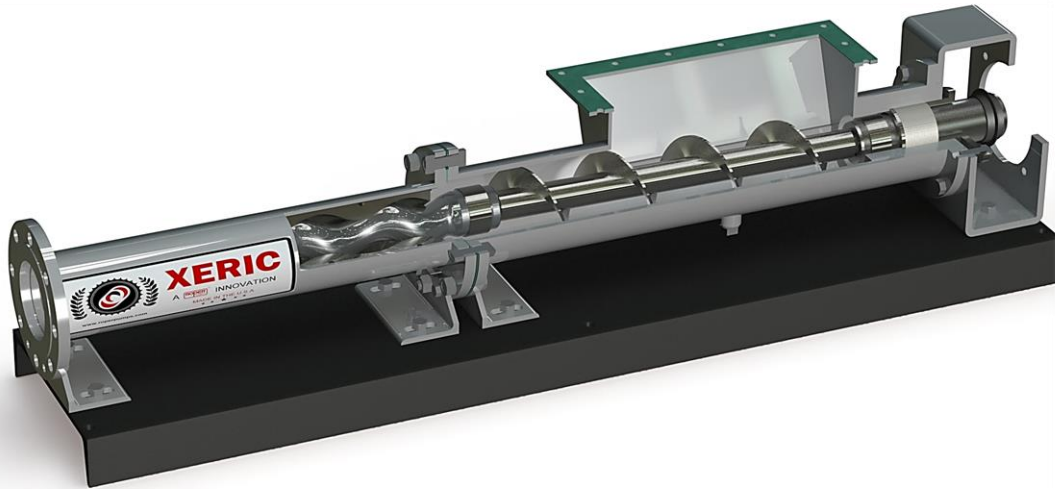




928XX TYPE 2 OWNERS MANUAL

G12-598

03/13/2018



*IMAGE MAY APPEAR DIFFERENT THAN ACTUAL PRODUCT

SAFETY INSTRUCTIONS

This is an industrial component. Only a qualified systems integrator should be allowed to design it into a system. The integrator must determine proper plumbing, mounting, driveline and guard components.

Improper installation or use could lead to a serious, even fatal, accident. The system integrator must communicate all safe operation procedures to the end user(s).

Before operation, fully understand and follow the instructions shown in this manual and any instructions communicated by the system integrator. No one should be allowed to operate or maintain this pump that has not been fully trained to work safely according to the configuration of the pump system and in accordance with all applicable government and industry regulations.

DO NOT remove, deface, or paint over nameplates, ID tags or warning tags.

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www.roperpumps.com

RECORD INFORMATION FROM PUMP NAMEPLATE HERE:

MODEL:

SPEC:

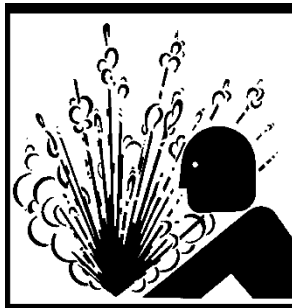
TYPE:

SERIAL:

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1. WARNINGS & GENERAL GUIDELINES



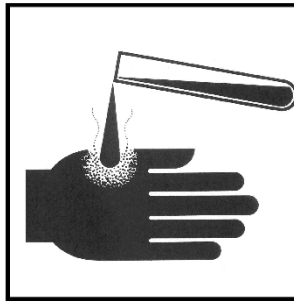
! WARNING

Over-pressure may burst pump or system components. Always include a relief valve in installation. Do not over pressurize pump or block discharge line while operating.



! WARNING

Injection Hazard: Do not try to stop a leak with your hand! Avoid any close contact with hydraulic fluid jets. Escaping fluid can penetrate skin, causing serious injury. In case of accident, seek medical attention immediately for removal of fluid.



! WARNING

Hazardous or Toxic fluids can cause serious injury.

WARNING: DO NOT remove, deface, or paint over any nameplates, ID tags, or warning tags attached to the pump.

NOTICE: These are general guidelines and do not cover all possible situations. It is the responsibility of the system integrator to apply this product properly.

- **System Pressure & Hazardous Fluids**

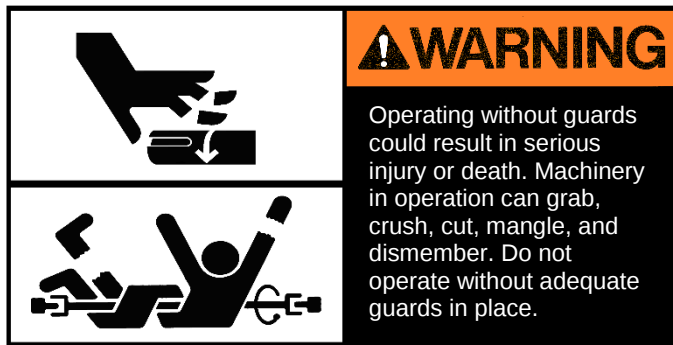
1. Disconnecting fluid or pressure containment components during pump operation can cause property damage, serious personal injury, or death.
2. Failure to relieve system pressure prior to performing pump service or maintenance can cause property damage, serious personal injury, or death.
3. If pumping hazardous or toxic fluids, system must be flushed and decontaminated, inside and out, prior to performing service or maintenance.

- **Plumbing**

1. The inlet pipe should be as short and straight as possible to minimize suction pressure losses. Excessive restrictions at the inlet can cause cavitation resulting in poor performance, noise, vibration, and pump damage.
2. Slope the inlet plumbing appropriately to avoid air pockets.
3. Plumbing weight, misalignment with the ports or thermal expansion can exert excessive forces on the pump body. Plumbing must be properly supported and aligned with expansion joints, if required, to minimize these forces.
4. To prevent over pressure situations, install a properly sized relief valve as close to the pump outlet as possible. Install the relief valve in line between the pump discharge and any shut-off valves.

DO NOT use Thread Seal (Teflon®) tape on pump port threads.

Teflon® is a registered trademark of E.I. DuPont de Nemours Co., Inc.



WARNING: DO NOT remove, deface, or paint over any nameplates, ID tags, or warning tags attached to the pump.

WARNING: Failure to stop the pump before adjusting the shaft packing can cause serious injury or death.

- **Mounting Base**

1. Mount the unit on a rigid, heavy base to provide support and absorb shock. Bases should be designed for high rigidity; not just strength.
2. The pump feet were not designed for mounting to concrete and do not have enough contact area to prevent concrete from failing. When mounting to cement or concrete, use a steel baseplate to distribute the mounting stress over an area large enough to prevent the cement from failing. Grout it in place.

- **Pump and Drive Assemblies**

1. Assure adequate guards have been installed to prevent personnel contacting moving components.
2. Follow all OSHA, Federal, State, and local codes.

- **Check Alignment of Pump to Driveline**

Excessive misalignment can overload the pump input shaft and cause premature failure. The figures below show parallel and angular misalignments which must be avoided.

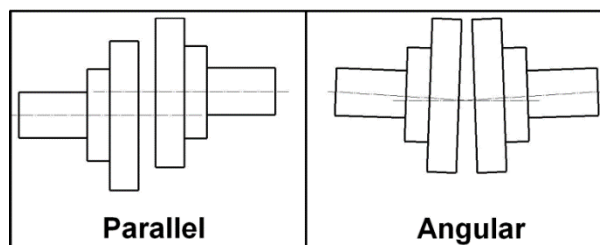


Figure 1.1: Coupling Alignment

- **Roper Pump Company Close Coupled Drives**

The hydraulic or gear motor units mount directly to the pump.

- Alignment between pump and driveline is maintained by the assembly.

Because the adapter bracket absorbs the reaction forces of the driveline, the mounting base does not need to be as robust. Piping loads are the major source of stress and strain in the pump body in this configuration.

- **Guarding PTO Drive Shafts**

PTO drive systems can be dangerous. Safety precautions, including guarding, are required and must be provided by the drive system installer. Roper Pump Company does not manufacture guards for the PTO drives. It is the responsibility of the pump and drive system installer to incorporate safe guarding and the operator to use, maintain and not defeat them.

NOTICE: The installation of proper guards for the power take-off and its associated equipment is the responsibility of the drive system designer and the installer who knows the particular product application and the user's exposure to danger. *The responsibility for the safe application, installation, and operation is ultimately the users.*

WARNING: Failure to stop the pump before adjusting the shaft packing can cause serious injury or death. Never attempt to adjust packing while a pump is running.



WARNING: DO NOT remove, deface, or paint over any nameplates, ID tags, or warning tags attached to the pump.

- **Hopper Feed Pumps**

In order to avoid an unsafe or hazardous condition, it is recommended that hopper feed pumps be installed with the following minimum provisions in addition to the other recommendations contained in this manual.

- Hopper feed pumps should not be operated unless the hopper body and inlet piping completely enclose the auger-moving elements and power transmission guards are in place. If the hopper body is to be opened for inspection, cleaning, or observation, the driver must be locked out in such a manner that it cannot be restarted by anyone, either in the vicinity or remotely, unless the hopper body has been closed and all other guards are in place.
- If the pump must have an open hopper body as a condition of its use and application, the entire pump is then to be guarded by a railing or fence and warning signs posted.
- Feed openings for shovel, front end loader, or other manual or mechanical equipment must be constructed in such a way that the hopper body opening is covered by grating. If the nature of the material is such that a grating cannot be used, then the exposed hopper body opening must be guarded by a railing or fence and warning signs posted.

WARNING:

- **DO NOT** walk on hopper gratings or power transmission guards.
- **DO NOT** poke or prod material in the hopper body with a bar or stick.
- **DO NOT** place hands feet, head, or any other part of the body in any hopper opening.

2. NAMEPLATE DATA

Roper Pump Company identifies each pump by a metal nameplate attached to the pump. The nameplate describes the pump as built at the factory. Copy the nameplate data from your pump into the area provided on the front page of this manual. Use this for ready reference when ordering repair parts or when consulting with a Roper distributor or Roper Pump Company about this pump.

WARNING: DO NOT remove, deface, or paint over any nameplates, ID tags, or warning tags attached to the pump.

PUMP NOMENCLATURE

MODEL 928XX*GHH **SPEC** xxxxxx **TYPE** 2 **SERIAL NO.** xxxxxx

- * **The letter “M” may be used in this space to indicate that the pump was originally supplied by the Roper factory mounted on a base (with or without the motor).**
- The Model Number consists of a five-digit number followed by a three or four letter material code.
 - The first digit (9) indicates the Xeric progressing cavity pump series.
 - The second digit (2) indicates the number of stages of pumping elements.
 - The third digit (8) indicates the drive size or configuration.
8 = Hopper feed (flange mounted motor), pin joint construction
 - The fourth, fifth, and (where appropriate) sixth digits indicate the approximate theoretical displacement in U.S. gallons per 100 revolutions.

4 th , 5 th , 6 th digits	06	13	24	49	96	105		
Gal./100 Rev.	6	13	24	49	96	105		

- The three letters (GHH) indicate the materials of construction. The first letter (G) indicates the pump body. The second letter (H) indicates the internals. The third letter (H) indicates the stator.

Item	Letter	Material
Pump Body	G	Alloy steel
Internals	H	Alloy steel, hard chrome plated rotor
Stator	H	High strength alloy steel tube and profile

NOTE: The preceding description of the model number is to assist in identifying your Roper progressing cavity pump only. **DO NOT** attempt to derive any ratings or performance from the figure number. **DO NOT** use the explanation of the figure number to construct your own pump. Not all combinations are possible. For assistance in pump selection, it is recommended that you consult Roper Pump Company or an authorized distributor.

- Occasionally, special pumps or configurations are required which are unique for a particular application. These modifications are denoted by a SPECification Number. Identification of any items different than a standard pump can be made by consulting Roper Pump Company or an authorized distributor.
- The TYPE number is a number used by Roper Pump Company for in-house identification of construction and hydraulics. Always include the TYPE number in any references to the pump.
- The SERIAL number is a unique number assigned to each pump built by Roper Pump Company.

In any communication concerning this pump, always be sure to include the model, spec, type, and serial numbers so proper identification of the pump can be made.

3. MAXIMUM PRESSURE RATINGS

Figure 3.1 shows the maximum allowable differential pressure (the amount of pressure difference between the inlet and discharge of the pump) based upon the number of pump stages. These values are the maximum allowable and are not recommended for every application. Abrasive fluids should not be pumped at these maximum values as it will shorten the life of the rotor and stator. Refer to Roper Pump Company's progressing cavity pump technical literature for additional information on recommended pressure limitations for pumping abrasive products.

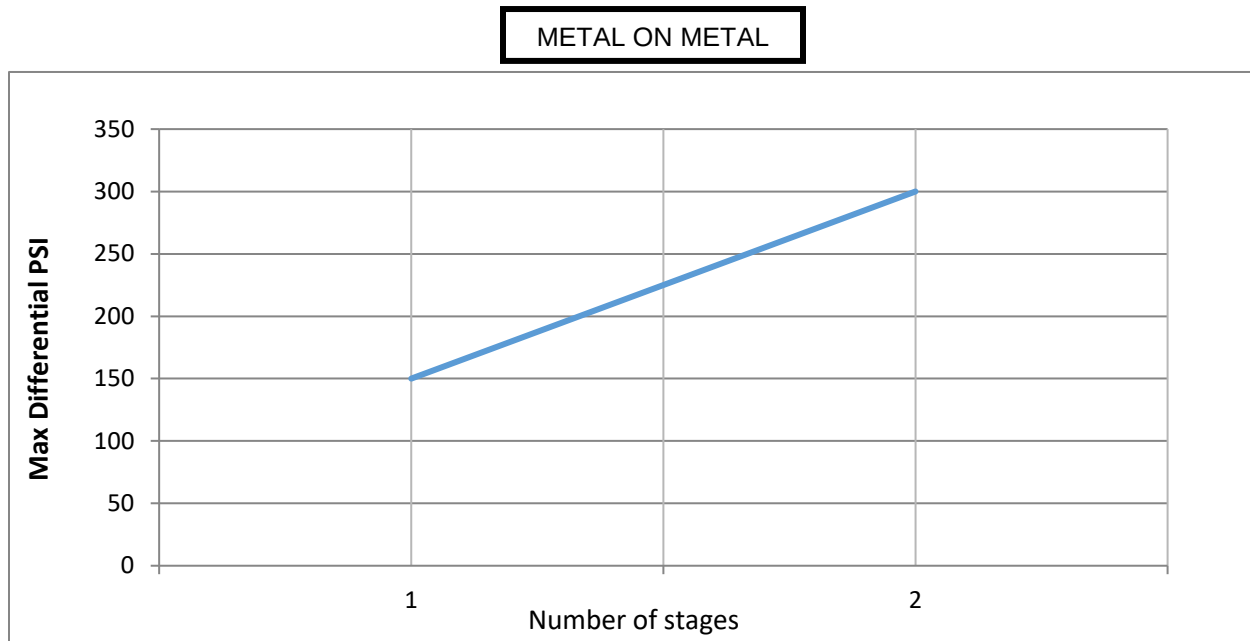


Figure 3.1

4. PREOPERATION CHECKS

Read and understand the instructions and recommendations contained in this manual.

De-energize or lock out the drive motor.

Disconnect the coupling between the driver and pump.

Be aware that the pump was tested at the factory with hydraulic oil and can have a residual amount left inside the stator.

Test the rotation of the driver to make sure it will operate the pump in the desired direction of rotation. Normal rotation is indicated on the pump drive end. The driver rotation test must be done with the driver and pump disconnected. **DO NOT run pump dry for long periods. Dry operation could be harmful to the pump and drive shaft if not equipped with a special cartridge seal.**

Before the initial startup, some of the fluid to be pumped should be introduced into the inlet body to insure wetting of the pumping elements. (On subsequent startups, if the pump does not discharge fluid after it has been operating for one minute, it should be re-primed.) Turn on the flush liquid to the packing, if applicable.

Before starting, make sure all guards are in place and the inlet and discharge valves are opened.

After starting the unit, check to see that the pump is delivering liquid. If not, stop the driver immediately and correct the problem. Once the pump starts delivering liquid, check the unit for excessive vibration, localized heating, and excessive shaft seal leakage. Check the pressure and vacuum by installing gauges at both the inlet and discharge sides of the pump to make sure the pressure and/or vacuum conform to specifications.

5. INSTRUCTIONS FOR PUMP DISASSEMBLY

Refer to Section 7. **PUMP SECTIONAL DRAWING.**

1. Read and understand all safety instructions and warnings before starting to disassemble pump. While disassembling pump, always inspect disassembled parts and adjacent parts to see if further disassembly is needed. Replace worn or damaged parts as required.
2. Turn off pump and lockout energy source to driver.
DO NOT proceed further with disassembly of pump if there is the slightest possibility the driver may be started.
3. If used, turn off and disconnect fluid flush to packing.
4. Close inlet and discharge valves.
5. Disconnect driver from pump.
6. Drain inlet and discharge lines. Disconnect piping from the pump inlet and discharge.
7. Remove pipe plug [24] from inlet body [1]. Drain inlet body.
8. Remove hex nuts and bolts [22, 23 & 18] from both ends of the stator [8].
9. Remove hex bolts [19] from support bracket [3 & 4] on both ends of the stator, then remove support brackets [3 & 4] from the stator [8] and bed plate.
10. Remove stator [8] from rotor [25]. Using a twisting motion (similar to unthreading parts) may help ease removal. Remove stator gasket [26].

NOTE: Any fluid trapped in cavities formed by rotor and stator will spill from these parts during disassembly. Full precautions should be taken to avoid any hazards.

11. Slide flinger [13] back and remove motor pin [12]. Remove hex bolts to packing gland [21]. Slide rotor [25], connecting rod [6], and drive shaft [5] out of the inlet body [1] from the end opposite the driver, removing flinger [13] and packing gland [16] in the process.
12. Remove inlet body [1] by removing hex nuts and bolts [17 & 20] and hex bolts [19].
13. Remove packing set [15], and packing retainer [14] from inlet body [1]. Packing hooks are commercially available to assist in removing packing. For more information about packing refer to Section 10 **SHAFT SEALING.**

NOTE: In case of oil-filled joints, fluid will spill from these parts during disassembly. Full precautions should be taken to avoid any hazards.

14. Starting at rotor [25] end of the connecting rod [6] use a flathead screwdriver or pliers to remove snap ring [11]. Slide rotor band [10] toward connecting rod [6].
15. Remove pin [9] and rotor [25].
16. Starting at drive shaft [5] end of the connecting rod [6] use a flathead screwdriver or pliers to remove snap ring [11]. Slide rotor band [10] toward connecting rod [6].
17. Remove pin [9] and drive shaft [5].
18. Visually inspect all parts. Replace all worn or damaged parts before reassembling pump. It is recommended that a new packing set [15], and gasket [26] be installed each time pump is disassembled and reassembled.

6. INSTRUCTIONS FOR PUMP ASSEMBLY

Refer to Section 7. **PUMP SECTIONAL DRAWING**.

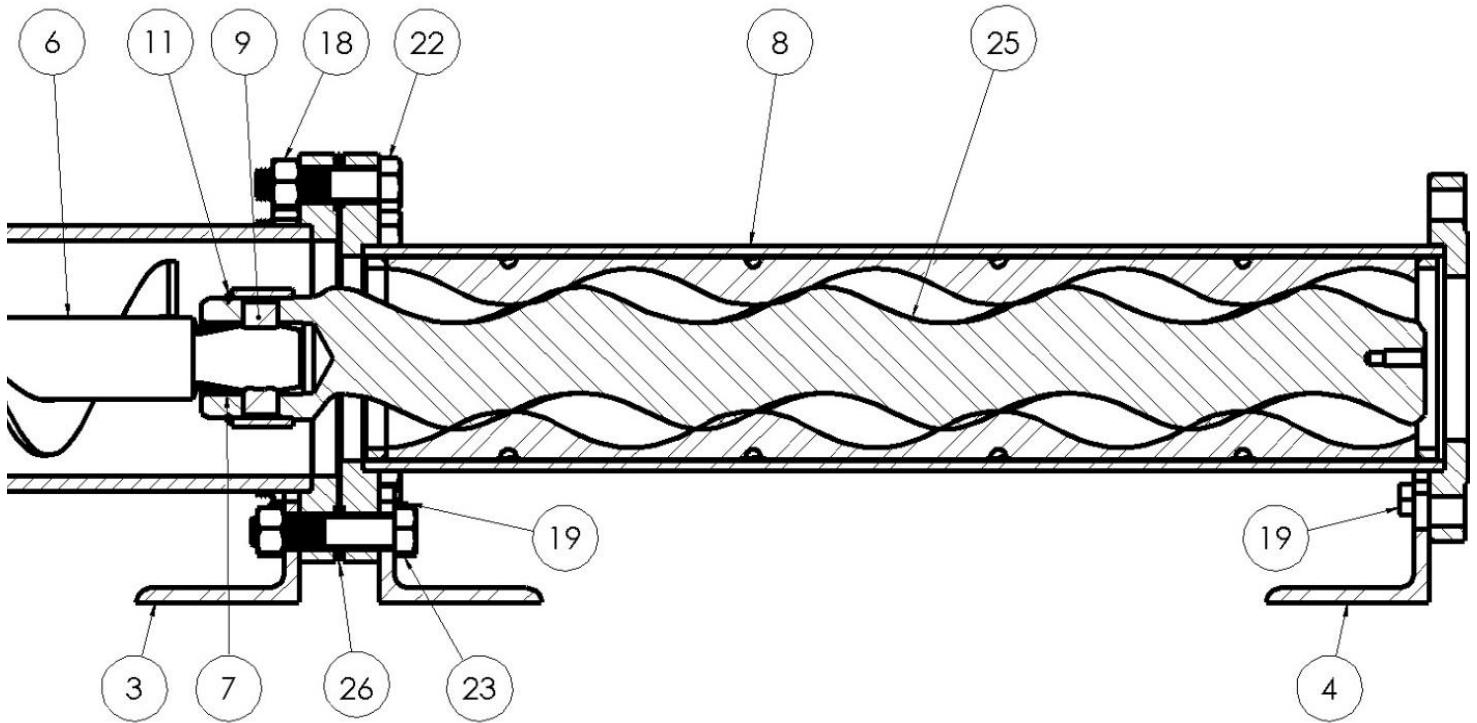
1. Read Sections 10, and 11 on **SHAFT SEALING**, and **JOINT LUBRICATION** before assembling pump. Visually inspect all parts during assembly. Replace all worn or damaged parts. Although they may appear reusable, it is recommended that a new packing set [15], and stator gasket [26] be installed each time pump is disassembled and reassembled.
2. Insert pipe plug [24] in inlet body [1]. Attach support bracket [3] to inlet body [1], secure with support bolts [19]. Do not secure support bracket [3] to the bed plate.
3. Connect inlet body [1] and motor bracket [2], secure with motor bracket nuts and bolts [20 & 17].
4. If necessary install new connecting rod washers [7] on both ends of connecting rod [6]. Slide rotor band [10] over head of connecting rod [6]. Apply a generous amount of grease compatible with pumped fluid to the head of the connecting rod [6]. Refer to Section 11. **JOINT LUBRICATION**, for additional information.
5. Slide connecting rod head into rear of drive shaft [5] and install pin [9]. Slide rotor band [10] over the rotor pin [9] and insert snap ring [11] into groove to secure the rotor band [10].
6. Slide rotor band [10] over head at other end of connecting rod [6]. Apply a generous amount of grease compatible with pumped fluid to the head of the connecting rod [6]. Refer to Section 11. **JOINT LUBRICATION**, for additional information.
7. Slide connecting rod head [6] into head of rotor [25] and install pin [9]. Slide rotor band [10] over the rotor pin [9] and insert snap ring [11] into groove to secure the rotor band [10].
8. Slide drive shaft [5], connecting rod [6], and rotor [25] through inlet body [1] into motor bracket [2]. Leave enough space between the motor bracket and the drive shaft to install packing retainer [14], packing set [15], packing gland [16], and flinger [13]. Be careful not to damage shaft, connecting rod, or rotor.
9. Slide packing retainer [14] onto the drive shaft. Lightly lubricate packing set [15]. Refer to Section 10. **SHAFT SEALING** for instructions on packing installation. Slide packing gland [16] onto the driveshaft after the last packing ring. Use packing gland insert [16] to push the rings into position. Slide flinger [13] onto end of drive shaft [5].
10. Slide drive shaft [5], connecting rod [6], and rotor [25] to final position. Secure packing gland [16] with packing gland bolts [21] but do not tighten.

Final tightening and packing adjustment should be done after pump has been completely assembled and installed. DO NOT TIGHTEN WHILE PUMP IS IN OPERATION. Refer to Section 10. **SHAFT SEALING**, for additional information.

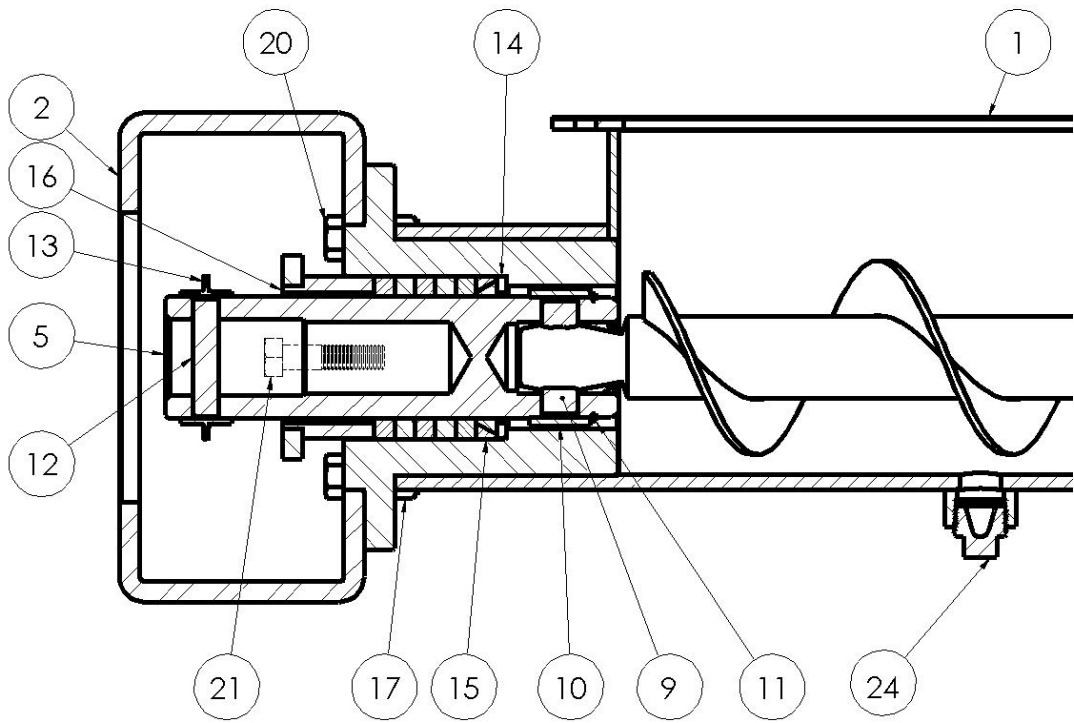
11. Place stator gasket [26] over the rotor [25] at the end of inlet body [1]. Lubricate inside of stator [8] and profile of rotor [25] with glycerin, waterless hand cleaner, or very soapy water. Grease or oil may also be used for this purpose when compatible with the pumped fluid. **Proceed with caution as both rotor and stator will be slippery and possibly difficult to hold.** Slide stator [8] onto rotor [25]. Using a twisting motion (similar to threading parts) may help ease assembly. Make sure stator [8] is oriented correctly with holes for support bolts [19] at the bottom. Immediately clean up any material used for lubricating parts that may have spilled.
12. Attach support brackets [3 & 4] to stator [8] using support bolts [19]. Attach stator [8] to inlet body [1] using stator bolts and nuts [22, 23 & 18]. Secure support brackets [3 & 4] to bed plate.
13. Insert motor pin [12] through drive shaft [5] and motor. Slide flinger [13] over motor pin.
14. Tighten packing gland bolts [21] according to section 10.

Read and understand all safety instructions and warnings, Section 1. **WARNINGS & GENERAL GUIDELINES**, Section 4. **PREOPERATION CHECKS**, Section 10. **SHAFT SEALING**, and make sure to follow Section 3. **MAXIMUM PRESSURE RATINGS** before installing and operating pump.

7. PUMP SECTIONAL DRAWING



DISCHARGE



DRIVE/ INLET

8. PARTS & REPAIR KITS

Refer to the drawing in Section 7.

XERIC rotors and stators are only sold as a kit. The stator is not interchangeable with any other rotor.

KEY NO.	DESCRIPTION	QTY
1	Inlet Body	1
2	Motor Bracket	1
3	Inlet Support Bracket	2
4	Stator Support Bracket	1
5	Drive Shaft	1
6*	Connecting Rod	1
7	Connecting Rod Washer	2
8**	Stator	1
9*	Rotor Pin	2
10	Rotor Band	2
11	Snap Ring	2
12	Motor Pin	1
13	Flinger	1
14	Packing Retainer	1
15*	Packing Set	1
16	Packing Gland	1
17	5/8" Nut	4
18	3/4" Nut	8
19	1/2" x 1" Bolt	6
20	5/8" x 2" Bolt	4
21	5/8" x 2.5" Bolt	2
22	3/4" x 3" Bolt	7
23	3/4" x 3 1/2" Bolt	1
24	Pipe Plug	1
25**	Rotor	1
26*	Stator Gasket	1

*REPAIR KITS INCLUDE COMPONENTS MARKED ABOVE.
(DOES NOT INCLUDE ROTOR & STATOR KIT).

**ROTOR & STATOR KITS INCLUDE COMPONENTS MARKED ABOVE.
(CANNOT BE PURCHASED AS SEPARATE PARTS).

9. STORAGE

If you do not intend to install this Roper pump immediately after purchase, the following recommendations are offered and should be followed to insure the best possible chances of a successful startup when the pump is installed.

STORAGE RECOMMENDATIONS:

- Protect the pump from the elements. Store the pump indoors whenever possible away from sources of ozone-generating equipment such as motors or generators. If indoor storage is not possible, cover the pump with a protective covering. Do not allow moisture to collect in or around the pump.
- Remove the drain plug from the inlet housing and allow the pump to dry completely.
- Relieve the compression on the packing by loosening the packing gland. If you intend to grease lubricate the packing after installing the pump, inject a liberal amount of grease into the stuffing box through the lube fitting. If a water flush is to be used, do not inject grease into the stuffing box; instead, place a small amount of light oil into the stuffing box.
- Read and understand this manual thoroughly before installing or starting pump.
- If applicable, remove the drive belts from belt-driven units or disconnect the coupling on direct-connected units.
- Fill the pump with a rust inhibitor since the stator is metal, and subject to rust. Applying oil can prevent corrosion and increase longevity of pump life. Approximately every two weeks, rotate the drive shaft of the pump manually.

If other equipment included with the pump, such as drivers, seals, flow monitors, etc., are to be stored also, refer to the respective manufacturer's recommendations for storage.

10. SHAFT SEALING

PACKING

The standard shaft sealing method used in these pumps is die-formed ring packing with WEDGEЕ packing.

If the packing is to be grease-lubricated during initial installation or during replacement, a good grade of bearing grease should generally be used. Should bearing grease be unacceptable or incompatible with the fluid being pumped, another paste-type lubricant may be used. Lubrication of the packing must be performed with the pump stopped. **DO NOT** lubricate or adjust packing with the pump operating.



WARNING

WHERE LIQUID BEING HANDLED IS HAZARDOUS OR VOLATILE, FULL PRECAUTIONS SHOULD BE TAKEN AT ALL TIMES.

DO NOT work on a pump while it is operating.

INSTALLATION AND REMOVAL OF PACKING

Packing hooks, figure 10.1, are commercially available to help in removing packing rings from the packing housing. It is generally not recommended to reuse old packing rings. When installing packing, use formed packing rings. **DO NOT** use a one-piece spiral wrap of packing. Before installing packing, carefully clean the stuffing box and shaft.

Correct installation of the WEDGEЕ on the shaft and into the stuffing box is important to achieve maximum efficiency of operation. Install the “Male” component first by spreading the part at the split and slip it over the shaft. The flat side of the “Male component faces the bottom of the stuffing box as illustrated below. The “female” component is installed next so both parts fit together like a single unit. Slide the WEDGEЕ unit down to the bottom of the stuffing box making sure that the splits in the components are 180° apart.



Figure 10.1

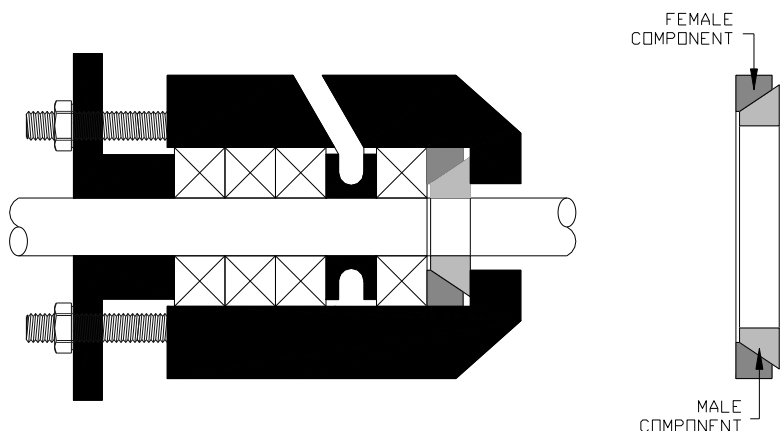


Figure 10.2

The packing rings with or without the lantern can now be installed one ring at a time, with the joints of adjacent rings staggered approximately 180°. Each ring should be seated firmly before the next ring is installed.

The packing gland nuts should first be evenly tightened with a wrench to seat the packing firmly in the packing housing and against the shaft, then backed off until finger-tight. After the pump is started, note the amount of leakage from the packing housing. If the packing leakage exceeds ten drops per minute, stop the pump and tighten the gland nuts. The gland nuts should be tightened evenly in 1/6 to 1/3 turn (1 to 2 flats on the nut) increments. Start the pump and allow it to operate for several minutes. Again, visually examine the stuffing box for excessive leakage. Repeat the above procedure until the stuffing box leakage is between five to ten drops per minute.

DO NOT over-tighten the packing. Slight leakage is a necessary requirement for proper packing operation. Leakage of five to ten drops per minute when the pump is operating is desirable, as it will preserve the packing and avoid scoring of the shaft. Over-tight packing may score shafts, increase torque requirements of the pump, damage couplings and drivers, and generate excessive heat.

The pump should be stopped and the packing gland adjusted whenever leakage exceeds ten drops per minute. The condition of the packing should be checked at regular intervals, the frequency depending on the type of service. Experience will dictate how frequently the inspections should be made.

MECHANICAL SEALS

Certain applications may not permit the necessary leakage required for the proper operation of packing. These applications may require the use of an end-face type of mechanical seal. Various types of mechanical seals may be available to fit most pumps. Due to the various seal types and styles available, the seal manufacturer's instructions for installation and setting should be followed.

11. JOINT LUBRICATION

This pump is provided with two universal joints which allow the rotor to rotate through an eccentric path necessary for proper functioning of the pump. The joints may be of a pin type or crowned gear type depending upon the model of the pump. Proper lubrication of the joints is important and will help extend the service life of the joint components.

When assembling the pump, make sure that all components of the joint are coated with lubricant. Also, fill the spaces between joint components full of lubricant. This is particularly important because joint lubrication can be performed only when the pump is disassembled, and the lubricant must perform its job until the next time maintenance is performed on the pump.

Use grease that is compatible with the fluid being pumped and that will not react with the fluid. A good grade of EP (extreme pressure) grease containing molybdenum disulfide additives should be used.