

**INSTALLATION, OPERATION,  
AND MAINTENANCE MANUAL**  
WITH PARTS LIST



**10 SERIES PUMPS**

MODELS
<b>14A2-TS2 S/G</b>

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

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**The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.**

# TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	<b>PAGE I – 1</b>
<b>WARNINGS - SECTION A</b> .....	<b>PAGE A – 1</b>
<b>INSTALLATION – SECTION B</b> .....	<b>PAGE B – 1</b>
Pump Dimensions .....	PAGE B – 1
<b>PREINSTALLATION INSPECTION</b> .....	<b>PAGE B – 2</b>
Battery Specifications And Installation .....	PAGE B – 2
<b>POSITIONING PUMP</b> .....	<b>PAGE B – 2</b>
Lifting .....	PAGE B – 2
Mounting .....	PAGE B – 2
Clearance .....	PAGE B – 2
<b>SUCTION AND DISCHARGE PIPING</b> .....	<b>PAGE B – 2</b>
Materials .....	PAGE B – 3
Line Configuration .....	PAGE B – 3
Connections to Pump .....	PAGE B – 3
Gauges .....	PAGE B – 3
<b>SUCTION LINES</b> .....	<b>PAGE B – 3</b>
Fittings .....	PAGE B – 3
Strainers .....	PAGE B – 3
Sealing .....	PAGE B – 3
Suction Lines In Sumps .....	PAGE B – 3
Suction Line Positioning .....	PAGE B – 4
<b>DISCHARGE LINES</b> .....	<b>PAGE B – 4</b>
Siphoning .....	PAGE B – 4
Valves .....	PAGE B – 5
Bypass Lines .....	PAGE B – 5
<b>OPERATION – SECTION C</b> .....	<b>PAGE C – 1</b>
PRIMING .....	PAGE C – 1
STARTING .....	PAGE C – 1
OPERATION .....	PAGE C – 2
Lines With a Bypass .....	PAGE C – 2
Lines Without a Bypass .....	PAGE C – 2
Leakage .....	PAGE C – 2
Liquid Temperature And Overheating .....	PAGE C – 2
Strainer Check .....	PAGE C – 3
Pump Vacuum Check .....	PAGE C – 3
STOPPING .....	PAGE C – 3
Cold Weather Preservation .....	PAGE C – 3
<b>TROUBLESHOOTING – SECTION D</b> .....	<b>PAGE D – 1</b>
<b>PUMP MAINTENANCE AND REPAIR - SECTION E</b> .....	<b>PAGE E – 1</b>
STANDARD PERFORMANCE CURVE .....	PAGE E – 1
PARTS LISTS:	

**TABLE OF CONTENTS**  
**(continued)**

Pump Model .....	PAGE E – 3
Pump End Assy .....	PAGE E – 5
<b>PUMP AND SEAL DISASSEMBLY AND REASSEMBLY .....</b>	<b>PAGE E – 6</b>
Back Cover Removal .....	PAGE E – 6
Suction Check Valve Removal .....	PAGE E – 6
Pump Casing Removal .....	PAGE E – 7
Impeller Removal .....	PAGE E – 7
Seal Removal and Disassembly .....	PAGE E – 7
Seal Reassembly and Installation .....	PAGE E – 8
Impeller Installation And Adjustment .....	PAGE E – 10
Pump Casing Installation .....	PAGE E – 10
Suction Check Valve Installation .....	PAGE E – 10
Back Cover Installation .....	PAGE E – 11
Final Pump Assembly .....	PAGE E – 11
<b>LUBRICATION .....</b>	<b>PAGE E – 11</b>
Seal Assembly .....	PAGE E – 11
Engine .....	PAGE E – 12

## 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 a 10 Series, semi-open impeller, self-priming centrifugal model with a suction check

valve. The pump is powered by an air-cooled Lister diesel engine engine, model TS2.

The pump will handle dirty water containing specified entrained solids. The basic material of construction for wetted parts is gray iron, with ductile iron impeller and steel wearing parts.

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

**The Gorman-Rupp Company**  
P.O. Box 1217  
Mansfield, Ohio 44901-1217

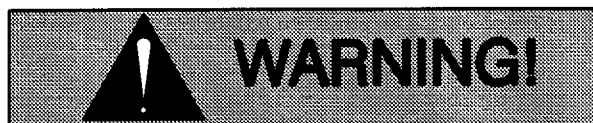
or **Gorman-Rupp of Canada Limited**  
70 Burwell Road  
St. Thomas, Ontario N5P 3R7

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:



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



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



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

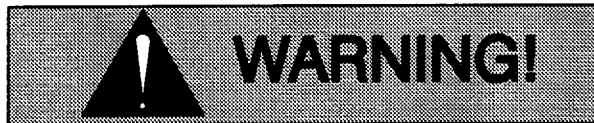
### NOTE

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



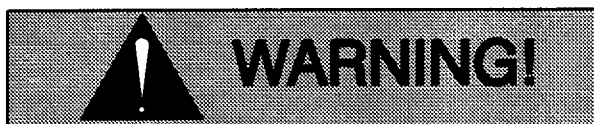
## SAFETY – SECTION A

This information applies to 10 Series engine driven pumps. Refer to the manual accompanying the engine before attempting to begin operation.

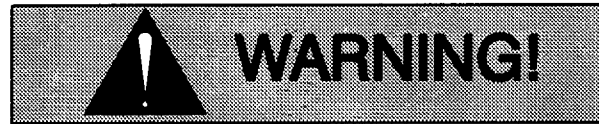


Before attempting to open or service the pump:

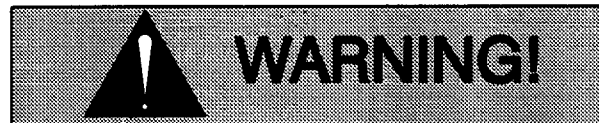
1. Familiarize yourself with this manual.
2. Shut down the engine and take other precautions to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.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



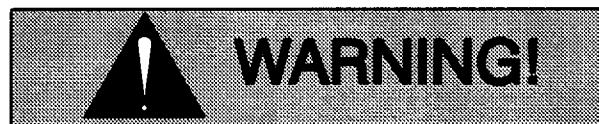
This pump is designed to handle dirty water containing specified entrained solids. Do not attempt to pump volatile, corrosive, or flammable materials, or any liquids which may damage the pump or endanger personnel as a result of pump failure.



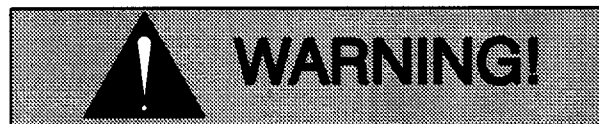
Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. Suction and discharge hoses and piping must be removed from the pump before lifting.



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

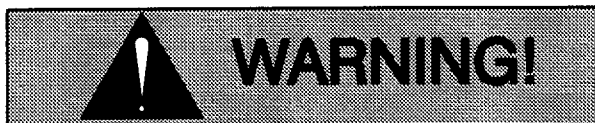


Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.



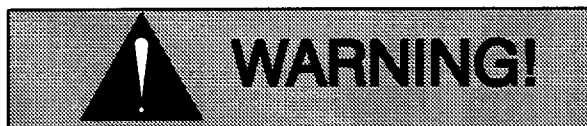
Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disen-

gaged to be ejected with great force. Allow the pump to cool before servicing.



Do not operate an internal combustion engine in an explosive 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.



Fuel used by internal combustion engines presents an extreme 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.



## INSTALLATION – SECTION B

**Review all SAFETY information in Section A.**

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

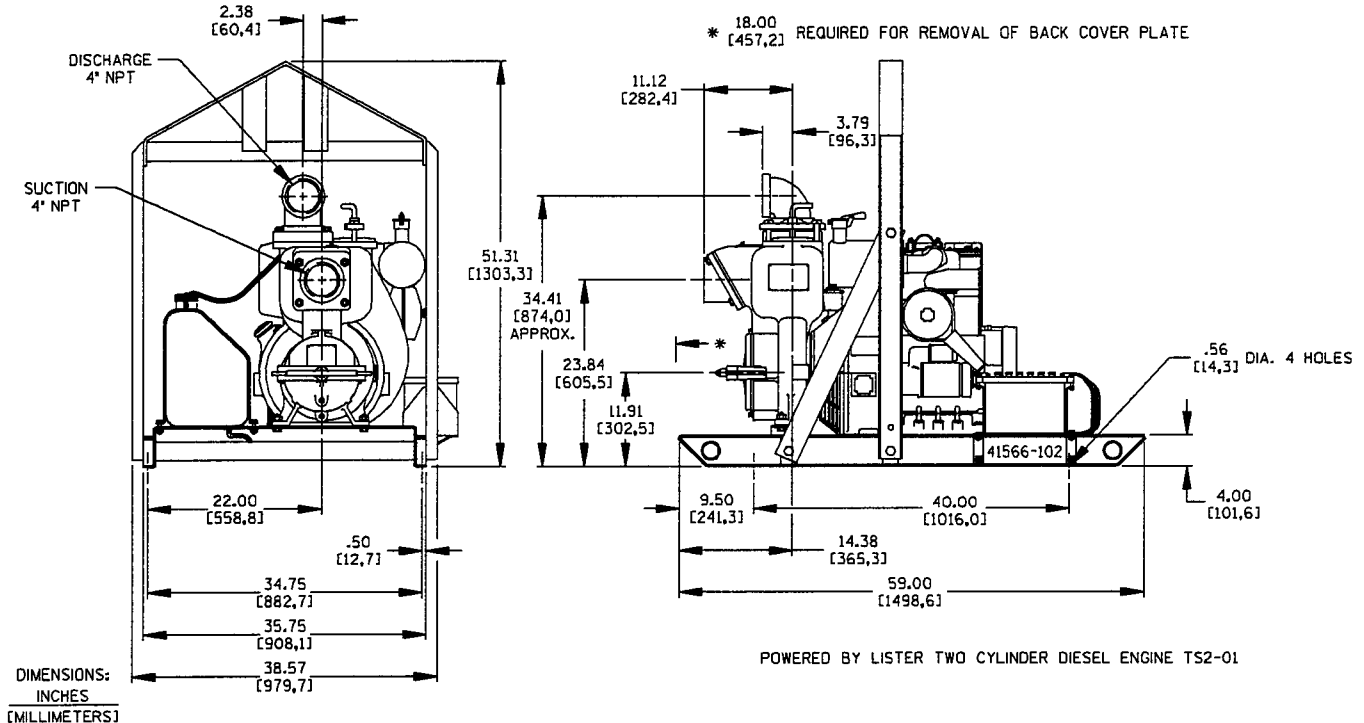
Most of the information pertains to a standard **static lift application where the pump is positioned above the free level of liquid to be pumped.**

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure,

some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to **50%** of the maximum permissible operating pressure. 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.

### OUTLINE DRAWING



**Figure 1. Pump Model 14A2-TS2 S/G**

### PREINSTALLATION INSPECTION

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

- a. Inspect the pump for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after dry-

ing, check for loose hardware at mating surfaces.

- c. Carefully read all warnings and cautions contained in this manual or affixed to the pump, and perform all duties indicated.
- d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.

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

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

**Battery Specifications And Installation**

Unless otherwise specified on the pump order, the engine battery was **not** included with the unit. Refer to the following specifications when selecting a battery.

Voltage	Cold Crank Amps @ 0° F	Reserve Capacity @ 80° F (Minutes)	Amp/ Hr. Rating	Approx. Overall Dims. (Inches)
12 Volts	350-385	76	57	10.25L X 6.75W X 8.88H

**Table 1. Battery Specifications**

Refer to the information accompanying the battery and/or electrolyte solution for activation and charging instructions.

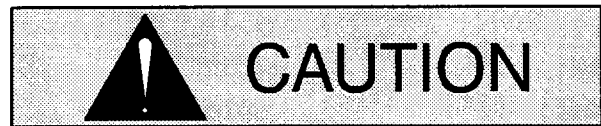
Before installing the battery, clean the positive and negative cable connectors, and the battery terminals. Secure the battery by tightening the holddown brackets. The terminals and clamps may be coated with petroleum jelly to retard corrosion. Connect and tighten the positive cable first, then the negative cable.

**POSITIONING PUMP**

**Lifting**

Use lifting equipment with a capacity of at least **4,500 pounds (2041 kg)**. The pump end weighs approximately **890 pounds (404 kg)**, not including the weight of accessories or customer installed options. Customer installed equipment such as suc-

tion and discharge piping **must** be removed before attempting to lift.



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.

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

To ensure sufficient lubrication and fuel supply to the engine, **do not** position the pump and engine more than 15° off horizontal for continuous operation. The pump and engine may be positioned up to 30° off horizontal for **intermittent operation only**; however, the engine manufacturer should be consulted for continuous operation at angles greater than 15°.

**Clearance**

When positioning the pump, allow a minimum clearance of **18 inches (457 mm)** in front of the back cover, and of the rotating assembly, which must be removed from the back of the pump.

**SUCTION AND DISCHARGE PIPING**

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. Contact the factory to be sure your overall application allows the pump to operate within the safe operation range.

## 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 (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

## SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the

line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

## Fittings

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

## Strainers

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

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

This pump is designed to handle up to 2 inch (50,8 mm) diameter spherical solids.

## Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

## Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the

sump at a distance equal to 1 1/2 times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance 1 1/2 times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a dis-

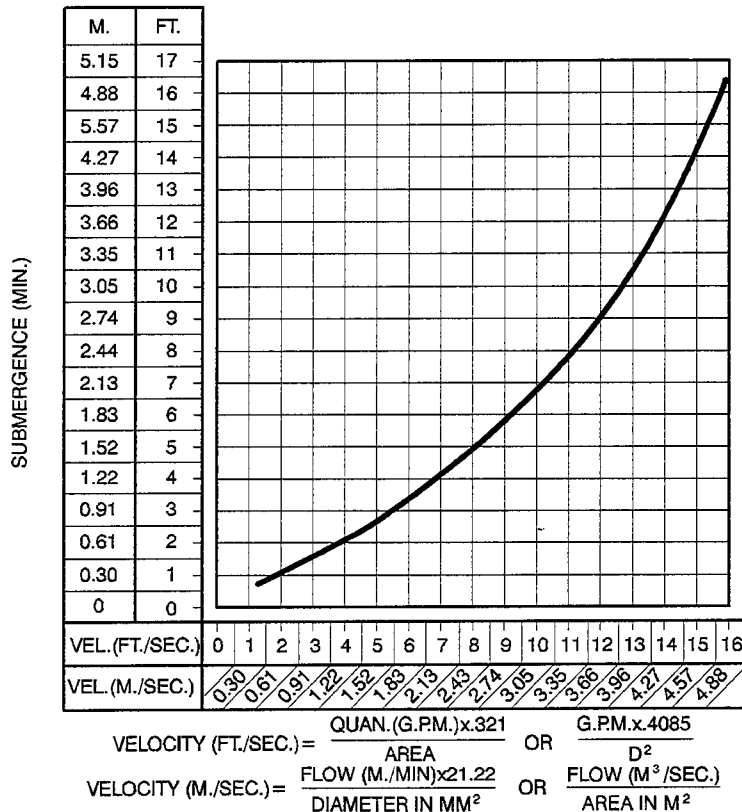
tance equal to at least 3 times the diameter of the suction pipe.

**Suction Line Positioning**

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

**NOTE**

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



**Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity**

## DISCHARGE LINES

### Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

### Valves

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

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

With high discharge heads, it is recommended that a throttling valve and a system check valve be in-

stalled in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.



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

### Bypass Lines

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



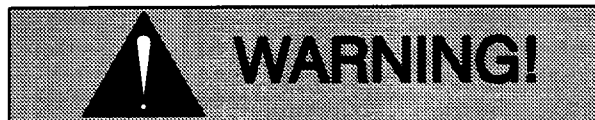
## OPERATION – SECTION C

Review all SAFETY information in Section A.

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



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



Never tamper with the governor to gain more power. The governor establishes safe operating limits that should not be exceeded. The maximum continuous operating speed is 2300 RPM.

### PRIMING

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

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



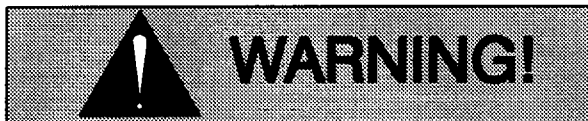
Never operate this pump unless there is liquid in the pump casing. The pump will

not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

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

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



After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

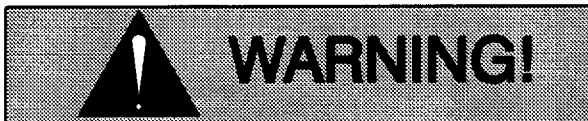
To fill the pump, remove the pump casing fill cover or fill plug in the top of the casing, and add clean liquid until the casing is filled. Replace the fill cover or fill plug before operating the pump.

### NOTE

*This pump is self-priming; however, it is **not** suited for unattended reprime applications. In the event of suction check valve failure and loss of prime, the pump casing **must** be refilled through the fill cover or fill plug.*

### STARTING

Consult the operations manual furnished with the engine.



**Consult the operations manual fur-**

nished with the engine before attempting to crank start the engine. When starting, make sure footing is firm and dry and other personnel are clear of the crank rotation plane. To avoid kickback injury, keep legs and upper body out of crank rotation plane and grasp the crank handle with **THE THUMB UNDER THE HANDLE.** (See Figure 1.)

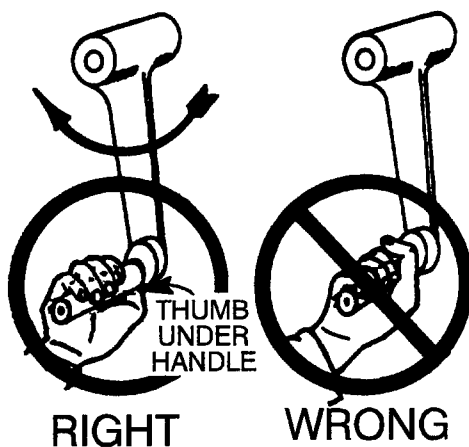


Figure 1. Crank Starting

## OPERATION

### Lines With a Bypass

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

### Lines Without a Bypass

Open all valves in the discharge line and start the engine. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.

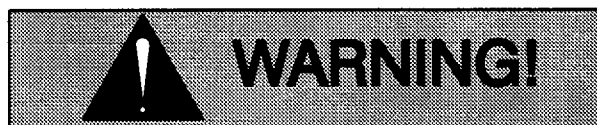
### Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

### Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 110° F (43°C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.



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



## low the pump to completely 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 (508,0 mm) or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists.

Before checking for the source of the leak, check the point of installation of the vacuum gauge.

## STOPPING

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

On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.



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

After stopping the pump, remove the engine ignition key to ensure that the pump will remain inoperative.

### Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts. If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.



## TROUBLESHOOTING – SECTION D

Review all SAFETY information in Section A.



**Before attempting to open or service the pump:**

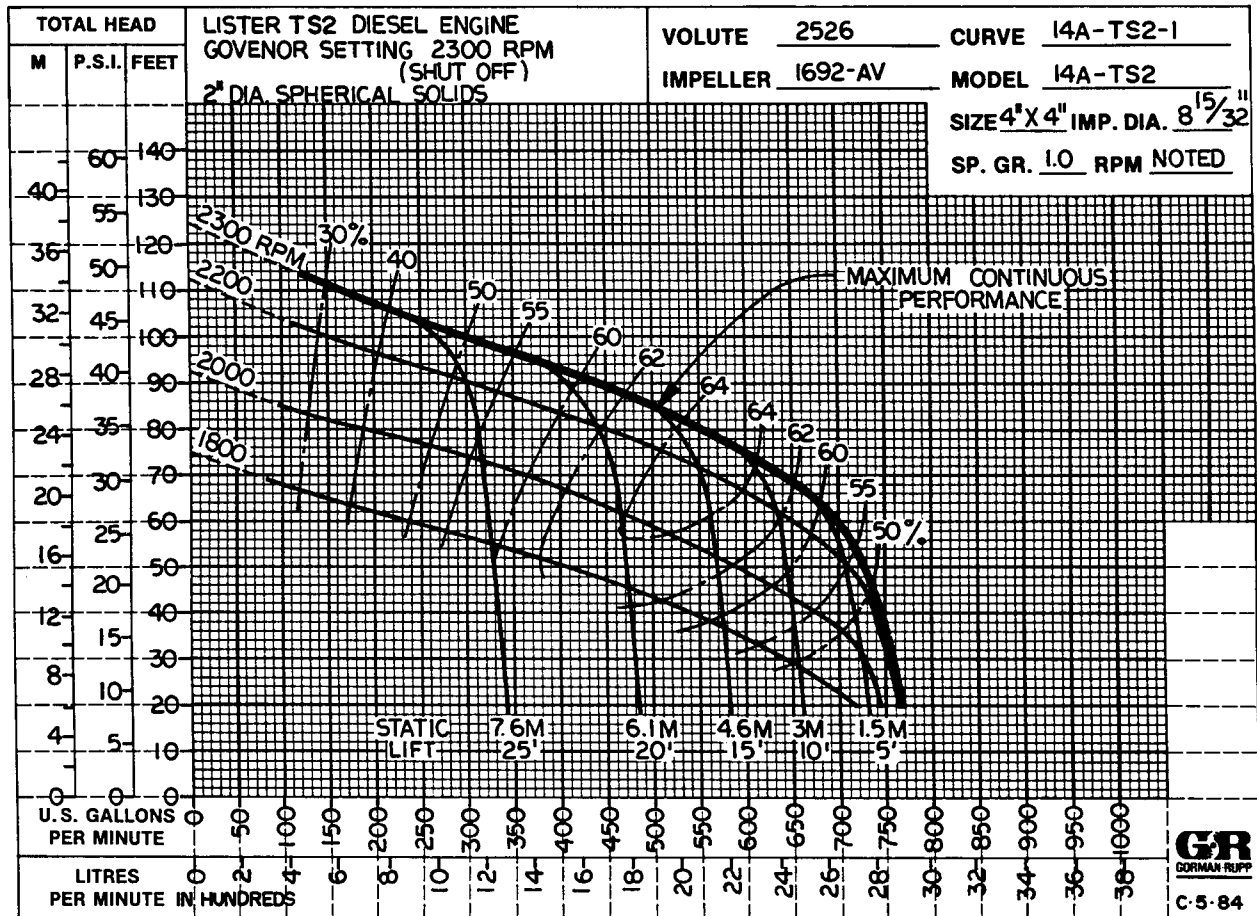
1. Familiarize yourself with this manual.
2. Shut down the engine and take other precautions to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.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

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing. Suction check valve contaminated or damaged. Air leak in suction line. Lining of suction hose collapsed. Leaking or worn seal or pump gasket. Suction lift or discharge head too high. Strainer clogged.	Add liquid to casing. See <b>PRIMING</b> . Clean or replace check valve. Correct leak. Replace suction hose. Check pump vacuum. Replace leaking or worn seal or gasket. Check piping installation and install bypass line if needed. See <b>INSTALLATION</b> . Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line. Lining of suction hose collapsed. Leaking or worn seal or pump gasket. Strainer clogged.	Correct leak. Replace suction hose. Check pump vacuum. Replace leaking or worn seal or gasket. Check strainer and clean if necessary.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (CONT'D)	<p>Suction intake not submerged at proper level or sump too small.</p> <p>Impeller or other wearing parts worn or damaged.</p> <p>Impeller clogged.</p> <p>Pump speed too slow.</p> <p>Suction lift or discharge head too high.</p>	<p>Check installation and correct submergence as needed.</p> <p>Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.</p> <p>Free impeller of debris.</p> <p>Check engine output; consult engine operation manual.</p> <p>Check piping installation and install bypass line if needed. See <b>INSTALLATION</b>.</p>
PUMP REQUIRES TOO MUCH POWER	<p>Pump speed too high.</p> <p>Discharge head too low.</p> <p>Liquid solution too thick.</p>	<p>Check engine output.</p> <p>Adjust discharge valve.</p> <p>Dilute if possible.</p>
PUMP CLOGS FREQUENTLY	<p>Liquid solution too thick.</p> <p>Discharge flow too slow.</p> <p>Discharge line clogged or restricted; hose kinked.</p> <p>Suction check valve or foot valve clogged or binding.</p>	<p>Dilute if possible.</p> <p>Open discharge valve fully to increase flow rate, and run power source at maximum governed speed.</p> <p>Check discharge lines; straighten hose.</p> <p>Clean valve.</p>
EXCESSIVE NOISE	<p>Cavitation in pump.</p> <p>Pumping entrained air.</p> <p>Pump or drive not securely mounted.</p> <p>Impeller clogged or damaged.</p>	<p>Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.</p> <p>Locate and eliminate source of air bubble.</p> <p>Secure mounting hardware.</p> <p>Clean out debris; replace damaged parts.</p>
BEARINGS RUN TOO HOT	<p>Bearing temperature is high, but within limits.</p> <p>Low or incorrect lubricant.</p> <p>Suction and discharge lines not properly supported.</p> <p>Drive misaligned.</p>	<p>Check bearing temperature regularly to monitor any increase.</p> <p>Check for proper type and level of lubricant.</p> <p>Check piping installation for proper support.</p> <p>Align drive properly.</p>

## PUMP MAINTENANCE AND REPAIR - SECTION E

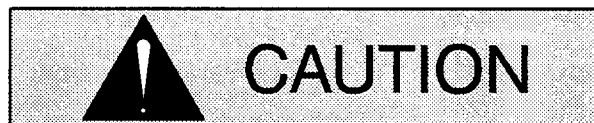
**MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.**



**\* STANDARD PERFORMANCE FOR PUMP MODELS 14A2-TS2 S/G**

\* Based on 70° F (21° C) clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

Contact the Gorman-Rupp Company to verify performance or part numbers.



If your pump serial number is followed by an "N", your pump is **NOT** a standard production model.

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

SECTION DRAWING

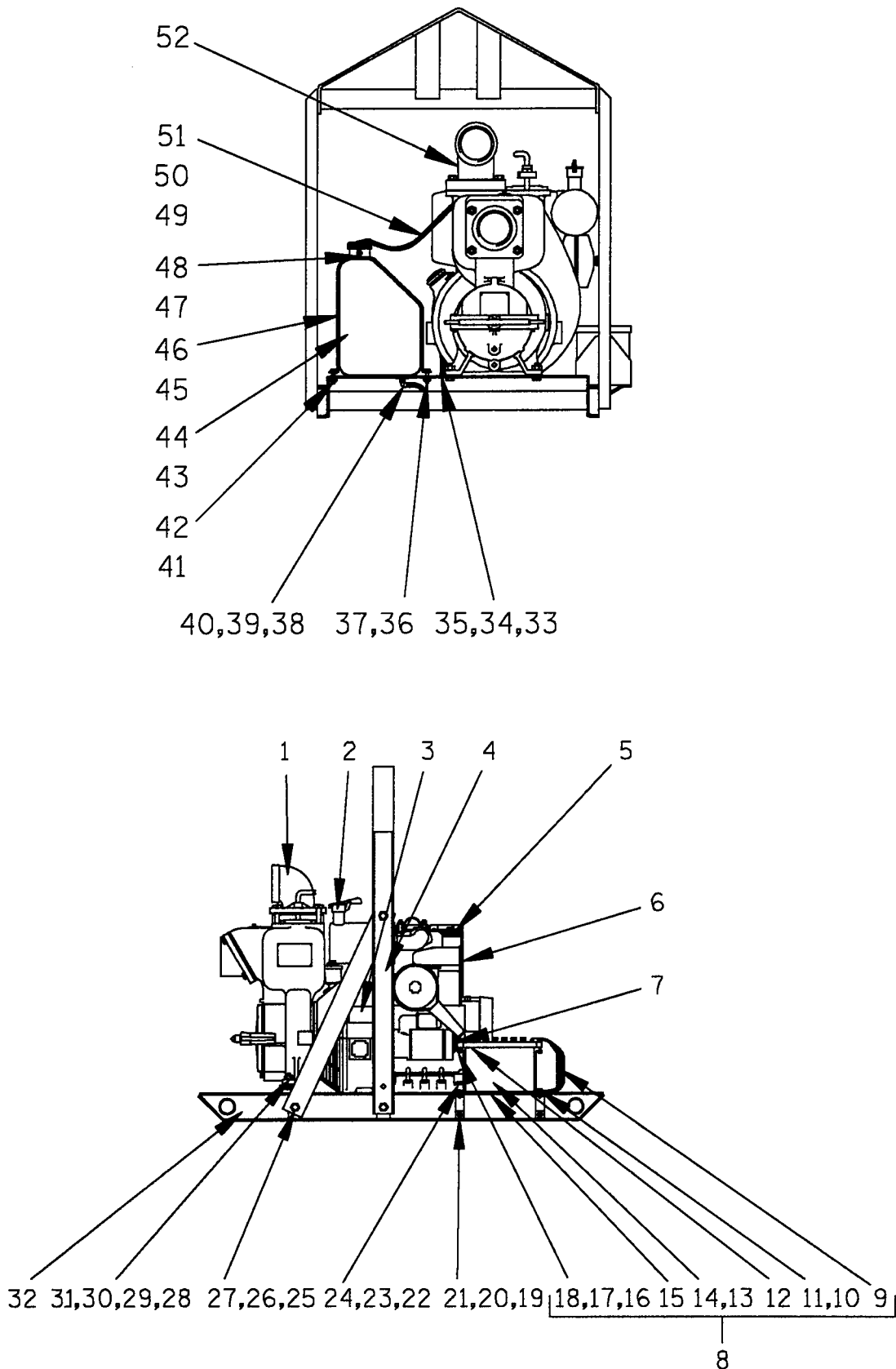


Figure 1. Pump Model 14A2-TS2 S/G

**PARTS LIST**  
**Pump Model 14A2-TS2 S/G**  
 (From S/N 1110708 up)

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

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP END ASSY	14A2-(TS2)	---	1	31	FLAT WASHER	K08	15991	2
2	WEATHER CAP	S1331	---	1	32	COMBINATION BASE	41566-102	24150	1
3	WARNING DECAL	38816-096	---	1	33	HOSE CONNECTOR	26523-382	---	1
4	HOIST BAIL ASSY	44715-023	24150	1	34	FUEL LINE	11308D	---	1
5	LISTER ENGINE	29231-145	---	1	35	HOSE CLAMP	26518-641	---	1
6	WARNING DECAL	38817-058	---	1	36	HEX HD CAPSCREW	B0607	15991	2
7 *	BATTERY CABLE ASSY	47311-402	---	1	37	FLANGED HEX NUT	21765-314	---	2
8	BATTERY BOX ASSY	GRP40-02C	---	1	38	PIPE PLUG	P04	15079	1
9	-GRD CABLE ASSY	5795AC	24040	1	39	BARBED ELBOW	26523-463	---	1
10	-HEX HD CAPSCREW	B0604	15991	4	40	HOSE CLAMP	26518-641	---	1
11	-FLANGED HEX NUT	21765-314	---	4	41	HEX HD CAPSCREW	B0606	15991	2
12	-BATTERY FRAME	8355B	24000	1	42	FLANGED HEX NUT	21765-314	---	2
13 *	-12V BATTERY	SEE OPTIONS		1	43	FELT STRIP	9490	18030	2
14	-BATTERY TAG	38818-338	---	1	44	FUEL TANK	7467A	---	1
15	-BATTERY BOX	8356B	24000	1	45	FELT STRIP	9490D	18030	2
16	-HEX HD CAPSCREW	B0612	15991	2	46	GAS TANK STRAP	6353	15990	2
17	-FLAT WASHER	K06	15991	2	47	HOSE CONNECTOR	26523-382	---	1
18	-FLANGED HEX NUT	21765-314	---	2	48	HOSE CLAMP	26518-641	---	1
19	HEX HD CAPSCREW	B0603	15991	2	49	FUEL LINE	11308D	---	1
20	FLANGED HEX NUT	21765-314	---	2	50	HOSE CLAMP	26518-641	---	1
21	BRACE	34335-138	15120	2	51	HOSE CONNECTOR	26523-382	---	1
22	HEX HD CAPSCREW	B0810	15991	4	52	ST ELBOW	RS64	11990	1
23	LOCKWASHER	J08	15991	4		NOT SHOWN:			
24	HEX HD NUT	D08	15991	4		GUARD WARNING STK	38816-063	---	1
25	HEX HD CAPSCREW	B1006	15991	6		ENG START-UP TAG	38816-269	---	1
26	LOCKWASHER	J10	15991	6		OPTIONS:			
27	HEX NUT	D10	15991	6		WHEEL KIT	GRP30-231A	---	1
28	HEX HD CAPSCREW	B0807	15991	2		* 12V BATTERY	S1338	---	1
29	LOCKWASHER	J08	15991	2					
30	HEX NUT	D08	15991	2					

\* INDICATES PARTS RECOMMENDED FOR STOCK

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

CANADIAN SERIAL NO. .... AND UP

SECTION DRAWING

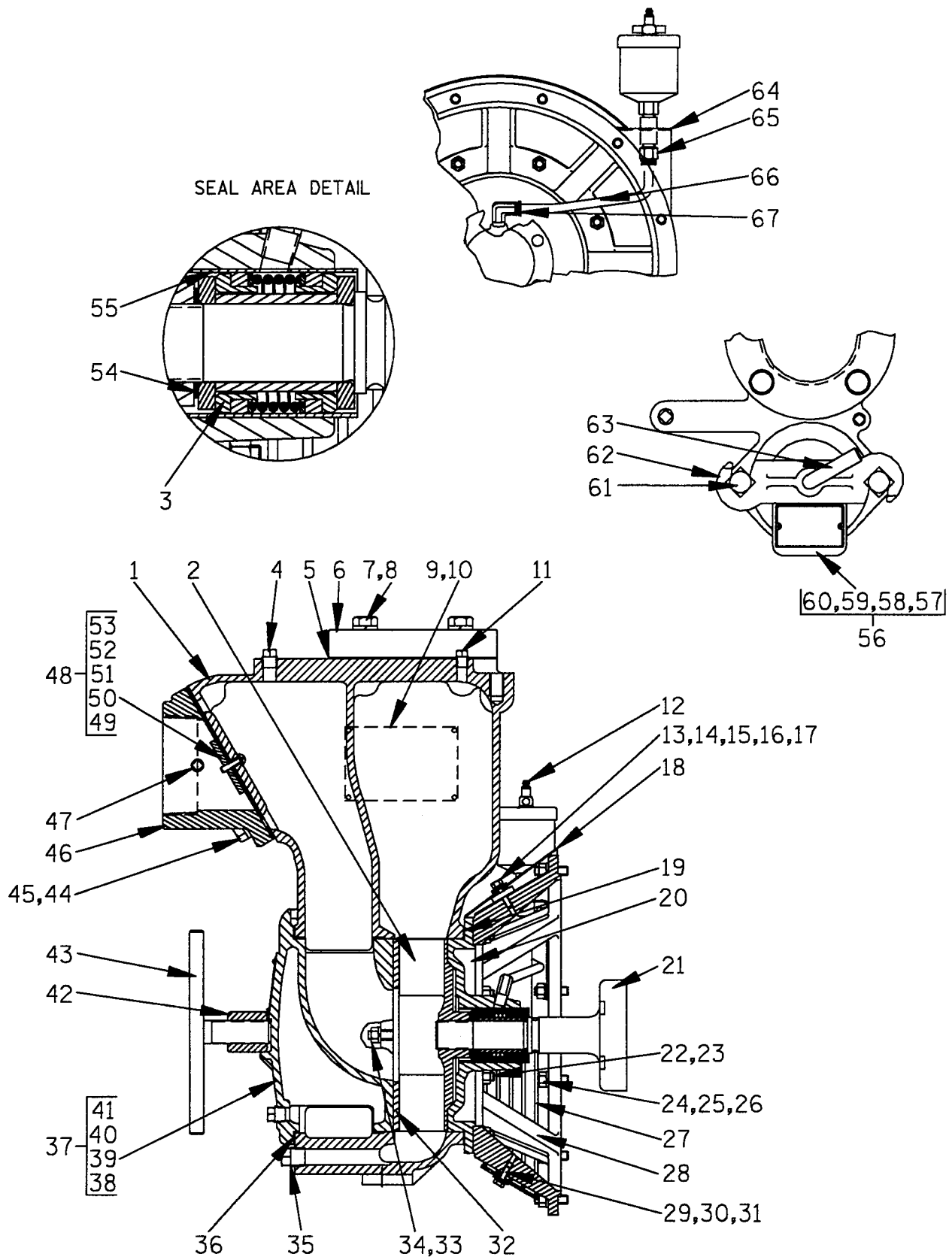


Figure 2. Pump End Assembly 14A2-(TS2)



## PARTS LIST

### Pump End Assembly 14A2-(TS2)

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP CASING	2526	10010	1	42	COVER CLAMP BAR	2528	11010	1
2 *	IMPELLER	1692AV	11060	1	43	CVR CLAMP SCREW ASSY	2536	24000	1
3 *	SEAL ASSY	GS1250	---	1	44	HEX HD CAPSCREW	B1007	15991	4
4	PIPE PLUG	P06	15079	1	45	LOCKWASHER	J10	15991	4
5 *	DISCH FLANGE GSKT	1674G	18000	1	46	SUCTION FLANGE	1736	10010	1
6	DISCHARGE FLANGE	271	10010	1	47	PIPE PLUG	P04	15079	1
7	HEX HD CAPSCREW	B1008	15991	4	48	CHECK VALVE ASSY	9915	---	1
8	LOCKWASHER	J10	15991	4	49	-RD HD MACH SCREW	X0404	17000	2
9	NAME PLATE	38818-023	13990	1	50	-VALVE WEIGHT	19	10010	1
10	DRIVE SCREW	BM#04-03	17000	4	51	-LOCKWASHER	J04	17090	2
11	PIPE PLUG	P04	15079	1	52	-VALVE WEIGHT	2936	10010	1
12	GREASE CUP	S1509	---	1	53	-CHECK VALVE GSKT	131D	19080	1
13	WASHER	S157	---	2	54	IMP ADJ SHIM SET	37J	17090	REF
14	STUD	C0405	15991	2	55	SEAL LINER	2205	14080	1
15	LOCKWASHER	J04	15991	2	56	FILL COVER PLATE ASSY	42111-344	---	1
16	FLAT WASHER	K04	15991	2	57	-COVER PLATE	NOT AVAILABLE		1
17	HEX NUT	D04	15991	2	58	-WARNING PLATE	38816-097	13990	1
18	SHIELD	34921-002	15020	1	59	-DRIVE SCREW	BM#04-03	17000	2
19 *	CASING GSKT SET	2474G	18000	1	60	-CVR PLATE GSKT	50G	19210	1
20	SEAL PLATE ASSY	2948A	10010	1	61	MACHINE BOLT	A1014	15991	2
21	STUB SHAFT	38531-008	11010	REF	62	CLAMP BAR	38111-004	11010	1
22	STUD	C0607	15991	8	63	CLAMP BAR SCREW	31912-009	15000	1
23	HEX NUT	D06	15991	8	64	MTG BRACKET ASSY	41881-360	24150	1
24	STUD	C0606	15991	12	65	MALE CONNECTOR	26171-013	---	1
25	HEX NUT	D06	15991	12	66	TUBING	31411-242	19550	1
26	LOCKWASHER	J06	15991	12	67	MALE ELBOW	26171-038	---	1
27	INTERMEDIATE GUARD	42381-036	24152	1		NOT SHOWN:			
28	ADAPTOR	38262-504	11060	1		STRAINER	2690	24000	1
29	HEX HD CAPSCREW	B0403	15991	2		GUARD WARNING STK	38816-063	---	1
30	LOCKWASHER	J04	15991	2		WARNING DECAL	38816-096	---	1
31	FLAT WASHER	K04	15991	2		INSTRUCTION TAG	38817-043	---	1
32	WEAR PLATE	2605	15990	1		SUCTION STICKER	6588AG	---	1
33	LOCKWASHER	J06	15991	2		PRIMING STICKER	6588AH	---	1
34	HEX NUT	D06	15991	2		GREASE CUP INSTRUCT	6588BD	---	1
35	CASING DRAIN PLUG	P08	15079	1		DISCHARGE STICKER	6588BJ	---	1
36 *	CVR PLATE GSKT	2527G	19090	1		INSTRUCTION LABEL	2613DK	---	1
37	COVER PLATE ASSY	42111-926	---	1		WARNING DECAL	2613FE	---	1
38	-COVER PLATE	NOT AVAILABLE		1		OPTIONAL:			
39	-PIPE PLUG	P06	15079	1		12V BATTERY	S1680	-----	1
40	-WARNING PLATE	2613EV	13990	1					
41	-DRIVE SCREW	BM#04-03	17000	4					

\* INDICATES PARTS RECOMMENDED FOR STOCK

## PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

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

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional views (see Figures 1 and 2) and the accompanying parts lists.

Most service functions, such as wear plate, impeller, and seal replacement, may be performed by draining the pump and removing the back cover assembly. However, the following instructions assume complete disassembly is required.

Before attempting to service the pump, shut down the engine and take other precautions to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

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



**Before attempting to open or service the pump:**

1. Familiarize yourself with this manual.
2. Shut down the engine and take other precautions to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.

6. Vent the pump slowly and cautiously.

7. Drain the pump.



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

### Back Cover Removal

(Figure 2)

Before attempting to service the pump, remove the pump casing drain plug (35) and drain the pump. Clean and reinstall the drain plug. The wear plate (32) and check valve (48) are easily accessible and may be serviced by removing the back cover assembly (37).

Remove the cover clamp screw (43) and clamp bar (42) securing the back cover. Pull the back cover and assembled wear plate from the pump casing (1). Inspect the back cover gasket (36) and replace it if damaged or worn.

Inspect the wear plate and replace it if badly scored or worn. To remove the wear plate, disengage the hardware (33 and 34).

### Suction Check Valve Removal

(Figure 2)

If the check valve assembly (48) is to be serviced, remove the suction piping and disengage the hardware (44 and 45) securing the flange (46) and check valve to the pump casing. Remove the check valve assembly from the suction port.

Remove the hardware (49 and 51) securing the check valve weights (50 and 52) to the check valve gasket (53).

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

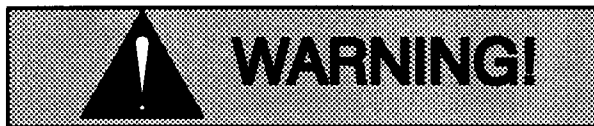
## Pump Casing Removal

### (Figure 1)

To service the impeller or seal assembly, disconnect the suction and discharge piping. Remove the hardware (28, 29, 30 and 31) securing the pump casing to the base (32).

### (Figure 2)

Remove the nuts (23) securing the pump casing to the seal plate (20). Install a standard 5/8-11 UNC lifting eye in the tapped hole in the top of the pump casing. **Be sure** to screw the eye into the casing until fully engaged. Use a hoist and sling of suitable capacity to separate the casing from the seal plate and intermediate.



**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.**

Remove the pump casing gaskets (19). Remove any leveling shims used under the casing mounting feet. Tie and tag the shims for ease of reassembly.

## Impeller Removal

### (Figure 1)

Turn the cross arm on the automatic lubricating grease cup (12) clockwise until it rests against the cover (see Figure 4). This will prevent the grease from escaping when the impeller is removed.

To remove the impeller (2), tap the vanes in counterclockwise direction (when facing the impeller) with a block of wood or soft-faced mallet. **Be careful** not to damage the impeller. When the impeller breaks loose, unscrew it from the shaft. Use caution when removing the impeller; tension on the shaft seal spring will be released as the impeller is unscrewed. Inspect the impeller and replace if cracked or badly worn.

Slide the impeller adjusting shims (54) off the impeller shaft (21). Tie and tag the shims or measure and record their thickness for ease of reassembly.

## Seal Removal and Disassembly

### (Figures 2 and 3)

To remove the seal assembly (3), remove the grease cup and piping (12, 65, 66 and 67). Slide the seal plate and seal parts off the shaft as a single unit. **Be careful** not to drop or damage any seal parts.

Carefully remove the stationary and rotating seal elements, packing rings, seal spring, and shaft sleeve from the seal plate.

### NOTE

*The seal assembly may be removed without completely disassembling the pump by removing the impeller through the back cover opening and using a pair of stiff wires with hooked ends to pull the seal parts out of the seal plate.*

Inspect the seal liner (55) for wear or grooves which could cause leakage or damage to the seal packing rings. The seal liner is a press fit in the seal plate, and does not normally require replacement. If replacement is necessary, see **Seal Installation**.

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

## Stub Shaft Removal

### (Figure 2)

Inspect the stub shaft (21) for distortion, nicks, scratches, or thread damage. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

To remove the shaft, disengage the hardware (13, 15, 16, 17, 29, 30, and 31) and remove the guard (27) and shield (18). Remove the hardware (25 and 26) and separate the adaptor (28) and bracket (64) from the engine bellhousing.

Remove the hardware (supplied with the engine) securing the stub shaft to the engine crankshaft.

## Stub Shaft Installation

### (Figure 2)

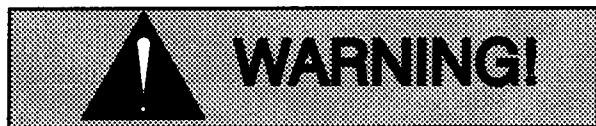
If the stub shaft (21) was removed, secure the new shaft to the engine crankshaft with the hardware

supplied with the engine. Secure the adaptor (28) and bracket (64) to the engine bellhousing with the hardware (25 and 26). Secure the guard (27 and shield (18) to the bellhousing with the hardware (13, 15, 16, 17, 29, 30 and 31).

### Seal Reassembly and Installation

(Figures 2 and 3)

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



**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 emer-

gency, **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 liner, 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 3).

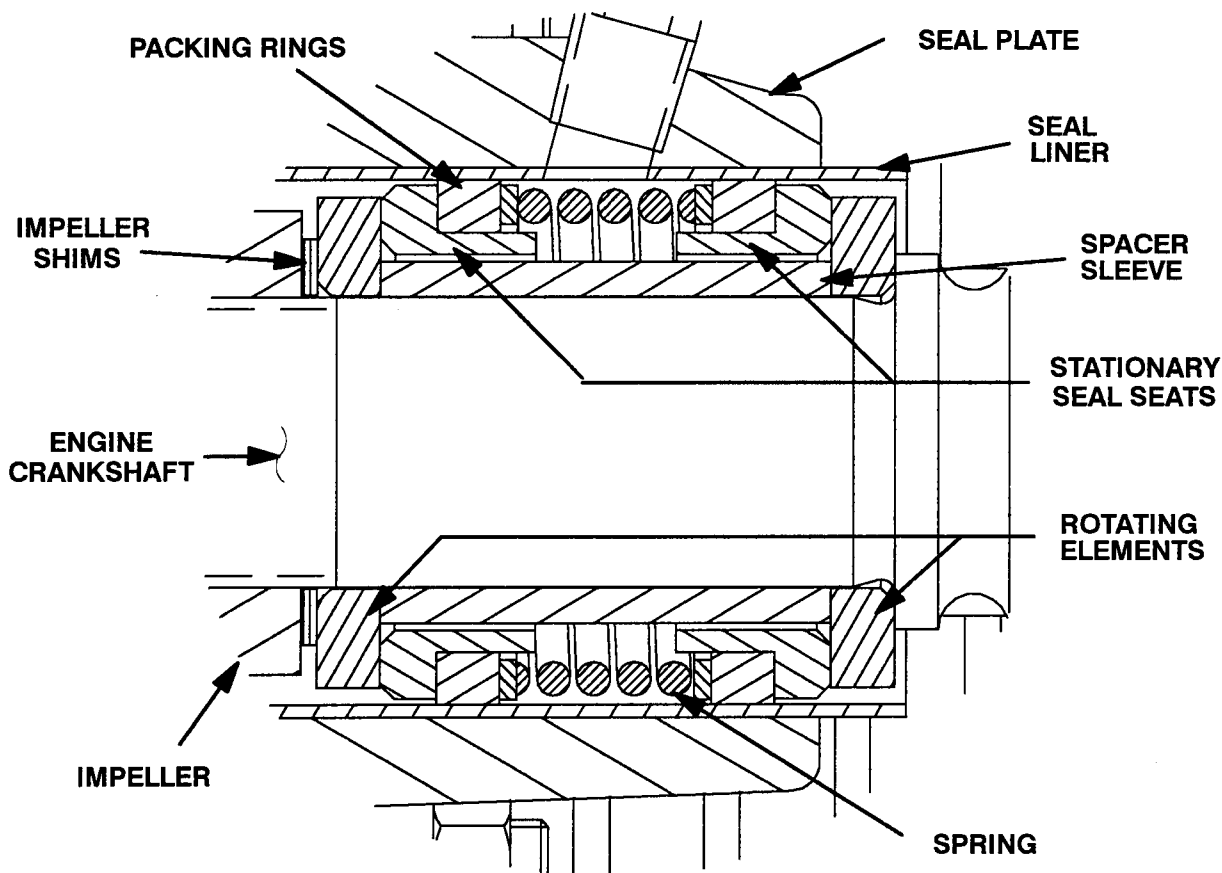


Figure 3. GS1250 Seal Assembly



This seal is not designed for operation at temperatures above 110°F (43°C). Do not use at higher operating temperatures.

Inspect the seal plate (20), seal liner (55), and the stub shaft (21) for burrs or sharp corners, and remove any that exist. Replace the seal liner if wear or grooves exist which could cause leakage or damage to the seal packing rings. To replace the seal liner, 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 properly installed, a 1/4 inch (6,4 mm) diameter hole must be drilled through it to permit the flow of lubricant to the seal assembly. **Be careful** to center the drill in the threaded grease pipe hole and not damage the threads. Deburr the hole from the inside of the seal liner after drilling.

Slide the seal plate onto the shaft until fully seated against the adaptor (28). Align the threaded seal lubricant hole up and temporarily secure the seal plate to the adaptor with two capscrews and nuts (3/8 -16 UNC X 1-1/2 inch long, not supplied).

Install the inboard rotating element with the chamfered side facing the shaft shoulder.

Subassemble the stationary seal seats, packing rings, stationary washers, and spring onto the shaft sleeve. Apply a drop of light oil on the precision finished faces of the stationary seats; **never use grease**. Slide the entire subassembly into the lubricated seal liner until it bottoms against the inboard rotating element.

Install the outboard rotating element with the chamfered side facing the impeller.

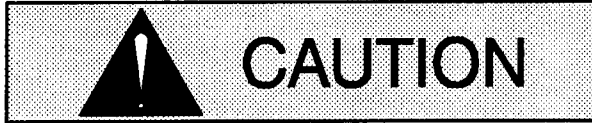
Reinstall the automatic grease cup and piping (12, 65, 66, and 67).

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

## Impeller Installation And Adjustment

### (Figure 2)

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



The shaft and impeller threads **must** be completely clean before reinstalling the impeller. Even the slightest amount of dirt on the threads can cause the impeller to seize to the shaft, making future removal difficult or impossible without damage to the impeller or shaft.

Install the same thickness of impeller adjusting shims (54) as previously removed, and screw the impeller onto the shaft until tight.

#### NOTE

*At the slightest sign of binding, **immediately** back the impeller off, and check the threads for dirt. Do **not** try to force the impeller onto the shaft.*

A clearance of .013 to .025 inch (0,33 to 0,64 mm) between the impeller and the seal plate is necessary for maximum pump efficiency. Measure this clearance, and add or remove impeller adjusting shims as required.

## Pump Casing Installation

### (Figure 2)

Remove the two capscrews temporarily holding the seal plate, and install the same thickness of casing gaskets (19) as previously removed. Secure the seal plate (20) and pump casing (1) to the adaptor (28) with the nuts (23). **Do not** fully tighten the nuts until the impeller face clearance has been set.

#### NOTE

*If the pump has been completely disassembled, it is recommended that the wear plate (32) and back cover assembly (37) be reinstalled at this point. The back cover and wear plate must be in place to ad-*

*just the impeller face clearance.*

A clearance of .026 to .038 inch (0,66 to 0,97 mm) between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance must be set after installing the back cover, by adding or removing gaskets in the pump casing gasket set (19) until the impeller scrapes against the wear plate when the shaft is turned.

#### NOTE

*Pre-load the engine crankshaft toward the pump when setting the face clearance.*

After the impeller scrapes, add approximately .012 inch (0,30 mm) of gaskets.

#### NOTE

*An alternate method of adjusting this clearance is to reach through the discharge port with a feeler gauge and measure the gap. Add or subtract pump casing gaskets accordingly.*

When the face clearance has been properly set, tighten the nuts (23), and secure the casing to the base (32, Figure 1) with previously removed hardware (28, 29, 30 and 31, Figure 1). Be sure to reinstall any leveling shims used under the casing mounting feet.

If a lifting eye was used to move the pump casing, **be sure** to remove the lifting eye from the pump casing.



**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.**

## Suction Check Valve Installation

### (Figure 2)

Inspect the check valve components and replace as required. Subassemble the check valve weights

(50 and 52) and check valve gasket (53) with the hardware (49 and 51).

Position the check valve assembly (48) in the suction port with the large weight facing toward the inside of the pump casing. Install the suction flange (46) and secure with the hardware (44 and 45). Check the operation of the check valve to ensure proper seating and free movement.

### Back Cover Installation

#### (Figure 2)

If the wear plate (32) was removed for replacement, carefully center it on the back cover and secure it with the hardware (33 and 34). The wear plate **must** be concentric to prevent binding when the back cover is installed.

Clean any scale or debris from the contacting surfaces in the pump casing that might interfere or prevent a good seal with the back cover. Replace the back cover gasket (36) and slide the back cover assembly into the pump casing. Be sure the wear plate does not bind against the impeller.

#### NOTE

*To ease future disassembly, apply a film of grease or '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 by tightening the cover clamp screw (43) against the clamp bar (42). **Do not** over-tighten the clamp screw; it should be just tight enough to ensure a good seal at the back cover shoulder.

### Final Pump Assembly

#### (Figure 1)

Install any leveling shims used under the pump casing mounting feet and secure the casing to the base with the previously removed hardware. **Be sure** the pump is secured to the base and engine.

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

**Be sure** the pump end and engine have been properly lubricated, see **LUBRICATION**.

Remove the fill cover assembly (56). Fill the pump casing with clean liquid. Reinstall the fill cover plate and gasket (60), and tighten the cover.

Refer to **OPERATION**, Section C, and start the pump.

## LUBRICATION

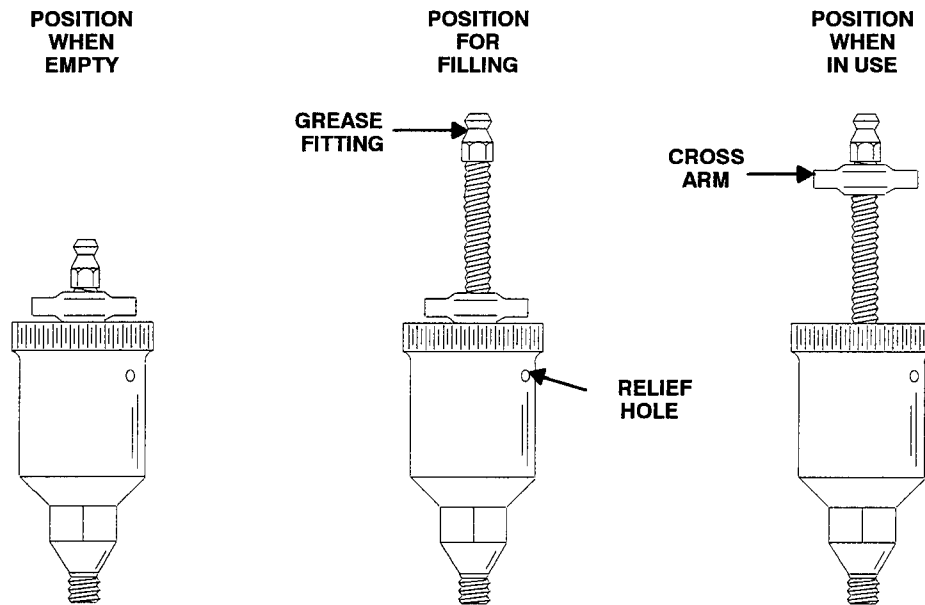
### Seal Assembly

#### (Figure 2)

Fill the grease cup (12) 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 4).

#### NOTE

*Bleed off the seal cavity and supply lines to eliminate an air pocket in the seal area.*

**NOTE:**

*When installing a new grease cup, lubricate the cup as indicated on the installation tag furnished with the grease cup.*

**Figure 4. Automatic Lubricating Grease Cup**

**Engine**

Consult the literature supplied with the engine, or contact your local Lister engine representative.





**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**