

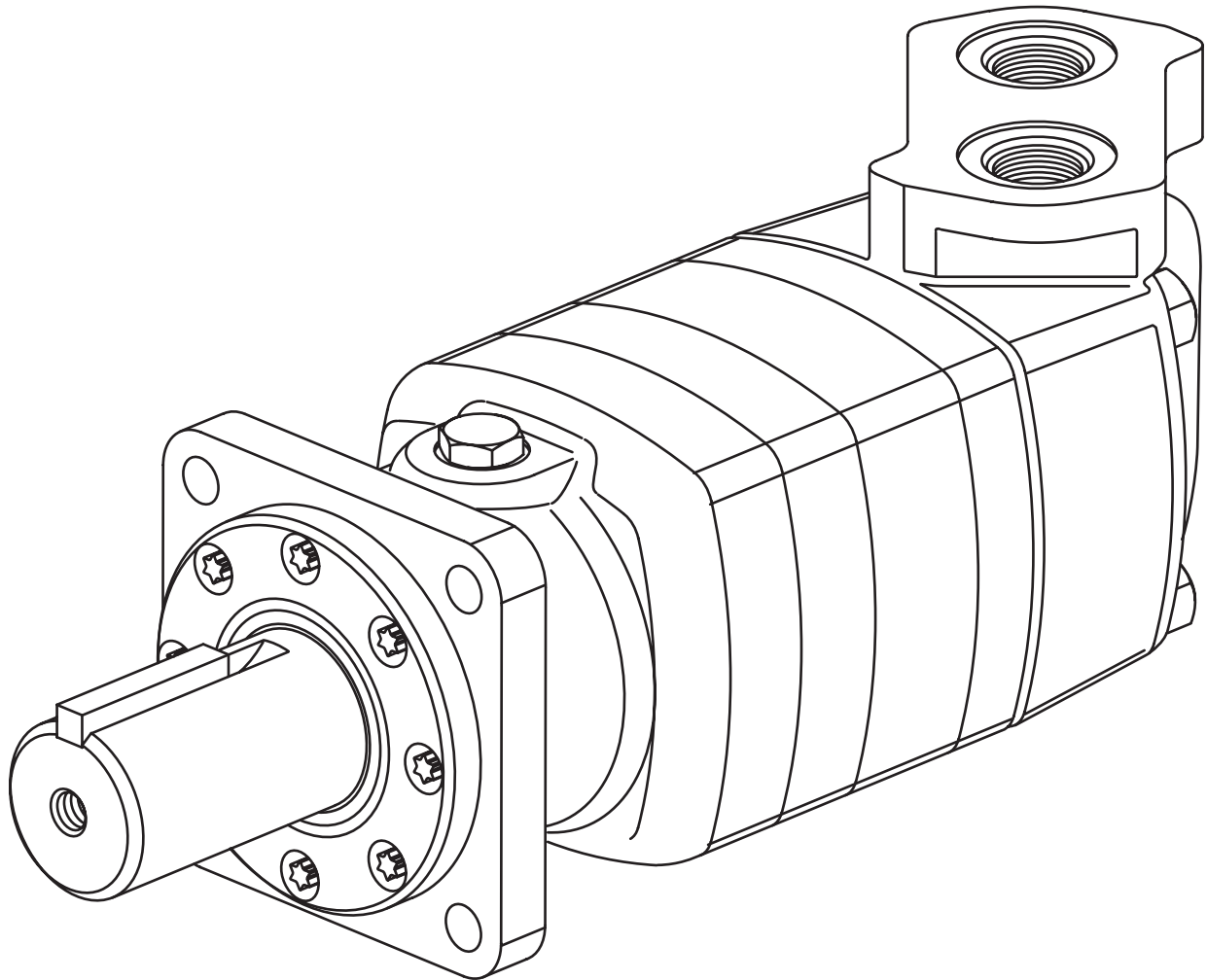
# Char-Lynn®

Hydraulic Motor

April, 1997



## Repair Information



**10 000 Series**  
**Geroler® Motors**

**002 003 004**



# 10 000 Series Geroler Motors

Ref. No.	Description
1	Shaft S/A
2	Flange, Mounting /Wear Plate
3	Bearing, Radial
4	Spacer, Bearing
5	Spacer, Bearing Front
6	Washer, Thrust
7	Bearing, Front Thrust
8	Washer, Thrust (Thin)
9	Plug/O-ring S/A
13	O-ring (Note 1)
14	O-ring (Note 1)
15	Retainer, Front
16	O-ring
17	Ring, Quad
18	Washer, Backup
19	Seal, Dust
20	Screw, Cap
21	Drive, Main
22	Plate, Wear

Ref. No.	Description
23	Washer, Rear Thrust
24	Bearing, Rear Thrust
25	Geroler
27	Plate, Valve
28	Drive, Valve
30	Seal, Outer Face
31	Seal, Inner Face
32	Spring, Compression
33 and 34	Balance Ring/Pin Assembly
35	Ball
36	Spring, Compression
37	Plug/O-ring S/A
38	Plug/O-ring S/A
39	Valve
40	Screw, Cap (replaces and interchanges with studs)
A	Kit, Housing, Valve (1-5/16 O-ring Ports)
B	Kit, Housing, Valve (1-1/4 Split Flange Ports)
C	Kit, Housing, Bearing (Std. Motor)
D	Kit, Housing, Bearing (Whl. Motor)

Note 1: The -002 and -003 Bearingless motors use 4 O-rings while -004 motor uses 3 O-rings.

Note 2: DO NOT use spacer with current replacement shafts (Ref. No. 1). Motors with this shaft spacer will still have to be reassembled with spacer unless the shaft was damaged and must be replaced.

See pages 10 and 11 for wheel motor and bearingless motor repair information.

**Tools required for disassembly and reassembly are:**

- Torque wrench (170 Nm [1500 in-lb or 125 ft-lb] capacity)
- 1, 15/16, 1/2, and 5/16 inch sockets
- 300 mm [12 in.] - 400 mm [16 in.] breaker bar

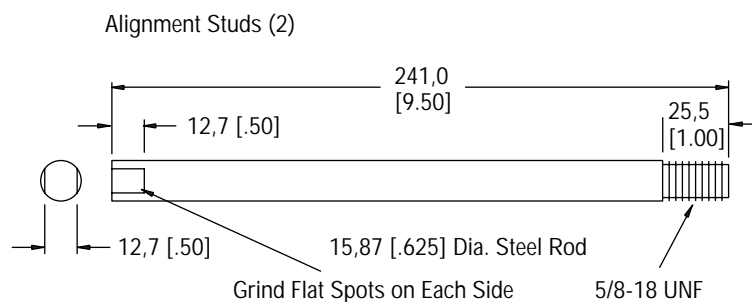
- Small screwdriver (150 mm [6 in.] — 200 mm [8 in.] long, 6,3 mm [.25 in.] blade)

- Plastic or rubber hammer

**The following tools are not necessary for disassembly and reassembly, but are extremely helpful.**

- Seal sleeve or bullet
- Alignment studs (2) if required

\* Motors with tie bolts and original studs not available.



# 10 000 Series Geroler Motors

## Disassembly

Cleanliness is extremely important when repairing a hydraulic motor. Work in a clean area. Before disconnecting the lines, clean the port area of the motor thoroughly. Use a wire brush to remove foreign material and debris from the exterior joints of the motor. Check the shaft and keyway, remove all nicks, burrs, or sharp edges that might damage the shaft seals when installing the retainer over the shaft. Before starting the disassembly procedures, drain the oil from inside the motor.



Figure 2

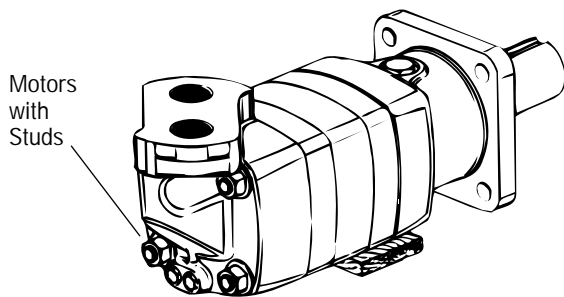
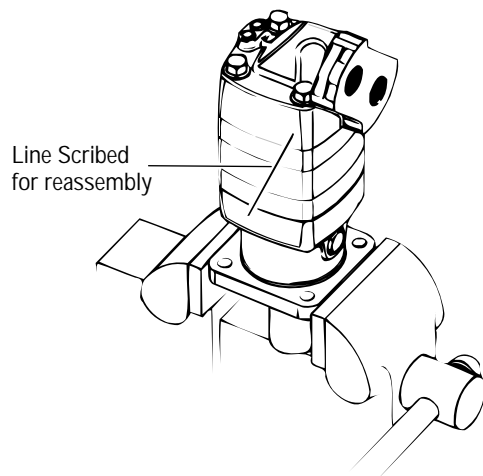


Figure 1

1 Place the motor in a vise with the output shaft down, or place the motor (earlier models with studs) on a smooth, clean, flat surface; use a piece of wood under the center section of the motor to raise the valve housing end of the motor off the surface of your work area, see Fig. 1, for these preparations.

**Note:** It may be helpful for reassembly to scribe a line across the length of the motor.

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

2 Remove 4 bolts (or nuts and washers for earlier models) from motor. Remove studs (earlier models) per step 17.

3 Carefully lift the valve housing straight off. If this is done carefully, the springs and balance ring assembly will remain on the valve for easy removal.

4 Remove 2 check valve plug assemblies (plugs, springs, and steel balls) from valve housing.

5 Place valve housing on bench with open end up, then carefully remove 108 mm [4.25 in.] I.D. seal, and 9,4 mm [.37 in.] I.D. seal.

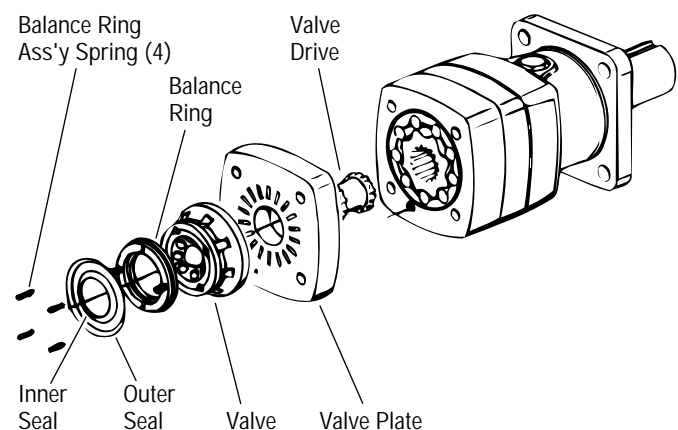


Figure 3

6 Remove 4 balance ring assembly springs.

7 Remove balance ring assembly.

8 Remove inner and outer seals from balance ring.

# 10 000 Series Geroler Motors

## Disassembly

- 9 Remove valve.
- 10 Remove valve plate.
- 11 Remove valve drive.

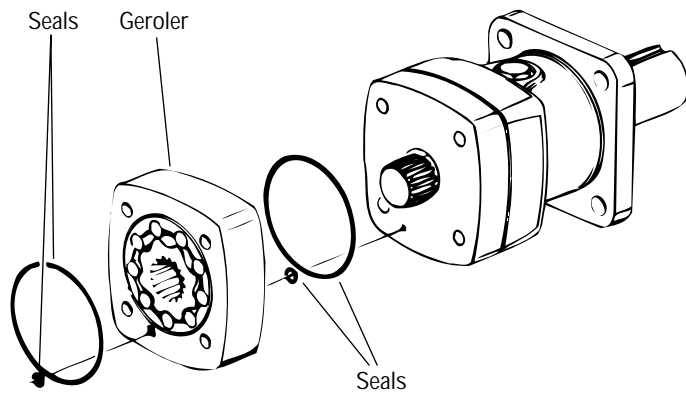


Figure 4

- 12 Remove Geroler. Retain rollers in Geroler assembly.
- 13 Remove 9,4 mm [.37 in.] I.D. seals, and 108 mm [4.25 in.] I.D. seals from the Geroler, 2 seals on each side of the Geroler.

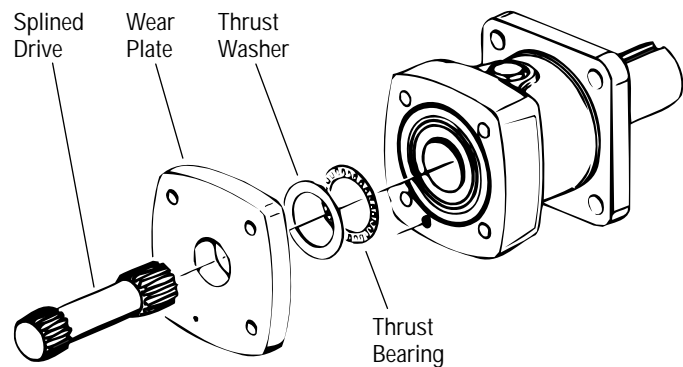


Figure 5

- 14 Remove splined drive from bearing housing.
- 15 Remove wear plate.
- 16 Remove thrust bearing and thrust washer from wear plate.

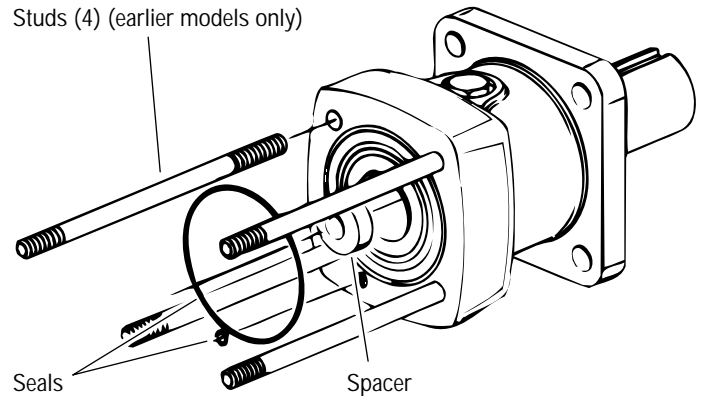


Figure 6

- 17 Use a stud remover or vise grips to remove studs (earlier models only) see Fig. 6.
- 18 Remove 9,4 mm [.37 in.] I.D. seal, and 108 mm [4.25 in.] I.D. seal from bearing housing.
- 19 Remove spacer from inside output shaft.

**Note:** Some units have shafts with a raised area at bottom of splined cavity and do not use spacer.

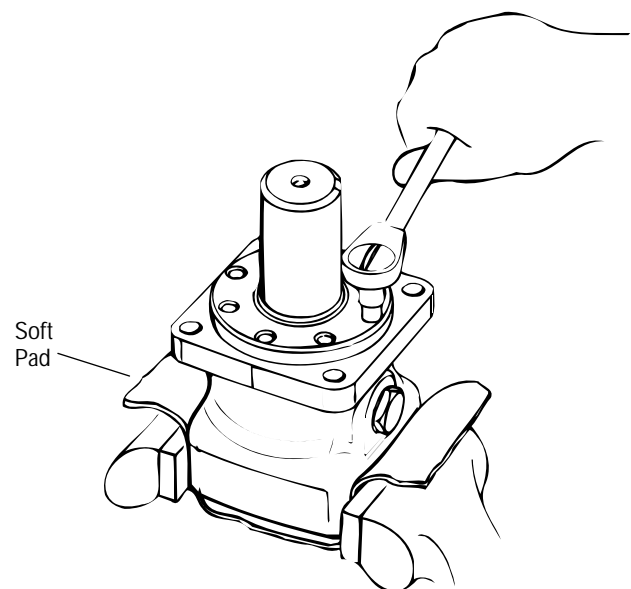


Figure 7

- 20 Place bearing housing in vise, as shown in Figure 7. Loosen 8 cap screws (5/16 inch) in retainer.

# 10 000 Series Geroler Motors

## Disassembly

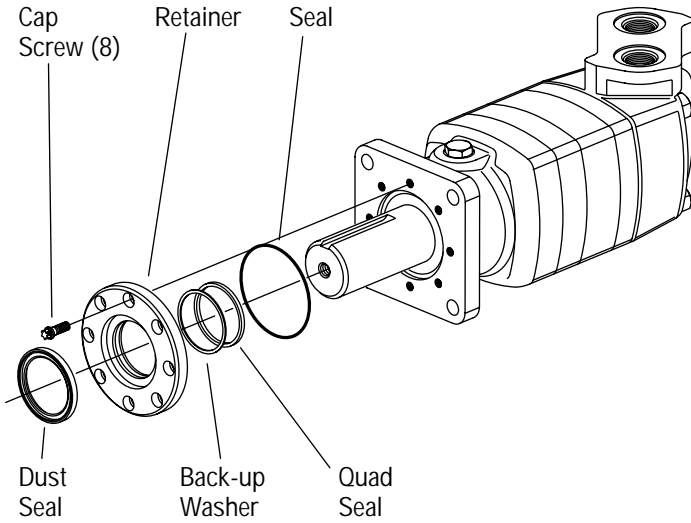


Figure 8

21 Place bearing housing on a clean, flat surface. Remove 8 cap screws and retainer.

22 Remove quad-ring seal, back-up washer, O-ring seal, and dust seal from retainer. Use a small screwdriver to remove the dust seal. Do not damage bore of retainer.

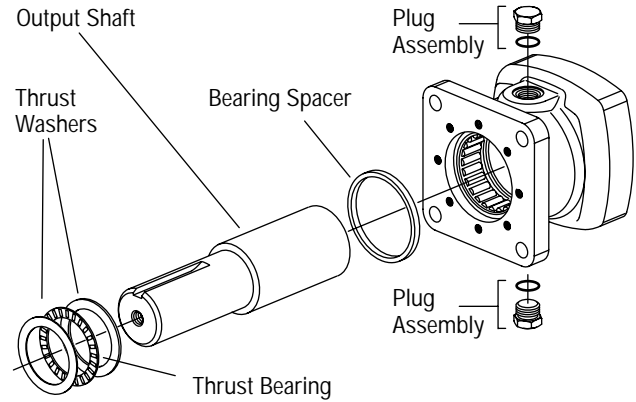


Figure 9

23 Remove output shaft.

24 Remove 2 thrust washers and thrust bearing from the output shaft.

25 Remove bearing spacer.

26 Remove 2 plug assemblies (1 inch) from the bearing housing.

**Note:** The bearing housing and bearings inside the housing are not sold separately. These bearings are hydraulically pressed into the bearing housing.

## Reassembly

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 with a cloth or paper towel because lint or other matter can get into the hydraulic system and cause damage. Do not use coarse grit or try to file these parts. Check around the keyway and chamfered area of the shaft for burrs nicks or sharp edges that can damage the seals when reassembling the retainer.

**Note:** Lubricate all seals with petroleum jelly such as Vaseline. Refer to the parts list (6-119) for replacement parts and proper seal kit number.

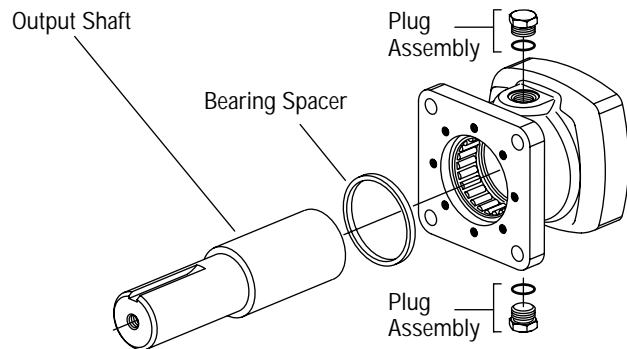


Figure 10

# 10 000 Series Geroler Motors

## Resassembly

1 Place bearing housing on a smooth, flat surface. Install 2 plug assemblies, see Figure 10. Tighten to 100 Nm [900 lb-in or 75 lb-ft].

2 Install bearing spacer in bearing housing.

3 Install output shaft. Rotate shaft while installing in bearing housing.

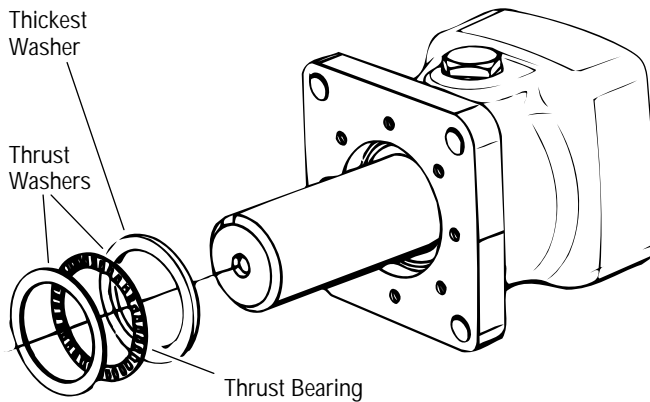
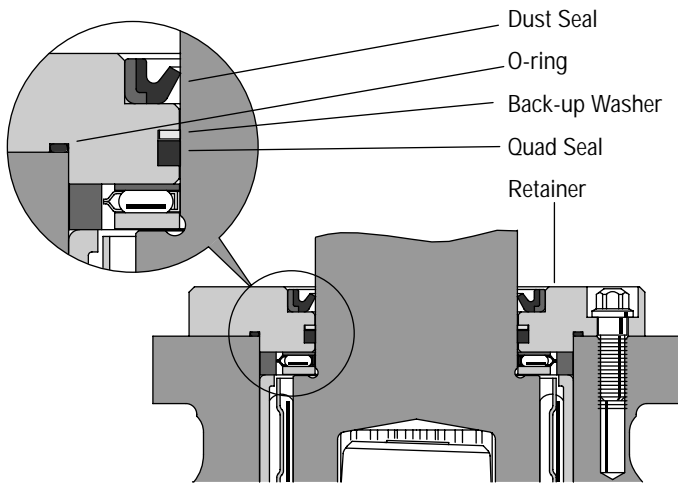


Figure 11

4 Install 2 thrust washers and thrust bearing. Install thrust bearing between the 2 thrust washers, thickest washer over shaft first, see Figure 11.



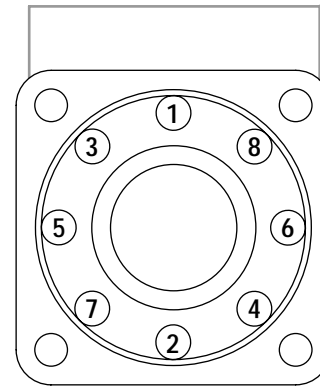
Seal Replacement

Figure 12

5 Use a small press, if available, to install dust seal in retainer. Metal side of dust seal must face toward retainer, as shown in Figure 12. If a press is not available, use a plastic or rubber hammer to tap dust seal in place.

6 Install back-up washer, quad ring seal, and 3-1/2" I.D. seal in the retainer. Apply petroleum jelly to inside diameter of dust seal and quad ring seal.

7 Before installing retainer, place a protective sleeve or bullet, if available, over shaft. To prevent damage to seals, install retainer over shaft with a twisting motion. Do not cut or distort retainer seals. Damage to these seals will cause external leakage.



Torquing Sequence

Figure 13

8 Lubricate threads of 8 cap screws with a light film of oil. Install and finger tighten screws. Place unit in a vise, as shown in Figure 7. Tighten cap screws to 34 Nm [300 lb-in] of torque – in the sequence shown in Figure 13.

9 Install key (when used) in key slot of shaft.

10 Reposition motor in vise, clamp housing flange, as shown in Fig. 1.

11 Pour a small amount of hydraulic oil inside output shaft.

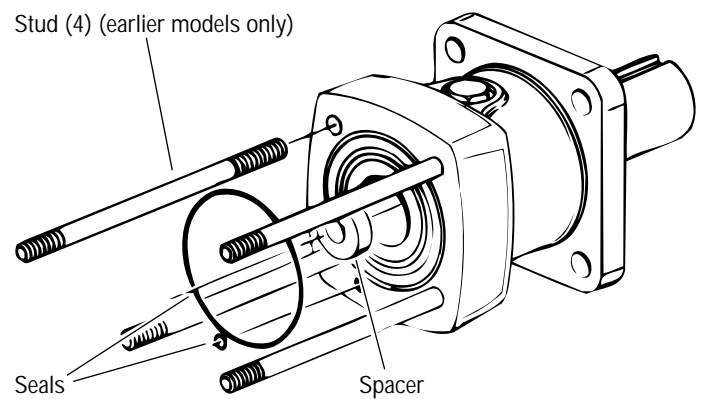


Figure 14

**Note:** Spacers are not used on units that have a raised area at bottom of splined cavity.

12 Install spacer in output shaft, guide spacer with a pencil.

# 10 000 Series Geroler Motors

## Resassembly

13 Apply petroleum jelly to 108 mm [4.25 in. I.D. seal, and install in seal groove of the bearing housing see Fig. 14.

14 Apply petroleum jelly to 9,4 mm [.37 in. I.D. seal. Install seal in case drain groove of bearing housing.

15 Install 2 studs (earlier models), diagonally opposed, in bolt holes of bearing housing, see Fig. 15. **If you replace studs with bolts, use 2 studs for alignment purposes when stacking parts.**

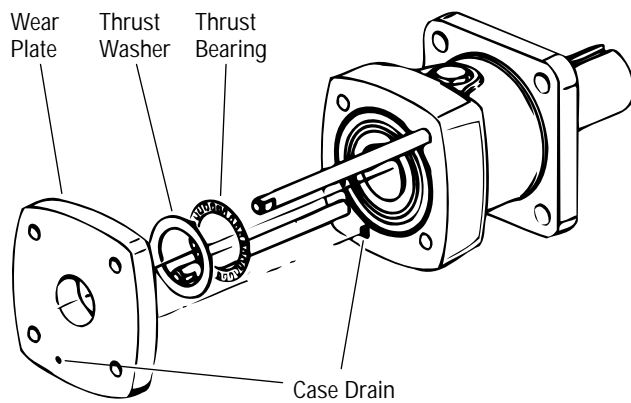


Figure 15

16 Install thrust washer and thrust bearing in wear plate – washer first, see Fig. 15. A light film of lubricant on the washer and bearing will help hold them in place.

17 Align case drain hole in wear plate with case drain hole in bearing housing. Install wear plate flush against bearing housing, see Fig. 15.

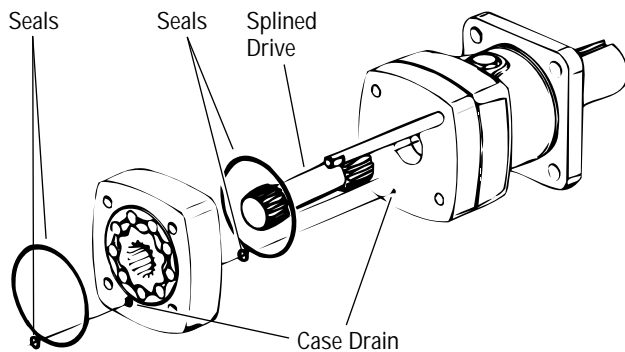


Figure 16

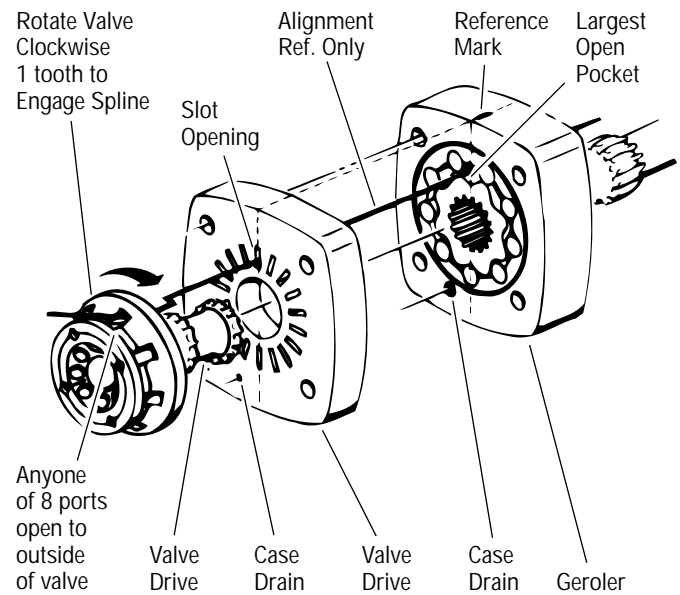
18 Install splined drive in output shaft. For 345 cm<sup>3</sup>/r [21.0 in<sup>3</sup>/r] displacement motor insert longer splined end of drive first, see Fig. 16.

19 Apply petroleum jelly on 2 seals 9,4 mm [.37 in.] I.D. and 2 seals 108 mm [4.25 in.] I.D. Install them in the seal grooves of the Geroler, see Fig. 16, (one of each seal on both sides of the Geroler).

**Note:** Installation at this point involves 3 steps in the timing of the motor. Timing determines the direction of rotation of the output shaft.

The timing parts include . .

- |                |                |
|----------------|----------------|
| 1. Geroler     | 3. Valve Plate |
| 2. Valve Drive | 4. Valve       |



Timing Alignment

Figure 17

**Timing Step 1**—Locate the largest open pocket in the Geroler and mark it on the outside edge of the Geroler, See Fig. 17.

20 Align case drain hole in Geroler with case drain hole in wear-plate. Install Geroler on wear plate, see Fig. 16. Be sure to retain rollers in Geroler assembly.

21 Install valve drive in Geroler.

22 Align case drain hole in valve plate with case drain hole in Geroler. Install valve plate flush against Geroler, see Fig. 17.

**Timing Step 2**—Locate the slot opening in the valve plate which is in line with the largest open pocket of the Geroler. See Fig. 17



# 10 000 Series Geroler Motors

## Resassembly

23 Use the following procedure for installing the valve on the valve plate.

**Timing Step 3**—Locate any one of the side openings of the valve that goes through to the face of the valve. Line up this side opening with the open slot of the valve plate that is in line with the largest open pocket of the Geroler. Rotate the valve clockwise until the spline teeth engage (1 spline tooth), see Fig. 17. This will provide the rotation shown when pressurized as shown, see Fig. 18.

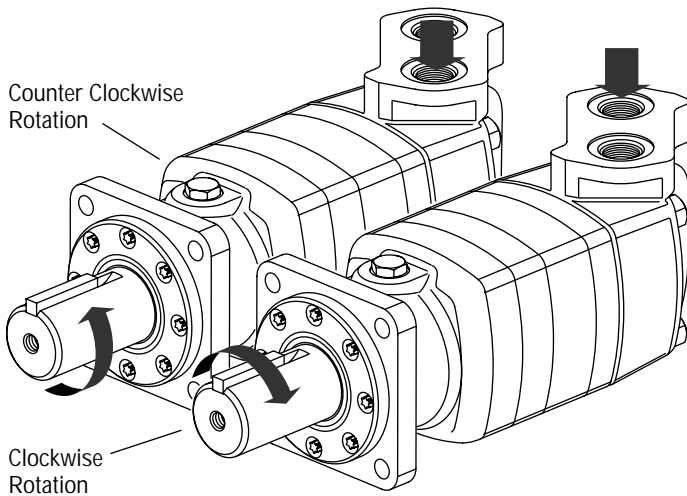


Figure 18

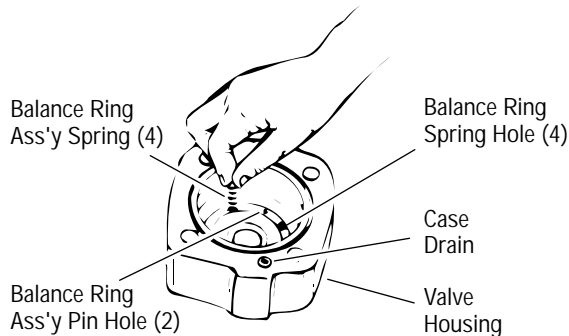


Figure 19

24 Apply grease to 4 balance ring assembly springs. Install springs in 4 holes located inside bore face of valve housing, see Fig. 19.

25 Apply a light film of petroleum jelly to 9,4 mm [.37 in.] I.D. seal. Install seal in case drain groove of valve housing.

26 Apply a light film of petroleum jelly to 108 mm [4.25 in.] I.D. seal. Install seal in outside seal groove of the valve housing.

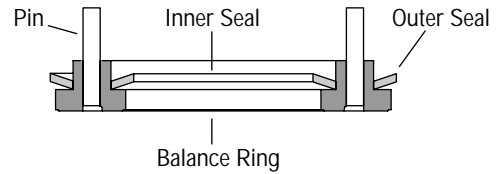


Figure 20

27 Apply petroleum jelly to inner and outer face seals. Install them on balance ring as shown in Fig. 20.

**Important:** Install these face seals in the positions shown or the motor will not operate properly. Do not force or bend these face seals. Any damage to these seals will affect the operation of the motor.

28 Align 2 pins in balance ring assembly with 2 holes in valve housing as shown in Fig. 19. Install the balance ring assembly in the valve housing.

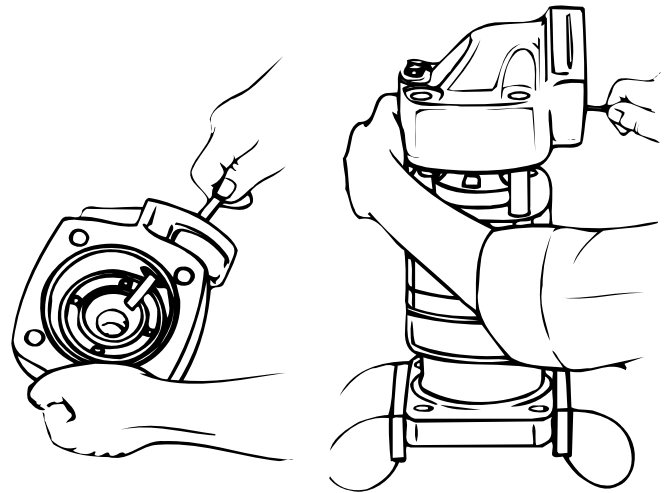


Figure 21

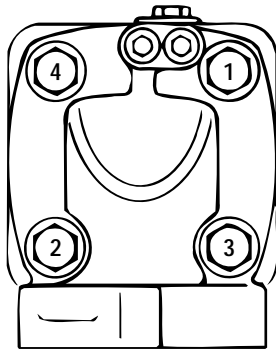
29 Insert a flat brass rod, or similar flat tool, through port of valve housing to hold balance ring assembly in position until you install valve housing. Align case drain hole in valve housing with case drain hole in valve plate. Install valve housing against valve plate, see Fig. 21. Remove brass rod as balance ring contacts the valve.

**Note:** After installing valve housing on valve plate, check for proper placement. Push down on the valve housing. You should get a slight spring action.

**Note:** After installing valve housing on valve plate, visually check between body parts of motor for unseated seals.

# 10 000 Series Geroler Motors

## Resassembly



Bolt Torquing Sequence

Figure 22

**30** Install and finger tighten 2 bolts (or studs for earlier models) opposite alignment studs. Remove alignment studs and install remaining bolts (or studs, 4 washers, and 4 nuts for earlier models). Torque bolts (or nuts) to 130-150 Nm [95-110 lb-ft], in sequence, see Fig. 22.

**31** Install 2 check balls in valve housing, one ball in each hole. To seat check balls, (on new valve housings only), tap lightly on ball with a punch, using a plastic (or rubber) hammer.

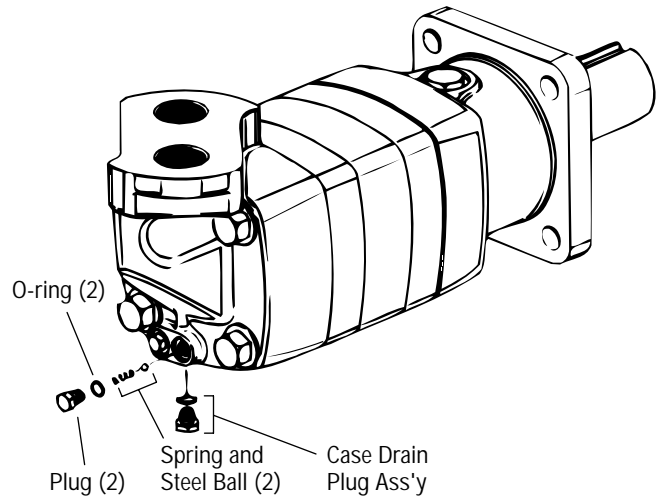


Figure 23

**32** Install 2 springs in check valve holes, one spring in each hole. Install o-rings on plugs, then install plugs. Tighten to 9,6 Nm [85 lb-in].

**33** Install case drain plug assembly. Tighten to 36 Nm [320 lb-in]. On wheel motors, a different bearing housing is used, see Fig. 24. Other than this the parts are the same as the standard motor and the same disassembly and reassembly procedures apply.

### Wheel Motor

On wheel motors a different bearing housing is used, see Fig. 24. Other than this the parts are the same as the standard motor and the same disassembly and reassembly procedures apply.

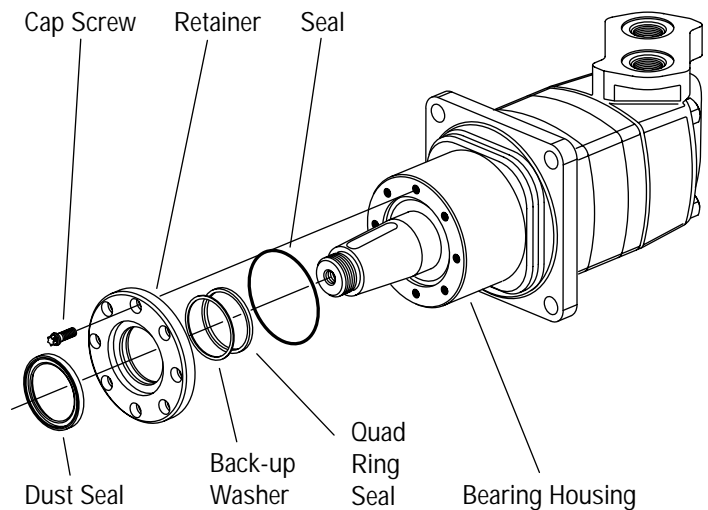


Figure 24

# 10 000 Series Geroler Motors

## Resassembly

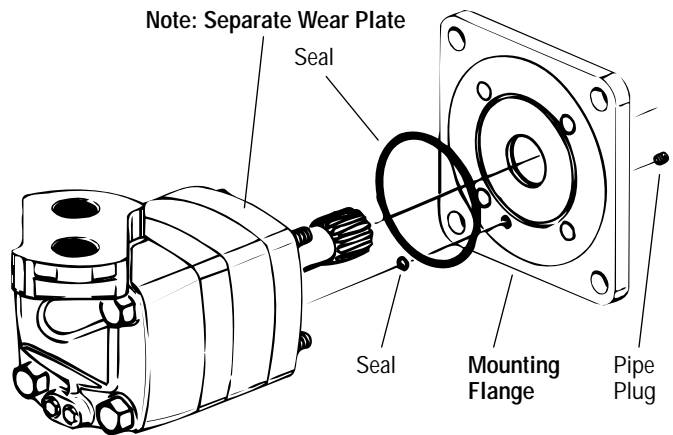
### Bearingless Motor -002 and -003

This motor is the same as the standard motor without the shaft/bearing assembly, retainer, and bearing housing (mounting flange replaces the bearing housing—see Fig. 25). Also, a thrust washer and needle thrust bearing are not required in the wear plate for this bearingless motor. Follow the same disassembly and reassembly procedures as rear section of standard motor.

**Important:** This motor requires Loctite in threaded holes of mounting flange. Follow these procedures:

Adequate Loctite penetration and sealing depend highly on cleanliness and dryness of threads. Use a non-petroleum base solvent to clean excess oil from threads of flange after disassembly. You may need to use a tap to clean threads of excess old Loctite. **Then, after you have fully reassembled the motor,** apply 2 to 3 drops of Loctite no. 290 at top of threaded holes—see example.

**Note:** Allow Loctite 5 minutes for thread penetration before installing motor on gear case.



**Attention:** Do not use more than 3 drops of Loctite on threaded portion.

-002  
-003

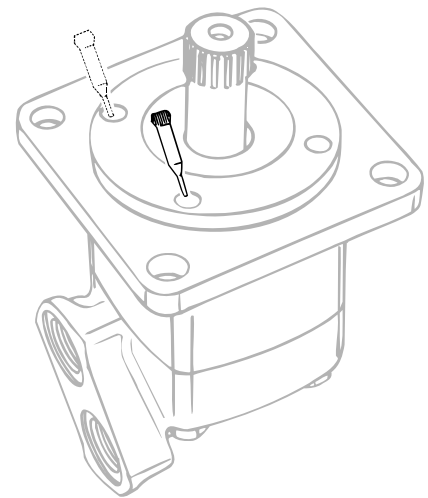
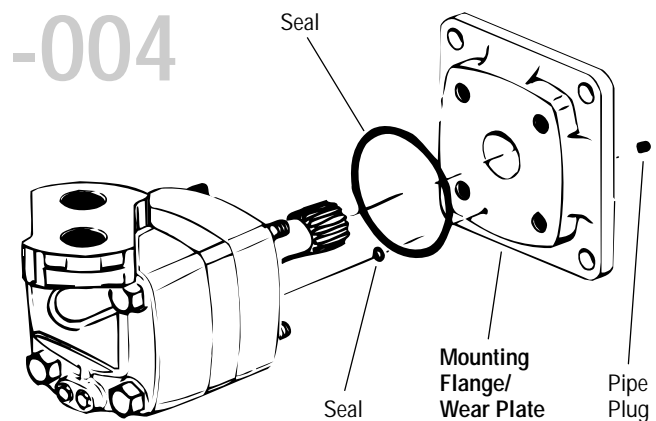


Figure 25

### Bearingless Motor -004

Loctite procedure does not apply to -004 design level.

This motor is the same as the standard motor without the shaft/bearing assembly, retainer, and bearing housing (mounting flange/wear plate replaces the bearing housing—see Fig. 26). Also, a thrust washer and needle thrust bearing are not required in the wear plate for this bearingless motor. Follow the same disassembly and reassembly procedures as rear section of standard motor.



-004

Figure 26

## Disc Valve Hydraulic Motor

# 10 000 Series Geroler Motors

### Product Numbers—10 000 Series Motors

Mounting	Shaft	Ports	Displ. cm <sup>3</sup> /r [in <sup>3</sup> /r] Product Number			
			345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Standard	2-1/4 in. Straight	1-5/16 O-ring	<b>119</b> -1028	-1029	-1030	-1031
		1-1/4 Split Flange	<b>119</b> -1040	-1041	-1042	-1043
	2-1/8 Inch 16 T Splined	1-5/16 O-ring	<b>119</b> -1032	-1033	-1034	-1035
		1-1/4 Split Flange	<b>119</b> -1044	-1045	-1046	-1047
	2-1/4 Inch Tapered	1-5/16 O-ring	<b>119</b> -1036	-1037	-1038	-1039
		1-1/4 Split Flange	<b>119</b> -1048	-1049	-1050	-1051
Wheel Motor	2-1/4 in. Straight	1-5/16 O-ring	<b>120</b> -1005	-1006	-1007	-1008
		1-1/4 Split Flange	<b>120</b> -1017	-1018	-1019	-1020
	2-1/8 Inch 16 T Splined	1-5/16 O-ring	<b>120</b> -1009	-1010	-1011	-1012
		1-1/4 Split Flange	<b>120</b> -1021	-1022	-1023	-1024
	2-1/4 Inch Tapered	1-5/16 O-ring	<b>120</b> -1013	-1014	-1015	-1016
		1-1/4 Split Flange	<b>120</b> -1025	-1026	-1027	-1028
Bearingless		1-5/16 O-ring	<b>121</b> -1007	-1008	-1009	-1010
		1-1/4 Split Flange	<b>121</b> -1011	-1012	-1013	-1014

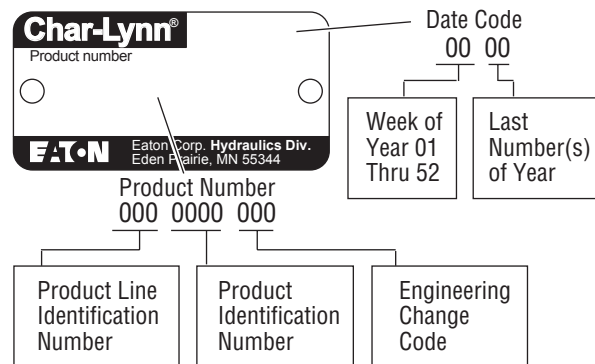
For Additional Literature Contact Eaton Corp. Hydraulics Division 15151 Highway 5 Eden Prairie, MN 55344.

- Specifications and performance Data, Catalog No. 11-878
- Replacement Part Numbers and Kit Information: 10 000 Series Motors Parts Information No. 6-119.

### 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



**Eaton**  
Fluid Power Group  
Hydraulics Business USA  
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Eden Prairie, MN 55344  
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Fax: 952-294-7722  
[www.eaton.com/hydraulics](http://www.eaton.com/hydraulics)

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