NELSEN™
WATER SOLUTIONS
Signature Series

Dealer Programming Guide



1", 1-1/4", 1-1/2", 2" & TWIN CONTROL VALVES

SIGNATURE SERIES

TABLE OF CONTENTS

General Instructions 2
Pre-Installation Check List 2
Bypass Valve Operation 3
System Loading & Startup Procedure 4
Installation . . . . . 4 - 5
Configuration Settings - Cycle Sequences . . . . . 6 - 7
Cycle Sequence/Adjustable Default Times Table 7
Air Cycle Sequence/Default Durations 8
Control Operation While In Error Mode 8
Operation of Regeneration Cycle with Alternator Systems 8
Regeneration & Error Screens, Button Operation & Function 9
User Displays 9
Setting Time of Day 10
Installer Level 10
Softener System Setup . . . . . 11 - 12
Salting Capacity Chart 12
Setting Options Table 13
Regeneration Cycles & Times 13
Filter System Setup 14
AIO System Settings . . . . . 15 - 16
Diagnostics 16
Controller History 17
Conditional Configuration Screens 17
Conditional User Screens 18
Conditional Aux MAV & Alt MAV Screens . . . . . 18 - 19
Conditional Relay Screens 20
Conditional Service Alarm Screens 21

Drawings & Part Numbers

Front Cover & Drive Assembly 22
Drive Cap Spacer Assembly 23
1" Drain Line Assembly 24
3/4" Drain Line Elbow Assembly 24
1" Drain Line Elbow Assembly 24
Water Meter Assembly 24
Air Check Valve Assembly 24
Distributor Identification 25
Troubleshooting Guide . . . . . 26 - 28
Error Codes 29
System Service Checklist 30

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:

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

Once the 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 diagnostics, valve history, and settings modifications (except hardness, day override, time of regeneration, and time of day) by anyone but the manufacturer, press ▼, **NEXT**, ▲ , and **SET CLOCK** in sequence after settings are made. To unlock so other displays can be viewed and changes can be made, press ▼, **NEXT**, ▲, and **SET 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 5 minutes, the display returns to a normal user display. Any changes made prior to the 5 minute time-out are incorporated.

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

When desired, all information in diagnostics and programming 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 Treatment Type display. Press ▼and ▲ simultaneously to reset diagnostic and programming values to defaults. Screen will return to User Display.

Sometimes, it is desirable to have the valve initiate and complete 2 regenerations within 24 hours and then return to the preset regeneration procedure. It is possible to do a double regeneration if the Regeneration Time Option is set to NORMAL or NORMAL + on 0. To do a double regeneration:

1. Press **REGEN** once. **REGEN TODAY** will flash on the display.
2. Press and hold **REGEN** for 3 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 Types 1.0T and 1.5T, press and hold **SET 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.

PRE-INSTALLATION CHECK LIST

WATER PRESSURE

A minimum of 20 pounds of pressure (psi) is required for proper regenerations to occur. The maximum operating pressure is 125 psi.

WATER QUALITY

On rural water supplies and private wells there is often sand and sediment in the water which can be damaging to the system and Control Valve. These may require a Big Blue style 20” sediment filter to be installed before your system. Any damage to controls due to poor water quality is not covered under warranty.

ELECTRICAL

Power Supplies require 120 Volt AC 60 Hz current supply. When installing, power adapters need to be protected from the weather, or you should use Outdoor adapters. Surge protection is recommended with all electrical controls for protection.

PLUMBING

Condition of existing plumbing should be free of lime scale and iron build up. Piping with heavy build-up inside should be replaced. If piping is blocked, additional services will be required.

DRAIN LINE

The filter should be as close to the drain as possible for best discharge. Avoid overhead drains, if possible, to prevent back pressure. If you must go overhead do not exceed 8’ vertical up. Total length should not exceed 20 feet and should be run with 3/4" pipe. All drains should have an airgap to protect from vacuum occurring during backwash. Systems with backwash flow rates over 10 gpm, and drain lines of 20 feet in length, should be piped in 1” pipe and should have a VACUUM BREAKER on the line.

BYPASS VALVE

Always provide room for a bypass as it is an effortless way to bypass the system, for servicing, without having to shut down the main water supply. the following pages.

BYPASS VALVE OPERATION

The bypass valve is typically used to isolate the control valve from the plumbing system's water pressure in order to perform control valve repairs or maintenance. The WS1 bypass valve is particularly unique in the water treatment industry due to its versatility and state-of-the-art design features. The 1" full-flow bypass valve incorporates four positions, including a diagnostic position that allows service personnel to work on a pressurized system while still providing untreated bypass water to the facility or residence. Its completely non-metallic, all-plastic design allows for easy access and serviceability without the need for tools.

The bypass body and rotors are glass filled Noryl and nuts and caps are glass filled polypropylene. All seals are self-lubricating EPDM to help prevent valve seizing after long periods of non-use. Internal O-rings can easily be replaced if service is required.

The bypass consists of two interchangeable plug valves that are operated independently by red, arrow-shaped handles. These handles identify the flow direction of the water and enable the bypass valve to operate in four positions:

1. **NORMAL OPERATION POSITION**
   The inlet and outlet handles point in the direction of flow indicated by the engraved arrows on the control valve. Water flows through the control valve during normal operation, and this position also allows the control valve to isolate the media bed during the regeneration cycle. (See Figure 1)
2. **BYPASS OPERATION POSITION**
   The inlet and outlet handles point to the center of the bypass. The control valve is isolated from the plumbing system water pressure, and untreated water is supplied to the plumbing system. (See Figure 2)
3. **DIAGNOSTIC MODE POSITION**
   The inlet handle points in the direction of flow, and the outlet handle points to the center of the bypass valve. System water pressure is allowed into the control valve and plumbing system while not allowing water to exit from the control valve to the plumbing. (See Figure 3)
4. **SHUT OFF MODE POSITION**
   The inlet handle points to the center of the bypass valve, and the outlet handle points in the direction of flow. Water is shut off to the plumbing system. If water is available on the outlet side of the softener, it indicates a plumbing connection elsewhere in the building bypasses the system. (See Figure 4)

Figure 1
NORMAL OPERATION

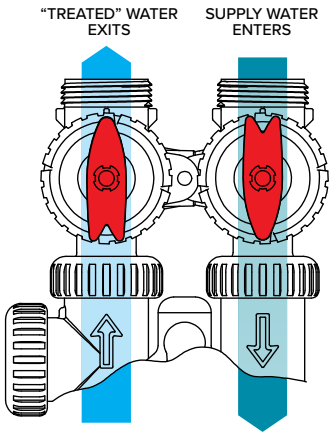


Figure 2
BYPASS OPERATION

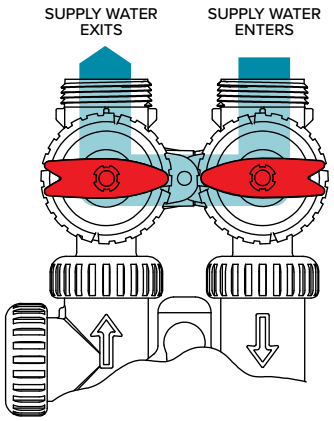


Figure 3
DIAGNOSTIC MODE

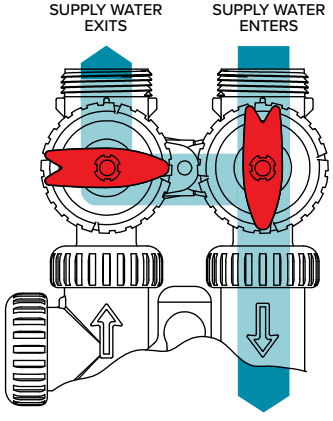
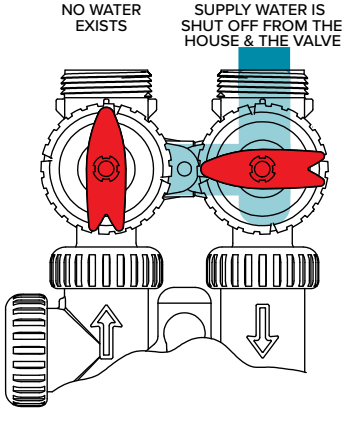


Figure 4
SHUT OFF MODE

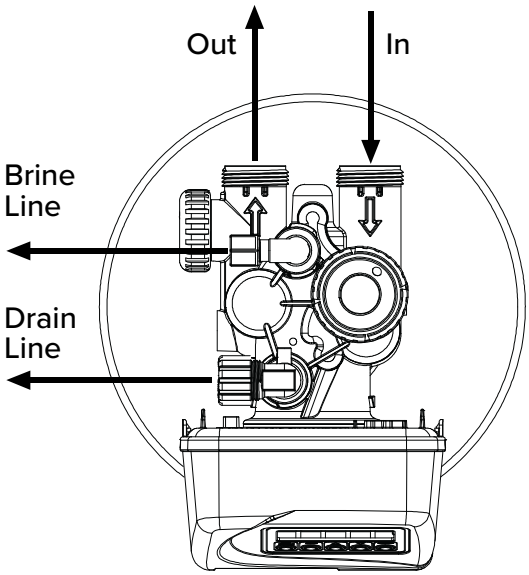


SYSTEM LOADING & STARTUP PROCEDURE

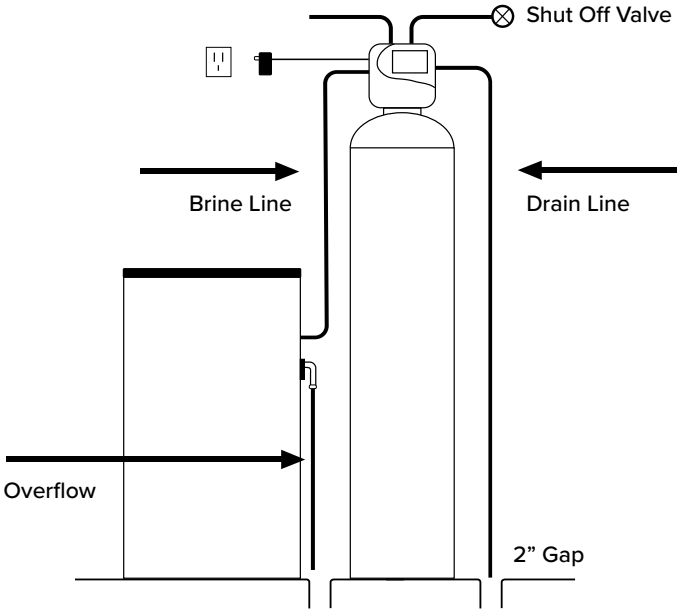
1. Set media tank close to the location of the installation.
2. Set the distributor tube into the tank, tolerance is +/- 1/2” from the top of tank; if tube is cut to fit, de-burr top of tube so it has a tapered clean edge.
3. Put a plug in the distributor tube, or tape over the top opening, so media does not get inside the tube.
4. Fill the media tank 25% of the way with water to help break the fall of the gravel and protect your distributor system.
5. Fill gravel under bed to cover distributor by 1 to 2”.
6. Fill the tank with the proper amount of Media required for the tank size.
7. Now remove the plug or tape from the top of the distributor pipe.
8. Slowly fill the tank the rest of the way with water, using a hose down through the distributor pipe until tank is filled.
9. Lubricate the pilot O-ring and top of tank O-ring with silicone lubricant **(DO NOT use any hydrocarbon- based lubricant as it will damage the valve).**
10. Screw the control valve into the top of the tank until the valve base O-ring engages, plus a 1/4 turn.
11. Prepare to plumb the system into the water supply following all local plumbing codes.
12. Plumb the drain with a maximum vertical of 8’ and horizontally 12’ for max 20’ drain run.
13. When plumbing is complete, put unit into bypass, open the main water shutoff valve, go to the faucet closest to the system and run hot/cold water to drain to flush any debris and air from the pipes.
14. Plug the unit into power and hold the **REGEN** button on the Control Valve, to let the unit go to backwash.
15. Unplug the power adapter and let the system backwash to drain.
16. Now open the inlet bypass very slowly to complete filling with water and purge any air slowly out.
17. When all air is eliminated, the inlet bypass valve can be fully opened. After the water runs clear for 10 minutes, plug the power adapter back in and let the regeneration finish.
18. Once full regeneration is complete, open the outlet bypass valve to the house, it will be ready to be placed into service.
19. Push the set clock button to set the proper time of day.

INSTALLATION

TOP VIEW



BASIC INSTALLATION



General Installation & Service Warnings

The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

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

Do not use pipe dope or other sealants on threads. Teflon tape must be used on the threads of the 1" NPT elbow or the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connections or caps because O-ring seals are used. The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic Service Wrench, #V3193. If necessary, pliers can be used to unscrew the nut or cap. **Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place a screwdriver in slots on caps and/or tap with a hammer.**

Site Requirements

- Water pressure, 20–125 psi
- Water temperature
- The tanks should be on a firm, level surface
- Electrical: Use a 115/120v, 60Hz uninterrupted outlet
- Current draw is 0.25 amperes
- A 15-foot power cord is furnished
- The plug-in transformer is for dry locations only
- Batteries are not used

1. The distance between the drain and the water conditioner should be as short as possible. All plumbing should comply with local plumbing codes.
2. Since salt must be periodically added to the brine tank, it should be located where it is easily accessible.
3. Do not install any water conditioner with less than 10 feet of piping between its outlet and the inlet of a water heater.
4. Do not locate the unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 34°F.
5. The use of resin cleaners in an unvented enclosure is not recommended.
6. **INLET/OUTLET PLUMBING**
   Connect to a supply line downstream of outdoor spigots. Install an inlet shutoff valve and plumb to the unit's bypass valve inlet located at the right rear as you face the unit. There are a variety of installation fittings available. When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring, and o-ring. Heat from soldering or solvent cements may damage the nut, split ring, or O-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring, and O-ring. Avoid getting solder flux, primer, and solvent cement on any part of the O-rings, split rings, bypass valve, or control valve. If the building's electrical system is grounded to the plumbing, install a copper grounding strap from the inlet to the outlet pipe. **Plumbing must be done in accordance with all applicable local codes.**
7. **DRAIN LINE**
   First, be sure that the drain can handle the backwash rate of the system. Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line flow control fitting and solder joints. Failure to do this could cause interior damage to the flow control. Install a 1/2" I.D. flexible plastic tube to the Drain Line Assembly or discard the tubing nut and use the 3/4" NPT fitting for rigid pipe. If the backwash rate is greater than 7 GPM, use a 3/4" drain line. Where the drain line is elevated but empties into a drain below the level of the control valve, form a 7" loop at the discharge end of the line so that the bottom of the loop is level with the drain connection on the control valve. This will provide an adequate anti-siphon trap. Where the drain empties into an overhead sewer line, a sink-type trap must be used. Run drain tube to its discharge point in accordance with plumbing codes. Pay special attention to codes for air gaps and anti-siphon devices.
8. **BRINE TANK CONNECTION**
   Install a polyethylene tube from the Brine Elbow to the Brine Valve in the brine tank.
9. **OVERFLOW LINE CONNECTION**
   An overflow drain line is recommended where a Brine overflow could damage furnishings or the building structure. Your softener may be equipped with a brine tank safety float which greatly reduces the chance of an accidental brine overflow. In the event of a malfunction, however, an **overflow line connection** will direct the "overflow" to the drain instead of spilling on the floor where it could cause considerable damage. This fitting should be on the side of the cabinet or the brine tank.

   To connect the overflow fitting, locate the hole in the side of the brine tank. Insert overflow fitting into tank and tighten with plastic thumb nut and gasket from the inside. Attach a length of 1/2" I.D. tubing (not supplied) to fitting and run to drain. Do not elevate overflow line higher than 3" below bottom of overflow fitting. Do not "tie" this tube into the drain line of the control valve. Overflow line must be a direct, separate line from overflow fitting to drain, sewer, or tub. Allow an air gap as per the drain line instructions.

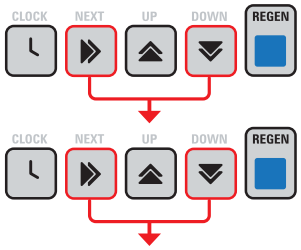
   IMPORTANT: Never insert a drain line directly into a drain, sewer line, or trap. Always allow an air gap between the drain line and the wastewater to prevent the possibility of sewage being back-siphoned into the conditioner.
10. **SERIAL NUMBER**
    Record the serial number on the installer's and customer's records.

CONFIGURATION SETTINGS - CYCLE SEQUENCES

Step 1CS

Press any button to activate display. Press **NEXT** and ▼ simultaneously for 3 seconds and release. Press **NEXT** and ▼ simultaneously for 3 seconds again and release. If the screen in **Step 2CS** does not appear, the lock on the valve is activated.

To unlock see **Step 1IL, Page 6**.

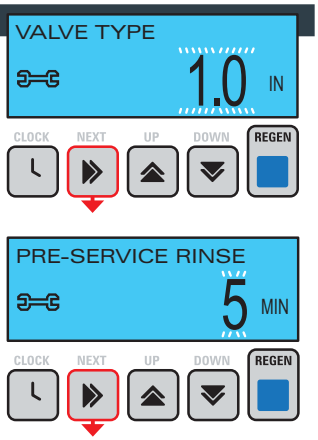


Step 2CS

Displays Valve Type. 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. With 1.0T set, meter calibration will be fixed, with a different value for each tank. With 1.0T set, the Pre-Service Rinse setting will be viewed instead of Configuration 3CS. Default is 1.0.

Press **NEXT** to go to Step 3CS.

Press **REGEN** to **EXIT** Configuration Settings.



Step 3CS

Use ▲ or ▼ to select the ALT MAV Output Operation.



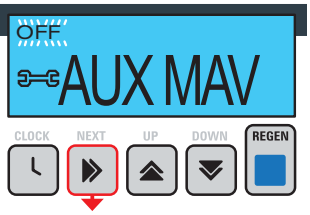
- "VALVE A or VALVE B" = Configures a 2-unit alternator system. With delayed alternator systems at 0 capacity, a unit transfers offline immediately, then waits for regeneration until Regen Time. Time Since Regen only reactivates on return to Service;
- "NO HARD BYPASS" = NHBP system with Bypass for part of regeneration cycle;
- "SEPARATE SOURCE" = NHBP system with Bypass for the full regeneration cycle;
- "SYSTEM CONTROLLER" = Configures board to operate as part of a non-alternator system;
- "PROGRESSIVE FLOW" = Configures board to operate multiple valves for progressive flow system;
- "OFF" is the Default.

Press **NEXT** to go to Step 4CS.

Press **REGEN** to return to previous step.

Step 4CS

Use ▲ or ▼ to select the AUX MAV Output Operation.



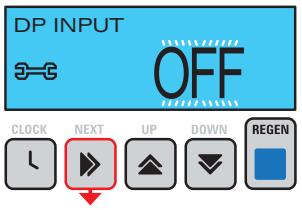
- "TIME" = Output changes state at a set item referenced to the start of regeneration, for a preset duration of time independent of actual regeneration status;
- "SEPARATE SOURCE" = Configures a separate source NHBP system, with Bypass for the full regeneration cycle;
- "OFF" is the Default.

Press **NEXT** to go to Step 5CS.

Press **REGEN** to return to previous step.

Step 5CS

Use ▲ or ▼ to select the Auxiliary (DP) Input Operation.



- "IMMED reg" = Input signal triggers an immediate regeneration after 2 minutes;
- "DELAY reg" = Input signal triggers a delayed regeneration after 2 minutes;
- "HOLD reg" = Input signal delays the start of regeneration until the signal is removed. Removing this signal for 15 sec minimum/ non-cumulative, allows immediate regeneration, but skips delayed regeneration until Regeneration Time;
- "OFF" is the Default.

Press **NEXT** to go to Step 6CS.

Press **REGEN** to return to previous step.

Step 6CS

Use ▲ or ▼ to select the first cycle step of the regeneration program.

Press **NEXT** to go to Step 7CS.

Press **REGEN** to return to previous step.



Step 7CS

Use ▲ or ▼ to select the second cycle step of the regeneration program.

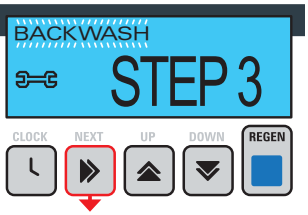
Press **NEXT** to go to Step 8CS.

Press **REGEN** to return to previous step.



CONFIGURATION SETTINGS - CYCLE SEQUENCES - CONTINUED

Step 8CS

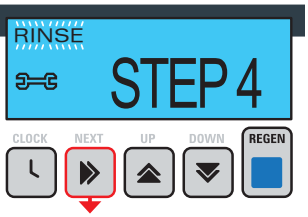


Use ▲ or ▼ to select the third cycle step of the regeneration program.

Press **NEXT** to go to Step 9CS.

Press **REGEN** to return to previous step.

Step 9CS



Use ▲ or ▼ to select the fourth cycle step of the regeneration program.

Press **NEXT** to go to Step 10CS.

Press **REGEN** to return to previous step.

Step 10CS



Use ▲ or ▼ to select the fifth cycle step of the regeneration program.

Press **NEXT** to go to Step 11CS.

Press **REGEN** to return to previous step.

Step 11CS



After all regeneration cycle steps have been selected, an end cycle step is required.

Up to 6 regeneration cycle steps, plus End, may be selected per regeneration sequence.

Press **NEXT** to **EXIT** configuration settings.

Press **REGEN** to return to previous step.

Twin Softener Valve Programming Steps			
Configuration Settings	Step 5CS	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.
Softener System Setup	Step 10S	Set System Capacity	Set System Capacity
Softener System Setup	Step 11S	Set to 'AUTO'	Set to 'AUTO'
Softener System Setup	Step 12S	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"

CYCLE SEQUENCE/ADJUSTABLE DEFAULT TIMES

Type	Brining	Location	Fill	Softening	Backwash	*Rinse**	Draw	Backwash	Rinse	Fill	*Fill**
Softening, 1.0"/1.25"/1.5"/1.0T" Valves	dn	Post			8		60	8	8	9.5 lbs	
Softening, 1.0"/1.25"/1.5"/1.0T" Valves	dn	Pre	9.5 lbs	240	8		60	8	8		*0:05*
Softening, 1.0"/1.25"/1.5"/1.0T" Valves	Up	Post				*0:30*	60	8	8	9.5 lbs	
Softening, 1.0"/1.25"/1.5"/1.0T" Valves	Up	Pre	9.5 lbs	240		*0:30*	60	8	8		*0:05*
Softening, 2.0" Valves dn	Post			8		60	8	8	6.0 min		
Softening, 2.0" Valves dn	Pre	6.0 min	240	8		60	8	8		*0:05*	
Softening, 2.0" Valves Up	Post				*0:30*	60	8	8	6.0 min		
Softening, 2.0" Valves Up	Pre	6.0 min	240		*0:30*	60	8	8		*0:05*	
Filtering Backwash, All Valves	N/A	N/A			8				8		
Filter Regen, 1.0"/1.25"/1.5"/1.0T Valves	dn	Post			8		60	8	8	.95 gal	
Filtering Regen 2.0" Valves	dn	Post			8		60	8	8	6.0 min	

Default duration in minutes, fill amounts in pounds of salt or gallons. *Italic = Cycles are non-adjustable, do not show in cycle sequence programming and are in seconds. 1.5" Valve may be set to LBS Fill (Default = 9.5 LBS) or MIN Fill (Default = 6.0 Min)

AIR CYCLE SEQUENCE/DEFAULT DURATIONS (MIN)

Type	Air Release (Fill)	Backwash	Air Charge (Draw)	Rinse
Air Cycle	4.0	14	40	OFF

CONTROL OPERATION WHILE IN ERROR MODE

1. The regeneration valve itself will complete regeneration only if already in regeneration and the current Error Code# generated is not 101/102/103/104.
2. The regeneration valve itself will not enter regeneration if the control is already in Error Mode, regardless of the Error Code # generated.
3. All relays will deactivate immediately, and remain deactivated until control reset, once any Error Code # has been generated by the control. This excludes relays set to non-regeneration related functions -Gallons, Regen Gallons, and Error where they should continue to function as set.
4. With the generation of any valve motor related error codes (101/102/103/104), regeneration is immediately canceled, and all MAVs are then either kept in the Service Position or returned sequentially to Service, remaining there until control reset. This excludes the Alt MAV in alternator systems (with Alt MAV set to Alt A or Alt B), which should remain in its current position, and System Controller applications whenever the ALT MAV has already transitioned to Bypass during regeneration, and an Error Code # was then generated sometime later on that same control. The Alt MAV in this case should remain in Bypass until the control is reset.
5. With the generation of any MAV errors (106/107/116/117) before regeneration is entered, regeneration is immediately canceled, with the regeneration valve and any remaining functional MAVs either kept in the Service Position or returned sequentially to Service, remaining there until control reset. This excludes the Alt MAV in alternator systems (with Alt MAV set to Alt A or Alt B), which should remain in its current position, and System Controller applications whenever a ALT MAV generates an error (106/107) during a non-regeneration transition, the ALT MAV valve in this case should remain in whatever position it is currently in until the control is reset. While in this state, service flow will still be monitored by that same control.
6. With the generation of any MAV errors (106/107116/117) during regeneration, the regeneration valve will continue to proceed normally with regeneration. However, all remaining scheduled MAV drives will be immediately canceled and all remaining functional MAVs returned sequentially to Service, remaining there until the control is reset. This excludes the Alt MAV in alternator systems (with Alt MAV set to Alt A or Alt B), which should remain in its current position.

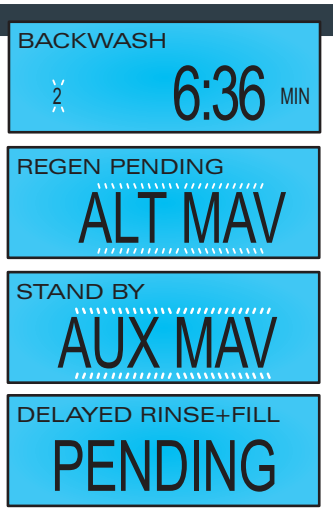
OPERATION OF REGENERATION CYCLE WITH ALTERNATOR SYSTEMS

When Step 2S is set to Softening XX Post, Configuration 1 to 1.0, 1.25, or 1.5, Configuration 3CS set to Valve A or B, and Configuration 2ALT MAV set to ON. Regeneration will advance and complete all steps normally, except for the last two (which should be programmed for Rinse and Fill). Once the valve reaches the point in regeneration where all but the last two steps are complete, it will immediately return to the Service Position (Standby Mode with Alt MAV in Bypass). These last two steps of the regeneration cycle (Rinse and Fill) will then be completed once the capacity of the Online Unit falls below 10%. Once the capacity of the Online Unit falls below 10%, the valve will advance from the Service Position to Rinse, then Fill, before returning to the Service Position (Standby Mode with Alt MAV in Bypass) and remaining there until the unit online is fully depleted and requesting regeneration.

In alternator systems with one of the following settings - Step 2F set to FILTERING XXX, Configuration 5CS (DP Input) set to IMMED REG or DELAY REG, Step 5F Filtering is set to OFF, Step 8F is set to OFF, RINSE and FILL are not the last two steps of regen, regeneration will proceed normally, without the delayed completion of regeneration described above. If the valve has been requested to be brought online, but has not yet completed Rinse, then the tank in service alternation will be delayed until it has. Whenever the delayed Rinse and Fill feature is active, a manually initiated immediate regeneration will force the immediate Rinse and Fill of the Standby Unit, regardless the present capacity of the unit online, prior to tank in service alternation and regeneration.

REGEN & ERROR SCREENS

Regen Screen



Displays the time remaining in the current cycle. 2nd backwash cycle will flash.

Pressing **REGEN** advances to the next cycle.

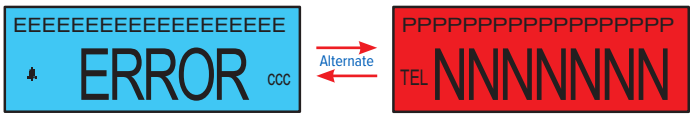
In Alternator Systems when a unit is waiting to initiate the first cycle step of regeneration, "REGEN PENDING" is displayed. "STAND BY" is displayed in Alternator Systems when a valve is in Standby state.

"DELAYED RINSE+FILL" 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.

Error Screens



ERROR Screen displays when error occurs and no Dealer Information is present. Top line will display specific error while the 3 digits in the lower right side will display specific error code. Top line error display longer than 18 characters will scroll across display from right to left.



Alternating ERROR and Dealer Contact Information will display when an error occurs and Dealer Contact Information is present.

BUTTON OPERATION & FUNCTIONS

Button Operation and Function



Scrolls to the next display.

Pressing once and releasing will schedule a regeneration at the preset delayed regeneration time.

Pressing again and releasing will cancel the regeneration.

Pressing and holding for 3 seconds will initiate an immediate regeneration

Pressing and release while in regeneration will advance to the next cycle.

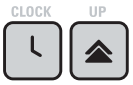
Pressing in the program levels will go backwards to the previous screen.



Changes variable being displayed.



Holding **NEXT** and **REGEN** simultaneously for 3 seconds initiates a control reset. The software version is displayed and the piston returns to the home/service position re-synchronizing the valve.



Used with a twin valve, 1.0T, holding for at least 3 seconds causes a switch in 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.



Holding ▲ and ▼ simultaneously for 3 seconds in Control Programming initiates a master reset. Resets programming and diagnostic level. Displays back to factory defaults. Retains current history level displays.

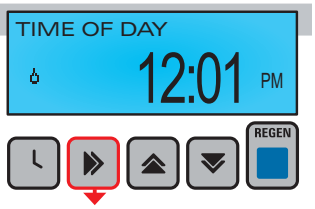


Key Sequence to lock and unlock program settings.

USER DISPLAYS

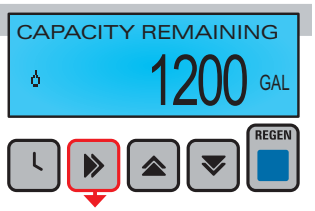
When the system is operating, one of five displays may be shown. Pressing **NEXT** will alternate between the displays shown below.

User 1



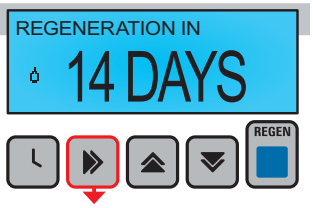
Typical user display. Shows Time of Day and droplet of water indicates water flow.

User 2



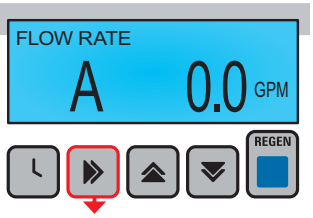
Shows volume remaining to regeneration. This screen will not be viewed if the control is set for time-clock operation.

User 3



Displays number of days to next regeneration. Not shown when day override set to off.

User 4



Flow Rate. Displays the current flow rate of treated water through the valve. If Configuration 3CS is set to ALT A or B and the valve is in Standby, this display and the flashing Flow Indicator viewed in other User Screens will not be viewed.

A Tank In Service Indicator (A or B) is active whenever 1.0T Mode is set in Configuration 2CS.

User 5



Displays dealer contact name and number when programmed in the Installer Level. Steps 7IL & 8IL.

SETTING TIME OF DAY

Press and hold **CLOCK** until **TIME HOUR** is displayed and the Hour and AM/PM flashes. Press ▲ or ▼ until the correct hour is displayed.



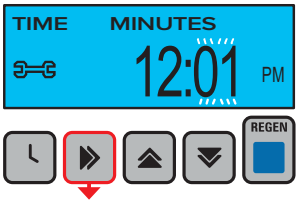
Then press **NEXT**. The Minutes will flash. Press ▲ or ▼ until the correct minute is displayed.



Press **NEXT** to return to the Time of Day screen.



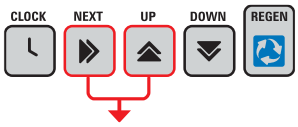
Time of day should only need to be set after power outages lasting more than 8 hours, if the battery has been depleted and a power outage occurs, or when daylight savings time begins or ends. If a power outage lasting more than 8 hours occurs, the time of day will flash on and off which indicates the time of day should be reset. If a power outage lasts less than 8 hours and the time of day flashes on and off, the time of day should be reset and the battery replaced.



INSTALLER LEVEL

Step 1IL

Press any button to activate display. Press **NEXT** and ▲ simultaneously for 3 seconds and release. If the screen in **Step 2IL** does not appear, the Valve Lock is activated.



Valve is locked. To unlock, press ▼, **NEXT**, ▲ and **CLOCK** in sequence.

Step 2IL

Press ▲ or ▼ to adjust the inlet water hardness.

Does not show in Filter mode.

Press **NEXT** to go to Step 3IL.

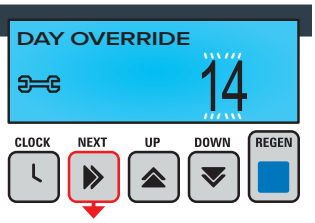


Step 3IL

Press ▲ or ▼ to adjust the Day Override. 1 - 28 days or "OFF" is selectable.

Press **NEXT** to go to Step 4IL.

Press **REGEN** to return to previous step.

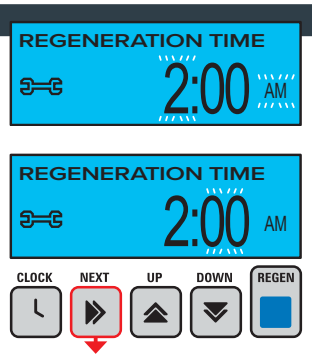


Step 4IL

Press ▲ or ▼ to adjust the Regeneration Time Hours and AM/PM. Press **NEXT** to adjust Time Minutes.

Press **NEXT** to go to Step 5IL.

Press **REGEN** to return to previous step.



Step 5IL

Press ▲ or ▼ to turn Light On or Off.

Press **NEXT** to **EXIT** or to set **MINIMUM REGEN.**

Press **REGEN** to return to previous step.



Set Dealer Info

From Step 5IL, press **CLOCK** and ▲ simultaneously for 3 seconds and release to enter your dealer contact phone number. Press ▲ or ▼ to adjust the number. Press **NEXT** to go to the next digit position. Repeat until the dealer phone number is complete.



Continue to Press **NEXT** to go to Set Dealer Name.

Press **REGEN** to return to previous step.

Set Dealer Name

Press ▲ or ▼ to adjust the dealer contact name. Press **NEXT** to go to the next digit position. Repeat until the dealer name is complete.

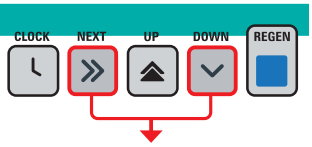


Press **NEXT** to **EXIT** Installer Level Settings.

Press **REGEN** to return to previous step.

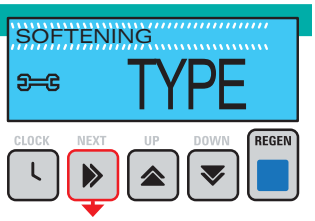
SOFTENER SYSTEM SETUP

Step 1S



Press any button to activate display. Press **NEXT** and ▼ simultaneously for 3 seconds and release. If the screen in **Step 2SS** does not appear, the lock on the valve is activated. To unlock see **Step 1IL, Page 6**.

Step 2S



Choose SOFTENING using ▲ or ▼.

To access adjustable cycle sequences, press **NEXT** & ▼ simultaneously for 3 seconds.

If adjustable cycle sequences are not needed, go to Step 3S.

Press **REGEN** to **EXIT** Softener System Setup.

Step 3S



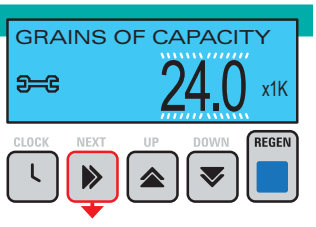
Cycle Durations: Use ▼ or ▲ to set the value for the first cycle. Value units will vary depending on the cycle, see Table below for more detail. Press **NEXT** to set the value for the next cycle. Repeat for all cycles. The End cycle does not have a value and will not appear.

Once a value is set for all cycles, press **NEXT** to go to Step 4S.

Press **REGEN** to return to previous step.

Cycle Options	Units
Backwash	Minutes
Rinse (fast)	Minutes
dn Brine (combination of brining and slow rinse)	Minutes
up Brine (combination of brining and slow rinse)	Minutes
Fill for 1", 1.25", and 1.5"	Lbs
Fill for WS2 valves or WS1.5 set to MIN	Minutes
Service	Minutes

Step 4S

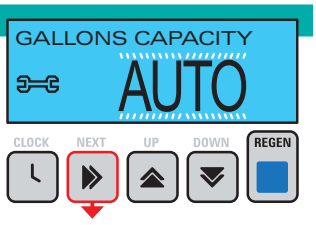


Press the ▲ or ▼ to set the system capacity. The System Capacity setting should be based on the volume of resin and LBS of salt fill set in Step 7S.

Press **NEXT** to go to Step 5S.

Press **REGEN** to return to previous step.

Step 5S



Set the Volume Capacity using the ▲ or ▼. If value is set to:

- "AUTO" = The control will automatically determine softening capacity and daily reserve
- "GAL" = The end user will manually determine softening capacity (less any fixed reserve) and enter it in this display
- "OFF" = Time clock regeneration

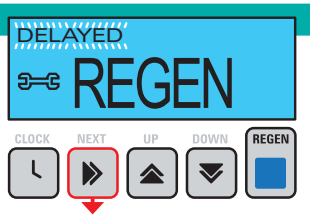
AUTO will not be an option with a filter sequence set in Step 2S. OFF will not be an option if 3IL is already set to OFF.

- "AUTO" is the Default.

Press **NEXT** to go to Step 6S.

Press **REGEN** to return to previous step.

Step 6S



Set Regeneration Type Options using ▲ or ▼. If value is set to:

- "DELAYED" = Means regeneration at a specified time;
- "IMMEDIATE" = Immediate regeneration at 0 capacity;
- "DELAY + IMMEDIATE" = Means delayed regeneration with override at 0 capacity. 10 minutes without water usage will trigger this override at 0 capacity, 1 hour maximum wait "DELAY + IMMEDIATE" setting is not available with 1.0T set in Configuration 2CS, Valve A, Valve B or System Controller set in Configuration 3CS.
- "DELAY" is the Default.

Press **NEXT** to go to Step 7S.

Press **REGEN** to return to previous step.

Step 7S



Set Relay 1 Options using ▲ or ▼. If value is set to:

- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 8S.

Press **REGEN** to return to previous step.

Step 8S



Set Relay 2 Options using ▲ or ▼. If value is set to:

- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;

SOFTENER SYSTEM SETUP

Step 8S Continued

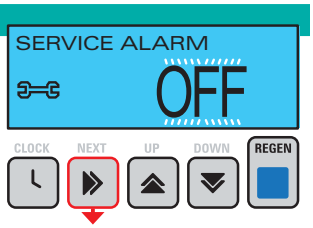
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "ERROR" = Relay closes whenever the control enters the Error Mode and immediately reactivating once power is restored;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 9S.

Press **REGEN** to return to previous step.

Step 9S



Set Service Alarm 1 Trigger using ▲ or ▼. Select between TIME, GALLONS or BOTH.

OFF is the Default

See Page 17 for Alarm Settings.

Press **NEXT** to **EXIT** Softener Settings.

Press **REGEN** to return to previous step.

Salting Capacity Chart Per ft^3

Resin Volume Cubic Foot	6#	9#	12#	15#
1.0	20,000	24,000	27,000	30,000
1.5	30,000	36,000	40,500	45,000
2.0	40,000	48,000	54,000	60,000
2.5	50,000	60,000	67,500	75,000
3.0	60,000	72,000	81,000	90,000
4.0	80,000	96,000	108,000	120,000
5.0	100,000	120,000	135,000	150,000
6.0	120,000	144,000	162,000	180,000
7.0	140,000	168,000	189,000	210,000
8.0	160,000	192,000	216,000	240,000
9.0	180,000	216,000	243,000	270,000
10.0	200,000	240,000	270,000	300,000
12.0	240,000	288,000	324,000	360,000
15.0	300,000	360,000	405,000	450,000
20.0	400,000	480,000	540,000	600,000
25.0	500,000	600,000	675,000	750,000
30.0	600,000	720,000	810,000	900,000
35.0	700,000	840,000	945,000	1,050,000

SETTING OPTIONS TABLE

Filters should only use shaded options				
Mode	**Volume Capacity**	**Regen Time Option**	**Day Override**	**Result[1]**
Softening	Auto	Normal	1-28 days	Reserve capacity automatically estimated. Regeneration occurs when volume capacity falls below the reserve capacity at the next Regen Set Time.
Softening	Auto	Normal	OFF	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.
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 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.

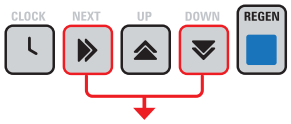
[1]Reserve Capacity estimate is based on history of water usage. Reserve Capacity estimate is not available with alternator systems or Twin Tank Valve.

REGENERATION CYCLES & TIMES

	RANGE		
Cycle	Softening	Filtering Regen	Filtering Backwash
Backwash	0ff-120 minutes	0ff-120 minutes	0ff-120 min.
Regenerant Draw/Slow Rinse (UP or DN)	0ff-180 minutes	0ff-180 minutes	NA
Fast Rinse	0ff-120 minutes	0ff-120 minutes	0ff-120 min.
Regenerant Refill	0.1-200.0 lbs.	0ff-99.0 GAL	NA
Regenerant Refill 2.0 or 1.5 set to MIN (softening only)	0.1-99.0 minutes	0.1-99.0 minutes	NA
Service	1-480 minutes	NA	NA

FILTER SYSTEM SETUP

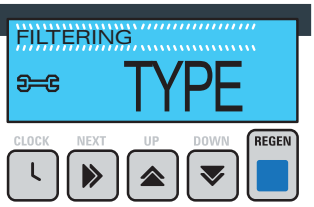
Step 1F



Press any button to activate display. Press **NEXT** and ▼ simultaneously for 3 seconds and release. If the screen in **Step 2F** does not appear, the lock on the valve is activated.

To unlock see **Step 1IL, Page 6.**

Step 2F



Use ▼ or ▲ to select FILTERING.

To access adjustable cycle sequences, press **NEXT** & ▼ simultaneously for 3 seconds.

If adjustable cycle sequences are not needed, go to Step 3F.

Press **REGEN** to **EXIT** Filter System Setup.

Step 3F



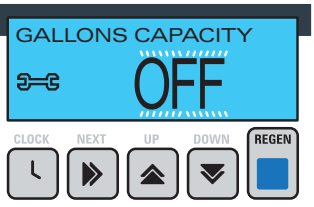
Cycle Durations: Use ▼ or ▲ to set the value for the first cycle. Value units will vary depending on the cycle, see Table below for more detail. Press **NEXT** to set the value for the next cycle. Repeat for all cycles. The End cycle does not have a value and will not appear.

Once a value is set for all cycles, press **NEXT** to go to Step 4F.

Press **REGEN** to return to previous step.

Cycle Options	Units
Backwash	Minutes
Rinse (fast)	Minutes
dn Brine (combination of regenerant and slow rinse)	Minutes
Fill for all valves except WS2	Gallons
Fill for WS2 Valves	Minutes
Service	Minutes

Step 4F



Set Regeneration trigger using ▲ or ▼. If value is set to:

- "GAL" = The end user will manually determine trigger capacity (less any fixed reserve) and enter it in this display;
- "OFF" = Time clock regeneration (w/o flow meter);
- "1000" is the Default.

Press **NEXT** to go to Step 5F.

Press **REGEN** to return to previous step.

Step 5F



Set Relay 1 Options using ▲ or ▼. If value is set to:

- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 6F.

Press **REGEN** to return to previous step.

Step 6F



Set Relay 2 Options using ▲ or ▼. If value is set to:

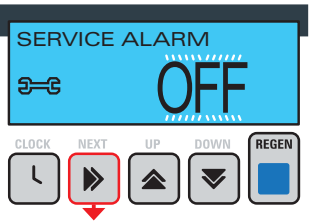
- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "ERROR" = Relay closes whenever the control enters the Error Mode and immediately reactivating once power is restored;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 7F.

Press **REGEN** to return to previous step.

Step 7F



Set Service Alarm 1 Trigger using ▲ or ▼. Select between TIME, GALLONS or BOTH.

- "OFF" is the Default.

See Page 17 for Alarm Settings.

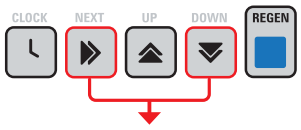
Press **NEXT** to **EXIT** Filter System Settings.

Press **REGEN** to return to previous step.

AIO SYSTEM SETTINGS

Step 1AIO

Press any button to activate display. Press **NEXT** and ▼ simultaneously for 3 seconds and release. If the screen in **Step 2F** does not appear, the lock on the valve is activated.

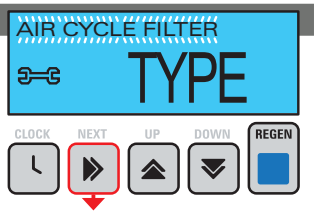


To unlock see **Step 1IL, Page 6**.

Step 2AIO

Use ▲ or ▼ to select AIR CYCLE FILTERING.

Press **NEXT** to go to Step 3AIO.



Step 3AIO

Use ▲ or ▼ to adjust first cycle air release time.



While in Regen, during Air Release, time counts down only during periods of non-flow up to a maximum of 20 minutes. If after 20 minutes the air release countdown has not yet reached zero, the control will skip the remaining air release time and continue on to the next Regen cycle step in the sequence.

Press **NEXT** to go to Step 4AIO.

Press **REGEN** to return to previous step.

Step 4AIO

Use ▲ or ▼ to adjust second cycle backwash time.

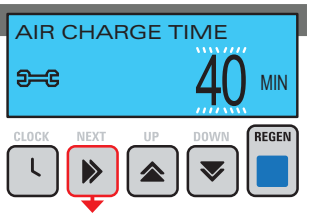


Press **NEXT** to go to Step 5AIO.

Press **REGEN** to return to previous step.

Step 5AIO

Use ▲ or ▼ to set third cycle air charge duration.



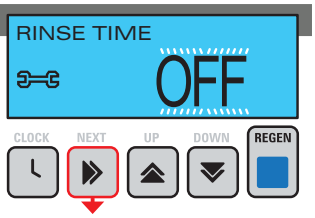
The direction of brining "DN" will NOT alternate with the current duration setting.

Press **NEXT** to go to Step 6AIO.

Press **REGEN** to return to previous step.

Step 6AIO

Use ▲ or ▼ to set fourth cycle to OFF.

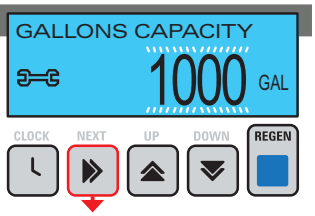


Press **NEXT** to go to Step 7AIO.

Press **REGEN** to return to previous step.

Step 7AIO

Use ▲ or ▼ to set regen trigger capacity (less any fixed reserve).

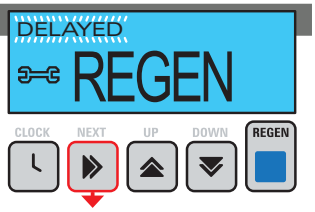


Press **NEXT** to go to Step 8AIO.

Press **REGEN** to return to previous step.

Step 8AIO

Use ▲ or ▼ to set Regeneration type.



"Immediate" = Immediate Regeneration @ 0 capacity without service flow delay.

"NORMAL" = Delayed regeneration @ specified time with service flow delay.

Press **NEXT** to go to Step 9AIO.

Press **REGEN** to return to previous step.

Step 9AIO

Set Relay 1 Options using ▲ or ▼. If value is set to:



- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 10AIO.

Press **REGEN** to return to previous step.

AIO SYSTEM SETTINGS - CONTINUED

Step 10AIO



Set Relay 2 Options using ▲ or ▼. If value is set to:

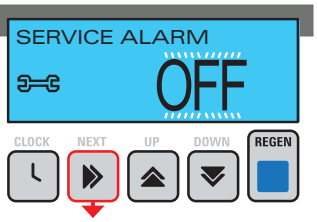
- "TIME" = This relay closes a set time after the start of regeneration, activation time referenced to start of the backwash or up-flow/down-flow brine whichever comes first;
- "GALLONS" = Relay closes every set number of gallons while in service;
- "REGEN GALLONS" = Relay closes every set number of gallons while in service or regeneration;
- "ERROR" = Relay closes whenever the control enters the Error Mode and immediately reactivating once power is restored;
- "OFF" is the Default.

See Page 16 for Relay Settings.

Press **NEXT** to go to Step 11AIO.

Press **REGEN** to return to previous step.

Step 11AIO



Set Service Alarm 1 Trigger using ▲ or ▼. Select between TIME, GALLONS or BOTH.

OFF is the Default

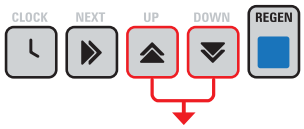
See Page 17 for Alarm Settings.

Press **NEXT** to **EXIT** Filter AIO Settings.

Press **REGEN** to return to previous step.

DIAGNOSTICS

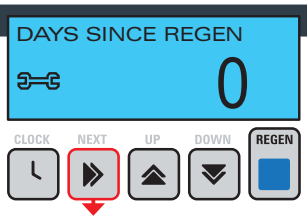
Step 1D



Press any button to activate display. Press ▲ and ▼ simultaneously for 3 seconds and release. If the screen in **Step 2D** does not appear, the lock on the valve is activated.

To unlock see **Step 1IL, Page 6**.

Step 2D

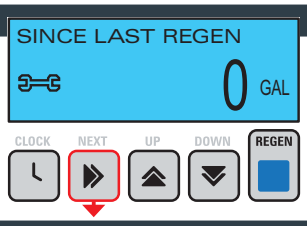


Displays the days since the last regeneration cycle.

Press **NEXT** to go to Step 3D.

Press **REGEN** to exit history.

Step 3D



Displays the gallons since the last regeneration cycle.

Press **NEXT** to go to Step 4D.

Press **REGEN** to **EXIT** history.

Step 4D



Displays the Reserve History. Use the ▲ or ▼ buttons to review past reserve capacities.

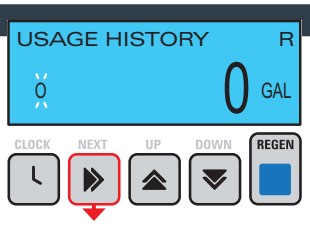
- "0" = Basic Reserve for the current day based on that days usage for the previous 4-6 weeks;
- "1" = Reserve for yesterday;
- "6" = Reserve for 6 days ago;

Display viewed only when the reserve capacity is determined by the control.

Press the **NEXT** button to go to Step 5D.

Press **REGEN** to return to previous step.

Step 5D



Displays the Usage History. Use the ▲ or ▼ buttons to review past usage.

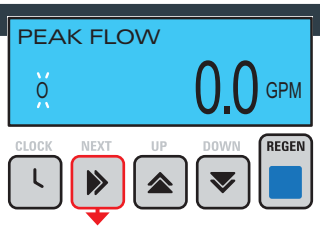
- "0" = Today;
- "1" = Yesterday;
- "63" = 63 days ago (max);
- "R" = Is shown for the 24 hour time period in which regeneration occurred;

T1 and T2 usage for this day is combined in this display (1.0T Mode Only).

Press the **NEXT** button to go to Step 6D.

Press **REGEN** to return to previous step.

Step 6D



Displays the Max Flow Rate History for the past 7 days. Use the ▲ or ▼ buttons to select the day.

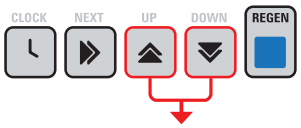
Reset by pushing both the ▲ and ▼ buttons simultaneously for 3 seconds. If configuration 3 is set to ALT A or B and the valve is currently in Standby, this display will be viewed but will not update.

Press **NEXT** to **EXIT** Diagnostic Level.

Press **REGEN** to return to previous step.

CONTROLLER HISTORY

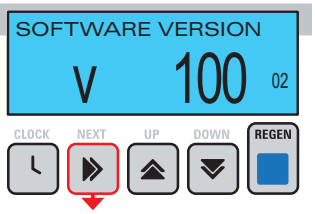
Step 1H



Press any button to activate display. Press ▲ and ▼ simultaneously for 3 seconds and release. Press ▲ and ▼ simultaneously for 3 seconds again and release. If the screen in **Step 2H** does not appear, the lock on the valve is activated.

To unlock see **Step 1IL, Page 4**.

Step 2H

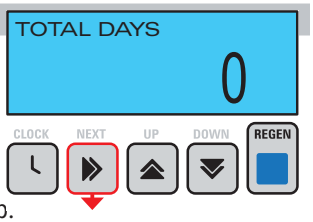


Displays the current software version programmed.

Press **NEXT** to go to Step 3H.

Press **REGEN** to **EXIT** history.

Step 3H

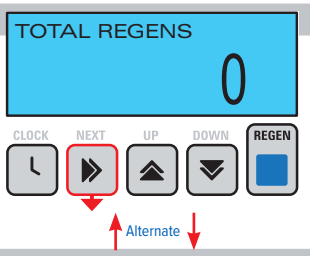


Displays the total days since valve startup. Time accumulates only when unit is plugged in.

Press **NEXT** to go to Step 4H.

Press **REGEN** to return to previous step.

Step 4H

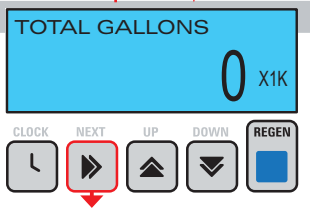


Displays the total number of regenerations since valve startup.

Press **NEXT** to go to Step 4H.

Press **REGEN** to return to previous step.

Step 5H

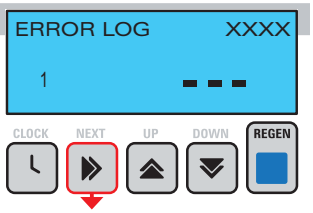


Displays the total gallons used since valve startup.

Press **NEXT** to go to Step 4H.

Press **REGEN** to return to previous step.

Step 6H



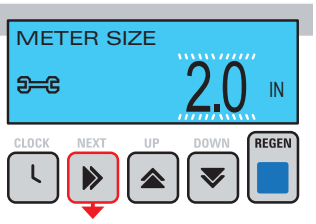
Displays the Error Log. Use the ▲ or ▼ buttons to review the last 10 logged error codes. With logged drive errors, motor position at the time of error detection is recorded in the top line of this display.

Press **NEXT** to **EXIT** History Level.

Press **REGEN** to return to previous step.

CONDITIONAL CONFIGURATION SCREENS

Step 1CCS



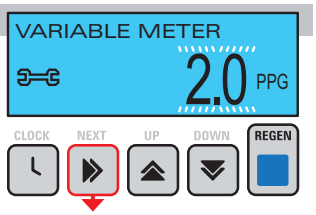
Using the ▲ or ▼ buttons, select the meter size, 1.5, 2.0, 3.0, 1.0r or VARIABLE METER.

Setting viewed when 2.0 or 1.5 are set in 2CS. When set to VARIABLE METER enter pulses per gallon.

Press **NEXT** to go to Step 2CCS.

Press **REGEN** to **EXIT** Configuration Settings.

Step 2CCS



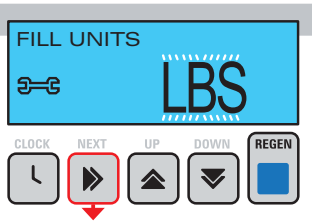
Setting viewed with VARIABLE METER option set. Set meter calibration in pulses per gallon.

• "DEFAULT" = 2.0 PPG

Press **NEXT** to go to Step 3CCS.

Press **REGEN** to return to previous step.

Step 3CCS



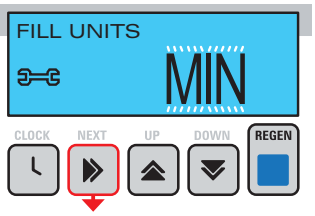
Display viewed when set to pounds of NaCL. Display only viewed in softener systems with Configuration 1 set to 1.5 IN and Fill is currently part of the regeneration cycle sequence.

• "DEFAULT" = LBS.

Press **NEXT** to go to Step 4CCS.

Press **REGEN** to return to previous step.

Step 4CCS



Display viewed when set to minutes of Fill. Display only viewed in softener systems with Configuration 1 set to 1.5 IN and Fill is currently part of the regeneration cycle sequence.

• "DEFAULT" = LBS.

Press **NEXT** to **EXIT** Configuration Settings.

Press **REGEN** to return to previous step.

CONDITIONAL USER SCREENS

Conditional User 1

DP Regeneration Signal Status. Present only when DP switch contacts are closed with IMMEDreg or DELAYreg set in Configuration 5.



Conditional User 2

DP Hold Signal Status. Present only when DP switch controls are closed with HOLD reg set in Configuration 5. This display takes precedence over USER 3 or 4



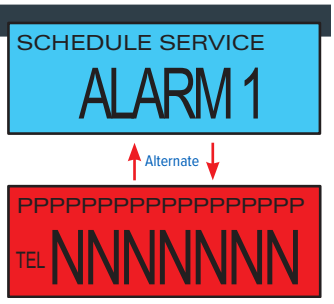
Service Alert 1

Scheduled Service Alert 1. Service Alarm 1 and 2 Screen WITHOUT a Contact Shown in User 5. Reset this display by pushing and holding both the ▲ and ▼ buttons for 3 seconds.



Service Alert 2

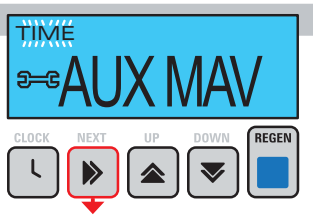
Service Alarm 1 and 2 Screen WITH a Contact Shown in User 5. While in Service Alarm Mode, these two screens will alternate being viewed. The top screen indicates that a service alarm has been triggered. The top line of the lower screen contains the set contact phone number, the large bottom line contains the set contact name. (NNNNNNN) scrolls. While either screen is viewed, push and hold both the ▲ and ▼ buttons for 3 seconds will reset the screen and its associated trigger.



CONDITIONAL AUX MAV SCREENS

Step 1AUX MAV Screens

Auxiliary MAV Drive set to operate in Time Mode. Aux MAV transitions to Bypass at a set time referenced to the start of regeneration, AFTER Valve Motor deactivation. Aux MAV transitions back to Service at the completion of the preset duration time. The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening or Filtering. Aux MAV will automatically return to Service with power loss or when the REGEN Button is pushed DURING Bypass.

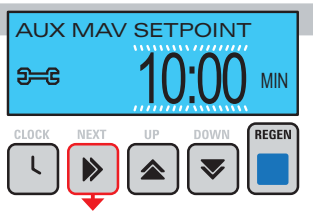


Press **NEXT** to go to Step 2AUX.

Press **REGEN** to **EXIT** Configuration Settings.

Step 2AUX MAV Screens

Set the start time for the Aux MAV transition to Bypass. Setpoint referenced to start of the first backwash or up-flow/down-flow brine cycle, whichever comes first.



• "DEFAULT" = 10:00 MIN.

Press **NEXT** to go to Step 3AUX.

Press **REGEN** to return to previous step.

Step 3AUX MAV Screens

Set duration of Aux MAV transition to Bypass.



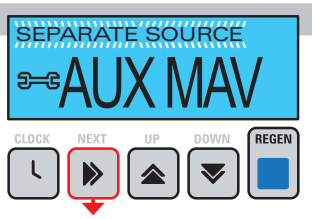
• "DEFAULT" = 15:00 MIN.

Press **NEXT** to go to Step 4AUX.

Press **REGEN** to return to previous step.

Step 4AUX MAV Screens

Auxiliary MAV Drive set to operate in Separate Source Mode. Aux MAV transitions to Bypass before the start of Regen Cycle #1, AFTER Alt MAV Motor transition. Aux MAV transitions back to Service at the completion of the last programmed regen cycle, once the Valve Motor deactivates and BEFORE Alt MAV transition (if scheduled). Aux MAV will NOT automatically return to Service while manually stepping valve through regeneration, or after power loss. MAV will instead remain in Bypass until regeneration cycle end.



Press **NEXT** to **EXIT** Configuration Settings.

Press **REGEN** to return to previous step.

CONDITIONAL ALTERNATOR MAV SCREENS

Step 1ALT MAV Screen

Alternator MAV set to operate as part of an alternator system.

MAV gear retracted IN for Valve A in Service, Valve B in Standby.

MAV gear extended OUT for Valve A in Standby, Valve B in Service.

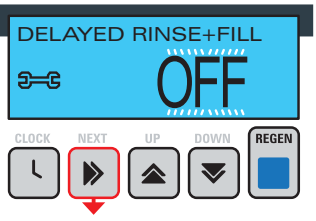


Press **NEXT** to go to Step 2ALT MAV.

Press **REGEN** to **EXIT** Configuration Settings.

Step 2ALT MAV Screen

Displays Alternator System Type.



• "ON" = Valve will proceed with last 2 steps of regeneration (Rinse + Fill) just prior to a return to Service. Prior to that time, upon completion of the initial regeneration cycle steps, the valve will enter Standby;

• "OFF" = Standard alternator system operation, without delays between any cycle steps;

CONDITIONAL ALTERNATOR MAV SCREENS - CONTINUED

• "OFF" is the Default.

Press **NEXT** to go to Step 3ALT MAV.

Press **REGEN** to return to previous step.

Step 3ALT MAV Screen



Alternator MAV set to operate as part of an alternator system.

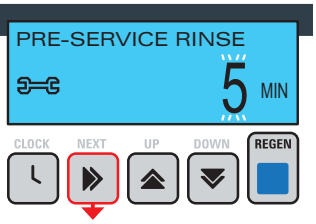
MAV gear retracted IN for Valve A in Service, Valve B in Standby.

MAV gear extended OUT for Valve A in Standby, Valve B in Service.

Press **NEXT** to go to Step 4ALT MAV.

Press **REGEN** to **EXIT** Configuration Settings.

Step 4ALT MAV Screen



Displays Alternator System Type.

Valve Motor Drive set to operate in Pre-Service Rinse Mode.

- "w/DURATION SET" = Valve in Standby drives to the Rinse Position for a set duration just prior to Service return. This duration is selectable from 1-20 minutes in 1 minute increments, including OFF;
- "OFF" = Standard alternator system operation, without any rinse prior to Service return;
- "DEFAULT" = OFF (1.0T Valve Type);
- "DEFAULT" = 5 minutes (2.0 Valve Type).

Press **NEXT** to go to Step 5ALT MAV.

Press **REGEN** to return to previous step.

Step 5ALT MAV Screen



Alternator MAV set to operate in No Hard Water Bypass Mode.

Bypass begins at the start of the first cycle step encountered that is NOT Fill, or at the end of SOFTENING or FILTERING in Pre-Fill systems. Bypass ends at the beginning of Fill in Post-Fill systems, or after the last cycle step has ended in Pre-Fill systems.

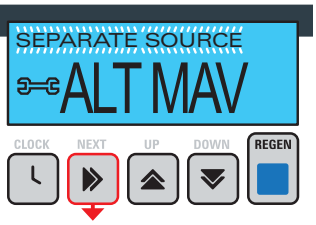
MAV gear extended OUT for service.

MAV gear retracted IN for bypass.

Press **NEXT** to go to Step 6ALT MAV.

Press **REGEN** to **EXIT** Configuration Settings.

Step 6ALT MAV Screen



Alternator MAV set to operate in Separate Source Mode.

Bypass begins in Post-Fill and Pre-Fill systems before the initial drive to the first cycle step. Bypass then continues until after the last cycle step has ended.

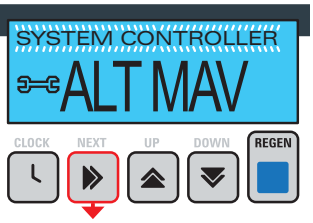
MAV gear extended OUT for service.

MAV gear retracted IN for bypass.

Press **NEXT** to go to Step 7ALT MAV.

Press **REGEN** to return to previous step.

Step 7ALT MAV Screen



Alternator MAV set to operate in System Controller Mode as part of a non-alternator system.

MAV gear extended OUT for service.

MAV gear retracted IN for bypass.

Press **NEXT** to **EXIT** Configuration Settings.

Press **REGEN** to return to previous step.

Step 8ALT MAV Screen

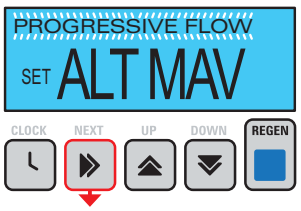
PROGRESSIVE FLOW SETUP

For proper progressive flow operation, three-wire communication cables are required to connected to each valve in the system via the 3-pin Comm Cable connector.

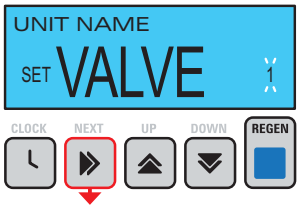
The available communication cable is:

CL-COM-34-12 WS Alt Connect Cord 12 ft
(For 2, 3 or 4-Valve Progressive Flow Systems)

NOTE: All cabling must be connected before starting initial valve programming.



Select Progressive Flow from the Alt MAV Output Operation display. Operation in Progressive Flow Mode requires 2 to 4 valves plumbed in parallel, each with a separate flow meter and No Hard Water Bypass unit.



Press **NEXT** to go to the UNIT NAME display. Set the UNIT NAME as required by the position of the control valve in the system. Each Valve needs to be set to Progressive Flow and have different addresses, 1, 2, 3, and 4. Valve 1 will be the controlling valve of the system.



If setting Valve 1, press **NEXT** to go to the ADD ANOTHER UNIT display and set the required flow rate adder value. The ADD ANOTHER UNIT setting will add or subtract the number of units currently in service, based on the overall flow rate through the system. The ADD ANOTHER UNIT screen will only appear on Valve 1.

Complete valve setup by pressing **NEXT** to advance through the remaining displays and make any other required changes prior to exiting programming.

CONDITIONAL RELAY SCREENS

Step 1RS

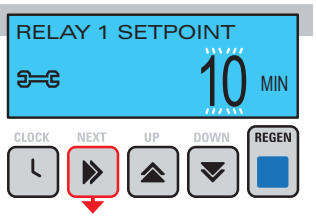


Relay 1 set to operate in a Time Mode. Relay activates at a set time referenced to the start of regeneration. Relay deactivation is at the completion of the preset duration time. The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening, or Filtering. Relay operation during regen is immediately concluded when the REGEN button is pushed, or after power loss DURING Relay 1 activation. If OFF is selected, the next two screens do not appear.

Press **NEXT** to go to Step 2RS.

Press **REGEN** to **EXIT** Configuration Settings.

Step 2RS



Set relay activation time from the start of regen.

Press **NEXT** to go to Step 3RS.

Press **REGEN** to return to previous step.

Step 3RS



Set duration of relay activation.

Press **NEXT** to go to Step 12S.

Press **REGEN** to return to previous step.

Step 4RS



Relay 2 set to operate in a Volume Mode during Normal Operation only. Relay activation is after the preset amount of service flow has been registered. Relay deactivation is at the completion of the preset duration time, or after the meter stops registering flow, whichever comes first. Setting not available with 1.0T set in 2CS.

Press **NEXT** to go to Step 5RS.

Press **REGEN** to **EXIT** Configuration Settings.

Step 5RS



Set relay activation volume.

Press **NEXT** to go to Step 6RS.

Press **REGEN** to return to previous step.

Step 6RS



Set duration of relay activation.

Press **NEXT** to go to Step 13S.

Press **REGEN** to return to previous step.

Step 7RS

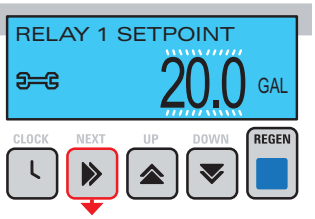


Relay 1 set to operate in a Volume Mode during Normal Operation as well as Regeneration. Relay activation is after the preset amount of flow has been registered. Relay deactivation is at the completion of the set duration time, or after the meter stops registering flow, whichever comes first. Setting not available with Valve A or B set in Configuration 2.

Press **NEXT** to go to Step 5RS.

Press **REGEN** to **EXIT** Configuration Settings.

Step 8RS



Set relay activation volume.

Press **NEXT** to go to Step 6RS.

Press **REGEN** to return to previous step.

Step 9RS



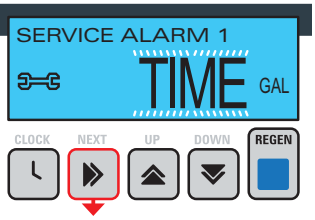
Set duration of relay activation.

Press **NEXT** to go to Step 12S.

Press **REGEN** to return to previous step.

CONDITIONAL SERVICE ALARM

Step 1SA

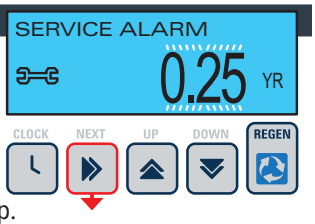


A Service Alarm is triggered by the passing of the amount of time as set in the next display.

Press **NEXT** to go to Step 6SA.

Press **REGEN** to **EXIT** Configuration Settings.

Step 2SA

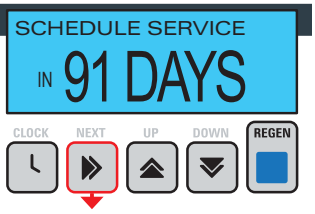


Set the duration between scheduled service calls based on the previously chosen format..

Press **NEXT** to go to Step 3SA.

Press **REGEN** to return to previous step.

Step 3SA

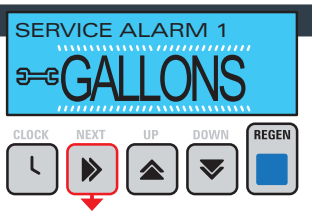


Time remaining to service alarm. To reset this value back to the initial value press ▲ and ▼ simultaneously for 3 seconds.

Press **NEXT** to go to Step 14S.

Press **REGEN** to return to previous step.

Step 4SA

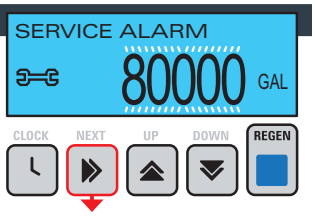


A Service Alarm is triggered by the amount of treated water usage as set in the next display.

Press **NEXT** to go to Step 5SA.

Press **REGEN** to return to previous step.

Step 5SA

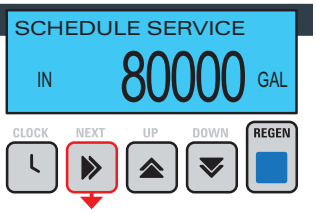


Set the duration between scheduled service calls based on the previously chosen format.

Press **NEXT** to go to Step 6SA.

Press **REGEN** to return to previous step.

Step 6SA

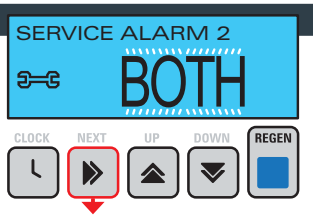


Time remaining to service alarm. To reset this value back to the initial value press ▲ and ▼ simultaneously for 3 seconds.

Press **NEXT** to go to Step 14S.

Press **REGEN** to return to previous step.

Step 7SA

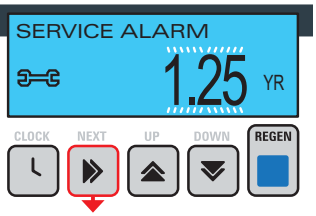


Service Alarm set to Both Mode. A Service Alarm is triggered by the passing of the amount of time as set in 8SA or by the settings in 9SA.

Press **NEXT** to go to Step 8SA.

Press **REGEN** to return to previous step.

Step 8SA

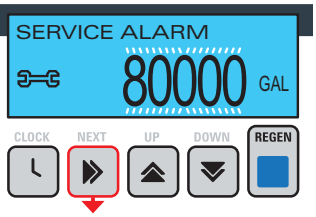


Set the duration between scheduled service calls based on the previously chosen format.

Press **NEXT** to go to Step 9SA.

Press **REGEN** to return to previous step.

Step 9SA

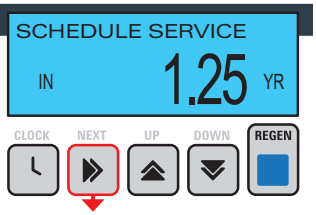


Set the duration between scheduled service calls based on the previously chosen format.

Press **NEXT** to go to Step 10SA.

Press **REGEN** to return to previous step.

Step 10SA

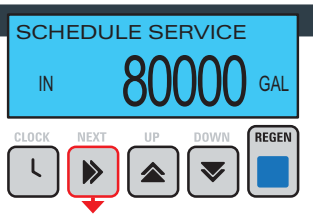


Time remaining to service alarm. To reset this value back to the initial value press ▲ and ▼ simultaneously for 3 seconds.

Press **NEXT** to go to Step 11SA.

Press **REGEN** to return to previous step.

Step 11SA



Time remaining to service alarm. To reset this value back to the initial value press ▲ and ▼ simultaneously for 3 seconds.

Press **NEXT** to go to Step 14S.

Press **REGEN** to return to previous step.

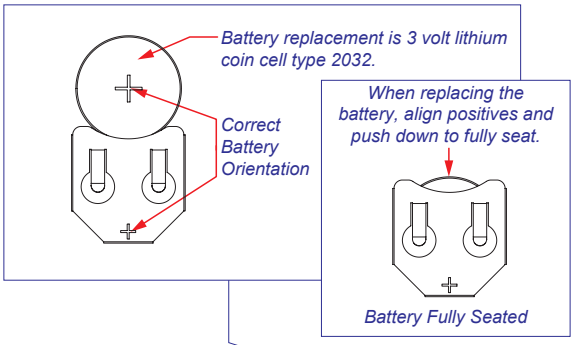
FRONT COVER & DRIVE ASSEMBLY

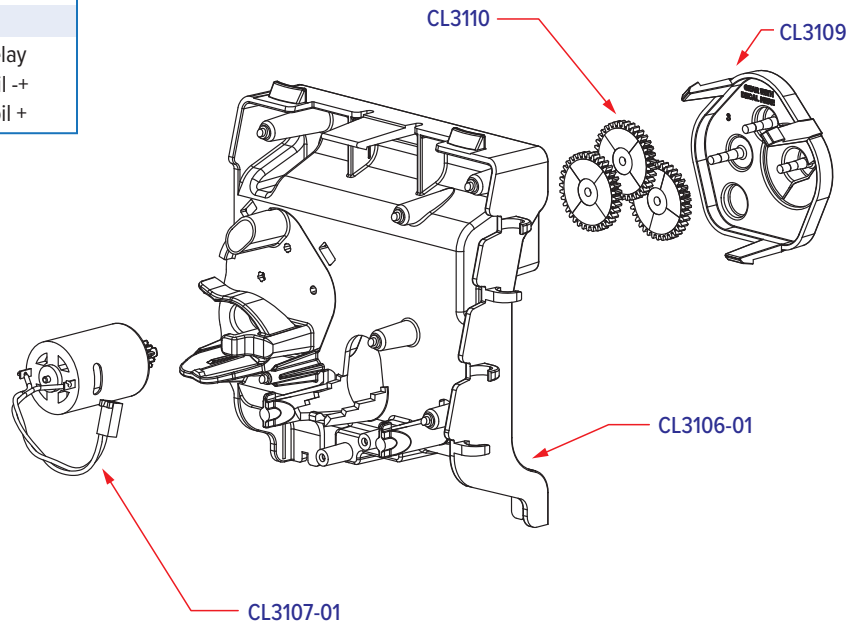
Part No.	Description	Qty
NWS4174-01G	NWS Front Cover	1
CL3107-01	Motor Assembly	1
CL3106-01	Drive Bracket & Spring Clip	1
CL4339NU-01BOARD	1" thru 2" NWS PCB 5 Digit Rpl Board	1
CL3110	Drive Reducing Gear 12 x 36	3
CL3109	Drive Gear Cover	1
CL3002TC	TC Drive Assembly	*
Not Shown		
CL3186	AC Adapter 120V-12V	1
CL3186-01	AC Adapter Cord Only	1

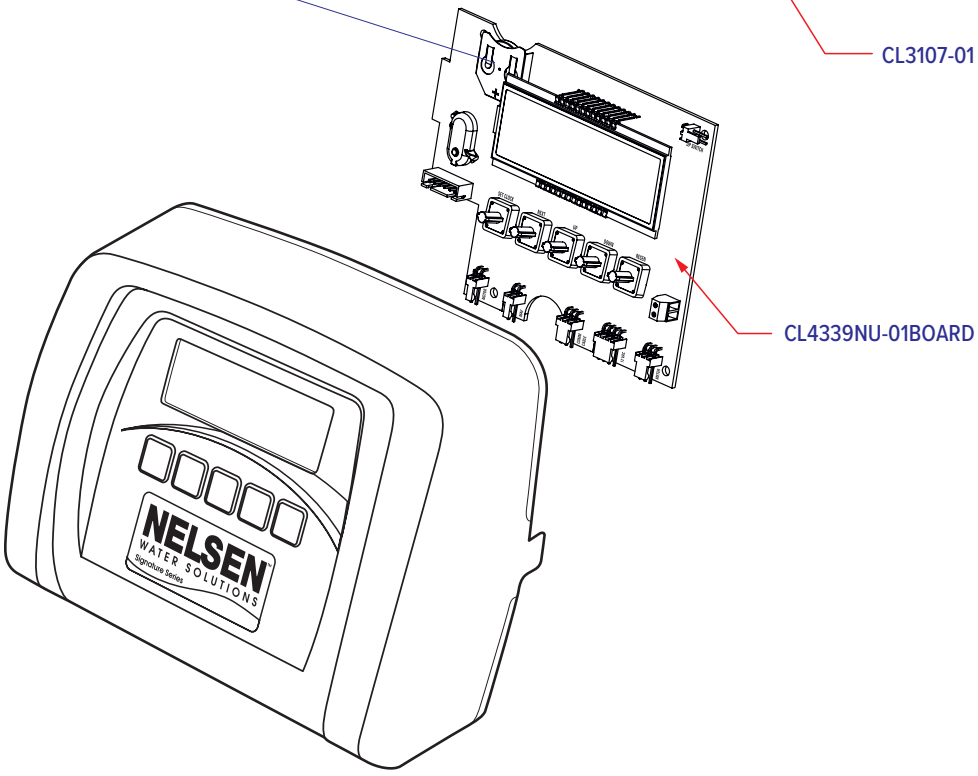
Relay Specifications: 12V DC Relay with a coil resistance not less than 80 ohms. If mounting relay under the cover, check for proper mounting dimensions on the backplate.

Wiring for Correct On/Off Operation

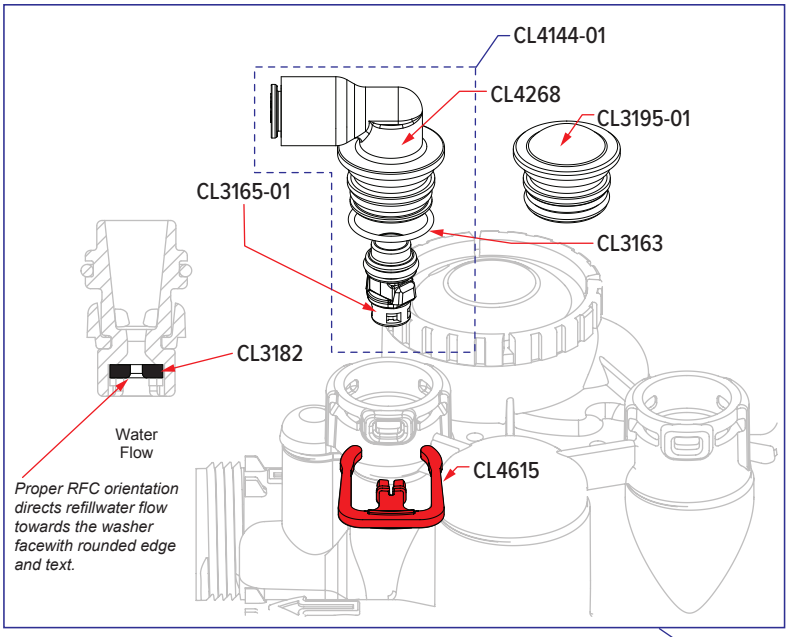
PC Board Relay Terminal Block .....Relay
RLY 1..... Coil -+
COM ..... Coil +

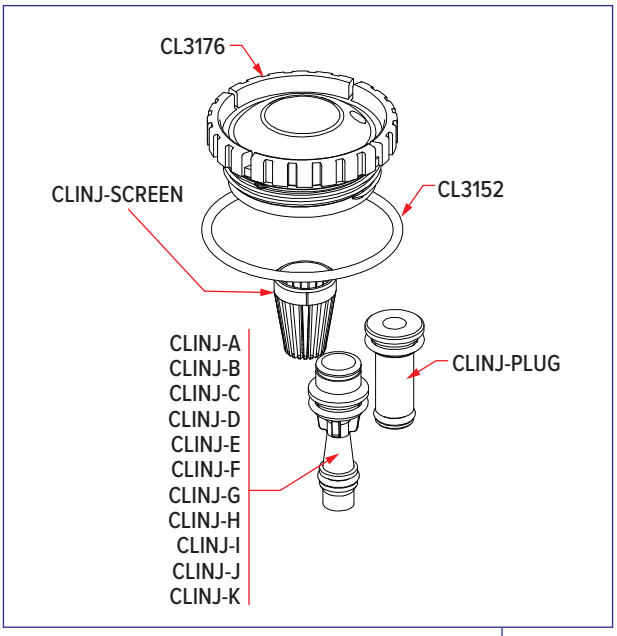




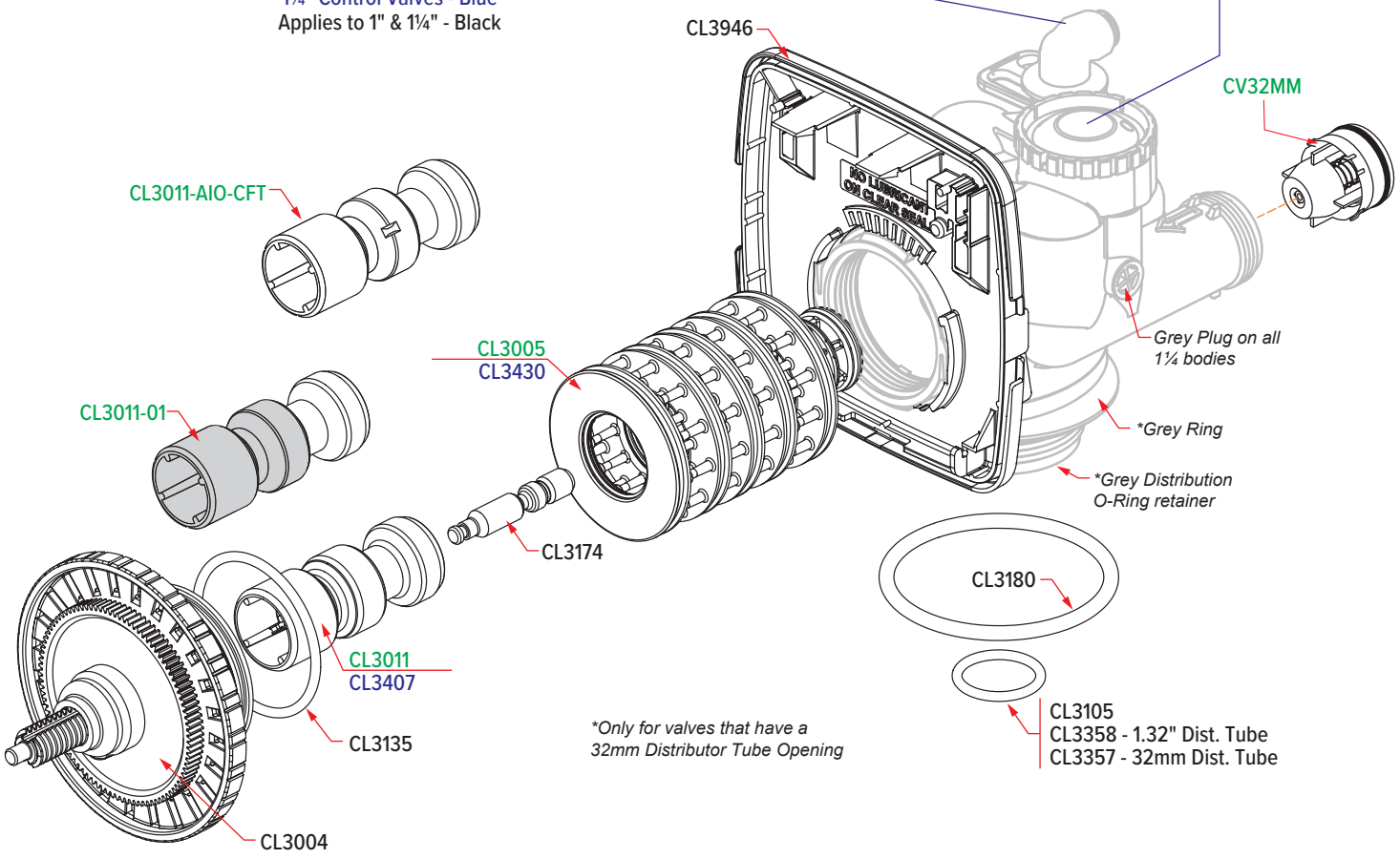


DRIVE CAP - SPACER ASSEMBLY

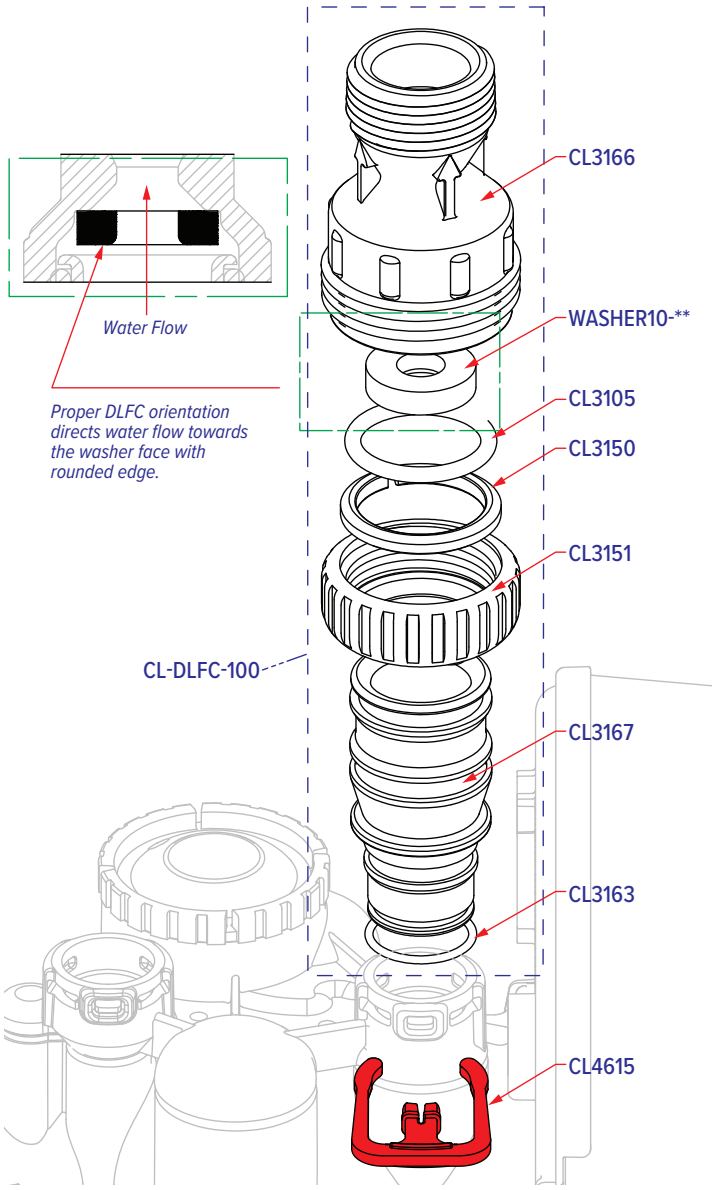




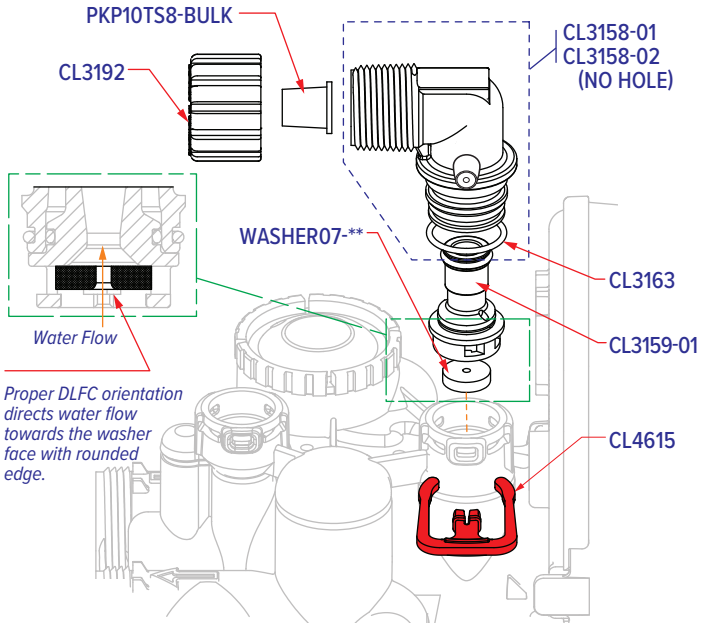
1" Control Valves - Green
1¼" Control Valves - Blue
Applies to 1" & 1¼" - Black



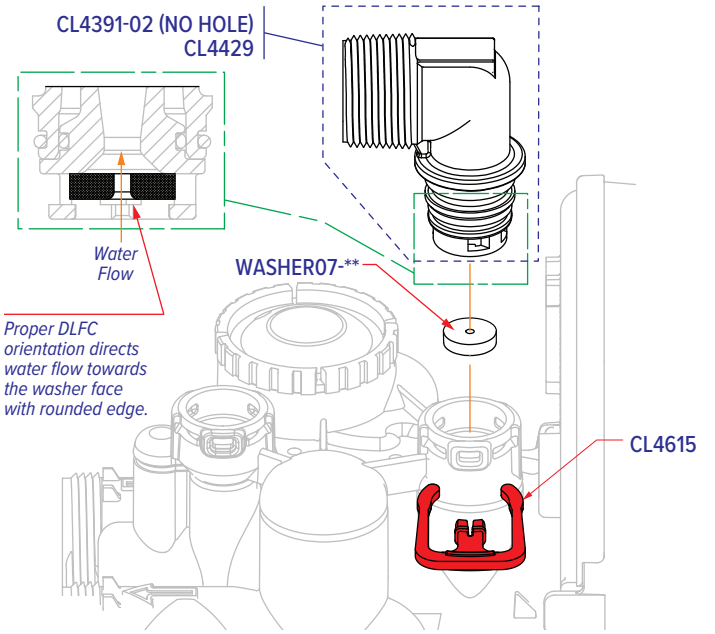
1" DRAIN LINE ASSEMBLY



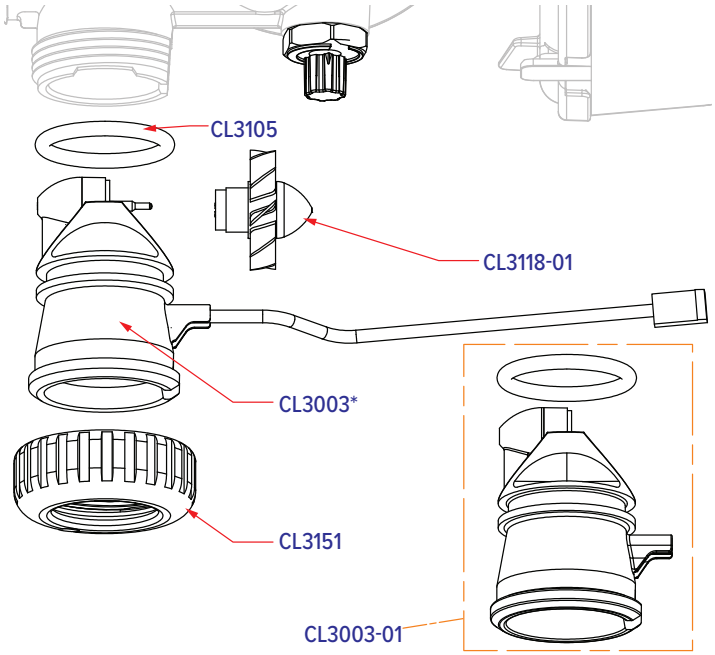
3/4" DRAIN LINE ELBOW ASSEMBLY



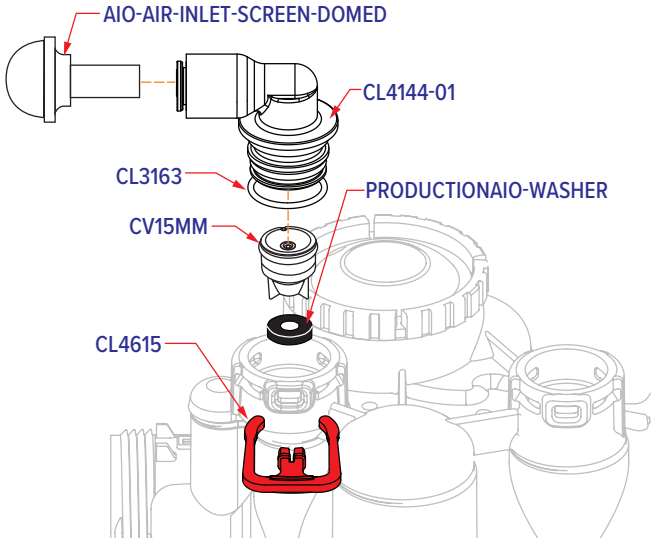
1" DRAIN LINE ELBOW ASSEMBLY



WATER METER ASSEMBLY

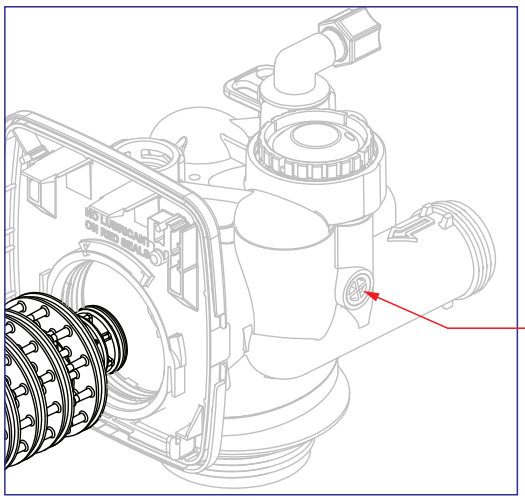


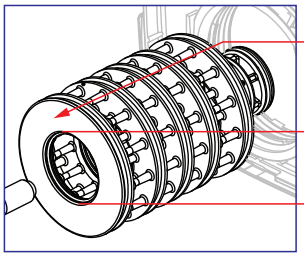
AIR CHECK VALVE ASSEMBLY

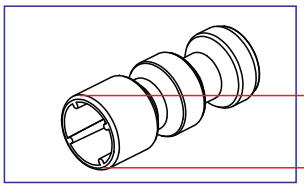


DISTRIBUTOR IDENTIFICATION

WS1 with 1.050" Distributor Tube Opening Identification

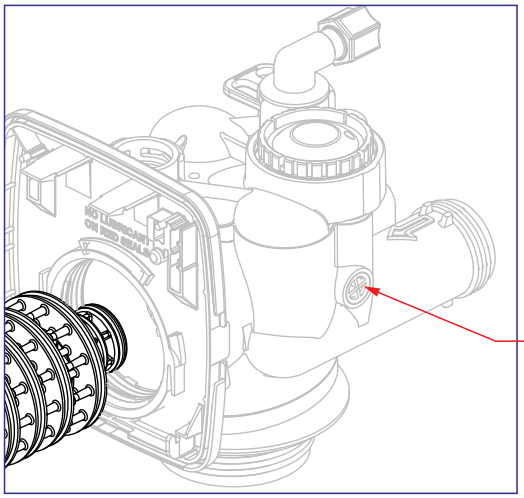


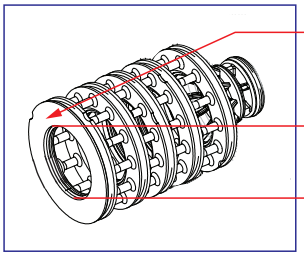


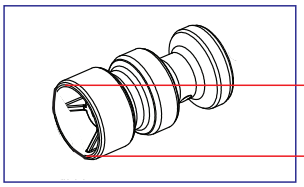


Note: The WS1 down

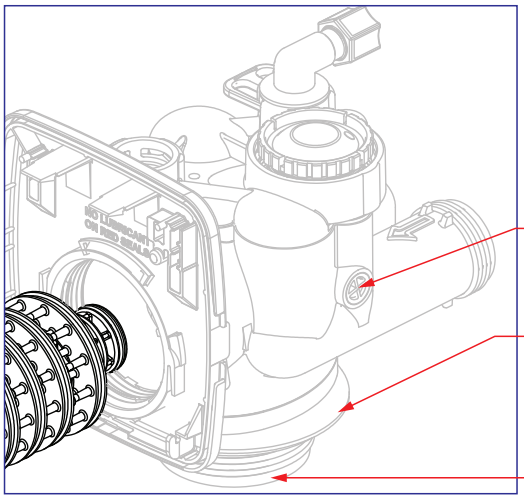
WS1.25 with 1.32" Distributor Tube Opening Identification

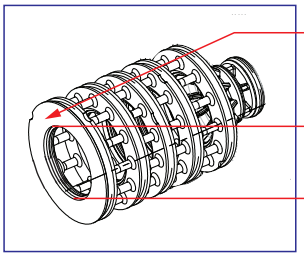


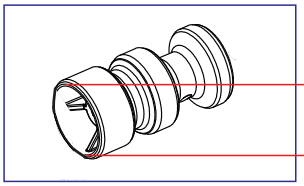




WS1.25 with 32mm Distributor Tube Opening Identification







TROUBLESHOOTING

1. No Display on PC Board	a. No power at electric outlet	a. Repair outlet or use working outlet
	b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC Board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/or GFI
	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See front cover and drive assembly drawing for instructions
	d. Defective PC Board	d. Replace PC Board
3. Display does not indicate that water is flowing. Refer to user instructions for how the display indicates water is flowing	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Meter wire not installed securely into three pin connector	d. Verify meter cable wires are installed securely into three pin connector labeled METER
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board
4. Control valve regenerates at wrong time of day	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See front cover and drive assembly drawing for instructions
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration set incorrectly	c. Reset regeneration time
	d. Control valve set at ”on 0“ (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at ”NORMAL + on 0“ (delayed and/or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See front cover and drive assembly drawing for instructions
6. Control valve does not regenerate automatically when the REGEN button is depressed and held	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Defective PC Board
7. Control valve does not regenerate automatically but does when the REGEN button is depressed and held	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connected meter to three pin connection labeled METER on PC Board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Incorrect programming	d. Check for programming error
	e. Meter wire not installed securely into three pin connector	e. Verify meter cable wires are installed securely into three pin connector labeled METER
	f. Defective meter	f. Replace meter
	g. Defective PC Board	g. Replace PC Board
8. Hard or untreated water is being delivered	a. Bypass valve is open or faulty	a. Fully close bypass valve or replace
	b. Media is exhausted due to high water usage	b. Check program settings or diagnostics for abnormal water usage
	c. Meter not registering	c. Remove meter and check for rotation or foreign material
	d. Water quality fluctuation	d. Test water and adjust program values accordingly
	e. No brine or low level of brine in brine tank	e. Add proper salt to tank
	f. Control fails to draw in brine	f. Refer to Trouble Shooting Guide number 12
	g. Insufficient brine level in brine tank	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace
	h. Damaged seal/stack assembly	h. Replace seal/stack assembly
	i. Control valve body type and piston type mix matched	i. Verify proper control valve body type and piston type match
	j. Fouled media bed	j. Replace media bed

TROUBLESHOOTING

9.	Control valve uses too much brine	a.	Improper refill setting	a. Check refill setting
		b.	Improper program settings	b. Check program setting to make sure they are specific to the water quality and application needs
		c.	Control valve regenerates frequently	c. Check for leaking fixtures that may be exhausting capacity or system is undersized
10.	Residual brine being delivered to service	a.	Low water pressure	a. Check incoming water pressure - water pressure must remain at minimum of 25 psi
		b.	Incorrect injector size	b. Replace injector with correct size for the application
		c.	Restricted drain line	c. Check drain line for restrictions or debris and clean
11.	Excessive water in brine tank	a.	Improper program settings	a. Check refill setting
		b.	Plugged injector	b. Remove injector and clean or replace
		c.	Drive cap assembly not tightened in properly	c. Re-tighten the drive cap assembly
		d.	Damaged seal/stack assembly	d. Replace seal/stack
		e.	Restricted or kinked drain line	e. Check drain line for restrictions or debris and or un-kink drain line
		f.	Plugged backwash flow controller	f. Remove backwash flow controller and clean or replace
		g.	Missing refill flow controller	g. Replace refill flow controller
12.	Control valve fails to draw in brine	a.	Injector is plugged	a. Remove injector and clean or replace
		b.	Faulty brine piston	b. Replace brine piston
		c.	Brine line connection leak	c. Inspect brine line for air leak
		d.	Drain line restriction or debris cause excess back pressure	d. Inspect drain line and clean to correct restriction
		e.	Drain line too long or too high	e. Shorten length and or height
		f.	Low water pressure	f. Check incoming water pressure - water pressure must remain at minimum of 25 psi
13.	Water running to drain	a.	Power outage during regeneration	a. Upon power being restored control will finish the remaining regeneration time. Reset time of day
		b.	Damaged seal/stack assembly	b. Replace seal/stack assembly
		c.	Piston assembly failure	c. Replace piston assembly
		d.	Drive cap assembly not tightened in properly	d. Re-tighten the drive cap assembly
14.	E1, Err - 1001, Err - 101 = Control unable to sense motor movement	a.	Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		b.	PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		c.	Missing reduction gears	c. Replace missing gears
15.	E2, Err - 1002, Err - 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled		Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		b.	Mechanical binding	b. Check piston and seal/stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		c.	Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		d.	Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect

16.	E3, Err - 1003, Err - 103 = Control valve motor ran too long and was unable to find the next cycle position	a.	Motor failure during a regeneration	a.	Check motor connection then Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		b.	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	b.	Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		c.	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c.	Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
17.	Err - 1004, Err - 104 = Control valve motor ran too long and timed out trying to reach home position	a.	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	a.	Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
18.	Err - 1006, Err - 106, Err - 116 = MAV/ SEPS/NHBP/AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a.	Control valve programmed for ALT A or B, NHBP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	a.	Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
		b.	MAV/NHBP motor wire not connected to PC Board	b.	Connect MAV/NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		c.	MAV/NHBP motor not fully engaged with reduction gears	c.	Properly insert motor into casing, do not force into casing. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		d.	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d.	Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
19.	Err - 1007, Err - 107, Err - 117 = MAV/ SEPS/NHBP/AUX MAV valve motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a.	Foreign material is lodged in MAV/NHBP valve	a.	Open up MAV/NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to re-synchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect
		b.	Mechanical binding	b.	Check piston and seal/stack assembly, check reduction gears, drive gear interface, and check MAV/NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect

ERROR CODES

Error	Description of Error	
101	UNABLE TO START	Valve not sensing valve movement with motor output energized
102	MOTOR STALLED	Valve unable to find next cycle position (stalled)
103	MOTOR RAN TOO LONG	Valve unable to find next cycle position
104	VALVE HOMING	Valve unable to find Home position
106	ALT MAV RAN TOO LONG	Alt MAV motor RAN TO LONG - unable to find proper park position
107	ALT MAV STALLED	Alt MAV motor RAN TO SHORT, STALLED - unable to find proper park position
109	INVALID MOTOR STATE	Control can no longer operate properly due to the detection of an invalid motor state
116	AUX MAV RAN TOO LONG	Aux MAV motor RAN TOO LONG - unable to find proper park position
117	AUX MAV STALLED	Aux MAV motor RAN TOO SHORT, STALLED - unable to find proper park position
201	INVALID REGEN STEP	Control can no longer operate properly due to the detection of an invalid regeneration cycle step - Internal Software Error
202	UNEXPECTED STALL	Motor encountered a unexpected stall which it was able to recover from and proceed normally
402	POWER DOWN MEMORY	Control can no longer operate properly due to a check sum error for the Operational Data and Status Section of E^2PROM memory
403	PROGRAM MEMORY	Control can no longer operate properly due to a check sum error for the Programming Section of E^2PROM memory
404	DIAGNOSTIC MEMORY	Control can no longer operate properly due to a check sum error for the Diagnostic Section of E^2PROM memory
405	HISTORY MEMORY	Control continues to operate normally w/check sum error for the History Section of E^2PROM memory, however error is recorded in Error Log
406	CONTACT MEMORY	Control can no longer operate properly due to a check sum error for the Contact Screen Section of E^2PROM memory
407	STATUS RAM	STATUS RAM MEMORY FAILURE - Error generated when the micro controller can't operate properly due to corrupted data contained in the Operational Data/Status Section of RAM memory. When this error is generated, like a "405" or "408" Error, a "407" is recorded in the Error Log, but the control does not enter Error Mode and continues to operate normally using previously stored Status RAM data (that can be up to 6 hrs. old). This portion of memory includes the state of motors, relays, flow, regen, and more. Most things that are tracked on a moment-by-moment basis that need to be able to recover in the event of a power loss or reset is saved here.
408	DIAGNOSTIC RAM	DIAGNOSTIC RAM MEMORY FAILURE - Error generated when the micro controller can't operate properly due to corrupted data contained in the Diagnostic Section of RAM memory. When this error is generated, like a "405" or "407" Error, a "408" is recorded in the Error Log, but the control does not enter Error Mode and continues to operate normally using previously stored Diagnostic RAM data (that can be up to 6 hrs. old). This portion of memory includes parameters normally displayed in the diagnostic branch of the menu map.
410	CONFIG DOWNLOAD	Configurator file downloaded to the control was not originally uploaded from another control with the identical software revision

SYSTEM SERVICE CHECKLIST

SITE

CUSTOMER NAME:

CUSTOMER ADDRESS:

WATER:

◯ WELL WATER ◯ CITY WATER

ORIGINAL WATER ANALYSIS:

DATE: _____ HARDNESS: _____ IRON: _____ pH: _____ TDS: _____ CHLORINE: _____

SYSTEM

SYSTEM DESIGN:

WATER SOFTENER: _____ IRON FILTER: _____ CARBON FILTER: _____ NEUTRALIZER: _____ OTHER: _____

MEDIA USED:

ORIGINAL INSTALL DATE:

SERIAL NUMBER:

MODEL:

SIZE:

ACTUAL CAPACITY BASED ON SALT SETTING:

WATER

TEST COLD:

DATE: _____ HARDNESS: _____ IRON: _____ pH: _____ TDS: _____ CHLORINE: _____

TEST HOT:

DATE: _____ HARDNESS: _____ IRON: _____ pH: _____ TDS: _____ CHLORINE: _____

BACTERIA TEST:

SUGGEST LABORATORY TEST:

◯ YES ◯ NO

CUSTOMER COMPLAINT:

VALVE

	UPON ARRIVAL	UPON DEPARTURE
CORRECT TIME OF DAY:	◯ YES ◯ NO	◯ YES ◯ NO
CORRECT DLFC:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO DLFC OBSTRUCTIONS:	◯ YES ◯ NO	◯ YES ◯ NO
DRAIN LINE CLEAR OF OBSTRUCTIONS:	◯ YES ◯ NO	◯ YES ◯ NO
BYPASS IN CORRECT POSITION:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO LEAKS TOP OF TANK, BYPASS:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO LEAK TO DRAIN:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO LEAK TO BRINE:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO PIPE OR CONNECTION LEAKS:	◯ YES ◯ NO	◯ YES ◯ NO
INJECTOR IS CLEAR:	◯ YES ◯ NO	◯ YES ◯ NO
CYCLE SETTINGS ARE CORRECT:	◯ YES ◯ NO	◯ YES ◯ NO
FLOW DURING CYCLES IS CORRECT:	◯ YES ◯ NO	◯ YES ◯ NO

BRINE TANK

	UPON ARRIVAL	UPON DEPARTURE
ACCEPTABLE SALT LEVEL:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO SALT BRIDGING:	◯ YES ◯ NO	◯ YES ◯ NO
ACCEPTABLE WATER LEVEL:	◯ YES ◯ NO	◯ YES ◯ NO
CLEAR UNOBSTRUCTED BRINE WALL:	◯ YES ◯ NO	◯ YES ◯ NO
BRINE LINE IN GOOD CONDITION:	◯ YES ◯ NO	◯ YES ◯ NO
CONFIRM NO BRINE TANK LEAKS:	◯ YES ◯ NO	◯ YES ◯ NO

NOTES

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