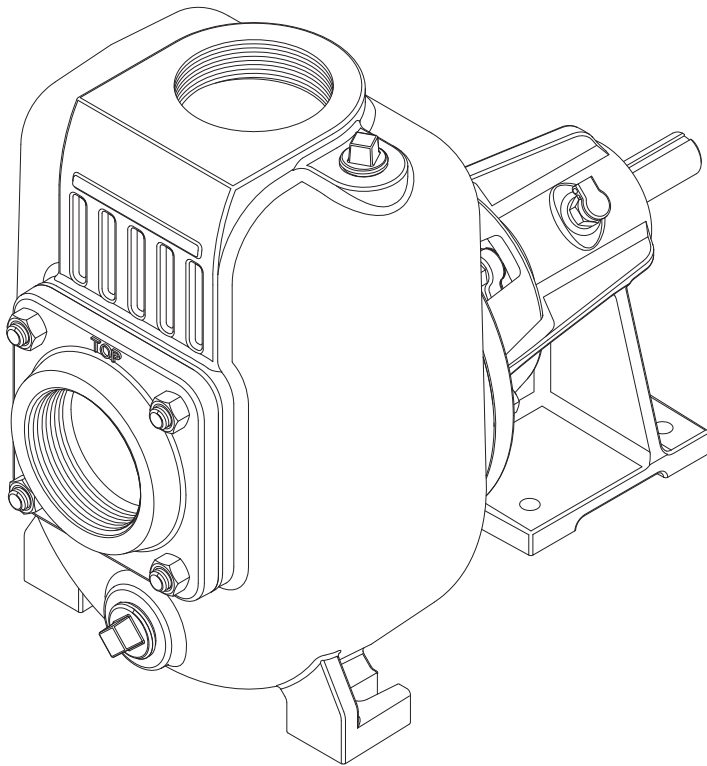


INSTALLATION, SERVICE & PARTS MANUAL



Series: PF20MU

***Self-Priming Frame
Mounted 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 imminently hazardous situation which, if not avoided, **WILL result in death or serious injury.**

⚠ WARNING "Warning" indicates an imminently 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.

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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 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.



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

IMPORTANT!

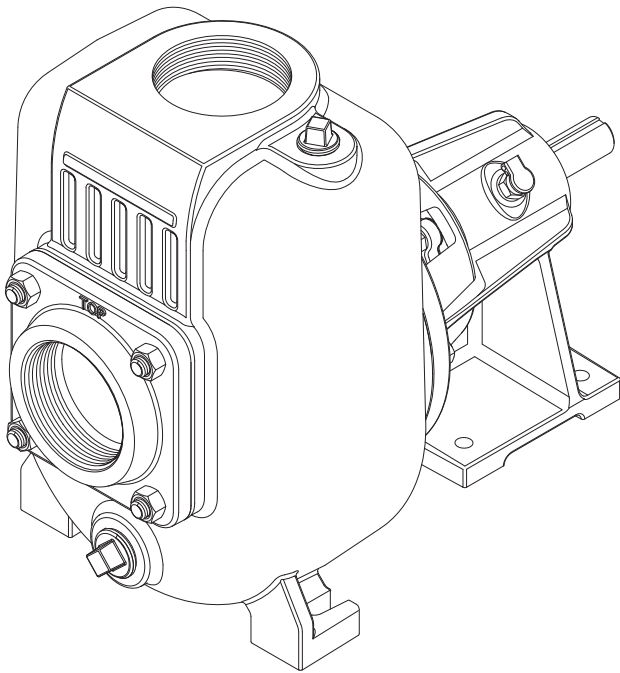
Prior to installation, record Model Number, MFG Date, and/or serial number, from pump name plate for future reference.

Model:
Serial:
MFG Date:



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Specifications

Series: PF20MU
3" x 3"
Universal Drive/Frame Mtd

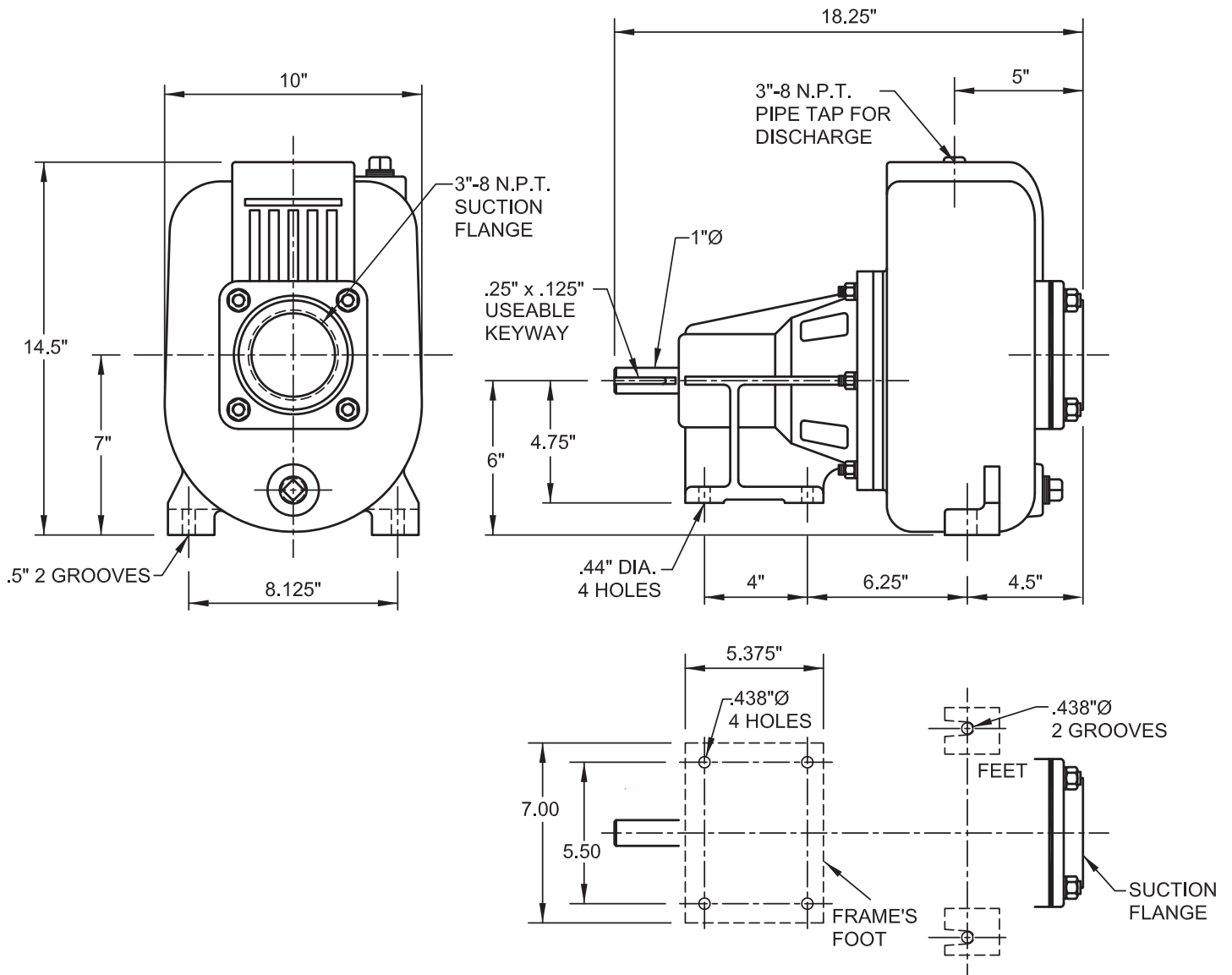
DISCHARGE	3" x 3" NPT, Female
LIQUID TEMPERATURE	160°F Continuous
CASING	Gray Iron, ASTM A48, Class 30
BEARING HOUSING	Gray Iron, ASTM A48, Class 30
SUCTION GLAND	Gray Iron, ASTM A48, Class 30
PEDESTAL	Gray Iron, ASTM A48, Class 30
SHAFT	Steel
SHAFT SLEEVE	Steel
IMPELLER	5 Vanes, Semi-open type. 3/4" Diameter Spherical solids handling. Material: Gray Iron, ASTM A48, Class 30
O-RINGS	Buna-N
HARDWARE	Steel
PAINT	Air dry enamel
SEAL	Mechanical, Type 21 Material: Carbon/Ceramic/Buna-N
PACKING	ADAMPACK
SHIM SET	Stainless
FLAP VALVE	Rubber with canvas cover

Description

Self-Priming frame mounted pumps for Industrial, Municipal and Marine applications.



Dimensions

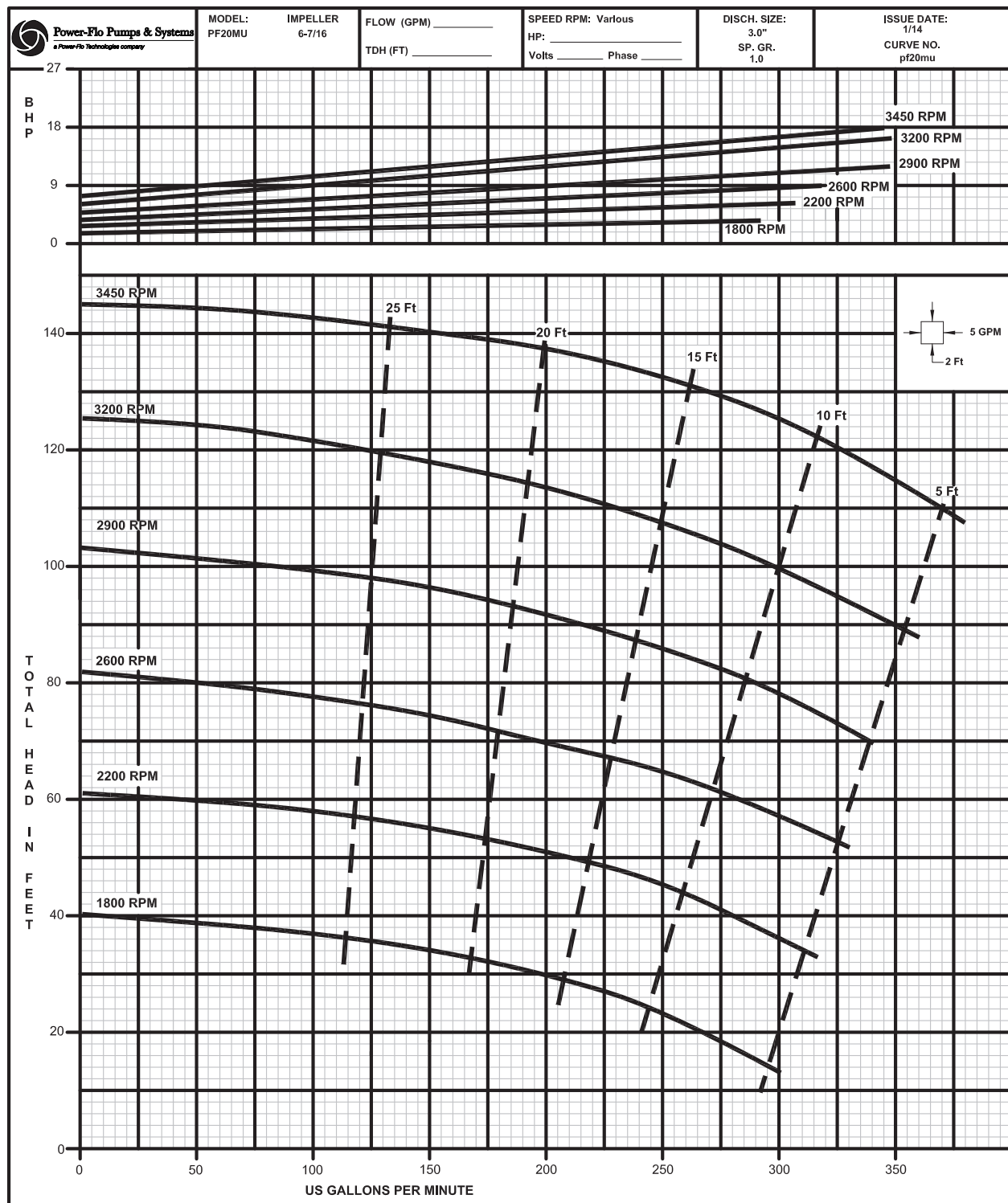


Model	Weight	
PF20MU	128 lbs	

Not for pumping flammable liquids or hazardous materials that is not compatible with pump materials.



Performance



Receiving, Installation & Service

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.

Location

Locate pump as near as possible to the liquid being pumped. Do Not place pump more than 25 feet above the surface of the liquid supply. Be sure pump is level. Mount pump firmly so not to move due to vibration.

Units should be permanently grouted onto a cement foundation. The pumps should be level to provide correct operating conditions. The flexible coupling should be realigned after grouting to eliminate excessive wear on the coupling.

Allow a minimum 18 inches in front of the pump case cover to permit easy removal and access to the interior of the pump. On belt drive units, allow a minimum of 10 inches at the shaft end to permit removal of the pedestal or rotating assembly.

Controls

Be sure the electrical specification of the control selected properly match the electrical specifications of the motor.

Motor Connection

All wiring of motor and control, overload protection and grounding should be in accordance with the National Electrical Code, State and Local codes. Make motor connection per label located on motor or motor manufactures manual.

Rotation

Pump rotation should agree with the direction on the rotation plate. If rotation on 3 phase is incorrect, interchange any two incoming wire leads. Rotation is "clockwise" when looking from the motor end.

The impellers are threaded on the shaft and it is necessary to slide one half of the coupling back when checking rotation in order to eliminate the possibility of unscrewing the impeller and damaging the pump.

Suction



CAUTION! - Pump should not be operated without a suction strainer to prevent foreign matter from being drawn into impeller. The strainer should be cleaned regularly.

The use of pipe the same size as the port size is highly recommended. Using a smaller pipe line can cause internal damage. Make sure all lines have air-tight joints. The smallest air leak in the suction line may prevent the pump from priming. All horizontal suction lines should slope up to the pump to avoid trapped air pockets.

Discharge

Connect discharge hose or pipe to the discharge port. Make sure all lines have air-tight joints.

Driver

Refer to Engine or Motor Manufacturer's Instructions.

Lubrication

The bearing housing is the only part that need lubricated. The shaft seals and impeller are lubricated by the liquid being pumped and needs no other lubrication.

The bearing housing is filled with 90 weight oil for bearing lubrication. The oil level should be checked periodically.

Priming

Remove pipe plug (32) in top of body (5) and fill the pump body completely with solids free liquid. In freezing weather prime pump with warm water.



DO NOT operate pump without priming first. Operating dry will damage seal.

Starting

To start pump, apply power to motor or engine per the Motor or Engine manufacture's instructions.

Shutdown

Disconnect electric power or stopping engine to shut down. It is recommended to drain and flush pump if pump has been operating in freezing weather.

Service

Turn off and lock out power before servicing pump.

Check Valve

Disconnect suction piping and remove hex nuts (27), and suction flange (2). DO NOT PRY ON FLANGE but bump off with block of wood and a hammer. Remove gasket (31), weights (3) & (4), screw (25) and replace if worn or damaged.

To replace, the *HINGE* section of gasket (31) is at the *TOP* and the *LARGE* weight is on the pump side of gasket.



Installation & Service**Body & Impeller**

Disconnect suction and discharge piping. To expose body (5), and impeller (6) for clean out or replacement, remove hex nuts (26) and lockwashers (16) then remove body (5) and gaskets (29) & (30) from bearing pedestal (1). If impeller (6) needs replacement, unscrew from shaft (10). Note the quantity of shims (17) & (18). The impeller has right hand threads, so to break loose use a block of wood against a vane and strike with hammer.

Shaft Seal

Remove body and impeller. Remove impeller shims (17), (18) and seal spring holder, spring and rotating member of seal (14) from shaft (10). Replace if worn or damaged.

If stationary member needs replaced, remove screws (21) and pull seal plate (8) together with stationary from bearing housing (1). Press stationary out of seal plate (8).



Handle all seal parts with care. Do Not damage lapped faces.

To reassemble, lightly oil seal cavity in seal plate (8) and ring of stationary member. Replace seal plate (8) onto bearing housing (1). Lightly oil shaft (10) press stationary over shaft and into seal plate (8). Lightly oil shaft sleeve (11) and inner surface of bellows of rotating member. With lapped surface facing bearing housing, slide rotating member onto shaft sleeve (11) until lapped faces are of rotating member and stationary together. Replace spring and spring holder and reassemble remainder of pump.

When impeller (6) is removed, also remove shims (17), (18). To reassemble be sure to use a combination of impeller shims (17) and (18), body gaskets (29) and (30) to result in an impeller-to-body clearance of approximately .015".

Shaft and Bearing

Pull deflector (28) from shaft (10), remove cap screws (22), lockwashers (16) and pull front bearing cap (7) with oil seal (15) and shims (19) and (20) from bearing pedestal (1). Tap on drive end of shaft (10) with a block of wood and a hammer, driving the shaft with bearings from pedestal (1).

Press bearings (13) from shaft (10) and remove oil seal (15) from pedestal by tapping with a drift and a hammer.

Press new oil seal (15) into pedestal with open end toward bearing. (See Figure 1) Press the cone and roller of drive end bearing (13) onto shaft (10) seating it snug against the shaft shoulder, with the taper running toward impeller end of shaft.

Press complete front bearing (13) onto impeller end of shaft (10) seating it snug against the shaft shoulder with taper running toward drive end of shaft.

Place assembled shaft and bearings into pedestal (1) key end first. Press oil seal (15) into bearing cap (7). Replace bearing cap (7) and oil seal (15) using required number of shims (19) and (20) to allow for a .005" shaft end play with cap screws (22) and lockwashers (16). Replace deflector (28) onto shaft (10) before reassembling remainder of pump.

Refill pedestal with 5.12 oz. of a ISO VG32, lubricating mineral oil suitable for hydraulic systems,

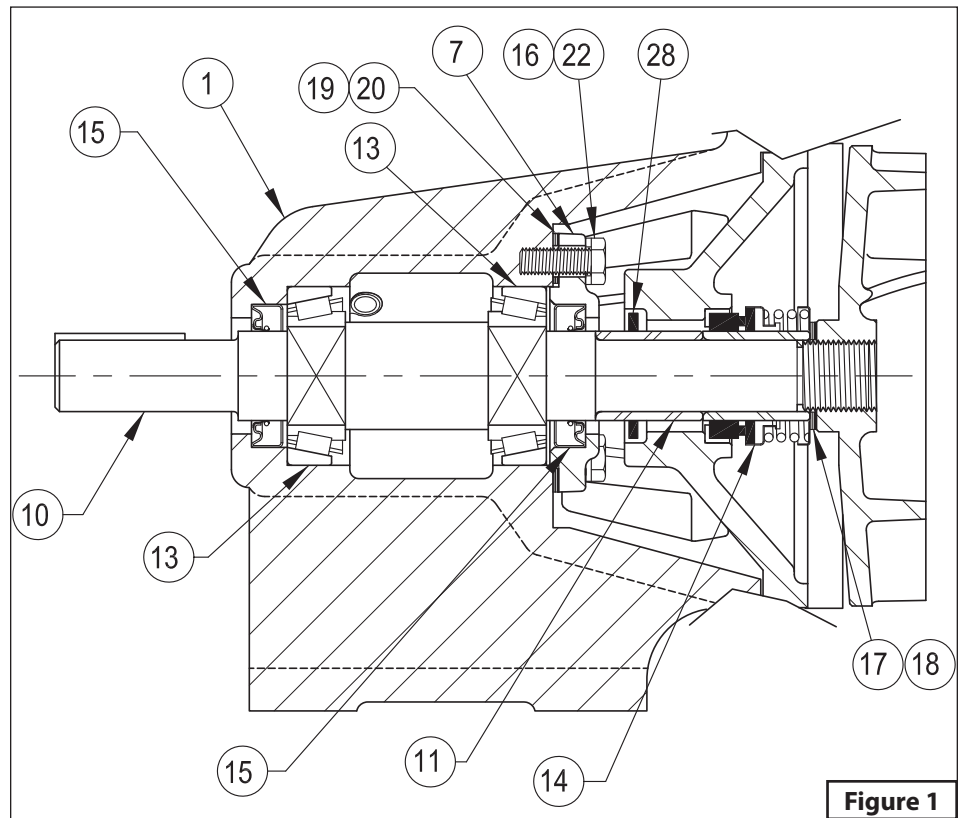


Figure 1



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.

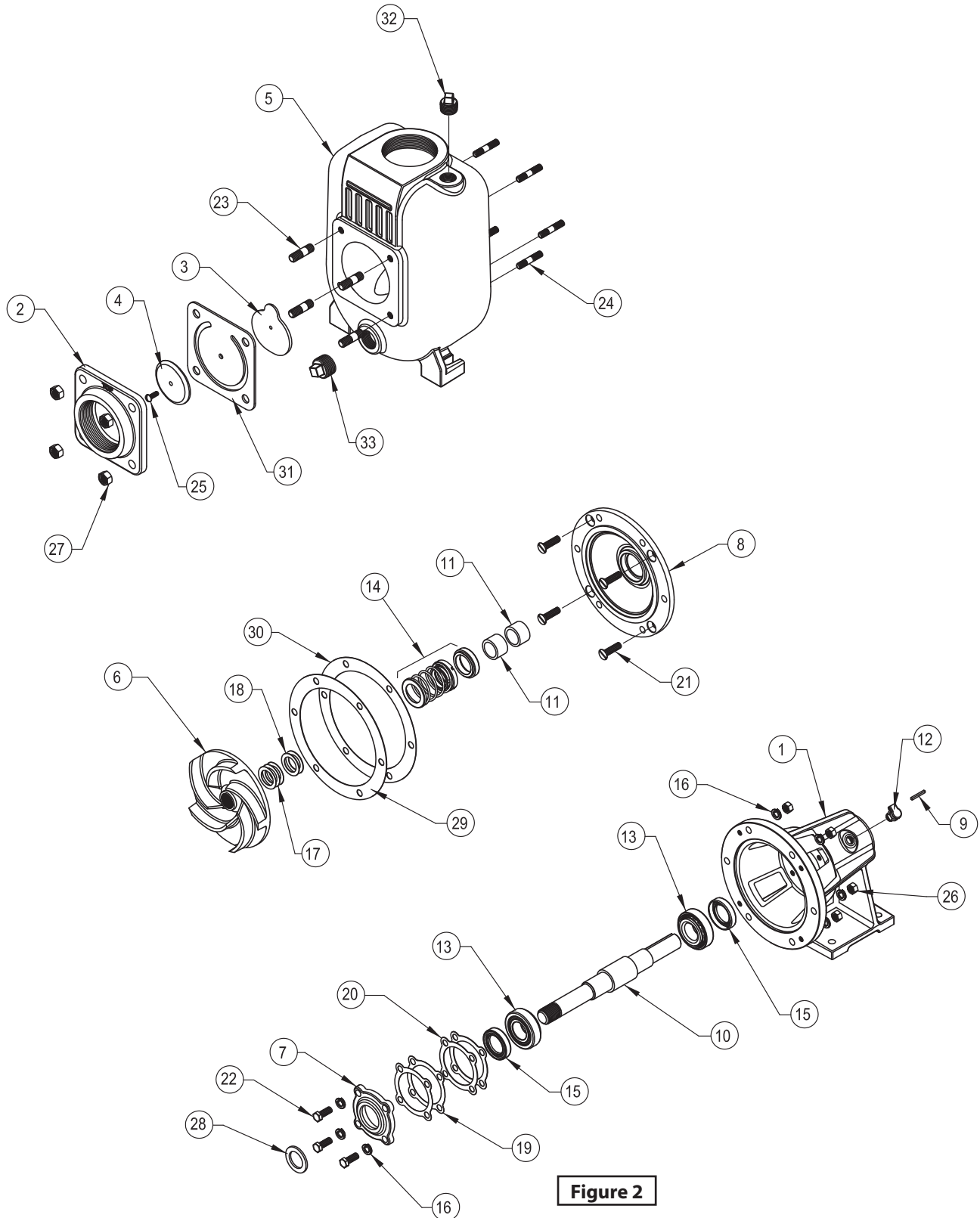


Figure 2



PF20MU**Self-Priming Frame Mounted 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 NUMBER
1	1		Bearing Housing	PF03040004
2	1	◆	Suction Flange	PF03050004
3	1	◆	Weight Large	PF03080006
4	1	◆	Weight Small	PF03080007
5	1		Casing	PF03090005
6	1	■	Impeller	PF03140005
7	1	◇	Cap Bearing	PF03170001
8	1	☆	Seal Plate	PF03180001
9	1	◇	Shaft Key 1/4" #5123	PF30400633
10	1		Shaft	PF30400701
11	2	☆	Shaft Sleeve	PF30400802
12	1	◇	Air Vent	PF31010033
13	2	◇	Bearing 15118/15250	PF31020002
14	1	☆	Shaft Seal 1.25", T21, Carbon/Ceramic/Buna-N	PF31030131
15	2	◇	Bearing Cap Oil Seal	PF31150001
16	10		Lockwasher 3/8"	◆
17	3	■	Shims Washer 0.10" #1349	PF91010121
18	2	■	Shims Washer .031" #1348	PF91010130
19	2	◇	Bearing Cap Shims #5126	PF91010147
20	2	◇	Bearing Cap Shims #5127	PF91010149
21	4		Conic Head Screw 3/8" x 1.50" Lg	◆
22	4		Hex Hd Screw 3/8 x 1" Lg	◆
23	4		Screw 1/2 x 1.75" Lg	◆
24	6		Screw 3/8 x 2" Lg #33824	◆
25	1	◆	Screw 1/4 x 3/4" Lg	PF91010404
26	6		Hex Nut 3/8"	◆
27	4		Hex Nut 1/2"	◆
28	1	◇	Deflector 1.25" Dia	PF92010014
29	1	☆	Casing Gasket #1699	PF92010142
30	1	☆	Casing Gasket #1700	PF92010143
31	1	◆	Suction Check Valve #11994	PF92010213
32	1		Square Head Plug 3/4"	◆
33	1		Square Head Plug 1"	◆
◆	CHECK VALVE KIT - Suction Flange (2), Large Weight (3), Small Weight (4), Screw (25), Check Valve (31)			PF20MUCHV-KIT
◇	PEDESTAL KIT - Bearing Kit (7), Shaft Key (9), Air vent (12), Bearing, Qty. 2 (13), Bearing Cap Oil Seal, Qty 2 (15), Bearing Cap Shims, Qty 2 (19), Bearing Cap Shims, Qty. 2 (20), Deflector (28)			PF20MUPED-KIT
■	IMPELLER KIT - Impeller (6), Shims 0.10", Qty 3 (17), Shims .031", Qty 2 (18)			PF20MUIMP-KIT

(◆) = Acquire standard hardware locally.

☆ = Supplied as individual items



[illegible]

Trouble Shooting Chart



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	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 15. Incorrect engine speed	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 15. Increase speed
Loss of suction after satisfactory operation	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	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	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 3. Speed too high	1. Increase back pressure by turning gate valve on discharge line to partially closed position that will not overload motor. 2. Consult factory 3. Check and correct speed
Pump vibrates and/or makes excessive noise	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	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	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	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	1. Worn mechanical seal 2. Seal not installed properly	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.



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.

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.

