TECHNICAL SERVICE MANUAL: INSTALLATION, OPERATION & MAINTENANCE

VIKING PUMP®

ROTARY LOBE PRODUCT LINE & CIRCUMFERENTIAL PISTON PRODUCT LINE: *STAINLESS STEEL*

REVOLUTION® SERIES

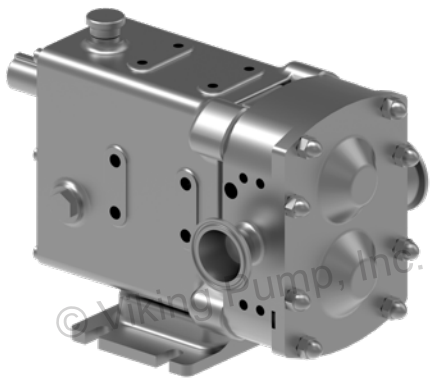
SIZES: 2, 3, 4, 5

TABLE OF CONTENTS

MODEL NUMBER CHART

Size 2	Size 3	Size 4	Size 5
R0150	R0200	R0450	R1800
R0160	R0300	R0600	R2200
R0180	R0400	R0800	R2600
		R1300	

FIGURE 1: R0150



NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

SAFETY INFORMATION & INSTRUCTIONS

IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF PUMP MAY CAUSE SERIOUS INJURY OR DEATH, AND/OR RESULT IN DAMAGE TO PUMP AND/OR OTHER EQUIPMENT. VIKING'S WARRANTY DOES NOT COVER FAILURE DUE TO IMPROPER INSTALLATION, OPERATION OR MAINTENANCE.

THIS INFORMATION MUST BE FULLY READ BEFORE BEGINNING INSTALLATION, OPERATION OR MAINTENANCE OF PUMP, AND MUST BE KEPT WITH PUMP. PUMP MUST BE INSTALLED, OPERATED AND MAINTAINED ONLY BY SUITABLY TRAINED AND QUALIFIED PERSONS.

THE FOLLOWING SAFETY INSTRUCTIONS MUST BE FOLLOWED AND ADHERED TO AT ALL TIMES.

⚠ **DANGER = FAILURE TO FOLLOW THE INDICATED INSTRUCTION MAY RESULT IN SERIOUS INJURY OR DEATH.**

⚠ **WARNING = IN ADDITION TO SERIOUS INJURY OR DEATH, FAILURE TO FOLLOW THE INDICATED INSTRUCTION MAY CAUSE DAMAGE TO PUMP AND/OR OTHER EQUIPMENT**

⚠ DANGER

DO NOT OPERATE PUMP IF:

- The front cover is not installed correctly.
- Any guards are missing or incorrectly installed.
- The suction or discharge piping is not connected.

⚠ DANGER

DO NOT place fingers, etc. into the pumping chamber or its connection ports or into any part of the gearbox if there is ANY possibility of the pump shafts being rotated. Severe injury will occur.

⚠ DANGER

DO NOT exceed the pumps rated pressure, speed, and temperature, or change the system/duty parameters from those for which the pump was originally supplied, without confirming its suitability for the new duty. Running the pump outside of its operating envelope can cause mechanical contact in the pump head, excessive heat and can represent a serious risk to health and safety.

⚠ DANGER

Installation and operation of the pump must always comply with health and safety regulations.

⚠ WARNING

A device must be incorporated into the pump, system, or drive to prevent the pump exceeding its stated duty pressure. It must be suitable for both directions of pump rotation where applicable. Do not allow pump to operate with a closed/blocked discharge unless a pressure relief device is incorporated. If an integral relief valve is incorporated into the pump, do not allow re-circulation through the relief valve for extended periods.

⚠ DANGER

The mounting of the pump or pump unit should be solid and stable. Pump orientation must be considered in relation to drainage requirements. Once mounted, shaft drive elements must be checked for correct alignment. Rotate pump shaft by at least one full revolution to ensure smoothness of operation. Incorrect alignment will produce excessive loading and will create high temperatures and increased noise emissions. It may also be necessary to earth the pump to avoid the build up of a potential charge difference that could cause a spark.

⚠ DANGER

The installation must allow safe routine maintenance and inspection (to check for leakage, monitor pressures, etc) and provide adequate ventilation necessary to prevent overheating.

⚠ WARNING

Fill all gearboxes with the recommended grades and quantities of lubricant (refer to ***"Start Up Procedure" on page 10*** and ***"Lubricants" on page 32***). Beware of over/under filling the gearbox as this could cause the pump to overheat and mechanical damage to occur.

⚠ WARNING

Before operating the pump, be sure that it and all parts of the system to which it is connected are clean and free from debris and that all valves in the suction and discharge pipelines are fully opened. Ensure that all piping connecting to the pump is fully supported and correctly aligned with its relevant connections. Misalignment and/or excess loads will cause severe pump damage. This could result in unexpected mechanical contact in the pump head and has the potential to be a source of ignition.

⚠ WARNING

Be sure that pump rotation is correct for the desired direction of flow (refer to ***"Start Up Procedure" on page 10***).

⚠ WARNING

Do not install the pump into a system where it will run dry (i.e. without a supply of pumped media) unless it is equipped with a flushed shaft seal arrangement complete with a fully operational flushing system. Mechanical seals require a thin fluid film to lubricate the seal faces. Dry running can cause excessive heat and seal failure.

⚠ WARNING

Pressure gauges/sensors are recommended, next to the pump suction and discharge connections to monitor pressures.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

⚠ DANGER

Caution must be taken when lifting the pump. Suitable lifting devices should be used as appropriate. Lifting eyes installed on the pump must only be used to lift the pump, not pump with drive and/or base plate. If pump is base plate mounted, the base plate must be used for all lifting purposes. If slings are used for lifting, they must be safely and securely attached.

⚠ DANGER

DO NOT attempt any maintenance or disassembly of the pump or pump unit without first ensuring that:

- The pump is fully isolated from the power source (electric, hydraulic, pneumatic).
- The pumping chamber, pneumatic relief valve and any shaft seal support system are depressurised and purged.
- Any temperature control devices (jackets, heat-tracing, etc) are fully isolated, that they are depressurised and purged, and components are allowed to reach a safe handling temperature.

⚠ DANGER

DO NOT loosen or undo the front cover, any connections to the pump, shaft seal housings, temperature control devices, or other components, until sure that such action will not allow the unsafe escape of any pressurised media.

⚠ WARNING

Use only genuine Viking Pump Hygienic parts.

All certification, standards, guarantees & warranties originally supplied with this pump will be invalidated by the use of non-genuine Service Parts.

⚠ DANGER

Pumps and/or drives can produce sound power levels exceeding 85dB (A) under certain operating conditions. When necessary, personal protection against noise must be taken.

⚠ DANGER

Avoid any contact with hot parts of pumps and/or drives that may cause injury. Certain operating conditions, temperature control devices (jackets, heat-tracing, etc.), bad installation, or poor maintenance can all promote high temperatures on pumps and/or drives.

⚠ WARNING

When cleaning, either manually or by CIP (cleaning in place) method, the operator must ensure that a suitable procedure is used in accordance with the system requirements. During a CIP cleaning cycle, a pump differential pressure of between 2 and 3 bar (30 and 45 psi) is recommended to ensure suitable velocities are reached within the pump head. The exterior of the pump should be cleaned periodically.

⚠ DANGER

Surface temperature of pump is also dependent on the temperature of pumped medium.

RISK ASSESSMENT

Risk assessment relating to the use of Viking Pump Revolution pumps and pump units in potentially explosive atmospheres.

Source of Hazards	Potential Hazards	Frequency of Hazards	Recommended Measures
Unvented cavities	Build up of explosive gas	**Very Rare**	Ensure that pump is totally filled. Consider mounting ports vertically. See ***"Safety Information & Instructions" on page 2***.
Rotorcase, rotors, front cover	Unintended mechanical contact	**Rare**	Ensure that operating pressures are not exceeded. Ensure that sufficient NPSH to prevent cavitation. See ***"Safety Information & Instructions" on page 2*** / ***"System Design & Installation" on page 7*** / ***"Lubricants" on page 32*** / ***"Service History" on page 35***.
Pump external surfaces	Excess temperature. Electrostatic charging.	**Rare**	User must ensure temperature limits. Do not overfill gearboxes with lubricant. Provide a ground contact for pump. See ***"Safety Information & Instructions" on page 2*** / ***"Service History" on page 35***
Cover O-ring	Pump liquid leakage. Build up of explosive gas.	**Very Rare**	Check selection of elastomers are suitable for application. Ensure cover retaining nuts are tight. Service plan.
Pump casing, cover	Pump liquid leakage. Build up of explosive gas.	**Very Rare**	Stainless steel, corrosion resistant
Shaft seals	Excess temperature. Unintended mechanical contact. Leakage. Build up of explosive gas.	**Rare**	Selection of seal system must be suitable for application. See ***"Seals" on page 21***. Service plan. Seals must never run dry.
Auxiliary system for shaft sealing	Pump liquid leakage. Build up of explosive gas.	**Rare**	Selection of auxiliary seal system must be suitable for application. Seals must never run dry.
Rotation direction test	Excess temperature	**Very Rare**	If flushed seals are installed, ensure that flush is applied to seal assemblies. Only allow pump to run for minimum period - just a few seconds.
Closed valve condition	Excess temperature. Excess pressure. Mechanical contact.	**Rare**	Can cause excessive pressure, heat and mechanical contact. See ***"Safety Information & Instructions" on page 2***.
Shaft	Random induced current	**Very Rare**	Provide a ground contact for pump. See ***"Safety Information & Instructions" on page 2.***
Mechanical shaft coupling (Torque Protection)	Temperature from friction sparks from break up of shear pins. Electrostatic charging.	**Rare**	Coupling selection must suit application. See ***"Safety Information & Instructions" on page 2.***
Mechanical shaft coupling (Standard)	Break up of spider. Unintended mechanical contact. Electrostatic charging.	**Rare**	Coupling selection must suit application. Service plan. See ***"Safety Information & Instructions" on page 2.***

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

INTRODUCTION

The illustrations used in this manual are for identification purposes only and cannot be used for ordering parts. Obtain a parts list from your Viking Pump® representative. Always give a complete name of part, part number and material with the model number and serial number of pump when ordering repair parts. The pump serial number is stamped on the pump nameplate and the rotorcase, refer to ***"Pump Model & Serial Number" on page 5***, ***"Figure 2" on page 5*** and ***"Figure 4" on page 5***. This manual only applies to the pump models specified in the **"Model Number Chart" on page 1**. Pump specifications and recommendations are listed in the Catalog Sections, which are available at vikingpump.com.

GENERAL

Revolution circumferential piston and rotary lobe pumps are manufactured by Viking Pump, a unit of the IDEX Corporation.

This manual includes all the necessary information for Revolution® Series pumps and should be read prior to beginning installation, operation, or maintenance.

Should you require any additional information regarding the Revolution® Series pumps, contact Viking Pump or their local Viking Pump Hygienic authorised distributor, refer to ***"Viking Pump Hygienic Distributors" on page 4***.

When asking for assistance please provide the pump model and serial number. This information can be obtained from the pump nameplate which is located on the side of the bearing housing, refer to ***"Pump Model & Serial Number" on page 5***.

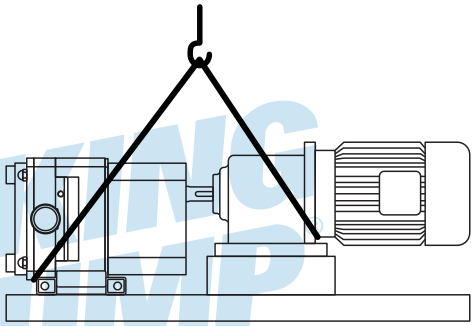
If the system or product characteristics are to be changed from the original application for which the pump was selected, Viking Pump or their Viking Pump Hygienic authorised distributor should be consulted to ensure the pump is suitable for the new application.

VIKING PUMP HYGIENIC DISTRIBUTORS

Viking Pump distributes its products internationally via a network of authorised distributors. Throughout this manual where reference is made to Viking Pump, service and assistance will also be provided by any Viking Pump Hygienic authorised distributor for Revolution.

RECEIPTS & STORAGE

- Always ensure any personnel undertaking lifting operations have the suitable experience and training to do so safely.
- Always ensure any lifting equipment used is in good condition and has been suitably tested, using lifting logs when applied.
- Always refer to the pump weights guide (Reference Weight Page section depending on Manual) and ensure any lifting equipment used is rated for and used within the load limits.
- Always ensure that the lifting points are in line with the centre of gravity and adjust the lifting point if necessary (see the following image).



- Always keep an eye on the load and stay clear during the lifting operation.
- The diagram above shows examples of how the equipment can be lifted; however, the user is to ensure this can be done safely with the equipment at hand:
- Pump with drive unit Bare shaft pump

On receipt always:

- Check the delivery note against the goods received.
- If motorised, check that the drive instructions are available.
- Be careful not to discard any manuals that may be enclosed with the packaging.
- Inspect the packing for signs of damage in transit.
- Carefully remove the packing away from the pump.
- Inspect the pump for any visible signs of damage.
- Clean away the packing from the pump port connections.
- Report any damage immediately to the carrier.

After receipt and inspection, if the pump is not to be installed immediately, the pump should be repacked in the original packaging and placed in suitable storage. The following points should be noted:

- Plastic port covers should be left in place.
- A clean, dry storage location free from vibration and without direct sunlight or UV light should be selected.
- Temperature range between –10° and 40°C (14°F and 105°F).
- Relative humidity <60%.
- If a moist or dusty atmosphere is used for storage, further protect the pump or unit with a suitable cover.
- No exposure to corrosive substances, including those contained in the air.
- Rotate the pump/pump unit by hand weekly, to prevent bearing damage.
- All associated ancillary equipment should be treated similarly

CLEANING

The Revolution pump series is suitable for both manual cleaning and CIP (Cleaning In Place), refer to ***"Installations with CIP Systems" on page 10***.

It is recommended that the exterior of the pump be cleaned periodically with a non-aggressive, non-abrasive cleaning solution.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

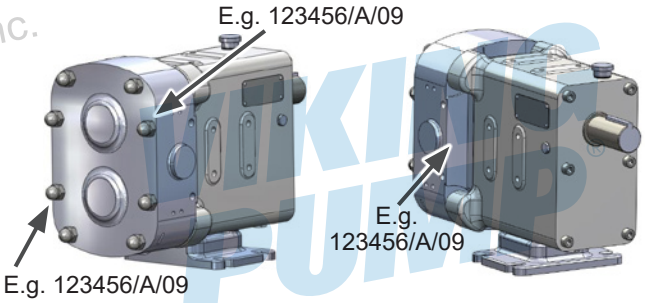
PUMP MODEL & SERIAL NUMBER

Should you require any information regarding your Revolution® Series pump, contact Viking Pump or your Viking Pump Hygienic authorised distributor, providing the pump model and serial number as stated on the pump nameplate. See ***"Figure 2" on page 5***, which is fixed to the pump gearbox.

Should this be damaged or missing, the pump serial number is also stamped on opposite corners of the rotorcase or on the rear face of the rotorcase - see ***"Figure 3" on page 5***.

FIGURE 2

FIGURE 3



ATEX INFORMATION

Mechanical seals are a source of heat and must never be allowed to run dry. We would recommend provision be made to ensure that there is always flow or fluid around the pump seals. If there is a risk of the supply being interrupted, then a temperature monitoring system must be applied to ensure the pump does not exceed the Atex rating. The surface temperature of the pump is dependent on the temperature of the pumped fluid and a due account of this should be taken whilst undertaking your risk assessment of the installation. These pumps are Atex rated T3.

⚠ WARNING

Only use genuine spare parts that have been designed and verified Atex compliant by Viking Pump Hygienic, failure to use genuine spare parts will invalidate the Atex certification.

⚠ WARNING

Pumps that have the Atex certification will have an earthing point on the front cover, this needs to be electrically earthed before use.

⚠ WARNING

The service and maintenance intervals are increased on certified Atex units, refer to ***"Additional Routine Maintenance – Atex units" on page 11*** for the required routine maintenance. Failure to maintain the pumps to these intervals will result in the Atex certification being invalidated.

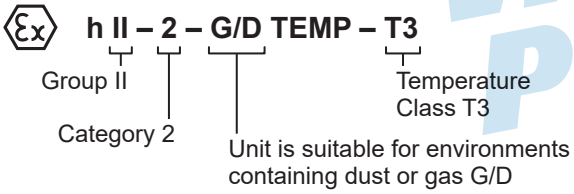
⚠ WARNING

When installing the unit make sure so far as reasonably practicable that the pump is aligned within 5 degrees to the horizontal – failure to align the unit could adversely affect the gearbox lubrication and could cause heat to build up.

It is the end user's responsibility to ensure that the Atex rating of the equipment supplied meets the requirements of the installation.

Equipment Groups & Categories

The pump range has been rated as:



Equipment - groups (Annex I of the EC-Directive 94/9/EC)

Group I (mines, mine gas and dust)		Group II (other explosive atmospheres gas/dust)					
Category M		Category 1		Category 2		Category 3	
1	2	G (gas) (Zone 0)	D (dust) (Zone 20)	G (gas) (Zone 1)	D (dust) (Zone 21)	G (gas) (Zone 2)	D (dust) (Zone 22)
for equipment providing a very high level of protection when endangered by an explosive atmosphere	for equipment providing a high level of protection when likely to be endangered by an explosive atmosphere	for equipment providing a very high level of protection when used in areas where an explosive atmosphere is very likely to occur		for equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur		for equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur	

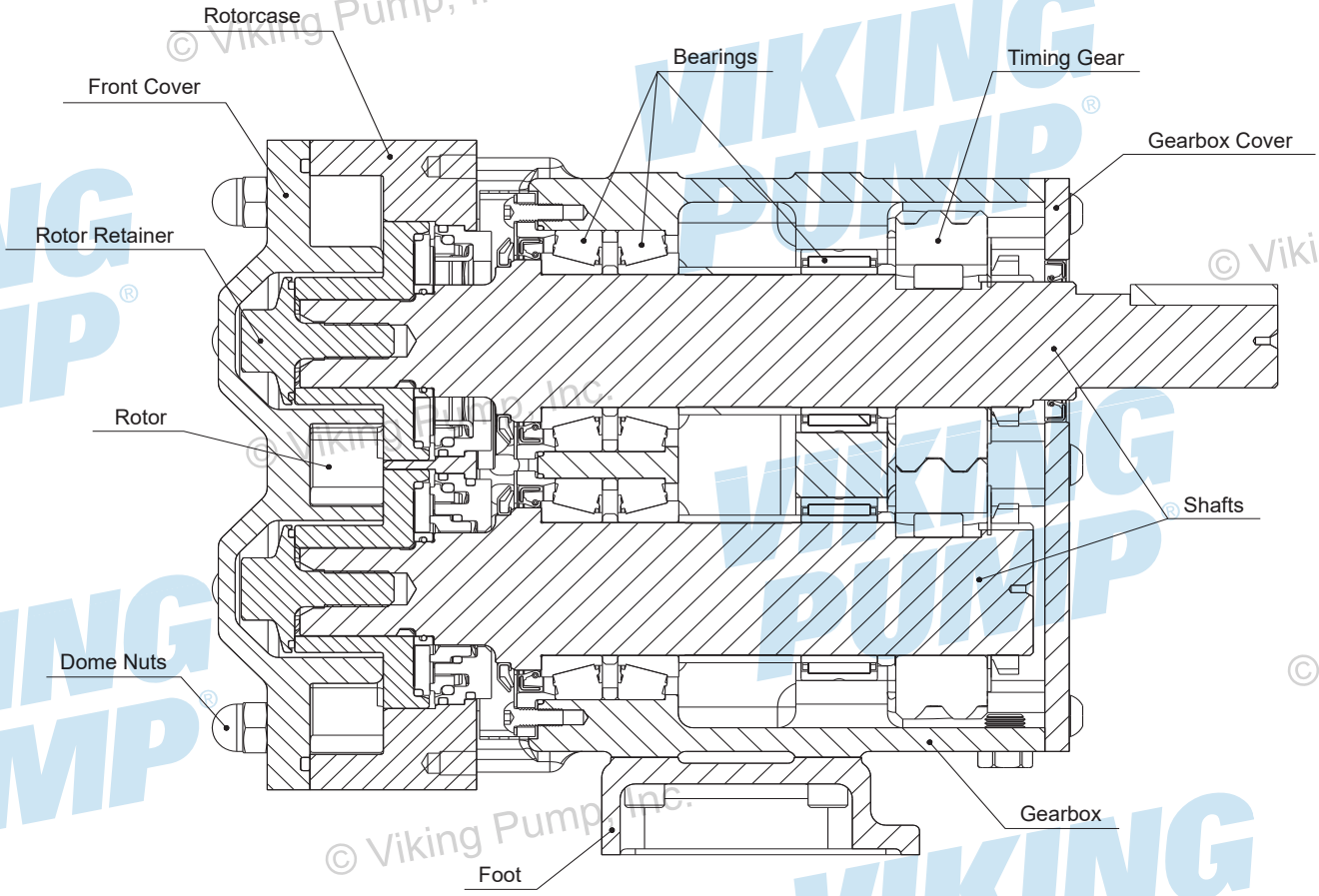
The Atex rating is displayed on the pump nameplate see ***"Figure 2" on page 5***.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

STANDARD PUMP COMPONENT TERMS

(Frame 3 CPP Shown)

FIGURE 4



NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

GENERAL

REVOLUTION PUMPING PRINCIPAL

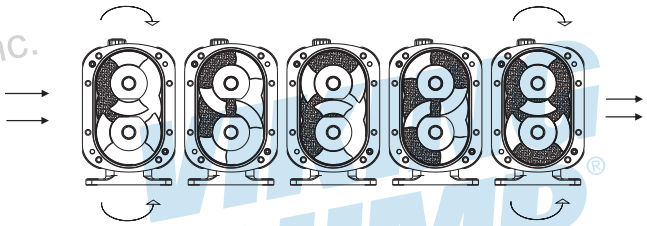
The pumping action is generated by the contra-rotation of two pumping elements (rotors) within a chamber (rotorcase) - see ***"Figure 5" on page 6***. The rotors are located on shafts, which in turn are mounted within an external gearbox and supported by the bearings; the timing gears are also located on the shafts. The timing gears transfer the energy from the drive shaft to the driven shaft, synchronising the rotors such that they rotate without contact with each other.

As the rotors pass the suction port, see ***"Figure 5" on page 6***, the cavity generated increases creating a pressure decrease, which induces the pumped medium to flow into the rotorcase.

The pumped medium is carried around the rotorcase by the rotors to the discharge side of the pump, here the cavity decreases and the pumped medium is discharged from the rotorcase.

For pump component terms see ***"Figure 4" on page 5***.

FIGURE 5



REVOLUTION PUMP HEAD MODULARITY

The Revolution pump has been designed with a universal pump head – This means that on some models by changing the rotors and front cover and a few ancillary items you change between a rotary lobe pump (RLP) and a Circumferential Piston Pump CPP.

⚠ DANGER

Note: when changing between RLP and CPP Timing and clearances must be checked.

REVOLUTION RANGE OPERATING PARAMETERS

The operating temperature limit of the pump is determined by the rotor clearance.

For the rotary lobe pumps (RLP):

- Size 1, 2, 3, 4, and 5 series - two rotor clearance bands (70 and 150 degrees C) (158 and 302 degrees F)

For the circumferential piston pumps (CPP):

- Size 1, 2, 3 4, and 5 series - four rotor clearance bands:
  - **a.** Standard
  - **b.** FF (Front Face)
  - **c.** Hot
  - **d.** Chocolate (High Viscosity)

The pump should not be subjected to sudden temperature changes to avoid the risk of damage from sudden expansion/contraction of components. Care should be taken when selecting pumps for handling liquids containing abrasive particles as these may cause wear of pump head components.

Operating Temperature Limit °C (°F)			
Standard	**FF**	**Hot**	**Chocolate**
93°C (200°F)	105°C (221°F)	150°C (302°F)	Refer to Viking Pump

SYSTEM DESIGN

System Design & Installation

When incorporating any pump into a system it is considered good practice to minimize piping runs and the number of pipe fittings (tees, unions, bends etc.) and restrictions. Particular care should be taken in designing the suction line, which should be as short and straight as possible with a minimum of pipe fittings to minimise restricting product flow to the pump. The following should be considered at the design stage of any system.

⚠ DANGER

Be sure ample room is provided around the pump to allow for:

- Access to the pump and drive for routine inspection and maintenance, i.e. to remove pump front cover and rotors.
- Ventilation of the drive to prevent overheating.

⚠ DANGER

The exterior of the pump unit may exceed 68°C (154°F),

Appropriate measures must be taken to warn or protect operators.

⚠ WARNING

The pump must not be used to support piping. All piping to and from the pump unit must be independently supported. Failure to observe this may distort the pump head components or assembly and cause serious consequential damage to the pump.

Valves should be provided adjacent to the pump suction and discharge connections to allow the pump to be isolated from the system for routine inspection and maintenance.

⚠ DANGER

Circumferential piston and rotary lobe pumps are of the positive displacement type and therefore an overload protection device must be provided. This can take the form of:

- An in-line pressure relief system, i.e. external to the pump.
- Incorporation of a torque-limiting device in the drive system.

⚠ WARNING

It is recommended that all piping and associated equipment from the tank to the discharge point is thoroughly cleaned before installation of the pump to avoid the possibility of debris entering the pump and causing damage.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

⚠ WARNING

Pressure gauges should be installed adjacent to the pump suction and discharge connections such that system pressures can be monitored. These gauges will provide a clear indication of changes in operating conditions and where a relief valve is incorporated in the system, will be necessary for setting and checking the functioning of the valve.

⚠ WARNING

It is imperative that the suction condition at the pump inlet meets the Net Positive Suction Head required (NPSHr) by the pump. Failure to observe this could cause cavitation, resulting in noisy operation, reduction in flow rate and mechanical damage to the pump and associated equipment.

⚠ WARNING

The Net Positive Suction Head available (NPSHa) from the system must always exceed the Net Positive Suction Head required (NPSHr) by the pump.

Observing the following general guidelines should ensure the best possible suction condition is created.

- Suction piping is at least the same diameter as the pump connections.
- The length of suction piping is kept to the absolute minimum.
- The minimum number of bends, tees and pipework restrictions are used.
- Calculations to determine system NPSHa are carried out for the worst condition, see below.

Should advice on pump or system NPSH characteristics be required contact the factory or their authorised distributor.

When installing a pump complete with base plate, motor and drive, the following guidelines must be observed:

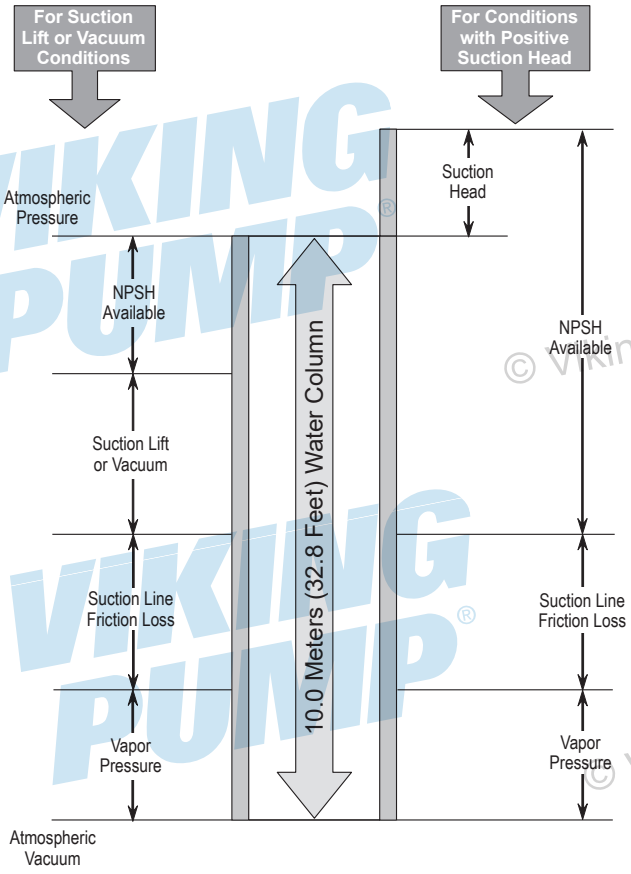
a. The preferred drive arrangement for any circumferential piston or rotary lobe pump is in-line direct coupled. If an alternative is required please contact Viking Pump or your Viking Pump Hygienic authorised distributor.

⚠ DANGER

b. Flexible couplings must always be incorporated and correctly aligned within the limits recommended by the coupling manufacturer. To check coupling alignment rotate the shaft by at least one full revolution and ensure that the shaft rotates smoothly.

Couplings of a non-flexible design must never be used.

FIGURE 6



⚠ DANGER

c. Couplings must always be enclosed in a suitable guard to prevent contact with rotating parts, which could result in personal injury. Guards should be of suitable material, (see d) and of sufficiently rigid design to prevent contact with rotating parts under normal operating conditions.

⚠ DANGER

d. When the pump is installed in a flammable or explosive environment, or is used for handling flammable or explosive materials, special consideration must be given. Not only to the safety aspects of the drive unit enclosure but also to the materials used for both the coupling and the guard to eliminate the risk of explosion.

⚠ DANGER

e. Base plates must be secured to a flat level surface such that distortion and misalignment are avoided. Once base plates are fastened in position the drive alignment must be re-checked, (see b).

f. When using electric motor drives, ensure that the electrical supply is compatible with the drive and controls and that the method of wiring is correct for the type of starting required by the motor i.e. Direct on Line, or other similar method. Ensure all components are correctly grounded.

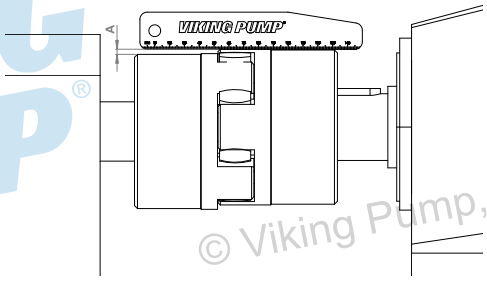
NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Pump & Motor Alignment

Before the pump unit is installed is it important to ensure that the mounting surface is flat to avoid distortion of the baseplate, which may cause pump/motor shaft misalignment and pump/motor unit damage. Once the baseplate has been secured, the pump shaft to motor shaft coupling alignment should be checked and adjusted as necessary. This is achieved by checking the maximum angular and parallel misalignment for the couplings as stated below, the recommended couplings are KTR Rotex. Shaft alignment that is outside the stated tolerances can be corrected by applying shims under the motor or pump foot, or, by moving the pump or driving sideways on the baseplate. All bolts that have been loosened should be re-tightened to the stated torque figure.

Radial tolerance: Measure 4 positions at 90° around coupling.

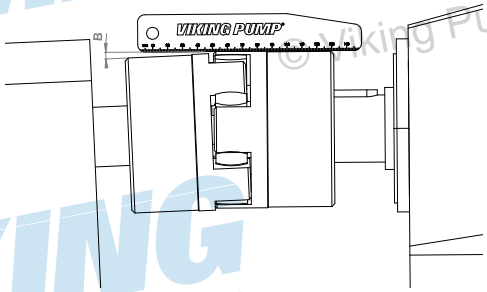
FIGURE 7



Size RX		14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. Radial (mm) Displacement "A" upto	1500 RPM	0.17	0.22	0.22	0.25	0.28	0.32	0.36	0.38	0.42	0.48	0.5	0.52	0.55	0.6	0.62	0.64	0.68
Max. Radial (Inch) Displacement "A" upto	1500 RPM	0.007	0.009	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.019	0.020	0.020	0.022	0.024	0.024	0.025	0.027

Angular tolerance: Measure 4 positions at 90° around coupling.

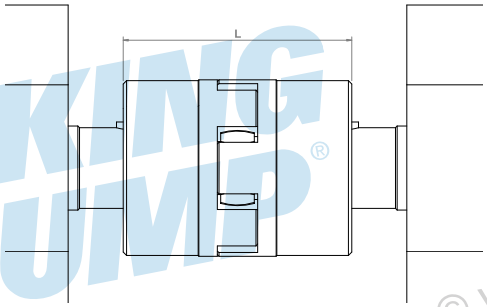
FIGURE 8



Size RX		14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. Angular (°) Displacement "B" upto	1500 RPM	1.1	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.0	1.1	1.1	1.1

Length Tolerance:

FIGURE 9



Size RX		14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Dimension L ± 1.0mm	1500 RPM	35	66	78	90	114	126	140	160	185	210	245	270	295	340	375	425	475
Dimension L ± 0.039"	1500 RPM	1.378	2.598	3.071	3.543	4.488	4.961	5.512	6.299	7.283	8.268	9.646	10.630	11.614	13.386	14.764	16.732	18.701

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Installations with CIP Systems

The Revolution pump range is designed to be effectively cleaned by the CIP procedures recommended for in place cleaning of process plant. It is recommended that a differential pressure of 2 to 3 Bar (30 to 45 psi) be developed across the pump head during cleaning in order to develop the necessary fluid velocities required for thorough cleaning.

To assist in maximizing the effectiveness of cleaning within the pump head, it is recommended that during the cleaning cycle a flow rate equivalent to a velocity of 1.5 metres per second in a pipe of equal diameter to the rotor case connections is achieved. In a pump with a 2.5-inch port, this means 300 litres per minute (for the R800)

We also recommend rotating the pump during the CIP cycle to help the flow enter all cavities

START UP PROCEDURE

⚠ WARNING

Check that all piping and associated equipment are clean and free from debris and that all pipe connections are secure and leak free.

⚠ WARNING

For pumps fitted with flushed product seals check all auxiliary services are in place and connected and provide sufficient flow and pressure for flushing purposes.

⚠ WARNING

Ensure lubrication is provided for both pump and drive. The Revolution can be shipped with different lubrications, refer to **Lubricants** for capacities and grades.

⚠ WARNING

If an external relief valve is incorporated in the system, check that it is set correctly. For start up purposes, it is considered good practice to set the relief valve lower than the system design pressure. On completion of start up, the relief valve should be reset to the required setting for the application. The required setting should never exceed the lower of either the pumps maximum pressure rating or the system design pressure.

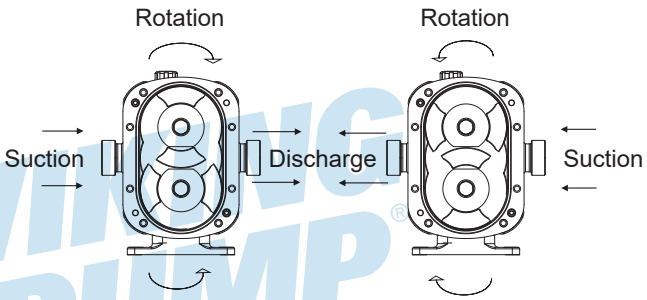
⚠ WARNING

Be sure both suction and discharge valves are fully opened and that pipe work is free from all obstructions. The Revolution is a positive displacement type pump and should therefore never be operated against a closed valve as this would result in pressure overload, resulting in damage to the pump and possibly the system.

⚠ WARNING

Make sure that the drive shaft rotation is correct for the direction of flow required. See ***"Figure 10" on page 10***.

FIGURE 10



⚠ WARNING

Be sure product is available in the suction vessel before starting the pump. This is very important for pumps fitted with un-flushed product seals, as these sealing arrangements must never be allowed to run dry.

Before beginning operation, it is considered good practice to momentarily start/stop the pump to check the direction of rotation and ensure that the pump is free of obstructions. Once this has been carried out, begin operation keeping a visual check on suction and discharge pressure gauges and monitor the pump temperature and absorbed power where possible.

SHUTDOWN PROCEDURE

⚠ DANGER

When shutting the pump down, stop pump, close both the suction and discharge valves and ensure that the necessary safety precautions are taken:

- The prime mover power source has been isolated.
- If installed, pneumatically operated integral relief valve has been depressurised.
- Flushed product seal auxiliary services have been isolated and depressurised.
- Pump head and piping have been drained and purged.
- Before undertaking any work on the pump refer to ***"General" on page 7***, ***"Revolution Disassembly & Assembly" on page 15***, **and** ***"Seals" on page 21***.

ROUTINE MAINTENANCE – NON ATEX UNITS

Grease

- Check for any signs of lubricant leakage
- Low maintenance gearbox, factory filled with EP 00 semi-fluid grease. The grease should not require replacement during the lifetime of the bearings or until 20,000 hours of operation.

Oil

⚠ WARNING

Check oil levels regularly.

- Change the oil every 12 months or 3000 operating hours, whichever is the sooner.

For lubricant capacities and grades refer to ***"Lubricants" on page 32***.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Seal Replacement Interval:

It is recommended that the Rotor Retainer O-ring seal is replaced every 12 months to maintain a bacteria-tight seal.

Rotor Retainer Seal Inspection:

Periodically inspect the Rotor Retainer O-ring seal for any discolouration, nicks, or cracks. If any of the defects above are noticed, the O-ring seal must be replaced. Inspection and replacement refer to the seal replacement procedure.

Seal Replacement Procedure:

1. Remove the Front Cover (see ***"Disassembly" on page 16***)
2. Loosen Rotor Retainers and ensure components are dry before servicing.
3. With a penlight, inspect Rotor Retainer blind tapped hole for contamination. If soiled, refer to cleaning procedure below
4. Remove and discard Rotor Retainer O-ring seal.
5. Install new Rotor Retainer O-ring seal.
6. Install Rotor Retainer and use a torque wrench to tighten to correct torque (see ***"Fasteners & Torque Settings" on page 31***)
7. Install the Front Cover and torque up the Dome Nuts – (see ***"Fasteners & Torque Settings" on page 31***).

Cleaning Procedure for Soiled Retainer Screw Tapped Hole:

1. Remove Rotor Retainer from the shaft.
2. Submerge and soak retainer for 5 minutes in Clean Out of Place tank with appropriate / compatible cleaning solution
3. Scrub both external and internal threads vigorously with appropriate bristle brush and appropriate / compatible cleaning solution
4. Rinse well with clean water and dry blind tapped hole with clean air.

Should debris remain, or time is of the essence, install a new (spare) Rotor Retainer.

ADDITIONAL ROUTINE MAINTENANCE – ATEX UNITS

Grease

- Check for any signs of lubricant leakage on startup.
- Check for any signs of overheating.

Low maintenance gearbox, factory filled with EP 00 semi-fluid grease. The grease should not require replacement during the lifetime of the bearings or until 14,000 hours of operation.

Oil

⚠ WARNING

Check oil levels on startup.

- Check for any signs of overheating.
- Change the oil every 6 months or 1500 operating hours, whichever is the sooner.

For lubricant capacities and grades refer to ***"Lubricants" on page 32***.

⚠ WARNING

After 14000 hours of use, the pump will need a general overhaul and it will need to be re-certified for use within the Atex environment.

A general overhaul must include a full disassembly of all components and the following work carried out.

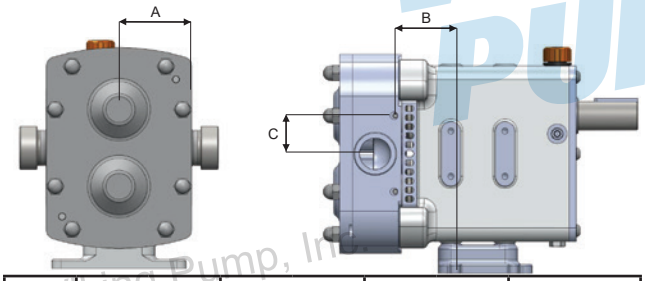
- Clean all pump components
- Examination of all components for damage/wear
- Replacement of all taper roller bearings
- Replacement of all elastomeric components
- Replacement of all seals, radial seals, and Gamma rings

The general overhaul must be carried out by qualified personnel in a specialist workshop with the appropriate equipment. Re-certification must then be carried out.

We highly recommend that the general overhaul is carried out by Viking Pump Hygienic.

FLUSHING POSITIONS SIZE 2, 3, 4

FIGURE 11



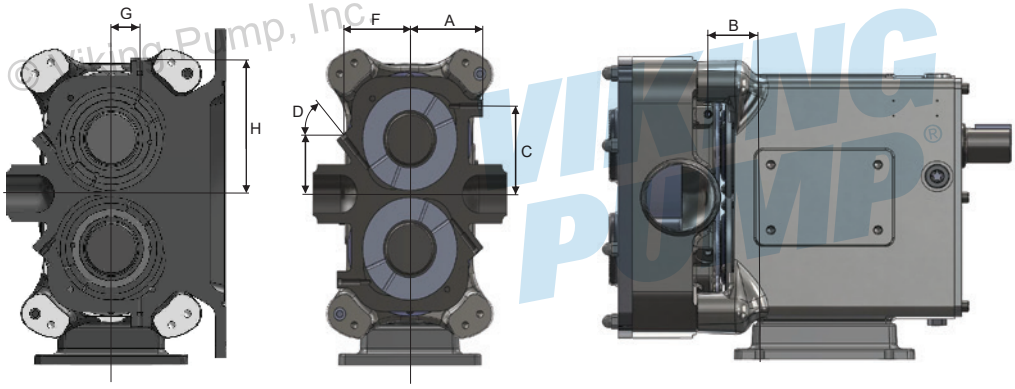
Size	A		B		C		Connection
	MM	Inch	MM	Inch	MM	Inch	
2	62	2.44	79	3.11	107	4.21	1/8" BSP
3	58	2.28	68	2.68	97.5	3.84	1/8" BSP
4	32.5	1.28	42	1.65	57	2.24	1/8" BSP

The diagram shows the positions for flushing the Revolution size 2,3 and 4 range of pumps.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

FLUSHING POSITIONS SIZE 5

FIGURE 12



Rectangular / Hopper Arrangement

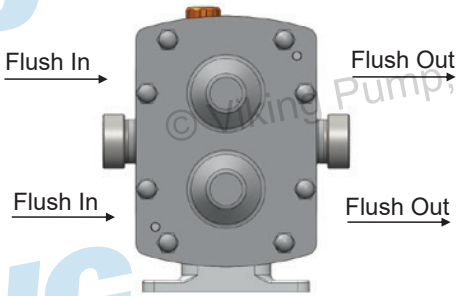
Standard Ports Arrangement

Size	A		B		C		D	E		F		G		H		Connection
	MM	Inch	MM	Inch	MM	Inch	Degrees	MM	Inch	MM	Inch	MM	Inch	MM	Inch	
5	110	4.33	42	1.65	122.2	4.81	50	82	3.23	102	4.02	9.8	0.39	136.7	5.38	1/8" BSP

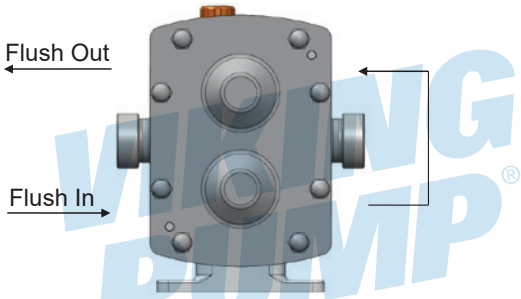
RECOMMENDED FLUSH CIRCULATION

FIGURE 13

Horizontal Port Straight Flush



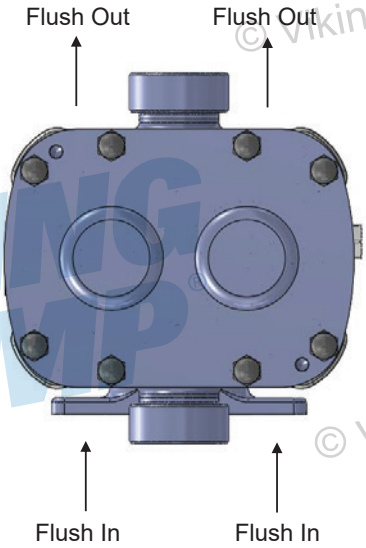
Horizontal Circular Flush



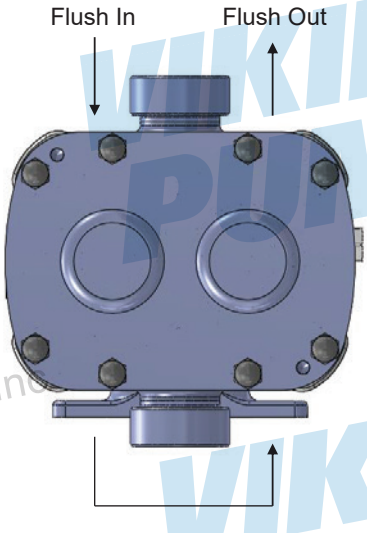
Note: The liquid supply connections to flushed seals are made using the threaded ports on the sides of the rotorcase. The pipe work should be arranged to provide an independent flush to each seal.

FIGURE 14

Vertical Straight Flush



Vertical Circular Flush



Note: The liquid supply connections to flushed seals are made using the threaded ports on the sides of the rotorcase. The pipe work should be arranged to provide an independent flush to each seal.

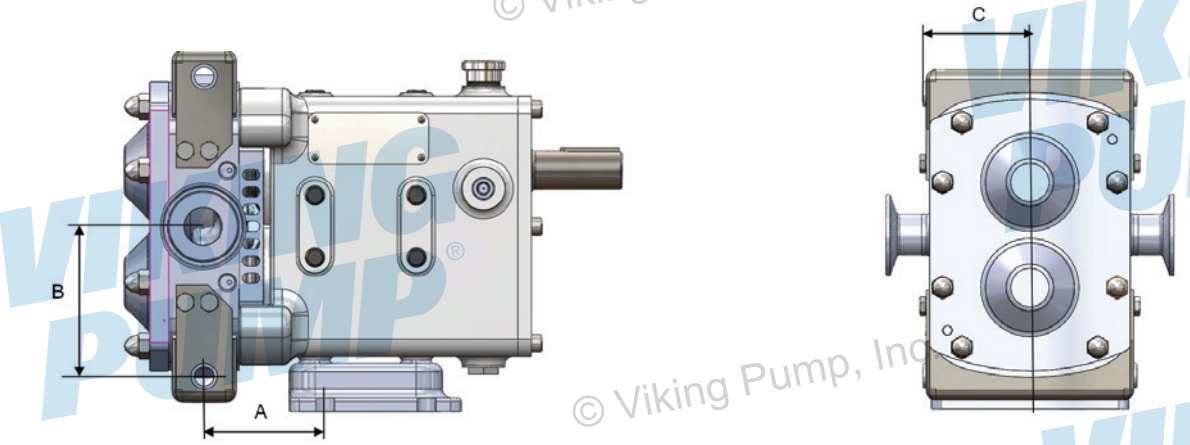
NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

HEATING / COOLING

The Revolution range of pumps can be supplied with heating / cooling jackets – these jackets will be a bolt on addition and use FDA thermal paste to ensure a good heat / cool transition.

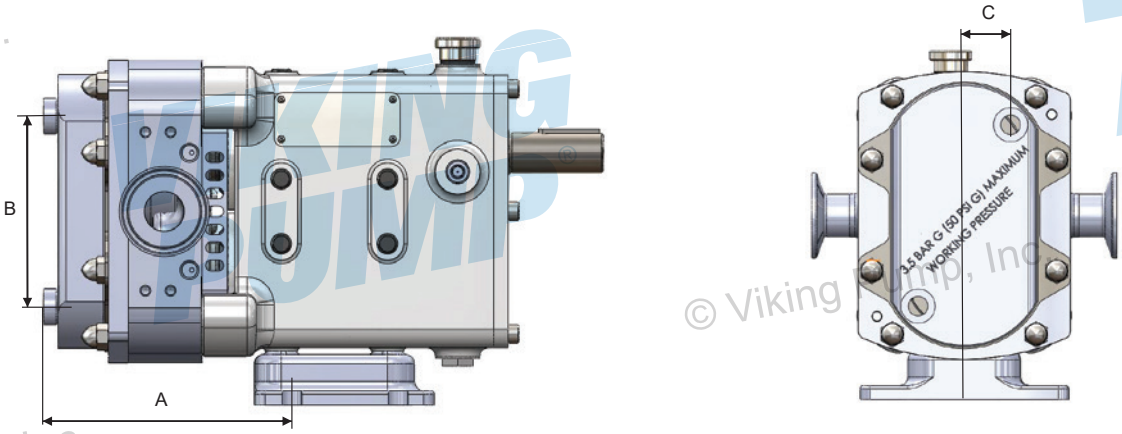
NOTE: The max temperature for the heating jacket is 150°C / 302°F and the max pressure is 3.5 bar / 50 PSI.

FIGURE 15



		Size 2				Size 3			Size 4				Size 5		
		R0150X	R0160L	R0180X	R0180L	R0200	R0300	R0400	R0450	R0600	R0800	R1300	R1800	R2200	R2600
A	mm	70.5	75	84	81.5	90.5	100.5	110.5	121	131	143	158	128.5	146.5	165.5
	Inch	2.78	2.95	3.31	3.21	3.56	3.96	4.35	4.76	5.16	5.63	6.22	5.06	5.77	6.52
B	mm	87				114			159				217		
	Inch	3.43				4.49			6.26				8.54		
C	mm	64.5				81			109				142		
	Inch	2.54				3.19			4.29				5.59		
Size		1/4” bsp				1/4” bsp			1/2” bsp				1/2” bsp		

FIGURE 16

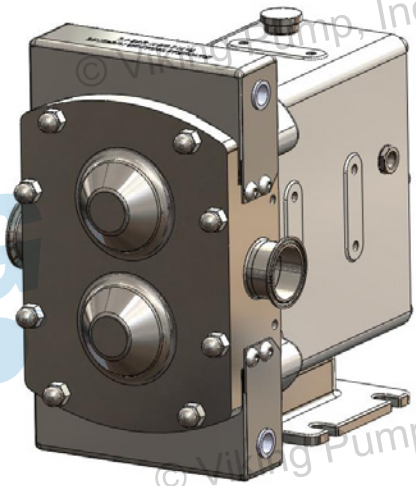


		Size 2				Size 3			Size 4				Size 5		
		R0150X	R0160L	R0180X	R0180L	R0200	R0300	R0400	R0450	R0600	R0800	R1300	R1800	R2200	R2600
A	mm	138	142.5	151.5	149	166.5	176.5	186.5	210	220	232	247	232	250	269
	Inch	5.43	5.61	5.96	5.87	6.56	6.95	7.34	8.27	8.66	9.13	9.72	9.13	9.84	10.59
B	mm	106				132			180				260		
	Inch	4.17				5.2			7.09				10.24		
C	mm	27				35			52				60		
	Inch	1.06				1.38			2.05				2.36		
Size		1/4” bsp				1/4" bsp			1/2” bsp				1/2” bsp		

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Rotorcase Heating Jacket installation

FIGURE 17



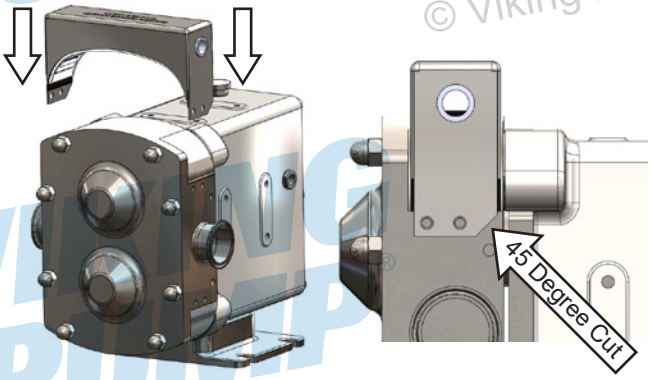
Apply the heat transfer paste to the underside of the bolt on Jacket (see below).

FIGURE 18

Frame Size	Heat Transfer Paste
2	2cc (0.067oz)
3	3cc (0.101 oz)
4	6cc (0.202 oz)
5	7cc (0.236 oz)

Fit the jacket onto the Rotorcase.

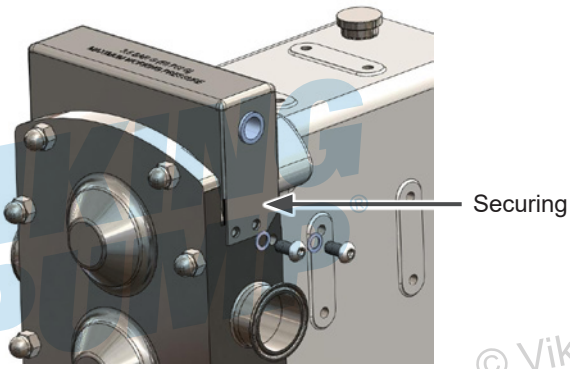
FIGURE 19



Note the 45-degree cutout faces the rear of the Rotorcase and allows clearance on the flushing holes.

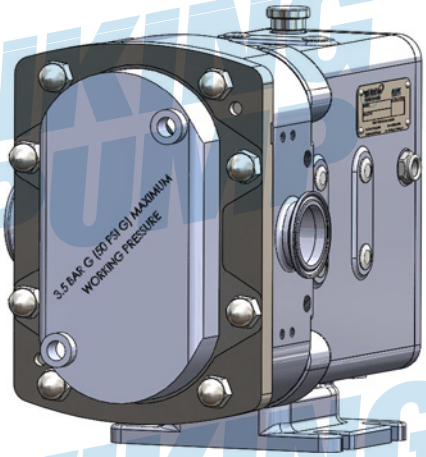
Secure the jacket onto the Rotorcase using the washers and the screws (Wipe away any extra heat transfer paste that is extruded).

FIGURE 20



Front Cover Heating Jacket installation

FIGURE 21



Apply the heat transfer paste to the underside of the bolt on Jacket (see below).

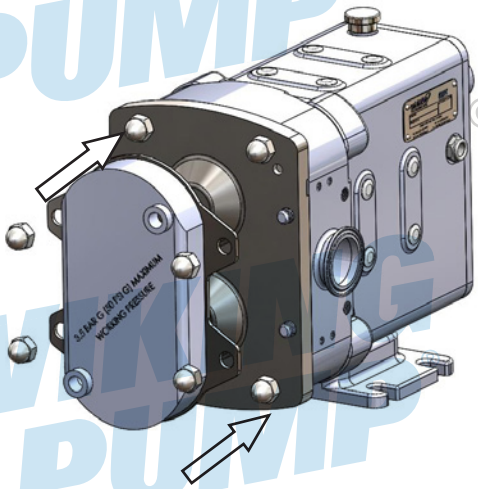
FIGURE 22

Frame Size	Heat Transfer Paste
2	0.7cc (0.024oz)
3	1.3cc (0.045 oz)
4	2.2cc (0.077 oz)
5	5.5cc (0.193 oz)

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

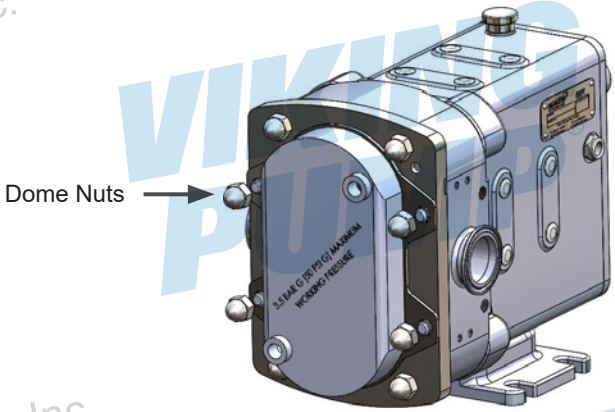
Fit the jacket onto the Front Cover.

FIGURE 23



Secure the jacket onto the Front Cover using the dome nuts (Wipe away any extra heat transfer paste that is extruded)

FIGURE 24



REVOLUTION DISASSEMBLY & ASSEMBLY

⚠ DANGER

Before starting any work on the pump the recommended Shutdown Procedure should be followed, refer to ***"Shutdown Procedure" on page 10***.

⚠ DANGER

While disassembling or assembling the pump it is essential to ensure that the pump and/or components are secured to provide adequate stability.

⚠ DANGER

Large pump components or sub-assemblies should be installed using suitable devices. Use threaded holes for the attachment of lifting eyes where appropriate.

During disassembly or before assembly, all components should be inspected for fit, wear and damage. If worn or damaged the components should be replaced.

The position of all parts should be identified as they are removed to ensure they are reinstalled in the same position.

Lipseals and O-rings are incorporated within the gearbox assembly to contain the lubricant for the bearings and timing gears. Regular inspection and correct maintenance of these items will ensure that the lubrication is sustained and the pump maximum working life is achieved. To ensure this, it is extremely important that care is taken when removing and replacing new O-rings and lipseals. When removing and replacing lipseals ensure that the location bore for the outside diameter and the seat for the back of the lipseal is not damaged as this may create a leak path for the lubricant.

When removing lipseals or o-rings care should be taken to avoid cutting or tearing the sealing faces as they pass over keyways, splines, threads or other potentially sharp or abrasive edges. All lipseals and O-rings should be carefully examined and if damaged in any way, be replaced.

All O-rings and sealing lips of lipseals should be lightly lubricated with an appropriate lubricant (suitable for application) before installing.

When installing lipseals do not allow the rear face to come into contact with bearings or other rotating parts.

Prior to beginning assembly, ensure all parts are clean and free from burrs or damage. Where a vice is to be used then this should be installed with protective jaws to avoid damage to components. Do not hammer or apply undue force to install or position components.

⚠ WARNING

All fasteners are required to be tightened to the required torque setting during assembly, refer to ***"Fasteners & Torque Settings" on page 31***.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

⚠ DANGER

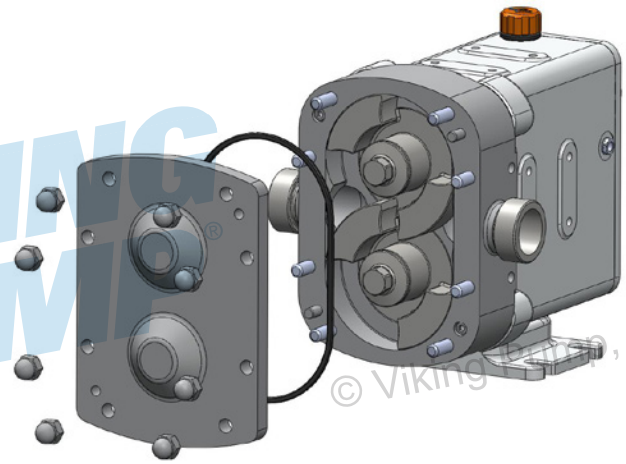
The preferred method of installing bearing cones is that they are heated to approximately 125°C (250°F) prior to installation. During this operation protective gloves should be used. Once bearing cones are installed in the correct position they should be allowed to cool before proceeding with assembly. As an alternative, bearing cones may be pressed into position providing the proper equipment is utilised and the necessary procedures are used to prevent component damage.

Under no circumstances should bearing cones or cups be hammered into position.

DISASSEMBLY

Front Cover & Rotor Removal

FIGURE 25



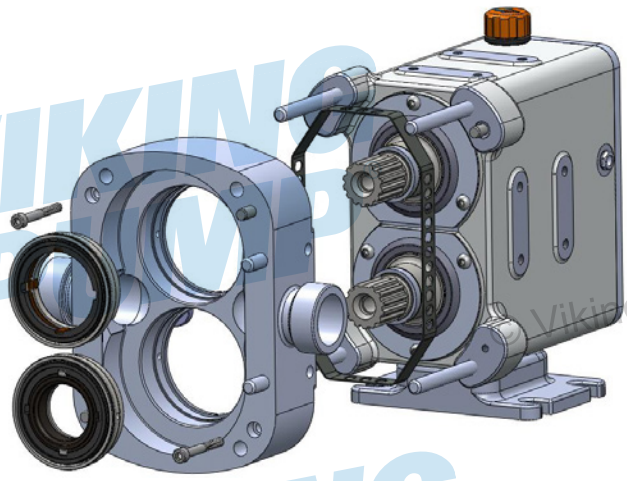
- Remove the front cover dome nuts.
- Remove the front cover and the front cover O-ring.

⚠ DANGER

- Remove the rotors by unscrewing the rotor retainers; taking care not to damage the product seal components.

Rotorcase Removal

FIGURE 26



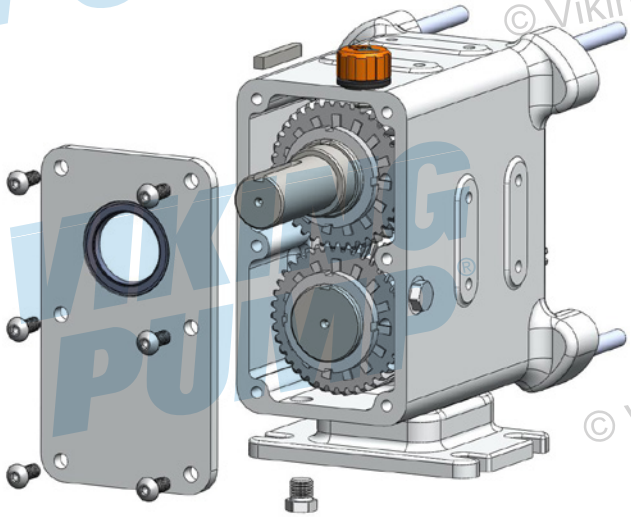
⚠ DANGER

- Remove the seal housings making sure that the static face is not damaged.

- Remove the rotorcase retaining screws and then remove the rotorcase.
- Remove the guard.

Gearbox Disassembly

FIGURE 27



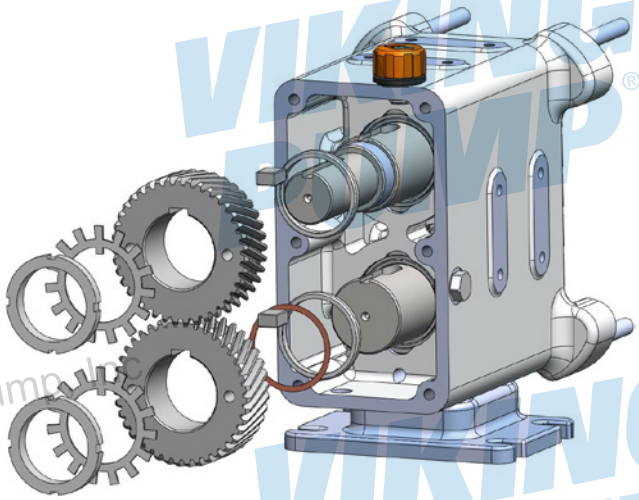
- Make sure the gearbox lubricant has drained by removing the drain plug.
- Remove the drive key.
- Remove the hexagon head bolts and remove the gearbox cover.

⚠ DANGER

Note: when removing the cover take care not do damage the lipseal on the keyway.

Gear removal

FIGURE 28



- Remove the lock nuts and tab washers.
- Remove the gears, the two threaded holes within the gears can be used to aid gear removal with a puller tool.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

⚠ DANGER

The two threaded holes are to be used only in conjunction with gear pullers – any other use will damage components.

- Remove the gear keys and the timing shims and then remove the gear spacer.

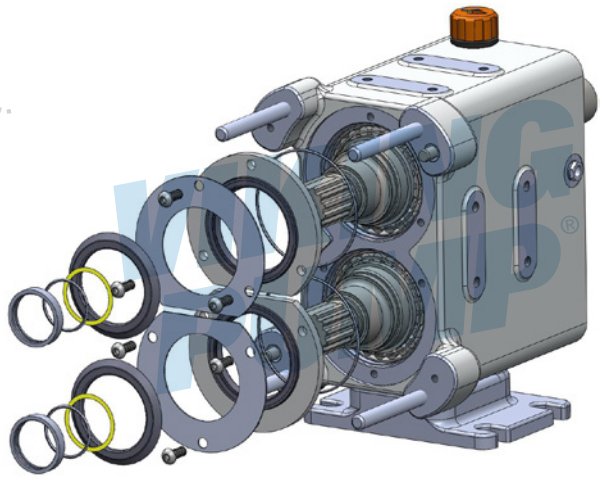
Note: the above picture show the timing shims on the lay shaft, depending on how the unit is built they could be on the drive shaft.

⚠ DANGER

Keep the locknut, tab washer, gear, key, shims and gear spacer in the sets that they were removed and identify them drive and lay.

Front Spacers & Lip-seals

FIGURE 29



- Remove the front spacer ring, O-ring and shims.

Keep these in the sets that they were removed and identify them drive and lay.

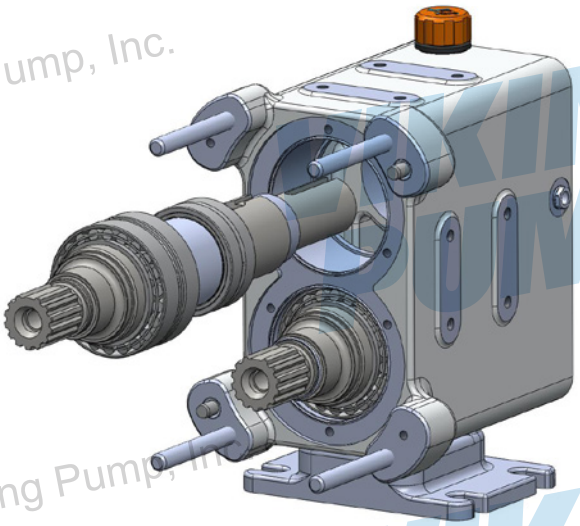
- Remove the screws holding the lip seal carriers.
- Remove the optional gamma seal, counter face gamma seal, bearing retainer plate and the O-ring.

⚠ DANGER

At this point the shafts are not held in place so take care when moving the gearbox.

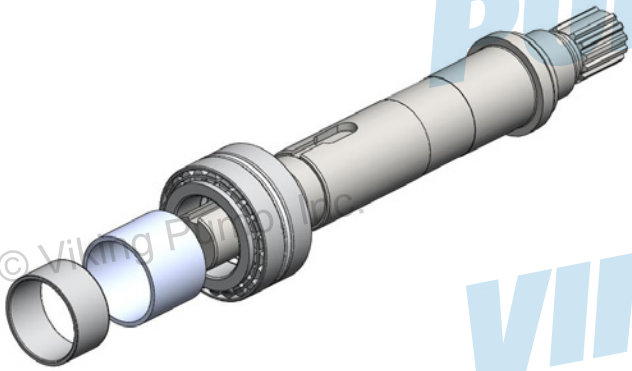
Shaft & Bearing Removal

FIGURE 30



- Using a light press remove the shafts.

FIGURE 31



- Remove the bearings and spacer using a press.

⚠ DANGER

Note: some models may have two bearing spacers

ASSEMBLY

Shaft Assembly

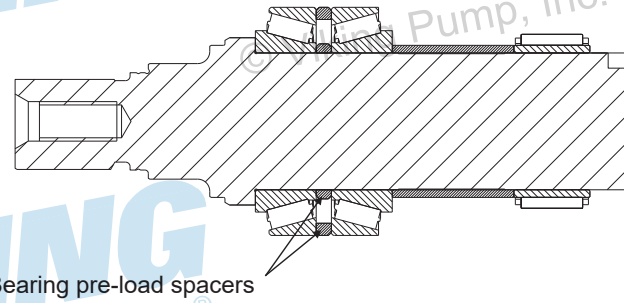
See ***"Figure 31" on page 17***.

- The tapered roller bearings have matched pre-load spacers, these set the rolling torque and must be kept with the matching bearings.
- Using a bearing heating plate heat the bearings to approximately 125°C (250°F) and Install the bearings and spacer onto the shafts

⚠ DANGER

Note: some models may have two bearing spacers

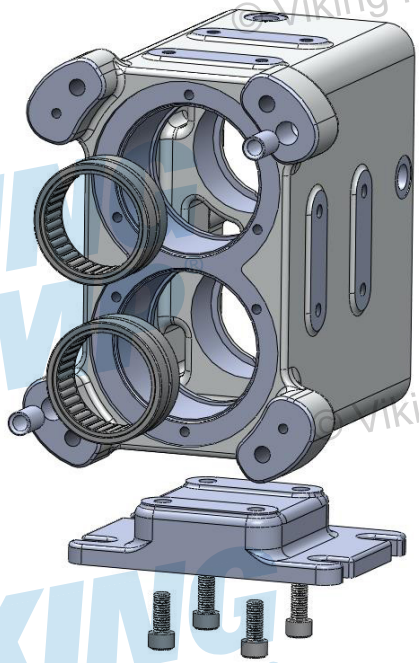
FIGURE 32



Bearing pre-load spacers

Gearbox

FIGURE 33



- Install the foot and secure with the screws.

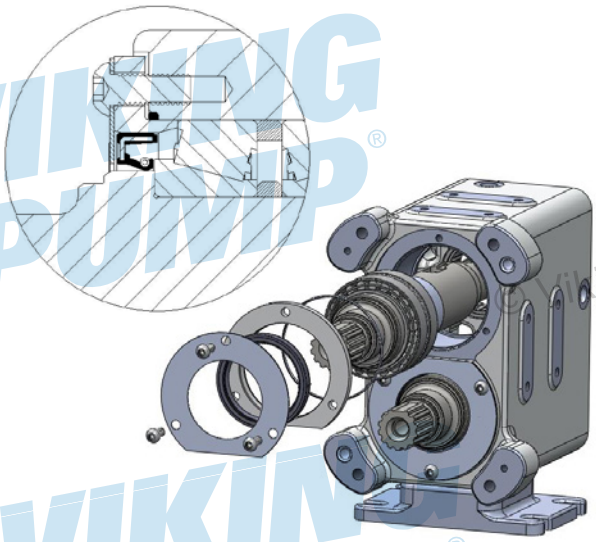
The foot screws need to be retained using a thread locking compound adhesive, Loctite 270 or similar.

- Press in the rear outer shells of the needle roller bearings.
- Press in the dowel bushes.

The dowel bushes need to be retained using a retaining compound adhesive, Loctite 638 or similar.

Shaft Installation

FIGURE 34



- Install the shaft assemblies.

⚠ DANGER

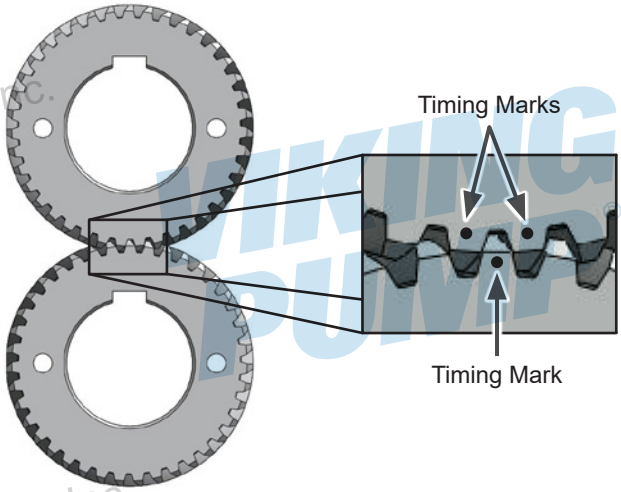
When installing the shafts make sure they are installed square to the gearbox and that none of the rollers on the needle roller bearing get obstructed.

- Install the lip-seals into the bearing retainer plate.
- Install the O-ring, bearing retainer plate and optional counter face gamma seal.
- Install the screws and torque them up.

Refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.

Timing Marks & Drive Gear Identification

FIGURE 35



- Before installing the gears into the gearbox timing marks need to be added.

Place the gears on a flat surface and align the keyways.

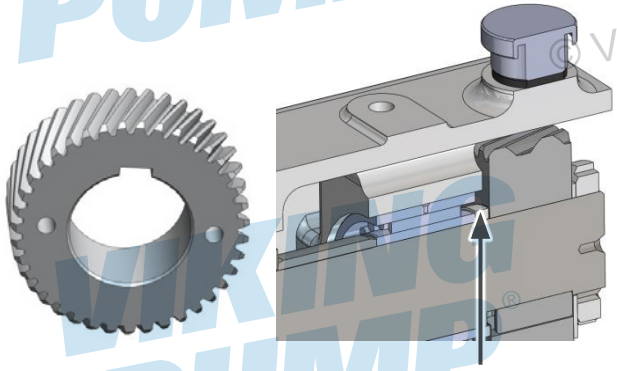
When the gears are lined up use a centre punch and lightly add the timing marks shown above.

- The drive gear must be installed onto the drive shaft.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

The drive gear can be identified by looking at the direction of the helix angle, if the helix angle is slanting to the right then it's the drive gear see below.

FIGURE 36

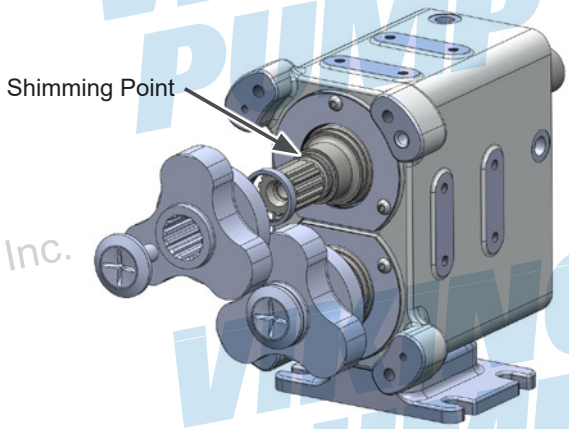


⚠ DANGER

- When installing the gears note the gear spacer and the keys must be installed first – otherwise the gear will fowl on the gearbox and the timing will move.

Timing

FIGURE 37

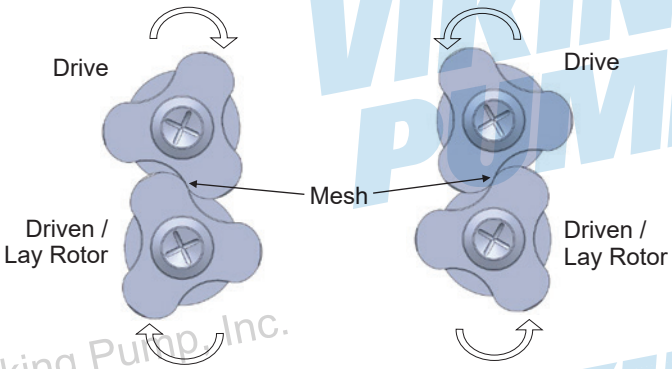


- Install a nominal amount of shim then the front setting rings, rotors and secure using the rotor retainers. Fasten the retainers to the correct torque.

Refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.

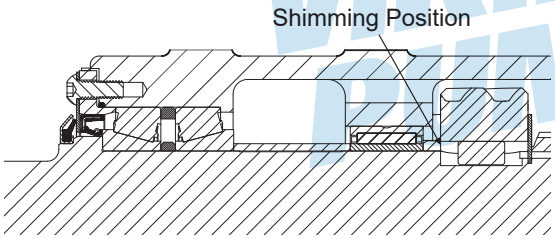
- When checking the mesh clearances make sure that the rotor is turned to remove backlash see below.

FIGURE 38



- Check the mesh clearance in all positions and note the minimum mesh clearance, refer to appropriate Clearance Chart under ***"Specifications" on page 27***.
- In ***"Figure 38" on page 19*** to increase the mesh clearance in the position shown you will need to add shim to the lay shaft. Repeat this procedure until the correct rotor mesh clearance is achieved

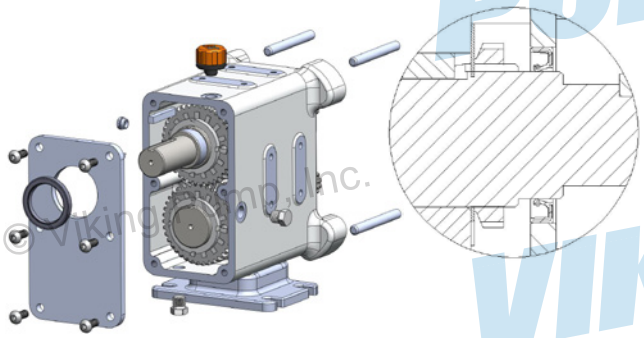
FIGURE 39



- Install timing shims between the gear and the gear spacer - see above picture
- **Note: To do this you will need to remove the rotors, gear and gear key.**

Gearbox / Rotorcase Assembly

FIGURE 40



- Once the correct timing is achieved, lock the tab washers onto the gears.
- Install the oil filler plug, oil sight glass and the oil drain plugs (if the pump is to be oil filled) If the pump is grease filled use the drain plugs in all locations.
- Install the lipseal into the gearbox plate.
- Seal the gearbox plate using flange sealant, Dow Corning 732 or similar and secure using the screws. Refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.
- Install the drive key.
- Install the rotorcase studs.

The rotorcase studs need to be retained using a thread locking compound adhesive, Loctite 270 or similar.

⚠ DANGER

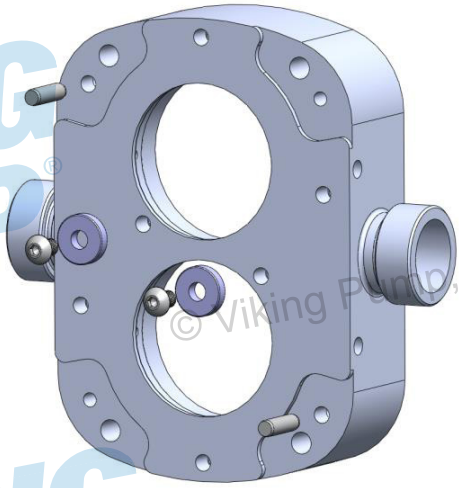
Note: when install the cover take care not do damage the lipseal on the keyway.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

- Install the anti-rotation washers and secure them with the button head screws, refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.
- Install the dowels.

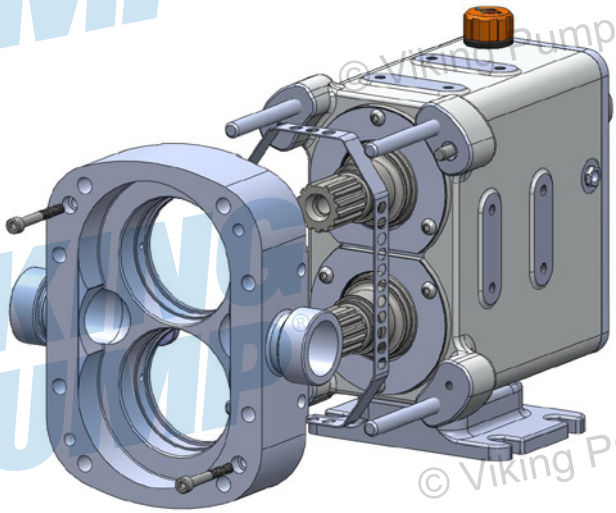
The dowel bushes need to be retained using a retaining compound adhesive, Loctite 638 or similar.

FIGURE 41



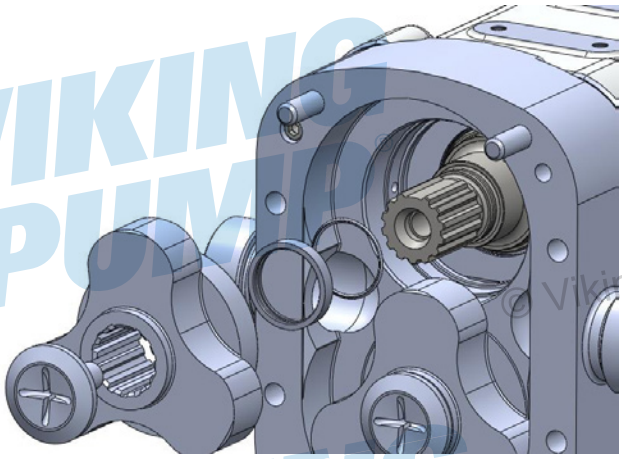
- Install the guard and rotorcase and secure using the retaining screws

FIGURE 42



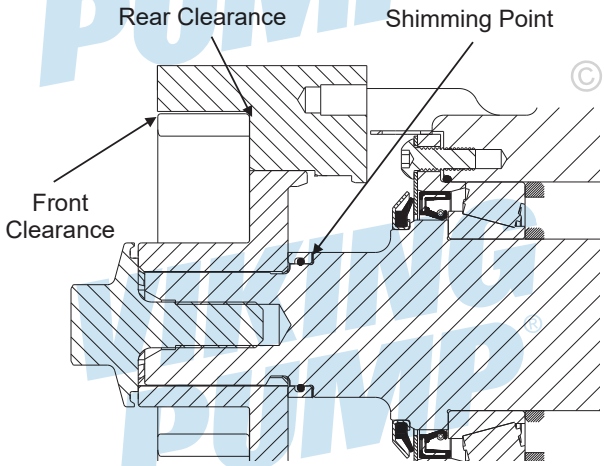
Front Clearance

FIGURE 43



- Install the shims, front setting ring, rotor, rotor retainer and tighten them up, refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.

FIGURE 44



- Measure the front clearance and rear clearance and refer to refer to appropriate Clearance Chart under ***"Specifications" on page 27*** to see how much shim you need to add / remove from the shimming point. See ***"Clearance Chart - Revolution CPP - 808 Alloy" on page 27*** or ***"Clearance Chart - Revolution RLP - Stainless Steel" on page 29.***
- After the front clearances have been set install the O-ring into the setting ring.

⚠ DANGER

When checking the front and rear clearances secure the rotorcase in place using washers and nuts on the studs protruding from the gearbox.

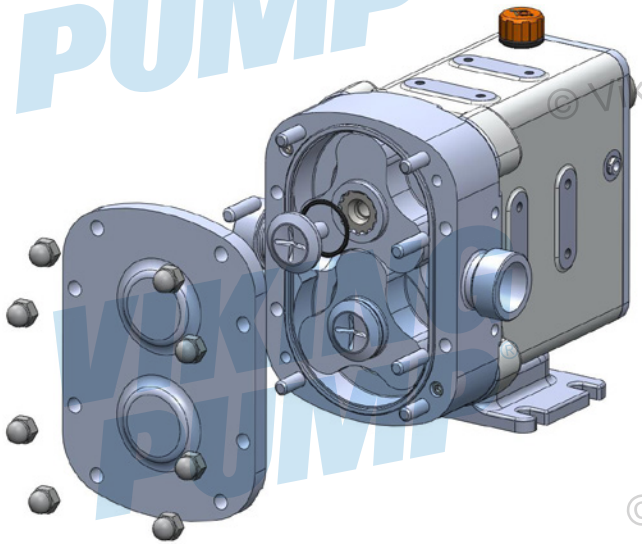
After the front clearance has been set check the radial clearances

Refer to refer to appropriate Clearance Chart under ***"Specifications" on page 27*** for clearance settings. See ***"Clearance Chart - Revolution CPP - 808 Alloy" on page 27*** or ***"Clearance Chart - Revolution RLP - Stainless Steel" on page 29.***

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Final Assembly Size 2,3 & 4

FIGURE 45



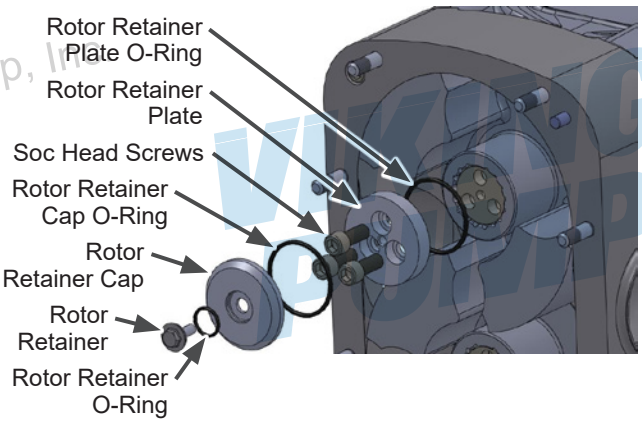
- Install pump seals before final assembly, refer to ***"Seals" on page 21.***
- Install the rotor retainer O-ring, rotor retainer and set the torque.
- Install the studs into the rotorcase.

The rotorcase studs need to be retained using a thread locking compound adhesive, Loctite 270 or similar.

- Install the front cover O-ring, front cover and secure with the dome nuts.

Final Assembly Size 5

FIGURE 46



- Install pump seals before final assembly refer to ***"Seals" on page 21.***
- Install the rotor retainer plate O-ring, rotor retainer plate and the three socket head cap screws - Refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.
- Install the rotor retainer cap O-ring and the rotor retainer cap. Secure in place using the rotor retainer O-ring and rotor retainer – Refer to ***"Fasteners & Torque Settings" on page 31*** for torque settings.
- Install the studs into the rotorcase.

The rotorcase studs need to be retained using a thread locking compound adhesive, Loctite 270 or similar.

- Install the front cover O-ring, front cover and secure with the dome nuts.

SEALS

SINGLE SEAL

FIGURE 47

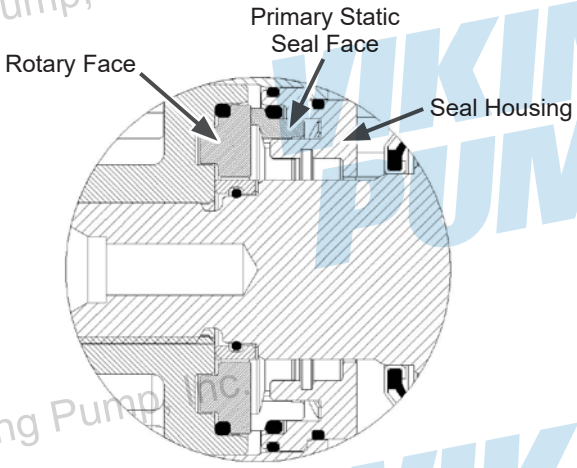
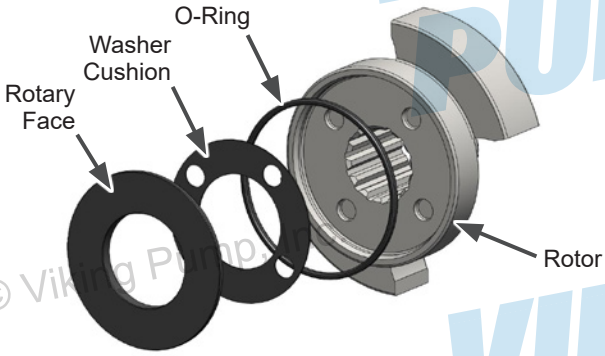
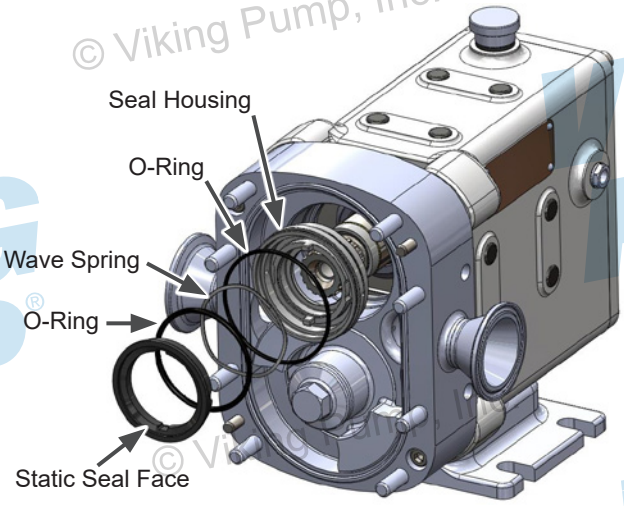


FIGURE 48



- Install the O-ring into the rotor.
- Install the washer cushion onto the rotary face where applicable, making sure the holes in the washer cushion match the lugs on the rotary face.
- Install the rotary face into the rotor making sure the lugs line up with the anti-rotation holes in the rotor.

FIGURE 49



- Install the O-ring into the seal housing.
- Install the seal housing into the rotorcase.

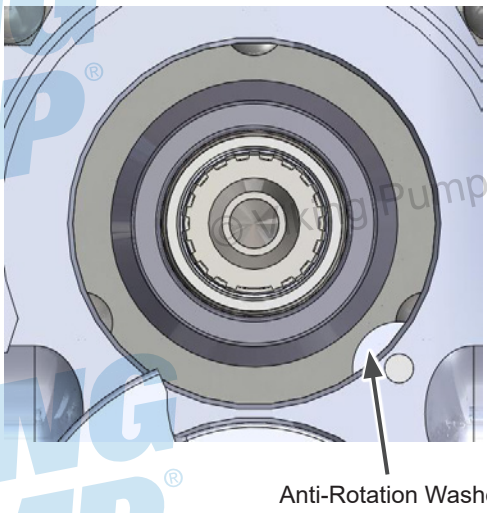
NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

⚠ DANGER

When installing the seal housing into the rotorcase the anti-rotation cut out must line up with anti-rotation washer on the rear of the rotorcase. See below

- Install the wave spring into the seal housing.
- Install the O-ring onto the static seal face.
- Install the static seal face into the seal housing.

FIGURE 50



DOUBLE SEAL – FLUSHED

FIGURE 51

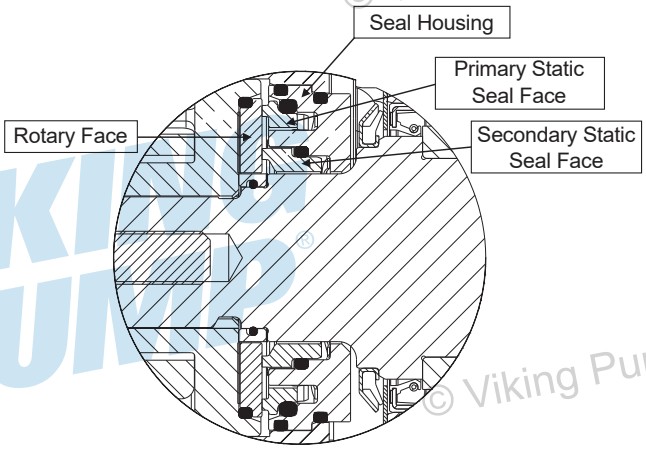
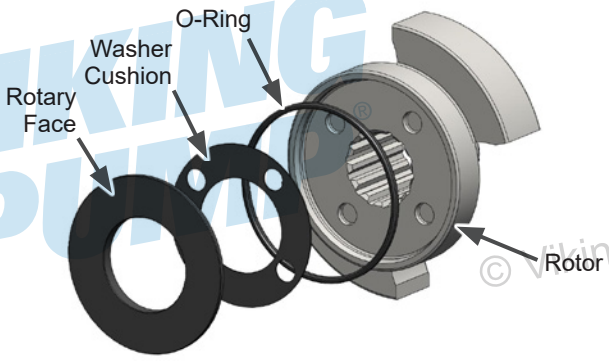


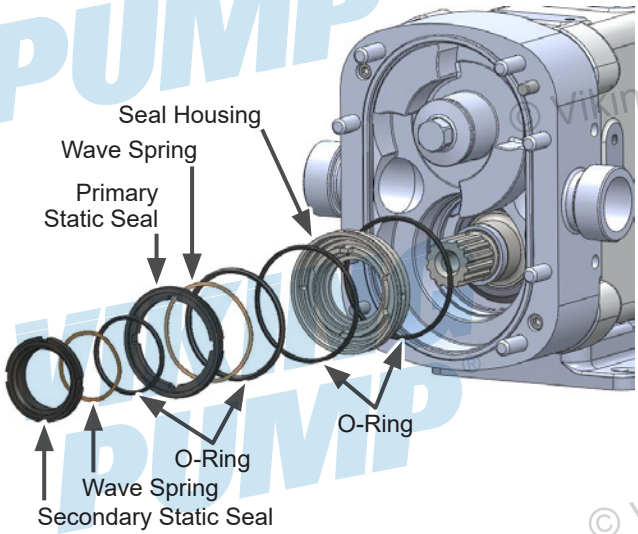
FIGURE 52



- Install the O-ring into the rotor.
- Install the washer cushion onto the rotary face where applicable, making sure the holes in the washer cushion match the lugs on the rotary face.
- Install the rotary face into the rotor making sure the lugs line up with the anti-rotation holes in the rotor.

Note: on the Size 5 there is an extra O-ring that fits on the Internal Diameter of the rotary face.

FIGURE 53



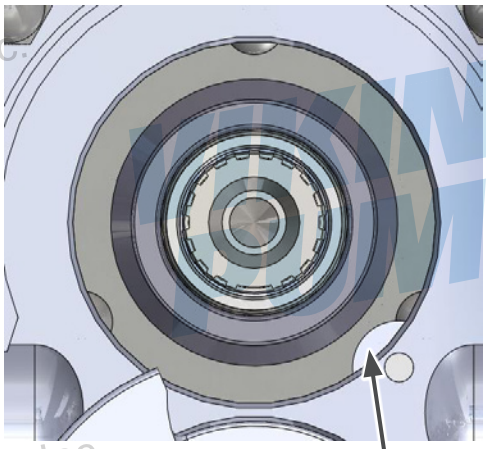
- Install the 2 seal housing O-rings into the seal housing.
- Install the seal housing into the rotorcase.

⚠ DANGER

When installing the seal housing into the rotorcase the anti-rotation cut out must line up with anti-rotation washer on the rear of the rotorcase. See below

- Install the wave springs into the seal housing.
- Install the O-rings onto the static seals.
- Install the static seals into the seal housing.

FIGURE 54



NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

SINGLE O-RING SEAL

FIGURE 55

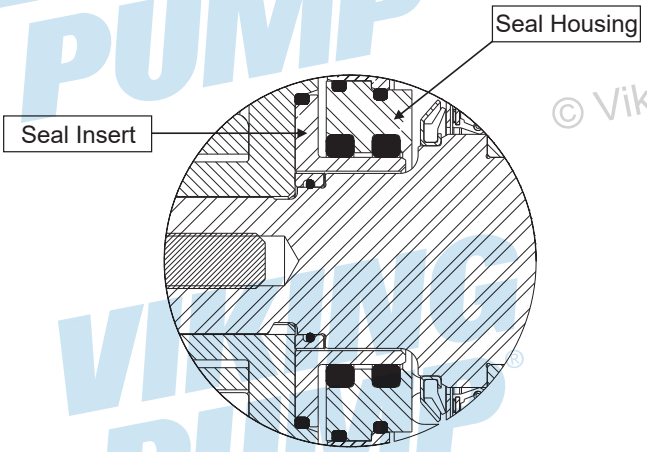
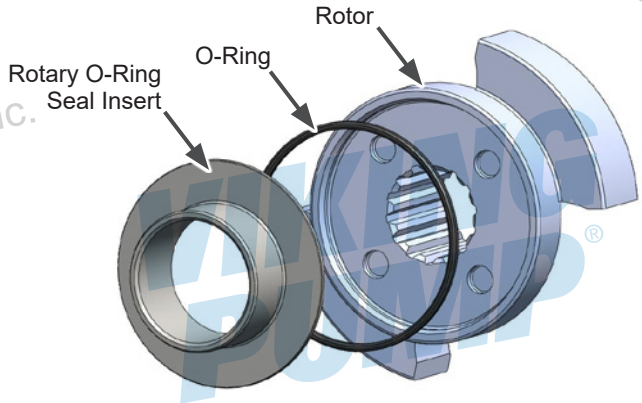
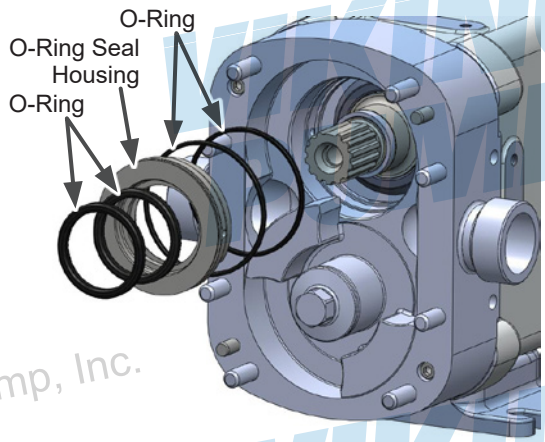


FIGURE 56



- Install the O-ring onto the rotary O-ring seal insert.
- Install the rotary O-ring seal insert into the rotor.

FIGURE 57

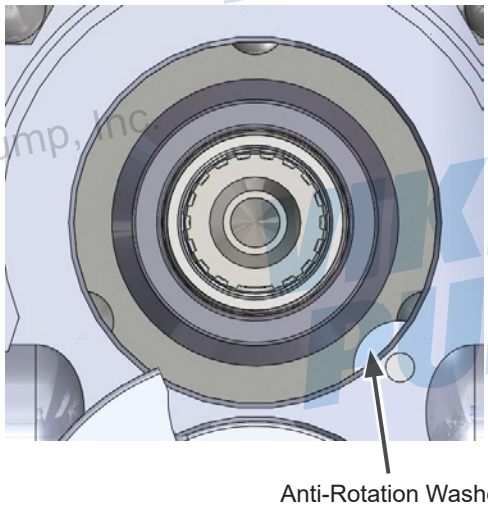


- Install the O-rings into the housing.
- Install the housing into the rotorcase.

⚠ DANGER

When installing the seal housing into the rotorcase the anti-rotation cut out must line up with anti-rotation washer on the rear of the rotorcase.

FIGURE 58



DOUBLE O-RING SEAL – FLUSHED

FIGURE 59

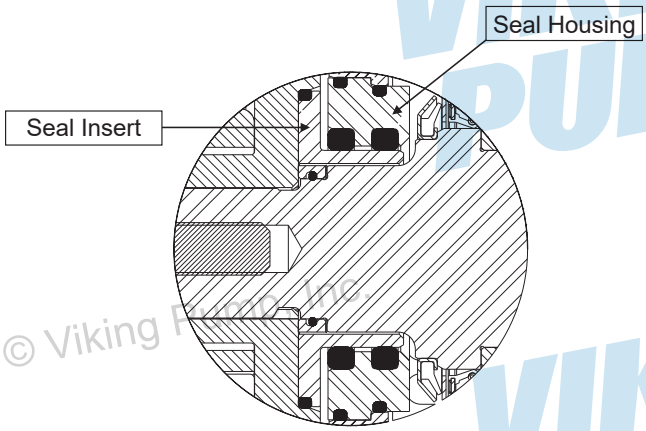
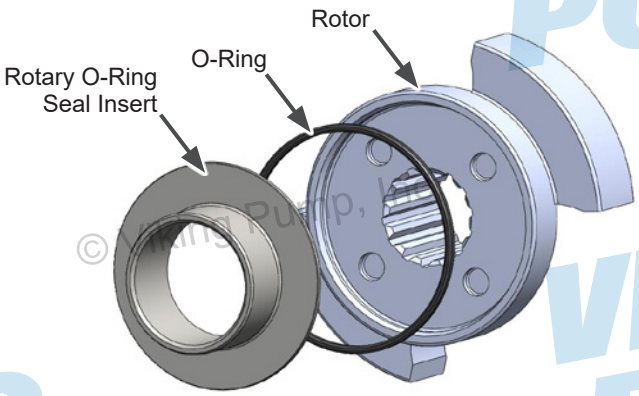


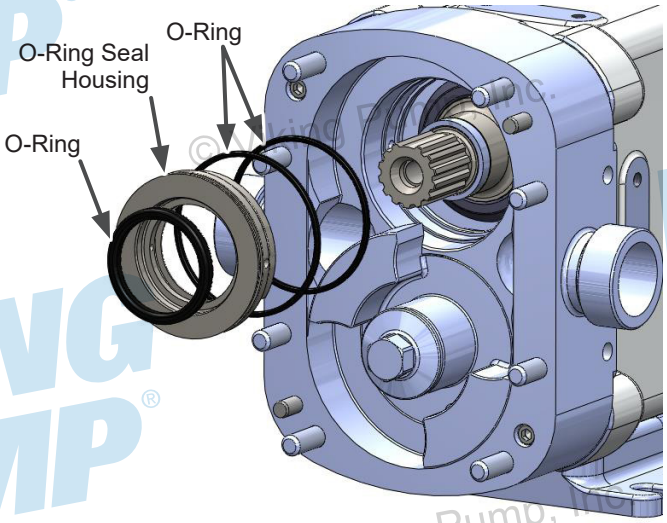
FIGURE 60



- Install the O-ring onto the rotary O-ring seal insert.
- Install the rotary O-ring seal insert into the rotor.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

FIGURE 61

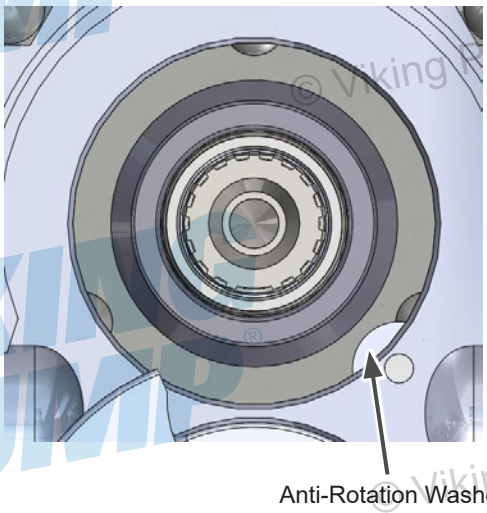


- Install the O-rings into the housing.
- Install the housing into the rotorcase.

⚠ DANGER

When installing the seal housing into the rotorcase the anti-rotation cut out must line up with anti-rotation washer on the rear of the rotorcase.

FIGURE 62



FLUSHED PRODUCT SEALS AUXILIARY SERVICES

1. Terminology
   a. "Flush"
      - To provide a liquid barrier that is induced to flow through the seal area by an external means
2. Flush Media

⚠ WARNING

The media used for flushing a seal area must be fully compatible with the pumped media, and the relevant materials of construction of the pump.

Special consideration must be given to the temperature limitations of the media to ensure that no hazards are created, e.g. risk of fire or explosion.

DOUBLE MECHANICAL SEAL

This seal arrangement requires a supply of media to be circulated between the inboard and outboard mechanical seals.

- **Buffer Fluid:** A product compatible non-toxic fluid used as a non-pressurized lubricant or buffer between double mechanical seals. The fluid is always maintained at a pressure lower than that of the process being sealed.
- **Barrier Fluid:** A product compatible non-toxic fluid introduced as a pressurized lubricant or barrier between double mechanical seals. The pressure of the barrier fluid is always higher than that of the process being sealed.

Details for the calculation of a "Barrier Fluid" flow rate, can be found below.

$$Q = \frac{(0.6 \times p + 0.25) \times n \times d^3 \times T}{c_p \times \rho \times 2.5 \times 10^9}$$

Q = Flow rate [l/hr]
p = Applied barrier fluid pressure [bar]
n = Shaft speed [rpm]
d = Shaft diameter [mm]
- Size 2 (0150-R0180) – 30 mm
- Size 3 (0200-0400) – 38 mm
- Size 4 (0450-R1300) – 51 mm
- Size 5 (1800-R2630) – 68 mm

T = Temperature of processed media [°C]
ρ = Specific gravity of barrier fluid [kg/dm³]
c_p = Specific heat capacity for barrier fluid [kJ/(kg x K)]

Typical values for some common barrier fluids:

Media Density	[kg/dm³]	Specific Heat [kJ/(kg x K)
Water	1.0	4.2
Olive Oil	0.9	1.6
Mineral Oil	0.9	1.7
Acetone	0.8	2.2

The flush media must be supplied at a minimum flow rate of 0.5 Litres/ Minute per seal, this can be worked out by the following equation where "Q" is the flow rate.

The barrier fluid pressure must be a minimum of 1 Bar (15 psi) greater than the maximum discharge pressure created by, or the maximum suction pressure applied to, the pump, whichever is the greater.

⚠ WARNING

Note: The liquid supply connections to flushed seals are made using the threaded ports on the sides of the rotorcase. The pipe work should be arranged to provide an independent flush to each seal.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

OPERATING PARAMETERS

Pressure / Speed Limits

Pressure and speed are two of the most important factors for frictional heat generation in a mechanical seal and the seal face material properties set limits to these parameters. Depending on the properties of the processed product, the mechanical seal design and the seal face materials tribological, physical and thermal properties, the limits specified below can differ.

Seal Face Combination

Size 2

Single seal:	Max pressure (at speed)	Max speed (at pres.)
Carbon v. Silicon Carbide	21 bar (1000 rpm)	1000 rpm (21 bar)
Silicon Carbide v. Silicon Carbide	21 bar (1000 rpm)	1000 rpm (21 bar)
Double outboard seal:	**Max pressure (at speed)**	**Max speed (at pres.)**
Carbon v. Silicon Carbide	22 bar (1000 rpm)	1000 rpm (22 bar)

Size 3

Single seal:	Max pressure (at speed)	Max speed (at pres.)
Carbon v. Silicon Carbide	21 bar (1000 rpm)	1000 rpm (21 bar)
Silicon Carbide v. Silicon Carbide	21 bar (1000 rpm)	1000 rpm (21 bar)
Double outboard seal:	**Max pressure (at speed)**	**Max speed (at pres.)**
Carbon v. Silicon Carbide	22 bar (1000 rpm)	1000 rpm (22 bar)

Size 4

Single seal:	Max pressure (at speed)	Max speed (at pres.)
Carbon v. Silicon Carbide	31 bar (800 rpm)	800 rpm (31 bar)
Silicon Carbide v. Silicon Carbide	31 bar (675 rpm)	800 rpm (24 bar)
Double outboard seal:	**Max pressure (at speed)**	**Max speed (at pres.)**
Carbon v. Silicon Carbide	32 bar (800 rpm)	800 rpm (32 bar)

Size 5

Single seal:	Max pressure (at speed)	Max speed (at pres.)
Carbon v. Silicon Carbide	31 bar (600 rpm)	600 rpm (31 bar)
Silicon Carbide v. Silicon Carbide	31 bar (375 rpm)	600 rpm (17 bar)
Double outboard seal:	**Max pressure (at speed)**	**Max speed (at pres.)**
Carbon v. Silicon Carbide	23 bar (600 rpm)	600 rpm (23 bar)

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

O-Ring Seal

Size 2

Circumferential Piston:	Max pressure (at speed)	Max speed (at pres.)
R0150X/21	14 bar (500 rpm)	500 rpm (14 bar)
R0180P/14	14 bar (500 rpm)	500 rpm (14 bar)

Rotary Lobe:	Max pressure (at speed)	Max speed (at pres.)
R0150X/15	14 bar (500 rpm)	500 rpm (14 bar)
R0160L/10	10 bar (1000 rpm)	500 rpm (10 bar)
R0180L/07	07 bar (1000 rpm)	500 rpm (07 bar)

Size 3

Circumferential Piston:	Max pressure (at speed)	Max speed (at pres.)
R0200X/21	14 bar (400 rpm)	400 rpm (14 bar)
R0300X/17	14 bar (400 rpm)	400 rpm (14 bar)
R0340X/17	14 bar (400 rpm)	400 rpm (14 bar)
R0400X/14	14 bar (400 rpm)	400 rpm (14 bar)

Rotary Lobe:	Max pressure (at speed)	Max speed (at pres.)
R0200X/14	14 bar (500 rpm)	400 rpm (14 bar)
R0300X/09	09 bar (1000 rpm)	400 rpm (09 bar)
R0340X/09	09 bar (1000 rpm)	400 rpm (09 bar)
R0400X/07	07 bar (1000 rpm)	400 rpm (07 bar)

Size 4

Circumferential Piston:	Max pressure (at speed)	Max speed (at pres.)
R0450X/31	14 bar (320 rpm)	320 rpm (14 bar)
R0600P/21	14 bar (320 rpm)	320 rpm (14 bar)
R0640P/21	14 bar (320 rpm)	320 rpm (14 bar)
R0800X/17	14 bar (320 rpm)	320 rpm (14 bar)
R1300X/14	14 bar (320 rpm)	320 rpm (14 bar)
R1340X/14	14 bar (320 rpm)	320 rpm (14 bar)

Rotary Lobe:	Max pressure (at speed)	Max speed (at pres.)
R0450X/15	14 bar (320 rpm)	320 rpm (14 bar)
R0800X/09	09 bar (320 rpm)	320 rpm (09 bar)
R1300X/07	07 bar (320 rpm)	320 rpm (07 bar)
R1340X/07	07 bar (320 rpm)	320 rpm (07 bar)

Size 5

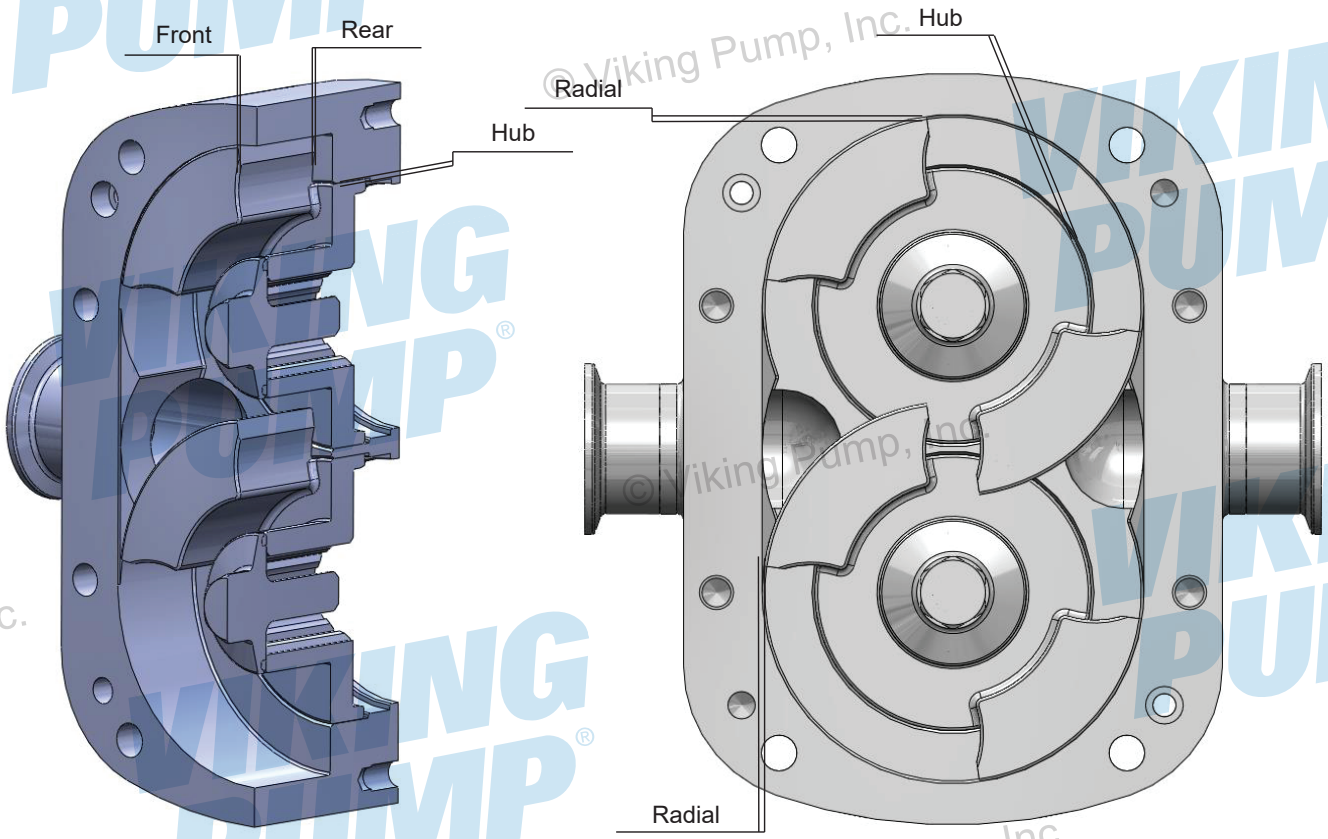
Circumferential Piston:	Max pressure (at speed)	Max speed (at pres.)
R1800X/31	14 bar (200 rpm)	200 rpm (14 bar)
R1830X/31	14 bar (200 rpm)	200 rpm (14 bar)
R2200X/21	14 bar (200 rpm)	200 rpm (14 bar)
R2230X/21	14 bar (200 rpm)	200 rpm (14 bar)
R2240X/21	14 bar (200 rpm)	200 rpm (14 bar)
R2600P/14	14 bar (200 rpm)	200 rpm (14 bar)
R2630P/14	14 bar (200 rpm)	200 rpm (14 bar)

Rotary Lobe:	Max pressure (at speed)	Max speed (at pres.)
R1800X/15	14 bar (200 rpm)	200 rpm (14 bar)
R1830X/15	14 bar (200 rpm)	200 rpm (14 bar)
R2200X/08	08 bar (200 rpm)	200 rpm (08 bar)
R2230X/08	08 bar (200 rpm)	200 rpm (08 bar)
R2240X/08	08 bar (200 rpm)	200 rpm (08 bar)

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

SPECIFICATIONS

CLEARANCE CHART - REVOLUTION CPP - 808 ALLOY



Clearances are set at the time of original build and may move small amounts during operation. They will however, remain within the published limits.

It is recommended that clearances are always checked and corrected (if necessary) during any periodic maintenance of the product.

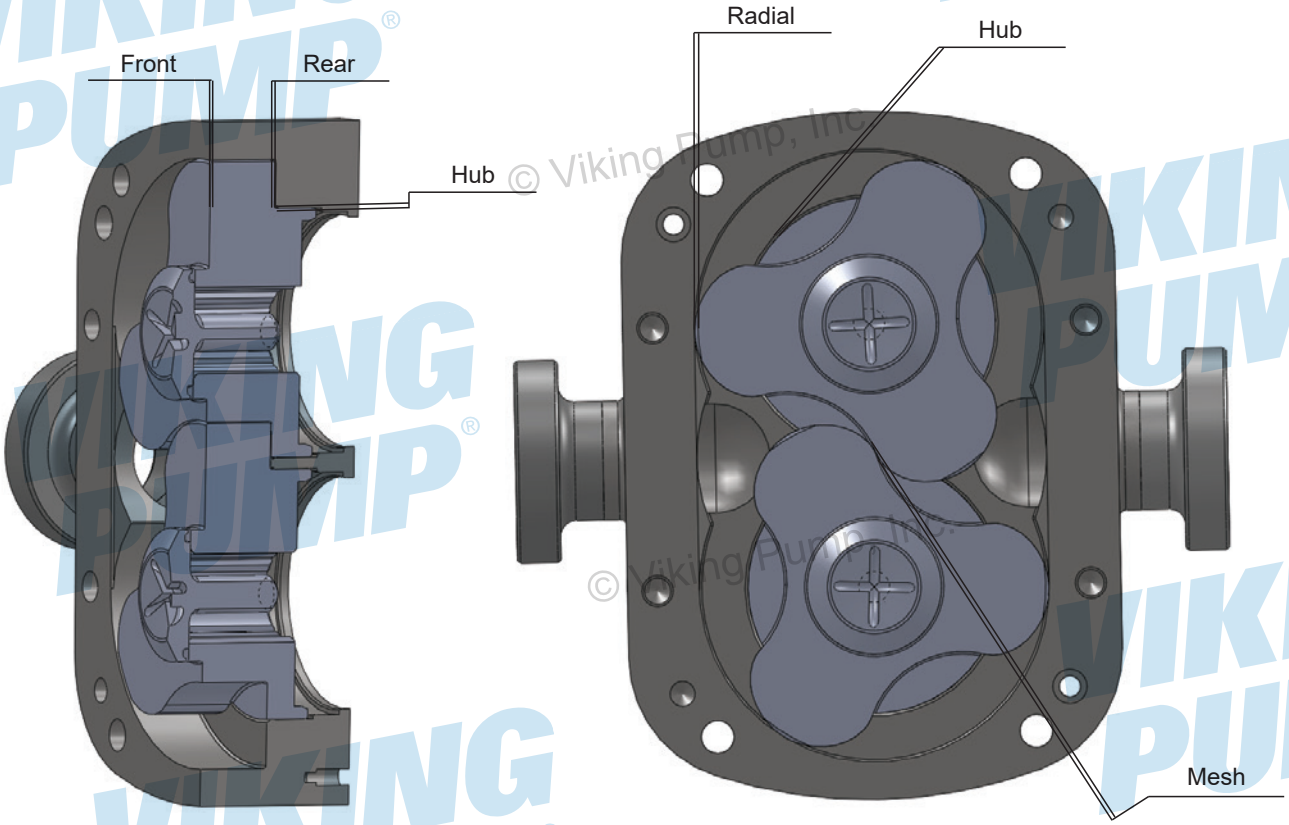
Metric (mm)										
			Temp Max	Front		Rear	Radial		Hub	
Size	Pump Model	Rotor Class	(°C)	Min	Max	Min	Min	Max	Min	Max
2	R0150 R0180	STANDARD	93	0.07	0.10	0.04	0.04	0.09	0.04	0.08
		FF	105	0.145	0.175	0.04	0.04	0.09	0.04	0.08
		Hot	150	0.16	0.21	0.04	009	0.13	0.11	0 17
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.17	0.22	0.11	0.13	0.17	0.24	031
3	R0200 R0300 R0400	Standard	93	0.07	0.10	0.05	0.05	0.10	0.04	0.08
		FF	105	0.15	0.18	0.05	005	0.10	0.04	0 08
		Hot	150	0.16	0.21	0.06	0.09	0.13	0.10	0.16
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.18	023	0.12	0 11	0.15	0.21	027
4	R0450X R0600P	Standard	93	0.145	0.175	0.07	0.1	0.16	0.08	0.13
		FF	105	0.245	0.275	0.07	0.1	0.16	0.08	0.13
		Hot	150	0.25	0.30	0.12	0.18	0.23	0.22	029
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.27	032	0.19	020	0.25	0.33	040
	R0800X R1300X	Standard	93	0.145	0.175	0.07	0.11	0.16	0.075	0.125
		FF	105	0.245	0.275	0.07	0.11	0.16	0.075	0 125
		Hot	150	0.25	0.3	0.12	0.18	0.23	0.22	0.29
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.27	0.32	0.19	0.2	0.25	0.33	0.4
5	R1800P	Standard	93	0.14	0.2	0.12	0.12	0.18	0.09	0.16
		FF	105	0.27	0.3	0.115	0.12	0.18	0.09	0 16
		Hot	150	0.27	0.3	0.12	0.29	0.34	0.24	0.32
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.27	0.3	0.19	0.3	0.36	0.24	032
	R2200P R2600P	Standard	93	0.17	0.23	0.12	0.14	0.21	0.09	0.19
		FF	105	0.27	0.3	0.115	0 14	0.21	0.09	0 19
		Hot	150	0.27	0.3	0.12	0.29	0.34	0.24	032
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.27	0.3	0.19	0.3	0.36	0.24	0.32

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

Imperial (Inch x 0.001)										
Size	Pump Model	Rotor Class	Temp Max (°C)	Front		Rear	Radial		Hub	
				Min	Max	Min	Min	Max	Min	Max
2	R0150 R0160 R0180	Standard	200	0.28	0.39	0.16	0.16	0.35	0.16	0.31
		FF	221	0.57	0.69	0.16	0.16	0.35	0.16	0.31
		Hot	302	0.63	0.83	0.16	0.35	0.51	0.43	067
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.67	0.87	0.43	0.51	0.67	0.94	1.22
3	R0200 R0300 R0400	Standard	200	0.28	0.39	0.20	0.20	0.39	0.16	0.31
		FF	221	0.59	0.71	0.20	0.20	0.39	0.16	031
		Hot	302	0.63	0.83	0.24	0.35	0.51	0.39	0.63
		Chocolate *(High Viscosity)*	*Refer to Factory*	0.71	0.91	0.47	0.43	0.59	0.83	1 06
4	R0450X R0600P	Standard	200	0.57	0.69	0.28	0.39	0.63	0.30	0.49
		FF	221	0.96	1.08	0.28	0.39	0.63	0.30	0.49
		Hot	302	0.98	1.18	0.47	0.71	0.91	0.87	1.14
		Chocolate *(High Viscosity)*	*Refer to Factory*	1.06	1.26	0.75	0.79	0.98	1.30	1.57
	R0800X R1300X	Standard	200	0.57	0.69	0.28	0.43	0.63	0.30	0.49
		FF	221	0.96	1.08	0.28	0.43	0.63	0.30	049
		Hot	302	0.98	1.18	0.47	0.71	0.91	0.87	1.14
		Chocolate *(High Viscosity)*	*Refer to Factory*	1.06	1.26	0.75	0.79	0.98	1.30	1.57
5	R1800P	Standard	200	0.55	0.787	0.472	0.472	0.709	0.354	0.63
		FF	221	1.06	1.181	0.453	0.472	0.709	0.354	063
		Hot	302	1.06	1.181	0.472	1.142	1.339	0.945	1.26
		Chocolate *(High Viscosity)*	*Refer to Factory*	1.06	1.181	0.748	1.181	1.417	0.945	1 26
	R2200P R2600P	Standard	200	0.67	0.906	0.472	0.551	0.827	0.354	0.748
		FF	221	1.06	1.18	0.45	0.55	0.83	0.35	075
		Hot	302	1.06	1.18	0.47	1.14	1.34	0.94	1.26
		Chocolate *(High Viscosity)*	*Refer to Factory*	1.06	1.181	0.748	1.181	1.417	0.945	1.26

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

CLEARANCE CHART - REVOLUTION RLP - STAINLESS STEEL

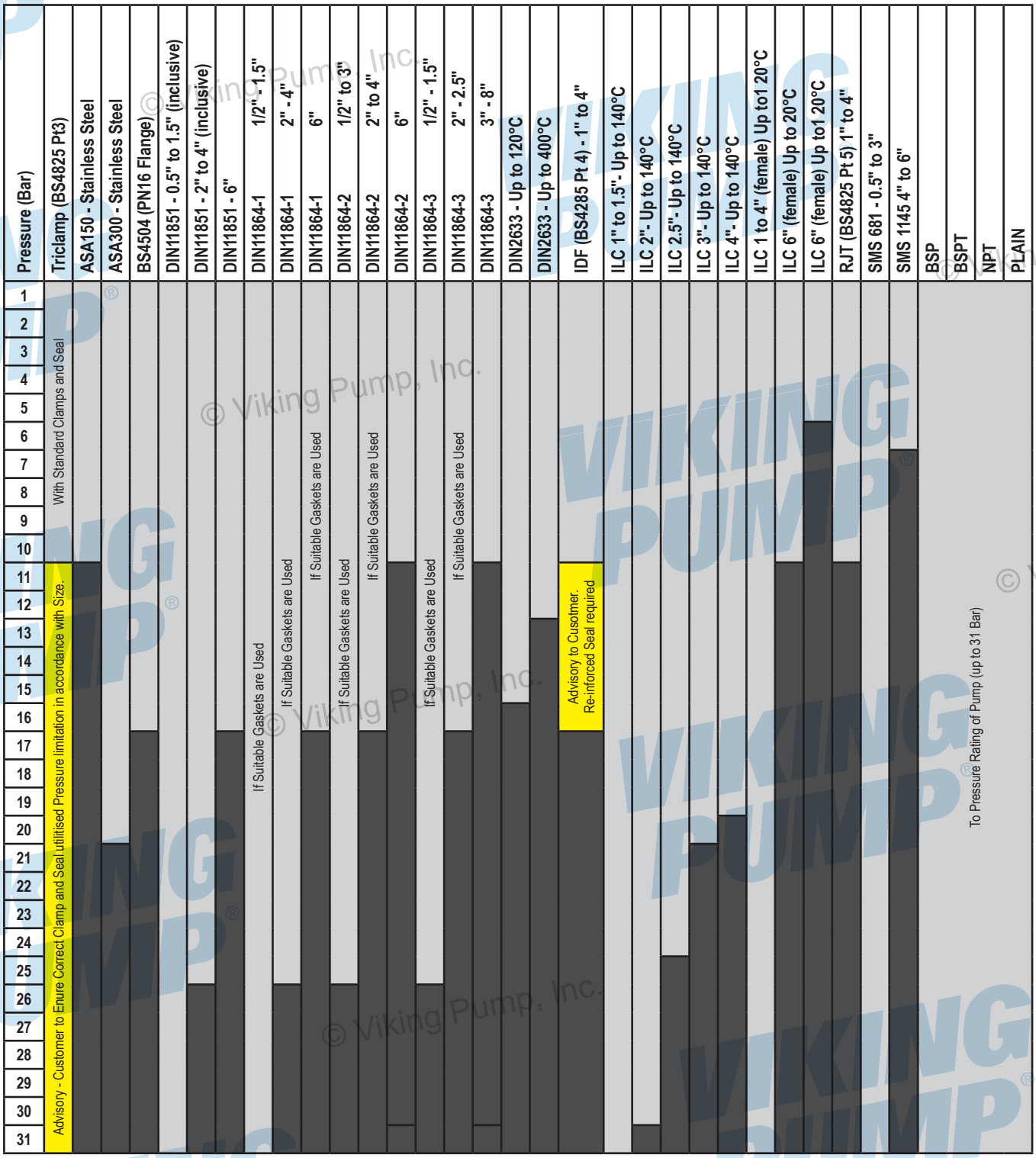


Metric (mm)												
Size	Pump Model	Temp Max (°C)	Front		Rear		Radial		Hub		Mesh
			Min	Max	Min	Max	Min	Max	Min	Max	Nominal
2	R0150X	70	0.07	0.10	0.09	0.13	0.08	0.16	0.10	0.17	0.17
		150	0.14	0.17	0.15	0.19	0.15	0.24	0.24	0.31	0.17
	R0160L R0180L	70	0.07	0.10	0.09	0.13	0.08	0.17	0.10	0.17	0.17
		150	0.14	0.17	0.15	0.19	0.15	0.24	0.24	0.31	0.17
3	R0200X	70	0.23	0.26	0.13	0.17	0.14	0.21	0.10	0.17	0.17
		150	0.29	0.32	0.21	0.24	0.22	030	023	0.29	0.17
	R0300X R0400X	70	0.22	0.26	0.13	0.17	0.13	0.22	0.10	0.17	0.17
		150	0.29	0.32	0.21	0.24	0.22	0.30	0.23	0.29	0.17
4	R0450X R0800X R1300X	70	0.23	0.27	0.12	0.16	0.18	0.26	0.22	0.29	0.20
		150	0.26	0.29	0.17	0.22	0.29	0.38	0.33	0.40	0.20
5	R01800X	70	0.12	0.19	0.13	0.23	0.11	0.19	0.17	0.25	0.50
		150	0.15	0.22	0.18	0.34	0.22	030	0.28	0.36	0.50

Imperial (Inch)												
Size	Pump Model	Temp Max (°C)	Front		Rear		Radial		Hub		Mesh
			Min	Max	Min	Max	Min	Max	Min	Max	Nominal
2	R0150X	158	0.28	0.39	0.35	0.51	0.31	0.64	0.39	0.67	0.67
		302	0.55	0.65	0.59	0.73	0.59	0.94	0.94	1.22	0.67
	R0160L R0180L	158	0.28	0.37	0.35	0.51	0.31	0.67	0.39	0.69	0.67
		302	0.55	0.65	0.59	0.73	0.59	0.94	0.94	1.22	0.67
3	R0200X	158	0.91	1.02	0.51	0.67	0.55	0.84	0.37	0.67	0.67
		302	1.14	1.24	0.83	0.93	0.87	1.18	0.91	1.14	0.67
	R0300X R0400X	158	0.87	1.02	0.51	0.67	0.51	0.87	0.37	0.67	0.67
		302	1.14	1.24	0.83	0.93	0.87	1.18	0.91	1.14	0.67
4	R0450X R0800X R1300X	158	0.89	1.06	0.47	0.63	0.69	1.02	0.87	1.14	0.79
		302	1.02	1.14	0.65	0.87	1.14	1.50	1.30	1.57	0.79
5	R01800X	158	0.47	0.75	0.51	0.91	0.43	0.75	0.67	1.00	1.97
		302	0.59	0.87	0.71	1.34	0.87	1.18	1.10	1.42	1.97

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

PRESSURE LIMITATION OF PORT TYPES



NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

FASTENERS & TORQUE SETTINGS

Description	Position		Size 2	Size 3	Size 4	Size 5 (1800)	Size 5 (2200 & 2600)
Dome Nut	Front Cover / Rotorcase	Quantity / Pump	4	4	8	8	8
		Size	M8	M10	M12	M12	M12
		Torque N/m	17	45	55	75	55
		Torque lbf ft	12.54	33.19	40.57	55.32	40.57
Rotor Retainer Plate	Retainer Plate / Shaft	Quantity / Pump	N/A	N/A	N/A	6	6
		Size				M12	M12
		Torque N/m				55	55
		Torque lbf ft				40.57	40.57
Rotor Retainer	Rotor Retainer / Retainer Plate	Quantity / Pump	2	2	2	2	2
		Size	M10	M12	M16	M8	M8
		Torque N/m	45	55	165	17	17
		Torque lbf ft	33.19	40.57	73.76	12.54	12.54
Stud	Front Cover / Rotorcase	Quantity / Pump	4	4	8	8	8
		Size	M8	M10	M12	M12	M12
		Torque N/m	17	45	55	75	55
		Torque lbf ft	12.54	33.19	40.57	55.32	40.57
Button Head Cap Screw	Anti-Rotation Washer / Rotorcase	Quantity / Pump	2	2	2	2	2
		Size	M6	M8	M10	M8	M8
		Torque N/m	7	17	45	17	17
		Torque lbf ft	5.16	12.54	33.19	12.54	12.54
Stud	Gearbox Housing / Front Cover	Quantity / Pump	4	4	8	8	8
		Size	M8	M10	M12	M12	M12
		Torque N/m	17	45	55	55	55
		Torque lbf ft	12.54	33.19	40.57	40.57	40.57
Socket Head Cap Screw	Rotorcase / Bearing Housing	Quantity / Pump	2	2	2	2	2
		Size	M6	M6	M6	M12	M12
		Torque N/m	7	7	7	55	55
		Torque lbf ft	5.16	5.16	5.16	40.57	40.57
Drive Shaft / Driven Shaft	Bearing Housing / Gearbox Housing	Rolling Torque N/m	0.6 - 2.6	1-3.3	1.4-6	4.6-15.6	4.6-15.6
		Rolling Torque lbf ft	0.4-1.9	0.7 - 2.4	1.0-4.4	3.4-11.5	3.4-11.5
Button Head Cap Screw	Bearing Retainer	Quantity / Pump	6	6	6	10	10
		Size	M6	M8	M8	M8	M8
		Torque N/m	7	17	17	17	17
		Torque lbf ft	5.16	12.54	12.54	12.54	12.54
Locknut	Timing Gear / Shaft	Quantity / Pump	2	2	2	2	2
		Size	M30	M45	M55	M80	M80
		Torque N/m	100	125	170	220	220
		Torque lbf ft	73.76	92.20	125.39	162.26	162.26
Socket Head Cap Screw	Feet	Quantity / Pump	4	4	4	4	4
		Size	M8	M8	M10	M12	M12
		Torque N/m	17	17	45	55	55
		Torque lbf ft	12.54	12.54	33.19	40.57	40.57
Socket Head Cap Screw	Rear Cover / Gearbox	Quantity / Pump	6	6	6	6	6
		Size	M6	M8	M10	M10	M10
		Torque N/m	7	17	45	45	45
		Torque lbf ft	5.16	12.54	33.19	33.19	33.19

* Torque values above indicate nominal values. Deviation of +/- 2.5% allowed.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

LUBRICANTS

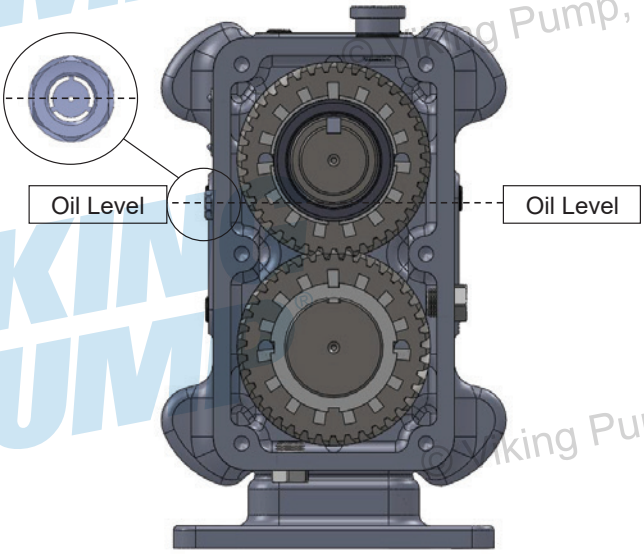
The Revolution has 2 lubrication options available gear oil and grease, the following lubricants are recommended for use with Revolution

	Food Grade Lubricants (NSF H1 Conforming Food Grade lubricants)	Standard Mineral Oil Based Lubricants
Gear Oil	Petro-Canada Purity FG EP Gear Oil EP220	EP150 - ambient temp range -20 to 0 deg Celsius EP220 - ambient temp range 0 to 30 deg Celsius EP320 – ambient temp range 30 deg Celsius and higher
Grease (Semi-Fluid Grease)	N/A	Petro-Canada Precision XL EP00 Aralube MFL 00 Mobilux EP 004 BP Energrease PR-EP 00 Shell Retinax CS 00

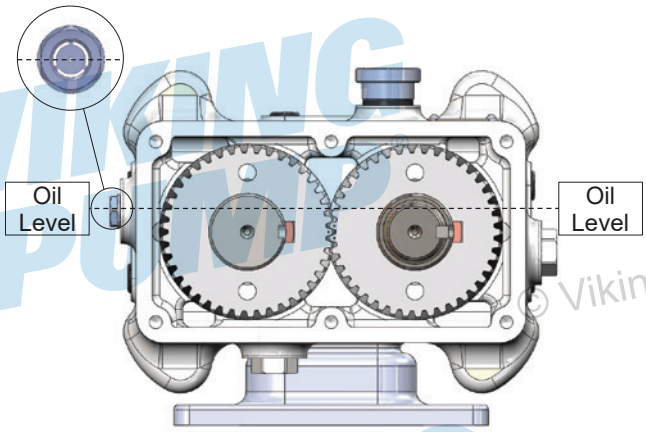
Approximate grease capacities for the Revolution:

Size 2 = 0.42 Litres	(0.11 US Gallons)
Size 3 = 0.85 Litres	(0.22 US Gallons)
Size 4 = 3 Litres	(0.79 US Gallons)
Size 5 = 4.4 Litres	(1.16 US Gallons)

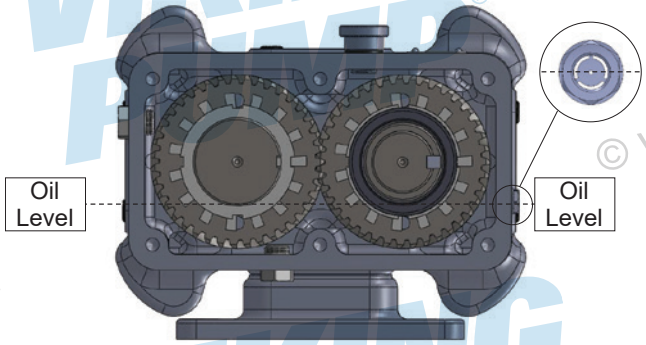
Note: For oil always add to the middle of the sight glass.



Frame 2,3 and 4 Vertical port arrangement - Sight glass located in the uppermost position on the side of the gearbox:



Frame 5 Only - Sight glass located in the lowermost position on the side of the gearbox:



MATERIAL SPECIFICATION

Rotorcase	316L Stainless Steel
Front Cover	316L Stainless Steel
Rotors	316L Stainless Steel or Alloy 808
Rotor Retainers	316L Stainless Steel
Shafts	316L Stainless Steel
Setting Ring	316L Stainless Steel
Gearbox	Cast Iron 250 / 304 Stainless Steel
Gearbox Cover	Cast Iron 250 / 304 Stainless Steel
Foot	304 Stainless Steel

ASTM A-494 is the standard rotor material for Revolution CPP pumps. This alloy was developed specifically for corrosion resistance and close operating clearance requirements of high performance rotary positive displacement pumps. ASTM A-494 is a nickel based, corrosion-resistant, non-galling or seizing material. The ASTM designation is A-494 Grade CY5SnBiM (UNS N26055), and the material is listed in the 3-A Sanitary Standards as acceptable for product contact surfaces. The above properties make ASTM A-494 the ideal material for Viking Pump CPP pumps. The non-galling rotors permit close operating clearances in the liquid end. This provides low slip and minimum shear damage. The rotors will not gall or seize if they come in contact with the body or cover during operation. The corrosion resistance of ASTM A-494 is approximately equal to AISI 300 Series Stainless Steel. However, ASTM A-494 has limited resistance to certain aggressive chemicals that may be commonly used in contact with AISI 300 Series Stainless Steel. Do not use ASTM A-494 in contact with nitric acid. Nitric acid is commonly used to passivate new installations of stainless-steel equipment. Do not allow nitric acid-based passivation chemicals to contact ASTM A-494 rotors. Remove the rotors during passivation and use a separate pump to circulate the passivation chemicals. Also, if nitric acid-based CIP cleaning chemicals are used, remove the rotors prior to CIP cleaning and clean them separately by hand in a mild detergent. If you have any questions regarding other aggressive chemicals, please contact Viking Pump Application Engineering for assistance.

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

PUMP LIFTING

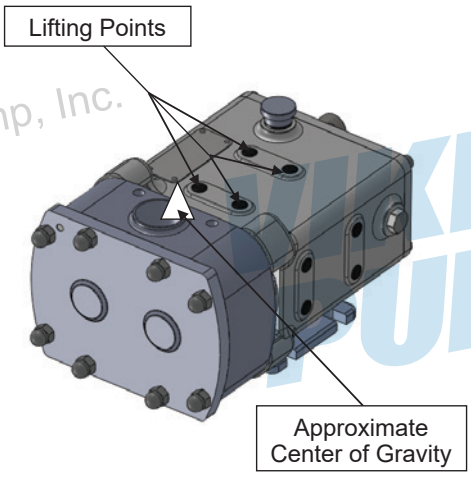
The Revolution pump has been designed with 4 Metric threaded locations on each side of the gearbox for lifting the pump.

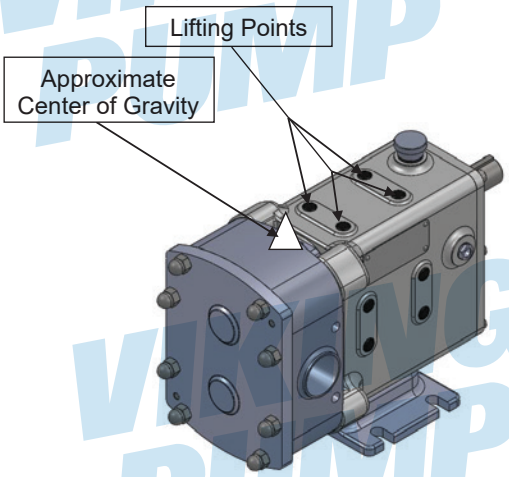
Notes:

⚠ WARNING

- **These lifting points have been designed to carry the weight of the pump only, if the pump has been installed / mounted these lifting points cannot be used.**

- **On lifting two certified lifting eyes must be used in conjunction with a correctly rated lifting sling.**





TROUBLESHOOTING

No Flow	Irregular Flow	Under Capacity	Pump Overheats	Motor Overheats	Excessive Rotor Wear	Excessive Seal Wear	Noise / Vibration	Seizure	Pump Stalls on Start Up	CAUSES	ACTION
■										Incorrect Direction Of Rotation	Reverse Motor
■										Pump Not Primed	Expel Gas From Suction Line / Pump Chamber & Prime
■	■	■					■			Insufficient NPSH Available	Increase Suction Line & Static Suction Head Diameter. Simplify Suction Line & Reduce Length. Reduce Pump Speed & Product Temperature
	■	■					■			Product Vaporising In Suction Line	
	■	■					■			Air Entering Suction Line	Remake Pipework Joints
■	■	■					■			Gas In Suction Line	Expel Gas From Suction Line / Pump Chamber
	■	■					■			Insufficient Static Suction Head	Raise Product Level To Increase Static Suction Head
			■	■			■		■	Product Viscosity Too High	Decrease Pump Speed / Increase Product Temperature
		■								Product Viscosity Too Low	Increase Pump Speed / Increase Product Temperature
		■	■		■		■		■	Product Temperature Too High	Cool Product / Pumping Chamber
				■					■	Product Temperature Too Low	Heat Product / Pumping Chamber
					■	■	■	■		Unexpected Solids In Product	Clean System / Fit Strainer On Suction Side Of Pump
		■	■	■	■		■		■	Discharge Pressure Too High	Check For Blockages / Simplify Discharge Line
			■	■	■		■	■		Rotorcase Strained By Pipework	Check Pipe Alignment / Support Pipework
				■			■			Pump Speed Too High	Decrease Pump Speed
		■								Pump Speed Too Low	Increase Pump Speed
			■	■	■	■	■	■		Seal Flush Inadequate	Increase Seal Flush To Required Pressure / Flow
			■	■	■	■	■	■	■	Bearing / Timing Gear Wear	Replace Worn Components

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

TOOL LIST

Listed below are tools required for the maintenance of the Revolution® Series pump.

TYPE	SIZE OR RANGE	Size 2	Size 3	Size 4	Size 5
Combination Spanner	13 mm	•			
	17 mm	•	•		
	19 mm			•	•
	26 mm			•	•
	27 mm			•	•
Hexagon (Allen) Key	4 mm	•	•		
	5 mm	•	•	•	•
	6 mm	•	•	•	•
	8 mm			•	•
	10 mm				•
Hexagon (Allen) Key Socket Driven	4 mm	•	•		
	5 mm	•	•	•	•
	6 mm	•	•	•	•
	8 mm			•	•
	10 mm				•
Torque Wrench	Adjustable to Min. 125 Nm(92.20 ft-lb.)	•	•	•	•
	Adjustable to Min. 170 Nm (125.39 ft-lb.)		•	•	•
	Adjustable to Min. 220 Nm (162.27ft-lb.)				•
Depth Micrometer	0 - 25 mm (0 - 1")	•	•	•	•
Feeler Gauge Set		•	•	•	•
Micrometer	0 - 25 mm (0 - 1")	•	•	•	•
Rolling Torque Meter	0 - 5 Nm (0 - 3.68 ft-lb.)	•	•	•	
	0 - 20 Nm (0 - 14.75 ft-lb.)				•
Rotor Retainer Socket	Supplied with Pump	•	•	•	•
C - Spanner	To Suit Locknut Ø38.0 mm (1.496")	•			
	To Suit Locknut Ø65.0 mm (2.559")		•		
	To Suit Locknut Ø75.0 mm (2.953")			•	
	To Suit Locknut Ø110.0 mm (4.331")				•
Soft Face Mallet		•	•	•	•
Screwdriver	Flat Blade, Medium	•	•	•	•
Circlip Pliers	Internal	•	•	•	•
Pin Punch	Small	•	•	•	•
Steel Hammer	Small	•	•	•	•

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

SERVICE HISTORY

Pump Model: Pump Serial No:

DATE	COMMENTS

NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.

NOTES

VIKING PUMP®

WARRANTY

Viking pumps, strainers and reducers are warranted to be free of defects in material and workmanship under normal conditions of use and service. The warranty period varies by type of product. A Viking product that fails during its warranty period under normal conditions of use and service due to a defect in material or workmanship will be repaired or replaced by Viking. At Viking's sole option, Viking may refund (in cash or by credit) the purchase price paid to it for a Viking product (less a reasonable allowance for the period of use) in lieu of repair or replacement of such Viking product. Viking's warranty is subject to certain restrictions, limitations, exclusions and exceptions. A complete copy of Viking's warranty, including warranty periods and applicable restrictions, limitations, exclusions and exceptions, is posted on Viking's website (www.vikingpump.com/warranty#information). A complete copy of the warranty may also be obtained by contacting Viking through regular mail at Viking Pump, Inc., 406 State Street, Cedar Falls, Iowa 50613, USA.

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NOTE: RLP ROTOR OPTION DISCONTINUED AS OF 3Q24.