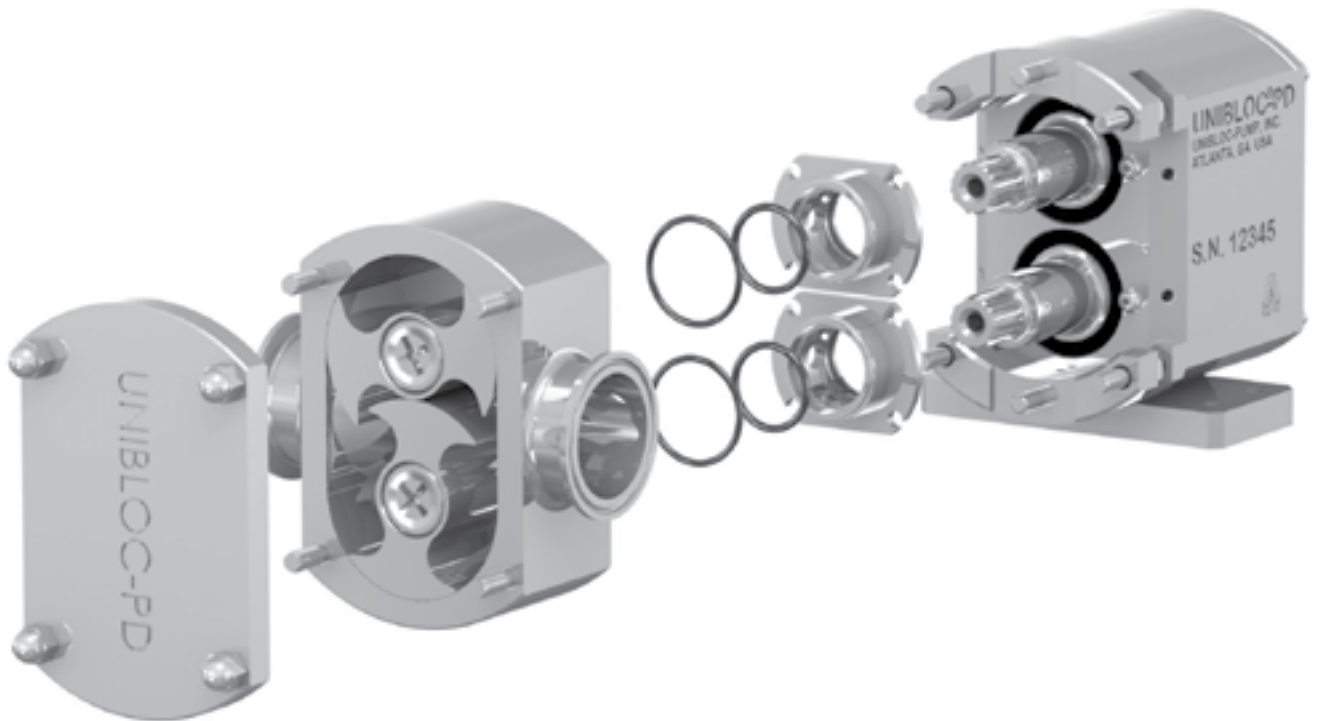


UNIBLOC[®]-PD

Operation & Service Manual

Models: 200-576



Original Instructions

MANUAL NO.: PD200-576 REVISION: 09/2019





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1.0 General

1.1 Declaration of Conformity

Original Declaration of Conformity

According to New Approach Machine Directive 2006/42/EC

Manufacturer

UNIBLOC-PUMP, Inc.
Flowtech Div.
1701 Ashborough Road
Marietta, GA 30067-8925
USA

Manufacturer

UNIBLOC-PUMP AB
Lantvarnsgatan 4
652 21 Karlstad
SWEDEN

Declares hereby

That the following product(s) if ordered with CE compliance are meeting the requirements set forth in EC Directive 2006/42/EC.

If the product is modified without our written permission, or if the safety instructions in the instruction manuals are not being followed, this declaration becomes invalid.

- Machine Description: Rotary Lobe Pump
- Product Denomination: UNIBLOC®-PD
- Model/Type: PD200-677
- Standards: Applicable Harmonized Standards
 - EN 809+A1 2009 Pumps and Pump Units for Liquids – Common Safety Requirements

Technical file for this machinery is retained at the above address.



Bhavesh Patel
QA Manager
UNIBLOC-PUMP, Inc.

Date: October 15, 2015
Marietta, Georgia, United States

Original Declaration of Conformity

According to New Approach Machine Directive 2006/42/EC

Manufacturer

UNIBLOC-PUMP, Inc.
1701 Ashborough Road
Marietta, GA 30067-8925
USA

Manufacturer

UNIBLOC-PUMP AB
Lantvarnsgatan 4
652 21 Karlstad
SWEDEN

Declares hereby

That the following product(s) if ordered with CE compliance are meeting the requirements set forth in EC Directive 2006/42/EC.

If the product is modified without our written permission, or if the safety instructions in the instruction manuals are not being followed, this declaration becomes invalid.

- Machine Description: Rotary Lobe Pump Assembly
- Product Denomination: UNIBLOC®-PD & GP ASSEMBLY
- Model/Type: PD200-677; GP200-450
- Directives: Applicable Directives
 - Electromagnetic Compatibility Directive 2004/108EC
 - Low Voltage Directive 2006/95/EC
- Standards: Applicable Harmonized Standards
 - EN 809+A1:2009 Pumps and Pump Units for Liquid – Common Safety Requirements
 - EN 60034 Rotating Electrical Machinery
 - EN 60038 IEC Standard Voltages
 - EN 60204-1:2006 Safety of Machinery, Electrical Equipment of Machines.

Technical file for this machinery is retained at the above address.



Bhavesh Patel
QA Manager
UNIBLOC-PUMP, Inc.

Date: October 15, 2015
Marietta, Georgia, United States

1.2 General Description

UNIBLOC-PD is a positive displacement rotary lobe pump. It may be supplied with a drive unit (figure 1.0) or without a drive unit (figure 1.1). When supplied with a drive unit it is called **UNIBLOC-PD ASSEMBLY**. Figure 1.0 indicates various parts of an assembly. UNIBLOC-PD can be supplied in 4 different series; 5000 series with stainless steel bearing housing, 4000A with an anodized aluminum bearing housing or 4000B with a painted aluminum bearing housing and 3000 series with steel bearing housing. Different models are available from each series. Table 1.0 shows the pump bearing housing and model relation. Each model can be mounted with the inlet and outlet ports in horizontal or vertical orientation. The orientation can be modified using either a foot for horizontal or pedestal for vertical. Port orientation should be specified when ordering.

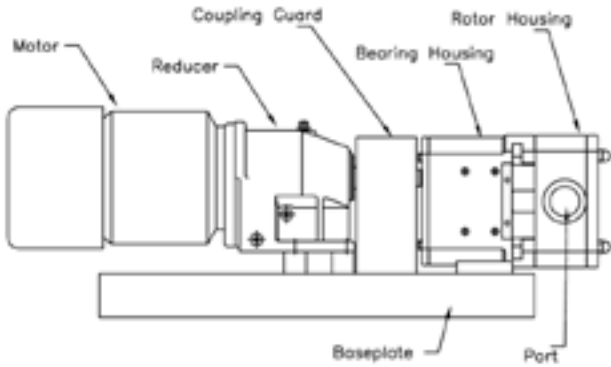


Figure 1.0

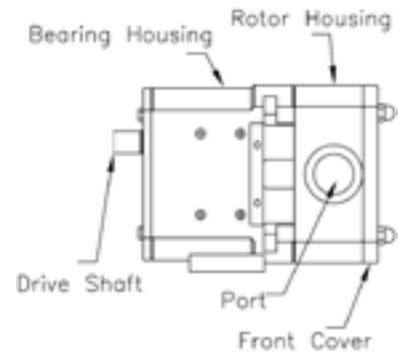


Figure 1.1

Bearing housing	Pump Model	Bearing housing	Pump Model	Bearing housing	Pump Model	Bearing housing	Pump Model	Bearing housing	Pump Model
200 Size	200-0	300 Size	300	400 Size	400	500 Size	500	501 Size	501
200 Size	200	300 Size	350	400 Size	450	500 Size	550	501 Size	551
200 Size	250					500 Size	575	501 Size	576
200 Size	275								

Table 1.0

The UNIBLOC-PD port positions are designed to accommodate both vertical and horizontal product flow. Model 200-275 has a bracket with an integrated foot and can be rotated 90° to change port orientation. Models 300-575 have a pre-drilled bearing housing. This allows custom installation, standard feet for horizontal ports, or a standard pedestal for vertical port orientation. The pump is designed to operate in both directions without modifications. See figure 1.2

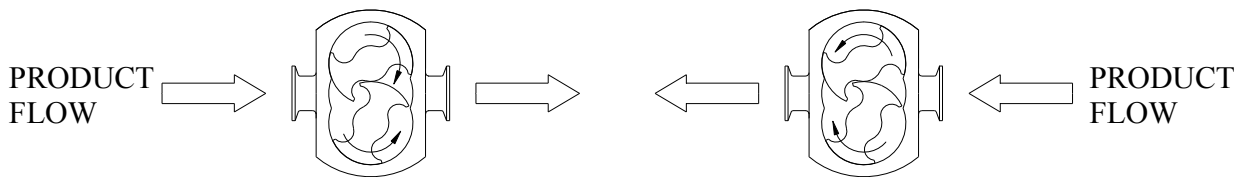


Figure 1.2

1.2.1 Limitation

The pump should be used for the duty for which it has been specified. The operating pressure, speed and temperature limits have been selected at the time of order and **MUST BE ADHERED TO**. These details are stated on the original order documentation. If not available, documentation may be obtained from your supplier by referencing the pump serial number and/or invoice number.

1.2.2 Noise Emission

Under certain operating conditions, pumps and/or drives and/or the systems within which they are installed can produce sound pressure levels that exceed 80dB. In such cases ear protection should be used.

1.2.3 Marking – CE

Figure 1.3 shows the tag that is attached on the pump bearing housing. If the tag were to be lost for any reason you can find the pumps serial number machined on the side of the bearing housing. See figure 1.4
Always state the pump model and/or serial number when asking for assistance.

UNIBLOC-PD CE
MADE IN USA
SERIES: 5000 4000A 4000B 3000
MODEL: _____
SERIAL No.: _____
BUILD CODE: _____
Year: _____ Mass, kg: _____
Max press. @ ambient temp, Bar: _____
Max temp. @ 1 Bar, °C: _____
UNIBLOC-PUMP
UNIBLOC PUMP MANUFACTURING CO. 2007-2008
PHONE: (714) 210-2100 FAX: (714) 210-2100
WWW.UNIBLOC.COM EMAIL: SALES@UNIBLOC.COM

Figure 1.3

1.2.4 Marking – Standard

Standard marking is machined on the side of pumps' bearing housing. See figure 1.4 for details. Pump size is machined on rotor housing next to the ports.

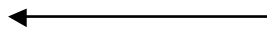


Figure 1.4

2.0 Safety

2.1 General

This information must be read carefully before installation, operation or servicing. The safety instruction must always be available for the pump operator. The following symbols are used.



WARNING: Indicates instructions that can affect personal safety if not followed.



WARNING: Indicates electrical voltage instructions that can affect personal safety if not followed.

ATTENTION

ATTENTION: Indicates instructions to be considered for safe operation and to protect the pump and pump unit.

2.2 Safety Instructions

Incorrect installation, operation or maintenance of the equipment can cause serious personal injury and/or damage to the equipment and will invalidate the warranty. Make sure the pipes are well supported as the pump is not meant to serve this purpose. Keep in mind that pipes filled with liquid are very heavy. See figure 2.2.1 for recommended pipe layout.

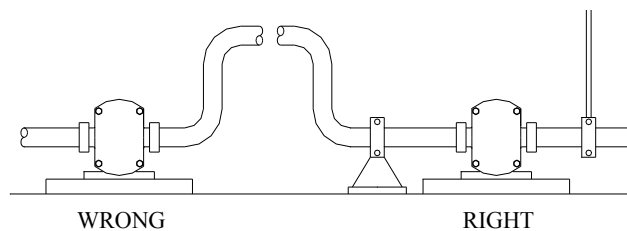


Figure 2.2.1



Pump or pump assembly must be electrically connected by authorized personnel, follow the motor instructions supplied in case of assembly.



Never operate the pump if the front cover and/or suction/discharge pipe-work are not in place. Make sure they are properly installed, see figure 2.2.1. Likewise, never operate the pump if other protection such as coupling and shaft guards are missing or incorrectly installed.



Never stick your appendages or other foreign objects inside the rotor housing, connections to the rotor housing, or in the back cover if there is any possibility that the pump shafts may rotate.



Do not exceed the pump's maximum operating pressure, speed or temperature. Do not modify the operating parameters/system for which the unit was originally supplied for without first consulting your local supplier.



Pump installation and operation must always comply with prevailing health and safety regulations.

- ⚠ Always make sure the alignment with the drive unit is within proper tolerances. Misalignment between the pump, drive and coupling will result in premature wear, increased operating temperature and noisier environment. See figure 2.2.2 for vertical misalignment: Place shims under pump or drive; 0.25mm (0.01inch) max deviation. See figure 2.2.3 for horizontal misalignment: Move pump or drive horizontally; 0.25mm (0.01inch) max deviation. See figure 2.2.4 for angular misalignment: Rotate pump or drive; 1° max deviation

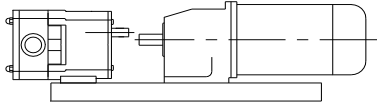


Figure 2.2.2

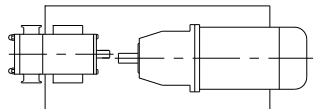


Figure 2.2.3

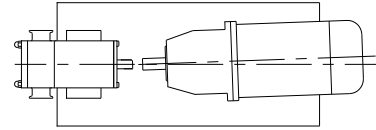


Figure 2.2.4

- ⚠ Avoid any direct contact with hot surfaces of the pump or drive unit. If the surface temperature of the system exceeds 68°C, the system must be marked with a warning sign for “hot surface.”
- ⚠ ALWAYS DISCONNECT THE POWER SUPPLY when performing any kind of maintenance. Make sure the power can not be switched by locking it. Allow the pump and associated parts to cool down to a safe handling temperature.
- ⚠ Never operate the pump with either the suction side or the pressure side blocked.
- ⚠ Never operate the pump without the front cover installed properly
- ⚠ Always make sure any safety/relief valves are depressurized or relieved before dismantling.
- ⚠ Always ensure correct rotation of pump with flow direction before start.

ATTENTION Installation of safety equipment to prevent pump from exceeding maximum allowable pressure is recommended. If an integrated safety relief valve is installed, do not allow extended periods of recirculation through the valve. **UNIBLOC-PUMP** can either integrate a safety valve with the front cover, or supply one as a separate unit. Please contact your supplier.

ATTENTION Installation of a non-return device is recommended to prevent reverse flow in the pump when it is being turned off. **UNIBLOC-PUMP** can supply a check valve as non-returning device. Please contact your supplier.

ATTENTION Check the pump and motor assembly for adequate oil prior start up.

ATTENTION Make sure the pump and pipe systems are clean and free from debris or any foreign material before start up.

ATTENTION Do not install the pump into a system where it may run dry (i.e. without a supply of pumped media) unless it is assembled with a flushed shaft seal that is properly installed with a fully operational flushing system.

ATTENTION Installation of pressure gauges/sensors in conjunction with the pump’s suction and discharge connections is recommended to be able to monitor the pump’s pressure.

ATTENTION When cleaning manually or by CIP, SIP methods, the operator must ensure that a suitable procedure is used in accordance with the systems requirements.

ATTENTION If operating with a pulley, proper support must be selected to prevent excessive bearing wear and bending of the shaft. See figure 2.2.5. Additional safety guards are a must.

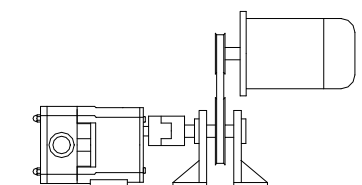


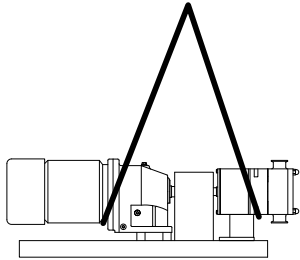
Figure 2.2.5

3.0 Installation

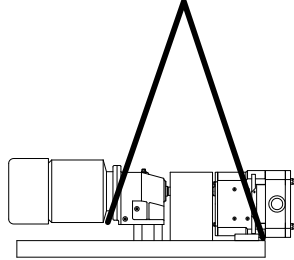
3.1 Handling and Storage



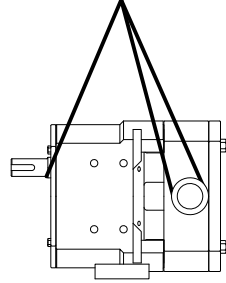
Caution must be taken when lifting the pump or pump unit. For all parts over 20kg we recommend the use of a lifting device or lifting arrangement when unpacking or moving. Check the weight guide in section 5.0 for details. See figure 3.0 and 3.1 for lifting guidance.



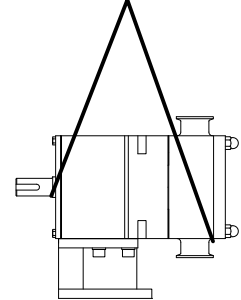
Vertical Port Mounting
Figure 3.0



Horizontal Port Mounting



Horizontal Port Mounting
Figure 3.1



Vertical Port Mounting

When you receive your product please follow these steps.

- Check packaging for any damage in transit.
- Check the packing slip against received goods.
- If an assembly, make sure the manual for the drive unit is included.
- Visually inspect the product for any signs of damage.
- Report any damage immediately to the carrier.

If installation of the pump is delayed, store and protect the unit properly by:

- Not removing plastic port protectors.
- Selecting a clean, dry storage location free from vibration. In a moist or dusty atmosphere, further protect the pump/assembly with suitable cover.
- Rotating the pump or pump assembly by hand every week, to prevent bearing damage.

3.2 System Design

When a pump is to be incorporated in a system, it is considered good practice to minimize the length of the pipes and the number of fittings and any other restrictions to product flow. Always consider the following when designing a system:

- Confirm the Net Positive Suction Head-NPSH available from the system exceeds the NPSH required from the pump to ensure smooth operation and avoid cavitation.
- Avoid suction lifts and manifold/common suction lines for two pumps running in parallel, as this may cause vibration or cavitation.
- Protect the pump from unintended blockage from nuts, bolts, welding slag, etc, by installing a strainer. Also protect the pump from unintended operation against a closed valve by installing a safety/pressure relief valve. Strainers and relief valves can be provided by **UNIBLOC-PUMP**.
- Install monitoring equipment on suction and pressure side of pump for diagnostic purposes.
- Install shut-off valves on suction and pressure side to isolate pump when service is necessary.
- Make sure the pipes are well supported. Do not use the pump to support the piping. See figure 2.3.1
- Make the necessary piping arrangement if pump is supplied with a flushed seal or if the housing is jacketed for heating/cooling.
- Do not expose pump to rapid temperature changes, this may seize the pump as a result from thermal shock.
- Allow at least 1m (3feet) free space around the pump for easy maintenance access.

Figure 3.2.1 shows a typical recommended design and required components for safe operation of the pump. All components are available from **UNIBLOC-PUMP**. Contact your supplier.

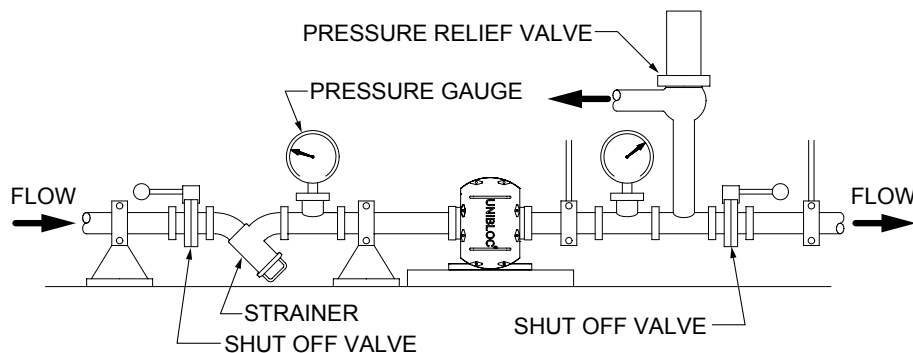


Figure 3.2.1

3.3 Flushed Seal Arrangement

The flushed seal arrangement cools and lubricates the shaft seal area. All flushed seals must be installed in a proper system; otherwise the seal will **NOT OPERERATE CORRECTLY**. The flushing system also works as a barrier between the environment and the pumped media.

3.3.1 Single and Double Mechanical Seal Flushing/Cooling

Flushing systems are normally not included with the pump. Connections to the seal housings are 1/8" NPTF.

It is important that:

- The flush system is correctly installed and connected, see figure 3.3.1 and 3.3.2 for recommendations.
- A compatible flushing fluid is used and supplied at the correct pressure and flow rate. If the discharge pressure fluctuates set the pressure to suit maximum condition.

ATTENTION

Double mechanical flushed seal pressure: 1bar (15psi) higher than the discharge pressure of the pump
Single mechanical with flushed housing max pressure: 0.5bar (7psi)
Minimum flow rate required per seal: 1lpm (0.3gpm) or a rate that keeps seal temperature within 5°C (9°F)

- It includes shut-off valves and check valves in the system so that the flush can be turned off and stop unwanted substance from flowing in the wrong direction.
- It includes monitoring equipment such as a pressure gauge in the system to ensure correct pressure is obtained.
- The flushed fluid is flowing before or at the same time the pump is engaged, and turned off after or at the same time the pump is disengaged.

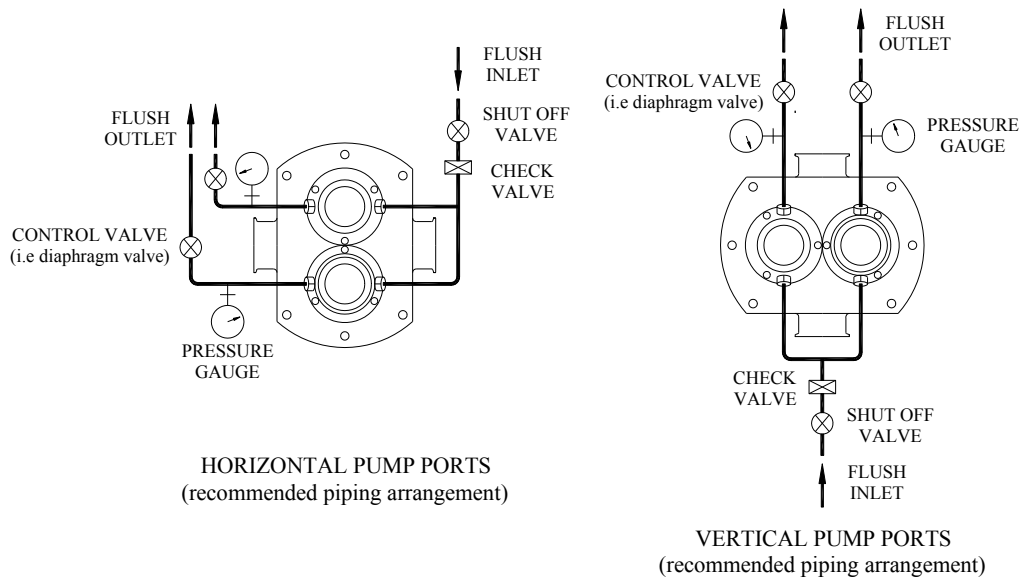


Figure 3.3.1

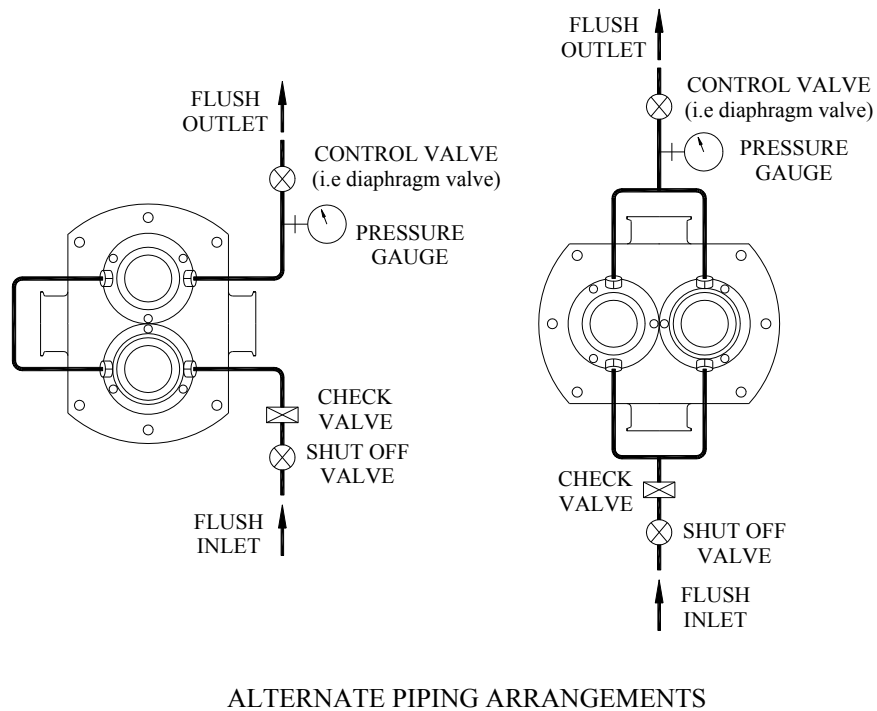


Figure 3.3.2

3.3.2 Double O-Ring Seal Flushing/Cooling

The flushing system may be arranged the same as the double mechanical seals, shown in figure 3.3.1 and 3.3.2. The double o-ring seals may also be lubricated with grease if the pump application justifies doing so. In this case, the seal flush chambers are filled through grease nipples with approved grease that is suitable for use with the pumped media. The chambers must be filled completely for proper operation. This can be accomplished by over pressurizing the chambers such that grease will be squeezed out of the seals along the shafts and into the rotor housing. The amount of grease in the seal chambers must be monitored daily, and if the pump is used in constant duty applications, it should be checked several times every 24 hour period.

3.4 Pre-Start Check List

- Check the pipes to make sure they have been purged of debris.
- Check all obstructions to make sure they have been removed from pipe or pump.
- Check pump connections and make sure they are tight.
- Check lubricant levels to make sure they are correct.
- Check that safety guards are in place.
- Check inlet and outlet valve to make sure they are open and functional.
- Check the seal flushing is connected and activated, if applicable.

4.0 Maintenance



BEFORE ANY MAINTENANCE TAKE PLACE: TURN OFF POWER SUPPLY TO THE MOTOR.

4.1 Clean In Place, CIP

The pump can be manually cleaned or by Cleaned In Place (CIP). The following is an example of suggested CIP procedure. However, specific advice for each application can be obtained from your pump supplier.

If the temperature difference between the process liquid, or the pump, and the cleaning media is greater than 100° C (180° F), stop the pump and then introduce the cleaning liquid. If the liquid is not gravity fed and the pump must draw the liquid from a supply vessel, run the pump until it is filled and then stop. Allow the pump to adjust to the cleaning liquid temperature and then continue running the pump at normal speed. If the pump has double mechanical seals, they must be continued to be flushed during the CIP process. The length of time necessary to clean the pump and the type of liquid used is dependent on the type of process liquid and its characteristics.



Never touch the pump or the pipelines as they can be extremely hot.



Always use rubber gloves and protective goggles if handling caustic substances.

ATTENTION

The rotors and shaft seals in the pump have been selected for specific temperature and pressure conditions. Verify with **UNIBLOC-PUMP** or the documentation supplied with the pump that the operating parameters are not exceeded.

ATTENTION

Always rinse well with clean water after using cleaning agent.

4.2 Steam In Place, SIP

The pump can be manually cleaned or cleaned with Steam In Place (SIP). Following is an example of suggested SIP procedure. However, specific advice for each application can be obtained from your pump supplier.

Stop the pump and introduce steam into the system. If the pump must be operated, allow it to adjust to the steam temperature and then run it between 50-100 rpm. If the pump has double mechanical seals, they must be continued to be flushed during the SIP process. The length of time necessary to steam the pump is dependent on the type of process liquid used and its characteristics. After the SIP process is complete, allow the pump to return to ambient temperature or to the temperature of the process liquid. Resume normal operation to remove condensate or to begin pumping another media.



Never touch the pump or the pipelines as they can be extremely hot.



Always use rubber gloves and protective goggles if handling caustic substances.

ATTENTION

The rotors and shaft seals in the pump have been selected for specific temperature and pressure conditions. Verify with **UNIBLOC-PUMP** or the documentation supplied with the pump that the operating parameters are not exceeded.

ATTENTION

Always rinse well with clean water after using cleaning agent.

4.3 Maintenance Schedule and Recommended Spare Parts

It is recommended to install pressure gauges on both sides of the pump so that any problems with the pump or pipelines can be monitored. It is also recommended to have shut-off valves on both sides for easy isolation of pump if manual service is required.

The UNIBLOC bearing housing is supplied permanently lubricated with nitrile seals. However, for certain applications and at the user's request, drain plugs and a vent will be supplied. When applications exceed constant service temperatures of 180° C (356° F) a vent and high temperature lubricant must be used. For such cases, contact UNIBLOC-PUMP or your supplier for an adequate service schedule.

Recommended weekly maintenance control to include:

- Control of oil levels in pump bearing housing and gear reducer. (Change once per year or after 2000 hours of operation, whichever comes first.)
- Control of oil seal leakage.
- Control of shaft seal leakage.
- Control of pump medium leakage.

ATTENTION

Allow the pump to cool down after shut down prior to inspection.

Recommended spare parts

- 1 set of shaft seals Qty 2
- 1 set of front oil seals Qty 2
- 1 set of rear oil seals Qty 1
- 1 wet-end o-ring kit Qty 1 (5 o-rings)
- 1 wet-end o-ring kit (for Metal Rotors) Qty 1 (5 o-rings)

4.4 Shaft Seal Service



DISENGAGE POWER TO THE MOTOR before proceeding with the following steps. If the pump is connected to piping, depressurize the system and close valves on both the suction and discharge sides to isolate the pump from the rest of the system. Disconnect the piping from the pump. If service is to be performed while the pump is still mounted to the system, disconnect the motor drive coupling or the electrical connection to the motor.

ATTENTION

To aid in the removal and installation of the shaft seals, use plastic mounting sleeves with the same diameter as the shafts seal area. The sleeves also protect the seals from the shaft splines. They can be obtained from UNIBLOC-PUMP. Contact your supplier for details.

Remove the front cover nuts (16) and the front cover (2). If the pump has polymer rotors (3b) they can be removed by sliding them off the shafts. If the rotors are stainless steel (3a), place a nonmetal object between the rotors to keep them from turning. Unscrew the rotor bolts (14a) and then slide the rotors off the shafts. If the rotors will not slide off they can be removed simultaneously with the rotor housing (1). Unless they are being replaced, **DO NOT USE PLIERS OR CHANNEL LOCKS TO REMOVE THE ROTORS.** They will be damaged. See the following sections for further instructions to remove the rotor housing.

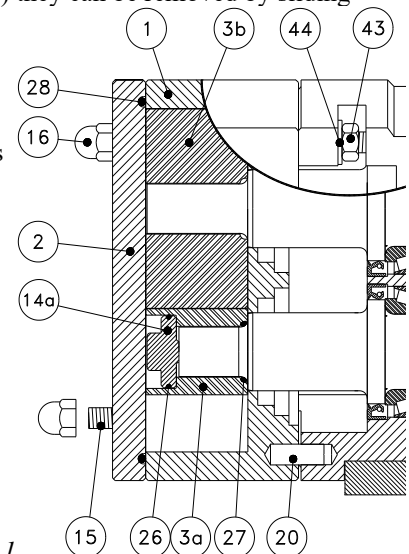


Figure 4.4.1

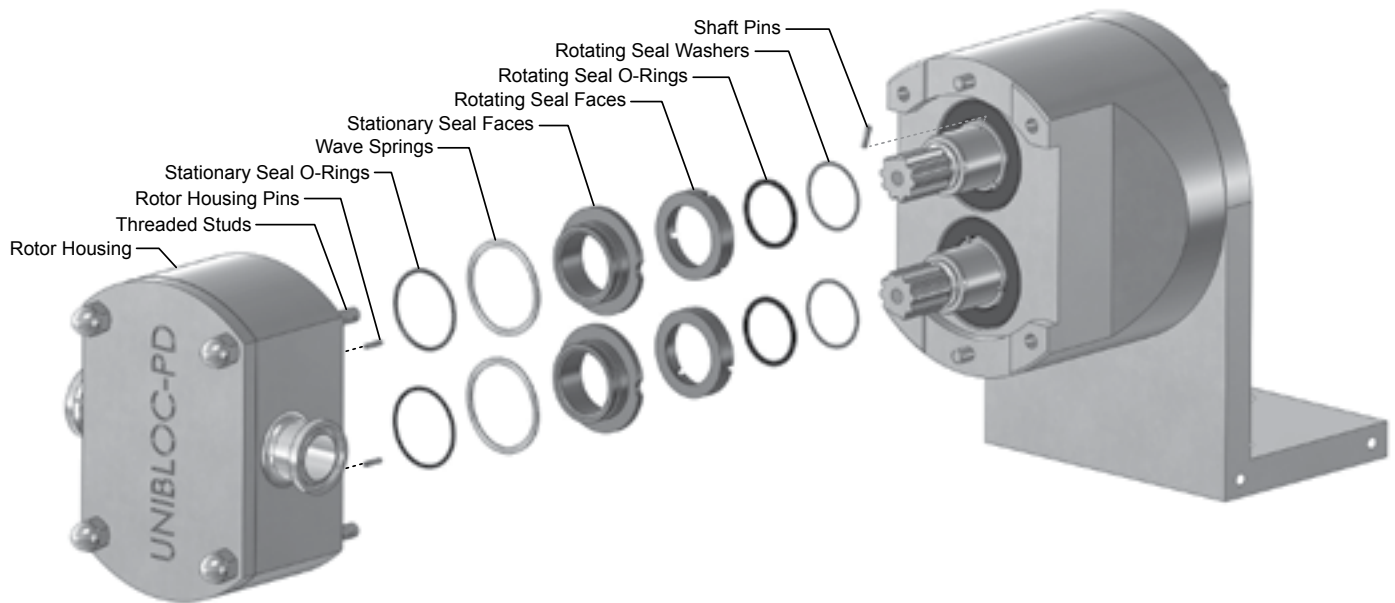
4.4.1 Single Mechanical Seal

This type of shaft seal is used in most applications with products that have a viscosity of less than 1,000 cPs. The maximum rotational speed of this seal is 1500 rpm and the maximum service pressure is 13.5 bar (195 psig). The seal materials available are stainless steel, carbon, silicone carbide, and tungsten. The standard o-rings supplied in these seals are FDA-viton or FDA-EPDM. These can be replaced with other materials upon request.

UNIBLOC-PD 501 Series has front loaded seals. This seal comes with different seal face combinations. (See drawing G812B for details.) Maximum shaft rotational speed for this seal is 2.4 m/s (7.8 ft/s) or 800rpm and the maximum service pressure should not exceed 15 bar (220 psig). Maximum and minimum temperature limits are +160°C (320°F) and -15°C (5°F).

4.4.1.1 UNIBLOC-PD 200-275 Single Mechanical Seal Removal

Loosen and remove the acorn nuts from the **Rotor Housing**. Loosen the **Threaded Studs** by locking two M6 nuts against each other on the exposed threaded stud ends. Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. Do not rock the housing back and forth excessively. This can cause the seals to break. Remove the **Stationary Seal Faces** and **Stationary Seal O-Rings** by pulling them out of the rotor housing. Remove the **Rotating Seal Faces**, the **Rotating Seal O-Rings**, and **Rotating Seal Washers** by sliding them off the shafts. To avoid damage, carefully handle and store the loose **Stationary Seal Faces** and the **Rotating Seal Faces** so that their lapped sealing surfaces do not get scratched.



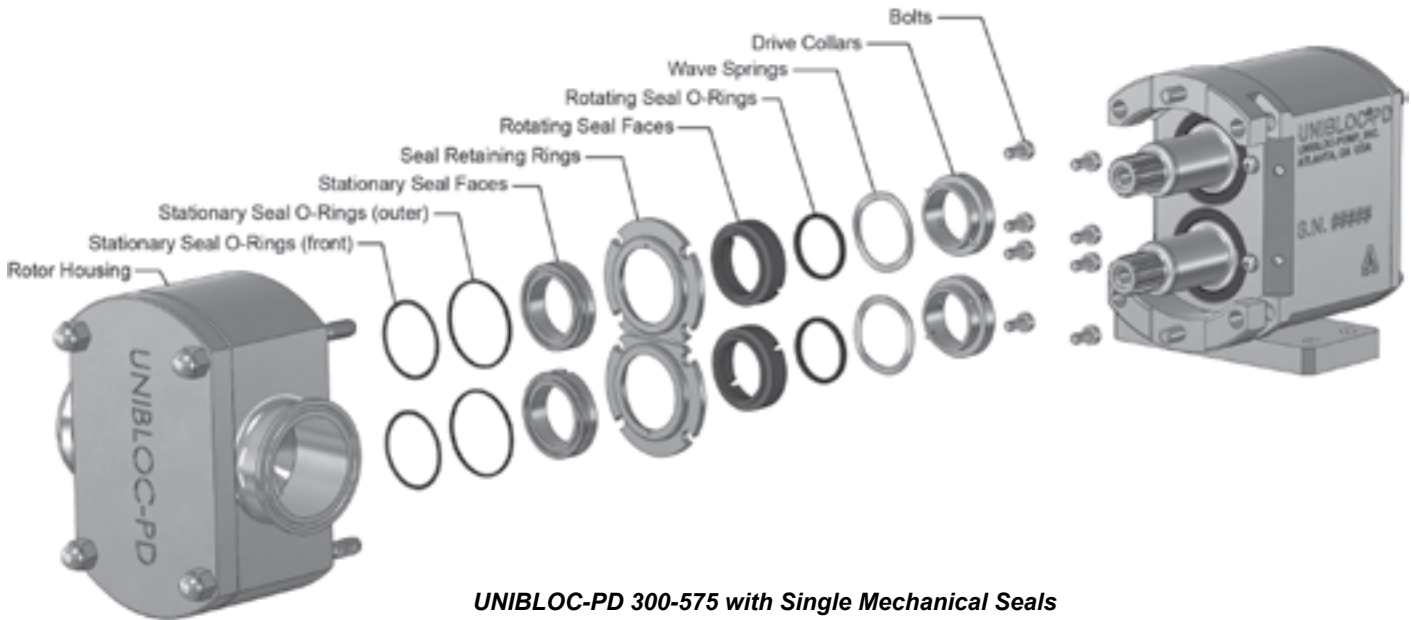
UNIBLOC-PD 200-275 with Single Mechanical Seals

4.4.1.2 UNIBLOC-PD 200-275 Single Mechanical Seal Installation

If missing, insert the **Rotor Housing Pins** into the rotor housing and the **Shaft Pins** into the shafts. Coat the shafts and rotor housing bores with a product compatible lubricant. Place the **Rotating Seal O-Rings** in the **Rotating Seal Face** first, and then the **Rotating Seal Washers**. Slide the **Rotating Seal Rings**, slotted side first, onto the shafts. Place the **Wave Springs** between the **Rotor Housing Pins**. Place the **Stationary Seal O-Rings** in the groove of the **Stationary Seal Faces**. Align the slots of the **Stationary Seal Faces** with the **Rotor Housing Pins** in the rotor housing. Push the **Stationary Seal Faces** into the rotor housing, o-ring side first. Press several times to make sure they slide easily. Place a product compatible lubricant on the sealing surfaces. **Proceed to section 4.4.7 to complete the installation.**

4.4.1.3 UNIBLOC 300-575 Single Mechanical Seal Removal

Loosen the **Stud Nuts** (item 43 in Figure 4.4.1). Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. Do not rock the **Rotor Housing** back and forth excessively. The seals may break. The **Seal Retaining Rings**, the **Bolts**, the **Stationary Seal Faces**, and the **Stationary Seal O-Rings** will all come off with the **Rotor Housing**. Unscrew the **Bolts** to remove the **Seal Retaining Rings**, the **Stationary Seal Faces**, and the **Stationary Seal O-Rings**. Slide the **Rotating Seal Faces** and the **Rotating Seal O-Rings** off the shafts. To avoid damage, handle and store the loose **Stationary Seal Faces** and **Rotating Seal Faces** so that their lapped sealing surfaces do not get scratched. If not being replaced, the **Drive Collars** may remain on the shafts, otherwise loosen the set screws and slide them off the shafts. UNIBLOC-PD 500 Series may use wear sleeves. See section 4.4.4.1 sketch.

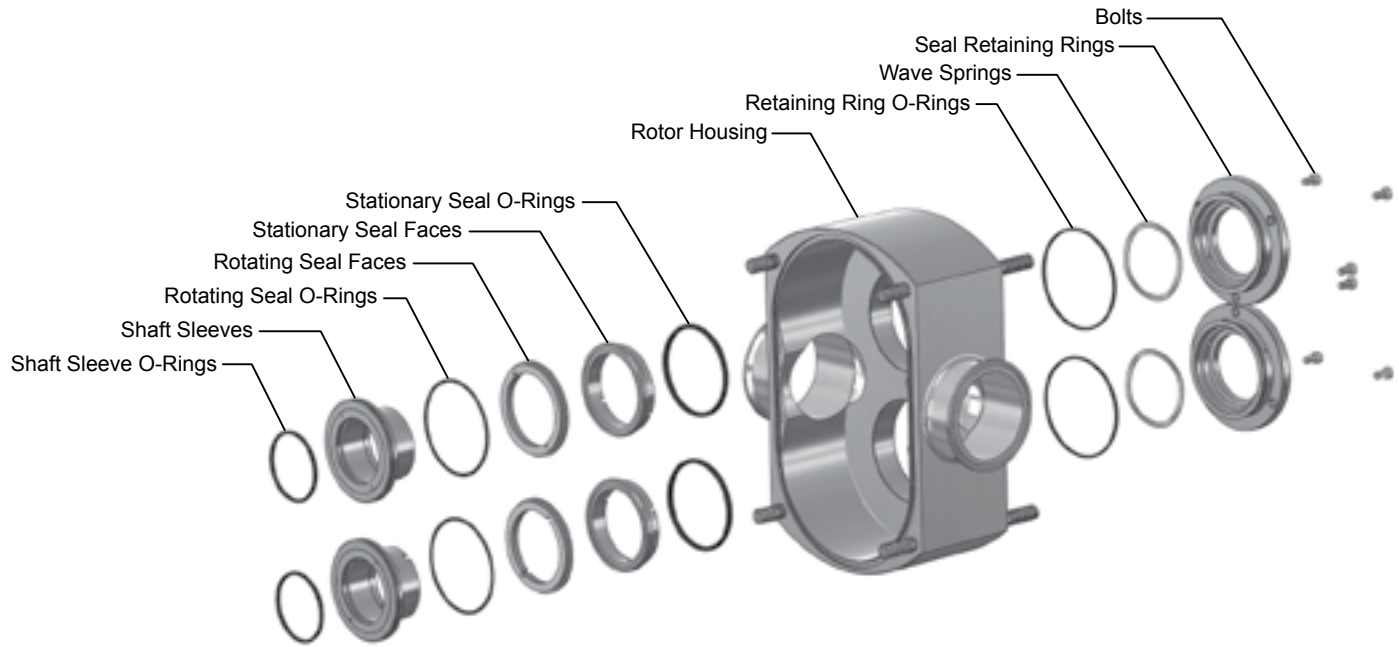


4.4.1.4 UNIBLOC 300-575 Single Mechanical Seal Installation

The shafts and the rotor housing bores should be cleaned before installing the seal components. Slide the **Drive Collars** on the shafts. Moisten the **Rotating Seal O-Rings** with water or coat them with a lubricant that is acceptable for use with the product. Slide the **Rotating Seal O-Rings** onto the shafts and then the **Rotating Seal Faces**, slotted sides first. Align the slots in the **Rotating Seal Faces** with the pins in the **Drive Collars**. Push the **Rotating Seal Faces** against the **Drive Collars** so that the **Rotating Seal O-Rings** seat properly. Place the **Stationary Seal O-Rings** (front & outer) on the **Stationary Seal Faces**. Only lubricate these o-rings with water or alcohol. Push the **Stationary Seal Faces** into the rotor housing so that they seat flat with the step in the housing. Some applications require pins to be used in the **Stationary Seal Faces**. When placing them in the rotor housing align the pins with the holes in the rotor housing and press them in. Do not use objects that will scratch the **Stationary Seal Faces**' seal surface to push them in. Place a product compatible lubricant on the sealing surfaces. If **Seal Retaining Rings** were supplied with the pump, bolt them to the rotor housing. **Proceed to section 4.4.7 to complete the installation.** After installing the housing push the **Drive Collars** toward it. Compress the **Wave Springs** while leaving a 2-3mm (0.08"-0.12") gap between the **Drive Collars** and the **Rotating Seal Faces**. Tighten the **Drive Collar** set screws. UNIBLOC-PD 500 Series may use wear sleeves. See section 4.4.4.1 sketch.

4.4.1.5 UNIBLOC 501, 551, 576 Front Loaded Single Mechanical Seal Removal

Remove the **Shaft O-rings** (item 27 in Figure 4.4.1) located behind the shaft splines. Use two long flat head screwdrivers 180° apart to pry the **Shaft Sleeve** out of the **Rotor Housing**. Use razor blade or sharp flat head screwdriver to remove the **Rotating Seal Face** from the **Shaft Sleeve**. Remove **Stationary Seal Face** from **Seal Retaining Ring** by hand.



UNIBLOC-PD 501, 551, 576 with Single Mechanical Seals

4.4.1.6 UNIBLOC 501, 551, 576 Front Loaded Single Mechanical Seal Installation

The shaft and rotor housing bores should be cleaned before installing the seal components. Before installing components, note the location of the dowel pins on the **Seal Retaining Ring**. Small ink markings can be made on the surface of the Rotor Housing to show pin locations. Replace and lubricate the **Retaining Ring O-Ring**.

Take the **Stationary Seal Face** and lubricate the **Stationary Seal O-Ring** already installed. Note location of pin slots on the **Stationary Seal Face**. Ink markings can be made on surface of Rotor Housing to show location of pins and similar markings can be made on seal face to show location of pin slots. Align the **Stationary Seal** pin slots with the **Seal Retaining Ring** pins. Evenly hand press the **Stationary Seal Face** until fully seated. **Stationary Seal Face** will be fully seated once a spring compression can be felt.

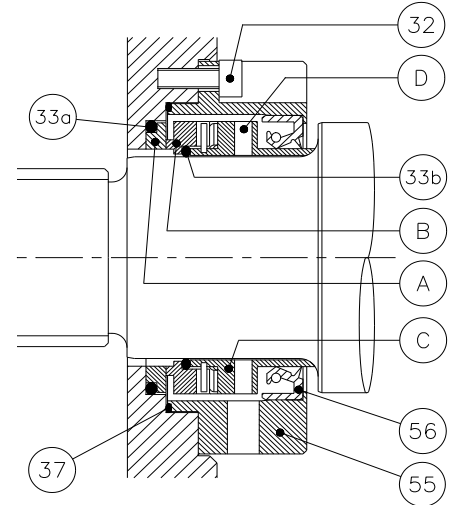
Place the **Rotating Seal O-Ring** on the stepped side of the **Rotating Seal Face** and lubricate. While aligning the **Rotating Seal Face** pin slots with the Shaft sleeve pins, hand press the **Rotating Seal Face** into the **Shaft Sleeve** until fully seated. Lubricate the **Shaft Sleeve O-Ring** located in the inner diameter of the **Shaft Sleeve**. Aligning the pin slots on the **Shaft Sleeve** with the pins on shaft (item 90 in Figure 4.4.1), hand press the Shaft Sleeve (with Rotating Seal installed) evenly until seated and spring tension can be felt. Spring tension will be set by installation of rotor onto shaft.

4.4.2 Flushed Single Mechanical Seal

The flushed single mechanical seal uses the same stationary mating ring, rotating seal nose ring, spring, and o-rings as the single mechanical seal discussed in section 4.4.1. The drive collar is different, however. The flushed single mechanical is not available for UNIBLOC 200-0, 200, 250, and 275. See section 3.3 for more information about flushing systems.

4.4.2.1 Flushed Single Mechanical Seal Removal

Disconnect the flush tubing from the flush housings (55). Loosen the set screws (D) by inserting an allen wrench into the flush housing port holes. Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the rotor housing (1) by pulling on the ports or by tapping gently with a rubber mallet and lay it rotor cavity down so that the seals face up. Do not rock the housing back and forth excessively or let it come in contact with the shaft splines. The seals may break. The entire seals with the flush housings will come off intact with the rotor housing. Unscrew the bolts (32) to remove the flush housings (55), the lip seals (56), and the flush housing o-rings (37). The remaining seal components may now be removed. To avoid damage, handle and store the loose seal nose rings (B) and the mating rings (A) so that their lapped sealing surfaces do not get scratched. To remove the lip seals (56), place the flush housings so that they are supported at the bolt holes not at the o-ring (37) location. This can be done by placing the flush housings, after all other seal parts have been removed, back into the rotor housing seal bores. Push or tap the lip seals with a tube to remove them.

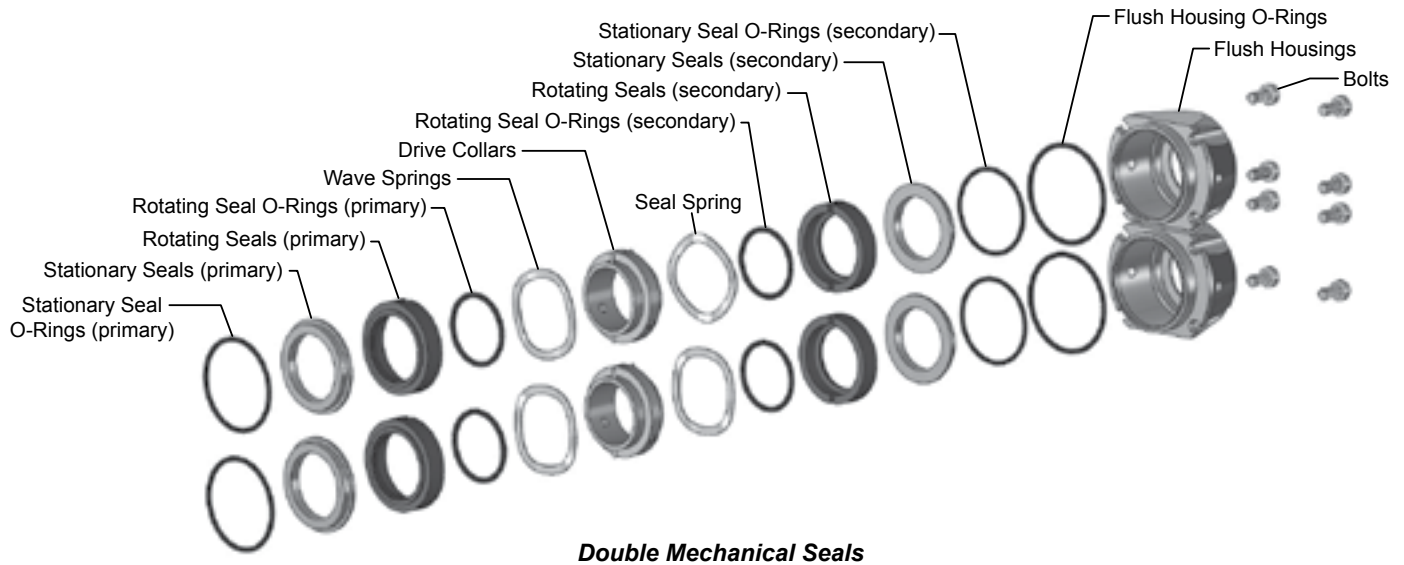


4.4.2.2 Flushed Single Mechanical Seal Installation

Place the mating ring o-rings (33a) in the rotor housing seal bores. Only lubricate these o-rings with water or alcohol. Push the mating rings into the rotor housing so that they seat flat with the step in the housing. Do not use objects that will scratch the mating rings' seal surface to push them in. Check the drive collars (C) for wear at the lip seal location. If a groove is present, the drive collars may need to be replaced. If the lip seals (56) have been removed, place the flush housings (55) so that the o-ring groove edges face up. Lubricate the lips and the outer diameters of the lip seals. Push the lip seals, spring sides facing up, into the flush housings with a tube that is the same diameter as the lip seals. Place the o-rings (37) into the o-ring grooves. Lubricate the shafts, the outside of the plastic mounting sleeves, and the drive collars at the lip seal location. Slide the flush housings on the drive collars. Slide the flush housings with the drive collars, seal nose o-rings (33b), and the seal nose rings (B), slotted sides first, on the plastic mounting sleeves. Align the slots with the pins in the drive collars and push the seal nose rings so that the o-rings (33b) seat properly. Place a product compatible lubricant on the sealing surfaces. Rotate the flush housings so that its port holes align with at least one set screw. Lubricate the o-rings (37) and mount the seal cartridge assemblies on the rotor housing. Tighten the bolts (32). **See section 4.4.7 to complete the installation.**

4.4.3 Double Mechanical Seal

The flushed Double Mechanical Seal uses the same **Stationary Seal Faces (primary & secondary)** and **Stationary Seal O-rings (primary & secondary)** as the Single Mechanical Seals discussed in section 2.1.2. The Drive Collar and Rotating Seal Face are different, however. The flushed Double Mechanical Seal is not available for UNIBLOC 200-0, 200, 250, and 275. See section 3.3 for more information about flushing systems.



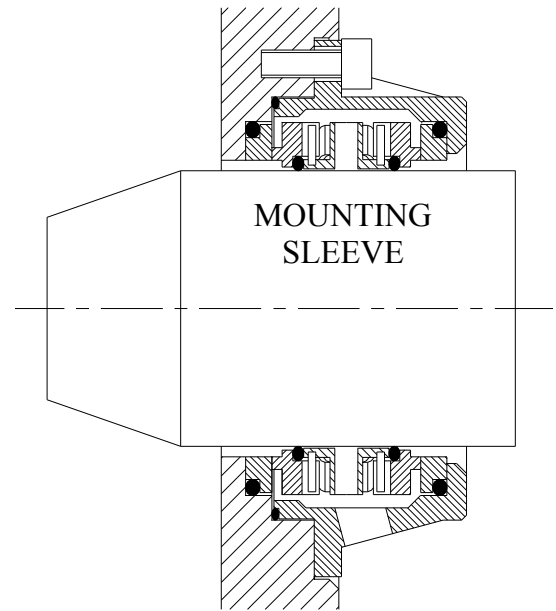
4.4.3.1 Double Mechanical Seal Removal

Disconnect the flush tubing from the **Flush Housings**. Loosen the **Drive Collar** set screws by inserting an allen wrench into the flush housing port holes. Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the rotor housing (item 1 in Figure 4.4.1) by pulling on the ports or by tapping gently with a rubber mallet and lay it rotor cavity down so that the seals face up. Do not rock the housing back and forth excessively or let it come in contact with the shaft splines. The seals may break. The entire Seal Package, with the Flush Housings attached, will come off with the rotor housing. Unscrew the **Bolts** to remove the **Flush Housings**, the **Stationary Seal Faces (secondary)**, **Flush Housing O-Rings**, and **Stationary Seal O-Rings (secondary)**. The remaining seal components may now be removed. To avoid damage, handle and store the loose Seal Faces so that their lapped sealing surfaces do not get scratched. Remove the **Stationary Seal Faces (primary)** by pulling them out of the rotor housing seal bores. Remove the **Stationary Seal Faces (secondary)** by pushing them out of the **Flush Housings**.

4.4.3.2 Double Mechanical Seal Installation

Place the **Stationary Seal O-Rings (primary & secondary)** in the rotor housing seal bores and the **Flush Housings**. Only lubricate these o-rings with water or alcohol. Push the **Stationary Seal Faces (primary)** into the rotor housing so that they seat flat with the step in the housing. Push the **Stationary Seal Faces (secondary)** into the **Flush Housings** making sure the o-rings seat properly. Do not use objects that will scratch the Stationary Seal Faces' seal surface to push them in. Place a product compatible lubricant on the sealing surface of the **Stationary Seal Faces**.

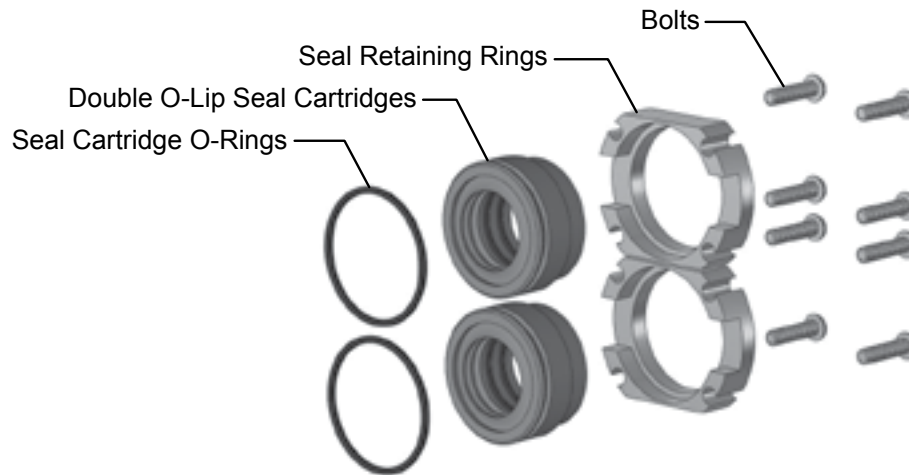
While the rotor housing is lying flat with the cavity facing down, stack the seal components on the **Stationary Seal Faces (primary)**. Begin with **Rotating Seal Faces (primary)**, slotted sides up. Place the **Rotating Seal O-Rings (primary)** into the **Rotating Seal Faces (primary)**. Next, place the **Drive Collars** into the the **Rotating Seal Faces (primary)**. Making sure to align the slots with the pins, push the **Drive Collar** gently to seat the o-rings. Place the **Rotating Seal O-Rings (secondary)** on the **Drive Collars**. Align the slots with the pins, and push gently to seat the o-rings. Place the **Flush Housings** over the stacked components, rotating them to make sure one set screw will be visible through the port holes in the Flush Housings. Push the housings down gently. Screw in the **Bolts** and hand tighten. Lubricate the plastic mounting sleeves and slide them, tapered end first, into the seals. Tighten the **Bolts**. Leave the sleeves in the seals and **proceed to section 4.4.7 to complete the installation.**



4.4.4 Double O-Lip™ Seal

This type of seal is most frequently used with liquids that are very difficult to seal because of high viscosity. The seal comes as a single cartridge that is easily serviced. The maximum shaft rotational speed for this seal is 1,5m/s (4,9ft/s) and the maximum service pressure should not exceed 10 bar (150 psig). The seal does not require external lubrication and can be run dry for short periods. It is available for all models except UNIBLOC 200-0, 200, 250, and 275 which has the two lips only and not the two shaft o-rings.

UNIBLOC-PD 501 Series has front loaded seals. The seal comes as a single cartridge that is easily serviced. The maximum shaft rotational speed for this seal is 1.5 m/s (4.8 ft/s), or 500 rpm, and the maximum service pressure should not exceed 10 bar (150 psig). The seal does not require external lubrication and can be run dry for short periods. This seal comes as standard on **UNIBLOC-PD 501 Series Truck/Transport pumps**.



UNIBLOC-PD 200-575 Double O-Lip Seals

4.4.4.1 UNIBLOC 200-575 Double O-Lip™ Seal Removal

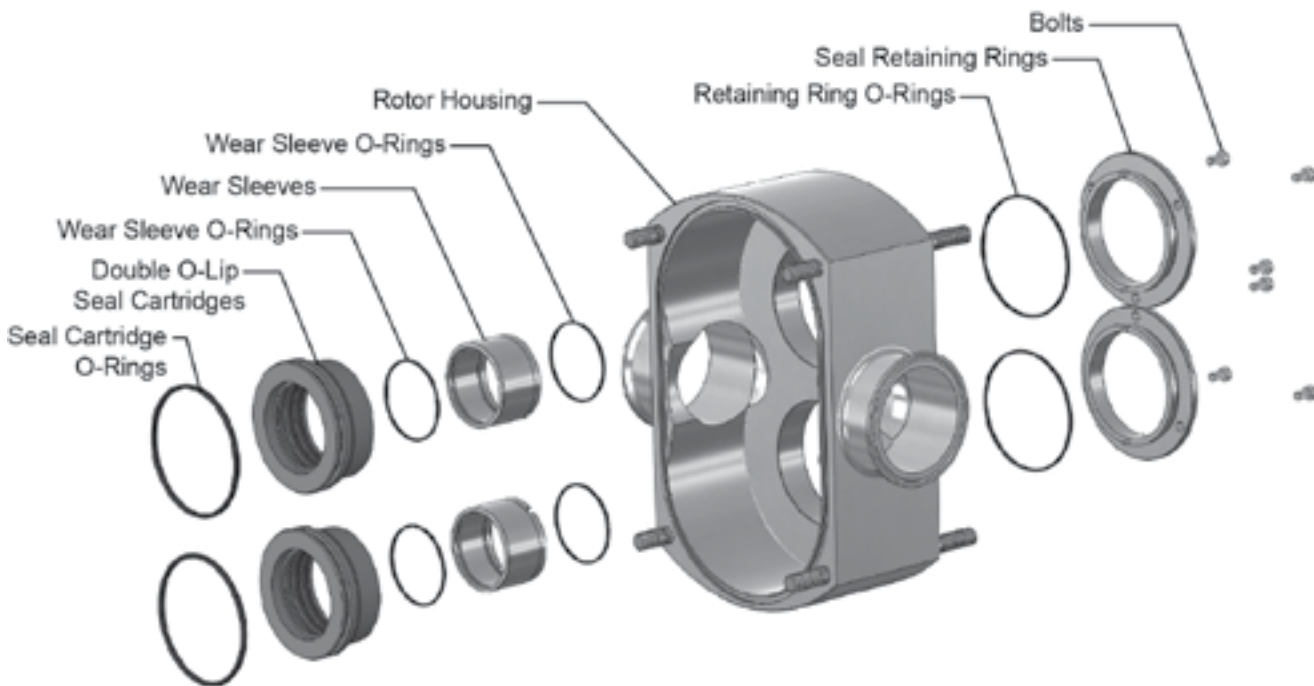
Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the rotor housing (item 1 in Figure 4.4.1) by pulling on the ports or by tapping gently with a rubber mallet. The entire seal with all components will come off attached to the rotor housing. Remove the **Bolts** and **Seal Retaining Rings**. Pull the **Double O-Lip Seal Cartridges** out of the rotor housing bores. If optional sleeve is used, sleeve will be removed with cartridge.

4.4.4.2 UNIBLOC 200-575 Double O-Lip™ Seal Installation

Check the shafts or optional sleeve for wear. If grooves are noticeable, they may have to be replaced. Place new **Seal Cartridge O-Rings** into the groove of the **Double O-Lip Seal Cartridges**. Clean the rotor housing seal bores. Apply product compatible lubricant to the bores and the shafts. Place the rotor housing so that the seal bores are pointing up, push the **Double O-Lip Seal Cartridges** in, lip side first. Attach the **Seal Retaining Ring** to the rotor housing with the **Bolts**. See section 4.4.7 for completing the installation.

4.4.4.3 UNIBLOC 501, 551, 576 Front Loaded Double O-Lip™ Seal Removal

If the rotors were removed, the rotor housing does not need to be taken off. The **Double O-Lip Seal Cartridge** can be removed by placing screwdrivers between the rotor housing and gearbox and pushing them out. Be aware that the **Wear Sleeve** can slide off with the **Double O-Lip Seal Cartridge** during removal.



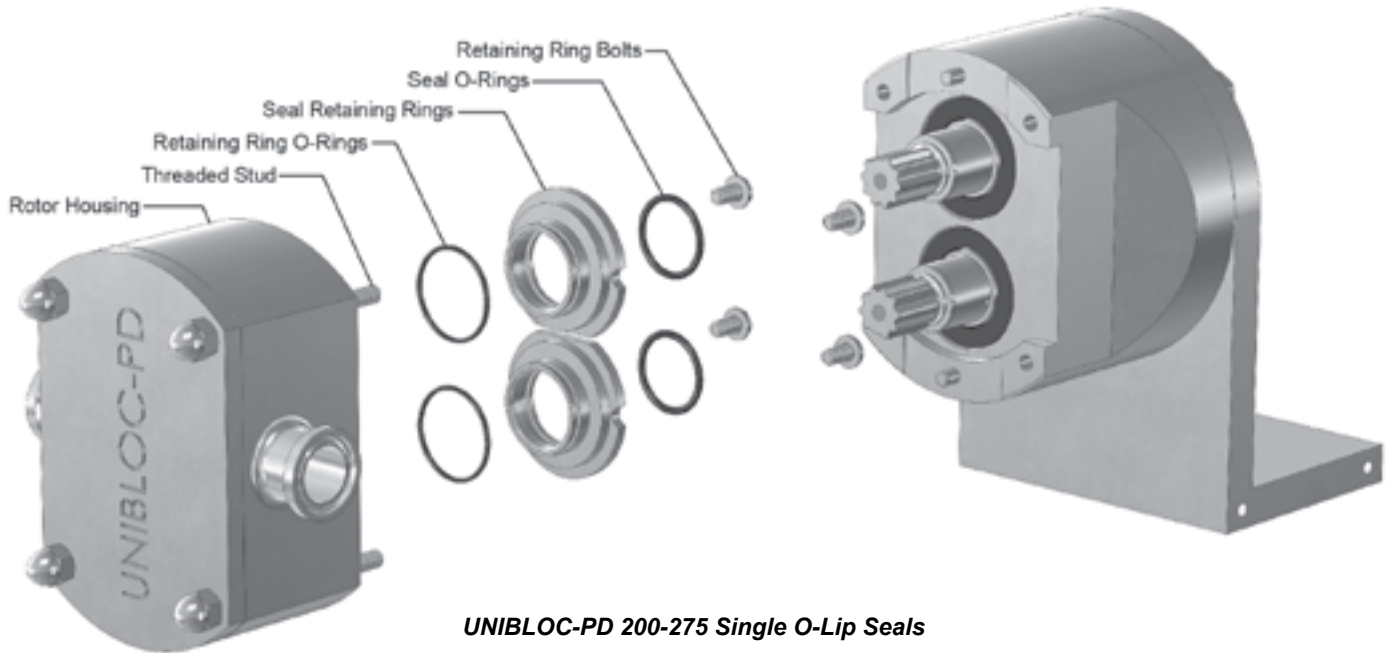
UNIBLOC-PD 501, 551, 576 Double O-Lip Seals

4.4.4.4 UNIBLOC 501, 551, 576 Front Loaded Double O-Lip™ Seal Installation

Check the **Wear Sleeves** for wear. If grooves are noticeable, the sleeves may need to be replaced. Place new **Seal Cartridge O-Rings** into the groove of the **Seal Cartridges**. Clean the rotor housing seal bores. Apply product compatible lubricant to the bores and the shafts. Slide the assembly sleeves onto the splined shaft ends. These must be used to prevent damage to the O-lip seal. Push the **Double O-Lip Seal Cartridges** in, lip side last, so that they are flush with the back of the rotor housing. See section 4.4.8 for completing the installation.

4.4.5 Single O-Ring Seal

This type of seal uses one o-ring, or optional quad ring, to seal against a rotating shaft. It is most frequently used when the liquid viscosity is greater than 2,000 cPs or is sticky. The seal is the least expensive of all shaft seals, but requires more frequent replacement. The maximum shaft rotational speed for this seal is 350 rpm and the maximum service pressure should not exceed 8 bar (115 psig). The o-ring seal must never be allowed to run dry as they will be damaged. This seal uses the pumped product as a lubricant.



4.4.5.1 UNIBLOC 200-275 Single O-Ring Seal Removal

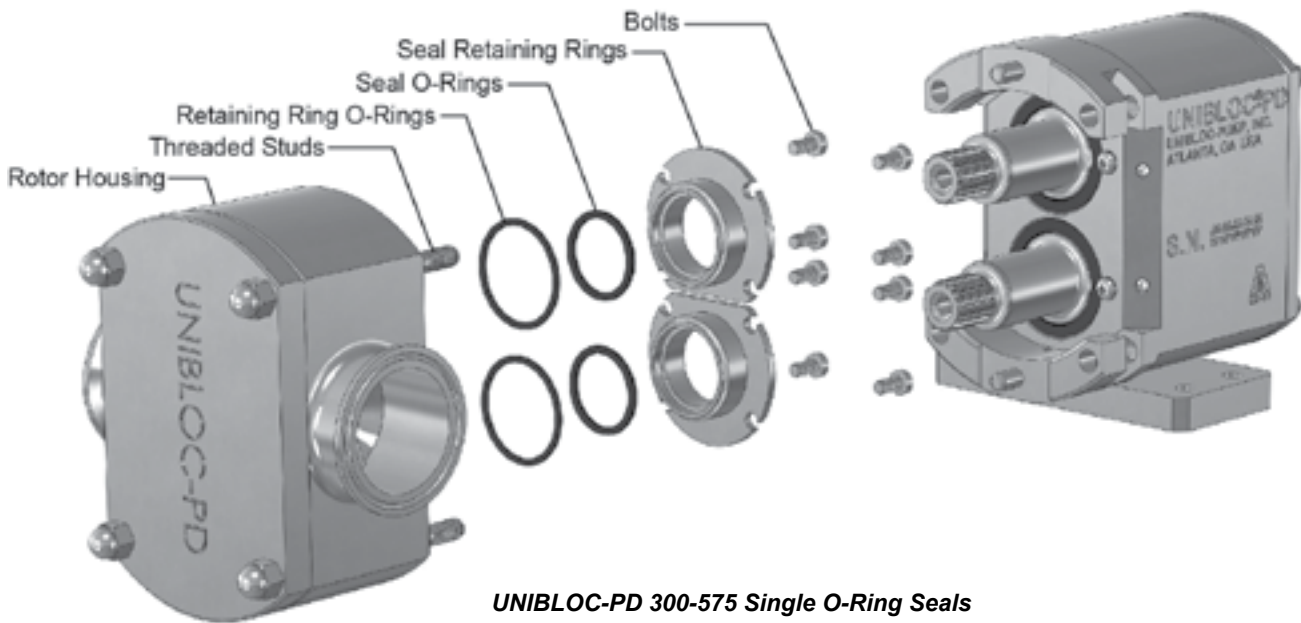
Loosen and remove the acorn nuts from the **Rotor Housing**. Loosen the **Threaded Studs** by locking two M6 nuts against each other on the exposed threaded stud ends. Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. All seal parts will come off with the housing. Remove the **Seal Retaining Rings** by unscrewing the **Retaining Ring Bolts**. The **Retaining Ring O-Rings** and **Seal O-Rings** can now be removed.

4.4.5.2 UNIBLOC 200-275 Single O-Ring Seal Installation

Check the shafts for wear. If grooves are noticeable, they may have to be replaced. Otherwise, the **Seal O-Rings** may not seal properly or may fail prematurely. Place new **Retaining Ring O-Rings** into the grooves of the **Seal Retaining Rings**. Apply a lubricant on the shafts, o-rings, and the rotor housing bores with a lubricant approved for use with the pumped product. Attach the **Seal Retaining Rings** to the **Rotor Housing** with the **Bolts**. See section 4.4.7 for completing the installation.

4.4.5.3 UNIBLOC 300-575 Single O-Ring Seal Removal

Loosen and remove the bolts from the **Threaded Studs**. Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. All seal parts will come off with the housing. Remove the **Seal Retainer Rings** by unscrewing the **Bolts**. The **Retaining Ring O-Rings** and **Seal O-Rings** can now be removed. If optional sleeve is used, sleeve will be removed with cartridge.



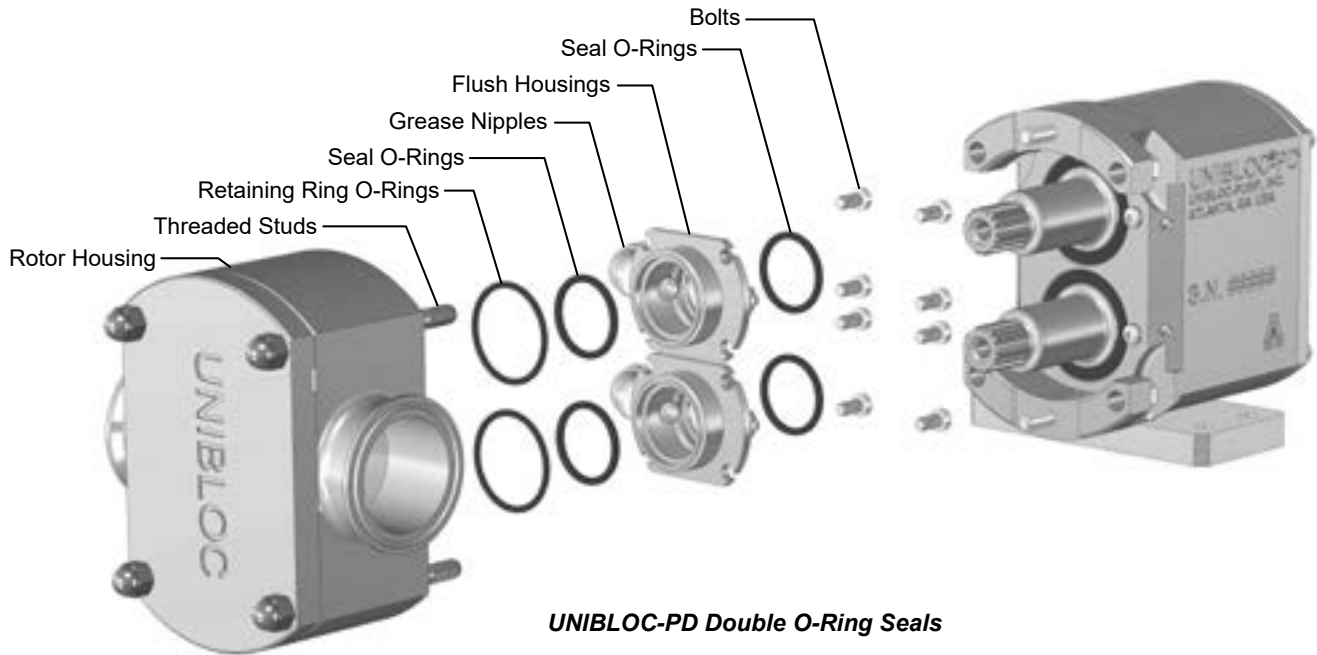
UNIBLOC-PD 300-575 Single O-Ring Seals

4.4.5.4 UNIBLOC 300-575 Single O-Ring Seal Installation

Check the shafts or optional sleeve for wear. If grooves are noticeable, they may have to be replaced. Otherwise, the **Seal O-Rings** may not seal properly or may fail prematurely. Place a new **Retaining Ring O-Ring** into the groove of the **Seal Retaining Ring**. Attach the **Seal Retaining Ring** to the **Rotor Housing** with the **Bolts**. Coat the **Seal O-Ring** and the shafts with a lubricant approved for use with the pumped product. **See section 4.4.7 for completing the installation.**

4.4.6 Double O-Ring Seal

This type of seal uses two o-rings, or optional quad rings, to seal against a rotating shaft. It is most frequently used when the liquid viscosity is greater than 2,000 cPs or is sticky. The maximum shaft rotational speed for this seal is 350 rpm and the maximum service pressure should not exceed 8 bar (115 psig). The seal must be lubricated by an external method such as grease or a flushing system as discussed in section 3.3. If seal is grease filled, the **Flush Housing** should be checked weekly to ensure that it is adequately lubricated. Add grease via the **Grease Nipples** if necessary.



UNIBLOC-PD Double O-Ring Seals

4.4.6.1 Double O-Ring Seal Removal

If using a flushing system as discussed in section 3.3, disconnect it from the **Flush Housings**. Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. All seal parts will come off with the housing. Remove the **Flush Housings** by unscrewing the **Bolts**. The **Retaining Ring O-Rings** and **Seal O-Rings** can now be removed.

4.4.6.1 Double O-Ring Seal Installation

Check the shafts or optional sleeve for wear. If grooves are noticeable, they may have to be replaced. Otherwise, the **Seal O-Rings** may not seal properly or may fail prematurely. Place new **Seal O-Rings** into the grooves of the **Flush Housings**. Attach the **Flush Housings** to the **Rotor Housing** with the **Bolts**. Coat the o-rings and the shafts with a lubricant approved for use with the pumped product. See section 4.4.7 for completing the installation. **It is imperative that the cavity between the o-rings is filled with grease or the flushing system is reconnected before operation is resumed.**

4.4.7 UNIBLOC 200-575 Seal Installation – Final Step

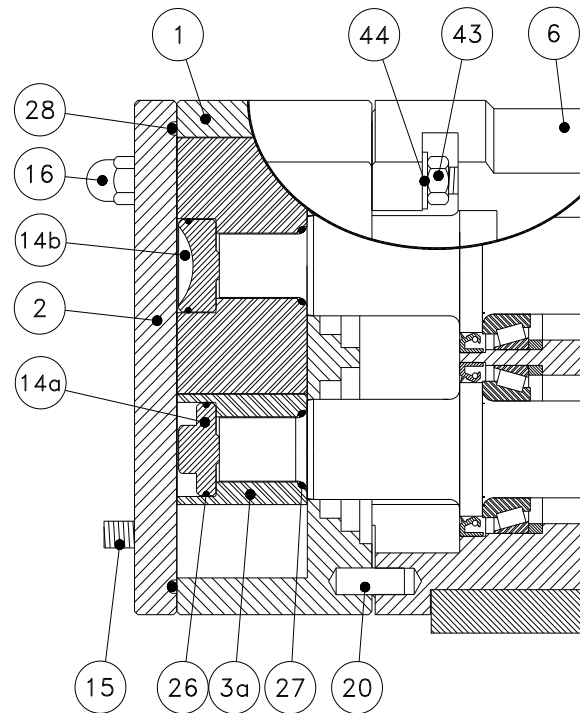
See section 5.3 for torque limits. If not part of the shaft seal assembly, slide the plastic mounting sleeves over the splined ends of the shafts. Slide on the rotor housing (1) tap it with a rubber mallet to seat it properly on the dowel pins (20). Make sure the alignment mark on the rotor housing lines up with the one on the bearing housing (6). The rotor housing must make firm contact with the bearing housing. On **UNIBLOC models 300-575**, fasten the hex nuts (43) with the split washer (44) on the stud ends and tighten in a cross pattern.

On **UNIBLOC models 200-275**, insert the one piece studs (15) through rotor housing and thread into the bearing housing. Tighten them in a cross pattern by locking two M6 nuts against each other on the protruding stud ends. Remove the plastic sleeves from the shaft ends. If the shaft seals are either flushed single or flushed double mechanical, tighten the set screws through the flush housing's port holes. If the rotors are made from a polymer (nonmetal) material, slide them on the shafts and turn the drive shaft to make sure the rotors turn freely. They do not require o-rings (26) and (27) or the rotor bolts (14a, 14b). If the rotors are metal, slide the rotor shaft o-rings (27) over the splined shaft ends and on the step, if applicable.

One of the rotors will have a small marking on the rear end. This indicates that this rotors match with the drive shaft.

Slide the rotors over the corresponding shafts and push them making sure the o-rings seat properly. The rotors must make contact with the shafts. Place o-rings (26) on the rotor bolts (14a, 14b). Lubricate them and the rotor bores. Place a nonmetal object between the rotors to keep them from turning. Thread the rotor bolts in to the shaft ends. Turn the drive shaft to make sure the rotors turn freely. Measure the clearances between the rotor housing and the rotors. Compare these values with those listed in section 5.4. If the measured clearances at positions 1-7, 8, and 10 are smaller than those listed, the rotors must be ground and polished to achieve the correct values. If the measured clearances at positions 9 and 11 are not within the tolerances listed the shafts must be adjusted by disassembling the bearing housing, as instructed in section 4.5 and changing the shims (11).

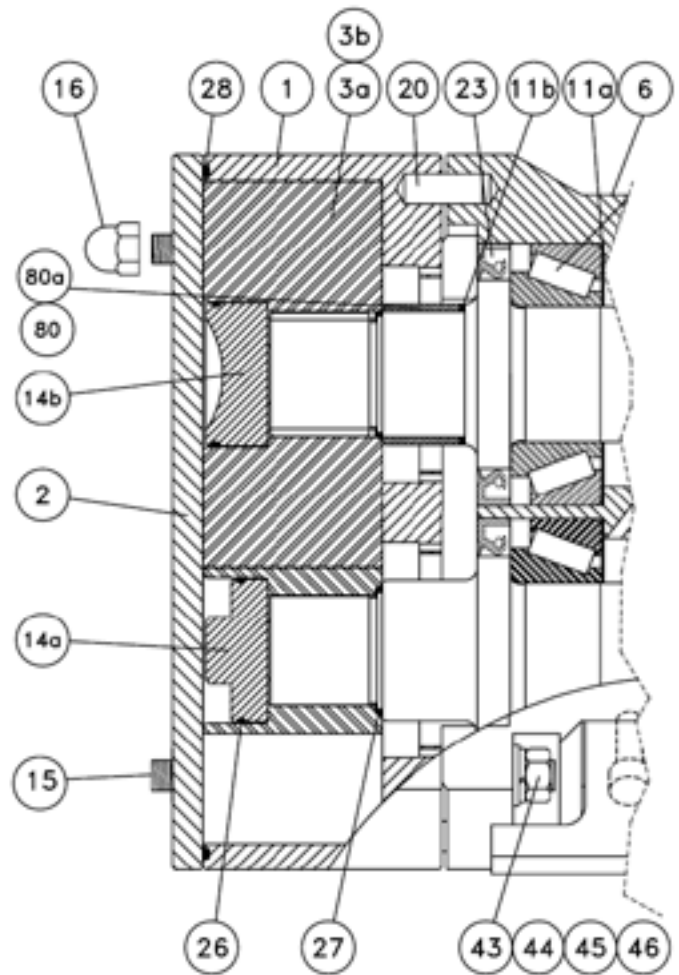
Place the o-ring (28) in the groove on the cover (2). Slide the cover on the studs (15). Tighten the front cover nuts (16). Check the oil level in the bearing housing as described in section 5.2. The pump is now ready to be installed in the system. If flushed seals were installed, reconnect the flush tubing. Refer to section 2.3 before starting the pump.



4.4.8 UNIBLOC 501 Series Seal Installation – Final Step

See section 5.3 for torque limits. If not part of the shaft seal assembly, slide the plastic mounting sleeves over the splined ends of the shafts. Slide on the rotor housing (1) tap it with a rubber mallet to seat it properly on the dowel pins (20). Make sure the alignment mark on the rotor housing lines up with the one on the gearbox (6). The rotor housing must make firm contact with the gearbox. Fasten the hex nuts (43) with the split washer (44) on the stud ends and tighten in a cross pattern. Remove the plastic sleeves from the shaft ends. Slide the rotor shaft o-rings (27) over the splined shaft ends and on the step, if applicable. One rotor and one shaft have been marked with the same symbol. Slide the rotors over the corresponding shafts and push them making sure the o-rings seat properly. The rotors must make contact with the shafts. Place o-rings (26) on the rotor bolts (14a,14b). Lubricate them and the rotor bores. Place a nonmetal object between the rotors to keep them from turning. Thread the rotor bolts into the shaft ends. Turn the drive shaft to make sure the rotors turn freely. Measure the clearances between the rotor housing and the rotors. Compare these values with those listed in section 5.4. If the measured clearances at positions 1-7, 8, and 10 are smaller than those listed, the rotors must be ground and polished to achieve the correct values. If the measured clearances at positions 9 and 11 are not within the tolerances listed the shafts must be adjusted by disassembling the gearbox, as instructed in section 3.0, and changing the shims (11a).

Place the front cover (2) and the o-ring (28) on the studs. Tighten the front cover nuts (16). Check the oil level in the gearbox as described in section 5.2. The pump is now ready to be installed in the system. Refer to section 2.3 before starting the pump.



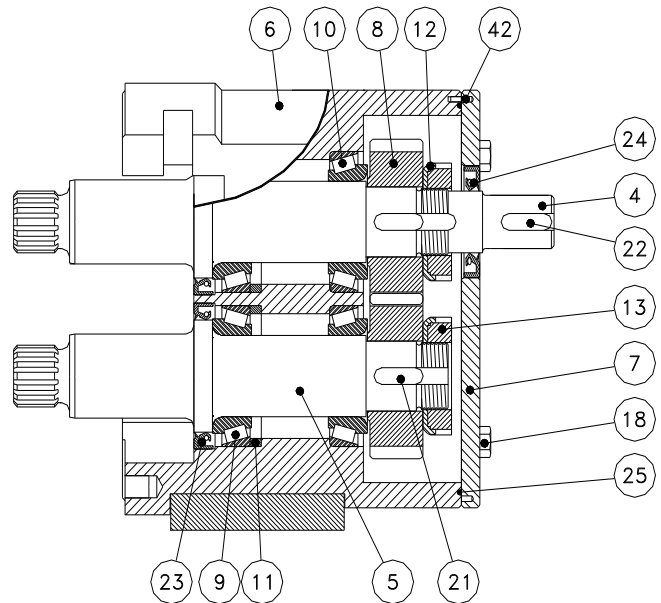
4.5 Pump Bearing Housing Service

The UNIBLOC bearing housing is supplied permanently lubricated with nitrile seals. However, for certain applications and at the user's request, drain plugs and a vent will be supplied. The oil level should be checked at regular intervals and the seals should be changed once per year or after 2000 hours of service, whichever occurs first. When applications exceed constant service temperatures of 180°C (356°F) a vent and high temperature lubricant must be used. For such cases, contact UNIBLOC-PUMP or an authorized service center for an adequate service schedule.

Before proceeding with the following steps, **DISENGAGE POWER TO THE MOTOR**. If the pump is connected to piping, depressurize the system and close valves on both the suction and discharge sides to isolate the pump from the rest of the system. Disconnect the piping and remove the pump from the system. Removal of the wet end of the pump (i.e. the cover, rotors, rotor housing, and shaft seals) must be completed first before disassembly of the pump bearing housing. The method of removing these parts is dependent upon the type of shaft seals the pump has and is outlined in section 4.4.

4.5.1 Bearing housing Disassembly

Remove the front cover, rotors, housing and shaft seals as described in section 4.4. Drain oil from the bearing housing by removing the drain plug, if available, or by removing the cover (7). Open the tab on the tabwashers (12) and remove them and the slotted nuts (13). With a rubber mallet, strike the ends of the shafts where the tabwashers were located to loosen the gears (8) and remove them. Be sure not to damage the threads on the shafts. The keys (21) will now be exposed and can be removed with a flat tipped screwdriver. Continue striking the shafts with the rubber mallet to push the shafts and the oil seals (23), which will get damaged and will have to be replaced, out of the bearing housing. Each shaft will have one bearing (9) located next to a shoulder. To remove them, if necessary, do so with a hydraulic press or tap with a punch or sleeve on the edge closest to the shoulder. Use caution to prevent damage to the shaft shoulder. Tap the bearing cups, (9) and (10), in a circular pattern to remove them from the bearing housing. Behind cup (9) are the shim rings (11) which can now be removed.

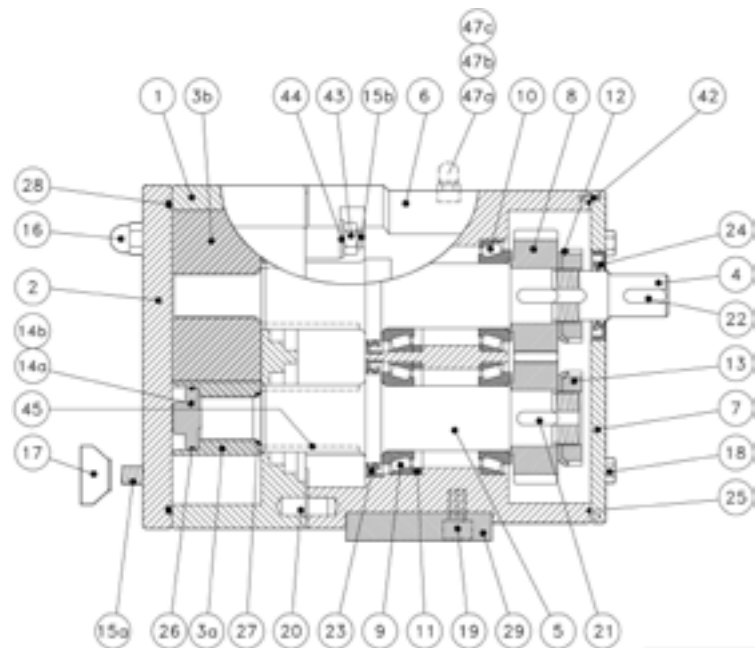


4.5.2 Bearing housing Assembly

See section 4.5.2.1 for complete pump assembly. The steps for assembly assume that the pump has been completely disassembled. Make sure all parts are clean and free of debris before proceeding. New oil seals are required to complete the assembly.

4.5.2.1 Pump Assembly - Stainless Steel Rotors

Insert the shim rings (11) into the front bores of the bearing housing (6). Oil the front (9) and rear (10) bearing cones and tap them into the bearing housing so that the tapered edge can be seen when looking into the bearing housing. If the bearings have been removed from the shafts, they must be pressed on with a hydraulic press before the shafts are installed into the bearing housing. Oil the shafts at the bearing seat location and slide the bearings on so that the text on the bearing shoulder will make contact with the shaft shoulder. Use extreme caution to not damage the bearing components or the splined shaft end when using the hydraulic press. Place a non-metal object between the splined shaft end and the hydraulic press to prevent damage to the shaft. Insert both shafts and stand the pump on the splined ends. Slide the rear bearings on, tap the keys (21) into place, and then slide on the gears (8), shoulder side towards the bearings. Make sure the timing marks are aligned. Tap on the gears to seat the bearings properly. Slide on the tabwashers (12) and thread on the slotted nuts (13). Slide on the rotors (3a) and place a nonmetal object between the rotors to keep the shafts from turning. Tighten the nuts so that the shaft rotating torques shown in section 5.3 are achieved. The torque can be measured by inserting the rotor bolts (14a, 14b) in the splined shaft ends with the rotors on. Do not set the tabs on the tabwashers. Remove the rotor bolts and rotors. Push the rotor housing (1) onto the dowels (20) in the bearing housing and tap gently with a rubber mallet to seat it properly. Insert the housing studs (15) and secure them with the split washers (44) and hex nuts (43). The UNIBLOC 200, 250, and 275 have one piece studs (15) and do not use items (43) and (44). To tighten these studs lock two M6 nuts against each other on the stud end. Slide the rotors (3a) on to the corresponding shaft. One rotor and one shaft will be marked with identical symbols. Secure the rotors with the rotor bolts (14). Measure the clearances between the rotors and the housing. If the measured values at positions 8-11 do not correspond with those listed in section 5, then the shim ring(s) (11) must be changed. Remove the rotor bolts, rotors, studs, and then the housing. Unscrew the slotted nuts and remove the tabwashers. Remove the shafts,



gears, and keys from the bearing housing. Tap out the front bearing cups only to reveal the shim ring(s). Insert an appropriate shim, and then repeat the steps described in this section. If the clearances fall within the ranges specified, then proceed to section 4.5.2.2.

4.5.2.2 Pump Assembly – Stainless Steel Rotors – Final Step

Lock the nuts in place by bending the tabwasher into the slots in the nut. Install the front oil seals (23) by first lubricating with oil all contact areas on the shafts and bearing housing. The text on the seals should face out. Push the seals on with a sleeve flush with the bearing housing. Stand the pump on the splined ends and fill the bearing housing cavity with approved oil listed in section 5.2. Place the oil seal(s) (24; 24 & 45 for UNIBLOC 200-275) in the bearing housing cover, text side out. Place the o-ring (25) into the groove on the rear side of the bearing housing. Slide the cover onto the drive shaft taking care not to damage the oil seal lips. Secure the cover with the bolts (18). Tap key (22) into place. Install the shaft seals and rotor housing as described in section 4.4.

4.5.2.3 Pump Assembly – QuickStrip™ Rotors

Insert the shim rings (11) into the front bores of the bearing housing (6). Oil the front (9) and rear (10) bearing cones and tap them into the bearing housing so that the tapered edge can be seen when looking into the bearing housing. If the bearings have been removed from the shafts, they must be pressed on with a hydraulic press before the shafts are installed into the bearing housing. Oil the shafts at the bearing seat location and slide the bearings on so that the text on the bearing shoulder will make contact with the shaft shoulder. Use extreme caution to not damage the bearing components or the splined shaft end when using the hydraulic press. Place a nonmetal object between the splined shaft end and the hydraulic press to prevent damage to the shaft. Insert both shafts and stand the pump on the splined ends. Slide the rear bearings on, tap the keys (21) into place, and then slide on the gears (8), shoulder side towards the bearings. Make sure the timing marks are aligned. Tap on the gears to seat the bearings properly. Slide on the tabwashers (12) and thread on the slotted nuts (13). If using **DuraCore™** rotors, assemble (Figure 4.5.1) the rotors (3b) before sliding the rotors onto the splined shaft end (Figure 4.5.2). Place a nonmetal object between the rotors to keep the shafts from turning. Tighten the nuts so that the shaft rotating torques shown in section 5.3 are achieved. Lock the nuts in place by bending the tabwasher into the slots in the nut. Install the front oil seals (23) by first lubricating with oil all contact areas on the shafts and bearing housing. The text on the seals should face out. Push the seals on with a sleeve flush with the bearing housing. Stand the pump on the splined ends and fill the bearing housing cavity with approved oil listed in section 5.3. Place the oil seal(s) (24; 24 & 45 for UNIBLOC 200-275) in the bearing housing cover, text side out. Place the o-ring (25) into the groove on the rear side of the bearing housing. Slide the cover onto the drive shaft taking care not to damage the oil seal lips. Secure the cover with the bolts (18). Tap key (22) into place. Install the shaft seals and rotor housing as described in section 4.4.

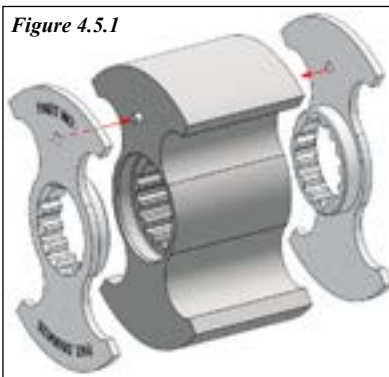
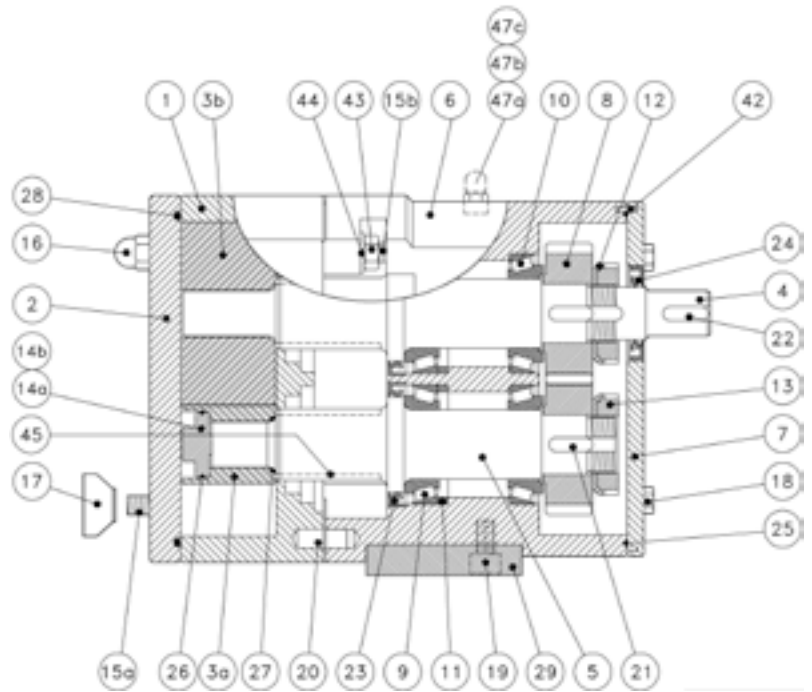


Figure 4.5.1
DuraCore™ Rotor Assembly

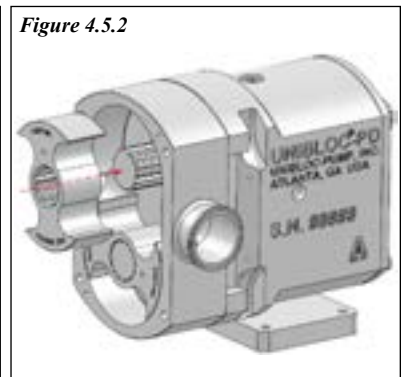


Figure 4.5.2
DuraCore™ & PolyFlex™ Rotor Installation

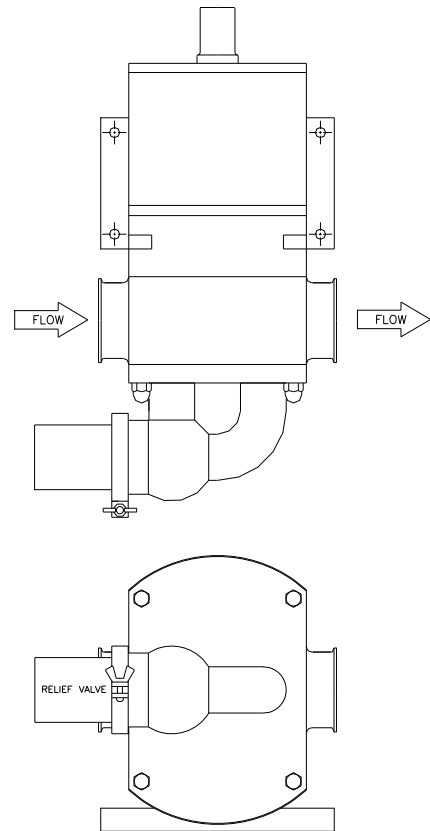
4.6 Relief Valve Cover Service

UNIBLOC® pumps may be supplied with a relief valve cover model #46, shown in section 4.6.1 or model #B shown in section 4.6.2. Both models will minimize or eliminate problems associated with over-pressurizing the pump. Although a complete external relief system is recommended, the types illustrated are useful when such systems are not practical.

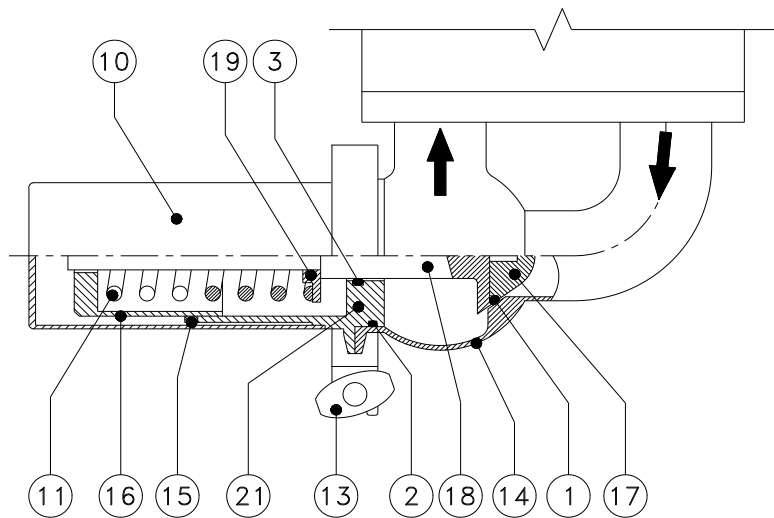
4.6.1 Relief Cover Model #46

This type functions only in one direction and must be oriented such that the high pressure, or discharge side of the pump is always at the inlet of the relief valve.

The pressure is set in conjunction with a pressure gauge installed on the discharge side of the pump. By compressing or decompressing the spring inside the valve, the pressure at which the valve will open can be adjusted. This must be done while the pump is operating at the desired flow rate. Extreme caution should be used to prevent damage to the pump or other equipment that is pressure sensitive. If the pump is used to handle hot liquids, do not touch the pump or the valve without protection. Unscrew the housing (10) to reveal the adjusting mechanism. Release the lock ring (15) and turn it and the adjusting sleeve (16) clockwise until they bottom out. Turn the sleeve counterclockwise until the pressure gauge begins to drop. Lock this position with the lock ring (15). Keep in mind that this pressure must be approximately 0.3-0.7 bar (5-10 psig) lower than the desired relief pressure, since the pump will continue to build pressure even though the valve may be open. Return the housing (10) and tighten.



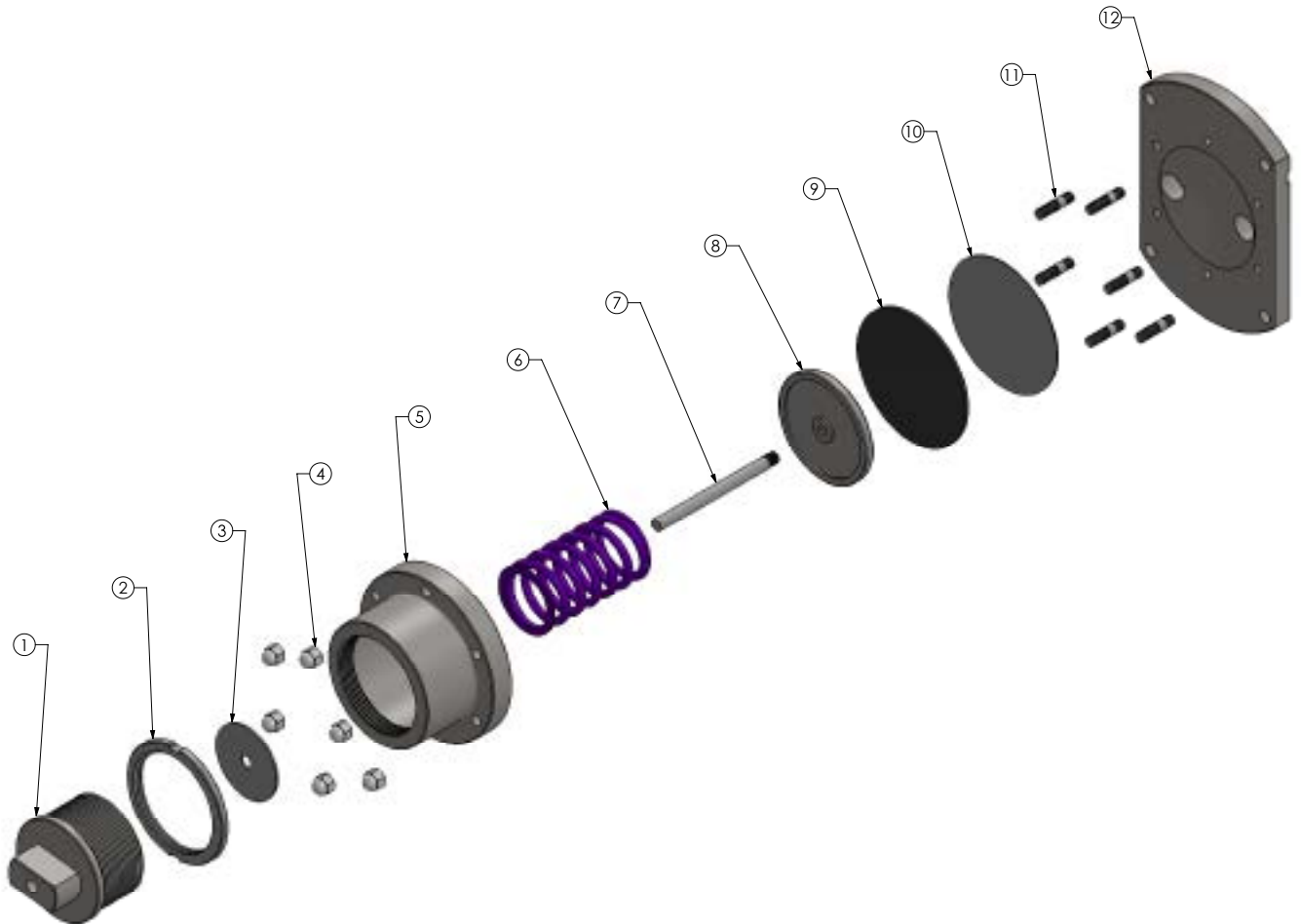
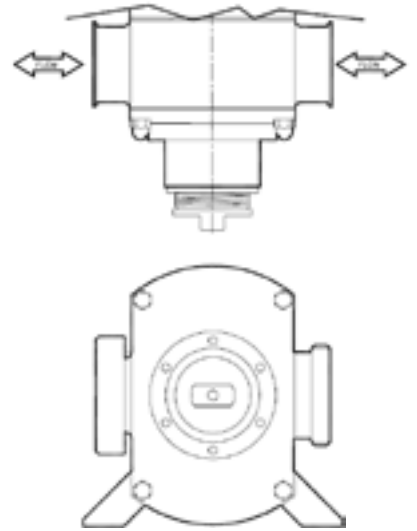
To service the valve seals the pump must not be operating, the system must be depressurized, and the pump isolated from the remainder of the system. Remove the housing (10) and mark the location of the lock ring (15). Unscrew the adjusting sleeve (16) and remove it. Remove the clamp (13) and separate the valve body and the top containing the spring. Slide the piston, (18) and (17), out and place its stem in a padded vise. Unscrew the tip (17). O-rings (1), (2), and (3) may now be replaced. Screw on the tip (17), roll o-ring (1) into the groove and tighten. Lubricate o-ring (3) and slide in the piston. Place the top with the piston in the valve body (14) and secure with the clamp (13). Turn the lock ring (15) so that it returns to the mark and thread on the adjusting sleeve (16) tight against it. Replace the housing (10) and tighten. The pump may now be returned to service.



4.6.2 Relief Cover Model #B

This type has bi-directional flow. No special orientation has to be adhered to.

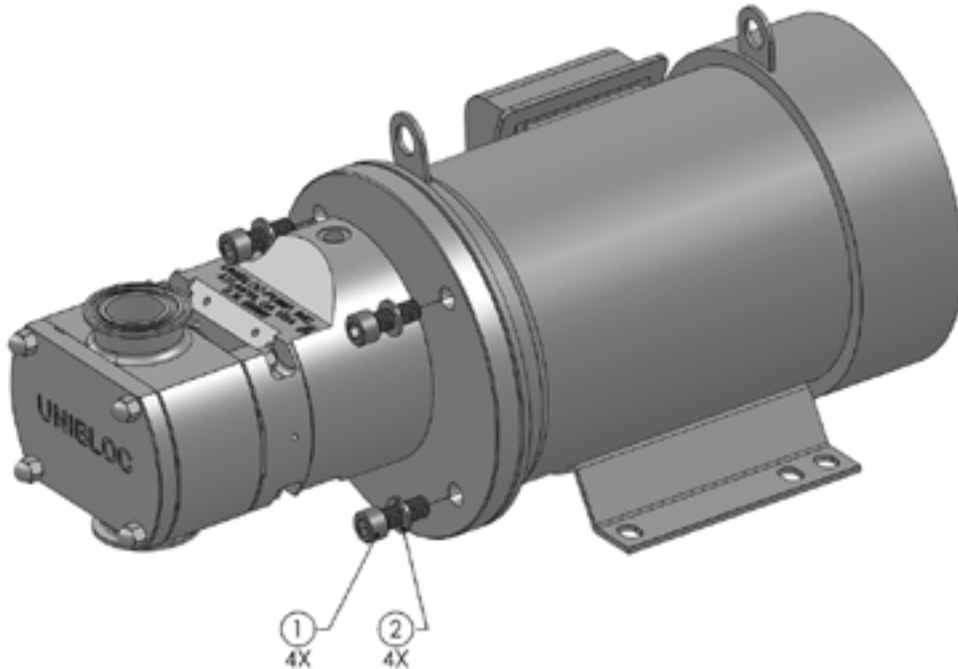
Mark the location of the lock ring (2) on the spring adjuster (1). Unscrew the spring adjuster (1) and remove it. Remove the spring (6). Look for the diaphragm washer (3) either inside the adjuster or on top of the spring for replacement. Unscrew the dome nuts (4) on the spring housing (5) and separate the housing (5) from the cover (12). The stem (7) and disk (8) will now be removable as one unit. It is now possible to replace the diaphragm (9 & 10). Press back the diaphragm (9&10) on the cover (12) after replacement. Slide the spring housing (5) back on the cover bolts (11), hold the stem (7) and disk (8) on the diaphragm (9 & 10) so they stay inside the housing. Fasten the spring housing (5) to the cover (12) with the dome nuts (4). Place the spring (6) over the stem (7). Make sure you have the diaphragm washer (3) placed either on top of the spring (6) or inside the spring adjuster (1). Turn the lock ring (2) back to correct settings on the spring adjuster (1). Thread the spring adjuster (1) back into the spring housing (5) and tighten. The pump may now be returned to service.



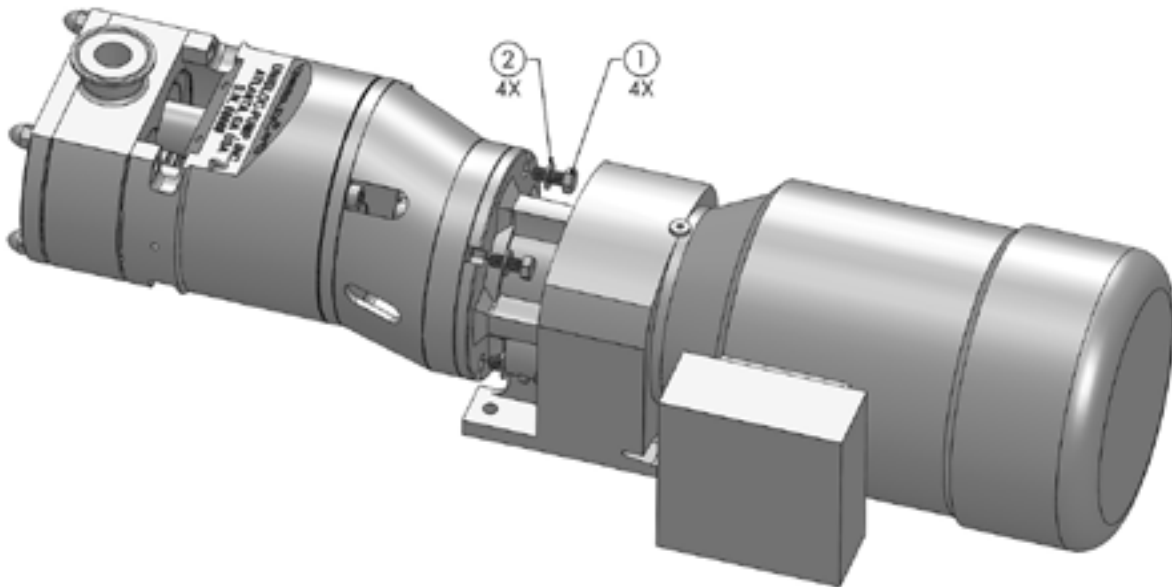
4.7 Compac Pump Series Service

UNIBLOC® **Compac™ Direct** and **Compac™ Flex** are flange mounted pump to flanged electric motor or gear motor. To service these either of these pumps, start with DISCONNECTING ALL POWER SUPPLIES. Remove **bolts (1)** and **washers (2)** as shown in figure below. It is important to always remove flange connected to electric or gear motor first to ensure limited loss of bearing housing oil. These bolts would also need to be removed when rotating pump from horizontal to vertical port position or visa versa.

Once pump is decoupled from the electric or gear motor, the Direct flange (for Compac™ Direct) or Flex flange (for Compac™ Flex) will act as the rear cover referenced in earlier sections of the Service Manual.



Decoupling Compac™ Direct



Decoupling Compac™ Flex

4.8 Troubleshooting


PROBLEM	POSSIBLE CAUSE	SOLUTION
A. No flow, but pump turns; pump does not prime	<ol style="list-style-type: none"> 1. Motor turning in wrong direction 2. Air pocket in pipe or pump. 3. NPSHA too low. 4. Pump runs too slow. 5. Viscosity too high. 6. Obstruction in discharge piping, valve closed. 	<ol style="list-style-type: none"> 1. Reverse motor. 2. Fill pipe and pump with liquid. Check pipe fittings for leaks. 3. Increase suction pipe diameter or shorten suction pipe length. Decrease pump speed. Raise feed tank or supply liquid level. 4. Increase speed. 5. Lower viscosity if possible. 6. Remove obstruction, open valve.
B. Capacity too low, but pump turns	<ol style="list-style-type: none"> 1. NPSHA too low. 2. Pump runs too slow. 3. Increased slip in pump. 4. Discharge pressure higher than expected. 5. Front cover not tight. 6. O-ring installed in front cover is too thick. 	<ol style="list-style-type: none"> 1. See A-3 2. Increase speed. 3. Check rotor clearances; replace worn parts if necessary. 4. Check discharge piping for closed valves or obstructions. Increase pump speed BUT DO NOT EXCEED PRESSURE LIMITS OF PUMP. Increase discharge pipe size. Increase pump size. 5. Tighten cover nuts to torques specified in section 5.3. 6. Replace front cover o-ring with correct size.
C. Pump is noisy, cavitating	<ol style="list-style-type: none"> 1. Collapsed suction hose. 2. Liquid temperature too high. 3. Speed too high. 4. Viscosity higher than Expected 5. NPSHA too low. 6. Suction side valve closed 	<ol style="list-style-type: none"> 1. Use reinforced hose or rigid piping. 2. Reduce speed, increase NPSHA. 3. Decrease speed. 4. Decrease speed, increase pump size. 5. See A-3. 6. Open valve, check suction side piping for obstructions
D. Rotors gall, pump seizes	<ol style="list-style-type: none"> 1. Liquid temperature too high. 2. Rotor clearances incorrect. 3. Loose rotor bolts/housing studs. 4. Bearings worn. 5. Gears worn. 6. Foreign particles in pump. 7. Particles in product too large. 8. Discharge pressure too high. 	<ol style="list-style-type: none"> 1. Lower temperature or increase Rotor clearances. 2. Adjust to factory recommended clearances. 3. Tighten or replace if necessary. 4. Replace bearings. 5. Replace gears. 6. Install suction side filter. 7. Increase rotor clearances. Use plastic rotors. Increase pump size. 8. See B-4.

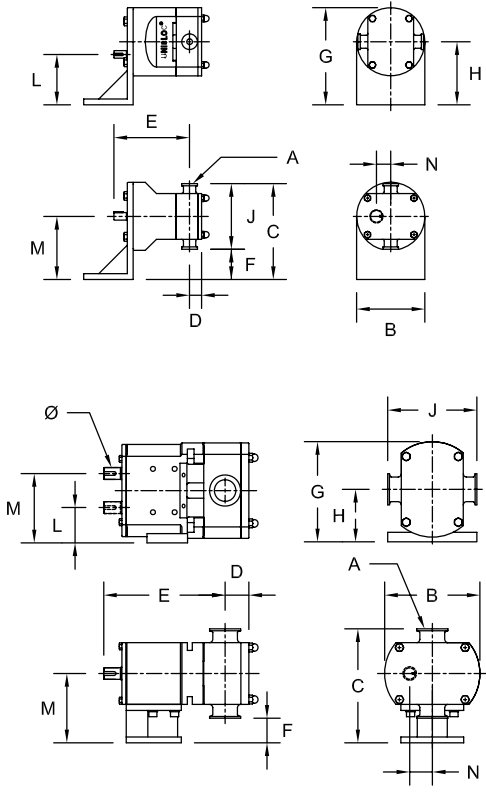
PROBLEM	POSSIBLE CAUSE	SOLUTION
E. Pump is noisy	<ol style="list-style-type: none"> 1. Cavitation. 2. Liquid contains air. 3. Discharge pressure too high. 	<ol style="list-style-type: none"> 1. See C. 2. Check pump shaft seals for leaks. Check suction side pipe fittings for leaks. Increase NPSHA. 3. Check suction and discharge piping for closed valves or obstructions. Increase pump size.
F. Motor overheating	<ol style="list-style-type: none"> 1. Motor size too small. 2. Discharge pressure too high. 3. Viscosity higher than expected. 4. Motor & pump misalignment. 	<ol style="list-style-type: none"> 1. Increase motor size. 2. Lower pump speed. Lower pressure. Check suction and discharge piping for closed valves or obstructions. 3. Decrease pump speed. Increase pipe size or shorten discharge pipe length. 4. Correct alignment.
G. Shaft seals leak	<ol style="list-style-type: none"> 1. Loose drive collar on single mechanical seals. 2. Worn parts. 3. Seals have been operated without product in pump or without flushing liquid. 4. Seal incompatible with liquid 	<ol style="list-style-type: none"> 1. Reset drive collars. 2. Replace seals and/or o-rings. 3. Operate pump only when liquids can come in contact with seals. Replace worn seal parts. 4. Contact factory for proper seal selection, operation, and replace if necessary.

5.0 Technical Data

5.1 General Dimensions and Weights

Drawing D100 shows overall dimensions for all models, 200-0 to 677. A separate service manual is required for model 600-677. 501 Series pumps are not shown in general dimensions below.





UNIBLOC MODEL	A	B	C	D	E	F	G	H	J	L	M	N	∅	WEIGHT ¹ kg (lbs.)
200-0	3/8"		155 (6.10)	14 (0.55)	118 (4.65)	49 (1.93)	157 (6.18)	102 (4.02)	106 (4.17)	82 (3.23)	102 (4.02)	21 (0.83)		7.7 (17)
200	1/2"		155 (6.10)	20 (0.79)	122 (4.80)	49 (1.93)	157 (6.18)	102 (4.02)	106 (4.17)	82 (3.23)	102 (4.02)	21 (0.83)		8.2 (18)
250	3/4"	110 (4.33)	155 (6.10)	22 (0.87)	128 (5.04)	49 (1.93)	157 (6.18)	102 (4.02)	106 (4.17)	82 (3.23)	102 (4.02)	21 (0.83)	12 (0.47)	8.2 (18)
275	3/4"		155 (6.10)	26 (1.02)	132 (5.20)	49 (1.93)	157 (6.18)	102 (4.02)	106 (4.17)	82 (3.23)	102 (4.02)	21 (0.83)		9.1 (20)
275	1"		167 (6.57)	26 (1.02)	132 (5.20)	37 (1.46)	157 (6.18)	102 (4.02)	130 (5.12)	82 (3.23)	102 (4.02)	21 (0.83)		9.1 (20)

UNIBLOC MODEL	A	B	C	D	E	F	G	H	J	L	M	N	∅	WEIGHT ¹ kg (lbs.)	WEIGHT ² kg (lbs.)
300	1"	154 (6.06)	184 (7.24)	32 (1.26)	191 (7.52)	40	162 (6.38)	85 (3.35)	144 (5.67)	57 (2.24)	112 (4.41)	28 (1.10)	19 (0.75)	17.7 (39)	12.2 (27)
350	1.5"			39 (1.54)	196 (7.72)									18.1 (40)	13.2 (29)
400	1.5"	205 (8.07)	248 (9.76)	42 (1.65)	244 (9.61)	56	215 (8.46)	113 (4.45)	192 (7.56)	74 (2.91)	152 (5.98)	39 (1.54)	24 (0.94)	35.8 (79)	26.8 (59)
450	2"			50 (1.97)	250 (9.84)									37.6 (83)	28.6 (63)
500	2.5"			60 (2.36)	331 (13.0)									103 (226)	81 (179)
550	3"	291 (11.5)	338 (13.3)	68 (2.68)	339 (13.3)	78	299 (11.8)	153 (6.02)	260 (10.2)	98 (3.86)	208 (8.19)	55 (2.17)	42 (1.65)	107 (235)	85 (188)
575	3"			74 (2.91)	352 (13.9)									111 (245)	90 (198)
575	4"			74 (2.91)	349 (13.7)										
600/602	4"			88 (3.46)	574 (22.6)									900 (410)	680 (310)
650/652	6"	440 (17.3)	573 (22.5)	113 (4.45)	599 (23.6)	98	445 (17.5)	225 (8.86)	435 (17.1)	140 (5.51)	310 (12.2)		70 (2.76)	970 (441)	750 (341)
675/677	8"			138 (5.43)	624 (24.6)									103 (226)	81 (179)

ALL DIMENSIONS IN MM, INCHES IN (). T/C SHOWN.

* ¹ PUMP WITH STAINLESS STEEL GEARBOX.
² PUMP WITH ALUMINUM GEARBOX.

MATERIAL

FINISH (UNLESS NOTED ON DWG.)

WEIGHT

BY: JPZ

DATE: 12/18/97

CHECKED

APP'D

SCALE: 0.25:1

ALL DIMENSIONS IN MM

UNIBLOC-PUMP

DWG. TITLE: **GENERAL DIMENSIONS**

SIZE: **200-575** DWG. NO.: **D100**

RELEASE DATE: **OCT. 14, 1999** SHEET **1 OF 2**

5.2 Lubricants and Bearing housing Oil Specification

The UNIBLOC-PD pumps are factory shipped with synthetic oil from Royal Purples: Poly-Guard® FDA. The oil is FDA, OSHA and CFR compliant.

ATTENTION

Before checking the oil levels **DISENGAGE THE POWER SUPPLY TO THE MOTOR.**

Permanent lubricated bearing housings; Models 200-0 - 275

When checking the oil level in permanently lubricated bearing housings, the pump must be removed from the system as described in section 4.5. After removing it, stand the pump on the front cover nuts so that the drive shaft points up. Remove the bearing housing cover bolts and rotate the cover without sliding it off the drive shaft. One of the oils specified above must be added. Replace the cover making sure the o-ring remains in its groove. Tighten the cover bolts. The pump is now ready to be installed in the system. Refer to section 3.4 before starting the pump.

Non-Permanent lubricated bearing housings; Models 300-576

When checking the oil level in bearing housings that are not permanently lubricated, the pump must first be stopped. Remove the oil level check plug. If oil does not come out of this hole, it must be added through the vent hole until it starts to do so. Reattach the vent and oil plug and resume operation.

If filling bearing housing oil with rear cover removed, fill oil level to approximately 1/8" from completely submerging the pump's timing gears. Ensure oil has fully settled and all air pockets have been removed. Air pockets will bubble to the top and decrease the oil level. Add additional oil to reach proper level and attached rear cover plate or flange.

Table 5.2.1 lists optional manufacturer and oil that may be used.

Table 5.2.2 list recommended fill volume

MANUFACTURER	LUBRICANT NAME	TEMP. RANGE, °C (°F)
Mobil	SHC 627	-23...121 (-10...250)
	SHC 634	121...152 (250...305)
Exxon	Spartan EP 100	-23...121 (-10...250)
	Spartan EP 150	121...152 (250...305)
Shell	Spirax S 75W90	-23...152 (-10...305)
Sentinel	S140	-26...288 (-15...550)
Sentinel (for Hot Oil Pump)	S-NT-AA-I250	-26...288 (-15...550)
Royal Purple	Poly-Guard® FDA	-26...165 (-15...330)

Table 5.2.1

UNIBLOC MODEL	APPROX. OIL CAPACITY, ml (oz.)	
	STANDARD BEARING HOUSING	COMPAC BEARING HOUSING
200-0, 200, 250, 275	50 (1.7)	
300, 350	150 (5.1)	170 (5.8)
400,450	350 (11.8)	1065 (36)
500, 550, 575	1500 (50.7)	N/A
501, 551, 576	650 (20.3)	N/A

Table 5.2.2

5.3 Tools and Torque Requirements

Table 5.3.1 lists required tools and torque.

Description	Tool Required	Pump Model			
		200-0; 200; 250; 275	300; 350	400; 450	500/501; 550/551; 575/576
Front Cover Nut #16	Wrench Size (mm)	6	13	17	19
	Torque Settings (Nm)	10	15	30	50
	Torque Setting (lbft)	7	11	22	37
Rotor Bolt #14a	Socket Size (mm)	10 with part# 6006-2	13	17	19
	Torque Settings (Nm)	20	35	70(110 for HP)	165(250 for HP)
	Torque Setting (lbft)	15	25	50(80 for HP)	120(180 for HP)
Rotor Housing Stud Nut #43	Wrench Size (mm)	10	13	17	19
	Torque Settings (Nm)	8	8	20	40
	Torque Setting (lbft)	6	6	15	30
Retainer Ring Bolt #32	Key Size (mm)	N/A	5	5	5
	Torque Settings (Nm)	N/A	Hand tight	Hand tight	Hand tight
	Torque Setting (lbft)	N/A	Hand tight	Hand tight	Hand tight
Bearing housing Cover Bolts #18	Socket Size (mm)	13	10	10	17
	Torque Settings (Nm)	20	15	15	40
	Torque Setting (lbft)	15	11	11	30
Mechanical Seal set screw	Key Size (mm)	N/A	2.5	2.5	3
	Torque Settings (Nm)	N/A	Hand tight	Hand tight	Hand tight
	Torque Setting (lbft)	N/A	Hand tight	Hand tight	Hand tight
Foot/Pedestal Mounting Bolt #19	Key Size (mm)	N/A	6	8	8
	Torque Settings (Nm)	N/A	Hand tight	Hand tight	Hand tight
	Torque Setting (lbft)	N/A	Hand tight	Hand tight	Hand tight
Rotating/Rotate/ Turn Shaft by turning rotors bolt #14a	Socket Size (mm)	10 with part# 6006-2	13	17	19
	Torque Settings (Nm)	2	4	6	10
	Torque Setting (lbft)	1.5	3	4.5	7.5
Shaft Guard	Key Size (mm)	N/A	4	4	4
	Torque Settings (Nm)	N/A	Hand tight	Hand tight	Hand tight
	Torque Setting (lbft)	N/A	Hand tight	Hand tight	Hand tight
Oil Plug #47b	Key Size (mm)	N/A	6.5	6.5	8
	Torque Settings (Nm)	N/A	Hand tight	Hand tight	Hand tight
	Torque Setting (lbft)	N/A	Hand tight	Hand tight	Hand tight

Table 5.3.1

5.3.1 Special Tools

There are only a few special tools needed to assemble the UNIBLOC in a safe and secure way. Please contact your pump supplier for ordering.

- 1) Bearing housing series 200 (Model 200-0 to 275) requires a socket removal/installation tool. Part# 6006-2
- 2) A plastic spline assembly sleeve is highly recommended when installing the rotor housing.

UNIBLOC-PUMP can supply factory assembly sleeves.

Please contact your pump supplier. Model 300/350 (Part# 6210) Model 400/450 (Part# 6220)

Model 500/501 550/551 /575/576 (Part# 6230)

5.4 Rotor Clearances

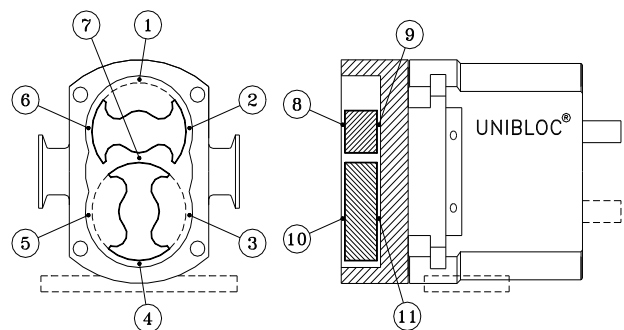
The tables below list the clearances between the rotor housing and the rotors. If the rotor class is not known you must contact your pump supplier to retrieve the correct clearance information. Always refer to pump serial number and/or have process conditions available.

CLEARANCES FOR CLASS C STAINLESS STEEL ROTORS, x0.01 mm (x0.001in.)				
UNIBLOC MODEL	POSITION			
	1-6	7	8 & 10	9 & 11
200	6-12 (2.3-4.7)	6-10 (2.4-3.9)	10-12 (3.9-4.7)	6-8 (2.4-3.1)
250	6-12 (2.3-4.7)	6-10 (2.4-3.9)	10-12 (3.9-4.7)	6-8 (2.4-3.1)
275	7-14 (2.8-5.5)	6-10 (2.4-3.9)	10-12 (3.9-4.7)	6-8 (2.4-3.1)
300	15-17 (5.9-6.7)	12-14 (4.7-5.5)	11-13 (4.3-5.1)	6-8 (2.4-3.1)
350	17-19 (6.7-7.5)	16-18 (6.3-7.1)	11-13 (4.3-5.1)	6-8 (2.4-3.1)
400	20-22 (7.9-8.7)	20-22 (7.9-8.7)	12-14 (4.7-5.5)	7-9 (2.8-3.5)
450	22-24 (8.7-9.4)	20-22 (7.9-8.7)	14-16 (5.5-6.3)	7-9 (2.8-3.5)
500/501	26-28 (10.2-11.0)	31-33 (12.2-13.0)	18-20 (7.1-7.9)	10-12 (3.9-4.7)
550/551	30-32 (11.8-12.6)	31-33 (12.2-13.0)	18-20 (7.1-7.9)	10-12 (3.9-4.7)
575/576	30-32 (11.8-12.6)	31-33 (12.2-13.0)	18-20 (7.1-7.9)	10-12 (3.9-4.7)

CLEARANCES FOR CLASS D STAINLESS STEEL ROTORS, x0.01 mm (x0.001in.)				
UNIBLOC MODEL	POSITION			
	1-6	7	8 & 10	9 & 11
200	10-12 (3.9-4.7)	6-8 (2.4-3.1)	12-14 (4.7-5.5)	6-8 (2.4-3.1)
250	12-14 (4.7-5.5)	6-8 (2.4-3.1)	12-14 (4.7-5.5)	6-8 (2.4-3.1)
275	14-16 (5.5-6.3)	6-8 (2.4-3.1)	12-14 (4.7-5.5)	6-8 (2.4-3.1)
300	15-17 (5.9-6.7)	12-14 (4.7-5.5)	12-14 (4.7-5.5)	8-10 (3.1-3.9)
350	17-19 (6.7-7.5)	16-18 (6.3-7.1)	12-14 (4.7-5.5)	8-10 (3.1-3.9)
400	20-22 (7.9-8.7)	20-22 (7.9-8.7)	14-16 (5.5-6.3)	8-10 (3.1-3.9)
450	22-24 (8.7-9.4)	20-22 (7.9-8.7)	14-16 (5.5-6.3)	8-10 (3.1-3.9)
500/501	26-28 (10.2-11.0)	31-33 (12.2-13.0)	20-22 (7.9-8.7)	10-12 (3.9-4.7)
550/551	30-32 (11.8-12.6)	31-33 (12.2-13.0)	20-22 (7.9-8.7)	10-12 (3.9-4.7)
575/576	30-32 (11.8-12.6)	31-33 (12.2-13.0)	20-22 (7.9-8.7)	10-12 (3.9-4.7)

CLEARANCES FOR CLASS E STAINLESS STEEL ROTORS, x0.01 mm (x0.001in.)				
UNIBLOC MODEL	POSITION			
	1-6	7	8 & 10	9 & 11
300	18-20 (7.1-7.9)	20-22 (7.9-8.7)	16-18 (6.3-7.1)	8-10 (3.1-3.9)
350	20-22 (7.9-8.7)	20-22 (7.9-8.7)	16-18 (6.3-7.1)	8-10 (3.1-3.9)
400	28-30 (11.0-11.8)	28-30 (11.0-11.8)	16-18 (6.3-7.1)	9-11 (3.5-4.3)
450	25-27 (9.8-10.6)	28-30 (11.0-11.8)	16-18 (6.3-7.1)	9-11 (3.5-4.3)
500/501	32-34 (12.6-13.4)	38-40 (15.0-15.7)	24-26 (9.4-10.2)	13-15 (5.1-5.9)
550/551	38-40 (14.9-15.7)	39-41 (15.3-16.1)	24-26 (9.4-10.2)	13-15 (5.1-5.9)
575/576	36-38 (14.2-15.0)	39-41 (15.3-16.1)	24-26 (9.4-10.2)	13-15 (5.1-5.9)

CLEARANCES FOR CLASS F STAINLESS STEEL ROTORS, x0.01 mm (x0.001in.)				
UNIBLOC MODEL	POSITION			
	1-6	7	8 & 10	9 & 11
400	32-34 (12.6-13.4)	32-34 (12.6-13.4)	30-35 (11.8-13.8)	25-30 (9.9-11.8)
450	32-34 (12.6-13.4)	32-34 (12.6-13.4)	30-35 (11.8-13.8)	25-30 (9.9-11.8)

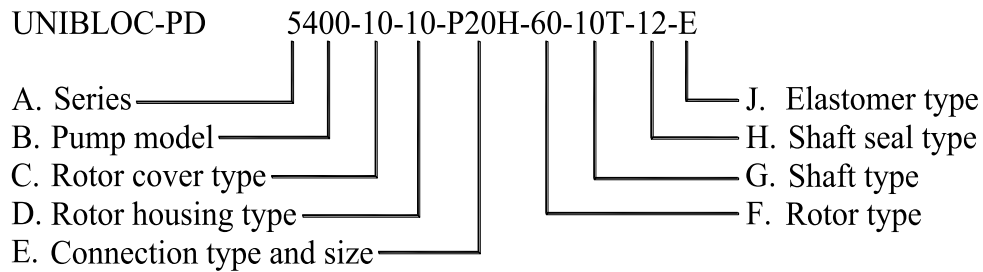


6.0 Pump Identification and Spare Parts

6.1 Pump Identification

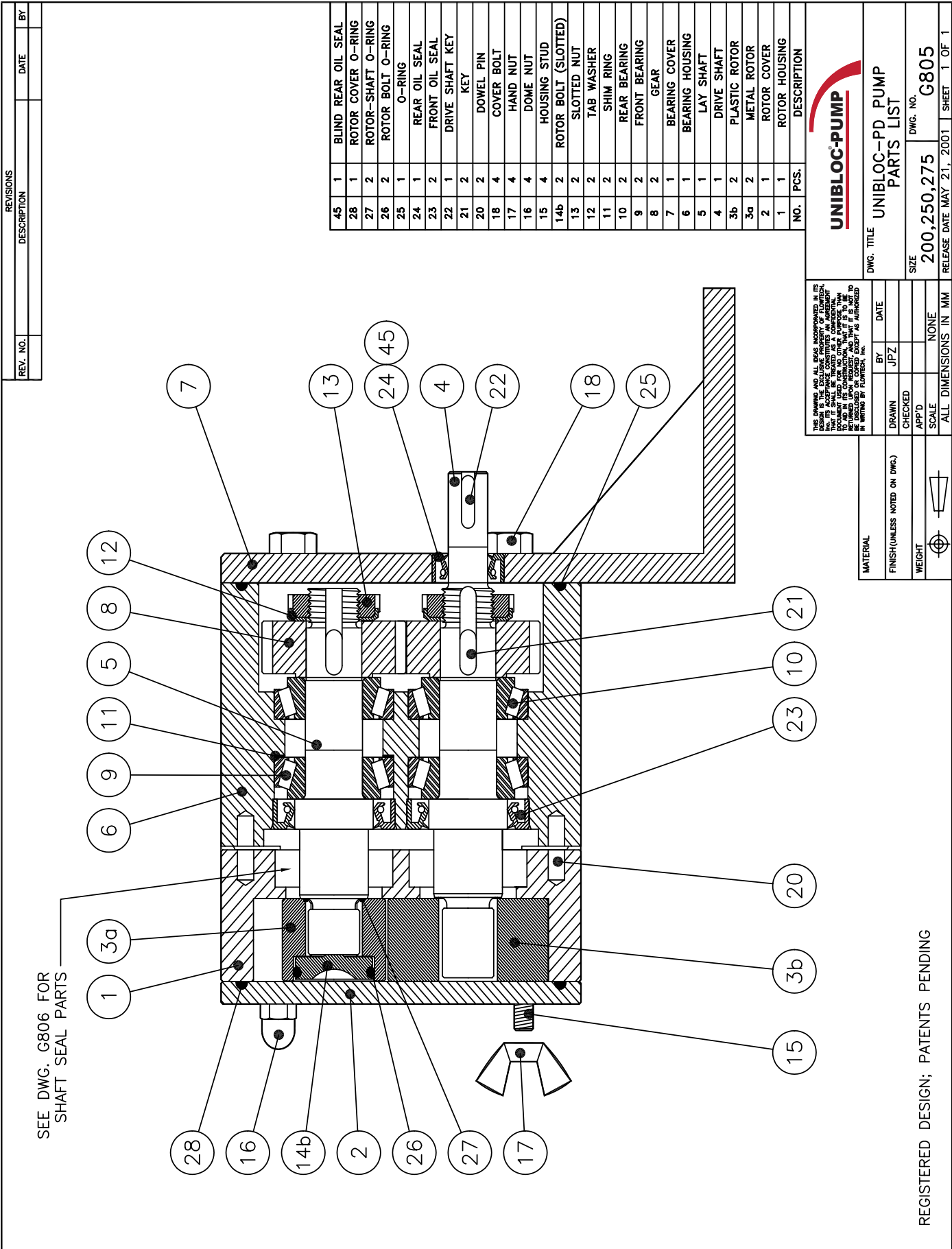
Each pump has a unique serial number machined into the bearing housing. See detailed description under section 1.2. Each serial number is linked to a unique build code, see example 1.0 below.

Example 1.0



Product Description

UNIBLOC®-PD 400 Size	(B)
Stainless Pump Bearing Housing	(A)
Standard Front Cover	(C)
316 Stainless Rotor Housing	(D)
1.5" T/C, Horizontal Mounting	(E)
Class C 316L Stainless Rotors	(F)
Standard Shafts, Drive Shaft in Top Position	(G)
Single Mechanical Shaft Seal (SiC vs SiC)	(H)
EPDM Elastomers	(J)



NO.	PCS.	DESCRIPTION
45	1	BLIND REAR OIL SEAL
28	1	ROTOR COVER O-RING
27	2	ROTOR-SHAFT O-RING
26	2	ROTOR BOLT O-RING
25	1	O-RING
24	1	REAR OIL SEAL
23	2	FRONT OIL SEAL
22	1	DRIVE SHAFT KEY
21	2	KEY
20	2	DOWEL PIN
18	4	COVER BOLT
17	4	HAND NUT
16	4	HOME NUT
15	4	HOUSING STUD
14b	2	ROTOR BOLT (SLOTTED)
13	2	SLOTTED NUT
12	2	TAB WASHER
11	2	SHIM RING
10	2	REAR BEARING
9	2	FRONT BEARING
8	2	GEAR
7	1	BEARING COVER
6	1	BEARING HOUSING
5	1	LAY SHAFT
4	1	DRIVE ROTOR
3b	2	PLASTIC ROTOR
3a	2	METAL ROTOR
2	1	ROTOR COVER
1	1	ROTOR HOUSING

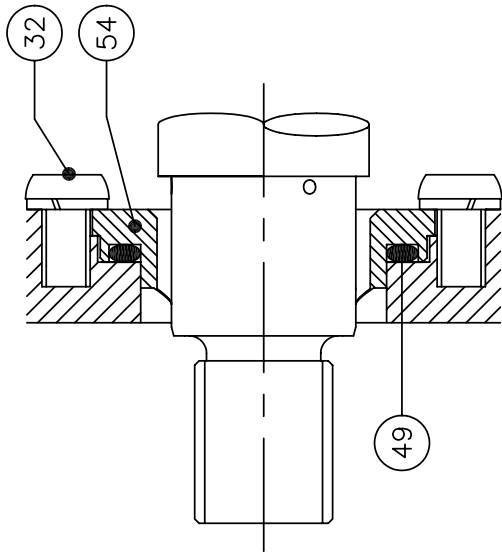
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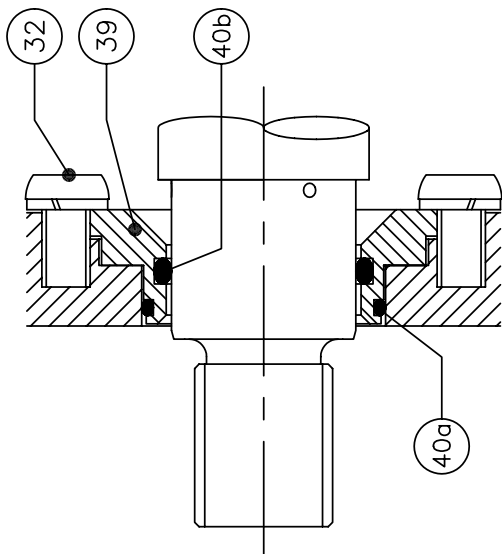
DWG. TITLE	UNIBLOC-PD PUMP PARTS LIST
SIZE	200,250,275
DWG. NO.	G805
RELEASE DATE	MAY 21, 2001
SHEET	1 OF 1

MATERIAL	BY	DATE
FINISH (UNLESS NOTED ON DWG.)	DRAWN	JPZ
WEIGHT	CHECKED	
	APP'D	
	SCALE	NONE
		ALL DIMENSIONS IN MM

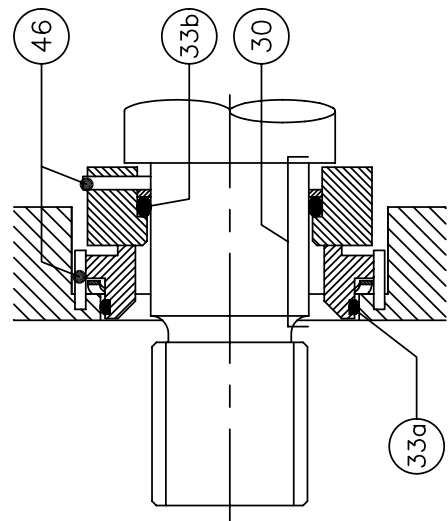
REGISTERED DESIGN; PATENTS PENDING



SINGLE O-RING SEAL



SINGLE O-RING SEAL

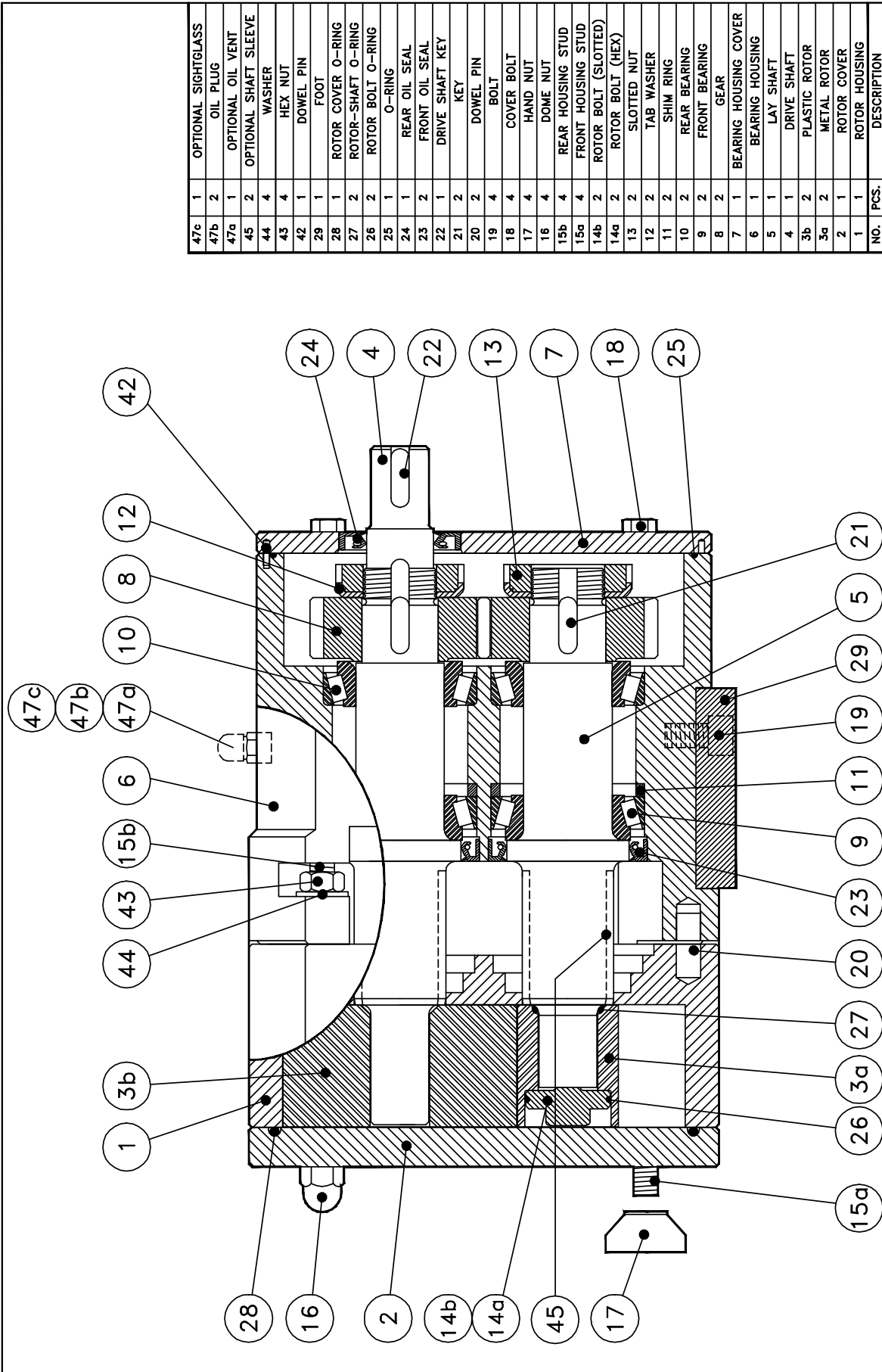


SINGLE MECHANICAL SEAL

NO.	PCS. PER SEAL	CALL FACTORY	PART NO.	DESCRIPTION
54	1	5106		SINGLE LIP SEAL CARTRIDGE
49	1	4216		O-RING
46	5	4601-2		DOWEL PIN SET
40	1	4204, 4213		SINGLE O-RING SEAL O-RING SET (40a,40b)
39	1	4901-1L		RETAINING RING
33	1	4204, 4205		SINGLE MECH. SEAL O-RING SET (33a,33b)
32	2	4301-2		BOLT
30	1			SINGLE MECHANICAL SHAFT SEAL
NO.	PCS. PER SEAL	CALL FACTORY	PART NO.	DESCRIPTION

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DRAWN	JFZ		
CHECKED			
APP'D			
SCALE	NONE		

UNIBLOC-PUMP	
DWG. TITLE UNIBLOC-PD & GP PUMP SHAFT SEAL PARTS LIST	
DWG. NO.	G806
SIZE	200-275
RELEASE DATE	MAY 21, 2001
SHEET	1 OF 1



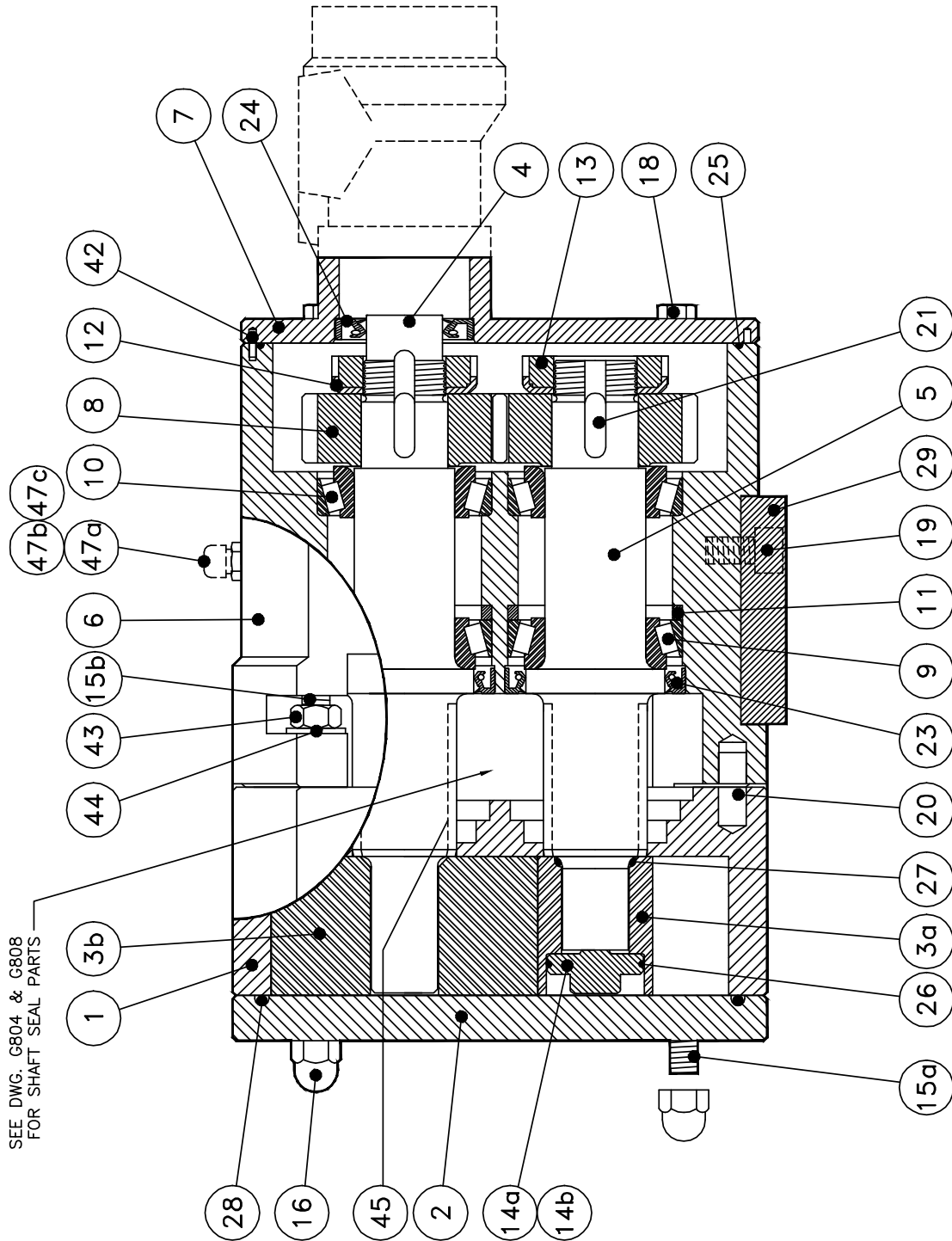
47c	1	OPTIONAL SIGHTGLASS
47b	2	OIL PLUG
47a	1	OPTIONAL OIL VENT
45	2	OPTIONAL SHAFT SLEEVE
44	4	WASHER
43	4	HEX NUT
42	1	DOWEL PIN
29	1	FOOT
28	1	ROTOR COVER O-RING
27	2	ROTOR-SHAFT O-RING
26	2	ROTOR BOLT O-RING
25	1	O-RING
24	1	REAR OIL SEAL
23	2	FRONT OIL SEAL
22	1	DRIVE SHAFT KEY
21	2	KEY
20	2	DOWEL PIN
19	4	BOLT
18	4	COVER BOLT
17	4	HAND NUT
16	4	DOME NUT
15b	4	REAR HOUSING STUD
15a	4	FRONT HOUSING STUD
14b	2	ROTOR BOLT (SLOTTED)
14a	2	ROTOR BOLT (HEX)
13	2	SLOTTED NUT
12	2	TAB WASHER
11	2	SHIM RING
10	2	REAR BEARING
9	2	FRONT BEARING
8	2	GEAR
7	1	BEARING HOUSING COVER
6	1	BEARING HOUSING
5	1	LAY SHAFT
4	1	DRIVE SHAFT
3b	2	PLASTIC ROTOR
3a	2	METAL ROTOR
2	1	ROTOR COVER
1	1	ROTOR HOUSING
NO.	PCS.	DESCRIPTION

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UNIBLOC-PUMP	
DWC. TITLE UNIBLOC-PD PUMP PARTS LIST	
SIZE 300-575	DWC. NO. G803
RELEASE DATE MAY 21, 2001 SHEET 1 OF 1	

MATERIAL	BY	DATE
FINISH (UNLESS NOTED ON DWG.)	JPZ	
WEIGHT	CHECKED	
	APP'D	
	SCALE	NONE
	ALL DIMENSIONS IN MM	

SEE DWG. G804 & G808
FOR SHAFT SEAL PARTS

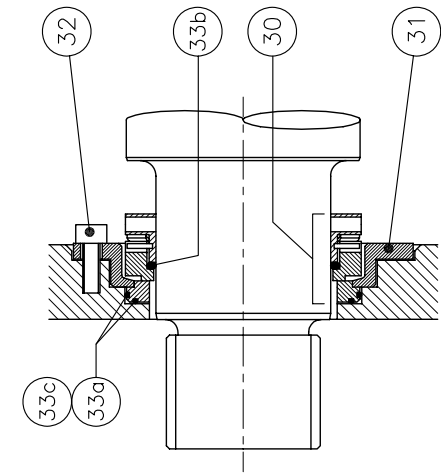


NO.	PCS.	DESCRIPTION
47c	1	OPTIONAL SIGHTGLASS
47b	2	OIL PLUG
47a	1	OIL VENT
45	2	OPTIONAL SHAFT SLEEVE
44	4	WASHER
43	4	HEX NUT
42	1	DOWEL PIN
29	1	FOOT
28	1	ROTOR COVER O-RING
27	2	ROTOR-SHAFT O-RING
26	2	ROTOR BOLT O-RING
25	1	O-RING
24	1	REAR OIL SEAL
23	2	FRONT OIL SEAL
21	2	KEY
20	2	DOWEL PIN
19	4	BOLT
18	4	COVER BOLT
16	4	DOVE NUT
15b	4	HOUSING STUD
15a	4	FRONT COVER STUD
14b	2	ROTOR BOLT (SLOTTED)
14a	2	ROTOR BOLT (HEX)
13	2(4)	SLOTTED NUT
12	2	TAB WASHER
11	2	SHIM RING
10	2	REAR BEARING
9	2	FRONT BEARING
8	2	GEAR
7	1	BEARING HOUSING COVER
6	1	BEARING HOUSING
5	1	LAY SHAFT
4	1	DRIVE SHAFT
3b	2	PLASTIC ROTOR
3a	2	METAL ROTOR
2	1	ROTOR COVER
1	1	ROTOR HOUSING

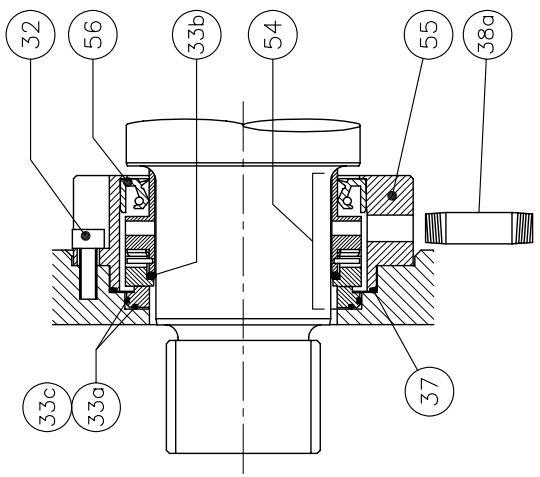
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UNIBLOC-PUMP	
DWC. TITLE UNIBLOC-PD PUMP PARTS LIST (WITH HYDRAULIC MTR.)	
SIZE	DWG. NO. G811
400-575	
RELEASE DATE	OCT 07, 2010
SHEET	1 OF 1

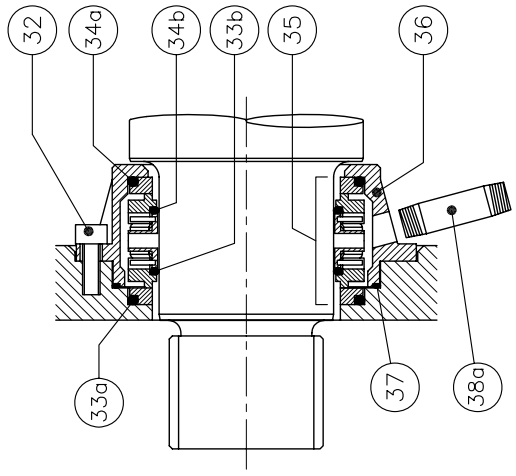
MATERIAL	BY	DATE
FINISH (UNLESS NOTED ON DWG.)	JPZ	
WEIGHT	CHECKED	
	APP'D	
	SCALE	NONE
	ALL DIMENSIONS IN MM	



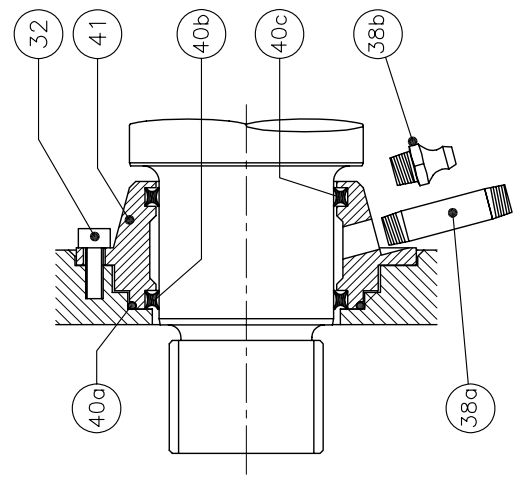
SINGLE MECHANICAL SEAL



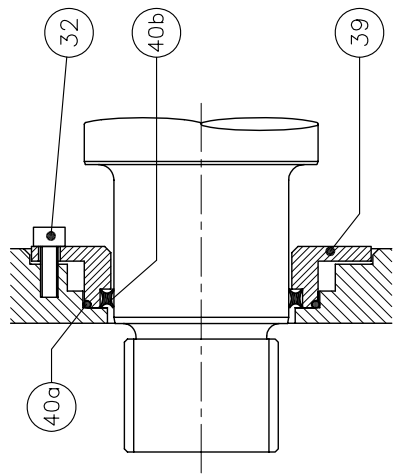
FLUSHED SINGLE MECHANICAL SEAL



DOUBLE MECHANICAL SEAL



DOUBLE O-RING SEAL



SINGLE O-RING SEAL

NO.	PCS. PER SEAL			DESCRIPTION
	UNIBLOC 300,350	UNIBLOC 400,450	UNIBLOC 500,550, 575	
57	1	1	1	DOUBLE O-RING SEAL O-RING SET (40a,40b,40c)
56	1	1	1	LIP SEAL
55	1	1	1	FLUSH HOUSING
54	1	1	1	FLUSHED SINGLE MECHANICAL SHAFT SEAL
41	1	1	1	FLUSH HOUSING
40	1	1	1	SINGLE O-RING SEAL O-RING SET (40a,40b)
39	1	1	1	RETAINING RING
38b	2	2	2	FLUSH HOUSING NIPPLE
38a	2	2	2	FLUSH HOUSING PIPE TUBE
37	1	1	1	FLUSH HOUSING O-RING
36	1	1	1	FLUSH HOUSING
35	1	1	1	DOUBLE MECHANICAL SHAFT SEAL
34	1	1	1	DOUBLE MECH. SEAL O-RING SET (33a,33b,33c,34a,34b)
33	1	1	1	SINGLE MECH. SEAL O-RING SET (33a,33b,33c)
32	4	4	3	BOLT
31	1	1	1	RETAINER RING
30	1	1	1	SINGLE MECHANICAL SHAFT SEAL

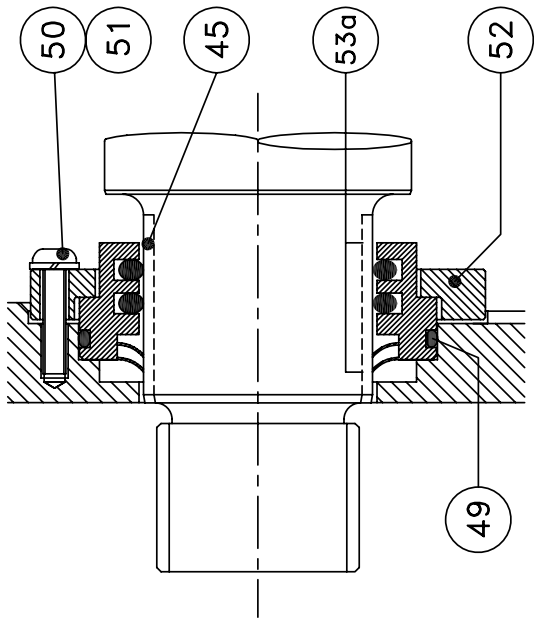
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UNIBLOC-PUMP

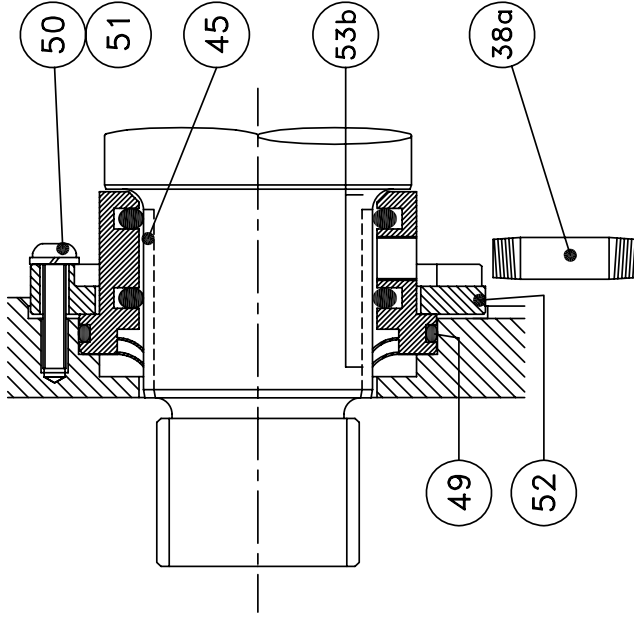
DWG. TITLE UNIBLOC-PD PUMP
SHAFT SEAL PARTS LIST

SIZE 300-575 DWG. NO. G804

RELEASE DATE MAY 21, 2001 SHEET 1 OF 1



DOUBLE O-LIP SEAL



FLUSHED DOUBLE O-LIP SEAL

NO.	UNIBLOC 300,350	UNIBLOC 400,450	UNIBLOC 500,550, 575	PCS. PER SEAL	DESCRIPTION
53b	1	1	1	1	FLUSHED DOUBLE O-LIP SEAL CARTRIDGE
53a	1	1	1	1	DOUBLE O-LIP SEAL CARTRIDGE
52	1	1	1	1	RETAINER RING
51	4	4	3	3	SPLIT WASHER
50	4	4	3	3	BOLT
49	1	1	1	1	O-RING
45	1	1	1	1	OPTIONAL SHAFT SLEEVE
38a	2	2	2	2	FLUSH HOUSING PIPE TUBE

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UNIBLOC-PUMP

DWG. TITLE UNIBLOC-PD PUMP SHAFT SEAL PARTS LIST

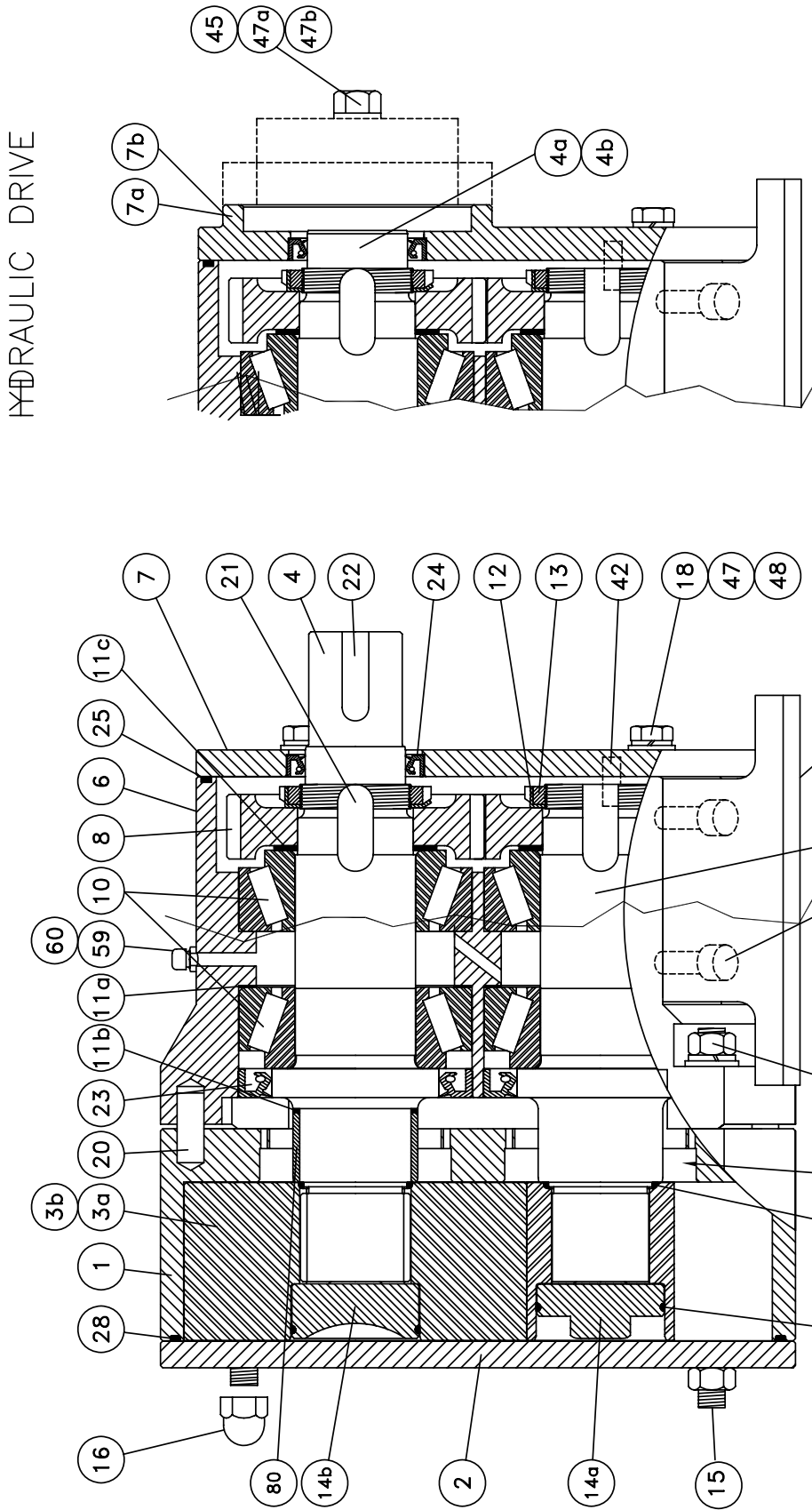
SIZE 300-575 DWG. NO. G808

RELEASE DATE MAY 21, 2001 SHEET 1 OF 1

ALL DIMENSIONS IN MM

DRAWN	CHECKED	APP'D	SCALE	BY	DATE
			NONE	JPZ	

PTO DRIVE



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UNIBLOC-PUMP		UNIBLOC-PD PUMP PARTS LIST	
DWG. TITLE	UNIBLOC-PD PUMP PARTS LIST	BY	DATE
DRAWN	JPZ	CHECKED	
APP'D		SCALE	NONE
SIZE	501,551,576	ALL DIMENSIONS IN MM	
DWG. NO.	G807	RELEASE DATE	

MATERIAL	
FINISH (UNLESS NOTED ON DWG.)	
WEIGHT	

REGISTERED DESIGN: PATENTS PENDING

	1/8" NPTM (Allen)	60	1	Oil Plug
4534-2	1/8" NPTM	59	1	Vent
	M10	48	4	Split Washer
BN622M12x45	M12x45 (hex)	47b	2	Danfoss Motor Bolt
BN622M12x40	M12x40 (hex)	47a	2	Charlynn Motor Bolt
BN670M10	M10	47	4	Washer
BN666M12x45	M12x45	46	4	Gearbox Stud
4535-2	M12	45	6	Split Washer
BN670M12	M12	44	4	Washer
4431-2	M12	43	4(8)	Hex Nut
4605	M8x22	42	2	Dowel Pin
3817		29	2	Foot
4235	226x3mm	28	1	Cover o-ring
4233	1.799"x0.103" #133	27	2	Rotor-shaft o-ring
4232	2.112"x0.103" #138	26	2	Rotor-Bolt o-ring
4239-N	7.9984"x0.139" #266	25	1	Gearbox Cover o-ring
4130	45x62x10mm	24	1	Rear Oil Seal
4135	75x105x13mm	23	2	Front Oil Seal
4716	12x8x40mm	22	1	Drive Shaft Key
4717	16x10x18mm (sq. key)	21	2	Key
4615	M12x34	20	2	Dowel Pin
BN610M10x30	M10x30 (Socket)	19	4	Foot Bolt
BN622M10x30	M10x30 (Hex)	18	4	Cover Bolt
4430-2	M12	16	4	Dome Nut
BN666M12x30	M12x30	15	4	Front Cover Stud
3381-1L		14b	2	Rotor Bolt (Slotted)
3380-1L		14a	2	Rotor Bolt (Hex)
4432		13	2	Slotted Nut
4515		12	2	Tab Washer
		11c	2	Gear Alignment shim
		11b	2	Sleeve shim ring
3671		11a	2	Shim ring
3765		10	4	Front & Rear Bearing
3617		8	2	Gears
3584	Cover For Danfoss Drive	7b		Bearing Housing cover
3583	Cover For Charlynn Drive	7a		Bearing Housing cover
3585	Cover For PTO Drive	7	1	Bearing Housing cover
3532		6	1	Bearing Housing
3239B	Relief cover, 2 way	2	1	Rotor Housing cover
3237	Relief cover, 1 way	2	1	Rotor Housing cover
3236	Plain cover	2	1	Rotor Housing cover
PART NO.	DETAILED DESCRIPTION	NO.	PCS.	DESCRIPTION
PUMP SIZE 501, 551, 576				

	For Wear Sleeve	5	1	Loy Shaft
3702B-1L	PTO Drive (Wear Sleeve)	4	1	Drive Shaft
3699B-1L	Charlynn Drive(Wear Sleeve)	4a	1	Drive Shaft
3701B-1L	Danfoss Drive (Wear Sleeve)	4b	1	Drive Shaft
3332-1L	Class E Bi-Lobe Rotor	3a	2	SS Rotor
8412-1L	Class E Tri-Lobe Rotor	3b	2	SS Rotor
3164-1	2.5" Tri-Clamp Conn. ***	1	1	Rotor Housing
PART NO.	DETAILED DESCRIPTION	NO.	PCS.	DESCRIPTION
PUMP SIZE 501				

Connections Also Available in:
- ACME
- DIN 100
- DIN 80
- RST
- SMS
- NPTM
- CAMLOC

	For Wear Sleeve	5	1	Loy Shaft
3698B-1L	PTO Drive (Wear Sleeve)	4	1	Drive Shaft
3696B-1L	Charlynn Drive(Wear Sleeve)	4a	1	Drive Shaft
3697B-1L	Danfoss Drive (Wear Sleeve)	4b	1	Drive Shaft
3335-1L	Class E Bi-Lobe Rotor	3a	2	SS Rotor
8442-1L	Class E Tri-Lobe Rotor	3b	2	SS Rotor
3168-1	3" Tri-Clamp Conn. ***	1	1	Rotor Housing
PART NO.	DETAILED DESCRIPTION	NO.	PCS.	DESCRIPTION
PUMP SIZE 551				

	For Wear Sleeve	5	4	Loy Shaft
3706B-1L	PTO Drive (Wear Sleeve)	4	1	Drive Shaft
3704B-1L	Charlynn Drive(Wear Sleeve)	4a	1	Drive Shaft
3705B-1L	Danfoss Drive (Wear Sleeve)	4b	1	Drive Shaft
3338-1L	Class E Bi-Lobe Rotor	3a	2	SS Rotor
8472-1L	Class E Tri-Lobe Rotor	3b	2	SS Rotor
3178-1	3" Tri-Clamp Conn. ***	1	1	Rotor Housing
PART NO.	DETAILED DESCRIPTION	NO.	PCS.	DESCRIPTION
PUMP SIZE 576				

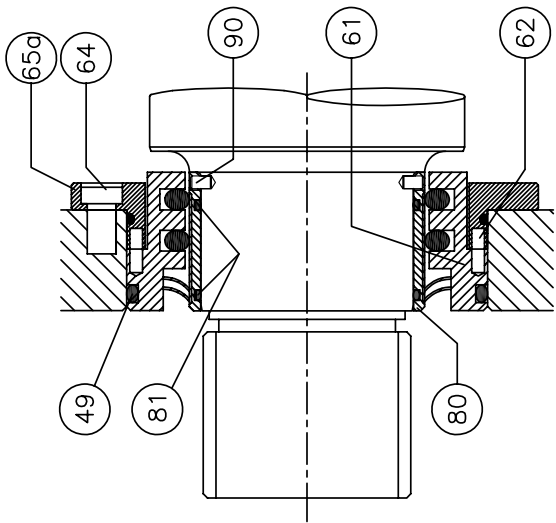
Also Available in 4"

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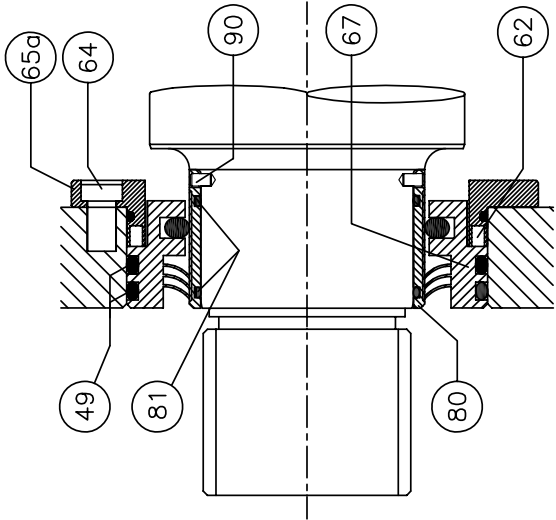


MATERIAL		BY	DATE
FINISH(UNLESS NOTED ON DWG.)		JPZ	
WEIGHT	CHECKED		
	APP'D		
	SCALE	NONE	
	ALL DIMENSIONS IN MM		
DWG. TITLE		UNIBLOC-PD PUMP PARTS LIST	
SIZE		501,551,576	
DWG. NO.		G807	
RELEASE DATE		SHEET 2 OF 2	

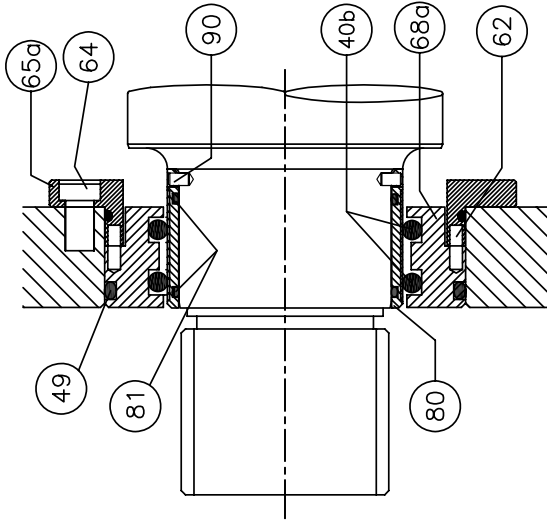
REGISTERED DESIGN: PATENTS PENDING



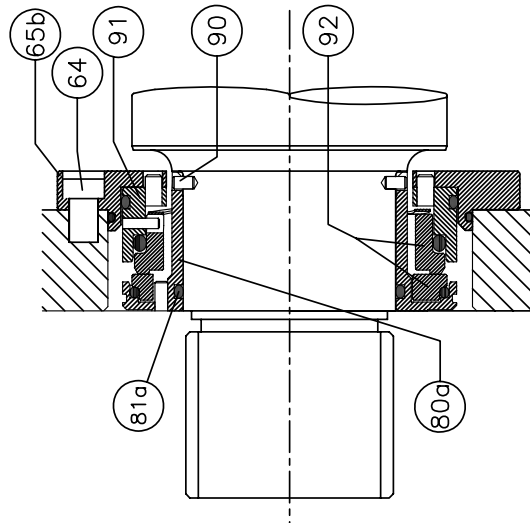
DOUBLE O-LIP SEAL
P/N 5272



TRIPLE O-LIP SEAL
P/N 5275



DOUBLE O-RING SEAL
OPTIONAL: SINGLE O-RING SEAL



MECHANICAL SEAL

NOTE 1.

P/N	SEAL FACE
5168-KIT	Tc vs Tc
5167-KIT	SIC vs SIC
5166-KIT	Tc vs SIC
5165-KIT	SS vs C
5169-KIT	-

92	1	SEE NOTE 1.	SINGLE MECHANICAL SEAL KIT (INCL SEAL FACES, O-RINGS, SPRING)	
91	1	49390	STATIONARY SEAL HOLDER	
90	2	4618-2	DOWEL PIN (M3x8 BN684)	
81a	1	4225	O-RING (1.987"x0.103")	
81	2	4228A	O-RING (1.989"x0.07")	
80a	1	4939C-2	SHAFT SLEEVE FOR MECHANICAL SEAL	
80	1	4939B	WEAR SLEEVE FOR O-RING & O-LIP SEAL	
68a	1	4937B-3	DOUBLE O-RING SEAL RETAINER RING	
67	1	5275	TRIPLE O-LIP SEAL CARTRIDGE (Shrink Fit)	
65b	1	4938 R-2	MECHANICAL SEAL RETAINER RING	
65a	1	4938 O-2	O-LIP SEAL RETAINER RING	
64	3	4312	BOLT (M6x12)	
62	2	4617-2	DOWEL PIN (M5x10BN684)	
61	1	5272	DOUBLE O-LIP SEAL CARTRIDGE	
49	2	4811	O-RING (75x3.5mm)	
40b	2	4238-N	PRIMARY O-RING (2.225"x0.210")	
No.	FCS	PER SEAL	PART NO.	DESCRIPTION

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UNIBLOC-PUMP INC.
FLOWTECH DIV. USA

DRAWN	BY	DATE	DWG. TITLE	DWG. NO.	REV. NO.
CHECKED	JPZ		UNIBLOC-PD PUMP	G812B	3
APPR'D			SHAFT SEAL PARTS LIST		
SCALE		NONE			
ALL DIMENSIONS IN MM			RELEASE DATE		
					SHEET 1 OF 1

WARRANTY

UNIBLOC-PUMP warrants every part of our product against poor workmanship and defective materials (wear items excluded) for a period of one (1) year from the date of shipment. If during this period the item does not conform to its performance parameters as a result of poor workmanship and/or defective materials, return the faulty item, shipping prepaid and fully insured, to an authorized UNIBLOC-PUMP service facility. If, upon inspection of the item in question, poor workmanship or defective materials are revealed, UNIBLOC-PUMP will repair or replace it, at UNIBLOC-PUMP's option, and will return it by shipping it F.O.B. to the service facility. This warranty is void if the item has not been used as recommended or instructed, has been altered or used with unauthorized accessories, has been subject to misuse, abuse or accident, or has been damaged due to causes not related to poor workmanship or defective materials. All parts or components not manufactured by UNIBLOC-PUMP are warranted only to the extent of the warranty of the respective manufacturers.

ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXPRESSLY EXCLUDED. IN NO EVENT SHALL UNIBLOC-PUMP OR ITS AFFILIATES BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER ARISING IN CONTRACT OR IN TORT.

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