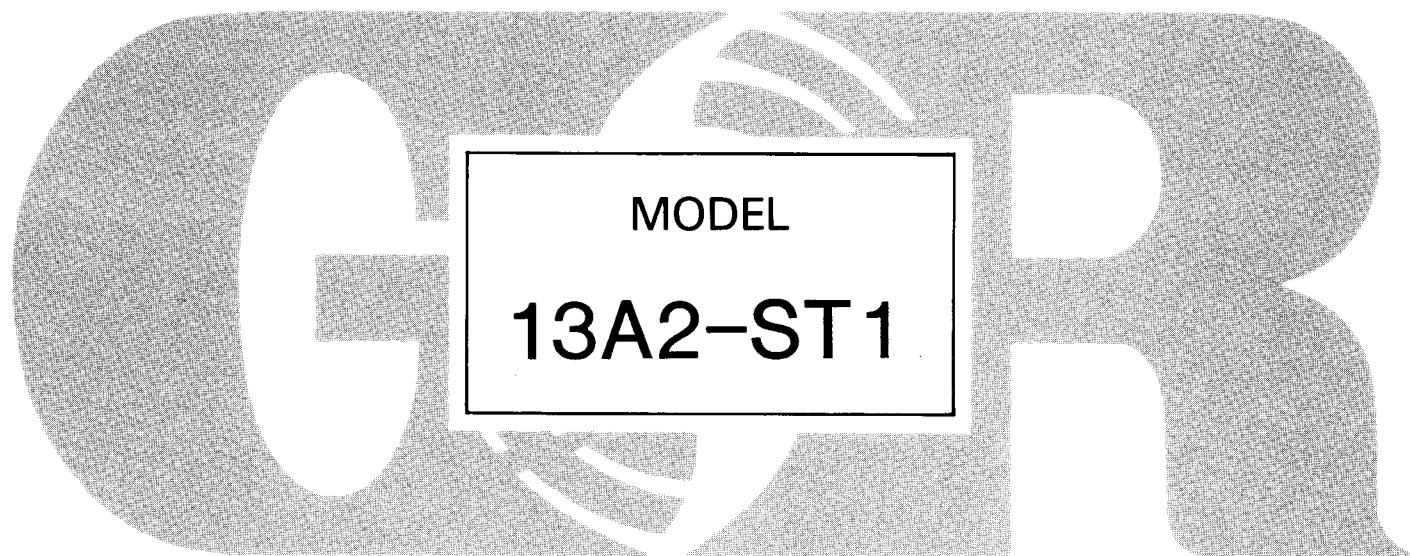




# INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



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

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

This pump is an 10 Series, semi-open impeller, self-priming centrifugal model designed for pumping liquids with specified entrained solids.

If there are any questions regarding the pump 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

or Gorman-Rupp of Canada Limited  
70 Burwell Road  
St. Thomas, Ontario N5P 3R7

For information or technical assistance on the ENGINE, contact the ENGINE 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 in- //  
// jury 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 10 SERIES ENGINE DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE ENGINE BEFORE ATTEMPTING TO START THE ENGINE.

## WARNING

```
//////////////////////////////////////  
//  
// Before attempting to open or service the pump: //  
//  
// 1. Familiarize yourself with this manual. //  
// 2. Disconnect the ENGINE 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

```
//////////////////////////////////////  
//  
// Do not attempt to pump volatile, corrosive, or flammable //  
// materials, or any liquids for which this pump has not //  
// been designed. //  
//  
//////////////////////////////////////
```

## WARNING

```
//////////////////////////////////////  
//  
// After the pump has been installed, make certain that the //  
// pump and all piping connections are secure before at- //  
// tempting to operate the pump. //  
//  
//////////////////////////////////////
```

## WARNING

```
//////////////////////////////////////  
//  
// 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. //  
//  
//////////////////////////////////////
```

## 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. //  
//  
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////  
//  
// Overheated pumps can cause severe burns and injury. If //  
// overheating of the pump casing occurs: //  
//  
// 1. Stop the pump immediately. //  
// 2. Allow the pump to cool. //  
// 3. Refer to instructions in this manual before 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 servic- //  
// ing. //  
//  
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////  
//  
// Do not operate an internal combustion engine in an ex- //  
// plosive atmosphere. When operating internal combustion //  
// engines in an enclosed area, make certain that exhaust //  
// fumes are piped to the outside. These fumes contain //  
// carbon monoxide, a deadly gas that is colorless, //  
// tasteless, and odorless. //  
//  
////////////////////////////////////
```

## WARNINGS

## WARNING

```
////////////////////////////////////  
//  
// Fuel used by internal combustion engines presents an ex- //  
// treme explosion and fire hazard. Make certain that all //  
// fuel lines are securely connected and free of leaks. //  
// Never refuel a hot or running engine. Avoid overfilling //  
// the fuel tank. Always use the correct type of fuel. //  
//  
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////  
//  
// Never tamper with the governor to gain more power. The //  
// governor establishes safe operating limits that should //  
// not be exceeded. //  
//  
////////////////////////////////////
```

## INSTALLATION - SECTION B

Seldom are two pump installations identical. The information presented in this section is a summary of the recommended installation practices related to inspection, pump positioning, hardware, suction and discharge piping, and sumps. For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

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

## OUTLINE DRAWING

POWERED BY LISTER ST1  
DIESEL ENGINE.

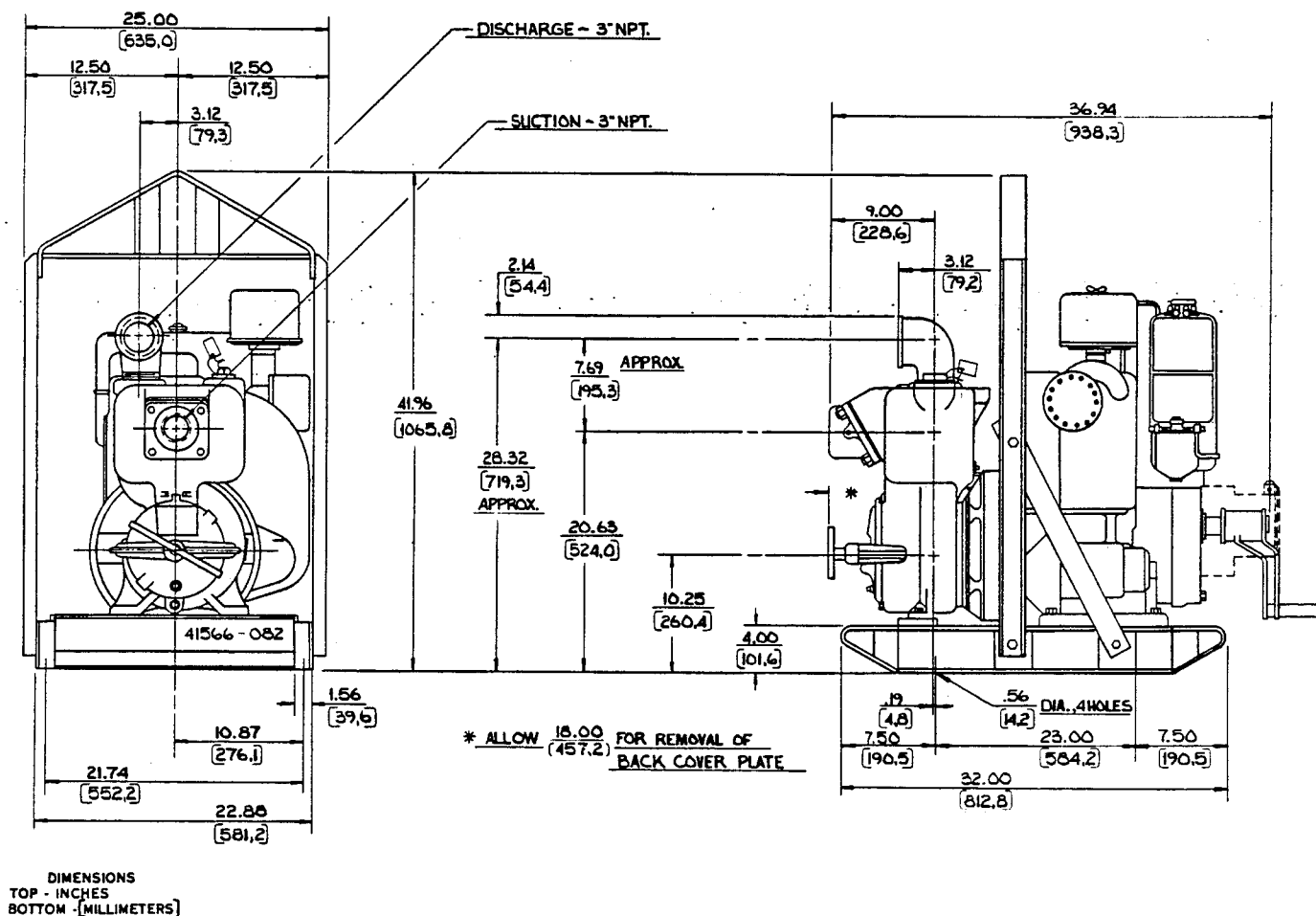


Figure 1. Pump Model 13A2-ST1

## 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

Section B.



shipment. Check as follows:

- a. Inspect the pump assembly for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews securing mating surfaces.
- c. Carefully read all tags, decals, and markings on the pump assembly, and follow the instructions indicated.
- 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.

## POSITIONING 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.

### Clearance

A minimum clearance of **18.00 inches** in front of the cover plate is required to permit removal of the cover and easy access to the pump interior.

### Lifting

#### WARNING

```
////////////////////////////////////  
//  
// Use lifting and moving equipment in good repair and with //  
// adequate capacity to prevent injuries to personnel or //  
// damage to equipment. //  
// //  
////////////////////////////////////
```

Make sure that hoists and other lifting equipment are of sufficient capacity to safely handle the pump assembly. If chains and cables are used, make certain that they are positioned so that they will not damage the pump, and so that the load will be balanced.

---

---

### CAUTION

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

## SUCTION AND DISCHARGE PIPING

### Materials

Either pipe or hose may be used for suction and discharge lines. Piping materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

### Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

### Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts 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 close to the pump before installing the lines.

---

## SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

### Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

### Strainers

If a strainer is furnished with the pump, be certain to use it; any entrained solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

### Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. In volatile and/or corrosive service, the pipe dope should be compatible with the liquid being pumped.

### Suction Lines In Sumps

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

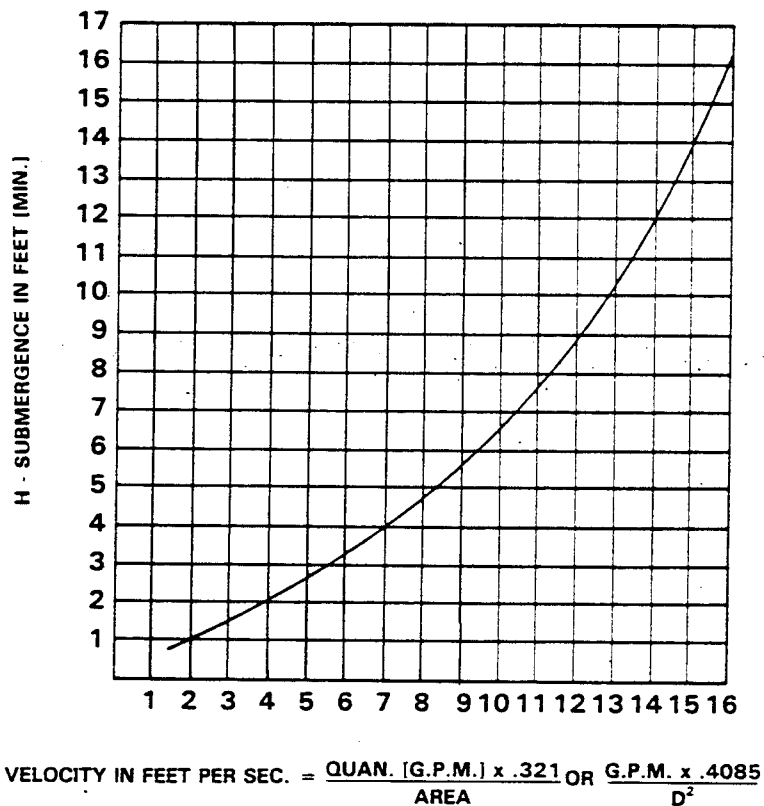


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

### 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.

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## Valves

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

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

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

## Bypass Lines

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

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

### NOTE

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

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 could result, causing damage to the pump.

---

---

**OPERATION - SECTION C****WARNING**

```
////////////////////////////////////  
//  
// Do not attempt to pump volatile, corrosive, or flammable //  
// materials, or any liquids for which this pump has not //  
// been designed. //  
// //  
////////////////////////////////////
```

**PRIMING**

Install the pump and piping as described in INSTALLATION. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see LUBRICATION in MAINTENANCE AND REPAIR).

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

**CAUTION**

Never operate a self-priming pump unless there is liquid in the volute. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Add liquid to the volute housing 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 volute housing has evaporated.

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

**WARNING**

```
////////////////////////////////////  
//  
// After filling the volute housing, do not attempt to op- //  
// erate the pump unless all connecting piping is securely //  
// installed. Otherwise, liquid in the pump forced out un- //  
// der pressure could cause injury to personnel. //  
// //  
////////////////////////////////////
```

To fill the pump, remove the volute 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 ENGINE.

## 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.

## OPERATION

## Overheating

Overheating can occur if the valves in the suction or discharge lines are closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the volute housing 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 servic- //  
// ing. //  
//  
////////////////////////////////////
```

## Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop.

## Pump Vacuum Check

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 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

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

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approx-



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---

imately 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

## WARNING

```

////////////////////////////////////
//
// Before attempting to open or service the pump:
//
// 1. Familiarize yourself with this manual.
// 2. Disconnect the ENGINE 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.
//
////////////////////////////////////

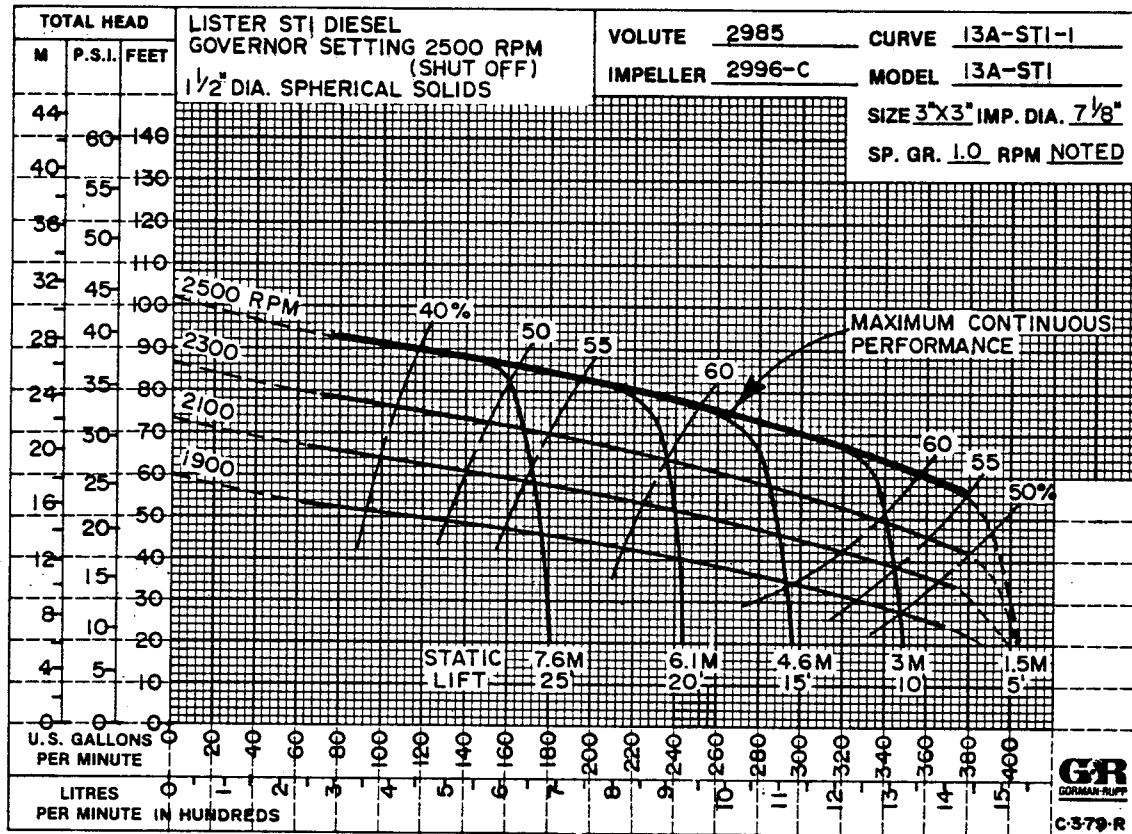
```

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	<p>Air leak in suction line.</p> <p>Lining of suction hose collapsed.</p> <p>Suction check valve clogged or binding.</p> <p>Leaking or worn seal or pump gasket.</p> <p>Suction lift or discharge head too high.</p> <p>Strainer clogged.</p>	<p>Correct leak.</p> <p>Replace suction hose.</p> <p>Clean valve.</p> <p>Check pump vacuum. Replace leaking or worn seal or gasket.</p> <p>Check piping installation and install bypass line if needed. See INSTALLATION.</p> <p>Check strainer and clean if necessary.</p>
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	<p>Air leak in suction line.</p> <p>Suction intake not submerged at proper level or sump too small.</p> <p>Lining of suction hose collapsed.</p> <p>Impeller or other wearing parts worn or damaged.</p>	<p>Correct leak.</p> <p>Check installation and correct as needed. Check submergence chart (Section B).</p> <p>Replace suction hose.</p> <p>Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.</p>

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE(cont.)	Impeller clogged. Pump speed too slow. Discharge head too high. Suction lift too high. Leaking or worn seal or pump gasket. Strainer clogged.	Free impeller of debris. Check engine output; consult engine operation manual. Install bypass line. Reduce suction lift. Check pump vacuum. Replace leaking or worn seal or gasket. Check strainer and clean if necessary.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high. Discharge head too low. Liquid solution too thick.	Check engine output. Adjust discharge valve. Dilute if possible.
PUMP CLOGS FREQUENTLY	Discharge flow too slow. Suction check valve clogged or binding.	Open discharge valve fully to increase flow rate, and run engine at maximum governed speed. Clean valve.
EXCESSIVE NOISE	Cavitation in pump. Pumping entrained air. Pump or drive not securely mounted. Impeller clogged or damaged.	Reduce suction lift and/or friction losses in suction line. Locate and eliminate source of air bubble. Secure mounting hardware. Clean out debris; replace damaged parts.

## 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 13A2-ST1

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

If your pump serial number is followed by an "N" or if you have a question on performance, contact The Gorman-Rupp Company.

## SECTIONAL DRAWING

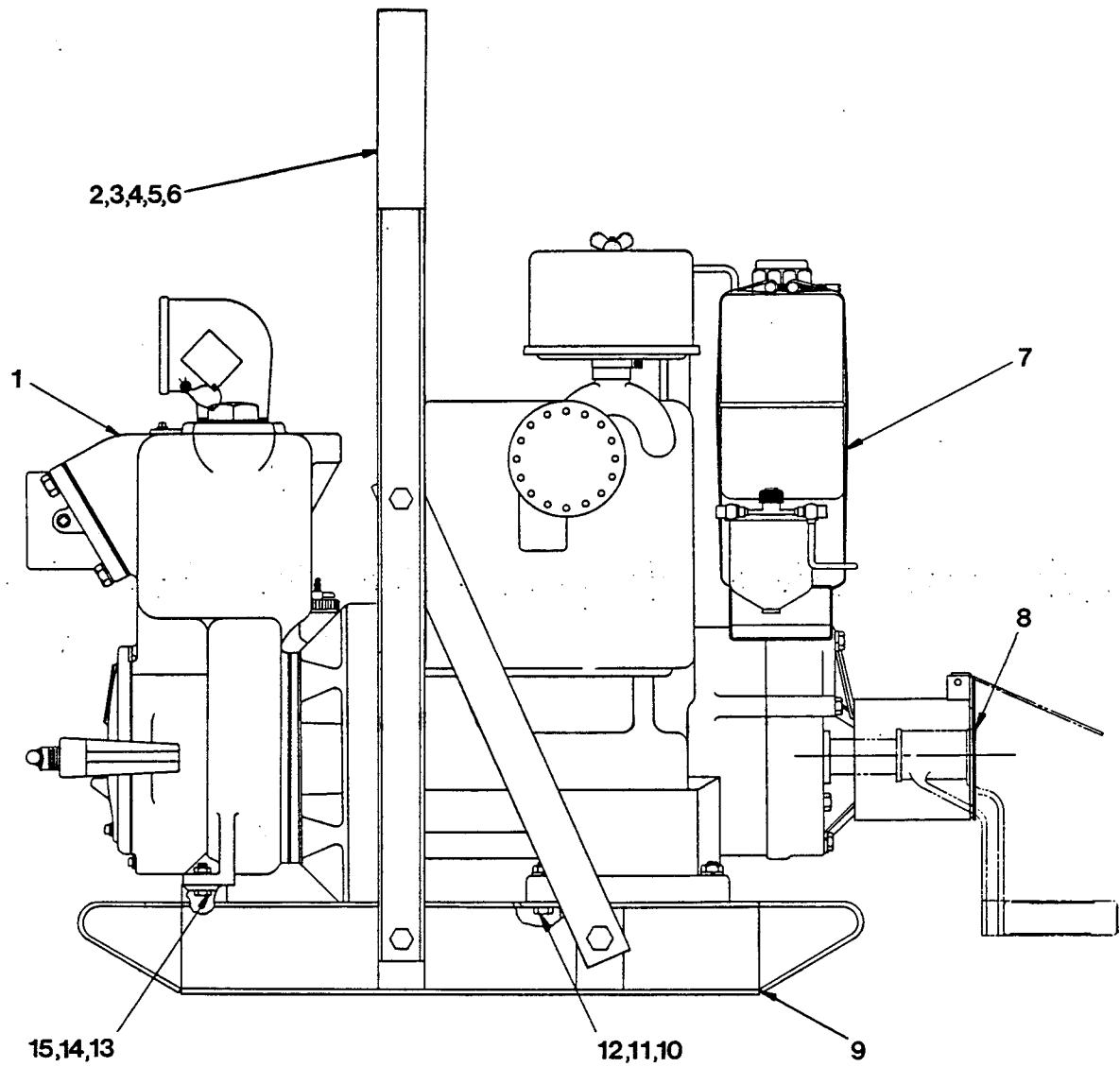


Figure 1. Pump Model 13A2-ST1

PARTS LIST  
Pump Model 13A2-ST1  
(From S/N 765578 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP END ASSY	13A2	-----	1
2	HOISTING BAIL	44714-035	24150	1
3	HEX HD CAPSCREW	B01006	15991	4
4	LOCKWASHER	J00010	15991	6
5	HEX NUT	D00010	15991	6
6	HEX HD CAPSCREW	B01005	15991	2
7	LISTER ST1 ENGINE	29231-052	-----	1
8	SHAFT GUARD ASSY	29291-151	-----	1
9	BASE	41566-082	24150	1
10	HEX HD CAPSCREW	B00809	15991	4
11	LOCKWASHER	J00008	15991	4
12	HEX NUT	D00008	15991	4
13	HEX HD CAPSCREW	B00606	15991	2
14	LOCKWASHER	J00006	15991	2
15	HEX NUT	D00006	15991	2

\*INDICATES PARTS RECOMMENDED FOR STOCK.

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

CANADIAN SERIAL NO. .... AND UP

## SECTIONAL DRAWING

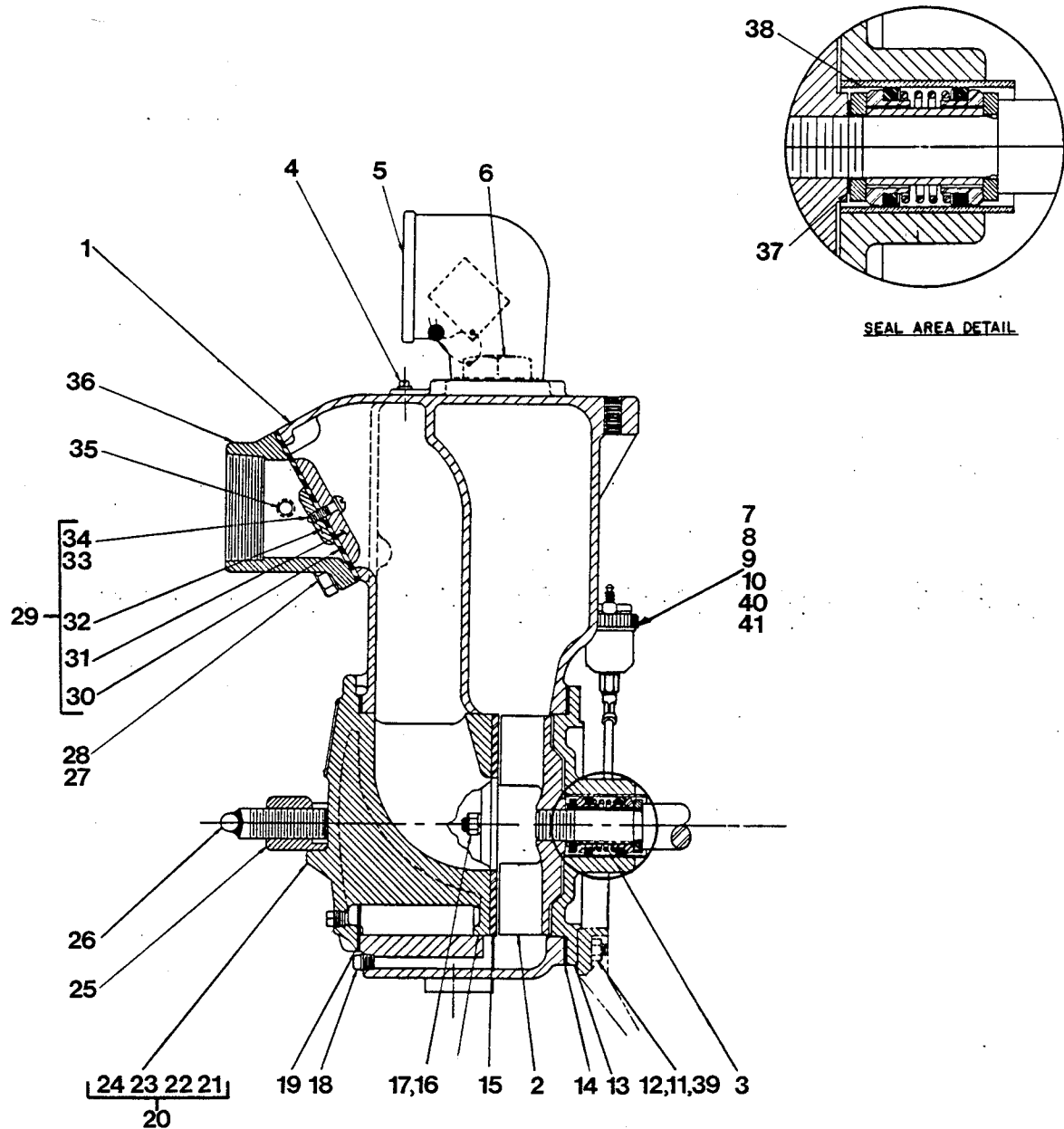


Figure 2. Pump End Assembly Model 13A2-ST1

# PARTS LIST Pump End Assembly Model 13A2-ST1

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	2985	10010	1	25	CLAMP	2987	11000	1
2	*IMPELLER	2996-C	11000	1	26	SCREW	2536	24000	1
3	*SEAL ASSY	GS01000	-----	1	27	HEX HD CAPSCREW	B00805	15991	4
4	PIPE PLUG	P00004	11990	1	28	LOCKWASHER	J00008	15991	4
5	STREET ELBOW	RS00048	11990	1	29	CHECK VALVE ASSY	1348	-----	1
6	FILL PLUG ASSY	48271-069	-----	1	30	* CHECK VLV/GSKT	1348-G	19070	1
7	GREASE CUP	S00036	-----	1	31	* LARGE VALVE WT	18-B	10010	1
8	PIPE ELBOW	R00004	11990	1	32	* SMALL VALVE WT	2944	10010	1
9	PIPE NIPPLE	T00416	15070	1	33	RD HD MACH SCREW	X00504	17090	1
10	PIPE ELBOW	AG00004	11990	1	34	LOCKWASHER	J00005	17090	1
11	HEX NUT	D00006	15991	8	35	ACCESSORY PLUG	P00004	11990	1
12	LOCKWASHER	J00006	15991	8	36	SUCT FLANGE	2943	10010	1
13	SEAL PLATE ASSY	392-B	10010	1	37	*IMP SHIM SET	2-X	17090	1
14	*VOLUTE GSKT SET	3-G	18000	1	38	*SEAL LINER	83	14080	1
15	*WEAR PLATE ASSY	2634-A	15990	1	39	STUD	C00608	15991	8
16	HEX NUT	D00006	15991	2	40	PIPE NIPPLE	T00004	15070	1
17	LOCKWASHER	J00006	15991	2	41	STREET ELBOW	AGS00004	11990	1
18	VOL DRAIN PLUG	P00008	11990	1	NOT SHOWN:				
19	*COVER PLATE GSKT	2985-G	19090	1		NAME PLATE	2613-D	13990	1
20	*COVER PLATE ASSY	42111-921	-----	1		DRIVE SCREW	BM#04-03	15990	4
21	COVER	N/A	10010	1		STRAINER	4917	24000	1
22	PIPE PLUG	P00004	11990	1	OPTIONAL:				
23	WARNING PLATE	2613-EV	13990	1		WHEEL KIT	GRP30-37B	-----	1
24	DRIVE SCREW	BM#04-03	15990	4					

\*INDICATES PARTS RECOMMENDED FOR STOCK



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## PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

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This pump requires little service due to its rugged, minimum-maintenance design. If it becomes necessary to inspect and/or replace the wearing parts, however, follow these instructions, which are keyed to the sectional view (see figures 1 and 2) and the accompanying parts list.

Before attempting to service the pump, disconnect the spark plug, or take other precautions to ensure that the engine will remain inoperative while the pump is being serviced, and close all connecting valves.

### Suction Check Valve Disassembly

Remove the suction piping. Remove the capscrews and lockwashers (27 and 28) securing the suction flange (36) to the volute casing (1). Pull the check valve assembly (29) from suction port opening. Remove the machine screw and lockwasher (33 and 34) securing check valve weights (31 and 32) to check valve gasket (30).

### Pump Disassembly

Remove the volute drain plug (18) to drain the pump. Clean and reinstall the drain plug.

Loosen the back cover screw (26) and clamp bar (25) and pull the back cover assembly (20) from the volute casing (1). Inspect the wear plate assembly (15) and replace it if badly scored or worn.

### NOTE

Before reinstalling the cover plate assembly, replace the cover plate gasket (19) and apply a film of grease or "Never-Seez" on any surface which contacts the volute casing. This action will reduce rust and scale build-up and ease future disassembly.

Remove the mounting hardware (13, 14, and 15, Fig. 1) securing the pump to the base assembly (9, Fig. 1).

Install a lifting eye bolt in the tapped hole provided in the top of the volute casing. Tighten the eye bolt completely until the threads have bottomed out.

Support the pump body using the eye bolt, and remove the hex nuts (11) and lockwashers (12) securing the volute casing and the seal plate (13) to the engine intermediate bracket. Separate the pump body from the engine.

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---

**WARNING**

```
////////////////////////////////////  
//  
// Do not attempt to lift the complete pump unit using the //  
// lifting eye. It is designed to facilitate removal or //  
// installation of individual components only. Additional //  
// weight may result in damage to the pump or failure of //  
// the eye bolt. //  
// //  
////////////////////////////////////
```

To loosen the impeller (2), tap the vanes on the direction of pump rotation with a block of wood or a soft-faced mallet or hammer. Unscrew the impeller, and replace it if cracked or badly worn. Use caution when removing the impeller; tension on the seal spring will be released as the impeller is unscrewed.

Remove the impeller adjusting shims (37). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

**Seal Disassembly**

Before removing the seal assembly, turn the cross arm on the seal grease cup (7) clockwise until it rests against the cover (see figure 4). This will prevent the grease in the cup from escaping after the seal is removed.

Carefully remove the shaft sleeve and the stationary and rotating elements, using a stiff wire with a hooked end if necessary. Remove the seal liner (38), which is a press fit.

Clean the seal cavity and shaft with a soft cloth soaked in cleaning solvent.

**WARNING**

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers. //  
// //  
////////////////////////////////////
```

**Seal Reassembly**

The seal is not normally reused because of the precision finish on its lapped faces, but if it is necessary to reuse the old seal, wash all metallic parts in cleaning solvent and dry thoroughly.

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

Replace the seal liner if worn or grooved. If the seal liner is replaced, a hole must be drilled in it after installation to permit the flow of lubricant from the grease cup to the seal assembly. Deburr the hole after drilling, and clean the seal liner.

### CAUTION

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

Lubricate the packing rings with soft grease or oil when installing the seal, and place a drop of light lubricating oil on the lapped faces. Assemble the seal as shown in figure 3.

Reinstall the shaft sleeve, and install the replacement seal as a complete unit.

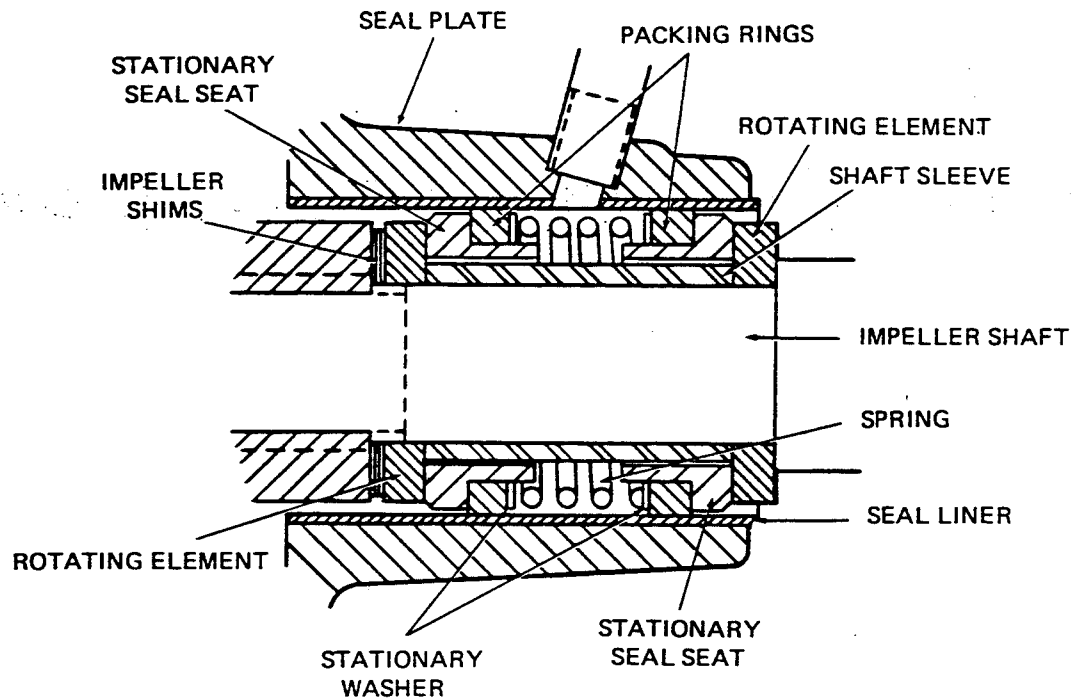


Figure 3. GS-1000 Seal Assembly

### Pump Reassembly

Reinstall the impeller adjusting shims and the impeller. A clearance of .020 to .040 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.

---

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Reassemble the volute casing to the engine intermediate and seal plate, replacing the volute gasket set (14). A clearance of .008 to .015 inch between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance can be reached by adding or subtracting gaskets in the volute gasket set until the impeller binds against the wear plate when the shaft is turned. After the impeller binds, add .010 inch of gaskets.

Secure the pump end assembly to the base using the mounting hardware (13, 14, and 15, Fig. 1). Remove the lifting eye from the top of the volute casing.

### Suction Check Valve Reassembly

Clean and inspect the check valve weights and gasket, replace if badly worn. Assemble the check valve weights with the check valve gasket secured between them using the machine screw and lockwasher. Install check valve assembly against suction port opening with the large weight facing the interior of the pump. Install the suction flange over the check valve assembly securing it with the capscrews and lockwashers. Reassemble suction piping.

Before starting the pump, insure that the piping is secure, fill the volute with liquid, and open all connecting valves.

## LUBRICATION

### Seal Assembly

Before starting the pump, fill the grease cup through the grease fitting with a good grade of No.2 pressure gun 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 4).

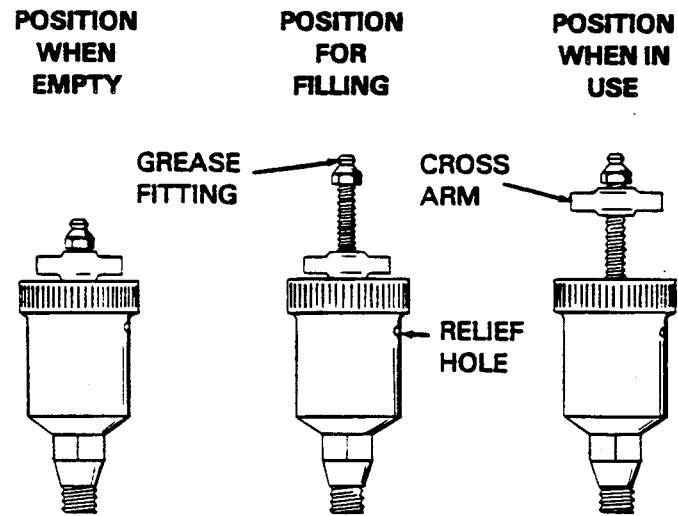


Figure 4. Automatic Lubricating Grease Cup

Engine

Follow the recommendations as outlined in the engine operations manual.

## WARRANTY

Pumping units manufactured by The Gorman-Rupp Company, Mansfield, Ohio are guaranteed to be free from defects in material and workmanship for one year from date of shipment from factory in Mansfield, Ohio. The obligation under this Warranty, statutory or otherwise, is limited to replacement or repair at Mansfield, Ohio factory or at a point designated by Gorman-Rupp, of such part as shall appear to us, upon inspection at such point, to have been defective in material or workmanship.

This Warranty does not obligate The Gorman-Rupp Company to bear the cost of labor or transportation charges in connection with replacement or repair of defective parts; nor shall it apply to a pump upon which repairs or alterations have been made unless authorized by Gorman-Rupp.

No warranty is made in respect to engines, motors, or trade accessories, such being subject to warranties of their respective manufacturers.

In Submersible Pumps, pump and motor are integral and Submersibles are warranted as a unit. Since motor is subject to an important degree upon quality and performance of electrical controls, unit warranty is valid only when controls have been specified and provided by Gorman-Rupp.

No express implied or statutory warranty, other than herein set forth is made or authorized to be made by Gorman-Rupp.

In no event shall The Gorman-Rupp Company be liable for consequential damages or contingent liabilities arising out of the failure of any Gorman-Rupp pump or parts thereof to operate properly.

THE GORMAN-RUPP COMPANY  
Mansfield, Ohio

NOTE: In Canada, all above references to "The Gorman-Rupp Company, Mansfield, Ohio" is understood to mean "Gorman-Rupp of Canada Limited, St. Thomas, Ontario."

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