OM-05172-OE01
January 17, 2001

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

60 SERIES PUMP

MODEL

62 1/2D1-CH23 T

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

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

INTRODUCTION ..... PAGE I – 1

SAFETY – 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
Mounting ..... 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

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

PRIMING ..... PAGE C – 1
Exhaust Primer ..... PAGE C – 1
STARTING ..... PAGE C – 1
OPERATION ..... PAGE C – 2
Leakage ..... PAGE C – 2
Liquid Temperature And Overheating ..... PAGE C – 2
Strainer Check ..... PAGE C – 2
Pump Vacuum Check ..... PAGE C – 2
STOPPING ..... PAGE C – 2
Cold Weather Preservation ..... PAGE C – 3

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

PREVENTIVE MAINTENANCE ..... PAGE D – 2

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
Exhaust Primer Assembly ..... PAGE E – 6
PUMP AND SEAL DISASSEMBLY AND REASSEMBLY ..... PAGE E – 7

TABLE OF CONTENTS
(continued)

Discharge Check Valve Disassembly ..... PAGE E – 7
Exhaust Primer Disassembly ..... PAGE E – 7
Pump Disassembly ..... PAGE E – 7
Seal Removal and Disassembly ..... PAGE E – 8
Seal Reassembly and Installation ..... PAGE E – 8
Impeller Installation ..... PAGE E – 10
Pump Reassembly ..... PAGE E – 10
Exhaust Primer Reassembly ..... PAGE E – 10
Discharge Check Valve Reassembly ..... PAGE E – 11
LUBRICATION ..... PAGE E – 11
Seal Assembly ..... PAGE E – 11
Engine ..... PAGE E – 11

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 60 Series, single-stage centrifugal model designed for agricultural or fire fighting service. It is designed as a truck mount unit to utilize the truck battery. The pump features compact, light weight design, as well as rugged construction for easy, low-cost maintenance. The basic material of construction for wetted parts is aluminum with bronze wear ring, and a self lubricated mechanical seal.

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:

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 60 Series Engine Driven pumps. Refer to the manual accompanying the engine before attempting to begin operation.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed instructions and precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that only safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed only after establishing that neither personal safety nor pump integrity are compromised by such practices.

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Shutdown the engine and disconnect the park plug wires 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 clear water for high pressure distribution. Do not attempt to pump volatile, corrosive, or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

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

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.

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

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.

Pump Dimensions

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

OUTLINE DRAWING

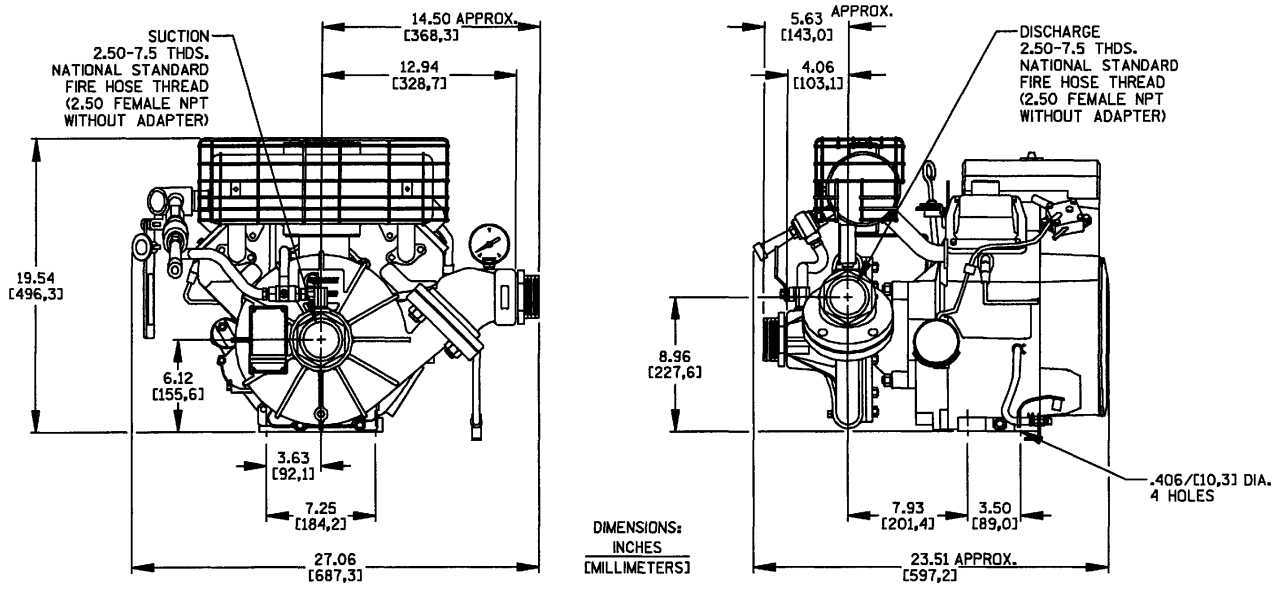


Figure 1. Pump Model 62 1/2D1-CH23 ST

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.

7c. Carefully read all tags, decals and markings on the pump assembly, and follow the instructions indicated.

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

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.

f. Check to ensure the following standard equipment items are included with the pump assembly:

- Portable 6.5 gallon fuel tank complete with quick-connect fitting.
- Suction strainer.
- Rubber foot mounting kit (must be installed). To install feet, position flat washers on capscrews, slide the capscrews through the rubber feet and holes in the base, and secure with the flanged hex nut.

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.

POSITIONING PUMP

This pump is designed to be very light-weight and portable. The total pump weight is approximately **169 pounds (77 kg)**, not including accessories or engine fuel. Customer installed equipment such as suction and discharge hoses **must** be removed before attempting to lift.

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.

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°.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and operating range shown 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.

The **maximum** vertical suction lift for this pump is 20 feet (6,1 meters). It is not designed to be operated at a higher lift.

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 5/16-inch (7,9 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 air-tight 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 2 shows recommended minimum submergence vs. velocity.

NOTE

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

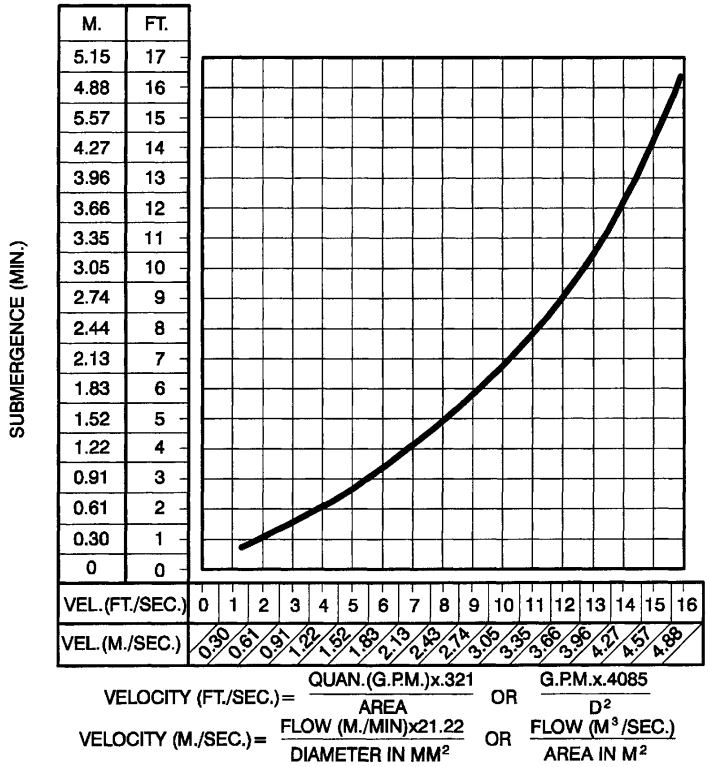


Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity

DISCHARGE LINES

Siphoning

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

Valves

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

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

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

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 clear water in high pressure distribution. Do not attempt to pump volatile, corrosive, or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

WARNING!

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

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**).

Exhaust Primer

Since this pump is not self-priming, it is equipped with an exhaust primer assembly (Figure 1).

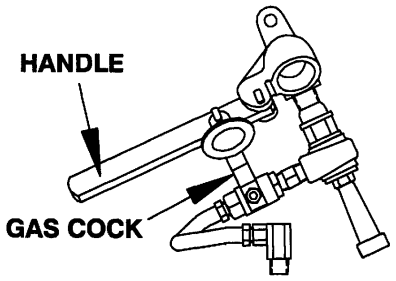


Figure 1. Exhaust Primer Assembly

The exhaust primer utilizes engine exhaust gases, directed through a venturi, to create a vacuum and draw air out of the suction line and pump casing.

The exhaust primer is capable of priming a pump with a maximum priming lift of 15 feet (4,6 meters) within 90 seconds; less time will be required for priming at a lesser lift. If the pump does not prime in a reasonable length of time, check the suction line for leaks.

To prime the pump, close the throttling valve in the discharge line.

Close the exhaust primer handle (see Figure 1), and open the cock in the priming line. Consult the starting instructions in this manual as well as the engine operating manual, and start the engine. Operate the engine at maximum governed speed and allow the pump to prime until liquid flows continuously from the exhaust primer nozzle. When the pump is fully primed, open the exhaust primer handle, and close the cock in the priming line.

Once fully primed, reduce the engine speed and partially open the discharge throttling valve. The discharge line should be filled slowly to prevent damage to the piping, gaskets, and other devices, resulting from the initial shock of liquid filling the lines. When the discharge line is completely filled, adjust the discharge throttling valve to the desired flow rate.

STARTING

Consult the operations manual furnished with the engine.

Attach the fuel line to the quick-connect fitting located on the engine. Position the portable fuel tank at the same level as the pump, or slightly higher. Squeeze the priming bulb until the fuel can be seen in the transparent fuel line at the carburetor inlet. The transparent fuel line need not be completely full. Fuel will be pulled into the carburetor while cranking the engine with the choke on.

Set the ignition toggle switch to the **ON** position.

Set the twist-lock throttle control at approximately half open position. Start the engine and follow engine manufacturer's recommendations for carburetor adjustments to obtain optimum performance.

NOTE

Hard starting may be experienced after connecting a new tank of fuel. This can be caused by air trapped in the fuel line. It is recommended that the fuel line be vented and filled by depressing the valve in the female quick connect fitting prior to installing it on the pump.

OPERATION

CAUTION

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

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 than is recommended.

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 completely cool before servicing it. Refill the pump casing with cool liquid.

WARNING!

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

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.

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

After stopping the pump, switch off the engine ignition and remove or ground the spark plug 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. **Shutdown the engine and remove the spark plug wires to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Vent the pump slowly and cautiously.**
5. **Close the suction and discharge valves.**
6. **Check the temperature before opening any covers, plates, or plugs.**
7. **Drain the pump.**

For specific instructions on engine troubleshooting or repair, see the engine manual.

Table B-1 Troubleshooting Chart

TROUBLE	CAUSE	REMEDY
ENGINE FAILS TO START	Auxiliary priming device faulty or improperly installed.	Repair priming device or check installation.
	Integral discharge check valve clogged or binding.	Clean valve.
	Spark plug contaminated.	Clean and replace plug; reset gap.
	No fuel to engine or fuel contaminated.	Check fuel tank level; vent tank; purge air from fuel lie; clean fuel filters. Check fuel for proper oil mix; check for contamination.
	Engine flooded.	Dry spark plug; adjust carburetor; see engine manual.
PUMP FAILS TO PRIME	Auxiliary priming device faulty or improperly installed.	Repair priming device or check installation.
	Integral discharge check valve clogged or binding.	Clean 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 to high.	Check piping installation and reduce suction lift and/or discharge head.
	Strainer clogged.	Check strainer and clean if necessary.

Table B-1 Troubleshooting Chart (continued)

TROUBLE	CAUSE	REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	Lining of suction hose collapsed.	Replace suction hose.
	Discharge line clogged or restricted; hose kinked.	Check discharge lines; straighten hose.
	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.
	Pump speed too slow.	Check engine output; consult engine operation manual.
	Suction lift or discharge head to high.	Check piping installation and reduce suction lift and/or discharge head.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
PUMP REQUIRES TOO MUCH POWER	Exceeding operating limits.	See performance curve in Pump Maintenance And Repair.
	Liquid solution too thick.	Dilute if possible.

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

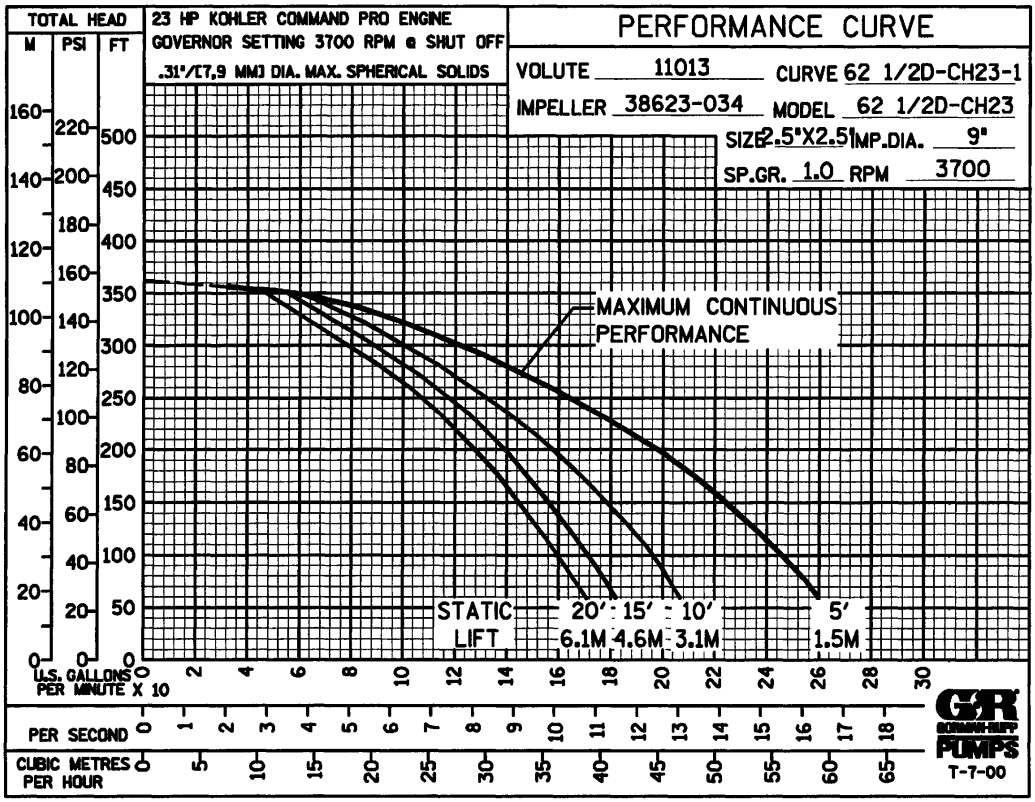
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		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 62 1/2D1-CH23 T**

* 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.

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

WARNING!

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

SECTION DRAWING

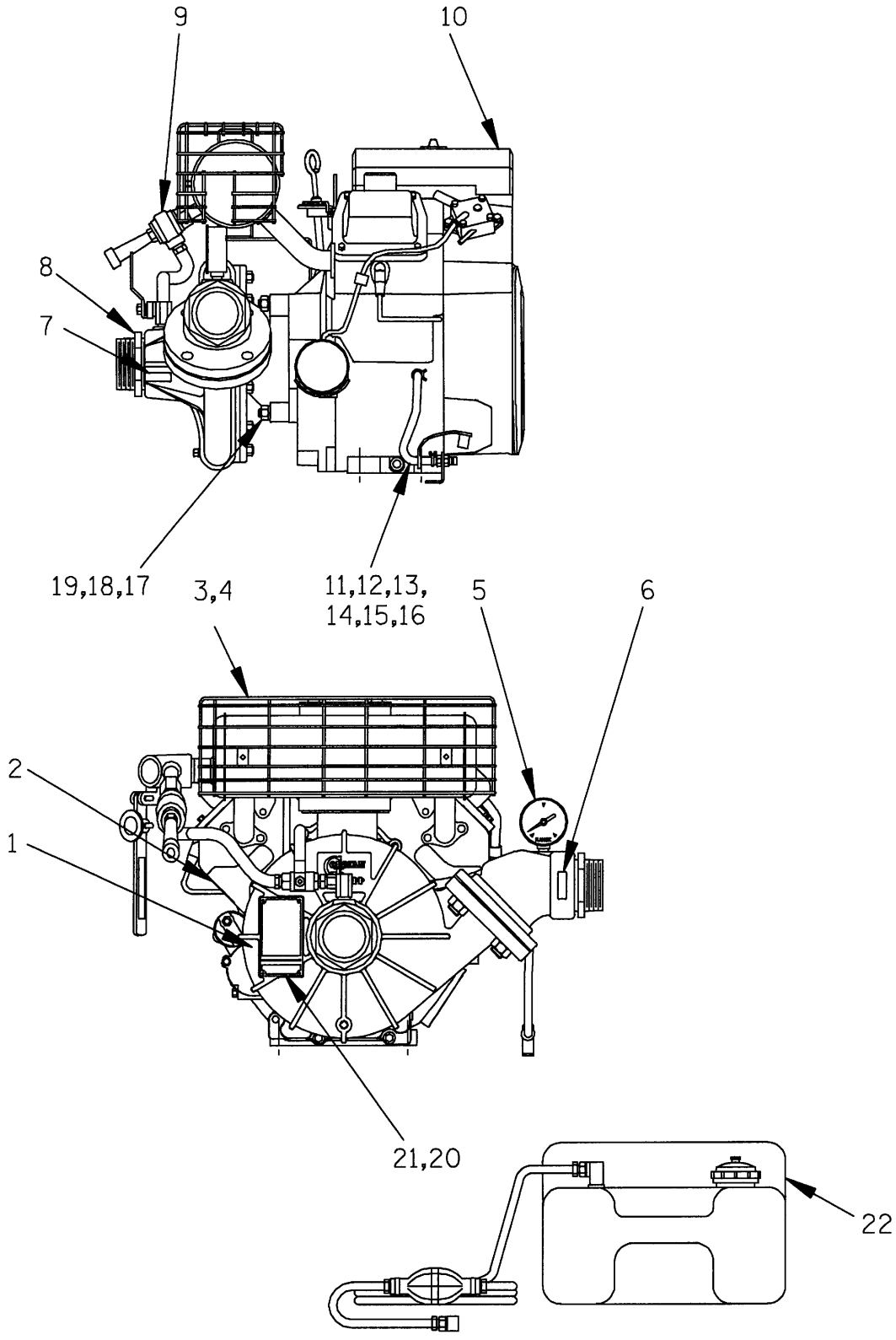


Figure 1. Pump Model 62 1/D1–CH23 T

PARTS LIST
Pump Model 62 1/2D1-CH23 T
(From S/N 1232860 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 END ASSY	62 1/2D1-(CH23)		1
2	KOHLER CH23PS ENGINE	29127-303	---	1
3	MUFFLER ASSY	46211-029	24150	1
4	MUFFLER GUARD KIT	29187-111	---	1
5	PRESSURE GAUGE	S180	---	1
6	DISCHARGE STICKER	6588BJ	---	1
7	SUCTION STICKER	6588AG	---	1
8	COUPLING	2469	14000	2
9	EXHAUST PRIMER ASSY	46112-706	---	1
10	WARNING DECAL	2613FE	---	1
11	BRACKET	34144-036	15080	1
12	DISCONNECT BUSHING	26534-082	---	1
13	DUST CAP	26531-301	---	1
14	JAM NUT	AT06	15991	1
15	FUEL LINE	11308H	---	1
16	HOSE CLAMP	S1788	---	2
17	STUD	C0709	15991	4
18	HEX NUT	D07	15991	4
19	LOCKWASHER	J07	15991	4
20	NAME PLATE	2613BF	13990	1
21	DRIVE SCREW	BM#04-03	17000	4
22	FUEL TANK ASSY	46711-086	---	1
NOT SHOWN:				
	STRAINER	26841-010	---	1
	ADAPTOR	26115-011	---	1
	EXHAUST PRIMER TAG	6588X	---	1
	INSTRUCTION TAG	38817-045	---	1
	ENG START-UP TAG	38816-269	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK

SECTION DRAWING

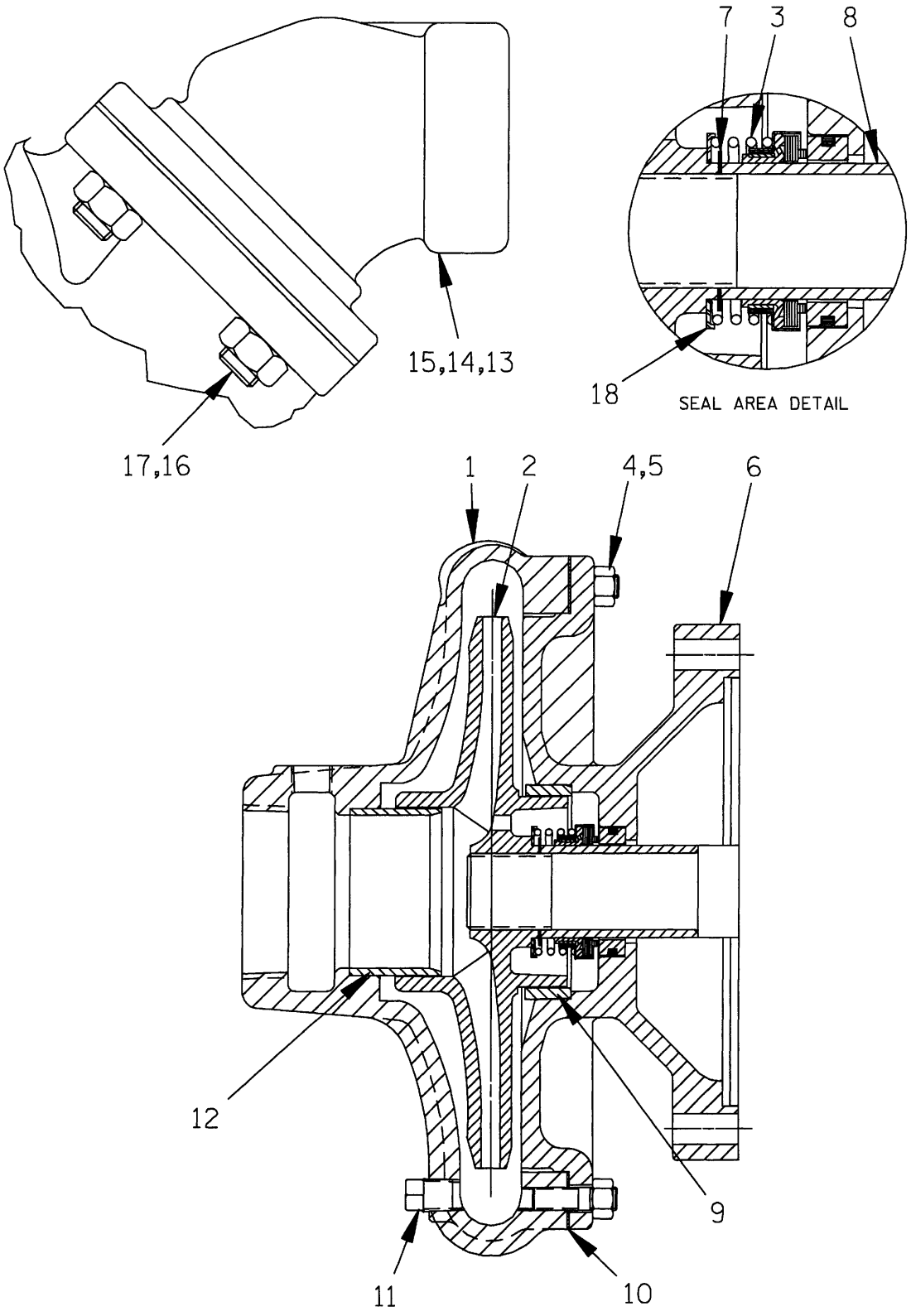


Figure 2. 62 1/2D1-(CH23) Pump End Assembly

PARTS LIST
62 1/2D1-(CH23) Pump End Assembly

ITEM NO.		PART NAME	PART NUMBER	MAT'L CODE	QTY
1		PUMP CASING	11013	13040	1
2	*	IMPELLER	38623-034	13047	1
3	*	SEAL ASSEMBLY	25271-903	---	1
4		STUD	C0605 1/2	15991	12
5		HEX NUT	D06	15991	12
6		INTERMEDIATE	38264-331	13040	1
7	*	IMPELLER ADJUSTING SHIM	37J	17090	1
8	*	SHAFT SLEEVE	3428D	16000	1
9	*	BALANCE RING	62ZL6	14000	1
10	*	CASING GASKET	11013G	18000	1
11		CASING DRAIN PLUG	P04	15079	1
12	*	WEAR RING	11017	14050	1
13		CHECK VALVE BODY	6323	13000	1
14	*	CHECK VALVE BODY GASKET	6323G	19060	1
15		CHECK VALVE ARM	6324	14000	1
16		STUD	C1009	15991	4
17		HEX NUT	D10	15991	4
18		SPRING HOLDER	25273-273	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK

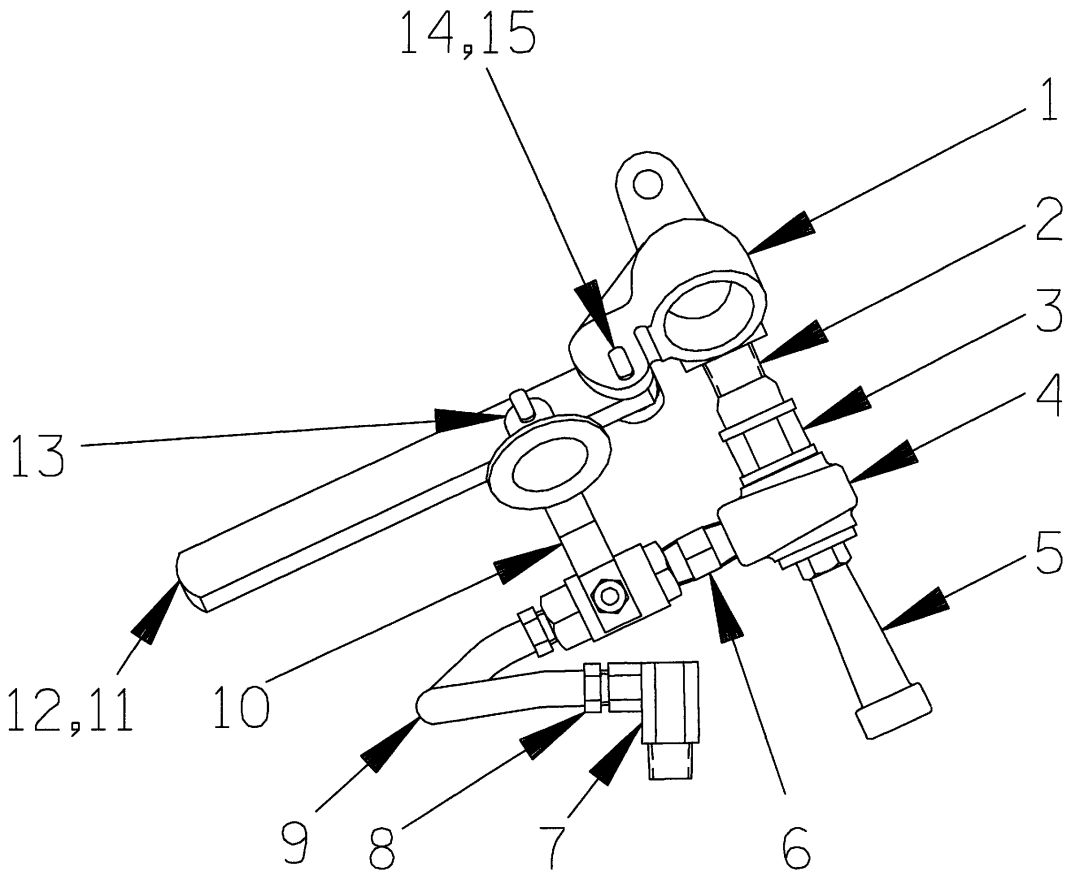


Figure 3. Exhaust Primer Detail

ITEM NO.		PART NAME	PART NUMBER	MAT'L CODE	QTY
1		EXHAUST PRIMER VALVE BODY	3643	10010	1
2	*	PIPE NIPPLE	T08	15079	1
3	*	EJECTOR JET	3645B	14000	1
4		EJECTOR BODY	3552	14000	1
5		VENTURI	2345B	14000	1
6		HEX NIPPLE	26112–053	---	1
7		SWIVEL FITTING	26571–002	---	1
8		HOSE ADAPTOR	26523–334	---	2
9		1 FT HOSE	18513–302	---	1
10		GAS COCK	S2	---	1
11		VALVE HAND	1458A	15990	1
12		EXH PRIMER DECAL	6588AS	---	1
13		EXHAUST PRIMER VALVE	1467	10010	1
14		COTTER PIN	M0406	15990	2
15		SPRING WASHER	S165	---	3

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 view (see Figure 1) and the accompanying parts list.

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.

As described in the **SAFETY** Section, this manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established shop procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

Before attempting to service the pump, switch off the engine ignition and remove the spark plug, or 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 Kohler engine representative.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Shut down the engine and remove the spark plug wires 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.**

Discharge Check Valve Disassembly

(Figure 2)

Remove the nuts (17) and separate the check valve body (13) from the pump casing (1). Pull the rubber gasket (14) from the flange studs (16), and pull the check valve arm (15) from the check valve body. Unscrew the pressure gauge and fire hose adaptor if required.

Clean the mating surfaces of both flanges and inspect all parts for wear or damage. If no further disassembly is required, refer to **Discharge Check Valve Reassembly**.

Exhaust Primer Disassembly

(Figure 3)

Remove the hose adaptor (8) from the swivel fitting (7). If necessary, remove the gas cock valve (10) and pipe nipple (6).

To remove the exhaust primer body (1) unscrew the body from the muffler (4). To disassemble the exhaust primer, remove the handle (11) and unscrew the various primer components.

If no further disassembly is required, refer to **Exhaust Primer Reassembly**.

Pump Disassembly

(Figure 2)

After disconnecting the exhaust primer, remove the casing drain plug (11) and drain the pump casing. Clean and reinstall the plug.

For access to the impeller (2) and seal assembly (3), remove the nuts (5) securing the pump casing to the intermediate (6). Remove the casing gasket (10) and clean the contacting surfaces.

Inspect the wear ring (12) for excessive wear or damage. The wear ring is secured in the pump casing by a press fit. If replacement is required, use a small bit to drill two holes horizontally through the ring, 180° apart. Use a chisel or other suitable tool to complete the cuts through the ring and remove the ring from the casing. **Be careful** not to damage the casing bore when removing the ring.

To remove the impeller, insert a steel bar or drift pin between the vanes, and turn the impeller in a counter-clockwise direction (when facing the impeller) while holding the engine crankshaft stationary. **Be careful** not to damage the impeller vanes. Use caution when unscrewing the impeller; tension on the seal spring will be released as the impeller is removed.

Inspect the balance ring (9) for excessive wear or damage. The balance ring is secured in the intermediate by a press fit. If replacement is required, use a small bit to drill two holes horizontally through the ring, 180° apart. Use a chisel or other suitable tool to complete the cuts through the ring and remove the ring from the intermediate. **Be careful** not to damage the intermediate bore when removing the ring.

Seal Removal and Disassembly

(Figure 2 And 4)

Remove the spring holder (18) and the impeller adjusting shims (7). Tie and tag the shims or measure and record their thickness for ease of reassembly.

Remove the seal spring, then slide the shaft sleeve and rotating portion of the seal off the engine 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 sleeve. Use two stiff wires with hooked ends to pull the stationary seat from the intermediate bore.

NOTE

An alternate method of removing the stationary seat is to remove the hardware (18 and 19, Figure 1) and separate the intermediate from the engine. Use a dowel to press the stationary seat from the intermediate.

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

Seal Reassembly and Installation

(Figure 2 And 4)

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 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, or replace it if there are cuts or nicks 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 rotating element O-ring 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 4).

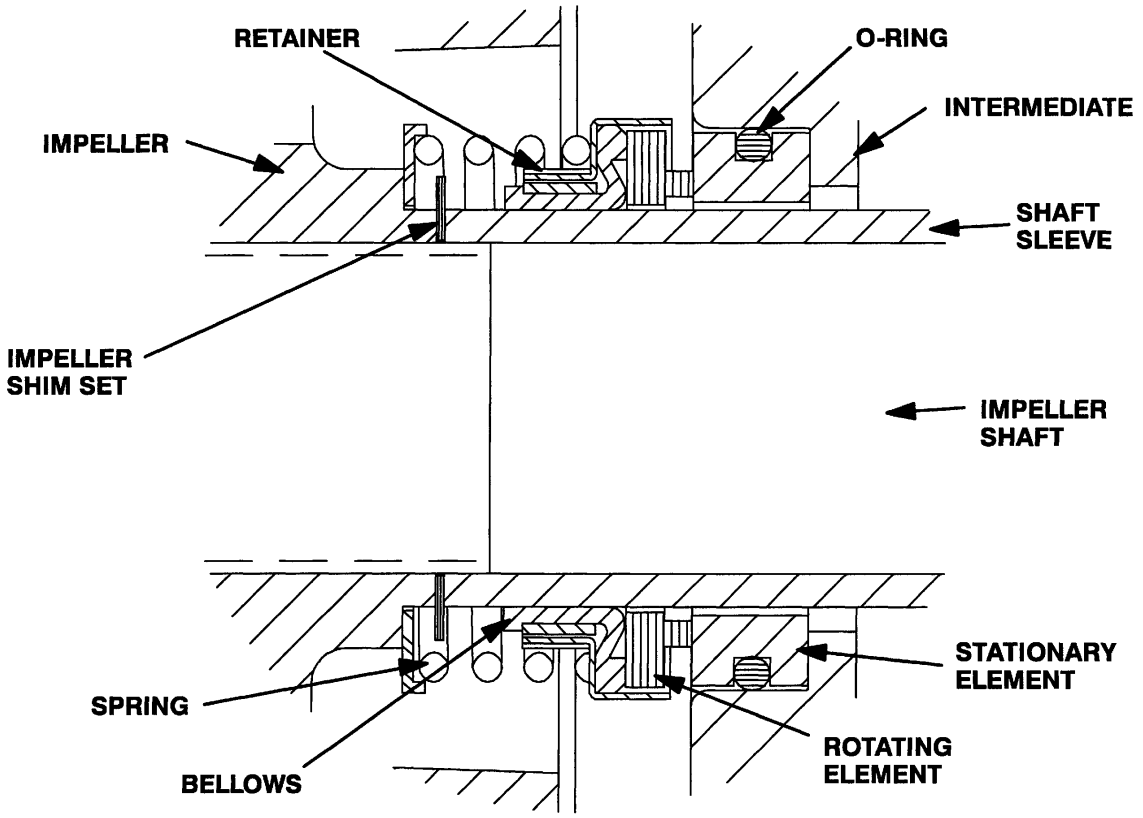


Figure 4. 25271-903 Seal Assembly

CAUTION

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

If the balance ring (9) was removed, the replacement ring should be pressed into the intermediate before installing the seal. Position the ring in the intermediate bore with the chamfered end toward toward the bore shoulder and press it into the bore until fully seated.

NOTE

The balance ring must be fully seated in the intermediate bore, otherwise binding and/or excessive wear could result.

If the intermediate was removed, lay it on a flat surface with the impeller side facing up.

Lubricate the stationary seat O-ring with light oil and install it in the stationary seat. Use thumb pressure to press this subassembly into the intermediate bore until fully seated. Be careful not to damage the seal face. After installation, wipe the seal face in a concentric pattern with a clean, lint-free cloth to remove any fingerprints.

Secure the intermediate to the engine with the hardware (26 and 27). **Be careful** not to damage the stationary seat on the shaft threads.

Slide the rotating portion of the seal (consisting of the retainer, bellows and rotating element) onto the sleeve (8) until the rotating face is **just flush** with the chamfered end of the sleeve. Slide the sleeve onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until it seats against the shaft shoulder.

Install the seal spring. Make sure that all components of the seal are seated squarely.

Impeller Installation

(Figures 2 and 5)

Inspect the impeller (2), and replace it if cracked or badly worn.

For maximum pump efficiency, the impeller must be centered within the volute scroll. To verify impeller positioning, measure the pump casing and impeller as shown in Figure 5. Use these measurements to calculate the required impeller location (dimension E). Add or remove impeller adjusting shims (55) to obtain dimension E.

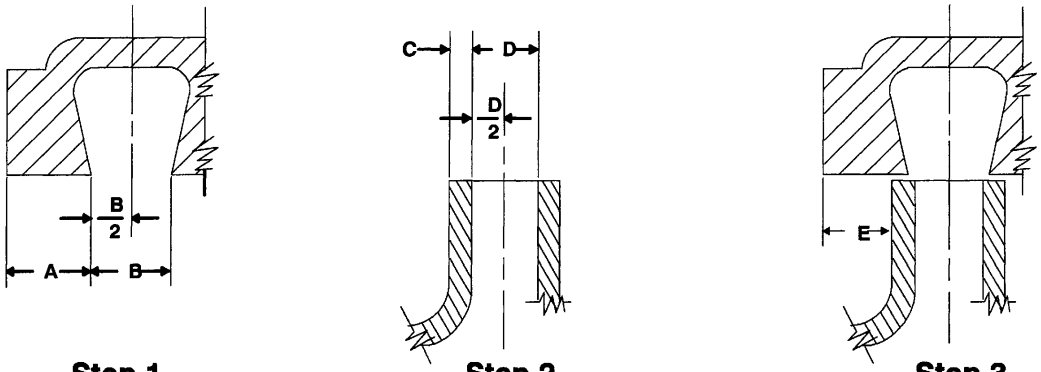


Figure 5. Centering Impeller Within Pump Casing

NOTE

After the impeller has been properly positioned, check for free rotation. Correct any scraping or binding before further reassembly.

Pump Reassembly

(Figure 2)

If the wear ring (12) was removed, apply 'Loctite No. 242 Threadlocker' or equivalent compound) between the casing and the wear ring. Position the replacement ring in the casing bore so that chamfer on the I.D. faces toward the impeller. Press the ring into the bore until fully seated against the casing shoulder.

NOTE

The wear ring must be fully seated in the casing bore, otherwise binding and/or excessive wear could result.

Install the pump casing gasket (10). Carefully guide the wear ring into the eye of the impeller, and secure the casing to the intermediate with the nuts (5).

NOTE

After the pump casing has been install check the impeller for free rotation. Correct any scraping or binding before further reassembly.

Exhaust Primer Reassembly

(Figure 3)

NOTE

Before assembly, apply pipe sealant on all threaded joints.

To install the exhaust primer body (1) screw the body into the muffler (4). To assemble the exhaust primer, install the handle (11) and install the various primer components.

Screw the hose adaptor (8) into the swivel fitting (7). Install the gas cock valve (10) and pipe nipple (6).

Discharge Check Valve Reassembly

(Figure 2)

Position the pivot of the check valve arm (15) in the slot in the valve body (13). Install the rubber gasket (14), and secure the assembly to the casing with the nuts (17). Check for free operation of the valve arm. Inspect the pressure gauge and hose adaptor for wear or damage before installation and replace as required.

LUBRICATION

Seal Assembly

(Figure 2)

The seal assembly is lubricated by the medium being pumped. No addition lubrication is required.

Engine

(Figure 1)

Refer to the literature provided with the engine, or contact your local Kohler 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