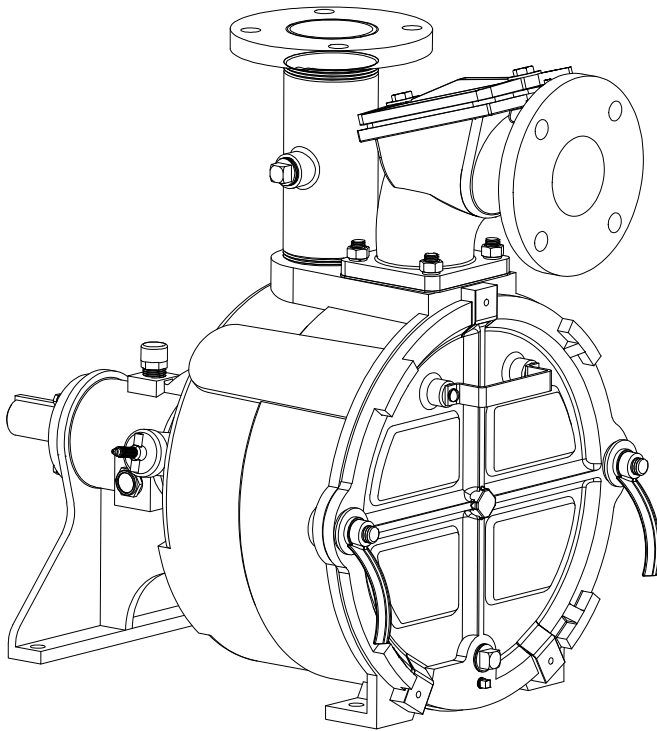
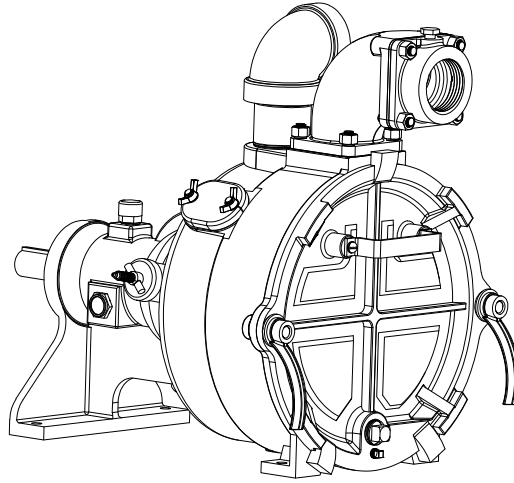


INSTALLATION, SERVICE & PARTS MANUAL



**Series: PFPO2LA6C,
PFPO3LA8D
Self-Priming Centrifugal
Pumps**



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 an imminent hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING "Warning" indicates an imminent hazardous situation which, if not avoided, MAY result in death or serious injury.

⚠ CAUTION "Caution" indicates a potentially 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.

® Power-Flo is a registered trademark of Power-Flo Technologies Inc. Other brand and product names are trademarks or registered trademarks of their respective holders. Alteration Rights Reserved. 11/12, 11/13, 5/16, 7/18, 1/2020, 9/2020, 1/2021

⚠ 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 Pumps build up heat and pressure during operation. Allow time for pumps to cool before handling or servicing.

⚠ DANGER This pump is **not** intended for use in swimming pools or water installations where human contact with pumped fluid.

⚠ 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.

⚠ 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.

⚠ WARNING Pumps constructed with or fitted with bronze/brass may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications.

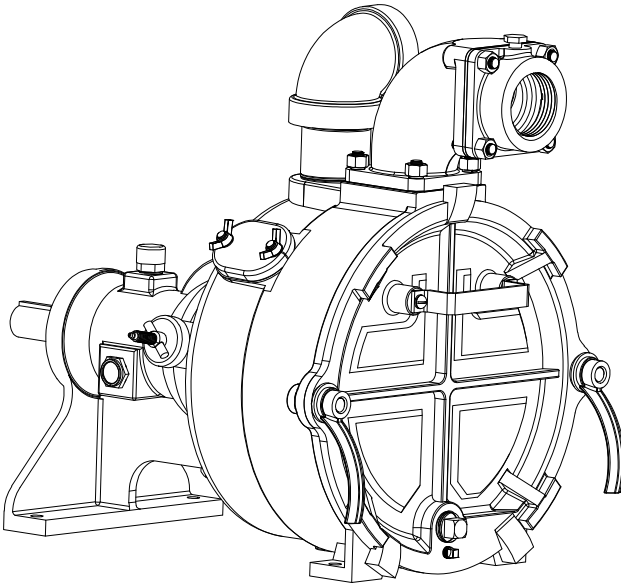
⚠ DANGER **DO NOT** operate pump without safety guards in place over rotating parts. Exposed rotating parts could cause severe injury to personnel.

⚠ 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



Series: PFPO2LA6C

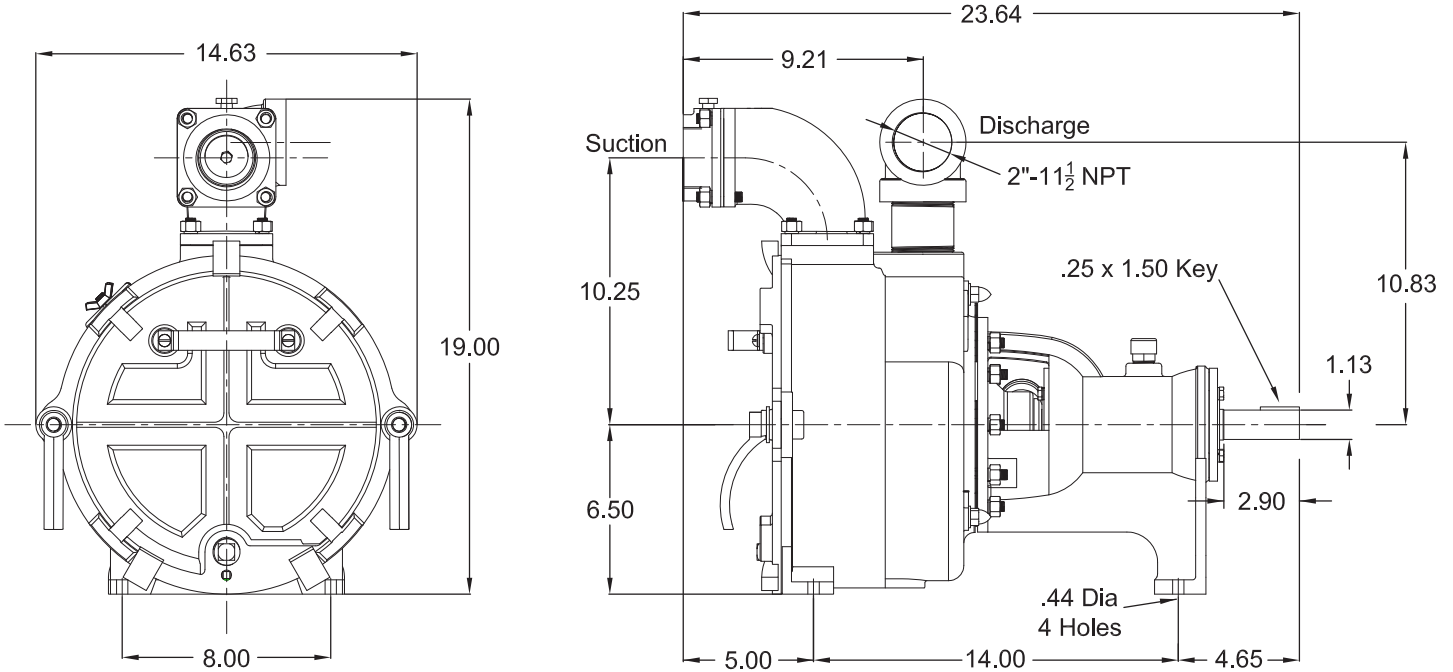
**Size: 2" x 2"
Self-Priming
Centrifugal Pumps**

SUCTION & DISCHARGE	2" x 2" , NPT Flanges included for Suction & Discharge
LIQUID TEMPERATURE	160°F Continuous
CASING	Cast Iron, Class 30
CHECK VALVE	Elbow and Weight Cast Iron Class 30, Neoprene Valve Flap
IMPELLER	2 Vane open type. Cast Iron Class 30, Handles 1-1/4" diameter spherical solids
SHAFT	High Carbon Steel
END COVER	Cast Iron, Class 30 Full Diameter, Removable
VOLUTE/WEAR PLATE	Cast Iron, Class 30, Replaceable with External Clearance Adjustment
SEAL PLATE	Alloy Steel, Replacable
SEAL	Single Mechanical, Graphite/Ceramic-NBR-304 Grease Lubricated by Self-Feeding Lubricator
O-RINGS	NBR
HARDWARE	Corrosion Resistant Steel
PEDESTAL	Cast Iron, Class 30
BEARING - PUMP END	Single Row Ball, Oil Lubricated, radial & Thrust load
BEARING - DRIVE END	Single Row Ball, Oil Lubricated, radial & Thrust load
LUBRICATION	Bearing - SAE No. 30 non detergent oil, pedestal includes oil level sight gauge
PAINT	Air dry enamel
PUMP WEIGHT	144 Lbs

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



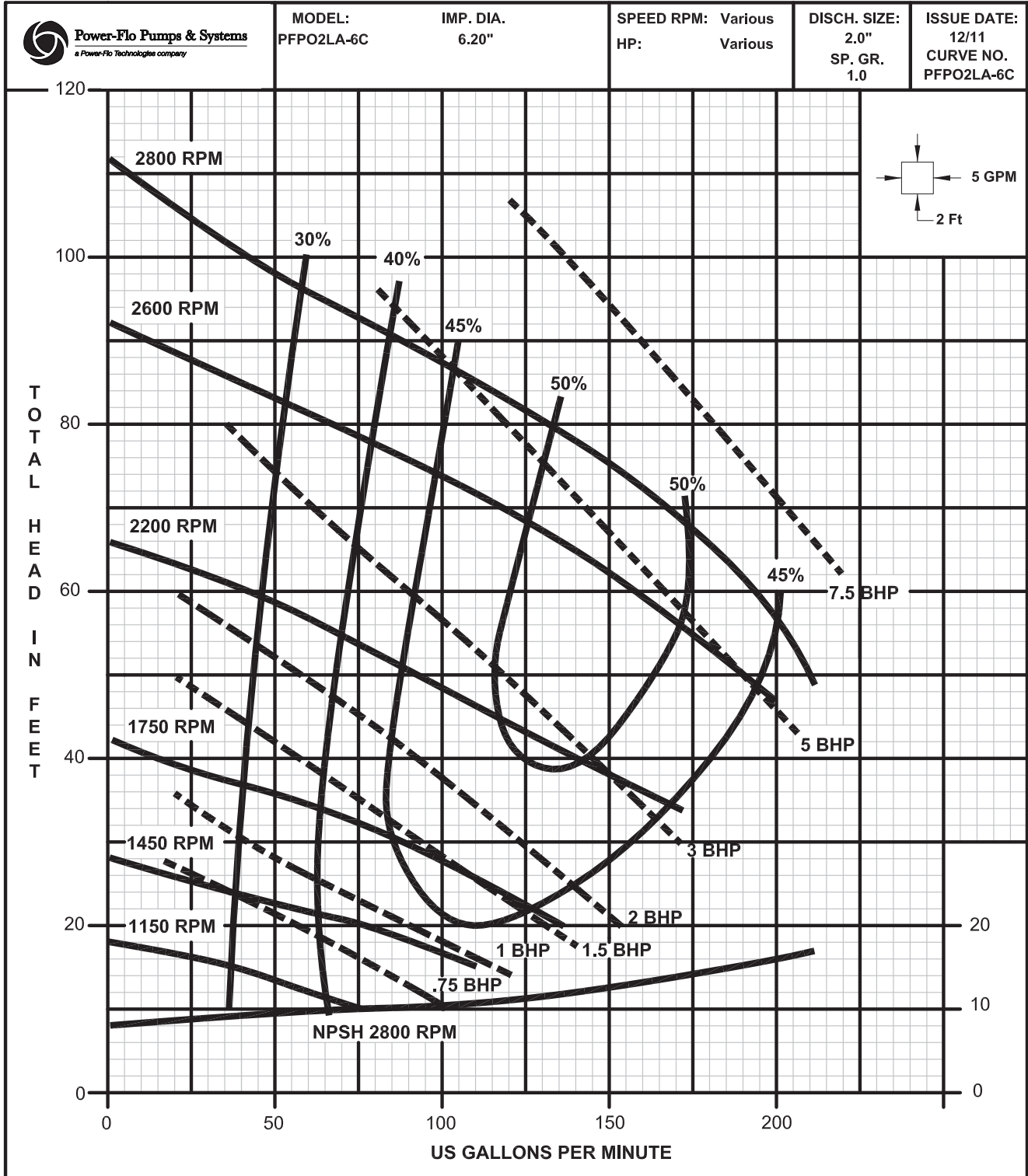
Dimensions & Data



When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This *net available NPSH* must exceed the *required NPSH* of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the *low* liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the *high* liquid level to the centerline of the impeller.

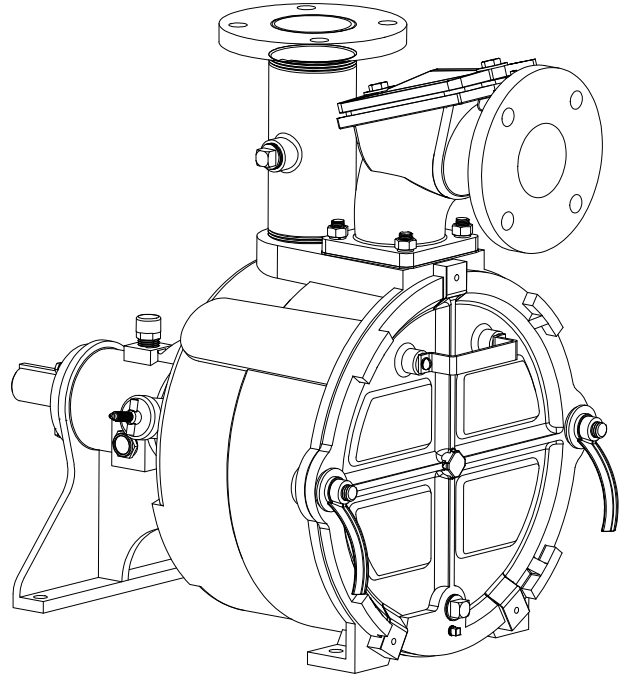
MAXIMUM DRY PRIMING LIFT					
PUMP SPEED	2 Min	4 Min	6 Min	8 Min	10 Min
1150 RPM	3 Ft	6 Ft	8 Ft	9 Ft	10 Ft
1450 RPM	5 Ft	8 Ft	12 Ft	14 Ft	16 Ft
1750 RPM	9 Ft	17 Ft	22 Ft	23 Ft	25 Ft
2200 RPM	17 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2600 RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2800 RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft

Performance



Specifications

SUCTION & DISCHARGE	3" x 3", 125 lb Flanges included for Suction & Discharge
LIQUID TEMPERATURE	160°F Continuous
CASING	Cast Iron, Class 30
CHECK VALVE	Elbow and Weight Cast Iron Class 30, Neoprene Valve Flap
IMPELLER	2 Vane open type. Cast Iron Class 30, Handles 1-1/4" diameter spherical solids
SHAFT	High Carbon Steel
END COVER	Cast Iron, Class 30 Full Diameter, Removable
VOLUTE/WEAR PLATE	Cast Iron, Class 30, Replaceable with External Clearance Adjustment
SEAL PLATE	Alloy Steel, Replacable
SEAL	Single Mechanical, Graphite/Ceramic-NBR-304 Grease Lubricated by Self-Feeding Lubricator
O-RINGS	NBR
HARDWARE	Corrosion Resistant Steel
PEDESTAL	Cast Iron, Class 30
BEARING - PUMP END	Single Row Ball, Oil Lubricated, radial & Thrust load
BEARING - DRIVE END	Single Row Ball, Oil Lubricated, radial & Thrust load
LUBRICATION	Bearing - SAE No. 30 non detergent oil, pedestal includes oil level sight gauge
PAINT	Air dry enamel
WEIGHT	242 Lbs



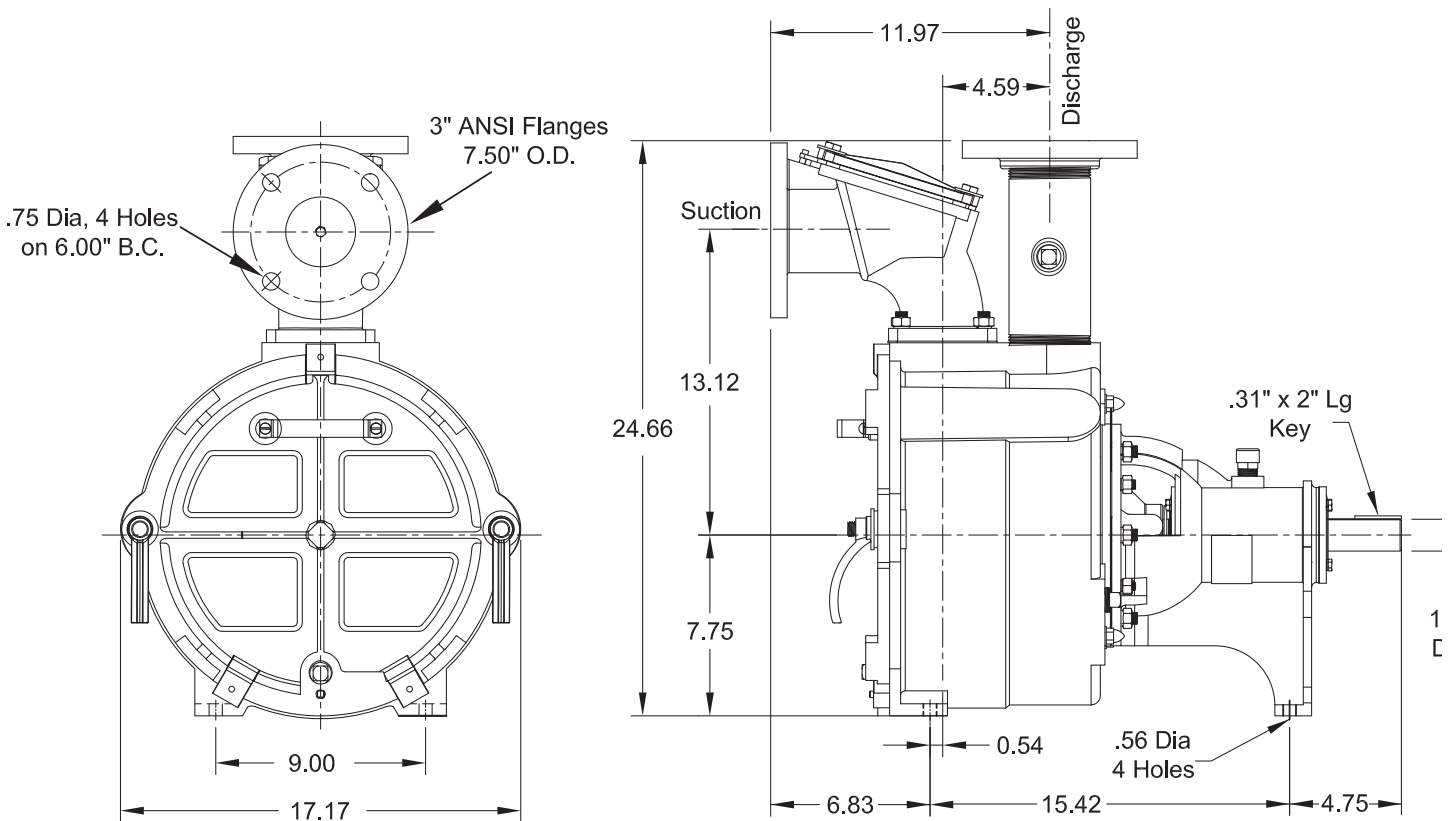
Series: PFPO3LA8D

**Size: 3" x 3"
Self-Priming
Centrifugal Pumps**

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



Dimensions & Data

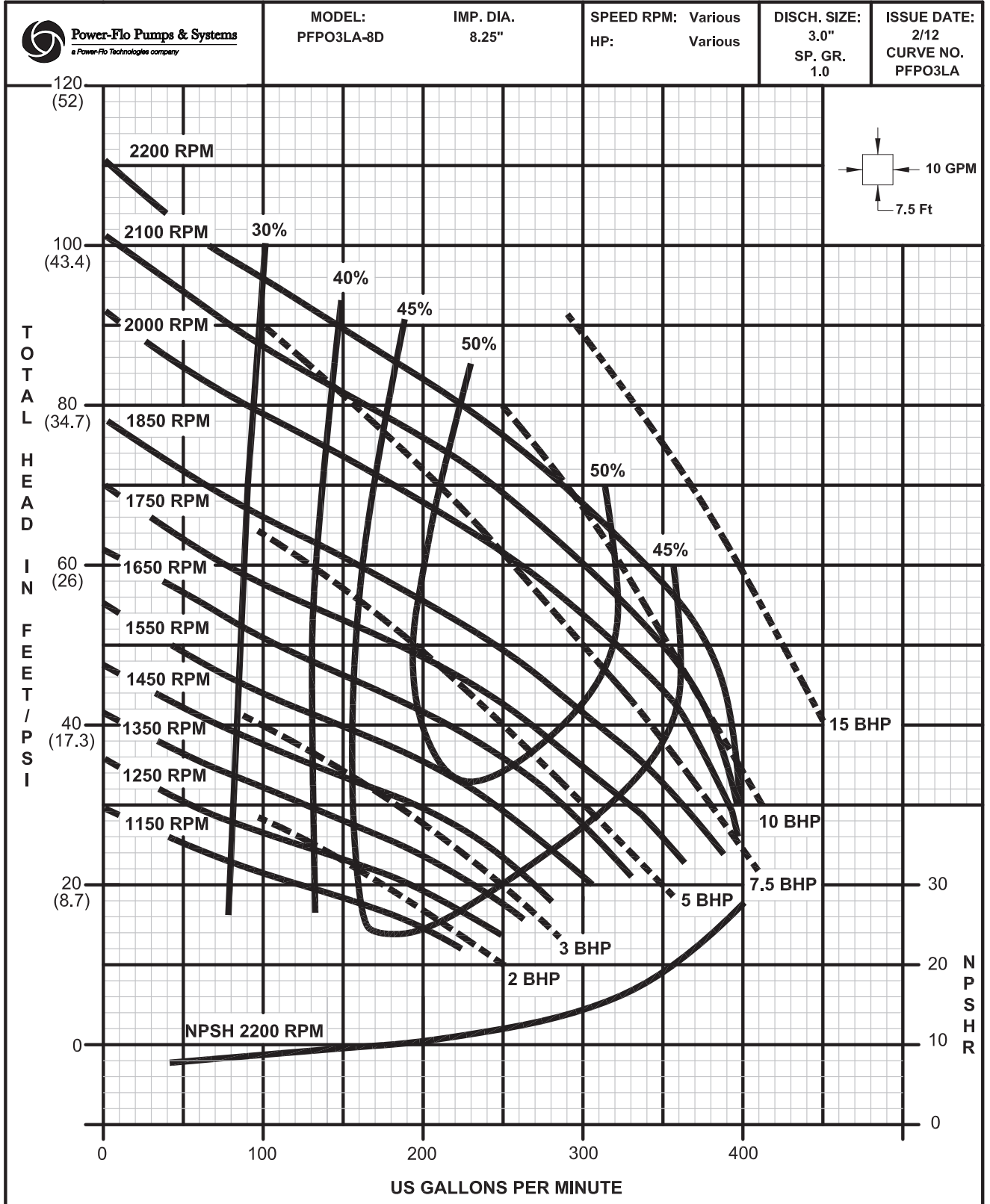


When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This *net available NPSH* must exceed the *required NPSH* of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the *low* liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the *high* liquid level to the centerline of the impeller.

MAXIMUM DRY PRIMING LIFT					
PUMP SPEED	2 Min	4 Min	6 MIN	8 Min	10 Min
1150 RPM	8 Ft	14 Ft	17 Ft	18 Ft	19 Ft
1450 RPM	14 Ft	20 Ft	22 Ft	23 Ft	25 Ft
1750 RPM	22 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2050 RPM	24 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2200 RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft



Performance



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

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. Do not pump out of liquid.

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
2"	18"	11"
3"	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. 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.

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.

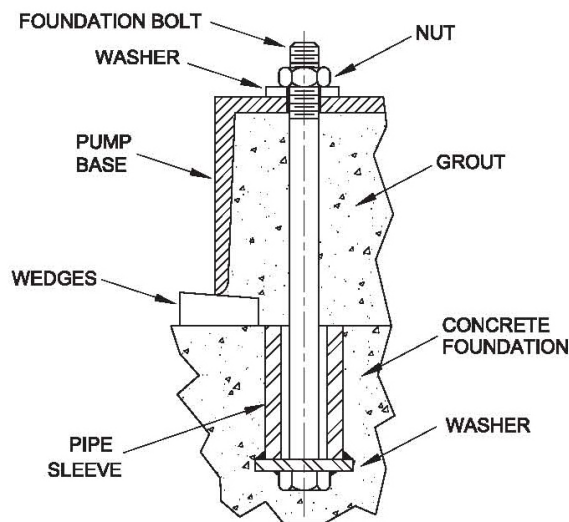


Figure 1



Installation

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.

PFPO2LA6C	1-1/4" Solids
PFPO3LA8D	1-1/2" 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.*

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.

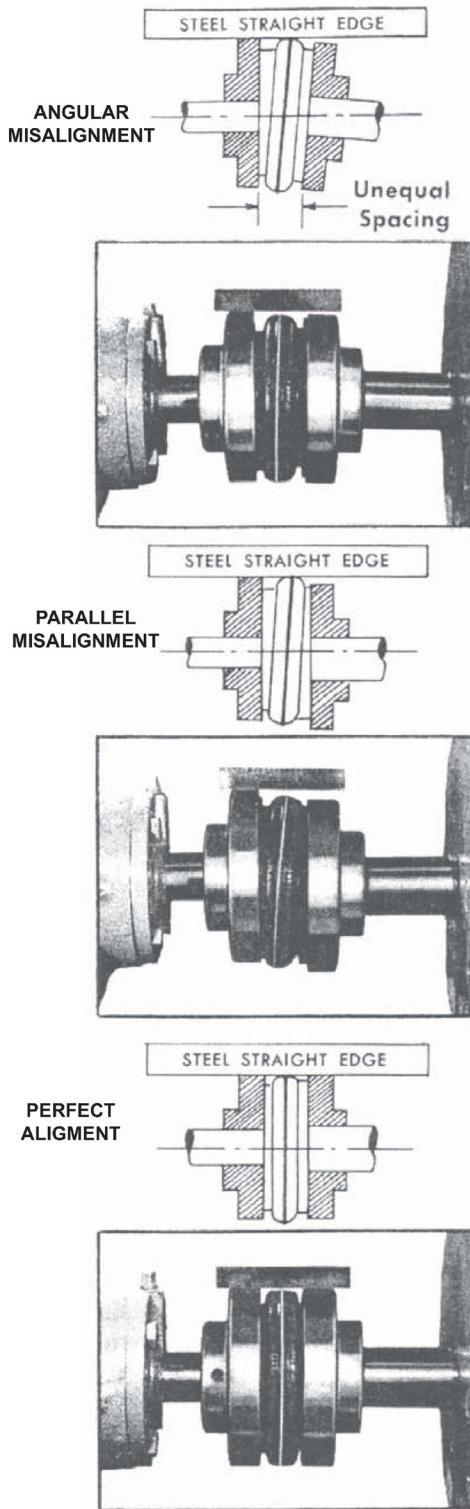


Figure 2a

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.

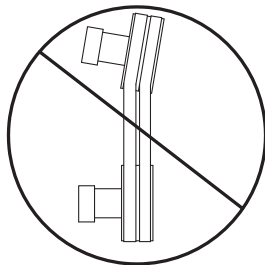


Installation & Pre-Operation

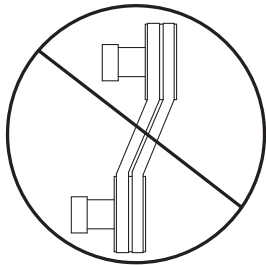
V-BELT DRIVEN

Be sure the pulleys are properly aligned and the power source and pump are parallel (See Figure 2b). If the drive system uses multiple belts, make sure they are of a matched set.

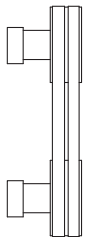
Belts must be adjusted in accordance with the belt manufactures instructions. If belts are too loose, slippage will occur. If belts are too tight, there will be excessive power loss and possible bearing failure. Belts and pulleys should be properly selected for the desired conditions.



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, or remove belts from sheaves, 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 or belts 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 properly aligned or belts properly tensioned
- c. Piping completed.
- d. Correct pump rotation.
- e. Pump shaft turns freely
- f. Discharge valve closed
- g. Suction valve open (if used)

h. Coupling Guard installed

- i. Pump fully primed
- j. Pump and driver properly lubricated

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

LUBRICATION

Check the eyeglass (13) on side of pedestal (12) for proper amount of S.A.E. No. 30 non-detergent oil.

Check that grease cup (32) is full of grease and activated. (see page 16)

PRIMING

CAUTION: Before starting the pump, the casing and suction line must be filled with liquid, by removing fill cover plates (75) on 2" models or hatch cover (66) on 3" models. 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.

PRIMING BY SUCTION PRESSURE

When operating with suction pressure (flooded suction), remove the fill cover plates (75) at the top of the casing or remove hatch cover (66) and when pump is filled with liquid, replace.

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 fill plates (75) or hatch (66), then fill suction pipe and pump with liquid. When pump is full of liquid, replace fill plates or hatch 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 pumps 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.*

To help prevent the pump against rupture or explosion due to heat, equipped the pump with a pressure relief valve. The valve will open if casing vapor pressure reaches a critical point.



Stop the pump if overheating occurs, and allow to cool before servicing. DO NOT remove any covers, plates,

gauges 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 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.

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.



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

Remove pipe plugs (39), 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.



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. Also remove the cover from the grease cup to permit water to escape should the shaft seal be leaking. If the above shows no leaks, remove bolts from 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 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 the pump 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

Item No	Areas to check	Correction
3	The leaking of these Lip seals can be caused by a plugged breather cap (11) or too high an oil level in the pedestal (12).	Check oil level in pedestal, see page 16. Clean or replace breather cap.
27	The leaking of this o-ring becomes critical on high suction lifts. Moreso if the clearance becomes great due to sever impeller-seal plate wear.	Adjust clearance. See page 17, Figure 6
31	If the o-ring leaks a priming problem will exist.	Check the chamfer which the o-ring seats against is clean and smooth. Check o-ring is not torn or nicked. Grease the o-ring and the area it seats when installing.
44	This o-ring must not leak around the top half of the casing or suction problems can exist.	Always grease this o-ring and the area it slides in before inserting case cover (45).

Trouble Shooting



⚠ DANGER

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

Symptom	Possible Cause(s)	Corrective Action
Little or no discharge and will not prime	<ol style="list-style-type: none"> 1. Pump body not filled with water 2. Total head too high 3. Suction head higher than pump designed for 4. Impeller partially or completely plugged 5. Leak in suction line 6. Foot-valve too small 7. Impeller damaged 8. Foot-valve or suction line not submerged deep enough in water, pulling air 9. Insufficient inlet pressure or suction head 10. Suction piping too small 11. Body gasket leaking 12. Suction or discharge line valves closed 13. Piping damaged 14. Clogged strainer or foot-valve 	<ol style="list-style-type: none"> 1. Fill pump body with water. 2. Shorten suction head 3. Lower suction head, install foot-valve and prime 4. Disassemble pump and clean out impeller 5. Repair or replace suction line 6. Match foot-valve size to piping or install one larger size foot-valve 7. Disassemble pump and replace impeller 8. Submerge lower in water 9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line partially closed. 10. Increase pipe size to pump inlet size or larger 11. Replace 12. Open 13. Clean or replace 14. Clean or replace
Loss of suction after satisfactory operation	<ol style="list-style-type: none"> 1. Air leak in suction line 2. When pump was last turned off, water siphoned out of pump body 3. Suction head higher than pump designed for 4. Insufficient inlet pressure or suction head 5. Clogged foot-valve, strainer or pump 6. Defective wearplate 	<ol style="list-style-type: none"> 1. Repaire or replace suction line 2. Refill (reprime) pump body before restarting 3. Lower suction head, install foot-valve and prime 4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed. 5. Unclog or replace 6. Replace
Pump overloads driver	<ol style="list-style-type: none"> 1. Total head lower than pump rating, unit delivering too much water 2. Specific gravity and viscosity of liquid being pumped different than the pump rating 	<ol style="list-style-type: none"> 1. Increase back pressure by turning gate valve on discharge line to partially closed position that will not overload motor. 2. Consult factory
Pump vibrates and/or makes excessive noise	<ol style="list-style-type: none"> 1. Mounting plate or foundation not rigid enough 2. Foreign material in pump causing unbalance 3. Impeller bent 4. Cavitation present 5. Piping not supported to relieve any strain on pump assembly 	<ol style="list-style-type: none"> 1. Reinforce 2. Disassemble pump and remove 3. Replace impeller 4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line 5. Make necessary adjustments
Pump runs but no fluid	<ol style="list-style-type: none"> 1. Air leak in suction piping 2. Pump located too far from fluid source 3. Gate valve closed 4. Clogged strainer 5. Fouled foot-valve 6. Discharge height too great 7. Fouled impeller 8. Faulty mechanical seal 	<ol style="list-style-type: none"> 1. Replace 2. Replace 3. Open 4. Clean or Replace 5. Clean or Replace 6. Lower the height 7. Clean or Replace 8. Replace
Pump leaks at shaft	<ol style="list-style-type: none"> 1. Worn mechanical seal 2. Seal not installed properly 	<ol style="list-style-type: none"> 1. Replace 2. Follow service instructions for installing seal

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.



Preventative Maintenance

PREVENTATIVE MAINTENANCE

The following is a general recommendation for preventive 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. Check that Grease cup is full.

On A Monthly Bases:

Check V-Belts (if equipped).

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 (60) 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 (33) 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 (26) ever needs replacing, check the following parts for wear or deterioration; volute (42), seal plate (41), impeller (33), shaft (9), o-rings (27), (43) & (44).

LUBRICATION

Bearings - On the side of the pedestal (12), check the oil level through the sight glass (13). 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 vent plug (11) and add SAE 30, non-detergent oil. 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.

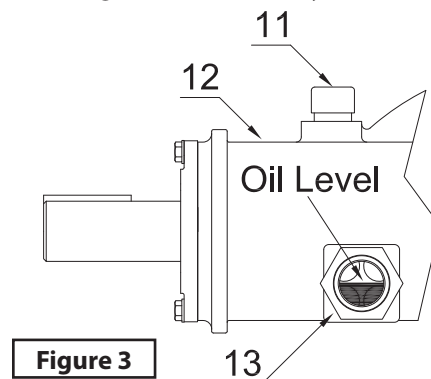


Figure 3

Mechanical Seal (see Figure 4) - A self-feeding lubricating grease cup (32) is provided to supply grease to the shaft seal (26).

The grease cup is empty when the wing nut, positioned at the outer end of the threaded plunger shaft, recedes to the cap of the grease cup.

To refill the grease cup, rotate the wing nut clockwise as far as it will go.

Attach a grease gun to the zerk fitting, then fill until grease oozes from the relief hole on the side of cup. For operation, return the wing nut to the end of the plunger.

CAUTION Never force the plunger into the grease cup as this can cause seal failures.

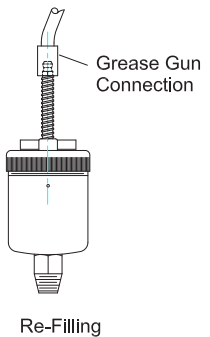
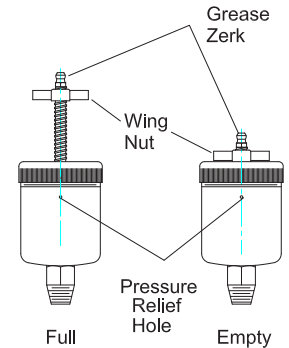


Figure 4

CAUTION Never remove the grease cup and insert a zerk fitting for lubricating this seal or the seal will be permanently damaged.

The use of a #1 grease is normally recommended. When high ambient temperatures are encountered, such as direct sunlight, a #2 grease can be used.

Use a water resistant, nonfiberous grease. Lithium based greases are excellent and molydisulfide is acceptable. The sodium soap base greases are the only non-water resistant types that are **NOT** acceptable.

If the pump is inoperative for a long period of time, or appears not to use any grease, remove and clean the grease cup (32) thoroughly. Caked grease in the cup can create a problem of not lubricating the seal. Under normal conditions, the grease cup full of grease will last three to four months.

If a grease seal requires grease every day, and is not leaking past the outer lip seal, it indicates that the seal is wearing out. The internal pressure of the pump will often force the cup plunger out when the seal leaks badly.

SHAFT SEAL REPLACEMENT

Through Hatch Cover - Remove handle nuts (49), washers (48) and pry off hatch cover (45). Next remove cap nuts (36), washers (37) and pull the volute (42) and seal plate (41) out of pump case (40).

Remove impeller nut (35), (standard right hand thread) and washer (34). Remove impeller (33) with the use of a wheel puller. Next remove the seal's (26) spring holder and spring. The rotating assembly and stationary seat can now be removed without further disassembly, but it is easier to remove hex nuts (21), washers (23), grease cup (25), to remove casing cover (25) before removing these parts. By using this method the lip seal (22) can be inspected and replaced if necessary, and seat area cleaned. Examine and replace if necessary, shaft slinger (20) and o-ring (27).

CAUTION *Lapped and polished faces of new seal are easily scratched and damaged. Protect From Damage, Dirt and Finger prints.*

Clean shaft (9) and counterbore in casing cover (25) with 180 to 240 grit emery cloth. Shoulder on shaft must **NOT** be sharp, polish and round to 1/32" radius. Lubricate shaft (9), seat counterbore in casing cover (25) and rubber members of seal with a compatible lubricant

(U.S. Seal Mfg. P-80 or equal) or SAE 10 non-detergent oil can be used on the rubber parts. Check seal surfaces to be sure they are free of any dirt, grit or lubricants. Install the Stationary seat into casing cover (25). Next install the rotating portion, with dry clean hands grasp the rotating portion and with a circular, rocking motion, push onto shaft (9) sliding it down against the stationary seat.

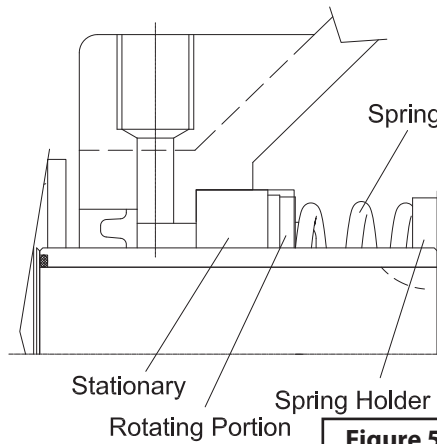


Figure 5

Once rotating portion is in place, install the spring and the spring holder. Replace impeller (33), washer (34) and nut (35) onto shaft (9) and torque per chart.

Impeller Nut Torque Values	
Model	Torque
PFPO2LA6C	55 ft. lbs.
PFPO3LA8D	100 ft. lbs.

Place seal plate (41) over the studs of the volute (42) and insert this assembly over the impeller with the volute studs projecting through the case (40).

Replace the washers (37) and cap nuts (36) onto studs (38), finger tight only, at this time.

Replace o-ring (43) on the volute and o-rings (31) and (44) on PFPO2LA or o-rings (15) and (44) on PFPO3LA on the hatch cover, grease these o-rings thoroughly.

Now install case cover (45) into case (40), place flat washers (48) onto studs (47) and tighten down with handle nuts (49). These handle nuts can be sufficiently tightened by hand. This method of securing the casing cover first, centers the volute properly over the impeller.

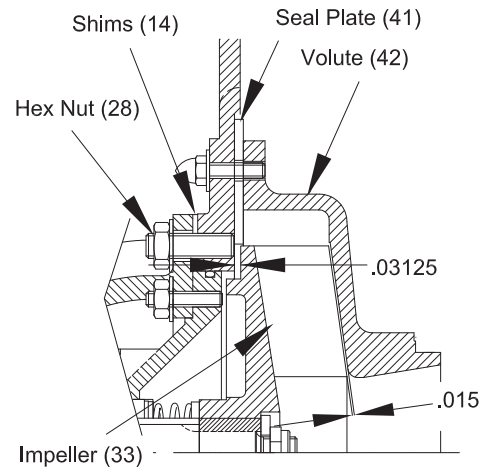


Figure 6

Now the cap nuts (36) can be tightened. The factory clearance between the impeller (33) and the wear surface of the volute (42) is .015 inches. This clearance is adjustable by adding or removing of the horseshoe shims (14) located between bearing housing (12) and casing (40). Add or remove shims (14) in equal amounts at each location, until the impeller rubs slightly, then add one shim at each location and tighten nuts (28) securely.

NOTE: *As wear clearance increases between the impeller and volute, the pump head pressure is reduced and priming ability is affected.*

A new pump will have a clearance of .03125" between the impeller (33) and seal plate (41). When this wears to .125" or more, priming is affected and especially on high suction lifts.

Service & Repair

SHAFT SEAL REPLACEMENT

By Removing Pedestal - for PFPO2LA

Only - First remove the belt or coupling guard and relieve the belt tension on belt-drive units and remove belts or remove bolts from motor base on the flex coupling units and detach coupling and remove motor and coupling. Next remove the pedestal bolts that attach the pedestal to the base.

IMPORTANT: *The PFPO3LA8D impeller is too large to be removed by this procedure.*

Remove hex nuts (28), washers (29) and nuts (21), washers (23) and remove pedestal assembly. Next remove impeller nut (35) and washer (34) from shaft. Impeller nut is standard right hand thread. Now remove impeller (33), use wheel puller if necessary.

Remove the grease cup (32) from casing cover (25). Next remove the hex nuts (21) and washers (23). With two pry bars force the casing cover along with old seal off the shaft. Lip seal (22) in casing cover (25), can be inspected and replaced if necessary, and seat area cleaned. Examine and replace if necessary, shaft slinger (20) and o-ring (27).

▲ CAUTION *Lapped and polished faces of new seal are easily scratched and damaged. Protect From Damage, Dirt and Finger prints.*

Clean shaft (9) and counterbore in casing cover (25) with 180 to 240 grit emery cloth. Shoulder on shaft must **NOT** be sharp, polish and round to 1/32" radius.

Lubricate shaft (9), seat counterbore in casing cover (25) and rubber members of seal with a compatible lubricant (*U.S. Seal Mfg. P-80 or equal*) or SAE 10 non-detergent oil can be used on the rubber parts. Check seal surfaces to be sure they are free of any dirt, grit or lubricants. Install the Stationary seat into casing cover (25).

Next install the rotating portion, with dry clean hands grasp the rotating portion and with a circular, rocking motion, push onto shaft (9) sliding it down against the stationary seat.

Once rotating portion is in place, install the spring and the spring holder. Replace impeller (33), washer (34) and nut (35) onto shaft (9) and torque per chart.

Impeller Nut Torque Values	
Model	Torque
PFPO2LA6C	55 ft. lbs.

Place pedestal assembly into pump and set clearance by adding or removing shims (14) until the impeller rubs slightly, then add one thin shim (.015 thick) at each location and tighten hex nuts.

NOTE: *As wear clearance increases between the impeller and volute, the pump head pressure is reduced and priming ability is affected.*

A new pump will have a clearance of .03125" between the impeller (33) and seal plate (41). When this wears to .125" or more, priming is affected and especially on high suction lifts.

Re-assemble the pedestal to the base and assemble the coupling and motor or sheaves, belts and guard to the unit. Adjust belts or coupling as specified.

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.

Repair Parts

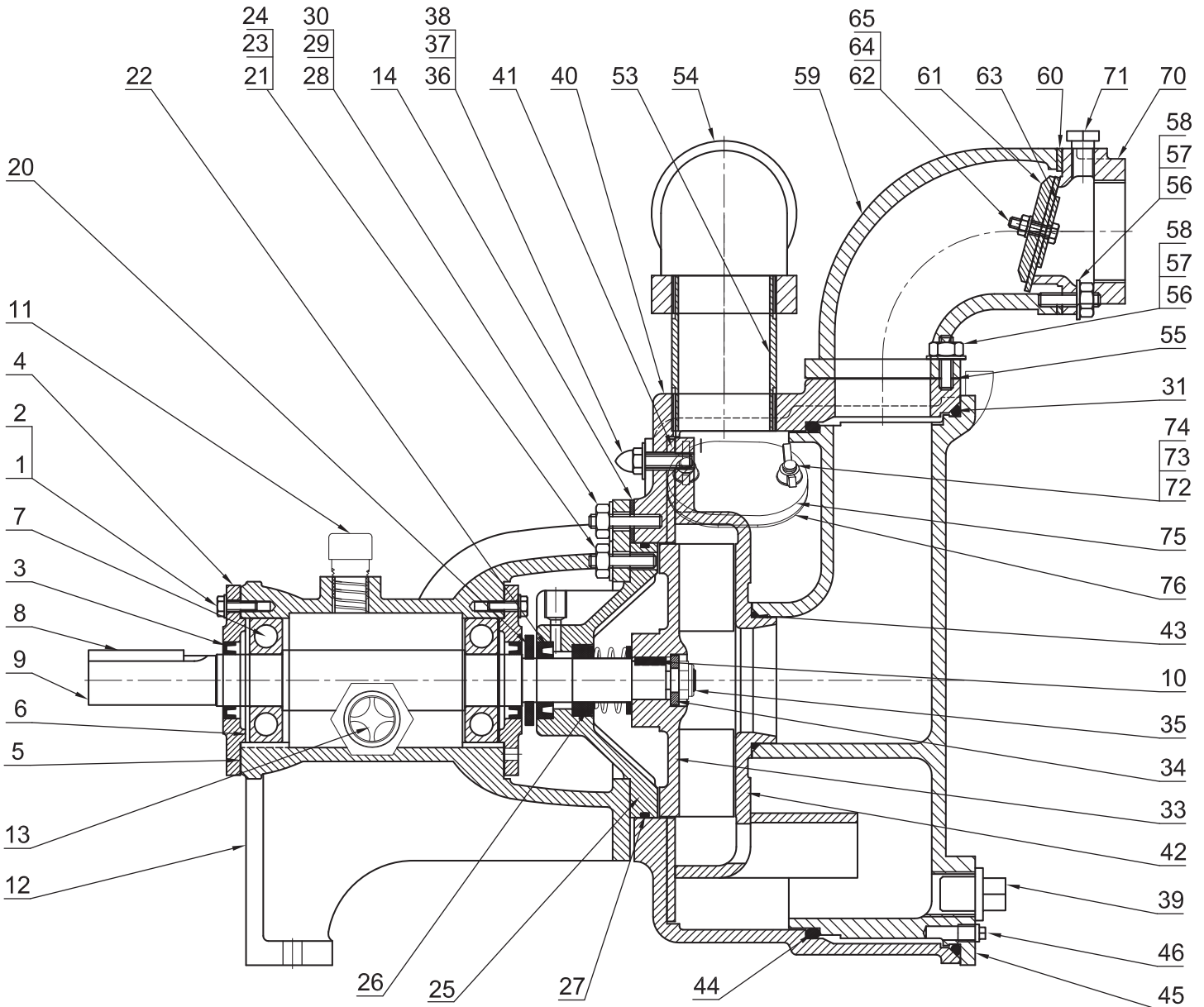


Figure 7



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.

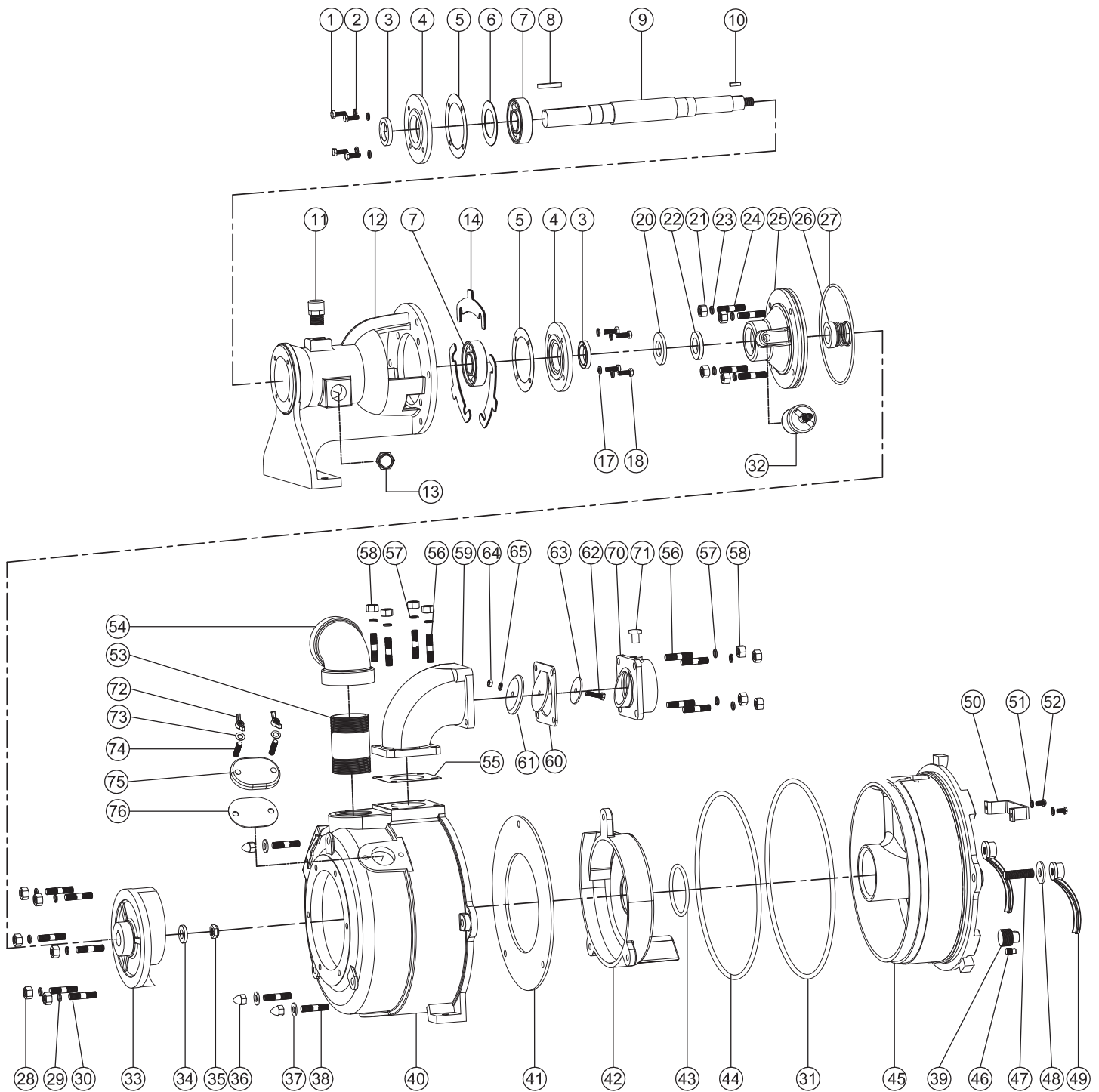


Figure 8

PFPO2LA6C

Self-Priming Universal Pumps

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.

Repair Parts

ITEM		QTY	DESCRIPTION	PART No.
1		4	Cap Screw - 1/4-20 x .75" Lg	◆
2		4	Lockwasher - 1/4"	◆
3	◆	2	Lip Seal, TC, Φ44.45xΦ30.1625x6.35	PFM4799
4		2	Bearing Cap	PFFP4342
5	◆	2	Gasket, Fishpaper	PFT27115
6		2	Adjustment Pad	PFM6611
7	◆	2	Ball Bearing, 6306, 72mm OD	PF62500719
8		1	Key - 1/4" Sq x 1.50" Lg	PFM3169
9		1	Shaft	PFT27117
10		1	Impeller Key - 3/16" Sq x .69" Lg	PFM4504
11	◆	1	Vent Plug, Steel, 1/2-14 NPT	PF089258
12		1	Bearing Housing	PFFP4341
13	◆	1	Sight Glass, Stainless	PF089257
14	◆	12	Gasket, PVC Transparent Plastic, .031" (.8 mm)	PFT27116
17		4	Lockwasher - 1/4"	◆
18		4	Cap Screw - 1/4-20 x .75" Lg	◆
20	◆	1	Slinger, NBR, Φ52x25x4.7mm	PFM6370
21		4	Hex Nut - 3/8-16	◆
22	□◆	1	Lip Seal	PFM5625
23		4	Lock washer, steel 3/8	◆
24		4	Stud steel, 3/8-16 x 1.50" lg	◆
25		1	Casing Cover	PFFP4343
26	□◆	1	Mechanical Seal - 1" Graphite/Ceramic-NBR-304	PFM4292F
27	□◆	1	O-ring - NBR Φ306x7mm	PFM6522
28		6	Hex Nut, steel - 3/8-16	◆
29		6	Lockwasher, steel - 3/8"	◆
30		6	Stud, steel - 3/8-16 x 1.50" Lg	◆
31	□◆	1	O-ring	PFM6458
32	☆	1	Grease Cup	PFM3415
33	☆	1	Impeller, cast iron - 6.20" Dia	PFFP4348B
34	◆	1	Impeller washer, stainless	PFTS27114
35	◆	1	Impeller Nut - 1/2-20, stainless/Nylock	◆
36		3	Cap Hex Nut - 3/8-16 Nylock	◆
37		3	Flat washer - 3/8"	◆

◆ = Acquire standard hardware locally.

□ = Seal/Gasket Kit

◆ = Overhaul Kit

● = Check Valve Kit

☆ = Supplied as individual items



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.

ITEM		QTY	DESCRIPTION	PART No.
38		3	Stud, steel - 3/8-16 x 1.75" Lg.	◆
39		3	Pipe Plug - 3/4" NPT	◆
40		1	Pump Casing	PFFP4305
41		1	Seal Plate	PFT27337
42		1	Volute	PFFP4307B
43	□◆	1	O-ring, NBR, Φ73x5.3mm	PFM6456
44	□◆	1	O-ring, NBR, Φ285x7mm	PFM6457
45		1	Case Cover	PFFP4306
46		1	Pipe Plug - 1/8" NPT	◆
47		2	Stud - 1/2-13 x 2.00" Lg Stainless	◆
48		2	Flat Washer - 1/2"	◆
49		2	Handle Nut	PFM6499
50		1	Cover Handle	PF51000521
51		2	Lockwasher - 1/4"	◆
52		2	Round Head Screw - 1/4-20 x 1/2" Lg	◆
53		1	Pipe Nipple - 2" NPT x 3.50" Lg	PF62502810
54		1	Elbow - 2" NPT	PF62502802
55	◆●	1	Gasket	PFT26639
56		8	Stud - 3/8-16 x 1.50" Lg	◆
57		8	Lockwasher - 3/8"	◆
58		8	Hex Nut - 3/8-16	◆
59		1	Suction Elbow	PFFP4309
60	◆●	1	Valve Flapper/Gasket, Rubber	PFT15907
61	●	1	Check Valve Weight, Steel	PFP3688
62	●	1	Capscrew - 1/4-20 x 1.00" Lg	PF1-7-1
63	●	1	Valve Weight, Steel	PFT26624
64	●	1	Hex Nut - 1/4-20, Stainless	◆
65	●	1	Lockwasher - 1/4"	◆
70		1	Suction Flange - 2"	PFFP3685A
71		1	Pipe Plug - 1/4" NPT	◆
72		2	Wing Nut - 5/16-18	◆
73		2	Flatwasher - 5/16"	◆
74		2	Stud - 5/16-18 x 1.50" Lg	◆
75		1	Fill Cover Plate	PFFP4310
76	□◆	1	Gasket, Fill Cover Plate, NBR	PFT26640
Repair Kits				
□	Seal & Gasket Kit - Includes, 22, 26, 27, 31, 43, 44, 76			PF89076
◆	Overhaul Assy - Includes; 3, 5, 7, 11, 13, 14, 20, 22, 26, 27, 31, 34, 35, 43, 44, 55, 60, 76			PF89087
●	Check Valve Assy - Includes; 55, 60, 61, 62, 63, 64, 65			PF2LA-CVK



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

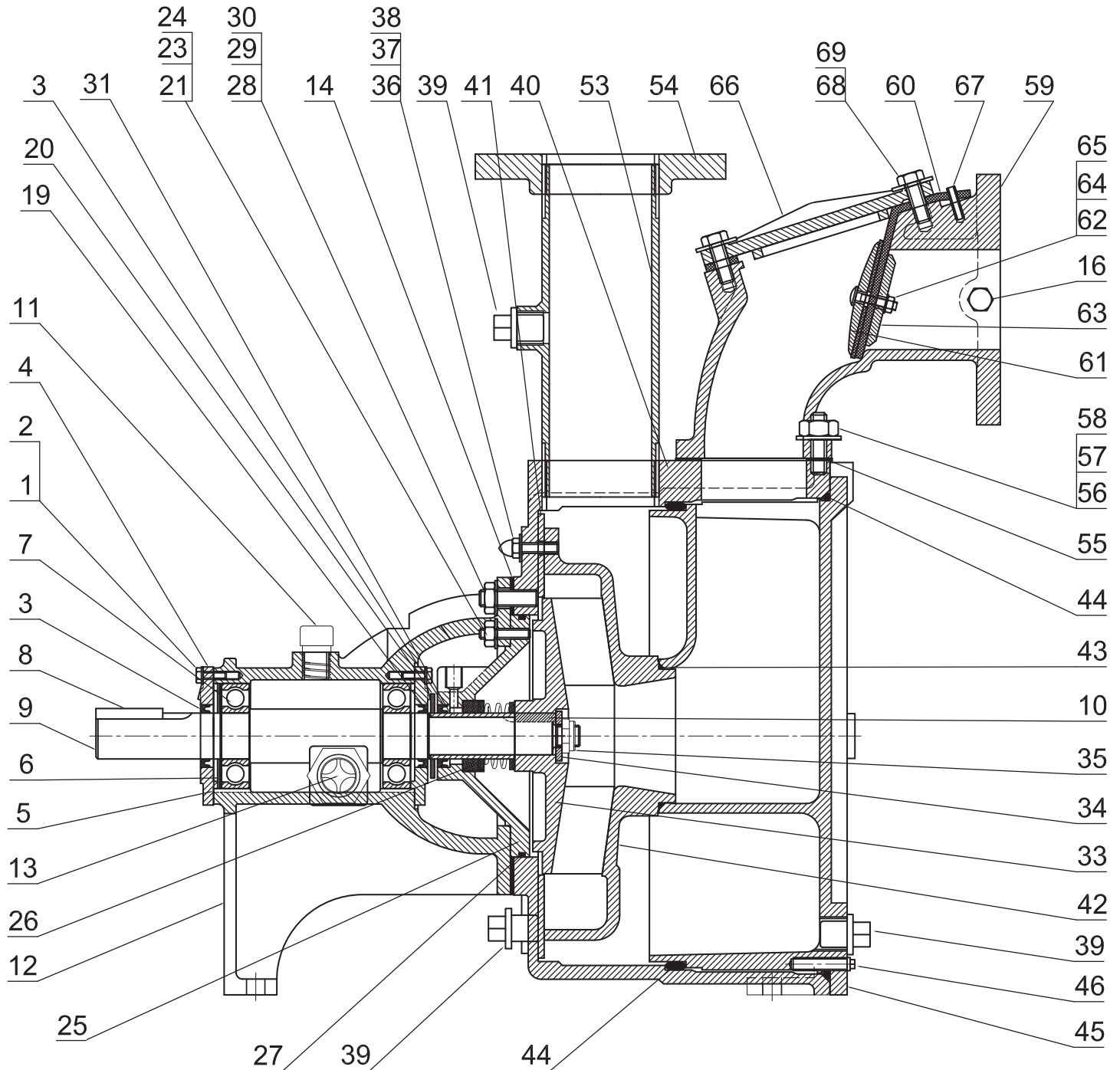


Figure 9



Parts List

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.

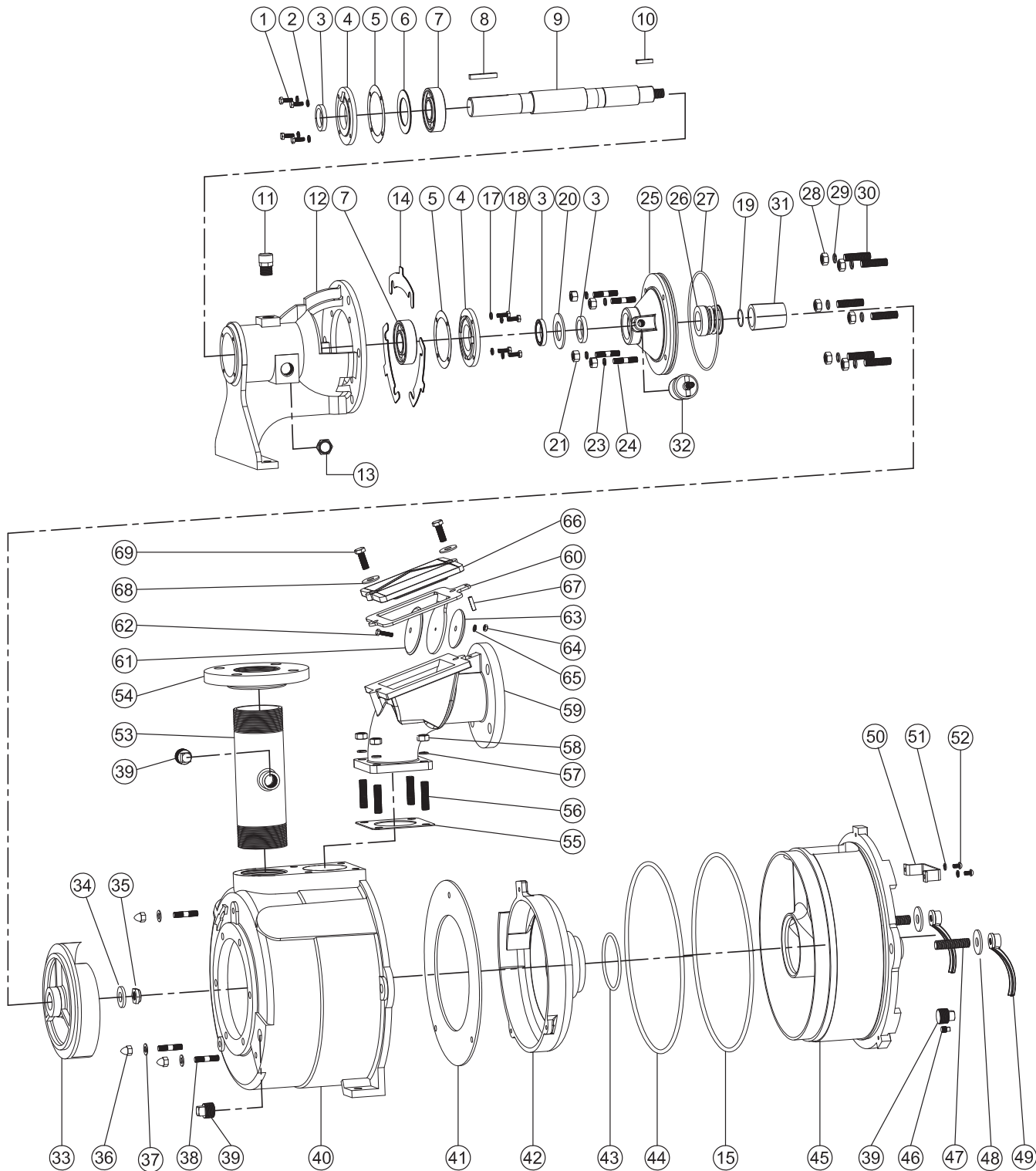


Figure 10



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.

Repair Parts

ITEM		QTY	DESCRIPTION	PART No.
1		4	Cap Screw - 1/4-20 x .75" Lg	◆
2		4	Lockwasher - 1/4"	◆
3	◆	3	Lip Seal, TC, Φ47.62xΦ34.925x6.35mm	PFM4080
4		2	Bearing Cap	PFFP4261
5	◆	2	Gasket, Fishpaper	PFT24886
6		2	Gasket, Φ79.5xΦ50.7x0.8mm	PFM4489
7	◆	2	Ball Bearing, 6307, 80mm OD	PFM6142
8		1	Key - 5/16" Sq x 2.00" Lg	PFM2222
9		1	Shaft	PFT2488C
10		1	Impeller Key - 1/4" Sq x 1.1875" Lg	PFM2650
11	◆	1	Vent Plug, steel, 1/2-14 NPT	PF089258
12		1	Bearing Housing	PFFP4263
13	◆	1	Sight Glass, stainless, 3/4-14 NPT	PF089257
14	◆	15	Shim, PVC, .02" (0.5mm)	PFT27239
15	◆	1	O-ring, NBR, Ø356 x 7mm	PFM3567
16		1	Pipe Plug 1/8" NPT	◆
17		4	Lockwasher - 1/4"	◆
18		4	Cap Screw - 1/4-20 x .75" Lg	◆
19	□◆	1	O-ring, Buna-N, Ø28 x 1.8mm	PFM2818
20	◆	1	Slinger, NBR, Ø64 x Ø34x3mm	PFM4313
21		4	Hex Nut - 3/8-16	◆
22				
23		4	Lock washer - 3/8	◆
24		4	Stud - 3/8-16 x 1.50" lg	◆
25		1	Casing Cover	PFFP4262B
26	□◆	1	Mechanical Seal, DY20-1.375	PFM3983F
27	□◆	1	O-ring - Buna-N, Ø177 x 3.55	PFM7965
28		6	Hex Nut - 1/2-13	◆
29		6	Lockwasher - 1/2"	◆
30		6	Stud - 1/2-13 x 2" Lg	◆
31	□◆	1	Shaft Sleeve, Bronze	PF51200007
32	☆	1	Grease Cup - 3 oz	PFM2655
33	☆	1	Impeller	PFFP4188C
34	◆	1	Impeller washer, stainless	PFTS24887
35	◆	1	Impeller Nut - 5/8-18, stainless/Nylock	◆
36		3	Cap Hex Nut - 3/8-16 Nylock	◆
37		3	Flat washer - 3/8"	◆

- ◆ = Acquire standard hardware locally.
- = Seal/Gasket Kit
- ◆ = Overhaul Kit
- = Check Valve Kit
- ☆ = Supplied as individual items



Parts List

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.

ITEM		QTY	DESCRIPTION	PART No.
38		3	Stud - 3/8-16 x 1.75" Lg.	◆
39		3	Pipe Plug - 3/4" NPT	◆
40		1	Pump Casing	PFFP4186H
41		1	Seal Plate	PFT24989
42		1	Volute	PFFP4184F
43	□◆	1	O-ring, Buna-N, Ø100 x 5mm	PFM5690
44	□◆	1	O-ring, Buna-N, Ø340 x 7mm	PFM5691
45		1	Case Cover	PFFP4187A
46		1	Pipe Plug - 1/8" NPT	◆
47		2	Stud - 5/8-11 x 2.50" Lg Stainless	◆
48		2	Flat Washer - 5/8"	◆
49		2	Handle Nut	PFM5800
50		1	Cover Handle	PF51000521
51		2	Lockwasher - 1/4"	◆
52		2	Round Head Screw - 1/4-20 x 1/2" Lg	◆
53		1	Pipe Nipple - 3" NPT	PFA6694
54		1	Flange - 3"	PF62502121
55	◆●	1	Gasket, Fishpaper	PFM9589
56		4	Stud - 1/2-13 x 2" Lg	◆
57		4	Lockwasher - 1/2"	◆
58		4	Hex Nut - 1/2-13	◆
59		1	Suction Elbow - 3"	PFFP4531
60	◆●	1	Valve Flapper/Gasket, Rubber	PFMT9037
61	●	1	Check Valve Weight, Steel	PFP3748
62	●	1	Carriage Bolt - 1/4-20 x 1.25" Lg	PF002161
63	●	1	Valve Weight, Steel	PFP37677
64	●	1	Hex Nut - 1/4-20, Stainless	◆
65	●	1	Lockwasher - 1/4", Stainless	◆
66		1	Hatch Cover	PFP45306
67	●	1	Spring Pin - 1/4" Dia x 1" Lg	PF62502841
68		2	Flatwasher - 7/16"	◆
69		2	Capscrew - 7/16-14 x 1.25" Lg	◆
Repair Kits				
□	Seal & Gasket Kit - Includes; 3, 15,19, 26, 27, 31, 43, 44			PF89077
◆	Overhaul Assy - Includes; 3, 5, 7, 11, 13, 14, 15, 19, 20, 26, 27, 31, 34, 35, 43, 44, 55, 60			PF89088
●	Check Valve Kit - Includes; 55, 60, 61, 62, 63, 64, 65, 67			PF3LA-CVK



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.powerflopumps.com, Attention: Customer Service Department, to obtain any needed repair or replacement of part(s) or additional information pertaining to our warranty.

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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.

