Waukesha Cherry-Burrell®

INSTRUCTION MANUAL

Universal 5000 Industrial Series

Rotary Positive Displacement Pump

FORM NO.: 95-03012

REVISION: 10/2025

SPXFLOW®

ORIGINAL INSTRUCTIONS

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.

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Warranty

LIMITED WARRANTY: Unless otherwise mutually agreed to in writing, (a) SPX FLOW US, LLC (SPX FLOW) goods, auxiliaries and parts thereof are warranted to the Buyer against defective workmanship and material for a period of twelve (12) months from date of installation or eighteen (18) months from date of delivery, whichever expires first, and (b) SPX FLOW services are warranted to Buyer to have been performed in a workmanlike manner for a period of ninety (90) days from the date of performance. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX FLOW shall, at SPX FLOW's option, either repair or replace the defective goods or re-perform defective services. If Buyer makes a warranty claim to SPX FLOW and no actual defect is subsequently found, Buyer shall reimburse SPX FLOW for all reasonable costs which SPX FLOW incurs in connection with the alleged defect. Third party goods furnished by SPX FLOW will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX FLOW shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX FLOW, has been subjected to accident, abuse, misapplication, improper repair, alteration (including modifications or repairs by Buyer, the end customer or third parties other than SPX FLOW), improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX FLOW; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products; (vi) damage resulting from the combination, operation or use with equipment, products, hardware, software, firmware, systems or data not provided by SPX FLOW, if such damage or harm would have been avoided in the absence of such combination, operation or use; or (vii) Buyer's use of the goods in any manner inconsistent with SPX FLOW's written materials regarding the use of such product. In addition, the foregoing warranty shall not include any labor, dismantling, re-installation, transportation or access costs, or other expense associated with the repair or replacement of SPX FLOW goods. THE WARRANTIES CONTAINED HEREIN ARE THE SOLE AND EXCLUSIVE WARRANTIES AVAILABLE TO BUYER AND SPX FLOW HEREBY DISCLAIMS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ANY PERFORMANCE OR PROCESS OUTCOME DESIRED BY THE BUYER AND NOT SPECIFICALLY AGREED TO BY SPX FLOW. THE FOREGOING REPAIR, REPLACEMENT AND REPERFORMANCE OBLIGATIONS STATE SPX FLOW'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Shipping Damage or Loss

If equipment is damaged or lost in transit, file a claim at once with the delivering carrier. The carrier has a signed Bill of Lading acknowledging that the shipment has been received from SPX FLOW in good condition. SPX FLOW is not responsible for the collection of claims or replacement of materials due to transit shortage or damages.

Warranty Claim

All warranty claims should initially be directed to the SPX FLOW authorized distributor (Distributor) from whom Buyer purchased the product(s) in question. Warranty claims must have a Returned Material Authorization (RMA) from the Distributor or SPX FLOW or returns will not be accepted. The Distributor and SPX FLOW will assess the product(s) and make any necessary or appropriate repairs or replace the product, as determined by SPX FLOW in its sole discretion, in accordance with the above warranty statement. If it is determined that any necessary repairs for the product(s) are not covered by warranty, Buyer will be contacted prior to the performance of such repairs or the return or destruction or such product(s), as applicable.

Claims for shortages or other errors must be made in writing to SPX FLOW or Distributor, as applicable, within ten (10) days after delivery. This does not include transit shortage or damages. Failure to give such notice shall constitute acceptance and waiver of all such claims by Buyer.

Safety

READ AND UNDERSTAND THIS MANUAL PRIOR TO INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

SPX FLOW recommends users of our equipment and designs follow the latest Industrial Safety Standards. At a minimum, these should include the industrial safety requirements established by:

1. Occupational Safety and Health Administration (OSHA)
2. National Fire Protection Association (NFPA)
3. National Electrical Code (NEC)
4. American National Standards Institute (ANSI)

⚠WARNING

Severe injury or death can result from electrical shock, burn, or unintended actuation of equipment. Recommended practice is to disconnect and lockout industrial equipment from power sources, and release stored energy, if present. Refer to the National Fire Protection Association Standard No. NFPA70E, Part II and (as applicable) OSHA rules for Control of Hazardous Energy Sources (Lockout-Tagout) and OSHA Electrical Safety Related Work Practices, including procedural requirements for:

- Lockout-tagout
- Personnel qualifications and training requirements
- When it is not feasible to de-energize and lockout-tagout electrical circuits and equipment before working on or near exposed circuit parts

Before putting SPXFLOW equipment into operation, the operator shall analyze the application for all foreseeable risks, their likelihood to occur and the potential consequences of the identified risks as per ISO 31000 and ISO/IEC 31010 in their actual current version.

Locking and Interlocking Devices: These devices should be checked for proper working condition and capability of performing their intended functions. Make replacements only with the original equipment manufacturer's OEM renewal parts or kits. Adjust or repair in accordance with the manufacturer's instructions.

Periodic Inspection: Equipment should be inspected periodically. Inspection intervals should be based on environmental and operating conditions and adjusted as indicated by experience. At a minimum, an initial inspection within 3 to 4 months after installation is recommended. Inspection of the electrical control systems should meet the recommendations as specified in the National Electrical Manufacturers Association (NEMA) Standard No. ICS 1.3, Preventative Maintenance of Industrial Control and Systems Equipment, for the general guidelines for setting-up a periodic maintenance program.

Replacement Equipment: Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are properly matched to the equipment series, model, serial number, and revision level of the equipment.

Noise level: Sound pressure levels may exceed 98 db (A). Personnel should wear appropriate hearing protection when working on or around pumps. Consider limiting personnel's exposure time to noise or, where possible, enclosing equipment to reduce noise.

Warnings and cautions are provided in this manual to help avoid serious injury and/or possible damage to equipment:

⚠ DANGER

marked with a stop sign.

Immediate hazards which WILL result in severe personal injury or death.

⚠WARNING

marked with a warning triangle.

Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠CAUTION

marked with a warning triangle.

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

Warnings

1. Read the instructions before installing the pump and starting it up. Always follow the guidelines for assembly in order to achieve optimum operational reliability.
2. Always check that the specifications of the motor and the motor control unit are correct, particularly in operating environments where there may be a risk of explosion.
3. Pumps should only be installed, disassembled, repaired and assembled by personnel trained in servicing pumps.
4. Always ensure that all electrical installation is carried out by qualified staff.
5. The pump shall be grounded to avoid risk of static electricity due to pumping of non-conductive liquids.
6. Pump operation involves the risk of producing an electrostatic charge in flowing liquids. The user should take measures according to IEC 60079-32-1.
7. Never hose down or clean the electric motor directly with water or cleaning fluid. If the motor will be used in a washdown environment a washdown designed motor must be used.
8. Never dismantle the pump before the motor has been disconnected from the power supply. Remove the fuses and disconnect the cable from the motor terminal box.
9. Never dismantle the pump until the isolating valves on the suction and discharge side have been closed and the immediate pipe system has been drained. If the pump is used for hot and/or hazardous fluids, special precautions must be taken. In such cases follow the local regulations for personal safety when working with these products.
10. Always ensure that all pipe connections have been fitted and tightened properly before the pump is started. If the pump is used for hot and/or hazardous liquids, take special care: follow the local regulations for personal safety when working with these products.
11. Always wear personal protective equipment according to the requirements established by OSHA, NFPA, NEC (See page 7).
12. Always remove all assembly and auxiliary tools from the pump before starting it up.
13. Make sure product lines and power cables are laid in suitable guides/trays.
14. Liquids should be compatible with the product contact surface of the pump to prevent damage and ensure efficient operation.
15. Always ensure that no debris of any kind is present in the pump.
16. Always ensure that the pump and the motor shafts are properly aligned.
17. Always ensure that the suction and discharge valves isolating the pump are fully open before starting the pump.
18. Never close or obstruct the outlet of the pump as the pressure in the system will increase above the specified maximum pressure of the pump and cause damage to the pump.
19. There are rotating parts in the pump. Never put hands or fingers into a pump while it is in operation.
20. The pump components and piping may contain sharp edges. Handle the rotors carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.
21. Never touch the gear case during operation. The surface temperature may exceed 110°F (43°C). The pump cover and body may be cold or hot depending on the product (CIP at 190°F (88°C) or 300°F (149°C) product, for example).
22. Never touch the motor or motor shroud (if supplied) during operation, as it can become very hot.
23. When moving the pump, use appropriate lifting devices. Attach lifting devices to the eye bolts on the gear case; the gear case has holes for attaching lifting eye bolts. Always use securely fitted lifting straps when lifting with a crane or similar lifting gear.
24. Never drop parts on the floor.
25. Never exceed the maximum temperature or operating pressure specified under “Operating Parameters” on page 12.
26. Guards should be used when applicable. See page 17 and page 105.
27. Make sure to keep the work area clear of machine parts, tools, product lines, foreign materials, and power cables to avoid potential hazards.

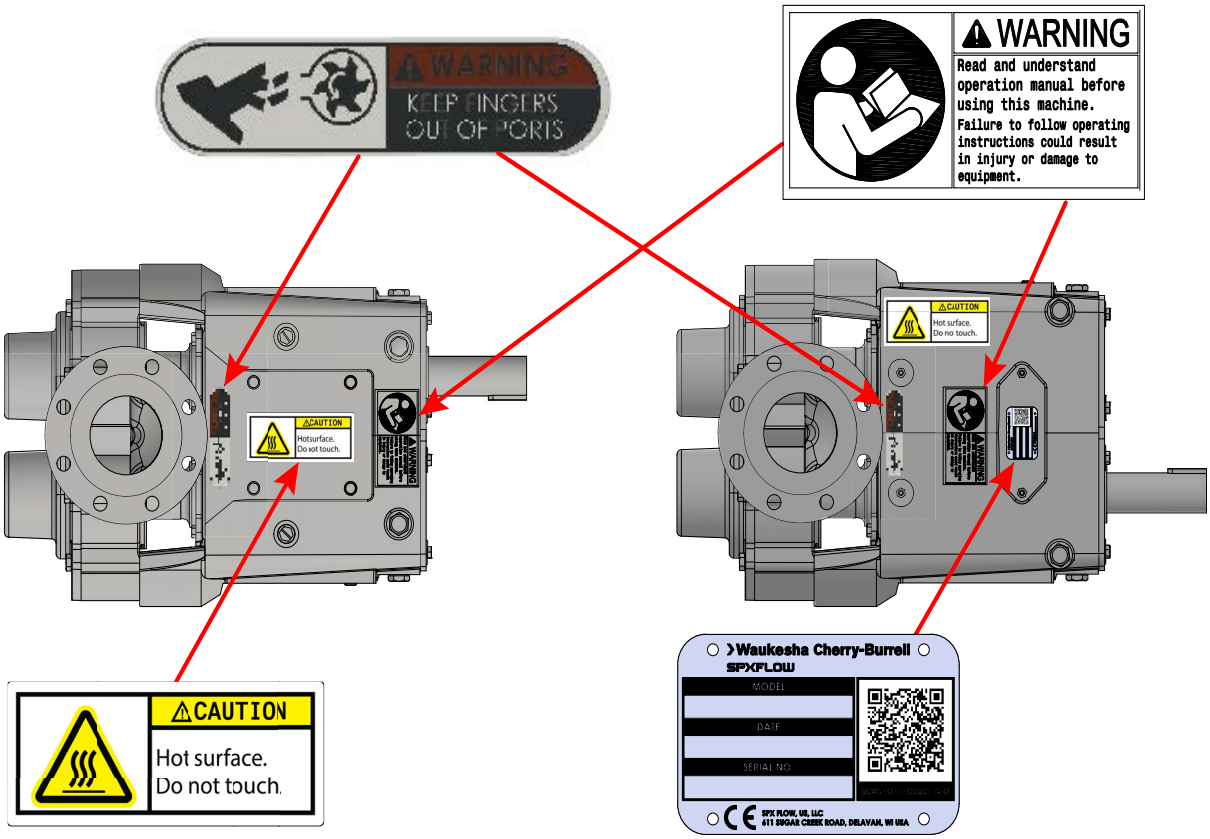
Replacement Labels

⚠WARNING

The following labels are installed on your equipment. If these labels are removed or become unreadable, contact your local distributor. Refer to the "Decal kit" in the parts lists starting on page 68 for replacement part numbers.

Application Instructions

Apply to a clean, dry surface. Remove the backing from the label, place it in proper position, protect it with a cover sheet and burnish it. (A soft rubber roller also may be used to press the label into place.) Apply all labels to be readable from the front of the pump.



IMPORTANT

1. Pump and Drive are factory aligned.
2. Recheck alignment after installation and before start-up.
3. Recheck alignment periodically, to maximize service life.

33-95

IMPORTANT

To avoid damage to the shaft seals and/or pump parts:

DO NOT START this pump unless Seal Flush has been installed and is turned ON.

PD100-236a

Care of Component Materials

NOTE: *SPX FLOW recommends the use of an FDA-approved anti-seize compound on all threaded connections.*

⚠WARNING

Failure to comply with the Care of Component Materials could lead to bodily injury.

Stainless Steel Corrosion

Corrosion resistance is greatest when a layer of oxide film is formed on the surface of stainless steel. If film is disturbed or destroyed, stainless steel becomes much less resistant to corrosion and may rust, pit or crack.

Corrosion pitting, rusting and stress cracks may occur due to chemical attack. Use only cleaning chemicals specified by a reputable chemical manufacturer for use with 300 series stainless steel. Do not use excessive concentrations, temperatures or exposure times. Avoid contact with highly corrosive acids such as hydrofluoric, hydrochloric or sulfuric. Also avoid prolonged contact with chloride-containing chemicals, especially in presence of acid. If chlorine-based sanitizers are used, such as sodium hypochlorite (bleach), do not exceed concentrations of 150 ppm available chlorine, do not exceed contact time of 20 minutes, and do not exceed temperatures of 104°F (40°C).

Corrosion discoloration, deposits or pitting may occur under product deposits or under gaskets. Keep surfaces clean, including those under gaskets or in grooves or tight corners. Clean immediately after use. Do not allow equipment to set idle, exposed to air with accumulated foreign material on the surface. Corrosion pitting may occur when stray electrical currents come in contact with moist stainless steel. Ensure all electrical devices connected to the equipment are correctly grounded.

Alloy 88

Waukesha Alloy 88 is the standard rotor material for Universal 1, Universal 2, Universal 3, Universal TS, Universal Lobe, Universal 420/520, and 5000 Series Rotary PD pumps. This alloy was developed specifically for corrosion resistance and close operating clearance requirements of high performance rotary positive displacement pumps. Alloy 88 is a nickel based, corrosion-resistant, non-galling or seizing material. The ASTM designation is A494 Grade CY5SnBiM (UNS N26055), and the material is listed in the 3-A Sanitary Standards as acceptable for product contact surfaces.

The corrosion resistance of Alloy 88 is approximately equal to AISI 300 Series Stainless Steel. However, Alloy 88 has limited resistance to certain aggressive chemicals that may be commonly used in contact with AISI 300 Series Stainless Steel.

Do not use Alloy 88 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 Alloy 88 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 questions regarding other aggressive chemicals, please contact SPX FLOW Application Engineering for assistance.

Elastomer Seal Replacement Following Passivation

Passivation chemicals can damage product contact areas of this equipment. Elastomers (rubber components) are most likely to be affected. Always inspect all elastomer seals after passivation is completed. Replace any seals showing signs of chemical attack. Indications may include swelling, cracks, loss of elasticity or any other noticeable changes when compared with new components.

Introduction

Pump Receiving

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out.

All ports are covered at the factory to keep out foreign objects during transit. If covers are missing or damaged, remove the pump cover for a thoroughly inspect the fluid head. Be sure that the pumping head is clean and free of foreign material before rotating the shaft.

Each Waukesha Cherry-Burrell brand pump is shipped completely assembled, lubricated and ready for use. Review “Operation” on page 25 before operating the pump.

Intended Use

The Universal Industrial 5000 Series Rotary Positive Displacement Pump is exclusively intended for pumping liquids, especially in industrial application.

Refrain from using the pump in a manner which exceeds the scope and specifications stated in this manual.

Any use exceeding the margins and specifications set forth is considered to be not intended.

SPX FLOW is not liable for any damage resulting from such activities. The user bears the full risk.

⚠WARNING

Improper use of the pump leads to:
- damage
- leakage
- destruction
- potential failures in the production process

Equipment Serial Number

All Waukesha Cherry-Burrell brand pumps are identified by a serial number on the gear case nameplate, which is stamped on the pump body and cover.

⚠CAUTION

The gear case, body, and cover must be kept together as a unit due to backface, rotor, and cover clearances. Failure to do so will damage the pump.

Pump Shaft Location

There are two pump drive shaft locations:

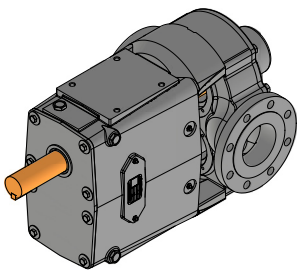


Figure 1 - Upper and Lower Shaft Mount

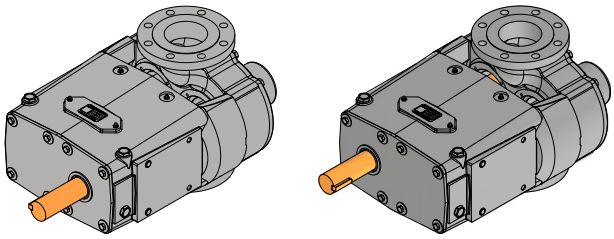


Figure 2 - Sidemount Left Hand and Right Hand (as viewed from pump cover)

Operating Parameters

Ambient temperature range: -20°C (-4 °F) ≤ Ta ≤ +40°C (+104°F)

5000 Series Model	Displacement per revolution	Maximum Nominal Capacity	Inlet/ Outlet	Optional Inlet/ Outlet	Maximum Product Pressure**	Maximum RPM	Temp Range*
5040	0.060 gal. (0.227 liter)	36 gpm (8.2 m3/hr.)	1-1/2"	2"	200 psi (13.8 bar)	600	Std: -40°F (-40°C) to 200°F (93°C); Hot/XHot: -180°F (82°C) to 300°F (149°C)
5050	0.153 gal. (0.579 liter)	90 gpm (20.4 m3/hr.)	2"	2-1/2"	200 psi (13.8 bar)	600	
5060	0.254 gal. (0.961 liter)	150 gpm (34.1 m3/hr.)	2-1/2"	3"	200 psi (13.8 bar)	600	
5070	0.440 gal. (1.666 liter)	260 gpm (59.1 m3/hr.)	4"	-	200 psi (13.8 bar)	600	
5080	0.754 gal. (2.854 liter)	450 gpm (102.2 m3/hr.)	6"	-	200 psi (13.8 bar)	600	

Std = Standard Clearance Rotors; FF = Front Face Clearance Rotors; Hot = Hot Clearance Rotors; XHot = Extra Hot Clearance Rotors

Other inlet/outlet sizes are available. Contact SPX FLOW Application Engineering.

Pump max temperature is 300°F (149°C).

* Contact SPX FLOW Application Engineering for higher pressures or higher temperature applications.

⚠ DANGER

Operating the pump outside the stated operating parameters may result in severe personal injury or death.

Rotor Styles

"Standard" clearance rotors may be used with liquid temperatures up to -40°F (-40°C).

Between 160°-200°F (71°-93°C), consider other application factors such as speed of operation, differential pressure, the lubricating properties of the liquid being pumped, and the product viscosity. If these factors trend toward a difficult application (high speed, high pressure, non-lubricating) then "Front Face" or "Hot" clearance rotors are recommended. Wine clearance rotors (same operating parameters as listed for standard rotors) provide additional clearance between the rotor hub and the cover bore area only. They give extra protection against contact in this area.

"FF" (Front Face) clearance rotors provide additional clearance in the front face area only. They are recommended for use with liquid temperature between 180°F (82°C) to 200°F (93°C). They give better pumping efficiency (less slip) than "Hot" clearance rotors when used with low viscosity liquids. However, do not use "FF" rotors if they will be subjected to temperature shock (extreme, rapid temperature change.)

"Hot" clearance rotors are recommended for use with liquid temperatures between 180°F (82°C) and 300°F (149°C). They provide additional clearance in the front face area plus rotor to body areas. Because of this additional clearance there is more slip (inefficiency) with low viscosity liquids, which the pump must overcome with higher operating speed (rpm.) VHP (viscous horsepower) is slightly lower when using hot clearance rotors. Hot clearance rotors are also used when the product viscosity is above 200 CPS.

"316SS" clearance rotors are made from 316 stainless steel material (in place of standard non-galling alloy 88) and recommended for use at temperatures up to 200°F (93°C). These rotors provide additional clearance all around (more than Hot clearance alloy 88 rotors) to ensure no running contact between the 316 SS rotors and other 316 SS pump components. Because of this additional clearance, there is more slip (inefficiency) with low viscosity liquids, which the pump must overcome with higher operating speed (rpm). VHP (viscous horsepower) is slightly lower when using "316SS" clearance rotors.

Some models in some series have a "316SS Hot" clearance rotor option for temperatures above 200°F (93°C).

NOTE: *Consult SPX FLOW Technical Services for applications near 300°F or above 200°F with 316SS rotors.*

"Extra Hot" clearance rotors are recommended for use with products such as chocolate, which tend to "plate out" and build up on rotor surfaces. These rotors require special selection procedures. Contact SPX FLOW Technical Services for assistance.

For clearance data, see Table 5, "Rotor Clearances," on page 54.

Factory Remanufacturing Program

Waukesha Cherry-Burrell brand Universal 5000 Industrial Series pumps are designed so that they may be factory remanufactured twice and backed with a new pump warranty each time.

Factory remanufacturing involves replacement of all shafts, bearings, oil seals, gears, etc. The pump body and cover are re-machined and new oversized rotors are installed. The pumps are stamped R-1 or R-2, after the serial number, designating that they have been reconditioned once or twice.

Contact your SPX FLOW Customer Service Representative at 1-800-252-5200 and furnish the serial number of any pump being considered for remanufacturing.

Qualification Guidelines for Operating Staff

Definitions

Operator

A person who is capable of handling the installation, interior, operation, warnings, cleaning, repair or transportation of the machine.

Trained person

A person who is instructed in the tasks given and the possible dangerous situation that may occur. The person is also aware of the protection installations and measures.

Skilled worker

A person who based upon his or her background and due to his or her knowledge, is able to perform the tasks, and has an appropriate knowledge of the provisions given.

Table 1: Qualification Guidelines for Operating Staff

Phase of Life	Task Example	Prerequisite for the operating staff	
		Trained person	Skilled worker
Transport	Lift	x	
	Loading	x	
	Unloading	x	
Assembly and Installation/ Commissioning	Assembly/fastening of the machine		x
	Connection to the electric grid		x
	Filling of lubricant to drive motors	x	
Operation	Startup	x	
	Controlling	x	
	Surveillance	x	
	Shutdown	x	
Cleaning, Maintenance	Cleaning	x	
	Refilling of lubricants	x	
	Disconnection from energy supply	x	
	Assembly/Disassembly of parts	x	
Troubleshooting	Disconnection from energy supply	x	
	Troubleshooting	x	
	Assembly/Disassembly of parts	x	
	Repair	x	
Dismounting/Unplugging from plant	Removal of energy supply	x	
	Dismount		x
	Lift		x
	Loading		x
	Unloading		x

Transportation/Installation

Transportation

Handling

- Use appropriate lifting equipment to handle the pump. Ensure the lifting equipment is rated for the weight of the pump.
- Avoid sudden impacts or jolts during handling to prevent damage to the pump components.

Securing the Pump

- The pump must be transported in an upright orientation.
- Ensure the pump is secured during transport to prevent tipping or shifting, which could cause damage or pose safety risks.

Important Safety Information

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de- pressurized.

⚠WARNING

The pump components and piping may contain sharp edges. Handle the rotors carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.

⚠CAUTION

Maintenance should be performed only by trained personnel. See See “Qualification Guidelines for Operating Staff” on page 14.

Lifting

⚠CAUTION

When moving the pump, use appropriate lifting devices. Always use securely fitted lifting straps/chains when lifting with a crane or similar lifting gear.

⚠WARNING

Do not stand underneath the pump while it is being lifted.

Attach lifting straps/chains to the two eye bolts on the top of the gear case.

Unit orders have holes for attaching eye bolts on the four corners of the base. Attach straps/chains to all four eye bolts.

Table 2: Pump Weights (less motor or base)

5000 Series Model	Weight lb (kg)
5040	100 (45)
5050	240 (109)
5060	245 (111)
5070	475 (215)
5080	810 (367)

⚠CAUTION

To lift the cover on a 5080, attach an eye bolt to the threaded hole in the cover and attach lifting straps or chains to the eye bolt. To lift the body of a 5060 or larger U 5000, use a lifting strap threaded through the ports on either side of the body. To lift the gear case assembly on pumps for all sizes of U 5000, attach lifting straps/chains to the two eye bolts on the top of the gear case.

Install Pump and Drive Unit

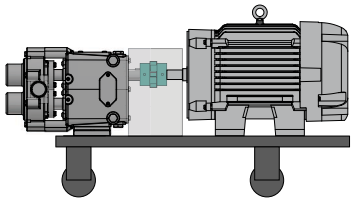


Figure 3 - Portable Base

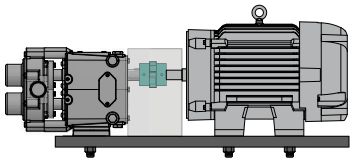


Figure 4 - Adjustable Leg Base

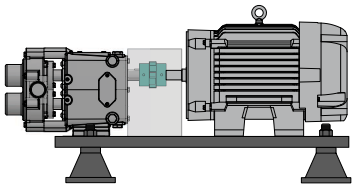


Figure 5 - Leveling and/or Vibration Isolation Pads

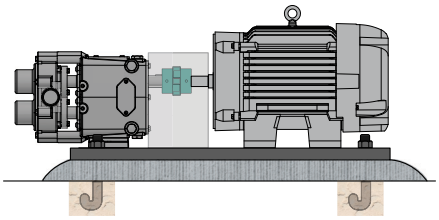


Figure 6 - Permanent Installation on Foundation

⚠CAUTION

The motor must be installed by qualified personnel, e.g., a licensed electrician.

All system equipment, such as motors, sheaves, drive couplings, speed reducers, etc., must be properly sized to ensure satisfactory operation of your Waukesha Cherry-Burrell brand pump within its limits. Customer-supplied motors should have a basic level of safety to prevent electrical hazards, and should be dealt with in accordance with the manufacturer's instructions.

In a typical installation configuration, the pump and drive unit are mounted on a common base plate. The unit can be installed in any of the arrangements shown in Figure 3 through Figure 6.

NOTE: *When installing a unit as shown in Figure 6, level the unit before installing the bolts.*

The shaded area in Figure 3 through Figure 6 indicates the guard location.

See “Pump Shaft Guards” on page 105.

⚠WARNING

Full guards must be installed to isolate operators and maintenance personnel from rotating components.

Guards are provided as part of a complete pump and drive package and are selected by SPX FLOW Engineering for the pump, base, and motor ordered. Do not modify the guard provided by SPX FLOW. If the guard provided by SPX FLOW is lost, contact SPX FLOW Customer Service and provide your order number or PO number of the pump to order a correctly-sized replacement guard.

If the pump was not purchased as a unit, it is the responsibility of the customer to ensure proper guarding. Refer to your local regulations for guidance.

Install Connections and Piping

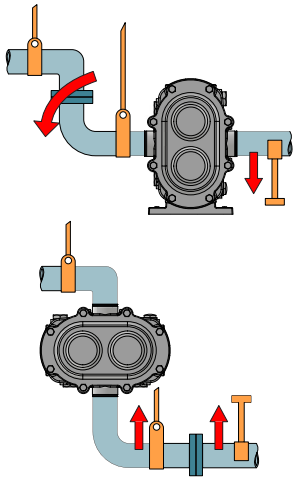


Figure 7 - Piping Support

Piping Support

To minimize forces exerted on the pump, support all piping to the pump independently with hangers or pedestals. Such forces can cause misalignment of the pump parts and lead to excessive wear of rotors, bearings, and shafts.

Figure 7 shows typical supporting methods used to independently support each pipe, reducing the weight effect of piping and fluid on the pump.

⚠WARNING

Do not exceed 50 lb (22.7 kg) load on pump inlet or discharge ports. Exceeding this limit may cause damage to the pump

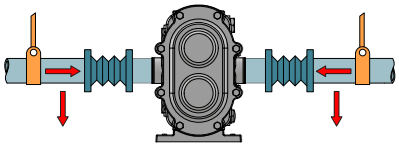


Figure 8 - Flexible Connections and Supports

Expansion Joints

Thermal expansion of piping can cause tremendous forces. Use thermal expansion joints to minimize these forces on the pump.

Flexible joints can be used to limit transmission of mechanical vibration. Ensure that the free ends of any flexible connections in the system are anchored.

Inlet Piping

Install the pump below the supply liquid level to reduce the air in the system by flooded suction (Figure 9).

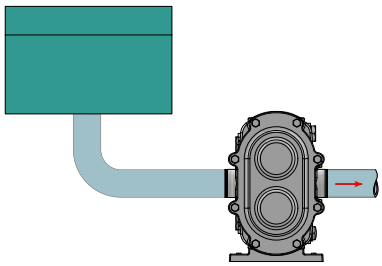


Figure 9 - Pump Below Supply

If the pump is installed above the supply liquid level, the piping on the inlet side must slope up toward the pump, preventing air pockets in the pipes (Figure 10).

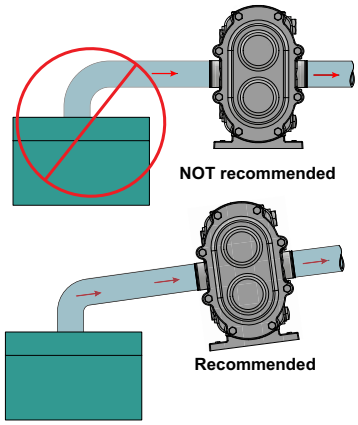
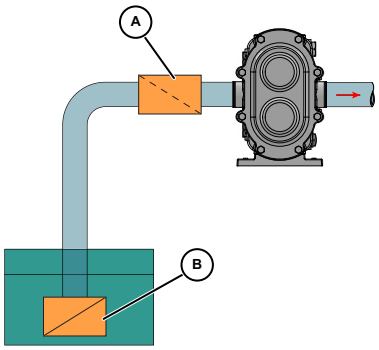


Figure 10 - Correct Piping to Prevent Inlet Air Pockets

Install Check Valves



A. Inlet Check Valve

B. Foot Check Valve

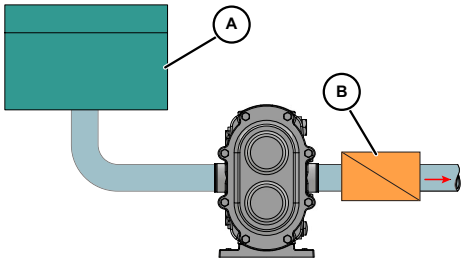
Figure 11 - Inlet Check Valve

Inlet Side on Lift Applications

Use check valves to keep the inlet line full, particularly with low-viscosity fluids (Figure 11).

Discharge Side

For systems with liquid under a vacuum, install a check valve on the discharge side of the pump. The check valve prevents backflow (air or fluid) to aid in the initial start-up by minimizing the required differential pressure supplied by the pump to start the flow (Figure 12).



A. Closed Tank - produces vacuum on liquid (Low Absolute Pressure)

B. Check Valve (outlet)

Figure 12 - Discharge Check Valve

Install Isolation Valves

Isolation valves permit pump maintenance and safe pump removal without draining the system (Figure 13, item A).

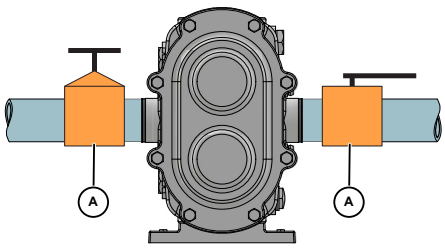


Figure 13 - Isolation Valves

Install Relief Valves

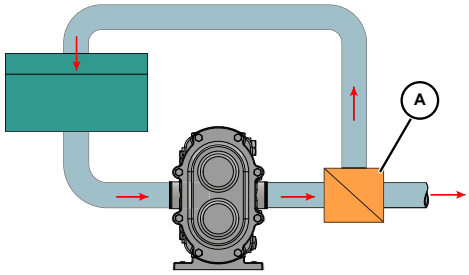
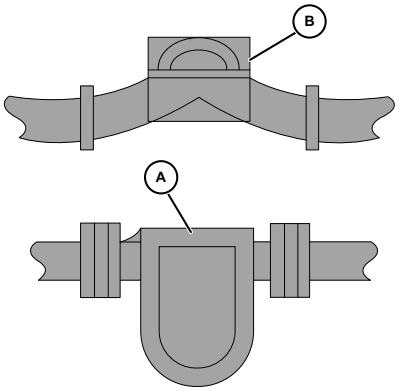


Figure 14 - Relief Valves

Install relief valves to protect the pump and piping system against excessive pressure. We recommend installing an external relief valve designed to bypass fluid from the pump outlet to the inlet side of the system (Figure 14, item A).

NOTE: *Integral relief valves are available, but are not recommended on applications with viscosities over 5000 cP or where the discharge must be closed for more than a few minutes. Prolonged operation of the pump with closed discharge will cause heating of fluid circulating through the relief valve. If this is the case, install an external relief valve to discharge externally through the piping connected to the fluid source, or into inlet piping near the source.*

Inlet Side Strainers and Traps



A. Strainer B. Magnetic Trap

Figure 15 - Inline Strainers and Traps

Inlet side strainers and traps (Figure 15, items A and B, respectively) can be used to prevent foreign matter from damaging the pump. Select carefully to prevent cavitation caused by the restriction of the inlet. If inlet strainers are used, they must be serviced regularly to prevent clogging and flow stoppage.

Install Pressure Gauges

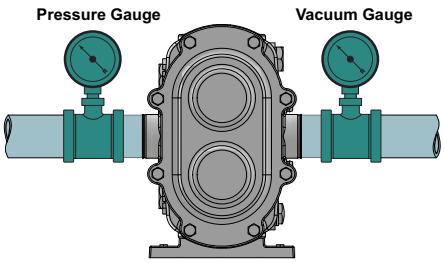


Figure 16 - Pressure and Vacuum Gauges

Pressure and vacuum gauges provide valuable information about pump operation (Figure 16). Wherever possible, install the gauges to help provide information on the following:

- Normal or abnormal pressures
- Indication of flow
- Changes in pump condition
- Changes in system conditions
- Changes in fluid viscosity

Check Coupling Alignment

Figure 17 - Lovejoy Coupling

Figure 18 - T.B. Woods® Coupling

Pumps and drives ordered from the factory and mounted on a common base plate are aligned before shipment. Alignment **must** be re-checked after the complete unit has been installed and piping completed. Periodic re-checking is advisable during the pump service life.

SPX FLOW recommends using a flexible coupling to connect the drive to the pump. Several different types are available, including couplings with slip or overload provisions. SPX FLOW provides Lovejoy (Figure 17) or T.B. Woods® (Figure 18) couplings unless otherwise specified when ordering. Flexible couplings can be used to compensate for end play and small differences in alignment.

Align the pump and drive shaft as closely as possible:

- Pump and Drive are factory aligned.
- Re-check alignment after installation and before start-up.
- Re-check alignment periodically, to maximize service life.

Check Angular Alignment

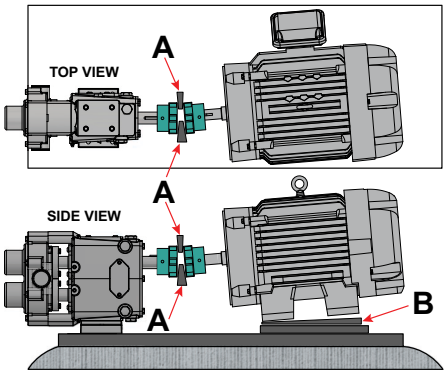


Figure 19 - Check Angular Alignment

1. Using feeler gauges or taper gauges (Figure 19, items A and B), check the alignment at four points every 90 degrees around the coupling; **adjust to equal dimension at all points.**
2. Set the space between the coupling halves to the manufacturer's recommended distance.
3. Install shims to bring the system into alignment.

Check Parallel Alignment

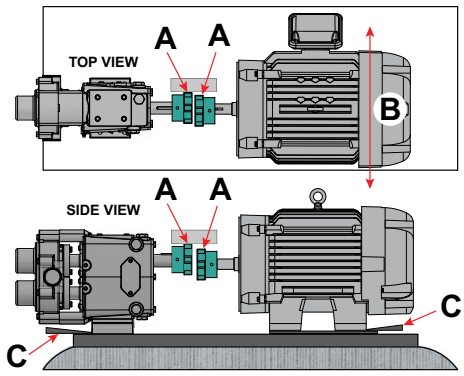


Figure 20 - Check Parallel Alignment

1. Check both the horizontal and vertical alignment of the pump and drive using a straight edge.
2. Using a feeler gauge at location “A” in Figure 20, determine the direction and amount of movement needed (Figure 20, item B).
3. If necessary, shim at location “C” and/or move drive as needed.

Check Belt and Chain Drive Alignment

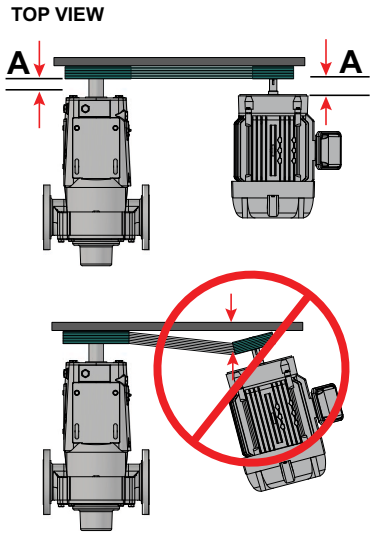


Figure 21 - Aligning Belt and Chain Drives

Use a straight edge to visually check the belt or chain alignment. Keep the shaft distance to a minimum (Figure 21, item A).

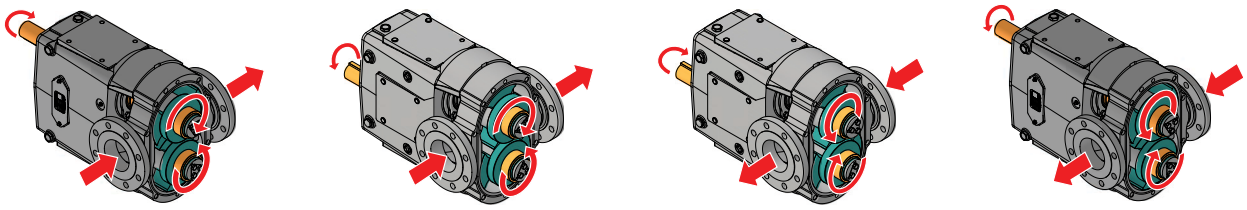
After the piping is complete and before the belts are installed, manually turn the pump shaft to ensure it turns freely.

Check Pump Rotation

Check the direction of the drive rotation to determine the rotation direction of pump (Figure 22). After the correct drive rotation is verified, connect the coupling and assemble the pump and coupling guards.

⚠CAUTION

The pump covers in the following figures have been removed to view the rotor rotation. Never operate the pump with the covers removed.



Top Shaft Drive **Lower Shaft Drive** **Lower Shaft Drive** **Top Shaft Drive**

Figure 22 - Direction of Drive Rotation

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Operation

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out.

⚠CAUTION

These pumps are positive displacement, low slip design and will be severely damaged if operated with closed valves in the discharge or inlet lines. The pump warranty is not valid for damages caused by a hydraulic overload from operation or start-up with a closed valve in the system.

Pre-Startup Checklist

⚠CAUTION

Do not use this pump to flush a newly-installed system. Severe damage may occur to the pump and system if the pump is used to flush the system. ***Remove the rotors during system flushing, to prevent debris from being trapped between the rotors and the pump body. This debris may damage the pump upon startup.***

⚠WARNING

Full guards must be installed to isolate the operators and maintenance personnel from the rotating components. Guards are provided as part of a complete pump and drive package.

⚠WARNING

Do not start a pump with seal flush unless the seal flush is installed and on.

1. Ensure that the pump is correctly installed as described in “Transportation/Installation” on page 15. Review “Install Relief Valves” on page 20 and install relief valves as needed.
2. Check the coupling alignment. See “Check Coupling Alignment” on page 21.
3. Ensure that the pump and piping are clean and free of foreign material such as welding slag, gaskets, etc.
4. Ensure that all piping connections are tight and leak-free. Where possible, check the system with non-hazardous fluid.
5. Ensure that the pump and drive are lubricated. See “Lubrication” on page 27.
6. Ensure that all guards are in place and secure.
7. Double mechanical seals require adequate supply and flow of clean flushing fluids.
8. Ensure that all valves are open on the discharge side and a free flow path is open to the destination.
9. Ensure that all valves are open on the inlet side and fluid can fill the pump. A flooded suction installation is recommended.
10. Check the direction of pump and drive rotation to ensure that the pump will rotate in the proper direction. See “Check Pump Rotation” on page 23.

Startup Procedure

⚠CAUTION

In order to avoid temperature shock after the introduction of hot or cold product, stop the pump after filling the pumphead with product. Once the product has filled the pumphead, allow up to 15 minutes for the pump’s fluid components to thermally adjust, then re-start the pump

1. Start the pump drive. Where possible, start at a slow speed or jog.
2. Ensure that the liquid is reaching the pump within 60 seconds. If pumping does not begin and stabilize, check “Troubleshooting” on page 63.

Shutdown Procedure

1. Shut off the power to the pump drive.
2. Shut off the supply and discharge lines.

Emergency Shutdown Procedure

Emergency Shutdown Procedures should be documented by plant personnel after assessing system-wide requirements.

Maintenance

Important Safety Information

⚠WARNING

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out and the pump is de-pressurized.

⚠WARNING

The pump components and piping may contain sharp edges. Handle the rotors carefully because edges may be sharp. Wear gloves while installing and servicing the pump to help avoid injuries from these hazards.

⚠WARNING

Never touch the gear case during operation. The surface temperature may exceed 110°F (43°C). The pump cover and body may be cold or hot depending on the product 300°F (149°C) product, for example).

⚠CAUTION

Maintenance should be performed only by trained personnel. See "Qualification Guidelines for Operating Staff" on page 14.

⚠CAUTION

Make sure the pump is securely bolted or clamped down prior to performing any maintenance work. The pump center of gravity changes as parts are added or removed, and could result in tipping of an unsecured pump.

⚠CAUTION

Make sure to keep the work area clear of machine parts, tools, product lines, foreign materials, and power cables to avoid potential hazards.

⚠CAUTION

Make sure appropriate lighting is available: at least 1000 lux, independent of daylight and weather conditions.

⚠CAUTION

Before carrying out any maintenance and repair work on cold components, ensure that the machine parts in question are sufficiently heated. The contact temperature of accessible machine parts must not be lower than those in EN ISO 13732-1.

⚠CAUTION

To lift the cover on a 5080, attach an eye bolt to the threaded hole in the cover and attach lifting straps or chains to the eye bolt. To lift the body of a 5060 or larger 5000 Series, use a lifting strap threaded through the ports on either side of the body. To lift the gear case assembly on pumps for all sizes of 5000 Series, attach lifting straps/chains to the two eye bolts on the top of the gear case.

Before detaching port connections to the pump:

- Close the suction and discharge valves.
- Drain the pump and clean or rinse, if necessary.
- Disconnect or shut off the electrical supply and lock out all power.

Lubrication

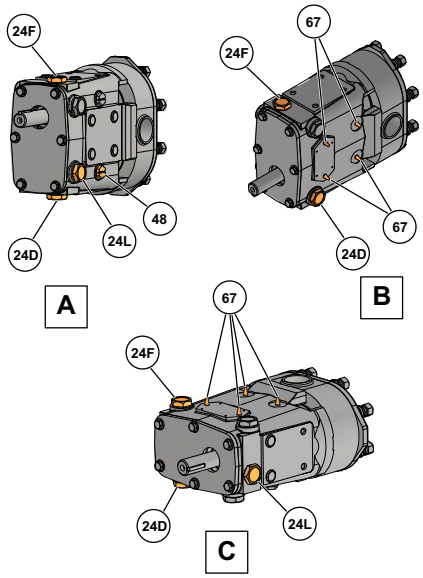


Figure 23 - Lubrication Points

A. Upper Shaft Drive Pump (Standard)
B. Lower Shaft Drive Pump (Optional)
C. Side-Mount Pump (Optional)
24D. Oil Drain Plug
24F. Oil Fill Plug
24L. Oil Level Check Plug, Sight Glass
48. Grease Clean-out Plug
67. Grease Fittings

Gear Oil Specification
ISO Grade 320, SAE 140 or AGMA Number 6EP, part number 118402+. If food-grade oil is required, use part number 000140003+.

Bearing Lubricant Grease
NLGI Grade No. 2, EP, Lithium-based lubricant is standard, part number 118401+. If food-grade grease is required, use part number 000140002+.

Drive Lubrication

Refer to the manufacturer's manual shipped with the drive for proper drive lubrication and frequency.

Gears

Gears are factory-lubricated with gear oil at the quantity shown in Table 3. **Change the oil every 750 hours.**

NOTE: *Aggressive washdown or extreme running conditions may require more frequent lubrication intervals.*

When the pump is not running, the gear oil level is correct when the oil level is visible in the sight glass.

When the pump is running, the oil level may be difficult to see and may appear cloudy.

Universal pumps are shipped with the oil level at or slightly above the sight glass.

Bearings

Bearings are factory-lubricated with grease. Re-lubricate them at the quantity shown in Table 3. **Grease the bearings every 750 hours.**

NOTE: *Aggressive washdown or extreme running conditions may require more frequent lubrication intervals.*

Excess grease will accumulate in the gear case and must be removed through the cleanout hole covered with a plastic plug (Figure 23, item 48).

Best practice is to clean out this area every time you grease the pump. Water can accumulate in the gearcase from condensation or from aggressive washdown. If water is found in the gearcase, clean out this area more frequently.

Table 3: Lubrication Quantities

5000 Series Model	Oil Capacity (Gears)		Grease Quantity (per Bearing)	
	Top or Bottom	Side Mount	Front	Rear
5040	2.0 oz (60 ml)	4 oz (120 ml)	0.60 oz (18 cc)	0.21 oz (6 cc)
5050	6.0 oz (170 ml)	9.5 oz (280 ml)	0.84 oz (25 cc)	0.76 oz (22 cc)
5060	6.0 oz (170 ml)	9.5 oz (280 ml)	0.84 oz (25 cc)	0.76 oz (22 cc)
5070	11 oz (320 ml)	20 oz (600 ml)	1.33 oz (39 cc)	1.03 oz (30 cc)
5080	17 oz (500 ml)	44 oz (1300 ml)	1.96 oz (58 cc)	1.16 oz (34 cc)

Maintenance Inspections

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out.

Detecting wear in the early stages can reduce repair costs and down time. A simple “look-feel” inspection of the pump during breakdown cleaning is recommended to detect signs of trouble at an early stage.

A detailed maintenance inspection should be scheduled annually. See “Annual Maintenance” on page 29.

Refer to the “Maintenance Inspection Chart” on page 31 for possible causes and solutions to common issues discovered during inspection.

Inspection of Rotor Tips

Remove the cover (see “Remove Cover” on page 33) and check for metal-to-metal contact between the rotor wings. When contact is detected, repair or replace the pump.

Visually inspect the rotors for rotor tip to rotor tip contact and rotor tip to rotor hub contact. Manually rotate the pump drive shaft and ensure that the rotor tip clearance is equal on both sides as indicated in Figure 24.

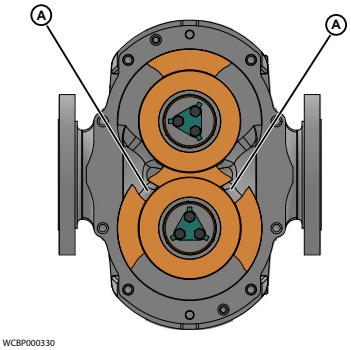


Figure 24 - Rotor to Rotor Tip Clearance

Inspection of Shaft and Shaft Shoulder

Visually inspect the shaft for twists or bends; replace it as necessary. Visually inspect the shaft shoulder (Figure 25) for excessive wear; replace it as necessary. If the shaft shoulder has a sharp edge, remove the edge with a file to prevent cutting the shaft O-ring on installation.

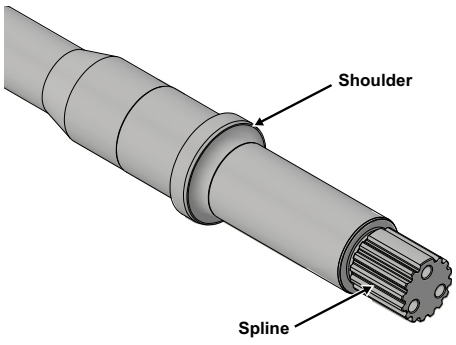


Figure 25 - Shaft Inspection

Inspection of Rotor Hub End

Visually inspect the rotor hub end (Figure 26) for excessive wear; replace it as necessary. Each time the rotors are removed, replace the O-rings on the hub.

NOTE: *Rotor hub and shaft shoulder wear are caused by operating with a loose rotor nut(s) for extended periods.*

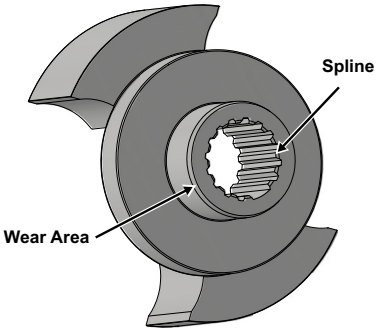


Figure 26 - Rotor Inspection

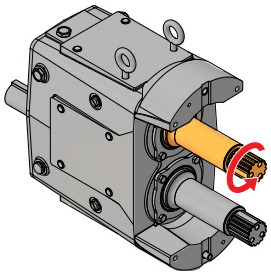


Figure 27 - Backlash Check

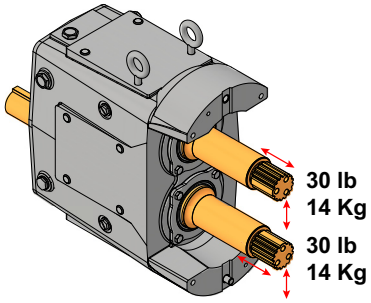


Figure 28 - Bearing Deflection Check

Inspection of Gears and Bearings

Gear backlash

With the fluid head and seals removed, feel for gear backlash by rotating either shaft by hand. The other shaft must engage immediately. Perform this check three times at 60-degree intervals. If play (backlash) is evident, remove the gear case cover, check the gear teeth for wear, and ensure that the gear is not loose on the shaft. If the gear teeth are worn, replace the gears. If the gear is loose on the shaft, inspect the shaft key and keyway; replace as necessary.

Check bearing condition

With the fluid head and seals removed, check the bearing condition by applying (by hand) an up or down force of approximately 30 lbs (14 kg). If movement is detected, the bearing may be failing. Also check the shaft movement forward or backward. If the bearing is failing, replace the bearing and review the lubrication section on page 27.

Annual Maintenance

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out.

At least annually, perform the procedures and corrective measures outlined in “Maintenance Inspections” on page 28, in addition to the following preventive maintenance:

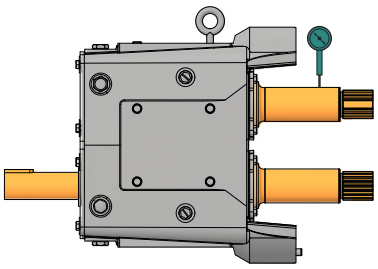


Figure 29 - Check bearings

- Check the bearings with a dial indicator for shaft radial play (Figure 29). If the deflection is equal to or greater than the rotor-to-body diametrical clearance (“” on page 53), replace the bearings.
- Remove the gear cover and inspect the gears for wear, backlash and looseness. Loosen and torque the gear retaining nuts to the proper torque. See Table 7 on page 61.
- Thoroughly inspect the rotors for worn keyways, hub wear and stress cracks (Figure 30, item A). Use the dye check method to detect any fatigue-type cracks at rotor stress points.

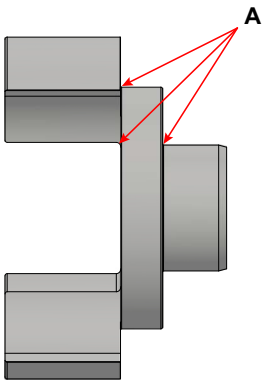


Figure 30 - Rotor Stress Points

- Review the performance record on the pump, and check the radial and backface clearances to determine wear and effect on performance. See Table 5, “Rotor Clearances,” on page 54. Adjustment to the operating speed can compensate for wear in some applications.

⚠CAUTION

When bearings or shafts are replaced in the field, take care to correctly position the shaft by shimming it to maintain sufficient running clearances between the rotor wing faces and the pump body faces (backface and cover face). It is important to hold the same backface dimension for both rotors to avoid crossover interference.

Maintenance Inspection Chart

Frequency	Check for	Possible Causes	Possible Solutions
At least weekly	Low oil level, oil contamination, oil leaks	Oil leak from gear case cover oil seal or gear case rear oil seal Loose back cover Oil plug damaged	Replace oil seals (items 5 & 15 in the parts lists starting on “5040 - Universal Industrial Series Pump Parts” on page 68) Check or replace oil plug. See “Lubrication” on page 27.
Weekly	Leaks - Product	Damaged seals Damaged elastomers	Replace seals Replace elastomers
Weekly	Leaks - Flush fluid	Damaged seal, fitting, or flush tube Damaged flush-side seal components Damaged elastomers.	Replace seal, fitting, or flush tube Replace flush-side seal components Replace elastomers
Monthly	Excess grease in cleanout plugs	Excess grease accumulates as part of normal operation	Remove excess gear oil from cleanout plugs (Figure 23, item 48 on page 27).
Every 3 months	Damaged front grease seals.	Seal may be old and worn. No grease on lips to lubricate. Shaft worn under seals.	Replace seals. Properly lubricate with grease when installing. Inspect shaft surface under seals.
Every 3 months	Damaged rear oil seals.	Seal may be old and worn. No grease on lips to lubricate. Shaft worn under seals. Not centered on shaft when installed.	Replace seals. Properly lubricate with grease when installing. Inspect shaft surface under seals.
Every 3 months	Rotor tip to rotor tip contact or uneven rotor tip to rotor tip clearance.	Hard object jammed into rotors and twisted shafts.	Replace shafts. Install strainers if necessary. Check and replace gears if necessary.
Every 3 months	Rotor tip to rotor hub contact.	Loose rotor nut(s). Backface clearances not even. Bearings need replacing.	Torque rotor nut(s) properly. Verify backface clearances are even. Check and replace bearings.
Every 3 months	Worn rotor or shaft splines.	Loose rotor nut(s).	Replace rotors, shafts. Torque rotor nut(s). See “Torque Values and Wrench Size” on page 61.
Every 3 months	Worn rotor hub end or shaft shoulder.	Loose rotor nut(s). Rotors slammed against shoulder when installed.	Torque rotor nut(s). See “Torque Values and Wrench Size” on page 61. Replace rotors and shafts or shim front bearing(s) to maintain proper backface clearances.
Every 3 months	Sharp edged shaft shoulder.	Loose rotor nut(s). Rotors slammed against shoulder when installed. Backface clearances not even.	Remove sharp edge with file to prevent cutting shaft O-ring. Verify backface clearances are even.
Every 3 months	Gear backlash.	Lack of lubrication. Excessive hydraulic loads. Loose gear locknuts.	Check lubrication level and frequency. Reduce hydraulic loads. Torque locknuts to specified torque values. See “Torque Values and Wrench Size” on page 61. Check and replace gears if necessary.

Frequency	Check for	Possible Causes	Possible Solutions
Every 3 months	Worn or broken gear teeth.	Lack of lubrication. Excessive hydraulic loads. Loose gear locknuts.	Check lubrication level and frequency. Reduce hydraulic loads. Torque locknuts to specified torque values. See “Torque Values and Wrench Size” on page 61. Check and replace gears if necessary.
Every 3 months	Loose gears.	Gear locknuts not torqued properly. Locking assembly not torqued properly. Worn gear key.	Torque gear nut to specified torque value. See “Torque Values and Wrench Size” on page 61. Check and replace gears if necessary. Inspect gear key, shaft keyway and shaft, replace if necessary.
Every 3 months	Loose bearings, axially or radially.	Lack of lubrication. Excessive hydraulic loads. Product or water contamination.	Check lubrication level and frequency. Reduce hydraulic loads. Ensure no excess grease build-up. Replace bearings if necessary.

Cleaning

Use a basket or wash tank with a rubber mat covering the bottom. Wash the parts thoroughly with a cleaning compound using brushes and plenty of fresh warm water at about 125°F (52°C). Rinse the parts thoroughly with 170°F (77°C) water and store them to permit free draining and natural drying. Reassemble the pump and sterilize it in accordance with accepted sterilizing practices. If a chlorine solution (200 ppm available chlorine) is used, it should leave no residual deposits which would remain in the pump.

⚠CAUTION

Acid cleaners have a much higher metal corrosion rate and pump parts should remain in acid cleaning solutions no longer than necessary. Any strong inorganic mineral-based acids that are harmful to your hands would be harmful to pump parts. Due to the high circulation required, SPX FLOW recommends that its pumps not be used to recirculate cleaning solutions.

Fluid Head Disassembly (All Models)

⚠ DANGER

The pump contains internal moving parts. DO NOT put hands or fingers into the pump body ports or drive area at any time during operation. To avoid serious injury, DO NOT install, clean, service, or repair pump unless all power is off and locked out.

⚠ DANGER

To avoid serious injury, shut off and drain product from the pump prior to disconnecting the piping.

Remove Cover

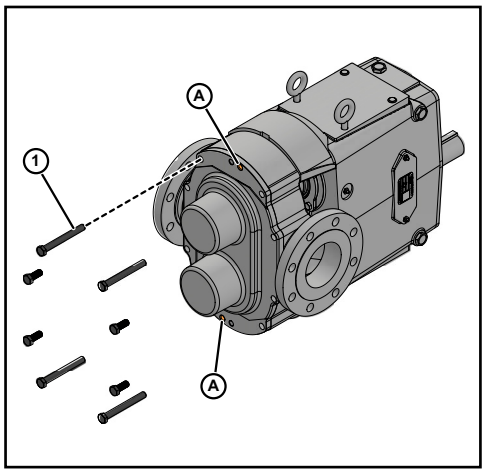


Figure 31 - Remove Cover Nuts

1. Remove eight cap screws (1) from the cover. Use two screws as jack bolts in the threaded holes (A) on the top and bottom of the cover, as shown in Figure 31. Tighten them evenly to push the cover off the dowels and rotor hubs. Make sure to have sufficient support when sliding the cover free, particularly on the larger units.

⚠ CAUTION

To lift the cover on a 5080, attach an eye bolt to the threaded hole in the cover and attach lifting straps or chains to the eye bolt.

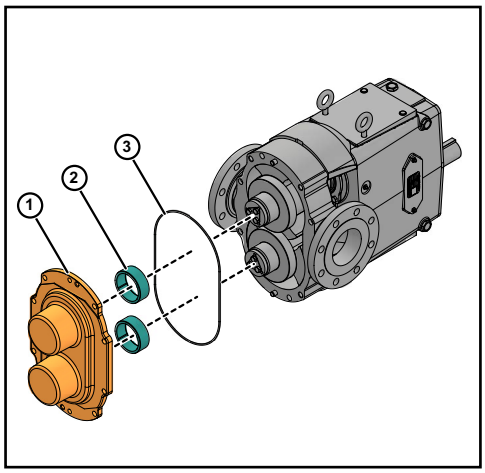


Figure 32 - Remove O-Ring

2. Remove the cover (1) and remove and inspect the cover O-ring (2), as shown in Figure 32.

NOTE: *Inspect the* gasket *for damage and replace them as necessary.*

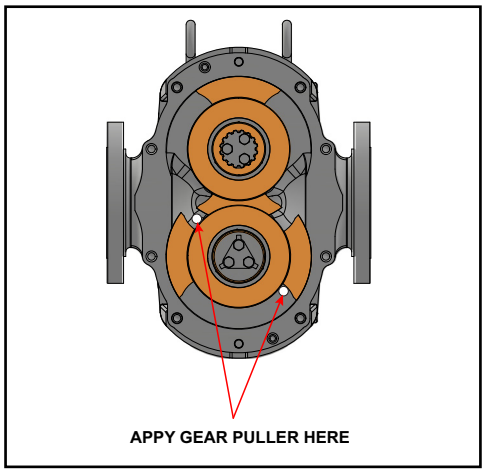


Figure 33 - Orientation Of Rotor

3. Turn shaft to orient rotors as shown for easy removal one at a time.

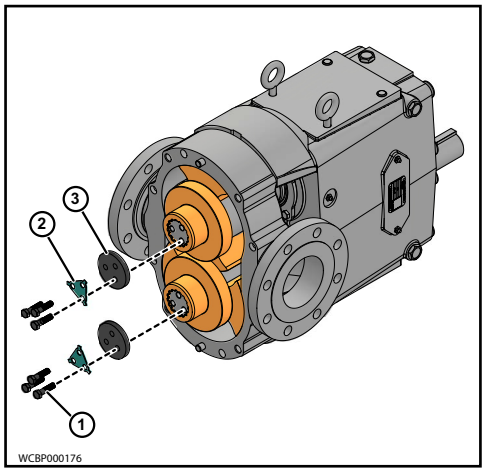


Figure 34 - Remove rotor retainer bolts

4. To remove rotor retainer bolts (1), straighten the lock clip tabs (2) by using a screw driver or drift. Then, when clear, use a conventional wrench and a sharp counterclockwise impact to loosen rotor retainer bolt (1). Remove the rotor retainer washer (3), as shown in Figure 34.
5. Remove the cover bushing (4).

⚠CAUTION

Some mechanical seal models use the back side of rotor as a spring retainer and will, if not restrained. push rotor off shaft with possible damage to rotor.

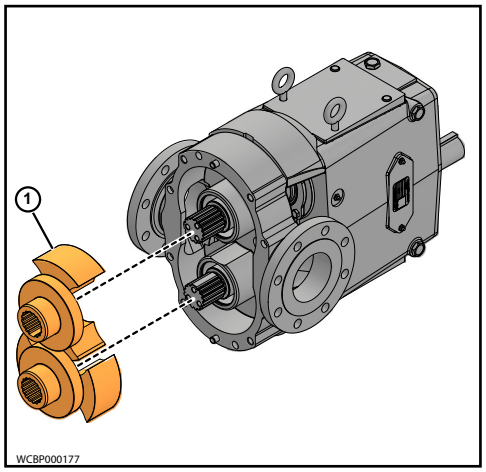


Figure 35 - Remove rotors

6. Remove the rotor (1) exposed first, as shown in Figure 35.

NOTE: *If rotor can not be removed by hand, use more forceful means such as, a standard gear puller used in the conventional manner, or a piece of hard wood used as a lever between back of rotor hub and body. (Do not use metal bar, etc.)*

7. Remove the second rotor (1) in the same way.

Remove Pump Body

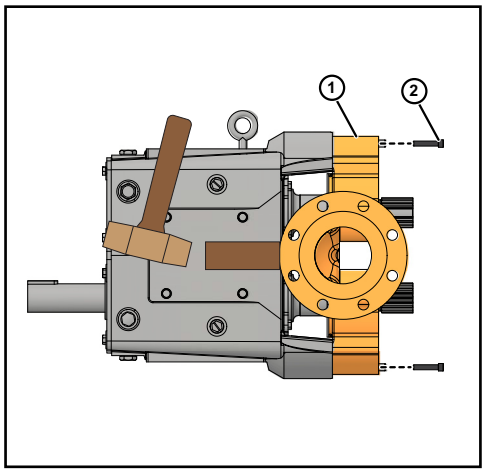


Figure 36 - Remove Cap Screws and Pump body

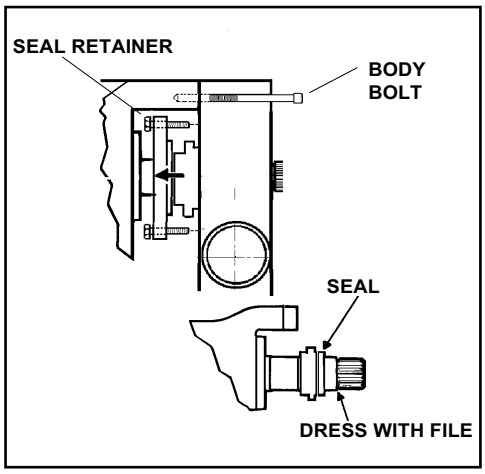


Figure 37 - Remove Pump Body

Body with Packing Seal

1. Remove packing gland nuts.
2. Remove body socket head retaining bolts (2). Using a block against the base of the ports, tap the block, alternating sides, to drive the fluid head off of the locating dowel pins, and slide body (1) off shaft, as shown in Figure 36.

NOTE: *See “Seal Maintenance” on page 36. for disassembly procedure of packing seal.*

Body with Mechanical Seals

1. Remove the cap screws from seal seat retainers and slide retainers back against bearing gear case, as shown in Figure 37.
2. Loosen body retaining bolts and tap body with soft hammer to drive body loose from bearing gear case and dowel pins. Remove retaining bolts and slide body off shafts.
3. Thoroughly clean the shafts. Dress off shaft around shoulder against which rotor bottoms to remove "flared end" to aid in seal removal.
4. Loosen both inboard seals and slide off shafts. Then remove the seal seat and gaskets.
5. If equipped with outside seal, loosen set screws and slide off shafts.
6. Dress off burrs on shaft which resulted from seating of set screws with a file or emery cloth.

Seal Maintenance

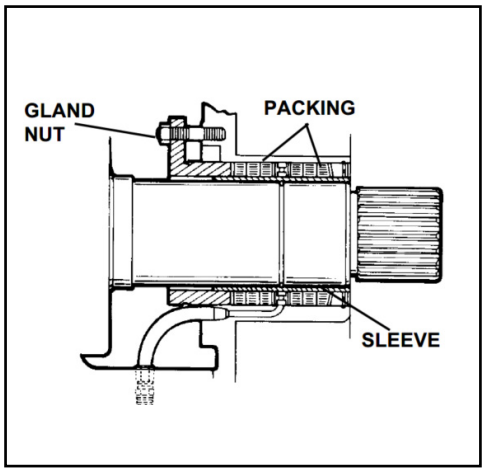


Figure 38 - Packing Seal

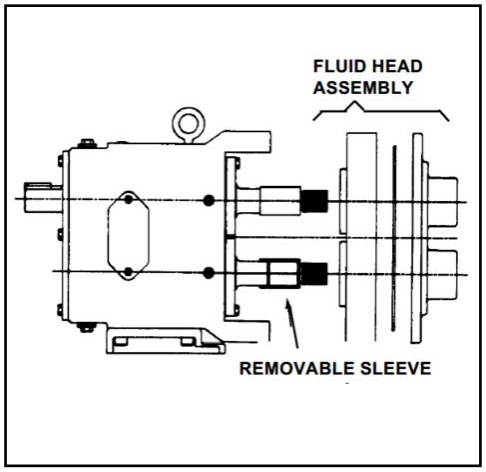


Figure 39 - Disassemble fluid head assembly

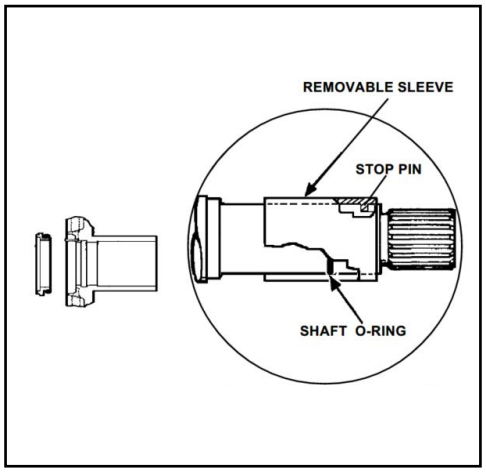


Figure 40 - Clean and inspect shaft sleeves

Packing Seal

1. To suit the required service, a variety of packing materials and replaceable shaft sleeves are available. Standard packing material is braided Teflon-compounds. Standard sleeves are 316 stainless; optional sleeves of ceramic coated stainless are available.
2. External adjustment with gland nuts will maintain sealing until worn packing can be conveniently replaced.
3. New packing ring can be installed by loosening gland, sliding it back and inserting packing into the cavity in front of gland.
4. **DO NOT TIGHTEN GLAND EXCESSIVELY.** A small amount of liquid leakage is normal for packing lubrication.

Packing Replacement

1. To facilitate repacking, disassemble the fluid head assembly from bearing gear case See “Fluid Head Disassembly (All Models)” on page 33.

2. Clean and inspect shaft sleeves; if worn, remove and replace both sleeve and shaft O-ring as shown in Figure 40.

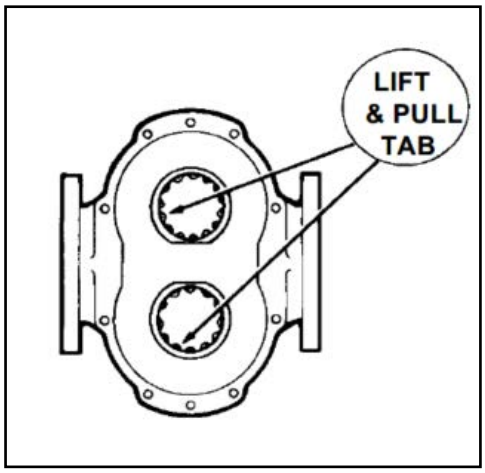


Figure 41 - Remove packing retainers

3. Remove packing retainers with a screwdriver.

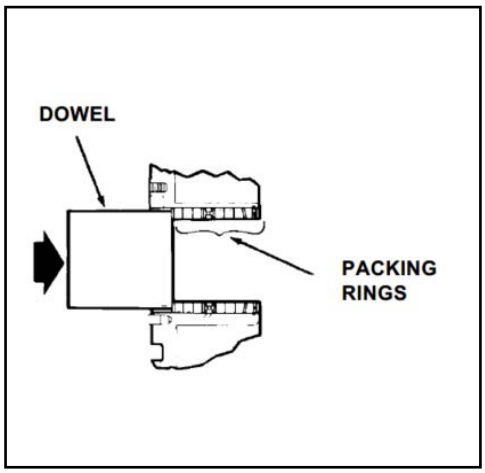


Figure 42 - Remove Dowel and Packing rings

4. Turn body over, remove gland and use a dowel and soft hammer to drive packing rings from body as shown in Figure 42.

NOTE: *Seat Retainer may also be called gland.*

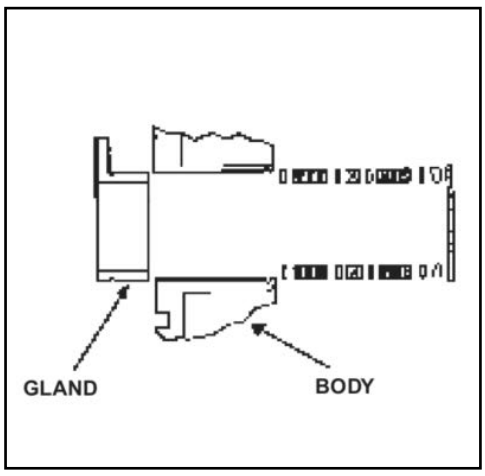


Figure 43 - ***Assemble packing components***

5. Refer to parts list and drawing for your pump. Assemble packing components into body cavity as shown in the drawing. Stagger the end joints in the packing rings so they do not line up. Snug up gland but DO NOT tighten.
6. Make final adjustment of packing glands after startup.

NOTE: *The pump can be repacked without removing fluid head if proper tools and expertise are available. See pictures for helpful hints.*

Mechanical Seals

A copy of seal manufacturer's descriptive literature is sent with your pump for service and parts identification. Shut off power and close isolation valves.

⚠WARNING

When working with hazardous fluids it is recommended the pumping head be drained and flushed before disengaging seal faces.

Outside Seal

1. Flush off any scale or crusted product that may have accumulated around the shaft, seal face and seal springs.
2. Check to see if seal is tight against seat. Repositioning seal to increase face seating pressure is suggested.
3. Check for cracked or damaged seal face by removing seal seat retainer bolts and sliding retainer back to expose sealing faces. If no faults are visible and leak persists or damaged is found, the replacement of seal and seal seat is recommended. To replace seal and seat, the head must be removed, see the proper procedure on page 33 to page 35.

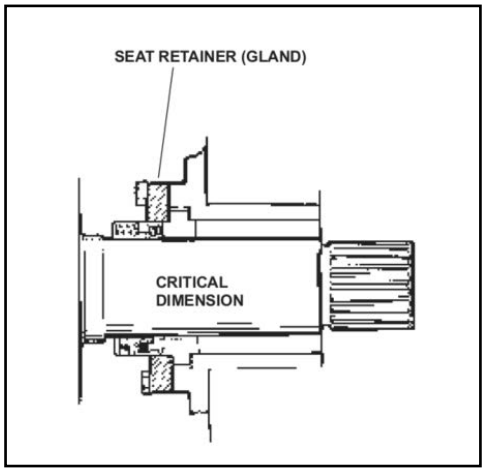


Figure 44 - Remove Seat Retainer

NOTE: *Critical dimension is set at factory and is unique to each different type of seal used. Measure and record before removing from shaft. All standard seals are shown on page 88 to 98.*

Inside Seal

1. If seal is leaking, replacement is recommended.
2. To replace seal and seal seat, the fluid head must be removed, See “Shaft Assembly” on page 43.

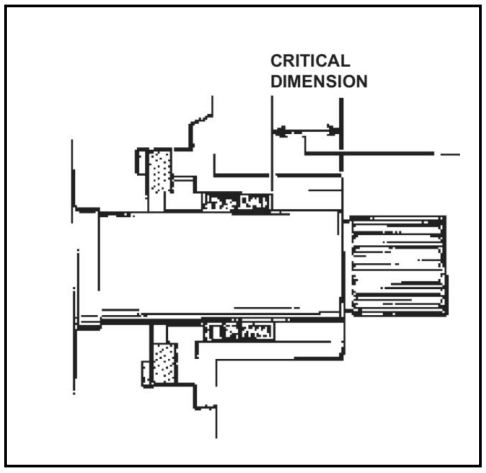


Figure 45 - Remove Seat Retainer

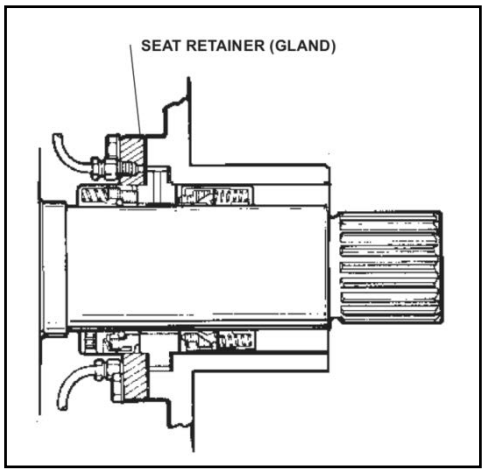


Figure 46 - Dual Inside and Outside Seal

Dual Inside and Outside Seal

1. Turn on seal water.
2. If water leaks past the outside seal, flush off any scale or crusted product that may have accumulated around the shaft and seal area and seal springs.
3. Check to see if seal is tight against seat. Repositioning seal to increase face seating pressure is suggested.
4. Check for cracked or damaged seal face by removing seal seat retainer bolts and sliding retainer back to expose sealing faces. If no faults are visible and leak persists or if damaged face is found, the replacement of seal and seal seat is recommended. To replace seal and seat, the fluid head must be removed. See “Fluid Head Disassembly (All Models)” on page 33.for proper procedure.
5. Remove pump cover and turn on seal water.
6. If water leaks past inside seal into pump body, replace entire seal assembly and seal seat. (See “Shaft Assembly” on page 43.).

Gear Case Disassembly

⚠ DANGER

To avoid serious injury, DO NOT install, clean, service, or repair the pump unless all power is off and locked out.

⚠ DANGER

To avoid serious injury, shut off and drain product from the pump prior to disconnecting piping.

⚠ CAUTION

To lift the cover on a 5080, attach an eye bolt to the threaded hole in the cover and attach lifting straps or chains to the eye bolt.

Remove Gear Case Cover

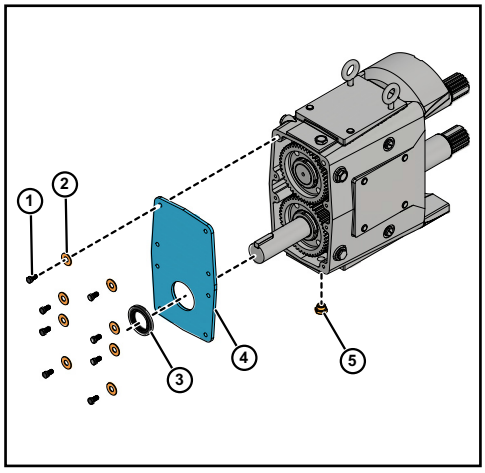


Figure 47 - Remove Gear Case Cover

1. Remove the oil drain plug (5) and drain the oil, as shown in Figure 47.
2. Remove the cap screws (1) and its washer (2) from gear case cover (4), as shown in Figure 47.
3. Pull the cover (4) off the shaft extension, as shown in Figure 47. If the cover sticks, use a soft hammer to loosen it.
4. Remove the silicone sealant from the gear case and cover.
5. Using an arbor press, remove the oil seal (3) from the cover (4). Discard the used oil seal, as shown in Figure 47.

Remove Shaft

1. Straighten the tab on the lock washers, as shown in Figure 48, (A).

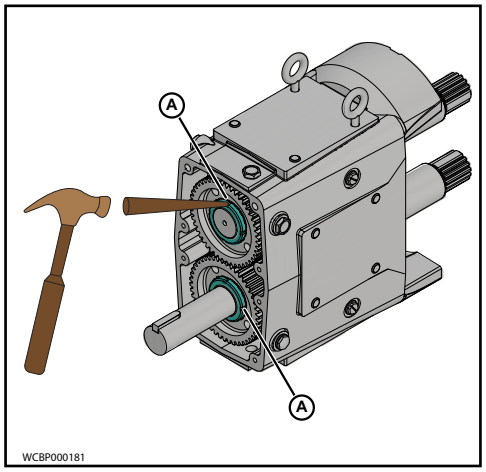


Figure 48 - Straighten Lock Tab

2. Prevent the shafts from turning by placing a wedge or soft dowel between the gears, as shown in Figure 49, (A).
3. Use spanner wrench or drift to remove gear lock nuts. Gears will be removed later.

NOTE: *Protect the liquid end of the shafts by wrapping them with tape.*

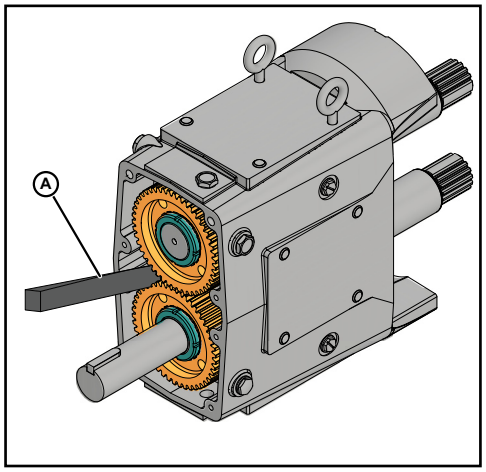


Figure 49 - Block Shaft Rotation

4. Remove the screws (1) and pull off the Seal Guard (2).

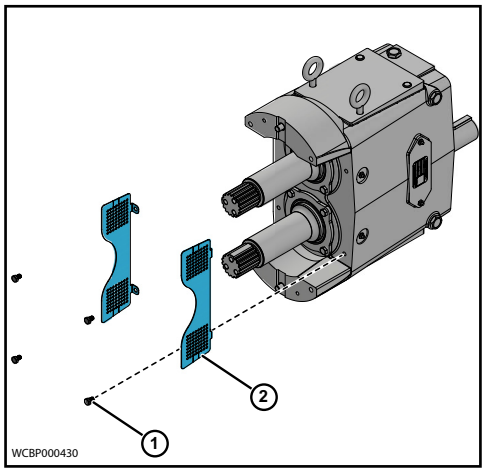


Figure 50 - Remove Seal Guard

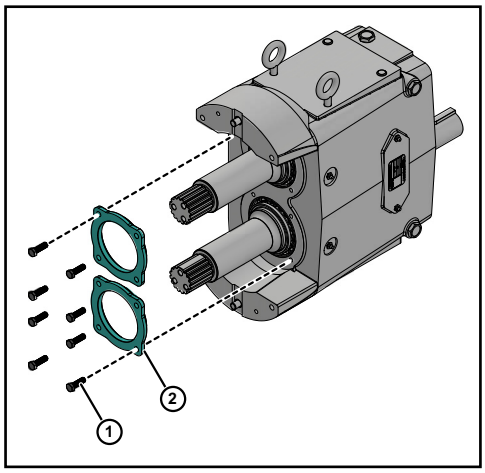


Figure 51 - Remove Bearing Retainers

5. Remove the front bearing retainer screws (1) and pull off the bearing retainers (2), as shown in Figure 51. (If a retainer is stuck, leave it in place, it will press out when the shaft is removed.)
6. Remove the silicone sealant from the bearing retainer (2) and gear case.

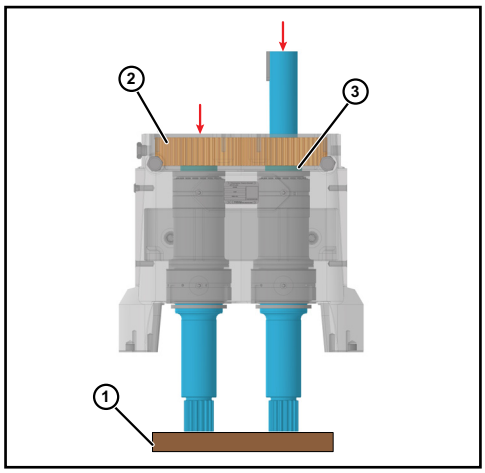


Figure 52 - Press Shafts from Gear Case

7. Place the gear case on an arbor press with the liquid end facing down. Protect the shaft ends with a wood or plastic block (1) and press the shafts out of the gear case, as shown in Figure 52.

⚠CAUTION

To lift the gear case assembly on pumps for all sizes of 5000 Series, attach lifting straps/chains to the two eye bolts on the top of the gear case.

8. Remove the gears (2) and spacers (3) from shaft. (See Table 8 on page 61 for hydraulic press tonnage required.)

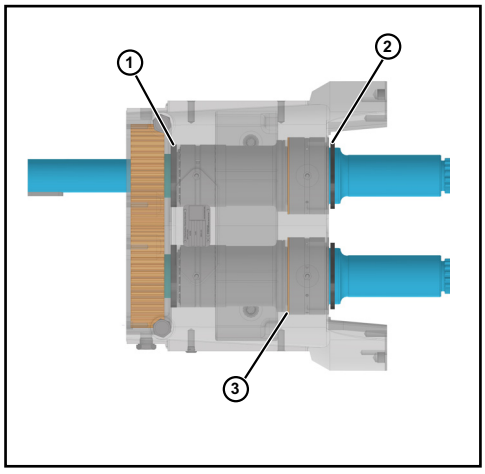


Figure 53 - Remove Oil Seals and Shims

9. Press out and discard the front bearing seals (2) from the front bearing retainers, as shown in Figure 52.
10. Remove the shims (3). If the shafts and bearings will be reused, identify the shims and bearings that belong with each shaft, as shown in Figure 53.
11. Press out and discard both rear oil seals (3) in the gear case, as shown in Figure 53.

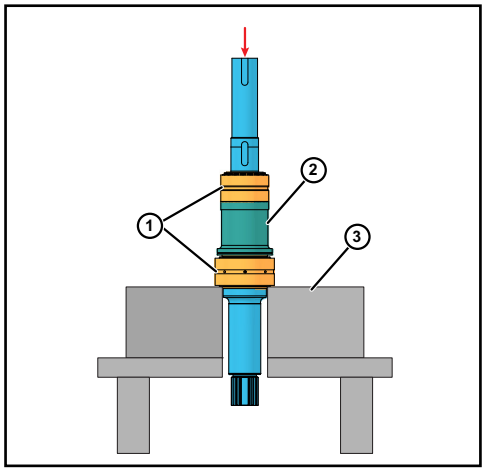


Figure 54 - Remove Bearings From Shaft

ALL SIZES EXCEPT 5080

1. Use hydraulic press and V-blocks (3) to remove the bearings (1) and spacer (2). (See Table 8 on page 61.)

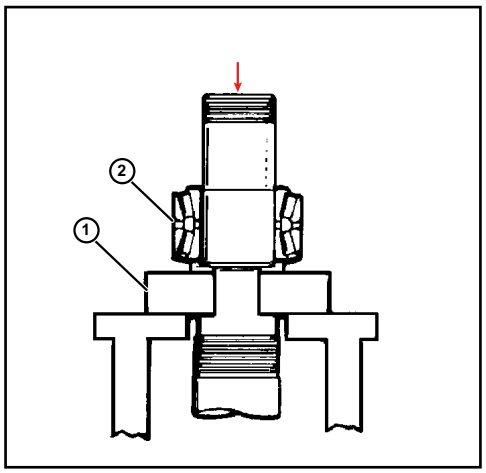


Figure 55 - Remove Rear Bearings From Shaft

SIZES 5080

1. Remove the rear bearing (2) by using V-blocks (1) and a hydraulic press. (See Table 8 on page 61.)

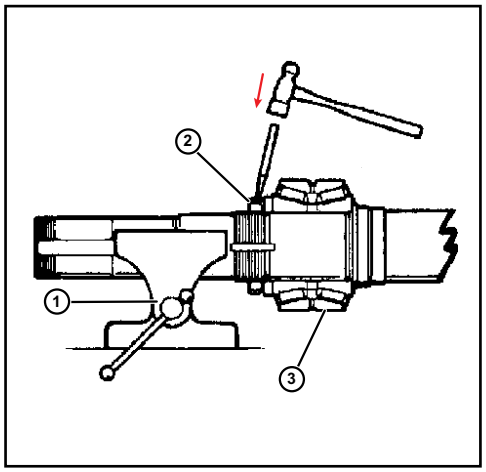


Figure 56 - Remove Lock Nut

2. Secure the shaft assembly in a soft jawed vise (1) as shown. Open tab in lock washer. Remove the front bearing lock nut (2) using a spanner wrench or drift punch.

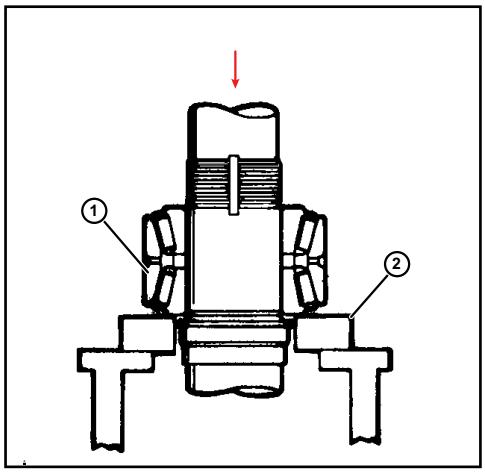


Figure 57 - Remove Front Bearings From Shaft

3. Remove the front bearings (1) using V-blocks (2) and a hydraulic press. (See Table 8 on page 61.)
4. Clean and inspect all the parts thoroughly if they are to be re-used.

Shaft Assembly

NOTE: *SPX FLOW now offers shaft assemblies with pressed-on bearings. See page 104.*

Front Bearing Assembly

SPX FLOW PD Precision Pumps require bearing assemblies with very tight internal tolerances. In fact, the internal tolerances of “off-the-shelf” bearings can be many times larger than required. Although they are considered in-spec in the bearing industry, they can cause internal damage within an SPX FLOW PD Pump.

SPX FLOW’s proprietary bearing “MATCHING” process starts with top quality bearing assemblies, then sorts, measures, pairs, grinds and adds spacers to them to ensure the matched bearing sets meet the required tight internal tolerances.

SPX FLOW bearings can be cross-referenced and appear to be the same, but competitive bearings are omitting the Matching process, which is imperative to achieve the required internal tolerances. Once a bearing set is matched, it must remain together as a set for the life of the pump, in order to maintain the tight internal tolerances.

Size 5040

1. Lubricate the front bearing area of the shaft with grease (3). Place it upright in a hydraulic press with the spline end down.

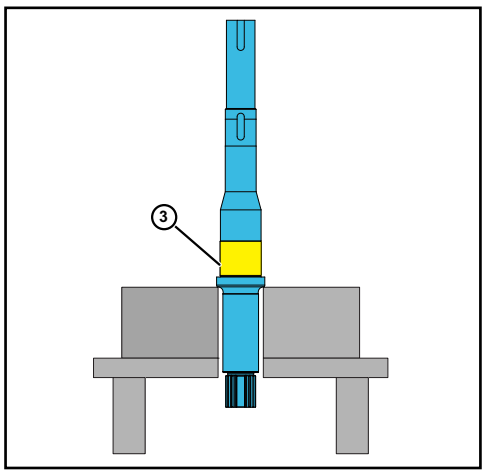


Figure 58 - Grease Shaft

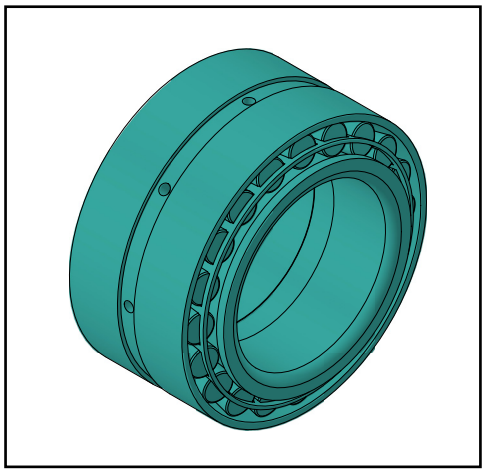


Figure 59 - Bearing Assembly

2. Unwrap the front bearing assembly.

***NOTE: DO NOT** interchange the parts of one bearing assembly with another. The parts are precisely matched during manufacturing and must be installed as a matched assembly.*

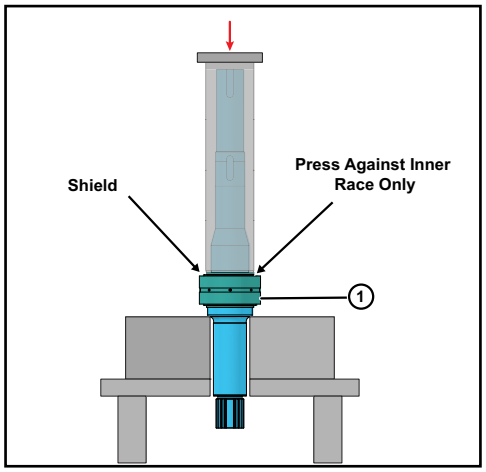


Figure 60 - Install Front Bearing

3. Place front bearing (1) over shaft with shield side up. Press onto shaft until seated against shaft shoulder. (See Table 8 on page 61.)

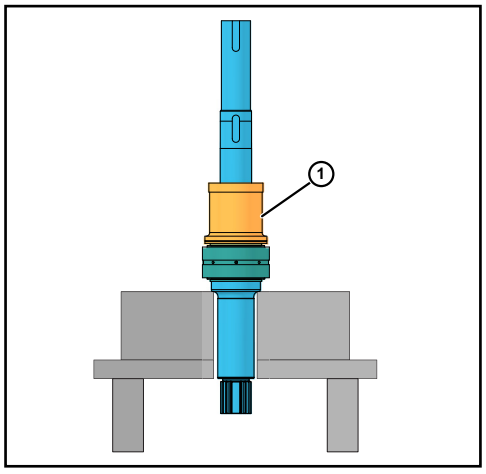


Figure 61 - Install Spacer

4. Place spacer (1) over shaft onto bearing, as shown in Figure 61.

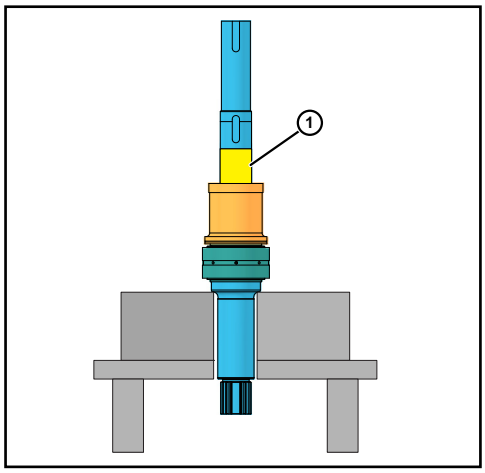


Figure 62 - Grease Shaft

5. Lubricate the shaft rear bearing area with grease (1), as shown in Figure 62.

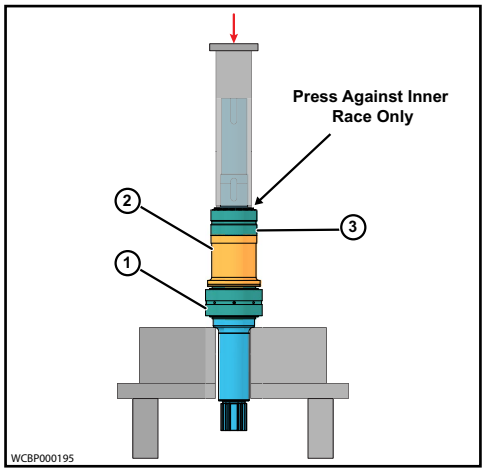


Figure 63 - Install Rear Beraing

6. Slip rear bearing (3) over shaft with shield side down. Press bearing onto shaft until it seats against spacer (2) and front bearing (1), as shown in Figure 63.

Size 5050, 5060, 5070 and 5080

1. Lubricate the front bearing area of the shaft with grease. Place it upright in a hydraulic press with the spline end down.

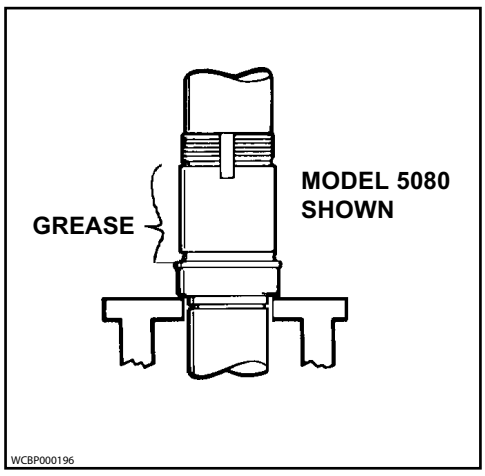


Figure 64 - Shaft Grease

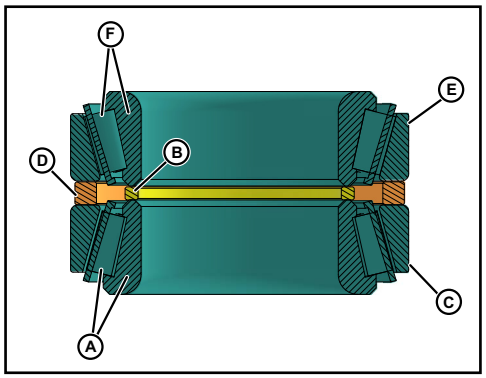


Figure 65 - Bearing Assembly

A. Lower Cone / Roller Assembly
B. Inner Spacer
C. Lower Cup
D. Outer Spacer
E. Upper Cup
F. Upper Cone / Roller Assembly

2. Unwrap the front bearing assembly.

***NOTE: DO NOT** interchange the parts of one bearing assembly with another. The parts are precisely matched during manufacturing and must be installed as a matched assembly.*

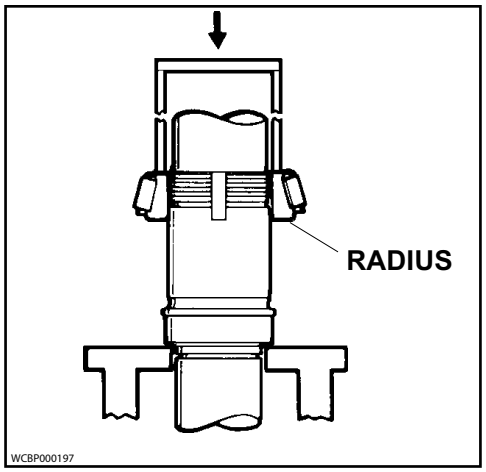


Figure 66 - Press Lower Cone onto Shaft

1. Lift the lower cone and roller assembly out of bearing stack and place on the shaft with the radius facing down. Press it onto the shaft until it is seated against the shaft shoulder. **Press only on the inner cone,** as shown in Figure 66.

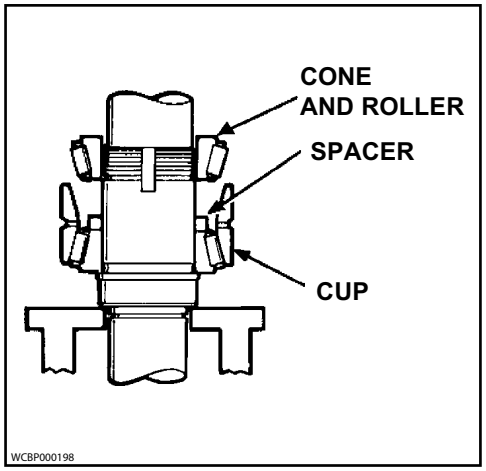


Figure 67 - Install Spacers, Cups and Cone

2. Place spacer over shaft onto bearing cone, as shown in Figure 67.
3. Place the bearing cup over cone and roller assembly, keeping the cup oriented with proper roller assembly, as shown in Figure 67.
4. Lubricate the remaining bearing cone and roller inside diameter with grease and slip them over the shaft with roller radius up. Press onto shaft and into cup to complete assembly of front bearing on shaft, as shown in Figure 67.

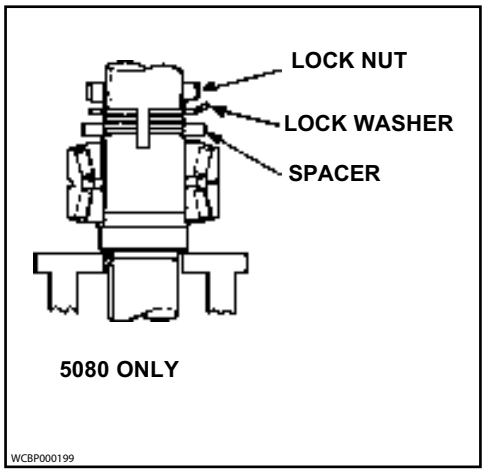


Figure 68 - Install Spacer, Lock Washer and Lock Nut

5080 ONLY

1. Apply the grease to threaded area on shaft and face of lock nut.
2. Install the spacer, lock washer and lock nut. Finger-tighten nut, as shown in Figure 68.

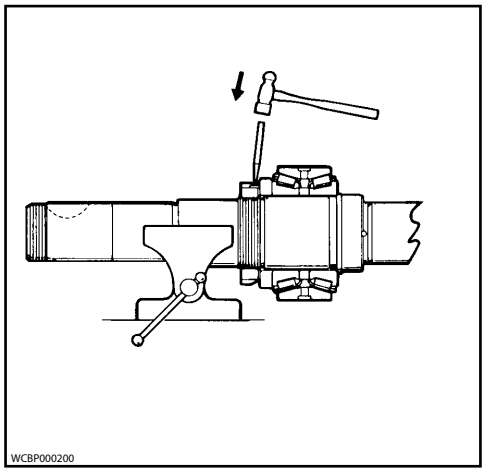


Figure 69 - Tighten Lock Nut

5080 ONLY

1. Clamp the shaft behind the lock nut in a soft jawed vise and drive the lock nut tight using a spanner wrench or drift. (See Table 7 on page 61 for torque requirements.).
2. Bend the lock washer tab into groove on the nut to secure assembly.

Rear Bearing Assembly

Sizes 5040,5050,5060,5070 and 5080

1. Unwrap the rear bearing assembly.

NOTE: *DO NOT interchange the parts of one bearing assembly with another. The parts are precisely matched during manufacturing and must be installed as a matched assembly.*

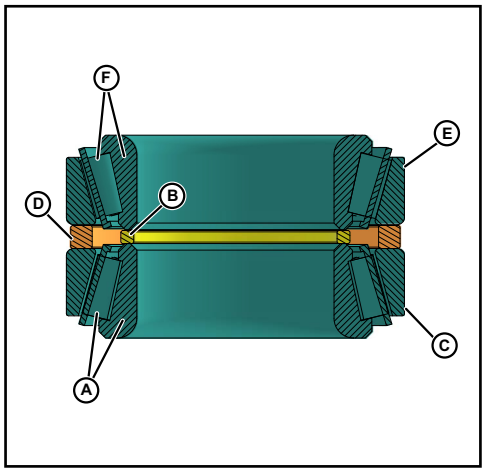


Figure 70 - Bearing assembly

A. Lower Cone / Roller Assembly
B. Inner Spacer
C. Lower Cup
D. Outer Spacer
E. Upper Cup
F. Upper Cone / Roller Assembly

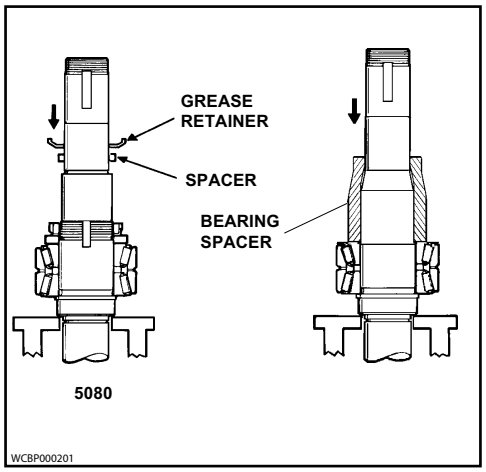


Figure 71 - Install Bearing Spacer

2. Place the shaft upright in an arbor press with gear end up. Install bearing spacer on all model shafts, as shown in Figure 71.

NOTE: *On 5080 only, install spacer and grease retainer with flange up.*

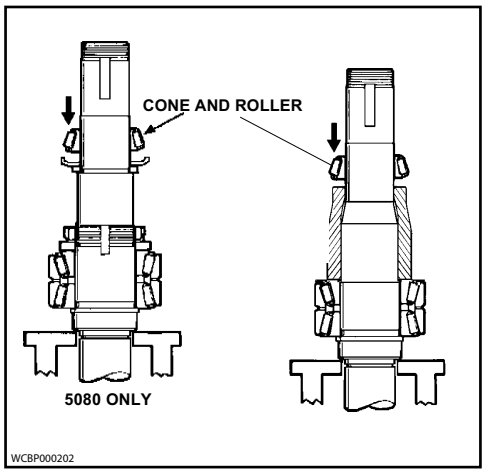


Figure 72 - Install Cone And Roller

3. Lubricate the shaft bearing area with grease. Press the bearing cone and roller assembly (with radius down) onto shaft. (For hydraulic press tonnage required, see Table 8 on page 61.).

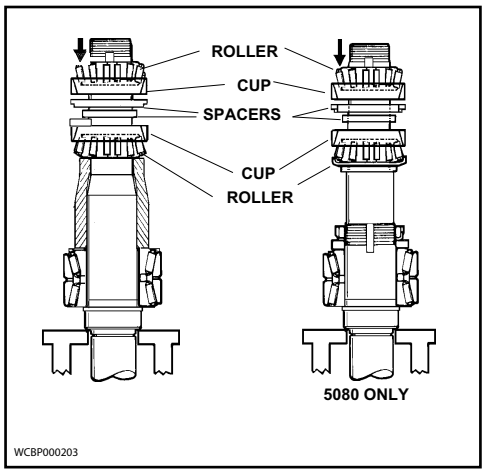


Figure 73 - Install Cup, Inner and Outer Spacer

NOTE: *On 5080 only, install the spacer and grease retainer with flange up.*

4. Press the cone and roller assembly until it seats against grease retainer and spacer.
5. Apply the grease again. Slip bearing cup over roller assembly. Install both inner and outer spacers. Place remaining cup onto the outer spacer and press on the remaining cone and roller assembly. (See Table 4 on Page 35.). Be sure outer spacer is concentric on shaft.

Gear Case Assembly

⚠CAUTION

To lift the gear case assembly on pumps for all sizes of U 5000, attach lifting straps/chains to the two eye bolts on the top of the gear case.

Suggested Shims				
5000 Series Model	Standard Shaft in	Replacement Shaft in	R1	R2
5040	0.116-0.120 in	0.110 in	0.090 in	0.060 in
5050	0.116-0.120 in	0.110 in	0.090 in	0.060 in
5060	0.116-0.120 in	0.110 in	0.090 in	0.060 in
5070	0.116-0.120 in	0.110 in	0.090 in	0.060 in
5080	0.120-0.126 in	0.110 in	0.090 in	0.060 in

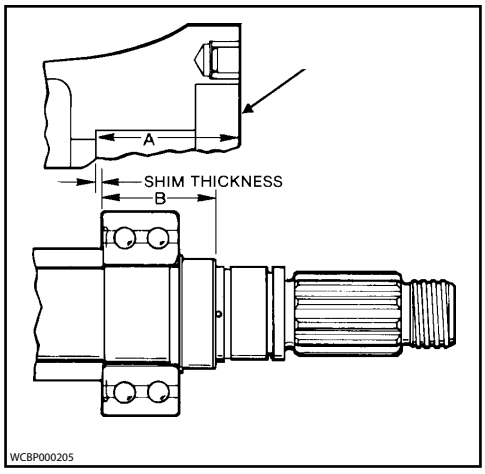


Figure 74 - Measure A and B

Shimming

1. When installing the shafts in the gear case, shim behind the front bearing to achieve the proper backface clearance between the back of the rotors and the body. The backface clearance must be equal for both rotors to prevent the rotors from hitting each other during operation.

NOTE: *Do not install bearing retainer sealant, gears, or gear lock nuts until the correct shimming has been verified.*

2. **If the shafts and/or bearings do not need to be replaced and** the **shims are marked indicating the shaft and bearing they are matched with,** a shim adjustment probably will not be necessary. Reuse the existing tagged shims, shafts and bearings in the same gear case bores.
3. **If existing shims are lost and/or a standard shaft is used,** determine the required shims from the chart.
4. **If it is necessary to calculate the required shims for replacement shafts, bearings or both,** refer to Figure 74; carry measurements and calculations to three decimal places (e.g., 0.059).

NOTE: *Arrange with thicker shims on outside of the shim pack.*

5. Determine the shim thickness required for the front bearing:
   - Measure “A” in the gear case and “B” on the shaft to three decimal places (1.000, for example).
   - Using these values to calculate the shim thickness as follows: Required Shims = A - B.
6. Use standard shim packs to equal the required shim thickness. Place the shims in the gear case, resting against the shoulder in the front bearing bore.

Install Shaft

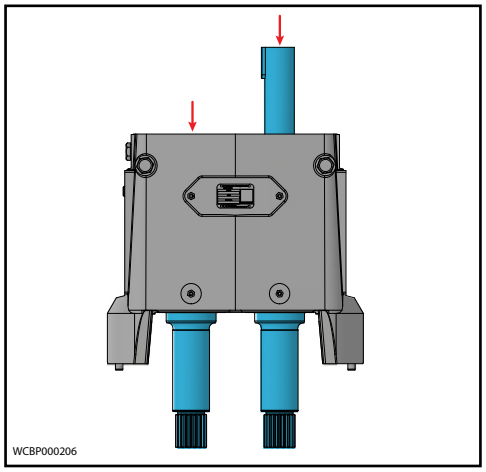


Figure 75 - Install Shaft assembly

1. With the shims in place, install the shaft assembly in the front bearing bore with the spline end facing up, as shown in Figure 75. Ensure that the shaft is installed in its original location.

NOTE: *The shafts may need to be removed for a final shim adjustment.*

2. Lubricate the outside diameter of the bearing.
3. Press the shaft into place until it is seated against the shim pack. Press only against the outer race of the bearing.

NOTE: *A tube of the same diameter as the outer race of the bearing also can be used to press the shaft into place.*

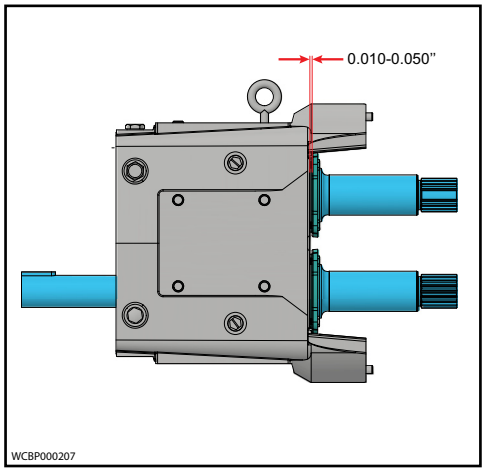


Figure 76 - Clearance

4. Secure the shaft assembly in gearcase with bearing retainers to aid in checking the clearances. **DO NOT** install silicone sealant at this time.
5. The bearing retainer must rest firmly against the bearing. Leave a 0.010 to 0.050 in (.25 to 1.25 mm) clearance between the back of the bearing retainer and the front of the gear case (Figure 76). If this clearance is not met, place shims between the bearing and retainer.
6. Check back face clearance. See Table 8 on page 61 and BACK FACE CLEARANCE, on page 53.
7. Remove the bearing retainers.

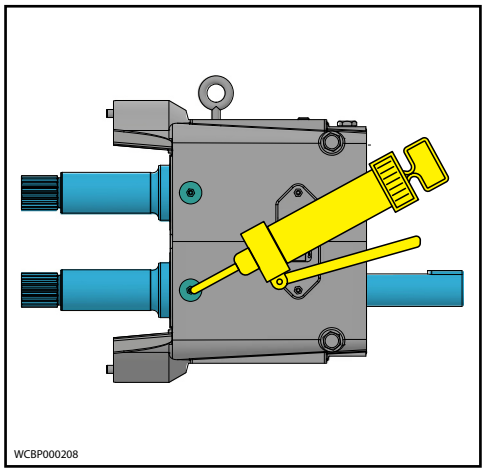


Figure 77 - Apply Grease

8. Apply the grease on front and rear bearing through grease fittings until grease is visible around ball assemblies.

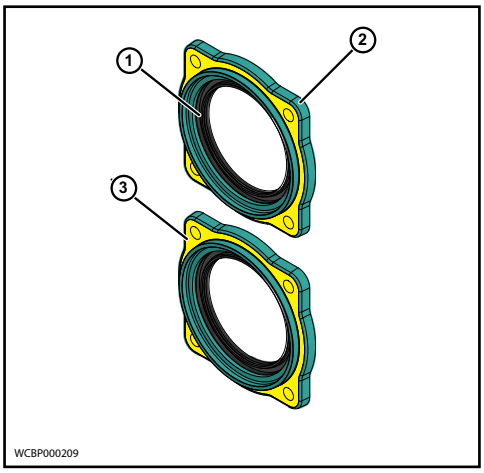


Figure 78 - Install Grease Seal

9. Lightly coat the Grease lip seal (1) outer diameter with Red Loctite® 2760. Installing the lip seal (1) into the bearing retainer (2) with the compression spring facing the inside of the pump.
10. Install the grease seals (1) in bearing retainers (2) (lip in) and lubricate the seal lips with grease. Lubricate the retainer flanges with silicone sealant (3), as shown in Figure 78.

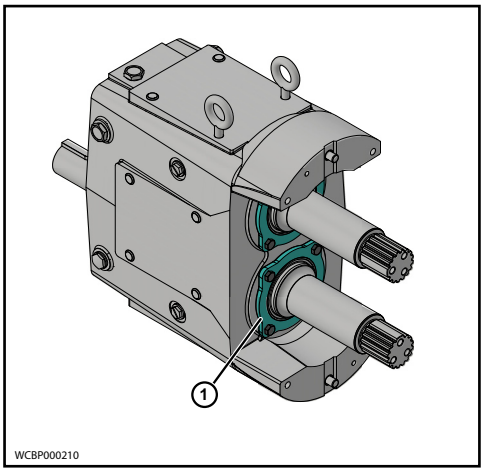


Figure 79 - Install Bearing Retainer

11. Install bearing retainers, as shown in Figure 79.

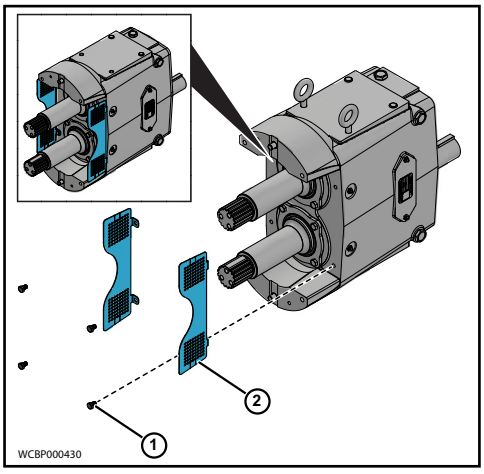


Figure 80 -Install Seal Guard

12. Install the Seal Guard (2) and tighten it with the screws (1), as shown in Figure 80.

Install Rear Seal Assembly

NOTE: *Place tape or other material over the shaft end to prevent cutting the seal during installation.*

1. Install the spacer seals and gear spacers (1), as shown in Figure 81.
2. Lubricate the inside and outside diameters of the oil seals (2) with grease.

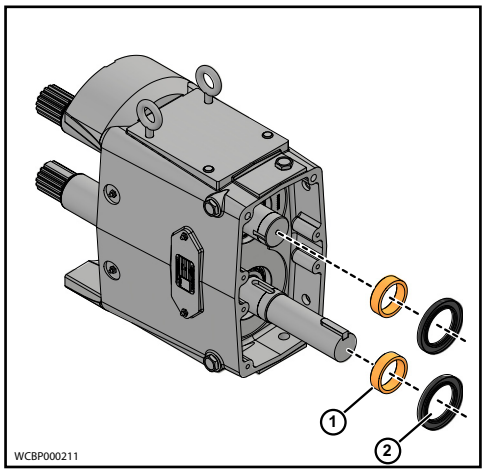


Figure 81 - Install Oil Seal and Spacer

3. Install the oil seals (2) with the spring facing out, as shown in Figure 81.

NOTE: *Seal is flush with gear case on Model 5050, 5060 and 5080 pumps. On the 5070 pump the seal will protrude 1/8-inch out side of gear case surface.*

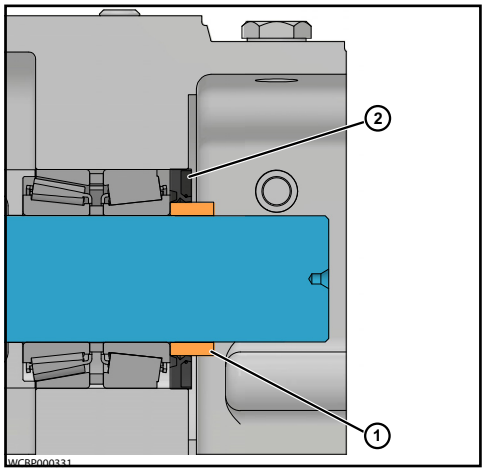


Figure 82 - Installed Oil Seal and Spacer

Install Timing Gears

1. Place the gear keys (3) into the shaft key slots. Angle the keys out for easier installation of the gears, as shown in Figure 83.

NOTE: *To aid in timing setup, rotate the rotors until they are at right angles to each other before installing the gears.*

2. Slide the spur drive gear onto the drive shaft. The spur drive gear has one punch mark on the gear, as shown in Figure 83.
3. Slide the short shaft gear onto the short shaft. The short shaft gear has two punch marks on the gear. Straddle the single punch mark of the spur drive gear with the two punch marks on the short shaft gear, as shown in Figure 83.

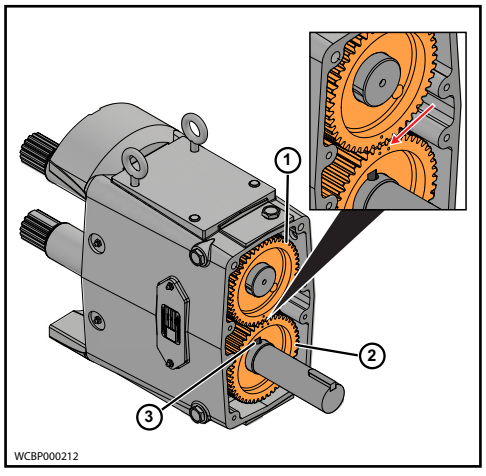


Figure 83 - Timing Gear Marks

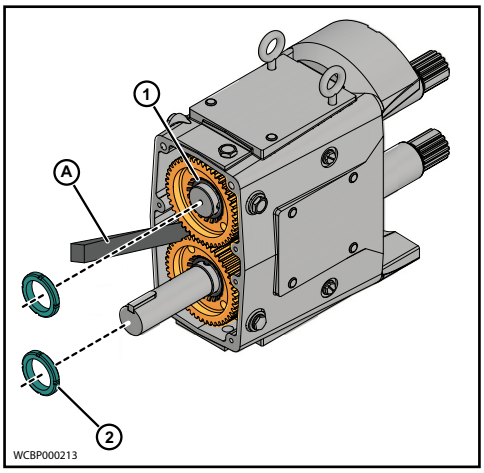


Figure 84 - Block Shaft Rotation

4. Use a wood or nylon block (A) to keep the shafts from turning. If a block is not available, use rags to block the gears, or with one rotor on the shaft, block the rotor with a nylon dowel, as shown in Figure 84.
5. Slide the lock washers (1) onto the shaft. Lubricate the threaded area on the shafts and face of the locknuts (2) with oil or grease, as shown in Figure 84.

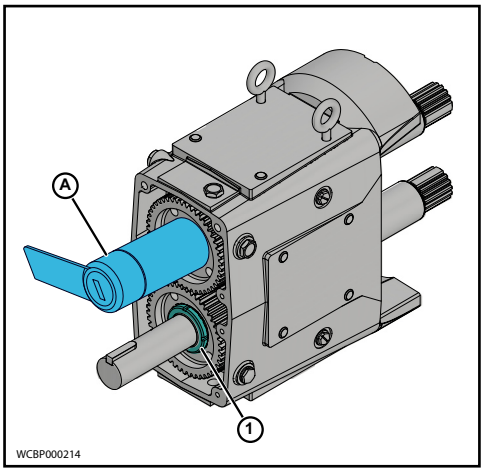


Figure 85 - Install Gear Locknut

6. Tighten the gear locknuts (1) to the specified torque, using a gear nut driver tool (A), as shown in Figure 85.

Table 4: Torque Values of Gear Locknut

5000 Series Model	Gear Nut Torque
5040	100 ft-lb 136 N·m
5050 - 5060	140 ft-lb 190 N·m
5070	230 ft-lb 312 N·m
5080	320 ft-lb 434 N·m

Table 5: Tool List

Description	5040	5050 5060	5070	5080
Gear Nut Driver	109282+	109283+	110304+	114702+
Gear End Thread Chaser	109288+	109289+	110305+	N/A

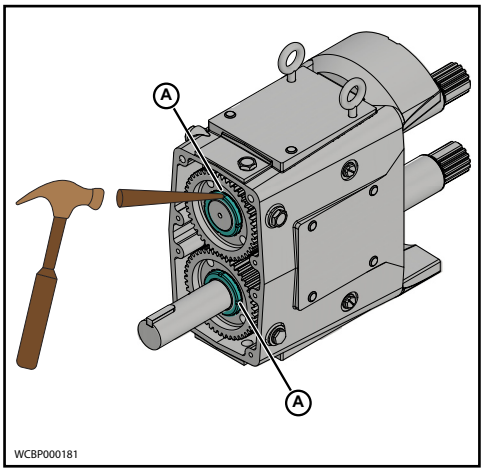


Figure 86 - Bend Lock Tab on Lock washers

7. Bend the locking tab (A) on the lock washers into the locking nut slots, securing the gear locknut into place, as shown in Figure 86.

Checking for Proper Clearance

Waukesha Cherry-Burrell brand pumps are designed with close running clearances. Backface clearances are set with shims during assembly.

Shafts are positioned with shims behind the front bearing and locked into gear case with the bearing retainers. Rotors lock against the shaft shoulder. Clearance between the body backface and the back of the rotor wing is called backface clearance.

NOTE: *It is generally best to keep backface clearance to a minimum.*

1. To check backface clearance, first mount the body (less seals) onto the housing. Assemble the rotors and secure them with rotor jam nuts.

⚠CAUTION

Backface clearance for both rotors must be equal to avoid crossover interference with the adjacent rotor hub.

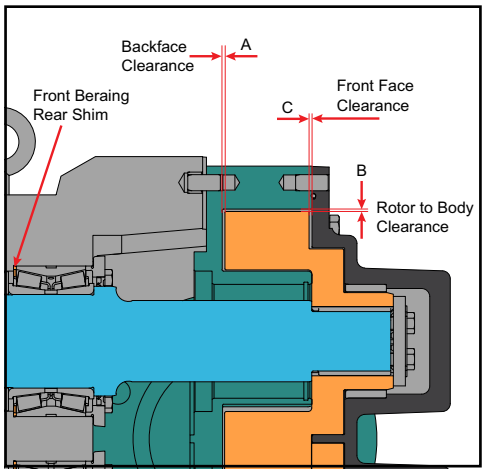


Figure 87 - Clearance Measurements

2. With feeler gauges, measure the rotor backface clearance (Figure 87, item A), through the port or from the front.
3. Measure the rotor front face clearance (Figure 87, item C).
4. Measure the rotor to body clearance (Figure 87, item B).
5. Check the measured clearances against Table 5, “Rotor Clearances,” on page 54.
6. Make corrections as required and follow examples in Table 6, “Backface Clearance Corrections,” to determine the exact adjustment to make and to avoid unnecessary assembly/ disassembly.
7. To make shim adjustments, first remove the rotors, body and shafts. Make the required shim adjustment and reassemble.
8. Re-check the backface clearances. Be sure both rotors have the same clearance to avoid crossover interference with the adjacent rotor hub.

Table 6: Rotor Clearances

5000 Series Model	A - Backface in (mm)	B - Rotor to Body in (mm)	C - Front Face in (mm)
5040	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.0025 - 0.005 in (0.063 - 0.127 mm)
5050	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5060	0.0025 - 0.003 in (0.063 - 0.076 mm)	0.0035 - 0.005 in (0.088 - 0.127 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5070	0.004 - 0.005 in (0.101 - 0.127 mm)	0.004 - 0.0055 in (0.101 - 0.139)	0.004 - 0.008 in (0.101 - 0.203 mm)
5080	0.005 - 0.006 in (0.127 - 0.152 mm)	0.005 - 0.007 in (0.127 - 0.177 mm)	0.005 - 0.009 in (0.127 - 0.228 mm)

Rotor Styles: Std. = Standard Clearance, FF = Front Face Clearance, Hot = Hot Clearance

See “Rotor Styles” on page 12 for descriptions; see page 12 for operating temperatures.

Table 7: Backface Clearance Corrections

Problem	Condition	Correction
Too Much Backface Clearance (A)	Dimension A is greater than the value in Table 5.	A (measured) minus Column A (Table 5) = shims to remove from the rear outer race of the front bearing
	Rotor wing face projects past the body front face	C (measured with depth micrometer) plus C (Table 5) = shims to remove from the rear of the front bearing
Not Enough Backface Clearance (A)	Dimension A is less than the value in Table 5.	Column A (Table 5) minus A (measured) = shims to add to the rear outer race of the front bearing

NOTE: *If the clearance corrections in Table 6 have been performed and desired performance is not achieved, contact SPX FLOW technical services for guidance.*

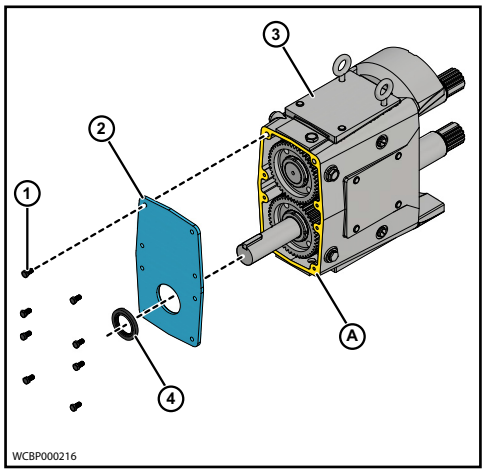


Figure 88 - Install Cover Lip Seal and Cover

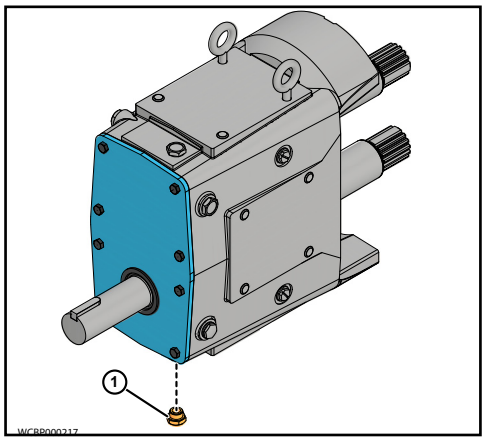


Figure 89 - Install Oil drain Plug

Install Gear Case Cover

1. Lightly coat the new oil seal (4) outer diameter with Red Loctite® 2760.
2. Lubricate the inside diameter of a new oil seal (4), as shown in Figure 88.
3. Press the new oil seal (4) into the gear case cover (2) flush with the outside face, with the spring facing in, as shown in Figure 88.
4. Apply silicone sealant (A) to the back of the gear case (3). (Gore-Tex® sealing tape can be used on silicone-free models.) Place tape on the inside of the screw holes.
5. Tape the shaft end to prevent cutting the seal on the keyway. Mount the cover assembly on the gear case. Secure it with cap screws.
6. Remove the tape from the shaft end.

   NOTE: *Make sure that the shaft is centered in the lip seal before securing the cap screws.*
7. Install the oil drain plug (1), as shown in Figure 89.
8. Fill the gear case with gear oil to the proper level. Refer to “Lubrication” on page 27.

Fluid Head Assembly

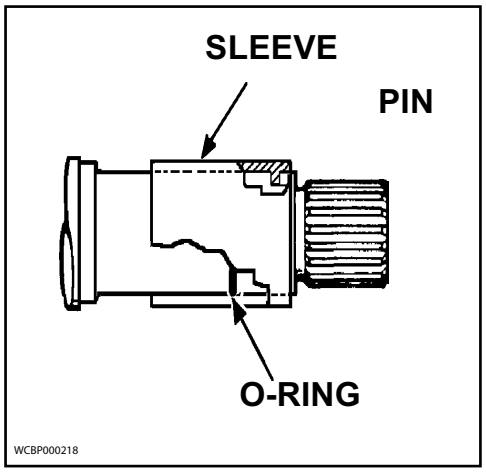


Figure 90 - Place O-rings on shaft grooves

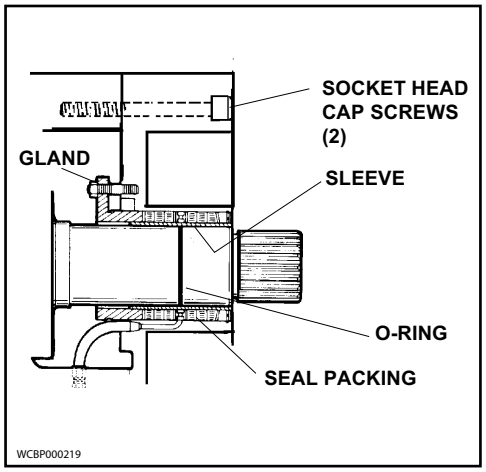


Figure 91 - Mount body

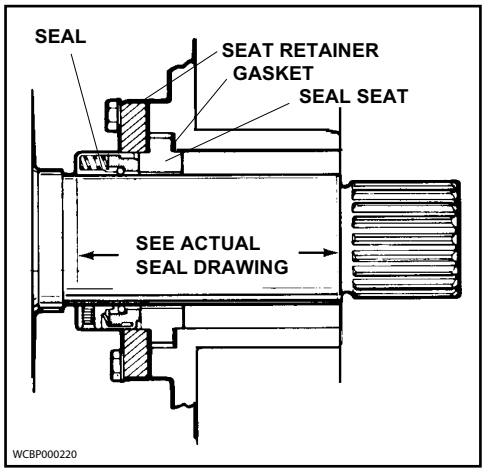


Figure 92 - Install Mechanical seal parts

Mechanical Packing

1. Place the O-rings into grooves on shafts then slip sleeves onto shafts with pin indexed into notch on shaft, as shown in Figure 90.
2. For parts identification and correct order of assembly see packing parts list and sectional drawing starting from page 88.
3. Mount body (with packing material) onto shafts and secure to bearing gear case with two socket head cap screws, as shown in Figure 91.
4. Make final gland adjustment when pump is in service.

Mechanical Seals

NOTE: *Handle all seal components with extreme care.*

External Type

1. Place seal rotating member onto shaft with seal face out. Lock seal onto shaft at proper location. (See seal assembly drawing for correct location dimension.)
2. Slip seal seat retainer, retainer gasket, seal seat, and seat gasket onto shaft in that order.
3. Mount body on bearing gear case with two socket head screws being sure to insert gaskets and seal seats into cavities on back of body. Secure seal seats with retainers using cap screws. ***Record dimension prior to disassembly. Refer to page 38.**

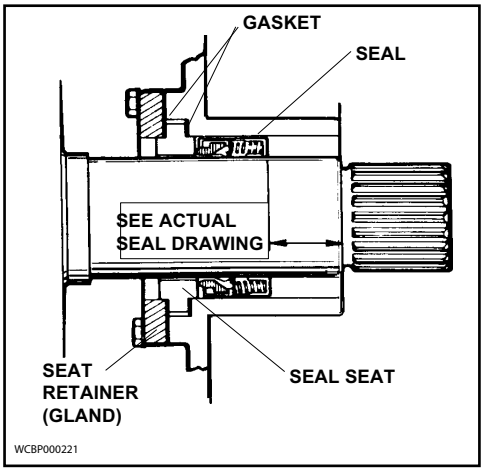


Figure 93 - Install Mechanical seal parts

Internal Type

1. Slip seal seat retainers onto shafts followed by gasket, seal seat and seat gasket.
2. Slip seals with seal face towards bearing gear case onto shafts and secure at proper location with set screws. (See seal assembly drawing for correct location dimension.)
3. Secure pump body to bearing gear case with two cap screws.
4. Slip seat gasket into body followed by seal seat. Install seat retainer and gasket and secure with cap screws. (See Table 7 on page 61.)

NOTE: *Seat Retainer may also be called gland.*

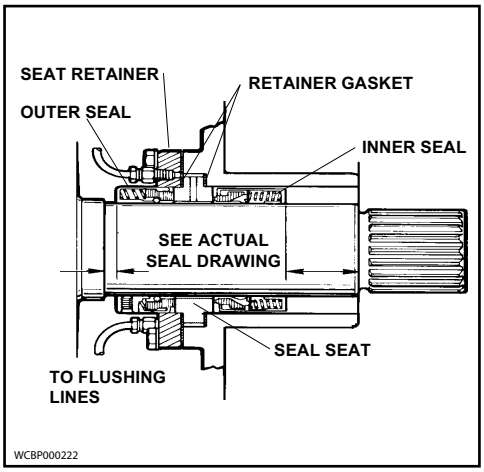


Figure 94 - Install Mechanical seal parts

Double Seal with Flushing

1. Place outer seal rotating member onto shaft with seal face toward fluid head. Lock seal onto shaft at proper location. (See seal assembly drawing for correct location dimension.)
2. Slip seal seat retainer, retainer gasket, seal seat, and seat gasket onto shaft in that order.
3. Slip inner seals with seal face towards bearing gear case onto shafts and secure at proper location with set screws. (See seal assembly drawing for correct location dimension.)
4. Mount body on bearing gear case with two socket head screws being sure to insert gasket and seal seats into cavities on back of body. Secure seal seats with retainers using cap screws (refer to seal assembly drawing.)
5. Connect flushing lines after pump is installed.

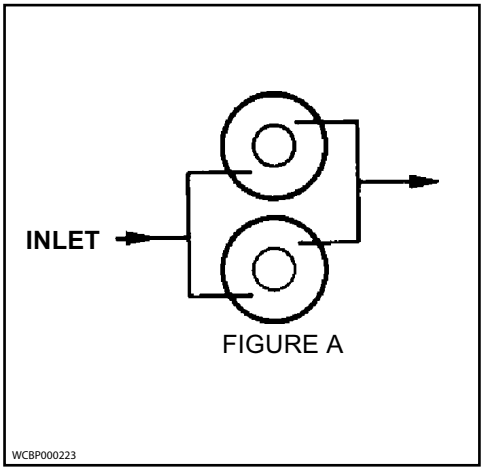


Figure 95 - Flushing Connections

Flushing Connections (1/8" NPT-F)

NOTE: *Flushing media should be piped into lower connection of each shaft seal and discharged out upper connections. Both inlets and both outlets may be manifolds to simplify piping. (Figure A).*

Typical Flush Piping

NOTE: *High pressure outside seal is required.*

1. Flushing media is restricted on discharge side of pump flushing glands. (Figure B).
2. Set flow rate of approximately 1/4 GPM for most applications. For high temperature applications, increase flow.

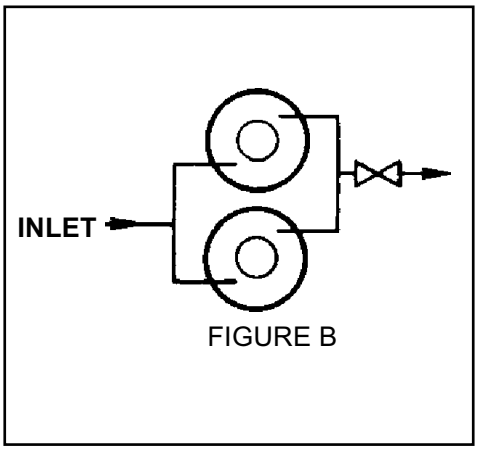


Figure 96 - Flushing Connections

Rotor and Cover Assembly

1. Install the rotors (1) onto the shaft splines, as shown in Figure 97.

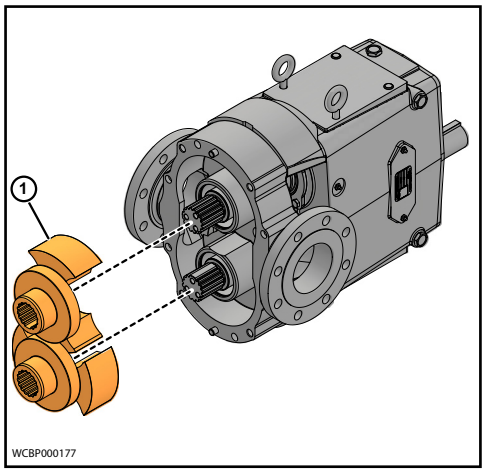


Figure 97 - Install Rotor

2. Install the following components:
   - Retainer washers (3)
   - Lock clips (2)
   - Retainer bolts (1), as shown in Figure 98.
3. Lock the bolts with locking clip tab. (Apply anti-seize compound to bolts.)

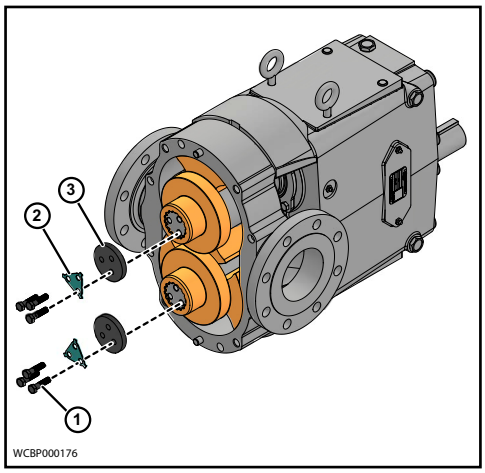


Figure 98 - Install components

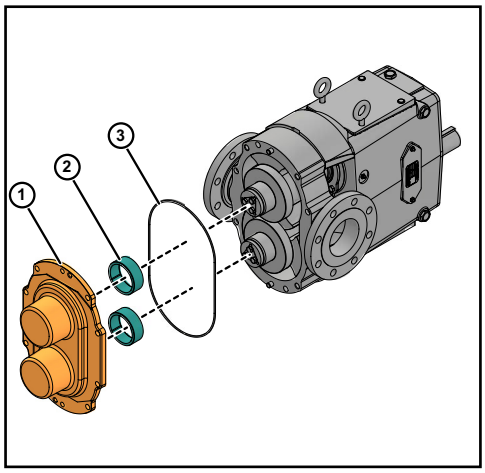


Figure 99 - Install the O-ring

4. Press fit the bushing (2) into the cover hub and place the O-ring (3) into the cover groove, as shown in Figure 99.

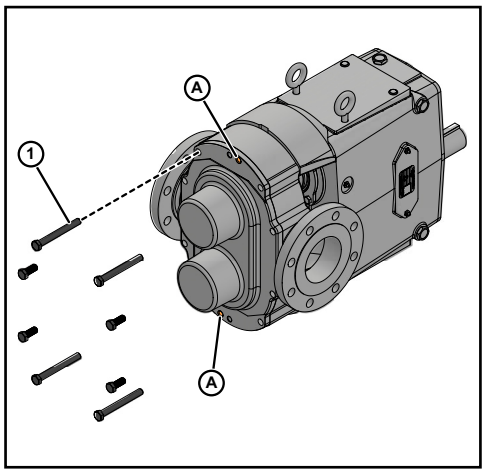


Figure 100 - Install cover

5. Mount cover over the rotor hubs and body dowels. Secure with eight cap screws (1), as shown in Figure 100. (See page 60 for relief cover installation and adjustment.).

Internal By-Pass Relief Valve

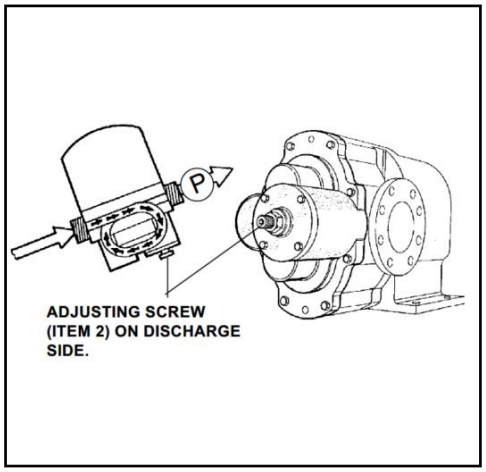


Figure 101 - Turn adjusting screw

FOR INDUSTRIAL STAINLESS STEEL ("I") PUMP

MODELS 5040, 5050, 5060, 5070, and 5080

Adjustable spring tension operated piston opposite the pumped fluid. The pump cover is reversible for right or left hand flow direction. O-ring seals are furnished in materials compatible with the product being pumped.

Installation

Valve Mechanism MUST BE ON DISCHARGE SIDE.

Adjustment

With pressure gauge and valve in discharge line.

1. Turn adjusting screw counterclockwise until loss of spring pressure is felt. then turn clockwise until light spring pressure is resumed.
2. Turn on pump.
   A. Close discharge valve slowly and observe gauge. Do NOT ALLOW PRESSURE to exceed 200 PSI.
   B. Turn adjusting screw clockwise.Observe gauge. When desired relief pressure is observed, lock adjusting screw with locknut.
   C. Open discharge valve. Relief valve is set and will open if system pressure exceeds preset limit.

Without pressure gauge in discharge Line.

1. Turn adjusting screw clockwise and observe product flow at discharge of system.
2. When product flow reaches maximum or desired flow rate, lock adjusting screw with locknut.

Reference Tables

Table 8: Torque Values and Wrench Size

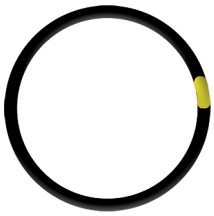
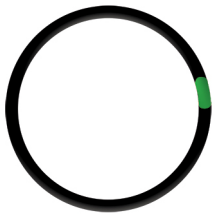
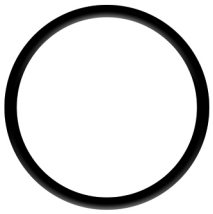
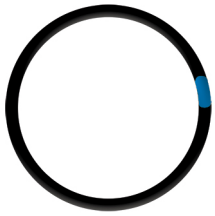
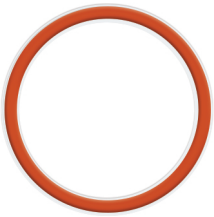
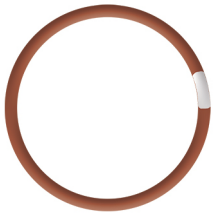
5000 Series Model	Torque Values - Lock Nuts			Wrench Size, Cap Screw
	Front Bearing	Gear	Rotor	
5040	-	100 ft lbs 136 N·m	30 ft lbs 41 N·m	1/2”
5050 - 5060	-	140 ft lbs 190 N·m	38 ft lbs 52 N·m	9/16”
5070	-	230 ft lbs 312 N·m	38 ft lbs 52 N·m	3/4”
5080	*360 ft lbs 488 N·m	320 ft lbs 434 N·m	38 ft lbs 52 N·m	15/16”

NOTE: ** The front bearing lock nut is used for the old shaft models, valid until July 30, 2001*

Table 9: Arbor or Hydraulic Press Required (Tons)

5000 Series Model	Shaft		Front Bearing		Rear Bearing Shaft	
	In	Out	On	Off	On	Off
5040	0.25	0.5	0.5	0.1	0.5	0.1
5050 - 5060	0.5	1	2	5	3	5
5070	0.5	1	5	15	5	15
5080	0.5	1	5	20	5	20

Standard O-Ring Selections, Descriptions and Color Codes for Universal Pumps

Nitrile (Buna-N) (NBR) Compound Color: Black Color Code: Yellow FDA Compliant to 21CFR177.2600 	Silicone (Si) Compound Color: Orange Color Code: Black FDA Compliant to 21CFR177.2600 
Ethylene Propylene Diene Rubber (EPDM) Compound Color: Black or Purple Color Code: Green FDA Compliant to 21CFR177.2600 	Perfluoroelastomer (FFKM) Compound Color: Black Color Code: None Individually packaged with size and material noted. 
Ethylene Propylene Diene Rubber (Sulfur Free) (EPDM) Compound Color: Black or Purple Color Code: Blue FDA Compliant to 21CFR177.2600 	PTFE Encapsulated Compound Color: Translucent coating over Orange or Black Silicone or FKM core Color Code: None FDA Compliant to 21CFR177.2600 
Fluorocarbon Rubber (FKM) Compound Color: Rust, Brown or Black Color Code: White FDA Compliant to 21CFR177.2600 	

Cleaning

Many of these sanitary elastomer materials appear similar. To facilitate identification, these sanitary gaskets are specifically color-coded with marks. Before installation, ensure the gaskets are cleaned to remove the colored markings and are cleaned.

A complete CIP cycle must be performed prior to initiating the production run.

Troubleshooting

Problem	Possible cause	Suggested action
No flow, pump rotors are not turning	Drive motor not running.	Check resets, fuses, circuit breakers.
	Keys sheared or missing.	Replace.
	Drive belts, power transmission components slipping or broken.	Replace or adjust.
	Pump shaft, keys, or gears sheared.	Inspect: and replace parts as necessary.
No flow, pump rotors are turning	Rotors turn in the wrong direction.	Check motor hookup to reverse motor rotation.
	Relief valve not properly adjusted, or held open by foreign material.	Adjust or clear valve.
	Suction port is blocked, not allowing flow to the pump.	Check all inlet valves, strainers, tank outlet ports.
No flow, pump not priming	Valve closed in inlet line.	Open valve.
	Inlet line clogged or restricted.	Clear line, clean filters, etc.
	Air leaks due to bad gaskets or pipe connections.	Replace gaskets; check lines for leakage (can be done by air pressure or by filling with liquid and pressurizing with air).
	Pump speed too slow.	Increase pump speed.
	Pump speed too fast for high-viscosity liquid.	Decrease pump speed.
	Liquid drains or siphons from system during off periods.	Use foot valve or check valves. Filling inlet lines with material before startup may solve startup priming problems due to no material in system.
	"Air" lock caused by fluids which "gas off", or vaporize, or allow gas to come out of solution during off periods.	Install and use a manual or automatic air bleed from pump or lines near pump.
	Extra clearance rotors, worn pump.	Increase pump speed, use foot valve to improve priming.
		Replace worn rotors.
	Net inlet pressure available too low.	Check Net Inlet Pressure Available & Net Inlet Pressure Required. Change inlet system as needed.

Problem	Possible cause	Suggested action
No flow, pump not priming, cont'd	On "Vacuum" inlet system: On initial start-up, atmospheric "blow back" prevents pump from developing enough differential pressure to start flow.	Install check valve in discharge line.
Insufficient flow	Speed too low or too high to obtain desired flow.	Check flow-speed curve (available from SPX FLOW customer service) and adjust as necessary.
	Air leak due to bad seals, pipe connections, or other equipment.	Replace seals, check inlet fittings.
Insufficient flow—flow being bypassed somewhere	Flow diverted in branch line, open valve, etc.	Check system and controls
	Relief valve not adjusted or jammed.	Clear or adjust valve.
Insufficient flow—high slip	Hot (HC) or extra clearance rotors on "cold" fluid and/or low viscosity fluid.	Replace with standard clearance rotors.
	Worn pump.	Increase pump speed (within limits). Replace rotors, have pump remanufactured.
	High pressure.	Reduce pressure by adjusting system settings or hardware.
Fluid vaporization ("starved" pump inlet)	Strainers, foot valves, inlet fittings or lines clogged.	Clear lines. If problem continues, inlet system may require changing.
	Inlet line size too small, inlet line too long. Too many fittings or valves. Foot valve, strainers too small.	Increase inlet line size. Reduce length, minimize direction and size changes, reduce number of fittings.
	NIPA - Net Inlet Pressure Available at Pump is too low.	Raise liquid level in source tank to increase Net Inlet Pressure (NIPA).
		Increase Net Inlet Pressure Available at Pump by raising or pressurizing source tank.
		Select larger pump size with lower Net Inlet Pressure Required.
	Fluid viscosity greater than expected.	Reduce pump speed and accept lower flow, or change system to reduce line losses.
		Change temperature of product to reduce viscosity.

Problem	Possible cause	Suggested action
Fluid vaporization, cont'd	Fluid temperature higher than expected (vapor pressure higher).	Reduce temperature, reduce speed and accept lower flow or change system to increase Net Inlet Pressure Available.
Noisy operation	Cavitation	
	High fluid viscosity. High vapor pressure fluid. High temperature.	Slow down pump, reduce temperature, change system setup.
	Net Inlet Pressure Available less than Net Inlet Pressure Required.	Increase NIPA - Net Inlet Pressure Required or reduce NIPR - Net Inlet Pressure Required. Contact SPX FLOW application engineering if necessary.
	Air or gas in fluid	
	Leaks in the pump or piping.	Correct leaks.
	Dissolved gas or naturally aerated products.	Minimize discharge pressure (also see "Cavitation," above).
Noisy operation caused by mechanical problems	Rotor to body contact	
	Improper assembly of pump.	Check clearances and adjust shimming.
	Distortion of pump due to improper piping installation.	Change piping installation to eliminate piping stress and distortion on body.
	Pressures required higher than the pump is rated for.	Reduce discharge pressure required.
	Worn bearings.	Rebuild with new bearings and lubricate regularly.
	Rotor to Rotor Contact	
	Loose or incorrectly-timed gears.	This has caused severe damage to components - rebuild with new parts.
	Sheared keys.	This has caused severe damage to components - rebuild with new parts.
	Worn gear splines.	This has caused severe damage to components - rebuild with new parts.
	Drive noise caused by gear trains, chains, couplings, bearings.	Repair or replace drive parts. Check bearings for damage and replace as necessary.

Problem	Possible cause	Suggested action
Pump requires excessive power (overheats, stalls, high current draw, breakers trip)	Higher than expected viscosity losses.	If within pump rating, increase drive size.
	Higher than expected pressures.	Reduce pump speed. Increase line sizes.
	Fluid is colder with a higher viscosity than expected.	Heat fluid, insulate lines or heat trace lines.
		Increase line sizes.
	Fluid sets in line and pump during shutdown.	Insulate lines or heat trace lines.
		Install a “soft start” drive.
		Install a recirculating bypass system.
		Flush system with a nonsetting fluid.
	Fluid builds up on pump surfaces.	Replace the pump with more running clearances.
Short pump service life	Pumping abrasives	Larger pumps at slower speeds.
	Speeds and pressures higher than rated.	Reduce speeds and pressures by making changes in the system.
		Replace pump with a larger model with higher pressure ratings.
	Worn bearings and gears due to lack of lubrication.	Check and replace bearing and gears as necessary. Adjust lubrication schedule to decrease time between lubrication.
		Modify external wash down method to reduce water entering into gear case.
	Misalignment of drive and piping. (Excessive overhung load or misaligned couplings.)	Check alignment of piping and drive. Adjust as necessary.

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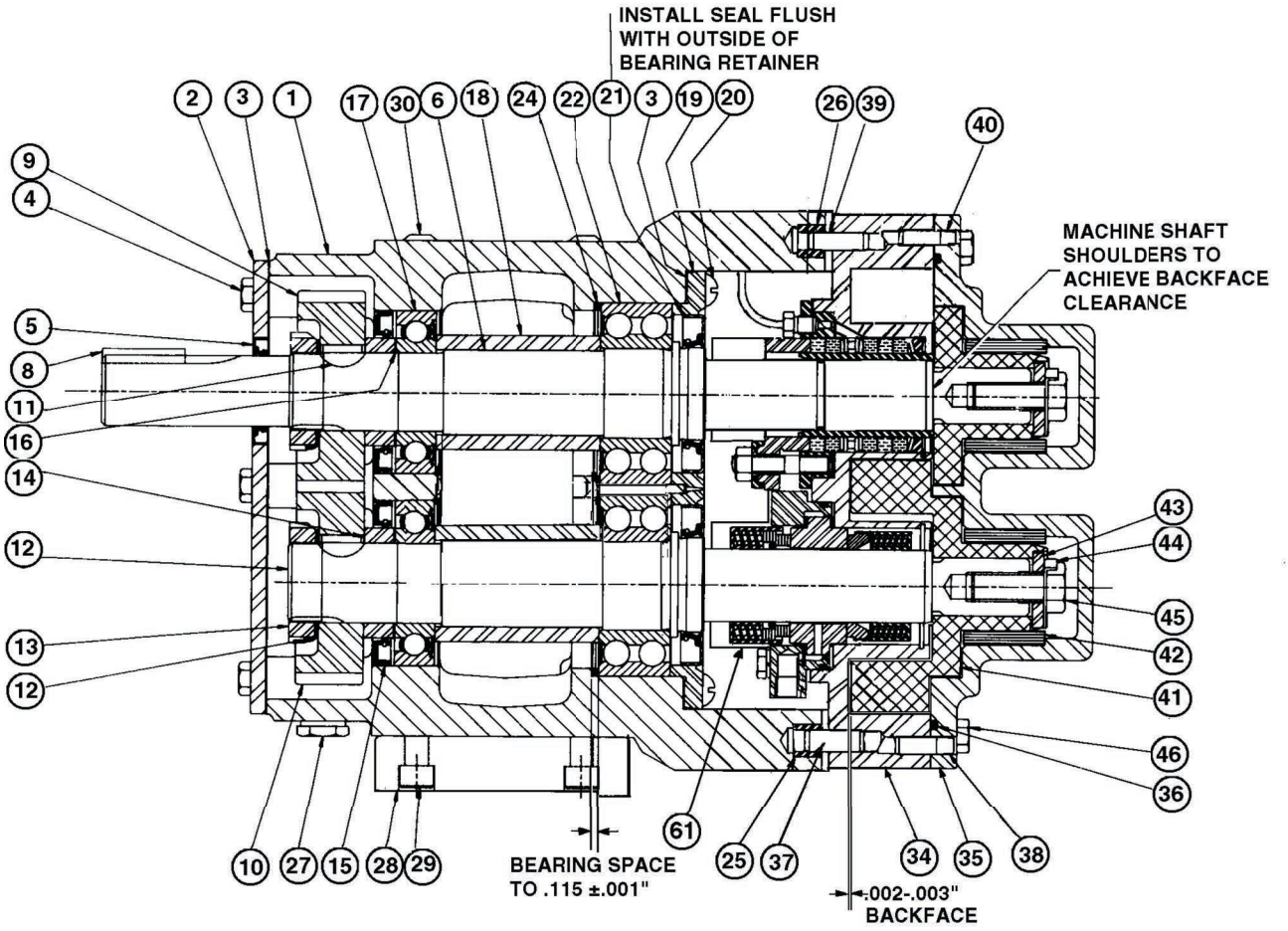
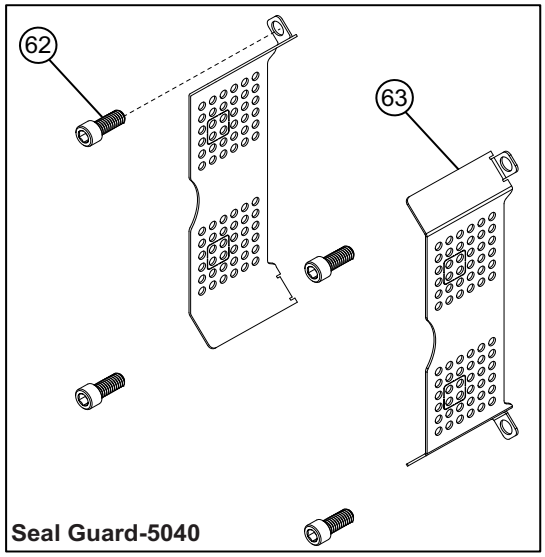
Parts List

5040 - Universal Industrial Series Pump Parts

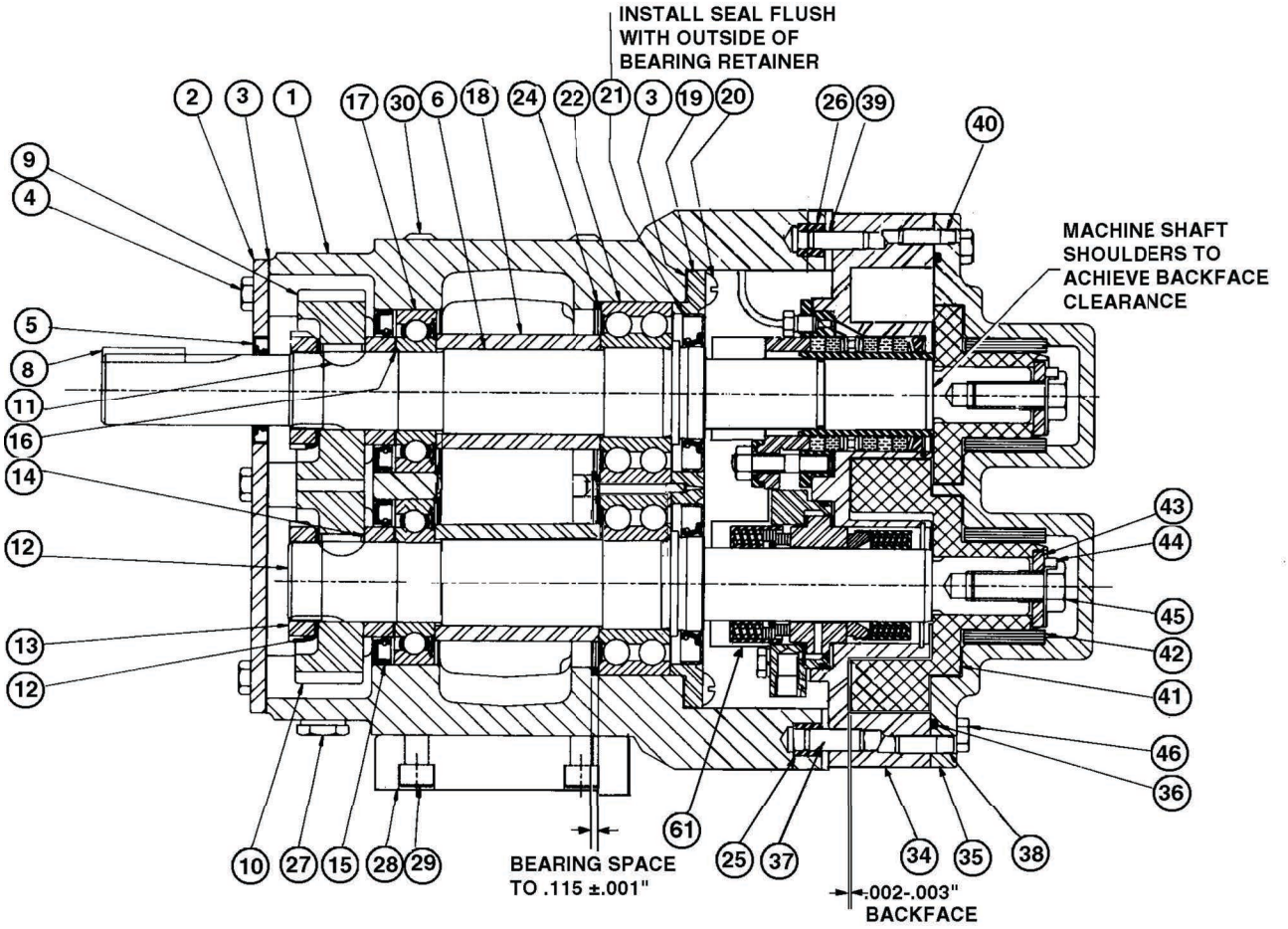


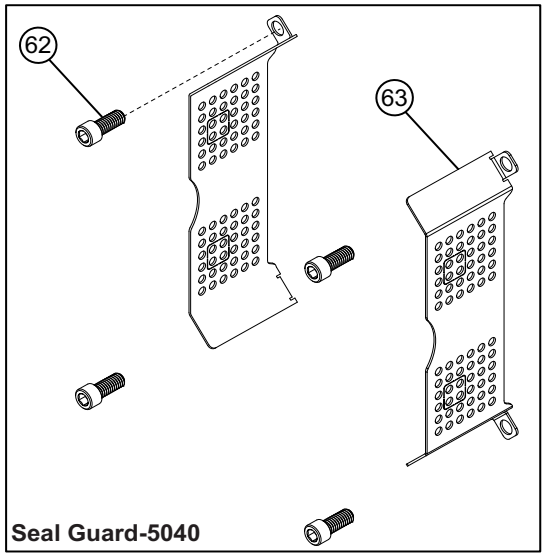


5040 - Universal Industrial Series Pump Parts

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
1	UI GEARCASE 040 MACHINED	1	40053+	
2	COVER 040 UI	1	040006004+	
3	SEALANT RTV SILICONE BLUE	AS REQ'D	000142301+	
4	CAP SCREW HEX HD 5/16 18 X .75	6	30-623	
5	SEAL SHAFT 1.250 DIA. X .250 WD	1	000030013+	
6	SHAFT DRIVE PACKING SEAL	1	40059+	
	SHAFT DRIVE MECH. SEAL	1	40065+	
7	SHAFT SHORT PACKING SEAL	1	40060+	
	SHAFT SHORT MECH. SEAL	1	40066+	
8	KEY 1/4 X 1/4 X 1- 3/4	1	000037002+	
9	SPUR GEAR RH	1	107999+	
10	SPUR GEAR LH	1	107999+	
11	KEY WOODRUFF	2	BD0037000	
12	LOCK WASHER	2	CD0036W00	
13	LOCK NUT	2	CD0036 N00	
14	SPACER GEAR	2	030055000+	
15	SEAL 48MM SHAFT DIA. X 7	2	000030014+	
16	SPACER SEAL	2	030127000	
17	BEARING REAR	2	030035000+	
18	SPACER BEARING	2	030055001+	
19	BRG RETAINER FRONT	2	030080000+	
20	SCREW BHD SOC 5/16-18 X .75	8	30-296	
21	SEAL OIL	1	40062+	
22	BEARING FRONT	2	030036000+	
24	SHIM KIT	AS REQ'D	117890-S	
25	BUSHING DOWEL G.C.	1	BD0116000	
26	BUSHING DOWEL G.C.	1	BD0116100	
27	PLUG OIL DRAIN AND LEVEL	6	000046003+	
28	SHIM 040 UI GEARCASE FINISHED	1	40323+	
29	CAP SCREW SOC HD 3/8-16 X1	4	30-189	
30	PLUG 3/8 PLASTIC	8	000121002+	

5040 - Universal Industrial Series Pump Parts, continued



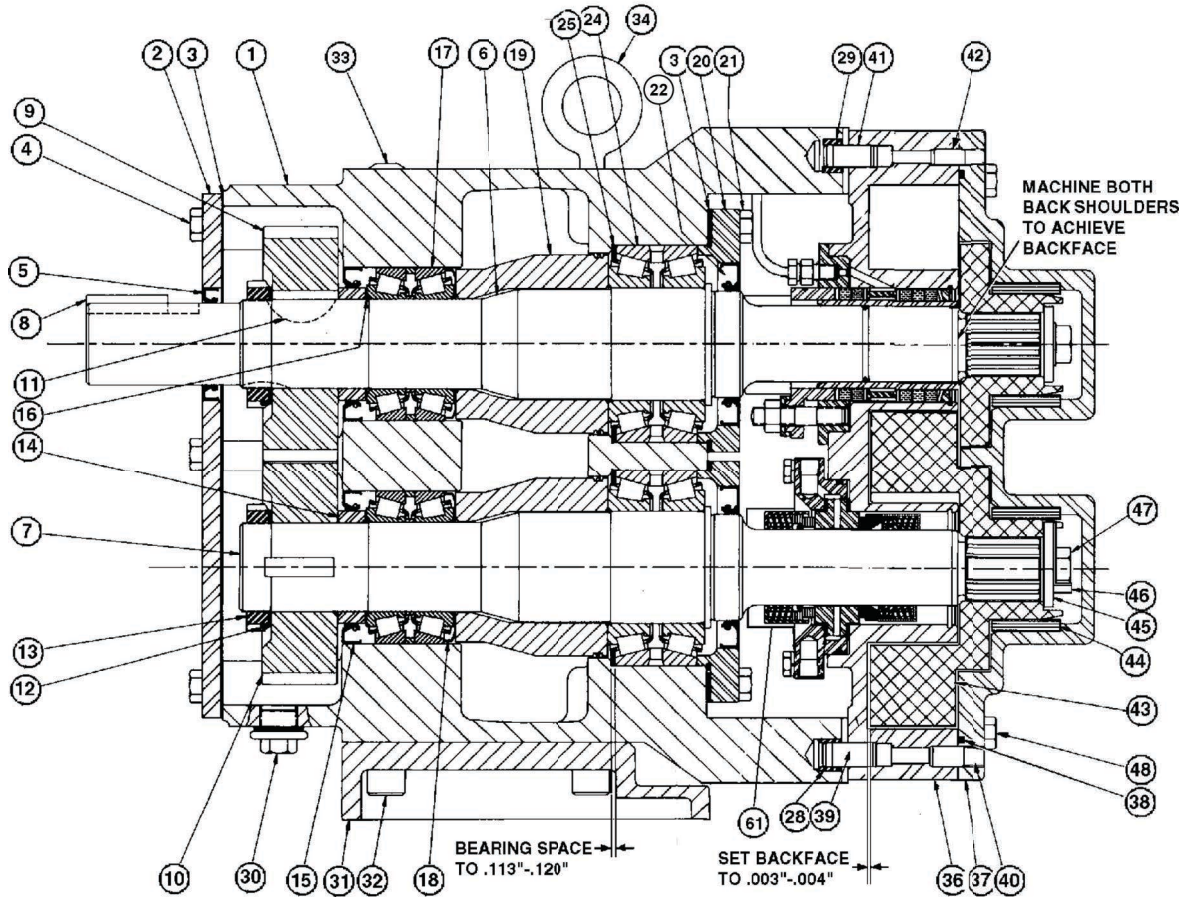


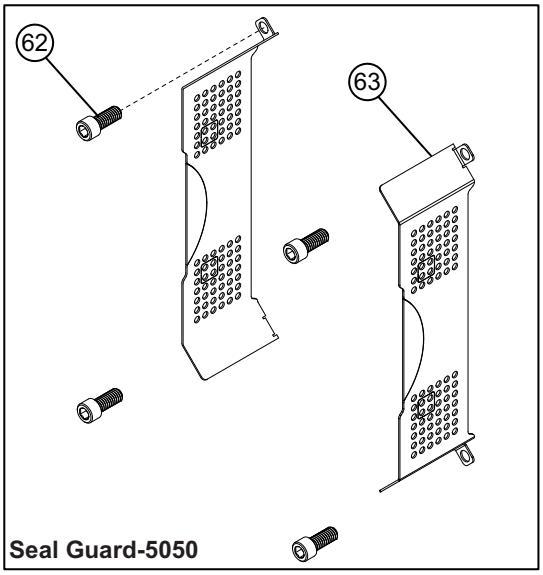
5040 - Universal Industrial Series Pump Parts, continued

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
34	BODY 5040 1-1/2 NPT STD PKG	1	40057+	
	BODY 5040 1-1/2 NPT STD MECH.	1	40058+	
35	COVER STD 316 SS	1	0B1002000	
36	O-RING COVER NITRILE	1	N70261	
37	PIN DOWEL	1	124583+	
38	PIN DOWEL	1	124582+	
39	PIN DOWEL	1	124582+	
40	PIN DOWEL	1	124581+	
41	ROTOR 2W STD 88	2	0B1010200	
42	COVER BUSHING CARBON	2	0B1048000	
43	WASHER ROTOR RETAINER	2	0B1052A00	
44	ROTOR LOCK CLIP	2	0B1052C00	
45	CAP SCREW HEX HD 1/2-13 X 1.25	2	30-36X	
46	SCREW HEX HD 5/16-18 X 2.5	4	30-96	
47	SCREW SOC HD 1/4-20 X 2	2	*30-211	
48	CAP SCREW HEX HD 5/16-18 X 1.0	4	*30-34	
51	NAME PLATE NON SANITARY	1	*135624+	
52	WARNING LABEL-PUMP-READ MANUAL	2	*121694+	
53	GREASE FITTING	4	*BD0092000	
54	PLASTIC CAP GC-1 RED	4	*BD0093000	
55	PLASTIC CLEAN OUT PLUG	2	*BD0121100	
56	SCREW DRIVE	8	*30-355	
60	KIT UI MAINTENANCE	1	*40808+	
61	SHAFT GUARD (Mechanical Seal Only)	2	111575+	
62	SEAL GUARD, BOLT	4	30-29	
63	SEAL GUARD	2	314626+	

*NOTE: *NOT SHOWN*

5050 - Universal Industrial Series Pump Parts

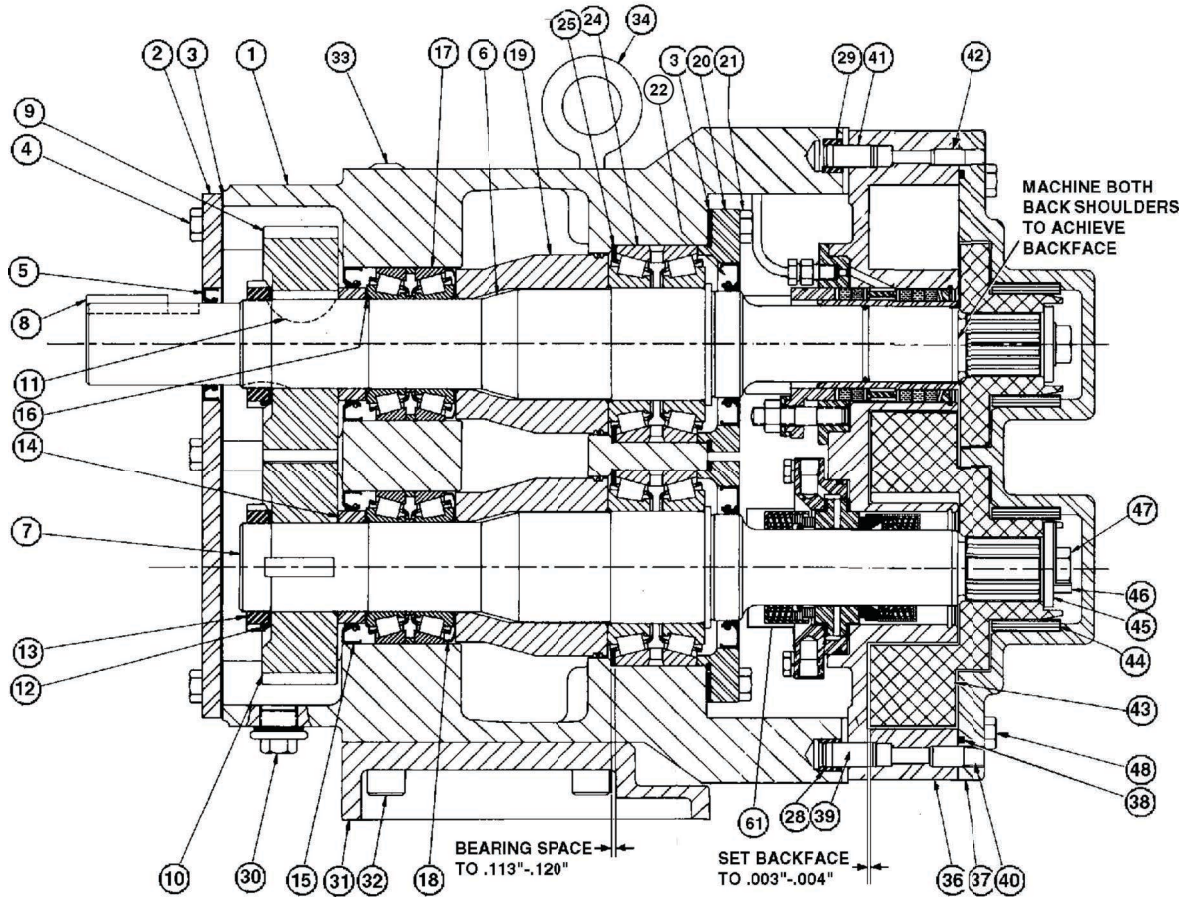


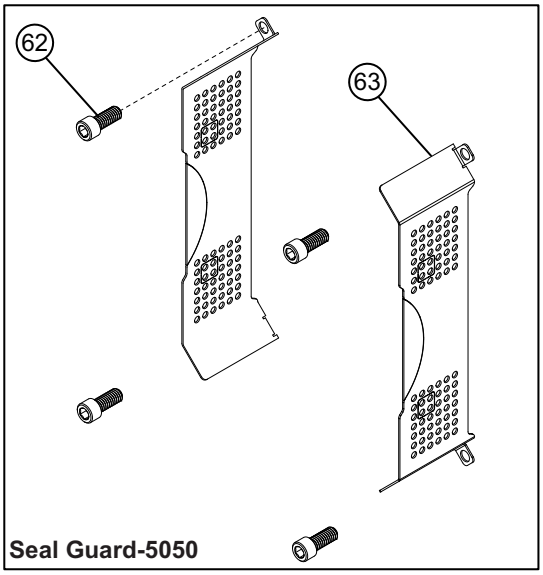


5050 - Universal Industrial Series Pump Parts

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
1	GEAR CASE 070 UI MACHINED	1	40054+	
2	COVER 070 UI GEARCASE FINISHED	1	070006000+	
3	SEALANT RTV SILICONE BLUE	AS REQ'D	000142300	
4	SCREW HX HD 3/8-16 X .75 6	6	30-50	
5	SEAL 1.625 SHAFT DIA X .312 WD	1	000030012+	
6	SHAFT 5050 DRIVE PACKING SEAL	1	40094+	
	SHAFT 5050 DRIVE MECHANICAL SEAL	1	40086+	
7	SHAFT 5050 SHORT PACKING SEAL	1	40095+	
	SHAFT 5050 SHORT MECHANICAL SEAL	1	40087+	
8	KEY 3/8 X 3/8 X 1-5/8	1	000037003+	
9	SPUR GEAR RH	1	107404+	
10	SPUR GEAR LH	1	107404+	
11	GEAR KEY	2	060037000+	
12	LOCK WASHER W09	2	STD136009	
13	LOCK NUT N09	2	STD236009	
14	SPACER GEAR	2	107187+	
15	SEAL 2.250 SHAFT DIA. X .375 WD	2	000030011+	
16	SPACER	2	060127000+	
17	BEARING REAR	2	107186+	
18	RETAINER GREASE	2	STD091002	
19	BEARING SPACER FINISHED 60/130	2	060055003+	
20	BEARING RETAINER	2	101812+	
21	CAP SCREW HXHD 3/8-16 X 1.25	8	30-60	
22	SEAL OIL 3.256 OD X .375 WIDE	2	40084+	
24	BEARING FRONT	2	060036000+	
25	SHIM KIT	AS REQ'D	117891-S	
28	BUSHING DOWEL	1	CD0116100	
29	BUSHING DOWEL	1	CD0116000	
30	PLUG WITH WASHER 3/4-16	6	000046004+	

5050 - Universal Industrial Series Pump Parts, continued



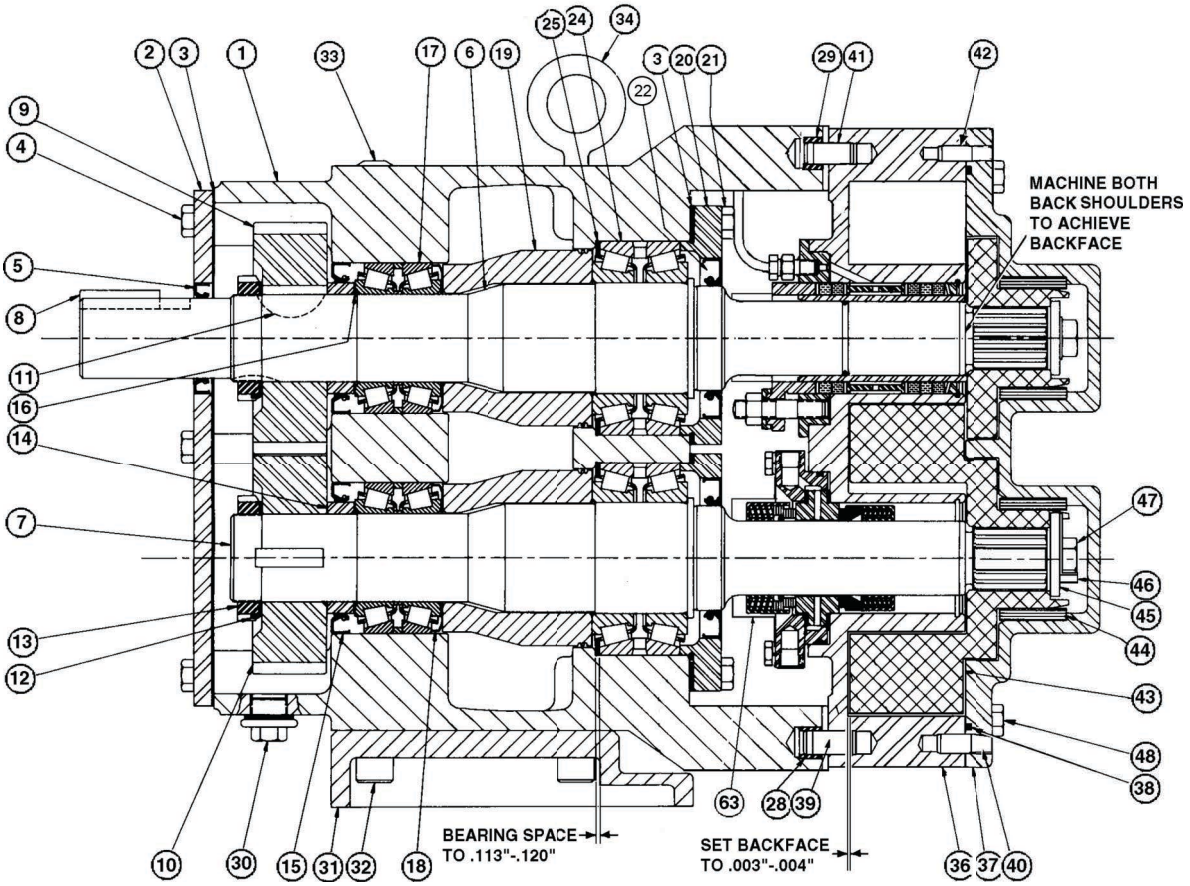


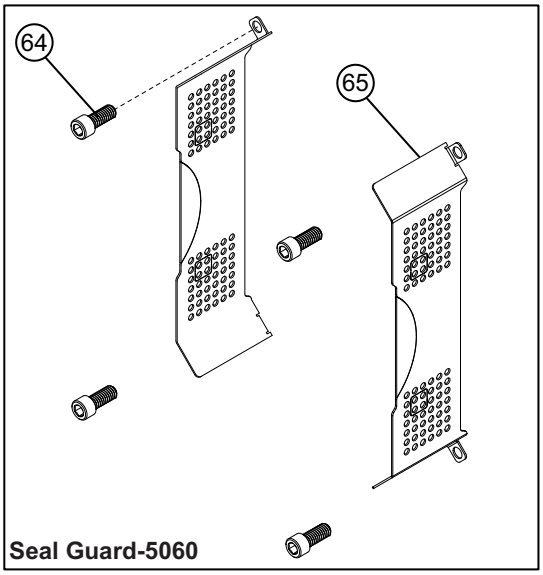
5050 - Universal Industrial Series Pump Parts, continued

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
31	SHIM 070 UI GEAR CASE FINISHED	1	40324+	
32	CAP SCREW SOC HD 1/2-13 X 1.25	4	30-503	
33	PLUG 1/2" PLASTIC	6	000121001+	
34	EYE BOLT 1/2-13 X .75 PLATED	2	30-360	
36	BODY 5050 2 NPT STD PACK	1	40088+	
	BODY 5050 2 NPT STD MECH	1	40091+	
37	COVER STD 316 SS	1	0C1002000	
38	O-RING COVER 9-5/8 ID SILICONE	1	S75128	
	O-RING COVER TEFLON	1	T85272	
	O-RING COVER VITON	1	V70272	
	O-RING COVER NITRILE	1	N70272	
	O-RING COVER E.P.	1	E70272	
39	PIN DOWEL	1	124583+	
40	PIN DOWEL	1	124586+	
41	PIN DOWEL	1	124584+	
42	PIN DOWEL	1	124582+	
43	ROTOR 2W STD #88	2	0C1010200	
44	COVER BUSHING #88	2	0C1048W00	
	COVER BUSHING CARBON	2	0C1048000	
45	WASHER RETAINER	2	0C1052A00	
46	ROTOR LOCK CLIP	2	0C1052C00	
47	CAP SCREW	2	0C1052 004	
48	CAP SCREW HEX HD 3/8-16 X 3	4	40768	
49	SCREW SOC HD 5/16-18 X 2	2	*30-318	
50	CAP SCREW HEX HD3/8-16 X 1.75	4	*0C1011 000	
53	NAMEPLATE NON-SANITARY PUMPS	1	*135624+	
54	WARNING LABEL-PUMP-READ MANUAL	2	*121694+	
55	GREASE FITTING	4	*BD0092000	
56	CAP PLASTIC GC-1 RED	4	*BD0093000	
57	PLUG PLASTIC CLEAN OUT	2	*BD0121100	
58	SCREW DRIVE	4	*30-355	
60	KIT UI MAINTENANCE	1	*40808+	
61	SHAFT GUARD (Mechanical Seal Only)	2	111575+	
62	SEAL GUARD, BOLT	4	30-29	
63	SEAL GUARD	2	314627+	

*NOTE: *NOT SHOWN*

5060 - Universal Industrial Series Pump Parts

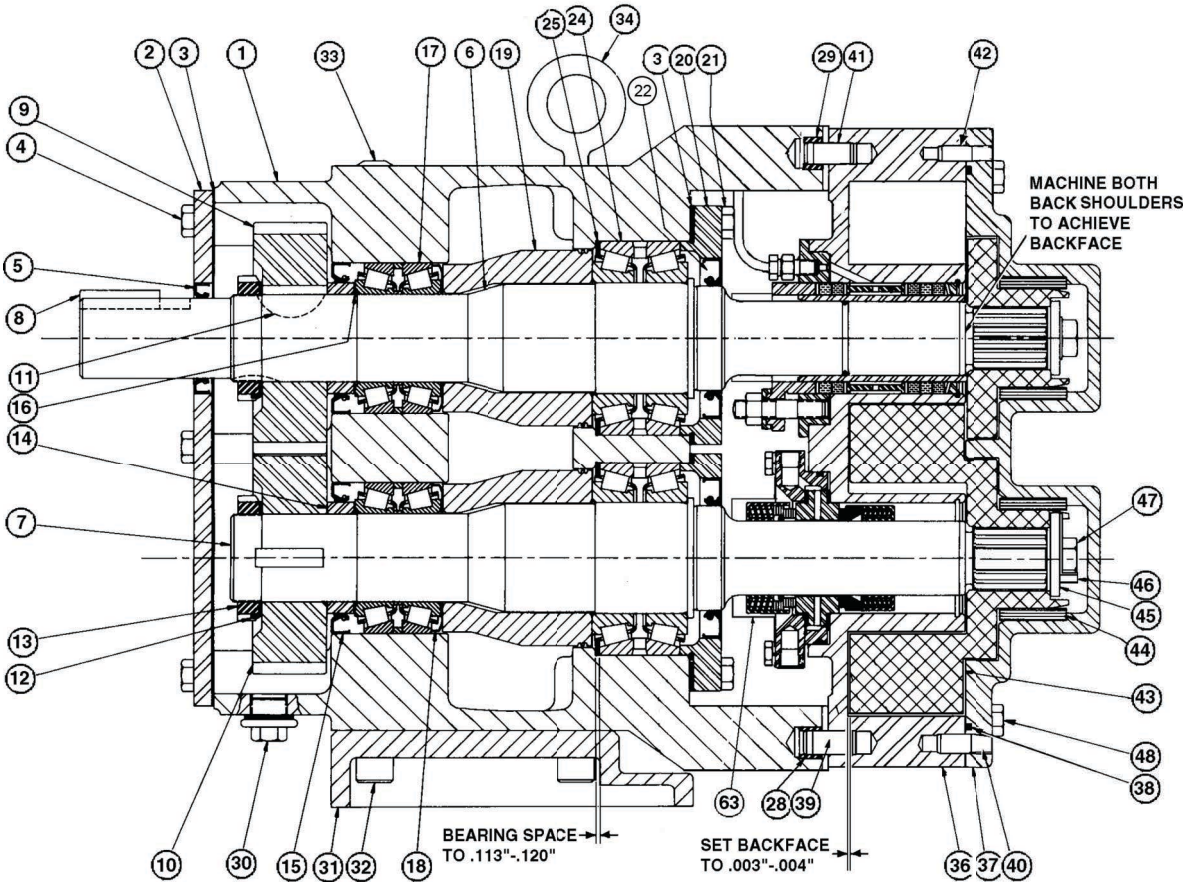


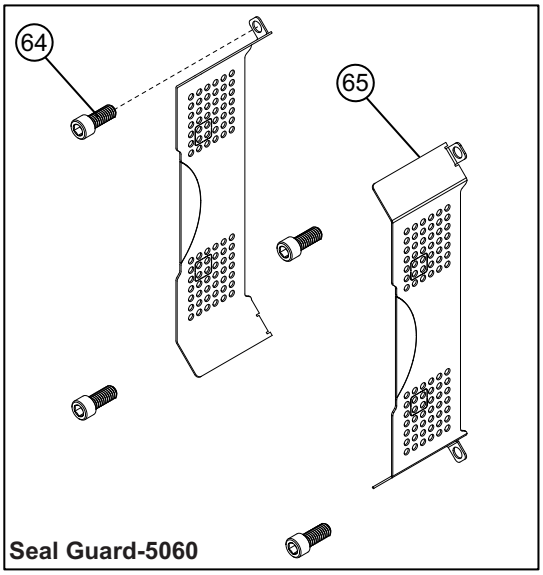


5060 - Universal Industrial Series Pump Parts

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
1	GEAR CASE 070 UI MACHINED	1	40054+	
2	COVER 070 UI GEARCASE FINISHED	1	070006000+	
3	SEALANT RTV SILICONE BLUE	AS REQ'D	000142301+	
4	SCREW HX HD 3/8-16 X .75	6	30-50	
5	SEAL 1.625 SHAFT DIA X .312 WD	1	000030012+	
6	SHAFT 5060 DRIVE PACKING SEAL	1	40096+	
	SHAFT 5060 DRIVE MECHANICAL	1	40076+	
7	SHAFT 5060 SHORT PACKING SEAL	1	40097+	
	SHAFT 5060 SHORT MECHANICAL	1	40077+	
8	KEY 3/8 X 3/8 X 1-5/8	1	000037003+	
9	SPUR GEAR RH	1	107404+	
10	SPUR GEAR LH	1	107404+	
11	GEAR KEY	2	060037000+	
12	LOCK WASHER W09	2	STD136009	
13	LOCK NUT N09	2	STD236009	
14	SPACER GEAR	2	107187+	
15	SEAL 2.250 SHAFT DIA. X .375 WD	2	000030011+	
16	SPACER	2	060127000+	
17	BEARING REAR	2	107186+	
18	RETAINER GREASE	2	STD091002	
19	BEARING SPACER FINISHED 60/130	2	060055003+	
20	BEARING RETAINER	2	121828+	
21	CAP SCREW HEX HD 3/8-16 X 1.25	8	30-60	
22	SEAL OIL 3.256 OD X .375 WIDE	2	40084+	
24	BEARING FRONT	2	060036000+	
25	SHIM KIT	AS REQ'D	117891-S	
28	BUSHING DOWEL	1	CD0116100	
29	BUSHING DOWEL	1	CD0116000	
30	PLUG WITH WASHER 3/4-16	6	000046004+	

5060 - Universal Industrial Series Pump Parts, continued



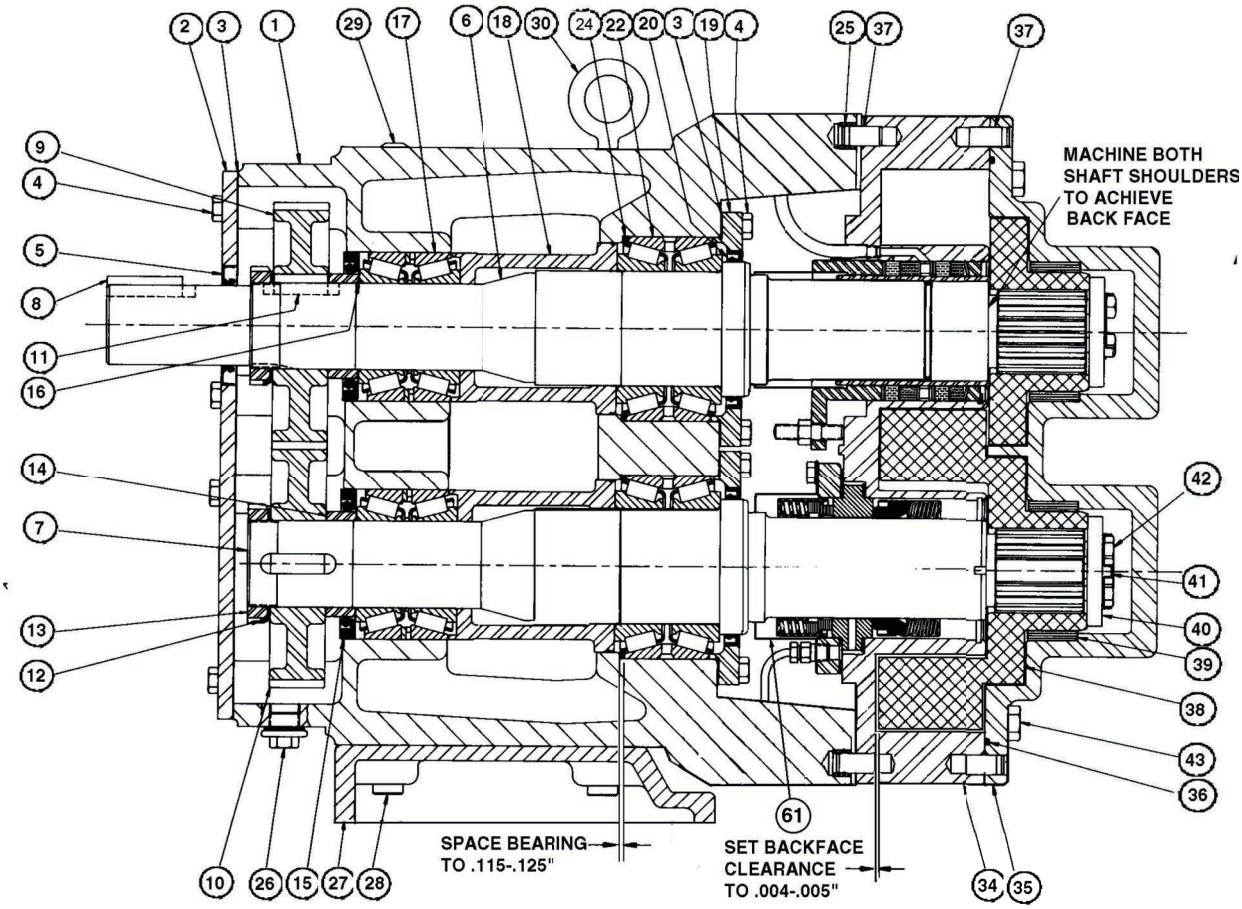


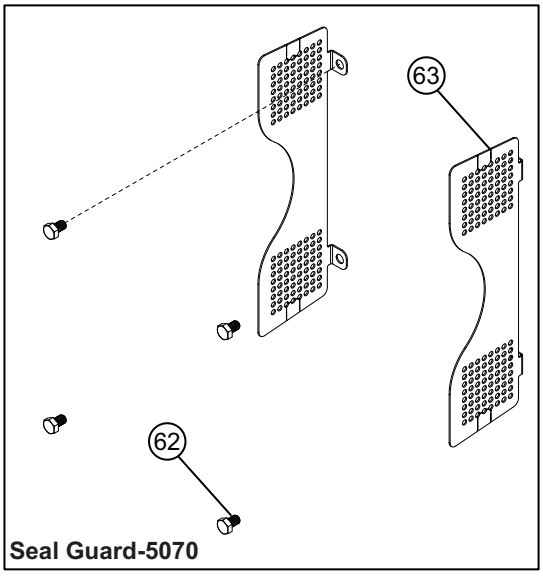
5060 - Universal Industrial Series Pump Parts, continued

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
31	SHIM 070 UI GEAR CASE FINISHED	1	40324+	
32	CAP SCREW SOC HD 1/2-13 X 1.25	4	30-503	
33	PLUG 1/2" PLASTIC	4	000121001+	
34	EYE BOLT 1/2-13 X .75 PLATED	2	30-360	
36	BODY 5060 2 NPT STD PACKING	1	40078+	
	BODY 5060 2 NPT STD MECH	1	40081+	
37	COVER 316 SS	1	0C1002000	
38	O-RING COVER 9-5/8 ID SILICONE	1	133117013+	
	O-RING COVER TEFLON	1	T80272	
	O-RING COVER VITON	1	V70272	
	O-RING COVER NITRILE	1	N70272	
	O-RING COVER E. P.	1	E70272	
39	PIN DOWEL	1	124583+	
40	PIN DOWEL	1	124586+	
41	PIN DOWEL	1	124584+	
42	PIN DOWEL	1	124582+	
43	ROTOR 2W STD 88	2	0E1010200	
44	COVER BUSHING #88	2	0C1048W00	
44	COVER BUSHING CARBON	2	0C1048000	
45	WASHER RETAINER	2	0C1052A00	
46	ROTOR LOCK CLIP	2	0C1052C00	
47	CAP SCREW HEX HD 1/2-13 X 1.25	2	30-36X	
48	CAP SCREW HEX HD 3/8-16 X 3	4	30-317	
49	CAP SCREW HEX HD 5/16-18 X 2	2	*30-319	
50	CAP SCREW HEX HD 3/8-16 X 1.75	4	*30-60	
53	NAMEPLATE NON-SANITARY PUMPS	1	*135624+	
54	WARNING LABEL-PUMP-READ MANUAL	2	*121694+	
55	GREASE FITTING	4	*BD0092000	
56	PLASTIC CAP GC-1 RED	4	*BD0093000	
57	PLASTIC CLEAN OUT PLUG	6	*BD0121100	
58	SCREW DRIVE	4	*30-355	
62	KIT UI MAINTENANCE	1	*40808+	
63	SHAFT GUARD (For Mechanical Seals only)	2	111576+	
64	SEAL GUARD, BOLT	4	30-29	
65	SEAL GUARD	2	314627+	

*NOTE: *NOT SHOWN*

5070 - Universal Industrial Series Pump Parts

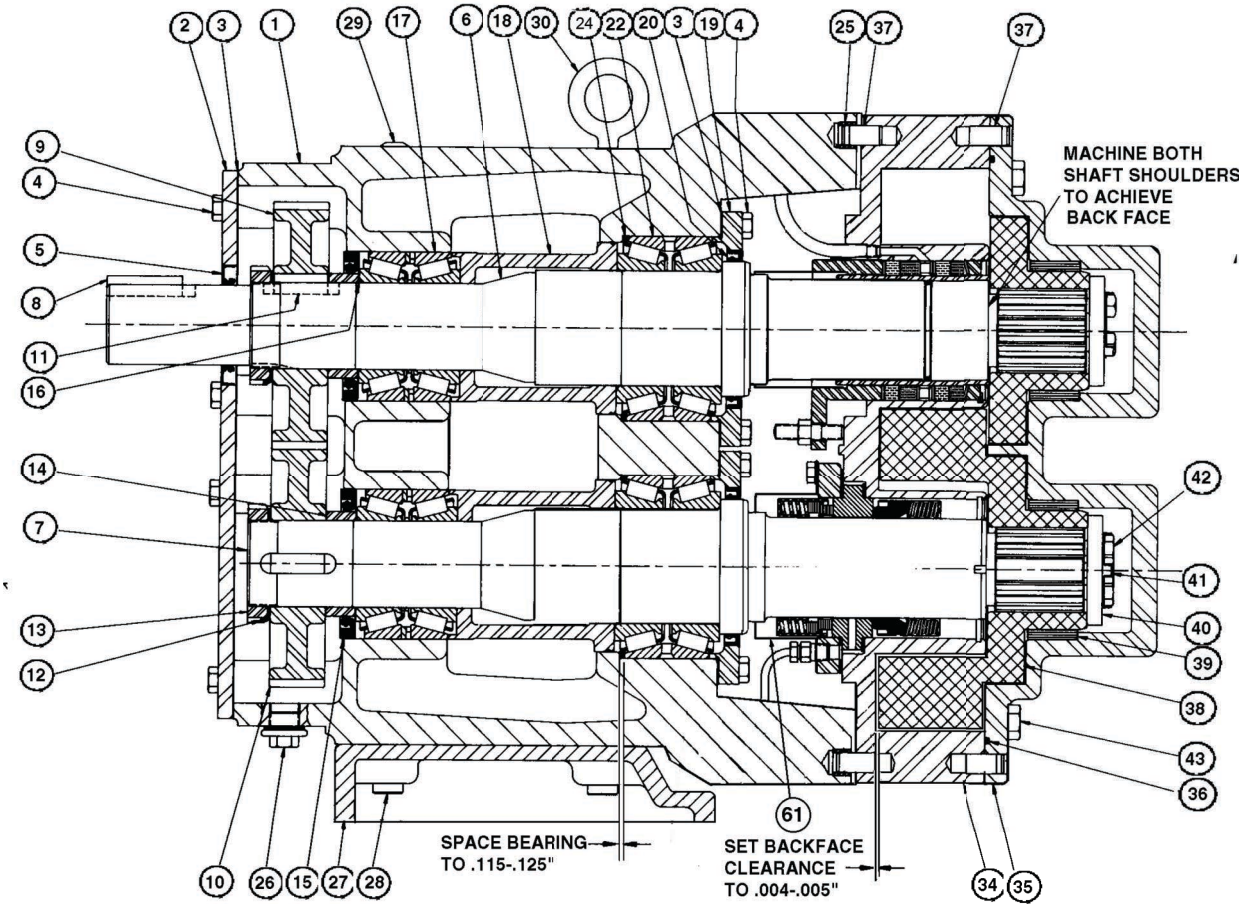


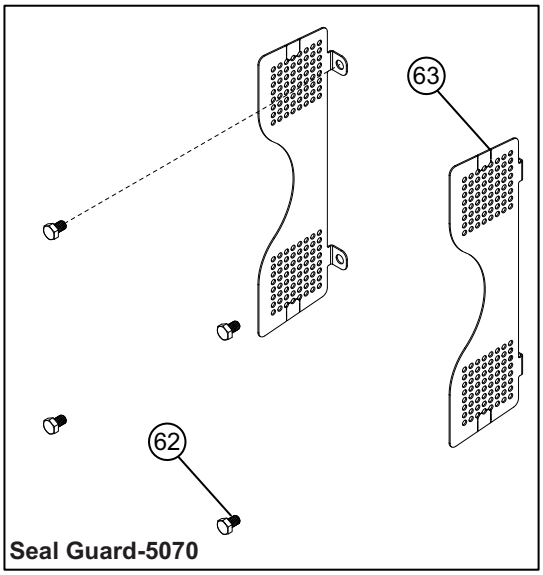


5070 - Universal Industrial Series Pump Partss

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
1	GEAR CASE 230 UI MACHINED	1	40454+	
2	COVER 230 UI GEAR CASE	1	230006000+	
3	SEALANT RTV SILICONE	AS REQD	000142300+	
4	SCREW HX HO 3/8-18 x 1.25	16	30-60	
5	SEAL, 2.000 SHAFT DIA x .312 WD	1	STD030006	
6	SHAFT, 5070 DRIVE MECH SEAL	1	40810+	
	SHAFT, 5070 DRIVE PACKING SEAL	1	40819+	
7	SHAFT, 5070 SHORT MECH SEAL	1	40811+	
	SHAFT, 5070 SHORT PACKING SEAL	1	40820+	
8	KEY 1/2 x 1/2 x 1-7/8	1	119717+	
9	SPUR GEAR, RH	1	110932+	
10	SPUR GEAR, LH	1	110932+	
11	GEAR KEY	2	200037000+	
12	LOCK WASHER, W11	2	STD136011	
13	LOCK NUT, N11	2	STD236011	
14	SPACER, 5070 GEAR	2	40878+	
15	SEAL, 2.625 SHAFT DIA x .375 WD	2	STD119002	
16	SPACER	2	200127000	
17	BEARING, REAR	2	200035000+	
18	SPACER, 5070 BEARING	2	40752+	
19	BEARING RETAINER	2	121829+	
20	SEAL OIL, 3.375 SET .375 WD	2	121829+	
22	BEARING, FRONT	2	200036000+	
24	SHIM KIT	AS REQ'D	117892-S	
25	BUSHING, DOWEL	2	CD0116100	
26	PLUG WITH WASHER 3/16	6	115798+	
27	SHIM, 230 UI GEARCASE FINISHED	1	40817+	
28	CAP SCREW SOC. HD 1/2-13X 1.5	1	30-315	
29	PLUG 1/2" PLASTIC	4	000121001+	
30	EYE BOLT 1/2-13 X .75 PLATED	2	30-360	

5070 - Universal Industrial Series Pump Parts, continued



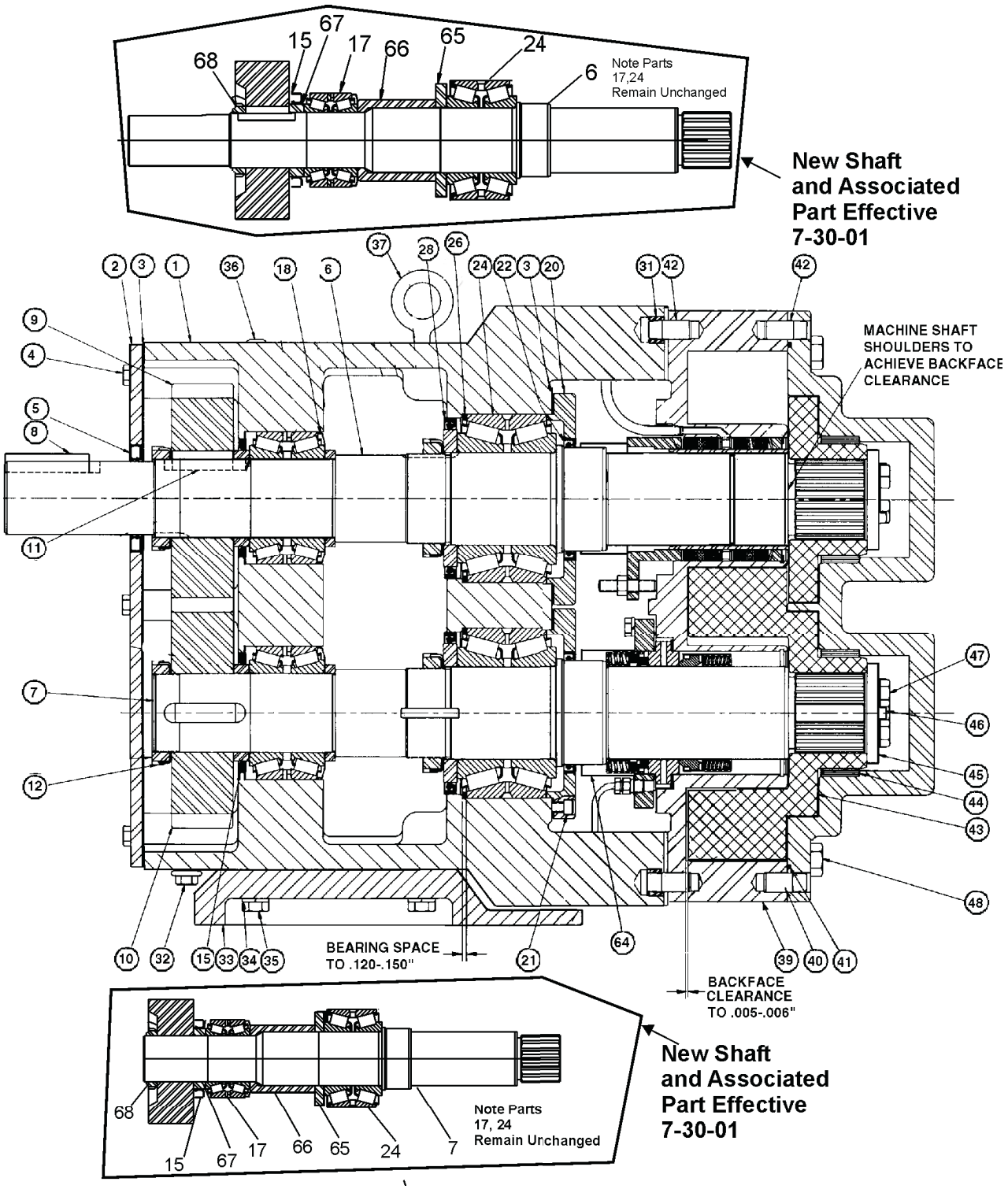


5070 - Universal Industrial Series Pump Parts, continued

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
34	BODY 5070 4-150# FLG STD MECH	1	40313+	
	BODY 5070 4-150# FLG STD PACKING	1	40316+	
35	COVER STD 316 SS	1	200002000+	
36	O-RING COVER NITRILE	1	GD0117000	
37	PIN DOWEL	4	124586+	
38	ROTOR 2W STD 88	2	200010000+	
39	COVER BUSHING CARBON	2	200048000+	
40	ROTOR RETAINING NUT	2	200052000+	
41	LOCK CLIP	2	200053000+	
42	CAP SCREW HXHD 3/8-16 x 1.5 SS	6	30-55X	
43	SCREW HX HD 1/2-13 X 4.5 SS 18-8	4	30-324	
44	SCREW SOC HD 3/8-16 X 3.5 SS 18-8	2	*30-326	
45	CAP SCREW HEX HD1/2-13 X 1.25 SS	4	*30-36X	
51	NAME PLATE NON-SANITARY PUMPS	1	*135624+	
52	WARNING LABEL-PUMP-READ MANUAL	2	*121694+	
53	FITTING GREASE	4	*BD0092000	
54	CAP PLASTIC GC-1 RED	4	*BD0093000	
55	PLUG PLASTIC CLEAN OUT	2	*41013+	
56	SCREW DRIVE	4	*30-355	
60	KIT UI MAINTENANCE	1	*40808+	
61	SHAFT GUARD (Mechanical Seal only)	2	111577+	
62	SEAL GUARD, BOLT	4	30-163	
63	SEAL GUARD	2	314628+	

*NOTE: *NOT SHOWN*

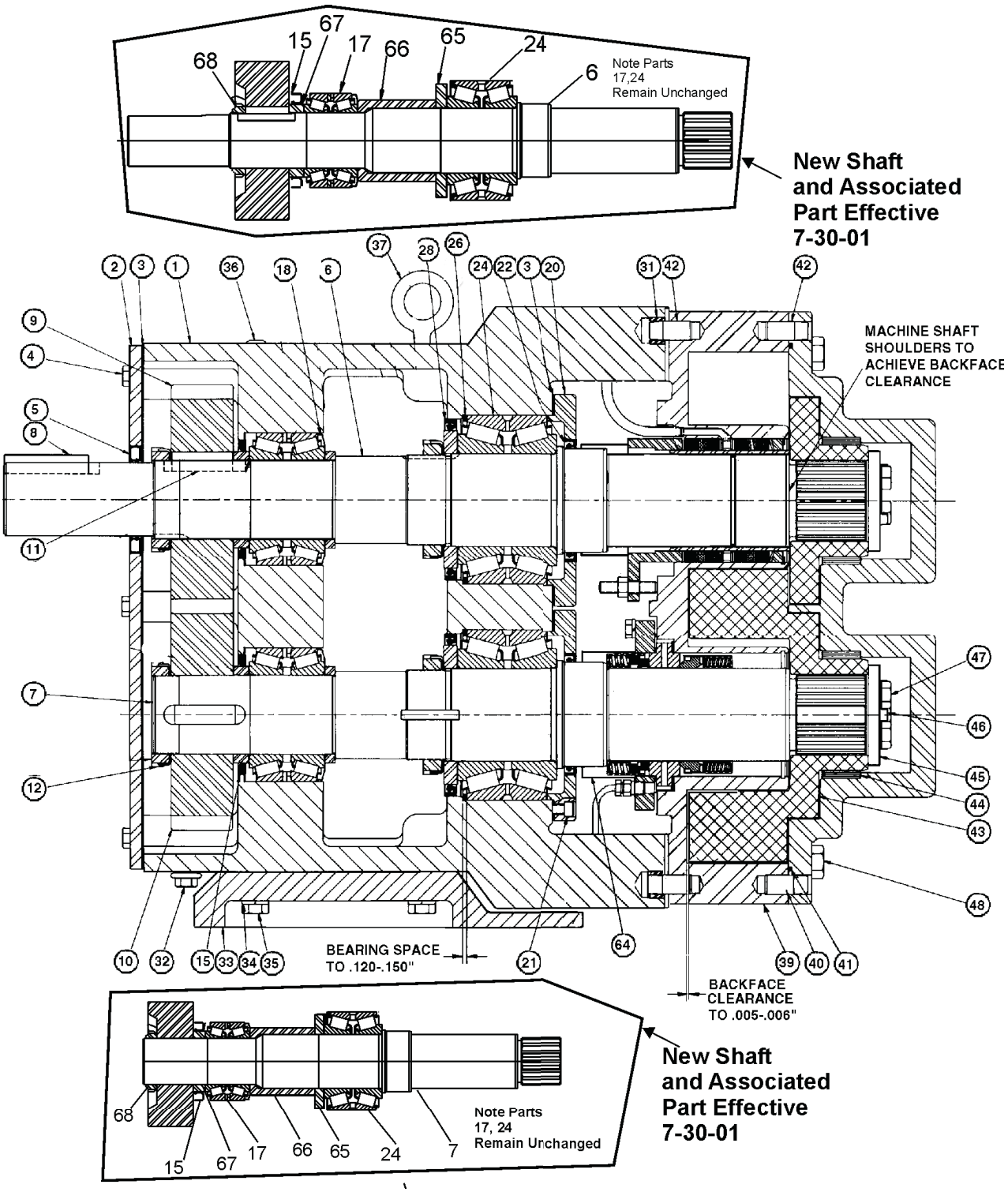
5080 - Universal Industrial Series Pump Parts



5080 - Universal Industrial Series Pump Parts

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
1	HOUSING 330 GEARCASE FINISHED	1	40616+	
2	COVER 330 GEARCASE PLATE	1	40669+	
3	SEALANT RTV SILICONE BLUE	AS REQ'D	000142301+	
4	CAP SCREW HX HD 3/8-16 X.75	6	30-314	
5	SEAL 2.375 DIA X .375 .625 WD	1	STD030004	
6	SHAFT DRIVE IND MECH	1	113514+	
	OPTIONAL 17-4 SHAFT		113512+	
	SHAFT DRIVE IND PKG	1	113510+	
7	SHAFT IND MECH	1	113515+	
	OPTIONAL 17-4 SHAFT		113513+	
	SHAFT IND PACKING	1	113511+	
8	KEY 5/8 X 5/8 X 2-3/4	1	000037005+	
9	SPUR GEAR RH	1	102470+	
10	SPUR GEAR LH	1	102470+	
11	KEY GEAR .625 SQ. X 1.94/1.97	2	0H1037000	
15	SEAL TIMING GEAR	2	102475+	
17	BEARING REAR	1	0H1036000	
18	RETAINER GREASE	2	STD091000	
20	RETAINER BEARING	2	123533+	
21	CAP SCREW SOCKET HD 5/16-18 X 1	8	30-525	
22	SEAL OIL, 3.375 SFT D/.375 WD	2	121681+	
24	BEARING FRONT	2	0H1036003	
26	SHIM KIT	AS REQ'D	117893-S	
28	SEAL GREASE 4.500 SFT D/.375WD	2	STD030003	
31	BUSHING DOWEL	2	0H1116000	
32	PLUG WITH WASHER 3/4-16	6	000046004+	
33	SHIM 324 324A GEARCASE	1	40288+	

5080 - Universal Industrial Series Pump Parts, continued



5080 - Universal Industrial Series Pump Parts, continued

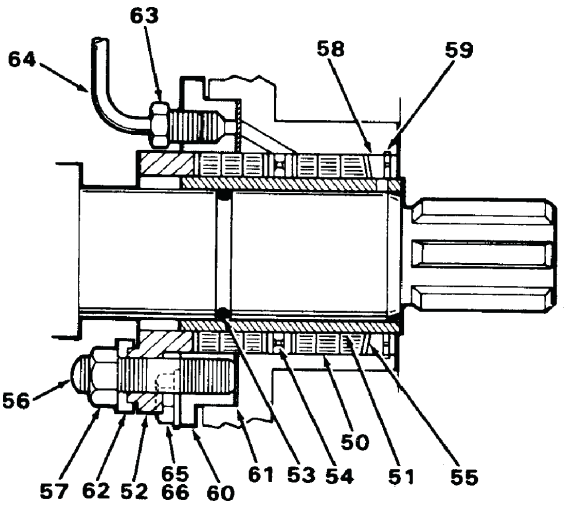
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.	NOTES
34	LOCK WASHER45293	4	43-16	
35	CAPSCREW HEX HD 1/2-13 X 1.75	4	30-127X	
36	PLUG 1/2 PLASTIC	6	000121001+	
37	EYE BOLT 1/2-13 X 1.5 PLATED	3	30-360	
39	BODY 5080 6 150# FLG STD MECH	1	40803+	
	BODY 5080 6 150# FLG STD PACKING	1	40804+	
40	COVER IND STD 316 SS	1	0H1002000	
41	O-RING COVER NITRILE	1	N70280	
42	PIN DOWEL	4	0H1040000	
43	ROTOR 2W STD 88	2	320010000+	
44	COVER BUSHING CARB	2	0H1048000	
45	ROTOR RETAINER WASHER	2	0H1052000	
46	ROTOR LOCK CLIP	2	0H1053000	
47	CAP SCREW HEX HD 1/2-13 X 1.75 SS	6	30-127X	
48	CAP SCREW HEX HD 5/8-11 X5.5	4	30-117	
49	SCREW SOC HD 3/8-16 X 4	2	*30-323	
50	CAP SCREW HEX HD 5/8-11 X 1.5	4	*30-105	
54	NAMEPLATE NON-SANITARY PUMPS	1	*135624+	
55	WARNING LABEL-PUMP-READ MANUAL	2	*121694+	
56	FITTING GREASE	4	*BD0092000	
57	CAP PLASTIC G.C. RED	4	*BD0093000	
58	PLUG PLASTIC CLEAN OUT	2	*BD0121100	
59	DRIVE SCREW	4	*30-555	
63	KIT UI MAINTENANCE	1	*40808+	
64	SHAFT GUARD (Mechanical Seal Only)	2	111578	
65	SPACER FRONT BEARING	1	102473+	
66	SPACER BEARING FRONT TO REAR	1	102472+	
67	SPACER TIMING GEAR	1	102474+	
68	BEARING LOCKNUT	1	105697+	

*NOTE: *NOT SHOWN*

5040 Packing and Seals

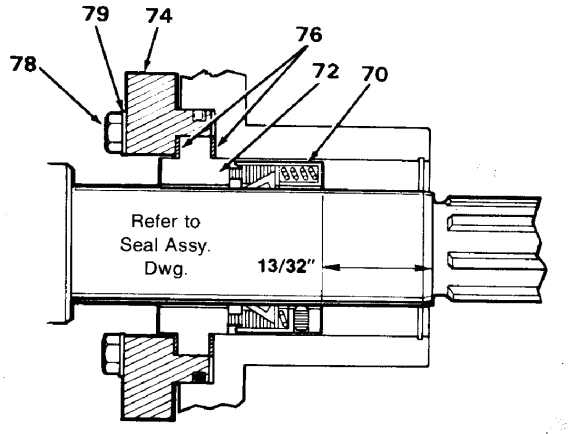
Mechanical Packing (Standard Seal Package)

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
50	PACKING	10	0B1033000
51	SLEEVE	2	0B1098000
52	GLAND SS	2	0B1004000
53	O-RING, SHAFT, NITRILE BUNA	2	N70024
54	LANTERN RING-GLASS FILLED	2	0B1 047000
55	PACKING SPACER	8	0B1 033100
56	STUD-PACKING GL	4	200050000
57	HEX NUT, 5/16-18 18-8 REG	4	36-41
58	PACKING ,RETAINING RING 316SS	2	0B1051000
59	RETAINER-5040-RING 2.154 OD	2	40067
60	GLAND, INSERT	2	0B1050200
61	GASKET INSERT	2	0B1043300
62	GLAND WASHER	4	0B1049000
63	NUT 6100x2	4	STD299022
64	TUBE-1 .187"x.030"W COPPER	24	87-699
65	HHCS 1/4-20 x .50" 18-8	8	30-62
66	LOCK WASHER,1/4" 18-8 REG	8	43-22



Inside Mechanical Seal

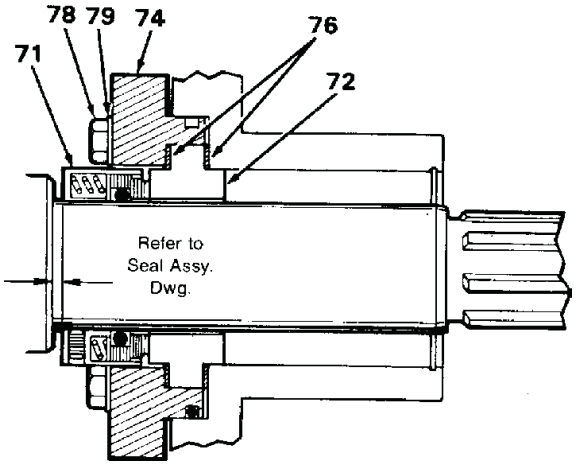
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL, JC #9	2	0B1114000
72	SEAT, SEAL, CERAMIC 5040 T STYLE	2	025014012+
	SEAT, SEAL, TUNGSTEN	2	025014013+
	SEAT, SEAL, SILICON	2	025014016+
74	GLAND, SS	2	0B1034001
76	GASKET, SEAT RING-OUTER	4	025042001+
78	HHCS, 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5040 Packing and Seals

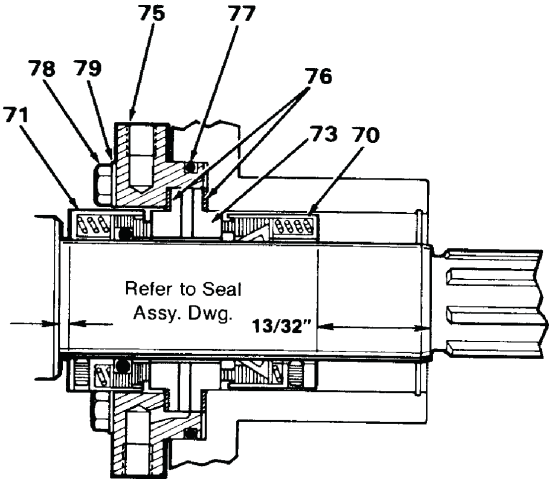
Outside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
71	SEAL JC #8B2 CARBON	2	0B1114FP0
72	SEAT, SEAL CERAMIC 5040 T STYLE	2	025014012+
	SEAT, SEAL, TUNGSTEN	2	025014013
	SEAT, SEAL, SILICON	2	025014016
74	GLAND, SS	2	0B1034001
76	GASKET, SEAT RING-OUTER	4	025042001+
78	HHCS ,1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER,1/4" 18-8 REG.	8	43-22



Outside-Inside Mechanical Seal

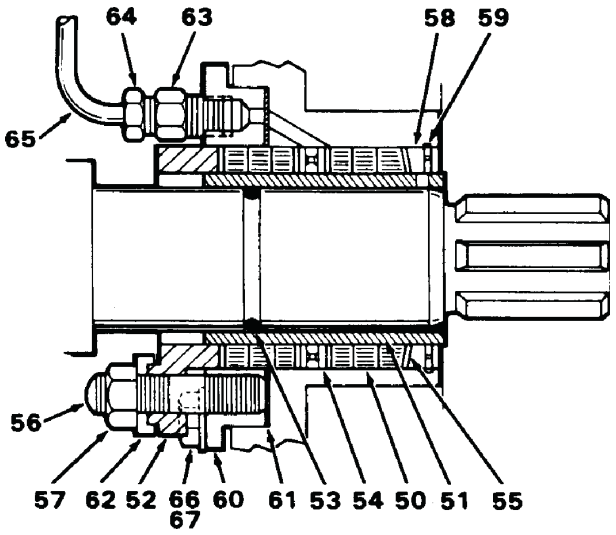
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL JC #9	2	0B1114000
71	SEAL JC #8B2 CARBON	2	0B1114FP0
73	SEAT, SEAL, FLUSH, CERAMIC	2	025014027+
	SEAT, SEAL, FLUSH, TUNGSTEN	2	025014028+
	SEAT, SEAL, FLUSH, SILICON	2	025014031+
75	GLAND, FLUSH	2	0B1034003
76	GASKET, SEAT RING, OUTER	2	025042001+
77	O-RING-147 FDA VITON	2	V70147
78	HHCS 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5050 Packing and Seals

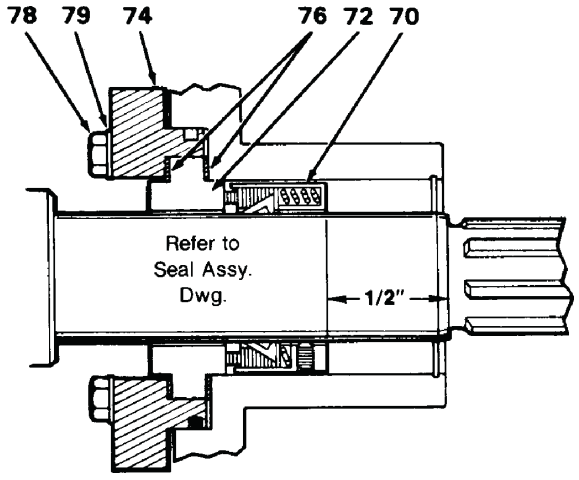
Mechanical Packing (Standard Seal Package)

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
50	PACKING	12	0C1033000
51	SLEEVE	2	0C1098000
52	GLAND	2	0C1004000
53	O-RING, NITRILE BUNA	2	N70228
54	RING, LANTERN GLASS FILLED	2	0C1047000
55	PACKING SPACER	8	0C1033100
56	STUD, 3/8-16 .375D 1.87LG	4	0C1050000
57	HEX NUT, 3/8-16 18-8 REGULAR	4	36-45
58	PACKING ,RETAINING RING 316SS	2	0C1051000
59	RETAINER-5050-RING 2.413 OD	2	40068
60	GLAND, INSERT	2	0C1050200
61	GASKET INSERT	2	0C1043300
62	GLAND WASHER	4	0C1049000
63	FTITNIG 6200X3	4	STD299003
64	FTITNIG 6100X3	4	STD299023
65	TUBE-1 .187"x.030" COPPER IN.	24	87-699
66	HHCS 1/4-20 x .50" 18-8	8	30-62
67	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



Inside Mechanical Seal

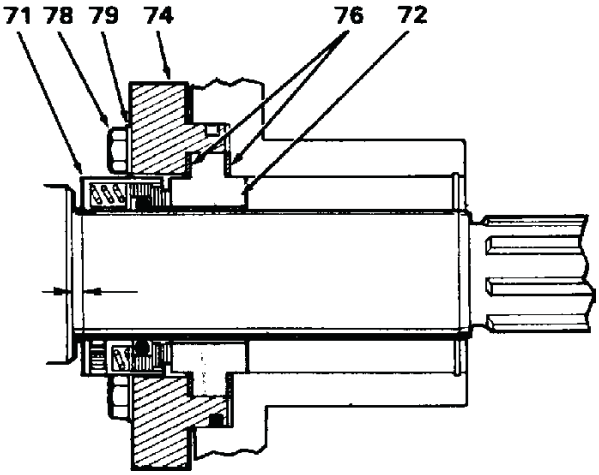
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL, JC #9	2	0C1114000
72	SEAT, SEAL, CERAMIC	2	055014012+
	SEAT, SEAL, TUNGSTEN	2	055014013+
	SEAT, SEAL, SILICON	2	055014016+
74	GLAND, 55 & 125I, 316	2	0C1034001
76	GASKET	4	055042001+
78	HHCS, 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5050 Packing and Seals

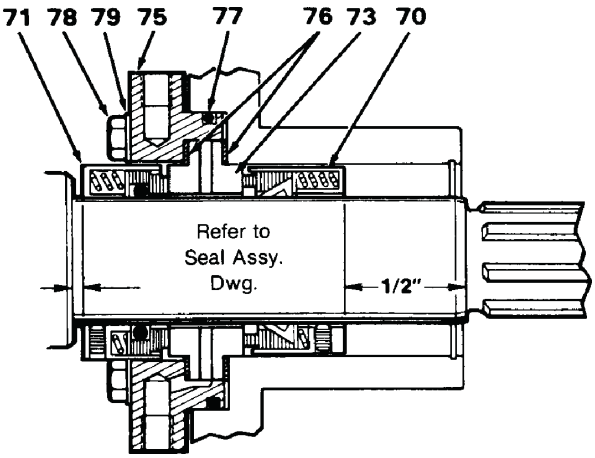
Outside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
71	SEAL JC #8B2	2	0C1114008
72	SEAT, SEAL-CERAMIC	2	055014012+
	SEAT, SEAL, TUNGSTEN	2	055014013+
	SEAT, SEAL, SILICON	2	055014016+
74	GLAND, 55 & 125I, 316	2	0C1034001
76	GASKET	4	055042001+
78	HHCS ,1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER,1/4" 18-8 REG.	8	43-22



Outside-Inside Mechanical Seal

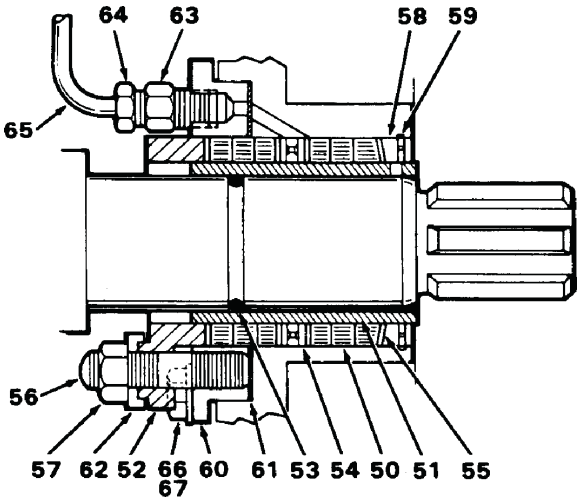
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL JC #9	2	0C1114000
71	SEAL JC #8B2 CARBON	2	0C1114008
73	SEAT, SEAL, FLUSH, CERAMIC	2	055014027+
	SEAT, SEAL, FLUSH, TUNGSTEN	2	055014028+
	SEAT, SEAL, FLUSH, SILICON	2	055014031+
75	GLAND, FLUSH	2	0C1034003
76	GASKET, SEAT RING, OUTER	2	055042001+
77	O-RING-147 FDA VITON	2	V70152
78	HHCS 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5060 Packing and Seals

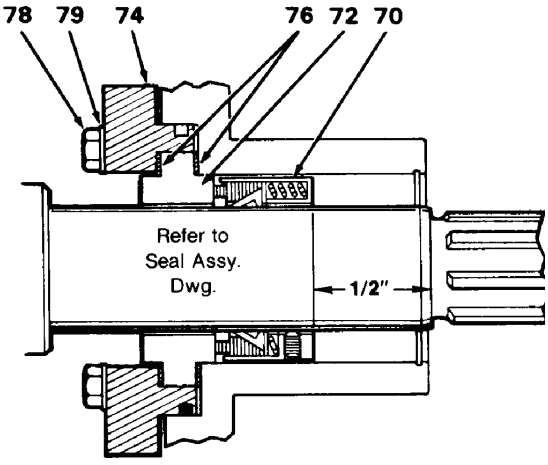
Mechanical Packing (Standard Seal Package)

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
50	PACKING	12	0C1033000
51	SLEEVE	2	0C1098000
	SLEEVE, CERAMIC COATED	2	0C1098001
52	GLAND	2	0C1004000
53	O-RING, NITRILE BUNA	2	N70228
54	RING, LANTERN GLASS FILLED	2	0E1047000
55	PACKING SPACER	8	0C1033100
56	STUD, 3/8-16 .375D 1.87LG	4	0C1050000
57	HEX NUT, 3/8-16 18-8 REGULAR	4	36-45
58	PACKING ,RETAINING RING 316SS	2	0C1051000
59	RETAINER-5050-RING 2.413 OD	2	40068
60	GLAND, INSERT	2	0C1050200
61	GASKET INSERT	2	0C1043300
62	GLAND WASHER	4	0C1049000
63	FTITNIG 6200X3	4	STD299003
64	FTITNIG 6100X3	4	STD299023
65	TUBE-1 .187"x.030" COPPER IN.	24	87-699
66	HHCS 1/4-20 x .50" 18-8	8	30-62
67	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



Inside Mechanical Seal

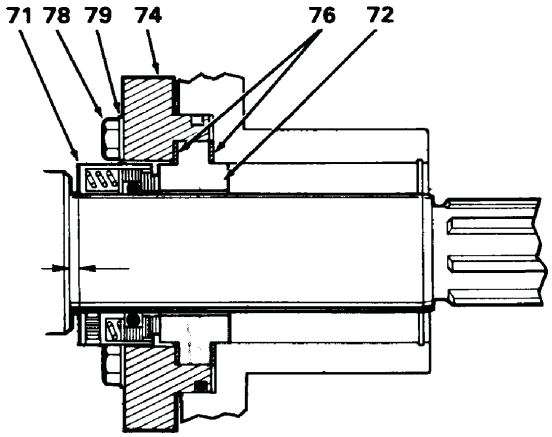
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL, JC #9	2	0C1114000
72	SEAT, SEAL, CERAMIC	2	055014012+
	SEAT, SEAL, TUNGSTEN CARBIDE	2	055014013+
	SEAT, SEAL, SILICON	2	055014016+
74	GLAND, 55 & 125I, 316	2	0C1034001
76	GASKET	4	055042001+
78	HHCS, 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5060 Packing and Seals

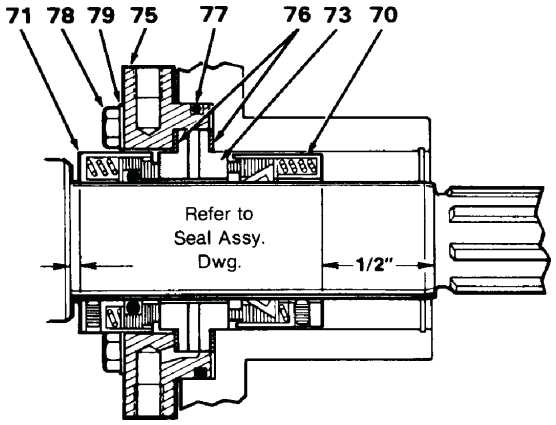
Outside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
71	SEAL JC #8B2	2	0C1114008
72	SEAT, SEAL-CERAMIC	2	055014012
	SEAT, SEAL, TUNGSTEN CARBIDE	2	055014013
	SEAT, SEAL, SILICON	2	055014016
74	GLAND, 55 & 125I, 316	2	0C1034001
76	GASKET	4	055042001
78	HHCS ,1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER,1/4" 18-8 REG.	8	43-22



Outside-Inside Mechanical Seal

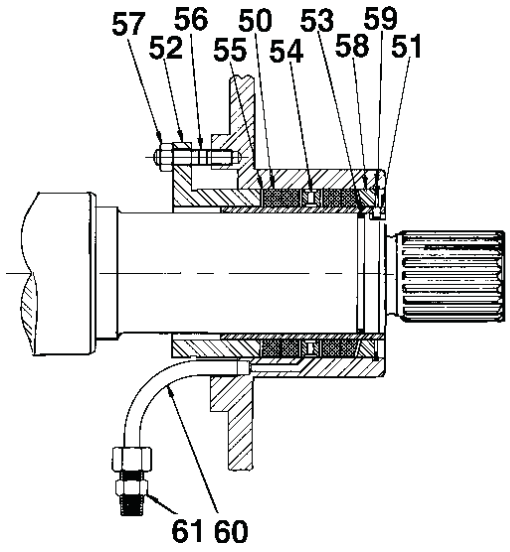
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL JC #9	2	0C1114000
71	SEAL JC #8B2 CARBON	2	0C1114008
73	SEAT, SEAL, FLUSH, CERAMIC	2	055014027+
	SEAT, SEAL, FLUSH, TUNGSTEN	2	055014028+
	SEAT, SEAL, FLUSH, SILICON	2	055014031+
75	GLAND, FLUSH	2	0C1034003
76	GASKET, SEAT RING, OUTER	2	055042001+
77	O-RING-147 FDA VITON	2	V70152
78	HHCS 1/4-20 x 1.0" 18-8	8	30-93
79	LOCK WASHER, 1/4" 18-8 REG.	8	43-22



5070 Packing and Seals

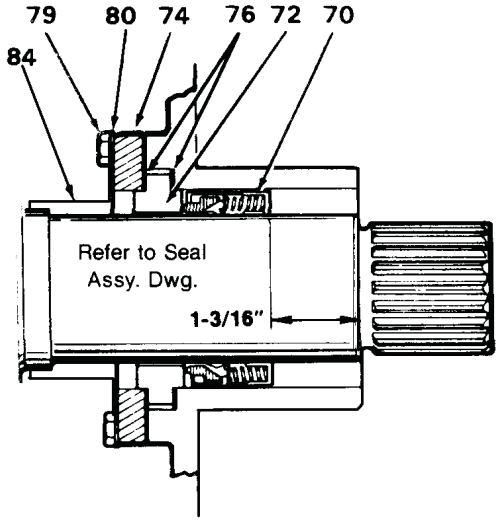
Mechanical Packing (Standard Seal Package)

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
50	PACKING C-13	8	200033000+
51	SLEEVE, STAINLESS	2	200098000+
	SLEEVE, CERAMIC COATED	2	200098003+
52	PACKING GLAND	2	200004000+
53	O-RING, SHAFT, NITRILE BUNA	2	N70140+
54	LANTERN RING, GLASS FILLED	2	200047000+
55	PACKING SPACER	8	200032000+
56	STUD,PACKING GL	4	200050000+
57	HEX NUT, 5/16-18 18-8 REG	4	36-41
58	PACK, RETAINING RING	2	200051000+
59	RETAINER,5070-RING, 3.636OD	2	40069+
60	TUBE, FLUSHING 5/16 STEEL	4	200317000+
61	FITTING, MALE BRASS	4	000299032+



Inside Mechanical Seal

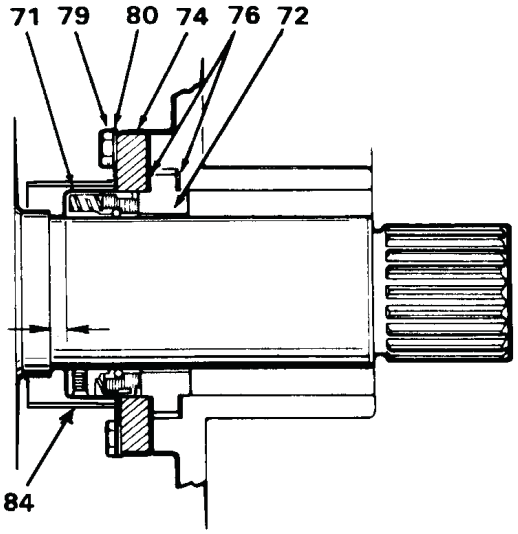
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	CRANE SEAL, #9	2	200114000+
72	SEAL SEAT, FLUSH CERAMIC	2	200014012+
	SEAL SEAT, FLUSH TUNGSTEN	2	200014013+
	SEAL SEAT, FLUSH, SILICON	2	200014016+
74	GLAND, FLUSH	2	200034000+
76	GASKET, INNER T-SEAT VITON	2	200042001+
79	HHCS, 5/16-18 x 1.0"	2	30-34
80	LOCK WASHER,5/16	8	43-15
84	SHAFT GUARD	8	111577+



5070 Packing and Seals

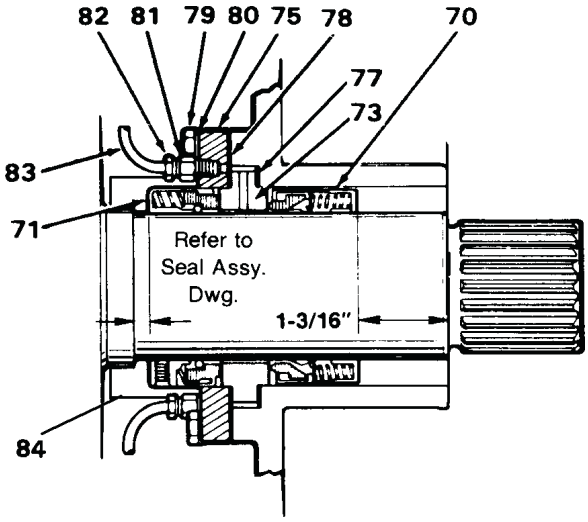
Outside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
71	CRANE SEAL, 8B2	2	200114002+
72	SEAT, SEAL-CERAMIC	2	200014012+
	SEAT, SEAL, TUNGSTEN CARBIDE	2	200014013+
	SEAT, SEAL, SILICON	2	200014016+
74	GLAND, 55 & 125I, 316	2	200034000+
76	GASKET	4	200042001+
79	HHCS, 5/16-18 x 1.0"	2	30-34
80	LOCK WASHER,5/16	8	43-15
84	SHAFT GUARD	8	111577



Outside-Inside Mechanical Seal

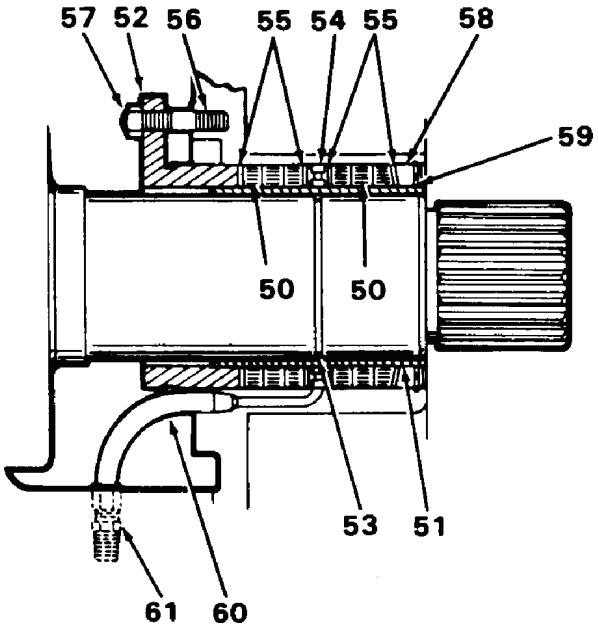
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	CRANE SEAL, #9	2	200114000+
71	CRANE SEAL, 8B2	2	200114002+
73	SEAL SEAT, FLUSH CERAMIC	2	200014027+
	SEAL SEAT, FLUSH TUNGSTEN	2	200014028+
	SEAL SEAT, FLUSH, SILICON	2	200014031+
75	GLAND, FLUSH	2	200034001+
77	GASKET, INNER T-SEAT VITON	2	200042001+
78	GASKET, OUTER	2	200042002+
79	HHCS, 5/16-18 x 1.0"	2	30-34
80	LOCK WASHER,5/16	8	43-15
81	FITTING 6200X3	4	STD299003
82	FITTING 6100X3	4	STD299023
83	TUBE-1 0.187"x 0.30"W COP	2	87-699
84	SHAFT GUARD	8	111577+



5080 Packing and Seals

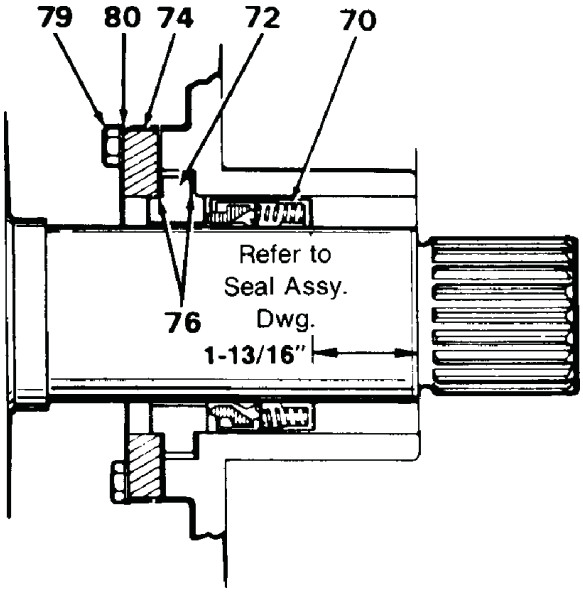
Mechanical Packing (Standard Seal Package)

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
50	PACKING-C 13	8	300033000+
51	SLEEVE, STAINLESS	2	300098000+
	SLEEVE, CERAMIC COATED	2	300098003+
52	PACKING GLAND	2	300004000+
53	O-RING, SHAFT, NITRILE, BUNA	2	N70149+
54	LANTERN RING, GLASS FILL	2	300047000+
55	4.0" OD X 3.375 ID X 1/16" TEFLON	8	20-138
56	STUD, 3/8-16 .375D 1.87LG	4	0C1050000+
57	HEX NUT, 3/8-16 18-8 REG	4	36-45
58	PACKING RETAINING RING	2	300051000+
59	RETAINER, 5080-RING 4.157 OD	2	40070+
60	TUBE, FLUSHING 5/16 STEEL 4"	4	200317000+
61	FITTING, MALE BRASS	4	000299032+



Inside Mechanical Seal

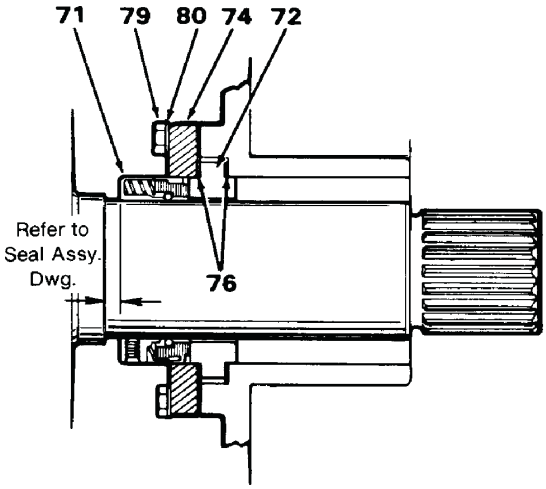
ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL, #9 CRANE	2	300114000+
72	SEAT SEAL, CERAMIC	2	300014012+
	SEAL SEAT, TUNGSTEN CARBIDE	2	300014013+
	SEAL SEAT, SILICON	2	300014016+
74	GLAND	2	300034000+
76	GASKET	4	300042001+
79	HHCS, 3/8-16 x 1.25" 18-8	8	30-60
80	LOCK WASHER, 3/8" 18-8 REG	8	43-28



5080 Packing and Seals

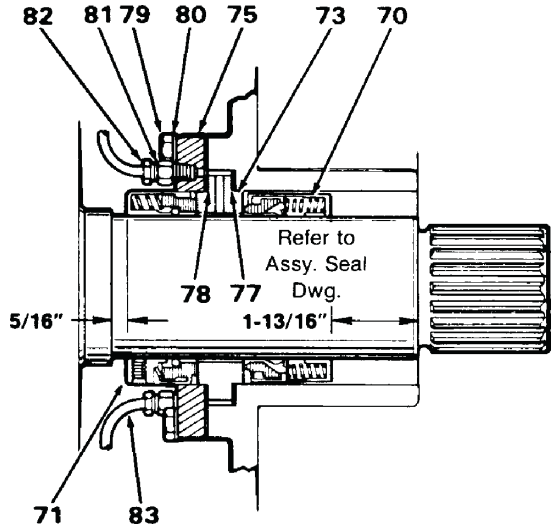
Outside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
71	SEAL, #8-B2 CRANE	2	300114002+
72	SEAT, SEAL-CERAMIC	2	300014012+
	SEAT, SEAL, TUNGSTEN CARBIDE	2	300014013+
	SEAT, SEAL, SILICON	2	300014016+
74	GLAND, 55 & 125I, 316	2	300034001+
76	GASKET	4	300114002+
79	HHCS, 3/8-16 x 1.25" 18-8	8	30-60
80	LOCK WASHER, 3/8" 18-8 REG	8	43-28

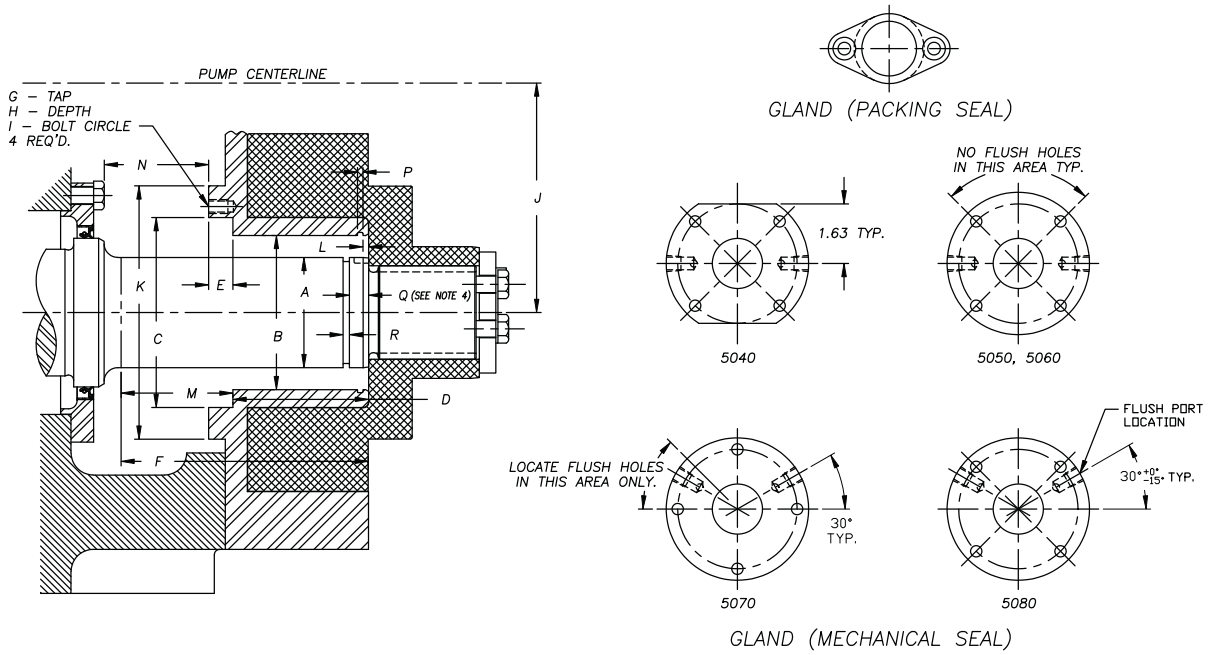


Outside-Inside Mechanical Seal

ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.
70	SEAL, #9 CRANE	2	300114000+
71	SEAL, #8-B2 CRANE	2	300114002+
73	SEAL SEAT, FLUSH CERAMIC	2	300014027+
	SEAL SEAT, FLUSH TUNGSTEN	2	300014028+
	SEAL SEAT, FLUSH, SILICON	2	300014031+
75	GLAND, FLUSHING	2	300034001+
	PIPE PLUG	4	STD128500
77	GASKET, INNER T-SEAT VITON	2	300042001+
78	GASKET, OUTER T-SEAT W/FLUSH	2	300042002+
79	HHCS, 3/8-16 x 1.25" 18-8	8	30-60
80	LOCK WASHER, 3/8" 18-8 REG	8	43-28
81	FITTING 6200X3	4	STD299003
82	FITTING 6100X3	4	STD299023
83	TUBE-1 0.187”x 0.30”W COP	2	87-699



Gland (Packing Seal) and Gland (Mechanical seal)



MODEL	A +0.000 -0.001	B +0.000 -0.001	C +0.003 -0.000	D	C ± 0.02	F	G	H	I
5040	1.251	2.000	2.882	1.625	0.373	3.562	1/4-20	0.312	3.250
5050	1.501	2.250	3.504	1.814	0.435	3.625	1/4-20	0.312	3.875
5060	1.501	2.250	3.504	2.750	0.435	4.562	1/4-20	0.312	3.875
5070	2.501	3.500	4.312	3.071	0.554	5.568	5/16-18	0.437	4.812
5080	3.001	4.000	4.880	3.698	0.554	5.884	3/8-16	0.562	5.625

J	K	L	M	N	P	Q	Q'	R
1.650	3.500	0.130	1.937	1.553	0.068	0.44	1.87	0.120
2.250	4.437	0.130	1.812	1.500	0.087	0.44	2.00	0.120
2.250	4.437	0.130	1.812	1.507	0.087	0.44	2.00	0.120
3.000	5.750	0.130	2.497	2.273	0.125	0.44	1.50	0.112
3.500	6.188	0.130	2.186	2.323	0.125	0.44	1.87	0.112

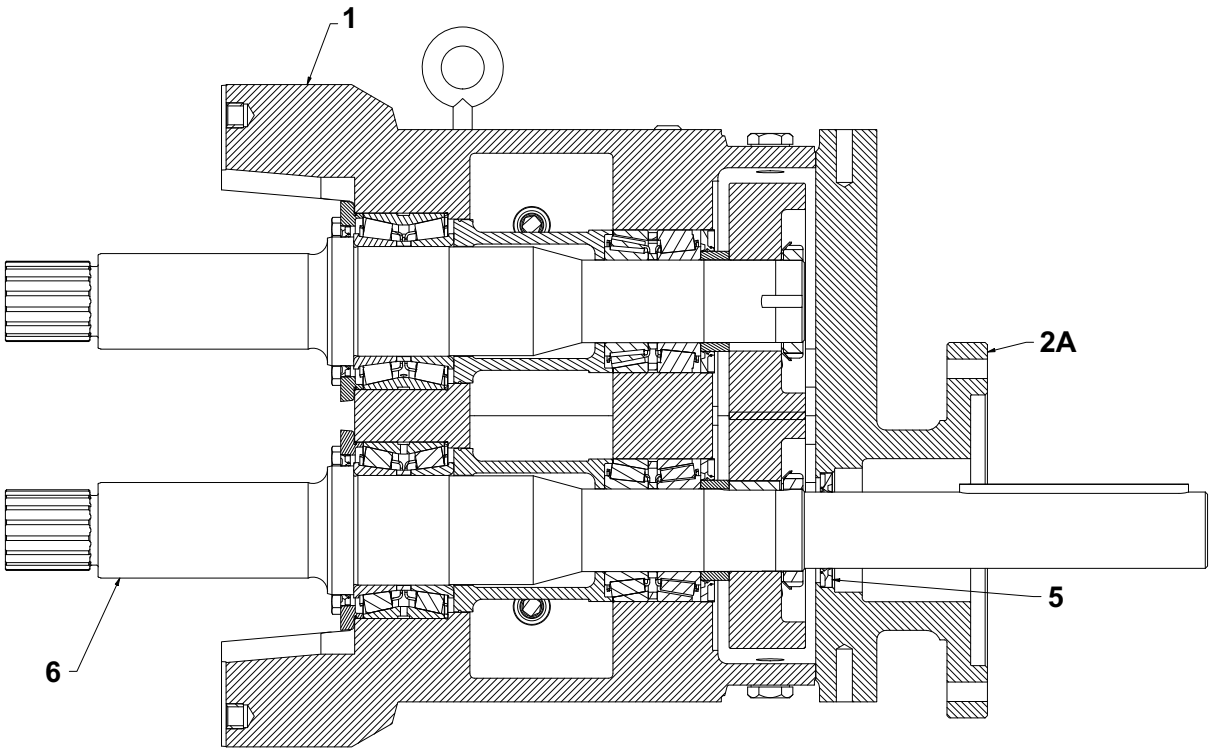
NOTE: 1. Gland bolt length not to exceed 'N' dimension.

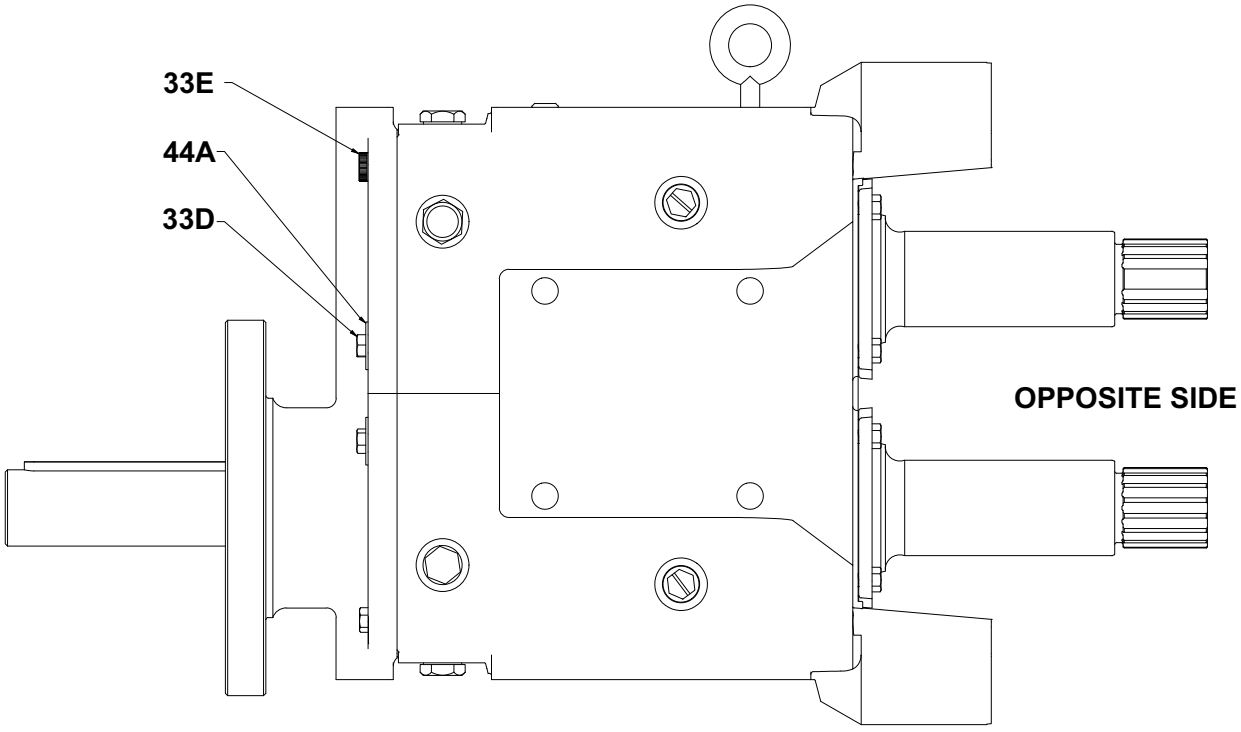
2. All dimension are reference unless tolerance is specified.

3. Dimension 'Q' and 'R' apply only to packing seal pumps.

4. On early universal industrial pumps the o-ring groove is located at Q'.

Tru-Fit™ Universal 5000 Industrial Series Pump





Tru-Fit™ Universal 5000 Industrial Series Pump

ITEN NO.	DESCRIPTION	QTY.	5000 PUMP SIZE	NOTE
			5040	
1	GEAR CASE	1	40053+	
2A	GEAR CASE COVER, ADAPTER	1	136578+	1
6	DRIVE SHAFT CC	1	311133+ 311134+	
5	OIL SEAL, GEAR CASE COVER	1	000030013+	2
33D	5/16-18 x 1-1/8" HHCS	4	30-237	
33E	3/8" x 3/4" lg. SHSB	2	30-691	
44A	Flat Washer, 3/8"	4	43-30	

ITEN NO.	DESCRIPTION	QTY.	5000 PUMP SIZE		NOTE
			5050	5060	
1	GEAR CASE	1	40054+		
2A	GEAR CASE COVER, ADAPTER	1	136579+ 139900+		1
6	DRIVE SHAFT CC	1	311164+ 311163+	311166+ 311165+	
5	OIL SEAL, GEAR CASE COVER	1	000030012+		2
33D	3/8-16 x 1-1/2" HHCS	4	30-50		
33E	1/2" x 1" lg. SHSB	2	30-692		
44A	Flat Washer, 1/2"	4	43-31		

ITEN NO.	DESCRIPTION	QTY.	5000 PUMP SIZE	NOTE
			5070	
1	GEAR CASE	1	40454+	
2A	GEAR CASE COVER, ADAPTER	1	136582+ 136583+	1
6	DRIVE SHAFT CC	1	311221+ 311220+	
5	OIL SEAL, GEAR CASE COVER	1	STD030006	2
33D	3/8-16 x 1-1/2" HHCS	6	30-50	
33E	1/2" x 1" lg. SHSB	2	30-692	
44A	Flat Washer, 1/2"	6	43-31	

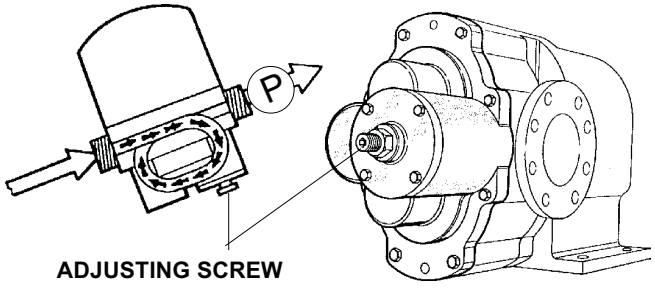
ITEN NO.	DESCRIPTION	QTY.	5000 PUMP SIZE	NOTE
			5080	
1	GEAR CASE	1	40616+	
2A	GEAR CASE COVER, ADAPTER	1	136585+ 136587+	1
6	DRIVE SHAFT CC	1	123619+ 123620+	
5	OIL SEAL, GEAR CASE COVER	1	STD030004	2
33D	1/2-13 x 1-1/2" HHCS	6	30-103	
33E	5/8" x 1" lg. SHSB	2	30-693	
44A	Flat Washer, 1/2"	6	43-31	

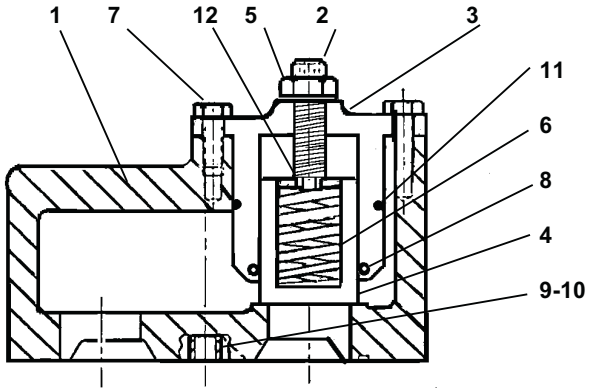
NOTE:

1. Depends on the Nord motor, material, paint.

2. Item 5, Oil seal, gear case cover, is the same seal that is used on non-Tru-Fit pumps. It is not included with item 2A.

Universal 5000 Industrial Series Pump Internal By-Pass Relief Valve





ITEM NO.	DESCRIPTION	QTY PER PUMP	PART NO.			
			5040	5050/5060	5070	5080
-	Cover Assembly		020022001+	050022001+	200022001+	300022001+
1	Cover 316 SS	1	020002001+	050002001+	200002001+	300020004+
2	Socket Head Cap Screw	1	000060002+	000060001+	000060001+	000060001+
3	Adapter	1	020071000+	050071000+	200071000+	300071000+
4	Piston	1	020073000+	050073000+	200073000+	300073000+
5	Hex Jam Nut	1	36-92	36-99	36-99	36-99
6	Spring, Relief Valve	1	000076003+	000076002+	000076005+	000076006+
7	Hex Head Cap Screw	2	30-623	-	-	-
-	-	4	-	30-349	-	-
-	-	6	-	-	30-349	30-349
8	O-Ring - Buna - N	1	N70222	N70041	N70232	N70235
9*	**Bushing - SST**	1	020116002+	050116002+	-	-
10*	**Bushing - SST**	1	020116003+	050116003+	-	-
11	O-Ring - Buna - N	1	N70034	N70227	N70045	N70157
12	Spring, Retainer Steel	1	020176000+	050176000+	200176000+	200176000+

*Bushings are shipped loose. Orient them with body dowel pins. Be sure VALVE mechanism is on DISCHARGE SIDE of pump.

Universal 5000 Industrial Series Pump Relief Valve Data

PUMP MODEL	5040	5050/5060
Valve face area (sq. inches)	2.483	2.776
Maximum valve travel (inches)	0.91	0.96
Spring rate (lbs per 0.1 inch) Ref. spring part number 000-076-006	40	70
Adjustment screw pitch (threads per inch)	13	10
Amount of spring compression (No. of turns/inches 5040/inches 5050-60)	Product cracking pressure/ Remaining available travel (psi/inches)	
1 turn / 0.08 in / 0.1 inch	16 psi/0.83 in	25 psi/0.86 in
2 turns / 0.15 in / 0.2 inch	32 psi/0.76 in	50 psi/0.76 in
3 turns / 0.23 in / 0.3 inch	48 psi/0.68 in	76 psi/0.66 in
4 turns / 0.31 in / 0.4 inch	64 psi/0.60 in	101 psi/0.56 in
5 turns / 0.38 in / 0.5 inch	81 psi/0.53 in	126 psi/0.46 in
6 turns / 0.46 in / 0.6 inch	96 psi/0.45 in	151 psi/0.36 in
7 turns / 0.54 in / 0.7 inch	113 psi/0.37 in	177 psi/0.26 in
8 turns / 0.62 in / 0.8 inch	129 psi/0.29 in	202 psi/0.16 in
9 turns / 0.69 in /0.9 inch	145 psi/0.22 in	227 psi/0.06 in
10 turns / 0.77 inch	161 psi/0.14 in	solid
11 turns / 0.85 inch	solid	-

PUMP MODEL	5070	5080
Valve face area (sq. inches)	4.43	5.67
Maximum valve travel (inches)	0.9	1.1
Spring rate (lbs per 0.1 inch) Ref. spring part number 000-076-006	120	120
Adjustment screw pitch (threads per inch)	10	10
Amount of spring compression (No. of turns/ inches)	Product cracking pressure/ Remaining available travel (psi/inches	
1 turn/ 0.1 inch	27 psi/.08 inch	21 psi/1.0 inch
2 turns / 0.2 inch	54 psi/0.7 inch	42 psi/0.9 inch
3 turns / 0.3 inch	81 psi/0.6 inch	63 psi/0.8 inch
4 turns / 0.4 inch	108 psi/0.5 inch	84 psi/0.7 inch
5 turns / 0.5 inch	135 psi/0.4 inch	105 psi/0.6 inch
6 turns / 0.6 inch	162 psi/0.3 inch	126 psi/0.5 inch
7 turns / 0.7 inch	185 psi/0.2 inch	147 psi/0.4 inch
8 turns / 0.8 inch	216 psi/0.1 inch	168 psi/0.3 inch
9 turns / 0.9 inch	solid	189 psi/0.2 inch
10 turns / 1.0 inch	-	210 psi/0.1 inch
11 turns / 1.1 inch	-	solid

NOTE: Spring force on valve increases as valve opens, and at the same rate as an equal amount of valve stem adjustment. For example, if the valve opens 0.2 inches, the increase in spring load is the same as making two turns of the adjustment screw.

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Long Term Storage

Long-term storage (greater than six months) of Waukesha Cherry-Burrell brand pumps:

Before Storage

1. Lubricate all bearings and seals, including:
   - Rubber o-rings and mechanical seal faces (new pump bearings installed from the factory are already lubricated).
   - Motors and drives (see manufacturer's instructions)
2. Be sure the pump contains no water. Make sure to disassemble the wet end and wipe it dry if necessary.
3. Use rust inhibitor on any exposed metal surfaces:
   - Any unpainted surfaces
   - Shafts, nuts/bolts
4. Cover the inlet/outlet connections of the pumps to keep out foreign materials.
5. Put all related instruction manuals in a separate water-tight envelope or container and store them with the equipment.
6. Completely enclose the equipment to prevent contamination from moisture, dust and other possible contaminants. Certain types of plastic wrap materials, when properly used, make excellent storage enclosures.
7. Rotate the pump and drive shafts several turns every 3 months.

Storage

1. Store in a dry location. Indoor storage is preferred. If stored outdoors, the equipment must be in a weather-tight enclosure and shielded from direct sunlight.
2. Maintain even temperatures to prevent condensation.

After Storage

NOTE: *Do not start the motor if there is any indication of water contamination. Have the motor checked by a qualified electrician before starting.*

1. Remove the equipment from the enclosure and repair or replace any damaged items before using equipment.
2. Check the electric motor (if applicable) per the manufacturer's instructions.
3. Pumps:
   - Completely disassemble the product contact liquid end per the instruction manual.
   - Clean and inspect all parts, including seals and o-rings.
   - Replace rubber parts with any sign of age or damage, such as cracks, taking a set, or loss of elasticity.
4. Lubricate the seal and o-rings and reassemble the liquid end per the instruction manual.
5. Purge pump bearings with fresh grease.
6. Lubricate the motor/drive (if applicable) per the manufacturer's instructions.
7. If the pump has been in storage longer than 1 year, change the oil in the pump and drive.

Pump Dimensions

Pump Shaft Guards

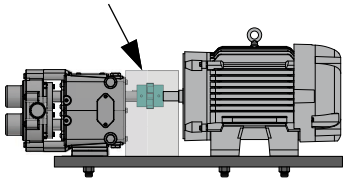
⚠WARNING

Full guards must be installed to isolate operators and maintenance personnel from rotating components.

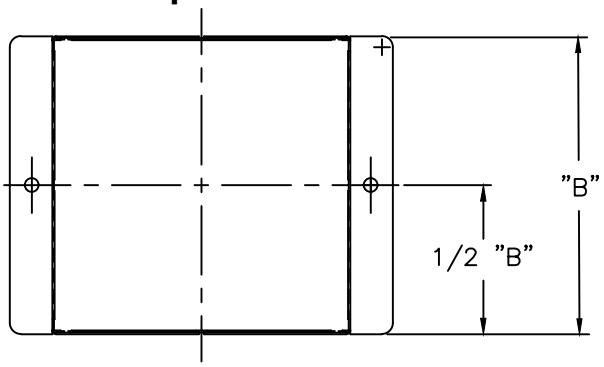
Guards are provided as part of a complete pump and drive package and are selected by SPX FLOW Engineering for the pump, base, and motor ordered. Do not modify the guard provided by SPX FLOW. If the guard provided by SPX FLOW is lost, contact SPX FLOW Customer Service and provide your order number or PO number of the pump to order a correctly-sized replacement guard.

If the pump was not purchased as a unit, it is the responsibility of the customer to ensure proper guarding. Refer to your local regulations for guidance.

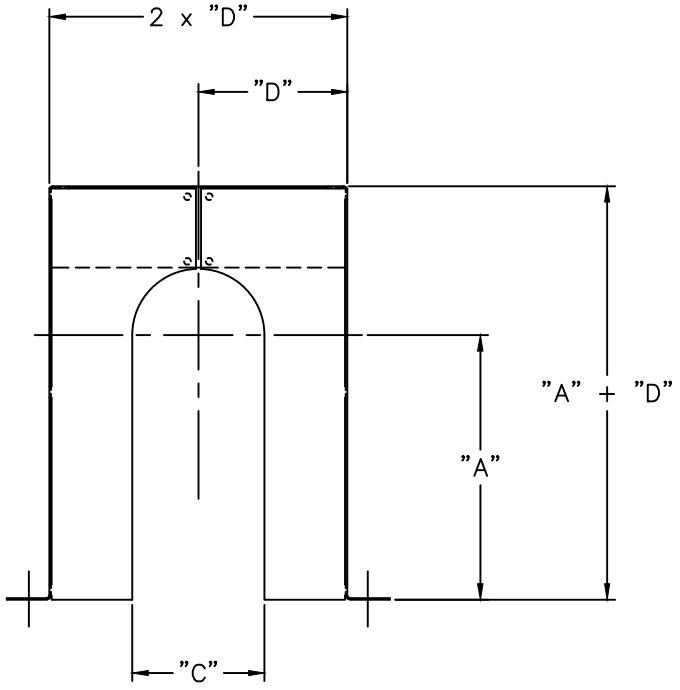
Guard (side view) shown as supplied with an SPX FLOW base package



Top view

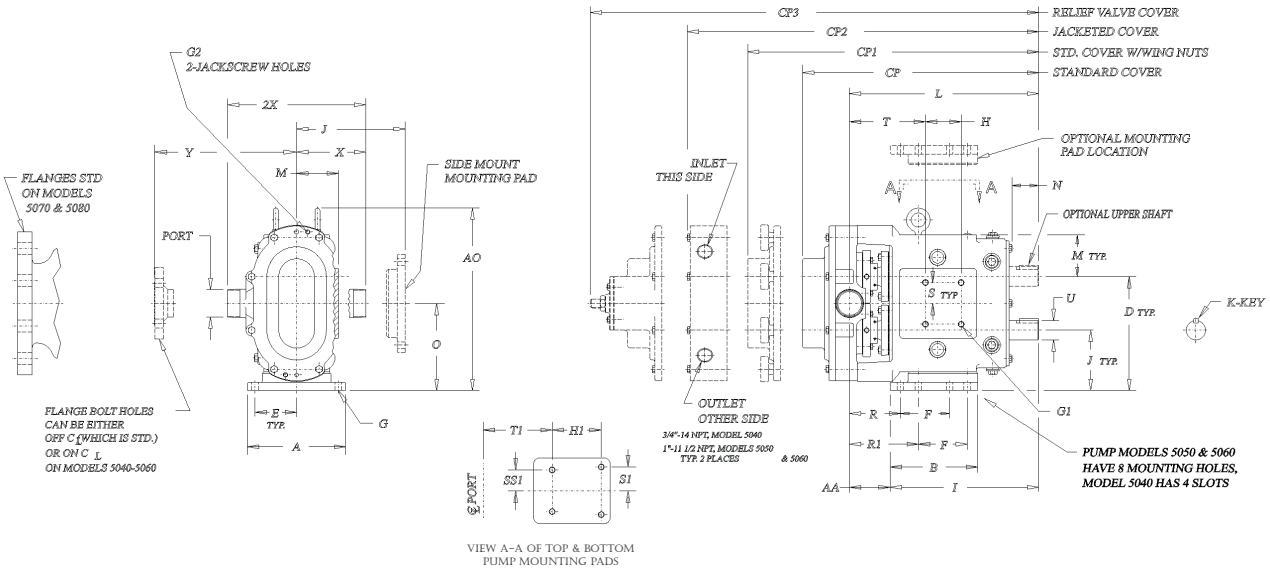


Front view



NOTE: *Dimensions A, B, C, and D depend on the specific pump unit configuration.*

Universal 5000 Industrial Series Pump



NOTE: *1. TO HOLD PORT TO MOUNTING THE SAME AS OLD "I" PUMPS, USE HOLS DIMENSIONS FROM PORT BY "R".*

2. TO HOLD SHAFT TO MOUNTING THE SAME AS OLD "I" PUMPS, USE HOLS DIMENSIONS FROM PORT BY "R1".

5000 SERIES PUMP MODEL		A	AA	AO	B	CP	CPI	CP2	CP3	D	E	F
5040	IN	6.25	4.06	10.04	4.25	16.52	16.52	16.91	18.64	6.86	2.31	2.56
	MM	159	103	255	108	419	419	430	473	174	59	65
5050	IN	8.25	3.4	15.31	7.38	19.83	19.83	20.44	23.08	9.56	3.5	4.13
	MM	210	86	389	187	504	504	519	586	243	89	105
5060	IN	8.25	4.1	15.31	7.38	20.78	20.78	21.39	24.03	9.56	3.5	4.13
	MM	210	104	389	187	528	528	543	610	243	89	105
5070	IN	11	4.27	19.13	9.5	26.31	26.31	-	28.5	12.38	4.75	7.5
	MM	279	108	486	241	668	668	-	724	314	121	191
5080	IN	12	4.12	22.38	11.63	30.17	30.17	-	34.05	13.88	5.25	8
	MM	305	106	568	295	766	766	-	865	353	133	203

5000 SERIES PUMP MODEL		G	G1	G2	H	HI	I	J	K	L
5040	IN	A1 WIDE SLOT	3/8-16x5/8	5/16–18	1.81	2.75	8.83	3.56	0.25	12.89
	MM	10 WIDE SLOT	-	-	46	70	224	90	6.35	327
5050	IN	0.56	1/2-13x7/8	3/8–16	3	4.13	12,49	5.06	0.375	15.89
	MM	14	-	-	76	105	317	129	9.525	404
5060	IN	0.56	1/2-13x7/8	3/8–16	3	4.13	12.49	5.06	0.375	16.59
	MM	14	-	-	76	105	317	129	9.525	421
5070	IN	0.66	1/2-13x1.00	1/2–13	5.38	5.38	15.29	6.38	0.5	19.56
	MM	17	-	-	137	137	388	162	12.7	497
5080	IN	0.66	1/2-13x1.00	5/8–11	5.38	5.38	17.8	6.88	0.625	21.92
	MM	17	-	-	137	137	462	175	15.875	557

Universal 5000 Industrial Series Pump

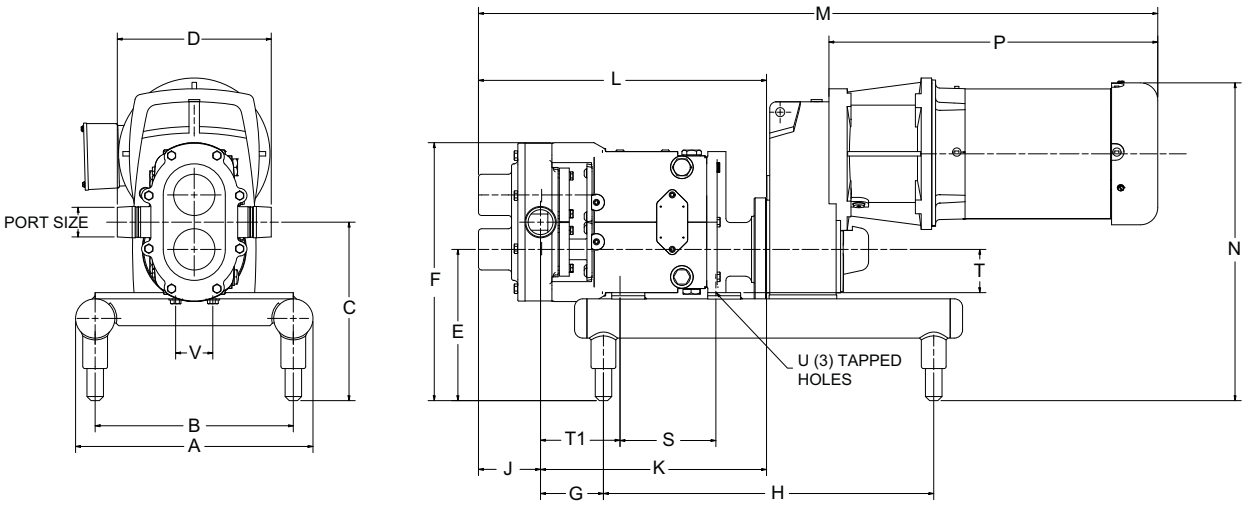
5000 SERIES PUMP MODEL		M	N	O	PORT*	R	R1	S	S1
5040	IN	2.62	2.32	5.21	1 1/2" - 11 1/2 NPT	4.87	-	1.12	1.12
	MM	67	59	132	-	124	-	28	28
5050	IN	3.5	2.25	7.31	2" - 11 1/2 NPT	4.28	5.78	1.75	2
	MM	89	57	186	-	109	147	44	51
5060	IN	3.5	2.25	7.31	2 1/2" - 8 NPT	4.97	6.47	1.75	2
	MM	89	57	186	-	126	164	44	51
5070	IN	4.5	2.75	9.38	4" - 150# FLANGE	5.27	-	2.69	2.69
	MM	114	70	238	-	134	-	68	68
5080	IN	5.06	4.06	10.38	6" - 150# FLANGE	5.37	-	2.69	2.69
	MM	129	103	264	-	136	-	68	68

5000 SERIES PUMP MODEL		SS1	T	T1	U +0.000 -0.001	X*	2X*	Y*	2Y*	WT.*
5040	IN	1.12	5.28	4.87	1.25	4.69	9.37	5.96	11.91	100
	MM	28	134	124	31.75	119	238	151	303	45
5050	IN	1.75	6.37	5.78	1.625	5.81	11.6	6.63	13.25	240
	MM	44	162	147	41.28	148	295	168	337	109
5060	IN	1.75	7.07	6.47	1.625	5.81	11.6	6.75	13.5	245
	MM	44	180	164	41.28	148	295	171	343	111
5070	IN	2.69	7.07	7.07	2	-	-	7.37	14.75	475
	MM	68	180	180	50.8	-	-	187	375	215
5080	IN	2.69	8.37	8.37	2.375	-	-	8	16	810
	MM	68	213	213	60.33	-	-	203	406	367

NOTE:

1. **PORT*-** PORT MODELS 5040, 5050 & 5060 FLANGE OPTION ARE THE SAME SIZE, 150# FLANGE.
2. **X*-** NPT
3. **2X*-** NPT
4. **Y*-** 150# FLANGE LASER 5040-5060
5. **2Y*-** 150# FLANGE LASER 5040-5060
6. **WT.*-** STD COVER

Tru-Fit™ Universal 5000 Industrial Series Pump Dimensions



Model	A	B	C	D (NPT)	D (150# FLANGE)	E	F	G	H	J	K	L
5040	14.38	12	10.81	9.37	11.91	9.16	15.62	3.81	20	3.76	13.69	17.44
5050	18.38	16	12.48	11.62	13.25	10.23	19.04	3.71	28	4.12	18.09	22.21
5060	18.38	16	12.48	11.63	13.5	10.23	19.04	4.47	28	4.31	18.85	23.16
5070	20.88	18	14.51	-	14.75	11.51	23.19	4.57	36	6.75	20.82	27.57
5080	26.88	24	16.07	-	16.00	12.57	25.82	-	48	8.31	18.5	30.68

M	N	P	S	T	T1	PORT SIZE	U	V
41.14	19.25	19.91	5.81	2.62	4.81	1 1/2" - 11 1/2 NPT	3/8 - 16 X 0.62	2.25
57.51	24.46	29.31	8.13	3.50	5.71	2" - 11 1/2 NPT	1/2 - 13 X 0.88	3.50
58.46	24.46	29.31	8.13	3.50	6.47	2 1/2" - 8 NPT	1/2 - 13 X 0.88	3.50
66.78	29.05	32.67	10.00	4.50	7.07	4" - 150# FLANGE	1/2 - 13 X 1.0	5.375
82.13	33.49	42.47	10.01	5.06	8.49	6" - 150# FLANGE	1/2 - 13 X 1.0	5.375

ATEX Declaration for Universal 5000 Industrial Series

1. The ATEX Declaration of Conformity must be included with the order. The declaration on the next page is not valid but is supplied for example purposes only.
2. Only Waukesha Cherry-Burrell brand spare parts are allowed to be installed into the pump. Use of non-Waukesha Cherry-Burrell brand parts will void ATEX approval.
3. For ATEX applications, the maximum temperature of the pumped liquid should be 149°C (300°F).
4. Ambient temperature range (Ta):
   - The ambient temperature should be between -4°F and 104°F (-20°C and 40°C).
5. Temperature Classification:
   - Surface temperature of Universal 5000 Industrial Series pumps depends on the temperature of the pumped liquid. The table below shows the temperature class of the pump with different temperatures of pumped liquid.

Temperature Class	Pumped Liquid Temperature	Max. Surface Temperature
T4	≤ 100 °C (212°F)	135°C (275°F)
T3	≤ 149°C (300°F)	200°C (392°F)

NOTE: *Never run the pump dry, as it could lead to temperature rise exceeding temperature class of pump. If there is any possibility of dry running during operation, a suitable dry run monitoring system shall be installed.*

6. Flushing media requirements for double mechanical seals:
   - Flow: minimum 0.13 gpm (0.5 l/min)
   - Temperature: maximum 104°F (40°C)
   - Pressure, atmosphere side: maximum 218 psi (15 bar)
   - Viscosity: maximum 10cP
   - Differential pressure from atmosphere to product side: maximum 102 psi (7 bar).

Nameplates

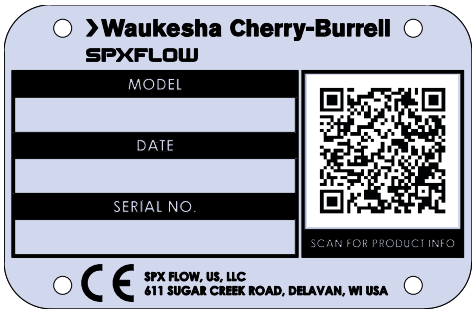


Figure 1 - Standard pump nameplate

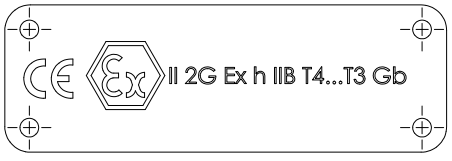


Figure 2 - ATEX Nameplates

Pump identification

The standard pump nameplate identifies the pump model, date of manufacture, and serial number. See Figure 1.

In addition to the standard pump nameplate, an ATEX pump has ATEX nameplate identifying the operating conditions for explosive environments. See Figure 2.

Hazard class identification

See Figure 2.

II	Equipment group
2	Equipment category (zone 1)
G	Hazardous Gas Atmosphere.
h	Constructional Safety 'c' and Liquid Immersion 'k'
IIB	Ethylene and related gas environment.
T4...T3	Temperature class, 135°C (275°F) to 200°C (392°F)
Gb	Equipment Protection Level for Category 2G.

Declaration of Conformity

SPXFLOW

Product

Nomenclature	:	**Rotary Positive Displacement Pumps.**
Model / Type	:	Universal 5000 Industrial Series Pump
Variants / Family code	:	5040, 5050, 5060, 5070, 5080
Serial Number	:	Please see the certificate received with your order for your serial number. This document only provides a generic Declaration.

Manufacturer
SPX Flow US, LLC.
611 Sugar Creek Road
Delavan, WI 53115, U.S.A.

Authorized Representative
SPX FLOW Technology GmbH
Gottlieb-Daimler Strasse 13
59439 Holzwickede, Germany

EU Declaration of Conformity in accordance with
ATEX Directive – 2014/34/EU

- Essential Health and Safety Requirement have been met by complying to the harmonised standard/s - EN 80079-36:2016, EN 80079-37:2016.
- Marking: II 2 G Ex h IIB T4...T3 Gb
- Notified Body involved:
  Name: XXXX
  Notified Body no.: XXXX.
  Certification reference: XXXX

EC Declaration of Conformity in accordance with
Machinery Directive – 2006/42/EC

- Essential Health and Safety Requirement for the relevant applicable clauses have been met by complying to harmonised standard/s - EN 12100:2010,
  EN 809:1998+AC:2010.
- Responsible Person for the compilation of the Technical File is:
  SPX FLOW Technology GmbH,
  Gottlieb-Daimler Strasse 13
  59439 Holzwickede, Germany

This declaration of conformity is issued under the sole responsibility of the Manufacturer and the Authorized Representative. It will lose its validity if the product is modified without the written permission from the Manufacturer and/or if the safety instructions specified in the instruction manual are not being followed.

Signatory on behalf of the Authorized Representative :

Andreas J. Klemm

Digitally signed by: Andreas J. Klemm
DN: CN = Andreas J. Klemm email = andeas.klemm@spxflow.com C = DE O = SPX FLOW OU = SPX Flow Technology Germany GmbH
Date: 2025.09.04 15:30:24 +02'00'

Signature: _____ **Date:** 04-09-2025

Andreas J. Klemm, PhD, Corp. Director Sustainability Reporting

Page 1 of 1

5000 Industrial Series Maintenance Summary Reference Sheet

5000 Series Model	**Change oil every 750 hours*** ISO Grade 320, SAE 140 or AGMA Number 6EP		**Grease bearings every 750 hours*** NLGI Grade No. 2, EP, Lithium-based grease.	
	** Aggressive washdown or extreme running conditions may require more frequent lubrication intervals.*			
	Oil Capacity (Gears)		**Grease Quantity (per Bearing)**	
	Top or Bottom	Side Mount	Front	Rear
5040	2.0 oz (60 ml)	4 oz (120 ml)	0.60 oz (18 cc)	0.21 oz (6 cc)
5050	6.0 oz (170 ml)	9.5 oz (280 ml)	0.84 oz (25 cc)	0.76 oz (22 cc)
5060	6.0 oz (170 ml)	9.5 oz (280 ml)	0.84 oz (25 cc)	0.76 oz (22 cc)
5070	11 oz (320 ml)	20 oz (600 ml)	1.33 oz (39 cc)	1.03 oz (30 cc)
5080	17 oz (500 ml)	44 oz (1300 ml)	1.96 oz (58 cc)	1.16 oz (34 cc)

5000 Series Model	Wrench Size, Cap Screw
5040	1/2”
5050 - 5060	9/16”
5070	3/4”
5080	15/16”

Rotor Clearances

5000 Series Model	A - Backface in (mm)	B - Rotor to Body in (mm)	C - Front Face in (mm)
5040	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.0025 - 0.005 in (0.063 - 0.127 mm)
5050	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5060	0.0025 - 0.003 in (0.063 - 0.076 mm)	0.0035 - 0.005 in (0.088 - 0.127 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5070	0.004 - 0.005 in (0.101 - 0.127 mm)	0.004 - 0.0055 in (0.101 - 0.139)	0.004 - 0.008 in (0.101 - 0.203 mm)
5080	0.005 - 0.006 in (0.127 - 0.152 mm)	0.005 - 0.007 in (0.127 - 0.177 mm)	0.005 - 0.009 in (0.127 - 0.228 mm)

Std = Standard Clearance Rotors; FF = Front Face Clearance Rotors; Hot = Hot Clearance Rotors

Standard Rotors: -40°F (-40°C) to 180°F (82°C); FF Clearance Rotors: 180°F (82°C) to 200°F (93°C);

Hot Clearance Rotors: -40°F (-40°C) to 300°F (149°C). Contact SPX FLOW Application Engineering if alternate rotors are needed.

NOTE: *The assembly clearances stated above are for reference only. Actual pump clearances may vary based on pump performance testing.*

5000 Industrial Series Maintenance Summary Reference Sheet - Copy for optional removal

5000 Series Model	**Change oil every 750 hours*** ISO Grade 320, SAE 140 or AGMA Number 6EP		**Grease bearings every 750 hours*** NLGI Grade No. 2, EP, Lithium-based grease.	
	** Aggressive washdown or extreme running conditions may require more frequent lubrication intervals.*			
	Oil Capacity (Gears)		**Grease Quantity (per Bearing)**	
	Top or Bottom	Side Mount	Front	Rear
5040	2.0 oz (60 ml)	4 oz (120 ml)	0.60 oz (18 cc)	0.21 oz (6 cc)
5050	6.0 oz (170 ml)	9.5 oz (280 ml)	0.84 oz (25 cc)	0.76 oz (22 cc)
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5070	11 oz (320 ml)	20 oz (600 ml)	1.33 oz (39 cc)	1.03 oz (30 cc)
5080	17 oz (500 ml)	44 oz (1300 ml)	1.96 oz (58 cc)	1.16 oz (34 cc)

5000 Series Model	Wrench Size, Body Retaining Cap Screw
5040	1/2”
5050 - 5060	9/16”
5070	3/4”
5080	15/16”

Rotor Clearances

5000 Series Model	A - Backface in (mm)	B - Rotor to Body in (mm)	C - Front Face in (mm)
5040	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.0025 - 0.005 in (0.063 - 0.127 mm)
5050	0.002 - 0.0025 in (0.050 - 0.063 mm)	0.003 - 0.004 in (0.076 - 0.101 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5060	0.0025 - 0.003 in (0.063 - 0.076 mm)	0.0035 - 0.005 in (0.088 - 0.127 mm)	0.004 - 0.006 in (0.101 - 0.152 mm)
5070	0.004 - 0.005 in (0.101 - 0.127 mm)	0.004 - 0.0055 in (0.101 - 0.139)	0.004 - 0.008 in (0.101 - 0.203 mm)
5080	0.005 - 0.006 in (0.127 - 0.152 mm)	0.005 - 0.007 in (0.127 - 0.177 mm)	0.005 - 0.009 in (0.127 - 0.228 mm)

Std = Standard Clearance Rotors; FF = Front Face Clearance Rotors; Hot = Hot Clearance Rotors

Standard Rotors: -40°F (-40°C) to 180°F (82°C); FF Clearance Rotors: 180°F (82°C) to 200°F (93°C);

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NOTE: *The assembly clearances stated above are for reference only. Actual pump clearances may vary based on pump performance testing.*

Notes

Waukesha Cherry-Burrell®

Universal 5000 Industrial Series

Rotary Positive Displacement Pump

SPXFLOW®

611 Sugar creek Road
Delavan, WI 53115
U.S.A.

P: (262) 728-1900 or (800) 252-5200
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Improvements and research are continuous at SPX FLOW, Inc. Specifications may change without notice.

ISSUED 10/2025
Form No.: 95-03012