



Instruction Manual & Parts List

For H/G323FXFSX-500_ & 800_ Pumps

With Flowserve Type BX Cartridge Seal



WARNING

This Special Instruction Manual and General Instructions Manual, CA-1, should be read thoroughly prior to pump installation, operation or maintenance.


Special Manual No. SRM00088


Rev. 0

July 2008



READ THIS ENTIRE PAGE BEFORE PROCEEDING

FOR SAFETY OF PERSONNEL AND TO PREVENT DAMAGE TO EQUIPMENT, THE FOLLOWING NOMENCLATURE HAS BEEN USED IN THIS MANUAL:

	DANGER	
Failure to observe the precautions noted in this box can result in severe bodily injury or loss of life.		

	WARNING	
Failure to observe the precautions noted in this box can cause injury to personnel by accidental contact with the equipment or liquids. Protection should be provided by the user to prevent accidental contact.		

CAUTION		ATTENTION
Failure to observe the precautions noted in this box can cause damage or failure of the equipment.		

Non compliance of safety instructions identified by the following symbol could affect safety for persons: <div style="text-align: center;"></div>	Safety instructions where electrical safety is involved are identified by: <div style="text-align: center;"></div>	Safety instructions which shall be considered for reasons of safe operation of the pump and/or protection of the pump itself are marked by the sign: <div style="text-align: center;">ATTENTION</div>
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ATTENTION
If operation of this pump is critical to your business, we strongly recommend you keep a spare pump or major repair kit in stock at all times. As a minimum, a minor repair kit (o-rings, gaskets, shaft seal and bearings) should be kept in stock so pump refurbishment after internal inspection can be accomplished.

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GENERAL INSTRUCTIONS

The instructions found herein cover the disassembly, assembly and parts identification of Series H323FXFSX pumps.

NOTE: Individual contracts may have specific provision that vary from this manual. Should any questions arise which may not be answered by these instructions, refer to the General Instructions Manual, CA-1, provided with your order. For further detailed information and technical assistance please refer to Imo Pump, Technical Service Department at (704) 289-6511.

This manual cannot possibly cover every situation connected with the installation, operation, inspection and maintenance of the equipment supplied. Every effort was made to prepare the text of the manual so that engineering and design data is transformed into the most easily understood wording. Imo Pump must assume the personnel assigned to operate and maintain the supplied equipment and apply this instruction manual have sufficient technical knowledge and are experienced to apply sound safety and operational practices which may not be otherwise covered by this manual.

INTRODUCTION

This instruction manual covers Imo Pump H323FXFSX series pumps with fabricated cases. Because of the large number of operating conditions, it is necessary to have a variety of construction arrangements and material combinations to meet application requirements. Each pump is identified with a serial number and model designator number on the pump nameplate. Definitions of model designators are given in Figure 1.

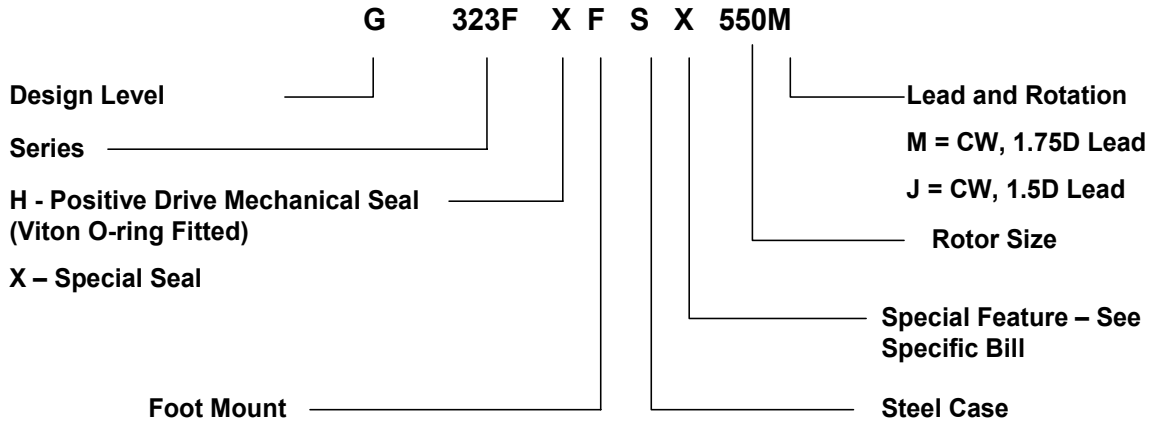


Figure 1 – Definition of Model Designators

ORDERING INSTRUCTIONS

All correspondence pertaining to renewal parts for the equipment must refer to the instruction manual number and should be addressed to the nearest Imo representative. The handling of renewal orders will be greatly facilitated if the following directions are carefully observed:

1. Give the number of the instruction manual.
2. Give the model number of the pump for which the part is desired. This number appears on the nameplate.
3. Give the model number of the pump for which the part is desired. This number appears on the nameplate.
4. Designate the desired part by the IDP number and name as listed in Table 1 in this instruction manual.
5. Give the drawing number or figure number in which the part is shown.

For Example:

Instruction Manual No. and Revision..... 323/1/SPL-00161, Rev. 0
 Model Number..... H323FXFSX-800J
 Part IDP Number and Name (See Item 4 above)..... 11, Housing

DESCRIPTION OF EQUIPMENT

The H323F series pumps are positive displacement, rotary screw type pumps. Fluid enters the inlet chamber and is divided equally as it enters the rotor sets. The smooth intermeshing of these rotor traps and propels the fluid axially in a smooth flow, without churning, pocketing or pulsating as it arrives at the central discharge chamber. The two direction fluid flow keeps the rotors hydraulically balanced. Fluid flowing through the pump provides lubrication to wearing parts.

External tubing is provided to bleed oil from both ends of the pump (high pressure fluid) to the pump suction. Shaft bushings are lubricated by a fluid flow between power rotor and bushing that is released back to the suction through the external tubing. On packing type pumps a relief valve is installed in the tubing connected to the packing end of the pump. The relief valve maintains a minimum positive pressure to the packing for lubrication. In all cases, fluid flow through the tubing ensures lubrication and cooling of bushings and packing or mechanical seal.

The normal rotation of the pump rotor is clockwise when the pump is viewed from the shaft end.

Note: The term outboard describes the closed end of the pump; the term inboard describes the exposed shaft end.

OPERATION

CAUTION

Operating conditions, such as speed, fluid viscosity, temperature inlet pressure, discharge pressure, filtration, duty cycle, drive type, mounting, etc. are interrelated. Due to these variable conditions, the specific application limits may be different from that of the operational limitations. This equipment must not be operated without verification that operating requirements are within its capabilities.

OPERATING TEMPERATURE AND THERMAL SHOCK EXPOSURE

Never operate with water. The pump is designed for liquids having the general characteristics of oil. Under NO circumstances are the following operating limitations to be exceeded:

Maximum Inlet Pressure25 Psig
Maximum Discharge Pressure 500 PSIG
Maximum Speed 1200 RPM
Maximum Operating Temperature250 °F

CAUTION

Never exceed the equipment's minimum or maximum allowable fluid temperature. Do not expose equipment to thermal shock. Differences in metallurgy and their respective coefficients of expansion could cause distortion of pump parts resulting in a breakdown condition.

ASSEMBLY AND DISASSEMBLY INSTRUCTIONS

Note: Part numbers contained within parentheses such as (36) refer to the balloon number as shown on the assembly drawing and the IDP numbers in Table 1.

WARNING

Before starting any maintenance procedure:

- Remove electrical service fuse, de-energize and lock the electrical service panel supply to the driver.
- Shut, wire or chain shut and lock all pump piping valves. If applicable, shut off any steam supply lines to the pump and/or driver.

Note: Depending on type of coupling installed (clearance between pump and driver shaft ends), maintenance to mechanical seal can be performed without removal of pump driver. If complete overhaul of pump is required, removing pump from its mounting and locating pump in a suitable work area is recommended.

If seal only is to be serviced, follow steps 1 through 3 in the disassembly procedure and steps 10 through 12 in the reassembly procedures.

If complete overhaul of pump is required, removal of pump from its mounting and locating the pump in a suitable work area is recommended. It is also recommended that all gaskets and the seal be replaced during overhaul; regardless of their condition.

Note: Use Assembly drawing, either Figure 3 of 4 depending on pump size.

PUMP DISASSEMBLY

- 1) Remove tubing (54) from inboard and outboard end of pump. Tag each tube to identify its installed location.
- 2) Loosen setscrew ((43) on 500J or (61) on 800J) and remove checknut (46), coupling hub and key (44).
- 3) Remove mechanical seal (64) using bullet numbers in mechanical seal figure #1 below.

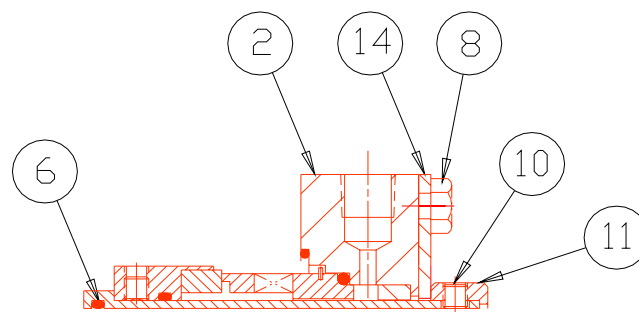


Figure 2 – Mechanical Cartridge Seal

- a. Disconnect any flush or quench lines.
 - b. Loosen bolts (8).
 - b. Position setting plates (14) (two each) into slot between drive collar (11) and seal flange (2).
 - c. Tighten bolts (8).
 - d. Remove any dirt or rust from pump shaft.
 - e. Loosen set screws (10).
 - f. Remove the four bolts ((9) on 800J or (75) with washers (80) on 550J) on pump assembly drawings (figures 2 and 3).
 - g. Remove seal cartridge assembly (64) from pump shaft (34).
- 4) If pump is an 800J, Remove nuts (26) and washers (79) from covers (2 & 3). Remove covers (2 & 3) and gaskets (5). If pump is a 550J, remove cover (63), cap screws (9), and washers (80) along with gaskets (5).
 - 5) Remove capscrews (8) from each cover (2). Remove covers (2) and o-rings (6).
 - 6) Remove capscrews (20), washers (21), shims (18) and cover (19) from outboard bracket (12).
 - 7) Remove both outboard bracket (12) & inboard bracket ((78) for 550J or (73) for 800J) from housings (11). This is done on 550J by removing cap screws (16) along with nuts (8) and lock washers (15) from each bracket. This is done on the 800J by removing cap screws (16) and washers (15).

- 8) If bushings (45) require replacement, remove spring pins (17) and slide bushings (45) from brackets (12, 73 or 78).
- 9) Remove idlers (40, 41) by grasping inboard and outboard ends of idlers (40, 41) and rotating each idler to remove all four idlers from housings (11). Slide power rotor (34) from housings (11).
10. Remove both housings (11) from pump case (1) by removing cap screws and washers ((13) and (14) respectively on 800J pump or (13) and (15) on 550J pump).
11. If collar (42) requires replacement, remove setscrew (43) from collar (42) and remove collar (42) from power rotor (34).

PUMP ASSEMBLY

Note: Clean and inspect all parts before assembly. Replace all worn or damaged parts. It is recommended that gaskets and mechanical seal be replaced regardless of their condition. Wipe each part with light lubricating oil just before installing. Rotate power rotor (34) frequently during assembly to ensure freedom of rotation.

1. Install inboard and outboard housings (11) in case (1) using capscrews and washers ((13) and (14) on 800J pump or (13) and (15) on 550J pump). Align housings (11) rotor bores such that the idler rotor bores are parallel to the pump case feet. Torque capscrews (13) to value on appropriate assembly drawing (figure 3 or 4).
2. If collar (42) was removed from power rotor (34), install collar (42) and lock in position using set screw (43). Ensure collar (42) is installed next to step-cut of power rotor (34). Peen set screw (43) to collar (42) threads using a center punch to prevent loosening.
3. If bushings (45) were removed, slide bushing (45) into each bracket (12 and 73 or 78). Using pinhole in brackets (12 & 73 or 78) as jugs, drill a 1/2 inch hole through bushing (45). Remove all drill burrs and install spring pin (17). DO NOT allow spring pin (17) to extend into bushing (45) bore.
4. Slide power rotor (34) into housing (11) rotor bore. Rotate power rotor while inserting inboard idlers (40) until idler ends are centered in housing (11). Idler position may be observed by looking into pump inlet port. Repeat procedure for both outboard idlers (41).
5. Install assembled brackets (12 and 73 or 78) on each end of housings (11). Before installing capscrews (16) in brackets (12 and 73 or 78), and with each bracket in place, check idlers (40, 41) to ensure bracket (12 and 73 or 78) idler stops are in line with ends of idlers. Turning power rotor (34) in its normal direction of rotation will pull idlers (40 & 41) toward center of pump. Attach each bracket (12 and 73 or 78) to housings (11) using bolts (16), washers (15) and nuts (8) on 500J pump or capscrews (16) and washers (15). Torque capscrews (16) to value on appropriate assembly drawing (figure 3 or 4).
6. Install shim (18) and cover (19) on outboard bracket (12) with six capscrews (20) and washers (21). Tighten capscrews (20) to torque value on appropriate assembly drawing (figure 3 or 4).
7. Push keyway end of power rotor (34) into pump as far as it will go. Mount a dial indicator on inboard bracket (73 or 78) with indicator point resting on end of power rotor (34). Set indicator pointer to "zero". Pull power rotor (34) out from the pump until collar (42) contacts face of inboard bushing (45). Check dial indicator to determine total end float travel. Correct end float is 0.055 to 0.060 inches. If end float requires shim adjustment, remove cover (19) and shim (18). Remove or add shim lamination to obtain correct end float. Brass shims have 0.003 inch lamination. Steel shims require full face grinding of metal to reduce shim thickness. Faces of steel shims after grinding are to be smooth and parallel within 0.002 inch full indicator runout (FIR). If shims are removed for adjustment, install shim (18), cover (19), capscrews (20) and washers (21). Torque capscrews (20) to torque value on appropriate assembly drawing (figure 2 or 3). Remove dial indicator from bracket (73). Rotate power rotor (34) to check for any binding.
8. Install O-rings (6) in inboard and outboard covers (2) and install covers (2) on pump case (1) using nuts (8). Torque nuts (8) to value on appropriate assembly drawing (figure 3 or 4)

9. Install gasket (5) and rear cover (3) on cover (2) at back end of pump using capscrews (9) and washers (80) if pump is a 550J or nuts (26) and washers (79) if pump is an 800J. Torque capscrews (9) or nuts (26) to value on appropriate assembly drawing (figure 2 or 4).
10. If pump is an 800J, install gasket (5) and cover (63) on cover (2) at front of pump using nuts (26) and washers (79). If pump is a 550J, install cover (63). It will be secured in the next step along with the seal assembly. If pump is an 800J, torque nuts (26) to value on appropriate assembly drawing (figure 3)
11. Reinstall mechanical seal using bullet numbers in mechanical seal figure 1 below:

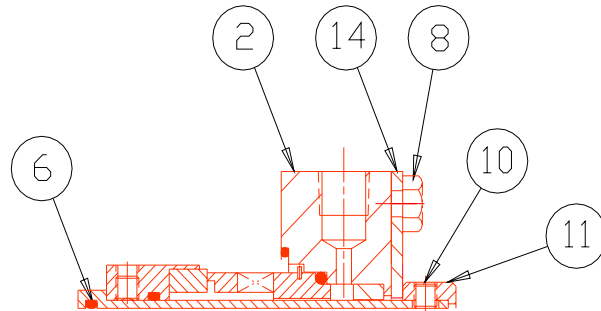


Figure 2 – Mechanical Cartridge Seal

WARNING

Seal is shipped with setting plates (14) engaged. **DO NOT** remove setting plates until seal installation is complete.

- a. Clean and polish pump shaft. Make sure there are no sharp edges or rough spots on shaft to damage seal O-ring (6) during installation.
 - b. Apply a coat of light lubricating oil to pump shaft to aid installation of seal assembly.
 - c. Slide seal assembly on to shaft, make sure O-ring (6) is in seal sleeve o-ring groove.
 - d. Secure seal flange (2) to pump seal housing with bolts ((9) if pump is a 800J or bolts (75) and washers (80) if pump is a 550J.) On this 550J bolts (75) also secure cover (63). Use caution not to damage gasket (5) during installation since it was not secured until this point. Torque bolts ((9) or (75)) to value on appropriate assembly drawings (fig 2 or 3).
 - e. Set up dial indicator to check total pump shaft end play. Position shaft at center of total of end play; approximately .015".
 - f. Secure set screws (10) to pump shaft.
 - g. Loosen bolts (8), two each, and remove setting plates (14) from slot between drive collar (11) and seal flange (2). Remove setting plates (14) Tighten bolts (8) to keep setting plates disengaged during pump operation.
 - h. Connect any required flush or quench lines.
12. Install tubing (54) on inboard seal housing ((64) for 550J pump and (63) for 800J pump)) and outboard cover (2).
 13. Install key (44), coupling hub and checknut (46). Lock checknut (46) in position by installing setscrew (43 or 61).
 14. Install pump and align pump driver to pump following procedures for alignment in CA-1 Manual.

H323FXFSX-550J and 800J Parts List

IDP	Qty	Description	Kit	IDP	Qty	Description	Kit
1	1	Case		41	2	Outboard Idlers	XX
2	2	Covers		42	1	Collar	
3	1	Rear Cover		43	f	Set Screw(s)	
5	2	Gaskets	X	44	1	Key	X
6	2	O-Rings	X	45	2	Bushings	X
8	A	Hex Nuts		46	1	Check Nut	
9	B	Hex Cap Screws		51	1	Tee	
11	2	Housings	XX	52	1	Close Nipple	
12	1	Bracket		53	2	Tubing Connectors	
13	C	Cap Screws		54	F	Tubing	
14	12	Lock Washers (800J Only)		55	2	Connectors	
15	16	Lock Washers		61	1	Set Screw (550J Only)	
16	D	Hex Bolts		62	G	Plugs	
17	2	Spring Pins	X	63	1	Seal Housing	
18	1	Shim	X	64	1	Seal	X
19	1	Cover	XX	72	1	Orifice (800J Only)	
20	E	Capscrews		73	1	Inboard Bracket (800J Only)	
21	E	Lock Washers		75	6	Capscrews (550J Only)	
26	16	Hex Nuts (800J Only)		78	1	Inboard Bracket (550J Only)	
33	2	Plugs (800J Only)		79	16	Spring Washers (800J Only)	
34	1	Power Rotor	XX	80	12	Washers (550J Only)	
40	2	Inboard Idlers	XX				

- A. (40) for 500J and (32) for 800J
- B. (6) for 550J and (4) for the 800J
- C. (8) For 550J, (12) for 800J
- D. (8) for 550J, (16) for 800J
- E. (4) for 550J, (6) for 800J
- F. (1) for 550J, (2) for 880J
- G. (5) for 550J, (4) for 800J

X = Minor Repair Kit Items

XX = Major Repair Kit Items (Items marked X are included in major repair kits.)

H323FXFSX-550J Assembly Drawing

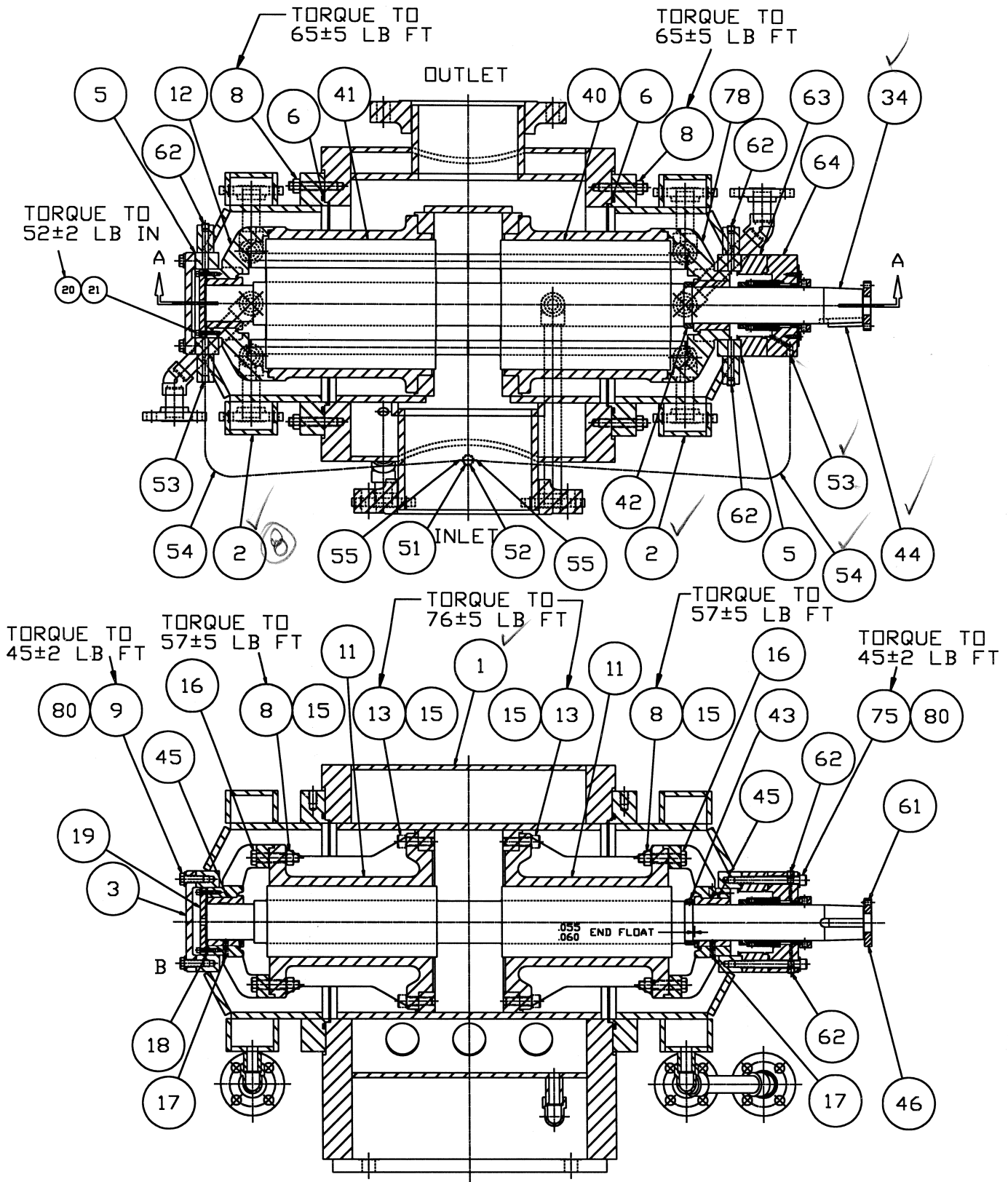


FIGURE 3

H323FXFSX-800J Assembly Drawing

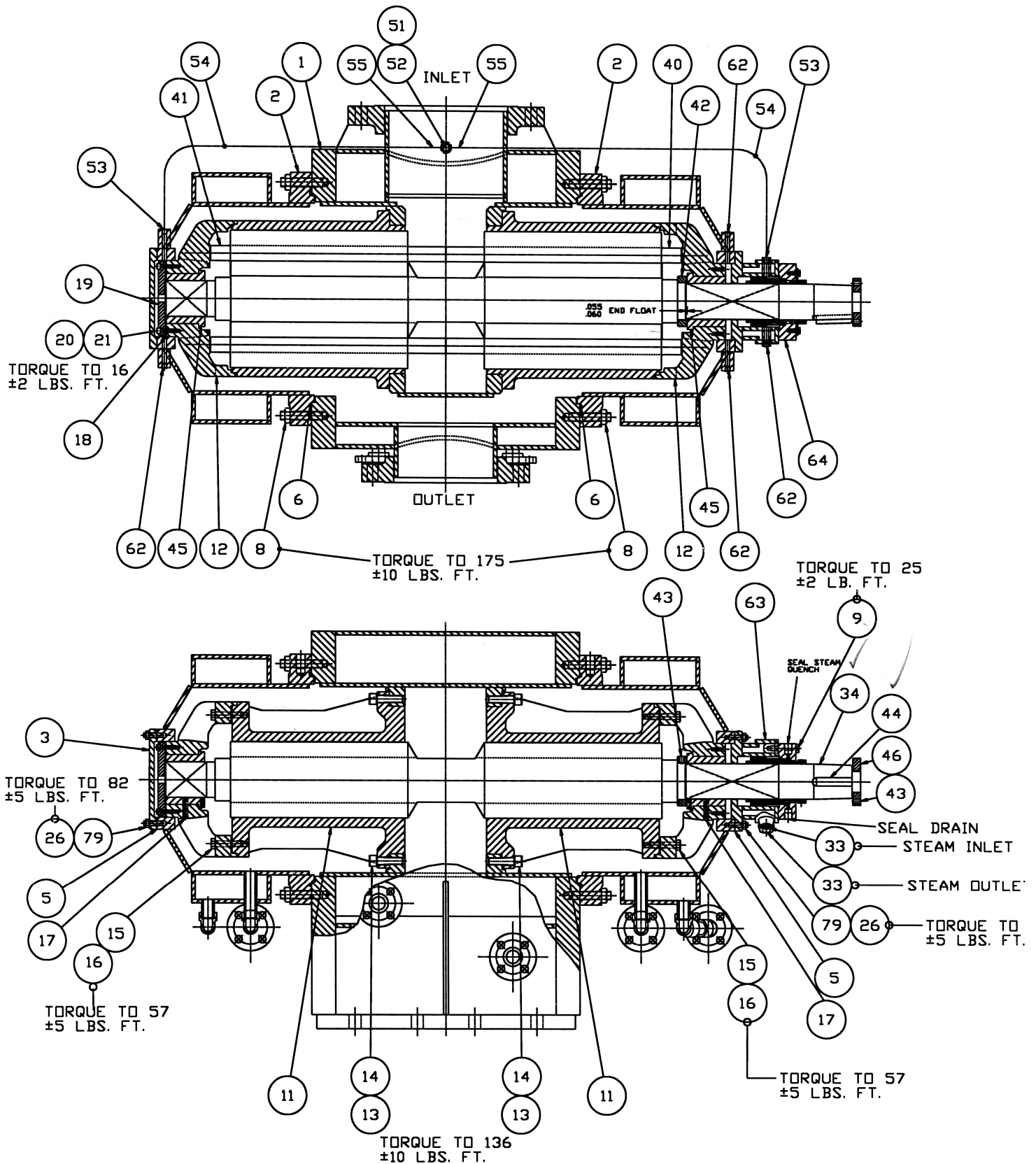


FIGURE 4

INSTALLATION, ALIGNMENT AND TROUBLESHOOTING

Install coupling to driver shaft and align pump and driver as detailed in the Installation Manual, CA-1.

After pump is connected to piping and inlet and outlet valves are open, be sure to vent air from seal chamber before starting pump by opening pipe plug at inboard end of pump until oil comes out. This will assure seals are lubricated at startup.

For detailed instructions regarding installation, alignment, operation and trouble shooting, see General Installation, Operation, Maintenance & Troubleshooting Manual, CA-1.

FIELD AND FACTORY SERVICE AND PARTS

Imo Pump maintains a staff of trained service personnel that can provide pump installation, pump start-up, maintenance/overhaul and troubleshooting supervision as well as installation and maintenance training.

Our factories provide maintenance as well as overhaul and test facilities in the event user prefers to return pumps for inspection or overhaul. Pumps that have been factory-overhauled are normally tested and warranted "as-new" for a period of one year from date of shipment.

For either field service or factory overhaul assistance, contact your local Imo Sales Office or representative at the Technical/Customer Service Department in Monroe, NC, USA.

Most pumps have minor repair kits available. Minor Repair Kits are used to repair leaking seals, bad bearings and/or for re-assembly after pump tear-down. They include (as applicable) pump shaft seals, packing, all gaskets/O-rings and bearings. Since kits have all the necessary parts, it is preferred that they be purchased rather than selecting individual parts. When parts are individually selected from Parts List, some needed components are often overlooked. In addition, mixing worn or used parts with new parts risks rapid wear and shortened service life from new parts



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