

INSTALLATION, SERVICE & PARTS MANUAL



**Series: PFSPTAM3
PFSPTAM4
PFSPTAM6**

**Self-Priming
Centrifugal Pumps**

▲ WARNING

Check Seal Chamber and Power Frame for oil levels. Chambers must be filled before start-up. See LUBRICATION section, pages 9 & 11.



Power-Flo Pumps & Systems

a Power-Flo Technologies company

General Safety Information

Before installation, read the following instructions carefully. Failure to follow instruction and Safety information could cause serious bodily injury, death and/or property damage. Each Power-Flo pump is individually factory tested to insure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of trouble-free service.

▲ DANGER "Danger" indicates a hazardous situation which, if not avoided, WILL result in death or serious injury.

▲ WARNING "Warning" indicates a hazardous situation which, if not avoided, MAY result in death or serious injury.

▲ CAUTION "Caution" indicates a hazardous situation which, if not avoided, MAY result in minor or moderate injury.

IMPORTANT - Power-Flo Pumps and Systems is not responsible for losses, injury or death resulting from failure to observe these safety precautions, misuse, abuse or misapplication of pumps or equipment.



ALL RETURNED PRODUCTS MUST BE CLEANED, SANITIZED, OR DECONTAMINATED PRIOR TO SHIPMENT, TO INSURE EMPLOYEES WILL NOT BE EXPOSED TO HEALTH HAZARDS IN HANDLING SAID MATERIAL. ALL APPLICABLE LAWS AND REGULATIONS SHALL APPLY.

▲ WARNING Installation, wiring, and junction connections must be in accordance with the National Electric Code and all applicable state and local codes. Requirements may vary depending on usage and location.

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▲ WARNING Installation and servicing is to be conducted by qualified personnel only.

▲ DANGER Keep clear of suction and discharge openings. **Do not** insert fingers in pump with power connected.

▲ WARNING Always wear eye protection when working on pumps. Do not wear loose clothing that may become entangled in moving parts

▲ DANGER Pump build up heat and pressure during operation. Allow time for pump to cool before handling or servicing.

▲ DANGER Risk of electric shock. To reduce risk of electric shock, always disconnect pump from power source before handling. **Lock out power & tag.**

▲ WARNING Do not use these pumps in water over 160°F. Do not exceed manufactures recommended maximum performance, as this could cause the motor to overheat.

▲ DANGER Operation against a closed discharge valve will cause premature bearing and seal failure. Heat build up on self-priming and end suction pumps may cause dangerous pressures. A high temperature switch or pressure relief valve is recommended to be installed in pump case.

▲ WARNING Carefully read instruction manuals supplied with motor or engine before operating or servicing.

▲ CAUTION Pump speed and operating conditions must be within the performance range.

▲ DANGER **DO NOT** pump hazardous material. These pumps are NOT to be installed in locations classified as hazardous in accordance with the National Electric Code, ANSI/NFPA 70.

▲ CAUTION **DO NOT** run pump backwards. Make shure that rotation is correct before operating pump.

▲ WARNING Use proper lifting equipment with adequate capacity to prevent personnel injuries or equipment damage.

▲ WARNING Before servicing close the suction and discharge valves, vent pump slowly and drain.

▲ CAUTION Never operate these pumps unless there is liquid in the pumps casing. The pump will not prime when dry. Extended operation of a dry pump wiil destroy the seal.

▲ CAUTION If in a climate where the fluid in the casing could freeze, never leave liquid in the pump casing. Drain the casing completely. During winter months and cold weather, the liquid could freeze and damage the pump casing.

WARNING: CANCER AND REPRODUCTIVE HARM- WWW.P65WARNINGS.CA.GOV



IMPORTANT! Prior to installation, record Model Number, MFG Date, and/or serial number, from pump name plate for future reference.

Model:
Serial:
MFG Date:

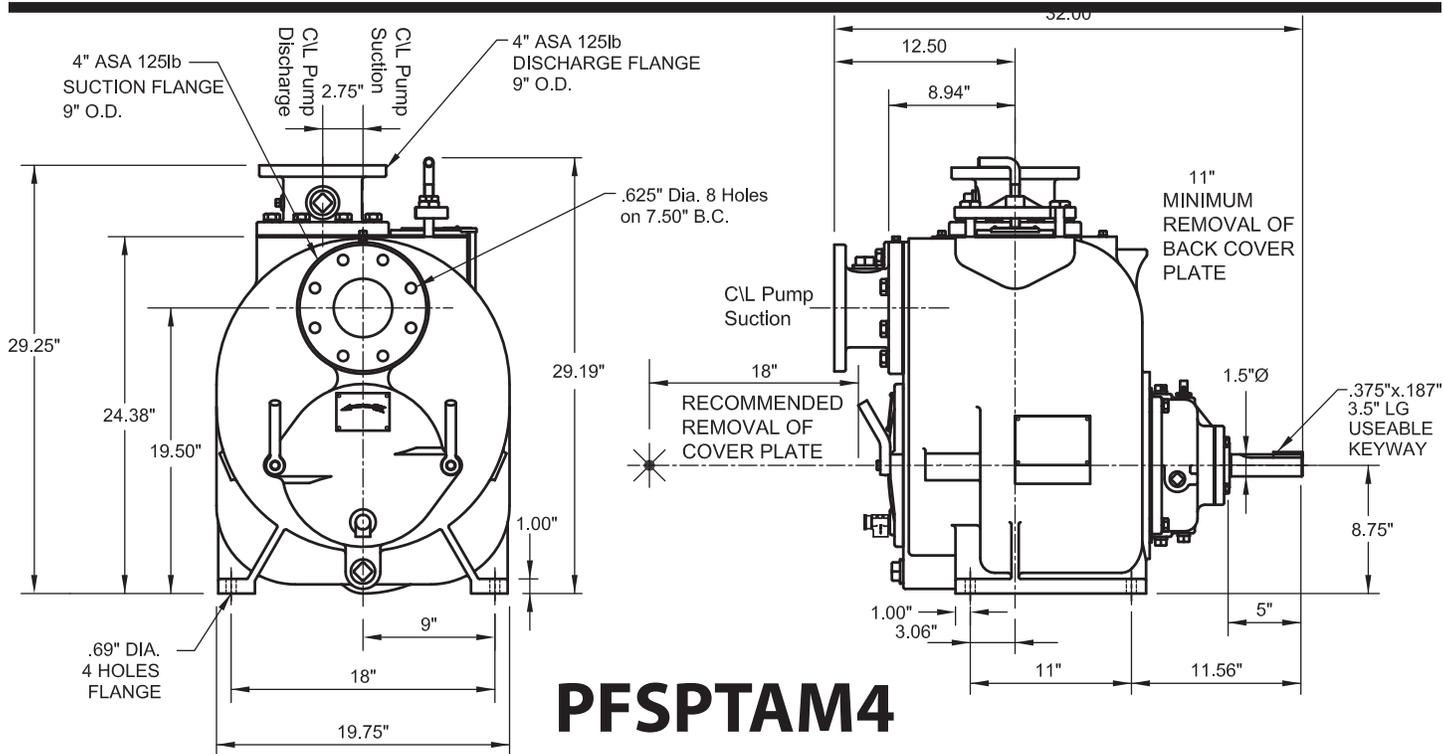
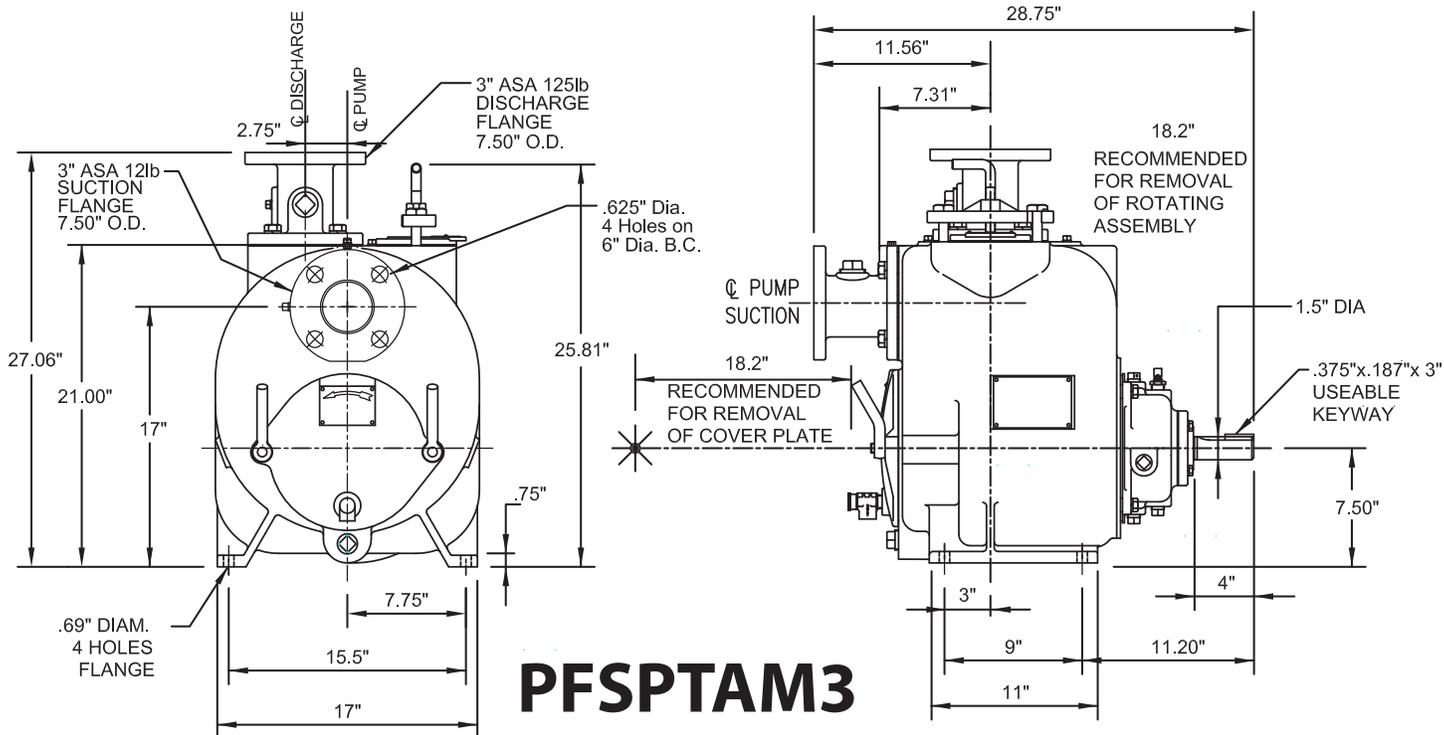
Specifications

	PFSPTAM3	PFSPTAM4	PFSPTAM6
DISCHARGE/SUCTION	3" x 3", 125lbs. Flange	4" x 4", 125lbs. Flange	6" x 6", 125lbs. Flange
SOLIDS	2-1/2"	3"	3"
NET WEIGHT	404 lbs	575 lbs.	802 lbs.
LIQUID TEMPERATURE	160°F		
CASING	Cast Iron ASTM A-48 Class 30 Maximum Operating pressure 86 psi		
IMPELLER	2 Vane semi-open type. <i>Material:</i> Ductile Iron		
STD IMPELLER SIZE	8.75" Dia.	9.75" Dia.	12.38" Dia.
SHAFT	Stainless Steel		
SHAFT SLEEVE	Stainless Steel		
WEAR RING	Carbon Steel, Replaceable		
COVER PLATE	Cast Iron ASTM A-48, Class 30, Removable, Adjustable, Weight 30 lbs.	Cast Iron ASTM A-48, Class 30, Removable, Adjustable, Weight 37 lbs.	
FLAP VALVE	Neoprene with steel reinforcing		
BEARING HOUSING	Cast Iron ASTM A-48, Class 30		
SEAL PLATE	Cast Iron ASTM A-48, Class 30		
BEARING - PUMP END	Open single ball, radial load		
BEARING - DRIVE END	Open double ball, thrust load		
LUBRICATION	Seal Cavity & Bearing - SAE No. 30 non detergent oil or ISO VG1000, pump includes oil level sight gauges		
GASKETS	Buna-N, compressed synthetic fibers, PTFE, vegetable fiber, cork and rubber		
O-RINGS	Buna-N		
HARDWARE	Standard plated steel		
PRESSURE RELIEF VALVE	Brass, 3/4" NPT, Pressure setting 75 PSI		
SEAL	Type 21, mechanical, oil lubricated. <i>Material:</i> Tungsten carbide rotating and stationary faces, fluorocarbon elastomers (Dupont Viton® or equivalent). Stainless steel cage and spring		

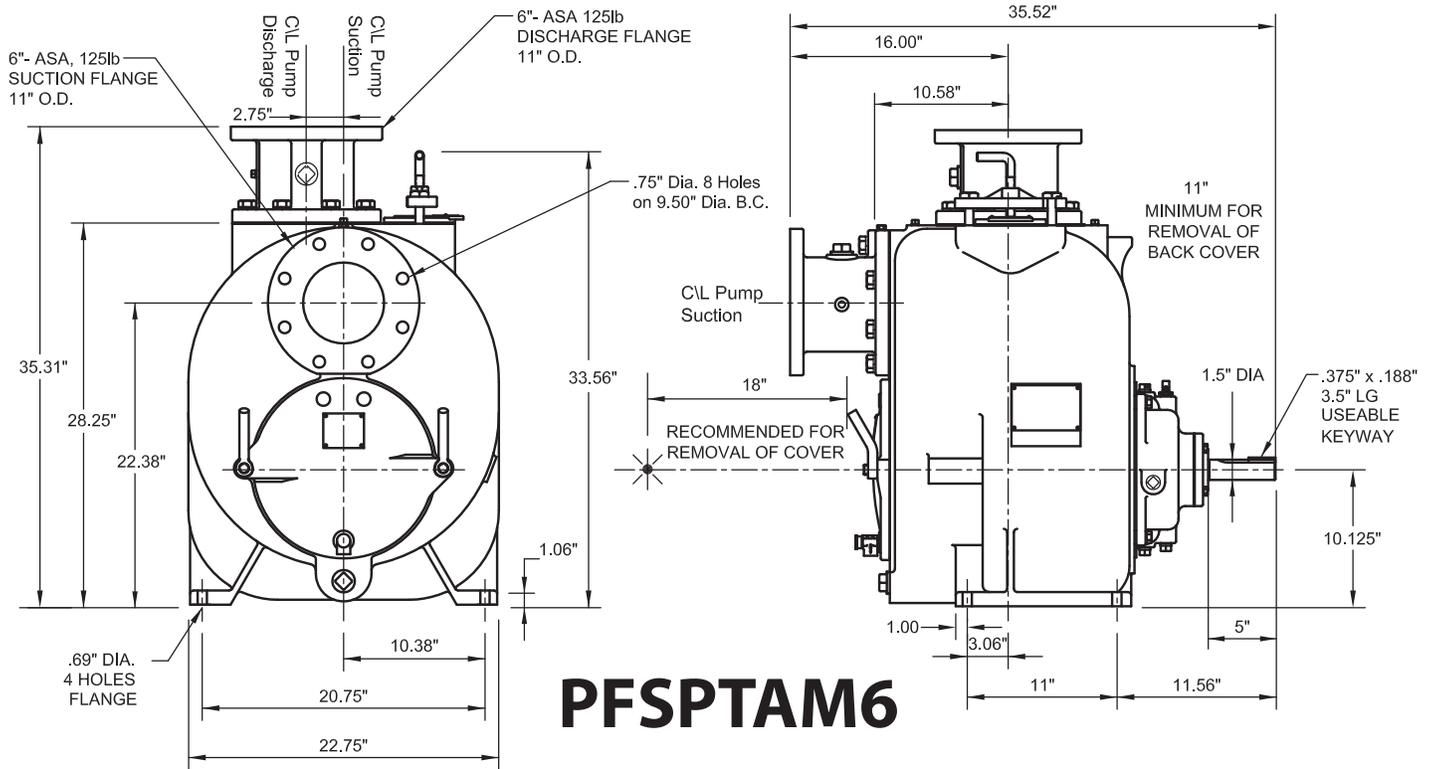
WARNING ! - DO NOT use in explosive atmosphere or for pumping volatile flammable liquids.



Dimensions



Dimensions



Receiving & Installation

RECEIVING INSPECTION

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. If the manual is removed from the packaging, do not lose or misplace.

STORAGE

Short Term - Store in factory crate in a dry atmosphere with constant temperature for up to six (6) months.

Long Term - Any time exceeding six (6) months, but not more than twenty-four (24) months. Store in temperature controlled area, a roofed over walled enclosure that provides protection from the elements and whose temperature can be maintained between +40° F and +120° F. All surfaces should be sprayed with a rust-inhibiting oil.

Any product that is stored for a period longer than six (6) months from the date of purchase should be bench tested prior to installation. A bench test consists of, checking the impeller to assure it is free turning and a run test to assure the motor (and switch if provided) operate properly.

INSTALLATION

These instructions cover general installations requirements of the pump. The pump is designed to handle mild industrial corrosives, mud or slurries containing large entrained solids.

There are two different applications for these pumps, first is **static lift**, which is most common, where the pump is position above the level of liquid to be pumped. The second is a **flooded suction**, where the liquid to the pump is under pressure. Mounting, line configuration and priming will be different for each application. The pressure supplied to the pump is critical to the performance and safety, limit incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve. For PSI multiply TDH in feet by 0.4335.

CLEARANCE

The chart shows the recommended clearance for servicing the pumps.

Pump Size	In Front of Back Cover	Min. Cover removal
3"	18"	11"
4"	18"	11"
6"	18"	11"

FOUNDATION - The pump foundation should be sufficiently substantial to form a level, rigid support for the combined weight of the pump and driver and maintain alignment of the installed unit. Recommended mass of concrete foundation should be three times that of the pump, motor and base. Foundation bolts, of the proper size, should be imbedded in the concrete. A pipe sleeve, about 2½" diameters larger than the bolt, should be used to allow for final positioning of the bolts. See Figure 1.

MOUNTING - Mount pump and driver on a common base plate with coupling, must be aligned. Preliminary alignment is necessary after the complete unit has been leveled on the foundation, and again, after the unit is piped, and rechecked periodically as outlined in the following paragraphs. Position unit on foundation and level the base plate, using rectangular metal blocks and shims, or wedges having a small taper as shown in Figure 1.

A gap of 3/4" to 1½" should be allowed between the base plate and foundation for grouting. Adjust the metal supports or wedges until the shafts of the pump and driver are level.

GROUTING

Grouting compensates for unevenness in the foundation and prevents vibration and shifting after mounting is complete. Build a form around the base plate to contain the grout, and sprinkle area with water to obtain a good bond. The base should be completely filled with a good quality, non-shrinking grout. The usual mixture for grouting is one part Portland cement and two parts sand with sufficient water to flow freely. It is also desirable to grout the leveling pieces, shims or wedges in place. Foundation bolts should be fully tightened when grout has hardened, usually about 48 hours after pouring.

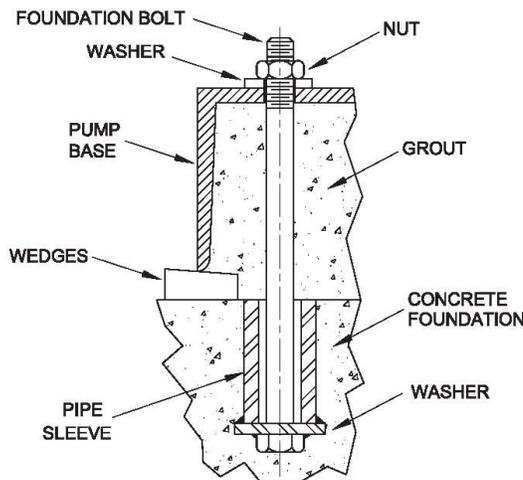


Figure 1

Installation

PIPING

The pump suction and discharge connections are not intended to indicate the required suction and discharge pipe sizes. The pipe diameter must be selected according to the requirements of the pumping system and recommended friction losses for the liquid being pumped.

Usually, it is advisable to increase the size of both the suction and discharge pipes at the pump nozzles to have minimum acceptable friction loss, suction pipe should never be smaller in diameter than the pump suction nozzle. When suction pipe is of larger diameter than the pump suction nozzle, an eccentric reducer is required to eliminate possible air or vapor pockets at the pump suction inlet.

Both suction and discharge pipes must be supported independently near the pump, so that when piping is connected to the pump, no strain will be transmitted to the pump. Piping should be arranged with as few bends as possible, and, preferably, with long radius elbow whenever possible.

MATERIAL

Either pipe or hose may be used, however, the material must be compatible with the liquid being pumped. If hose is used in suction lines, it must be rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is **NOT** recommended.

SUCTION PIPING

A horizontal suction line must have a gradual rise to the pump. Any high point in the suction pipe can become filled with air and prevent proper operation of the pump and may cause loss of prime. The pipe and fittings must be free of all air leaks.

Maximum performance is obtained when suction line and pump size are matched. The velocities of 8 to 11 feet per second are obtained when the suction line is sized to the pump suction. This tends to keep solids in suspension and suction line cleaner.

The use of oversized suction line will increase priming time and could cause clogging at the reducers.

SUCTION LINE IN SUMP

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 1-1/2 times the diameter of the suction line.

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 1-1/2 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 they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

GAUGES

Pumps are usually drilled and tapped for discharge pressure and vacuum suction gauges. If gauges are required and pumps are not tapped, drill and tap the discharge and suction lines not less than 18 inches from the discharge and suction ports and install in the lines. Do not mount any closer as this may cause inaccurate readings.

STRAINER

If a strainer is used, make sure the total area of the openings in the strainer is at least three to four times the cross section of the suction line, the openings should not permit passage of solids larger than the solids handling capability of the pump.

PFSPTM3	1-3/4" Solids
PFSPTM4 & 6	3" Solids

DISCHARGE PIPING

On the 3" model a 3/4" air bleed line should be used in order to reduce the priming time to a minimum. This is mandatory on force main installations.

An air-bleed valve (by others) may be placed in this line, but not necessary. A clear plastic line is excellent, allowing the operator to detect any clogging. There are two ways of returning the air-bleed line to the pit. 1.) A line discharging above the liquid level. This condition is most accepted, but has the disadvantage of losing its prime if the suction check valve is held open by debris. This is generally not a problem if pump is ran at 1600 rpm or higher. 2.) A line discharging below the liquid level. This condition works best at slower speeds where considerable debris is encountered. However, the pipe should not project more than one foot below the low liquid level. The pump will not lose prime, if there are no leaks in the systems.

⚠ CAUTION *The air-bleed line that is returned to the pit MUST be secured against being drawn into the pump suction inlet.*

The air bleed return line to the pit must be separated from the suction pipe as far as possible in order to eliminate churning air into the sump liquid.

⚠ DANGER *DO NOT leave manual shut off valve (if installed in air bleed line), closed during operation. A closed valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing.*



Installation

Standard designs require the installation of a check valve and a gate valve. The check valve should be installed in the horizontal position to avoid deposits between the disc and the body and should have a spring loaded arm or an externally weighted arm. The gate valve is used when cleaning or repairing the check valve and should be down stream from the check valve.

ALIGNMENT

For a trouble free operation, the alignment of the pump and power source is critical. The driver and pump shafts, of either a flex coupled or v-belt driven system, must be aligned with and parallel to each other. Check pump and piping after installed and before operation.

FLEX-COUPLED

Check the coupling faces, as well as the suction and discharge flanges of the pump for horizontal or vertical position by means of a level. Correct the positions, if necessary, by adjusting the supports or wedges under the base plate, as required.

NOTE: A flexible coupling should not be used to compensate for misalignment of the pump and driver shafts. The purpose of the flexible coupling is to compensate for temperature changes and to permit end movement of the shafts without interference with each other, while transmitting power from the driver to the pump.

⚠ DANGER *Remove and lock out power to driver.*



FIELD ALIGNMENT

The faces of the coupling halves should be spaced far enough apart so that they cannot strike each other when the driver rotor is moved toward the pump. The necessary tools for checking the alignment of a flexible coupling are a straight edge and a taper gauge or a set of feeler gauges.

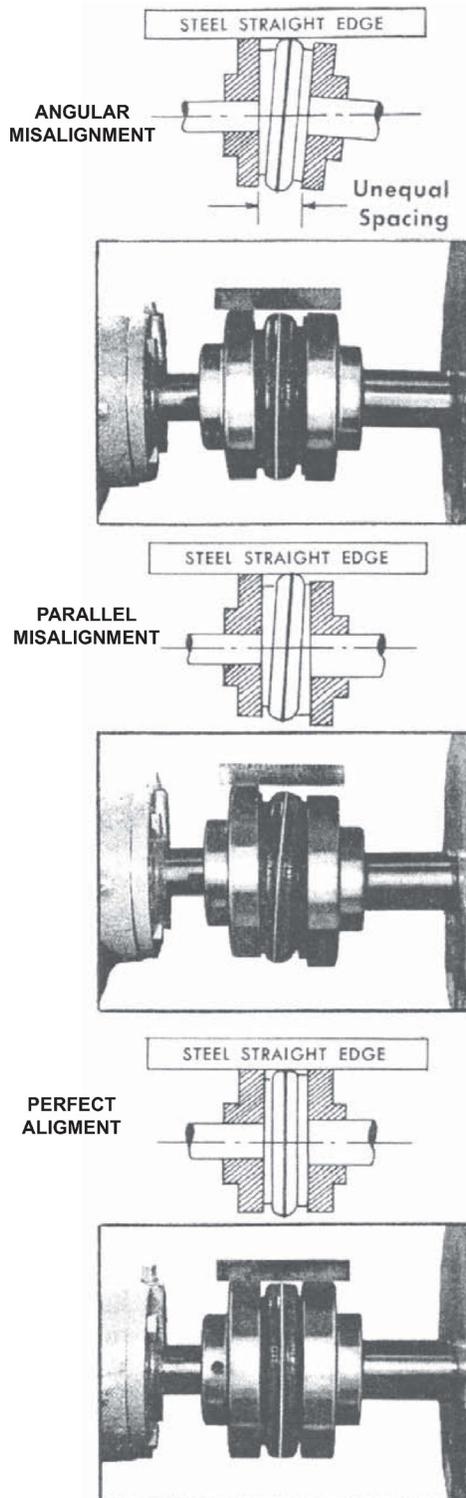


Figure 2a

NOTE: In most cases where extreme accuracy is necessary, a dial indicator or laser alignment tool may be required to align coupling.

Angular alignment check is made by inserting a taper gauge or feelers between the coupling faces at 90-degree intervals around the coupling. The unit will be in angular alignment when the coupling faces are exactly the same distance apart at all points. (See Figure 2a).

Parallel alignment check is made by placing a straight edge across both coupling rims at the top, bottom and at both sides. The unit will be in parallel alignment when the straight edge rests evenly on the coupling rim at all positions. Allowance may be necessary for temperature changes and for coupling halves that are not of the same outside diameter. Care must be taken to have the straight edge parallel to the axis of the shafts. Correction for Angular and Parallel Misalignment is made by adjusting the shims under the driver. After each change, it is necessary to recheck the alignment of the coupling halves, as adjustment in one direction may disturb adjustments already made in another direction.

The permissible amount of coupling misalignment will vary with the type of pump and driver, but should be limited to approximately .002 inches per inch of shaft diameter when final adjustment is made.

When the units are lined up cold, it is necessary to make allowance for the vertical rise of the driver caused by heating when in operation. When the preliminary alignment has been completed the foundation, bolts should be tightened evenly, but not too firmly.

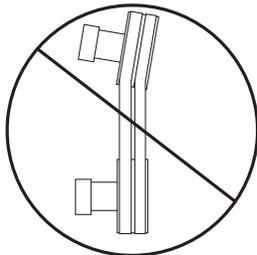
⚠ DANGER *Coupling or belt guards must be used to avoid serious injury to operating personnel.*

Installation & Pre-Operation

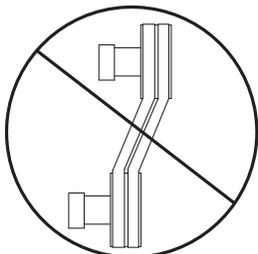
V-BELT DRIVEN

Be sure the pulleys are properly aligned and the power source and pump are parallel. If the drive system uses multiple belt, make sure they are of a matched set.

Belts must be adjusted in accordance with the belt manufactures instructions. If belts are too loose, slippage will occur. If belts are too tight, there will be excessive power loss and possible bearing failure. Belts and pulleys should be properly selected for the desired conditions.



SHAFTS NOT PARALLEL



SHAFTS NOT IN LINE



SHAFTS PARALLEL AND SHEAVES IN LINE

Figure 2b

BELT TENSIONING

New belt drives should be checked after 5, 20 and 50 hours of operation and re-tension as required. Then check and re-tension monthly or at least in 500 hour intervals.

The ideal belt tension is the lowest tension at which the belt will not slip under peak load. **DO NOT** over-tension belts, as this will shorten belt life as well as bearing life. Under-tensioning will cause belt slippage. Belt slippage can be caused by dirt, grease, oil and other foreign materials.

WIRING

For electric motor drives, connect power supply to conform with national and local codes. Line voltage and wire capacity must match the ratings stamped on the motor nameplate.

ROTATION

Before starting the pump, check the required direction of rotation of the pump. The proper direction is indicated by a direction arrow on the pump casing. Separate the coupling halves, then start motor to see that it rotates in the direction required by the pump.

If it does not, reverse any two main leads of the 3-phase wiring to the motor. The coupling halves can be reconnected and the pump primed for starting.

Pre-Operation

The following important items should be checked as pump is started and placed in operation.

- a. Pump and driver securely bolted
- b. Coupling or belts properly aligned
- c. Piping completed.
- d. Correct pump rotation.
- e. Pump shaft turns freely
- f. Discharge valve closed
- g. Suction valve open (if used)
- h. Guard installed and not rubbing
- i. Pump fully primed
- j. **Seal and frame properly lubricated**
- k. **Impeller to wear plate clearance checked**

▲ WARNING *Failure to adjust running clearances prior to pump operation can/will cause decreases in pump performances and could cause unit to not properly prime.*

Only after these items have been checked should the pump be started.

LUBRICATION

Check the eyeglass (68.7) on side of bearing housing (6) for proper amount of S.A.E. No. 30 non-detergent oil.

▲ WARNING *Seal Chamber is shipped with No oil and must be filled before start-up.*

Failure to ensure that the seal chamber is properly filled with oil will cause severe damage to the mechanical seal and could cause power frame failure. The seal chamber must be filled with oil to the top of the fill port.

▲ WARNING *Power Frame is shipped with no oil and must be filled before start-up.*

Failure to ensure that the power frame is properly filled with oil will cause severe damage to the bearing assembly and will cause power frame failure. The power frame must be filled with oil to the center of the oil sight glass located on the side of power frame.

PRIMING

Before starting the pump, the casing and suction line must be filled with liquid through fill cover (23), and air-vented through the vent pipe plugs. The pump must not be run until it is completely filled with liquid, because of danger of injuring some of the parts of the pump which depend upon liquid for lubrication. The discharge gate vane should be closed during priming. Be sure the mechanical seal and power frame are supplied with the proper lubrication.



Installation & Operation

CAUTION *Never operate pump unless there is liquid in the pump casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal.*

PRIMING BY SUCTION PRESSURE

When operating with suction pressure (flooded suction), remove the pipe plug at the top of the casing and when pump is filled with liquid, replace plug.

PRIMING WITH FOOT VALVE AND STRAINER

A foot valve and strainer may be installed on the lower end of the suction pipe to keep pump filled with liquid. Incorporate filler pipe in discharge pipe between pump and check valve. Remove pipe plug at top of casing, then fill suction pipe and pump with liquid. When pump is full of liquid, replace plug and close filler pipe.

CAUTION: When a foot valve and strainer are installed on the suction pipe, a spring loaded type check valve **MUST** be installed next to the pump in the discharge piping to prevent pump rupture from water hammer shock.

Priming by means of primer pump or ejector, attached to the pump, will also remove air from suction pipe and pump casing. When pump is filled with liquid, start motor and slowly open discharge gate valve.

STARTING THE PUMP

Consult the operating manual for the power source before starting the power source.

On initial start up, the gate valve in the discharge piping should be closed and slowly opened after pump is up to speed and pressure developed.

WARNING *DO NOT operate pump for any appreciable length of time against a closed discharge valve, as this may heat trapped liquid excessively and damage the pump or seal.*

OVERHEATING

The operating temperature of these pump is 160°F Max. Do Not operate above this temperature. Closed valves in the suction and discharge line can cause the overheating.

DANGER *Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode.*



DANGER

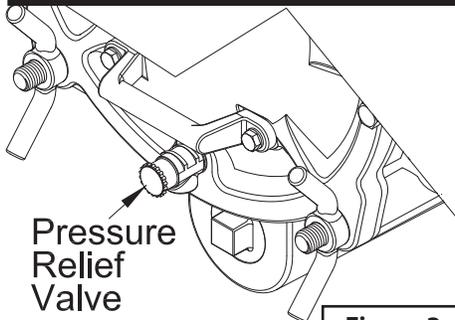


Figure 3

The pump is equipped with a pressure relief valve to safeguard against rupture or explosion due to heat. The valve will open if casing vapor pressure reaches a critical point.

DANGER *Stop the pump if overheating occurs, and allow to cool before servicing. DO NOT remove any covers, plates, gauges, fittings or pressure relief valve from the pump. Liquid within the pump can reach boiling temperatures and pressure in the pump can cause ejection of parts and liquid. AFTER the pump cools the pump can be drained and serviced.*

BEARING TEMPERATURE

Normally bearings run at higher than ambient temperatures because of heat generated by friction. Normal bearing temperatures up to 160°F and can operate up to 180°F safely.

Check bearing temperatures with a contact-type thermometer against the housing. Record this temperature for future use. A sudden bearing temperature increase is a warning that the bearings are at the point of failing to operate properly. Check lubricant for proper viscosity at correct level. Shaft misalignment can cause overheating.

STRAINER CHECK

If a strainer is installed, be sure to check and clean regularly or when the pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings to detect strainer blockage.

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or equipment damage. If back flushing is necessary, liquid pressure must be limited to 50% of the maximum permissible operating pressure shown on the performance curve.

PUMP VACUUM CHECK

With pump inoperative, install a vacuum gauge in the system. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches or more of mercury.

Open the suction line and read the vacuum gauge with the pump primed and operation speed. Shut off pump, the vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If reading falls rapidly after stabilization, an air leak exists. Check the vacuum gauge installation before checking for the source of the leak.

STOPPING THE PUMP

Never stop the flow suddenly. If the pumped liquid is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly. Reduce the throttle speed slowly on engine driven pumps and allow the engine to briefly idle before stopping.



Preventative Maintenance

If the application involves a high discharge head, gradually close the discharge-throttling valve before stopping the pump. Lock out and disconnect the power source after stopping the pump.

⚠ DANGER Do not operate the pump against a closed discharge-throttling valve for long periods of time. Components could deteriorate, liquid could come to a boil and build pressure, causing pump casing to rupture or explode.

COLD WEATHER PRESERVATION

Drain the pump to prevent freezing and flush out any solids with a hose. Operate the pump for approximately one minute to remove any remaining liquid.

PREVENTATIVE MAINTENANCE

The following is a general recommendation for preventative maintenance. Regardless of the application, following a routine preventive maintenance program will help assure trouble-free performance and long life from your pump.

A first inspection of parts for NEW applications should be approx. 250 hours. This will give you some insight of the wear rate for your application.

On A Daily Bases:

Check the general conditions, such as Temperature, Vibrations, Unusual noises, cracks, leaks, loose hardware, etc.

Check pump performance and record gauge readings (if equipped), speed and flow. Changes in gauge readings can indicate problems that can be corrected before damage or failure occurs.

On A Weekly Bases:

Check Bearing and Mechanical Seal lubrication.

On A Monthly Bases:

Check V-Belts or coupling.

Every Six Months:

Check Front Impeller/Wear plate clearance.

Check Rear Impeller/Seal Plate clearance

Once A Year:

Inspect and clean the Check Valve Assembly. Check the valve flapper (14) that it may be torn or deteriorated with use. Deposits may also build up between the rubber and the seat.

Check pump and driver alignment.

Check to see if there is any shaft deflection.

Check Bearings and Bearing Housing.

Replace bearing lubrication

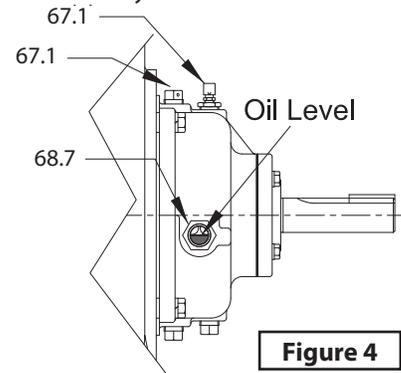
If the impeller (03) is removed for any reason and the mechanical seal is in good condition, **DO NOT** disturb the seal as this will cause the seal to leak and require replacing.

If the mechanical seal (25) ever needs replacing, check the following parts for wear or deterioration; casing (1), seal plate (19), impeller (3), shaft (7).

LUBRICATION

Bearings - On the side of the pedestal check the oil level through the sight glass (68.7). The level should be up to the center of the sight glass. In order for both bearings to be lubricated properly, the pump must be level. If the oil is low, remove plug (67.1) and add **non-detergent** oil. The oil must be free of water, sediment, resin, soaps, acid and fillers of any kind. It should contain rust and oxidation inhibitors. The proper oil viscosity is determined by the bearing housing operating temperature.

Inspect and clean if required vent plug before replacing it on pedestal. It is recommended that this oil be changed at least once a year.



Seal cavity - Oil level should be just below the vent plug (67.1) hole. If low add **non-detergent** oil. Inspect and clean if required before replacing it on pedestal. It is recommended that this oil be changed at least once a year

Recommended Lubricants:

Mineral oil	Quality mineral oil with rust and oxidation inhibitors. Mobil DTE Heavy/Medium ISO VG 68 or equivalent
Synthetic	Royal Purple SynFilm 68, Conoco SYNCON 68 or equivalent. Some synthetic lubricants require Viton o-rings.

Oil Viscosity Grades:

Maximum Oil Temperature	ISO Viscosity Grade	Minimum Viscosity Index
Up to 160°F	46	95
160-175°F	68	95
175-200°F	100	95

Lubrication Intervals:

Lubricant	Under 160°F	160-175°F	175-200°F
Mineral Oil	6 mo	3 mo	1.5 mo
Synthetic Oil	12 mo	12 mo	12 mo



Service & Repair

Service and Repair - Disassembly

The following is for the pump end only, for power source repair, see manual supplied with the power source. Many repairs can be done by draining the pump and removing the back cover. The piping and power source must be disconnected if major repairs are needed.

Before servicing pump, please observe the following:



⚠ DANGER Disconnect or lock out the power source to ensure the pump will remain inoperative.

Allow pump to cool before opening or removing any covers, plates or plugs.

Close all valves in suction & discharge lines and slowly vent pump.

Drain the pump.

Use appropriate lifting equipment to prevent personnel injuries or damage to equipment.

See Figure 8 for the following.

Cleanliness

One of the major causes of pump failure is the presence of contaminants in the bearing housing. This contamination can be in the form of moisture, dust, dirt and other solid particulates such as metal chips. Contamination can also be harmful to the mechanical seal as well as other parts of the pump. It is very important that proper cleanliness be maintained.

Periodically send drained oil for analysis and if contaminated, determine the cause and correct it.

Back Cover and Wear Plate

Remove pump casing drain plug (16) and drain the pump. Clean and reinstall the drain plug. Remove the hand nuts (53.2) and pull the back cover and wear plate assembly from pump casing (1).

Inspect the wear plate (02), and replace if worn. Remove lockwasher (57.3) and hex nut (57.2) to remove wear plate (02). Inspect back cover o-rings (27) and replace if damaged.

Suction Check Valve

To service or replace check valve assembly (14.1), remove pin and reach through the back cover opening and pull complete assembly from suction flange (10). Check valve is available as a repair part and not sold as individual parts.

Rotating Assembly

Remove power source to provide clearance for rotating assembly. Suction and discharge piping does not need to be removed.

Remove the cavity drain plug (68.2) and drain the seal lubricant. Clean and reinstall the seal cavity drain plug (68.2). Loosen impeller (3) while rotating assembly is still in the pump casing.

Wedge a block of wood between the vanes of the impeller and the pump casing and then remove socket head screw (33) and washer (66).

On the drive end of shaft (7) place a lathe dog with the "V" notch positioned over the shaft keyway.

With the impeller (7) blocked use a long piece of bar stock to pry against the arm of the lathe dog in a counterclockwise direction (while facing the drive end of pump). Do not damage the shaft or keyway. Once impeller breaks loose, remove wood block and lathe dog. (See Figure 5).



IMPORTANT! - Do not remove impeller until rotating assembly has been removed from pump casing.

(See Figures 8).

Remove capscrews (45.2) and washers (45.1) from casing. Pull rotating assembly away from the pump casing. Take note of the number of turns on the screw sets for reassembly.

Rotating Assembly Tool

An assembly tool may be constructed using 1/2 NPT steel or malleable iron, Tee, qty. 2 pieces approx. 6" long and one piece approx. 14" long (See Figure 6).

Remove air vent (67.1) from bearing housing (6) and screw the 14" long piece into the air vent hole. Assemble the Tee onto the pipe and the two 6" pieces into the Tee. Remove bearing housing o-ring (43).

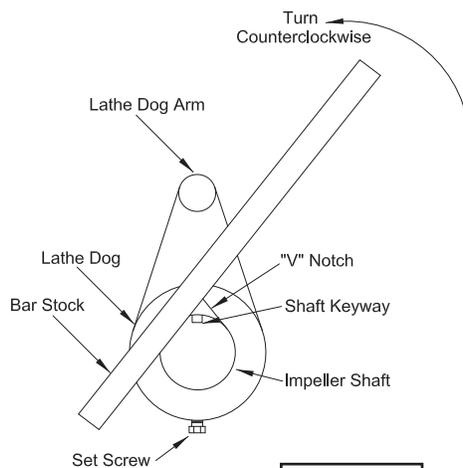


Figure 5

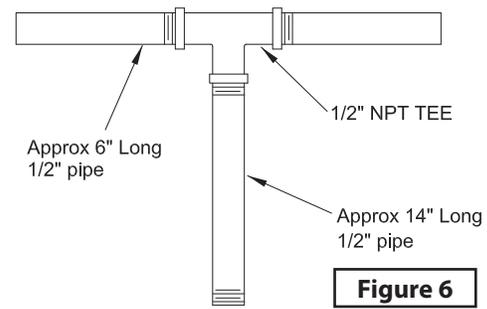


Figure 6

Service & Repair

Impeller Removal

Unscrew impeller (3) from shaft (7) being careful that the tension on the shaft seal spring will be released as impeller is removed. Inspect and replace impeller if worn or cracked. Note quantity and thickness of shims for reassembly.

⚠ DANGER *Do Not apply heat to the impeller. If liquid is entrapped in the hub, an explosion could occur.*

Seal Removal

Remove seal assembly (25) off of shaft (7) as a unit. To remove stationary, first remove hexnut (45.1) and lockwasher (45.2) from seal plate (19). Position seal plate (19) on a flat surface and using a seal tool or wooden dowel, press stationary out from back side of seal plate. Gasket (43.1) should be replaced.

Go to **"Seal Installation"**, if no further disassembly is required.

Shaft & Bearing Removal

Normally, under proper maintenance, the bearing housing should not require disassembly. Disassemble the shaft and bearings **ONLY** when they show signs of wear or damage.



IMPORTANT! - Field disassembly of shaft and bearings should not be done in the field, but done in the shop by qualified personnel.

Remove drain plug (68.2) from bearing housing (6) and drain the lubricant. Clean and reinstall the drain plug.

Remove capscrew (55) and slide bearing cap (8) and oil seal (71) off of shaft (7). Remove bearing cap gasket (8.2) and press oil seal (71) from bearing cap (8). With a block of wood against the impeller end of shaft (7), tap the shaft with bearings, from the bearing housing (6). Pry or press oil seal (71.2) from bearing housing.

Clean and inspect bearings (58) and (59) without removing from shaft, as not to damage bearings. It is recommended that the bearings be replaced when shaft and bearings are removed.

With a soft cloth soaked in cleaning solvent, clean the bearing housing, shaft and all components **EXCEPT** the bearings. Replace any parts worn or damaged.

⚠ WARNING *Use solvent in well ventilated area free from sparks and flames. Wear the correct protective clothing as solvents may be toxic and flammable.*

Thoroughly clean bearings in fresh solvent and dry with filtered compressed air, then coat with light oil. Keep bearings free of all dirt and foreign material. **DO NOT** spin bearings dry as this may scratch the balls or races and cause premature failure.

Inspect the bearing balls by rotating the bearing checking for roughness or binding. If balls are discolored or rough when rotated, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the bearing housing. If proper fit is not achieved, replace the bearings, shaft or bearing housing. If bearing replacement is required, remove snap ring (62) and use a bearing puller to remove the bearings from the shaft.

Shaft & Bearing Reassembly

Inspect shaft for nicks, scratches, distortions or thread damage on the impeller end. Clean up small nicks and burrs with a fine file or emery cloth. Replace shaft if defective.

Position the inboard oil seal (71.2) in the bearing housing bore with the lip positioned toward the threaded end of shaft. Press the oil seal into the housing until the face is flush with the counterbored surface toward the inside of the housing.



IMPORTANT! - The shielded side of bearing (59) must be toward the impeller end of the shaft. The outboard bearing (58) must be positioned with the retaining ring on the O.D. of the bearing toward the drive end of the shaft.

An electric oven, hot oil bath, induction heater or hot plate may be used to heat the bearings for ease of installing onto shaft. Bearings should never be heated with direct flame or directly on a hot plate.

Note: If a hot oil bath is used to heat the bearings, both the oil and container must be absolutely clean. Filter oil thoroughly if it has been previously used.

Heat bearings to a uniform temperature no higher than 250°F and slide the bearings, quickly, one at a time, in one continuous motion to prevent the bearing from cooling and sticking to the shaft, until they are fully seated.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If the bearings have moved, use a suitable sized sleeve and press the bearings into position against the shaft shoulders. A sleeve or an arbor press can be used to install the bearings if heating the bearings is not practical.

Press only on the inner race when installing the bearings onto the shaft. Never press or hit against the outer race, balls or cage. Install snap ring (62) onto shaft to secure the outboard bearing.

Slide the shaft with bearings into the bearing housing by pushing against the bearing's outer race (Never hit the balls or ball cage), until the snap ring on the outboard bearing seats against the bearing housing.



Service & Repair

Press the outboard oil seal (71) into the bearing cap (8) with the lip positioned toward the key end of shaft. Replace the bearing cap gasket (8.2) and secure the bearing cap with capscrew (55). Be careful not to damage the oil seal lip on the shaft keyway. Lubricate the bearing housing as indicated in the "Lubrication" section.

Seal Installation

See Figures 7 & 8.

With a cloth soaked in fresh cleaning solvent, clean the seal cavity and shaft. Inspect and remove any dirt, nicks and burrs in the stationary seat bore in the seal plate (19). The bore must be completely clean before installing the seal.

A new seal assembly should be installed any time the old seal is removed from the pump. Wear patterns on the finished faces cannot be realigned during reassembly. Reusing an old seal could result in premature failure.

Remove the new seal and inspect the precision finished faces to ensure that they are free of any foreign matter. To ease installation of the seal, lubricate the shaft sleeve, bellows and stationary o-ring (25) with water or a small amount of oil, and apply a drop of light lubricating oil on the precision finished faces. If seal plate (19) was removed, install seal plate gasket (43.1) and position seal plate (19) over shaft (7) and secure to bearing housing (6) with hex nut (45.2) and lockwasher (45.1).

To prevent damaging the shaft sleeve o-ring on the shaft threads, stretch the o-ring over a piece of tubing 1-1/4" I.D. x 1-1/2" O.D. x 2" long.

Slide the tube over the shaft threads, then slide the o-ring off the tube and onto the shaft. Remove the tube and continue sliding the o-ring down the shaft until seated against the shaft shoulder.

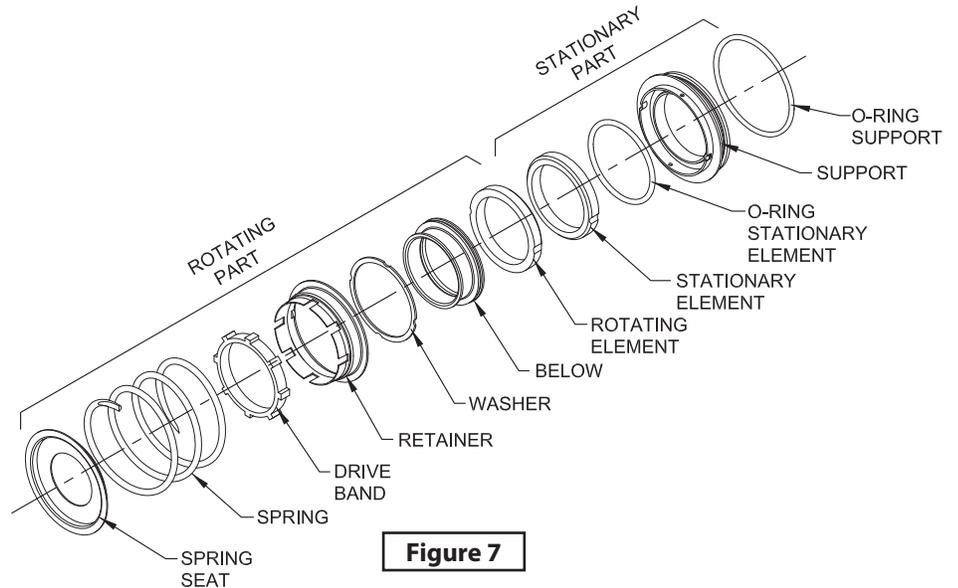


Figure 7

When installing a new cartridge seal assembly, remove the seal from container and remove the mylar storage tabs from between the seal faces.

Subassemble the stationary element into the stationary seat. Lubricate the external stationary seat o-ring with light oil and press the subassembly squarely into the seal plate (19) until the o-ring engages the bore in the seal plate.

Subassemble the rotating element into the retainer and bellows. Slide this subassembly onto the shaft sleeve until the face of the rotating element is just flush with the chamfered end of the sleeve. Slide the assembled seal and sleeve onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until the chamfered end seats firmly against the shaft shoulder. Install the spring and spring seat against the spring.

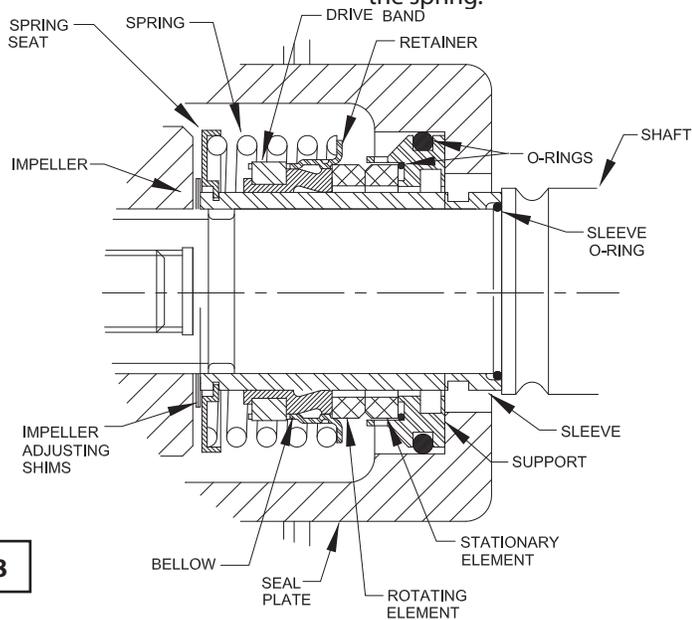


Figure 8

Service & Repair

Impeller Installation

Inspect the impeller and replace if cracked or badly worn. Clean shaft threads and impeller threads before reassembly.

Apply Anti-Seize or equal to the shaft threads and screw the impeller (3) onto the shaft (7) until tight. **DO NOT** force the impeller onto the shaft. Back the impeller off at the first sign of binding. Make sure the shaft and impeller threads are clean and free of dirt. The seal spring should seat over the shoulder on the back side of impeller.

See chart "A" for impeller and seal plate clearance. Measure this clearance and add and remove impeller adjusting shims as needed.

Chart "A" Impeller to Seal Plate Clearance	
PFSTAM3, 4, 6	.025 to .040 inch

This clearance can be measured by reaching through the priming port with a feeler gauge if the rotating assembly has been installed in the pump casing.

Before installing the impeller capscrew and washer, install the Rotating Assembly (See Figure 8). The rotating assembly must be installed in the pump casing before the impeller capscrew can be torqued down.

Install rotating assembly in pump casing (1), coat the threads of capscrew (33) with Anti-Seize or equal and install the impeller washer (66) and capscrew (33). Torque capscrew (33) to 90 ft. lbs.



IMPORTANT! - If the pump has been completely disassembled, reassemble the suction check valve and back cover assembly at this time. The back cover assembly must be in place to adjust the impeller face clearance.

Rotating Assembly Installation

Install the rotating assembly adjusting screw sets. Install the intermediate o-ring (43), and lubricate the o-rings with light grease. Use the installation tool, and carefully ease the rotating assembly into the pump casing. **Do not damage the o-rings.**

Secure the rotating assembly to pump casing (1) with hex nuts. **Do Not** completely tighten until the back cover has been set.

Chart "B" Impeller to Wear Plate Clearance	
PFSTAM3, 4, 6	.012 to .024 inch

See chart "B" for impeller and wear plate clearance. This clearance is accomplished by turning the set screws an equal amount until the impeller scrapes against the wear plate when the shaft is turned. After the impeller scrapes, adjust to approximately .015 inch.

An alternate method of adjusting, is to reach through the suction port with a feeler gauge and measure the gap.

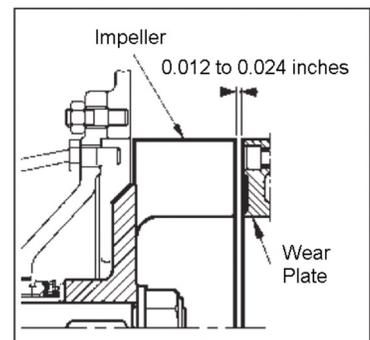
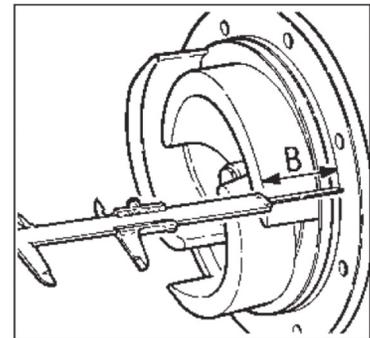
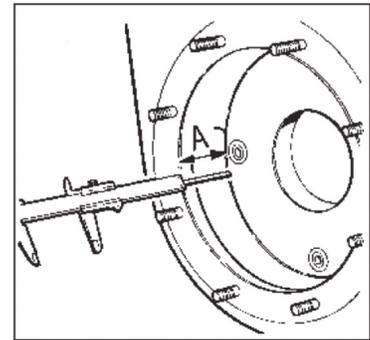
Suction Check Valve Installation

See Figures 8.

Inspect the check valve assembly (14.1), and replace if badly worn.

Reach through the back cover opening with check valve (14.1) and position the adaptor in the mounting slot in the suction flange (10). Align the adaptor with the flange hole, and secure the assembly with the check valve pin.

Note: If the suction or discharge flanges were removed, replace the gaskets by applying Permatex Aviation No 3 Form-A-Gasket or equal to the mating surfaces and secure the flanges with the appropriate hardware.



Back Cover Installation

See Figures 8.

If wear plate (2) was removed, carefully center it on the back cover (26) and secure with lockwasher (57.3) and hex nut (57.2). The wear plate must be concentric to prevent binding when back cover is installed.

Service & Repair

Replace the back cover o-ring (27) and lubricate with No. 2 grease. Clean the contacting surfaces in the pump casing that might interfere or prevent a good seal with the back cover.

Place the back cover assembly into the pump casing, being sure the wear plate does not bind against the impeller.

Apply Anti-Seize or grease on the shoulder of the back cover or any contact surfaces on the pump casing to aid in future disassembly and to reduce rust and build-up of scale.

Tighten the hand nuts (53.2) evenly to secure the back cover assembly. Do Not over-tighten, they should be just tight enough to ensure a good seal at the shoulder of the back cover. Be sure the wear plate does not bind against the casing.

Pressure Relief Valve Maintenance

To provide additional safety for the pump and operator, the back cover is equipped with a pressure relief valve (70).

When ever the pump is overhauled, it is recommended that the pressure relief be replaced. Always use Power-Flo OEM replacement parts. Remove the valve periodically for cleaning and inspection.

To reinstall, apply Teflon pipe sealant or equal to the threads on relief valve. Position the discharge port downward when reinstalled.

Final Assembly

Place key (61) into shaft (7) and reconnect the power source. Install any guards used over rotating members.

⚠ DANGER *Do Not operate pump without guards in place. Exposed rotating parts can cause sever injury to personnel.*

Install the suction and discharge lines and open all valves. All piping connections should be tight and properly supported and secure.

Remove fill cover assembly (23) and fill the pump casing with clean liquid. Reinstall cover and tighten. See Pre-Operation Section for Priming the pump.

Lubrication - Seal Assembly

Before operating the pump, remove vent plug (67.1) and fill the seal cavity with approximately 20 ounces of SAE no. 30 non-detergent oil to just below the vent plug hole. Clean and reinstall the vent plug (67.1).

Lubrication - Bearings

Check the oil level regularly through sight gauge (68.7) and maintain at the middle of the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for air vent (67.1). Do not over-fill, as this can cause overheating of bearings and result in bearing failure. Under normal conditions, drain the bearing housing yearly and refill with approx. 32 oz of clean oil. Change more frequent when operated continuously or in a rapid temperature change environment.

Monitor the bearing oil regularly for rust or moisture condensation especially in areas of variable temperature changes.



Trouble Shooting

LOCATING TROUBLE

To aid in locating problems, it is recommended the following be installed.

- a.) Install a vacuum gauge on the suction side of the pump.
- b.) Install a low-pressure gauge on the discharge side of the pump.

Use a small valve for attaching the gauges and keep them shut off when not in use. If left to flutter with pulsations a vacuum gauge will develop a crack in the internal tube causing it to leak unknowingly and give priming problems. By using the vacuum and pressure gauges, you should be able to locate most problems that will occur. Air leaks on the suction side are the most common problems encountered in self-priming pumps.

It may be necessary to connect a pressure water supply to the drain hole of the pump and hydrostatically test it if all checks fail to identify the location of the leak. Keeping the water pressure low, 5 to 10lbs is ideal. Higher pressures may not show an o-ring leak. If the above shows no leaks, remove bolts from the the suction flange and insert a solid steel backing plate and tighten the flange.

If with the pump running the vacuum gauge reads as much or more than during normal operation, then the problem is most likely in the suction pipe or sump area. Don't overlook the possibility of air entering the suction line, air that could be coming from the air bubbler control pipe (if used).



Allow pump to cool before servicing. DO NOT remove any covers, plates, gauges, relief valve or fittings from the

pump. Liquid within the pump can reach boiling temperatures and pressure in the pump can cause ejection of parts and liquid. AFTER the pump cools, close the suction & discharge valves, vent the pump, then it can be drained and serviced.



Always wear eye protection when working on pumps. Do not wear loose clothing that may become entangled in moving parts



Risk of electric shock. Always disconnect the pump from the power source before handling inspections or repairs.

Symptom	Possible Cause(s)	Corrective Action
Pump will not prime	<ol style="list-style-type: none"> 1. Pump body not filled with water 2. Air leak in suction line 3. Suction check valve clogged or damaged 4. Leaking or worn seal or pump gasket 5. Suction check valve or foot valve clogged or binding 6. Suction lift or discharge head too high 7. Clogged strainer or foot-valve 	<ol style="list-style-type: none"> 1. Fill pump body with water. 2. Repair or replace suction line 3. Clean or replace check valve 4. Check pump vacuum. Replace leaking or worn seal or gasket 5. Clean valve 6. Check piping installation and install bypass line if needed. See INSTALLATION 7. Clean or replace
Pump stops or fails to deliver rated flow or pressure	<ol style="list-style-type: none"> 1. Air leak in suction line 2. Leaking or worn seal or pump gasket 3. Suction intake not submerged at proper level or sump too small 4. Impeller or other wearing parts worn or damaged 5. Clogged strainer or pump 6. Impeller clogged 7. Suction lift or discharge head too high 8. Pump speed too slow 9. Wrong direction of rotation 10. Incorrect impeller diameter 	<ol style="list-style-type: none"> 1. Repaire or replace suction line 2. Check pump vacuum. Replace leaking or worn seal or gasket 3. Check installation and correct submergence as needed 4. Replace worn or damaged parts. Check that impeller is properly centered and rotates freely 5. Unclog or replace 6. Clean impeller of debris 7. Check piping installation and install bypass line if needed. See Installation 8. Check driver output, check belts or coupligs for slippage 9. Correct rotation 10. Check system requirements

Trouble Shooting

Symptom	Possible Cause(s)	Corrective Action
Pump requires too much power	<ol style="list-style-type: none"> 1. Pump speed too high 2. Discharge head too low 3. Liquid specific gravity or viscosity greater than expected 4. Impeller oversized for system requirements 5. Electrical defects 6. Wrong direction of rotation 	<ol style="list-style-type: none"> 1. Check driver output, check that sheaves or couplings are sized correctly 2. Adjust discharge valve 3. Change to higher horse power motor 4. Replace with smaller impeller 5. Check power supply and motor 6. Correct rotation
Pump Clogs Frequently	<ol style="list-style-type: none"> 1. Discharge flow too slow 2. Suction check valve or foot valve clogged or binding 	<ol style="list-style-type: none"> 1. Open discharge valve fully to increase flow rate and run engine at maximum governed speed 2. Clean valve
Excessive noise	<ol style="list-style-type: none"> 1. Cavitation in pump 2. Pumping entrained air 3. Pump, drive or base not securely mounted 4. Impeller clogged or damaged 5. Suction and discharge lines not properly supported 6. Pump and motor misaligned 7. Pump bearings worn 8. Motor bearings worn or fan rubs housing 	<ol style="list-style-type: none"> 1. Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory 2. Locate and eliminate source of air bubble 3. Secure mounting hardware 4. Clean out debris, replace damaged parts 5. Check piping installation for proper support 6. Aline 7. Replace bearings 8. Repaire or replace
Bearings run too hot	<ol style="list-style-type: none"> 1. Bearing temperature is high, but within limits 2. Low or incorrect lubricant 3. Drive misaligned 4. Pump speed too high 5. Bearing(s) frozen 	<ol style="list-style-type: none"> 1. Check bearing temperature regularly to monitor any increase 2. Check for proper type and level of lubricant 3. Align drive properly 4. Reduce speed of power source 5. Disassemble pump and check bearing(s)
Excessive pump vibration	<ol style="list-style-type: none"> 1. Cavitation at pump suction due to insufficient NPSHA 2. Impeller imbalance due to wear or corrosion 3. Pump shaft bent 4. Base plate loose on foundation or insufficient strength to support the load 	<ol style="list-style-type: none"> 1. Alter installation to reduce NPSHR 2. Check for Impeller balance or replace 3. Replace 4. Secure mounting hardware or reinforce
Pump works for a while then quits	<ol style="list-style-type: none"> 1. Obstruction in pump or piping 2. Air or gas in liquid 3. Imcomplete priming 	<ol style="list-style-type: none"> 1. Clean out pump or piping 2. Locate and eliminate source of air bubble 3. Fill pump body with water, See Priming

NOTE: Power-Flo Pumps & Systems assumes no responsibility for damage or injury due to disassembly in the field. Disassembly of the pumps or supplied accessories other than at Power-Flo Pumps & Systems or its authorized service centers, automatically voids warranty.



Repair Parts

For Repair Part Please supply: Model Number and MFG Date as shown on Name Plate, and Part Description and Part Number as shown on Parts List.

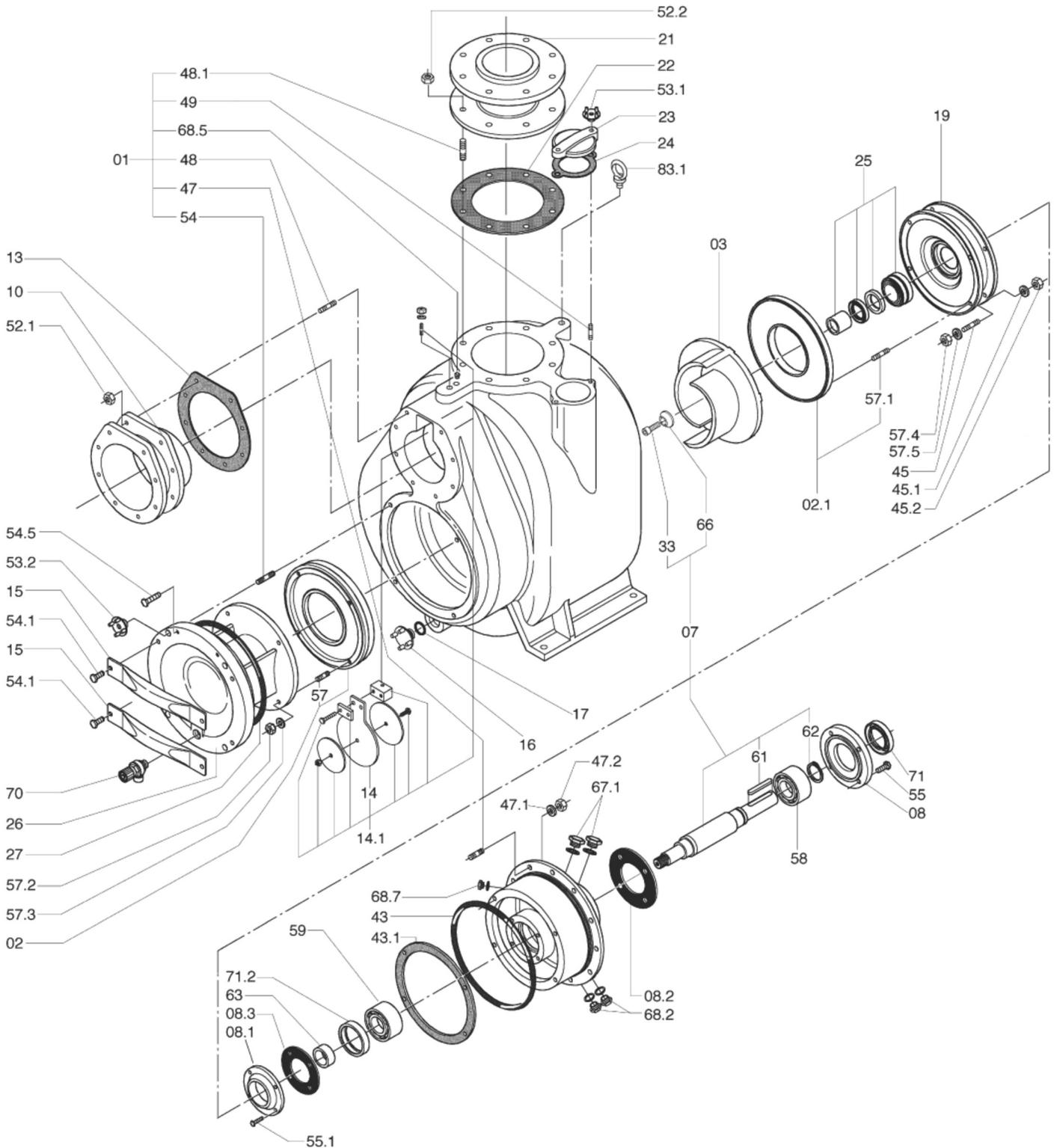


Figure 8

For Repair Part Please supply: Model Number and MFG Date as shown on Name Plate, and Part Description and Part Number as shown on Parts List.

Parts List

Ref. No.	Qty		Name
1	1		Pump Casing
2	1	☆	Wear Plate, Front
2.1	1		Wear Plate, Rear
3	1	☆	Impeller
6	1		Bearing Housing
7	1		Shaft
8	1		Bearing Cover, Rear
8.1	1		Bearing Cover, Front
8.2	1		Gasket, Bearing Cover, Rear
8.3	1		Gasket, Bearing Cover, Front
10	1		Suction Flange
13	1	○	Gasket, Suction Flange
14	1	◆	Flapper, EPDM
14.1	1	◆	Check Valve Assembly
15	1		Handle, Clean-out Cover
16	1		Cover, Drain Plug
17	1	○	Gasket, cover
19	1		Head / Stuff Box
21	1		Discharge Flange
22	1	○	Gasket, Discharge Flange
23	1		Cover, Fill Hole
24	1		Gasket, Fill Hole
25	1	☆	Mechanical Seal Assembly
26	1		Cover, clean-out
27	1	○	O-ring, clean-out
33	1		Impeller Nut
33.1	1		Lockwasher, Impeller
43	1	○	Casing Gasket
43.1	1	○	Gasket, Bearing Housing
45	varies		Screw, Stuff Box - casing
45.1	varies		Nut, Stuff Box - casing
45.2	varies		Washer, Stuff Box to Casing
47	varies		Stud, Brg Hsg - casing
47.1	varies		Washer, Bearing Housing to casing
47.2	varies		Nut, Bearing Housing to casing

Ref. No.	Qty		Name
48	varies		Stud, Suct Flange - casing
48.1	varies		Stud, Discharge Flange - casing
49	varies		Stud, Fill Plug
52	varies		Nut, Bearing Frame
52.1	varies		Nut, Suction Flange
52.2	varies		Nut, Discharge Flange
53.1	varies		Wrench Nut, Fill Plug
53.2	varies		Wrench Nut, Clean-out cover
54	varies		Stud, Clean-out - casing
54.1	varies		Screw, clean-out - handle
54.5	varies		Screw, clean-out - casing
55	varies		Screw, Rear Bearing - Bearing Frame
55.1	varies		Screw, Frame Bearing Cover to Casing
57	varies		Screw, Frame wear plate - casing
57.1	varies		Screw, Rear wear Plate - casing
57.2	varies		Nut, Frame Wear Plate - casing
57.3	varies		Washer, Frame wear plate to casing
57.4	varies		Nut, Rear wear Plate to Stuff box
57.5	varies		Washer, Rear wear Plate to Stuff Box
58	1	■	Ball Bearing, Outboard
59	1	■	Ball Bearing, Inboard
60	1		Key, Impeller
61	1	■	Key, Coupling
62	1		Locknut, outboard Bearing
63	1		Sleeve, shaft
66	1		Washer, Impeller
67.1	2		Plug, Bearing Housing
68.2	1		Plug, Bearing Housing
68.5	1		Plug, casing
68.7	1		Oil Level Indicator
70	1		Pressure Relief Valve, 1/2" Brass, IRV50-100
71	1	■	Lip Seal, Outboard Bearing
71.2	1	■	Lip Seal, inboard Bearing
83.1	1		Eye Hook

☆ = Supplied as individual items.

◆ = Check Valve Kit

○ = Wear Plate Kit

⊕ = Rotating Assembly

■ = Rotating Assembly Repair Parts Kit



Repair Parts

For Repair Part Please supply: Model Number and MFG Date as shown on Name Plate, and Part Description and Part Number as shown on Parts List.

Ref. No.		Name	PFSP TAM3	PFSP TAM4	PFSP TAM6
3	☆	Impeller	PF444-1292-053	PF444-1293-053	PF444-1294-053
25	☆	Mechanical Seal	PF800-0108-886	PF800-0108-886	PF800-0108-886
2	☆	Wear Plate	PF911-1101-087	PF911-1102-087	PF911-1103-087
REPAIR KITS					
◆		Check Valve Kit , Flapper, Pin	PF490-1026-474	PF490-1027-474	PF490-1028-474
○		O-ring/Gasket Kit , Gaskets - 13, 22, 43.1; Ring Gaskets - 27, 43; O-ring 17	PF490-1011-000	PF490-1012-000	PF490-1013-000
⊛		Rotating Assembly	PF702-0097-642	PF702-0098-642	PF702-0099-642
■		Rotating Assy Repair Parts Kit , Bearings - 58, 59; Lip Seals - 71, 71.2; Key - 61	PF975-4202-000	PF975-4203-000	PF75-4204-000

☆ = Supplied as individual items.
 ◆ = Check Valve Kit
 ○ = Wear Plate Kit

⊛ = Rotating Assembly
 ■ = Rotating Assembly Repair Parts Kit



LIMITED WARRANTY

Manufacturer warrants, to the immediate purchaser and subsequent initial owner during the warranty period, every new pump to be free from defects in material and workmanship under normal use and service, when properly used and maintained, for a period of eighteen (18) months from date of manufacture or twelve (12) months from date of installation (which ever comes first). Failure due to wear due to excessive abrasives is not covered. The initial owner is the purchaser who first uses the pump after its initial installation, or for non-permanent installation, the first owner who uses the pump. The date of installation shall be determined by a dated sales receipt noting the model and serial number of the pump. The dated sales receipt must accompany the returned pump. Product will be repaired, replaced or remanufactured at Manufacturer's option. No allowance will be made for shipping charges, damages, labor or other charges that may occur due to product failure, repair or replacement. This warranty does not apply to and there shall be no warranty for any material or product that has been disassembled without prior approval of Manufacturer, subjected to misuse, misapplication, neglect, alteration, accident or act of God; that has not been installed, operated or maintained in accordance with Manufacturer's installation instructions; that has been exposed to outside substances including but not limited to the following: sand, gravel, cement, mud, tar, hydrocarbons, hydrocarbon derivatives (oil, gasoline, solvents, etc.), or other abrasive or corrosive substances, wash towels or feminine sanitary products, etc. in all pumping applications. The warranty set out in the paragraph above is in lieu of all other warranties expressed or implied; and we do not authorize any representative or other person to assume for us any other liability in connection with our products. Contact Manufacturer at: 1-877-24PUMPS or www.powerflo pumps.com Attention Customer Service Department, to obtain any needed repair or replacement of part(s) or additional information pertaining to our warranty.

MANUFACTURER EXPRESSLY DISCLAIMS LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OR BREACH OF EXPRESSED OR IMPLIED WARRANTY; AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY.

Some states do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

