

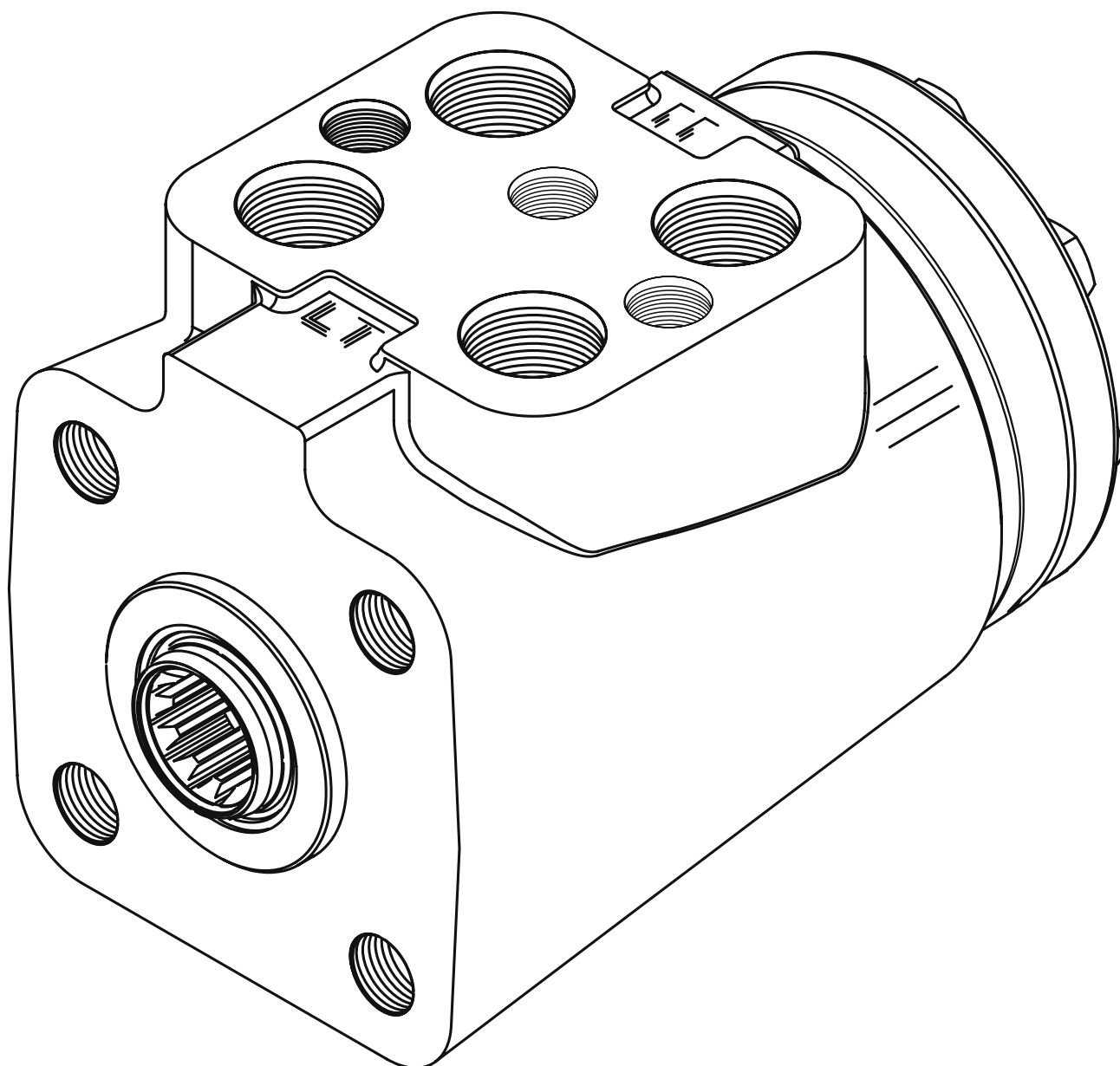


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Introduction

This manual provides service information for Eaton's Char-Lynn® Series 10 Steering Control Units with wide angle feature. Step by step instructions for complete disassembly, inspection and reassembly of the control unit are given.

The following recommendations should be followed to insure successful repairs.

- Most repairs require the removal of the control unit from the vehicle.
- Cleanliness is extremely important.
- Clean the port areas thoroughly before disconnecting the hydraulic lines.
- Plug the control unit ports and cover open hydraulic lines immediately after they have been disconnected.
- Drain the oil and clean the exterior of the control unit before making repairs.
- Wash all metal parts in clean solvent.
- Use filtered, moisturefree compressed air to dry the parts. Do not wipe them dry with paper towels or cloth – lint in a hydraulic system will cause damage.
- Always use new seals when reassembling hydraulic control units.
- Lubricate new rubber seals with a petroleum jelly before installation.
- Torque all bolts over gasketed joints, then repeat the torquing sequence to make up for gasket compression. After all repairs are complete it is essential to verify the accuracy of control unit repairs on an authorized test stand.

Ordering Parts

How to Order Replacement Parts

Each order must include the following:

1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts

Refer to specific part listings for your Char-Lynn® Steering Control Unit when ordering replacement parts. Listings are available from Eaton. Sample tag shows identification.

For additional literature contact:

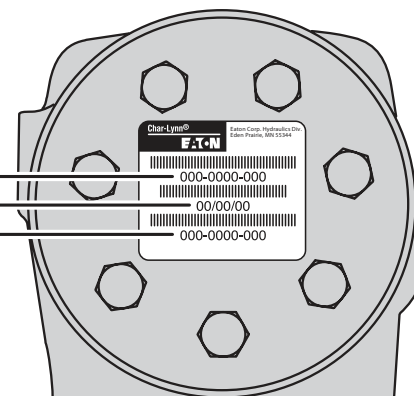
Eaton Hydraulics
14615 Lone Oak Road,
Eden Prairie, MN 55344
www.eaton.com/hydraulics

Bar Code Label — Launch Date June, 1999

Customer part number or base unit number if it has a column or valve assembled

Month / Day / Year

Eaton Part Number



Port Face

Tools

Tools Required For Disassembly and Assembly

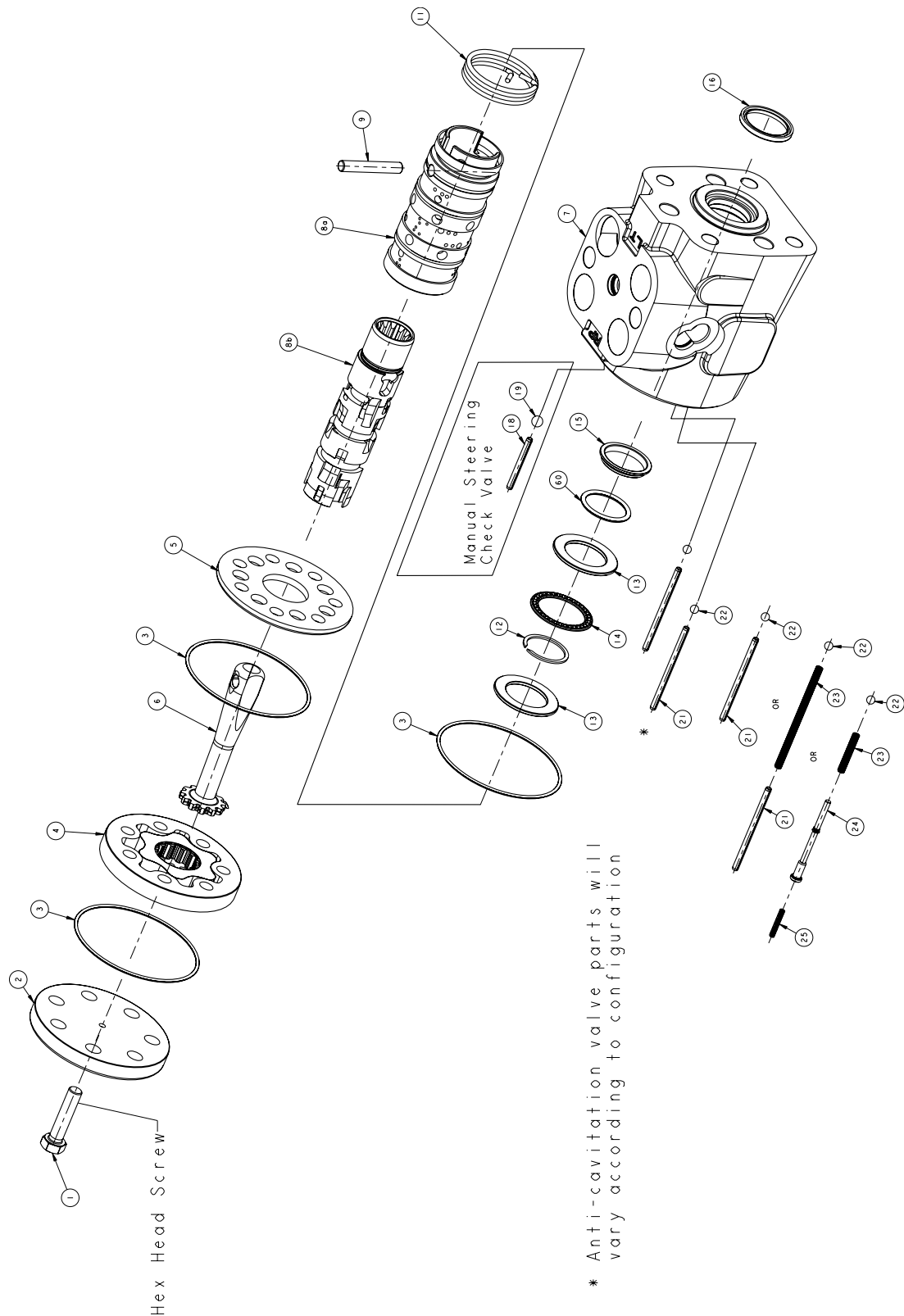
- Screwdriver (102-152 mm [4 in. - 6 in.] long, x 3 mm [118 in.] wide flat blade).
- 1/2 inch socket for current hex head cap screws.
- Breaker bar wrench.
- Torque wrench (30 Nm [300 lb-in] capacity).
- T-Handle No. 600604*
- Retaining ring pliers - Eaton PN 600610*

Special Tools:

- Plunger and Sleeve Tool No. 600792-001*

* Tools available by special order through our service department.

Parts
Assembly
Drawing



Parts

Parts List

Series 10 Steering Control Unit

ITEM NO.	PART NO.	QTY.	DESCRIPTION	REFERENCE PAGE
1	See Table 1.0	7	Cap Screw, Hex Head	6
2	23901-000	1	Cap, End	
3	5776-000	3	Seal, 72,6 mm [2.86 in.] ID	
4	See Table 1.0	1	Gerotor, Sub-assembly	6
5	113094-000	1	Plate, Spacer	
6	112238-000	1	Drive	
7	5986894-XXX	1	Housing, Valve	
8a		1	Control Sleeve	
8b		1	Control Spool	
9	15-000	1	Pin, Centering	
11	5987794-001	1	Spring, Centering	
12	265018-024	1	Retainer Spring	
13	4996933-001	2	Bearing Race	
14	5544-000	1	Bearing, Needle Thrust	
15	9332-000	1	Seal – 24,9 mm [.98 in.] ID	
16	844-000	1	Dust Seal	
18	16026-422P	1	Pin, Roll– 34,92 mm [1.375 in.] Length	
19	285020-080	1	Ball – 6,35 mm [.25 in.] OD	
21	16026-436	2	Pin, Roll – 40,00 mm [1.575 in.] Length	
22	18015-000	2	Ball, Check – 6,35 mm [.250 in.] OD	
23	230400-000 or 4999516-000	2 2	Compression Spring Compression Spring (See main parts assembly drawing)	
24	113598-000	2	Anti-cav plug retainer	
25	230313-000	2	Compression Spring	
60	4999651-001	1	O-ring	

Parts

Gerotor

ACTUAL DISPL. cm ³ /r [in ³ /r]	REF. NO. 4 GEROTOR PART NO.	WIDTH mm[in]	REF. NO. 29 CAP SCREW PART NO.	LENGTH mm[in]
60 [3.6]	8618-023	10,2 [.40]	16336-514	38,1 [1.50]
75 [4.5]	8618-024	10,2 [.40]	16336-514	38,1 [1.50]
95 [5.9]	8618-003	13,2 [.52]	16336-515	41,3 [1.62]
120 [7.3]	8618-009	16,5 [.65]	16336-516	44,5 [1.75]
145 [8.9]	8618-020	20,1 [.79]	16336-517	47,6 [1.87]
160 [9.7]	8618-004	21,9 [.86]	16336-520	50,8 [2.00]
185 [11.3]	8618-005	25,4 [1.00]	16336-521	54,0 [2.12]
230 [14.1]	8618-031	31,7 [1.25]	16336-523	60,3 [2.37]
295 [17.9]	8618-035	40,4 [1.59]	16336-525	66,7 [2.62]
370 [22.6]	8618-032	50,8 [2.00]	16336-531	79,4 [3.12]
460 [28.2]	8618-033	63,5 [2.50]	16336-535	92,0 [3.62]
590 [35.9]	8618-036	80,8 [3.18]	16336-542	108,0 [4.25]
740 [45.1]	8618-034	101,6[4.00]	16336-551	130,2 [5.12]

Disassembly

Cleanliness is extremely important when repairing a steering control unit. Work in a clean area. Before disconnecting lines, clean port area of unit thoroughly. Use a wire brush to remove foreign material and debris from around exterior joints of the unit.

We recommend that you keep the unit in a vise during disassembly. Follow the clamping procedures explained throughout the manual.

1. Clamp unit in vise, meter end up. Clamp lightly on edges of port face sides (see figure1). Use protective material on vise jaws. Housing distortion could result if jaws are overtightened.

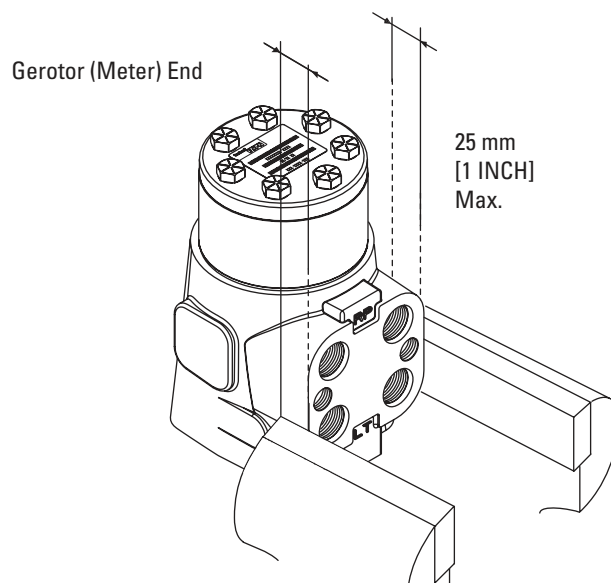


Figure 1

Disassembly

2. Remove 5/16 in. cap screws.
3. Remove end cap.
4. Remove seal from gerotor (meter).

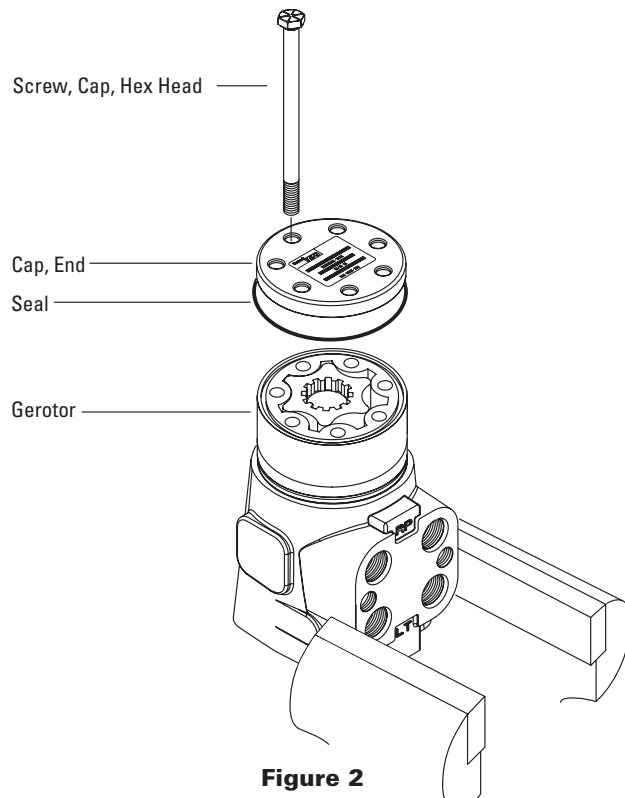


Figure 2

5. Remove gerotor (meter). Be careful not to drop star.
6. Remove seal from spacer plate.
7. Remove spacer plate.
8. Remove seal from housing.

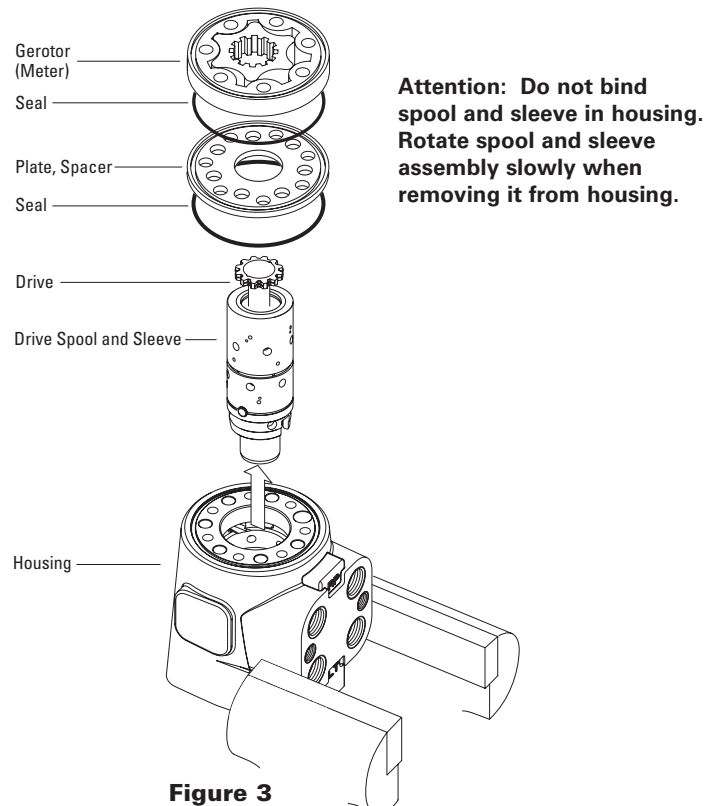
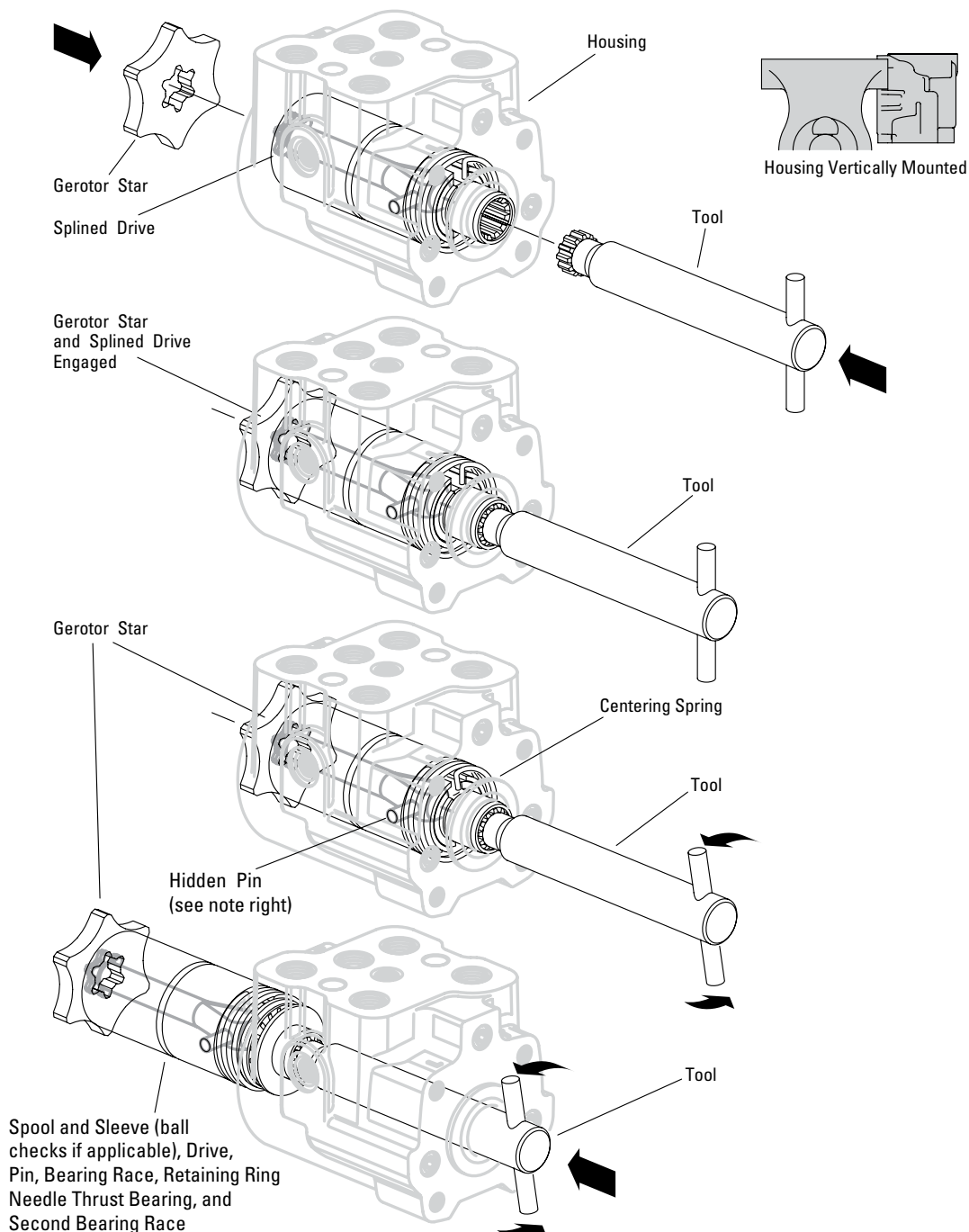


Figure 3

Disassembly

Note: If tension on this pin is released before these parts are fully disengaged and the pin is not horizontal, the pin can drop and lockup can occur like a deadbolt. Positioning unit vertically is a safe option and is required if the unit has anti-cavitation valves.

9. Engage tool with splined end of spool.
10. Protect gerotor star and hand with shop towel — hold gerotor star and splined drive from turning.
11. Twist tool to compress centering spring radially CW or CCW, decreasing the coil diameter of the centering spring allowing it to be removed along with the spool and sleeve, drive, pin, bearing race (2), retaining ring, and needle thrust bearing. (Bearing races, retaining ring, and needle thrust bearing, not shown on drawing (left). Centering spring shown compressed.)
12. With drive held stationary and centering spring compressed, carefully push these assembled parts out of housing.



Disassembly

13. Remove housing from vise.
14. Carefully remove bearing and race, anti-cavitation valves and manual steering check valve (roll pin and ball) from bolt holes by tipping housing Gerotor side down. (see figure 3).
15. Do not remove any valves other than manual steering check valve as sembly and anti-cavitation valve assembly. All other valves are factory preset and are non-serviceable.
16. Carefully remove seal with a thin-blade screw driver. Do not scratch seal groove with screw driver.
17. Use thin bladed screw driver to pry dust seal from housing. Do not damage housing.
18. Push pin from spool and sleeve assembly.
19. Remove drive
20. Push spool partially from control end of sleeve, then carefully remove centering springs and retaining ring from spool by hand (figure 8).

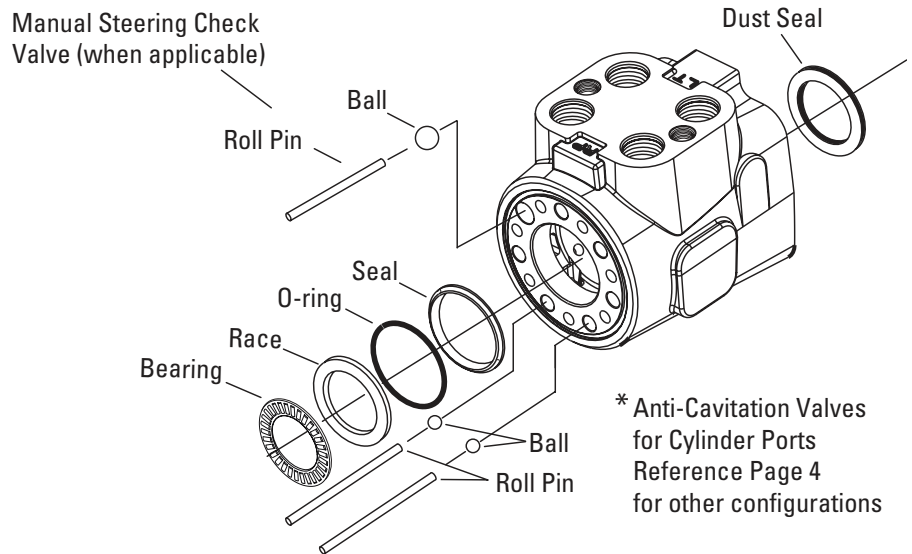


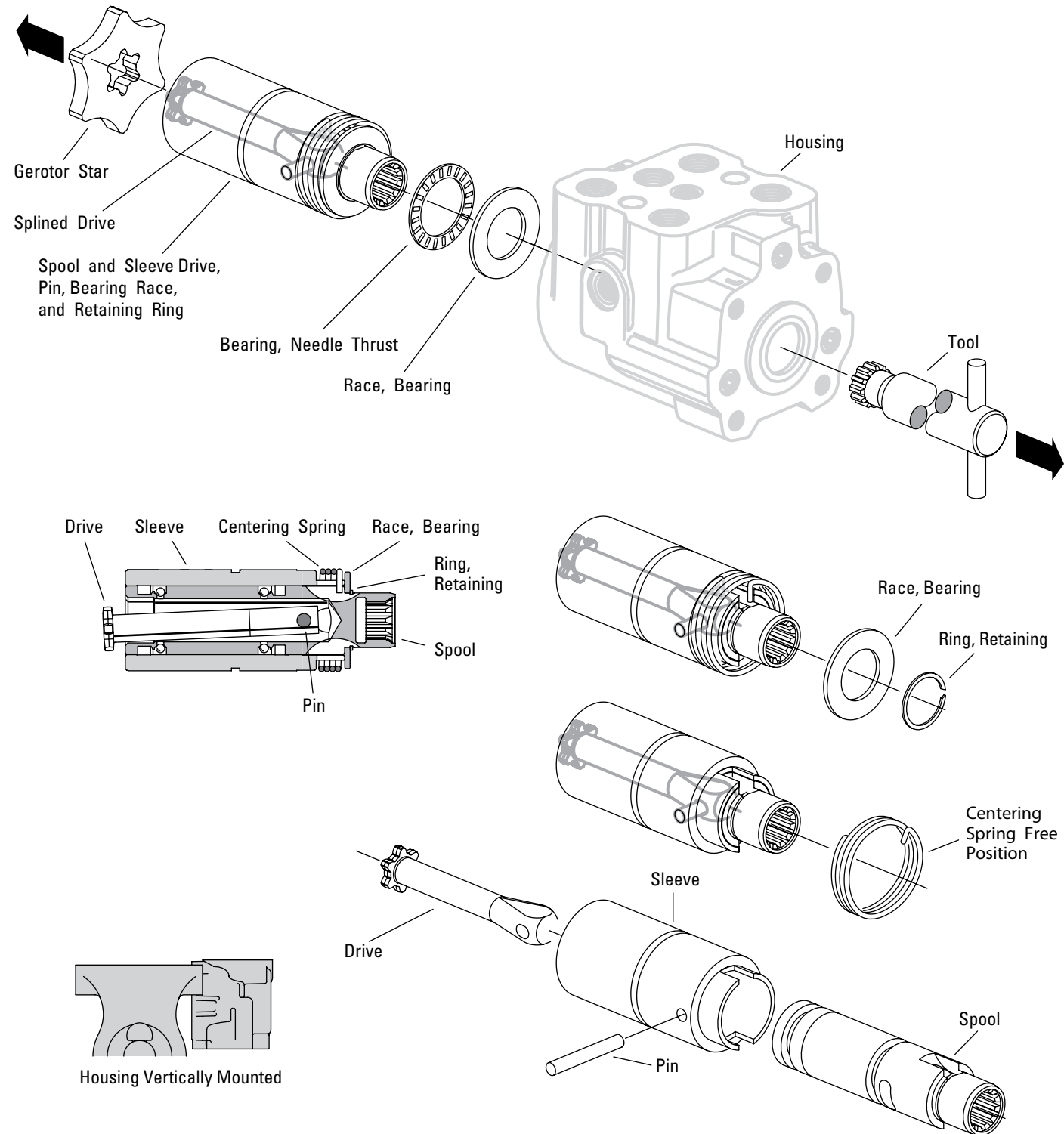
Figure 4

Disassembly

1.

Remove the thrust bearing race and needle thrust bearing.
2.

Remove the retaining ring (use retaining ring pliers Eaton part no. 600610), bearing race, centering spring, pin, drive, spool, sleeve.



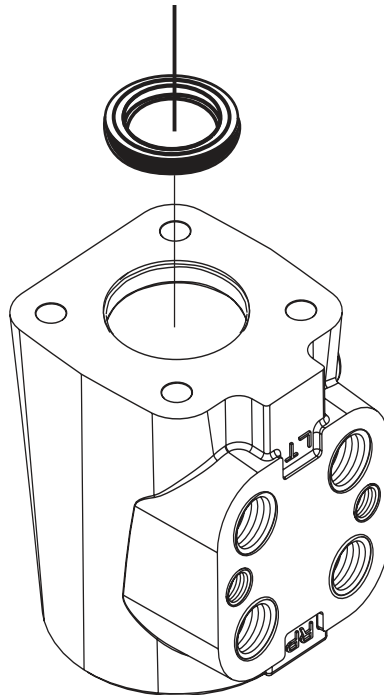
Assembly

Cleanliness Recommendations

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage. Clean all metal parts in clean solvent. Blow dry with air. Do not wipe dry with cloth or paper towel because lint or other matter can get into the hydraulic system and cause damage. Do not use grit paper or file or grind these parts.

Note: Lubricate all seals with clean petroleum jelly. A good service policy is to replace all old seals with new seals. Do not use excessive lubricant on seals for meter section. Refer to parts lists covering your steering control unit when ordering replacement parts.

Place housing on a flat work area on a clean lint free cloth. Install press-fit 24,9 mm[.98 in.] ID seal in housing with metal surface of seal facing toward housing (figure 6).



2-Piece Shaft Seal Installation

For installation of o-ring:
4999651-001 and Seal 9332-000

1. Place housing on a flat work area as shown in figure 7.
2. Lubricate seal and o-ring with hydraulic oil before installation
3. Align sleeve with housing bore (figure 7)



Figure 7



Tool No. 600792-001

Assembly

2-Piece Shaft Seal Installation

4. Insert sleeve into housing bore (Figure 8)



Figure 8

8. Align plunger with sleeve (figure 12).



Figure 12

5. Place o-ring on plunger (Figure 9).



Figure 9

9. Push plunger into sleeve until it bottoms out, rotate 1/4 turn (figure 13).

While holding sleeve in housing, withdraw plunger.

Withdraw sleeve.



Figure 13

6. Align seal with plunger. cross section "L" shape of seal should be upside down (figure 10).



Figure 10

12. Inspect seal installation. Seal and o-ring must both be within shaft seal counterbore of housing (figure 14).



Figure 14

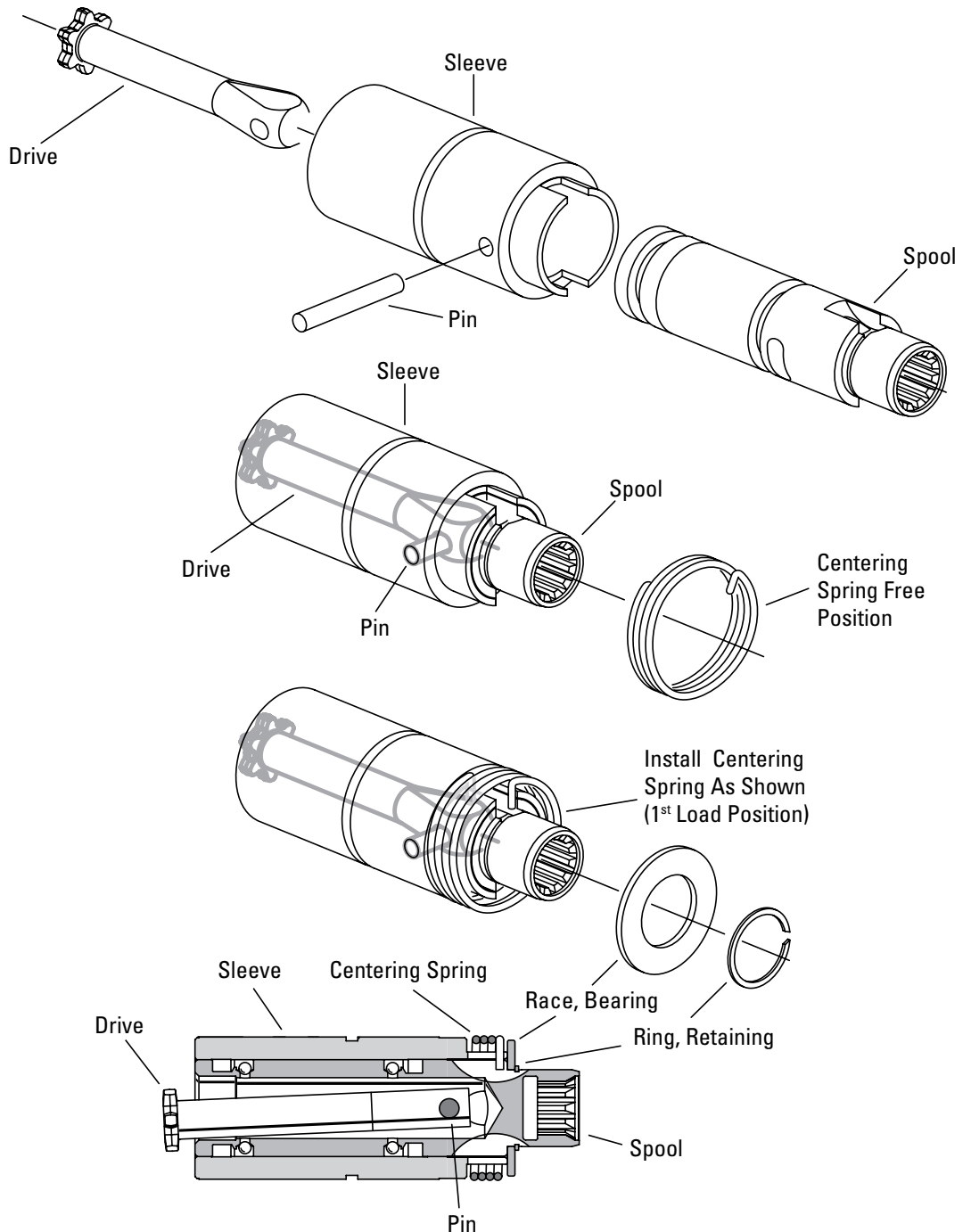
7. Push seal onto plunger. Lip of seal should be between o-ring and plunger. No gap should exist between o-ring and seal (figure 11).



Figure 11

Assembly

13. Clamp housing in Vice (figure 15).
14. Assemble spool and sleeve carefully so that spring slots line up at the same end. Rotate spool while sliding parts together. Test for free rotation. Spool should rotate smoothly in sleeve with fingertip force applied at splined end.
15. Apply a light coating of clean hydraulic fluid to the spool and slide it into the sleeve along with the ball checks if applicable.
16. Install the drive and pin.
17. Install the centering spring. Position one end of spring in slotted end of spool and sleeve, and compress the spring radially (CCW) to engage free end of spring.
18. Install the bearing race and retaining ring (use retaining ring pliers Eaton part no. 600610) onto spool.



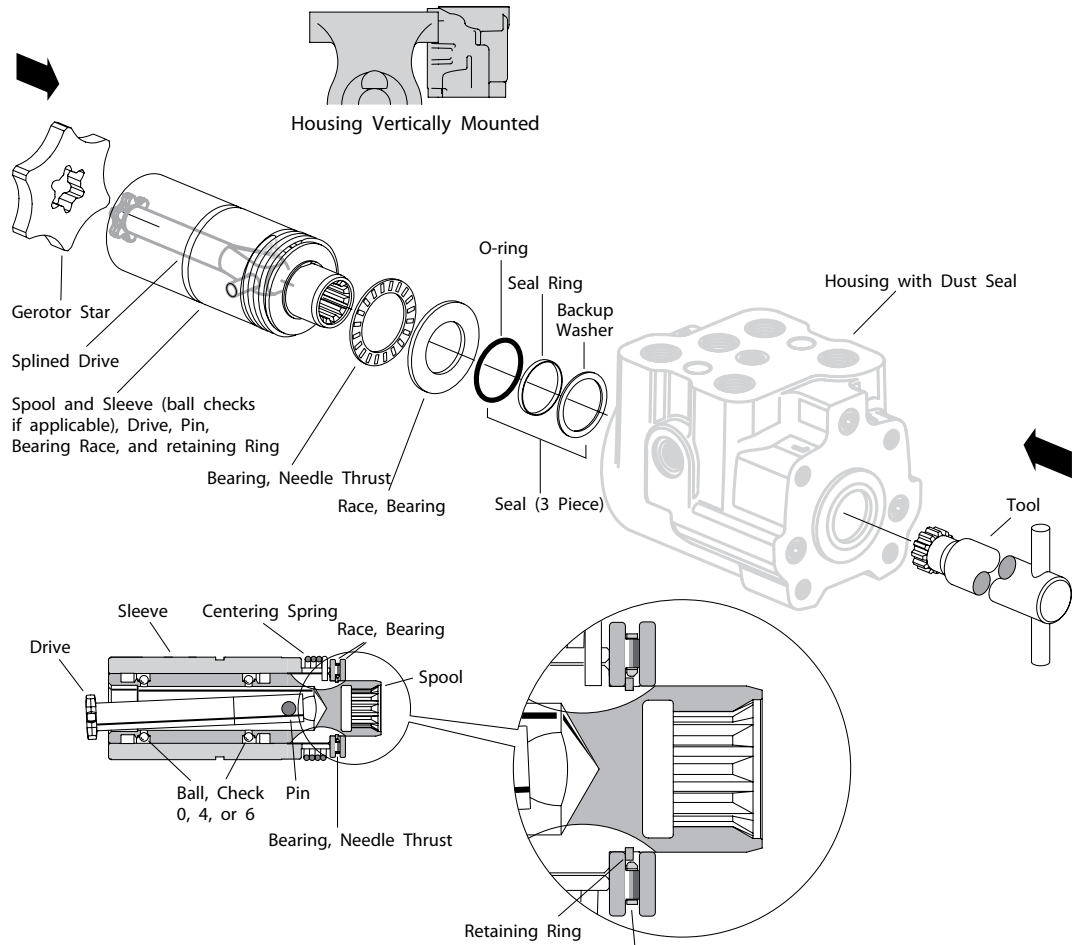
Assembly

19. Apply a light coating of petroleum jelly to the inside diameter of the previously mounted dust seal in the housing.

20. Apply a light coating of petroleum jelly to the needle thrust bearing, second bearing race. Position each part on to the spool as shown in enlarged section drawing below. The needle thrust bearing goes between the two bearing races and must be centered around retaining ring.

21. Apply a light coating of clean hydraulic fluid to the spool and sleeve assembly and slide it into the housing (see steps 20-25).

Important: Do not damage the dust or shaft seals.



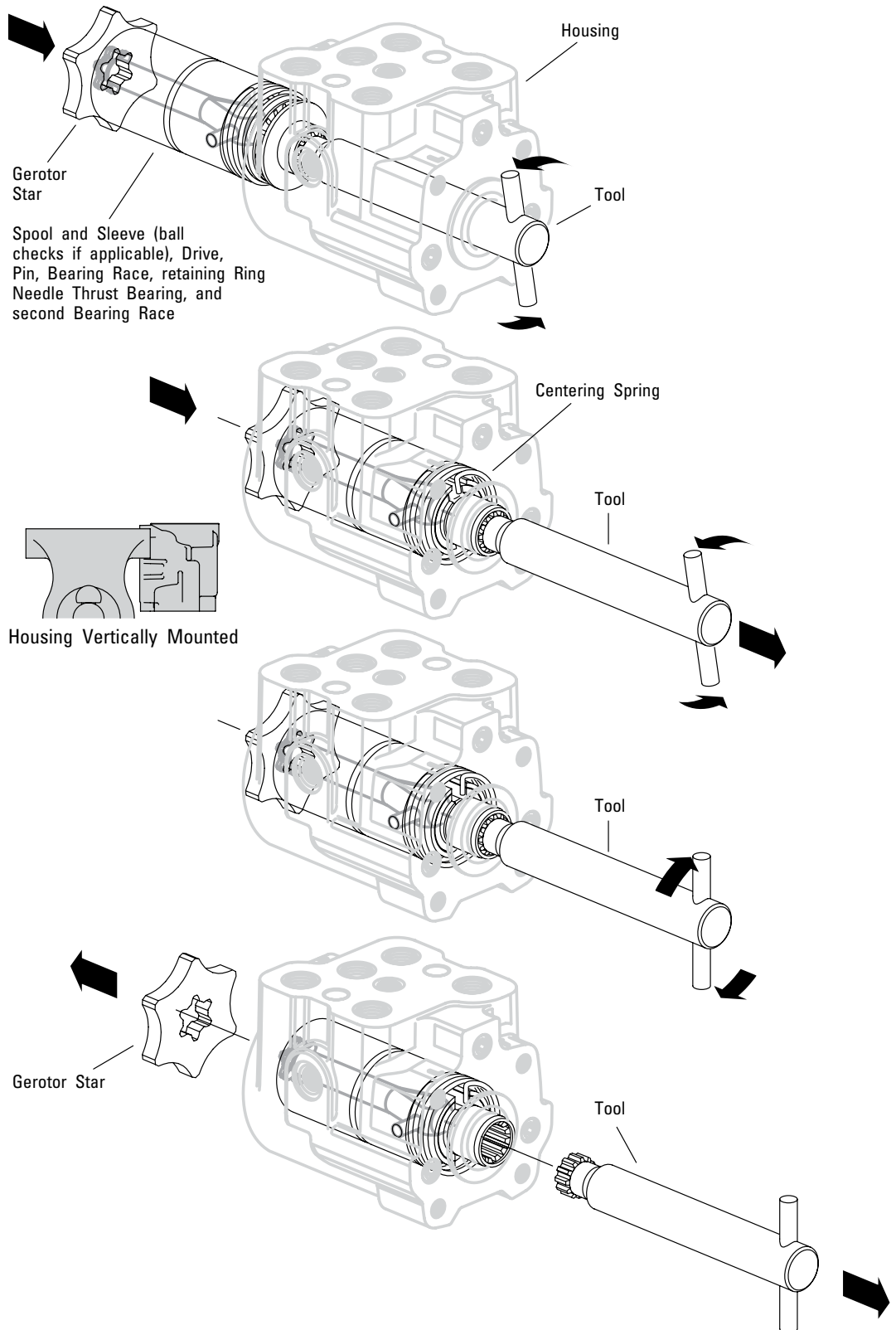
Note: Needle Thrust Bearing MUST Be Centered Around Retaining Ring. Use Petroleum Jelly to Hold Parts in Place.

Assembly

22. Protect gerotor star and hand with shop towel — hold gerotor star and splined end of drive to keep it from turning.
23. Insert tool through housing; engage with splined end of spool assembled inside of sleeve, centering spring, drive, pin, bearing race, retaining ring, needle thrust bearing, second bearing race, shaft seals and backup washer. Twist tool to compress spring coils radially CW or CCW.

Note: If by some chance this unit is in the horizontal position keep pin nearly horizontal. If tension on this pin is released before these parts are fully engaged and the pin is not horizontal, the pin can drop and lockup can occur like a deadbolt.

24. Keep centering spring compressed, and carefully insert these assembled parts into housing. **DO NOT FORCE.** (Bearing races, retaining ring, needle thrust bearing, not shown on drawing at left. Centering spring shown compressed.)
25. Release centering spring tension.
26. Remove gerotor star.
27. Remove tool.



Assembly

28. Install 72,6 mm [2.86 in.] ID O-ring in housing (figure 20).
29. Install anti-cavitation valves and manual steering check valve (if used) in holes, as shown in figure 20. After installing balls, inspect holes to make sure they are properly seated.

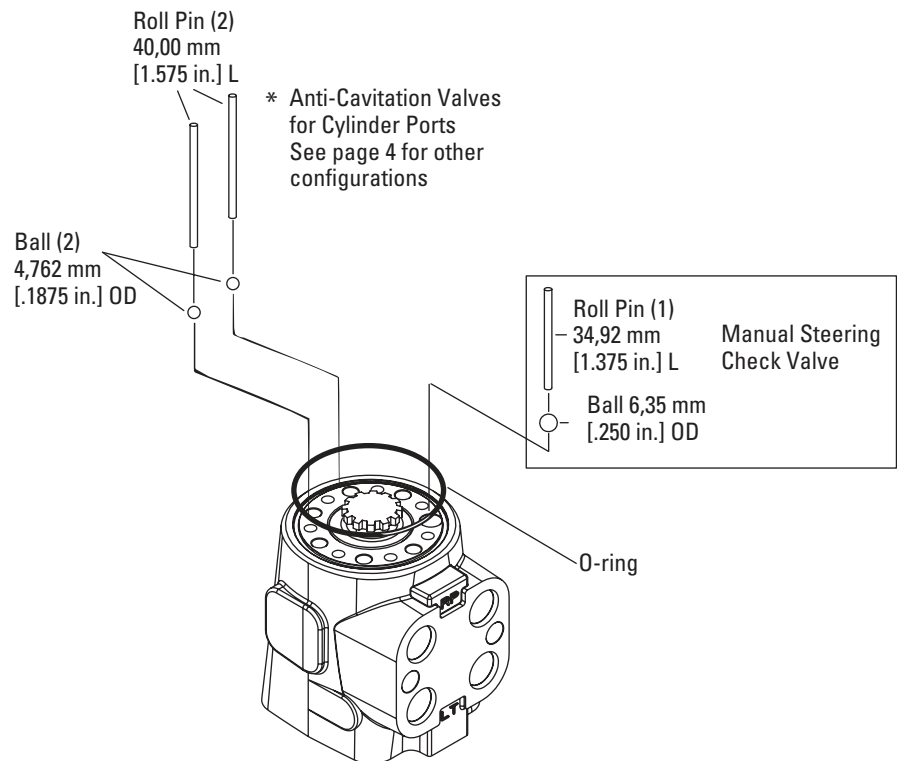


Figure 20

Assembly

Timing Reference Data —

Align star valleys (reference A) with marked drive 1 and drive 2 (reference B). Valleys must align with pin. Note parallel relationship of reference lines A, B, C, and D in figure 21. Align bolt holes without disengaging gerotor (meter) from drive.

30. Install spacer plate. Align bolt holes in spacer plate with tapped holes in housing.
31. Lubricate and install 72,6 mm [2.86 in.] ID seal in spacer plate.
32. Install gerotor (meter) seal groove up, note position of star valleys in relation to marked drive.
33. Lubricate and install 72,6 mm [2.86 in.] ID seal in gerotor ring.
34. Lubricate and install 72,6 mm [2.86 in.] ID seal in gerotor (meter).
35. Install end cap on gerotor, aligning holes.

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

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

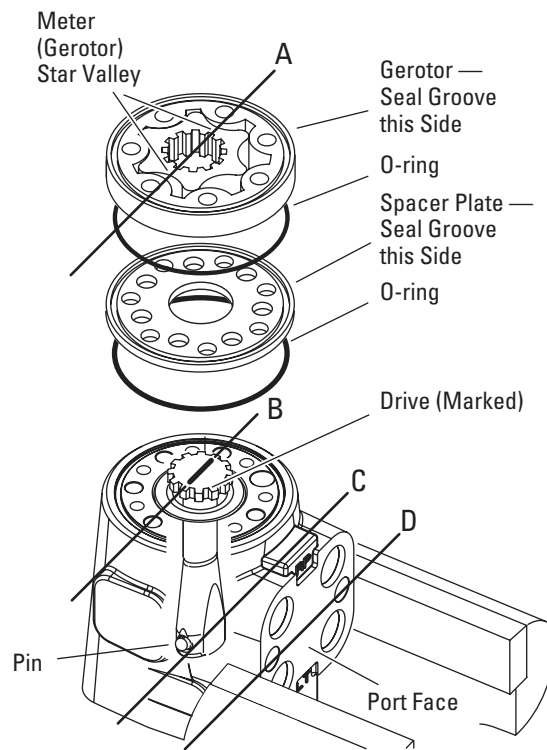


Figure 21

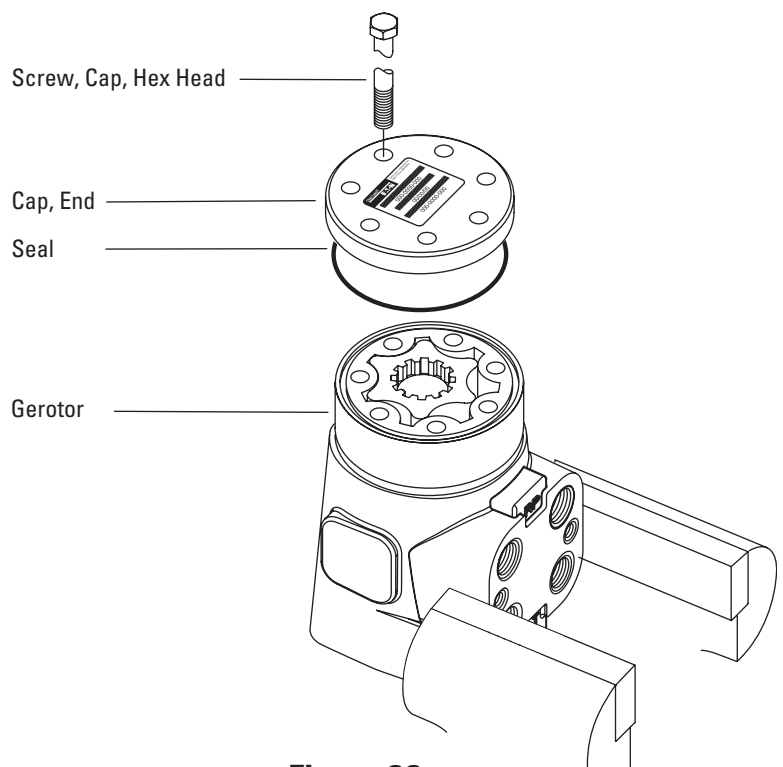


Figure 22

Assembly

36. Install 7 dry cap screws in end cap. Pretighten cap screws to 17Nm [150 lb-in], then torque screws to 28-34 Nm [250-300 lb-in] in sequence shown in figure 24.

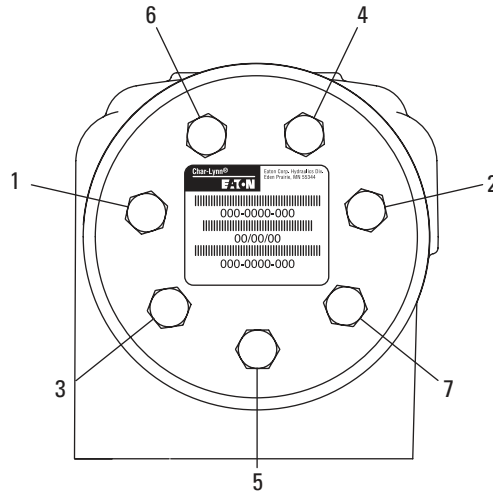


Figure 23

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