

INSTALLATION, OPERATION, PARTS LIST,
AND MAINTENANCE MANUAL

A B C D E G H



OM-01615-0E02

Rev. - A

January 30, 1981

***Engine Driven
Self-Priming
Centrifugal Pump
Model 81½ P47-6***

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

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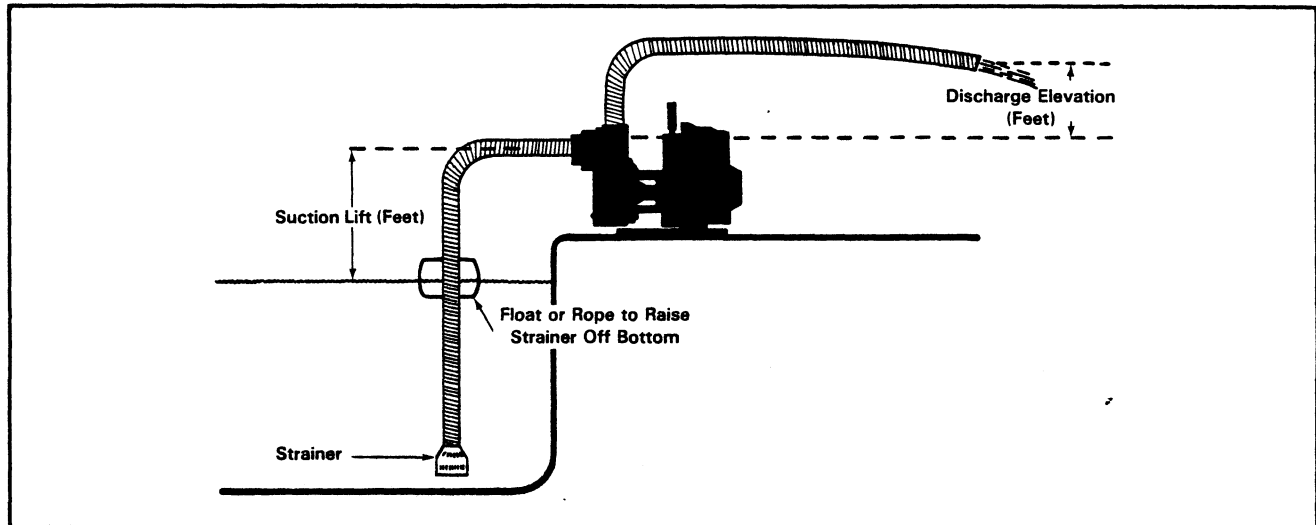


Figure 1. Typical Installation for Pump Model 81 ½ P47-6

NOTE

Pump performance is adversely affected by increased suction lift, discharge elevation, and friction losses due to hose length. See tables 1 and 2 for pump application data.

| U.S. GALLONS PER MINUTE DELIVERED USING 1½" HOSE | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------|----|----|----|----|----|----|---------------------|----|----|----|----|----|----|----------------------|----|----|----|----|----|----|----------------------|----|----|----|----|----|----|
| TOTAL HOSE LENGTH | 1 FOOT SUCTION LIFT | | | | | | | 5 FOOT SUCTION LIFT | | | | | | | 10 FOOT SUCTION LIFT | | | | | | | 15 FOOT SUCTION LIFT | | | | | | |
| | DISCHARGE ELEVATION | | | | | | | DISCHARGE ELEVATION | | | | | | | DISCHARGE ELEVATION | | | | | | | DISCHARGE ELEVATION | | | | | | |
| | open | 5 | 15 | 25 | 35 | 45 | 55 | open | 5 | 15 | 25 | 35 | 45 | 55 | open | 5 | 15 | 25 | 35 | 45 | 55 | open | 5 | 15 | 25 | 35 | 45 | 55 |
| 20 | 88 | 85 | 76 | 68 | | | | 84 | 82 | 73 | | | | | 82 | 77 | | | | | | 77 | 73 | | | | | |
| 40 | 80 | 77 | 69 | 61 | 53 | | | 78 | 74 | 67 | 58 | 50 | | | 74 | 71 | 62 | 58 | 49 | | | 71 | 67 | 62 | 58 | 54 | | |
| 60 | 74 | 71 | 64 | 57 | 49 | 39 | 27 | 72 | 68 | 62 | 54 | 46 | 35 | 29 | 68 | 65 | 58 | 54 | 45 | 35 | 29 | 65 | 62 | 58 | 54 | 50 | 41 | 29 |
| 80 | 69 | 66 | 60 | 53 | 45 | 36 | 25 | 67 | 64 | 57 | 50 | 42 | 31 | 26 | 64 | 61 | 54 | 50 | 42 | 31 | 26 | 61 | 57 | 54 | 50 | 46 | 37 | 26 |
| 100 | 65 | 62 | 56 | 50 | 42 | 33 | 22 | 63 | 60 | 54 | 47 | 39 | 29 | 24 | 60 | 57 | 51 | 47 | 39 | 29 | 24 | 57 | 54 | 51 | 47 | 43 | 35 | 24 |
| 200 | 52 | 49 | 44 | 39 | 33 | 25 | 17 | 50 | 48 | 42 | 36 | 30 | 22 | 17 | 48 | 45 | 40 | 36 | 30 | 22 | 17 | 45 | 42 | 40 | 36 | 34 | 26 | 17 |
| 300 | 44 | 42 | 38 | 33 | 28 | 22 | 15 | 42 | 41 | 36 | 32 | 26 | 19 | 15 | 41 | 38 | 34 | 32 | 26 | 19 | 15 | 38 | 36 | 34 | 32 | 29 | 23 | 15 |
| 400 | 38 | 36 | 33 | 29 | 25 | 19 | 13 | 37 | 35 | 31 | 27 | 23 | 17 | 13 | 35 | 33 | 30 | 27 | 23 | 17 | 13 | 33 | 31 | 30 | 27 | 26 | 25 | 13 |
| 500 | 34 | 33 | 30 | 26 | 22 | 17 | 12 | 33 | 32 | 28 | 25 | 21 | 15 | 12 | 32 | 30 | 27 | 25 | 21 | 15 | 12 | 30 | 28 | 27 | 25 | 23 | 18 | 12 |
| 600 | 31 | 30 | 27 | 24 | 20 | 16 | 11 | 31 | 29 | 26 | 22 | 19 | 13 | 11 | 29 | 28 | 24 | 23 | 19 | 14 | 11 | 28 | 26 | 24 | 23 | 21 | 17 | 11 |

TABLE 1

Table 1 gives the approximate pump delivery in U.S. gallons per minute (GPM) according to various suction/discharge elevations and total hose length. Total hose length includes both suction and discharge lines. Delivery figures are based on the pump operating at 3600 RPM with 1 ½-inch suction and discharge hose.

| U.S. GALLONS DELIVERED USING VARIOUS DIA. DISCHARGE | | | | |
|---|----|----|------|------|
| DISCHARGE HOSE DIA. | ¾" | 1" | 1 ¼" | 1 ½" |
| MAX. G.P.M. DELIVERED | 17 | 34 | 53 | 68 |

TABLE 2

Table 2 gives the maximum pump delivery in gallons per minute (GPM) according to various discharge hose diameter, based on the pump operating at 3600 RPM with 1 ½-inch suction hose. The total elevation is 10 feet and total hose length of 60 feet.



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 an 80 Series, semi-enclosed impeller, self-priming model. The pump body and components are made of a high grade fiberglass reinforced plastic, and the pump is designed for service with water containing small entrained solids.

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

| | | |
|-------------------------|----|-------------------------------|
| The Gorman-Rupp Company | or | Gorman-Rupp of Canada Limited |
| P. O. Box 1217 | | 70 Burwell Road |
| Mansfield, Ohio 44902 | | St. Thomas, Ontario N5P 3R7 |

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

The following are used to alert maintenance and operating 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 PUMP MODEL 81½P47-6. 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. Remove the spark plug 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 suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

This pump is not designed for volatile or corrosive fluids. Do not attempt to pump them.

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

Never attempt to unclog the pump by inserting hands or any object into suction or discharge piping while the pump is running. Stop the pump, and ensure that it will remain inoperative, before attempting to unclog it.

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 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

- a. Inspect the pump assembly for cracks, broken edges, and other obvious damage. The pump body and components are made of fiberglass reinforced polyester, which is rugged but not unbreakable; use reasonable care when handling the pump.
- b. Check for and tighten loose attaching hardware, particularly around mating surfaces.
- c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated.
- d. Check the engine lubrication levels, and lubricate as necessary following the engine manufacturer's recommendations.

BASE AND HANDLE ASSEMBLY

The pump base, handle, and attaching hardware are shipped loose with the pump, and must be mounted before the pump is put into operation; assembly instructions follow. The numbers shown in parentheses are keyed to the sectional drawing and parts list in the MAINTENANCE AND REPAIR section of this manual.

Thread one 3/8" hex nut (11) onto each leg of the handle (8). Nuts should be equally spaced approximately 1" from the threaded end of the handle. Insert the handle in the outermost diagonal holes (see figure 1, below) in the base (15) until the nuts are flush against the base. Install one 3/8" deformed lock nut (29) on each leg of the handle, and tighten the nuts securely against the base.

Locate the pump and engine assembly on the base, and align the engine mounting holes. Elevating the base will simplify assembly. Secure the engine to the base with four 5/16" x 1 1/4" hex head capscrews (12), lockwashers (13), and hex nuts (14). Tighten the nuts securely against the base.

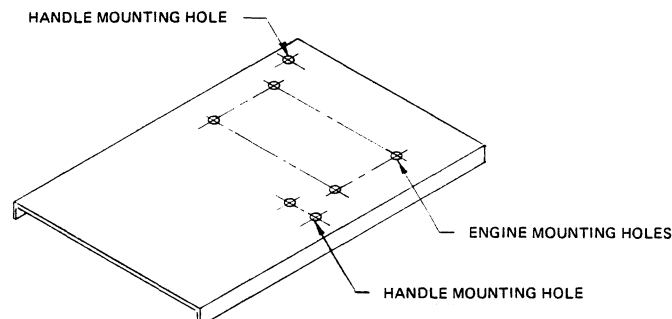


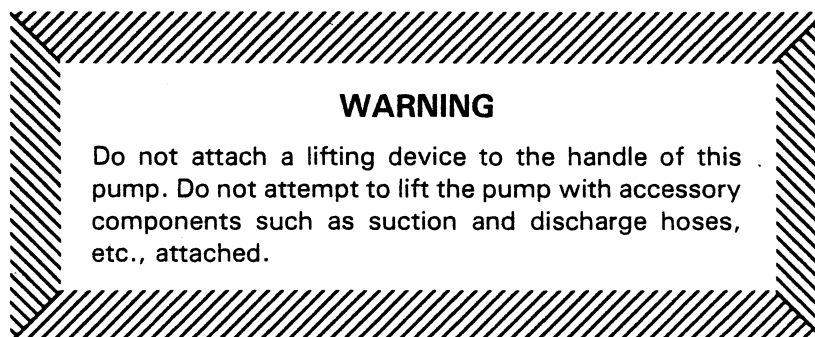
Figure 1. Base and Mounting Holes



The volute drain plug (24) is also shipped loosed with the pump. Apply pipe sealant or teflon tape to the threads of the drain plug, and install and tighten the plug in the drain hole.

POSITIONING THE PUMP

The handle on this pump has been designed for hand carrying only; do not attach a lifting device to the handle. The handle has been designed to support the weight of the pump unit only; do not attempt to lift the pump by the handle when accessory components are attached.



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

When operating the pump on hard surfaces, place a carpet square or other vibration-dampening material under the pump to protect floor surfaces and reduce "walking" due to engine vibration.

SUCTION AND DISCHARGE PIPING

Either pipe or hose of 1 ½-inches I. D. may be used in the suction and discharge lines. If hose is used in the suction line, it must be the rigid-wall, reinforced type to prevent collapse under suction. **The suction line should not exceed 20 feet in length.**

Lines near the pump must be independently supported to avoid strain on the pump which could cause serious vibration, 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.

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.

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**

The use of plastic fittings to connect suction and discharge lines to the pump is recommended. Use a good grade of pipe sealant on the threads of the fittings. Draw the fittings up hand tight, then give them one full turn with a wrench.

Suction lines should be the same size as the pump inlet (1 ½-inches). 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

To avoid possible clogging or damage, install the strainer provided with the pump at the end of the suction line. Submerge the strainer deep to avoid vortexing (pulling air), and anchor or fix the suction hose so that the strainer will not bury itself or become obstructed (see figure 1). The strainer will pass solids up to 1/4 inch in diameter; the pump will pass solids up to 9/16 inch in diameter.

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.

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 engine is properly lubricated (see engine manufacturer's recommendations).

This pump is self-priming, but the pump volute casing must first be filled with liquid if:

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

Add clean liquid until the pump is filled to the suction port. Once the volute casing has been filled, the pump will prime and reprime as necessary.

CAUTION

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

WARNING

Keep away from the discharge outlet while waiting for the pump to prime. When the pump does prime, discharge will be rapid and without warning.



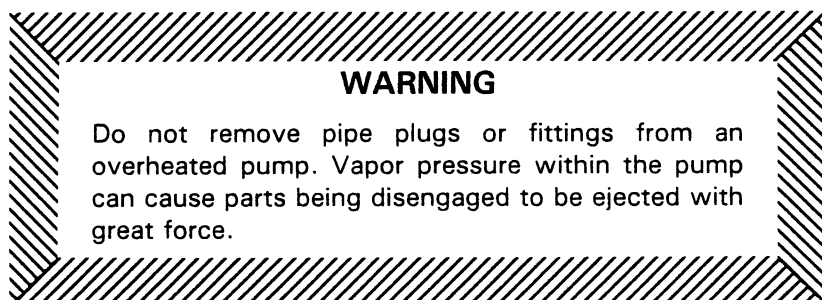
STARTING

Make certain that all piping connections are securely tightened before starting the pump. To start the engine, consult the operating manual furnished with the engine.

Open all the valves in the discharge line and start the engine. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

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 can occur if valves in the suction or discharge line 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.



Check the suction strainer regularly during pump operation, or if the pump flow rate begins to drop, and clean it as necessary.

STOPPING

After stopping the pump, remove the engine spark plug to ensure that the pump will remain inoperative.

In below-freezing conditions, drain the pump to prevent damage from freezing, and 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 a week or more in warm weather, drain the pump and flush it thoroughly with clean water to prevent salting.

TROUBLESHOOTING

WARNING

Before attempting to open or service the pump:

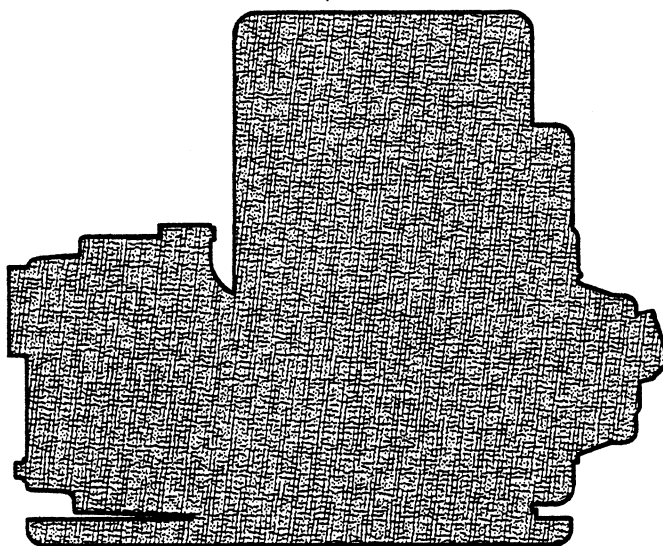
1. Consult pump service manual.
2. Remove the spark plug to ensure that the pump will remain inoperative.
3. Allow pump to cool if overheated.
4. Close suction and discharge valves.
5. Drain pump.

| Trouble | Possible Cause | Probable Remedy |
|---|--|---|
| PUMP FAILS TO PRIME | No liquid in pump. Air in suction line. Suction strainer clogged. Lining of suction hose collapsed. Leaking or worn seal or O-rings. | Fill volute. Correct leak. Clean suction strainer. Replace suction hose. Replace. |
| PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE | Suction strainer clogged. Air in suction line. Suction lift too high. Suction intake not submerged at proper level or sump too small. Impeller clogged. Impeller or other wearing parts worn or damaged. Lining of suction hose collapsed. Leaking or worn seal or O-rings. | Clean suction strainer. Correct leak. Reduce suction lift. See Performance Chart, Table 1. Check installation and correct as needed. Free impeller of debris. Check impeller clearance. Replace worn parts as needed. Replace suction hose. Replace. |

| Trouble | Possible Cause | Probable Remedy |
|------------------------------|--|--|
| PUMP REQUIRES TOO MUCH POWER | Pump speed too high. Discharge head too low. Liquid solution too thick. | Reduce speed of power source. Adjust discharge valve. Dilute if possible. |
| PUMP CLOGS FREQUENTLY | Discharge flow too slow. Strainer damaged. Too many solids. | Open discharge valve fully to increase flow rate, and run engine at maximum governed speed. Replace. Strainer buried; raise strainer. |
| 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. |

Engine Driven Self-Priming Centrifugal Pump

Model 81½ P47-6



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

SECTIONAL DRAWING

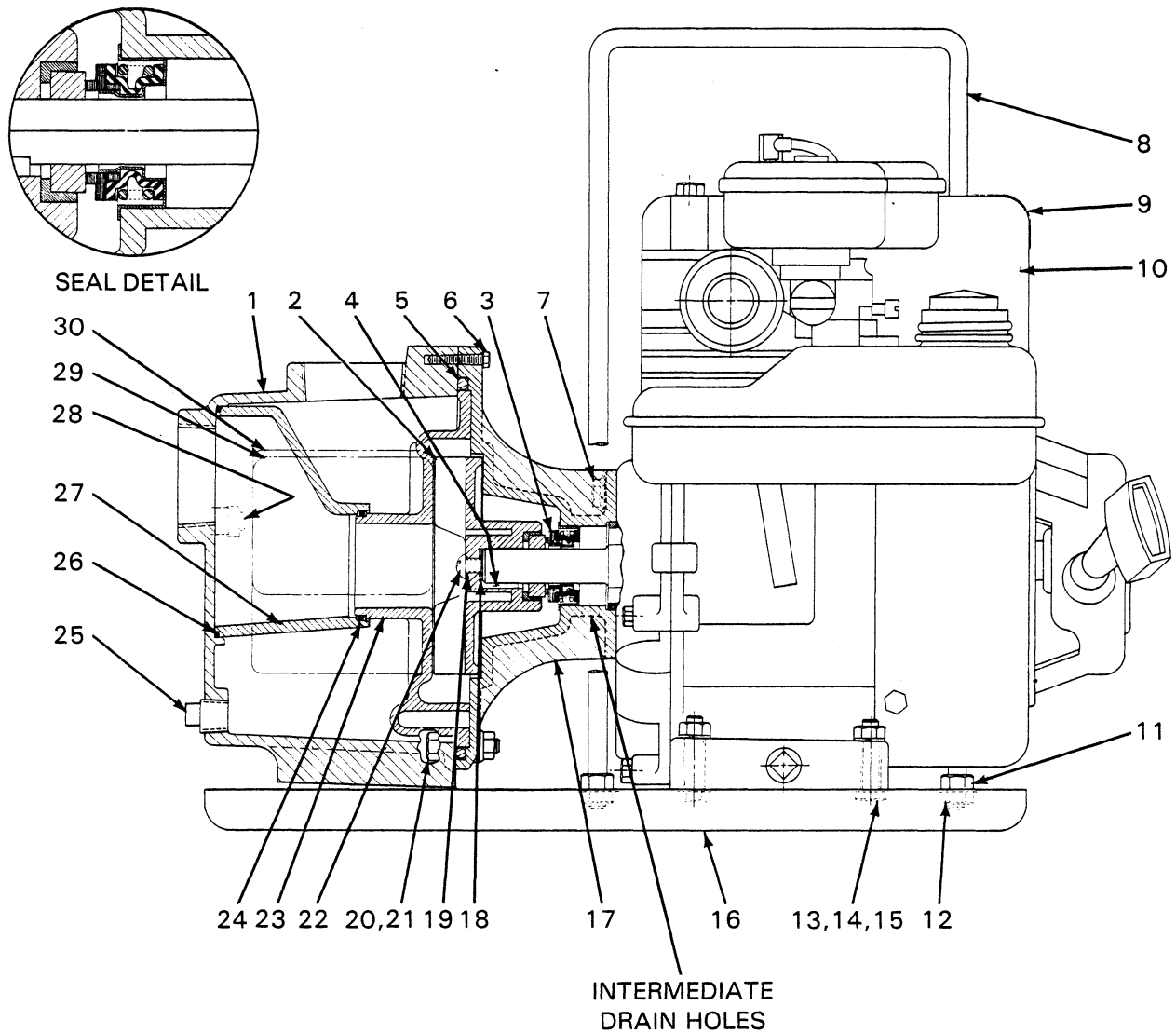


Figure 1. Pump Model 81 1/2 P47-6



PARTS LIST

PUMP MODEL 81½ P47-6

(From S/N 719093 up)

| ITEM NO. | PART NAME | PART NUMBER | MATL CODE | QTY |
|------------|--------------------------|-------------|-----------|-----|
| 1 | PUMP HOUSING | 38231-401 | — | 1 |
| 2 | ★ IMPELLER | 38617-703 | — | 1 |
| 3 | ★ SEAL ASSEMBLY | 25271-411 | — | 1 |
| 4 | IMPELLER KEY | N-0302½ | 17000 | 1 |
| 5 | ★ VANE PLATE O-RING | 25152-363 | — | 1 |
| 6 | SELF-TAPPING SCREW | 21287-106 | — | 2 |
| 7 | MACHINE SCREW | 22381-115 | — | 4 |
| 8 | LIFTING HANDLE | 31921-020 | — | 1 |
| 9 | WARNING DECAL | 2613-FE | — | 1 |
| 10 | B&S 6 ENGINE | 29112-024 | — | 1 |
| 11 | HEX NUT | D-06 | 15991 | 2 |
| 12 | DEFORMED LOCKNUT | DD-06 | 15991 | 2 |
| 13 | HEX HEAD CAPSCREW | B-0506 | 15991 | 4 |
| 14 | LOCKWASHER | J-05 | 15991 | 4 |
| 15 | HEX NUT | D-05 | 15991 | 4 |
| 16 | BASE | 34451-050 | — | 1 |
| 17 | ★ INTERMEDIATE | 38264-213 | — | 1 |
| 18 | ★ IMPELLER SHIM SET | 48261-032 | — | 1 |
| 19 | ★ IMPELLER O-RING | 25152-010 | — | 1 |
| 20 | HEX HEAD CAPSCREW | B-0405 | 17000 | 10 |
| 21 | HEX NUT W/FLANGE | 21765-310 | — | 10 |
| 22 | ROUND HEAD MACHINE SCREW | X-0403-S | 17000 | 1 |
| 23 | ★ VANE PLATE | 38632-507 | — | 1 |
| 24 | ★ VANE PLATE O-RING | 25152-134 | — | 1 |
| 25 | VOLUTE DRAIN PLUG | 26471-003 | — | 1 |
| 26 | ★ FLOW GUIDE O-RING | 25152-155 | — | 1 |
| 27 | FLOW GUIDE | 38354-018 | — | 1 |
| 28 | SELF-TAPPING SCREW | 21287-584 | — | 2 |
| 29 | NAME PLATE | 38812-031 | — | 1 |
| 30 | WARNING TAG | 38816-091 | — | 1 |
| NOT SHOWN: | | | | |
| | STRAINER | 11194-A | 19220 | 1 |

★ INDICATES PARTS RECOMMENDED FOR STOCK

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

CANADIAN SERIAL NO. AND UP

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

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

Pump and Seal Disassembly

Remove the spark plug to ensure that the pump will remain inoperative while it is being serviced. Remove the volute drain plug (25) to drain the pump. Clean and reinstall the plug after the pump has been drained.

The pump end cannot be separated from the engine unless the impeller has been removed.

For access to the impeller (2), disengage the hex head capscrews (20) and hex nuts (21) and the self-tapping screws (6) securing the pump housing (1) to the intermediate (17).

The flow guide (27) rarely requires removal or replacement, but if it is necessary to remove it, disengage the self-tapping screws (28).

Remove the vane plate (23) from the integral plastic pins on the intermediate.

To remove the impeller, disengage the round head machine screw (22), and slip the impeller off the engine shaft; retain the impeller key (4).

Remove the impeller shim set (18); for ease of reassembly, tag and tie the shims.

To remove the seal assembly (3), remove the rotating seat and element from the impeller cavity. Using a stiff wire with a hooked end if necessary, remove the retainer and the remainder of the seal components from the intermediate as a unit. If the intermediate is removed, the seal components can be pressed out from the rear.

To remove the intermediate, disengage the machine screws (7) securing it to the engine (10).

To remove the engine from the base (16), disengage the hex nuts and capscrews (12 and 14) securing the engine and base.

Seal and Pump Reassembly

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

WARNING

Most cleaning solvents are toxic and flammable. Use them only in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

The seal is not normally reused because of the high polish on its lapped faces, but if it is necessary to reuse the old seal, clean all metallic parts. 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 components.

If the intermediate has been removed from the engine, the seal retainer and the components it holds should be installed in the intermediate before the intermediate is secured to the engine. Place a drop of light lubricating oil on the lapped faces of the seal; **never use grease on these faces**. Press the seal retainer and its components into the intermediate. Inspect the impeller, and replace it if cracked or worn. Install the seal rotating seat and rotating element in the impeller cavity. Use care when installing the rotating element; never use a sharp object to seat the element.

See figure 2 for the proper installation of seal components.

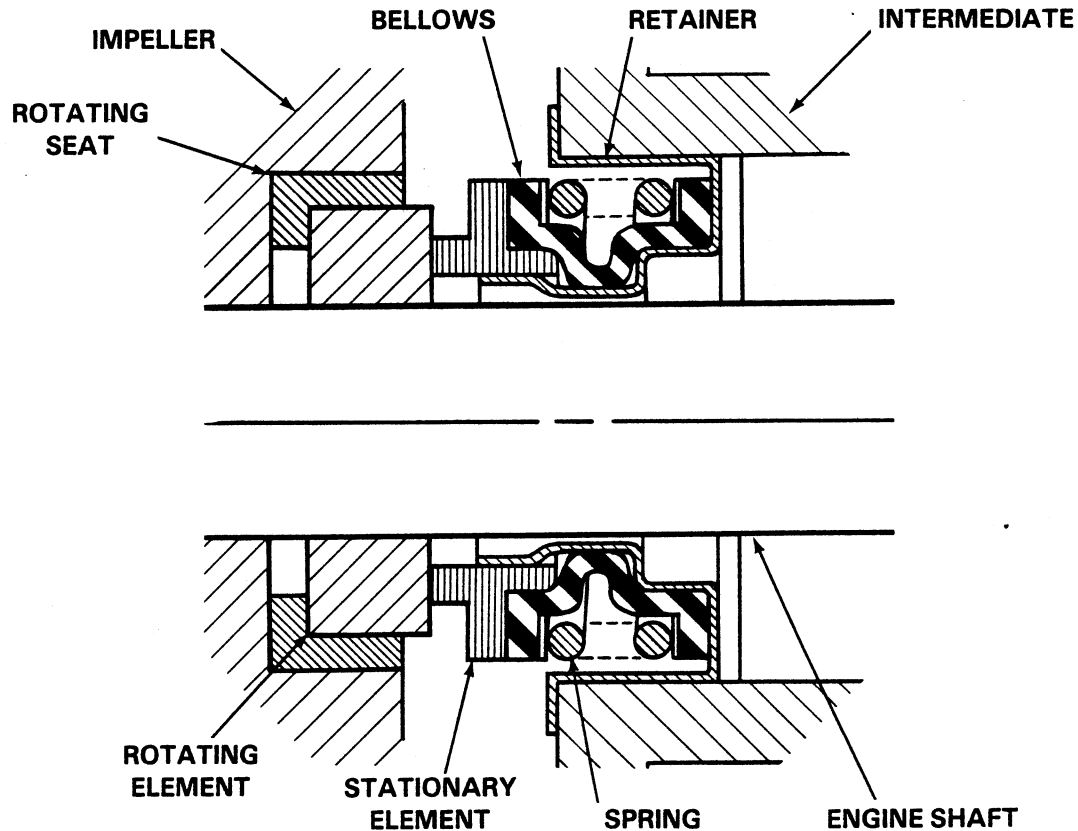


Figure 2. 25271-411 Seal Assembly

CAUTION

Be sure to follow all torque recommendations when securing pump hardware. Overtightening could cause threads to strip.

Secure the engine to the base, and the intermediate to the engine, if they have been separated. The intermediate is offset and not concentric to the shaft; be sure to install the intermediate with the drain holes in the neck of the engine mounting flange down. Torque the machine screws securing the intermediate to the engine to 50-60 inch-pounds.

Lightly grease and install the impeller shim set. Replace the impeller O-ring (19). Rotate the shaft until the impeller keyway is in the down position. Install the impeller key in the impeller, and slide the impeller onto the shaft, taking care not to damage the rotating seal element. Torque the machine screw securing the impeller to the shaft to 15-20 inch-pounds.

Position the vane plate on the integral plastic pins on the intermediate. The vane plate will seat properly in only one position; **do not try to force the vane plate on the plastic pins**. Replace the vane plate O-rings (5 and 24); lubricate the O-rings with soft grease or oil before installation.

A clearance of .008 to .015 inch between the vane plate and the impeller face is recommended for maximum pump efficiency. Measure this distance, and add or remove shims to arrive at the recommended clearance.

Replace the flow guide O-ring (26), and reinstall the flow guide on the pump housing. Torque the attaching self-tapping screws to 8-10 inch-pounds.

Secure the pump housing and flow guide to the intermediate. Torque the attaching self-tapping screws to 15-20 inch-pounds. Alternate back and forth to tighten the attaching hex head capscrews and nuts evenly around the bolt circle, and torque to 20-25 inch-pounds.

Make certain that the pump is securely mounted, fill the volute with liquid, and make certain that all piping connections are tight before starting the pump.

LUBRICATION**Seal Assembly**

The seal assembly is lubricated by the medium being pumped.

Engine

Follow the engine manufacturer's recommendations for engine lubrication.

**For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419-755-1280
International: +1-419-755-1352**

**For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519-631-2870**