

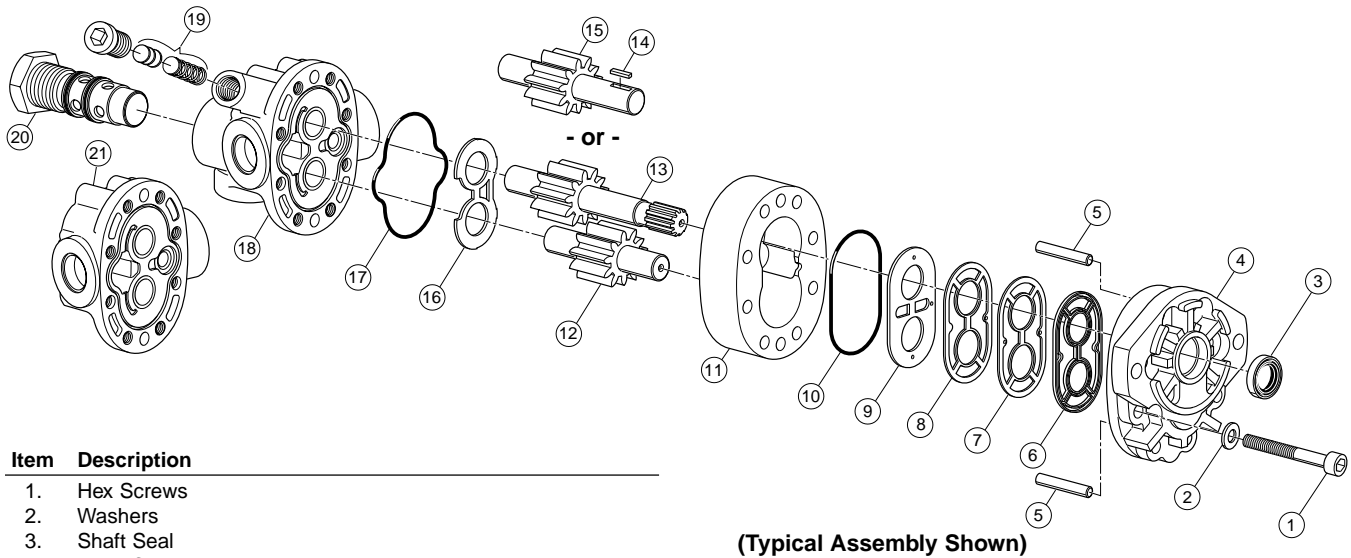


Bulletin 2630-C1

Series D/H/M Fixed Displacement Gear Pumps Service Manual

Effective: January, 2000
Supersedes: December, 1988





Item	Description
1.	Hex Screws
2.	Washers
3.	Shaft Seal
4.	Front Cover
5.	Dowel Pin
6.	V-Seal
7.	Gasket
8.	Heat Shield
9.	Wear Plate
10.	O-Ring
11.	Center Section
12.	Driven Gear Assembly
13.	Drive Gear Assembly (Splined)
14.	Key
15.	Drive Gear Assembly (Keyed)
16.	Thrust Plate ("H" & "M" Only)
17.	Molded O-Ring
18.	Back Cover ("H" Flow Divider Pump Only)
19.	Relief Valve ("H" Flow Divider Pump Only)
20.	Flow Control ("H" Flow Divider Pump Only)
21.	Back Cover

Repair Kits

Series	Part Number	Consisting of Items
"D"	686632K 745083K (Viton Seals)	3, 6, 7, 8, 9, 10, 17
"H"	706024K 745100K (Viton Seals)	3, 6, 7, 8, 9, 10, 16, 17
"H" Flow Divider	696173K	3, 6, 7, 8, 9, 10, 16, 17 Seals only. For 19 & 20
"H" Power Steering	805333K	3, 6, 7, 8, 9, 10, 16, 17 Seals only. For 19 & 20
"M"	715567K 745088K (Viton Seals)	3, 6, 7, 8, 9, 10, 16, 17

Trouble Shooting Guide

Before the pump is removed or disassembled, check the following list of common troubles and remedies. It could save time effort, and money.

Trouble	Probable Cause	Remedy
1. Noisy Pump	a. Low oil supply b. Oil too heavy (i.e. viscous) c. Air leak in inlet line d. Partly blocked inlet line	a. Fill reservoir b. Change to proper viscosity c. Check plumbing d. Check for foreign object and/or clean
2. Foaming Oil	a. Pump cavitating b. Water in the oil	a. See 1a, 1b, 1c, 1d b. Check reservoir and/or heat exchange
3. Pump or oil overheating	a. Oil supply too thin b. Oil supply contaminated c. Pump cavitating d. Pump drive shaft excessively misaligned with pump driven shaft e. Pump drive shaft axially loaded by driving shaft (Prime Mover) f. System relief valve bypassing	a. Drain and fill with proper viscosity oil b. Drain, clean filter, & fill with clean oil c. See 1a, 1b, 1c, 1d d. Check alignment e. Check for clearance at ends of shafts, for shaft misalignment or worn driving keys, keyways or splines. If pulley drive check for belt alignment. f. Check relief valve setting (see 4c)
4. Low Flow	a. Pump cavitating b. Foaming oil c. Relief valve leaks or set too low d. Speed too low e. Oil too hot	a. See 1a, 1b, 1c, 1d b. See 2a, 2b c. Check relief valve for foreign particles d. Check prime mover speed e. Check temperature (see 3a, 3b, 3c, 3d, & 3e)
5. Failure to build pressure	a. Defective relief valve b. Low oil supply	a. Check and reset or replace b. Fill reservoir

Disassembly Instructions

1. Clean unit thoroughly with solvent, kerosene, or other non-corrosive cleaning fluid, which will not affect rubber components.
2. Scribe a line across the three sections of the pump to act as a guide in reassembly.
3. Remove the six screws (1). Remove the key (14) from the drive shaft. (Four screws in "D" series.)
4. Remove the front cover (4) by lightly tapping the flange with a soft metal hammer.
5. The center section (11) will remain attached to either the front cover (4) or back cover (21). Place the drive gear (13 or 15) into the unseparated sections, and while holding the center section (11), tap lightly to separate. Be careful to avoid cocking on the dowel pins (5).
6. Remove wear plate (9) and thrust plate (16).
7. Mark the front cover island next to the pressure vent hole in the heat shield (8), gasket (7), and V-seal (6) to act as a guide in reassembly. The location of this vent hole determines pump rotation.
8. Use a small diameter wire (a paper clip will do) to remove the phenolic heat shield (8), the paper compound gasket (7) and the rubber V-seal (6). Discard these parts and replace when pump is reassembled.
9. Remove both o-rings (10 and 17) and discard. They also should be replaced.
10. Do not remove shaft seal (3) in the front cover (4) unless it is damaged or leaking. If seal is to be replaced, use great care not to damage the seal recess or bearing. Heating the cover in an oven to 250°F will reduce the press fit.
11. If flow control is defective replace as a cartridge.
12. If relief valve is defective replace as complete relief valve unit.

Inspection

Drive (13 or 15) and Driven (12) Gear Assemblies

Inspect shafts for roughness in the bearing and sealing areas. Measure for wear. Minimum acceptable .4998" in "D"; .7492" in "H"; and .9365" in "M". 5J surface finish maximum.

Inspect keyway, keys or splines for damage or excessive wear.

Inspect the gear end faces, outside diameter and teeth for roughness and score marks. The O.D. of the "D" gears must be 1.2395" minimum. "H" gears must be 1.7140" minimum and the "M" gears 2.1047" minimum. For minimum gear widths see Table (A).

Be sure snap rings are secure; break any sharp edges on the sides of the gears.

Gears and shafts are available only as assemblies. One gear assembly may be replaced separately if the other is in good condition.

Table A:

"D" SERIES		"H" SERIES		"M" SERIES	
Size	Minimum Gear Width	Size	Minimum Gear Width	Size	Minimum Gear Width
D05	.1875"				
D07	.2770"	H25	.4531"		
D09	.3463"	H31	.5663"	M09	1.0756"
D11	.4309"	H39	.7079"	M11	1.3446"
D14	.5412"	H49	.8849"	M14	1.6807"
D17	.6655"	H62	1.1072"		
D22	.8597"	H77	1.3840"		
D27	1.0562"	H90	1.6740"		

Front Cover (4) and Back Cover (21) Assemblies

If any bearing bore diameter exceeds .5015" in the "D" Series; .7518" in the "H" Series; or .9394" in the "M" Series, the cover should be discarded. Bearings are not supplied separately.

Replace the shaft seal (3) only if it shows excessive wear or cracking. Check all internal threads for damage.

Bearings must be below the cover faces and show no signs of contact with snap rings on gear shafts.

If bearings are scored, rough, or show signs of heat discoloration, the cover assemblies should be replaced.

Center Section (11)

Inspect the wall of gear bore diameters for excessive wear or score marks. The center section gear bores will show signs of wear on the inlet side of the pump. A wear ridge will develop at the end of the gear bore where the thrust plate is located. This wear ridge should not exceed 1/32".

Lightly tap the faces to remove any nicks or burrs. Do not break inside edges.

Wear Plate (9) and Thrust Plate (16)

Inspect bronze wear surfaces for excessive roughness or heat discoloration. If wear ridges exceed .0005", discard and replace.

General

The following parts should be replaced at every major overhaul; Wear Plate (9), Thrust Plate (16), Fiber Heat Shield (8). Paper Gasket (7), V-Seal (6), and O-rings (10 and 17). The shaft seal (3) should be replaced only when necessary.

Reassembly Procedure

1. All parts must be thoroughly cleaned prior to reassembly by dipping in solvent and brushing to remove all traces of contamination. Pump should be assembled in a dirt free area.
2. Install shaft seal (3), if it was removed, in front cover with the spring loaded lip facing inward. Force seal into place, using a flat steel rod slightly smaller in diameter than the O.D. of the seal. This will permit the tool to enter the seal recess and bottom the rotary seal on the stop. (The front cover (4) must be backed up on a smooth, clean surface to prevent damaging its face.)
The load to force seal into place should be applied exactly in line with the housing seal bore to prevent bending the seal steel retainer, and/or scoring the seal housing bore.
3. Install the V-seal (6), the gasket (7), and heat shield (8) into the front cover cavity as follows:
 - The small vent hole through all of these parts shall be in line and positioned next to the scribe mark on the island previously made during disassembly. This position locates the vent holes on the outlet side of the pump.
 - The lips on the V-seal shall face toward the cavity and be tucked into the groove with the aid of a dull tool to prevent damage to the rubber surface. A small screw driver can be used.
 - The gasket shall be pressed firmly toward the bottom of the cavity with the thumbs so as to insure all of its perimeters are completely within the groove to avoid interference with subsequent assembly. The heat shield shall be firmly pressed toward the bottom of the cavity with the thumbs to provide sufficient space for the wear plate.
4. Install o-ring (10) into the groove provided in front cover face. Oil the o-ring and stretch it slightly, if necessary, so that it will remain in its groove.
5. Install the wear plate (9) with the bronze surface against the gears and the small vent hole in line with the hole in the heat shield. Press the wear plate. The wear plate shall be sufficiently within the oval cavity so that it is axially retained.
6. Install drive gear (13 or 15) and driven gear (12) assemblies into the front cover. Apply oil to the shaft at the drive end to prevent damage to the shaft seal caused by sharp edges on the drive shaft passing through the shaft seal. An oil coated shaft, rotated slowly, will usually cause no damage to the seal. Check to see that the shaft seal lip and spring is not pushed out by the shaft.
7. Check wear plate to insure it is still seated into its oval cavity and install the center section (11) over the gears until it engages the wear plate. Center section must be positioned so that the previously scribed lines on the housing exteriors are in line with those scribed on the front cover. The small slot located midway between the bores should align with the small vent hole in wear plate. The face containing the slot shall be in contact with the wear plate.
Then, install dowel pins (5) and add a generous amount of clean oil into the gear cavities. Rotate gears to distribute the oil.
8. Position the thrust plate (16) on top of the gears in the center section, with the bronze face toward the gears. The open side should be toward the inlet.
9. Install o-ring (17) into its back cover face groove. Oil the o-ring, the cover face, and the bearings. Install the back cover so that the scribe marks are in line with the marks on the center section and front cover.
10. The housing retaining screws shall be alternately tightened to 190-210 in. lbs. on the "D" Series; 190-210 in. lbs. on the "H" Series; and 355-375 in. lbs. on the "M" Series.
Add a generous amount of clean oil into both ports to insure the pump is adequately lubricated. Rotate the drive shaft to distribute the oil and check for freedom of shaft rotation. Shaft shall be free to rotate with the help of a short wrench. (100 in. lbs. maximum)

Testing Procedure

After pump has been re-installed run for 2-3 minutes before pressurizing. Try to apply pressure gradually for an additional five minutes, but do not pressurize for longer than 5 seconds at a time.

 **WARNING**

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