissible)	6777354		
3	Cover (no scoring permissible)	6881690		
12	Driven gear shaft OD	6776428	0.749	(19.02)
B, foldout 9	CONTROL VALVE ASSEMBLIES			
8	Valve clearance in body 9	6831187	0.004	(0.10)
		6776971	0.004	(0.10)
16	Plug clearance in body 9	6835502	0.0035	(0.09)
20	Valve clearance in body 9	6774262	0.004	(0.10)
21	Valve plug clearance in plug 25	6771914	0.004	(0.10)
27	Valve clearance in body 9	6831188	0.003	(0.07)
		6774693	0.003	(0.07)
37	Valve clearance in body 9	6774599	0.003	(0.07)
40	Valve clearance in body 9	6838472	0.003	(0.07)
		6774598	0.003	(0.07)
45	Valve plug clearance in plug 46	6758305	0.004	(0.10)
48	Valve clearance in body 9	6839891	0.003	(0.07)

SPRING CHART

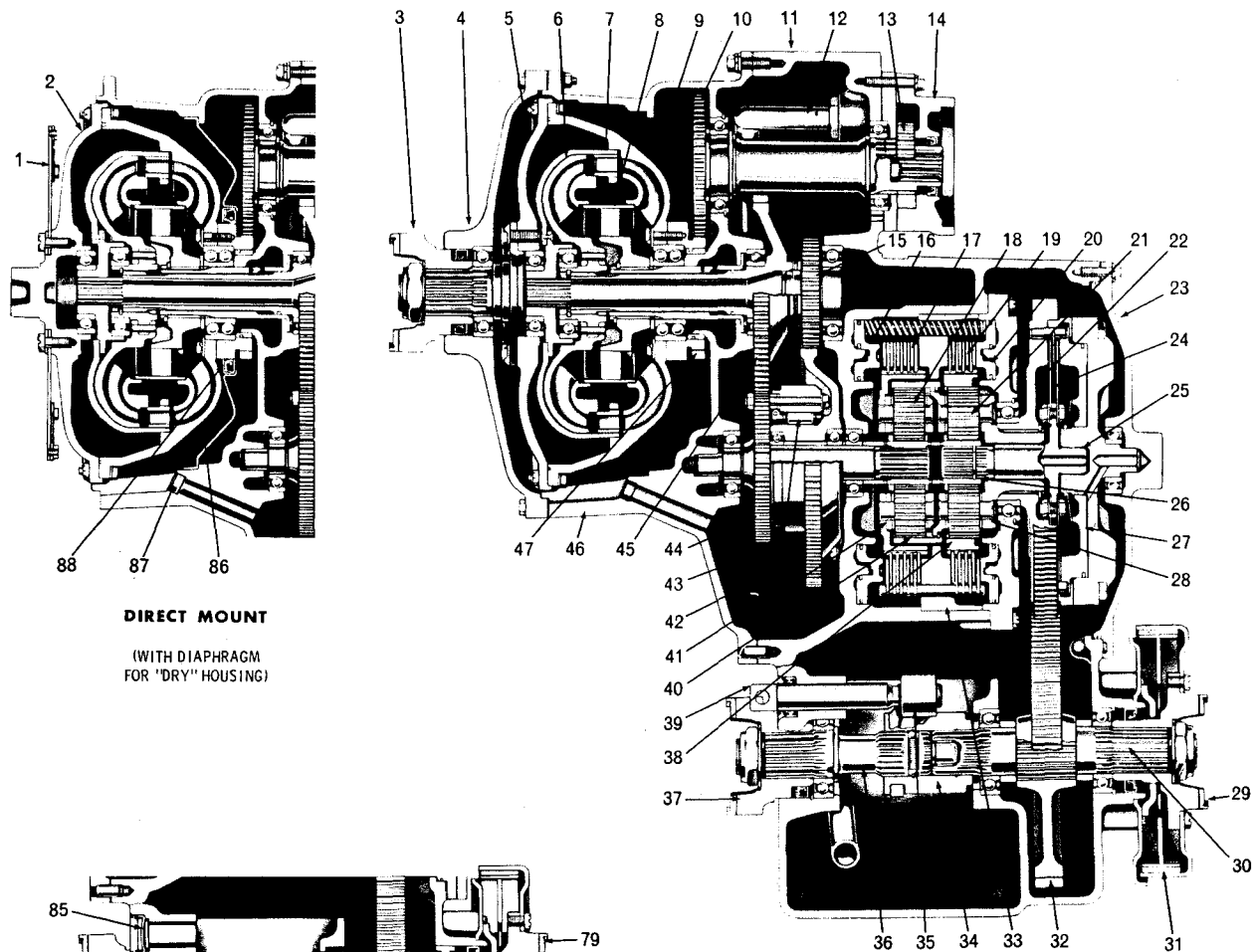
Fold-out	Ref	Spring	Part No.	No. coils	Diameter of wire		Outside diameter		Free length		Length under load			
					in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	lb	(N)
3B	19	Lubrication pressure regulator valve	6773689	13.5	0.047	(1.19)	0.403	(10.23)	1.44	(36.57)	1.00	(25.4)	5.58 to 6.82	(24.8-30.3)
3B	22	Converter pressure regulator valve	6773551	10	0.080	(2.03)	0.468	(11.88)	1.206	(30.63)	1.00	(25.4)	23.4 to 28.6	(104.1-127.2)
4A	7	Freewheel clutch	6835343	27	0.033	(0.83)	0.185	(4.69)	1.58	(40.13)	1.14	(28.95)	6.05 to 7.25	(26.91-32.2)
5A	22	Reverse-, low-range clutch piston return*	6775437	37.5	0.105	(2.66)	0.625	(15.87)	6.127	(155.62)	4.80	(121.92)	45.1 to 49.9	(200.6-222)
6A	17	High-range clutch piston return	6756134	—Belleville spring			5.14	(130.55)	0.275	(6.98)	—	—	—	—
7A	17	High-range clutch piston return	6756134	—Belleville spring			5.14	(130.55)	0.275	(6.98)	—	—	—	—
7B	11	Service brake return—TTB	6831441	20	0.080	(2.03)	0.621	(15.77)	3.865	(98.17)	2.94	(74.67)	16.7 to 20.3	(74.3-90.3)
7B	11	Service brake return	6765710	18.5	0.080	(2.03)	0.625	(15.87)	3.04	(76.30)	2.08	(52.83)	18.9 to 23.1	(84.1-102.7)
8A	12	Disconnect detent	6773464	14	0.062	(1.57)	0.353	(8.96)	1.32	(33.52)	1.15	(29.21)	11.88 to 14.52	(52.8-64.6)
9B	14	Main-pressure regulator valve: 135-170 psi (930-1172 kPa)**	6835377	17	0.118	(2.99)	0.754	(19.15)	3.61	(91.69)	2.50	(63.50)	80 to 90	(355.8-400.3)
		160-195 psi (1103-1344 kPa)	6835705	16	0.1250	(3.175)	0.787	(19.98)	3.60	(91.44)	2.50	(63.50)	96 to 106	(427-471.5)
9B	15	Trimmer	6830365	8	0.128	(3.25)	1.110	(28.19)	2.58	(65.53)	1.43	(36.32)	72.20 to 82.20	(321.2-365.6)
9B	19	Clutch cutoff valve (130 psi)	6765710	18.5	0.080	(2.03)	0.625	(15.87)	3.04	(76.30)	2.08	(52.83)	18.9 to 23.1	(84.1-102.7)
9B	19	Clutch cutoff valve (250 psi)	6758503	20	0.091	(2.31)	0.625	(15.87)	3.20	(81.28)	2.38	(60.45)	27.9 to 34.1	(124.1-151.7)
9B	19	Clutch cutoff valve (400 psi)	6830366	14.5	0.112	(2.84)	0.625	(15.87)	2.72	(69.08)	2.04	(51.81)	74.8 to 82.8	(332.7-368.3)
9B	31	Selector valve detent	6770253	11	0.054	(1.37)	0.480	(12.19)	1.24	(31.49)	0.78	(19.81)	7.84 to 8.16	(34.9-36.3)
9B	31	Selector valve detent	6833934	10	0.054	(1.37)	0.490	(12.45)	1.47	(37.30)	0.80	(20.30)	11.90 to 13.10	(53-58)
9B	36	Inching regulator front	6770298	14.6	0.041	(1.04)	0.384	(9.75)	1.28	(32.51)	0.78	(19.81)	3.93 to 4.07	(17.5-18.1)
9B	39	Inching regulator rear	6774595	21.5	0.072	(1.82)	0.585	(14.85)	3.80	(96.52)	2.00	(50.80)	25.2 to 27.8	(112.1-123.7)
9B	39	Inching regulator rear	6838473	26.4	0.089	(2.26)	0.618	(15.69)	4.29	(108.96)	2.50	(63.50)	41.85 to 51.15	(186.2-227.5)
9B	41	Inching valve return	6774594	17	0.120	(3.04)	1.105	(28.06)	5.75	(146.05)	4.04	(102.61)	28.5 to 31.5	(126.8-140.1)

*Color coded green

**Color coded blue

WEAR LIMITS AND SPRING DATA

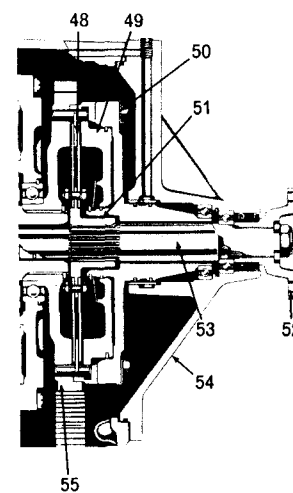
- | | |
|---|---------------------------------------|
| 1 - Flex disk drive assembly | 43 - Freewheel clutch |
| 2 - Torque converter cover | 44 - Second-turbine driven gear |
| 3 - Input flange | 45 - Second-turbine drive gear |
| 4 - Transmission front cover | 46 - Torque converter housing |
| 5 - Torque converter drive cover | 47 - Accessory drive gear |
| 6 - Second turbine | 48 - High-range clutch |
| 7 - First turbine | 49 - High-range clutch piston |
| 8 - Torque converter stator | 50 - High-range clutch piston housing |
| 9 - Torque converter pump | 51 - High-range clutch hub |
| 10 - Accessory driven gear | 52 - PTO output flange |
| 11 - Transmission housing | 53 - PTO shaft |
| 12 - Oil suction tube | 54 - Rear cover |
| 13 - Oil Pump | 55 - Transfer drive gear |
| 14 - Accessory pump mounting pad | 56 - Transfer drive gear |
| 15 - First-turbine drive gear | 57 - High-range clutch |
| 16 - Reverse-range clutch piston | 58 - High-range clutch piston |
| 17 - Reverse-range clutch | 59 - Rear cover |
| 18 - Reverse-range planetary pinion | 60 - Internal brake |
| 19 - Low-range clutch | 61 - Brake apply plate |
| 20 - Low-range piston | 62 - Brake piston |
| 21 - Low-range planetary pinion | 63 - Rear cover plug |
| 22 - Transfer drive gear | 64 - Diaphragm |
| 23 - Transmission rear cover | 65 - High-range piston housing |
| 24 - High-range clutch | 66 - High-range clutch hub |
| 25 - High-range clutch hub | 67 - Transfer drive gear |
| 26 - Reverse-and-low-range sun gear | 68 - High-range clutch |
| 27 - High-range piston | 69 - High-range clutch piston |
| 28 - Low-range planetary carrier assembly | 70 - Diaphragm |
| 29 - Rear output flange | 71 - Rear cover |
| 30 - Rear output shaft | 72 - Internal brake |
| 31 - Parking brake | 73 - Brake apply plate |
| 32 - Transfer driven gear | 74 - Brake piston |
| 33 - Reverse-and-low-range clutch anchor | 75 - High-range clutch hub |
| 34 - Disconnect coupling | 76 - High-range piston housing |
| 35 - Disconnect shifter fork | 77 - PTO output flange |
| 36 - Front output shaft | 78 - PTO shaft |
| 37 - Front output flange | 79 - Rear output flange |
| 38 - Low-range ring gear | 80 - Output shaft |
| 39 - Disconnect shifter shaft | 81 - Parking brake |
| 40 - Reverse-range ring gear | 82 - Transfer driven gear |
| 41 - Reverse-range planetary carrier assembly | 83 - Oil suction tube |
| 42 - First-turbine driven gear | 84 - Front output flange |
| | 85 - Shifter shaft hole plug |
| | 86 - Converter diaphragm |
| | 87 - Plug |
| | 88 - Oil seal |



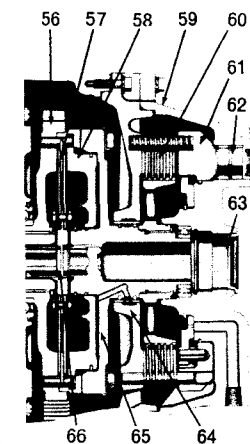
DIRECT MOUNT

(WITH DIAPHRAGM
FOR "DRY" HOUSING)

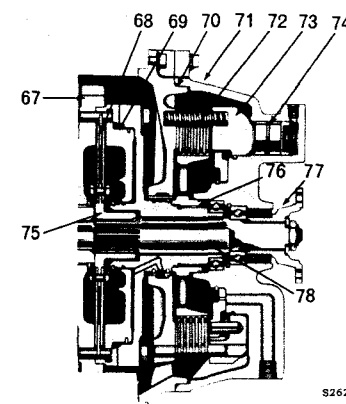
ONE-PIECE OUTPUT SHAFT



TT WITH PTO



TTB WITHOUT PTO



TTB WITH PTO

S2622

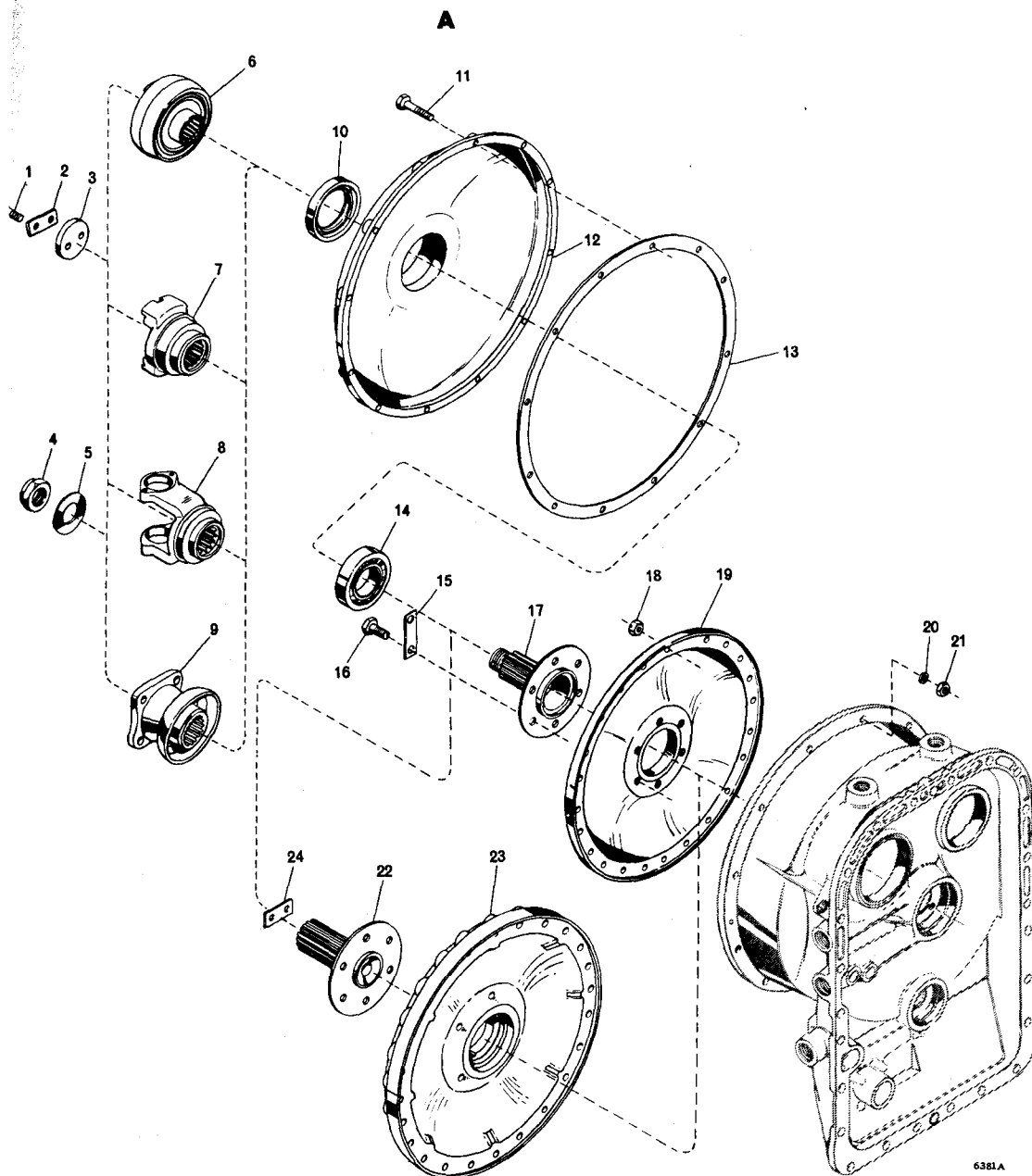
Foldout 1. TT 2001 and TTB 2001 transmissions—cross section view

A

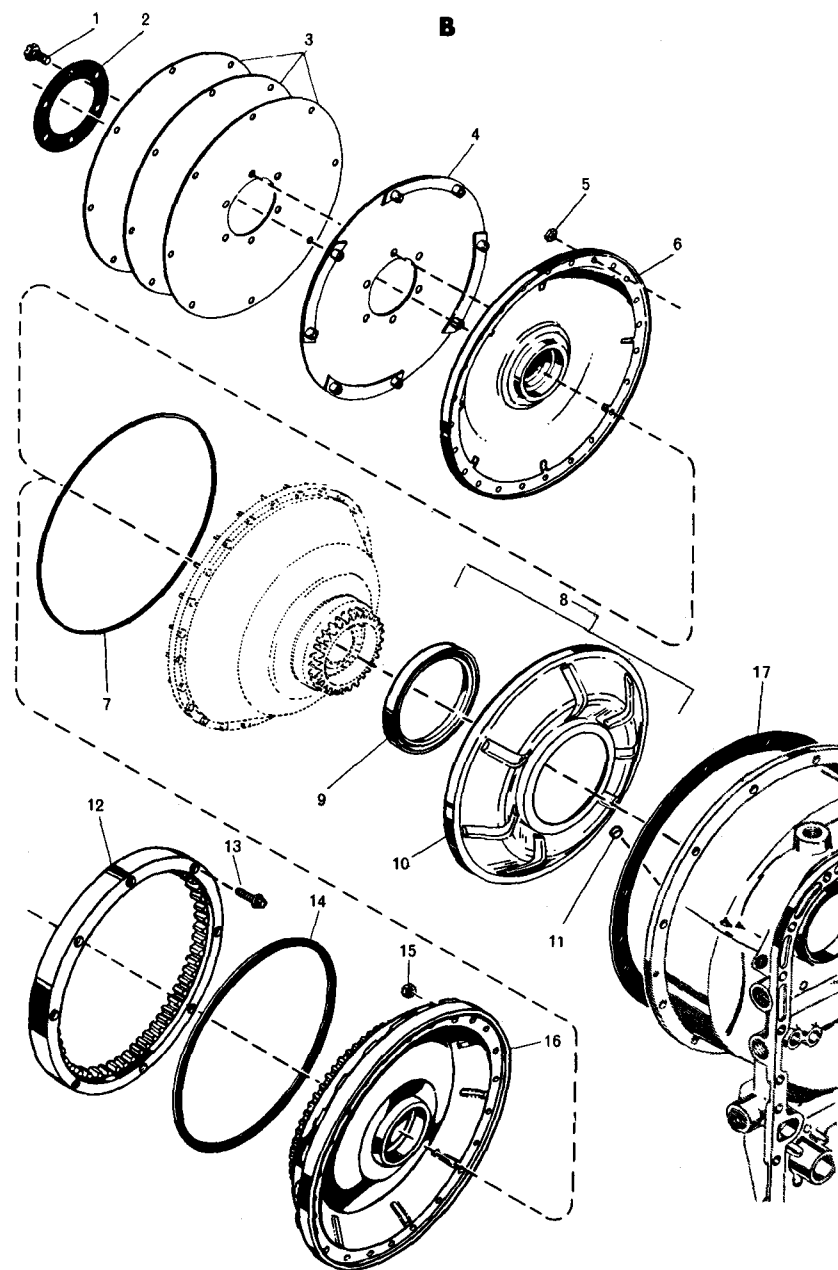
- 1 - Self-locking bolt, 3/8-24 x 1 1/8 (2)
- 2 - Lockstrip
- 3 - Flange retaining washer
- 4 - Flange retaining nut, 1 1/4-12
(nylon insert)
- 5 - Flange washer
- 6 - Torqmatic coupling assembly
- 7 - Flange (Mechanics 5C)
- 8 - Flange (Type 5N)
- 9 - Flange (S1500)
- 10 - Oil seal
- 11 - Bolt, 3/8-24 x 2 (12)
- 12 - Transmission front cover
- 13 - Front cover gasket
- 14 - Ball bearing
- 15 - Lockstrip (3)
- 16 - Bolt, 1/2-13 x 1 1/8 (6)
- 17 - Input shaft
- 18 - Self-locking nut, 5/16-24 (24)
- 19 - Torque converter drive cover
- 20 - Lockwasher, 3/8 (12)
- 21 - Nut, 3/8-24 (12)
- 22 - Input shaft
- 23 - Torque converter drive cover
- 24 - Shim (as required)
 - 0.025-in. (0.63-mm) thick
 - 0.005-in. (0.13-mm) thick

B

- 1 - Self-locking bolt, 1/2-13 x 7/8 (6)
- 2 - Flex disk plate
- 3 - Flex disk (3)
- 4 - Flex disk and washer assembly
- 5 - Nut, 5/16-24 (24)
- 6 - Torque converter drive cover
- 7 - Sealring
- 8 - Converter diaphragm assembly
- 9 - Oil seal
- 10 - Converter diaphragm
- 11 - Plug
- 12 - Converter drive ring
- 13 - Twelve-point bolt, 3/8-16 x 1 1/4 (8)
- 14 - Sealring
- 15 - Nut, 5/16-24 (24)
- 16 - Torque converter drive cover
- 17 - Gasket



A, foldout 2. Transmission front cover and input components, remote mount—exploded view



B, foldout 2. Transmission input components, direct mount—exploded view

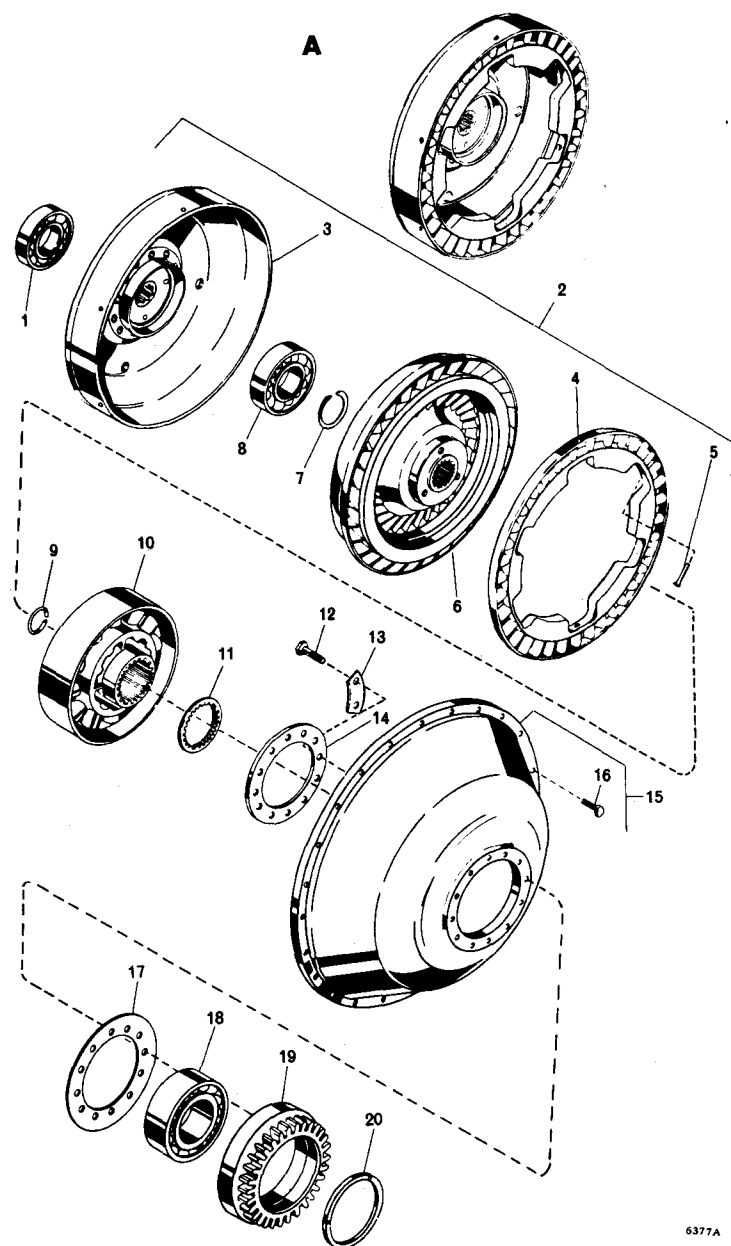
A

- 1 - Ball bearing
- 2 - First turbine and support assembly
- 3 - First-turbine support
- 4 - First turbine
- 5 - First-turbine retaining pin
 - Model 2221-1 (6)
 - Model 2421-1 (9)
- 6 - Second turbine
- 7 - Internal snapping
- 8 - Ball bearing
- 9 - External snapping
- 10 - Torque converter stator
- 11 - Spacer
- 12 - Bolt, 1/4-28 x 1 1/4 (12)
- 13 - Lockstrip (6)
- 14 - Torque converter pump retainer
- 15 - Torque converter pump assembly
- 16 - Special bolt, 5/16-24 x 1.30 (24)
- 17 - Torque converter pump gasket*
- 18 - Double-row ball bearing
- 19 - Input accessory drive gear
- 20 - Step-joint sealring

*Not used with "wet" housing

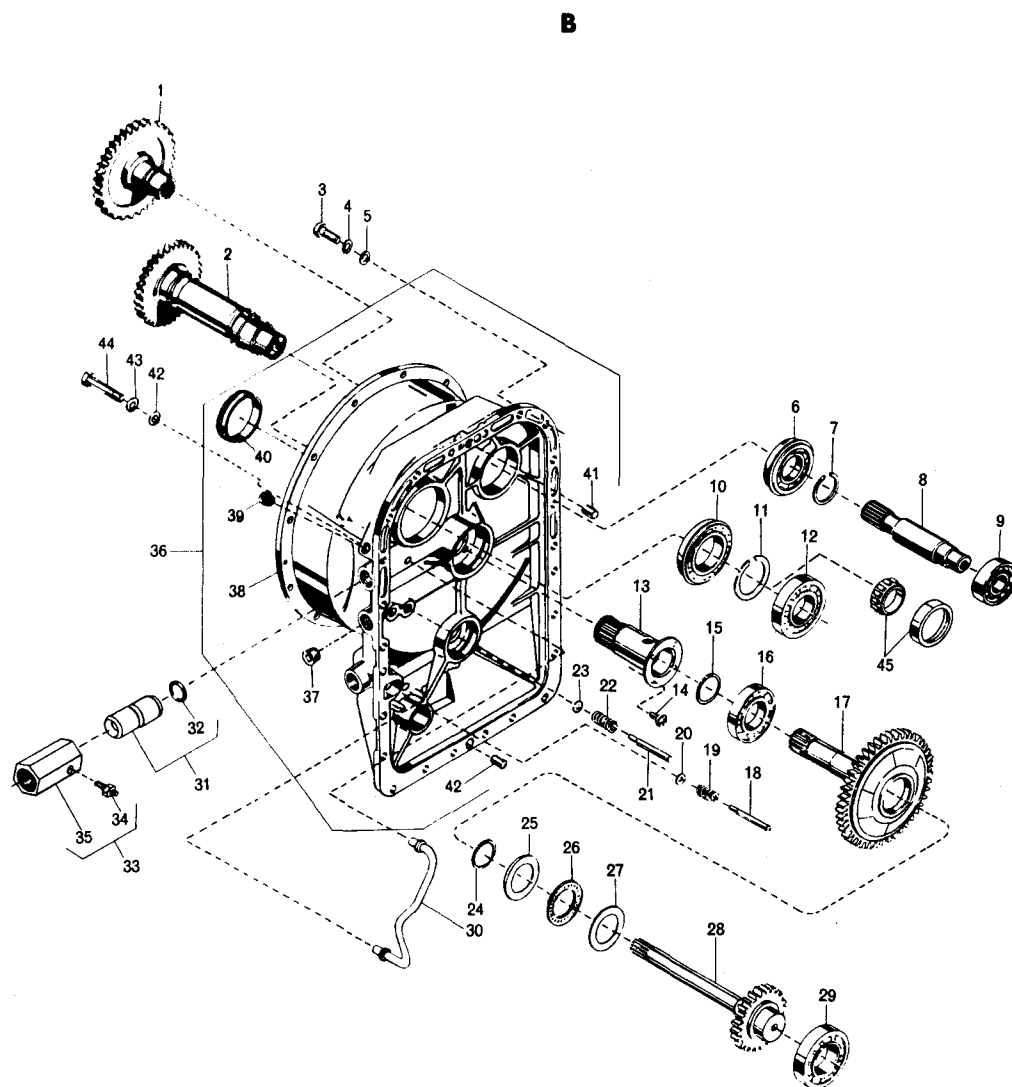
B

- 1 - Accessory drive gear
- 2 - Accessory driven gear
- 3 - Bolt, 7/16-14 x 1 3/8 (23)
- 4 - Lockwasher (23)
- 5 - Flat washer (23)
- 6 - Ball bearing
- 7 - External snapping
- 8 - Accessory drive shaft
- 9 - Ball bearing
- 10 - Ball bearing
- 11 - External snapping
- 12 - Ball bearing (standard duty)
- 13 - Converter ground sleeve
- 14 - Self-locking bolt, 5/16-18 x 3/4 (4)
- 15 - Step-joint sealring
- 16 - Ball bearing
- 17 - Second-turbine drive gear
- 18 - Lubrication regulator valve guide pin
- 19 - Lubrication regulator valve spring
- 20 - Lubrication regulator valve
- 21 - Converter pressure regulator valve guide pin
- 22 - Converter pressure regulator valve spring
- 23 - Converter pressure regulator valve
- 24 - Step-joint sealring
- 25 - Thrust race
- 26 - Thrust roller bearing
- 27 - Thrust race
- 28 - First-turbine drive gear
- 29 - Ball bearing
- 30 - Lubrication bypass tube
- 31 - Thermostat assembly
- 32 - Sealring
- 33 - External thermostat kit (includes thermostat assembly 31)
- 34 - Connector
- 35 - Adapter
- 36 - Converter housing assembly
- 37 - Pipe plug, 3/4 NPTF
- 38 - Converter housing
- 39 - Plug, 1/2-14 PTF
- 40 - Converter housing sleeve
- 41 - Dowel pin (2)
- 42 - Flat washer, 7/16
- 43 - Lockwasher, 7/16
- 44 - Bolt, 7/16-14 x 2 3/4
- 45 - Roller bearing (heavy duty)



6377A

A, foldout 3. Torque converter—exploded view



637811

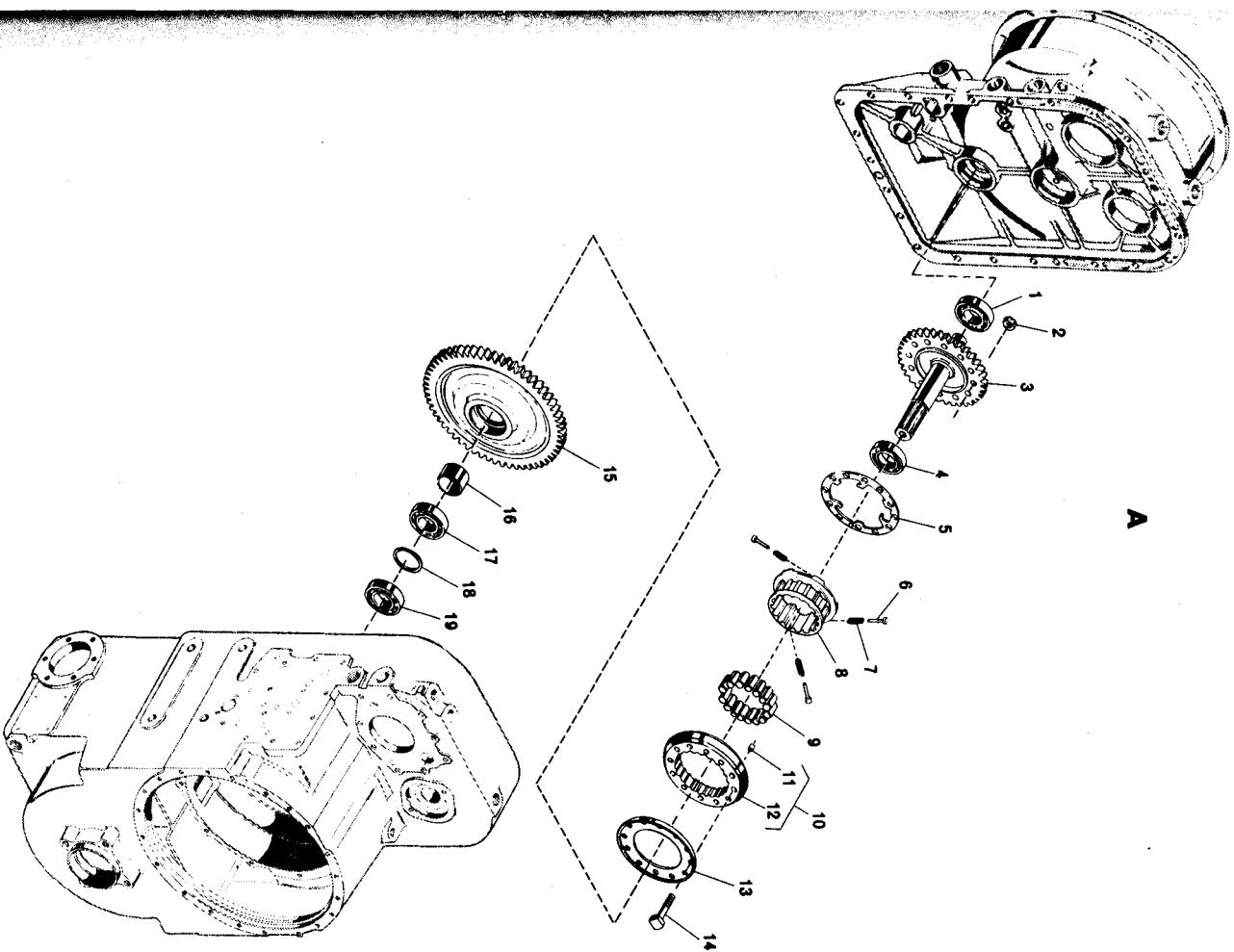
B, foldout 3. Torque converter housing and turbine drive gears—exploded view

A

- 1 - Ball bearing
- 2 - Self-locking nut, 3/8-24 (12)
- 3 - Second-turbine driven gear
- 4 - Ball bearing
- 5 - Spring plate
- 6 - Spring pin (3)
- 7 - Spring (3)
- 8 - Freewheel roller cage
- 9 - Freewheel roller (15)
- 10 - Freewheel cam assembly
- 11 - Index pin
- 12 - Freewheel cam
- 13 - Retainer plate
- 14 - Square-head bolt (12)
- 15 - First-turbine driven gear
- 16 - Bearing spacer
- 17 - Ball bearing
- 18 - Bearing spacer
- 19 - Ball bearing

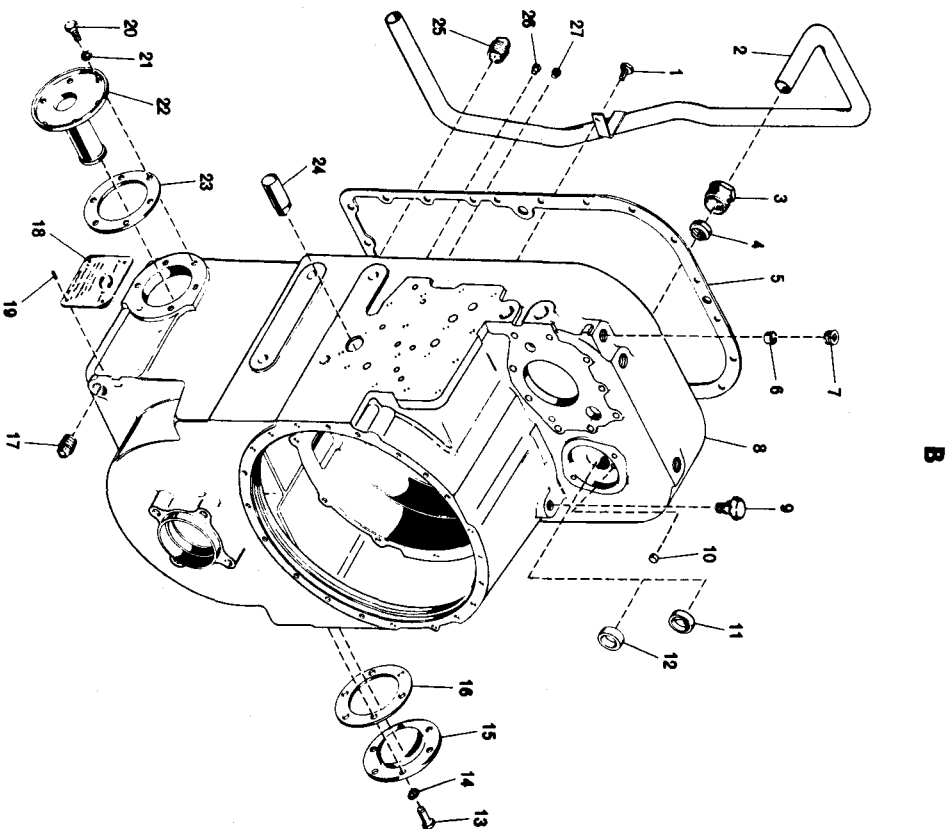
B

- 1 - Self-locking bolt, 3/8-16 x 5/8
- 2 - Suction tube
- 3 - Male nut, 1 3/4-14
- 4 - Suction tube compression seal
- 5 - Transmission housing gasket
- 6 - Remote filter plug
- 7 - Plug, 3/4-14 NPTF
- 8 - Transmission housing
- 9 - Breather
- 10 - Cup plug
- 11 - Oil seal
- 12 - Accessory drive cup plug
- 13 - Bolt, 3/8-16 x 7/8 (6)
- 14 - Lockwasher, 3/8 (6)
- 15 - Core hole cover
- 16 - Gasket
- 17 - Drain plug, 3/4-14 NPTF
- 18 - Nameplate
- 19 - Drive screw, no. 4 x 1/4 (4)
- 20 - Bolt, 3/8-16 x 7/8 (6)
- 21 - Lockwasher, 3/8 (6)
- 22 - Oil strainer assembly
- 23 - Gasket
- 24 - Anchor pin
- 25 - Oil filler plug
- 26 - Add-level oil plug, 1/4-18 NPTF
- 27 - Full-level oil plug, 1/4-18 NPTF



A, foldout 4. Turbine driven gears and freewheel clutch—exploded view

6622A



B, foldout 4. Transmission housing—exploded view

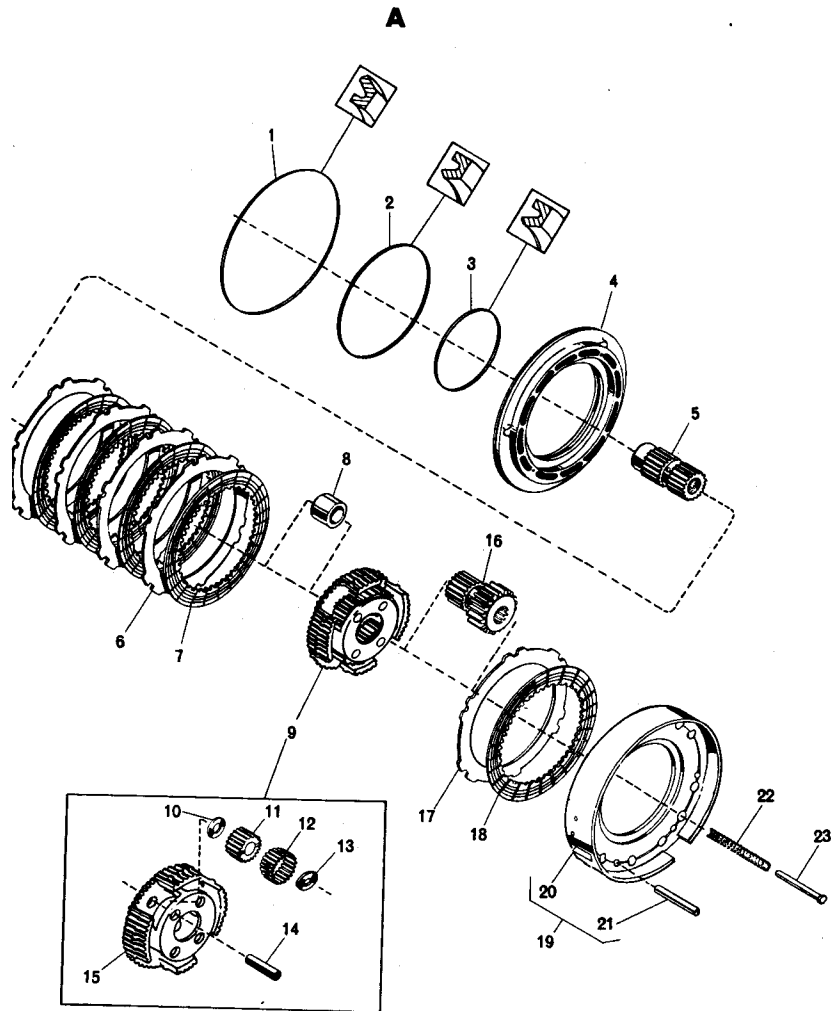
6622B

A

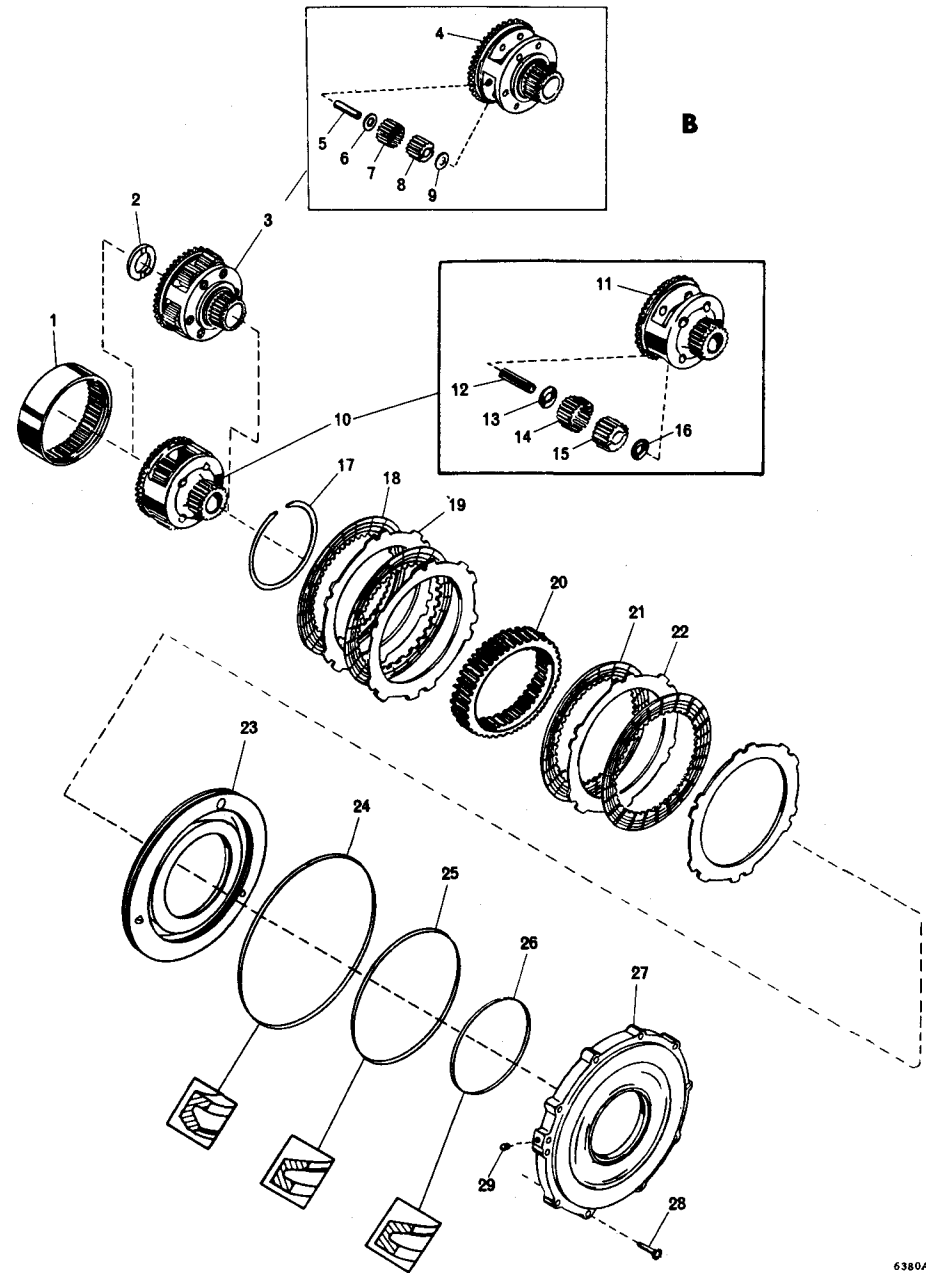
- 1 - Piston sealring
- 2 - Piston sealring
- 3 - Piston sealring
- 4 - Reverse-range clutch piston
- 5 - Reverse-and-low-range sun gear
(standard-speed low gear)
- 6 - External-tanged, reverse-range clutch
plate (4)
- 7 - Internal-splined, reverse-range clutch
plate (4)
- 8 - Spacer
- 9 - Reverse-range planetary carrier
assembly
- 10 - Thrust washer (4)
- 11 - Planetary pinion (matched set of 4)
- 12 - Pinion roller (88)
- 13 - Thrust washer (4)
- 14 - Spindle (4)
- 15 - Reverse-range planetary carrier
- 16 - Reverse-and-low-range sun gear
(high speed, low gear)
- 17 - External-tanged reverse clutch plate
- 18 - Internal-splined reverse clutch plate
- 19 - Reverse-and-low-range clutch anchor
assembly
- 20 - Reverse-and-low-range clutch anchor
- 21 - Anchor pin (6)
- 22 - Piston return spring (12)
- 23 - Return spring guide pin (12)

B

- 1 - Reverse ring gear
- 2 - Thrust washer
- 3 - Low-range planetary carrier assembly
(high-speed low gear)
- 4 - Low-range planetary carrier
- 5 - Spindle (6)
- 6 - Thrust washer (6)
- 7 - Pinion roller (120)
- 8 - Planetary pinion (matched set of 6)
- 9 - Thrust washer (6)
- 10 - Low-range planetary carrier assembly
(standard-speed low gear)
- 11 - Low-range planetary carrier
- 12 - Spindle (4)
- 13 - Thrust washer (4)
- 14 - Pinion roller (88)
- 15 - Planetary pinion (matched set of 4)
- 16 - Thrust washer (4)
- 17 - Internal snapping
- 18 - Internal-splined low-range clutch
plate (2)
- 19 - External-tanged low-range clutch
plate (2)
- 20 - Low-range ring gear
- 21 - Internal-splined low-range clutch
plate (2)
- 22 - External-tanged low-range clutch
plate (2)
- 23 - Low-range clutch piston
- 24 - Piston sealring
- 25 - Piston sealring
- 26 - Piston sealring
- 27 - Low-range clutch piston housing
- 28 - Self-locking bolt, 3/8-16 x 1 1/2 (10)
later models 3/8-16 x 1 3/4 (10)
- 29 - Plug, 1/4-18 PTF



A, foldout 5. Reverse-range clutch and planetary—exploded view



B, foldout 5. Low-range clutch and planetary—exploded view

6379A

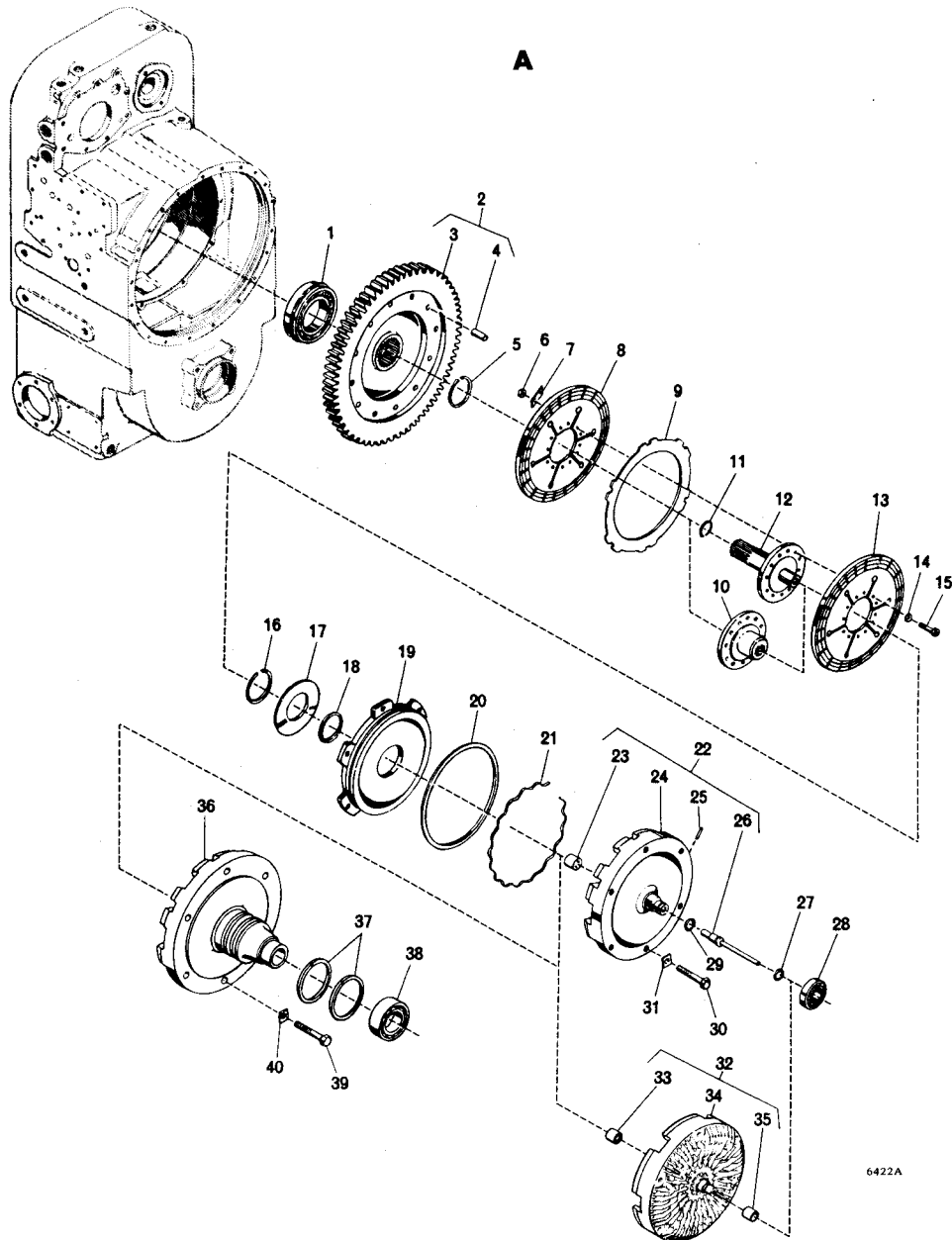
6380A

A

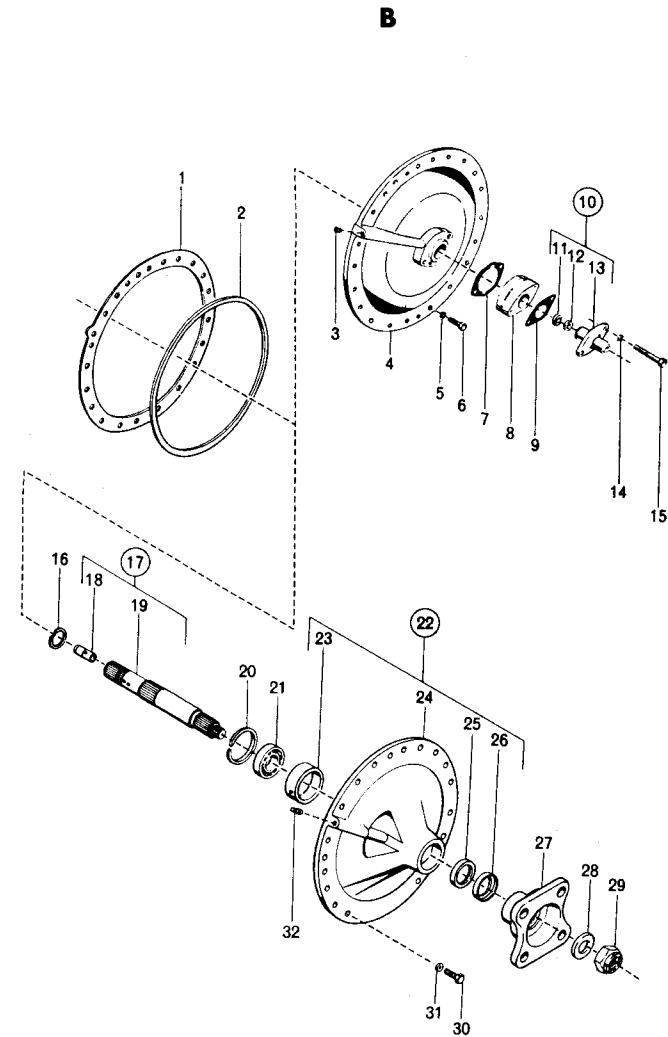
- 1 - Ball bearing
- 2 - Transfer drive gear assembly
- 3 - Transfer drive gear
- 4 - Pin (6)
- 5 - External snapping
- 6 - Nut, 5/16-24 (12)
- 7 - Lockstrip (6)
- 8 - High-range clutch plate
- 9 - High-range, external-tanged clutch plate
- 10 - High-range clutch hub (PTO)
- 11 - External snapping
- 12 - High-range clutch hub
- 13 - High-range clutch plate
- 14 - Flat washer (12)
- 15 - Self-locking bolt, 5/16-24 x 7/8 (12)
- 16 - External snapping
- 17 - High-range clutch piston return spring
- 18 - Hook-type sealring
- 19 - High-range clutch piston
- 20 - Sealring
- 21 - Sealring expander
- 22 - High-range clutch piston housing assembly (speedometer drive)
- 23 - Bushing
- 24 - High-range clutch piston housing
- 25 - Pin
- 26 - Speedometer drive shaft
- 27 - Hook-type sealring
- 28 - Ball bearing
- 29 - Hook-type sealring
- 30 - Bolt, 1/2-20 x 2 3/4 (6)
- 31 - Lock tab
- 32 - High-range clutch piston housing assembly
- 33 - Bushing
- 34 - High-range clutch piston housing
- 35 - Sleeve
- 36 - High-range clutch piston housing (PTO without brake)
- 37 - Step-joint sealring (2)
- 38 - Ball bearing
- 39 - Bolt, 1/2-20 x 2 3/4 (6)
- 40 - Locktab (6)

B

- 1 - Gasket
- 2 - Sealring
- 3 - Pipe plug, 3/8 NPTF
- 4 - Rear cover
- 5 - Lockwasher, 3/8 (19)
- 6 - Bolt, 3/8-16 x 1 1/8 (19)
- 7 - Gasket
- 8 - Speedometer drive adapter
- 9 - Gasket
- 10 - Speedometer drive sleeve assembly
- 11 - Lip-type oil seal
- 12 - Washer (cork)
- 13 - Speedometer drive sleeve
- 14 - Lockwasher, 5/16 (2)
- 15 - Bolt, 5/16-18 x 2 1/4 (2)
- 16 - External snapping
- 17 - PTO shaft assembly
- 18 - Pin
- 19 - PTO shaft
- 20 - Internal snapping
- 21 - Ball bearing
- 22 - Rear PTO cover assembly
- 23 - Sleeve
- 24 - Rear cover
- 25 - Lip-type sealring
- 26 - Dust shield
- 27 - PTO output flange
- 28 - Flange retaining washer
- 29 - Self-locking nut, 7/8-14
- 30 - Bolt, 3/8-16 x 1 1/8 (19)
- 31 - Lockwasher, 3/8 (19)
- 32 - Plug



A, foldout 6. High-range clutch and piston housing (TT model)—exploded view



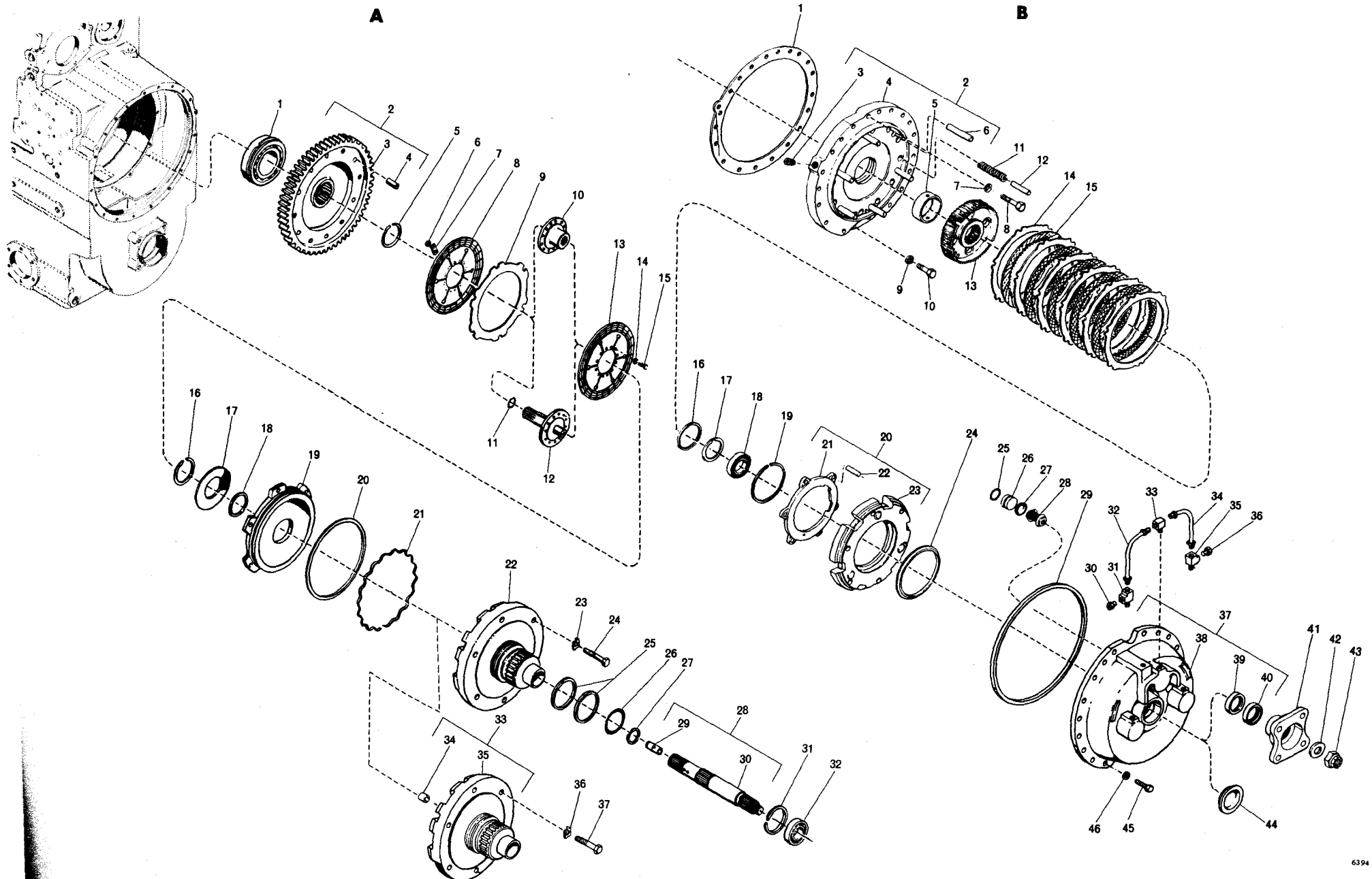
B, foldout 6. Rear covers and PTO shaft (TT model)—exploded view

A

- 1 - Ball bearing
- 2 - Transfer drive gear assembly
- 3 - Transfer drive gear
- 4 - Pin (6)
- 5 - External snapring
- 6 - Nut, 5/16-24 (12)
- 7 - Lockstrip (6)
- 8 - High-range clutch plate
- 9 - High-range, external-tanged clutch plate
- 10 - High-range clutch hub (PTO)
- 11 - External snapring
- 12 - High-range clutch hub
- 13 - High-range clutch plate
- 14 - Flat washer (12)
- 15 - Self-locking bolt, 5/16-24 x 7/8 (12)
- 16 - External snapring
- 17 - Piston return spring
- 18 - Hook-type sealring
- 19 - High-range clutch piston
- 20 - Sealring
- 21 - Sealring expander
- 22 - High-range clutch piston housing (PTO)
- 23 - Lock tab (6)
- 24 - Bolt, 1/2-20 x 2 3/4 (6)
- 25 - Step-joint sealring (2)
- 26 - Sealring
- 27 - External snapring
- 28 - PTO shaft assembly
- 29 - Pin
- 30 - PTO shaft
- 31 - Internal snapring
- 32 - Ball bearing
- 33 - High-range clutch piston housing assembly
- 34 - Bushing
- 35 - High-range clutch piston housing
- 36 - Lock tab (6)
- 37 - Bolt, 1/2-20 x 2 3/4 (6)

B

- 1 - Gasket
- 2 - Diaphragm assembly
- 3 - Pipe plug, 1/4 NPTF
- 4 - Diaphragm
- 5 - Sleeve
- 6 - Pin (6)
- 7 - Lockwasher, 3/8
- 8 - Bolt, 3/8-16 x 2
- 9 - Lockwasher, 3/8 (2)
- 10 - Bolt, 3/8-16 x 1 1/8 (2)
- 11 - Brake return spring (12)
- 12 - Spring guide pin (12)
- 13 - Brake hub
- 14 - External-tanged brake plate (6)
- 15 - Internal-splined brake plate (5)
- 16 - Step-joint sealring
- 17 - External snapring
- 18 - Ball bearing
- 19 - External snapring
- 20 - Brake apply plate assembly
- 21 - Brake adjusting ring
- 22 - Spring pin (6)
- 23 - Brake apply plate
- 24 - Sealring
- 25 - Sealring (3)
- 26 - Brake piston (3)
- 27 - Brake piston cup (3)
- 28 - Expander assembly (3)
- 29 - Snapring
- 30 - Plug, 7/16-20
- 31 - Brake manifold fitting
- 32 - Brake manifold
- 33 - Brake manifold fitting
- 34 - Brake manifold
- 35 - Brake manifold fitting
- 36 - Plug, 7/16-20
- 37 - Rear cover assembly (PTO)
- 38 - Rear cover
- 39 - Lip-type oil seal
- 40 - Dust shield
- 41 - PTO output flange
- 42 - Flange retaining washer
- 43 - Self-locking nut, 7/8-14
- 44 - Plug
- 45 - 3/8-16 x 2 3/4 (18)
- 46 - Lockwasher, 3/8 (18)



A, foldout 7. High-range clutch and piston housing (TTB model)—exploded view

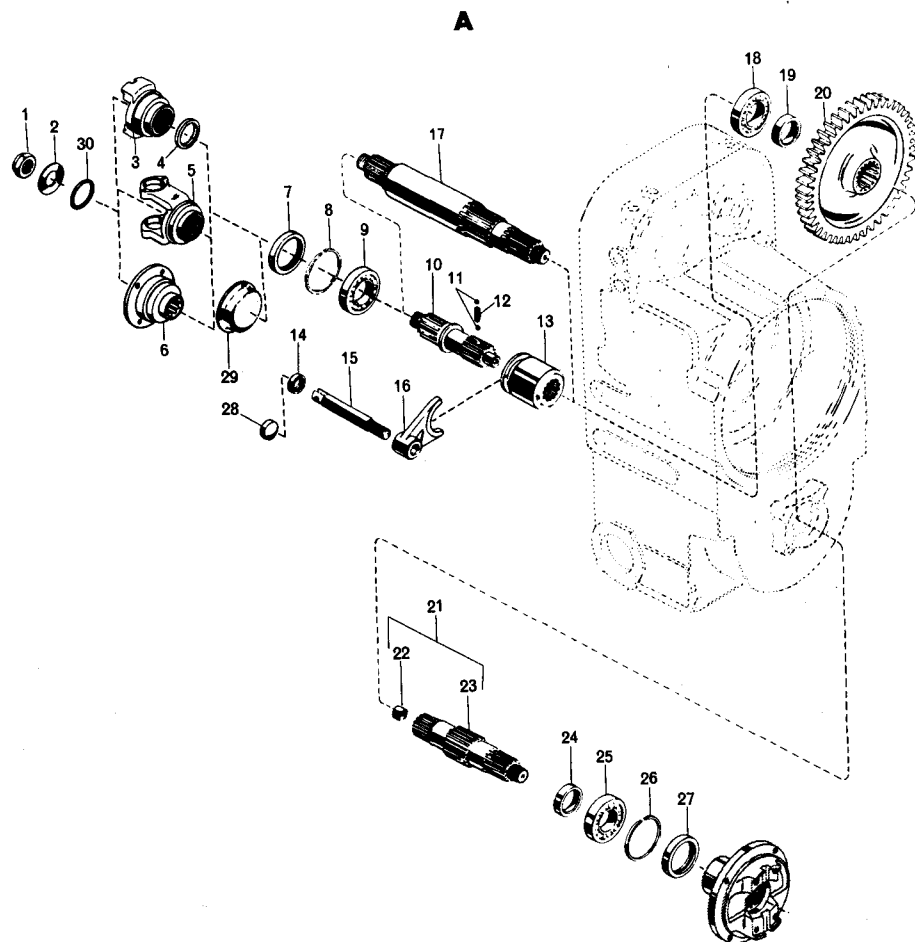
B, foldout 7. Internal brake and rear cover (TTB model)—exploded view

A

- 1 - Flange retaining nut, 1 1/4-12
(nylon insert)
- 2 - Flange washer
- 3 - Flange (Mechanics 5C)
- 4 - Flange spacer
- 5 - Flange (Type 5N)
- 6 - Flange (S1480)
- 7 - Lip-type oil seal
- 8 - Internal snapring
- 9 - Ball bearing
- 10 - Front output shaft
- 11 - Detent ball (2)
- 12 - Detent spring
- 13 - Disconnect coupling
- 14 - Lip-type oil seal
- 15 - Shifter fork shaft
- 16 - Shifter fork
- 17 - Output shaft
- 18 - Ball bearing
- 19 - Spacer
- 20 - Transfer driven gear
- 21 - Rear output shaft assembly
- 22 - Bushing
- 23 - Rear output shaft
- 24 - Spacer
- 25 - Ball bearing
- 26 - Internal snapring
- 27 - Lip-type oil seal
- 28 - Shifter fork shaft orifice plug
- 29 - Front output shaft orifice plug
- 30 - Sealring (use after S/N 23290)

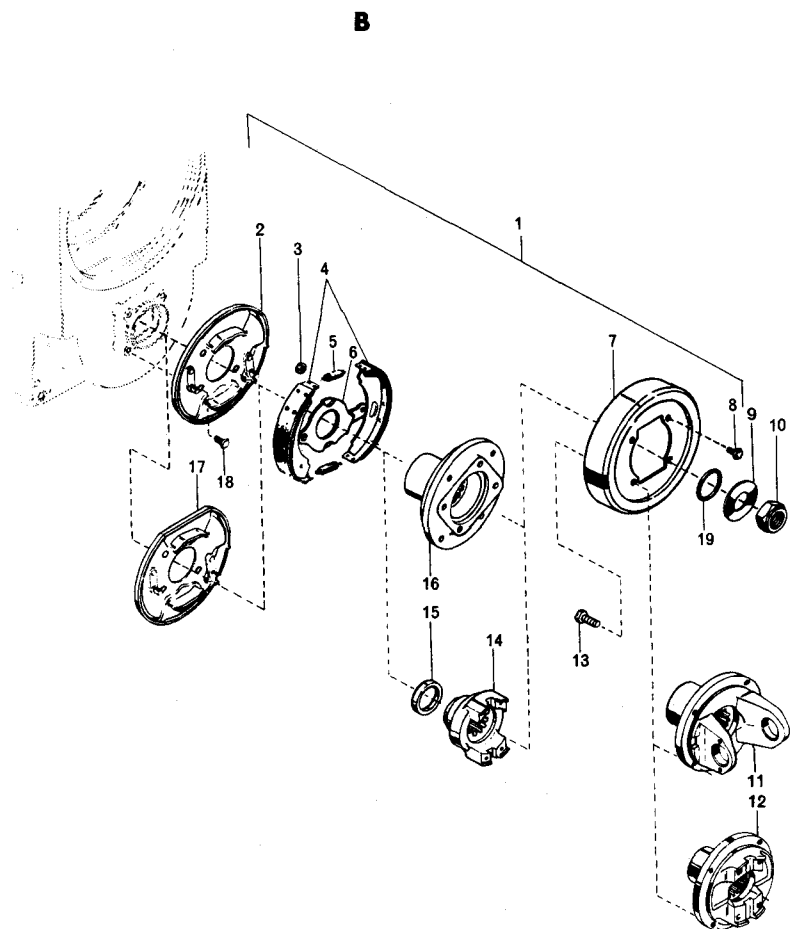
B

- 1 - Parking brake assembly
- 2 - Brake back plate (TT)
- 3 - Roller
- 4 - Brake shoe and lining (2)
- 5 - Brake shoe return spring (2)
- 6 - Brake apply arm
- 7 - Brake drum
- 8 - Self-locking bolt, 3/8-24 x 5/8 (4)
- 9 - Flange washer
- 10 - Flange retaining nut, 1 1/4-12
(nylon insert)
- 11 - Flange (Type 5N)
- 12 - Flange (Mechanics 5C)
- 13 - Self-locking bolt, 3/8-24 x 5/8 (4)
- 14 - Flange (Mechanics 5C)
- 15 - Spacer
- 16 - Flange (S1480)
- 17 - Brake back plate (TTB)
- 18 - Self-locking bolt, 1/2-13 x 7/8 (4)
- 19 - Sealring (use after S/N 23290)



A, foldout 8. Output shafts and disconnect assembly—exploded view

6477A



B, foldout 8. Parking brake and flanges—exploded view

6476A

A

- 1 - Gasket
- 2 - Oil pump assembly
- 3 - Oil pump cover
- 4 - Oil pump cover gasket
- 5 - Drive gear
- 6 - Driven gear assembly
- 7 - Driven gear
- 8 - Needle bearing (2)
- 9 - Oil pump body assembly
- 10 - Oil pump body
- 11 - Dowel pin
- 12 - Driven gear shaft
- 13 - Lip-type oil seal
- 14 - Lockwasher, 3/8 (7)
- 15 - Bolt, 3/8-16 x 2
 - 4-bolt C pad (7)
 - 2-bolt B pad (7)
 - 2-bolt C pad (6)
- 16 - Lockwasher, 3/8 (2)
- 17 - Bolt, 3/8-16 x 3 (2)
- 18 - Adapter drive coupling
- 19 - Bolt, 3/8-16 x 3

B

- 1 - Control valve body gasket
- 2 - Lockwasher, 3/8 (16)
- 3 - Bolt, 3/8-16 x 1
- 4 - Bolt, 3/8-16 x 2 1/2 (15)
- 5 - Control valve body assembly
- 6 - Plug
- 7 - Gasket
- 8 - Main-pressure regulator valve
- 9 - Control valve body
- 10 - Ball
- 11 - Ball retainer plug
- 12 - Valve stop
- 13 - Spring retainer
- 14 - Main-pressure regulator spring
- 15 - Trimmer spring
- 16 - Trimmer plug
- 17 - Gasket
- 18 - Plug
- 19 - Clutch cutoff valve spring
- 20 - Clutch cutoff valve
- 21 - Cutoff valve plug (hydraulic actuated)
- 22 - Sealring
- 23 - Gasket
- 24 - Cup (hydraulic actuated)
- 25 - Retainer plug (hydraulic actuated)
- 26 - Oil seal
- 27 - Manual range selector valve
- 28 - Detent ball (2)
- 29 - Plug
- 30 - Gasket
- 31 - Detent spring (2)
- 32 - Gasket
- 33 - Plug
- 34 - Plug, 1/8
- 35 - Inching valve stop
- 36 - Spring
- 37 - Inching regulator valve
- 38 - Regulator valve stop
- 39 - Inching regulator valve spring
- 40 - Inching control valve
- 41 - Valve return spring
- 42 - Sealring
- 43 - Plug
- 44 - Oil seal
- 45 - Cutoff valve plug (air actuated)
- 46 - Retainer plug (air actuated)
- 47 - Plug
- 48 - Manual range selector valve (used with neutral start switch)
- 49 - Gasket
- 50 - Plug (neutral switch hole)

valve assemblies—exploded view

