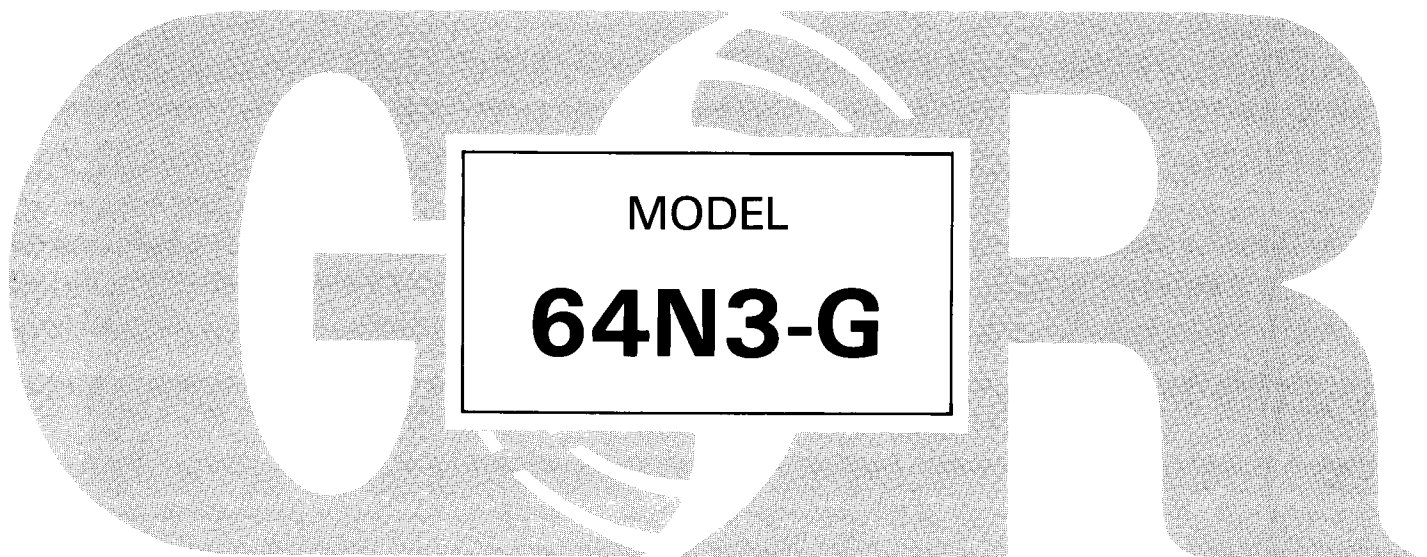


60SERIES

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



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

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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

or

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.

TABLE OF CONTENTS

WARNINGS	Section A
INSTALLATION	Section B
OPERATION	Section C
TROUBLESHOOTING	Section D
MAINTENANCE AND REPAIR	Section E
WARRANTY	

WARNINGS

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

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to 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.

Do not attempt to pump any liquids for which this pump has not been designed.

After the pump has been installed, make certain that the pump and all piping connections are secure before attempting to operate it.

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

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



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.

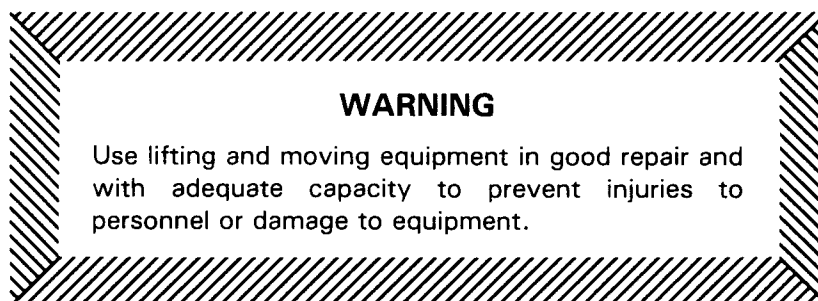
- d. Check all lubricant levels and lubricate as necessary. Refer to the MAINTENANCE AND REPAIR section of this manual.

POSITIONING THE PUMP

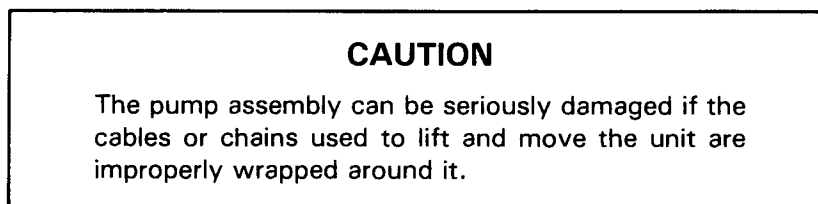
Mounting

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.

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.



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.

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.

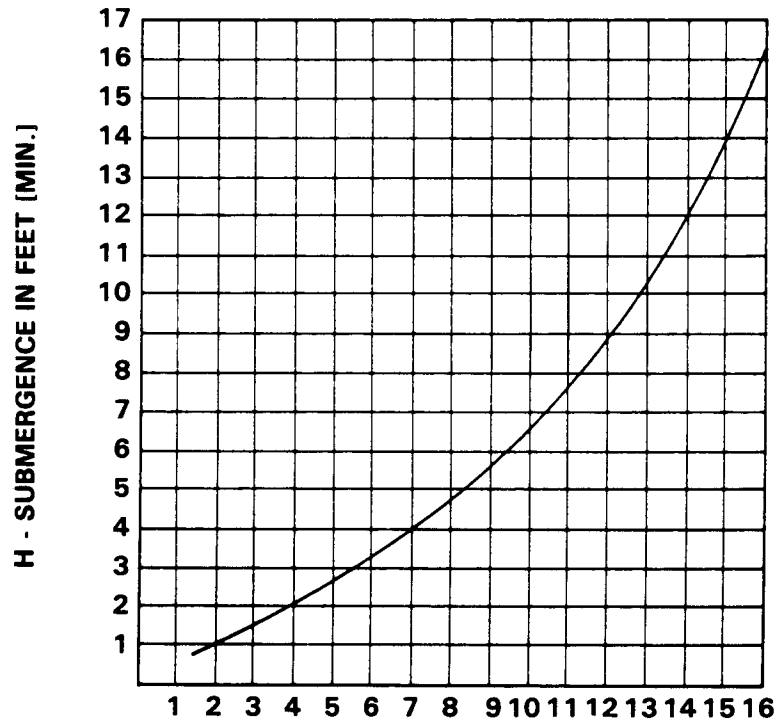
If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

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.

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.



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

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.

ALIGNMENT

This pump is provided with a standard ASAE-6B, 1 3/8 splined power take off shaft designed to be connected to a power take off unit.

WARNING

When installing and/or aligning universal shaft assemblies, disconnect the power source to ensure that the pump will remain inoperative.

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 connecting the universal joint drive shaft assembly to a PTO unit, 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 rotation of the PTO unit 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.

WARNING

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

LUGS MUST BE IN LINE, REGARDLESS
OF OPERATING ANGLE SHOWN BELOW

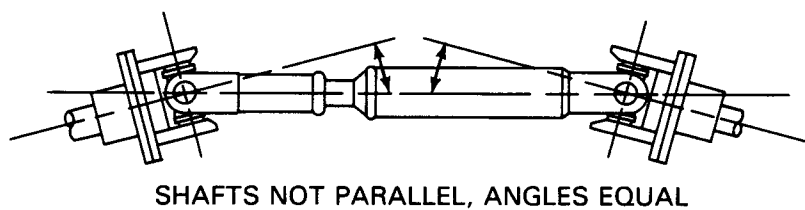
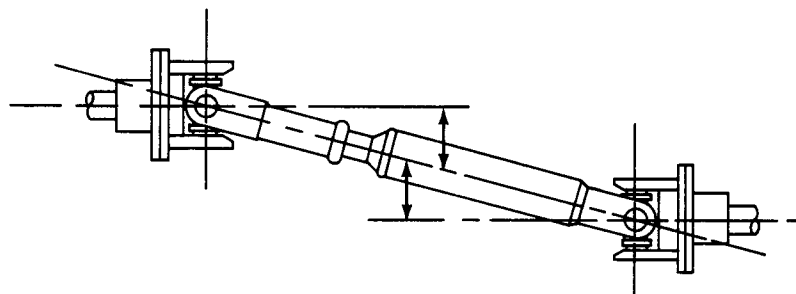
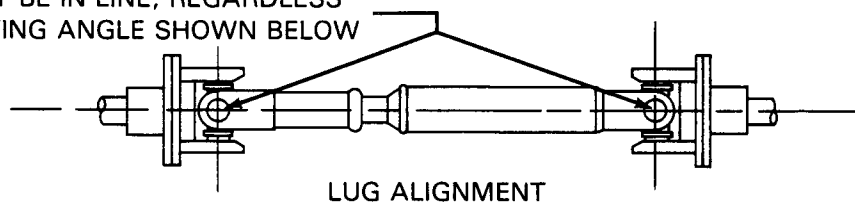


Figure 2. Proper Installation and Alignment of Universal Assembly

OPERATION

WARNING

Do not attempt to pump any liquids for which this pump has not been designed.

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).

Since this pump is not self-priming, it is equipped with a hand-operated vacuum priming pump, and a spring-loaded check valve.

Hand-Operated Priming Pump

The hand-operated priming pump, mounted directly on the pump, is designed to draw air out of the suction line and the volute.

The hand-operated priming pump can be used while the pump is either stopped or operating.

Close the discharge line throttling valve, and close the spring-loaded check valve before engaging the priming device.

To prime the pump, open the cock in the priming line. Operate the handle of the pump until liquid flows from the check valve (see figure 1).

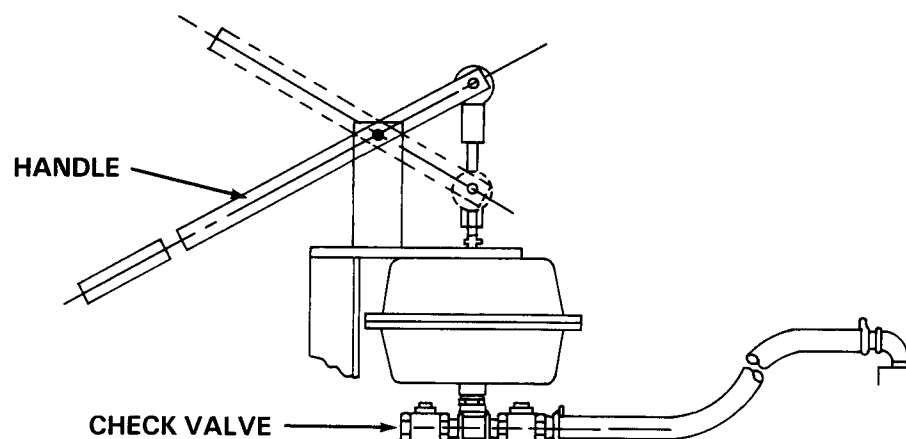


Figure 1. Hand Primer Assembly

Once the pump is fully primed, close the cock in the priming line, and open the spring-loaded check valve.

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.

Drive

This pump is designed for operation with a power take off unit coupled to the universal joint drive shaft assembly furnished with the pump. The drive shaft assembly is designed for operation at 550 RPM, and is coupled at the pump end to a gearbox with a 4.82:1 ratio.

Consult the manual furnished with the PTO unit before attempting to start the unit.

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.

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 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.

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.

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. The vacuum gauge reading will immediately drop proportionately to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilizing, an air leak exists. Before checking the lines for the source of the air leak, check the point of installation of the vacuum gauge.

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 draining completely, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F 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:

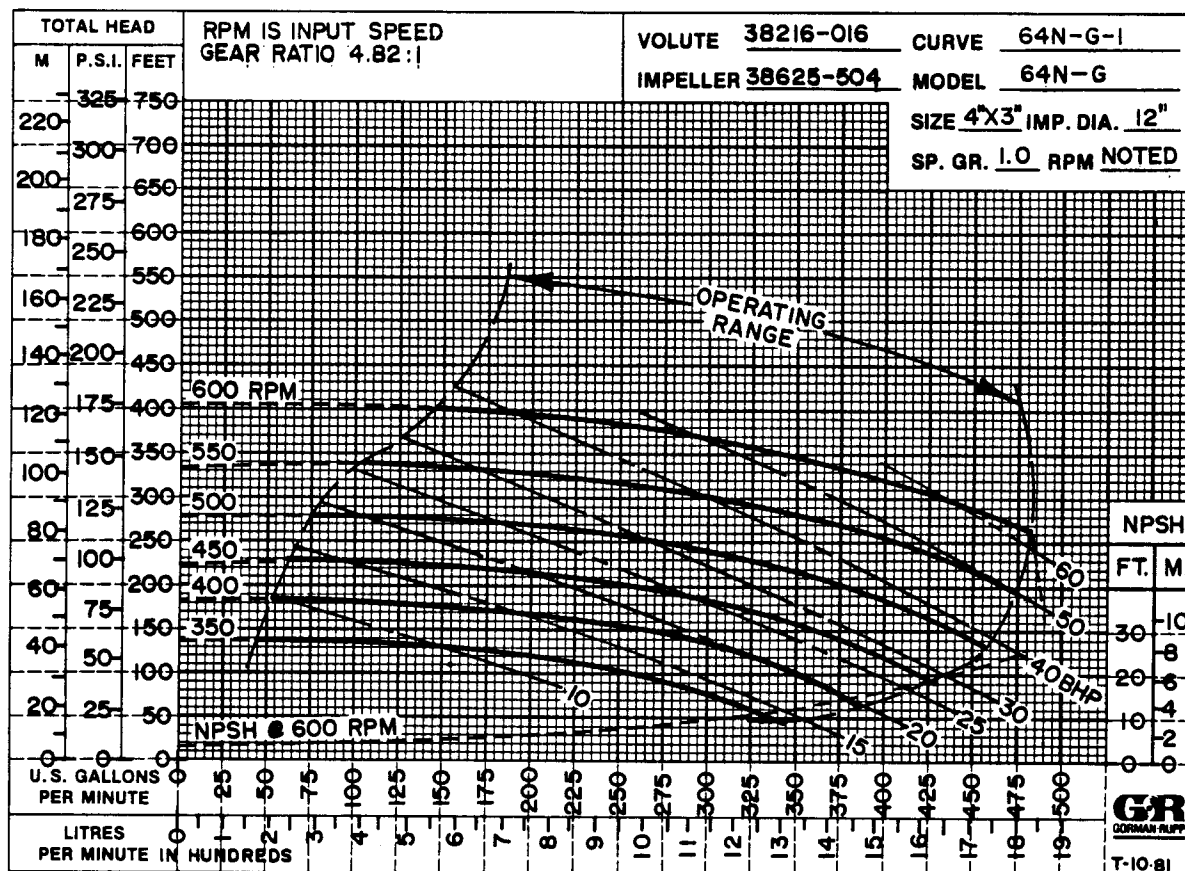
1. Consult pump service manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

Trouble	Possible Cause	Probable Remedy
PUMP FAILS TO PRIME	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 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 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 DELIVER 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 TOO MUCH POWER	Pump speed too high. Discharge head too low. Liquid solution too thick.	Check driver output; check that the universal joint drive is properly installed. Adjust discharge valve. 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. Pumping entrained air. Pump or drive not securely mounted. Impeller clogged or damaged.	Reduce suction lift and/or friction losses in suction line. Locate and eliminate source of air bubble. Secure mounting hardware. Clean out debris; replace damaged parts.
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits. Low or incorrect lubricant. Suction and discharge lines not properly supported. Universal joint drive misaligned.	Check bearing temperature frequently to monitor any increase. Check for proper type and level of lubricant. Check piping installation for proper support. Align drive.

MAINTENANCE AND REPAIR

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



* STANDARD PERFORMANCE FOR PUMP MODEL 64N3-G

* Based on 70°F 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" or if you have a question on performance, contact The Gorman-Rupp Company.

SECTIONAL DRAWING

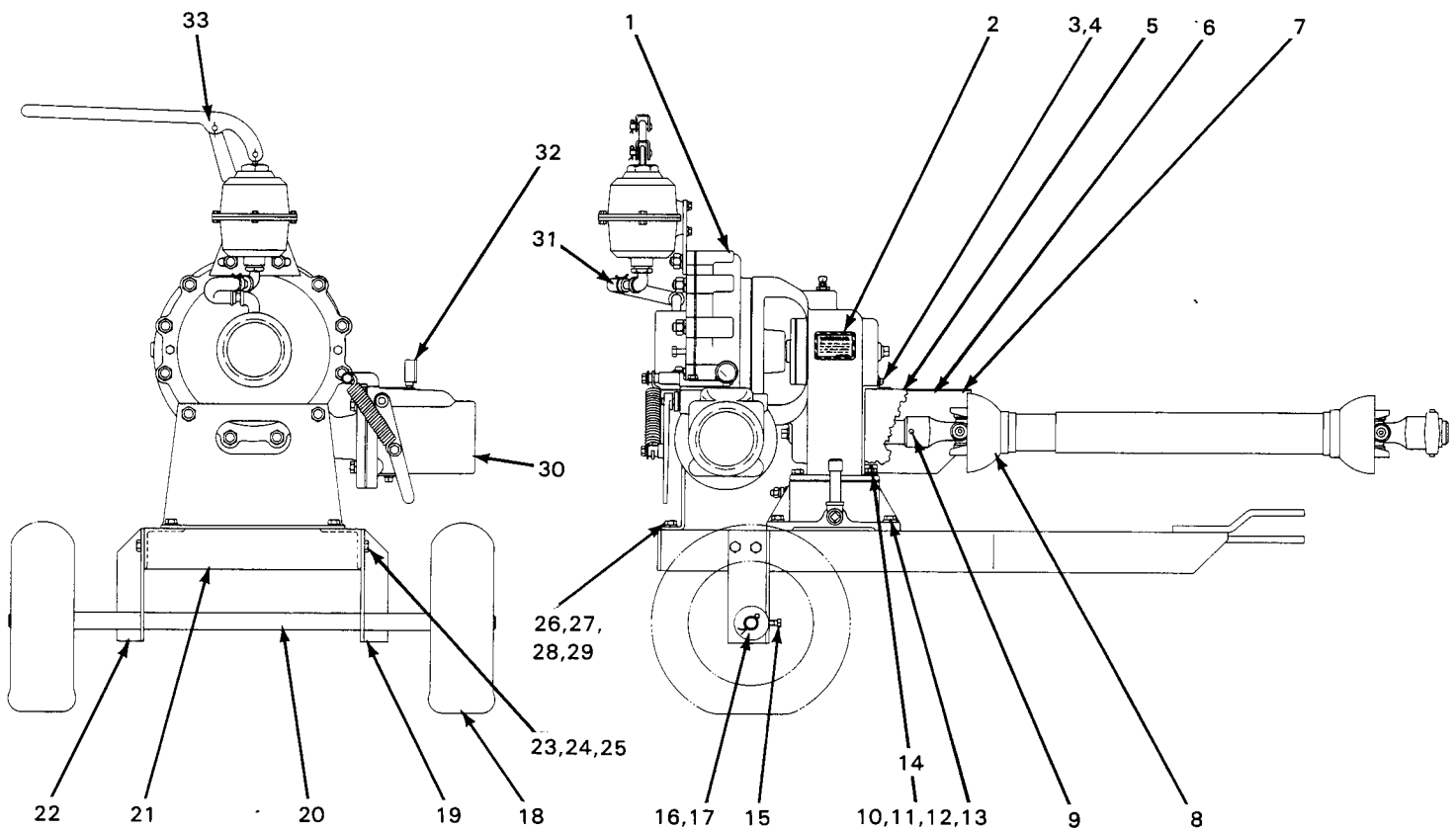


Figure 1. Pump Model Assembly 64N3-G



PARTS LIST

PUMP MODEL 64N3-G

(From S/N up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP SUB-ASSY	64N3-G (see fig 2)		1	25	HEX NUT	D-08	15991	4
2	GUARD WARNING STK	38816-063		1	26	HEX HEAD CAPSCREW	B-0805	15991	2
3	RD HD MACH SCREW	X-0402	15991	1	27	LOCKWASHER	J-08	15991	2
4	LOCKWASHER	J-04	15991	1	28	FLAT WASHER	K-08	15991	2
5	GUARD WARNING STK	38816-062		1	29	HEX NUT	D-08	15991	2
6	RPM INPUT DECAL	2613-FM		1	30	CHECK VLV ASSY (see fig 4)	GRP14-12-A		1
7	UNIV ASSY GUARD	6408	15990	1	31	★ HOSE 5/8 x 16	31412-101		1
8	UNIVERSAL ASSY	S-1413-A		1	32	★ PRESSURE GAUGE	S-0180		1
9	COTTER PIN	M-0616	15991	1	33	HAND PRIMER ASSY	GRP43-02		1
10	HEX HD CAPSCREW	B-0807	15991	4		PIPE NIPPLE	2432	15070	2
11	LOCKWASHER	J-08	15991	4		BRACKET	7688	15990	1
12	FLAT WASHER	K-08	15991	4		HEX HD CAPSCR	B-0602 1/2	15991	4
13	HEX NUT	D-08	15991	4		LOCKWASHER	J-06	15991	4
14	PAN HD TAPSCREW	BP#14-02	15991	2		PIPE ELBOW	R-06	11990	1
15	SQ HD SETSCREW	G-0604	15991	2		HOSE CLAMP	S-0887		2
16	COTTER PIN	M-0306	15990	2	★	DIAPHRAGM	S-1252		1
17	FLAT WASHER	S-1532		4		PIPE NIPPLE	T-0610	15070	1
18	PNEU WHEEL	S-2005		2		RED PIPE BUSH	AP-0806	11990	1
19	AXLE BRACKET	6417-A	15990	1		STREET ELBOW	RS-06	11990	1
20	AXLE	6423	15000	1	NOT SHOWN:				
21	BASE	6419	24000	1		STRAINER	S-1528		1
22	AXLE BRACKET	6417-B	15990	1		NAME PLATE	2613-R	13990	1
23	HEX HD CAPSCREW	B-0805	15991	4		DRIVE SCREW	BM#04-03	15990	4
24	LOCKWASHER	J-08	15991	4		A HD SETSCREW	GA-0601 1/2	15990	1

★ INDICATES PARTS RECOMMENDED FOR STOCK

CANADIAN SERIAL NO. AND UP

SECTION DRAWING

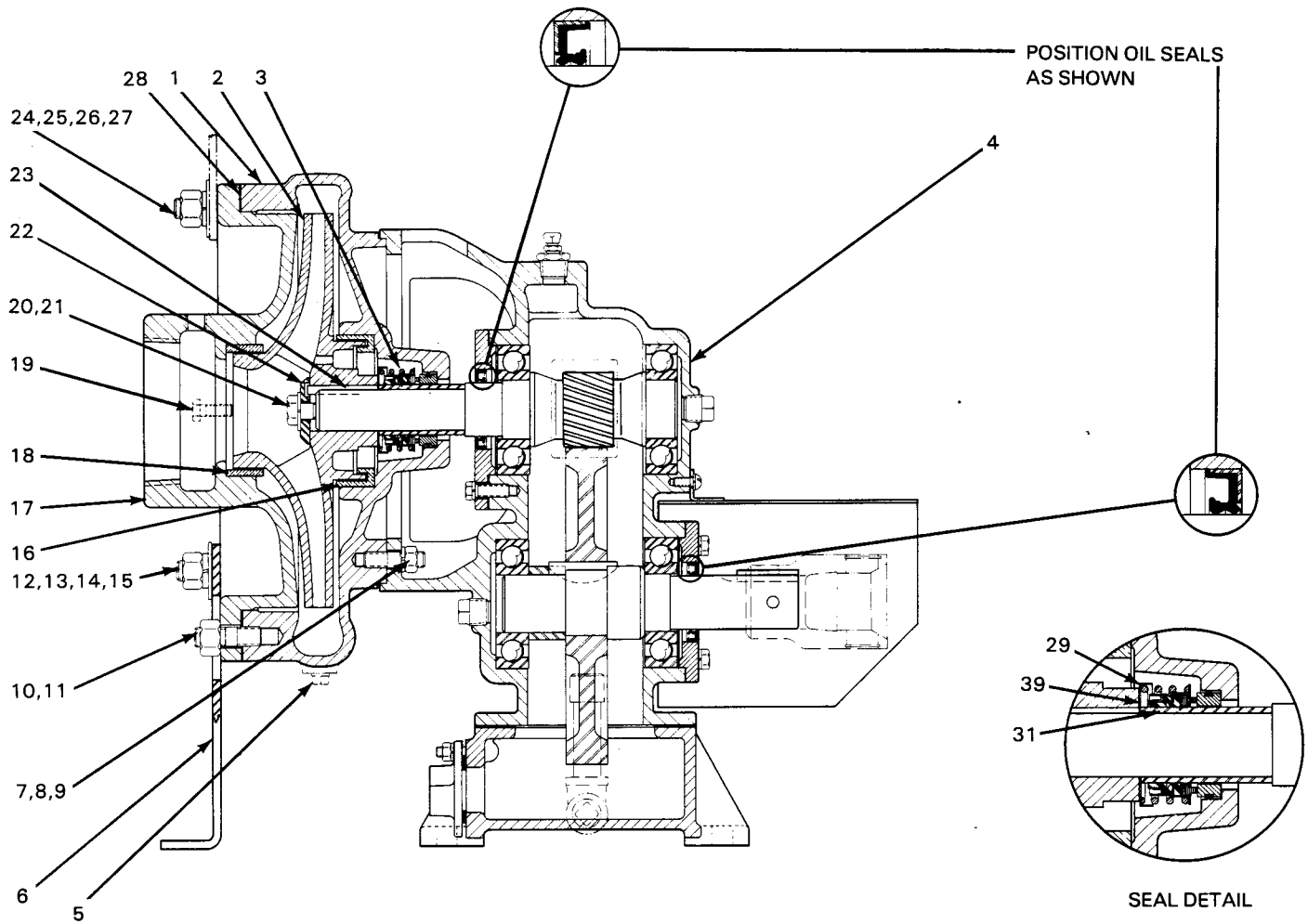


Figure 2. Pump Sub-Assembly 64N3-G



PARTS LIST

64N3-G PUMP ASSEMBLY

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	38216-017	10010	1	17	SUCTION HEAD	38247-205	10010	1
2	IMPELLER	38625-504	10010	1	18	SUCT HD WEAR RING	6554-A	17070	1
3	SEAL ASSY	25271-207		1	19	HEX HD CAPSCREW	B-0604	15991	2
4	GEAR BOX ASSY (see fig 3)	44161-031		1	20	NYLOCK CAPSCREW	BT-0806	15991	1
5	VOLUTE DRAIN PLUG	P-04	11990	2	21	LOCK WASHER	J-08	15991	1
6	VOLUTE SUPPORT	34712-011	15990	1	22	IMPELLER WASHER	6403	15991	1
7	STUD	C-0807	15991	4	23	IMPELLER KEY	N-0409	15990	1
8	LOCK WASHER	J-08	15991	4	24	STUD	C-1010	15991	2
9	HEX NUT	D-08	15991	4	25	FLAT WASHER	K-10	15991	2
10	STUD	C-1008	15991	8	26	LOCK WASHER	J-10	15991	2
11	HEX NUT	D-10	15991	8	27	HEX NUT	D-10	15991	2
12	STUD	C-1010	15991	2	28	SUCT HEAD GASKET	38685-806	18000	1
13	FLAT WASHER	K-10	15991	2	29	SPRING CENT WASHER	3930	17090	1
14	LOCK WASHER	J-10	15991	2	30	IMPELLER SHIM SET	37-J	17090	1
15	HEX NUT	D-10	15991	2	31	SHAFT SLEEVE	3428-A	17030	1
16	VLT CSNG WEAR RING	6520	14000	1					

★ INDICATES PARTS RECOMMENDED FOR STOCK

SECTION DRAWING

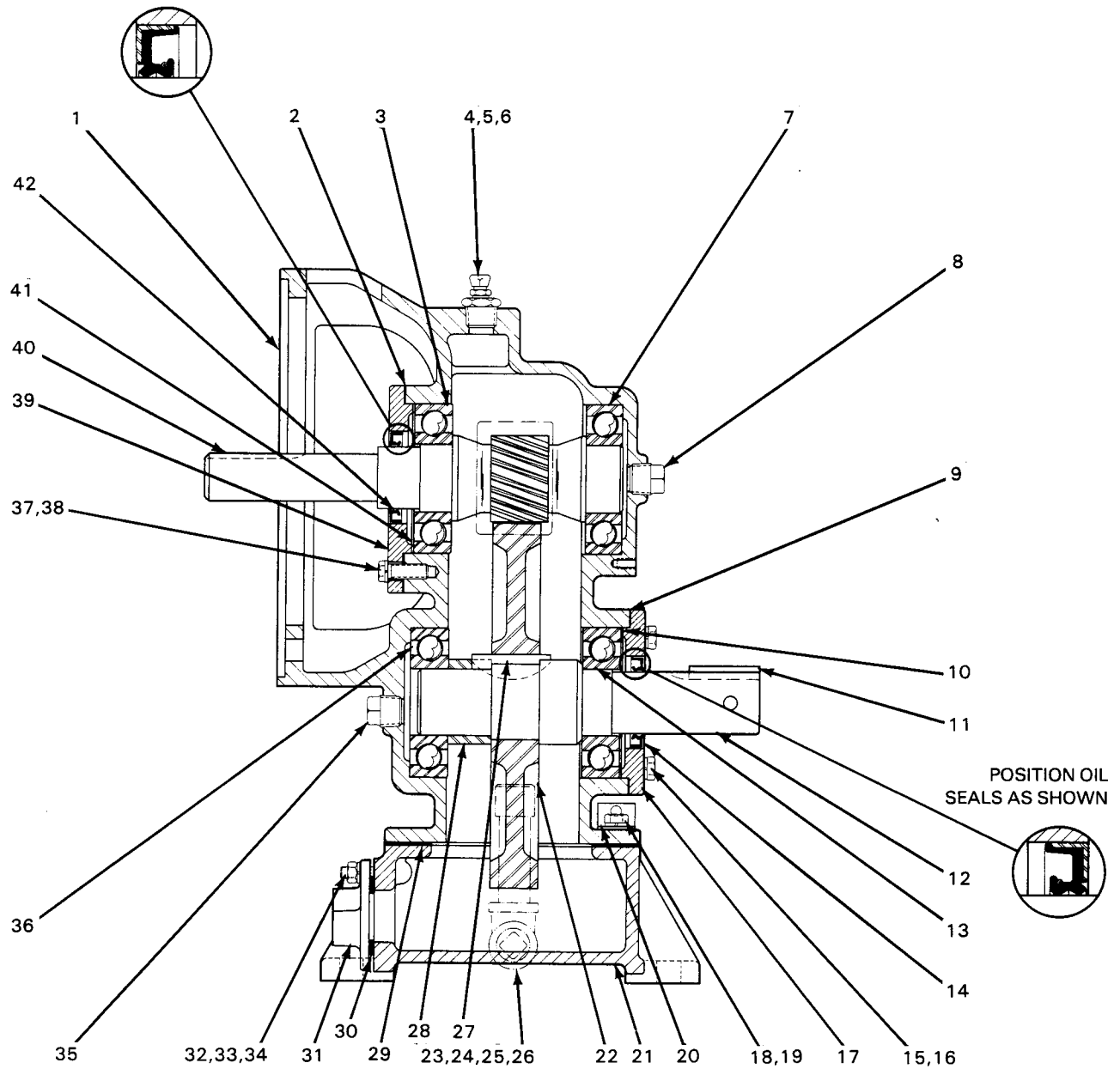


Figure 3. Gearbox Assembly 44161-031



PARTS LIST

44161-031 GEARBOX ASSEMBLY

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	GEAR HOUSING	6412-A	10010	1	22	★HELICAL GEAR	38541-616	16060	1
2	★BEARING CAP GASKET	12934-G	18000	1	23	SERVICE TEE	US-08	11990	1
3	★PINION INBRD BRNG	S-1088		1	24	GEARBOX DRAIN PLUG	P-08	11990	1
4	AIR VENT FITTING	S-2162		1	25	PIPE NIPPLE	T-0812	15070	1
5	REDUCING PIPE BUSHING	AP-0602	15991	1	26	DIP STICK	42111-319		1
6	SHIP PLUG	11495-A	11990	1	27	★HELICAL GEAR KEY	AV-1622	15990	1
7	★PINION OUTBRD BRNG	S-1088		1	28	SPACER SLEEVE	6414	15990	1
8	OUTBOARD PIPE PLUG	P-06	11990	1	29	★BASE GASKET	6409-G	18000	1
9	★BEARING CAP GASKET	12934-G	18000	1	30	★COVER PLATE GASKET	6518-G	18000	1
10	★DRV SFT BRNG SHIM SET	8545	15990	1	31	COVER PLATE	6518-A	15020	1
11	★DRIVE SHAFT KEY	N-0608	15990	1	32	STUD	C-0505	15991	6
12	★DRIVE SHAFT	6405	16040	1	33	LOCKWASHER	J-05	15991	6
13	★DRV SHFT OUTBRD BRNG	S-1088		1	34	HEX NUT	D-05	15991	6
14	★OTBD BRG CAP OIL SEAL	25258-526		1	35	INBOARD PIPE PLUG	P-06	11990	1
15	HEX HEAD CAPSCREW	B-0604	15991	4	36	★DRV SHFT INBRD BRNG	S-1088		1
16	LOCKWASHER	J-06	15991	4	37	HEX HEAD CAPSCREW	B-0604	15991	4
17	OUTBOARD BEARING CAP	38325-009	10010	1	38	LOCKWASHER	J-06	15991	4
18	HEX HEAD CAPSCREW	B-0804	15991	8	39	INBOARD BEARING CAP	38325-009	10010	1
19	LOCKWASHER	J-08	15991	8	40	★PINION SHAFT	38521-709	16060	1
20	BRACKET	6408-C	15990	1	41	★PINION BRNG SHIM SET	8545	15990	1
21	GEAR BASE	6409	10010	1	42	★INBRD BRG CAP OIL SEAL	25258-526		1

★INDICATES PARTS RECOMMENDED FOR STOCK

SECTION DRAWING

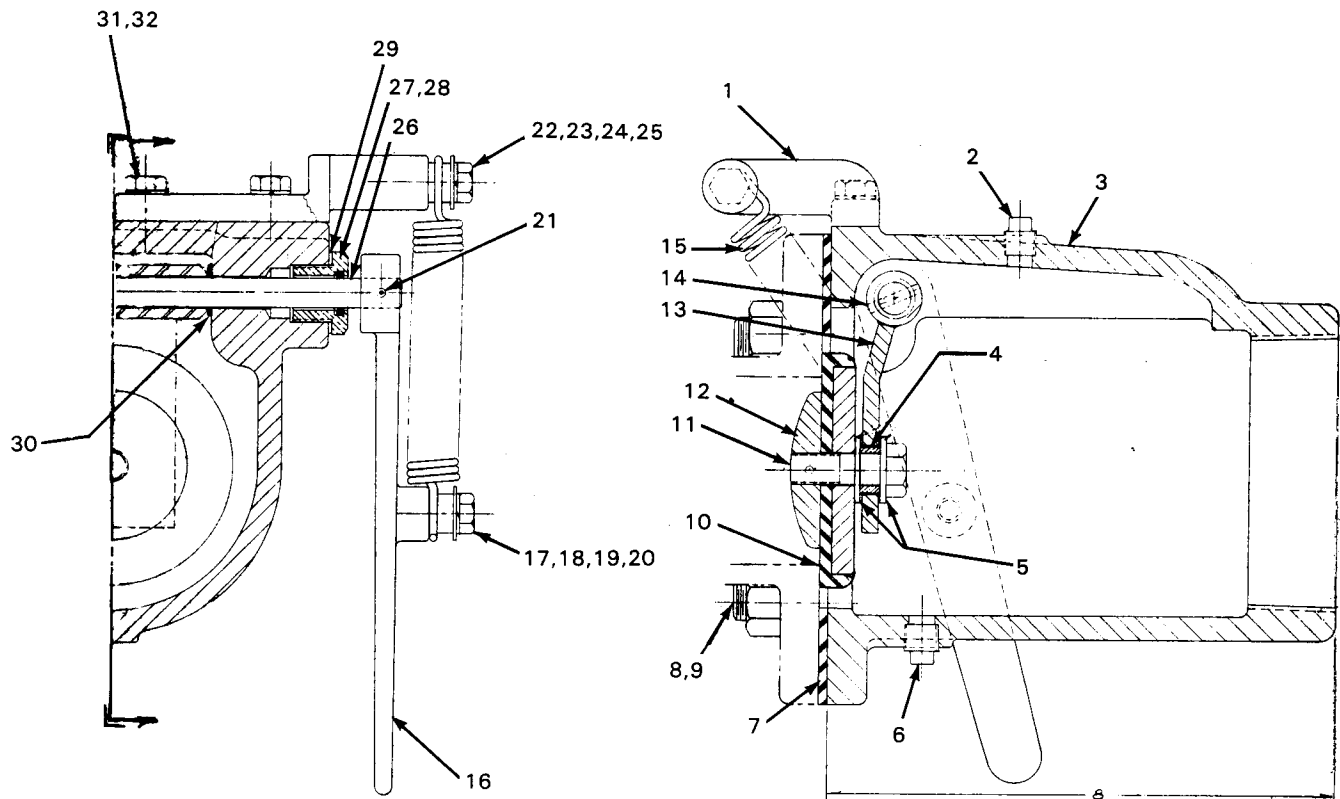


Figure 4. Check Valve Assembly GRP14-12-A



PARTS LIST

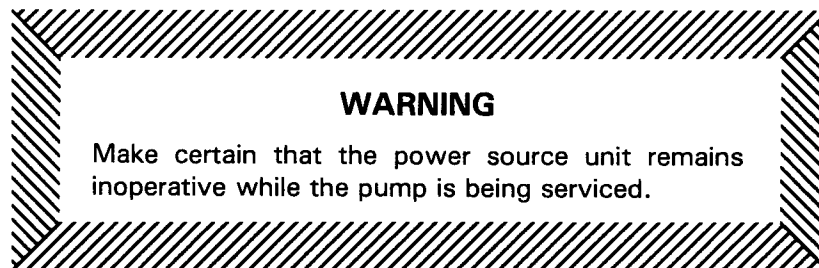
GRP14-12-A CHECK VALVE ASSEMBLY

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	SPRING BRACKET	3844	14000	1	17	HEX HEAD CAPSCREW	B-0606	15991	1
2	PIPE PLUG	P-04	11990	1	18	SPACER	3855	15070	1
3	CHECK VALVE BODY	6837	10010	1	19	FLAT WASHER	K-06	15991	1
4	BUSHING	11573	15030	1	20	LOCKWASHER	J-06	15991	1
5	FLAT WASHER	KE-08	15991	2	21	DRIV-LOK PIN	21142-445		1
6	PIPE PLUG	P-04	11990	1	22	HEX HEAD CAPSCREW	B-0606	15991	1
7	CHECK VALVE GASKET	11589-G	18000	1	23	SPACER	3855	15070	1
8	STUD	C-1009	15991	4	24	FLAT WASHER	K-06	15991	1
9	HEX NUT	D-10	15991	4	25	LOCKWASHER	J-06	15991	1
10	CHECK VALVE	12391	24010	1	26	SHAFT	5263	17010	1
11	NYLOCK CAPSCREW	BT-0806½	15991	1	27	PACKING NUT	5252	14100	1
12	VALVE WEIGHT	11588	10010	1	28	O-RING	S-0942		1
13	WEIGHT ARM	5253-A	15990	1	29	GASKET	5252-G	18000	1
14	ROLL PIN	S-0630		2	30	ADJ SHIM SET	669-A	17000	1
15	EXTENSION SPRING	6270	16080	1	31	HEX HEAD CAPSCREW	B-0603½	15991	2
16	HANDLE	6334	11000	1	32	LOCKWASHER	J-06	15991	2

★ 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, 2, 3 and 4), and the accompanying parts lists.



PUMP ASSEMBLY DISASSEMBLY

See figure 2, and remove the volute casing drain plug (5) to drain the pump. Clean and reinstall the drain plug.

Universal Assembly

See figure 1, and remove the round head machine screws (3), lockwashers (4), and pan head tapscrews (14) securing the universal guard (7) to the pump sub-assembly (1). Remove the universal guard. Remove the cotter pin (9) securing the universal assembly (8) to the gear box drive shaft, and remove the universal assembly from the drive shaft. Retain the drive shaft key.

Hand Primer Assembly

See figure 1, and disconnect the hose connection (31) from the hand primer (33) to the pump sub-assembly.

See figure 2, remove the flat washers (25), lockwashers (26), and hex nuts (27) securing the hand primer bracket to the volute casing (1), and remove the hand primer.

Check Valve Assembly

To remove the check valve assembly (30, figure 1) from the pump sub-assembly, see figure 4, and close the check valve to release tension on the extension spring (15). Remove the drain plug (6) to drain the check valve. Remove the hex head capscrew (22), spacer (23), flat washer (24), and lockwasher (25) securing the extension spring bracket (1) to the pump sub-assembly. Remove the hex nuts (8) securing the check valve assembly to the discharge flange of the pump sub-assembly, and remove the check valve.

PUMP SUB-ASSEMBLY DISASSEMBLY

See figure 2. Remove the flat washers (13), lockwashers (14), and hex nuts (15) securing the volute casing support (6) to the suction head (17).

Remove the hex nuts (11) securing the suction head to the volute casing (1), and remove the suction head and assembled wear ring (18).

Block rotation of the impeller (2), and remove the nylock capscrew (20), lockwasher (21), and impeller washer (22), securing the impeller to the pinion shaft. Work the impeller off the shaft, retaining the impeller key (23). Use caution when working the impeller off the shaft; tension on the seal spring will be released as the impeller is removed.

Remove the impeller adjusting shims (30); tag and tie the shims.

Remove the seal spring centering washer (29). Use a stiff wire with a hooked end, and remove the seal assembly (3) from the bore of the volute casing. Remove the shaft sleeve (31).

Remove the hex nuts (9) and lockwashers (8) securing the volute casing (1) and assembled wear ring (16) to the gear box assembly, and remove the volute casing.

GEAR BOX DISASSEMBLY

See figure 3, and drain the gear box of lubricant by removing the gear box drain plug (24). Clean and reinstall the plug after draining the gear box.

Remove the hex head capscrews (18) and lockwashers (19) securing the gear box housing (1) and universal guard bracket (20) to the gear box base (21), and remove the housing and the bracket.

(If desired to remove the gear box base, see figure 1, and remove the hex head capscrews (10), lockwashers (11), flat washers (12), and hex nuts (13) securing the gear box base to the pump assembly base (21)).

Remove the hex head capscrews (37) and lockwashers (38) securing the inboard bearing cap (39) to the gear box housing, and remove the bearing cap, oil seal (42), and bearing shims (41).

Remove the outboard pipe plug (8), and drive the pinion shaft (40) and assembled inboard bearing (3) out of the gear box housing. Remove the inboard bearing from the shaft. Remove the outboard pinion shaft bearing (7) from the bore of the gear box housing.

NOTE

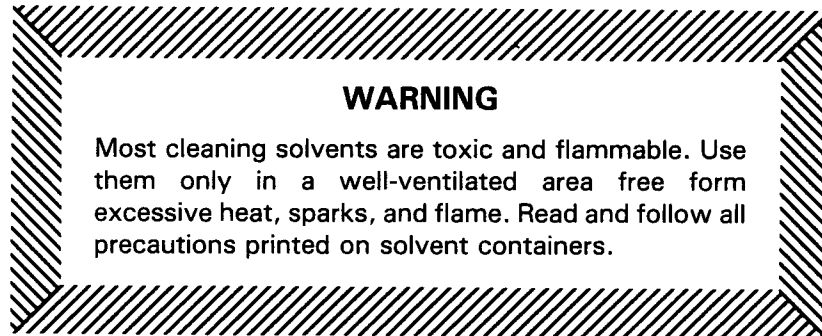
The bearings used in the gear box are identical parts.

Remove the hex head capscrews (15) and lockwashers (16) securing the outboard bearing cap (17) to the gear box housing, and remove the bearing cap, oil seal (14), and bearing shims (10).

Remove the inboard pipe plug (35), and drive the drive shaft (12) and assembled outboard bearing (13) housing, retaining the shaft spacer sleeve (28), helical gear (22), and gear key (27) as they come free of the shaft. Remove the outboard bearing from the shaft. Remove the inboard drive shaft bearing (36) from the bore of the gear box housing.

GEAR BOX REASSEMBLY

Clean the pinion shaft, drive shaft, and the bores of the gear box housing with a soft cloth soaked in cleaning solvent.



Wash the bearings in clean solvent free of grit or metallic particles. Inspect the bearings, and replace as necessary.

See figure 3, and install the inboard drive shaft bearing in the gear box housing bore. Inspect the drive shaft, and replace as necessary. Install the helical gear key on the drive shaft, and introduce the drive shaft into the gear box housing. Engage the key in the helical gear keyway, and install the helical gear, making certain that it seats squarely against the shoulder of the drive shaft. Install the shaft spacer sleeve, and install the drive shaft in the inboard bearing. Install the outboard drive shaft bearing, making certain that it seats squarely against the shoulder of the shaft.

Install sufficient bearing shims to maintain a clearance of .005-.012 inch between the outboard drive shaft bearing and the outboard bearing cap, replace the bearing cap gasket (9), and install and secure the bearing cap. Inspect the oil seal, and replace as necessary. Install the oil seal with the lip positioned as shown in figure 3. Install the inboard pipe plug.

Install the pinion shaft outboard bearing in the gear box housing bore. Install the pinion shaft, making certain that it engages the helical gear, and that the shoulder of the shaft seats squarely against the outboard bearing. Install the inboard pinion shaft bearing, making certain that it seats squarely against the shoulder of the shaft.

Install sufficient bearing shims to maintain a clearance of .005-.012 inch between the inboard pinion bearing and the inboard bearing cap, replace the bearing cap gasket (2), and install and secure the bearing cap. Inspect the oil seal, and replace as necessary. Install the oil seal with the lip positioned as shown in figure 3. Install the inboard pipe plug.

Replace the gear box base gasket (29), and secure the gear box housing to the gear box base. Make certain to reinstall the universal guard bracket on the gear box housing when securing the housing to the base.

(If the gear box base has been removed, see figure 1 and secure the base to the pump assembly base.)

PUMP SUB-ASSEMBLY REASSEMBLY

See figure 2, and inspect the volute casing wear ring—which is a press fit in the volute casing—and replace it if badly scored or worn. Secure the volute casing to the gear box housing.

Clean and polish the shaft sleeve. Inspect the shaft sleeve, and replace it if there are nicks or cuts on the ends. Install the shaft sleeve, making certain that it seats squarely against the shoulder of the pinion shaft.

The seal is not normally reused because of the precision finish 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 5 for the correct order of installation of seal components.

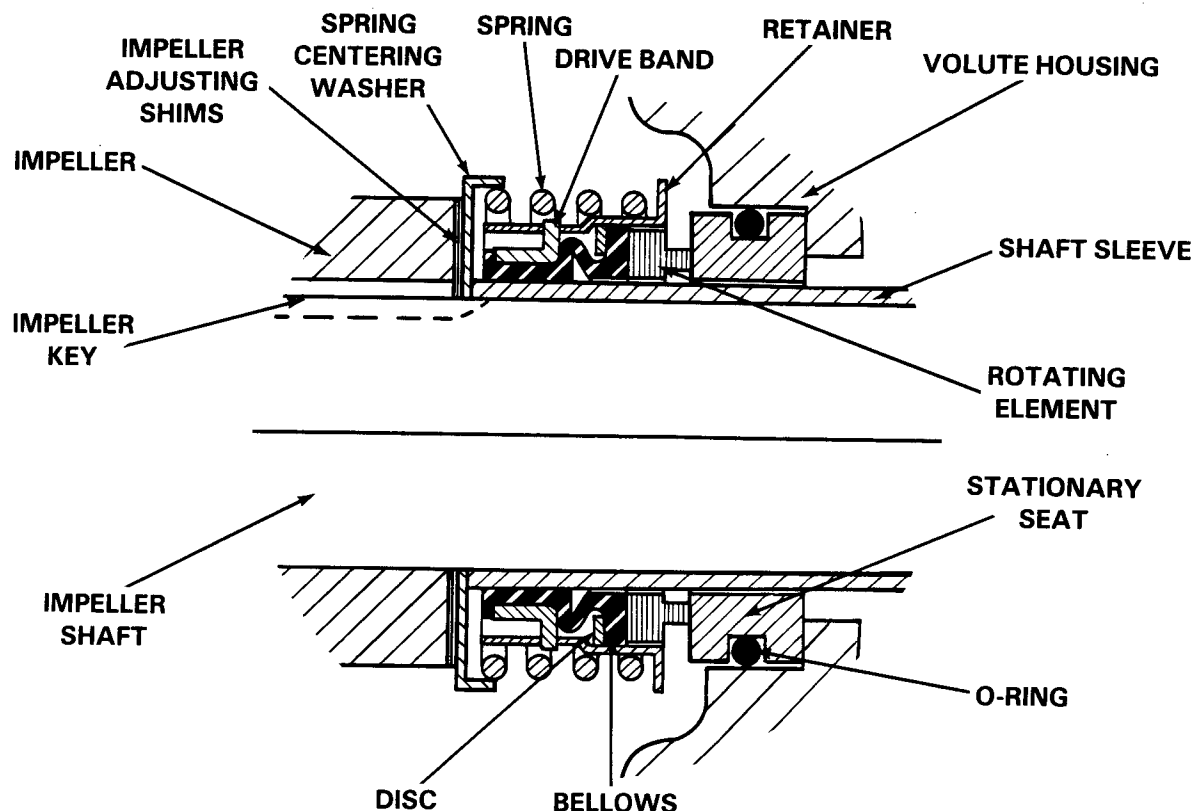


Figure 5. 25271-207 Seal Assembly

Lubricate the stationary seat O-ring and the bellows assembly with petroleum jelly or oil, and place a drop of light lubricating oil on the lapped faces of the seal. Install the seal as a complete unit.

Install the seal spring centering washer and the impeller adjusting shims.

NOTE

For maximum pump efficiency, the impeller should be centered in the volute scroll. Add or remove impeller adjusting shims to center the impeller.

Install the impeller key in the pinion shaft keyway, making certain that the key bottoms against the impeller adjusting shims. Inspect the impeller, and replace it if cracked or badly worn. Install the impeller washer and lockwasher. Install the nylock capscrew securing the impeller to the pinion shaft. Block rotation of the impeller and torque the capscrew to 40 ft-lbs (480 in-lbs).

Inspect the suction head wear ring—which is a press fit in the suction head—and replace it if badly scored or worn. Replace the suction head gasket (28), and secure the suction head to the volute casing.

Install the flat washers, lockwashers, and hex nuts securing the volute support to the suction head.

PUMP ASSEMBLY REASSEMBLY

Check Valve Assembly

See figure 4, and install the hex nuts securing the check valve assembly to the discharge flange of the pump sub-assembly. Install the lockwasher, flat washer, spacer, and hex head capscrew securing the extension spring bracket to the pump sub-assembly. Clean and install the check valve drain plug.

Hand Primer Assembly

See figure 2, and install the flat washers, lockwashers, and hex nuts securing the hand primer bracket to the volute casing.

See figure 1, and connect the hose connection from the hand primer to the pump sub-assembly.

Universal Assembly

See figure 3, and install the gear box drive shaft key (11) in the shaft keyway.

See figure 1, and engage the gear box drive shaft key in the keyway of the universal assembly. Install the cotter pin securing the universal assembly to the drive shaft. Install the universal guard, and install the round head machine screws, lockwashers, and pan head tapscrews securing the universal guard to the pump sub-assembly.

Check that all piping connections are secure, and open all connecting valves in the suction and discharge lines. See **LUBRICATION** before starting the pump.

LUBRICATION

Seal Assembly

The seal assembly is lubricated by the medium being pump.

Gear Box Assembly

See figure 3, remove the dip stick (26), and add 4 ounces of Molykote M Gear Guard or equivalent gear lubricant to the gear box. Add SAE No. 90 non-detergent motor oil until the dip stick indicates the proper lubrication level. Check the dip stick regularly during pump operation.

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