



# OWNER'S FILTER MANUAL

## E6 TWIN ALTERNATING



This owner's manual is designed to assist owners and installers with the operation, maintenance and installation of your new water softener. It is our sincere hope that this manual is clear, concise and helpful to both owner and installer. We have included detailed instructions on general operating conditions, pre-installation and installation instructions, start-up, and timer and meter programming. We have included a troubleshooting guide, service instructions and parts diagrams to assist you.

Owners will appreciate the simplified, illustrated format for operation, programming and troubleshooting. **In the event that you need professional assistance for servicing your water softener, please contact the dealer who installed this system.**

## TABLE OF CONTENTS

Job Specification Sheet.....2	Cycle Sequence ..... 11-12
Soft Water Basics .....3	Water Softener Disinfection ..... 13
Operating Conditions.....3	Water Softener Draining Procedure ..... 14
Pre-Installation Check List.....4	Troubleshooting ..... 14-16
Bypass Valve Operation .....4	Parts Diagrams..... 17-23
Installation Instructions .....5	Service Instructions ..... 24-28
Programming .....6	Installation Fittings.....29
Softener Set-Up..... 7-9	Specifications .....30
Diagnostics .....10	Injector Flow Graphs .....31
Valve History..... 11	Warranty .....32

## JOB SPECIFICATION SHEET

MODEL NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_ INSTALL DATE \_\_\_\_\_

### WATER TEST AT TIME OF INSTALLATION

_____ Hardness CaCo <sub>3</sub> (gpg)	_____ Other _____
_____ Iron (ppm)	_____ Other _____
_____ pH	_____ Other _____

### SIZING INFORMATION

All Water is Softened Except:

\_\_\_\_\_ Rear Hose Bib    \_\_\_\_\_ Front Hose Bib    \_\_\_\_\_ Kitchen Cold    \_\_\_\_\_ Toilets    \_\_\_\_\_ All Cold  
 \_\_\_\_\_ Other \_\_\_\_\_

The average family uses 50 gallons per person daily for all water uses in the home, about 40 gallons per person daily if soft water is not supplied to the toilets, and about 30 gallons per person daily if only hot water is softened.

\_\_\_\_\_ Daily Water Usage (Gallons/Person)  
 x \_\_\_\_\_ Family Size (Number of people in family)  
 = \_\_\_\_\_ Total Gallons Per Day  
 x \_\_\_\_\_ Grains Per Gallon of Hardness  
 (Note: Add 3 grains per gallon of hardness for each ppm iron for total compensated hardness)  
 = \_\_\_\_\_ Total Grains Per Day

Dealer Name \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_ Email \_\_\_\_\_

# SOFT WATER BASICS

## Hardness

Excess amounts of calcium and magnesium in water produce hardness. A water softener removes the majority of calcium and magnesium to produce softened water.

Hardness is measured in terms of grains. (This grain weight is derived from the average weight of a dry grain of wheat.) When water is tested the grain hardness is calculated and expressed as grains per gallon (gpg). This calculation, as well as the number of people in the household or business will help determine what type and size of water softener will most efficiently soften your water.

Your water softener contains an ion exchange media (often called resin) which removes the hardness from water as it flows through each softener tank. Eventually so much hardness collects on the exchange media that the softener can no longer soften the water in that tank. At this point it is considered "exhausted". The twin alternating function automatically switches to the standby tank and regeneration occurs immediately on the exhausted tank.

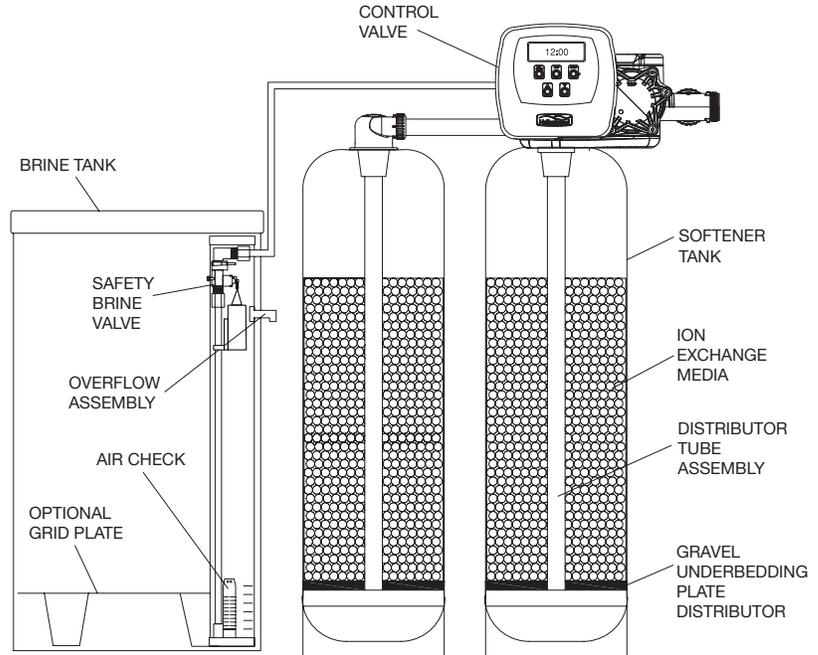


Figure 1

## Regeneration

To regenerate the exchange media, it must be rinsed with a brine (salt) solution. This removes the hardness from the exchange media and replaces it with sodium. The exchange media is then ready to remove hardness from water. The hardness minerals and excess brine solution are rinsed down the drain.

During the regeneration cycle the softening media is also backwashed. This reversing of the normal flow of water serves to remove sediment which may have accumulated during the softening process due to the filtering action of the exchange media. Backwashing also loosens and fluffs up the bed of exchange media to insure that during regeneration the brine solution will come into contact with all the media.

## Maintenance of Your Softener

**Salt:** Salt to a softener is what gasoline is to a car. Not only must a softener have salt, but it should be the proper type to insure efficient recharging of the unit. Ask your dealer what type of salt may best suit your needs. Always have an adequate supply of salt on hand. Check the salt level of your brine tank every couple of weeks initially to determine how much salt you use - this will depend on how much water you use. As a rule of thumb, with 20 gpg hard water, about a 1/2 lb. of salt per person per day is used. In other words, a family of four uses 60 lbs. of salt a month. Fill the tank approximately three-fourths full, with a minimum of 12" of salt. **DO NOT USE Block Salt** when the E6 Series control is programmed with a brine tank prefill. Block salt does not dissolve quickly enough to provide a good regeneration.

**Cleaning Salt Tank:** The salt tank may require periodic cleaning. Inspect the salt tank at least once a year for buildup of insoluble materials. It is recommended to periodically clean the salt tank no matter what kind of salt you are using. See page 13, Miscellaneous #2 for details on cleaning.

**REMEMBER:** Salt is the fuel to run your water softener. Buy the **best clean salt available**.

# OPERATING CONDITIONS

Your water conditioner has been designed to adequately handle up to 100 grains per gallon of hardness as well as up to 2 ppm of ferrous bicarbonate iron. This is iron that is dissolved in water and not visible to the eye in a freshly drawn sample. After standing in contact with air, the ferrous iron will become oxidized to the ferric state and start to precipitate as a reddish brown floc. It can be seen and may cause discolored water. In order for your softener to remove the iron, air (oxygen) must be kept from coming in contact with water until after it has been

passed through the water conditioner. In some cases, additional equipment may be required to treat water supplies having special characteristics, such as: ferric hydroxide iron, iron bacteria, low pH, taste and odors, etc. If any question should exist, contact your dealer.

**This water softener is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after treatment.**

# PRE-INSTALLATION CHECK LIST

(All electrical & plumbing should be done in accordance to all local codes)

**Water Pressure:** A minimum of 25 pounds of water pressure (psi) is required for regeneration. Maximum 125 psi.

**Water Quality:** On rural water supplies there is often a problem with sand or sediment in the water. (This problem occasionally occurs in public water supplies.) If the water is not filtered before being softened, the sand and sediment may plug up the water softener restricting the flow through the resin bed. This problem often requires rebedding of the mineral tank. **Note:** Well and/or pump problems affecting the operation of the softener are repairs that are not covered under warranty. To prevent these unnecessary, and expensive repairs that are not covered under warranty, we recommend the installation of an in-line filter system ahead of a water softener.

**Electrical:** A continuous 110 volt 60 cycle current supply is required. Make certain the current supply is uninterrupted and cannot be turned off with another switch. All electrical connections must be connected per local codes. **Surge protection is recommended with all electric controls.**

**Existing Plumbing:** Existing plumbing must be free from lime and iron build-up. Piping that is built-up heavily with lime and/or

iron must be replaced. If piping is blocked with iron, additional equipment must be installed ahead of the water conditioner to correct the problem.

**Drain Line:** The softener should be located close to a drain. Avoid overhead drain lines if possible to prevent back pressure on the brine injector. Overhead drains are not to exceed 8 feet above the floor and no more than 20 feet in length. The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line.

**Bypass Valves:** Always provide for the installation of a bypass valve.

**Softening:** It is recommended that the conditioner be installed to soften both the hot and cold water supply. A separate hard water faucet may be plumbed for drinking purposes if desired. Outside faucets should be left on hard water.

**Caution:** Water temperature is not to exceed 110°F; the conditioner cannot be subject to freezing conditions, or to a vacuum due to loss of pressure (such as a water main break).

## BYPASS VALVE OPERATION

NORMAL OPERATION

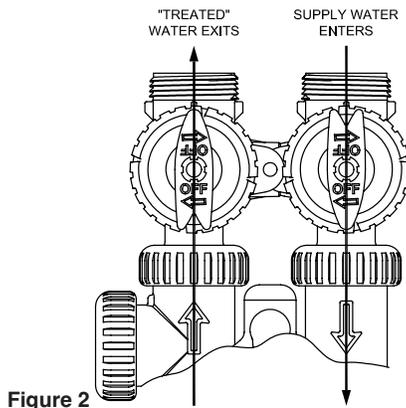


Figure 2

BYPASS OPERATION

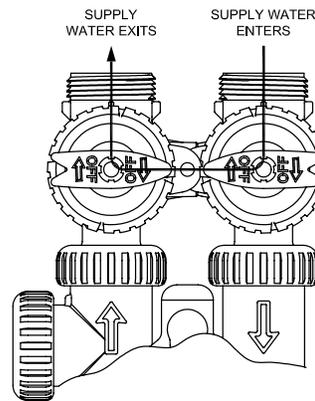


Figure 3

DIAGNOSTIC MODE

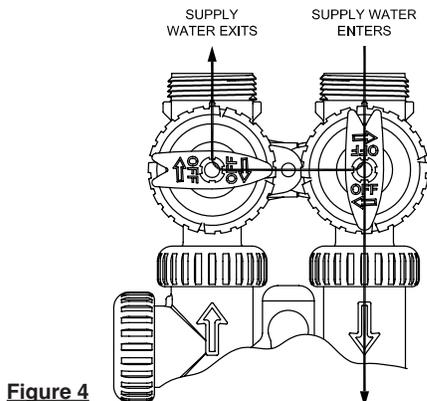


Figure 4

SHUT OFF MODE

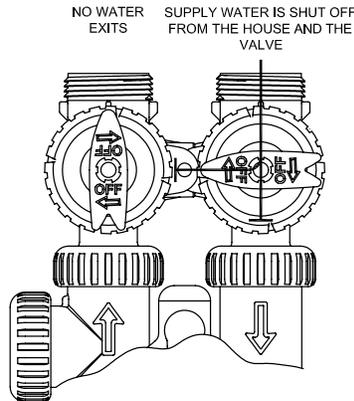


Figure 5

# INSTALLATION INSTRUCTIONS

(All electrical & plumbing should be done in accordance to all local codes)

## CAUTION:

- Do not use vaseline, oils or other hydrocarbon lubricants or spray silicone anywhere. A silicon lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**
  - Do not use pipe dope or other sealants on threads. Only teflon tape may be used on threads. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
  - The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line.
1. Place the conditioner where it is to be installed, making sure each tank is on a clean, level and firm base.
  2. Do all necessary plumbing (inlet to inlet, outlet to outlet and drain line to drain). The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.
  3. 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 solvent 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.
  4. **A jumper ground wire should be installed between the inlet and outlet pipe whenever the metallic continuity of a water distribution piping system is interrupted. Install grounding strap on metal pipes.**
  5. Some contractors make drain line using 5/8" polytube (See figure 6a, page 6) or a 3/4" female adapter. If soldering, joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
  6. The brine refill flow control assembly is installed in an easy to access refill elbow located on top of the control valve. The refill flow control assembly is attached to the control valve with a locking clip. The locking clip allows the elbow to rotate 270 degrees so the outlet can be orientated towards the salt tank.
  7. Connect the brine line found in the brine tank to the brine connection on the control valve. The control valve has a standard refill elbow to which a 3/8" flexible tube can be connected, see figure 6a. (An optional elbow can be ordered which accommodates a 1/2" flexible tube for a high regenerant draw rate situation). Both elbows use the same refill flow control and retainer. Make sure the floor is clean beneath the salt tank and that it is level and smooth.
  8. A 1/2" (inside diameter) gravity drain line may be connected to the overflow fitting on the side of the brine tank. This overflow is in case of a malfunction in the brine shut off. If the unit is installed where water may flow in the event of an overflow and cause water damage, connect a length of flexible tubing and run to a drain below the level of the overflow. (**Do not connect the tubing to the drain line on the control valve. Do not run tubing above overflow height at any point.**)



Figure 6a

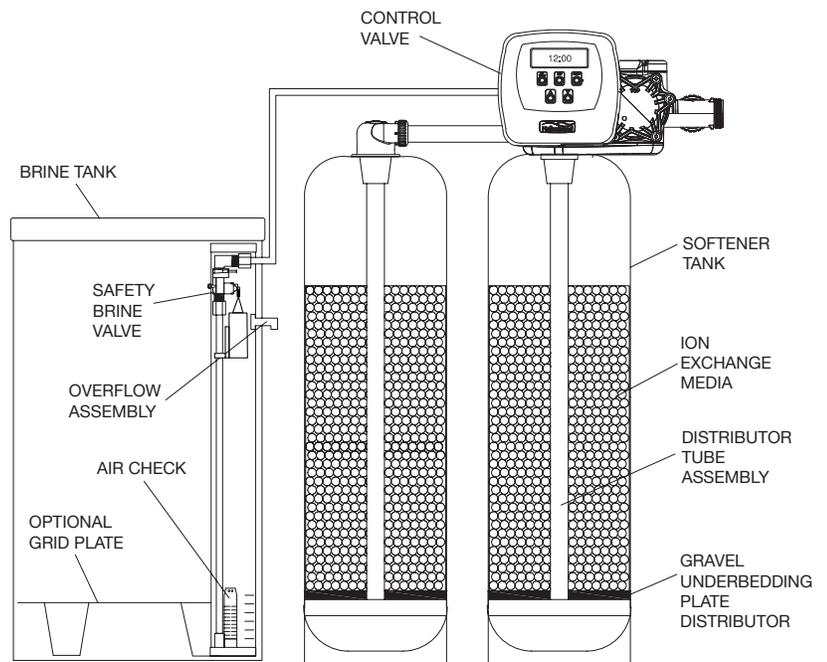


Figure 6b

# PROGRAMMING

## General Information

The E6 Series control valve is the "brain" of your twin alternating water softener. It consists of the valve body and powerhead with solid state microprocessor.

The display panel (see Figure 7) consists of the LCD display and five push buttons which are used in displaying and programming the water softener settings.

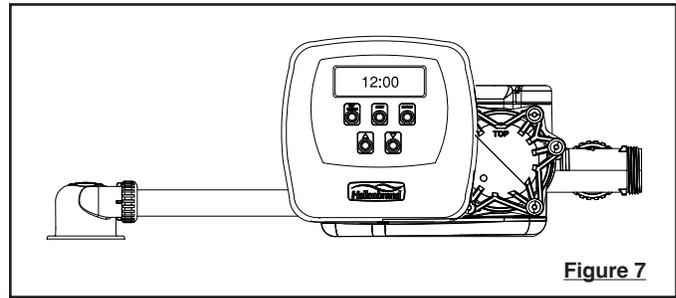


Figure 7

## Initial Start Up

The initial start up will probably be done by the technician installing the softener system. If not, the following instructions will step through the process.

1. Complete all plumbing connections: inlet, outlet, drain line and brine line. Do not add salt at this time.
2. Place the bypass valve in the bypass position. (See figure 3 page 4) Turn on the main water supply. Open a cold soft water faucet to flush the piping of any air and/or foreign material. Run until the water is clear.
3. Manually add 6 inches of water to the brine tank.
4. Now plug the transformer into a 110-volt receptacle. (Be certain the outlet is uninterrupted.) Within 5 seconds the control will automatically align itself into the softening mode and display will automatically alternate between time of day, gal/min and gallons remaining. (figure 8).
5. Set the time of day by pushing clock button (figure 9, page 7) and using ▲ and ▼ buttons.
6. Push REGEN button and hold it down for 3 seconds. The system will advance to the "First" position. (Note: Depending on how the system is programmed it could read backwash, rinse, brine or fill). Pushing REGEN button until "Rinse" shows in the left upper hand corner of display. Slowly place the bypass into the "diagnostic mode" (see fig 4, page 4). Run water to the drain until it runs clear. Return the bypass valve to the by-pass position (fig 3, page 4). Push REGEN button until unit is back to softening mode. **Repeat with second tank.**
7. Once again, push REGEN button and hold down for 3 seconds. Keep pressing REGEN button until "Backwash" appears. Slowly place the bypass valve into the

"Diagnostic Mode" 1/2 way. Allow water to slowly fill the mineral tank. When a solid stream of water starts coming out of the drain line, open the bypass inlet valve all the way and allow to run out the drain until water clears. Then slowly place the by-pass into the "normal operation" mode by opening the outlet side of bypass valve, figure 2, page 4.

8. Press the REGEN button until LED display says "REGENERANT DRAW DN". Loosen the brine line from the elbow on control valve in the brine tank. Place finger over the end of the elbow to check for suction. If no suction, see trouble-shooting guide. (See #10, Page 15) If proper suction, reattach brine tube and allow it to draw water down to the bottom of the air check, (figure 6b, page 5).
9. Press REGEN button again until LED once again displays "BACKWASH". Keep in backwash until water once again runs clear at the drain. **Backwash both tanks.**
10. Press REGEN button again until "RINSE" is displayed. Allow rinse cycle to run its full course. While the rinse cycle is finishing, load brine tank with salt. If utilizing brine reclaim, manually add full volume of water to brine tank for first regeneration.
11. Once the rinse cycle has finished the softener control will return to the softening cycle. The LED screen will scroll between "TIME/GPM/GALLONS REMAINING".
12. Next set your softeners water hardness and regeneration time settings (see figure 10a, page 8).

Your programming is now complete.

## General Operation

When the system is operating, one of three displays may be shown. Pressing NEXT will alternate between the displays. The tank in service is displayed on the left. One of the displays is the current time of day. The second display is the following: days to a regen/gallons remaining. Capacity remaining is the number of gallons that will be treated before that tank goes through a regeneration cycle. The third display is current flow in gal/min. The user can scroll between the displays as desired by pushing NEXT.

When water is being treated (i.e. water is flowing through the system) the word "GPM" flashes on left side of display when other than flow rate is displayed.

Unit A is the tank the control valve is on and Unit b is the tank with in/out head.

## USER DISPLAYS/SETTINGS

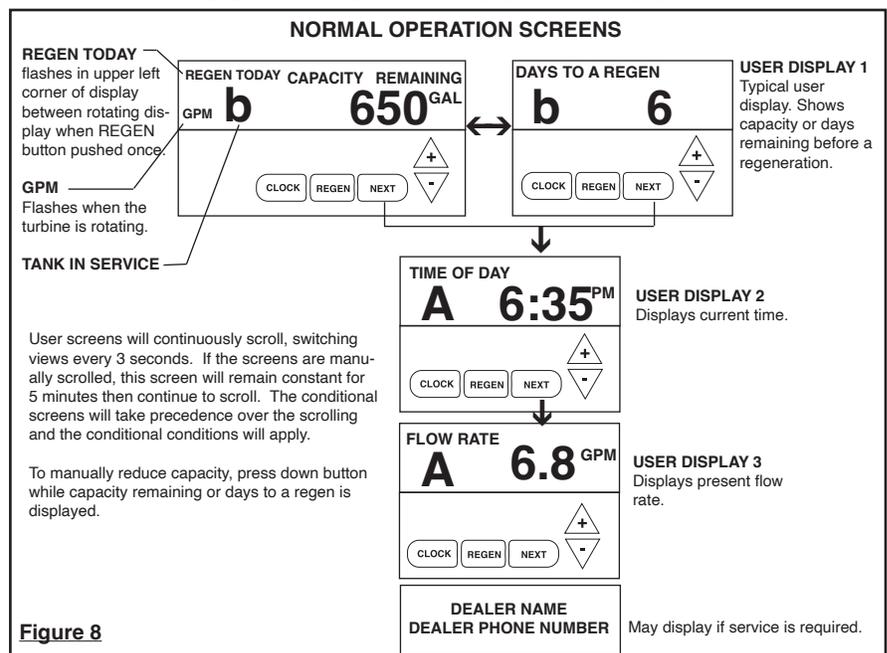
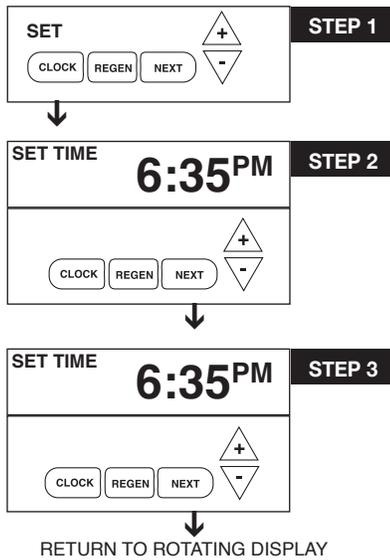


Figure 8

## SET TIME OF DAY



▲ = ▲ Up Arrow    ▼ = ▼ Down Arrow

**Step 1** - Press SET CLOCK.

**Step 2** - Current Time (**hour**): Set the hour of the day using ▲ or ▼ buttons. AM/PM toggles after 12. Press NEXT to go to step 3.

**Step 3** - Current Time (**minutes**): Set the minutes of day using ▲ or ▼ buttons. Press NEXT to exit Set Clock. Press REGEN to return to previous step.

**Power Loss** - Lithium battery on circuit board provides up to 2 years of time clock backup during power outages. If the power is out when battery is depleted, only time of day needs to be reset, all other values are stored in non-volatile memory. When time of day is flashing, replace lithium coin type 2032 battery.

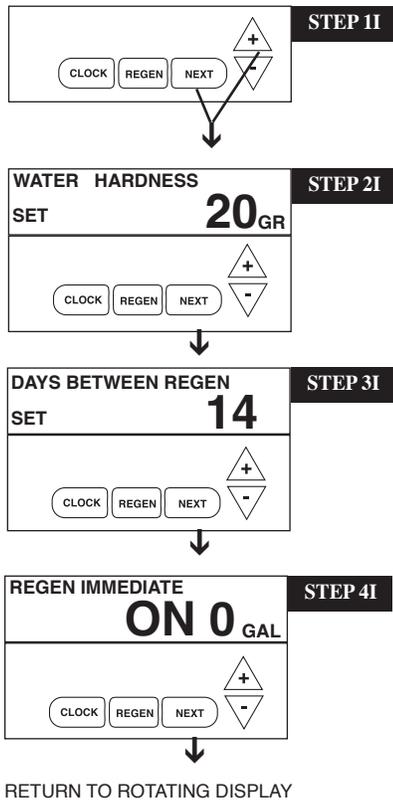
Battery back-up feature will be activated after 24 hours of power.

Do not forget to reset for daylight savings time.

Figure 9

## INSTALLER DISPLAYS/SETTINGS

▲ = ▲ Up Arrow    ▼ = ▼ Down Arrow



**Step 1I** - Press NEXT and ▲ simultaneously for 3 seconds.

**Step 2I - Hardness:** Set the amount of total compensated hardness in grains (hardness as calcium carbonate) per gallon using ▲ or ▼ buttons. **The factory setting is 20** with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon should be increased if soluble iron needs to be reduced. Add 3 grains of hardness for each ppm of iron present. If this display shows nA -, then system is set-up in "filter" mode or "AUTO" is not selected in softener system setup. Press NEXT to go to Step 3. Press REGEN to exit Installer Displays/Settings.

**Step 3I - Day Override:** This sets the number of days between regenerations. If value set to "oFF" regeneration initiation is based solely on gallons used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for a regeneration. Set Day Override using ▲ or ▼ buttons. As twin alternating configuration is often applied for salt and water efficiency: **Factory setting is Off.**

- number of days between regeneration (1 to 28); or
- "oFF"

Press NEXT to go to step 4. Press REGEN to return to previous step.

**Step 4I - Regeneration:** This display will show REGEN on 0 GAL, when set for twin alternating.

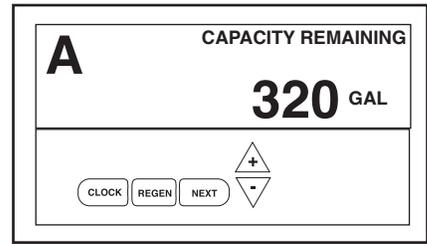
Figure 10

## Manual Regeneration

To initiate a manual transfer of tank, press and hold REGEN button. This will initiate a regeneration on the tank previously in service and put standby tank into service.

## Alternate Tanks

To switch tanks manually without cycling the regeneration, press and hold SET CLOCK and ▲ button for 3-4 seconds.

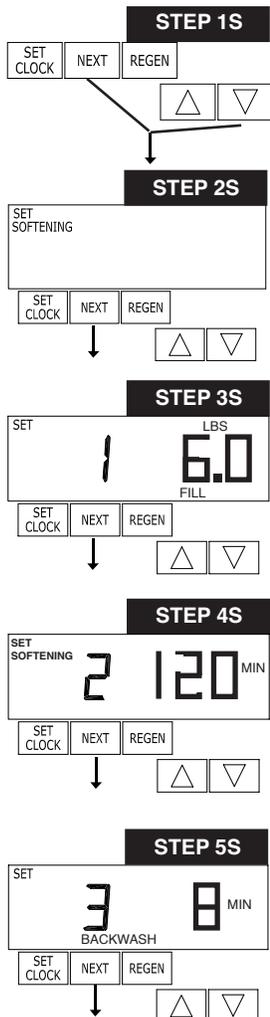


## CYCLE TIME ADJUSTMENTS

Normally it is not recommended to adjust the lengths of the cycle times. However, certain water conditions may dictate adjustments. This should only be done from the recommendation of a water conditioning professional. The following chart shows the upper and lower limits of each cycle.

Cycle Options	Units	Lower/Upper Limit	Factory Setting
Fill	Lbs.	0.1 to 200	See Page 38
Softening (Service)	Minutes	1 to 480	120
Backwash	Minutes	1 to 120	8
Regenerant Draw DN Time	Minutes	1 to 180	60
Rinse-Fast	Minutes	1 to 120	4

## SOFTENER SETUP



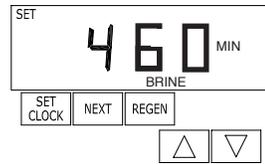
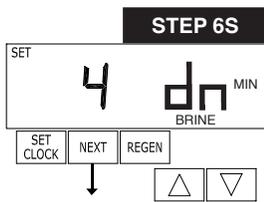
**STEP 1S** – Press NEXT and ▼ simultaneously for 3 seconds until display changes. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated.

**STEP 2S** – Choose SOFTENING using ▼ or ▲ button. Press NEXT to go to Step 3S. Press REGEN to exit Softener System Setup.

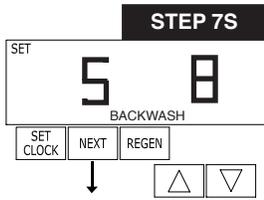
**STEP 3S** – Select the time for the first cycle (which in this example is FILL) using the ▼ or ▲ button. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

**STEP 4S** – Select the time for the second cycle (which in this example is SOFTENING) using ▼ or ▲ button. Press NEXT to go to Step 5S. Press REGEN to return to the previous step.

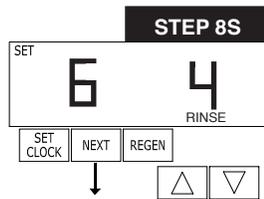
**STEP 5S** – Select the time for the third cycle (which in this example is BACKWASH) using the ▼ or ▲ button. Press NEXT to go to Step 6S. Press REGEN to return to the previous step.



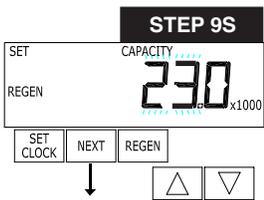
**STEP 6S** – Select the time for the fourth cycle (which in this example is dn BRINE) using the ▼ or ▲ button. Press NEXT to go to Step 7S. Press REGEN to return to the previous step.



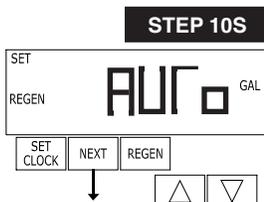
**STEP 7S** – Select the time for the fourth cycle (which in this example is 2nd Backwash) using the ▼ or ▲ button. Press NEXT to go to Step 8S. Press REGEN to return to the previous step.



**STEP 8S** – Select the time for the fourth cycle (which in this example is RINSE) using the ▼ or ▲ button. Press NEXT to go to Step 9S. Press REGEN to return to the previous step.



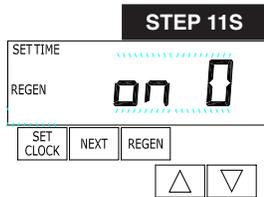
**STEP 9S – Set Grain Capacity** using the ▼ or ▲ button. The ion exchange capacity is in grains of hardness as calcium carbonate for the system based on the pounds of salt that will be used. Calculate the pounds of salt using the fill time previously selected. The allowable grains capacity range varies from 5,000 to 1,500,000 grains. The increment increase is 500 for the range from 5000 to 30,000; 1000 for the range of 30,000 to 100,000; 2000 for the range of 100,000 to 200,000; and 5000 for range of 200,000 to 1,500,000. Grains capacity is affected by the fill time. The capacity and hardness levels entered are used to automatically calculate reserve capacity when gallon capacity is set to AUTO. Press NEXT to go to Step 10S. Press REGEN to return to previous step.



**STEP 10S – Set Gallons Capacity** using ▼ or ▲ button. If value is set to:

- “AUTO” gallon capacity will be automatically calculated.
- “oFF” regeneration will be based solely on the day override set (see Installer Display/Settings Step 3I); or
- as a number of gallons (allowable range 20 to 1,500,000) regeneration initiation will be based off the value specified.

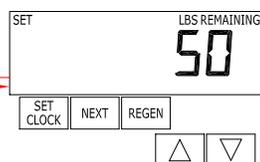
Increment increase is 20 for the range 20 to 2000, 100 for the range of 2000 to 10,000 and 500 for the range of 10,000 to 50,000 and 2000 for the range of 50,000 to 1,500,000. If “oFF” or a number is used, hardness display will not be allowed to be set in Installer Displays/Settings Step 2I. Press NEXT to go to Step 11S. Press REGEN to return to previous step.



**STEP 11S – Set Regeneration Time Options** using the ▼ or ▲ button. If value is set to:

- “NORMAL” means regeneration will occur at the preset time;
- “on 0” means regeneration will occur immediately when the gallons capacity reaches 0 (zero); such as with a twin alternating system or
- “NORMAL + on 0” means regeneration will occur at one of the following:
  - the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached, whichever comes first; or
  - immediately after 10 minutes of no water usage when the gallon capacity reaches 0 (zero).

Press NEXT to go to Step 12S. Press REGEN to return to previous step.



**STEP 12S – Set Low Salt Warning** using the ▼ or ▲ button. If value is set to:

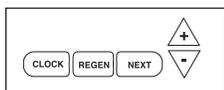
- “oFF” no low salt level warning will appear for the user, or
- a specific value “FILL SALT” will flash on the display when the calculated remaining pounds of salt falls below that level. Allowable values range from 10 to 400 pounds in 10 pound increments.

Press NEXT to exit Softener System Setup. Press REGEN to return to previous step.

# DIAGNOSTICS

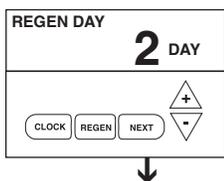
▲ = ▲ Up Arrow    ▼ = ▼ Down Arrow

**Reset Diagnostic Values:** Hold   NEXT/DOWN buttons for 3 seconds, then hold  UP/DOWN buttons for 3 seconds.



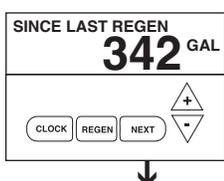
**STEP 1D**

**STEP 1D** – Press ▼ or ▲ simultaneously for three seconds. If screen in step 2D does not appear in 5 seconds the lock on the valve is activated.



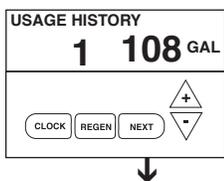
**STEP 2D**

**STEP 2D – Days, since last regeneration:** This display shows the days since the last regeneration occurred. Press the NEXT button to go to Step 3D. Press REGEN to exit Diagnostics.



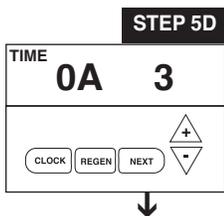
**STEP 3D**

**STEP 3D – Volume, since last regeneration:** This display shows gallons of water that has been treated since the last regeneration. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.



**STEP 4D**

**STEP 4D – Volume of water used, 63-day usage history:** This display shows day 0 (for today) and 1 (for yesterday) will show day 2 (which would be the day before yesterday) and flashes the volume of water treated on that day. Continue to press the ▲ button to show the volume of water treated for the last 63 days. This display will show dashes if a water meter is not installed. Press the NEXT button at any time to go to Step 5D. Press REGEN to return to the previous step.

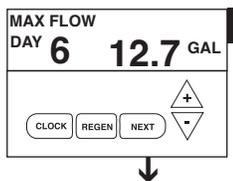


**STEP 5D**



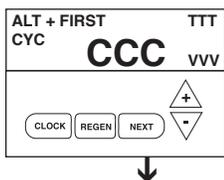
**STEP 5D – Twin Tank Transfer History:** only displays when 1.0F was selected in step 2CS. Use ▲ & ▼ arrows to scroll through the last 10 tank transfers.

The first position in the display ranges from 0 to 9 with the lowest number being the most recent transfer. The second position in the display will be either "A" or "b". If "A" then the tank with the valve on it was in service, if "b" the tank with the in/out head on it was in service. The next three digits represent the number of hours ago that the transfer occurred. The display alternates with the volume that was treated before the tank transferred. Press NEXT to go to Step 6D. Press REGEN to return to the previous step.



**STEP 6D**

**STEP 6D – Flow rate, maximum of each of last seven days:** The maximum flow rate in gallons per minute that occurred in each of the last seven days will be displayed. Press ▲ arrow to display maximum flow rate today = 0, yesterday = 1. This display will equal zero if a water meter is not installed. Resettable by pressing ▲ & ▼ arrows for 5 seconds. Press REGEN to return to the previous step.



**STEP 7D**

**STEP 7D – MAV Drive History** – Not displayed if MAV set to off.

- First - Average of 1st three drive times of MAV in that direction
- Last - Last drive time measured for that MAV in that direction
- Ave - Average drive time measured for MAV in that direction
- TTT - Drive time (1424 = 14.24 seconds)
- CCC - Total number of cycles for that MAV
- VVV - Relative drive voltage

MAV drives piston "in" is designated by (-) sign.

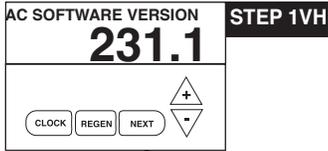
MAV drives piston "out" is designated by (+) sign.

Any time MAV is rebuilt or replaced, reset diagnostics to reflect new drive characteristics.

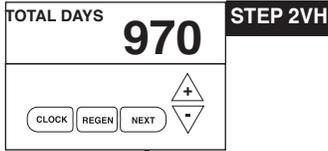
RETURN TO NORMAL MODE

# VALVE HISTORY

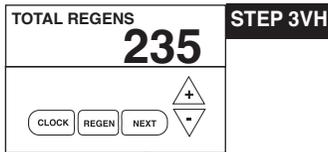
(Can not be reset)



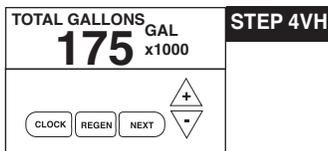
**STEP 1VH** – Press ▼ and ▲ simultaneously until display changes, release and press ▼ and ▲ again simultaneously and release. If screen in step 1VH does not appear in 5 seconds the lock on the valve is activated.



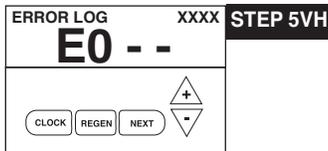
**STEP 2VH – Days, total since start-up:** This display shows the total days since startup. Press the NEXT button to go to Step 3VH. Press REGEN to return to previous step.



**STEP 3VH – Regenerations, total number since start-up:** This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to Step 4VH. Press REGEN to return to previous step.



**STEP 4VH – Volume, total used since start-up:** This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press NEXT button to go to Step 5VH. Press REGEN to return to previous step.



**STEP 5VH – Error Log history:** up to 10 errors. Press ▼ and ▲ buttons to view each recorded error. If no errors have occurred "E0 --" is displayed. Press NEXT to exit valve history.

## CYCLE SEQUENCE

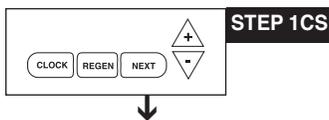
**Anytime cycle sequence is modified, softener set-up will revert to manufacturer setting and must be reprogrammed as desired.**

Cycle Sequence instructions allows the operator to set the order of the cycle. The Softener System Setup allows the operator to set how long the cycles will last. The operator may choose up to 9 cycles in any order.

END must be used as the last cycle option. The SOFTENING cycle should only be used in brine prefill applications to allow salt to dissolve.

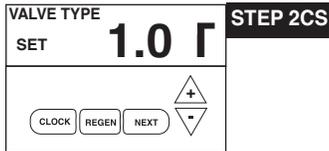
Cycle Options		
BACKWASH	REGENERANT DRAW-DN	FILL
RINSE	SOFTENING	END
	REGENERANT DRAW-UP	

The following is an example of how to set a valve so that when regeneration is initiated, BACKWASH occurs first, REGENERANT DRAW DN occurs second, a second BACKWASH is programmed third (used in high iron applications), RINSE occurs fourth, and FILL occurs fifth.



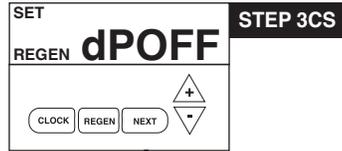
**STEP 1CS**

**STEP 1CS** – Press NEXT and ▼ simultaneously until TYPE appears on screen and release. Then press NEXT and ▼ simultaneously again for 3 seconds and release. If screen in step 2CS does not appear in 5 seconds the lock on the valve is activated.



**STEP 2CS**

**STEP 2CS – Valve Type.** Use the ▲ or ▼ to select from 1.0", 1.25", 1.50", 2.0L", 2.0" valve. E6 Twin Alternating is a 1.0 (Γ)" valve. Press NEXT to go to Step 3CS.

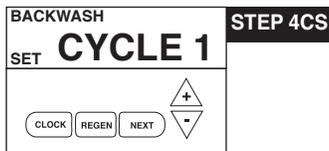


**STEP 3CS**

**STEP 3CS** – This display will be available to select the use of an outside signal to control the initiation of a regeneration. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

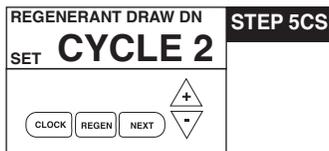
- dPonO – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur immediately. After MAV has transitioned.
- dPdeL – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur at the schedule regeneration time and switch tanks immediately.
- HOLD REGEN – If the dP switch is closed a regeneration will be prevented from occurring.
- **dPOFF - Factory setting is off**

Press NEXT to go to Step 8CS. Press REGEN to return to previous step.



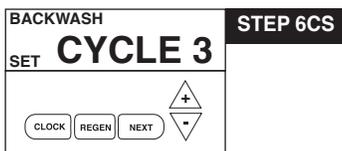
**STEP 4CS**

**STEP 4CS** – Press the ▲ or ▼ buttons until selection of first cycle appears in left upper corner, in this example BACKWASH is selected. Press NEXT to go to Step 9CS. Press REGEN to return to previous step.



**STEP 5CS**

**STEP 5CS** – Press the ▲ or ▼ buttons until selection of second cycle appears in left upper corner, in this example Regenerant Draw DN is selected. Press NEXT to go to Step 10CS. Press REGEN to return to previous step.



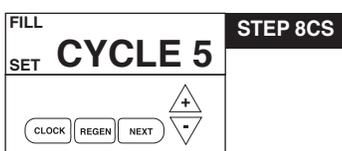
**STEP 6CS**

**STEP 6CS** – Press the ▲ or ▼ buttons until selection of third cycle appears in left upper corner, in this example BACKWASH is selected. A second backwash mode is recommended on iron applications > 1.0 ppm. Press NEXT to go to Step 7CS. Press REGEN to return to previous step.



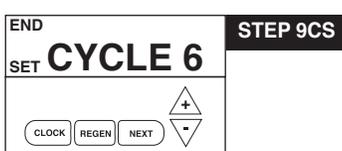
**STEP 7CS**

**STEP 7CS** – Press the ▲ or ▼ buttons until selection of fourth cycle appears in left upper corner, in this example RINSE is selected. Press NEXT to go to Step 8CS. Press REGEN to return to previous step.



**STEP 8CS**

**STEP 8CS** – Press the ▲ or ▼ buttons until selection of fifth cycle appears in upper left corner. Press NEXT to go to Step 9CS. Press REGEN to return to previous step.



**STEP 9CS**

**STEP 9CS** – Press the ▲ or ▼ button until last regeneration cycle; END appears (up to 9 regeneration modes are possible). **End must be selected as last cycle.**

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## WATER SOFTENER DISINFECTION

The construction materials of your water softener will not support bacterial growth nor will these materials contaminate a water supply. However, the normal conditions existing during shipping, storage, and installation indicate the advisability of disinfecting a softener after installation, before the softener is used to treat potable water. In addition, during normal use a softener may become fouled with organic matter or in some cases, with bacteria from the water supply.

Therefore, every water softener should be disinfected after installation, some will require periodic disinfection during their normal life. You have two choices for disinfection as follows:

- A. SODIUM HYPOCHLORITE (household bleach)  
5.25% SODIUM HYPOCHLORITE solutions are available under such trade names such as Clorox, Linco, Bo Peep, White Sail

and Eagle Brand Bleach. If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

1. Dosage:
  - a. Softening resin; 1.2 fluid ounce per cubic foot of resin.
  2. Add the required amount of hypochlorite solution to the brine well of the brine tank.
    - a. Proceed with the normal regeneration. Press REGEN and allow the water softener to go through a normal regeneration.
- B. EPA and NSF approved Sani-System by Pro Products. This can be purchased from your water treatment provider or at: <http://proproducts.com/products/sani-system>.

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## WATER SOFTENER DRAINING PROCEDURE

In cold weather climates it is common for plumbing systems that are not in use to be "winterized" or drained of all water to prevent any damage that may be caused by the excessive expansion of water when it freezes. To prevent damage to a water softener it must be **properly** drained also. A simple way to properly drain or winterize a water softener is to use compressed air to force all of the water out of the softener mineral tank. The following procedure will explain the process:

- 1) Initiate the softener into a manual regeneration cycle. After the refill cycle, advance control to backwash and allow it to complete the backwash cycle (this will clean the media) and start into the brine-draw cycle. Allow the regeneration to continue in the brine draw cycle until the brine is drawn out of the salt tank and the air check at the bottom of the brine pick-up tube shuts off. This should be done with each tank. **NOTE: Be sure you have salt in the brine tank and allow 1 hour minimum to make a saturated brine. It is important that any liquid left in the softener tank when you finished blowing out system be saturated brine solution to prevent any damage to the softener.** At this time no more brine is introduced into the softener and the slow rinse process begins.
- 2) Turn the water supply inlet and outlet valves off to the water softener as soon as the air check shuts off and no more brine is being drawn into the softener (at the beginning of the slow rinse process).
- 3) Unplug the electric power leaving the softener control valve in the brine draw cycle.
- 4) Remove the brine refill elbow assembly from the control valve. Remove the refill flow control retainer assembly from the elbow. Reinstall the elbow assembly and secure with the locking clip. Disconnect the brine tube at the top of the salt keeper and force air into the brine tube toward the softener mineral tank and control valve. The air will force the brine/water solution that was drawn into the mineral tank out to drain through the control valve drain line. (An air compressor blow gun attachment with a portable air compressor works well.) Reinstall the brine line flow control retainer in side of the refill elbow assembly. Reinstall the brine refill elbow assembly and secure with locking clip.

**CAUTION:** You do not want to apply any more pressure than necessary to force the brine/water out of the mineral tank.

The small amount of brine/water that may be left in the mineral tank will not expand enough to cause any damage to the softener when it freezes.

If your softener is equipped with an optional bottom drain on the mineral tank, you will have to follow all of the same procedures with the exception of the need for compressed air. With the brine tube disconnected from the salt keeper, raise it to a level above the softener control valve and temporarily secure it in this position. Now open the drain valve at the bottom of the mineral tank and allow all brine/water to drain from the mineral tank.

**CAUTION:** If a hose is connected to the drain valve to direct the brine/water to a floor drain be sure it runs downward and is unobstructed. When brine/water quits running at the drain, be sure to leave the drain valve open until you start the system up again.

- 5) At this time the salt keeper has very little water left in it. What liquid is left in the salt keeper is saturated brine, provided that there is still salt left in the tank. Saturated brine will not freeze solid and cause any damage and does not have to be drained any further from the brine tank.

If there is no salt left in the salt keeper when the system is drained we recommend dumping all of the water out of the brine tank at this time. See brine tank cleaning instructions. (#2 in Miscellaneous section, below)

- 6) **CAUTION:** It is important at this time to be assured that the inlet/outlet water supply piping is properly drained. Depending on how the water supply piping was routed to the water softener control valve, a water loop or trap may have been created.

Sometimes drain valve(s) are installed at the bottom of the loop to assure all water can be drained out. If not it may be necessary to disconnect the control valve from the piping system and open the inlet/outlet valve(s) to allow all the water to drain from the piping. This should be done after the rest of the plumbing system is drained.

- 7) Draining or winterizing of your softener is complete. Refer to the start-up procedures on page 6 when you are ready to start your softener.

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## MISCELLANEOUS

1. Salt Usage: See your water conditioning professional for a recommendation on the best type of salt for your application.
2. Brine Tank Cleaning:
  - a. Remove brine tank cover.
  - b. Scoop out as much old salt as possible.
  - c. Disconnect brine tubing from safety brine valve at brine well.
  - d. Remove safety brine valve from brine well.
  - e. Place one hand in brine well to hold overflow nut and remove 2-piece overflow.
  - f. Remove brine well and optional grid plate, if used, from brine tank.
  - g. Remove any remaining salt and/or impurities from brine tank.
  - h. Using clean water and a brush or rag, wipe and rinse inside of brine tank. Wipe and rinse the grid plate and brine well.
  - i. Reassemble brine tank reversing steps c - f. Note: If grid plate is used and it is damaged or cracked, replace with new one.
  - j. Put brine tank in place making sure there is no debris or foreign material beneath it.
  - k. Reconnect brine tubing to safety brine valve.
  - l. Manually add 6 inches of water to the brine tank (or to approximately 1" above the grid plate, if used).
  - m. Add new salt. Important: Do not add the old salt which was removed earlier unless it is clean and not mushy. We recommend using new salt.
  - n. Follow the disinfection instructions found at top of page.
  - o. Put on brine tank cover.



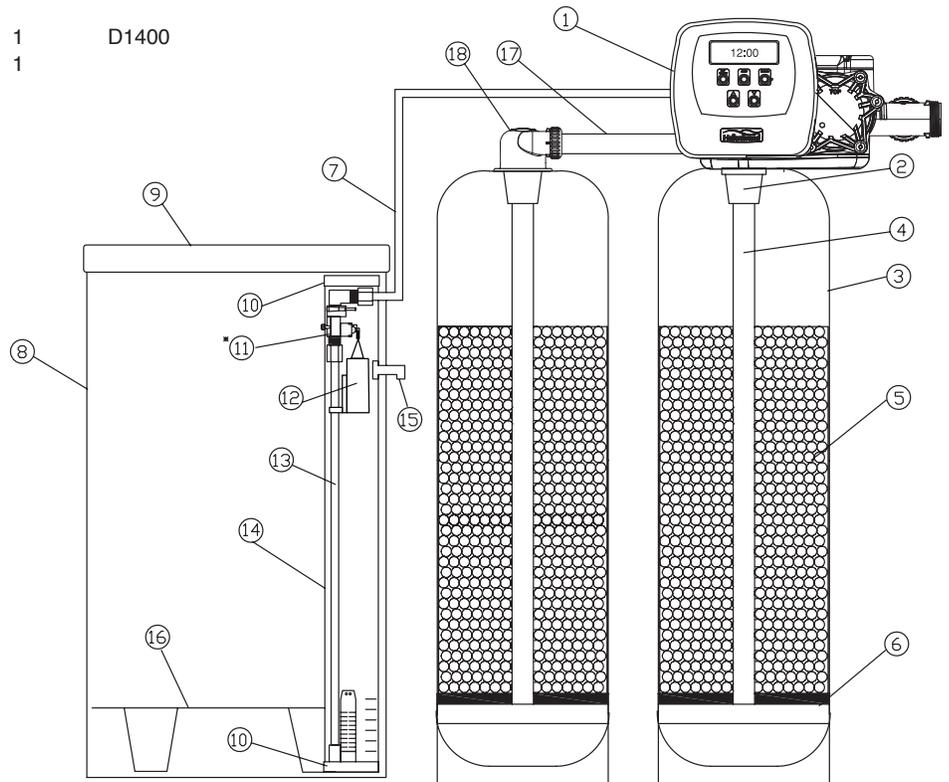
# TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
5. Softener delivers hard water.	<ul style="list-style-type: none"> <li>A. Bypass valve is open or faulty.</li> <li>B. No salt or low salt level in brine tank.</li> <li>C. Softener fails to draw brine.</li> <li>D. Excessive water usage.</li> <li>E. Insufficient brine level in brine tank.</li> <li>F. Resin level inadequate.</li> <li>G. Meter faulty.</li> <li>H. Raw water hardness fluctuation.</li> </ul>	<ul style="list-style-type: none"> <li>A. Close bypass valve or replace.</li> <li>B. Add salt to brine tank and maintain salt level above water level.</li> <li>C. See problem #10.</li> <li>D. Check gallon capacity settings.</li> <li>E. Check brine refill setting and refill flow restrictor for blockage.</li> <li>F. See problem #7.</li> <li>G. Test meter and clean or replace meter.</li> <li>H. Test raw water hardness and adjust settings to highest known hardness.</li> </ul>
6. Unit uses too much salt.	<ul style="list-style-type: none"> <li>A. Improper brine refill setting.</li> <li>B. Improper settings.</li> <li>C. Excessive water in brine tank.</li> <li>D. Leaking faucets, toilets, etc...</li> <li>E. Brine line flow control out of place</li> </ul>	<ul style="list-style-type: none"> <li>A. Check brine refill setting for proper salt dosage</li> <li>B. Check water hardness and reevaluate capacity setting specification</li> <li>C. See problem #9.</li> <li>D. Repair or replace those items.</li> <li>E. Replace Brine line flow control.</li> </ul>
7. Loss of resin.	<ul style="list-style-type: none"> <li>A. Backwash controller missing.</li> <li>B. Faulty distributor tube assembly.</li> <li>C. Air being drawn in through brine system.</li> <li>D. Air in water supply system</li> </ul>	<ul style="list-style-type: none"> <li>A. Install backwash controller.</li> <li>B. Check distributor tube assembly for cracks or holes.</li> <li>C. Check for leaks in brine lines, fittings, or air check. Repair or replace.</li> <li>D. <ul style="list-style-type: none"> <li>1. Install upper distributor if missing.</li> <li>2. Ensure that water supply system has an air eliminator.</li> </ul> </li> </ul>
8. Softener delivers salty water.	<ul style="list-style-type: none"> <li>A. Low water pressure.</li> <li>B. Excessive water in brine tank.</li> <li>C. Wrong size injector.</li> </ul>	<ul style="list-style-type: none"> <li>A. Check incoming water pressure - Must remain at minimum of 25 psi.</li> <li>B. See problem #9.</li> <li>C. Install correct injector.</li> </ul>
9. Excessive water in brine tank.	<ul style="list-style-type: none"> <li>A. Plugged injector.</li> <li>B. Faulty piston/seal assembly.</li> <li>C. Plugged or kinked drain line.</li> <li>D. Backwash flow controller closed off.</li> <li>E. Defective brine line flow control.</li> </ul>	<ul style="list-style-type: none"> <li>A. Remove injector and clean ports.</li> <li>B. Replace piston/seal assembly.</li> <li>C. Correct any kinking or plugging of drain line.</li> <li>D. Check backwash flow controller.</li> <li>E. Replace brine refill flow control.</li> </ul>
10. Softener fails to draw brine.	<ul style="list-style-type: none"> <li>A. Injector is plugged, absent/missing oring(s)</li> <li>B. Faulty piston assembly.</li> <li>C. Brine line connection leak.</li> <li>D. Drain line plugged creating excess back pressure.</li> <li>E. Drain line too long or too high.</li> <li>F. Low inlet pressure.</li> </ul>	<ul style="list-style-type: none"> <li>A. Remove injector and clean ports/replace if necessary</li> <li>B. Check piston assembly.</li> <li>C. Inspect brine line during refill cycle for leaks.</li> <li>D. Inspect drain line for blockage.</li> <li>E. Refer to drain line specifications.</li> <li>F. Increase inlet pressure to a minimum of 25 psi.</li> </ul>
11. Continuous flow to drain.	<ul style="list-style-type: none"> <li>A. Piston assembly failure.</li> <li>B. Motor failure.</li> <li>C. Circuit board failure.</li> </ul>	<ul style="list-style-type: none"> <li>A. Replace piston assembly.</li> <li>B. Replace motor.</li> <li>C. Replace circuit board.</li> </ul>
12. Loss of water pressure.	<ul style="list-style-type: none"> <li>A. Iron build-up in resin.</li> <li>B. Resin bed fouled with sand or sediment.</li> <li>C. Resin bed mushing due to high amount of oxidizers in water supply (chlorine).</li> </ul>	<ul style="list-style-type: none"> <li>A. See problem #13.</li> <li>B. Rebed softener and install sediment filter ahead of softener.</li> <li>C. Rebed softener. Install dechlorination system ahead of softener</li> </ul>
13. Iron in softened water.	<ul style="list-style-type: none"> <li>A. Iron has fouled resin bed.</li> <li>B. Iron is not in a soluble state.</li> <li>C. Prefilter failure.</li> <li>D. Iron level excessive.</li> <li>E. Control fails to regenerate.</li> </ul>	<ul style="list-style-type: none"> <li>A. Use iron reducing resin cleaner to clean resin bed, and increase salt dosage or regenerate more frequently or rebed softener. Install an Iron Curtain System ahead of the softener.</li> <li>B. Test water to determine type of iron, install iron reduction system.</li> <li>C. Check prefilter.</li> <li>D. Install iron reduction system.</li> <li>E. See problem #3.</li> </ul>
14. Absent or incomplete LED display	<ul style="list-style-type: none"> <li>A. Transformer unplugged</li> <li>B. No electric power at outlet</li> <li>C. Defective transformer</li> <li>D. Battery &lt; 3 volts</li> <li>E. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>A. Plug transformer into uninterrupted outlet</li> <li>B. Repair outlet or use working outlet</li> <li>C. Replace transformer</li> <li>D. Replace 2032 battery</li> <li>E. Replace PC board</li> </ul>
15. Control does not display correct time of day	<ul style="list-style-type: none"> <li>A. Power outage &gt; 2 years</li> <li>B. Power outage &lt; 2 years, time of day flashing, battery depleted</li> </ul>	<ul style="list-style-type: none"> <li>A. Reset time of day</li> <li>B. Replace lithium coin type battery on circuit board Model 2032 battery</li> </ul>
16. No "softening" or "filtering" display when water is flowing	<ul style="list-style-type: none"> <li>A. Bypass valve in bypass position</li> <li>B. Meter connection disconnected</li> <li>C. Restricted/stalled meter turbine</li> <li>D. Defective meter</li> <li>E. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>A. Put bypass valve in service position</li> <li>B. Connect meter to PC board</li> <li>C. Remove meter and check for free rotation, clean foreign material</li> <li>D. Replace meter</li> <li>E. Replace PC board</li> </ul>
15 17. Control valve regenerates at wrong time of day	<ul style="list-style-type: none"> <li>A. Twin Alternating softener can regenerate</li> </ul>	

# E6 SERIES TWIN ALT CONDITIONER & BRINE TANK ASSEMBLIES

Item	Description	Qty	Part #	
1	Metered Control Valve	1	VTT1CCDMD	E6-032 (see page 29 for detailed components) Specify Model - ie 024, 032, 048
2	Top Diffuser	2	D1203	
3&4	Mineral Tank Assembly		<u>Item 3 only</u> <b>Mineral Tank</b>	<u>Item 4 only</u> <b>Distributor Assy</b>
	E6-024 8 x 44	2	C80844N61E01	D780C2A43.6875
	E6-032 9 x 48	2	C80948N61E01	D780C2A47.625
	E6-032-10 10 x 44	2	104548	D780C2A43.6875
	E6-048 10 x 54	2	104554	D780C2A53.6
	E6-064 13 x 54	2	104567	D780C2A53.6
	E6-096 14 x 65	2	104465	D780C2A72
	E6-128 16 x 65	2	C81665N62E13	D780C2A72
	E6-160 18 x 65	2	C81865N62E13	103512 (Hub & Lateral)
	E6-192 21 x 62	2	C82162N62E13	103513 (Hub & Lateral)
5	Ion Exchange Resin	x2*	101113	*See Specifications for amount
6	Underbedding	x2	100983	
7-15a	Brine Tank Assy (18x40)-Granite	1	J7525-10HB	
b	Brine Tank Assy (24x41)		104424	
b	24x50 Salt Keeper Tank-Black	1	G22450CB1C00	
9a	Brine Tank Cvr 18x40	1	101488	
b	Brine Tank Cvr 24x41		Included with 8b	
c	Brine Tank Cvr 24x50		Included with 8c	
10-14a	Safety Brine Valve Assy 41"	1	104172	
b	Safety Brine Valve Assy 50"	1	104173	
11*	Safety Brine Valve Assembly	1	H4600	
12	Float Valve Assembly	1	H4640-32	
13	Air Check	1	H4500-48	
14 a	Brine Well 40"-41"	1	H1030-36S	
b	Brine Well 50"	1	H1030-46S	
15	2-Piece Overflow	1	H1018	
16 a	Grid Plate 18" (optional)	1	H1072-01	
b	Grid Plate 24" (optional)	1	H1080	
17	Interconnect Fitting	1		
	8-10" Tanks		V4017-01	
	Interconnect fittings are made specifically for larger tank systems			
18	In/Out Head	1	D1400	
-	Owners Manual (Not Shown)	1		

\*Must be ordered as complete assembly



## FRONT COVER AND DRIVE ASSEMBLY

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3175CC-01	E6 Cover without Label	1
1	110265	Label	
2	V3107-01	Motor	1
3	101262	Drive Bracket & Spring Clip	1
4	V3108CC-05BOARD	E6 - PC Board	1
5	V3110	Drive Gear 12x36	3
6	101459	Drive Gear Cover	1
8	102385	Relay Only	1
Not Shown	V3186-06	Transformer 110V-15V DC	1
9	110038	Battery	1

After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack from the printed circuit board (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (ex: 214) and then reset the valve to the service position.

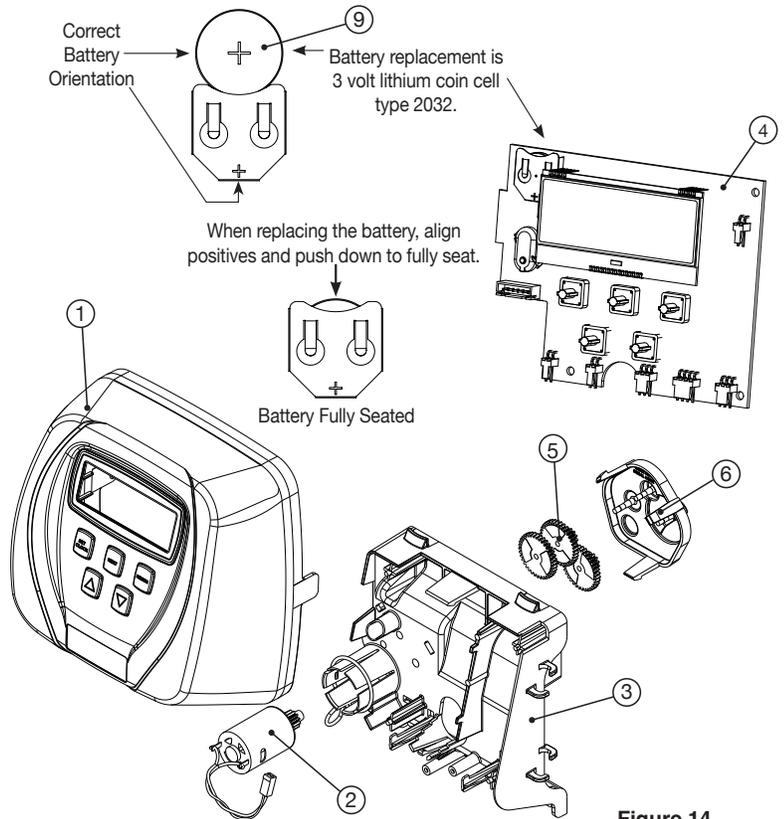


Figure 14

## DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, REGENERANT PISTON AND SPACER STACK ASSEMBLY

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3005-02	Spacer Stack Assy	1
2	V3004	Drive Cap Assy.	1
3	V3135	O-Ring 228 -Drive Cap Assy.	1
4a	V3011	Piston Downflow Assy.	1**
4b	V3011-01	Piston Upflow Assy.	1
5	V3174	Regenerant Piston	1
6	V3180	O-ring 337-tank	1
7	V3105	O-ring - Distributor Tube	1
8	V3178	E6 Back Plate	1
9	V3193-02	Service Wrench - Not Shown	1

\*V3011 is labeled with DN and V3011-01 is labeled with UP.  
 Note: The regenerant piston is not used in backwash only applications.  
 \*\*Standard Option.

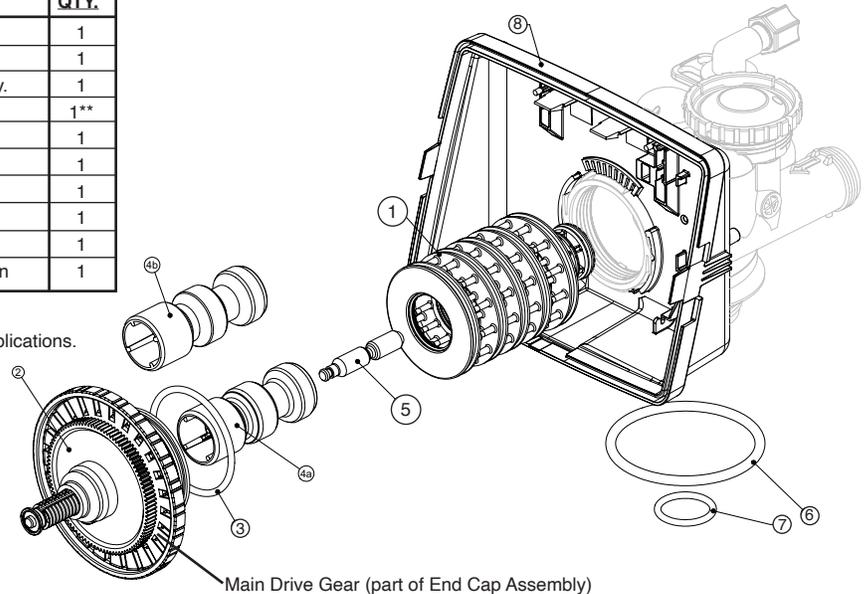


Figure 15

Do not use vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**

After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack from the printed circuit board (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (ex: 101.3) and then reset the valve to the service position.

# INJECTOR CAP, INJECTOR SCREEN, INJECTOR, PLUG AND O-RING

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3176-01	Injector Cap	1
2	V3152	O-ring 135	1
3	V3177-01	Injector Screen	1
4	V3010-1Z	Injector Assy. Z Plug-Filter	1
5	V3010-1A	Injector Assy. A Black	1
	V3010-1B	Injector Assy. B Brown	
	V3010-1C	Injector Assy. C Violet	
	V3010-1D	Injector Assy. D Red	
	V3010-1E	Injector Assy. E White	
	V3010-1F	Injector Assy. F Blue	
	V3010-1G	Injector Assy. G Yellow	
	V3010-1H	Injector Assy. H Green	
	V3010-1I	Injector Assy. I Orange	
	V3010-1J	Injector Assy. J Light Blue	
	V3010-1K	Injector Assy. K Light Green	
Not Shown	V3170	O-ring 011	*
Not Shown	V3171	O-ring 013	*

\* The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.

See system specification, injector color on page 30 for current injector.

Note: For upflow position, injector is located in the up hole and injector plug in the down hole. For a filter that only backwashes injector plugs are located in both holes.

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Teflon tape must be used on threads of the 1" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection nor caps because of o-rings seals.

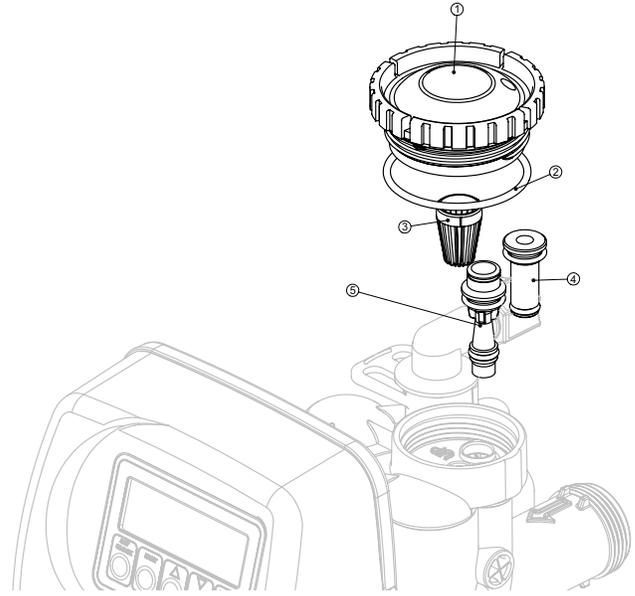
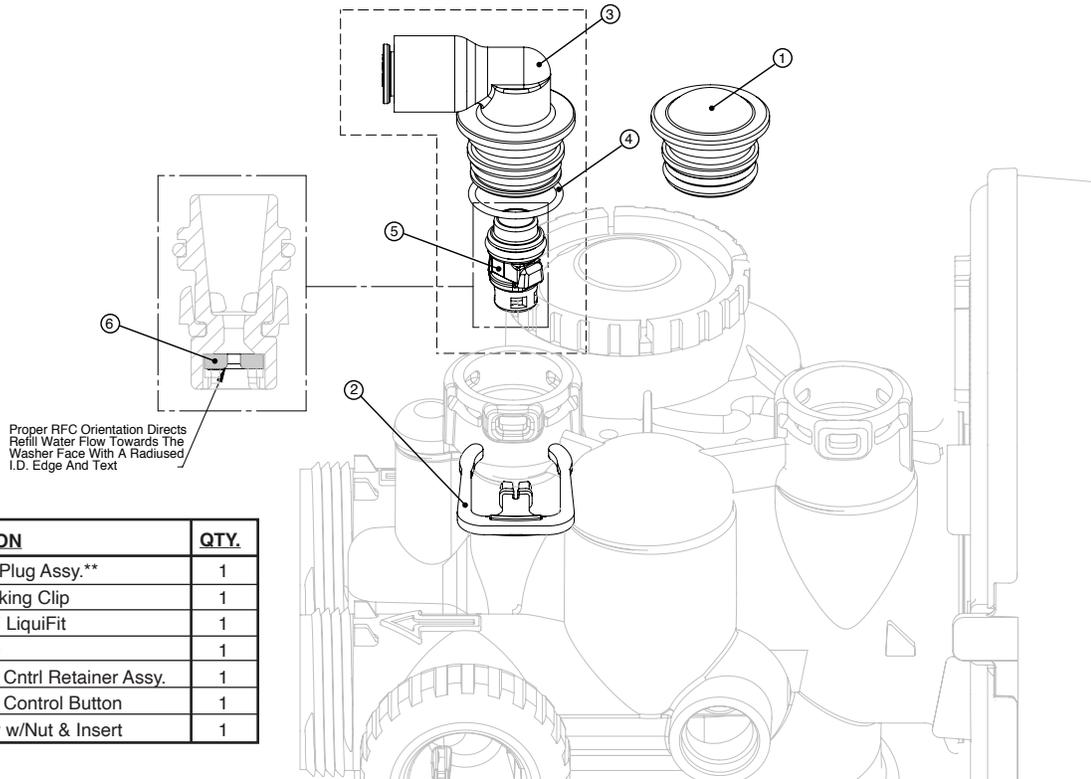


Figure 16

# REFILL AND REFILL PORT PLUG



ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3195-01	Refill Port Plug Assy.**	1
2	H4615	Elbow Locking Clip	1
3	V4144-01	Elbow 3/8" LiquiFit	1
4	V3163	O-ring 019	1
5	V3165-01*	Refill Flow Cntrl Retainer Assy.	1
6	V3182	Refill Flow Control Button	1
Not Shown	101617	1/2" Elbow w/Nut & Insert	1

\*Assembly includes item #6.

\*\*This part is required for backwash only systems.

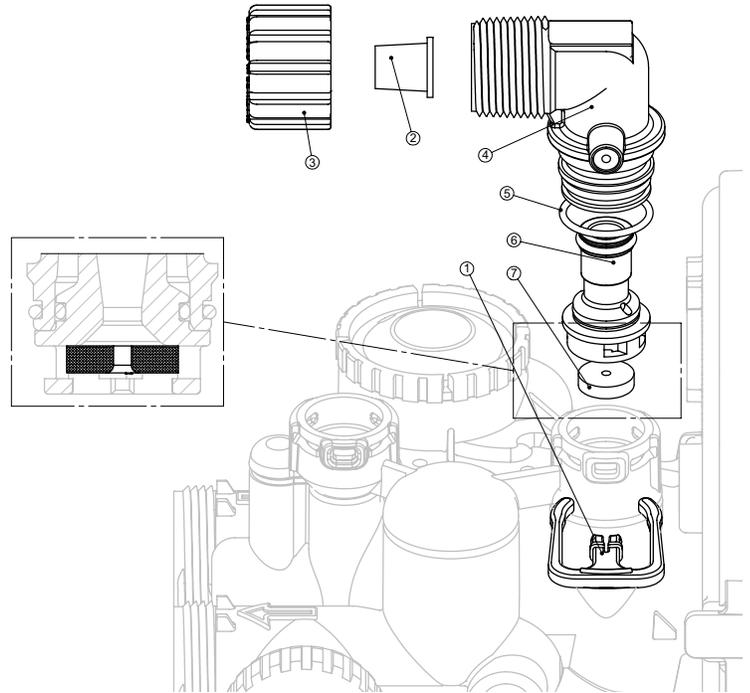
Figure 17

## DRAIN LINE - 3/4"

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	H4615	Elbow Locking Clip	1
2	PKP10TS8-BULK	Polytube Insert, 5/8"	Optional
3	V3192	Nut 3/4" Drain Elbow	Optional
4-5	V3158-01	Drain Elb 3/4" Male Assy-Vent	Optional
4-5	<b>V3158-02</b>	<b>Drain Elb 3/4" Male Assy-No Vent</b>	<b>1</b>
5	V3163	O-ring 019	1
6	V3159-01	DLFC Retainer Assy.	1
7	V3162-007	DLFC 0.7 gpm for 3/4"	One DLFC must be used if 3/4 fitting is used
	V3162-010	DLFC 1.0 gpm for 3/4"	
	V3162-013	DLFC 1.3 gpm for 3/4"	
	V3162-017	DLFC 1.7 gpm for 3/4"	
	V3162-022	DLFC 2.2 gpm for 3/4"	
	V3162-027	DLFC 2.7 gpm for 3/4"	
	V3162-032	DLFC 3.2 gpm for 3/4"	
	V3162-042	DLFC 4.2 gpm for 3/4"	
	V3162-053	DLFC 5.3 gpm for 3/4"	
	V3162-065	DLFC 6.5 gpm for 3/4"	
	V3162-075	DLFC 7.5 gpm for 3/4"	

Systems are shipped without 3/4" nut for drain elbow (polytube installation only) and 5/8" polytube insert (polytube installation only).

See System Specifications DLFC on page 30, for correct DLFC size for your unit.



**Figure 18**

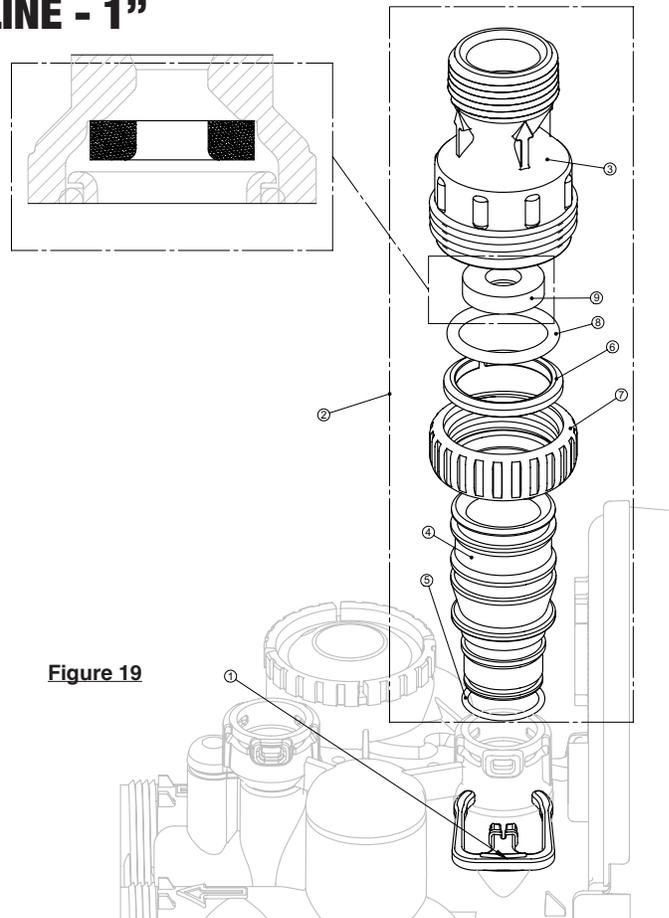
## DRAIN LINE - 1"

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	H4615	Elbow Locking Clip	1
2	V3008-02	Drain Ftg, 1" Straight Assy-Vent	optional
2	<b>V3008-04</b>	<b>Drain Ftg, 1" Straight Assy-No Vent</b>	<b>1</b>
3*	V3166	Drain Ftg Body, 1"	1
4*	V3167	Drain Ftg Adapter, 1"	1
5*	V3163	O-ring 019	1
6*	V3150	Split Ring	1
7*	V3151	Nut, 1" QC	1
8*	V3105	O-ring 215	1
9	V3190-090	DLFC 9.0 gpm for 1"	One DLFC must be used if 1" fitting is used
	V3190-100	DLFC 10.0 gpm for 1"	
	V3190-110	DLFC 11.0 gpm for 1"	
	V3190-130	DLFC 13.0 gpm for 1"	
	V3190-150	DLFC 15.0 gpm for 1"	
	V3190-170	DLFC 17.0 gpm for 1"	
	V3190-200	DLFC 20.0 gpm for 1"	
	V3190-250	DLFC 25.0 gpm for 1"	

See System Specifications DLFC on page 30, for correct DLFC size for your unit.

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Teflon tape must be used on threads of the 1" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection nor caps because of o-rings seals.



**Figure 19**

# WATER METER AND METER PLUG

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3151	Nut 1" QC	1
2-4	V3003-05	Meter Assy.	1
3	V3118-01	Turbine Assy.	1
4	V3105	O-ring 215	1
5	V3003-01	Meter Plug Assy.**	1

\*Order number V3003-05 includes V3118-01 and V3105, which are item numbers 3 & 4.

\*\*Only used if metering is not to be done (time clock units)

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

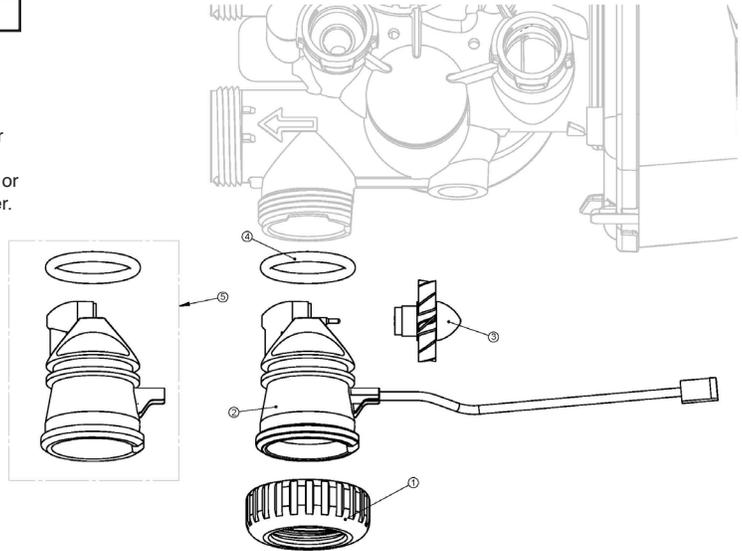


Figure 20

# BYPASS VALVE

## Bypass Valve

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	V3151	Nut 1" Quick Connect	2
2	V3150	Split Ring	2
3	V3105	O'Ring 215	2
4	V3145	Bypass 1" Rotor	2
5	110997	Bypass Cap	2
6	V3147	Bypass Handle	2
7	V3148	Bypass Rotor Seal Retainer	2
8	V3152	O-Ring 135	2
9	V3155	O-Ring 112	2
10	V3156	O-Ring 214	2

## (Not Shown) Bypass Vertical Adapter Assembly

ORDER NO.	DESCRIPTION	QTY.
V3151	Nut 1" Quick Connect	2
V3150	Split Ring	2
V3105	O'Ring 215	2
106858	Bypass Vertical Adapter	2

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Teflon tape must be used on threads of the 1" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection nor caps because of o-ring seals.

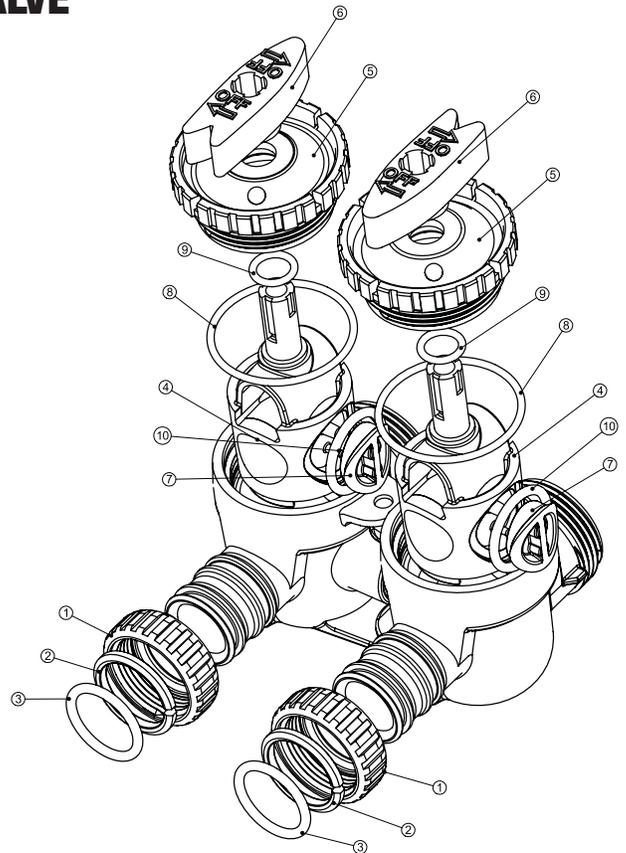
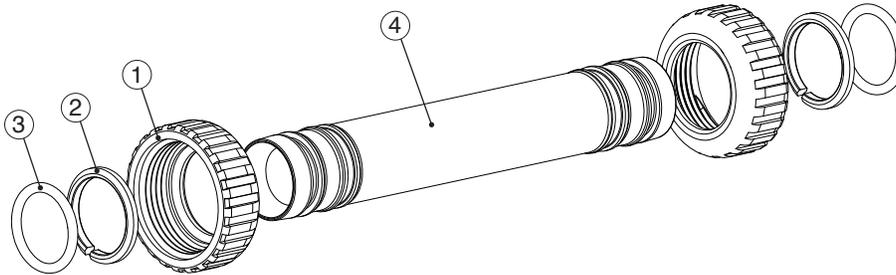


Figure 21

## INTERCONNECT FITTING ASSEMBLY – 110194

Used for Tanks up to 10"

Drawing No.	Order No.	Description	Quantity
1	V3151	Nut 1" Quick Connect	4
2	V3150	Split Ring	4
3	V3105	O-Ring 215	4
4	110184	T1 Interconnect Fitting	2

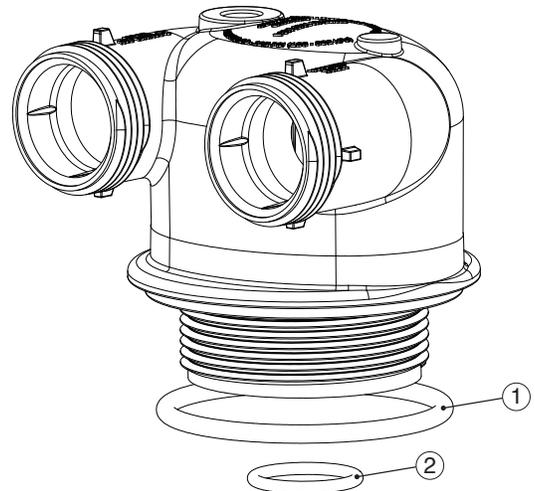


### Fitting Installation Instructions:

- Installation fittings are designed to accommodate minor plumbing misalignments, but are not designed to support the weight of a system or the plumbing.
- Slide nut on first, then the split ring and o-ring.
- Hand tighten the nut only.

## IN/OUT HEAD – 101777

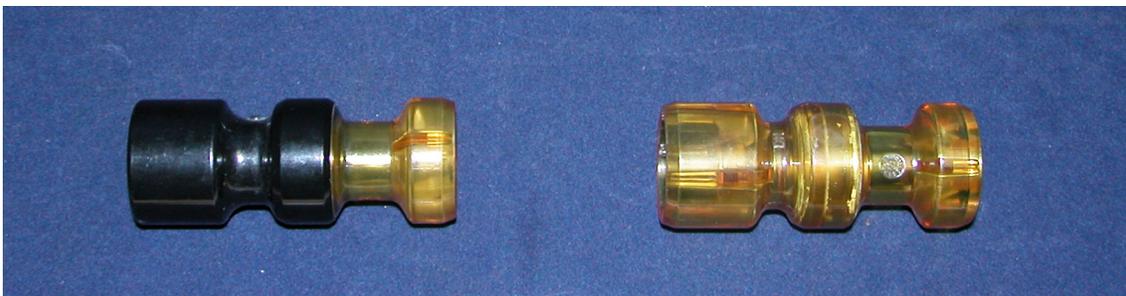
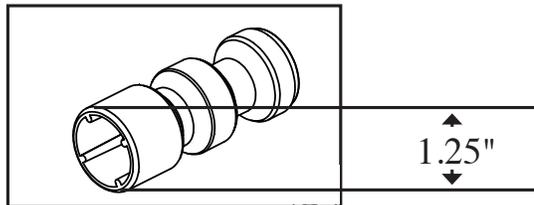
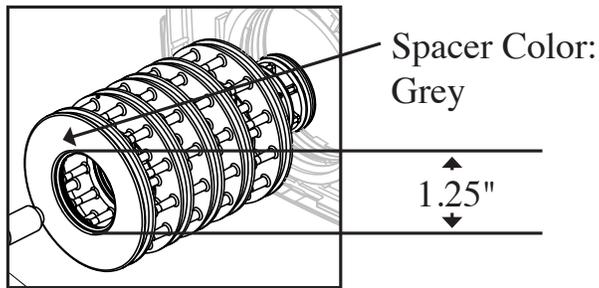
Drawing No.	Order No.	Description	Quantity
1	V3180	O-Ring 337	1
2	V3105	O-Ring 215 (Distributor Tube)	1



## VALVE BODY COMPLIANCE TABLE

Application	Injector and/or Plug(s)	Main Piston	Regenerant Piston	Stack	Body
1" Downflow Softener or Regenerating Filter	Injector in "DN" hole, Plug in "UP" hole	V3011	V3174	V3005-02	V3031
1" Backwash Only Filter	Plug in "DN" and "UP" holes, Install Refill Port Plug	V3011	None	V3005-02	V3031
1" Upflow Softener	Injector in "UP" hole, Plug in unlabeled hole	V3011-01	V3174	V3005-02	V3031

### TWIN ALTERNATING WITH 1.050" DISTRIBUTOR TUBE OPENING IDENTIFICATION

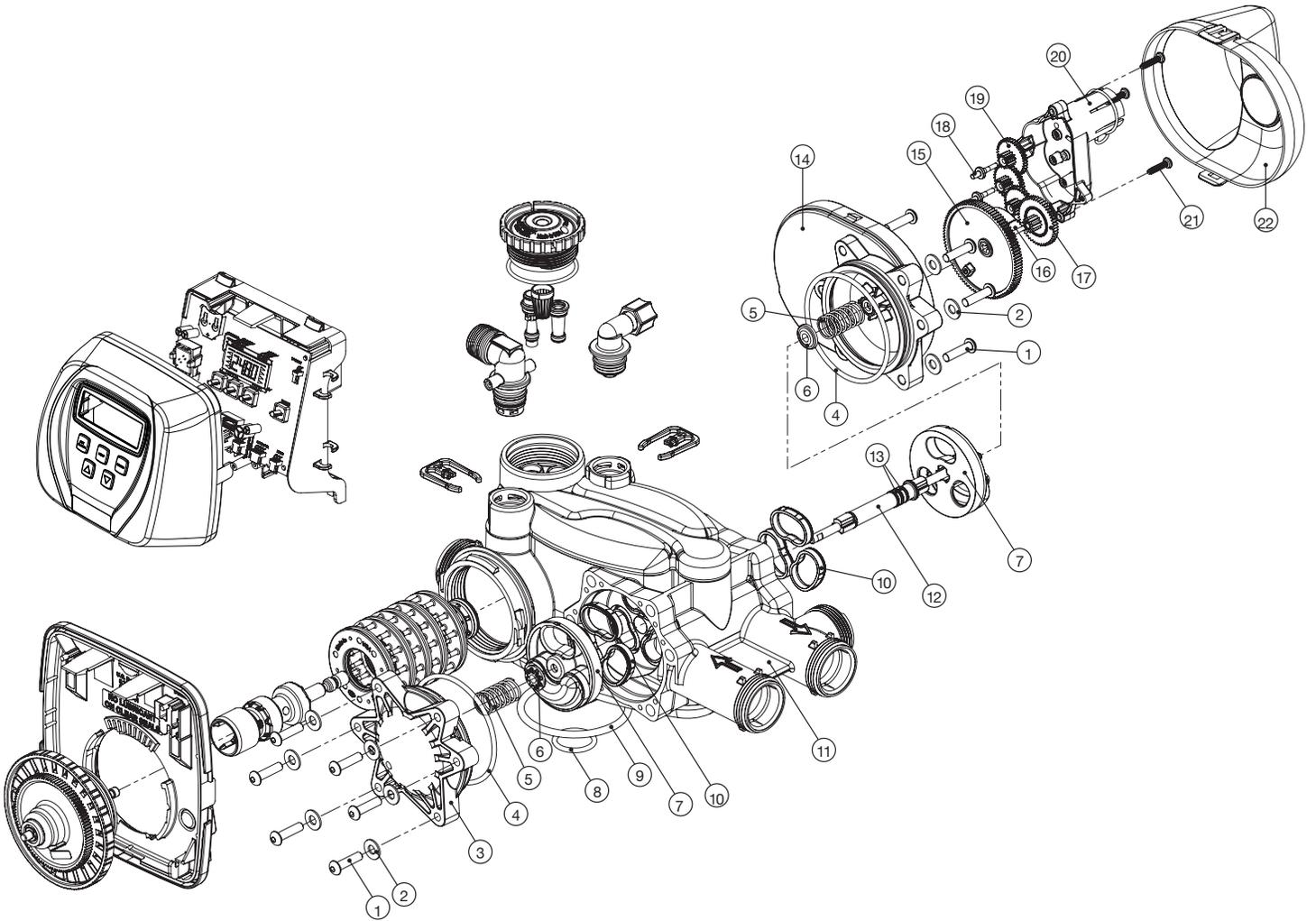


**Note:**

The upflow piston is black and amber.

The downflow piston is a solid amber color.

# TWIN TRANSFER



Part No	Order No	Description	Qty
1	V3470	Screw, BHC 1/4-20 x 1 SS	12
2	V3724	Washer Flat SS 1/4	12
3	V4005-01	Transfer Cap Asy	1
4	V4029	O-Ring 236	2
5	V4015	Transfer Spring	2
6	V4014	Transfer Spring Support	2
7	V4036	Rotor Disk Asy	2
8	V3105	O-Ring 215 (Distributor Tube)	1
9	V3180	O-Ring 337	1
10	V4016	Transfer Seal	6
11	V3031	Body Sft Wtr Regen	1
12	V4023	Transfer Drive Shaft Asy	1
13	V3287	O-Ring 110	2
14	V4006-01	Transfer Drive Cap Asy	1

15	V4011-01	Transfer Drive Gear Asy	1
16	V4012	Transfer Drive Gear Axle	1
17	V4013	TTransfer Reduction Gear	1
18	V3264	Bypass Reduction Gear Axle	3
19	V3110	Drive Reducing Gear 12x36	3
20	V3262-01	1.5&2 Alt/2BY Reduce Gear Cvr Asy	1
21	V3592	Screw #8-1 PHPN T-25 SS	3
22	V4049	Cover Assembly	1
Not Shown	V4043	Transfer Motor Asy	1
Not Shown	V3151	Nut 1 QC	1
Not Shown	V3003-06	1.5/2L/2H Meter Commercial Asy	1
Not Shown	V4017-01	Interconnect Fitting Asy	1
Not Shown	D1400	1191 In/out Head	1

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# SERVICE INSTRUCTIONS

## CONTROL VALVES

The twin alternating control valve consist of the following components:

1. Drive Assembly
2. Drive Cap Assembly, Main Piston and Regenerant Piston
3. Spacer Stack Assembly
4. Injector Cap, Screen, Injector Plug and Injector
5. Refill Flow Control Assembly or Refill Port Plug
6. Drain Line Flow Control and Fitting Assembly
7. Water Meter
8. Twin Transfer Valve.

## DRIVE ASSEMBLY

The drive assembly consists of the following parts:

- Drive Bracket
- Printed Circuit (PC) Board
- Motor
- Drive Gears
- Drive Gear Cover

The drive bracket hold the PC board, the motor, the drive gears and drive gear cover in place.

The PC board receives and retains information, displays the information, determines when to regenerate and initiates regeneration. The display shows different types of information in the initial setup (for softeners or filters), installer display settings, diagnostics, valve history or user display settings.

The PC board powers the motor. The PC board's two-prong jack connects wires to the direct current (DC) motor. The motor is held in place on the drive bracket by a spring-loaded clip and a small bulge in the plastic, which fits in one of the slots on the motor housing. The motor turns drive gears that drive the piston to cycle positions for backwashing, regeneration, rinsing, refill or service. The motor is fully reversible (turns both ways) and changes direction of rotation to change the direction of piston motion. The motor is easily replaced if necessary.

There are three drive gears held in place by the drive gear cover. All three drive gear are the same size. A reflective coating is applied to the gears. As the center drive gear turns a light shines on the coating and a light sensing diode determines if a light pulse was returned. The PC board counts the pulses and determines when to stop driving the motor.

## DRIVE CAP ASSEMBLY, MAIN PISTON AND REGENERANT PISTON

The drive gears turn the main gear of the drive cap assembly, which moves the piston. The screw-driven, horizontally moving piston stops at specific positions to direct the flow of water to backwash, regenerate, rinse or refill. The PC board determines the position of the piston by counting pulses produced when the piston is moved. An optical sensor looking at one of the reduction drive gears generates these pulses. Each cycle position is defined by a number of pulses. The counter is zeroed each time the valve goes to the service position. The PC board finds the service position by noting the increase in current delivered to the motor when the mechanical stop at the service position is reached. This method of controlling piston position allows for greater flexibility and requires no switches or cams (US Patent 6444127).

One of two main pistons is always used:

1. A 1.25" diameter downflow piston is used when the control

valve is used as a downflow softener, regenerating filter or non-regenerating filter.

2. A 1.25" diameter upflow piston is used when the control valve is used as an upflow softener.

If the control valve is used as a softener or a regenerating filter, a regenerant piston must be attached to the main piston. If the control valve is to be used on a system that does not require a regenerant to be added, the regenerant piston must be removed.

## SPACER STACK ASSEMBLY

The spacer stack assembly provides the necessary flow passage for water during the different cycles. The all-plastic spacer stack assembly is a one-piece design which allows the stack to be removed using your fingers.

The exterior of the stack is sealed against the body bore with self lubricating EPDM o-rings, while the interior surface is sealed against the piston using slippery self cleaning directional (one-way) silicone lip seals. The lip seals are clear in color and have a special slippery coating so that the piston does not need to be lubricated.

## INJECTOR CAP, SCREEN, INJECTOR PLUG AND INJECTOR

The screen, injector and/or injector plug(s) are installed under the injector cap in an easy to access location on top of the valve. The injector cap contains four slots so no water accumulates in the cap. The injector cap is designed to be hand tightened.

Under the injector cap there is an easy to clean removable screen to prevent fouling of the injector. There are two holes under the injector cap labeled "DN" and "UP". The holes will be filled with a plug or an injector.

The plug (pn 102319) prevents water from traveling a certain pathway. The injector lets water pass through the pathway. The self-priming injector increases the velocity of the water, creating a zone of negative pressure that draws in the concentrated liquid regenerant, such as sodium chloride (brine), potassium permanganate, etc. The regenerant blends with the stream of water, which passes through the media to regenerate the bed.

The injector provides a consistent regenerant/water mixture ratio over the entire operating pressure range of the control valve. The injector provides good performance in a variety of applications, which may involve elevated drain lines and long regenerant draw lengths. Injectors are chosen by knowing the type, amount, and regenerant flow rate for a particular type of media. Guidelines can be found in the media manufacturer's literature. The color coded injectors give different regenerant draw, slow rinse and total flow rates over the pressure range. See injector graphs (pages 38-39) for total, slow rinse and draw rates.

The control valve has been manufactured to be one of the following:

- regeneration downflow (for softeners or regenerating filters install injector in DN location, plug in UP location)
- regeneration upflow (upflow option is for softeners only. Install injector in UP location, plug in other hole location)
- no regenerant (both the DN and UP holes have injector plugs installed) and plug installed for the refill elbow.

NOTE: It is okay to field covert valves from upflow to downflow and vice versa with the twin alternating valve as long as software supports upflow brine.

# SERVICE INSTRUCTIONS

## DRIVE ASSEMBLY

Remove the valve cover to access the drive assembly.

Disconnect the power source (black wire) from the PC board prior to disconnecting the motor or water meter plugs from the PC board. The power source plug connects the four-pin jack. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The water meter plug (gray wire) connects to the three-pin jack on the far right-hand side of the PC board.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. To remove the drive bracket start by removing the plugs from the power source and the water meter. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket forward. The lower edge of the drive bracket has two notches that rest on the drive back plate. Lift up and outward on the drive bracket to disengage the notches.

To reassemble, seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket toward the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket slightly to the left by pressing on the side of the upper right corner. This helps drive the gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drive bracket and drive back plate, or the gear is not engaging the drive cap assembly.

To inspect the drive gears, the drive gear cover needs to be removed. Before trying to remove the gear cover, the drive bracket must be removed from the drive back plate. (Refer to the instructions above regarding removing the drive bracket from the drive back plate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board.) The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. With the PC board facing up, push in and down on the large clip on the drive gear cover. Handle the cover and the gears carefully so that the gears do not fall off the pegs in the cover.

Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting.

The drive gear cover only fits on one way, with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

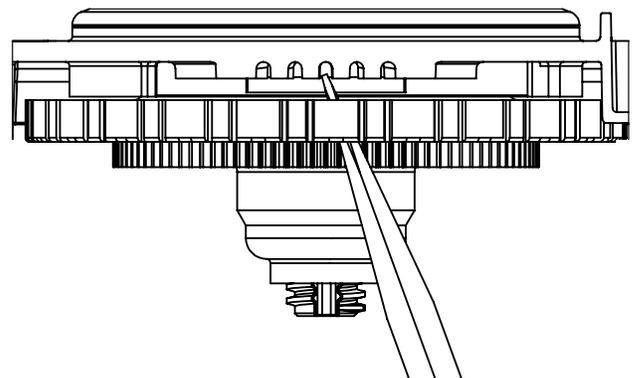
The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor, disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a 1/4" turn in either direction so the wire are vertical (up & down) before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor.

Replace the motor if necessary. Do not lubricate the motor or the gears. To reinstall the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. Release the spring clip loop and continue to rotate the motor until the wires are horizontal and the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the lower left side of the PC board. If the motor will not easily engage with the drive gears when reinstalling, lift and slightly rotate the motor before reinserting. Reconnect the power plug.

Replace the valve cover. After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3 seconds. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

## DRIVE CAP ASSEMBLY, MAIN PISTON AND REGENERANT PISTON

The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston(s). The drive cap assembly is threaded into the control valve body and seals with an o-ring. To remove the drive cap assembly use the special plastic wrench or insert a 1/4" to 1/2" flat blade screwdriver into one of the slots around the top 2" of the drive cap assembly so it engages the notches molded into the drive back plate around the top 2" of the piston cavity. The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counter clockwise. Once loosened unscrew the drive cap assembly by hand and pull straight out.



The drive cap assembly contains the drive cap, the main drive gear, drive cap spine, piston rod and various other parts that should not be disassembled in the field. The only replacement part on the drive cap assembly is the o-ring. Attached to the drive cap assembly is the main piston (downflow or upflow) and if a regenerant is used, a regenerant piston. Upflow if not applicable to EA, EE or EI control valves.

The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by pressing sideways and unsnapping it from its latch. (Chemically clean in dilute sodium bisulfate or vinegar, or replace the regenerant piston if needed. To remove the main piston fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean in dilute sodium bisulfate or vinegar, or replace the main piston.

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly using a screwdriver as a ratchet until the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3 seconds. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

## SPACER STACK ASSEMBLY

To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can be removed easily without tools by using thumb and forefinger. Inspect the black o-rings and clear lip seals for wear or damage. Replace the entire stack if necessary. Do not disassemble the stack.

The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

The spacer stack assembly can be pushed in to the control valve body bore by hand. Since the spacer stack assembly can be compressed it is easier to use a blunt object (5/8" to 1-1/8" in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8"). Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack.

Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3 seconds. This resets the electronics and establishes the service piston position. The display should flash all working, then flash the software version and then reset the valve to the service position.

## INJECTOR CAP, SCREEN, INJECTOR PLUG AND INJECTOR

Unscrew the injector cap and lift off. Loosen cap with special plastic wrench or pliers if necessary. Attached to the injector cap is a screen. Remove the screen and clean if fouled. The plug and/or injector can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite. The holes can be blown out with air. Both pieces have small diameter holes that control the flow rates of water to insure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector.

**Two holes are labeled DN and UP. Check for compliance. Refer to Valve Body Compliance Table at the beginning of this manual.**

Push the plug(s) and/or injectors firmly in place, replace the screen and hand tighten the injector cap.

## REFILL FLOW CONTROL ASSEMBLY AND REFILL PORT PLUG

To clean or replace the refill flow control, pull out the elbow-locking clip and then pull straight up on the elbow. Replace the elbow locking clip in the slot so that it is not misplaced. Twist to remove the white flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small flat blade screwdriver.

Chemically clean the flow control or the white flow control retainer using dilute sodium bisulfite or vinegar. Do not use a wire brush. If necessary, replace the flow control, o-ring on control retainer, or the o-ring on the elbow.

Reseat the flow control so that the rounded end is visible in the flow control. Reseat the white flow control retainer by pushing the retainer into the elbow until the o-ring seats. Remove locking clip, push down on elbow to reseal and insert locking clip.

Do not use Vaseline, oils or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring on the elbow or the white retainer.

## WATER METER

The water meter assembly is connected to the PC board by a wire. If the entire water meter assembly is to be replaced, remove the control valve cover and disconnect the power source and water meter plugs from the PC board. Unlatch the drive assembly and lean it forward. Unthread the water meter wire from the side of the drive assembly and through the drive back plate. To reinstall, rethread the water meter wire through the drive back plate and the side of the drive assembly. Reattach the drive assembly and the water meter and power plugs.

If no water meter wire is visible, then a plug is installed, not a water meter.

The water meter wire does not need to be removed from the PC board if the water meter is only being inspected and cleaned. To remove the water meter assembly, unscrew the meter cap on the left side of the control valve. Pliers may be used to unscrew the nut if necessary.

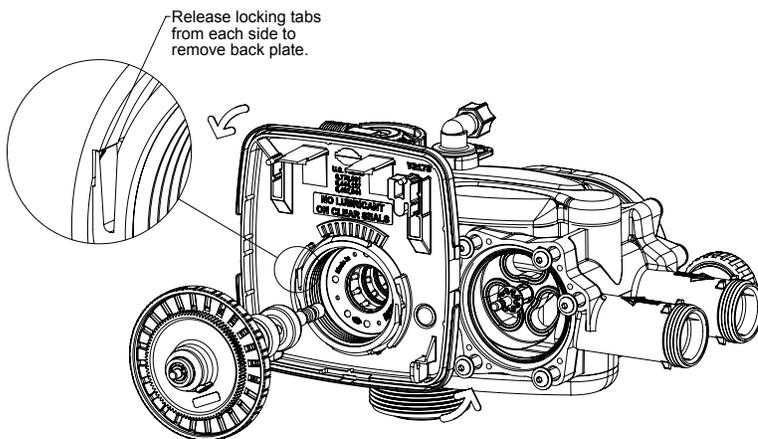
With the nut removed, a slot at the top of the water meter is visible. Twist a flat blade screwdriver in the slot between the control valve body and the meter. When the meter is part way out it is easy to remove the water meter from the housing. Once the water meter is removed from the control valve body, gently pull forward on the turbine to remove it from the shaft.

Do not use a wire brush to clean the turbine. Wipe with a clean cloth or chemically clean in dilute sodium bisulfite or vinegar. The turbine can be immersed in the chemical. Do not immerse electronics. If the turbine is scored or damaged or the bearings on the turbine are worn, replace the turbine.

Do not lubricate the turbine shaft. The turbine shaft bearings are prelubricated. Do not use Vaseline, oils, or other unacceptable lubricants on the o-ring. A silicone lubricant may be used on the black o-ring.

Reinsert the water meter into the side slot. Hand tighten the nut. Do not use a pipe wrench to tighten nut.

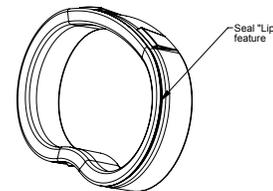
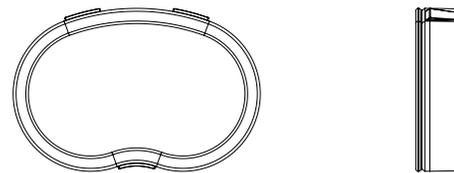
## SERVICING TRANSFER CAP ASSEMBLIES



The control valves backplate must be removed first to allow access to removing the transfer cap assembly. NOTE: Hold slight downward pressure on the top left corner of the backplate while using a thin flat screwdriver or knife blade to push in on the locking tabs, this will release the backplate and it will twist to the left off of the valve body. For removal of the drive motor side you will need to remove the drive cover assembly to access the motorized drive. The drive motor can be removed by pressing the spring clip loop to the right then rotate the motor a ¼ turn and pull outward to remove the motor from the reducing gear cover assembly. Remove the three Phillips head stainless steel screws that retain the reducing gear cover to the drive cap. Once the cover is removed you have access to the reducing drive gears simply slide them off of the gear axles with your fingers to inspect / check them there are 3 small black gears with foil decals and 1 larger black reducing gear. Remove the large white drive gear from the stainless steel drive shaft. To remove the large white transfer drive gear firmly grab the outside edge of the gear with your fingers and pull it outward away from the control

valve assembly. Now you can use a 5/32" or 4mm allen wrench to remove the ¼-20 screws that retain the transfer drive cap assemblies on both sides of the valve.

NOTE: Once the screws are removed from retaining the inlet side transfer valve cap and the outlet drive motor transfer cap from the control valve the cap will spring out away from the valve body. At this point the transfer discs may be removed by pulling the discs outward off of the shaft away from the valve body with your hand. With the disc out you can inspect the flat surface area to be sure it's clean and smooth free of any debris or scratches. Note that the disc is keyed to the drive shaft so that it will only assemble in one orientation. The transfer discs may be chemically cleaned with a dilute sodium bisulfate solution, vinegar or just wiped with a soft clean cloth.



To remove seals gently pull out on the outer lip of the seal to lift the seal out from its cavity being careful not to damage the face surface of the seal. To reassemble re-seat seals into the seal cavity of the control valve body being sure that the lip of the seal is facing outward. With seals in place put a thin film of Dow #7 on the tops of the seals and the flat surface of the discs. Prior to reinstalling the discs the drive shaft should be removed and the O-rings cleaned, inspected and lubricated with Dow #7. The shaft can then be installed into the disc prior to installation. With the outlet disc assembled to the shaft the orientation of the shaft to inlet disc can be assured by installing the set with the through hole on the outlet disc at the 6 o'clock position. The easiest thing would be to remove both disc drives and assemble the outlet side first. Then each disc could be fitted on the shaft individually. At this point the transfer valve cap assemblies can be reinstalled.

Note: That both transfer caps only mount in one orientation. Prior to installation of cap assembly be sure to check that the stainless steel spring and the plastic spring support is in place attached to the inside of the c assembly. Next you can wipe the outside edge of the O-ring on the cap and the inside mating area of the valve with a clean cloth & re-apply a thin layer of silicone lubricant like Dow #7.

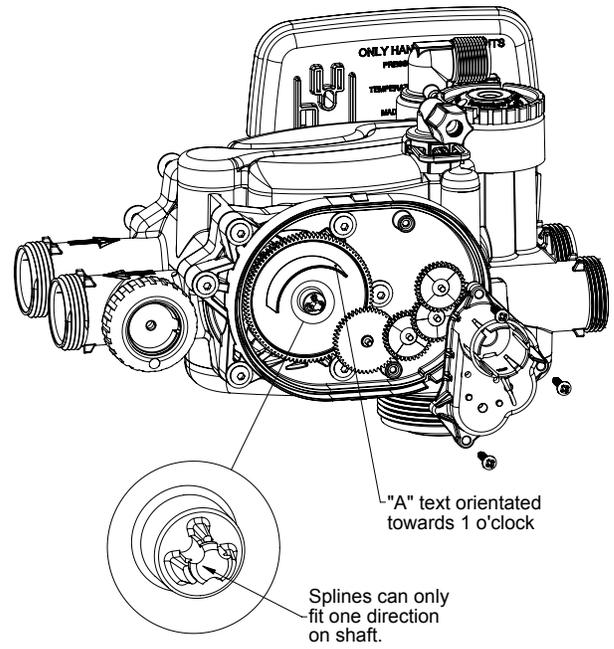
**BE SURE NOT TO USE ANYTHING HYDROCARBON BASED SUCH AS VASELINE OR PETROLEUM JELLY TO LUBRICATE PLASTIC COMPONENTS OR O-RINGS AS THEY WILL BE DAMAGED BY THE HYDROCARBONS AND POTENTIALLY CAUSE FAILURES THAT CAN RESULT WITH LEAKS.**

Noting the one possible orientation of the transfer drive cap, use one hand to press in and support the transfer drive cap while using the opposing hand to start two screws in, one on the top and one opposing it on the bottom. Tighten the screws in evenly so the cap seats the O-ring without getting pinched or damaged. Screws should only be hand tightened with a 5/32" or 4mm allen wrench, DO NOT OVER TIGHTEN SCREWS.

NOTE: be careful and make sure the meter cable doesn't get under the drive cap while tightening as it will result in damaging the cable.

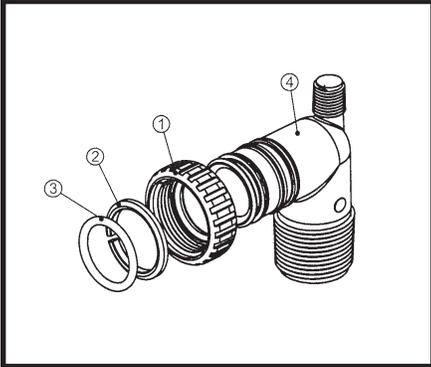
Position the large white drive gear with the "A" pointing toward the 1 o'clock position and then press it onto the stainless steel drive shaft, make sure it snaps & locks into position. NOTE: The white drive gear is splined to the drive shaft and will only assemble in one orientation. Because of this it is not necessary that the discs and gear be exactly positioned, the positioning needs to be approximate but they have to fit on the shaft.

Next install the larger black reducing gear onto the stainless steel shaft, then install the remaining smaller reducing gears from left to right. Re-install the grey reducing gear cover over the gears and affix with the 3 stainless steel screws. Now you can re-install the drive motor by pressing the spring clip loop to the right then rotate the motor as you are inserting it so the gear of the motor meshes properly with the reducing gears. Release the spring clip loop and rotate the motor until the motor housing engages with the plastic nub inside the housing that holds the motor in place and make sure that the top of the motor is flush with the top of the grey gear housing. Press the drive motor wires down into the strain relief of the drive cap, now you can re-install the cover assembly.

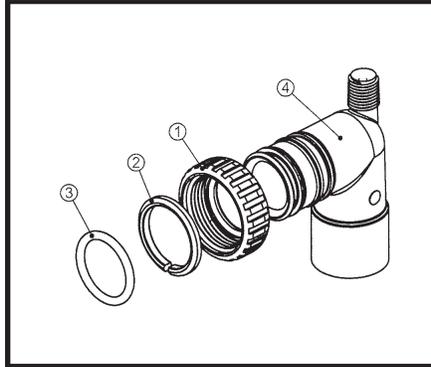


After completing any valve maintenance involving the valve drive assembly or the transfer drive assembly please press and hold the NEXT & the REGEN buttons simultaneously for 3 to 5 seconds to perform a soft reset which will synchronize the control valves positions.

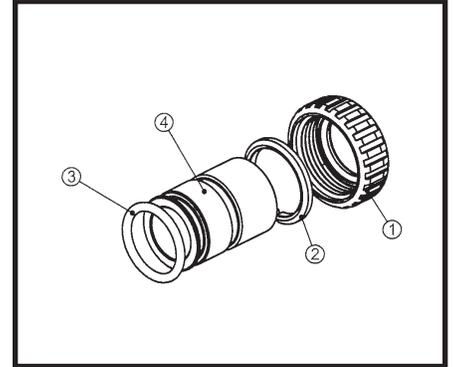
# INSTALLATION FITTING ASSEMBLIES



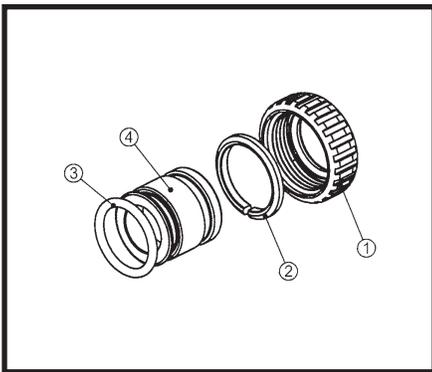
V3007 - Fitting 1" PVC Male NPT



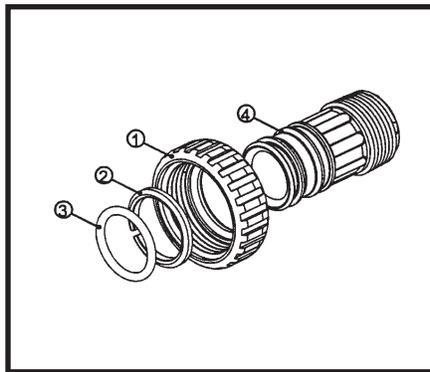
V3007-01 - Fitting 3/4" & 1" PVC Solv 90



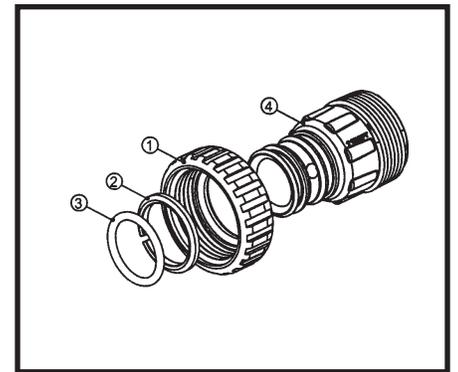
V3007-02LF - Fitting 1" Lead Free Brass Sweat



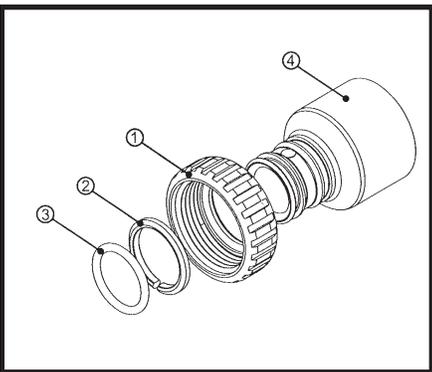
V3007-03LF - Fitting 3/4" Lead Free Brass Sweat



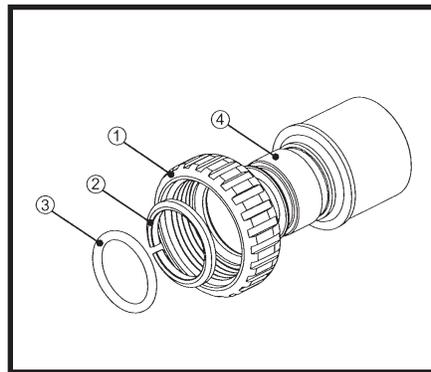
V3007-04 - Fitting 1" Male NPT



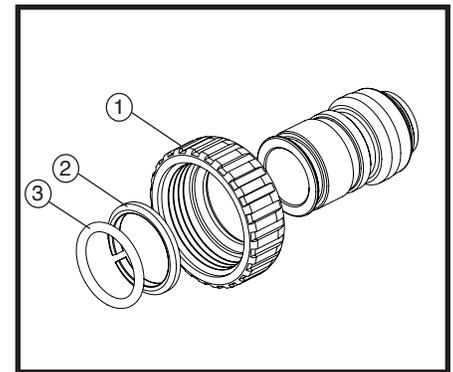
V3007-05 - Fitting 1-1/4" Male NPT



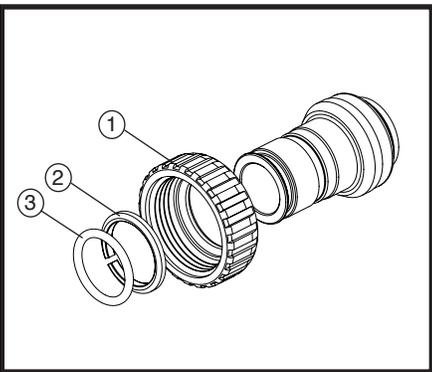
101648 - Fitting 1-1/4" & 1-1/2" Brass Sweat



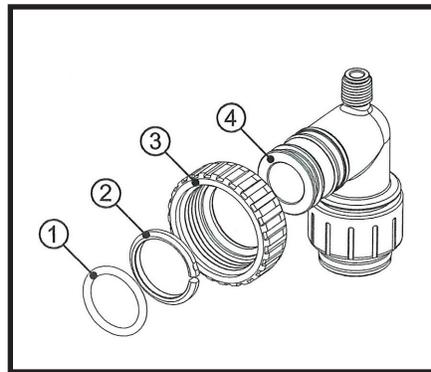
V3007-07 - Fitting 1-1/4" & 1-1/2" PVC Solvent



V3007-12LF - Fitting 3/4" Brass Sharkbite



V3007-13LF - Fitting 1" Brass Sharkbite



V3007-15 - Fitting 3/4" John Guest QC

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Teflon tape must be used on threads of the 1" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection nor caps because of o-rings seals.

ITEM NO.	ORDER NO.	DESCRIPTION
1	V3151	Nut 1" Quick Connect
2	V3150	Split Ring
3	V3105	O-Ring 215

# TWIN ALTERNATING SYSTEM SPECIFICATIONS

MODEL		E6-024TA	E6-032TA	E6-032-10TA	E6-048TA	E6-064TA
<b>FACTORY PRESET MINUTES</b>						
FILL:	MINUTES	3.0	4.0	4.0	6.0	8.0
	GALLONS	1.5	2.0	2.0	3.0	4.0
BACKWASH:	MINUTES	8.0	8.0	8.0	8.0	8.0
	GALLONS	10.4	13.6	17.6	17.6	33.6
BRINE:	MINUTES	60.0	60.0	60.0	60.0	68.0
	GALLONS	14.4	16.2	16.2	19.2	38.1
RINSE:	MINUTES	4.0	4.0	4.0	4.0	4.0
	GALLONS	5.2	6.8	8.8	8.8	16.8
TOTAL REGENERATION IN GALLONS @35 PSI, INCLUDES BRINE MAKE UP.		31.5	38.6	44.6	48.6	92.5
<b>Refill - Pounds of Salt</b>						
HIGH EFFICIENCY SALTING		2.5	3.3	3.3	4.95	6.6
<b>LOW SALTING</b>		<b>4.5</b>	<b>6</b>	<b>6</b>	<b>9</b>	<b>12</b>
MEDIUM SALTING		7.5	10	10	15	20
HIGH SALTING		11.5	15	15	22.5	30
<b>Capacity - Grains</b>						
HIGH EFFICIENCY SALTING		10,492	13,972	13,972	20,958	27,944
<b>LOW SALTING</b>		<b>17,200</b>	<b>22,930</b>	<b>22,930</b>	<b>34,400</b>	<b>45,870</b>
MEDIUM SALTING		21,040	28,060	28,060	42,090	56,120
HIGH SALTING		24,230	32,310	32,310	48,460	64,620
Salt efficiency at factory settings (grains of hardness reduced per lb. of salt)		3822	3822	3822	3822	3822
<b>SERVICE FLOW RATE</b>						
FLOW RATE AT 10 PSI		9.8	10.1	11.3	10.5	13.0
FLOW RATE AT 15 PSI		13.1	13	14.5	14.1	16.4
<b>OTHER DATA</b>						
RESIN, CUBIC FEET		0.75	1	1	1.5	2
GRAVEL UNDERBED CF.		0.08	0.11	0.14	0.14	0.2
MINERAL TANK DIMENSIONS		8x44	9x48	10x44	10x54	1252
BRINE TANK DIMENSIONS		18x40	18x40	18x40	18x40	18x40
DRAIN LINE FLOW CONTROL RATE GPM		1.3	1.7	2.2	2.2	4.2
BRINE LINE FLOW CONTROL RATE GPM		0.5	0.5	0.5	0.5	0.5
INJECTOR SIZE-COLOR		C-Violet	D-Red	D-Red	E-White	G-Yellow
INJECTOR DRAW RATE AT 35 PSI		0.135	0.21	0.21	0.25	0.41
INJECTOR SLOW RINSE RATE AT 35 PSI		0.24	0.27	0.27	0.32	0.56

Factory settings are programmed for clean, iron-free water, such as city water supplies, for efficient salt use. On water supplies with turbidity and/or iron concentrations >0.5ppm, recommend programming second backwash cycle after brine cycle to maintain resin for optimal performance.

Factory Settings are Bold. Actual programed capacity has been adjusted for non-metered regeneration water.

**If installation hardness is not 20 grains adjust accordingly.**

System conforms to ANSI/NSF 44 for specific performance claims as verified and substantiated by test data. Efficiency is measured by a laboratory test as described in ANSI/NSF 44, testing represents maximum efficiency system can achieve. Operational efficiency is achieved after system is installed and may be less than tested efficiency due to application parameters such as water hardness, TDS and other contaminants that reduce the softeners capacity.

If installation hardness is not 20 grains adjust accordingly.

## GENERAL SPECIFICATIONS

### OPERATING PRESSURES

Minimum/Maximum .....25 psi-125 psi

### OPERATING TEMPERATURES

Minimum/Maximum .....40° - 110° F

### METER

Accuracy.....±5%  
Flow Rate Range.....0.25 - 27 GPM  
Gallon Range .....20 - 1,500,000

### DIMENSIONS

Drain Line .....3/4" or 1" NPT  
Brine Line .....3/8" Poly Tube

**ELECTRICAL CURRENT DRAW/VOLTAGE/FREQUENCY** .....0.5A/110v/60Hz

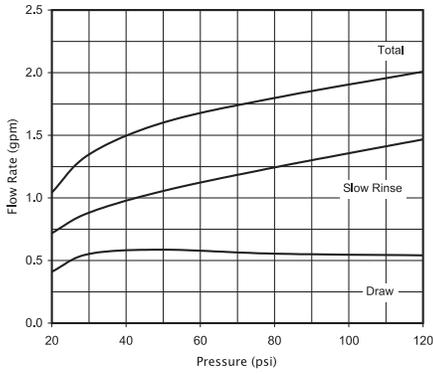
**TANK THREAD** .....2-1/2" - 8 NPSM

Compatible with the following regenerants or chemicals: Sodium chloride, potassium permanganate, sodium bisulfite, sodium hydroxide, hydroxide, hydrochloric acid, chlorine and chloramines.

# INJECTOR FLOW GRAPHS

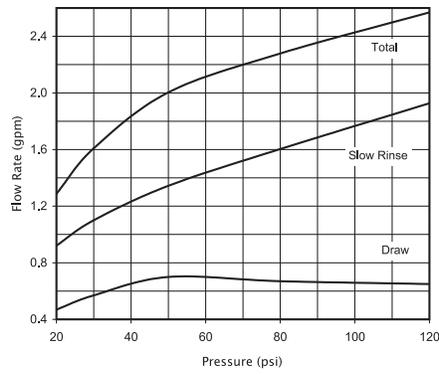
**ORANGE, ORDER NO. V3010-1I**

US Units



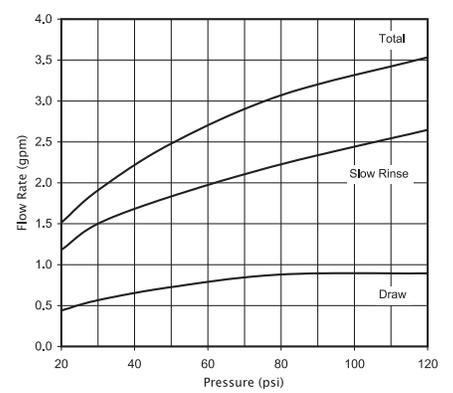
**LIGHT BLUE, ORDER NO. V3010-1J**

US Units



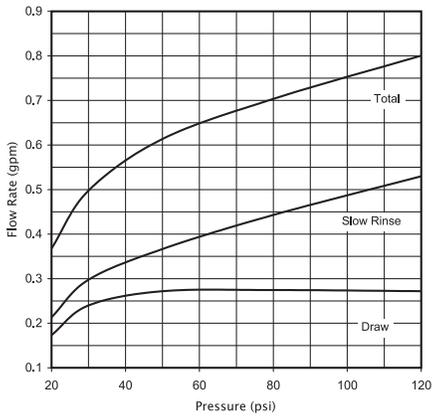
**LIGHT GREEN, ORDER NO. V3010-1K**

US Units



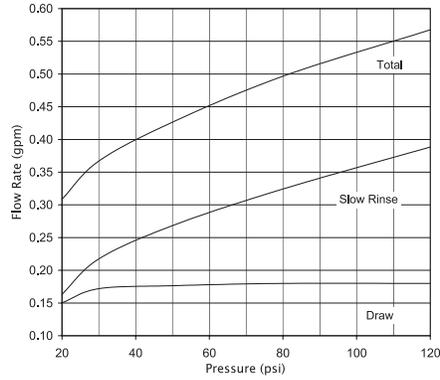
**WHITE, ORDER NO. V3010-1E**

US Units



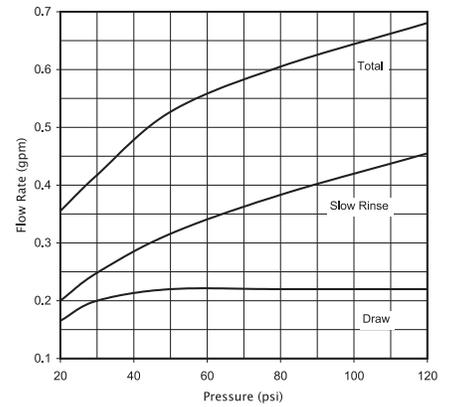
**VIOLET, ORDER NO. V3010-1C**

US Units



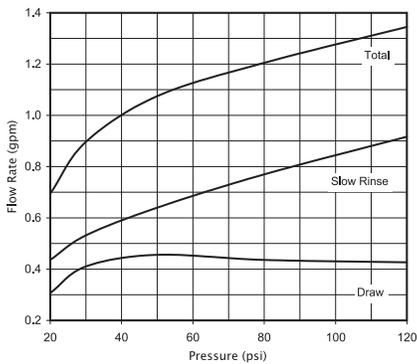
**RED, ORDER NO. V3010-1D**

US Units



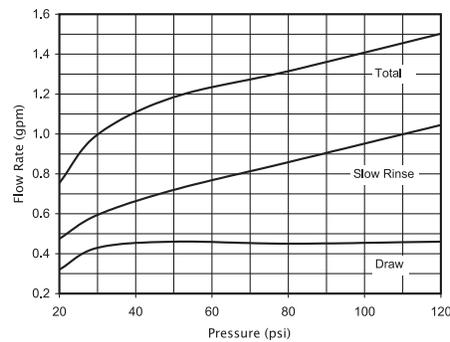
**YELLOW, ORDER NO. V3010-1D**

US Units



**GREEN, ORDER NO. V3010-1H**

US Units



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# Residential Water Softener & Filter Limited Warranty

**INCLUDES – ProMate®, ProMate-1®, ProMate-5®, ProMate-6®, ProMate-6.5®, ProMate-7.0®, ProMate-7.1®, E6  
EXCLUDES – Iron Curtain®, Iron Curtain® Jr. and Storm Filter Systems**

Hellenbrand warrants to the original consumer purchaser that the System and the parts listed below will be free from defects in material and/or workmanship from the date of the original installation for the following time periods:

For a Period of FIVE YEARS: The filter control valve electrical parts including the motor and board, control valve body, and internal parts.

For a Period of TEN YEARS: Mineral tanks, 6" Diameter - 13" Diameter.

For a Period of FIVE YEARS: Mineral tanks, 14" Diameter - Up.

For a Period of FIVE YEARS: The salt storage/cabinet tank.

For a Period of ONE YEAR: The entire water conditioner system ("System").

Any parts used for replacement are warranted for the remainder of the original warranty period for the applicable part.

THIS WARRANTY IS EFFECTIVE TO THE ORIGINAL CONSUMER PURCHASER ONLY, AND ONLY FOR AS LONG AS THE SYSTEM REMAINS AT THE ORIGINAL INSTALLATION SITE. COVERAGE TERMINATES IF YOU SELL OR OTHERWISE TRANSFER THE SYSTEM OR IF THE SYSTEM IS MOVED FROM THE ORIGINAL INSTALLATION SITE.

No sales representative, distributor, agent, dealer, reseller, authorized seller or any other person or entity is authorized to make any other warranty, or modify or expand the warranty provided herein on behalf of Hellenbrand. Upon expiration of the applicable warranty period, Hellenbrand shall have no further liability related to the System/parts to which the warranty period applies, except with respect to valid warranty claims asserted during the appropriate warranty period.

If the System or any part described above becomes defective within the specified warranty period, you should notify your local authorized seller of Hellenbrand products, and arrange a time during normal business hours for the inspection of the System at the original installation site. You may also contact Hellenbrand and we will provide you with the contact information for your local authorized seller of Hellenbrand products. Hellenbrand, at its option, will repair or replace the System or any part found defective within the terms of this warranty. You are responsible for freight from our factory and any service fees charged by the local authorized seller of Hellenbrand products for installation, repair, removal, replacement, service, etc., of any System or parts. This warranty does not include any labor charges. This paragraph sets forth the exclusive remedy for any valid warranty claims against Hellenbrand.

THIS WARRANTY DOES NOT COVER defects caused by sand, sediment or bacteria fouling, accident, fire, flood, Act of God, misuse, misapplication, neglect, alteration, installation or operation contrary to Hellenbrand's printed instructions, or installation, repair or service by anyone other than Hellenbrand or an authorized seller of Hellenbrand products.

IN ADDITION, THIS WARRANTY DOES NOT COVER UNPROTECTED OUTDOOR INSTALLATIONS. This System, including all of the electrical components, must be protected against windblown dust, falling and windblown rain, freezing temperatures and the formation of ice, with an appropriate enclosure consisting of a floor, roof, walls, ventilation and heat.

As a manufacturer, we do not know the characteristics of your water supply or the purpose for which you are purchasing this system. You should be aware that the quality of water supplies may vary seasonally or over a period of time, and that your water usage rate may vary as well. Water characteristics may change considerably if this System is moved to a new location. For these reasons, Hellenbrand assumes no liability for the determination of the proper equipment necessary to meet your needs; and Hellenbrand does not authorize others to assume such obligations for Hellenbrand.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, REMEDIES FOR DEFECTS OR FAILURES ARE LIMITED TO THE REMEDIES PROVIDED IN THIS WARRANTY. THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE SET FORTH HEREIN. ANY IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, NON-INFRINGEMENT, OR ANY WARRANTIES ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING, OR FROM USAGES OF TRADE, ARE LIMITED IN DURATION TO THE APPLICABLE WARRANTY PERIOD SET FORTH ABOVE.

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