

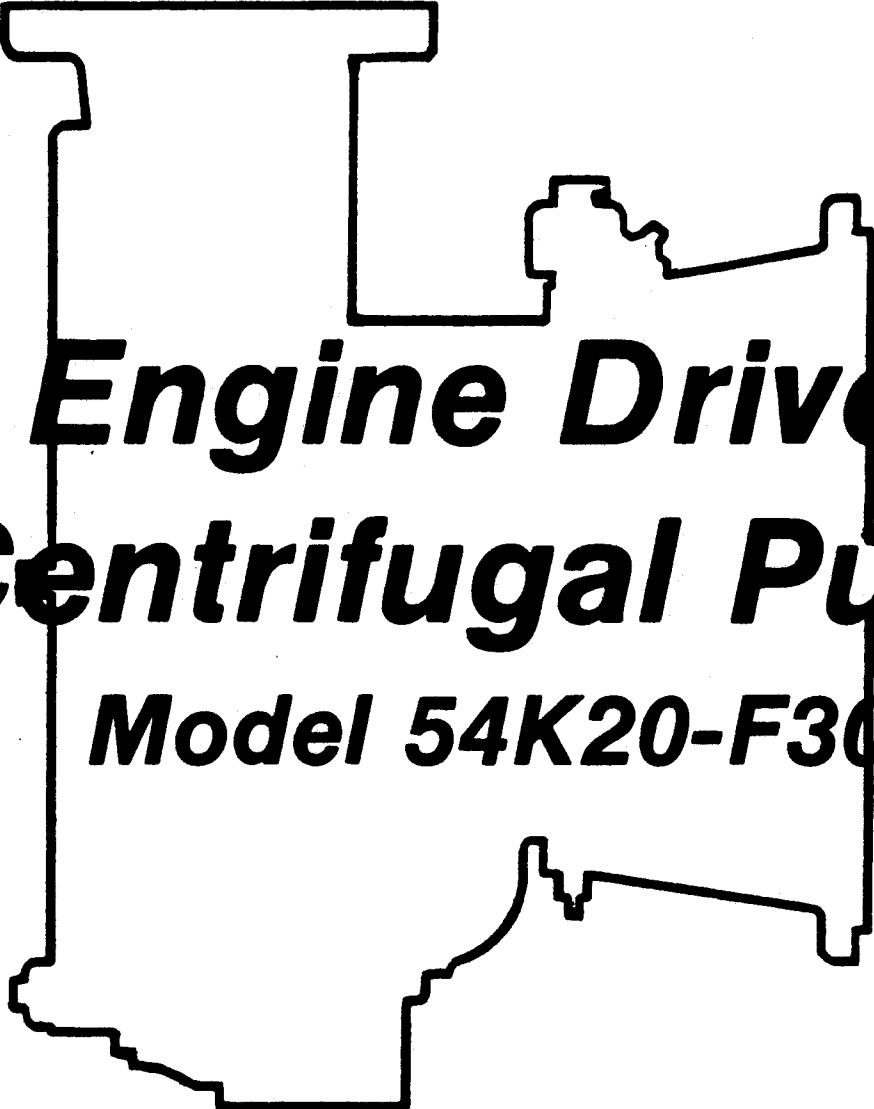
**INSTALLATION, OPERATION, PARTS LIST,  
AND MAINTENANCE MANUAL**

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ACE



February 27, 1981



***Engine Driven  
Centrifugal Pump  
Model 54K20-F300***

**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 specifically to help you get the best performance and longest life from your Gorman-Rupp pump.

This pump is a 50 Series, enclosed impeller, centrifugal model. It is specifically designed for the pumping of clean liquids at high heads and high discharge pressures.

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

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.

#### 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 ALL ENGINE DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE ENGINE BEFORE ATTEMPTING TO START THE ENGINE.

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 volatile or corrosive materials for which this pump has not been designed.

After the pump has been located in its operating position, make certain that the pump has been secured before attempting to operate it.

Do not operate the pump without shields and/or guards in place over drive shafts, belts and/or couplings, or other 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.

Do not operate an internal combustion engine in an explosive atmosphere. When operating internal combustion engines in an enclosed area, make certain that exhaust fumes are piped to the outside. These fumes contain carbon monoxide, a deadly gas that is colorless, tasteless, and odorless.

Fuel used by internal combustion engines presents an extreme explosion and fire hazard. Make certain that all fuel lines are securely connected and free of leaks. Never refuel a hot or running engine. Avoid overfilling the fuel tank. Always use the correct type of fuel.

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

## INSTALLATION

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

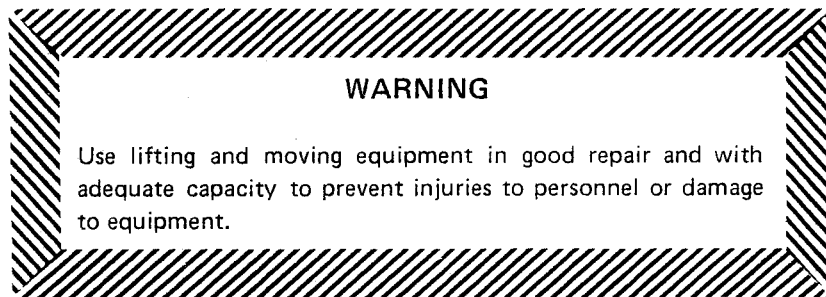
The pump assembly was inspected and tested before it was shipped from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

- 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.

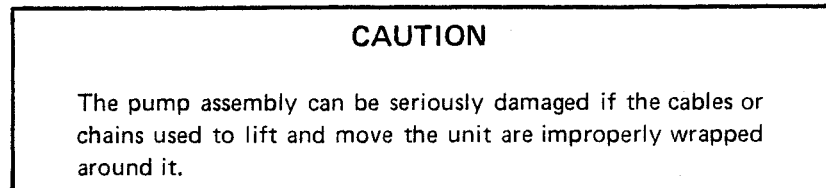
### POSITIONING THE PUMP

#### 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. 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, 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 valve is desired, install it 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 the suction line.

### Check Valves

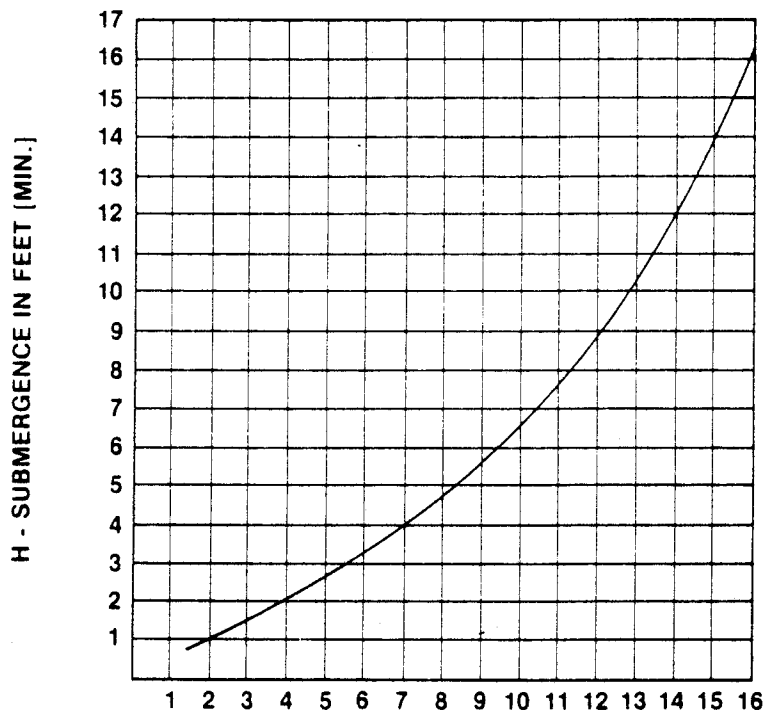
A check valve in the discharge line is normally recommended, but is not necessary in low discharge head applications.

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

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.



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

Figure 1. Recommended Minimum Suction Line Submergence Vs. Velocity

## OPERATION

### WARNING

Do not attempt to pump volatile or corrosive materials 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 an exhaust primer.

### Exhaust Primer

In the exhaust primer, engine exhaust gases are directed through a venturi to create a vacuum and draw air out of the suction line and the volute.

The exhaust primer is capable of priming a pump with a 20-foot suction lift in about two minutes; less time will be required for priming at a lesser lift. If the pump does not prime in a reasonable length of time, check the suction line for leaks.

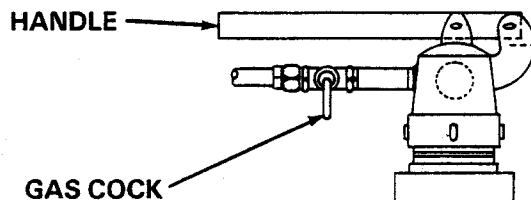


Figure 1. Exhaust Primer Assembly



Close the discharge line throttling valve.

Close the spring-loaded check valve in the discharge line before engaging the exhaust primer.

To prime the pump, close the exhaust primer handle (see figure 1), and open the cock in the priming line. Consult the operating manual furnished with the engine, and start the engine. Allow the pump to prime until liquid flows continuously from the exhaust primer nozzle. When the pump is fully primed, open the exhaust primer handle, and close the cock in the priming line.

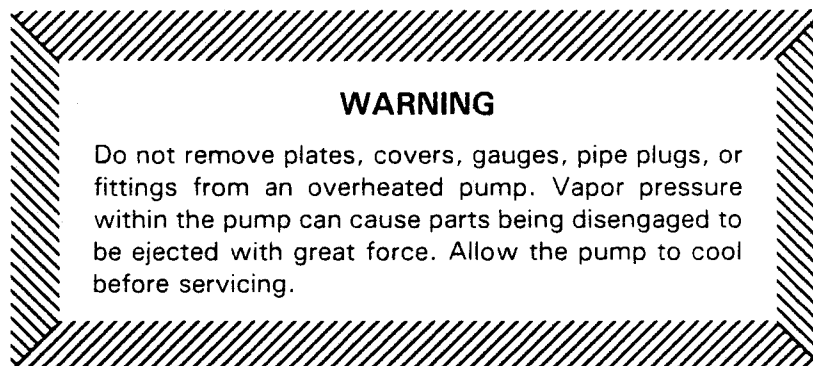
Open the spring-loaded check valve in the discharge line. Partially open the discharge throttling valve so that the discharge line fills slowly to prevent damage to piping, gaskets, and other devices in the line which could be affected by shock resulting from rapid filling of the line. When the discharge line is completely filled, adjust the discharge throttling valve to the desired 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, 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 pedestal bearings, and they can operate safely to at least 180°F.

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

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

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



# TROUBLESHOOTING

## WARNING

Before attempting to open or service the pump:

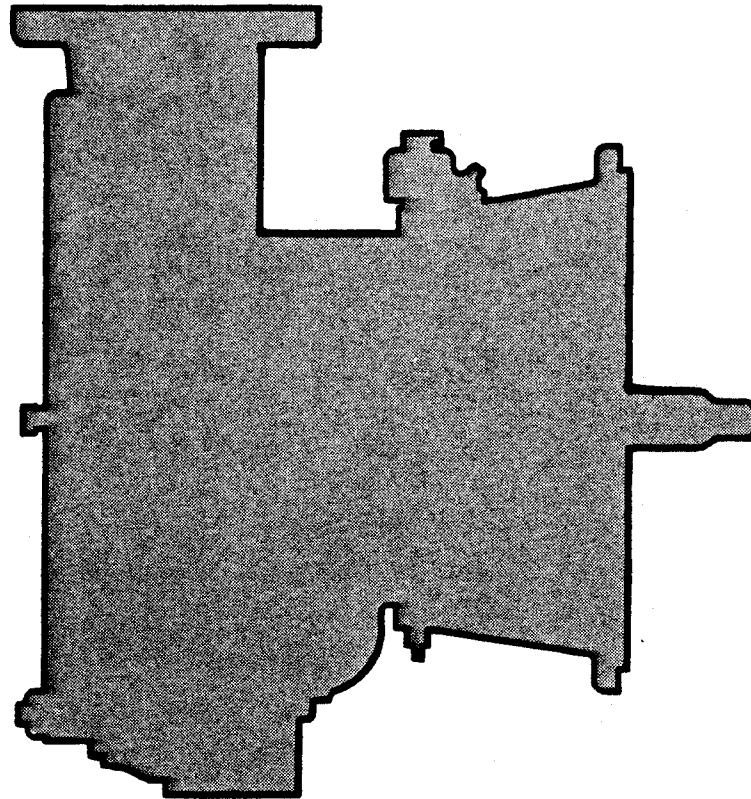
1. Consult pump service manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

Trouble	Possible Cause	Probable Remedy
PUMP FAILS TO PRIME	<p>Air leak in suction line.</p> <p>Lining of suction hose collapsed.</p> <p>Suction check valve clogged or binding.</p> <p>Leaking or worn seal or pump gasket.</p> <p>Suction lift or discharge head too high.</p> <p>Suction strainer clogged.</p>	<p>Correct leak.</p> <p>Replace suction hose.</p> <p>Clean valve.</p> <p>Check pump vacuum. Replace leaking or worn seal or gasket.</p> <p>Check piping installation and install bypass line if needed. See INSTALLATION.</p> <p>Clean suction strainer.</p>
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	<p>Air leak in suction line.</p> <p>Suction intake not submerged at proper level or sump too small.</p> <p>Lining of suction hose collapsed.</p> <p>Impeller or other wearing parts worn or damaged.</p> <p>Impeller clogged.</p> <p>Pump speed too slow.</p> <p>Discharge head too high.</p> <p>Suction lift too high.</p>	<p>Correct leak.</p> <p>Check installation and correct as needed. Check submergence chart (Section B, page 4).</p> <p>Replace suction hose.</p> <p>Check impeller clearance. Replace worn parts as needed.</p> <p>Free impeller of debris.</p> <p>Check driver output.</p> <p>Install bypass line.</p> <p>Reduce suction lift.</p>

Trouble	Possible Cause	Probable Remedy
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont)	<p>Leaking or worn seal or pump gaskets.</p> <p>Suction strainer clogged.</p>	<p>Check pump vacuum. Replace leaking or worn seal or pump gaskets.</p> <p>Clean suction strainer.</p>
PUMP REQUIRES TOO MUCH POWER	<p>Pump speed too high.</p> <p>Discharge head too low.</p> <p>Liquid solution too thick.</p>	<p>Reduce speed of power source.</p> <p>Adjust discharge valve.</p> <p>Dilute if possible.</p>
PUMP CLOGS FREQUENTLY	<p>Discharge flow too slow.</p> <p>Suction check valve clogged or binding.</p>	<p>Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.</p> <p>Free valve, and clean or replace it.</p>
EXCESSIVE NOISE	<p>Cavitation in pump.</p> <p>Pumping entrained air.</p> <p>Pump or drive not securely mounted.</p> <p>Impeller clogged or damaged.</p>	<p>Reduce suction lift and/or friction losses in suction line.</p> <p>Locate and eliminate source of air bubble.</p> <p>Secure mounting hardware.</p> <p>Clean out debris; replace damaged parts.</p>
BEARINGS RUN TOO HOT	<p>Bearing temperature is high, but within limits.</p> <p>Low or incorrect lubricant.</p> <p>Suction and discharge lines not properly supported.</p> <p>Drive misaligned.</p>	<p>Check bearing temperature frequently to monitor any increase.</p> <p>Check for proper type and level of lubricant.</p> <p>Check piping installation for proper support.</p> <p>Align drive properly.</p>



# ***Engine Driven Centrifugal Pump Model 54K20-F300***



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

# SECTIONAL DRAWING

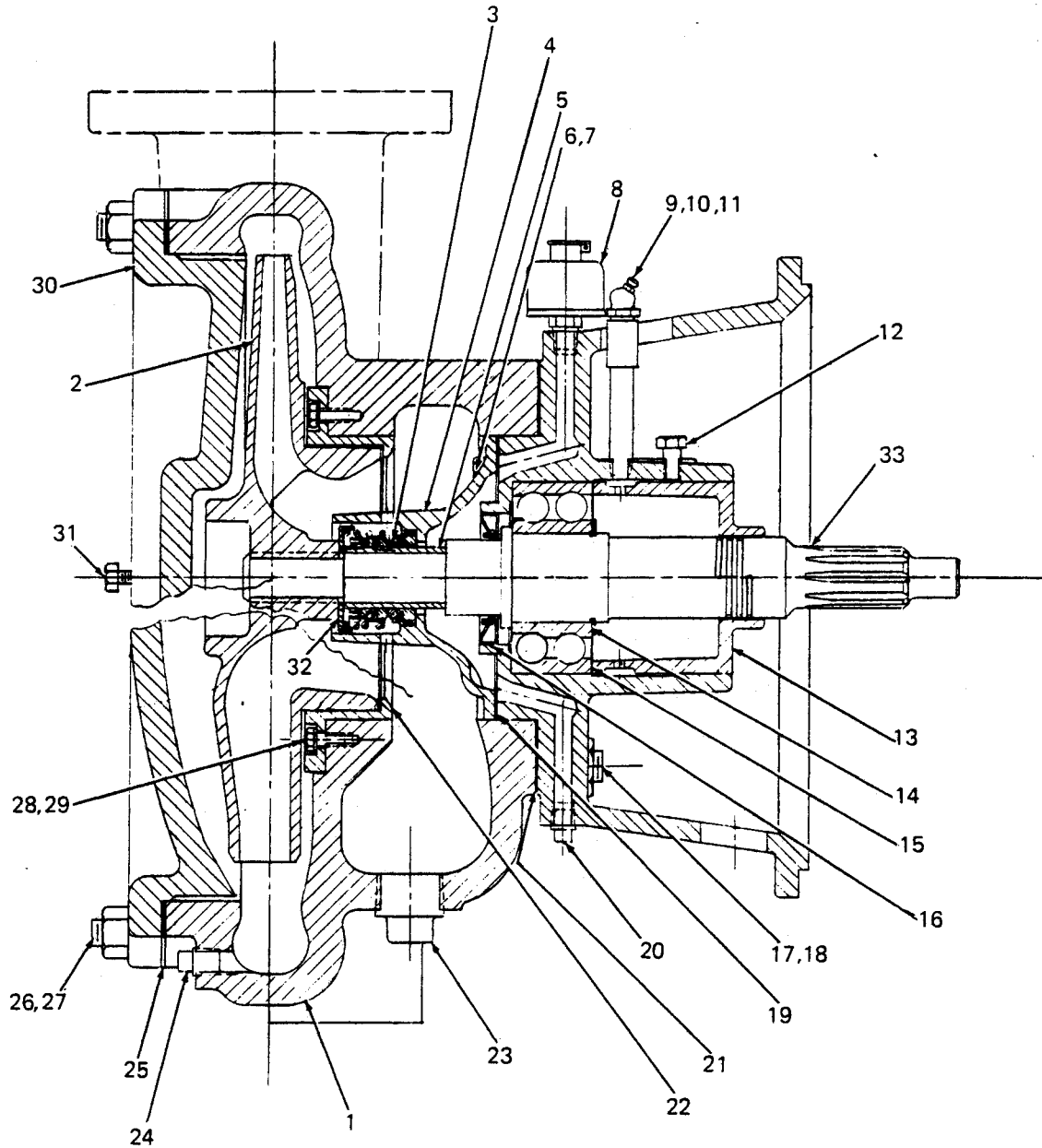


Figure 1. Pump End Only Model 54K20-F300



# PARTS LIST

## PUMP END ONLY MODEL 54K20-F300

(From S/N 711238 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	926-A	10020	1		BATTERY BOX	8356-B	24000	1
2	★IMPELLER	1382	10010	1		HEX HEAD CAPSCREW	B-0604	15991	2
3	★SEAL ASSEMBLY	12364-E	-	1		HEX HEAD CAPSCREW	B-0610	15991	2
4	SEAL HOUSING	38333-611	-	1		HEX NUT	D-06	15991	4
5	★SHAFT SLEEVE	31414-063	-	1		LOCKWASHER	J-06	15991	4
6	HEX HEAD CAPSCREW	B-0603	14990	6		FLAT WASHER	K-06	15991	4
7	LOCKWASHER	J-06	15991	6		BATTERY	S-1338	-	1
8	★SEAL BOTTLE OILER	46711-505	-	1		FUEL TANK & GUARD ASSEMBLY	46711-033	-	1
9	★BEARING LUBE FITTING	S-194	-	1		HEX NUT	D-06	15991	4
10	PIPE COUPLING	AE-04	11990	1		LOCKWASHER	J-06	15991	4
11	PIPE NIPPLE	T-0412	15070	1		FLAT WASHER	K-06	15991	4
12	★SQUARE HEAD SETSCREW	G-0604	15990	1		FUEL TANK GUARD ASSEMBLY	42381-017	-	1
13	BEARING RETAINING NUT	2196	10010	1		FUEL TANK	46711-034	-	1
14	★BEARING RETAINING RING	S-215	-	1		INSTRUMENT PANEL ASSEMBLY	48312-002	-	1
15	BALL BEARING	S-1033	-	1		FEMALE CONNECTOR	S-577	-	1
16	★OIL SEAL	S-79	-	1		TUBE FITTING	S-634	-	1
17	STUD	C-1209	15991	8		GROMMET	S-756	-	1
18	HEX NUT	D-12	15991	8		GROMMET	S-807	-	1
19	★SEAL HOUSING GASKET	38683-431	-	1		SAFETY SWITCH	S-812	-	1
20	SEAL DRAIN PLUG	P-06	11990	1		HOSE END SWIVEL	S-1670	-	2
21	★VOLUTE GASKET	922-G	18000	1		HOSE	31411-012	-	1
22	★IMPELLER WEAR RING	6597	10010	1		MOUNTING HARDWARE			
23	VOLUTE DRAIN PLUG	P-20	11990	1		HEX HEAD CAPSCREW	B-0804	15991	2
24	VOLUTE DRAIN PLUG	P-08	11990	3		HEX HEAD CAPSCREW	B-0806	15991	2
25	★COVER GASKET	926-G	18000	1		HEX HEAD CAPSCREW	B-1209	15991	2
26	STUD	C-1210	15991	16		HEX NUT	D-08	15991	4
27	HEX NUT	D-12	15991	16		HEX NUT	D-12	15991	2
28	LOCKWASHER	J-05	15991	4		LOCKWASHER	J-08	15991	4
29	HEX HEAD CAPSCREW	B-0503	14990	4		LOCKWASHER	J-12	15991	2
30	COVER PLATE	923	10010	1		CHECK VALVE ASSEMBLY	GRP14-13	-	1
31	HEX HEAD CAPSCREW	B-0604	15991	2		VALVE WEIGHT	20-A	10010	1
32	★IMPELLER SHIM SET	37-J	17090	1		VALVE BODY	942	10010	1
33	★IMPELLER SHAFT	6819-A	16040	1		VALVE COVER	943	10010	1
NOT SHOWN:						VALVE WEIGHT	943-A	10010	1
	STRAINER	S-2278	-	1		VALVE BRACKET	943-B	15990	1
	FORD C5PG ENGINE	204-K1	-	1		VALVE BAR	943-C	15990	1
	WIRE ASSEMBLY	5795-CE	-	1		VALVE	943-B	19080	1
	CABLE ASSEMBLY	6926-K	24040	1		GASKET	943-G	18000	1
	FUEL OUTLET ASSEMBLY	10765	24030	1		FLANGE GASKET	1676-G	18000	1
	EXHAUST PIPE	11436-A	24000	1		HEX HEAD CAPSCREW	B-0502	15991	1
	BASE	12468	24000	1		HEX HEAD CAPSCREW	B-0605	17000	1
	FUEL LINE	12618	-	1		HEX HEAD CAPSCREW	B-1011	15991	8
	HOISTING BAIL	13351-L	24000	1		STUD	C-1009	15991	6
	CONNECTOR	S-551	-	2		HEX NUT	D-04	14990	3
	CLAMP	S-804	-	1		HEX NUT	D-10	15991	14
	COPPER TUBING	W-8160	14990	1		LOCKWASHER	J-04	15991	3
	EP7B EXHAUST PRIMER	GRP15-03	-	1		LOCKWASHER	J-05	15991	2
	LEVER HANDLE	1267-A	15990	1		LOCKWASHER	J-06	17000	1
	PRIMING VALVE BODY	1629-A	10010	1		PIPE PLUG	P-04	11990	1
	PRIMING VALVE	1630	10010	1		ROUND HEAD MACHINE SCREW	X-0403	17090	3
	EJECTOR BODY	1778	14000	1		DISCHARGE FLANGE	1756	10010	1
	EJECTOR BODY	1779	14000	1		SUCTION FLANGE	1757	10010	1
	FLAT WASHER	K-05	15991	2		DISCHARGE FLANGE GASKET	1676-G	18000	1
	COTTER PIN	M-0506	15990	2		SUCTION FLANGE GASKET	1678-G	18000	1
	GAS COCK	S-02	-	1		PIPE NIPPLE	2434	15070	1
	SPRING WASHER	S-995	-	3		HOSE	31412-110	-	1
	PIPE NIPPLE	T-06	15070	1		NAME PLATE	2613-C	13990	1
	PIPE NIPPLE	T-16	15070	1		OPTIONAL:			
	STREET ELBOW	RS-06	11990	1		WHEEL KIT	GRP30-26	-	1
	BATTERY BOX ASSEMBLY	GRP40-02	-	1		SIDE PANEL	42142-022	-	1
	GROUND CABLE ASSEMBLY	5795-AC	24040	1		HOURLY METER	48312-401	-	1
	BATTERY FRAME	8355-B	24000	1		TACHOMETER	48312-602	-	1

★ INDICATES PARTS RECOMMENDED FOR STOCK  
Above Serial Numbers Do Not Apply To Pumps Made In Canada.

CANADIAN SERIAL NO. . . . . AND UP

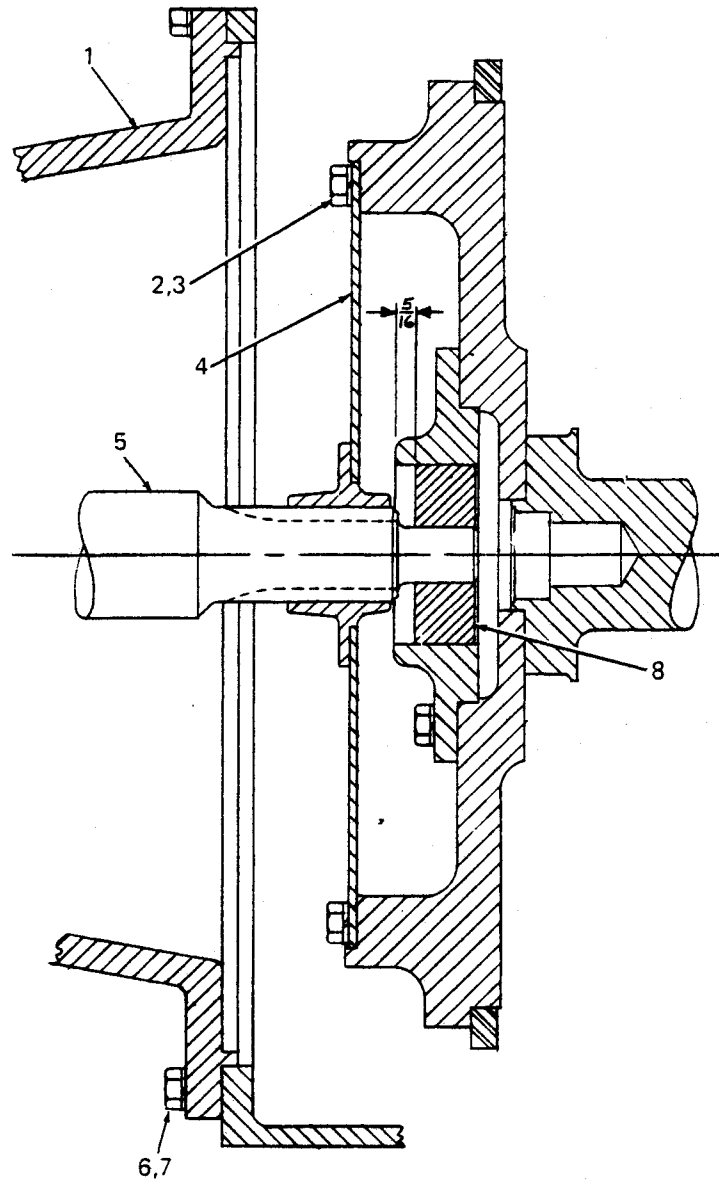
**SECTIONAL DRAWING**

Figure 2. Drive Assembly

## PARTS LIST

ITEM NO.	DRIVE ASSEMBLY PART NAME	PART NUMBER	MATERIAL CODE	NUMBER REQUIRED
1	INTERMEDIATE	2175-D	10010	1
2	HEX HEAD CAP SCREW	B-0603	15991	8
3	LOCKWASHER	J-06	15991	8
4	DRIVE PLATE ASSEMBLY	7409-A	24020	1
5	★ IMPELLER SHAFT	6819-A	16040	1
6	HEX HEAD CAP SCREW	B-0605	15991	12
7	LOCKWASHER	J-06	15991	12
8	★ PILOT BUSHING	8312-A	15010	1

★ Indicates parts recommended for stock

### ENGINE SEPARATION

If it is necessary to separate the pump from the engine, disengage the hex head cap screws (6) securing the intermediate (1) to the engine housing, and separate the assemblies.

It is not necessary to remove the drive plate assembly (4) unless the pilot bushing (8) needs replacing. To remove the drive plate assembly, disengage the attaching hex head cap screws (2).

The pilot bushing is a press fit in the flywheel assembly. If replacing the pilot bushing be certain to apply "Never-Seez" compound or equivalent to the inside diameter of the bushing before reassembling the engine and pump end.

### CAUTION

If the drive assembly is not properly positioned on the shaft, a preload condition can occur and cause premature thrust bearing failure.

## 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 power source, making certain that it will remain inoperative while the pump is being serviced, and close all connecting valves. Remove the volute drain plugs (23 and 24) to drain the pump.

Remove the hex nuts (27) securing the cover plate (30) to the volute casing (1) for access to the wear ring (22), impeller (2), and seal assembly (3).

To remove the impeller, block the shaft (33) or power source to prevent rotation, and using an impeller wrench, turn the impeller in the direction of pump rotation. Unscrew the impeller and replace it if scored or badly worn.

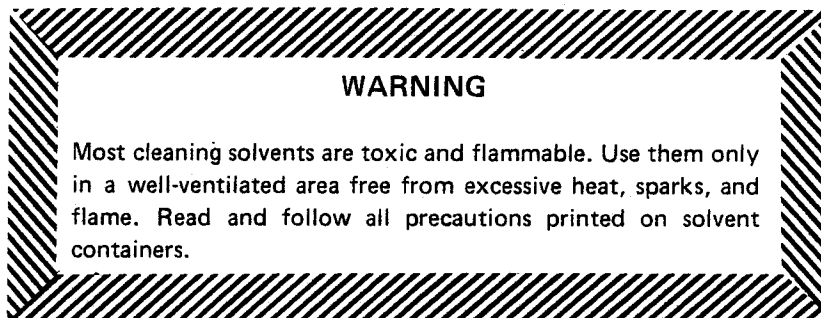
Remove the impeller adjusting shims (32). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

Inspect the wear ring, and replace it if scored or worn.

### Seal Disassembly

Carefully remove the seal spring centering washer and the stationary and rotating seal elements, using a stiff wire with a hooked end if necessary.

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



### Seal Reassembly

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. Clean and polish the shaft sleeve, or replace it if there are nicks or cuts on the end.

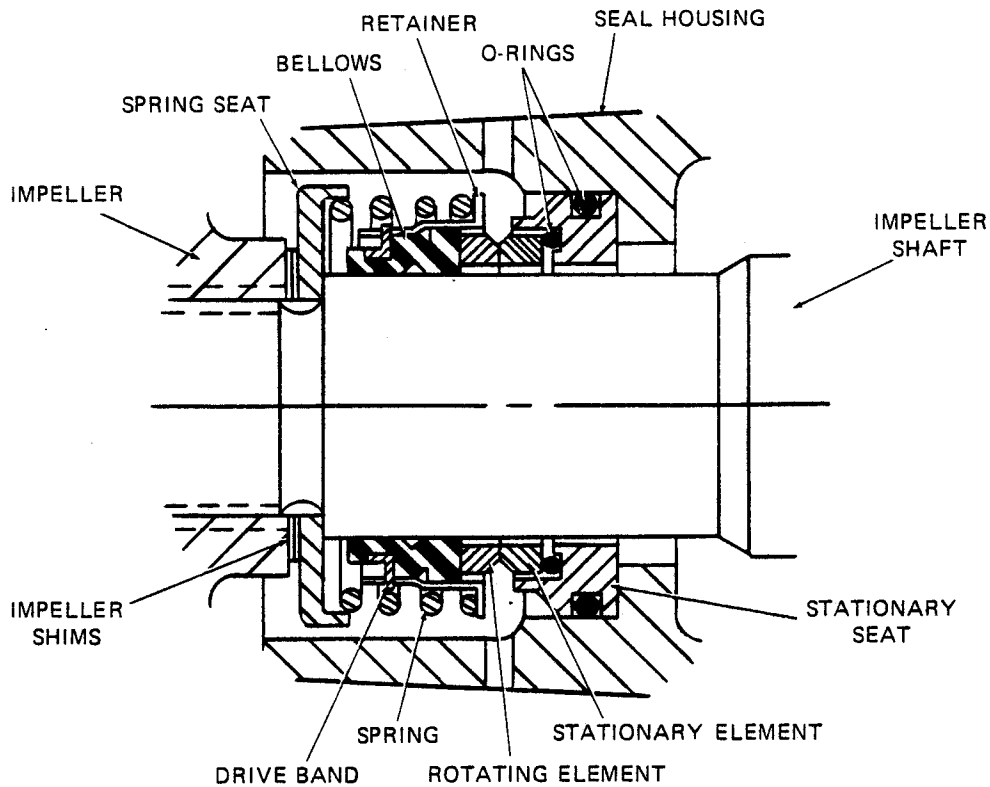


Figure 3. 12364-E Seal Assembly

**CAUTION**

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

Install the replacement seal as a complete unit.

Lubricate the bellows and O-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 3.

**Pump Reassembly**

Reinstall the impeller adjusting shims and the impeller. It is necessary for the impeller to be centered in the volute scroll for maximum pump efficiency. Measure this clearance and add or subtract impeller shims until it is reached.

Reassemble the cover plate to the volute casing, replacing the cover gasket (25).

Before starting the pump, turn the shaft to be sure the impeller does not bind or scrape.

Clean and reinstall the volute drain plugs.

## LUBRICATION

### Seal Assembly

Before starting the pump, fill the bottle oiler (8) with SAE No. 30 non-detergent motor oil.

### Bearings

When shipped from the factory, the pump contains sufficient grease to lubricate the bearings for approximately 5,000 operating hours. Do not lubricate sooner than required. When additional grease is required, fill the bearing cavity with 1/4 pound of No. 0 pressure gun grease through the bearing lube fitting (9).





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