



ATCWS | ATWS | ATWS-C/CC | ATWS-HI | ATNWS | ATTWS

Operation & Maintenance Manual

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ATTENTION

ATWS System Specifications & Warnings

System Specifications

Water pressure: 40 psi minimum 100 psi

Maximum Water Temperature: 40°F to 110°F

Electrical Requirements:

Supply Voltage: 120V

Supply Frequency: 60Hz

Output Voltage: 12V AC

Output Current: Maximum 3.0 Amps

Water Meter:

Pipe Size: 3/4"-1"

Accuracy: ± 5%

Minimum Flow : 0.25 GPM

Control Valve to Tank Connection: 2.5"-8UN Control

Valve Distributor Pipe Connection: 1"

Circuit Board Memory: Non-volatile EEPROM (Electrical Erasable Programmable Read Only Memory)

Compatible with the following typical concentrations of regenerant chemicals: Sodium Chloride, Potassium Chloride, Potassium Permanganate, Sodium Bisulfite, Chlorine and Chloramines



WARNINGS



- ① The control valve and fittings are not designed to support the weight of the system or the plumbing.
- ① Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on black O-rings.
- ① Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain O-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.
- ① The water meter should not be used as the primary monitoring device for critical or health effect applications.
- ① Do not use pipe dope or other sealants on threads. Teflon tape is recommended to be used on all threads. Use of pipe dope may break down the plastics in the control valve.
- ① This system is not intended for use where water is microbiologically unsafe or with water of unknown quality.
- ① **WARNING!** Electrical Shock Hazard! Prior to servicing equipment, disconnect power supply.
- ① If incorrectly installed, operated or maintained, this product can cause injury or property damage. Those who install, operate, or maintain this product should be trained in its proper use and should read the entire manual before attempting to install, operate, or maintain this product.
- ① **NOTICE** This system is not intended for use where water is microbiologically unsafe or with water of unknown quality.

Introduction

Please Read Manual First

Before you operate your Aquatek Water Softener, read this manual to become familiar with the device and its capabilities.

Installation or maintenance done on this system by an untrained service person can cause major damage to equipment or property damage. Not adhering to the recommended service/maintenance can cause damage to equipment or property damage.

Long term, successful operation of Aquatek ATWS water softeners depends upon the care and attention it receives. Ordinarily, water treatment systems will provide uniform performance after the initial start-up period and operation is stable. Gallonage delivery between regenerations and treated water purity usually do not vary appreciably over the life of the resins--as long as the mineral content of the incoming water does not change.

This manual is intended to be a practical reference guide for all operating personnel. In view of the fact that system performance can change very dramatically throughout the year, a discussion of "ion exchange" theory is included in addition to basic information relative to equipment operation and regeneration procedures. Thorough understanding of the simple chemical reactions will help to determine if some equipment malfunction has occurred, or if the system is simply responding to changing water conditions. For this reason, all operation and supervising personnel are encouraged to study **PRINCIPLES OF ION EXCHANGE IN THE SOFTENING PROCESS** (pg. 6) which defines terminology and the simple chemistry associated with this system.

Meet Your Water Softener

Cabinet Systems



Aquatek ATCWS Cabinet Water Softeners are a single, space saving, self-contained units. Inside the cabinet you will find most of the standard components of a two tank system. Inside the Cabinet you will find the Control Valve, Mineral Tank and a self contained Brine System. All of the processes and programing will be exactly the same as the Two Tank Systems on the following page (pg. 5).

Two Tank Systems

All Aquatek Two Tank Water Softeners are comprised of three primary components: **(A)** Control Valve, **(B)** Mineral Tank, & **(C)** Brine Tank.

A Control Valve



B Mineral Tank



C Brine Tank



A. Control Valve: Your control valve automatically performs 3 primary operations which are commonly referred to as cycles. These operations/cycles are (1)Service, (2)Regeneration, & (3) Brine Refill.

1. Service: During service, raw water passes through the inlet of the control valve and down-flows through the resin bed where the hardness is removed, the newly softened water flows up the distributor pipe and exits through the outlet of the control valve and into your home. Service flow continues until the pre-set gallonage has been used which then initiates the regeneration process.

2. Regeneration: The regeneration cycle can be broken down into 4 parts:

A. Backwash (~10 minutes) Raw water is directed down through the distributor pipe flowing through distribution system at the bottom of the tank which then travels upward through the resin bed. This up-flow expands the resin bed scrubbing the beads and washing away any accumulated dirt or sediment out of the system into the drain.

B. Brine & Slow Rinse (~ 60 minutes) The salt-brine solution is pulled from the bottom of the brine tank and into the mineral tank where it passes through the resin bed restoring its ability to remove hardness from your water. The brine then flows up distributor pipe and out of the system into the drain.

C. SECOND BACKWASH (~10 minutes) Water flow is the same as the first backwash. This step in the regeneration process helps to remove iron that was released from the resin during the Brine cycle.

D. FAST RINSE (~10 minutes) Raw water is brought through the inlet of the control valve and down through the resin bed, then up the distributor pipe and exits the system into the drain. This removes all remaining brine from the resin bed, completes the regeneration cycle and initiates the Brine Refill.

3. BRINE REFILL: Fresh water flows through the brine line and into the brine tank refilling it to the preset level. Now additional salt is being dissolved to provide the salt-brine solution that will be needed for the next regeneration cycle.

B. The Mineral Tank: The Mineral Tank contains Ion Exchange Resin (*Note* ATWS-C/CC Carbon Combo Softeners also includes an upper shelf of carbon media for chlorine taste/odor reduction & ATWS-HI, ATNWS & ATTWS contain specialized resin beds to provide their added treatment abilities). The number of gallons of hard water that can be treated by the resin before it needs regeneration is called the "capacity" of the resin column, and depends upon the amount of hardness minerals in each gallon of water (expressed as grains per gallon) and upon the amount of regenerant brine solution (expressed as pounds of salt) passed through the resin column during regeneration.

C. The Brine Tank: The Brine Tank consists of a salt storage container and brine valve assembly. The salt storage container holds the salt that is used to make the regenerant salt-brine solution. The brine valve assembly limits the amount of water that is returned to the salt storage tank during the brine refill cycle. Because a predetermined amount of salt is dissolved with each brine refill cycle, the salt must be periodically replenished in order to maintain efficient operation. *see page *** for more on The Brine System*

PRINCIPLES OF ION EXCHANGE IN THE SOFTENING PROCESS

1. ION EXCHANGE SOFTENING PROCESS

In order to understand what happens in the ion exchange softening process, it will first be necessary to understand the meaning of the terms that are used in the explanation. HARD WATER, CATION EXCHANGER, and BRINE are therefore defined below and then used to show how the ion exchange process works.

A. Hard Water - All natural waters contain much the same dissolved impurities, but in widely varying amounts. There are always enough ANIONS (-) present to balance the CATIONS (+), but anions have no effect on the ion exchange softening process. Water will be HARD, if it contains large amounts of Calcium (Ca^{++}) and/or Magnesium (Mg^{++}) ions.

B. Brine - water in which SALT has dissolved. SATURATED brine contains as much salt as it is possible to hold in solution (approx. 26% to 27%).

SALT - SODIUM CHLORIDE (NaCl). When dissolved in water it splits up (ionizes) into Sodium (Na^{+}) ions and Chloride (Cl^{-}).

SATURATED BRINE - contains a very great number of Na^{+} and Cl^{-} ions (concentration is over 200,000 ppm). When used to regenerate a CATION EXCHANGER, only the Sodium ions (Na^{+}) are put to use. The Chloride ions (Cl^{-}) do not work in the process.

C. Cation Exchanger - a solid material that has a very large number of "REACTION POINTS". These reaction points have NEGATIVE (-) electric charges, and are able to attract and hold CATIONS, which are POSITIVELY (+) charged (much the same way as the way opposite poles of a magnet attract each other).

D. The Softening Process - When Ca^{++} or Mg^{++} ions have occupied most of the reaction points, hardness will begin to slip through the bed in increasing amounts. This rise in hardness in the effluent is an indication that the effective capacity of the CATION EXCHANGER has been reached. The CATION EXCHANGER must then be regenerated to restore it to its original condition.

E. Regeneration - A solution of NaCl is applied to the CATION EXCHANGER at a controlled rate and the softening process is reversed. The Ca^{++} and Mg^{++} ions are driven off of the CATION EXCHANGER and replaced with Na^{+} ions. At the end of regeneration, the "spent" brine is rinsed away and the REGENERATED CATION EXCHANGER, with its reaction points again occupied by sodium ions -is again able to soften HARD WATER.

2. QUALITY OF EFFLUENT

If the hard water contains less than 500 ppm (about 30 grains) of Calcium, Magnesium and Sodium salts, all expressed as CaCO_3 , it will be found that the effluent from a softener will contain an average of not more than 30 ppm actual total hardness (Zero hardness by the SOAP TEST). However, as the total CATION concentration in the hard water increases above 500 ppm, the average hardness in the effluent will also increase proportionately.

The reason for this is that when the sodium salt - those present in the raw water plus those formed by the exchange reactions - are present in high enough concentrations, they cause a "back-regeneration" effect at the same time as the softening process is taking place. This effect prevents as complete a removal of calcium and magnesium as would otherwise be possible.

It is often possible to reduce the average hardness in the effluent below normally expected concentrations, by using a greater amount of salt than usual for regeneration.

Normal Softening Cycle - At the start of a normal softening cycle, the hardness in the effluent drops rapidly as the residue of hardness ions left in the bed at the end of the rinse are forced out. The effluent hardness reaches a certain minimum value and remains at approximately this concentration for the major part of the softening run.

2.3 CAPACITY OF ION EXCHANGER

The capacity for the removal of calcium and magnesium depends mainly upon the type of ion exchanger that is used. It is further influenced by the amounts of hardness and sodium ions in the raw water, and by the amount of salt used for regeneration.

A. Raw Water – The effect of the amounts of hardness and sodium ions in the raw water, is expressed in terms of COMPENSATED HARDNESS. The hardness of the raw water is considered to be greater than it actually is for capacity determinations, whenever: (a) the total hardness is greater than 400 ppm (as CaCO_3), or (b) the sodium salts are over 100 ppm as (CaCO_3). This “greater-than-actual” hardness is referred to as COMPENSATED HARDNESS.

B. Salt Dosage – The capacity that will be obtained from a cation exchanger is also determined by the amount of salt used during regeneration. The Kilograins (kgr) of hardness that can be removed by each cubic foot of ion exchanger between regenerations increases as more salt is used for regeneration. At the same time, the efficiency of salt usage decreases with the higher regenerant dosages. That is, a greater number of Kilograins of hardness are removed for each pound of salt used at the lower salt dosages, (and consequently, at the lower capacities). Thus, greater economy may be obtained at the expense of the number of gallons of water softened between regenerations.

3. NORMAL OPERATOR RESPONSIBILITIES

Long term, reliable system performance depends upon how conscientiously the equipment is operated and maintained. Operator responsibilities to assure operation should include the following recommended practices:

A WORD OF CAUTION -- DON'T ARBITRARILY MAKE CHANGES, IF YOU WISH TO MAINTAIN EFFICIENT REGENERATIONS.

Installation Guide

Pre-Installation Checklist

1. A standard electrical outlet (120V/160Hz) must be located within 12' of installation site.
2. A functioning floor drain, washer sand pipe or suitable location for waste water discharge must be located within 20' of installation site.
- a. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of 1/2". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 3/4" drain line.
3. A working pressure reducing valve must be installed on the inlet water line that supplies the water softener.
4. **(Note: The warranty is void if the system is exposed to water pressure in excess of 100 psi.)**
5. **Important:** Protect your water softener and the entire drainline from freezing temperatures. The temperature at the location of the water softener system should never be below 40° F



WARNING! DANGER: If your unit should freeze, do not attempt to disassemble it. Call us first 877-414-PURE



Installation

1. **Floor Space:** Make sure the floor space that has been selected to install the water softener is clean and on a level surface.
 2. **Leveling the System:** Mineral are fitted with an adjustable leveling base, if tank is not vertical/straight lift tank 1-3 inches off the floor and gently release tank back on to the floor (repeat until stright up and down). If the floor beneath the salt container is not level, do not use shims or spacers to level the salt container. A platform that supports the entire bottom surface of the salt container must be used.
 3. **What to Bypass:** A typical installation would include bypassing the outside hose bibs. The cold water feeding the kitchen sink may or may not be bypassed depending upon preference.
 4. **Connection Kit:** The standard connection kit supplied with the water softener will be a 1" plastic elbow connection kit. (See Figure 1) Other connection kits are available.
 5. **Plumbing Preparations Optional Brass Connection Kit:** Unscrew the two plastic nuts (#1) and pull on the two brass connectors (#4) to remove them from the bypass assembly. Next remove the white plastic rings (#2) and the O-rings. (#3) See Figure 2
 - Solder at least 6" of pipe to the brass connectors before reassembly. (See Figure 2)
 - After soldering is complete, cool the pipe and connectors. Slide the plastic nuts (#1) over the brass connectors (#4). Place the white plastic split rings (#2) into the grooves closest to the end of the brass connectors (#4). Reassembly the connection kit onto the bypass assembly.
- Warning:** When assembling the installation-fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and O-ring. Heat from soldering or sol- vent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and O-ring. Avoid getting primer and solvent cement on any part of the O- rings, split rings, bypass valve or control valve.
6. **Plumbing:** When connecting the water softener to the existing plumbing, make sure the inlet water is connected to the inlet of the softener. Arrows on the valve body indicate direction of flow. Make sure the bypass valves are in the correct position See Figure 3.

Note: All plumbing should be done in accordance with local plumbing codes.

Warning: The control valve, fittings and/or bypass are designed to accommodate minor plumbing mis-alignments but are not designed to support the weight of a system or the plumbing.

Installation CONT.

7. Locate Polytube Insert: Now that the water softener is connected to the existing plumbing, the drain line may be connected. First, locate and remove the polytube insert (#2) from the gray cable on the left side of the control valve.

8. Connecting the Drain Line: Slide plastic nut (#3) over the permanent drain tubing and place the polytube insert (#2) into the end of the drain tubing. Insert the drain tubing into the drain elbow fitting (#4) and tighten plastic nut (#3) hand-tight plus 1/2 turn with pliers. Caution: Do Not Over-tighten. (See Figure 4)

9. Drain Line Specs: If the distance from the water softener to the drain is greater than 20' the drain line size must be increased to 3/4". The threads on the drain elbow fitting are 3/4" male NPT and can be used in lieu of the 1/2" plastic nut and insert. If the drain line must run overhead, the maximum height of the drain line should not exceed 8' above the top of the water softener.

10. Air Gap: The drain line must have an approved air gap to prevent the possibility of a cross connection to the sewer. (See Figure 5)

11. Connecting the overflow line: The brine overflow fitting is located on the outside of the salt container approximately 12" down from the top. Connect 1/2" drain tubing to the overflow fitting and run it to the nearest floor drain. This line is a gravity flow line and cannot be run overhead or cannot connect to a drain that is higher than the overflow fitting.

12. Connecting the brine line: A 3/8" brine line approximately 4' long is attached to the salt container and is supplied with the tube insert (#2) in the end of the brine line. (See Figure 6) Unscrew the brine nut (#3) and slide it over the end of the brine line. Insert the brine line into the brine fitting. (#4) and tighten the brine nut (#3) hand tight plus 1/2 turn with pliers. Caution: Do Not Over-tighten.

The water softener is equipped with a 15-foot power cord with built-in transformer. Plug the power cord into a standard (120V 60Hz) electrical outlet. It will take approximately 10 seconds before you will see the display (this is normal). The water softener is now ready to be programmed

Fig. 1

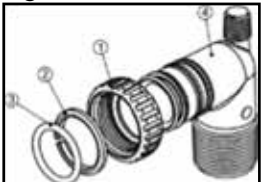


Fig. 2 (optional)

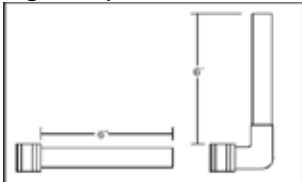


Fig. 4

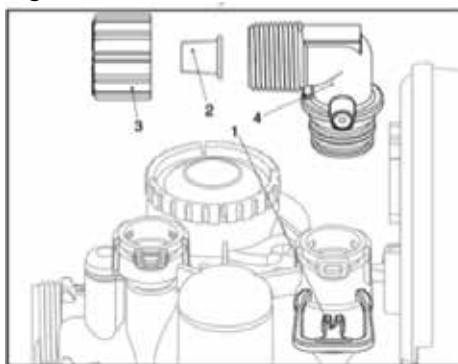


Fig. 5

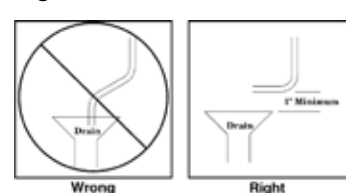


Fig. 3

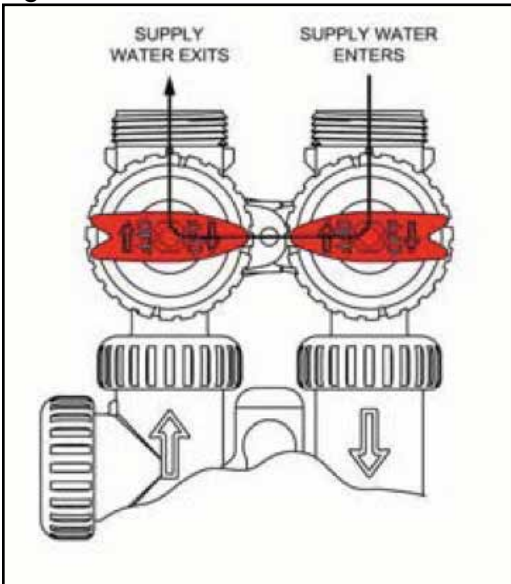
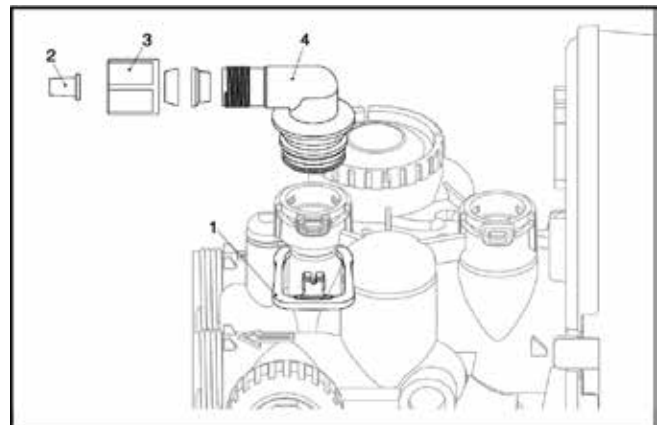


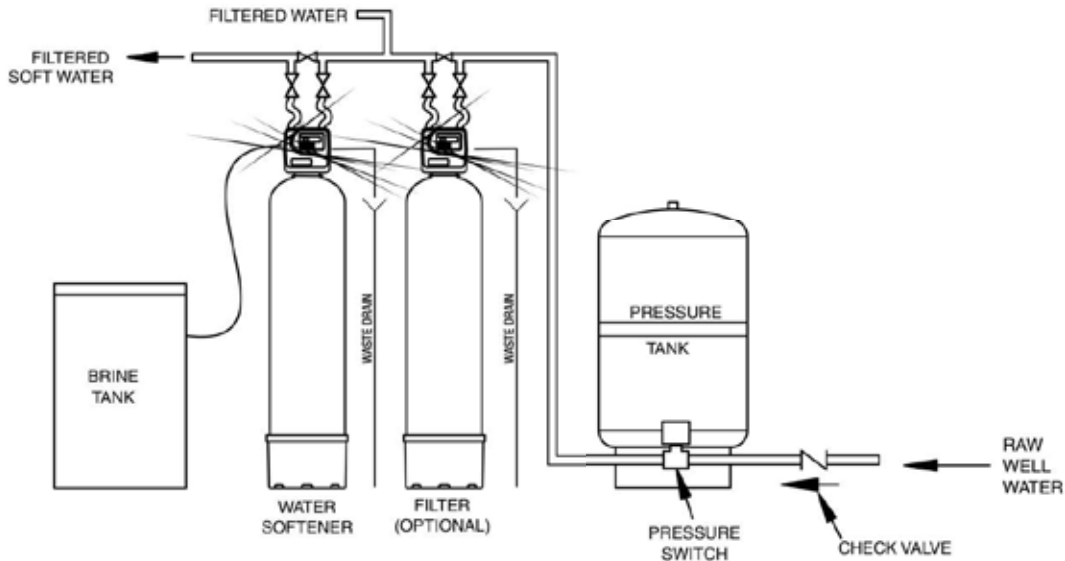
Fig. 6



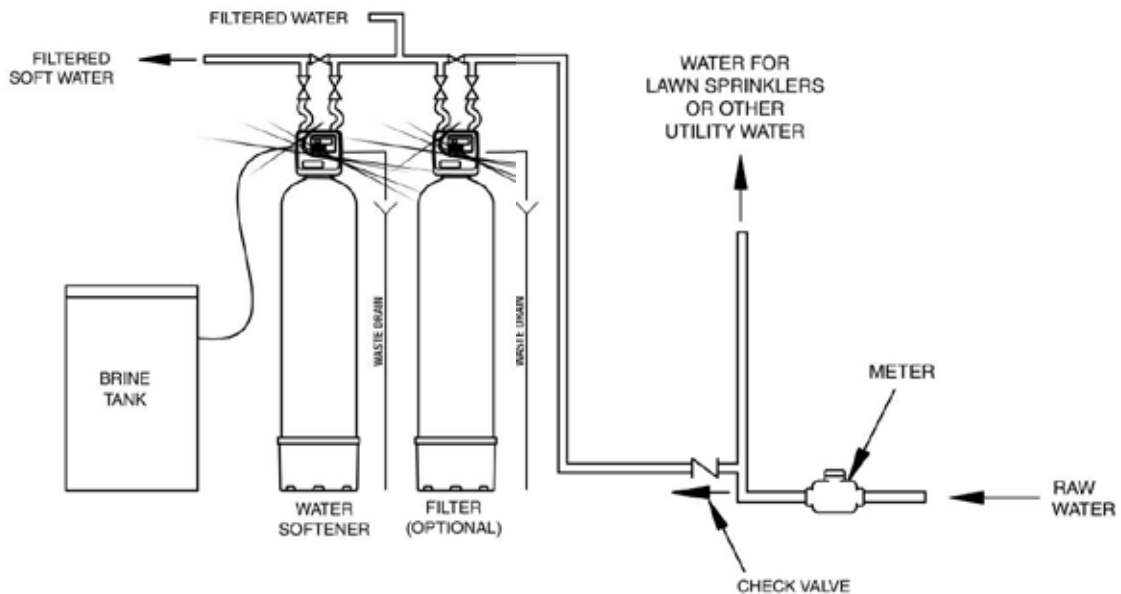
Installation Diagram

Below are two typical installation examples: 1. Well Water & 2. City Water. Please reference the flow diagram and placement of system(s) to ensure your system will be functioning properly.

TYPICAL WELL INSTALLATION



PUBLIC WATER SUPPLY INSTALLATION



Disclaimer United Water strongly recommends that each system be installed by a licensed and knowledgeable professional. Failure to do so could result in property damage, equipment failure and potentially void warranty.

All systems MUST be installed in accordance with local and state plumbing codes.

System Start-Up



*****NOTE***** In situations where there are multiple systems being started/used it is imperative that each system be started independently AND place all other systems not being started in bypass to avoid flushing debris/contaminates across systems



To start-up your Aquatek ATWS Softener begin by placing the bypass in the position shown in Figure 1 and adding salt to your brine tank or cabinet (for ATCWS models) – see page *** for more on The Brine Tank

Next place the control valve of the softener into the Backwash cycle:

- Press and hold the REGEN button (approx. 6 seconds) until the control valve initiates a regeneration cycle. The softener is now in the Backwash cycle. An initial burst of air will be released to the drain. Leave the unit in the Backwash cycle until the water running to the drain runs clear.
- Next press the REGEN button to advance the controller to the next cycle. The softener is now in the Brine/Slow Rinse cycle.
- When the timer begins countdown press the REGEN button to advance the controller to the next cycle. The softener is now in the 2nd Backwash cycle.
- When the timer begins countdown press the REGEN button to advance the controller to the next cycle. The softener is now in the Fast Rinse cycle. Leave the unit in the Fast Rinse cycle for at least five minutes.
- After at least five minutes press the REGEN button to advance the controller to the next cycle. The softener is now in the Brine Tank Fill cycle. Leave the unit in the Brine Tank Fill cycle for at least five minutes. To speed up the process, fill the brine tank with water manually. Fill the brine tank up to a few inches ABOVE the false bottom, (approx. 6-8 inches).
- After the brine tank has been filled to the proper level press the REGEN button to advance the controller to the home position.

To complete the Start-up place bypass in the position shown in Figure 2. Now your softener should be up and running sending softened water throughout your home. Please note after starting your water softener there is typically a delay of three to four days to purge all the remaining hard water from your home and appliances i.e. water heater, pipes etc.

Fig. 1

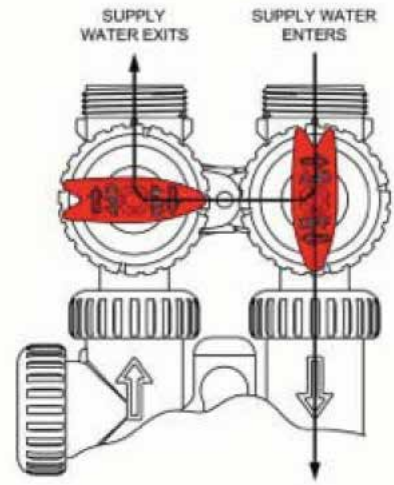
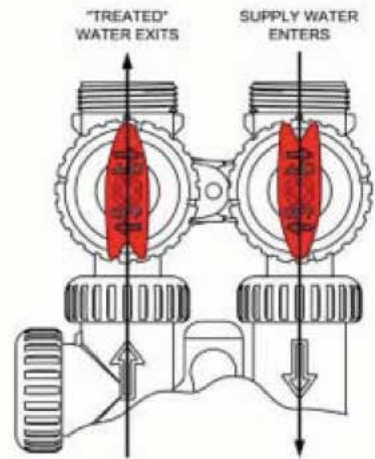


Fig. 2



Programming Guide

Aquatek Water Softener Control Valve Programming & Operation



During normal operation one of three screens can be displayed. Pressing the NEXT button alternates between these screens.

Screen 1 - Current Time of Day

Screen 2 - Capacity Remaining in Gallons

Screen 1



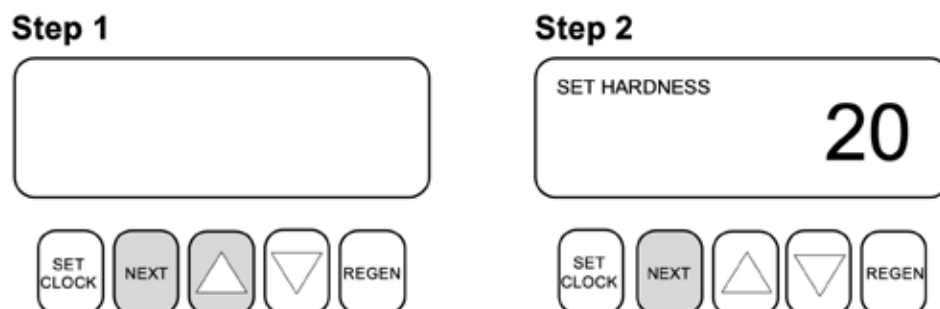
Screen 2



Your control valve has been pre-programmed from the factory with the correct regeneration cycle program and cycle times. The gallon capacity between regeneration can be changed by adjusting the water hardness.

Step 1 – Press the NEXT and the UP Arrow buttons at the same time and hold for 2 seconds.

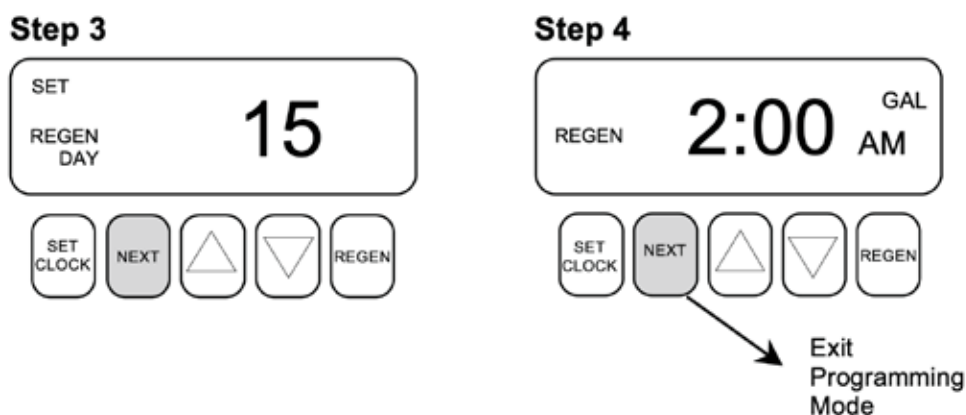
Step 2 – Raw Water Hardness: Adjust to the correct hardness by pressing the UP or DOWN arrow button. Default setting 20 grains per gallon. Press NEXT to go to Step 3.



Step 3 – Day Override: For all models *EXCEPT* ATWS-C/CC (Carbon Combo Softeners) this setting should be set to 15. For ATWS-C/CC this should be set to 7. Press NEXT to go to Step 4. (Settings may vary for certain installations)

Step 4 – Regeneration Time: The system regenerates at 2:00 AM. This setting is adjustable. No water should be used during regeneration. (Typically this is the middle of the night.)

Press NEXT to exit programming.



SET TIME: The time of day should only need to be set after initial installation or after an extended power outage. If an extended power outage has occurred, the time of day will flash indicating that it needs to be set.

Step 1 – Press SET CLOCK

Step 2 – Current Time of Day – Hours: Adjust to the correct hour by pressing the UP or DOWN arrow button. Press NEXT to go to Step 3.

Step 3 – Current Time of Day – Minutes: Adjust to the correct minutes by pressing the up or down arrow button. Press NEXT to return to the normal operating screen.



Manual Regeneration

There are two different purposes and methods for manual regeneration of the water softener.

- **Delayed Regeneration**

- **Immediate Regeneration**

Reasons you may want to manually regenerate the water softener:

1. If the brine tank has run out of salt:

- After adding salt to the brine tank manually regenerate the softener using the delayed regeneration method. (The water needs time to dissolve the salt for a minimum of six hours.)
- To initiate a delayed regeneration simply push the REGEN button one time. (Don't hold the button down) REGEN TODAY will appear on the left hand side of the screen. The softener is queued to regenerate that day at the preset regeneration time. (Typically this is in the middle of the night.) If for some reason you want to cancel the delayed regeneration just push the REGEN button again. REGEN TODAY will no longer be visible on the screen.

2. If you have guests coming to stay in your home:

- The water softener is programmed to measure the specific water usage of your family and regenerates based on water usage history. If you know that there will be extra people using the water you may want to manual regenerate the softener using the delayed regeneration method.
- To initiate a delayed regeneration simply push the REGEN button one time. (Don't hold the button down) REGEN TODAY will appear on the left hand side of the screen. The softener is queued to regenerate that day at the preset regeneration time. (Typically this is in the middle of the night.) If for some reason you want to cancel the delayed regeneration just push the REGEN button again. REGEN TODAY will no longer be visible on the screen.

3. If the water is hard:

- The quickest way to get soft water in your home is by initiating an immediate regeneration of the water softener.
- To initiate an immediate regeneration of the water softener push and hold the REGEN button for approximately six seconds. The unit will immediately begin its regeneration cycle and water will be running to the drain. (When the softener has completed the manual regeneration the system will automatically return to its preset normal operations.)

Note: After an immediate regeneration of the water softener there is typically a delay of three to four days to purge the system i.e. water heater, pipes etc. of the hard water. After the three to four day period is passed and there is still hard water present you may need to contact a service professional.

The Brine System

Your Aquatek water softener utilizes a salt brine system in order to regenerate and refresh the softening capabilities of your system. Two Tank systems (ATWS) have an external Brine Tank and Cabinet Systems (ATCWS) have a brine chamber inside the cabinet. Regardless of model you will need to perform periodic maintenance, system cleaning, and replenishing of salt levels.

Here is some information about salt usage, types and service. You may use any water softener salt of good quality, including rock, pellet, solar, or "evaporated" types.

NOTE : All rock salt, regardless of source, contains insoluble materials which collect at the bottom of the brine tank and requires periodic clean-out. We generally recommend avoiding rock salts if possible.

If purified salt products are used, the salt storage compartment will require less frequent clean-out, but you must check more frequently for "bridging."

Recommended: SOLAR SALTS – Solar salt crystals are a naturally white, opaque, high purity salt. Using solar salt in your softener can help minimize the accumulation of brine tank residue—helping to keep the water softener clean and trouble-free. Top Salt Brands: Morton, Diamond Crystal, Pure Soft

We recommend you check your salt level monthly and maintain a minimum of 20 lbs. of salt in the brine tank at all times.

Cleaning:

A periodic clean-out of the Brine Tank is necessary to keep your system at peak operating efficiency. Do it at least every two years when the salt supply is low. Follow these step-by-step procedures:

Tools Needed:

- Scoop
- Clean, bucket-size container
- Garden hose
- Household scrub brush or sponge

Procedure:

1. Remove the salt storage tank cover and the cap from the brine valve chamber.
2. Disconnect the brine line from the brine valve by holding the outer ring of the push fitting; push the tubing in slightly before pulling it out.
3. Lift the brine valve out of the brine valve chamber and set aside in an upright position.
4. If you'd like to save any clean, dry salt remaining in the tank, remove it and place it in a clean container.
5. Using the scoop, dig out and discard as much remaining salt, water and debris as possible.
6. Remove the brine valve chamber by removing the screws on either side of the salt tank.
7. Remove the salt plate at the bottom of the brine tank.
8. Lay the salt tank on its side and direct a brisk stream of water from your garden hose to its inside to rinse out all residue.
9. Using a household scrub brush and a mild soapy solution, clean the salt plate. This will complete the tank cleaning.
10. Insert the brine valve into the chamber and replace brine valve chamber cap. (Re-insert the brine valve into the chamber, re-insert the brine line fully, and replace brine valve chamber cap.)
11. Fill the salt storage tank with 4 to 6 inches of water.
12. Fill the tank with salt to within a few inches of the top.
13. Replace salt storage tank cover.

Square Brine Tank



Brine Tank internal components & functionality of parts are essentially the same regardless of whether you have a square or a round tank. The only real differences are the shape of the Salt Shelf/Tank Grid, and the Brine Valve Assembly. If you any questions we're here to help - call us at 1-877-414-PURE (7873)



Round Brine Tank

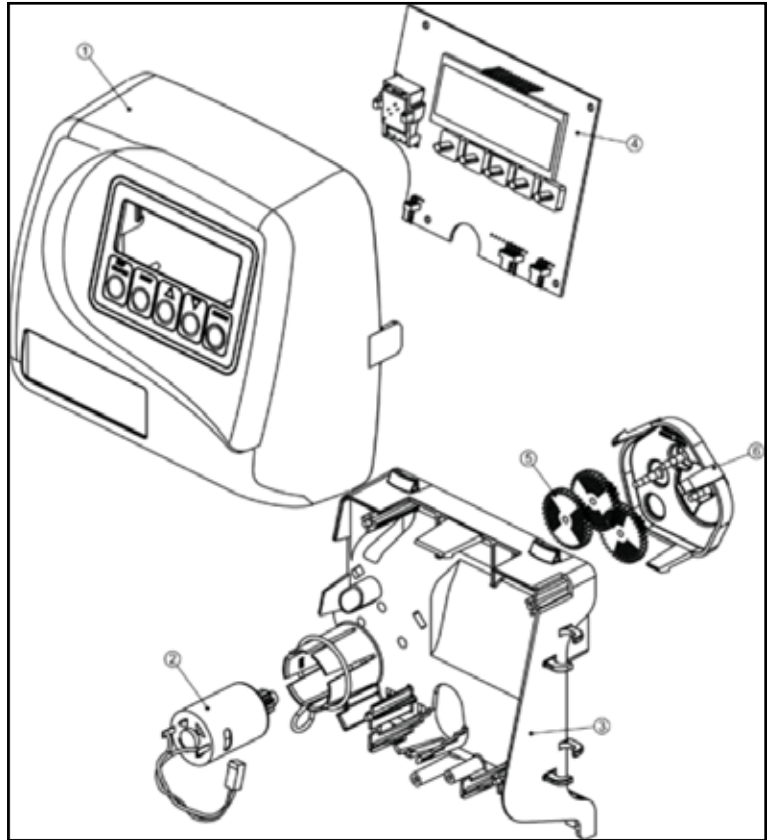


Drawing Number	Part Number	Description	Qty.
1	HBVA474-8	Round Tank Brine Valve Assembly (474)	1
2	?	Square Tank Brine Valve Assembly	1
3a	HBWS-XX	Round Tank Brine Well	1
3b	?	Square Tank Brine Well	1
4	HOF	Overflow Assembly	1
5.	?	Square Tank Deck Assembly / Salt Shelf	1
6.	HD-18	Round Tank Deck Assembly / Salt Shelf	1

Parts Breakdown

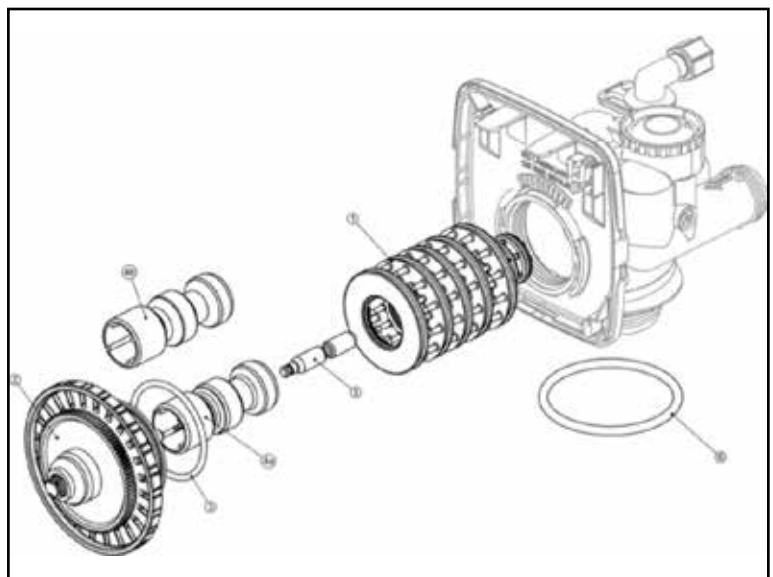
Front Cover and Drive Assembly

Drawing Number	Part Number	Description	Qty.
1	V3175-01	Front Cover Assembly	1
2	V3107-01	Drive Motor	1
3	V3106-01	Drive Bracket and Spring Clip	1
4	V3108	Circuit Board	1
5	V3110	Drive Reducing Gear	3
6	V3109	Drive Gear Cover	1
Not Shown	V3186	Transformer 110VAC-12VAC	1



Main Body Internals

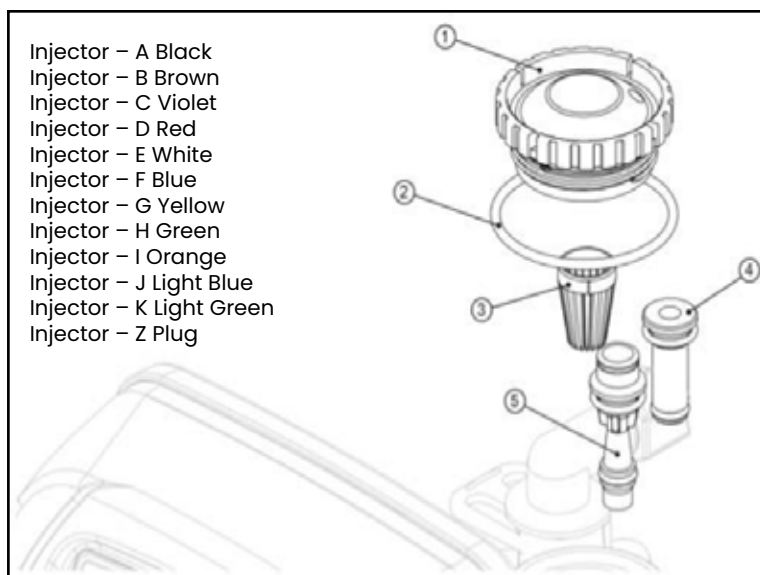
Drawing Number	Part Number	Description	Qty.
1	V3005	Spacer Stack Assembly	1
2	V3004	Drive Cap Assembly	1
3	V3135	Drive Cap ASM. O-Ring	1
4a	V3011	Piston Down-Flow ASM.	1
4b	V3011-1	Piston Up-Flow ASM.	1
5	V3174	Regenerant Piston	1
6	V3180	O-Ring	1



Front Cover and Drive Assembly

Drawing Number	Part Number	Description	Qty.
1	V3176	Injector Cap	1
2	V3152	O-Ring Injector Cap	1
3	V3177-01	Injector Screen	1
4	?	?	1
5	V3010-1	Injector Assembly Color/ Letter varies (see list)	1

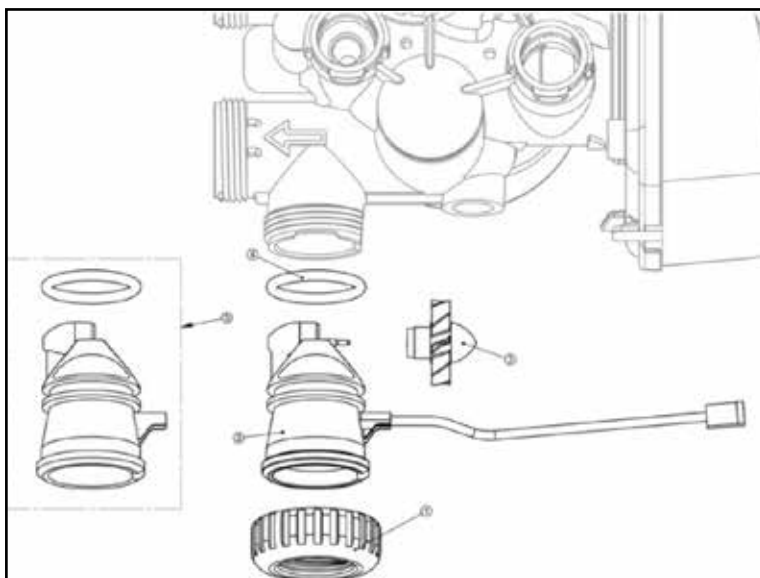
The size of your system will determine which injector assembly will be needed.



Brine Elbow Refill Flow ASM & Port Plug

Drawing Number	Part Number	Description	Qty.
1	V3195-01	Refill Port Plug ASM**	-
2	H4615	Brine Elbow Locking Clip	1
3	JCP-P-6	Polytube Insert 3/8"	1
4	JCPG-6PBLK	Brine Elbow Nut 3/8"	1
5	V3330-01	Brine Elbow with Flow Control Retainer ASM	1
6	V3163	Brine Elbow O-Ring	1
7	V3165-01	Brine Flow Control Retainer ASM (0.5 GPM)	1

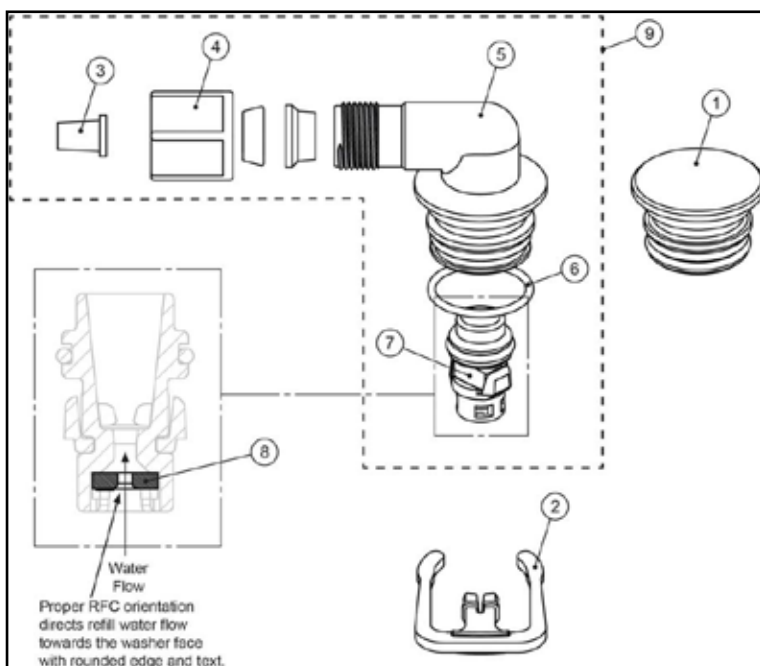
**Part not normally used on ATWS Systems



Brine Elbow Refill Flow ASM & Port Plug

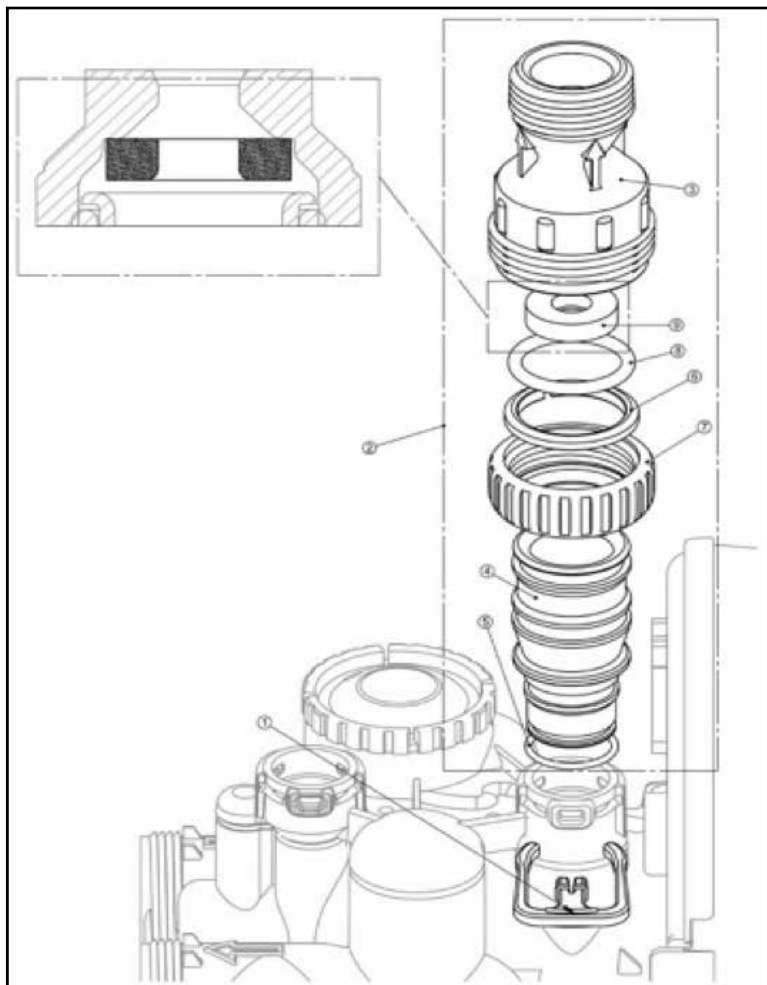
Drawing Number	Part Number	Description	Qty.
1	H4615	Drain Elbow Locking Clip	1
2	PKP10TS8-BULK	Poly Tube Insert 5/8"	1
3	V3192	Drain Elbow Nut	1
4	V3158-01	Drain Elbow 3/4" Male NPT	1
5	V3163	Drain Elbow O-Ring	1
6	V3159-01	Drain Flow Control Retainer Assembly	1
7	V3162-XX	Drain Line Flow Control Button*	

*The size of your system will determine which flow control button is needed.



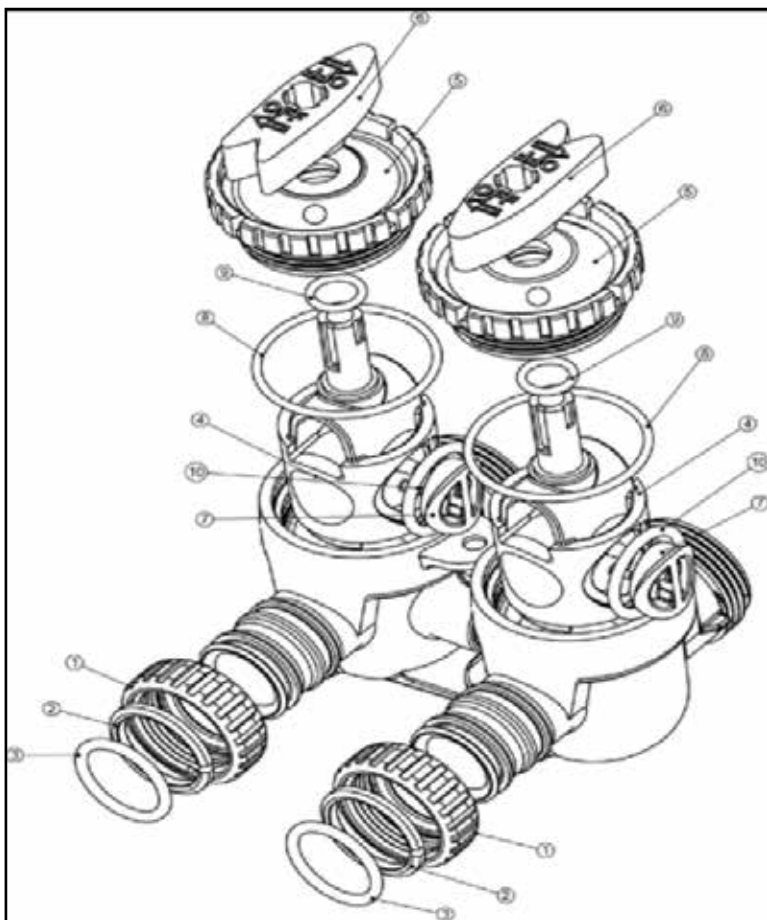
1" Drain Assembly (Optional)

Drawing Number	Part Number	Description	Qty.
1	H4615	Elbow Locking Clip	1
2	V3008-02	Drain Footing Straight	1
3	V3166	Drain Footing Body	1
4	V3167	Drain Footing Adapter	1
5	V3163	O-Ring	1
6	V3150	Split Ring	1
7	V3151	1" Nut	1
8	V3105	O-Ring	1
9	V3190-XX	DLFC (specify size)	1



Bypass Assembly

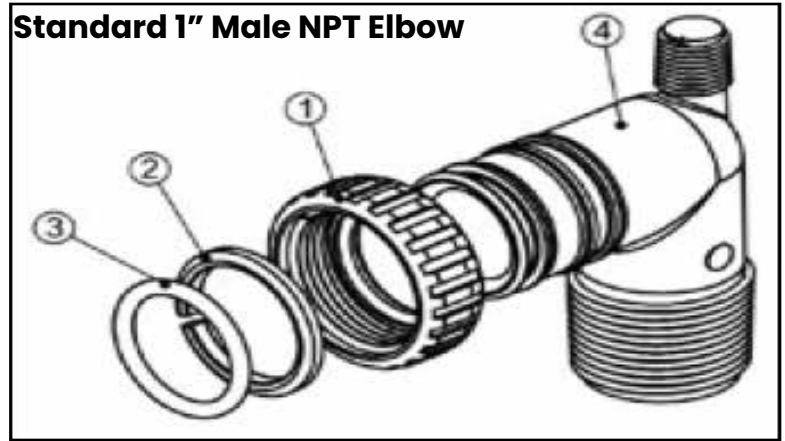
Drawing Number	Part Number	Description	Qty.
1	V3151	1" Nut	2
2	V3150	Split Ring	2
3	V3105	O-Ring	2
4	V3145	1" Bypass Rotor	2
5	V3146	Bypass Cap	2
6	V3147	Bypass Handle	2
7	V3148	Bypass Rotor Seal Retainer	2
8	V3152	Bypass Cap O-Ring	2
9	V3155	Bypass Handle O-Ring	2
10	V3156	Bypass Rotor O-Ring	2



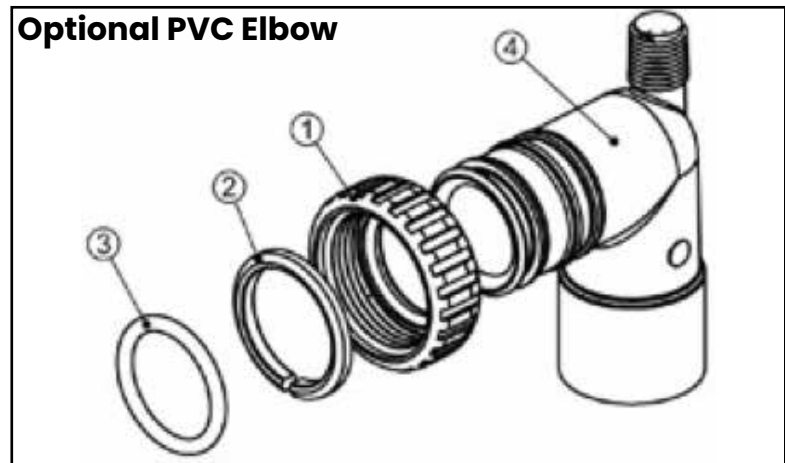
Installation Fittings

Drawing Number	Part Number	Description	Qty.
Standard 1" Male NPT Elbow			
1	V3151	1" Nut	2
2	V3150	Split Ring	2
3	V3105	O-Ring	2
4	V3149	1" Fitting PVC Male NPT Elbow	2
Optional PVC Elbow			
1	V3151	1" Nut	2
2	V3150	Split Ring	2
3	V3105	O-Ring	2
4	V3189	1" Fitting PVC ¾ and 1 PVC Solvent 90	2
Optional ¾" Brass			
1	V3151	1" Nut	
2	V3150	Split Ring	
3	V3105	O-Ring	
4	V3188-01	¾" Fitting Brass	
Optional 1" Brass			
1	V3151	1" Nut	
2	V3150	Split Ring	
3	V3105	O-Ring	
4	V3188	1" Fitting Brass	

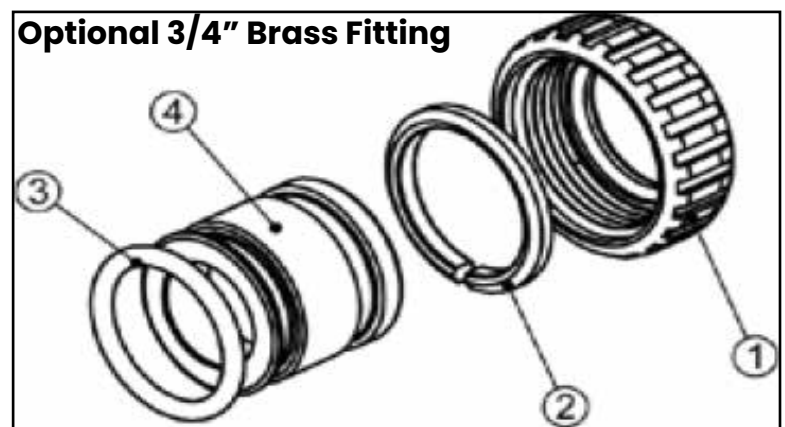
Standard 1" Male NPT Elbow



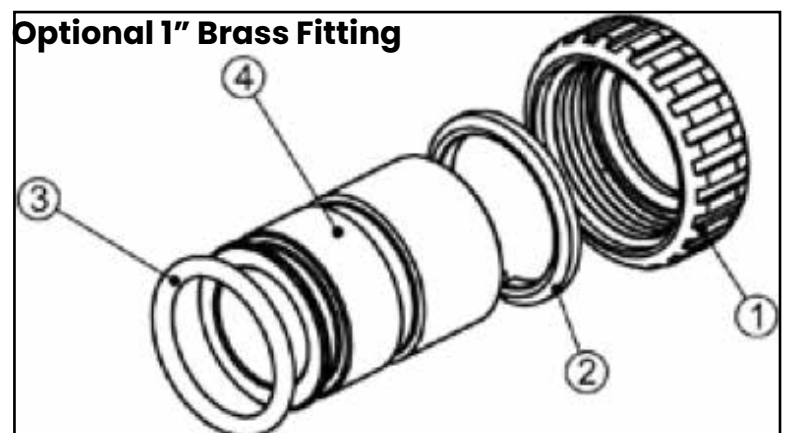
Optional PVC Elbow



Optional ¾" Brass Fitting



Optional 1" Brass Fitting



Trouble Shooting Guide

Problem	Possible Cause	Solution
No display on Control Valve Circuit Board	No power at electrical outlet	Repair outlet or use working outlet
	Control Valve Power Cord not plugged onto Control Valve Circuit Board	Make sure Control Valve Power Cord is connected securely at both ends
	Improper power supply	Verify proper voltage is being delivered to circuit board
	Defective Circuit Board	Replace Circuit Board
Control Valve Circuit Board does not display correct time of day	Control Valve Power Cord plugged into electric outlet controlled by light switch	Use uninterrupted outlet
	Tripped Breaker Switch and/or tripped GFI	Reset Breaker Switch and/ or GFI switch
	Power outage	Reset time of day. If Circuit Board has battery back up present, the battery may be depleted. Replace if necessary.
	Defective Circuit Board	Replace Circuit Board
Display does not indicate that water is flowing. The word "Softening" flashes on the display when water is being used	Bypass valve in bypass position	Turn Bypass Handles to place Bypass in service position
	Meter is not connected to meter connection on Circuit Board or is not connected securely	Connect Meter to three-pin connection labeled METER on Circuit Board. Remove and reconnect to ensure proper connection
	Restricted/ stalled Meter Turbine	Remove Meter and check for rotation or foreign material
	Defective Meter Defective Circuit Board	Replace Meter Replace Circuit Board
Time of day flashes on and off	Power outage	Reset time of day. If Circuit Board has battery back up present, the Battery may be depleted. Replace if necessary.
Control valve does not regenerate automatically when the REGEN button is depressed and held.	Broken Drive Gear or Drive Cap Assembly	Replace Drive Gear or Drive Cap Assembly
	Broken Piston Rod	Replace Piston Rod
	Defective PC Board	Replace Defective PC Board
Control valve does not regenerate automatically but does when the REGEN button is depressed and held.	Bypass Valve in bypass position	Turn Bypass Handles to place Bypass in service position
	Meter is not connected to meter connection on Circuit Board or is not connected securely	Connect Meter to three pin connection labeled METER on Circuit Board. Remove and reconnect to ensure proper connection
	Restricted/ stalled Meter Turbine	Remove Meter and check for rotation or foreign material
	Incorrect programming	Check for programming error
	Defective Meter	Replace Meter
	Defective Circuit Board	Replace Circuit Board

Problem	Possible Cause	Solution
Hard or untreated water is being delivered	Bypass Valve is open or faulty	Fully close Bypass Valve or replace. Also check for multiple bypasses
	Media is exhausted due to high water usage	Check program settings or diagnostics for abnormal water usage
	Meter not registering	Remove Meter and check for rotation or foreign material
	Water quality fluctuation	Test water and adjust program values accordingly
	No Salt or low level of Salt in Brine Tank	Add proper type of salt to Brine Tank
	Control Valve fails to draw in brine	Refer to Trouble Shooting Guide number 12
	Insufficient brine level in Brine Tank	Check refill setting in programming. Check Refill Flow Control for restrictions or debris and clean or replace
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Control valve body type and piston type mix matched	Verify proper control valve body type and piston type match
	Fouled media bed	Replace media bed
System uses too much salt	Improper refill setting	Check refill setting
	Improper program settings	Check program setting to make sure they are specific to the water quality and application needs
	Control valve regenerates frequently	Check for leaking fixtures that may be exhausting capacity or system is undersized
	Slow drip from brine refill tubing. Float Valve is not designed to shut off a drip	Replace Seal and Spacer Stack Assembly
Residual salt in service lines	Low water pressure	Check incoming water pressure. Water pressure must remain at minimum of 40 psi
	Incorrect injector size	Replace Injector with correct size for the application. Refer to System Specification for the correct size
	Restricted drain line	Check drain line for restrictions or debris and clean
Excessive water in Brine Tank	Improper program settings	Check refill setting
	Plugged Injector	Remove Injector and clean or replace
	Drive cap assembly not tightened in properly	Re-tighten the drive cap assembly
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Restricted or kinked drain line	Check drain line for restrictions or debris and or un-kink drain line
	Plugged backwash flow controller	Remove backwash flow controller and clean or replace
	Missing Refill Flow Controller	Replace Refill Flow Controller

Problem	Possible Cause	Solution
Control Valve fails to draw brine	Injector is plugged	Remove Injector and clean or replace
	Faulty Brine Piston	Replace Brine Piston
	Brine line tubing connection leak	Inspect Tubing and Fittings for air leak
	Drain line restriction or debris can cause excess back pressure on Injector	Inspect drain line and clean to correct restriction
	Drain line too long or elevated too high	Shorten length and or height
	Low water pressure	Check incoming water pressure. Water pressure must remain at minimum of 40 psi
Water running to drain	Power outage during regeneration	Upon power being restored Control Valve will finish the remaining regeneration time. Reset time of day.
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Piston assembly failure	Replace Piston Assembly
	Drive Cap Assembly not tightened in properly	Re-tighten the Drive Cap Assembly
Err - 1001 = Control unable to sense motor movement	Motor not inserted full to engage pinion, motor wires broken or disconnected	Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the Circuit Board labeled MOTOR. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Circuit Board not properly snapped into drive bracket	Properly snap Circuit Board into drive bracket and then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Missing reduction gears	Replace missing gears
Err - 1002 = Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign material is lodged in control valve	Open up Control Valve and pull out piston assembly and Seal and Spacer Stack Assembly for inspection. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Mechanical binding	Check Piston and Seal and Spacer Stack Assembly, check Reduction Gears, check Drive Bracket and Main Drive Gear Interface. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Main Drive Gear too tight	Loosen Main Drive Gear. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Improper voltage being delivered to Circuit Board	Verify that proper voltage is being supplied. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston

Problem	Possible Cause	Solution
Err – 1003 = Control valve motor ran too long and was unable to find the next cycle position	Motor failure during a regeneration	Check motor connections then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Foreign matter built up on Piston and Seal and Spacer Stack Assemblies creating friction and drag enough to time out Motor	Replace Piston and Seal and Spacer Stack Assemblies. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Drive Bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap Drive Bracket in properly then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
Err – 1004 = Control valve motor ran too long and timed out trying to reach home position	Drive Bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap Drive Bracket in properly then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.

Manufacturer's Limited Warranty

The manufacturer warrants to the original owner that its Water Conditioning Equipment will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date of installation, when installed and operated within recommended parameters. No warranty is made with respect to defects not reported to Manufacturer within the warranty period and/or defects or damages due to neglect, misuse, alterations, accident, misapplication, physical damage, or damage caused by fire, floods, acts of God, freezing or hot water or similar causes. Manufacturer's obligation to the owner of this equipment under this Limited Warranty shall be limited, at its option, to replacement or repair of this Water Conditioning Equipment.

To obtain warranty service mail or ship the defective parts freight prepaid to the Manufacturer's place of business. Manufacturer will, at its option, repair or replace the defective components at its expense and return parts freight collect.

Manufacturer gives this warranty to the owner in lieu of all other warranties, express or implied, including without limitation any implied warranties of merchantability or fitness for a particular purpose and hereby expressly disclaims all other such warranties. Manufacturer's liability hereunder shall not exceed the cost of the product. Under no circumstances will Manufacturer be liable for any incidental or consequential damages or for any other loss, damage or expense of any kind, including loss of profits, arising in connection with the installation or use or inability to use this product.

To obtain warranty service contact:

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