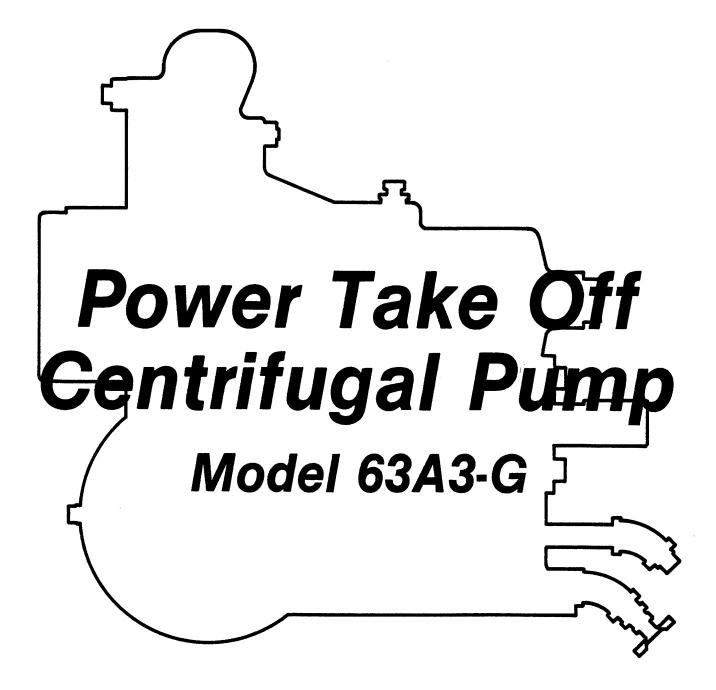
INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

GORMAN-RUPP
OM-01408-0P01

AE

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THE GORMAN-RUPP COMPANY · MANSFIELD, OHIO



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

This pump is a 60 Series, semi-enclosed impeller, centrifugal model with straight-in suction without a suction check valve. This pump is suitable for pumping liquids which do not contain large entrained solids. For specific service, consult your Gorman-Rupp distributor or the Gorman-Rupp Company.

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

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.

CAUTION

Instructions which must be followed to avoid causing damage to the product or other equipment incidental to the installation. These describe the procedure required and the damage which could result from failure to follow the procedure.

WARNING

Instructions which must be followed to avoid causing injury or death to personnel. These describe the procedure required and the injury which could result from failure to follow the procedure.

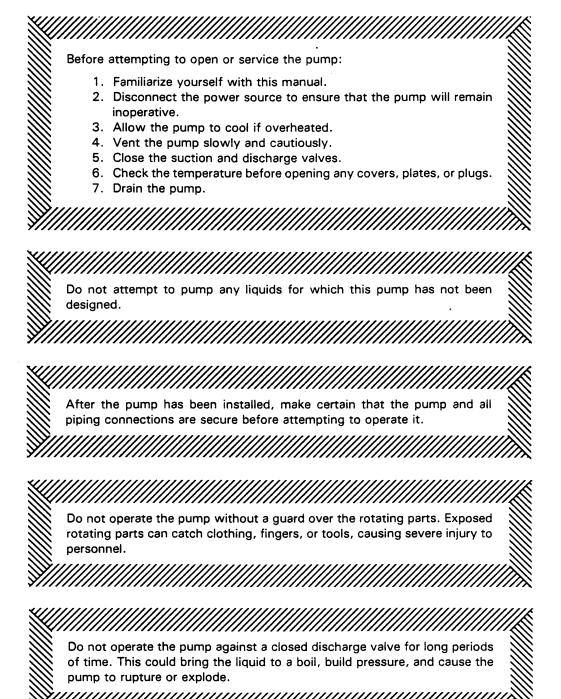
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WARNINGS

THESE WARNINGS APPLY TO 60 SERIES PUMPS WITH POWER TAKE OFF DRIVE.



Section A. Page 1



Overheated pumps can cause severe burns and injury. If overheating of the pump casing occurs:

- 1. Stop the pump immediately.
- 2. Allow the pump to cool.
- 3. Refer to instructions in this manual before restarting the pump.

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.



INSTALLATION

Since pump installations vary, this section is intended only to summarize recommended installation practice. If there are any questions concerning a specific installation, 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.

- a. Check the pump assembly for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews 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. Check that the pump shaft rotates in the required direction.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

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

POSITIONING THE PUMP

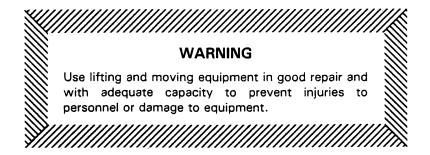
Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation. It may be necessary to support or shim the pump for level operation.

Section B. Page 1



Lifting



Make sure that hoists and other lifting equipment are of sufficient capacity to safely handle the pump assembly. If chains and cables are 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. Piping 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.

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.

Page 2 Section B.



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 entrained 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.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all threaded connections in the suction line should be sealed with pipe dope to ensure an airtight seal. In volatile and/or corrosive service, the pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to one and one-half times the diameter of the suction pipe.

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

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

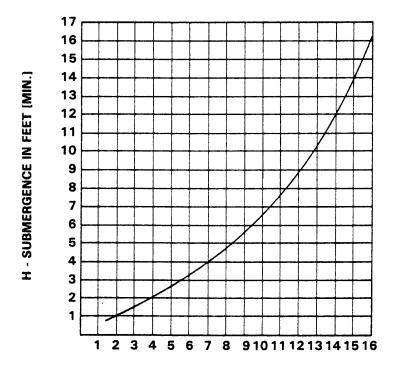
If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least three times the diameter of the suction pipe.

Section B. Page 3



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.



VELOCITY IN FEET PER SEC. = $\frac{\text{QUAN. [G.P.M.]} \times .321}{\text{AREA}}$ OR $\frac{\text{G.P.M.} \times .4085}{\text{D}^2}$

Figure 1. Recommended Minimum Suction Line Submergence Vs. Velocity

DISCHARGE LINES

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

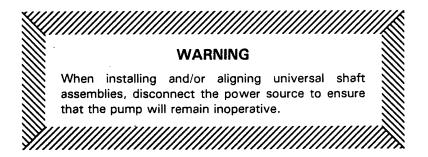
If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe in the line to minimize friction losses. Never install a throttling valve in a suction line.

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

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

Page 4 Section B.

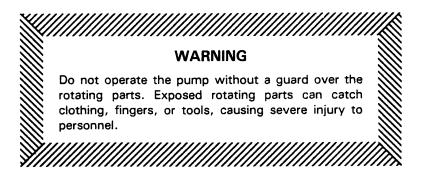




The alignment of the pump and its power source is critical for trouble-free mechanical operation. Before checking alignment, make sure that the gearbox mounting bolts are tight.

When using a universal joint drive shaft assembly to connect the pump to a PTO, install, support, and align the drive shaft in accordance with the manufacturer's instructions. The pump and the drive power source are generally positioned so that shaft centerlines are parallel and horizontal. The maximum operating angle should not exceed 15 degrees (see figure 1).

Check the direction of PTO rotation before starting the pump. The drive shaft must rotate in the direction shown on the body of the pump, gearbox, and/or decals, tags, and labels.



Section B. Page 5



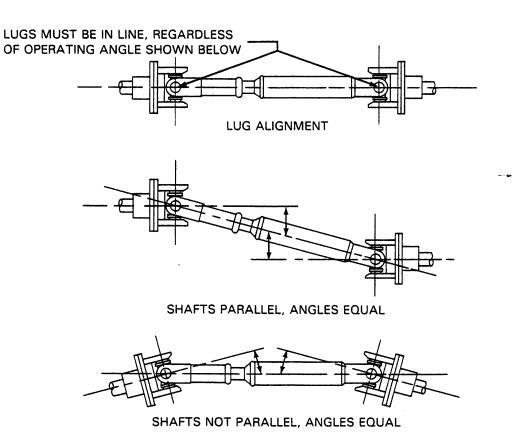
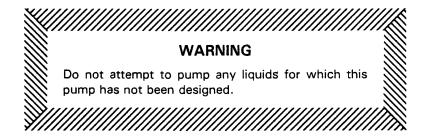


Figure 2. Proper Installation and Alignment of Universal Assembly



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).

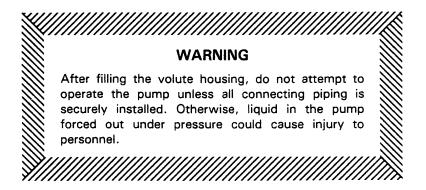
This pump should never be operated unless there is liquid in the volute.

CAUTION

Never operate this 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.

Add liquid to the volute housing:

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





STARTING

Rotation

The correct direction of pump rotation is indicated by an arrow on the pump body, and on the accompanying decal. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

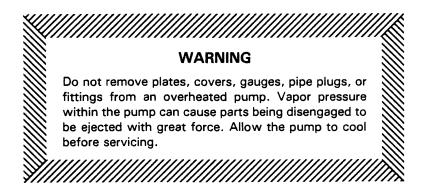
Consult the operating manual furnished with the power source before attempting to start the power source.

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

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.

Pump Vacuum Check

Since this pump does not have a suction check valve, the discharge line must be fitted with a check valve if a pump vacuum reading is to be taken.

Page 2 Section C.



With the pump inoperative, install a vacuum gauge in the suction side of the pump, 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 or more of mercury. If it does not, check for air leaks in the seal or gasket.

Open the suction line, and read the vacuum gauge with the pump primed and at operating speed. Shut off the pump, and read the gauge again to determine if the vacuum remains at the maximum developed by the pump. If the vacuum falls off rapidly, an air leak exists; 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 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.

BEARING TEMPERATURE CHECK

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

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the gearbox 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 MAINTENANCE AND REPAIR). Bearing overheating can also be caused by shaft or universal joint misalignment, or by 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

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.

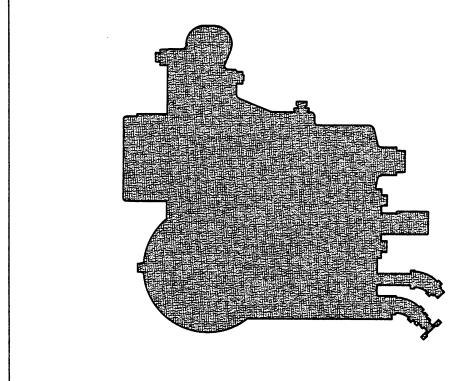
Trouble	Possible Cause	Probable Remedy	
PUMP FAILS TO	Air leak in suction line.	Correct leak.	
	Lining of suction hose collapsed.	Replace suction hose.	
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.	
	Suction lift or discharge head too high.	Check piping installation.	
	Strainer clogged.	Check strainer and clean if necessary.	
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.	
	Lining of suction hose collapsed.	Replace suction 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 driver output. Check universal joint drive for slippage.	
	Discharge head too high.	Reduce head.	
	Suction lift too high.	Reduce suction lift.	
	Strainer clogged.	Check strainer and clean if necessary.	



Trouble	Possible Cause	Probable Remedy
PUMP STOPS OR FAILS TO DE- LIVER RATED FLOW OR PRESSURE (cont)	Leaking or worn seal or pump gaskets.	Check pump vacuum. Replace leaking or worn seal or pump gaskets.
PUMP REQUIRES Pump speed too high TOO MUCH POWER		Check driver output; check that the universal joint drive is properly installed.
TOWER	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 power source at maximum governed speed.
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.
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature frequently 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.
	Universal joint drive misaligned.	Align drive.



Power Take Off Centrifugal Pump Model 63A3-G



Maintenance and replacement of the wearing parts will maintain the peak operating efficiency of the pump.



SECTIONAL DRAWING

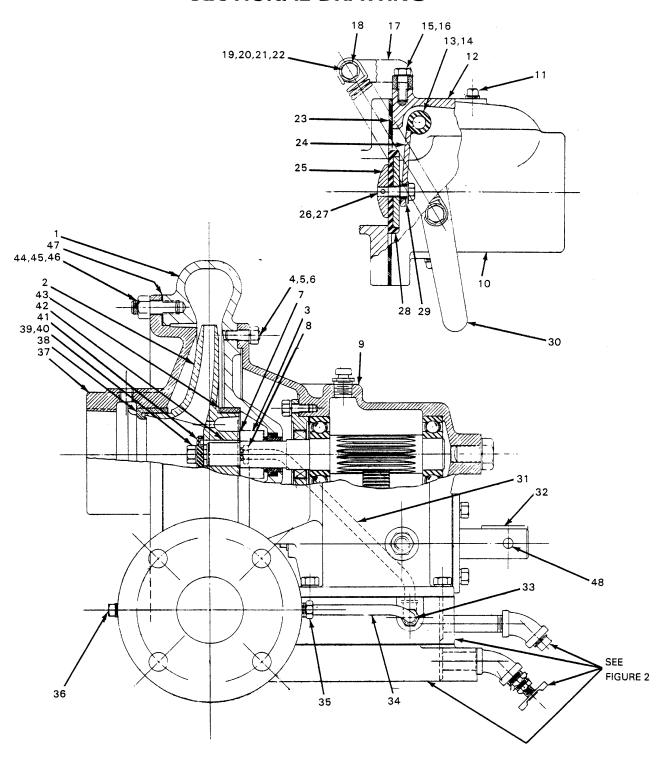


Figure 1. Pump Model 63A3-G



PARTS LIST

PUMP MODEL 63A3-G

(From S/N 365179 up)

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

NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE HOUSING	6048	10010	1	42	IMPELLER KEY	N-0306	15990	1
2	★ IMPELLER	6045	10010	1	43	★ VOL HSNG BALANCE RING	62-ZL6	14000	1
3	★ SEAL ASSEMBLY	S-298	_	1	44	STUD	C-0807	15991	4
4	STUD	C-0606	15991	8	45	STUD	C-0808	15991	4
5	HEX NUT	D-06	15991	8	46	HEX NUT	D-08	15991	8
6	LOCKWASHER	J-06	15991	8	47	★ VOLUTE HOUSING GSKT	62-H2G1	18000	2
7	SPRING CENT WASHER	3928	17000	1			62-H2G2	18000	2
8	HALF UNION	S-0468		1	48	COTTER PIN	M-0412	15990	1
9	GEARBOX ASSY (figure 2)	GRP44-04	_	1	NOT	SHOWN:			
10	CHECK VALVE ASSEMBLY	GRP14-11A	_	1	l	HAND PRIMER ASSEMBLY	GRP43-02A	_	1
11	PIPE PLUG	P-04	11990	1		PIPE NIPPLE	2434	15070	2
12	CHECK VALVE BODY	6333	10010	1		PRIMING BRACKET	7723	15990	1
13	★ SHAFT	6338	17000	1		HEX HEAD CAPSCREW	B-06021/2	15991	4
14	ROLL PIN	S-0630	_	2		LOCKWASHER	J-06	15991	4
15	HEX HEAD CAPSCREW	B-0604	15991	2	-	HOSE CLAMP	S-0887	_	2
16	LOCKWASHER	J-06	15991	2		DIAPHRAGM PRIMER	S-1252	_	1
17	SPRING BRACKET	3844	14000	1		REDUCING PIPE BUSHING	AP-0806	11990	1
18	★ EXTERNAL SPRING	6270	16080	1		NAME PLATE	2613-R	13990	1
19	SPACER	3855	15070	2		BASE	6095	24000	1
20	HEX HEAD CAPSCREW	B-0606	15991	2		MOUNTING HARDWARE			
21	LOCKWASHER	J-06	15991	2		HEX HEAD CAPSCREW	B-0608	15991	4
22	FLAT WASHER	K-06	15991	2		HEX NUT	D-06	15991	4
23	★ GASKET	11607-G	18000	1		LOCKWASHER	J-06	15991	4
24	ARM WEIGHT	6337	15990	1		FLAT WASHER	K-06	15991	4
25	VALVE WEIGHT	11614	10010	1		GUARD	6118-A	24000	1
26	FLAT WASHER	KE-06	15991	2		AXLE BRACKET	11018-A	24000	1
27	NYLOCK CAPSCREW	BT-0605	15991	1		AXLE BRACKET	11018-B	24000	1
28	★ CHECK VALVE MOLD	12651	24010	1		AXLE	6150	15990	1
29	SPACER	7420	15990	1		SEAL ALIGNMENT	6453	14090	1
30	HANDLE	6334	11000	1		HEX HEAD CAPSCREW	B-0604	15991	10
NS	★ ADJUSTING SHIM SET	669-A	17000	1		HEX NUT	D-06	15991	10
NS	PACKING NUT	5252	14100	1		SQUARE HD SETSCREW	G-0604	15990	2
NS	★ O-RING	S-0942	_	1		LOCKWASHER	J-06	15991	8
NS	DRIV-LOK PIN	21142-445	-	1		COTTER PIN	M-0306	15990	4
NS	★ GASKET	5252-G	18000	1		PRESSURE GAUGE	S-0180	_	1
NS	STUD	C-1009	15991	4		FLAT WASHER	S-1532	_	4
NS	HEX NUT	D-10	15991	4		STRAINER	S-1569		1
NS	PIPE PLUG	P-04	11990	1		UNIVERSAL ASSEMBLY	S-1412-A	_	1
31	★ RETAINING HOSE ASSY	S-0897	-	1		PNEU WHEEL	S-2005	_	2
32	DRIVE SHAFT KEY	N-04071/2	15990	1		STREET ELBOW	RS-04	11990	1
33	STREET ELBOW	RS-04	11990	1		SERVICE TEE	US-06	11990	1
34	★ PRESSURE HOSE ASSY	S-0896	_	1		SUCTION SUPPORT	6119	15990	1
35	HALF UNION	S-0468	_	1		HOSE	31412-105	_	1
36	PIPE PLUG	P-04	11990	1		FLAT WASHER	KE-06	15991	1
37	SUCTION FLANGE	6047	10010	1		HEX HEAD CAPSCREW	B-0504	15991	2
	★SUCT FŁNG WEAR RING	62-ZL5	14000	1		HEX NUT	D-10	15991	4
39	IMPELLER LOCKWASHER	J-06	15991	1		LOCKWASHER	J-08	15991	4
40	IMPELLER CAPSCREW	BT-0604	15991	1		FLAT WASHER	K-08	15991	4
41	IMPELLER WASHER	6750	13090	1					

★INDICATES PARTS RECOMMENDED FOR STOCK

CANADIAN SERIAL NO. AND UP



SECTIONAL DRAWING

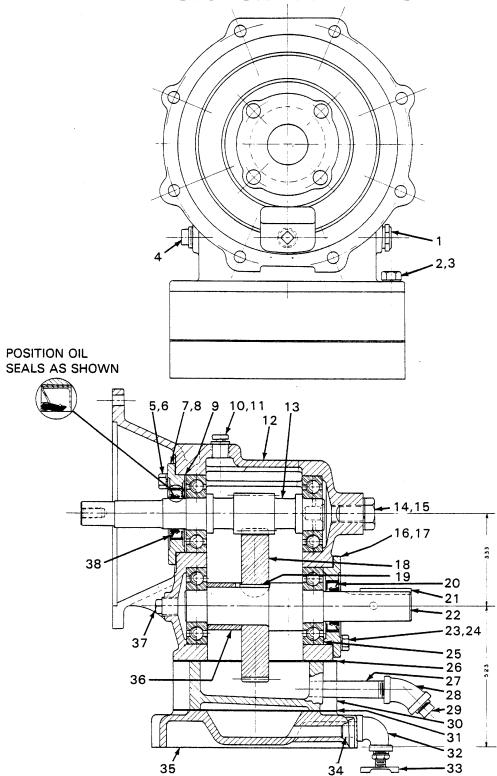


Figure 2. GRP44-04 Gearbox for Pump Model 63A3-G



PARTS LIST GRP44-04 GEARBOX ASSEMBLY FOR PUMP MODEL 63A3-G

ITEM NO.	PART NAME	PART NUMBER	MATERIAL CODE	QTY
1	SIGHT GAUGE	26714-011	_	1
2	HEX HEAD CAPSCREW	B-0611	15991	6
3	LOCKWASHER	J-06	15991	6
4	PIPE PLUG	P-06	11990	1
5	HEX HEAD CAPSCREW	B-0503	15991	4
6	LOCKWASHER	J-05	15991	4
7	BEARING CAP	3815	10010	1
8	★BEARING CAP GASKET	3815-G	18000	1
9	★SHAFT SHIM SET	S-464		1
10	AIR VENT	S-1530	_	1
11	RED PIPE BUSHING	AP-0602	15990	1
12	GEARBOX HOUSING	3813-B	10010	1
13	★PINION SHAFT	11400	16020	1
14	HEX HEAD CAPSCREW	B-1004	15991	1
15	LOCKWASHER	J-10	15991	1
16	BEARING CAP	3815	10010	1
17	★ BEARING CAP GASKET	3815-G	18000	1
18	★ DRIVE GEAR	11401	16060	1
19	DRIVE GEAR KEY	AV-1210	15990	1
20	★ OIL SEAL	S-389	_	1
21	DRIVE SHAFT KEY	N-04071/2	15990	1
22	★ DRIVE SHAFT	5094-A	16040	1
23	HEX HEAD CAPSCREW	B-0503	15991	4
24	LOCKWASHER	J-05	15991	4
25	★BALL BEARING	S-390	_	4
26	★ GEARBOX GASKET	3814-G	18000	1
27	PIPE NIPPLE	T-0612	15070	1
28	PIPE ELBOW	AG-06	11990	1
29	PIPE PLUG	P-06	11990	1
30	BASE	6108	10010	1
31	★BASE GASKET	3814-G	18000	1
32	REDUCING ELBOW	Q-0604	11990	1
33	DRAIN COCK	S-929		1
34	PIPE NIPPLE	T-0608	15070	1
35	BASE	3814	10010	1
36	DRIVE SHAFT SPACER	5095	15030	1
37	PIPE PLUG	P-06	11990	1
38	OIL SEAL	S-389	_	1

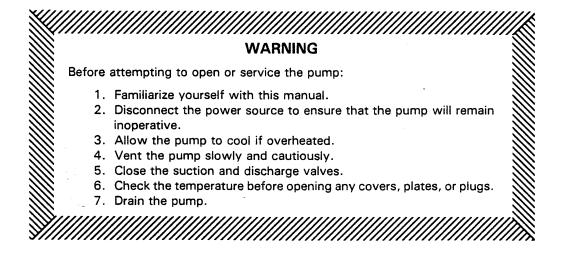
[★]INDICATES PARTS RECOMMENDED FOR STOCK



PUMP, SEAL, AND GEARBOX 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 views (see figures 1 and 2), and the accompanying parts lists.

Pump Disassembly



Disconnect the power source, making certain that it will remain inoperative while the pump is being serviced, and close all connecting valves.

Remove the volute housing drain plug to drain the pump. Clean and reinstall the drain plug.

For access to the impeller (2, figure 1) and seal assembly (3), disconnect the suction piping, and disengage the hex nuts (46) securing the suction flange (37) to the volute housing (1). Remove the suction flange.

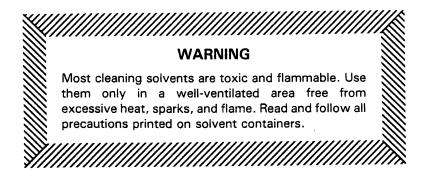
To remove the impeller, disengage the impeller capscrew (40) and impeller washers (39 and 41). Slide the impeller off the shaft, retaining the impeller key (42). Use caution when sliding the impeller off the shaft; pressure on the seal spring will be released as the impeller is removed.



Seal Disassembly

Remove the spring centering washer (7) and the seal spring. Using a stiff wire with a hooked end if necessary, remove the remainder of the seal components.

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



Seal Reassembly

If the gearbox is to be serviced or disassembled, do not reassemble the seal or the pump at this time; see **Gearbox Disassembly**.

The seal is not normally reused because of the high polish on its lapped faces, 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.

CAUTION

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

See figure 3 for the correct order of installation of seal components.

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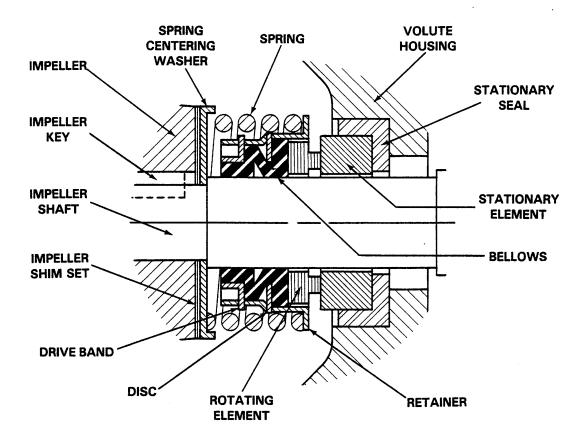


Figure 3. S-298 Seal Assembly

Place a drop of light lubricating oil on the lapped faces of the seal.

Lubricate the OD of the stationary seat, and install the stationary seat and the stationary element in the volute bore.

Lubricate the bellows with soft grease or oil, and install the bellows assembly and the rotating element. Install the seal spring and the spring centering washer, making certain that all components of the seal seat squarely.



Pump Reassembly

Inspect the volute housing balance ring (43) and the suction flange wear ring (38), both of which are press fits, and replace them if scored or worn.

Inspect the impeller, and replace it if cracked or badly worn. Reinstall the impeller key, and position the impeller on the shaft. Reinstall the impeller washers; reinstall and tighten the impeller capscrew.

For maximum pump efficiency, the impeller must be centered with the volute scroll.

Secure the suction flange to the volute housing.

Turn the shaft to check that the impeller rotates freely. If the impeller binds, add or remove volute housing gaskets (47) until the impeller rotates freely.

If the pump is to be put into service at this time, see LUBRICATION.

Fill the volute, connect the suction piping, and open all connecting valves. Make certain that all piping connections are tight before starting the pump.

Gearbox Disassembly

Refer to **Pump Disassembly** and **Seal Disassembly**. Close all connecting valves, drain the pump, and disconnect the suction piping. Remove the suction flange, impeller, and seal assembly.

Disengage the hex nuts (5, figure 1) securing the gearbox to the volute housing, and separate the gearbox from the volute housing.

Drain the gearbox by opening the drain cock (33, figure 2). Close the drain cock after the pump has been drained.

Disengage the hex head capscrews (2) securing the gearbox assembly to the base (35), and remove the base.

Disengage the hex head capscrews (23) securing the outboard bearing cap (16) to the gearbox housing (12), and remove the bearing cap and oil seal (20).

Remove the pipe plug (37) at the inboard end of the gearbox, and use an arbor press to force the drive shaft (22) and bearings from the gearbox. Retain the drive shaft spacer (36), drive gear (18), and drive gear key (19) as the shaft comes free.

Disengage the hex head capscrews (5) securing the inboard bearing cap (7) to the gearbox housing, and remove the bearing cap, oil seal (38) and shaft shims (9).

Remove the hex head capscrew (14) at the outboard end of the gearbox, and install a 6-inch long capscrew with 5/8-11 UNC-2A threads. Tighten the capscrew to jack the pinion shaft (13) and bearings from the gearbox.



Gearbox Reassembly

Inspect the shafts, bearings, and drive gear, and replace as necessary.

Clean the shafts and the bearings with a soft cloth soaked in cleaning solvent.



Reinstall the pinion shaft and bearings in the gearbox housing, making certain that the bearings seat squarely in their respective bores.

Install the shaft shim set. Inspect the inboard oil seal, and replace as necessary. Reinstall the oil seal in the inboard bearing cap, positioning the lip as shown in figure 2. Replace the bearing cap gasket (8), and secure the bearing cap to the gearbox housing.

Recommended shaft end play is .005 to .012 inch. Measure the end play, and add or remove shaft shims as necessary.

Reinstall the capscrew and lockwasher (15) at the outboard end of the gearbox.

Install the inboard drive shaft bearing in its respective bore in the gearbox housing, making certain that it seats squarely. Install the drive gear key, position the drive shaft in the gearbox housing, and reinstall the drive shaft, drive gear, and drive shaft spacer, making certain that the drive gear engages the pinion shaft.

Reinstall the outboard bearing snugly against the shoulder of the drive shaft. Inspect the outboard oil seal, and replace as necessary. Reinstall the oil seal in the outboard bearing cap, positioning the lip as shown in figure 2.

Replace the bearing cap gasket (17), and secure the bearing cap to the gearbox housing.

Replace the gearbox gasket (26), and secure the base to the gearbox assembly. Secure the volute housing to the gearbox assembly.

Refer to **Seal Reassembly** and **Pump Reassembly**, and reinstall the seal assembly, impeller and suction flange.

Refer to LUBRICATION, and lubricate the gearbox assembly.

Fill the volute, connect the suction piping, open all connecting valves, and make certain that all piping connections are tight before starting the pump.

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LUBRICATION

Seal Assembly

The seal is lubricated by the medium being pumped.

Gearbox

Remove the bushing and air vent (10 and 11) at the top of the gearbox, and add 4 ounces of Molykote M or equivalent gear lubricant to the gearbox.

Add approximately 33 ounces of SAE No. 90 non-detergent motor oil, or fill the gearbox to the midpoint of the oil level sight gauge (1). Clean and reinstall the bushing and air vent.

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THE GORMAN-RUPP COMPANY AND GORMAN-RUPP OF CANADA LIMITED 12 MONTH LIMITED WARRANTY

EXTENT AND DURATION OF WARRANTY

Coverage: The Gorman-Rupp Company or Gorman-Rupp of Canada Limited (herein individually referred to as "GR") each individually warrant that its products and parts shall be free from defects in material and workmanship for twelve (12) months from the date of purchase by the original end user.

Exceptions: This Limited Warranty shall not apply to the following products and parts: engines, motors, trade accessories and other products, components or materials not manufactured by GR. With respect to submersible pumps, the pump and motor are an integral unit and are therefore warranted as a unit. However, with respect to the electrical components in submersible pumps, this warranty is valid **only** when electrical controls for the pump have been specified and/or provided by GR. Wear and tear on any product resulting from normal use is not covered by this Limited Warranty.

LIMITATIONS

GR'S SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO ITS PRODUCTS AND PARTS IS THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS AND/OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

EXCLUSIVE REMEDY AND DAMAGES

The sole and exclusive remedy for breach of this Limited Warranty by GR, and the entire extent of its liability for such breach or for damages arising and/or resulting from the use of the products and parts covered by this Limited Warranty shall be as follows:

1. Repair or replacement: If inspection shows that any GR product or part covered under this LimitedWarranty is defective in materials or workmanship, GR shall repair or replace the defective product or part at its option, without charge. You must have properly installed, maintained and used the product or part claimed to be defective in accordance with the maintenance schedule and/or manual which comes with the product. No allowance will be made for labor, transportation or other charges incurred by you in connection with such repair or replacement.

2. To obtain the above remedy:

- a) Immediately notify GR at the address below of the claimed defect in materials or workmanship and provide the serial number or date code of the product and/or part and provide a copy of the invoice or bill of sale referencing the product and/or part by no later than the expiration date of the Limited Warranty period.
- b) GR will advise whether inspection of the product and/or part will be necessary and whether and how repair or replacement will be effected. If inspection by GR is necessary, the product or part must be sent freight prepaid to GR at the address stated below. Return shipment of the repaired product or part will be F.O.B. the address stated below.
- 3. Damages: GR's liability for damages for breach of this Limited Warranty shall not exceed the amount of the purchase price of the product or part in respect to which damages are claimed. IN NO EVENT SHALL GR BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES FOR BREACH OF THIS LIMITED WARRANTY OTHER THAN AS STATED HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages. Accordingly, the above may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state and province to province.

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