

Better Water LLC

City Booster Pump Control Box

Operator Manual



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Visit our website to see our complete product line of water purification products!

www.betterwater.com



Our Company

Better Water LLC is a leading integrated manufacturer of water treatment equipment and components for the industrial, commercial, and institutional markets.



Located in Smyrna, Tennessee, Better Water LLC continues its history of manufacturing and distribution of equipment specifically designed for the renal dialysis market.

Founded in 1971, Better Water LLC has built a reputation for solving our customers' toughest problems with high quality products and unmatched service.

Contact Us

Better Water LLC
698 Swan Dr
Smyrna, TN 37167

Phone (615) 355-6063
Fax (615) 355-6065

Technical Support:
Phone (615) 355-6063, press "1"
Email support@betterwater.com

Customer Service:
Phone (615) 355-6063, press "3"
Email customerservice@betterwater.com

Technical Phone Support

Support is available regarding all Better Water LLC systems, **24 hours a day, 7 days a week.**

- Normal business hours are [Monday through Friday](#) from **8:00 am until 3:30 pm, Central Standard Time** (*excluding holidays*)

Call (615) 355-6063, press "1" for Technical Support

Emergency assistance is available after normal business hours (*including holidays*) by calling **(615) 708-8627.**

BEFORE calling for emergency assistance:

- Check the Troubleshooting guide in this manual
- Check the electrical-power connections, fuses/circuit breakers (*if applicable*)
- Check all valves to ensure each is in the correct position (*if applicable*)

Technical Support Info Online

Our website, www.betterwater.com, which is updated frequently, contains a wealth of technical support information on the **SUPPORT** tab and includes:

- Operator and Service Manuals
- Interactive Frequently Asked Questions for Troubleshooting
- Consumables and Accessories Lists
- Technical Service Bulletins

For your convenience there are also online forms for placing **Orders** and requesting **Returned Goods Authorization**. These are Adobe forms that can be downloaded and either faxed or emailed to us.



Specific Contacts

Technical Support	Phone (615) 355-6063, option "1"
	Email support@betterwater.com
To Place an Order (purchase orders)	Fax (615) 355-6065
	Email orders@betterwater.com
	Phone (615) 355-6063
Customer Service (returns)	Phone (615) 355-6063, option "2"
	Fax (615) 355-6065
	Email customerservice@betterwater.com

Website www.betterwater.com

Helpful information and forms that can be found on our website:

- Operator & Service Manuals
- Technical Service Bulletins
- Consumables and Replacement Parts List
- Brochures
- Order Form
- Return Goods Authorization Request Form

Introduction

The Better Water LLC City Booster Pump Control Box is manufactured to the utmost quality. With proper operation, maintenance, and care, this device should give you years of reliable service.

Before starting you should first read and have a thorough understanding of this entire Operator Manual. It describes in detail the steps and procedures for safe usage of this device..

This device was designed and built with consideration for the information that has been provided to use on the current product water requirements at your site of operation.

This device was designed and built to control the city booster pump to boost the pressure to an acceptable level to operate the system. This device is not intended for any other application.

Once the this device has been delivered, it is the responsibility of the Medical Director to ensure that it is used, monitored, and maintained in such a manner so as to satisfy all applicable standards. Guidelines and other related information are available from:

- Food and Drug Administration (FDA)
- National Association of Nephrology Technicians/Technologists (NANT)
- Association for the Advancement of Medical Instrumentation (AAMI)



NOTE concerning pictures in this manual:

Pictures of devices and components may vary slightly due to product changes, and therefore should be for general reference only. Information concerning their use, functionality, or replacement will not differ unless noted.

WARNINGS



1. It is unsafe to operate or service this device without first reading and understanding the **entire** Operator's Manual. Keep this manual and other associated documentation for future reference.
2. Misuse, improper operation, and/or improper monitoring of this system could result in serious injury, death, or other serious reactions to patients undergoing hemodialysis treatment.
3. Misuse, improper use, or handling of disinfectants and chemical cleaning solutions could result in serious injury or even death. You must comply with the information contained in the Material Safety Data Sheet (MSDS) for the chemical being used.
4. To avoid electrical shock hazard, do not operate this device when the covers or panels are removed.
5.  **ELECTROMAGNETIC INTERFERENCE: This device can create and radiate radio frequency energy and may cause harmful interference if not installed according to the manufacturer's instructions.**

CAUTIONS



1. When used as a medical device, federal law restricts this device to sale by or on the authority of a physician. Per CFR 801.109 (b)(1).
2. Improper operation of this device could result in a low or no-flow condition with the pre-treatment components or RO.
3. Misuse or improper operation of this device will void any warranty.
4. Where water is mentioned, unless otherwise noted, it is city water.
5. Electrical and plumbing connections must adhere to local statutes and any facility codes. Connect this device to a proper ground connection in accordance with the National Electrical Code. Do not remove the ground wire or ground plug. Do not use an extension cord with this device.
6. Do not remove any Caution, Warning, or any other descriptive labels from the device.
7. Do not operate this device in an explosive environment or in the presence of flammable materials. Do not use this device to store, mix, or transfer flammable liquids.
8. Movement or vibrations during shipment may cause connections to loosen.
9. Do not operate this unit in an environment where temperatures may be below 50° F or above 90° F.
10. This device should not be used for purposes outside the device's stated applications, specifications, or limitations.

DEVICE INFORMATION

SPECIFICATIONS	
Operating Weight	21 lbs.
Dimensions	Height 13" x Length 17" x Width 7.5"
Electrical	1 phase Units: 230 vac, 60 Hz, 20 amp breaker 3 phase Units: 208 vac, 60 Hz, 20 amp breaker Control voltage = 24 vac
FEATURES	
Variable Frequency Drive	Use to optimize pump performance by speeding up or slowing it down as needed.
Water Leak Detector	If the remote water sensor detects water, an alarm will sound. If so installed, it can close the main water shut-off solenoid valve.
REQUIREMENTS	
Electrical	- 3 phase: 3 hots, 1 neutral, 1 ground - 1 phase: 2 hots, 1 neutral, 1 ground

PRODUCT DESCRIPTION

Control Box

The control box is a water-tight, chemical resistant box, containing electronic components needed to operate the pre-treatment interlocks, and the city booster pump. There is an indicator light when the city booster pump is operating. Inside the control box is a **Variable Frequency Drive (VFD)** to speed-up or slow-down the city booster pump as needed.

It also contains a **Water Leak Detector** which will sound an audible alarm if water is detected on the remote surface probe.



City Booster Pump

The City Booster Pump is selected to meet the specific needs and characteristics of the water system. It will increase the water pressure to meet the needs of all equipment in the pre-treatment and RO portions of the system.

The city booster pump is a stainless steel, multi-stage, centrifugal pump designed for continuous duty service. The pump is usually powered by a 1½ or 3 HP, 208-230/460 VAC, 60 Hz, 1 or 3 phase motor, with the standard being 3 HP.

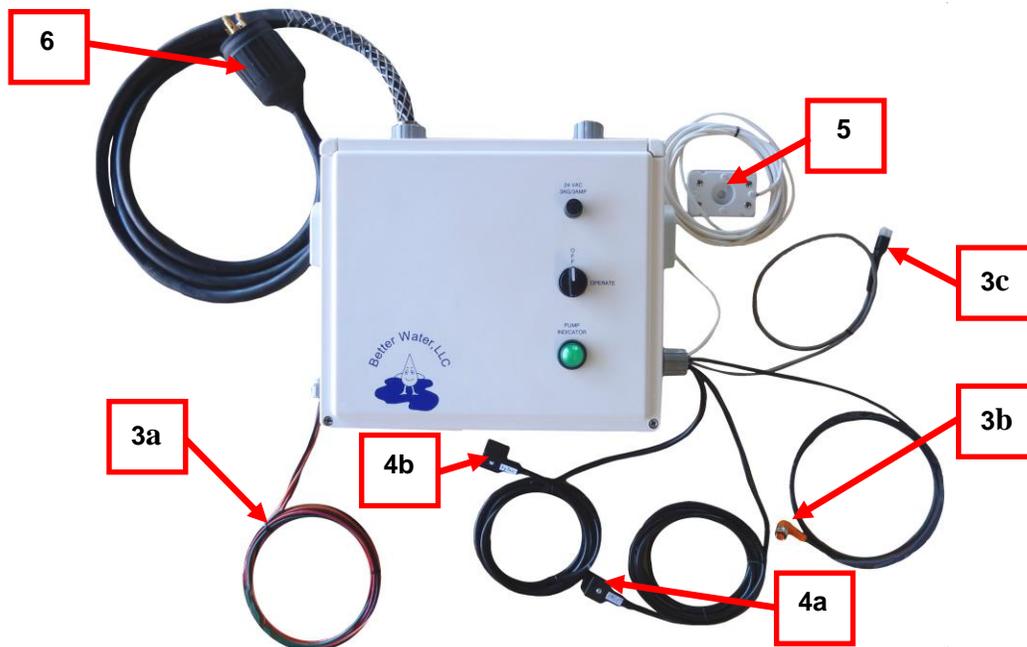


The pump starts automatically when the RO starts or when any of the pre-treatment components that backwash or regenerate start that cycle. This pump is designed for boosting water pressure to the water treatment system, and includes a variable frequency drive (VFD) to speed-up or slow-down the city booster pump as needed.

INSTALLATION & SET- UP

INSTALLATION OUTLINE

1. Mount the **Control Box** to the wall.
2. Plumb in the **City Booster Pump**.
3. Make the following wiring connections:
 - a. Connect the **Pump Power Wires** (green, red, black, orange wires) to the Pump.
 - b. Connect the **VFD Transducer Wire** (black wire, orange elbow connection) to the VFD Transducer.
 - * The VFD Transducer should be installed into a Pipe-Tee which is then plumbed in-line after the city booster pump.
 - c. Connect the **RO Control Wire** (gray wire, square 4-pin connection) to the RO.
 - * This wire powers the smart relay in the Control Box and controls the RO's call for water.
4. The following wiring connections are **optional** based on system components:
 - a. Connect the **Inlet Solenoid Control Wire** (labeled as "Inlet") to the Main Water Shut-Off Solenoid Valve.
 - * If used, the Main Water Shut-Off Solenoid Valve should be plumbed in-line after the city booster pump.
 - b. Connect the **Cold Water Bypass Valve Control Wire** (labeled as "Bypass") to the Cold Water Bypass Valve.
5. Uncoil and place **Water Leak Detector Remote Sensor** on the floor near the water inlet.
6. Connect the **Main Power Cord** to an appropriate electrical outlet.



6. Bleed air from the **City Booster Pump**.
 - * See "SYSTEM MAINTENANCE, Priming the City Booster Pump" section for instructions.

7. Turn the **OPERATE-OFF Switch** on the Control Box to **OPERATE**.



OPERATION

Before you start using this device, operators must read and understand this manual in its entirety. This manual of Operator's Instructions describes in considerable detail all of the steps and procedures required to **safely** operate this device. With proper operation, maintenance, and care, this device should give you years of reliable service.

It is **unsafe** to operate this device without a basic understanding of water treatment and a thorough understanding of the contents of this manual. Inadequately treated water for hemodialysis poses a severe threat to the health and safety of hemodialysis patients. Education and training of the staff in these facilities is critical given the technically complex subject of water treatment. Guidelines and other related information are available from:

- Food and Drug Administration (FDA)
- National Association of Nephrology Technicians/Technologists (NANT)
- Association for the Advancement of Medical Instrumentation (AAMI)

Incoming tap water contaminants, temperature, pH, pressure, and flow-rates have a direct impact on the quality and quantity of the RO output. The operator must be aware of changing tap water conditions. This can be easily accomplished with good, two-way communications with the local municipal water supplier and with routine testing of the tap water.

FAMILIARIZATION with CONTROL BOX

The following is a brief description of the functions and functional settings of each of the controls on the Control Box. Specific operational functions are described in detail in the sections following, some of which require the controls to be used in conjunction with one another.



OPERATE-OFF Switch

This is a two position switch with controls whether the city-booster pump operation.

- **OFF** – Basically turns the Control Box and the City Booster Pump OFF.
- **OPERATE** – Provides power to and control of the city booster pump, when there is a need for a boost in water pressure to the water treatment system.

PUMP INDICATOR Light

This light will illuminate when the city booster pump is actually running.

DAILY START-UP

The pre-treatment system runs automatically based on signals received from the RO and pre-treatment media tanks. Its component devices are controlled based on the settings from their own automatic controllers.

For it to function in this manner, the **OPERATE-OFF Switch** on the Control Box must be in the **OPERATE** position.



* The **PUMP INDICATOR Light** will illuminate when the city booster pump is actually running.



SHUTDOWN

Since the City Booster Pump runs automatically as long as the **OPERATE-OFF Switch** on the Pre-Treatment Control Box is in the **OPERATE** position, there is no daily shutdown procedure.

To turn the City Booster Pump off, simply turn the **OPERATE-OFF Switch** to the **OFF** position.

* *Turning this switch to OFF only turns the City Booster Pump OFF, and will not stop the automated backwash and regeneration of the other pre-treatment components. If OFF there will be water, but there may not be sufficient pressure and flow for an adequate backwash/regeneration.*



WATER LEAK DETECTOR

The City Booster Pump Control Box is equipped with a water leak detector. This detector is composed of two parts. The first is a **control console** which is hardwired into the control box, with the second being a **remote surface probe** which lays flat on the floor near the Control Box. All that is required to signal an alarm condition is a film of moisture forming a bridge between the two metallic contacts on the remote surface probe. It was designed to detect water only (*distilled or deionized water cannot be detected*). As sensitive as it is, it will not alarm due to high humidity or condensation.

If the detector senses water an audible alarm will sound, the main water shutoff solenoid will close (*if so installed*), which turns off all water to the Pre-Treatment system, and the city booster pump will turn OFF. Once dry again, the alarm will be silenced and the main water shutoff solenoid will re-open restoring water flow once again (*if so installed*).

SILENCING THE WATER LEAK DETECTOR ALARM

In the event the water leak detector senses water and sounds the alarm there are two ways to silence the alarm:

TURN the CONTROL BOX OFF

- a. Turn the **OPERATE-OFF Switch** on the Control Box to **OFF**.
 - This will silence the alarm, the city booster pump will turn OFF, but the main water shutoff solenoid will remain closed (*if so installed*).
- b. Determine the source of the water that caused the alarm and correct the problem.
- c. Lift and dry the remote surface probe with a clean dry cloth or paper towel, then return to its original location.
- d. Once the condition that caused the alarm has been corrected, turn the **OPERATE-OFF-Switch** to **OPERATE**.

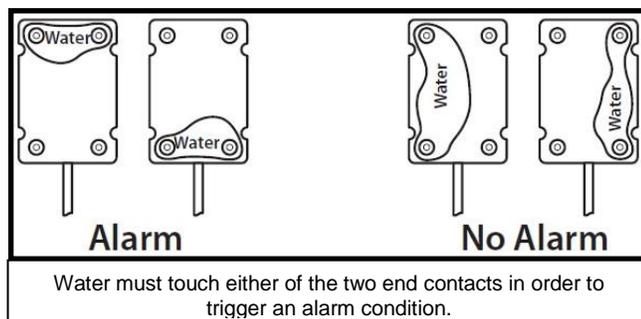
DRY THE REMOTE SURFACE PROBE

- a. Determine the source of the water that caused the alarm and correct the problem.
 - If a simple spill, then clean up the water.
 - If a leak, fix the leak at its source. This may require turning off the incoming water.
- b. Lift and dry the remote surface probe with a clean dry cloth or paper towel, then return to its original location.
 - After a few seconds, this will silence the alarm and re-open the main water shutoff solenoid valve (*if so installed*).

NOTE: If the Water Leak Detector is connected to the main water shut-off valve, make sure if the problem was a leak, to correct the problem or turn off the incoming water prior to drying off the remote surface probe since when dry it will re-open the main water shutoff solenoid if the Pre-Treatment system is ON.



Remote Surface Probe and connecting cable



SYSTEM MAINTENANCE

SYSTEM MAINTENANCE, Priming the City Booster Pump

WARNING

All city booster and repressurization pumps must be primed prior to initial use, or whenever air has been allowed to enter the pump. This includes the initial start-up of the pump and usually every time the pump has shutdown from a no-flow situation. Failure to complete this procedure may result in damage to the pump and may void all warranties.

To prime the pump, air must be bled from the casing of the pump from the air bleed screw. The location of this screw will vary from model to model.

1. Verify that the pump inlet valve to the pump is open and there is an ample supply of water.
2. Verify that the pump outlet valve is closed.
3. Slowly open the air bleed screw and allow air to escape until a solid stream of water is flowing from the screw. It is not necessary to completely remove the screw, as this will make it difficult to replace while the water is flowing.
4. When a solid stream of water is flowing from the air bleed screw, tighten it back down. Do not over-tighten which can damage the underlying o-ring.



Horizontally Mounted
City Booster Pump
(Current Model)

SYSTEM MAINTENANCE: Variable Frequency Drive Adjustments

VFD – Adjusting Pump Pressure

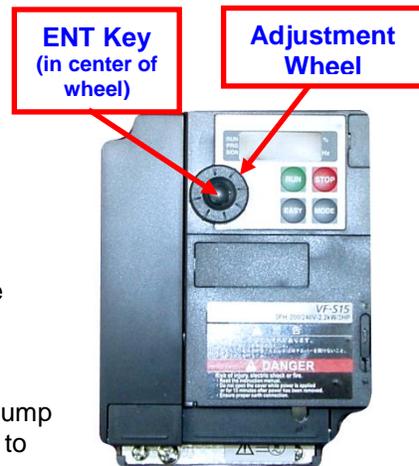
The VFD is pre-programmed with operational parameters set by Better Water and locked out to the end user. **If trouble-shooting VFD issues Call Better Water for technical assistance.**

The VFD pump pressure is set by turning the **ADJUSTMENT Wheel**. *NOTE: Older models had Up and Down Arrow Buttons for adjustment.*

- To properly set the correct pump pressure the pump must be ON and running.

When setting the pump pressure....

- Turn the **ADJUSTMENT Wheel** to set the desired hertz for pump pressure. Turn clock-wise to increase and counter-clockwise to decrease.
- Once set then push **ENT Button**.
- **FC** will appear briefly in the display and then the display will read actual frequency the Pump is running at.
- * *If the **ENT** is not pushed the VFD will revert back to the last set point.*



VFD ERROR CODES

Occasionally power interruptions cause a VFD error to occur. First check the breaker in the Control Box, and reset if tripped. Otherwise check to see if any error codes are displayed on the VFD. Below are some of the more common error codes and their cause.

- **OC1, OC2, or OC3** = Over current event has occurred.
- **EPHI or EPHO** = Phase input or output event has occurred.
- **OP1, OP2, OP3** = Over voltage event has occurred.
- **OL1 or OL2** = Overload event has occurred.
- **LStP** = VFD is idle and below minimum programmed set point. This set point is 6 Hz, is pre-programmed, and is locked out to the end-user.

To correct any of the above error codes except for the **LStP** do the following:

1. Press the STOP button on the VFD twice.
 - * If this clears the error code nothing else is required, otherwise perform the following steps.
2. Turn the **OPERATE-OFF Switch** to **OFF**.
3. Unplug the Main Power Cord and wait 10-15 seconds for the VFD to power down.
4. Reconnect the Main Power Cord.
5. Turn the **OPERATE-OFF Switch** to **OPERATE**.
6. If the error persists contact Technical Support for assistance.

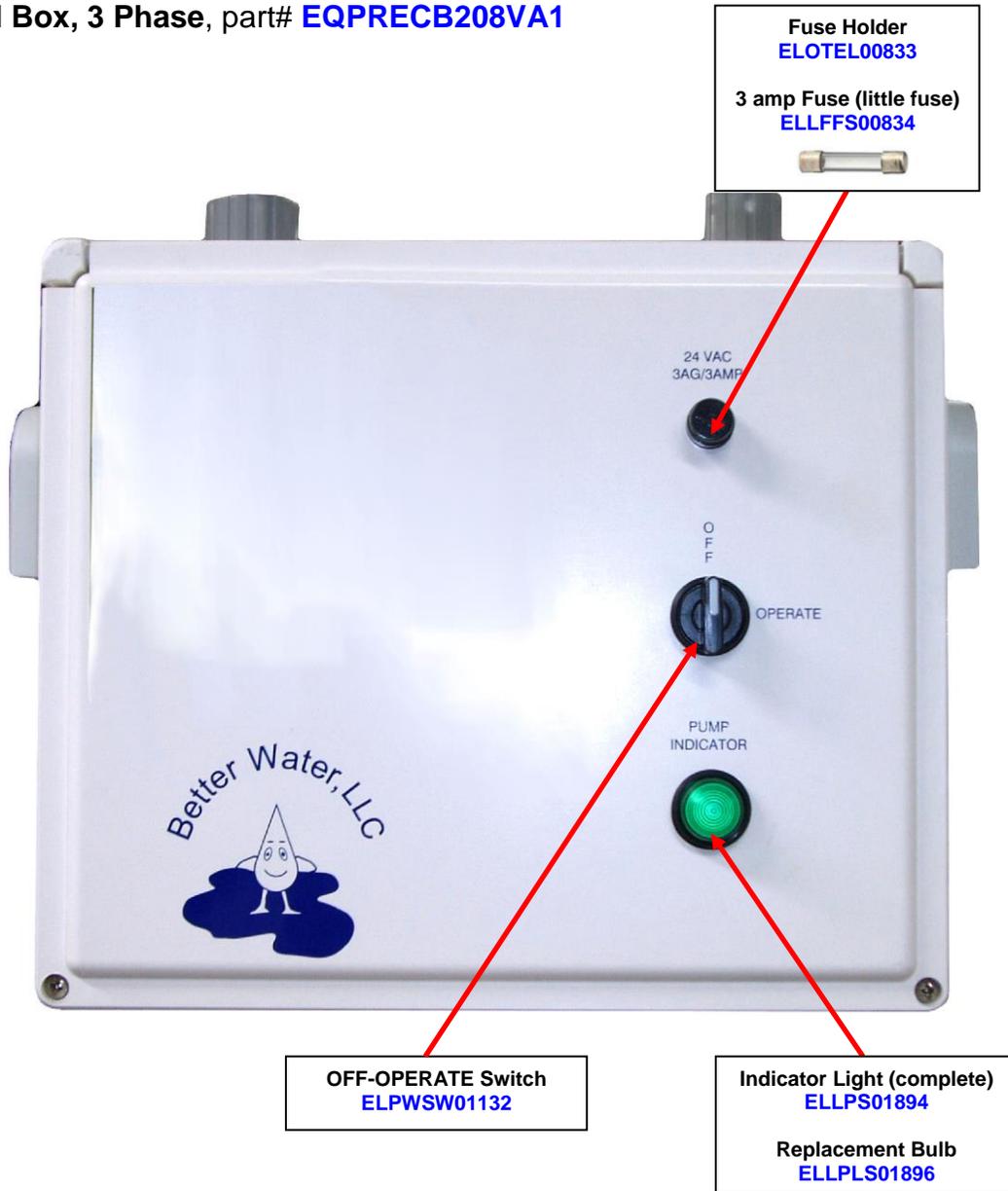
VFD – Breaker

The VFD breaker is located in the Control. If the breaker has tripped the Pump and VFD will not operate. This breaker will shut off power to the VFD to prevent damage to the VFD and the Pump.

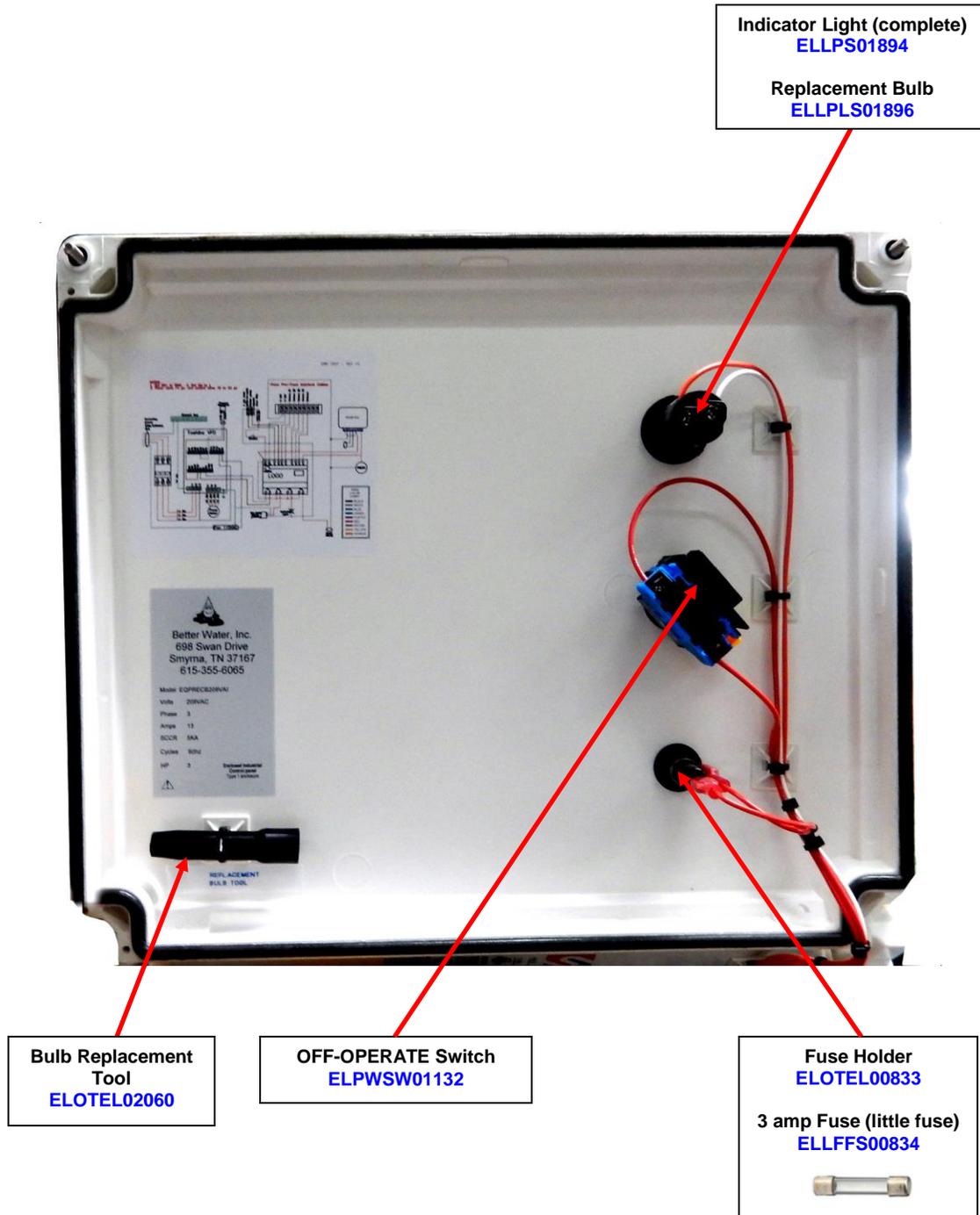
SERVICE HELP

SERVICE HELP: Control Box (front view)

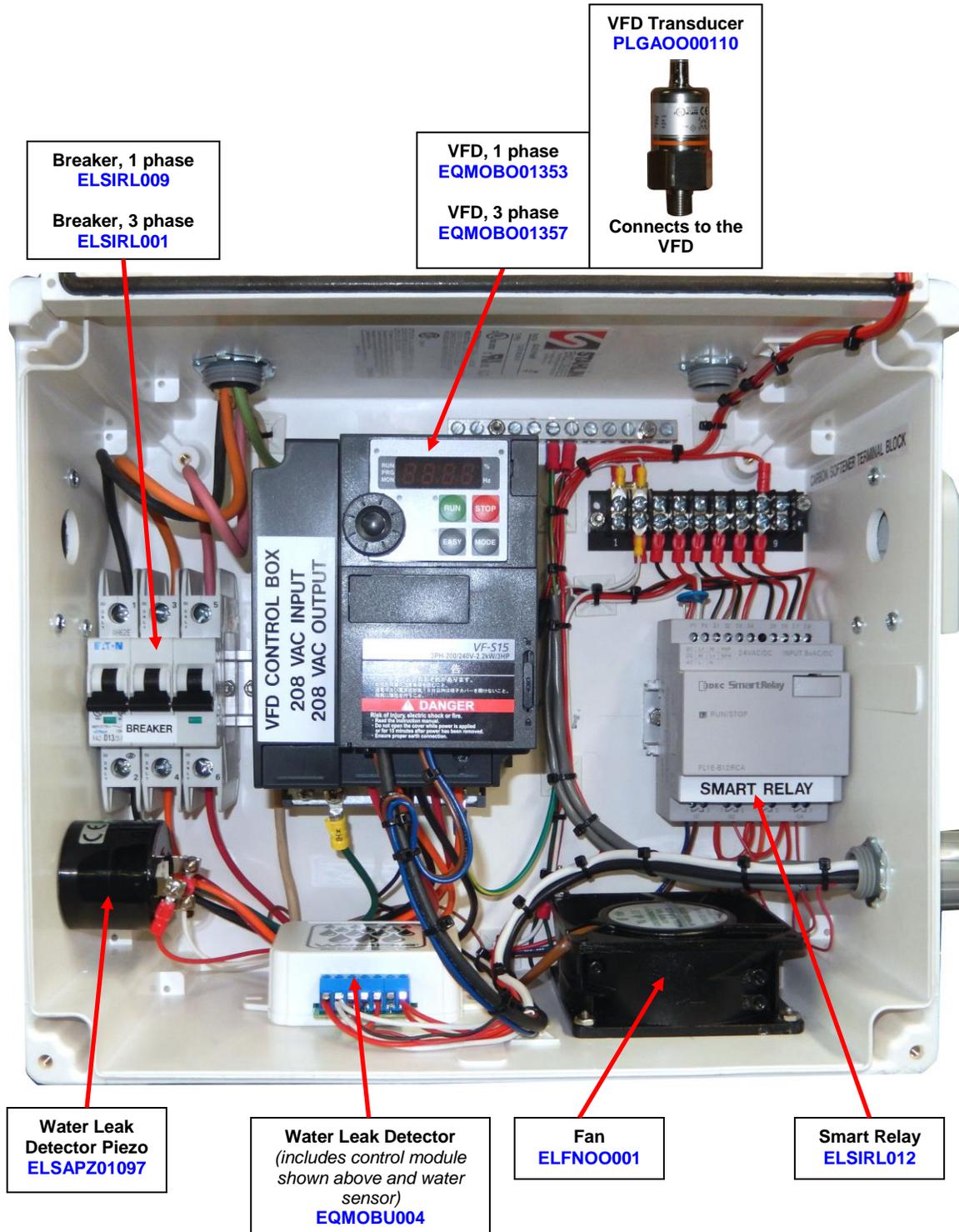
Control Box, 1 Phase, part# [EQPRECB230VA](#)
Control Box, 3 Phase, part# [EQPRECB208VA1](#)



SERVICE HELP: Control Box (inside lid view)



SERVICE HELP: Control Box (inside view)



Breaker, 1 phase
ELSIRL009

Breaker, 3 phase
ELSIRL001

VFD, 1 phase
EQMOB001353

VFD, 3 phase
EQMOB001357

VFD Transducer
PLGA000110

Connects to the
VFD

Water Leak
Detector Piezo
ELSAPZ01097

Water Leak Detector
(includes control module
shown above and water
sensor)
EQMOBU004

Fan
ELFN00001

Smart Relay
ELSIRL012

NOTE: VFD label will vary based on model. Older models will not have the Water Leak Detector Piezo or the Water Leak Detector Control Module.

SERVICE HELP: City Booster Pump



City Booster Pump
3 HP/ 3PH, 120 Series
[EQPUEB01600](#)

APPENDIX A

LIMITED WARRANTY TERMS and CONDITIONS

- a. This limited warranty is given only to the original buyer and covers the equipment delivered with this limited warranty.
- b. The buyer shall be barred from any recovery on this limited warranty or otherwise for damages due in whole or in part to...
 - ... unreasonable use
 - ... improper operation
 - ... use beyond normal fashion
 - ... failure to follow instructions
 - ... failure to maintain the product in good condition and repair
 - ... or the like.
- c. If the buyer discovers or should have discovered a defect in which it is reasonable to conclude that damage, either personal, property, or economic, may result, the buyer's continued use of the product shall constitute any assumption of risk by the buyer and a bar to any recovery for breach of this limited warranty or otherwise.
- d. No oral or written representation, information, or advice given by Better Water LLC or any of its representatives shall create a warranty or in any way increase the scope of this express limited warranty and shall not form a part of the basis for bargain.

WHAT IS WARRANTED AND FOR HOW LONG?

- a. All equipment, excluding ion exchange and filtration media and cartridges, are warranted to be free from factory defects in materials, and workmanship under normal use for a period of one (1) year from the date of shipment.
- b. It is a condition precedent to recovery on this limited warranty that the buyer strictly comply with all operating and maintenance guidelines established by Better Water LLC and that the serial number (*if applicable*) is intact and legible on the equipment.
- c. It is a condition precedent to recovery on this limited warranty for damage to the external finish of the equipment that the buyer notifies Better Water LLC at the time of the installation that the finished is damaged.

WHAT IS REMEDY FOR BREACH OF THIS LIMITED WARRANTY or NEGLIGENCE BY BETTER WATER LLC

- a. Buyer's sole and exclusive remedy for any breach of this limited warranty or negligence by Better Water LLC shall be repair or replacement of the defective part, at the option of Better Water LLC, provided such defective part is returned to Better Water LLC for inspection.
- b. Better Water LLC shall not be obligated to supply an exact replacement of the defective part and reserves the right to substitute new and improved parts.
- c. Better Water LLC shall provide at no cost to buyer, labor to remove and/or replace defective parts covered by this limited warranty for a period of ninety (90) days from the date of installation by Better Water LLC of the equipment.
- d. After such ninety (90) day period, buyer shall be responsible for any labor or service charge for the removal and/or replacement of any defective parts.
- e. Buyer shall be responsible for all travel expenses and freight charges at all times.
- f. Better Water LLC shall have no obligation to repair or replace any defective part if buyer fails to follow the procedure set forth in "HOW TO OBTAIN A REPLACEMENT PART UNDER LIMITED WARRANTY".

IN NO EVENT SHALL THIS LIMITED WARRANTY BE CONSTRUED TO COVER, NOR SHALL BETTER WATER LLC BE LIABLE TO BUYER AS ANY OTHER PERSON FOR, ANY

CONSEQUENTIAL, INCIDENTAL, ECONOMIC, DIRECT, INDIRECT, GENERAL OR SPECIAL DAMAGES, WHICH ARE HEREBY EXPRESSLY DISCLAIMED.

HOW TO OBTAIN A REPLACEMENT PART UNDER LIMITED WARRANTY

- a. Buyer should contact the Customer Service or Technical Support Departments and request a Return Goods Authorization.
- b. Described part(s) will be sent with a purchase order.
- c. The returned part(s) will be returned to the factory for limited warranty and consideration, and if they are not covered under the limited warranty, those parts will be considered billable and the purchase order will be used to invoice those parts.

WHAT IS NOT COVERED BY THIS LIMITED WARRANTY:

By way of example and not limitation, this limited warranty does not cover:

- Damage to or replacement of any ion exchange resin or filter media
- Labor or service charges for the removal and/or replacement of any defective parts after the ninety (90) day period from the date of installation by Better Water LLC
- Freight charges and travel expenses
- Damage from inadequate or defective wiring, improper voltage, improper connections or electrical service, inadequate or defective plumbing, water supply, or water pressure, or in violation of applicable building, plumbing or electrical codes, laws, ordinances or regulations.
- Damage from improper installation or operation, including but not limited to, abuse, accident, neglect, improper maintenance, freezing and fires, or abnormal use.
- Damage caused by contaminants in Buyer's water supply, including hardness, chlorine, chloramines, sulfur, bacterial iron, tannin, algae, oil, organic matter or other unusual substances, if special equipment has not been installed by Better Water LLC to remove such contaminants
- Damage to or caused by filters/membranes or other replacement parts not purchased from Better Water LLC or damage caused by modification, alteration, repair or service of the equipment or any of its parts by anyone other than Better Water LLC or its expressly authorized representatives.

