

Operation & Service Manual

Pump Models: PD200-576

REVISION: 05/2024



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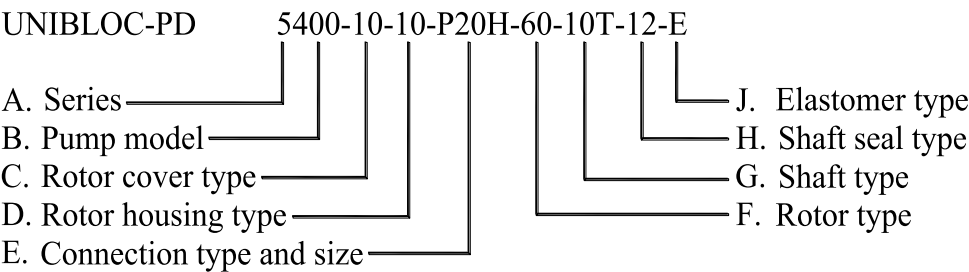
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Pump Identification

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)

1.0 General

1.1 Declaration of Conformity



EC DECLARATION OF CONFORMITY

We hereby declare that the following machinery is intended for installation into a machine or to be assembled with other machines into a machine. It must **not** be put into service until the machinery into which it is incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC, 09/392/EEC, amendments 91/368/EEC, 93/44/EEC, 93/68/EEC.

Manufacturer	Manufacturer
Unibloc Hygienic Technologies, LLC 1650 Airport Road Kennesaw, GA 30144 USA	UNIBLOC-RH GmbH Stromberger Strasse 197 Beckum 59269 Germany

Machine Description: Rotary Lobe Pump

Type: UNIBLOC-PD
UNIBLOC-GP

Size: PD200-677
GP200-450

Serial Number: *****

These machines have been designed and manufactured in accordance with the following transposed harmonized European Standards.

EN292 Parts 1 and 2: 1991 Safety of Machinery – Basic Concepts, general principles for design.

EN294: 1992 Safety distances to prevent danger zones being reached by the upper limbs.

Amendment: CR NO 2023/2006: GMP for materials and articles in contact with food

Amendment: EC NO 1935/2004: Materials and articles in contact with food

Amendment: CR NO 10/2011: Plastic materials and articles in contact with food

A technical construction file for this machinery is retained at the above address.

Signed:  Date: January 12, 2021

Bhavesh Patel, Operations Manager

Q42.2101.1

1.2 General Description

UNIBLOC-PD is a positive displacement rotary lobe pump. It may be supplied with a drive unit (figure 1.0-1.2) or without a drive unit (figure 1.3). 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.

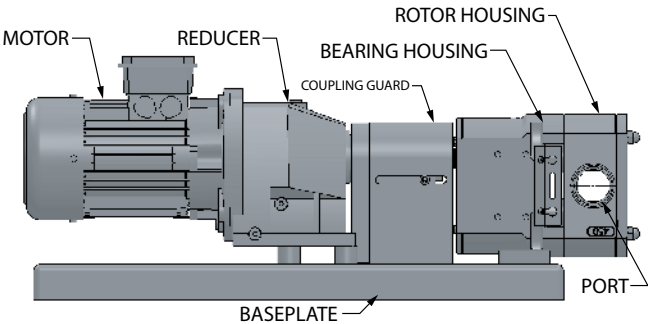
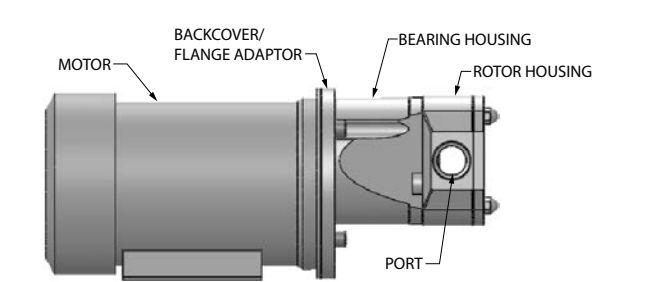
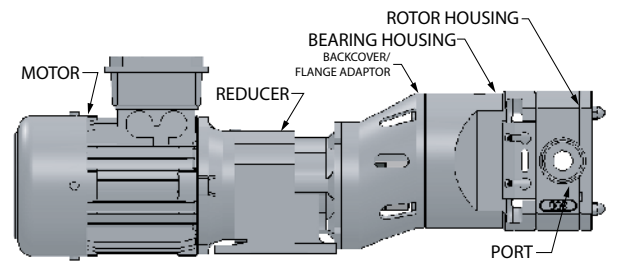


Figure 1.0



Compac™ Direct Mount: Coupled Assembly (baseplate optional)

Figure 1.2



Compac™ Flex Mount: Coupled Assembly (baseplate optional)

Figure 1.1

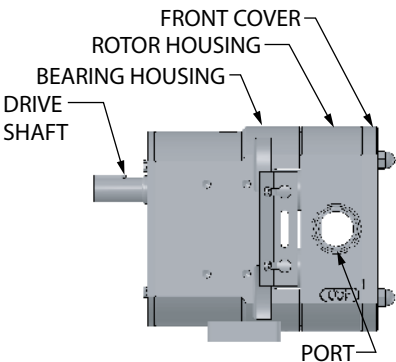


Figure 1.3

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

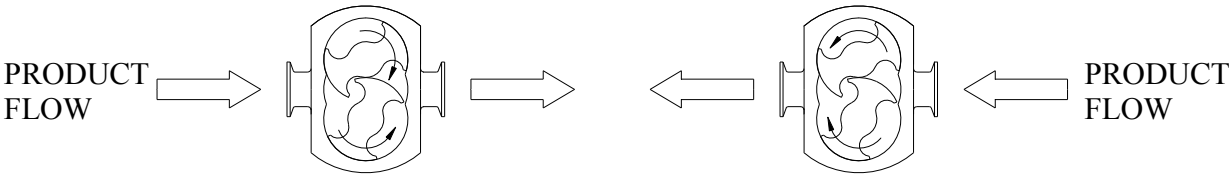


Figure 1.2

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	
SERIES: <input type="checkbox"/> 5000 <input type="checkbox"/> 4000A <input type="checkbox"/> 4000B <input type="checkbox"/> 3000	
MODEL: _____	
SERIAL No.: _____	
BUILD CODE: _____	
Year: _____	Mass, kg: _____
Max press. @ ambient temp, Bar: _____	
Max temp. @ 1 Bar, °C: _____	
UNIBLOC Hygienic Technologies	

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.

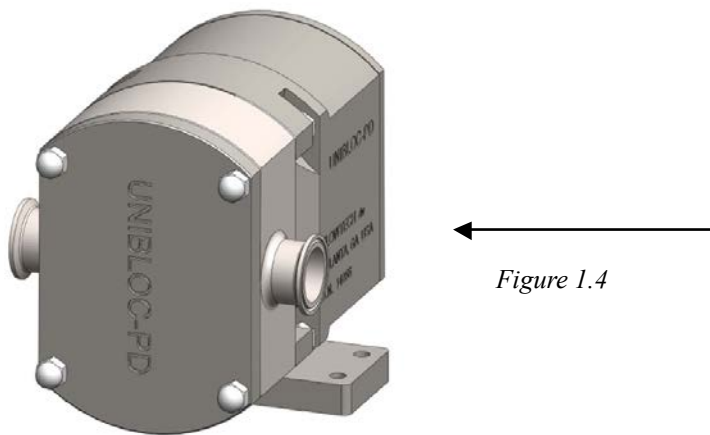


Figure 1.4

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.

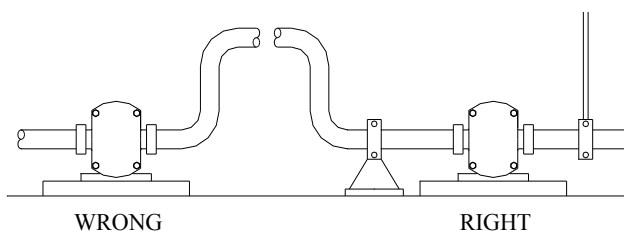


Figure 2.2.1



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

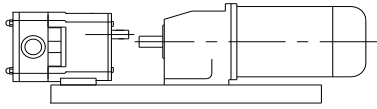


Figure 2.2.2

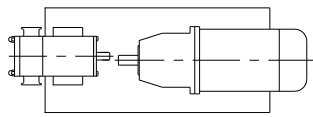


Figure 2.2.3

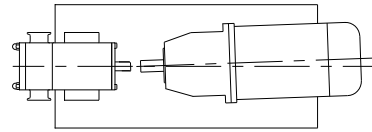


Figure 2.2.4



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.

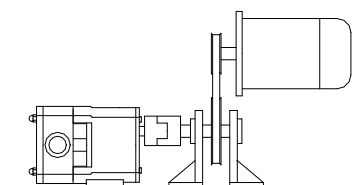


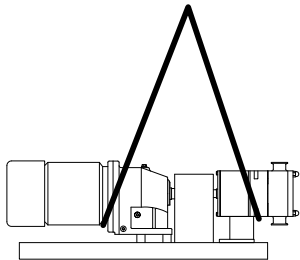
Figure 2.2.5

3.0 Installation

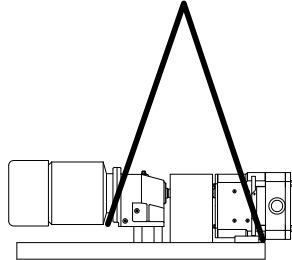
3.1 Handling and Storage



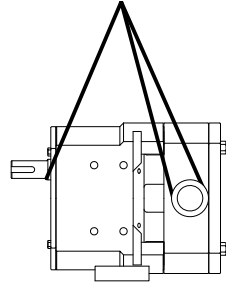
Caution must be taken when lifting the pump or pump unit. For all parts over 20kg we recommend the use of a lifting device or lifting arrangement when unpacking or moving. Check the weight guide in section 5.0 for details. See figure 3.0 and 3.1 for lifting guidance.



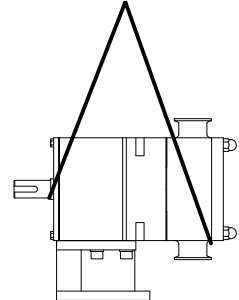
Vertical Port Mounting
Figure 3.0



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.

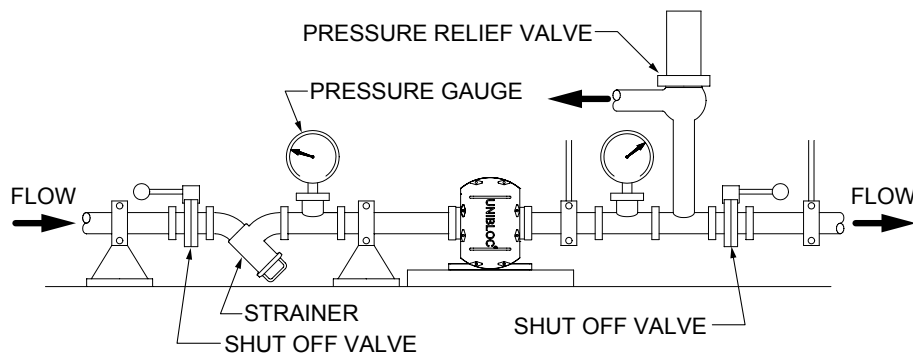


Figure 3.2.1

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 OPERATE 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: 11pm (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.

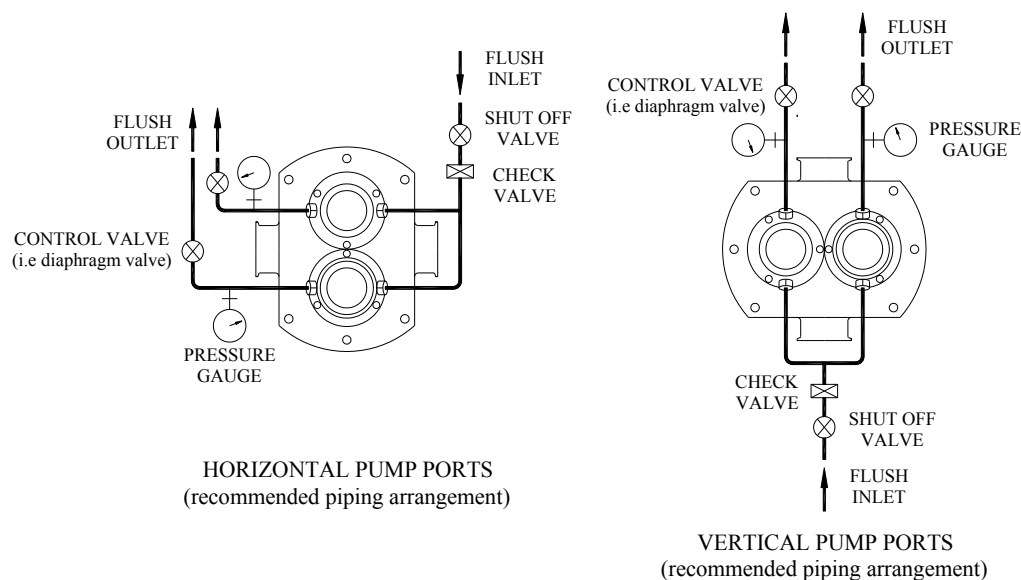
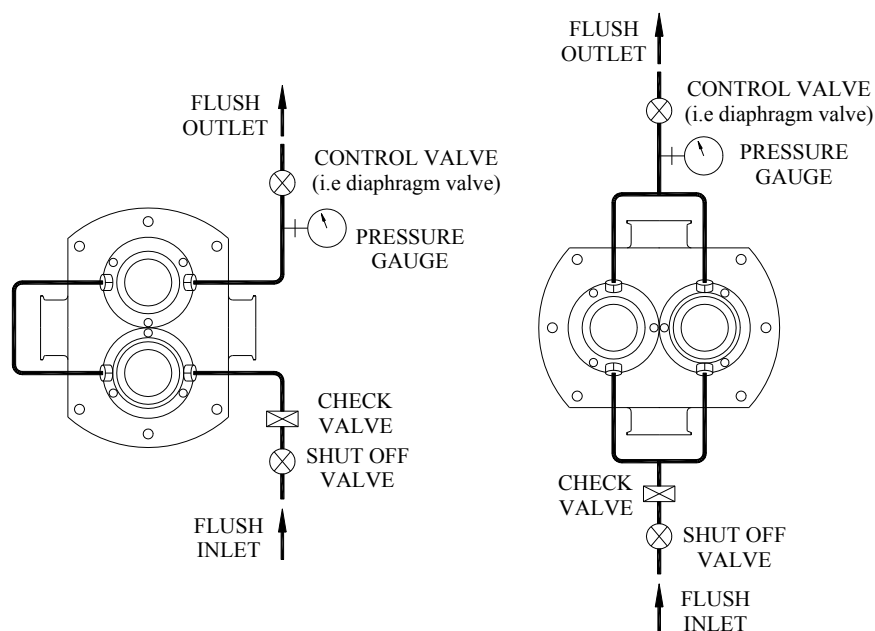


Figure 3.3.1



ALTERNATE PIPING ARRANGEMENTS

Figure 3.3.2

3.3.2 Double O-Ring & O-Lip 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. **Unibloc recommends using Lubriplate Synxtreme FG-2 calcium sulfonate complex grease.** 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 TAKES 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 non-metal 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.

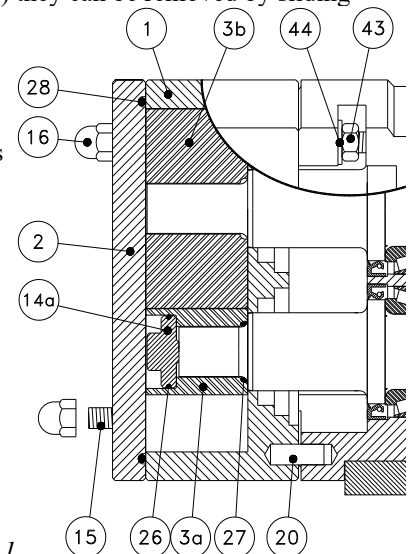


Figure 4.4.1

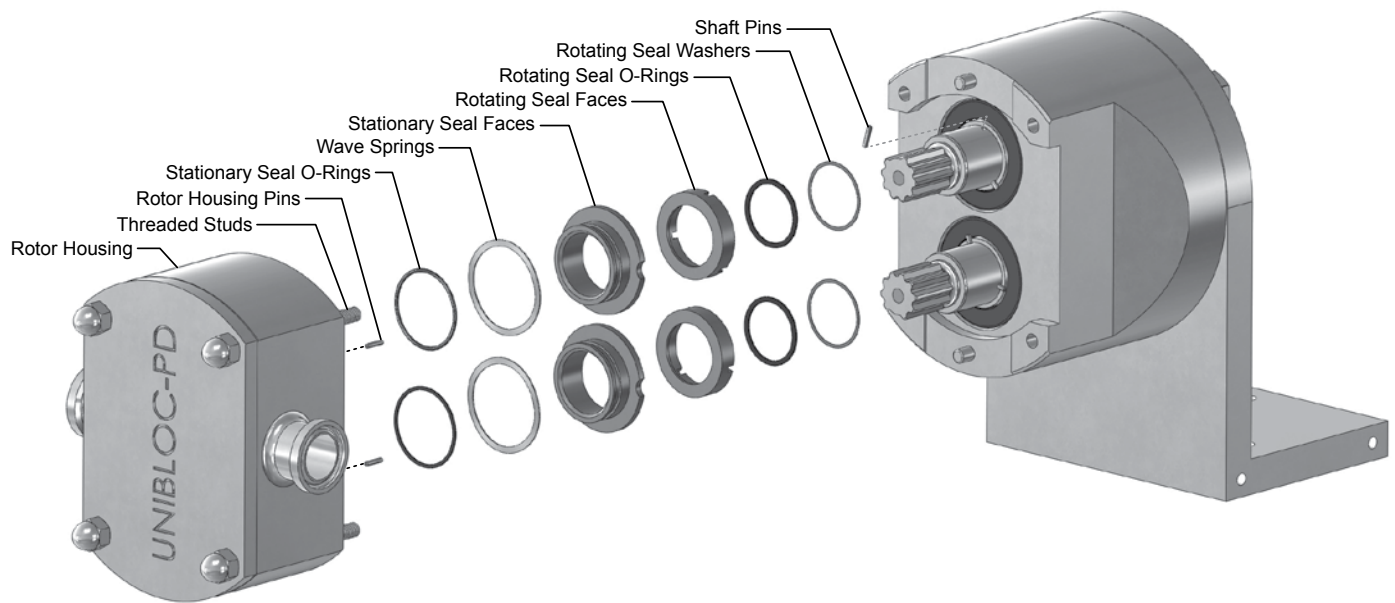
4.4.1 Single Mechanical Seal

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.

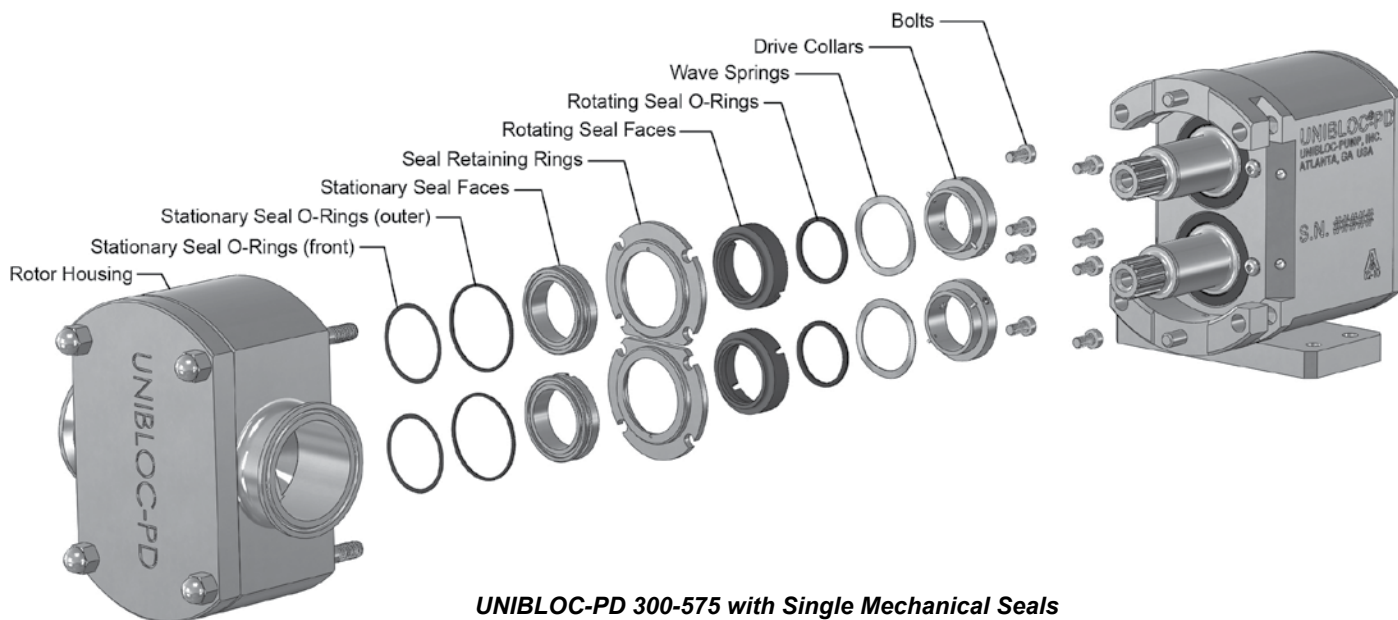


4.4.1.2 UNIBLOC-PD 200-275 Single Mechanical Seal Installation

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.

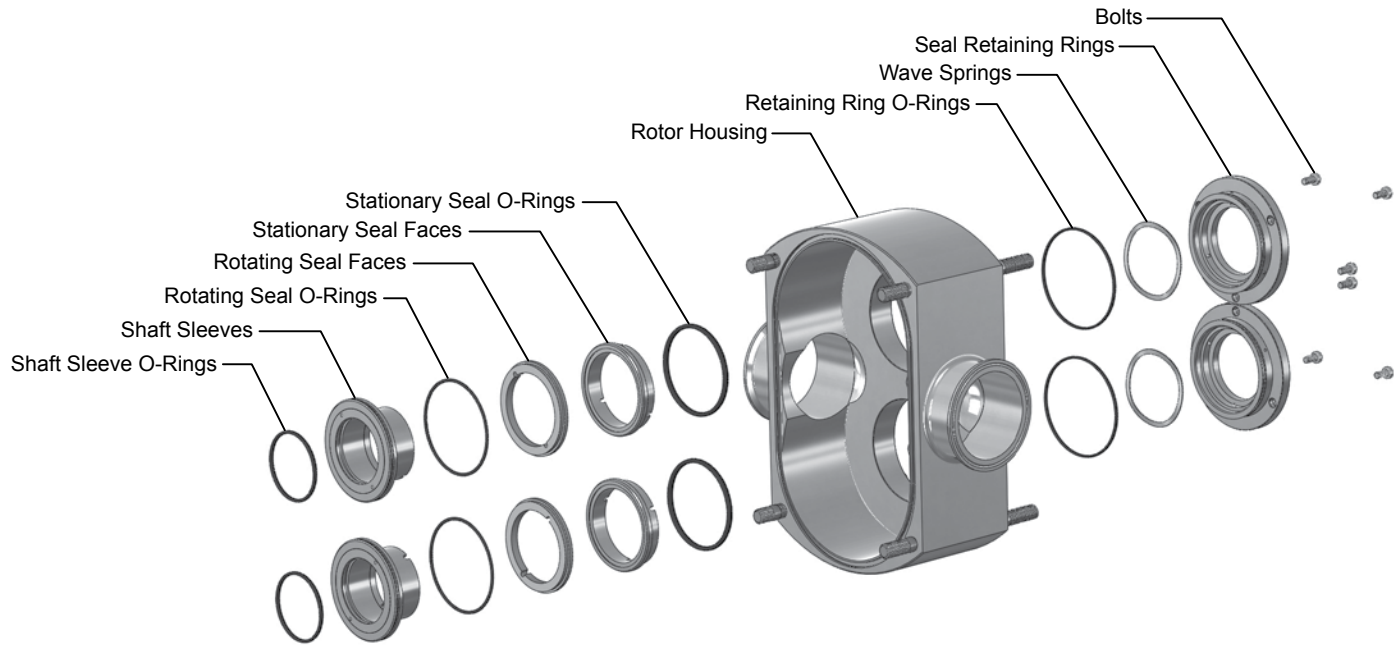


4.4.1.4 UNIBLOC 300-575 Single Mechanical Seal Installation

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.



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

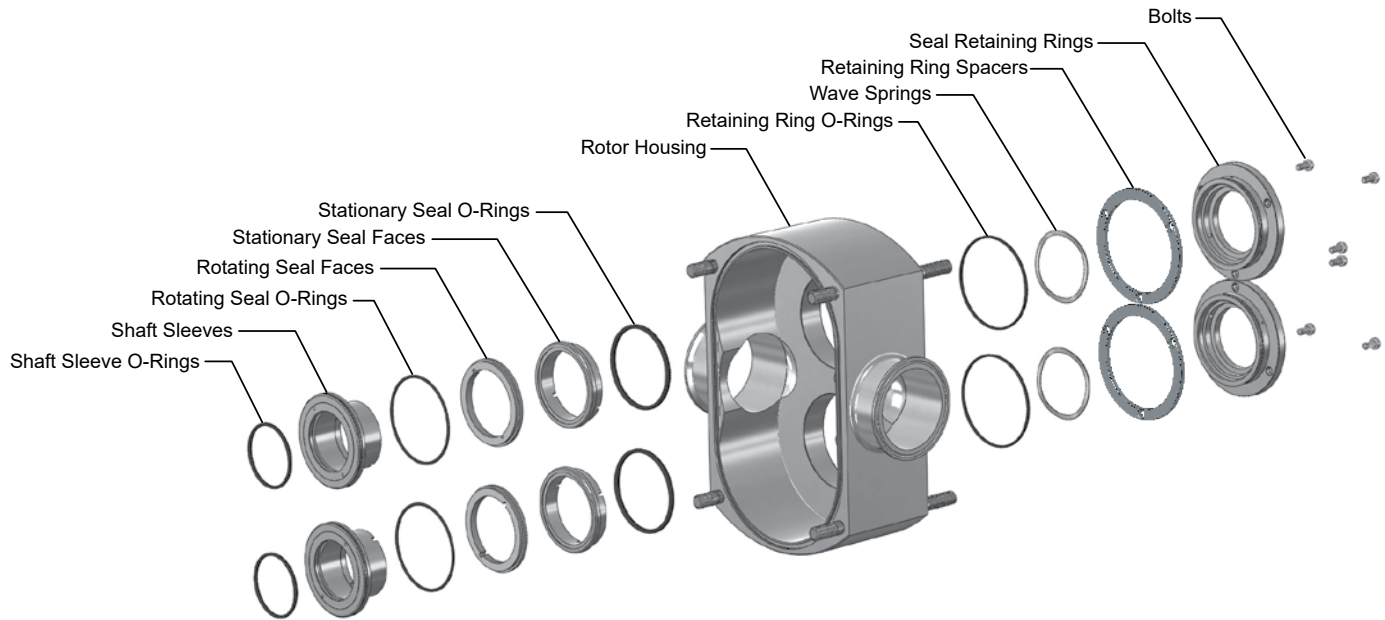
The shaft and rotor housing bores should be cleaned before installing the seal components. Before installing components, note the location of the dowel pins on the **Seal Retaining Ring**. Small ink markings can be made on the surface of the Rotor Housing to show pin locations. Replace and lubricate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

4.4.1.6 UNIBLOC 500, 550, 575 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 500, 550, 575 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.

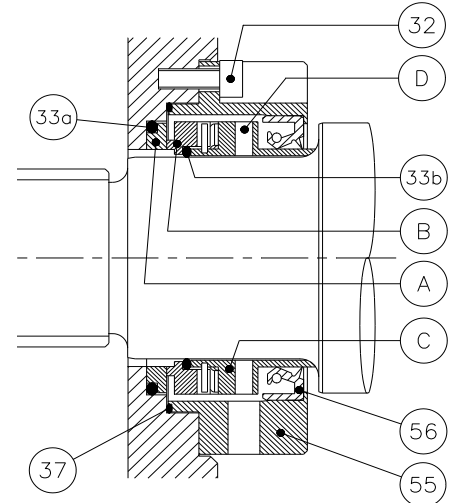
Place the **Rotating Seal O-Ring** on the stepped side of the **Rotating Seal Face** and lubricate. While aligning the **Rotating Seal Face** pin slots with the Shaft sleeve pins, hand press the **Rotating Seal Face** into the **Shaft Sleeve** until fully seated. Lubricate the **Shaft Sleeve O-Ring** 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.

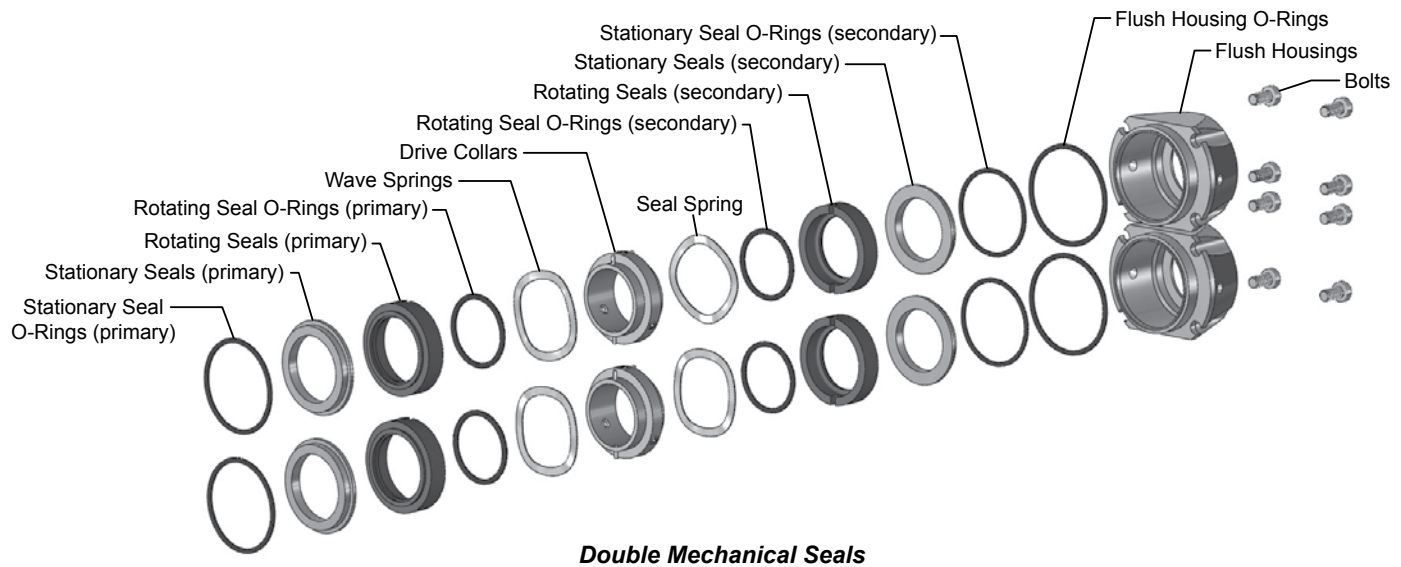


4.4.2.2 Flushed Single Mechanical Seal Installation

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.



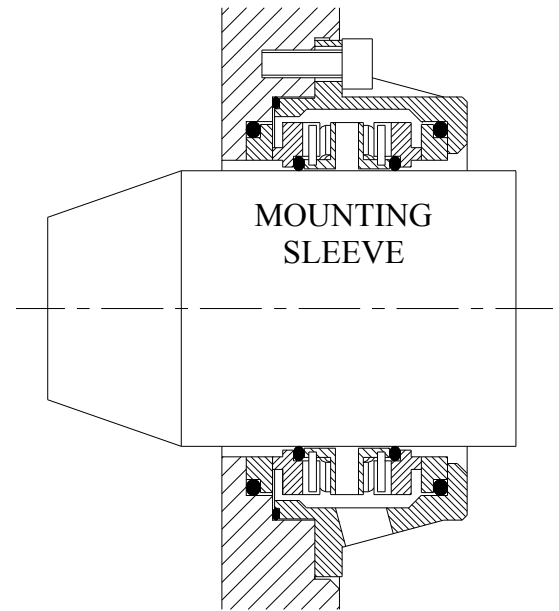
4.4.3.1 Double Mechanical Seal Removal

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**.

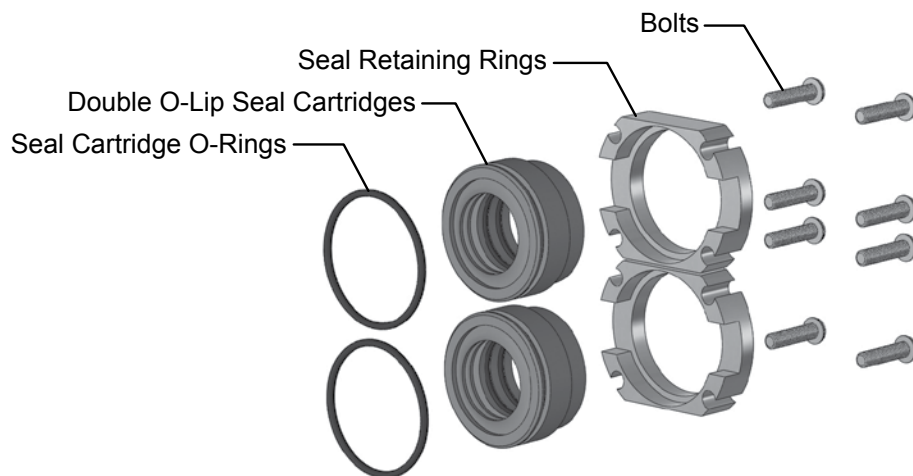
While the rotor housing is lying flat with the cavity facing down, stack the seal components on the **Stationary Seal Faces (primary)**. Begin with **Rotating Seal Faces (primary)**, slotted sides up. Place the **Rotating Seal O-Rings (primary)** into the **Rotating Seal Faces (primary)**. Next, place the **Drive Collars** into the **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.

Optional **front loaded, double o-lip seals** are available on **UNIBLOC-PD 400 & 500 Series pumps**. **UNIBLOC-PD 501 Series Tanker/Transport pumps** feature front loaded seals as standard. 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.



UNIBLOC-PD 200-575 Double O-Lip Seals

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

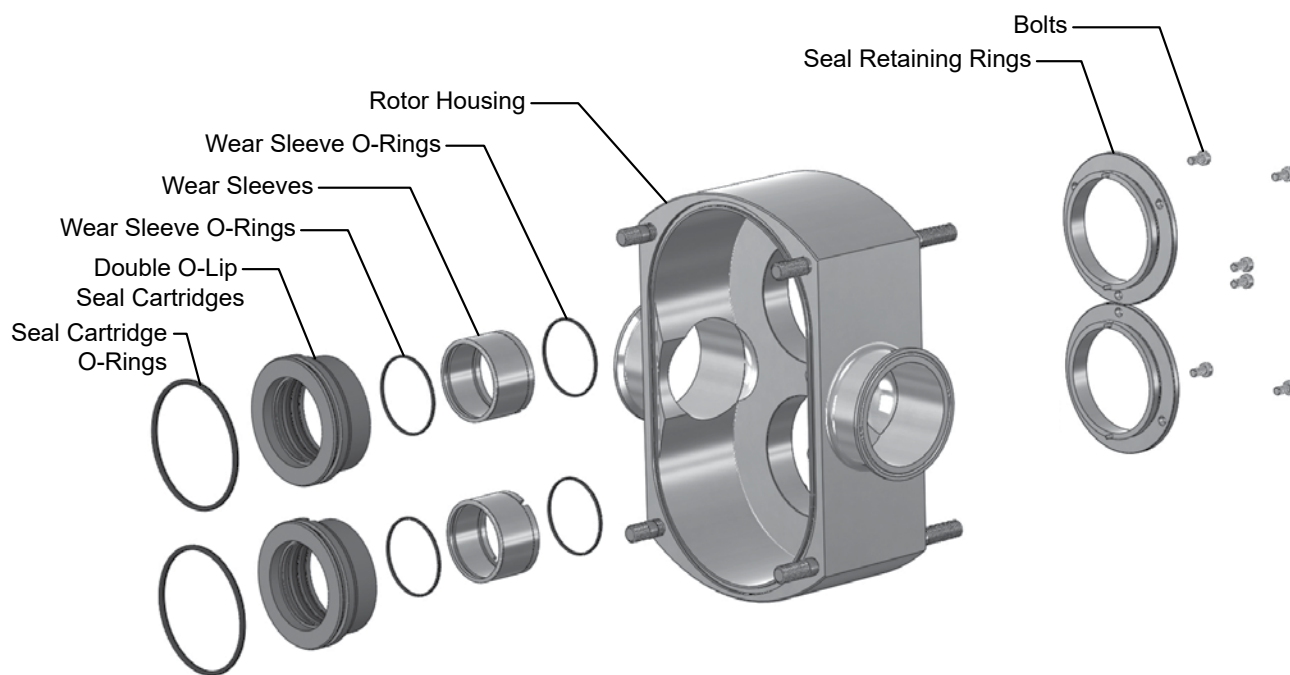
Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the rotor housing (item 1 in Figure 4.4.1) by pulling on the ports or by tapping gently with a rubber mallet. The entire seal with all components will come off attached to the rotor housing. Remove the **Bolts** and **Seal Retaining Rings**. Pull 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 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.



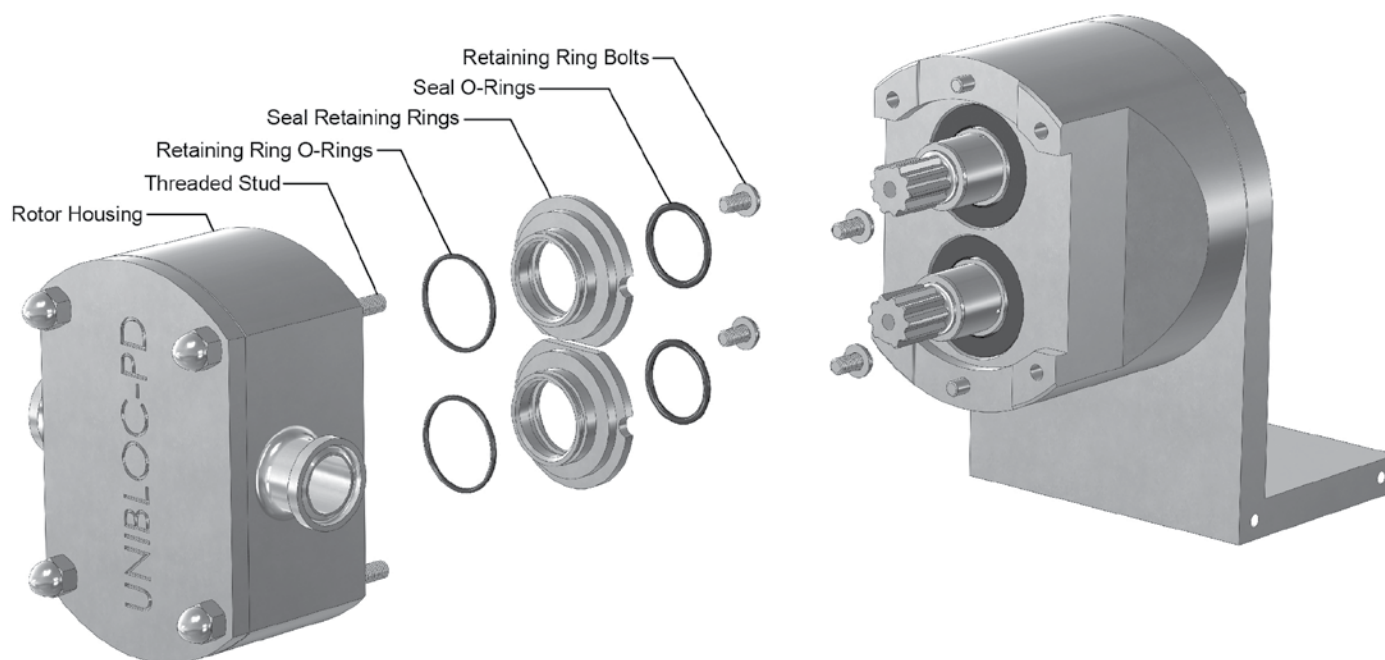
UNIBLOC-PD 500-576 Front Loaded Double O-Lip Seals

4.4.4.4 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 cavity. See section 4.4.7 for completing the installation on PD400/450 and PD500/550/575 model pumps. See Section 4.4.8 for completing the installation on PD501/551/576 model pumps.

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



UNIBLOC-PD 200-275 Single O-Lip Seals

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

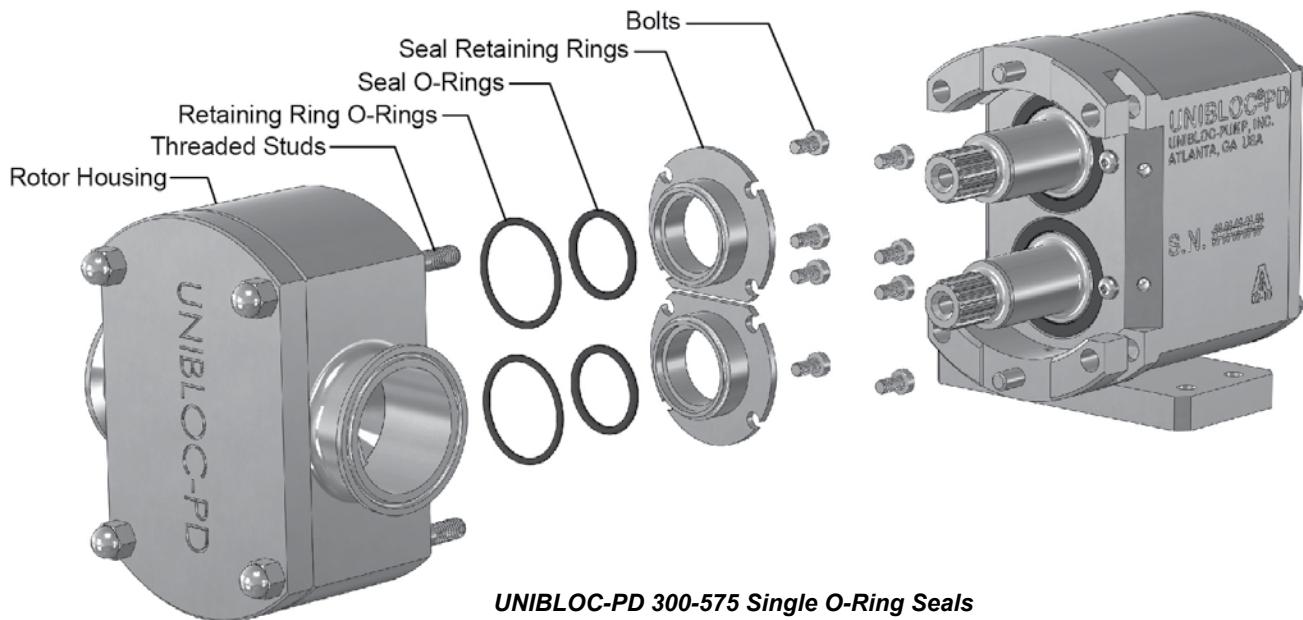
Loosen and remove the acorn nuts from the **Rotor Housing**. Loosen the **Threaded Studs** by locking two M6 nuts against each other on the exposed threaded stud ends. Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. All seal parts will come off with the 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.

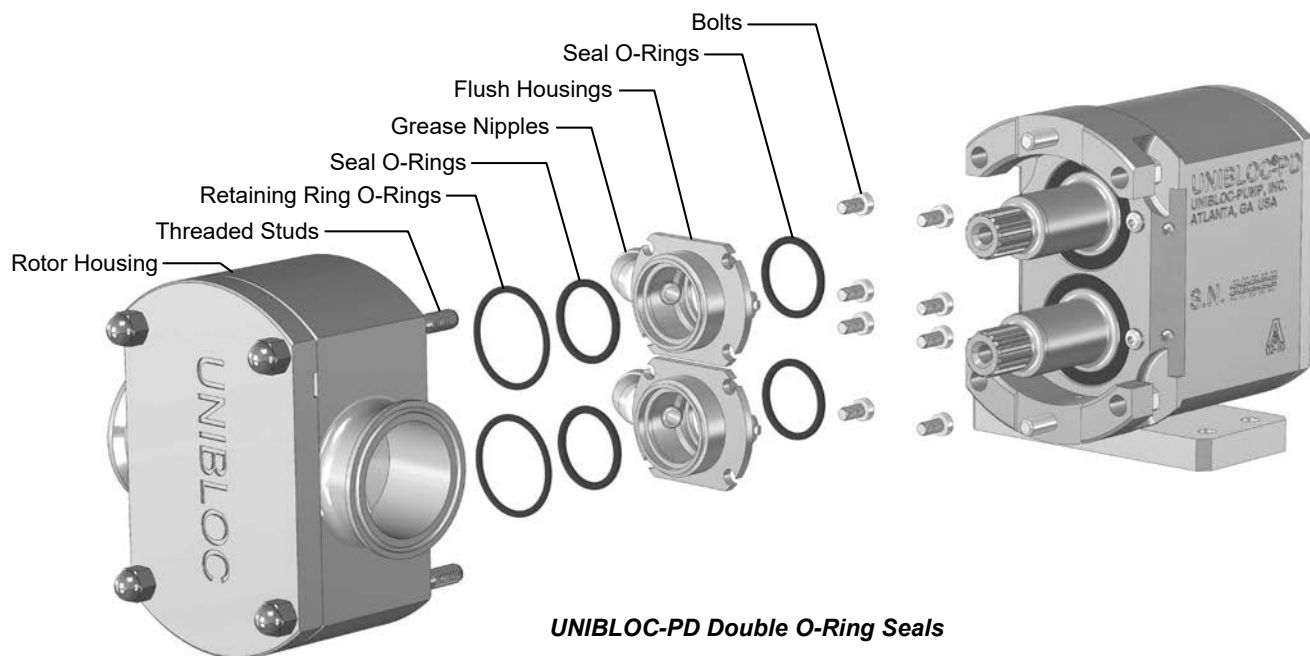


4.4.5.4 UNIBLOC 300-575 Single O-Ring Seal Installation

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.



4.4.6.1 Double O-Ring Seal Removal

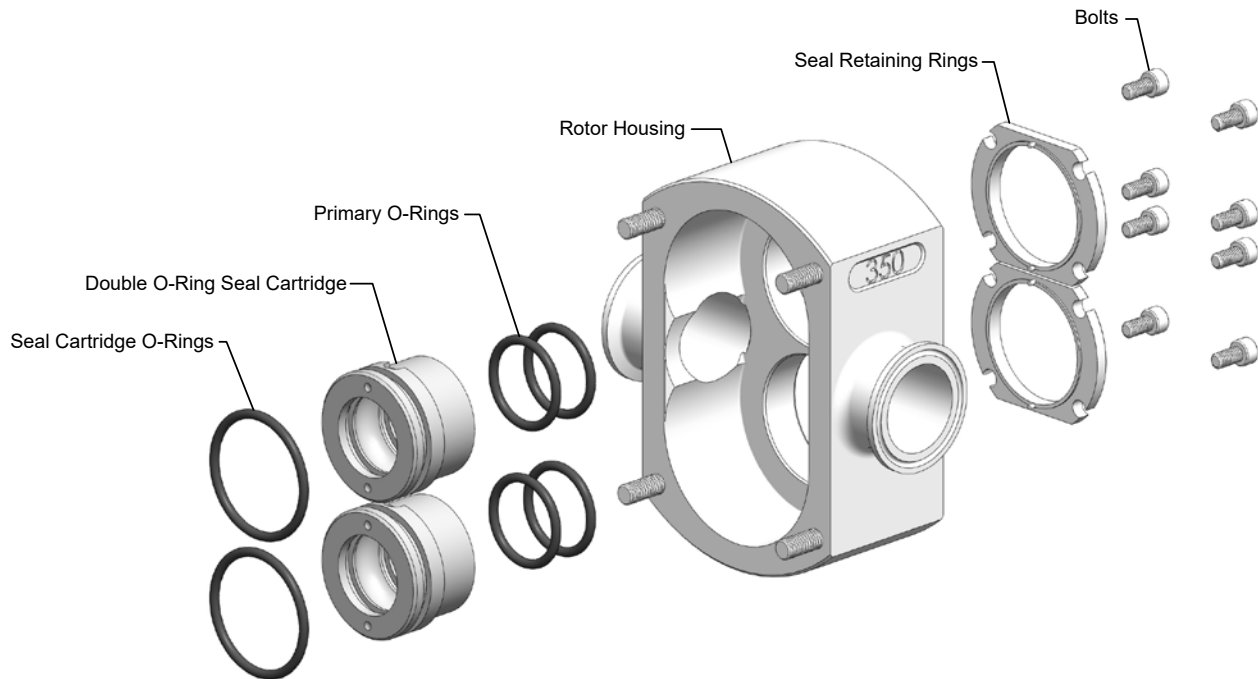
If using a flushing system as discussed in section 3.3, disconnect it from the **Flush Housings**. Loosen the stud nuts (item 43 in Figure 4.4.1). Remove the **Rotor Housing** by pulling on the ports or by tapping gently with a rubber mallet. All seal parts will come off with the housing. Remove the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

4.4.6.2 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.

4.4.6.3 UNIBLOC 300-576 Series Front Loaded Double O-Ring™ Seal Removal

If the rotors were removed, the rotor housing does not need to be taken off. The **Double O-Ring Seal Cartridge** can be removed by placing screwdrivers between the rotor housing and gearbox and pushing them out.



UNIBLOC-PD 300 Series Double O-Ring Seals

4.4.6.4 UNIBLOC 300-576 Series Front Loaded Double O-Ring™ Seal Installation

Place new **Seal Cartridge O-Ring** into the groove of the **Double O-Ring Seal Cartridges**. Install **Primary O-Rings** into the grooves inside the **Seal Cartridge**. 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 seals **Primary O-Rings**. Push the **Double O-Ring Seal Cartridges** over the assembly sleeves. Before pressing seals into the **Rotor Housing**, rotate each seal to where two dimples on the front face of the **Double O-Ring Seal Cartridge** aligns with the two pins on the **Seal Retaining Ring**. Once dimples are aligned with pins, push the **Double O-Ring Seal Cartridge** into the **Rotor Housing** so that they are flush with the back of the rotor housing cavity. See section 4.4.7.2 for completing the installation.

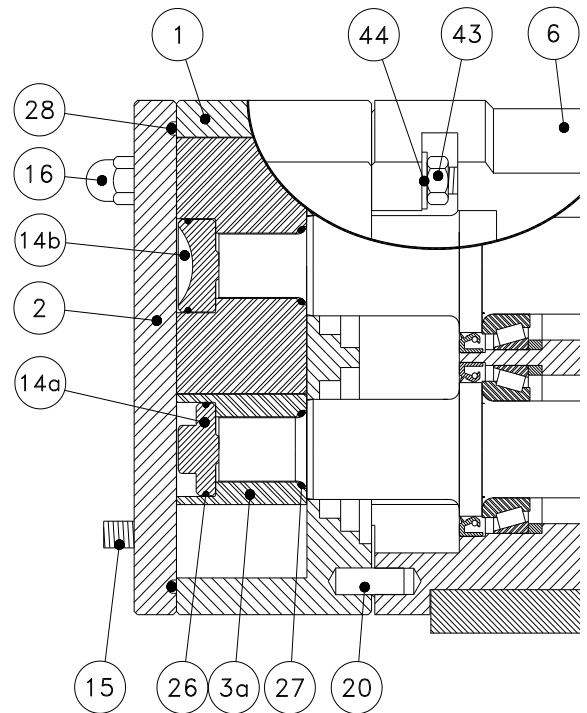
*Assembly sleeves not used on PD300 series pumps.

4.4.7 UNIBLOC 200-575 Seal Installation – Final Steps

4.4.7.1 Rotor Housing Installation

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 (non-metal) 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).



4.4.7.2 Rotor Installation

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.

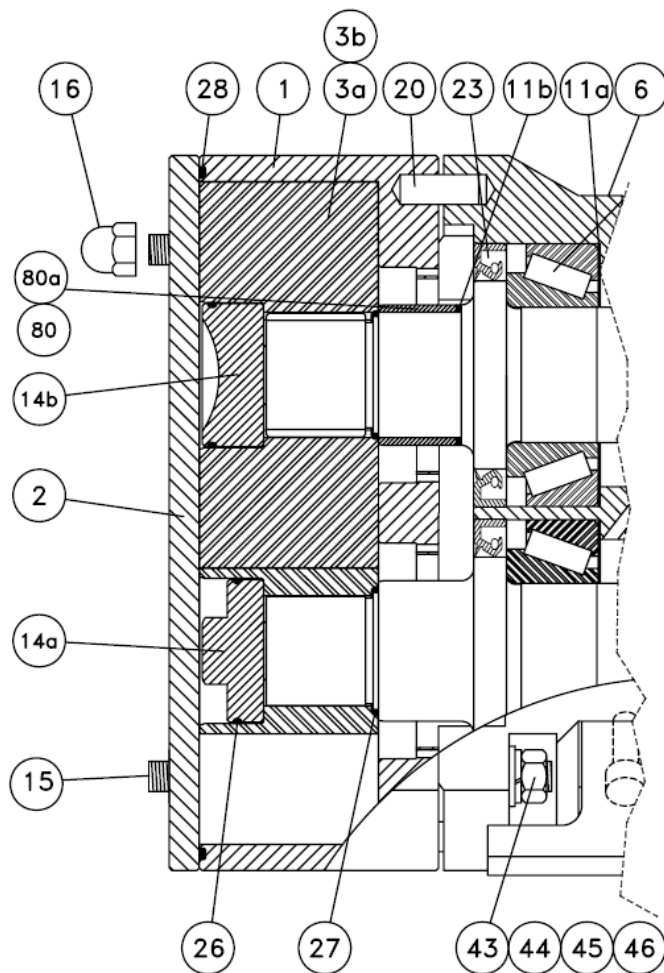
Slide the rotors over the corresponding shafts and push them making sure the o-rings seat properly. The rotors must make contact with the shafts. Place o-rings (26) on the rotor bolts (14a, 14b). Lubricate them and the rotor bores. Place a non-metal object between the rotors to keep them from turning. 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 non-metal 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.



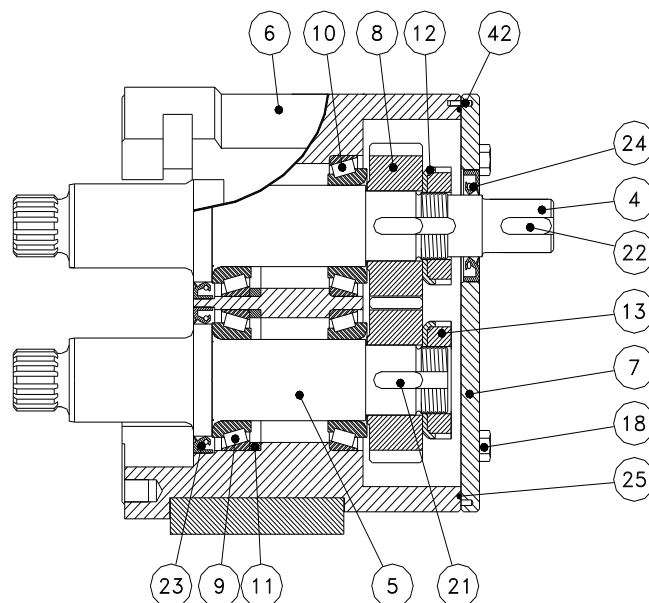
4.5 Pump Bearing Housing Service

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 1800C (3560F) 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 tab washers (12) and remove them and the slotted nuts (13). With a rubber mallet, strike the ends of the shafts where the tab washers 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.

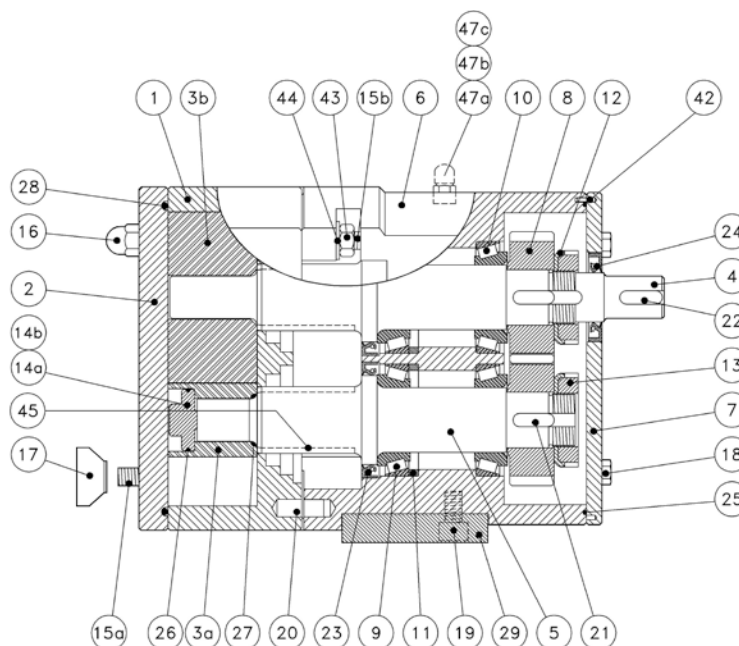


4.5.2 Bearing housing Assembly

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 tab washers (12) and thread on the slotted nuts (13). Slide on the rotors (3a) and place a non-metal 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 tab washers. 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 tab



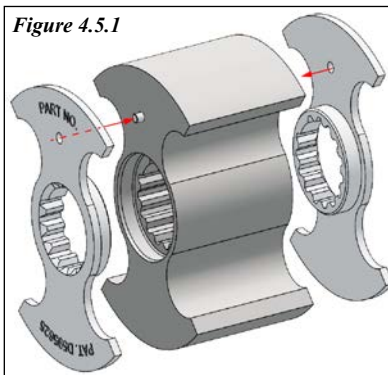
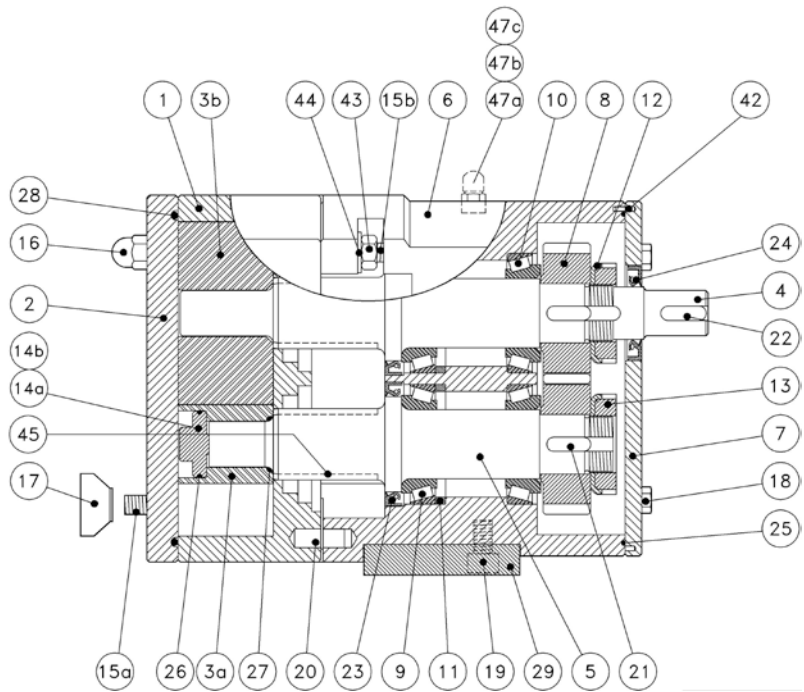
washers. Remove the shafts, gears, and keys from the bearing housing. Tap out the front bearing cups only to reveal the shim ring(s). Insert an appropriate shim, and then repeat the steps described in this section. If the clearances fall within the ranges specified, then proceed to section 4.5.2.2.

4.5.2.2 Pump Assembly – Stainless Steel Rotors – Final Step

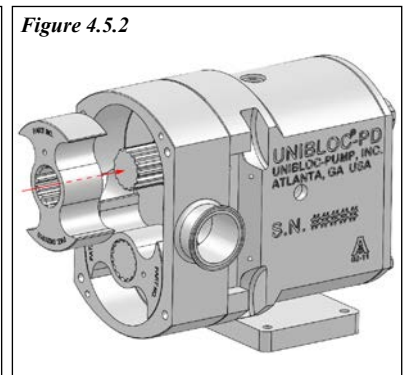
Lock the nuts in place by bending the tab washer into the slots in the nut. Install the front oil seals (23) by first lubricating with oil all contact areas on the shafts and bearing housing. The text on the seals should face out. Push the seals on with a sleeve flush with the bearing housing. Stand 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 – Quick-Strip™ 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 tab washers (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 non-metal 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 tab washer 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.



DuraCore™ Rotor Assembly



DuraCore™ & PolyFlex™ Rotor Installation

4.5.2.4 Pump Assembly- FoodFirst Rotors

FoodFirst Rotors do not require locking mechanisms and work in tandem with the **FoodFirst Front Cover**. The FoodFirst system utilizes two sets of removable spacer rings (fig. 4.5.3) or caps (fig. 4.5.4). One set of spacer rings or caps are located in the front cover (**Front Cover Spacer Ring/Front Cover Spacer Cap**) while the other set are located in the rotors (**Rotor Spacer Ring/Rotor Spacer Cap**). It is important to take care when maintaining FoodFirst pumps. Damage to the spacer rings/caps, rotors, and front cover may prevent the pump from operating as intended.

FoodFirst Cover and Rotor with Spacer Rings

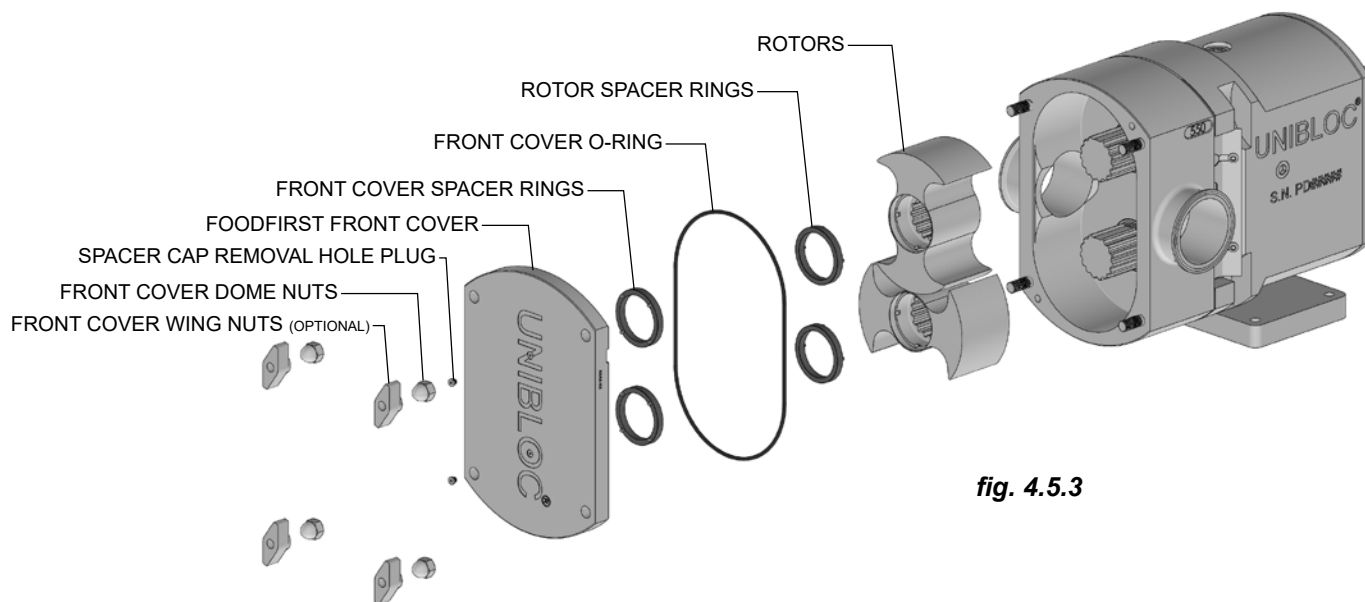


fig. 4.5.3

FoodFirst Cover and Rotor with Spacer Caps

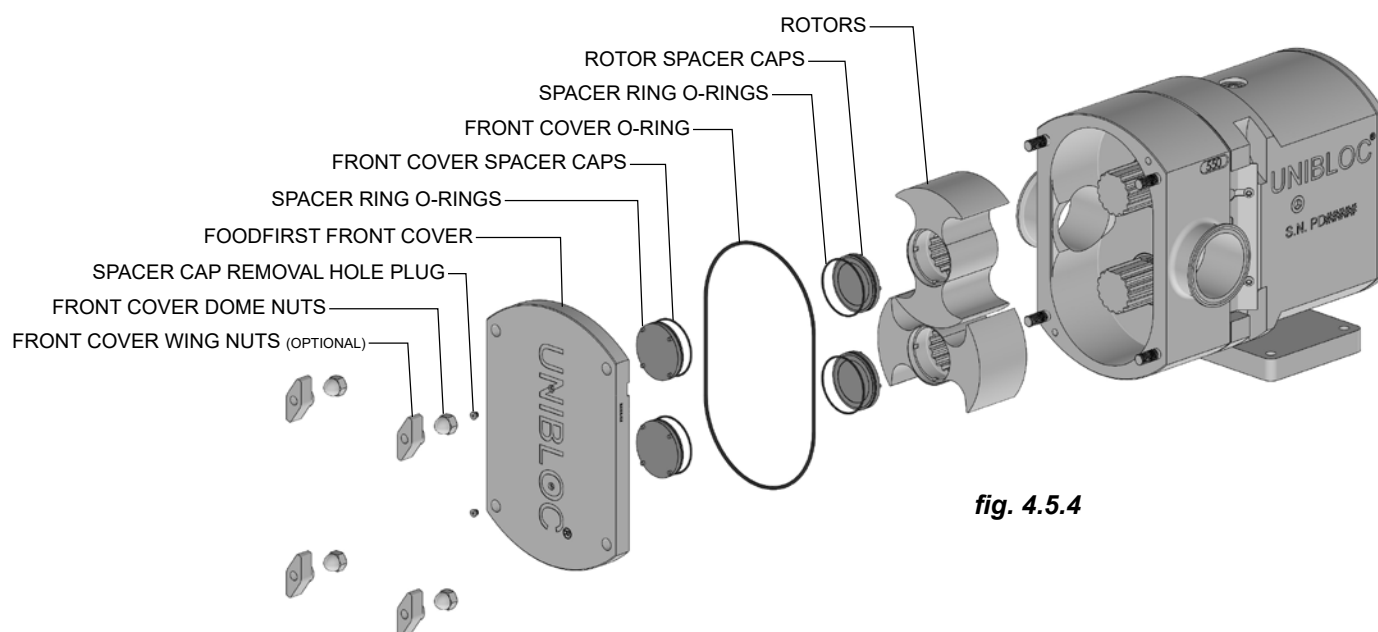


fig. 4.5.4

4.5.2.4.0 FoodFirst Front Cover Removal- Spacer Rings (reference fig. 4.5.3)

Remove the **Front Cover Nuts**. Carefully remove the **FoodFirst Front Cover**, taking caution not to damage the **Spacer Rings**. The **Rotor Spacer Rings** may adhere to the **Front Cover Spacer Ring** and dislodge from the **Rotors** during **Front Cover** removal. Store any loose spacer rings in a safe place.

4.5.2.4.1 FoodFirst Front Cover Spacer Ring Removal- Standard Front Cover (ref. fig. 4.5.6)

The **Front Cover Spacer Rings** may be removed from the **Front Cover** by gently pulling them out of the cover. Once removed, be sure to store spacer rings in a safe place.

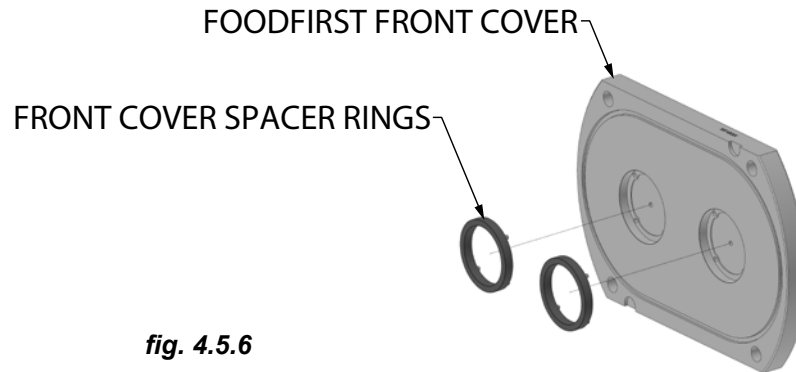


fig. 4.5.6

4.5.2.4.2 FoodFirst Front Cover Spacer Ring Removal- High Pressure (HP) Cover (ref. fig. 4.5.7)

The **Front Cover Spacer Rings** may be removed from the **Front Cover** by gently pulling them from the spigots. Once removed, be sure to store spacer rings in a safe place.

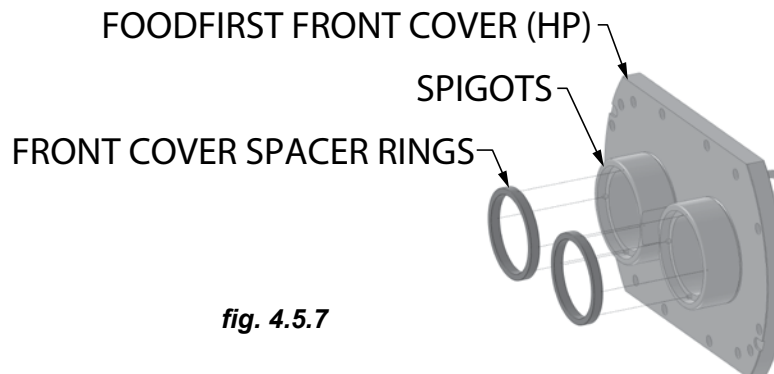


fig. 4.5.7

4.5.2.4.3 FoodFirst Front Cover Removal- Spacer Caps (reference fig. 4.5.4)

Remove the **Front Cover Nuts**. Carefully remove the **FoodFirst Front Cover**, taking caution not to damage the **Spacer Caps**. The **Rotor Spacer Caps** may adhere to the **Front Cover Spacer Caps** and dislodge from the **Rotors** during **Front Cover** removal. Store any loose spacer rings in a safe place.

4.5.2.4.4 FoodFirst Front Cover Spacer Cap Removal- UNIBLOC 300-575 (ref. fig. 4.5.8, 4.5.9, 4.5.10)

The **Front Cover Spacer Caps** may be removed from the **Front Cover** by first removing the handle or swing arm, if present, (see pg.74&75) to allow access to the **Removal Plugs** (fig.4.5.8). Remove the two **Removal Plugs** (fig.4.5.8) and safely store.

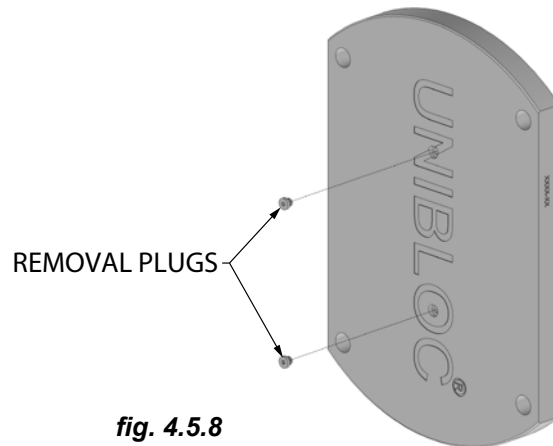


fig. 4.5.8

Next, insert the **Cap Removal Tool** (PN: 6015) into the plug hole and turn clockwise until contact with the **Spacer Cap** is made (fig. 4.5.9). Once the tool has contacted the **Spacer Cap**, continue turning the **Cap Removal Tool** clockwise until the **Spacer Cap** is completely freed from the cover (fig.4.5.10). Take care not to drop or damage the **Spacer Caps** during removal. Remove the **Cap Removal Tool** by turning it counter clockwise and repeat the removal steps on the remaining **Spacer Cap**.

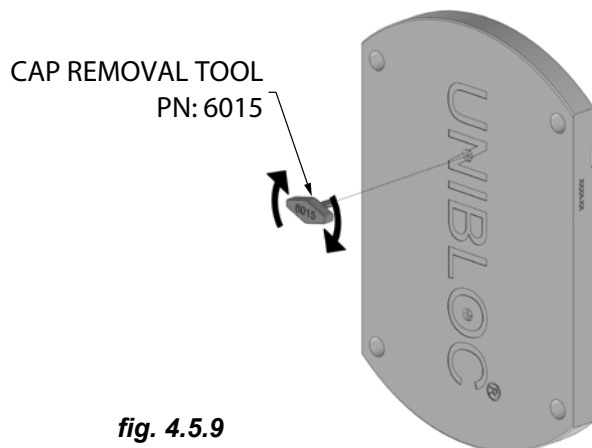


fig. 4.5.9

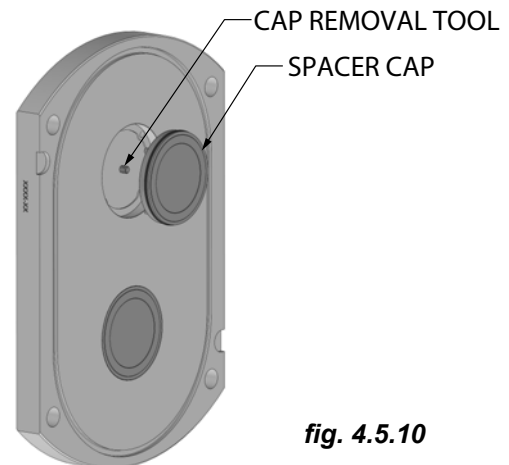


fig. 4.5.10

4.5.2.4.4 FoodFirst Front Cover Spacer Cap Removal- Model B Relief Valve Cover UNIBLOC 501, 551, 576 (ref. fig. 4.5.11 and 4.5.12)

The **Front Cover Spacer Caps** may be removed from the **Front Cover** by first removing the relief valve from the cover (see pg.71). Next, insert the **Cap Removal Tool** (PN: 6016) into the **Access Hole** and turn clockwise until contact with the **Spacer Cap** is made (fig. 4.5.11). Once the tool has contacted the **Spacer Cap**, continue turning the tool clockwise until the **Spacer Cap** is completely freed from the cover (fig. 4.5.12). Take care not to drop or damage the **Spacer Caps** during removal. Remove the **Cap Removal Tool** by turning it counter clockwise and repeat the removal steps on the remaining **Spacer Cap**.

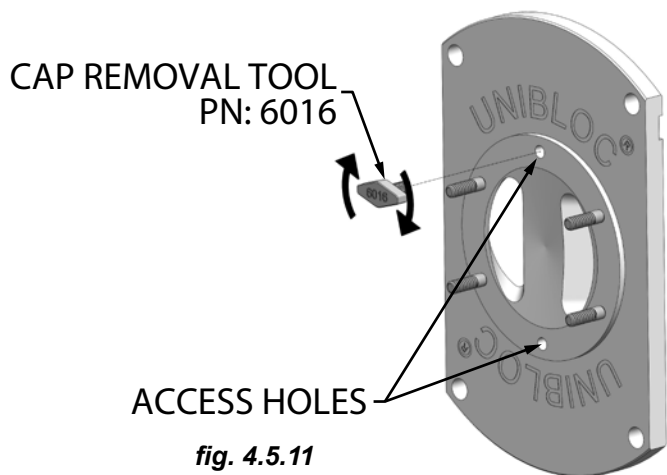


fig. 4.5.11

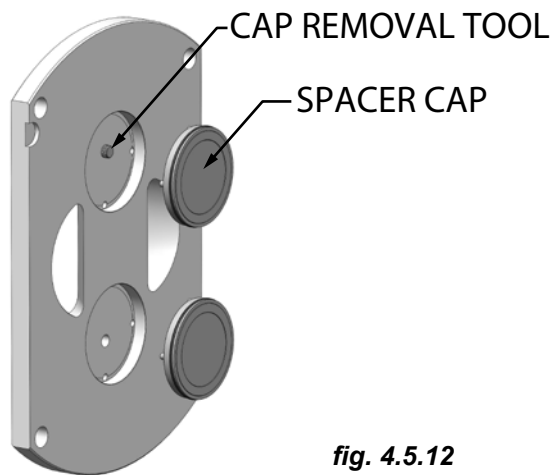


fig. 4.5.12

4.5.2.4.7 FoodFirst Front Cover Spacer Installation (reference fig. 4.5.13, 4.5.14, 4.5.15 and section 4.4.8)

Thoroughly clean **Front Cover** and **Spacers** before installing. Inspect **Front Cover Spacers** for excessive wear and damage. If damaged, replace **Spacers** with new ones. **Rotor Spacer Caps** contain a sealing **O-ring** around the perimeter (fig. 4.5.14). It is advised to check this o-ring for damage and replace if necessary before installing spacer (fig.4.5.14). If **Cover Spacer Rings** are not damaged, it is important to ensure that they are within the acceptable wear range (see section 5.5). To check wear level, insert the spacers into the cover by aligning the spacer's dowel pins with the cover's dowel pin holes. If installing **Spacer Caps**, it is important to lubricate the **Spacer Cap O-ring** and to ensure the **Removal Plugs** have been removed before firmly pressing it into the rotor pocket. If the **Spacer** is within the acceptable wear range (see section 5.5), remove the spacer and place a generous amount of food grade grease on each dowel pin and **Cap O-ring** before aligning and installing the spacer for final installation. Reinstall **Removal Plugs** if present (fig. 4.5.15).

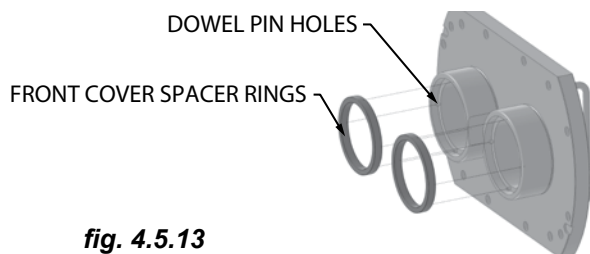


fig. 4.5.13

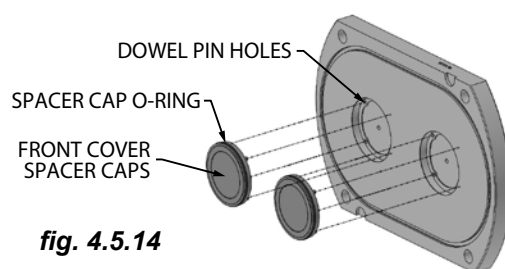


fig. 4.5.14

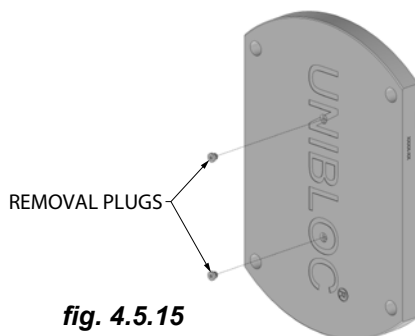


fig. 4.5.15

4.5.2.4.3 FoodFirst Rotor Removal (reference fig. 4.5.3 and 4.5.4 in Section 4.5.2.4)

Each **FoodFirst Rotor** is composed of two parts, a **Rotor** and a **Rotor Spacer** (see Section 4.5.2.4). During assembly and operation the **Rotor Spacer** is seated in a pocket on the **Rotor**. When maintaining the pump, the **Rotor Spacer(s)** may dislodge from the **Rotor(s)** during **Front Cover** removal. If the **Rotor Spacers** are still seated in the **Rotors** after cover removal, they can be removed once the **Rotors** have been removed from the **Rotor Housing**. Remove the **Rotors** from the **Rotor Housing** by sliding them off the shafts (see Section 4.5.2.4). Be sure to place the rotors and spacers in a safe place while maintaining the pump, as they can be easily damaged.

4.5.2.4.4 FoodFirst Rotor Spacer Removal (reference fig. 4.5.16 and 4.5.17)

Rotor Spacer Rings may be removed from the **Rotors** by gently pulling them out of the rotor (fig.4.5.16). **Rotor Spacer Caps** may be removed from the rotor by gently pressing them out through the splined center hole, accessible from the rear side of the rotor (fig. 4.5.17). Once removed, be sure to store the **Rotor Spacers** in a safe place.

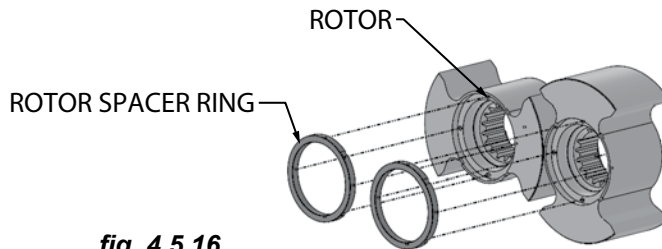


fig. 4.5.16

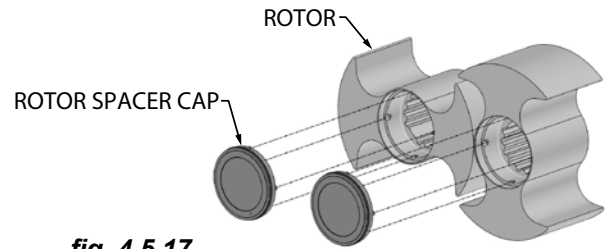


fig. 4.5.17

4.5.2.4.5 FoodFirst Rotor Spacer Installation (reference fig. 4.5.18 and 4.5.19)

Thoroughly clean **Rotors** and **Spacers** before installing. Inspect **Rotor Spacers** for excessive wear and damage. If damaged, replace **Rotor Spacers** with new ones. **Rotor Spacer Caps** contain a sealing o-ring around the perimeter. It is advised to check this **O-ring** for damage and replace if necessary (fig.4.5.19). If **Rotor Spacers** are not damaged, it is important to ensure that they are within the acceptable wear range (see section 5.5). To check wear level, insert the **Rotor Spacer** into the rotor by aligning the spacer ring or cap's dowel pins with the rotor's dowel pin holes. If installing **Spacer Caps**, it is important to lubricate the **Rotor Spacer Cap O-ring** before firmly pressing it into the rotor pocket. If the **Spacer Ring** is within the acceptable wear range (see section 5.5), remove the spacer ring and place a generous amount of food grade grease on each dowel pin and **Cap O-ring** before aligning and installing the spacer ring for final installation.

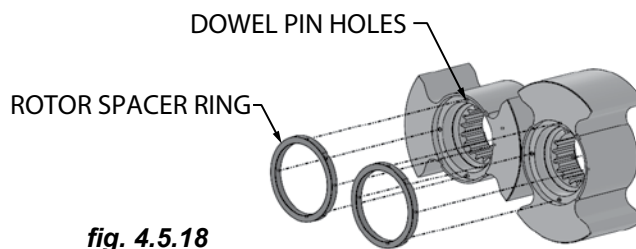


fig. 4.5.18

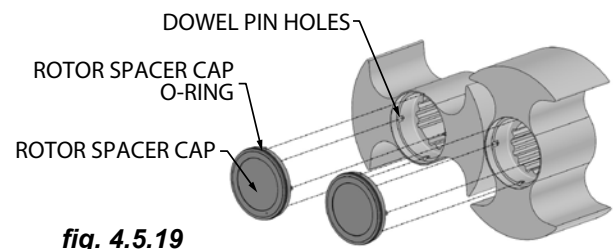


fig. 4.5.19

4.5.2.4.6 FoodFirst Rotor Installation (reference Section 4.5.2.4)

With the **Rotor Spacer Ring or Cap** installed, align missing rotor spline with missing shaft spline and slide rotor onto shaft.

4.6 Relief Valve Cover Service

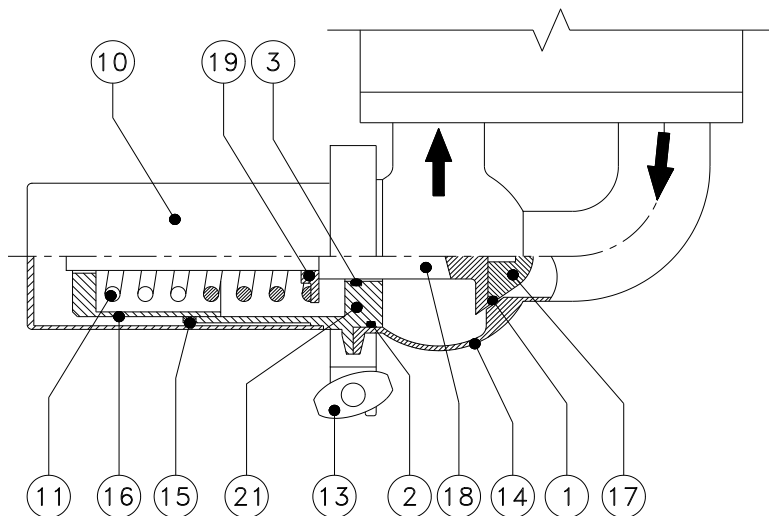
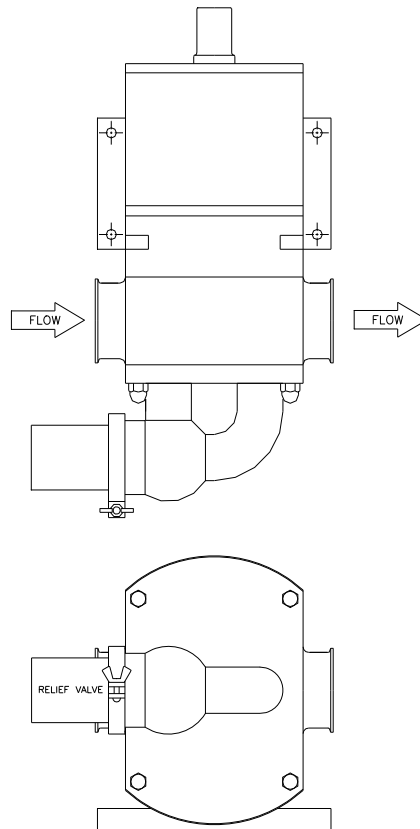
UNIBLOC® pumps may be supplied with a relief valve cover model #46, shown in section 4.6.1 or model #B shown in section 4.6.2. Both models will minimize or eliminate problems associated with over-pressurizing the pump. Although a complete external relief system is recommended, the types illustrated are 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 counter-clockwise 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.

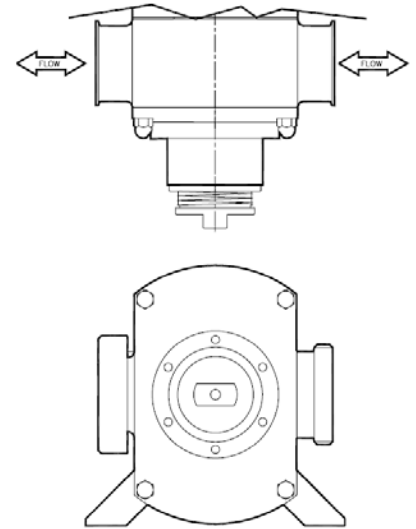
To service the valve seals the pump must not be operating, the system must be depressurized, and the pump isolated from the remainder of the system. Remove the housing (10) and mark the location of the lock ring (15). Unscrew the adjusting sleeve (16) and remove it. Remove the clamp (13) and separate 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.



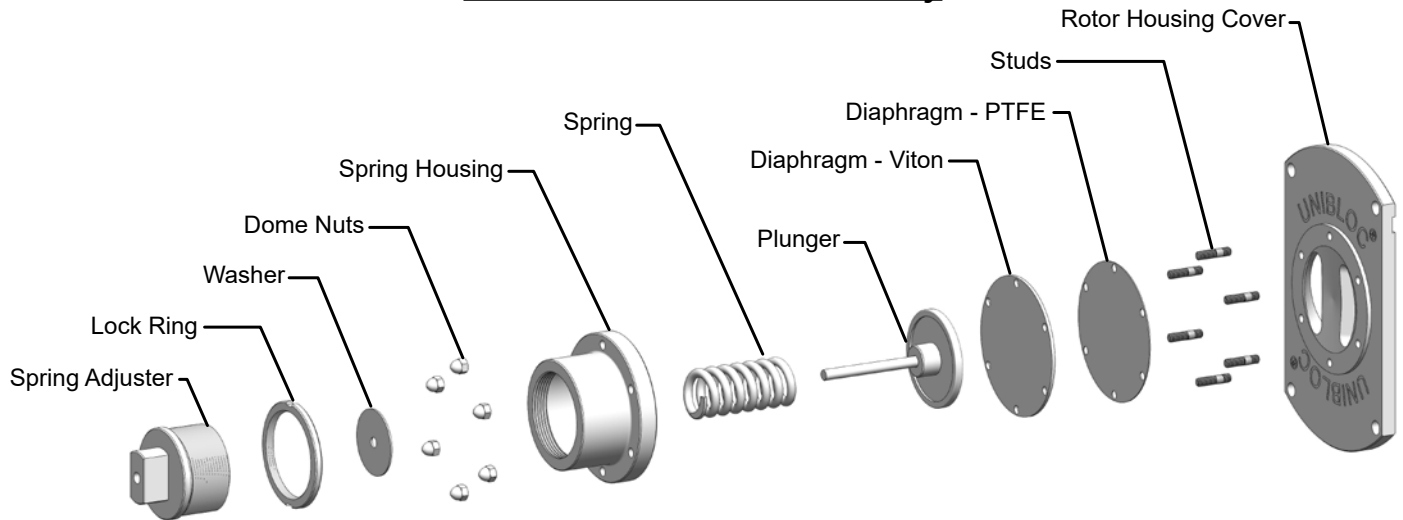
4.6.2 Relief Cover Model B

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

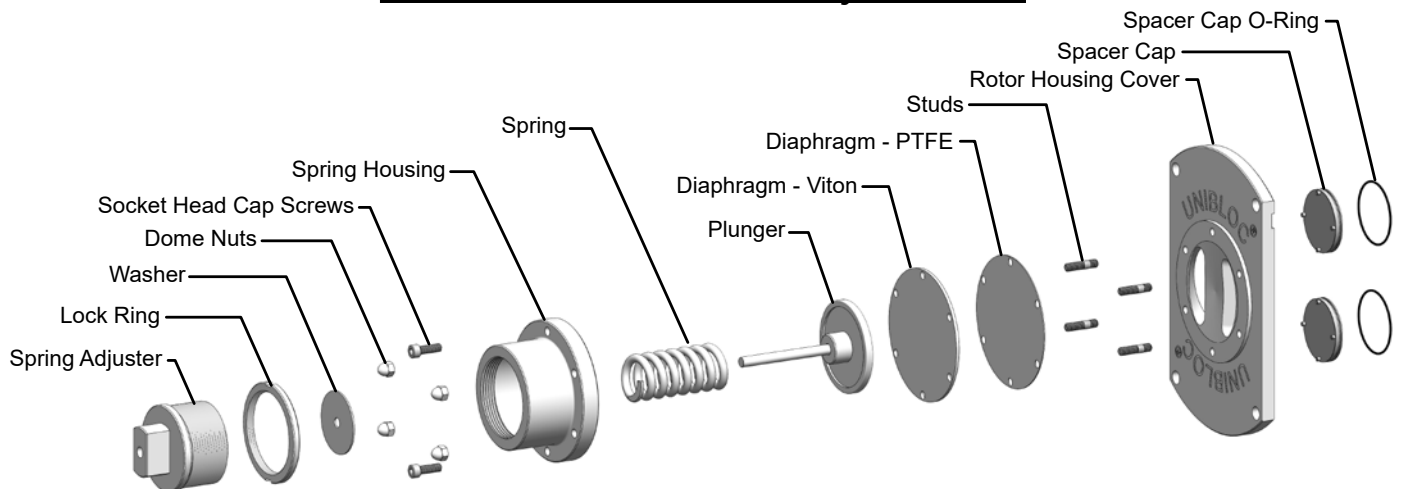
Mark the location of the **lock ring** on the **spring adjuster**. Unscrew the **spring adjuster** and remove it. Remove the **spring**. Look for the **washer** either inside the **spring adjuster** or on top of the **spring** for replacement. Unscrew the **dome nuts** on the **spring housing** and separate the **spring housing** from the **rotor housing cover**. The **plunger** will now be removable as one unit. It is now possible to remove the **diaphragms** from the **studs**. Once old diaphragms have been removed, place new diaphragms (**PTFE diaphragm** first, followed by **Viton diaphragm**) onto the **studs**. Next, slide the **spring housing** back on the **studs**, hold the **plunger** on the diaphragms so it stays inside the **spring housing**. Fasten the **spring housing** to the **rotor housing cover** with the **dome nuts**. Place the **spring** over the **plunger** stem. Make sure you have the **diaphragm washer** placed either on top of the **spring** or inside the **spring adjuster**. Turn the **lock ring** back to correct settings on the **spring adjuster**. Thread the **spring adjuster** back into the **spring housing** and tighten. The pump may now be returned to service.



Model B Relief Cover Assembly



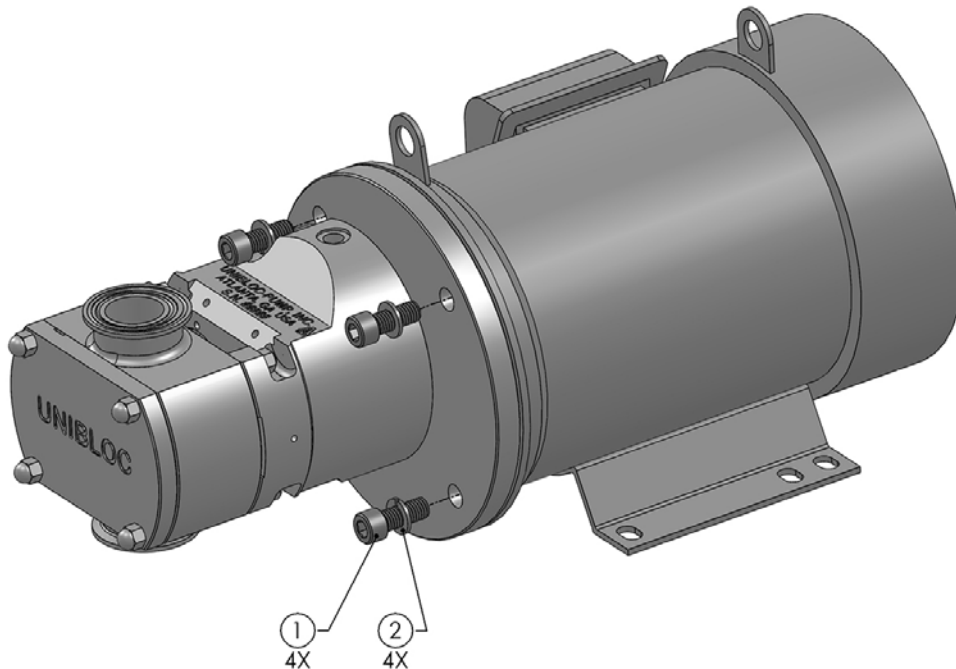
Model B Relief Cover Assembly- FoodFirst



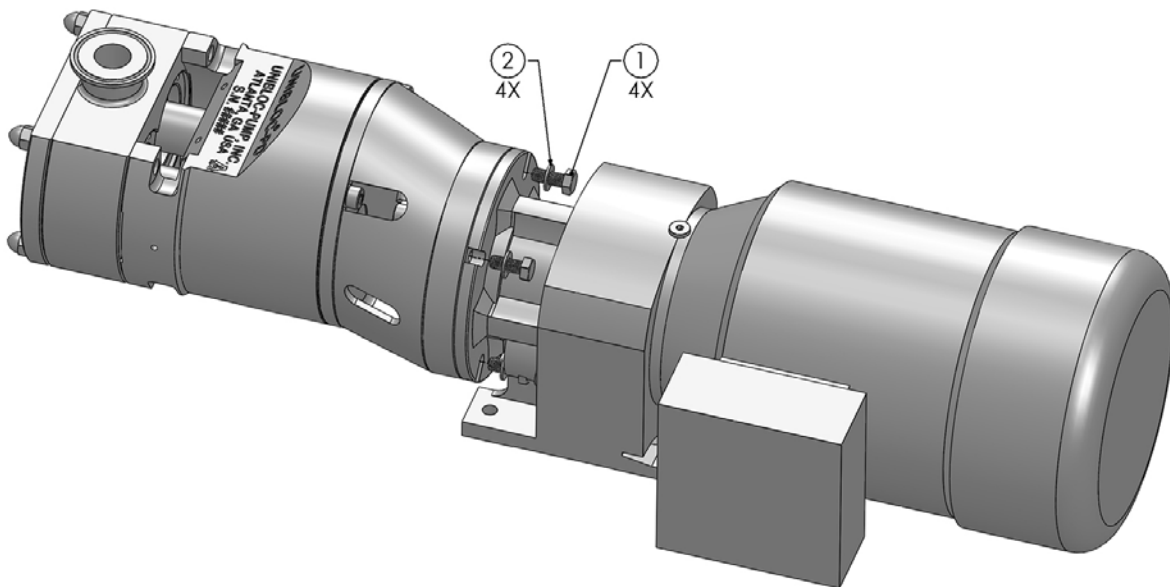
4.7 Compac Pump Series Service

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

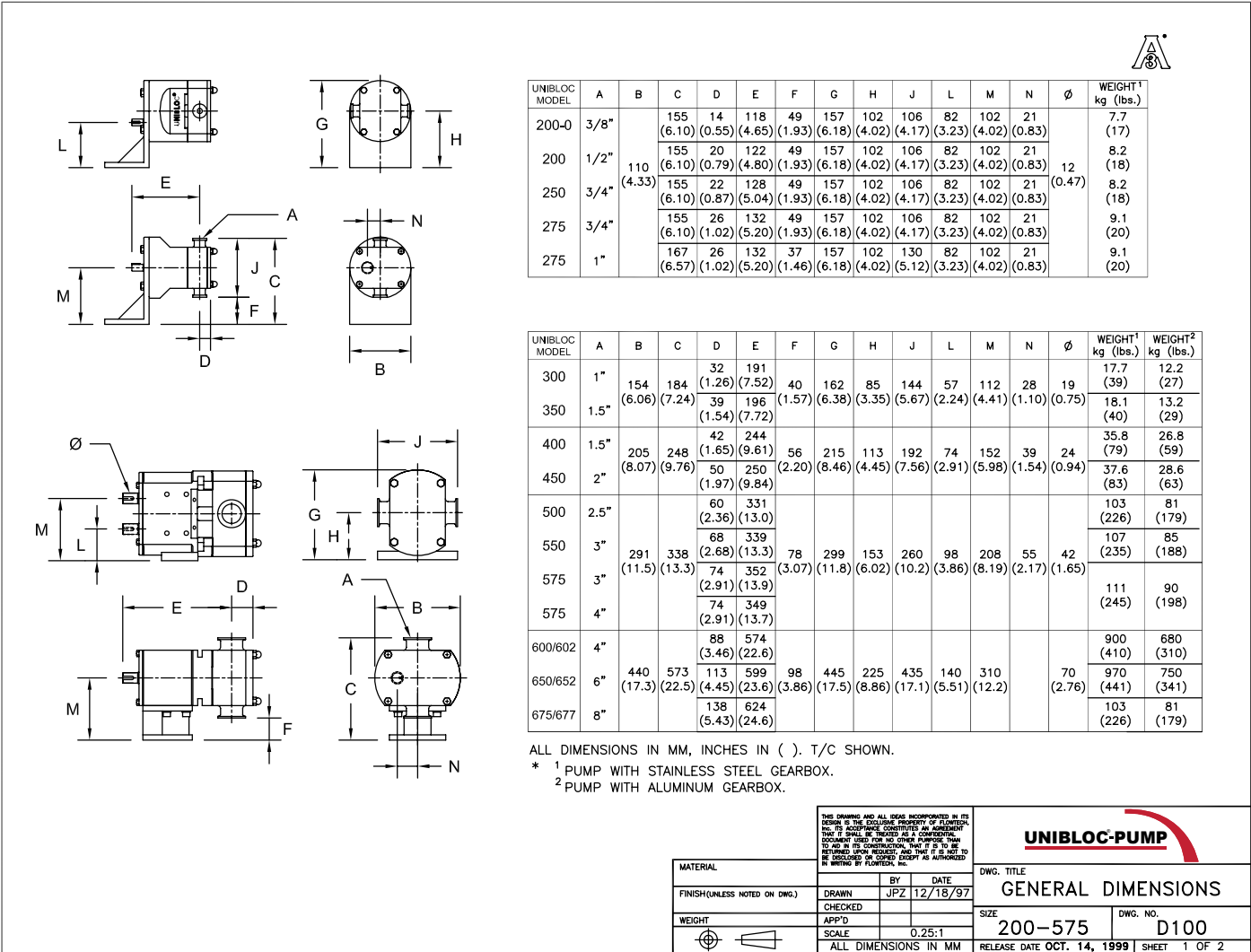
PROBLEM	POSSIBLE CAUSE	SOLUTION
A. No flow, but pump turns; pump does not prime	<ol style="list-style-type: none"> 1. Motor turning in wrong direction 2. Air pocket in pipe or pump. 3. NPSHA too low. 4. Pump runs too slow. 5. Viscosity too high. 6. Obstruction in discharge piping, valve closed. 	<ol 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.



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	24
	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
Slotted Gear Nut (13)	Key Size (mm)	N/A	N/A	N/A	N/A
	Torque Settings (Nm)	14	81	136	224
	Torque Setting (lbft)	10	60	100	165
Front Cover Cap Removal Plug	Key Size (mm)	N/A	2	2	2
	Torque Settings (Nm)	N/A	2.2	2.2	2.2
	Torque Setting (lbft)	N/A	1.6	1.6	1.6

Table 5.3.1

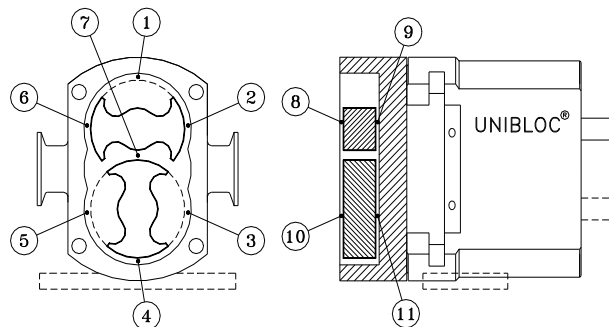
5.3.1 Special Tools

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.
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.



Class C Stainless Steel Rotor Clearances, x0.01mm (x0.001in.)						
Pump Size	Position					
	1-6	7	8 & 10		9 & 11	
	min	min	min	max	min	max
200-0/200	6 (2.4)	6 (2.4)	10 (3.9)	12 (4.7)	6 (2.4)	8 (3.1)
250	6 (2.4)	6 (2.4)	10 (3.9)	12 (4.7)	6 (2.4)	8 (3.1)
275	7 (2.8)	7 (2.8)	10 (3.9)	12 (4.7)	6 (2.4)	8 (3.1)

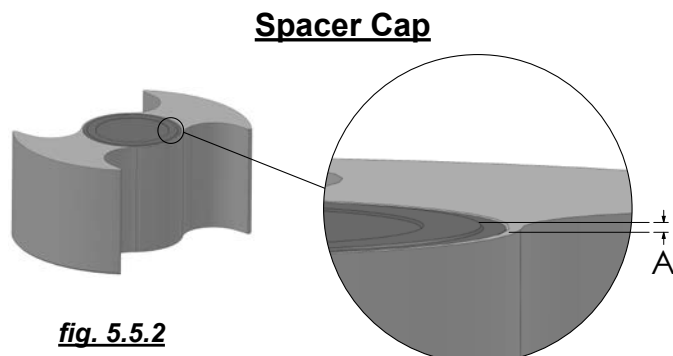
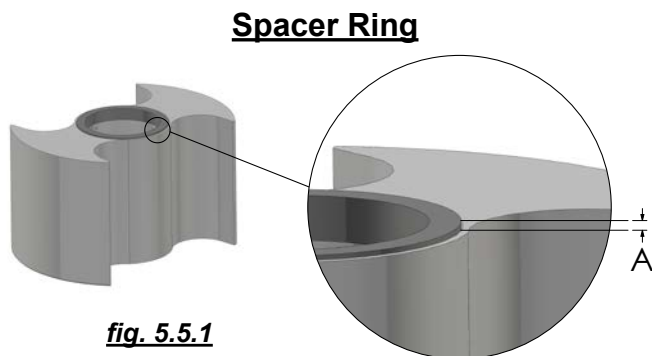
Class D Stainless Steel Rotor Clearances, x0.01mm (x0.001in.)						
Pump Size	Position					
	1-6	7	8 & 10		9 & 11	
	min	min	min	max	min	max
200-0/200	6 (2.4)	6 (2.4)	9 (3.5)	11 (4.3)	6 (2.4)	8 (3.1)
250	6 (2.4)	6 (2.4)	10 (3.9)	12 (4.7)	6 (2.4)	8 (3.1)
275	10 (3.9)	6 (2.4)	12 (4.7)	14 (5.5)	6 (2.4)	8 (3.1)
300	10 (3.9)	12 (4.7)	12 (4.7)	16 (6.3)	10 (3.9)	14 (5.5)
350	10 (3.9)	12 (4.7)	12 (4.7)	16 (6.3)	10 (3.9)	14 (5.5)
400	15 (5.9)	14 (5.5)	13 (5.1)	18 (7.1)	10 (3.9)	14 (5.5)
450	15 (5.9)	14 (5.5)	13 (5.1)	18 (7.1)	10 (3.9)	14 (5.5)
500/501	20 (7.9)	22 (8.7)	20 (7.9)	22 (8.7)	12 (4.7)	14 (5.5)
550/551	20 (7.9)	22 (8.7)	20 (7.9)	22 (8.7)	12 (4.7)	14 (5.5)
575/576	26 (10.2)	22 (8.7)	20 (7.9)	22 (8.7)	12 (4.7)	14 (5.5)

Class E Stainless Steel Rotor Clearances, x0.01mm (x0.001in.)						
Pump Size	Position					
	1-6	7	8 & 10		9 & 11	
	min	min	min	max	min	max
300	12 (4.7)	12 (4.7)	14 (5.5)	18 (7.1)	10 (3.9)	14 (5.5)
350	12 (4.7)	12 (4.7)	14 (5.5)	18 (7.1)	10 (3.9)	14 (5.5)
400	20 (7.9)	20 (7.9)	14 (5.5)	19 (7.5)	12 (4.7)	16 (6.3)
450	22 (8.7)	22 (8.7)	14 (5.5)	19 (7.5)	12 (4.7)	16 (6.3)
500/501	26 (10.2)	26 (10.2)	22 (8.7)	26 (10.2)	14 (5.5)	18 (7.1)
550/551	28 (11.0)	28 (11.0)	22 (8.7)	26 (10.2)	14 (5.5)	18 (7.1)
575/576	30 (11.8)	30 (11.8)	22 (8.7)	26 (10.2)	14 (5.5)	18 (7.1)

Class F Stainless Steel Rotor Clearances, x0.01mm (x0.001in.)						
Pump Size	Position					
	1-6	7	8 & 10		9 & 11	
	min	min	min	max	min	max
300	18 (7.1)	18 (7.1)	22 (8.7)	26 (10.2)	12 (4.7)	16 (6.3)
350	18 (7.1)	18 (7.1)	22 (8.7)	26 (10.2)	12 (4.7)	16 (6.3)
400	30 (11.8)	30 (11.8)	30 (11.8)	35 (13.8)	25 (9.8)	30 (11.8)
450	30 (11.8)	30 (11.8)	30 (11.8)	35 (13.8)	25 (9.8)	30 (11.8)
500	30 (11.8)	28 (11.0)	28 (11.0)	34 (13.4)	25 (9.8)	30 (11.8)
550	30 (11.8)	28 (11.0)	28 (11.0)	34 (13.4)	25 (9.8)	30 (11.8)
575	30 (11.8)	28 (11.0)	30 (11.8)	35 (13.8)	25 (9.8)	30 (11.8)

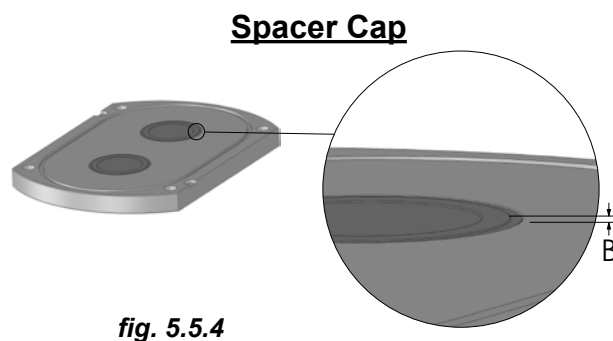
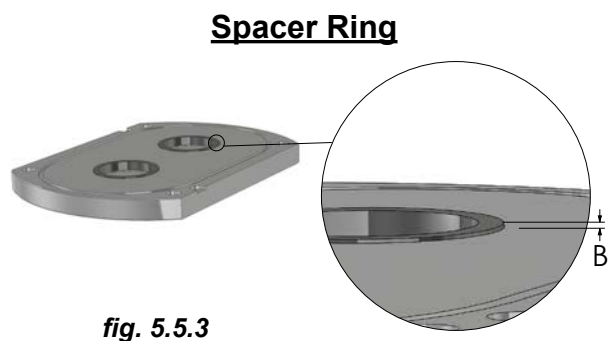
5.5 FoodFirst Spacer Ranges

FoodFist Spacers are designed to be replaced once worn past the minimum value on the table below. Measurement should be taken with clean spacer firmly seated in clean rotor or clean front cover. Measurement is taken from face of spacer to face of rotor or front cover.



ROTOR SPACER WEAR RANGE (ref. fig. 5.5.1 and 5.5.2)

DIMENSION	PUMP SIZE	ACCEPTABLE RANGE	DISCARD & REPLACE
A	300, 350	0.09mm to 0.05mm	LESS THAN 0.05mm
	400, 450	0.07mm to 0.05mm	LESS THAN 0.05mm
	500, 550, 575	0.15mm to 0.08mm	LESS THAN 0.08mm



FRONT COVER SPACER WEAR RANGE (ref. fig. 5.5.3 and 5.5.4)

DIMENSION	PUMP SIZE	ACCEPTABLE RANGE	DISCARD & REPLACE
B	300, 350	0.09mm to 0.05mm	LESS THAN 0.05mm
	400, 450	0.07mm to 0.05mm	LESS THAN 0.05mm
	500, 550, 575	0.15mm to 0.08mm	LESS THAN 0.08mm

6.0 Spare Parts

ITEM NO.	DESCRIPTION	PART NUMBER	QTY.
1	DOWEL PIN	DPM5x14	2
2	M5x10 BUTTON HEAD SCREW	BHM5x10	2
3	OIL SEAL RETAINER	3640	1
4	FRONT OIL SEAL	4105	2
5	SHAFT O-RING (16mmx1mm)	4203	2
6	SHAFTS	----	2
7	FRONT BEARINGS	3750	2
8	FLAT HEAD BOLT	FHBM3x6	8
9	SHIM PLATE	3646-075	4
10	BEARING HOUSING	3500	1
11	REAR BEARINGS	3750	2
12	SHAFT KEYFOR TIMING GEARS	4700	2
13	GEAR	3600	2
14	TAB WASHER FOR TIMING GEARS	4500	2
15	SLOTTED NUT FOR TIMING GEARS	4402	2
16	REAR COVER O-RING (3.237"x0.103" #152)	4201	1

ITEM NO.	DESCRIPTION	PART NUMBER	QTY.
17	BEARING HOUSING COVER	3551	1
18	REAR OIL PLUG	4101	1
19	DRAIN PLUG	----	2
20	REAR OIL SEAL	4100	1
21	SHAFT KEY FOR DRIVE	4701	1
22	M8x25 HEX BOLT	4300	4
23	M6 DOME NUT	4400	4
24	ROTOR HOUSING COVER	3200	1
25	FRONT COVER O-RING (2.987"x0.103" #151)	4200	1
26	ROTOR BOLT O-RING (0.799"x0.103" #117)	4213	1
27	ROTOR BOLT	3352	2
28	ROTOR	----	2
29	ROTOR HOUSING STUD	----	4
30	ROTOR HOUSING	----	1

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BY	DATE
DRAWN	JFZ
CHECKED	06/09/15
APPROVED	
SCALE	

DWG. TITLE
UNIBLOC-PD PUMP PARTS LIST

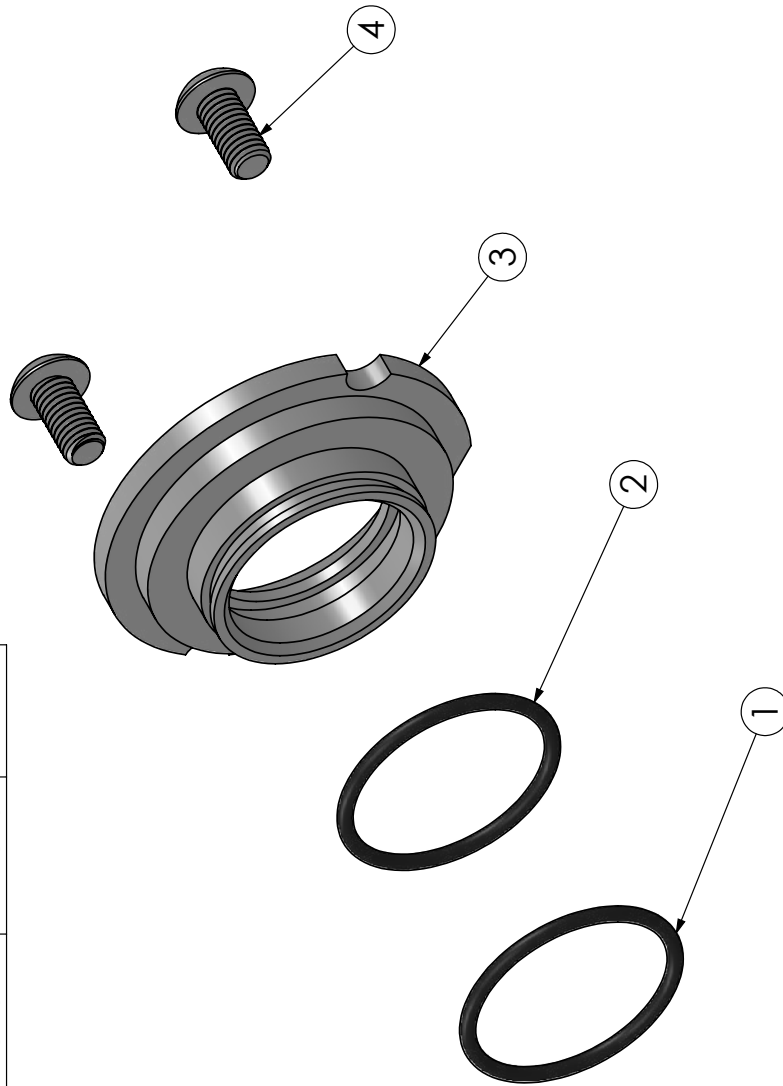
SIZE	DWG. NO.	REV. NO.
200,250,275	G805	3

RELEASE DATE JUN. 21, 2021 SHEET 1 OF 2

CONTACT UNIBLOC-PUMP IF PART NUMBER IS NOT AVAILABLE

SINGLE O-RING SEAL

ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4206	1
2	O-RING	4213	1
3	SINGLE O-RING SEAL HOUSING	4901	1
4	BUTTON HEAD M5X10	BHM5x10	2

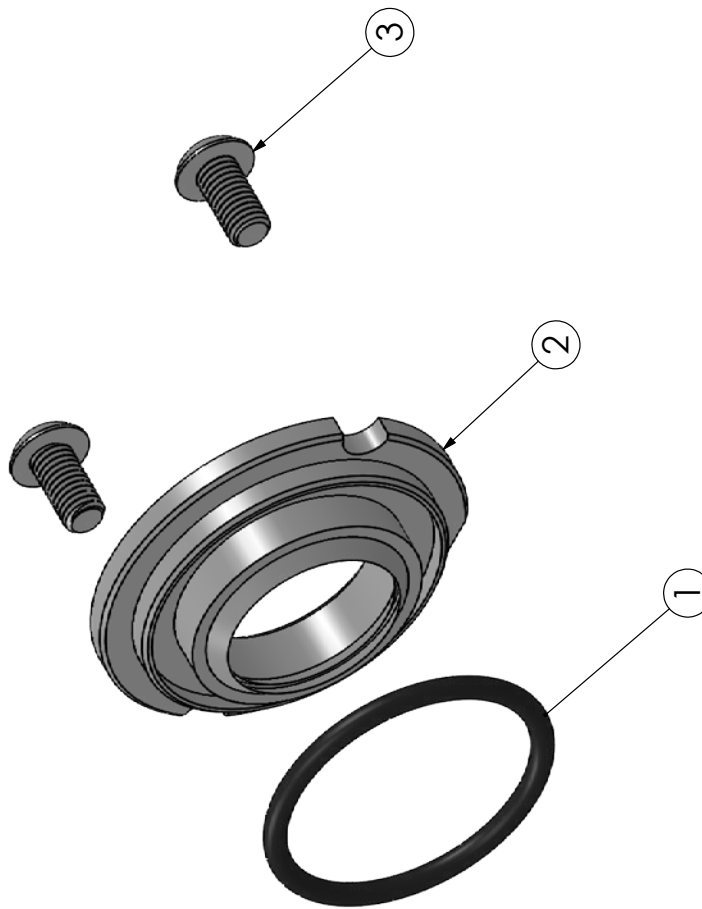



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BY		DATE	DWG. TITLE	
DRAWN	JFZ	06/10/15	UNIBLOC-PD & GP PUMP SHAFT	
CHECKED			SEAL PARTS LIST	
APPD			SIZE	REV. NO.
SCALE			200-275	4
ALL DIMENSIONS IN MM. [IN]		RELEASE DATE	DWG. NO.	
		AUG. 6, 2021	G806	
				SHEET 1 OF 3

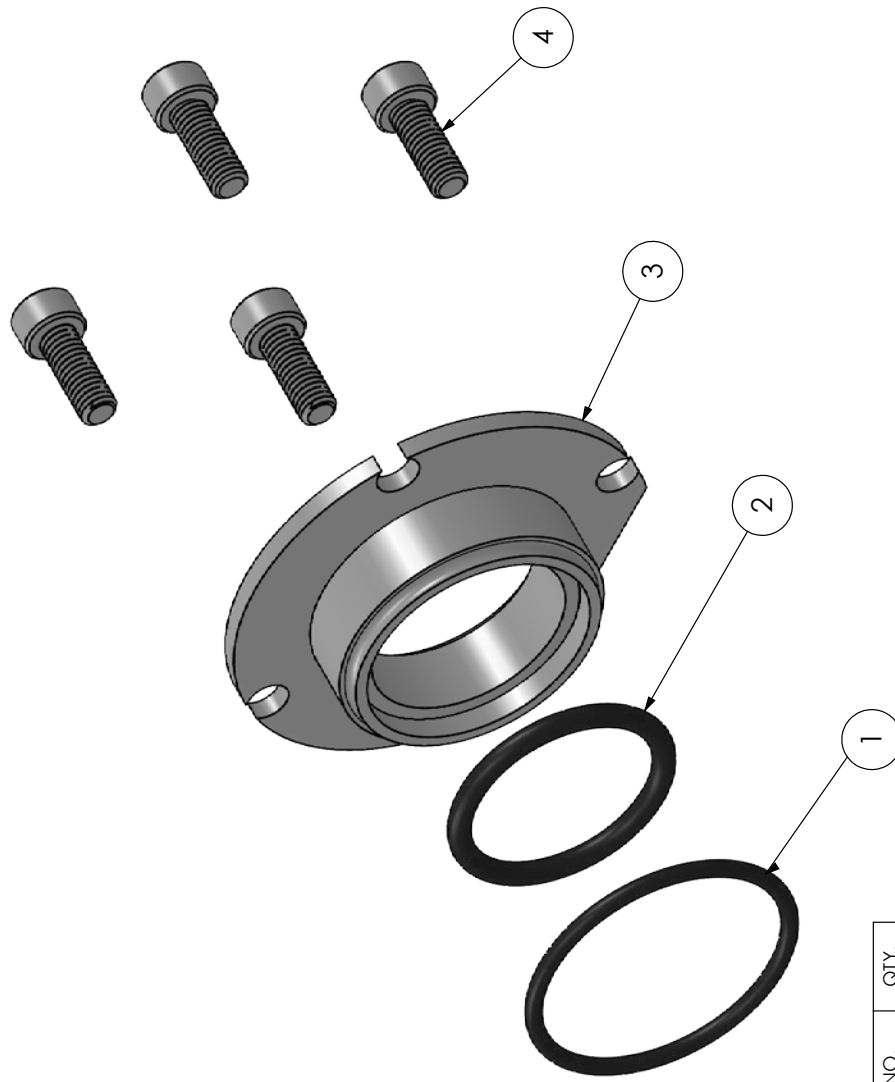


ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING (1.174"X0.103" #123)	4216	1
2	DOUBLE O-LIP SEAL	5107	1
3	BUTTON HEAD M5X10 BOLT	BHM5X10	2




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DWG. TITLE		DOUBLE O-LIP SEAL PARTS LIST					
BY		DATE		SIZE	DWG. NO.	REV. NO.	
DRAWN	JC	06/10/15		200.250.275	5107	1	
CHECKED							
APPROVED							
SCALE							
ALL DIMENSIONS IN MM. [IN]				RELEASE DATE	JUN. 18, 2021		
				SHEET 1 OF 2			

SINGLE O-RING SEAL



SIZE	ITEM	DESCRIPTION	PART NO.	QTY.
300/350	1	O-RING	4217	1
	2	O-RING	4218	1
	3	SINGLE O-RING SEAL RETAINER	4913	1
	4	M6x12	SBM6x12	4
400/450	1	O-RING	4225	1
	2	O-RING	4863	1
	3	SINGLE O-RING SEAL RETAINER	4923	1
	4	M6x12	SBM6x12	4
500/550	1	O-RING	4237	1
	2	O-RING	4864	1
	3	SINGLE O-RING SEAL RETAINER	4933	1
	4	M6x12	SBM6x12	3

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BY		DATE	
DRAWN		JPZ	
CHECKED		06/16/15	
APPROVED			
SCALE			
DWG. TITLE		UNIBLOC-PD PUMP SEAL PARTS LIST	
SIZE		DWG. NO.	
300-575		G804-2	
REV. NO.		3	

SINGLE MECHANICAL SEAL

SINGLE MECHANICAL SEAL COMPONENTS

(P.N. 5104)

ITEM	DESCRIPTION	PART NO.	QTY.
1*	SS PIN	DPM1.5X10	5
2	O-RING	4204	1
3	WAVE SPRING	5327	1
4	CARBON SEAL NOSE RING	5328-C	1
5	316 SS MATING RING	5330-SS	1
6	O-RING	4206	1
7	MATING RING WASHER	5332	1

SINGLE MECHANICAL SEAL COMPONENTS

(P.N. 5106)

ITEM	DESCRIPTION	PART NO.	QTY.
1	SS PIN	DPM1.5x10	5
2	O-RING	4204	1
3	WAVE SPRING	5327	1
4	TUNGSTEN SEAL NOSE RING	5328-TC	1
5	TUNGSTEN MATING RING	5330-TC	1
6	O-RING	4206	1
7	MATING RING WASHER	5332	1

SINGLE MECHANICAL SEAL COMPONENTS

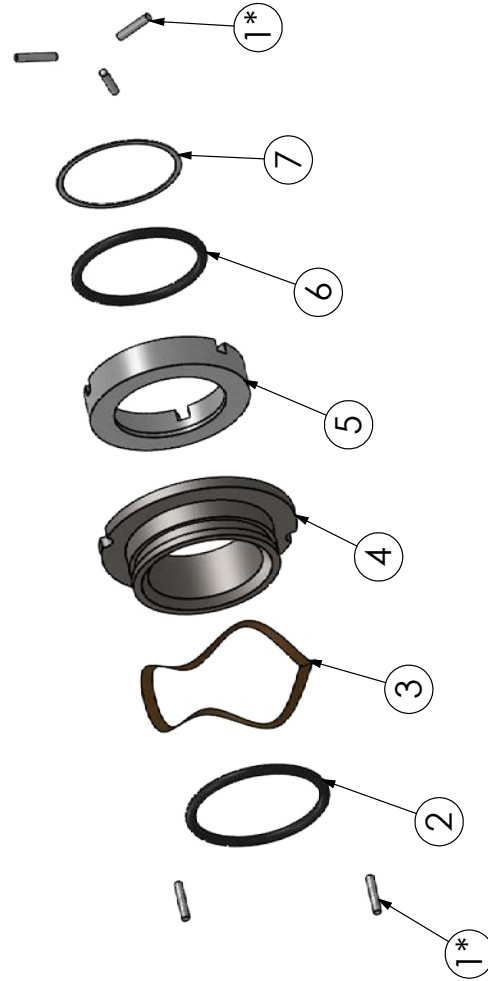
(P.N. 5105)

ITEM	DESCRIPTION	PART NO.	QTY.
1*	SS PIN	DMX1.5X10	5
2	O-RING	4204	1
3	WAVE SPRING	5327	1
4	SIL. CARBIDE SEAL NOSE RING	5328-SIC	1
5	TUNGSTEN MATING RING	5330-TC	1
6	O-RING	4206	1
7	MATING RING WASHER	5332	1

SINGLE MECHANICAL SEAL COMPONENTS

(P.N. 5107)

ITEM	DESCRIPTION	PART NO.	QTY.
1	SS PIN	DPM1.5x10	5
2	O-RING	4204	1
3	WAVE SPRING	5327	1
4	SIL. CARBIDE SEAL NOSE RING	5328-SIC	1
5	SIL. CARBIDE MATING RING	5330-SIC	1
6	O-RING	4206	1
7	MATING RING WASHER	5332	1



* NOT INCLUDED IN REPLACEMENT SEAL. PLEASE CONTACT UNIBLOC-PUMP IF NEEDED.

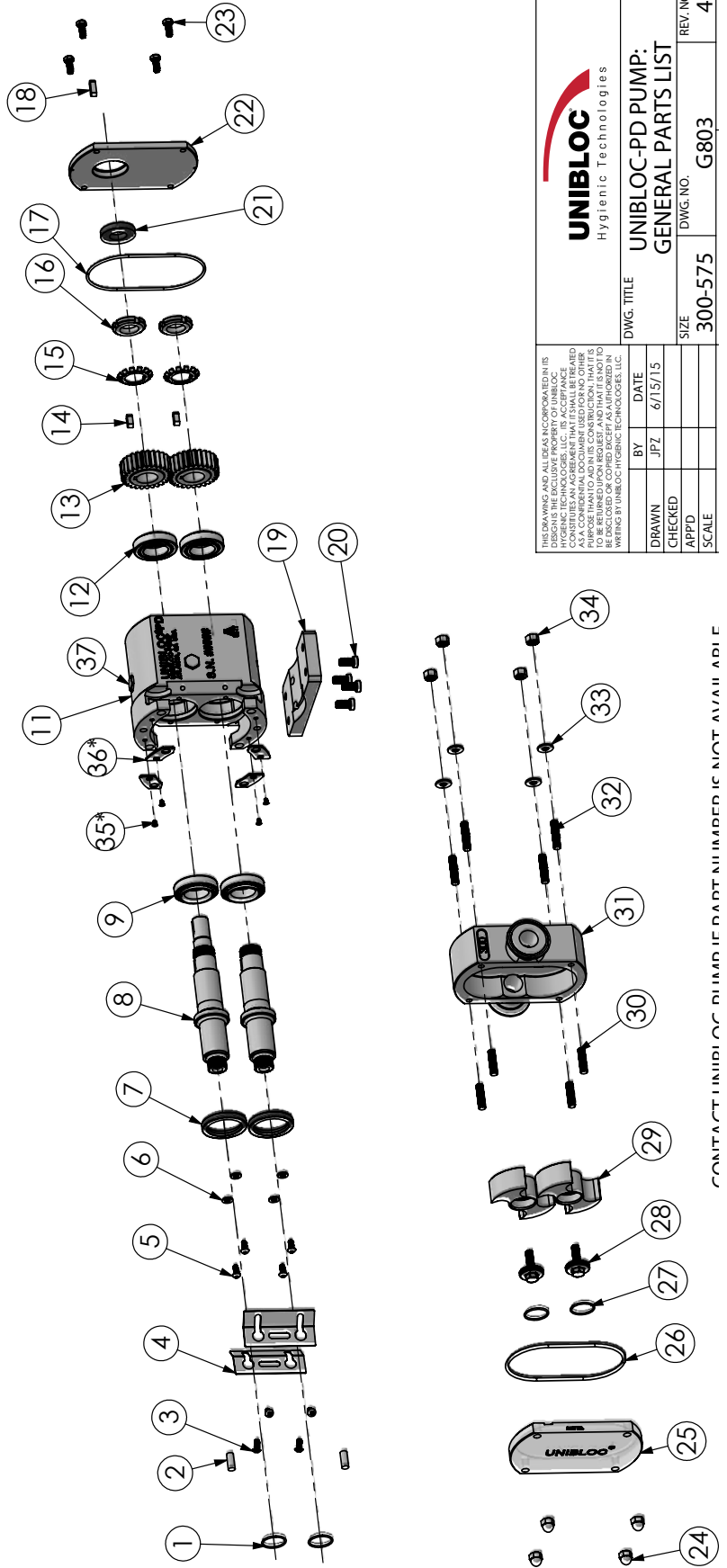
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DRAWN	JPZ	06/10/15	
CHECKED			
APPD			
SCALE			

UNIBLOC Hygienic Technologies		DWG. TITLE	UNIBLOC-PD & GP PUMP SHAFT SEAL PARTS LIST
SIZE	200-275	DWG. NO.	G806
REV. NO.	4	RELEASE DATE	AUG. 6, 2021
ALL DIMENSIONS IN MM. [IN]		SHEET 3 OF 3	

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	O-RING (SHAFT)	4213	4233
2	DOWEL PIN	DPM8x20	DPM12x30
3	BUTTON HEAD CAP SCREW	BHM6x8	BHM6x8
4	SHAFT GUARD	8005	8015
5	BUTTON HEAD CAP SCREW	BHM6x8	BHM6x8
6	WASHER	OWM6	OWM8
7	FRONT OIL SEAL	4115	4135
8	SHAFT	---	---
9	FRONT BEARING	3755	3760
11	BEARING HOUSING	3512	3522
12	REAR BEARING	3755	3760
13	TIMING GEAR	3606	3611
14	SHAFT KEY (TIMING GEAR)	4705	4710
15	TAB WASHER (TIMING GEAR)	4505	4510
16	SLOTTED NUT (TIMING GEAR)	4412	4422
17	O-RING (BEARING HOUSING COVER)	4211	4220
18	SHAFT KEY (DRIVE SHAFT)	4706	4711
19	FOOT	3806	3810
	PUMP SERIES	300-350	400-450
		500-575	

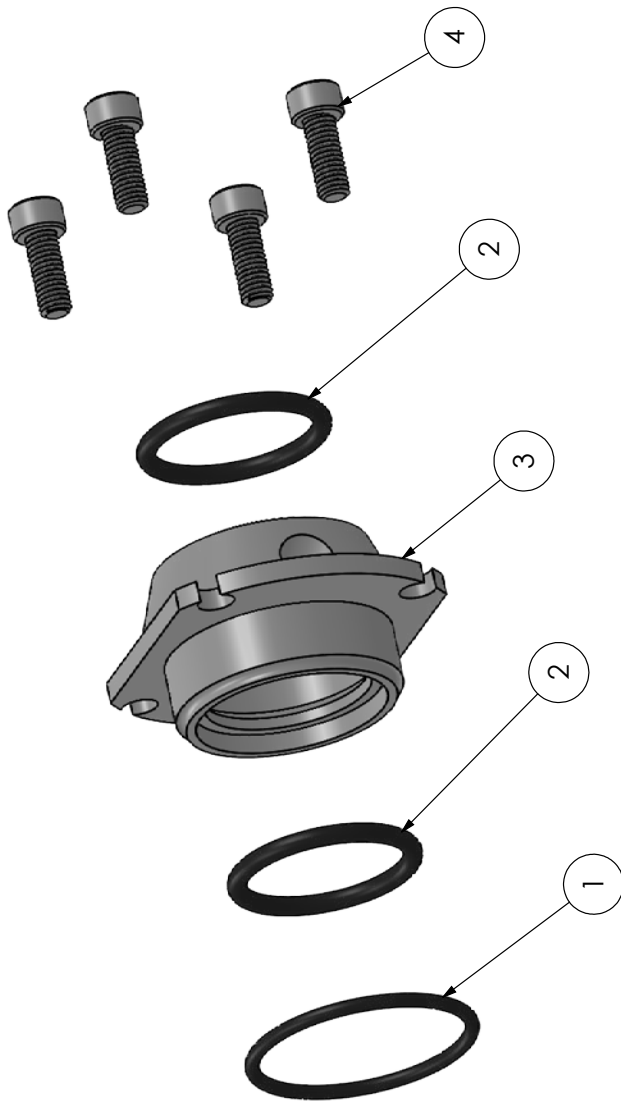
ITEM NO.	DESCRIPTION	PART NO.	QTY.
20	SOCKET BOLT	SBM8x16	SBM10x25
21	REAR OIL SEAL	4110	4120
22	BEARING HOUSING COVER	3560	3570
23	HEX BOLT	HBM6x16	HBM10x25
24	DOME NUT	DNM8	DNM10
25	ROTOR HOUSING COVER	3210	3220
26	O-RING (ROTOR HOUSING COVER)	4210	4220
27	O-RING (ROTOR BOLT)	4212	4222
28	ROTOR BOLT (HEX HEAD/SLOTTED)	3360/3361	3370/3371
29	ROTOR	---	---
30	STUD (ROTOR HOUSING: FRONT)	SM8x20	SM10x25
31	ROTOR HOUSING	---	---
32	STUD (ROTOR HOUSING: REAR)	SM8x25	SM10x40
33	WASHER	WM8	WM10
34	HEX NUT	NM8	NM10
35*	FLAT HEAD SCREW: M3x6	FHM3x6	FHM3x6
36*	SHIM (EXTERNAL)	3656	3666
37	OIL PLUG	---	---
	PUMP SERIES	300-350	400-450
		500-575	

* PARTS WILL NOT BE ON SOME PUMP ASSEMBLIES



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BY	DATE	DWG. TITLE	REV. NO.
JPZ	6/15/15	UNIBLOC-PD PUMP: GENERAL PARTS LIST	4
CHECKED		SIZE	
APPD		300-575	
SCALE		G803	

CONTACT UNIBLOC DIRECT IF PART NUMBERED IS NOT AVAILABLE



FLUSHED DOUBLE O-RING SEAL

SIZE	ITEM	DESCRIPTION	PART NO.	QTY.
300/350	1	O-RING	4217	1
	2	O-RING	4218	2
	3	DOUBLE O-RING FLUSH HOUSING	4912	1
	4	M6x12	SBM6x12	4
400/450	1	O-RING	4225	1
	2	O-RING	4863	2
	3	DOUBLE O-RING FLUSH HOUSING	4922	1
	4	M6x12	SBM6x12	4
500/550	1	O-RING	4237	1
	2	O-RING	4864	2
	3	DOUBLE O-RING FLUSH HOUSING	4932	1
	4	M6x12	SBM6x12	3

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		UNIBLOC-PD PUMP SEAL PARTS LIST	
BY	DATE	SIZE	REV. NO.
DRAWN	JPZ	300-575	3
CHECKED		DWG. NO.	
APPD		RELEASE DATE	
SCALE		MAY 10, 2022	SHEET 1 OF 2

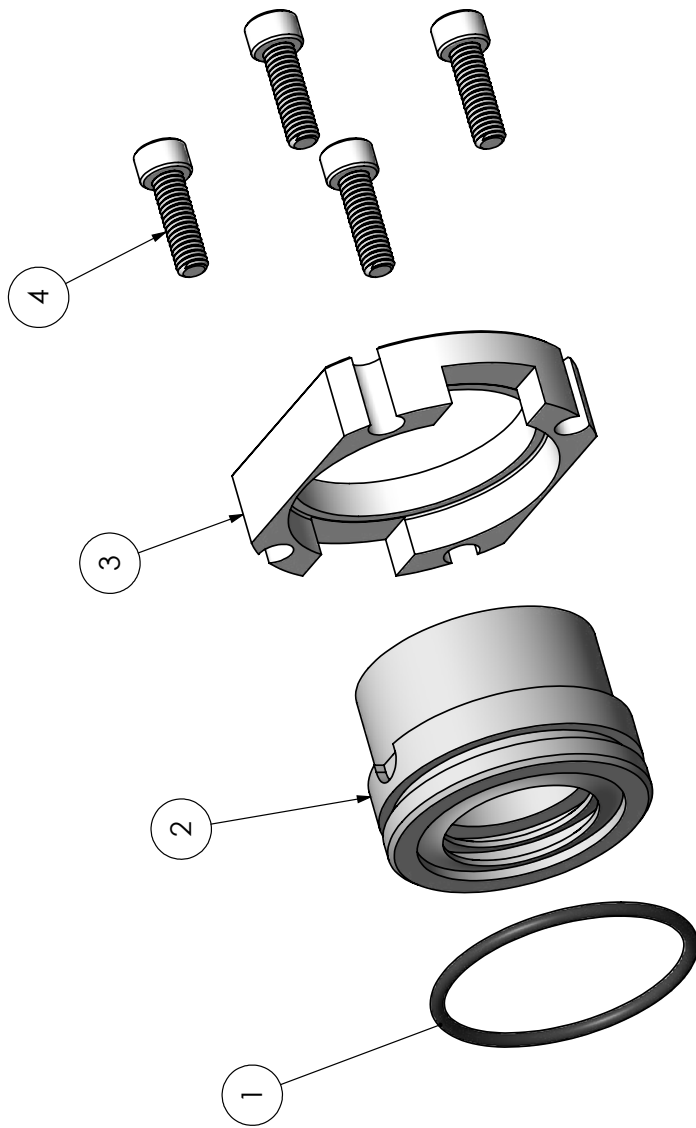
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	4823	O-RING	1
2	4912A	SEAL HOUSING	1
3	4218	O-RING	2
4	4915FL	SEAL RETAINER RING	1
5	SBM6X12	SOCKET HEAD SCREW: M6X12	4




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DWG. TITLE	DOUBLE O-RING SEAL: FRONT LOADED		
BY	KL	DATE	04/03/20
CHECKED			
APPD			
SCALE	300	DWG. NO.	G804-4
ALL DIMENSIONS IN MM. [IN.]		RELEASE DATE	APR. 3, 2020
		REV. NO.	0
		SHEET 1 OF 2	

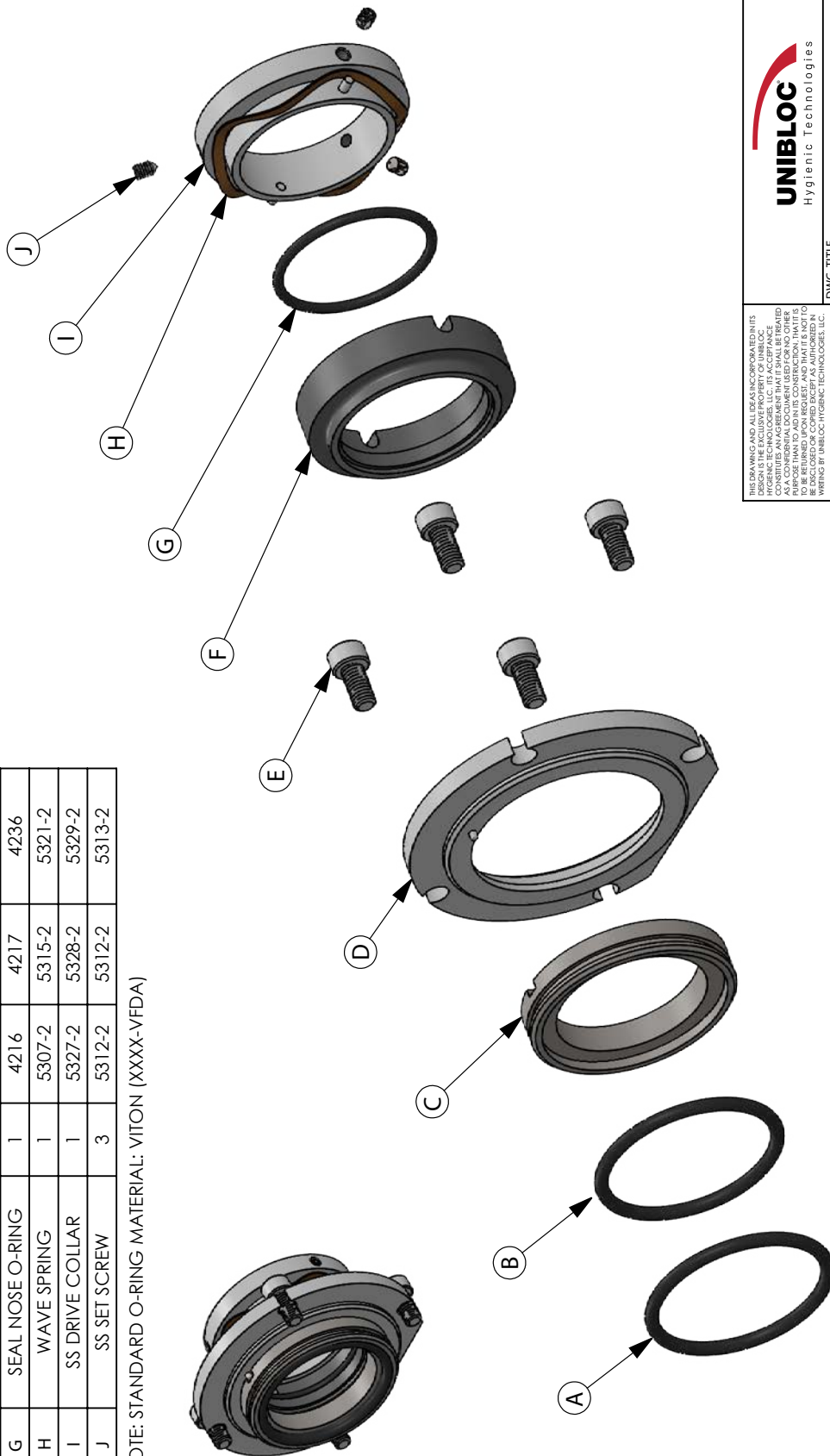


DOUBLE O-LIP SEAL COMPONENTS		SIZE	500/550/575
ITEM	QTY.	SEAL NUMBER	5272
1	1	O-RING	4811
2	1	O-LIP SEAL	5272
3	1	O-LIP RETAINER RING	4915
4	4	SOCKET HEAD CAP SCREW	SBM6x20

		DWG. TITLE	
		DOUBLE O-LIP SEAL	
BY	DATE	SIZE	REV. NO.
DRAWN	JFZ	300-575	4
CHECKED		DWG. NO.	
APPD		G808	
SCALE		RELEASE DATE	
ALL DIMENSIONS IN MM. (IN)		JUL 29, 2022	SHEET 1 OF 2

ITEM	DESCRIPTION	QTY.	PART NUMBER		
			300/350	400/450	500/550/575
A	MATING O-RING	1	4822	4823	4824
B	MATING O-RING	1	4222	4228A	4237
C	MATING RING	1			
D	SS RETAINING RING	1	4910-2	4920-2	4930-2
E	SS BOLT	4	SBM6x12	SBM6x12	SBM6x12
F	SIC SEAL NOSE RING	1			
G	SEAL NOSE O-RING	1	4216	4217	4236
H	WAVE SPRING	1	5307-2	5315-2	5321-2
I	SS DRIVE COLLAR	1	5327-2	5328-2	5329-2
J	SS SET SCREW	3	5312-2	5312-2	5313-2

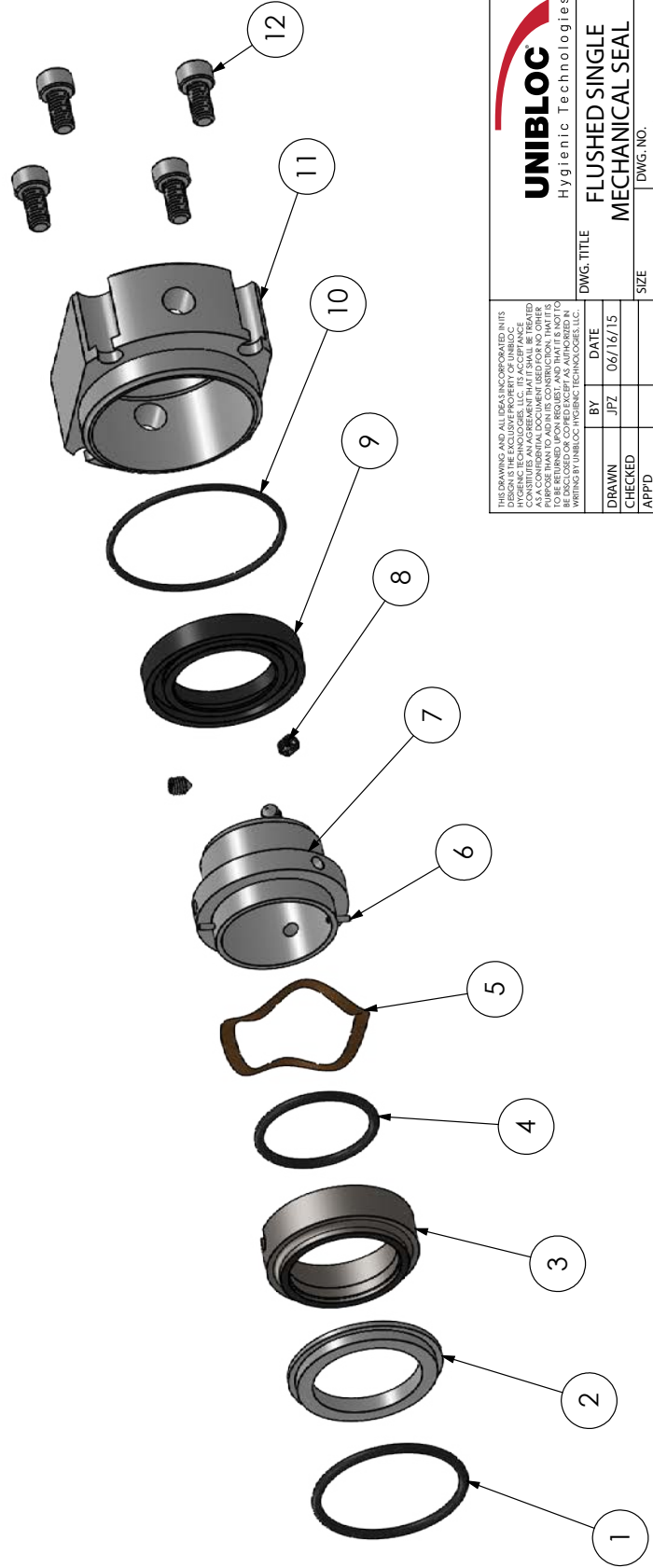
NOTE: STANDARD O-RING MATERIAL: VITON (XXXX-VFDA)



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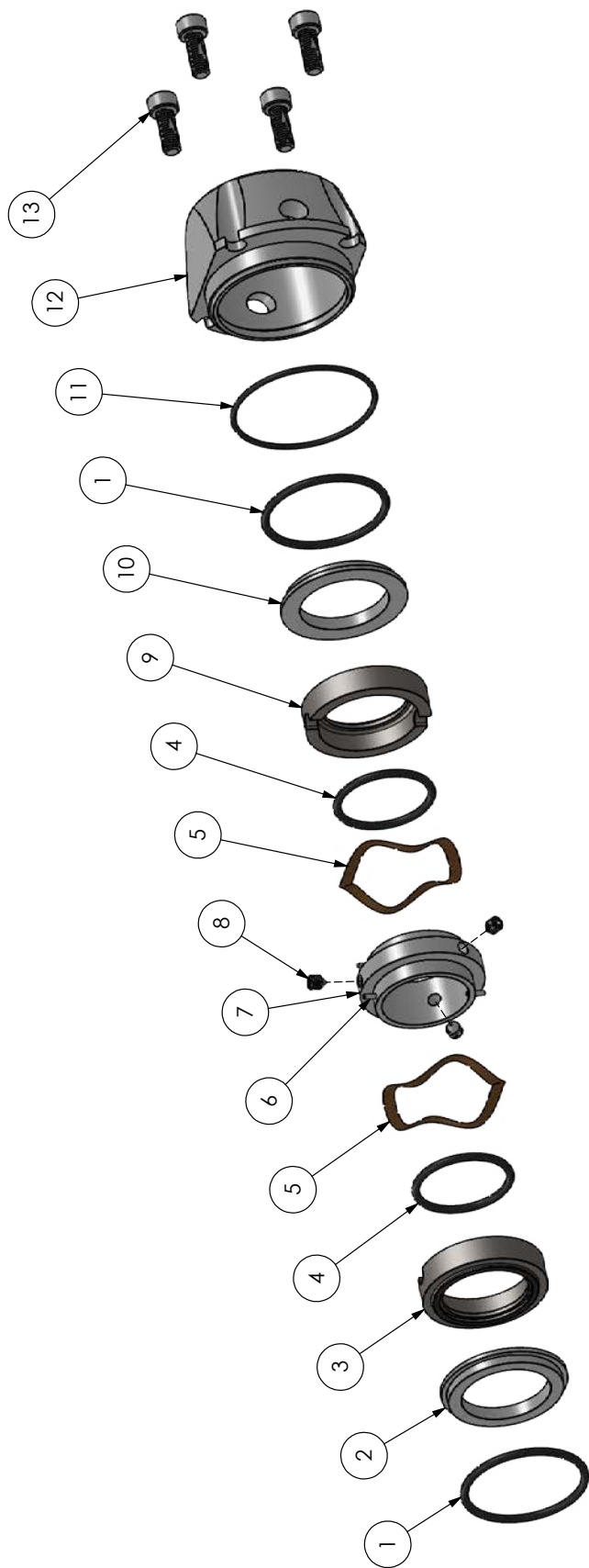
		DWG. TITLE	
		SINGLE MECHANICAL SEAL	
DRAWN	DA	8/25/14	
CHECKED	P		
APPD			
SCALE			
ALL DIMENSIONS IN MM. [IN.]		SIZE	300/400/500
		DWG. NO.	5120A-64A
		REV. NO.	2
		RELEASE DATE	MAY 21, 2021
		SHEET 1 OF 2	

ITEM	DESCRIPTION	PUMP SIZE					
		300/350			400/450		
		PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.
1	O-RING	4217	1	4225	1	4237	1
2	MATING RING	5309	1	5317	1	5323	1
3	SEAL NOSE RING	5308	1	5316	1	5322	1
4	O-RING	4216	1	4217	1	4236	1
5	WAVE SPRING	5307	1	5315	1	5321	1
6	SS DRIVE PIN	5311	2	5311	2	5311	2
7	DRIVE COLLAR	5310	1	5318	1	5324	1
8	SS SET SCREWS	5312	3	5312	3	5312	3
9	LIP SEAL (45x35x7)	4111	1	4130	1	4136	1
10	O-RING	4214	1	4224	1	4234	1
11	FLUSH HOUSING	4916	1	4926	1	4936	1
12	M6x12	SBM6x12	4	SBM6x12	3	SBM6x12	4



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UNIBLOC Hydraulic Technologies		DWG. TITLE		DWG. NO.		REV. NO.	
FLUSHED SINGLE MECHANICAL SEAL		300-575		G804-1		3	
BY	DATE	DRAWN	CHECKED	APPROD	SCALE	RELEASE DATE	SHEET 1 OF 2
JFZ	06/16/15					FEB. 23, 2011	



DOUBLE MECHANICAL SEAL COMPONENTS
(P.N. 5220)

ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4217	2
2	316SS MATING RING (PRIMARY)	-	1
3	CARBON SEAL NOSE RING (PRIMARY)	-	1
4	O-RING	4216	2
5	WAVE SPRING	-	2
6	SS DRIVE PIN	-	4
7	SS DRIVE COLLAR	-	1
8	SS SET SCREW	-	3
9	CARBON SEAL NOSE RING (SECONDARY)	-	1
10	316SS MATING RING (SECONDARY)	-	1
11	O-RING	4214	1
12	FLUSH HOUSING	4911	1
13	SS BOLT	SBM6x12	4

DOUBLE MECHANICAL SEAL COMPONENTS
(P.N. 5221)

ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4217	2
2	TUNGSTEN CARBIDE MATING RING (PRIMARY)	-	1
3	SILICON CARBIDE NOSE RING (PRIMARY)	-	1
4	O-RING	4216	2
5	WAVE SPRING	-	2
6	SS DRIVE PIN	-	4
7	SS DRIVE COLLAR	-	1
8	SS SET SCREW	-	3
9	CARBON SEAL NOSE RING (SECONDARY)	-	1
10	316SS MATING RING (SECONDARY)	-	1
11	O-RING	4214	1
12	FLUSH HOUSING	4911	1
13	SS BOLT	4312	4

DOUBLE MECHANICAL SEAL COMPONENTS
(P.N. 5223)

ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4217	2
2	SILICON CARBIDE MATING RING (PRIMARY)	-	1
3	SILICON CARBIDE SEAL NOSE RING (PRIMARY)	-	1
4	O-RING	4216	2
5	WAVE SPRING	-	2
6	SS DRIVE PIN	-	4
7	SS DRIVE COLLAR	-	1
8	SS SET SCREW	-	3
9	CARBON SEAL NOSE RING (SECONDARY)	-	1
10	316SS MATING RING (SECONDARY)	-	1
11	O-RING	4214	1
12	FLUSH HOUSING	4911	1
13	SS BOLT	4312	4

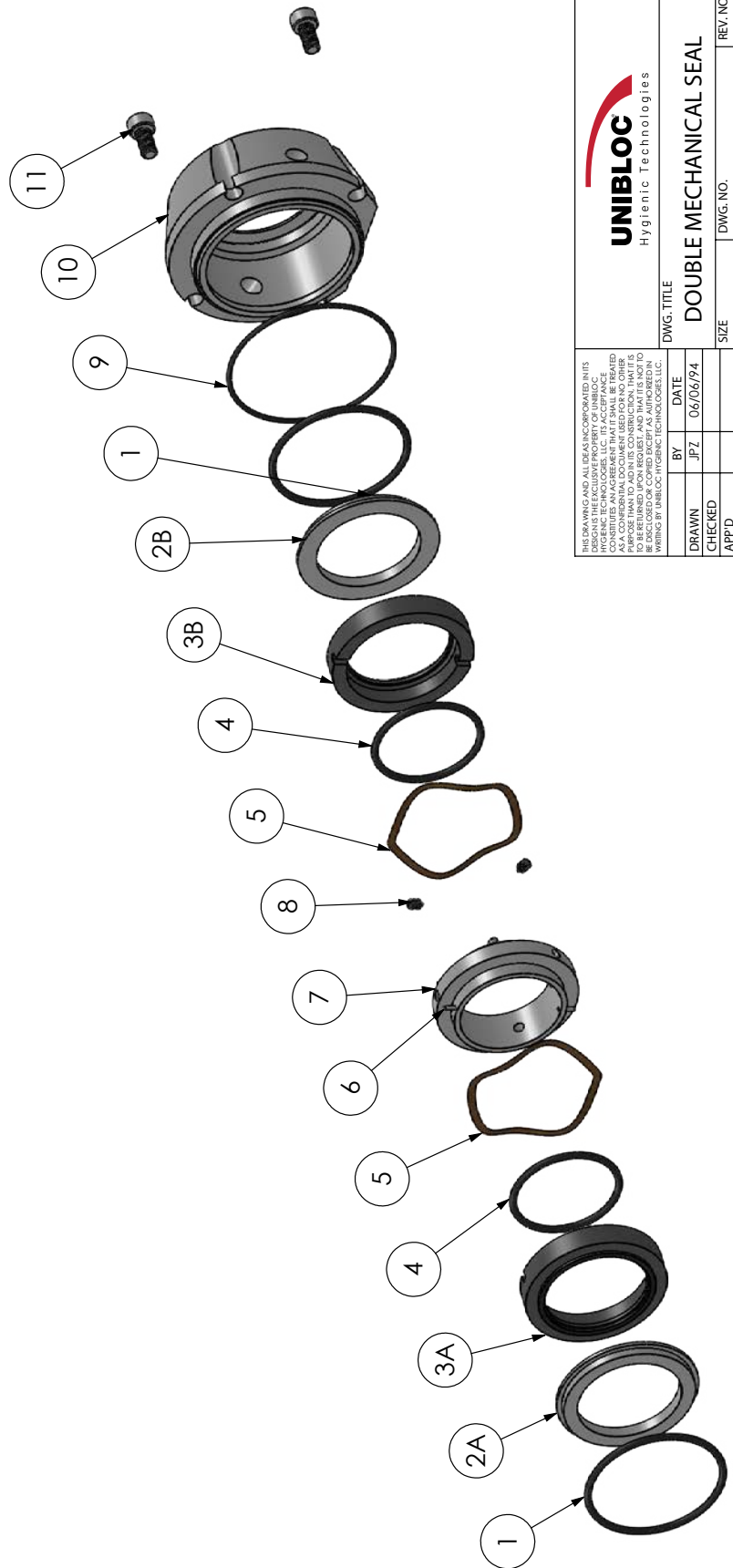
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BY		DATE	
DRAWN	JPZ	06/16/15	
CHECKED			
APPD			
SCALE			
ALL DIMENSIONS IN MM. [IN]			
DWG. TITLE			
DOUBLE MECHANICAL SEAL			
SIZE		DWG. NO.	REV. NO.
300 & 350		5220-1	3
RELEASE DATE		JUNE 16, 2016	
		SHEET 1 OF 2	

DOUBLE MECHANICAL SEAL COMPONENTS			
ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4225	2
2A	STATIONARY SEAL FACE	REF. TABLE 2	1
3A	ROTATING SEAL FACE	REF. TABLE 2	1
3B	ROTATING SEAL FACE	REF. TABLE 2	1
2B	STATIONARY SEAL FACE	REF. TABLE 2	1
4	O-RING	4217	2
5	WAVE SPRING	5315	2
6	SS DRIVE PIN	5311	4
7	SS DRIVE COLLAR	5320	1
8	SS SET SCREW	5312	3
9	O-RING	4224	1
10	SS FLUSH HOUSING	4921	1
11	SS BOLT	SBM6x12	2

TABLE 2			
P.N.	ITEM	DESCRIPTION	PART NO. QTY.
5240	2A	STATIONARY SEAL FACE: STAINLESS STEEL	5317-SS 1
	3A	ROTATING SEAL FACE: CARBON	5319-C 1
	3B	ROTATING SEAL FACE: CARBON	5319-C 1
	2B	STATIONARY SEAL FACE: STAINLESS STEEL	5317-SS 1
5241	2A	STATIONARY SEAL FACE: TUNGSTEN	5317-TC 1
	3A	ROTATING SEAL FACE: SILICON CARBIDE	5319-SIC 1
	3B	ROTATING SEAL FACE: CARBON	5319-C 1
	2B	STATIONARY SEAL FACE: TUNGSTEN	5317-TC 1
5245	2A	STATIONARY SEAL FACE: TUNGSTEN	5317-TC 1
	3A	ROTATING SEAL FACE: TUNGSTEN	5319-TC 1
	3B	ROTATING SEAL FACE: CARBON	5319-C 1
	2B	STATIONARY SEAL FACE: TUNGSTEN	5317-TC 1



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DWG. TITLE

DOUBLE MECHANICAL SEAL

BY DATE
JFZ 06/06/94

DRAWN
CHECKED
APP'D
SCALE

SIZE
400 & 450

DWG. NO.
5240-45

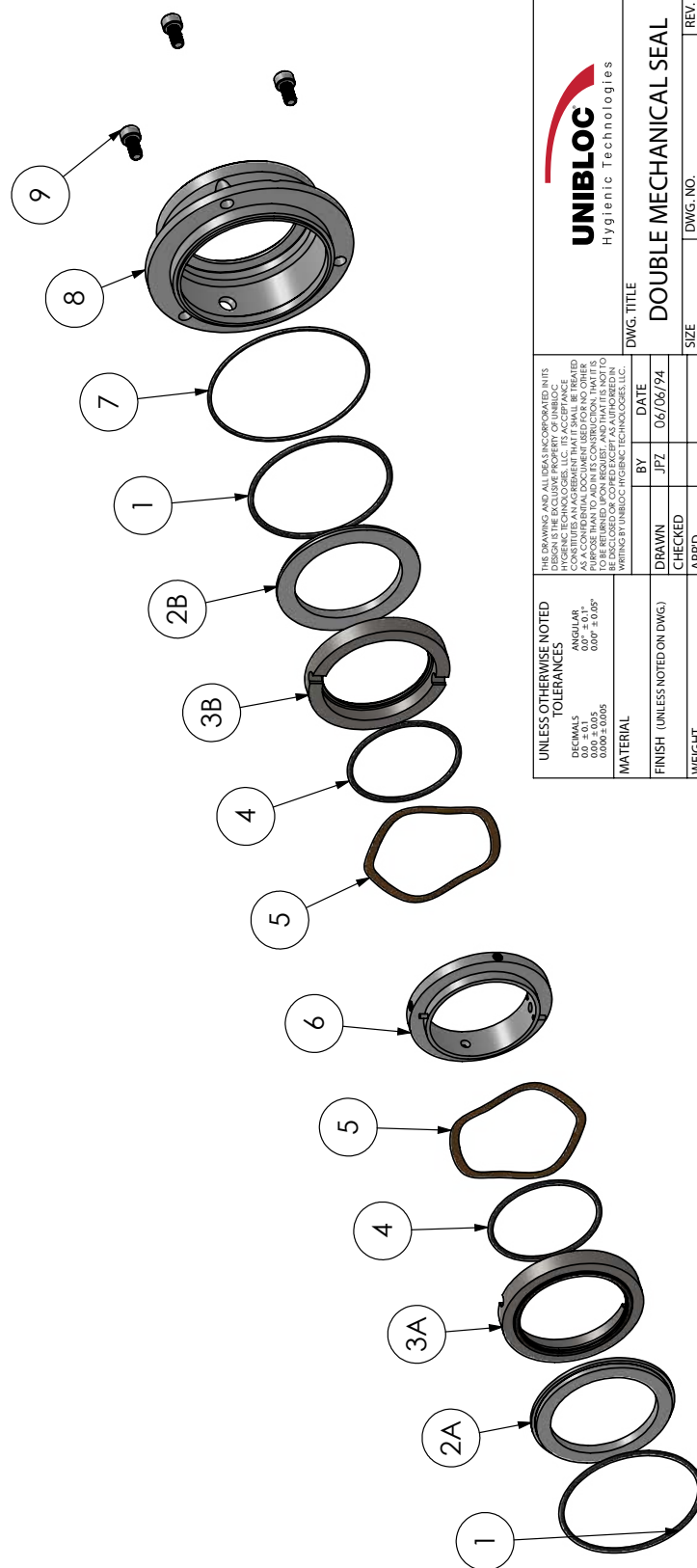
REV. NO.
3




RELEASE DATE
JUN. 23, 2021

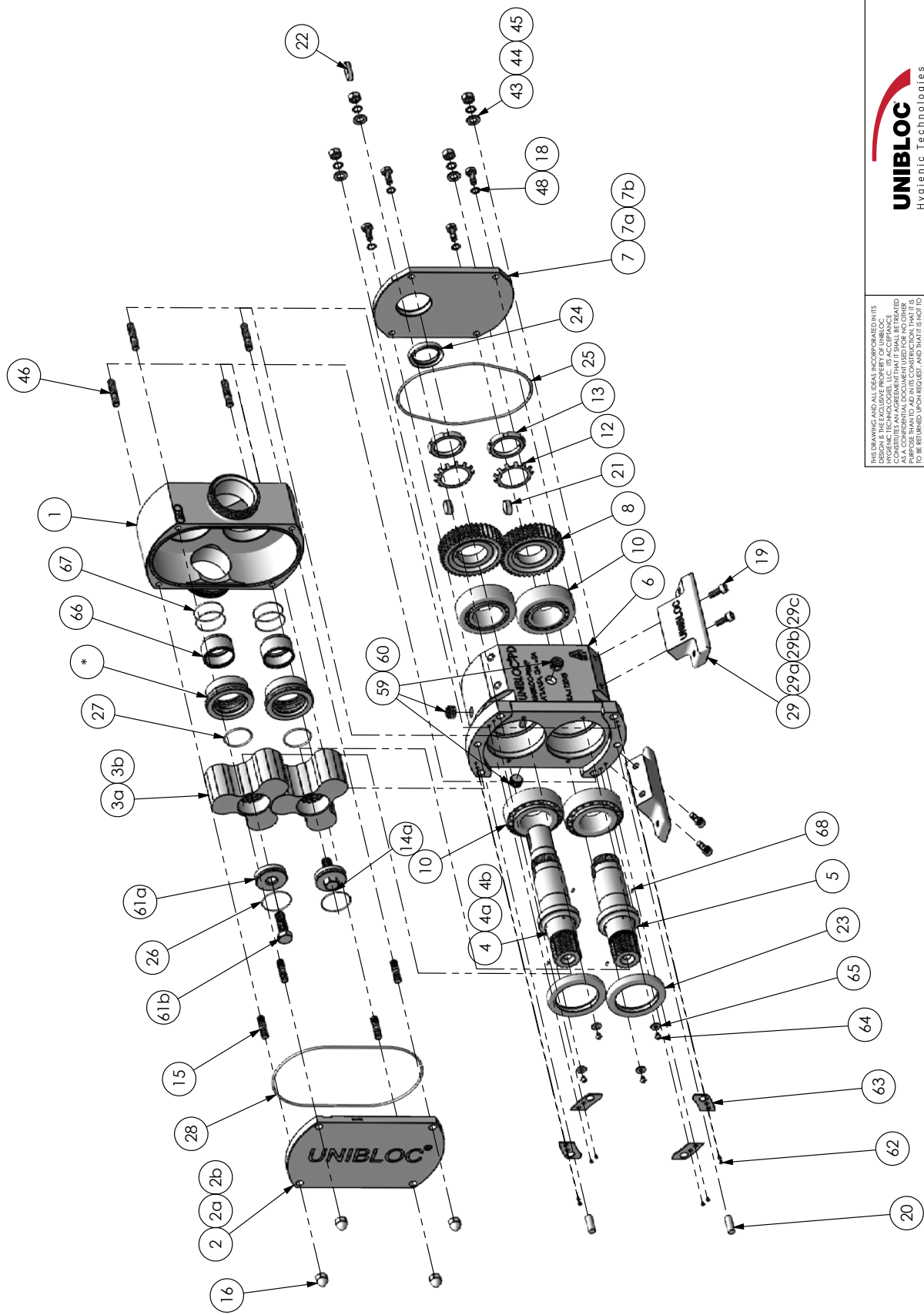
SHEET 1 OF 2

DOUBLE MECHANICAL SEAL COMPONENTS			
ITEM	DESCRIPTION	PART NO.	QTY.
1	O-RING	4237	2
2A	STATIONARY SEAL FACE	REF. TABLE 2	1
3A	ROTATING SEAL FACE	REF. TABLE 2	1
3B	ROTATING SEAL FACE	REF. TABLE 2	1
2B	STATIONARY SEAL FACE	REF. TABLE 2	1
4	O-RING	4236	2
5	WAVE SPRING	5321	2
6	SS DRIVE COLLAR	5326	1
7	O-RING	4234	1
8	SS FLUSH HOUSING	4931	1
9	SOCKET BOLT: M6X12	SBM6X12	3

TABLE 2			
P.N.	ITEM	DESCRIPTION	PART NO. QTY.
5260	2A	STATIONARY SEAL FACE: STAINLESS STEEL	5323-SS 1
	3A	ROTATING SEAL FACE: CARBON	5325-C 1
	3B	ROTATING SEAL FACE: CARBON	5325-C 1
	2B	STATIONARY SEAL FACE: STAINLESS STEEL	5323-SS 1
5261	2A	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1
	3A	ROTATING SEAL FACE: SILICON CARBIDE	5325-SIC 1
	3B	ROTATING SEAL FACE: CARBON	5325-C 1
	2B	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1
5262	2A	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1
	3A	ROTATING SEAL FACE: TUNGSTEN	5325-TC 1
	3B	ROTATING SEAL FACE: TUNGSTEN	5325-TC 1
	2B	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1
5263	2A	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1
	3A	ROTATING SEAL FACE: SILICON CARBIDE	5325-SIC 1
	3B	ROTATING SEAL FACE: SILICON CARBIDE	5325-SIC 1
	2B	STATIONARY SEAL FACE: TUNGSTEN	5323-TC 1



UNLESS OTHERWISE NOTED TOLERANCES DECIMALS 0.00 ± 0.05 0.000 ± 0.005 0.007 ± 0.007	 	UNLESS OTHERWISE NOTED THIS DRAWING AND ALL IDEAS INCORPORATED IN ITS DESIGN IS THE EXCLUSIVE PROPERTY OF UNIBLOC HYGIENIC TECHNOLOGIES, LLC. ITS ACCEPTANCE OF THE SEALING COMPONENTS IS NOT A WARRANTY OF THE SEALING COMPONENTS AS A CONFIDENTIAL DOCUMENT FOR NO OTHER PURPOSE THAN TO ADDRESS CONSTRUCTION THAT IT IS BEING USED FOR. IT IS NOT TO BE REPRODUCED OR COPIED EXCEPT AS AUTHORIZED IN WRITING BY UNIBLOC HYGIENIC TECHNOLOGIES, LLC.		 Hygienic Technologies		
		DWG. TITLE		DOUBLE MECHANICAL SEAL		
		FINISH (UNLESS NOTED ON DWG.)		SIZE	DWG. NO.	REV. NO.
		WEIGHT		APPD	500,550,575	5260-63
ALL DIMENSIONS IN MM. [IN]		SCALE	RELEASE DATE		SHEET 1 OF 2	
			AUG. 6, 2021			



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UNIBLOC
Hygienic Technologies

DWG. TITLE		PARTS LIST	
BY	DATE	DWG. NO.	REV. NO.
DRAWN	KL	501, 551, 576	2
CHECKED		SIZE	
APPD		501, 551, 576	
SCALE		RELEASE DATE	
ALL DIMENSIONS IN MM. [IN]		MAY 26, 2020	SHEET 1 OF 2

PUMP SIZES 501, 551, 576

PUMP SIZE 501


PUMP SIZE 551

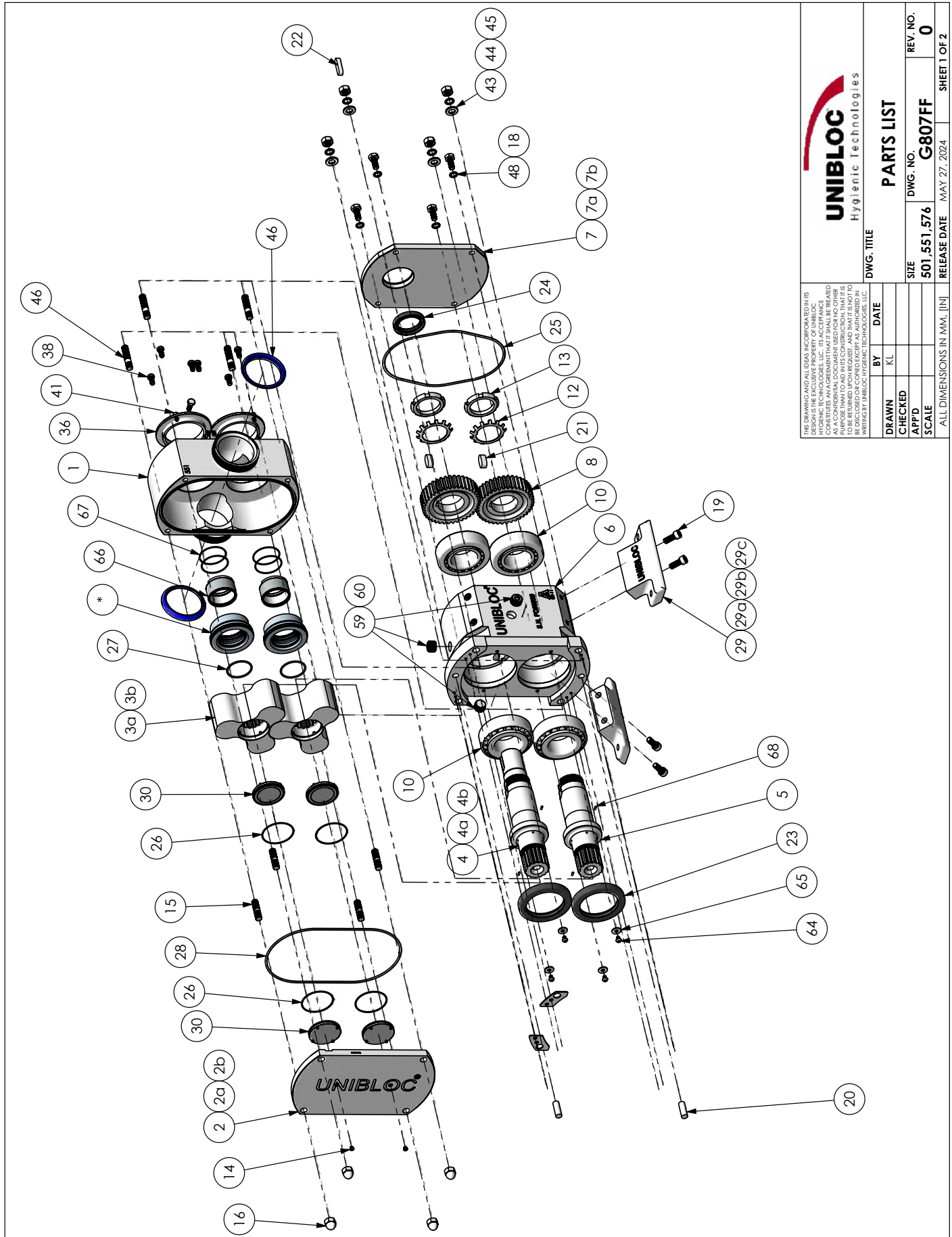
PUMP SIZE 576

*** Connections Also Available In:

- ACME
- DIN 100
- DIN 80
- RJT
- SMS
- NPTM
- CAMLOC

* See DWG. G812B For Shaft Seal Parts

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	DRAWN	KL						
	CHECKED							
	APPD							
	SCALE			SIZE	501, 551, 576		DWG. NO.	REV. NO.
					G807		1	
ALL DIMENSIONS IN MM. [IN]			RELEASE DATE		MAY 26, 2020			
					SHEET 2 OF 2			



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DWG. TITLE		PARTS LIST	
BY	DATE	SIZE	REV. NO.
DRAWN	KL	501.551.576	G807FF
CHECKED		DWG. NO.	0
APP'D		RELEASE DATE	MAY 27, 2024
ALL DIMENSIONS IN MM. [IN]		SHEET 1 OF 2	

PUMP SIZES 501, 551, 576			
PART NO.	DETAILED DESCRIPTION	NO. PCS.	DESCRIPTION
DPM3x8	M3x8	68 4	Shaft dowel pin
4228A		67 4	Shaft wear sleeve o-ring
4939B		66 2	Shaft wear sleeve
OWM6	M6 washer	65 4	Fender washer
BHM6x8	M6x8 (socket)	64 4	Button head screw
3673		63 4	Shim Plate
FHBM3x6	M3x6 (socket)	62 8	Flat head screw
HPLO.5	1/2" NPT Hex Plug	60 1	Oil Plug
RV0.5	1/2" NPT	59 1	Vent
3.0IN-BSG-T	3.0" Bevel Seat Gasket, PTFE	51 2	Port Gasket
4534-2	M10	48 4	Split Washer
HBM12x45	M12x45 (hex)	47b 2	Danfoss Motor Bolt
HBM12x35	M12x35 (hex)	47a 2	Charlynn Motor Bolt
WM10	M10	47 4	Washer
SM12x45	M12x45	46 4	Gearbox Stud
LWM12	M12	45 6	Split Washer
WM12	M12	44 4	Washer
NM12	M12	43 4(8)	Hex Nut
DPMBx20	M8x22	42 2	Dowel Pin
323CFH	Foodfirst Spacer Cap	30 4	Spacer Cap
3814	RTP30 Drop-In Foot	29c 2	Foot
3815	STP125 Drop-In Foot	29b 2	Foot
3818	Dum Drop-In Foot	29a 2	Foot
3817	Standard Foot	29 2	Foot
4230	22x63mm	28 1	Cover o-ring
4233	1.799"x0.103" #133	27 2	Rotor-shaft o-ring
4866	2.25"x0.0625"	26 2	Spacer cap 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
SBM10x30	M10x30 (socket)	19 4	Foot Bolt
HBM10x30	M10x30 (socket)	18 4	Cover Bolt
DNM12	M12	16 4	Dome Nut
SM12x30	M12x30	15 4	Front Cover Stud
SPM5x4	M5x4	14 2	Front Cover Socket Plug
4432		13 2	Slotted Nut
4515		12 2	Tab Washer
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	2b 1	Rotor Housing cover
3237	Relief cover, 1 way	2a 1	Rotor Housing cover
3236	Plain cover	2 1	Rotor Housing cover

PUMP SIZE 501			
PART NO.	DETAILED DESCRIPTION	NO. PCS.	DESCRIPTION
3702B-1L	For Wear Sleeve	5 1	Lay Shaft
3699B-1L	PTO Drive (Wear Sleeve)	4 1	Drive Shaft
3700B-1L	Charlynn Drive (Wear Sleeve)	4a 1	Drive Shaft
3701B-1L	Danfoss Drive (Wear Sleeve)	4b 1	Drive Shaft
3332FF	Class E Bi-Lobe Rotor	3a 2	SS Rotor
8412FF	Class E Tri-Lobe Rotor	3b 2	SS Rotor
3164-1	2.5" Tri-Clamp Conn. ***	1 1	Rotor Housing


PUMP SIZE 551			
PART NO.	DETAILED DESCRIPTION	NO. PCS.	DESCRIPTION
3698B-1L	For Wear Sleeve	5 1	Lay Shaft
3695B-1L	PTO Drive (Wear Sleeve)	4 1	Drive Shaft
3697B-1L	Charlynn Drive (Wear Sleeve)	4a 1	Drive Shaft
3697B-1L	Danfoss Drive (Wear Sleeve)	4b 1	Drive Shaft
3335FF	Class E Bi-Lobe Rotor	3a 2	SS Rotor
8442FF	Class E Tri-Lobe Rotor	3b 2	SS Rotor
3168-1	3.0" Tri-Clamp Conn. ***	1 1	Rotor Housing

PUMP SIZE 576			
PART NO.	DETAILED DESCRIPTION	NO. PCS.	DESCRIPTION
3706B-1L	For Wear Sleeve	5 1	Lay Shaft
3703B-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
3338FF	Class E Bi-Lobe Rotor	3a 2	SS Rotor
8472FF	Class E Tri-Lobe Rotor	3b 2	SS Rotor
3178-1	3" or 4" Tri-Clamp Conn. ***	1 1	Rotor Housing

*** Connections Also Available In:

- ACME
- DIN 100
- DIN 80
- RJT
- SMS
- NPTM
- CAMLOC

* See DWG. G812B For Shaft Seal Parts

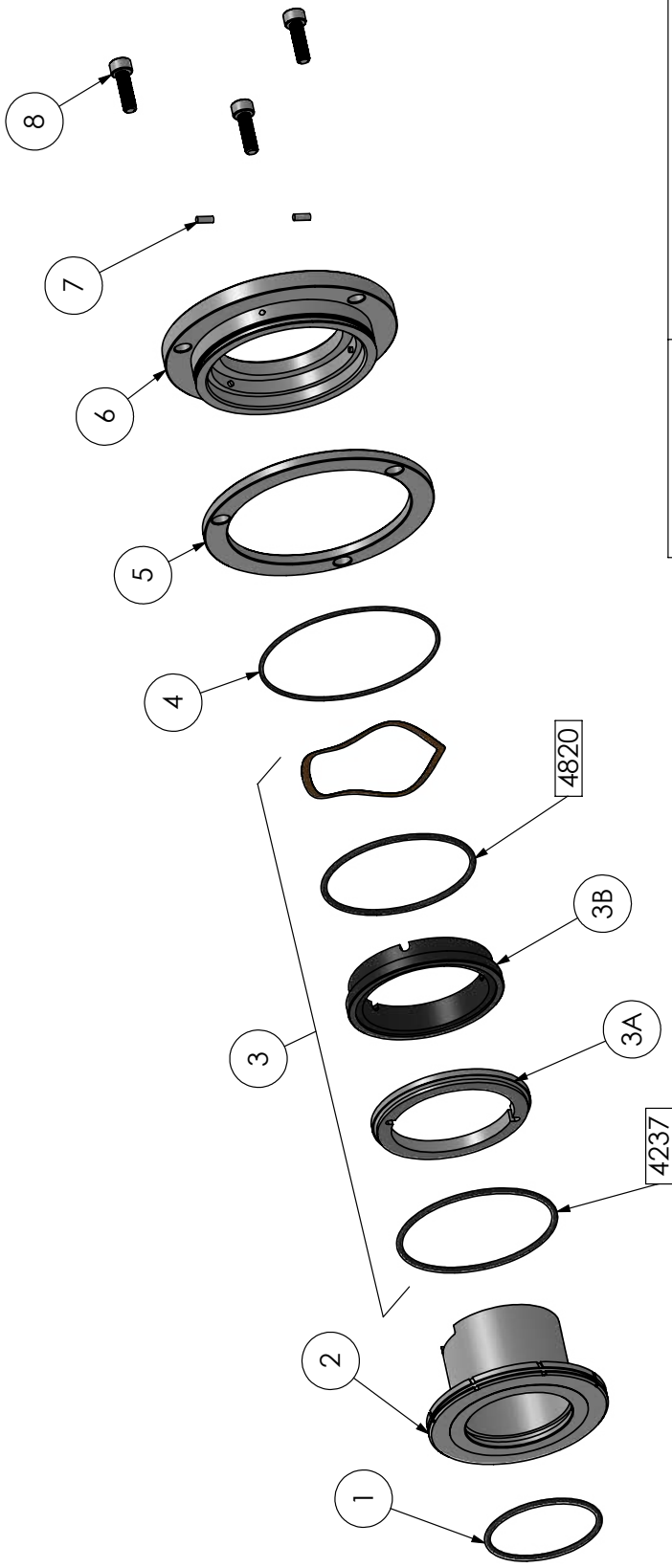


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DWG. TITLE		PARTS LIST	
DRAWN	BY	DWG. NO.	REV. NO.
CHECKED	DATE	G807FF	0
APP'D			
SCALE			
ALL DIMENSIONS IN MM. [IN]		SIZE	RELEASE DATE
		501, 551, 576	MAY 27, 2024
			SHEET 2 OF 2

SINGLE MECHANICAL SEAL			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4225	O-RING	1
2	4939F	SINGLE MECHANICAL SHAFT SLEEVE	1
3	REFERENCE TABLE 2	SINGLE MECHANICAL SHAFT SLEEVE FACE KIT	1
4	4234	O-RING	1
5	SPCR4938A-2	SPACER	1
6	4938A-2	SINGLE MECHANICAL RETAINER RING	1
7	DPM3x8	M3x8 PIN (SHAFT)	2
8	SBM6x20	M6x20 SOCKET BOLT	3

TABLE 2		
KIT NO.	ITEM NO.	DESCRIPTION
51 65-KIT	3A	ROTATING SEAL FACE: STAINLESS
	3B	STATIONARY SEAL FACE: CARBON
51 66-KIT	3A	ROTATING SEAL FACE: TUNGSTEN CARBIDE
	3B	STATIONARY SEAL FACE: SILICON CARBIDE
51 67-KIT	3A	ROTATING SEAL FACE: SILICON CARBIDE
	3B	STATIONARY SEAL FACE: TUNGSTEN CARBIDE
51 68-KIT	3A	ROTATING SEAL FACE: TUNGSTEN CARBIDE
	3B	STATIONARY SEAL FACE: TUNGSTEN CARBIDE



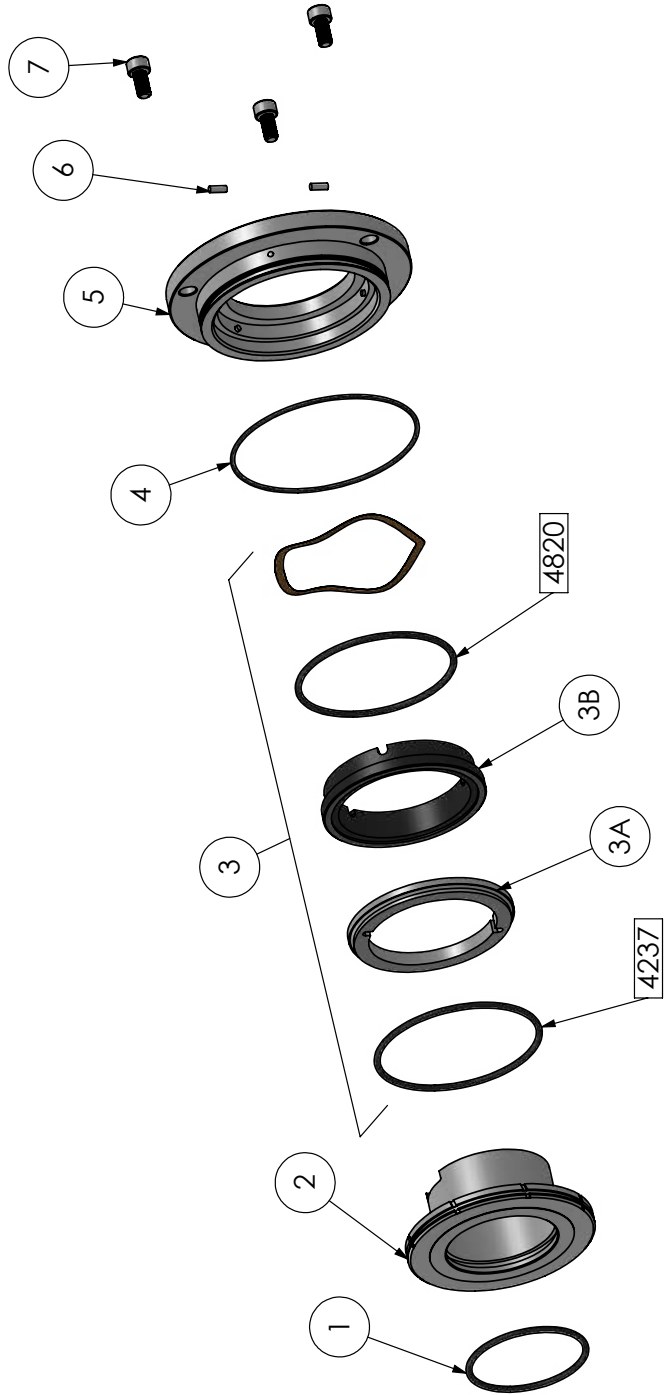
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UNIBLOC		Hygienic Technologies	
BY	DATE	DWG. TITLE	
DRAWN	JFZ	FRONT LOAD SINGLE MECH. SEAL PARTS	
CHECKED	4/19/22	REV. NO.	
APPROD		DWG. NO.	
SCALE		G812B	
ALL DIMENSIONS IN MM. [IN]		PD500	
		RELEASE DATE	
		APRIL 18, 2022	
		SHEET 1 OF 2	

SINGLE MECHANICAL SEAL			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4225	O-RING	1
2	4939E	SINGLE MECHANICAL SHAFT SLEEVE	1
3	REFERENCE TABLE 2	SINGLE MECHANICAL SHAFT SLEEVE FACE KIT	1
4	4234	O-RING	1
5	4938A-2	SINGLE MECHANICAL RETAINER RING	1
6	DPM3x8	M3x8 PIN (SHAFT)	2
7	SBM6x12	M6x12 SOCKET BOLT	3

TABLE 2

KIT NO.	ITEM NO.	DESCRIPTION
5165-KIT	3A	ROTATING SEAL FACE: STAINLESS
	3B	STATIONARY SEAL FACE: CARBON
5166-KIT	3A	ROTATING SEAL FACE: TUNGSTEN CARBIDE
	3B	STATIONARY SEAL FACE: SILICON CARBIDE
5167-KIT	3A	ROTATING SEAL FACE: SILICON CARBIDE
	3B	STATIONARY SEAL FACE: SILICON CARBIDE
5168-KIT	3A	ROTATING SEAL FACE: TUNGSTEN CARBIDE
	3B	STATIONARY SEAL FACE: TUNGSTEN CARBIDE



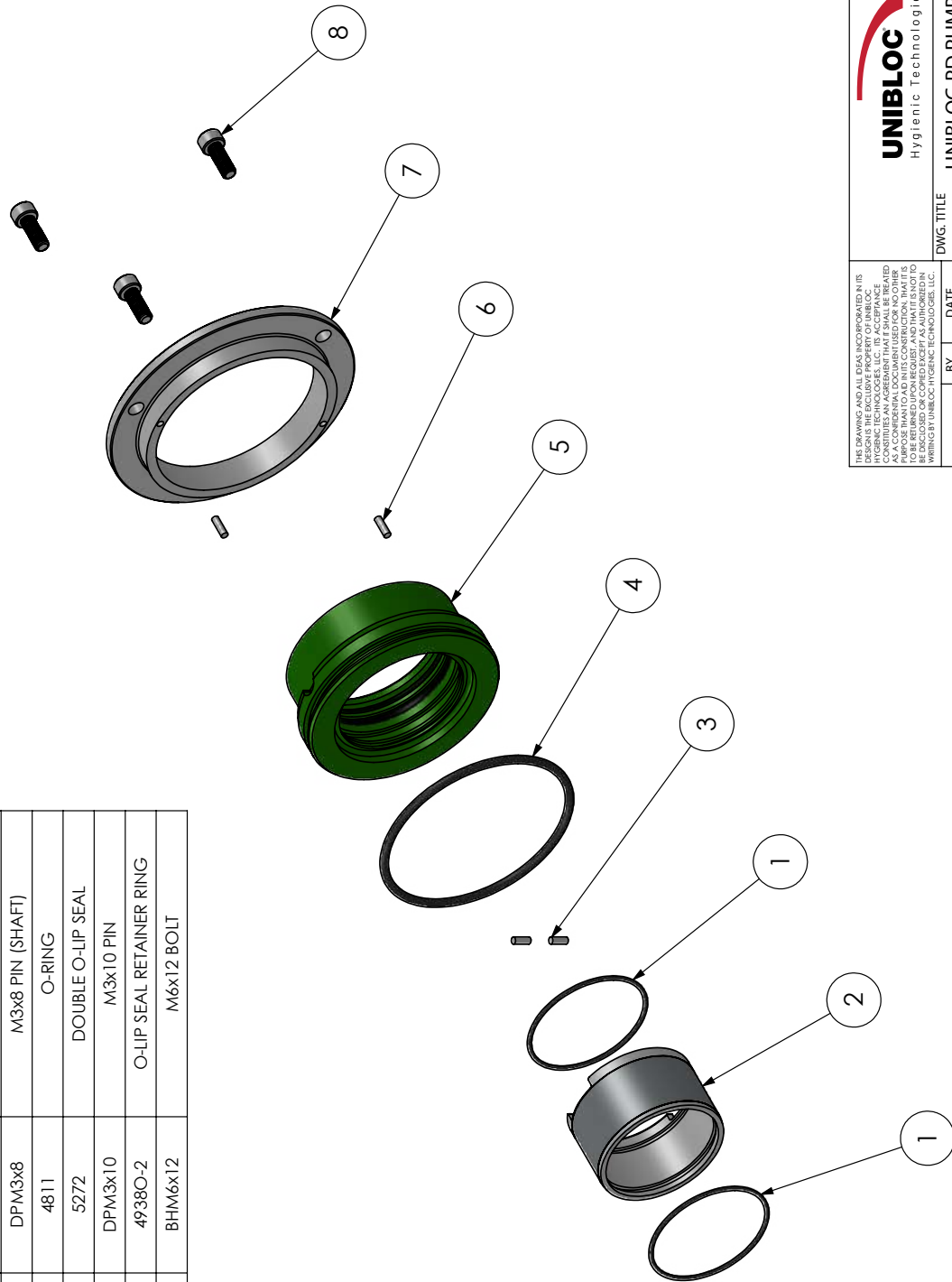
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DWG. TITLE		DWG. NO.		REV. NO.	
BY	DATE	SIZE	PD501	G812C	0
DRAWN	JPR	4/19/22			
CHECKED					
APP'D					
SCALE					
ALL DIMENSIONS IN MM. [IN]		RELEASE DATE		APRIL 19, 2022	
				SHEET 1 OF 2	

DOUBLE O-LIP SEAL
P.N. 5272

ITEM NO.	PCS. PER SEAL	PART NO.	DESCRIPTION
1	2	4228A	O-RING
2	1	4939B	WEAR SLEEVE
3	2	DPM3x8	M3x8 PIN (SHAFT)
4	1	4811	O-RING
5	1	5272	DOUBLE O-LIP SEAL
6	2	DPM3x10	M3x10 PIN
7	1	4938O-2	O-LIP SEAL RETAINER RING
8	3	BHM6x12	M6x12 BOLT

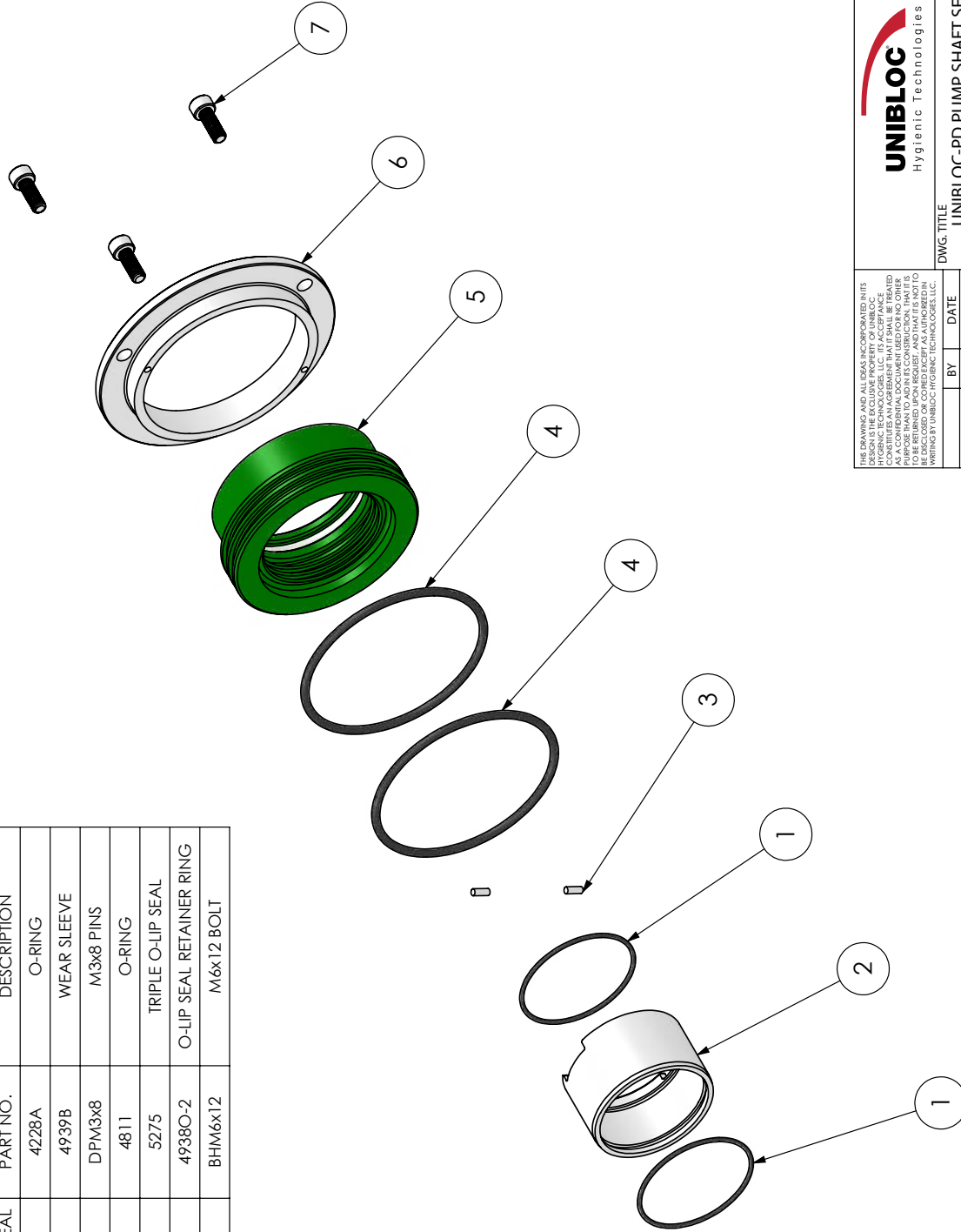


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DRAWN	BY	DATE	
CHECKED	JPZ	06/29/15	
APPD			
SCALE			

UNIBLOC Hygienic Technologies		UNIBLOC-PD PUMP SHAFT SEAL PARTS LIST	
DWG. NO.	501,551,576	REV. NO.	2
SIZE		DWG. NO.	G812B-1
RELEASE DATE	APRIL 5, 2004	SHEET 1 OF 2	

TRIPLE O-LIP SEAL
P.N. 5275

ITEM NO.	PCS. PER SEAL	PART NO.	DESCRIPTION
1	2	4228A	O-RING
2	1	4939B	WEAR SLEEVE
3	2	DPM3x8	M3x8 PINS
4	2	4811	O-RING
5	1	5275	TRIPLE O-LIP SEAL
6	1	4938O-2	O-LIP SEAL RETAINER RING
7	3	BHM6x12	M6x12 BOLT



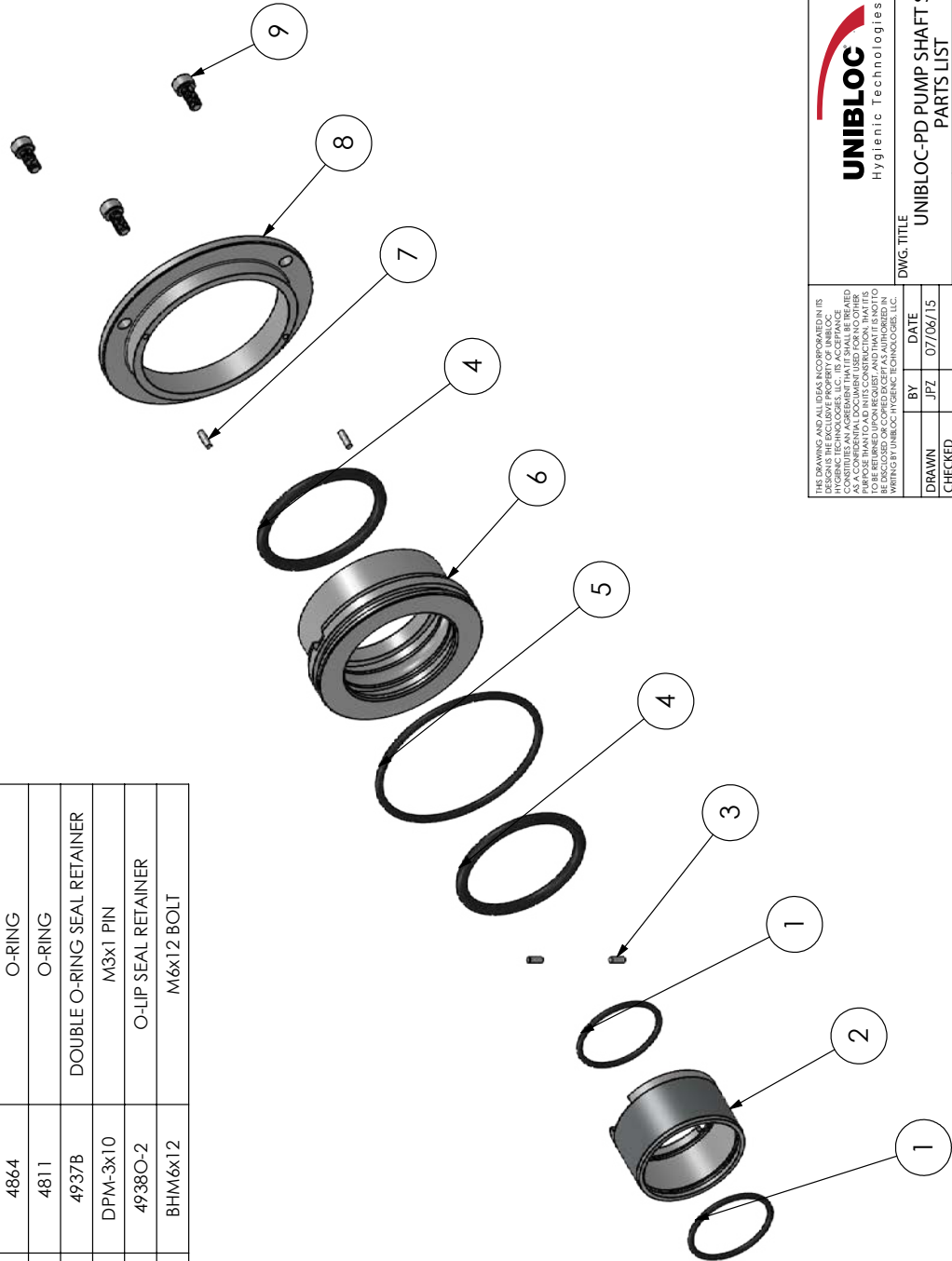
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DWG. TITLE		UNIBLOC-PD PUMP SHAFT SEAL	
BY		DATE	
DRAWN		JPZ 07/06/15	
CHECKED			
APPD			
SCALE			
PARTS LIST		REV. NO.	
SIZE		DWG. NO.	
501,551,576		G812B-2	
RELEASE DATE		APRIL 5, 2004	
ALL DIMENSIONS IN MM. [IN]		SHEET 1 OF 2	

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

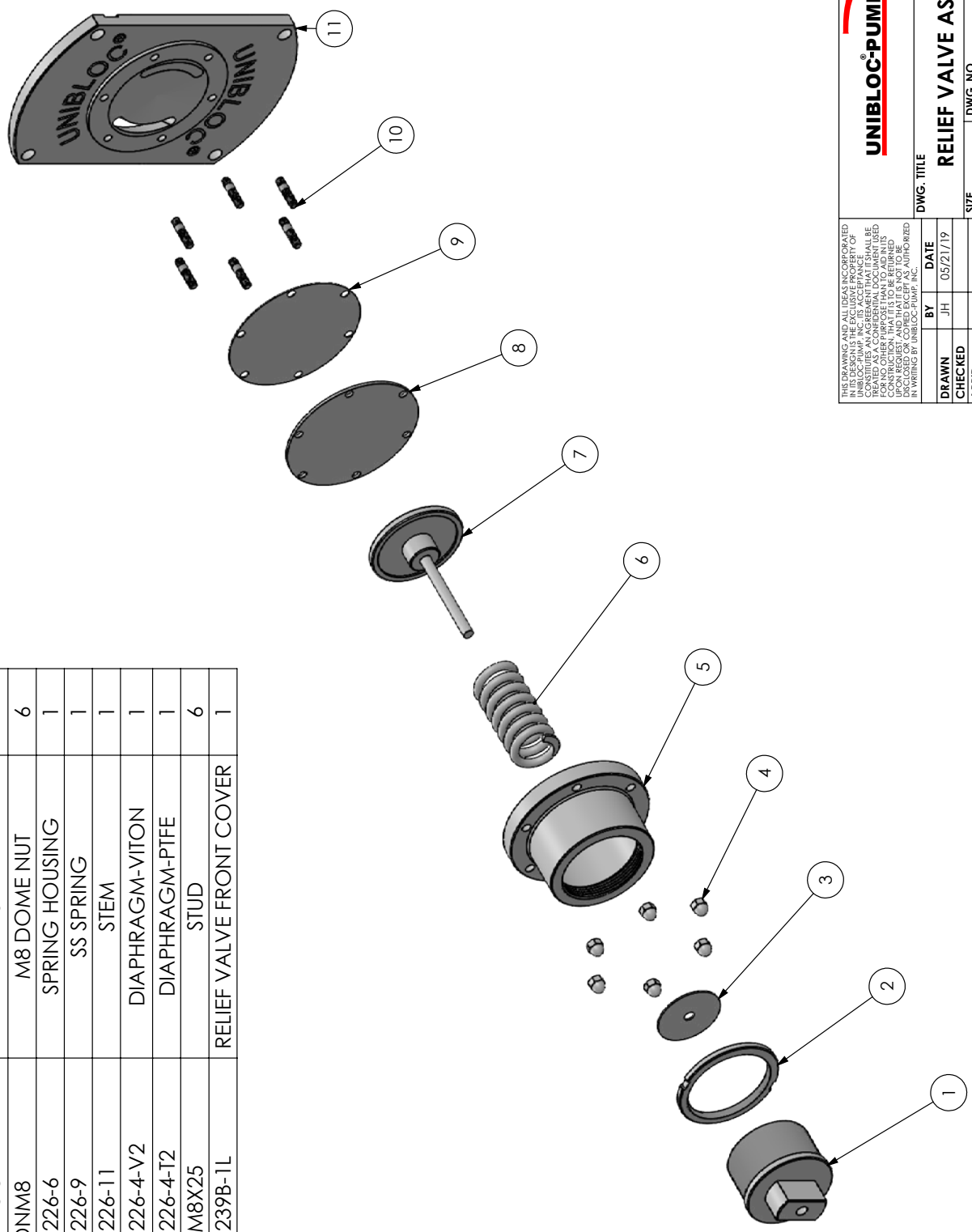
ITEM NO.	PCS. PER SEAL	PART NO.	DESCRIPTION
1	2	4228A	O-RING
2	1	4939B	WEAR SLEEVE
3	2	DPM3x8	M3x8 PIN
4	2	4864	O-RING
5	1	4811	O-RING
6	1	4937B	DOUBLE O-RING SEAL RETAINER
7	2	DPM-3x10	M3x1 PIN
8	1	4938O-2	O-LIP SEAL RETAINER
9	3	BHM6x12	M6x12 BOLT



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BY	DATE	DWG. TITLE	
DRAWN	JFZ	UNIBLOC-PD PUMP SHAFT SEAL	
CHECKED	07/06/15	PARTS LIST	
APPD		SIZE	REV. NO.
SCALE		501,551,576	G812B-3
ALL DIMENSIONS IN MM. [IN]		RELEASE DATE	SHEET 1 OF 2
		MAY 10, 2022	3



ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	3226-7	SPRING ADJUSTER	1
2	3226-8	LOCK RING	1
3	3226-5	WASHER	1
4	DNM8	M8 DOME NUT	6
5	3226-6	SPRING HOUSING	1
6	3226-9	SS SPRING	1
7	3226-11	STEM	1
8	3226-4-V2	DIAPHRAGM-VITON	1
9	3226-4-T2	DIAPHRAGM-PTFE	1
10	SM8X25	STUD	6
11	3239B-1L	RELIEF VALVE FRONT COVER	1

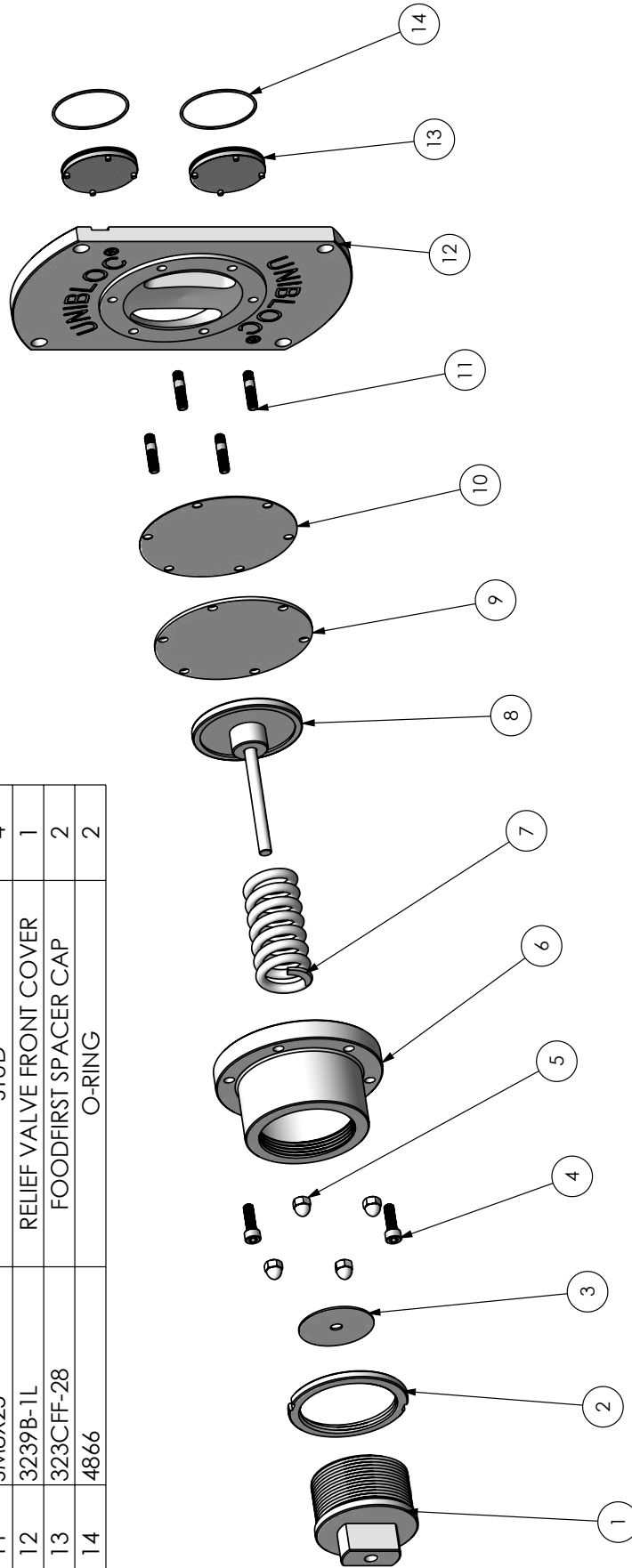


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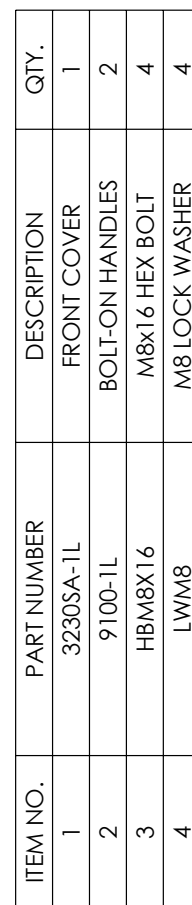
DWG. TITLE		DWG. NO.		REV. NO.	
RELIEF VALVE ASSEMBLY		3239B2		1	
BY	DATE	SIZE	DWG. NO.	REV. NO.	
DRAWN	JH	05/21/19			
CHECKED					
APPD					
SCALE					
ALL DIMENSIONS IN MM. [IN]		MAR. 15, 2021		SHEET 1 OF 2	

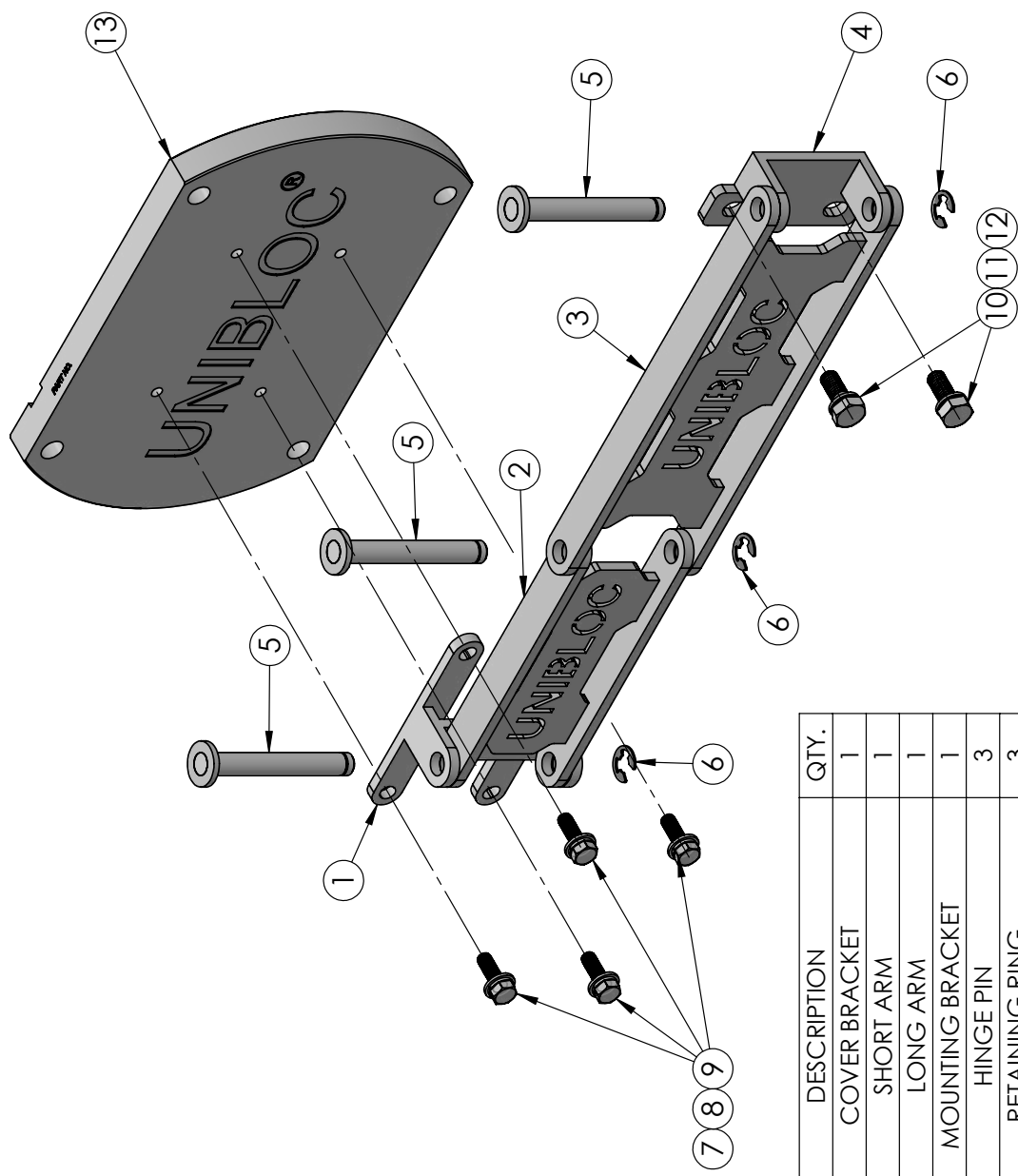
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	3226-7	SPRING ADJUSTER	1
2	3226-8	LOCK RING	1
3	3226-5	WASHER	1
4	SBM8x25	M8X25 SOCKET HEAD CAP SCREW	2
5	DNM8	M8 DOME NUT	4
6	3226-6	SPRING HOUSING	1
7	3226-9	SPRING	1
8	3226-11	STEM	1
9	3226-4-V2	DIAPHRAGM-VITON	1
10	3226-4-T2	DIAPHRAGM-PTFE	1
11	SM8X25	STUD	4
12	3239B-1L	RELIEF VALVE FRONT COVER	1
13	323CFF-28	FOODFIRST SPACER CAP	2
14	4866	O-RING	2



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UNIBLOC Hygienic Technologies		DWG. TITLE	
RELIEF VALVE ASSEMBLY-FOODFIRST		DWG. NO.	
SIZE		REV. NO.	
PD501		0	
RELEASE DATE		SHEET 1 OF 2	
MAY 25, 2024			
ALL DIMENSIONS IN MM, [IN]			
BY	DATE		
DRAWN	KL	5/25/24	
CHECKED			
APP'D			
SCALE			





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SAV3230-4	COVER BRACKET	1
2	SA3230-3	SHORT ARM	1
3	SA3230-2	LONG ARM	1
4	SAV3230-1	MOUNTING BRACKET	1
5	SA3230-13	HINGE PIN	3
6	RR-0.5IN	RETAINING RING	3
7	WM8	M8 WASHER	4
8	LWM8	M8 LOCK WASHER	4
9	HBM8x25	M8x25 HEX BOLT	4
10	HBM10x25	M10x25 HEX BOLT	2
11	LWM10	M10 SPLIT WASHER	2
12	WM10x18	M10 WASHER	2
13	FRONT COVER	---	1

--- CONTACT UNIBLOC FOR PART NUMBER

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BY	DATE
JR	12/16/2021
CHECKED	
APPD	
SCALE	

UNIBLOC
Hygienic Technologies

DWG. TITLE: VERTICAL SWINGARM ASSEMBLY

SIZE: 500

REV. NO.: 0

DWG. NO.: 3230SAV

RELEASE DATE: DEC. 16, 2021

SHEET 1 OF 1

Notes:

Pump Size: _____

Pump SN: _____

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Notes:

Pump Size: _____

Pump SN: _____

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Notes:

Pump Size: _____

Pump SN: _____

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Unibloc Hygienic Technologies US, LLC

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