



## **Instruction Manual and Parts List GLH8L-400 and GLH8L-462**

<b>WARNING</b>
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<p><b>This Instruction Manual and General Instructions Manual, CA-1, should be read thoroughly prior to pump installation, operation or maintenance.</b></p>
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<b>Manual No. SRM00122</b>
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<b>Rev. 01 (21-0001)</b>
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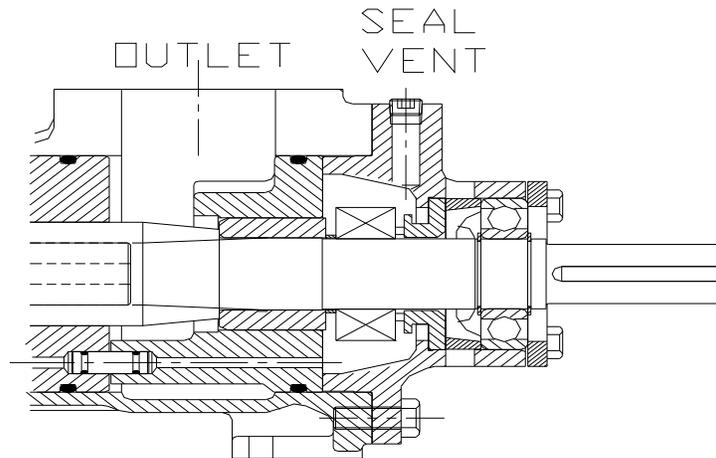
<b>Date: October, 2021</b>
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## IMPORTANT NOTE

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 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.	

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 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 here in cover disassembly, assembly and parts identification of GLH8L-400 and GLH8L-462 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.

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 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.

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.

## INTRODUCTION

This instruction manual covers Imo Pump GLH8L-400, 400P and 462 with ductile iron 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.

## STRUCTURAL LIMITS

Operating conditions such as speed, fluid, viscosity, inlet pressure, temperature, filtration, duty cycle, mounting, driving 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.

**Table 1 – Normal Pump Operating and Structural Limits**

Condition	Limit
Maximum Speed	2300 RPM (All speeds above 1800 RPM must be factory approved)
Minimum Viscosity	60 SSU Minimum Book Rating (Consult IMO pump for minimum viscosity with relation to specific speed and pressure)
Maximum Viscosity	Contact factory
Liquid Temperature	250° F
Maximum Inlet Pressure	75 PSIG
Maximum Discharge Pressure (Continuous Duty)	(Size 400) 1500 PSIG (Size 462) 2000 PSIG
Filtration	Imo General Installation, Operation, Maintenance, and Troubleshooting Manual, SRM00046
Drive	Direct Only
Mounting	Foot mounted

**DESCRIPTION OF PUMP FEATURES**

**Balance**



**WARNING**

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 identified GLH major kit will be required to make the conversion.

By design, all rotor sets are hydraulically balanced in the radial direction. Idler rotors (40 and 41) 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-400 Mod Kit (3268/1000M) and GLH8L-462 Mod Kit (3269/1000M)**

Note: Not every previous designed 8L-400/462 can be converted to the GLH8L-400/462. Please contact IMO for additional details.

Note: Although the converted pump will be annotated as a GLH8L the outline maybe slightly different due to the inlet head design. Please contact IMO for additional details

The Mod Kit includes the following design changes:

- Bearing spacers - to compensate for additional axial clearances
- Oil Balance tubes - to provide discharge pressure (via housing port) to the GLH thrust plate (design enhancement to remove gun drilled idlers)
- End cover – provides additional clearance in order to convert from the thrust cage design to the thrust plate design.



**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**

The GLH8L-400 and GLH8L-462 series pumps are equipped with a standard width size 16 Conrad ball bearing.

**Mechanical Seals**

The GLH8L-400 and GLH8L-462 series pumps are equipped with a positive drive mechanical seal. This is a balanced mechanical seal with a tungsten carbide rotating face and a tungsten carbide stationary face (seal type/material is identified in the 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.

## **Mounting**

The GLH8L-400 and GLH8L-462 series pumps are designed for horizontal foot mounting. The pump case (001) has four feet; the two inboard feet are each drilled to receive two tie-down or mounting bolts. The rear or outboard feet are each drilled to receive one bolt each. The double bolting on the inboard or front end is designed to provide rigid location of the pump front end. 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 (001) is usually several times that of the sub-base or bedplate. If relative movement can't take place between the outboard feet and the base, thermal movement can distort the sub-base and produce pump to driver misalignment.

## **End Cover**

The end cover (50) is designed for RTD installation. The end cover has 2 X 1/2-14 NPT threaded connection ports (supplied with plugs (14)) with 1/4 inch OD x 1-1/2 inch blind hole for the RTD probe on the outboard cover (50) for connection of two optional RTD's.

The RTD's (when installed) are used to read the temperature in-line with the suction idlers. 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 that the operating system should immediately be shut down if the delta temperature between these two RTDs exceeds 25°F to 30°F.

## **Inboard Cover**

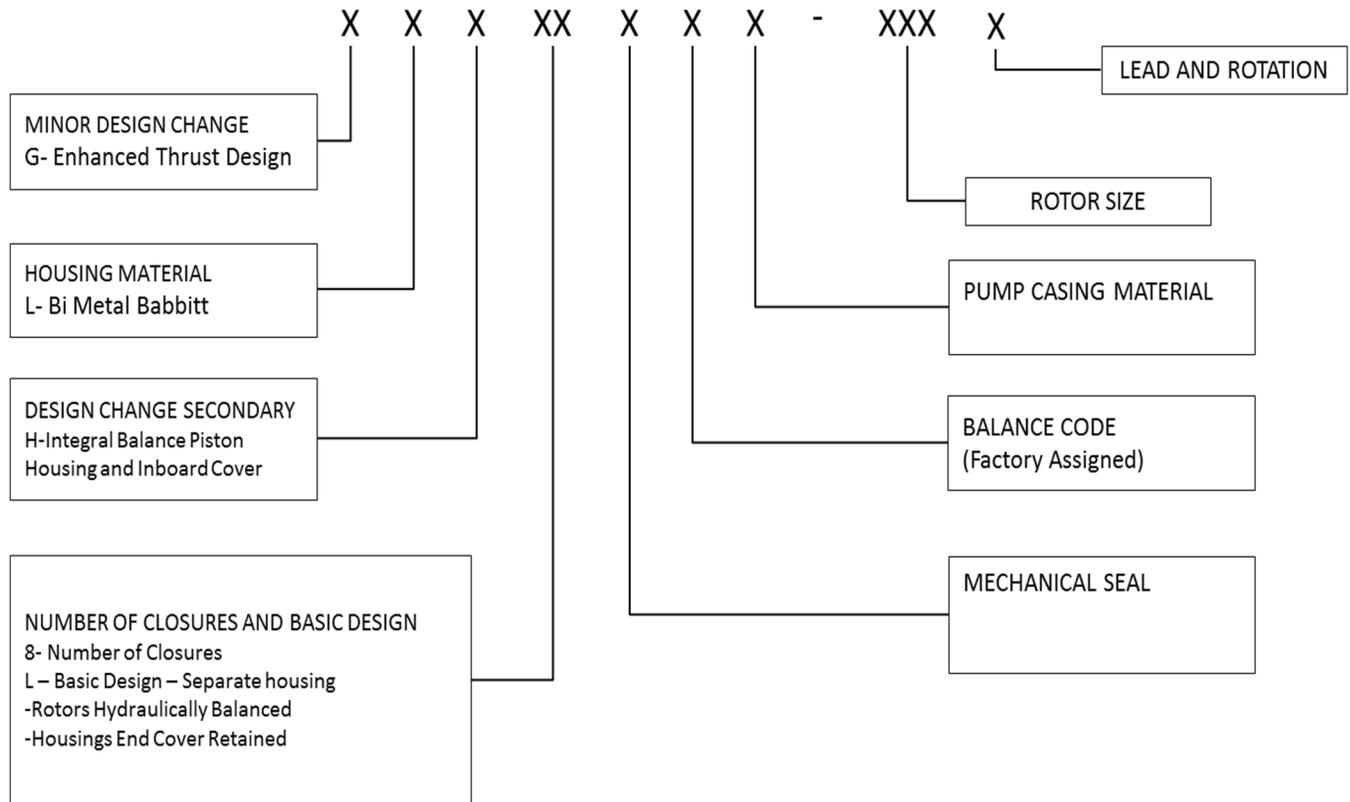
### **Bearing RTD**

A 1/2" – 14 NPT threaded connection with a 5/16" diameter drill through for a temperature sensor (RTD) probe is provided on the inboard cover (13) This RTD ( when installed) monitors the temperature of the ball bearing (31). 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.

### **Vibration Monitoring**

A 1/4"-18 NPT, 3/4" deep with 2" diameter machined surface spot face is provided for installation of an optional vibration transmitter.

## PUMP MODEL IDENTIFICATION



## INSTALLATION

### Inlet Position

The inlet flange on the inlet head (37) may be positioned to have the fluid enter the pump from the top or either side. The inlet flange may be rotated for bottom inlet, but a special seal vent tube (53) and a positive fluid inlet pressure is required.

<b>CAUTION</b>	<b>ATTENTION</b>
The end cover (50) must always be assembled with the RTD connection ports in-line with the suction idlers.	

To change the position of the inlet head (37) complete the following steps:

1. Disconnect the seal vent line (53) and flare fitting (52) from the inlet head.
2. Install an eyebolt in the  $\frac{3}{4}$ -10 x 1-1/8" (2) tapped hole in the end cover (50). While supporting the weight of the end cover (50) (size 400 - 108 lbs.; size 462 - 133 lbs.),

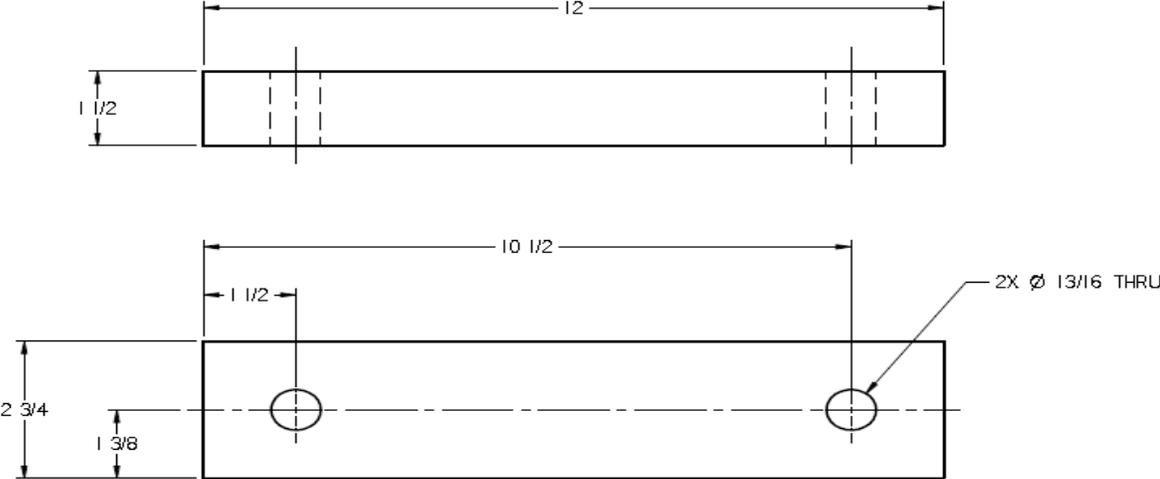
- remove hex bolts (51). Remove end cover (50). Take care not to damage o-ring (12) or thrust plate (48).
3. Place a sling or lifting hooks on inlet head (37) (size 400 – 203 lbs.; size 462 – 275 lbs.). Remove capscrews (20) and lockwashers (21) (size 400: 39 and 38, respectively). Break inlet head (37) free from the case, taking care not to damage O-ring (12)
  4. Rotate inlet head (37) so that the inlet flange is in the desired position, using care in order to prevent damage to O-ring (12). Install capscrews (38) and lockwasher (39). Tighten to a torque specification of  $340 \pm 15$  lbs. ft. (Size 400:  $215 \pm 15$  lbs. ft.)
  5. Remove plug (19) that is now on the underside of the inlet head (37) in line with the seal vent line (53) Install fitting (52), use either pipe thread compound on the threads to ensure an airtight seal. Connect seal vent line (53) to fitting (52). Install plug (19) in the tapped opening from which fitting (52) has been taken. Use pipe thread compound to ensure an airtight seal.
  6. Mount cover (50). Check to make sure O-ring (12) is properly seated in the face groove. Align RTD ports in the plane of the idlers (41). Install hex bolts (51) and tighten to a torque specification of  $193 \pm 10$  lbs. ft. (Size 400:  $215 \pm 15$  lbs. ft.)

## MAINTENANCE

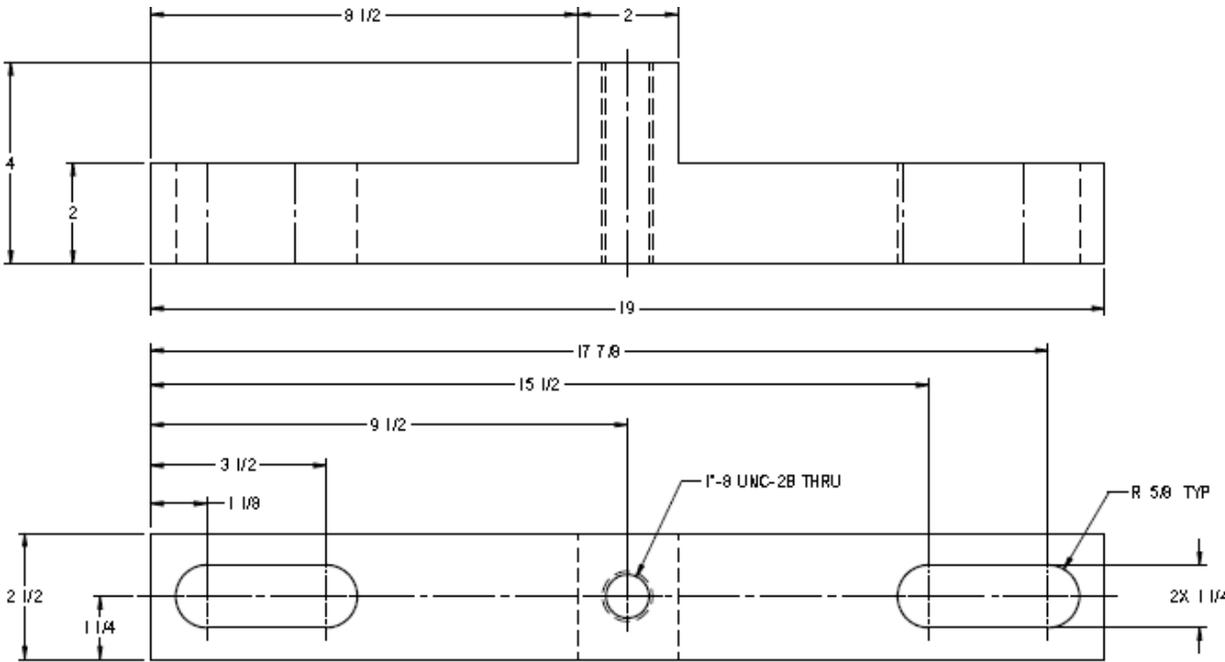
### Special Tooling Required

- Bearing Removal Tool (Figure 1) or Bearing Puller (2-jaw)
- Power Rotor/Housing Removal Strongback (Figure 2)
- $\frac{3}{4}$ -10 x 30" Allthread (Qty 2) (Bearing removal)
- Blank (Power rotor/Housing removal)
- 1"-8 X 36" Allthread (Power rotor/Housing removal)
- 1"- 8 Hex nuts (qty 2) (Power rotor/Housing Strongback to inlet head)
- $\frac{7}{8}$ "- 9 X 14" Allthread (qty 2) and  $\frac{7}{8}$ " Hex nuts and Hardened washers (qty 2 each) for size 400 (Housing removal)
- 1"- 8 X 14" Allthread (qty 2) and 1" Hex nuts and Hardened washers (qty 2 each) for size 462 (Housing removal)
- $\frac{3}{4}$ " Hex nuts and Hardened washers (Qty 2 each) (Bearing removal)
- Bar stock 1  $\frac{1}{16}$ " X 4" (qty 2) (Bearing removal)
- $\frac{1}{2}$ "-13 Jacking Bolt (qty 2) (Inboard cover removal)
- $\frac{3}{8}$ -16 x 2" Bolt (Stop pin removal)
- $\frac{5}{8}$ "-11 X 1- $\frac{1}{4}$ " Eyebolts (qty 2) – optional for size 462 housing removal/installation
- 1"- 8 X  $\frac{7}{8}$ " Eyebolts (qty 2) – optional for size 462 housing removal/installation

**Manufactured Tooling**



**Figure 1. Bearing Removal Tool**



**Figure 2. Power Rotor/Housing Removal Strongback**

## **Servicing the Mechanical Seal and Bearing**

### Mechanical Seal and Bearing Removal

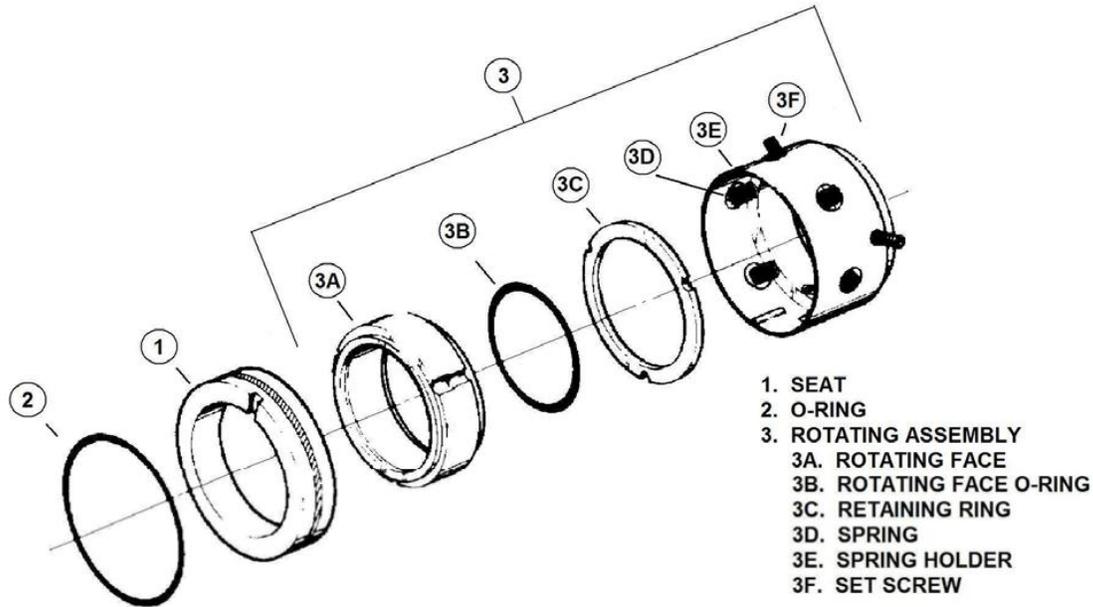
1. Close inlet and outlet valves. Vent pressure from pump and drain before disconnecting inlet and outlet lines. The inlet may be drained by loosening tube fitting (52) or removing plug (19) from outboard end cover (50). Fluid in the outlet can be pumped to the inlet chamber by rotating the unit counterclockwise. Remove tubing (53) from pump.
2. Remove spacer section of coupling. Disconnect inlet and outlet flanges. Remove pump from baseplate.
3. Install a ¾"-10 eyebolt (2) in the tapped hole in end cover (050) (Approx. weight – Size 400: 108 lbs., Size 462: 133 lbs.). Support weight of cover and remove Hex bolts (051). Remove cover (050).
4. Remove O-ring (12) and discard.
5. Loosen and remove capscrews (61). Remove thrust plate (48), spacers (88) and oil balance tube (81) concurrently.
6. Remove O-rings (82) from oil balance tube (81) and discard.
7. Slide idler balance piston housing (044) from idlers (041).
8. Rotate idlers (041) and remove from housing (005). Rotate power rotor (022) counterclockwise and remove both idlers (040). DO NOT drop idlers as they emerge from housing (005).
9. Loosen setscrew (056) and remove coupling nut (055). Remove key (054) from power rotor.
10. Loosen setscrews (75) and remove locknut (33) and nut (32).
11. Remove retainer (034) by removing bolts (035) and lockwashers (036). Grasp power rotor (022) and pull assembly from pump until the seal seat adapter (63) extends from the pump.

<b>NOTE</b>
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The power rotor may need to be pressed out of the housings due to seal seat adapter/inboard cover mating surface providing resistance. (Optional) Use the housing strongback along with a blank to apply even pressure to the outboard size of the power rotor in order to prevent damage to the mechanical seal faces. Blank must be smaller than the power rotor bore of the housing.

12. Removal of ball bearing (031) can be accomplished using a bearing puller (2-jaw placing jaws inside outer spacer (30) holes) or by the completing following steps (see special tools required):
  - a) Installing allthread into the inboard cover/bearing retainer holes
  - b) Install coupling nut (55) in order to prevent damaging the power rotor threads.
  - c) Installing the bearing removal tool on the allthread and securing it using nuts and hardened washers to the inboard end of the power rotor.
  - d) Place bar stock in outer spacer holes and rest the bar stock against the inboard cover.
  - e) Tighten bearing removal tool nuts evenly until the bearing is free from the shaft. This will cause the power to be pressed back into the pump.

- f) Remove the bearing (31), inner spacer (29) and outer spacer (30) from the shaft.



### Multi-Spring Seal with O-ring Seat (Figure 3)

13. Move power rotor assembly forward to expose mechanical seal assembly (3, Figure 3) which is mounted on seal sleeve (26). Slide mechanical seal sleeve off of the power rotor (22), keeping the seal assembly (3, Figure 2) and stationary seat (1, Figure 3) intact. This will include the following parts: mechanical seal (27), seal sleeve (26), retaining ring (28), stationary seat adapter (63) and seat gasket (65). Remove O-ring (25) from power rotor (22).
14. Remove retaining ring (28) from the groove of the seal sleeve (26).
15. Remove seat adapter (63) with gasket (65). Remove mechanical seal stationary seat (1, Figure 3) with O-ring (2, Figure 3) from seat adapter (63).
16. Loosen setscrew (3E, Figure 3) from seal spring holder (3D, Figure 3) and slide mechanical seal rotating assembly (3, Figure 3) from seal sleeve (26).
17. Remove O-ring (25) from internal groove of seal sleeve (26).
18. Inspect the shaft/shaft sleeve and remove any nicks or burrs which are present. Polish shaft to remove any rust or oxidants that may be present under the seal sleeve area.

#### NOTE

The manufacturer recommends replacement of ball bearing (31), mechanical seal (27), gasket (65), and O-ring (25) when these parts are disturbed from their original installed position. All parts should be coated with light lubricating oil to assist in assembly.

### Mechanical Seal and Bearing Installation

1. Install O-ring (25) in internal groove of seal sleeve (26)
2. Install rotating assembly (3, Figure 3) onto the sleeve (26), butting the holder (3E, Figure 3) up against the sleeve shoulder.

#### **NOTE**

The mechanical seal should be assembled onto the sleeve prior to installing it onto the shaft. Using a rubber lubricant on O-ring (3B, Figure 3) will aid in the installation. Do not use grease. Do not tighten mechanical seal setscrews (3F, Figure 3) until the sleeve (26) butts up against the balance piston (24).

3. Insert stationary seat (1, Figure 3) w/ O-ring (2, Figure 3) into seal seat adapter (63). Ensure anti-rotation pin in the seal seat adapter is aligned with the slot on the backside of the stationary seal seat.

#### **NOTE**

It is recommended to clean the stationary/rotating seal faces (Fig. 3, 1 and 3A) with alcohol using a lint-free wipe prior to installing the seal seat adapter. Use caution to avoid damage to the stationary/rotating seal faces when installing the seal seat adapter onto the shaft sleeve.

4. Install the seal seat adapter (63), along with its associated gasket (65), onto the shaft sleeve (26).
5. Compress mechanical seal enough to expose spiral ring groove and install spiral ring (28) in shaft sleeve (26), locking mechanical seal (27) assembly into place.
6. Install assembled shaft sleeve (26) on power rotor (22) shaft until it rests against balance piston (27). Use caution when installing shaft sleeve (16) to avoid damage to installed O-ring (25). Tighten setscrews (3F, figure 3).
7. Install inner spacer (29) and outer spacer (30) on power rotor (22) shaft. Align outer spacer (30) so openings correspond to drain hole and slots in end cover (13).
8. Slide ball bearing (31) on power rotor (22) shaft.

#### **NOTE**

Ball bearing (31) can be heated to 200° F for ease of installation on power rotor (22) shaft. Bearing must be cooled prior to installing the power rotor into the pump.

9. Apply a thin coat of anti-seize to the power rotor threads.
10. Thread nut (32) on power rotor (22) and tighten to a torque specification of  $600 \pm 20$  lbs. ft. (Size 400:  $450 \pm 20$  lbs. ft.) To prevent the power rotor from rotating, hold rotor with a spanner wrench fastened to the rotor's key slot. An extension bar may be required to provide sufficient resistance. Remove any burrs from the key slot after nut (32) is installed.

11. Thread nut (33) on power rotor (22) shaft. Tighten nut to good engineering practices (Critical torque is applied to setscrews (75)). Install set screws (75) in nut (33) and tighten set screws to  $12 \pm 2$  lbs. ft. (Size 400:  $80 \pm 5$  lbs. in.)
12. Install assembled power rotor into the pump, ensuring that each part is centered as it enters the inboard cover (13) and is properly seated. Ensure that the gasket (65) is seated evenly in the inboard cover (13).
13. Install bearing retainer (34) using bolts (35) and lockwashers (36). Tighten bolts (35) to a torque value of  $95 \pm 5$  lbs. ft. (Size 400: same as size 462)
14. Install key (54), coupling hub, and coupling nut (55). Tighten setscrew (56).
15. Install coupling spacer.

### PUMP DISASSEMBLY

<b>CAUTION</b>	<b>ATTENTION</b>
<p>The 8L series pumps incorporate highly finished precision parts that must be handled carefully to avoid damage to critical machined surfaces. The parts removed should be tagged for identification and their exact positions in the pump carefully noted so that the new parts, or the same parts, are properly replaced without damage.</p>	
<b>NOTE</b>	
<p>Because of the size and weight of the individual parts, we recommend removing the pump from its baseplate to a location equipped with a crane when a full disassembly is required.</p>	

1. Complete mechanical seal disassembly (Steps 1-18).
2. Remove power rotor (22) from the pump (Approximate weight: Size 400: 117 lbs., Size 462: 166 lbs.)
3. Install a 3/4"-10 eyebolt (2) into the tapped hole on the inboard cover (13). Connect a lifting hook to the eyebolt for support of the cover. (Approximate weigh: Size 400: 231 lbs., Size 462: 330 lbs.)
4. Remove inboard cover capscrews (21) and lockwashers (20).
5. Install 1/2"-13 jacking bolts in the jacking bolt holes on the inboard cover (13) and evenly torque to separate the inboard cover from the pump case.
6. Using a soft face mallet, tap the inboard cover (13) to loosen it from the case and remove. Set inboard cover (13) on a work bench and remove balance piston bushing/idler stop assembly. Remove capscrew (18), idler stop (16), and balance piston bushing (15).
7. Remove O-ring (4) from the cover and O- ring (12) from pump case.
8. Remove stop pin plug (11) with O-ring (10). Insert 3/8-16 inch bolt in threaded hole of stop pin (009) and remove.
9. Remove strainer (92) from the discharge housing (3).

10. Remove inlet head (37). Using a sling or eyebolts and nuts support the weight of the inlet head, then remove bolts (21) and washers (20) (size 400: 39 and 38, respectively).
11. Install strongback assembly on the suction side of the pump case (1). This consist of the following: strongback, blank, allthread, nuts, and hardened washers (size dependent on pump; see special tools). A blank is required to ensure even compression occurs to the face of the housing.
  - a) Install applicable allthread (see Special Tooling; Housing Removal) into the suction side pump case bolt holes 180° apart. (location of bolts 21 or 39)
  - b) Install housing strongback, sliding the allthread thru the slots in the stongback.
  - c) Install nuts and hardened washers on the back side of the allthread leaving a 1" gap between the strongback and the housing.
  - d) Install 1"-8 allthread into the strongback and tighten to secure a metal blank against the suction housing.
  - e) Install 1" jam nuts on the open end of the strongback allthread.

**CAUTION**

**ATTENTION**

The suction and discharge housings are not bolted together and will separate. Please use caution when removing.

- f) Push the housing out of the discharge end by rotating the outboard jam nut.
- g) As the discharge housing emerges support the weight using a sling.
- h) After the discharge housing is removed, remove vent pins (8), balance tube (87), and O-rings (4 and 82).
- i) Remove the suction housing(5).
- j) (GLH8L-400) Remove retaining ring (7) from the pump case.

**PUMP ASSEMBLY**

1. (GLH8L-400) Install retaining ring (7) into the pump case (1).
2. Install O-rings (82) in grooves of oil balance tube (87).
3. Install vent pins (8), oil balance tube (87), O-ring (4), and strainer sub-assembly (92) in discharge housing (3).

**NOTE**

Either the inlet housing (5) or discharge housing (3) must be placed partly in the suction side or the discharge side of the pump case (1) (size 400 – housing must be installed from the discharge side) prior to meshing them together and installing the anti-rotation pin (9).

4. Assemble inlet housing (5) and discharge housing (3) together ensuring vent pins (8), oil balance tube (87) and housing openings mesh together.
5. Ensure slot in the discharge housing (3) flange aligns with stop-pin hole in the case (1). Install housing stop pin (9). Install O-ring (10) on plug (11) and thread plug into anti-rotation pin opening.

**CAUTION****ATTENTION**

Prior to inboard cover assembly, ensure the orifice (14) (size 400: orifice (100)) is not clogged. Flow through this orifice provides additional flow to the mechanical seal faces for cooling.

6. Install bushing (15) into bore of inboard cover (13). Install idler stop (16) on inboard cover (13) ensuring that spring pin engages slot in the installed bushing. The idler stops should be in alignment with the projected idlers positioning (i.e. perpendicular to the  $\frac{3}{4}$ "-10 tapped hole on top of the inboard cover). Install capscrews (18), and tighten capscrews to a torque value of  $27 \pm 2$  lbs. ft. (Size 400:  $20 \pm 2$  lbs. ft.)
7. Install O-ring (12) on the discharge side of the case.
8. Install O-ring (4) onto the inboard cover
9. Install eyebolt (2) in  $\frac{3}{4}$ " tapped bore in inboard cover (13) to support weight during assembly. Install inboard cover (13) on case (1), using caution to avoid damage to O-ring (12) and ensuring that stop subassembly is properly positioned with idler rotor bores of housing (3). Install capscrews (21) and lockwashers (20). Tighten capscrews (21) to a torque value of  $340 \pm 15$  lbs. ft. (Size 400:  $220 \pm 15$  lbs. ft.).
10. Install the power rotor assembly into the inboard cover end of the pump.
11. Using the power rotor strongback secure the power rotor in position in preparation for the mechanical seal/bearing installation. (see step 22 of disassembly for power rotor strongback installation; blank should be only the size of the power rotor for this step.)
12. Complete Steps 1-15 of Servicing the Mechanical Seal and Bearing - Mechanical Seal and Bearing Installation.
13. Remove power rotor strong back.
14. Install O-ring (12) on the suction side of the case.
15. Install inlet head (37) to case (1) using capscrews (21) and lockwashers (20) (size 400: 39 and 38, respectively). Torque capscrews to  $340 \pm 15$  lbs. ft. (Size 400:  $215 \pm 15$  lbs. ft.).
16. Install idler rotors (40), tapered end first, into inlet end of housing (5). Mesh threads of idler rotors (40) with installed power rotor (22) and rotate power rotor (22) by hand to draw idlers into proper position. Install idler rotors (41) into inlet end of rotor housing (5). Mesh threads of idler rotors (41) with threads of power rotor (22), and rotate power rotor (22) by hand to draw idlers into proper position.
17. Slide idler balance piston housings (44) onto end of idler rotors (41).
18. Install O-rings (82) into grooves of oil balance tube (81) and insert oil balance tube (81) into rotor housing (5).
19. Insert capscrews (61) into plate (48). Slide spacers (88) onto capscrews (61). Mount plate (48) onto rotor housing (5), ensuring the oil balance tube (81) is aligned with the slot in the plate (48). Torque capscrews (61) to  $73 \pm 5$  lbs. ft. (Size 400: same as size 462)
20. Place O-ring (12) in groove of cover (50). Mount cover (50) to inlet head (37) using capscrews (51). Torque capscrews (51) to  $193 \pm 10$  lbs. ft. (Size 400:  $215 \pm 15$  lbs. ft.)
21. Install tubing (53) to elbow fittings (52). Install drain plug (19) in cover (50).

**PARTS LIST**

**GLH8L-462 PART LIST**

IDP	Part Description	Qty	Kit	IDP	Part Description	Qty	Kit
1	Pump Case	1		33	Check Nut	1	XX
2	Eyebolt	2		34	Bearing Retainer	1	
3	Housing	1	XX	35	Hex Bolt	8	
4	O-ring	2	X	36	Lock Washer	8	
5	Housing	1	XX	37	Inlet Head	1	
8	Vent Pin	2	XX	40	Idler	2	XX
9	Stop Pin	1		41	Idler	2	XX
10	O-ring	1	X	44	Idler Balance Piston Housing	2	XX
11	Plug	1		48	Plate	1	XX
12	O-ring	3	X	50	Cover	1	
13	Inboard Cover	1		51	Flange Screw	12	
14	Pipe Plug	4		52	Elbow Fitting	2	
15	Bushing	1	XX	53	Tube	1	
16	Idler Stop Subassembly	1	XX	54	Key	1	
18	Capscrew	2	XX	55	Nut	1	
19	Pipe Plug	5		56	Setscrew	1	
20	Lockwasher	24		57	Outlet Adapter	1	
21	Flange Screw	24		58	Gasket	1	X
22	Power Rotor	1	XX	59	Hex Bolt	4	
23	O-ring*	1	X	61	Capscrew	4	
24	Balance Piston	1	XX	63	Seal Seat Adapter	1	
25	O-ring	1	X	65	Gasket	1	X
26	Seal Sleeve	1		69	O-Ring*	1	X
27	Mechanical Seal	1	X	75	Set Screw	2	XX
28	Spiral Ring	1	X	81	Oil Balance Tube	1	
29	Inner Spacer	1		82	O-Ring	4	X
30	Outer Spacer	1		87	Oil Balance Tube	1	XX
31	Bearing	1	X	88	Spacer	4	
32	Check Nut	1		92	Strainer Sub-assembly	1	XX

X Denotes Minor Repair Kit Items

XX Denotes Major Repair Kit Items

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

\*Pump will have either O-ring (25) or O-ring (69) depending on seal type.

## GLH8L-400 PART LIST

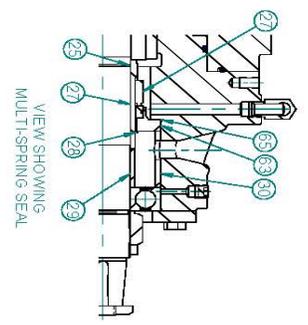
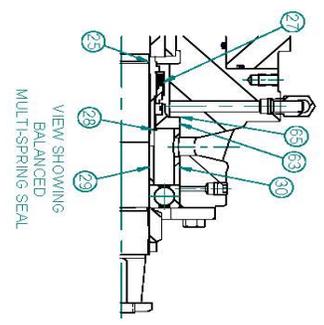
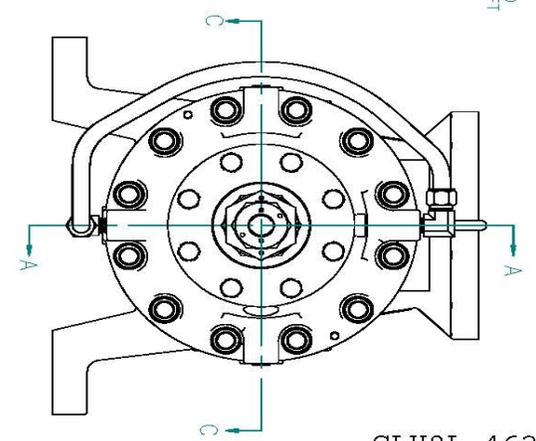
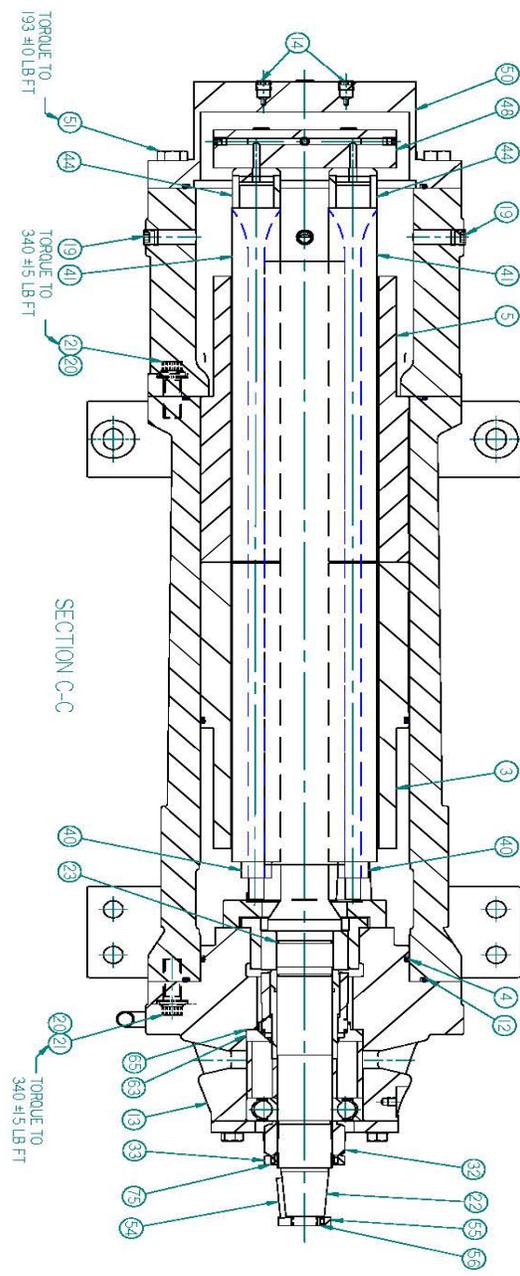
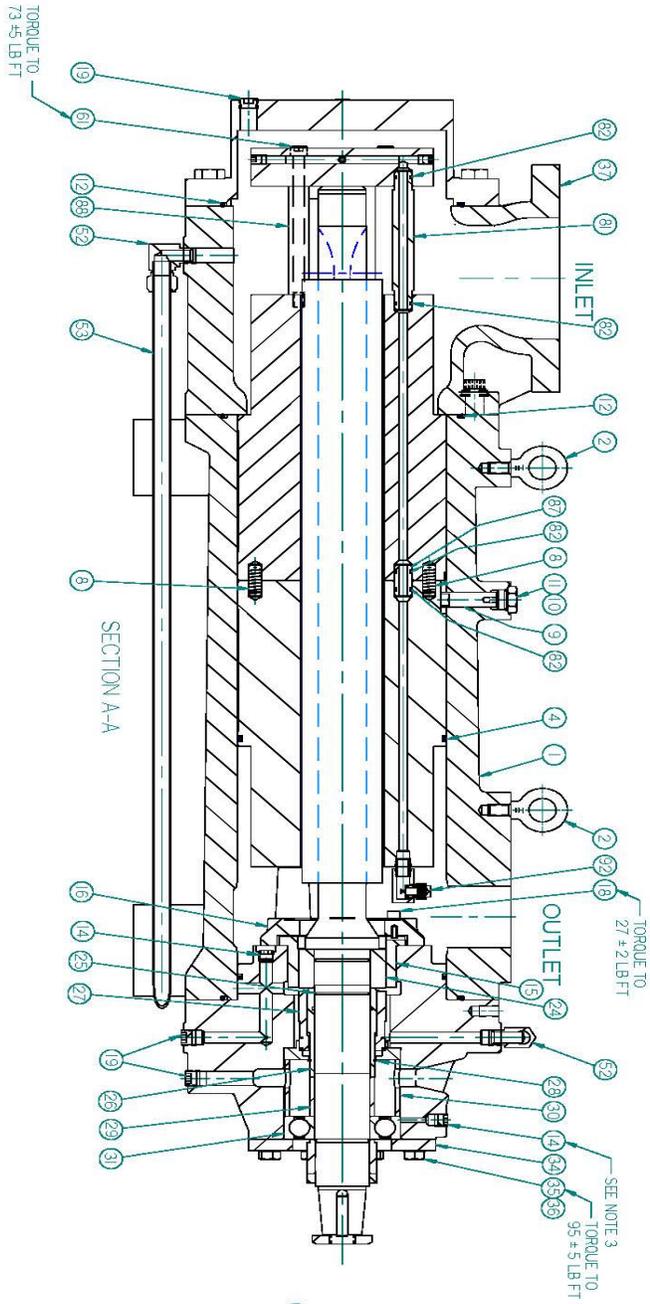
IDP	Part Description	Qty	Kit	IDP	Part Description	Qty	Kit
1	Pump Case	1		34	Bearing Retainer	1	
2	Eyebolt	2		35	Hex Bolt	8	
3	Housing	1	XX	36	Lock Washer	8	
4	O-ring	2	X	37	Inlet Head	1	
5	Housing	1	XX	38	Flange Screw	8	
6	Spacer	1		39	Lock Washer	8	
7	Retaining Ring	2		40	Idler	2	XX
8	Vent Pin	2	XX	41	Idler	2	XX
9	Stop Pin	1		44	Idler Balance Piston Housing	1	XX
10	O-ring	1	X	48	Plate	1	XX
11	Plug	1		50	Cover	1	
12	O-ring	3	X	51	Hex Bolt	8	
13	Inboard Cover	1		52	Elbow Fitting	2	
14	Pipe Plug	4		53	Tube	1	
15	Bushing	1	XX	54	Key	1	
16	Idler Stop Subassembly	1	XX	55	Nut	1	
18	Capscrew	2	XX	56	Setscrew	1	
19	Pipe Plug	5		57	Outlet Adapter	1	
20	Lockwasher	8		58	Gasket	1	X
21	Flange Screw	8		59	Hex Bolt	4	
22	Power Rotor	1	XX	61	Capscrew	4	
23	O-ring*	1	X	63	Seal Seat Adapter	1	
24	Balance Piston	1	XX	65	Gasket	1	X
25	O-ring	1	X	75	Set Screw	2	XX
26	Seal Sleeve	1		81	Oil Balance Tube	1	
27	Mechanical Seal	1	X	82	O-Ring	4	X
28	Spiral Ring	1	X	87	Oil Balance Tube	1	XX
29	Inner Spacer	1		88	Spacer	4	
30	Outer Spacer	1		90	Plug	1	
31	Bearing	1	X	91	O-ring	1	
32	Check Nut	1		92	Strainer Sub-assembly	1	XX
33	Check Nut	1	XX				

X Denotes Minor Repair Kit Items

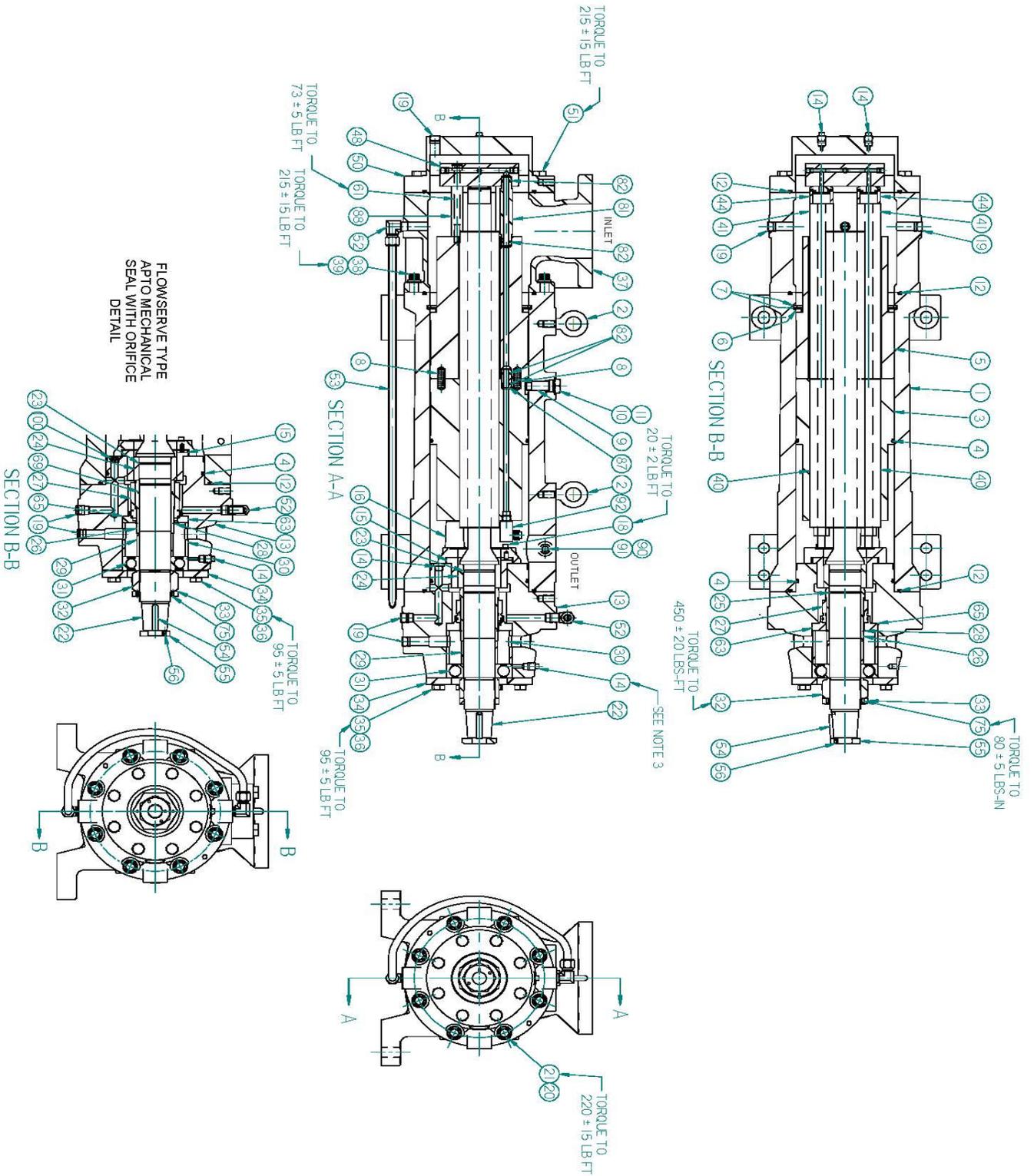
XX Denotes Major Repair Kit Items

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

# DRAWINGS



GLH8L-462 ASSEMBLY



GLH8L-400 ASSEMBLY



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