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60 SERIES

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

MODEL

64M20A-B

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 60 Series, enclosed impeller, centrifugal model with straight-in suction without a suction check valve. This pump is designed to pump products with specific gravity as high as 2.0 such as cement or heavy slurry. 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

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 60 SERIES BASIC PUMPS. ALTHOUGH THIS PUMP IS DESIGNED TO BE DRIVEN BY A CLOSE-COUPLED HYDRAULIC MOTOR, IT CAN BE OTHERWISE DRIVEN, AND GORMAN-RUPP HAS NO CONTROL OVER 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 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.

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

Volute Casing

The volute casing and integral discharge flange can be rotated to five different positions (see Figure 1, Section E). This pump is normally shipped from the factory with the discharge flange in the 12 o'clock position.

NOTE

If the pump user rotates the discharge flange to the 11 o'clock position, the shaft seal bottle oiler must be moved to the opposite side of the seal plate (see Figure 1, Section E).

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 and 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

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 piping 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

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 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 times the diameter of the suction pipe.

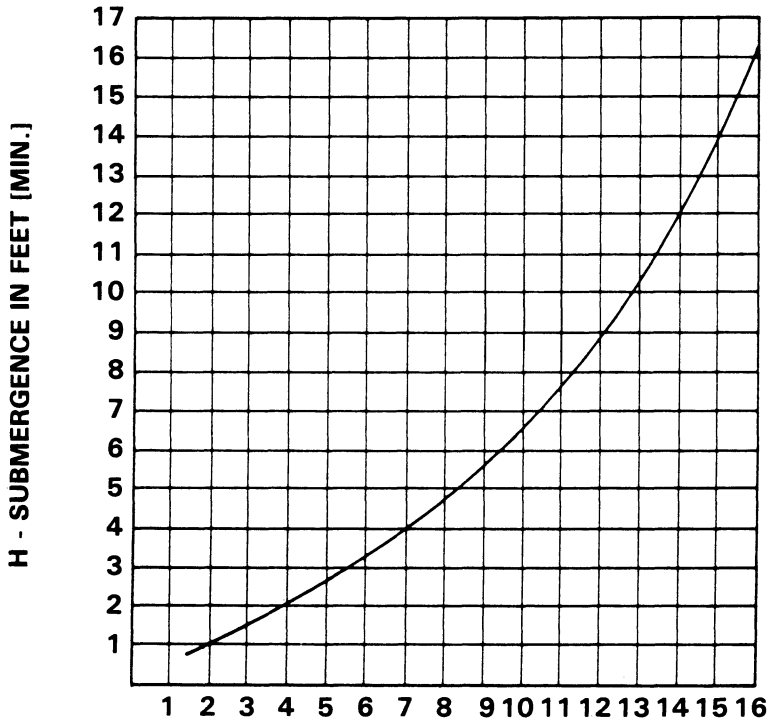
If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

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 diameter of the suction pipe. 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 equal to at least three times the diameter of the suction pipe.

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.

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 be 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.

Drives

The pedestal of this pump has a flange for mounting to a hydraulic motor adapter (not furnished by Gorman-Rupp), and for close coupling by means of a magnalloy No. 500 coupling with urethane spider.

The pump may be otherwise driven and coupled, however.

Coupled Drives

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).

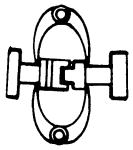


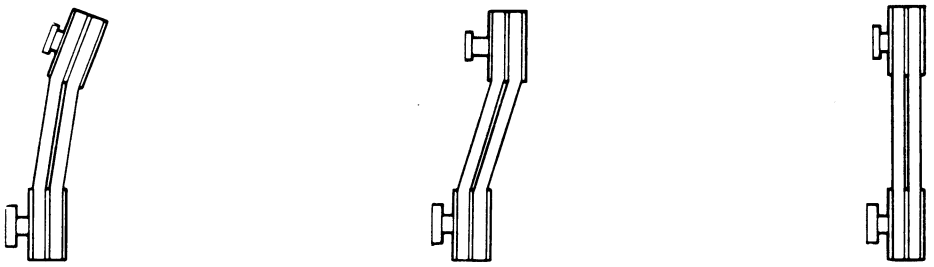
Figure 2A. Aligning Spider-Type Couplings

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 Drives

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.

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).

This pump should never be operated unless there is liquid in the volute.

CAUTION

Never operate this pump unless the volute is filled with liquid to its maximum capacity. Extended operation of a dry pump will destroy the seal assembly.

Add liquid to the volute housing:

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.

WARNING

After filling the volute housing, do not attempt to operate the pump unless 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, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently and observe rotation. If incorrect, have the motor wiring checked by qualified personnel.

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

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 or 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, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the 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 of 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:

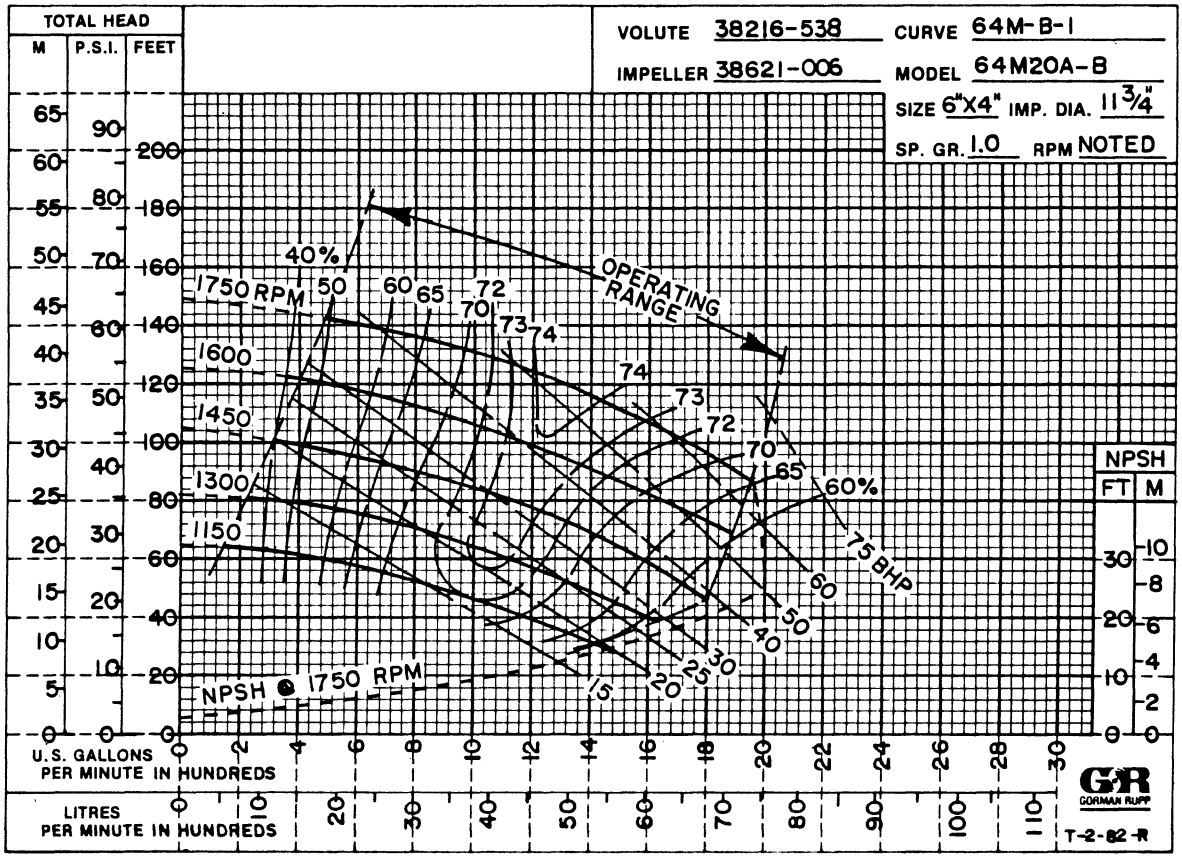
1. Consult pump service manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

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 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).
	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 **Cleanout Access,** Section E).
	Pump speed too slow.	Check driver output; check belts or couplings 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 DE-LIVER 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.
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 (see **Cleanout Access,** Section E).
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 64M20A-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

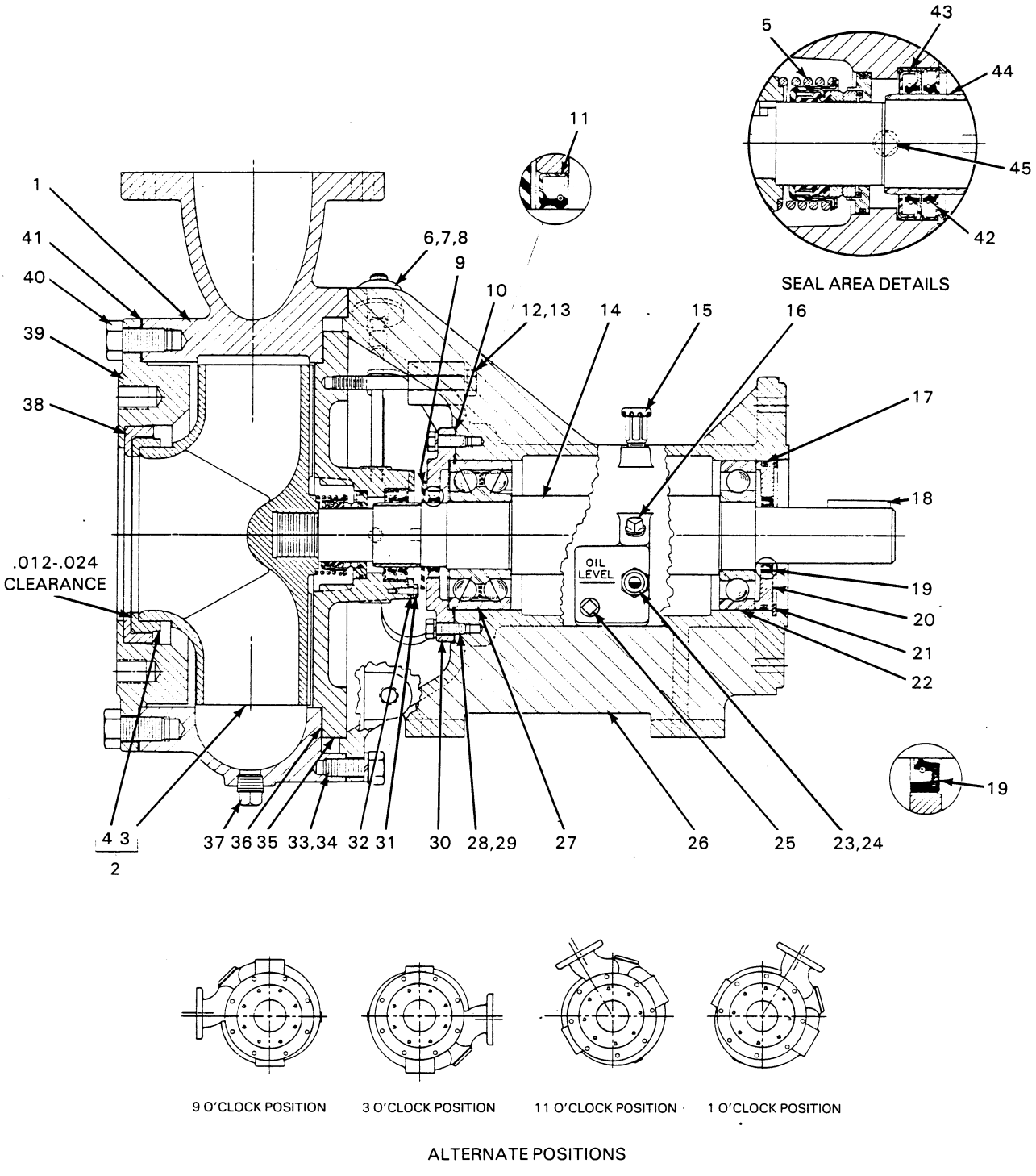


Figure 1. Pump Model 64M20A-B

PARTS LIST

PUMP MODEL 64M20A-B

(From S/N 748877 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	38216-538	10010	1
2	IMPELLER ASSY	46151-014		1
3	★ IMPELLER	38621-006	11040	1
4	★ ROT WEAR RING	38691-355	11080	1
5	★SEAL ASSY	46512-043		1
6	BOTTLE OILER	46711-505		1
7	PIPE COUPLING	AE-04	11990	1
8	HEAVY PIPE NIPPLE	THA-0430	15070	1
9	★SLINGER RING	31134-067		1
10	★BEARING CVR GSKT	38683-446		1
11	★INBOARD OIL SEAL	25258-725		1
12	HEX HEAD CAPSCREW	B-00818	15991	1
13	LOCKWASHER	J-08	15991	1
14	★IMPELLER SHAFT	38515-564	17060	1
15	PEDESTAL AIR VENT	S-1703		1
16	PIPE PLUG	P-06	11990	1
17	★BRG CVR O-RING	25152-351		1
18	★SHAFT KEY	N-0809	15990	1
19	★OUTBOARD OIL SEAL	25217-601		1
20	OUTBOARD BRG COVER	38322-520		1
21	BRG CVR RET RING	24121-078		1
22	★OUTBOARD BEARING	S-1911		1
23	OIL LVL SIGHT GAUGE	26714-011		1
24	PIPE PLUG	P-06	11990	1
25	PIPE PLUG	P-06	11990	1
26	PEDESTAL	38257-514	10010	1
27	★INBOARD BEARING	23422-613		1
28	HEX HEAD CAPSCREW	B-0604	15991	6
29	LOCKWASHER	J-06	15991	6
30	INBD BEARING COVER	38322-408		1
31	HEX HEAD CAPSCREW	B-0402½	15991	8
32	SEAL RETAINER	38329-310		1
33	HEX HEAD CAPSCREW	B-1006	15991	12
34	LOCKWASHER	J-10	15991	12
35	SEAL PLATE	38272-001	10010	1
36	★VOLUTE CASING GSKT	38682-610	18000	1
37	VOLUTE DRAIN PLUG	P-08	11990	3
38	★STA WEAR RING	38691-356	11080	1
39	SUCTION HEAD	38246-611	10010	1
40	HEX HEAD CAPSCREW	B-1206	15991	6
41	★SUCTION HD GSKT SET	48211-044		1
42	★SEAL PLT OIL SEAL	25227-733		1
43	★SEAL PLT OIL SEAL	25227-734		1
44	★SHAFT SLEEVE	31185-009		1
45	PIPE PLUG	P-04	11990	4
NOT SHOWN:				
	HAND HOLE COVER	38244-017		1
	★GASKET	38686-010		1
	HEX HEAD CAPSCREW	B-0804	15991	2
	NAME PLATE	2613-C	13990	1
	DRIVE SCREW	BM#04-03	15990	4
	SHIPPING PLUG	11495-A	11990	1
OPTIONAL:				
	BOOT INST TOOL	38838-001		1
	BREATHER VENT	26717-004		1

★INDICATES PARTS RECOMMENDED FOR STOCK

CANADIAN SERIAL NO. . . . . AND UP

PUMP DISASSEMBLY AND REASSEMBLY

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

PUMP DISASSEMBLY

Disconnect the power source to ensure that the pump will remain inoperative, and close all connecting valves.

Drain the pump by removing the lowest of the volute drain plugs (37). Clean and reinstall the drain plug.

Cleanout Access

Debris may be removed from the impeller and volute casing without disassembling the pump. For access, remove the hex head capscrews (not shown) securing the hand hole cover (not shown) to the volute casing discharge flange. Replace the hand hole cover gasket when reinstalling the cover.

Impeller and Shaft Seal

For access to the impeller assembly (2) and shaft seal (3) without disturbing the piping, remove the hex head capscrews (33) and lockwashers (34) securing the pedestal (26) and assembled rotating assembly to the volute casing (2), and separate the pedestal from the volute casing.

Drain the seal plate cavity by removing the lowest of the seal cavity pipe plugs (45). Clean and reinstall the pipe plug.

To remove the impeller assembly, which includes the impeller (3) and rotating wear ring (4), block impeller rotation and turn the impeller shaft (14) counter to the direction of pump rotation. Use caution when removing the impeller assembly; tension on the shaft seal spring will be released as the impeller is unscrewed.

To remove the shaft seal, use a stiff wire with a hooked end, and carefully slide the seal elements off the shaft.

Seal Plate

To remove the seal plate (35), remove the hex head capscrews (12) and lockwashers (13) securing the seal plate to the pedestal, and slide the seal plate and assembled seal plate oil seals (42 and 43) off the shaft sleeve (44). Remove the shaft sleeve.

NOTE

The inside diameter of the shaft sleeve and the outside diameter of the impeller shaft are bonded with Loctite RC-620 at the factory.

For access to the seal plate oil seals, remove the hex head capscrews (31) securing the oil seals retainer (32) to the seal plate.

Bearings and Impeller Shaft

Remove the lower of the pedestal pipe plugs (16 and 25) and drain the lubricant from the pedestal. Clean and reinstall the pipe plug.

For access to the inboard bearing (27), remove the slinger ring (9), and the hex head capscrews (28) and lockwashers (29) securing the inboard bearing cover (30) to the pedestal, and remove the bearing cover and oil seal (11). Remove the inboard bearing and snap ring.

Remove the outboard bearing retaining ring (21). Remove the outboard bearing cover (20), oil seal (19), and O-ring (17). Remove the impeller shaft and assembled outboard bearing (22). Remove the outboard bearing.

PUMP REASSEMBLY

Use a soft cloth soaked in cleaning solvent, and clean the impeller shaft, and the bores of the seal plate, bearing covers, and pedestal.

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.

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

Impeller Shaft and Bearings

Install the outboard bearing on the impeller shaft, making certain that the bearing seats squarely against the shaft shoulder. Install the impeller shaft and assembled bearing in the pedestal bore.

Replace the outboard bearing cover O-ring (17). Lubricate the new O-ring with soft grease or oil, install it in the bearing cover, and install the bearing cover, making certain that it seats squarely against the outboard bearing.

Inspect the outboard oil seal, and replace as necessary. Install the oil seal in the outboard bearing cover with the lip positioned as shown in figure 1. Install the bearing cover retaining ring. The assembled bearing cover should sit squarely against the retaining ring.

Install the inboard bearing and snap ring with the bearing loading groove positioned away from the impeller. Make cerain that the bearing seats snugly against the shaft shoulder. Replace the inboard bearing cover gasket (10), and secure the inboard bearing cover to the pedestal.

Inspect the inboard oil seal, and replace as necessary. Install the oil seal in the inboard bearing cover with the lip positioned as shown in figure 1. Install the slinger ring on the impeller shaft.

Seal Plate

Inspect the shaft sleeve, and replace if nicked or cut on the ends.

Clean the inside diameter of the shaft sleeve, and the outside diameter of the mating surface of the impeller shaft. Thoroughly spray both surfaces with Loctite Locquic Primer Grade T, and allow to dry completely (approximately 5 minutes). After drying, thoroughly coat both surfaces with Loctite RC-620, and install the shaft sleeve.

Inspect the seal plate oil seals, and replace as necessary. Install the inboard seal as shown in figure 1. Pack the seal bore with Lubriplate Marine Lube A grease, and install the outboard seal as shown in figure 1. Wipe away excess grease, and secure the oil seals retainer to the seal plate.

Install the seal plate and assembled ol seals on the shaft sleeve, and secure the seal plate to the pedestal.

Shaft Seal and Impeller

The seal is not normally reused because of the precision finish 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.

Apply a drop of light lubricating oil to the lapped faces of the seal, and lubricate the inside diameter of the bellows with a soft grease or oil.

Install the seal components in the seal plate bore—with the exception of the seal boot and seal spring—as shown in figure 2, making certain that the O-rings seat properly.

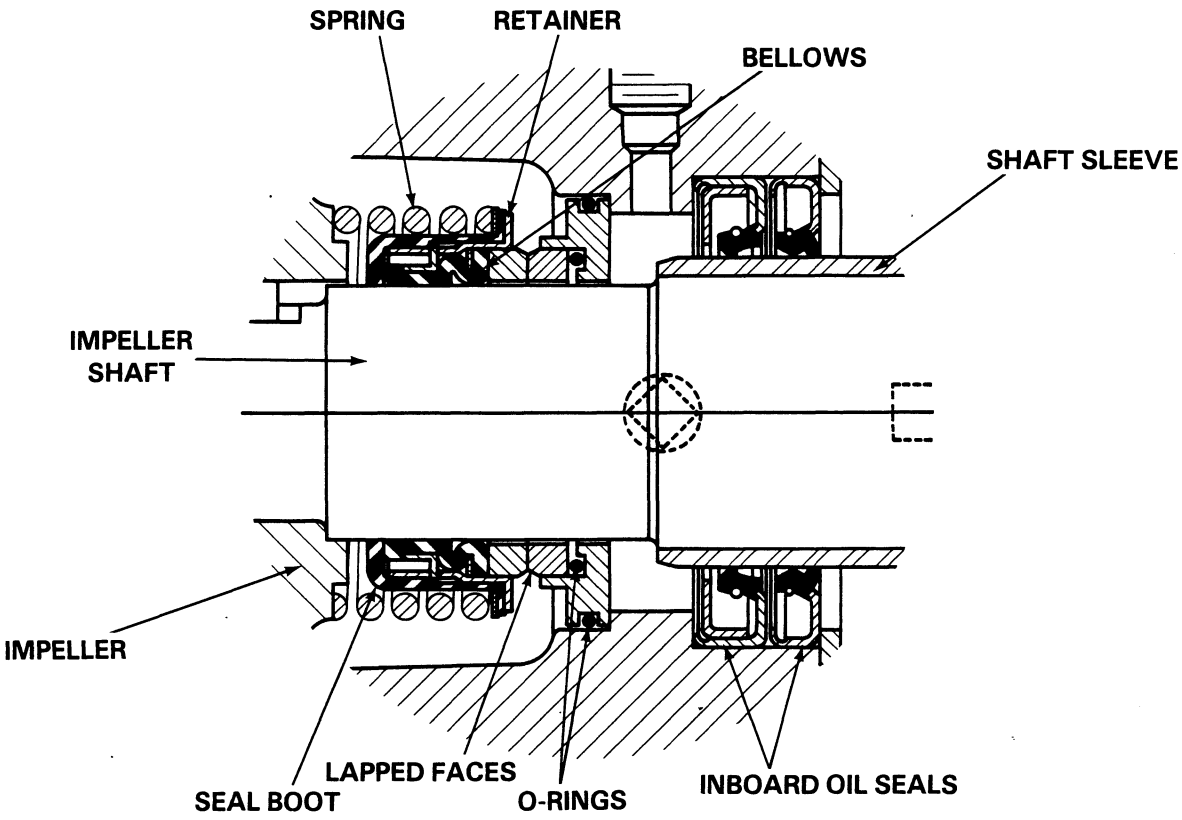


Figure 2. 46512-043 Seal Assembly

Pack the inside of the seal boot with a generous amount of Molykote 111 Compound, or equivalent grease, and pull the boot over the bellows assembly until the lip of the boot is flush against the retainer. (Gorman-Rupp P/N 38838-001 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.

Wipe the seal assembly clean of excess grease, and install the seal spring.

Inspect the impeller, and replace it if cracked or worn. Inspect the rotating wear ring, and replace it if scored or badly worn.

NOTE

The rotating wear ring is a heated shrink fit on the impeller.

CAUTION

When replacing either impeller or rotating wear ring, make certain that the wear ring seats squarely on the impeller. Otherwise, binding and/or excessive wear could result.

Screw the impeller onto the impeller shaft. Block impeller rotation, and turn the impeller shaft in the direction of pump rotation until the impeller is securely threaded on the shaft.

Suction Head and Wear Ring

Inspect the suction head (stationary) wear ring (38), and replace if scored or badly worn.

NOTE

The stationary wear ring is a heated shrink fit in the suction head (39).

If necessary to replace the stationary wear ring, remove the hex head capscrews (40) securing the suction head to the volute casing, and remove the hardware securing the suction head to the suction piping.

Remove the worn stationary wear ring. Chill the suction head by refrigeration or other means. Heat the stationary wear ring, and install it in the chilled suction head. Do not secure the suction head to the suction piping until final assembly.

CAUTION

When replacing the stationary wear ring, make certain that it seats squarely in the suction head. Otherwise, binding and/or excessive wear could result.

Final Assembly

Replace the volute casing gasket (36), and secure the pedestal and assembled rotating assembly to the volute casing.

A clearance of .012-.024 inch between the stationary and rotating wear rings is recommended for maximum pump efficiency.

If the suction head has been separated from the suction piping and the volute casing, replace the suction head gasket set (41), and secure the suction head to the volute casing. Use a feeler gauge to measure the clearance between the stationary and rotating wear rings, and add or remove gaskets in the suction head gasket set until the clearance falls within the recommended range. Secure thesuction piping to the suction head after the correct clearance has been established.

If the suction head remains secured to the suction piping, remove gaskets in the suction head gasket set until the stationary and rotating wear rings bind when the shaft if turned. After the wear rings bind, add .018 inch of suction head gaskets.

After the pump has been reassembled, fill the volute to the maximum level with clean liquid. Make certain that all piping connections are secure, and open all connecting valves. See **LUBRICATION** before starting the pump.

LUBRICATION

Seal Assembly

Fill the seal bottle oiler (6) with Dextron Automatic Transmission Fluid or equivalent.

Bearings

Remove the pedestal air vent (15), and add SAE No. 30 non-detergent motor oil to the mid-point of the oil level sight gauge (23). Clean and reinstall the air vent.

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

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