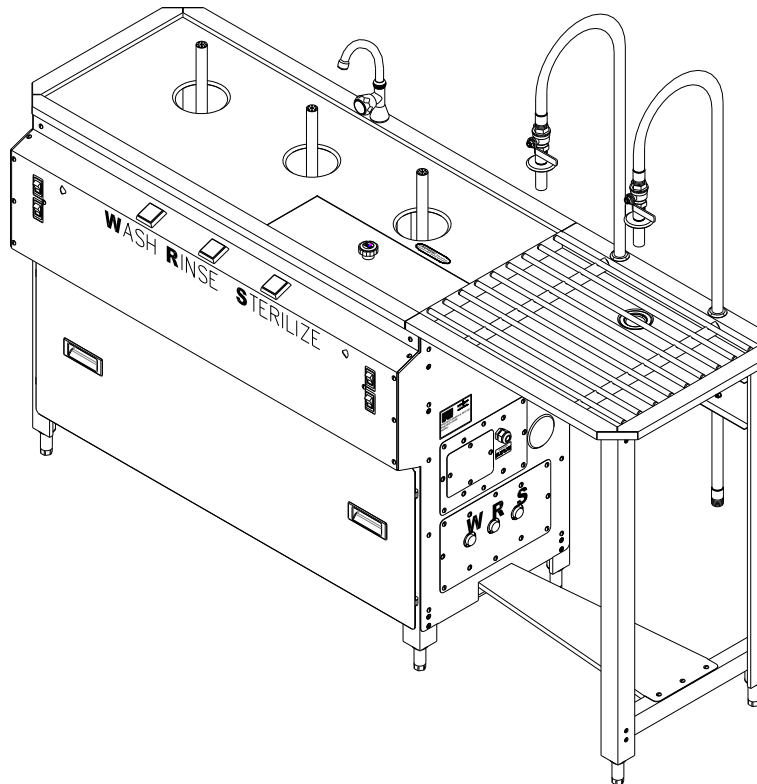


Precision Water Systems Bottle Washer & 2 Fill Station



Owners' Guide

Model: PWS BWF-2

Part No: 900000

Series: 0009

Manufactured By:
Precision Design & Manufacturing Inc.
9024 – 100 Street
Westlock, AB, Canada
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**Please read this Owners' Guide
completely before installing or
operating your
Precision Water Systems
Bottle Washer & Fill Station.**

*Specifications are subject to
change without notice.*

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Introduction

Congratulations on the purchase of your new Precision Water Systems (PWS) Semi-Automatic Bottle Washer and Fill Station. When installed and maintained properly, your bottle washer and fill station will provide years of safe, trouble free service. It is important to observe and follow the safety and maintenance instructions carefully. If you have any questions or concerns regarding installation or operation of your bottle washer and fill station please contact your dealer.

Your bottle washer and fill station must be installed according to any Local or State Regulations.

Records

Please record all of the important information below to assist you and the service centre in case there is any service work required in the future. All of the information is required to properly identify your bottle washer and fill station and will make servicing much easier. The information is located on the serial plate, which is located on the side of the bottle wash sink above the thermostat for the heating element.

PWS Model: BWF-2

Series: *eg: 0009*

Serial Number: *eg: 0901812*

Date of Purchase: _____

Warranty

- The warranty for your bottle washer and fill station covers defects to pumps for one (1) year, all other components and electrical parts for one (1) year and heating elements and thermostats for thirty (30) days to the original purchaser.
- Stainless Steel parts are also warranted for one (1) year. With this warranty it is the responsibility of the bottle washer and fill station owner to properly maintain the bottle washer and fill station. If there is any mis-use or abuse the one (1) warranty will be void. **Misuse includes exposure of the sink to over-strength chemical solutions causing corrosion and pitting.**
- PWS does not warrant any transportation charges incurred to complete the repair. The bottle washer and fill station owner is responsible for all shipping charges to and from the service centre.
- Warranty is void if the bottle washer and fill station is found to have been consumer damaged or misused, caused by acts of God, unauthorized alteration, repair or vandalism.

Important Safety Precautions

When using electrical appliances, basic safety precautions should always be followed including the following:

- 1. Read all instructions.**
- 2.** Do not touch hot surfaces.
- 3.** To protect against electrical shock do not immerse cords or plugs in water or other liquid.
- 4.** Close supervision is necessary when any appliance is used near children.
- 5.** Do not allow children to operate this appliance.
- 6.** Allow to cool before putting on or taking off parts.
- 7.** Do not operate any appliance with a damaged cord or plug or after the appliance malfunctions or has been damaged in any manner. Return appliance to the nearest service facility for examination, repair or adjustment.
- 8.** The use of accessory attachments not recommended by the appliance manufacturer may cause injuries.
- 9.** This appliance is intended for commercial use only.
- 10. Save these instructions.**

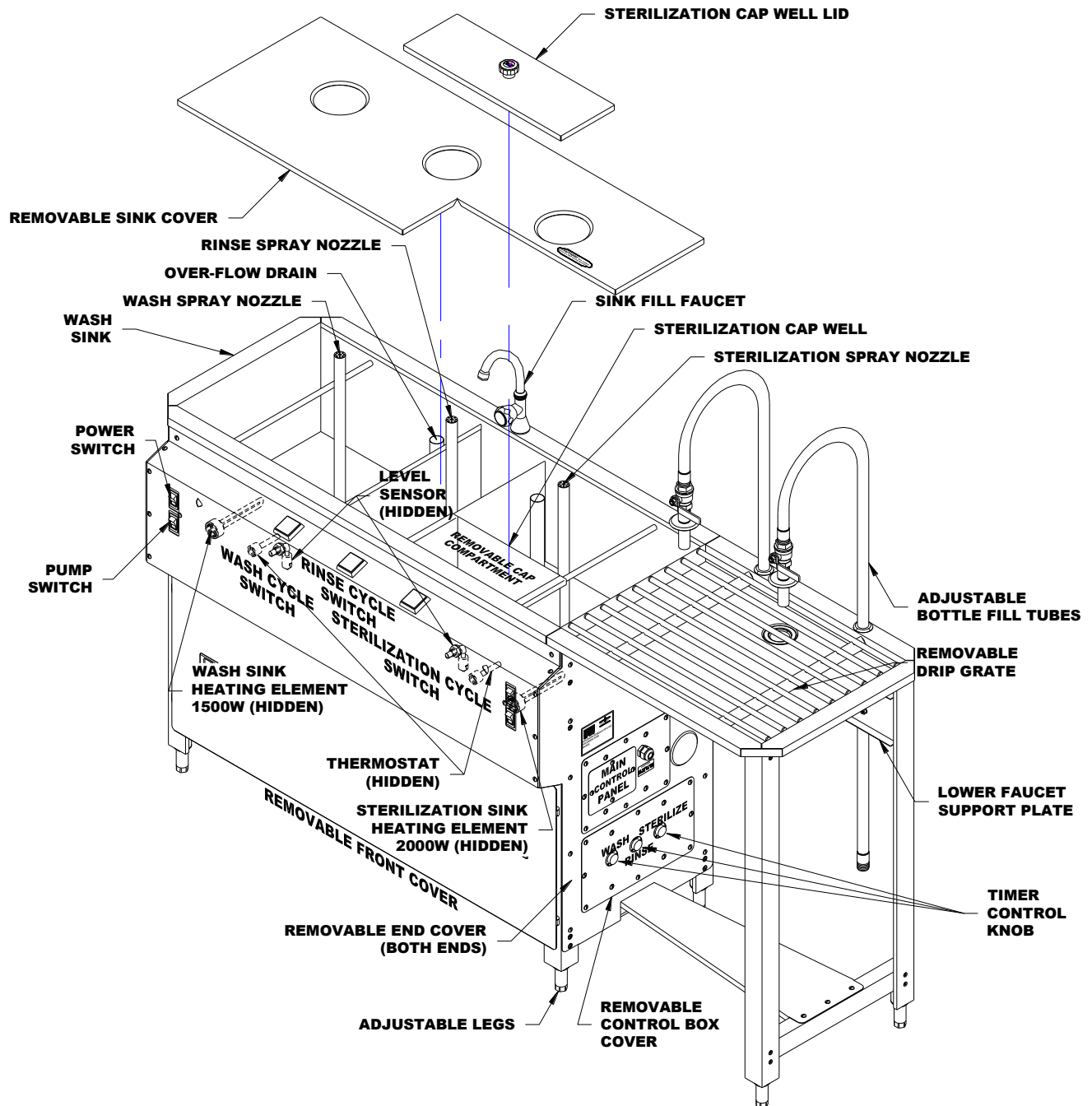
Additional Safety Recommendations

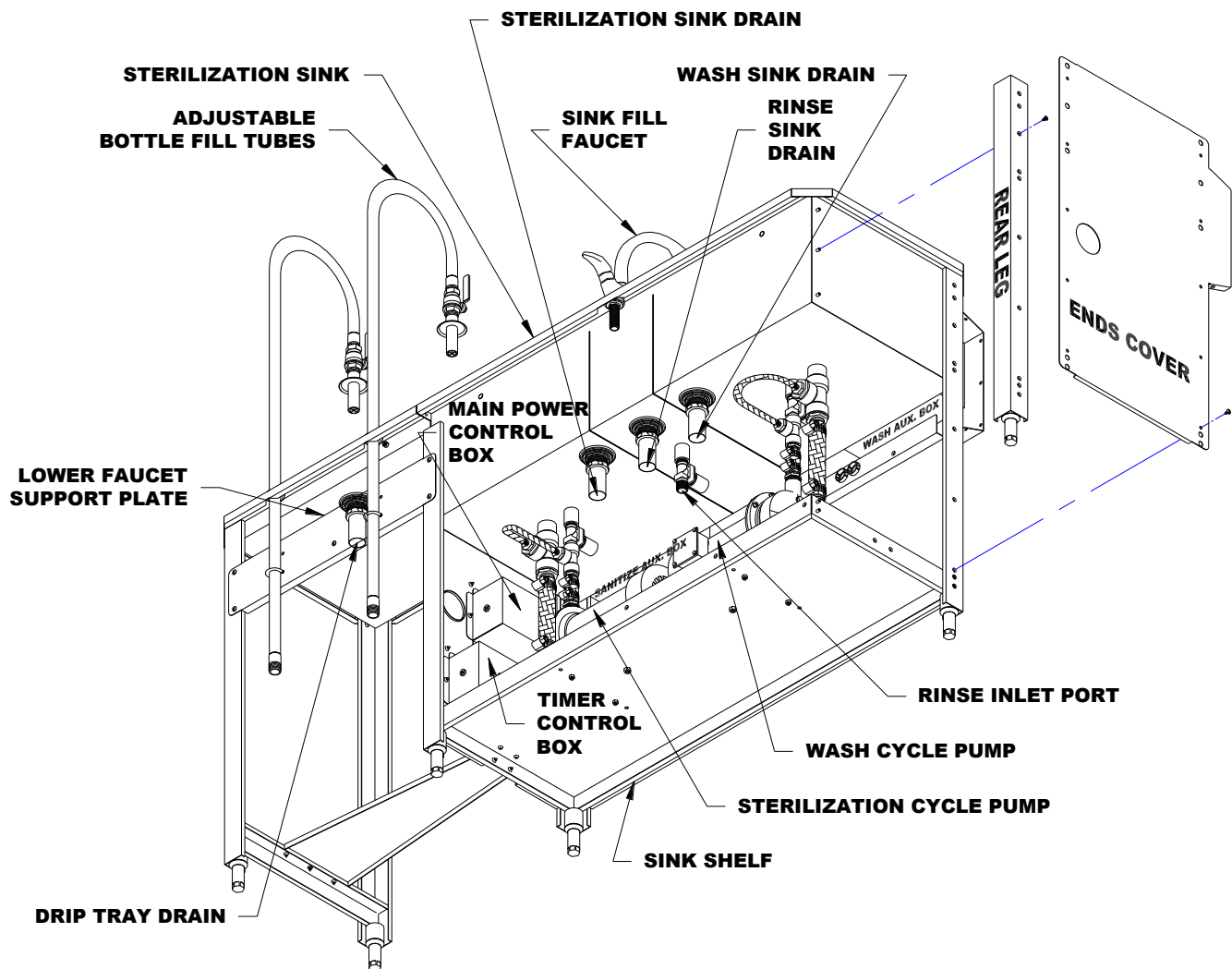
- 1.** Personnel should wear sterile gloves, hair net and mask at all times during the bottling operation.

Features

The semi-automatic bottle washer and fill station has been engineered from the ground up and includes the features shown in the diagrams below:

Bottle Washer and Fill Station Front View Features Diagram





Bottle Washer and Fill Station Rear Bottom View Features Diagram

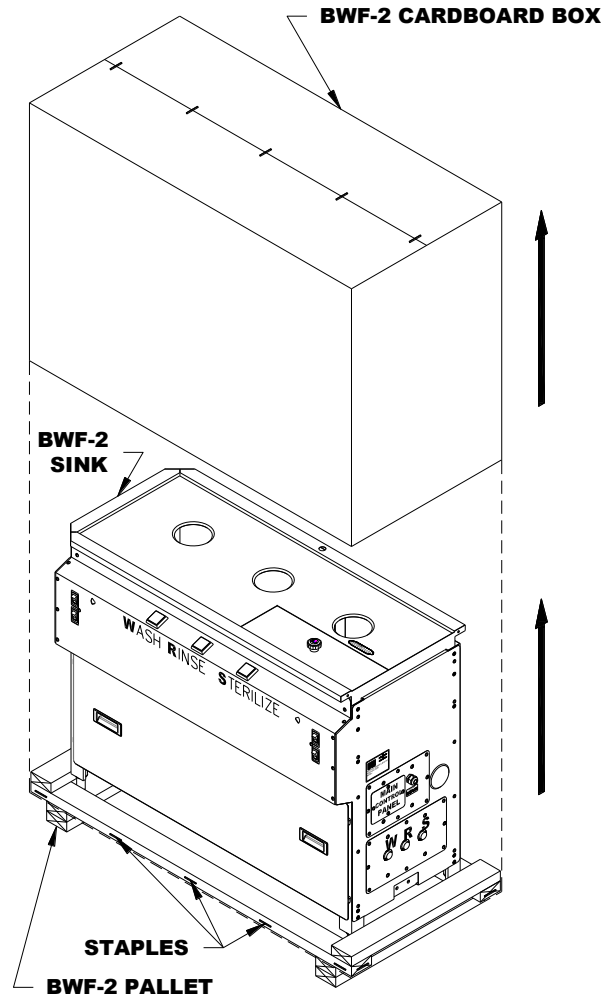
Finding a Good Installation Location

Before installing your bottle washer and fill station it is important to find a good location. Following the points listed below will provide the best location for your bottle washer and fill station.

1. There needs to be adequate room for good bottle flow. An area on the left of the bottle washer and fill station is required for stacks of dirty, empty bottles. An area on the right is required for stacks of clean, bottled water. If a lot of heavily soiled empty bottles will be part of your business, then this needs to be accommodated for. It may include a pre-wash sink included in the flow of dirty empty bottles. Plan for bottle racks or pallets or whatever type of storage you will be using for your empty and filled bottles.
2. Plan for electrical and plumbing requirements for the bottle washer and fill station. The **Pre-Installation Preparation** section in the **Installation** section of this guide explains the electrical and plumbing requirements in detail. The most critical component of the installation in regards to plumbing is the floor drain location. A wall drain may be your only option. If a wall drain is used, be sure there is sufficient slope to follow local plumbing codes.
3. Good lighting is required to make sure the bottle washer and fill station can be operated properly. Lighting may be added to an installation location easier than plumbing or floor drains.
4. An open area that can be kept clean and maintained is important when considering the location for your bottle washer and fill station. The installation location should not be near an overhead door.
5. The bottle washer and fill area should be away from the general traffic flow of your operation. By keeping the area isolated it reduces the introduction of contaminants and makes it easier to keep the area clean.

Unpacking Your Bottle Washer and Fill Station

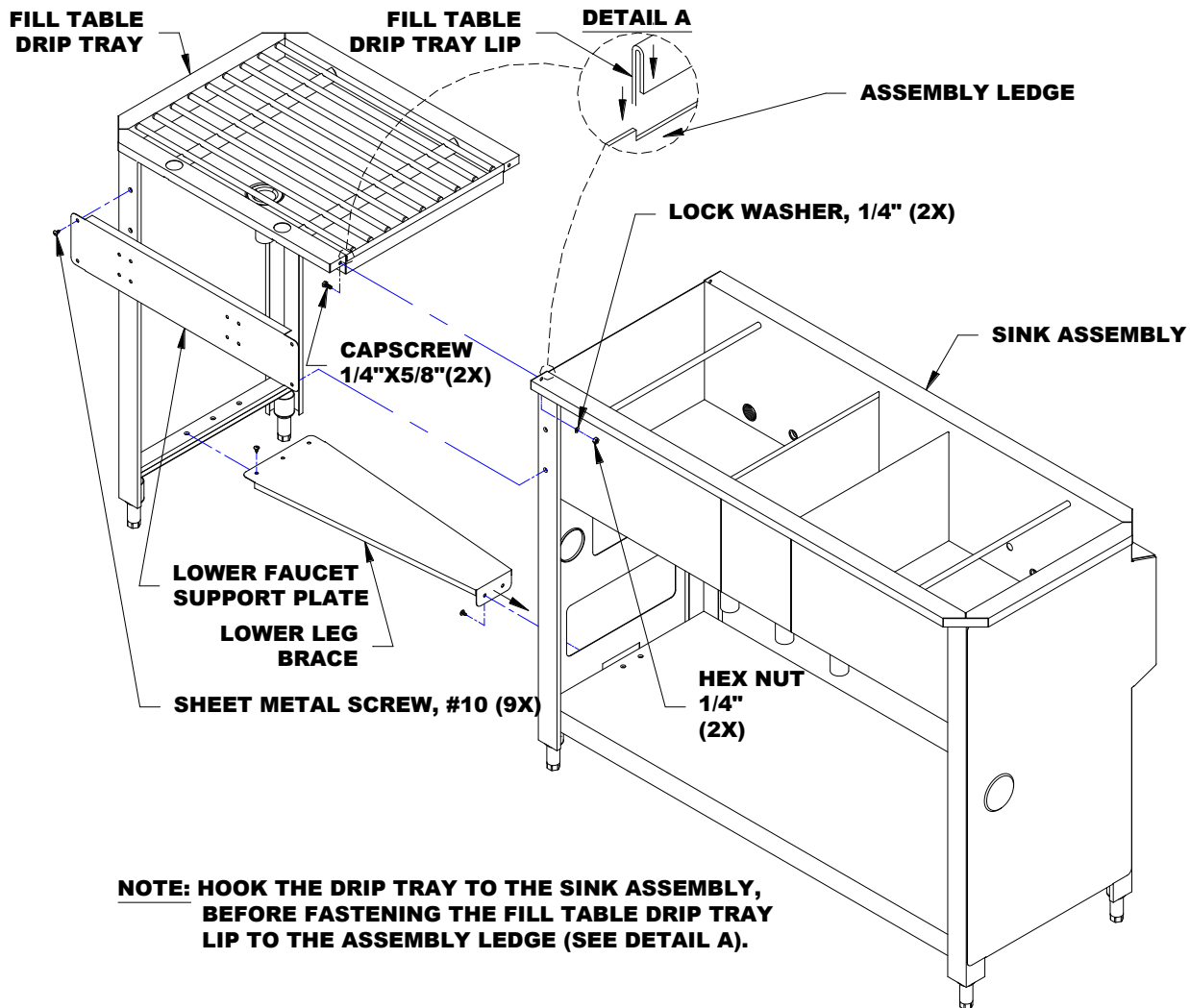
Bottle Washer and Fill Station Unpacking Diagram



Your bottle washer and fill station has been shipped on a pallet and is wrapped with cardboard, strapped and shrink-wrapped. Unpack the bottle washer and fill station by:

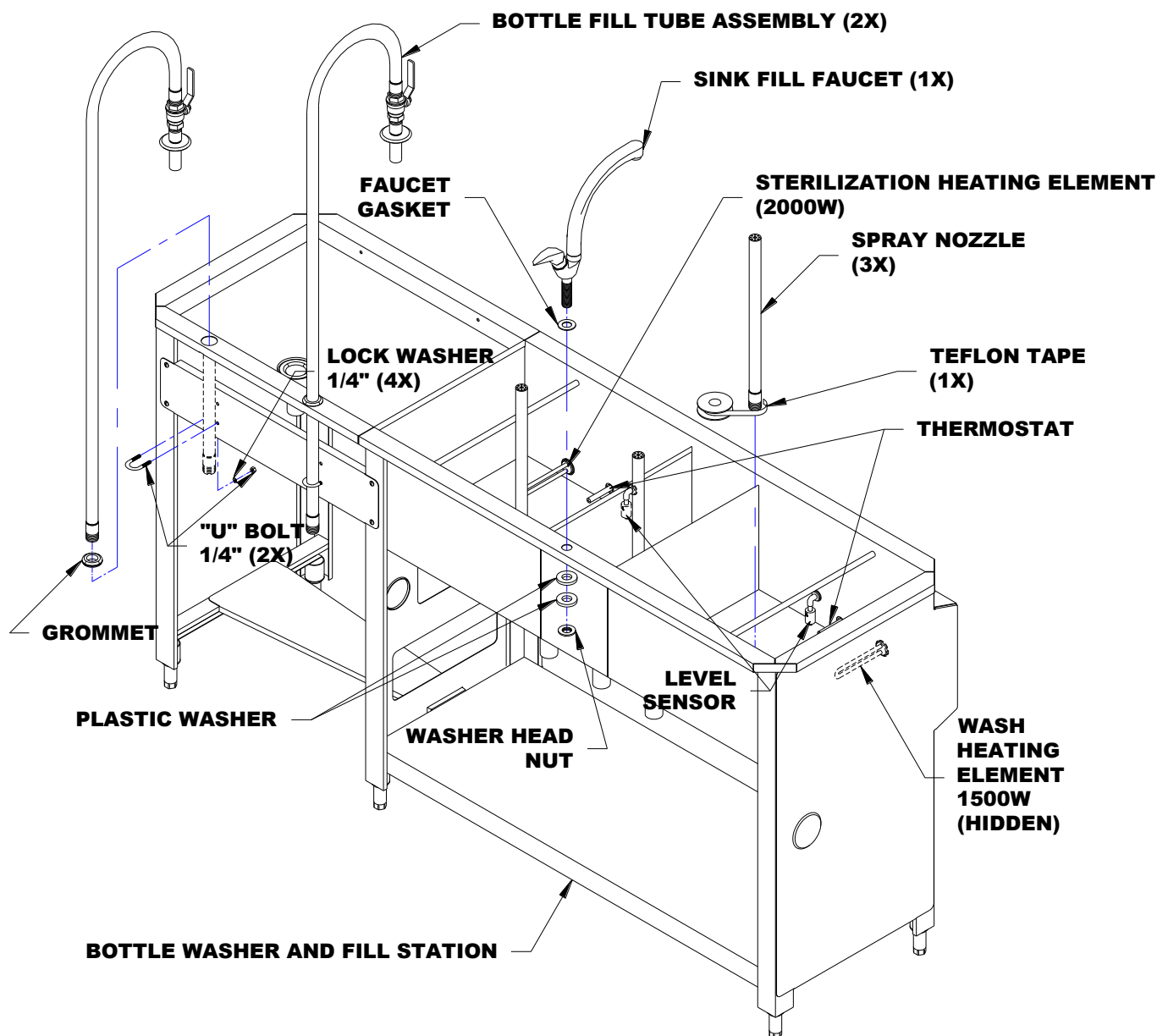
1. Removing the staples/screws off the cardboard at the bottom and lift the cardboard off of the wooden pallet.
2. Remove the fill table from the back of the sink assembly.
3. Remove the fill table legs from inside the sink assembly.
4. Carefully removing any shrink-wrap and cutting tie straps.
5. Make sure the sterilization spray tube is located in the sterilization sink and that there are two sink strainers, one in the wash sink and one in the sterilization sink. If any parts are missing or if you have been given the wrong part, DO NOT return the bottle washer and fill station unit. Contact your dealer for the required parts. They will be pleased to assist you.

Assembly



Bottle Washer and Fill Station Drip Tray Assembly Diagram

1. Refer to the diagram above. Hang the drip tray lip on the sink assembly ledge on the end from which it was unpacked. It should fit together so that the top of the table looks like one piece. There are two 1/4" holes located in the front and back of the drip tray at the hang ledge. Permanently attach the fill table to the sink assembly using 2-1/4"x5/8" capscrews, lock-washers and nuts.
2. Install the lower leg brace by placing the small end (with two holes) into the slot on the sink assembly and the other end (with three holes) on the cross brace between the two end legs. Also install the lower faucet support plate as shown. Attach both securely using sheet metal screws.



Bottle Washer and Fill Station Spray Nozzle, Bottle Fill Tube and Sink Fill Faucet Assembly Diagram

3. Refer to the diagram above. Apply Teflon tape to the male threads on the three spray nozzles and thread them into each sink.
4. Using soapy water, wet the grommet for the bottle fill tube assy. and push the bottle fill tube assy. through the grommet and attach upper (if possible) to the wall and lower sink support brackets to each faucet and the wall.
5. Assembly of your bottle washer and fill station is complete. It is now ready to be installed.

Installation

Pre-Installation Preparation

Introduction

To ensure that installation of your bottle washer and fill station can be completed as quickly as possible, it is best to have all of the electrical supplies and plumbing fittings installed before your station arrives. All connections should be located so when your bottle washer and fill station arrives, all you have to do is assemble it, slide it against the wall, and connect the electrical and plumbing with a minimum amount of trouble.

The bottle washer and fill station should be installed according to local electrical and plumbing codes. If you are unable to install the station according to code, then have a plumber and electrician complete all connections for you.

Sink Faucet and Fill Tube Connections

Four water supply connections are required on the bottle washer and fill station. One connection for the sink fill faucet, one connection for the rinse sink supply and two connections for the bottled water fill tubes.

The sink fill faucet is used to fill the wash and sterilization sinks. The rinse sink supply water is used for rinsing bottles after the initial wash. Domestic water can be used for the wash, rinse and sterilization sinks. It is recommended that you use purified water of no greater mineral content than what you are bottling for these sinks. For example, if you are bottling distilled water, you should use distilled water in these sinks, so it does not increase the Total Dissolved Solids (TDS) of your bottled water. Low mineral water, such as Reverse Osmosis (RO) water will also improve the cleaning process dramatically.

If the bottled water is used for the sink fill faucet and rinse sink supply, then a solid 1 inch supply line with four, $\frac{3}{4}$ " outlet nipples can be mounted on the wall behind the location of the bottle washer and fill station. Once the bottle washer and fill station is installed, $\frac{3}{4}$ " flexible tubing can be used to connect the sink fill faucet, rinse sink supply and bottle fill tubes.

If domestic water is used for the sink fill faucet and rinse sink supply, then a connection is required for these. The two bottled water supply outlets are also needed. Flexible tubing must be used for the two bottle fill tubes because they are adjustable depending on the height of the bottles that are being filled.

The **Bottle Washer and Fill Station Plumbing Diagram** on the next page shows the dimensions for the location of all water supply connections.

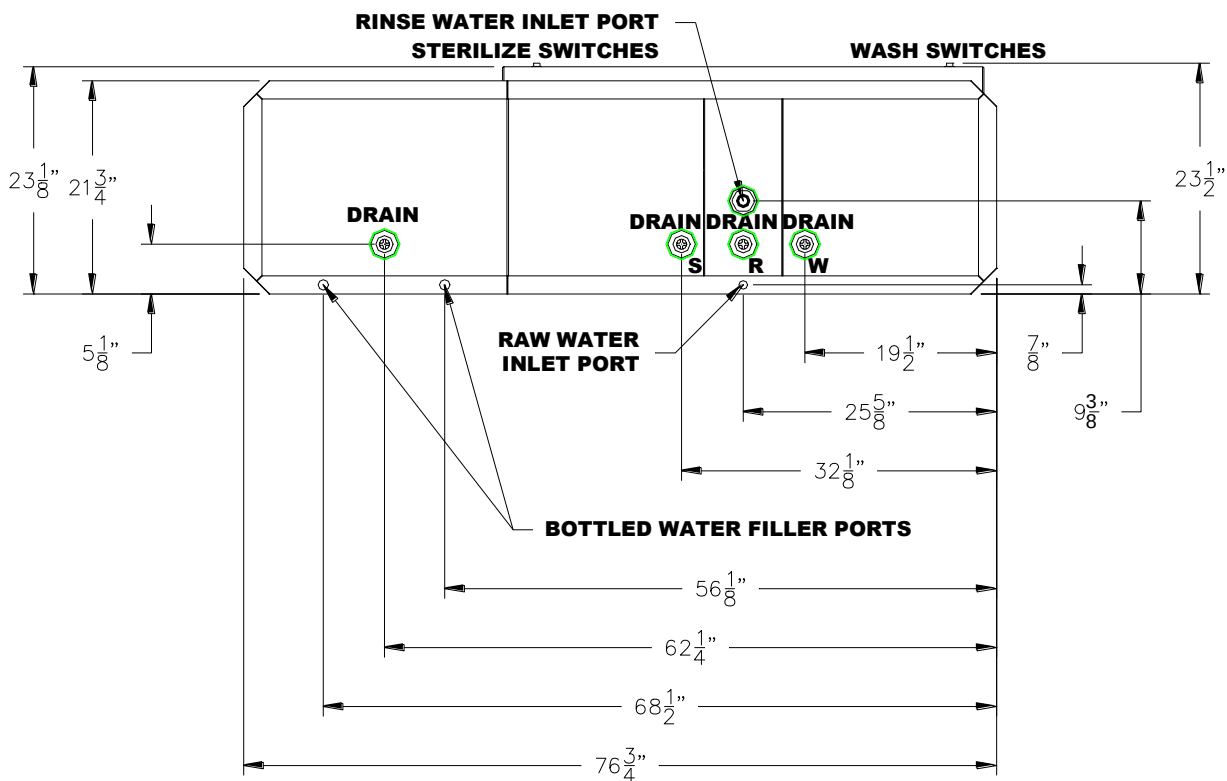
Note: If you would like to minimize heat-up times, we recommend that you install a separate hot water tank for the purified water for the wash and sterilization sinks so that these sinks are filled with pre-heated water .

Drain Connections

Four drain connections are required for the bottle washer and fill stations as follows:

- Wash Sink Drain
- Rinse Sink Drain
- Sterilization Sink Drain
- Fill Station Table Drain

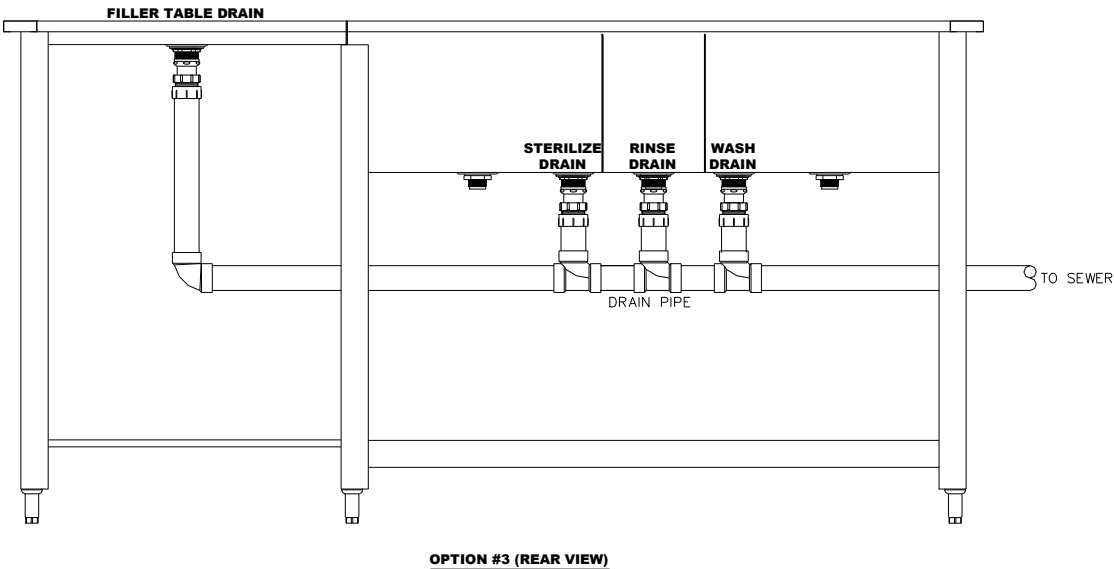
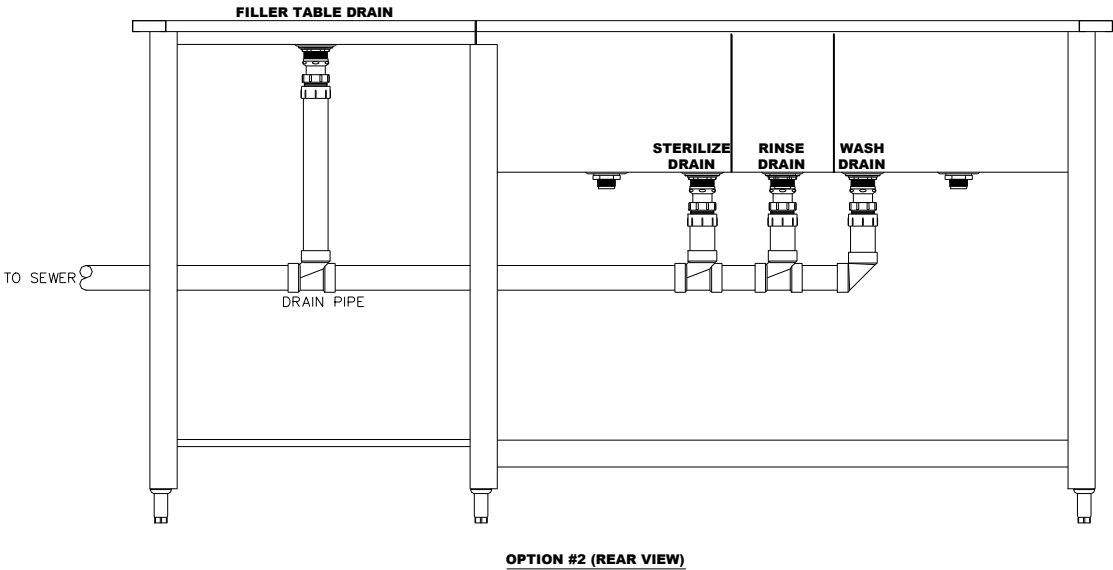
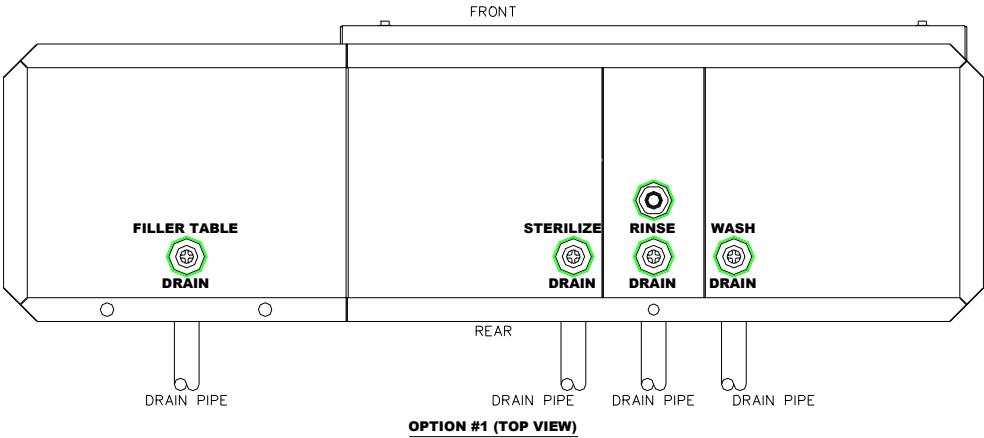
All four drains should be teed into a solid 1-1/2" line located along the wall behind the station and then drained to a suitable floor drain in a manner, which meets local plumbing codes. The **Bottle Washer and Fill Station Plumbing Diagram** below shows the dimensions for the location of all drain connections. Be sure to install according to appropriate local building codes.

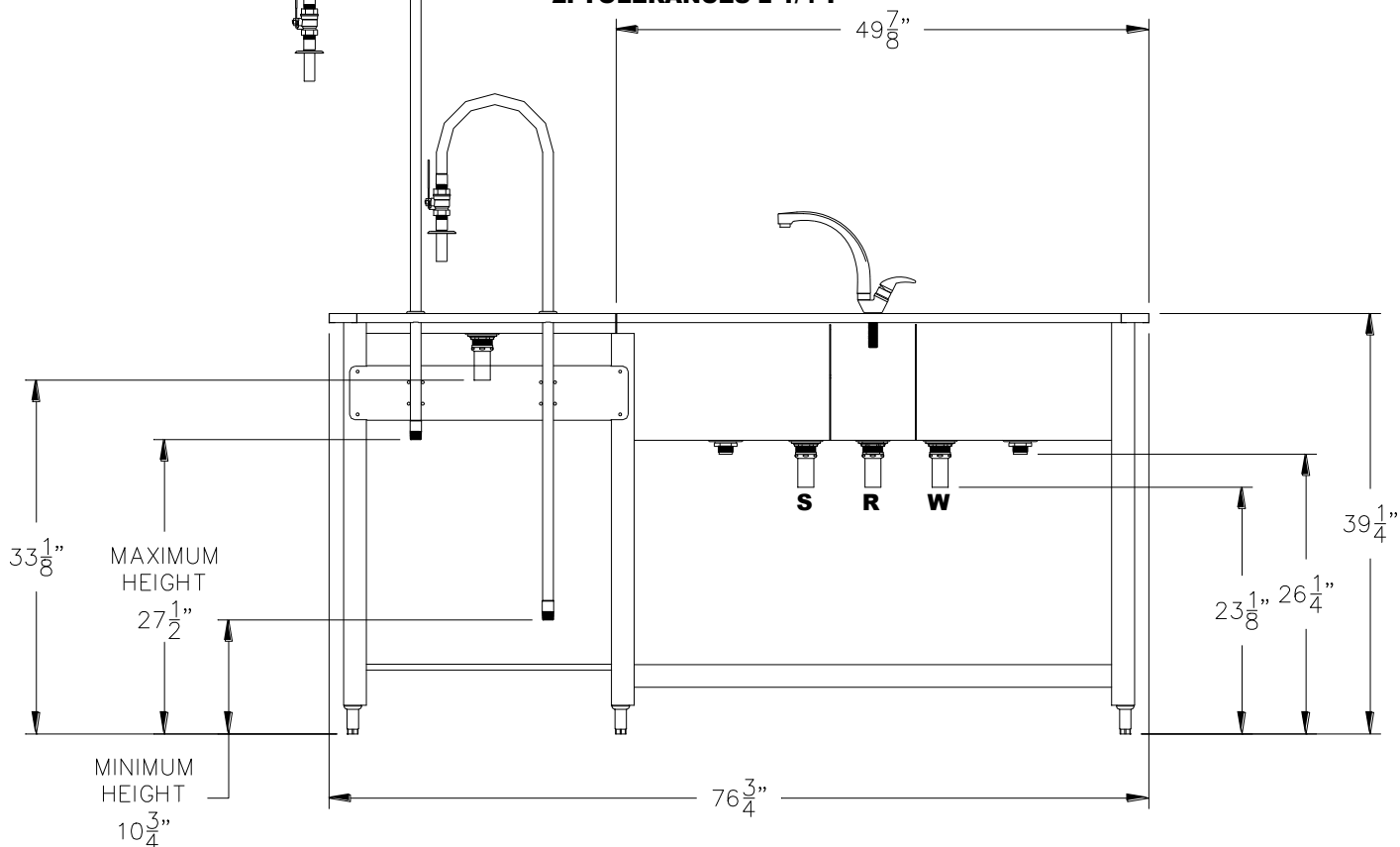


NOTE:
ALL DIMENSIONS ARE ACCURATE AT TIME OF PRINTING
BUT ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Bottle Washer and Fill Station Plumbing Diagram-Top View

Below are diagrams showing the 3 main methods of installing the drains.



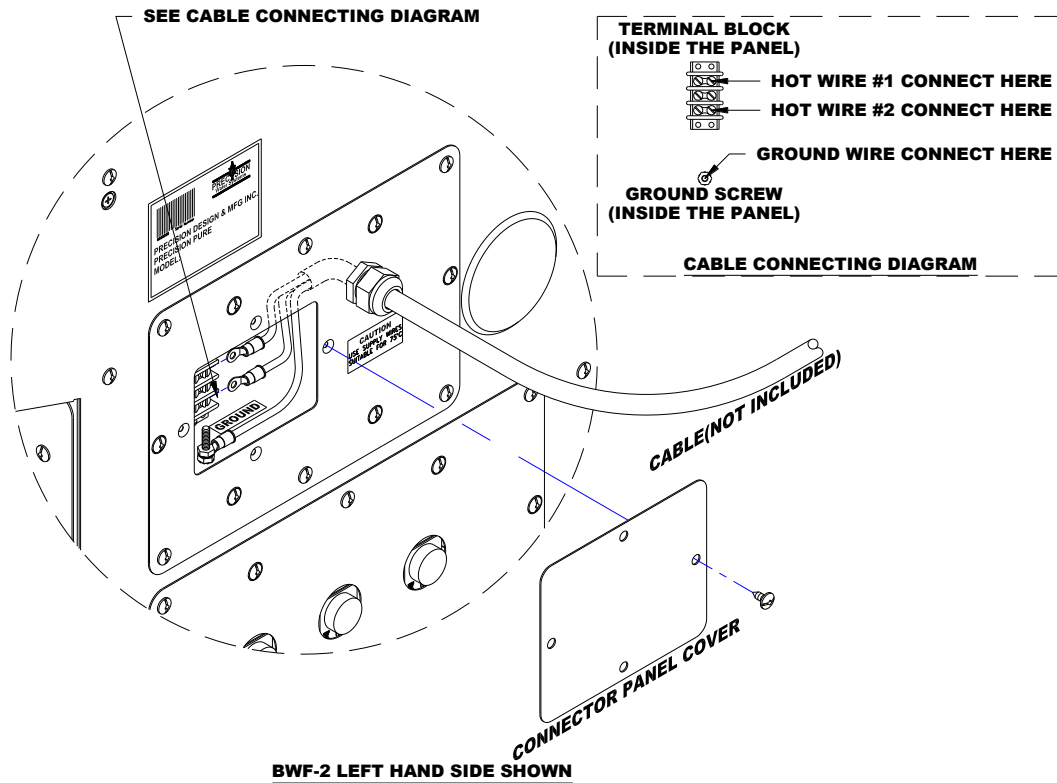
NOTES:**1. ALL DIMENSIONS ARE ACCURATE AT TIME OF PRINTING****2. TOLERANCES $\pm 1/4"$.**

Bottle Washer and Fill Station Plumbing Diagram-Rear View

Electrical Connections

A qualified electrician must be used to complete the electrical connections for the bottle washer and fill station. A 220 Volt, 30 Amp Feeder will be required to provide adequate electrical service for the bottle washer and fill station.

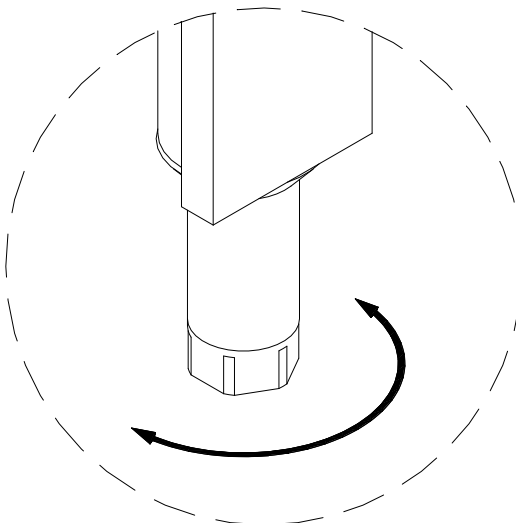
The PWS BWF-2 has been completely wired internally and only requires a 220 Volt hard-wired connection. The main electrical hook-up is located below the filler table on the sterilize end of the wash compartment. To connect remove the four screws that hold the inspection cover over the field connection terminals. Route the appropriate feed cable through the strain relief and connect to the main terminal block. Tighten the strain relief to the cable and replace the field connection inspection cover.



Bottle Washer and Fill Station Electrical Connections Diagram

Levelling

The bottle washer and fill station has six adjustable legs on the bottom of the station. Each leg has a threadable adjustment. Level the station so that it is level from right to left and level from front to rear, so that the front is slightly higher to allow complete draining of the sinks. Ensure that all legs are adjusted out and contact the floor.



Operation

NOTE: Read all parts of the Owners Guide before operating the Bottle Washer and Fill Station.

Introduction

For the washing of returnable bottles made of polycarbonate, care must be taken in the temperature and chemistry of the washing solutions used so that stress crack corrosion is not promoted. The following operation steps are provided as a guideline to the user and may need to be adjusted to suit individual needs.

Please Note these are the mixing instructions to achieve the below products recommended concentrations. If another product is substituted please follow that product's mixing instructions

PB-Wash

Fill tank to the top of the overflow tube 60 litres/15.85 U.S. gallons; add 300 milliliters/10 U.S. oz. of PB-Wash. Set the solution heater to between 54C/130F – 66C/150F. **DO NOT exceed 82C/180F as the timer solenoid valves cannot be operated above this temperature!** Place a bottle over the spigot and run 5 cycles to mix solution. You are now ready to start your bottle washing run.

To maintain the proper solution concentration mixture **must** be changed out after 50 bottle washing cycles.

To avoid possible damage to the tank and pump the tank should be drained and rinsed and 2 cycles of water should run in order to flush the pump system.

NOTE: Do not mix *CHEMICAL WASH* or *SANITIZE* solutions *TOO STRONG!*

More chemical is NOT better!

Excess chemical in your wash and sanitize solutions may damage your stainless steel sink and/or your operator.

Stainless Steel is a corrosion resistant material, not a corrosion proof material. Rinse thoroughly with water when finished for day.

Always follow the chemical mixing directions on the label of the chemical container.

Over-strength mixed chemical solutions may cause severe and premature corrosion and pitting of the stainless steel not covered by the warranty of this product.

Note: Chlorine test strips can be purchased from local pool, spa or chemical companies to check chlorine levels and ensure that you do not damage your sink due to excessive chlorine levels.

Perox-E

Fill tank to the top of the overflow tube 60litres/15.85 U.S. gallons, add 500 milliliters/18 U.S. oz. of Perox-E. Place a bottle over the spigot and run 5 cycles to mix solution. You are now ready to start your bottle run.

Please Note: Perox-E is most effective at room temperature; the solution heater must be left off, no heating of solution is required.

To maintain the proper solution concentration mixture **must** be changed out after 50 bottle washing cycles.

To avoid possible damage to the tank and pump the tank should be drained and rinsed and 2 cycles of water should run in order to flush the pump system.

Any questions or concerns please contact Precision Design & Mfg. at 780-349-4933 or toll free at 1-877-888-7364

NOTE: Do not run heaters or pumps without water in the tanks. This will burn the heating elements out and will void the heating element warranty. Water level sensors in each side of the sink should prevent the heaters and pumps to operate without sufficient water.

NOTE: Each sink side is equipped with a low water sensor that will not allow the pump or heater to operate if there is insufficient water in that section of the sink.

Heaters can be turned on as soon as the sink is being filled and heater will energize as soon as there is enough water to cover the heating element.

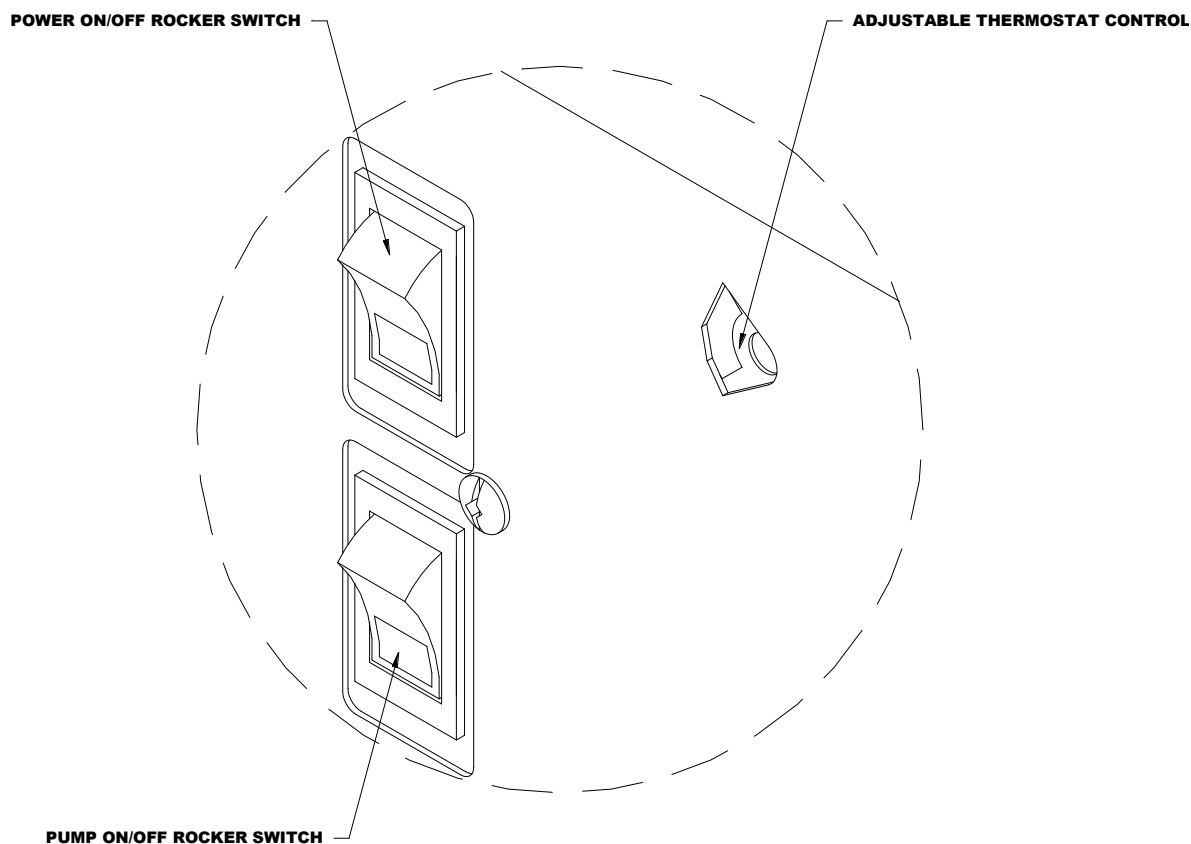
Ensure that level sensors are not contacted, kept free of debris so that the sensor float moves freely and never purposely prop up the level sensor for any reason.

1. Wait until the temperature in each tank reaches the desired level. Wash sink temperature should be 54-66 deg. C (130-150 deg. F). If using another manufacturers sterilizing product, heat as per manufacturer instructions. **Do NOT exceed 82 deg. C (180 deg. F) as the timer solenoid valves cannot be operated above this temperature!** Thermostat temperature levels can be adjusted with a screwdriver through the opening on the front cover on each side of the sink near the pump and heater switches. It is advisable to check the temperature with a thermometer and not rely on your thermostat settings. The thermostat settings are a rough guideline and you will want to calibrate your settings using a thermometer.

Bottle Washer and Fill Station Control Switches & Thermostat Adjustment

2. When the sink temperature reaches the desired level, turn on both pumps with the upper rocker switches on the front covers. The station is now ready for washing, rinsing, sterilizing and filling bottles.

NOTE: Pumps should remain off until the sink is filled and then remain on until all washing is done for the shift. A bypass has been built into the system so that pumps can remain on when not washing. Water will only travel up spray tube when push button is pressed to allow water up the spray tubes. Continual starting and stopping of the pump will cause premature pump motor failure.

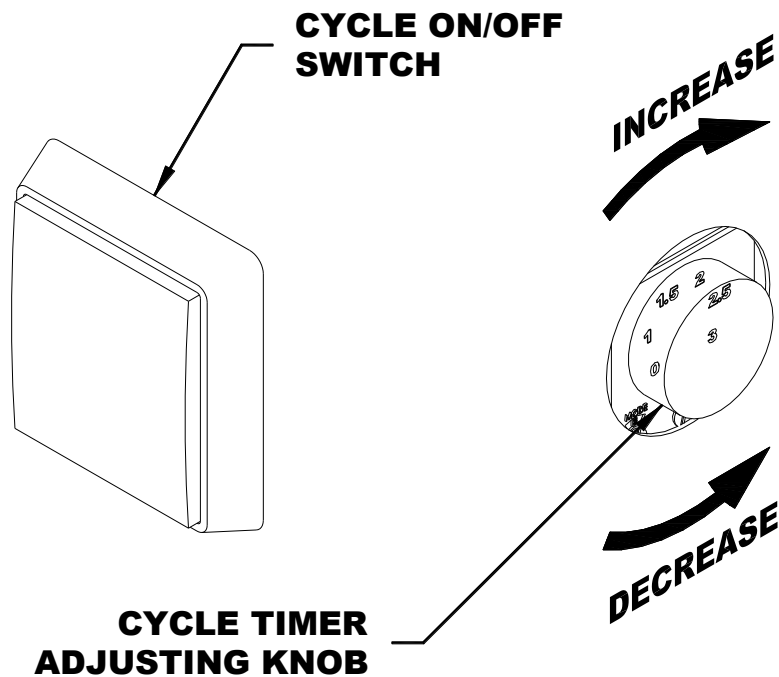


Heavy Soil Removal

Heavily soiled bottles should be cleaned in a separate sink with a solution of Pink Chlorinated Sanitizer, (Dyversol), at 5-10 grams/litre or potable water. Soak, spray or brush the bottles until all soil is removed. This should be done prior to placing them on the bottle washer.

Cycle Activation Controls

There are three operation cycles on the bottle washer and fill station that use a push button **Cycle ON/OFF Switch** to start the cycle. The corresponding Cycle Timer Adjusting Knob controls the length of each cycle. Turning the cycle timer adjusting knob clock-wise increases the length of the cycle. The timer range has been preset at the factory for 10 to 100 seconds.



Bottle Washer and Fill Station Procedure

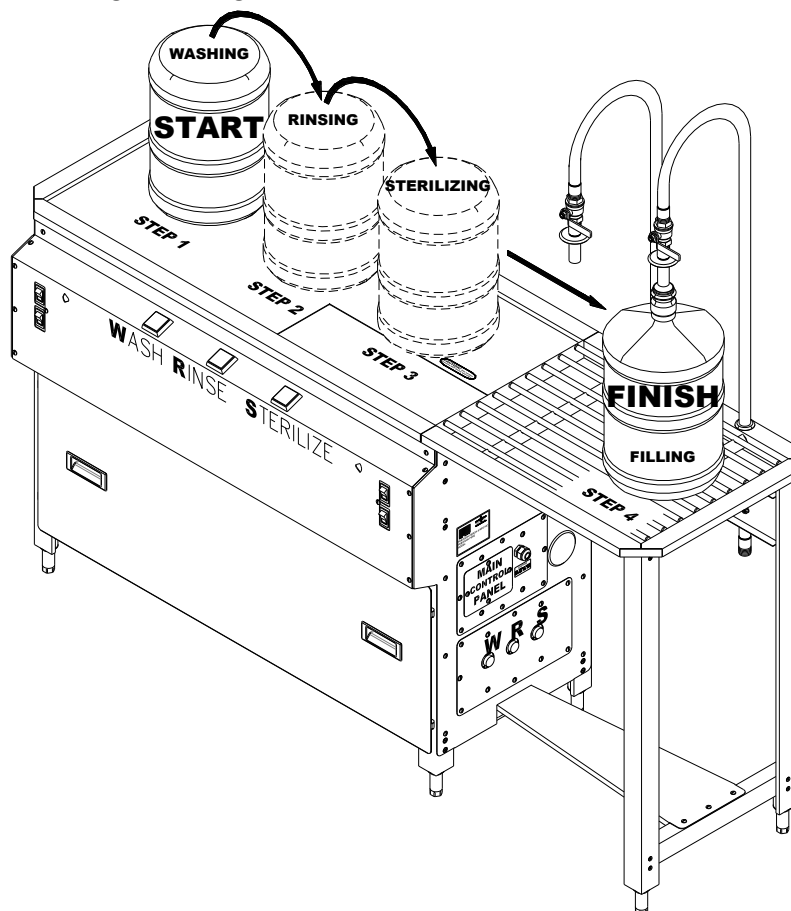
Introduction

Operation of the bottle washer and fill station follows the pattern of any assembly line. The process starts at one end and works to the other. Using timed circuits allows one operator to complete all steps on a continuing basis. This means that while the first bottle is completing the second step, a second bottle can be started on the first step. As the process continues, four bottles will be completing four different steps on the station at one time.

The four operational steps are

- Step 1:** Washing
- Step 2:** Rinsing
- Step 3:** Sterilizing
- Step 4:** Filling

Each step is shown in the **Bottle Washer and Fill Station Operation Procedures Diagram** below and described in detail following the diagram.



Bottle Washer and Fill Station Operation Procedures Diagram

Step 1: Washing

The first sink and spray nozzle is used to wash the inside of the bottles. Bottles to be washed are inverted and placed over the wash spray nozzle. The Wash Cycle Activation Switch is pressed and the preset timer washes the inside of the bottle. Recommended wash time is 30 seconds. Bottles are left to drain and then cycled to the next step.

Step 2: Rinsing

The second spray nozzle is used to rinse the inside of the bottles. Bottles to be rinsed are inverted and placed over the rinse spray nozzle. The Rinse Cycle Activation Switch is pressed and the preset timer rinses the inside of the bottle. The rinse cycle should be long enough to remove the smell of chlorine from the bottle. Recommended rinse time is 30 seconds. Bottles are left to drain and then cycled to the next step.

Step 3: Sterilizing

The third sink and spray nozzle is used to sterilize the inside of the bottles. A compartment at the front of the sterilizing sink is for sterilizing and softening the bottle caps. Bottles to be sterilized are inverted and placed over the sterilization spray nozzle. The Sterilization Cycle Activation Switch is pressed and the preset timer sterilizes the inside of the bottle. Recommended sterilization time is 30 seconds. Bottles are left to drain thoroughly and then cycled to the next step.

Step 4: Filling

Stand bottle upright and place under fill nozzle and open valve until bottle is full. Slide bottle out from fill nozzle. Remove a cap from the cap sterilizer well at the front compartment of sterilization sink. Place cap on bottle and push down firmly (a rubber mallet may be used to obtain a tight fit). Wipe the exterior of bottles with a clean towel and remove from the table.

System Shut Down

When bottling is completed for the day, the following steps should be completed.

1. Shut off the heating elements and pumps using the switches on the front of the machine.
2. Drain sinks thoroughly.
3. Refill sinks with fresh water until float activates pump, with the pump switch on and the heater switch off. Run for two minutes to circulate fresh water through pumps and flush out chemicals. Drain sinks.
4. Wash & rinse all three compartments and the fill table of the BWF-2 free of dirt or grime. When washing your BWF-2, rub the sink walls and bottom with a scotchbrite type pad to keep your BWF-2 sparkling clean.

Note: Never use steel wool type scrubbers as they will contaminate the stainless steel and promote rust.

5. Check pump suction screens for blockage and clean if necessary.
6. Wipe down excess water spills on all surfaces.

Each sink side is equipped with a low water sensor that will not allow the pump or heater to operate if there is insufficient water in that section of the sink. Heaters can be turned on as soon as the sink is being filled and heater will energize as soon as there is enough water to cover the heating element.

Maintenance and Cleaning

Regular Maintenance

Keeping your bottle washer and fill station clean on a daily basis is the best maintenance that you can provide. Following the System Shut Down Procedure carefully will help to provide years of trouble free service.

Wash your sink with a scotchbrite type pad to keep your BWF-2 sparkling clean.

Note: Never use steel wool type scrubbers as they will contaminate the stainless steel and promote rust.

Troubleshooting

Caution! Always Disconnect all power and let the bottle washer and fill station cool down completely before completing any Troubleshooting.

PROBLEM	CAUSE
A) Bubbles are coming out of the pump suction port on the sterilization sink.	1. Hydrogen peroxide levels are too high. Reduce the concentration of hydrogen peroxide.
B) No Water Flow when the cycle activation switch is pressed.	1. The Timer has not energized the solenoid valve, which is connected to the cycle activation switch. Change Timer from another switch to confirm malfunction, and replace Timer. 2. Ensure that there are sufficient water levels.
C) Solenoid Valve does not turn off at the end of cycle.	1. Debris in solenoid valve is holding the valve open. Remove the top off from the solenoid valve by removing screws and check for blockage. Remove blockage and/or flush valve with clean water.
D) Water is not getting hot in Wash and/or Sterilization Sink.	1. Heating element is burned out. Replace Heating element. NOTE: Do not run heaters without water in the tanks!

Contact any Precision Water Systems Service Centre to correct any problems with your Bottle Washer and Fill Station that is not covered in this guide.

To locate a Service Centre in your area contact the manufacturer at:

Precision Design & Manufacturing Inc.
9024 – 100th Street
Westlock, Alberta, Canada
T7P 2L4
<http://www.precisioncanada.com>
e-mail: info@precisioncanada.com

Phone: (780) 349 4933
FAX: (780) 349 4957

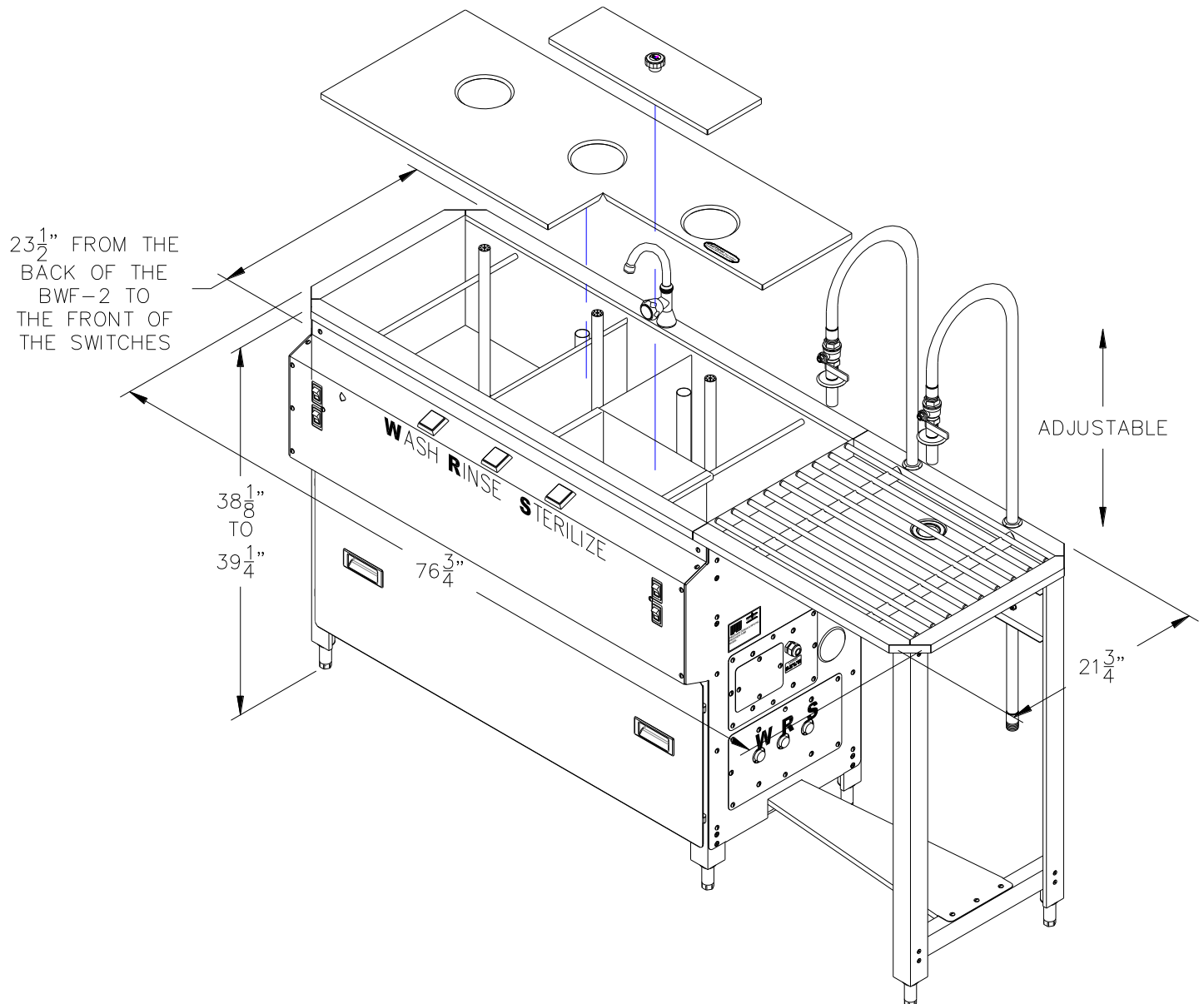
Optional Accessories

All Options are available from your Precision Water Systems Dealer or Service Centre

Specifications and Technical Information

Bottle Washer and Fill Station Specifications Diagram

For all replaceable parts please consult the Replacement Parts Manual #097118, Series 0009.



Wiring List

Wiring List, Circuit Box (BWF-2) PART # 900151-

						SERIES 9	
No.	Part#	Color	Ga	Length	From Conn.	ToConn.	To Location
1	900340	BLK	#18	4"	F250 #18-#22	F250 #18-#22	TRANSFORMER (SMOOTH)
2	900340	BLK	#18	4"	F250 #18-#22	F250 #18-#22	TRANSFORMER (RIBBED)
3	095099	YLW	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #7 W
4	095100	BLU	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #2 W
5	095099	YLW	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #7 R
6	095100	BLU	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #2 R
7	095099	YLW	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #7 S
8	095100	BLU	#16	8"	#10 RING #14-#16	#10 RING #14-#16	8 PINS BASE #2 S
9							
10							
11							
12							
13							
14							
15	900225	BLK	#18	87"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #8 W (SM)
16	900225	BLK	#18	87"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #6 W (RIB)
17	900222	BLK	#18	77"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #8 R (SM)
18	900222	BLK	#18	77"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #6 R (RIB)
19	900219	BLK	#18	77"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #8 S (SM)
20	900219	BLK	#18	77"	#10RING#18-#22	F250 #18-#22	8 PINS BASE #6 S (RIB)
21	900223	BLK	#18	17"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 W (SM)
22	900223	BLK	#18	17"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #3 W (RIB)
23	900220	BLK	#18	14"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 R (SM)
24	900220	BLK	#18	14"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #3 R (RIB)
25	900217	BLK	#18	9"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 S (SM)
26	900217	BLK	#18	9"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #3 S (RIB)
27	900585	BLK	#18	64"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 W (SM)
28	900585	BLK	#18	64"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #1 W (RIB)
29	900586	BLK	#18	50"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 R (SM)
30	900586	BLK	#18	50"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #1 R (RIB)
31	900587	BLK	#18	41"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #8 S (SM)
32	900587	BLK	#18	41"	#10 RING #18-#22	F250 #18-#22	8 PINS BASE #1 S (RIB)

NOTES: 1. ALL WIRES ARE #18-2 CONDUCTOR EXCEPT #3 TO #8.

2. **W** = WASH (START), **R** = RINSE (CENTER) & **S** = STERILIZE (END).



Pump Instruction Manual -PST

**** 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. Each pump is carefully tested and packaged at the factory.
2. The catalogue 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 tapping 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 tapping and 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 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.

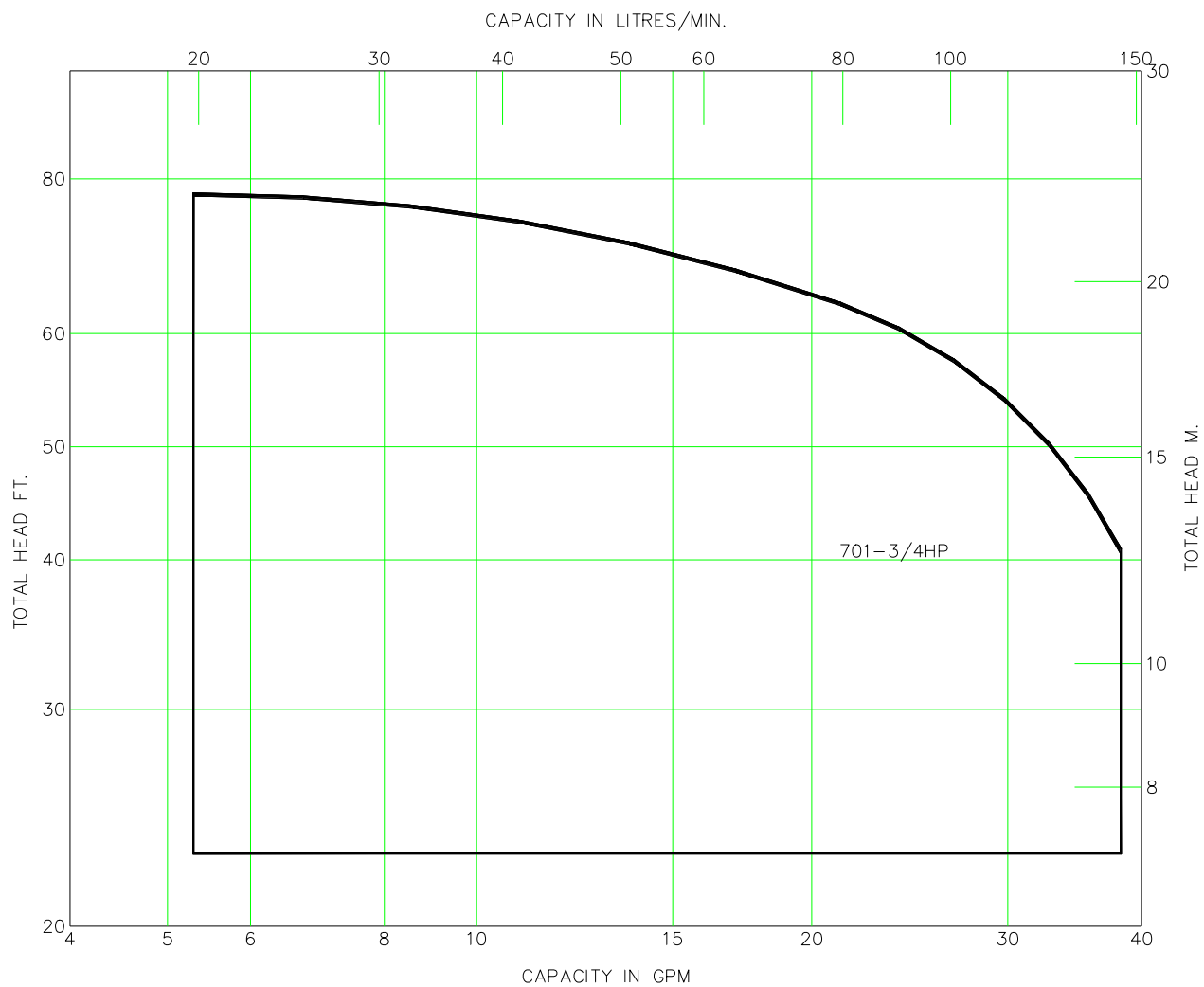
STARTING – When the pump is up to operating speed, open the discharge valve to obtain desired capacity or pressure. Do not allow the pump to run for long periods with the discharge valve tightly closed. If the pump runs for an extended period of time without liquid being discharged, the liquid in the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

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

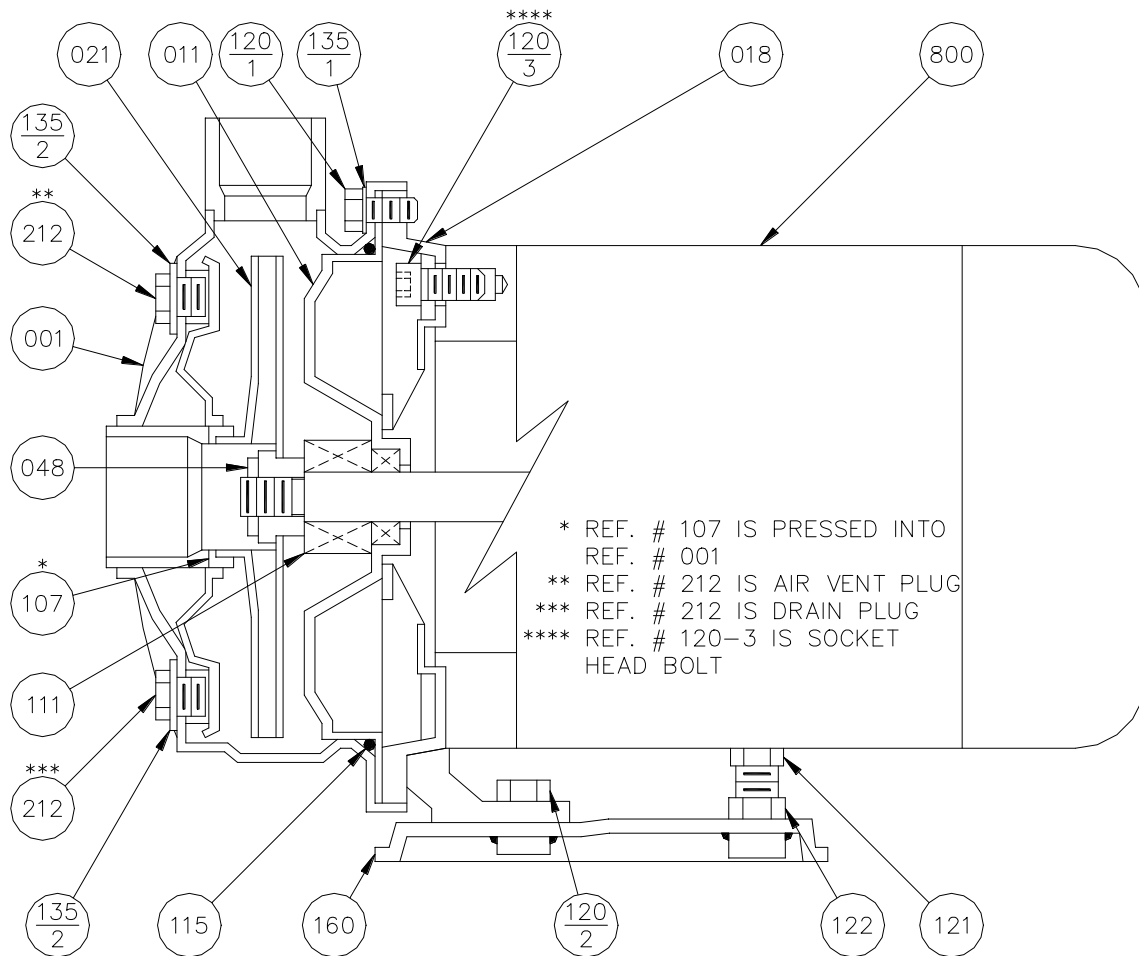
LOCATION OF UNIT – The pump should be installed as near to the liquid source as is practical so that the static suction lift (vertical distance from the center line of the pump to water level) is minimum, and so that a short, direct suction pipe may be used. The capacity of a centrifugal pump is reduced 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.



SPECIFICATIONS PST

	Standard	Optional
Size Suction Discharge	PST70: 1 ¼" NPT thread 1 " NPT thread	
H.P. Range	¾ H.P.	
Performance Range Capacity Head	5.5 to 90 GPM at 3450 R.P.M. 23-144 feet at 3450 R.P.M.	
Liquid Handling Liquid Type Temperature Working Pressure	various Dependent on Mechanical Seal selection Max. 115 P.S.I.G. (8 Bar)	
Materials Casing Impeller (Closed type) Shaft Bracket Mechanical Seal	304 Stainless Steel 304 Stainless Steel Stainless Steel Aluminum Carbon vs. Ceramic (Buna Elastomers)	Various material options for high temperature, corrosive, and abrasive services
Direction of Rotation	Clockwise when viewed from motor end.	
Motor Type Speed Single Phase Motor Protection	NEMA 56J Frame 60Hz 3450 R.P.M. (2 poles) TEFC: ¾ H.P. TO 3 H.P. ODP: ¾ H.P. TO 3 H.P 115/230V Single Phase: Built-in over-load protection	- explosion proof - 1750 R.P.M. for lower flows and pressures

SECTIONAL VIEW



Ref. No.	Part Name	Standard Material	ASTM, ANSI CODE	Qty.
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				

TECHNICAL DATA

APPLICATIONS

304Stainless Steel Products Materials Suitability for Pumpage

Item No.	Pumpage Type	Conc. %	Temp. Deg C	*Code Level
1	Acetic acid	10	20	2
2	Ammonium bicarbonate	10	20	2
3	Ammonium carbonate		60	3
4	Ammonium chloride	10	20	3
5	Ammonium hydroxide	10	<80	3
6	Ammonium nitrate	5		3
7	Beer			1
8	Benzilic acid	10	20	2
9	Benzilic acid		20	2
10	Boric acid	5	20	1
11	Boric acid	5	80	1
12	Brine			2
13	Butyric acid	Wat. Sol.		2
14	Calcium chloride		20	3
15	Calcium nitrate	10		2
16	Calcium phosphate	10	≤100	2
17	Citric acid	5	20	2
18	Coffee			1
19	Copper sulfate	5	20	2
20	Ethylene glycol			1
21	Fluosilicic acid	20	20	4
22	Fruit Juices			1
23	Hydro cyanic acid		20	2
24	Hydrogen peroxide		20	2
25	Lactic acid	5	≤65	3
26	Lactic acid	10	20	2
27	Magnesium chloride			3
28	Magnesium sulfate		20	2
29	Maleic acid	10	20	3
30	Milk			1
31	Nitric acid	20	20	4
32	Nitric acid	20	70	4
33	Oleic acid	20	20	3
34	Oxalic acid	≤10	≤20	2
35	Oxalic acid	10	70	4

* Code Key: 1=Good 2=Fair 3=Poor 4=Not recommended

IMPORTANT: Pumpages coded 3 (poor) may result in reduced or unsatisfactory service life.

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 and the suction lift does not exceed the permissible values.

TECHNICAL DATA

APPLICATIONS

304Stainless Steel Products Materials Suitability for Pumpage

Item No.	Pumpage Type	Conc. %	Temp Deg C	*Code Level
36	Phosphoric acid		≤80	3
37	Phtalic acid	Wat. Sol.	20	2
38	Potassium bicarbonate	30	20	1
39	Potassium carbonate	40	20	1
40	Potassium chloride	10	20	2
41	Potassium hydroxide	10	<80	2
42	Potassium permanganate		20	2
43	Potassium phosphate	10	80	3
44	Potassium sulfate			2
45	Propionic acid	20	20	2
46	Propylene glycol	60	20	3
47	Salicylic acid		20	2
48	Sodium bicarbonate	10	20	1
49	Sodium carbonate		<60	1
50	Sodium chloride			3
51	Sodium hydroxide	<10	<60	2
52	Sodium nitrate	10		2
53	Sodium phosphate		≤100	1
54	Sodium sulfate	5	<60	2
55	Sulfuric acid	10	20	4
56	Sulfurous acid	Sat	20	3
57	Sulfurous acid	10	20	2
58	Tannic Acid	10	20	1
59	Tataric acid	10	20	2
60	Tea			1
61	Vinegar		≤60	1
62	Water		≤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

* Code Key: 1=Good 2=Fair 3=Poor 4=Not recommended

IMPORTANT: Pumpages coded 3 (poor) may result in reduced or unsatisfactory service life.

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 and the suction lift does not exceed the permissible values.

Trouble	Possible Troubleshooting	Cause
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 lift. 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 damaged 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. Leakage in system.	Replace pressure switch to wider range. Check and repair leaks.
Pump does not stop.	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.

Warranty Registration

IMPORTANT!