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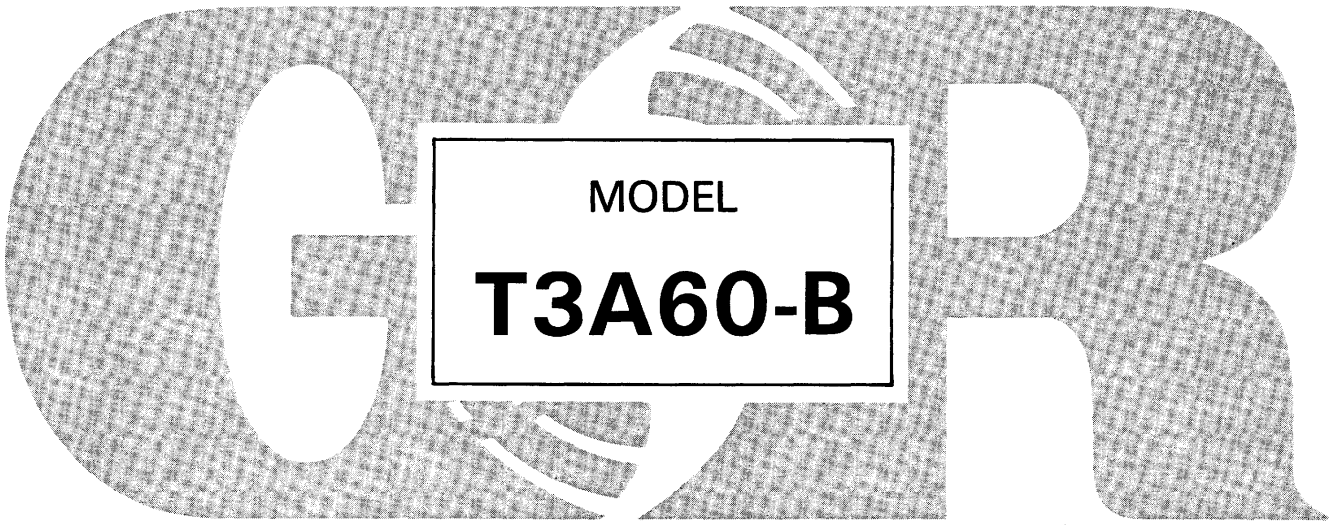
Rev. - A

T SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA
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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 T-Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed for handling liquids which contain large entrained solids, mild corrosives, mud, or slurries. For specific service or application, 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 44901

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 T SERIES BASIC PUMPS. GORMAN-RUPP HAS NO CONTROL OVER OR PARTICULAR KNOWLEDGE OF THE POWER SOURCE WHICH WILL BE USED. REFER TO THE MANUAL ACCOMPANYING THE POWER SOURCE BEFORE ATTEMPTING TO START THE POWER SOURCE.

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.

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

After the pump has been located in its operating position, 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.

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.

Clearances

A minimum clearance of **18 inches** in front of the cover plate is required to permit removal of the cover and easy access to the pump interior.

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.

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.

Strainers

A strainer is not furnished with the pump. If a strainer 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. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to one and one-half the size of the suction line.

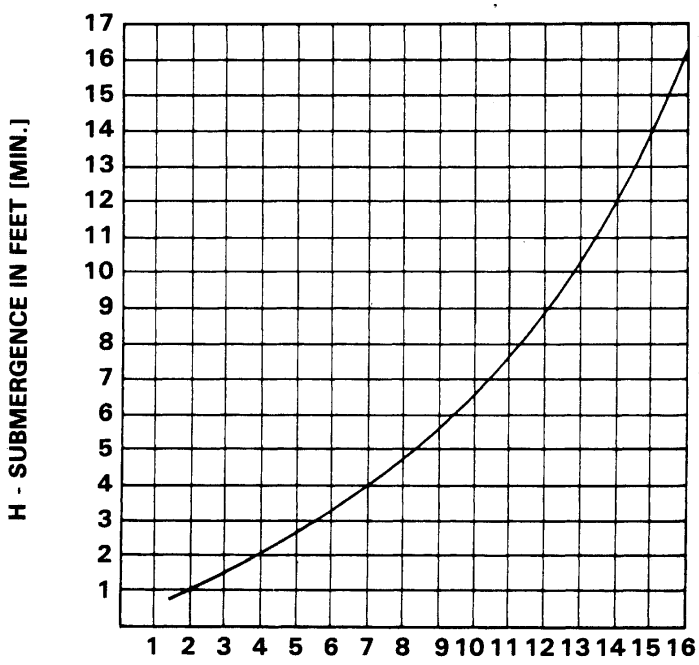
If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance one and one-half times the size of the suction line. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance at least three times the diameter of the suction line.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 1 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 1. 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.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe in the line to minimize friction losses. Never install a throttling valve in a suction line.

A check valve in the discharge line is normally recommended, but is not necessary in low discharge head applications.

With high discharge heads, it is recommended that a throttling valve and a check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

Bypass Lines

If it is necessary to permit the escape of air to atmosphere during initial priming or in the repriming cycle, install a bypass line between the pump and the discharge check valve. The bypass line should be sized so that it does not affect pump discharge capacity.

Either a Gorman-Rupp automatic air release valve—which will automatically open to allow the pump to prime, and automatically close when priming is accomplished—or a hand-operated shutoff valve should be installed in the bypass line.

NOTE

The bypass line may clog frequently, particularly if the valve remains closed. If this condition occurs, either use a larger bypass line or leave the shutoff valve open during the pumping operation.

ALIGNMENT

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their shafts are aligned with and parallel to each other. It is imperative that alignment by checked after the pump is installed, and before operation.

Check **Rotation**, Section C, before final alignment.

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 2A).

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 2B).

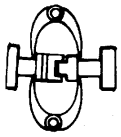


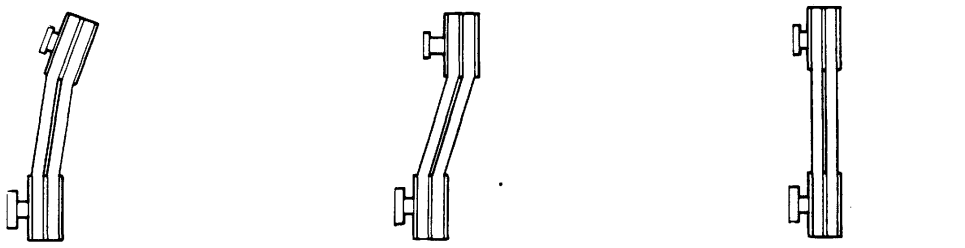
Figure 2A. Aligning Spider-Type Couplings

Figure 2B. 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.

V-Belt Driven Pumps

When using V-belt drives, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see figure 2C). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.



MISALIGNED: SHAFTS NOT PARALLEL

MISALIGNED: SHEAVES NOT IN LINE

ALIGNED: SHAFTS PARALLEL AND SHEAVES IN LINE

Figure 2C. Alignment of V-Belt Driven Pumps

Tighten the belts in accordance with the belt manufacturer's instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure. Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.

Drive Shaft Guards

Driver and shaft assemblies, couplings, and belts and sheaves mounted at the Gorman-Rupp factory are supplied with a guard for protection of personnel. Do not operate the pump without a guard.

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.

PRIMING

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).

Although this pump is self-priming, it should never be operated unless the volute is filled with liquid.

CAUTION

Never operate this pump unless the volute is filled with liquid. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Fill the pump with liquid:

1. When the pump is being put into service for the first time.
2. When the pump has not been used for a considerable length of time.
3. When the liquid in the volute housing has evaporated.

When the volute housing is full, the pump will prime and reprime as necessary.

To fill the pump, loosen the clamp bar screw and clamp bar, remove the fill cover at the top of the volute casing, and add clean liquid. Be certain to reinstall the fill cover before operating the pump.

WARNING

After filling the volute housing, do not attempt to operate the pump unless the fill cover and all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

STARTING

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 power source before attempting to start the power source.

If an electric motor is being used as a power source, operate the motor independently and observe rotation. If incorrect, have the motor wiring checked by qualified personnel.

Lines With a Bypass

Since this pump does not have a suction check valve, the discharge end of the bypass line must be submerged in order to maintain suction.

Close the throttling valve in the discharge line, and open the shutoff valve in the bypass line so that the pump will not have to prime against the weight of the liquid in the discharge line. Start the power source. When the pump has been primed and liquid is flowing steadily through the bypass line, close the bypass shutoff valve and open the discharge throttling valve.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required discharge flow rate.

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 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

Since this pump does not have a suction check valve, the discharge line must be fitted with a check valve if a pump vacuum reading is to be taken.

With the pump inoperative, install a vacuum gauge in the system, 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. The vacuum gauge reading will immediately drop proportionately to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilizing, an air leak exists. Before checking the lines for the source of the air leak, check the point of installation of the vacuum gauge.

Stopping

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

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.

If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from draining completely, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

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:

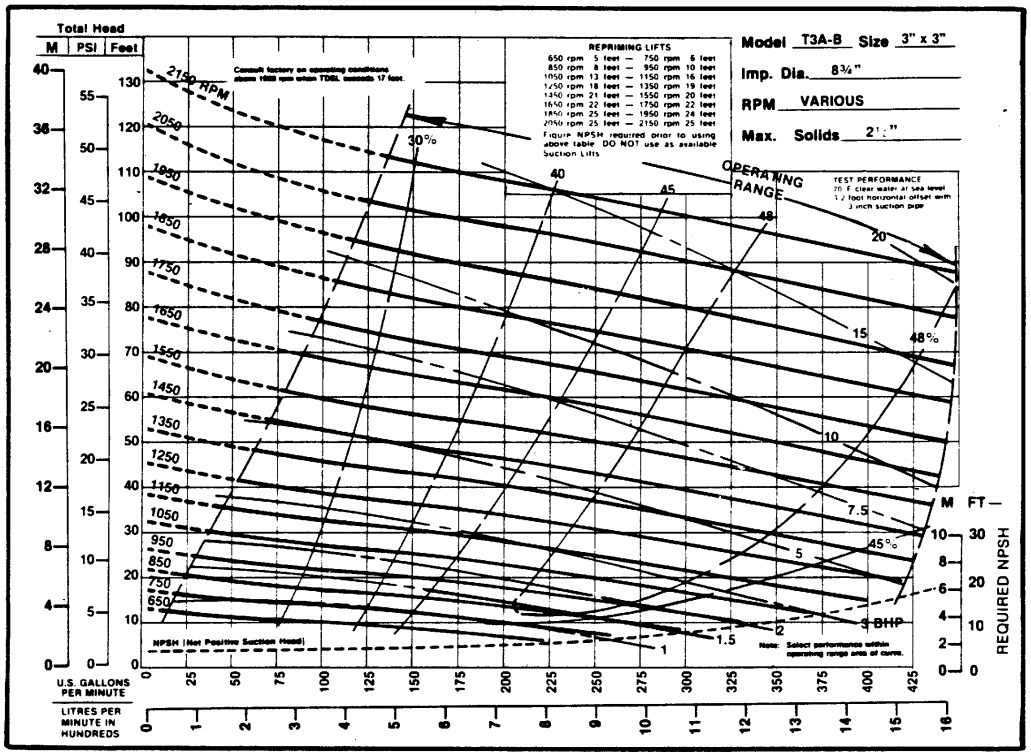
1. Consult pump service manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

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.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DE-LIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction intake not sub-merged at proper level or sump too small.	Check installation and correct as needed. Check submergence chart, Section B.
	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, (see Section E).
	Pump speed too slow.	Check driver output; check belts or cou-plings for slippage.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Reduce suction lift.
	Strainer clogged.	Check strainer and clean if necessary.

Trouble	Possible Cause	Probable Remedy
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont)	Leaking or worn seal or pump gaskets.	Check pump vacuum. Replace leaking or worn seal or pump gaskets.
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.
	Suction check valve clogged or binding.	Free valve, and clean or replace it.
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 (see Section E); 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.

MAINTENANCE AND REPAIR

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



*** STANDARD PERFORMANCE FOR PUMP MODEL T3A60-B**

* Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.
If your pump serial number is followed by an "N" or if you have a question on performance, contact The Gorman-Rupp Company.

SECTIONAL DRAWING

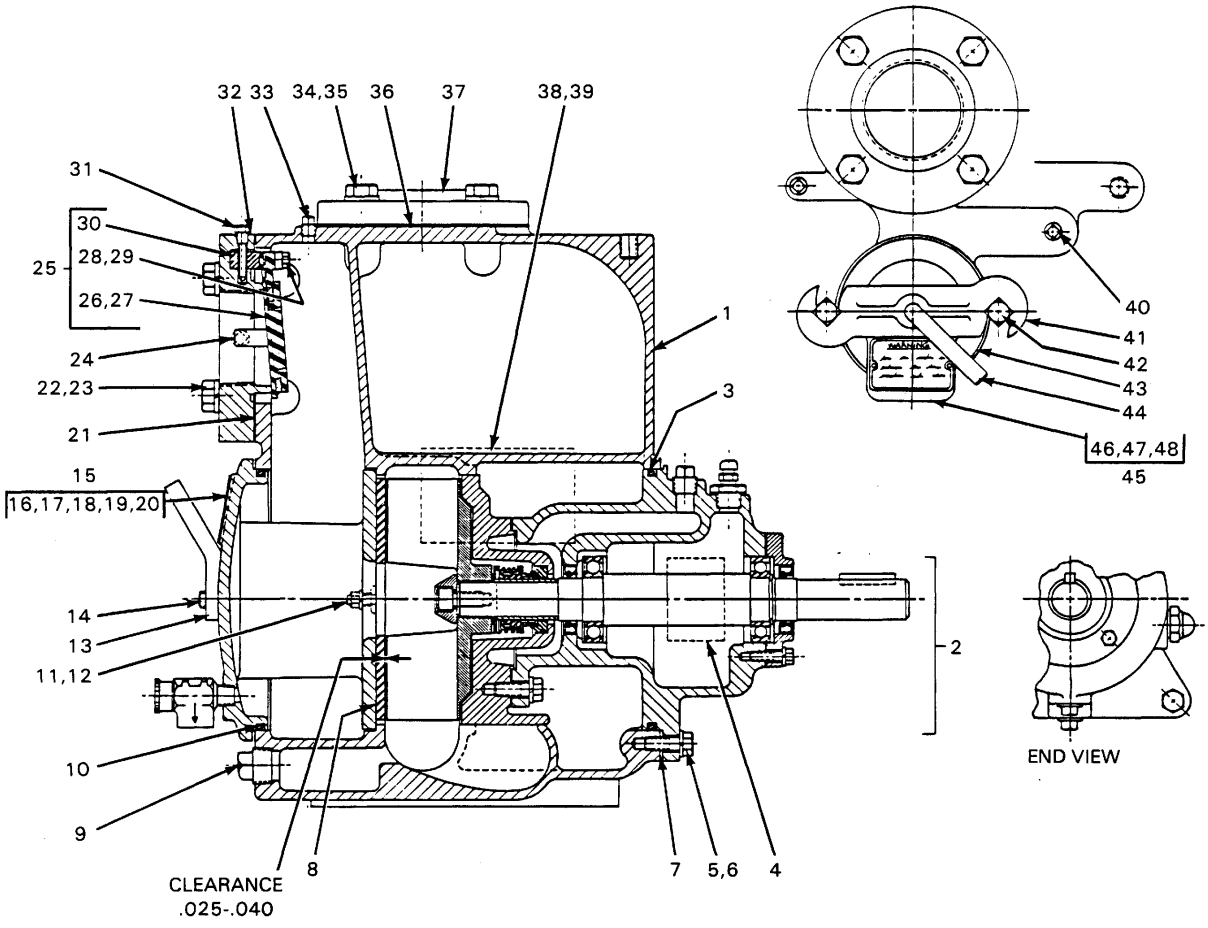


Figure 1. Pump Model T3A60-B

PARTS LIST

PUMP MODEL T3A60-B

(From S/N 769463 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	11405-B	10010	1
2	ROTATING ASSY (See fig. 2)	44163-046		1
3	★BEARING HSNG O-RING	S-1748		1
4	ROTATION DECAL	2613-CU	00000	1
5	HEX HEAD CAPSCREW	B-0805½	15991	4
6	LOCKWASHER	J-08	15991	4
7	★ROTATING ASSY SHIM SET	13130	17000	4
8	★WEAR PLATE	11407-A	15990	1
9	VOLUTE DRAIN PLUG	P-16	11990	1
10	★COVER O-RING	S-1748		1
11	LOCKWASHER	J-06	15991	2
12	HEX NUT	D-06	15991	2
13	COVER HAND NUT	10701	15040	2
14	STUD	C-1010	15991	2
15	★COVER ASSEMBLY	42111-901		1
16	COVER	NOT AVAILABLE		1
17	WARNING PLATE	2613-EV	13990	1
18	DRIVE SCREW	BM#04-03	15990	4
19	★ PRESSURE RELIEF VLV	26662-005		1
20	CAUTION DECAL	2613-FG		1
21	★SUCTION FLANGE GSKT	11412-G	21020	1
22	HEX HEAD CAPSCREW	B-1009	15991	4
23	LOCKWASHER	J-10	15991	4
24	PIPE PLUG	P-04	11990	1
25	★CHECK VALVE ASSY	46411-060		1
26	CHECK VALVE	NOT AVAILABLE		1
27	SPACER SLEEVE	NOT AVAILABLE		2
28	BACK UP PLATE	NOT AVAILABLE		1
29	NYLOCK CAPSCREW	NOT AVAILABLE		2
30	CHECK VLV ADAPTER	NOT AVAILABLE		1
31	★CHECK VALVE PIN	11557-A	17010	1
32	SUCTION FLANGE	11412	10010	1
33	PIPE PLUG	P-04	11990	1
34	HEX HEAD CAPSCREW	B-1007	15991	4
35	LOCKWASHER	J-10	15991	4
36	★DISCHARGE FLNG GSKT	1674-GE	21020	1
37	DISCHARGE FLANGE	1753-A	10010	1
38	NAME PLATE	2613-D	13990	1
39	DRIVE SCREW	BM#04-03	15990	4
40	PIPE PLUG	P-04	11990	1
41	FILL COVER CLAMP BAR	38111-004	11000	1
42	MACHINE BOLT	A-1014	15991	2
43	★FILL COVER GSKT	50-G	19210	1
44	FILL CVR CLAMP SCREW	31912-009		1
45	★FILL CVR ASSY	42111-344		1
46	FILL CVR PLATE	NOT AVAILABLE		1
47	WARNING PLATE	NOT AVAILABLE		1
48	DRIVE SCREW	NOT AVAILABLE		2
OPTIONAL:				
	FLANGED SUCTION	11412-A	10010	1
	FLANGED DISCH	10845	10010	1
	DISASSEMBLY TOOL	12859	24000	1
	CASING HEATER 120V	47811-006		1
	CASING HEATER 240V	47811-007		1
	ST STL PR REL VLV	26662-101		1
	NEO SOLID CK VLV	46411-043		1
	VITON SOLID CK VLV	46411-086		1
	VITON BLOW OUT VLV	46411-074		1
	SEAL BOOT INST TOOL	38838-003		1
	WEAR PLATE ASSY	46451-337		1

★INDICATES PARTS RECOMMENDED FOR STOCK

CANADIAN SERIAL NO. . . . . AND UP

SECTIONAL DRAWING

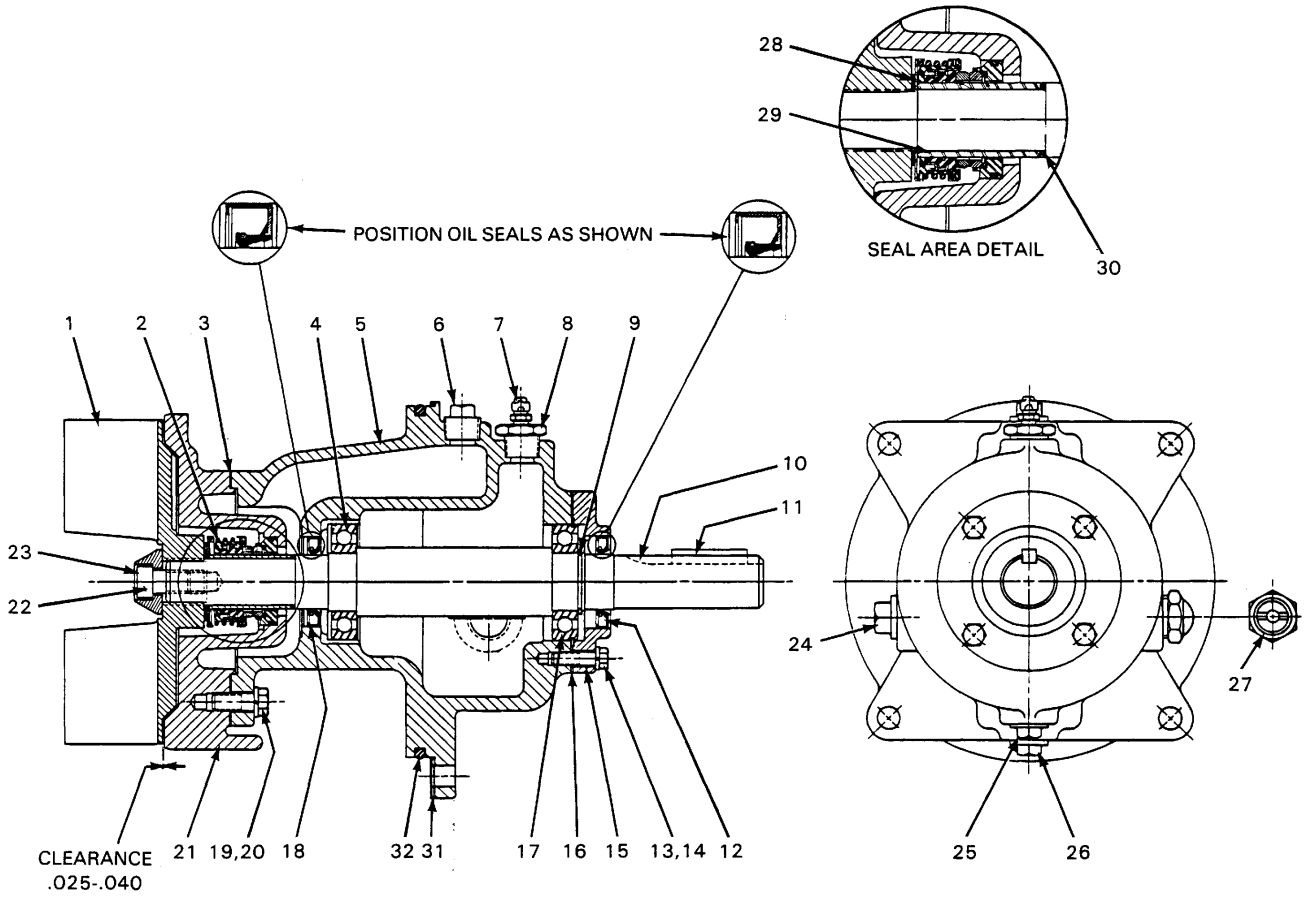


Figure 2. 44163-046 Rotating Assembly

PARTS LIST

44163-046 ROTATING ASSEMBLY

ITEM NO.	PART NAME	PART NUMBER	MATERIAL CODE	QTY
1	★IMPELLER	11406	11000	1
2	★SEAL ASSEMBLY	46512-050		1
3	★SEAL PLATE GASKET	10959-G	20000	1
4	★BALL BEARING	S-0250		1
5	BEARING HOUSING	11399-A	10010	1
6	★VENTED SEAL CAVITY PLUG	4823-A	11990	1
7	★BEARING HOUSING AIR VENT	S-1530		1
8	REDUCER BUSHING	AP-0802	11990	1
9	★SNAP RING	S-0244		1
10	★IMPELLER SHAFT	11398	16040	1
11	★SHAFT KEY	N-0608	15990	1
12	★OIL SEAL	S-1352		1
13	HEX HEAD CAPSCREW	B-0605	15991	4
14	LOCKWASHER	J-06	15991	4
15	★BEARING CAP	11408	10010	1
16	★BEARING CAP GASKET	11408-G	18000	1
17	★BALL BEARING	S-1749		1
18	★OIL SEAL	S-1352		1
19	HEX HEAD CAPSCREW	B-0805	15991	4
20	LOCKWASHER	J-08	15991	4
21	★SEAL PLATE	11837-D	10010	1
22	★IMPELLER CAPSCREW	DM-1004-S	15991	1
23	IMPELLER WASHER	10278	15030	1
24	★PIPE PLUG	P-12	11990	1
25	BEARING HOUSING DRAIN PLUG	P-08	11990	1
26	SEAL CAVITY DRAIN PLUG	P-08	11990	1
27	★OIL LEVEL SIGHT GAUGE	S-1471		1
28	★IMPELLER SHIM SET	37-J	17090	1
29	★SHAFT SLEEVE	11876-A	16000	1
30	★SEAL SLEEVE O-RING	S-2088		1
31	★ROTATING ASSY ADJUSTING SHIMS	13130	17000	4
32	★BEARING HOUSING O-RING	S-1748		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 and/or replace the wearing parts, however, follow these instructions, which are keyed to the sectional views (see figures 1 and 2) and the accompanying parts lists.

DISASSEMBLY

By removing the rotating assembly, this pump may be disassembled and serviced without disconnecting the suction or discharge piping.

Disconnect the power source, or take other precautions to ensure that the pump will remain inoperative while it is being serviced, and close all connecting valves.

Remove the volute drain plug (9, figure 1), and drain the pump. Clean and reinstall the drain plug.

Cleanout (Figure 1)

For cleanout access, loosen the hand nut (13) securing the cover plate assembly (15) to the volute casing (1), and remove the cover plate assembly. Replace the cover plate assembly O-ring (10) when reinstalling the cover plate.

Rotating Assembly Removal (Figure 1)

The rotating assembly (2) may be serviced without disconnecting the suction or discharge piping.

To remove the rotating assembly, remove the hex head capscrews (5) and lockwashers (6) securing the rotating assembly to the volute casing (1). Remove the rotating assembly and the rotating assembly shim sets (7); tag and tie the shim sets.

Impeller Disassembly (Figure 2)

Drain the shaft seal lubricant by removing the seal cavity drain plug (26). Clean and reinstall the drain plug.

To remove the impeller (1), immobilize it by placing a block of wood between the vanes, and remove the impeller capscrew (22) and washer (23). Unscrew the impeller from the impeller shaft (10). Use caution when unscrewing the impeller; tension on the shaft seal spring will be released as the impeller is removed.

Shaft Seal Disassembly (Figure 2)

Remove the impeller adjusting shims (28); tag and tie the shims.

Remove the seal sleeve (29) and the seal sleeve O-ring (30).

Use a stiff wire with a hooked end, and remove the components of the shaft seal assembly (2).

NOTE

The stationary seat and stationary element of the seal assembly are held together by a silicone rubber sealant. Do not attempt to separate these components.

Seal Plate Disassembly (Figure 2)

To remove the seal plate (21), remove the hex head capscrews (19) and lockwashers (20) securing the seal plate to the bearing housing (5).

Impeller Shaft and Bearings Disassembly (Figure 2)

Drain the bearing lubricant by removing the bearing housing drain plug (25). Clean and reinstall the drain plug.

Remove the bearing housing oil seal (18).

Remove the hex head capscrews (13) and lockwashers (14) securing the bearing cap (15) to the bearing housing, and remove the bearing cap and assembled oil seal (12).

Remove the impeller shaft (10) and assembled bearings (4 and 17) from the bearing housing.

Remove the outboard bearing snap ring (9), and remove the outboard bearing from the impeller shaft.

Remove the inboard bearing from the impeller shaft.

REASSEMBLY

Impeller Shaft and Bearings Reassembly (Figure 2)

Clean the bores of the bearing cap, bearing housing, seal plate, and impeller, and the seal sleeve and the impeller shaft, 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.

Soak the bearings in cleaning solvent free of grit or metallic particles. Inspect the bearings, and replace as necessary.

Install the outboard bearing so that it seats squarely against the impeller shaft shoulder, and install the bearing snap ring.

Install the inboard bearing so that it seats squarely against the impeller shaft shoulder.

Replace the bearing cap gasket (16), and secure the bearing cap to the bearing housing.

Inspect the bearing cap oil seal, and replace as necessary. Install the oil seal with the lip positioned as shown in figure 2.

Inspect the bearing housing oil seal, and replace as necessary. Install the oil seal with the lip positioned as shown in figure 2.

Replace the bearing housing O-ring (32).

Seal Plate Reassembly (Figure 2)

Replace the seal plate gasket (3), and secure the seal plate to the bearing housing.

Shaft Seal Reassembly (Figure 3)

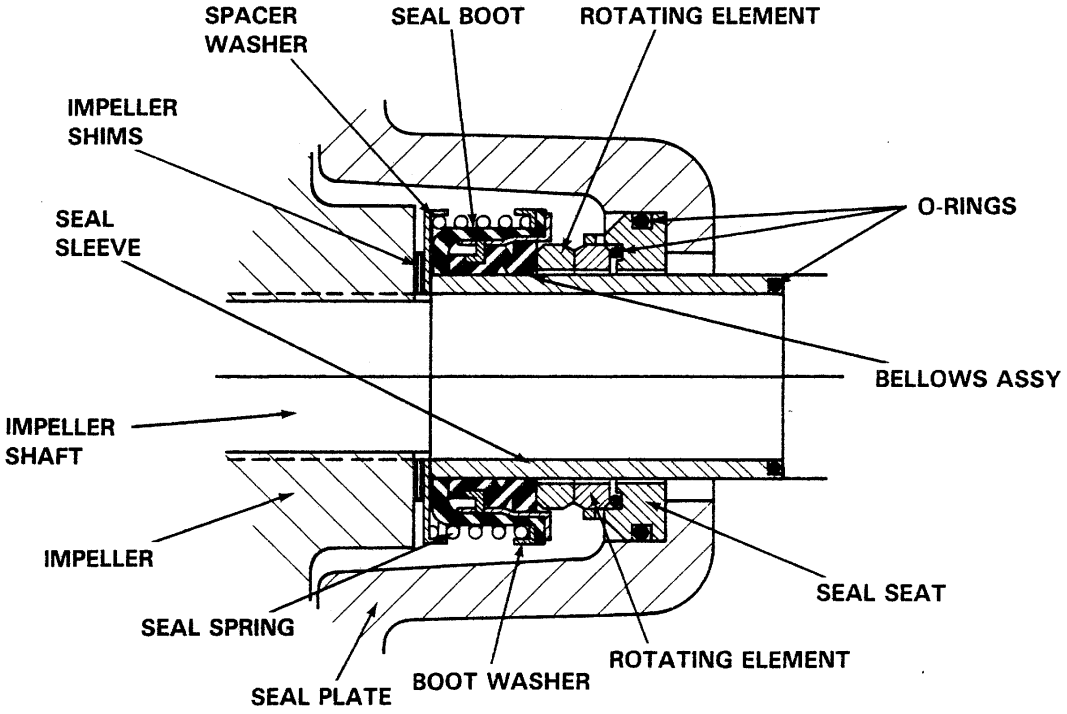


Figure 3. 46512-050 Seal Assembly

Because of the precision finish on the lapped faces of the seal, the seal assembly is not normally reused. If it is necessary to reuse the old seal, however, 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.

Replace the seal sleeve O-ring, and install the new O-ring so that it butts against the shoulder of the impeller shaft.

Inspect the seal sleeve, and replace it if there are nicks or cuts on the end. Install the seal sleeve with the chamfered end facing the bearing housing.

Place a drop of light lubricating oil between the lapped faces of the stationary and rotating seal elements.

NOTE

Inspect the lapped faces to make certain that they are free of the silicone rubber sealant securing the stationary seat and stationary element. If there is any sealant of the lapped faces, do not use the seal.

Lubricate the stationary seat O-ring and the inside diameter of the bellows assembly with petroleum jelly or soft grease. Install the stationary seat and element, rotating element, and bellows assembly on the seal sleeve.

Pack the inside of the seal boot with a generous amount of Molykote 111 Compound or equivalent, and pull the boot over the bellows assembly until the lip of the boot is flush against the retainer. (Gorman-Rupp P/N 38838-003 Boot Installation Tool is available as an option with this pump.)

NOTE

There must be sufficient grease inside the seal boot to completely penetrate and shield the bellows area.

Install the seal boot washer. Wipe the seal boot clean of excess grease, and install the seal spring and spring retainer.

Install the impeller adjusting shims.

CAUTION

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

Impeller Reassembly (Figure 2)

Inspect the impeller, and replace it if cracked or badly worn.

Install the impeller. Coat the threads of the impeller capscrew with Never-Seez or equivalent compound, and install the impeller washer and capscrew; torque the capscrew to 90 ft. lbs.

A clearance of .025 to .040 inch between the impeller and the seal plate is recommended for maximum pump efficiency. Measure this clearance, and add or remove impeller adjusting shims until it is reached.

Rotating Assembly Installation (Figure 1)

Inspect the wear plate (8), and replace it if badly worn or grooved. For access to the wear plate, remove the cover plate assembly (see **Cleanout**). The wear plate is secured by hex nuts (12) and lockwashers (11).

Reinstall the rotating assembly shim sets, and secure the rotating assembly to the volute casing.

A clearance of .025 to .040 between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance can be reached by removing an equal number of shims in each rotating assembly shim set until the impeller binds against the wear plate when the impeller shaft is turned. After the impeller binds, add .030 to .035 inch of shims to each shim set.

LUBRICATION (Figure 2)

Shaft Seal Assembly

Remove the vented seal cavity plug (6), and fill the seal cavity with SAE No. 30 non-detergent motor oil. Clean and reinstall the vented plug.

Bearings

Under normal service conditions, drain and refill the bearing housing with clean oil yearly. When oil is required, remove the bearing housing air vent (7), and fill the bearing housing with SAE No. 30 non-detergent motor oil to the midpoint of the oil level sight gauge (27). Clean and reinstall the air vent.

OPERATION

NOTE

If the suction flange (32, figure 1) and/or discharge flange (37) has been removed, apply Permatex Gasket Cement, Grade No. 3, to the mating surfaces of the new suction and/or discharge flange gaskets (21 and 36) before installing the gaskets.

Make certain that all piping connections are secure, and open all connecting valves.

Refer to **OPERATION** (Section C).

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