



**Two-Speed Transaxle
Compact Tractors**

Service Manual No. 9-99583

JI Case
A Tenneco Company



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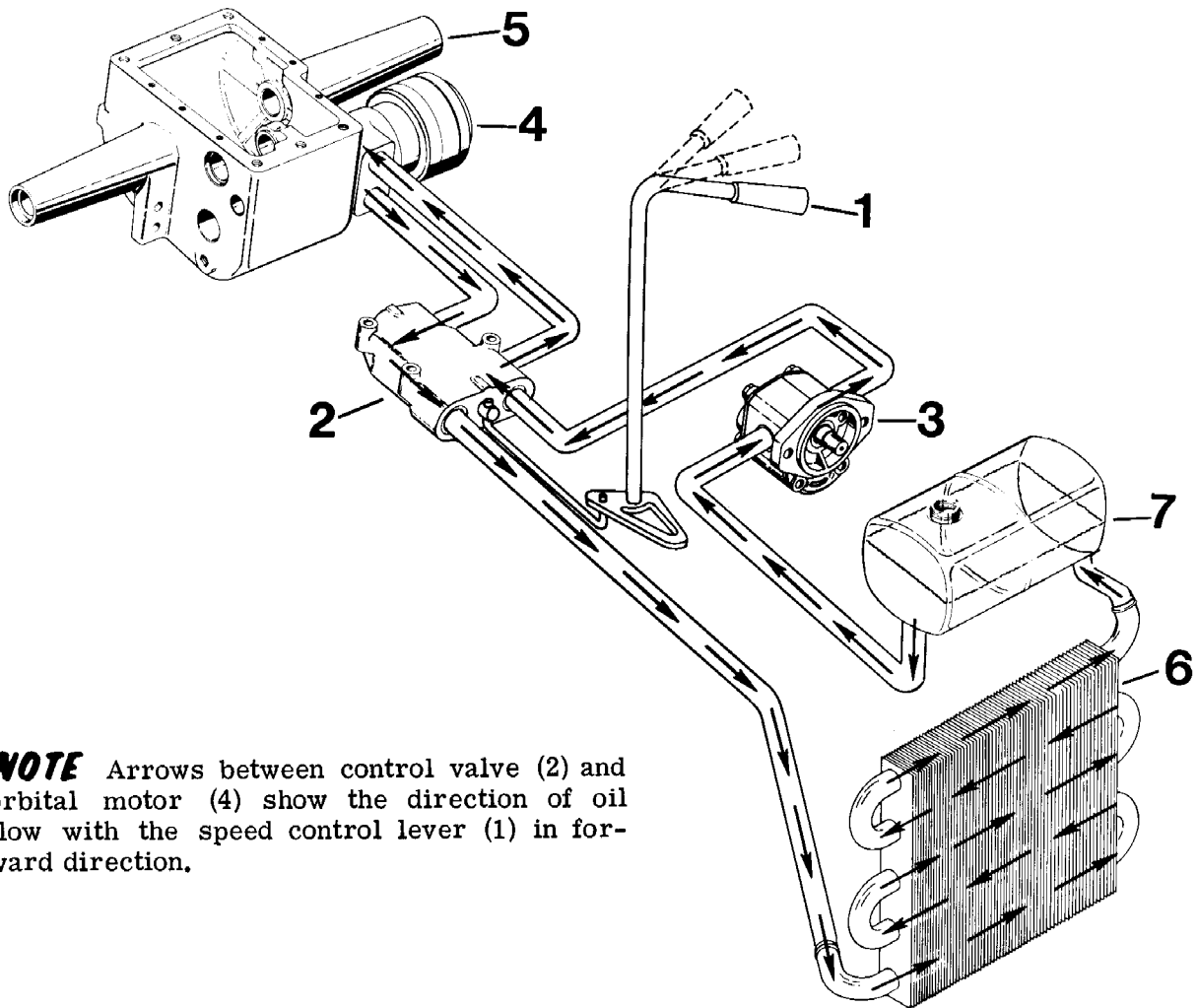
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INTRODUCTION

This manual covers the service procedures for the hydraulically driven two-speed transmission used on Case Model 220, 222, 442, and 444 Compact Tractors.

Hydraulic pressure is developed by the engine mounted gear type pump, Reference 3, Figure 1, which draws oil from a separate reservoir (7) located under the hood. A directional control valve (2) routes the pressurized oil from the pump to the orbital hydraulic motor (4) attached to the transmission housing (5). The orbital motor converts the hydraulic pressure developed by the pump to mechanical power to drive the two-speed transmission.

The two-speed drive gear on the splined input shaft from the orbital motor is selectively meshed with one of the two individual differential ring gears. The differential then transmits this power to the rear axles through four bevel gears. The carburized and deeply case hardened, heavy duty, steel gears are all housed in the rugged, top-access transmission case (5). The oil leaving the orbital motor (4) is returned through the control valve and heat exchanger (6) to the hydraulic reservoir (7). An engine fan draws air through the heat exchanger to cool the oil before it returns to the reservoir.



NOTE Arrows between control valve (2) and orbital motor (4) show the direction of oil flow with the speed control lever (1) in forward direction.

Figure 1. Hydraulic Drive System Case Model 220, 222, 224, 442, 444, 446, 644 and 646 Compact Tractors

REMOVAL

1. Remove the plug (7A) and drain the transmission oil. Replace the drain plug.
2. Remove the four bolts holding the seat support assembly to the frame. Remove the seat support assembly while keeping the fuel tank in its original position.
3. Loosen lug bolts on rear wheels, raise and securely block up the tractor frame and remove the rear wheels.
4. Set the "High-Low" range lever in "Neutral" and remove the four cap screws which connect the oil line manifold to the orbital motor. Set the fuel tank ahead of the transmission mounting bolts.
5. Place a portable hoist or other suitable support under the transmission and remove the four frame mounting bolts.

CAUTION The transmission assembly is heavy. Avoid injury by securing help when removing or installing the transmission.

6. Move the transmission to the left to clear the brake drum (40) from the brake band and slide it back and away from the tractor frame.

NOTE Cover the exposed oil line manifold and the orbital motor ports to insure against entry of dirt or other foreign matter.

DISASSEMBLY

1. Remove transmission cover plate screws (46), lockwashers (45), cover plate and gasket.
2. Place a large drift pin against the inside end of the brake drum shaft (40) and rap sharply with a hammer. This will dislodge the retainer which holds the brake drum shaft to the brake gear (38). Remove the brake drum (40), key (41), gear (38), retainer (39), seal (4), and bushings (5 and 6).
3. Remove snap rings (15), rear axles (11 and 13), differential assembly, washers (36), seals (4), and bushings (2 and 3).
4. Disassemble the complete differential assembly by removing the four special bolts (34) and locknuts (35).
5. Remove the four cap screws which attach the orbital motor to the transmission case and remove the motor and input shaft (16) as an assembly. If necessary, remove bearing (9).

NOTE When the input shaft is part way removed, slide off the shims (48 and 49), thrust washers (20), bearing (18), and the drive gear (24) to prevent them from dropping to the bottom.

NOTE Shims (48 & 49) thrust washer (20) and bearing (18) are not applicable to the model 444, 224, 446, 644, 646 tractors, or the model 442 S/N 9632451, 222 S/N 9649062, 220 S/N 9647203 tractors and after.

6. Remove snap rings (23), yoke (21), shifting shaft (22), and seal (8). If necessary, remove plug (10).
7. On Model 220 prior to S/N 9649062, Model 222 S/N 9647203 and under and 442 tractors S/N 9632450 and under, pull out or gently tap the input shaft (16) from the orbital motor. On all Model 444, 224, 446, 644 and 646 tractors and on 442 S/N 9632451 220 S/N 9647203 and 222 S/N 9649062 tractors and above, the input shaft is integral with the orbital motor and cannot be removed unless the motor is disassembled.

INSPECTION

1. Thoroughly clean and wipe dry all parts before inspection.
2. Inspect all gears and shafts for burrs, nicks or excessive wear both to the teeth and to the splines. Light burrs and nicks may be removed with a hone or crocus cloth.
3. Inspect bearings for worn or pitted rollers. There should be no pits or other visible damage. If damaged, replace with new parts.
4. Inspect the differential housings and transmission case for cracks, burrs or nicks.

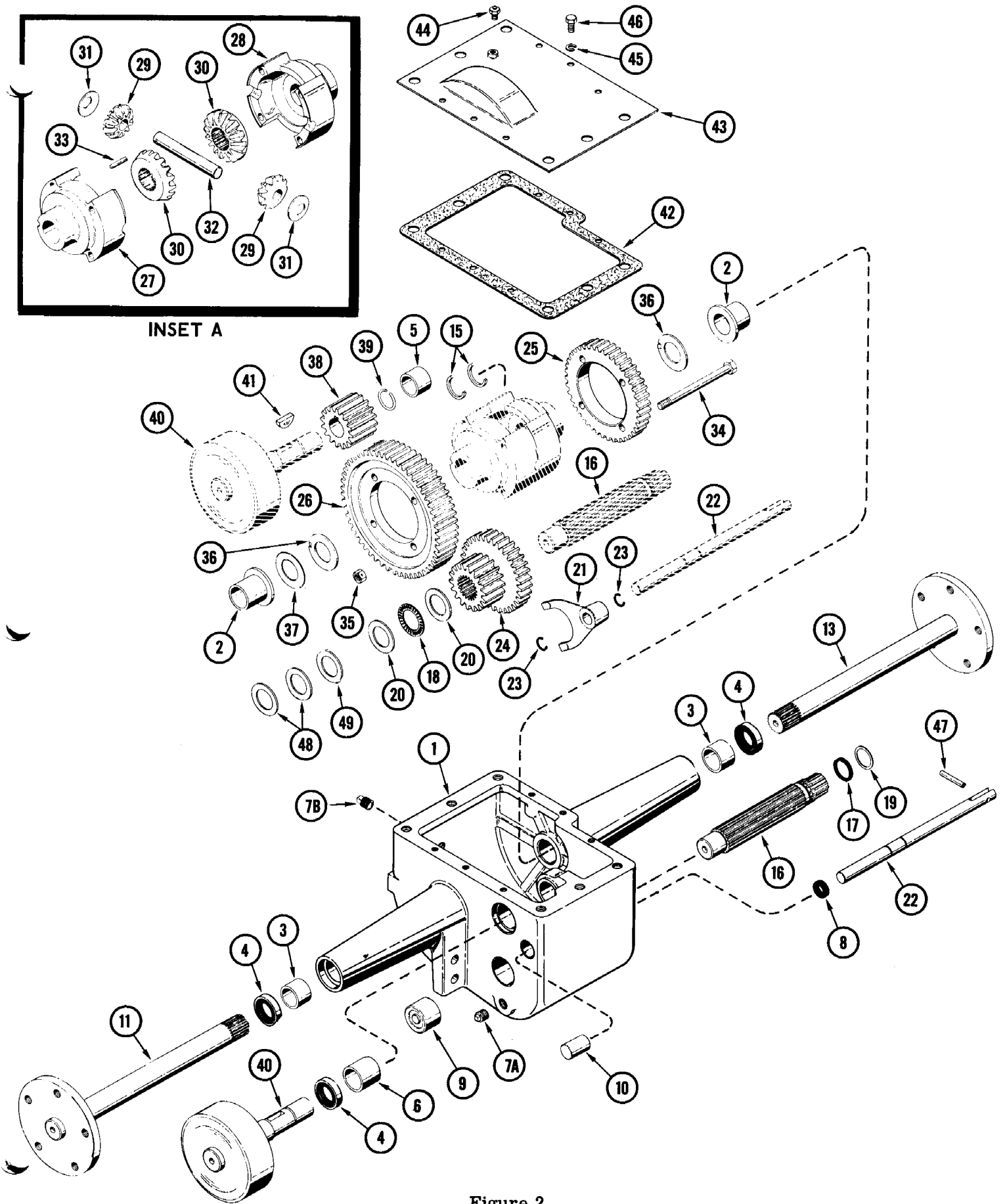


Figure 2

INSPECTION, CONTINUED

5. Inspect axles for nicks, cracks and stripped or damaged threads.
6. Inspect bushings for score marks, nicks or

excessive wear and replace if necessary.

7. Replace all oil seals each time the unit is disassembled.

ASSEMBLY

1. Install new seal (8) and reassemble shifting shaft (22) and yoke (21). Secure in place with snap rings (23). Replace plug (10) if previously removed.
2. On Model 220 S/N 9647202 and 222 S/N 9649061 tractors and 442 tractors S/N 9632450 and under, very carefully install a new O ring (17) and back up washer (19) on the input shaft (16). The O ring must be installed first and be located to the inside of the back up washer. Check the O ring for installation damage and carefully insert the shaft into the hydraulic motor until it bottoms. If necessary, tap the end of the shaft lightly with a plastic hammer. Install a new O ring on the face of the orbital motor flange.
3. Install needle bearing (9) and start the assembled input shaft (16) into the case. Slide the drive gear (24), thrust bearing and washers (18 and 20), and shims (48 and 49) on the input shaft and place the yoke (21) between the gears.

NOTE Thrust bearing and washer (18 & 20) and shims (48 & 49) apply only to tractor models and serial numbers listed in paragraph 2.

NOTE Shims (48) are .030" thick and shim (49) is .015" thick. The thicker shim is used next to the bearing (9).

4. Slide the input shaft (16) into the needle bearing (9) until the orbital motor flange is flush and tight against the machined face of the case. Check the clearance between thrust washer (20) and shim (48) on tractors noted in paragraph 2. Clearance must not be less than .001" and not more than .015". If necessary, adjust the shim stack keeping a .030" shim next to the needle bearing.
5. Install the four orbital motor cap screws using locktite and torque to 110-125 foot pounds. Install new O rings on the orbital motor ports.
6. Assemble the differential according to inset "A" and install the ring gears (25 and

26). Use new locknuts on the special bolts (34) and torque to 50 foot pounds.

7. If the axle bushings (2 and 3) were removed, press in new bushings.

IMPORTANT Install the flange bushings (2) with the oil groove downward. Press the flange bushings in until seated and the straight bushings (3) in until flush with the oil seal shoulder. Bushings must be reamed after assembly to 1.1876" - 1.1877" inside diameter. Install new oil seals lip side first.

8. Carefully install the axle shafts (11 and 13) through the housings and into the differential assembly, being sure that stop washers (36), and shim washers (37), if required, are in place.

NOTE Maximum end play on the differential assembly is .030". Minimum end play is .005". Use .015" shim washers (37) as required. A coating of grease on the shim washers will help to hold them in position while inserting the axle. Secure the axle shafts with snaprings (15).

9. If the brake shaft bushings (5 and 6) were removed, press in new bushings until flush with their seats. Ream the inner bushing to 1.004" - 1.005". Ream the outer bushing to 1.192" - 1.193". Install a new dirt seal (4).

10. Install a new wire retainer to the brake gear. With the Woodruff key (41) in place, insert the brake shaft (40) through the case and into the brake gear (38). When the inside end of the shaft is in contact with the wire retainer, rap the outside end sharply with a leather mallet to seat the retainer.

11. Fill the transmission to level plug (7B) using approximately 3 quarts of clean 20W-40 motor oil or No. 80 or 90 EP gear lubricant. Install a new cover gasket (42) and replace cover (43) with six bolts (46) and lockwashers (45). Check to see that the breather plug (44) is functional.

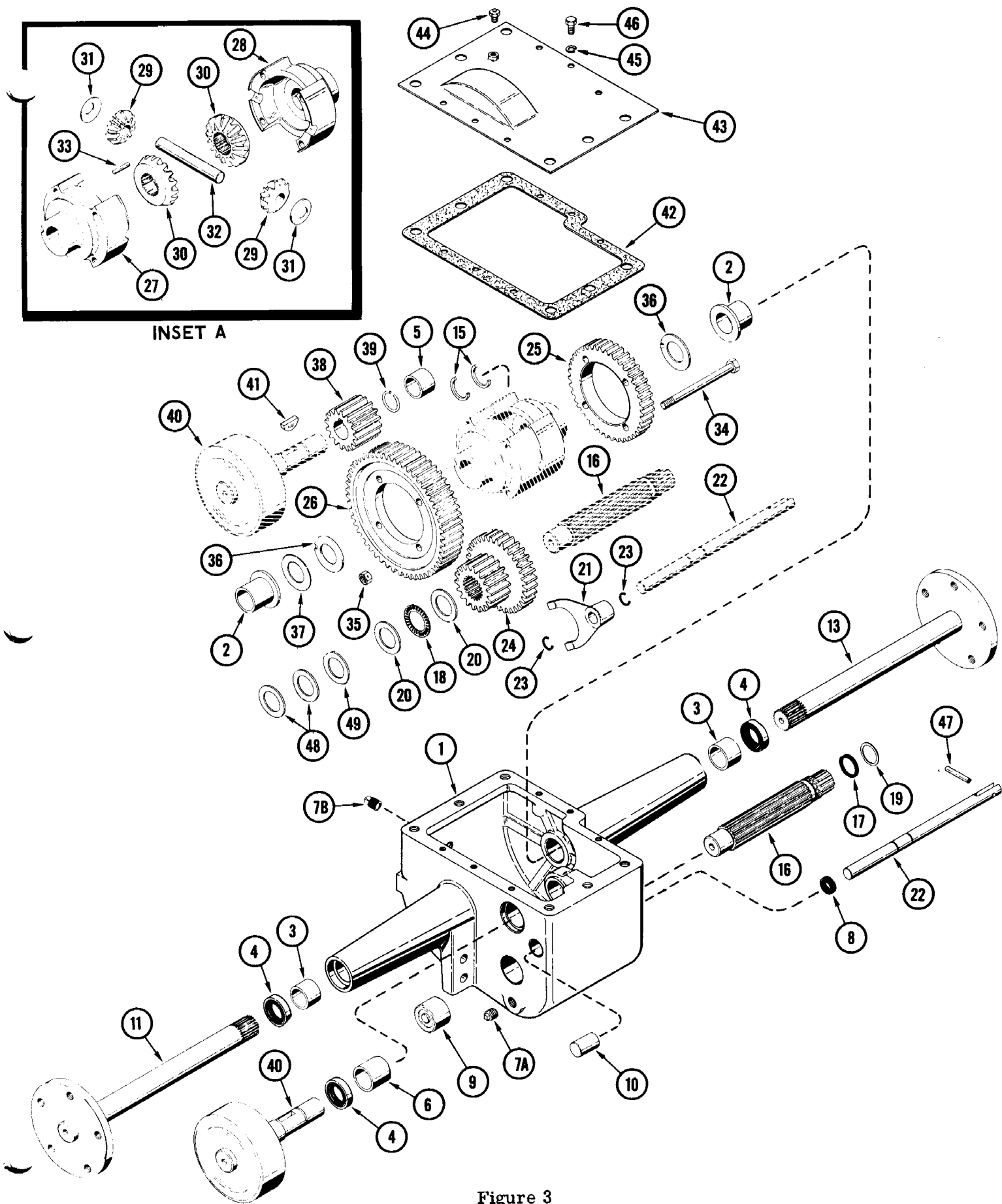


Figure 3

INSTALLATION

1. Position the transmission under the tractor frame and place the brake drum into the brake band.
2. Secure the transmission to the frame with the four bolts and lockwashers.

NOTE Check and make sure the two right frame channel spacers are in place between the mounting holes.

3. Make sure the new O rings are in place on the orbital motor ports. Secure the oil line manifold to the orbital motor with the original four cap screws. Tighten to 24-28 ft. lb.

NOTE The oil manifold is used on tractors prior to model 220 S/N 9649062, 222 S/N 9647203 and 442 S/N 9632450.

4. Return the fuel tank to its normal location and install the seat support with the original bolts.

NOTE Before installing the seat support mounting bolts, place the slotted end of the shift lever over the roll pin on the transmission shift rod.

5. Install the rear wheels and remove the blocks from the tractor frame. Torque lug bolts according to Specification Chart.