

# FORD

## TRACTOR REPAIR MANUAL

REMOTE VALVE . . . . .

1700—1900 SERIES

WITH

DRAFT CONTROL

POWER

STEERING. . . 1700-1900 SERIES

## SUPPLEMENT

## **FOREWORD**

This supplement contains service and repair information not included in the 1000 Series Tractor Repair Manual, SE3771. It covers the information for remote valve service on draft control 1700 and 1900 tractors. Also included is the power steering for these tractors.

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# —REMOTE VALVE—

REMOTE VALVE FOR 1700 AND 1900 DRAFT  
CONTROL TRACTORS (SINGLE AND DOUBLE  
ACTING TYPE)

## NOMENCLATURE

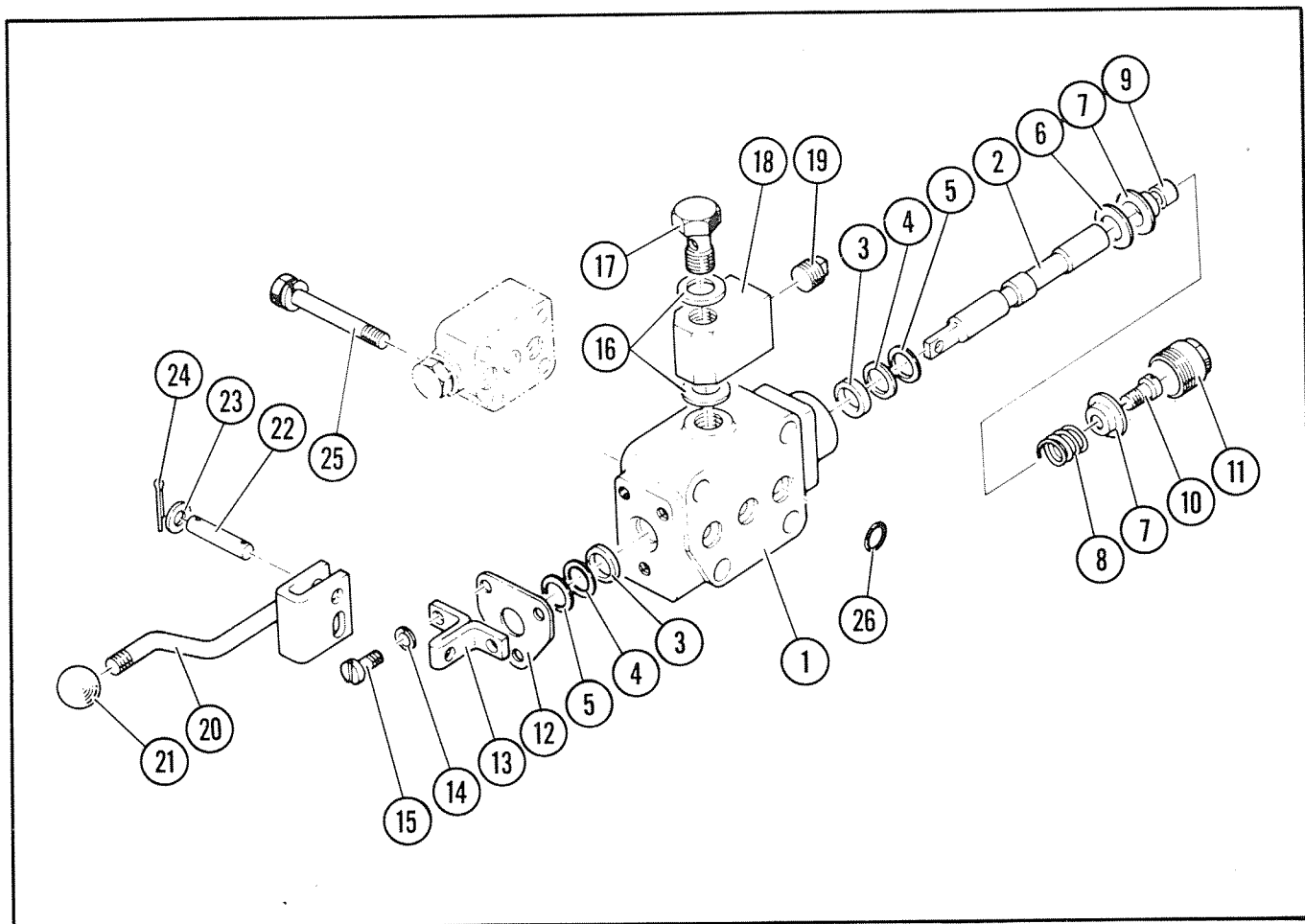
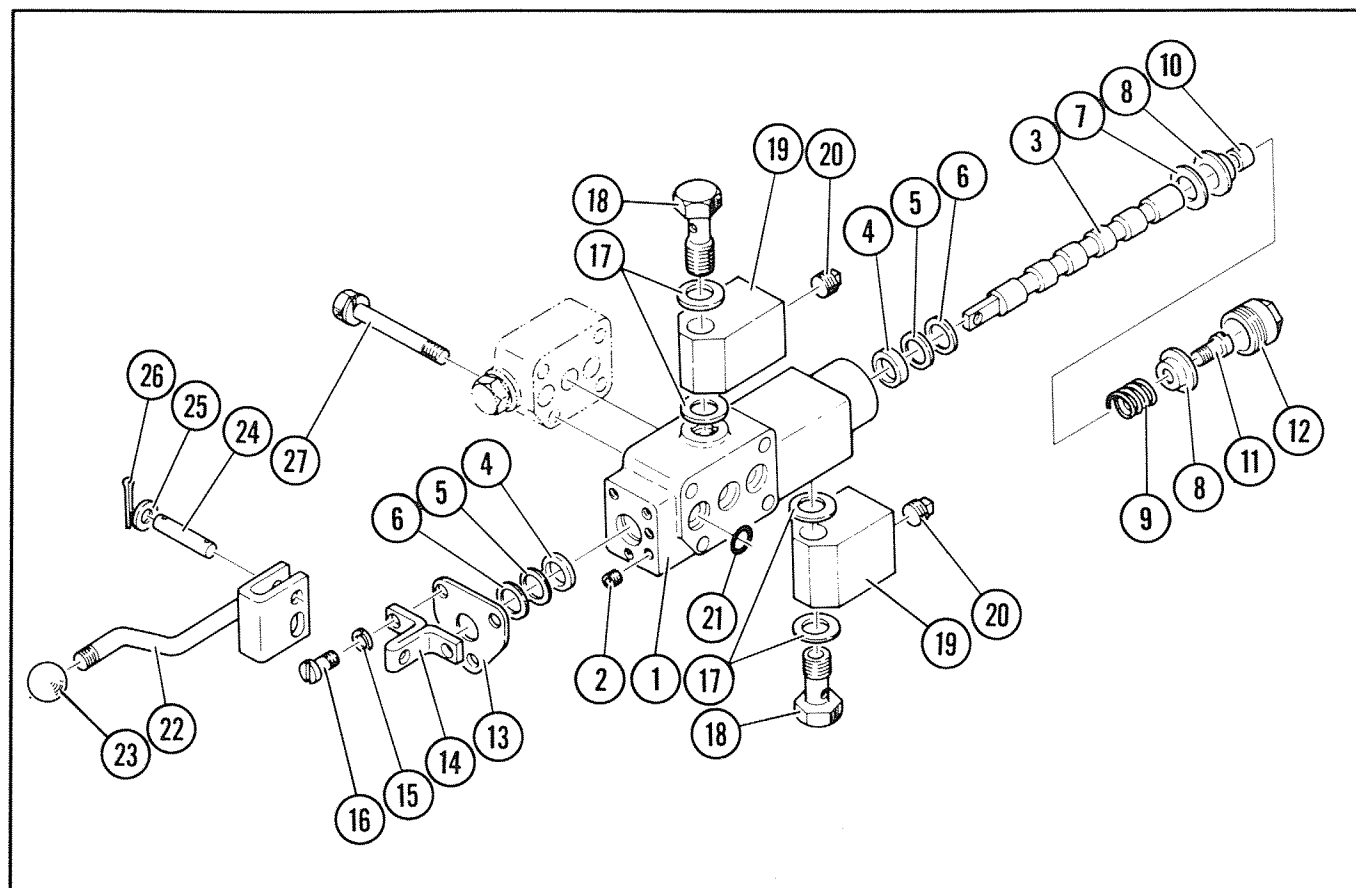


Figure 1  
Remote Valve — Single Acting Type

- |                 |                   |
|-----------------|-------------------|
| 1. Housing      | 14. Spring Washer |
| 2. Spool        | 15. Screw         |
| 3. Seal Ring    | 16. Gasket        |
| 4. Back-Up Ring | 17. Bolt          |
| 5. Washer       | 18. Adaptor       |
| 6. Ring         | 19. Plug          |
| 7. Spring Seat  | 20. Control Lever |
| 8. Spring       | 21. Grip          |
| 9. Collar       | 22. Pin           |
| 10. Screw       | 23. Washer        |
| 11. Plug        | 24. Split Pin     |
| 12. Plate       | 25. Bolt          |
| 13. Bracket     | 26. O-Ring        |



**Figure 2**  
**Remote Valve — Double Acting Type**

- |                 |                   |
|-----------------|-------------------|
| 1. Housing      | 15. Spring Washer |
| 2. Screw        | 16. Screw         |
| 3. Spool        | 17. Gasket        |
| 4. Seal Ring    | 18. Bolt          |
| 5. Back-Up Ring | 19. Adaptor       |
| 6. Washer       | 20. Plug          |
| 7. Ring         | 21. O-Ring        |
| 8. Spring Seat  | 22. Control Lever |
| 9. Spring       | 23. Grip          |
| 10. Collar      | 24. Pin           |
| 11. Screw       | 25. Washer        |
| 12. Plug        | 26. Split Pin     |
| 13. Plate       | 27. Bolt          |
| 14. Bracket     |                   |

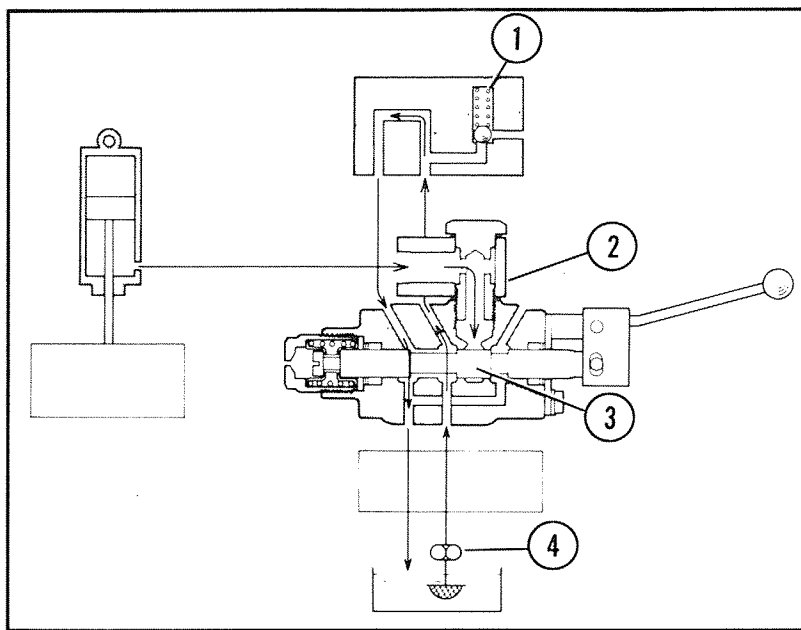
# —REMOTE VALVE—

## FUNCTION

### Single Acting Cylinders

The oil from the oil pump returns to the sump via the control valve and relief valve (cover assembly)

as shown in Figure 3. The oil compressed by the implement weight is stopped by the spool as shown and the height of the implement is kept constant.

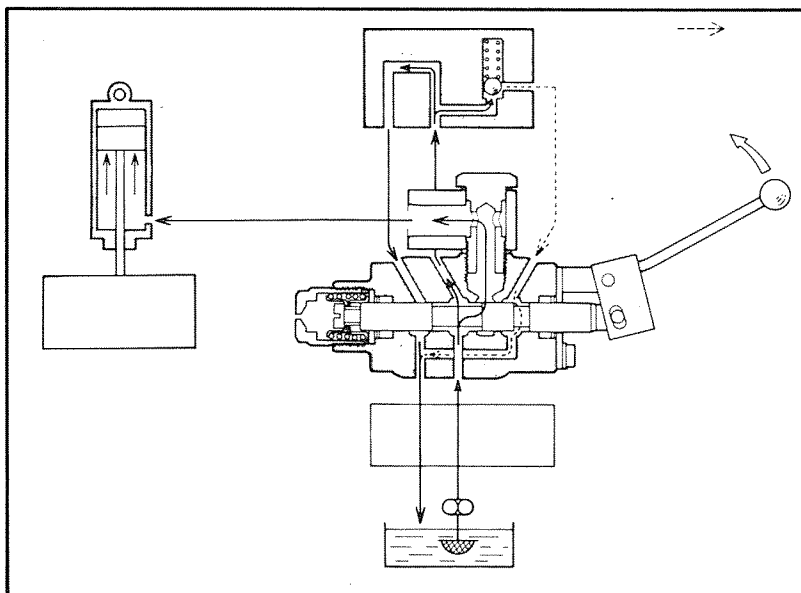


**Figure 3**  
**Remote Valve Oil Flow — Neutral Position**

- |                         |             |
|-------------------------|-------------|
| 1. Relief Valve         | 3. Spool    |
| 2. Remote Control Valve | 4. Oil Pump |

When the lever is moved toward the lifting position, the spool moves as shown in Figure 4. The oil is fed to the hydraulic cylinder via the adaptor

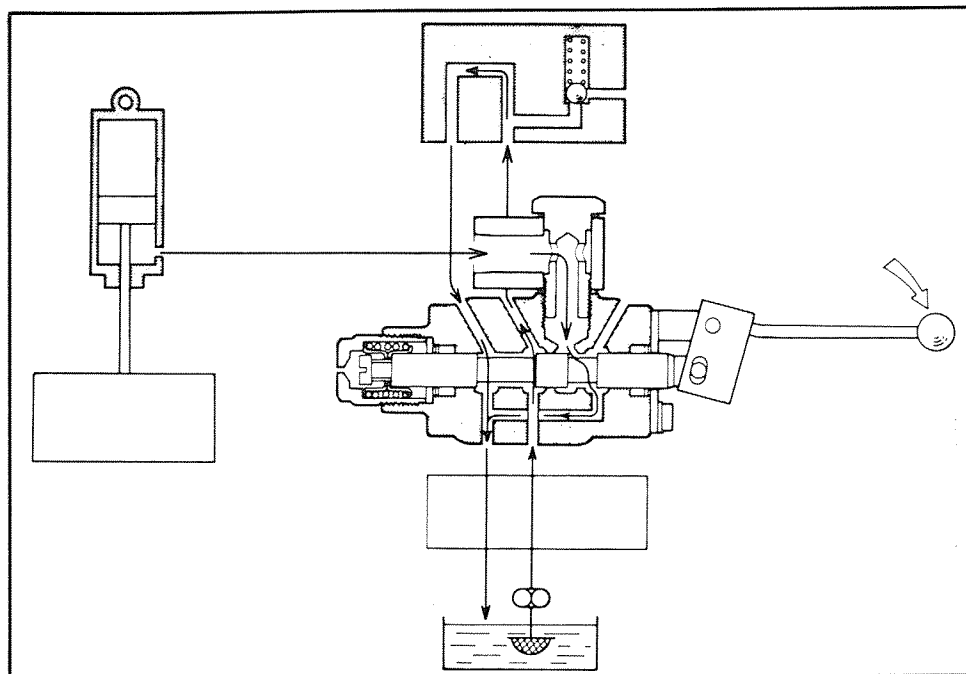
to raise the implement. When the oil pressure exceeds 2135 PSI (150 kg/cm<sup>2</sup>), the relief valve opens and the oil returns to the sump.



**Figure 4**  
**Remote Valve Oil Flow — Lifting Position**

When the lever is moved toward the lowering position, the spool moves as shown in Figure 5. The oil from the pump flows the same way as it does

in the neutral position. As the spool opens, the oil from the hydraulic cylinder returns to the sump due to the implement weight.

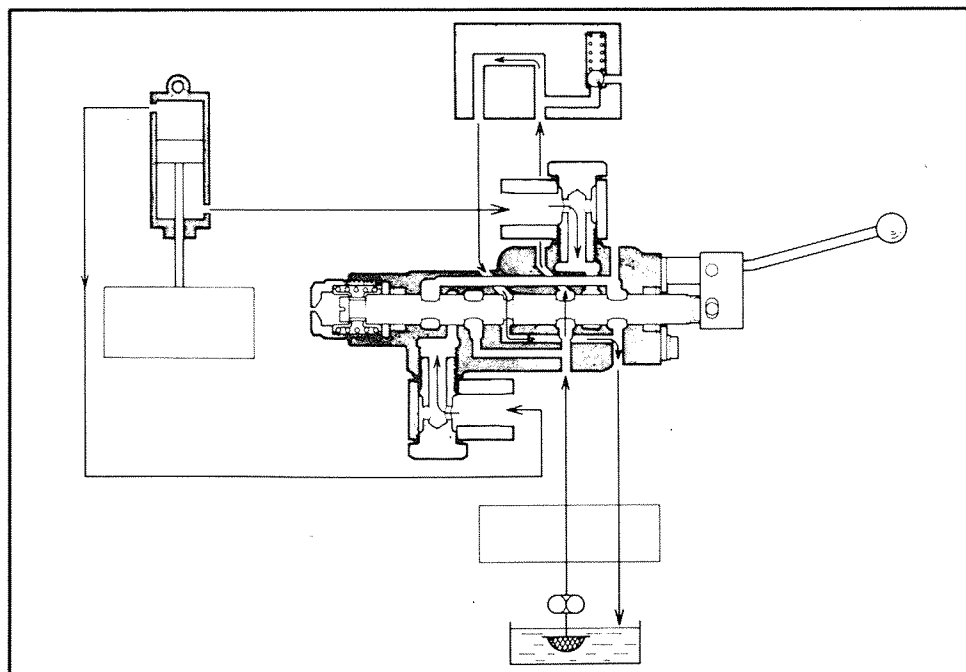


**Figure 5**  
**Remote Valve Oil Flow — Lowering Position**

### Double Acting Cylinders

In the neutral position, the oil from the oil pump flows in the same way as that of the single acting

type and returns to sump. The oil from the hydraulic cylinder is stopped by the spool as shown in Figure 6, and the implement height is kept constant.

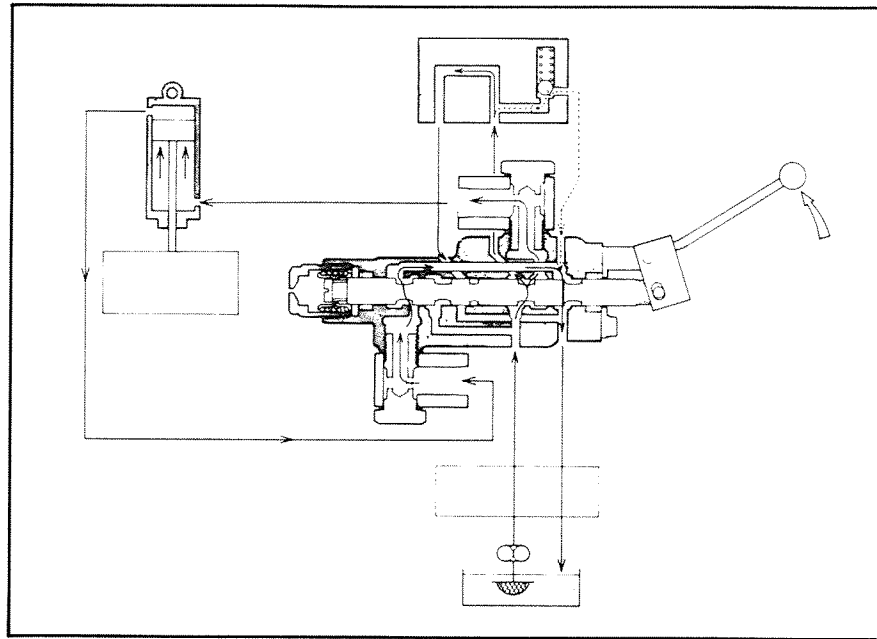


**Figure 6**  
**Remote Valve Oil Flow — Neutral Position**

## —REMOTE VALVE—

When the lever is moved toward the lifting position, the spool moves as shown in Figure 7. The oil from the pump raises the implement. When the oil pressure exceeds 2135 PSI (150 kg/cm<sup>2</sup>), the

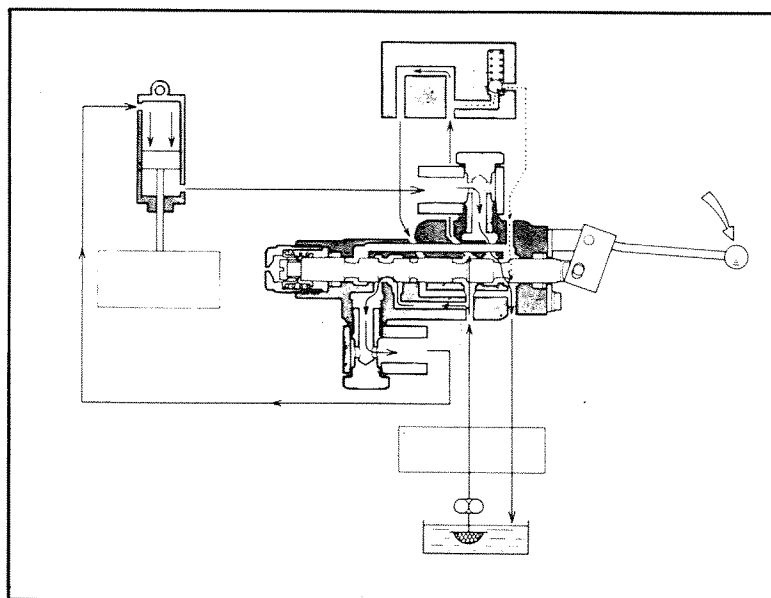
relief valve opens and the oil returns to sump. As the spool opens, the oil from the piston end of the hydraulic cylinder returns to sump.



**Figure 7**  
**Remote Valve Oil Flow — Lifting Position**

When the lever is moved toward the lowering position, the spool moves as shown in Figure 8. The oil from the oil pump is fed to the hydraulic cylinder to lower the implement. When the oil

pressure exceeds 2135 PSI (150 kg/cm<sup>2</sup>), the relief valve opens and the oil returns to sump. The oil from the rod end returns to sump.



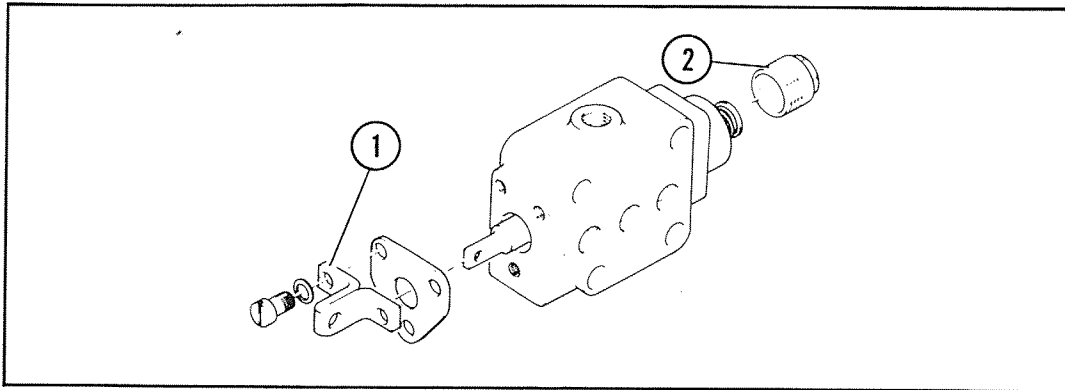
**Figure 8**  
**Remote Valve Oil Flow — Lowering Position**



## DISASSEMBLY OF REMOTE VALVE

1. Remove the split pin, and remove the remote valve lever.

2. Remove the bolt and remove the adaptor.
3. Remove the bolt and remove the bracket (1), Figure 9.
4. Remove the plug (2), Figure 9.

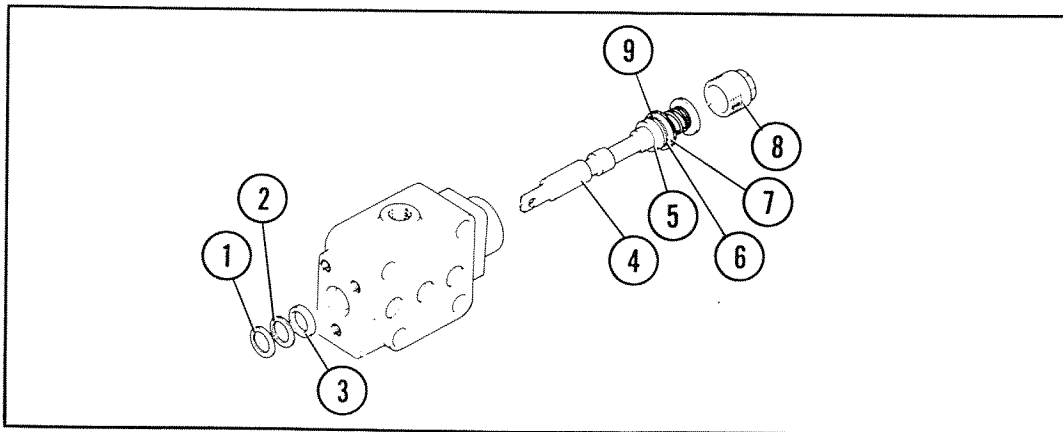


**Figure 9**  
**Remote Valve Disassembly**

1. Bracket
2. Plug

5. Pull out the spool (4) in the direction that the plug was removed, Figure 10.
6. Remove the washer (1), back-up ring (2), and seal ring (3), Figure 10.

**NOTE:** Remove them with the spool.

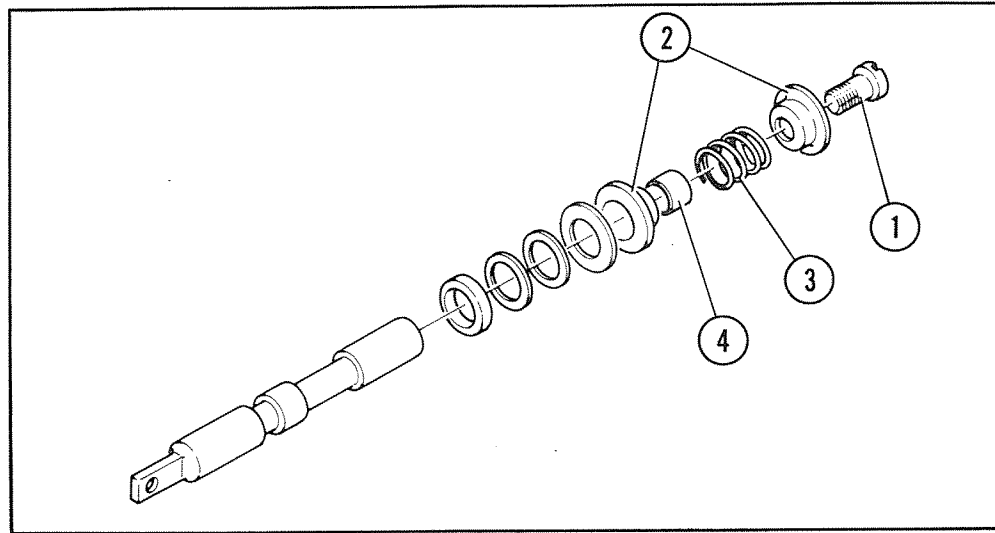


**Figure 10**  
**Remote Valve Disassembly**

- |                 |              |                 |
|-----------------|--------------|-----------------|
| 1. Washer       | 4. Spool     | 7. Ring         |
| 2. Back-Up Ring | 5. Seal Ring | 8. Plug         |
| 3. Seal Ring    | 6. Washer    | 9. Back-Up Ring |

## —REMOTE VALVE—

7. Remove the screw (1), and remove the spring seat (2), spring (3) and collar (1), Figure 11.



**Figure 11**  
**Remote Valve Disassembly**

- 1. Screw
- 2. Spring Seat
- 3. Spring
- 4. Collar

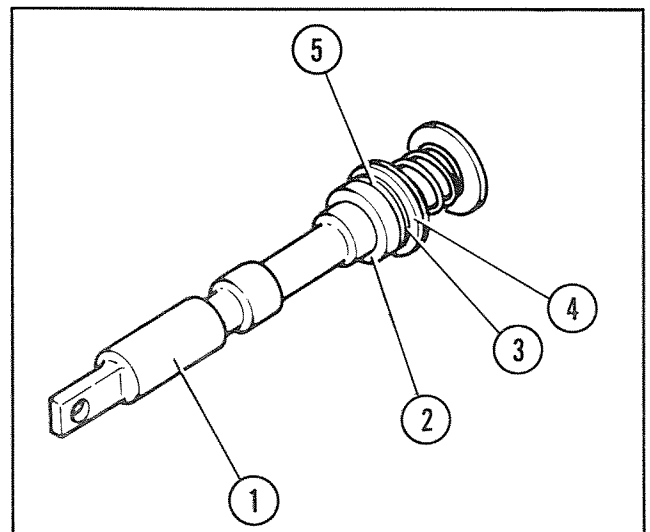
### INSPECTION

#### Housing and Spool

1. Check the housing for foreign particles. Check the spool surface for burrs and scratches. Replace the spool if the surface is damaged.

#### Sealing Parts (O-Ring, Seal Ring, Back-Up Ring, Etc.)

1. Check the sealing parts for scratches, cracks, wear and damage and replace with new ones if necessary.



**Figure 12**  
**Remote Valve Assembly**

- 1. Spool
- 2. Seal Ring
- 3. Washer
- 4. Ring
- 5. Back-Up Ring

### ASSEMBLY

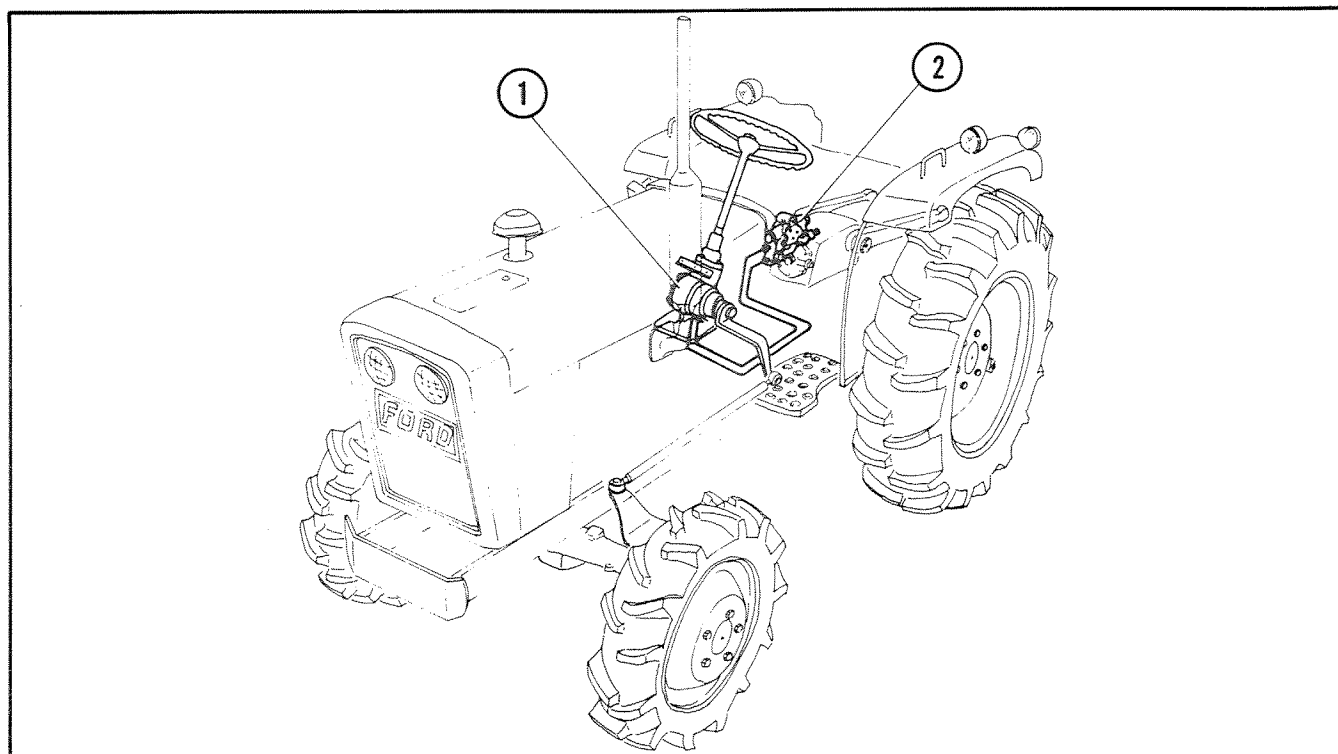
1. Install the parts in the reverse order of removal.
2. Install the spool in the housing together with the seal ring, back-up ring and washer, Figure 12.

## TROUBLESHOOTING AND REMEDY

| Symptom  | Possible Cause  | Remedy  |
|--|---|---|
| 1. Implement does not raise when lever is moved to lifting position. | (1) Implement is too heavy.                                 | (1) Use lighter implement.                                    |
|  | (2) Defective hydraulic pump.                               | (2) Replace pump.   |
|  | (3) Relief valve setting is too low.                        | (3) Readjust relief valve pressure (Refer to "Relief Valve"). |
| 2. Implement raises slowly.  | (1) Oil leaks past the relief valve seat.                   | (1) Replace valve seat.                                       |
|  | (2) Defective hydraulic pump.                               | (2) Replace pump.   |
|  | (3) Hydraulic filter is plugged.                            | (3) Clean or replace filter.                                  |
|  | (4) Incorrect hydraulic oil (too heavy).                    | (4) Replace oil with correct type (Ford M2C-53-A).            |
| 3. The implement drops when lever is in neutral position.            | (1) Housing and spool are worn.                             | (1) Replace valve assembly.                                   |
|  | (2) Oil used is incorrect.                                  | (2) Use specified oil (Ford M2C-53-A).                        |
|  | (3) Hydraulic cylinder leaks.                               | (3) Replace sealing parts in cylinder.                        |
|  | (4) Oil leaks between valve and cylinder (or relief valve). | (4) Retighten parts or replace o-ring.                        |
| 4. Lever does not return to the neutral position.                    | (1) Spring is broken.                                       | (1) Replace spring.   |
|  | (2) Sticking spool.   | (2) Disassemble and clean valve and replace oil.              |

# —POWER STEERING

## POWER STEERING FOR 1700 AND 1900 TRACTORS



**Figure 13**  
**Power Steering — External View**

- 1. Power Steering
- 2. Priority Valve

### External View

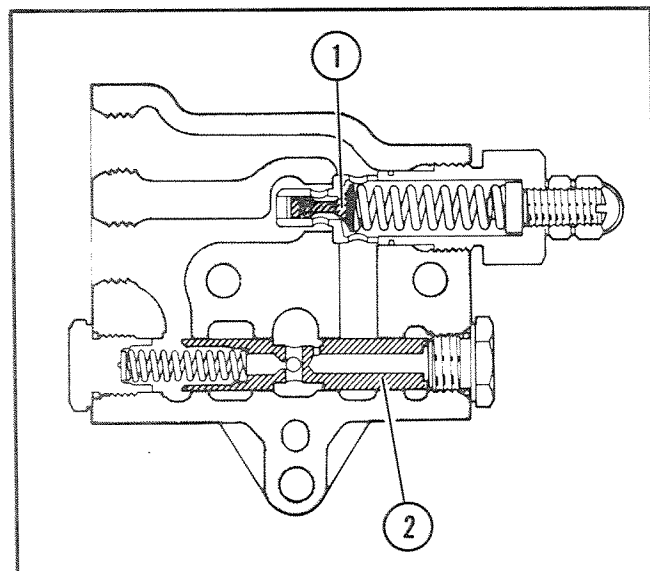
This power steering is in an integral power assist type. The source of oil for the power steering comes from the tractor hydraulic pump, Figure 13.

### PRIORITY VALVE

The priority valve divides the oil flow from the hydraulic pump to the power steering and the tractor hydraulic system.

### Components of Priority Valve

The priority valve consists of a plunger and poppet relief valve, Figure 14. The plunger keeps the oil flow to the power steering circuit constant and permits the remaining oil to flow to the tractor hydraulic system. The relief valve protects the power steering mechanism against over loading.



**Figure 14**  
**Priority Valve**

- 1. Poppet Relief Valve
- 2. Plunger

## Operation

- 1. Oil flow when the pump output is less than the maximum oil flow accepted by the power steering circuit (approximately 1.2 G.P.M.):** The oil from the hydraulic pump enters the power steering circuit through the

orifice of the plunger. The force of the oil going through the orifice is not great enough to overcome the resistance of the spring. The plunger does not move left (in this view), Figure 15. The passageway A to the tractor hydraulic system remains blocked and oil from the pump goes to the power steering circuit.

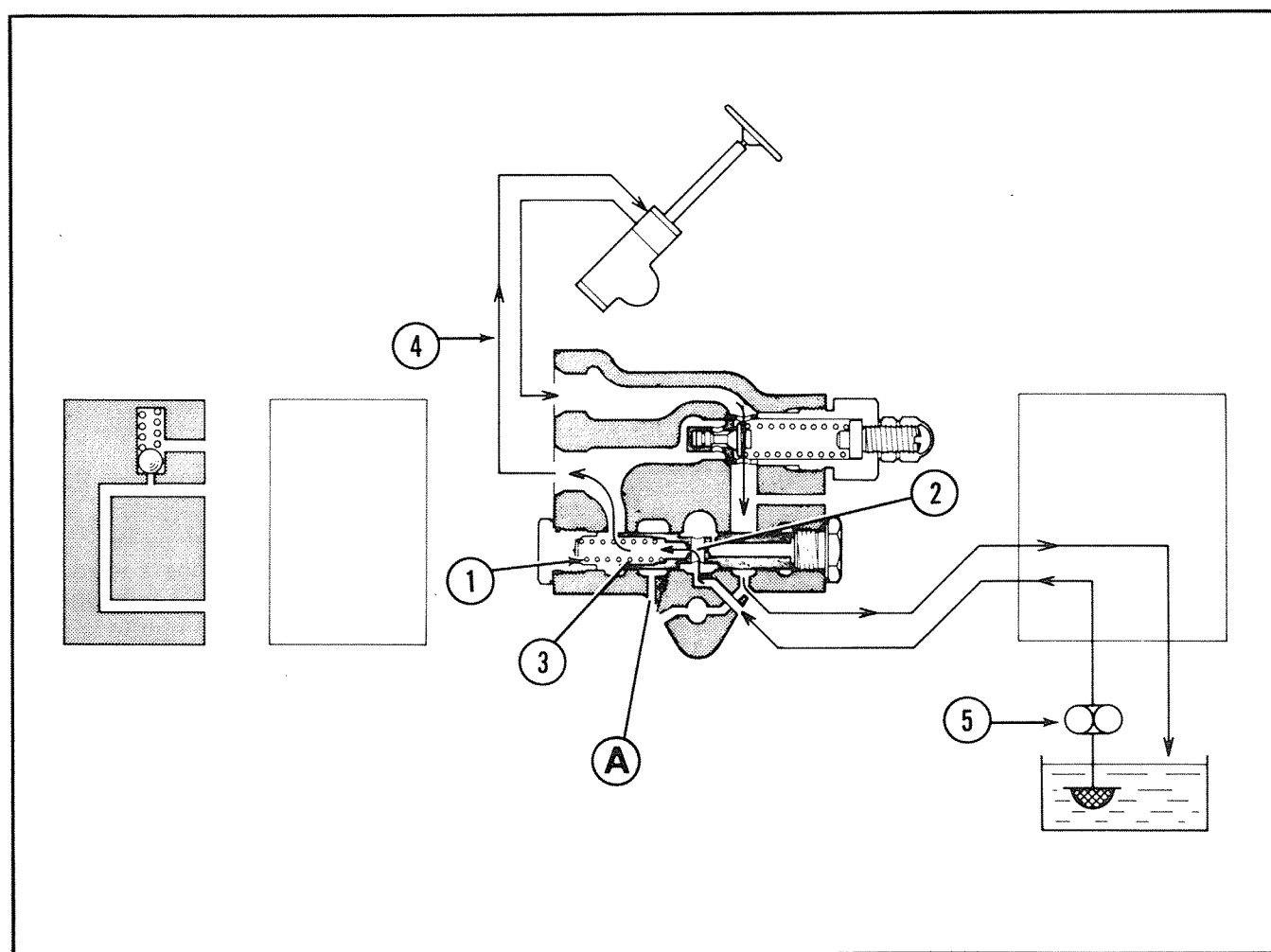


Figure 15  
Priority Valve — Oil Flow

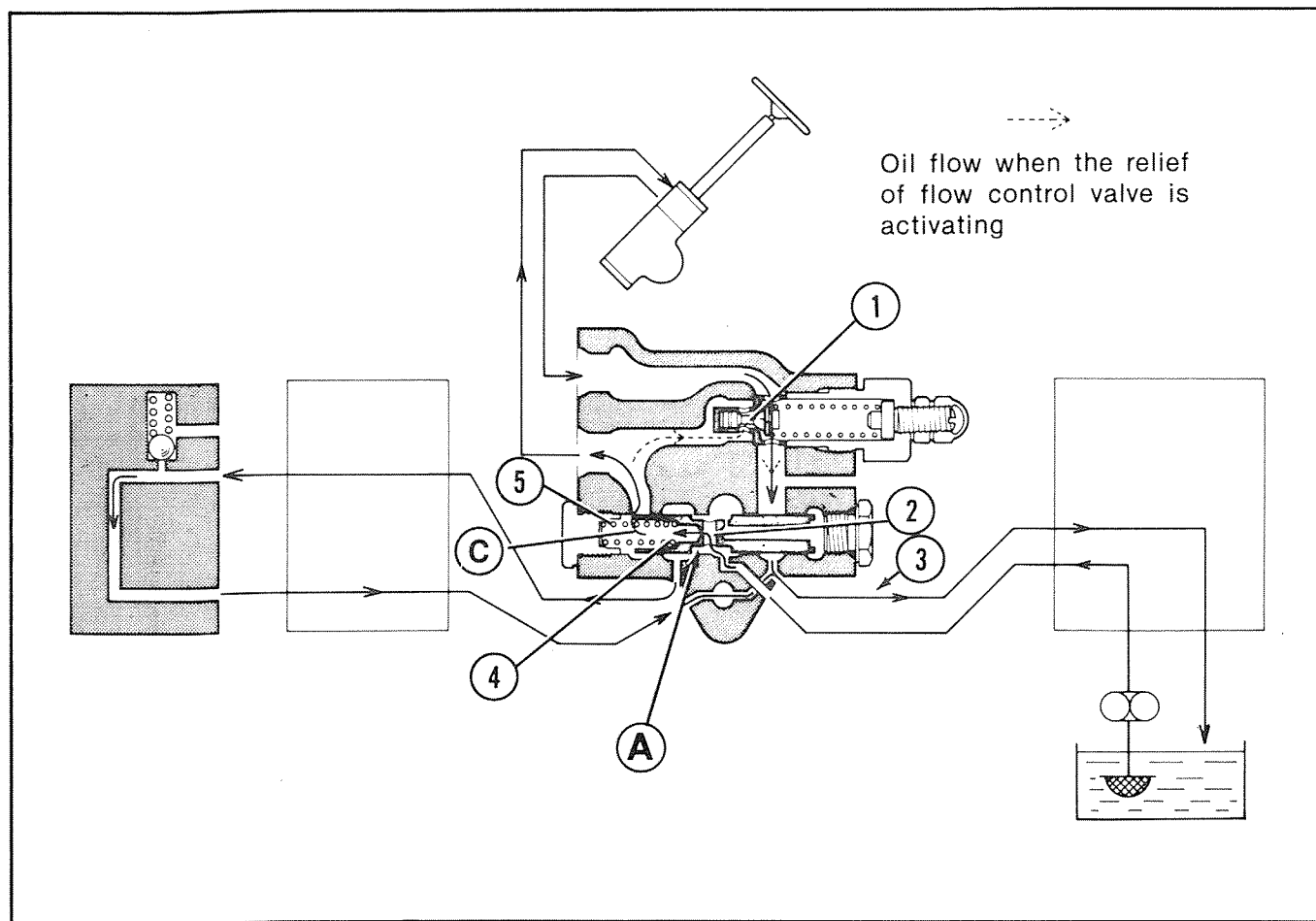
1. Spring
2. Orifice
3. Plunger
4. Power Steering Circuit
5. Hydraulic Pump

(A) Passage To Tractor Hydraulic System

## —POWER STEERING

- 2. Oil flow when the output is greater than the maximum oil flow accepted by the power steering circuit:** The force of the oil going through the orifice of the plunger overcomes the resistance of the spring and the plunger moves to the left. This opens passageway A, Figure 16, and the remaining oil

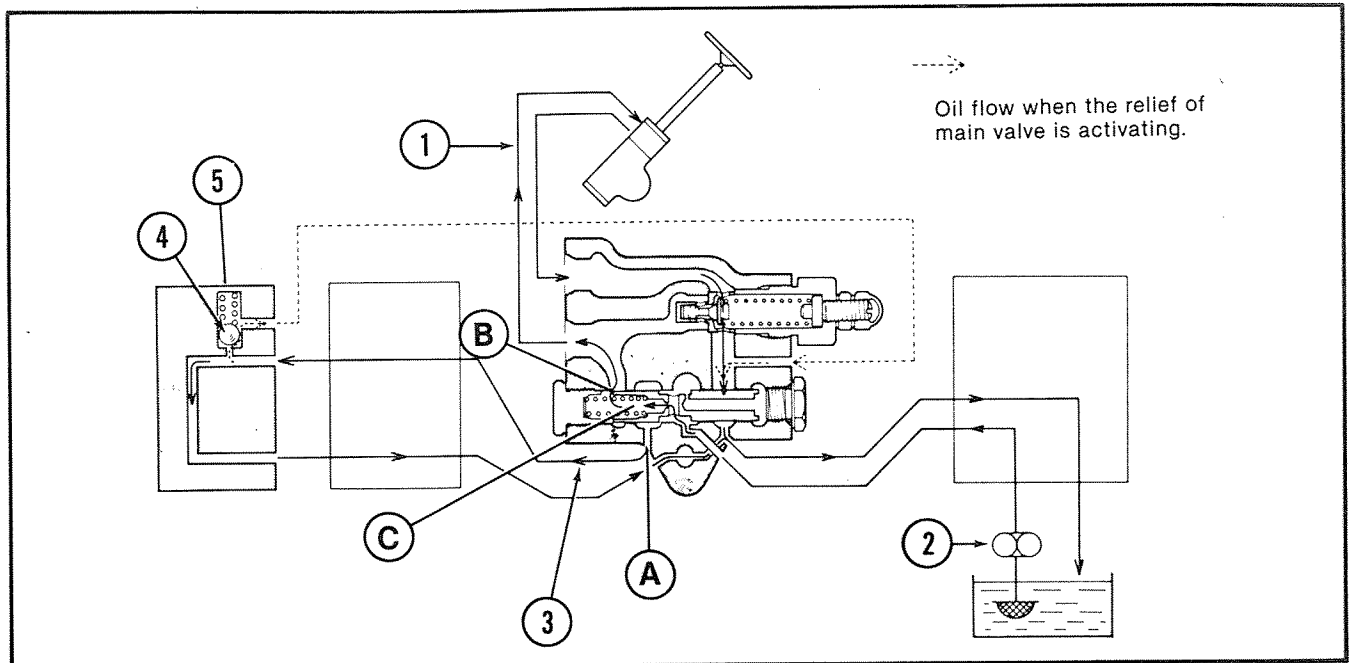
not going to the power steering circuit is diverted to the tractor hydraulic system. Under this condition, when the power steering circuit is activated the oil pressure through the orifice drops and the plunger moves to the right making passageway A smaller. Thus operating pressure and control flow are balanced.



**Figure 16**  
**Priority Valve - Oil Flow**

- 1. Relief Poppet
- 2. Orifice
- 3. Return Circuit
- 4. Plunger
- 5. Spring

(A) Passage To Tractor Hydraulic System

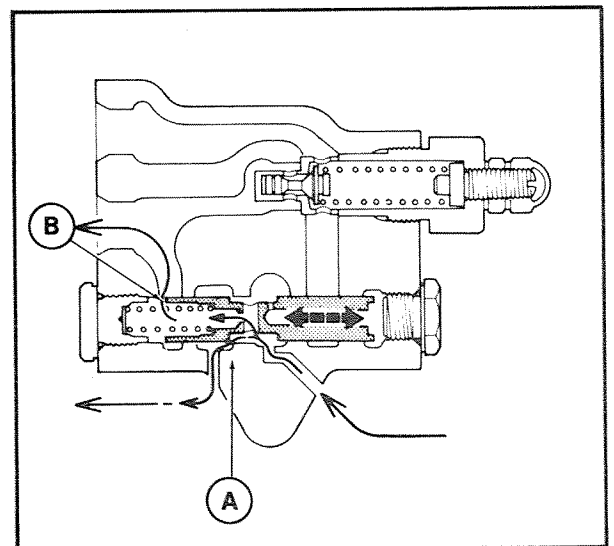


**Figure 17**  
**Power Steering — Oil Flow**

1. To Piston
2. Pump
3. To Lift
4. Ball Poppet
5. Flow Control Valve

**3. Oil flow when the power steering circuit is activated:** When the power steering control valve is actuated and oil flows to the power steering piston, flow is restricted at B and pressure increases in C, Figure 17. Oil and spring pressure moves the plunger to the right. This reduces oil flow to the hydraulic lift A, and increases oil flow to the steering circuit to move the power steering piston. When the power steering piston reaches the end of the stroke, pressure increases in the steering circuit. The increased pressure unseats the relief poppet and excess oil is dumped into the return circuit. (See dotted line, Figure 17.) When pressure at C drops, the plunger moves left to return to controlled flow. When pump output exceeds the capacity of the tractor hydraulic lift circuit, the back pressure unseats the ball poppet in the flow control valve and bypasses oil back through the priority valve to sump.

the openings A and B (Figure 18,) are automatically adjusted so that the control flow rate is constant to the power steering.



**Figure 18**  
**Priority Valve — Oil Flow**

**4. Oil flow when both the tractor hydraulic system and power steering circuits are activated:** When both circuits are activated,

# —POWER STEERING

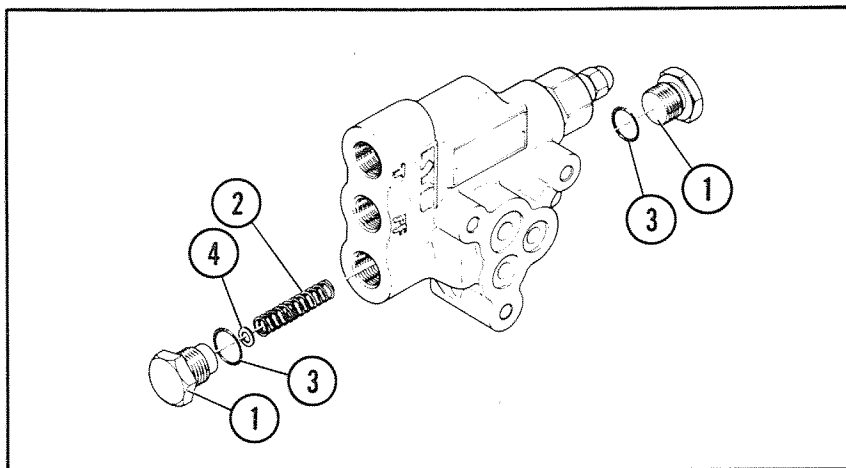
## DISASSEMBLY OF PRIORITY VALVE

1. Remove two plugs (1) Figure 19, from the body.

**NOTE:** On some tractors a shim (4) with a T-PF mark may be in the housing. Make certain this shim is retained for reassembly.

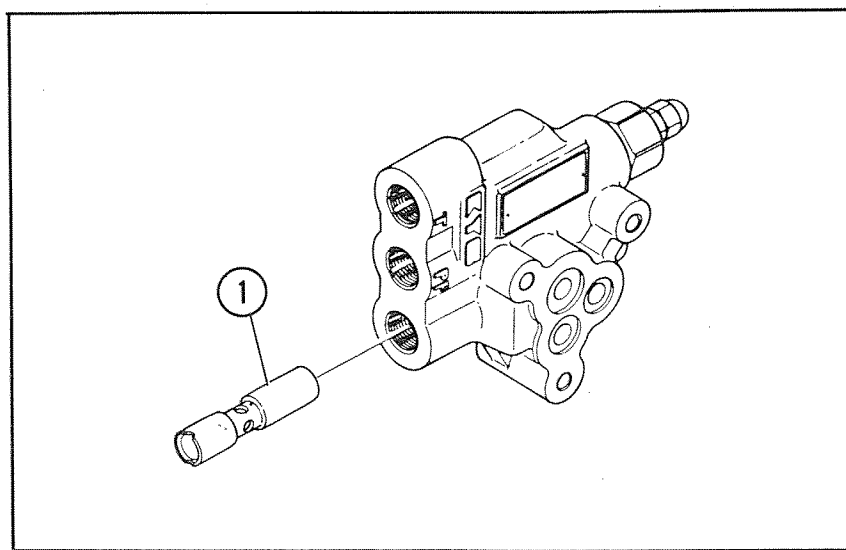
2. Remove the spring (2), Figure 19.
3. Depress the plunger (1), (Figure 20) and pull out the plunger core while rotating it.

**NOTE:** Never apply an excessive force to pull out the plunger core. Be careful not to damage the orifice.



**Figure 19**  
**Priority Valve Disassembly**

1. Plug
2. Spring
3. O-Ring
4. Shim



**Figure 20**  
**Priority Valve Disassembly**

1. Plunger

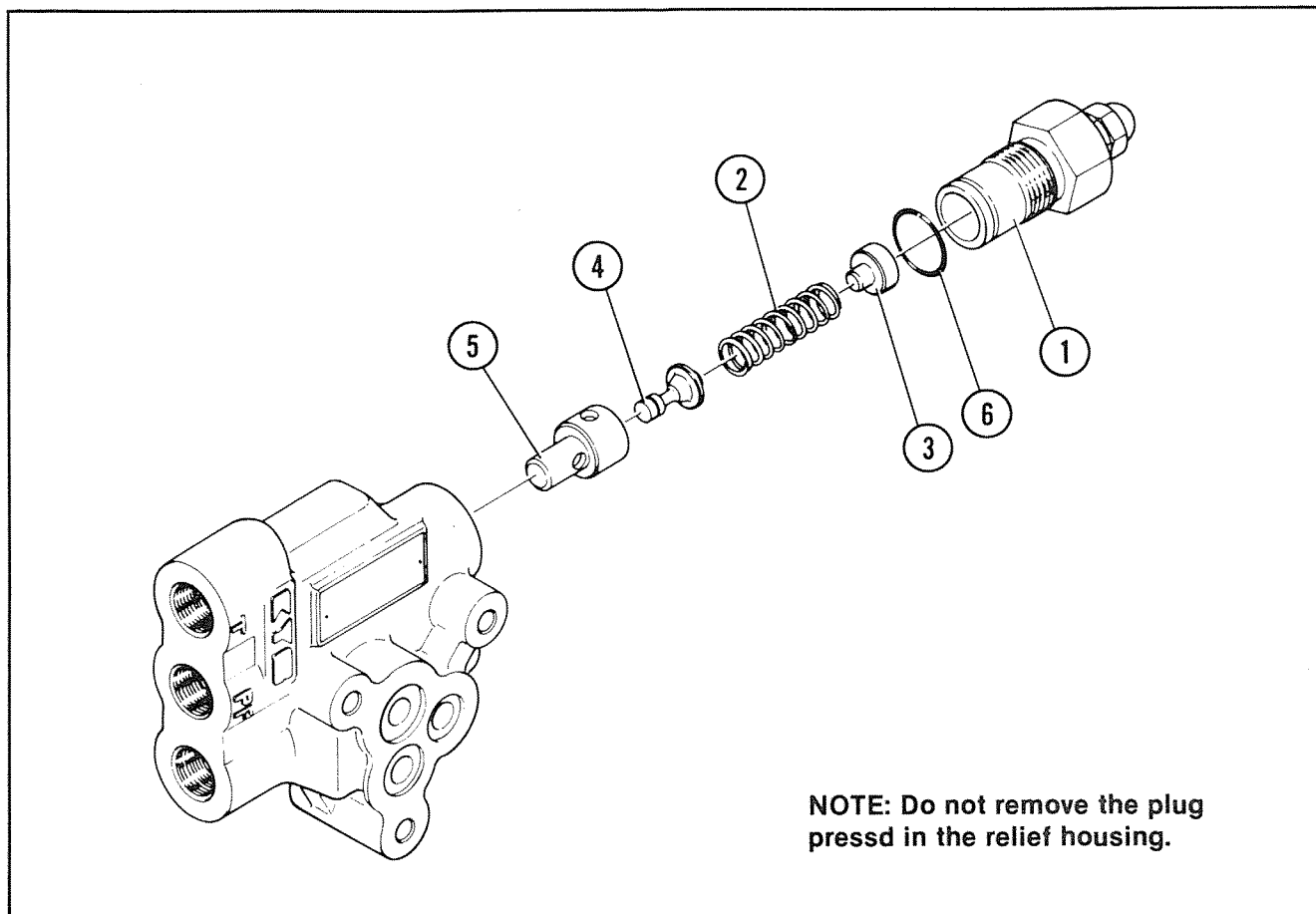


4. Remove the plug (1) Figure 21, from the body.

**NOTE:** Avoid loosening the cap nut and lock nut if possible because it will change the preset relief pressure.

5. Remove the spring (2) and spring seat (3), Figure 21.

6. Remove the poppet (4) and relief housing (5), Figure 21.



**Figure 21**  
**Priority Valve Disassembly**

- 1. Plug
- 2. Spring
- 3. Spring Seat

- 4. Poppet
- 5. Relief Housing
- 6. O-Ring

## INSPECTION OF PRIORITY VALVE

### Body and Plunger

Thoroughly clean the body to remove foreign particles. Check the plunger surface for burrs and scratches. If the plunger surface is damaged, replace with a new plunger.

**NOTE:** The body and plunger are matched sets and must be replaced as an assembly.

### Poppet and Relief Housing

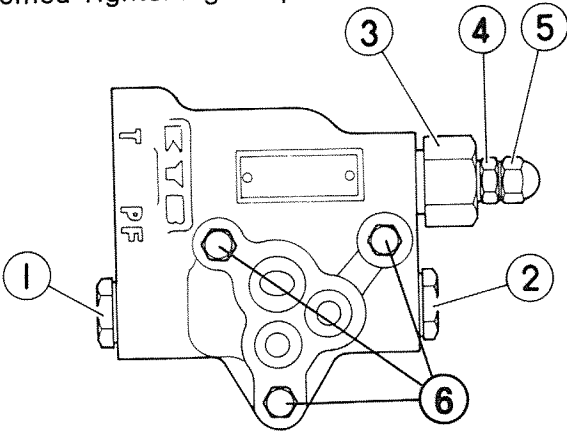
Check the poppet and relief housing for wear and scratches. Replace damaged parts.

### O-Ring

Replace all O-rings.

# —POWER STEERING

## ASSEMBLY OF PRIORITY VALVE

| Specified Tightening Torque   |                   | Tightening Torque |           |
|---|-------------------|-------------------|-----------|
|   |                   | Foot Pounds       | (Kg·F-m)  |
|  | Part Name         |                   |           |
|   | 1 Plug            | 36—43             | 5 ~ 6     |
|   | 2 Plug            | 36—43             | 5 ~ 6     |
|   | 3 Plug            | 25—32             | 3.5 ~ 4.5 |
|   | 4 Lock Nut        | 20—23             | 2.8 ~ 3.2 |
|   | 5 Cap Nut         | 20—23             | 2.8 ~ 3.2 |
|   | 6 Attaching Bolts | 14—18             | 2.0 ~ 2.5 |

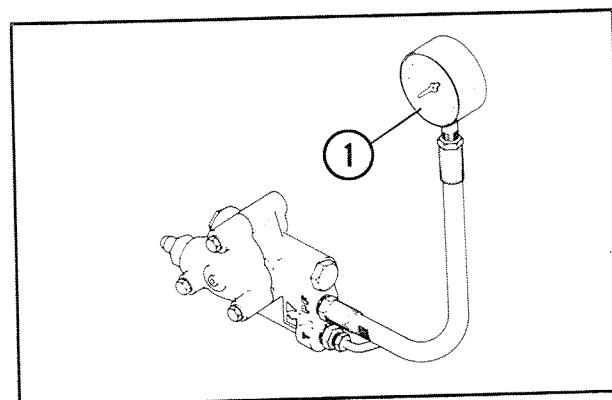
**Figure 22**

1. Assembly is in the reverse order of disassembly.

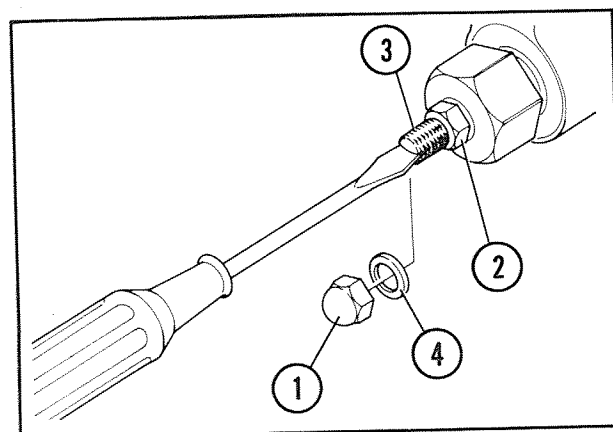
### ADJUSTING THE RELIEF VALVE PRESSURE

1. Warm the hydraulic oil to about 60° C.
2. Disconnect the power steering pipe and connect a pressure gage 0-1500 PSI (0~100 kg/cm<sup>2</sup>) to the PF port of the flow priority valve.
3. Operate the engine at a high speed and fully turn the steering wheel. Read the pressure gauge when the relief valve is activated, Figure 23. Set pressure of relief valve: 758-925 PSI (55-65 kg/cm<sup>2</sup>).
4. To adjust the relief valve pressure, remove the cap nut, loosen the lock nut and turn the adjuster, Figure 24. (Turning the adjuster clockwise will raise the pressure.) One turn of the adjuster will raise the pressure by about 350 PSI (25 kg/cm<sup>2</sup>).

**NOTE:** Never raise relief pressure more than 925 PSI (65 kg/cm<sup>2</sup>)



**Figure 23**  
**Relief Valve Pressure Adjustment**  
1. Pressure Gauge



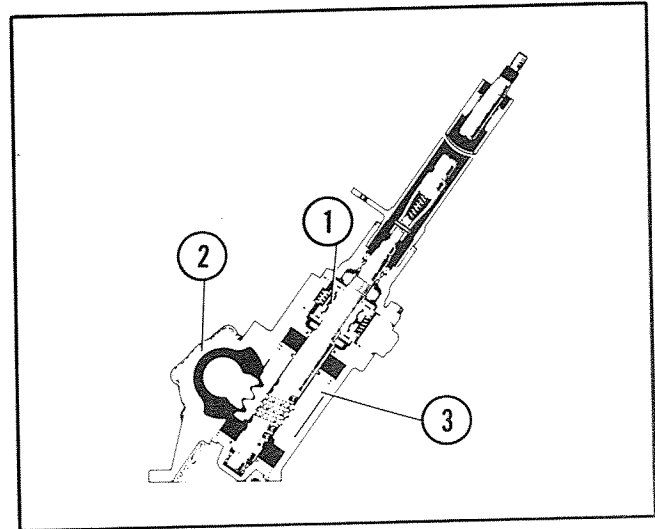
**Figure 24**  
**Relief Valve Pressure Adjustment**  
1. Cap Nut  
2. Lock Nut  
3. Adjuster  
4. Seal Washer

## POWER STEERING CYLINDER AND CONTROL VALVE

### Construction

The power steering cylinder and control valve are built in the steering gear housing. Hydraulic power is transferred to the pitman arm to assist in steering.

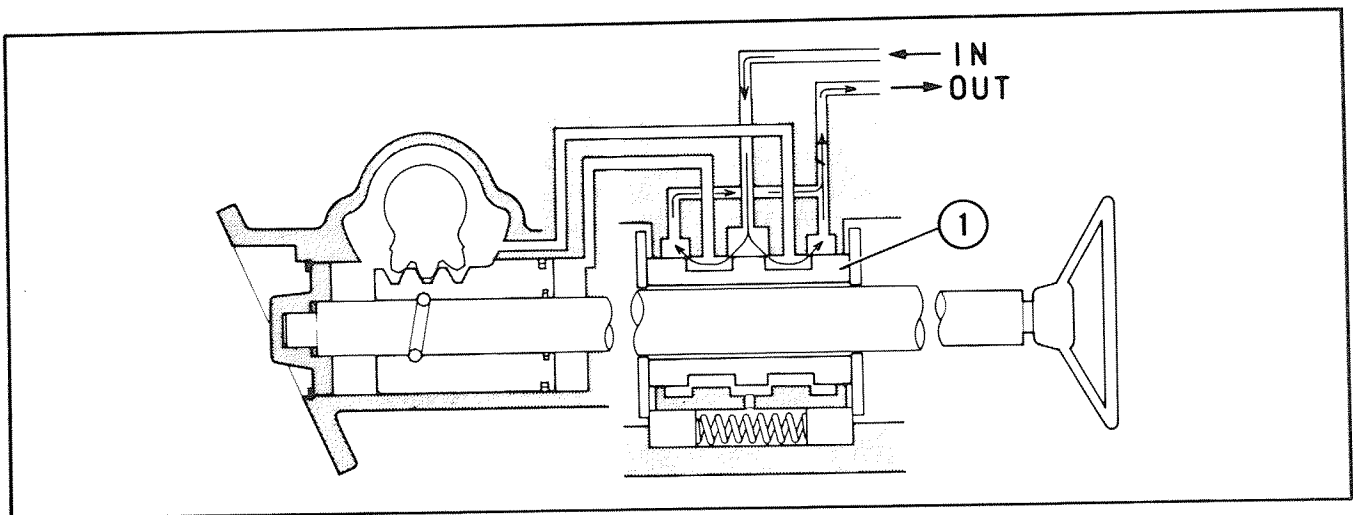
The gear housing acts as a power cylinder and the ball nut acts as a power piston. The valve spool of the control valve is installed at the center of the steering shaft.



**Figure 25**  
**Power Steering Cylinder and Control Valve**

1. Valve Spool
2. Gear Housing
3. Ball Nut

When turning the steering wheel, the valve spool moves up and down in the valve housing to control the oil flow, Figure 25.



**Figure 26**  
**Power Steering Cylinder and Control Valve Air Flow At Neutral**

1. Valve Spool

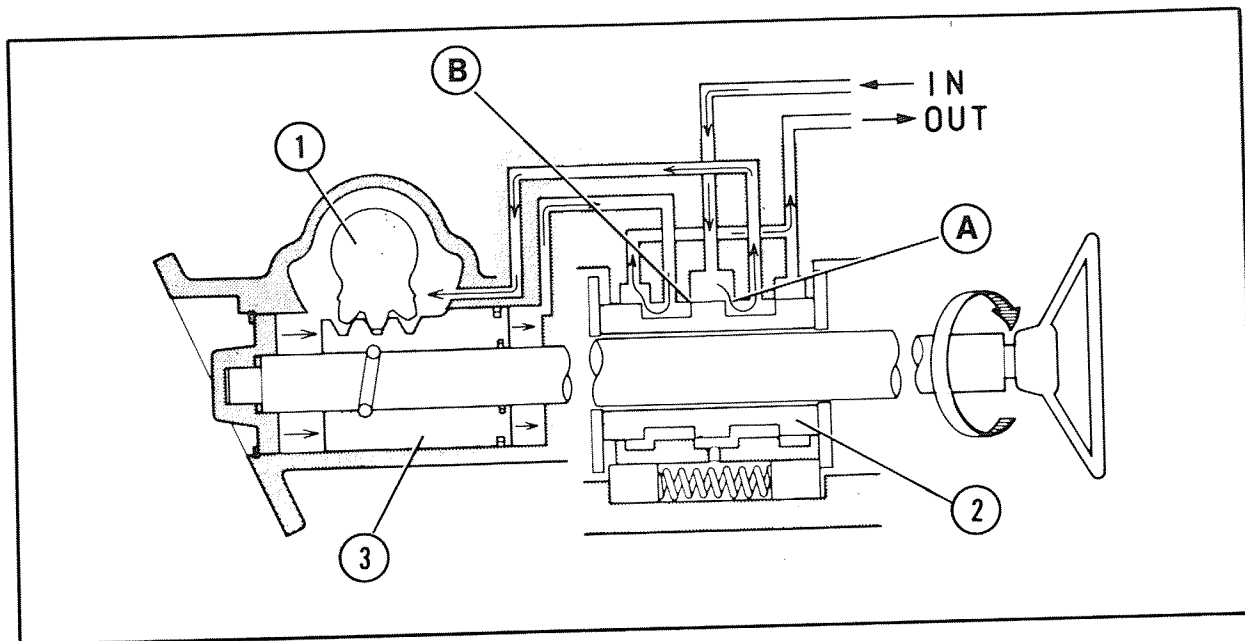
### Operation

**Oil flow at neutral (Steering Wheel Not Activated):** When the steering wheel is not activated, the valve spool is in a neutral position as shown in Figure 26. The oil enters the control valve and immediately returns to sump as shown by the arrows, Figure 26.

**Oil flow when the steering wheel is turned clockwise:** When turning the steering wheel

clockwise, the power piston tends to move toward the steering wheel due to the steering shaft reaction. In line with the steering wheel movement, the valve spool moves to open A and close B passageway. Thus, the oil flows in the direction of the arrows and the power piston is moved to the right due to the hydraulic pressure. The sector shaft rotates to turn the front wheels to the right via the pitman arm, Figure 27.

# —POWER STEERING—

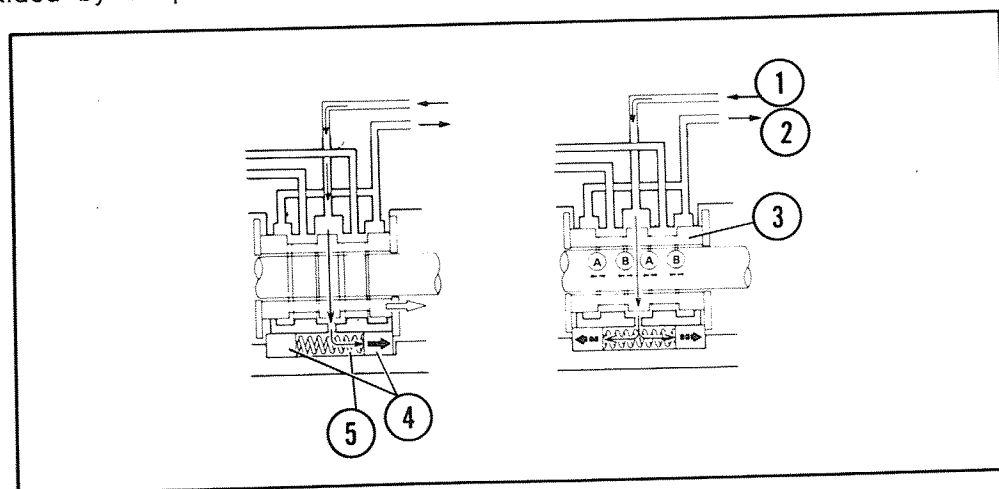


**Figure 27**  
Power Steering Cylinder and  
Control Valve Oil Flow  
(Steering Wheel Turned Clockwise)

1. Sector Shaft
2. Valve Spool
3. Power Piston

When the steering wheel is not being turned, there is no axial force on the steering shaft, and the centering plungers return the valve spool to the neutral position as shown in Figure 28. The pressure exerted against the plungers by their springs is aided by oil pressure in the spring

cavity. The force on the plungers determines how much force must be applied to turn the steering wheel before the power assistance comes into action, thus providing some "road feel" for the operator.



**Figure 28**  
Power Steering Cylinder and  
Control Valve Oil Flow

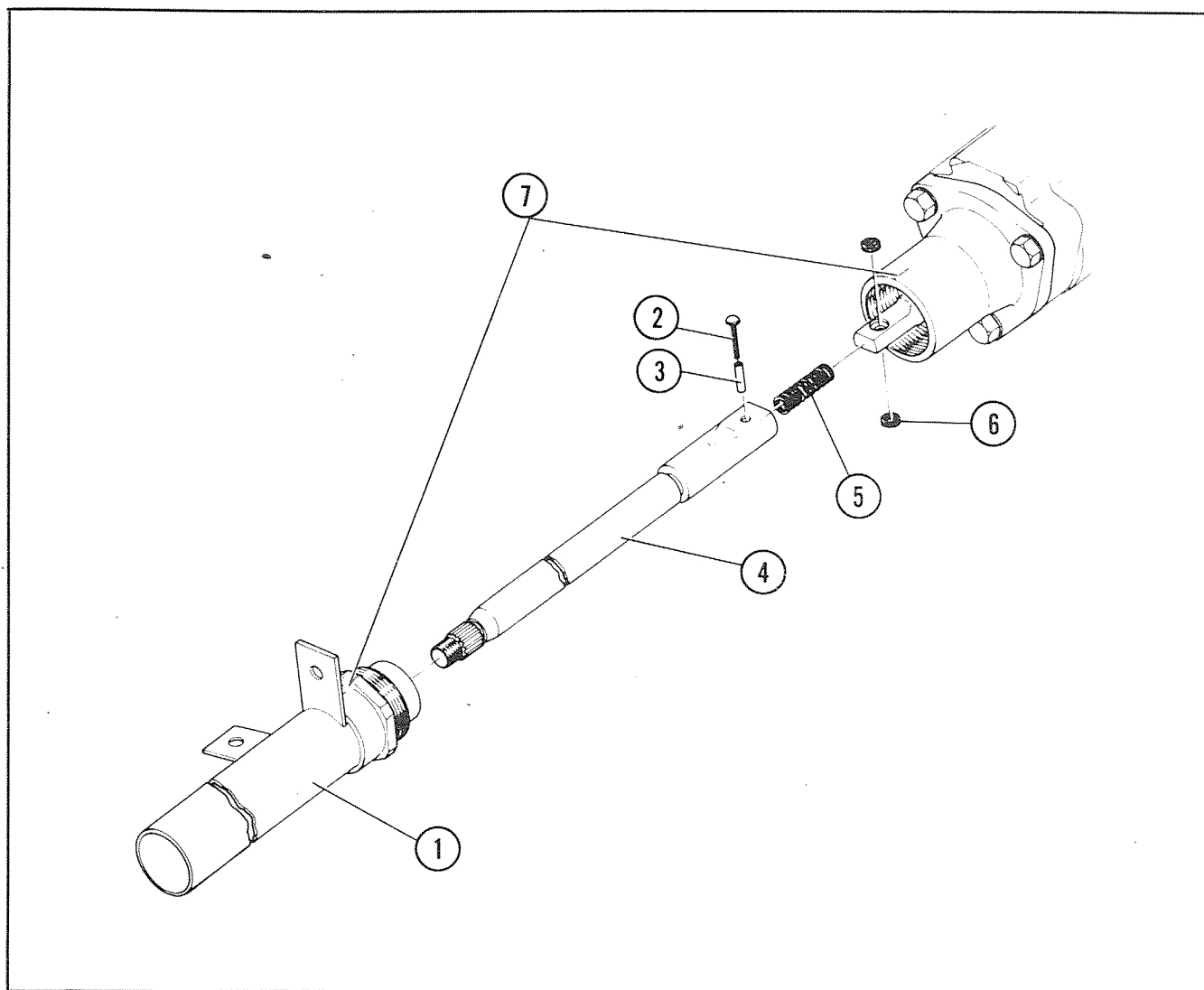
1. From Pump
2. To Sump
3. Valve Spool
4. Centering Plungers
5. Reaction Spring

## DISASSEMBLY OF POWER STEERING CYLINDER AND CONTROL VALVE

1. Remove the column (1) from the gear box, Figure 29.

**NOTE:** Mark the position before removal.

2. Straighten the rivet (2) and pull out the rivet and spring pin (3), Figure 29.
3. Remove the steering shaft (4) and pull out the spring (5), Figure 29.

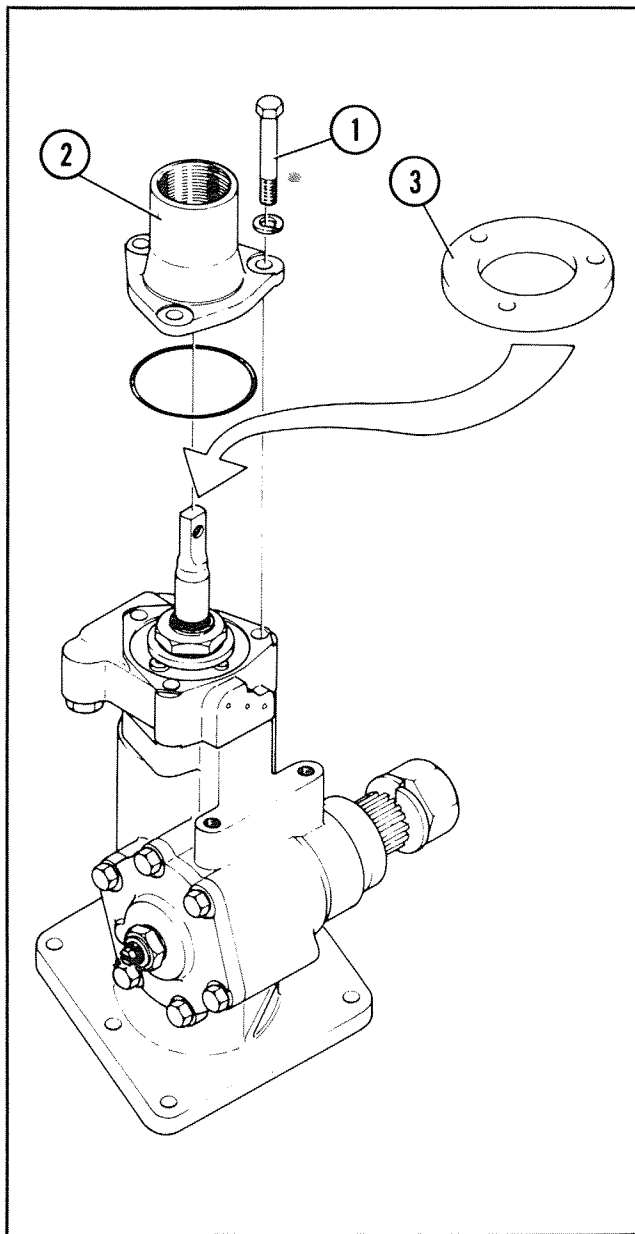


**Figure 29**  
**Steering Shaft Column Disassembly**

1. Column Assembly
2. Rivet
3. Spring Pin
4. Steering Shaft
5. Spring
6. O-Ring
7. Mark

## —POWER STEERING—

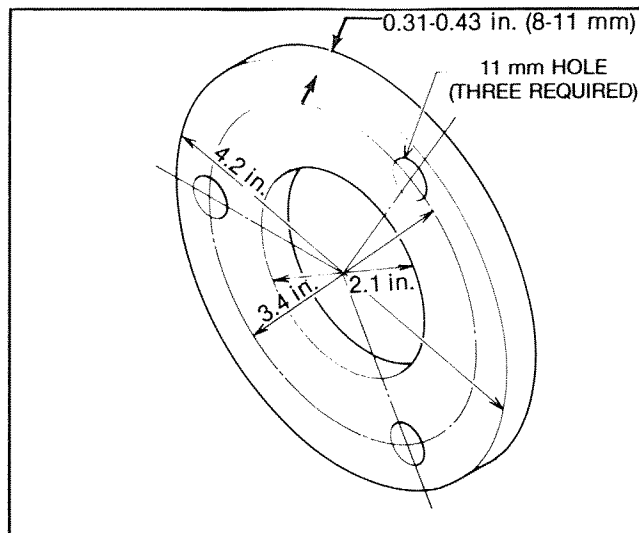
4. Remove the bolts (1) and rear cover (2), Figure 30.



**Figure 30**  
**Rear Cover Disassembly**

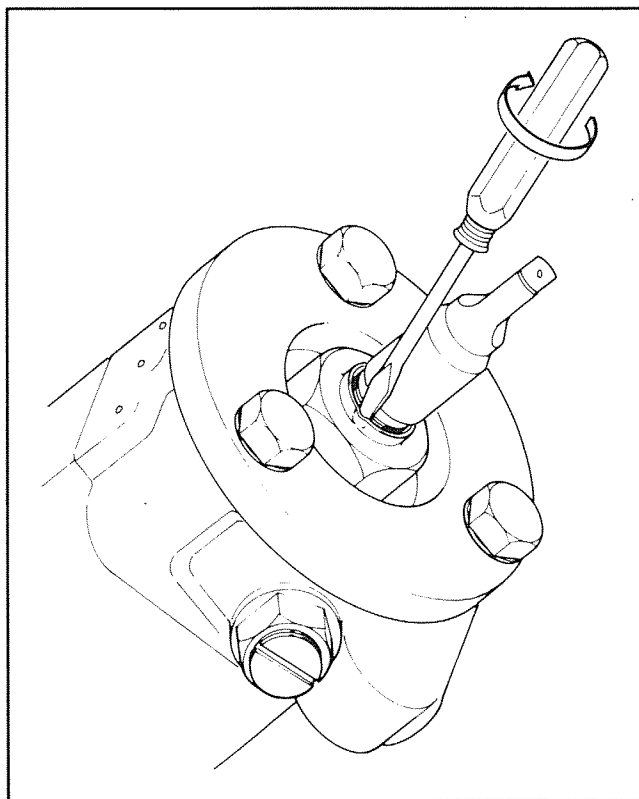
- 1. Bolt
- 2. Rear Cover
- 3. Assembly Plate

5. Make an assembly plate as shown in Figure 31. Install the assembly plate (3), Figure 30, using the rear cover retaining bolts.



**Figure 31**  
**Assembly Plate**

6. Straighten the washer tab with a screwdriver and remove the nut, Figure 32.

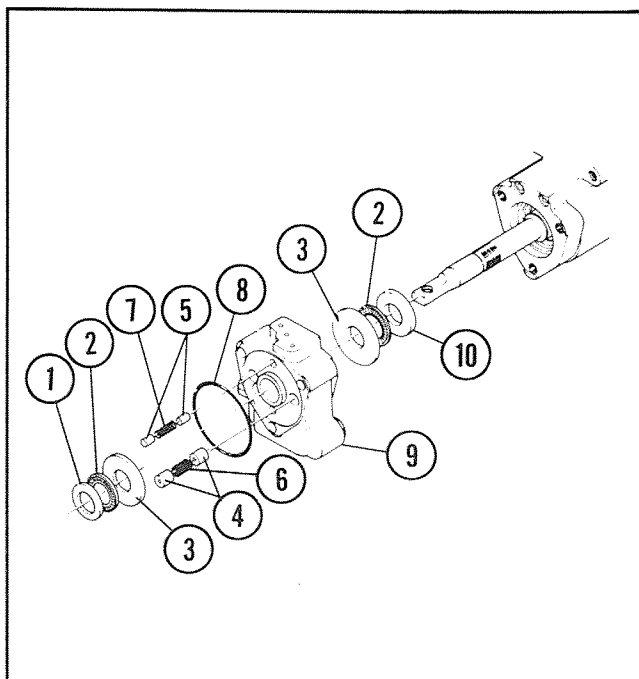


**Figure 32**

7. Remove the assembly plate and remove the valve assembly, Figure 33.

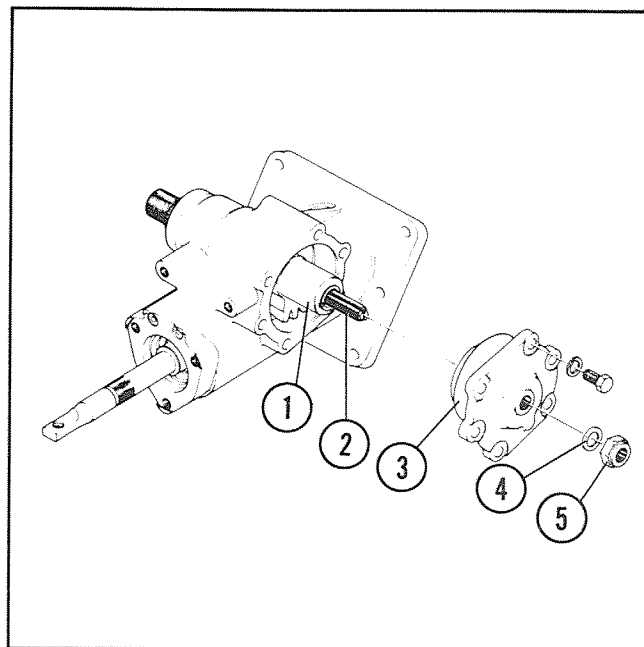
**NOTE:** Be careful not to lose the pistons and springs.

8. Remove the lock nut (5), and gasket (4), Figure 34.
9. Remove the side cover (3), by turning the adjusting screw (2), Figure 34 clockwise. (On the series 1700 tractor remove the seal nut.)



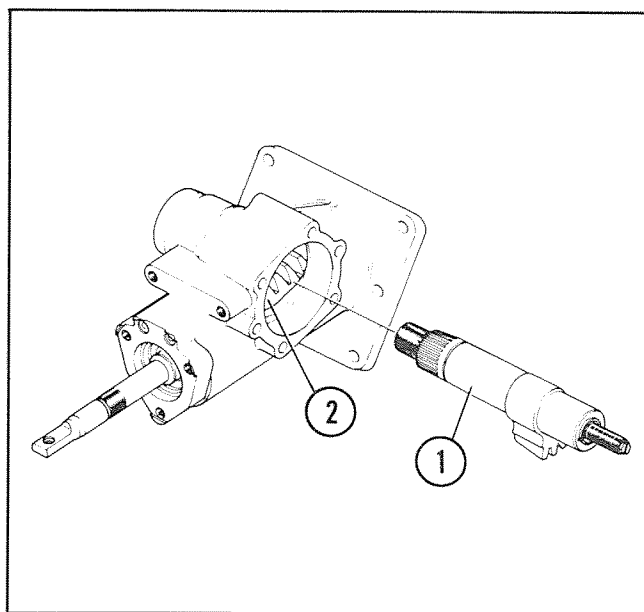
**Figure 33**  
**Assembly Plate and Valve Assembly Removal**

1. Bearing Washer
2. Bearing
3. Thrust Washer
4. Piston
5. Piston
6. Spring
7. Spring
8. O-Ring
9. Valve Assembly
10. Thrust Washer



**Figure 34**  
**Side Cover Removal**

1. Sector Shaft
2. Adjusting Screw
3. Side Cover
4. Gasket
5. Lock Nut

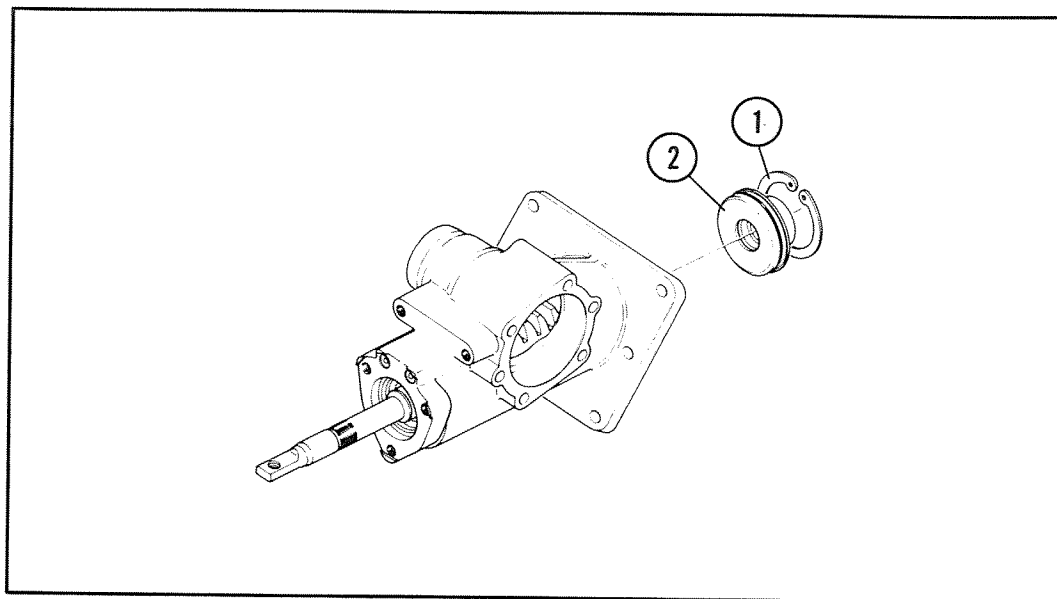


**Figure 35**  
**Sector Shaft Removal**

1. Sector Shaft
2. Ball Nut

10. Align the sector shaft (1) with the ball nut teeth (2), Figure 35.
11. Drive out the sector shaft by tapping it from the pitman arm side with a plastic hammer.

## —POWER STEERING



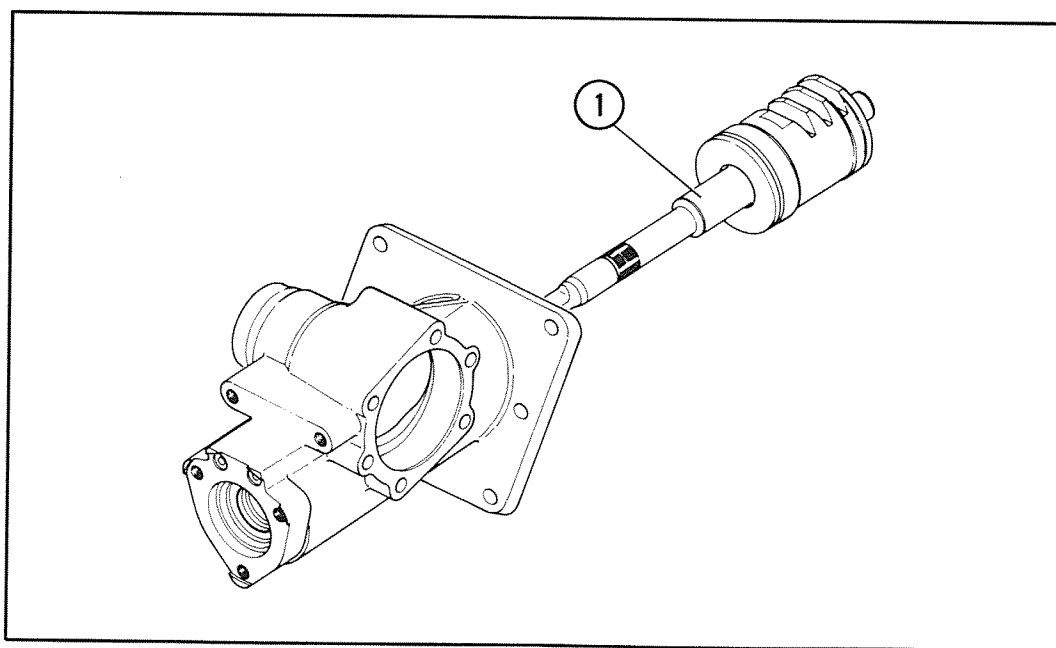
**Figure 36**  
**Front Cover Removal**

- 1. Snap Ring
- 2. Front Cover

12. Remove the snap ring (1) and remove the front cover (2), Figure 36.

13. Remove the ball nut assembly (1), Figure 37, from the steering case, Figure 37.

**NOTE:** *Never disassemble the ball nut assembly.*



**Figure 37**  
**Ball Nut Assembly Removal**

- 1. Ball Nut Assembly



## INSPECTION

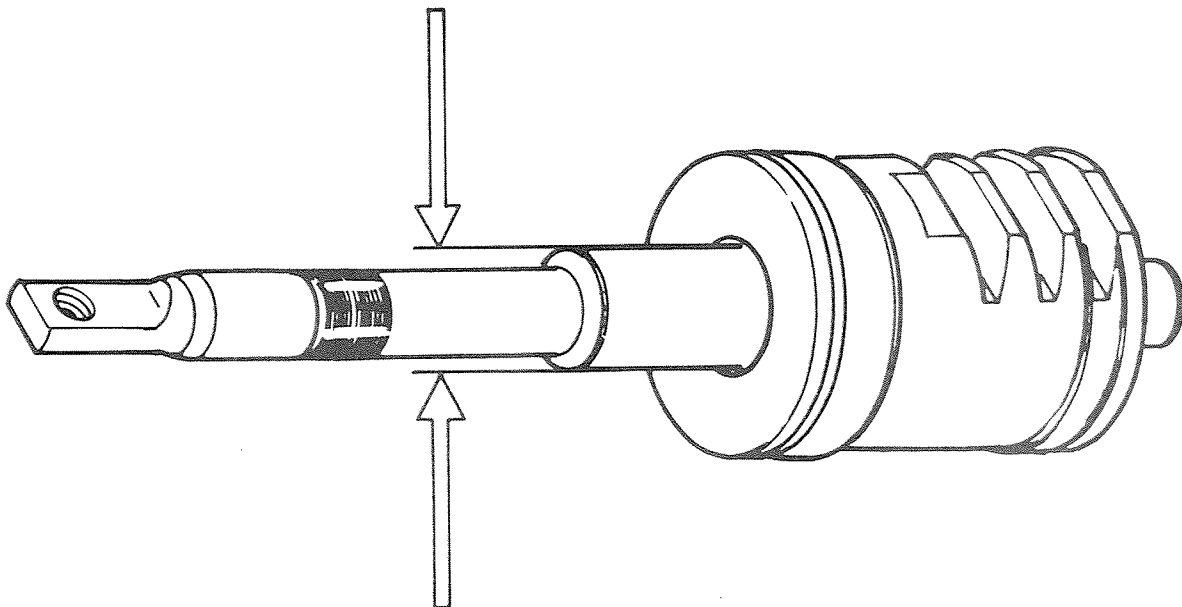
Check after cleaning.

the worm shaft rotate smoothly. If not, replace the ball nut assembly.

### Ball Nut Assembly

1. Hold the ball nut assembly horizontally and carefully rotate the worm shaft to check that
2. Measure the worm shaft outer diameter, Figure 38. If the diameter is less than 1.121 in. (28.475 mm) replace the shaft.

| Tractor Series | Designed Value  | Allowable Limit                      |
|----------------|---|--------------------------------------|
| 1900           | 1.125 — 1.124 in. ( $\varnothing$ 28.575 ~ 28.562 mm) | 1.121 in. ( $\varnothing$ 28.475 mm) |
| 1700           | 0.984 — 0.985 in. (24.996 ~ 25.009 mm)                | 0.980 in. (24.9 mm)                  |



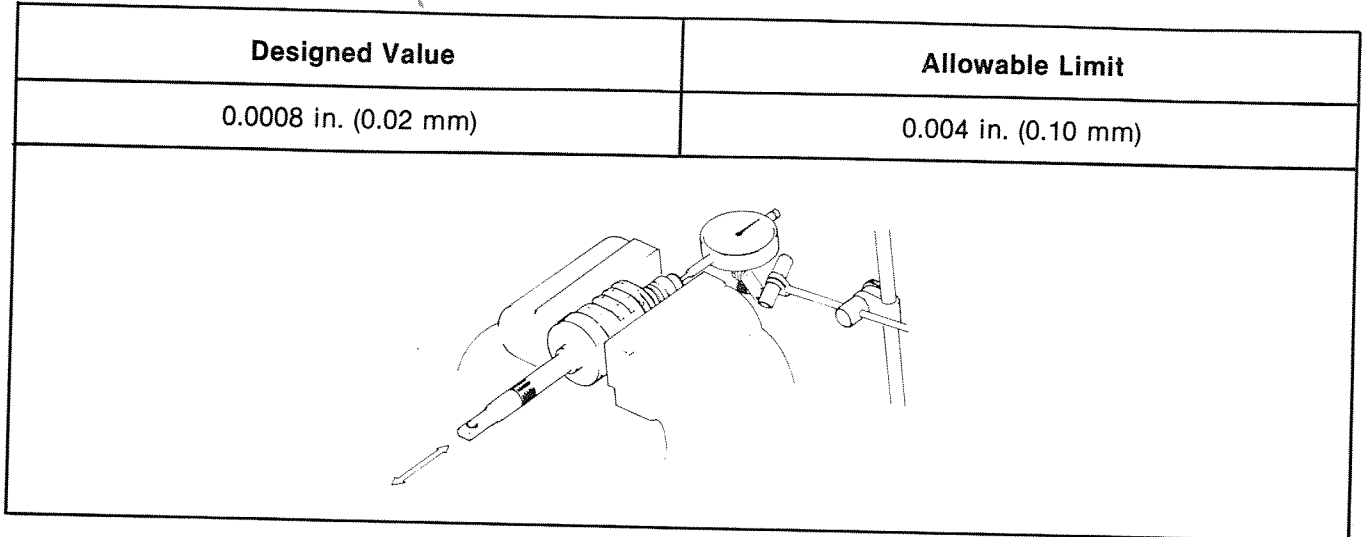
**Figure 38**  
**Worm Shaft Outer Diameter Measurement (mm)**

# —POWER STEERING—

3. Clamp the ball nut in a vise and measure the end play of the worm shaft, Figure 39. If the end play exceeds 0.004 in. (0.10 mm), replace the shaft.
4. Check the worm thread for peeling-off and scratches.

5. Check the rack teeth for cracks and scratches.

**NOTE:** Replace the ball nut assembly, if necessary.

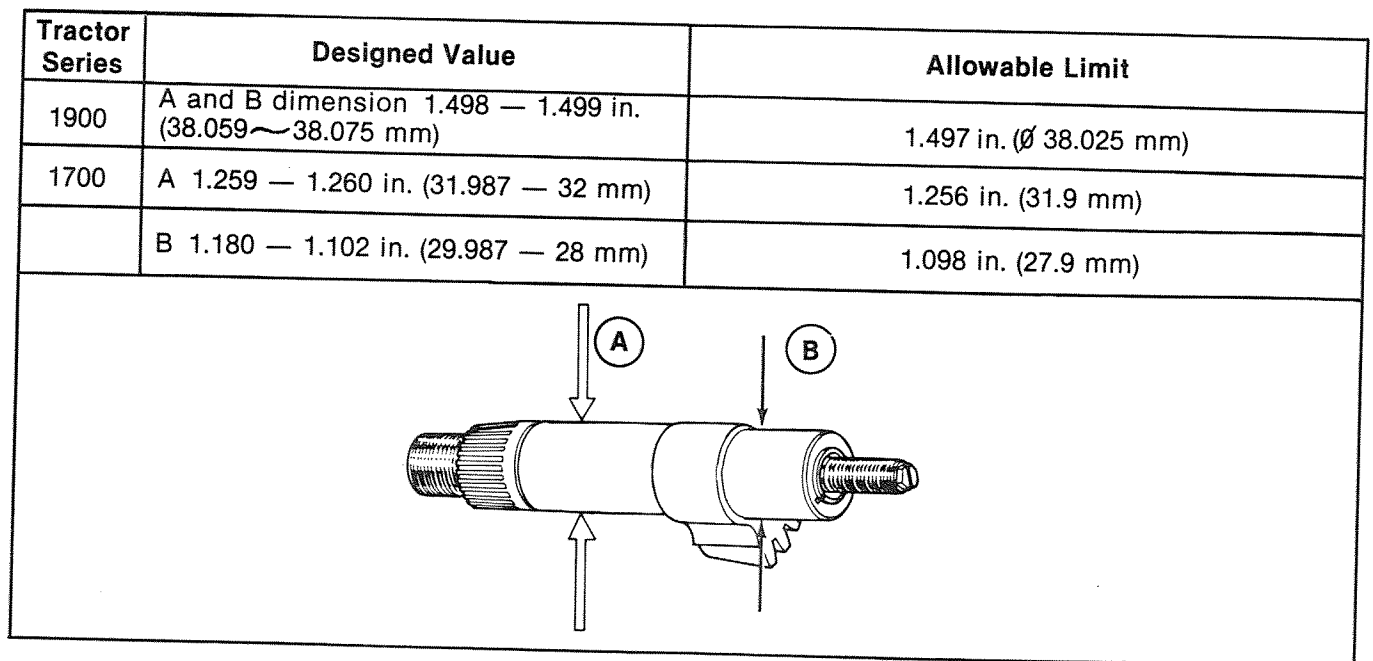


**Figure 39**  
**Worm Shaft Thrust Play**

## Sector Shaft

1. Check the bearing surface, sealing parts and gear for wear, scratches and cracks. If necessary, replace.

2. Measure the other diameter of the sector shaft, Figure 40. If the diameter measures below the allowable limit, replace the sector shaft.



**Figure 40**  
**Sector Shaft Outer Diameter Measurement**

# -POWER STEERING

## Gear Box

1. Check the cylinder inner surface for wear and scratches. If necessary, replace. Measure the

inner diameter of the gear box and outer diameter of the ball nut, Figure 41-42. If the difference in diameter exceeds 0.006 in. (0.15 mm), replace the gear box or ball nut assembly or both.

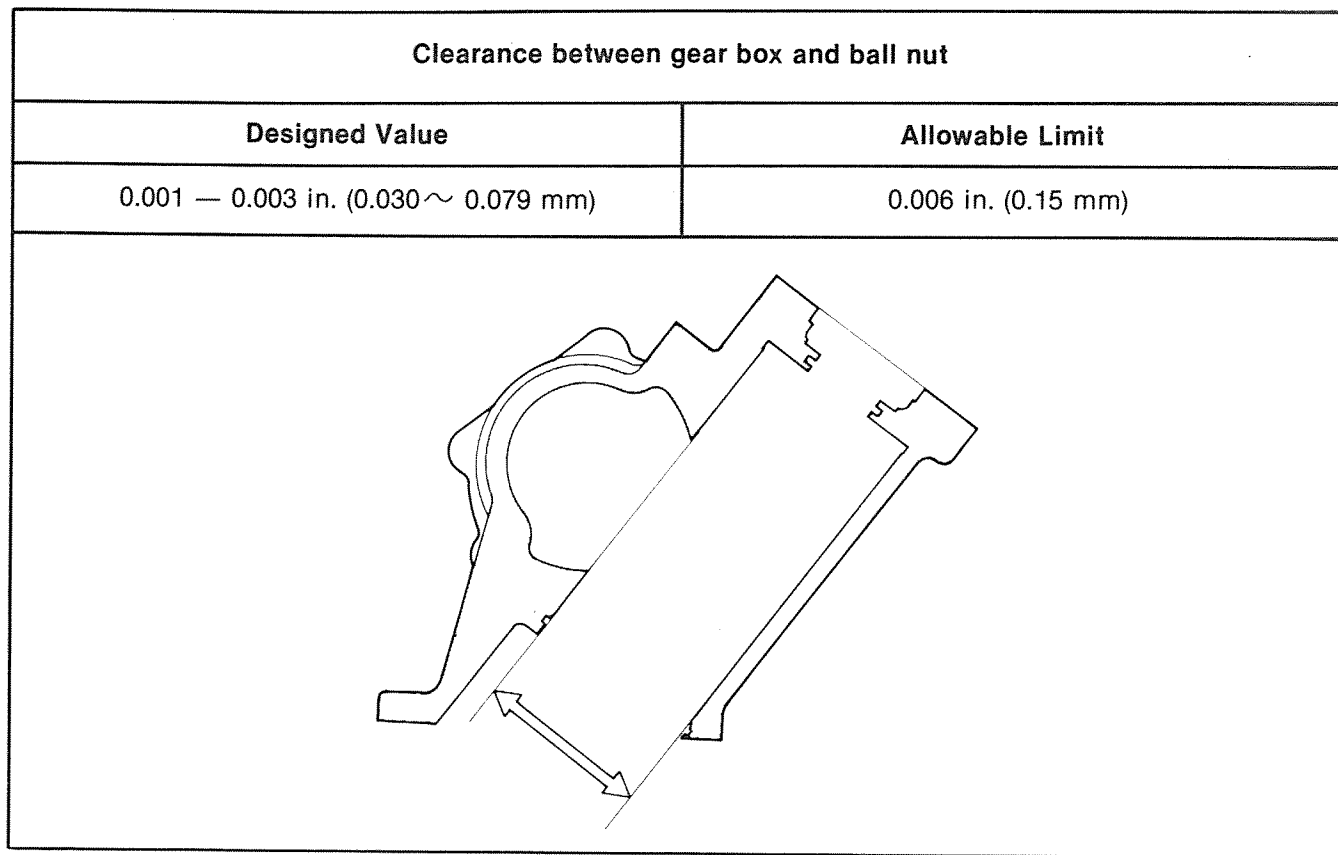


Figure 41  
Gear Box

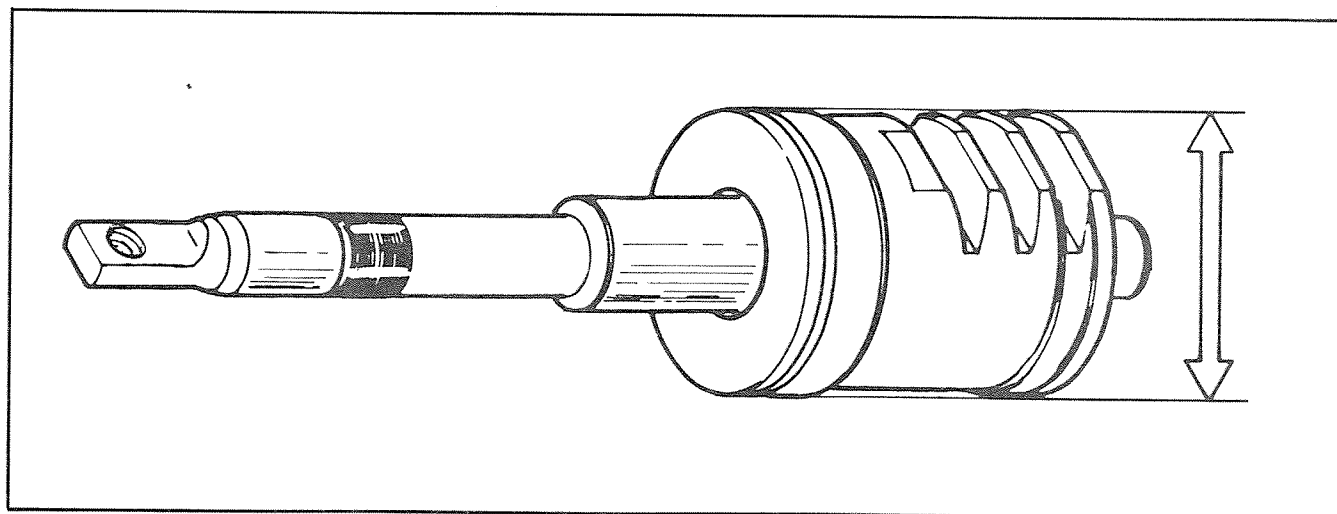


Figure 42  
Ball Nut

# — POWER STEERING —

## Valve Assembly

1. Check the orifice edges of the sleeve and spool for wear and damage. If necessary, replace the valve assembly.

2. Measure the clearance between the valve housing and spool, Figure 43-44. If the measured difference exceeds 0.001 in. (0.025 mm), replace the valve assembly.

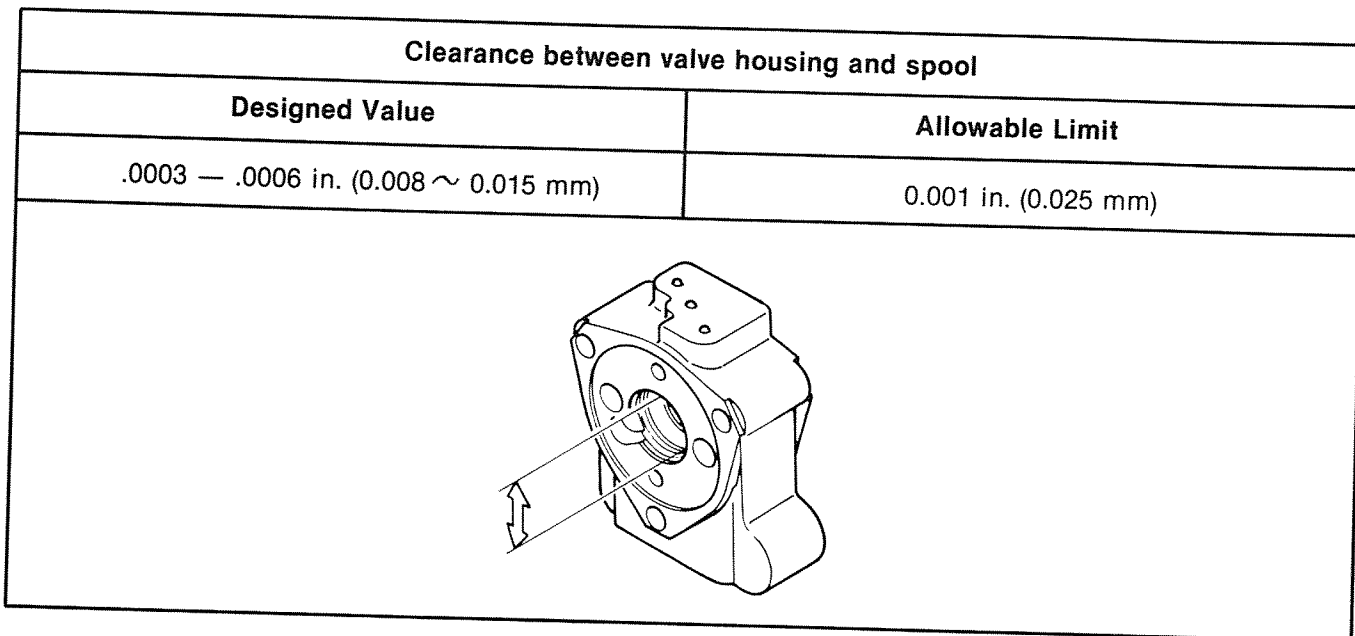


Figure 43  
Valve Housing

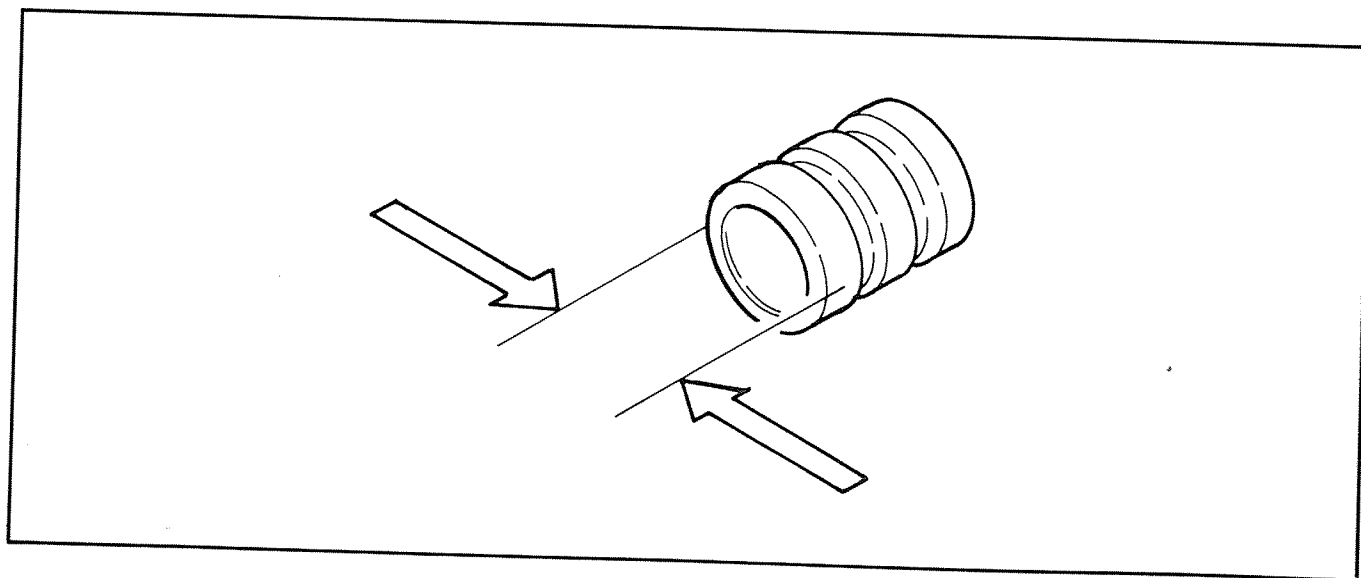


Figure 44  
Spool

## Bearings

1. Check the race surface for damage and wear, and check that the bearing rotates smoothly. If necessary, replace.

## Sealing Parts (O-ring, U-packing and oil seal)

1. Check the sealing parts for damage and wear. If necessary, replace with a new one.

# —POWER STEERING

## ASSEMBLY

Reassemble in the reverse order of disassembly.

### Valve Assembly Installation

1. Align the "P" marks of the sleeve and spool and install the valve assembly, Figure 45.

### Steering Shaft Nut (Tightening)

1. Fully turn the shaft counterclockwise with a wrench and tighten the nut. At that time, there should be no end play in shaft. Back off the nut  $1/4$  turn ( $42^\circ$ ), Figure 46.
2. Bend the locking tab on the lockwasher to secure the nut.

### Grease

1. Apply grease (including molybdenum dioxide) to the column assembly.

### Steering Wheel Play

1. Adjust the adjusting screw so that the circumferential play of the steering wheel is 0.787 — 1.378 in. (20 — 35 mm).

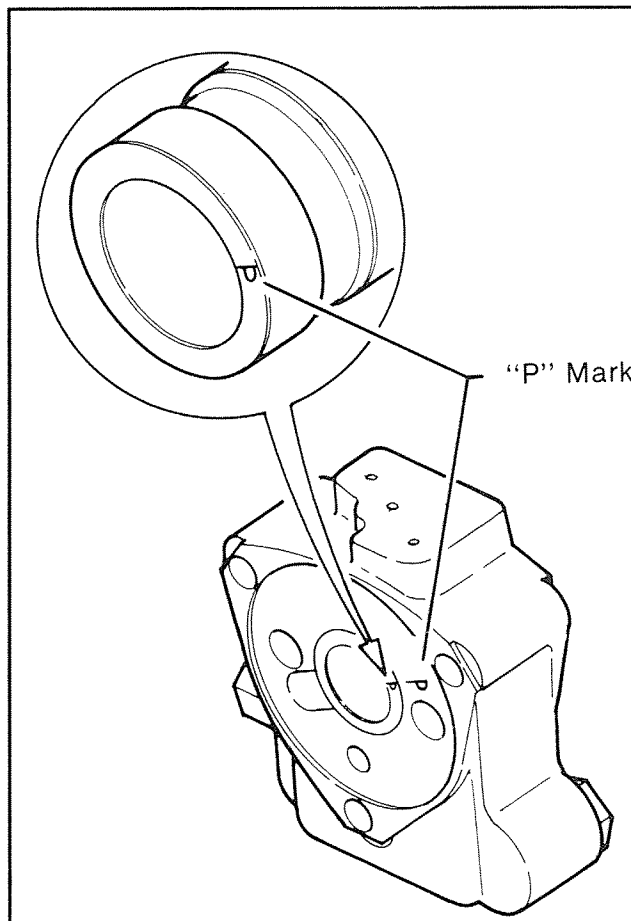


Figure 45  
Valve Assembly

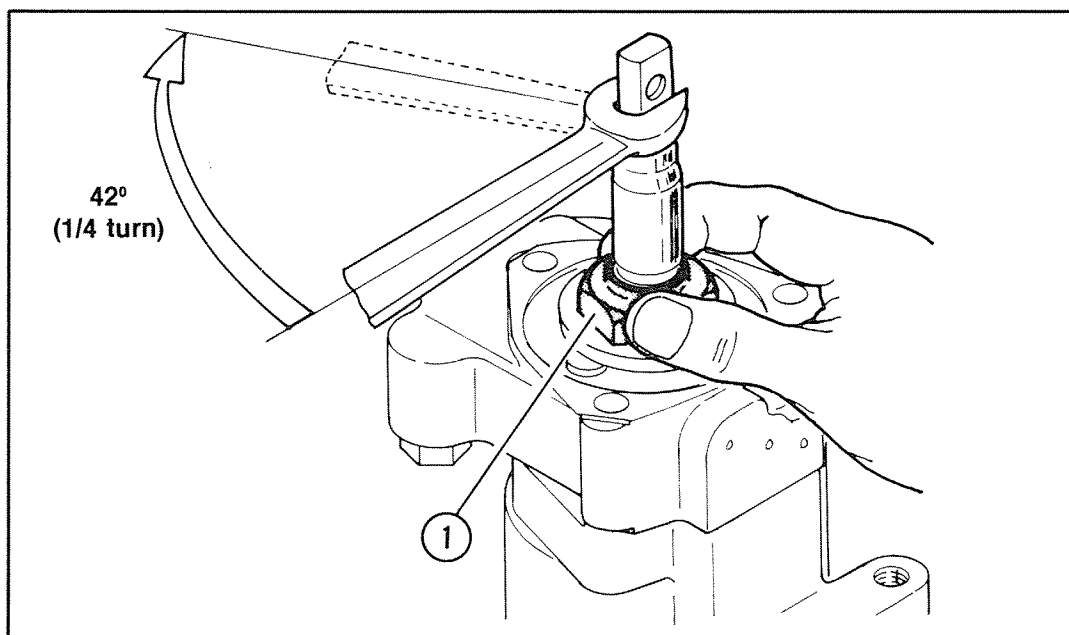


Figure 46  
Tightening Steering Shaft Nut

1. Nut

## Specified Tightening Torque

|   | Tightening Torque |                        |
|---|-------------------|------------------------|
|   | Ft./Lbs.          | (kg f-m)               |
| 1. Column retaining bolt  | 72-94             | 10 — 13                |
| 2. Rear cover retaining bolt                                    | 27-42             | 3.8 — 5.8              |
| 3. Side cover retaining bolt                                    | 27-42             | 3.8 — 5.8              |
| 4. Adjustment Nut<br>1700 Series Tractor<br>1900 Series Tractor | 27-36<br>43-58    | 3.8 — 5.0<br>6.0 — 8.0 |

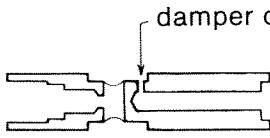
Figure 47

# —POWER STEERING



## TROUBLESHOOTING AND REMEDY

### PRIORITY VALVE

| SYMPTOM  | POSSIBLE CAUSE  | REMEDY  |
|--|---|---|
| 1. The pressure in the power steering circuit does not raise.                | (1) Seized plunger  | (1) Free up plunger or replace.<br>(2) Clean the oil filter and replace the oil.  |
|  | (2) Defective spring  | Replace the spring.   |
|  | (3) Clogged plunger damper orifice  | Clean the orifice.  |
|  |  <p>damper orifice.</p> <p><b>Figure 50</b></p> |   |
|  | (4) Low relief valve setting pressure   | Adjust the setting pressure.  |
|  | (5) Attaching bolts not tight   | Torque to 14-18 ft. lbs.<br>(2.0 — 2.5 kg/Fm)   |
| 2. The pressure of the tractor hydraulic system does not raise.              | (1) Seized plunger  | (1) Free up plunger or replace.<br>(2) Clean the oil filter and replace the oil.  |
|  | (2) Clogged plunger damper orifice  | Clean the orifice.  |
| 3. Vibration in the steering occurs and the pressure does not raise quickly. | (1) Seized plunger  | (1) Free up plunger or replace.<br>(2) Clean the oil filter and replace the oil.  |
|  | (2) The oil contains air  | (1) Check and replace the O-ring attached to the suction pipe and oil filter.<br>(2) Check the suction pipe for air tightness.<br>(3) Check the oil pump oil seal for air tightness.<br>(4) Prime the pump to remove air. |
|  | (3) Clogged plunger and damper orifice.   | Clean the orifice.  |

(Continued)

# —POWER STEERING—

## PRIORITY VALVE (CON'T.)

|  |                                    |  |
|--|------------------------------------|--|
| 4. The pressure of the power steering is too high. | (1) Seized plunger                 | (1) Free up plunger or replace.<br>(2) Clean the oil filter and replace the oil. |
|  | (2) Clogged plunger damper orifice | Clean the orifice.   |
|  | (3) Malfunction of relief valve    | Refer to the "Relief valve".   |
| 5. Abnormal noise.                                 | Malfunction of relief valve.       | Refer to the "Relief valve".   |

## POWER STEERING

| SYMPTOM   | POSSIBLE CAUSE                                      | REMEDY  |
|---|---|---|
| 1. The hydraulic pressure does not raise.       | (1) Defective pump                                  | Replace the oil pump.   |
|   | (2) Seized control valve plunger.                   | Clean or replace.   |
|   | (3) Seized, damaged or worn power steering valve.   | Clean or replace.   |
|   | (4) Defective or worn piston (ball nut).            | Replace the ball nut ass'y.                                   |
|   | (5) Defective seal                                  | Replace the seal.   |
|   | (6) Defective or leaking lines.                     | Retighten or replace.   |
| 2. Heavy steering wheel turning effort.         | (1) The oil contains air.                           | Remove the air.   |
|   | (2) The oil pressure does not raise.                | Refer to the item 1. "The hydraulic pressure does not raise." |
|   | (3) Seized or defective flow control valve plunger. | Clean or replace.   |
|   | (4) Seized piston (ball nut).                       | Clean or replace.   |
|   | (5) Loose lock nut.                                 | Retighten the steering shaft lock nut.                        |
| 3. The steering wheel does not return smoothly. | (1) Seized piston (ball nut).                       | Clean or replace.   |
|   | (2) Seized or defective control valve.              | Clean or replace.   |
|   | (3) Defective spring (reaction piston).             | Replace the spring.   |



|   |   |   |
|---|---|---|
| 4. Steering vibrates or abnormal noise. | (1) Loose lock nut.                                 | Retighten the steering shaft lock nut.            |
|   | (2) Defective control valve.                        | Correct or replace.                               |
|   | (3) The oil contains air.                           | Remove the air.                                   |
|   | (4) Defective spring (reaction piston).             | Replace the spring.                               |
|   | (5) Excessive backlash of sector shaft.             | Readjust with the adjusting screw.                |
| 5. Abnormal noise.                      | (1) Cavitation due to excessive suction resistance. | (1) Clean the oil filter.<br>(2) Replace the oil. |
|   | (2) Malfunction of relief valve.                    | Refer to the "Relief valve".                      |

**Reference:**

The power steering oil is common with that of the transmission. Check the oil for impurities and periodically replace the oil.



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