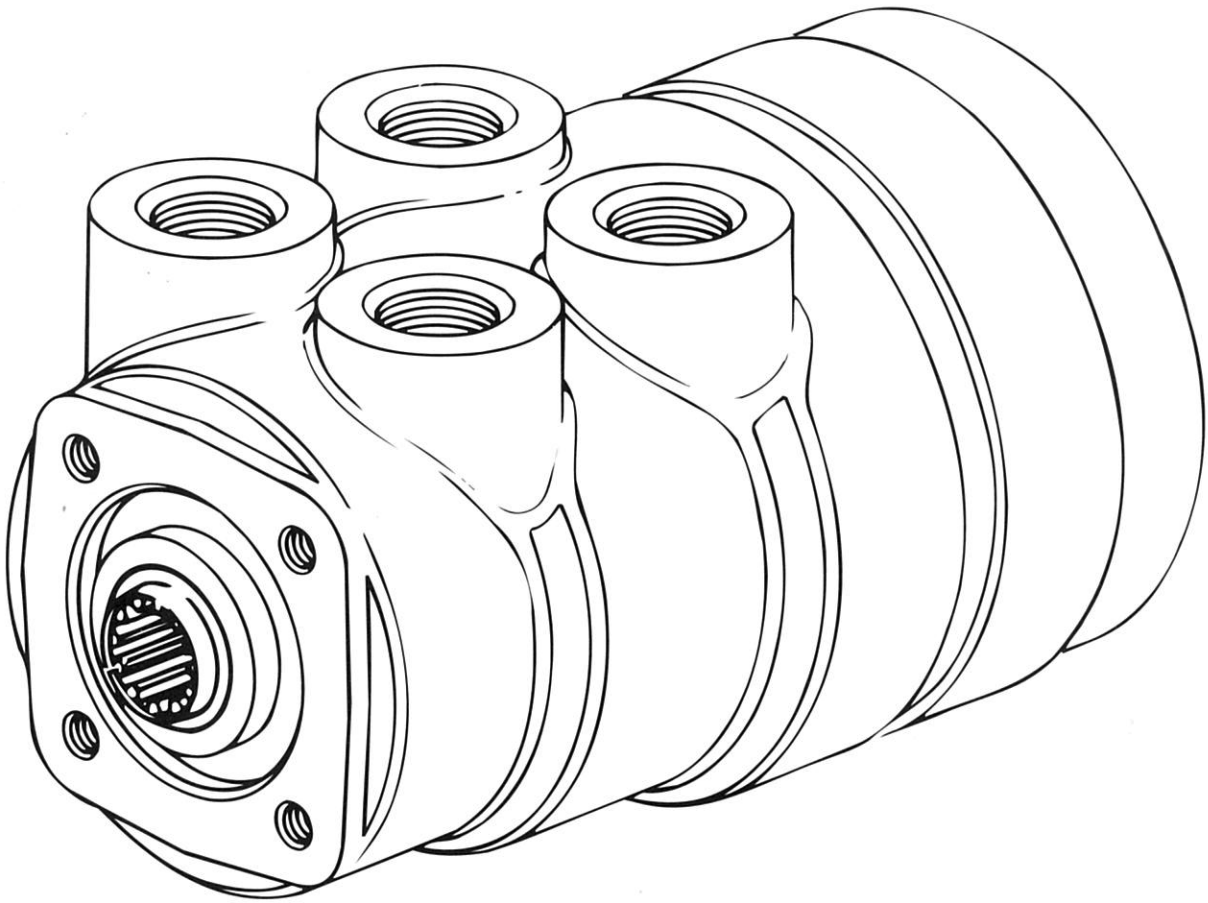
Char-Lynn®
Power Steering

No. 7-306
Revised May, 1993

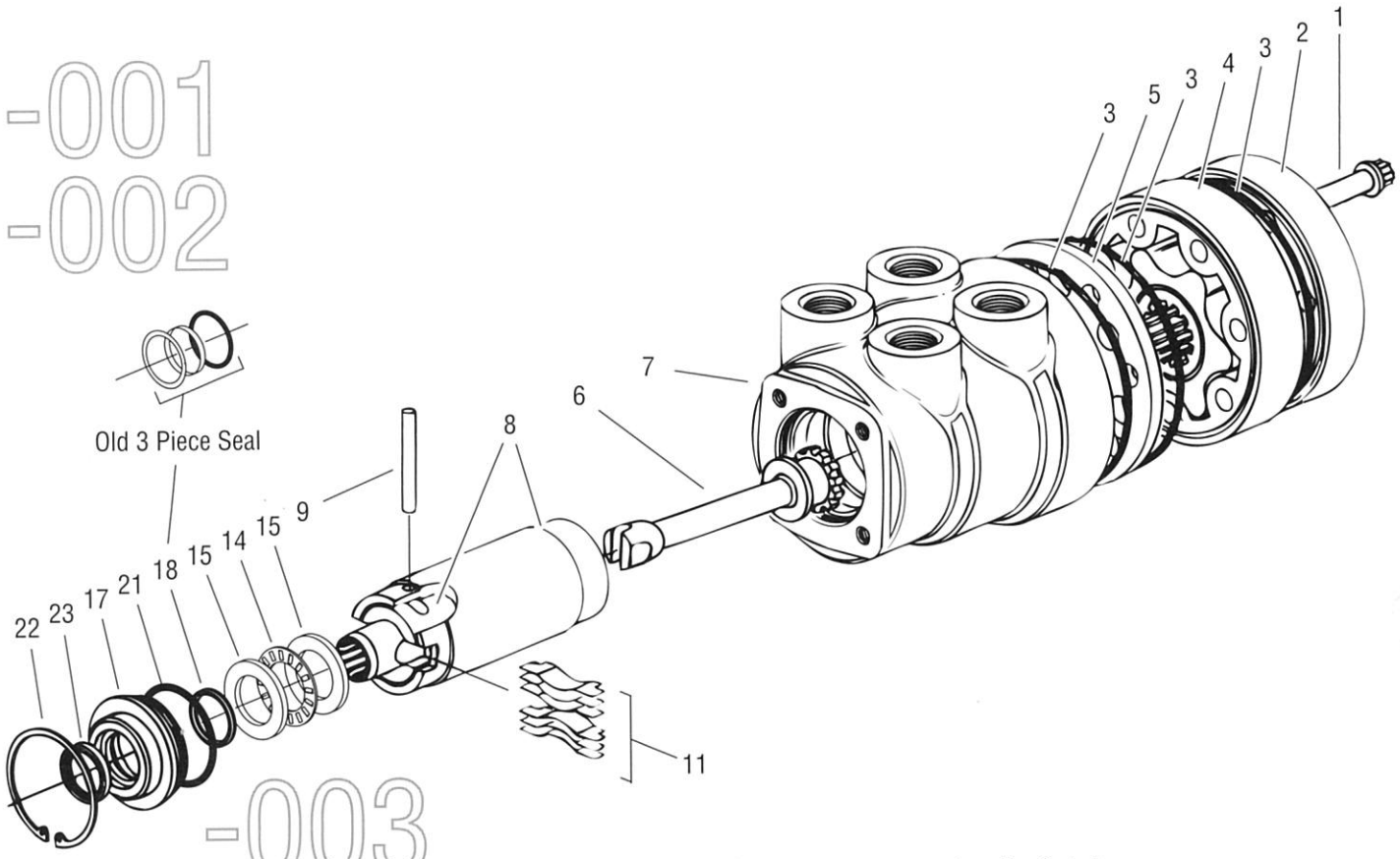
EATON

Repair Information



25 Series
Steering Control Units

001 002 003



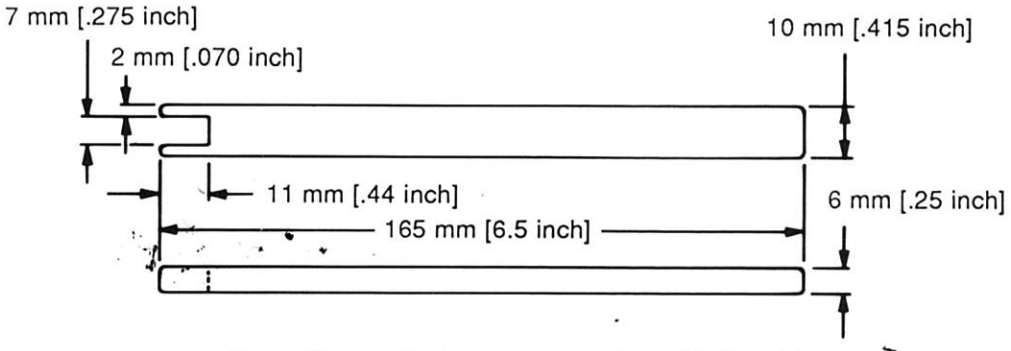
1	Screw, Cap, 12 Point Drive
2	Cap, End
3	Seal, O-ring 120,4 mm [4.74 in.] ID
4	Gerotor
5	Plate, Wear
6	Drive
7	Housing
8	Sleeve, Control Spool, Control
9	Pin, Centering
11	Spring, Centering
14	Bearing, Needle Thrust
15	Bearing Race
17	Retainer, Front
18	Seal, 25,4 mm [1.00 in.] ID
21	Seal, O-ring, 50,5 mm [1.99 in.] ID
22	Ring, Retaining
23	Seal, Dust, 31,7 mm [1.25 in.] OD

Tools required for disassembly and reassembly:

2 Screwdrivers (100-150 mm [4 in. - 6 in.] long, 3 mm [1/8 in.] Flat Blade)
1/2" socket (12 point)
Breaker bar wrench
Torque wrench (120 Nm [90 lb-ft] capacity)
Plastic hammer or rubber hammer
Tru-Arc Retaining Ring Ratchet Pliers (S-6500)

The following tool isn't necessary for disassembly and reassembly, but is extremely helpful.

Spring installation tool



Note: Break all sharp corners 4 mm [.015 inch]

Disassembly

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

> Although not all drawings show the unit in a vise, we recommend that you keep the unit in the vise during disassembly. Follow the clamping procedures explained throughout the manual.

Gerotor (Meter) End

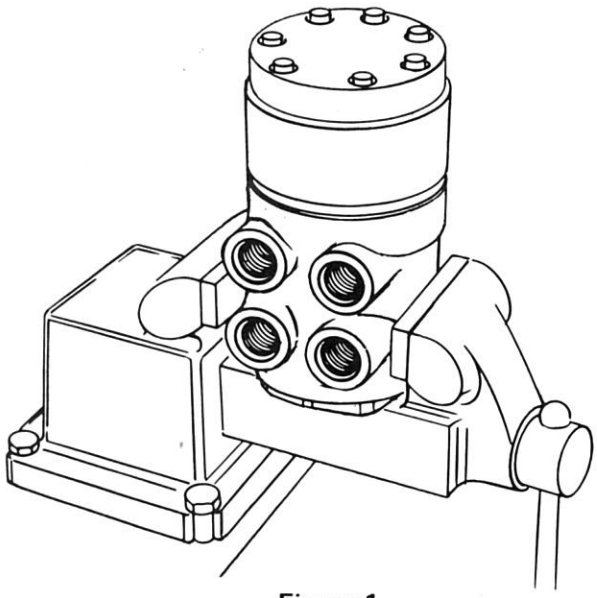


Figure 1

1 Clamp unit in vise, meter end up. Clamp lightly on edges of mounting area, see Fig. 1. Use protective material on vise jaws. Do not over tighten jaws.

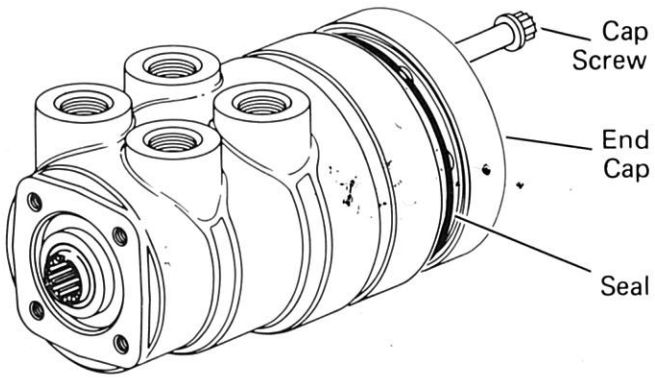


Figure 2

2 Remove 1/2" cap screws from end cap.

3 Remove end cap.

4 Remove seal from end cap.

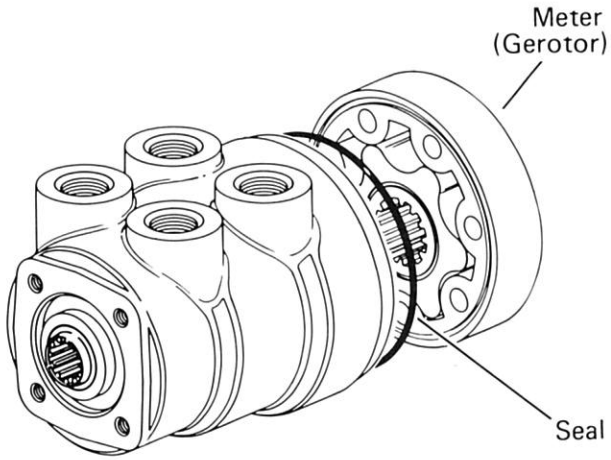


Figure 3

5 Remove meter. Be careful not to drop star.

6 Remove seal from meter (gerotor).

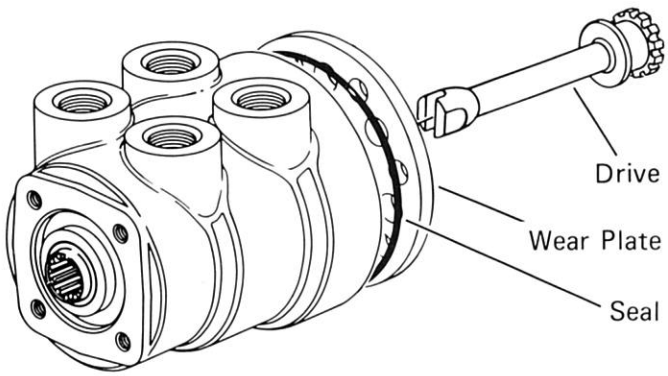


Figure 4

7 Remove wear plate.

8 Remove seal from housing.

9 Remove drive.

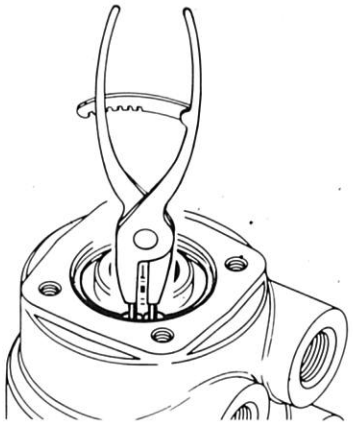


Figure 5

10 Remove housing from vise. Place housing on a clean soft cloth to protect surface finish. Use a Tru-Arc retaining ring ratchet pliers (S-6500) to remove retaining ring from housing, as shown in Fig. 5.

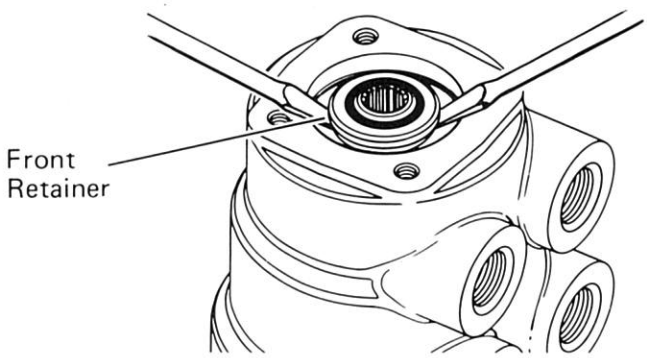
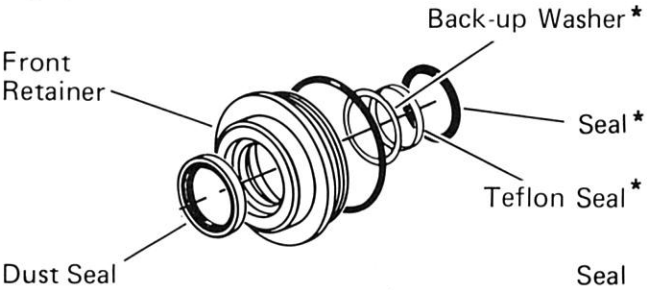


Figure 6

11 Position 2 flat blade screwdrivers 180° apart in groove of retainer, see Fig. 6. Pry retainer upward until flush with housing. Be careful not to damage ring groove of front retainer. Remove screwdrivers. Push spool down while removing retainer from housing by hand.



* One Piece Teflon Seal use on -003 Unit and is Replacement Seal for 3 Piece Seal on Older Units (Old 3 Piece Shown in Fig. 7 Disassemly).

Cross Section of Old and New Seal

Figure 7

12 Remove Teflon seal, o-ring seal, back-up ring, 50 mm [2 inch] dia. seal, and dust seal from front retainer.

13 Use a thin bladed screwdriver to pry dust seal from front retainer. Do not damage retainer.

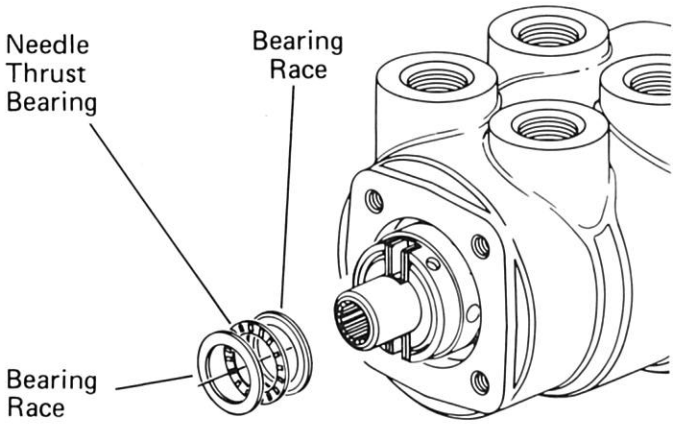


Figure 8

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

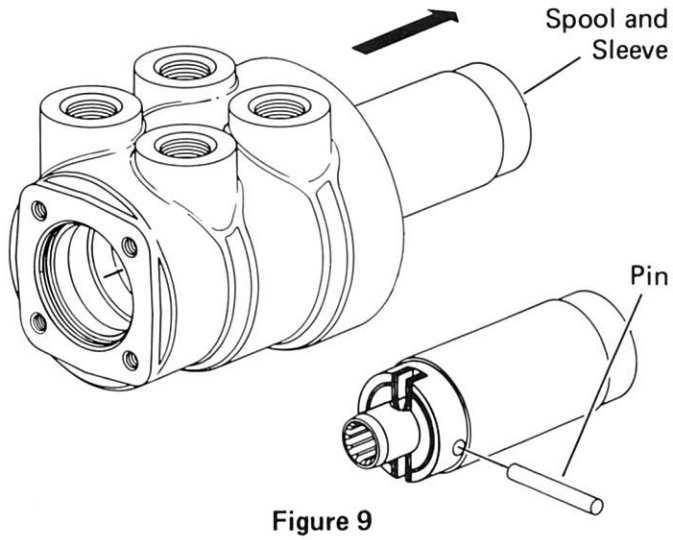


Figure 9

15 Remove spool and sleeve assembly from 14 hole end of housing, see Fig. 9.

Caution: Avoid binding spool and sleeve in housing. Limited alternate rotation of spool and sleeve helps reduce binding. Note, keep pin in a nearly horizontal position when removing spool and sleeve from housing. If pin becomes vertical during removal, it may drop from spool and sleeve into an oil passage inside the housing.

16 Push pin from spool and sleeve assembly, see Fig. 9.

Disassembly

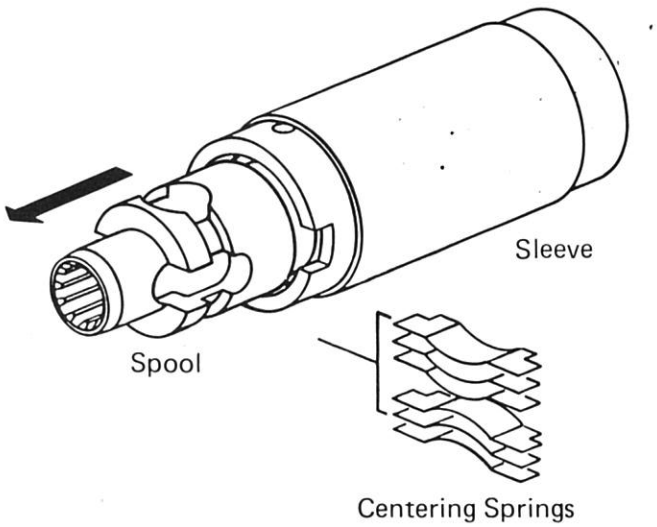


Figure 10

17 Remove spool from sleeve, see Fig. 10. Remove 6 centering springs from spool carefully by hand.

Reassembly

Clean 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, or try to file or grind steering control unit parts.

Note: Lubricate all seals (with exception of new quad ring seal) with a clean petroleum jelly, such as Vaseline. Do not use excessive lubricant on seals for meter section.

Refer to parts list 6-225 when ordering replacement parts. A good service policy is to replace all old seals with new seals whenever unit is disassembled.

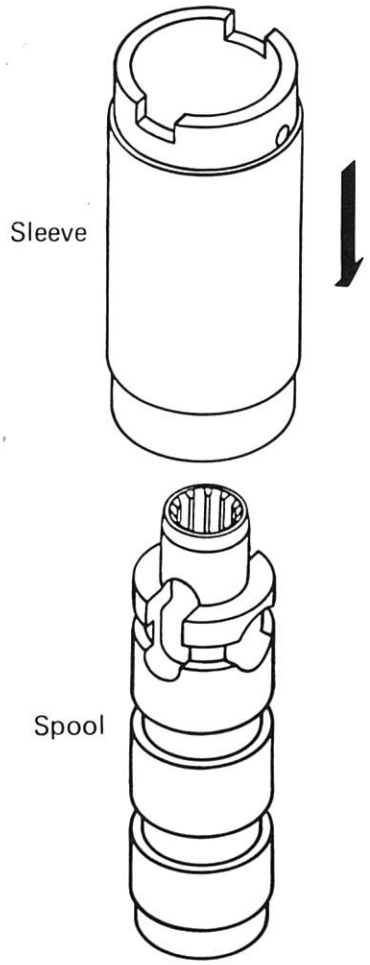


Figure 11

1 Insert control end of spool in sleeve. Assemble spool and sleeve carefully so that the centering spring slots line up at the same end (Fig. 11). Apply a light film of clean oil to O.D. of spool. Rotate spool while sliding parts together. Because of close tolerance between spool and sleeve, do not use force when rotating parts together. Be careful not to burr spool. Test for free rotation. Spool should rotate smoothly in sleeve with finger tip force applied at splined end.

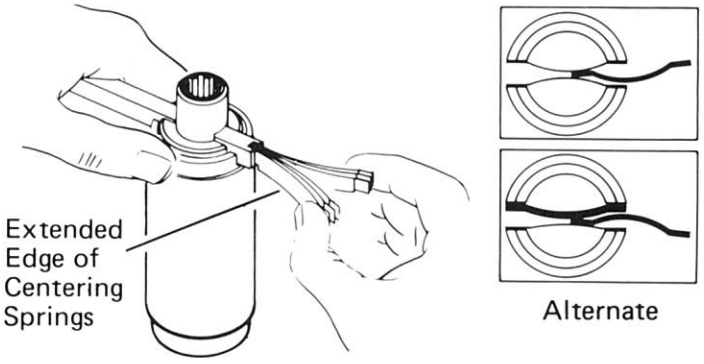


Figure 12

2 Align spring slots of spool and sleeve, then stand parts on bench. Insert spring installation tool (see tooling information, page 3) through spring slots of both parts. Position centering springs (2 sets of 3 each) on bench so that extended edge is down and center section is together. In this position, insert one end of entire spring set into spring installation tool, as shown in Fig. 12. If no tool is available, see NOTE below for alternate installation instructions.

3 Compress expanded end of centering spring set and push into spool and sleeve assembly. Keep pressure on spring ends when withdrawing installation tool, push forward on springs at the same time.

4 Center spring set in spring slots. Seat springs down evenly and flush with the upper surface of the spring and sleeve.

Note: Carefully follow these instructions when installing centering springs without the aid of a spring installation tool:

A) Insert 1 centering spring, with extended edge down, in spring slot of spool (raise spool from sleeve slightly for more spring clearance).

B) Insert 1 centering spring opposite spring located in slot of spool. Make sure center sections of both springs are together, and that the extended edges of the springs are down.

C) Push 1 set of 2 centering springs between the 2 springs in the spool, see Fig. 12.

D) Push remaining set of 2 centering springs opposite 3 centering springs in spool.

E) Push spool in sleeve until springs seat flush with top and sides of sleeve.

Reassembly

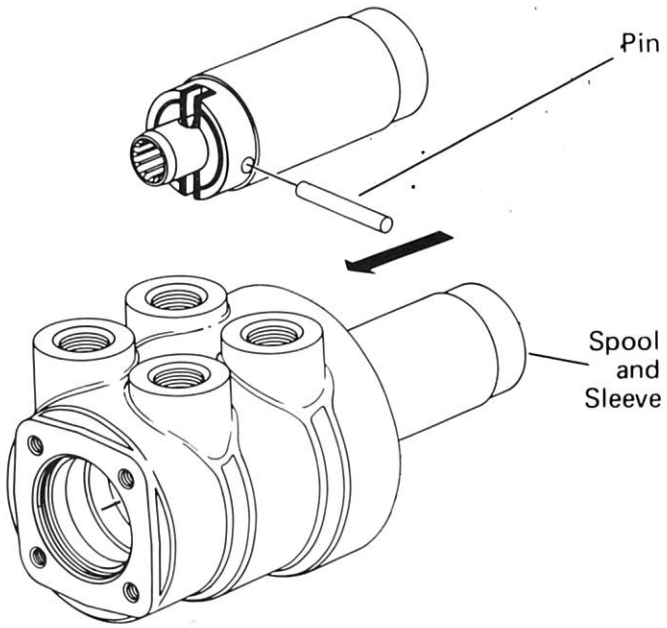


Figure 13

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

6 Position spool and sleeve assembly so splined end of spool enters meter end of housing first, see Fig. 13.

Caution: Be extremely careful that spool and sleeve don't tilt out of position while inserting in housing. Lubricate O.D. of sleeve. Push parts gently into place with slight rotation. Keep pin horizontal. Bring the spool assembly entirely within the housing bore until the parts are flush at the meter 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 force at the splined end.

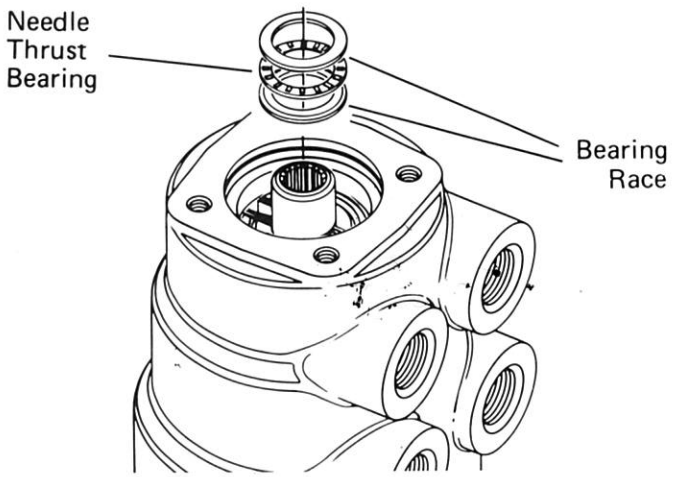


Figure 14

7 Place housing on a clean shop towel. Install 2 bearing races and the needle thrust bearing in the order shown in Fig. 14.

8 Install dust seal in front retainer, flat or smooth side of dust seal must face down toward retainer, see Fig. 16.

9 Install New one piece Teflon seal in front retainer. Seat seal in place with your finger. Do not use any seal that falls freely into pocket of retainer, see Fig. 16.

10 Install 50 mm [2 inch] Dia. o-ring seal on front retainer, see Fig. 16.

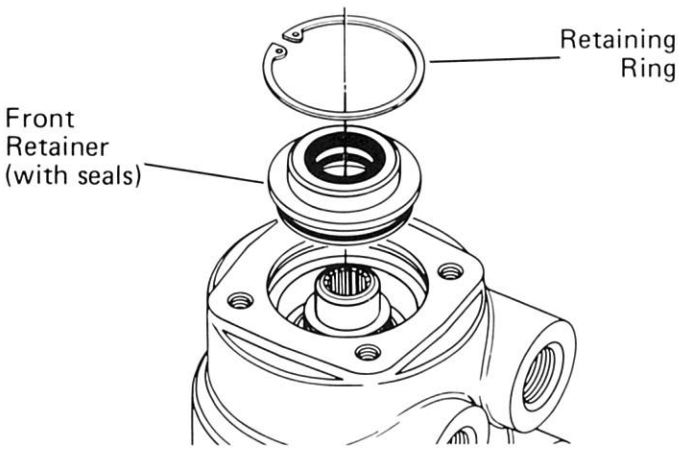


Figure 15

11 Install front retainer over the spool end with a twisting motion. Tap the retainer in housing with a rubber hammer. Make sure the retainer is flush against the bearing race.

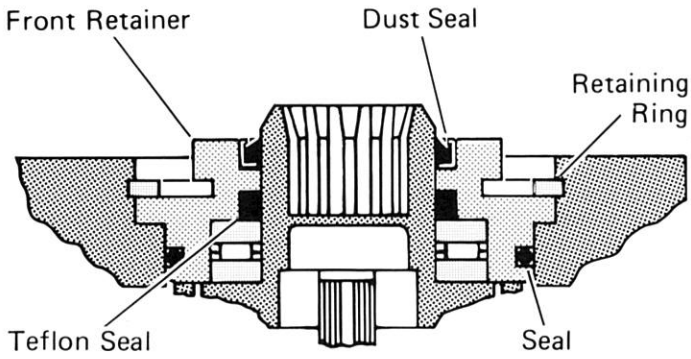


Figure 16

12 Use a Tru-Arc retaining ring ratchet pliers (S-6500) to install retaining ring (see Fig. 15-16) in housing. After installing ring, tap on ring to properly seat ring in groove.

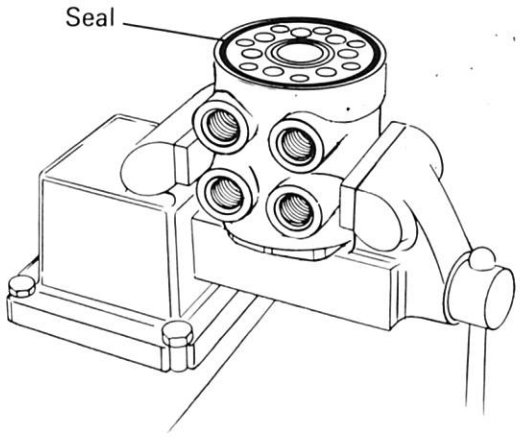


Figure 17

13 Clamp housing in vise, as shown in Fig. 17. Clamp lightly on edges of mounting area. Do not over tighten jaws. Install 120 mm [4-3/4 inch] Dia. seal in housing.

Note: Check to insure that the spool and sleeve are flush or slightly below the meter end of the housing. Clean the upper surface of the housing by wiping with the palm of clean hand.
Clean each of the flat surfaces of the meter end parts in a similar way when ready for reassembly. Do not use cloth or paper towel to clean surfaces.

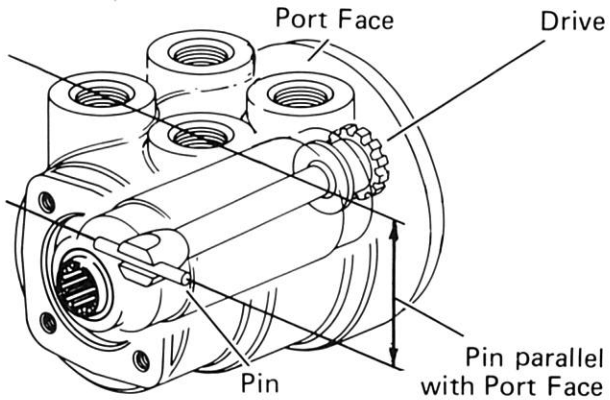


Figure 18

14 Rotate spool and sleeve assembly until pin is parallel with port face, see Fig. 18. Install drive, make sure you engage drive with pin.
To assure proper alignment, mark one of the two drive tooth slots that are parallel with slot in the end of drive, see Fig. 20, (Ref. B,C,).

15 The wear plate oil feed holes are larger on one side than the other. When reassembling the unit, make sure the side with the smaller diameter holes is against the valve housing.

16 Install 120 mm [4-3/4 inch] Dia. o-ring seal on meter face.

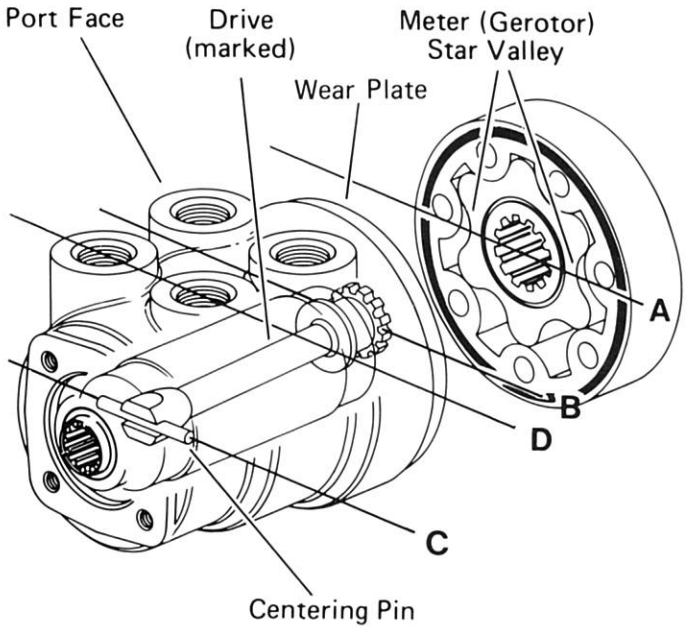
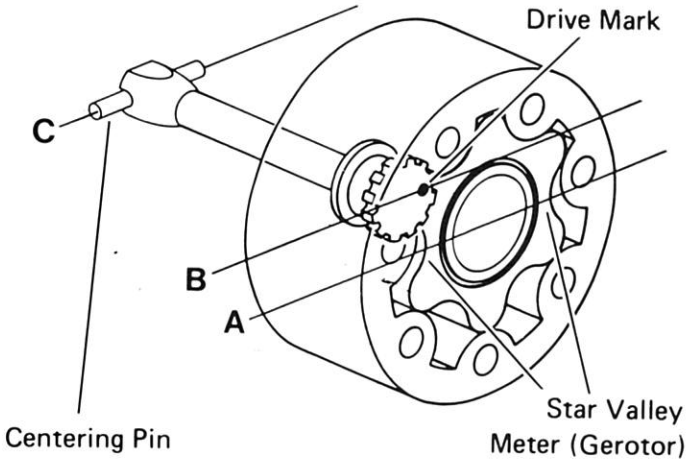


Figure 19

17 With seal side of meter down, install meter on drive. If star has counterbore install with counterbore facing end cap.

Important: The timing mark on drive must fall on the parallel line between any 2 meter star valleys. Note parallel relationships of reference lines A,B,C and D—Figs. 19 and 20. Align bolt holes without disengaging meter from drive. Be careful when adjusting meter on housing, excessive turning of meter may disrupt seal between meter and housing.



Reassembly

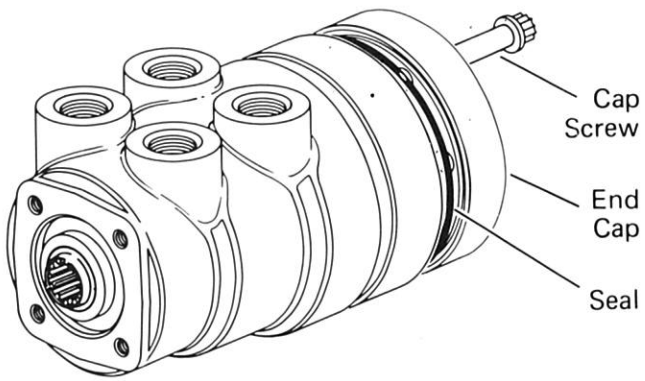


Figure 21

18 Install 120 mm [4-3/4 inch] Dia. seal in end cap.

19 Install end cap, align holes. Do not disrupt seal from end cap.

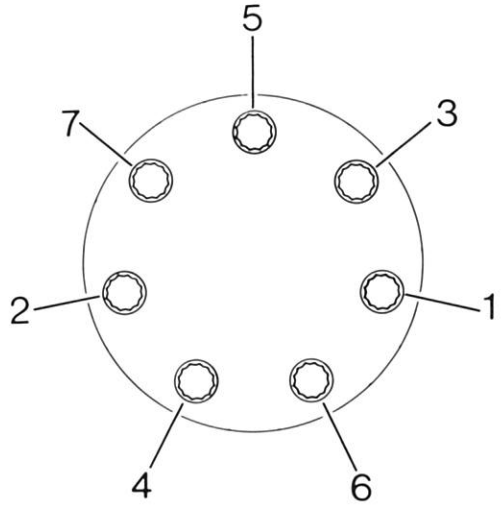


Figure 22

20 Install 7 dry cap screws. Pretighten screws to 20-27 Nm [15-20 lb-ft], then torque screws to 100 Nm [75 lb-ft] in sequence, see Fig. 22.