Water Specialist GM
Control Valve
Programming and Cover Drawing Manual

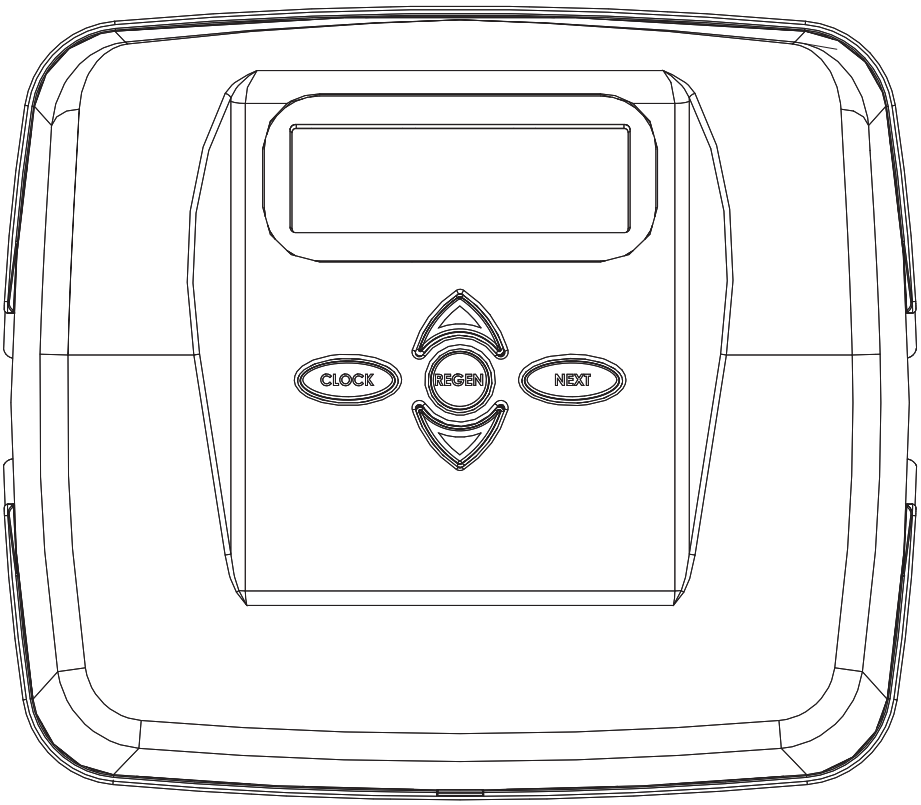


Table of Contents

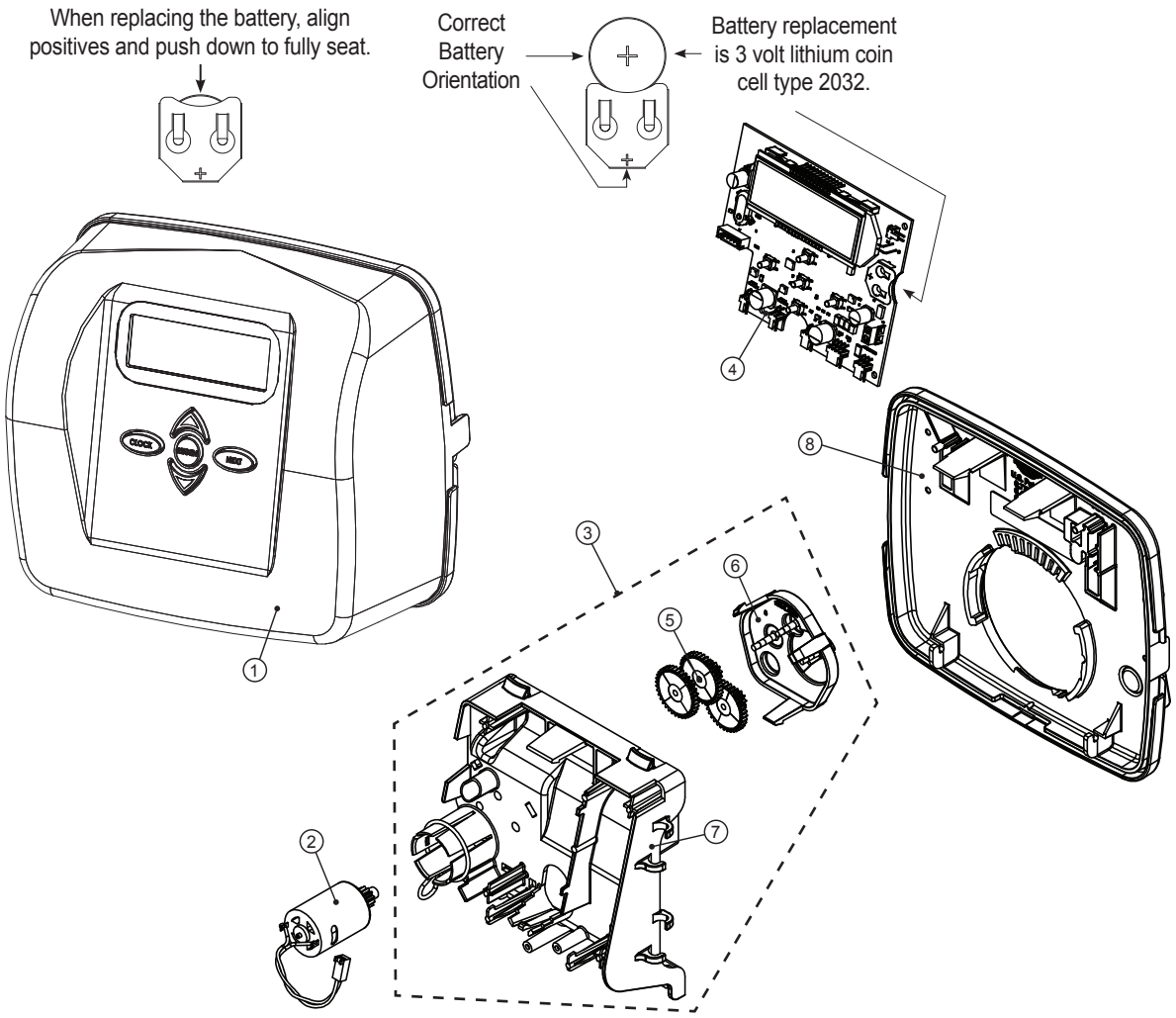
GM Front Cover and Drive Assembly

Drawing No.	Order No.	Description	Quantity
1	V4238-01	WS1 GM FRONT COVER BLACK ASSEMBLY	1
2	V3107-01	WS1 MOTOR	1
3	V3002-A	WS1 DRIVE BRACKET ASY	1
4	V4183LM-BOARD	WS1THRU2 LM PCB REPL	1
5	V3110	WS1 DRIVE GEAR 12X36	3
6	V3109	WS1 DRIVE GEAR COVER	1
7	V3106-01	WS1 DRIVE BRACKET & SPRING CLIP	1
8	V3946	WS1 WIDE DRIVE BACK PLATE	1
Not Shown	V3186-05	WS1 POWER SUPPLY US 15VDC VI	1

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

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.

AC Adapter	U.S.
Supply Voltage	120V AC
Supply Frequency	60 Hz
Output Voltage	15VDC
Output Current	500 mA



OEM General 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 Setup
- OEM Softener System Setup
- OEM Filter System Setup
- Installer Display Settings
- User Display Settings
- Diagnostics

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

At the discretion of the manufacturer, the field technician can access all settings. 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, gallons remaining before regeneration, days remaining before regeneration or lbs. salt 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.

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 programming and diagnostic values 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:

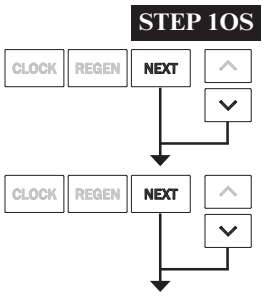
1. Press REGENonce. REGEN TODAY will flash on the display.
2. Press and hold REGEN for three seconds until the valve regeneration initiates.

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

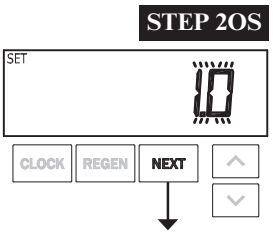
For Valve Type 1.0T, press and hold CLOCK and ▲ for about 3 seconds to initiate an exchange of the tank in Service without cycling the regeneration valve. After tank switch, days remaining and capacity remaining status is retained for each tank until the next regeneration.

OEM Setup

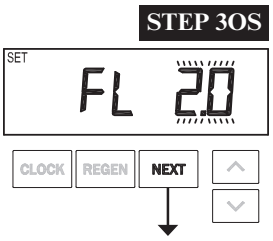
OEM Setup instructions allows the OEM to set meter size, dPswitch or alternating valve, pre or post fill and dn or up brine where applicable. Fill and brine values are ignored when the system is set up as a filter. The OEM Softener System Setup or the OEM Filter System Setup allow the OEM to set how long cycles will last.



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



Step 2OS – 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 a twin valve.



Step 3OS – When 1.5 or 2.0 is selected, an additional screen will appear. It is used to select which size flow meter is to be used with the valve, 1.0r, 1.5, 2.0 or 3.0. Variable meter pulses of 0.1-150.0 PPG can also be selected.

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

Step 4OS – 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.

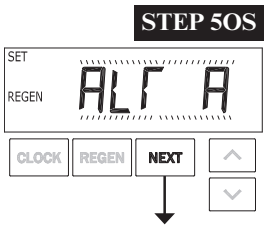
dPon0 – If the dP switch is closed for an accumulative time of 2 minutes a regeneration will be signaled to the unit. In a twin alternating system the MAV will transition first to switch units so that the signaled unit can start regeneration. After the MAV has fully transitioned, the regeneration begins 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 5OS. Press REGEN to return to previous step.

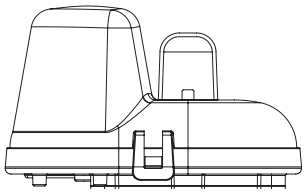
OEM Setup (continued)



Step 5OS - Allows selection of one of the following using ▲ or ▼:
• 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.
This display will not appear if 1.0T was selected in Step 2OS.
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.

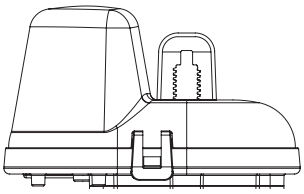
Prior to starting the programming steps, connect the interconnect cable to each control valve board's three pin connector labeled "COMM CABLE". Also connect the meter cord to either control valve to the three pin connector labeled "METER".			
		Softener valve programming steps	
OEM cycle sequence	Step 5OS	Set to ALT A Connect the outlet plumbing of Valve A to the MAV's A port and connect the MAV's two pin wire connector to the two pin connector labeled "DRIVE" on Valve A	Set to ALT B Connect the outlet plumbing of Valve B to the MAV's B port. No electrical connections are required between Valve B and the MAV
Softener System Setup	Step 11S	Set to "AUTO"	Set to "AUTO"
Softener System Setup	Step 10S	Set regeneration time option to "On 0".	Set regeneration time option to "On 0".
Installer Display Setting	Step 3I	Set Day Override to "OFF"	Set Day Override to "OFF"

If set up for a filter, in Step 8F set Volume Capacity in Gallons; in Step 9F select Regeneration Time Option "On 0"; and in Step 3I select Day Override "oFF".



Retracted

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



Extended

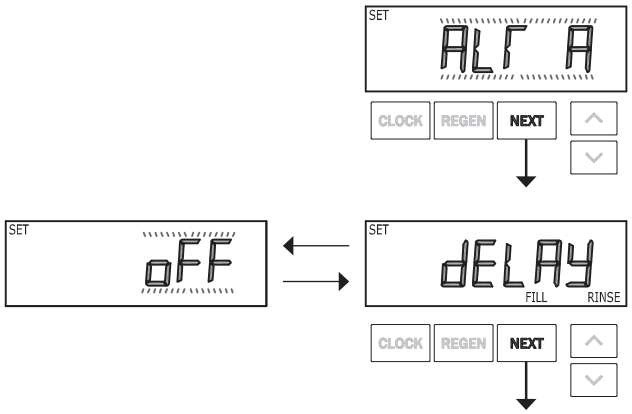
Valve "B" in Service Position =
MAV piston rod Extended

Note: Clack Twin Alternator Operations
• Twin alternating systems can be programmed with a day override setting combined with the normal volume-based regeneration programming. A twin alternating system in this configuration will then regenerate based on the volume used or the day override if there is a period of low water usage.
• Twin alternating systems can be programmed as a time clock only based regenerating system. In this configuration, the days remaining are counted only on the unit that is in service. The unit in Stand-by Mode only notes days in diagnostics, which results in time clock only twin regeneration initiation.
• Twin alternating systems can be programmed for a delayed regeneration time. The system will allow an immediate transfer of the MAV to switch tanks and place a fully regenerated unit in service once a unit becomes exhausted. The exhausted unit will then be placed into Stand-by Mode and allowed to have a delayed regeneration at the pre-set time.

OEM Setup (continued)

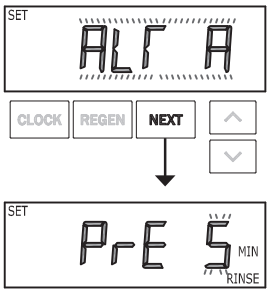
For Clack Corporation alternator systems using WS1, WS1.25 and WS1.5 valves there will be an option to delay the last two cycles of regeneration (only "Rinse" and "Fill"). This feature splits the regeneration into two portions. The first portion of the regeneration will start immediately and all programmed 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.

WS1, WS1.25, and WS1.5 Valves



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.

WS2 Valve

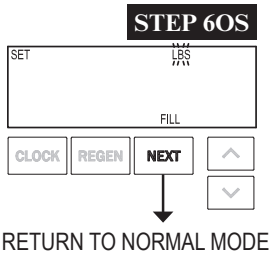


<u>Configuring the Control Valve for No Hard Water Bypass Operation:</u>
Select "nHbP" for control operation. For no hard water bypass operation the three wire connector is not used. Selection requires that a connection to MAV or a Clack No Hard Water Bypass Valve is made to the two pin connector labeled MAV 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 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 System Controller Enabled to link the Control Valve to the Clack System Controller. For communication between the Control Valve and the System Controller a three wire communication cable is required.
Press NEXT to go to Step 6OS. Press REGEN to return to previous step.

OEM Setup (continued)

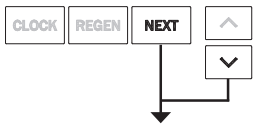


STEP 6OS – Fill Units: If set as a softener, if Step 2OS is set to 1.5 and FILL is part of the Regeneration Cycle Sequence, FILL UNITS of MIN or LBS can be selected. Press NEXT to exit OEM Configuration Setup. Press REGEN to return to previous step.

OEM Softener System Setup

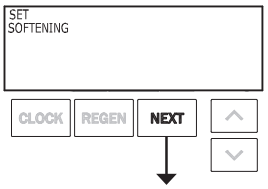
Step 3S	Step 4S	Softening Cycles
DN	Post	Backwash, Brine, Backwash Rinse, Fill
DN	Pre	Fill, Service, Backwash, Brine, Backwash, Rinse
UP	Post	Brine, Backwash, Rinse, Fill
UP	Pre	Fill, Service, Brine, Backwash, Rinse

STEP 1S



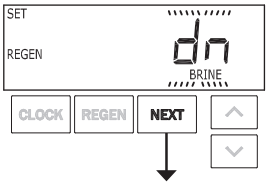
Step 1S – Press NEXT and ▼ simultaneously for approximately 3 seconds and release. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press NEXT and ▼ simultaneously for approximately 3 seconds and release.

STEP 2S



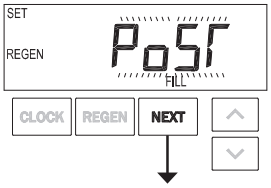
Step 2S – Choose SOFTENING using ▲ or ▼. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.

STEP 3S



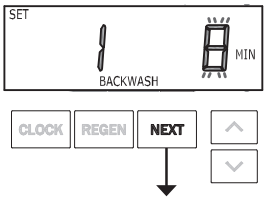
Step 3S – Step 3S - Set regenerant downflow or upflow using ▲ or ▼:
• "dn" if the regenerant is to flow downward through the media; or
• "UP" if the regenerant is to flow upward through the media.
Prior to selecting the upflow regeneration cycle, verify that the correct body, main piston, regenerant 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.
Press NEXT to go to Step 4S. Press REGEN to return to previous step.

STEP 4S



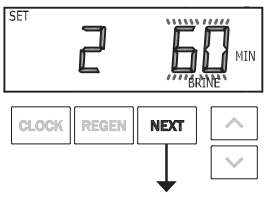
Step 4S – Set Refill option using ▲ or ▼:
• "PoST" to refill the brine tank after the final rinse; or
• "PrE" to refill the brine tank four hours before the regeneration time set.
Press NEXT to go to Step 5S. Press REGEN to return to previous step.

STEP 5S



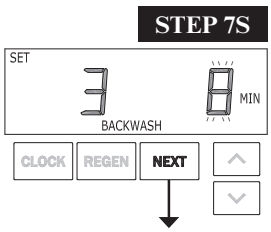
Step 5S – Select the time for the first cycle using ▲ or ▼. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

STEP 6S

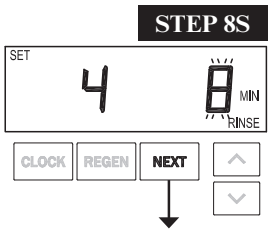


Step 6S – Select the time for the second cycle using ▲ or ▼. Press NEXT to go to Step 7S. Press REGEN to return to previous step.
NOTE: The display will flash between cycle number and time, and brine direction (dn).

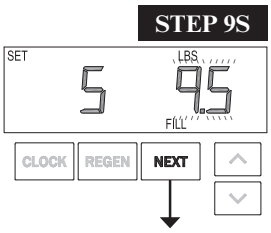
OEM Softener System Setup (continued)



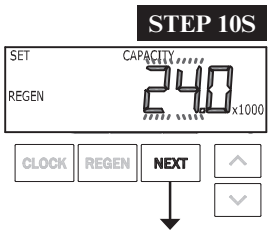
Step 7S – Select the time for the third cycle using ▲ or ▼. Press NEXT to go to Step 8S. Press REGEN to return to previous step.



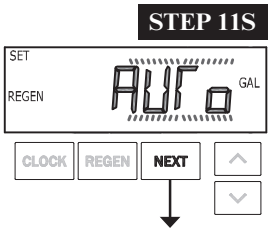
Step 8S – Select the time for the fourth cycle using ▲ or ▼. Press NEXT to go to Step 9S. Press REGEN to return to previous step.



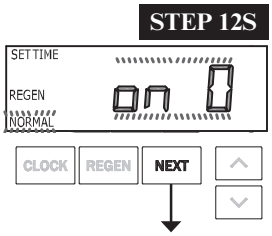
Step 9S – Select the LBS for the fifth cycle using ▲ or ▼. Fill is in minutes when Step 2OS is set to 2.0, or when Step 6OS is set to MIN. Press NEXT to go to Step 10S. Press REGEN to return to previous step.



Step 10S –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 11S. Press REGEN to return to previous step.



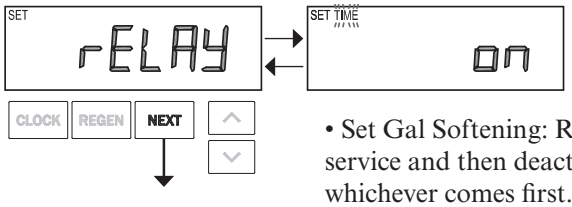
Step 11S – Set Volume Capacity using ▲ or ▼. If value is set to:
• "AUTO" capacity will be automatically calculated and reserve capacity will be automatically estimated;
• "oFF" regeneration will be based solely on the day override set (see Installer Display Settings Step 3I); or
• a number regeneration 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. See Setting Options Table for more detail. Press NEXT to go to Step 12S. Press REGEN to return to previous step.



Step 12S – 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.
"NORMAL" is the default if Step 5OS is set to ALT A or ALT B, and "NORMAL + on 0" is not available.
"On 0" is the default if Step 2OS is set to 1.0T, and "NORMAL + on 0" is not available.
Press NEXT to go to Step 13S. Press REGEN to return to previous step.

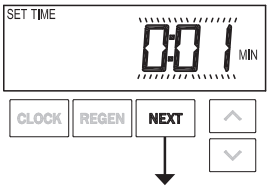
OEM Softener System Setup (continued)

STEP 13S



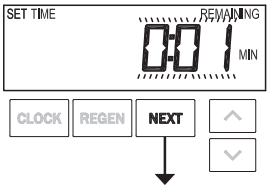
Step 13S: Set Relay operation using ▲ or ▼. The choices are:
• Set Time: Relay activates after a set time at the beginning of a regeneration and then deactivates after a set period of time. The start of regeneration is defined as the first backwash cycle or Up or Dn brine cycle, which ever comes first.
• Set Gal Softening: Relay activates after a set number of gallons have been used while in service and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
• Set Gal Softening Regen: Relay activates after a set number of gallons have been used while in service or during regeneration and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
• Error: Relay closes whenever the control enters the Error Mode, and immediately deactivates when the error mode is exited.
• Set Off: If set to Off, Steps 14S and 15S will not be shown.
Press NEXT to go to Step 14S. Press REGEN to return to previous step.

STEP 14S



Step 14S: 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, Dn brine cycle or UP brine cycle which ever comes first. Ranges from 1 second to 200 minutes.
• Relay Actuation Gallons: Relay activates after a set number of gallons has passed through the meter when the valve is in the Service mode. Ranges from 1 to 50 gallons.
Press NEXT to go to Step 15S. Press REGEN to return to previous step.

STEP 15S



RETURN TO NORMAL MODE

Step 15S: Set Relay Deactivate Time using ▲ or ▼.
• If Set Time on is selected in Step 13S, the relay will deactivate after the time set has expired. Ranges from 1 second to 200 minutes.
• If Set Gal Softening or Gal Softening Regen on is selected in Step 13S, the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first. Ranges from 1 second to 20 minutes.
Press NEXT to exit OEM Softener System Setup. Press REGEN to return to previous step.

Setting Options Table

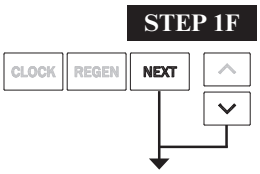
Filters should only use shaded options

Volume Capacity	Regeneration Time Option	Day Override	Result[1]
AUTO	NORMAL	oFF	Reserve capacity automatically estimated. Regeneration occurs when volume capacity falls below the reserve capacity at the next Regen Set Time
AUTO	NORMAL	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached.
Any number	NORMAL	oFF	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity reaches 0.
oFF	NORMAL	Any number	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached.
Any number	NORMAL	Any number	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when volume 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 volume capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur when volume capacity reaches 0.
Any number	On 0	oFF	Reserve capacity not automatically estimated. Regeneration occurs immediately when volume 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 volume capacity falls below the reserve capacity at the next Regen Set Time or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
AUTO	NORMAL on 0	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Any number	NORMAL on 0	Any number	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.

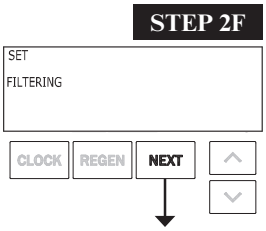
[1] Reserve Capacity estimate is based on history of water usage. Reserve Capacity estimate is not available with alternator systems or Twin Tank Valve.

OEM Filter System Setup

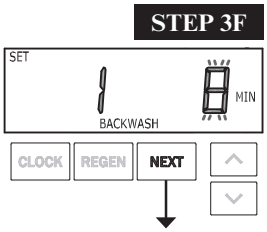
Filter Settings	
Filtering Regen	Backwash, Brine, Backwash, Rinse, Fill
Filtering Backwash	Backwash, Rinse



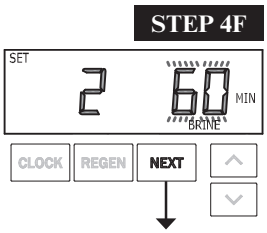
Step 1F – Press NEXT and ▼ simultaneously for approximately 3 seconds and release. If screen in Step 2F does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press NEXT and ▼ simultaneously for approximately 3 seconds and release.



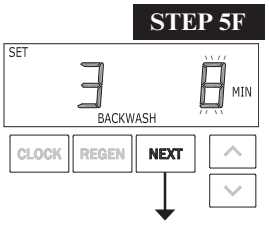
Step 2F – Choose FILTERING REGEN or FILTERING BACKWASH using ▲ or ▼. Press NEXT to go to Step 3F. Press REGEN to exit OEM Filter System Setup.



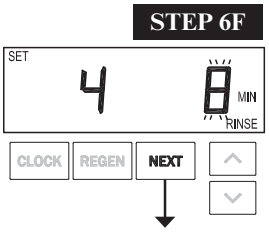
Step 3F – Select the time for the first cycle using ▲ or ▼. Press NEXT to go to Step 4F. Press REGEN to return to previous step.



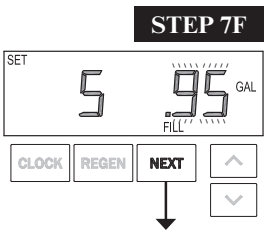
Step 4F – Select the time for the second cycle using ▲ or ▼. Press NEXT to go to Step 5F. Press REGEN to return to previous step.
NOTE: The display will flash between cycle number and time, and brine direction.



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



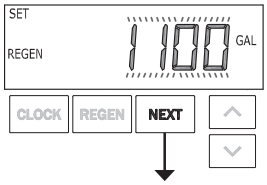
Step 6F – Select the time for the fourth cycle using ▲ or ▼. Press NEXT to go to Step 7F. Press REGEN to return to previous step.



Step 7F – Select the volume in gallons for the fifth cycle using ▲ or ▼. When 2.0 is selected in Step 20S, FILL is in minutes. Press NEXT to go to Step 8F. Press REGEN to return to previous step.

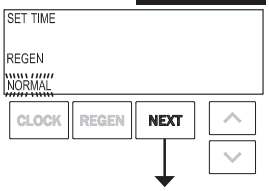
OEM Filter System Setup (continued)

STEP 8F



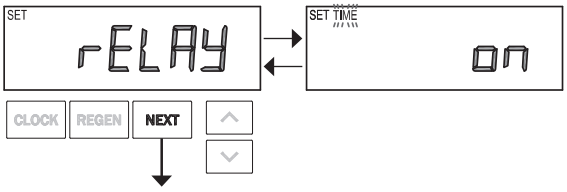
Step 8F – Set Volume Capacity using ▲ or ▼. If value is set to:
• "oFF" regeneration will be based solely on the day override set (see Installer Display/Settings Step 3I); or
• a number, regeneration initiation will be based off the value specified.
See Setting Options Table for more detail. Press NEXT to go to Step 9F. Press REGEN to return to previous step.

STEP 9F



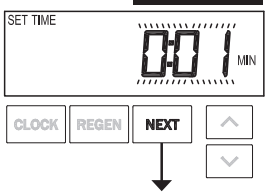
Step 9F – Set Regeneration Time Options using ▲ or ▼. If value is set to:
• "NORMAL" means regeneration will occur at the preset time;
• "on 0" means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
• "NORMAL + on 0" means regeneration will occur at one of the following:
— 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 gallon capacity reaches 0 (zero).
See Setting Options Table for more detail.
"NORMAL" is the default if Step 5OS is set to ALT A or ALT B, and "NORMAL + on 0" is not available.
"On 0" is the default if Step 2OS is set to 1.0T, and "NORMAL + on 0" is not available.
Press REGEN to return to previous step. Press NEXT to go to Step 10F.

STEP 10F



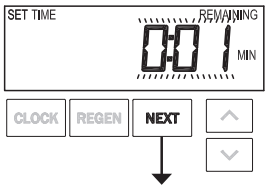
Step 10F: Set Relay operation using ▲ or ▼. The choices are:
• Set Time: Relay activates after a set time at the beginning of a regeneration and then deactivates after a set period of time. The start of regeneration is defined as the first backwash cycle or Dn brine cycle, which ever comes first.
• Set Gal Filtering: Relay activates after a set number of gallons have been used while in service and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
• Set Gal Filtering Regen: Relay activates after a set number of gallons have been used while in service or during regeneration and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
• Error: Relay closes whenever the control enters the Error Mode, and immediately deactivates when the error mode is exited.
• Set Off: If set to Off, Steps 11F and 12F will not be shown.
Press NEXT to go to Step 11F. Press REGEN to return to previous step.

STEP 11F



Step 11F: 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 second to 200 minutes.
• Relay Actuation Gallons: Relay activates after a set number of gallons has passed through the meter when the valve is in the Service mode. Ranges from 1 to 50 gallons.
Press NEXT to go to Step 12F. Press REGEN to return to previous step.

STEP 12F

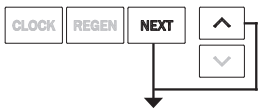


RETURN TO NORMAL MODE

Step 12F: Set Relay Deactivate Time using ▲ or ▼.
• If Set Time on is selected in Step 10F, the relay will deactivate after the time set has expired. Ranges from 1 second to 200 minutes.
• If Set Gal Filtering or Gal Filtering Regen on is selected in Step 10F, the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first. Ranges from 1 second to 20 minutes.
Press NEXT to exit OEM Filter System Setup. Press REGEN to return to previous step.

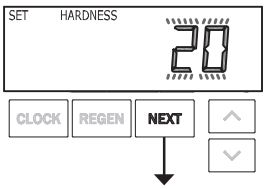
Installer Display Settings

STEP 1I



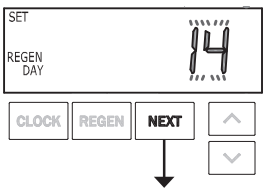
STEP 1I - Press NEXT and ▲ simultaneously for 3 seconds.

STEP 2I



STEP 2I – Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using ▲ or ▼. Note: The grains per gallon can be increased if soluble iron needs to be reduced. This display will not appear if Filtering 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

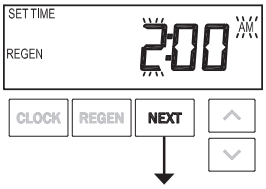


STEP 3I – Day Override: When volume capacity is set to oFF, sets the number of days between regenerations. When volume capacity is set to AUTO or to a number, sets the maximum number of days between regenerations. If value set to oFF, regeneration initiation is based solely on volume used. If value is set as a number 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

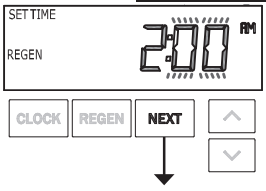
See Setting Options Table for more detail on setup. Press NEXT to go to step 4I. Press REGEN to return to previous step.

STEP 4I



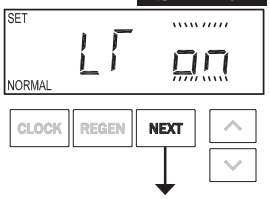
STEP 4I – Next Regeneration Time (hour): Set the hour of day for regeneration using ▲ or ▼. AM/PM toggles after 12. The default time is 2:00 AM. This display will show "REGEN on 0 GAL" if "on 0" is selected in Step 10S or Step 9F. Press NEXT to go to step 5I. Press REGEN to return to previous step.

STEP 5I



STEP 5I – Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▲ or ▼. This display will not appear if "on 0" is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup. Press NEXT go to Step 6I. Press REGEN to return to previous step.

STEP 6I



STEP 6I – Set Backlight Operation using ▲ or ▼: OFF indicates the backlight is always on. ON sets the backlight to go off after 5 minutes of inactivity.
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.

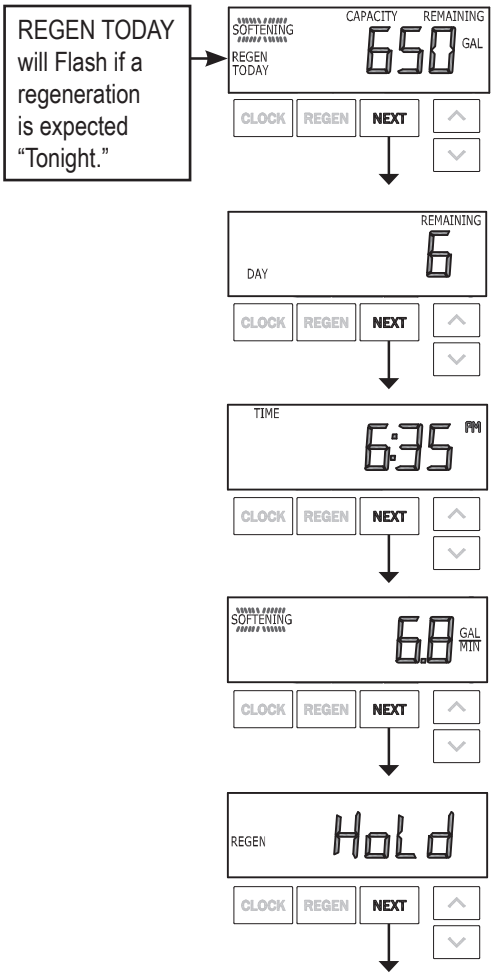
Days remaining is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the gallons that will be treated before the system goes through a regeneration cycle. When set up as a softener, initial capacity remaining is equal to the (set in OEM Softener Setup) grains capacity divided by the hardness (set in Installer Display Settings) multiplied by 0.88.

Another display shows the current treated water flow rate through the system. If 1.0T is selected in Step 2OS, an "A" in front of the flow rate indicates that the tank with the control valve on it is in service. If "b" is displayed, the tank with the in/out head is in service. dP or HoLd will be displayed if the dP switch is closed.

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).

REGEN TODAY will Flash if a regeneration is expected "Tonight."



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.

User Display Settings (continued)

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 + on 0", 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 REGEN in error, pressing the button again will cancel the request. Note: If the regeneration time option is set to "on 0" there is no set delayed regeneration time so "REGEN TODAY" will not activate if REGEN button is pressed.

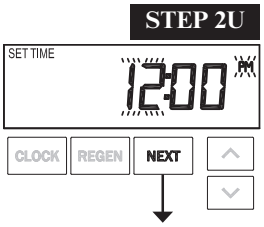
To initiate a manual regeneration immediately, press and hold REGEN for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

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

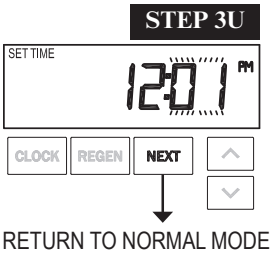
Set Time of Day

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 – Press CLOCK.



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



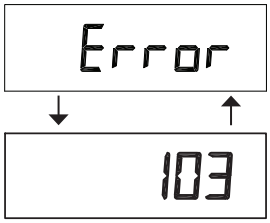
STEP 3U - Current Time (minutes): Set the minutes of the day using ▲ or ▼ buttons. Press NEXT to exit Set Time of Day. Press REGEN to return to previous step.

Power Loss

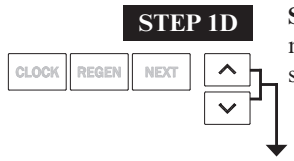
If the power goes out the system will keep time until the battery is depleted. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset and the battery replaced. The system will remember the rest.

Error Message

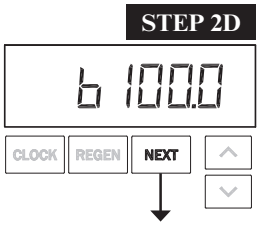
If the word "ERROR" and a number are alternately flashing on the display, contact the OEM for help. A number indicates that the valve was not able to function properly.



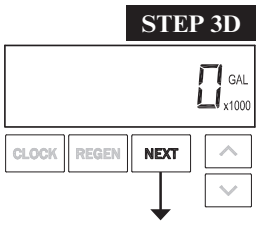
Diagnostics



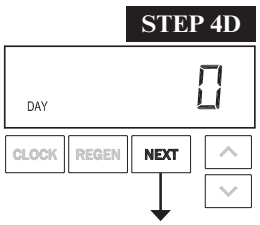
STEP 1D – Press ▲ and ▼ simultaneously for approximately three seconds. If screen in step 2D does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and CLOCK in sequence, then press ▲ and ▼ simultaneously for approximately 3 seconds.



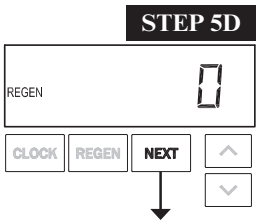
STEP 2D – Software version. Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.



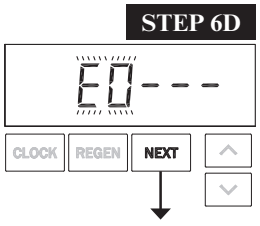
STEP 3D – Total gallons used since startup. Press NEXT to go to Step 4D. Press REGEN to return to previous step.



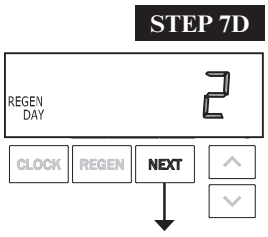
STEP 4D – Total days since startup. Press NEXT to go to Step 5D. Press REGEN to return to previous step.



STEP 5D – Total number of regenerations since startup. Press NEXT to go to Step 6D. Press REGEN to return to previous step.

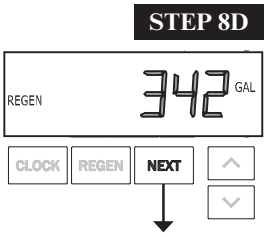


STEP 6D – Error Log. Use ▲ or ▼ to review the last 10 logged errors. Press NEXT to go to Step 7D. Press REGEN to return to previous step.

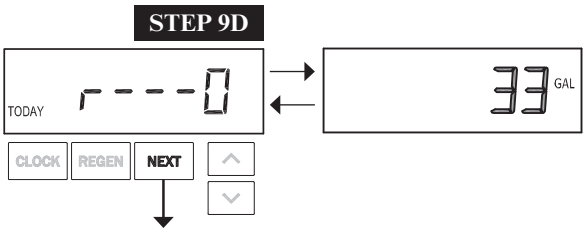


STEP 7D – Days, since last regeneration: This display shows the days since the last regeneration occurred. Press NEXT to go to Step 8D. Press REGEN to return to previous step.

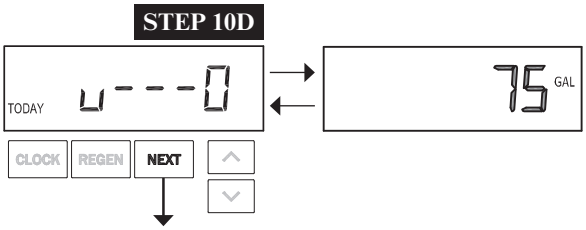
Diagnostics (continued)



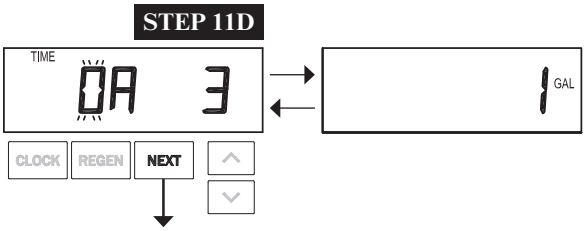
STEP 8D – Volume, since last regeneration: This display shows the volume of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press NEXT to go to Step 9D. Press REGEN to return to previous step.



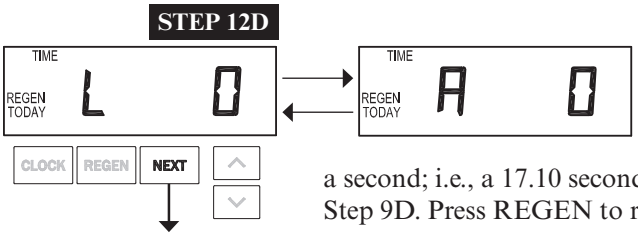
STEP 9D – Volume, reserve capacity used for last 7 days: If the valve is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto," this display shows 0 day (for today) and flashes the reserve capacity. Pressing ▲ will show day 1 (which would be yesterday) and flashes the reserve 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. Display does not appear if 1.0T is selected in Step 2OS. Press NEXT at any time to go to Step 10D. Press REGEN to return to previous step.



STEP 10D - 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 11D. Press REGEN to return to previous step.

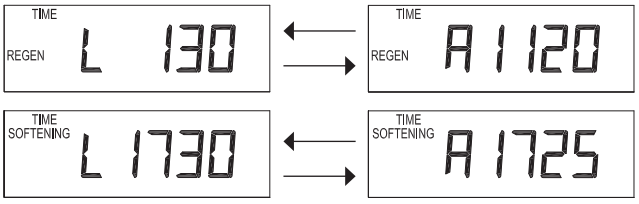


STEP 11D - Twin Tank Valve Transfer History only displays when 1.0T was selected in Step 2OS. Use ▲ or ▼ to scroll through the last 10 tank transfers. The first position in the display ranges from 0 to 9 with the lowest number being the most recent transfer. The second position in the display will be 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 at any time to go to Step 12D. Press REGEN to return to previous step.

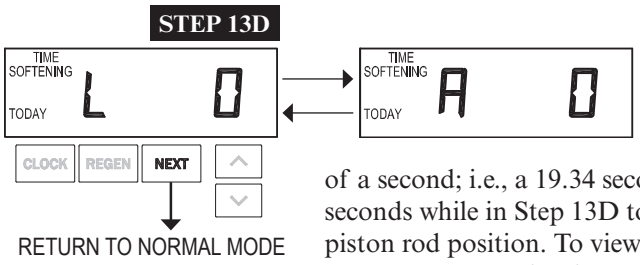


STEP 12D – MAV Drive History in the direction of extended piston rod position. Display will only be shown if 1.0T is selected in Step 2OS, or OFF is not selected in Step 5OS. Up to a four digit number will appear after the "L" which stands for latest and "A" which stands for average. Drive time is measured 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 9D. Press REGEN to return to previous step.

Press and hold ▲ and ▼ buttons for 3 seconds while in Step 8D 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 CLOCK and ▼ while in Step 8D. Press NEXT to advance display to the old MAV drive history.



Diagnostics (continued)



STEP 13D – MAV Drive History in the direction of retracted piston rod position. Display will only be shown if 1.0T is selected in Step 2OS, or OFF is not selected in Step 5OS. 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 19.34 second move is displayed as "1934". Press and hold ▲ and ▼ for 3 seconds while in Step 13D to reset the relative drive history in both the extended and retracted piston rod position. To view the old relative drive history data see Step 12D.
Press NEXT to exit Diagnostics. Press REGEN to return to previous step.

When desired, all programming and information in Diagnostics (Steps 7-13) 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 programming and diagnostic values (Steps 7-13) to defaults. Screen will return to User Display. Diagnostics Steps 2-6 cannot be reset.

Revision History:

8/28/2017

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