APPLIED MEMBRANES INC.®

Industry Leader in RO Expertise and Membrane Applications since 1983™

Manual for Operation & Maintenance Of Carbon Filter with Metered Valve

for Models:

W-G2162EM & W-G2472EM

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ISO 9001:2008 Certified Company

Water Quality Association MEMBER

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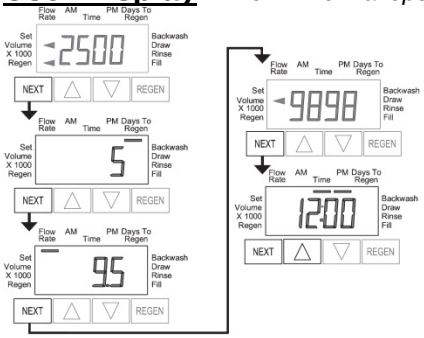
Panel Operation Quick Reference Guide

User Display

When in normal operation, one of five displays may be shown. Pressing NEXT will alternate between the displays.

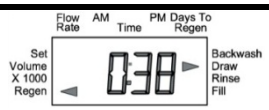


- **User Screen 1:** Typical user display. Shows volume remaining (in gallons) until next regeneration.
- **User Screen 2:** Displays number of days to next regeneration.
- **User Screen 3:** Displays flow rate in gallons per minute.
- **User Screen 4:** Displays total flow in gallons since last reset. *(Press and hold ▼ for 3 seconds to reset to 0.)*
- **User Screen 5:** Shows current time.

User screens 1, 3 and 4 will not be shown if 7 or 28 day options are selected in configuration settings.

Regeneration Screens

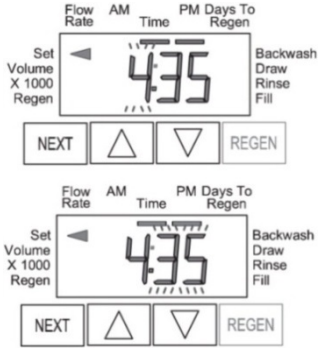
- During Regeneration: The display shows the time remaining in the current cycle. Pressing "REGEN" will advance to the next cycle.



Set Time of Day

In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right.

(Time of day will only need to be set when a power outage lasts more than 8 hours, or when daylight savings time begins or ends.)

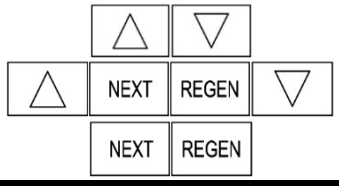


- Press NEXT until the time of day screen is displayed.
- Press and hold ▲ or ▼until the SET indicator is displayed and the hour flashes.
- Press ▲ or ▼until the correct hour is displayed.
- Press NEXT, the minutes will flash.
- Press ▲ or ▼until the correct minute is displayed.
- Press NEXT to return to the display screen.

Button Operation and Function

Scrolls to the Next Display

- Press once and release to schedule a regeneration at the preset delayed regeneration time. (Press and release again to cancel the regeneration.)
- Press and Hold for 3 seconds to initiate an immediate regeneration.
- **While Regeneration is in Process:** Press to advance to the next cycle.
- **While in Programming Screens:** Press to go backwards to the previous screen.



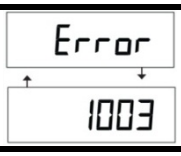
Changes variable being displayed.

Key sequence to lock and unlock program settings.

Press and Hold for 3 seconds to initiate a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve.

Error Message

If the word "ERROR" and a number are flashing on the display, check the trouble shooting section of this manual to identify the error. Clear error by disconnecting the power supply at the PC board and reconnecting, or press the NEXT & REGEN buttons simultaneously for 3 seconds.



Manual Regeneration

Delayed Regeneration: Press and Release the "REGEN" button. "◄" will flash towards REGEN. Regeneration will be performed "tonight" at the preset time of day. (Cancel request by pressing the "REGEN" button again.)

Immediate Regeneration: Press and Hold the "REGEN" button for approximately 3 seconds. Regeneration will begin immediately. Request cannot be cancelled.

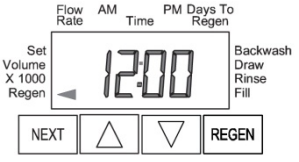


Table of Contents

Design Basis & Specifications

Table 1 – Design Basis

Model No.*	Flow Rate** (gpm)		Backwash Flow** (gpm)	Volume of Media (cu.ft.)		Resin Tank (Dia"×H")	Valve & In/Out Conn.
	5gpm/ft²	15gpm/ft²		Carbon (only)	Total (Incl. Underbed)		
W-G2162EM	13	36	25	6	7	21 × 62	1.5"
W-G2472EM	15	47	35	8	10	24 × 72	1.5"

* Filters are available with USA or European style plugs and voltages.
  - W-G2162EM-US & W-G2472EM-US = 120V AC/60Hz with USA cord
  - W-G2162EM-EU & W-G2472EM-EU = European 220V AC *(EU plug is removable to convert into universal 220v cord)*

** Backwash flow rate based on 25 psi pressure drop.

Operating Limits: Vessel rated at 150 psi max. operating pressure, 120°F max. operating temp.

General Information and Safety

DISCLAIMER:
The information contained in this document is subject to change without notice. Applied Membranes, Inc. shall not be liable for technical or editorial omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

READ THIS MANUAL:
Prior to operating or servicing this unit, this manual must be read and understood. If anything is not clear, call for assistance before proceeding. Keep this and other associated manuals for future reference and for new operators or qualified service personnel.

⚠ **USE PROPER POWER CONNECTIONS:**
Use proper wiring and connection methods to satisfy local electrical codes. SHOCK HAZARD: Connect this unit to a properly grounded connection in accordance with the National Electrical Code. DO NOT, under any circumstances, remove the ground wire or ground prong from any power plug. Do not use extension cords or an adapter without proper consideration.

⚠ **SERVICE WARNING:**
To prevent electrical shock, disconnect power to the system prior to servicing.

⚠ **WARNING:**
Do not make any alteration or modification in the wiring or plumbing of the system. This can result in damage to the system and cause injury to operators or users.

⚠ **WARNING:**
Flush the system for at least 30 minutes before use to remove all chemicals present.

CAUTION:
Never let the filter freeze. Freezing can damage the resin tank.

Installation

Unpack the filter. Inspect assemblies for damage (cracked couplings, broken or split pipes, loose straps, etc.).

Location

Select a location for the filter with adequate clearance from walls and other equipment to allow access on all sides of the tank. The unit must be located near a drain able to accommodate the backwash flow rate of your unit (see the table on page 4). This is in addition to any other equipment sharing the drain.

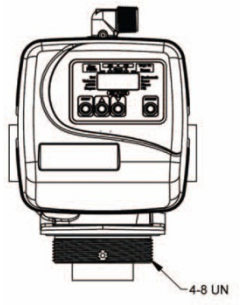
Select a location for the brine tank that is accessible for easy refilling. Ensure floor beneath the brine tank is clean and level.

A grounded power supply of the appropriate voltage and a local disconnect switch is required.

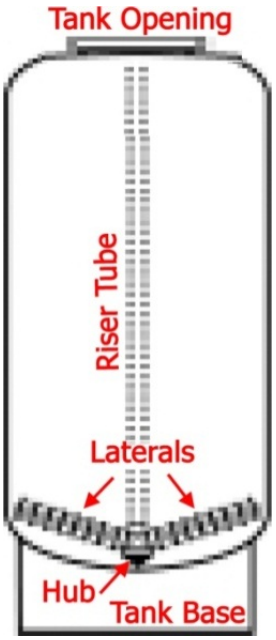
Caution: The unit must not be located near any corrosive chemicals, or in an area where the temperature may exceed 113°F (45°C). Do not install any water conditioner with less than 10 feet of piping between its outlet and the inlet of a water heater.

⚠ **Warning:** The power supply must be properly grounded to avoid injury from electrical shock.

Loading the Media



1. Place tank on a level, solid surface in the correct position for installation. Lift the riser tube from the tank, keeping the attached hub within the opening of the tank. Within the tank, assemble the laterals onto the hub, twisting each lateral into the hub to lock securely. Gently lower the assembly to the bottom of the tank. The top of the riser tube should be about level with the top of the tank.
2. The "riser tube" inside the media/resin tank delivers treated water to your control valve. It will need to be temporarily covered with tape on the top end to prevent anything from falling down inside the tube during loading.
3. Step back and look at the tank to make sure it is standing straight, and not tilted. The black base on the bottom of the tank should also be straightened before filling the tank. If your tank is tilted, simply pick up the tank 2-3 inches off the floor and drop it gently (but firmly) down, favoring the side of the base that needs to be adjusted.
4. Before loading the media, fill the tank with 2-3 feet of water (or 1/3 full, depending on the tank size), to soften the fall of the rocks and prevent damage to the distributor. To load the media, use a funnel in the top of the media tank with the riser tube still inside. Make sure the riser tube is covered with tape to keep media out.



5. Scoop the media into the funnel, slowly letting it fall down inside the media tank around the riser tube. Fill the tank with the media provided, pouring the media in the following order (1st will end up on the bottom of the tank, last will end up at the top of the tank, etc.). *Note: The tank will be approximately ½ - ⅔ full after loading is complete. Refer to Table 2 for the proper quantities of each media.*
    I. Gravel – YMGRVL11618 – 1 CF (100 lbs.) per bag
    II. Gravel ¼" × ⅛" – YMGRVL1418 – 0.5 CF (50 lbs) per bag *(not used in W-G2162EM)*
    III. YMC1240RCOAL – 1 CF (27.5 lbs.) per bag
6. Remove the funnel from the top of the tank, and the tape from the end of the riser tube. Brush any loose media or resin off the top opening of the tank.
7. The bottom of the control valve has an opening with O-rings inside; lubricate the O-ring with a non-petroleum based lubricant. Position the valve over the top of the media tank, making sure the top of the riser tube inserts inside the opening in the bottom of the valve.
8. Screw the valve down into the media tank. Another person should hold the tank as the valve is being snugly tightened onto the tank. **Do not over-tighten.** Tighten until snug, tighten a bit more, then STOP. The large o-ring will seal itself.

MediaQuantity per Model

Table 2 –Media Quantities

Model No.* (-US or –EU)	Gravel 1⁄16 × ⅛ I	Gravel ¼ × ⅛ II	Carbon III
W-G2162EM	1 CF (100 lbs)	N/A (0)	6 CF (165 lbs)
W-G2472EM	1 CF (100 lbs)	1 CF (100 lbs)	8 CF(220 lbs)

PLUMBING

Note: All plumbing is to be done in accordance with state and local codes.

Caution: Before placing wall anchors to support piping ensure that no electrical conduit or wiring is located behind the intended mounting location.

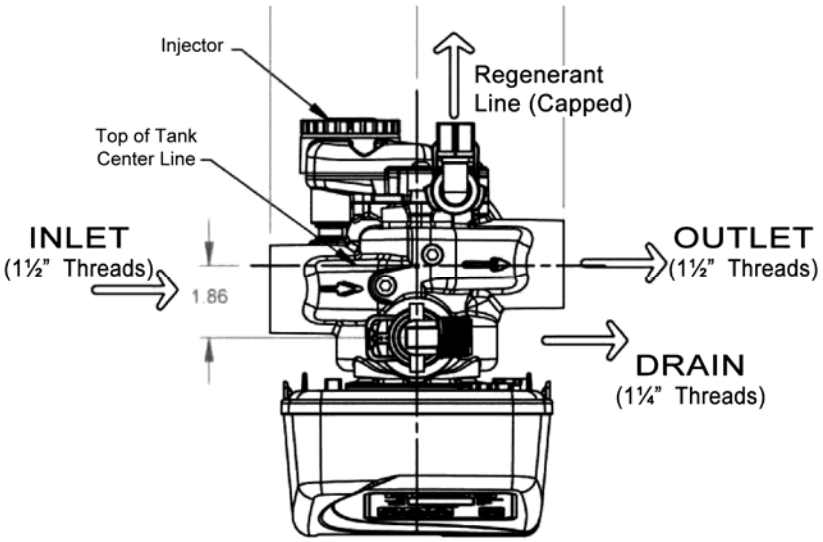
Note: The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

Note: Connect to a supply line downstream of outdoor spigots. Install an inlet shutoff valve and plumb them to the unit's inlet. Installation of a bypass valve is recommended. If using plastic fittings, ground the water conditioner per local electrical codes. If a water meter is used, install the water meter on the outlet side of the control valve. The turbine assembly may be oriented in any direction, but is usually oriented pointing up to reduce drainage out of the pipe during service.

Note: Do not use pipe dope or other sealant on threads. Use teflon tape on threaded inlet, outlet and drain fittings.

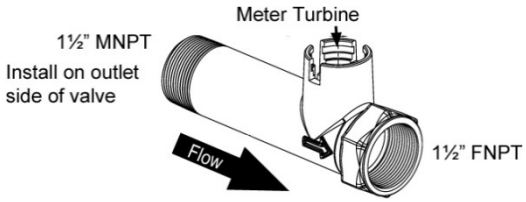
1. **Install connecting piping between raw water source and input pipe on control valve.**

2. **Install drain line from control valve to a free flowing drain.**
   A 1.25" Male NPT × 1.5" Female NPT SS drain flow control is installed on the valve. Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" (152.4mm) between the drain line flow control itting and the solder joints to prevent heat from damaging the flow control. Avoid elevating the drain line above the control valve where possible. Discharge the drain line through an air gap to a receptacle in accordance with local plumbing codes.

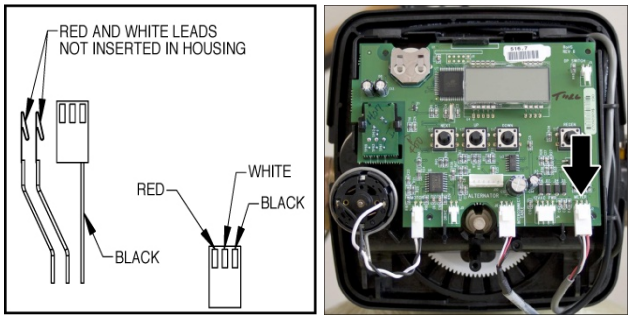


Important: Never insert a drain line directly into a drain, sewer line or trap. Always allow an air gap between the drain line and the receptacle to prevent back siphonage.

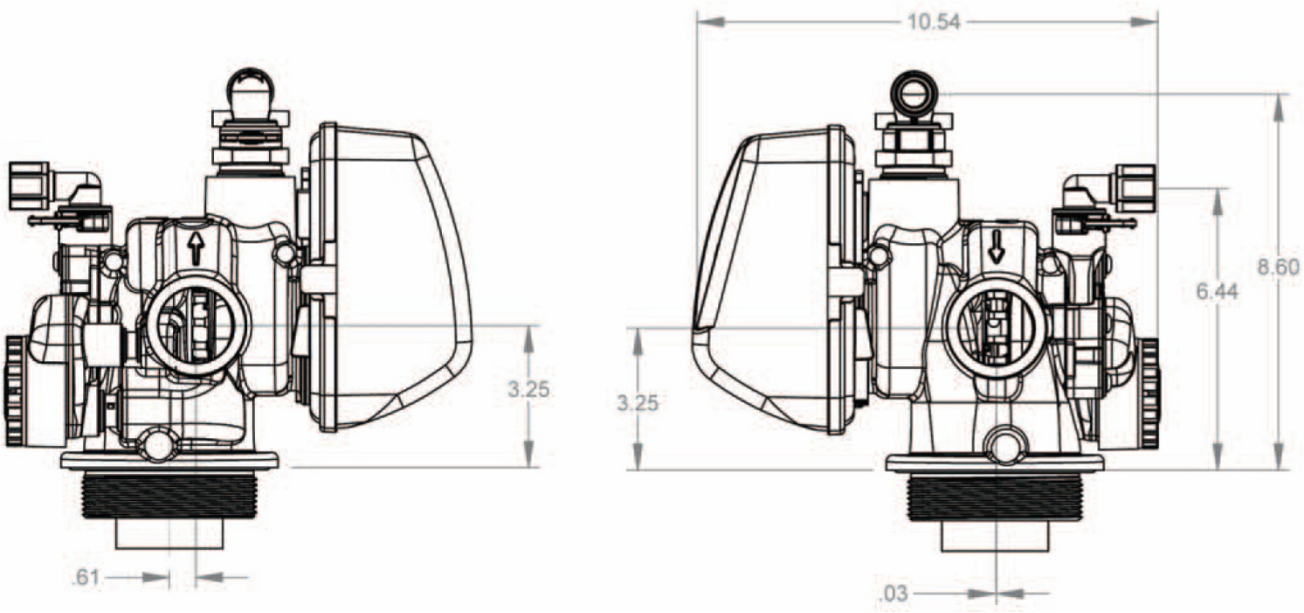
3. **Install the water meter on the outlet side of the control valve**.
   The meter may be threaded directly into the valve or may be plumbed separately downstream of the unit*. Ensure the arrow on the meter body is going the same direction as the water flow. The turbine assembly may be oriented in any direction, but is usually oriented pointing up to reduce drainage out of the pipe during service. Meter can be installed horizontally or vertically.
   **A longer cable (Part #V3221) is required for distances longer than 3" from the valve body.*



4. **Connect the meter cable**: Remove the valve cover and strain relief cover on rear of valve. Bring meter cable through the knockout hole in the back of the valve and connect to the three-pin connection labeled "METER" on the PC board. Weave the meter cable through the strain relief and replace the cover and fastening screw**.**
   Ensure meter cable is connected to the meter assembly. *See "Meter Service Instructions" in the "Control Valve Service Instructions" section of this manual for detailed meter disassembly and reassembly instructions.*



5. **Install piping between meter output and point of use.**



Operating Do's and Don'ts

DO:

- Monitor system and keep a log.
- Maintain proper water pressure for backwashing.

DON'T:

- Permit oils or fats in feed water.
- Shut down system for extended periods.
- Exceed operating pressures or temperatures.
- Backwash filter with insufficient water flow.

Initial Start-Up

1. Check all piping connections and make sure feed valves are open. Inspect plumbing for leaks.
2. Check that control valve is connected to electrical source.
3. Open Raw Water source valve.

> ⚠ ***Note:*** *Check for leaks throughout system as pressure is applied.*

4. Fully open a cold water faucet downstream of the system. Allow water to run until clear. Close the cold water faucet.
5. Turn off the supply water.
6. Initiate manual backwash of the control valve: Press and hold the REGEN button for three seconds until the drive motor starts. Press the REGEN button to advance the unit into the backwash cycle. Wait until the motor stops and the backwash time begins to count down.
7. Open the inlet water supply valve very slowly, allowing the water to fill the tank in order to expel air.

> ***Caution:*** *If water flows too rapidly, there will be a loss of media out the drain.*

8. When water is flowing steadily to the drain without the presence of air, fully open the water supply inlet valve. Press the REGEN button again to advance to the rinse position and allow the water to run to drain for 2-3 minutes or until the drain runs clear.
9. Press the REGEN button to advance to the service position.
10. Review the control valve operations section of this manual and ensure settings are properly programmed before placing the carbon filter in service.

System Monitoring and Record Keeping

Monitor filter and record all pertinent data. This data is needed to determine operating efficiency and for performing system maintenance. *The latter includes changing of the media, pressure drop across the mineral tank and control valve.*

> ***Note:*** *Warranty Claims cannot be processed without adequate operating data and filter history.*

Operating Conditions

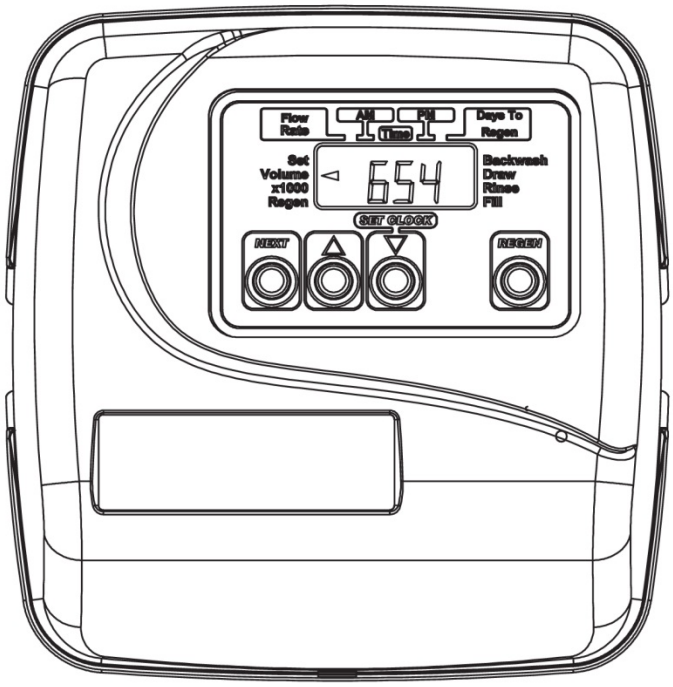
For optimum filter performance, observe the following:

- Maintain a minimum of 25 psi during backwash cycle.
- Water pressure should not exceed 120 psi across mineral tank.
- Water temperature should not exceed 110 °F.

> **CAUTION:** *Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain o-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.*

Control Valve Operation & Service

CV1.5 Control Valve



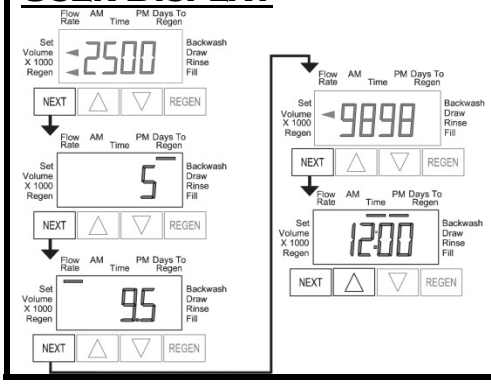
Control Valve Specifications

• Minimum/Maximum Operating Pressures:	20 psi (138 kPa, 1.4 bar) to 125 psi (862 kPa, 8.6 bar)
• Minimum/Maximum Operating Temperatures:	40°F (4°C) to 110°F (43°C)

⚠ No user serviceable parts are on the PC board, the motor, or the power adapter. The means of disconnection from the main power supply is by unplugging the power adapter from the wall.

User Display

When in normal operation, one of five displays may be shown. Pressing NEXT will alternate between the displays.



- **User Screen 1:** Typical user display. Shows volume remaining (in gallons) until next regeneration.
- **User Screen 2:** Displays number of days to next regeneration.
- **User Screen 3:** Displays flow rate in gallons per minute.
- **User Screen 4:** Displays total flow in gallons since last reset. *(Press and hold ▼ for 3 seconds to reset to 0.)*
- **User Screen 5:** Shows current time.

User screens 1, 3 and 4 will not be shown if 7 or 28 day options are selected in configuration settings.

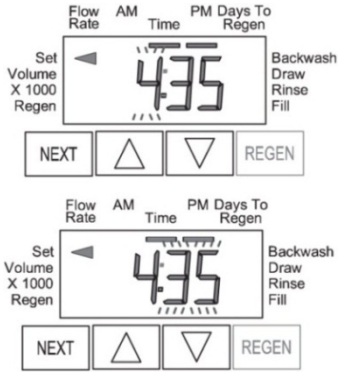
Regeneration Screens

- During Regeneration: The display shows the time remaining in the current cycle. Pressing "REGEN" will advance to the next cycle.

Set Time of Day

In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right.

(Time of day will only need to be set when a power outage lasts more than 8 hours, or when daylight savings time begins or ends.)



- Press NEXT until the time of day screen is displayed.
- Press and hold ▲ or ▼until the SET indicator is displayed and the hour flashes.
- Press ▲ or ▼until the correct hour is displayed.
- Press NEXT, the minutes will flash.
- Press ▲ or ▼until the correct minute is displayed.
- Press NEXT to return to the display screen.

Button Operation and Function

Scrolls to the Next Display

- Press once and release to schedule a regeneration at the preset delayed regeneration time. (Press and release again to cancel the regeneration.)
- Press and Hold for 3 seconds to initiate an immediate regeneration.
- **While Regeneration is in Process:** Press to advance to the next cycle.
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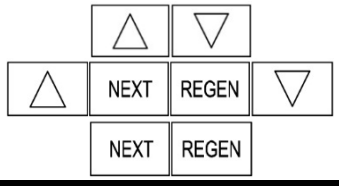

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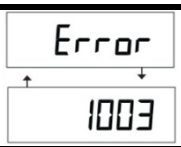
Key sequence to lock and unlock program settings.

Press and Hold for 3 seconds to initiate a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve.

Error Message

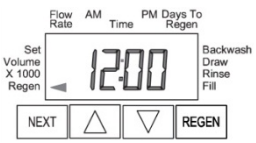
If the word "ERROR" and a number are flashing on the display, check the trouble shooting section of this manual to identify the error. Clear error by disconnecting the power supply at the PC board and reconnecting, or press the NEXT & REGEN buttons simultaneously for 3 seconds.



Manual Regeneration

Delayed Regeneration: Press and Release the "REGEN" button. "◄" will flash towards REGEN. Regeneration will be performed "tonight" at the preset time of day. (Cancel request by pressing the "REGEN" button again.)

Immediate Regeneration: Press and Hold the "REGEN" button for approximately 3 seconds. Regeneration will begin immediately. Request cannot be cancelled.



General Warnings & Site Requirements

⚠ 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 silicone lubricant may be used on black o-rings but is not necessary

⚠ Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain o-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.

⚠ Teflon tape is recommended to be used on all threads. Do not use pipe dope, as it may break down the plastics in the control valves.

⚠ The plug in power adapter is for dry locations only, and should be connected to an uninterrupted outlet installed within 15 feet (4.57 meters) of the water conditioner.

⚠ All plumbing should be done in accordance with local plumbing codes.

⚠ 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 control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.

⚠ Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.) Install grounding strap on metal pipes.

⚠ After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3 seconds. The cover button may have other names like "SET HOUR", "CLOCK" or "SET CLOCK" but the circuit board is labeled with SET. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

Control Valve General Features and Information

This fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a downflow regeneration filter. The control valve included with this system is equipped with a meter and can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days).

The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing, and the replenishing of treated water into a regenerant tank.

The control valve uses no traditional fasteners (e.g. screws); instead clips, threaded caps and nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screw driver, one large blade screw driver, pliers and a pair of hands. A plastic wrench is available which eliminates the need for screwdrivers and pliers. Disassembly for servicing takes much less time than com parable products currently on the market. Control valve installation is made easy because the distributor tube can be cut ½" above to ½" below the top of tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

The AC adapter comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter is for dry location use only. The control valve maintains timekeeping for up to 8 hours if the power goes out and the battery is not depleted. After 8 hours, the only item that needs to be reset is the time of day; valve status and programming are permanently stored in the nonvolatile memory. If a power loss lasts less than 8 hours and the time flashes on and off, the time of day should be reset and the non-rechargeable battery should be replaced.

Configuring and Programming Control Valve Options

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

- User Displays
- Configuration Settings
- Cycle Times Settings (for Regeneration)
- Installer Display Settings
- Diagnostics

These procedures can be accessed in any order. Details on each of the procedures are provided below and on the following pages.

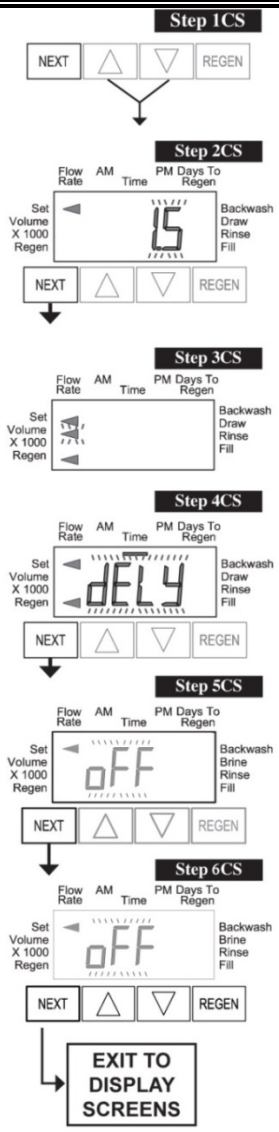
At the discretion of the installer, the end user can access all settings. To "lock out" access to programming settings, press the key sequence: ▲, NEXT, REGEN, ▼. When locked, the valve can be unlocked by pressing the same key sequence.

METERED BACKWASH FILTER RECOMMENDED PROGRAMMING OVERVIEW

Table 3 – Valve Programming Steps for Recommended Default Program

Valve Programming Section (See following pages)		**Recommended Setting**
• **Valve Size**	**Step 2CS**	**1.5**
• **Regeneration Type**	**Step 3CS**	**◄ Volume (no # in display)**
• **Regeneration Timing**	**Step 4CS**	**“DELY” (Delay)**
• **Twin Alternating Configuration**	**Step 5CS**	**oFF**
• **Pressure Differential Option**	**Step 6CS**	**oFF**
• **Gallon Capacity**	**Step 2I^{d}**	**Enter the desired number of gallons between backwash**
• **Days Override Option**	**Step 3I^{d}**	**12**
• **Regeneration Time**	**Step 4I^{d} & 5I^{d}**	**Time of day to backwash (time of projected non-use)**
• **Softener or Filter Setup**	**Step 2CT**	**FILTER**
• **Length of Backwash**	**Step 3CT**	**10**
• **Length of Rinse**	**Step 4CT**	**6**

CONFIGURATION SETTINGS *(PRE-PROGRAMMED TO FACTORY DEFAULTS)*



Step 1CS

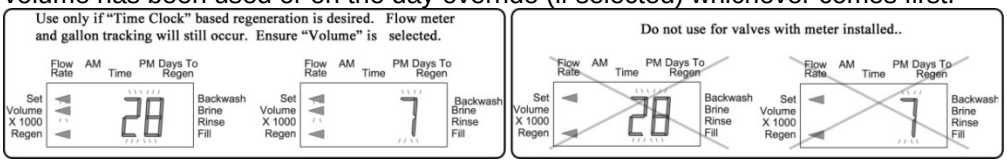
Press ▲ and ▼ simultaneously for 5 seconds and release. If screen in Step 2CS does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲and ▼ simultaneously for 5 seconds and release.

Step 2CS

Press ▲or ▼ to select **1.5** (for 1.5" valve). Press NEXT to go to Step 3CS.
Press REGEN to exit Configuration Settings.
If 2.0 or 2.0L are accidentally selected, an additional screen will appear. If selected, press REGEN to return to this step and set to 1.5

Step 3CS

Select "Volume" arrow (with a blank number display). If a different display (listed below) is shown, press the ▲or ▼ buttons to scroll through the options until the correct display is shown. When Volume (gallons) is selected the regeneration will occur after the specific volume has been used or on the day override (if selected) whichever comes first.



Step 4CS

Press ▲ or ▼ to select "DELY"

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

Step 5CS

Press ▲ or ▼ to select "OFF" option.
Note: If a setup utilizing a No Hard water Bypass (purchased separately) or "Separate Source" during regeneration choose the appropriate option in this step. Detailed instructions follow.
Press NEXT to go to Step 6CS. Press REGEN to return to previous step.

If "ALT" is accidentally selected in step 5CS, an additional screen for Rinse & Fill delay will be displayed. If this is selected, press REGEN to return to the previous step and set to "OFF".

Step 6CS

Press ▲ or ▼ to set external pressure differential option the desired setting:

- "oFF" should be selected if no dP switch is connected
- If dP is connected choose from "on0", "dELy", or "HoLd".
  See detailed instructions on the following page.

Press NEXT to exit configuration settings. Press REGEN to return to previous step.

Configuring the Control Valve for No Hard Water Bypass Operation

No Hard Water Bypass equipment is sold separately. Only use no hard water bypass valves supplied by the manufacturer of this product which are specifically design for use with this valve. Select nHbP for control operation. For no hard water bypass operation, the three wire connector is not used.

Selection requires that a connection to the No Hard Water Bypass Valve is made to the two pin connector labeled ALTERNATOR DRIVE located on the printed circuit board.

Note: If the control valve enters into an error state during regeneration mode, the no hard water bypass will remain in its current state until the error is corrected and reset.

Configuring the Control Vale for Separate Source Operation

Select SEPS for control operation. For separate source operation the three wire connector is not used.

Selection requires that a connection to a Motorized Alternator Valve (MAV) is made to the two pin connector labeled ALTERNATOR DRIVE located on the printed circuit board. The C port of the MAV must be connected to the valve inlet and the A port connected to the separate source used during regeneration. The B port must be connected to the feed water supply.

When set to SEPS the MAV will be driven closed before the first regeneration cycle, and be driven open after the last regeneration cycle.

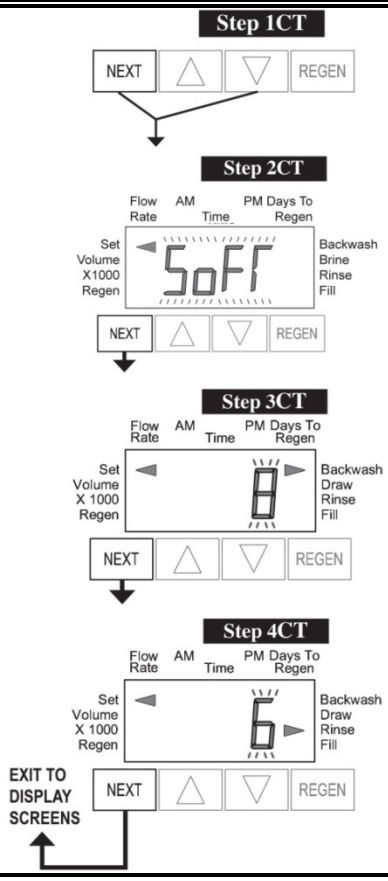
Note: If the control valve enters into an error state during regeneration mode, the MAV will remain in its current state until the error is corrected and reset.

Configuring the Control Valve for Use of an Outside Signal to Initiate Regeneration

Select the desired option in step 6CS.
Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

- **oFF** – Feature not used.
- **on0** – If the dP switch is closed for an accumulative time of 2 minutes an immediate regeneration will be signaled to the unit.
- **dELy** – If the dP switch is closed a regeneration will occur at the scheduled delayed regeneration time of day.
- **HoLd** – If the dP switch is closed a regeneration will be prevented from occurring while there is a switch closure.

Regeneration Cycle Time Settings *(Pre-Programmed to Factory Defaults)*



Step 1CT

Press NEXT and ▼ simultaneously for 5 seconds and release. If screen in Step 2CT does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲and ▼ simultaneously for 5 seconds and release.

Step 2CT

Press ▲ or ▼ to select "FILTERING" setting.
(Note: if "SOFTENING" setting is accidentally selected, only screens additional screens will appear – press REGEN to skip back to this screen and changing to FILTERING.)

Press NEXT to go to Step 3CT. Press REGEN to return to previous step.

Step 3CT

Adjust the length of the backwash from 1 to 95 minutes using the ▲and ▼ buttons.
Recommended: 10
Press NEXT to go to Step 4CT. Press REGEN to return to previous step.

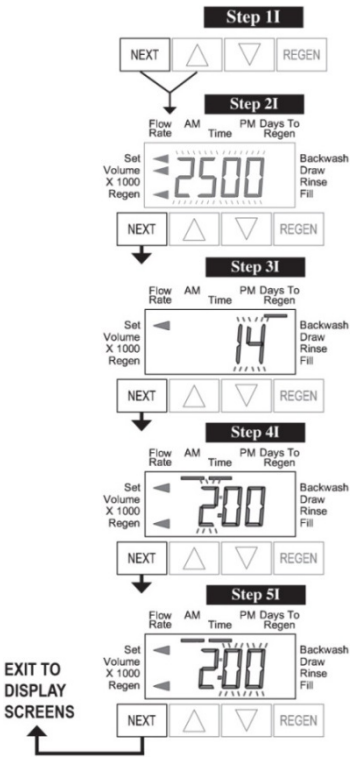
Step 4CT

Adjust the length of the rinse from 1 to 95 minutes using the ▲and ▼ buttons.
Recommended: 6

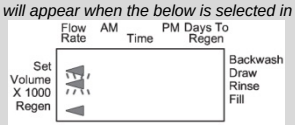
Press NEXT to go to exit Regeneration Cycle Times.
Press REGEN to return to previous step.

Installer Displays and Settings for Control Valve Options

One of the three displays below will be shown depending on the option was selected in Configuration Settings Step 3CS.



This menu will appear when the below is selected in step 3CS.



Volume Initiated (Demand) Regeneration Settings

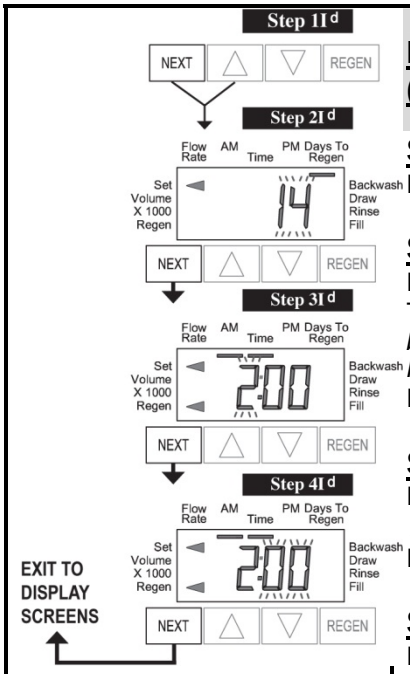
Step 1I To enter Installer Display press NEXT and ▲ simultaneously for 5 seconds and release.

Step 2I
Press ▲ or ▼ to enter the volumetric capacity in gallons.
Press NEXT to go to Step 3I. Press REGEN to return to previous step.

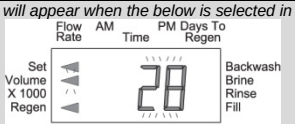
Step 3I
Press ▲ or ▼ to adjust the days override setting from 1 – 28 or OFF.
Press NEXT to go to Step 4I. Press REGEN to return to previous step.
Recommended: 12

Step 4I:
Time of day the regeneration will occur on the day that the softener meets its volume capacity (or days override). Press ▲ or ▼ to adjust the regeneration hour.
Press NEXT to go to step 5I. Press REGEN to return to previous step.

Step 5I
Press ▲ or ▼ to adjust the regeneration minutes.
Press NEXT to exit Installer Display Settings.
Press REGEN to return to previous step.



This menu will appear when the below is selected in step 3CS



Regeneration Settings (1-99 Days Time Clock Option)

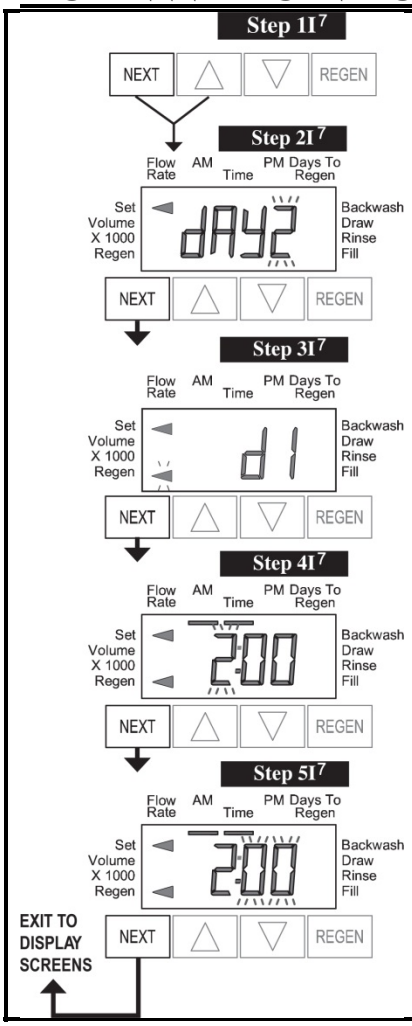
Step 1I^{d}
From normal mode, press NEXT + ▲ buttons simultaneously for 5 seconds and release.

Step 2I^{d}
Days to Regen: Set the number of days between regenerations by pressing ▲ or ▼. The allowable range is 1 to 99. *Days should be set for estimated time to deplete resin capacity based on volume capacity and estimated usage. See Table 4 (page 12) for capacity information. It is recommended to backwash at least once every 12 days.*
Press NEXT to go to the next step. Press REGEN to go to exit.

Step 3I^{d}
Regeneration Time Hour: Set the time of day for regeneration to occur by pressing ▲ or ▼.
Press NEXT to go to the next step. Press REGEN to go to the previous step.

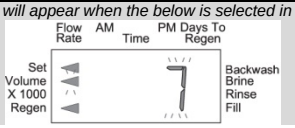
Step 4I^{d}
Regeneration Time Minutes: Set the time of day for regeneration to occur by pressing ▲ or ▼. Press NEXT to go to the next step.
Press NEXT to exit. Press REGEN to go to the previous step.

Installer Displays and Settings (Continued)



Regeneration Settings (7 Day Time Clock Option)

This menu will appear when the below is selected in step 3CS



STEP 1I7
From normal mode, press NEXT + ▲ simultaneously for 5 seconds and release.

STEP 2I7
Use▲ or ▼to set the current day of the week.
Default = 2 (Monday)

Press NEXT to go to the next step.
Press REGEN to exit.

Display		Day of Week
day 1	d1	Sunday
day 2	d2	Monday
day 3	d3	Tuesday
day 4	d4	Wednesday
day 5	d5	Thursday
day 6	d	Friday
day 7	d7	Saturday

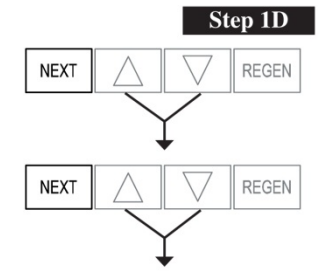
STEP 3I7
Scroll through the days 1 to 7 using "NEXT". Use ▲ or ▼ to turn regeneration on or off for each individual day. *When "◄" indicator is displayed next to "Regen", regeneration is ON for that day. When there is no indicator, regeneration is OFF for that day.*
After completing the 7th day, press NEXT to go to the next step.
Press REGEN to go to previous display.

STEP 4I7
Regeneration Time Hour: Set the time of day for regeneration to occur by pressing ▲ or ▼.
Press NEXT to go to the next step. Press REGEN to go to the previous step.

STEP 5I7
Regeneration Time Minutes: Set the time of day for regeneration to occur by pressing ▲ or ▼. Press NEXT to go to the next step.

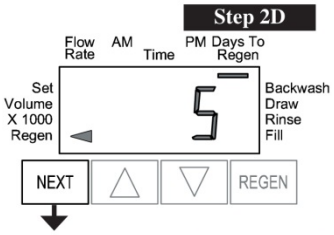
Press NEXT to exit Installer Displays and Settings.

DIAGNOSTICS



Step 1D

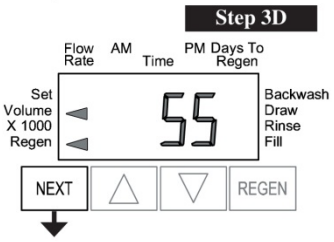
Press ▲ and ▼ simultaneously for 5 seconds and release.
Then press ▲ and ▼ simultaneously for 3 seconds and release.
If screen in Step 2D does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲and ▼ simultaneously for 5 seconds and release.



Step 2D

Display shows the number of days since a regeneration last occurred.

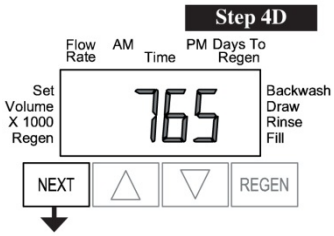
Press NEXT to go to next step. Press REGEN to exit Diagnostics.



Step 3D

Display shows the volume of water treated in gallons since the last regeneration.

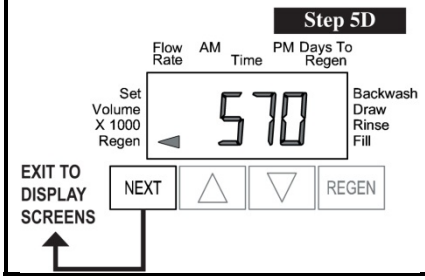
Press NEXT to go to next step. Press REGEN to return to previous step.



Step 4D

Display shows the days in service since start up.

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

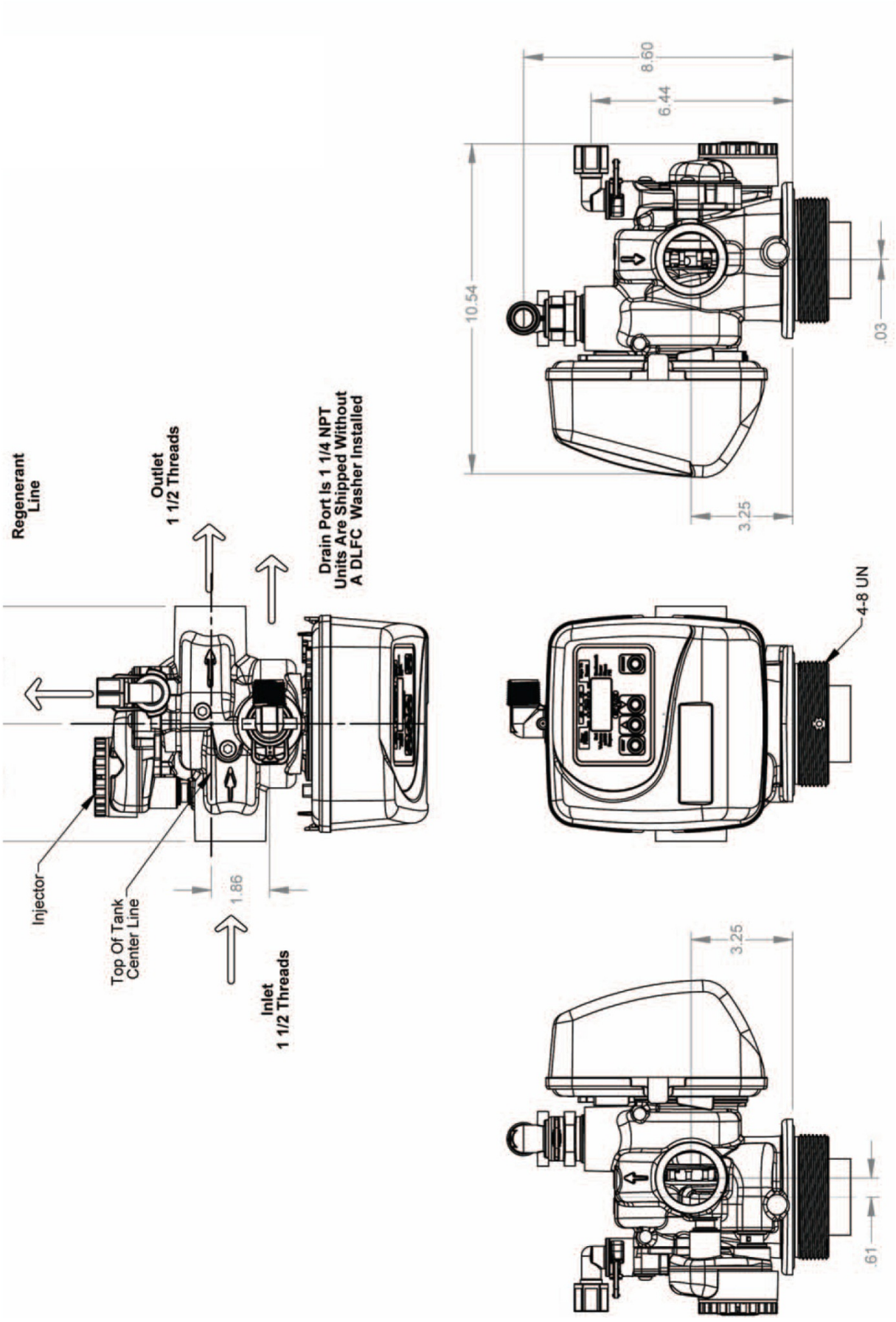


Step 5D

Display shows the total number of regeneration cycles since start up.

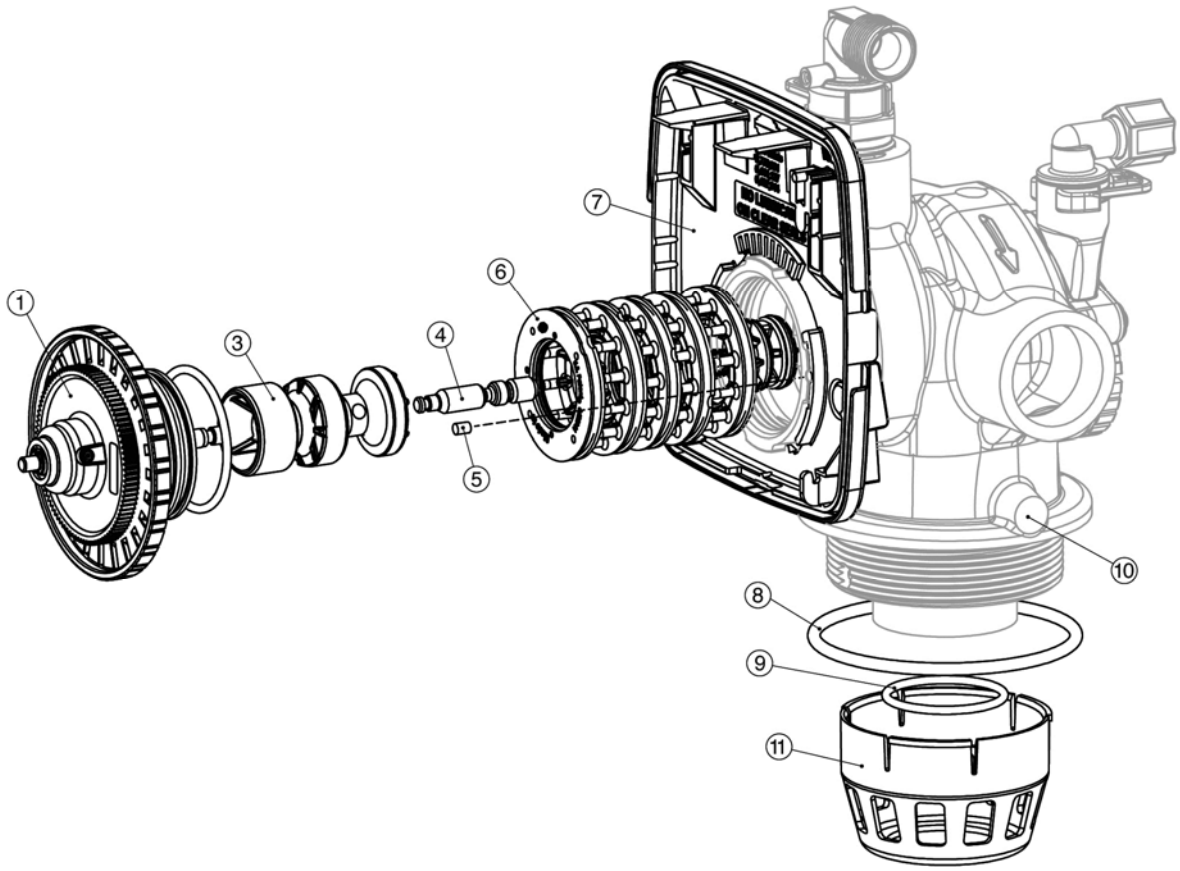
Press NEXT to exit Diagnostics. Press REGEN to return to previous step.

CV1.5 Overview Drawings



CV1.5 Drive Cap Assembly, Downflow Piston, Regenerate Piston & Spacer Stack Assembly

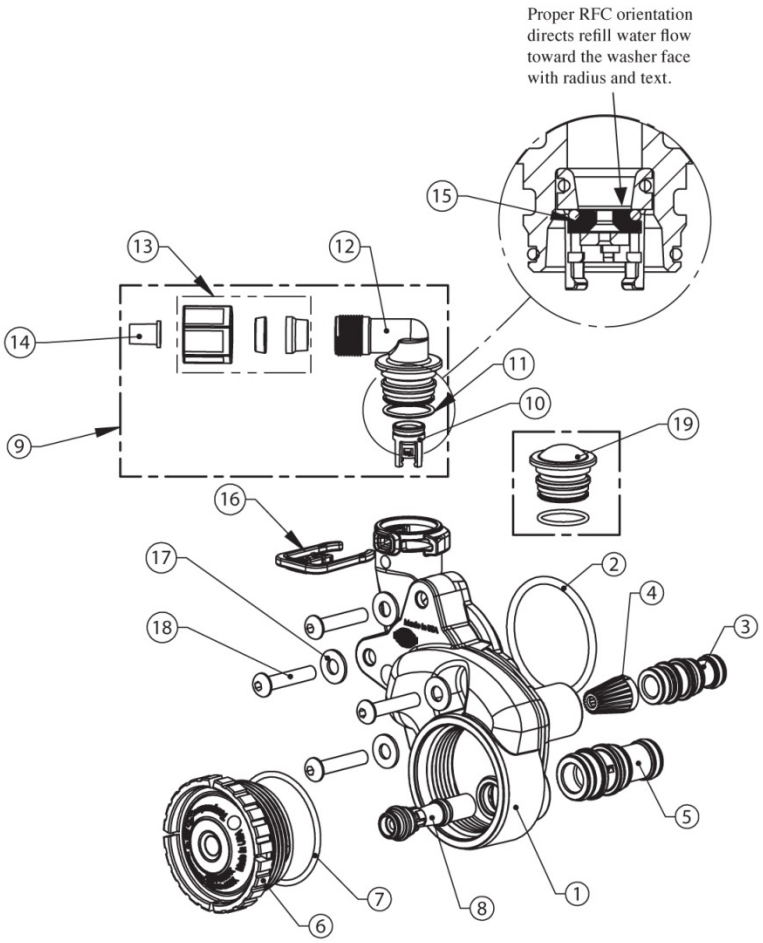
Dwg. No.	Item No.	Description	Qty. Per Valve
1	V3004	Drive Cap Assembly	1
2	V3135	O-Ring, 228	1
3	V3407	Piston Downflow Assembly	1
4	V3174	Regenerant Piston	Not used in Backwash Valve
5	V3423	Backplate Dowel	1
6	V3430	Spacer Stack Assembly	1
7	Back Plate	Back Plate	1
8	V3419	O-Ring, 347	1
9	V3641	O-Ring,225	1
10	V3950-01	CV1.5 NPT Valve Body, w/ V3468	1
not shown	V3468	Test Port Plug, ¼" NPT	2
11	D1300	Top Baffle Diffuser, 1.5/50MM	1



CV1.5 Injector Valve Body, Refill Flow Control and Injector Plug

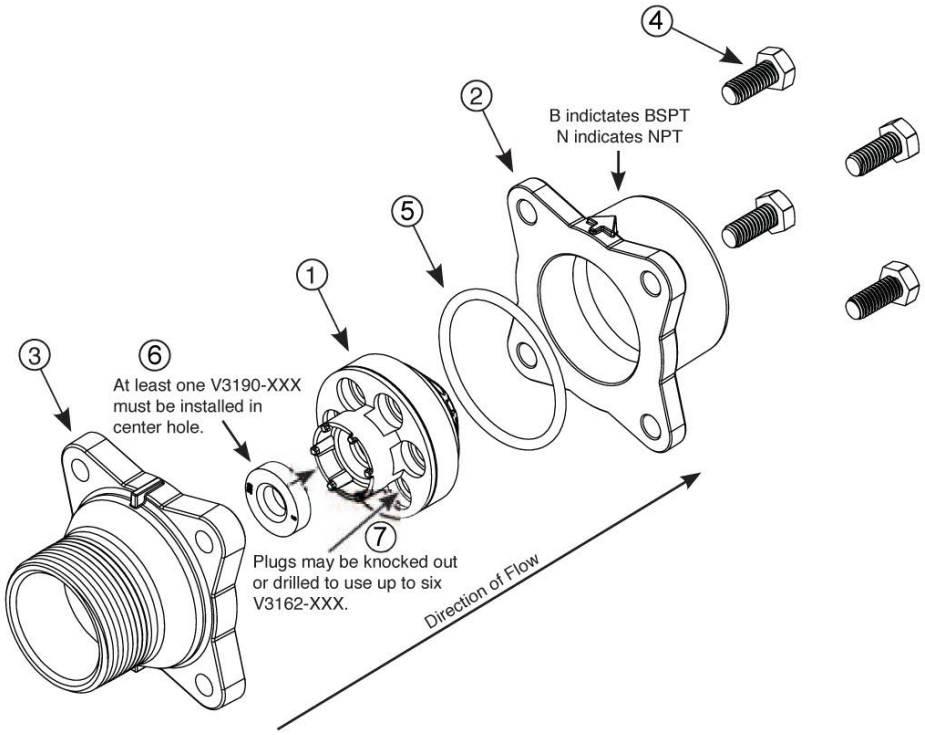
Dwg. No.	Item No.	Description	Qty. Per Valve
1	V3967	Injector Body	1
2	V3441	O-Ring, 226	1
3	V3968*	Injector Feed Tube	1
4	V3177-01	Injector Screen	1
5	V3969**	Injector Draw Tube	1
6	V3176	Injector Cap	1
7	V3152	O-Ring, 135	1
8	V3010-15Z	Injector Plug	1
9	V3498***	Refill Flow Control, ½”	1
10	V3428***	Refill Retainer Assembly (0.5 GPM)	1
11	V3163	O-Ring, 019	1
12	H4612	Regenerant Elbow with Flow Control	1
13	JCPG-8PBLK	Compression Nut, ½” Black	1
14	JCP-P-8	Polytube, ½”	1
15	V3182	Refill Flow Control (0.5 GPM)	1
16	H4615	Retaining Clip	1
17	V3724	Washer, Flat Stainless Steel	4
18	V3642	Bolt, BHCS Stainless Steel ¼-20 × 1¼	4
19	V3195-01	Refill Port Plug	1

*V3968 contains one D1240o O-Ring (111) and two V3155 O-Ring (112)
**V3969 contains one V3638 O-Ring (113) and two V3157 O-Ring (1155)
*** Ctonatins a V3182 0.5 gpm flow control

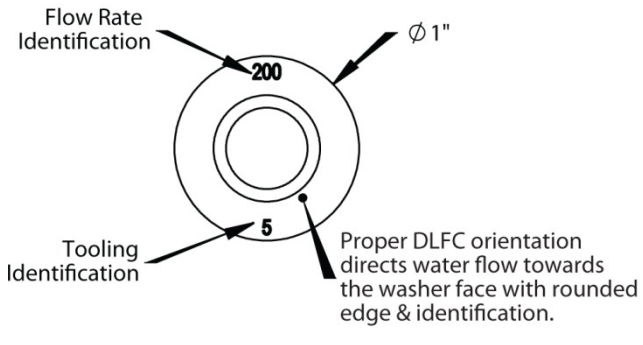


CV1.5 Drain Line Flow Controls

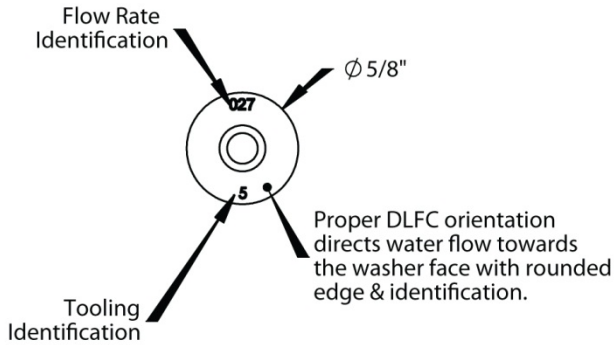
Dwg. No.	Item No.	Description	Qty. Per Valve	
			W-G2162ET	**W-G2472ET**
1	V3081	DLFC Retainer Assembly	1	1
2	V3645	DLFC Flange Outlet, FNPT	1	1
3	V3646	DLFC Flange Inlet, MNPT	1	1
4	V3652	Bolt, Hex S/S HCS 5/16-18x3/4	4	4
5	V3441	O-Ring, 226	1	1
6	V3190-250	DLFC Washer, Center, 25 GPM	1	1
7	V3162-100	DLFC Washer, Side, 10 GPM	0	1



V3190-250

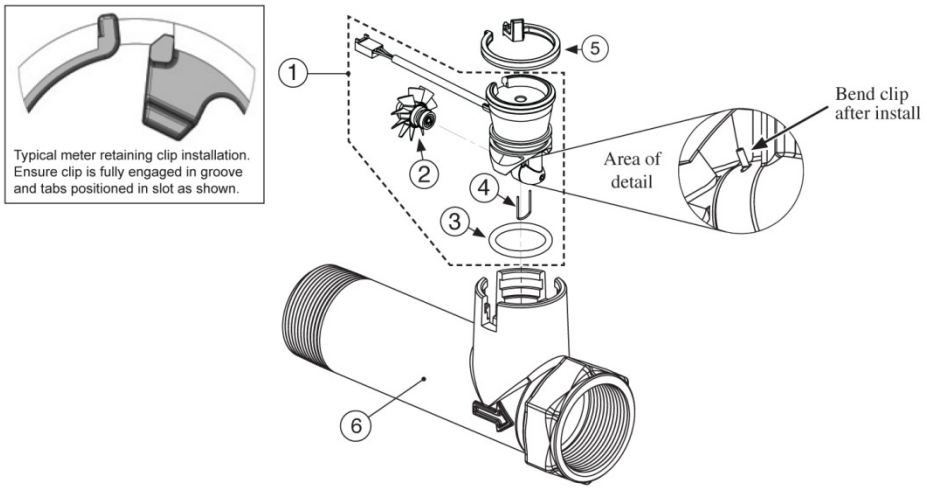


V3162-100



Meter Assembly

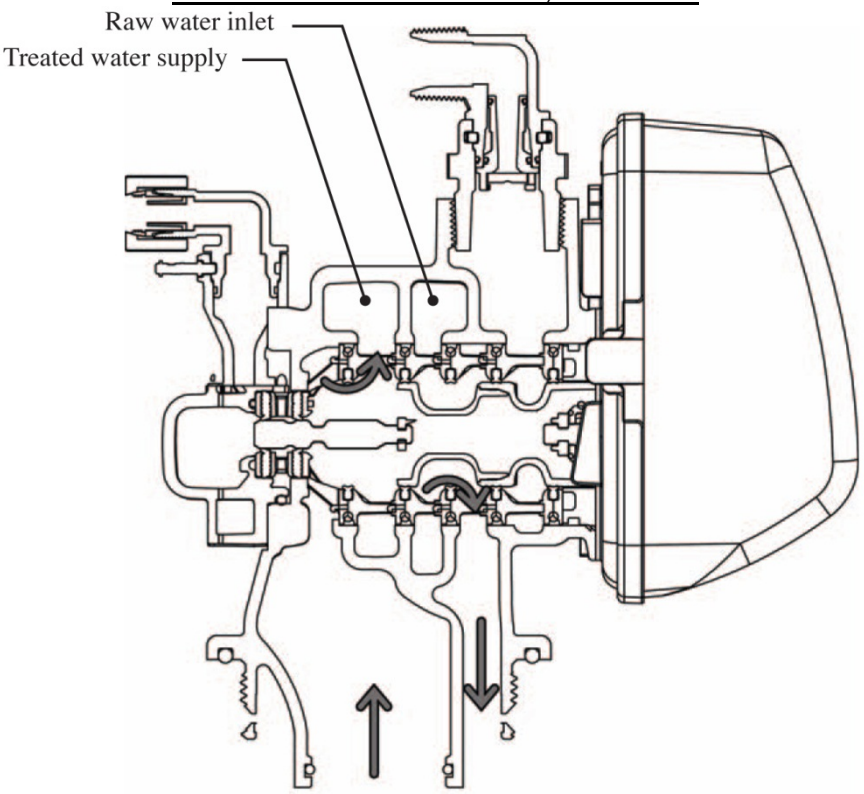
Dwg. No.	Item No.	Description	Qty. Per Softener
1	V3003-02	Commercial meter assembly, 28” cable	1
2	V3118-03	Commercial meter turbine assembly	1
3	V3105	O-Ring, 215	1
4	V3501	Turbine clip	1
5	V3632*	Meter retaining clip	1
6	V3401-04	CV1.5 Meter housing (NPT)	1
Not Shown	V3437	CV1.5 flow straightener	1



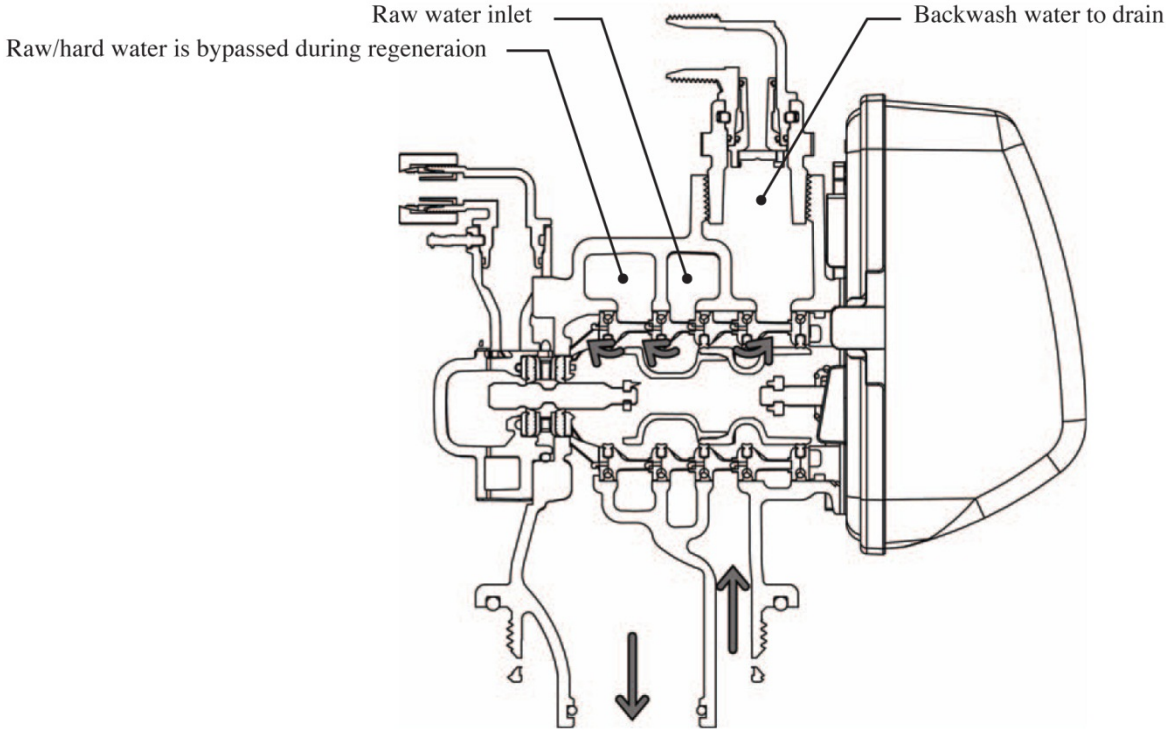
Complete Meter Assembly: V3040 (Includes 28” Cable)

This water meter should nto be used as the primary monitoring device for critical or health effect applications. Operating pressures: 20 psi minimum/ 125 psi maximum. Operating temperatures: 40°F Minimum/ 110°F Maximum

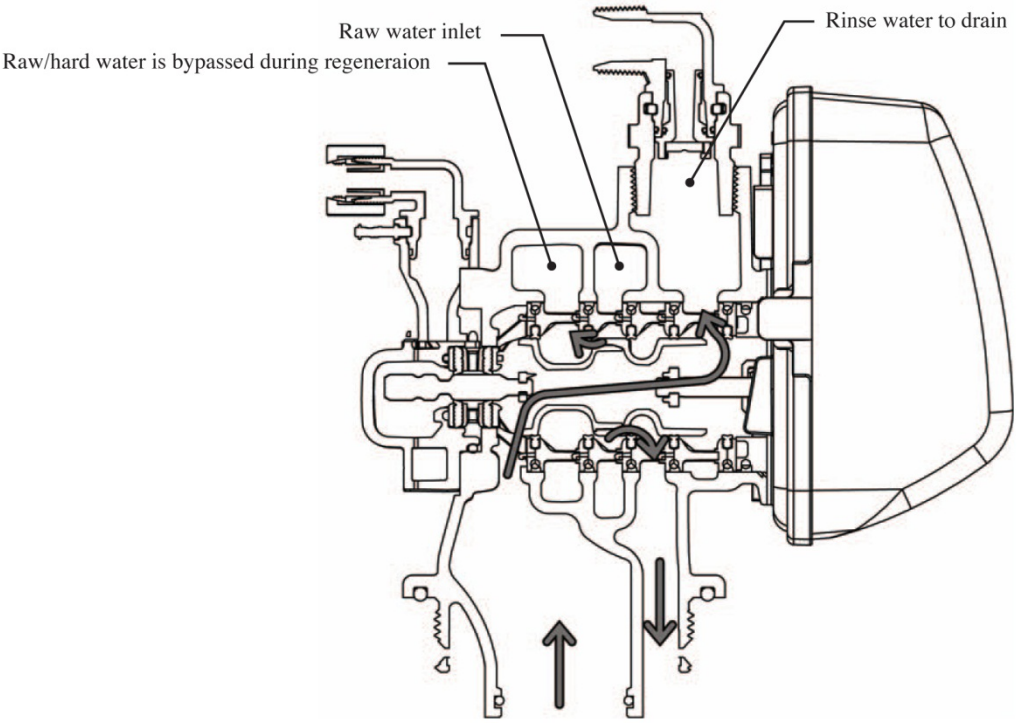
CV1.5 Flow Diagram, Service



CV1.5 Flow Diagram, Backwash



CV1.5 Flow Diagram, Rinse

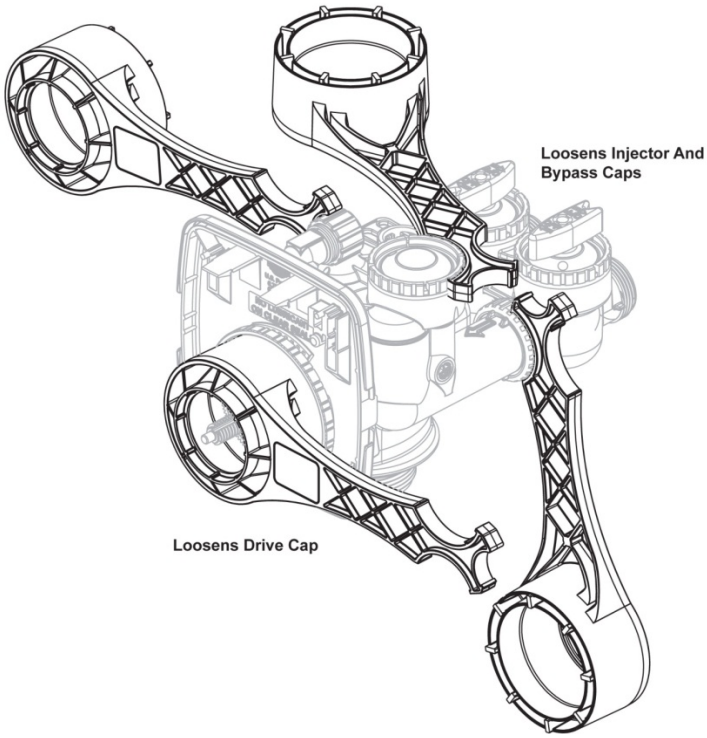


Service Spanner Wrench

Model No: V3193-02 (Sold Separately)

Although no tools are necessary to assemble or disassemble the valve, the CV1 wrench (shown below in various positions on the valve) may be purchased separately to aid in assembly or disassembly of the control valve.

Figure 1



Control Valve Service Instructions

Drive Assembly

Disassembly and Inspection: The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. Disconnect the power source plug (4 pin, black cable) from the PC board prior to disconnecting any other plugs from the PC board. Disconnect and MAV/ AUX drive motors (2 pin, black cable) from the PC board. Disconnect the water meter plug (3 pin, grey cable), located on the far right side of the PC board. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket towards your body. The lower edge of the drive bracket has two notches that rest on the drive back plate. Lift up and outward on the drive bracket to disengage the notches.

To inspect the drive reduction gears, the drive gear cover needs to be removed. The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. With the PC board facing up, push in and down on the large clip on the drive gear cover. Handle the cover and the gears carefully so that the gears do not fall off of the pegs in the cover. Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting.

The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor, disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a ¼ turn in either direction before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor. Visually inspect the motor for free spinning and remaining brush life (visible through slots on the size of the motor). Check the pinion gear for endplay. If the pinion gear is pushed tight against the motor housing, eliminating endplay, slide it away from the housing so the end of the shaft is flush with the end of the gear.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

Reassembly: If the drive gear cover was removed, reinstall it with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

To reinstall the drive bracket, seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket towards the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket slightly to the left by pressing on the side of the upper right corner. This helps the drive gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drive bracket and drive back plate, or the gear is not engaging the drive cap assembly.

Replace the motor if necessary. Do not lubricate the motor or the gears. To reinstall the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. Release the spring clip loop and continue to rotate the motor until the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the lower left hand side of the PC board. If the motor will not easily engage with the drive gear when reinstalling, lift and slightly rotate the motor before reinserting. Reconnect the power plug.

Replace the valve cover. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

Drive Cap Assembly

Disassembly: Turn off supply water and relieve system pressure. The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston(s). The drive cap assembly is threaded into the control valve body and seals with an o-ring. To remove the drive cap assembly use the special plastic wrench (V3193-02 Figure 1) or insert a ¼" to ½" flat bladed screwdriver into one of the slots around the top 2" of the drive cap assembly so it engages the notches molded into the drive back plate around the top 2" of the piston cavity. See Figure 2. The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counter clockwise. Once loosened unscrew the drive cap assembly by hand and pull straight out.

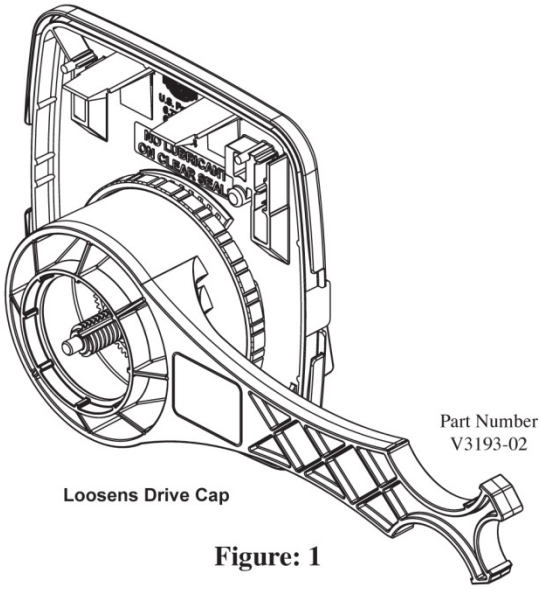


Figure: 1

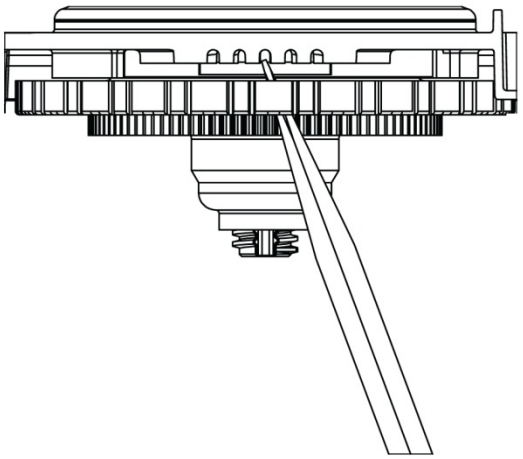


Figure: 2

Inspection: The drive cap assembly contains the drive cap, the main drive gear, drive cap spline, piston rod and various other parts that should not be dissembled in the field. Visually inspect the drive cap for damage and free operation of the gear and threaded rod. The only replaceable part on the drive cap assembly is the o-ring.

Main Piston

Disassembly and Inspection: Attached to the drive cap assembly is the main downflow piston. To remove, fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean the piston in dilute sodium bisulfite or vinegar, or replace it. The main piston is Teflon coated. If the teflon coating is abraded, replace the main piston.

Reassembly: Reattach the main piston to the drive cap assembly. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly until the backside of the drive cap bottoms out and is flush with the casting or the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (4 pin, black cable) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

Spacer Stack Assembly

Disassembly and Inspection: To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can then be pulled straight out. Inspect the black o-rings and inner seals for wear or damage; replace the entire stack if necessary. Do not disassemble the stack. The spacer stack assembly may be chemically cleaned (in dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

Reassembly: The spacer stack assembly can be pushed into the control valve body bore by hand. The assembly is properly seated when at least four threads are exposed (approximately ⅝"). Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack.

Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (4 pin, black cable) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

Injector Cap, Screen, and Injector Plug

Disassembly and Inspection: The injector can be accessed at the back of the valve by removing the threaded injector cap. The cap is removed by using the V3193-02 service wrench (figure 1). Once the cap is removed, use the open end of the V3193-01 service wrench at an angle to pry out the injector. The injector plug should not need to be cleaned, just verify that it has both o-rings on the plug and that it is fully seated.
Reassembly: Press the injector plug into its bore hole and press until seated all the way down. Replace the injector cap.

Refill Port Plug

Disassembly and Inspection: Refill port plugs should not need to be serviced. O-rings may be replaced if necessary. Pull out the locking clip and then pull the fitting straight out. Remove the flow control retainer. If necessary, replace the o-rings. A silicone lubricant may be used, but do not use Vaseline, oils, or other unacceptable lubricants on o-rings.
Reassembly: Insert the flow control into its seat, confirming correct flow control orientation. Reseat the flow control retainer and reassemble the fitting (see diagram in the exploded view section). Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring on the elbow or the retainer, but not on the flow control or its seat. Refill port plugs should not need to be serviced. O-rings may be replaced if necessary.

Drain Line Flow Control

Disassembly and Inspection: Depending on the flow control installed on the unit, remove the red plastic retaining clip (plastic flow control) or the (4) screws (stainless steel flow control) to expose the flow control and retainer. The flow controls can be removed by flexing the washer with a small screwdriver being careful not to mar the plastic seat. The flow control and retainer may be chemically cleaned using dilute sodium bisulfite or vinegar, do not clean with abrasive methods.
Reassembly: Insert the flow washers back into their respective bores, confirming correct flow control orientation (see diagram in the exploded view section). Place back into the housing and reassemble the housing /fitting. Do not use Vasoline, oils or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring of the elbow or the retainer, but not on the flow control or its seat.

Meter Assembly Service Instructions

Service or replace turbine by:

- Turn the bypass for the system on and relieve the pressure on the system before removing the meter.
- Press downward on the remote meter assembly to relieve tension on the retaining clip. Remove the clip and take the meter assembly out of the housing.
- Remove the bend from the two exposed tips of the retaining clip and remove clip.
- Service or replace the turbine assembly and place it back on the turbine shaft.
- Insert the turbine clip and re-bend the exposed ends of the clip. The turbine has a groove to line up with the turbine clip.
- Insert meter assembly back into the meter housing.
- Reinstall the meter retaining clip.
- Open the bypass for the system slowly to bring back into service and check to be sure you have no water leaks.

Maintenance – Removal & Replacement of Carbon Media

Tools Needed:

- Wrench (to removing piping)
- Screwdriver wide blade
- Buckets (for materials)
- Wet and Dry Vacuum Cleaner or Tarp

1. Turn off water to filter.
2. Relieve pressure in tank by either opening a downstream valve or cycling the control valve into the back wash position.
3. If a by-pass valve is installed, place it in the by-pass position.
4. Disconnect drain line.
5. Turn off electrical source and disconnect control valve. Remove any wiring connected to control valve.
6. Loosen plumbing from control valve.
7. Carefully move filter forward until it clears plumbing.
8. Move the filter to an area where access is available to all sides.
9. Carefully loosen control valve on mineral tank top. Slowly unscrew valve being careful not to damage threads in top of tank.
10. When valve is loose from top of tank, slowly twist it back and forth to remove it from top of distributor tube inside tank.
11. To remove carbon from the mineral tank choose one of the recommended methods below:
    a. **Vacuum Removal:** Vacuum all material out of tank and then wash inside with clean water.
    b. **Manual Removal:** Place a canvas on floor to catch filter and other materials dumped from mineral tank. Lay tank on its side and tip it up to dump the carbon and other materials out of tank. Slowly rotate tank as it is being dumped. When all material is out of tank wash it with clean water.

> ***Note:*** *Dispose of the carbon & underbedding by local procedures or laws.*

12. Replace media as per media loading instructions.
13. Perform start-up procedure.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Inlet pressure low	Low supply pressure	Correct incoming supply pressure
	Low flow from source	Remove blockage or other restrictions
Treated water flow low	Media/Resin bed fouled	Backwash Filter
	Valves closed	Check valves and fully open
Untreated water is being delivered	Bypass valve is open or faulty	Fully close bypass valve or replace
	Media is exhausted due to high water usage	Check program settings or diagnostics for abnormal water usage
	Water quality fluctuation	Test water and adjust program values accordingly
	Damaged seal/stack assembly	Replace seal/stack assembly
	Control valve body type and piston type mismatched	Verify proper control valve body type and piston type match
	Fouled media bed	Replace media bed
No Display on PC Board	No Power at electrical outlet	Repair outlet or use working outlet
	Control Valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	Plug Power Adapter into outlet or connect power cord end to PC Board connection
	Improper Power Supply	Verify power voltage is being delivered to the PC Board
	Defective Power Adapter	Replace Power Adapter
	Defective PC Board	Replace PC Board
PC Board does not display correct time of day	Power Adapter plugged into electric outlet controlled by light switch	Use uninterrupted outlet
	Tripped breaker switch and/or tripped GFI	Reset breaker switch and/ or GFI switch
	Power outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	Defective PC Board	Replace PC Board
Display does not indicate that water is flowing.	Bypass valve in bypass position	Place bypass in service position.
	Meter is not connected to meter connection on PC board or is not installed securely	Connect meter three pin connection labeled METER on the PC board. Verify meter cable is securely onto three pin connection.
	Restricted/Stalled turbine	Remove meter and check for rotation or foreign material
	Defective meter	Replace meter
	Defective PC board	Replace PC board

PROBLEM	POSSIBLE CAUSE	SOLUTION
Control valve regenerates at wrong time of day	Power outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	Time of day not set correctly	Reset to correct time of day
	Time of regeneration set incorrectly	Reset regeneration time
Time of day flashes on and off	Power Outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
Control valve does not regenerate automatically when the ▲&▼ buttons are depressed and held	Broken drive gear or drive cap assembly	Replace drive gear or drive cap assembly
	Broken Piston Rod	Replace Piston Rod
	Defective PC Board	Replace PC Board
Control valve does not regenerate automatically but does when the ▲&▼ buttons are depressed and held	Bypass valve in bypass position	Turn bypass handles to place bypass in service position
	Defective PC Board	Replace PC Board
Water running to drain	Power outage during regeneration	Upon power being restored control will finish the remaining regeneration time. Reset time of day.
	Damaged seal/stack assembly	Replace seal/sack assembly
	Piston assembly failure	Replace piston assembly
	Drive cap assembly not tightened in properly	Re-tighten the drive cap assembly
Err 1001 Error Message: Control unable to sense motor movement	Motor not inserted full to engage pinion, motor wires broken or disconnected	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 and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	PC Board not properly snapped into drive bracket	Properly snap PC Board into drive bracket. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Missing reduction gears	Replace missing gears
Err 1002 Error Message: Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign material is lodged in control valve	Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Mechanical binding	Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.

PROBLEM	POSSIBLE CAUSE	SOLUTION
	Main drive gear too tight	Loosen main drive gear. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Improper voltage being delivered to PC Board	Verify that proper voltage is being supplied. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
Err 1003 Error Message: Control valve motor ran too long and was unable to find the next cycle position	Motor failure during a regeneration	Check motor connections. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	Replace piston and stack assemblies. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
Err 1004 Error Message: Control valve motor ran too long and timed out trying to reach home position	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.

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- SELLER hereby warrants to CUSTOMER that the goods herein described will be free from any liens or encumbrances, that good title to said goods will be conveyed to CUSTOMER by sale of same.

  SELLER warrants materials of its own manufacture against defects in material and workmanship under normal conditions of usage and service for one year from whichever of the following events occurs first:
  - First use of the system
  - Three (3) months following date of shipment from Vista.

  Materials not manufactured by seller receive only such warranty, if any, of the manufacturer thereof and which are hereby assigned to CUSTOMER without recourse to SELLER.

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