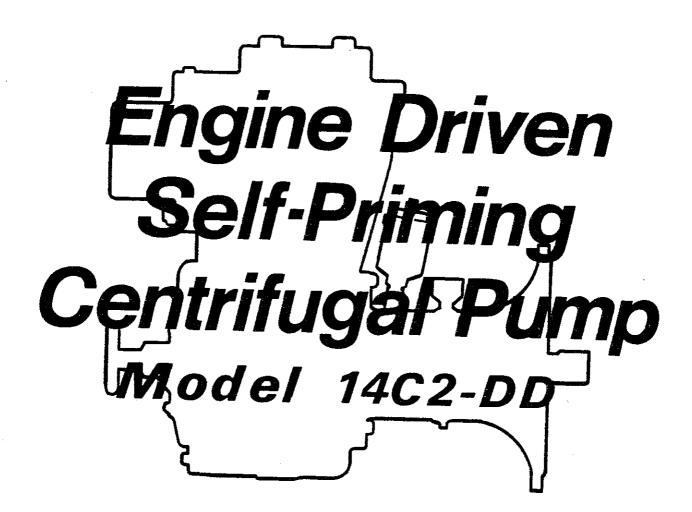
INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



OM-00672-0E

SEPTEMBER 5, 1979 ISSUE 1



THE GORMAN-RUPP COMPANY . MANSFIELD, OHIO

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



10 SERIES OM-00672-0E

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

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

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

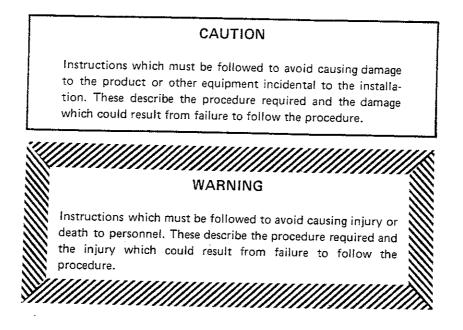
The Gorman-Rupp Company P.O. Box 1217 Mansfield, Ohio 44902

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

# NOTE

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



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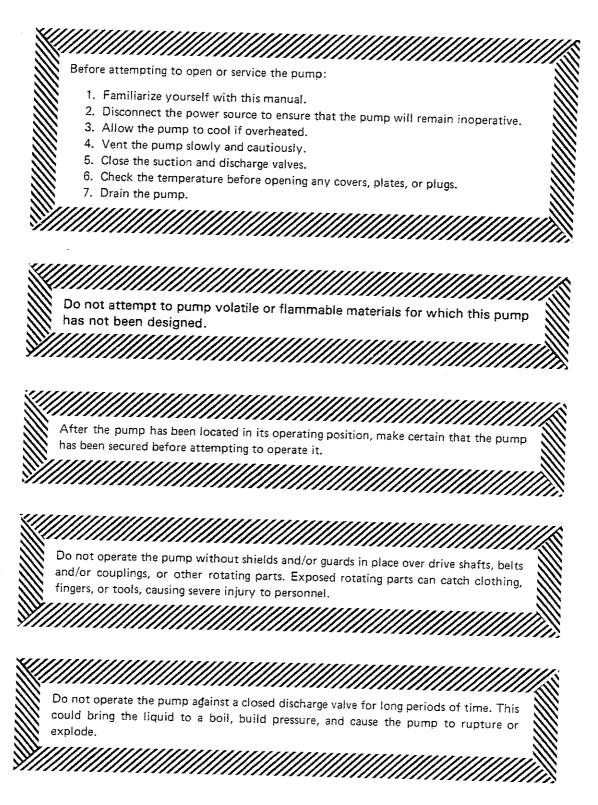
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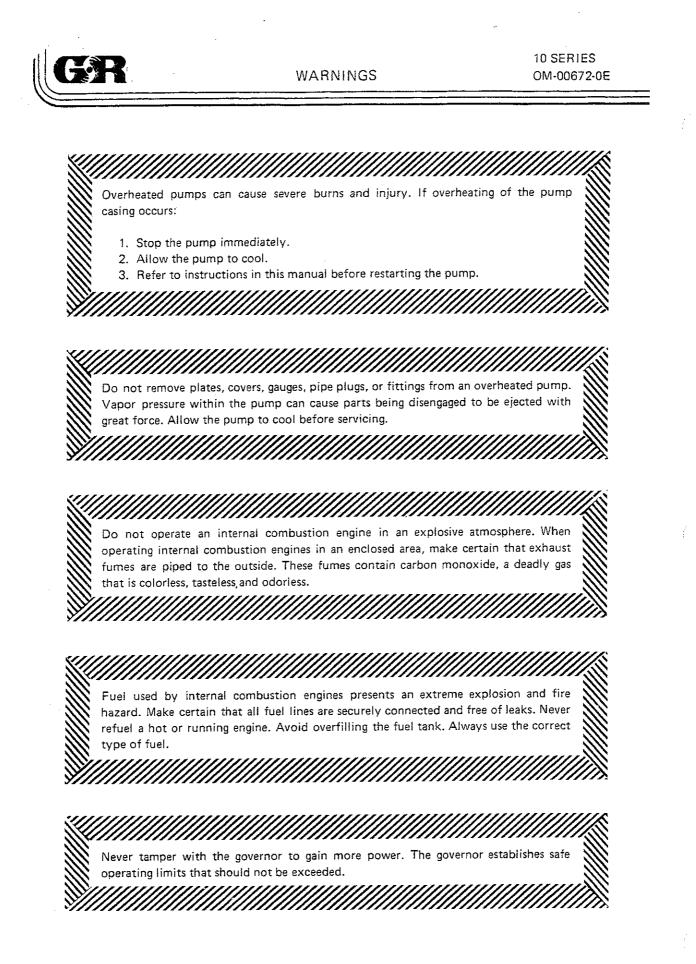
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# WARNINGS

THESE WARNINGS APPLY TO ALL ENGINE DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE ENGINE BEFORE ATTEMPTING TO START THE ENGINE.







# INSTALLATION

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

# PREINSTALLATION INSPECTION

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

a. Inspect the pump assembly for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose bolts, nuts, cap screws, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and cap screws securing mating surfaces.

c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note the direction of rotation indicated on the pump.

d. Check all lubricant levels and lubricate as necessary. Refer to the MAINTENANCE AND REPAIR section of this manual.

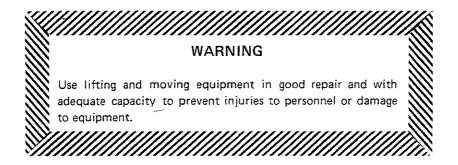
# POSITIONING THE PUMP

## Mounting

Locate the pump in an accessible place as close as practical to the liquid to be pumped. Level mounting is essential for proper operation. The pump may have to be supported to provide for level operation or to eliminate vibration.



Lifting



Make sure that hoists and other lifting equipment are of sufficient capacity to safely handle the pump assembly. Attach the lifting mechanism to the bail, eye bolt, or other specific lifting device provided on the pump. If no specific lifting device is provided and chains or cables must be used, make certain that they are positioned so that they will not damage the pump, and so that the load will be balanced.

# CAUTION

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

## SUCTION AND DISCHARGE PIPING

#### Materials

Either pipe or hose may be used for suction and discharge lines, but hose used in suction lines must be the rigid-wall, reinforced type to prevent collapse under suction. Using pipe 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**

Never pull a pipe line into place by tightening the flange bolts. The connecting flange must be aligned exactly with the pump port. Lines near the pump must be independently supported to avoid strain on the pump which could cause serious vibration, decreased bearing life, and increased shaft and seal wear. Hose-type lines should have supports strong enough to secure the line when it is filled with liquid and under pressure.

## Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines close to the pump before installing the lines.



# SUCTION LINES

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

## Fittings

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

#### Strainers

Install a strainer at the end of the suction line to avoid possible clogging or damage to the pump. The total area of the openings in the strainer should be at least three or four times the cross section of the suction line, but no opening should be larger than the solids handling capability of the pump. Clean the strainer regularly during operation.

# Sealing

All connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift. After installation, inspect the suction line carefully for potential leaks.

# **DISCHARGE LINES**

# Throttling Valves

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

#### Check Valves

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

With high discharge heads, install a throttling value and a check value in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

#### **Bypass Lines**

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

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



# NOTE

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

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

# SUCTION LINE POSITIONING

The depth of submergence of the suction line is critical to efficient pump operation. Figure 1 shows recommended minimum submergence vs. velocity.

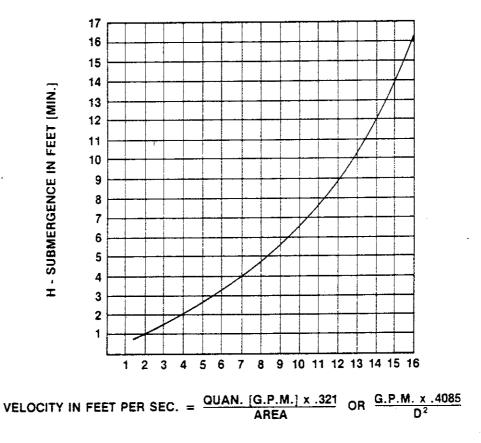
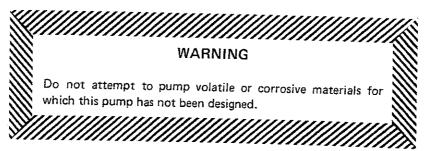


Figure 1. Recommended Minimum Suction Line Submergence Vs. Velocity

-20



# **OPERATION**



# 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 volute casing must first be filled with liquid if:

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

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

# CAUTION

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

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

## STARTING

Consult the operating manual furnished with the power source.

# OPERATION

# Lines With a Bypass

Either a Gorman-Rupp automatic air release valve or a hand operated shutoff valve may be installed in a bypass line.

If a Gorman-Rupp automatic air release valve has been installed, close the throttling valve in the discharge line. The Gorman-Rupp valve will automatically open to allow the pump to prime, and automatically close when priming has been accomplished. After the pump has been primed, and liquid is flowing steadily from the bypass line, open the discharge throttling valve.



If a hand operated shutoff valve has been installed, close the throttling valve in the discharge line, and open the bypass shutoff valve so that the pump will not have to prime against the weight of the liquid in the discharge line. When the pump has been primed, and liquid is flowing steadily from the bypass line, close the bypass shutoff valve and open the discharge throttling valve.

# Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by 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.

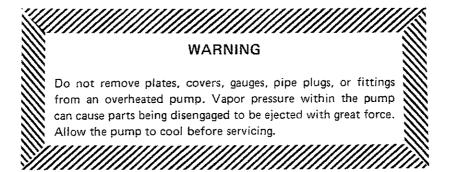
After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled,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

## Leakage

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

#### Overheating

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



#### Strainer Check

Check the suction strainer regularly during pump operation, or if the pump flow rate begins to drop, and clean it as necessary. Be especially alert for unusual noises when pumping liquids containing solids.

#### Pump Vacuum Check

Install a vacuum gauge in the system, using pipe dope on the threads.

The pump should pull a vacuum of 20 inches or more of mercury at operating speed with the suction line blocked. If it does not, check for air leaks in the seals or gaskets.



With the pump primed and at operating speed, and the suction line open, read the vacuum gauge. Shut off the pump, keep the vacuum line open, and read the gauge again to see if the vacuum remains at the maximum developed by the pump. If the vacuum falls off rapidly, an air leak exists. If the liquid level at the source of supply remains at a constant level, check to make certain that the air leak is not from the vacuum gauge connection.

## STOPPING

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

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for 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, operate the pump during the draining process. Clean out any remaining solids by flushing with a hose.

(



# TROUBLESHOOTING

WARNING Before attempting to open or service the pump: 1. Consult pump service manual. 2. Disconnect the power source to ensure that the pump will remain inoperative. 3. Allow pump to cool if overheated. 4. Close suction and discharge valves. 5. Drain pump.

Trouble	Possible Cause	Probable Remedy
PUMP FAILS TO PRIME	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Suction check valve clogged or binding.	Clean valve.
	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.
	Suction strainer clogged.	Clean suction strainer.
PUMP STOPS OR FAILS TO DE-	Air leak in suction line.	Correct leak.
LIVER RATED FLOW OR PRESSURE	Suction intake not sub- merged at proper level or sump too small.	Check installation and correct as needed. Check submergence chart (Section B, page 4).
	Lining of suction hose collapsed.	Replace suction hose.
	Impeller or other wearing parts worn or damaged.	Check impeller clearance. Replace worn parts as needed.
	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Reduce suction lift.

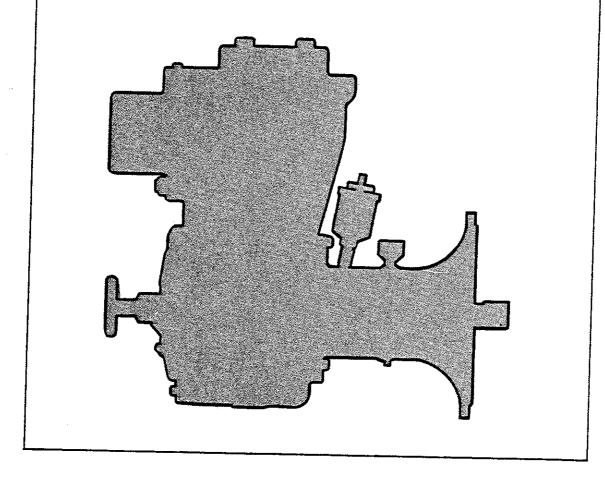


		Destable Describe
Trouble	Possible Cause	Probable Remedy ·
PUMP STOPS OR FAILS TO DE- LIVER RATED	Leaking or worn seal or pump gaskets.	Check pump vacuum. Replace leaking or worn seal or pump gaskets.
FLOW OR PRESSURE (cont)	Suction strainer clogged.	Clean suction strainer.
PUMP REQUIRES	Pump speed too high.	Reduce speed of power source.
POWER	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
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 clogged or binding.	Free valve, and clean or replace it.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line.
	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.



10 SERIES OM-00672-0E

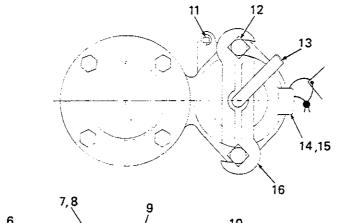
# Engine Driven Self-Priming Centrifugal Pump Model 14C2-DD



The only moving parts of this pump are the impeller, seal rotating elements, and the shaft. The wear plate, impeller, and seal, which receive the most wear, are easily accessible and can be replaced without disturbing the piping. Maintenance and replacement of these three parts will maintain the peak operating efficiency of the pump.



# SECTIONAL DRAWING



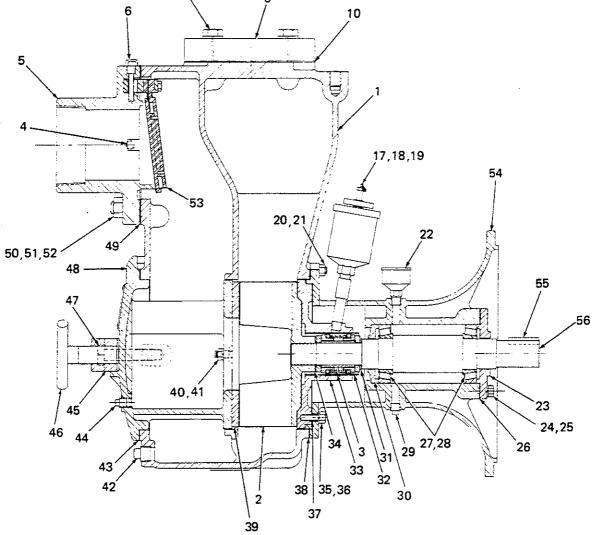


Figure 1. Pump Model 14C2-DD



# PARTS LIST

ITEN NO.	MODEL 14C2-DD PART NAME	PART NUMBER	MATL R CODE			MODEL 14C2-DD PART NAME	PART NUMBEI	MATL R CODE
1	VOLUTE CASING	12062	10010	42		VOLUTE DRAIN PLU	JG P-08	11990
2		9934-A	11000	43	☆	COVER GASKET	2527-G	19090
	🛠 SEAL ASSEMBLY	GS-1250		44		COVER DRAIN PLUC		11990
4	PIPE PLUG	P-04	11990	45		COVER CLAMP BAR	12064	11000
5	SUCTION FLANGE	12065	10010	46		COVER CLAMP SCRE		24000
6	FLAP VALVE PIN	11557	17010	47		MACHINE BOLT	A-1012	15991
7	LOCKWASHER	J-10	15991	48	☆	COVER	12063	10010
8	HEX HD CAP SCREW	B-1008	15991	49	*	SUCTION FLANGE	11389-G	21020
9	DISCHARGE FLANGE		10010			GASKET		21020
10	🖈 DISCHARGE FLANGE	1674-G	18000	50		STUD	C-1010	15991
	GASKET			51		STUD	C-1011	15991
11	ACCESSORY PIPE	P-04	11990	52		HEX NUT	D-10	15991
	PLUG			53		FLAP VALVE ASSY	46411-062	
2	MACHINE BOLT	A-1014	15991	54		NTERMEDIATE	7687	10010
3	FILL COVER	136	15000	55		SHAFT KEY	N-0607	15990
_	CLAMP SCREW					MPELLER SHAFT	45	
4	FILL COVER	50	10010			OWN:	45	15010
_	ASSEMBLY				S	STRAINER	2690-C	24000
	FILL COVER GASKET	50-G	19090			ORD DD ENGINE	2000-0 204-E1	24000
6	FILL COVER	40	11000			CABLE ASSEMBLY	6926-V	24040
_	CLAMP BAR					OISTING BAIL	13351-G	24040
7	HEAVY PIPE NIPPLE	THA-0408	15070			DRIVE ARM ASSY	13817-A	24000
8	PIPE COUPLING	AE-04	11990			DYNA FLEX JOINT	S-02110	
	SEAL GREASE CUP	S-1509				RIVE PIN	13819-D	15030
)	STUD	C-0606	15991		8	ASE	13508	24000
	HEX NUT	D-06	15991		В	ATTERY BOX ASSY	GRP40-08	2.000
7	INTERMEDIATE	S-35				GRD CABLE ASSY	5795-AC	24040
. <b>.</b> .	GREASE CUP		1			BATTERY BOX	14443	24000
	BEARING CAP	43-X	10010		i	BATTERY FRAME	14444	24000
4	LOCKWASHER	J-06	15991		į	HEX HD CAP SCREW	B-0605	15991
5	HEX HD CAP SCREW	B-0604	15991		1	HEX HD CAP SCREW	B-0610	15991
	BEARING SHIMSET	48261-031			ļ	HEX HD CAP SCREW	B-0806	15991
	BEARING CUP	S-1086		1	!	HEX NUT	D-06	15991
	BEARING CONE	S-1087			ł	HEX NUT	D-08	15991
}	INTERMEDIATE	Р-04	11990		ł	OCKWASHER	J-06	15991
	DRAIN PLUG					OCKWASHER	J-08	15991
	BEARING CLOSURE	44	10010		F	LAT WASHER	K-06	15991
Ŕ	SEAL RETAINING	37-H	15990		Ê	BATTERY	29331-506	
بغ	WASHER		1	1	E	SATTERY SUPPORT	41432-007	
	SEAL LINER	2205	14080		M	DUNTING HARDWAR	E	
	SEAL PLATE	6567-A	10010		Н	IEX HD CAP SCREW	B-0706	15991
	IMPELLER SHIM SET	37-J	17090	1	Н	IEX HD CAP SCREW	B-0806	15991
i	LOCKWASHER	J-06	15991		H	IEX NUT		15991
يد ا	HEX HD CAP SCREW		15991		Н	EX NUT		15991
☆	SEAL PLATE GASKET		18000	1	L	OCKWASHER		15991
4	VOLUTE GASKET SET		18000	1		OCKWASHER		15991
			15990		F	LAT WASHER		15991
			15991		OP	TIONAL WHEEL KIT		
	HEX NUT	D-06	15991					

 $\bigstar$  Indicates parts recommended for stock

Note: This parts list applies to pumps from serial no. 432845.

CANADIAN SERIAL NO. ..... AND UP



# PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

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

#### Pump Disassembly

Disconnect the spark plug, or take other precautions to ensure that the engine will remain inoperative while the pump is being serviced, and close all connecting valves. Remove the volute drain plug (42) to drain the pump.

Support the pump body, and remove the hex nuts (21) and the hex head cap screws (36) securing the volute casing (1) to the seal plate (33) and the intermediate (54). Separate the assemblies. Inspect the wear plate (39), and replace it if scored or worn.

To loosen the impeller (2), immobilize it by placing a block of wood between the vanes, and hand turn the shaft counter to the direction of pump rotation. Unscrew the impeller, and replace it if cracked or badly worn.

Remove the impeller adjusting shims (34). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

#### Seal Disassembly

Before removing the seal assembly, turn the cross arm on the seal grease cup (19) clockwise until it rests against the cover (see figure 3). This will prevent the grease in the cup from escaping after the seal is removed.

Carefully remove the shaft sleeve and the stationary and rotating seal elements, using a stiff wire with a hooked end if necessary. Remove the seal liner (32), which is a press fit.

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

		<u>//</u>
	WARNING	
Ĭ.	Most cleaning solvents are toxic and flammable. Use them only	Ŵ
ij	in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent	
ij	containers.	
ÿ		$\otimes$

#### Seal Reassembly

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



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

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

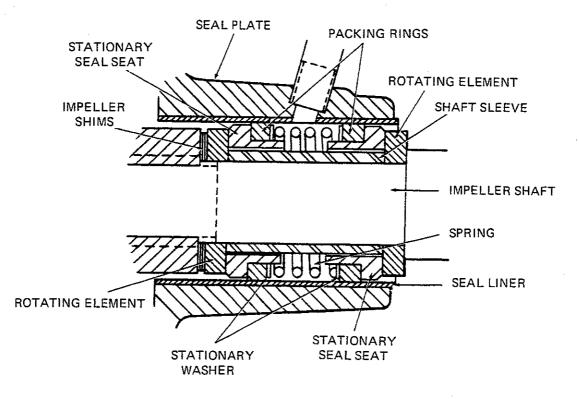
# CAUTION

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

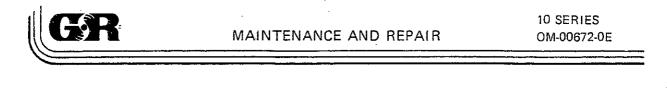
Reinstall the shaft sleeve, and install the replacement seal as a complete unit.

Lubricate the packing rings with soft grease or oil when installing the seal, and place a drop of light lubricating oil on the lapped faces. Assemble the seal as shown in figure 2.

Before starting the pump, fill the grease cup through the grease fitting with a good grade of No. 2 pressure gun grease until grease escapes from the relief hole. Turn the grease cup arm counterclockwise until it is at the top of the stem; this will release the spring to apply grease to the seal (see figure 3).







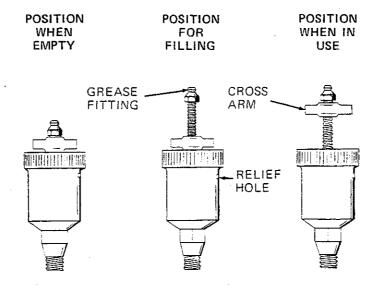


Figure 3. Automatic Lubricating Grease Cup

## Pump Reassembly

Reinstall the impeller adjusting shims and the impeller. A clearance of .020 to .040 inch between the impeller and the seal plate is necessary for maximum pump efficiency. Measure this clearance, and add or subtract impeller shims until it is reached.

Reassemble the volute casing to the seal plate and the intermediate, replacing the volute gasket set (38) and the seal plate gasket (37). A clearance of .010 to .020 inch between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance can be reached by adding or subtracting gaskets in the volute gasket set until the impeller binds against the wear plate when the shaft is turned by hand. After the impeller binds, add .015 inch of gaskets.

Before starting the pump, clean and reinstall the volute drain plug, and fill the volute with liquid.

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# WARRANTY

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

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

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

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

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

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

> THE GORMAN-RUPP COMPANY Mansfield, Ohio

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

# THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

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