WATEROUS COMPANY
SOUTH ST. PAUL, MINNESOTA 55075

FORM NO. T-336

OVERHAUL INSTRUCTIONS

FOR

WATEROUS TYB/TYC SERIES CHAIN DRIVE TRANSMISSIONS

WITH FRONT OR REAR FACING

OUTPUT SHAFT

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Waterous
DEPENDABLE

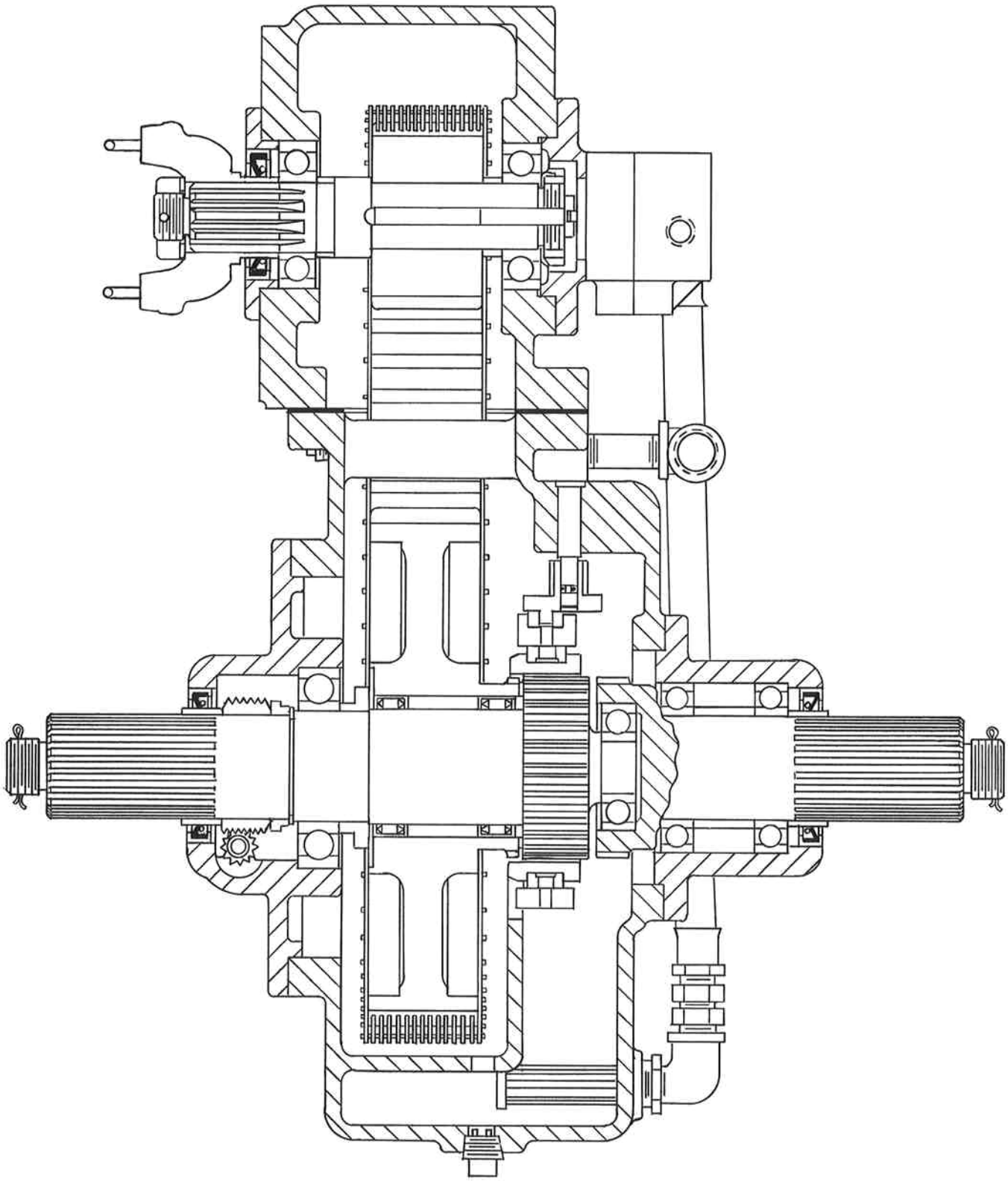

Figure 1

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TYB/TYC Transmission with Front Facing Shaft

a

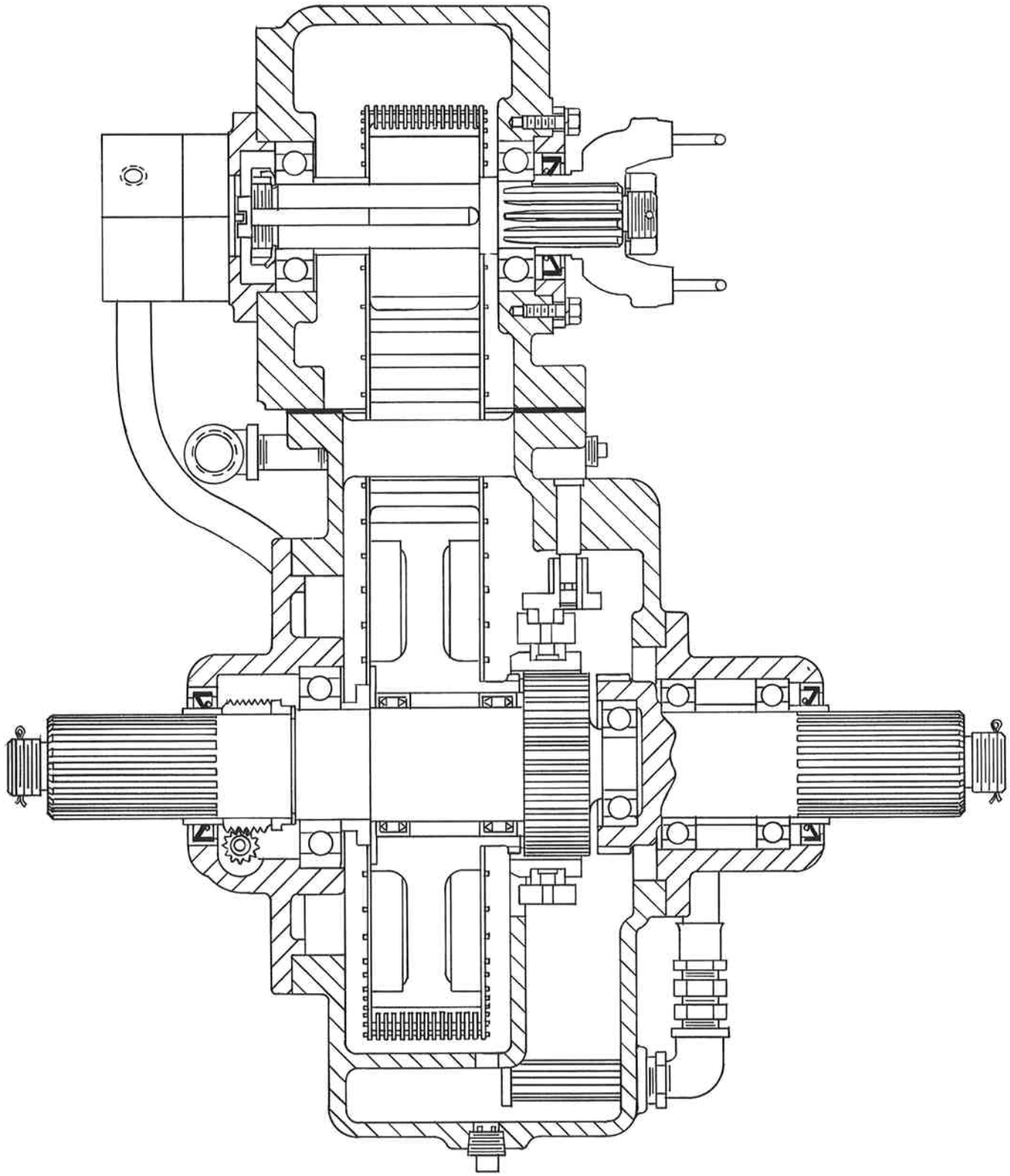

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Figure 2

TYB/TYC Transmission with Rear Facing Shaft

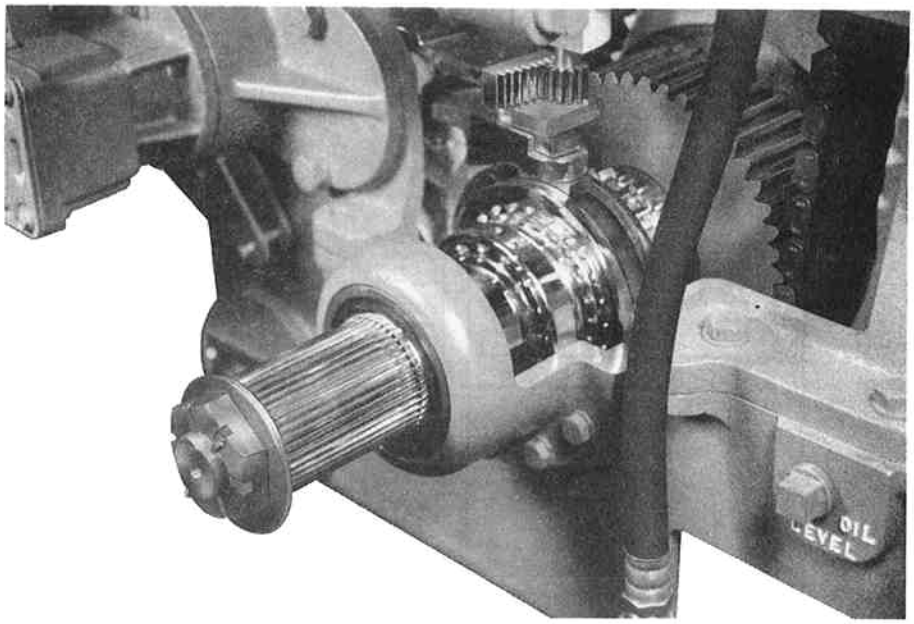

Figure 3

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Drive Line

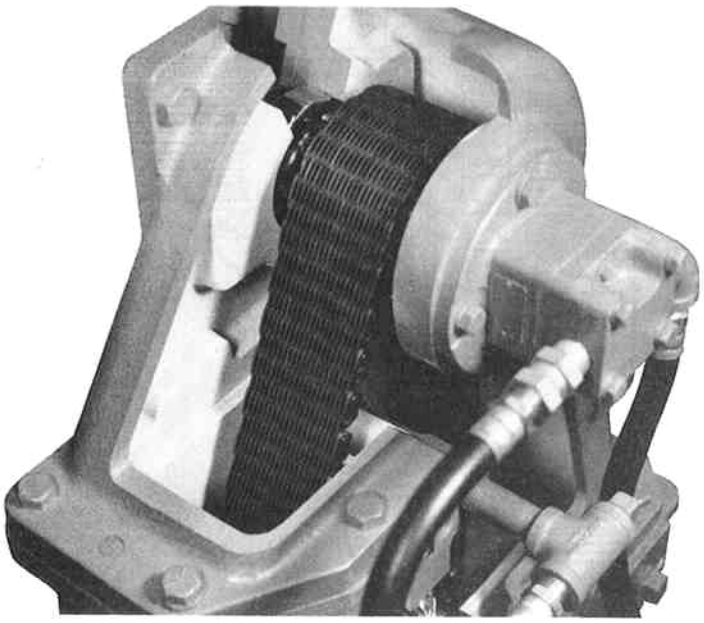

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Figure 4

Driven Sprocket, Chain and Oil Pump

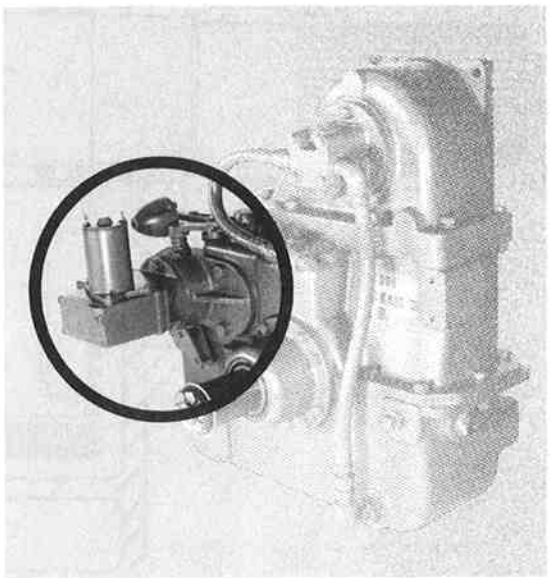

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Figure 5

Electric Shift

INTRODUCTION

This section contains overhaul and repair instructions for Waterous TYB & TYC Series chain drive transmissions with front or rear facing driven (output) shaft.

The transmission may be equippped with the electric shift as shown in Figure 5.

The transmission is removed as a unit for out of chassis overhaul. These instructions apply for out of chassis overhaul.

NOTE

Front and rear facing shafts, spacers, housings and oil pumps are not interchangeable. To change from front to rear or rear to front requires purchase of the proper parts.

REFERENCE NUMBERS

The text below frequently uses "reference numbers" when discussing specific parts. These numbers refer to the parts called out on the Service Parts List included with the manual.

PROPELLER SHAFT DISCONNECT AND ACCESSORY REMOVAL

1. Disconnect propeller shafts from drive and coupling shafts. The companion flanges or end yokes attached to the transmission shafts can be left attached to the transmission and removed later. Disconnect the propeller shaft from the driven shaft.

2. Disconnect tachometer cable, electric shift override linkage, and the shift wiring.

3. Drain oil from the transmission.

4. Remove electric shift assembly and bracket. Take care not to lose adjusting screw retainers (T87) which are exposed when the bracket is removed.

REMOVAL OF TRANSMISSION FROM THE CHASSIS

1. Examine structure that supports the transmission in the chassis and determine if the oil pump and/or oil hoses will have to be removed first to allow removal of the transmission.

NOTE

Removal of the oil hoses and fittings screwed into the oil pump ports may be all that is necessary to allow removal of the transmission from its support structure.

If the oil pump must be removed first, proceed as follows and disregard instructions further on concerning its removal.

a) Loosen oil hoses (T64) (T67) at the swivel fittings (T66).

b) Remove the four capscrews (T97) and remove the oil pump (T34) and any attached hoses and fittings. Do not remove the two small screws that fasten the oil pump together.

2. Loosen all fasteners that fasten the transmission to the support structure in the chassis.

3. Support the transmission via a support from the floor or a sling from above.

4. Remove the fasteners that fasten the transmission to the support structure in the chassis.

5. Lower the transmission and remove from under the chassis.

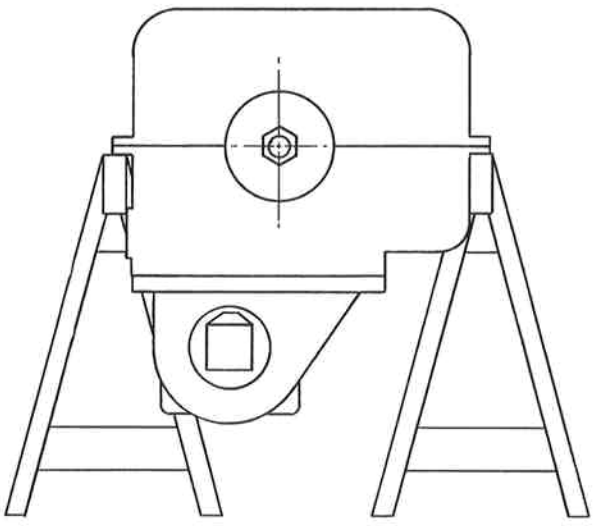
DISASSEMBLY OF TRANSMISSION

The transmission consists of three sections; the cap, the mid-section, and the bottom section. The order of disassembly is bottom section, mid-section, cap.

Figure 2 shows a vertical cross section view through the assembly, while Figure 3 shows a close-up view of the drive line. Figure 4 shows a close-up of the driven sprocket, chain and oil pump. Refer to these illustrations and to the parts list illustrations, when overhauling a chain case.

NOTE

To do an out of chassis overhaul, support the transmission in an upside down position by attaching it directly to an engine overhaul stand at the face of the cap that bolts to the support structure in the chassis or by making an adapter that connects to an overhaul stand. It can also be supported on the underside of the flange of the mid-section. The flange bolts at the support areas must be removed first. See Figure 6.



86-9-12 FIGURE 6

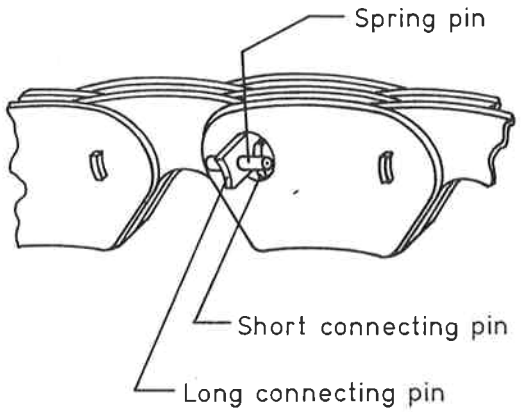
1. Remove companion flanges or end yokes from drive and coupling shafts and the driven shaft.

2. Remove lube system hoses by disconnecting hoses (T67) and (T64) at swivel fittings (T66), tee (T102) and elbows (T57 and T171). Remove sump oil strainer (T132) from bottom section of case (T28).

3. Remove self-locking cap screws (T8) and lock washers (T9) attaching drive and coupling shaft housings (T11 and T42) to bottom section. Loosen cap screws (T16) that attach housings to mid-section.

4. Remove cap screws (T52), bolts (T93), nuts (T69), and lock washers (T53), that attach bottom section to mid-section. Drive dowels (T131) out of bottom section flange. Remove bottom section.

5. Rotate drive line until removable connecting pin (T83) of the chain is visible at the drive sprocket (T5). The removable connecting pin has a spring pin (T108) in each end holding it in place. See Fig. 7.



86-10-11 Figure 7

Chain Connecting Pin Set

6. Remove one spring pin (T108), tap both the long and short connecting pins out of the chain links. Disengage chain (T18) from the drive (T5) and driven sprocket (T26) and remove the case.

7. Remove tachometer driven gear sleeve (T90) and driven gear (T89) from drive shaft housing (T11).

8. Remove the remaining cap screws attaching the coupling shaft housing (T42) to the mid-section.

9. Remove coupling shaft housing (T42) and shims (T41).

NOTE

Coupling shaft (T44) and its associated parts may come off with housing (T42).

10. Remove the coupling shaft assembly (T44) if it did not come out when removing housing (T42).

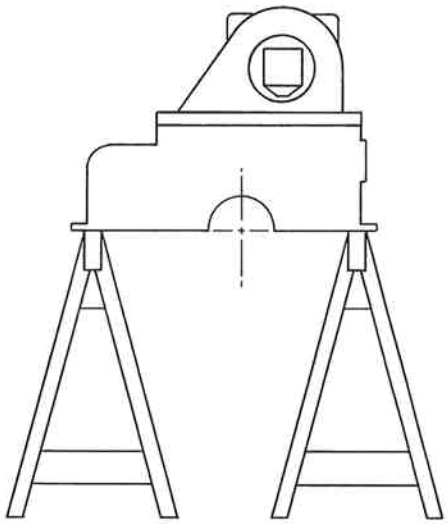
11. Remove the remaining cap screws that attach the drive shaft housing (T11) to the mid-section. The housing (T11) and the drive shaft (T13), drive sprocket (T35), shift collar (T4) and associated shaft parts can now be removed as a unit from the mid-section. The shift fork (T80) will slip off the shift shaft (T46) when the drive shaft assembly is lifted out. Remove shifter shoe (T40) from locking arm (T38).

12. Slip locking arm (T38) off pivot pin (T37).

NOTE

The pivot pin (T37) and shift shaft busing (T112) need only be removed if bent or otherwise damaged.

13. Reposition mid and cap section assembly on the supports so that the cap portion is on top as shown in Figure 8 or set the assembly on a bench.



86-9-13 Figure 8

14. Remove 4 screws (T97) that fasten oil pump (T34) to pump support housing (T31) and remove the oil pump (T34). Do not remove the 2 small screws that fasten the pump together.

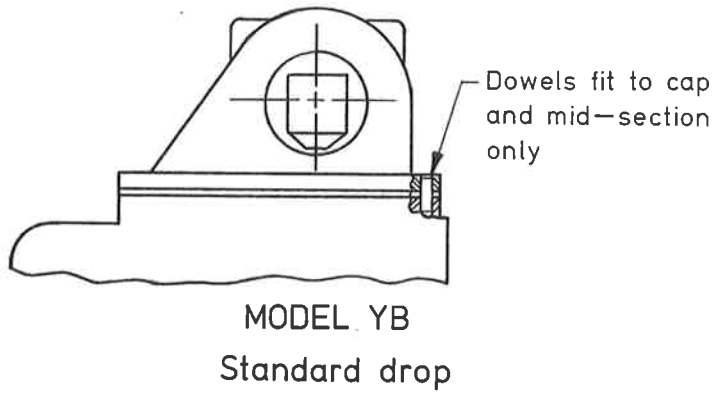
15. Remove pin (T51) attaching shift arm (T62) to shift shaft (T46). Remove shift arm (T62) and spring (T61). Remove shift shaft (T46) and attached sector gear (T47) from inside of the mid-section. Spacer (T48) will fall free as shift shaft (T46) is removed.

16. Press out bushings (T50) from mid-section. O-ring (T49) between bushings (T50) will come out when the bushings are removed.

17. Remove pin (T54) that attaches the sector gear (T47) to the shift shaft (T46) and remove sector gear (T47).

18. Remove cap screw, bolts, nuts and stud nuts that attach the cap (T65) to the top of the mid-section.

19. Remove cap (T65) and its driven shaft from the top of the mid-section. Rapping the cap with a soft hammer will break adhesion with the shims, spacer and mid-section and free the dowels between the cap and mid-section.



86-9-14 Figure 9

CAUTION

Do not drive the dowels through the flange of the cap deeper into the mid-section or spacer plates.

20. Remove any shims and spacers from the top of mid-section.

NOTE

The quantity and thickness of shims and spacers depends on transmission model and ratio.

On the model TYB and TYC (long drop), the dowels between the cap and mid-section pass freely through the shims and spacers. On the model TYC (extra long drop), the spacers are doweled to each other and also to the cap and mid-section. See Figure 9

DISASSEMBLY AND REMOVAL OF DRIVEN SHAFT FROM THE CHAIN CASE CAP

1. Remove 4 cap screws (T133) that fasten housing (T31) to cap (T65) and removing housing (T31).

2. Straighten tab of lock washer (T32) from slot in locknut (T33) and then remove then locknut (T33).

3. Remove 4 cap screws (T133) that fasten housing (T23) to cap (T65) but do not remove the housing (T23).

4. Under a press, support the assembly on the face of housing (T23) and apply a press load to the slot end of the driven shaft (T120) and press shaft out of bearing (T25), spacer (T95), (rear facing driven shaft) or (T29), (front facing driven shaft) and sprocket (T26). Remove spacer and sprocket from the cap.

5. Remove housing (T23), shaft (T120) and bearings (T25) from cap (T65). Press bearing (T25) from shaft (T120), remove spacer (T29) (front facing shaft) and remove key (T136).

6. Remove oil seal (T122) from housing (T23).

DISASSEMBLY OF COUPLING SHAFT ASSEMBLY

1. Slide housing (T42) off of bearings (T1) or (T6) if not previously removed.

2. Pull outer bearing (T1 or T6) from shaft (T44); oil seal sleeve (T14) will come off with the bearing. Remove spacer (T2), pull inner bearings (T1 or T6) from shaft. Due to closeness of this bearing to hub end of shaft (T44), a split plate type puller may be necessary.

3. Tap out pilot bearing (T3) if still in coupling shaft (T44) by using a punch through the two access holes in the coupling shaft for this purpose.

DISASSEMBLY OF DRIVE SHAFT ASSEMBLY

1. Slide shift collar (T4) from teeth on drive shaft (T13).

2. Slide housing (T11) from bearing (T15) and press oil seal (T45) from housing (T11). Discard oil seal.

3. With suitable puller, remove tachometer gear (T10) and sleeve (T14).

4. This step applicalbe only to units with 2.35" 46T 20/40 involute spline end.

   a. Remove spacer (T104).
   b. Remove snap ring (T105).

5. Place shaft and sprocket assembly in an arbor press in a vertical position with the spline end up and supported on the bottom face of sprocket (T5). Press shaft out of bearing (T15). Catch shaft to avoid damage.

6. Remove needle bearings (T6) from sprocket (T5).

MISCELLANEOUS

Remove any remaining fittings or hardware.

INSPECTION

Refer to general instructions concerning inspection of bearings and their cleaning; in addition, check for the following:

- Bent shift shaft.
- Bent shift fork.
- Worn shifter shoes.
- Loose shift shoe studs.
- Damaged lock arm,sector gear, or bent pivot pin.
- Condition of oil hoses.
- Plugged or dirty holes in oil spray tube.
- Worn or damaged drive slot in end of driven shaft.
- Oil seals, if not discarded.
- Worn oil pump.
- Worn sprocket teeth.
- Worn flanks on inner chain links.
- Outside guide links of chain not retained by "riveted over" pins.
- Wear on inner faces of outside guide links of chain.
- Badly worn pointing on teeth of shift collar, and similar wear on teeth of drive shaft and coupling shaft.
- Worn or damaged oil seal sleeves.
- Damaged or dirty sump oil strainer.
- Oil pump - If oil pump does not operate properly or show signs of damage, it must be replaced. Check to make sure pump turns

freely and drive tang is not damaged. If in doubt, contact factory for instructions.
- Damaged splines on drive and coupling shafts.

Before reassembly, make sure all reusable parts have been cleaned and are kept free of dirt during reassembly.

REASSEMBLY

INSTALLING BEARINGS

Keep reusable bearings covered and new bearings wrapped until they are to be installed. Before pressing a ball bearing on a shaft, coat bearing bore with grease. Apply grease to the outside of needle bearings. Always apply force on the inner race of a ball bearing when pressing it on a shaft, and to the outer race if pressing in a bore. Press on evenly with a piece of pipe or tube which just clears the shaft. Apply force to the cup of a needle bearing when pressing it into the bore with a pipe or tube which just clears the bore. Be sure shafts, bores, and pipe or tube used for pressing out bearings are clean before installing bearings.

INSTALLING OIL SEALS

Before installing an oil seal in its housing, coat seal O.D. evenly with oil or grease. Be sure that seal, shaft, and housing are clean. Always install a seal with the seal lip facing in. Apply force to the outer edge of a seal, and press in evenly.

INSTALLING GASKETS

If a gasket is awkward to hold in place while assembling a component, coat one of the mating flanges with grease and press the gasket into position against the flange. The grease will hold the gasket in place during reassembly.

CAP AND DRIVEN SHAFT ASSEMBLY

1. Press oil seal (T19) into housing (T23).

With front facing shaft

2. Install spacer (T29) up against shoulder on shaft (T120) and press bearing (T25) on the shaft (T120) up tight against spacer (T29).

With rear facing shaft

Press bearing (T25) against shoulder on shaft (T120).

3. Install key (T136) in the keyway in the shaft up against the spacer (T95).

4. With the cap (T65) resting on its base, position the driven sprocket (T26) inside of the cap (T65) and at the same time take the driven shaft and bearing and key assembled previously with the spline end facing the right direction, slide the shaft through the bore in the cap into the bore in the driven sprocket (T26) lining up the key in the shaft with the keyway in the sprocket. Tap bearing (T25) into the bore in the cap (T65). If the key (T136) moves axially in its keyway, tap the key back into full engagement with the driven sprocket. Install spacer (T29) on front facing shaft or spacer (T95) on rear facing shaft on the driven shaft up against the sprocket.

5. Place cap (T65) and driven shaft under a press with the face of the cap supported on blocking allowing the spline end of the driven shaft to contact and rest on the table of the press.

Position the other bearing (T25) on shaft and press the bearing (T25) on the shaft tight up against spacer (T29) or (T95).

6. Remove cap and driven shaft from the press and install the bearing lockwasher (T32) and locknut (T33). Make sure the tang of the washer is in the keyway in the shaft. Tighten nut (T33) and bend one of

the locking tangs on the washer (T32) into one of the slots in the locknut (T33).

With front facing shaft

7. Position gasket (T24) on housing (T23) and install housing (T23) on cap (T65). Fasten in place with cap screws and lockwashers (T107) and (T53).

With rear facing shaft

Position gasket (T30) on housing (T131) and install the housing (T131) on cap (T65). Fasten in place with cap screws and lockwashers (T133) and (T9).

8. The driven shaft assembly was factory shimmed to limit the axial float. If any of the parts have been changed, it may be necessary to change the total thickness of shims between the cap and oil pump support housing with front facing shaft or the cap and oil seal housing with rear facing shaft. The correct thickness of shims can be determined as follows:

With front facing shaft

Apply axial force to end of the driven shaft so it is moved forward against housing (T23) as far as it can go. Install oil pump support housing (T31), less shims (T30), until the nose end of the adapter (T31) contacts the outer driven shaft bearing (T25). Measure clearance between oil pump support housing (T31) and the face of the cap (T65) and add to this measurement .005 to .010 in. and this total is the thickness of shims (T30) to install between oil pump support housing (T31) and cap. Remove the housing and install the shims and fasten the housing to the cap with cap screws (T133) and lockwashers (T9).

With rear facing shaft

Appy axial force to end of the driven shaft so it is moved forward against housing (T31) as far as it can go. Install oil seal housing (T23), less shims (T30), until the nose end of the adapter (T23) contacts the outer driven shaft bearing (T25). Measure clearance between oil pump support housing (T23) and the face of the cap (T65)and add to this measurement .005 to .010 in. and this total is the thickness of shims (T30) to install between oil seal housing (T23) and fasten the housing to the cap with cap screws (T133) and lockwashers (T9).

NOTE

Shims are color coded for thickness as follows: .005" blue, .010" brown.

9. Install end yoke (T122), install nut (T123) and tighten; install cotter pin (T12) and spread open to secure.

10. Place this assembly aside for later installation.

DRIVE SHAFT ASSEMBLY

1. Press needle bearings (T6) into each end of bore of drive sprocket (T5) (see note below), setting them back from each face 1/8 in. Slide sprocket, coupling teeth end first, onto drive shaft (T13).

NOTE

One end of the O.D. of the cup of the needle bearings (T6) has a shiny surface and the remaining surface has a dull appearance. These bearings should be installed in the bore of the drive sprocket (T5) shiny end first.

2. Press spacer (T7) and bearing (T15) on shaft against shoulder at drive sprocket. (Drive sprocket should rotate freely on shaft after installation of the bearing.)

3. On chain case Models TYBX and TYCX (with 2.35 in. spine shaft) install snap ring (T105), and spacer (T104).

4. Press tachometer gear (T10) and sleeve (T14) on shaft against shoulder (on 2 in. spline shaft), or spacer (T104) (on 2.35 in. spline shaft). Press pilot bearing (T3) on other end of shaft.

5. Press oil seal (T45) into drive shaft housing (T11). Make sure bushing (T88) is in place in the housing (T11).

6. Apply a light coat of sealant (Permatex Super 300) to face of drive shaft housing (T11). Position gasket (T17) in place on the housing (T11).

7. Install the drive shaft housing (T11) on the bearing (T15) on the drive shaft assembly.

8. Place this assembly aside for later installation.

COUPLING SHAFT ASSEMBLY

1. Stand coupling shaft (T44) on press table with spline end up.

2. Press on inner bearing (T1) tight against shoulder on coupling shaft.

3. Slip spacer (T2) over shaft (T44) and seat it against bearing (T1).

4. Press on outer bearing (T1) tight against spacer (T2).

5. Press on oil seal sleeve (T14) tight against bearing inner race.

6. Press oil seal (T45) into the coupling shaft housing (T42).

7. Install the coupling shaft housing (T42) onto bearings (T1) on the coupling shaft assembly.

8. Place this assembly aside for later installation.

CASE MID-SECTION ASSEMBLY

1. Press bushings (T50) into the mid-section shift shaft hole with top of outer bushing flush with pad on the mid-section and with 1/8" space between the bushings (T50). Install O-ring (T49) in the space between the bushings (T50).

2. Install pins (T60) in shift arm (T62) and in the case mid-section.

3. Slide sector gear (T47) on the shift shaft (T46).

NOTE

The hub end of the sector gear (T80) is towards the shouldered end of the shaft. Line up the hole in the hub of the sector gear (T80) with the hole mid-length in the shift shaft (T46) and install pin (T54).

4. Slide spacer (T48) on the shift shaft (T46) up against the sector gear (T47).

5. Position spring sleeve (T59) on pin (T60) in the case mid-section.

6. Install the previously assembled shift shaft (T46) and sector gear (T47) from the inside through the shift shaft hole in the mid-section.

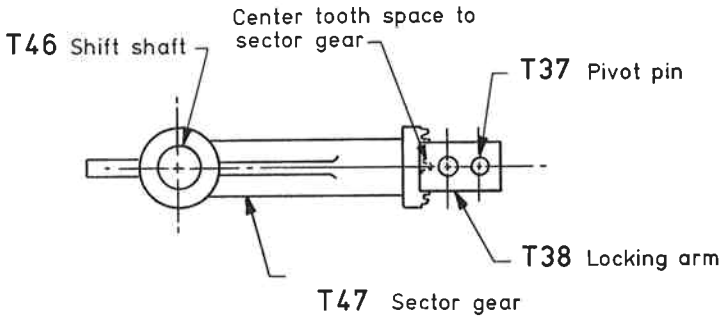
7. Insert spring (T61) in spring sleeve (T59). Position the shift arm (T62) on the shift shaft (T46). Slide down until hole in the shift arm (T62) and shift shaft (T46) line up and at the same time compress spring (T61) in its sleeve (T59) to allow pin (T60) in the shift arm (T62) to slide through the slot in the sleeve (T59). Install pin (T51) that fastens shift arm (T62) to shaft (T46). Support midsection with shift shaft in place in inverted position on work bench or other supports.

8. Install O-ring (T39) in groove in pivot pin (T37).

NOTE

This O-ring serves only to hold the locking arm (T38) on the pivot pin if the assembly is in a right side up position.

9. Install the locking arm (T38) on pivot pin (T37) and mesh with teeth on the sector gear (T47). Proper meshing of these is when the pin end of the locking arm (T38) is in line with the sector gear (T47) and the center tooth space in the sector gear (T47) is centered with the pivot pin (T37). See Figure 10.



Proper meshing of sector gear and locking arm at mid—point of sector gear travel.

86-9-15 Figure 10

10. Install shifter shoe (T40) on the pin on the locking arm (T38).

NOTE

Shifter shoe (T40) can be installed with face of counter-bore at hole either up or down.

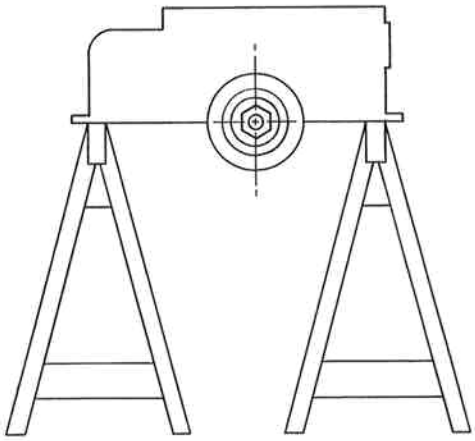
11. Install adjusting screws (T86) in the mid-section and adjust these screws so that locking arm (T38) is rotatable slightly less than 90° each direction from a center position with sector gear (T47).

12. a. If unit does not incorporate an electric shift assembly, align slot in adjusting screws (T86), install adjusting screw retainers (T87) in slots in adjusting screws (T86). Install gasket (T56), manual shift indicator light bracket, if so equipped, and cover (T55) and fasten with cap screws.

12. b. If equipped with electric shift, the electric shift assembly should not be installed until assembly of the case has been completed. The adjusting screw retainers (T87) will be installed when the electric shift unit is installed.

13. Slide the shift collar (T4) into engagement with the shoes (T75) on the shift fork (T80). The 3/16 x 45° (chamfered) pointed (tapered) end of the collar to face towards the drive shaft end of the case.

14. Take the drive shaft and housing assembly and install it into the half bore in the mid-section of case (T28). Make sure tachometer drive outlet is orientated. Engage the teeth at the end of the drive sprocket (T18) with those in the shift collar (T4). Line up holes in housing (T11) with holes in the case and install cap screws (T16) and lockwashers (T9) and tighten finger tight only.



86-9-16 Figure 11

15. Support the mid-section and drive shaft assembly on suitable blocking so the flange that cap (T65) bolts to is up. See Figure 11.

CAP AND DRIVEN SHAFT ASSEMBLY TO MID-SECTION ASSEMBLY

1. Make sure face of flanges that meet on the mid-section and cap are clean and free of nicks and burrs.

2. Clean shims (T99) on "TYB" models and shims and/or spacer(s) (T100) on "TYC" models. Install dowels (T103) in top flange of the mid-section.

3. Apply light coat of sealant (Permatex Super 300) to face of top flange of the mid-section. Place shims (T99) and/or spacers (T100) in place on the dowels (T103) in the flange of the mid-section.

NOTE

On extra long drop "TYC" models, install dowels (T103) also in top spacer (T100).

4. Apply light coat of sealant (Permatex Super 300) to top surface of last shim (T99) or spacer (T100).

5. Position previously assembled cap and driven shaft on dowels in the top flange of the mid-section and tap down into contact with shims or spacer. Install fasteners with lockwashers and tighten evenly.

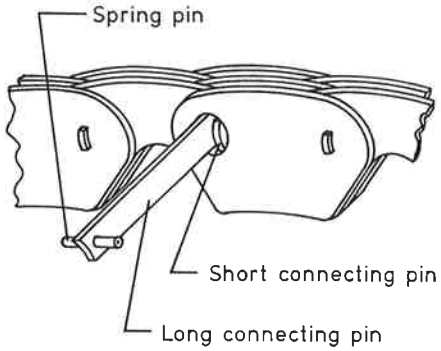
NOTE

Fasteners used vary between models TYB and TYC. Refer to table in Service Parts List for location and types of fasteners.

6. Support the mid-section and cap assembly in an upside down position on suitable supports. See Figure 6.

INSTALLING THE CHAIN

1. Lower one end of the chain (T18) into the case until it touches the inside of the cap (T65). Reach down into the case and grasp the lower end of the chain (T18) and pull it up and engage it with the teeth on the driven sprocket (T26) and drive sprocket (T5). Mesh the chain ends together around the drive sprocket (T5) and install the connecting pins as noted below and shown in Figure 12.



86-10-12 Figure 12

2. Tap the short connecting pin partway through holes in end links. Tap a spring pin (T108) in one hole of the long connecting pin, and start the long pin in the side link alongside the short pin. See Figure 12. Make sure the long pin is installed nearest the end of the connecting guide link.

3. Tap both connecting pins through the chain end links, aligning the links as the pins go through. Tap the other spring pin (T108) in the other hole of the long connecting pin. Make sure the spring pins overlap the short connecting pin on each end.

INSTALLING THE LOWER SECTION OF CASE (T28) TO THE MID-SECTION

1. Install lower shift shaft bushing (T112) into lower portion of case assembly (T28).

2. Install dowels (T31) in flange of the mid-section portion of the case (T28).

3. Coat flange of the mid-section portion of the case (T28) with a light coat of sealant (Permatex Super 300).

4. Position lower portion of the case (T28) to the mid-section of the case and align with dowels (T31) and tap into position until flanges of the mid-section and lower section meet. Install cap screws (93), bolts (T52), lockwashers (T53) and nuts (T69) and tighten securely. See Table in Service Parts List for location of the fasteners.

5. Install cap screws (T8) with nylock insert and lockwashers (T9) in drive shaft housing (T11) and tighten these fasteners and previously installed in the drive shaft housing cap screws (T11) securely.

INSTALLING THE COUPLING SHAFT AND HOUSING ASSEMBLY TO CASE (T28)

NOTE

The drive line assembly was factory shimmed to limit the axial float of the drive line. If any of the drive line parts have been changed, it may be necessary to change the total thickness of shims (T41) between the coupling shaft housing (T42) and the transmission case. Shims are color coded for thickness as follows: .005" blue, .007" natural, .010" brown. The correct thickness of shims can be determined as follows:

1. Install coupling shaft and housing assembly (T42) with no shims between the housing and case. Tighten cap screws evenly and tap the end of the coupling shaft with a soft mallet to force drive line all the way forward. Do not overtighten causing bending or breakage of the coupling shaft housing.

2. Measure gaps between housing and case in several places to assure a uniform gap, and add 0.005 in. This will be the total thickness of shims needed to provide the recommended axial float of 0.005 in.

3. Remove coupling shaft housing from case after measuring gap.

NOTE

Field conditions may make it difficult to determine the correct amount of shims. If in doubt, add another 0.005 in. shims. No harm will result from a small amount of additional axial float but bearing life will be shortened if bearings are excessively preloaded.

4. Install correct amount of shims on the coupling shaft housing, or if all original parts are being reused, reinstall original shims (T41) (if not reuseable, replace with new shims) on coupling shaft housing (T42) applying a light coat of Permatex sealant between shims and on both faces of first and last shim. Install the housing over the bearings (T1 or T6) on the coupling shaft.

REASSEMBLY OF MISCELLANEOUS PARTS

TACHOMETER DRIVE

1. Install tachometer driven gear (T89) in drive shaft housing (T11) making sure it fits into bushing (T88) previously installed in the housing.

2. Install sleeve (T90) over end of gear (T89) and thread into housing (T11). Install flinger grommet (T137) and flinger disc (T138) on end of the driven shaft. Tapered end of grommet (T137) should face the pump.

MISCELLANEOUS HARDWARE

1. Install magnetic drain plug (T58).

2. Install street elbow (T57) and breather (T27).

3. Install oil level plug (T73) and site plug (T134).

4. Install breather (T27).

5. Install sump oil strainer (T132).

The installation of the oil pump and hoses may not be possible until the transmission has been reinstalled in the chassis.

OIL PUMP

1. Install gasket (T96) over pilot diameter on oil pump (T34).

2. Position pump (T34) on adapter (31).

3. Line up drive tang of oil pump shaft with slot in driven shaft.

4. Fit pilot diameter of oil pump (T34) into adapter (T31) making sure tang on oil pump shaft and slot in driven shaft line up and engage. Fasten pump (T34) to adapter (T31) with screws (T97) which pass through pump into the adapter.

OIL HOSES

1. Install nipple (T101), tee (T102), hose (T64), if previously removed, and adapter union (T66) between discharge side of pump and spray tube assembly.

2. Install street elbows (T57) at sump strainer (T132) and inlet of oil pump (T34).

3. Install adapter union (T66) in elbow (T57) at sump strainer (T132).

4. Install hose (T67).

5. Install plug (T98) (a pressure gage may have been installed) in tee (T102) and case (T28).

REINSTALLING THE TRANSMISSION TO THE PUMP

1. Reposition under the chassis and provide means for lifting into position.

2. Raise the transmission to alignment with the holes in the support structure in the chassis.

3. Install the fasteners that fasten the transmission to the support structure and evenly tighten these to draw the transmission tight to the support structure.

REASSEMBLY OF ACCESSORIES TO THE TRANSMISSION

ELECTRIC SHIFT ASSEMBLY

1. Make sure adjusting screws (T86) are in place and adjusted, and adjusting screw retainer (T87) installed in slot in end of each screw.

2. Position and bolt electric shift assembly into place making sure gasket (T56) is installed between shift assembly and face of the case (T74). Fasten in place with cap screws (T52).

3. Fasten pivot plate (T62) and cover

(T75) to shift arm (T62) if these were removed.

4. Reconnect wiring and check for proper adjustment of indicator light switch if shift unit is so equipped.

NOTE

If chassis is equipped with an automatic transmission, indicator lights must be used.

Refer to separate Operation and Maintenance Instructions for adjustment of the shift switch. For detail of electric shift assembly, refer to separate Service Parts List.

COMPANION FLANGES

1. Slide companion flange or end yoke on the drive shaft (T13) up against the oil seal sleeve (T14), or pulley if equipped with a belt driven primer.

2. Install washer (T94) (used only with the 2.35 dia. spline) and lock nut (T43); tighten nut securely. Make sure one slot in nut lines up with hole in end of drive shaft (T13). Install cotter pin (T12) and spread open split end of pin.

3. Repeat same installation procedure at coupling shaft end.

PROPELLER SHAFT RECONNECT

Reconnect drive line to companion flanges, or end yoke. Tighten all connecting bolts securely.

LUBRICATION AND FINAL CHECK

Fill transmission to oil level plug hole with automatic transmission fluid (approximately 12-1/4 quarts required). The exact capacity will vary depending on transmission ratio.

1. Recheck fasteners for tightness.

2. Check for oil leaks.

3. Recheck for proper operation of shift mechanism and that shift indicator light system (if so equipped), is functioning properly.