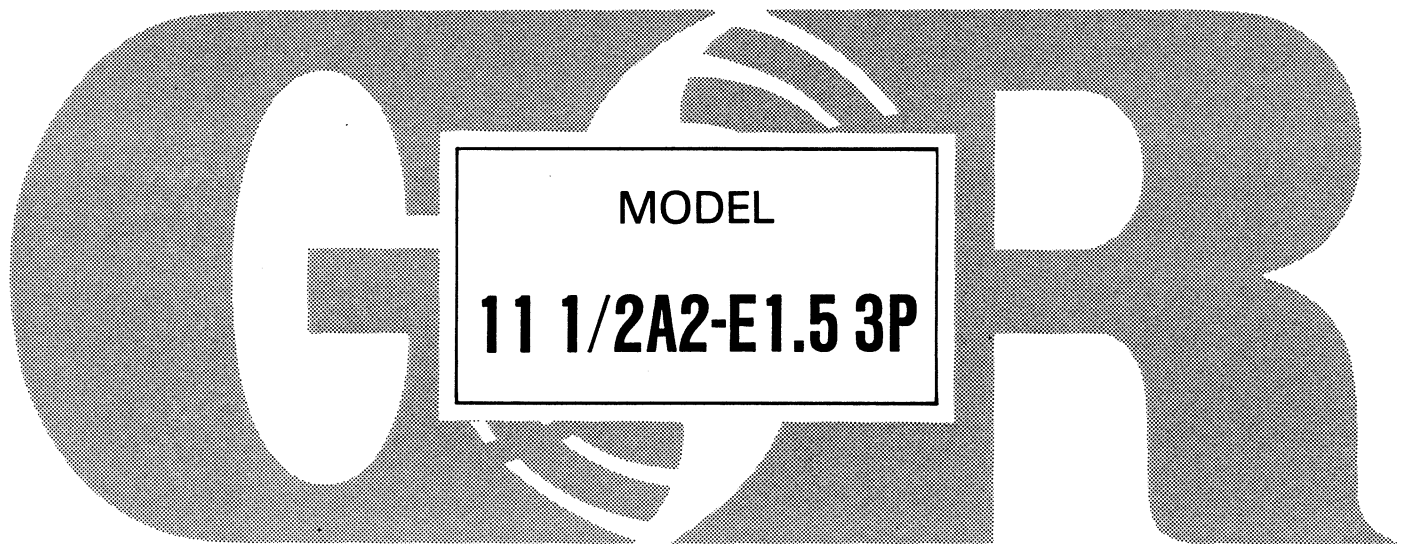




# INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



**THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO**

GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

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## WARNINGS

## WARNINGS - SECTION A

THESE WARNINGS APPLY TO 10 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. Disconnect incoming power to the motor and lock //  
// it out to ensure that the pump will remain inop- //  
// erative. //  
// 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-flammable liquids containing specified entrained //  
// solids. Do not attempt to pump volatile, corrosive or //  
// flammable liquids which may damage the pump or endanger //  
// personnel as a result of pump failure. //  
//  
//////////////////////////////////////
```

## WARNING

```
//////////////////////////////////////  
//  
// After the pump has been installed, make certain that the //  
// pump and all piping connects are tight, properly sup- //  
// ported, 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. //  
//  
//////////////////////////////////////
```

## 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.

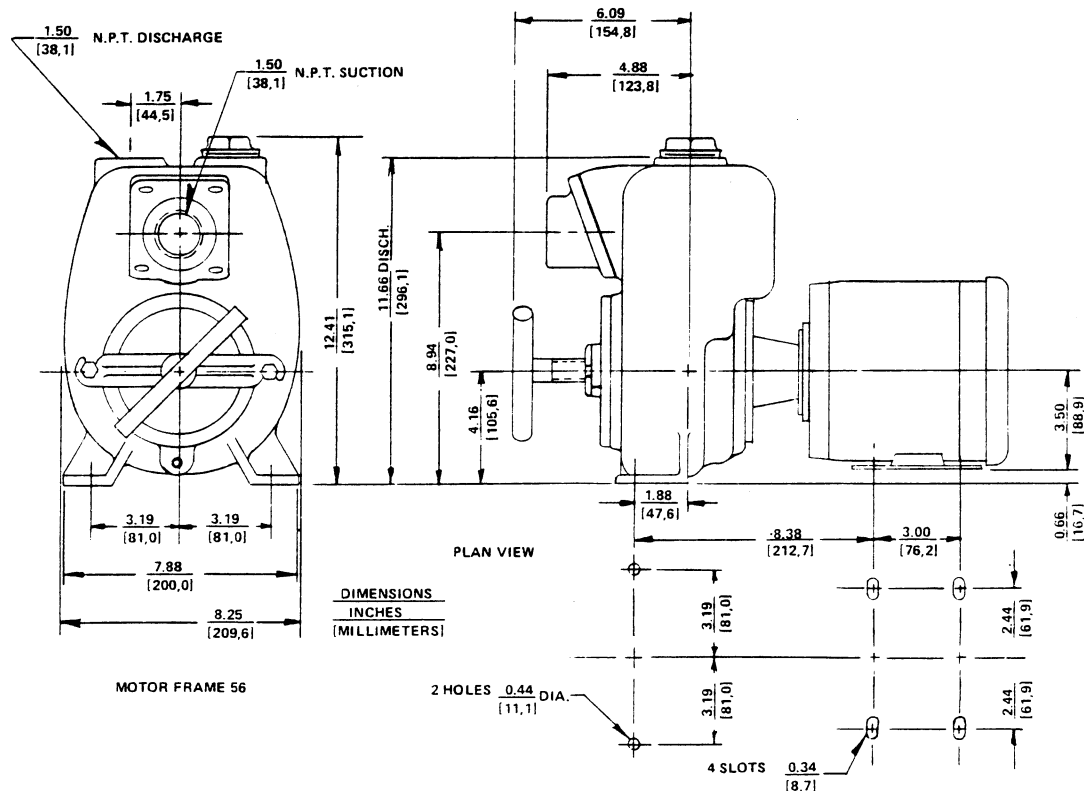


Figure 1. Pump Model 11 1/2A2-E1.5 3P

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## POSITIONING PUMP

### Lifting

Use lifting equipment with a capacity of at least **500 pounds**. This pump weighs approximately **96 pounds**, not including the weight of accessories and base. Customer installed equipment such as suction and discharge piping **must** be removed before attempting to lift.

### CAUTION

The pump assembly can be seriously damaged if the 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.

### Clearance

A minimum clearance of **18 inches** in front of the cover plate is required to permit removal of the cover and easy access to the pump interior.

## 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

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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 1 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).

## INSTALLATION

## 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.

## 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.

## 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 con- //  
// nections. //  
// //  
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////  
//  
// Do not install and operate a non-explosion proof motor //  
// in an explosive atmosphere. Install, connect, and oper- //  
// ate the motor in accordance with the National Electric //  
// Code and all local codes. If there is a conflict be- //  
// tween 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 pre- //  
// cedence. //  
// //  
////////////////////////////////////
```

Refer to the following motor data before making electrical connections.

## OPERATION

## OPERATION - SECTION C

## WARNING

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

## CAUTION

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

## PRIMING

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.



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## OPERATION

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### 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.

## OPERATION

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### 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. Disconnect incoming power to the motor and lock
// it out to ensure that the pump will remain inop-
// erative.
// 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.
//
////////////////////////////////////

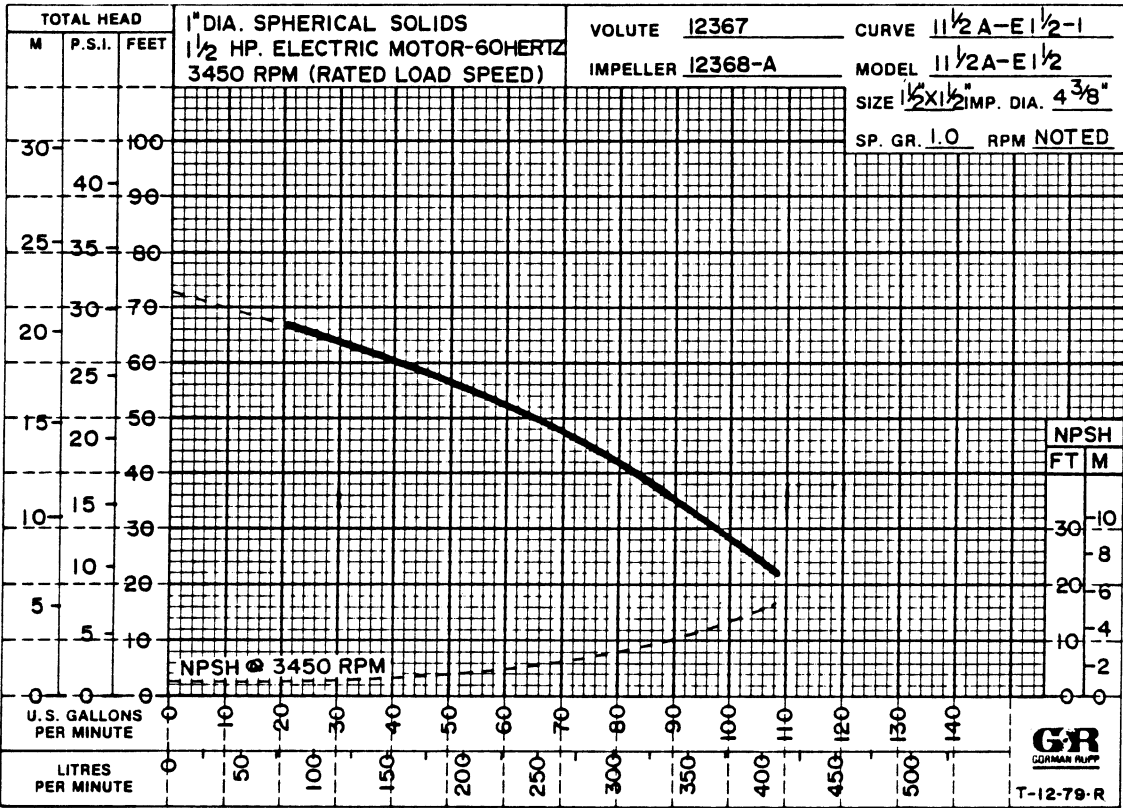
```

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
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.

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 11 1/2A2-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.)

**PARTS LIST**  
**Model 11 1/2A2-E1.5 3P**  
 (From S/N 412712 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	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING	12367	10010	1	28	*BACK COVER GSKT	12369-G	20000	1
2	*IMPELLER	12368-A	10010	1	29	BACK COVER PLATE	12369	10010	1
3	*SEAL ASSY	GS625	-----	1	30	HEX HD CAPSCREW	B0808	15991	2
4	SUCTION FLANGE	8599	10010	1	31	CLAMP BAR SCREW	8618	24000	1
5	ACCESSORY PLUG	P04	11990	1	32	CLAMP BAR	12370	11000	1
6	FILL PLUG ASSY	48271-067	-----	1	33	LOCKWASHER	J04	15991	2
7	NAME PLATE	38818-021	13990	1	34	HEX NUT	D04	15991	2
8	DRIVE SCREW	BM#04-03	15990	4	35	CHECK VALVE ASSY	1352	-----	1
9	WARNING PLATE	2613-EV	13990	REF	36	*-CHECK VALVE	1352-G	19070	1
10	DRIVE SCREW	BM#04-03	15990	REF	37	-SM VALVE WEIGHT	1354	10010	1
11	*IMP ADJ SHIM SET	513-A	17090	REF	38	-RD HD MACH SCRW	X0403	17090	1
12	STUD	C0605 1/2	15991	4	39	-LOCKWASHER	J04	17090	1
13	HEX NUT	D06	15991	4	40	-LRG VLV WEIGHT	1353	10010	1
14	GREASE CUP	S36	-----	1	41	STUD	C0606	15991	4
15	PIPE NIPPLE	T0410	15070	1	42	HEX NUT	D06	15991	4
16	PIPE ELBOW	R04	11990	1		NOT SHOWN:			
17	WARNING DECAL	2613-FE	-----	1		ROTATION DECAL	2613-M	-----	1
18	*SLINGER RING	14049	19140	1		STRAINER	12383	24000	1
19	1.5 HP 3P MOTOR	M41	-----	1		SUCTION STICKER	6588-AG	-----	1
20	WARNING DECAL	2613-FF	-----	1		DISCHARGE STICKER	6588-BJ	-----	1
21	*SEAL LINER	1904	14080	REF		OPTIONAL:			
22	HEX HD CAPSCREW	B0503-S	15991	4		HI TEMP SHUT-DOWN KITS:			
23	LOCKWASHER	J05	15991	4		120°F	48313-257	-----	1
24	INTERMEDIATE ASSY	2935	10010	1		130°F	48313-256	-----	1
25	*CASING GSKT SET	504-G	18000	1		145°F	48313-186	-----	1
26	*WEAR PLATE ASSY	2643	15990	1					
27	CASING DRAIN PLUG	P06	11990	1					

\*INDICATES PARTS RECOMMENDED FOR STOCK

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

CANADIAN SERIAL NO ..... AND UP

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## Pump Disassembly

Remove the hardware securing the pump casing to the base.

Remove the nuts (13) and slide the casing off the intermediate (24). Remove the gasket set (25) from the casing studs. Tie and tag the gasket set for ease of reassembly.

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.

To remove the impeller, immobilize the motor shaft, and tap the vanes with a soft-faced mallet or block of wood in a counterclockwise direction (when facing the impeller). **Be careful** not to damage the impeller vanes. Use caution when unscrewing the impeller from the shaft; tension on the seal spring will be released as the impeller is removed.

Remove the impeller adjusting shims (11). Tie and tag the shims for ease of reassembly.

## 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 intermediate. Use a stiff wire with a hooked end to remove the inboard stationary washer, packing ring, stationary and rotating seal elements, and slinger ring (18).

Inspect the seal liner (21) for wear or grooves that could cause leakage or damage to the seal packing rings. The seal liner is a press fit in the intermediate (24) and does not normally require replacement. If replacement is required, remove the grease cup and piping (14, 15 and 16). Remove the hardware (22 and 23) securing the intermediate to the motor, and slide the intermediate off the shaft.

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

## Seal Installation

### (Figures 1 and 2)

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

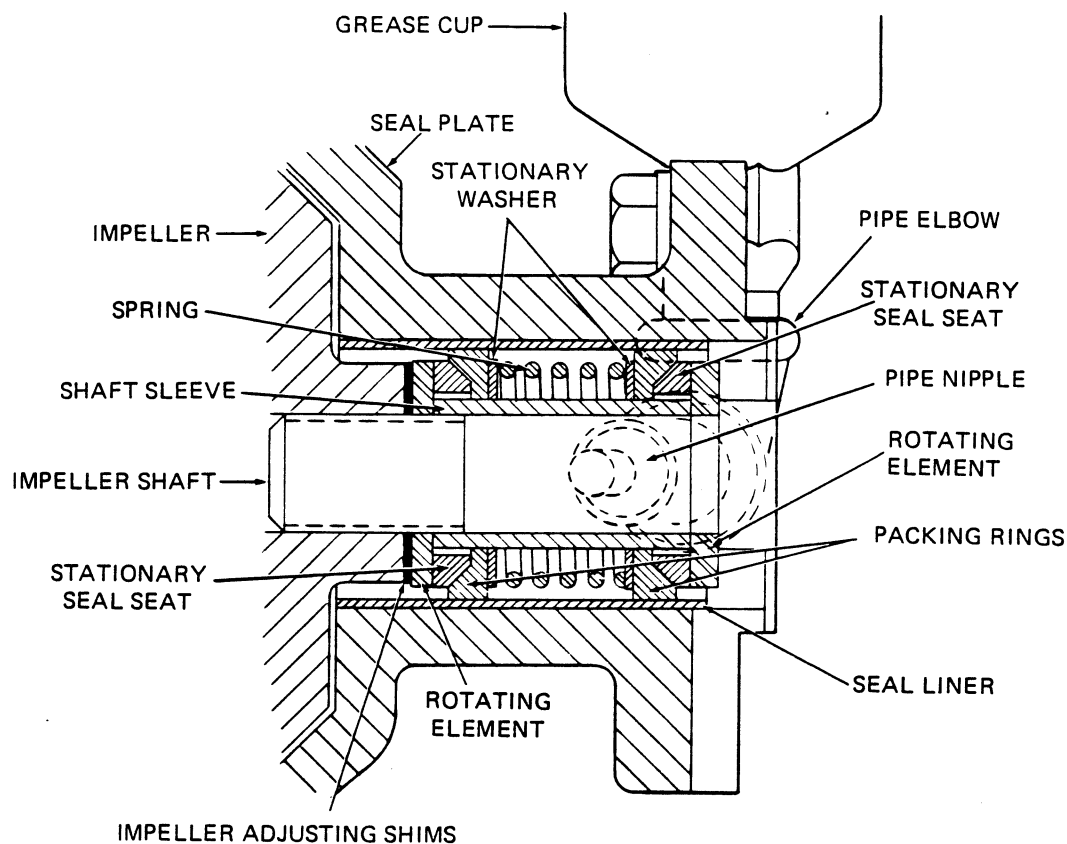


Figure 2. GS625 Seal Assembly

## CAUTION

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

Before installing the seal, inspect the bore of the seal liner (22) for wear or grooves that might cause leakage or damage to the seal packing rings. If the seal liner must be replaced, position the intermediate 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.

Secure the intermediate to the motor with the previously hardware (22 and 23). Be sure the rotation decal (17) is up.

Install the slinger ring (18) on the shaft.

Slide the inboard rotating element into the lubricated seal liner with the chamfered side toward the shaft shoulder. 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



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### NOTE

To ease future disassembly, apply a film of grease of 'Never-Seez' on the back cover shoulder, or any surface which contacts the pump casing. This action will reduce rust and scale build-up.

Secure the back cover assembly with the clamp bar (32) and clamp bar screw (31). Be sure the wear plate does not bind against the impeller.

### Suction Check Valve Reassembly And Installation

Assemble the valve weights to each side of the check valve gasket (36) and secure the parts with the round head machine screw and lockwasher (38 and 39).

Position the check valve assembly in the suction port with the large weight (40) toward the impeller and the small weight (37) toward the suction flange (4). Install the suction flange, and secure the complete assembly with the nuts (42).

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).

**For U.S. and International Warranty Information,  
Please Visit [www.grpumps.com/warranty](http://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](http://www.grcanada.com/warranty)  
or call:  
519-631-2870**