

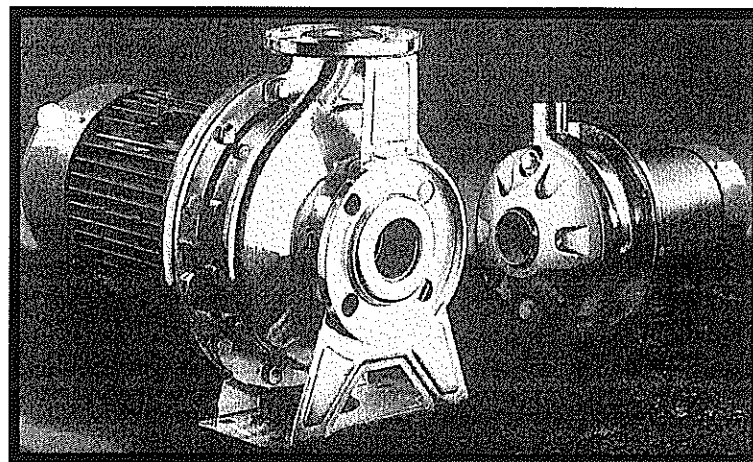
FLO FAB

INSTALLATION AND OPERATION MANUAL

STAINLESS STEEL CENTRIFUGAL PUMPS

FLO-STEEL

TYPE: PST & PSF



IMPORTANT: *Read all instruction in this manual before operating pump.*

FLO FAB reserves the right to change this product without prior written notice.

FLO FAB is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

* 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 interruptor 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. Each pump is carefully tested and packaged at the factory.

2. The catalog lists all parts included with package. A packing list packed with pump, also lists contents.

3. Be sure all parts have been furnished and that nothing has been damaged in shipment.

4. 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 lapping and should have a minimum of elbows and fittings. 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.

DISCHARGE PIPING – Discharge piping should never be smaller than pump lapping 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.

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 – FLO-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 lift (vertical distance from the center line of the pump to water level) is minimum, 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.

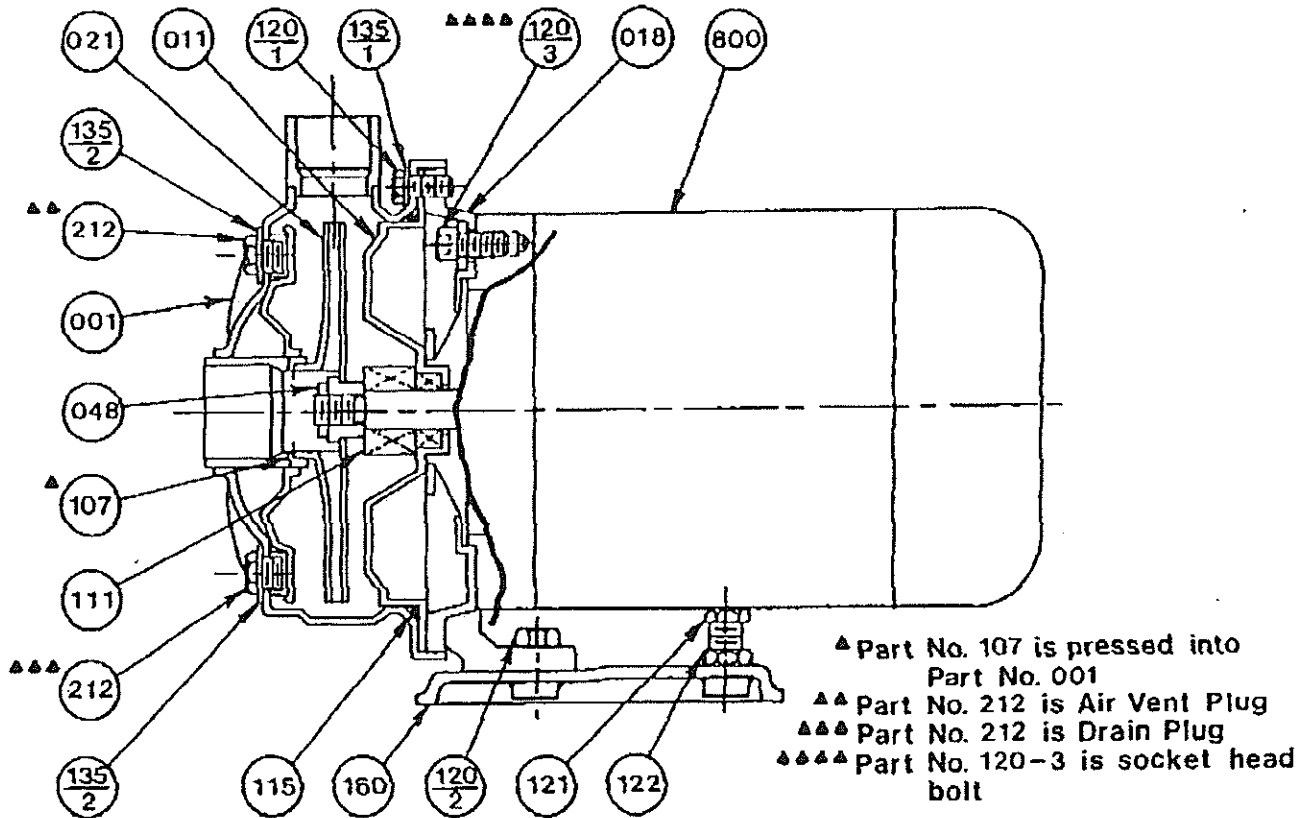


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SECTIONAL VIEW PST



Ref. No.	Part Name	Standard Material	ASTM, ANSI Code	Qty. Req'd
001	Casing	304 Stainless	AISI 304	1
011	Casing Cover	304 Stainless	AISI 304	1
018	Bracket	Aluminum		1
021	Impeller	304 Stainless	AISI 304	1
048	Impeller Nut	304 Stainless	AISI 304	1
107*	Casing Ring	Brass/NBR		1
111	Mechanical seal	Carbon/Ceramic.Buna		1
115	O-ring	NBR		1
120-1	Bolt	304 Stainless	AISI 304	8
120-2	Bolt	Steel	A283 Grade D	2
120-3	Bolt	Steel	A283 Grade D	4
121	Bolt - Motor Support	304 Stainless	AISI 304	1
122	Nut - Motor Support	304 Stainless	AISI 304	1
135-1	Washer	304 Stainless	AISI 304	8
135-2	Washer	304 Stainless	AISI 304	2
160	Base	Steel	A283 Grade D	1
212	Plug	304 Stainless	AISI 304	2
800	Motor		NEMA 56J Frame	1

*Required on model PST 70 only.

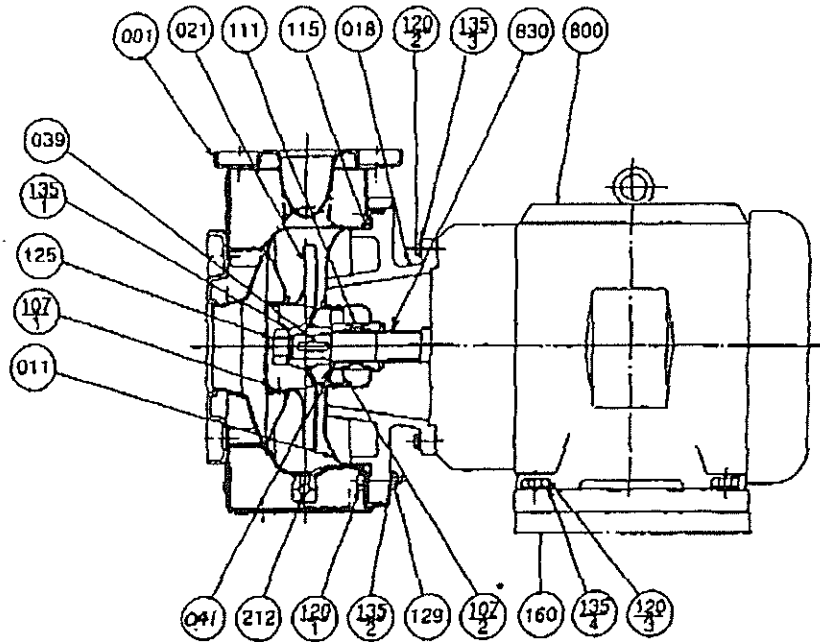


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SECTIONAL VIEW PSF



Ref. No.	Part Name	Standard Material	ASTM, ANSI Code	Qty. Req'd
001	Casing	304 Stainless	AISI 304	1
011	Casing Cover	304 Stainless	AISI 304	1
018	Bracket	Cast Iron	A49 Class 30	1
021	Impeller	304 Stainless	AISI 304	1
039	Key	304 Stainless	AISI 304	1
041	Sleeve	304 Stainless	AISI 304	1
107-1	Casing Ring	304 Stainless	AISI 304	1
107-2*	Casing Ring	304 Stainless	AISI 304	1
111	Mechanical seal	Carbon/Ceramic/Buna/316	—	1
115	O-ring	NBR	—	1
120-1	Bolt	304 Stainless	AISI 304	8/10/12
120-2	Bolt	Steel	A283 Grade D	4
120-3	Bolt	Steel	A283 Grade D	4
125	Bolt	304 Stainless	AISI 304	1
129	Nut	304 Stainless	AISI 304	8/10/12
135-1	Washer	304 Stainless	AISI 304	1
135-2	Washer	304 Stainless	AISI 304	8/10/12
135-3	Washer	Steel	A283 Grade D	4
135-4	Washer	Steel	A283 Grade D	4
160	Motor Support	Steel	A283 Grade D	2
212	Plug	304 Stainless	AISI 304	1
800	Motor	—	NEMA JM Frame	1
830	Shaft	—	NEMA JM Frame	1

*Required on models PSF704, PSF1205, PSF1206, PSF2003 & PSF2004 only.



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MAINTENANCE

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.

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.

REMOVING MOTOR FOR SERVICE AND REPLACING SHAFT SEAL (Fig. 1)

Shaft Seal Replacement

Turn disconnect switch to "OFF" position.

1. Remove the four cap screws holding pump volute to motor.
2. Separate volute from motor.
3. Remove shaft closure on end of motor opposite shaft.
4. With a large screwdriver, hold shaft and remove impeller. NOTE: shaft to impeller has right hand thread. Shaft seal is now accessible.
5. Pry rotating shaft seal member from impeller (Fig. 1A).
6. Pry ceramic seat free and remove from motor (Fig. 1B).
7. Remove loose particles from seal cavity in motor bracket and wipe clean.

Installing New Shaft Seal

Before handling shaft seal parts, wipe hands clean.

1. Wet the inside surfaces of the seal cavity in bracket with a few drops of lubricating oil.
2. Coat rubber cup enclosing the ceramic seat with oil.
3. Place rotating seal member in position on impeller and press or lightly tap into place. Take care not to press against the polished seal surface (Fig. 1C).
4. Place ceramic seal over shaft and push into cavity securely using cardboard washer and 3/4" pipe to push in place (Fig 1D).

5. Position impeller on shaft and tighten securely (Fig. 1E).
6. Shaft must rotate freely without binding.
7. Place volute gasket in position.
8. Assemble volute to motor.
9. Replace volute to motor cap screws and tighten securely.
10. Pumping unit repair now complete.

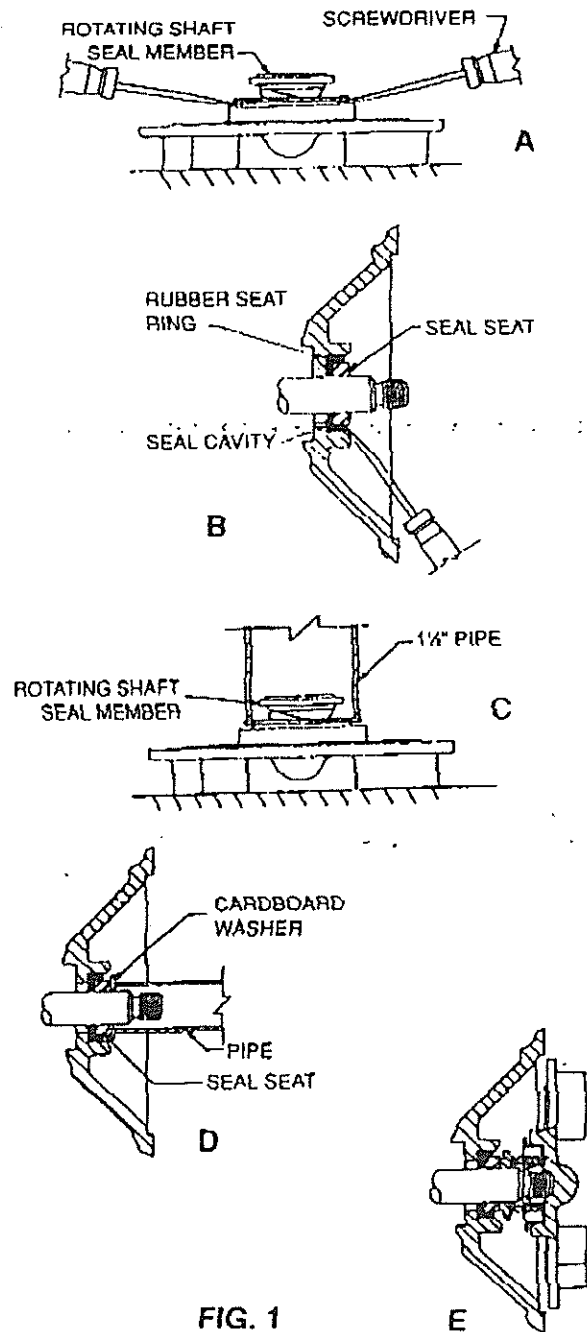


FIG. 1



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DISASSEMBLY INSTRUCTIONS

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

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 seal plate with a screwdriver.

IMPELLER

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

SEAL

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

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

Check for straightness.

SHAFT SLEEVES

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.

ASSEMBLY INSTRUCTIONS

All pump parts should be cleaned thoroughly before being reassembled.

MOTOR

- (a) Assure that the rubber slinger is in place on the motor shaft.

SEAL

- (a) A new pump seal should always be used when rebuilding a pump.
- (b) Apply some light oil to the rubber which surrounds the ceramic stationary seat. Insert the seal into the seal plate using finger pressure to press firmly and squarely until it bottoms. Care must be taken to keep grease and dirt off face areas of the seal. Be sure the seal faces are not damaged during assembly (cracked, scratched, or chipped) or the seal will leak.
- (c) Position the seal plate into the motor flange. Use care not to chip the stationary seal seal by hitting the motor shaft.
- (d) By hand, carefully press the rotating seal assembly onto the motor shaft. The smooth face of the carbon ring must contact the ceramic seat. The rubber ring must seal against the shaft.

IMPELLER

- (a) Hold the motor shaft with a screwdriver.
- (b) Turn the impeller clockwise onto the shaft. Check that the rubber ring of the seal is positioned on the shaft.

VOLUTE

- (a) Assure that a new or good condition gasket is in place on the seal plate.
- (b) Carefully position the volute in alignment over the impeller and seal plate.
- (c) Assemble the components with cap screws.

RESTARTING OPERATION

- (a) Prime the pump by adding liquid to the volute case through the top plug.
- (b) Reconnect electric power.
- (c) After a few minutes of operation, check that there is no leakage from the pump or piping.



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Trouble	Possible Cause	Troubleshooting
Pump does not run.	<ul style="list-style-type: none"> • Faulty connection of power supply circuit. • Wrong wiring of control circuit. • Bound shaft • Mechanical seal faces stuck together • Faulty motor • Damage to bearing 	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Correct rotation direction. • Reprime 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	<ul style="list-style-type: none"> • Considerable fluctuation of power supply voltage. • Considerable voltage drop. • Low head and overflow rate. • Damaged bearing. 	<ul style="list-style-type: none"> • Throttle flow rate at outlet. • Replace any damaged bearing.
Pump vibrates, excessive operating noise	<ul style="list-style-type: none"> • Beyond rated capacity. • Cavitation. • Improper piping. • Damaged bearing. • Foreign matter clogging cooling fan. 	<ul style="list-style-type: none"> • Reduce flow rate. • Consult distributor • Secure piping again. • Replace any damaged bearing. • Remove foreign matter.
Pressurizing application. Pump starts and soon stops	<ul style="list-style-type: none"> • Too limited pressure switch setting. • Leakage in system. 	<ul style="list-style-type: none"> • Replace pressure switch to wider range. • Check and repair leaks.
Pump does not stop	<ul style="list-style-type: none"> • Too high pressure setting. 	<ul style="list-style-type: none"> • 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.



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FLO-STEEL / FLO-DRAINER WARRANTY

Flo Fab warrants its Flo-Steel and Flo-Drainer products to be free of defective material and workmanship under normal use and service for a period of 12 months from date of sale to the end-user or 18 months from the original date of shipment from Flo Fab, whichever comes first. This warranty applies only to products which are used in accordance with all instructions as to installation, maintenance and operation as outlined in the documentation provided by Flo Fab.

Before returning any product or part for warranty consideration, the claimant must first contact the Flo Fab distributor that furnished the product, describe the claim, provide product identification numbers and proof of purchase. Upon receipt of all necessary information, the distributor shall submit the claim to Flo Fab for consideration and subsequent instructions.

Flo Fab liability for any damage or loss caused by a product which fails due to defective materials or workmanship, at any time, shall be limited (at Flo Fab option) to the replacement or repair of the defective product, as originally furnished by Flo Fab. Flo Fab shall not be liable for any loss, damage or expenses directly or indirectly related to the use of its products or from any other cause or for consequential damages (including, without limitation, loss of time, inconvenience, loss of product and loss of production). It is expressly understood that Flo

Flo Fab is not responsible for damage or injury caused to other products, machinery, buildings, property or persons by reason of the installation and/or use of its products. This warranty does not obligate Flo Fab to bear any costs associated with inspection, removal, installation, transportation or any other expenses related to a warranty claim without written authorization by Flo Fab.

This warranty will be void if, in the judgment of Flo Fab, any product or component has been (a) tampered with, disassembled, repaired or altered by any party other than a Flo Fab authorized service depot; and/or (b) subjected to misapplication, misuse, neglect, abuse or accident; and/or (c) used to pump materials for which it was not designed to handle, which may attack or harm the materials used in construction of the product or which may otherwise harm or impair the proper operation of the product.

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