

# 11-B

crawler tractor

## service manual

### STEERING CLUTCHES AND BRAKES

S/N 16C16001 - UP  
25L16001 - UP

Form 70682005 English  
(Same as 0682005-4)

### **WARNING**

**DO NOT OPERATE THIS MACHINE  
WITHOUT FIRST READING  
THE OPERATOR MANUAL**

*English*

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## FOREWORD

This manual contains the Fiat-Allis approved procedures for overhaul of 11B steering clutches, brakes and the related hydraulic system components.

All torque values given in this manual are for clean and lubricated threads.

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# TOPIC 1 GENERAL DESCRIPTION AND OIL FLOW SCHEMATIC

## 1.1 MECHANICAL OPERATION

### 1.1.1

Steering clutches and brakes are used to steer and stop tractor. Both are located in steering clutch compartments in main housing. Multiple plate steering clutches are held in engaged (driving) position by heavy springs; clutches are hydraulically disengaged.

### 1.1.2

"Double wrap" brake is a one piece, three section band assembly with bonded linings. Brakes, located around brake drums which enclose steering clutches, are mechanical; foot operated linkage is provided to apply brakes. When brake pedal is pushed, middle section of band assembly applies first; as middle section applies, it pulls two outer sections tight around drum. Left brake can be locked in applied position by parking brake lever.

### 1.1.3

Steering clutches and brakes operate in oil to provide cooler operating temperature and longer component life.

## 1.2 HYDRAULIC SYSTEM

### 1.2.1 OIL FLOW

#### 1.2.1.1

Power shift models -- the hydraulic system, Fig. 2, consists of hydraulic pump (single gear) suction line screen, oil filter, steering control valve, and necessary lines and fittings.

#### 1.2.1.2

Direct drive models -- the hydraulic system, Fig. 1, consists of hydraulic pump (dual gear) two suction line screens, oil filter, steering control valve, and the necessary lines and fittings.

#### 1.2.1.3

Oil flow TO steering control valve in both systems is the same; oil flow FROM valve differs. On power shift models, oil from valve dumps directly to sump, Fig. 2. On direct drive models, oil from valve is used to lubricate transmission and engine clutch, Fig. 1. Oil in transmission is returned to sump by rear gears in steering pump; oil in engine clutch is returned to sump by centrifugal force created by rotation of engine flywheel.

### 1.2.2 HYDRAULIC PUMP

#### 1.2.2.1

Power shift models -- pump is mounted on left rear of torque converter and driven by engine through accessory drive gear train in converter housing; pump turns at .83:1 engine speed. Containing a single set of gears the pump supplies oil from sump to steering control valve.

#### 1.2.2.2

Direct drive models -- pump is mounted on rear of engine clutch housing and driven by engine through accessory drive gear train in clutch housing. Pump turns .92:1 engine speed. Pump has two sets of gears. Front set of gears supplies oil from sump to steering control valve; rear set of gears scavenges oil from transmission case and returns it to sump.

### 1.2.3 STEERING CONTROL VALVE

#### 1.2.3.1

Mounted on bevel gear compartment top cover, valve regulates pressure delivered to disengage the steering clutches. Pressure is regulated by sliding springs and sleeves on the control valve plungers. Plunger on right side of valve (as installed on machine) regulates pressure to left clutch; plunger on left side of valve regulates pressure to right clutch. Pressure to either side can be adjusted individually. Plungers have a common oil inlet with independent outlets; flow divider directs inlet oil to each plunger.

#### 1.2.3.2

With steering controls in neutral, oil entering steering control valve flows through flow divider plunger and around each operating plunger. Oil returns to sump on power-shift models; it is used to lubricate the transmission and engine clutch on direct drive models.

#### 1.2.3.3

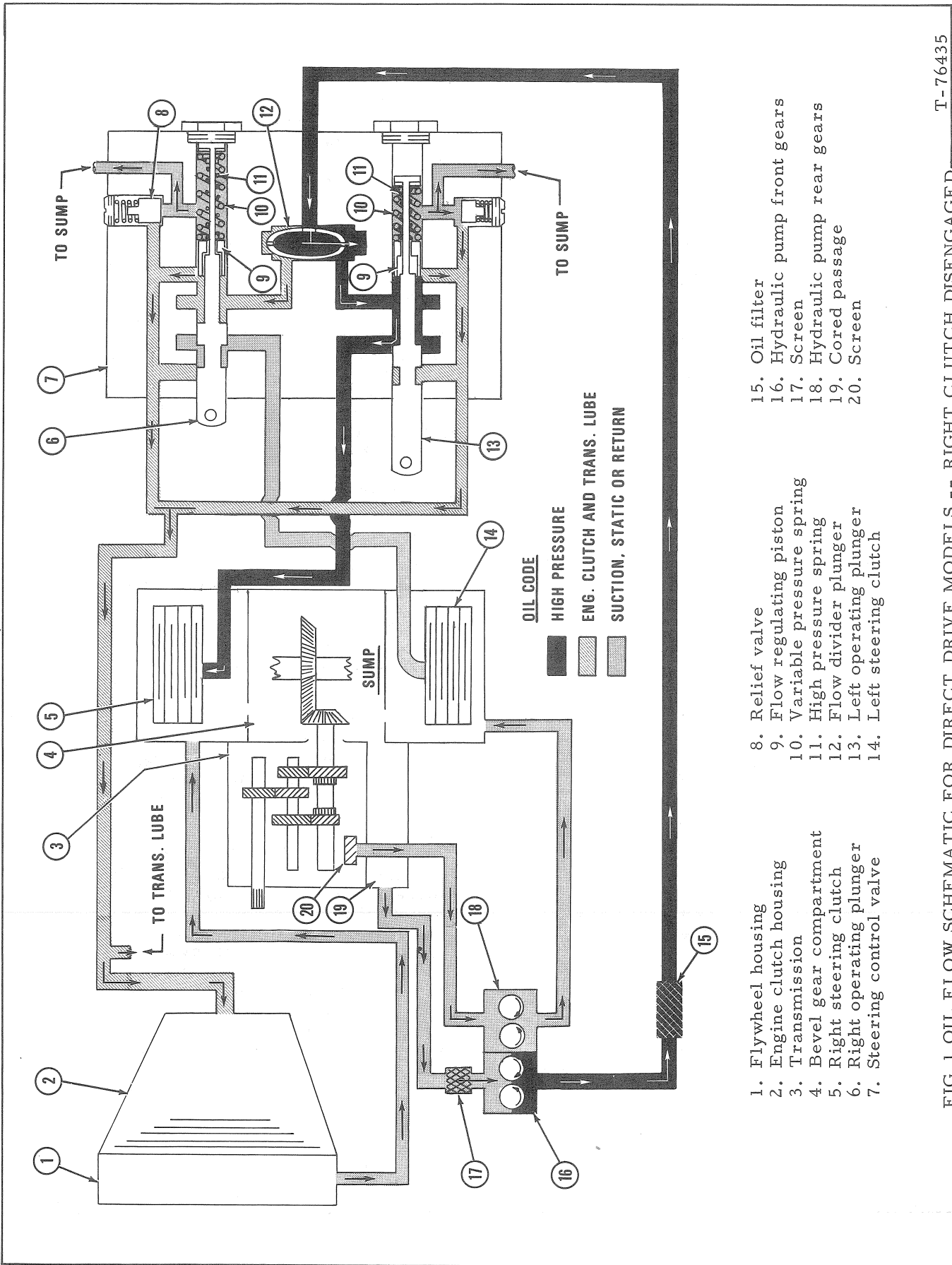
As right steering control lever is pulled back, left operating plunger is pulled forward, Fig. 1 or 2. Forward travel of plunger opens right clutch outlet port to inlet oil and increases spring tension against pressure regulating piston, forcing piston forward to close the bypass port. Resulting pressure increase in left side of control valve increases flow through right side of valve; flow increase forces flow divider plunger forward to restrict oil flow through right side of valve. High pressure oil in left side of valve disengages right clutch; oil bypasses when pressures overcome spring tension against pressure regulating piston. Spring pressure against pressure regulating piston increases as operating plunger is pulled forward; maximum pressure is obtained by use of an additional spring, Fig. 6 (5), compressed only when operating plunger is pulled all the way forward.

#### 1.2.3.4

When right steering control lever is returned to neutral, the left operating plunger also returns to its neutral position. Oil in right steering clutch dumps through the steering control valve allowing right clutch to engage.

(Continued)

# General Description and Oil Flow Schematic



T-76435

1. Flywheel housing
2. Engine clutch housing
3. Transmission
4. Bevel gear compartment
5. Right steering clutch
6. Right operating plunger
7. Steering control valve
8. Relief valve
9. Flow regulating piston
10. Variable pressure spring
11. High pressure spring
12. Flow divider plunger
13. Left operating plunger
14. Left steering clutch
15. Oil filter
16. Hydraulic pump front gears
17. Screen
18. Hydraulic pump rear gears
19. Cored passage
20. Screen

# General Description and Oil Flow Schematic

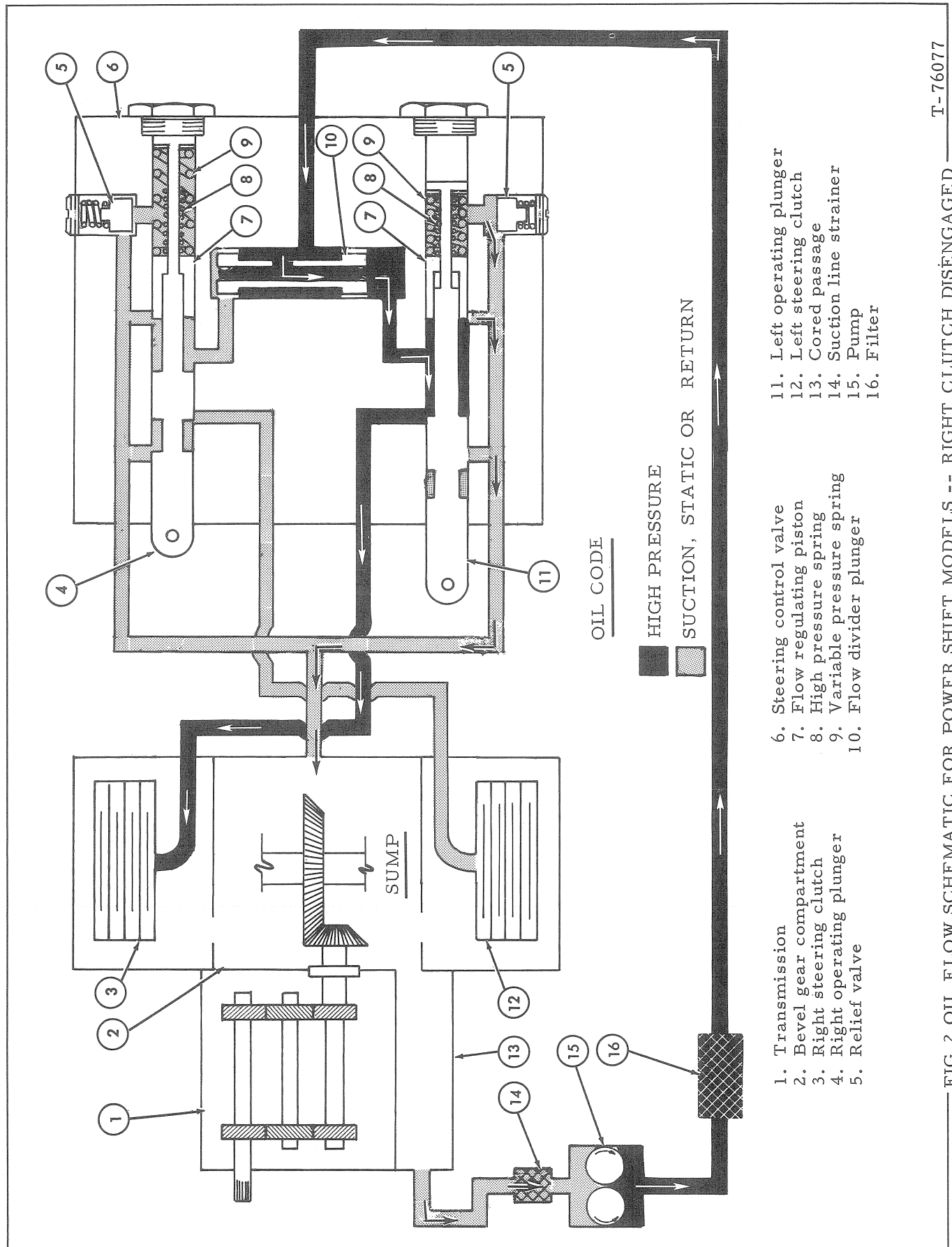


FIG. 2 OIL FLOW SCHEMATIC FOR POWER SHIFT MODELS -- RIGHT CLUTCH DISENGAGED

T-76077

## General Description and Oil Flow Schematic

### 1.2.3.5

When left steering control lever is pulled back, flow of oil is same as described for right steering except oil flows through right side of steering control valve and left steering clutch is disengaged.

### 1.2.3.6

High pressure oil which leaks along the

operating plungers is returned to sump through the steering valve on power shift models or through external piping on direct drive models. The relief valves Fig. 6 (3) open at a very low pressure to prevent a pressure build up on back side of operating plunger and at the same time prevent a backward flow of oil to the operating plunger.

# TOPIC 2 HYDRAULIC SYSTEM LUBRICANT SPECIFICATIONS, CAPACITY, AND SERVICE

## 2.1 LUBRICANT SPECIFICATIONS

### 2.1.1

Oil for use in hydraulic system must meet one of the following specifications:

#### 2.1.1.1

Transmission fluid "Type C-1 or C-2".

#### 2.1.1.2

Crankcase oil SAE 10W API Classification "Service SD" or "MIL - L - 2104B" Grade 10W.

#### 2.1.1.3

Automatic transmission fluid Dexron® or "Type A Suffix "A".

### CAUTION

API Classification "Service CD" or "Series 3" oil is not recommended.

#### 2.1.1.4

When atmospheric temperature is below -10°F (-23°C) Automatic Transmission Fluid Dexron® or "Type A - Suffix A", or lubricating oil meeting Military Specification "MIL - L - 10295B OES" must be used.

### CAUTION

Do not use "MIL - L - 10295B OES" if atmospheric temperature remains consistently above -10°F, (-23°C).

## 2.2 CAPACITY AND SERVICE

### 2.2.1

Capacity of the system on both direct drive and power-shift models is 17 gal. (64, 35 lit).

### 2.2.2

Service consists of changing oil, replacing filter element, cleaning breather element and cleaning suction line strainers. Replace filter element, clean suction line strainers and install clean oil after making major repairs to any part of the system; replace filter element and clean pressure pump suction line strainer again after first 50 hours of operation. Detailed service procedures and specified service intervals are given in Operator's Manual furnished with the tractor.

## TOPIC 3 TROUBLE-SHOOTING

### 3.1 TRACTOR WILL NOT TURN EITHER DIRECTION

#### 3.1.1

This indicates a failure in the hydraulic system. Check pressures; refer to TOPIC 4.

### 3.2 TRACTOR WILL NOT TURN ONE DIRECTION

#### 3.2.1

Determine if brake or clutch is at fault by driving tractor forward (low gear) on level surface with engine running at approximately 1/2 throttle. Momentarily depress brake pedal of side in question. Do not pull steering clutch lever.

##### 3.2.1.1

If tractor slows down but does not turn, it indicates brake is working and steering clutch is not slipping; trouble lies in hydraulic portion of steering clutch system. Check steering control linkage adjustment (5.1.4) and steering clutch pressure (4.2). If linkage and pressure are both O.K., check for oil leaks between steering control valve and collector ring or defective throwout mechanism (refer to STEERING CLUTCHES).

##### 3.2.1.2

If tractor does not slow down or turn, trouble is in brakes. Adjust brakes (7.3.2) and/or brake linkage (7.3.1).

##### 3.2.1.3

If tractor slows down and turns, it indicates brake is working properly and steering clutch is slipping. Check for high steering clutch pressure in neutral (4.3.2). If pressure is O.K. remove steering clutch and check for a mechanical failure.

### 3.3 TRACTOR VEERS ONE DIRECTION WHILE MOVING FORWARD

#### 3.3.1

If tractor turns and steering lever comes down it indicates pressure build-up on back side of steering control valve plunger. Check for high steering pressure with steering lever in neutral (4.3.2).

#### 3.3.2

If tractor turns and steering lever does not come down, it indicates malfunction in clutch on affected side. Disassemble clutch and make necessary repairs (refer to STEERING CLUTCHES).

### 3.4 TRACTOR CONTINUES TURNING AFTER STEERING LEVER IS RELEASED

#### 3.4.1

Oil trapped in steering clutch because of insufficient clearance between steering control valve plunger and housing, Fig. 6. Add shim, Fig. 7 (25) to increase clearance; see 5.1.3.4 for additional information.

### 3.5 TRANSMISSION AND ENGINE CLUTCH LUBE PRESSURE LOW (Direct Drive Models Only)

NOTE: Pressure will normally vary from upper to lower portion of Operating Range on gauge as the oil in steering system warms to normal operating temperature.

#### 3.5.1

Check oil level in steering hydraulic system; add oil if necessary. Oil filler pipe is under the operator's seat.

#### 3.5.2

Defective gauge. Check pressure with a direct reading gauge known to be accurate; refer to 4.5 for pressure check procedure.

#### 3.5.3

Steering pressure pump output too low. Check pump flow -- refer to 4.6 for flow check procedure.

## TOPIC 4 PRESSURE CHECKING AND FLOW CHECKING

### 4.1 SPECIFICATIONS

#### 4.1.1 Steering pressures:

STEERING VALVE PLUNGER TRAVEL	PRESSURE AT LOW IDLE		OIL TEMPERATURE
	PSI	KG/CM <sup>2</sup>	
NEUTRAL .07" (1,4 mm) .5" (12,7 mm) .56" (14,2 mm)	70 -- 100 130 -- 170 270 -- 350 350 -- 450	4,9 -- 7,0 9,1 -- 11,9 18,9 -- 24,6 24,6 -- 31,6	120° -- 180° F. (48° -- 82° C)

#### 4.1.2

Transmission and engine clutch lube pressure:  
15 -- 60 psi (1,05 -- 4,22 kg/cm<sup>2</sup>) at high idle

#### 4.1.3

Pump flow -- power shift models:  
6 gpm (22,7 lit/min) at high idle

#### 4.1.4

Pump flow -- direct drive models:

##### 4.1.4.1 Front gears (pressure)

Prior to S/N16C16205 (inc. 16C16211 and 16C16216).

9.25 gpm (35,0 lit/min) at high idle.

S/N 16C16205 -- up (exc. 16C16211 and 16C16216).

13.5 gpm (51,1 lit/min) at high idle.

##### 4.1.4.2

Rear gears (scavenger)

6.5 gpm (24,6 lit/min) at high idle

### 4.2 STEERING PRESSURE CHECK PROCEDURE

#### 4.2.1

Individual pressure check ports are provided on top of steering control valve, Fig. 3; check pressure at low idle as respective steering control valve plunger is pulled forward from housing. Proper function of valve can be determined by taking pressure readings in neutral and at three plunger positions. Measure plunger travel at front end of plunger; accurate measurements are essential to obtain proper pressure readings!

#### 4.2.2

Operate tractor until temperature of oil in hydraulic system is approximately 180°F(82°C); connect pressure gauge with a capacity of 600 psi (42,1 kg/cm<sup>2</sup>) in pressure check port Fig. 3 (4).

#### 4.2.3

With engine at low idle, record pressure with steering valve plungers in neutral. Pull left steering lever back slowly -- pausing long enough to record pressure at the three points in operating plunger travel. Adjust control linkage if necessary to obtain the full .56" (14,2mm) plunger travel (5.1.4).

#### 4.2.4

Connect pressure gauge to other check point, Fig. 3 (3); check right steering clutch pressure in the same manner as the left.

#### 4.2.5

Refer to 4.3 for pressure check results.

### 4.3 STEERING PRESSURE CHECK RESULTS

NOTE: Low oil level or improper lubricant will cause low, erratic pressure readings. Be sure hydraulic system is filled to proper level with specified lubricant.

#### 4.3.1 NO PRESSURE BOTH SIDES

##### 4.3.1.1

Hydraulic pump or pump drive failure. See 5.2 or 5.3 for repairs.

#### 4.3.2 HIGH PRESSURE WITH STEERING LEVER IN NEUTRAL

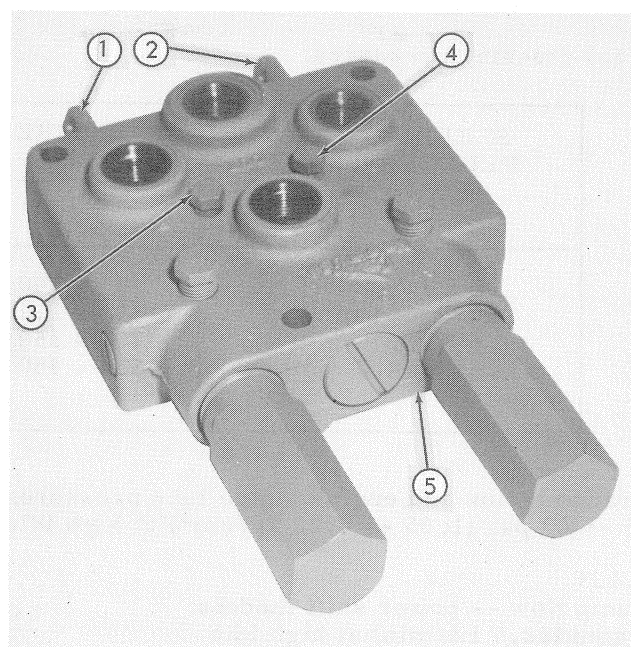
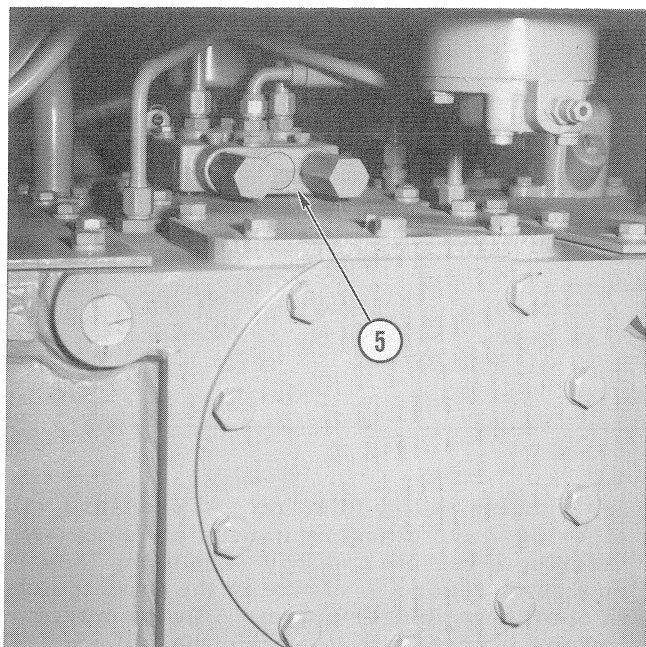
##### 4.3.2.1

Control linkage not returning steering control valve to neutral position. Adjust linkage (5.1.4)

##### 4.3.2.2

Flow divider plunger stuck in one end of its bore. Remove plug, Fig. 7 (20) and check plunger (17) for free movement. Replace if necessary.

## Pressure Checking and Flow Checking



T-76829

T-76842

FIG. 3 STEERING CLUTCH PRESSURE CHECK POINTS

1. Left operating plunger
2. Right operating plunger

### 4.3.2.3

Power shift models--pressure relief valve, Fig. 7 (21), stuck closed. Remove plug (24) from affected side and replace defective parts.

### 4.3.3 LOW ERRATIC PRESSURE

#### 4.3.3.1

Suction line strainer clogged or restricted; remove and clean strainer.

### 4.3.4 LOW PRESSURE ONE SIDE: OTHER SIDE O.K.

#### 4.3.4.1

Control linkage out of adjustment on affected side. Adjust linkage to obtain the full .56" (14,2mm) plunger travel (5.1.4).

#### 4.3.4.2

Flow divider plunger not seating properly on one end. Remove plug, Fig. 7 (20) from rear of valve and check movement of plunger.

#### 4.3.4.3

Weak pressure regulating valve spring on affected side. Spring can be shimmed to raise pressure (4.4). If shims fail to raise pressure, disassemble valve and check for failure on affected side.

3. Right clutch pressure check point
4. Left clutch pressure check point
5. Steering control valve

### 4.3.5 HIGH PRESSURE ONE OR BOTH SIDES

#### 4.3.5.1

On power shift models, check for a defective relief valve, Fig. 7 (21), on affected side. On direct drive models, or if relief valve is O.K. on power shift models, disassemble control valve and check for a failure on affected side.

## 4.4 ADJUSTING STEERING CLUTCH PRESSURES

### 4.4.1

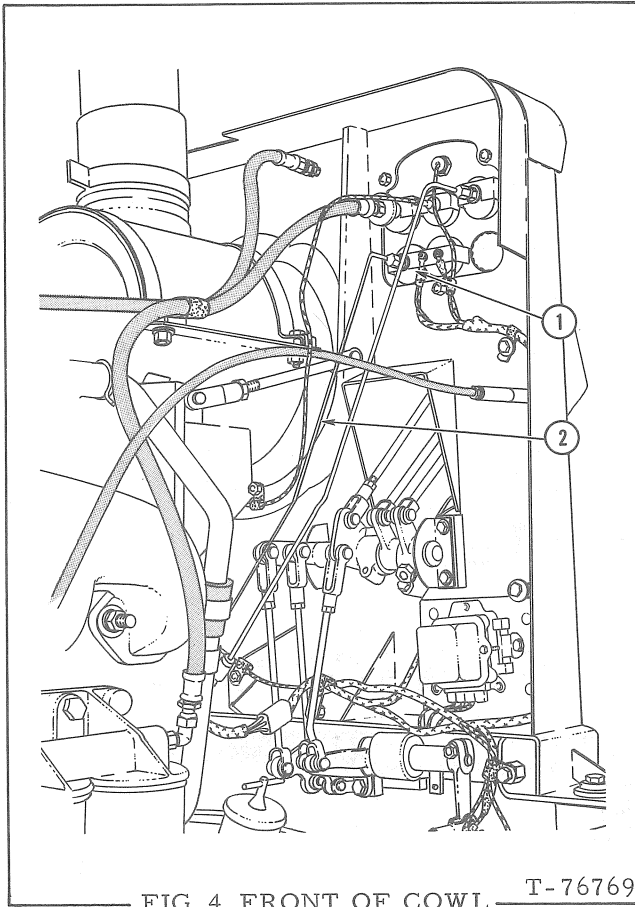
Remove operating plunger cap, Fig. 7 (14), on affected side. Remove screw (26) and slide parts off rear end of shaft.

### 4.4.2

Use shim, Fig. 7 (9) to change pressure during first .5" (12,7mm) plunger travel; use shim (5) to change pressure at .56" (14,2mm) plunger travel. Both shims are available in two thickness -- .005" and .015" (0,12 and 0,38mm). Add shims to raise pressure; remove shims to lower pressure. A .005" (0,12mm) shim, Fig. 7 (9), will change pressure approximately 2 psi (0,14 kg/cm<sup>2</sup>); a .005" (0,12mm) shim (5) will change pressure approximately 6 psi (0,42 kg/cm<sup>2</sup>). A .015" (0,38mm) shim at either location will give proportional pressure changes.



## Pressure Checking and Flow Checking



1. Transmission and engine clutch lube pressure gauge
2. Gauge line

### 4.4.3

Assemble valve and re-check pressure.

## 4.5 TRANSMISSION AND ENGINE CLUTCH LUBE PRESSURE CHECK PROCEDURE

### 4.5.1

This pressure is indicated on a gauge in the tractor instrument panel, but for test purposes a direct reading gauge can be connected to the pressure gauge line in place of the instrument panel gauge, Fig. 4. Gauge line can be disconnected along upper right side of transmission or under right side of cowl.

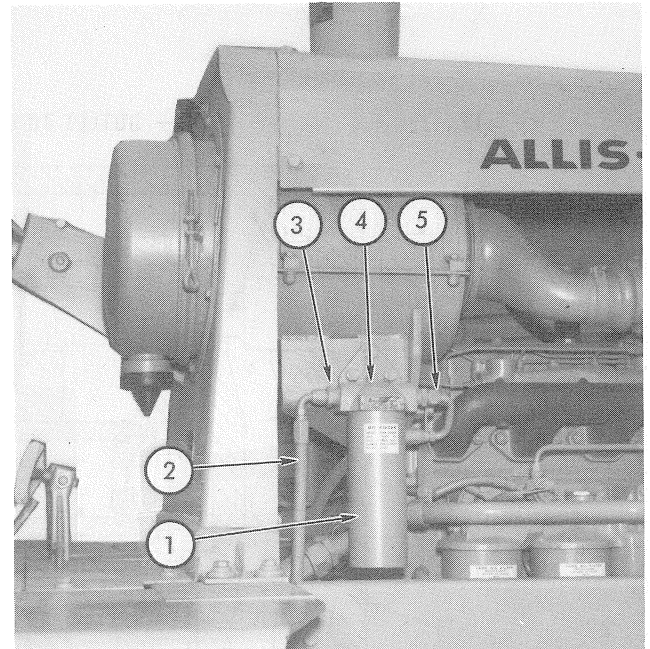
### 4.5.2

Operate tractor until temperature of oil in steering system is 120° -- 180°F (48° -- 82°C). Check pressure at high idle with steering clutches engaged.

### 4.5.3 Pressure check results.

#### 4.5.3.1

The possible causes for low pressure readings are all listed under 3.5.



T-76393  
FIG. 5 STEERING SYSTEM FILTER

1. Filter body
  2. Filter outlet line, 1/2" I. D.
  - \* 3. Connector, 1/2" tube x 3/4" pipe
  4. Filter head
  5. Filter inlet line
- \*S/N 16C16205 -- up (exc. 16C16211 & 16C16216)  
connector is 1/2" tube x 1-5/16" NF w/O-ring

## 4.6 FLOW CHECK PROCEDURE

### 4.6.1

Connect flow meter in-line on the outlet side of oil filter, Fig. 5. Check pump flow with engine at high idle and both steering clutches disengaged.

### 4.6.2 Flow check results:

#### 4.6.2.1

No flow. Pump drive shaft broken; remove and repair pump (5.2 or 5.3).

#### 4.6.2.2

Low flow, flow meter needle fluctuates during check. Suction line screen clogged and/or leak in suction line. Remove and clean screen and/or tighten suction line fittings.

#### 4.6.2.3

Low flow. Repair or replace pump if flow is less than 85% of specified flow (4.1.3 or 4.1.4).

## TOPIC 5 HYDRAULIC SYSTEM COMPONENTS

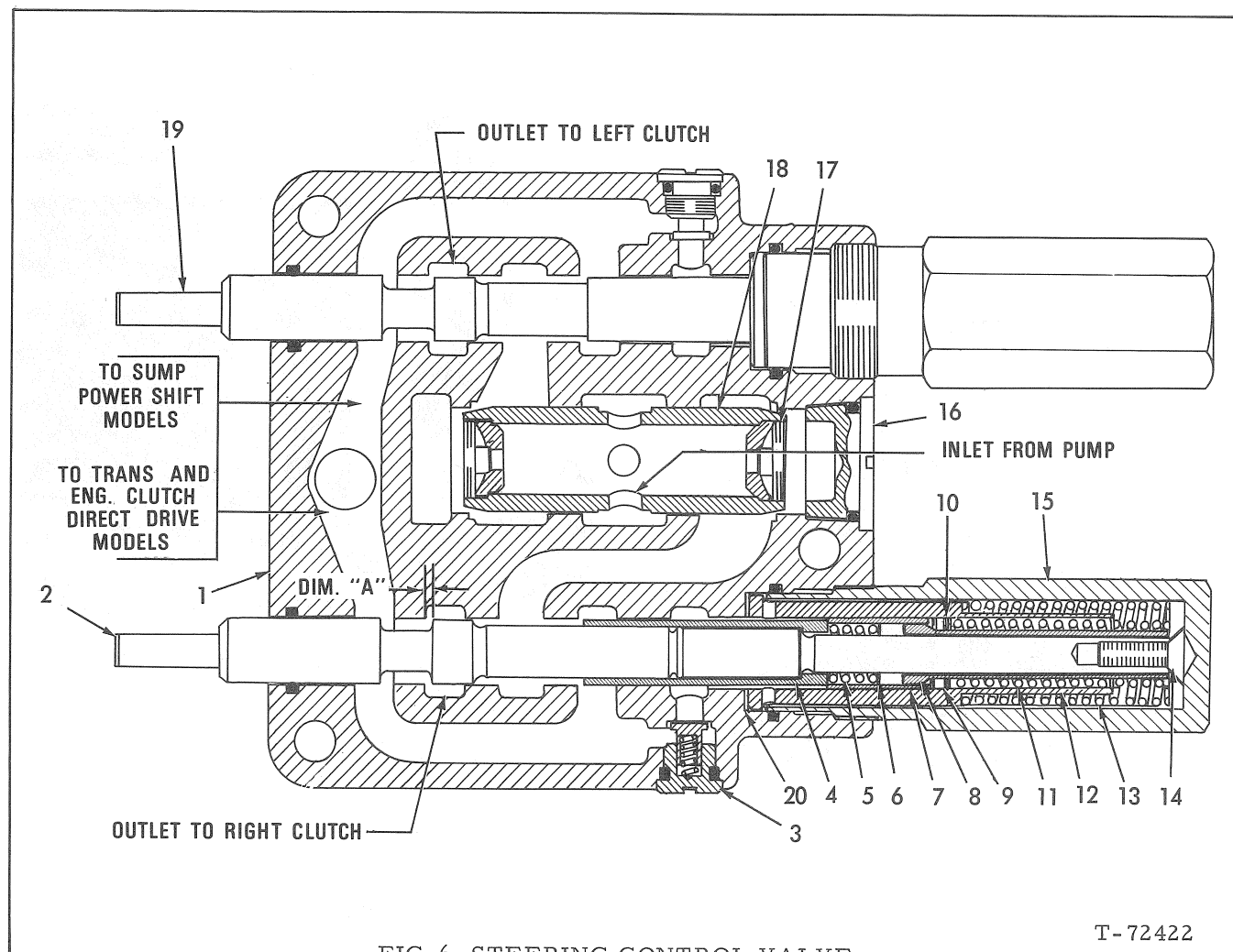


FIG. 6 STEERING CONTROL VALVE

T-72422

- |                           |                              |                                    |
|---------------------------|------------------------------|------------------------------------|
| 1. Body                   | 8. Inner sleeve              | 16. Plug w/O-ring                  |
| 2. Left operating plunger | 9. Washer                    | 17. Orifice plug (.161" [4,06 mm]) |
| 3. Relief valve assembly  | 10. Shims                    | 18. Flow divider plunger           |
| 4. Piston                 | 11. Variable pressure spring | 19. Right operating plunger        |
| 5. High pressure spring   | 12. Return spring sleeve     | *20. Plunger locating shim         |
| 6. Shims                  | 13. Return spring            |                                    |
| 7. Outer sleeve           | 14. Washer and screw         |                                    |
|                           | 15. Operating plunger cap    |                                    |
- \*Use if required  
DIM. "A" -- .020" (0,50mm) minimum

### 5.1 STEERING CONTROL VALVE

#### 5.1.1 REMOVAL AND DISASSEMBLY

##### 5.1.1.1

Clean exterior of valve and surrounding area; disconnect valve hoses and linkage. Cover hose openings to prevent entrance of dirt.

##### 5.1.1.2

Remove valve from bevel gear compartment cover.

##### 5.1.1.3

Block between front end of operating plungers and body to prevent plungers being pulled into body as valve is disassembled.

##### 5.1.1.4

Remove left cap, Fig. 7 (14); remove screw (26) and washer (13) from end of operating plunger.

NOTE: Screw is coated with "Loctite"; it will be hard to remove.

## Hydraulic System Components

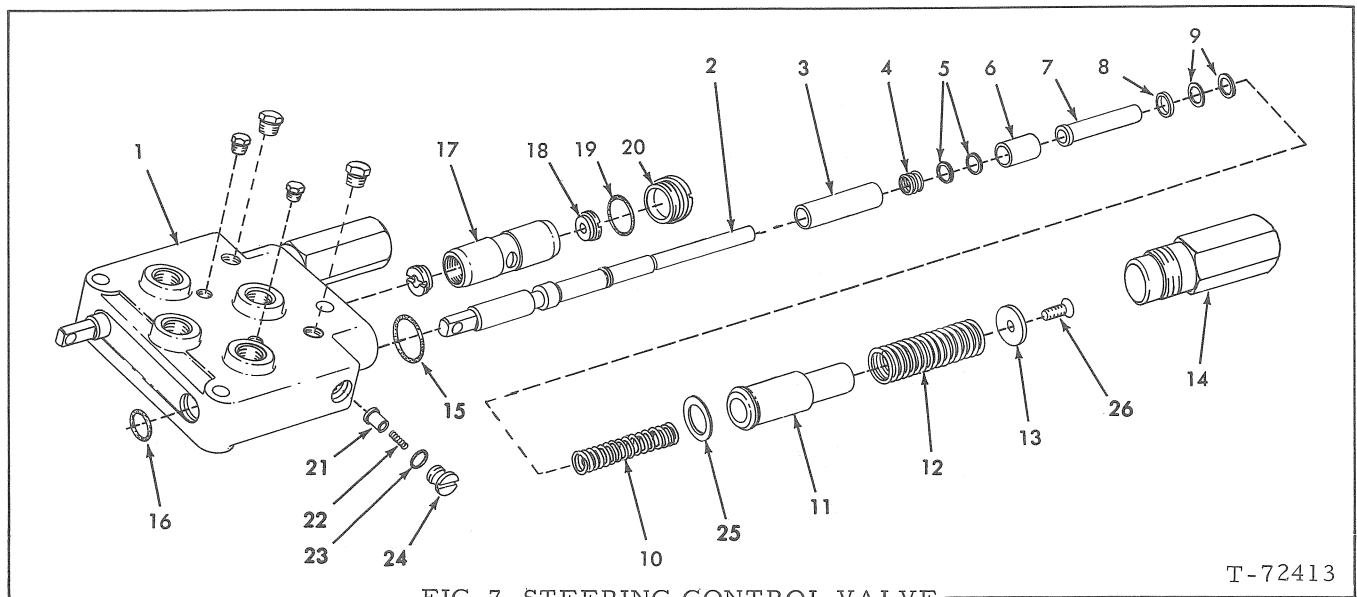


FIG. 7 STEERING CONTROL VALVE

T-72413

- |                               |                              |                                 |
|-------------------------------|------------------------------|---------------------------------|
| 1. Body                       | 10. Variable pressure spring | 19. O-ring                      |
| 2. Operating plunger          | 11. Return spring sleeve     | 20. Plunger retaining plug      |
| 3. Pressure regulating piston | 12. Return spring            | 21. Relief valve plunger        |
| 4. High pressure spring       | 13. Washer                   | 22. Relief valve spring         |
| 5. Shims                      | 14. Operating plunger cap    | 23. O-ring                      |
| 6. Outer sleeve               | 15. O-ring                   | 24. Relief valve retaining plug |
| 7. Inner sleeve               | 16. O-ring                   | * 25. Plunger locating shim     |
| 8. Washer                     | 17. Flow divider plunger     | 26. Screw                       |
| 9. Shims                      | 18. Orifice plug             | * Use if required               |

### 5.1.1.5

Slide springs, shims, sleeves, washer, and piston off rear end of plunger; keep shims with their respective spring (s).

### 5.1.1.6

Pull operating plunger from front of body; remove O-rings, Fig. 7 (15) (16), from body. Remove shim (25) (if present) from bore.

### 5.1.1.7

Remove right operating plunger in the same manner as the left; each plunger must be kept with its components.

### 5.1.1.8

Remove plug, Fig. 7 (20), from rear of body; tap body on bench to remove flow divider plunger (17).

### 5.1.1.9

Remove plugs, Fig. 7 (24), from each side of body; remove relief valve springs and plungers.

## 5.1.2 INSPECTION

### 5.1.2.1

Inspect plungers, sleeves pistons, and plunger bores for scoring or "shiny" areas that indicate component is sticking.

### 5.1.2.2

Check spring tensions; refer to FITS AND TOLERANCES.

## 5.1.3 ASSEMBLY AND INSTALLATION

NOTE: Assemble valve using following instructions and reversal of disassembly procedure.

### 5.1.3.1

Use new housing O-rings, Fig. 7 (15) (16); lubricate before installing.

### 5.1.3.2

Be certain original shims are re-used in proper locations.

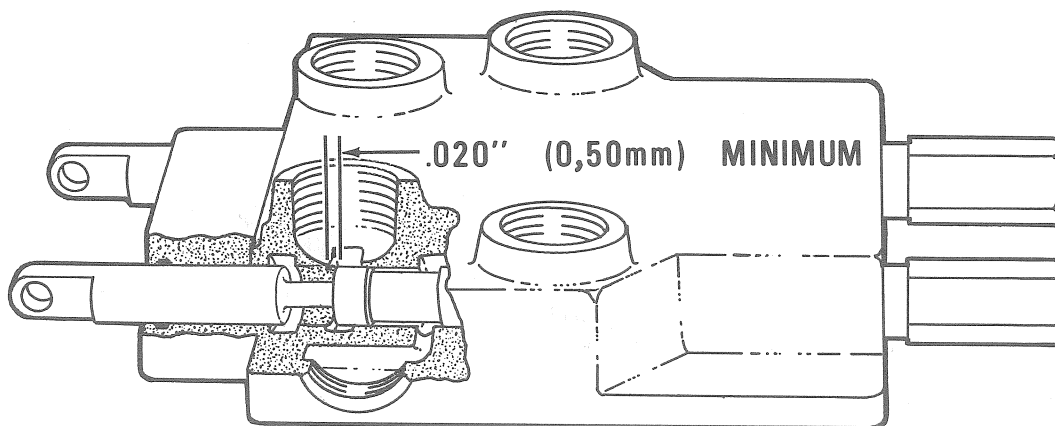
### 5.1.3.3

Clean and dry threads on plunger end screws Fig. 7 (26) and mating threads in operating plungers. Coat screw threads with "Loctite"; torque to 5 -- 8 lbs. ft. (0, 6-1, 1 kg/m).

### 5.1.3.4

Before installing valve check clearance between operating plungers and housing port, Fig. 8; clearance must be at least .020" (0, 50 mm) to allow fast re-engagement of steering clutches. If clearance is less than .020" (0, 50 mm) add shim, Fig. 7 (25) behind sleeve (11). If more than one shim must be added to obtain specified clearance, valve must be replaced.

## Hydraulic System Components



T-73645

FIG. 8 CHECKING PLUNGER CLEARANCE

**IMPORTANT:** Thickness of shim, Fig. 7 (25) is .010" (0,25mm); if shim is added to obtain clearance, add equal shims (5) under high pressure spring.

### 5.1.3.5

Install valve (with new O-ring) and connect oil lines; torque valve attaching capscrews to 30 lbs. ft. (4.1 kg/m). **DO NOT OVERTIGHTEN.**

### 5.1.3.6

Connect and adjust steering control linkage (5.1.4).

### 5.1.3.7

Check steering clutch pressures (refer to **PRESSURE CHECKING**).

## 5.1.4 STEERING CONTROL LINKAGE ADJUSTMENT

### 5.1.4.1

Steering control valve plunger must be in as far as possible (neutral) when steering lever contacts upper stop in bracket, Fig. 9. Make adjustment at horizontal control rod, Fig. 9 (27 or 28).

**NOTE:** Length of vertical control rod Fig. 9 (17) -- measured between center-lines of yoke pin holes -- must be 10.34" -- 10.46" (262,6 -- 265,6 mm).

### 5.1.4.2

Steering control valve plunger must be pulled all the way forward and over-travel, Fig. 9 (31) slightly extended when steering lever contacts lower stop in bracket.

## 5.2 HYDRAULIC PUMP (Power Shift Models)

### 5.2.1 REMOVAL AND DISASSEMBLY

#### 5.2.1.1

Pump is mounted on rear side of torque converter housing; clean pump and surrounding area. Disconnect oil lines from pump; cover openings. Remove pump.

#### 5.2.1.2

Scribe line length of pump as index for re-assembly. Remove capscrews from rear plate, Fig. 10 (11); pull rear plate off dowels in gear body. Remove O-ring (15) from rear plate.

#### 5.2.1.3

Mark position of pump gears; pull drive shaft and idler shaft out of gear body and front plate. Cover drive shaft splines to prevent damage to oil seal, Fig. 10 (1), if it must be re-used.

#### 5.2.1.4

Separate the gear body and front plate; remove diaphragm, Fig. 10 (16), gaskets (5) (6), seal (4), and springs and balls (3) from front plate. Remove drive shaft oil seal (1) from front plate.

### 5.2.2 INSPECTION

#### 5.2.2.1

Wash parts in solvent; dry with compressed air. Remove burrs from gear teeth and from the mating machined surfaces of front plate gear body, and rear plate. Wash after deburring.

# Hydraulic System Components

LEGEND FOR FIG. 9

1. Knobs
2. Left steering lever
3. Right steering lever
4. Bushing (small)
5. Bushing (large)
6. Steering lever shaft
7. Upper control rods
8. Bearing
9. Capscrew
10. Inner lever
11. Bushing (large)
12. Bushing (small)
13. Upper cross shaft
14. Outer lever
15. Capscrew
16. Bushing
17. Vertical control rod

18. Yoke
19. Yoke pins
20. Lower cross shaft
21. Pillow block
22. Capscrew
23. Lower bellcrank
24. Bushing (large)
25. Bushing (small)
26. Spacer
27. Left horizontal control rod
28. Right horizontal control rod
29. Yoke pin
30. Over-travel retaining pin
31. Over-travel
32. Return spring
33. Clip
34. Steering control valve

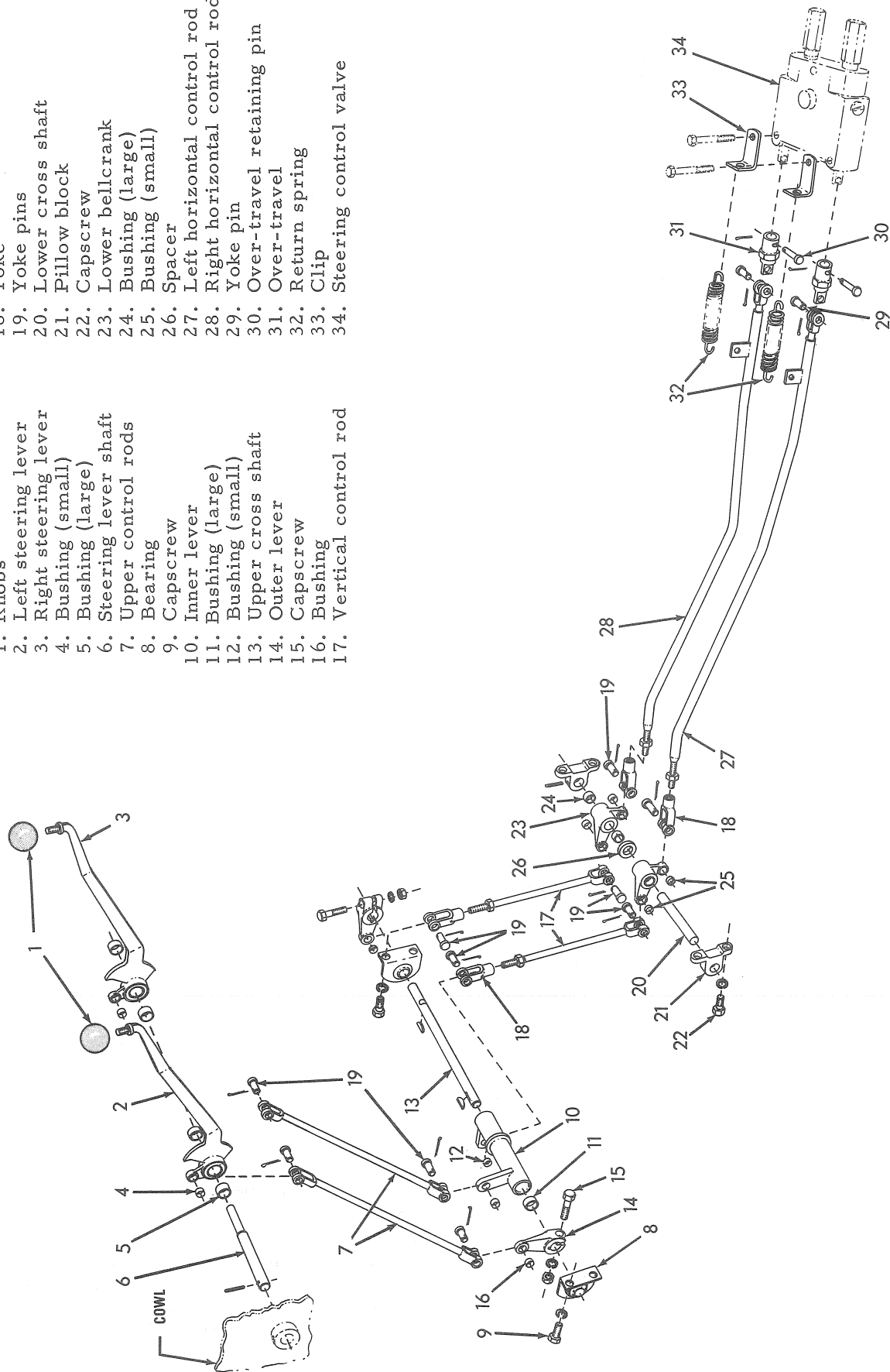


FIG. 9 STEERING CONTROL LINKAGE

T-74935

## Hydraulic System Components

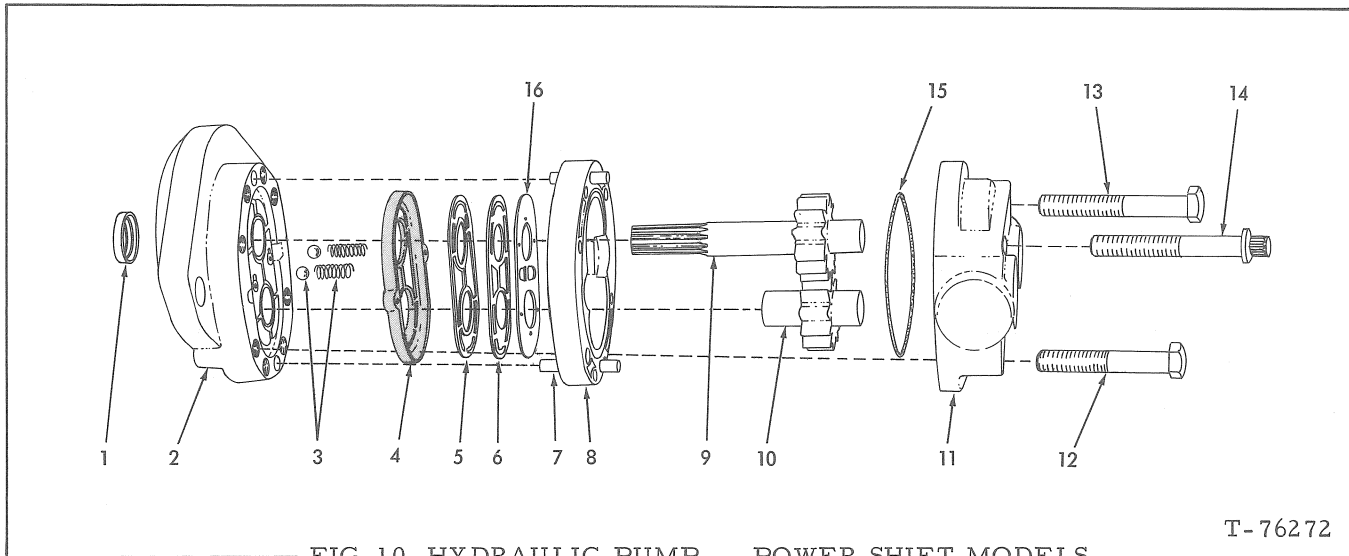


FIG. 10 HYDRAULIC PUMP -- POWER SHIFT MODELS

T-76272

1. Drive shaft oil seal
2. Front plate
3. Check balls and springs
4. Diaphragm seal
5. Gasket (thin)
6. Gasket (thick)
7. Dowel pin
8. Gear body

9. Drive shaft and gear
10. Idler shaft and gear
11. Rear plate
12. Capscrew (short)
13. Capscrew (long)
14. Capscrew (12 point head)
15. O-ring
16. Diaphragm

### 5.2.2.2

GEAR BODY. Replace if I. D. of gear pocket is more than 1.719" (43,66 mm).

### 5.2.2.3

SHAFTS AND GEARS. Replace if gear teeth are worn or chipped, or if O. D. of either shaft at any location is less than .685" (17,39 mm) Replace drive shaft if rough at oil seal location or if splines show excessive wear or signs of twisting. Always replace shafts and gears as a set.

### 5.2.2.4

FRONT PLATE AND BACK PLATE. Replace if bushing I. D. is more than .691" (17,55mm). (Bushings are not serviced).

### 5.2.2.5

DRIVE SHAFT OIL SEAL, DIAPHRAGM AND DIAPHRAGM GASKETS AND SEAL. Replace.

### 5.2.3 ASSEMBLY AND INSTALLATION

#### 5.2.3.1

Lightly oil all parts prior to assembly. Install check balls, Fig. 10, in bores in front plate; seat springs over the balls. Install seal (4), gaskets (5) (6), and diaphragm (16) (bronze side up) in front plate. Use dull tool to "tuck" seal into grooves in front plate; diaphragm (16) will be flush with outer lip of seal when properly installed.

### 5.2.3.2

Tightly clamp front plate in a vise -- diaphragm up. Install shafts and gears; match the alignment marks placed on gears if the original gears are used.

### 5.2.3.3

Align marks placed at disassembly; install gear body, Fig. 10 (8) and rear plate (11) with new O-ring (15).

NOTE: Half moon cavities in gear body must face up (toward rear plate) with hole in base of one cavity on pressure side of pump.

### 5.2.3.4

Install capscrews, Fig. 10 (12) (13) (14) in proper location; torque evenly to 25 -- 28 lbs. ft. (3,45 -- 3,87 kg/m).

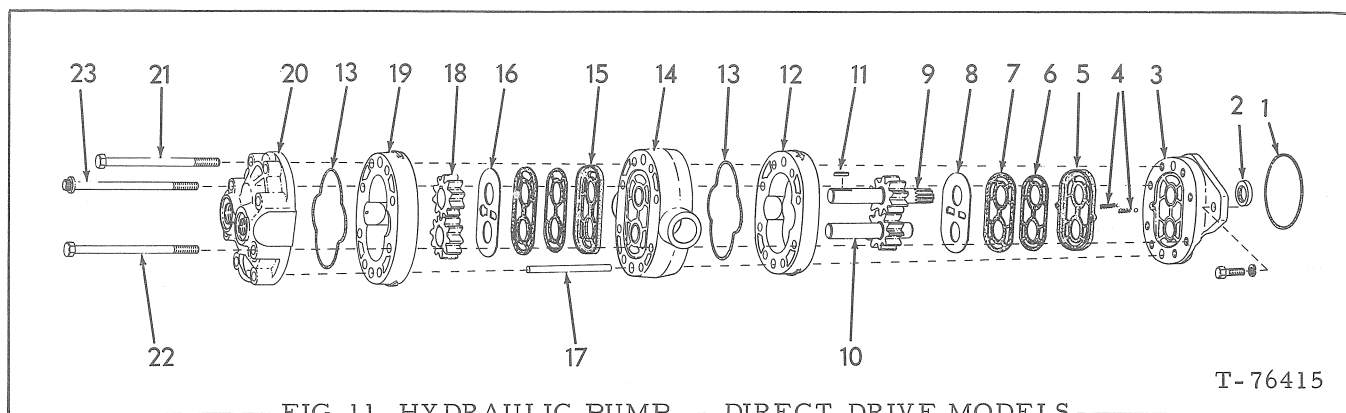
### 5.2.3.5

Install drive shaft oil seal, Fig. 10 (1) -- sealing lip in. Turn drive shaft with pliers; sight drag will be noticed if pump is properly assembled.

### 5.2.3.6

Clean mounting surfaces on pump and torque converter housing; install pump and connect oil lines. Use new O-ring around pump mounting flange. Check system pressures and/or pump flow; refer to Topic 4.

## Hydraulic System Components



- |                            |                              |
|----------------------------|------------------------------|
| 1. Pump mounting O-ring    | 13. O-ring                   |
| 2. Drive shaft oil seal    | 14. Center body              |
| 3. Front plate             | 15. Rear diaphragm seal      |
| 4. Check balls and springs | 16. Rear diaphragm           |
| 5. Front diaphragm seal    | 17. Dowel pin                |
| 6. Gasket (thin)           | 18. Rear gears               |
| 7. Gasket (thick)          | 19. Rear gear body           |
| 8. Front diaphragm         | 20. Rear plate               |
| 9. Drive shaft and gear    | 21. Capscrew (short)         |
| 10. Idler shaft and gear   | 22. Capscrew (long)          |
| 11. Key                    | 23. Capscrew (12 point head) |
| 12. Front gear body        |                              |

### 5.3 HYDRAULIC PUMP (Direct Drive Models)

#### 5.3.1 REMOVAL AND DISASSEMBLY

##### 5.3.1.1

Pump is mounted on rear of engine clutch; remove right front floor plate for access. Clean pump and surrounding area. Identify and disconnect oil lines from pump; cover openings. Remove pump.

##### 5.3.1.2

Clean exterior of pump and mark pump sections as an index for assembly. Remove capscrews from rear plate, Fig. 11 (20); pull rear plate and gear body (19) from dowels. DO NOT PRY PUMP SECTIONS APART.

##### 5.3.1.3

Mark position of pump gears, Fig. 11 (18); slide idler gear from shaft and pull drive gear from woodruff key in shaft. Remove woodruff key, center body (14) and gear body (12).

##### 5.3.1.4

Mark position of remaining pump gears; remove idler shaft and drive shaft from front plate.

##### 5.3.1.5

Remove diaphragms, Fig. 11 (8) (16), diaphragm gaskets (6) (7), and diaphragm seals (5) (15) from center body and front plate; remove springs and balls (4) from front plate.

##### 5.3.1.6

Remove drive shaft oil seal Fig. 11 (2) from front plate.

#### 5.3.2 INSPECTION

##### 5.3.2.1

Wash parts in solvent; dry with compressed air. Remove burrs from gear teeth and mating machined surfaces of gear bodies, center body and front and rear plates. Wash after deburring.

##### 5.3.2.2

GEAR BODIES. Replace if I. D., of gear pocket is more than 1.719" (43, 66 mm).

##### 5.3.2.3

SHAFTS AND GEARS. Replace if gears are chipped or worn, or if shaft O. D. at bushing locations is less than .685" (17, 39 mm). Replace if drive shaft is rough at oil seal location or if splines are excessively worn. Always replace shafts and gears as a set.

##### 5.3.2.4

BACK PLATE, FRONT PLATE, AND CENTER BODY. Replace if bushing I. D. is more than .691" (17, 55 mm). (Bushings are not serviced).

##### 5.3.2.5

DRIVE SHAFT OIL SEAL, DIAPHRAGMS, AND DIAPHRAGM GASKETS AND SEALS. Replace.

## Hydraulic System Components

### 5.3.3 ASSEMBLY AND INSTALLATION

#### 5.3.3.1

Oil all parts prior to assembly. Install springs in bores in front plate. Install seals, Fig. 11 (5) (15) with open side down, gaskets (6) (7), and diaphragm (8) (16) with bronze side up in front plate and center body; seal with "ears" goes in front plate. Use dull tool to "tuck" seals into grooves in front plate and center body; diaphragms (8) (16) will be flush with outer lip of seals when properly installed.

**IMPORTANT:** Intake hole in diaphragm (16) must be over intake hole in center body.

#### 5.3.3.2

Coat mating surfaces of front plate, gear bodies, center body, and rear plate with a good grade of liquid sealer. Clamp front plate in a vise -- diaphragm side up. Install drive shaft Fig. 11 (9) and idler shaft (10) in front plate; align marks placed on gears at disassembly if original gears are used. Align marks placed at disassembly and install front gear body (12) and center body (14).

**IMPORTANT:** Half moon cavities in gear body must face up (toward center body) with hole in base of one cavity on pressure side of pump.

#### 5.3.3.3

Install drive shaft woodruff key, Fig. 11 (11) and pump gears (18); align marks placed on gears at disassembly if original gears are used. Install gear body (19) and rear plate (20); be sure alignment marks placed on them are matched.

**IMPORTANT:** Half moon cavities in gear body must face up (toward rear plate) with hole in base of one cavity on pressure side of pump.

#### 5.3.3.4

Install drive shaft oil seal, Fig. 11 (2) -- sealing lip directed in.

#### 5.3.3.5

Install capscrews, Fig. 11 (21) (22) (23) in proper location; torque evenly to 25 -- 28 lbs. ft. (3,45 -- 3,87 kg/m). Turn drive shaft with pliers; slight drag will be noticed if pump is properly assembled.

#### 5.3.3.6

Clean mounting surfaces on pump and engine clutch housing. Install pump with new O-ring Fig. 11 (1) and attach oil lines to pump. Check system pressures and/or pump flows; refer to TOPIC 4.



## TOPIC 6 STEERING CLUTCHES

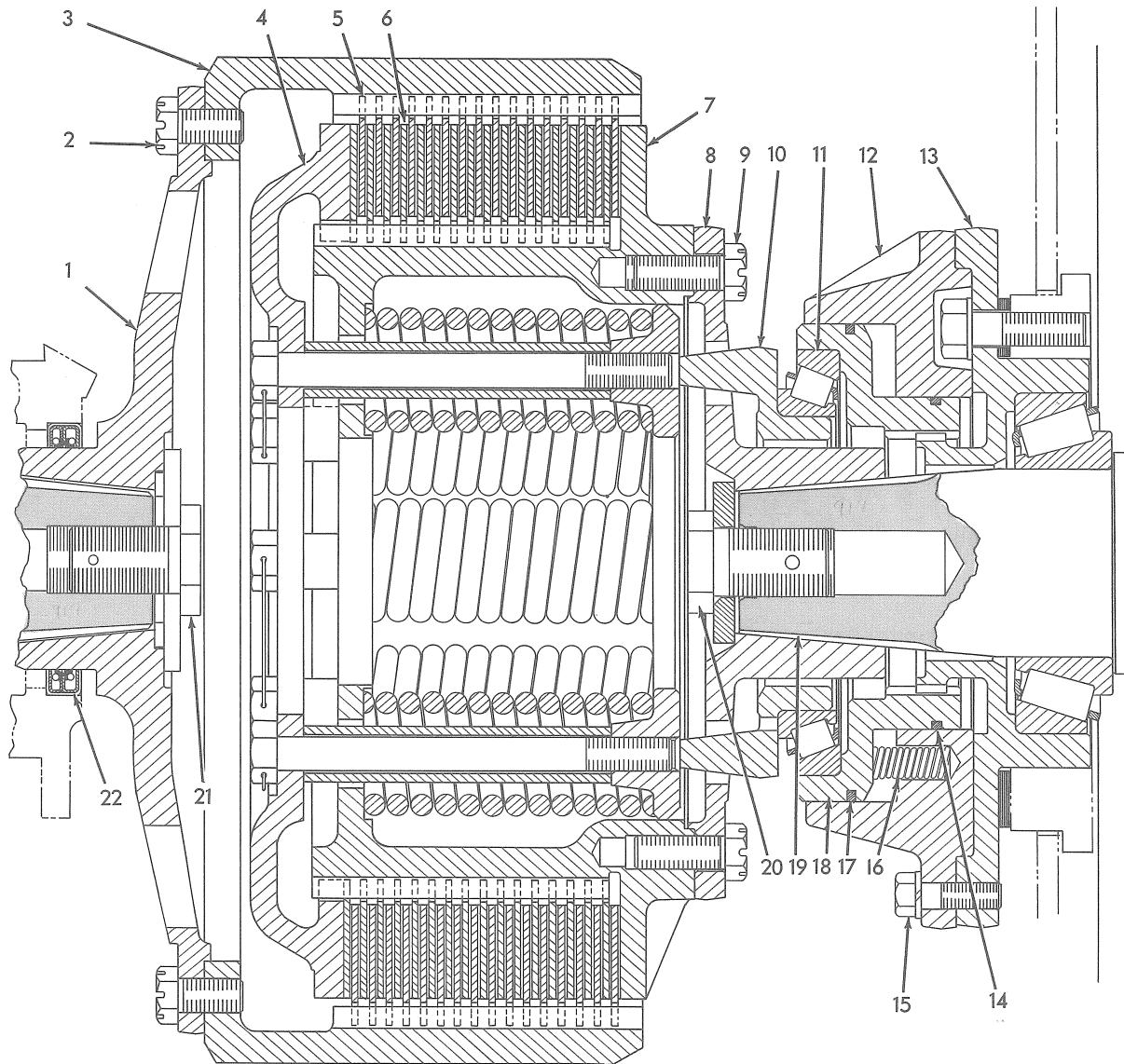


FIG. 12 STEERING CLUTCH INSTALLED

T-76805

- |                                |                                   |                         |
|--------------------------------|-----------------------------------|-------------------------|
| 1. Brake drum driving hub      | 8. Steering clutch driving hub    | 15. Capscrew            |
| 2. Place bolt                  | 9. Place bolt                     | 16. Collector spring    |
| 3. Brake drum                  | 10. Throwout sleeve               | 17. Piston ring (outer) |
| 4. Steering clutch assembly    | 11. Throwout bearing              | 18. Actuating piston    |
| 5. Friction disc (bi-metallic) | 12. Collector ring                | 19. Bevel gear shaft    |
| 6. Steel disc                  | 13. Bevel gear shaft bearing cage | 20. Capscrew            |
| 7. Steering clutch hub         | 14. Piston ring (inner)           | 21. Capscrew            |
|                                |                                   | 22. Oil seal            |

### 6.1 REMOVAL

NOTE: Following procedures apply to either steering clutch.

#### 6.1.1

Turn electrical system master switch off. Drain oil from steering clutch and bevel gear compartment; clean drain plugs and reinstall in respective locations.

## Steering Clutches

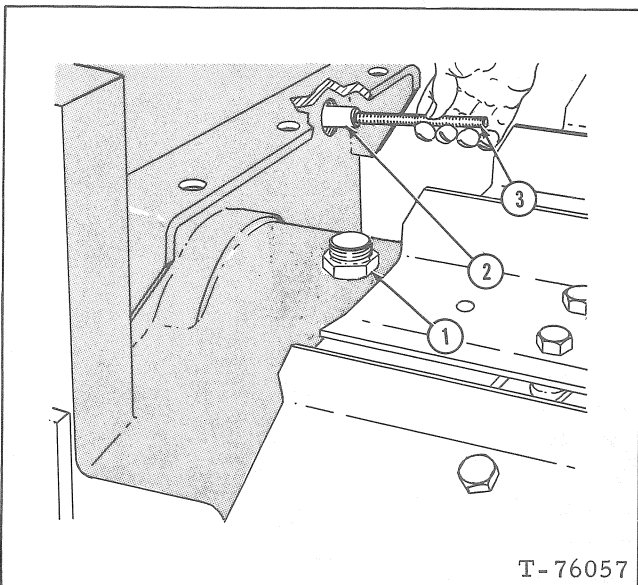


FIG. 13 REMOVING BRAKE LEVER UPPER PIN

- |                          |                 |
|--------------------------|-----------------|
| 1. Pipe plug             | 3. Puller screw |
| 2. Brake lever upper pin | (1/4" NC)       |

### 6.1.2

Remove seat and seat supporting rear channel. Turn fuel line shut-off cocks off and disconnect fuel lines; cover ends of hose openings to prevent entrance of dirt. Remove fuel tank.

### 6.1.3

Remove capscrews attaching linkage cover, Fig. 23 (10) to clutch compartment cover. Raise rear end of linkage cover and disconnect control rod (8) from band operating lever (11) loosen large clamp on linkage cover boot and remove linkage cover and clutch compartment cover.

### 6.1.4

Remove plug from side of steering clutch compartment, Fig. 13; turn band adjusting block Fig. 23 (12) counter-clockwise to loosen brake band until brake lever upper pin (15) can be seen through plug hole. Use puller screw to remove brake lever upper pin, Fig. 13.

### 6.1.5

Remove place bolts attaching steering clutch assembly to steering clutch driving hub and brake drum to brake drum hub Fig. 12; leave one each of the bolts installed at top.

NOTE: Place bolts may be removed by rotating clutch assembly (move tractor or use jack under track shoes to rotate track until bolts are accessible).

### 6.1.6

Attach suitable lifting device around brake band pin and brake lever pin, Fig. 14;

lift steering clutch and brake drum assembly gently to take weight off of remaining two bolts. Remove bolts, pry throwout sleeve, Fig. 12 (10) away from steering clutch, and lift steering clutch out of main housing. Slide brake band assembly from drum.

### 6.1.7

Turn clutch driving hub capscrew, Fig. 12, (20) out three turns; use tools shown in Fig. 15 to pull clutch driving hub. Remove puller tools, hub retaining capscrew, and hub retaining washer. Remove clutch driving hub, throwout sleeve, and bearing cone as an assembly.

NOTE: Use same procedure and tools to remove brake drum hub if necessary.

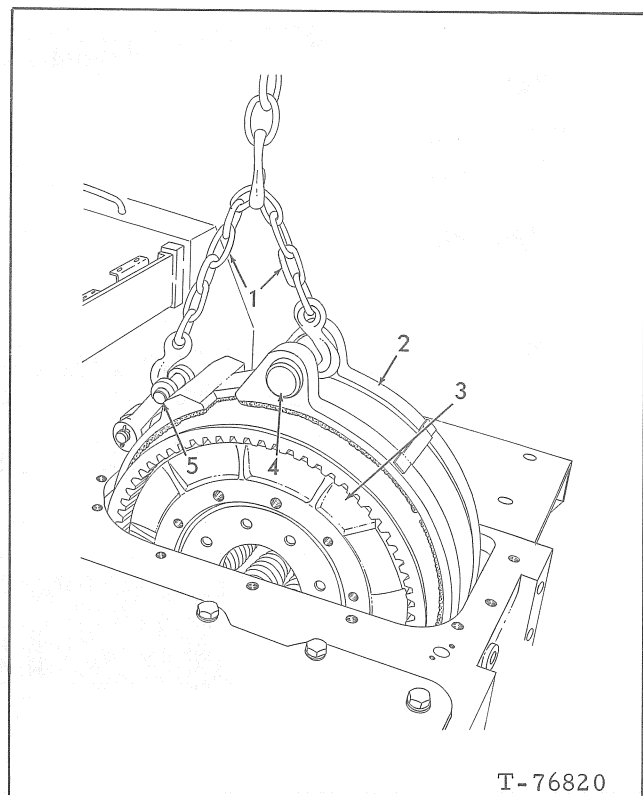


FIG. 14 REMOVING STEERING CLUTCH AND BRAKE

- |                    |                    |
|--------------------|--------------------|
| 1. Chain           | 4. Brake band pin  |
| 2. Brake band      | 5. Brake lever pin |
| 3. Steering clutch |                    |

### 6.1.8

Disconnect oil line from collector ring and remove capscrews attaching collector ring to bevel gear shaft bearing cage, Fig. 12. Remove collector ring and actuating piston as an assembly; remove actuating piston and spring from collector ring.

### WARNING

If actuating piston sealing rings, Fig. 12 (14)(17) are replaced, do not destroy old rings by burning. Fumes from burning rings are toxic when inhaled.

## Steering Clutches

### 6.1.9

If throwout bearing is to be replaced, use suitable tools to remove bearing cup from actuating piston and pull bearing cone from throwout sleeve.

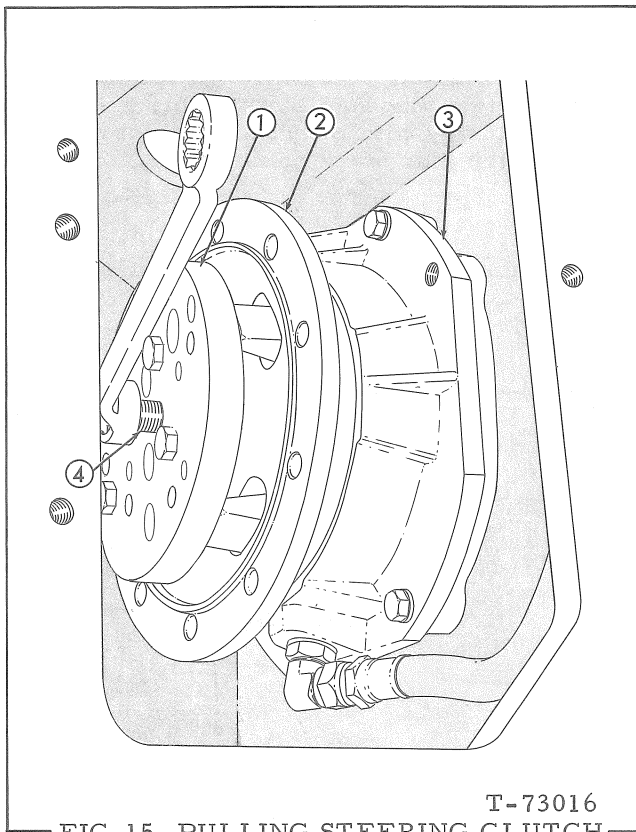


FIG. 15 PULLING STEERING CLUTCH DRIVING HUB

- |                                |                    |
|--------------------------------|--------------------|
| *1. Puller plate               | 3. Collector ring  |
| 2. Steering clutch driving hub | *4. Forcing screw  |
|                                | *See SERVICE TOOLS |

## 6.2 STEERING CLUTCH DISASSEMBLY

### 6.2.1

Before disassembly, mark pressure plate, clutch hub, and throwout plate so they may be assembled in the same relative positions. Remove brake drum from steering clutch; use care to avoid damaging clutch disc teeth.

### 6.2.2

Remove lock wires from throwout plate cap screws. Place a backing plate under steering clutch throwout plate; backing plate should have an O. D. of slightly less than throwout plate O. D. and a tapped hole in center to accept the forcing screw, Fig. 16.

Insert forcing screw, Fig. 16 (1) into backing plate (5) under throwout plate. Install tube (4) over forcing screw and against the top of clutch hub. Install tube end plate (3), hydraulic ram (7), and lock nut (2) over forcing screw. Compress steering clutch springs to release tension from throwout plate cap screws; remove cap screws. Slowly release hydraulic pressure until tension is off of steering clutch springs; remove tools.

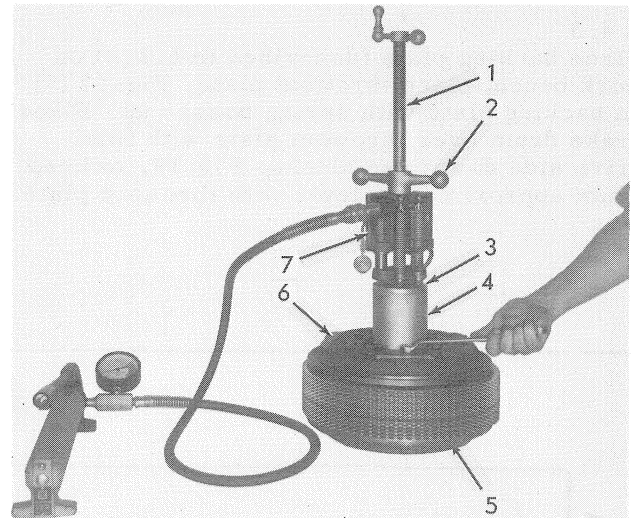


FIG. 16 REMOVING THROWOUT PLATE CAPSCREWS

1. Forcing screw
2. Lock nut
3. Tube end plate
4. Tube (3.25" O. D.; .25" wall thickness / 82,5mm O. D.; 6,3mm wall thickness)
5. Backing plate (7" O. D. / 177,8mm O. D.)
6. Pressure plate
7. Hydraulic ram (17 ton)

### 6.2.3

Remove pressure plate, friction discs, clutch hub, springs, and spacers from throwout plate.

## 6.3 INSPECTION

### 6.3.1

Visually inspect all the clutch and throwout parts for wear; check spring tension. Sizes of parts when new, their wear limits, and specified spring tension are given in FITS AND TOLERANCES.

## 6.4 STEERING CLUTCH ASSEMBLY

### 6.4.1

Clean components before assembly. Place clutch hub, Fig. 17 (6) -- flanged side down -- on work bench. Stack clutch discs (4) (5) alternately on hub, beginning with bi-metallic (5) then steel (4), etc., until all discs are on hub (16-bimetallic and 16 steel).

### 6.4.2

Refer to Fig. 18 and check stack height (measure distance from top steel disc to top machined surface of clutch hub). Specified dimension is .50" -- .62" (12,7 -- 15,7mm). Add or remove steel disc on top of stack to obtain specified dimension. After obtaining proper disc stack height, remove discs from clutch hub; keep discs in proper positions.

## Steering Clutches

**IMPORTANT:** At least one steel disc must be at top of stack.

### 6.4.3

Place backing plate (described in 6.2.2) on work bench; place throwout plate, Fig. 17 (9) on backing plate with spring bosses up. Place brake drum over throwout plate with final drive side down; use blocks, Fig. 19, to keep drum approximately level with throwout plate.

### 6.4.4

Install pressure springs Fig. 17 (7) over spring bosses on throwout plate; insert spacer (8) into each spring. Align marks placed at disassembly and install clutch hub (6) in position over springs; be sure springs are properly seated in hub.

### 6.4.5

Install two aligning studs through spacers and turn studs into throwout plate. Lubricate splines of hub sparingly with graphite base lubricant; install clutch disc stack on hub.

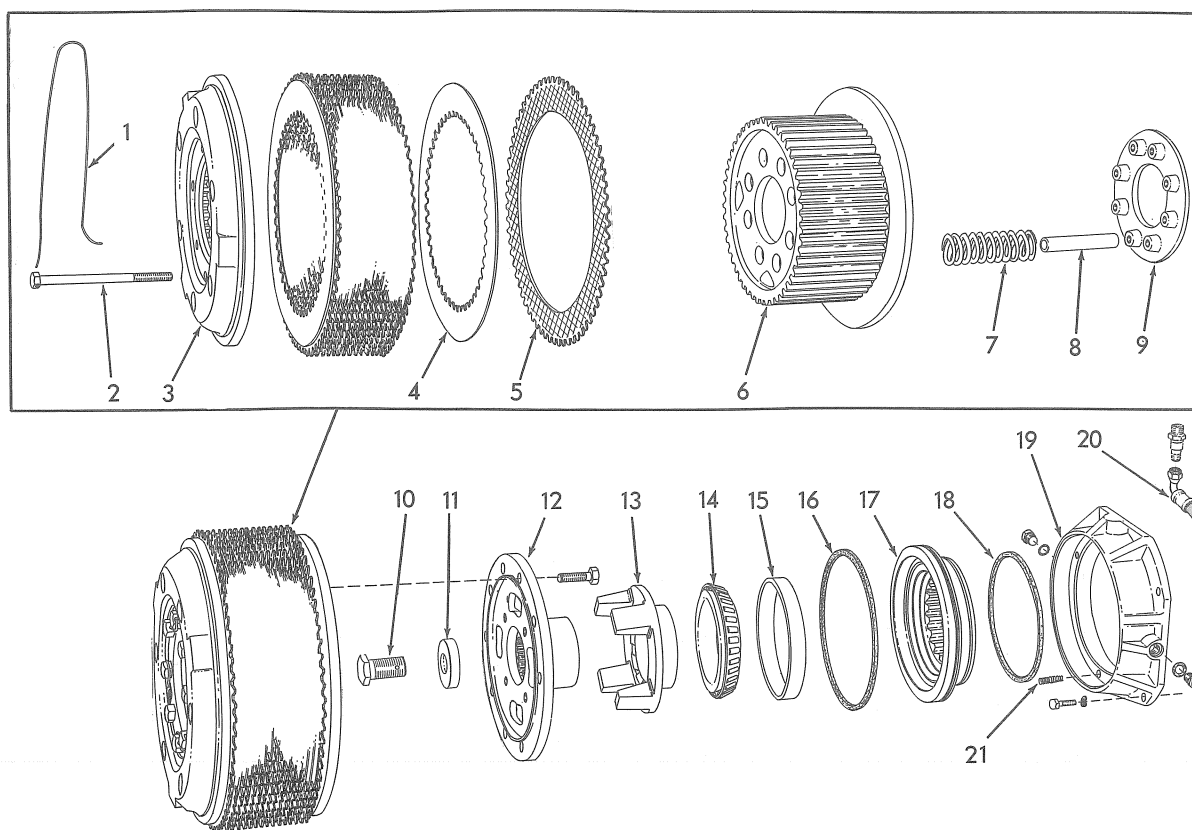


FIG. 17 STEERING CLUTCH

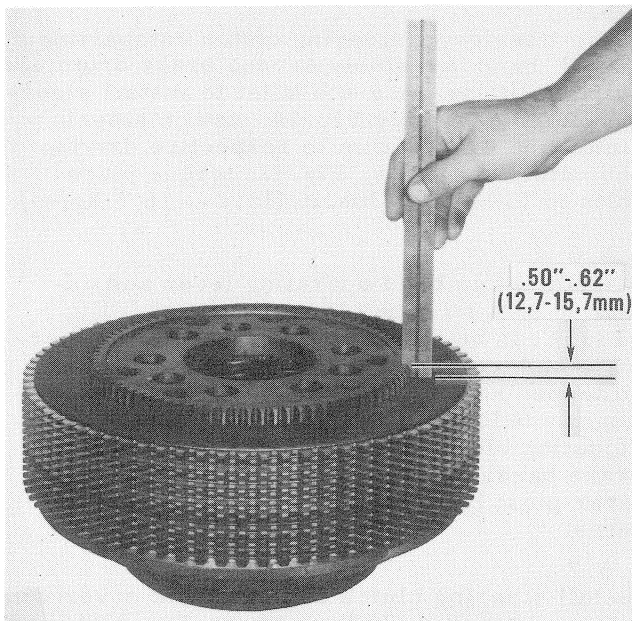
T-41894

1. Locking wire
2. Throwout plate capscrow
3. Pressure plate
4. Steel disc
5. Friction disc
6. Clutch hub
7. Pressure spring

8. Throwout plate spacer
9. Throwout plate
10. Hub retaining capscrow
11. Hub retaining washer
12. Driving hub
13. Throwout sleeve
14. Throwout bearing cone

15. Throwout bearing cup
16. Actuating piston outer sealing ring
17. Actuating piston
18. Actuating piston inner sealing ring
19. Collector ring
20. Oil supply hose
21. Piston return spring

## Steering Clutches



T-22038

FIG. 18 CHECKING STACK HEIGHT

### 6.4.6

Turn forcing screw, Fig. 19, fully into backing plate; install tube, tube end plate, hydraulic ram, and lock nut over forcing screw. Compress pressure springs and install throwout plate capscrews; remove aligning studs and install remaining capscrews. Torque all capscrews evenly to 40 -- 50 lbs. ft. (5,53 -- 6,91 kg/m).

**IMPORTANT:** Throwout plate capscrews are designed for this particular application; standard capscrews must never be substituted.

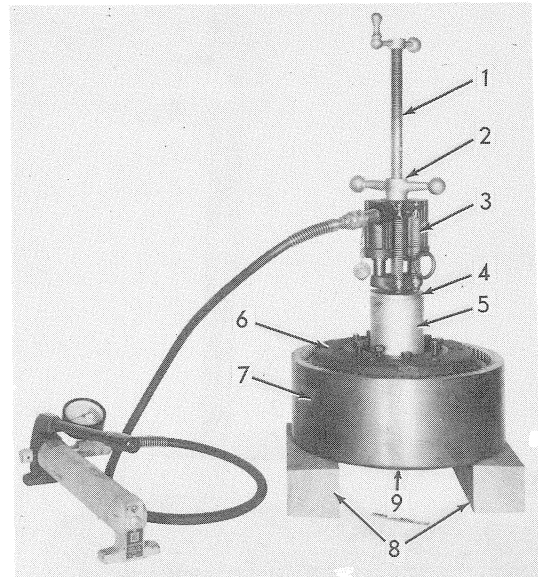
### 6.4.7

Slowly release hydraulic pressure and remove tools; remove steering clutch assembly from brake drum.

### 6.4.8

Measure distance from machined surface of clutch hub to machined surface of throwout plate, Fig. 20; throwout plate must be .21" -- .34" (5,3 -- 8,6mm) below clutch hub. Add steel disc next to pressure plate to increase distance; remove steel disc to decrease distance.

**IMPORTANT:** At least one steel disc must remain next to pressure plate after necessary adjustments. If only one steel disc is next to pressure plate and a steel disc must be removed, remove steel disc in third and fourth position from pressure plate side of clutch.



T-22039

FIG. 19 INSTALLING THROWOUT PLATE CAPSCREWS

1. Forcing screw
2. Lock nut
3. Hydraulic ram (17 ton)
4. Tube end plate
5. Tube (3.25" O. D.; .25" wall thickness / 82,5 mm O. D.; 6,3 mm wall thickness).
6. Pressure plate
7. Brake drum
8. Wooden blocks
9. Backing plate (7" O. D. / 177,8 mm O. D.).

### 6.4.9

Lock throwout plate capscrews in groups of four. Reinstall steering clutch assembly in brake drum; use care to prevent damage to friction disc teeth.

## 6.5 INSTALLATION

### 6.5.1

If removed, press throwout bearing cup into actuating piston and cone assembly on throwout sleeve; be sure both are fully seated.

### 6.5.2

Install actuating piston sealing rings, Fig. 17 (16) (18); clamp sealing rings in their grooves (use large hose clamps); allow to set approximately 30 minutes.

### 6.5.3

Install springs, Fig. 17 (21) in collector ring (19); lubricate sealing rings and install actuating piston in collector ring. Install collector ring and actuating piston on bevel gear shaft bearing cage, Fig. 12; connect oil line to collector ring.

## Steering Clutches

IMPORTANT: Use self locking capscrew.

### 6.5.5

Clean interior of steering clutch compartment. Install band assembly around brake drum; use suitable lifting sling and hoist to install steering clutch assembly Fig. 14. Attach steering clutch and brake drum to respective driving hub with place bolts, Fig. 12; torque place bolts to 110 -- 120 lbs.ft. (15,2 -- 16,5 kg/m).

### 6.5.6

Align holes in band operating lever and adjusting fork so brake lever upper pin, Fig. 23 (15) can be installed through hole in steering clutch compartment, Fig. 13. Install pin so tapped hole is toward outer wall; drive pin slightly below flush in adjusting fork. Turn adjusting block, Fig. 23 (12) clockwise until brake bands are tight on drum to seat brake lever pins; back adjusting block off several turns.

### 6.5.7

Install steering clutch compartment cover (with new gasket). Slide linkage cover, Fig. 23 (10) (with new gasket) over brake control rod (8); connect control rod to band operating lever (11) and secure linkage cover to steering clutch compartment cover. Clamp boot to linkage cover.

### 6.5.8

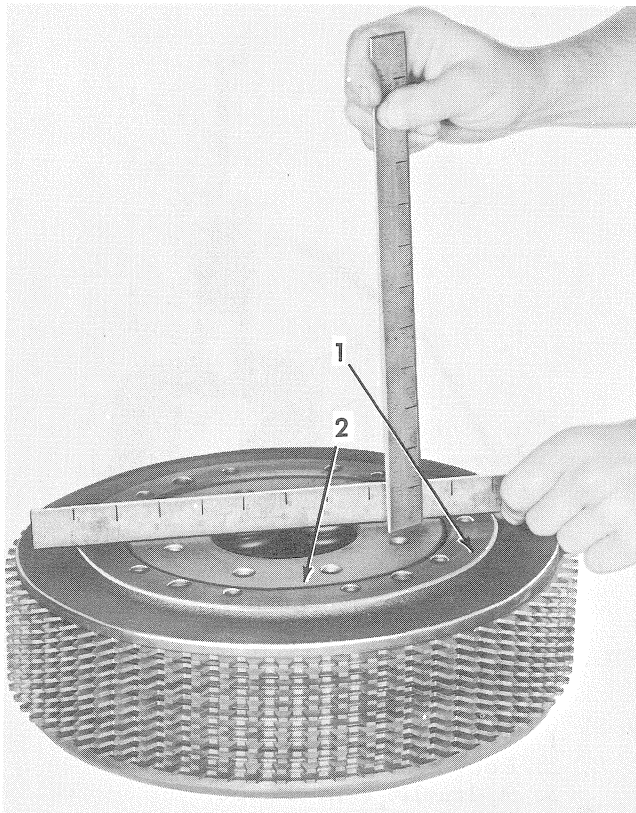
Adjust brake linkage and brake bands; refer to 7.3.

### 6.5.9

Install fuel tank; connect fuel lines and open shut-off cocks. Install seat support channel, seat frame and seat cushions.

### 6.5.10

Be certain oil drain plugs are properly installed and fill system to proper level with specified lubricant (refer to HYDRAULIC SYSTEM LUBRICANT SPECIFICATIONS, CAPACITY, AND SERVICE).



T-36845

FIG. 20 MEASURING DISTANCE BETWEEN CLUTCH HUB AND THROWOUT PLATE

1. Clutch hub                      2. Throwout plate

### 6.5.4

Slide throwout sleeve on clutch driving hub; install hub on bevel gear shaft, Fig. 12. Torque hub attaching capscrew to 300 lbs.ft. (41,47kg/m).

## TOPIC 7 BRAKES

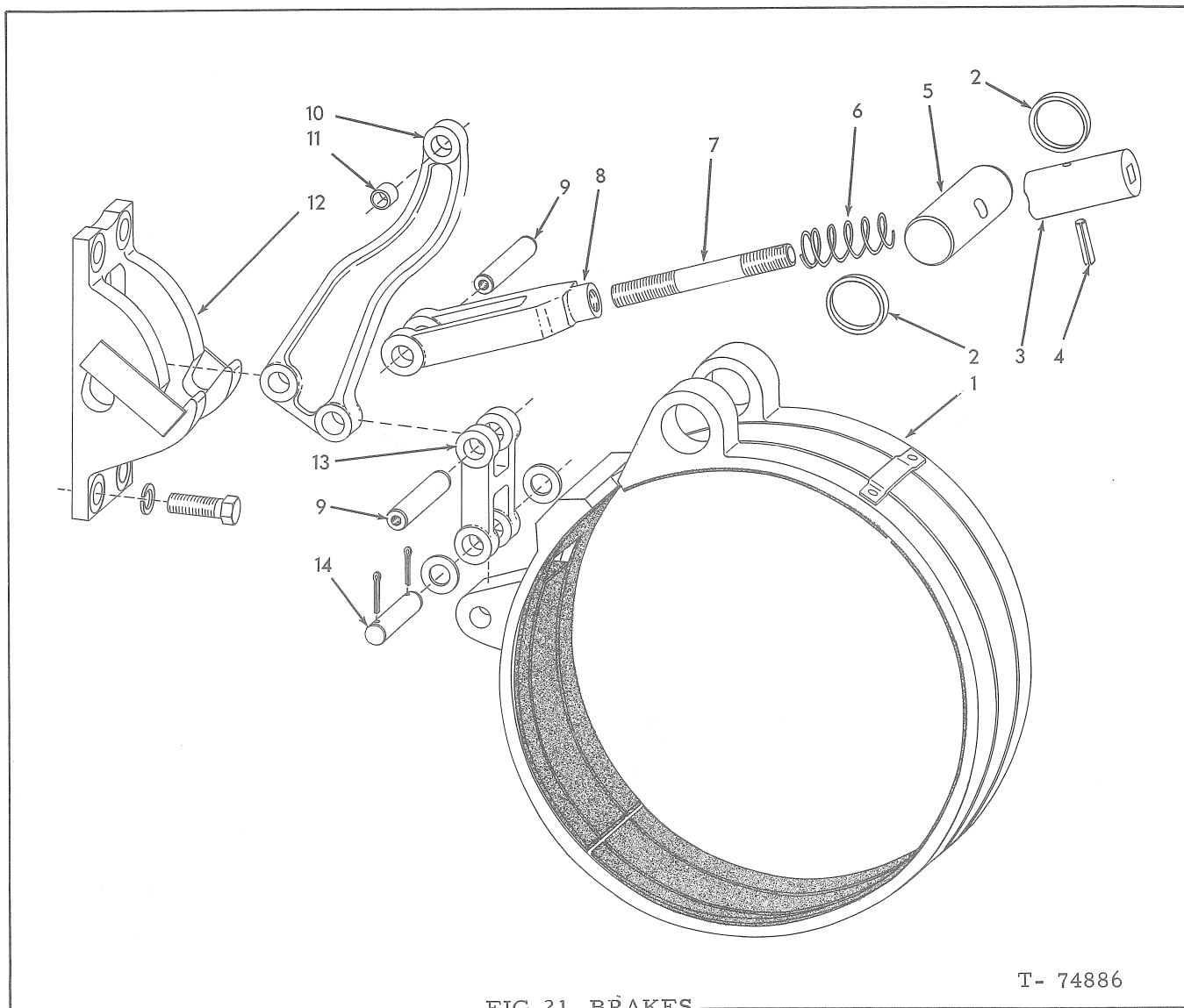


FIG. 21 BRAKES

T- 74886

- 1. Band assembly
- 2. Washer
- 3. Band adjusting block
- 4. Roll pin
- 5. Brake band pin

- 6. Spring
- 7. Band adjusting rod
- 8. Yoke
- 9. Brake lever pin
- 10. Brake band lever

- 11. Bushing
- 12. Bracket
- 13. Yoke
- 14. Pin

### 7.1 REMOVAL AND INSTALLATION

#### 7.1.1

Steering clutch and brake must be removed and installed as an assembly. Refer to 6.1 and 6.5 for detailed procedures. See Figs. 21 and 22 for brakes and brake controls.

### 7.2 INSPECTION

#### 7.2.1

Replace band assembly before lining is worn to bottom of grooves. Depth of groove in new lining is .097" -- .103" (24, 63 -- 26, 16mm).

#### 7.2.2

Replace brake drum if lining contact area is rough or scored.

#### 7.2.3

Replace pins, yokes, bushings, and/or levers if excessively worn; lubricate pins and bushings sparingly when assembled.

### 7.3 BRAKE ADJUSTMENTS

#### 7.3.1 CONTROL LINKAGE

##### 7.3.1.1

Remove yoke pin Fig. 23(4) and access plug (13); use torque wrench to tighten brake bands (see 7.3.2.2).



## Brakes

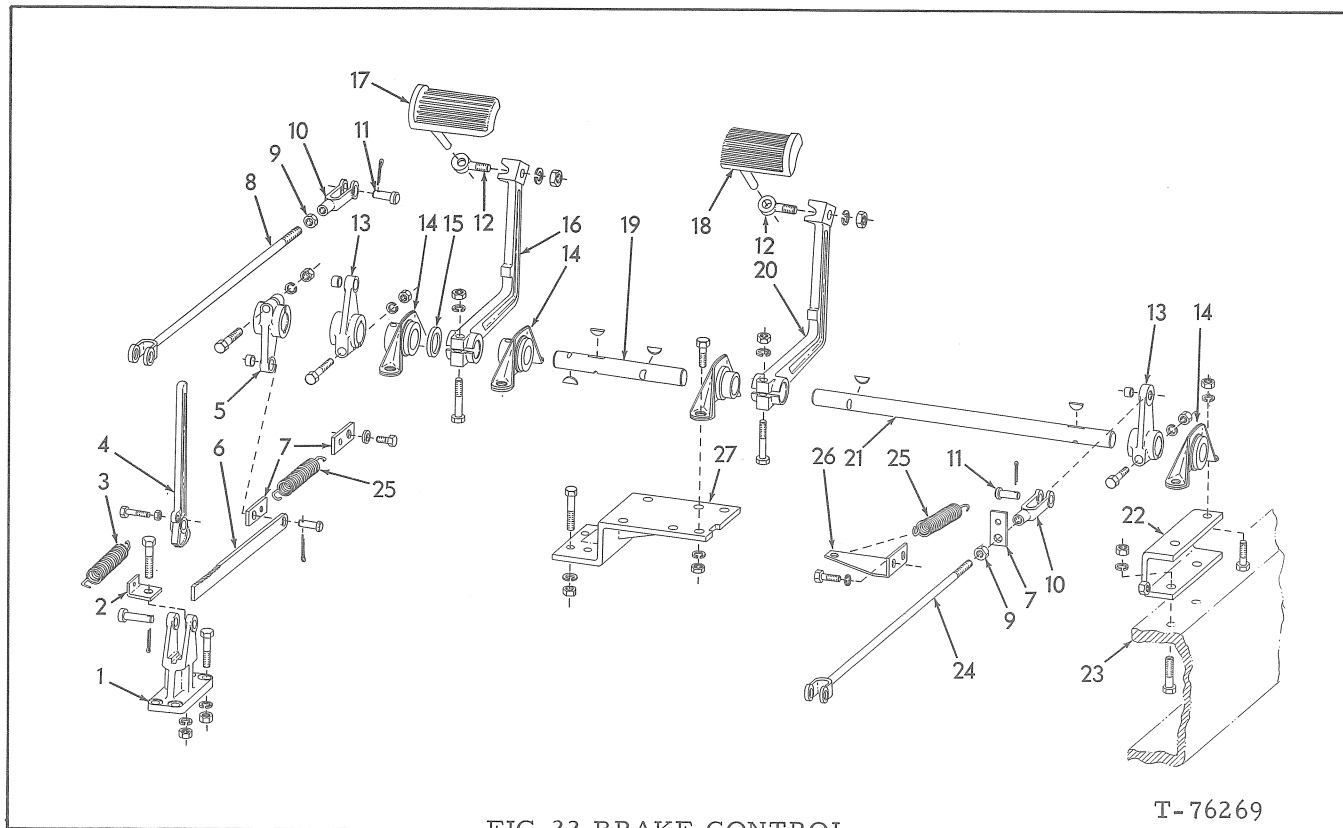


FIG. 22 BRAKE CONTROL

T-76269

- |                                   |                                     |                               |
|-----------------------------------|-------------------------------------|-------------------------------|
| 1. Parking brake bracket          | 10. Adjusting yoke                  | 19. Left pedal shaft          |
| 2. Parking brake spring anchor    | 11. Yoke pin                        | 20. Right pedal lever         |
| 3. Parking brake spring           | 12. Eye bolt                        | 21. Right pedal shaft         |
| 4. Parking brake lock             | 13. Pedal shaft lever               | 22. Pedal shaft right channel |
| 5. Parking brake lever            | 14. Pedal shaft bearing             | 23. Main frame                |
| 6. Parking brake bar              | 15. Spacing washer (left side only) | 24. Right pedal rod           |
| 7. Pedal retracting spring anchor | 16. Left pedal lever                | 25. Pedal retracting spring   |
| 8. Left brake rod                 | 17. Left pedal pad                  | 26. Retracting spring anchor  |
| 9. Jam nut                        | 18. Right pedal pad                 | 27. Pedal shaft left channel  |

### 7.3.1.2

Remove floor plates. Clamp or block pedal levers Fig. 23(1) against floor supporting channel(3). Loosen jam nut on adjusting yoke (5) and adjust yoke so yoke pin (4) can be installed with easy slip fit with brake pedal levers (1) against floor supporting channel. Tighten adjusting yoke jam nut; install floor plates.

### 7.3.1.3

Back off adjusting block, Fig. 23 (12) two turns and install access plug (13).

### 7.3.2 BRAKE BANDS

### 7.3.2.1

Remove access plug, Fig. 23 (13).

### 7.3.2.2

Use a torque wrench to turn brake band adjusting block, Fig. 23 (12); each half turn the groove in base of adjusting block will seat on the brake band pin, Fig. 21 (5). Turn adjusting block clockwise; stop adjusting block in its groove when torque wrench reads as close as possible to 80 lbs.ft. (11,06 kg/m).

### 7.3.2.3

Back off adjusting block two turns and install access plug, Fig. 23 (13).



## Brakes

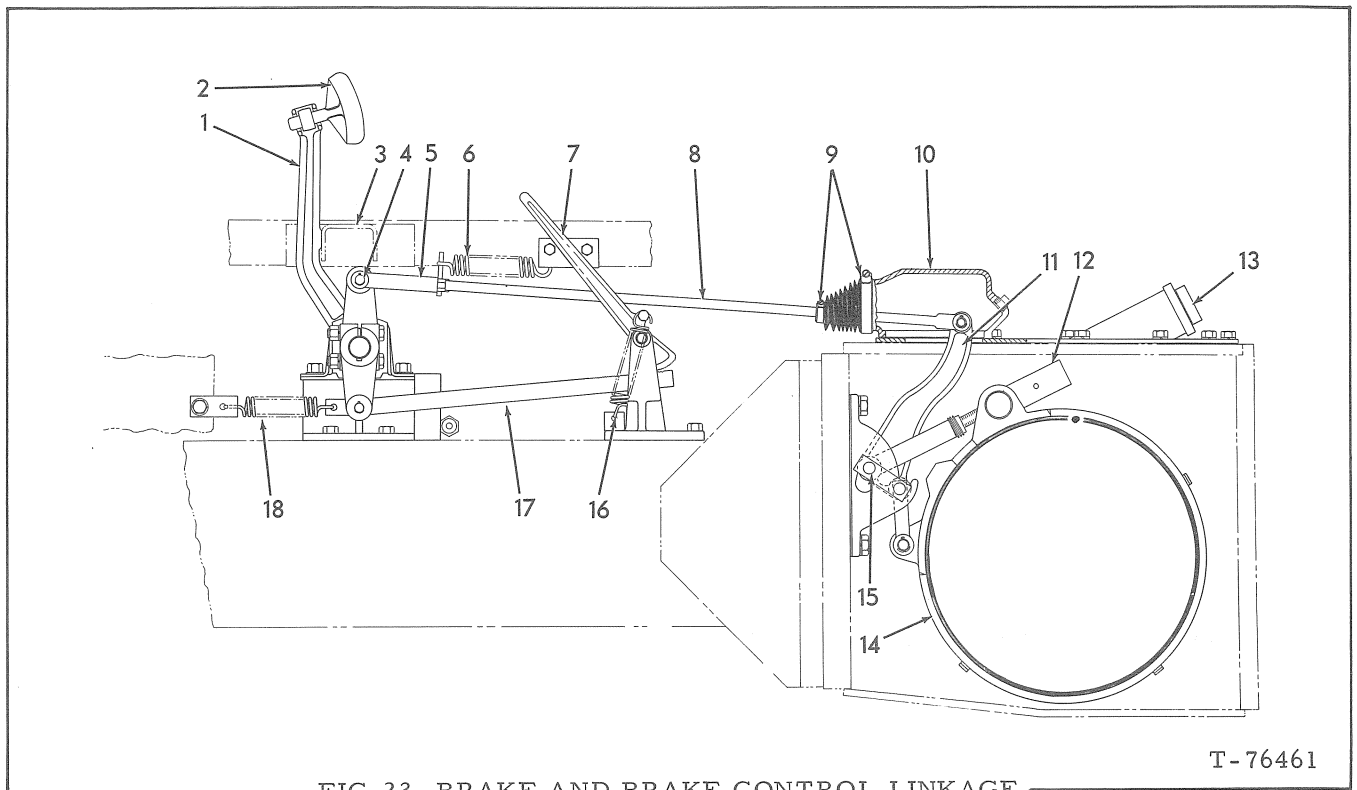


FIG. 23 BRAKE AND BRAKE CONTROL LINKAGE

T-76461

1. Brake pedal lever
2. Pedal lever pad
3. Floor supporting channel
4. Yoke pin
5. Adjusting yoke
6. Pedal retracting spring
7. Parking brake lock
8. Control rod
9. Hose clamps

10. Brake band linkage cover
11. Brake band lever
12. Band adjusting block
13. Access plug
14. Brake band
15. Brake lever upper pin
16. Parking brake spring
17. Parking brake bar
18. Parking brake retracting spring

## TOPIC 8 FITS AND TOLERANCES

### 8.1 STEERING CONTROL VALVE

#### 8.1.1 VARIABLE PRESSURE SPRING

Approximate free length - - - - - 2.76" (67, 81mm)  
Load when compressed to 1.93" (49, 02mm) - - - - - 26-32 lbs. (11, 7-14, 5 kg)  
Load when compressed to 1.68" (42, 6mm) - - - - - 36-42 lbs. (16, 3-19, 0 kg)

#### 8.1.2 HIGH PRESSURE SPRING

Approximate free length - - - - - .406" (10, 31mm)  
Load when compressed to .400" (10, 16mm) - - - - - .7-.9 lb. (0, 3-0, 4 kg)

#### 8.1.3 PLUNGER RETURN SPRING

Approximate free length - - - - - 5.75" (146, 05mm)  
Load when compressed to 2" (50, 4mm) - - - - - 18-22 lbs. (8, 1-9, 9 kg)

#### 8.1.4 OVER-TRAVEL SPRING (CONTROL LINKAGE)

Approximate free length - - - - - 1.52" (38, 6mm)  
Load when compressed to 1.09" (27, 6mm) - - - - - 67-81 lbs. (31, 4-36, 7 kg)

#### 8.1.5 FLOW DIVIDER

Size of orifice - - - - - .161" (4, 08mm)

### 8.2 HYDRAULIC PUMP OUTPUT INSTALLED ON TRACTOR

#### 8.2.1 POWER SHIFT MODELS

Engine speed - - - - - High idle  
Steering clutches - - - - - Engaged  
Oil temperature - - - - - 120° -- 180°F (48° -- 82°C)  
Pump output - - - - - \*6 gpm (22, 7 lit/min)

#### 8.2.2 DIRECT DRIVE MODELS

Engine speed - - - - - High idle  
Steering clutches - - - - - Engaged  
Oil temperature - - - - - 120° -- 180°F (48° -- 82°C)  
Pump output  
Rear gears -- scavenger - - - - - \*6.5 gpm (24, 6 lit/min)  
Front gears -- pressure (prior to  
S/N 16C16205 inc. 16C16211 & 16C16216) - - - - - \*9.25 gpm (35, 0 lit/min)  
Front gears -- pressure (S/N 16C16205 -- up  
exc. 16C16211 & 16C16216) - - - - - \*13.5 gpm (51, 1 lit/min)

\*85% of specification is minimum allowable output

### 8.3 STEERING CLUTCH

#### 8.3.1 STEEL DISC

Thickness-new - - - - - .084 -- .096" (2, 13-2, 43mm)  
Replace if thickness is less than - - - - - .072" (1, 82mm)  
Must be flat within - - - - - .015" (0, 38mm)

#### 8.3.2 FRICTION DISCS (BI-METALLIC)

Thickness-new - - - - - .152"-.157" (3, 86-3, 98mm)  
Replace if thickness is less than - - - - - .132" (3, 35mm)  
Must be flat within - - - - - .015" (0, 38mm)

#### 8.3.3 PRESSURE SPRINGS

Approximate free length - - - - - 5.57" (141, 4mm)  
Load when compressed to 4.21" (106, 9mm) - - - - - 694-766 lbs. (314, 7-347, 4 kg)

#### 8.3.4 PRESSURE PLATE

Clutch disc contact area must be flat within - - - - - .010" (0, 25mm)

#### 8.3.5 CLUTCH HUB

Maximum allowable taper on clutch disc  
contact area from O. D. to I. D. - - - - - .010" (0, 25mm)

### 8.4 BRAKES

Depth of grooves in lining - - - - - .097"-.103" (24, 63-26, 16mm)

## TOPIC 9 SERVICE TOOLS

Any special purpose service tools required to perform the repair operation shown in this manual are listed below; order these tools from your Fiat-Allis dealer.

All other tools are considered to be standard service tools; these can be ordered from your local supplier.

### SPECIAL PURPOSE SERVICE TOOLS

FIG. NO.	TOOL PART NO.	DESCRIPTION
15	75000441	Puller plate and forcing screw assembly

# ALPHABETICAL INDEX

## SUBJECT

## PARAGRAPH

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