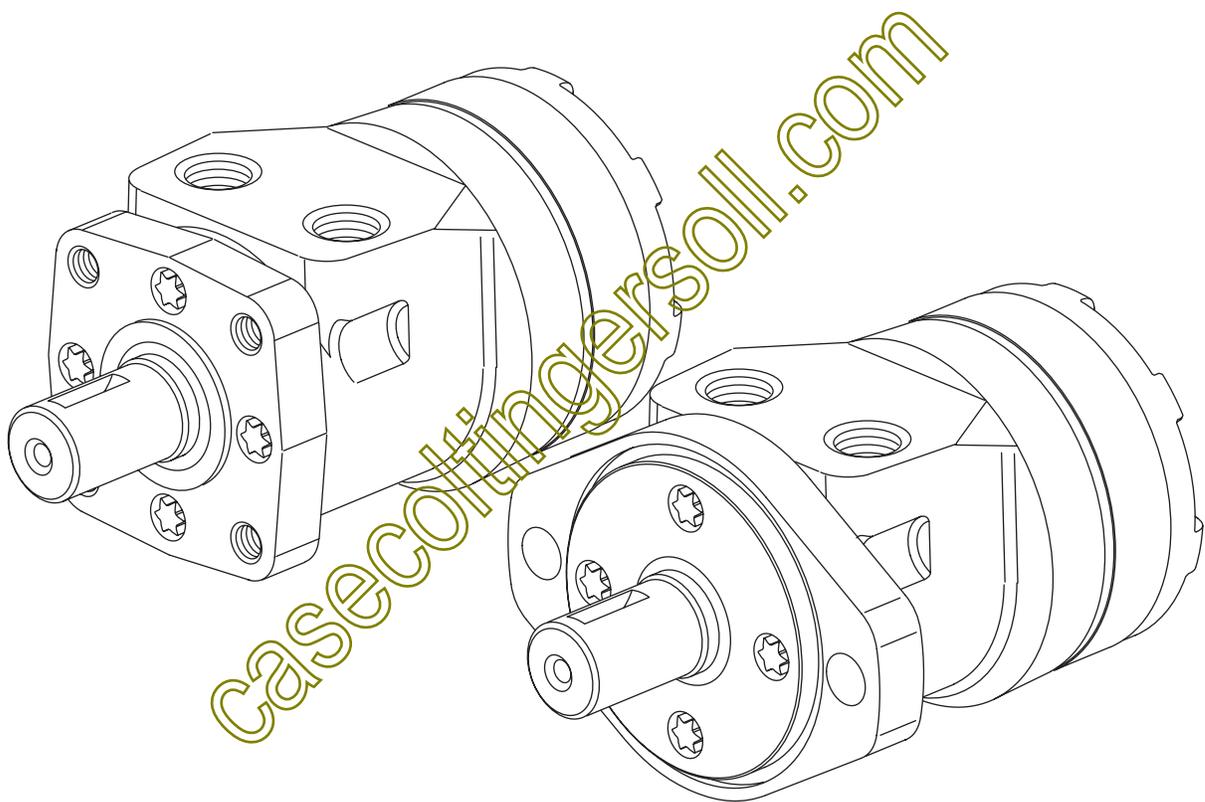


Char-Lynn® Hydraulic Motor

November, 1996



Repair Information

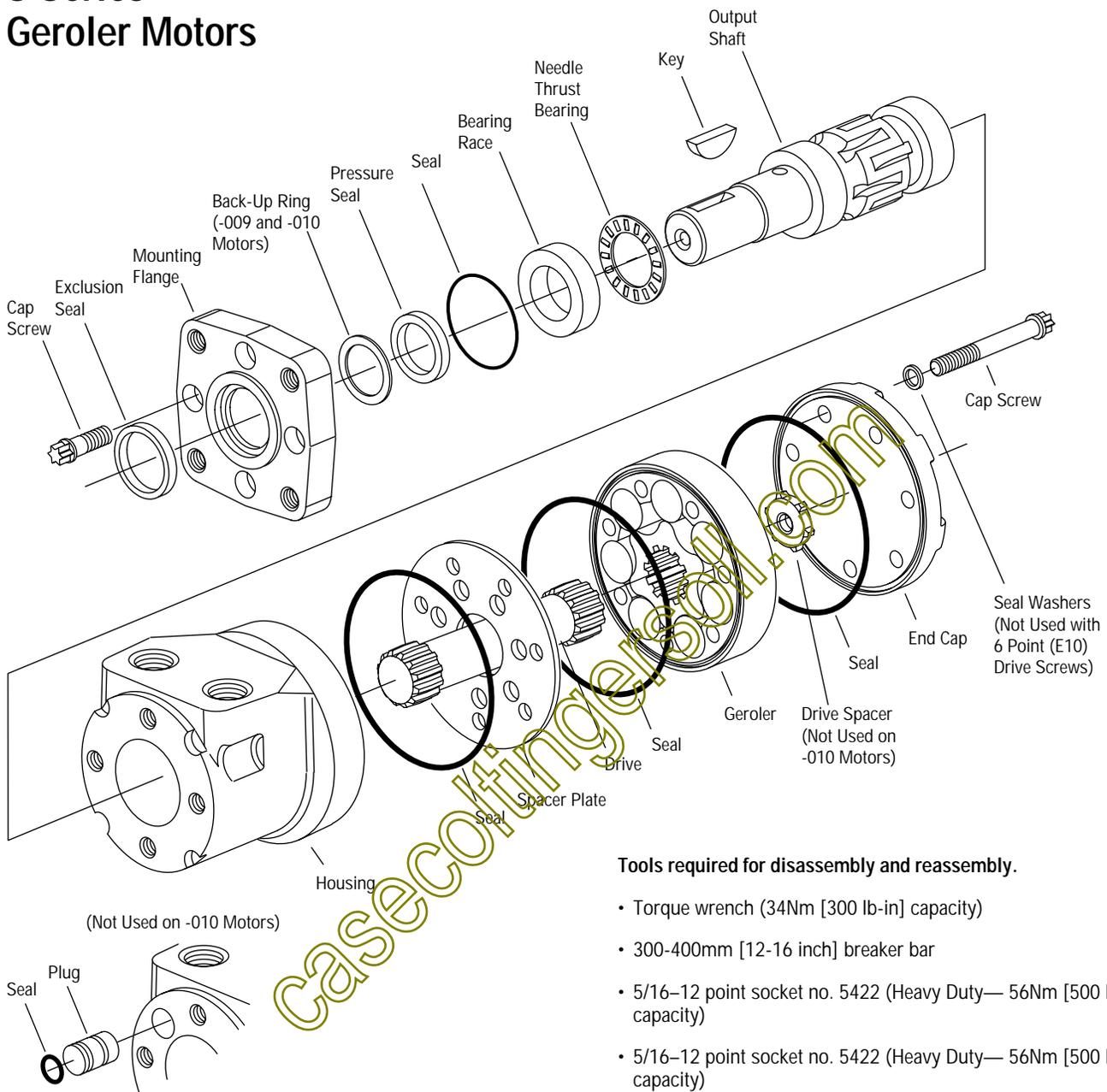


**S Series
General Purpose Geroler® Motor**

008 009 010

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S Series Geroler Motors



Tools required for disassembly and reassembly.

- Torque wrench (34Nm [300 lb-in] capacity)
- 300-400mm [12-16 inch] breaker bar
- 5/16–12 point socket no. 5422 (Heavy Duty— 56Nm [500 lb-in] capacity)
- 5/16–12 point socket no. 5422 (Heavy Duty— 56Nm [500 lb-in] capacity)
- Small screwdriver (150-200 x 6mm [6-8 x .25 inch] flat blade), see page 6 for tooling information.
- 3/16 inch [5mm] hex key
- Shaft pressure seal installation tool for -008 motor P/N 600470
- Shaft pressure seal installation tool for -009 and -010 motors P/N 600523
- Seal sleeve or bullet P/N 600304 (1 inch dia. shaft), P/N 600466

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

- Small propane torch

*Tools available—by special order—through our service department.

S Series Disassembly

Cleanliness is extremely important when repairing these motors. Work in a clean area. Before disconnecting the lines, clean port area of motor. Remove key when used. Check shaft and key slot, remove burrs, nicks or sharp edges and polish around the key slot. Before starting disassembly, drain oil from motor, then plug ports and thoroughly clean exterior of motor.

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

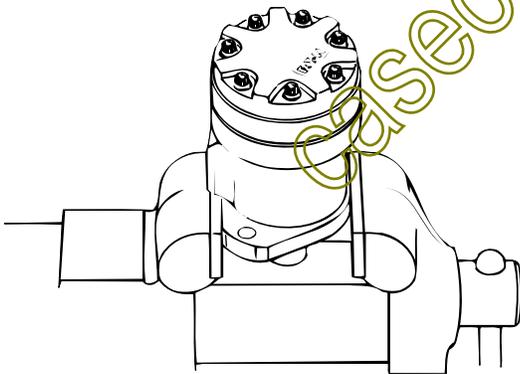


Figure 1

1 Place motor in vise, clamp across edge of flange with output shaft down. When clamping, use protective device on vise, such as special soft jaws, pieces of hard rubber or board, see Fig. 1.

2 Some motors may have a case drain plug in the end cap. If external case drain is not used, it is **not** necessary to replace the seal unless leakage occurs.

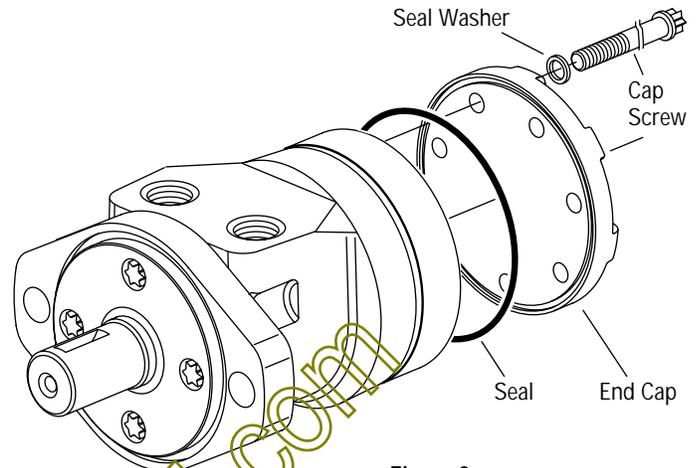


Figure 2

3 Remove cap screws and seal washers from end cap (seal washers used on 59, 69 and 95 cm³/r [3.6, 4.2 and 5.8 in³/r] displacement motors only)

4 Remove end cap.

5 Remove seal from Geroler.

6 Remove Geroler—retain rollers in the outer Geroler ring, see Fig. 3.

7 Remove seal from Geroler, see Fig. 3.

8 Remove drive spacer (not used on 95 and 159 cm³/r [5.8 and 9.7 in³/r] displacement motors for the -008 and -009 motors and not used on -010 motors).

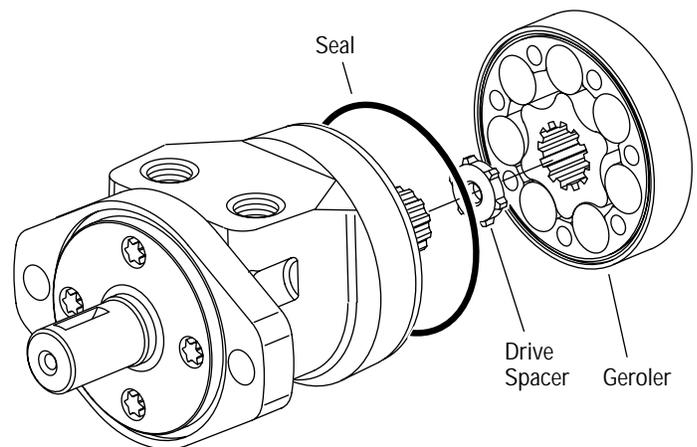


Figure 3

S Series Disassembly

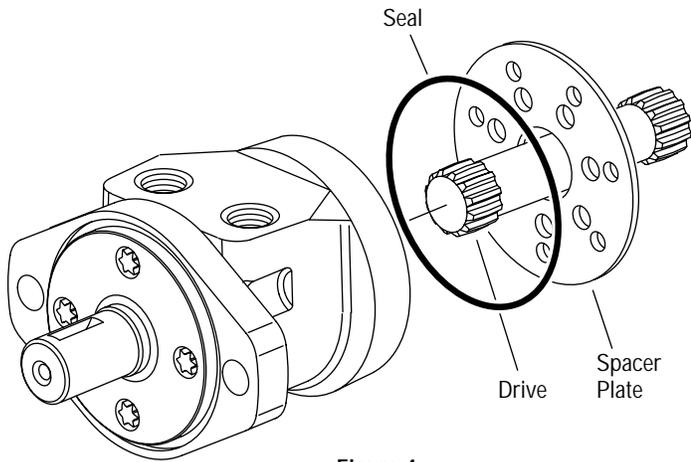
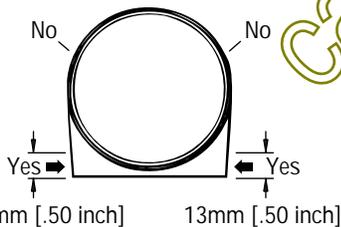
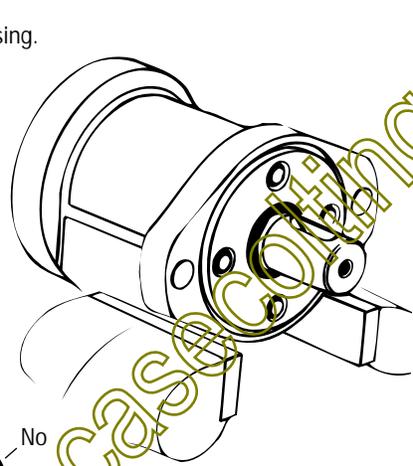


Figure 4

- 9 Remove spacer plate.
- 10 Remove drive, see Fig. 4.
- 11 Remove seal from housing.

The screws will require approximately 34-45Nm [300-400 lb-in] of torque to break loose and approximately 11 Nm [100 lb-in] torque to remove after they are broken loose. Do not use an impact wrench on Loctited screws, this may result in rounded heads or broken sockets.

Note: If higher torque than given above is required to break the screws loose, apply heat according to the following instructions. When heated the Loctite partially melts and the torque required to remove the screw is greatly reduced. Follow the instructions carefully, and be careful not to overheat and cause damage to the motor. Use a small flame propane torch to heat a small area of the housing, where the screw enters, see Fig. 6. Apply torque to the screw with a socket wrench gradually as heat is applied for 8 to 10 seconds. As soon as the screw breaks loose, remove heat from the housing and continue turning the screw until it is completely removed.



Clamp across ports not across housing. Excessive clamping pressure causes distortion.

Figure 5

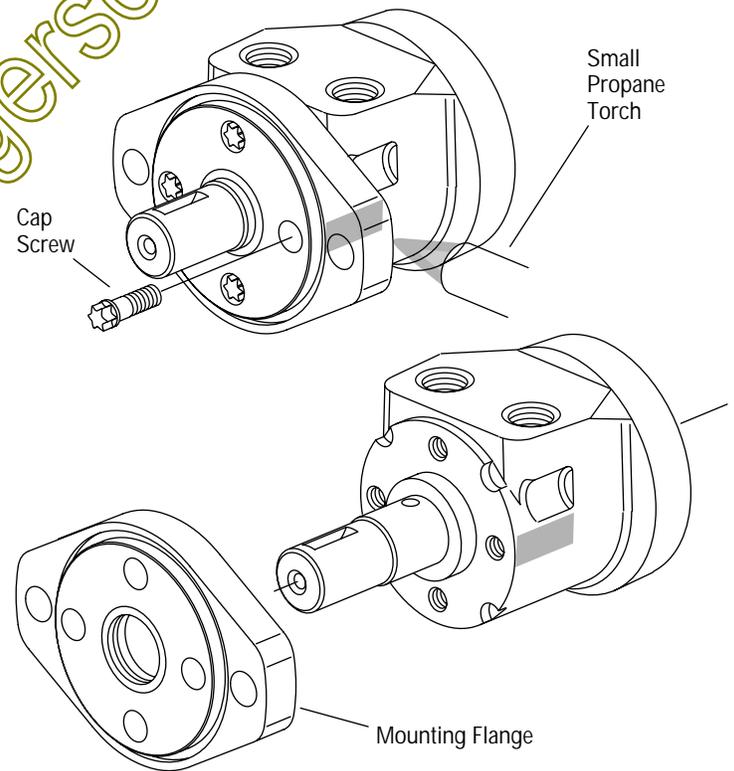


Figure 6

- 12 Reposition motor in vise. Clamp across ports as shown in Fig. 5, not on side of housing. Do not over tighten jaws. Excessive clamping force may distort housing.
- 13 Remove the 4 cap screws from the mounting flange. These motors are assembled using Loctite on the screws to hold them in place.

- 14 Remove motor from vise. Place on clean flat surface. Carefully lift flange from housing with a twisting motion.

S Series Disassembly

15 The dust seal, pressure seal and oil seal will come off with the flange. Use a seal remover tool, like the one shown in Fig. 7, to remove the dust seal and pressure seal, as shown in Fig. 8 and 9.

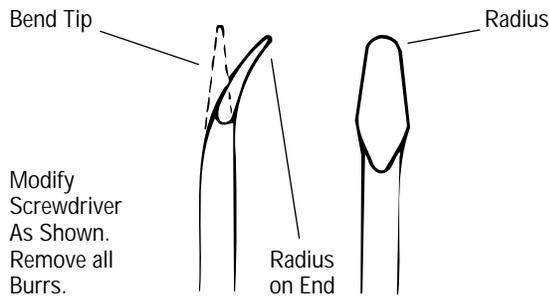


Figure 7

Work nose of tool between pressure seal and flange. Pry seal part way. Remove tool and repeat at a point 180° away. Push seal completely out of cavity, see Fig. 8.

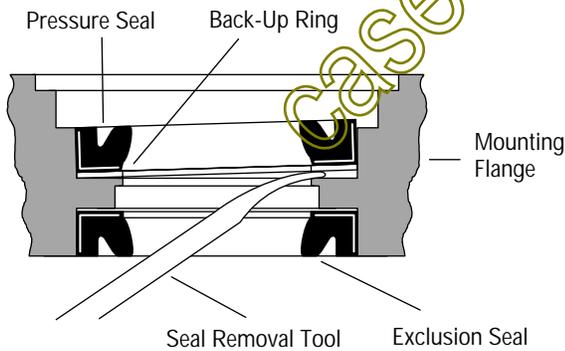


Figure 8

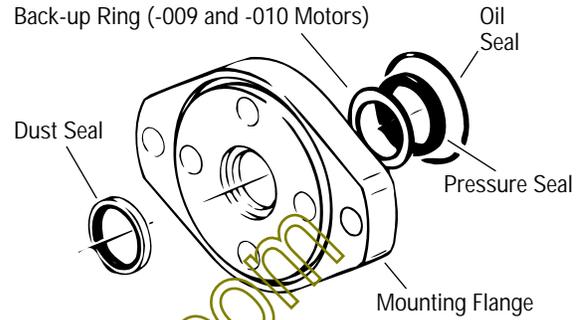


Figure 9

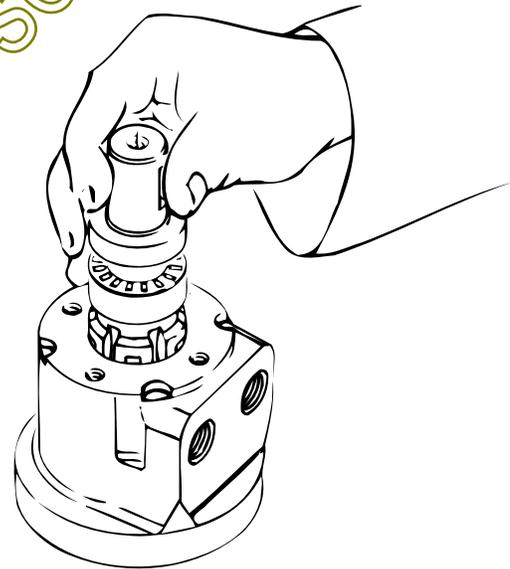


Figure 10

16 Remove output shaft from housing.

17 Remove bearing race and needle thrust bearing from shaft.

18 Some older housings have plugs. To remove the plug, use a 5mm [3/16 inch] hex key, inserted through port opening, to push them out.

S Series Reassembly

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage or damage. Clean all metal parts in clean solvent. Blow dry with air. Do not wipe parts with cloth or paper towel, lint or other matter can get into the hydraulic system and cause damage. Check around the key slot and chamfered area of the shaft for burrs, nicks or sharp edges that can damage the seals when reassembling. Remove nicks or burrs with a hard smooth stone (such as an Arkansas stone). Do not try to file or grind motor parts.

Note: Lubricate all seals with petroleum jelly such as Vaseline. Use new seals when reassembling the motor. Refer to parts list (No. 6-125) for proper seal kit number.

Important: Do not stretch seals before installing. Cleanliness is extremely important in the successful application of Loctite. Use the following procedures to properly clean all parts.

A. Wash the housing with non-petroleum base solvent to remove oil, grease and debris. Petroleum base solvents may leave residue detrimental to successful Loctiting. Pay particular attention to 4 tapped holes on the flange end.

Note: Fully cured Loctite resists most solvents, oils, gasoline, kerosene, and is not affected by cleaning operations.

B. Blow dry with compressed air. Clean and dry the tapped holes.

Note: It is not necessary to remove the cured Loctite that is securely bonded in the tapped holes; however any loose particles of cured Loctite should be removed.

C. Wire brush the screw threads to remove cured Loctite and other debris. Discard any screws that have damaged threads or a corroded, damaged, or rounded head.

D. Wash the screws with non-petroleum base solvent. Blow dry with compressed air jet.



Figure 11

19 If you removed check valves, or plug(s), replace seal(s). Lubricate new seal(s). Install on check valves, or plug(s). Carefully push check valves, or plug(s), in housing until flush with housing face. Do not damage seal(s).

20 Lubricate output shaft with clean hydraulic oil, then install shaft in housing.

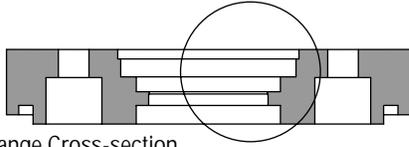
Important: Do not permit oil to get into the 4 tapped holes.

Note: To help with timing procedures, a timing dot is machined on output shaft, see figures 18 and 19.

21 Install needle thrust bearing then bearing race on shaft. Pull shaft partially out of housing, push all three parts in housing together. The bearing race must rotate freely when in position.

S Series Reassembly

Important: Prior to installing high pressure shaft seal it is necessary to break the sharp corner of the flange seal seat, see Fig. 12. Use 400 grit paper to break corner.



Mounting Flange Cross-section

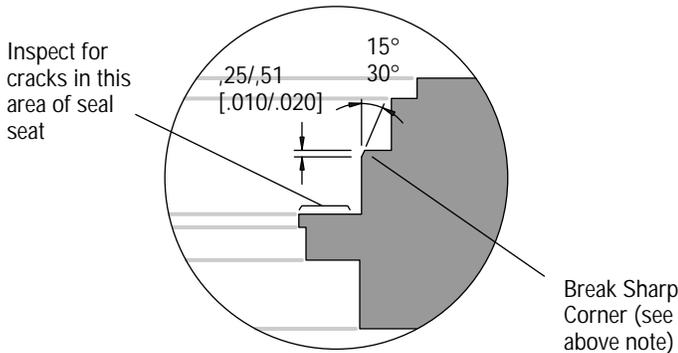


Figure 12

22 Clean mounting flange of all loose metallic chips, particles, dirt or other contamination, including oil. During cleaning, visually check seal seat in mounting flange for scratches or other marks that might damage the pressure seal. Check for cracks in flange that might cause leakage, see Fig. 12.

Important: If a pressure seal installation tool is not available, temporarily install flange without seals. Then install 2 cap screws to secure flange to housing. Install seals in flange, and apply loctite, after you reassemble Gerotor end of motor (see step 41 thru 45 page 11).

Note: If you have a pressure seal installation tool, continue reassembly, starting with step 23.

Seal Installation Tool

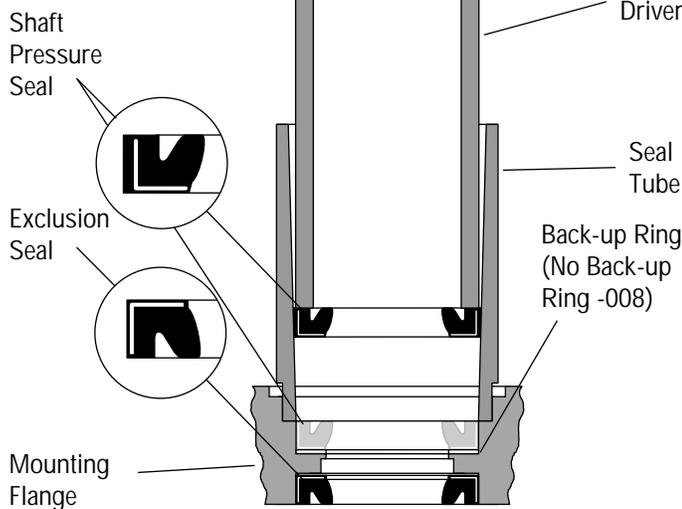


Figure 13

23 Lubricate I.D. of seal tube and O.D. of shaft pressure seal with a light film of clean petroleum jelly. Align small I.D. end of seal tube with seal seat in mounting flange. Install back-up ring and pressure seal in tube—lips of seal face up—see above. Then insert seal driver in tube to firmly push (by hand with rotating action) seal in seal seat.

Important: After installing seal in flange, examine seal condition. If cut, damaged, or improperly installed, you must replace it before continuing reassembly.

24 Install dust seal in flange, see Fig. 15. Press the dust seal into place carefully. To eliminate damage to rubber portion or distortion of metal container use a tool (flat-round face 35-41mm [1.37 to 1.62 inch] diameter) which provides proper guiding and positioning.

25 Install 1.94 inch [50mm] I.D. seal in flange.

Place tip of applicator at top of threaded portion.

Apply 3 or 4 drops in each hole.

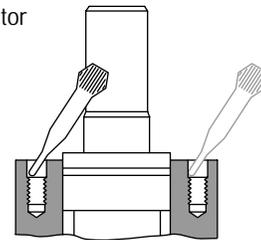


Figure 14

Caution: Do not use excessive amount of Loctite.

26 Apply 3 or 4 drops of Loctite adhesive (Loctite no. 601 sealant) at top of threads in each of 4 holes in housing, see Fig. 14. Do not allow parts with Loctite applied to surface to contact any metal parts other than their proper assembly. Wipe off excess Loctite from housing face, using a non-petroleum base solvent. Do not apply Loctite to threads more than 15 minutes before installing screws. If housing stands for more than 15 minutes, repeat application. No additional cleaning or removal of previous Loctite is necessary.

S Series Reassembly

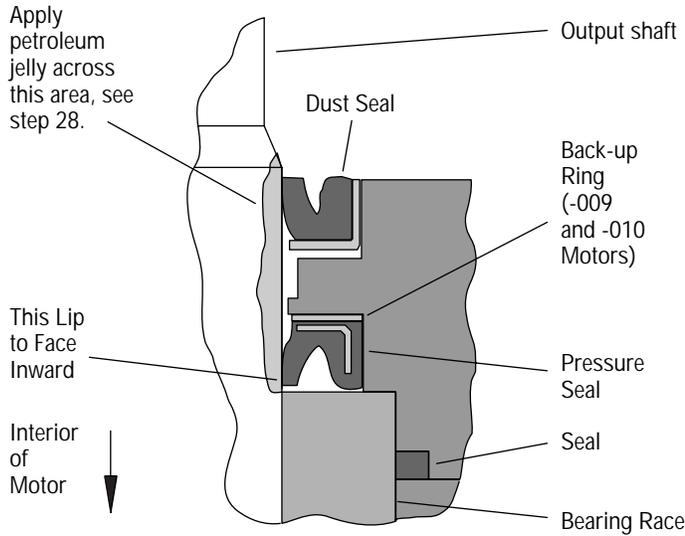


Figure 15

30 Pour approximately 35 cc of clean hydraulic oil in output shaft cavity.

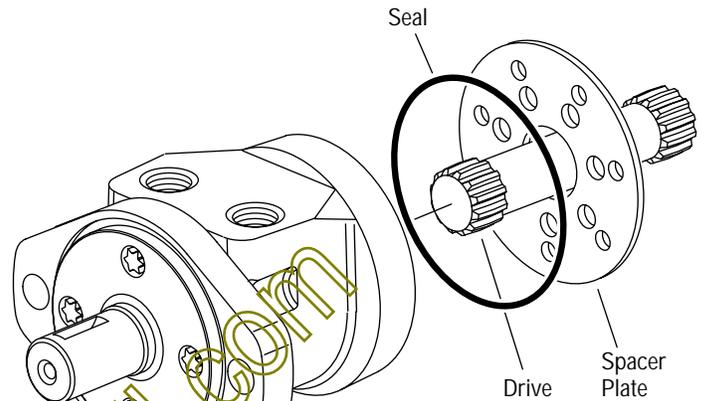


Figure 16

27 Before installing the flange and seal assembly over the shaft, place a protective sleeve or bullet over the shaft. Lubricate space between dust seal and pressure seal, as well as lips of both seals, see Fig. 15. Install flange. Rotate flange slowly while pushing down over shaft. Be careful not to invert or damage the seals.

28 Clamp motor in vise as shown in Fig. 5, install dry screws and alternately torque immediately to 28Nm [250 lb-in]. If you use primer, allow to cure for 10-15 minutes, without primer, allow 6 hours before subjecting motor to high torque reversals. On all other applications you can run the motor immediately. If you use new bolts, make sure they are the correct length, 22mm [.875 inch] under head length, see parts list for correct part number. Longer screws will not permit proper seal between the flange and housing. Install key in key slot of shaft.

Geroler End

29 Clamp housing in a vise, Gerotor end up. See Step 1 for correct clamping procedure.

Important: To aid installation of seals, apply light coating of clean petroleum jelly, such as Vaseline, to seals before installing.

Important: Do not stretch seals before installing.

31 Install 90mm [3.59 in.] I.D. seal in housing seal groove. Avoid twisting seal.

32 Install drive, observe proper timing procedure (Fig. 18).

33 Place spacer plate carefully on the housing, align bolt holes.

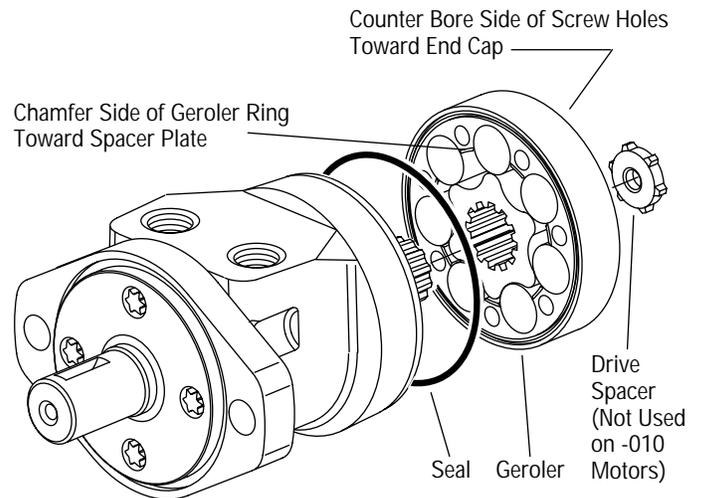


Figure 17

34 Install 90mm [3.59 in.] I.D. seal in Gerotor seal groove, see Fig. 17. Avoid twisting seal.

35 Carefully place Gerotor on the spacer plate, see Fig. 17. Observe proper timing procedure, see Fig. 18.

S Series Reassembly

Timing Procedure

- A. Align shaft timing dot with any bolt hole.
- B. Install drive. For the 59 and 74 cm³/r [3.6 and 4.5 in³/r] displacements on the -010 motors, install the wide end of the drive in the output shaft. Install either end of the drive in the output shaft for the -010 motor displacements ranging from 97 to 370 cm³/r [5.9 to 22.6 in³/r].
- C. Install spacer plate. Remember which bolt hole was aligned with the shaft timing dot.
- D. Place gerotor on wear plate, positioning any star point over the bolt hole aligned with the timing dot.
- E. Rotate gerotor to line up bolt holes. Be careful not to disengage star from drive or disturb gerotor seal.

Reverse rotation is obtained by positioning any star valley, rather than any star point, over the aligned bolt hole.

Standard Rotation

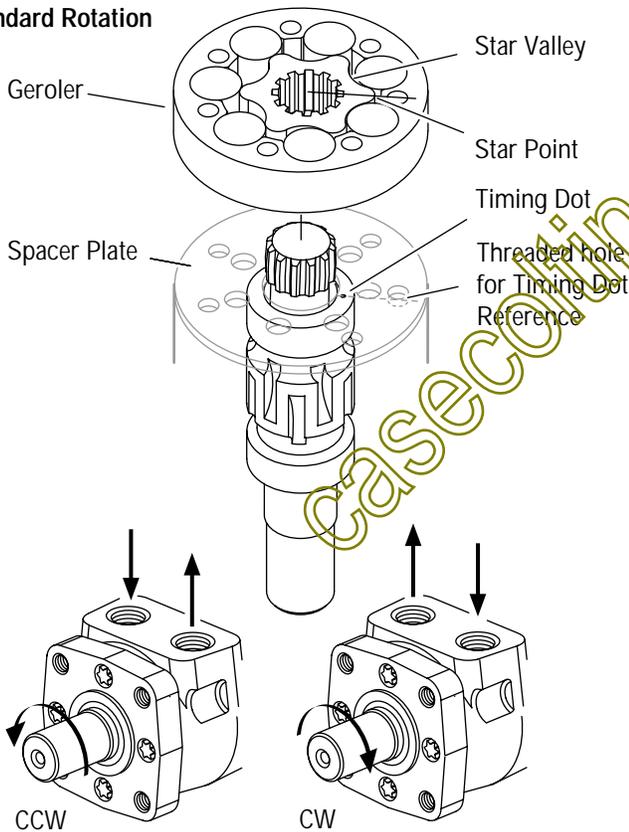


Figure 18

Reverse Rotation

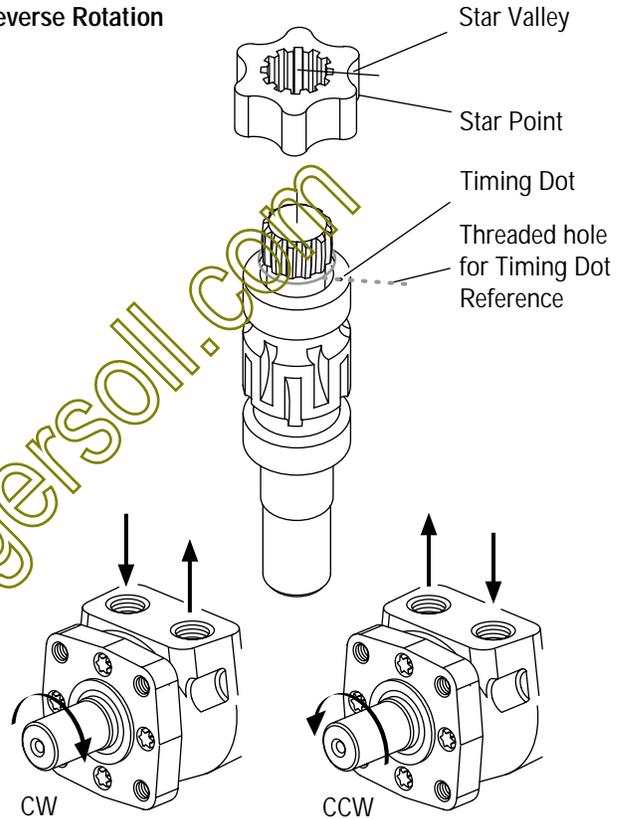


Figure 19

36 Install drive spacer (not used on 97 and 159 cm³/r [5.9 and 9.7 in³/r] displacements on the -008 and -009 motors and not used at all on -010 motors). See figure 17.

37 Install 90mm [3.59 inch] I.D. seal in Geroler seal groove. Avoid twisting seal.

38 Install end cap, see Figures 20 and 21.

S Series Reassembly

39 Install cap screws (and seal washers when required, see information below) in end cap.

On 97 cm³/r [5.9 in³/r] displacement motors or less, use seal washers. Pre-tighten all screws to 2-5 Nm [15-40 lb-in]. Make sure Geroler section seals are properly seated before torquing screws. Then torque screws to 23 Nm [200 lb-in] in sequence, as shown in Fig. 21.

On 120 cm³/r [7.3 in³/r] displacement motors or larger, omit seal washers. Pretighten all screws to 2-5 Nm [15-40 lb-in]. Make sure Geroler section seals are properly seated before torquing screws. Then torque screws to 34Nm [300 lb-in] in sequence, as shown in Fig. 21.

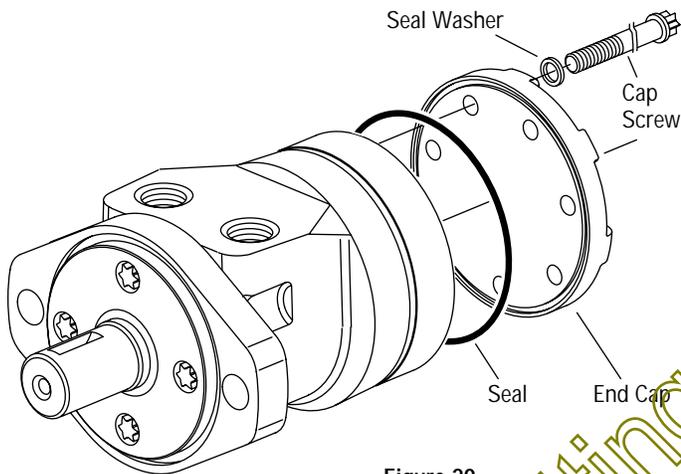
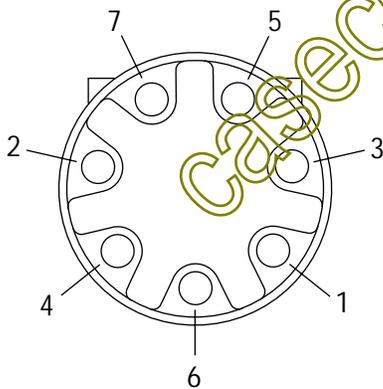


Figure 20



Bolt Torquing Sequence

Figure 21

Note: Steps 41 through 45 cover mounting flange seal installation without using a seal installation tool.

40 Clamp motor in vise with output shaft up, see Fig. 23. Remove cap screws and flange.

41 Prepare seal seat of flange, see step 22.

42 Lubricate dust seal O.D. Install dust seal in flange. Make sure dust seal is flush with flange, see step 24.

43 Install pressure seal flush against bearing race, see Fig. 22. Lightly lubricate pressure seal O.D.

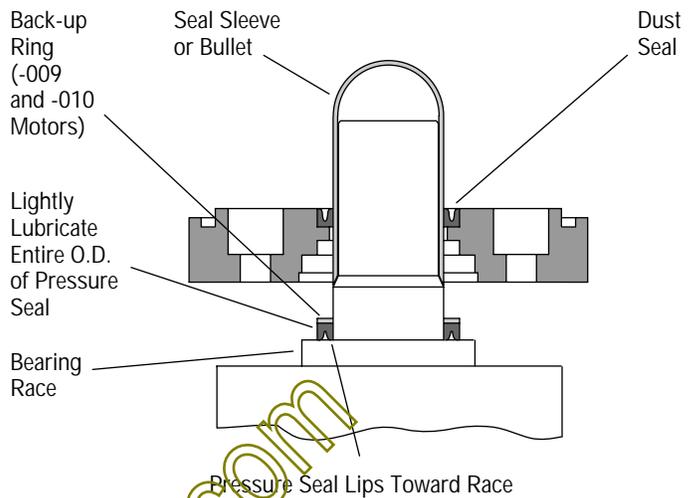


Figure 22

44 Place a seal sleeve or bullet over shaft. Twist flange down shaft until flush against pressure seal. The pressure seal must enter into seal evenly and gradually. Install 4 cap screws. Gradually and evenly finger tighten cap screws (crisscross pattern). Then use a hand socket wrench to lightly snug tighten screws until flange is flush against housing. **Do not tighten screws more than one full rotation at a time (crisscross pattern).**

45 Use a hand torque wrench to gradually and evenly tighten cap screws (crisscross pattern) until they reach 28Nm [250 lb-in]. See important information below.

Important: Do not use air socket wrench on cap screws for this type of seal installation.

Important: Proper pressure seal installation is important. You must remove cap screws and flange to examine seal condition. If you have cut or damaged the pressure seal, you must replace it with a new one. If seal is in good condition continue flange reassembly—starting with procedure step 24, page 8.

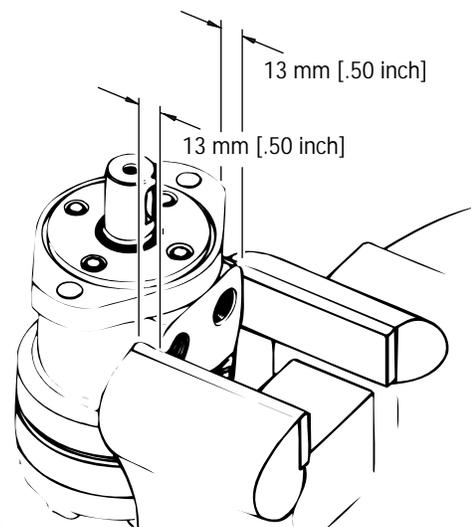


Figure 23

General Purpose Motors

S Series

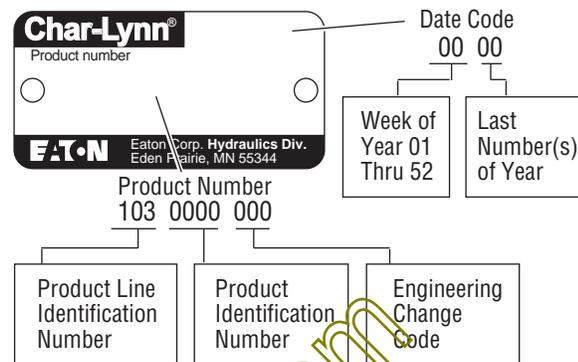
For Additional Literature Contact Eaton Corp. Hydraulics Division 15151 Highway 5 Eden Prairie, MN 55344.

- Specifications and performance Data, Catalog No. 11-885
- Replacement Part Numbers and Kit Information: S Series Motors — Parts Information No. 6-125.

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



103-1000-XXX Numbers 1001 through 1999 Standard Models

103-2000-XXX Numbers 2001 through 2999 Motors with Case Drain Port

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