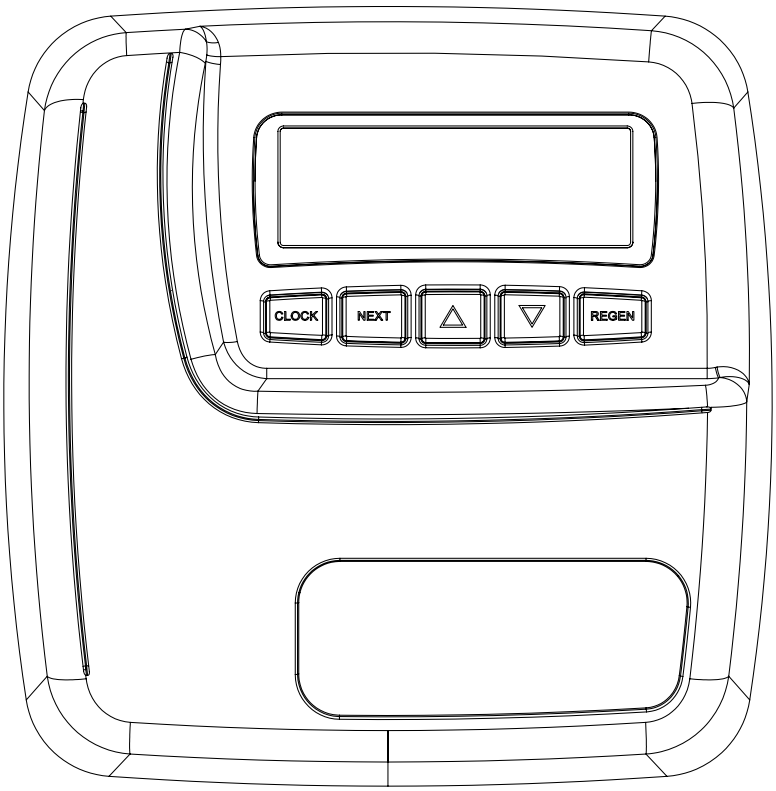
Water Specialist
CH Control Valve
Programming Manual



CHARGER
Water Treatment Products

Table of Contents

Front Cover and Drive Assembly

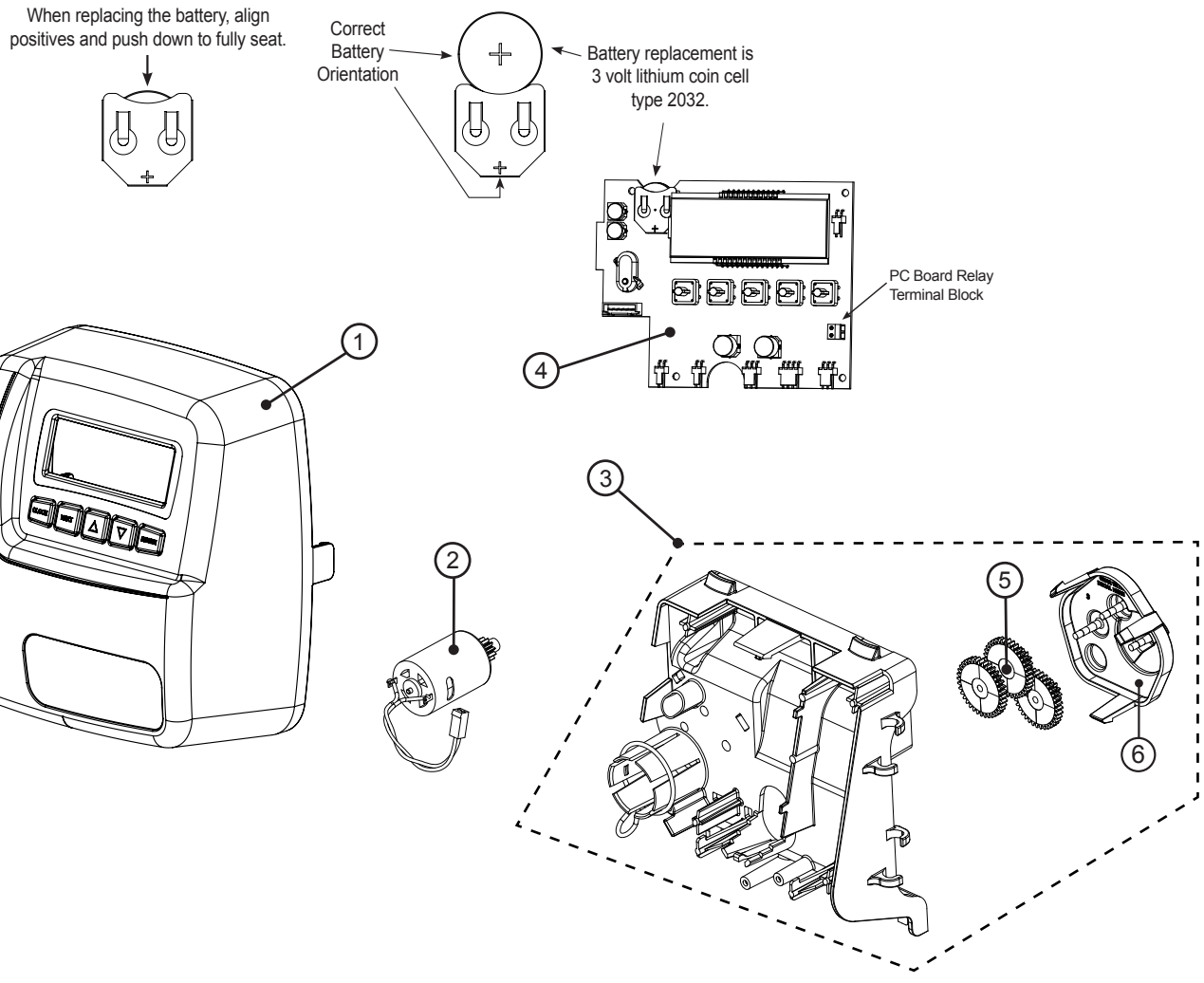
Drawing No.	Order No.	Description	Quantity
1	V3545-01	WS1CH FRONT COVER ASSEMBLY	1
2	V3107-01	WS1 MOTOR	1
3	V3002-A	WS1 DRIVE BRACKET ASY	1
4	V3558CH-03BOARD	WS1THRU2 CH XMEGA PCB REPLACE	1
5	V3110	WS1 DRIVE REDUCING GEAR 12X36	3
6	V3109	WS1 DRIVE GEAR COVER	1
Not Shown	V3186-06	WS1 POWER SUPPLY US 15VDC HOCP	1
	V3186EU-06	WS1 POWER SUPPLY EU 15VDC HOCP	
	V3186UK-06	WS1 POWER SUPPLY UK 15VDC HOCP	
	V3186-01	WS1 POWER CORD ONLY	
Not Shown	V3178	WS1 DRIVE BACKPLATE	1

Refer to Control Valve Service Manual for other drawings and part numbers.

Power Supply	U.S.	International
Supply Voltage	100-120 VAC	100-240 VAC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15 VDC	15 VDC
Output Current	500 mA	500 mA

Relay Driver Output Type – Single Solid-State 12VDC "wet" contact - N.O.
Relay Driver Output Capacity - 12VDC @100mA.
NOTE: Check for proper mounting dimensions on valve back plate prior to mounting an external relay under control cover.

Wiring For Correct On/Off Operation	
PC Board Relay Terminal Block	Relay
RLY 1	Coil -
COM	Coil +



OEM General Programming Instructions

The control valve offers multiple procedures that allow the valve to be modified to suit the needs of the installation. These procedures are:

- OEM Cycle Sequence
- OEM Softener System Setup
- OEM Filter System Setup
- Installer Display Settings
- User Display Settings
- Diagnostics
- Valve History

Once the OEM Cycle Sequence has been set, the other procedures can be accessed in any order. Details on each of the procedures are provided on the following pages.

To "lock out" access to diagnostic and valve history displays and modifications to settings except hardness, day override, time of regeneration and time of day by anyone but the manufacturer, press ▼, NEXT, ▲, and CLOCK in sequence after settings are made. To "unlock", so other displays can be viewed and changes can be made, press ▼, NEXT, ▲, and CLOCK in sequence.

When in operation normal user displays such as time of day, volume remaining before regeneration, present flow rate or days remaining before regeneration are shown. When stepping through a procedure, if no buttons are pressed within five minutes, the display returns to a normal user display. Any changes made prior to the five minute time out are incorporated.

To quickly exit OEM Softener Setup, OEM Filter Setup, Installer Display Settings, Diagnostics or Valve History press CLOCK. Any changes made prior to the exit are incorporated.

To clear the Service Call reminder, press ▲ and ▼ simultaneously while CALL is displayed.

When desired, all programming and information in Diagnostics may be reset to defaults when the valve is installed in a new location. To reset to defaults, press NEXT and ▼ simultaneously to go to the Softening/Filtering Screen. Press ▲ and ▼ simultaneously to reset diagnostic values and all programming to defaults. Screen will return to User Display.

Sometimes it is desirable to have the valve initiate and complete two regenerations within 24 hours and then return to the preset regeneration procedure. It is possible to do a double regeneration if the control valve is set to "NORMAL" or "NORMAL + "On 0" in OEM Softener System Setup or OEM Filter System Setup. To do a double regeneration:

1. Press the "REGEN" button once. REGEN TODAY will flash on the display.
2. Press and hold the "REGEN" button for three seconds until the valve regeneration initiates.

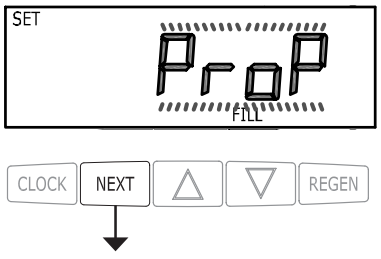
Once the valve has completed the immediate regeneration, the valve will regenerate one more time at the preset regeneration time.

For Valve Type 1.0T, press and hold CLOCK and ▲ for about 3 seconds to initiate an exchange of the tank in Service without cycling the regeneration valve. After tank switch, days remaining and capacity remaining status is retained for each tank until the next regeneration.

Prior to selecting the upflow regeneration cycle, verify that the correct body, main piston, regenerant piston and stack are being used, and that the injector plug(s) are in the correct location. Refer to the Service Manual for drawings and part numbers.

Proportional Brining

If the system is set up as a prefill upflow softener the control valve can also be set to normal or proportional brining.



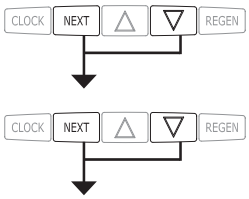
This step will appear after Step 8S and before Step 9S if the system is set up as a prefill upflow softener. The following options can be selected:

- NORMAL FILL - System always prefills with the salt level selected.
- ProP FILL - If proportional brining is selected, the actual salt fill time will be calculated by dividing the actual volume of treated water used by the full volumetric capacity, then multiplying this value by the maximum salt fill time.

Press NEXT to go to the next step. Press REGEN to return to the previous step.

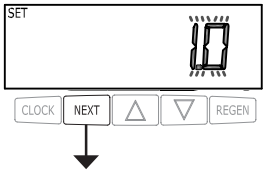
OEM Cycle Sequence

STEP 1C



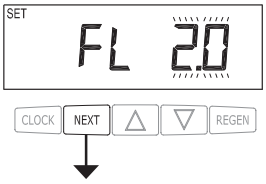
Step 1C – Press NEXT and ▼ simultaneously for 3 seconds and release. Then press NEXT and ▼ simultaneously for 3 seconds and release. If screen in Step 2C does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press NEXT and ▼ simultaneously for 3 seconds and release. Then press NEXT and ▼ simultaneously for 3 seconds and release.

STEP 2C

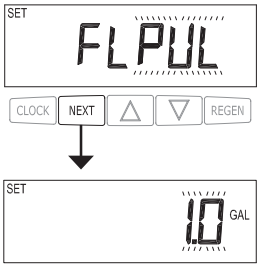


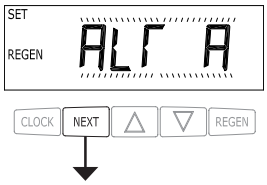
Step 2C – Use ▲ or ▼ to select 1.0 for 1" valve, 1.25 for 1.25" valve, 1.5 for 1.5" valve, 2.0 for 2" valve, or 1.0T for twin valve.
Press NEXT to go to Step 3C. Press REGEN to return to exit OEM Cycle Sequence.

STEP 3C



Step 3C – When 1.5 or 2.0 are selected, an additional screen will appear. It is used to select which size flow meter is to be used with the valve, 1.5", 2.0", 3.0", 1.0 or PUL (Variable Meter Calibration.) Variable meter pulses of 0.1-150.0 PPG can be selected.
Press NEXT to go to Step 4C. Press REGEN to return to previous step.





Step 4C – Allows selection of one of the following using the ▲ or ▼ buttons:
- the Control Valve to act as an alternator; or
- the Control Valve to have a no hard water bypass: or
- the Control Valve to have a Separate Source during the regeneration cycle; or
- the Control Valve to operate with the Clack System Controller.

Select OFF when none of these features are used.
Only use Clack No Hard Water Bypass Valves or Clack Motorized Alternating Valves (MAV) with these selections. Clack No Hard Water Bypass Valves (1" or 1.25" V3070FF or V3070FM) are not designed to be used with the alternator function or separate source mode.

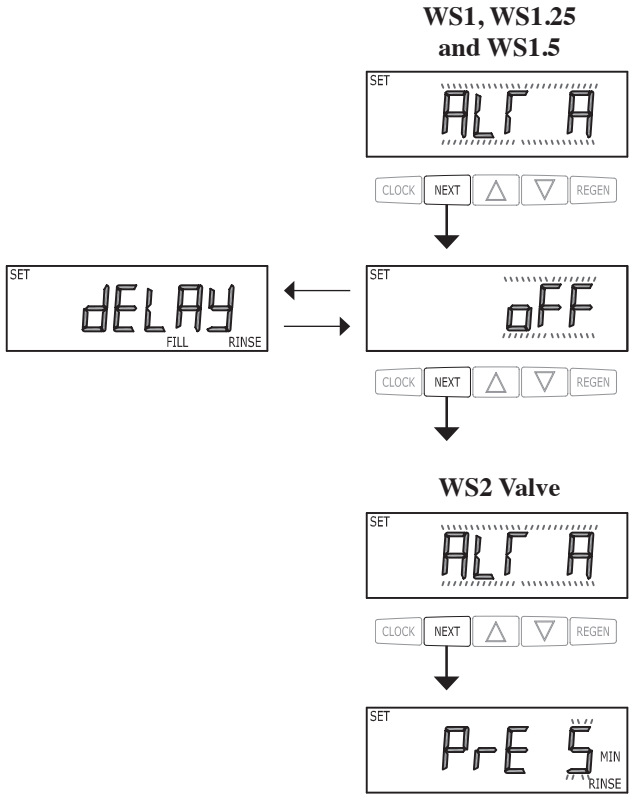
Selecting the Control Valve to act as an alternator:
C102.8 and higher = Use 3-wire Interconnect Cable for all communication between units.
C100.8 and lower = Use 2-wire Interconnect Cables for twin alternators with independent flow meters.

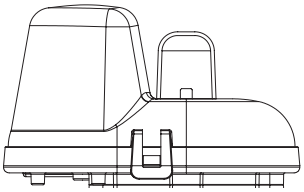
Prior to starting the programming steps, connect the communication cable to each control valve board's three pin connector labeled 'COMM CABLE'. Also connect the meter cord to either control valve to the three pin connector labeled 'METER'.			
		Softener Valve Programming Steps	
OEM Cycle Sequence	Step 4C	Set to ALT A Connect the outlet plumbing of ALT A valve to the MAV's A port and connect the MAV's two pin wire connector to the two pin connector labeled "DRIVE" on the ALT A valve	Set to ALT b Connect the outlet plumbing of ALT b valve to the MAV's B port. No electrical connections are required between the ALT b valve and the MAV.
OEM Softener System Setup	Step 8S	Set System Capacity	Set System Capacity
OEM Softener System Setup	Step 9S	Set to 'AUTO'	Set to 'AUTO'
OEM Softener System Setup	Step 10S	Set regeneration time option to 'on 0'.	Set regeneration time option to 'on 0'.
Installer Display Settings	Step 3I	Set Day Override to "oFF"	Set Day Override to "oFF"

If set up for a filter, in Step 7F set Volume Capacity in Gallons; in Step 8F select Regeneration Time Option "On0"; and in Step 3I select Day Override "oFF".

For Clack Corporation alternator systems using **WS1, WS1.25, and WS1.5** valves there will be an option to delay 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. Once "Rinse" and "Fill" are completed, the valve will re-enter Standby mode until requested to come on-line for Service.

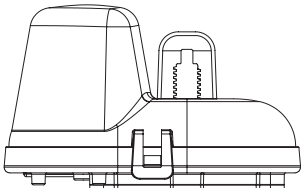
For Clack Corporation alternator systems using the **WS2** valve, when NEXT is pressed after selecting ALT A or ALT B, a display will allow the user to set the amount of pre-service rinse time for the stand by tank just prior to returning to service.





Retracted

Valve "A" in Service Position = MAV piston rod Retracted



Extended

Valve "B" in Service Position = MAV piston rod Extended

NOTE: Clack twin alternators may be set up to operate with day over-ride in conjunction with the main volume-based regeneration setting. Alternator systems will only count days on the unit that is on-line, which will allow the system to alternate regeneration based exclusively on the day over-ride setting when programmed for either time-clock regeneration or volume based regeneration during periods of low usage. At zero capacity remaining, a Clack twin alternator will perform an immediate transfer of the MAV to place a fully regenerated tank on-line. The regeneration of the exhausted tank will then be delayed until the set Regeneration Time.

<u>Configuring the Control Valve for No Hard Water Bypass Operation:</u>

Select "nHbP" for control operation. For no hard water bypass operation the three wire connector is not used. Selection requires that a connection to MAV or a Clack No Hard Water Bypass Valve is made to the two pin connector labeled MAV DRIVE located on the printed circuit board. If using a MAV, the A port of the MAV must be plugged and the valve outlet connected to the B port. When set to "nHbP", 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.

<u>Configuring the Control Valve for Separate Source Operation:</u>

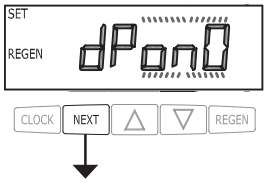
Select "SEPS" for control operation. For separate source operation, the three wire connector is not used. Selection requires that a connection to a Clack Motorized Alternator Valve (MAV) is made to the two pin connector labeled MAV DRIVE located on the printed circuit board. The C port of the MAV must 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 "SEPS", the MAV will be driven closed before the first regeneration cycle, and be driven 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.

<u>Configuring the Control Valve to operate with Clack System Controller:</u>

Select SYS 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. Selection requires that a connection to a Clack No Hard Water Bypass (V3070FF or V3070FM) be made to the two-pin connector labeled MAV located on the printed circuit board for WS1 and WS1.25 control valves. For valve types WS1.5 and WS2, a connection from a Clack No Hard Water Bypass (V3097/BSPT or V3098/BSPT) to the two pin connector labeled MAV located on the printed circuit board is required.

Press NEXT to go to Step 5CS. Press REGEN to return to previous step.

STEP 5C



Step 5C – Allows selection of one of the following using ▲ or ▼:
- an outside signal to initiate a regeneration
- an outside signal to prevent or delay 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:
OFF - Feature not used.
NOTE: In a twin alternating system, each control must have a separate dP signal or dP switch. One dP signal or one dP switch cannot be used for both controls.

dPon0 – If the dP switch is closed for an accumulative time of 2 minutes a regeneration will be signaled to the unit. In a twin alternating system the MAV will transition first to switch units so that the signaled unit can start regeneration. After the MAV has fully transitioned, the regeneration begins immediately. Note: For WS1 – WS1.5 control valves programmed for twin alternating: if the dP function "dPon0" is set, the Delayed Rinse and Fill feature is not available.

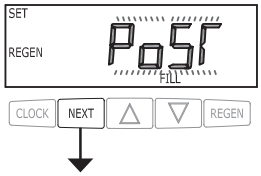
dPdEL – If the dP switch is closed for an accumulative time of 2 minutes a regeneration will occur at the scheduled delayed regeneration time. In a twin alternating system once the dP switch is triggered the PC Board will display "REGEN TODAY" and when the delayed regen time comes the control will switch tanks and the triggered unit will then go into regeneration.
Note: For WS1 – WS1.5 control valves programmed for twin alternating: if the dP function "dPdEL" is set, the Delayed Rinse and Fill feature is not available.

HoLd – If the dP switch is closed a regeneration will be prevented from occurring while there is switch closure. In a twin alternating system the regeneration of a unit can be prevented upon switch closure. If the unit depletes the capacity down to zero, it will not be allowed to switch tanks to regenerate until the switch is open.

Note: For WS1 – WS1.5 control valves programmed for twin alternating the Delayed Rinse and Fill feature can be set in conjunction with the "HoLd" if desired.

Press NEXT to go to Step 6C. Press REGEN to return to previous step.

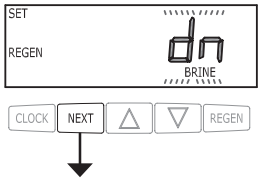
STEP 6C



STEP 6C – Set Refill option using ▲ or ▼:
- "PoST" to refill the brine tank after the final rinse; or
- "PrE" to refill the brine tank two hours before the regeneration time set.

If "Filter" is selected in Step 2F, this screen will not appear.
Press NEXT to go to Step 7C. Press REGEN to return to previous step.

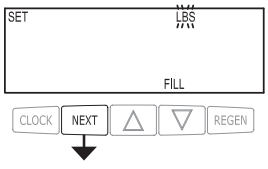
STEP 7C



STEP 7C – Set regenerant downflow or upflow using ▲ or ▼:
- "dn" if the regenerant is to flow downward through the media; or
- "UP" if the regenerant is to flow upward through the media.

Prior to selecting a regenerant flow direction, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. Refer to the Service Manual for drawings and part numbers. This screen will only appear if Step 2S is set to SOFTENING.
Press NEXT to go to Step 8C. Press REGEN to return to previous step.

STEP 8C



RETURN TO NORMAL MODE

Step 8C – Fill Units: If set as a softener, if Step 2C is set to 1.5, and FILL is part of the Regeneration Cycle Sequence, FILL UNITS of LBS or MIN can be selected.
Press NEXT to exit OEM Cycle Sequence. Press REGEN to return to previous step.

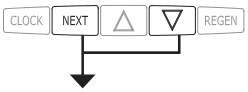
OEM Softener System Setup

In OEM Softener System Setup the OEM chooses the value for the specified cycles (the order of which is specified by the selections for Step 6C and Step 7C in OEM Cycle Sequence) and specifies other operating parameters for the system. If a cycle is present the value can be set to off. Fill is in pounds of salt and all other cycles are in minutes. Fill is in minutes for 2.0 valve, or 1.5 valve when Step 9C is set to MIN.

Step 6C	Step 7C	Cycle Order
Post	dn	Backwash, Brine, Backwash, Rinse, Fill
Pre	dn	Fill, Service, Backwash, Brine, Backwash, Rinse
Post	UP	Brine, Backwash, Rinse, Fill
Pre	UP	Fill, Service, Brine, Backwash, Rinse

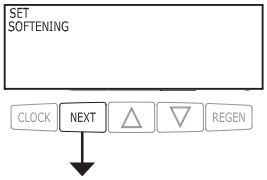
Note: If "Pre" is selected in Step 6C and "UP" is selected in Step 7C, the proportional brining display will appear after the Grains Capacity display (Step 8S).

STEP 1S



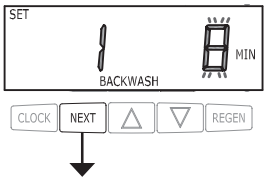
Step 1S – Press NEXT and ▽ simultaneously for 3 seconds and release. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated. To unlock press ▽, NEXT, ▽, and CLOCK in sequence, then press NEXT and ▽ simultaneously for 3 seconds and release.

STEP 2S



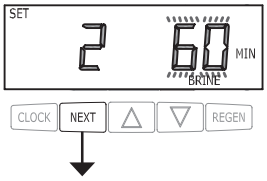
Step 2S – Choose SOFTENING using △ or ▽. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.

STEP 3S



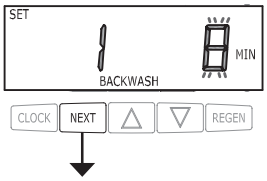
Step 3S – Select the time for the first cycle (which in this example is BACKWASH) using △ or ▽. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

STEP 4S



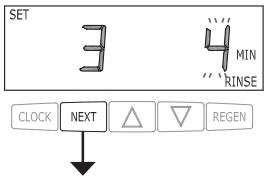
Step 4S – Select the time for the second cycle (which in this example is dn BRINE) using △ or ▽. Press NEXT to go to Step 5S. Press REGEN to return to previous step.
NOTE: The display will flash between cycle number and time, and brine direction (dn or UP).

STEP 5S



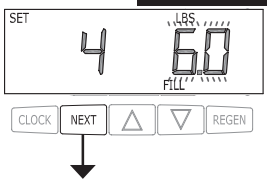
Step 5S – Select the time for the third cycle (which in this example is BACKWASH) using △ or ▽. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

STEP 6S



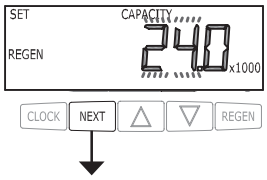
Step 6S – Select the time for the fourth cycle (which in this example is RINSE) using ▽ or △. Press NEXT to go to Step 7S. Press REGEN to return to previous step.

STEP 7S



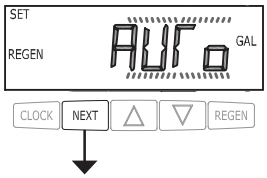
Step 7S – Select the LBS for the fifth cycle (which in this example is FILL) using ▽ or △. Fill is in minutes for 2.0 valve, or 1.5 valve when Step 8C is set to MIN.
Press NEXT to go to Step 8S. Press REGEN to return to previous step.

STEP 8S



Step 8S –Set Grains Capacity using ▼ or ▲. The ion exchange capacity is in grains of hardness as calcium carbonate for the system based on the pounds of salt that will be used. Calculate the pounds of salt using the fill time previously selected. Grains capacity is affected by the fill time. The grains capacity for the selected fill time should be confirmed by OEM testing. The capacity and hardness levels entered are used to automatically calculate reserve capacity when gallon capacity is set to AUTO. Press NEXT to go to Step 9S. Press REGEN to return to previous step.

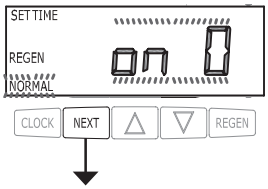
STEP 9S



Step 9S – Set Volume Capacity using the ▼ or ▲ button. If value is set to:
- "AUTO" – 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 3I); or
- a number – regeneration initiation will be based off the value specified.

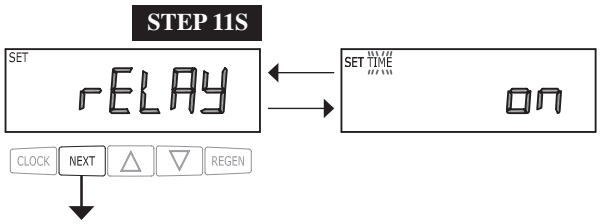
If "OFF" or a number is used, hardness display will not be allowed to be set in Installer Display Settings Step 2I.
If "OFF" is selected, Regeneration Time is automatically "Delayed", so Step 10S will not appear. See Setting Options Table for more detail.
Press NEXT to go to Step 10S. Press REGEN to return to previous step.

STEP 10S



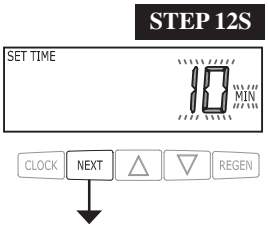
Step 10S – Set Regeneration Time Options using ▽ or △. If value is set to:
- "NORMAL" means regeneration will occur at the preset time;
- "on 0" means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- "NORMAL + on 0" means regeneration will occur at one of the following:
  - —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
  - —after 10 minutes of no water usage when the gallons capacity reaches 0 (zero). See Setting Options Table for more detail.

"on 0" is the default if Step 2C is set to 1.0T, and "NORMAL + on 0" is not available. This step will not appear if Step 9S is set to oFF or Step 4C is set to "SYS".
"NORMAL" is the default if Step 4C is set to ALT A or ALT B, and "NORMAL + on 0" is not available.
Press NEXT to go to Step 11S. Press REGEN to return to previous step.



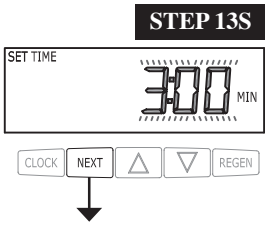
Step 11S – Set Relay operation using ▲ or ▼. The choices are:
- Set Time: After the start of a regeneration the amount of time that should pass prior to activating the relay. The start of regeneration is defined as the first backwash cycle, Dn brine cycle or UP brine cycle which ever comes first.
- Set Softening Gal: Relay activates after a set volume has been used while in service, then deactivates after the meter stops registering flow and the set time period has expired.
- Set Softening Regen Gal: Relay activates after a set volume has been used while in service or during regeneration, then deactivates after the meter stops registering flow and the set time period has expired.
- Set HoLd Gal: Relay closes every set number of gallons and releases when ▲ is pressed.
- Set Error: Relay closes when a valve/MAV error is generated, and opens when the error is reset.
- Set Off: If set to Off, Steps 12S and 13S will not be shown.

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

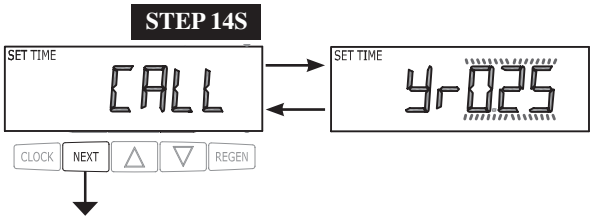


Step 12S: Set Relay Actuation Time or Gallons using ▲ or ▼. The choices are:
- Relay Actuation Time: After the start of a regeneration the amount of time that should pass prior to activating the relay. The start of regeneration is defined as the first backwash cycle or Dn brine cycle, which ever comes first. Ranges from 1 minute to 500 minutes.
- Relay Actuation Gallons: Relay activates after a set number of gallons have passed. Ranges from 1 to 100 gallons.
- Relay HoLd: Relay closes every set number of gallons. Ranges from 1,000 to 99,000,000 gallons.

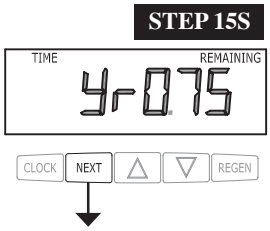
Press NEXT to go to Step 13S. Press REGEN to return to previous step.



Step 13S: Set Relay Deactivate Time using ▲ or ▼.
- If Set Time on is selected in Step 11S the relay will deactivate after the time set has expired. Ranges from 1 second to 500 minutes.
- If Set Gal Softening on or Set Gal Softening Regen on is selected in Step 11S the relay will deactivate after the time set has expired or after the meter stops registering flow, which ever comes first. Ranges from 1 second to 500 minutes.
- Does not display for HoLd Gal selection. Press NEXT to go to Step 14S. Press REGEN to return to previous step.



Step 14S: Set the Service Call Indicator by using ▲ or ▼. Range is in ÷ of a year increments from 0.25 to 9.75 years. Selecting OFF will disable this feature. Press NEXT to go to Step 15S. Press REGEN to return to previous step.



Step 15S: Displays time remaining before a service call is requested. To reset the time remaining to the original programmed value, press and hold ▲ and ▼ for approximately 3 seconds. The display will return to the value selected in Step 14S.

NOTE: To clear the Service Call reminder, press ▲ and ▼ simultaneously while the reminder screen is displayed.

RETURN TO NORMAL MODE

Setting Options Table[1]

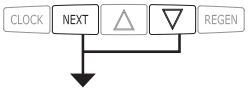
System Type	Regeneration Option	Regeneration Type	Day Override	
Softening	Auto	Normal	1-28 days	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity, or the specified number of days is reached, whichever comes first.
Softening	Auto	Normal	OFF	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity.
Softening or Filtering	20 - 1,500,000 Gallons	Normal	1-28 days	Regeneration occurs at the next regeneration time when volume capacity reaches 0, or the specified number of days is reached, whichever comes first.
Softening or Filtering	20 - 1,500,000 Gallons	Normal	OFF	Regeneration occurs at the next regeneration time when volume capacity reaches 0.
Softening or Filtering	OFF	Normal	1-28 days	Time Clock operation. Regeneration occurs at the next regeneration time the specified number of days is reached.
Softening	Auto or 20 - 1,500,000 Gallons	On 0	1-28 days	Regeneration occurs immediately when volume capacity reaches 0, or the specified number of days is reached, whichever comes first.
Softening or Filtering	20 - 1,500,000 Gallons	On 0	OFF	Regeneration occurs immediately when volume capacity reaches 0.
Softening	Auto	Normal + On 0	1-28 days	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity, or the specified number of days is reached, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Softening or Filtering	20 - 1,500,000 Gallons	Normal + On 0	1-28 days	Regeneration occurs at the next regeneration time the specified number of days is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Softening	Auto	Normal + On 0	OFF	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.

[1] Reserve Capacity estimate is based on history of water usage. Reserve Capacity estimate is not available with alternator systems or Twin Tank Valve.

OEM Filter System Setup

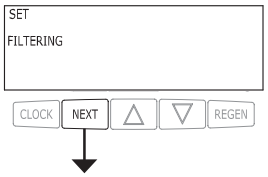
In OEM Filter System Setup the order of the cycles is preset to Backwash, dn Brine, Backwash, Rinse and Fill. Fill is set in gallons and all other cycles are set in minutes. Fill for 2" valve is in minutes. Each cycle can be set to off.

STEP 1F



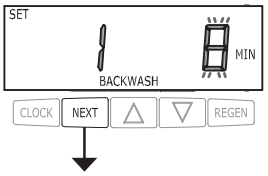
Step 1F – Press NEXT and ▽ simultaneously for 3 seconds and release. If screen in Step 2F does not appear in 5 seconds the lock on the valve is activated. To unlock press ▽, NEXT, ▽, and CLOCK in sequence, then press NEXT and ▽ simultaneously for 3 seconds and release.

STEP 2F



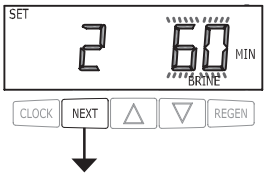
Step 2F – Choose FILTERING using △ or ▽. Press NEXT to go to Step 3F. Press REGEN to exit OEM Filter System Setup.

STEP 3F



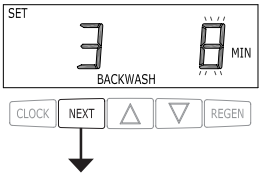
Step 3F – Select the time for the first cycle using △ or ▽. Press NEXT to go to Step 4F. Press REGEN to return to previous step.

STEP 4F



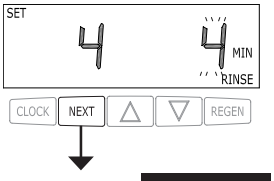
Step 4F – Select the time for the second cycle using △ or ▽. Press NEXT to go to Step 5F. Press REGEN to return to previous step.
NOTE: The display will flash between cycle number and time, and brine direction.

STEP 5F



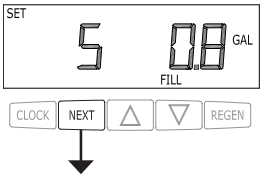
Step 5F – Select the time for the third cycle using △ or ▽. Press NEXT to go to Step 6F. Press REGEN to return to previous step.

STEP 6F

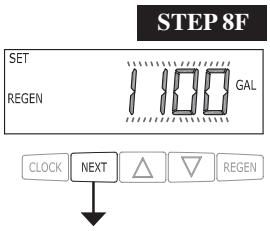


Step 6F – Select the time for the fourth cycle using △ or ▽. Press NEXT to go to Step 7F. Press REGEN to return to previous step.

STEP 7F



STEP7F – Enter "oFF" if regenerant is not used (i.e. backwash only) or enter the refill volume (in gallons) using △ or ▽. Press NEXT to go to Step 8F. Press REGEN to return to previous step.

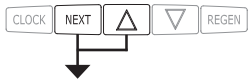


Step 8F – Set Volume Capacity using ▼ or ▲. If value is set to:
- "oFF" – regeneration will be based solely on the day override set (see Installer Display/Settings Step 3I); or
- a number – regeneration initiation will be based off the value specified.

See Setting Options Table for more detail. Press NEXT to go to the remaining Filter Systems Setup screens. Refer to Softener System Setup starting at step 10S for details. Press REGEN to return to previous step.

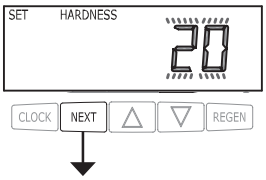
Installer Display Settings

STEP 1I



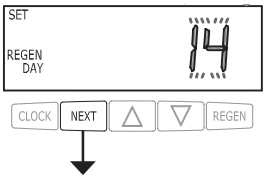
STEP 1I - Press NEXT and ▲ simultaneously for 3 seconds.

STEP 2I



STEP2I – Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using ▼ or ▲. The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon can be increased if soluble iron needs to be reduced. This display will not appear if "FILTER" is selected in Step 2F or if 'AUTO' is not selected in Set Volume Capacity in OEM Softener System Setup. Press NEXT to go to step 3I. Press REGEN to exit Installer Display Settings.

STEP 3I

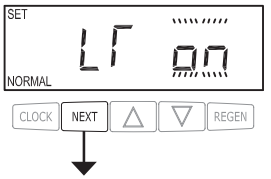


STEP3I – Day Override: When volume capacity is set to "oFF", sets the number of days between regenerations. When volume capacity is set to AUTO or to a number, sets the maximum number of days between regenerations. If value set to "oFF", regeneration initiation is based solely on volume used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient volume of water were not used to call for a regeneration. Set Day Override using ▼ or ▲:

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

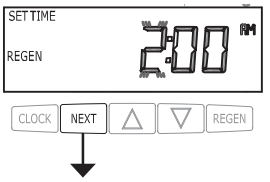
See Setting Options Table for more detail on setup. Press NEXT to go to step 4I. Press REGEN to return to previous step.

STEP 4I



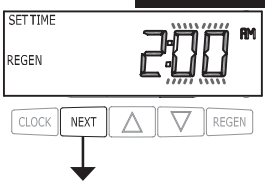
STEP4I – Backlight Operation: Set the normal activity of the backlight. Set to ON, the backlight is always on. Set to OFF, the backlight turns off after 5 minutes of keyboard inactivity. When the backlight is inactive, any button push will activate the backlight.
Press NEXT to go to Step 5I. Press REGEN to return to previous step.

STEP 5I



STEP5I – Next Regeneration Time (hour): Set the hour of day for regeneration using ▼ or ▲. AM/PM toggles after 12. The default time is 2:00 AM. This display will show "on 0" if "on 0" is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup. Press NEXT to go to step 6I. Press REGEN to return to previous step.

STEP 6I



STEP6I – Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▼ or ▲. This display will not be shown if "on 0" is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup. Press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

User Display 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 always the current time of day.

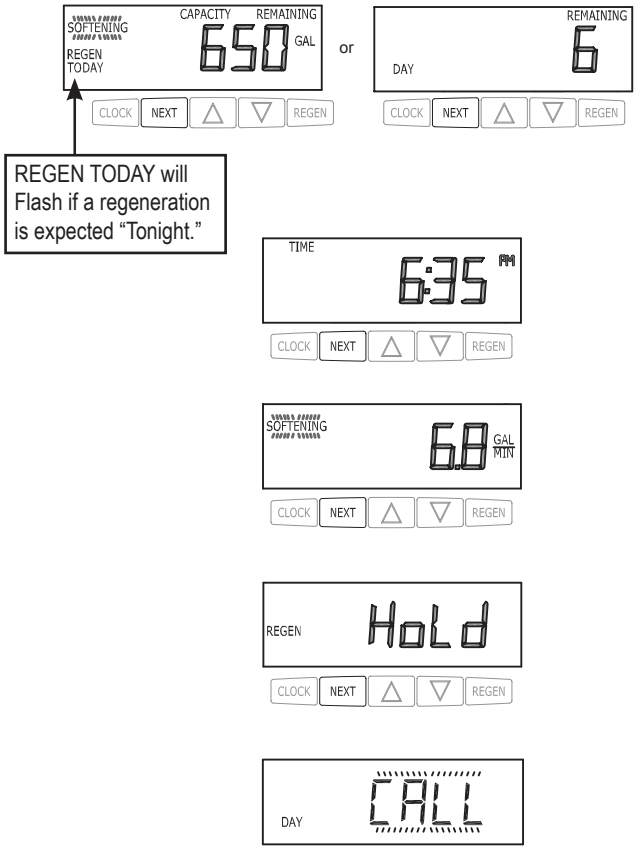
Days remaining is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the gallons that will be treated before the system goes through a regeneration cycle.

Another display shows the current treated water flow rate through the system. The fourth display will show either dP or hold if the dP switch is closed.

The service call display will not appear if OFF is selected in Step 14S of OEM Softener System Setup. To clear the Service Call reminder, press ▲ and ▼ simultaneously while CALL is displayed.

If the system has called for a regeneration that will occur at the preset time of regeneration, the words REGEN TODAY will appear on the display.

If a water meter is installed, the word "Softening" or "Filtering" flashes on the display when water is being treated (i.e. water is flowing through the system).



In Alternator Systems when a unit is waiting to initiate the first cycle step of regeneration, "REGEN Pndg" is displayed.

"STbY" is displayed in Alternator Systems when a valve is in Standby state.

"REGEN Pndg FILL RINSE" is displayed whenever a zero-capacity tank has transferred to an off-line state and is currently waiting to initiate the second portion of a regeneration cycle. Viewed only when Delayed Rinse and Fill is set to ON.

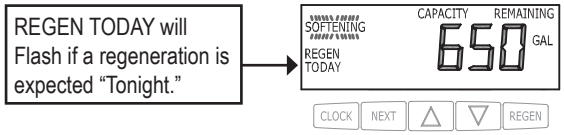
Regeneration Mode

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 a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.

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.

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, when the regeneration time option is set to "NORMAL" or "NORMAL+on0", 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. Note: If the regeneration time option is set to "on0" there is no set delayed regeneration time so "REGEN TODAY" will not activate if "REGEN" is pressed.

To initiate a manual regeneration immediately, press and hold "REGEN" for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

Note: For softeners, if the brine tank does not contain salt, fill with salt and wait at least two hours before regenerating.

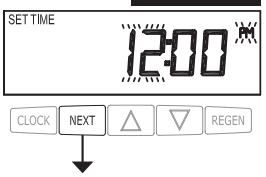
Set Time of Day

The user can also set the time of day. Time of day should only need to be set if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The non rechargeable battery should also be replaced.

STEP 1U

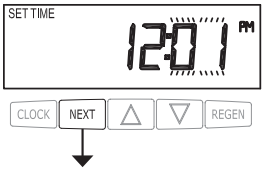
STEP 1U – Press CLOCK.

STEP 2U



STEP2U - Current Time (hour): Set the hour of the day using ▲ or ▼. AM/PM toggles after 12. Press NEXT to go to Step 3U.

STEP 3U



STEP3U - Current Time (minutes): Set the minutes of the day using ▲ or ▼. Press NEXT to exit Set Time of Day. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

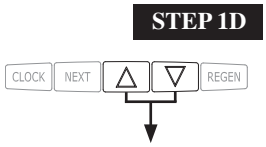
Power Loss

If the power goes out the system will keep time until the battery is depleted. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset and the battery replaced. The system will remember the rest.

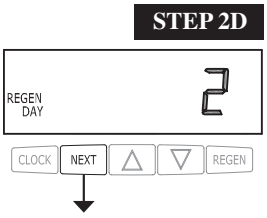
Error Message

If the word "ERROR," a number and the word "CALL" are alternately flashing on the display contact the OEM for help. A number indicates that the valve was not able to function properly.

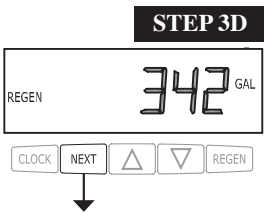
Diagnostics



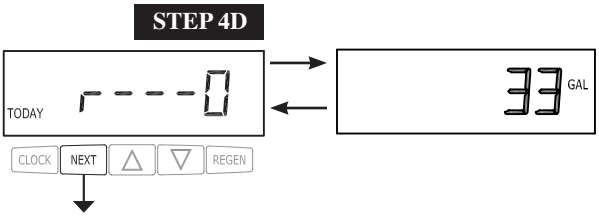
STEP1D – Press ▲ and ▼ simultaneously for three seconds. If screen in step 2D does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press ▲ and ▼ simultaneously for 3 seconds.



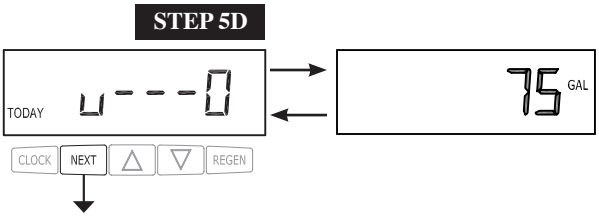
STEP2D – Days, since last regeneration: This display shows the days since the last regeneration occurred. Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.



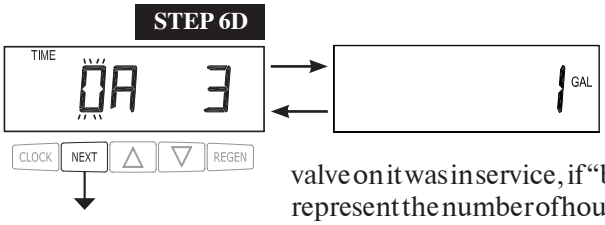
STEP3D – Volume, since last regeneration: This display shows the volume of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 4D. Press REGEN to return to previous step.



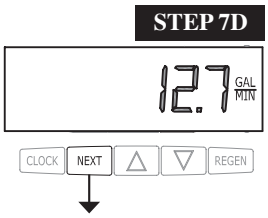
STEP4D – Volume, reserve capacity used for last 7 days: If the valve is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto," this display shows 0 day (for today) and flashes the reserve capacity. Pressing ▲ will show day 1 (which would be yesterday) and flashes the reserve capacity used. Pressing ▲ again will show day 2 (the day before yesterday) and the reserve capacity. Keep pressing ▲ to show the capacity for days 3, 4, 5 and 6. ▼ can be pressed to move backwards in the day series. Press NEXT at any time to go to Step 5D. Press REGEN to return to previous step.



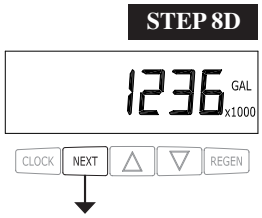
STEP 5D - Volume, 63-day usage history: This display shows day 1 (for yesterday) and flashes the volume of water treated yesterday. Pressing ▲ will show day 2 (which would be the day before yesterday) and flashes the volume of water treated on that day. Continue to press ▲ to show the maximum volume of water treated for the last 63 days. If a regeneration occured on the day the word "REGEN" will also be displayed. This display will show dashes if a water meter is not installed. Press NEXT at any time to go to Step 6D. Press REGEN to return to previous step.



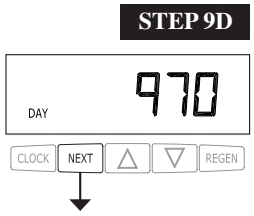
STEP6D – Twin Tank Valve transfer history: only displays when 1.0T was selected in Step 2S. Use ▲ or ▼ to scroll through the last 10 tank transfers. The first position in the display ranges from 0 to 9 with the lowest number being the most recent transfer. The second position in the display will be either "A" or "b". If "A" then the tank with the valve on it was in service, if "b" the tank with the in/out head on it was in service. The next three digits represent the number of hours ago that the transfer occurred. The display alternates with the volume that was treated before the tank transferred.
Press NEXT to go to Step 7D. Press REGEN to return to previous step.



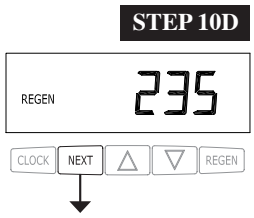
STEP7D – Flow rate, maximum last seven days: The maximum flow rate in gallons per minute that occurred in the last seven days will be displayed. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 8D. Press REGEN to return to previous step.



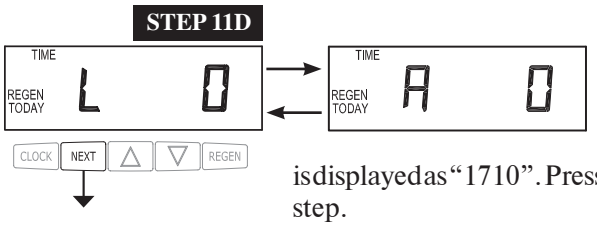
STEP8D – Gallons, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 9D. Press REGEN to return to previous step.



STEP9D – Days, total since start-up: This display shows the total days since startup. Press NEXT to go to Step 10D. Press REGEN to return to previous step.

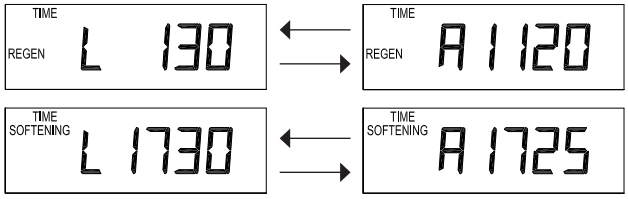


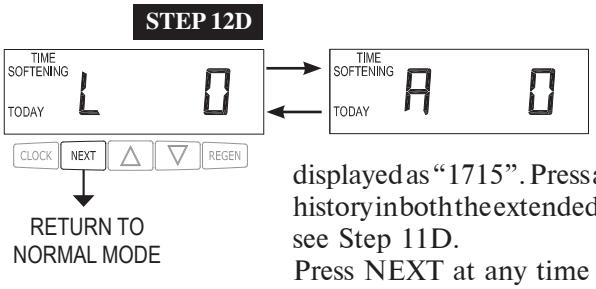
STEP 10D – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press NEXT to go to Step 11D. Press REGEN to return to previous step.



STEP11D – MAV Drive History in the direction of extended piston rod position. Display will only be shown if 1.0T is selected in Step 2C, or OFF is not selected in Step 4C. Up to a four digit number will appear after the "L" which stands for latest and "A" which stands for average. Drive time is measured in 1/100 of a second; i.e., a 17.10 second move is displayed as "1710". Press NEXT at any time to go to Step 12D. Press REGEN to return to previous step.

Press and hold ▲ and ▼ for 3 seconds while in Step 11D to reset the MAV drive history in both the retracted and extended piston rod position. To view the old MAV drive history data for retracted and extended rod position press and hold REGEN and ▲ while in Step 11D. Press NEXT to advance display to the old MAV drive history.



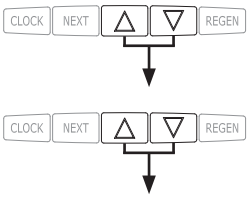


STEP12D – MAV Drive History in the direction of retracted piston rod position. Display will only be shown if 1.0T is selected in Step 2C, or OFF is not selected in Step 4C. Up to a four digit number will appear after the "L" which stands for latest and "A" which stands for average. Drive time is measured in 1/100 of a second; i.e., a 17.15 second move is displayed as "1715". Press and hold ▲ and ▼ for 3 seconds while in Step 12D to reset the MAV drive history in both the extended and retracted piston rod position. To view the old MAV drive history data see Step 11D.
Press NEXT at any time exit Diagnostics. Press REGEN to return to previous step.

When desired, all programming and information in Diagnostics may be reset to defaults when the valve is installed in a new location. To reset to defaults, press NEXT and ▼ simultaneously to go to the Softening/Filtering screen. Press ▲ and ▼ simultaneously to reset all programming and diagnostic values to defaults. Screen will return to User Display.

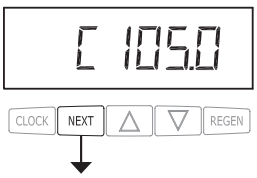
Valve History

STEP 1VH



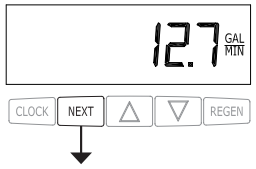
STEP1VH – Press ▲ and ▼ simultaneously for three seconds and release. Then press ▲ and ▼ simultaneously and release. If screen in step 2VH does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press ▲ and ▼ simultaneously for 3 seconds and release. Then press ▲ and ▼ simultaneously and release.

STEP 2VH



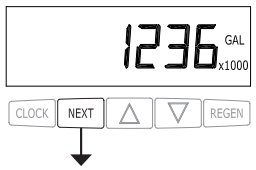
STEP2VH[2] – Software Version: This display shows the software version of the valve. Press NEXT to go to Step 3VH. Press REGEN to exit Valve History.

STEP 3VH



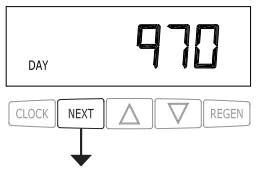
STEP3VH – Flow rate, maximum since startup: This display shows the maximum flow rate in gallons per minute that has occurred since startup. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 4VH. Press REGEN to return to previous step.

STEP 4VH



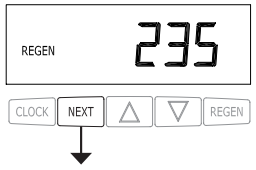
STEP4VH – Gallons, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 5VH. Press REGEN to return to previous step.

STEP 5VH



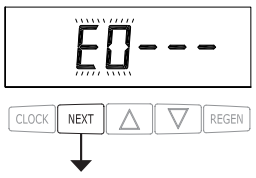
STEP5VH – Days, total since start-up: This display shows the total days since startup. Press NEXT to go to Step 6VH. Press REGEN to return to previous step.

STEP 6VH



STEP6VH – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press NEXT to go to Step 7VH. Press REGEN to return to previous step.

STEP 7VH



STEP7VH – Error Log: This display shows a history of the last 10 errors generated by the control during operation. Press ▲ or ▼ to view each recorded error. Press NEXT to exit Valve History. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

[2]Values in steps 2VH through 7VH cannot be reset.

Revision History:

8/25/2017

PAGE 4:
Updates to table and drawing - Bracket and Spring Clip / Power Supply

5/8/2018

PAGE 12:
Step 11S: Set Softening Gal: / Set Softening Regen Gal:

9/4/2018

PAGE 4:

4	V3558CH-03BOARD	WS1THRU2 CH XMEGA PCB REPLACE	1

PAGE 13:
New Setting Options table

PAGE 16:
Add step for Backlight Operation

PAGE 17:
New “Call” display

PAGE 20:
New displays for Steps 4D and 5D

PAGE 22:
New displays for Steps 2VH

10/10/2018

PAGE 4:
Update Power Supply information

4/23/2020

PAGE 4:
Removed #7 V3106-01 from table and drawing.

Not Shown	V3186-06	WS1 POWER SUPPLY US 15VDC HOCP	1
	V3186EU-06	WS1 POWER SUPPLY EU 15VDC HOCP	
	V3186UK-06	WS1 POWER SUPPLY UK 15VDC HOCP	
	V3186-01	WS1 POWER CORD ONLY	

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