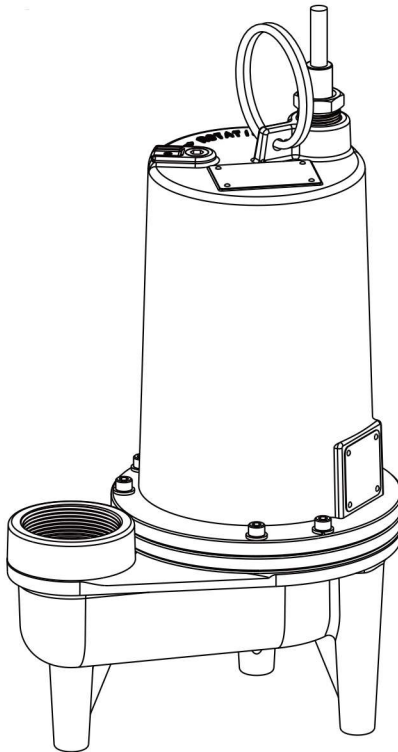




## Installation, Operation, & Maintenance Manual

### Submersible Sewage Pumps



**IMPORTANT! Read all instructions in this manual before operating or servicing a pump.**

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 Bluefin product is carefully inspected to ensure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of Trouble-Free service.

"DANGER" indicates an imminently hazardous situation which, if not avoided WILL, result in death or serious injury.

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

"CAUTION" indicates an imminently hazardous situation which, if not avoided MAY, result in minor or moderate injury.

**IMPORTANT:** SupplyHouse.com 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 ensure employees will not be exposed to 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/servicing is to be conducted by qualified personnel only.

Keep clear of suction and discharge openings. Do not insert fingers in pump with power connected; the impeller can cause serious injury.

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 the pump or any accessory items associated with or near the pump.

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

**"DANGER" : RISK OF ELECTRIC SHOCK. To reduce risk of electric shock, always disconnect pump from power source before handling any aspect of the pumping system. Lock out power and tag.**

**"WARNING" : Do not use these pumps in water over 104°F. Do not exceed manufacturer's 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, burns 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.**

**"DANGER" These pumps are not to be installed in locations classified as hazardous in accordance with the National Code, ANSI/NFPA 70.**

**"WARNING" The Uniform Plumbing Code (UPC) States that sewage systems shall have an audio and visual alarm, readily accessible, that signals a system malfunction. This is required to reduce the potential for property damage.**

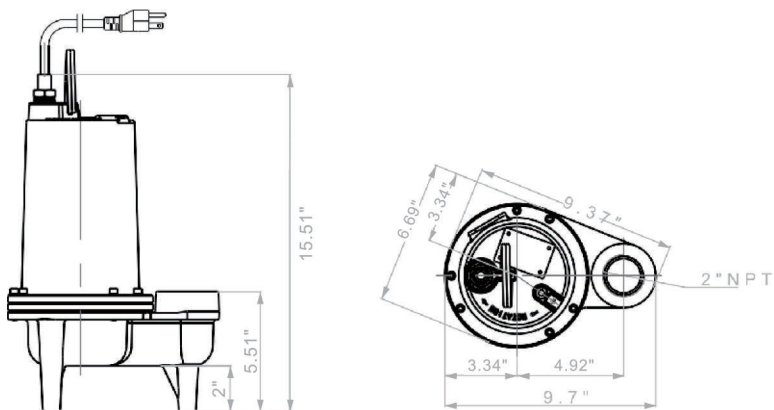
**IMPORTANT! Prior to installation, record Model Number, Serial, Amps, Voltage, Phase, and HP from pump name plate for future reference. Also record the Voltage and Current reading at startup.**

**Model Number \_\_\_\_\_ Serial \_\_\_\_\_ AMPS \_\_\_\_\_**

**Voltage \_\_\_\_\_ Phase \_\_\_\_\_ HP \_\_\_\_\_ Current \_\_\_\_\_**

- Discharge:** 2" NPT, Female, Vertical
- Solid Handling:** 2"
- Liquid Temp:** 104F (40C) Max
- Volute:** Cast Iron ASTM A-48 Class 30
- Motor Housing:** Cast Iron ASTM A-48 Class 30
- Impeller:** Vortex. Cast Iron ASTM A-48 Class 30, dynamically balanced, ISO G6.3
- Shaft:** 416 Series Stainless Steel
- O-Rings:** Square Shaped Buna-N
- Paint:** Air Dry enamel, water based
- Seal:** Single Mechanical, oil filled chamber. Carbon/Ceramic / Buna-N, with stainless steel hardware.
- Hardware:** 300 Series stainless steel
- Cord Entry:** SJTOW 16/3, Sealed against moisture.
- Upper Bearing:** Ball, single row, oil lubricated for radial load.
- Lower Bearing:** Ball, single row, oil lubricated for radial and axial loads.
- Motor:** NEMA L, single phase, permanent split capacitor, 115v 60 Hz, 3500 RPM, oil filled, with overload protection in motor.

Model	HP	Volts	Phase	RPM	Amps	Cord	Max Head (ft)	Flow GPH (5ft head)
PUPLSEV412-V	4/10	115	1	3500	10.8	10 ft.	24.5	92



## Receiving Inspection

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, please contact [SupplyHouse.com](http://SupplyHouse.com) as soon as possible. If the manual is removed from the packaging do not lose or misplace.

## Storage

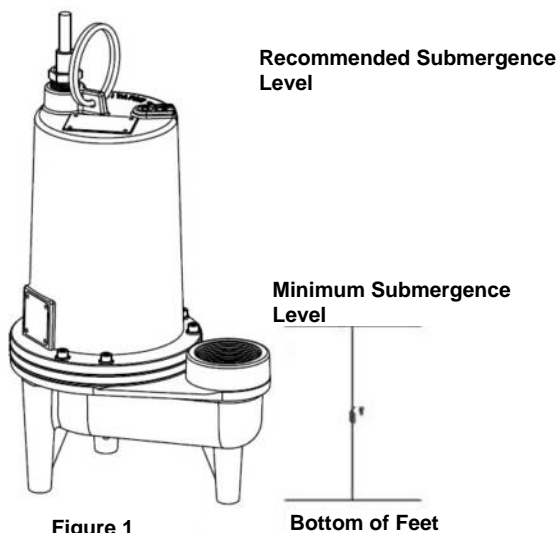
Any product that is stored for a period longer than 6 months from the date of purchase should be bench tested prior to installation. A bench test consists of checking the impeller to assure it is freely turning, and switch (if provided) operates properly.

## Controls

Any product that is stored for a period longer than 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 freely turning, and that the switch (if provided) operates freely.

## 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).

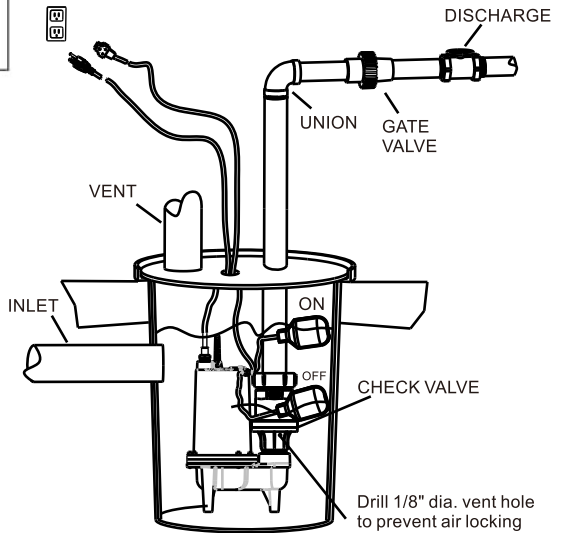


## Liquid Level Control

### Typical Discharge Pipe Mounted:

Refer to Figure 2 which shows a typical installation of a 1 ph 115v Pump using a level control mounted to the discharge piping with a piggyback plug. Level control should have adequate clearance so it can not hang up in it's swing and 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.

## Typical Discharge Pipe Mounted Level Control



### Level Control Basic Instructions:

Plug the level control plug into the GFI receptacle, then plug the pump into the piggyback plug (See Figure 3). 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 ensure that the liquid in the sump never drops below the top of the motor housing or a minimum level of 6" above the basin floor.

**Installation:** These pumps are recommended for use in a sump or basin. The sump or basin shall be sealed and vented in accordance with local plumbing codes. This pump is designed to pump effluent or wastewater, non explosive and noncorrosive liquids, and shall NOT be installed in locations classified as hazardous in accordance with the National Electrical Code (NEC).

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.

## **Electrical Connections**

### **Power Cable:**

The power cable mounted to the pump must not be modified in any way. This pump is provided with a 3 wire cord and 3 prong grounded plug that must be connected into a 3 wire grounded Ground Fault receptacle. Do not bypass grounding wire or remove ground prongs from plug. This pump requires a separate, properly fused and grounded branch circuit. Use of a ground fault circuit interrupter (GFCI) is strongly recommended.

The electrical outlet or panel shall be within the length limitations of the pump power cord, and at least 4 feet above floor level to minimize possible hazards from flood conditions. Do not use an extension cord.

### **IF USED with Control Panel:**

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 NEMA 4 Construction at a minimum, if located within the wet well.

### **DO NOT USE 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 inherent 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.

### **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 required, consult 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. If the rotation is incorrect contact [SupplyHouse.com](http://SupplyHouse.com).
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 sump basin, 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, bearings and shaft seal for wear or leakage.

## **Servicing**

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 from housing.

With a flashlight, visually inspect the oil in the housing 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**

- 1) Drain oil into a clean, dry container by placing pump on its side, remove pipe plug from housing.
- 2) Check oil for contamination using an oil tester with a range to 30 Kilovolts breakdown.
- 3) If oil is found to be clean and uncontaminated (measuring above 15 kV breakdown) Refill the housing.
- 4) 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.

## CAUTION:

After leak is repaired, dispose of old oil properly, and refill with new oil. Pressure builds up extremely fast, increase pressure by "TAPPING" air nozzle. Too much pressure can damage seal. DO NOT exceed 10 psi.

Oil replacement - Set unit upright and refill with new cooling oil as per table below. Fill to just above motor, but below capacitor 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 then assemble to housing.

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.

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

## Disassembly

### Impeller and Volute:

1. Disconnect Power.
2. Remove cap screws, volute and gasket.
3. Clean and examine impeller for cracks or breakage, and replace if required. To remove impeller, place a flat screwdriver in the slot of the end of the shaft to hold the shaft stationary while unscrewing.
4. Check v-ring and remove if damaged.

### Power Cord and Motor:

5. Remove pipe plug and drain oil from housing.
6. Remove gland nut, washer and nylon housing from motor housing. Pull cord through and disconnect the wires from the terminals on power cord.
7. Remove screws and washer and lift motor housing and stator from seal plate.
8. Remove o-ring, replace if damaged.
9. Check motor capacitor 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 move 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.
10. 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.

### **Shaft Seal:**

11. Remove snap ring from seal plate. Remove shaft and motor rotor from seal plate.
12. Remove seal's rotating member, spring and retaining ring from seal plate. Examine all seal parts, if seal faces shows signs of wear, uneven wear patten, chips, or scratches replace entire seal. DO NOT interchange seal components

### **Bearings:**

13. Examine lower bearing and upper bearing. If replacement is required, remove by using a wheel puller.

## **Reassembly**

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

### **Bearings:**

1. Press Bearings and onto shaft

### **Shaft Seal:**

2. Clean seal cavity in seal plate and oil. Press seal's stationary member firmly into seal plate, 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.
3. Place seal's retaining ring and spring on to shaft. Lighly oil (Do not use grease) shaft and inner surface of bellows.
4. With lapped surface of seal's rotating member facing outward, slide over shaft using a seal tool. Being careful not to damage seal face. Make sure spring is seated in retaining ring and spring is lined up on rotating member and not cocked or resting on bellow's tail.

### **Motor:**

5. Slide rotor/shaft with bearings and seal parts into seal plate until bearing seats into seal plate. Install snap ring into seal plate.
6. Lower housing while stringing motor leads through the cord entry bore, with motor stator onto seal plate.
7. Place screws with washers through housing into seal plate and torque to 60 in/lbs.

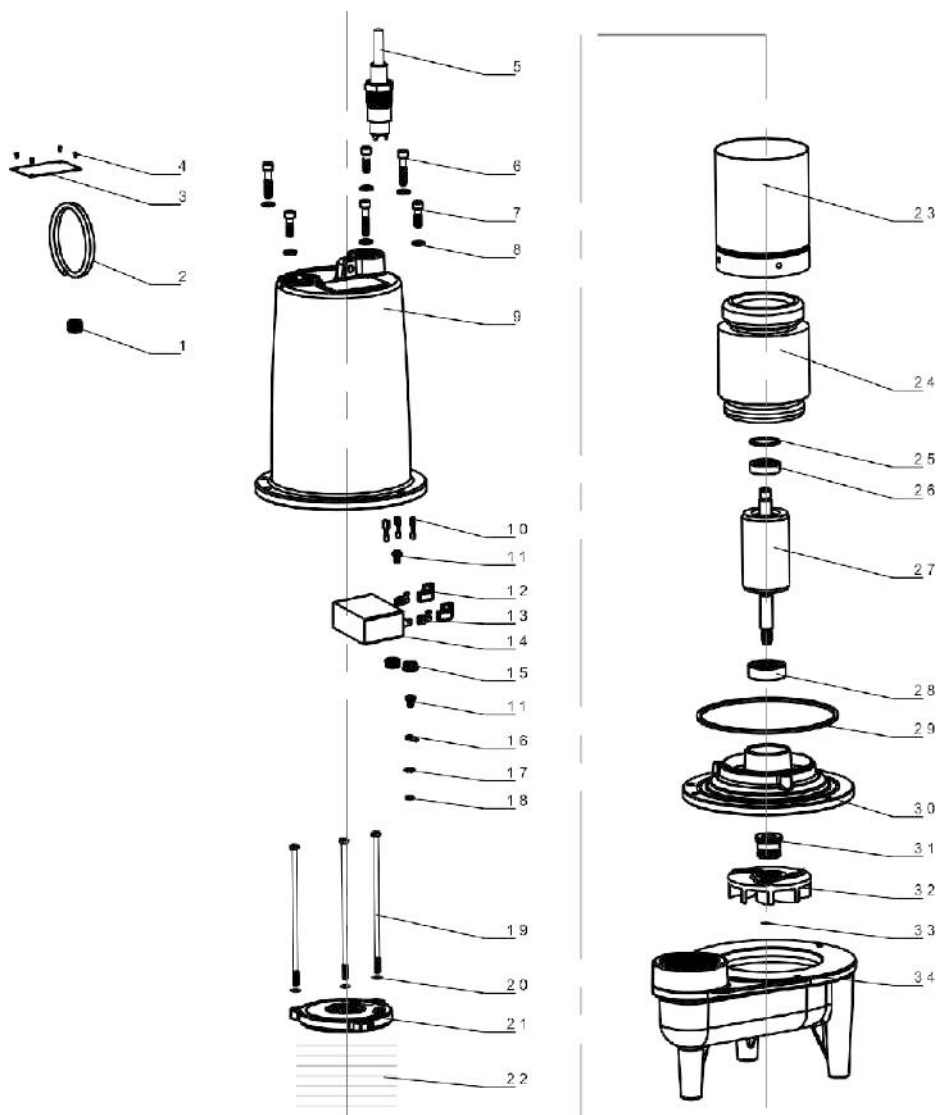
### **Power Cord:**

8. Check power cord for cracks or damage and replace if required. Reconnect motor leads.
9. Place power cord with nylon housing, ring, washer, and gland nut into housing and tighten gland nut to 17.5 ft/lbs.

### **Impeller, V-Ring and Volute:**

10. Position v-ring into seal plate until seated.
11. Clean the threads with thread locking compound cleaner. Apply removable Loctite 242 or equivalent to shaft threads. Screw impeller onto the shaft hand tight while using a screwdriver in the slot at the end of the shaft to hold it stationary. Rotate impeller to check for binding.

12. Position gasket on volute flange and position impeller and motor housing assembly on volute.
13. Place screws into volute and torque to 11 ft/lbs. Check for free rotation of impeller.
14. Refill with cooling oil.



ITEM	DESCRIPTION	QTY
1	Hexagonal socket head plug NPT1/4 (JB/ZQ 447)	1
2	handle	1
3	nameplate 115V/60HZ	1
4	Rivet 2'4(GB/T 827)	4
5	connector cable assemblies	1
6	hexagon socket head cap screws 1/4-20UNC'1.25	3
7	hexagon socket head cap screws 1/4-20UNC'0.75	3
8	lock washer 1/4	6
9	pump housing	1
10	Insulating plug (negative ) FDFN1.25-187	3
11	cross recessed pan head screws #10	2
12	6.3 bending sheath DR250-40	2
13	Φ6.3 bending sliding spring	2
14	capacitor	1
15	cable clamp	2
16	OT(2.5-5) cold-pressed terminal	1
17	external teeth lock washer 5	1
18	lock washer #10	1
19	Hexagon bolt 10-24UNC'5.5(ASME B18.2.1)	3
20	flat washer 5	3
21	plate	1
22	Transformer oil	
23	pump housing	1
24	winding core (56#B70)	1
25	wave spring D30	1
26	single row radial ball bearings 6200	1
27	rotor(56#B 70)	1
28	single row radial ball bearings 6301	1
29	rectangular seals	1
30	connector cable assemblies	1
31	mechanical seal LX301-12-21	1
32	impeller	1
33	Circlip for shaftΦ8 (GB/T 959.1)	1
34	pump body	1

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

<b>Risk of electric shock. Always disconnect the pump from the power source before repairs or inspections.</b>		
<b>Symptom</b>	<b>Possible Cause(s)</b>	<b>Corrective Action</b>
<b>Pump will not Run</b>	<ol style="list-style-type: none"> <li>1. Poor Electrical Connection, blown fuse, tripped breaker or other interruption of power. Improper Power supply.</li> <li>2. Motor or switch inoperative (go to manual operation)</li> <li>3. Float movement Restricted</li> <li>4. Switch will not activate pump or is defective.</li> <li>5. Defective motor</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all electrical connections for security. Have electrician measure current in motor leads. If current is within 20% of locked rotor amps, impeller is probably locked. If current is 0, overload may be tripped. Remove power, allow pump to cool, then re-check current.</li> <li>2. (go to manual operation)</li> <li>3. Reposition pump or clean basin as required to provide adequate clearance for float.</li> <li>4. Disconnect level control. Set ohmmeter for a low range, such as 100 ohms full scale and connect to level control leads. Actuate level control manually and check to see that ohmmeter shows zero ohms for closed switch and full scale for open switch (Float Switch)</li> <li>5. Check winding Insulation (Megger Test) and winding resistance. If check is outside of range, dry and re-check. If still defective replace per service instructions.</li> <li>6. Make sure liquid level is above pump</li> <li>7. Re-check all sizing calculations to determine the proper pump size.</li> <li>8. Check discharge line for restrictions, including ice if line passes through cold areas.</li> <li>9. Remove and examine check valve for proper installation and freedom of operation.</li> <li>10. Open Valve</li> <li>11. Check Impeller for freedom of operation, security, and condition. Clean impeller cavity and inlet of any obstruction.</li> <li>12. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.</li> </ol>
<b>Pump will not turn off</b>	<ol style="list-style-type: none"> <li>3. Float movement Restricted</li> <li>4. Switch will not activate pump or is defective.</li> <li>7. Excessive inflow or pump not properly sized for application</li> <li>12. Pump may be airlocked causing pump not to flow</li> <li>17. H-O-A switch on panel is in "HAND" position</li> </ol>	
<b>Pump Hums but doesn't run</b>	<ol style="list-style-type: none"> <li>1. Incorrect low Voltage</li> <li>11. Impeller jammed or loose on shaft or inlet plugged</li> </ol>	
<b>Pump delivers insufficient capacity</b>	<ol style="list-style-type: none"> <li>1. Incorrect low Voltage</li> <li>7. Excessive inflow or pump not properly sized for application</li> <li>8. Discharge restricted</li> <li>9. Check valve partially closed or installed backwards.</li> <li>10. Shut off valve closed</li> <li>11. Impeller jammed or loose on shaft, or inlet plugged</li> <li>12. Pump may be air locked causing pump not to flow</li> <li>13. Piping fixtures leaking or discharge before the nozzle</li> </ol>	
<b>Pump cycles too frequently or runs periodically when fixtures are not in use</b>	<ol style="list-style-type: none"> <li>9. Check valve partially closed or installed backwards</li> <li>14. Fixtures are leaking</li> <li>18. Ground water entering basin</li> </ol>	

<p><b>Pump shuts off and turns on independent of switch. (Trips thermal overload protector)</b></p> <p><b>CAUTION: Pump may start unexpectedly. Disconnect power supply.</b></p>	<p>1. Incorrect low Voltage</p> <p>7. Excessive inflow or pump not properly sized for application</p> <p>11. Impeller jammed or loose on shaft or inlet plugged</p> <p>15. Excessive water temperature (internal protection only)</p>	<p>13. Check rotation. If power supply is 3 phase, reverse any of three power supply leads to ensure proper impeller rotation.</p> <p>14. Repair fixtures as required to eliminate leakage.</p> <p>15. Check pump temperature limits and fluid temperature.</p> <p>16. Replace portion of discharge pipe with flexible connector or tighten existing piping</p> <p>17. Turn to auto position</p> <p>18. Check for leaks around basin inlet and outlets</p>
<p><b>Pump operates noisily or vibrates excessively</b></p>	<p>5. Worn bearings, motor shaft bent</p> <p>8. Debris in impeller cavity or broken impeller</p> <p>13. Pump Running backwards</p> <p>16. Piping attachments to building structure too loose or rigid.</p>	

**NOTE: SupplyHouse.com assumes no responsibility for damage or injury due to disassembly in the field. Disassembly of the pumps or supplied accessories other than at SupplyHouse.com automatically voids warranty.**