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January 12, 1994

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

80 SERIES PUMP

MODEL

83A52-E10 460/3

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

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INTRODUCTION

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 an 80 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. It is close-coupled to a 10 H.P., frame 215JM wash-down duty 460 volt, three-phase electric motor. The pump is designed for mine water applications in a non-flammable atmosphere. The basic material of construction for wetted parts is gray iron, with gray iron impeller and steel wearing parts.

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

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:

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

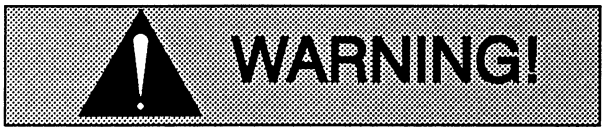
Instructions to aid in installation, operation, and maintenance, or which clarify a procedure.

SAFETY - SECTION A

This information applies to 80 Series electric motor driven pumps. Refer to the manual accompanying the motor before attempting to begin operation.

Before attempting to open or service the pump:

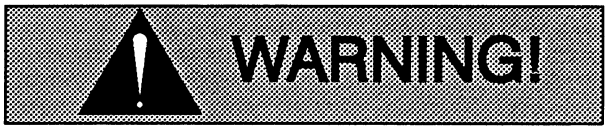
1. Familiarize yourself with this manual.
2. Lock out incoming power to the motor to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump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



This pump is designed to handle mine water in a non-flammable atmosphere. Do not attempt to pump volatile, flammable, or corrosive materials, or any liquids which may damage the pump or endanger personnel as a result of pump failure.

After the pump has been installed, 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.

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

1. Stop the pump immediately.
2. Ventilate the area.
3. Allow the pump to cool.
4. Check the temperature before opening any covers, plates, gauges, or plugs.
5. Vent the pump slowly and cautiously.
6. Refer to instructions in this manual before restarting the pump.

Do not install and operate a non-explosion proof motor in an explosive atmosphere. Install, connect and operate the motor in accordance with the National Electric Code and all local codes. If there is a conflict between the instructions in the manual accompanying the unit and the National Electric Code or the applicable local code, the National or local code shall take precedence.

The electric power used to operate this pump is high enough to cause injury or death. Obtain the services of a qualified electrician to troubleshoot, test and/or service the electrical components of this pump.

Never run this pump backwards. Be certain that rotation is correct before fully engaging the pump.

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.

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

Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.

OUTLINE DRAWING

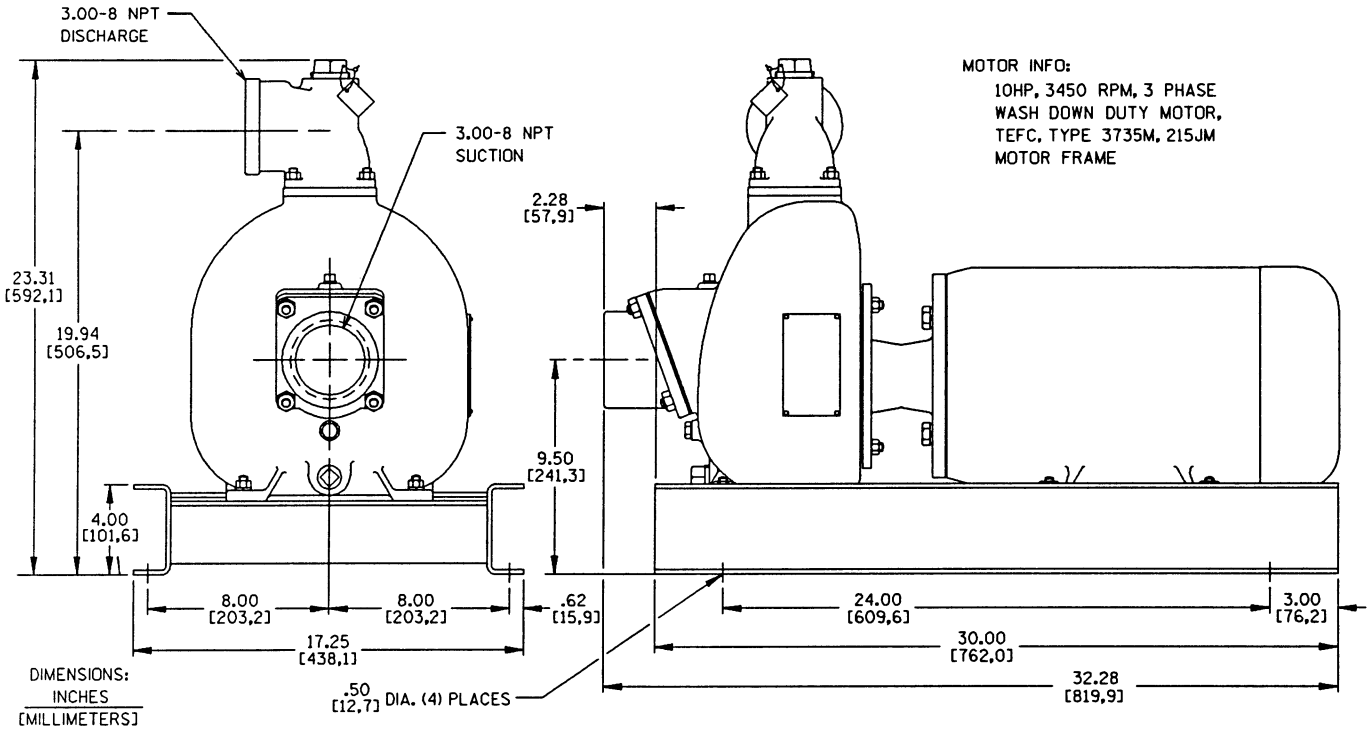


Figure 1. Pump Model 83A52-E10 460/3

PREINSTALLATION INSPECTION

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

a. Inspect the pump and motor 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.

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 and motor have 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.

WARNING!

The electric power used to operate this pump is high enough to cause injury or death. Obtain the services of a qualified electrician to troubleshoot, test and/or service the electrical components of this pump.

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

WARNING!

Do not install and operate a non-explosion proof motor in an explosive atmosphere. Install, connect and operate the motor in accordance with the National Electric Code and all local codes. If there is a conflict between the instructions in the manual accompanying the unit and the National Electric Code or the applicable local code, the National or local code shall take precedence.

Lifting

Use lifting equipment with a capacity of at least **1,500 pounds (680,4 kg)**. The total pump weight is approximately **291 pounds (132 kg)**, not including accessories or customer installed options. Customer installed equipment such as suction and discharge hoses **must** be removed before attempting to lift.

CAUTION

The pump assembly can be seriously damaged if the cables or chains 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.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and notes 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.

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 3/4 inch (19,1 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 airtight 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 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).

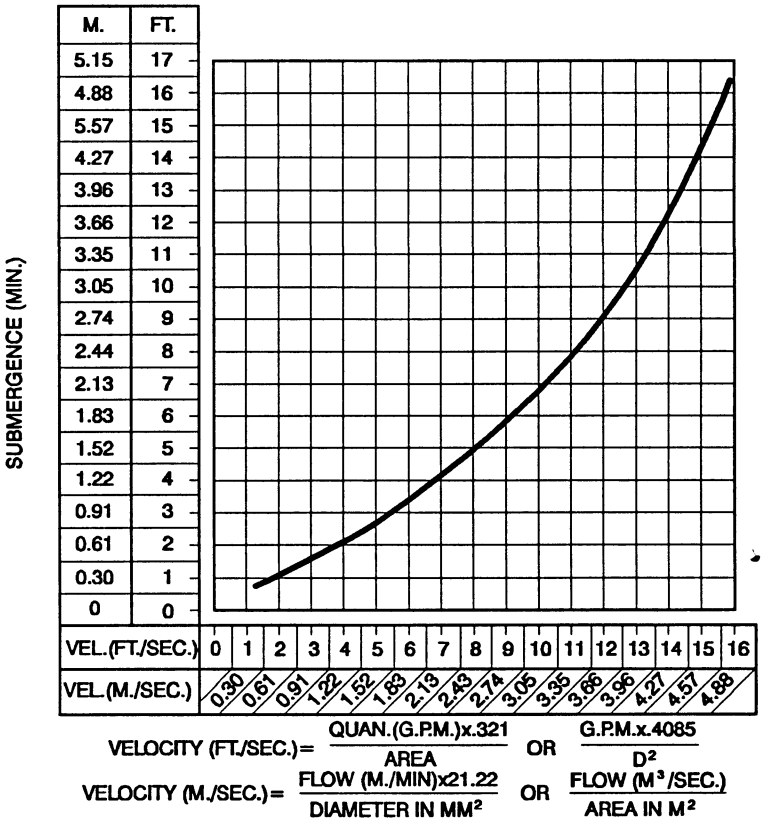


Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity

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

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

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.

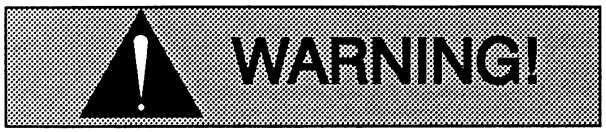
With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

Bypass Lines

If a system check valve is used due to high discharge head, it may be necessary to vent trapped air from the top of the pump during the priming process. This may be accomplished by installing a bypass line from the top of the pump, back to the source of liquid. The end of the bypass line must be submerged. The line must be large enough to prevent clogging, but not so large as to affect pump discharge capacity.

ELECTRICAL CONNECTIONS

Before connecting the motor to the incoming power, check that the electrical service available matches the pump motor requirements stamped on the motor nameplate. Voltage available at the motor must be within the range indicated in Table B-1.



The electric power used to operate this pump is high enough to cause injury or death. Obtain the services of a qualified electrician to troubleshoot, test and/or service the electrical components of this pump.

TABLE B-1. MOTOR VOLTAGE LIMITS

NOMINAL VOLTAGE	PHASE	MINIMUM VOLTAGE	MAXIMUM VOLTAGE
460	3	420	500

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 mine water in a non-flammable atmosphere. Do not attempt to pump volatile, flammable, or corrosive materials, or any liquids which may damage the pump or endanger personnel as a result of pump failure.

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 is self-priming, but the pump should never be operated unless there is liquid in the pump casing.

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.

Add liquid to the pump casing when:

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

Once the pump casing has been filled, the pump will prime and reprime as necessary.

WARNING!

After filling the pump casing, reinstall and tighten the fill plug. 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.

To fill the pump, remove the pump casing fill cover or fill plug in the top of the casing, and add clean liquid until the casing is filled. Replace the fill cover or fill plug before operating the pump.

STARTING

Consult the operations manual furnished with the motor.

Rotation

The correct direction of pump rotation is indicated by an arrow on the pump body or accompanying decals. Operation of the pump in the wrong direction could result in loss of performance or damage to the pump.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump or accompanying decals. Operation in the wrong direction could result in loss of performance or damage to the pump.

Consult the operations manual furnished with the pump motor before attempting to start the motor.

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

OPERATION

Lines With a Bypass

Close the discharge throttling valve (if so equipped) so that the pump will not have to prime against the weight of the liquid in the discharge line. Air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. When the pump is fully primed and liquid is flowing steadily from the bypass line, open the discharge throttling valve. 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 engine. 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.

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.

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. 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 operation 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.

After stopping the pump, lock out incoming power to the motor 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.

TROUBLESHOOTING - SECTION D

Review all SAFETY information in Section A.

Before attempting to open or service the pump:

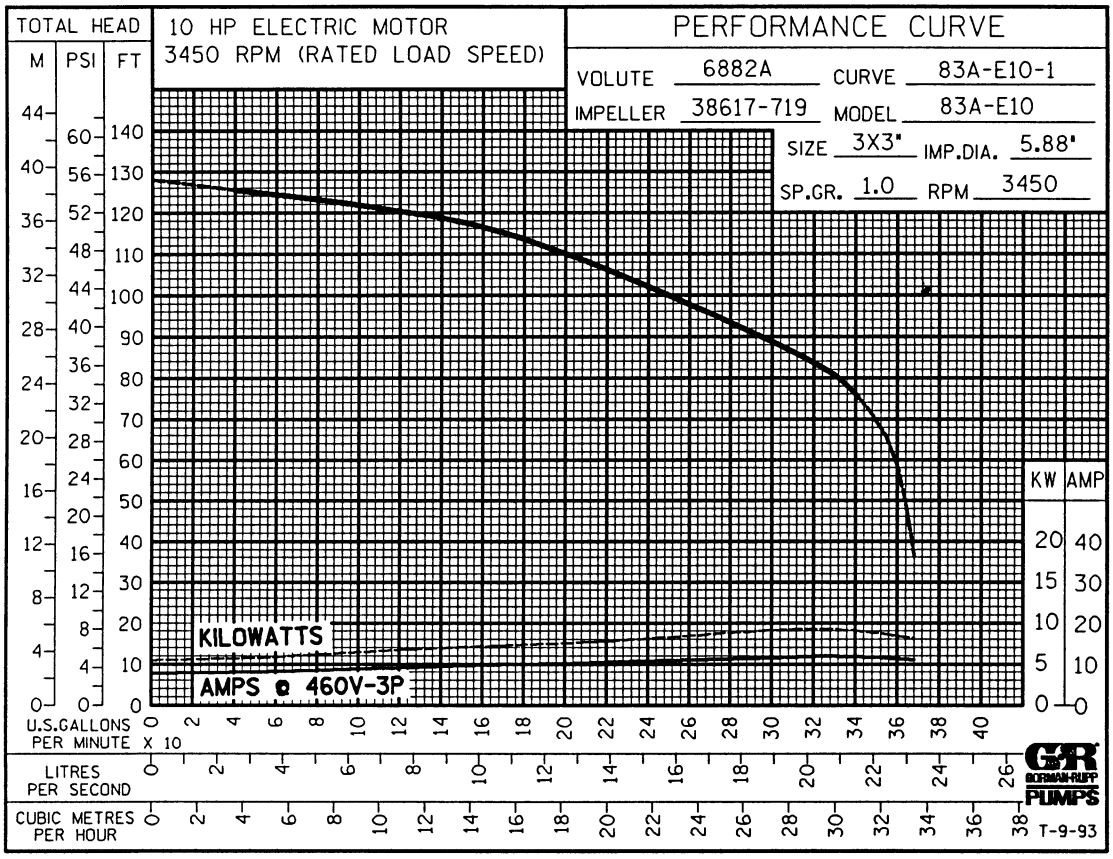
1. **Familiarize yourself with this manual.**
2. **Lock out incoming power to the motor to ensure that the pump will remain inoperative.**
3. **Allow the pump to cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**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

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing.	Add liquid to casing. See **PRIMING**.
	Suction check valve contaminated or damaged.	Clean or replace check valve.
	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.
	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.
	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.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	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.
	No voltage at line side of circuit breaker or control box.	Check power source for blown fuse, open circuit breaker in control box, broken lead or loose connection.
	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.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP REQUIRES TOO MUCH POWER	Motor shaft or bearings defective.	Disassemble pump, check and replace motor bearings as required.
	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.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.
	Motor shaft or bearings defective.	Disassemble pump, check and replace motor bearings as required.

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 83A52-E10 460/3

✳ 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 difference 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.

SECTION DRAWING

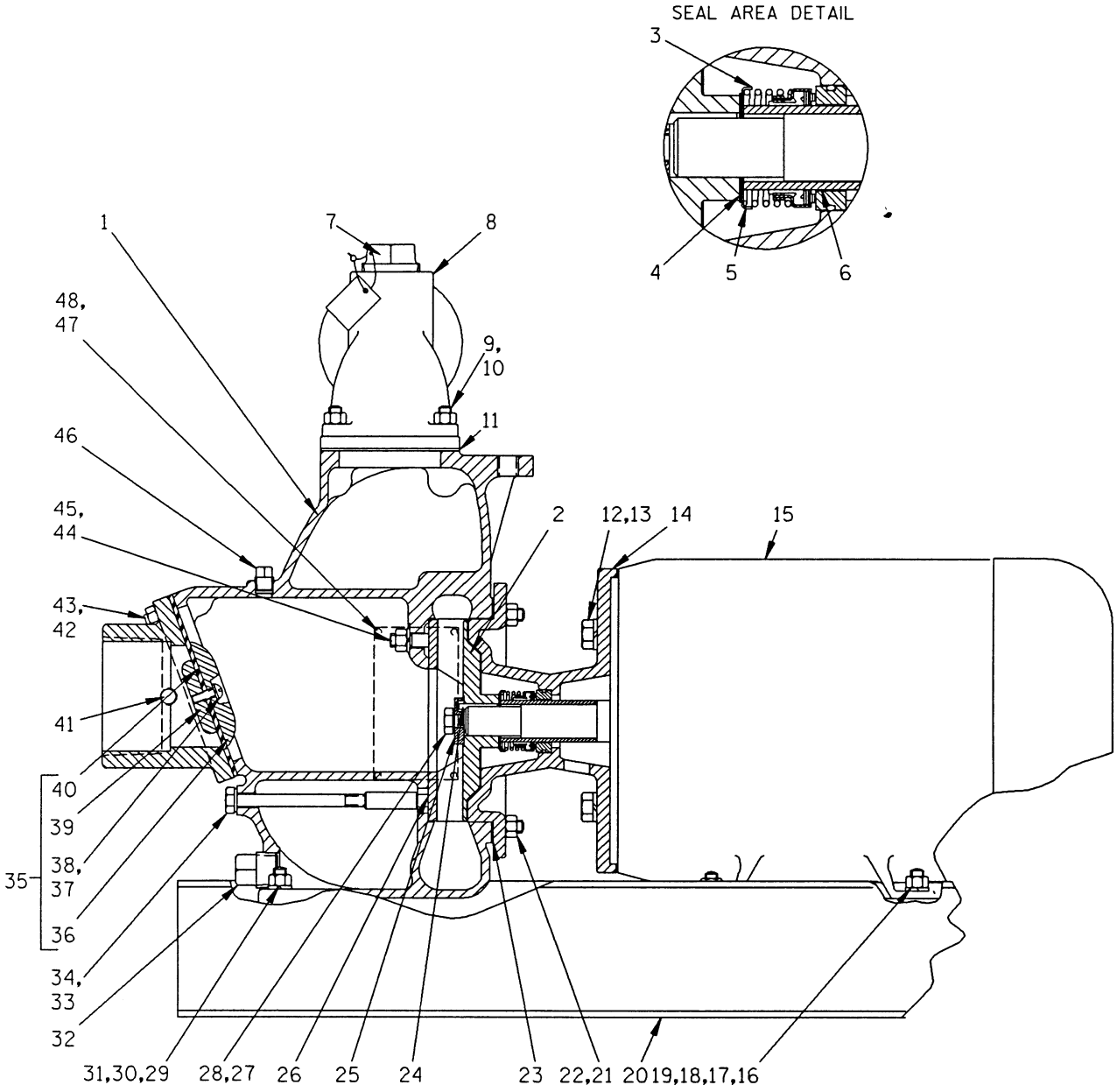


Figure 1. Pump Model 83A52-E10 460/3

PARTS LIST
Pump Model 83A52-E10 460/3
(From S/N 1036066 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	6882A	10010	1
2 ✳	IMPELLER	38617-719	10000	1
3 ✳	SEAL ASSEMBLY	25284-951	-----	1
4 ✳	IMP ADJ SHIM SET	2Z	17090	1
5 ✳	SEAL SPRING WASHER	3928	17000	1
6 ✳	SHAFT SLEEVE	31413-080	16000	1
7	FILL PLUG ASSY	48271-066	-----	1
8	DISCH ELBOW	543	10010	1
9	STUD	C0607	15991	4
10	HEX NUT	D06	15991	4
11 ✳	DISCH FLANGE GSKT	543G	20000	1
12	HEX HD CAPSCREW	B0804	15991	4
13	LOCKWASHER	J08	15991	4
14	INTERMEDIATE	38264-223	10000	1
15	10 H.P. ELEC MOTOR	28259-601	-----	1
16	HEX HD CAPSCREW	B0604	15991	4
17	LOCKWASHER	J06	15991	4
18	HEX NUT	D06	15991	4
19	FLAT WASHER	K06	15991	4
20	BASE	41547-561	24150	1
21	STUD	C0606	15991	6
22	HEX NUT	D06	15991	6
23 ✳	GASKET SET	229G	20010	1
24 ✳	IMPELLER KEY	N0306	15990	1
25 ✳	IMPELLER WASHER	6750	17000	1
26	WEAR PLATE ASSY	6951	15990	1
27	HEX HD CAPSCREW	B0604	15991	1
28	WASHER	AK06	15991	1
29	HEX HD CAPSCREW	B0605	15991	2
30	LOCKWASHER	J06	15991	2
31	HEX NUT	D06	15991	2
32	PIPE PLUG	P12	15079	1
33	HEX HD CAPSCREW	B0618	15991	1
34	FIBER WASHER	KF06	18040	1
35	CHECK VALVE ASSY	544A	-----	1
36	-LARGE VLV WEIGHT	1364	10010	1
37	-RD HD MACH SCREW	X0403	17090	1
38	-LOCKWASHER	J04	17090	1
39	-SMALL VLV WEIGHT	18	10010	1
40 ✳	-CHK VLV GSKT	544G	19070	1
41	PIPE PLUG	P04	15079	1
42	SUCT FLANGE	2946	10010	1
43	STUD	C0606	15991	4
44	HEX NUT	D06	15991	4
45	LOCKWASHER	J06	15991	1
46	HEX NUT	D06	15991	1
47	PIPE PLUG	P04	15079	1
48	NAME PLATE	38818-019	13990	1
49	DRIVE SCREW	BM#04-03	15990	4
NOT SHOWN:				
	STRAINER	2645	24000	1
	SUCTION STICKER	6588AG	-----	1
	DISCHARGE STICKER	6588BS	-----	1
	PRIMING STICKER	6588AH	-----	1
	ROTATION DECAL	2613M	-----	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

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

CANADIAN SERIAL NO. ..... AND UP

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 1) and the accompanying parts list.

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

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

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Lock out incoming power to the motor to ensure that the pump will remain inoperative.**
3. **Allow the pump to 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 Check Valve Disassembly

Before attempting to service the pump, remove the pump casing drain plug (32) and drain the pump. Clean and reinstall the drain plug.

To service the suction check valve, remove the suction piping. Remove the nuts (44) securing the suction flange (42) to the pump casing (1). Pull the check valve assembly (35) from the suction port.

Remove the hardware (37 and 38) securing the check valve weights (36 and 39) to the check valve (40).

If no further disassembly is required, see **Suction Check Valve Installation.**

Pump Casing Removal

To service the impeller or seal assembly, disconnect the discharge piping. Remove the hardware (29, 30 and 31) securing the pump casing to the base (20).

Remove the hardware (22) securing the pump casing to the intermediate. Separate the parts by pulling the casing straight away from the intermediate. If shims have been used under the mounting feet to level the pump casing, tie and tag these shims, or measure and record their thickness.

Remove the casing gasket set (23). Record the thickness of the gaskets for future reference. Clean the mating surfaces of the intermediate and pump casing.

Inspect the wear plate (26) and replace if badly scored or worn. To remove the wear plate, disengage the hardware (33, 34, 45 and 46) and pull the wear plate from the pump casing.

Impeller Removal

Immobilize the impeller by inserting a screwdriver in the slot in the end of the motor shaft. Remove the impeller capscrew and lockwasher (27 and 28), and the impeller washer (25). Use a pair of screwdrivers to pry the impeller off the shaft. Retain the impeller key (24).

Slide the impeller adjusting shims (4) off the shaft. Tie and tag the shims, or measure and record their thickness for ease of reassembly.

Seal Removal and Disassembly

(Figures 1 and 2)

Carefully remove the spring seat (5) and seal spring. Slide the shaft sleeve (6) and rotating portion of the seal off the shaft. Use a pair of stiff wires with hooked ends to remove the stationary seat and O-ring from the intermediate bore.

NOTE

An alternate method of removing the stationary seat is to remove the hardware (12 and 13) and separate the intermediate (14) from the motor. Use a wooden dowel or other suitable tool to press the stationary seat out of the intermediate bore from the back side.

If no further disassembly is required, see **Seal Reassembly and Installation**.

Seal Reassembly and Installation

(Figures 1 and 2)

Inspect the motor shaft for damage. Small scratches or nicks may be removed with a emery cloth or a fine file. If excessive wear exists, the motor shaft will have to be replaced (refer to the motor manual).

Clean the seal cavity and shaft 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.

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. 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 O-ring with water or a very **small** amount of light lubricating oil, and apply a drop of light lubricating oil on the finished seal faces. Assemble the seal as follows (see Figure 2).

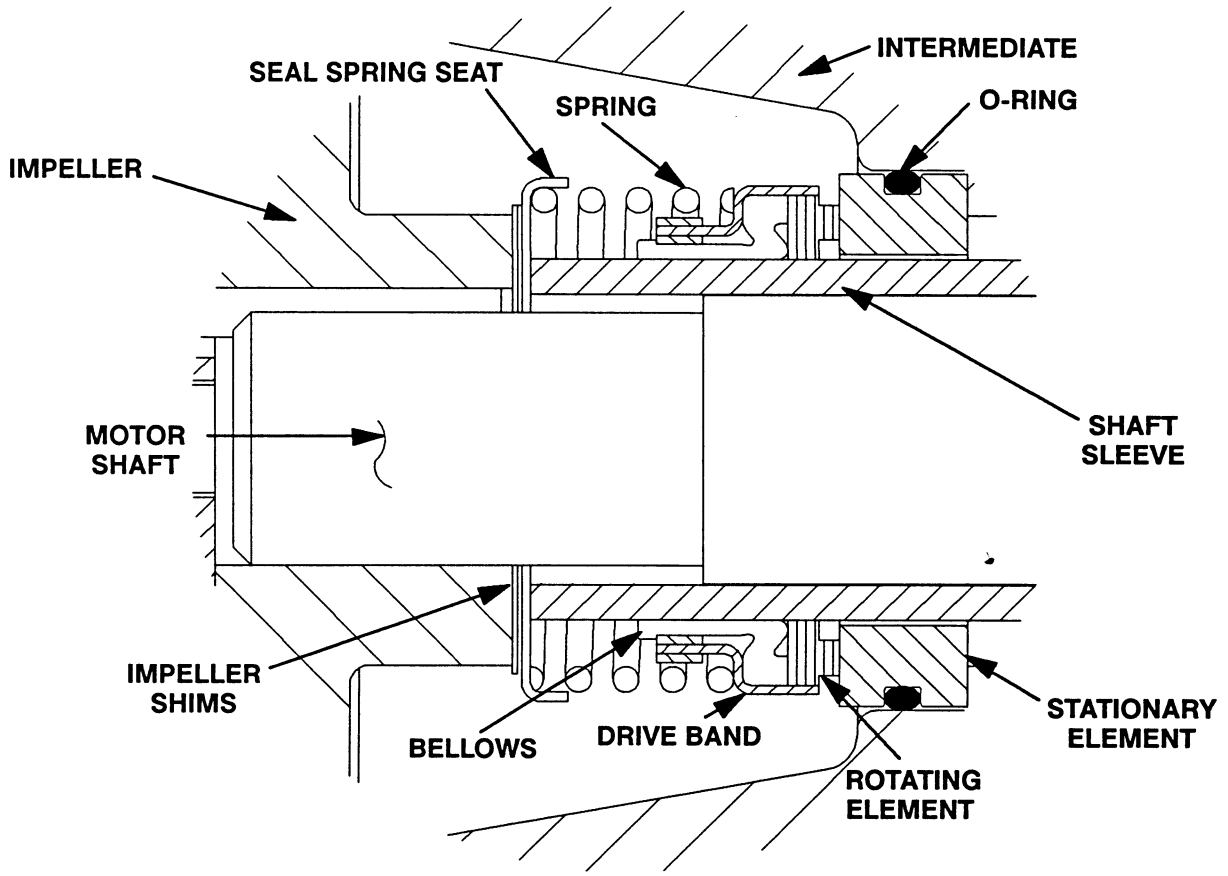


Figure 3. 25284-951 Seal Assembly

CAUTION

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

If the intermediate (14) was removed, lay it on a flat surface with the impeller side facing up.

Subassemble the O-ring onto the stationary seat, and press this subassembly into the intermediate bore until it seats squarely against the shoulder. Slide the assembled intermediate and stationary seat over the shaft and secure the intermediate to the motor with the hardware (12 and 13). When installing the intermediate, use caution not to damage the stationary seat on the shaft threads.

NOTE

If the intermediate was not separated from the motor during disassembly, subassemble the O-ring into the stationary seat, and use a piece of plastic pipe to press the seat into the intermediate bore until fully seated. The O.D. of the pipe should be approximately the same as the O.D. of the seal spring.

Subassemble the rotating element into the retainer and bellows, then slide this subassembly onto the shaft sleeve (6) until the face of the rotating element is **just flush** with the chamfered end of the sleeve.

Slide the sleeve and seal parts onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until the chamfered end seats firmly against the shaft shoulder.

Install the seal spring and spring washer (5).

Impeller Installation And Adjustment

Inspect the impeller, and replace it if cracked or badly worn. Install the same thickness of impeller shims (4) as previously removed. Position the key (24) in the shaft keyway. Align the impeller keyway with the key, and slide the impeller onto the shaft until fully seated.

A clearance of .020 to .040 inch (0,51 to 1,02 mm) between the impeller and the intermediate is neces-

sary for maximum pump efficiency. Measure this clearance and add or remove impeller shims until this clearance is reached.

Pump Casing Installation

If the wear plate assembly (26) was removed for replacement, secure it to the pump casing using the attaching hardware (33, 34, 45 and 46) at this time. Replace the fiber washer (34) if badly worn or compressed.

Install the same thickness of pump casing gaskets (23) as previously removed, and secure the pump casing to the intermediate with the nuts (22). **Do not** fully tighten the nuts at this time.

A clearance of .008 to .015 inch (0,20 to 0,38 mm) between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance can be obtained by removing gaskets in the pump casing gasket set until the impeller scrapes against the wear plate when the shaft is turned. After the impeller scrapes add approximately .008 inch of gaskets.

After the face clearance has been set, tighten the nuts (22) securing the pump casing to the intermediate.

Secure the pump casing to the base (20) with the hardware (29, 30 and 31). Be sure to reinstall any leveling shims used under the mounting feet of the pump casing.

Suction Check Valve Installation

Inspect the check valve components and replace as required. Subassemble the check valve weights (36 and 39) and check valve (40) with the hardware (37 and 38).

Position the check valve assembly (35) in the suction port with the large weight toward the inside of the pump. Install the suction flange (42) and secure with the nuts (44). Check the operation of the check valve to ensure proper seating and free movement.

Final Pump Assembly

Be sure the pump and motor are securely mounted to the base.

Install the suction and discharge lines and open all valves. Make certain that all piping connections are tight, properly supported and secure.

Fill the pump casing with clean liquid. Reinstall the fill plug and tighten it.

Refer to **OPERATION**, Section C, before putting the pump back into service.

LUBRICATION

Seal Assembly

The seal is lubricated by the medium being pumped. No addition lubrication is required.

Motor

The bearings in the motor are permanently lubricated and sealed from the manufacturer. No addition lubrication is required.

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,
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519—631—2870

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