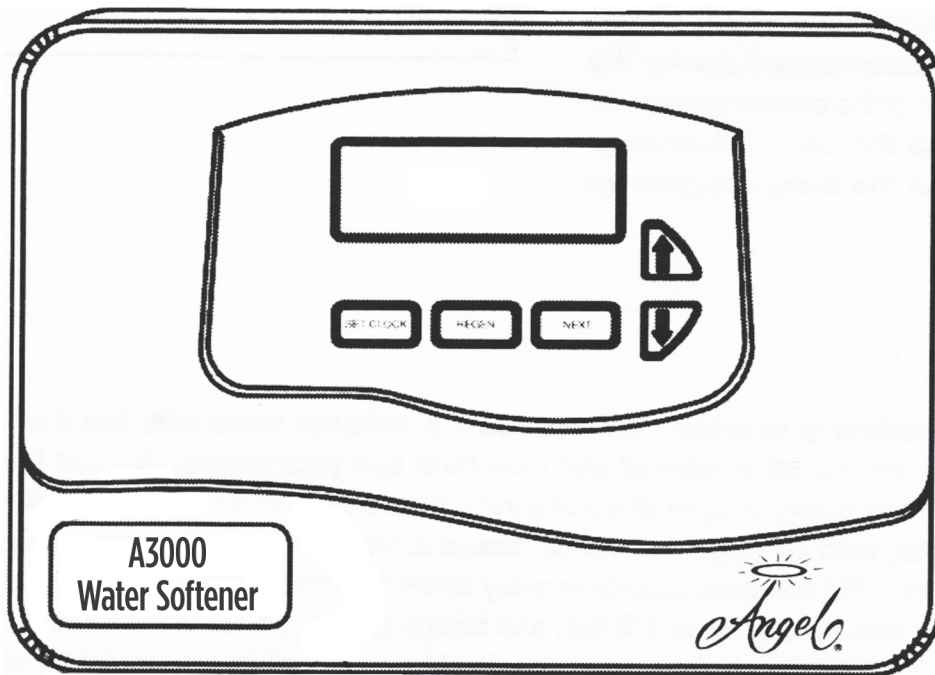




A3000 Series Water Softener



A3000 Series Water Softener Manual

www.angelwater.com
21 S. Main St. • Elburn, IL 60119 • 630.365.2600
214 S. Hager Ave. • Barrington, IL 60010 • 847.382.7800

WELCOME TO THE ANGEL FAMILY!



Thank you for purchasing our A5000-DMT Water Softener. We hope you enjoy this product to its full potential, and see as we have the benefits of clean, clear, purified water! Our staff is always available to answer questions you may have at 847.382.7800 or 630.365.2600.

www.angelwater.com

21 S. Main St. • Elburn, IL 60119 • 630.365.2600

214 S. Hager Ave. • Barrington, IL 60010 • 847.382.7800

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.

In the event that you need professional assistance for servicing your water softener, please contact the dealer who installed this system.

Table Of Contents

Frequently Asked Questions	4
Job Specification Sheet	5
Soft Water Basics	5
Operating Conditions	5
Pre-Installation Check List	7
Installation Instructions	8
Programming	9
Installer Programming	10
Softener Set-Up	11
Diagnostics	14
Valve History	15
Cycle Sequence	15
Water Softener Disinfection	17
Water Softener Draining Procedure	17
Troubleshooting	18-19
Specifications	20
Programming Options and General Specifications	21
Warranty	24

Frequently asked questions

- 1. Do I still use the same amount of soap in the dishwasher, clothes washer and showers now that I have a water softener?**
No, the Water Quality Association states soft water can save up to 55% on detergent use. Start with using half the amount of detergent previously used, this can be adjusted up or down based on preference. Soft water helps fabrics last longer, because hardness minerals combined with soap can make fabric fibers brittle.
- 2. What is the health impact of drinking soft water?** The sodium added to water by softening is a non-issue most of the time, even for people on a sodium-restricted diet. One could soften water with up to 75 grains per gallon hardness with sodium chloride and still be well within the US Food and Drug Administration's labeling of a "Low Sodium" beverage. People on a sodium-restricted diet should consult their physician.
- 3. Should I use soft water for my plants?** Some plants may be sensitive to even minute amounts of sodium. We suggest using hard water for watering plants, often a kitchen cold faucet is plumbed for hard water or the outside faucets are usually plumbed for hard water. If not, you can place your softener on bypass and fill water containers at the closest sink. Water from a reverse osmosis system can always be used to water plants.
- 4. Will water spots disappear now that I have soft water?** Water spots caused by hardness scale will disappear with a functioning water softener. However, other natural minerals dissolved in the water in high enough concentrations may cause spotting. These mineral spots will be much easier to wipe away compared to hardness spotting.
- 5. Will soft water cause my water or ice cubes to look or taste different?** Most people can tell the difference in taste between hard and soft water, it is a personal preference. Ice cubes will appear the same, they may look cloudy due to air in water or dissolved minerals, and this will not change because now they are made with softened water. A reverse osmosis drinking water system will provide clearer ice cubes.

Job specification sheet

MODEL NO. _____ ANGEL A3000 _____

*WATER TEST AT TIME OF INSTALLATION

_____ Hardness CaCO₃ (gpg) _____ Other _____
_____ Iron (ppm) _____ Other _____
_____ pH _____ Other _____

OPTIONAL RELAY SETTINGS

_____ Off
_____ On Time
_____ Start Time, Minutes into Regeneration
_____ Run Time
_____ On Gallons
Pulse per _____ Gallons
 _____ Minutes Relay Closed

*SIZING INFORMATION

All Water is Softened Except:

_____ Rear Hose Bib _____ Front Hose Bib _____ Kitchen Cold _____ Toilets _____ All Cold
_____ Other _____

The average family uses 75 gallons per person daily for all water uses in the home, about 50 gallons per person daily if soft water is not supplied to the toilets, and about 30 gallons per person daily if only hot water is softened.

_____ Daily Water Usage (Gallons/Person)
x _____ Family Size (Number of people in family)
= _____ Total Gallons Per Day
x _____ Grains Per Gallon of Hardness
 (Note: Add 5 grains per gallon of hardness for each ppm iron for total compensated hardness) =
_____ Total Grains Per Day

*INSTALLATION DATE _____

*SERIAL NUMBER _____

NOTES _____

Dealer Name _____ Angel Water, Inc. _____ Phone _____ 847-382-7800 _____

Address _____ 214 S Hager Ave, Barrington, IL 60010 _____

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.

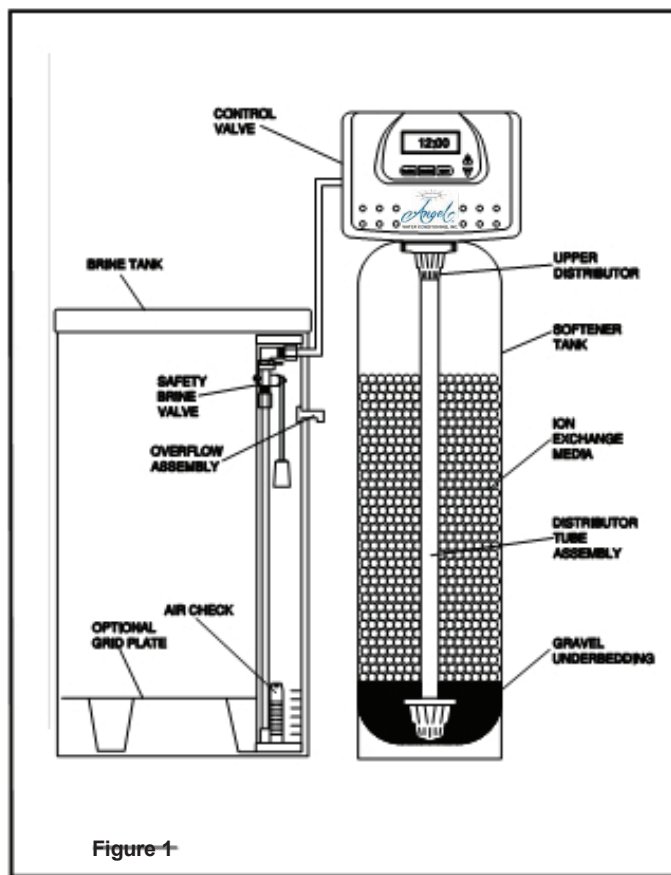
Hardness is measured in terms of grains. (This grain weight is derived from the average weight of a dry grain of wheat.) When your water is tested the grain hardness is calculated and expressed as grains per gallon (gpg). This calculation, as well as the number of people in your household will help determine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

Your water softener contains an ion exchange media (sometimes 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.

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



Maintenance of your softener

Salt: Salt to a softener is what gasoline is to a car. Not only must a softener have salt, but it should be the proper type to insure efficient recharging of the unit. Ask your dealer what type of salt may best suit your needs. Always have an adequate supply of salt on hand. Check the salt level of your brine tank every couple of weeks initially to determine how much salt you use - this will depend on how much water you use. As a rule of thumb, with 20 gpg hard water, about a 1/2 lb. of salt per person per day is used. In other words, a family of four uses 60 lbs. of salt a month. Fill the tank approximately three-fourths full, with a minimum of 12" of salt. 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 A3000 control is programmed with a brine tank prefill. Block salt does not dissolve quick enough to provide a good regeneration.

Cleaning Salt Tank: The salt tank may require periodic cleaning. Inspect the salt tank at least once a year for buildup of insoluble materials. It is recommended to periodically clean the salt tank no matter what kind of salt you are using. See page 15, Miscellaneous #2 for details on cleaning.

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

Operating Condition

Your water conditioner has been designed to adequately reduce up to 100 grains per gallon of hardness as well as up to 2 ppm of ferrous bicarbonate iron. This is iron that is dissolved in an oxygen-free water supply. It is not visible to the eye in a freshly drawn sample because the water appears clear. But upon 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 then be seen and if allowed to remain in the supply will cause discolored water. In order for your conditioner to remove the iron, air (oxygen) must

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

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

Pre-installation Checklist

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

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

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

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

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

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

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

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

Bypass Valve Operation

NORMAL OPERATION

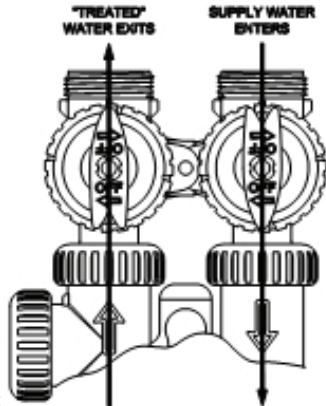


Figure 2

BYPASS OPERATION

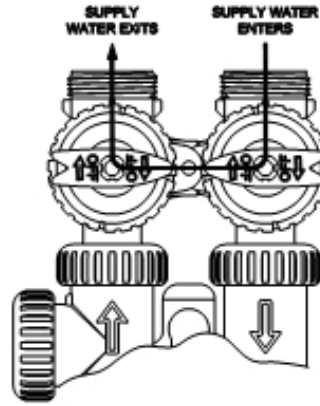


Figure 3

DIAGNOSTIC MODE

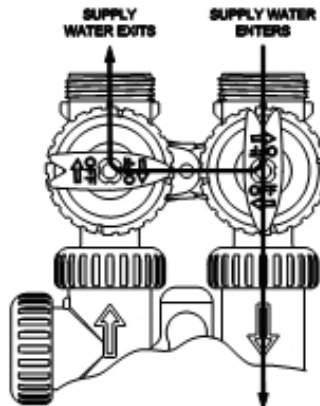


Figure 4

SHUT OFF MODE

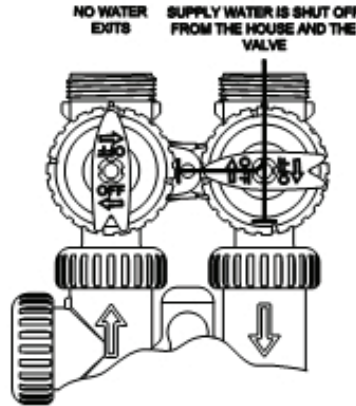


Figure 5

Installation Instruction

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

CAUTION:

- Do not use vaseline, oils or other hydrocarbon lubricants or spray silicone anywhere. A silicon lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**
- Do not use pipe dope or other sealants on threads. Only teflon tape may be used on threads. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
- The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line.

- 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 may 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 (See figure 6a, page 6) or a 3/4" female adapter. If soldering, joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
- The brine refill flow control assembly is installed in an easy to access refill elbow located on top of the control valve. The refill flow control assembly is attached to the control valve with a locking clip. The locking clip allows the elbow to rotate 270 degrees so the outlet can be orientated towards the salt tank.
- Connect the brine line found in the brine tank to the brine connection on the control valve. The control valve has a standard refill elbow to which a 3/8" flexible tube can be connected, see figure 6a, page 6. (An optional elbow can be ordered which accommodates a 1/2" flexible tube for a high regenerant draw rate situation). Both elbows use the same refill flow control and retainer. Make sure the floor is clean beneath the salt tank and that it is level and smooth.
- A 1/2" (inside diameter) gravity drain line may be connected to the overflow fitting on the side of the brine tank. This overflow is in case of a malfunction in the brine shut off. If the unit is installed where water may flow in the event of an overflow and cause water damage, connect a length of flexible tubing and run to a drain below the level of the overflow. **(Do not connect the tubing to the drain line on the control valve. Do not run tubing above overflow height at any point.)**

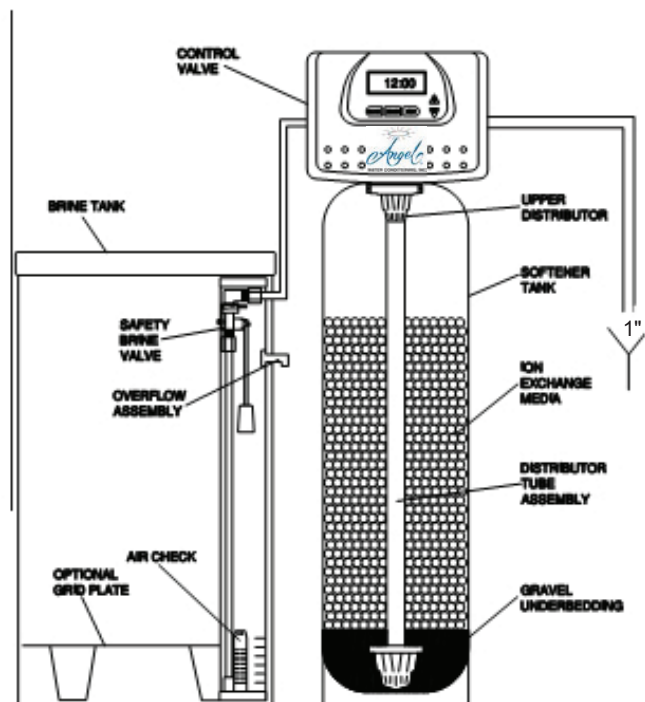
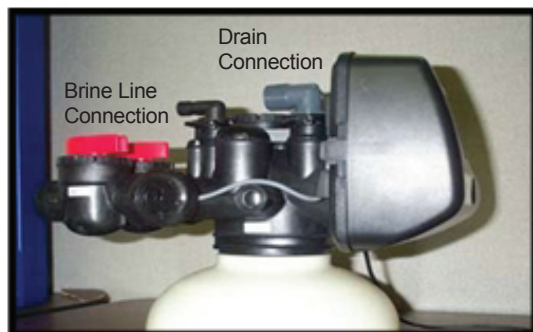
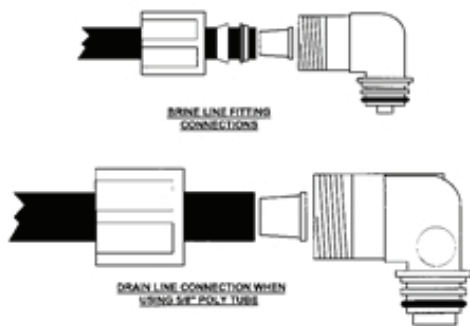


Figure 6a

Figure 6b

Programming

General information

The A3000 control valve is the “brain” of your water softener. It consists of the valve body and powerhead with solid state microprocessor.

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

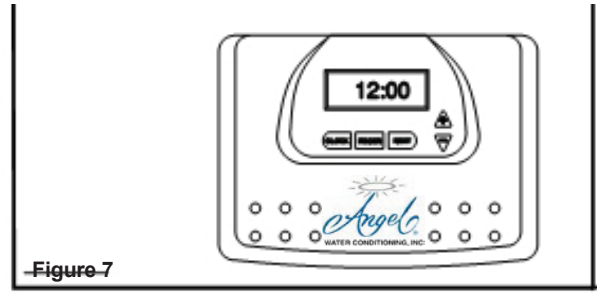


Figure 7

Initial Start Up

The initial start up will probably be done by the technician installing the softener system. If not, the following instructions will step you 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 5) 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 7).
5. Set the time of day by pushing clock button (figure 9, page 8) and using \square and \square buttons.
6. Push REGEN button and hold it down for 3 seconds. The system will advance to the “First” position. (Note: Depending on how the system is programmed it could read backwash, rinse, brine or fill). Keep pushing REGEN button until “Rinse” shows in the lower right hand corner of display. Slowly place the by-pass into the “diagnostic mode” (see fig 4, page 5). Run water to the drain until it runs clear. Return the by-pass valve to the by-pass position (fig 3, page 5). Push REGEN button until “unit is back to softening mode.”
7. Once again, push REGEN button and hold down for 3 seconds. Keep pushing REGEN button until “Backwash” appears. Slowly place the by-pass 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 by-pass 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 by-pass valve, figure 2, page 5.
8. Press the REGEN button until LED display says “BRINE”. Loosen the brine line from the top of the safety brine valve in the brine tank. Place finger over the end of the tube to check for suction. If no suction, see troubleshooting guide. (See #11, Page 17) If proper suction, reattach brine tube to safety brine valve, and allow it to draw water down to the bottom of the air check, (figure 6b, page 6).
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, this would be a good time to load your brine tank with salt.
11. Once the rinse cycle has finished the softener control will return to the softening cycle. The LED screen will scroll between “TIME/GPM/GALLONS REMAINING”.
12. Next set your softeners water hardness, days override and regeneration time settings (see figure 10a, page 8).

Your programming is now complete.

User displays/settings

General Operation

When the system is operating, one of three 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 one of the following: days remaining or gallons remaining. Days remaining 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 “Softening” or “Filtering” flashes on the display if a water meter is installed.

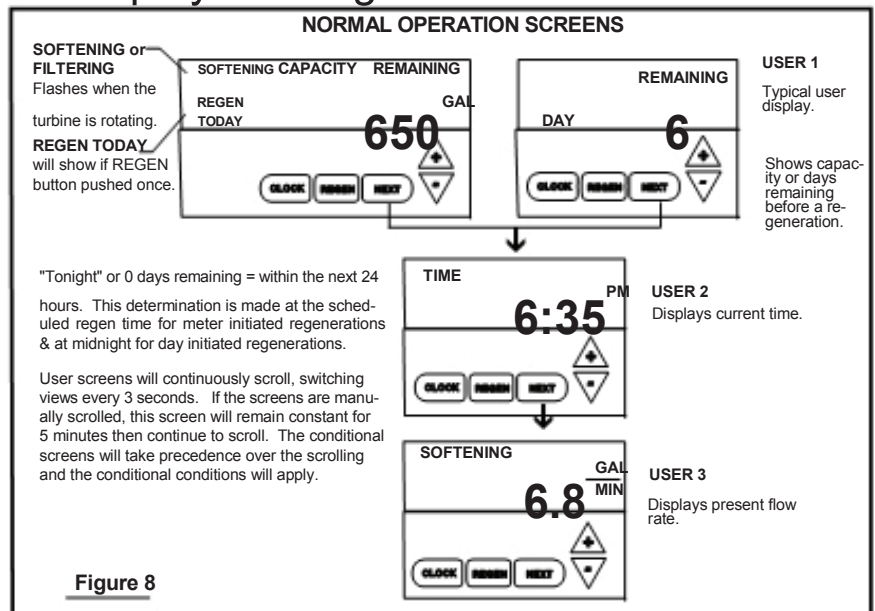


Figure 8

Set time of day

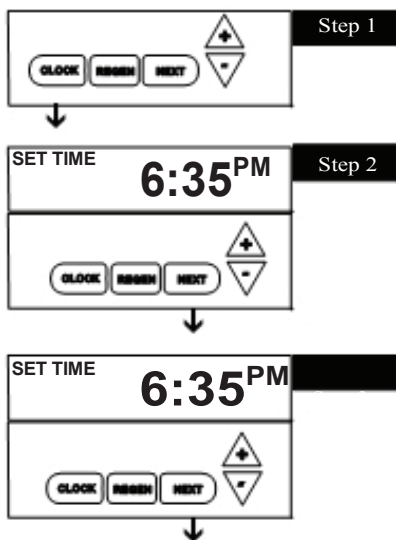


Figure 9

▲ = □ Up Arrow ▼ = □ Down Arrow

Step 1 - Press 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.

Do not forget to reset for daylight savings time.

Installer displays/settings

▲ = □ Up Arrow ▼ = □ Down Arrow

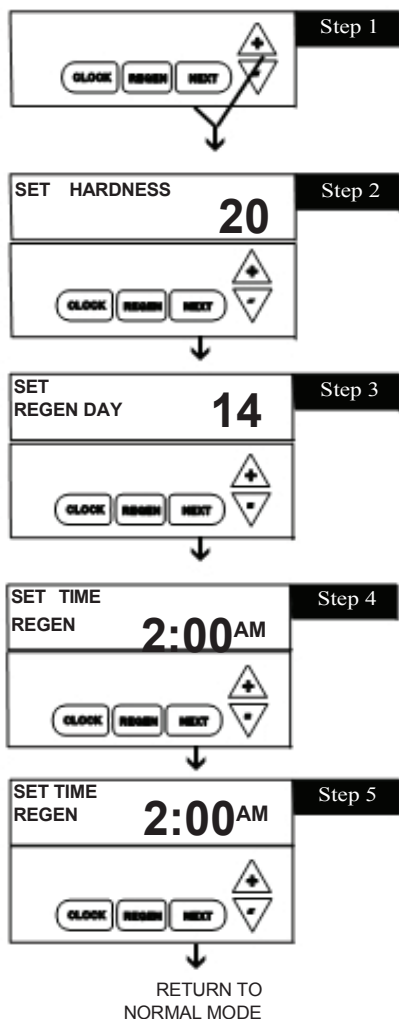


Figure 10a

Step 1 - Press NEXT and □ simultaneously for 3 seconds.

Step 2 - 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 27). Press NEXT to go to Step 3. Press REGEN to exit Installer Displays/Settings.

Step 3 - 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 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 10-11, for more detail on softener setup. Press NEXT to go to step 4. Press REGEN to return to previous step.

Step 4 - 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" on 0 GAL if system is set for immediate regeneration. See page 27. Press NEXT to go to step 5. Press REGEN to return to previous step.

Step 5 - 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.

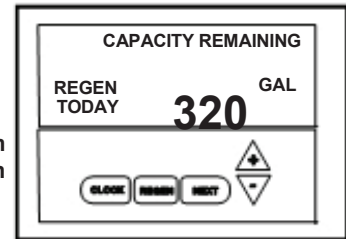
Manual regeneration

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 on the display 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 salt tank does not contain salt, fill with salt and wait at least two hours before regenerating.



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

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.

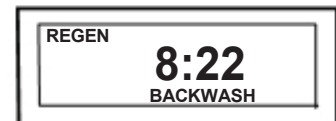


Figure 11

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. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

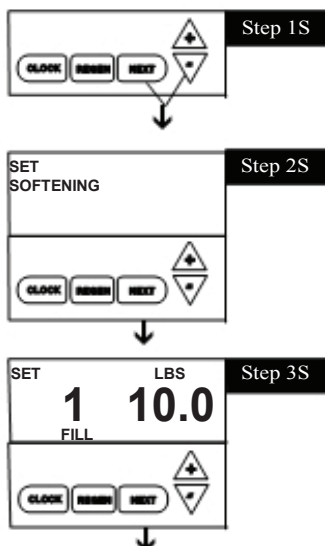
Cycle Time Adjustment

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 1200	See Page 26
Softening (Service)	Minutes	1 to 480	120
Backwash	Minutes	1 to 120	8
Brine	Minutes	1 to 180	60
Backwash	Minutes	1 to 120	8
Rinse	Minutes	1 to 120	4

Softener Set Up

▲ = □ Up Arrow ▼ = □ Down Arrow



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

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

STEP 3S - **Select the time for the first cycle** (which in this example is FILL, setting is changed by lbs. of salt entered) using the or button. **Factory setting is Medium Salting,** See page 26. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

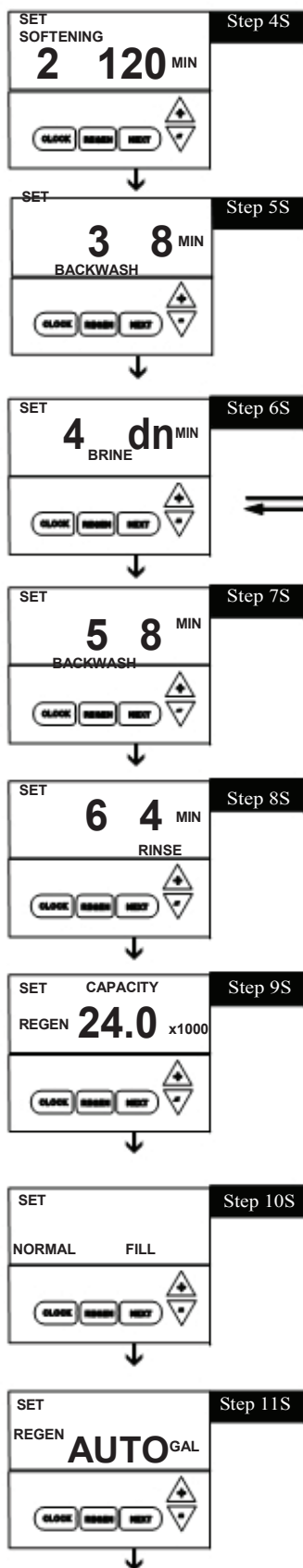
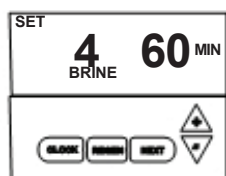


Figure 12a.

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 BACKWASH) 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 dn BRINE) 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 BACKWASH) using the or button. Press NEXT to go to Step 8S. Press REGEN to return to the previous step.

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

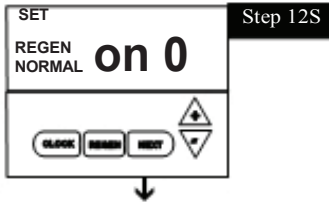
STEP 9 S - Set Grain Capacity using the or button. The ion exchange capacity is in grains of hardness as calcium carbonate for the system based on the pounds of salt that will be used. The allowable grains capacity range varies from 5,000 to 500,000 grains. The increment increase is 500 for the range from 5000 to 50,000; 1000 for the range of 50,000 to 200,000; and 2000 for the range of 200,000 to 500,000. 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 medium salting.** See Page 26. Press NEXT to go to Step 10S. Press REGEN to return to previous step.

STEP 10 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. This option requires a functioning meter. **Factory Setting = Normal brining.** Press NEXT to go to Step 11S. Press REGEN to return to previous step.

STEP 11 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 I, page 8 / proportional brining will not function if OFF selected); or
- as a number of gallons (allowable range 20 to 250,000) regeneration will be based on the value specified.

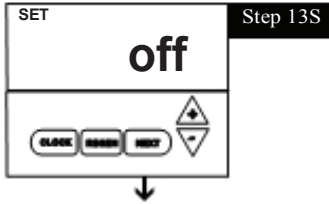
Increment increase is 20 for the range 20 to 2000, 100 for the range of 2000 to 10,000 and 500 for the range of 10,000 to 50,000 and 2000 for range of 50,000 to 250,000. If “OFF” or a number is used, hardness cannot be set in Installer Displays/Settings Step 2 I, page 8. See page 27 for more detail. **Factory Setting is AUTO.** Press NEXT to go to Step 12 S. Press REGEN to return to previous step.



Step 12S

STEP 12 S - Set Regeneration Time Options using the or button. If value is set to:

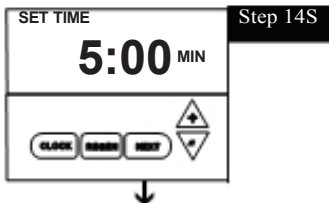
- “NORMAL” means regeneration will occur at the preset time;
- “on 0” means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or • “NORMAL + on 0” means regeneration will occur at one of the following:
 - the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached, whichever comes first; or
 - immediately after 10 minutes of no water usage when the gallon capacity reaches 0 (zero). See page 27 for more options. **Factory Setting is Normal and on 0.** Press NEXT to go to Step 13S. Press REGEN to return to previous step.



Step 13S

STEP 13 S - Set Relay to energize by time or gallons or OFF by using or buttons. This screen will only appear if unit is ordered with relay driver. A relay can be used to operate a chemical feed pump or solenoid. The choices are:

- Relay Set 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.
- Relay Set on Gallons - Relay activates every set number of gallons while in service and deactivates after set time
- **Off** - If off is selected, Steps 14S or 15S will not be shown. **Factory setting = OFF.** Press NEXT to go to step 14S or 15S for relay settings, or 16S if OFF selected.

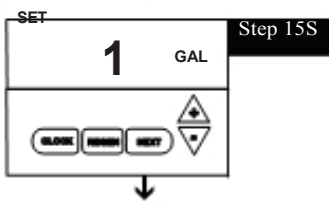
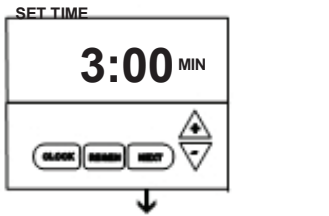


Step 14S

STEP 14 S - If off was selected in previous step, this screen does not appear.

If Time chosen to Energize Relay, use up and down arrows to set # of minutes AFTER START OF REGEN (excluding prefill & time to dissolve salt) to close relay. Press NEXT.

Use Up and Down arrows to set time duration of relay closure. Time Range = 1 second - 200 minutes. Press NEXT to go to Step 16S. Press REGEN to return to previous step.

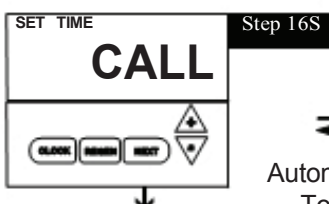
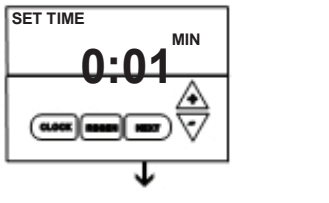


Step 15S

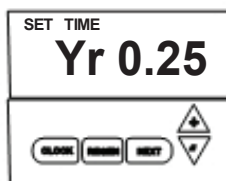
STEP 15 S - If Time or off was selected in previous steps, this screen does not appear.

If Gallons Chosen to Energize Relay, use up and down arrows to set # of gallons per relay closure. Range = 1-50 gallons. Press NEXT.

Use up and down arrows to set time duration of relay closure in minutes. Range = 1 second - 20 minutes. Press NEXT to go to Step 16S. Press REGEN to return to previous step. Meter does not read during regeneration.



Step 16S



Automatically
Toggles

STEP 16 S - Set duration between scheduled service reminders.

Use UP & DOWN arrows to select in 1/4 year increments from 1/4 to 9.75 years or on gallons or both or OFF.

Factory Setting = OFF.

To reset call alert, press up & down arrows together for 3 seconds.

Figure 12b

Diagnostics

▲ = □ Up Arrow ▼ = □ Down Arrow

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



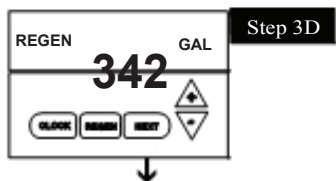
Step 1D

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.



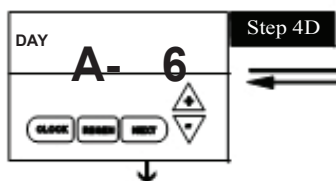
Step 2D

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.

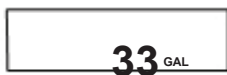


Step 3D

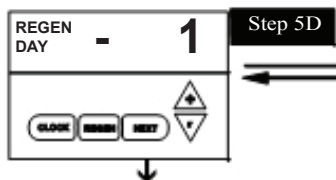
STEP 3D - Volume, since last regeneration: This display shows gallons of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.



Step 4D



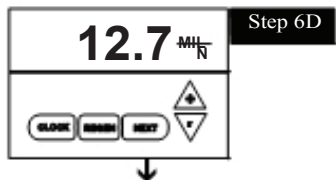
STEP 4D - Volume of reserve capacity used for last 7 days: If the unit is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto", this display shows 0 day (for today) and flashes the reserve capacity. Pressing the button will show day 1 (which would be yesterday) and flashes the reserve capacity used. Pressing the button again will show day 2 (the day before yesterday) and the reserve capacity used. 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 1 (for yesterday) and flashes the volume of water treated yesterday. Pressing the button 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 word "REGEN" 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.



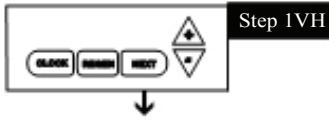
Step 6D

STEP 6D - Flow rate, maximum last seven days: The maximum flow rate in gallons per minute that occurred in the last seven days will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button to exit Diagnostics. Press REGEN to return to the previous step.

RETURN TO NORMAL MODE

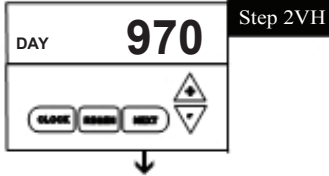
To reset diagnostic data push "Next" and button for 3 seconds, release when softening appears in window, then press " & " button simultaneously for 3 seconds.

Valve History (Can not be reset)



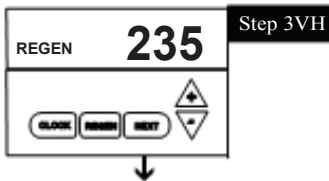
Step 1VH

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.



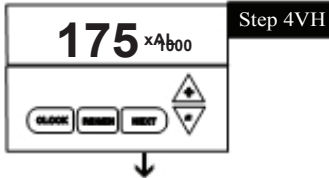
Step 2VH

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 exit Valve History. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

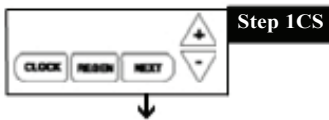
Cycle Sequence

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

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

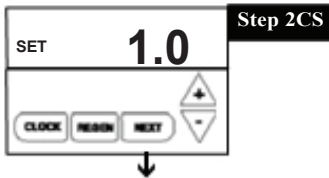
The following is an example of how to set a valve so that when regeneration is initiated, BACKWASH occurs first, dn BRINE occurs second, RINSE occurs third, and FILL occurs fourth.

Cycle Options		
BACKWASH	DN BRINE	FILL
RINSE	SOFTENING	END



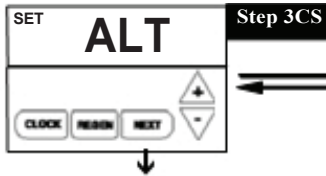
Step 1CS

STEP 1 CS - Press NEXT and simultaneously for three seconds and release. Then press NEXT and simultaneously and release. If screen in step 2CS does not appear in 5 seconds the lock on the valve is activated.



Step 2CS

STEP 2 CS - Meter Size. Use the or to select 1 for 1" A3000- valve. Press NEXT to go to Step 3CS. Press REGEN to exit cycle sequence.



STEP 3 CS - Select Auxiliary Valve function - Use or buttons to select one of the following:

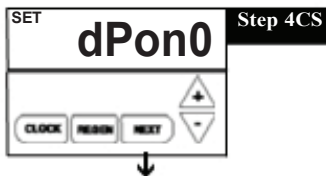
- Twin Alternating
- No Hard Water Bypass

factory setting is Off

STEP 3 CS - Twin Alternating System - Allows automatic alternation between two units to provide softened water 24 hours a day. Use or buttons to select **ALT A** on control valve that has 2-pin connector labeled DRIVE connected to the motorized alternator valve (MAV). Select **ALT b** for control valve connected only by interconnect cable. MAV drive cable or interconnect cable must be connected or Error Code 1006 will result.

Program Regeneration Time Option as "on 0" and select number of days between regeneration (or calendar day override) as "OFF". For additional programming information, refer to MAV manual.

STEP 3 CS - Use or buttons to select **nHbP** to enable no hard water bypass valve. Selection requires that a connection be made to a motorized alternator valve (MAV) is made to the two-pin connector labeled "Alternator Drive" located on circuit board. The MAV will be driven closed before the first regeneration cycle that is NOT fill or softening & be driven open after last regeneration cycle that is not fill.

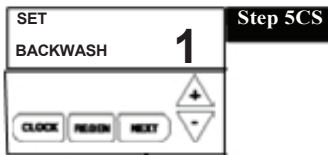


STEP 4 CS - Select differential pressure switch to trigger REGEN. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Use or arrows to select. Following is an example of the options:
factory setting is dPoff.

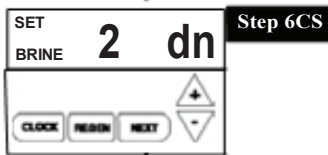
dPon0 - If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur immediately. Factory Setting is dPon0.

dPdEL - If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur at the scheduled regeneration time.

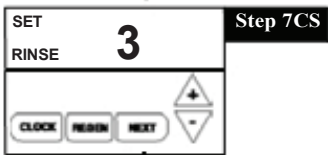
HoLd - If the dP switch is closed, a regeneration will be prevented from occurring. Press NEXT to go to Step 4CS. Press REGEN to return to previous step.



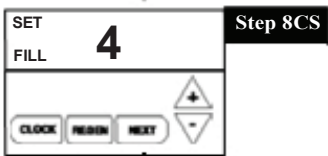
STEP 5CS - First Regeneration Cycle. Press or buttons to select, in this example it is backwash. Press NEXT to go to Step 5CS. Press REGEN to return to previous step.



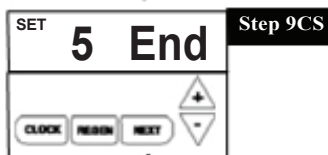
STEP 6CS - Second Regeneration Cycle. Press or buttons to select, in this example it is dn Brine. Press NEXT to go to Step 6CS. Press REGEN to return to previous step.



STEP 7CS - Third Regeneration Cycle. Press or buttons to select, in this example it is Rinse. Press NEXT to go to Step 7CS. Press REGEN to return to previous step.



STEP 8CS - Fourth Regeneration Cycle. Press or buttons to select, in this example it is Fill. Press NEXT to go to Step 8CS. Press REGEN to return to previous step.



STEP 9CS - Programmer can select up to 9 regeneration cycles. After all cycles have been programmed, an END cycle must be added. Press or buttons until END appears. Press NEXT to exit Cycle Sequence. Press REGEN to return to previous step.

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. Disinfect 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 (see page 26 for the cu ft of resin in your softener).
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.

Water softener draining procedure

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

- 1) Initiate the softener into a manual regeneration cycle. After the refill cycle, advance control to backwash and allow it to complete the backwash cycle (this will clean the media) and start into the brine-draw cycle. Allow the regeneration to continue in the brine draw cycle until the brine is drawn out of the salt tank and the air check at the bottom of the brine pick-up tube shuts off. **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 7 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 salt keeper (or to approximately 1" above the grid plate, if used).
 - m. Add new salt. Important: Do not add the old salt which was removed earlier unless it is clean and not mushy. We recommend using new salt.
 - n. Follow the disinfection instructions found at top of page.
 - o. Put on brine tank cover.

Trouble Shooting

PROBLEM	CAUSE	CORRECTION
1. ERROR followed by code number		
Error Code 1001 - Unable to recognize start of regeneration	A1. Control valve has just been serviced	A1. Press NEXT and REGEN for 3 seconds or unplug power source jack from PC Board (black wire) and plug back in to reset control valve
	A2. Incorrect Assembly	A2. Disassemble drive bracket, verify wires are in guides & reassemble.
Error Code 1002 - Unexpected stall	B. Mechanical binding	B. Check piston and spacer stack assembly for foreign matter
Error Code 1003 - Motor ran too long, timed out trying to reach next cycle position	C. High drive forces on piston	C1. Loosen drive cap gear 1/4 turn or replace C2. Address high drive forces
Error Code 1004 - Motor ran too long, timed out trying to reach home position	D. Control valve piston not in home position	D. Press NEXT and REGEN for 3 seconds or unplug power source jack from PC board (black wire) and plug back into reset control valve
	E. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	E. Check motor and wiring. Replace motor if necessary
	F. Drive gear label dirty or damaged, missing or broken gear	F. Replace or clean drive gear
	G. Drive bracket incorrectly aligned to back plate	G. Reseat drive bracket
	H. PC board is damaged or defective	H. Replace PC board
	I. PC board incorrectly aligned to drive bracket	I. Ensure PC board is correctly snapped on to drive bracket
Error Code 1006	A. MAV not connected to PC board when unit is programmed to use MAV	A. Connect MAV cable(s) to PC board
If other Error Codes display contact the factory		
2. Control valve stalled in regeneration	A. Motor not operating	A. Replace Motor
	B. No electric power at outlet	B. Repair outlet or use working outlet
	C. Defective transformer	C. Replace transformer
	D. Defective PC board	D. Replace PC board
	E. Broken drive gear or drive cap assembly	E. Replace drive gear or drive cap assembly
	F. Broken piston retainer	F. Replace drive cap assembly
	G. Broken main or regenerant piston	G. Replace main or regenerant piston
3. Control valve does not regenerate automatically when REGEN button is depressed and held	A. Transformer unplugged	A. Connect transformer
	B. No electric power at outlet	B. Repair outlet or use working outlet
	C. Broken drive gear or drive cap assembly	C. Replace drive gear or drive cap assembly
	D. Defective PC board	D. Replace PC board
4. Control valve does not regenerate automatically but does when REGEN button is depressed	A. Bypass valve in bypass position	A. Put control valve in service position
	B. Meter connection disconnected	B. Connect meter to PC board
	C. Restricted/stalled meter turbine	C. Remove meter and check for rotation or foreign matter
	D. Defective meter	D. Replace meter
	E. Defective PC board	E. Replace PC board
	F. Set-up error	F. Check control valve set-up procedure
5. Time of day flashes on and off	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.	A. Reset time of day and replace battery on PC Board (Lithium coin type battery 2032)
	B. Prior to 2/2007, PC board did not have battery back-up - capacitor held time of day up to 2 hours. Power outage > 2 hours.	B. Reset time of day.
6. Softener delivers hard water.	A. Bypass valve is open or faulty.	A. Close bypass valve or replace.
	B. No salt or low salt level in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Softener fails to draw brine.	C. See problem #11.
	D. Excessive water usage.	D. Check gallon capacity settings.
	E. Insufficient brine level in brine tank.	E. Check brine refill setting and refill flow restrictor for blockage.
	F. Resin level inadequate.	F. See problem #9, page 17.
	G. Meter faulty.	G. Test meter and clean or replace meter.
	H. Raw water hardness fluctuation.	H. Test raw water hardness and adjust settings to highest known hardness.
7. Unit uses too much salt.	A. Improper brine refill setting.	A. Check brine refill setting for proper salt dosage
	B. Improper settings.	B. Check water hardness and reevaluate capacity setting specification
	C. Excessive water in brine tank.	C. See problem #11, page 17.
	D. Leaking faucets, toilets, etc...	D. Repair or replace those items.

Trouble Shooting

PROBLEM	CAUSE	CORRECTION
8. Loss of resin.	<ul style="list-style-type: none"> A. Backwash controller missing. B. Faulty distributor tube assembly. C. Air being drawn in through brine system D. Air in water supply system 	<ul style="list-style-type: none"> A. Install backwash controller. B. Check distributor tube assembly for cracks or holes. C. Check for leaks in brine lines, fittings, or air check. Repair or replace. D. 1. Install upper distributor if missing. 2. Ensure that water supply system has an air eliminator.
9. Softener delivers salt water.	<ul style="list-style-type: none"> A. Low water pressure. B. Excessive water in brine tank. C. Wrong size injector. 	<ul style="list-style-type: none"> A. Check incoming water pressure - Must remain at minimum of 25 psi. B. See problem #11. C. Install correct injector.
10. Excessive water in brine tank.	<ul style="list-style-type: none"> A. Plugged injector. B. Faulty piston/seal assembly. C. Plugged or kinked drain line. D. Backwash flow controller closed off. E. Defective brine line flow control. 	<ul style="list-style-type: none"> A. Remove injector and clean ports. B. Replace piston/seal assembly. C. Correct any kinking or plugging of drain line. D. Check backwash flow controller. E. Replace brine refill flow control.
11. Softener fails to draw brine.	<ul style="list-style-type: none"> A. Injector is plugged. B. Faulty piston assembly. C. Brine line connection leak. D. Drain line plugged creating excess back pressure. E. Drain line too long or too high F. Low inlet pressure. 	<ul style="list-style-type: none"> A. Remove injector and clean ports. B. Check piston assembly. C. Inspect brine line during refill cycle for leaks. D. Inspect drain line for blockage. E. Refer to drain line specifications. F. Increase inlet pressure to a minimum of 25 psi.
12. Continuous flow to drain.	<ul style="list-style-type: none"> A. Piston assembly failure. B. Motor failure. C. Circuit board failure. 	<ul style="list-style-type: none"> A. Replace piston assembly. B. Replace motor. C. Replace circuit board.
13. Loss of water pressure.	<ul style="list-style-type: none"> A. Iron build-up in resin. B. Resin bed fouled with sand or sediment. C. Resin bed mushing due to high amount of oxidizers in water supply (chlorine). 	<ul style="list-style-type: none"> A. See problem #15. B. Rebed softener and install sediment filter ahead of softener. C. Rebed softener. Install dechlorinator system
14. Iron in softened water.	<ul style="list-style-type: none"> A. Iron has fouled resin bed. B. Iron is not in a soluble state. C. Prefilter failure. D. Iron level excessive. E. Control fails to regenerate. 	<ul style="list-style-type: none"> A. Use iron reducing resin cleaner to clean resin bed, and increase salt dosage or regenerate more frequently. Install an Iron Curtain System ahead of the softener. B. Test water to determine type of iron, install iron reduction system. C. Check prefilter. D. Install iron reduction system. E. See problem #4, page 16.
15. Absent or incomplete LED display	<ul style="list-style-type: none"> A. Transformer unplugged B. No electric power at outlet C. Defective transformer D. Short in meter E. Defective PC board 	<ul style="list-style-type: none"> A. Plug transformer into uninterrupted outlet B. Repair outlet or use working outlet C. Replace transformer D. Unplug meter from PC board, if LED display lights appropriately, replace meter E. Replace PC board
16. Control does not display correct time of day	<ul style="list-style-type: none"> A. Power outage > 2 years B. Power outage < 2 years, time of day flashing, battery depleted 	<ul style="list-style-type: none"> A. Reset time of day B. Replace lithium coin type battery on circuit board Model 2032 battery
17. No "softening" or "filtering" display when water is flowing	<ul style="list-style-type: none"> A. Bypass valve in bypass position B. Meter connection disconnected C. Restricted/stalled meter turbine D. Defective meter E. Defective PC board 	<ul style="list-style-type: none"> A. Put bypass valve in service position B. Connect meter to PC board C. Remove meter and check for rotation, clean foreign material D. Replace meter E. Replace PC board
18. Control valve regenerates at wrong time of day	<ul style="list-style-type: none"> A. Power outages > 2 years B. Time of day not set correctly C. Time of regeneration incorrect D. Control valve set at "on 0" (immediate regeneration) E. Control valve set at NORMAL + on 0 	<ul style="list-style-type: none"> A. Reset control valve to correct time of day B. Reset to correct time of day C. Reset regeneration time D. Check control valve set-up procedure regeneration time option (see page 27) E. Check control valve set-up procedure regeneration time option (see page 27)

MODEL	A3000-024	A3000-032	A3000-032-10	A3000-048	A3000-064	A3000-096	A3000-128	A3000-160	A3000-192
FACTORY PRESET MINUTES									
Backwash-1; Min	8	8	8	8	8	8	8	8	8
Brine; Min.	60	60	60	60	60	60	60	60	60
Backwash-2; Min	8	8	8	8	8	8	8	8	8
Fast Rinse; Min	4	4	4	4	4	4	4	4	4
Refill-Minutes									
-High Efficiency	3.0	4.0	4.0	6.0	8.0	12.0	16.0	20.0	24.0
-Low Salting	4.0	5.3	5.3	8.0	10.7	16.0	21.3	26.7	32.0
-Medium Salting*	5.0	6.7	6.7	10.0	13.5	20.0	27.0	33.5	40.0
-High Salting	7.5	10.0	10.0	15.0	20.0	30.0	40.0	50.0	60.0
Refill-Lbs of Salt									
-High Efficiency	4.5	6.0	6.0	9.0	12.0	18.0	24.0	30.0	36.0
-Low Salting	6.0	8.0	8.0	12.0	16.0	24.0	32.0	40.0	48.0
-Medium Salting*	7.5	10.0	10.0	15.0	20.0	30.0	40.0	50.0	60.0
-High Salting	11.5	15.0	15.0	22.5	30.0	45.0	60.0	75.0	90.0
Capacity Grains									
-High Efficiency	17,200	22,930	22,930	34,400	45,870	68,810	91,750	114,690	137,620
-Low Salting	19,980	26,650	26,650	39,970	53,300	79,950	106,600	133,250	159,900
-Medium Salting*	21,040	28,060	28,060	42,090	56,120	84,180	112,240	140,300	168,360
-High Salting	24,230	32,310	32,310	48,460	64,620	96,930	129,240	161,550	193,860
Water Usage (U.S. Gallons)									
At Factory Settings and 40 psi Inlet Pressure	44	54	68	69	127	134	179	245	272
Service Flow Rate;									
Flow Rate @ 10 psi	9.8	10.1	11.3	10.5	14.2	14.4	15.1	17.3	17.8
Flow Rate @ 15 psi	13.1	13.0	14.5	14.1	18.2	19.2	20.1	22.7	23.1
Resin; Cu Ft.	0.75	1	1	1.5	2	3	4	5	6
Underbedding;lbs	8	11	14	14	40	40	45	50	75
Mineral Tank Dimen.	8x44	9x48	10x44	10x54	13x54	14x65	16x65	18x65	20x62
Brine Tank Dimen.	18x40	18x40	18x40	18x40	18x40	24x41	24x41	24x50	24x50
Drain Line Flow Control	1.3	1.7	2.2	2.2	4.2	4.2	5.3	7.5	7.5
Brine Line Flow Control	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Injector; color	C-Violet	D-Red	D-Red	E-White	G-Yellow	H-Green	I-Orange	J-L. Blue	K-L. Green


***Factory Settings are in bold**



System conforms to ANSI/NSF 44 for specific performance claims as verified and substantiated by test data.

Programming Options

Reserve Gallons	Regeneration Type	Days Override	Results (Reserve capacity estimate based on history of water usage)
AUTO	NORMAL	OFF	Reserve capacity automatically estimated. Regeneration occurs when gallons capacity falls below the reserve capacity at the next Regen Set Time.
AUTO	NORMAL	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	NORMAL	OFF	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity reaches 0.
OFF	NORMAL	1 to 28	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached.
20 to 250,000	NORMAL	1 to 28	Reserve capacity not 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	On 0	OFF	Reserve capacity not automatically estimated. Regeneration occurs immediately when gallons capacity reaches 0. Time of regeneration will not be allowed to be set because of regeneration will always occur when gallons capacity reaches 0.
20 to 250,000	On 0	OFF	Reserve capacity not 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	NORMAL on 0	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.
AUTO*	NORMAL on 0*	1 to 28 *14	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	NORMAL on 0	1 to 28	Reserve capacity not 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/Maximum25 psi-125 psi

OPERATING TEMPERATURES

Minimum/Maximum40° - 110° F

METER

Accuracy±5%
Flow Rate Range... ..0.25 - 27 GPM
Gallon Range20 - 250,000

DIMENSIONS

Drain Line3/4" or 1" NPT
Brine Line3/8" Poly Tube
Electrical Current Draw/Voltage/Frequency0.5A/110v/60Hz

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

NOTES

NOTES



A3000 Series Water Softener System

Angel Water, Inc. warrants material and workmanship to be free of defects to the original purchaser. Angel Water, Inc. will repair or replace without cost for a period of one year after purchase, any part or portion, which our examination shall disclose to be defective. At the expiration of this service policy, a service fee will be charged.

A3000 Series Water Softener Systems:

- Angel Water, Inc. warranties to the original owner all parts* related to equipment for a period of 10 years.
- A3000 Series Water Softener will provide a lifetime warranty on the water softener vessel to the original owner.

A charge will be made for service required because of misuse, alteration, freezing, neglect, used in rental property, accident, foreign matter, change in water content, customer error, customer imagination, or other causes beyond Angel's control.

"Manufacturing Defect" does not include damage to the unit or its parts caused by abuse, negligence, freezing, fire, heat, direct exposure to weather or sunlight, water pressures exceeding 100 psi, flooding, other causes not considered normal operating conditions, or an act of God.

* Wearable parts not covered by this warranty include filter material, screens, injectors, stacker, pistons which are wearable and may be damaged by water itself.

OWNERS OBLIGATION

The unit must be installed and operated within the design limitations according to the installation and maintenance manual provided. This warranty is valid to the original owner when installed by an Angel Water, Inc representative or a contracted installer hired by Angel Water, Inc. (Warranty transfers may be purchased.) Customers must properly maintain the unit per the manufacturers service schedule.

A3000 Series Water Softener System:

- Water Softener- Must properly provide salt for the unit regularly and set timer to correct time of day. Must have Angel Water Inc. perform an annual (every year) inspection, service and cleaning of unit.