ACE

OM-04407-OB02
September 23, 1997
Rev. B 09/04/02

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

60 SERIES PUMP

MODEL

612M60–B

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

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

www.gormanrupp.com

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

INTRODUCTION

Thank You for purchasing a Gorman-Rupp pump. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump.

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

This pump is a 10 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed for handling most non-volatile, non-flammable liquids containing specified entrained solids. The basic material of construction for wetted parts is gray iron, with ductile iron wear plate and a steel impeller shaft.

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

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

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901-1217
Phone: (419) 755-1011

or

Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631-2870

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:

DANGER!

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

WARNING!

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.

CAUTION

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

NOTE

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

SAFETY - SECTION A

This information applies to 60 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 begin operation.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.

Before attempting to open or service the pump:

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

This pump is designed to handle most non-volatile, non-flammable liquids containing specified entrained solids. Do not attempt to pump volatile, corrosive or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. Suction and discharge hoses and piping must be removed from the pump before lifting.

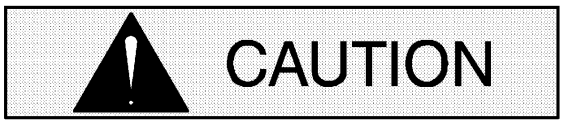
After the pump has been positioned, make certain that the pump and all piping or hose connections are tight, properly supported and secure before operation.

Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

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.

Do not operate the pump without

shields and/or guards in place over the drive shafts, belts, and/or couplings, or other rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.



Pumps and related equipment must be installed and operated according to all national, local and industry standards.

INSTALLATION – SECTION B

Review all SAFETY information in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift** application where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve (see Section E, Page 1).

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

Figure 1 shows the approximate physical dimensions of the pump.

OUTLINE DRAWING

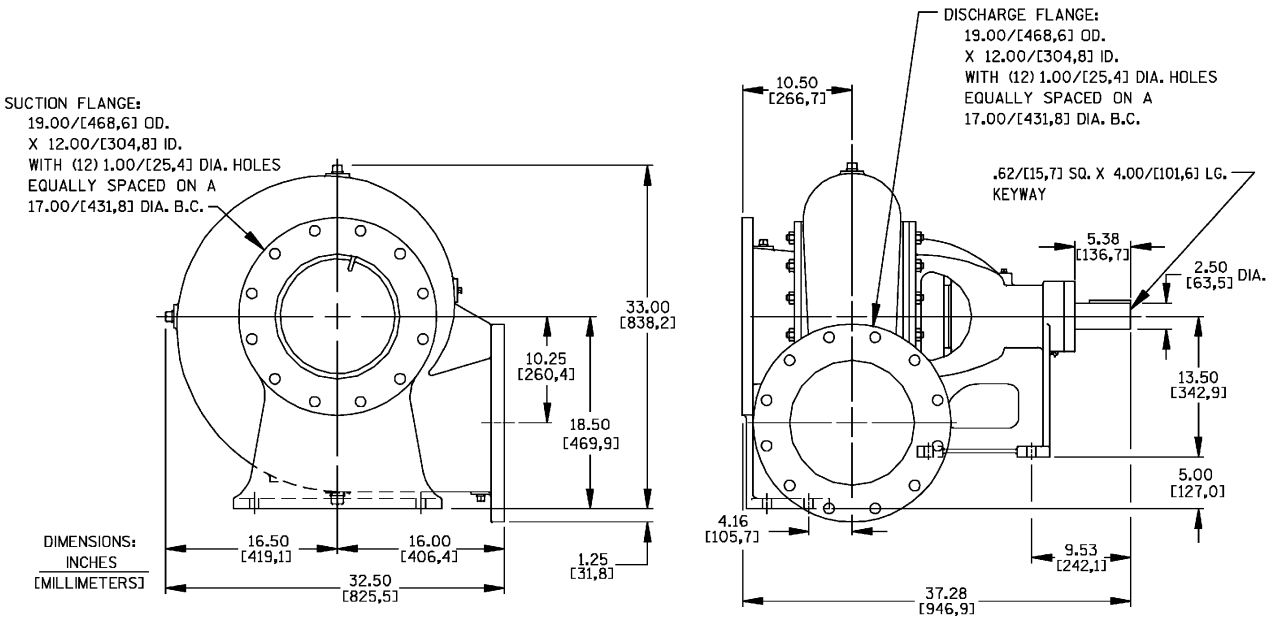


Figure 1. Pump Model 612M60-B

PREINSTALLATION INSPECTION

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

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

b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.

c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note 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 levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.

e. If the pump has been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

POSITIONING PUMP

Lifting

Use lifting equipment with a capacity of at least **4,960 pounds (2250 kg)**. This pump weighs approximately **992 pounds (450 kg)**, not including the weight of accessories, base and power source. Customer installed equipment such as suction and discharge piping **must** be removed before attempting to lift.

CAUTION

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

The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

If the pump has been mounted on a moveable base, make certain the base is stationary by setting the brake and blocking the wheels before attempting to operate the pump.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve on Page E-1 to be sure your overall application allows pump to operate within the safe operation range.

Materials

Either pipe or hose maybe used for suction and discharge lines; however, the 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 and/or couplings.

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 not less than 18 inches (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

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.

Never use a suction line smaller than the pump inlet connection. This pump is designed to accept a standard 12 inch pipe flange.

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 spherical 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.

This pump is designed to handle up to 3 inch (76,2 mm) diameter spherical solids.

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 air-tight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. 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 1-1/2 times the diameter 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 1-1/2 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 3 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 B–2 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced

by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

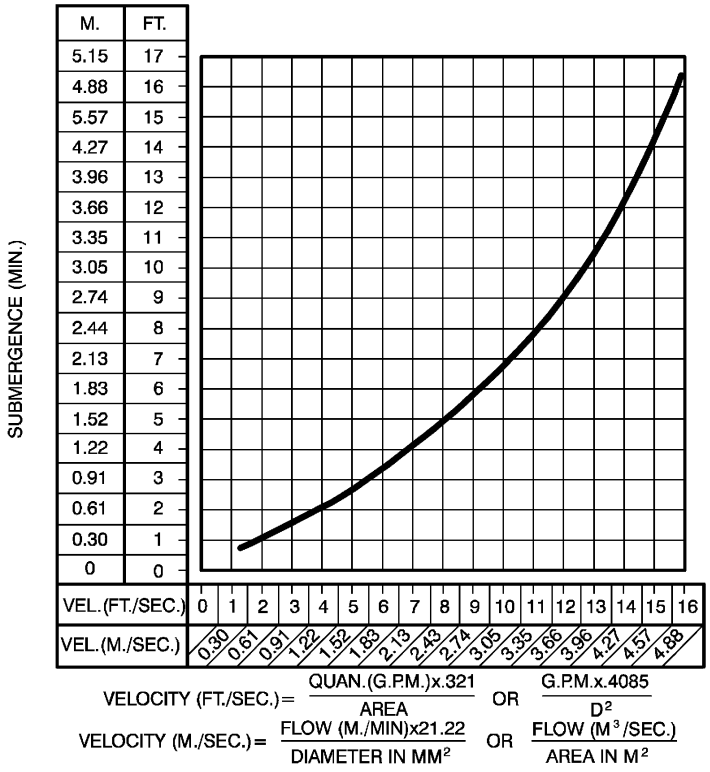


Figure B--2. Recommended Minimum Suction Line Submergence vs. Velocity

DISCHARGE LINES

Siphoning

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 to minimize friction losses. Never install a throttling valve in a suction line.

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

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

CAUTION

If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

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 (sized so that it will not affect pump discharge capacity) between the pump and the discharge check valve. Since this pump does not use a suction check valve, the discharge end of the bypass line must be submerged in the liquid being pumped in order to maintain suction.

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 and piping are installed, and before operation.

NOTE

*Check **Rotation**, Section C, before final alignment of the pump.*

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment will occur in transit and handling. Pumps **must** be checked and realigned before operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

WARNING!

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

CAUTION

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

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°. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure B-3).

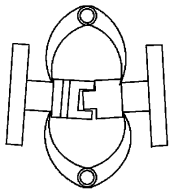


Figure B-3. Aligning Spider-Type Couplings

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

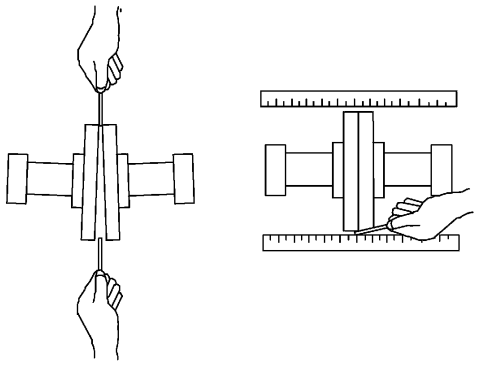


Figure B-4. Aligning Non-Spider Type Couplings

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 B-5). In drive systems using two or more belts, make certain that

the belts are a matched set; unmatched sets will cause accelerated belt wear.

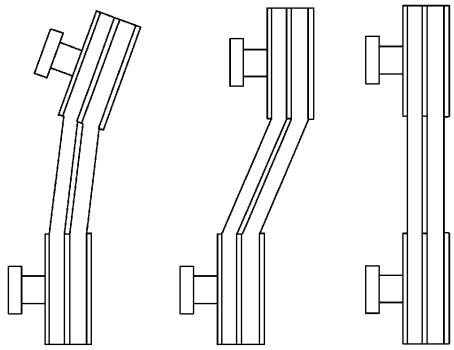


Figure B--5. Alignment of V-Belt Driven Pumps

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 the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

OPERATION – SECTION C

Review all SAFETY information in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.

WARNING!

This pump is designed to handle most non-volatile, non-flammable liquids containing specified entrained solids. Do not attempt to pump volatile, corrosive or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve (see Section E, Page 1).

PRIMING

This is not a self-priming pump, so an external priming device must be used if the pump is installed on a **suction lift**. A foot valve may be installed at the end of the suction pipe to maintain the prime; however, this may adversely affect pump performance due to friction loss. Many standard centrifugal models are equipped with a hand-operated vacuum pump, exhaust primer, or ejector for this purpose. If a priming device was not furnished with the pump, it may be ordered from the factory as an option.

Before attempting to operate the priming device, close the discharge throttling valve. (Installation of a spring-loaded check valve is also recommended to facilitate priming.) Once the pump is fully primed, close the valve between the priming device and pump to preserve the prime. Start the pump and open the discharge valve slowly to fill the discharge line.

When installed in a **flooded suction** application, simply open the system valves and permit the incoming liquid to evacuate the air. After the pump and piping system have completely filled, evacuate any remaining air pockets in the pump or suction line.

CAUTION

Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

STARTING

Consult the operations manual furnished with the power source.

Rotation

The pump could be damaged and performance adversely affected by incorrect rotation. If pump performance is not within the specified limits (see the curve on page E-1), check the direction of power source rotation before further troubleshooting.

CAUTION

The pump must operate in the direction indicated by the arrow on the pump, or accompanying decals.

Consult the operating manual furnished with the pump power source before attempting to start the power source.

If an electric motor is used to drive the pump, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently while observing the direction of the motor shaft, or cooling fan.

If rotation is incorrect on a three-phase motor, have a qualified electrician interchange any two of the three phase wires to change direction. If rotation is

incorrect on a single-phase motor, consult the literature supplied with the motor for specific instructions.

OPERATION

Lines With a Bypass

If a Gorman-Rupp Automatic Air Release Valve has been installed, the valve will automatically open to allow the pump to prime, and automatically close after priming is complete (see **INSTALLATION** for Air Release Valve operation).

If the bypass line is open, air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. Liquid will then continue to circulate through the bypass line while the pump is in operation.

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 a 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 flow rate.

WARNING!

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

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.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160° F (71°C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines 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 pump casing with cool liquid.

DANGER!

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

As a safeguard against rupture or explosion due to heat, this pump is equipped with a pressure relief valve which will open if vapor pressure within the pump casing reaches a critical point. If overheating does occur, stop the pump immediately and allow it to cool before servicing it. **Approach any overheated pump cautiously**. It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump casing overheats and activates the valve. **Never** replace this

valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

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. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, **liquid pressure** must be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve (see Section E, Page 1).

Pump Vacuum Check

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 (508 mm) or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

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 proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

CAUTION

If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, disconnect the power source or lock it out to ensure that the pump will remain inoperative.

Cold Weather Preservation

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 completely draining, 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 (71°C) are considered normal for bearings, and they can operate safely to at least 180°F (82°C).

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 Section E). 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 – SECTION D

Review all SAFETY information in Section A.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Lock out or disconnect the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the 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 check valve or foot valve clogged or binding.	Clean valve.
	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.
	Lining of suction hose collapsed.	Replace suction hose.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Strainer clogged.	Check strainer and clean if necessary.
	Impeller clogged.	Free impeller of debris.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Pump speed too slow.	Check engine output; consult engine operation manual.
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 or foot valve clogged or binding.	Clean valve.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	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 regularly 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.

PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

Preventive Maintenance Schedule

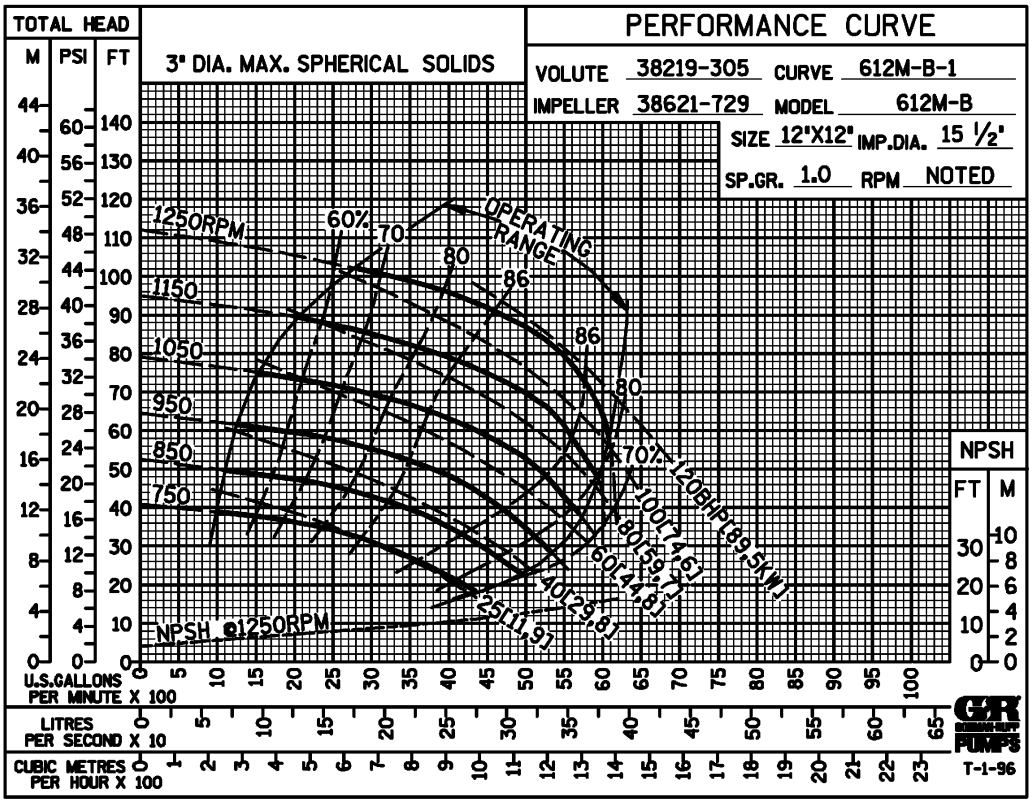
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication – See Mfgr's Literature					

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

PUMP MAINTENANCE AND REPAIR - SECTION E

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



✳ STANDARD PERFORMANCE FOR PUMP MODEL 612M60--B

✳ Based on 70° F (21° C) 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", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve.

SECTION DRAWING

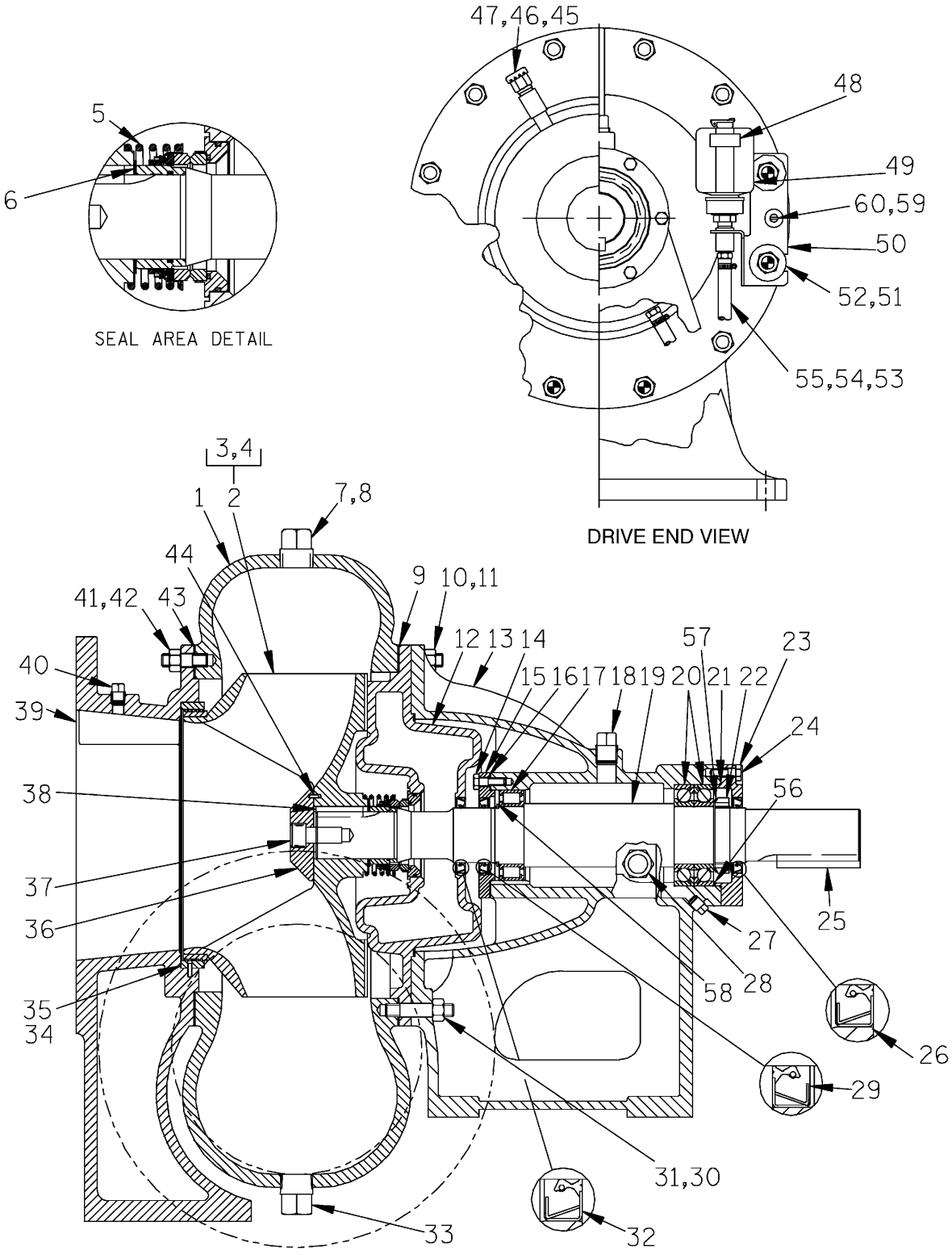


Figure 1. Pump Model 612M60 – B

PARTS LIST
Pump Model 612M60-B
(From S/N 1172152 up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP CASING	38219-305	10010	1
2 ✳	IMP/WEAR RING ASSY	46151-022	24110	1
3	-IMPELLER	38621-729	11010	1
4	-WEAR RING	4182A	11030	1
5 ✳	MECHANICAL SEAL	46512-109	---	1
6 ✳	SHIM SET	48261-033	---	1
7	PIPE PLUG	P12	15079	2
8	PIPE PLUG	P06	15079	1
9 ✳	PUMP CASING GASKET	38674-434	18000	1
10	STUD	C1011	15991	8
11	HEX NUT	D10	15991	8
12	SEAL PLATE	38272-713	10010	1
13	PEDESTAL	38257-520	10000	1
14	HEX HD CAPSCREW	B0605	15991	6
15	INBOARD BEARING CAP	38322-425	10010	1
16 ✳	BEARING CAP GASKET	4184G	18000	1
17 ✳	INBOARD ROLLER BRG	23528-005	---	1
18	VENTED PIPE PLUG	38649-009	15079	1
19 ✳	IMPELLER SHAFT	38512-522	17040	1
20 ✳	OUTBRD BALL BEARING	23413-015	---	2
21 ✳	BEARING CAP O-RING	25152-249	---	1
22	BEARING LOCKNUT	23962-015	---	1
23	BEARING CAP	38322-429	10000	1
24	HEX HD CAPSCREW	B0605	15991	6
25 ✳	SHAFT KEY	N1016	15990	1
26 ✳	OIL SEAL	25258-845	---	1
27	PIPE PLUG	P04	15079	1
28	SIGHT GAUGE	S1471	---	2
29 ✳	OIL SEAL	25258-845	---	1
30	STUD	C1013	15991	4
31	HEX NUT	D10	15991	4
32 ✳	OIL SEAL	25258-845	---	1
33	PIPE PLUG	P24	10009	1
34 ✳	CASING WEAR RING	4181A	14000	1
35	SPIRAL PIN	21137-123	---	3
36 ✳	IMPELLER WASHER	31167-022	15030	1
37	SOC HD CAPSCREW	BD1206	15990	1
38 ✳	IMPELLER KEY	N0809	15990	1
39	SUCTION HEAD	4180	10010	1
40	PIPE PLUG	P06	15079	1
41	STUD	C1009	15991	12
42	HEX NUT	D10	15991	12
43 ✳	SUCT HD GASKET	4180G	18000	1
44	ROLL PIN	S2197	---	1
45	AIR VENT	S1703	---	1
46	PIPE NIPPLE	T0608	15079	1
47	PIPE COUPLING	AE06	15079	1
48	OIL LEVEL DECAL	38816-123	---	1
49	BOTTLE OILER	26713-004	---	1
50	BOTTLE OILER BRKT	41881-618	24150	1
51	FLAT WASHER	K10	15991	2
52	LOCKWASHER	J10	15991	2
53	MALE CONNECTOR	26523-409	---	2
54	3/8 HOSE	18513-054	---	.9'
55	HOSE CLAMP	26518-642	---	2
56 ✳	BRG SHIM SET	48261-055	---	1
57	LOCKING TAB WASHER	23962-515	---	1
58	BRG RETAINING RING	24124-057	---	1
59	RD HD MACH SCREW	X0405	15991	2
60	LOCKWASHER	J04	15991	2
NOT SHOWN:				
	G-R DECAL	GR-03	---	1
	STRAINER	46641-012	24150	1
	INSTRUCT PAPER TAG	38817-024	---	1
	SUCTION DECAL	6588AG	---	1
	DISCHARGE DECAL	6588BJ	---	1
	LUBRICATION DECAL	38816-079	---	2
	ROTATION DECAL	2613M	---	1
	INSTRUCT PAPER TAG	38817-011	---	1
ALTERNATE PARTS:				
	60 SERIES PUMP:			
	-NAME PLATE	2613D	13990	1
	-DRIVE SCREW	BM#04-03	17000	4

✳ INDICATES PARTS RECOMMENDED FOR STOCK

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional view (see Figure E–1) and the accompanying parts list.

As described on the following pages, this manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

Before attempting to service the pump, disconnect or lock out the power source to ensure that the pump will remain inoperative. Close all valves in the suction and discharge lines.

For power source disassembly and repair, consult the literature supplied with the power source, or contact your local power source representative.

WARNING!

Before attempting to open or service the pump:

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

Suction Head And Wear Ring Removal

Remove the hardware securing the suction head (39) to the base. Support the suction head using a suitable hoist and sling. Disengage the hardware (42) and separate the suction head and wear ring (34) from the pump casing. Remove the suction head gasket (43) and clean the mating surfaces.

Inspect the wear ring for excessive wear or scoring. The wear ring is a press fit into the suction head and secured with the spiral pins (35). If replacement is required, use a small bit to drill three holes horizontally, 180° apart, through the wear ring between each of the spiral pins. Use a chisel or other suitable tool to complete the cuts through the wear ring. **Use caution** not to damage the suction head bore. Remove the wear ring sections from the suction head. Pull the spiral pins from the suction head.

If no further disassembly is required, see **Suction Head and Wear Ring Installation**.

Pump Casing Removal

Support the pump casing using a suitable hoist and sling.

WARNING!

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. If slings or chains are used to move the pump or components, make sure that the load is balanced; otherwise serious personal injury or death could result. Suction and discharge hoses and piping must be removed from the pump before lifting.

Remove the hardware (11, 31, 51 and 52) securing the pump casing and bottle oiler bracket (50) to the pedestal.

Pull the pump casing straight away from the pedestal to prevent binding on the impeller. Remove the casing gasket (9) and clean the contacting surfaces.

Impeller Removal

Before removing the impeller, loosen the hose clamp (55) and remove the hose (54) from the seal plate connector (53). Remove the bottle oiler (49) and drain the seal cavity. This will prevent oil from escaping when the impeller is removed.

Immobilize the impeller shaft and remove the impeller nut and washer (36 and 37). Use a pair of pry bars or large screwdrivers to pry on opposite sides of the back of the impeller until the impeller comes free. Retain the impeller key (38) and roll pin (44).

Inspect the wear ring (4) for excessive wear or scoring.

CAUTION

Proper wear ring replacement requires dynamic balancing the impeller assembly after the wear ring is welded to the impeller. Failure to properly install the wear ring and balance the impeller assembly can result premature shaft, seal or bearing failure, or other damage to the pump.

To replace the wear ring, grind off the three weld spots securing the wear ring to the impeller. **Use caution** not to damage the impeller. Pry or carefully grind the wear ring off the impeller.

Seal Removal

This pump is designed with two seals; a primary mechanical seal (5) located directly behind the impeller and a secondary oil seal (32) located at the back of the seal plate (12). If the liquid being pumped leaks past the oil seal, both seals should be replaced immediately.

Remove the impeller shims (6). Tie and tag the shims for ease of reassembly. Remove the seal spring. Slide the rotating portion of the seal (consisting of the shaft sleeve and O-ring, bellows and retainer, and rotating element) off the shaft as a unit.

Remove the rotating element. Apply oil to the sleeve and work it up under the rubber bellows. Slide the bellows and retainer off the sleeve. Remove the sleeve O-ring.

With the hardware (11, 31, 59 and 60) removed, slide the seal plate and remaining components off the shaft.

Pull the stationary portion of the seal from the seal plate. Remove the stationary element and O-rings from the stationary seat.

Use a suitably sized dowel to press the oil seal out of the seal plate.

If no further disassembly is required, refer to **Seal Installation**.

Pedestal Assembly Removal

Disassembly of the pedestal requires separation of the pump and driver. If the pump is flex-coupled to a variable speed motor, loosen then separate the halves of the coupling before removal of the pump.

If the pump is V-belt driven, loosen the motor tensioners and remove the pump drive belt(s) and sheave.

If the pump is engine driven, loosen the engine and use pry bars to move the engine assembly enough to remove the pump drive belts.

Remove the hardware securing the pedestal to the base. Use a suitable hoist and sling to remove the pedestal assembly.

Shaft and Bearing Removal and Disassembly

When the pump is properly operated and maintained, the pedestal should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

CAUTION

Shaft and bearing disassembly in the field

is not recommended. These operations should be performed only in a properly equipped shop by qualified personnel.

Before disassembling the pedestal, remove the pedestal drain plug (27) and drain the oil from the pedestal. Clean and reinstall the pipe plug.

Disengage the capscrews (24) and remove the outboard bearing cap (23) and oil seal (26). Remove the bearing cap O-ring (21). Press the oil seal from the bearing cap.

Disengage the capscrews (14) and remove the inboard bearing cap (15) and oil seal (29). Remove the bearing cap gasket (16) and clean the mating surfaces. Press the oil seal from the bearing cap.

Place a block of wood against the impeller end of the shaft and tap the shaft (19) and assembled bearings (17 and 20) out of the pedestal.

After removing the shaft and bearings, clean and inspect the bearings **in place** as described in **Bearing Cleaning And Inspection**.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the pedestal. Replace the bearings, shaft, or pedestal if the proper bearing fit is not achieved.

If bearing replacement is required, remove the retaining ring (58) and use a bearing puller to remove the inboard and outboard bearings from the shaft.

Bearing Cleaning And Inspection

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

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.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **Do not** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding. Inspect the bearing balls (or rollers) on open-type bearings. If rotation is rough or the balls or rollers are discolored, replace the bearings.

Shaft and Bearing Reassembly and Installation

Inspect the shaft for distortion, nicks or scratches, or damaged keyways. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

CAUTION

Use caution when handling hot bearings to prevent burns.

NOTE

If a hot oil bath is used to heat the bearings, both the

*oil and the container must be **absolutely** clean. If the oil has been previously used, it must be **thoroughly** filtered.*

Heat the bearings to a uniform temperature **no higher than** 250° F (120° C), and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

Secure the inboard bearing (17) on the shaft with the bearing retaining ring (58).

Slide the outboard bearings (20) onto the shaft one at a time, with the small inner ring of each bearing positioned toward each other.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitable sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, use a suitable sized sleeve, and an arbor (or hydraulic) press to install the bearings on the shaft.

CAUTION

When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Slide the shaft and assembled bearings into the pedestal until the retaining ring on the outboard bearing seats against the pedestal.

CAUTION

When installing the shaft and bearings into the bearing bore, push against the outer race. **Never** hit the balls or ball cage.

Press the outboard oil seal (6) into the bearing cap (23) with the lip positioned as shown in Figure 1. Lubricate and install a new bearing cap O-ring (21) Install the bearing locknut (22) and shims (56). Secure the bearing cap (23) with the capscrews (24). Use caution not to cut or roll the oil seal lip.

Press the inboard oil seal (29) into the bearing cap (15) with the lip positioned as shown in Figure 1. Replace the bearing cap gasket (16) and secure the bearing cap with the capscrews (14). Use caution not to cut or roll the oil seal lip.

Lubricate the pedestal as indicated in **LUBRICATION**.

Pedestal Assembly Installation

Use a suitable hoist and sling to position the pedestal assembly on the base. Secure the pedestal to the base using the previously removed hardware.

Seal Reassembly and Installation

(Figures 1 and 2)

Clean the bore of the seal plate (12) and shaft (19) with a cloth soaked in fresh 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.

Lay the seal plate on a flat surface with the impeller side down. Press the oil seal (32) into the seal plate with the lip positioned as shown in Figure 1.

Since the mechanical seal is the primary seal in the pump, special consideration should be given to ensure proper installation.

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a

non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the shaft sleeve, or replace it if there are nicks or cuts on either end. If any components are worn, replace the complete seal; **never mix old and new seal parts**.

If a replacement seal is being used, remove it from the container and inspect the precision finished faces to ensure that they are free of any foreign matter.

To ease installation of the seal, lubricate the bellows and stationary seat O-rings with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure 2).

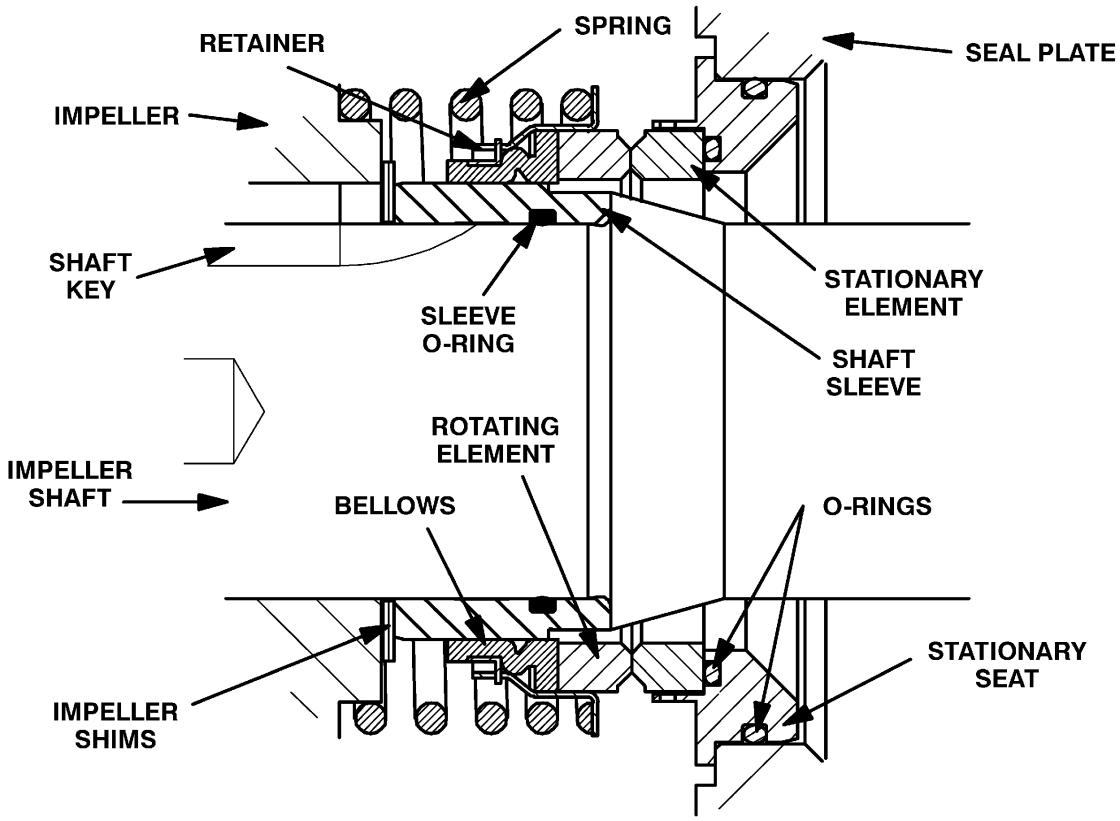


Figure 2. 46512-109 Seal Assembly

CAUTION

The standard seal is not designed for operation at temperatures above 160°F (71°C). Do not use at higher operating temperatures.

Lubricate the stationary seat O-rings with water or light oil, and install them in the stationary seat. Install the stationary seal element in the stationary seat. Position the seal plate with the impeller side up and press this stationary subassembly into the front of the seal plate until it seats squarely against the bore shoulder.

Position the seal plate and stationary seat over the shaft, and secure it to the pedestal with the previously removed machine screws and lockwashers (59 and 60). **Be careful** not to damage the stationary element on the shaft keyway.

Lubricate the seal sleeve O-ring with a **small** amount of light oil and install it in the groove in the I.D. of the sleeve.

Lubricate the seal sleeve with a **small** amount of light oil and slide the rotating subassembly (con-

sisting of rotating element, bellows and retainer), onto the sleeve until the rotating element is **just flush** with the **turned** end of the sleeve.

Slide the sleeve and subassembled seal onto the shaft until the seal faces contact and the sleeve seats against the shaft shoulder.

Install the seal spring. Lubricate the seal as indicated in **LUBRICATION** after the impeller, remaining pump components, bottle oiler and piping are installed.

Impeller Installation

CAUTION

Proper replacement of the wear ring (4) requires dynamic balancing the impeller assembly after the wear ring is welded to the impeller. Failure to properly install the wear ring and balance the impeller assembly can result premature shaft, seal or bearing failure, or other damage to the pump.

Inspect the impeller, and replace it if cracked or badly worn. If the wear ring (4) was removed, chill the impeller by refrigeration and use an induction heater or oven to heat the wear ring. Slide the wear ring onto the impeller until fully seated against the shoulder and allow it to cool.

CAUTION

The wear ring **must** seat squarely on the impeller; otherwise binding and/or excessive wear will occur. Use caution when handling hot parts to prevent burns.

Spot weld the wear ring to the impeller at three places, equally spaced at the vanes. After welding, dynamically balance the impeller assembly per plane 1.05 oz./in. (29.95 gm./in.).

Install the same thickness of impeller adjusting shims (6) as previously removed. Install the shaft key (36) and press the impeller onto the shaft until fully seated. **Be sure** the seal spring seats squarely over the shoulder on the back side of the impeller.

A clearance of approximately .015 inch (0,38 mm) between the impeller and the seal plate is recommended for maximum pump efficiency. Measure this clearance, and add or remove impeller adjusting shims as required.

After the impeller clearance has been set, align the pin (44) in the impeller washer with the hole in the impeller and install the washer. Apply "Never-Seez" or equivalent compound on the threads of the impeller capscrew (37). Immobilize the shaft and secure the impeller by torquing the capscrew to 225 ft. lbs. (2700 in. lbs. or 31 m. kg.).

Pump Casing Installation

Install the casing gasket (9) over the pump casing studs (10). Use a suitable hoist and sling to position the volute over the impeller and slide the studs through the seal plate and pedestal mounting holes.

Install the bottle oiler and bracket (49 and 50) over the volute studs. Secure the bracket and volute casing with the hardware (11, 31, 51 and 52). Reconnect the hose (54) to the connector (53) in the seal plate and secure it with the hose clamps (55).

Suction Head And Wear Ring Installation

If the wear ring (34) was removed, chill the wear ring by refrigeration and use an oven to heat the suction head. Slide the wear ring into the suction head until fully seated and allow it to cool.

CAUTION

The wear ring **must** seat squarely in the suction head; otherwise binding and/or excessive wear will occur. Use caution when handling hot parts to prevent burns.

The wear ring is secured to the suction head with the spiral pins (35). Drill three evenly spaced 3/16-inch diameter by 3/4-inch deep holes through the wear ring and into the suction head. Tap the spiral pins into the holes until fully seated.

Install the suction head gasket (43) over the studs (41). Position the suction head over the studs (41) and secure it with the nuts (42).

Rotate the impeller shaft by hand to check for scraping or binding and correct any before putting the pump back into service.

LUBRICATION

Seal Assembly

Fill the bottle oiler (49) with SAE No. 30 non-detergent oil. Check the oil level regularly and refill as required.

Bearings

The pedestal was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauges (28) and maintain it at the midpoint of the gauges. When lubrication is required, remove the vented plug (18) and add SAE No. 30 non-detergent oil through the opening. Clean and reinstall the vented plug. **Do not** over-lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

NOTE

The white reflector in the sight gauge must be positioned horizontally to provide proper drainage.

Under normal conditions, drain the bearing housing once each year and refill with clean oil. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.

CAUTION

Monitor the condition of the bearing lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

Power Source

Consult the literature supplied with the power source, or contact your local power source representative.

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