SPECIFICATIONS

Manufacturer ..... Eaton

Special Torques
Cap screws for end cap ..... 31 NM (275 pound-inches)

SPECIAL TOOLS

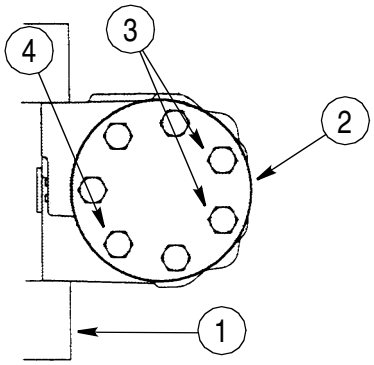
Spring installation..... Eaton part number 600057

Order Special Tools from:
Eaton Corporation, Hydraulics Division, 15151 Highway 5, Eden Prairie, MN 55344

STEERING CONTROL VALVE

Disassembly

1. Clean the port area of the steering control valve housing before disconnecting the hydraulic lines.
2. Drain the oil, and plug the ports. Clean the exterior of the steering control valve housing. Protect the machines surfaces during repair.
3. Put the steering control valve in a vise so that the end cap (2) is up, refer to Figure 1.



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1. VISE
2. END CAP
3. ANTI-CAVITATION VALVES
4. CHECK VALVE

FIGURE 1. STEERING CONTROL VALVE-END CAP UP

4. Remove the seven cap screws (1), end cap (2), O-ring (3), gerotor (4), O-ring (3), spacer plate (5), and O-ring (3), refer to Figure 2.
5. Remove the gerotor star from gerotor (4), Figure 2.
6. Remove drive shaft (6), Figure 2.

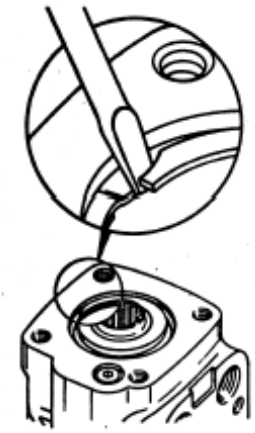


Figure 1-A

7. Remove housing from vise. Place housing on a clean soft cloth to protect surface finish. Use a thin bladed screwdriver to pry retaining ring from housing, as shown in Fig. 1- A .

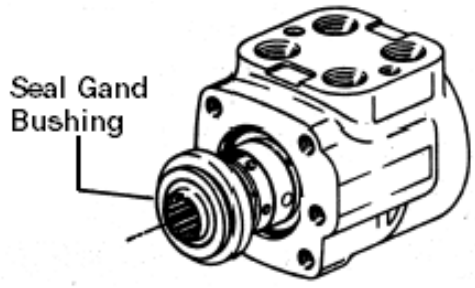
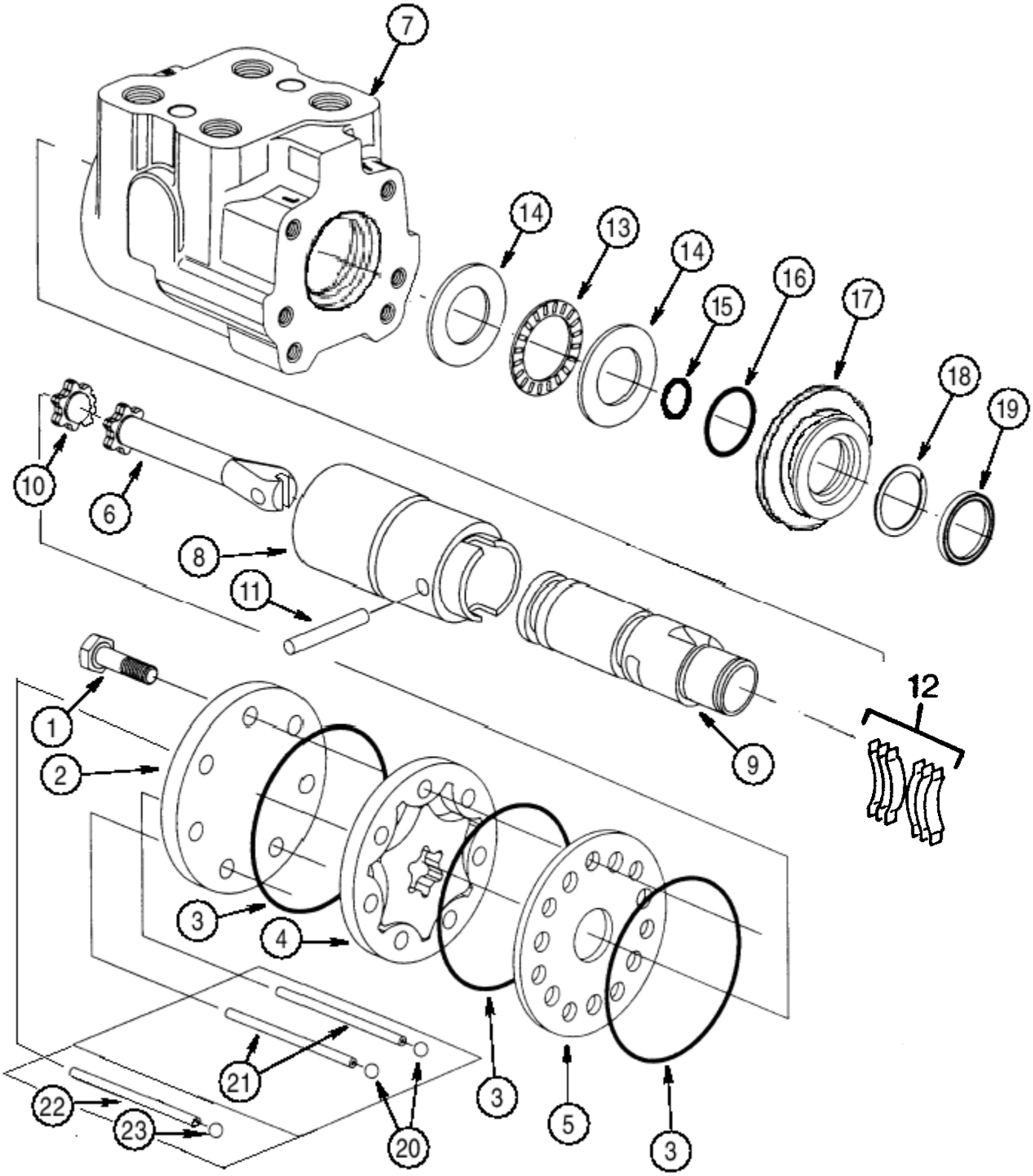


Figure 1 - B

8. Rotate spool and sleeve until pin is horizontal. Push spool and sleeve assembly forward with your thumbs just far enough to free gland bushing from housing, see Fig. 1 - B. Remove bushing



1. CAP SCREW
2. END CAP
3. O-RING
4. GEROTOR
5. SPACER PLATE
6. DRIVE SHAFT
7. STEERING CONTROL HOUSING
8. SLEEVE
9. SPOOL
10. SPACER
11. PIN
12. CENTERING SPRING
13. NEEDLE THRUST BEARING
14. BEARING RACE
15. O-RING
16. O-RING
17. SEAL GLAND BUSHING
18. RETAINING RING
19. DUST SEAL
20. 23. BALL CHECK
21. 22. ROLL PIN

FIGURE 2. STEERING CONTROL VALVE - EXPLODED VIEW

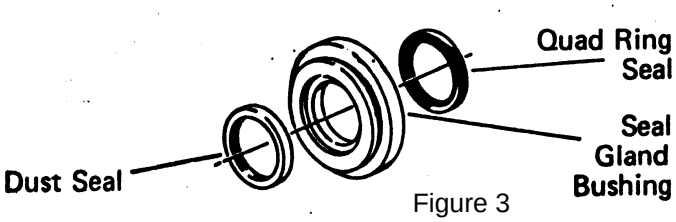


Figure 3

9. Remove quad ring seal from seal gland bushing.

10. Use a thin bladed screwdriver to pry dust seal from seal gland bushing. Do not damage bushing.

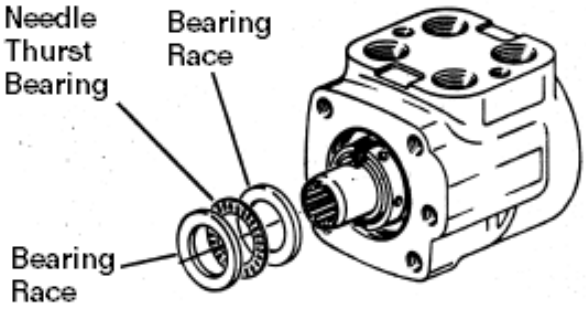


Figure 4

11. Remove 2 bearing races and the needle thrust bearing from spool and sleeve assembly.

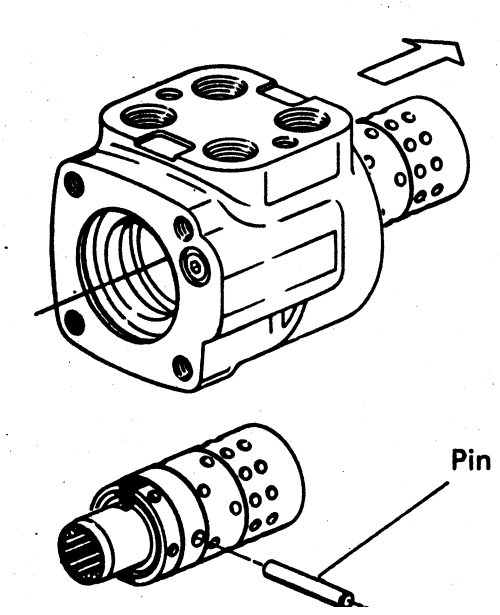


Figure 5

12. Remove spool and sleeve assembly from 14 hole end of housing, see Fig. 5.

Attention: Do not bind spool and sleeve in housing. Rotate spool and sleeve assembly slowly when removing from housing.

13. Push pin from spool and sleeve assembly.

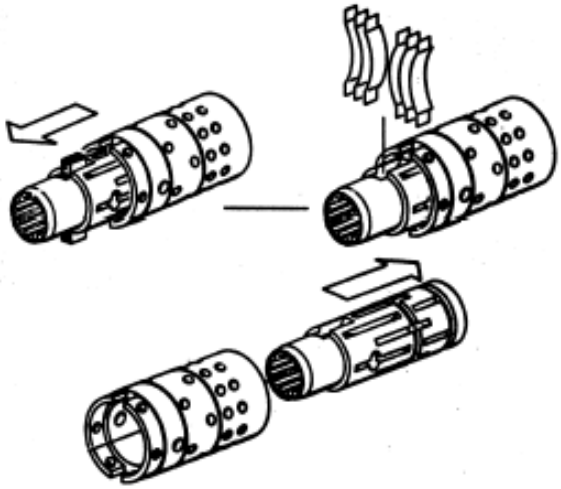


Figure 6

14. Push spool partially from control end of sleeve, then remove 6 centering springs from spool carefully by hand, see Fig. 6

15. Push spool back through and out of sleeve, see Fig. 6 Rotate spool slowly when removing from sleeve.

16. Remove o-ring from housing, see Fig. 7 and two cylinder port shock valves (set screw, o-ring, spring, and check ball).

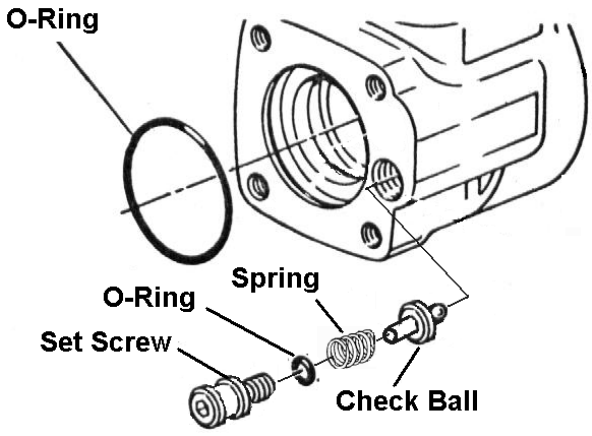
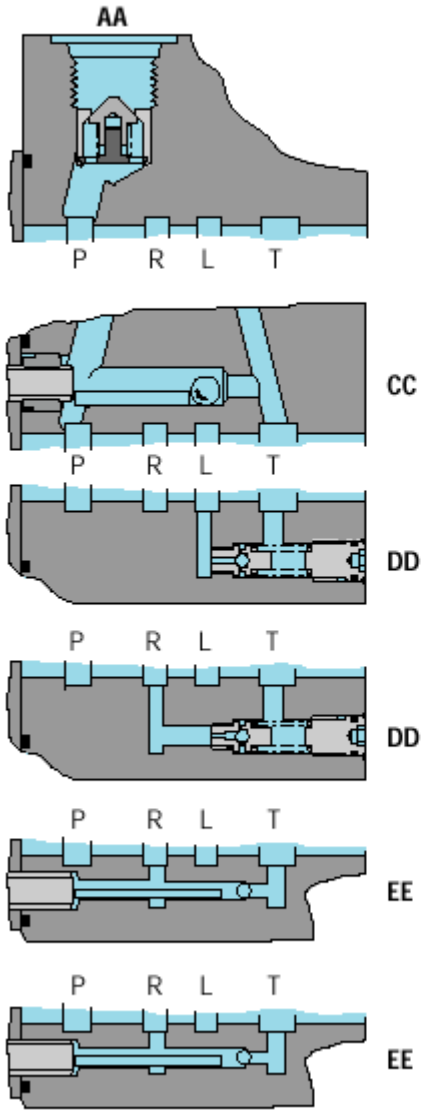


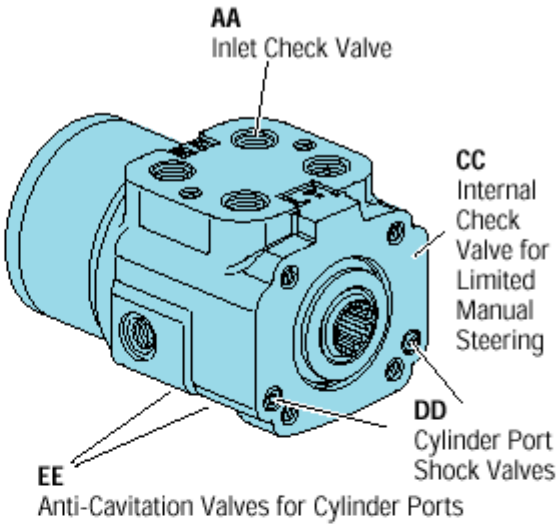
Figure 7

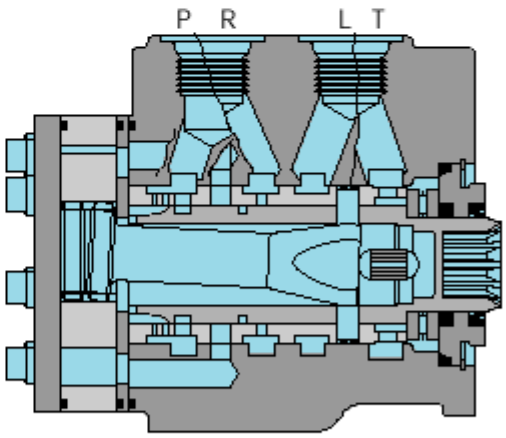
Section Drawing and Integral Valves

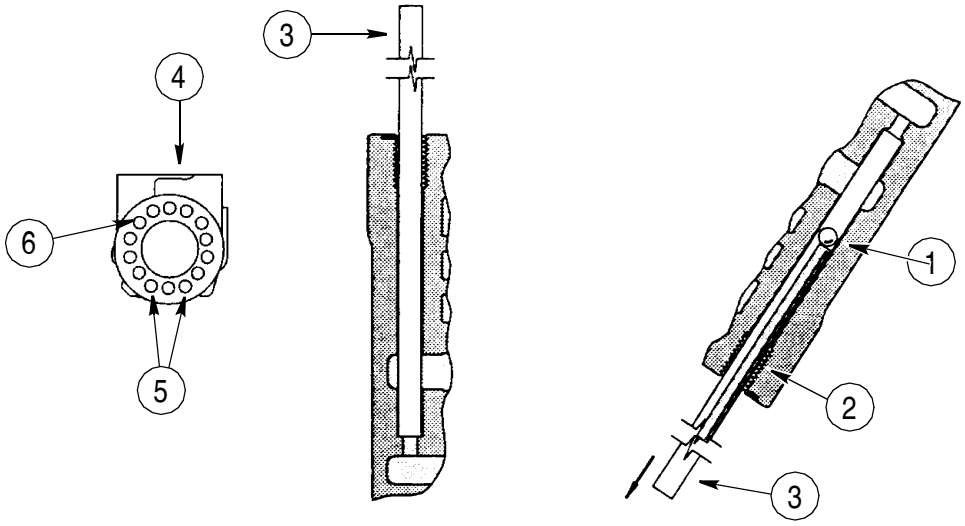
NOTE: The steering control valve housing (7) Fig. 2 has internally two anti-cavitation valves (EE) and one check valve (CC). Before removing these valves, verify their positions.

17. To disassemble these valves, insert soda straws (3) in each end of the threaded holes, refer to Figure 3. Remove the steering control valve housing from the vise and tilt it until the port face (4) is upward. Continue turning until the roll pins (2) and ball checks (1) slide through the straws (3).









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1. BALL CHECK
2. ROLL PIN
3. SODA STRAW
4. PORT FACE
5. ANTI-CAVITATION VALVES
6. CHECK VALVE

FIGURE 8. ANTI-CAVITATION VALVE - DISASSEMBLY

Inspection

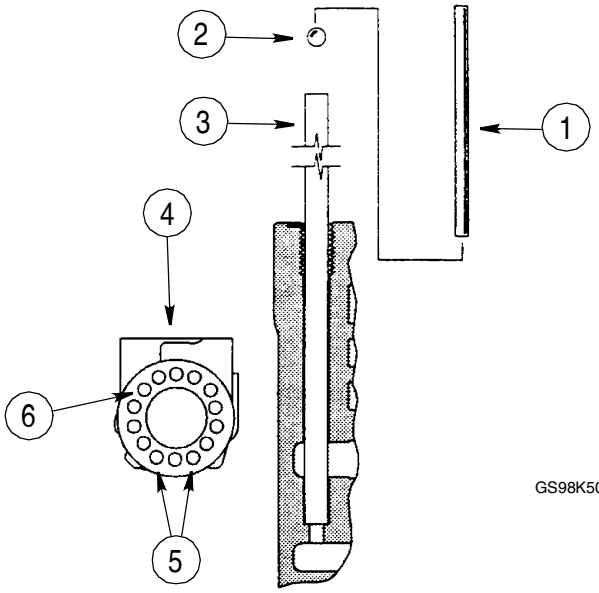
1. Clean all parts in cleaning solvent and air dry on paper towels. Do not use cloths to wipe parts dry, as it may leave lint on the parts.
2. Check all machined surfaces for wear or damage. If there are rough places on the ends of the gerotor star or gerotor (4), steering control valve housing (7), end cap (2), or spacer plate (5), use 600 grit emery cloth to smooth the surfaces, refer to Figure 2. Place the emery cloth on a flat surface. If the emery cloth is new, rub a piece of steel across the emery cloth six times to remove the sharp pieces of grit. Make sure that the part is held flat on the emery cloth. Rub each part across the cloth six times. Check to see if the rough places are removed. Use this method until all rough places are removed. Clean the parts in cleaning solvent to remove any grit.
3. If the spool (9) and sleeve (8) or the bore in the housing of the steering control valve (7) is damaged or worn, use a new steering control valve.
4. Inspect the cap screws (1), pin (11), backup washer (15), seal ring (16), O-ring (17), needle thrust bearing (13) and bearing race (14). Use new parts as required.
5. If your steering control valve has anti-cavitation and check valves, inspect the balls checks (20), (23) and roll pins(21), (22) for damage or wear. Use new parts as required.

Assembly

NOTE: *Use new seals (3), (16), and (19) when reassembling the steering control valve.*

IMPORTANT: *Lubricate all new seals (with exception of new quad seal) with clean petroleum jelly such as Vaseline.*
Do not use excessive lubricant on seals for meter section. Refer to parts listings covering your steering control unit when ordering replacement parts. A good service policy is to replace all old seals with new seals.

1. Use a soda straw (3) as a guide tool, refer to Figure 9. Drop the straw (3) into the anti-cavitation valves (5) and check valve (6) to the bottom of the bore. Drop the ball check (2) through the straw (3). Pull the straw (3) out and use the same procedure in the others ball seat.



1. ROLL PIN
2. BALL CHECK
3. SODA STRAW
4. PORT FACE
5. ANTI-CAVITATION VALVES
6. CHECK VALVE

FIGURE 9. CHECK AND ANTI-CAVITATION VALVES ASSEMBLY

2. Use a small light and check each bore to make sure each ball check (2) is in the correct place. Add the roll pin (1) in each.

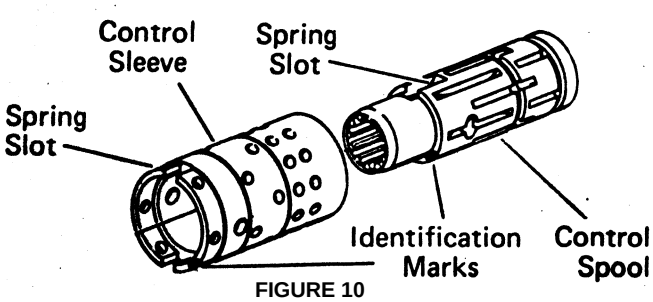


FIGURE 10

3. Assemble spool and sleeve carefully so that the spring slots line up at the same end. Rotate spool while sliding parts together. Some spool and sleeve sets have identification marks, align these marks as shown in Fig.10. Test for free rotation. Spool should rotate smoothly in sleeve with finger tip force applied at splined end.

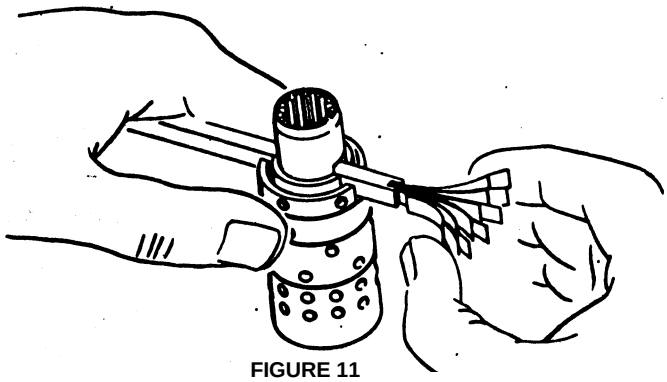


FIGURE 11

4. Bring spring slots of both parts in line and stand parts on end of bench. Insert spring installation tool through spring slots of both parts. Tool is available as part no. 600057. Position 3 pairs of centering springs (or 2 sets of 3 each) on bench so that extended edge is down and arched center section is together. In this position, insert one end of entire spring set into springinstallation tool, see Fig. 11.

5. Compress extended end of centering spring set and push into spool sleeve assembly with drawing installation tool at the same time.

6. Center the spring set in the parts so that they push down evenly and flush with the upper surface of the spool and sleeve.

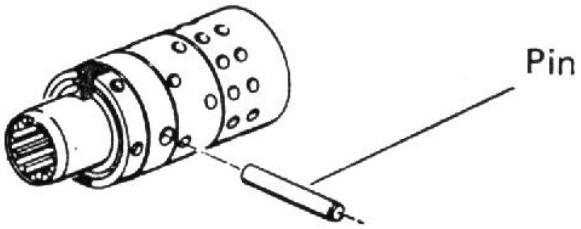


FIGURE 12

7. Install pin through spool and sleeve assembly until pin becomes flush at both sides of sleeve.

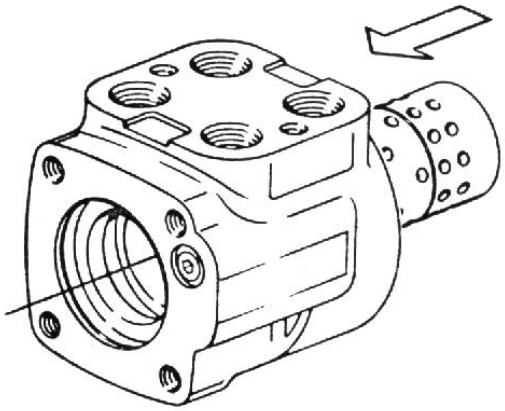


FIGURE 13

8. Position the spool and sleeve assembly so that the splined end of the spool enters the 14 hole end of housing first, see Fig. 13.

Attention: Be extremely careful that the parts do not tilt out of position while inserting. Push parts gently into place with slight rotating action, keep pin nearly horizontal. Bring the spool assembly entirely within the housing bore until the parts are flush at the meter end or 14 hole end of housing. Do not pull the spool assembly beyond this point to prevent the cross pin from dropping into the discharge groove of the housing. With the spool assembly in this flush position, check for free rotation within the housing by turning with light finger tip force at the splined end.

9. Place housing on clean, lint free cloth. Install seal in housing, see Fig. 14.

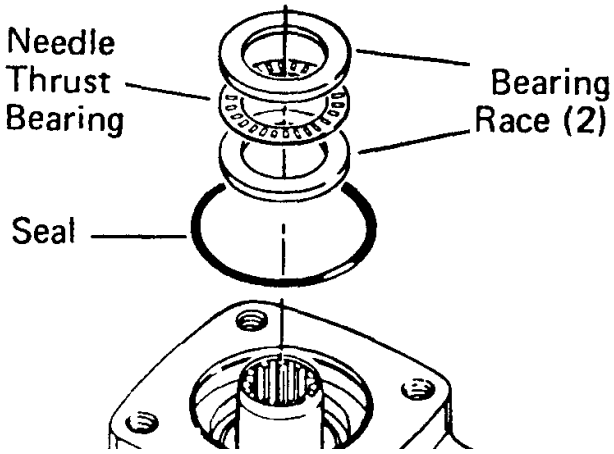


Figure 14

10. Install 2 bearing races and the needle thrust bearing in the order shown in Fig. 14.

11. Install dust seal in seal gland bushing, flat or smooth side of dust seal must face down toward bushing, see Fig.16.

12. Install **dry** quad ring seal in seal gland bushing, Smooth seal in place with your finger. Do not use any seal that falls freely into pocket of bushing , see Fig. 19.

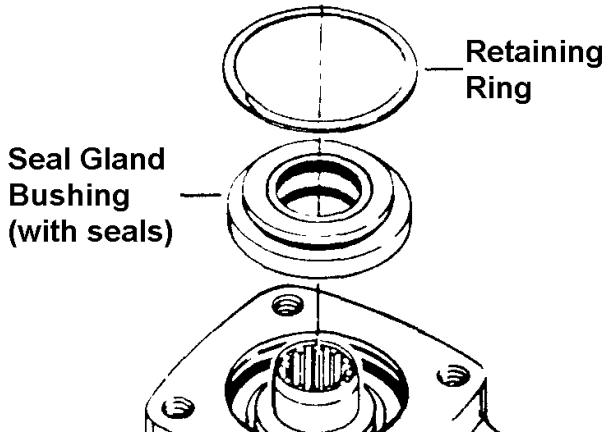


FIGURE 15

13. Install seal gland bushing over the spool end with a twisting motion. Tap the bushing in place with a rubber hammer. Make sure the bushing is flush against the bearing race.

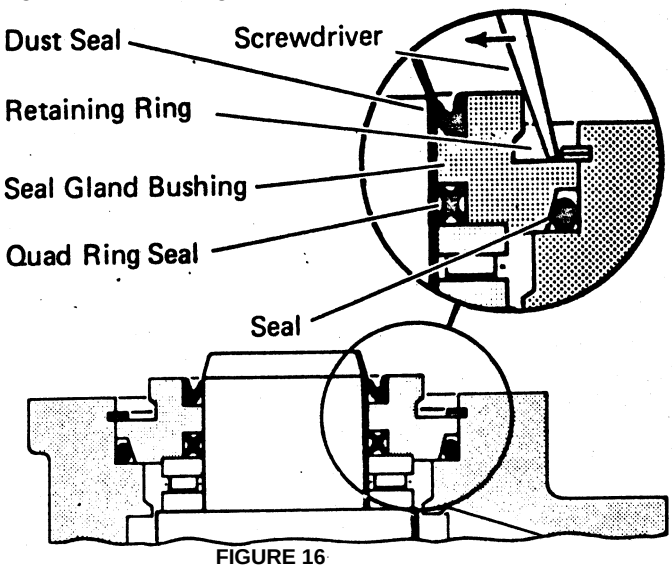


FIGURE 16

14. Install retaining ring (see Fig. 15-16) in housing. After installing ring, tap on ring end to pry with screwdriver around entire circumference of ring to property seat ring in groove.

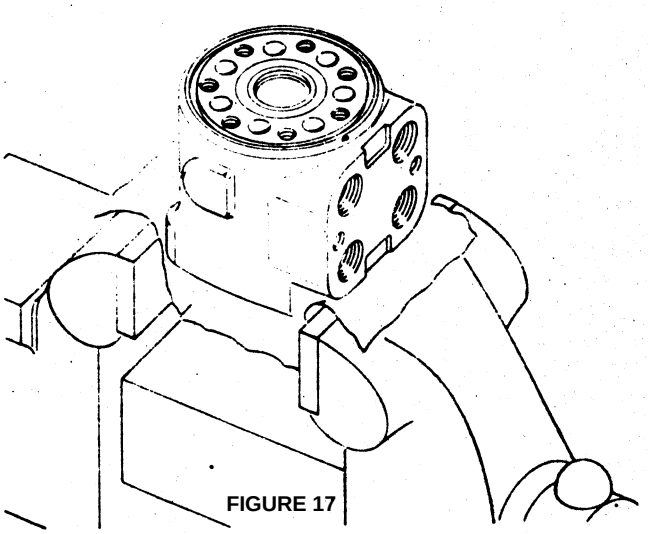


FIGURE 17

15 Clamp housing in vise, as shown in Fig. 17. Clamp lightly on edges of mounting area. Do not over tighten jaws.

Note: Check to insure that the spool and sleeve are flush or slightly below the 14 hole surface of the housing.

Attention: Clean the upper surface of the housing by wiping with the palm of clean hand. Clean each of the flat surfaces of the meter section parts in a similar way when ready for reassembly. Do not use cloth or paper to clean surfaces.

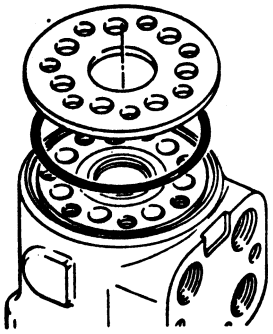


FIGURE 18

16. Install seal in housing, see Fig. 18.

17. Install spacer plate. Align bolts holes in spacer plate with tapped holes in housing.

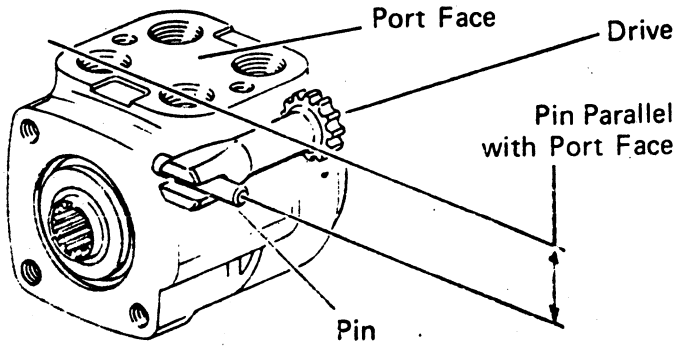


FIGURE 19

18. Rotate spool and sleeve assembly until pin is parallel with port face, see Fig. 19. Install drive, make sure you engage drive with pin, To assure proper alignment, mark drive as shown in Fig. 21 (ref. B). Note relationship between slotted end of drive to splined end of drive when marking.

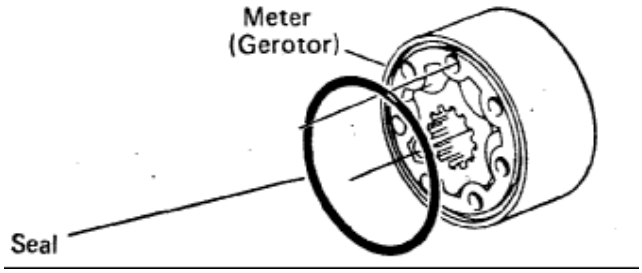


FIGURE 20

19. Install seal in meter.

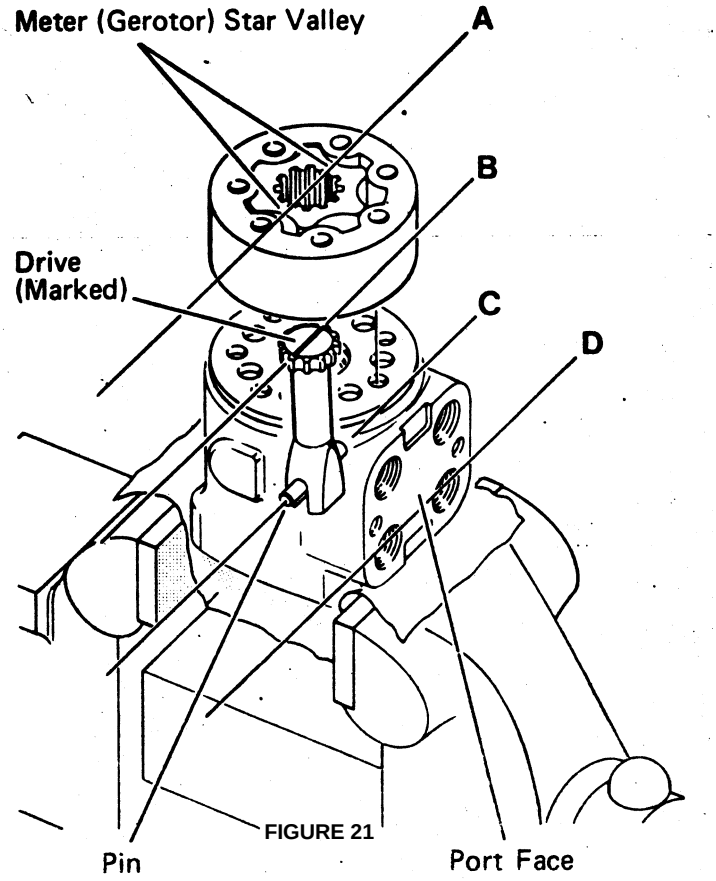


FIGURE 21

20. With seat side of meter toward spacer plate, align star valleys (ref. A) on drive (ref. B). Note the parallel relationship of reference lines A, B, Ç, and D - Fig. 21. Align bolt holes without disengaging meter from drive.

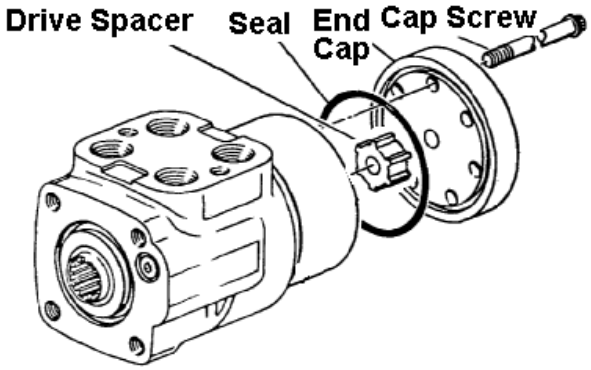


FIGURE 22

21. Install drive spacer when used, in meter see Fig. 22

22. Install seal in end cap.

23. Install end cap on gerotor, align holes.

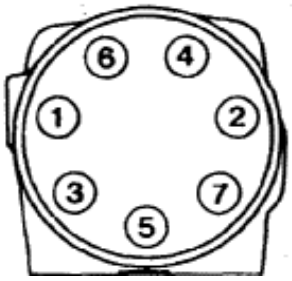


FIGURE 23

24. Install 7 **dry** cap screws in end cap. Pretighten screws to 17 N.m (150 lb.in), then torque screws to 31 N.m (275 lb.in) in the sequence show in Fig. 23.

TROUBLE SHOOTING

Must steering problems can be corrected if the problem is properly defined. The entire steering system should be evaluated before removing any components. The steering control unit is generally not the cause of most steering problems. The following is a list of steering problems along with possible causes and suggested corrections.

Problem	Possible Cause	Correction
1. Slow steering, hard steering, or loss of power assist.	Worn or malfunctioning pump.	Replace pump.
	Stuck flow divider piston.	Replace flow divider.
	Worn pump compensator allowing the system pressure to be less than specified.	Replace pump and compensator.
	Malfunctioning relief valve allowing the system pressure to be less than specified.	Replace the relief valve.
	Overloaded steer axle.	Reduce Load.
	If load sensing system 1. Leaking or kinked load sensing signal line. 2. Malfunctioning priority valve.	Correct Check spring and sticking piston. Check damping orifices in both ends of main bore. Check system pressure at SCU inlet for proper system pressure. If not correct replace priority valve relief cartridge.
2. Wander – Vehicle will not stay in a straight line.	Air in the system due to low level of oil, cavitating pump, leaky fitting, pinched hose, etc.	Correct.
	Worn mechanical linkage.	Repair or replace.
	Bending of linkage or cylinder rod.	Repair or replace.
	Loose cylinder piston.	Repair or replace.
	Leaky crossover relief or anticavitation valve in cylinder lines.	Repair or replace the accessory valve.
	Severe wear in steering control unit.	Replace the steering control unit.
3. Drift – Vehicle veers slowly in one direction.	Single rod end cylinder slowly extends without turning the steering wheel.	A small rate of extension may be normal on a closed center system.
	Worn or damaged steering linkage.	Replace linkage and align front end.
4. Slip – A slow movement of steering wheel fails to cause any movement of steered wheels.	Leakage of cylinder piston seals or accessory valve between cylinder lines or ports.	Replace seals or accessory valve.
	Worn steering control unit meter.	Replace steering control unit.