



**Instruction Manual and Parts List For  
G/H323F – 550/550J/550M Pumps with  
Crane Type 2, 8-1, FS QWD and FS Q  
Non-Cartridge Seals**



**WARNING**

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

**Manual No. - SRM00076**

**Rev. 02 (21-0001)**

**October, 2021**

## READ THIS ENTIRE PAGE BEFORE PROCEEDING

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

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

	<b>WARNING</b>	
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.		

<b>CAUTION</b>		<b>ATTENTION</b>
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:	Safety instructions where electrical safety is involved are identified by:	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:
		<b>ATTENTION</b>

<b>ATTENTION</b>
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

Instructions found herein cover disassembly, assembly and parts identification of Series H/G323F-550/550M/550J pumps with Crane Type 2, 8-1, FS QWD and FC Q Seals.

**NOTE:** Individual contracts may have specific provisions that vary from this manual. Should any questions arise which may not be answered by these instructions, refer to 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.

Manual cannot possibly cover every situation connected with installation, operation, inspection and maintenance of equipment supplied. Every effort was made to prepare text of manual so that engineering and design data is transformed into most easily understood wording. Imo Pump must assume personnel assigned to operate and maintain 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 H/G323F-550/550M/550J pumps with Crane Type 2, 8-1, FS QWD and FC Q Seals. Because of 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 pump nameplate. Definitions of model designators are given in Figure 1.

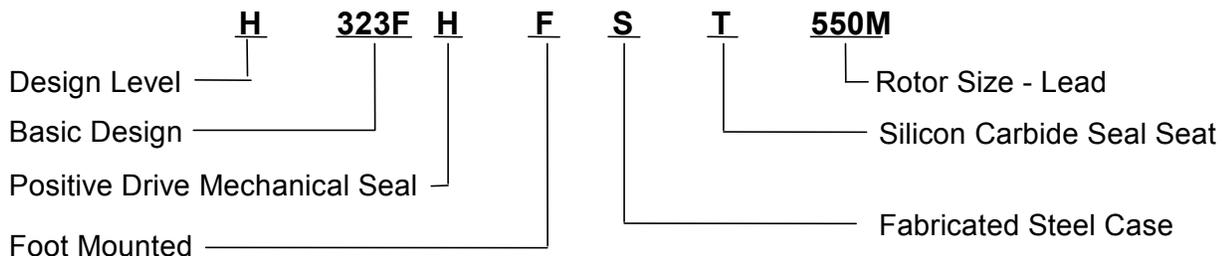


Figure 1 – Definition of Model Designators

## ORDERING INSTRUCTIONS

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

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

For Example:

Instruction Manual No. and Revision ..... SRM000XXX, Rev. 0

Model Number..... H323FHFST-550M

Part IDP Number and Name (See Item 4 above)..... 11, Housing

## DESCRIPTION OF EQUIPMENT

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

External tubing is provided to bleed oil from both ends of pump (high pressure fluid) to pump suction. Shaft bushings are lubricated by a fluid flow between p 1 ver rotor and bushing that is released back to suction through external tubing. In all cases, fluid flow through tubing ensures lubrication and cooling of bushings and mechanical seal.

Normal rotation of pump rotor is clockwise when pump is viewed from shaft end.

**Note:** Term outboard describes closed end of pump; term inboard describes 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 Pressure .....25 Psig  
Maximum Discharge Pressure..... 300 or 500 Psig Depending on Specific Model  
Maximum Speed ..... 1200 RPM  
Maximum Operating Temperature ..... 250°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.

**Table 1 – H/G323F- 550\_ Parts List**

IDP	Qty	Description	Kit	IDP	Qty	Description	Kit
1	1	Case		34	1	Power Rotor	XX
2	2	Covers		40	2	Inboard Idlers	XX
3	1	Rear Cover		41	2	Outboard Idlers	XX
5	2	Gaskets	X	42	1	Collar	
6	2	O-Rings	X	43	1	Set Screw(s)	
8	8	Hex Nuts		44	1	Key	X
9	12	Hex Cap Screws		45	2	Bushings	X
10	4	Pipe Plug		46	1	Check Nut	
11	2	Housings	XX	51	1	Tee	
12	2	Bracket		52	1	Close Nipple	
13	8	Cap Screws		53	2	Tubing Connectors	
15	16	Lock Washers		54	2	Tubing	
16	8	Hex Bolts		55	2	Connectors	
17	2	Spring Pins		61	1	Set Screw (550J Only)	
18	1	Shim	X	62	1	Pipe Plug	
19	1	Cover	X	63	1	Seal Housing	
20	4	Capscrews	XX	64	1	Mechanical Seal	X
21	4	Lock Washers					
X =	Minor Repair Kit Items						
XX =	Major Repair Kit Items (Items marked X are included in major repair kits.)						

## ASSEMBLY AND DISASSEMBLY INSTRUCTIONS

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

<b>WARNING</b>
<p>Before starting any maintenance procedure:</p> <ul style="list-style-type: none"> <li>• Remove electrical service fuse, de-energize and lock the electrical service panel supply to the driver.</li> <li>• 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.</li> </ul>

**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 4 in disassembly procedure and steps 10 through 12 in reassembly procedures.

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

## PUMP DISASSEMBLY

1. Remove tubing (54) from inboard and outboard end of pump. Tag each tube to identify its installed location.
2. Loosen setscrew (61) and remove checknut (46), coupling hub and key (44).
3. Remove seal cover (63), cap screws (9), and washers (80) along with gaskets (5). Note: Mechanical seal stationary seat will be removed with seal cover (63).
4. Loosen setscrews on mechanical seal (64) rotating assembly and slide assembly from shaft. Make sure setscrews are backed off enough so they will not score shaft as assembly is removed.
5. Remove capscrews (9) cover (3) and gasket (5) from outboard side of pump.
6. Remove capscrews (59) from each cover (2). Remove covers (2) and o-rings (6).
7. Remove capscrews (20), washers (21), shims (18) and cover (19) from outboard bracket (12).
8. Remove both outboard and inboard brackets (12) from rotor housings (11) by removing cap screws (16) along with nuts (8) and lock washers (15) from each bracket.
9. If bushings (45) are going to be replaced, remove spring pins (17) and slide bushings (45) from brackets (12).
10. Remove idlers (40,41). Grasp inboard and outboard ends of idlers (40, 41) pull and rotate each idler to remove from rotor housings (11). Slide power rotor (34) from rotor housings (11).
11. Remove both housings (11) from pump case (1) by removing cap screws and washers ((13) and (15)).
12. If thrust collar (42) is to be replaced, 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 rotor housings (11) in case (1) using capscrews and washers (13) and (15). Align housing (11) rotor bores such that the idler rotor bores are parallel to the pump case feet. Torque capscrews (13) to  $57 \pm 5$  LBS. FT.
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). Stake setscrew (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). Using pinhole in brackets (12) as a pilot, drill a 3/8 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. Lubricate power rotor (34) with light oil and side into rotor housings (11) power rotor bore. Install inboard idler rotors (40) by aligning threads with power rotor threads, rotate idlers while pushing towards center of pump. Idler position may be observed by looking into pump inlet port. Repeat procedure for both outboard idlers (41).
5. Install assembled brackets (12) on each end of housings (11) using capscrews (16) washers (15) and nuts (8). Before tightening capscrews (16) in brackets (12), and with each bracket in place, check idlers (40, 41) to ensure bracket (12) 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. Torque capscrews (16) to  $57 \pm 5$  LBS. FT.
6. Install shim (18) and cover (19) on outboard bracket (12) with capscrews (20) and washers (21). Torque capscrews (20) to  $52 \pm 2$  LBS. IN.
7. Push coupling end of power rotor (34) into pump as far as it will go. Mount a dial indicator on inboard bracket (12) with indicator point resting on end of power rotor (34). Set indicator pointer to "zero". Pull power rotor (34) out from 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  $52 \pm 2$  LBS. IN. 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 capscrews (59). Torque capscrews (59) to  $65 \pm 5$  LBS. FT.
9. Install gasket (5) and rear cover (3) on cover (2) at back end of pump using capscrews (9). Torque capscrews (9) to  $45 \pm 5$  LBS. FT.
10. Installation of mechanical seal. Check seal to see if it is Crane type 2 or type 8-1 or Flowserve QWD or type Q. This will determine assembled position of seal shown on assembly drawing. John Crane Type 8-1 and FlowServe (formerly Borg Warner) Type QWD and Q mechanical seal rotating assemblies are installed on power rotor (34) shaft with setscrews. When seal housing (63) is installed, with mechanical seal stationary seat, seal is compressed to its correct working length only if rotating assembly is correctly positioned when it is installed.
  - 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. Pull power rotor (34) out of the pump until thrust collar (42) contacts face of bushing (45). Place a straight across the end face of inboard cover (2) and lightly scribe power rotor shaft at this point. Scribe a second mark the correct distance from the original scribed mark depending on the seal type shown on the assembly drawing. For instances,  $51/64$ " for the type QWD seal. Apply a coat of light lubricating oil to pump shaft to aid installation of seal assembly.
  - c. Apply a coat of light lubricating oil to O-ring in seal rotating assembly and insure O-ring is properly seated in its groove. Slide seal rotating assembly on to shaft up to the second scribed mark from the end face of inboard cover (2) scribe mark per views on assembly drawing. Securely tighten rotating assembly set screws to power rotor shaft.

- d. Install a light coat of lubricating oil to mechanical seal stationary sea O-ring. Install mechanical seal stationary seat into seal housing (63) counter bore. Insure that slot on bottom of seal seat aligns with anti-rotation pin in seal housing counter bore.
  - e. Wipe seal faces with a clean lint free cloth.
  - f. Install seal housing, with installed seal stationary seat, to cover (2) using gasket (5) and hex capscrews (9). Toque hex capscrews (9) to  $45 \pm 2$  LBS FT.
11. Install tubing (54) from case (1) on inboard seal housing (63) and outboard cover (2) using tube fittings (55) and (53).
  12. Install key (44), coupling hub and checknut (46). Lock checknut (46) in position by installing setscrew (61).
  13. Install pump and align pump driver to pump following procedures for alignment in CA-1 Manual.



## **TROUBLESHOOTING**

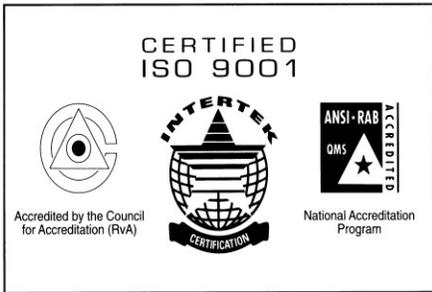
For assistance with troubleshooting see the General Instruction Manual, CA-1

### **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 the in event user prefers to return pumps for inspection or overhaul. Factory-overhauled pumps 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 Technical/ Customer Service Department in Monroe, NC, USA.

Most pumps have 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. Major Repair Kits are sufficient to rebuild completely worn-out pumps to “as-new” condition. They include all parts found in Minor Repair Kits plus all major internal parts subject to wear. Since kits have all necessary parts, kit purchase is preferred 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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