



## OWNER'S MANUAL

### PROMATE ECOMAX



Franklin Water Treatment, LLC  
[hellenbrand.com](http://hellenbrand.com)



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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.**

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Dealer Name \_\_\_\_\_ Phone \_\_\_\_\_  
Address \_\_\_\_\_ Email \_\_\_\_\_  
\_\_\_\_\_

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Hellenbrand products are not for sale or distribution into the State of California effective 8/31/18

# JOB SPECIFICATION SHEET

MODEL NO. \_\_\_\_\_

## \*WATER TEST AT TIME OF INSTALLATION

Hardness  $\text{CaCO}_3$  (gpg)  Other \_\_\_\_\_  
 Iron (ppm)  Other \_\_\_\_\_  
 pH  Other \_\_\_\_\_

## OPTIONAL RELAY SETTINGS

	ALT MAV	AUX MAV
<input type="checkbox"/> Off	<input type="checkbox"/> Alternator system enabled	<input type="checkbox"/> Brine Reclaim Enabled
	<input type="checkbox"/> Reclamation mode enabled	<input type="checkbox"/> Separate Source Enabled
	<input type="checkbox"/> No Hard By-pass enabled	
	<input type="checkbox"/> Separate Source enabled	
	<input type="checkbox"/> System Board	

### Relay 1 Trigger

#### On Time

Start Time, Minutes into Regeneration  
 Run Time

#### On Gallons

Pulse per  Gallons  
 Time Relay Closed

#### On Regen Gallons

(Relay activated by flow through meter during service & flow through meter during regeneration)

Pulse per  Gallons  
 Time Relay Closed

#### On Service Alarm

Years  
 Gallons

## \*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, and about 30 gallons per person daily if only hot water is softened.

Daily Water Usage (Gallons/Person)  
 Family Size (Number of people in family)  
 $=$   Total Gallons Per Day  
 Grains Per Gallon of Hardness  
 $=$   Total Grains Per Day  
 Number of Days between Regenerations desired  
 $=$   Total Capacity Required

\*INSTALLATION DATE \_\_\_\_\_

\*SERIAL NUMBER \_\_\_\_\_

# 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 your 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 your household 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 the softener tank. Eventually so much hardness collects on the exchange media that the softener can no longer soften water. At this point it is considered "exhausted". Regeneration is now necessary.

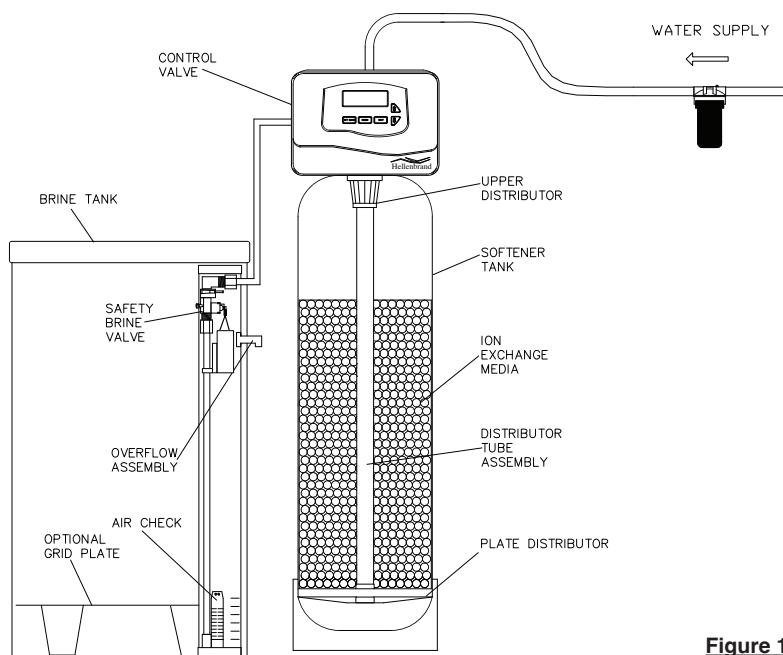


Figure 1

## 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. Fill the tank approximately three-fourths full, with a minimum of 12" of salt. If your household does not use much water, do not fill your salt keeper over 1/2 full, salt bridging may occur in the brine tank. This may result in hard water due to ineffective regeneration. DO NOT USE Block Salt when the EcoMax control is programmed with a brine tank prefill. Block salt does not dissolve quickly enough to provide a good regeneration.

**Cleaning Brine Tank:** The brine tank may require periodic cleaning. Inspect the brine tank at least once a year for buildup of insoluble materials. It is recommended to periodically clean the brine tank no matter what kind of salt you are using. See page 19, 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 40 grains per gallon of hardness as well as up to 0.5 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 questions should exist, contact your dealer.

**Required - Sediment pre-filter for single tank EcoMax units.**

**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 20 pounds of water pressure (psi) is required for regeneration. Maximum 125 psi.

**Water Quality:** Influent water supply should be clean and iron free. If sediment or particulate is a problem, installation of an inline filter system is recommended prior to the 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:** Condition of 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

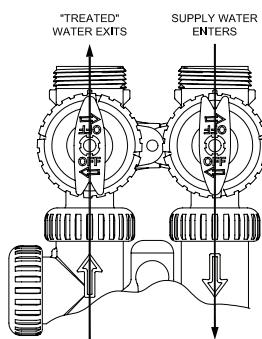


Figure 3

BYPASS OPERATION

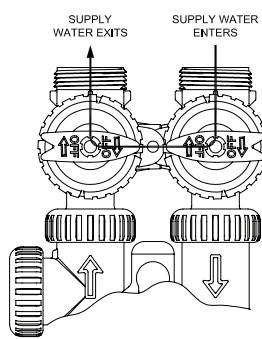


Figure 4

DIAGNOSTIC MODE

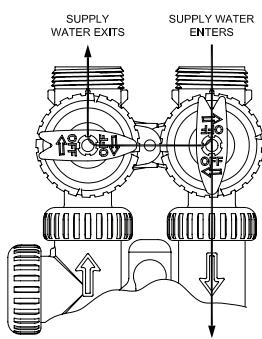


Figure 5

SHUT OFF MODE

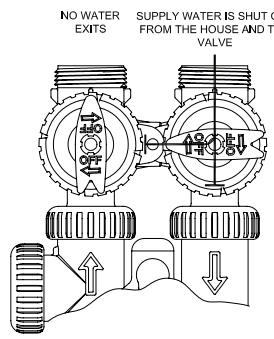


Figure 6

## 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:

- 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>.

# 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.**
- 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.
- Required - Sediment pre-filter for single tank EcoMax units.**

- Place the conditioner where you want to install it, making sure it is on a clean, level and firm base.
- 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.
- 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.
- 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.**
- The drain connection may be made using either 5/8" polytube

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.

- 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 brine tank.
- 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. (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 brine tank and that it is level and smooth.
- A 1 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.**)

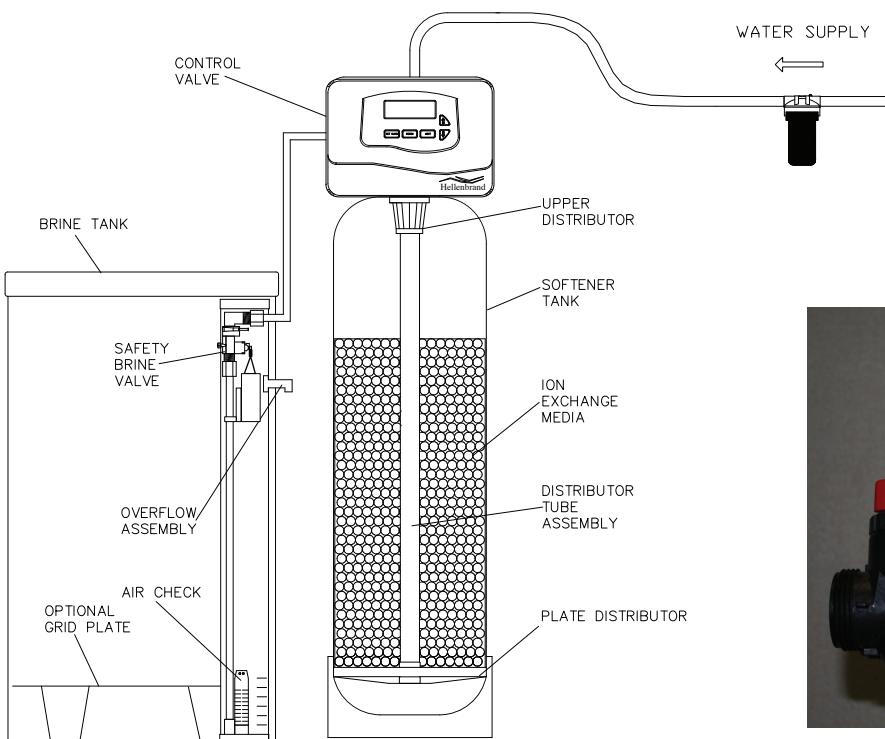


Figure 6b



Figure 6a

## Initial Start Up

The initial start up will probably be done by the installing technician. 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 6) 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, page 9).
5. Set the time of day by pushing clock button (figure 9, page 9) 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 will read fill, softening, regen draw up, backwash, rinse). 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 6). Run water to the drain until it runs clear. Return the bypass valve to the by-pass position (fig 3, page 6). Push REGEN button until unit is back to softening mode.
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 6.
8. Press the REGEN button until LED display says "REGENERANT DRAW UP". 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 21) If proper suction, reattach brine tube and allow it to draw water down to the bottom of the air check, (figure 6b, page 7).
9. Press REGEN button again until LED once again displays "BACKWASH". Keep in backwash until water once again runs clear at the drain.
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 softener's water hardness, days override and regeneration time settings (see figure 10a, page 10).

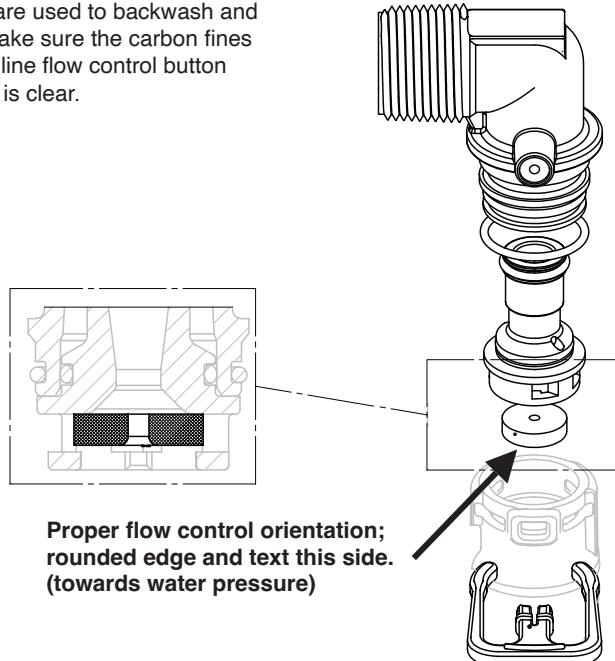
Your programming is now complete.

## EcoMax

All EcoMax high efficiency softeners are to be installed on clean water. As part of the efficiency programming involved with ProMate EcoMax softeners, low flow rates are used to backwash and rinse the resin. The EcoMax unit has carbon in the top chamber. To make sure the carbon fines are reduced and not causing a noticeable pressure drop; remove drain line flow control button from drain line elbow & reinstall elbow. Backwash until drain line water is clear.

## Specific Start Up Instructions for EcoMax DMT

Remove drain line elbow and remove button, replace elbow and retaining clip. Follow standard start-up steps until Step 6. Push and hold REGEN button until system advances to first position. After motor stops running, push REGEN button through regeneration steps until "BACKWASH" is displayed. Slowly place the bypass in the "diagnostic" position part way (see figure 4, page 6). Run water to drain until carbon fines are no longer apparent. Return bypass valve to bypass position (see figure 1, page 6) and wait until water stops running from drain line. Re-install drain line flow control button by removing clip from elbow and removing elbow from valve to insert button; proper orientation of DLFC button is with the flow of water towards the rounded edge of button hole and text on button. Re-insert elbow and retaining clip. Push REGEN button until "Rinse" is displayed, slowly open bypass to diagnostic position and run water to drain until any color throw from resin dissipates. Continue with Step #8, check brine draw and finish start up.

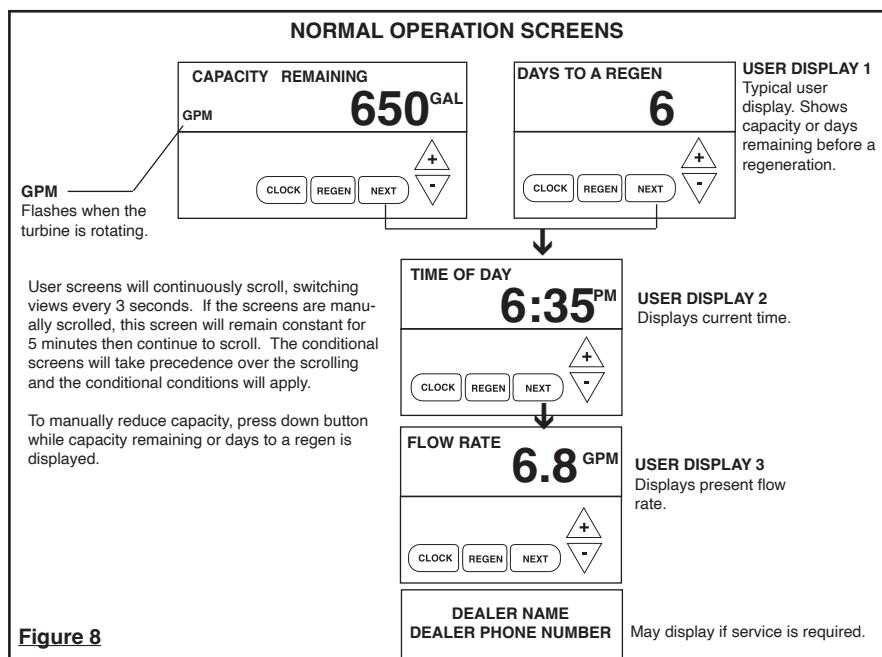


# USER DISPLAYS/SETTINGS

## General Operation

When the system is operating, one of several displays may be shown. Pressing NEXT will alternate between the displays. One of the displays is the current time of day. The second display is the following: days to a regen/capacity remaining. Days To A Regen is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the number of gallons that will be treated before the system 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 or display will scroll automatically.

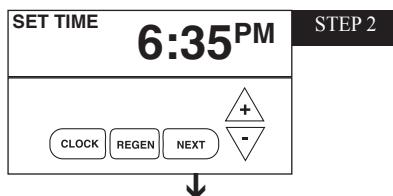
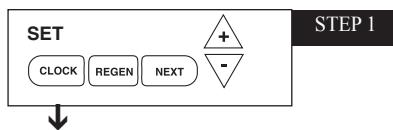
When water is being treated (i.e. water is flowing through the system) the word "GPM" flashes on left side of display when other than flow rate is displayed.



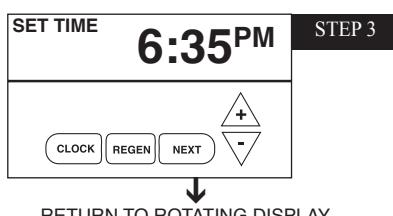
## SET TIME OF DAY

= ▲ 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.

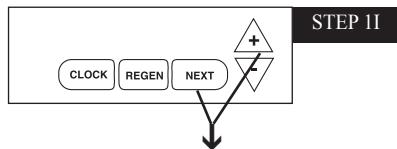
Battery back-up feature will be activated after 24 hours of power.

Do not forget to reset time for daylight savings time.

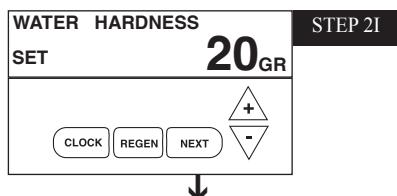
**Figure 9**

## INSTALLER DISPLAYS/SETTINGS

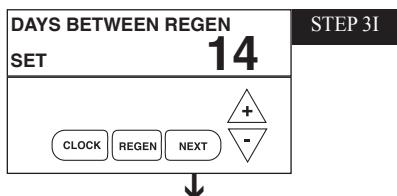
 = ▲ Up Arrow     = ▼ Down Arrow



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



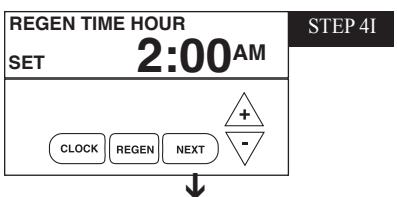
**Step 2I - Hardness:** Set the amount of total compensated hardness in grains (hardness as calcium carbonate) per gallon using ▲ or ▼ buttons. **The factory setting is 20** with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon should be increased if soluble iron needs to 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. (See page 32). 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: **Factory setting is 14 days.**

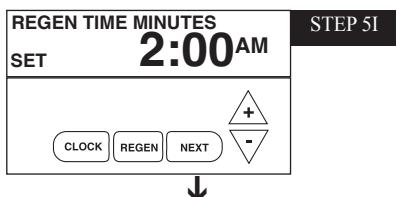
- number of days between regeneration (1 to 28); or
- "oFF"

See figure 12a & b, page 12-13, for more detail on softener setup. Press NEXT to go to step 4. Press REGEN to return to previous step.



**Step 4I - Regeneration Time (hour):** Set the hour of day for regeneration using ▲ or ▼ buttons. AM/PM toggles after 12. The factory setting time is 2:00 a.m. This display will show "REGEN" "IMMEDIATE ON ZERO GAL" if "Immediate" is selected on Step 12 of softener set-up. See page 32. Press NEXT to go to step 5. Press REGEN to return to previous step.

**Note:** When installing this unit as part of a multi unit parallel system the regen time of day must be adjusted to prevent multiple units from regenerating at the same time.



**Step 5I - Regeneration Time (minutes):** Set the minutes of day for regeneration using ▲ or ▼ buttons. This display will not be shown if system is set for immediate regeneration. Press NEXT to exit Installer Displays/Settings. Press REGEN to return to previous step.

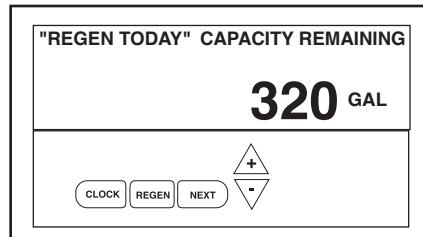
RETURN TO ROTATING DISPLAY

**Figure 10a**

## Manual Regeneration

Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual regeneration at the preset delayed regeneration time, press and release "REGEN". The words "REGEN TODAY" will flash in left corner of display as it scrolls through displays to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request.



To initiate a manual regeneration **immediately**, press and hold the "REGEN" button for five seconds. The system will begin to regenerate immediately. The request cannot be cancelled. You must cycle all the way through the cycles to make it stop. PLEASE NOTE: This will reset the meter.

**Note:** If the brine tank does not contain salt, fill with salt and wait at least two hours before regenerating. If two regenerations are desired within 24 hour period, press /release REGEN button. REGEN TODAY will flash on screen. Press and hold REGEN button until valve initiates regeneration.

## Regeneration Mode

Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when the household is asleep. If there is a demand for water when the system is regenerating, untreated water will be supplied.

When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed (see figure 11). The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

Regeneration Step  
(shows time remaining in regen step  
is 8 minutes, 22 seconds)



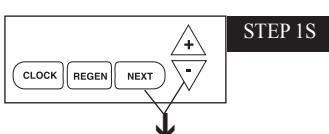
Figure 11

## 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 32
Softening (Service)	Minutes	1 to 480	120
Regenerant Draw Up	Minutes	1 to 180	75
Backwash	Minutes	1 to 120	12
Rinse-Fast	Minutes	1 to 120	8

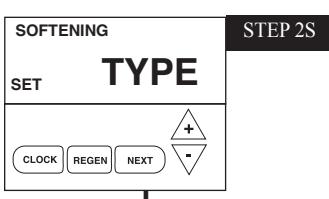
## SOFTENER SETUP



STEP 1S

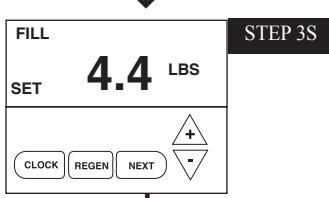
$\triangle$  =  $\blacktriangle$  Up Arrow    $\nabla$  =  $\blacktriangledown$  Down Arrow

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



STEP 2S

**STEP 2S** – Select between softening or filtering. A flashing "SOFTENING" or "FILTERING" will appear. Choose SOFTENING using  $\nabla$  or  $\blacktriangle$  button. **Factory setting is Softening.** Press NEXT to go to Step 3S. Press REGEN to exit Softener System Setup.

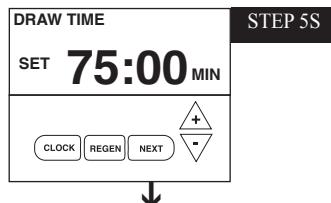


STEP 3S

**STEP 3S** – Select the time for the first cycle (which in this example is FILL, setting is changed by lbs. of salt entered) using the  $\nabla$  or  $\blacktriangle$  button. **Factory setting is Efficient Salting**, on page 32. Press NEXT to go to Step 4S. Press REGEN to return to previous step.



**STEP 4 S – 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.



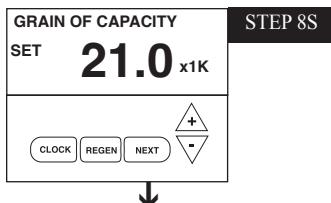
**STEP 5 S – Select the time for the third cycle** (which in this example is REGENERANT DRAW UP) using the ▼ or ▲ button. Press NEXT to go to Step 6S. Press REGEN to return to the previous step.



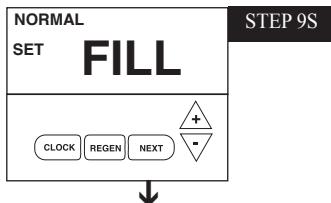
**STEP 6 S – Select the time for the fourth cycle** (which in this example is BACKWASH) using the ▼ or ▲ button. Press NEXT to go to Step 7S. Press REGEN to return to the previous step.



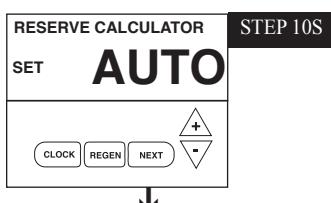
**STEP 7 S – Select the time for the fifth cycle** (which in this example is RINSE) using the ▼ or ▲ button. Press NEXT to go to Step 8S. Press REGEN to return to the previous step.



**STEP 8 S - 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. The allowable grains capacity range varies from 5,000 to 3,000,000 grains. The increment increase is 500 for the range from 5000 to 30,000; 1000 for the range of 30,000 to 100,000; and 2000 for the range of 100,000 to 3,000,000. Grains capacity is affected by the fill time. The grains capacity for the selected lbs. salting should be confirmed by testing. The capacity and hardness levels entered are used to automatically calculate reserve capacity when gallon capacity is set to AUTO. **Factory setting is the capacity of the softener at efficient salting.** See Page 32. Press NEXT to go to Step 9S. Press REGEN to return to the previous step.



**STEP 9 S – Select between proportional or normal brining.** Use ▼ or ▲ buttons to select. **Proportional brining is only available if configured as prefill/upflow softener or screen will not appear.** Proportional brining will divide the actual gallons used by calculated volumetric capacity then multiply fill volume by this percentage. If regeneration is initiated by calendar day override it will brine proportionately; minimum of 20% or pre-programmed amount. This option requires a functioning meter. **Factory Setting = Normal brining.** Press NEXT to go to Step 10S. Press REGEN to return to previous step.



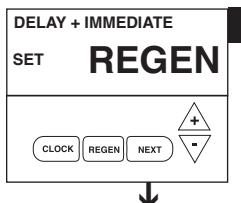
**STEP 10 S – Set Gallons Capacity** using ▼ or ▲ button. If value is set to:  

- “AUTO” gallon capacity will be automatically calculated and reserve capacity will be automatically estimated;
- “oFF” regeneration will be based solely on the day override set (see Installer Display/Settings Step 3, page 9 / proportional brining will not function if OFF selected); or
- as a number of gallons (allowable range 20 to 1,500,000) regeneration will be based on the value specified.

Increment increase is 20 for the range 20 to 2000, 100 for the range 2000 to 10,000 and 500 for the range of 10,000 to 50,000 and 2000 for range of 50,000 to 1,500,000.

If “oFF” or a number is used, hardness cannot be set in Installer Displays/Settings Step 2, page 9. See page 34 for more detail. **Factory Setting is AUTO.** Press NEXT to go to Step 11 S. Press REGEN to return to previous step.

**Figure 12a**

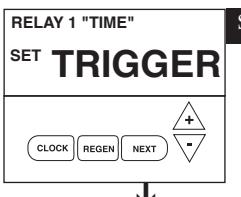


STEP 11S

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

- “DELAY” means regeneration will occur at the preset time; (page 9, step 4)
- “IMMEDIATE” means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- “DELAY + IMMEDIATE” 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).
- Delay + Immediate is NOT available if control is programmed as a twin alternating configuration. Selecting “DELAY” will result in an immediate alternation upon capacity depletion but regeneration is delayed to preset time.

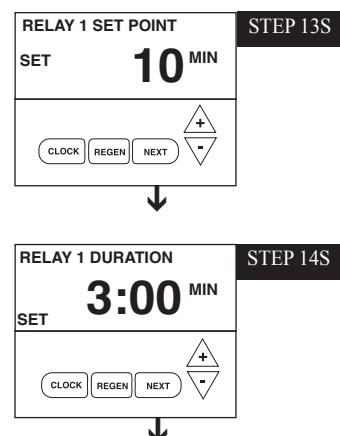
See page 33 for more options. **Factory Setting is DELAY + IMMEDIATE.** Press NEXT to go to Step 12S. Press REGEN to return to previous step.



STEP 12S

**STEP 12 S – Set Relay to activate by Time, Gallons, Regen Gallons, Lockout, Off or Service Alarm** by using ▼ or ▲ buttons. A relay can be used to operate a chemical feed pump or solenoid, etc. The choices are:

- Relay Triggered on Time - Relay activates after set number of minutes after start of regeneration. Start of regeneration is defined by first backwash cycle, dn brine or up brine, whichever is first. Relay deactivates after set time. Press NEXT for programming.
- Relay Triggered on Gallons - Relay activates every set number of gallons while in service and deactivates after set time. Press NEXT to go to 16S for programming.
- Relay Triggered on Regen Gallons - Relay activates after set number of gallons in service **or** gallons used during regeneration and de-activates after set time or when meter stops registering flow, whichever comes first. Press NEXT to go to 19S for programming.
- Service Alarm - Relay activates on service alarm setting: gallons, time or both, see step 21S.
- Relay Triggered for Lockout - Relay closes at set time before regeneration or after regeneration starts. Selection of energizing relay for complete regeneration cycle is available by selecting REGEN for time setting, see step 23S.
- Off - If off is selected, Steps 13S – 24S will not be shown. **Factory setting = OFF.** Press NEXT to go to step 13S or other selection for relay settings, or 22S if OFF selected.



STEP 13S

**STEP 13 S – If off was selected in previous step, this screen does not appear.**

**Time chosen to Activate Relay**, use up and down arrows to set # of minutes AFTER START OF REGEN to activate relay. Start of regeneration is defined as first Backwash or Regenerant Draw mode. Time Range = 1 – 500 minutes. Press NEXT to go to Step 14S.



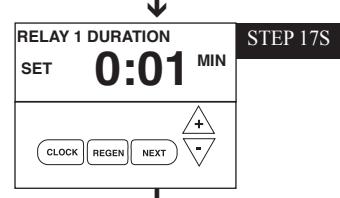
STEP 14S

**STEP 14 S – Use Up and Down arrows to set duration of relay activation in minutes. Range is 0:01 (1 second) to 500:00 (500 minutes).** Press NEXT to go to Step 25S. Press REGEN to return to previous step.



STEP 15S

**STEP 15 S – Gallons chosen to activate relay.** If Off or Time was selected in previous steps, this screen does not appear. Press NEXT for trigger programming.



STEP 16S

**STEP 16 S – Use up and down arrows to set # of gallons per relay activation. Range = 0.1 – 20,000 gallons.** Press NEXT for Relay Duration. Press REGEN to return to previous step.



STEP 17S

**STEP 17 S – Use up and down arrows to set duration of relay activation in minutes. Range = 0:01 (1 second) - 500:00 (500 minutes).** Press NEXT to go to Step 25S. Press REGEN to return to previous step.



STEP 18S

**STEP 18 S – REGEN gallons chosen to activate relay.** Relay activates after set number of gallons have been used in service **or** passes through meter during regeneration and then deactivates after set period of time or after flow stops, whichever comes first. Press NEXT to go to Step 19S.

**RELAY 1 SET POINT** **STEP 19S**

SET	1	GAL
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>		
<input type="button" value="+"/> <input type="button" value="-"/>		

**STEP 19S** – Use up and down arrows to select number of gallons per relay activation of regen gallon setting.  
Range: 0.1 -20,000 gallons. Press NEXT to go to Step 20S.

**RELAY 1 DURATION** **STEP 20S**

SET	0:01	MIN
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>		
<input type="button" value="+"/> <input type="button" value="-"/>		

**STEP 20S** – If Off or Time was selected in previous steps, this screen does not appear. Use up and down arrows to set duration of relay activation in minutes. Range = 0:01 (1 second) - 500:00 (500 minutes). Press NEXT to go to Step 25S. Press REGEN to return to previous step. Meter does not read during regeneration.

**RELAY 1 SERV ALARM** **STEP 21S**

SET	TRIGGER
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>	
<input type="button" value="+"/> <input type="button" value="-"/>	

**STEP 21S**  
**Service Alarm chosen to activate relay**, relay closes whenever Service Alarm has triggered. Programming for relay closure on service reminder is done on Step 26S. Relay opens when service alarm reset. Press NEXT to go to Step 25S to set Relay 2 Settings. If off selected for Relay 2, service reminder programming on Step 25S.

- Relay closes on Gallons
- Relay closes on Time
- Relay closes on Both
- Off, **Factory setting is off**

**RELAY 1 LOCKOUT** **STEP 22S**

SET	TRIGGER
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>	
<input type="button" value="+"/> <input type="button" value="-"/>	

**STEP 22S**  
**Relay Triggered for Lockout**, relay closes at set time before regeneration ( $\leq 0$  start) or after regeneration (start  $\geq 0$ ). Negative start time is referenced by 1st regen cycle. Positive start time is referenced by backwash or draw. Negative start time delays start of regeneration time by that amount. Press NEXT to Set Start Time.

**RELAY 1 SETPOINT** **STEP 23S**

SET	-20	MIN
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>		
<input type="button" value="+"/> <input type="button" value="-"/>		

**STEP 23S**  
Use up or down arrows to select minutes into or before regeneration for relay activation. Range = -20 – 500 minutes. Press NEXT to select duration of relay activation. You may select REGEN if relay activation is desired for complete regeneration access by pressing down button through all negative numbers.

**RELAY 1 DURATION** **STEP 24S**

SET	70:00	MIN
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>		
<input type="button" value="+"/> <input type="button" value="-"/>		

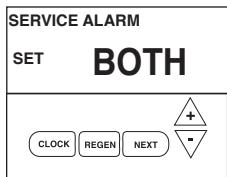
**STEP 24S**  
Use up or down arrows to select duration of relay activation. Range = 0:01 (1 second) - 500:00 (500 minutes). Press NEXT to go to Relay 2 programming.

**RELAY 2 TRIGGER** **STEP 25S**

SET	REGEN	GAL
<input type="button" value="CLOCK"/> <input type="button" value="REGEN"/> <input type="button" value="NEXT"/>		
<input type="button" value="+"/> <input type="button" value="-"/>		

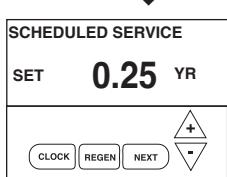
**STEP 25S** – Relay 2 programming includes identical options as Relay 1 with the addition of the ability to activate Relay 2 in the event of an error. Press NEXT to go to Step 26S.

## SERVICE REMINDER



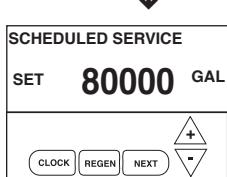
STEP 26S

**STEP 26S** – Set scheduled service display using **▲** or **▼** buttons. Available options are OFF, TIME, ON GAL or BOTH. Selecting OFF disables this feature. If OFF is selected, press NEXT to exit System Setup. If TIME, ON GAL or BOTH is selected press NEXT to select the TIME and/or ON GAL values. See Steps 27S and/or 28S. This can also activate relay if Service Alarm is selected on Step 21S. Display following programming screens will show "scheduled service in XXX days" when days remaining is less than 1 year. Press REGEN to return to the previous step.



STEP 27S

**STEP 27S** – Service alarm for TIME ranges from 0.25 to 9.75 years. Press **▲** and **▼** buttons to select time interval. If time remaining falls below 1 year, display will show "scheduled service in XXX days". Press NEXT to either exit System Setup or if BOTH was selected go to Step 28S. Press REGEN to return to the previous step.



STEP 28S

**STEP 28S** – Service alarm for ON GAL ranges from 100 to 9,999,900 gallons. Press **▲** and **▼** buttons together until "set" appears, use arrows to select value. Press NEXT to exit System Setup. Press REGEN to return to the previous step.

Reset service reminder by pressing up and down arrows together when reminder is displayed.

RETURN TO NORMAL MODE

## DIAGNOSTICS

**▲** = **▲** Up Arrow      **▼** = **▼** Down Arrow

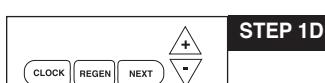
**Reset Diagnostic Values:** Hold



NEXT/DOWN buttons for 3 seconds, then hold

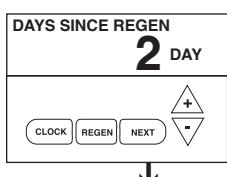


UP/DOWN buttons for 3 seconds



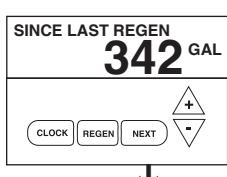
STEP 1D

**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.



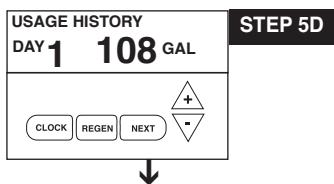
STEP 3D

**STEP 3D – Volume, since last regeneration:** This display shows gallons of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.



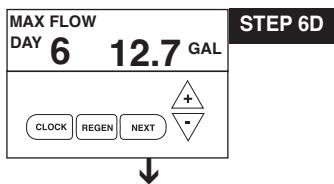
STEP 4D

**STEP 4D – Volume of reserve capacity used for last 7 days:** If the unit is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto", this display shows 0 day (for today) and the reserve capacity. Pressing the **▲** button will show day 1 (which would be yesterday) and displays the reserve capacity. Pressing the **▲** button again will show day 2 (the day before yesterday) and the reserve capacity. Keep pressing the **▲** button to show the capacity for days 3, 4, 5 and 6. The **▼** button can be pressed to move backwards in the day series. Press NEXT button at any time to go to Step 5D. Press REGEN to return to previous step.



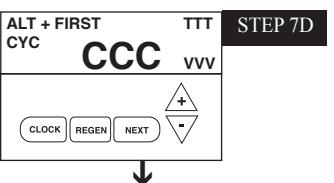
STEP 5D

**STEP 5D – 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. If a regeneration occurred on the day, the "letter R" will also be displayed. This display will show dashes if a water meter is not installed. Press the **NEXT** button at any time 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 the **NEXT** button to exit Diagnostics. Press **REGEN** to return to the previous step.



STEP 7D

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

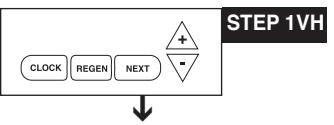
- First - Average of 1st three drive times of MAV in that direction
- Last - Last drive time measured for that MAV in that direction
- Ave - Average drive time measured for MAV in that direction
- TTT - Drive time (1424 = 14.24 seconds)
- CCC - Total number of cycles for that MAV
- VVV - Relative drive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

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

RETURN TO NORMAL MODE

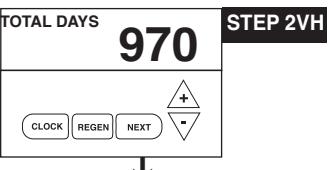
Any time MAV is rebuilt or replaced, reset diagnostics to reflect new drive characteristics.

## VALVE HISTORY (Can not be reset)



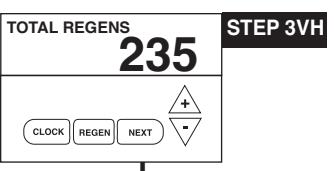
STEP 1VH

**STEP 1VH –** Press **▼** and **▲** simultaneously for three seconds and release, then press **▼** and **▲** simultaneously and release. If screen in step 2VH does not appear in 5 seconds the lock on the valve is activated.



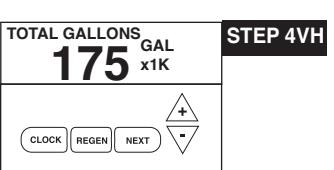
STEP 2VH

**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.



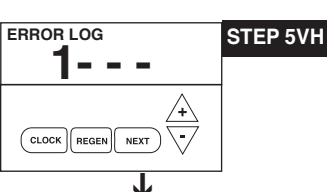
STEP 3VH

**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

**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

**STEP 5VH – Error Log history:** Rolling log up to 10 errors. Press **▼** and **▲** buttons to view each recorded error. If no errors have occurred " --- " is displayed. With STALL ERRORS 102, 107, 117 the right upper corner of display indicates piston position at time of stall. Press **NEXT** to exit valve history.

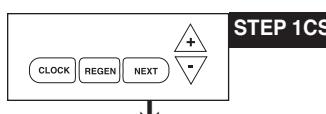
## CYCLE SEQUENCE

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.

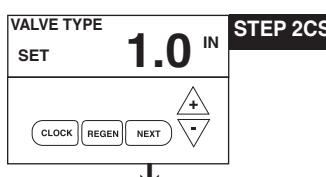
END must be used as the last cycle option. The SERVICE cycle should only be used in brine prefill applications to allow salt to dissolve.

The following is an example of how to set a valve so that when regeneration is initiated, FILL occurs first, SOFTENING occurs second, REGENERANT DRAW UP occurs third, BACKWASH occurs fourth, and RINSE occur fifth.



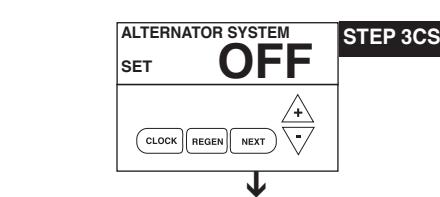
STEP 1CS

**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

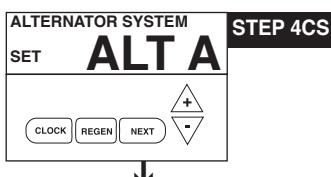
**STEP 2CS – Valve Type.** Use the ▲ or ▼ to select from 1.0", 1.25", 1.50", 2.0L", 2.0" valve. EcoMax is a 1.0" meter. Press NEXT to go to Step 3CS.



STEP 3CS

**STEP 3CS** – Use the ▲ or ▼ to select one of the following:

- **Twin Alternating System** – Select Alt A or Alt B, See instructions in Step 4CS; or
- **System Board - Allows Demand Recall Programming** – See instructions in Step 9CS.
- **No Hard Water Bypass During Regeneration** – See instructions in Step 6CS.
- **Reclaim Enabled** - Allows control to operate in Reclamation Mode See instructions in Step 8CS.
- **Separate Source Enabled** – Allows control to have a separate water source during the regeneration cycle. See instructions in Step 7CS.
- **System Board Enabled** – Allows system to operate with Hellenbrand SystemMate Controller, see instructions in Step 9CS.
- **OFF; Factory Setting is OFF** - Press NEXT to go to Step 10CS.



STEP 4CS

**STEP 4CS – Twin Alternating System** – Allows automatic alternation between two units to provide softened water 24 hours a day.

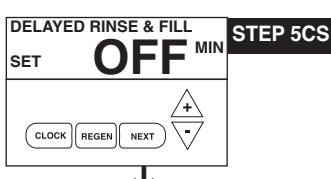
Use ▲ or ▼ buttons to select ALT A or ALT B

Select ALT A for the control valve that has the two-pin connector labeled MAV DRIVE connected to the alternator valve.

Select ALT B for the control valve that will be connected via three-prong connector labeled INTERCONNECT. Must use 3-wire interconnect cable. Press NEXT to go to Step 5CS.

For Alternating System, change programming:

- Set softener, with volume capacity in GALLONS and select Regeneration Time Option "IMMEDIATE" or "DELAYED" and select DAYS BETWEEN REGEN as desired.
- For complete programming, see Twin Alternating MAV manual.



STEP 5CS

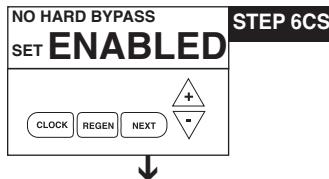
**STEP 5CS – Select Twin Alternating Option.**

Use ▲ or ▼ buttons to select:

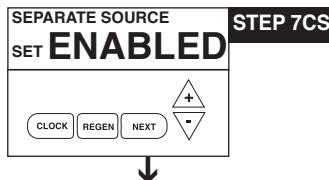
- Standard - Standard Alternating Function
- Refresh Rinse - Alternates every 6am & 6pm and runs programmable number of gallons to service prior to alternating back to on-line unit. Press NEXT to set number of gallons.
- Delayed Rinse and Fill- See below

This option delays the last two cycles of regeneration (only "Rinse" and "Fill"). This feature splits the regeneration into two portions. The first portion of the regeneration will start immediately and all programmed cycles before the "Rinse" and "Fill" cycles will be performed. After all programmed cycles before "Rinse" and "Fill" are completed the control valve will drive to the service position (displaying "Delayed Rinse + Fill Pending"). When the volume of the on-line unit is depleted to 10% of its programmed capacity, the control valve will be triggered to finish the second portion of the regeneration and complete the "Rinse" and "Fill" cycles and return to Service and be placed into Standby mode, and wait to come on-line for service. Must be programmed for post brine fill. Press NEXT to go to Step 10CS.

Cycle Options		
BACKWASH	REGENERANT DRAW-UP	FILL
RINSE	SOFTENING	END

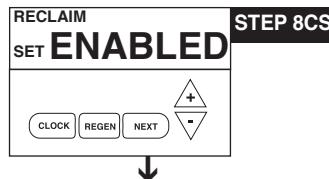


**STEP 6CS – No Hard Water Bypass Enabled** - Selection requires that a connection to a Motorized Alternator Valve (MAV) is made to the two pin-connector labeled ALTERNATOR MAV DRIVE located on the printed circuit board. The MAV will be driven closed before the first regeneration cycle that is not FILL or SOFTENING or FILTERING, and be driven open after the last regeneration cycle that is not FILL. NOTE: If the control valve enters into an error state during regeneration mode, the no hard water bypass valve will remain in its current state until the error is corrected and reset. Press NEXT to go to Step 10CS.

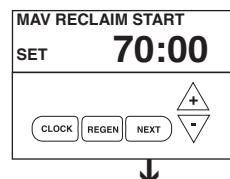


**STEP 7CS – Configuring the Control Valve for Separate Source Operation** - Select Separate Source Enabled for control operation. For separate source operation, the three wire connector is not used. Selection requires that a connection to a MAV is made to the two pin connector labeled ALTERNATOR MAV DRIVE located on the printed circuit board. The C port of the MAV must be connected to the valve inlet and the A port connected to the separate source used during regeneration. The B port must be connected to the feed water supply. When set to Separate Source Enabled the MAV will be driven closed before the first regeneration cycle, and be driven to open after the last regeneration cycle.

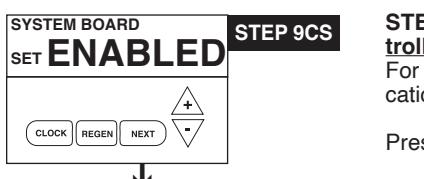
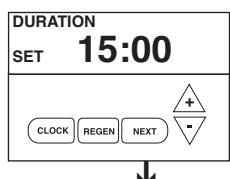
NOTE: If the control valve enters into an error state during regeneration mode, the MAV will remain in its current state until the error is corrected and reset. Press NEXT to go to Step 10CS.



**STEP 8CS – Configuring the Control Valve for Water Reclamation Mode** - Select Reclamation Enabled for control operation. Motorized Alternating Valve will advance to Bypass at a set time after the beginning of regeneration, and return to Service after a set duration.

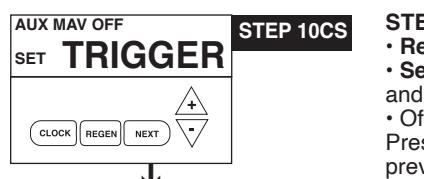


The Alternating MAV transitions to Bypass at the set time after the start of regeneration. The start of regeneration is defined as the first cycle that is not FILL, SOFTENING or FILTERING. The Alternating MAV will transition back to Service after the completion of the preset duration time, labeled MAV Reclaim Stop.



**STEP 9CS – Configuring the Control Valve to operate with the Hellenbrand System Controller** - Select System Board Enabled to link the Control Valve to the Clack System Controller. For communication between the Control Valve and the System Controller a three wire communication cable is required.

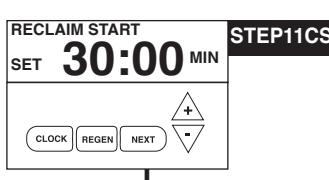
Press NEXT to go to Step 10CS. Press REGEN to return to previous step.



**STEP 10CS – Use the ▲ or ▼ buttons to select one of the following:**

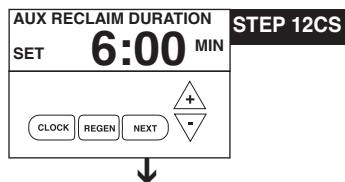
- **Reclaim** – Allows brine reclamation
- **Separate Source** – Allows Auxiliary MAV to switch positions before the start of regeneration and to switch back at the end of regeneration. See instructions in Step 13CS.
- **Off - Factory Setting is Off**

Press NEXT to go to Step 11CS when reclaim selected as trigger. Press REGEN to return to previous step.



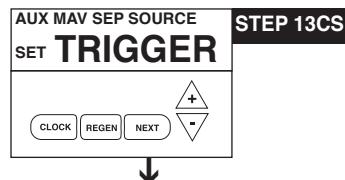
**STEP 11CS – If reclaim is selected in Step 10CS. Use the ▲ or ▼ buttons to select the number of minutes after the start of regeneration before the MAV will divert the brine waste water from the plumbing drain receptacle to the brine tank. Start of regeneration is defined as any mode that is not fill or softening.**

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



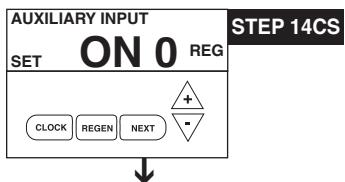
**STEP 12CS** – Only displays if reclamation of brine is enabled in Step 10CS. Use the ▲ or ▼ buttons to select the number of minutes to divert the brine waste water to the brine tank. After the minutes count down to zero the waste water will once again be diverted to the plumbing drain receptacle.

Press NEXT to go to Step 13CS. Press REGEN to return to previous step.



**STEP 13CS** – Separate source selection requires connection of motorized alternator valve (MAV) to Auxiliary Drive two-pin connection on board.

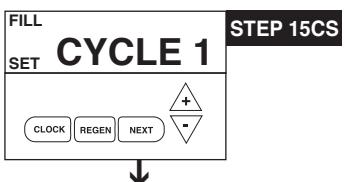
Auxiliary MAV Drive set to operate with a Separate Source trigger. Auxiliary MAV transitions to Bypass before the start of regen cycle #1, AFTER Alternator MAV motor transition. Auxiliary MAV transitions back to Service at the completion of the last programmed regen cycle, once the Valve Motor deactivates and BEFORE Alternator MAV transition (if scheduled). Auxiliary MAV will NOT automatically return to Service while manually stepping valve through regen, MAV will remain in Bypass until regen cycle end. Press NEXT to go to Step 14CS. Press REGEN to return to previous step.



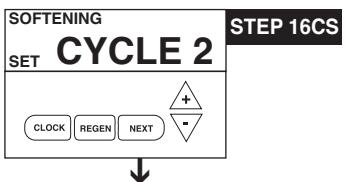
**STEP 14CS** – This display will be available to select the use of an outside signal to control the initiation of a regeneration. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

- **ON 0 REGEN** – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur immediately.
- **DELAY REGEN** – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur at the schedule regeneration time.
- **HOLD REGEN** – If the dP switch is closed a regeneration will be prevented from occurring.
- **OFF - Factory setting is off**

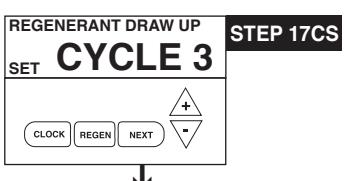
Press NEXT to go to Step 16CS. Press REGEN to return to previous step.



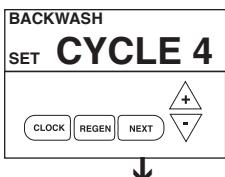
**STEP 15CS** – Press the ▲ or ▼ buttons until selection of first cycle appears in left upper corner, in this example FILL is selected. Press NEXT to go to Step 16CS. Press REGEN to return to previous step.



**STEP 16CS** – Press the ▲ or ▼ buttons until selection of second cycle appears in left upper corner, in this example SOFTENING is selected. For a H125 control valve: prior to selecting DN or UP or not selecting a regenerant flow cycle, verify the correct valve body, main piston, regenerant piston and stack are being used and the injector or injector plug(s) are in the correct location. Press NEXT to go to Step 17CS. Press REGEN to return to previous step.

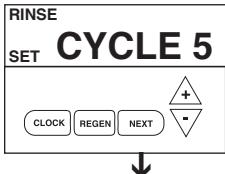


**STEP 17CS** – Press the ▲ or ▼ buttons until selection of third cycle appears in left upper corner, in this example REGENERANT DRAW UP is selected. Press NEXT to go to Step 18CS. Press REGEN to return to previous step.



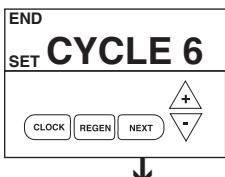
STEP 18CS

**STEP 18CS** – Press the ▲ or ▼ buttons until selection of fourth cycle appears in left upper corner, in this example BACKWASH is selected. Press NEXT to go to Step 19CS. Press REGEN to return to previous step.



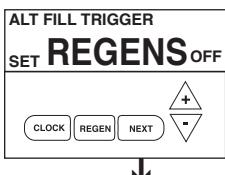
STEP 19CS

**STEP 19CS** – Press the ▲ or ▼ buttons until selection of fifth cycle appears in upper left corner, in this case RINSE is selected. Press NEXT to go to Step 20CS. Press REGEN to return to previous step.



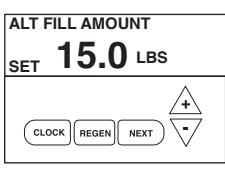
STEP 20CS

**STEP 20CS** – Press the ▲ or ▼ button until last regeneration cycle; END appears (up to 9 regeneration modes are possible). **End must be selected as last cycle.** Press NEXT to go to Step 21CS.



STEP 21CS

**STEP 21CS** – Press the ▲ or ▼ button to select number of standard regenerations which would trigger one alternate brine fill amount. Range: 1-99. **Factory setting is Off.** Press NEXT to go to Step 22CS.



STEP 22CS

**STEP 22CS** – Select amount of salt to be used when alternate regeneration requested. This screen is not displayed if off is selected in previous step. Softener Range 0.1–200 lbs. Filter Range 0.05–20.0 Gallons.

## 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 brine tank and the air check at the bottom of the brine pick-up tube shuts off. **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 8 when you are ready to start your softener.

## 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 on page 5.
- o. Put on brine tank cover.

# TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
<p>After resolving the cause of any error code or any service work on valve, press NEXT &amp; REGEN simultaneously for 5 seconds or disconnect power supply for 5 seconds at PC board and reconnect to resynchronize software with piston position.</p>		
<b>VALVE ERROR CODES</b>		
Error Code 101 - Unable to recognize start of regeneration	A1. Control not reading piston position	A1. Resynchronize software with piston position by pressing start of regeneration NEXT and REGEN buttons simultaneously for 5 seconds, until screen changes. Initiate regeneration to verify function by pressing and holding REGEN button until regeneration initiates, step through regeneration modes by pushing REGEN button each time motor stops. A2. Verify motor connection to PC board; motor wires intact and motor fully inserted to engage pinion. A3. Verify correct assembly; PC board snapped onto drive bracket and wires are in backplate guides and drive bracket snapped onto backplate. Verify three drive gears are in place on drive bracket.
Error Code 102 - Unexpected stall	B1. Mechanical Binding	B1a. Check for any foreign material in stack assembly impeding piston movement and remove; verify seals intact and in place in stack assembly, if not replace stack assembly. B1b. Check for incorrect assembly, drive bracket not snapped into place, motor pushed inside of barrel of drive bracket (black gear on motor end should be flush with end of shaft). B1c. Drive gears unable to rotate freely - replace gear(s) if not rotating freely. B2. Motor unable to move piston, check voltage is present on 12V DC motor at start of regeneration modes. Transformer should provide 12 volts when plugged into outlet and not attached to board - if not replace transformer
Error Code 103 - Motor ran too long, timed out trying to reach next position	C1. High drive forces on piston	C1. Loosen drive cap gear 1/4 turn C2. Address high drive forces C3. Motor failure during regeneration-replace motor
Error Code 104 - Motor ran too long, timed out trying to reach home position	D1. Piston unable to reach home position	D1. Incorrect assembly; check drive bracket is correctly seated and snapped into place on backplate, wires outside of guides on backplate can impede drive bracket from correct position. D2. Check PC board is seated on posts and snapped into place on drive bracket D3. Drive gear labels dirty or missing, missing or broken gear, replace as needed
<b>MAV ERROR CODES</b> <p>After resolving any MAV error or servicing MAV, resynchronize software with piston positioning by pressing NEXT and REGEN buttons simultaneously for 5 seconds or disconnecting power from PC board for 5 seconds and reconnecting.</p>		
<b>ALTERNATING MAV DRIVE - ERROR CODES 106 &amp; 107</b>		
Error Code 106 - Alternating MAV ran too long		A1. Control valve is programmed for alternating or as NHWB without having MAV connected to board. Reprogram valve to proper setting or connect MAV to alternating MAV drive on PC board A2. MAV motor not fully engaged with gears B1. Open MAV and check for foreign material on stack assembly, remove if present, verify seals intact and in place. If not, replace stack assembly B2. Drive gear should spin freely-replace if necessary
Error Code 107 - Alternating MAV stalled	Mechanical Binding	
<b>AUXILIARY MAV DRIVE - ERROR CODES 116 &amp; 117</b>		
Error Code 116 - Auxiliary MAV ran too long		A1. Control valve is programmed for auxiliary MAV without having MAV connected to board. Reprogram valve to proper setting or connect MAV to two-pin connection labeled auxiliary drive on PC board A2. MAV motor not fully engaged with gears B1. Open MAV and check for foreign material on stack assembly, remove if present, verify seals intact and in place. If not, replace stack assembly B2. Drive gear and reducing gears should spin freely, replace if necessary
Error Code 117 - Auxiliary MAV stalled	Mechanical Binding	
1. Control valve stalled in regeneration	A. Motor not operating B. No electric power at outlet C. Defective transformer D. Defective PC board E. Broken drive gear or drive cap assembly F. Broken piston retainer G. Broken main or regenerant piston	A. Replace Motor B. Repair outlet or use working outlet C. Replace transformer D. Replace PC board E. Replace drive gear or drive cap assembly F. Replace drive cap assembly G. Replace main or regenerant piston

## TROUBLE SHOOTING

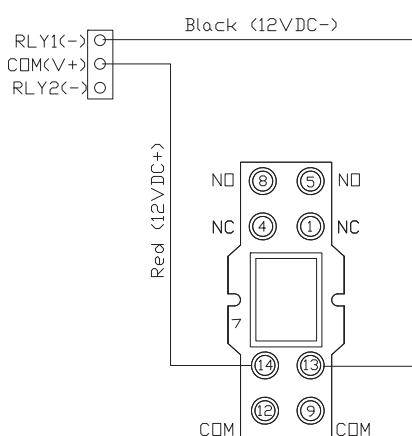
PROBLEM	CAUSE	CORRECTION
2. Control valve does not regenerate automatically when REGEN button is depressed and held	<ul style="list-style-type: none"> <li>A. Transformer unplugged</li> <li>B. No electric power at outlet</li> <li>C. Broken drive gear or drive cap assembly</li> <li>D. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>A. Connect transformer</li> <li>B. Repair outlet or use working outlet</li> <li>C. Replace drive gear or drive cap assembly</li> <li>D. Replace PC board</li> </ul>
3. Control valve does not regenerate automatically but does when REGEN button is depressed	<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> <li>F. Programming error</li> </ul>	<ul style="list-style-type: none"> <li>A. Put control valve in service position</li> <li>B. Connect meter to PC board</li> <li>C. Remove meter and check for free rotation or foreign matter</li> <li>D. Replace meter</li> <li>E. Replace PC board</li> <li>F. Check control valve set-up procedure</li> </ul>
4. Time of day flashes on and off	<ul style="list-style-type: none"> <li>A. Battery back-up maintains time-of-day up to 2 years in event of power outage and battery is not depleted. Time of day flashes when battery is depleted.</li> <li>B. Prior to 2/2007, PC board did not have battery back-up - capacitor held time of day up to 2 hours. Power outage &gt; 2 hours.</li> </ul>	<ul style="list-style-type: none"> <li>A. Reset time of day and replace battery on PC Board (Lithium coin type battery 2032)</li> <li>B. Reset time of day.</li> </ul>
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. 1. Install upper distributor if missing. 2. Ensure that water supply system has an air eliminator.</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 o-ring(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, page 24.</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>

## TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
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, page 23.</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. Short in meter</li> <li>E. Battery depleted</li> <li>F. 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. Unplug meter from PC board, if LED display lights appropriately, replace meter</li> <li>E. Replace 2032 lithium battery</li> <li>F. 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>
17. Control valve regenerates at wrong time of day	<ul style="list-style-type: none"> <li>A. Power outages &gt; 2 years</li> <li>B. Time of day not set correctly</li> <li>C. Time of regeneration incorrect</li> <li>D. Control valve set at "on 0" (immediate regeneration)</li> <li>E. Control valve set at NORMAL + on 0</li> </ul>	<ul style="list-style-type: none"> <li>A. Reset control valve to correct time of day</li> <li>B. Reset to correct time of day</li> <li>C. Reset regeneration time</li> <li>D. Check control valve set-up procedure regeneration time option (see page 32)</li> <li>E. Check control valve set-up procedure regeneration time option (see page 32)</li> </ul>

## RELAY TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
18. Relay does not energize		
A. Relay driver programmed on "Time"	<ul style="list-style-type: none"> <li>A. Programmed incorrectly</li> <li>B. Defective relay, See figure below</li> <li>C. Defective PC Board</li> <li>D. Faulty wire connections between PC board and relay</li> </ul>	<ul style="list-style-type: none"> <li>A. Reprogram, see page 12</li> <li>B. Replace Relay</li> <li>C. Replace PC Board</li> <li>D. Check and repair wire connections</li> </ul>
B. Relay driver programmed on "Gallons"	<ul style="list-style-type: none"> <li>A. Programmed incorrectly</li> <li>B. Faulty meter connection</li> <li>C. Defective relay, See figure below</li> <li>D. Defective PC Board</li> <li>E. Faulty wire connections between PC board and relay</li> </ul>	<ul style="list-style-type: none"> <li>A. Reprogram, see page 12</li> <li>B. Repair or replace meter assembly</li> <li>C. Replace Relay</li> <li>D. Replace PC Board</li> <li>E. Check and repair wire connections</li> </ul>
19. Relay energized during regeneration	<ul style="list-style-type: none"> <li>A. Relay programmed as "on REGEN gallons"</li> </ul>	<ul style="list-style-type: none"> <li>A. Reprogram, see page 12.</li> </ul>



### Relay operation while in error modes

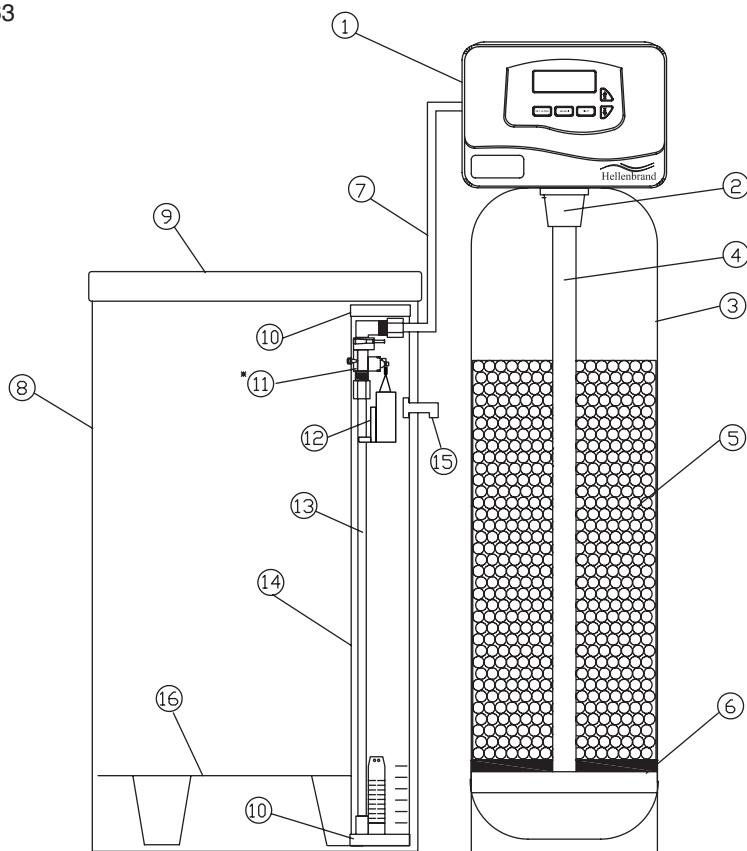
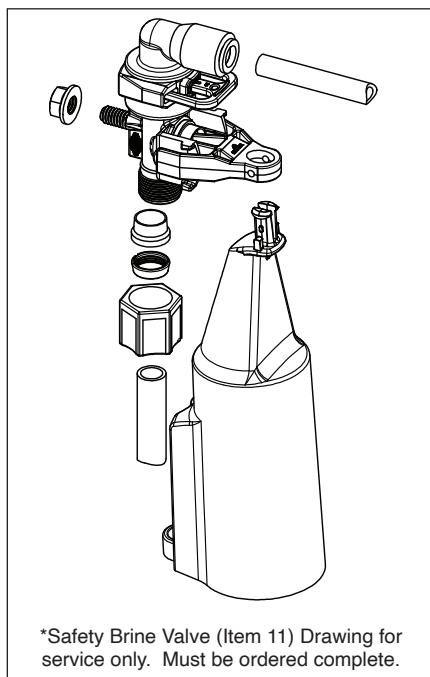
1. Relays should turn off immediately whenever a Valve Error occurs.
2. Relays should remain on and continue to operate as programmed if a MAV Error (106/107 or 116/117) occurs and the valve has already entered regen.
3. Relays should remain off, and not operate as programmed, if a MAV Error (106/107 or 116/117) occurs and the valve has not entered regen.

## PROMATE ECOMAX CONDITIONER & BRINE TANK ASSEMBLIES

Item	Description	Qty	Part #
<b>PM EcoMax Softeners</b>			
	PM EcoMax-9	1	109583
	PM EcoMax-10	1	109584
	PM EcoMax DMT-10	1	109608
	PM EcoMax-12	1	110564
	PM EcoMax-13	1	110565
	PM EcoMax-14	1	110566
	PM EcoMax-16	1	110567
	PM EcoMax-18	1	110568
1	Metered Control Valve	1	109570
2	Top Diffuser	1	101539
3&4	Mineral Tank Assembly		<b>Mineral Tank</b>
	PM EcoMax-8	1	110560
	PM EcoMax-9 9 x 48	1	110561
	PM EcoMax-10 10 x 54	1	110563
5	Ion Exchange Resin	*	110102
6	Vortech Plate Distributor		*See Specifications for amount
7-15	Brine Tank Assy (18x40)-Granite	1	104449
9	Brine Tank Cover 18x40	1	101448
10	Cap, Brine Well	2	101365
11*	Safety Brine Valve	1	101274
12	Float Assembly	1	101660
13	Air Check	1	101181
14	Brine Well 40"-41"	1	102877
15	2-Piece Overflow	1	102217
16	Grid Plate 18" (optional)	1	101758
	Owners Manual (Not Shown)	1	800663

\*Must be ordered as complete assembly

Same brine tank recommended for each model



## FRONT COVER AND DRIVE ASSEMBLY

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	101473 / 111094	PM EcoMax Cover w/Label	1
2	102096	Motor	1
3	101262	Drive Bracket & Spring Clip	1
4	109807	PC Board	1
5	101746	Drive Gear 12x36	3
6	101459	Drive Gear Cover	1
7	Relay Kit Options:	See Page 24 for Relay Wiring	1
	103724	PCM Relay Installed	
	103723	PCM Relay Kit	
	103730	Pigtail Relay Installed	
	103729	Pigtail Relay Kit	
8	102385	Relay Only	1
Not Shown	111723	Transformer 110V-15V DC	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.

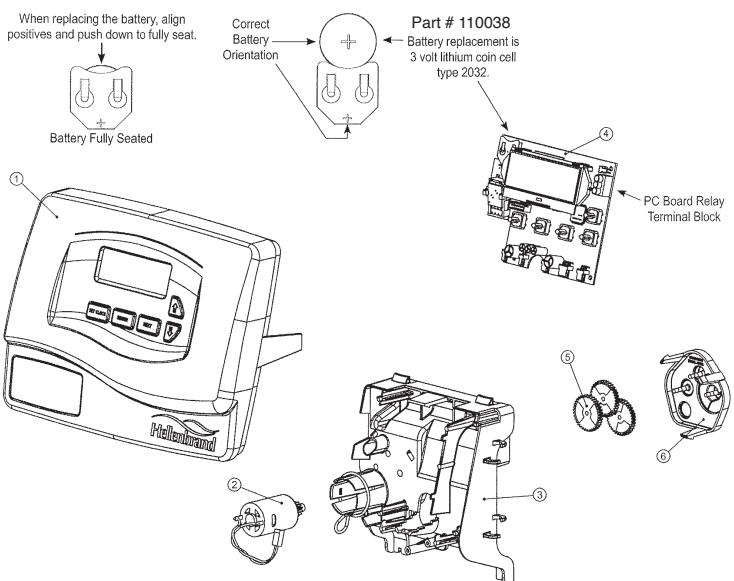


Figure 14

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

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102548	Spacer Stack Assy	1
2	101613	Drive Cap Assy.	1
3	102167	O-Ring 228 -Drive Cap Assy.	1
4	102297	Piston Upflow Assy.	1
5	102296	Regenerant Piston	1
6	102192	O-ring 337-tank	1
7	102165	O-ring - Distributor Tube	1
8	101189	Back Plate	1
9	102892	Service Wrench - Not Shown	1
10	111418	Upflow Valve Body	1

Valve body is upflow, must be ordered as upflow.

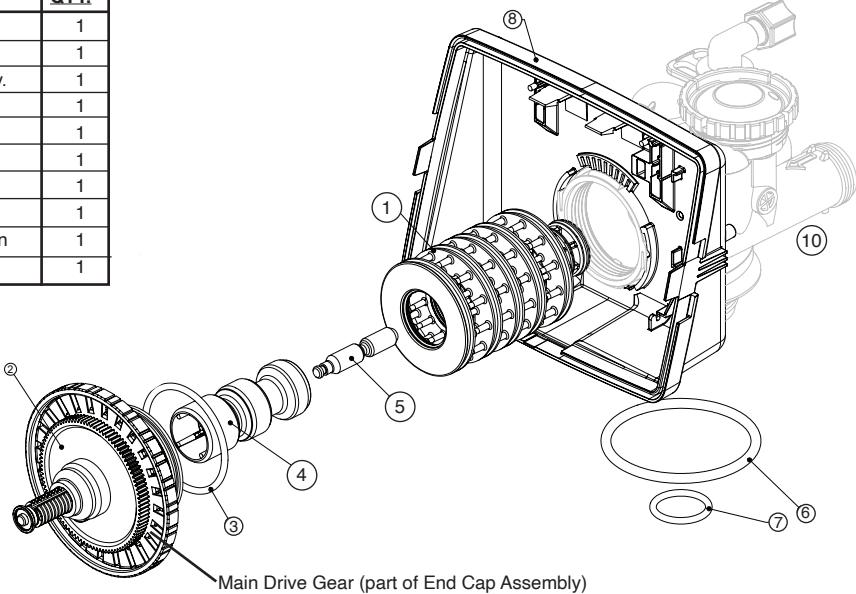


Figure 15

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: 214) 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	101375	Injector Cap	1
2	102159	O-ring 135	1
3	102457	Injector Screen	1
4	102319	Injector Assy. Z Plug-Filter	1
5	101825 101826 101827 101828 101829 101830 101831 101832 101833 101834 101835	Injector Assy. A Black Injector Assy. B Brown Injector Assy. C Violet Injector Assy. D Red Injector Assy. E White Injector Assy. F Blue Injector Assy. G Yellow Injector Assy. H Green Injector Assy. I Orange Injector Assy. J Light Blue Injector Assy K Light Green	1
Not Shown	106767	O-ring 011	*
Not Shown	106768	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 32 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.

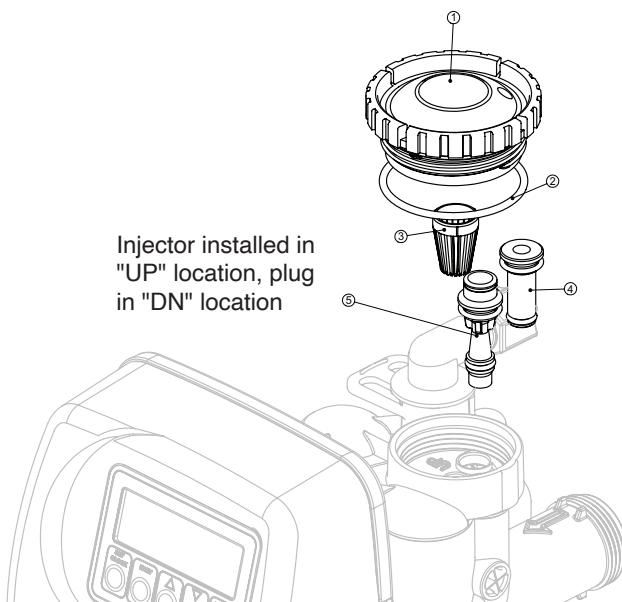
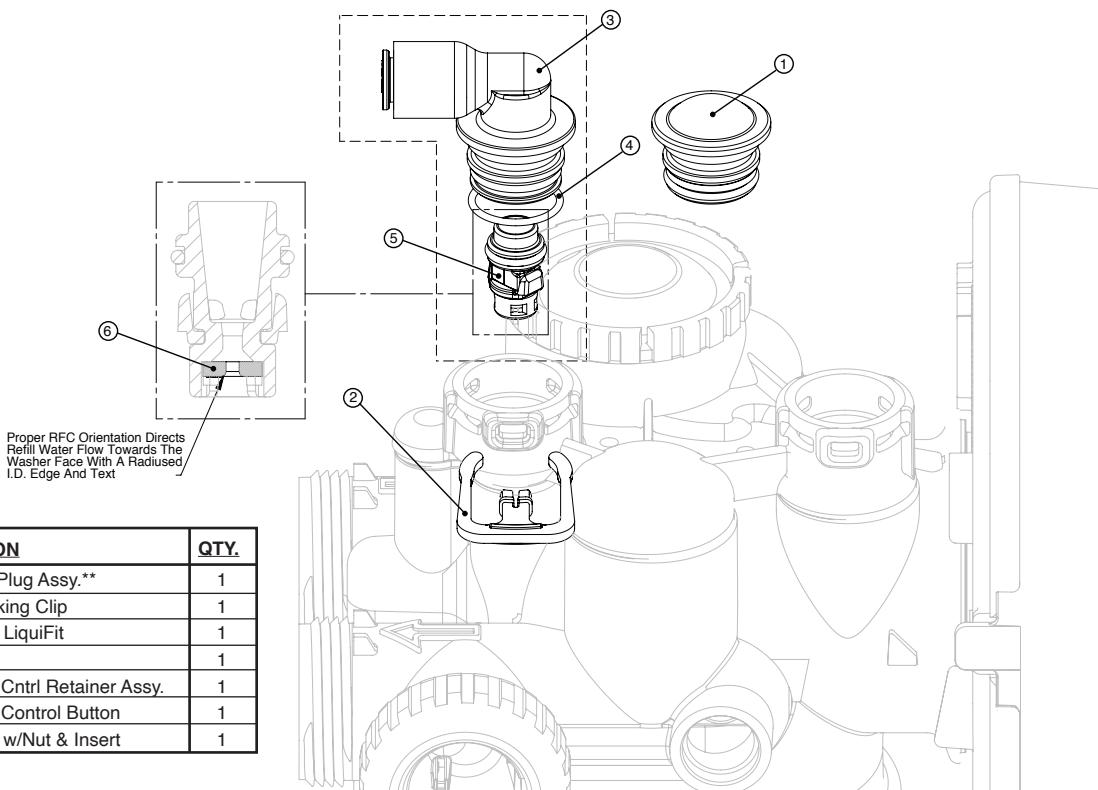


Figure 16

## REFILL AND REFILL PORT PLUG



ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102322	Refill Port Plug Assy.**	1
2	101414	Elbow Locking Clip	1
3	111389	Elbow 3/8" LiquiFit	1
4	102153	O-ring 019	1
5	102418*	Refill Flow Cntrl Retainer Assy.	1
6	102421	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	101414	Elbow Locking Clip	1
2	101871	Polytube Insert, 5/8"	Optional
3	102131	Nut 3/4" Drain Elbow	Optional
4-5	101618	Drain Elb 3/4" Male Assy-Vent	Optional
<b>4-5</b>	<b>101619</b>	Drain Elb 3/4" Male Assy-No Vent	<b>1</b>
5	102153	O-ring 019	1
6	102406	DLFC Retainer Assy.	1
7	101551	DLFC 0.7 gpm for 3/4"	1
	101552	DLFC 1.0 gpm for 3/4"	
	101556	DLFC 1.3 gpm for 3/4"	
	101559	DLFC 1.7 gpm for 3/4"	
	101574	DLFC 2.2 gpm for 3/4"	
	101577	DLFC 2.7 gpm for 3/4"	
	101583	DLFC 3.2 gpm for 3/4"	
	101588	DLFC 4.2 gpm for 3/4"	
	101591	DLFC 5.3 gpm for 3/4"	
	101593	DLFC 6.5 gpm for 3/4"	
	101594	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 32, for correct DLFC size for your unit.

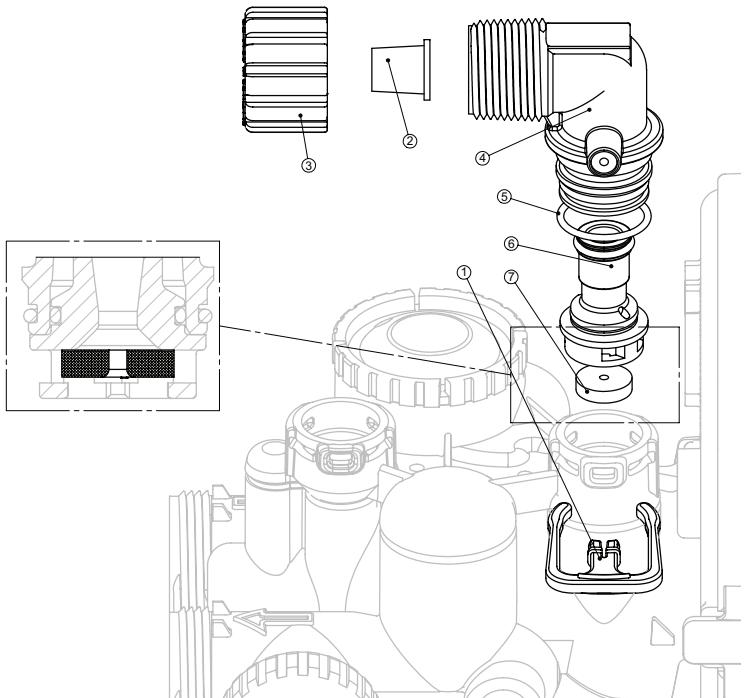


Figure 18

## DRAIN LINE - 1"

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	101414	Elbow Locking Clip	1
2	101635	Drain Ftg, 1" Straight Assy-Vent	optional
<b>2</b>	<b>101636</b>	Drain Ftg, 1" Straight Assy-No Vent	<b>1</b>
3*	101244	Drain Ftg Body, 1"	1
4*	101160	Drain Ftg Adapter, 1"	1
5*	102153	O-ring 019	1
6*	102437	Split Ring	1
7*	102141	Nut, 1" QC	1
8*	102165	O-ring 215	1
9	101599	DLFC 9.0 gpm for 1"	
	101562	DLFC 10.0 gpm for 1"	
	101564	DLFC 11.0 gpm for 1"	
	101567	DLFC 13.0 gpm for 1"	
	101568	DLFC 15.0 gpm for 1"	
	101571	DLFC 17.0 gpm for 1"	
	101578	DLFC 20.0 gpm for 1"	
	101580	DLFC 25.0 gpm for 1"	

See System Specifications DLFC on page 32, 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.

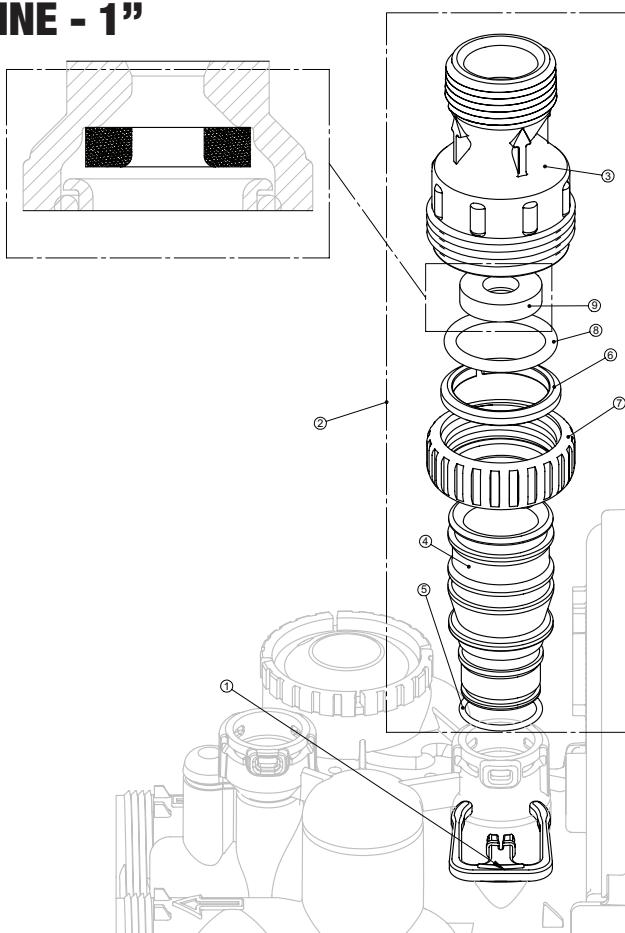


Figure 19

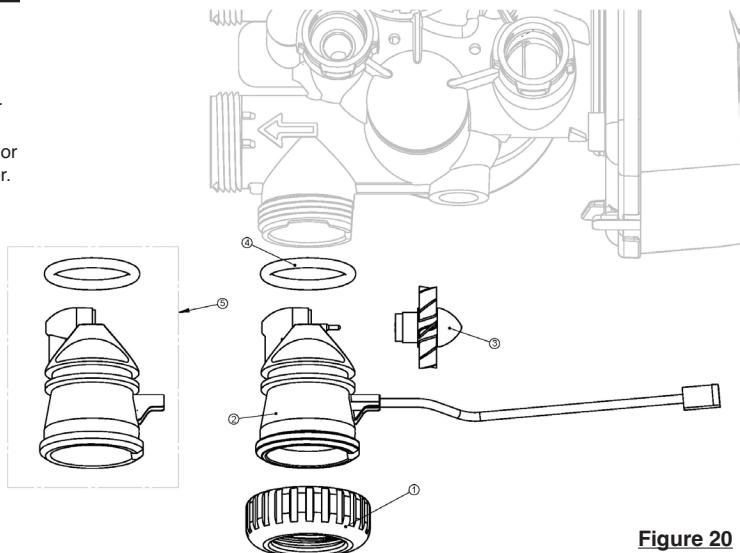
# WATER METER AND METER PLUG

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" QC	1
2-4	102051	Meter Assy.	1
3	102687	Turbine Assy.	1
4	102165	O-ring 215	1
5	102321	Meter Plug Assy.**	1

\*Order number 102051 includes 102687 and 1102165, 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

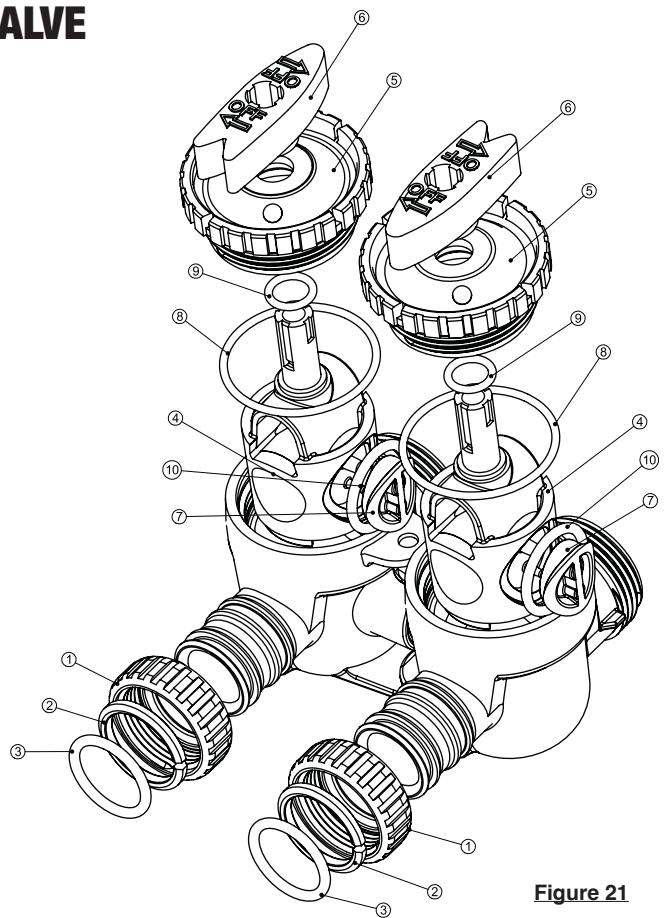
ITEM NO.	ORDER NO.	DESCRIPTION	QTY
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-ring 215	2
4	102450	Bypass 1" Rotor	2
5	110997	Bypass Cap	2
6	110998	Bypass Handle	2
7	109479	Bypass Rotor Seal Retainer	2
8	102159	O-ring 135	2
9	102161	O-ring 112	2
10	102160	O-Ring 214	2

### (Not Shown) Bypass Vertical Adapter Assembly

ORDER NO.	DESCRIPTION	QTY
102141	Nut 1" Quick Connect	2
102437	Split Ring	2
102165	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.

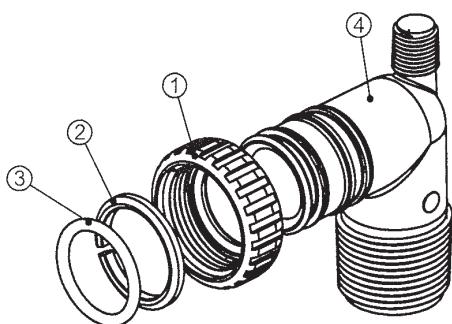


**Figure 21**

## INSTALLATION FITTING ASSEMBLIES

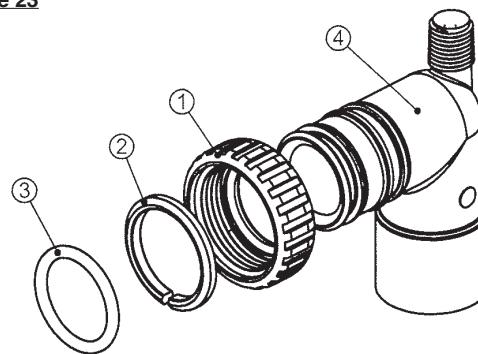
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106761	Fitting 1" PVC Male NPT Elbow.	2
1-4	101639	Fitting 1" PVC Male NPT Asy. (Set of 2)	1

**Figure 22**



ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106762	Fitting 3/4" & 1" PVC Solv. 90	2
1-4	101640	Fitting 3/4" & 1" PVC Solv 90 (set of 2)	1

**Figure 23**

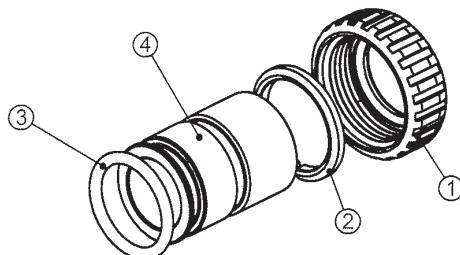


The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

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.

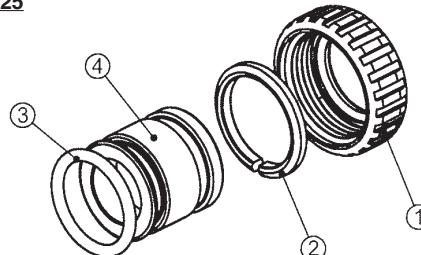
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106763	Fitting 1" Brass Sweat	2
1-4	108618	Fitting 1" Lead Free Brass Sweat Asy (Set of 2)	1

**Figure 24**



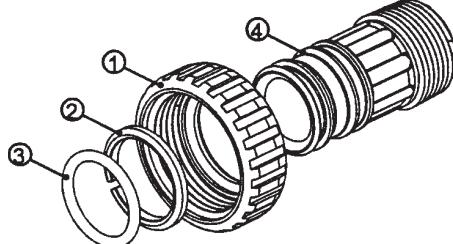
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106764	Fitting 1" Brass Sweat	2
1-4	108617	Fitting 1" Lead Free Brass Sweat Asy (Set of 2)	1

**Figure 25**



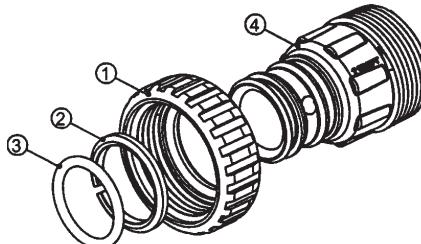
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106765	Fitting 1" Plastic Male NPT	2
1-4	101643	Fitting 1" Male NPT Asy. (Set of 2)	1

**Figure 26**



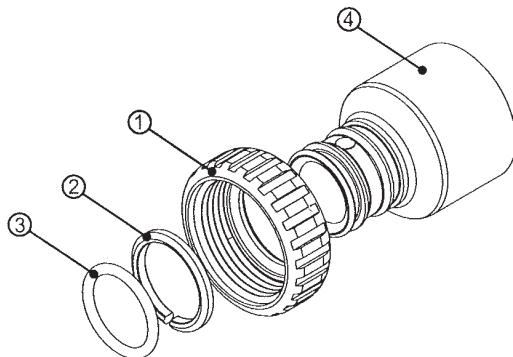
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106766	Fitting 1-1/4" Plastic Male NPT	2
1-4	101644	Fitting 1-1/4" Male NPT (Set of 2)	1

**Figure 27**



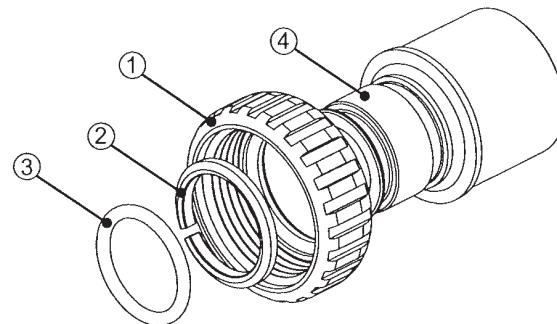
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106787	Fitting 1-1/4"&1-1/2" Brass Sweat	2
1-4	101648	Fitting 1-1/4"&1-1/2" Brass Swt Asy.(Set of 2)	1

**Figure 28**



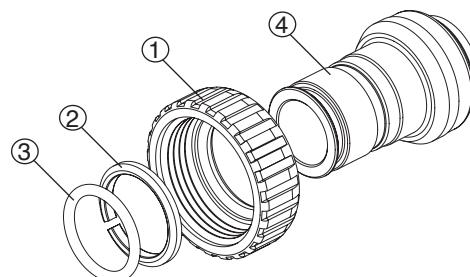
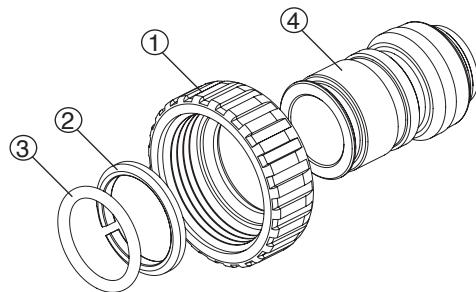
ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106786	Fitting 1-1/4"&1-1/2" PVC Solvent	2
1-4	101646	Fitting 1-1/4"&1-1/2" PVC Solvent Asy.(Set of 2)	1

**Figure 29**

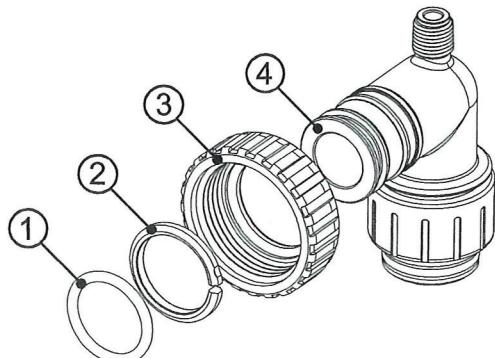


ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106769	Fitting 3/4" Brass Sharkbite	2
1-4	110135	Fitting 3/4" Brass Sharkbite Asy.(Set of 2)	1

ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	106770	Fitting 1" Brass Sharkbite	2
1-4	110136	Fitting 1" Brass Sharkbite Asy. (Set of 2)	1



ITEM NO.	ORDER NO.	DESCRIPTION	QTY.
1	102141	Nut 1" Quick Connect	2
2	102437	Split Ring	2
3	102165	O-Ring 215	2
4	108478	Fitting 3/4" John Guest	2
1-4	108478	Fitting 3/4" JG QC Assy (Set of 2)	1



## PROMATE ECOMAX SYSTEM SPECIFICATIONS

Model #	PM6 <sup>1</sup>	PM6 <sup>1</sup>	PM6 <sup>1</sup>	PM6 <sup>1</sup>	PM6*	PM6*	PM6*	PM6*
	EcoMax 8	EcoMax 9	EcoMax10	EcoMax12	EcoMax13	EcoMax14	EcoMax16	EcoMax18
Regeneration Gallons on Factory Settings @ 35 psi	24.1	33.5	45.7	62.4	78.7	93.5	127.5	180
<b>Capacity</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>	<b>Grains</b>
High Efficiency Salting (5427gr/lb) <sup>2</sup>	17,909	23,878	33,104	47,757	57,526	66,209	89,545	107,454
Refill Lbs. of Salt	3.3	4.4	6.1	8.8	10.6	12.2	16.5	19.8
<b>Low Salting (5200 grains/lb)</b>	<b>20,800</b>	<b>27,664</b>	<b>38,480</b>	<b>55,640</b>	<b>66,560</b>	<b>76,960</b>	<b>104,000</b>	<b>124,800</b>
Refill Lbs. of Salt	4	5.32	7.4	10.68	12.8	14.8	20	24
<b>Service Flow Rates</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>	<b>GPM</b>
Service Flow @ 10 psi	5.5	6.8	7.8	10.9	11.6	11.9	12.7	13.6
Max. Service Flow @ 15 psi	7.9	9	10.4	12.5	14.1	14.7	15.9	16.2
Resin Tank Size	8x44	9x48	10x54	12x52	13x54	14x65	16x65	18x65
<b>Recommended Brine Tank*</b>	18x40	18x40	18x40	18x40	18x40	18x40	18x40	18x40
Brine Line Size	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Water to drain does not exceed 5 gpm in any EcoMax model								

**Factory Settings at Low Salting, 5200 grains/lb.**

1. System conforms to ANSI/NSF 44 for performance claims as verified and substantiated by test data.
2. High efficiency salting is maximum efficiency system can achieve, efficiency is only valid at set salt dosage. The operational efficiency may be less than the tested efficiency due to individual application factors such as water hardness, TDS, water usage or other contaminants in water supply that may reduce softener capacity.

\*Larger units utilize same engineering but have not been independently tested according to NSF44.

**Operating Parameters:**

up to 40 gpg hardness	Upflow high efficiency water softeners are intended for clean water such as
Up to 0.5 ppm Iron	municipal supplies or well water

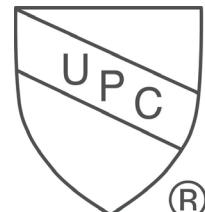
Softeners are not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. EcoMax softeners are demand initiated regeneration softeners which comply with specific performance specifications designed to minimize the amount of regeneration brine and water used in operation

Maximum working pressure 125 psi	Minimum working pressure 20 psi
Maximum operating temperature 110F	Minimum operating temperature 40F

Reduction Capabilities for the following contaminants have also been verified by test data:

When hardness is reduced to less than 1gpg, radium & barium will be effectively reduced

US EPA Max Contaminant Level	
Barium	2 mg/L
Radium	5 pCi/L



For general operation and maintenance information, refer to owner's manual. For specific information related to resin volumes and discharge water during regeneration, contact Hellenbrand, Inc.

Recommend using solar salt or cleanest salt available for softener regeneration

**\*If Systemate panel is used, controls must be set as post fill and the brine tank sized accordingly**

Hellenbrand products are not for sale or distribution into the State of California effective 8/31/18.

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## PROGRAMMING OPTIONS

Reserve Gallons	Regeneration Type	Days Override	Results (Reserve capacity estimate based on history of water usage)
AUTO	DELAYED REGEN	oFF	Reserve capacity automatically estimated. Regeneration occurs when gallons capacity falls below the reserve capacity at the next Regen Set Time.
AUTO	DELAYED REGEN	1 to 28	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity falls below the reserve capacity or the specified number of days between regenerations is reached.
20 to 250,000	DELAYED REGEN	oFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity reaches 0.
oFF	DELAYED REGEN	1 to 28	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached.
20 to 250,000	DELAYED REGEN	1 to 28	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity reaches 0 or the specified number of days between regenerations is reached.
AUTO	IMMEDIATE REGEN	oFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs immediately when gallons capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur when gallons capacity reaches 0.
20 to 250,000	IMMEDIATE REGEN	oFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs immediately when gallons capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur on 0.
AUTO	DELAY + IMMEDIATE	oFF	Reserve capacity automatically estimated. Regeneration occurs when gallons capacity falls below the reserve capacity at the next Regen Set Time or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.
<b>AUTO*</b>	<b>DELAY + IMMEDIATE</b>	1 to 28 <b>*14</b>	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity falls below the reserve capacity or the specified number of days between regenerations is reached or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.
20 to 250,000	DELAY + IMMEDIATE	1 to 28	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when specified number of days between regenerations is reached or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.

**\*Factory settings in bold**

To "lockout" access to softener setup, diagnostic and valve history press  next,  and clock buttons in sequence.

To "unlock" repeat sequence, press  next,  and clock buttons in order. Time of Day, Hardness, Day Override and Time of Regeneration not included in Lockout.

## GENERAL SPECIFICATIONS

**OPERATING PRESSURES**

Minimum/Maximum ..... 20 psi-125 psi

**OPERATING TEMPERATURES**

Minimum/Maximum ..... 40° - 110° F

**METER**

Accuracy ..... ±5%  
Flow Rate Range ..... 0.25 - 27 GPM  
Gallon Range ..... 20 - 250,000

**DIMENSIONS**

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

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

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

# Residential Water Softener & Filter Limited Warranty

**INCLUDES – ProMate®, ProMate-1®, ProMate-5®, ProMate-6®, ProMate-7.0®,**

**ProMate-EcoMax®, ProMate-EcoMax Duo®, 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.

UNDER NO CIRCUMSTANCES SHALL HELLENBRAND BE LIABLE TO THE ORIGINAL CONSUMER PURCHASER OR TO ANY OTHER PERSON FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE, OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT, IN TORT OR OTHERWISE, AND REGARDLESS OF WHETHER HELLENBRAND WAS AWARE OF THE POSSIBILITY OF SUCH LOSS. THESE LIMITATIONS WILL APPLY REGARDLESS OF ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. Similarly, some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Hellenbrand products are not for sale or distribution into the State of California effective 8/31/18

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3/12/19