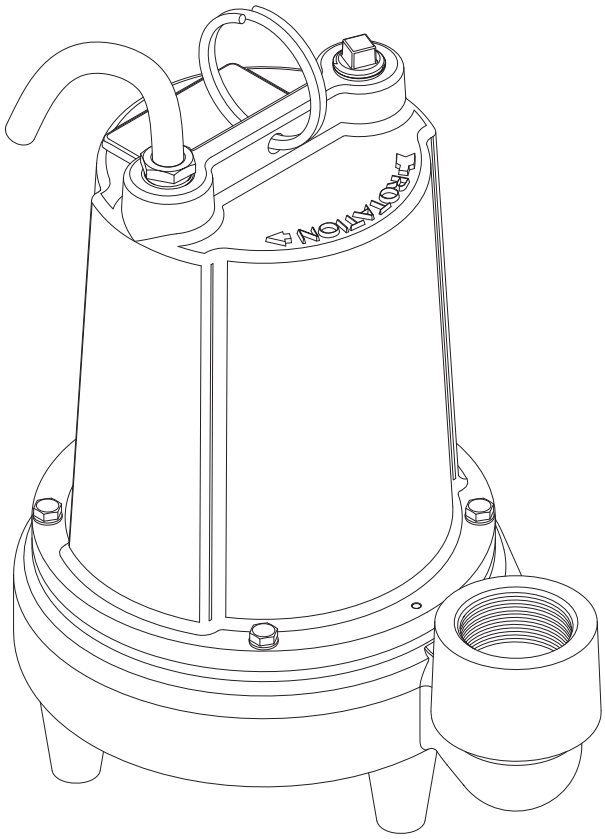
INSTALLATION, SERVICE & PARTS MANUAL



Series: PFEH512
PFEH1022
PFEH1032
PFEH1042

0.5 & 1HP • 3450 RPM
60 Hz
Submersible Effluent Pumps

Power-Flo Pumps & Systems

a Power-Flo Technologies company

877-24PUMPS • www.powerflopumps.com

ISP No: PFEH - 1/2021

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 imminenty hazardous situation which, if not avoided, WILL result in death or serious injury.***

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

⚠ CAUTION ***"Caution" indicates an 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 RECONTAMINATED 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.

⚠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. Pumps when used as a decorative water fountain pump **MUST** be used in circuit protected by a Ground Fault Interrupter.

⚠ 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** us these pumps in water over 104˚F. **Do not** exceed manufactures recommended maximum performance, as this could cause the motor to overheat.

⚠ DANGER **Do not** lift, carry or hang pump by the electrical cables. Damage to the electrical cables can cause shock, burnes or death. **Never** handle connected power cords with wet hands. Use appropriate lifting device.

⚠WARNING Sump and sewage pumps often handle materials which could cause illness or disease. wear adequate protective clothing when working on a used pump or piping. Never enter a basin after it has been used.

⚠ DANGER Failure to permanently ground the pump, motor and controls before connecting to power can cause shock, burns or death.

⚠WARNING These pumps are **NOT** to be installed in locations classified as hazardous in accordance with the National Electric Code, ANSI/NFPA 70.

⚠ CAUTION The Uniform Plumbing Code (UPC) states that sewage systems shall have an audio and visual alarm that signals a malfunction of the systems that is required to reduce the potential for property damage.

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

IMPORTANT!
Prior to installation, record Model Number, MFG Date, Amps, Voltage, Phase and HP, from pump name plate for future reference. Also record the Voltage and Current Readings at Startup:

1 Phase Models	
Amps:	Volts:
3 Phase Models	
Amps L1-2:	Volts L1-2:
Amps L2-3:	Volts L2-3:
Amps L3-1:	Volts L3-1:

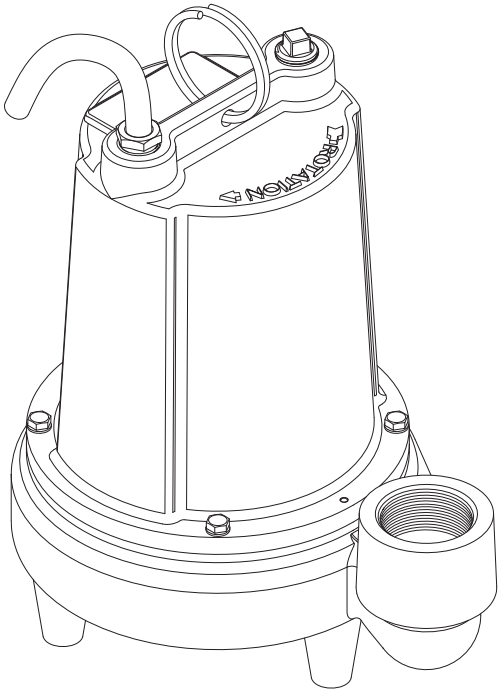
Model Number: _____

MFG Date: _____

PHASE: _____ HP: _____

 5/09, 6/09, 8/09, 12/09, 7/10, 3/11, 8/17, 9/2020, 1/2021

Specifications



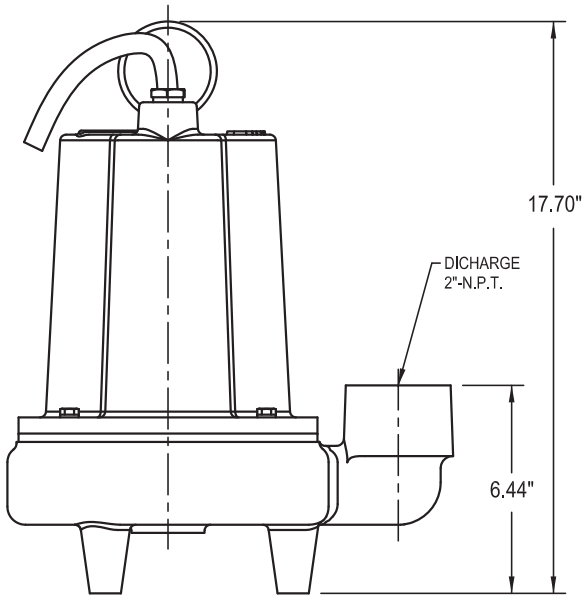
DISCHARGE	2" NPT Female, Vertical
LIQUID TEMPERATURE	104°F Continuous
MOTOR HOUSING	Cast Iron, Class 30
VOLUTE	Cast Iron, Class 30
IMPELLER	2 vane open with pump out vanes on back side. Bronze 85-5-5-5
SOLIDS HANDLING	3/4" spherical
SHAFT	Stainless steel
SEALPLATE	Cast Iron, Class 30
SQUARE RINGS	Buna-N
HARDWARE	Stainless steel
SEAL	Ouboard, Single mechanical, Oil Filled Silicon Carbide/Silicon Carbide/Buna-N
UPPER BEARING	Single row, ball, oil lubricated
LOWER BEARING	Single row, ball, oil lubricated
POWER CORD	15 Ft. Cord. Pressure Grommet for Sealing and Strain Relief
MOTOR	NEMA Design L - Single Phase, NEMA B - Three Phase, Class B Insulation
SINGLE PHASE	Permanant split capacitor Includes overload protection in motor
THREE PHASE	Requires overload protection to be include in control panel

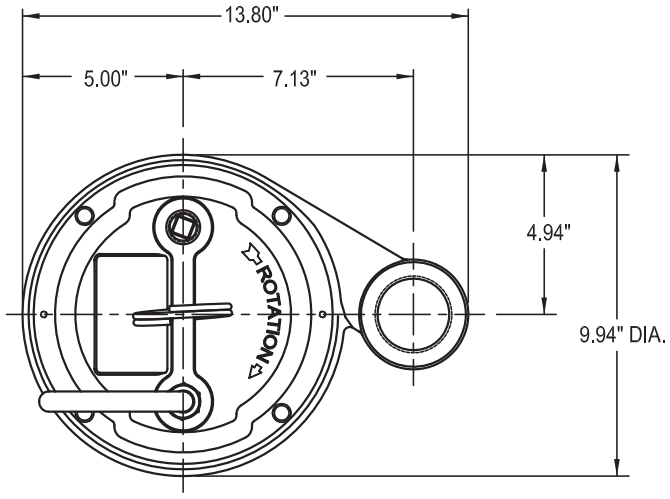
Series: PFEH512
PFEH1022
PFEH1032
PFEH1042

1/2 & 1HP, 3450 RPM, 60 Hz Submersible Effluent Pumps

HP	HP	VOLT/PH	Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D INCH
PFEH512	.50	115/1	60	3450	F	11.0	23.0	14/3	SJTOW	0.39
PFEH1022	1.0	230/1	60	3450	B	8.2	13.8	14/3	SJTOW	0.39
PFEH1032	1.0	230/3	60	3450	K	5.4	21.2	12/4	SOW	0.60
PFEH1042	1.0	460/3	60	3450	K	2.8	20.7	12/4	SOW	0.60

Dimensions

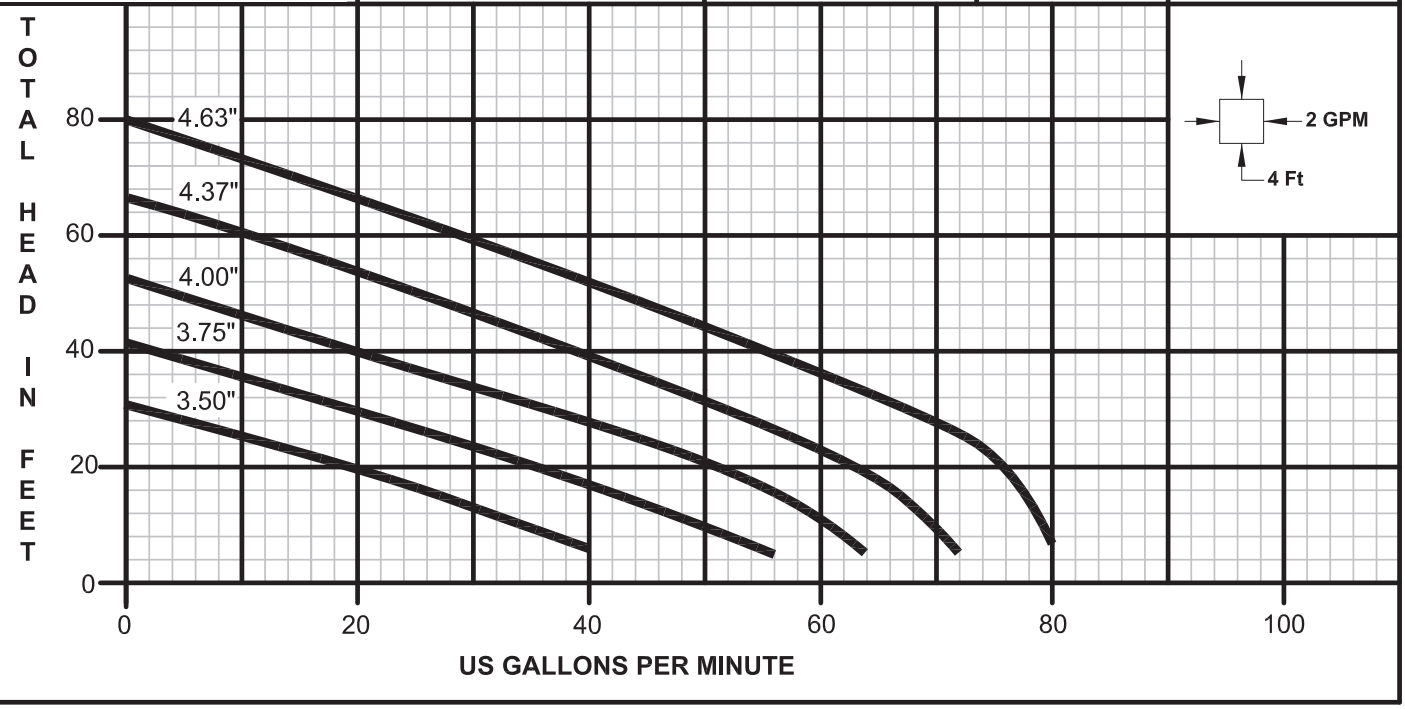




Performance

Power-Flo Pumps & Systems
a Power-Flo Technologies company

MODEL:	IMP. DIA.	SPEED RPM:	3500	DISCH. SIZE:	ISSUE DATE:
PFEH512, 522	4.00"	HORSE POWER:	1/2 & 1	2"	8/11
PFEH1022, 1032, 1042	4.63"	HERTZ:	60	SP. GR. 1.0	CURVE NO. PFEH curve 1



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.

Controls

Manual models require a separate approved pump control device or panel for automatic operation. Be sure the electrical specification of the control selected properly match the electrical specifications of the pump.

Submergence

The pump should always be operated in the submerged condition. The minimum sump liquid level should never be less than above the pump's volute (See Figure 1).

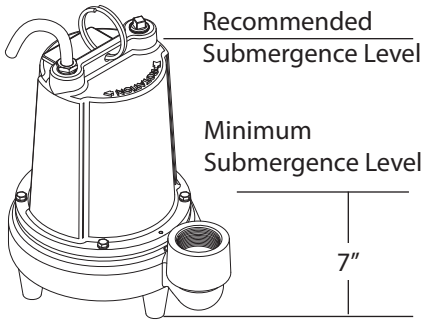


Figure 1

Installation

There are two methods of installing effluent pumps:
1.) In a Flex-Hose system, most commonly used in interceptor tanks and.
2.) A slide rail in a package system or concrete wet well, which allows the pump(s) to be installed or removed without requiring personnel to enter the wet well.

The sump or basin shall be sealed and vented in accordance with local plumbing codes. ***This pump is designed to pump effluent or wastewater, nonexplosive and noncorrosive liquids and shall NOT be installed in locations classified as hazardous in accordance with the National Electrical Code (NEC) ANSI/NFPA 70 or Canadian Electric Code (CEC).*** The pump should never be installed in a trench, ditch, or hole with a dirt bottom. The legs will sink into the dirt and the suction will become plugged.

The installation should be at a sufficient depth to ensure that all plumbing is below the frost line. If this is not feasible, remove the check valve and size the basin to accommodate the additional backflow volume.

Discharge Piping

Discharge piping should be as short as possible and sized no smaller than the pump discharge. **Do not reduce the discharge pipe size below that which is provided on the pump.** Both a check valve and a shut-off valve are recommended for each pump. The check valve is used to prevent backflow into the sump. The shut-off valve is used to manually stop system flow during pump servicing.

Liquid Level Controls

The level control(s) should be mounted on the discharge piping, a cable rack or float pole. The level control should have adequate clearance so it cannot hang up in it's swing and that the pump is completely submerged when the level control is in the "Off" mode. By adjusting the cord tether the control level can be changed. One cycle of operation should be observed, so that any potential problems can be corrected.

It is recommended that the level control float should be set to insure that the liquid in the sump never drops below the top of the motor housing or a minimum level of 17 inches above the basin floor.

Electrical Connections

Power cable:
The power cable mounted to the pump must not be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be made in accordance with the electric codes. It is recommended that a junction box, if used, be mounted outside the sump or be of at a minimum Nema 4 construction if located within the wet well. **DO NOT USE THE POWER CABLE TO LIFT PUMP.**

Always rely upon a Certified Electrician for installation.

Overload Protection:
Single Phase - The stator in-winding overload protector used is referred to as an overheating protector and operates on the combined effect of temperature and current. This means that the overload protector will trip out and shut the pump off if the windings become too hot, or the load current passing through them becomes too high.

Installation & Service

IMPORTANT ! - The overload will then automatically reset and start the pump up after the motor cools to a safe temperature. In the event of an overload, the source of this condition should be determined and corrected immediately.

WARNING! - DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !

If current through the temperature sensor exceeds the values listed, an intermediate control circuit relay must be used to reduce the current or the sensor will not work properly.

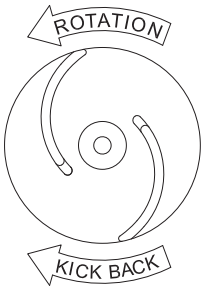
TEMPERATURE SENSOR ELECTRICAL RATINGS		
Volts	Continuous Amperes	Inrush Amperes
110-120	3.00	30.0
220-240	1.50	15.0

Wire Size:
If longer power cable is required consult a qualified electrician for proper wire size.

Pre-Operation

1. Check Voltage and Phase
   Compare the voltage and phase information stamped on the pump name plate.

2. **Check Pump Rotation** - Improper motor rotation can result in poor pump performance and can damage the motor and/or pump. Incorrect rotation for Single-Phase pumps is unlikely. Impeller rotation is counter-clockwise as viewed from bottom of pump.



Bottom of Pump

3. **Name Plate** - Record the information from the pump name plate to drawing in front of manual for future reference.

4. **Insulation Test** - An insulation (megger) test should be performed on the motor. Before the pump is put into service. The resistance values (ohms) as well as the voltage (volts) and current (amps) should be recorded.

5. **Pump-Down Test** - Be sure pump has been properly wired, lowered into the basin, sump or lift station, check the system by filling with liquid and allowing the pump to operate through its pumping cycle. The time needed to empty the system, or pump-down time along with the volume of water, should be recorded.

Maintenance

No lubrication or maintenance is required. Perform the following checks when pump is removed from operation or when pump performance deteriorates:

a). Inspect motor chamber for oil level and contamination.
b). Inspect impeller and body for excessive build-up or clogging.
c). Inspect motor and bearings.
d). Inspect seal for wear or leakage.

Servicing

NOTE: Item numbers in ( ) refer to Figure 6.

Cooling Oil - Anytime the pump is removed from operation, the cooling oil in the motor housing should be checked visually for oil level and contamination. To check oil, set unit upright. Remove pipe plug (16) from housing (4). With a flashlight, visually inspect the oil in the housing (4) to make sure it is clean and clear, light amber in color and free from suspended particles. Milky white oil indicates the presence of water. Oil level should be just above the motor when pump is in vertical position.

Oil Testing

- Drain oil into a clean, dry container by placing pump on it's side, remove pipe plug (16), from housing (4).
- Check oil for contamination using an oil tester with a range to 30 Kilovolts breakdown.
- If oil is found to be clean and uncontaminated (measuring above 15 KV. breakdown), refill the housing.
- If oil is found to be dirty or contaminated (or measures below 15 KV. breakdown), the pump must be carefully inspected for leaks at the shaft seal, cable assembly, square ring and pipe plug, before refilling with oil. To locate the leak, perform a pressure test.

After leak is repaired, dispose of old oil properly, and refill with new oil.

Pressure Test (If oil has been drained)
Remove pipe plug (16) from housing (4). Apply pipe sealant to pressure gauge assembly and tighten into hole. Pressurize motor housing to 10 P.S.I. Use soap solution around the sealed areas and inspect joints for "air bubbles". If, after five minutes, the pressure is still holding constant, and no "bubbles" are observed, slowly bleed the pressure and remove the gauge assembly. Replace oil. Leek must be located and repaired if pressure does not hold.

Pressure Test (If oil has NOT been drained) - Oil should be at normal level. Remove pipe plug (16) from housing (4). Apply pipe sealant to pressure gauge assembly and tighten into hole. Pressurize motor housing to 10 P.S.I.

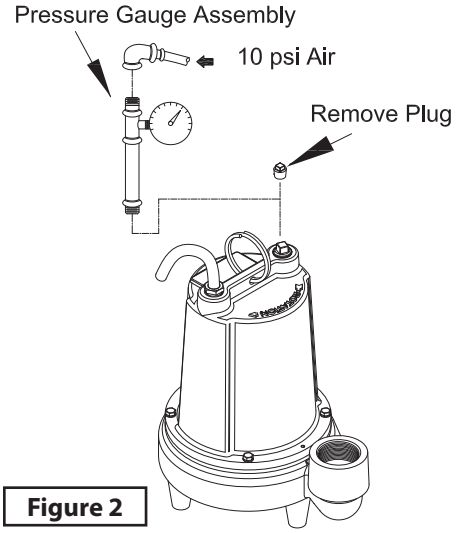


Figure 2

Use soap solution around the sealed areas above the oil level and inspect joints for "air bubbles". For sealed areas below oil level, leeks will seep oil. If, after five minutes, the pressure is still holding constant, and no "bubbles" /oil seepage is observed, slowly bleed the pressure and remove the gauge assembly. Replace oil. Leek must be located and repaired if pressure does not hold.

Pressure builds up extremely fast, increase pressure by "TAPPING" air nozzle. Too much pressure will damage seal. ***DO NOT exceed 10 P.S.I.***

Oil Replacement - Set unit upright and refill with new cooling oil as per table. Fill to just above motor, (but below capacitor, on 1 phase units) as an air space must remain in the top of the housing to compensate for oil expansion. Apply pipe thread compound to threads of pipe plug (16) then assemble to housing (4).

DO NOT *overfill oil. Overfilling of housing with oil can create excessive and dangerous hydraulic pressure which can destroy the pump and create a hazard. Overfilling oil voids warranty.*

102 oz - Cooling Oil Recommended Supplier/Grade	
BP	Enerpar SE100
Conoco	Pale Paraffin 22
Mobile	D.T.E. Oil Light
Shell Canada	Transformer-10
Texaco	Diala-Oil-AX

Disassembly & Assembly

Impeller, V-ring and Volute:

Disconnect power. Remove cap screws (8) and lock washers (9) vertically lift motor, housing and seal plate assembly from volute (1). Clean out volute (1) if necessary. Inspect gasket (12) and replace if cut or damaged. Clean and examine impeller (2), for cracks or breakage and replace if required. To remove impeller (2), remove impeller nut (10), place a flat screwdriver in the slot of the end of the shaft to hold the shaft stationary while unscrewing the impeller (2).

To reassemble, clean the threads with thread locking compound cleaner. Apply removable Loctite® 242 or equivalent to shaft threads. Screw impeller (2) onto the shaft hand tight while using a screwdriver in the slot at the end of the shaft to hold it stationary. Install impeller nut (10) and tighten. Rotate impeller to check for binding. Position gasket (12) on volute flange and position impeller and motor housing assembly on volute (1). Position lock washer (9) on cap screw (8) and screw into volute (1). Torque to 100 in-lbs. Check for free rotation of impeller.

Motor, Capacitor, Bearings:

Place pump upright on blocks or piece of PVC pipe, to avoid resting unit on shaft. Disassemble volute and impeller as stated and drain oil from housing. Loosen gland nut (19) and slide up cord along with washers (20) and grommet (21). Remove socket head screws (15) from seal plate (3). Slide motor housing (4) up cable (18) until wire connectors (24) are exposed. ***NOTE wire connections for reassembly.*** Disconnect cable leads from motor leads and remove motor housing (4) and o-ring (11), replace if cut or damaged.

Check motor capacitor (29) with an Ohm meter by first grounding the capacitor by placing a screwdriver across both terminals and then removing screwdriver. Connect Ohm meter (set on high scale) to terminals. If needle moves to infinity (∞) then drifts back, the capacitor is good. If needle does not move or moves to infinity (∞) and does not drift back, replace capacitor (29). Inspect motor winding for shorts and check resistance values. Check rotor for wear. If rotor or the stator windings are defective, the complete motor must be replaced.

Disconnect capacitor leads from capacitor (29). Remove v-ring (13) and spacer (14) from seal plate (3). Remove bolts from motor stator (6) and lift stator up from rotor. Loosen conduit bushing (25) and remove motor rotor, bearing and seal assembly from seal plate (3).

SEAL - Remove rotating member (5b), spring (5c) and retaining ring (5d), from shaft (see Figure 3). Inspect for signs of uneven wear pattern on stationary member, chips and scratches on either seal face. Replace the complete seal if any part is damaged.

Service

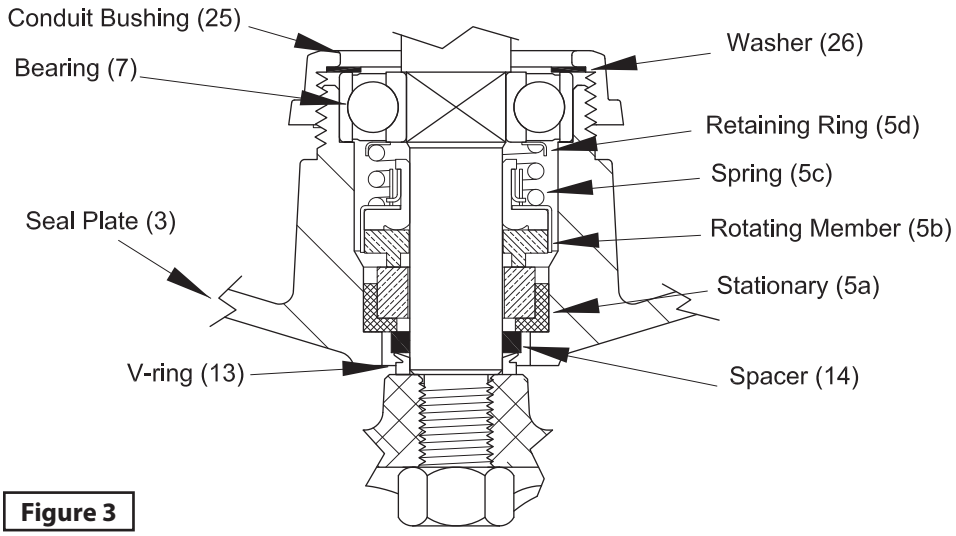


Figure 3

If replacing the seal, remove stationary (5a) from seal plate (3) by prying out with screw driver.

BEARING - Examine bearing (7) and replace if worn. Remove bearing (7) from shaft using a wheel puller, if replacement is required. The washer bushing (26) and conduit bushing (25) can now be removed.

REASSEMBLY

IMPORTANT! - All parts must be clean before reassembly. Handle seal parts with extreme care. DO NOT damage lapped surfaces.

To reassemble - clean seal cavity in seal plate (3) and oil. Press seal's (5) stationary member (5a) firmly into seal plate (3), using a seal tool or pipe. Nothing should come in contact with the seal face except the seal tool. Be sure the stationary is in straight. Lightly oil **(Do not use grease)** shaft and inner surface of bellows.

Slide retaining ring (5d) and spring (5c) over shaft and let rest on bearing. Lightly oil **(Do not use grease)** shaft, bullet and inner srface of bellows on rotating member (5b). See Figure 3. With lapped surface of rotating member (5b) facing outward, slide over seal tool and unto shaft, making sure spring (5c) is seated in retaining ring (5d) and spring (5c) is lined up on rotating member (5b) and not cocked or resting on bellows tail.

Place conduit bushing (25) and washer (26) onto shaft. Slide rotor/shaft (6) with bearing (7) and seal (5) into seal plate (3) until bearing (7) seats into seal plate. Locate washer (26) into place on bearing and tighten conduit bushing (25) onto seal plate (3). Place stator (6) over rotor (6), lining up motor bolts with holes in seal plate (3). Position capacitor (29) on motor with clamp (30) and reconnect capacitor leads. Torque motor bolts to 17 in-lbs. Set square ring (11) in grove on seal plate (3).

Lower motor housing (4) down onto seal plate (3) while aligning holes and stringing motor leads through the cord entry bore. Place socket head screws (15) through seal plate (3) into housing (4) and torque to 60 in-lbs. Reconnect motor leads, as shown in Figure 5.

Power Cable Connection

Check power cord (18) for cracks or damage and replace if required. Insert one washer (20), grommet (21), washer (20) into motor housing (4). Apply pipe sealant to gland nut (19) and screw into motor housing (4). Torque gland nut to (19) to 15 ft. lbs. to prevent water leakage (See Figure 4). Refill the cooling oil and replace pipe plug (16).

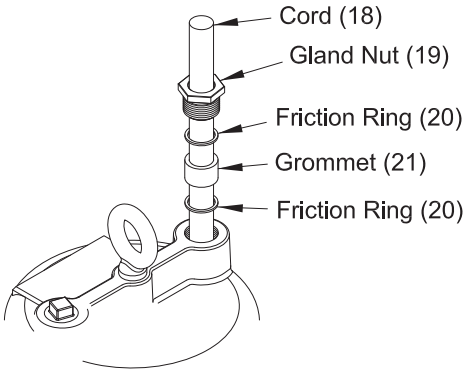


Figure 4

Insert spacer (14) and v-ring (13) into seal plate (3) and reassemble remaining parts per "Impeller, V-ring and Volute" section on page 7.

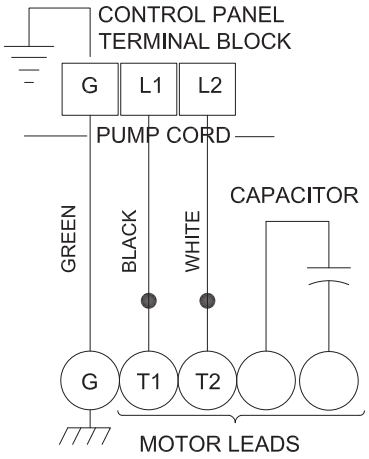


Figure 5 - 115/230 Volt AC, 1Ph
Models: PFEH512, PFEH1022

Power Cable	Motor Lead Number
Green (Ground)	Green
Black	1
White	2
Flag Terminal	Capacitor
Flag Terminal	Capacitor

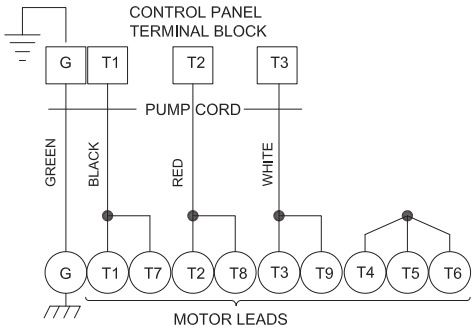


Figure 5 - 230 Volt AC, 3Ph
Models: PFEH1032

Power Cable	Motor Lead Number
Green (Ground)	Green
Black	1 & 7
Red	2 & 8
White	3 & 9
	4, 5 & 6 Together

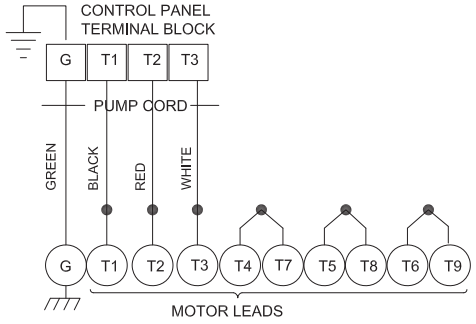


Figure 5 - 460 Volt AC, 3Ph
Models: PFEH1042

Power Cable	Motor Lead Number
Green (Ground)	Green
Black	1
Red	2
White	3
	4 & 7 Together
	5 & 8 Together
	6 & 9 Together

Figure 5

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.

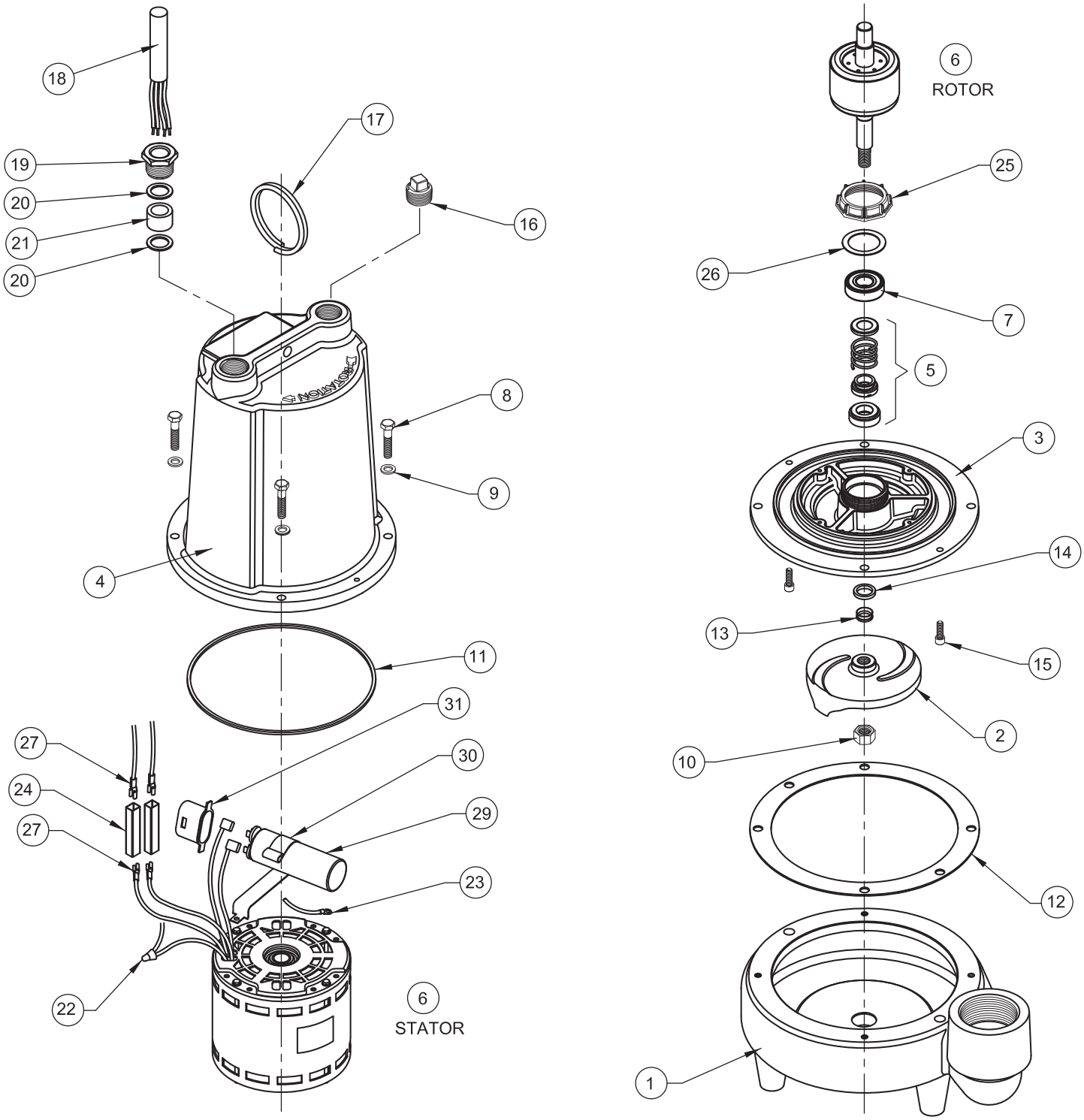


Figure 6

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

Ref. No.	Qty		Name	Part Numbers
1	1		Volute	PF3090055
2	1	☆	Impeller, 4.00 Dia. 1/2HP	PF03140104
			Impeller, 4.63 Dia. 1 HP	PF03140104B
3	1		Seal plate	PF03180011
4	1		Motor Housing Single Phase	PF03100001
			Motor Housing Three Phase	PF03100001B
5	1	♦	Shaft Seal, Silicon Carbid/Silicon Carbide/Buna-N	PF31030151
6	1	☆	Motor, 1/2HP, 1Ph, 115 Volt, 3450RPM	PF40040011
			Motor, 1 HP, 1Ph, 230 Volt, 3450RPM	PF40040012
			Motor, 1 HP, 3Ph, 230/460 Volt, 3450RPM	PF40040013
7	1	♦	Ball Bearing	PF31020008
8	4		Screw, 5/16-18 x 1-1/2" Lg., Stainless	♦
9	4		Lock Washer, 5/16 Stainless	♦
10	1	♦	Impeller Nut, 1/2" Stainless	♦
11	1	♦	Gasket #27269	PF92010082
12	1	♦	Gasket #27344	PF92010147
13	1	♦	V-ring #56789	PF92010111
14	1	♦	Spacer	PF92010086
15	2		Soc Hd cap screw 1/4" x 3/4" Lg Stainless	♦
16	1		Pipe Plug, 3/4" NPT	♦
17	1		Lifting bail	PF31120002
18	1	☆	Power cable Assembly, 14/3, SJTOW, For 1/2 & 1 Hp, 1 Ph. Includes 19, 20, 21	PF091513
19	1		Hex plug, For 1/2 & 1Hp, 1Ph	PF30400901
20	2		Washer, For 1/2 & 1Hp, 1Ph	PF91010057
21	1		Grommet, For 1/2 & 1Hp, 1Ph	PF92010005
18	1	☆	Power cable Assembly, 12/4, SOW, For 1 Hp, 3 Ph. Includes 19, 20, 21	PF051545
19	1		Hex plug, For 1/2 & 1Hp, 3Ph	PF30400902
20	2		Washer, For 1/2 & 1Hp, 3Ph	PF91010056
21	1		Grommet, For 1/2 & 1Hp, 3Ph	PF92010004
22	1		Wire Connector, 3Ph	PF94010012
23	1		Terminal 3/16"	♦
24	2 3		Terminal Connector, 1Ph 3Ph	PF94010027

♦ = Aquire standard hardware locally.
♦ = OVERHAUL 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.

25	1	♦	Conduit Bushing	PF31190022
26	1	♦	Washer Bushing	PF91010053
27	2 6		Female Connector, 1Ph 3Ph	PF94010041
28	.8 Gal		Cooling Oil - See Chart on Page 7	Aquire Locally
29	1	☆	Capacitor	PF31030031
30	1		Clamp	PF93010001
31	1		Wire Connector	PF94010011
OVERHAUL KIT				
♦	Kit to include: shaft seal (5), bearing (7), impeller nut (10), gasket (11), gasket (12), v-ring (13), spacer (14), conduit bushing (25), washer (26).			PFEH-OHK

Typical Name Plate

POWER-FLO *Pumps & Systems*

Model Number

MFG Date

AMPS VOLTAGE

PHASE HP

60 Hz

POWER-FLO *Pumps & Systems*
877-24 PUMPS
www.powerflopumps.com

♦ = Aquire standard hardware locally.
♦ = OVERHAUL Kit.
☆ = Supplied as individual items.

Power-Flo Pumps & Systems
a Power-Flo Technologies company

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
Pump will not run	Blown fuse or other interruption of power; improper voltage.	Check that the unit is securely plugged in. Have an electrican check all wiring for proper connections and adequate voltage and capacity.
	Switch is unable to move to the "turn ON" position due to interference with the side of basin or other obstruction	Position the pump or switch so that it has adequate clearance for free operation.
	Insufficient liquid level	Make sure the liquid level is allowed to rise enough to activate level control(s).
	Defective level control	Remove and replace level controls
Pump will not turn off	Discharge is blocked or restricted	Check the discharge line for foreign material, including ice if discharge line passes through or into cold areas
	Check valve is stuck closed or installed backwards	Remove check valve(s) and examine for freedom of operation and proper installation
	Gate or ball valve is closed	Open gate or ball valve
	Total lift is beyond pump's capability	Try to route piping to a lower level. If not possible, a larger pump may be required. Consult the factory
	Pump impeller is jammed or volute casing is pluged	Disconnect unit electrically. Remove the pump from the basin. Detach the pump base and clean the area around the impeller. Rotate impeller by hand. Reassemble and reinstall
Pump will not turn off	Level control(s) unable to move to the "turn OFF" position due to interference with the side of basin or other obstacle	Posistion the pump or level control so that it has adequate clearance for free operation
	Defective level control	Remove and replace level control
Pump runs periodically when fixtures are not in use	Check valve is stuck open or is leaking	Remove check valve(s) and examine for freedom of operation and proper installation
	Fixtures are leaking	Repair fixtures as required to eliminate leakage
Pump operates noisily	Debris in the impeller cavity	Remove the pump from the basin. Detach the pump base and clean the area around the impeller. Reassemble and reinstall
	Damaged impeller	Consult the factory for information regarding replacement of impeller
	Worn bearings	Return pump to the factory or authorized repair station for repair
	Piping attachments to building are too rigid	Replace a portion of the discharge line with rubber hose or connector

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.

Notes:

Notes:

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.