INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

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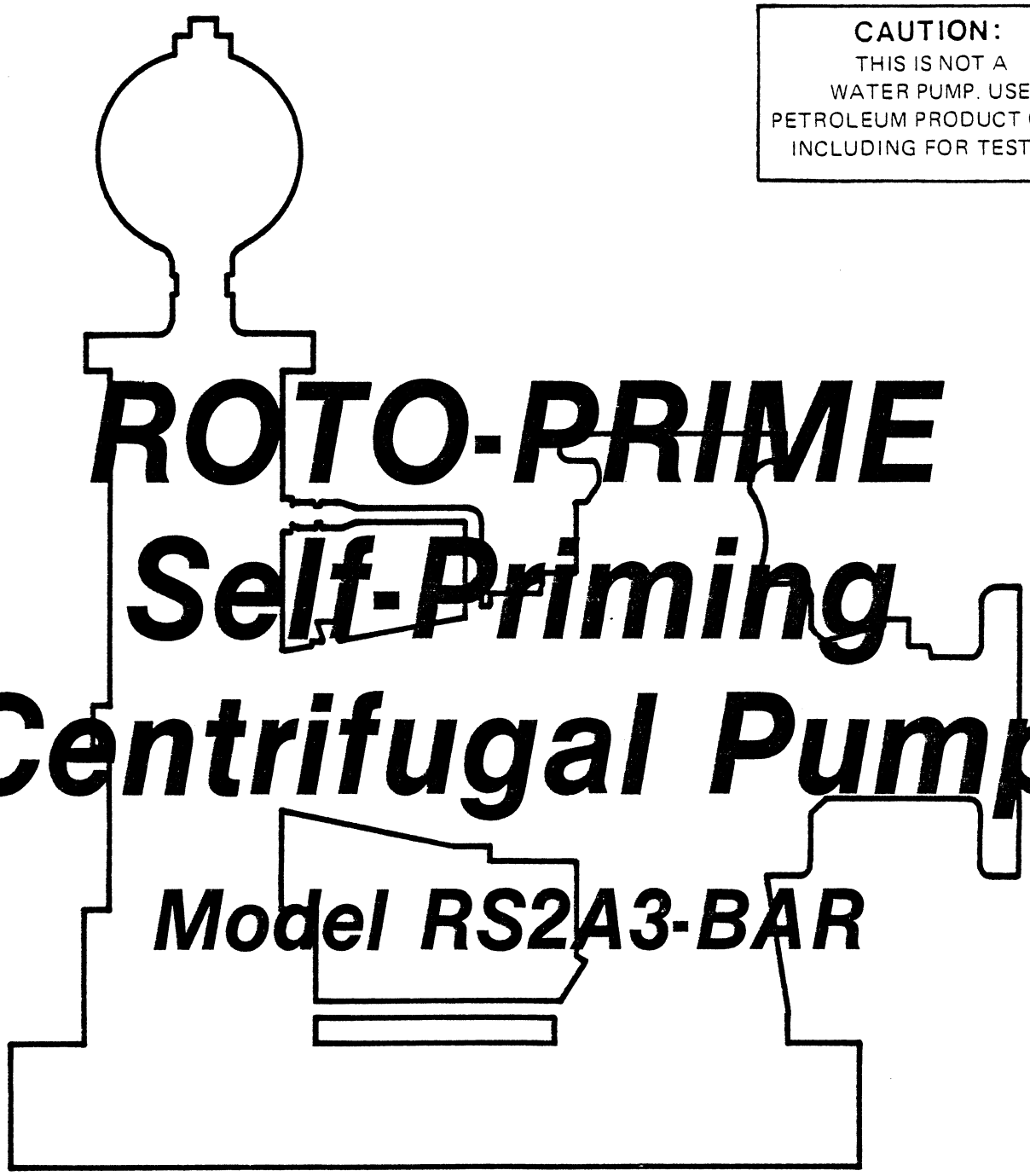
GORMAN-RUPP

OM-01706-0M02

March 25, 1981

CAUTION:
THIS IS NOT A WATER PUMP. USE PETROLEUM PRODUCT ONLY INCLUDING FOR TESTING



ROTO-PRIME Self-Priming Centrifugal Pump

Model RS2A3-BAR

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA Printed in U.S.A.

This Installation, Operation, and Maintenance Manual is designed to help you get the best performance and longest life from your Gorman-Rupp pump.

This pump is a Roto-Prime Self-Priming Centrifugal Petroleum Pump, **designed to pump petroleum products only.** For specific service, consult your Gorman-Rupp distributor or the Gorman-Rupp Company.

If there are any questions regarding the pump which are not covered in this manual or in other literature accompanying the unit, please contact your Gorman-Rupp distributor, or write:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44902

or

Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

NOTE

Instructions to aid in installation, operation, or maintenance or which clarify a procedure.

CAUTION

Instructions which must be followed to avoid causing damage to the product or other equipment incidental to the installation. These describe the procedure required and the damage which could result from failure to follow the procedure.

WARNING

Instructions which must be followed to avoid causing injury or death to personnel. These describe the procedure required and the injury which could result from failure to follow the procedure.

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WARNINGS

THESE WARNINGS APPLY TO ROTO-PRIME PUMPS WITH ELECTRIC MOTOR DRIVE.

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the motor to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

This pump is designed primarily to handle specific volatile and/or flammable liquids. Do not attempt to pump any liquids for which this pump has not been designed.

This pump is usually installed in a permanent configuration. After the pump has been installed, make certain that the pump and all piping connections are secure before attempting to operate it.

Do not operate the pump without shields and/or guards in place over drive shafts, belts and/or couplings, or other rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

Do not operate the pump against a closed discharge valve for long periods of time. This could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode.

Overheated pumps can cause severe burns and injury. If overheating of the pump casing occurs:

1. Stop the pump immediately.
2. Allow the pump to cool.
3. Refer to instructions in this manual before restarting the pump.

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to cool before servicing.

If this pump is used with volatile and/or flammable liquids, overheating may produce dangerous fumes. Use extreme caution when venting the pump, or when removing covers, plates, plugs, or fittings.

If this pump is used with volatile and/or flammable liquids, take precautions to ensure that adequate ventilation is provided, and that adequate protective clothing is worn, while the pump is being serviced.

Install, connect, and operate the motor in accordance with the National Electric Code and all local codes. If there is a conflict between the instructions in the manual accompanying the unit and the National Electric Code or the applicable local code, the National or local code shall take precedence. All electrical equipment supplied with this pump conformed to applicable federal regulations and national codes in effect on the date of manufacture.

The electric power applied to the motor unit is high enough to cause injury or death. Ground the unit before connecting it to the electrical power supply; never use gas piping as an electrical ground. Be sure to connect the motor to the correct phase and voltage. Do not run the pump if the voltage is not within limits. If the circuit breaker or fuse is tripped, examine the problem before restarting the pump.

INSTALLATION

Since pump installations vary, this section is intended only to summarize recommended installation practice. If there are any questions concerning a specific installation, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before it was shipped from the factory. Before installation, inspect the pump for damage which may have occurred during shipment.

a. Check the pump assembly for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews securing mating surfaces.

c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates in the required direction.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

d. Check all lubricant levels and lubricate as necessary. Refer to the MAINTENANCE AND REPAIR section of this manual.

POSITIONING THE PUMP

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation. It may be necessary to support or shim the pump for level operation.

Lifting

WARNING

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment.

Make sure that hoists and other lifting equipment are of sufficient capacity to safely handle the pump assembly. If chains or cables are used, make certain that they are positioned so that they will not damage the pump, and so that the load will be balanced.

CAUTION

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around it.

SUCTION AND DISCHARGE PIPING

Materials

This pump is usually installed in a permanent piping configuration, but either pipe or hose may be used for suction and discharge lines. Piping materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using pipe couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines close to the pump before installing the lines.

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created (see figure 1).

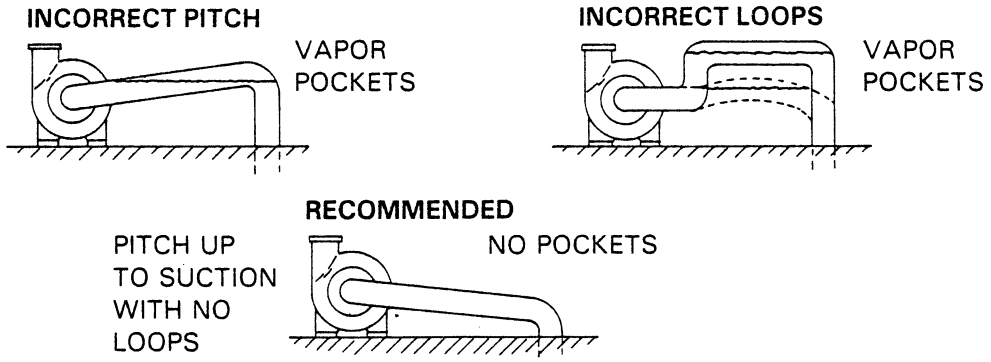


Figure 1. Suction Lines

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets (see figure 2).

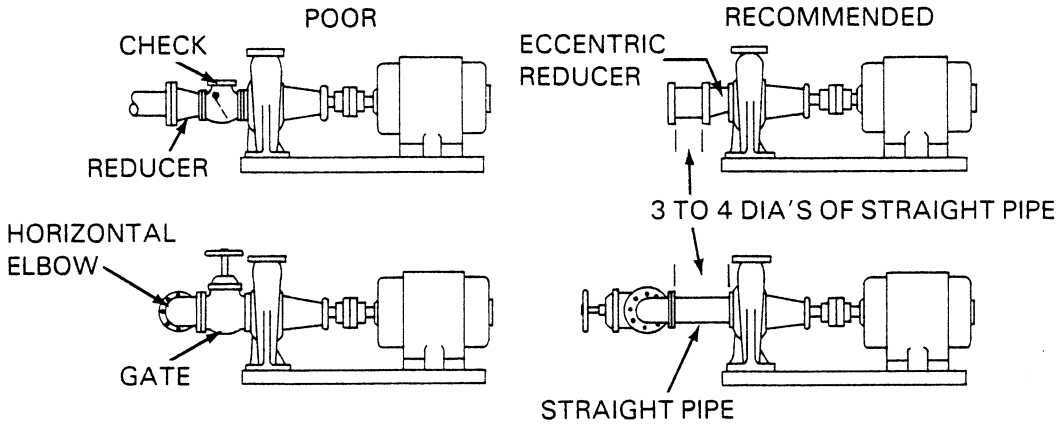


Figure 2. Entrance Conditions

Strainers

If a strainer is furnished with the pump, be certain to use it; any entrained solids which pass through a strainer furnished with the pump will also pass through the pump itself.

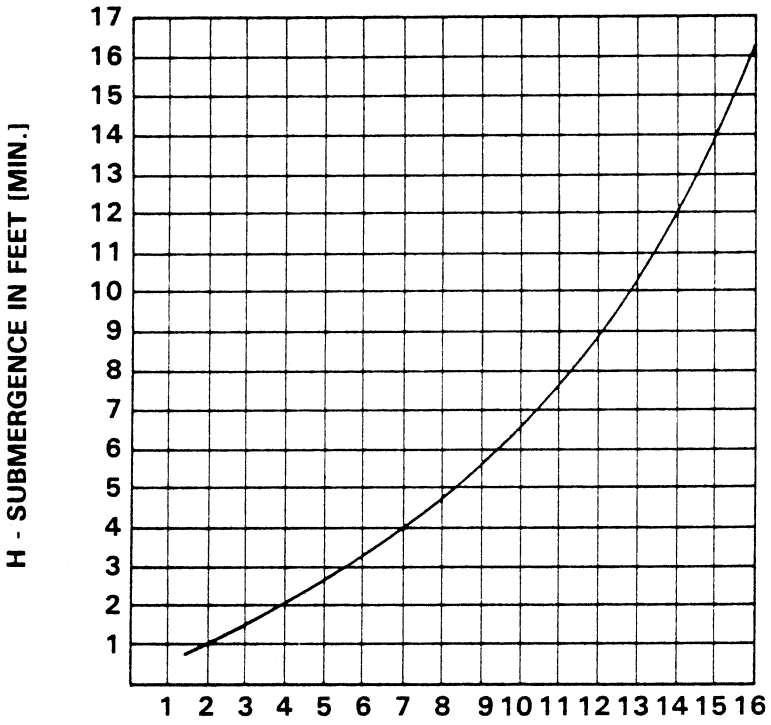
If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. In volatile and/or corrosive service, the pipe dope should be compatible with the liquid being pumped.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 3 shows recommended minimum submergence vs. velocity.



$$\text{VELOCITY IN FEET PER SEC.} = \frac{\text{QUAN. [G.P.M.]} \times .321}{\text{AREA}} \text{ OR } \frac{\text{G.P.M.} \times .4085}{D^2}$$

Figure 3. Recommended Minimum Suction Line Submergence Vs. Velocity

DISCHARGE LINES

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

AIR RELEASE VALVE

Roto-Primes equipped with an Air Release Valve, permit the priming assembly to prime the pump and over come relatively high discharge heads or back pressure.

Before starting the pump, remove the 3/4-inch shipping plug in the air release valve assembly so that normal operation and venting may take place.

WARNING

When the pump and air release valve are installed within a closed building, the vent piping should be run outside the building in accordance with governing agencies or local regulations.

NOTE

An appropriate length of 3/4-inch tubing should be installed in place of the shipping plug to remove any hazardous vapors from the immediate vicinity of the pump.

NOTE

When two pumps equipped with Air Release Valves are installed in parallel, a check valve must be installed on each air release outlet.

ALIGNMENT

Aligning the pump and its power source is critical for trouble-free mechanical operation.

WARNING

When checking alignment, disconnect the power source to ensure that the pump will remain inoperative.

Before checking alignment, tighten the foundation bolts, pump casing and/or pedestal feet, and power source mounting bolts. Make sure that the pump is level.

> **CAUTION**
>
> Adjusting the alignment in one direction may alter the alignment in another direction. Check each procedure after altering alignment.

Coupling-Driven Pumps

When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer's service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90 degrees. The coupling is in alignment when the hub ends are the same distance apart at all points (see figure 4A).

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90 degrees. The coupling is in alignment when the hubs are the same distance apart at all points (see figure 4B).

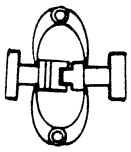


Figure 4A. Aligning Spider-Type Couplings

Figure 4B. Aligning Non-Spider Type Couplings

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

WARNING

Do not operate the pump without a guard over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

OPERATION

WARNING

Do not attempt to pump any liquids for which this pump has not been designed.

Install the pump and piping as described in INSTALLATION. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see LUBRICATION in MAINTENANCE AND REPAIR).

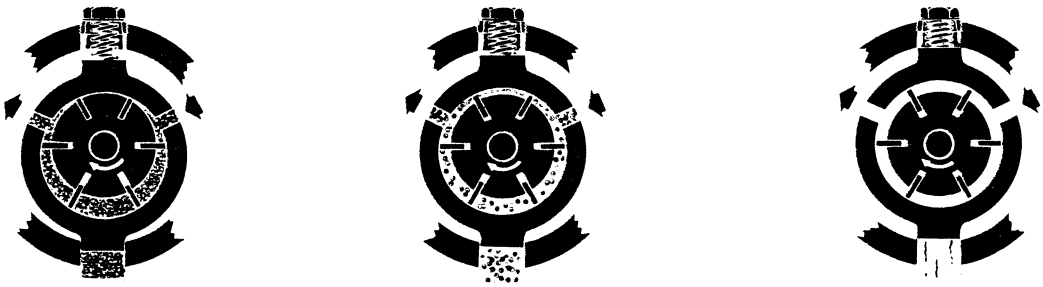
AUTOMATIC SELF-PRIMING

Before starting the pump for the first time, remove the 1/8 NPT pipe plug from the priming pump housing. Pour approximately 8 ounces of SAE 10 or SAE 20 motor oil into the priming pump housing to lubricate the pump vanes, and reinstall the plug.

Whenever air or vapor is present at the start of the pumping operation — or when there is loss of suction because of air or vapor during pumping — the priming pump automatically forces air and vapor through the discharge tube assembly to the Air Release Valve.

With air or vapor in the lines, pressure of the spring on top of the movable slide holds the priming pump in full priming position. As the pump evacuates air and vapor from the lines, liquid pressure builds up. This pressure is exerted through the priming tube assembly to the underside of the slide, moving it upward toward neutral.

When all air and vapor are removed, liquid pressure equalizes spring pressure and the pump automatically slides into neutral. The priming pump remains in neutral until air and vapor enters the pumping system again (see figure 5).



FULL PRIMING PARTIAL PRIMING NEUTRAL

Figure 5. Automatic Priming Pump

Priming Pump Check

With the pump inoperative, remove the priming pump drain plug from the bottom of the center plate and remove the spring cap and spring from the top of the center plate.

Insert a screwdriver or other suitable device into the drain plug hole, and move the slide block up and down.

The slide block should move 1/8 inch from the full priming position to the neutral position. If it does not, flush the priming pump with penetrating oil. Reinstall the spring and the spring cap; clean and reinstall the drain plug after flushing the priming pump. The slide block should move freely.

AIR RELEASE VALVE

When the pump is idle, there is air in the suction line, the Air Release Valve is open and there is back pressure against the discharge line check valve "D".

When the pump is started, air is drawn from the suction line into the priming pump through the priming tube "A", compressed and discharge through the discharge tube "B" to the Air Release Valve and vented to the atmosphere.

With the float down, sump valve "E" is closed; air cannot re-enter the suction piping through the return tube assembly "C".

As product fills the volute, the impeller will develop pressure, opening check valve "D" in the discharge piping. The priming pump will deliver product, filling the float chamber. The float will rise, opening sump valve "E", and closing the air valve.

The product recirculates through the return tube assembly "C" to the pump suction flange. The liquid pressure equalizes the priming pump spring pressure and the priming pump slides into neutral.

In neutral position the priming pump circulates a small amount of liquid through the discharge tube to the float chamber through the return tube and back into the suction flange.

If air or vapor enters the suction piping during the pumping operation, again the discharge line check valve will close, and the priming pump will again evacuate the air through the Air Release Valve.

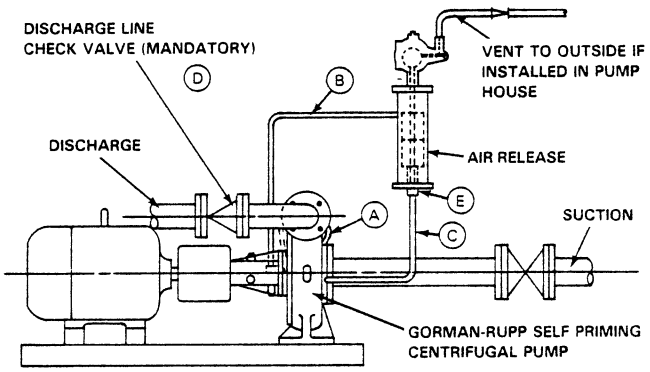


Figure 6. Schematic Arrangement of a Roto-Prime with the Air Release Valve

STARTING

Check that the motor speed meets pump specifications. The pump is designed to be driven at 1750 rpm; do not exceed 2100 rpm maximum.

Rotation

The correct direction of pump rotation is indicated by an arrow on the pump body, and on the accompanying decal. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

Consult the operating manual furnished with the motor before attempting to start the motor.

If a three-phase electric motor is being used, check rotation by starting the pump for a moment to see if the rotation is correct. If the shaft coupling is not visible, rotation can usually be determined by observing the motor cooling fan. If the rotation is incorrect, have qualified personnel interchange any two of the three-phase wires to change direction.

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Overheating

Overheating can occur if the valves in the suction or discharge lines are closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the volute casing with cool liquid.

WARNING

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to cool before servicing.

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop.

Pump Vacuum Check

With the pump inoperative, install a vacuum gauge on the suction side of the pump, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches or more of mercury. If it does not, check for air leaks in the seal and gasket.

Open the suction line, and read the vacuum gauge with the pump primed and at operating speed. Shut off the pump, and read the gauge again to determine if the vacuum remains at the maximum developed by the pump. If the vacuum falls off rapidly, an air leak exists; check to make certain that the air leak is not from the vacuum gauge connection.

Stopping

After stopping the pump, disconnect the power source to ensure that the pump will remain inoperative.

Unless they are extremely severe, below-freezing conditions will not affect pump operation in petroleum service. In other service in below-freezing conditions, a stopped pump should be drained, and any solids cleaned out by flushing with a hose, to prevent damage from freezing. After draining and flushing, operate the pump for approximately one minute to remove any remaining liquid that could freeze pump rotating parts.

In above-freezing conditions, a pump which will be idle for more than a few hours, or which has been pumping liquids containing solids, should be drained and flushed thoroughly. Operate the pump during the draining process.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F are considered normal for pedestal bearings, and they can operate safely to at least 180°F.

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperatures is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see LUBRICATION in MAINTENANCE AND REPAIR). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

TROUBLESHOOTING

WARNING

Before attempting to open or service the pump:

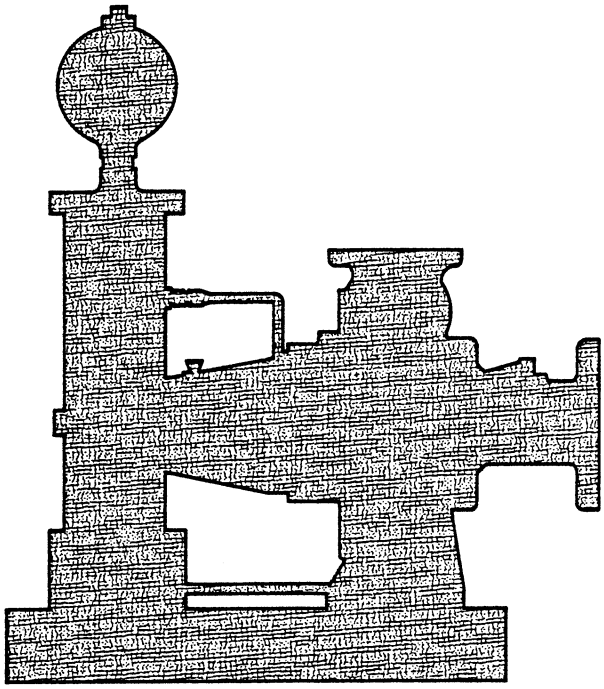
1. Consult pump service manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

Trouble	Possible Cause	Probable Remedy
PUMP FAILS TO PRIME	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
	Priming pump clogged or worn.	Check slide block. Replace damaged or worn vanes.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct as needed. Check submergence chart (Section B, 4).
	Lining of suction hose collapsed.	Replace suction hose.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Discharge head too high.	Install bypass line.

Trouble	Possible Cause	Probable Remedy
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont)	Suction lift too high.	Reduce suction lift.
	Strainer clogged.	Check strainer and clean if necessary.
	Leaking or worn seal or pump gaskets.	Check pump vacuum. Replace leaking or worn seal or pump gaskets.
	Priming pump clogged or worn.	Check slide block. Replace damaged or worn vanes.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
PUMP CLOGS FREQUENTLY	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature frequently to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

Roto-Prime Self-Priming Centrifugal Pump

Model RS2A3-BAR



MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING EFFICIENCY.

EXPLODED VIEW

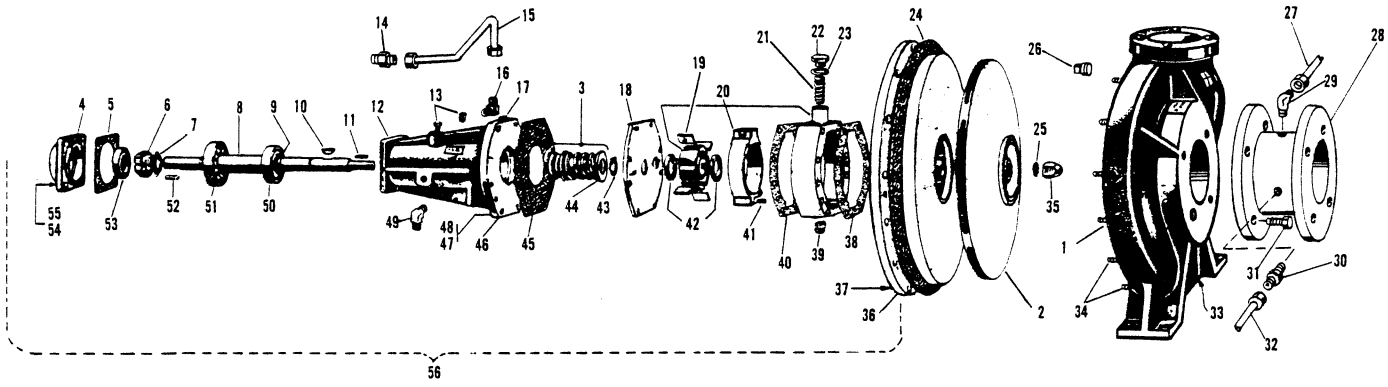


Figure 1. Pump Model RS2A3-BAR

PARTS LIST

PUMP MODEL RS2A3-BAR

(From S/N up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE HOUSING	W-0729	10020	1
2	★IMPELLER	K-76048	13040	1
3	★SEAL ASSEMBLY	25271-192	—	1
4	BEARING CAP	N-14130	10010	1
5	★BEARING CAP GASKET	K-74033	18000	1
6	BEARING LOCKNUT	S-301	—	1
7	BEARING LOCKWASHER	S-302	—	1
8	★IMPELLER SHAFT	R-9454	15010	1
9	BRNG RETAINING RING	S-248	—	1
10	WOODRUFF KEY	K-61559	15990	1
11	IMPELLER KEY	K79328-23	15990	1
12	BEARING HOUSING	T-2990	10020	1
13	AIR VENT FITTING	S-2162	—	2
14	MALE CONNECTOR	26351-062	—	1
15	DISCHARGE TUBE ASSY	R-12638	—	1
16	MALE ELBOW	26351-133	—	1
17	PIPE PLUG	P-02	11990	1
18	SPACER PLATE	N-14129	10020	1
19	★PUMP BLADES	K79300-20	—	6
20	★★GROUP GRIND	LK-5266	—	1
21	PRESSURE REG. SPRING	K-76301	—	1
22	SPRING CAP	K-68064	15991	1
23	★PRESS REG. CAP GSKT	K-86067	—	1
24	★BODY COVER GASKET	R-8108	20000	1
25	IMPELLER LOCKWASHER	23962-506	—	1
26	PIPE PLUG	P-06	11990	1
27	PRIMING TUBE ASSY	R-12639	—	1
28	SUCTION SPOOL	10845-B	10010	1
29	MALE ELBOW	26351-133	—	1
30	MALE CONNECTOR	26351-062	—	1
31	HEX HEAD CAPSCREW	B-1007	15991	4
32	RETURN TUBE ASSY	T-8070	—	1
33	PIPE PLUG	P-02	11990	1
34	STUD	C-0606	15991	12
35	IMPELLER NUT	K-75775	15111	1
36	BODY COVER	T-3532-A	10020	1
37	HEX NUT	D-06	15991	12
38	★PRIMING PUMP GASKET	N-14145	18010	1
39	PRIM PUMP DRN PLUG	P-06	11990	1
40	★PRIMING PUMP GASKET	N-14145	18010	1
41	ROLL PIN	21154-666	—	1
42	BLADE SPACER	K-74031	15030	2
43	SNAP RING	S-700	—	1
44	★SPRING CENT WASHER	25273-266	—	1
45	★BEARING HSNG GSKT	N-14144	18000	1
46	DOWEL PIN	21133-073	—	2
47	LOCKWASHER	J-06	15991	8
48	HEX HEAD CAPSCREW	21632-611	—	8
49	MALE ELBOW	26351-106	—	1
50	★BALL BEARING	23257-012	—	1
51	★BALL BEARING	23282-008	—	1
52	SHAFT KEY	N-0406	15990	1
53	★OIL SEAL	25227-230	—	1
54	LOCKWASHER	J-05	15991	4
55	HEX HEAD CAPSCREW	B-0503½	15991	4
56	BEARING HSNG ASSY	R12214-04	—	1
NOT SHOWN:				
	AIR RELEASE VALVE	GRP33-06A	—	1
	NAME PLATE	2613-DZ	13990	1
	★SUCTION FLANGE GSKT	11589-GA	18000	1
	HEX HEAD CAPSCREW	B-0805	15991	2
	LOCKWASHER	J-08	15991	2
	★DISCHARGE FLNG GSKT	N-14226	18000	1
	★RING GASKET	38681-818	—	1
	PIPE PLUG	P-02	11990	1
OPTIONAL:				
	COMPANION FLANGE	K-33849	(as reqd)	
	GASKET SET	K-33642	—	1

★INDICATES PARTS RECOMMENDED FOR STOCK

★★CENTER PLATE, SLIDE AND ROTOR

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

NOTE: ALL ROTO-PRIME IMPELLERS ARE TRIMMED AND INCLUDE THE WEAR RINGS AND GROOVE PINS. WEAR RINGS ARE NOT SOLD SEPARATELY.

CANADIAN SERIAL NO. . . . . AND UP

SECTIONAL DRAWING

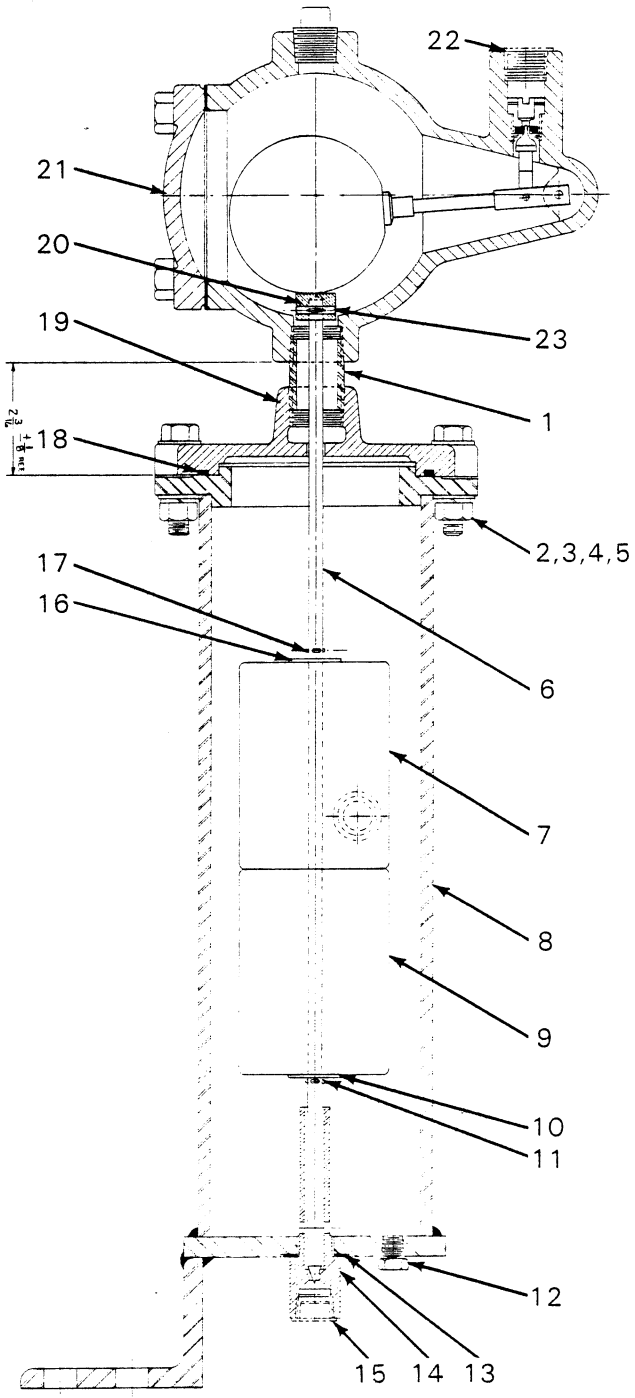


Figure 2. GRP33-06A Air Release Valve

PARTS LIST

GRP33-06A AIR RELEASE VALVE

ITEM NO.	PART NAME	PART NUMBER	MATERIAL CODE	QTY
1	HEAVY PIPE NIPPLE	THA-1206	15070	1
2	HEX HEAD CAPSCREW	B-0607	15991	4
3	HEX NUT	D-06	15991	4
4	FLAT WASHER	K-06	15991	8
5	LOCKWASHER	J-06	15991	4
6	FLOAT ROD	31361-008		1
7	FLOAT	K-81577		1
8	FLOAT CHAMBER ASSEMBLY	T-6327		1
9	FLOAT	K-81577		1
10	FLOAT WASHER	KB-06	17000	1
11	COTTER PIN	21126-712		1
12	PIPE PLUG	P-02	11990	2
13	★PRESSURE REGULATING GASKET	K-86067		1
14	★SUMP VALVE	N-16727-01	17010	1
15	PLASTIC CLOSURE	25141-039		2
16	FLAT WASHER	KB-06	17000	1
17	COTTER PIN	21126-712		1
18	AIR RELEASE ADAPTER O-RING	25152-243		1
19	AIR RELEASE ADAPTER	38354-033	11056	1
20	★PLUNGER PAD	31115-008		1
21	★AIR RELEASE VALVE ASSEMBLY	26664-003		1
22	PLASTIC CLOSURE	25141-042		1
23	PIN	21144-058		1

★INDICATES PARTS RECOMMENDED FOR STOCK

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

This pump requires little service due to its rugged, minimum-maintenance design. If it becomes necessary to inspect or replace components in and adjacent to the rotating assembly, however, follow these instructions, which are keyed to the exploded view and the sectional view (see figure 1 and figure 2) and the accompanying parts lists.

Pump Disassembly

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

Disconnect the power source, making certain that it will remain inoperative while the pump is being serviced, and close all connecting valves.

Remove the coupling guard and disconnect the pump to motor couplings, retaining shaft key (52, figure 1).

For easy access to the pump, remove the motor mount bolts and separate the motor from the pump.

Remove the volute housing drain plugs and the priming pump drain plug (39), to drain the pump. Clean and reinstall the plugs after the pump has been drained.

Disconnect the priming pump discharge tube (15) from the bearing housing (12) and the Air Release Valve.

Disconnect the priming pump suction tubing (27) from the suction flange and the group grind priming pump assembly (20).

For access to the impeller (2), the pump must be opened at the point where the body cover (36) and the volute housing (1) are joined. Remove hex nuts (37) securing the body cover and attached bearing housing assembly (56), to the volute housing and separate the assemblies.

To remove the impeller, immobilize it by placing a pry bar or other suitable device between the vanes; use caution not to damage the impeller vanes. Disengage the impeller nut (35) and slide the impeller off the shaft (8) retaining the impeller lockwasher (25) and the impeller shaft key (11).

For access to the priming pump assembly, remove the spring cap (22) and the pressure regulating spring (23). Disengage hex head capscrews (48) and lockwasher (47) securing the bearing housing assembly to the body cover and separate the assemblies.

Tap out the priming pump dowel pins and slide the priming pump assembly, pump vanes (19), vane spacers (42) and the spacer plate (18) off the shaft, retaining the woodruff shaft key (10).

Seal Disassembly

Remove the seal snap ring (43), spring centering washer (44) and the seal spring. Using a stiff wire with a hooked end if necessary remove the remainder of the seal components.

Shaft and Bearing Disassembly

For access to the bearings (50 and 51), remove the bearing cap (4). Disengage hex head capscrews (55) and lockwashers (54) securing the bearing cap to the bearing housing, and remove the bearing cap and the oil seal (53).

Using a soft faced mallet, tap the impeller end of the shaft to remove the shaft and the bearings from the bearing housing.

Disengage the bearing lock nut (6) and the lockwasher (7), and remove the bearing from the drive end of the shaft.

Disengage the bearing retaining ring (9), and remove the ring and the bearing from the impeller end of the shaft.

Clean the shaft and the bearing housing seal cavity with a soft cloth soaked in cleaning solvent.

WARNING

Most cleaning solvents are toxic and flammable. Use them only in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Air Release Valve Disassembly

Remove the drain plug (12, figure 2) to drain the float chamber (8). Clean and reinstall the drain plug after the chamber has been drained. Use Loctite HVV or its equivalent on the threads of the drain plug.

Disconnect the return tubing (32, figure 1) from the sump valve.

To remove the sump valve (14, figure 2), which is a press fit, pull the valve from the base of the float chamber.

Disconnect the vent tubing from the air release valve. To remove the air release valve assembly (21), disengage the assembly from the heavy pipe nipple (1).

To remove the plunger pad (20), tap out pin (23) and remove the pad from the float rod (6).

Air Release Valve Reassembly

Inspect the plunger pad and replace it if it is badly worn. Install the pad on the float rod and secure it with the pin.

If it is necessary to replace the air release valve, replace the entire assembly. Install the air release assembly onto the heavy pipe nipple so that the bottom of the assembly is 2-3/16 inches, ± 1/8 inch, from the point where the air release adapter (19) and the float chamber are joined; reinstall the vent tubing.

Replace the pressure regulating gasket (13).

Inspect the sump valve and replace it if badly worn. The sump valve is a press fit into the float chamber.

Reinstall the return tubing, making certain all connections are secure before starting the pump.

Shaft and Bearing Reassembly

Inspect the bearings and replace them if they are badly worn. This pump is equipped with sealed bearings and no relubrication is required. Install the bearings and secure the bearing on the impeller end of the shaft with the retaining ring. Secure the bearing on the drive end of the shaft with the lockwasher and hex nut.

Reinstall the shaft, with bearings, in the bearing housing.

Replace the bearing cap gasket (5, figure 1) and the oil seal; reassemble the bearing cap to the bearing housing, securing the assembly with the attaching hardware.

Seal Reassembly

The seal is not normally reused because of the high polish on its lapped faces, but if it is necessary to reuse the old seal, wash all metallic parts in cleaning solvent and dry thoroughly.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. If any components are worn, replace the complete seal; never mix old and new seal parts.

CAUTION

This seal is not designed for operation at temperatures above 160°F. Do not use at higher operating temperatures.

See figure 3 for the correct order of installation of seal components.

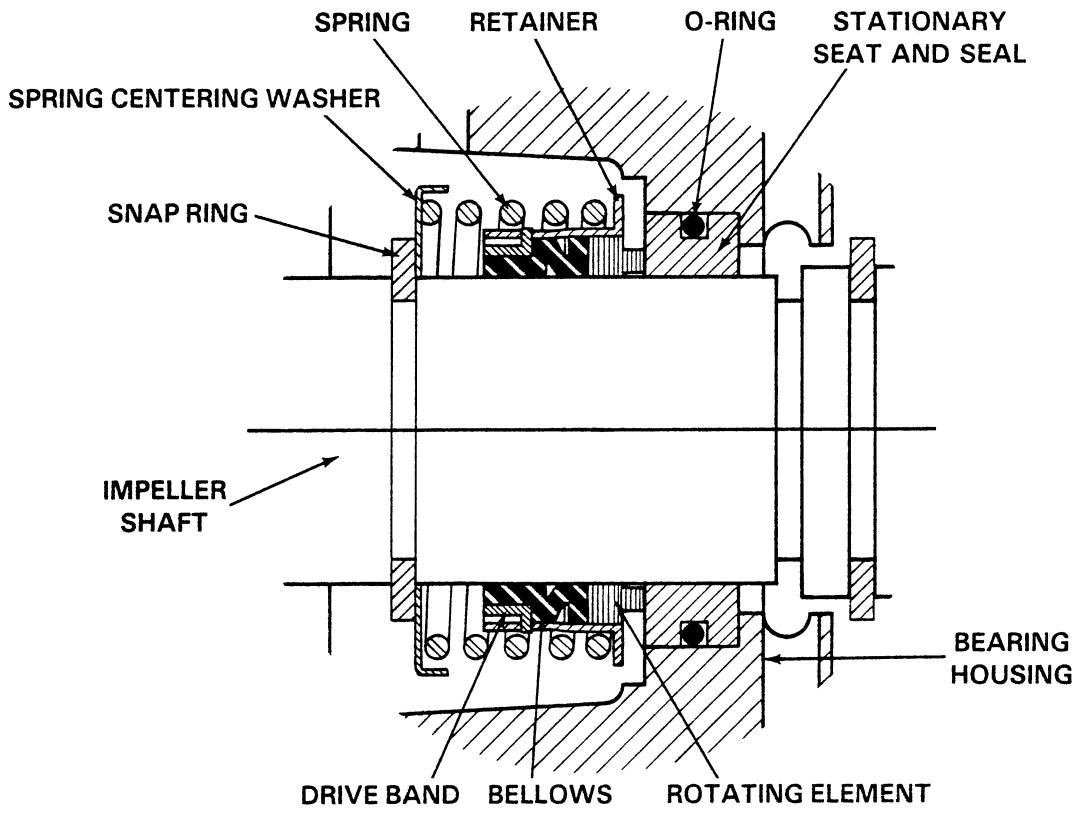


Figure 3. 25271-192 Seal Assembly

Place a drop of light lubricating oil on the lapped faces of the seal. Lubricate the stationary seat O-ring with soft grease or oil and install it in the stationary seat.

Install the stationary seat and the rotating element. Lubricate the bellows assembly with soft grease or oil and install the bellows. Install the seal spring and spring centering washer. Secure the seal assembly on the shaft with the snap ring, making certain that all components of the seal are seated squarely on the shaft.

Pump Reassembly

Replace the bearing housing gasket (45) and install the spacer plate.

Install a vane spacer and the woodruff key; install the priming pump rotor on the shaft, coating both ends of the rotor with "Hercules Moly Duo-Lube, Style 69" or its equivalent.

Install the priming pump vanes in the rotor and slide the other vane spacer on the shaft. Inspect the slide block roll pin (41) and replace it if badly worn. Install the slide block on the rotor assembly.

Replace priming pump gasket (40) on the bearing housing face on the center plate, and install the center plate.

If the priming pump group grind is replaced it must be positioned on the pump shaft so that it is concentric with the bearing housing and the body cover.

NOTE

Positioning of the priming pump group grind is critical for maximum pump efficiency. For precise positioning contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

If the priming pump group grind must be replaced in the field, however, dowel holes must be drilled and reamed through the center plate.

To drill and ream the dowel holes in the center plate; with the slide block in the full priming position — slide block contact with the bottom of the center plate — rotate the shaft until the highest point on the rotor contacts the slide block. Insert a .002 inch feeler gauge at this point and secure the center plate in this position with two 7/16-20UNF-2Ax2 inch bolts inserted through the bearing housing into the tapped holes in the center plate.

Remove the feeler gauge and replace the priming pump gasket (38) on the body cover face of the center plate. If the rotor or slide block thickness is greater than the center plate thickness, one additional priming pump gasket will be required on the center plate.

Mount the body cover on the shaft, concentric with the bearing housing and the priming pump. Secure the body cover to the bearing housing and the priming pump with the attaching lockwashers and capscrews.

Drill and ream the dowel pin holes in the center plate using the existing dowel holes in the bearing housing and body cover as pilot holes.

Remove the 7/16 inch positioning bolts and reinstall the remaining lockwashers and capscrews.

Reinstall the dowel pins.

To check that the priming pump is assembled properly refer to **Priming Pump Check**, (Section C, Page 2).

Replace the body cover gasket (24).

Reinstall the impeller shaft key.

Inspect the impeller and replace it if cracked or badly worn. Slide the impeller on the shaft, immobilize it, and secure the impeller with the impeller lockwasher and the impeller lock nut.

Reassemble the bearing housing assembly and body cover to the volute housing and secure these assemblies with the attaching hardware.

Reinstall the priming pump suction tubing and the discharge bypass line.

Turn the shaft to check that the impeller rotates freely when the pump is completely assembled.

Install the shaft key and reassemble the pump to motor coupling and check the pump to motor alignment (see Section B, Pages 5 and 6).

Reinstall the coupling guard, and make certain that all plugs and piping are securely tightened before starting the pump.

LUBRICATION

Seal Assembly

The seal assembly is lubricated by the medium being pumped.

Bearings

The bearings are self lubricating.

Priming Pump

When starting the pump for the first time or if the pump has not been used for a long period of time, refer to **Automatic Self-Priming** (Section C, Page 1) for initial lubrication. Otherwise the priming pump is lubricated by the medium being pumped.

For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419—755—1280
International: +1—419—755—1352

For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519—631—2870

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA