



PRODUCT SERVICE MANUAL
FOR
GLH8L-630 and J8L-630

	WARNING
<p>The Imo General Installation Operation, Maintenance, and Troubleshooting Manual, (No. SRM00046), along with this manual, should be read thoroughly prior to pump installation, operation or maintenance.</p>	

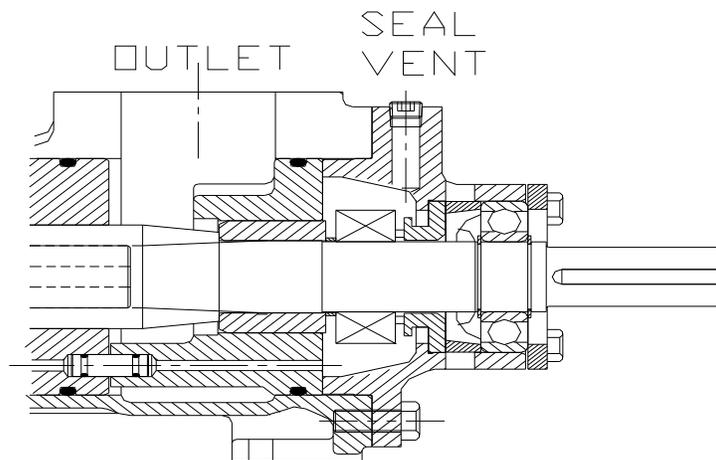
Manual No. SRM00085	Rev. 02 (20-0051)	Aug 2020
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IMPORTANT NOTE

The importance of seal chamber priming cannot be overemphasized. Due to the prevalence of seal damage and leakage caused by not filling the seal chamber with liquid before putting a pump in service, this page is located at the beginning of this document.

SEAL CHAMBER PRIMING

Fill mechanical seal chamber with liquid to insure seal does not start dry. This can be done by removing seal vent set-screw and pouring liquid into vent passageway before opening pump inlet. Alternately, seal chamber can be vented in situations where inlet pressure is above atmospheric by opening inlet and discharge valves and then loosening seal vent plug to allow positive inlet pressure to push air out of seal chamber until oil flows from it. **See figure below.**



Filling or Venting Seal Cavity Using Seal Vent

CAUTION

Failure to fill or vent seal chamber as described above may cause damage to seal running faces which may result in seal leakage.

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:

	<div style="border: 1px solid black; padding: 5px; display: inline-block;">DANGER</div>	
Failure to observe precautions noted in this box can result in severe bodily injury or loss of life.		

	<div style="border: 1px solid black; padding: 5px; display: inline-block;">WARNING</div>	
Failure to observe precautions noted in this box can cause injury to personnel by accidental contact with equipment or liquids. Protection should be provided by user to prevent accidental contact.		

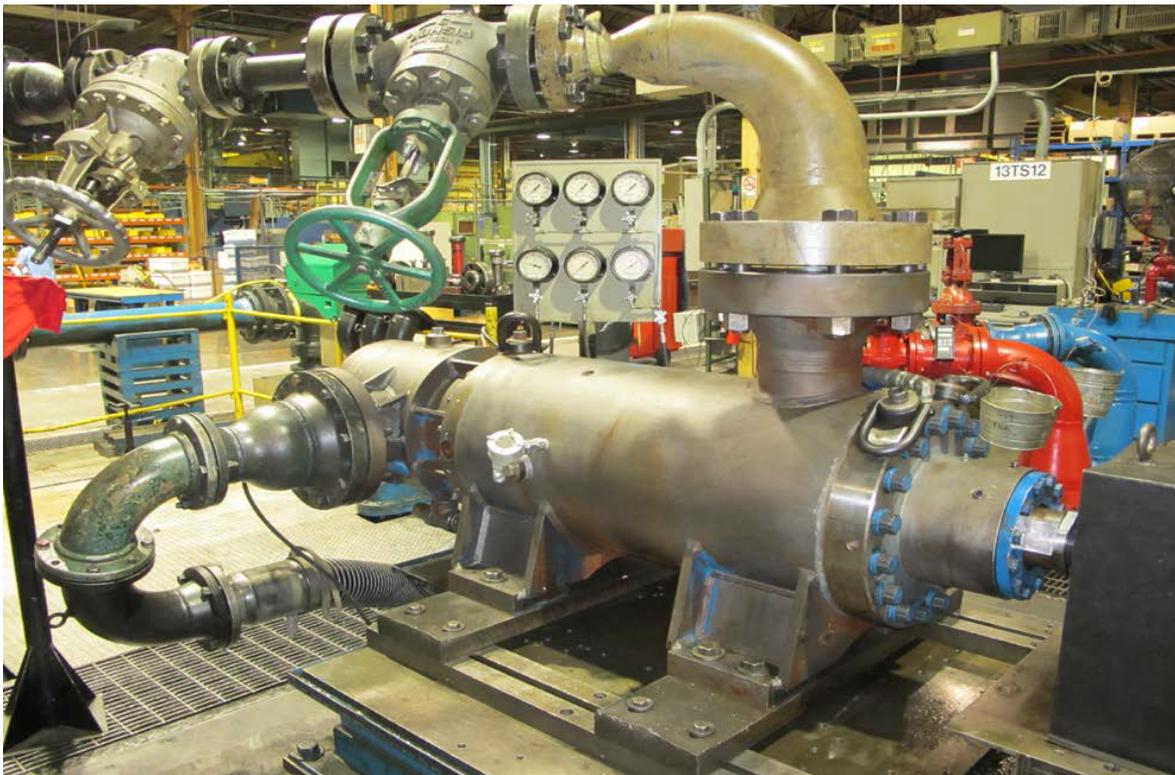
	<div style="border: 1px solid black; padding: 5px; display: inline-block;">CAUTION</div>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">ATTENTION</div>	
Failure to observe precautions noted in this box can cause damage or failure of equipment.			

Noncompliance 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 pump and/or protection of pump itself are marked by the sign:
		<div style="border: 1px solid black; padding: 2px; display: inline-block;">ATTENTION</div>

	<div style="border: 1px solid black; padding: 5px; display: inline-block;">ATTENTION</div>	
If operation of 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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A. GENERAL INSTRUCTIONS

Instructions found here in cover disassembly, assembly and parts identification of GLH8L-630 and J8L-630 series pumps.

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 Imo General Installation Operation, Maintenance, and Troubleshooting Manual, SRM00046, provided with your order. For further detailed information and technical assistance please refer to Imo Pump, Technical/Customer Service Department, at (704) 289-6511.

This manual cannot possibly cover every situation connected with installation, operation, inspection, and maintenance of equipment supplied. Every effort was made to prepare the text of this 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 instruction manual have sufficient technical knowledge and are experienced to apply the sound safety and operational practices which may not be otherwise covered by this manual.

In applications where equipment furnished by Imo Pump is to become part of processing machinery, these instructions should be thoroughly reviewed to ensure proper fit of said equipment into overall plant operational procedures.



WARNING

If installation, operation, and maintenance instructions are not correctly and strictly followed and observed, injury to personnel or serious damage to pump could result. Imo Pump cannot accept responsibility for unsatisfactory performance or damage resulting from failure to comply with instructions.

B. INTRODUCTION

This instruction manual covers Imo Pump GLH8L-630 and J8L-630 with fabricated cases. This series of pumps has been designed for use in crude oil applications. The model and design construction of each pump can be identified by the designator code on the pump nameplate. Definitions of model designators are identified in Figure 1A and 1B.

C. DESCRIPTION OF EQUIPMENT

The "GLH" design is an upgrade to existing 8L series pumps consisting of a modification kit for field conversion. The "GLH" design replaces gun drilled idlers with an internal balance return tube. A strainer was also installed on the discharge housing to minimize the chance of a severe idler thrust loss. Most previous 8L designs can be converted to the "GLH" design by purchasing the modification kit and will require the installation of a "GLH" major repair kit during overhaul. 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 1A and 1B.

The "J" design is an upgrade to the "GLH" design. The "J" design incorporates an internal mechanical seal line return (porting is drilled through the pump case). Due to this design change, parts between the "GLH" and "J" designs are considered incompatible. Please contact IMO pump division with question/concern relating to nomenclature

D. PUMP MODEL IDENTIFICATION

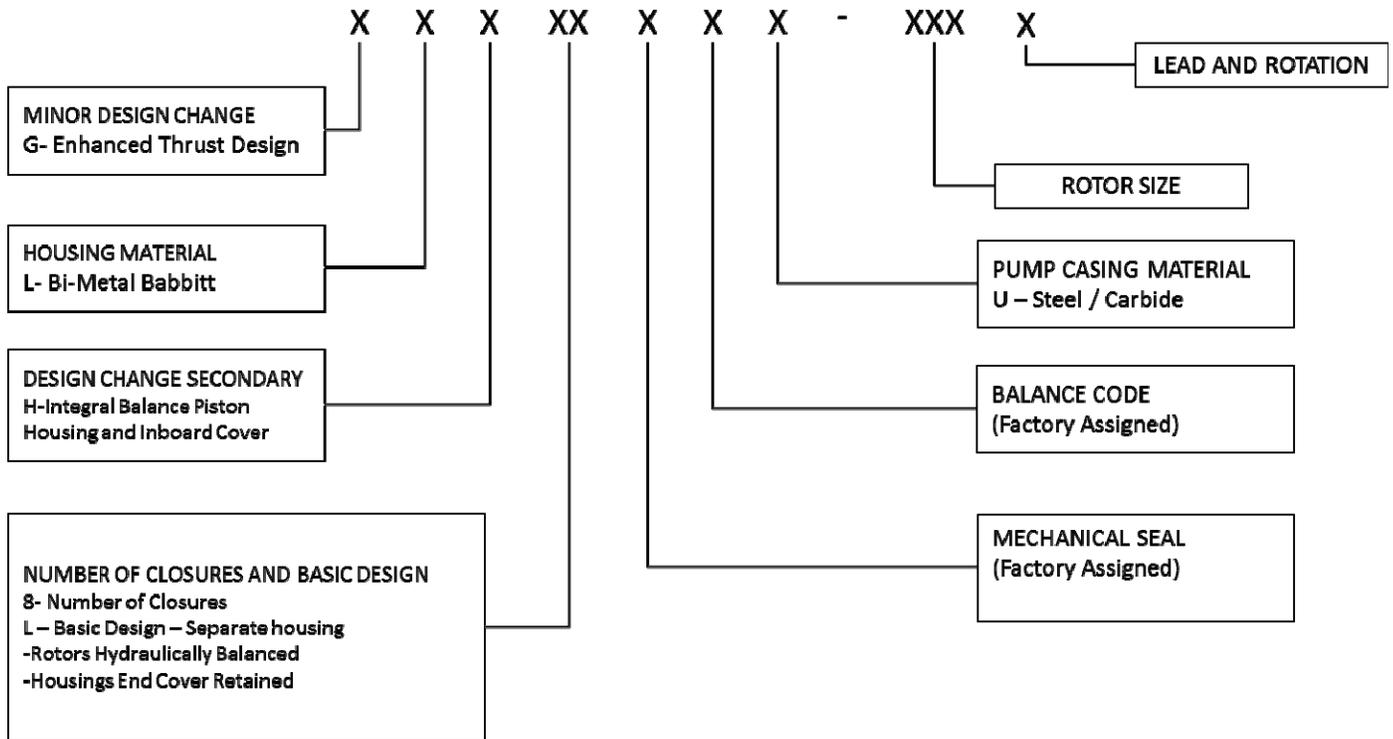


Figure 1. Definitions of Model Designators of GLH8L-630 pumps

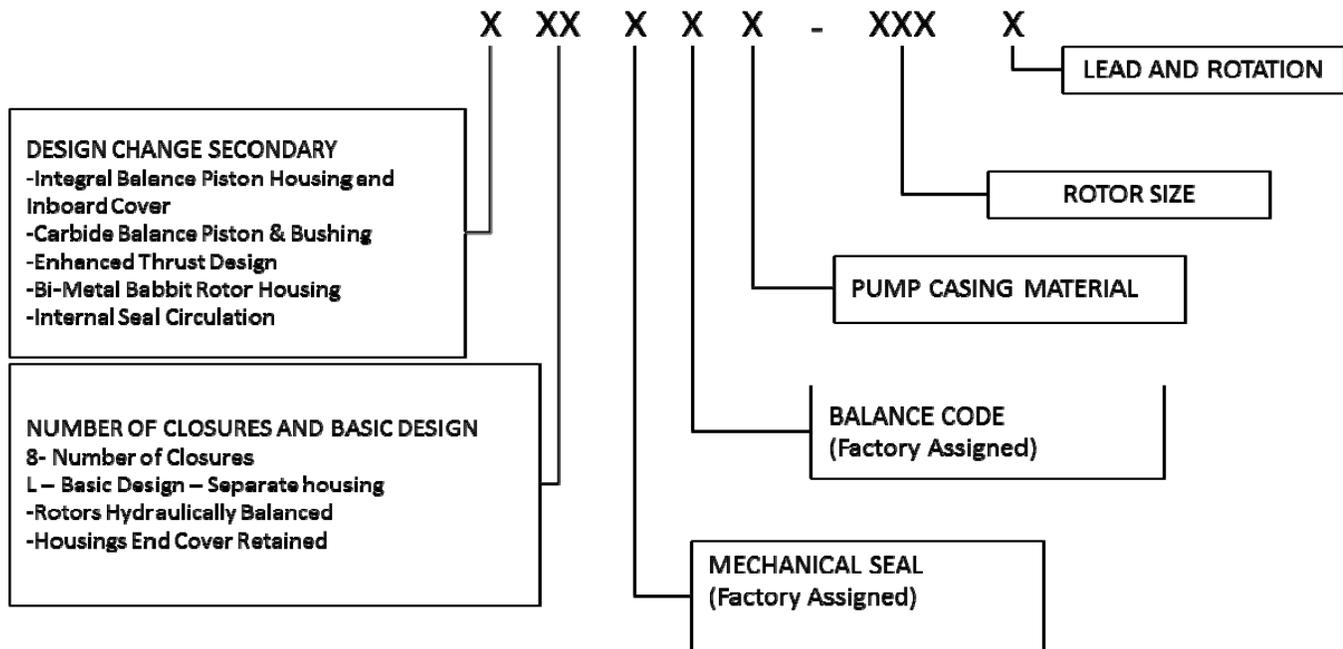


Figure 2. Definitions of Model Designators of J8L-630 pumps

E. ORDERING INSTRUCTIONS

When corresponding with Imo Pump regarding Series GLH8L-630 and J8L-630 series pumps, refer to pump nameplate, this instruction manual, and assembly drawing as instructed below:

1. From pump nameplate, record pump model number, serial number, and manufactured date.
2. Record instruction manual number, revision, and date.
3. From instruction manual, record figure numbers that apply to replacement part(s).
4. From assembly drawing or parts list (see Figure 5 and 6) provide IDP number(s) and names for replacement part(s).
5. Give above information to your Imo service representative.

Imo sales and service representatives are listed herein and in General Instruction Manual, SRM00046.

F. OPERATION

F.1 LIQUID LIMITATIONS

Never operate with thin liquids such as solvents or water. Pump is designed for liquids having general characteristics of oil.

F.2 OPERATING LIMITS

CAUTION	ATTENTION
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, specific application limits may be different from operational limitations. Equipment must not be operated without verifying system operating requirements are within pump's capabilities.	

Under no circumstances are the following operating limits (specified in table 1) to be exceeded without specific approval from Imo Pump.

Operating conditions such as speed, fluid viscosity, inlet pressure, temperature, filtration, duty cycle, mounting, drive type, etc. are interrelated. Due to variable conditions, specific application limitations may vary from structural limitations. This equipment must not be operated without verification that operating requirements are within published capabilities as shown in the appropriate pump brochures (available from local Imo Pump offices and representatives listed in Manual CA-1).

Under no circumstances are the following structural design limits to be exceeded.

Table 1 – Normal Pump Operating and Structural Limits

Condition	Limit
Maximum Speed	1200 RPM
Minimum Viscosity	60 SSU (Minimum Book Rating)
Maximum Viscosity	Contact factory
Liquid Temperature	250 degrees F (Standard Pump)
Maximum Inlet Pressure	125 PSIG Standard Pump
Maximum Discharge Pressure (Continuous Duty)	1500 PSIG Standard Pump
Filtration	Imo General Installation Operation, Maintenance, and Troubleshooting Manual, SRM00046
Drive	Direct Only
Mounting	Foot mounted

G. DESCRIPTION OF PUMP FEATURES

Balance

	WARNING
<p>The GLH series pump parts are not interchangeable with previous designs unless the factory has approved to convert the old design to a GLH design using a modification kit. The modification kit along with the a GLH major kit will be required to make the conversion.</p>	
	WARNING
<p>The J series pump parts are not interchangeable with previous designs. The J series is the most current series (Aug 2013).</p>	

By design, all rotor sets are hydraulically balanced in the radial direction. Idler rotors (19 and 23) are balanced axially by internally transferring high pressure oil from the pump discharge end to the pump inlet end (thrust end). The high pressure oil is transferred to the pump inlet end through bores that have been drilled axially through the rotor housings (83 and 28).

In order to provide axial hydraulic balance on the power rotor (11), a balance piston (17) is provided. The sizes of the balance piston (17) and the balance piston bushing (18) in which it rotates are selected to produce minimum axial thrust loads on the anti-friction ball bearings (7) under the conditions of operation that are "normal" for the application.

GLH8L-630 Mod Kit (3267/1000M)

The modification kit includes a J8L design outboard cover (66) that consist of thru holes drilled for RTD installation. As of Aug 2013, all of the GLH major kits will include the standard thrust plate (65) for the J8L design. This will allow for the installation of thermowells and RTD's to penetrate the thrust plate allowing initial detection of a severe idle rotor thrust loss to occur prior to damaging the outboard cover. **Please contact IMO Pump Division for thermowell and RTD part numbers, as they are not supplied with the mod kit.**



WARNING

When a unit is purchased, if no inlet conditions are specified, the power rotor will be provided with standard balance. If a unit with standard balance is installed on an operation with high inlet pressure, both the ball bearings (7) and the mechanical seal (51) may be overloaded. If the unit has been fitted to operate with high inlet pressure, operation on low inlet pressure can overload the ball bearings. Do not change inlet pressure radically without approval from Imo Pump Division.

Ball Bearing

8L-630 pumps are equipped with duplex angular contact ball bearings lubricated with Mobil SHC 32 or equivalent grease. Normal grease interval is every 4500 hours of pump operation. Grease quantity is about 2-2½ (12.5 oz.) tubes for first time bearing is re-greased and about 2 (12.5 oz.) tubes each time thereafter for bearing operating temperatures up to 180 °F. For every 15 °F rise in temperature above 180 °F, re-greasing interval should be cut in half. To re-grease ball bearings, remove pipe plug from vented reducer bushing located several inches closer to coupling end of drive shaft. Insert grease gun nozzle onto grease fitting and pump grease into fitting until at least a couple of ounces of grease emerges from fitting or lip seal. Wipe off excess grease. Run pump at normal operating conditions for at least 30 minutes to allow any excess grease to purge from vented reducer bushing or lip seal. Replace pipe plug to vented reducer bushing. During purging process, bearing temperature may increase beyond normal values.

CAUTION

Any questions regarding regreasing cycles should be directed to Imo Pump Division.

Mechanical Seals

The GLH8L-630 and J8L-630 series pumps are equipped with a positive drive mechanical seal. This is a balanced mechanical seal with a carbide rotating face and a carbide stationary face (material is dependent on pump nomenclature). Refer to mechanical seal drawing, figure 3, for construction.

When ordering new mechanical seals, it is important that the pump designator and/or serial number be given. When pump designator and/or serial number cannot be ascertained, operating conditions should be listed so that proper mechanical seal can be supplied.

Instrumentation

The GLH8L-630/J8L-630 pumps are provided with instrumentation connections for monitoring temperatures of inboard and outboard areas of the pump and vibration at the ball bearing.

Ball Bearing RTD – A ½ inch-14 NPT threaded connection with a $\frac{5}{16}$ inch diameter drill through for a temperature sensor (RTD) probe is provided on the inboard cover (40). This RTD (when installed) monitors the temperature of the ball bearing (7). The temperature will vary, depending on the temperature of the fluid pumped, the speed at which the pump is running and the suction pressure. Typically the ball bearing temperature will run 50 °F to 70°F above the fluid temperature. The maximum temperature allowed is 250°F.

Thrust Loss RTD's -

(Original GLH8L-630 design)-Two ½ inch-14 NPT threaded connection ports with ¼ inch OD X 1-½ inch deep blind hole for the RTD probe are provided on the outboard cover (66) for connection of two optional RTD's.

J8L design/GLH8L mod kit- Outboard cover (66) has 2 X ¾ - 14 NPT thru holes with ¾ inch NPT pipe plugs inserted (optional RTD installation).

The RTD's (when installed) are used to read the temperature in the two idler rotor thrust plate areas individual to each idler. These temperatures should be relatively close to each other in normal operation. If a serious idler rotor thrust loss occurs, the temperature difference between the two idler rotor thrust areas will be detected.

It is recommended the operating system should immediately be shut down if the delta temperature between these two RTDs exceeds 25°F to 30°F.

Vibration Monitoring - A ¼ inch-18 NPT, ¾ inch deep connection is located on the inboard cover (40) is provided for installation of an optional vibration transmitter.

Optional Features:

Smart Pump Features – Contact factory for additional details.

Seal Leak Detection – Catastrophic seal leak detection pressure switch, set to a minimum, approximately 5-7 psig.

Seal Leak Detection – Detection of normal to moderate seal weepage, on – off float switch.

GLH8L-630/J8L-630 Wear Resistant Pumps – The GLH/J8L designs consist of the option to sleeve the suction idler (axial thrust balance surface); in an effort to extend the life of the rotor set by replacing just the sleeves and idler cups on the suction idlers during situations where the pump is meeting application specifications, but the customer has deemed that certain monitoring parameters (typically vibrational readings) are above the end users acceptable level. Please contact IMO pump division for details.

H. INSTALLATION

GLH8L-630 and J8L-630 series pumps are designed for horizontal foot mounting. The pump case (32) has four feet. The two inboard feet are drilled to receive two tie-down or mounting bolts and the rear or outboard feet are drilled to receive one bolt each. The double bolting on the inboard end is designed to provide rigid location of the front end of the pump. The length of the pump and the normal variations in temperature require that allowance be made for thermal growth. The rigidity of the pump case (32) is usually several times that of the bedplate. If relative movement cannot take place between the outboard feet and the base, thermal movement can distort the bedplate and produce misalignment between pump and driver.

NOTE: Please ensure that you have the correct assembly drawing for your particular pump. The assembly drawing includes the require torque values. Torque specifications vary between the 8L-630 pump designs. Contact IMO pump division with pump serial number, pump nomenclature, and pump part number to ensure you are provided with the correct assembly drawing and bill of materials. Attached in Figure 5 and Figure 6 are the general assembly drawings for the J8L-630 and GLH8L-630, respectively.

Inlet Position

The inlet head (27) may be positioned to permit fluid to enter the pump from the top or either side. The inlet head may be rotated in 90° increments.

1. If applicable to change position of inlet head (27), disconnect bleed tube (54) by loosening flareless connection (37 and 55).
2. Install an eyebolt in 1 inch tapped bore in cover (66) to aid in support of cover during removal. (Approximate weight of cover is 181 pounds. Remove bolts (62) and cover (66) using caution to avoid damage to O-ring (30).
3. Place a sling or lifting hooks on inlet head (27). (Approximate weight of inlet head is 590 pounds.) Remove ferry capscrews (53). Break inlet head (27) free from case (32).
4. Rotate inlet head (27) so that inlet flange is in desired position, using care to avoid damage to O-ring (30). Install ferry capscrews (53) and tighten capscrews to a torque of 700 ft. lbs. ± 15 ft. lbs. (949 Nm).

5. If applicable remove plug (59) which is now on the underside of inlet head (27) and align with bleed tube (54). Remove nipple (57) which will also remove tee (58), plug (59), bushing (56) and flareless connection (55). Install nipple assembly (57); using either pipe compound or Teflon tape on threads to ensure an airtight seal. Connect bleed tube (54) using flareless connection (55) and (37). Install plug (59) in tapped opening from which nipple (57) assembly was removed, using thread compound or Teflon tape to ensure airtight seal.
6. Install cover (66), ensuring that O - ring (30) is properly seated and not damaged. Install bolts (62) and tighten bolts to a torque value specified on the pump assembly drawing.

I. MAINTENANCE

Servicing Mechanical Seal and/or Ball Bearings

NOTE: 8L-630 Tool Kit (3267/1000TK) includes specialized tooling required to complete an 8L-630 pump repair. Please ensure that you have the correct assembly drawing for your particular pump. The assembly drawing includes the require torque values. Torque specifications vary between the 8L-630 pump designs. Contact IMO pump division with pump serial number, pump nomenclature, and pump part number to ensure you are provided with the correct assembly drawing and bill of materials. Attached in Figure 5 and Figure 6 are the general assembly drawings for the J8L-630 and GLH8L-630, respectively.

Required tooling: 8L-630 Tool Kit (3267/1000TK)

- 1" Hardened washers (qty 2) (Power rotor removal)
- 1"-8 Hex nut (qty 2) (Power rotor removal)
- 3/4"-10 x 30" Allthread (qty 2) (Bearing removal/power rotor installation)
- 3/4" Hex nuts (qty 2) (Bearing removal/power rotor installation)
- 3/4" Hardened washers (qty 2) (Bearing removal/power rotor installation)
- Torque capability up to 1600 ft. lbs. (2170 Nm)
- Pass-Thru ratchets and sockets
- 3/8"-16 X 2" Bolt (for stop pin removal)
- Loctite 242 compound (installation of studs (63))
- General Tooling

NOTE: GLH8L-630 and J8L-630 series pumps are normally installed with a spacer type coupling between the pump and driver. Removal of coupling spacer provides sufficient space for removal of coupling hub and for servicing of ball bearings and mechanical seal.

1. Close inlet and outlet valves. Vent pressure from pump. Remove spacer member from coupling. Loosen setscrew (45) and remove checknut (44) from power rotor (11) shaft. Remove coupling hub from pump shaft.



CAUTION

Fluid leakage from disassembly of pump may make floor slippery and can cause personal injury

2. Install Torque fixture (S626ML) onto the end of the power rotor and insert the threaded rod (PP050CCK-9) into the thru holes. Position a metal bar/wood block approximately 30 inches long between the two studs or bolts, and brace the opposite end of bar against pump bedplate to lock power rotor in place to prevent rotation when loosening bearing locknut (46) and checknut (47). Loosen setscrews (45) located in the bearing checknut (47).

3. Using crowfoot wrench (S626MM); loosen bearing locknut (46) and checknut (47). Remove metal locking bar and bolts or studs which were installed in torque fixture (S626ML). Remove the torque fixture and key (10) from power rotor (11) shaft.
4. Remove bearing locknut (46), bearing setscrews (45) and checknut (47) from power rotor shaft.
5. Remove bolts (9) and bearing retainer (48).
6. Position power rotor (11) assembly forward from pump until seat adapter (15) extends from the inboard cover by completing the following steps:
 - a) If applicable, remove RTDs and thermowells (94) from end cover (66).
 - b) Install eyebolt (29) in tapped bore of cover (66). Remove Hex bolts (62), and end cover (66).
 - c) Remove O-ring (30) from end cover (66).
 - d) Remove Hex nuts (61), washers (60 and 70), thrust plate (65), spacers (26), idler cups (72), oil balance tube (81), and O-rings (82) from the suction housing (83).
 - e) Rotate power rotor in opposite direction of rotation (by hand) to remove idlers (23 and 27).

	CAUTION	ATTENTION	
Do not permit idlers (23 or 27) to drop as they emerge from housing.			

- f) Install power rotor removal strongback (S626MN) on threaded rod (63) using hex nuts (61) and washers (70) to secure it in position.
 - g) Install rotor removal tool (S626MS) into strongback ensuring a metal blank is placed between the end of the threaded rod and the power rotor (11). Note: Metal blank is installed to prevent damage to the end of the power rotor.
 - h) Rotate the rotor removal tool until the seat adapter (15) extends from the inboard cover (40).
 - i) Remove strongback assembly.
7. Install bearing removal tabs (S626MR) into slots in the seat adaptor sub assembly (15).
 8. Cut two $\frac{3}{4}$ -10 continuous thread studs (24 inches minimum) to thread $1\frac{3}{8}$ inches into inboard cover (threaded holes; Bolt (9) location) and extend a minimum of $2\frac{1}{2}$ inches past end of power rotor (11). Install the threaded studs 180 degrees apart, through the removal tabs, into the inboard cover. Thread a hex nut/hardened washer on each stud to lock the tabs in position against the inboard cover.
 9. Install the bearing removal strongback (S626MP) on the end of the power rotor, ensuring the thru holes align with the threaded rod. Thread hex nuts/hardened washers onto the threaded rod to secure the strongback in position.
 10. Tighten nuts installed on both studs evenly to press power rotor (11) shaft back into pump and through ball bearings (7) to remove both bearings. Spacer (49) with O-ring (12) and lip seal (8) and outer spacer (13) will be unseated as ball bearings (7) are removed. Ensure that spacers (49 and 13) and lip seal (8) are not permitted to drop as they are unseated. After power rotor (11) is pressed through both ball bearings, remove strongback. Remove bearing removal tabs from seat adapter subassembly (15). Remove studs from bores of inboard cover (40). Remove the following components: spacer (49), spacer (13), O-ring (12) and lip seal (8). Remove O-ring (12) from groove of spacer (49) and remove lip seal (8)

Multi-Spring seal with O-ring seat (11-22)

11. Pull power rotor (11) assembly forward from pump to expose mechanical seal (51) assembly which is mounted on shaft sleeve (16).
12. Remove inner spacer (13).
13. Remove shaft sleeve (16) from power rotor (11) shaft. Removal of shaft sleeve (16) will also remove mechanical seal (51), seat adapter subassembly (15), lip seal (6), O-rings (38), seat retainer (5), capscrews (4), and spiral ring (14).
14. Remove spiral ring (14) from groove of shaft sleeve (16).
15. Remove seat adapter subassembly (15) including O-rings (38) and lip seal (6), seat retainer (5), capscrews (4) and mechanical seal stationary seat (1, figure 3) with O-ring (2, figure 3) from shaft sleeve (16). Remove capscrews (4) and seat retainer (5) from seat adapter subassembly (15). Remove mechanical seal stationary seat (1, figure 3) with O-ring (2, figure 3) from seat adapter subassembly (15). Remove O-rings (38) from grooves of seat adapter subassembly (15). Remove lip seal (6) from counterbore of seat adapter subassembly (15).

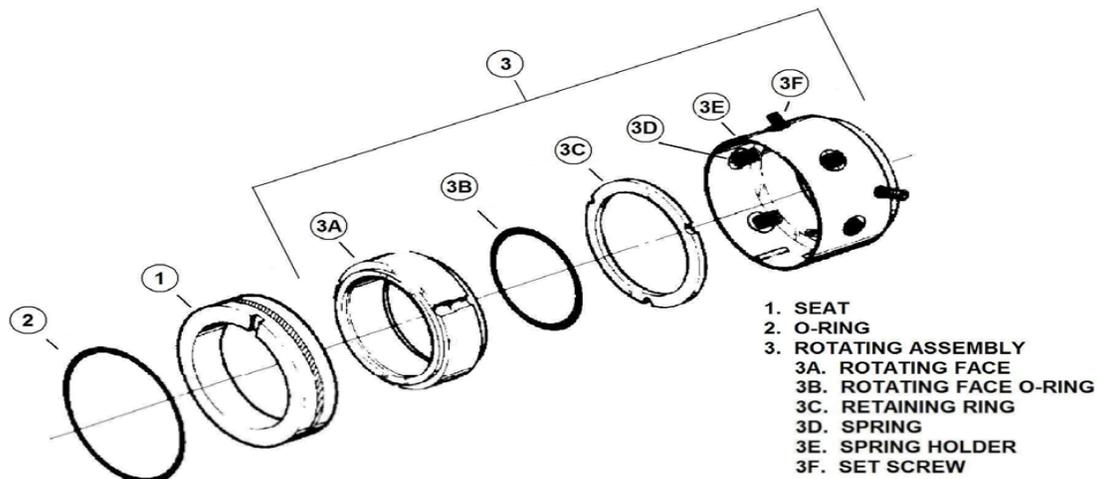


Figure 3. Mechanical Seal Drawing

16. Loosen setscrews (3F, figure 3) and slide mechanical seal (51) rotating assembly (3, figure 3) from shaft sleeve (16).
17. Remove O-ring (36) from groove of power rotor (11) shaft. (If only replacing a minor kit, continue with the following steps. Otherwise proceed to Pump Disassembly, step 3.
18. Inspect power rotor (11) shaft and shaft sleeve (16) and remove any nicks or burrs which are present. Polish power rotor shaft to remove any rust or oxidants that may be present under shaft sleeve. The manufacturer recommends replacement of lip seals (6 and 8), ball bearings (7), mechanical seal (51), and O-rings (12, 36 and 38) when these parts are disturbed from their original installed position. All parts should be coated with light lubricating oil to assist in assembly.
19. Install O-ring (36) in groove of power rotor (11) shaft.

NOTE: Rotating and stationary seal assembly should be installed on the shaft sleeve prior to installing the sleeve onto the power rotor.

20. Install rotating assembly (3, figure 3) of mechanical seal (51) on shaft sleeve (16) positioned against shoulder of shaft sleeve (16). Install O-ring (2, figure 3) on stationary seat (1, figure 3). Install assembled stationary seat on seat adapter subassembly (15), ensuring that lock pin engages slot of stationary seat. Install seat retainer (5) using capscrews (4). Tighten capscrews (4) to a torque value of 17 in. lbs. \pm 2 in. lbs. (2 Nm). Install O-rings (38) in grooves of seat adapter subassembly (15). Install lip seal (6) in counterbore of seat adapter subassembly (15). Install assembled seat adapter subassembly (15) on shaft sleeve (16). Use caution to avoid damage to stationary seat and O-ring (1 and 2, figure 3).
21. Compress mechanical seal enough to expose spiral ring groove and install spiral ring (14) in shaft sleeve (16), locking mechanical seal (51) assembly into place.
22. Install assembled shaft sleeve (16) on power rotor (11) shaft until it rests against balance piston (17). Use caution when installing shaft sleeve (16) to avoid damage to installed O-ring (36). Tighten setscrews (3F, figure 3). (If only replacing a minor kit, proceed to step 35. Otherwise, proceed to Pump Assembly, step 11.)

Cartridge Seal (metal bellows design) Steps 23-34)

23. Pull power rotor (11) assembly forward from pump to expose mechanical seal (51) assembly which is mounted on shaft sleeve (7, figure 4).
24. Remove inner spacer (13).
25. Remove shaft sleeve (7, figure 4) from power rotor (11) shaft. Removal of shaft sleeve (7, figure 4) will also remove mechanical seal (51), seat adapter subassembly (15), lip seal (6), O-rings (38), seat retainer (5), capscrews (4), and spiral ring (8, Figure 4).
26. Remove spiral ring (8, Figure 4) from groove of shaft sleeve (7, figure 4).

Item	Qty	Description
1	6	SET SCREWS
2	1	O RING
3	1	BELLOWS CORE
4	1	ROT. FACE INSERT
5	1	STATIONARY SEAT
6	1	O RING
7	1	SLEEVE
8	1	SNAP RING
9	6	SET SCREWS

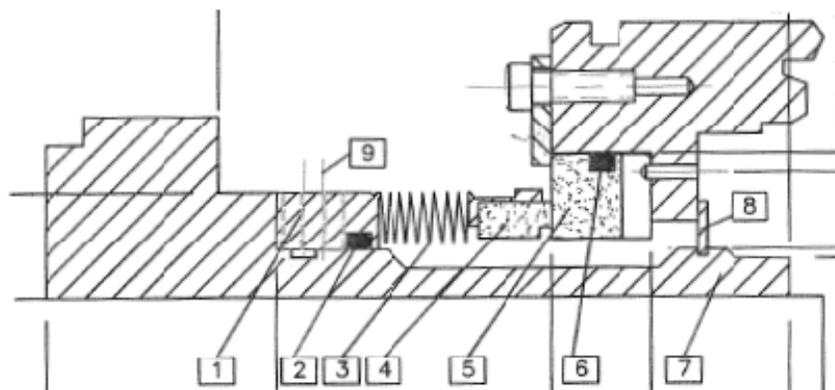


Figure 4. Cartridge (Bellows Type) Mechanical Seal

27. Remove seat adapter subassembly (15) including O-rings (38) and lip seal (6), seal retainer (5), capscrews (4) and mechanical seal stationary seat (5, figure 4) with O-ring (6, figure 4) from shaft sleeve (7, figure 4). Remove capscrews (4) and seal retainer (5) from seat adapter subassembly (15). Remove mechanical seal stationary seat (5, figure 4) with O-ring (6, figure 4) from seat adapter subassembly (15). Remove O-rings (38) from grooves of seat adapter subassembly (15). Remove lip seal (6) from counterbore of seat adapter subassembly (15).
28. Loosen setscrews (1 and 9, figure 4) and slide mechanical seal rotating assembly (4, figure 4) from shaft sleeve (7, figure 4).
29. Remove O-ring (36) from groove of power rotor (11) shaft. (If only replacing a minor kit, continue with the following steps. Otherwise proceed to Pump Disassembly, step 4.)
30. Inspect power rotor (11) shaft and shaft sleeve (7, figure 4) and remove any nicks or burrs which are present. Polish power rotor shaft to remove any rust or oxidants that may be present under shaft sleeve. The manufacturer recommends replacement of lip seals (6 and 8), ball bearings (7), mechanical seal (51), and O-rings (12, 36 and 38) when these parts are disturbed from their original installed position. All parts should be coated with light lubricating oil to assist in assembly.
31. Install O-ring (36) in groove of power rotor (11) shaft.
32. Install rotating assembly (3, figure 4) of mechanical seal (51) on shaft sleeve (7, figure 4) positioned against shoulder of shaft sleeve. Install O-ring (6, figure 4) on stationary seat (5, figure 4). Install assembled stationary seat on seat adapter subassembly (15), ensuring that lock pin engages slot of stationary seat. Install seat retainer (5) using capscrews (4). Tighten capscrews (4) to a torque value of 17 in. lbs. \pm 2 in. lbs. (2 Nm). Install O-rings (38) in grooves of seat adapter subassembly (15). Install lip seal (6) in counterbore of seat adapter subassembly (15). Install assembled seat adapter subassembly (15) on shaft sleeve (16) next to installed mechanical seal rotating assembly, using caution to avoid damage to stationary seat and O-ring (1 and 2, figure 3) and O-rings (38).
33. Compress mechanical seal enough to expose spiral ring groove and install spiral ring (14) in shaft sleeve (16) to lock mechanical seal (51) assembly into place.
34. Install assembled shaft sleeve (16) on power rotor (11) shaft until it rests against balance piston (17). Use caution when installing shaft sleeve (16) to avoid damage to installed O-ring (36). Tighten setscrews (1 and 9, figure 4). (If only replacing a minor kit, proceed to Bearing Installation, step 35. Otherwise, proceed to Pump Assembly, step 11.)

Bearing Installation

35. Install inner spacer (13) on power rotor (11) shaft, ensuring that the inner lip seal (6) does not fold.

NOTE: If oven/induction heater is available, ball bearings (7) can be heated to approximately 200 degrees F for ease of installation on power rotor (11) shaft. Power rotor can be secured in position using the power rotor removal strongback (S626MN) and the rotor removal tool (S626MS).

36. Preassemble outer spacer (49), installing lip seal (8) and O-ring (12).

NOTE: The outer spacer assembly must be installed onto the inner spacer (13) prior to installing the locknut (46) and checknut (47).

37. Slide ball bearings (7) on power rotor (11) shaft.



WARNING

Ensure that the bearings are correctly installed. The thicker side of the bearing inner races should be in contact with each other. Improper installation of the bearings will cause a premature, potentially catastrophic failure.

38. Slide outer spacer (13) on power rotor (11) shaft.

39. Install the outer spacer assembly.

40. Slide and thread checknut (47) onto power rotor (11) shaft. As checknut is tightened onto power rotor, it will push ball bearings (7) and outer spacer (13) into proper position on power rotor shaft.

41. Install bearing locknut (46) on power rotor (11) shaft.

42. Install drive key (10).

43. Using the torque fixture (S626ML) as described in step 2 of Servicing Mechanical Seal and/or Ball Bearings, lock power rotor in place and tighten bearing checknut (47) to a torque value of 600 ft. lbs. \pm 15 ft. lbs. (813 Nm). Tighten bearing locknut (46) on power rotor (11) shaft. Engage setscrews (45).

NOTE: After the bearing locknut is fully tightened, the bearings must cool to ambient temperature prior to proceeding with reassembly.

44. Install coupling hub, checknut (44) and setscrew (45).

45. Install assembled power rotor (11) into pump.

NOTE: The power rotor can be pressed in using the bearing removal strongback (S626MP), allthread, and hardened nuts and washers. Thread the $\frac{3}{4}$ -10 allthread into the threaded holes in the inboard cover (bolt (9) location) 180° apart. Install the strongback, aligning the thru holes with the allthread. Use the nuts and washers to evenly press the power rotor assembly into final position.



CAUTION

Pay close attention to O-rings (38 and 12) to ensure that they are not pinched during power rotor installation.

46. Install bearing retainer (48) using bolts (9). Tighten bolts (9) to a torque value of 125 ft. lbs. \pm 5 ft. lbs. (170 Nm). (Proceed to Pump Assembly, Step 13)

PUMP DISASSEMBLY

Due to size and weight of individual parts of the pump, it is recommended that a crane and/or block and tackle be available when complete disassembly of pump is required.

NOTE: GLH8L-630/J8L-630 series pumps incorporate highly finished precision parts which must be handled carefully to avoid damage to critical machined surfaces. Parts should be tagged for identification and exact position so that all parts are properly installed during reassembly.

1. Close inlet and outlet valves. Vent pressure from pump and drain pump prior to disconnecting inlet and outlet piping. Remove plugs (59) to drain pump fluid from inlet end. (if applicable) Remove bleed tube (54) by loosening flareless connections (37 and 55).

	CAUTION
Fluid leakage from disassembly of pump may make floor slippery and can cause personal injury	

2. Complete steps 1-10 of Servicing Mechanical Seal and/or Ball Bearings
3. Complete steps 11-17 or 23-29 of Servicing Mechanical Seal and or Ball Bearings (dependent on seal configuration).
4. Remove power rotor (11) from the pump.
5. (GLH design) remove all associated external piping/connections including: Plug (59), Tee (58), Nipple (57), Bushing (56), Flareless Fitting (55), Bleed Tube (54), and Flareless Fitting (37).
6. Using hoist ring (29), support weight of inboard cover (40). (Approximate weight of assembled inboard cover is 555 pounds.) Remove ferry capscscrews (50). Using jacking bolts provided, remove assembled inboard cover (40). Removal of inboard cover (40) also removes O-ring (3), balance piston bushing (18), stop subassembly (34), and capscscrews (52).
7. (J8L design) remove oil balance tube (80) and O-rings (82) from the inboard side of the pump case (32).
8. Remove O-ring (3) from groove of inboard cover (40). Remove capscscrews (52) and stop subassembly (34) from inboard cover (40). Remove balance piston bushing (18) from inboard cover (40).
9. Remove strainer (92) from the discharge housing (28) by accessing the strainer through the discharge flange.

CAUTION
Failure to remove the strainer prior to removing the housings will damage to the housing/strainer area. The strainer is too large to slide within the pump case during housing removal.

10. Break free torque from bolts (53), leaving bolts snug, prior to lifting pump case assembly.

CAUTION

Combined weight of the inlet head (27), case (32), and housings (28 and 83) is approximately 4,728 lbs. Lift assembly slowly; the housings will slide inside the pump case

11. Install 1"-8 x 1 ½ " hoist rings (29) 180° apart into the inlet head (27). Lift the assembly and place the inboard side of the case (32) onto a clean surface.
12. Remove ferry capscrews (53) and inlet head (27) from pump case (32). Remove O-ring (30) from groove of inlet head (27).

CAUTION

Housings (28 and 83) are bolted together and must be removed as a single unit. Combined weight of housings (28 and 83) is approximately 1485 pounds.

13. Remove plug (22) and O-ring (21). Remove anti-rotation pin (20) by threading a 3/8"-16 x 2" bolt into the back end of the pin and pulling/leveraging in out of the pump case. Complete step 14 concurrently to assist with plug removal by supporting the weight of the housings.
14. Install hoist rings (29) into housing (83) and remove housings (28 and 83) by lifting vertically from the pump case.

PUMP ASSEMBLY

NOTE: Prior to assembly of the pump, all parts should be cleaned and inspected for nicks and burrs. All worn or damaged parts should be replaced. Imo Pump recommends automatic replacement of O-rings (3, 12, 21, 30, 35, 36, 38, and 82), lip seals (6, 8), ball bearings (7), mechanical seal (51) and spiral ring (14) when these parts are disturbed from their previous installed position. Wipe all parts with light lubricating oil periods of time. Check all oil passages to ensure that they are clean and free of any debris. Rotate power rotor frequently by hand during assembly to ensure freedom of rotation.

1. Place pump case, inboard face down, on a clean surface in preparation for installing housings (28 and 83).
2. Install hoist ring (29) into the suction housing (83). Install O-ring (30) on the discharge housing (28). Lift and insert the housings into the pump case ensuring that the slot in the housing aligns with the stop pin (20) hole in the case.
3. Insert the pin (20), O-ring (21) and plug (22).
4. Position pump case horizontally and install strainer (92) into the discharge housing (28)
5. Install bushing (18) on inboard cover (40). Install stop subassembly (34) on inboard cover (40), ensuring that spring pin engages slot in installed bushing (18).

NOTE: Prior to installing capscrew (52), verify idler stops align with the idler housing bores. Position the bushing (18) to make this possible.

6. Install capscrews (52), and tighten capscrews to a torque value of 30 ft. lbs. \pm 2 ft. lbs. (41 Nm). Install O-ring (3) in groove of inboard cover. (J8L design) Install oil balance tube (80) and O-rings (82) into the discharge housing (28).
7. Using hoist ring (29) to support weight of assembled inboard cover (40), install inboard cover (40) into case (32), using caution to avoid damage to O-ring (3) and ensure that stop subassembly is properly positioned with idler rotor bores of housing (28). (J8L design) ensure that the inboard cover aligns with the oil balance tube (80) in the discharge housing (28).
8. Install ferry capscrews (50), and tighten capscrews to a torque value of 1600 ft. lbs. \pm 15 ft. lbs. (2170 Nm).
9. Install power rotor (11) in the pump positioning the power rotor with the mechanical seal area exposed outside the inboard cover (40).
10. Reassemble and install the sleeve assembly per the Servicing Mechanical Seal and/or Ball Bearings instruction steps 18-22 or 30-34 (dependent of mechanical seal configuration).
11. Install the bearings (7) per the Servicing Mechanical Seal and/or Ball Bearings; Bearing Installation steps 35-42.
12. Install O-ring (30) in groove of inlet head (27). Using eyebolt (29) for support, install inlet head (27) on case (32). (Approximate weight of inlet head is 590 pounds.) Use caution during installation of inlet head to avoid damage to O-ring (30). Install ferry capscrews (53), and tighten capscrews (53) to a torque value of 600 ft. lbs. \pm 15 ft. lbs. (813 Nm).
13. Install idler rotors (19), tapered end first, into inlet end of housings (28 and 83). Mesh threads of idler rotors (19) with installed power rotor (11) and rotate power rotor (11) by hand to draw idlers into proper position. Install idler rotors (23) into inlet end of rotor housing (83) with the idler balance piston housing end of the idlers positioned toward inlet end of the pump. Mesh threads of idler rotors (23) with threads of power rotor (11), and rotate power rotor (11) by hand to draw idlers into proper position. Slide idler balance piston housing assemblies (72) onto the idler rotors (23).
14. Install O-rings (82) into grooves on oil balance tube (81). Insert oil balance tube into the suction housing (83).
15. Coat studs (63) with Loctite 242 compound and install the studs into the suction housing (83). Slide spacers (26) onto studs and install thrust plate (70). Ensure that the oil balance tube is aligned with the oil balance hole in the thrust plate.
16. Install washer (70), lockwasher (60) and nuts (61). Tighten nuts (61) to a torque value 400 ft. lbs. \pm 15 ft. lbs. (542 Nm).
17. Install O-ring (30) in groove of cover (66). Install hoist ring (29) in tapped bore of cover (66). Support weight of cover (66) (approximately 177 pounds) and install cover (66) on inlet head (27) using bolts (62). Use caution during installation of cover (66) to avoid damage to installed O-ring (30). Tighten bolts (62) to a torque value of 300 ft. lbs. \pm 15 ft. lbs. (406 Nm).
18. (GLH design) Install all associated external piping/connections including: Plug (59), Tee (58), Nipple (57), Bushing (56), Flareless Fitting (55), Bleed Tube (54), and Flareless Fitting (37).
19. (If applicable) Install thermowells (94) and RTDs into cover (66).

20. Mount assembled pump (approximately 6351 pounds) on bedplate. Verify pump and driver alignment as outlined in General Installation, Operation, Maintenance, and Troubleshooting Manual (SRM00046) and 8L-630 General Start-Up Checks, Troubleshooting, and Verification Record (SRM00119).

NOTE: To access service manuals please visit our web site at www.imopump.com; under the resources tab, click service manual and select the appropriate manual for your particular pump. BOM (Bills of Materials) can also be accessed under the resources tab by clicking on parts list search and entering the pump part number or pump nomenclature.

J8L-630 PARTS LIST

IDP	Part Description	Qty	Kit	IDP	Part Description	Qty	Kit
1	Stud	8	XX				
2	Nut	8	XX	44	Check Nut	1	
3	O-ring	1	X	45	Setscrew	3	
4	Capscrew	8	XX	46	Bearing Locknut	1	
5	Seat Retainer	1		47	Check Nut	1	
6	Lip Seal	1	X	48	Bearing Retainer	1	
7	Bearing	2	X	49	Spacer	1	
8	Lip Seal	1	X	50	Ferry Capscrew	16	
9	Bolt	12		51	Mechanical Seal	1	X
10	Key	1		52	Capscrew	4	XX
11	Power Rotor	1	XX	53	Ferry Capscrew	16	
12	O-ring	1	X				
13	Spacer	2					
14	Retainer Ring	1	X				
15	Seat Adapter Subassembly	1					
16	Shaft Sleeve	1					
17	Balance Piston	1	XX	59	Plug	3	
18	Balance Piston Bushing	1	XX	60	Lockwasher	4	
19	Idler Rotor	2	XX	61	Nut	4	
20	Stop Pin	1	XX	62	Bolt	16	
21	O-ring	1	X	63	Stud	4	XX
22	Plug	1		65	Thrust Plate	1	XX
23	Idler Rotor	2	XX	66	Cover	1	
26	Spacer	1		68	Grease	2	X
27	Inlet Head	1		70	Washer	4	
28	Rotor Housing	1	XX	72	Idler B.P.H. Assembly	2	XX
29	Eyebolt	3		73	Clamp	1	
30	O-ring	3	X	74	Jackscrew	4	
31	Vent Pin	2	XX	75	Pipe Plug	1	
32	Pump Case	1		76	Bushing	1	
33	Plug	1		77	Pipe Plug	4	
34	Stop Subassembly	1	XX	80	Oil Balance Tube	2	XX
35	O-ring	1	X	81	Oil Balance Tube	1	
36	O-ring	1	X	82	O-ring	6	X
				83	Housing	1	XX
38	O-ring	2	X	89	Orifice Plug	1	
39	Fitting	1		92	Strainer Sub-assembly	1	XX
40	Inboard Cover	1		93	Pipe Plug	1	
				94	Thermowell	2	

X Denotes Minor Repair Kit Items

XX Denotes Major Repair Kit Items

(Note: Minor Repair Kit Items are included in the Major Repair Kit)

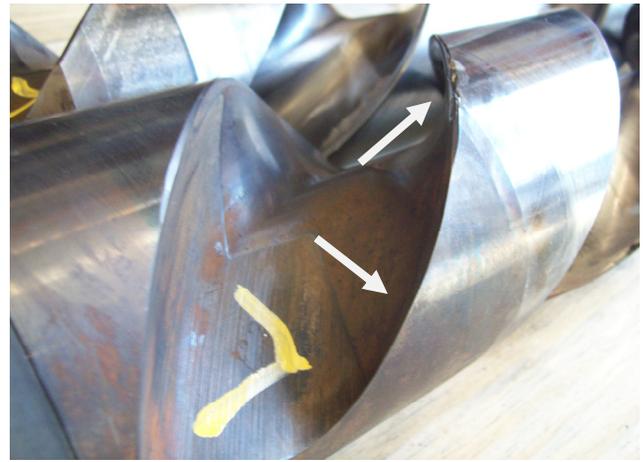
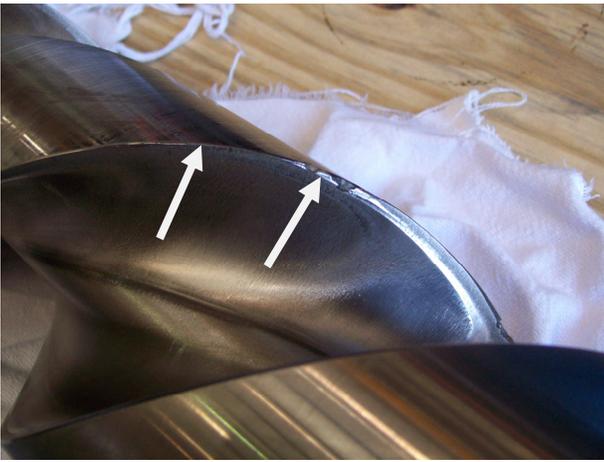
GLH8L-630 PARTS LIST

IDP	Part Description	Qty	Kit	IDP	Part Description	Qty	Kit
1	Stud	8	XX				
2	Nut	8	XX	44	Check Nut	1	
3	O-ring	1	X	45	Setscrew	3	
4	Capscrew	8	XX	46	Bearing Locknut	1	
5	Seat Retainer	1		47	Check Nut	1	
6	Lip Seal	1	X	48	Bearing Retainer	1	
7	Bearing	2	X	49	Spacer	1	
8	Lip Seal	1	X	50	Ferry Capscrew	16	
9	Bolt	12		51	Mechanical Seal	1	X
10	Key	1		52	Capscrew	4	XX
11	Power Rotor	1	XX	53	Ferry Capscrew	16	
12	O-ring	1	X	54	Bleed Tube	1	
13	Spacer	2		55	Flareless Fitting	1	
14	Retainer Ring	1	X	56	Bushing	1	
15	Seat Adapter Subassembly	1		57	Nipple	1	
16	Shaft Sleeve	1		58	Tee	1	
17	Balance Piston	1	XX	59	Plug	3	
18	Balance Piston Bushing	1	XX	60	Lockwasher	4	
19	Idler Rotor	2	XX	61	Nut	4	
20	Stop Pin	1	XX	62	Bolt	16	
21	O-ring	1	X	63	Stud	4	XX
22	Plug	1		65	Thrust Plate	1	XX
23	Idler Rotor	2	XX	66	Cover	1	
26	Spacer	1		68	Grease	2	X
27	Inlet Head	1		70	Washer	4	
28	Rotor Housing	1	XX	72	Idler B.P.H. Assembly	2	XX
29	Eyebolt	3		73	Clamp	1	
30	O-ring	3	X	74	Jackscrew	4	
31	Vent Pin	2	XX	75	Pipe Plug	1	
32	Pump Case	1		76	Bushing	1	
33	Plug	1		77	Pipe Plug	2	
34	Stop Subassembly	1	XX	80	Oil Balance Tube	1	XX
35	O-ring	1	X	81	Oil Balance Tube	1	
36	O-ring	1	X	82	O-ring	4	X
37	Flareless Fitting	1		83	Housing	1	XX
38	O-ring	2	X	89	Orifice Plug	1	
39	Fitting	1		92	Strainer Sub-assembly	1	XX
40	Inboard Cover	1		93	Pipe Plug	1	

X Denotes Minor Repair Kit Items

XX Denotes Major Repair Kit Items

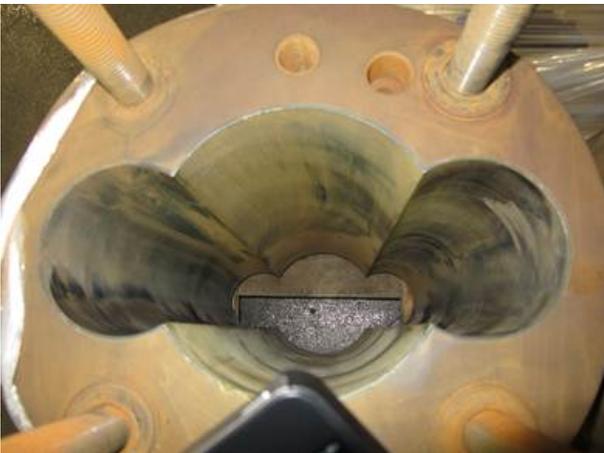
(Note: Minor Repair Kit Items are included in the Major Repair Kit)



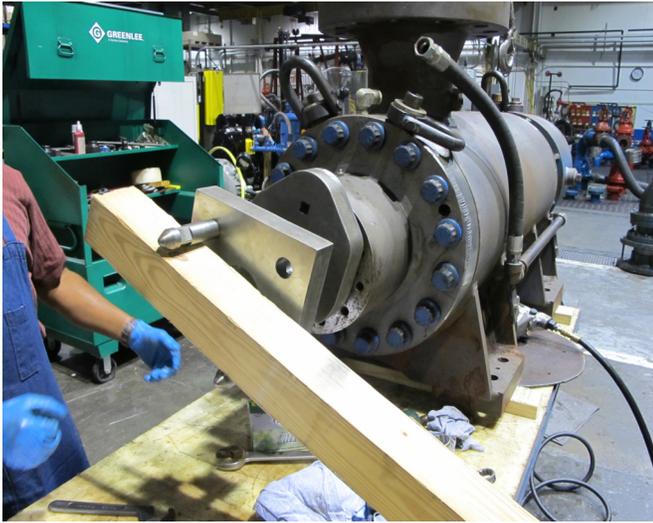
Chip-out damage on land areas of suction Idlers (23) from relative large hard particles passing through pump. Photos also show “sharpening” of land that is consistent with excessive wear.



Idler cup and shoe normal wear in an application with high sand content. Bottom of cup (left) shows some damage where metal has been “picked out”- possibly cavitation.



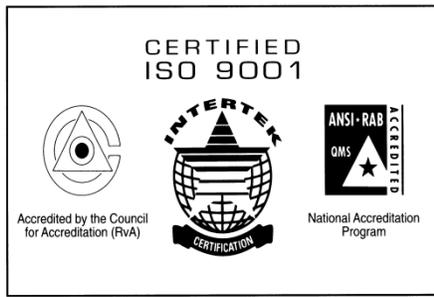
LEFT – Typical housing wearing in a crude oil application. Note: Although rotor bores may look in relatively good condition, running clearances between rotor OD’s and housing bores could be well outside application-dependent values. For example, there may be pump efficiency limits or maximum allowable vibration levels. Maintenance cycles and wear may also vary from location to location, as well as differences in fluid particulate content/size and fluid viscosity. Good record keeping is vital in determining changes and will provide a baseline when troubleshooting is required. **RIGHT** – Typical thrust plate wear in crude oil applications.



Above photos show proper way to lock shaft in position to break lock-nut free on shaft.



LEFT – Pressing power rotor out of inboard cover. If shaft is to be reused, ensure a blank is placed between power rotor removal strongback (S626MN) and outboard end of power rotor. **RIGHT** – Mechanical seal/bearing installation.



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