OM–06592–01
September 17, 2012

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

10 SERIES PUMP

MODEL

112D60–B–TCD914L6

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

Register your new
Gorman-Rupp pump online at
www.grpumps.com

Valid serial number and e-mail address required.

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

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: _____

Serial Number: _____

TABLE OF CONTENTS

INTRODUCTION ..... PAGE I – 1

WARNINGS - SECTION A ..... PAGE A – 1

INSTALLATION – SECTION B ..... PAGE B – 1

Pump Dimensions ..... PAGE B – 1
PREINSTALLATION INSPECTION ..... PAGE B – 1
POSITIONING PUMP ..... PAGE B – 2
Lifting ..... PAGE B – 2
Mounting ..... PAGE B – 2
Clearance ..... PAGE B – 2
SUCTION AND DISCHARGE PIPING ..... PAGE B – 2
Materials ..... PAGE B – 2
Line Configuration ..... PAGE B – 2
Connections to Pump ..... PAGE B – 2
Gauges ..... PAGE B – 2
SUCTION LINES ..... PAGE B – 3
Fittings ..... PAGE B – 3
Strainers ..... PAGE B – 3
Sealing ..... PAGE B – 3
Suction Lines In Sumps ..... PAGE B – 3
Suction Line Positioning ..... PAGE B – 3
DISCHARGE LINES ..... PAGE B – 4
Siphoning ..... PAGE B – 4
Valves ..... PAGE B – 4
Bypass Lines ..... PAGE B – 4
AUTOMATIC AIR RELEASE VALVE ..... PAGE B – 6
Theory of Operation ..... PAGE B – 6
Air Release Valve Installation ..... PAGE B – 6
ALIGNMENT ..... PAGE B – 7

OPERATION – SECTION C ..... PAGE C – 1

PRIMING ..... PAGE C – 1
STARTING ..... PAGE C – 1
Rotation ..... 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 – 2
Pump Vacuum Check ..... PAGE C – 3
STOPPING ..... PAGE C – 3
Cold Weather Preservation ..... PAGE C – 3
BEARING TEMPERATURE CHECK ..... PAGE C – 3

TROUBLESHOOTING – SECTION D ..... PAGE D – 1

TABLE OF CONTENTS
(continued)

PUMP MAINTENANCE AND REPAIR - SECTION E ..... PAGE E – 1

STANDARD PERFORMANCE CURVE ..... PAGE E – 1
PARTS LIST:
- Pump Model ..... PAGE E – 3
- Pump End Assembly ..... PAGE E – 5

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY ..... PAGE E – 6
- Suction Check Valve Disassembly ..... PAGE E – 6
- Wear Plate And Suction Head Removal ..... PAGE E – 6
- Impeller Removal ..... PAGE E – 7
- Seal Removal and Disassembly ..... PAGE E – 7
- Pump Disassembly ..... PAGE E – 7
- Shaft and Bearing Removal and Disassembly ..... PAGE E – 8
- Shaft and Bearing Reassembly and Installation ..... PAGE E – 9
- Impeller Back Clearance ..... PAGE E – 10
- Seal Reassembly and Installation ..... PAGE E – 11
- Impeller Installation And Adjustment ..... PAGE E – 12
- Pump Casing Installation ..... PAGE E – 13
- Wear Plate And Suction Head Installation ..... PAGE E – 13
- Suction Check Valve Assembly ..... PAGE E – 13
- Final Pump Assembly ..... PAGE E – 14

LUBRICATION ..... PAGE E – 14
- Bearings ..... PAGE E – 14
- Seal Assembly ..... PAGE E – 14
- Engine ..... PAGE E – 14

INTRODUCTION

Thank You for purchasing a Gorman-Rupp pump. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump.

This pump is a 10 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is flex-coupled to a Deutz diesel engine. It is designed for handling most non-volatile, non-corrosive liquids containing specified entrained solids. The basic material of construction for wetted parts is gray iron, with an alloy steel impeller shaft.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed **only** after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment **must** be installed and operated according to all national, local and industry standards.

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 The Gorman-Rupp Company:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901—1217
Phone: (419) 755—1011
or:
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631—2870

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:

DANGER!

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

WARNING!

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

CAUTION

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

NOTE

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

SAFETY — SECTION A

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

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Switch off the engine ignition and remove the key 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 most non-volatile, non-flammable liquids containing specified entrained solids. Do not attempt to pump volatile, explosive, or flammable materials, or any liquids which may damage the pump or endanger personnel as a result of pump failure.

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

Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

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

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

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

1. **Stop the pump immediately.**
2. **Ventilate the area.**
3. **Allow the pump completely to cool.**
4. **Refer to instructions in this manual before restarting the pump.**

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. The bail is intended for use in lifting the pump assembly only. Suction and discharge hoses and piping must be removed from the pump before lifting.

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.

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.

Never tamper with the governor to gain more power. The governor establishes safe operating limits that should not be exceeded. See the performance curve, page E—1 for the maximum continuous operating speed for this pump.

Pumps and related equipment must be installed and operated according to all national, local and industry standards.

INSTALLATION − SECTION B

Review all SAFETY information in Section A.

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

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

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve (see Section E, Page 1).

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

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 drying, check for loose hardware at mating surfaces.

c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note that the pump shaft rotates in the required direction.

d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.

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

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.

Table 1. Battery Specifications

Voltage	Cold Crank Amps @ 0° F	Reserve Capacity @ 80° F (Minutes)	Amp/ Hr. Rating	Approx. Overall Dims. (Inches)
12 Volts	960−975	365	175	20.5L x 8.75W x 9.75H

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

Pump unit weights will vary depending on the mounting and drive provided. Check the shipping tag on the unit packaging for the actual weight, and use lifting equipment with appropriate capacity. Drain the pump and remove all customer-installed equipment such as suction and discharge hoses or piping before attempting to lift existing, installed units.

CAUTION

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

A minimum clearance of **9 inches** is required to permit removal of the rotating assembly.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve on Page E—1 to be sure your overall application allows pump to operate within the safe operation range.

Materials

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

Line Configuration

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

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

SUCTION LINES

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

Fittings

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

Strainers

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

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

This pump is designed to handle up to 3-inch (76,2 mm diameter spherical solids.

Sealing

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

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to 1-1/2 times the diameter of the suction line.

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

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

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure B—1 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).

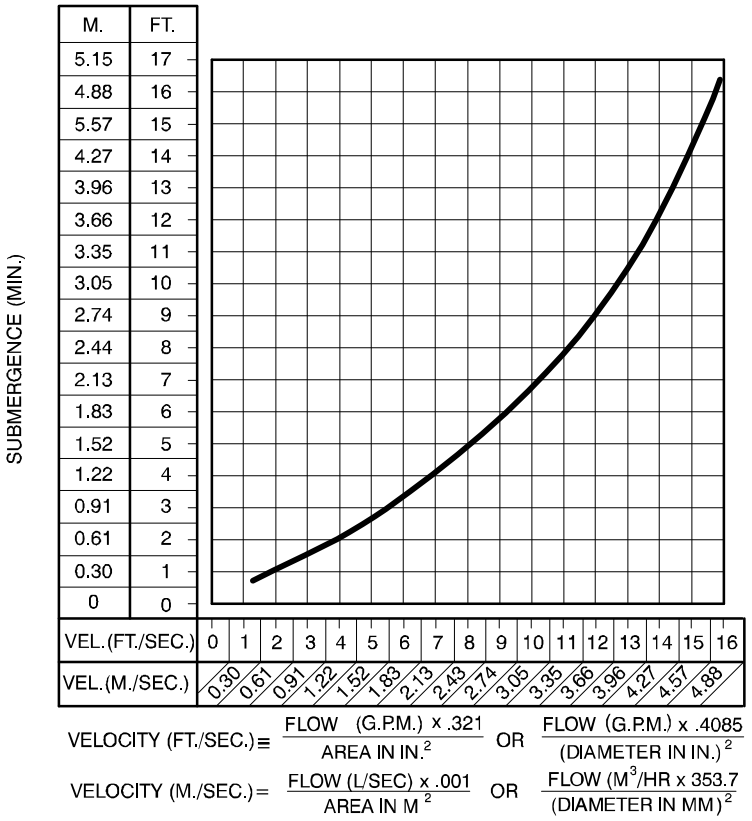


Figure B—1. Recommended Minimum Suction Line Submergence vs. Velocity

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

CAUTION

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

Bypass Lines

Self-priming pumps are not air compressors. During the priming cycle, air from the suction line must be vented to atmosphere on the discharge side. If the discharge line is open, this air will be vented through the discharge. However, if a check valve has been installed in the discharge line, the discharge side of the pump must be opened to atmospheric pressure through a bypass line installed between the pump discharge and the check valve. A self-priming centrifugal pump **will not prime** if there is sufficient static liquid head to hold the discharge check valve closed.

NOTE

The bypass line should be sized so that it does not affect pump discharge capacity; however, the bypass line should be at least 1 inch (25,4 mm) in di-

ameter to minimize the chance of plugging.

In **low discharge head applications** (less than 30 feet (9,1 m)), it is recommended that the bypass line be run back to the wet well, and located 6 inches below the water level or cut-off point of the low level pump. In some installations, this bypass outline may be terminated with a six-to-eight foot (1,8 to 2,4 m) length of 1-1/4 inch (31,8 mm) I.D. **smooth-bore** hose; air and liquid vented during the priming process will then agitate the hose and break up any solids, grease, or other substances likely to cause clogging.

CAUTION

A bypass line that is returned to a wet well must be secured against being drawn into the pump suction inlet.

It is also recommended that pipe unions be installed at each 90° elbow in a bypass line to ease disassembly and maintenance.

In **high discharge head applications** (more than 30 feet (9,1 m), an excessive amount of liquid may be bypassed and forced back to the wet well under the full working pressure of the pump; this will reduce overall pumping efficiency. **Therefore, it is recommended that a Gorman-Rupp Automatic Air Release Valve be installed in the bypass line.**

Gorman-Rupp Automatic Air Release Valves are reliable, and require minimum maintenance. See **Automatic Air Release Valves** in this section for installation and theory of operation of the Automatic Air Release Valve. Consult your Gorman-Rupp distributor, or contact the Gorman-Rupp Company for selection of an Automatic Air Release Valve to fit your application.

CAUTION

Except in certain specific applications (to prevent flooding during service of an automatic air release valve in a below-ground lift station), if a manual shut-off valve is installed **anywhere** in a bypass line, it **must** be a full-opening, **ball-type** valve to prevent plugging by solids.

WARNING!

A manual shut-off valve <u>should not</u> be installed in any bypass line. A manual shut-off valve may inadvertently be left closed during operation. A pump which has lost prime may continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

<u>Allow an over-heated pump to cool before servicing.</u> <u>Do not</u> remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. <u>After the pump cools</u>, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

AUTOMATIC AIR RELEASE VALVE

When properly installed, a Gorman-Rupp Automatic Air Release Valve will permit air to escape through the bypass line and then close automatically when the pump is fully primed and pumping at full capacity.

WARNING!

Some leakage (1 to 5 gallons [3.8 to 19 liters] per minute) will occur when the valve is fully closed. <u>Be sure</u> the bypass line is directed back to the wet well or tank to prevent hazardous spills.

Consult the manual accompanying the Air Release Valve for additional information on valve installation and performance.

Air Release Valve Installation

The Automatic Air Release Valve must be independently mounted in a horizontal position between the pump discharge port and the inlet side of the discharge check valve (see Figure B—2). The inlet opening in the Air Release Valve is equipped with standard 1-inch NPT pipe threads.

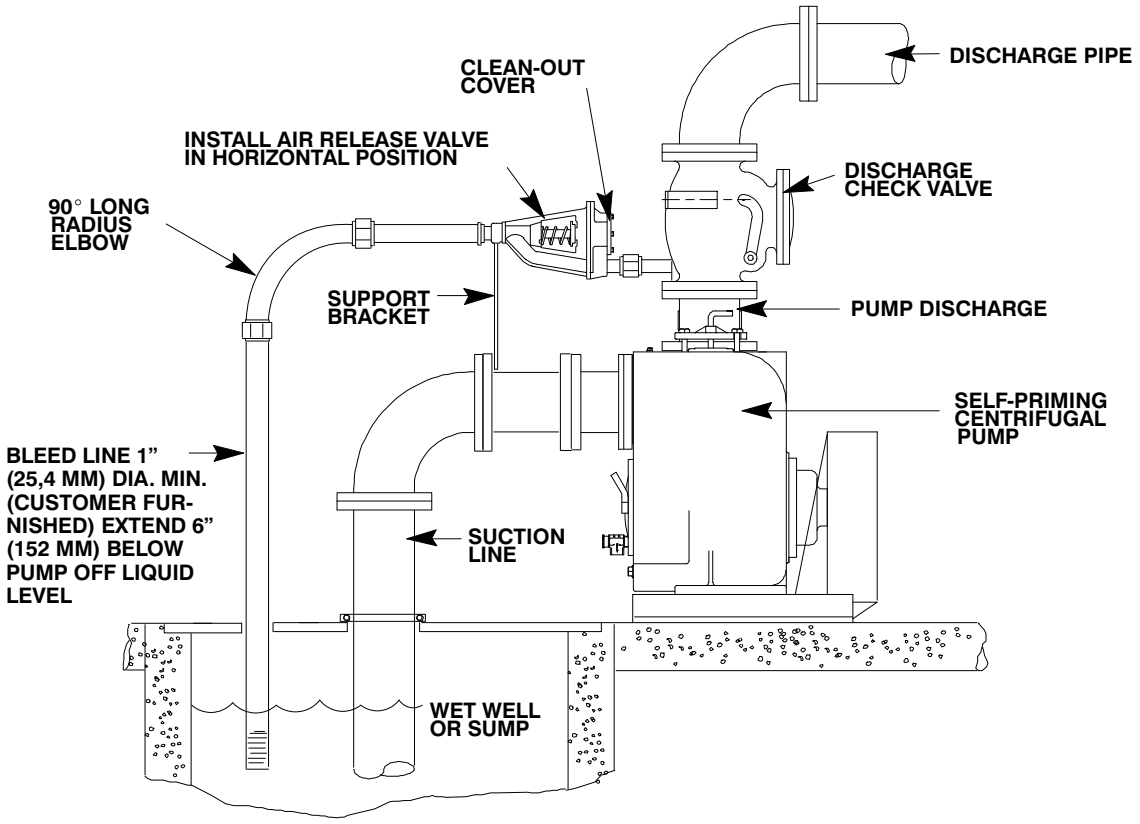


Figure B—2. Typical Automatic Air Release Valve Installation

Connect the valve outlet to a bleed line which slopes back to the wet well or sump. The bleed line must be the same size as the outlet opening or larger, depending on which Air Release Valve is being used. If **piping** is used for the bleed line, avoid the use of elbows whenever possible.

NOTE

*For multiple pump installations, it is recommended that each Air Release Valve be fitted with an independent bleeder line directed back to the wet well. If multiple Air Release Valves are installed in a system, **do not** direct bleeder lines to a common manifold pipe. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for information about installation of an Automatic Air Release Valve for your specific application.*

ALIGNMENT

The alignment of the pump and engine is critical for trouble-free mechanical operation. The driver and pump must be mounted so that their shafts are aligned with and parallel to each other.

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment can occur in transit and handling. Pumps should be checked, and realigned if necessary, before being put into operation. Before checking alignment, tighten the hardware securing the pump to the base.

The axis of the drive unit must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven

shafts. Refer to the coupling manufacturer's service literature for information.

This pump is furnished with a flexible coupling. To check alignment, use a feeler gauge or a taper gauge between the coupling halves every 90 degrees. The coupling is in alignment when the hubs are the same distance apart at all points.

To check parallel adjustment, lay a straightedge across both coupling halves at the top, bottom, and side. The coupling is in horizontal parallel alignment when the straightedge rests evenly on both halves of the coupling. Use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

Coupling and alignment adjustments may be made by loosening the hold-down bolts and shifting the driver and/or pump, or by shimming as required.

Adjusting the alignment in one direction may alter the alignment in another direction. Check each procedure after altering alignment.

Do not operate the pump without the coupling guard in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

OPERATION — SECTION C

Review all SAFETY information in Section A.

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

WARNING!

This pump is designed to handle 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

The pump end is designed to operate at ???? RPM through a gearbox with a 1.6:1 ratio at a maximum input speed of ???? RPM. Make certain that input speed does not exceed this RPM. Operation at higher RPM can cause pump components to be damaged or destroyed.

PRIMING

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

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

CAUTION

Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

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

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

WARNING!

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

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

STARTING

Consult the operations manual furnished with the engine.

OPERATION

Gearbox Check

Check the gearbox lubrication before operation, and periodically thereafter. See the gearbox manufacturer's literature for recommendations.

Lines With a Bypass

If a Gorman-Rupp Automatic Air Release Valve has been installed, the valve will automatically open to

allow the pump to prime, and automatically close after priming is complete (see **INSTALLATION** for Air Release Valve operation).

If the bypass line is open, air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. 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 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.

WARNING!

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

Leakage

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

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160°F (71°C). Do not apply it at a higher operating temperature.

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

DANGER!

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

As a safeguard against rupture or explosion due to heat, this pump is equipped with a pressure relief valve which will open if vapor pressure within the pump casing reaches a critical point. If overheating does occur, stop the pump immediately and allow it to cool before servicing it. **Approach any overheated pump cautiously**. It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump casing overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Strainer Check

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

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, **liquid pressure** must be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve (see Section E, Page 1).

Pump Vacuum Check

With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches (508,0 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 operating speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

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

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

After stopping the pump, disconnect the engine or lock it out 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.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F (71°C) are considered normal for bearings, and they can operate safely to at least 180°F (82°C).

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperatures is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see **LUBRICATION** in Section E). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

TROUBLESHOOTING — SECTION D

Review all SAFETY information in Section A.

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut down the engine and remove the key 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.	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.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Strainer clogged.	Check strainer and clean if necessary.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Impeller clogged.	Free impeller of debris.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.
	Pump speed too slow.	Check engine output; consult engine operation manual.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check engine output.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
	Bearing(s) frozen.	Disassemble pump and check bearing(s).
PUMP CLOGS FREQUENTLY	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Liquid solution too thick.	Dilute if possible.
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.
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

Preventive Maintenance Schedule

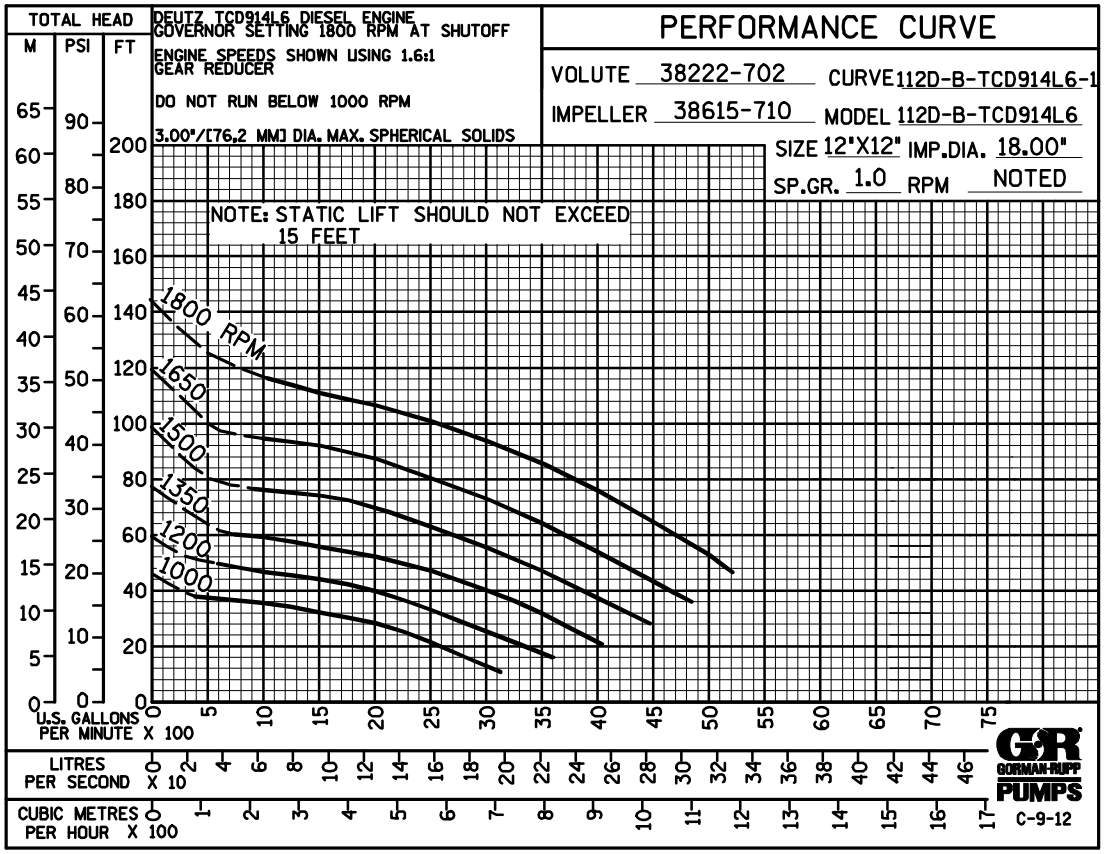
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication — See Mfgr's Literature					

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

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 112D60—B—TCD914L6**

✳ 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.

CAUTION

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

ILLUSTRATION

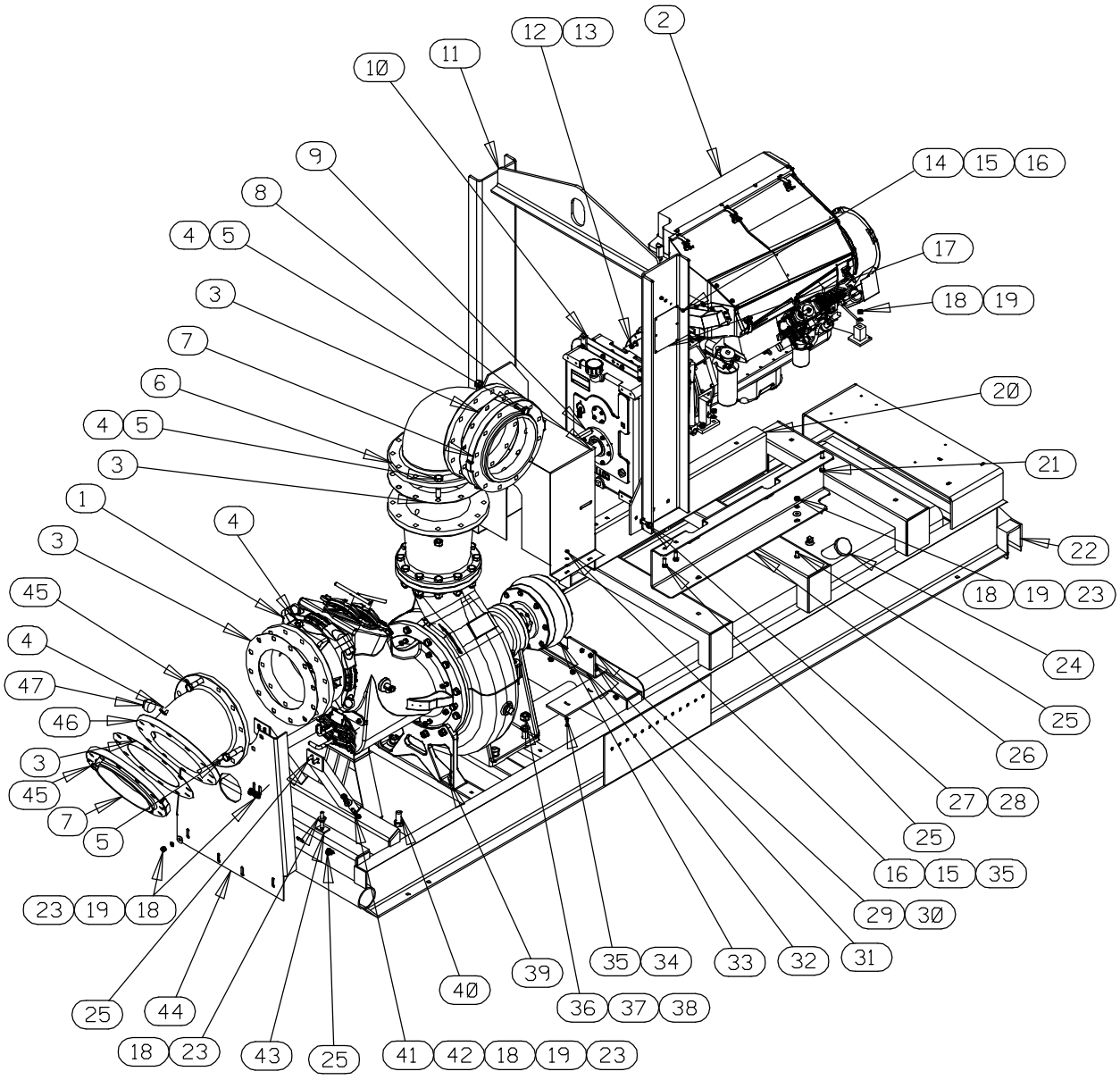


Figure E–1. Pump Model 112D60–B–TCD914L6

PARTS LIST
Pump Model 112D60−B−TCD914L6
(From S/N 1520501 Up)

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

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP MODEL ASSY	112D60−B	−−−	1
2	DEUTZ TCD914L6 ENGINE	29210−729	−−−	1
3	GASKET	4991G	18000	4
4	HEX NUT	D14	15991	48
5	HEX HEAD CAP SCREW	B1416	15991	30
6	FLANGED ELBOW	S5017	−−−	1
7	FLANGE	4991A	10010	2
8	COUPLING GUARD ASSY	42341−049	24150	1
9 ✳	GEAR RED DRIVE KEY	N1216	15990	1
10	GEAR REDUCER	24572−207	−−−	1
11	LIFTING BAIL ASSY	44713−058	24150	1
12	HEX HEAD CAP SCREW	22645−164	−−−	12
13	LOCK WASHER	21171−511	−−−	20
14	HEX HEAD CAP SCREW	B0403	15991	6
15	LOCK WASHER	J04	15991	10
16	HEX NUT	D04	15991	10
17	INSTRUCTION PLATE	38818−160	13000	1
18	HEX NUT	D08	15991	34
19	LOCK WASHER	J08	15991	34
20	ENGINE RAIL	34458−080	15080	1
21	HEX HEAD CAP SCREW	B0816	15991	2
22	COMBINATION BASE	41566−726	24150	1
23	FLAT WASHER	K08	15991	26
24	FUEL TANK ASSY	46711−072	−−−	1
25	HEX HEAD CAP SCREW	B0806	15991	26
26	ENGINE RAIL	34458−081	15080	1
27	HEX HEAD CAP SCREW	B1008	15991	8
28	LOCK WASHER	J10	15991	8
29	HEX HEAD CAP SCREW	B0605	15991	4
30	LOCK WASHER	J06	15991	4
31	HEX HEAD CAP SCREW	B0807	15991	2
32	SUPPORT	34228−087	15080	1
33	FLEX COUPLING	24341−024	−−−	1
34	HEX HEAD CAP SCREW	B0404	15991	4
35	FLAT WASHER	K04	15991	8
36	HEX NUT	D16	15991	8
37	LOCK WASHER	J16	15991	8
38	HEX HEAD CAP SCREW	B1612	15991	6
39	FLAT WASHER	K16	15991	2
40	HEX HEAD CAP SCREW	B1609	15991	2
41	SUPPORT ASSY	41881−570	24150	2
42	HEX HEAD CAP SCREW	B0811	15991	2
43	TENSIONER BAR	11165	24000	2
44	NOZZLE SUPPORT ASSY	41881−571	24150	1
45	HEX HEAD CAP SCREW	B1415	15991	18
46	DISCH ADAPTER FLANGE	14275	10010	1
47	PIPE PLUG	P32	10009	1
48	T-BOLT CLAMP	26518−166	−−−	1
49	HUMP CONNECTOR	26413−001	−−−	1
50	T-BOLT CLAMP	26518−164	−−−	7
51	ELBOW	29284−039	−−−	1
52	WEATHER CAP	S2021	−−−	1
53	HEX HEAD CAP SCREW	B0504	15991	4
54	LOCK WASHER	J05	15991	4
55	HEX NUT	D05	15991	4
56	FLAT WASHER	K05	15991	4
57	MUFFLER BRKT WLDMNT	41888−282	24150	1
58	MUFFLER	29334−104	−−−	1
59	MUFFLER BRACKET	29334−286	−−−	2
60	MUFFLER CLAMP	S2227	−−−	2
61	EXHAUST ELBOW	29334−382	−−−	1
62	EXHAUST FLANGE ASSY	46281−007	24150	1
63	INSERT	29284−042	−−−	1
64	AIR INTAKE ELBOW	29284−033	−−−	2
65	AIR INTAKE PIPE	31417−066	15210	1
66	CONNECTOR	S1447	−−−	2
67	HOSE ASSY	46341−803	−−−	2
68	FUEL RETURN ASSY	46331−014	24030	1
69	PIPE ELBOW	R04	11999	1
70	POS BATT CABLE	47311−113	−−−	1
71	NEG BATT CABLE	47311−133	−−−	1
72	BATTERY BOX ASSY	42432−003	−−−	1
73	12V BATTERY	SEE OPTIONS		REF
74	BELT GUARD KIT	29277−055	−−−	1
75	AIR INTAKE PIPE	31417−065	15000	2
76	AIR FILTER BRACKET	41888−283	24150	1
NOT SHOWN:				
	CAP SCREW M10X1.5X60	22645−170	−−−	8
	SPRING STRAP	33245−023	15099	2
	MUFFLER GUARD	34611−019	15080	1
	SPACER SPRING	24641−014	−−−	2
	STRAPPING	12961−203	−−−	2
	BUCKLE	12961−213	−−−	2
	CONT PANEL INST KIT	48122−503	−−−	1
	WHEEL KIT	GRP30−10E	−−−	1
	DISCHARGE DECAL	6588BJ	−−−	1
	GUARD WARNING DECAL	38816−063	−−−	1
	CAUTION DECAL	2613FJ	−−−	1
	WARNING DECAL	2613FE	−−−	1
	SUCTION DECAL	6588AG	−−−	1
OPTIONAL:				
	12V BATTERY	29331−506	−−−	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

ILLUSTRATION

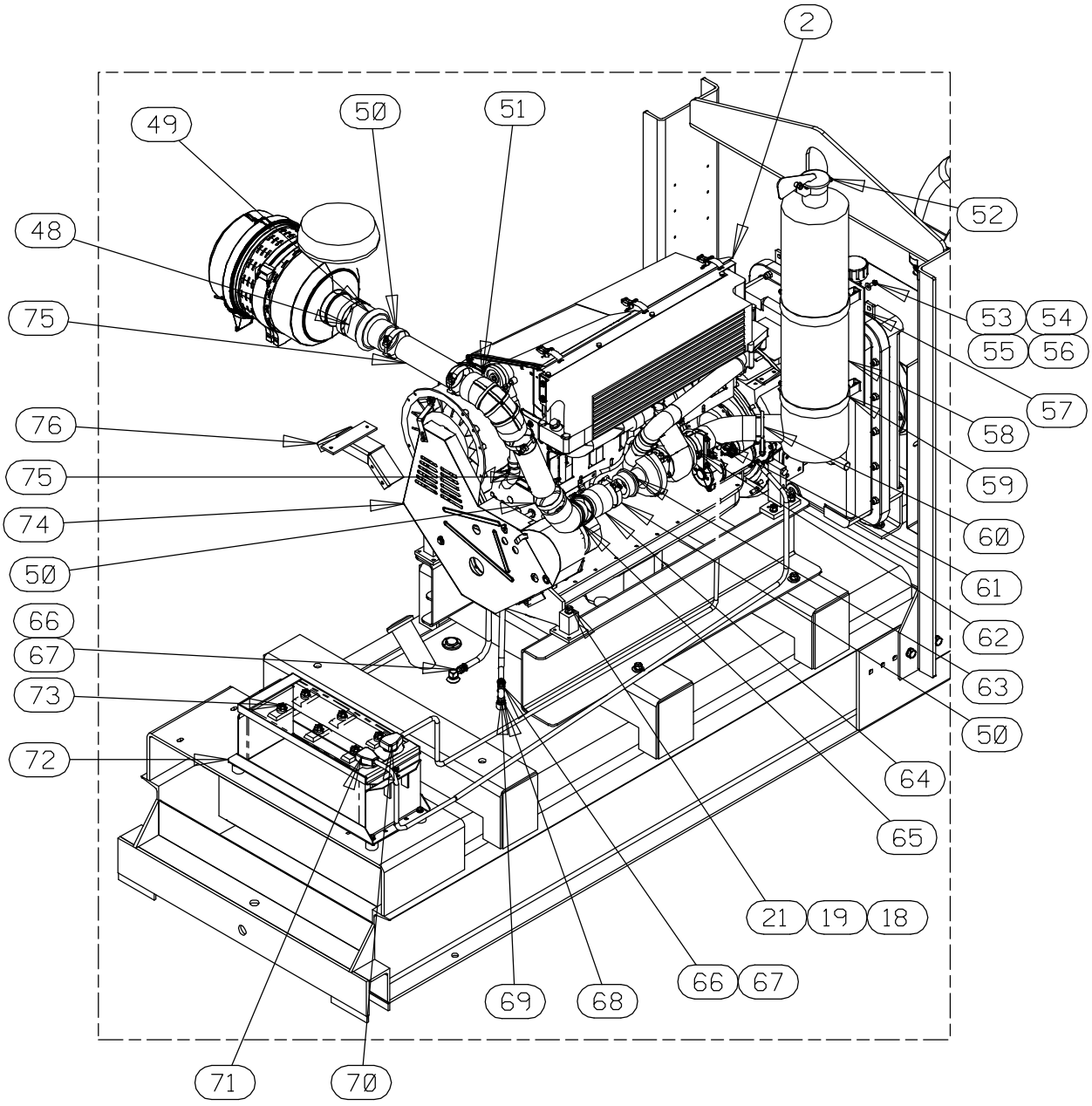


Figure E—2. Pump Model 112D60—B—TCD914L6 (Cont'd)

PARTS LIST
Pump Model 112D60−B−TCD914L6 (Cont'd)
(From S/N Up)

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

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP MODEL ASSY	112D60−B	−−−	1
2	DEUTZ TCD914L6 ENGINE	29210−729	−−−	1
3	GASKET	4991G	18000	4
4	HEX NUT	D14	15991	48
5	HEX HEAD CAP SCREW	B1416	15991	30
6	FLANGED ELBOW	S5017	−−−	1
7	FLANGE	4991A	10010	2
8	COUPLING GUARD ASSY	42341−049	24150	1
9 ✳	GEAR RED DRIVE KEY	N1216	15990	1
10	GEAR REDUCER	24572−207	−−−	1
11	LIFTING BAIL ASSY	44713−058	24150	1
12	HEX HEAD CAP SCREW	22645−164	−−−	12
13	LOCK WASHER	21171−511	−−−	20
14	HEX HEAD CAP SCREW	B0403	15991	6
15	LOCK WASHER	J04	15991	10
16	HEX NUT	D04	15991	10
17	INSTRUCTION PLATE	38818−160	13000	1
18	HEX NUT	D08	15991	34
19	LOCK WASHER	J08	15991	34
20	ENGINE RAIL	34458−080	15080	1
21	HEX HEAD CAP SCREW	B0816	15991	2
22	COMBINATION BASE	41566−726	24150	1
23	FLAT WASHER	K08	15991	26
24	FUEL TANK ASSY	46711−072	−−−	1
25	HEX HEAD CAP SCREW	B0806	15991	26
26	ENGINE RAIL	34458−081	15080	1
27	HEX HEAD CAP SCREW	B1008	15991	8
28	LOCK WASHER	J10	15991	8
29	HEX HEAD CAP SCREW	B0605	15991	4
30	LOCK WASHER	J06	15991	4
31	HEX HEAD CAP SCREW	B0807	15991	2
32	SUPPORT	34228−087	15080	1
33	FLEX COUPLING	24341−024	−−−	1
34	HEX HEAD CAP SCREW	B0404	15991	4
35	FLAT WASHER	K04	15991	8
36	HEX NUT	D16	15991	8
37	LOCK WASHER	J16	15991	8
38	HEX HEAD CAP SCREW	B1612	15991	6
39	FLAT WASHER	K16	15991	2
40	HEX HEAD CAP SCREW	B1609	15991	2
41	SUPPORT ASSY	41881−570	24150	2
42	HEX HEAD CAP SCREW	B0811	15991	2
43	TENSIONER BAR	11165	24000	2
44	NOZZLE SUPPORT ASSY	41881−571	24150	1
45	HEX HEAD CAP SCREW	B1415	15991	18
46	DISCH ADAPTER FLANGE	14275	10010	1
47	PIPE PLUG	P32	10009	1
48	T-BOLT CLAMP	26518−166	−−−	1
49	HUMP CONNECTOR	26413−001	−−−	1
50	T-BOLT CLAMP	26518−164	−−−	7
51	ELBOW	29284−039	−−−	1
52	WEATHER CAP	S2021	−−−	1
53	HEX HEAD CAP SCREW	B0504	15991	4
54	LOCK WASHER	J05	15991	4
55	HEX NUT	D05	15991	4
56	FLAT WASHER	K05	15991	4
57	MUFFLER BRKT WLDMNT	41888−282	24150	1
58	MUFFLER	29334−104	−−−	1
59	MUFFLER BRACKET	29334−286	−−−	2
60	MUFFLER CLAMP	S2227	−−−	2
61	EXHAUST ELBOW	29334−382	−−−	1
62	EXHAUST FLANGE ASSY	46281−007	24150	1
63	INSERT	29284−042	−−−	1
64	AIR INTAKE ELBOW	29284−033	−−−	2
65	AIR INTAKE PIPE	31417−066	15210	1
66	CONNECTOR	S1447	−−−	2
67	HOSE ASSY	46341−803	−−−	2
68	FUEL RETURN ASSY	46331−014	24030	1
69	PIPE ELBOW	R04	11999	1
70	POS BATT CABLE	47311−113	−−−	1
71	NEG BATT CABLE	47311−133	−−−	1
72	BATTERY BOX ASSY	42432−003	−−−	1
73	12V BATTERY	SEE OPTIONS		REF
74	BELT GUARD KIT	29277−055	−−−	1
75	AIR INTAKE PIPE	31417−065	15000	2
76	AIR FILTER BRACKET	41888−283	24150	1
NOT SHOWN:				
	CAP SCREW M10X1.5X60	22645−170	−−−	8
	SPRING STRAP	33245−023	15099	2
	MUFFLER GUARD	34611−019	15080	1
	SPACER SPRING	24641−014	−−−	2
	STRAPPING	12961−203	−−−	2
	BUCKLE	12961−213	−−−	2
	CONT PANEL INST KIT	48122−503	−−−	1
	WHEEL KIT	GRP30−10E	−−−	1
	DISCHARGE DECAL	6588BJ	−−−	1
	GUARD WARNING DECAL	38816−063	−−−	1
	CAUTION DECAL	2613FJ	−−−	1
	WARNING DECAL	2613FE	−−−	1
	SUCTION DECAL	6588AG	−−−	1
OPTIONAL:				
	12V BATTERY	29331−506	−−−	1

✳ INDICATES PARTS RECOMMENDED FOR STOCK

ILLUSTRATION

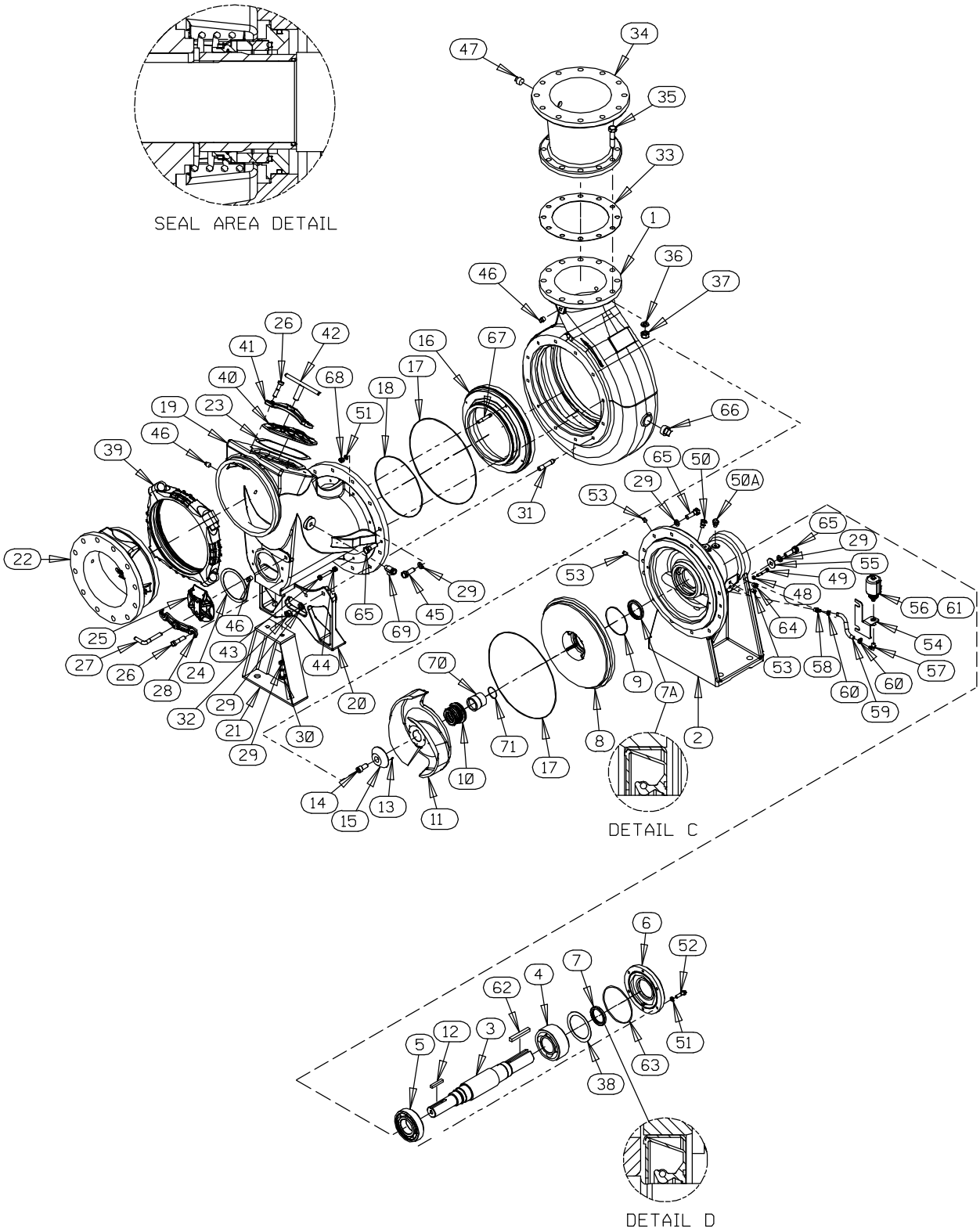


Figure E—3. Pump End Assembly 112D60—B

PARTS LIST
Pump End Assembly 112D60−B

ITEM NO.		PART NAME	PART NUMBER	MAT'L CODE	QTY
1		PUMP CASING	38222−702	10010	1
2		PEDESTAL	38257−511	10010	1
3		IMPELLER SHAFT	38512−519	16040	1
4	✳	BALL BEARING	23421−417	−−−	1
5	✳	BALL BEARING	23275−017	−−−	1
6		BEARING COVER	38322−419	10010	1
7	✳	OUTBOARD OIL SEAL	25258−851	−−−	1
7A	✳	INBOARD OIL SEAL	25258−851	−−−	1
8		SEAL PLATE	38272−706	10010	1
9	✳	O-RING	25152−256	−−−	1
10	✳	SEAL ASSY	46512−259	−−−	1
11	✳	IMPELLER	38615−710	11030	1
12	✳	IMPELLER KEY	N0812	15990	1
13	✳	ROLL PIN	S2197	−−−	1
14	✳	SOCKET HD CAP SCREW	BD1206	15990	1
15	✳	IMPELLER WASHER	31167−012	15030	1
16	✳	WEAR PLATE	38691−808	11030	1
17	✳	WEAR PLATE O-RING	25152−283	−−−	1
17A	✳	SEAL PLATE O-RING	26152−283	−−−	1
18	✳	O-RING	25152−278	−−−	1
19		SUCTION ELBOW	38647−910	10010	1
20		PEDESTAL FOOT	38151−002	10010	1
21		SUCT ELBOW SUPPORT	41881−258	24150	1
22		SUCTION CHK VLV ASSY	46421−035	−−−	1
		−HEX HD CAP SCREW	B0606	15991	2
		−PIPE PLUG	P08	15079	2
		−FLAT WASHER	KB08	17000	2
		−PIVOT CAP	38141−003	11060	2
		−CHECK VALVE BODY	38341−806	10010	1
		−T-TYPE LK WASHER	AK06	15991	2
	✳	−CHK VALVE ASSY	46411−068	24010	1
23	✳	GASKET	38688−015	20000	1
24	✳	GASKET	38682−016	20000	1
25		COVER PLATE ASSY	48271−025	−−−	1
		−CLEANOUT COVER	NOT AVAILABLE		1
		−WARNING PLATE	38816−097−13990		1
		−DRIVE SCREW	BM#04−03	17000	2
26		SQUARE HEAD BOLT	A1011	15991	8
27		CLAMP BAR SCREW	31912−009	15000	2
28		CLAMP BAR	38111−310	11010	2
29		LOCK WASHER	J12	15991	26
30		HEX HD CAP SCREW	B1206	15991	2
31		STUD	C1216	15991	4
32		HEX NUT	D12	15991	4
33	✳	GASKET	2751G	18000	1
34		CONCENTRIC REDUCER	38642−620	10000	1
35		HEX HD CAP SCREW	B1416	15991	12
36		LOCK WASHER	J14	15991	12
37		HEX NUT	D14	15991	12
38		WAVE WASHER	23963−333	−−−	3
39		VICTAULIC CPLG	25552−214	−−−	1
40		COVER PLATE ASSY	48271−026	−−−	1
		−FILL COVER PLATE	NOT AVAILABLE		1
		−WARNING PLATE	38816−097	13990	1
		−DRIVE SCREW	BM#04−03	17000	2
41		COVER PLATE CLAMP	12872	11010	2
42		CLAMP SCREW	2536	24000	2
43		TAP BOLT	21612−199	−−−	4
44		HEX JAM NUT	AT08	15991	4
45		HEX HD CAP SCREW	B1209	15991	8
46		PIPE PLUG	P08	15079	4
47		PIPE PLUG	P16	10009	1
48		LOCK WASHER	J06	15991	2
49		HEX HD CAP SCREW	B0610	15991	2
50		BRG CAVITY AIR VENT	S1703	−−−	2
50A		SEAL CAVITY AIR VENT	S1703	−−−	2
51		LOCK WASHER	J08	15991	10
52		HEX HD CAP SCREW	B0808	15991	6
53		PIPE PLUG	P06	15079	6
54		BOTTLE OILER BRKT	41881−617	24150	1
55		FLAT WASHER	K12	15991	2
56		BOTTLE OILER	26713−004	−−−	1
57		BARBED ELBOW	26523−506	−−−	1
58		MALE CONNECTOR	26523−409	−−−	1
59		HOSE	31411−227	19360	1
60		HOSE CLAMP	26518−642	−−−	2
61		OIL LEVEL DECAL	38816−123	−−−	1
62	✳	DRIVE KEY	N1020	15990	1
63	✳	O-RING	S1874	−−−	1
64		SIGHT GAGE	26714−011	−−−	1
65		HEX HD CAP SCREW	B1210	15991	14
66		PIPE PLUG	P24	10009	3
67		STUD	C0814	15991	4
68		HEX NUT	D08	15991	4
69	✳	PRESS RELIEF VALVE	26662−005	−−−	1
NOT SHOWN:					
		NAME PLATE	2613D	13990	1
		ROTATION DECAL	2613M	−−−	1
		STRAINER	46641−012	24150	1
		DRIVE SCREW	BM #04−03	17000	4
		LUBE DECAL	38816−079	−−−	1
		WARNING DECAL	38816−302	−−−	1
		G-R DECAL	GR−06	−−−	1
		INSTRUCTION LABEL	2613DK	−−−	1
		WARNING DECAL	2613FE	−−−	1
		INSTRUCTION TAG	38817−011	−−−	1
		INSTRUCTION TAG	38817−024	−−−	1
		SUCTION STICKER	6588AG	−−−	1
		DISCHARGE STICKER	6588BJ	−−−	1

✳ 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 illustrations (see Figures E-1 through E-3) and the accompanying parts lists.

Before attempting to service the pump, shut down the engine and remove the key to ensure that the pump 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 engine representative.

WARNING!

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut down the engine and remove the key 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.**

Suction Check Valve Disassembly

(Figure E-1)

Before attempting to service the pump, remove the lowermost pipe plug (66, Figure E-3) and drain the pump. Clean and reinstall the drain plug.

(Figure E-3)

To service the suction check valve assembly (22), loosen the cover clamp screw (42) and remove the cover plate clamp (41) securing the cover plate assembly (40) to the suction elbow (19). Remove the cover plate gasket (23) and replace as required.

Reach through the access opening and remove the hardware and pivot caps securing the check valve to the check valve body. Remove the check valve through the access opening.

Inspect the check valve for wear or damage. If replacement is required, remove the flat washers from the pivot arm. Tie and tag the washers for future reference.

If the check valve body needs replaced, remove the suction piping. See Figure 1 and remove the hardware (4, 5 and 45) securing the adaptor flange (46) to the suction elbow (19, Figure 3). Remove the adaptor flange and gasket (3).

Remove the “Victaulic” coupling (39) and separate the valve body from the suction elbow. Inspect the rubber “Victaulic” gasket for damage and replace as required.

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

Suction Elbow and Wear Plate Removal

(Figure E-3)

Service to the wear plate (16), impeller (11) or seal assembly (10), can be accomplished from either side of the pump casing (1). The following instructions are based on service from the suction side of the pump.

Install a 3/4—10 UNC—2B lifting eye (not supplied) in the tapped hole located in the suction elbow. Be sure the eye bolt is fully engaged before attaching a hoist. Support the suction elbow using a suitable hoist and sling. The hoist is used to support the

suction elbow only, **do not** try to lift the pump. Remove the hardware securing the elbow support (21) and pedestal foot (20) to the base. Tie and tag any leveling shims used under the mounting feet to ease reassembly.

Before attempting to remove the suction elbow, support the pump body by wedging a block of wood under the pump casing.

Remove the hardware (29, 32 and 45) securing the pedestal foot and suction elbow (19) to the pump casing. Use the jacking screws (65) to press the suction elbow out of the pump casing and separate the assemblies.

Inspect the wear plate (16) and O-ring (17) for damage or wear. If the wear plate must be replaced, remove the hardware (51 and 68) from the wear plate studs (67). Loosen the jam nuts (44) and then tighten the adjusting screws (43) until the wear plate is free. Inspect the suction head O-ring (18) for damage and replace as required.

Impeller Removal

(Figure E-3)

Before attempting to remove the impeller, immobilize the impeller by wedging a block of wood between the vanes and the pump casing. Remove the impeller capscrew, washer and roll pin (13, 14 and 15). Remove the wood block and install two 3/8—16 UNC—2B capscrews (not supplied) in the tapped holes in the impeller hub. Use a suitable puller to remove the impeller from the shaft (3). Retain the impeller key (12).

Remove the impeller adjusting shims (not shown). For ease of reassembly, tie and tag the shims or measure and record thickness.

Seal Removal and Disassembly

NOTE

*There is an air filled cavity with an open drain hole toward the bottom of the pedestal directly behind the seal plate (55). If oil escapes from the drain hole, the seal plate O-ring (52) has failed and removal of the seal plate is required. The drain hole is tapped, but **do not** install a pipe plug in the drain hole..*

(Figures E-3 and E-4)

Before removing the seal, disconnect the hose (59) from the connector (58) and plug the tube to stop the flow of oil from the bottle oiler (56). Remove the connector (58) and allow the seal cavity to drain.

NOTE

The oil will not drain below the hole for the connector. To drain the remaining oil from the seal cavity, remove one of the pipe plugs (53) and drain the remaining oil into a pan.

Remove the seal spring. Slide the shaft sleeve (70) and rotating portion of the seal off the shaft as a unit. Apply oil to the sleeve and work it up under the bellows. Slide the rotating portion of the seal off the shaft sleeve.

Remove the shaft sleeve O-ring (71).

Use a pair of stiff wires with hooked ends to remove the stationary element, seat and O-rings from the seal plate.

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 precautions printed on solvent containers.

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

Pump Disassembly

(Figure E-3)

Remove the discharge piping. If disassembly is required, remove the hardware (35, 36 and 37) securing the discharge spool flange (34) and flange gasket (33) to the pump casing (1).

Remove the hardware (29, 55 and 56) securing the bottle oiler bracket (54) to the pedestal (2). Use a suitable hoist and sling to support the pump cas-

ing, and remove the remaining hardware (29 and 65). Separate the casing from the pedestal (2).

Remove the seal plate O-ring (22).

Separate the seal plate (8) from the pedestal by removing the hardware (48 and 49). Remove the seal plate O-ring (9).

To separate the pedestal from the engine, remove the hardware (15, 16, 29, 30 and 35, Figure E—1) securing the coupling guard assembly (8, Figure E—1) and remove the guard. Remove the separate the halves of the coupling (33, Figure E—1) and remove the half from the impeller shaft (3). Remove the drive key (62).

Install a lifting eye (not supplied) in the 3/8—18 NPT tapped hole in the top of the pedestal. Be sure the eye is fully engaged before attaching a hoist. Remove the mounting hardware (36, 37 and 38, Figure E—1) and separate the pedestal from the base. Tie and tag any shims used under the mounting foot.

Shaft and Bearing Removal and Disassembly

(Figure E-3)

When the pump is properly operated and maintained, the pedestal should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

CAUTION

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Before opening the pedestal, drain the lubricant from the pedestal by removing the drain plug (49). Clean and reinstall the plug.

Remove the hardware (51 and 52) securing the bearing cover (6) to the pedestal. Remove the wave washer (38) and O-ring (63). Inspect the oil seal (7) and, if replacement is required, press it from the bearing cover.

Place a block of wood against the impeller end of the shaft (3) and tap the shaft and assembled bearings (4 and 5) from the pedestal bore. **Be careful** not to damage the shaft.

Inspect the oil seal (7A) and, if replacement is required, press it from the pedestal.

After removing the shaft and bearings, clean and inspect the bearings **in place** as follows.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Clean the pedestal, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

WARNING!

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

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **Do not** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If ro-

tation is rough or the bearing balls are discolored, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the pedestal. Replace the bearings, shaft, or pedestal if the proper bearing fit is not achieved.

If bearing replacement is required, use a bearing puller to remove them from the shaft.

Shaft and Bearing Reassembly and Installation

(Figure E-3)

Clean and inspect the bearings as indicated in **Shaft and Bearing Removal and Disassembly**.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Be sure the oil return hole in the bottom of the bearing housing is clean and free of dirt.

Inspect the shaft for distortion, nicks or scratches, or for thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

NOTE

If a hot oil bath is used to heat the bearings, both the oil and the container must be **absolutely** *clean. If the oil has been previously used, it must be* **thoroughly** *filtered.*

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C) and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

WARNING!

Use caution when handling hot bearings to prevent burns.

Slide the inboard bearing (5) onto the shaft until fully seated against the shaft shoulder.

Position the outboard bearing (4) on the shaft with the loading groove facing **away** from the impeller, and slide it onto the shaft until fully seated against the shaft shoulder.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitably sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, use a suitably sized sleeve and an arbor (or hydraulic) press to install the bearings on the shaft.

CAUTION

When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Slide the shaft and assembled bearings into the pedestal until the inboard bearing is fully seated against the bore shoulder.

CAUTION

When installing the shaft and bearings into the pedestal bore, push against the outer race. **Never** hit the balls or ball cage.

Slide the oil seal (7A) over the shaft and press it into the pedestal bore with the lip positioned as shown in Figure E−3. **Be careful** not to damage the oil seal lip.

Press the oil seal (7) into the bearing cover (6) with the lip positioned as shown in Figure E−3.

Lubricate the bearing cover O-ring (63) and install it in the groove in the bearing cover.

Install the wave washer (38) and position the bearing cover over the shaft and against the pedestal with the word “TOP” on the bearing cover at the 12 o’clock position. Secure the bearing cover to the pedestal with the hardware (51 and 52).

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

Lubricate the bearings and pedestal as indicated in **LUBRICATION** at the end of this section.

Reinstall any leveling shims used under the pedestal mounting foot and use a hoist and the previously installed lifting eye to position the assembled pedestal on the base. Secure the pedestal to the base with the previously removed hardware (36, 37 and 38, Figure E—1).

Install the drive key (62) and the half of the coupling (33, Figure E—1) on the shaft. Connect the coupling halves and check the coupling alignment (see **Alignment** in **INSTALLATION**).

Position the coupling guard (8, Figure E—1) over the coupling and secure it to the base with the previously removed hardware (15, 16, 29, 30 and 35, Figure E—1).

Use the hardware (29, 55 and 56) to secure the bottle oiler bracket (54) to the pedestal (2).

Seal Reassembly and Installation

(Figures E—3 and E—4)

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

WARNING!

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

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

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in **fresh** cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the shaft sleeve (30), 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 O-rings, bellows and shaft sleeve 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 E—4).

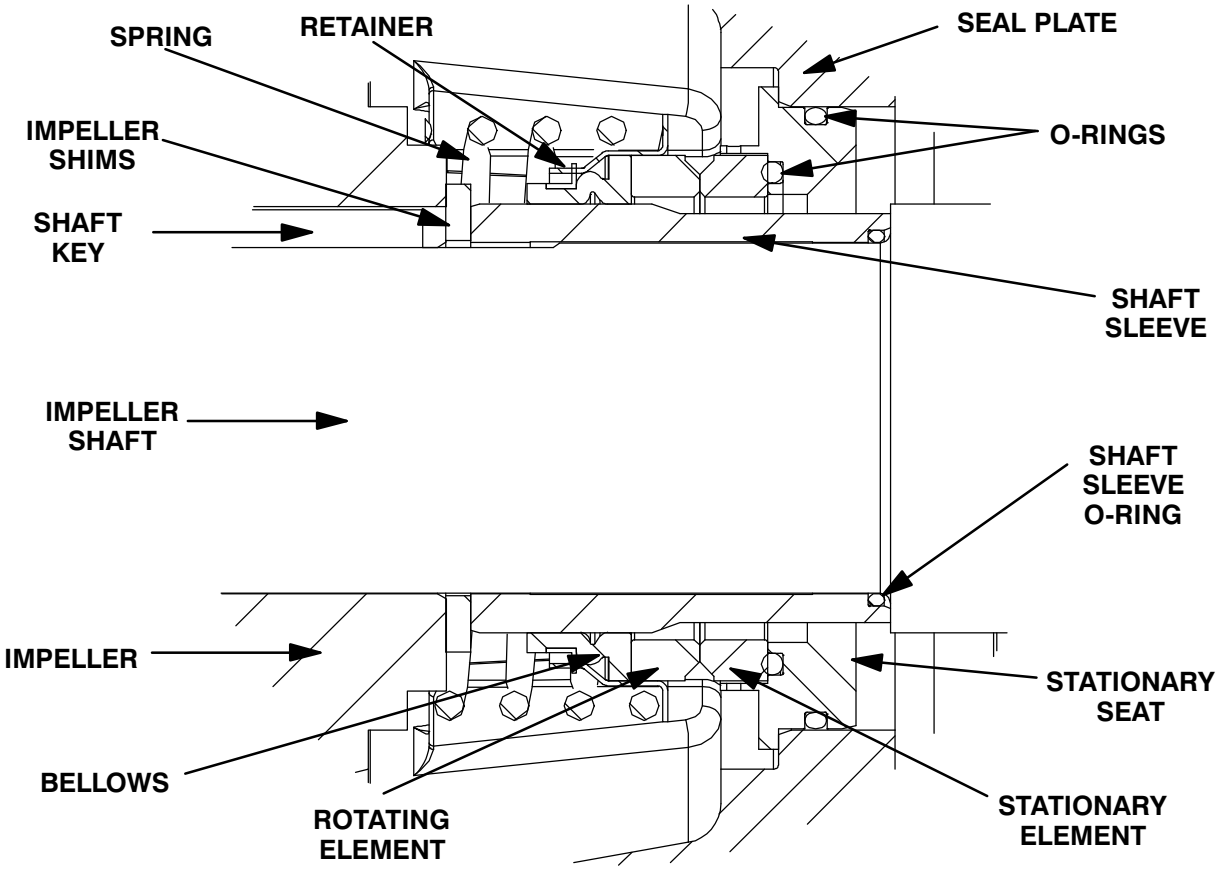


Figure E—4. Seal Assembly

CAUTION

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

Lubricate the O-rings (9 and 17) with a small amount of grease and install them on the seal plate (8).

Position the seal plate on a flat surface with the impeller side up. Press the stationary subassembly (consisting of the stationary seat, O-rings and stationary element) into the seal plate until the stationary seat bottoms against the seal plate bore.

Slide the seal plate over the shaft and secure it to the pedestal with the hardware (29 and 65).

To prevent damaging the shaft sleeve O-ring (71) on the shaft keyway, cover the keyway with electrical tape. Slide the O-ring over the shaft until it seats against the shaft shoulder. Remove the tape covering the keyway. Check to ensure that the shaft is free of any tape residue and clean as required before proceeding with seal installation.

Lubricate the O.D. of the shaft sleeve and slide the rotating subassembly (consisting of the rotating element, retainer and bellows) onto the sleeve until the rotating element is **just flush** with the chamfered end of the shaft. Slide the sleeve and rotating subassembly onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until it bottoms against the shaft shoulder. Install the seal spring.

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

Impeller Installation And Adjustment

(Figure E-3)

Inspect the impeller, and replace it if cracked or badly worn. Install the same thickness of impeller adjusting shims as previously removed, and install the impeller key (12). Apply a thin, uniform coat of “Never-Seez” or equivalent compound to the shaft area under the impeller and press the impeller onto

the shaft until fully seated. Make sure the seal spring is squarely seated over the step on the back of the impeller.

A clearance of .010 to .020 inch (0,25 to 0,51 mm) is required between the impeller and seal plate to achieve maximum pump efficiency. Use a feeler gauge to measure this clearance and add or remove impeller adjusting shims as required.

Make sure the threads on the impeller capscrew (14) and the tapped threads in the impeller shaft are clean (degreased). Install the roll pin and impeller washer (13 and 15). Apply four drops of "Loctite Threadlocker No. 242" or equivalent compound around the circumference of the capscrew threads, one inch from the end of the capscrew. Install the capscrew and torque to 145 ft. lbs. or 1740 in. lbs. (20 m. kg.).

Pump Casing Installation

(Figure E-3)

Ensure that the seal plate O-ring (17) is installed and lubricated with light grease or a very **small** amount of oil. Secure the pump casing to the pedestal assembly with the hardware (29 and 65).

Reinstall the bottle oiler (56). Remove the plug from the hose (59), reconnect it to the male connector (58) in the seal plate and secure with the clamp (60).

If removed, replace the discharge flange gasket (33) and secure the reducer (34) to the pump casing with the previously removed hardware (35, 36 and 37). Reconnect the discharge piping.

Wear Plate And Suction Head Installation

(Figure E—3)

Lubricate the O-rings (17 and 18) with "Never-Seez" or equivalent and install them in the grooves in the wear plate (16). Press the wear plate into the suction elbow (19) and secure it with the hardware (43 and 44).

Using the lifting eye and hoist used for removal, position the suction elbow against the pump casing secure the suction elbow and wear plate to the pump casing with the hardware (29 and 45).

A clearance of .010 to .020 inch (0,25 to 0,51 mm) between the impeller and the wear plate is also recommended for maximum pump efficiency. To adjust this clearance, back off the jam nuts (44) until they contact the heads of the wear plate adjusting screws (43). Loosen the hardware (51 and 68) securing the wear plate to the suction elbow. Tighten the adjusting screws evenly, no more than a half turn at a time, while rotating the impeller shaft by hand until the wear plate scrapes against the impeller. Back off each of the adjusting screws 1/2 turn, then tighten the jam nuts until they are snug against the suction head. Re-tighten the hardware (51 and 68).

Secure the pedestal foot (20) and suction elbow support (21) to the pump casing using the hardware (29, 30 and 32). Reinstall any leveling shims used under the pedestal foot and suction elbow support, and secure them to the base with the previously removed hardware.

Suction Check Valve Assembly

(Figure E—3)

Install one stainless steel flat washer on each side of the bearing pivot arm. Position the check valve in the check valve body with the 1/2" diameter core holes toward the pump side of the check valve body. Secure the check valve and pivot caps to the check valve body with the previously removed hardware.

NOTE

Be sure the check valve is positioned so that the 1/2" diameter core holes face toward the interior of the pump.

Secure the check valve body to the suction elbow with the "Victaulic" coupling (39). Be sure the rubber gasket is properly seated and not damaged.

Reach through the cover plate access opening and check the operation of the check valve to ensure proper seating and free movement.

Final Pump Assembly

Be sure the pump and engine are securely mounted to the base and that they are properly aligned. If used, removed the eyes bolt used to lift component parts.

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

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

Remove the cover assembly (40) and fill the pump casing with clean liquid. Reinstall the fill cover and tighten it.

Be sure the pump and power source have been properly lubricated, see **LUBRICATION**.

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

PRESSURE RELIEF VALVE MAINTENANCE

(Figure E—3)

The suction elbow is equipped with a pressure relief valve (69) to provide additional safety for the pump and operator (refer to **Liquid Temperature And Overheating** in **OPERATION**).

It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Periodically, the valve should be removed for inspection and cleaning. When reinstalling the relief valve, apply 'Loctite Pipe Sealant With Teflon No. 592' or equivalent compound, on the relief valve threads. Position the valve air vent with the discharge port pointing down.

LUBRICATION

Bearings

(Figure E—3)

The pedestal was fully lubricated when shipped from the factory. Check the oil level regularly and maintain it at the midpoint of the sight gauge (64). When lubrication is required, unscrew the air vent (50) and fill the pedestal with SAE No. 30 non-detergent oil. Clean and reinstall the pedestal air vent.

When lubricating a dry (overhauled) pedestal, add approximately 128 ounces (3,8 Liters) of oil. **Do not** overfill. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

Under normal conditions, change the oil each 5000 hours of operation, or at twelve month intervals, which ever occurs first. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.

CAUTION

Monitor the condition of the bearing lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

Seal Assembly

(Figure E-2)

Check the seal lubricant before starting the pump and periodically during operation. Fill the bottler oiler (56) with SAE No. 30 non-detergent oil. Check the oil level regularly and maintain it at the level indicated on the bottle oiler.

Periodically clean and reinstall the seal cavity air vent (50A).

Engine

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

For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419—755—1280
International: +1—419—755—1352

For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519—631—2870

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