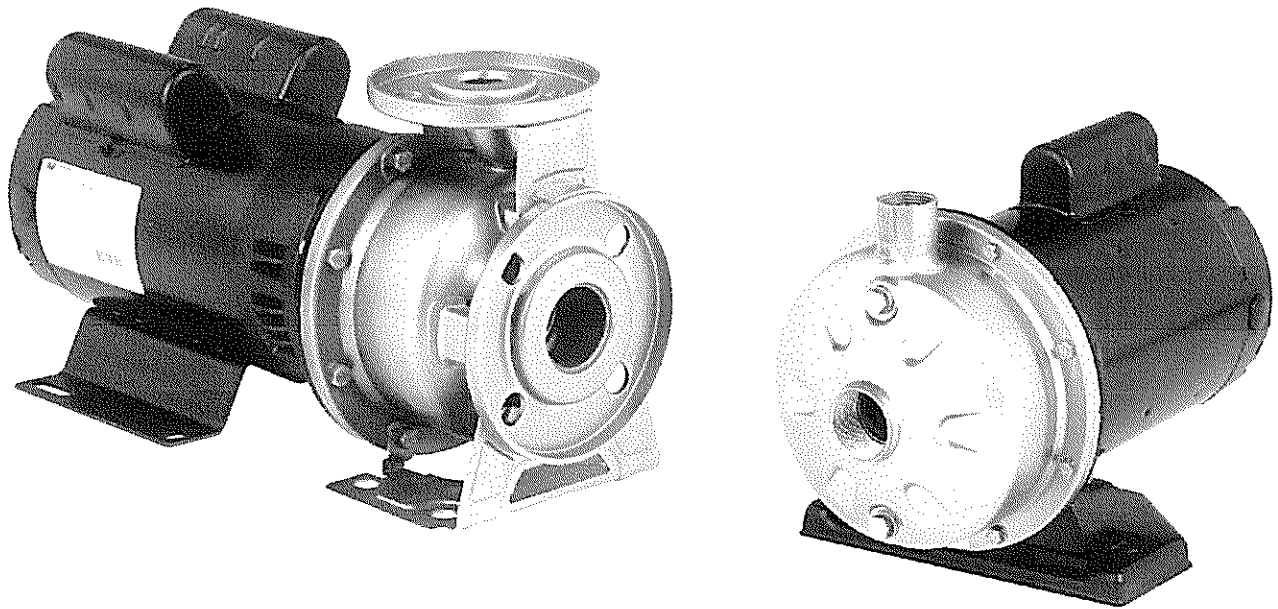


# FF FLO FAB



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Model PSF and PST Instruction and Operation Manual

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**Instructions and Operation**

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**WARNING**

**IMPORTANT SAFETY INSTRUCTIONS**

**Rules for Safe Installation and Operation**

1. Read these rules and instructions carefully. Failure to follow them could cause serious bodily injury and/or property damage.
2. Check your local codes before installing. You must comply with their rules
3. For maximum safety, this product should be connected to a grounded circuit equipped with a ground fault interrupter device.
4. Before installing this product, have the electrical circuit checked by an electrician to make sure it is properly grounded.
5. Before installing or servicing your pump, BE CERTAIN pump power source is disconnected.
6. Make sure the line voltage and frequency of the electrical current supply agrees with the motor wiring. If motor is dual voltage type, BE SURE it is wired correctly for your power supply.
7. Complete pump and piping system MUST be protected against below freezing temperature. Failure to do so could cause severe damage and voids the Warranty.
8. Avoid system pressures that may exceed one and a half times the operating point selected from the pump performance curve.
9. Do not run your pump dry. If it is, there will be damage to the pump seal.

**Installation**

**PACKAGE CONTENTS**

1. Be sure all parts have been furnished and that nothing has been damaged in shipment.
2. The catalog lists all parts included with package. A packing list packed with pump, also lists contents.
3. OPEN PACKAGES AND MAKE THIS CHECK BEFORE GOING ON JOB.

PIPING – Pipes must line up and not be forced into position by unions. Piping should be independently supported near the pump so that no strain will be placed on the pump casing. Where any noise is objectionable, pump should be insulated from the piping with rubber connections. Always keep pipe size as large as possible and use a minimum of fittings to reduce friction losses.

SUCTION PIPING – Suction pipe should be direct and as short as possible. It should be at least one size larger than suction inlet tapping and should have a minimum of elbows and fittings (5 to 6 pipe diameters of straight pipe before inlet is recommended). The piping should be laid out so that it slopes upward to pump without dips or high points so that air pockets are eliminated. The highest point in the suction piping should be the pump inlet except where liquid flows to the pump inlet under pressure.

The suction pipe must be tight and free of air leaks or pump will not operate properly.

**Instructions and Operation**

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**Rules for Safe Installation and Operation (continued)**

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**DISCHARGE PIPING** – Discharge piping should never be smaller than pump tapping and should preferably be one size larger. A gate valve should always be installed in discharge line for throttling if capacity is not correct. To protect the pump from water hammer and to prevent backflow, a check valve should be installed in the discharge line between the pump and gate valve.

**ELECTRICAL CONNECTIONS** – Be sure motor wiring is connected for voltage being used. Unit should be connected to a separate circuit. A fused disconnect switch or circuit breaker must be used in this circuit. Wire of sufficient size should be used to keep voltage drop to a maximum of 5%.

Single phase motors have built-in overload protection. Flexible metallic conduit should be used to protect the motor leads.

**PRIMING** – The pump must be primed before starting. The pump casing and suction piping must be filled with water before starting motor. In the PST models, remove vent plug in top of casing while pouring in priming water. A hand pump or ejector can be used for priming when desired. When water is poured into pump to prime, remove all air before starting motor.

**STARTING** – When the pump is up to operating speed, open the discharge valve to obtain desired capacity or pressure. Do not allow the pump to run for long periods with the discharge valve tightly closed. If the pump runs for an extended period of time without liquid being discharged, the liquid in the pump case can get extremely hot.

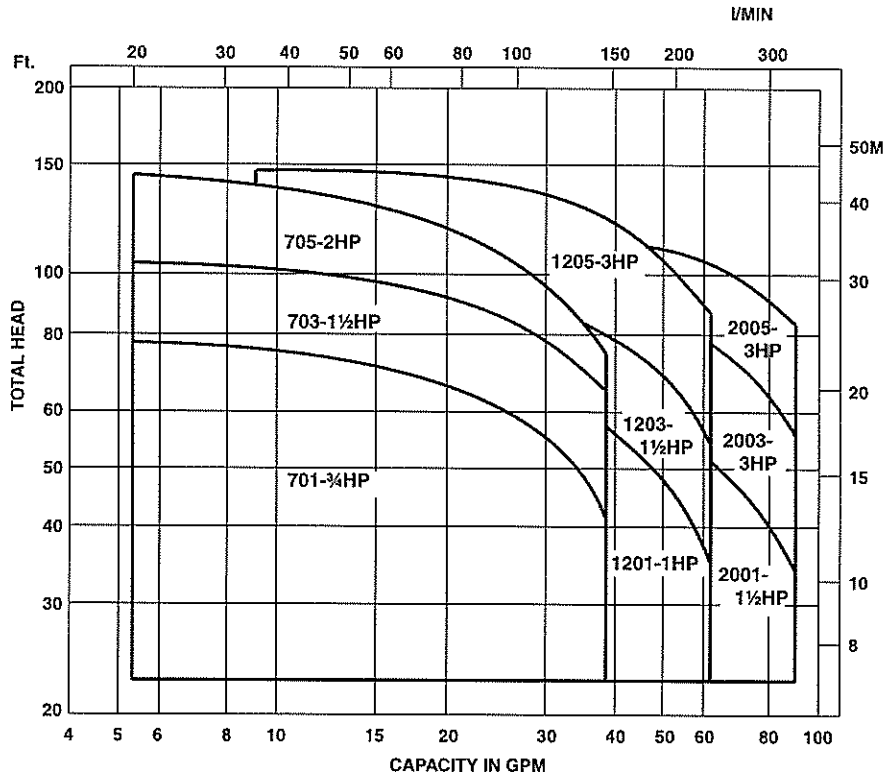
**ROTATION** – All single phase motors are single rotation and leave factory with proper rotation. Three phase motors should be checked to ensure proper rotation

**FREEZING** – Care should be taken to prevent the pump from freezing during cold weather. It may be necessary, when there is any possibility of this, to drain the pump casing when not in operation. Drain by removing the pipe plug in the bottom of the casing.

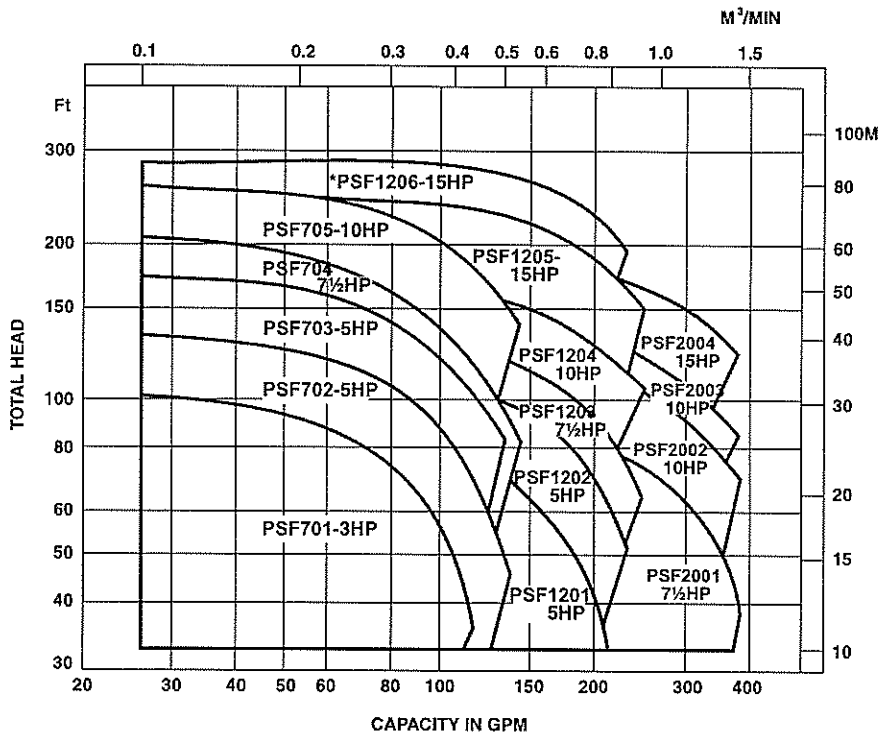
**ROTARY SEAL** – PRO STEEL pumps are fitted only with rotary seal. This seal is recommended for LIQUIDS free from abrasives.

**LOCATION OF UNIT** – The pump should be installed as near to the liquid source as is practical so that the static suction head (vertical distance from the center line of the pump to water level) is maximized, and so that a short, direct suction pipe may be used. The capacity of a centrifugal pump is reduced when the unit is operated under a high suction lift. The piping should be as free from turns and bends as possible, as elbows and fittings greatly increase friction loss. Place the unit so that it is readily accessible for service and maintenance and on a solid foundation, which provides a rigid and vibration-free support. Protect the pump against flooding and excess moisture.

Model PST Selection chart Synchronous Speed 3450 RPM



Model PSF Selection chart Synchronous Speed 3450 RPM



\*Three phase motor only

**Instructions and Operation**

**Specifications – PST**

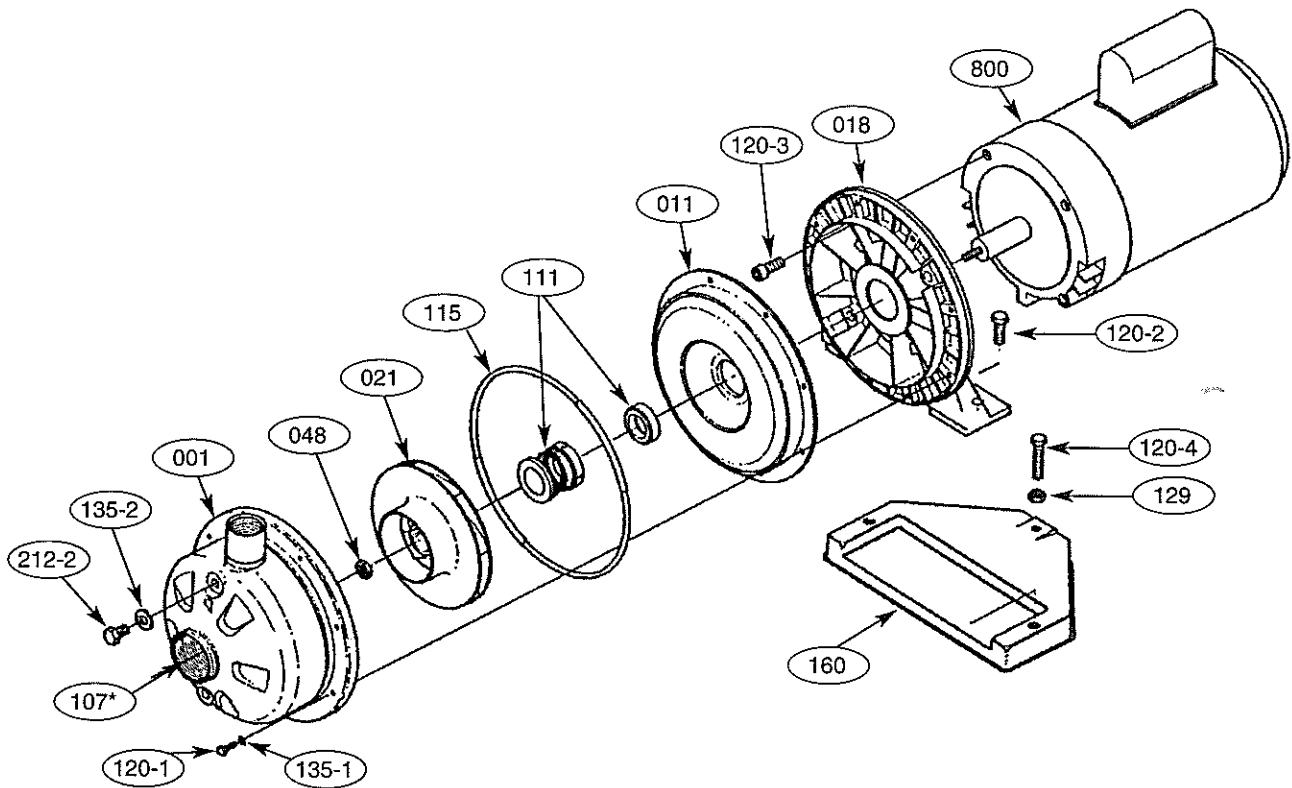
	<b>Standard</b>	<b>Optional</b>
<b>Size</b> Suction  Discharge	PST70 – 1¼" NPT thread PST120 – 1¼" NPT thread PST200 – 1½" NPT thread 1" NPT thread	
<b>Range of HP</b>	¾ HP to 3 HP	
<b>Range of Performance</b> Capacity Head	5.5 to 95 GPM at 3450 RPM 26 to 144 feet at 3450 RPM	
<b>Liquid handled</b> Type of liquid Temperature  Max. working pressure	Water 212°F (100°C)  125 PSI (9 Bar)	Max. 250°F (121°C) with optional high temperature seal
<b>Materials</b> Casing Impeller (closed type) Shaft Bracket Shaft Seal  Bearing	304L Stainless Steel 304L Stainless Steel Stainless Steel Aluminum Mechanical Seal – Type 21  Ball Bearing	High temperature version Mild chemical version
<b>Direction of Rotation</b>	Clockwise when viewed from motor end	
<b>Motor</b> Type Speed Single Phase  Three Phase  Motor Protection	NEMA 56J Frame 60 Hz, 3450 RPM (2 poles) TEFC – ¾ HP to 3 HP ODP – ¾ HP to 3 HP, 115/230V  TEFC – ¾ HP to 3 HP ODP – ¾ HP to 3 HP, 208-230/460V Built-in overload protection (single phase)	60Hz, 1725 RPM (4 poles)  Explosion proof Washdown duty Explosion proof Washdown duty

Instructions and Operation

Specifications – PSF

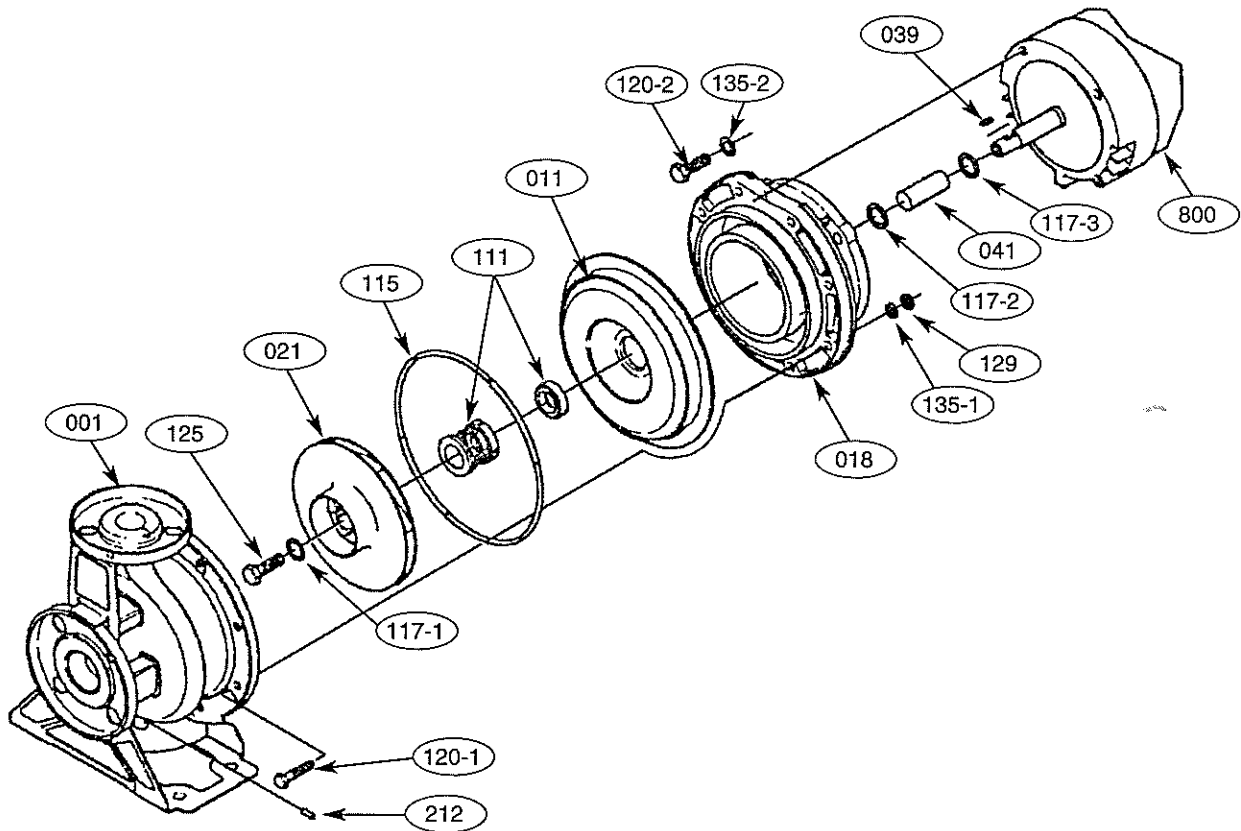
	Standard	Optional
<b>Size</b> Suction (150 lb. ANSI R.F. equivalent)  Discharge (150 lb. ANSI R.F. equivalent)	PSF70 – 2" ANSI Equivalent PSF120 – 2½" ANSI Equivalent PSF200 – 2½" ANSI Equivalent  PSF70 – 1¼" ANSI Equivalent PSF120 – 1½" ANSI Equivalent PSF200 – 2" ANSI Equivalent	
<b>Range of HP</b>	3 HP to 15 HP	
<b>Range of Performance</b> Capacity Head	13 to 380 GPM at 3450 RPM 33 to 285 feet at 3450 RPM	
<b>Liquid handled</b> Type of liquid Temperature  Max. working pressure	Clean water 212°F (100°C)  230 PSI (15 Bar)	Max. 250°F (121°C) with optional high temperature seal
<b>Materials</b> Casing Impeller (closed type) Shaft Sleeve Bracket Shaft Seal  Bearing	304L Stainless Steel 304L Stainless Steel 304L Stainless Steel Cast iron Mechanical Seal – Type 21  Ball Bearing	High temperature version Mild chemical version
<b>Direction of Rotation</b>	Clockwise when viewed from motor end	
<b>Motor</b> Type Speed Single Phase  Three Phase  Motor Protection	NEMA JM Frame 60 Hz, 3450 RPM (2 poles) TEFC – 3 HP ODP – 3 HP to 10 HP  TEFC – 3 HP to 15 HP ODP – 3 HP to 15 HP 208-230/460V  Overload protection must be provided	60Hz, 1725 RPM (4 poles)  Explosion proof – consult factory for availability Washdown duty – consult factory
<b>Standard Accessories</b>	Suction and Discharge Flange Gasket Motor support	

**Sectional view – PST**



Part No.	Part Name	Material	No. for 1 Unit
001	Casing	304L Stainless	1
011	Casing cover	304L Stainless	1
018	Bracket	Aluminum	1
021	Impeller	304L Stainless	1
048	Impeller nut	304L Stainless	1
107*	Casing ring (*CDU 70 series only)	Viton	1
111	Mechanical seal	—	1
115	O-Ring	Viton	1
120-1	Bolt	304L Stainless	8
120-2	Bolt	304L Stainless	2
120-3	Bolt	304L Stainless	4
120-4	Bolt	304L Stainless	1
129	Nut	304L Stainless	1
135-1	Washer	304L Stainless	8
135-2	Washer	Aluminum	2
160	Base	Steel	1
212-2	Plug	304L Stainless	2
800	Motor	—	1

**Sectional view – PSF**



Part No.	Part Name	Material	No. for 1 Unit
001	Casing	304L Stainless	1
011	Casing cover	304L Stainless	1
018	Bracket	Cast Iron	1
021	Impeller	304L Stainless	1
039	Key	304L Stainless	1
041	Shaft sleeve	304L Stainless	1
111	Mechanical seal	–	1
115	O-Ring	Viton	1
117-1	Gasket	Nylon	1
117-2	Gasket	Nylon	1
117-3	Gasket	Nylon	1
120-1	Bolt	304L Stainless	8
120-2	Bolt	304L Stainless	4
125	Impeller Bolt	304L Stainless	1
129	Nut	304L Stainless	8
135-1	Washer	304L Stainless	8
135-2	Washer	304L Stainless	4
160	Motor support (not shown)	Steel	1 set
212	Plug	304L Stainless	1
800	Motor	–	1
	Suction Flange Gasket	Viton	1
	Discharge Flange Gasket	Viton	1

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**Instructions and Operation**


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**Maintenance**


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**Service**

Keep ventilation openings clear of extraneous objects which may hinder free flow of air thru motor. Motor bearings are lubricated during manufacture. Additional lubrication is not required during their normal lifetime.

**CAUTION****Draining**

The pump and piping should always be protected against freezing temperatures. If there is any danger of freezing, the unit should be drained. To drain the pump, remove the drain plug at the bottom of the volute, and remove the priming plug to vent the pump. Drain all piping.

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**Disassembly Instructions**


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All pumping parts can be removed from case without disturbing the piping.

**WARNING**

**POWER SUPPLY** – Open the power supply switch contacts and remove fuses. Disconnect the electrical wiring from the motor.

**VOLUTE CASE**

- (a) Drain pump case by removing drain plugs.
- (b) Remove the bolts securing volute case to pump bracket.
- (c) Pry volute case from casing cover with a screwdriver.

**IMPELLER**

- (a) Hold the motor shaft with a screwdriver in the shaft end slot. Grasp and turn the impeller counterclockwise (as viewed from pump end).

**SEAL**

- (a) Remove the rotating part of the seal by pulling it off the shaft.
- (b) The stationary seat can be pressed from the casing cover.

**CHECK LIST FOR EXAMINATION OF PUMP PARTS**

**IMPELLER** - Replace the impeller if any vane is broken, excessive erosion shows, or if labyrinth surfaces are worn. Impeller cap screw, washer and lockwasher should be replaced if damaged.

**MECHANICAL SEAL** - Seal face, O-ring and sealing members should be free of burrs and dirt. Complete seal assembly should be replaced if not in perfect condition.

**SHAFT**- Shaft sleeve surface under seal or packing must be clean, smooth and without any grooves. It should be replaced if necessary.

**VOLUTE AND SEAL/PACKING PLATE LABYRINTH SURFACES (Wear Rings)**- If worn, replace the necessary part. If furnished with pressed in wear rings, only the rings need be replaced.

**GASKETS** - Volute, suction pipe and discharge pipe gaskets should be checked for damage. Replace if necessary.

**NOTE**

If replacement parts are ordered, please furnish the following information to your FloFab distributor:

1. Reference Numbers
  2. Description of Pump Part
  3. FloFab Model Number and Serial Number on the Nameplate.
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**Instructions and Operation**

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**PST Assembly Instructions**

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Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor.

**WARNING**

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

**Assembling the Pump**

1. Position the motor bracket on the motor with the mounting feet toward the motor. Cross-tighten bolts to factory recommended torque of 6 ft. lbs.
2. Using finger pressure only, firmly press the stationary seal seat into the casing cover. Press the seat until it evenly bottoms out in the seat cavity.
3. Be careful not to damage the stationary seal.
  - a. Position the casing cover over the the motor shaft.
  - b. Align the casing cover holes with the motor bracket holes.
  - c. Firmly press the casing cover into position. (Casing cover may need to be tapped into place by using a rubber mallet.)
4. Ensure all seals have good contact.
  - a. Carefully press the rotating seal assembly onto the motor shaft. Ensure the face of the seal assembly has solid, square contact with the stationary seal seat.
  - b. The seal retainer must seal against the motor shaft.
  - c. Position the seal spring and seal washer.
5. Failure to properly install the impeller and the impeller nut could result in the impeller spinning off the shaft in three phase applications (when the motor may start in reverse rotation).
  - a. While holding the seal spring in place, thread the impeller clockwise onto the motor shaft.
  - b. Use a screwdriver to hold the motor shaft stationary. Turn the impeller on the shaft until it spins down and bottoms out. Make certain that the impeller is firmly bottomed and sealed.
  - c. Install the impeller nut onto the shaft in the same manner as the impeller was installed. Make certain the impeller nut is firmly sealed against the impeller. Apply lock tite to the impeller nut before installing.
6. Position the Viton O-ring over the casing cover. Do not cut nick or damage the O-ring during installation.
7. *The discharge can be positioned in the direction desired.*
  - a. Position the pump volute casing over the casing cover.
  - b. Rotate the discharge to the desired direction.
  - c. Align the bolt holes and secure the case to the casing cover with lock washers and cap screws.
  - d. Cross tighten the bolts to 3.4 lbs (factory recommended torque). Overtightening may result in stripping of the motor bracket threads.
8. Position the mounting base on the pump and secure with cap screws.
9. Place the bolt and lock nut on the back of the mounting base. Adjust the bolt height to support the motor and tighten the lock nut to secure the bolt height.
10. Rotate the impeller to ensure proper alignment.

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**Instructions and Operation**

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**PST Assembly Instructions**

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**Mounting the Assembly**

Do not operate the pump unless the assembly is securely and properly mounted.

Misalignment of the motor/pump assembly or not having the assembly reasonably level may cause pump vibration, noisy operation, fluid leaks, or air leaks and air locks in the suction pipe.

1. Place the motor/pump assembly in its intended operating position.
2. Level the pump through the centerline of the motor/pump assembly suction port.

**Initial Operation**

Make certain the motor is not connected to a power source until the motor is properly assembled and mounted. Serious personal injury or damage to the motor/pump assembly could occur if the motor is activated improperly.

Only certified electricians should make electrical connections.

1. Prime the pump by adding fluid to the volute case through the top plug. To properly prime the pump, venting may be required.
2. Check the nameplate on the motor to determine the correct wiring procedure for your intended power source and if the motor is single or three phase. Connect the motor to a power source by following the wiring procedure on the motor's nameplate.

**Note:**

- a. Single phase motors are typically dual voltage. In some cases, three phase motors are tri-voltage. Check the nameplate and follow the proper wiring procedure for the voltage you are using. Improperly wiring the motor could result in damage to the motor.
- b. Three phase motors require a control box. Install overload protection to help prevent motor damage.
- c. Depending on the wiring, three phase motors may start in reverse. Interchange any two power leads to change the starting direction and pump rotation.
  - Always follow correct operating procedures.
  - Always disconnect the motor/pump assembly from all power sources before servicing the pump or motor.
  - Periodically check all power connections, bolts, screws, and the motor's mounting.
  - Failure to properly follow assembly and operating instructions could result in damage to the pump and motor.
  - Failure to properly install the impeller and impeller nut could result in damage to the pump and could cause serious personal injury.

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**Instructions and Operation**

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**PSF Assembly Instructions**

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Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor.

**WARNING**

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

**Assembling the Pump**

1. Position a Nylon gasket (part#275476028) over the motor shaft.
2. Carefully press the rotating seal assembly onto the shaft sleeve (part #275416013) The smooth face of the rotating ring must make good contact with the seal seat and the seal retainer must seal against the shaft sleeve.  
*Note: Seal faces should be wiped clean with non-oil based solvent or alcohol.*
3. Using finger pressure only, insert the seal seat into the seal plate. Press the seal until it evenly bottoms out in the seal cavity.
4. Position the cast iron motor bracket over the shaft. Fasten the bracket to the motor, tightening bolts using a cross-tightening pattern. (Tighten the bolts to the factory recommended torque specifications of 8 ft. lbs.) Overtightening may cause stripping of threads.
5. Carefully position the seal plate and seal over the shaft. Be careful not to damage the stationary seal seat.
6. Slide the stainless steel shaft sleeve, with rotating seal assembly, over the motor shaft.
7. Position the Viton O-ring around the casing cover. Do not cut, nick, or damage the O-ring during the installation.
8. Install the impeller shaft key ( $\frac{3}{16}'' \times \frac{3}{16}'' \times 1 \frac{3}{16}''$ ).
9. Place the seal spring assembly over the retainer in position to receive the impeller.
10. Place a Nylon gasket (part #275476029) on top of spring retainer.
11. Firmly press the impeller into position by aligning the slot over the shaft key. Press the impeller down the shaft until it bottoms and seats squarely against the Teflon gasket and shaft sleeve.
12. Place a Nylon gasket (part #275476030) over the impeller hub and into the impeller eye. Install the shaft bolt to secure the impeller to the shaft. Do not overtighten the shaft bolt. (Use a thread compound or cement to secure the shaft bolt and prevent it from working loose.)
13. Tighten the impeller bolt. (Tighten the bolts to the factory recommended torque specifications of 11 ft. lbs.)
14. Install the pump volute (casing) over the seal plate. Rotate the volute to align with the bolt holes and secure it with the bolts, washers, and nuts. Cross-tighten the bolts to the factory recommended torque specifications (8 ft. lbs.).
15. With a socket wrench, rotate impeller to check for alignment. If rubbing against casing, loosen bolts on casing and retighten.

**Mounting the Assembly**

Do not operate the pump unless the assembly is securely and properly mounted.

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**Instructions and Operation**

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**PSF Assembly Instructions**

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Misalignment of the motor/pump assembly or not having the assembly reasonably level may cause pump vibration, noisy operation, fluid leaks, or air leaks and air locks in the suction pipe.

1. Place the unit in position at the desired mounting location.
2. Using the motor supports supplied, level the motor/pump assembly by aligning the centerline of the motor.
3. Level the suction and discharge flanges.
4. Firmly tighten the foundation bolts. Make certain when the bolts are tightened that the assembly is not misaligned.
5. Pour cement under the motor bedplate to create a solid, firm foundation for the assembly. Do not move the assembly or adjust the foundation bolts further until the cement is properly cured.

**Initial Operation**

Make certain the motor is not connected to a power source until the motor is properly assembled and mounted. Serious personal injury or damage to the motor/pump assembly could occur if the motor is activated improperly.

Only certified electricians should make electrical connections.

Check the nameplate on the motor to determine the correct wiring procedure for your intended power source and if the motor is single or three phase. Connect the motor to a power source by following the wiring procedure on the motor's nameplate.

**Note:**

- a. Single phase motors are typically dual voltage. In some cases, three phase motors are tri-voltage. Check the nameplate and follow the proper wiring procedure for the voltage you are using. Improperly wiring the motor could result in damage to the motor.
- b. Three phase motors require a control box. Install overload protection to help prevent motor damage.
- c. Depending on the wiring, three phase motors may start in reverse. Interchange any two power leads to change the starting direction and pump rotation.
  - Always follow correct operating procedures.
  - Always disconnect the motor/pump assembly from all power sources before servicing the pump or motor.
  - Periodically check all power connections, bolts, screws, and the motor's mounting.
  - Failure to properly follow assembly and operating instructions could result in damage to the pump and motor.

Instructions and Operation

Troubleshooting

TROUBLE	POSSIBLE CAUSE	TROUBLESHOOTING
Pump does not run.	Faulty connection of power supply circuit. Wrong wiring of control circuit. Bound shaft Mechanical seal faces stuck together Faulty motor Damage to bearing	Check power supply circuit. Correct control circuit. Remove cause of obstruction. Release seal by turning shaft. Repair or replace motor. Repair or replace any damaged bearing.
Pump does not pump water. Inadequate quantity.	Considerable voltage drop. Rotation direction reversed. Lack of priming. High discharge head. Large piping loss. Clogged foot valve. Leakage from suction piping. Too high suction lift. Low water level.	Correct rotation direction. Re-prime the pump. Re-examine the plan. Re-examine the plan. Clear foot valve suction. Check and repair suction piping. Re-install as per our instructions. Foot valve in ample immersion.
Overcurrent	Considerable fluctuation of power supply voltage. Considerable voltage drop. Low head and overflow rate. Damaged bearing.	Throttle flow rate at outlet. Replace any damage bearing.
Pump vibrates, excessive operating noise	Beyond rated capacity. Cavitation. Improper piping. Damaged bearing. Foreign matter clogging cooling fan.	Reduce flow rate. Consult distributor Secure piping again. Replace any damaged bearing. Remove foreign matter.
Pressurizing application. Pump starts and soon stops	Too limited pressure switch setting.	Replace pressure switch to wider range. Check and repair leaks.
Pump does not stop	Leakage in system. Too high pressure setting.	Reduce max pressure setting to the lower in pressure switch.

**MAINTENANCE:**

The pump does not require special maintenance.

The following rules must be observed for safe operation:

If the pump is not going to be used for a long period, the pump should be drained of water and flushed with clean water.

Where the pump is exposed to freezing temperatures, it should always be left drained when not in use.

\*All specifications subject to change without notice.

Instructions and Operation

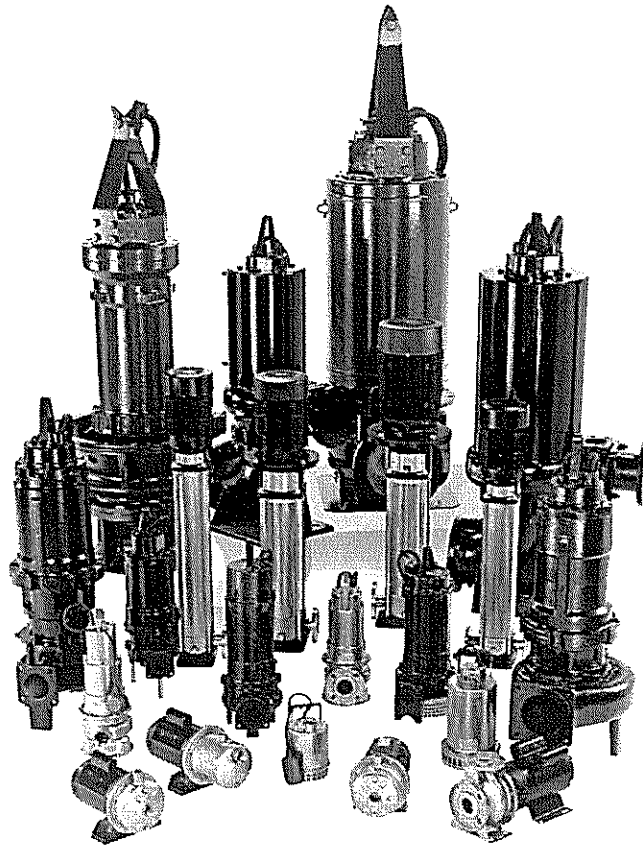
Chemical Compatibility Chart

Item No.	Pumpage Type	Formula	Conc. %	Temp. °F	Temp. °C	*Code Level
1	Acetic acid	CH <sub>3</sub> COOH	10	68°	20°	2
2	Ammonium bicarbonate	NH <sub>4</sub> CO <sub>3</sub>	10	68°	20°	2
3	Ammonium carbonate	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>		68°	60°	3
4	Ammonium chloride	NH <sub>4</sub> Cl	10	68°	20°	3
5	Ammonium hydroxide	NH <sub>4</sub> OH	10	176°	<80°	3
6	Ammonium nitrate	NH <sub>4</sub> NO <sub>3</sub>	5			3
7	Beer					1
8	Benzilic acid	C <sub>6</sub> H <sub>5</sub> COOH	10	68°	20°	2
9	Benzilic acid	C <sub>6</sub> H <sub>5</sub> COOH		68°	20°	2
10	Boric acid	H <sub>3</sub> BO <sub>3</sub>	5	68°	20°	1
11	Boric acid	H <sub>3</sub> BO <sub>3</sub>	5	176°	80°	1
12	Brine					2
13	Butyric acid	C <sub>3</sub> H <sub>7</sub> COOH	Wat. Sol.			2
14	Calcium chloride	CaCl <sub>2</sub>		68°	20°	3
15	Calcium nitrate	Ca(NO <sub>3</sub> ) <sub>2</sub>	10			2
16	Calcium phosphate	Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	10	212°	≤100°	2
17	Citric acid	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>	5	68°	20°	2
18	Coffee					1
19	Copper sulfate	CuSO <sub>4</sub>	5	68°	20°	2
20	Ethylene glycol	CH <sub>2</sub> OHCH <sub>2</sub> OH				1
21	Fluosilicic acid	H <sub>2</sub> SiF <sub>6</sub>	20	68°	20°	4
22	Fruit juices					1
23	Hydrocyanic acid	HCN		68°	20°	2
24	Hydrogen peroxide			68°	20°	2
25	Lactic acid	C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	5	149°	≤65°	3
26	Lactic acid	C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	10	68°	20°	2
27	Magnesium chloride	MgCl <sub>2</sub>				3
28	Magnesium sulfate	MgSO <sub>4</sub>		68°	20°	2
29	Maleic acid	(CHCO <sub>2</sub> H) <sub>2</sub>	10	68°	20°	3
30	Milk					1
31	Nitric acid	HNO <sub>3</sub>	20	68°	20°	4
32	Nitric acid	HNO <sub>3</sub>	20	158°	70°	4
33	Oleic acid	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>	20	68°	20°	3
34	Oxalic acid	(COOH) <sub>2</sub>	≤10	68°	≤20°	2
35	Oxalic acid	(COOH) <sub>2</sub>	10	158°	70°	4

Item No.	Pumpage Type	Formula	Conc. %	Temp. °F	Temp. °C	*Code Level
36	Phosphoric acid	H <sub>3</sub> PO <sub>4</sub>		176°	≤80°	3
37	Phthalic acid	C <sub>6</sub> H <sub>4</sub> (COOH) <sub>2</sub>	Wat. Sol.	68°	20°	2
38	Potassium bicarbonate	KHCO <sub>3</sub>	30	68°	20°	1
39	Potassium carbonate	K <sub>2</sub> CO <sub>3</sub>	40	68°	20°	1
40	Potassium chloride	KCl	10	68°	20°	2
41	Potassium hydroxide	KOH	10	176°	<80°	2
42	Potassium permanganate	KMnO <sub>4</sub>		68°	20°	2
43	Potassium phosphate	KH <sub>2</sub> PO <sub>4</sub>	10	176°	80°	3
44	Potassium sulfate	K <sub>2</sub> SO <sub>4</sub>				2
45	Propionic acid	CH <sub>3</sub> CH <sub>2</sub> CO <sub>2</sub> H	20	68°	20°	2
46	Propylene glycol	CH <sub>3</sub> CHOHCH <sub>2</sub> OH	60	68°	20°	3
47	Salicylic acid	C <sub>6</sub> H <sub>4</sub> OHCOOH		68°	20°	2
48	Sodium bicarbonate	NaHCO <sub>3</sub>	10	68°	20°	1
49	Sodium carbonate	Na <sub>2</sub> CO <sub>3</sub>		140°	<60°	1
50	Sodium chloride	NaCl				3
51	Sodium hydroxide	NaOH	<10	140°	<60°	2
52	Sodium nitrate	NaNO <sub>3</sub>	10			2
53	Sodium phosphate	Na <sub>3</sub> PO <sub>4</sub>		212°	≤100°	1
54	Sodium sulfate	Na <sub>2</sub> SO <sub>4</sub>	5	140°	<60°	2
55	Sulfuric acid	H <sub>2</sub> SO <sub>4</sub>	10	68°	20°	4
56	Sulfurous acid	H <sub>2</sub> SO <sub>3</sub>	Sat.	68°	20°	3
57	Sulfurous acid	H <sub>2</sub> SO <sub>3</sub>	10	68°	20°	2
58	Tannic acid	C <sub>76</sub> H <sub>52</sub> O <sub>46</sub>	10	68°	20°	1
59	Tartaric acid	C <sub>4</sub> H <sub>6</sub> O <sub>6</sub>	10	68°	20°	2
60	Tea					1
61	Vinegar			140°	≤60°	1
62	Water			230°	≤110°	1
63	Water, condensation					1
64	Water, de-cationized					3
65	Water, demineralized					1
66	Water, distilled					1
67	Water, mine					1
68	Water, sea					3
69	Water, thermal					1
70	Wine-Whiskey					1

Where hot and aggressive liquids are to be pumped, in addition to checking the chemical compatibility, bear in mind that any deviations in temperature, density, and viscosity from the reference data would bring about variations in terms of power input, hydraulic performance, and suction capacity. Make sure in all cases that the power input is not higher than the rated power.

**\*Code Key: 1 = Good 2 = Fair 3=Poor\* 4=Not recommended**  
 Important – Pumpages coded 3 "poor" may result in reduced or unsatisfactory service life.



***Contact your dealer or supplier  
for more information about other products:***

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