ACDEGH

OM-00817-OM02
December 17, 1979
Rev. A

80 SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

MODEL

82E2-E1.5 3P

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

TABLE OF CONTENTS

INTRODUCTION I-1

WARNINGS - SECTION A A-1

INSTALLATION - SECTION B B-1
- Pump Dimensions B-1
- PREINSTALLATION INSPECTION B-2
- POSITIONING PUMP B-3
  - Lifting B-3
  - Mounting B-3
- SUCTION AND DISCHARGE PIPING B-3
  - Materials B-3
  - Line Configuration B-3
  - Connections to Pump B-4
  - Gauges B-4
- SUCTION LINES B-4
  - Fittings B-4
  - Strainers B-4
  - Sealing B-5
  - Suction Lines In Sumps B-5
  - Suction Line Positioning B-5
- DISCHARGE LINES B-6
  - Siphoning B-6
  - Valves B-6
- ELECTRICAL CONNECTIONS B-7

OPERATION - SECTION C C-1
- PRIMING C-1
- STARTING C-2
  - Rotation C-2
- OPERATION C-3
  - Lines With a Bypass C-3
  - Lines Without a Bypass C-3
  - Leakage C-3
  - Liquid Temperature And Overheating C-3
  - Strainer Check C-4
  - Pump Vacuum Check C-4
- STOPPING C-4
  - Cold Weather Preservation C-5

PUMP TROUBLESHOOTING - SECTION D D-1

PUMP MAINTENANCE AND REPAIR - SECTION E E-1
- PERFORMANCE CURVE E-1
- PUMP MODEL - PARTS LIST E-3
- PUMP AND SEAL DISASSEMBLY AND REASSEMBLY E-4
  - Suction Check Valve Removal And Disassembly E-4
  - Pump Disassembly E-4
  - Impeller Removal E-5
  - Seal Removal E-5
  - Seal Installation E-6
  - Impeller Installation E-8
  - Pump Reassembly E-8
  - Suction Check Valve Reassembly And Installation E-8
- LUBRICATION E-9
  - Seal Assembly E-9
  - Motor E-9

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. The pump is designed for straight-in suction, where the medium being pumped enters directly into the eye of the impeller. It will handle most non-volatile, non-corrosive liquids containing specified entrained solids. The basic material of construction for wetted parts is gray iron, with steel wearing parts and impeller shaft.

The pump is close-coupled to a 1 1/2 HP, three phase, dual voltage open drip-proof electric motor.

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

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

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

NOTE

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

CAUTION

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

WARNING

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

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 80 SERIES MOTOR DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE MOTOR BEFORE ATTEMPTING TO BEGIN OPERATION.

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. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

WARNING

This pump is designed to handle most non-volatile, non-corrosive 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.

WARNING

After the pump has been installed, make certain that the pump and all piping connects are tight, properly supported and secure before operation.

WARNING

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

WARNINGS

WARNING

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

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

WARNING

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

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.

WARNING

The electrical 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.

WARNING

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

INSTALLATION - SECTION B

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). If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

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 and motor.

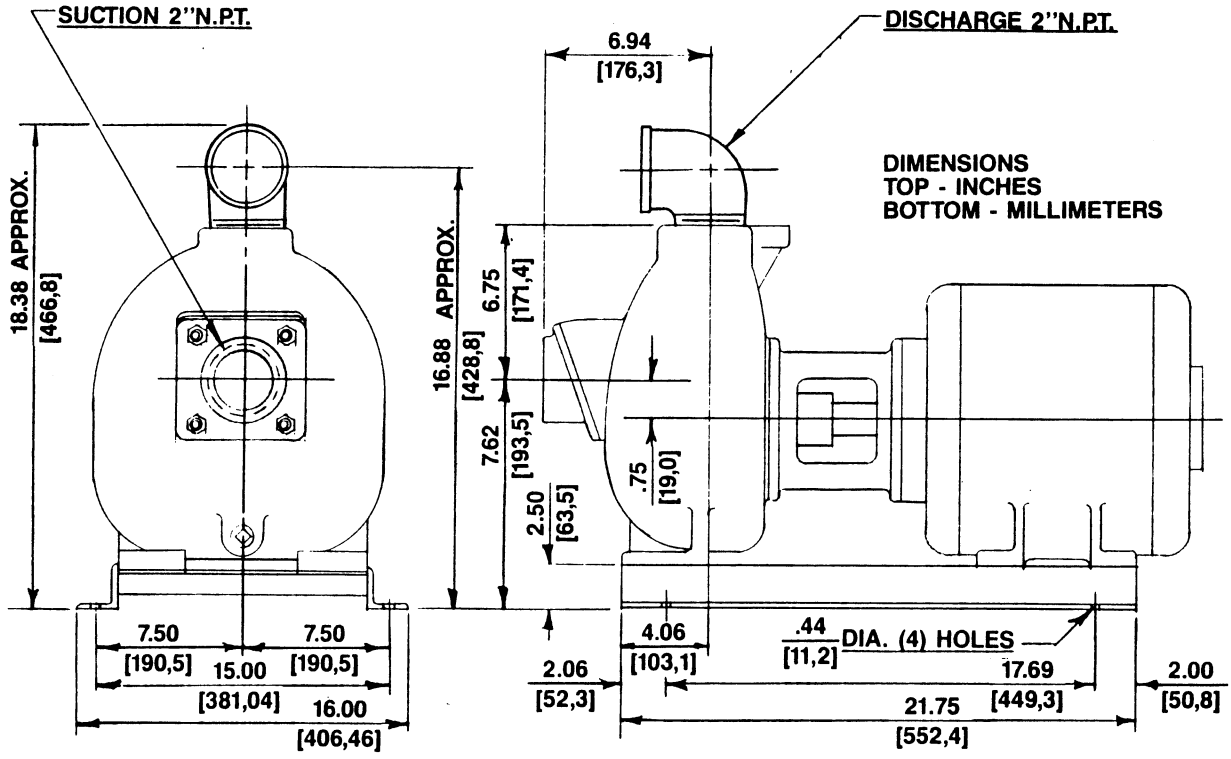


Figure 1. Pump Model 82E2-E1.5 3P

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 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. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates in the required direction.

CAUTION

The impeller of the pump is threaded onto the pump shaft. Reverse rotation of the shaft can cause the impeller to unscrew and break the suction head or casing. Disconnect power source before checking for proper direction of rotation.

d. Check all lubricant 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 electrical 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 on any itemhas 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 **800 pounds**. This pump weighs approximately **157 pounds**, not including the weight of accessories and base. 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

Materials

Either pipe or hose may be 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 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 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 one and one-half 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 one and one-half times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

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

Suction Line Positioning

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

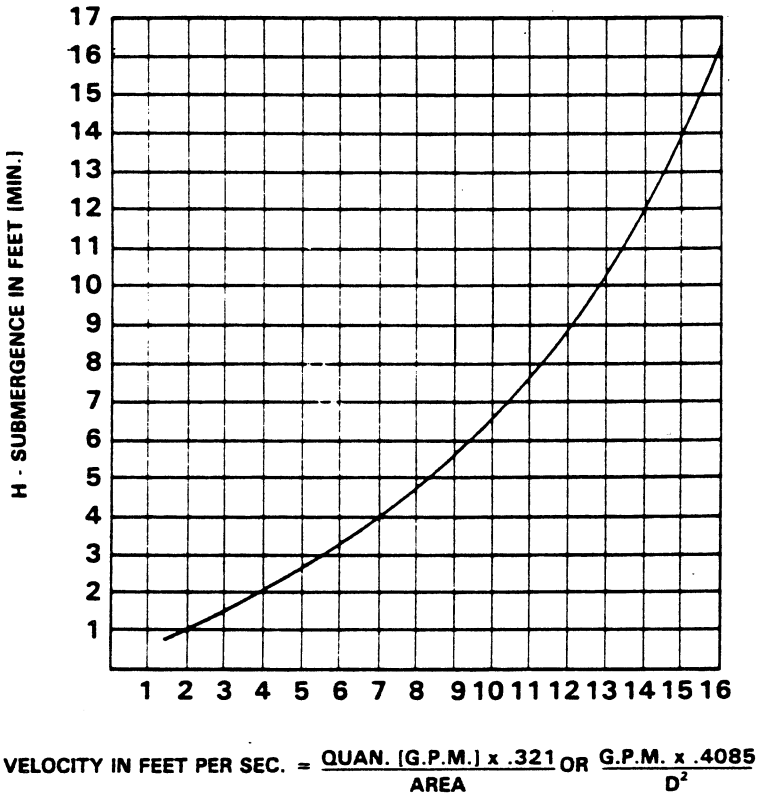


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

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.

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.

ELECTRICAL CONNECTIONS

Before connecting the motor to the incomming power, check that the electrical service available matches the pump motor requirements stamped on the motor nameplate.

WARNING

The electrical power used to operate this pump is high enough to cause injury or death. Obtain the services of a qualified electrician to make all electrical connections.

Refer to the following motor data before making electrical connections.

MOTOR DATA

VOLTAGE	PHASE	HP	Hz	RPM	THERMAL OVERLOAD
230/460	3	1.5	60	3450	N/A

OPERATION - SECTION C

WARNING

//
// //
// This pump is designed to handle most non-volatile, //
// non-corrosive 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

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 casing.

CAUTION

Never operate a self-priming pump unless there is liquid in the 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 at the top of the casing and add clean liquid until the pump 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. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

CAUTION

The pump must operate in the direction indicated by the arrow on the pump, or accompanying decals. Reverse rotation could loosen the impeller and seriously damage the pump.

Consult the operating 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 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

Either a Gorman-Rupp automatic air release valve or a hand operated shutoff valve may be installed in a bypass line.

If a Gorman-Rupp automatic air release valve has been installed, close the throttling valve in the discharge line. The Gorman-Rupp valve will automatically open to allow the pump to prime, and automatically close when priming has been accomplished. After the pump has been primed, and liquid is flowing steadily from the bypass line, open the discharge throttling valve.

If a hand operated shutoff valve has been installed, close the throttling valve in the discharge line, and open the bypass shutoff valve so that the pump will not have to prime against the weight of the liquid in the discharge line. When the pump has been primed, and liquid is flowing steadily from the bypass line, close the bypass shutoff valve and open the discharge throttling valve.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by 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 110° F. 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.

WARNING

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

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. 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). If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

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 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.

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.

PUMP TROUBLESHOOTING - SECTION D

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. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

WARNING

The electrical 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.

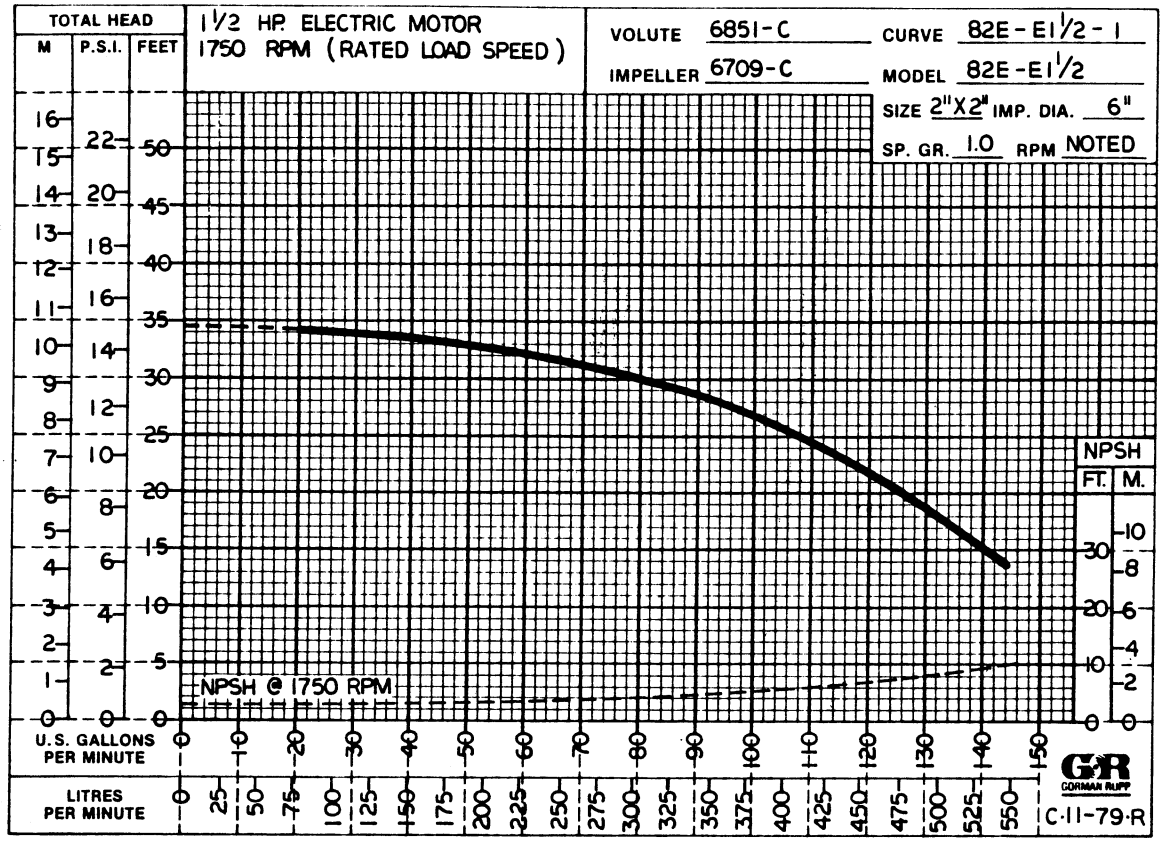
TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing.	Add liquid to casing. See PRIMING.
	Suction check valve contaminated or damaged.	Clean or replace check valve.
	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction 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.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
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.
	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 or 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.
	Motor defective.	Check for and replace defective unit.
PUMP REQUIRES TOO MUCH POWER	Motor shaft or bearings defective.	Disassemble pump and check motor and bearings.
	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 motor at maximum governed speed.
	Suction check valve or foot valve clogged or binding.	Clean valve.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
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 and check motor and bearings.

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 82E2-E1.5 3P

*Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", 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. (See Section E, Page 1.)

SECTIONAL DRAWING

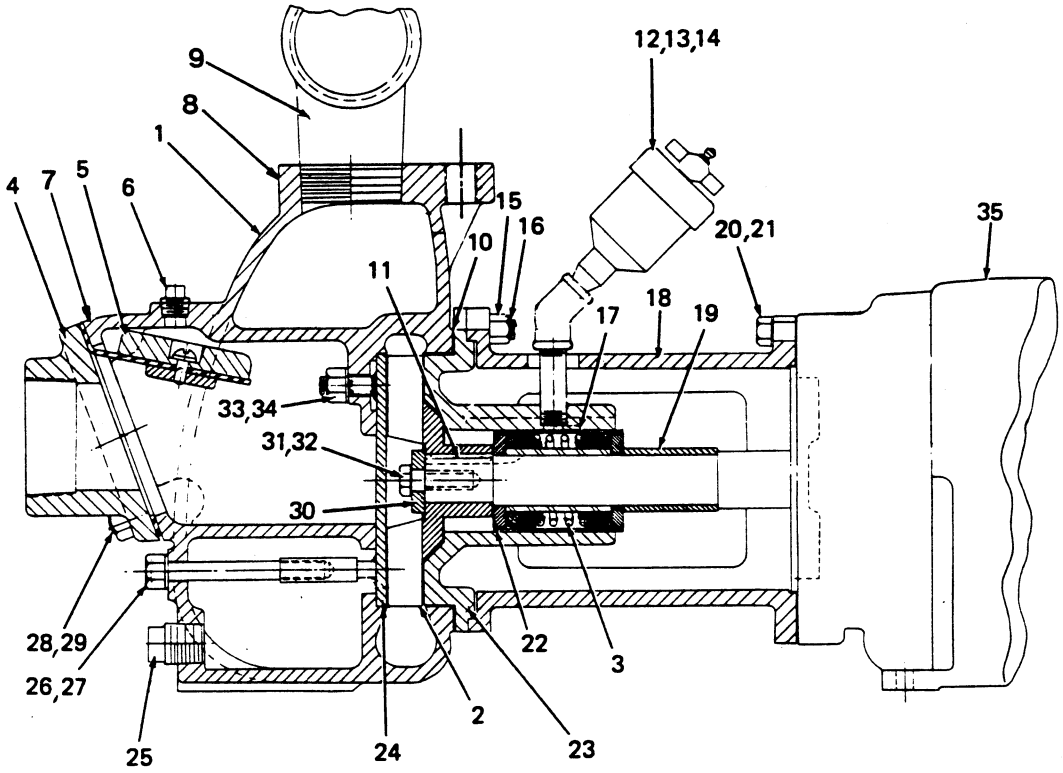


Figure 1. Pump Model 82E2-E1.5 3P

PARTS LIST
Model 82E2-E1.5 3P
(From S/N 253595 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	MATL CODE	QTY
1	PUMP CASING	6851-C	10010	1
2	*IMPELLER	6709-C	10010	1
3	*SEAL ASSY	GS1000	-----	1
4	SUCTION FLANGE	1361	10010	1
5	CHECK VALVE ASSY	1361-A	-----	1
	-SM VALVE WEIGHT	1354	10010	1
	-RD HD MACH SCRW	X0403	17090	1
	-LOCKWASHER	J04	15991	1
	-LG VALVE WEIGHT	19-B	10010	1
*	-CHECK VALVE	1361-G	19070	1
6	FILL PLUG ASSY	48271-063	-----	1
7	SUCTION STICKER	6588-AG	-----	1
8	DISCHARGE STICKER	6588-BJ	-----	1
9	STREET ELBOW	RS32	11990	1
10	*CASING GASKET SET	229-G	18000	1
11	*IMPELLER KEY	N0306	15990	1
12	PIPE NIPPLE	T0408	15070	1
13	PIPE ELBOW	AG04	11990	1
14	GREASE CUP	S36	-----	1
15	HEX NUT	D06	15991	6
16	STUD	C0607	15991	6
17	*SEAL LINER	83-A	14080	REF
18	INTERMEDIATE	8221	10010	1
19	*SPACER SLEEVE	2146	17030	1
20	LOCKWASHER	J06	15991	4
21	HEX HD CAPSCREW	B0604	15991	4
22	*IMP ADJ SHIM SET	2-Z	17090	1
23	SEAL PLATE ASSY	8292	10010	1
24	*WEAR PLATE ASSY	6822	15990	1
25	CASING DRAIN PLUG	P12	11990	1
26	FLAT WASHER	KF06	18040	1
27	HEX HD CAPSCREW	B0614	15991	1
28	STUD	C0606	15991	4
29	HEX NUT	D06	15991	4
30	*IMPELLER WASHER	6750	13090	1
31	T-TYPE LOCKWASHER	AK06	15991	1
32	IMPELLER CAPSCREW	B0604	15991	1
33	LOCKWASHER	J06	15991	1
34	HEX NUT	D06	15991	1
35	1.5 HP, 3P MOTOR	28165-550	-----	1
NOT SHOWN:				
	NAME PLATE	38818-019	13990	1
	DRIVE SCREW	BM#04-03	15990	4
	STRAINER	26841-025	-----	1
	BASE	13232	24000	1
	BASE MOUNTING HARDWARE			
	-HEX HD CAPSCREW	B0605	15991	2
	-HEX HD CAPSCREW	B0609	15991	4
	-LOCKWASHER	J06	15991	6
	-FLAT WASHER	K06	15991	2
	-HEX NUT	D06	15991	6
OPTIONAL:				
	WHEEL KIT	GRP30-18	-----	1
	STEEL STRAINER	2362	24000	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

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(s) (see Figures 1 and 2) and the accompanying parts list(s).

Before attempting to service the pump, lock out incoming power to the motor to ensure that the motor will remain inoperative and 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. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

Suction Check Valve Removal And Disassembly

Before attempting to service the pump, remove the casing drain plug (25) and drain the pump. Clean and reinstall the drain plug.

Remove the nuts (29) and separate the suction flange (4) and check valve assembly (5) from the pump casing (1). Inspect the check valve parts and replace as required. To disassemble the check valve assembly, remove the machine screw and lockwasher, and separate the valve weights and check valve gasket.

Pump Disassembly

For access to the impeller (2), wear plate assembly (24), and seal assembly (3), remove the discharge piping. Remove the hardware securing the pump casing to the base. Disengage the nuts (15) and slide the casing off the seal plate (23) and intermediate (18).

Remove any leveling shims used under the casing mounting feet. Tie and tag the shims for ease of reassembly.

Remove the gasket set (10) from the casing studs. For ease of reassembly, tie and tag the gaskets, or measure and record their thickness.

Inspect the wear plate assembly (24) and replace it if badly scored or worn. To remove the wear plate assembly, remove the capscrew (27) and fiber washer (26) located below the suction port. Reach through the suction port and disengage the hardware (33 and 34) from the wear plate stud. Tap the wear plate assembly free of the casing.

Impeller Removal

Before attempting to remove the impeller (2), turn the cross arm on the automatic lubricating grease cup (14) clockwise until it rests against the cover (see Figure 3). This will prevent the grease in the cup from escaping when the impeller is removed.

Immobilize the motor shaft and remove the impeller capscrew, lockwasher and washer (30, 31 and 32).

Install two 5/16 UNC X 1 1/2 inch long capscrews (not supplied) in the tapped holes in the impeller, and use a suitable puller to remove the impeller and key (11). Use caution when removing the impeller; tension on the seal spring will be released as the impeller is removed.

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

Slide the impeller adjusting shims (22) off the impeller shaft. For ease of reassembly, tie and tag the shims, or measure and record their thickness.

Seal Removal

(Figures 1 and 2)

Carefully remove the outboard stationary and rotating seal elements, packing ring, stationary washer, seal spring and spacer sleeve from the seal plate. Use a stiff wire with a hooked end to remove the inboard stationary washer, packing ring, and stationary and rotating seal elements.

Remove the spacer sleeve (19) from the shaft.

Inspect the seal liner (17) for wear or grooves that could cause leakage or damage to the seal packing rings. The seal liner is a press fit in the seal plate (23) and does not normally require replacement. If replacement is required, remove the grease cup and piping (12, 13 and 14) and slide the seal plate off the shaft.

For seal liner replacement, see **Seal Installation**.

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

It is not necessary to remove the intermediate (18) unless replacement is required. To remove the intermediate, remove the hardware (20 and 21) securing it to the motor (35).

Seal Installation

(Figures 1 and 2)

If the intermediate (18) was removed, position the replacement intermediate over the shaft and secure it to the motor (35) with the hardware (20 and 21). Be sure the hole in the intermediate for the grease cup and piping is directed up.

Before installing the seal, inspect the bore of the seal liner (17) for wear or grooves that might cause leakage or damage to the seal packing rings. If the seal liner must be replaced, position the seal plate on the bed of an arbor (or hydraulic) press and use a new sleeve to force the old one out. After the new liner is installed, drill a 1/4 inch diameter hole through it to permit the flow of lubricant to the seal. **Be careful** to center the drill in the threaded hole so not to damage the threads. Deburr the hole from the inside of the seal liner after drilling.

Before installing the seal plate, clean the spacer sleeve (19) and shaft shoulder that it seats against. Replace the sleeve if severely damaged. Apply 'Loctite Plastic Gasket' or equivalent compound to the chamfered end of the sleeve and slide it onto the shaft until seated squarely against the shaft shoulder.

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. Clean and polish the seal spacer 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 packing rings and seal liner 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).

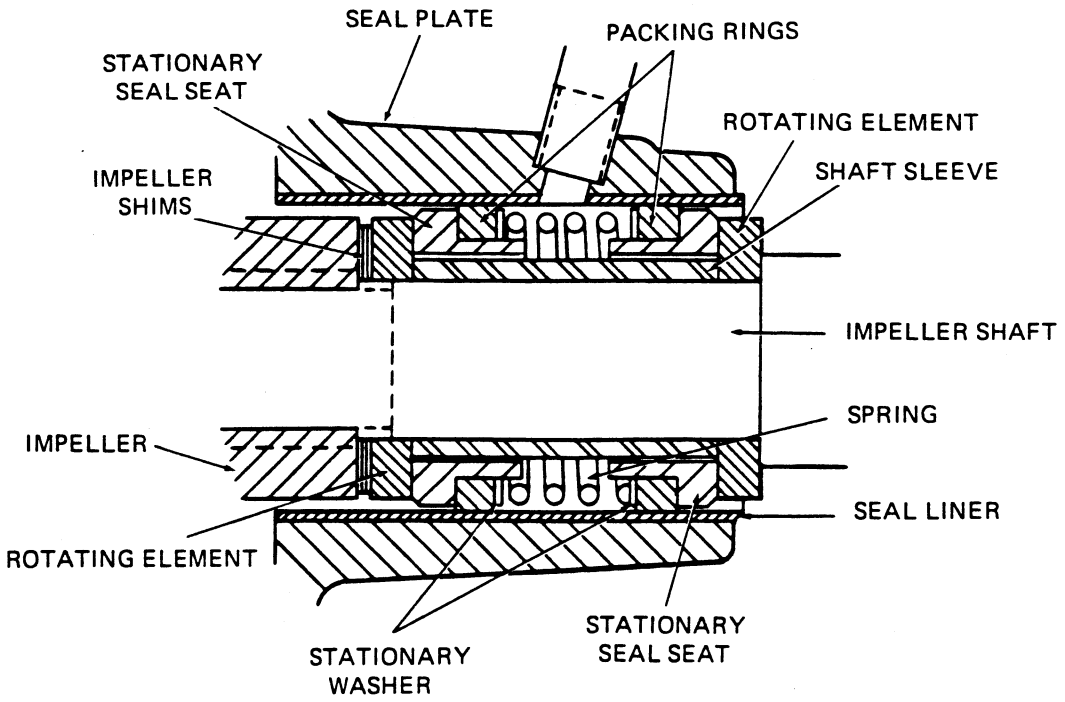


Figure 2. GS1000 Seal Assembly

CAUTION

> This seal is not designed for operation at temperatures above 110°F. Do not use at higher operating temperatures.

Temporarily secure the seal plate to the intermediate with two capscrews and nuts (3/8-16 UNC by 1 1/2 inches long, not supplied). Be sure the lubrication hole in the seal plate aligns with the hole in the intermediate.

Slide the inboard rotating element into the lubricated seal liner with the chamfered side toward the spacer sleeve (19). Subassemble the inboard stationary seat, packing ring and stationary washer. Press this subassembly into the seal liner. A push tube cut from a length of plastic pipe would aid this installation. The O.D. of the pipe should be approximately the same diameter as the O.D. of the seal spring.

Slide the seal spacer sleeve onto the shaft until it seats against the inboard rotating element, and install the seal spring. Subassemble the outboard stationary seat, packing ring and stationary washer. Press this subassembly into the lubricated seal liner.

Install the outboard rotating element with the chamfered side toward the inside of the seal plate.

Lubricate the seal assembly as indicated in **LUBRICATION** after the impeller has been installed.

Impeller Installation

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

If a new seal assembly was installed, discard the impeller adjusting shims included with the seal. Use the same impeller adjusting shims (22) as previously removed, or install the same thickness of new shims. Install the key (11) in the shaft keyway, align the slot in the impeller, and press the impeller onto the shaft until fully seated.

A clearance of .015 to .030 inch between the impeller and the seal plate is necessary for maximum pump efficiency. Measure this clearance, and add or subtract impeller shims until it is reached.

NOTE

Be sure the seal plate is tight against the intermediate while measuring this clearance.

When the back clearance is set, secure the impeller with the capscrew, lockwasher and washer (30, 31 and 32).

Pump Reassembly

If the wear plate assembly (24) was removed, position it squarely against the casing shoulder and secure it with the mounting hardware (26, 27, 33 and 34). Replace the fiber washer (26) if badly worn or compressed.

Remove the hardware temporarily securing the seal plate to the intermediate. Install the same thickness of pump casing gaskets (10), as previously removed and secure the pump casing to the seal plate and intermediate with the nuts (15).

A clearance of .008 to .016 inch between the impeller and the wear plate assembly is also recommended for maximum pump efficiency. This clearance can be obtained by adding or subtracting gaskets in the casing gasket set until the impeller binds against the wear plate when the shaft is turned. After the impeller binds, add .012 inch of gaskets.

Secure the pump casing to the base with the previously removed hardware. Be sure to reinstall any leveling shims used under the casing mounting feet.

Suction Check Valve Reassembly And Installation

Assemble the valve weights to each side of the check valve gasket and secure the parts with the round head machine screw and lockwasher.

Position the check valve assembly in the suction port with the large weight toward the impeller and the small weight toward the suction flange (4). Install the suction flange, and secure the complete assembly with the nuts (29).

Check the operation of the suction check valve to ensure proper seating and free movement. Reinstall the suction and discharge piping.

Before starting the pump, check that the piping is secure, fill the casing with liquid, and open all valves in the suction and discharge lines.

LUBRICATION

Seal Assembly

Fill the grease cup (14) through the grease fitting with No. 2 lithium base grease until grease escapes from the relief hole. Turn the grease cup arm counterclockwise until it is at the top of the stem; this will release the spring to apply grease to the seal (see Figure 3).

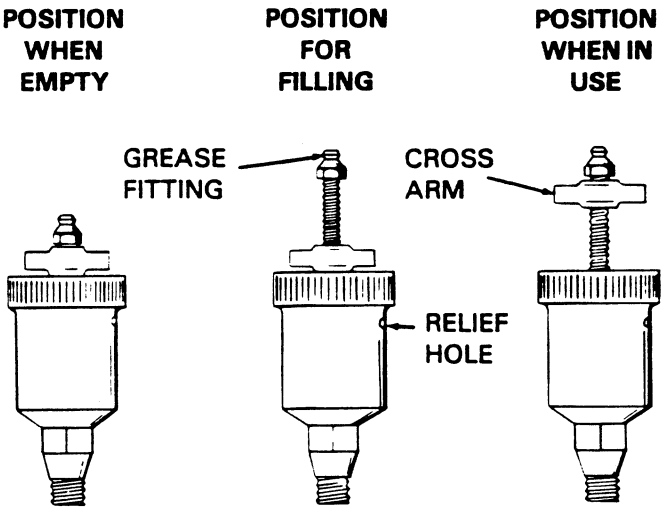


Figure 3. Automatic Lubricating Grease Cup

Motor

Consult the literature supplied with the motor.

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