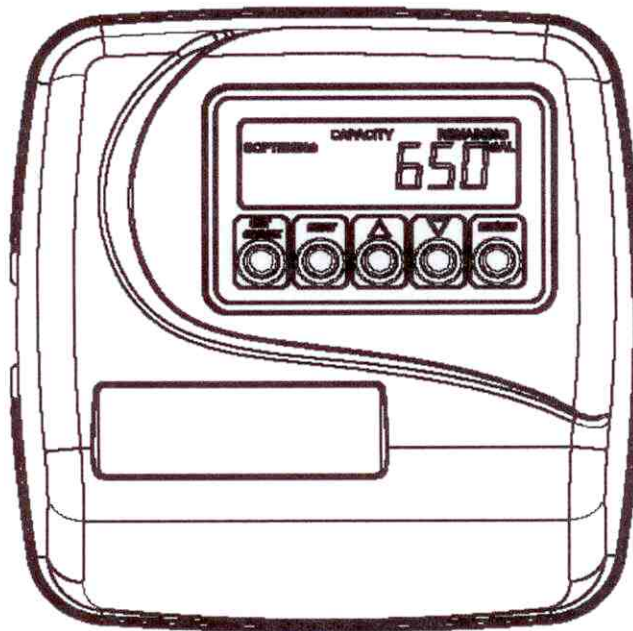


# Addie Water Systems

Series CM1 and CM125 Water Softener with  
1" Control Valve Series Model: CM1  
1.25" Control Valve Series Model: CM125



## Operation and Instruction Manual

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## Product Safety

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. Avoid any type of lubricants, including silicone, on the clear lip seals.

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a 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 the slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Use Teflon tape on the threaded inlet, outlet and drain fittings. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

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. 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.

All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of ½". Backwash flow rates in excess of 7 gpm (26.5 lpm) or length in excess of 20' (6.1m) require ¾" drain line.

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.

When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.

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.

Do not use this system for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

## Pre-Installation Check List

(All plumbing and electrical should conform to state and local codes.)

### Electrical Requirement:

A continuous 120 volt 60 Hz AC current supply is required. Make sure the electrical outlet cannot be switched off. Surge protection is recommended.

### Water Pressure:

A minimum of 20 PSI and a maximum of 120 PSI water pressure are required for proper operation.

### Plumbing Connection:

All plumbing must be done to all state and local codes. Existing piping must be free of all foreign materials such as lime, pipe rust or iron build up. Piping with excessive iron build up must have additional equipment installed to correct the problem prior to the water softener.

### Water Quality:

On occasion there is sand, sediment or debris that is in the main water supply. This can cause problems to the water conditioner control, as well as restricting the flow of water thru the resin bed. It is generally recommended to install a pre-filter ahead of the water conditioner to prevent unnecessary repairs that may not be covered under warranty. Water with higher amounts of iron or low PH may need additional equipment.

### Bypass Valves:

A bypass must be installed prior to the water softener to enable isolation from the water service lines for maintenance and service and also provide access to water when softener is disconnected. If a 3 valve bypass is not provided in the plumbing system an optional bypass (#V3006) can be purchased.

### CM1 and CM125 Control Valve:

Operating pressures – minimum/maximum 20 PSI-125 PSI

Operating temperatures – minimum/maximum 40 degrees-110 degrees F

### Electrical Specifications:

Supply Voltage: 120V AC

Supply Frequency: 60 Hz

Output Voltage: 12 VAC

Output Current: 500 mA

Conditioner cannot be subject to a vacuum due to loss of pressure.

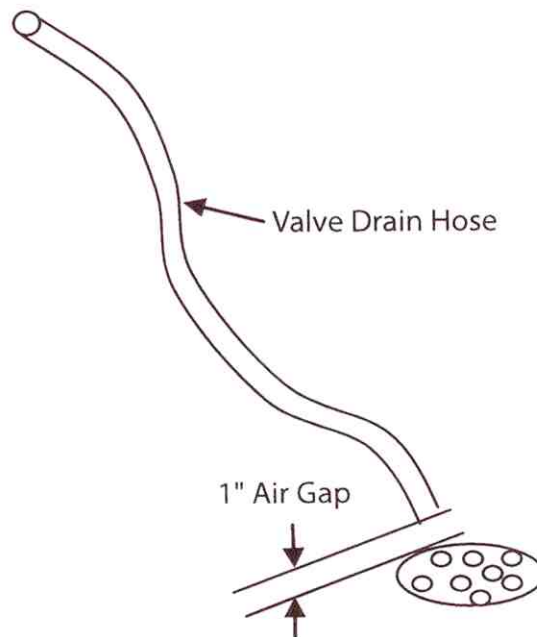
### Water Conditioning:

All water should be softened (hot and cold) with the exception of a hard water supply to the outside faucets and kitchen cold for drinking purposes.

## Installation Instructions

(All Electrical and Plumbing must be done per code.)

1. Location should be in a clean (free from debris that could puncture tanks), level, and a solid surface. Electrical outlet needs to be close enough to the conditioner, so the electrical plug will reach.
2. Make all plumbing connections to the water conditioner. The inlet and outlet connections are 1" sweat copper or 1" NPT male adaptor and the drain is 5/8" compression (for poly tube) or 3/4" NPT male. Use only Teflon tape on the pipe threads. The drain line must be constructed with an air gap of 1" or 2 times the pipe diameter or a vacuum break (see diagram below). If the drain is run overhead, do not exceed 8' high from the floor or 20' in length. A jumper ground wire should be run between the inlet and outlet metal pipe whenever the electrical continuity of a water distribution piping system is interrupted.
3. Connect 3/8" poly brine line from the salt tank to the brine line fitting connection on the control valve.
4. Connect a 1/2" ID poly tube (not included) to overflow fitting on the side of the salt tank and run to the floor drain. The drain cannot be connected together with control valve drain line tubing and cannot be run higher than the overflow fitting on the salt tank. Overflow must be connected to prevent damage should an overflow occur.



## Installation Check and Start Up:

1. Check all plumbing connections: Inlet, outlet, drain line, brine line and salt tank overflow.
2. Place the bypass in the bypass position as in figure 2 (See page 8).
3. Turn water on, open a cold soft water faucet and allow water to run until the water looks clear. Turn the cold water faucet off and check for leaks.
4. Manually add water into the salt tank, so water is 1" above salt platform.
5. Plug the transformer into an uninterrupted 120V/60Hz power source. Set the time of day by pressing the Set Clock button and hold until the hour number starts flashing. Set AM or PM and the correct hour of day using the up and down buttons. Press the Next button until minutes flash then use the up or down buttons to set the correct minutes. Press Next to escape the time of day mode.
6. Press and hold the Regen button until the motor starts. Once in the backwash position, unplug the transformer.
7. Slowly rotate the bypass to the diagnostic mode (Refer to bypass valve operation page 8-Figure 3) and slowly let water enter into the resin tank. Once water is flowing out the drain open the bypass fully. Let the water discharge to the drain until the water looks clear.
8. Plug the transformer into the electrical outlet again, press the Regen button and rotate the valve to the Brine position. When motor stops in the Brine position press the Regen button and let the valve advance to the 2nd backwash position. When the motor stops in the 2nd backwash position, press the Regen button again and rotate the valve to the rinse position. When the motor stops in the rinse position press the Regen button again and rotate the valve to the Fill position. When the motor stops press the Regen button once again and rotate the valve to the softening position. The time of day will now be displayed.
9. Rotate bypass valve to normal operation position. (Refer to bypass valve operation page 8-Figure 1.)
10. Reset the time of day again (Refer to #5).
11. Set the softener's hardness, days override and regeneration time settings (See Installers displays/setting page 15).
12. Disinfect softener according to the following procedure with 5.25% Sodium Hypochlorite (Household bleach) solution available under trade names such as Clorox, Linco, Bo Peep, White Sail and Eagle Brand bleach. Periodically disinfection of the softener may be required due to organic matter or bacteria from the water supply.
  - Dosage: 1.2 fluid ounces per cubic foot of mineral.
  - Add the required amount of hypochlorite solution to the brine well of the brine tank.
  - Proceed with a normal regeneration. Press and hold the Regen button until the motor starts. Let the softener finish the regeneration cycles.
13. Your conditioner is now set.

## Bypass Valve

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 CM 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 personal 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<sup>1</sup> (or equivalent) and the 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. The handles identify the flow direction of the water. The plug valves 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 Position: The inlet and outlet handles point to the center of the bypass, the control valve is isolated from the water pressure contained in the plumbing system. Untreated water is supplied to the plumbing system. (See Figure 2)
3. Diagnostic Position: The inlet handle points in the direction of flow and the outlet handle points to the center of bypass valve, system water pressure is allowed to the control valve and the plumbing system while not allowing water to exit from the control valve to the plumbing. (See Figure 3)
4. Shut Off Position: The inlet handle points to the center of the bypass valve and the outlet handle points in the direction of flow, the water is shut off to the plumbing system. If water is available on the outlet side of the softener it is an indication of water bypass around the system (i.e. a plumbing connection somewhere in the building bypasses the system). (See Figure 4)

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<sup>1</sup> Noryl is a trademark of General Electric.

# BYPASS VALVE OPERATION

Figure 1

## NORMAL OPERATION

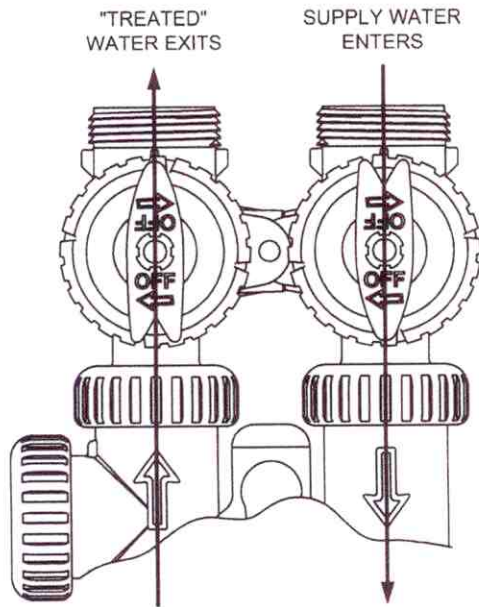


Figure 2

## BYPASS OPERATION

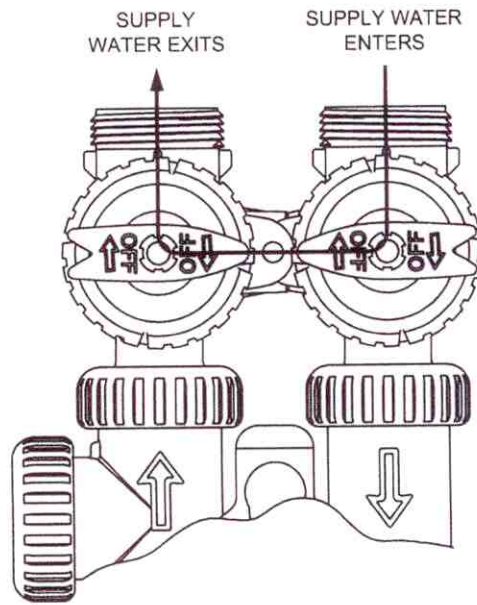


Figure 3

## DIAGNOSTIC MODE

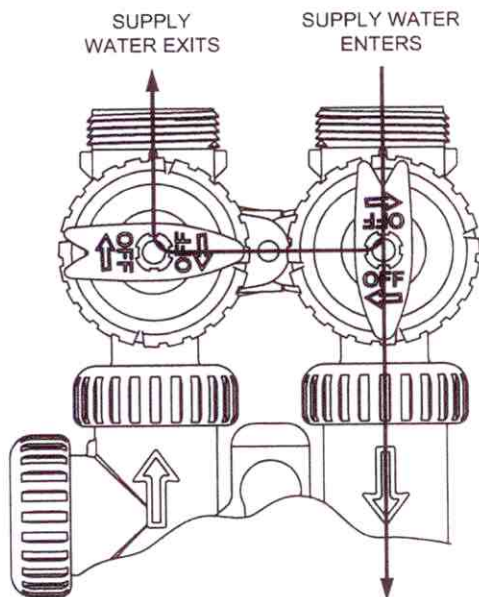
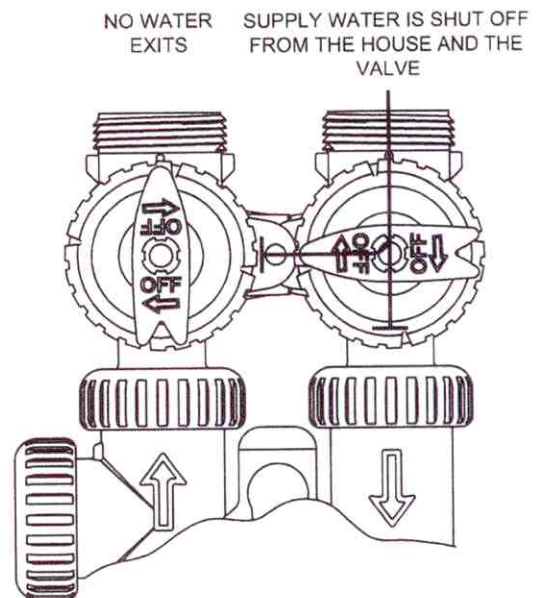


Figure 4

## SHUT OFF MODE





## CM1 Series Product Specifications

	CM1-844-24	CM1-948-32	CM1-1054-48	CM1-1252-60	CM1-1354-75	CM1-1465-90
Cation Exchange Resin (cu ft)	0.75	1.0	1.5	2.0	2.5	3.0
Rated Capacity (grains@lbs salt dose)	13500@3.4 17000@6.5 20500@11.0	18000@4.5 23000@9.0 28000@15.0	27500@7.0 35000@13.5 42000@22.5	36000@9.0 46000@18.0 56000@30.0	45000@11.5 58000@22.5 69000@37.0	54000@13.5 70000@27.0 84000@45.0
Rated Efficiency* (grains/lb@min. salt dose)	4042@3.4	4042@4.5	4042@7.0	4042@9.0	4042@11.5	4042@13.5
Maximum Service Flow Rate (gpm)	11.7	13.1	13.3	16.4	17.1	17.8
Pressure Drop (psig) at Maximum Service Flow	15	15	15	15	15	15
Minimum/Maximum Operating Pressure	20 psi - 125 psi					
Minimum/Maximum Operating Temperature	40°F - 110°F					
Power Adapter: Supply Voltage Supply Frequency Output Voltage Output Current	120V AC 60 Hz 12V AC 500 mA					
Regenerant Refill Rate	0.5 gpm					
Injectors (See pressure vs flow graphs on page 12-13.)	V3010-C	V3010-D	V3010-E	V3010-F	V3010-G	V3010-H
Type and Grade of Salt	Solar Salt Crystals					
Drain Line Flow Rate (gpm)	1.7	2.2	2.7	3.2	4.2	5.3

\*Efficiency rating was determined in accordance with NSF/ANSI 44 and is only valid at the lowest salt dosage.

## CM125 Series Product Specifications

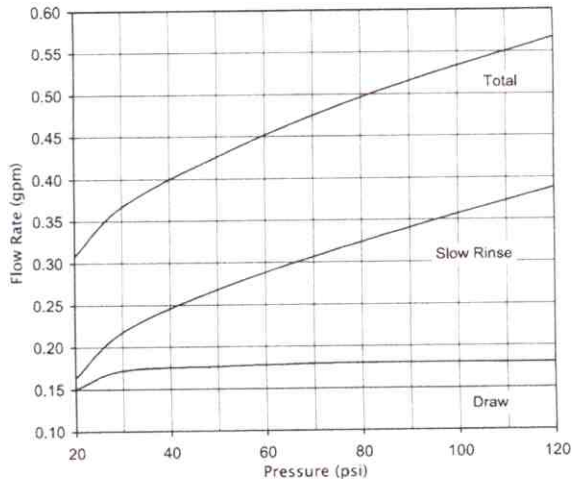
	CM125-32	CM125-48	CM125-64	CM125-75	CM125-90
Cation Exchange Resin (cu ft)	1.0	1.5	2.0	2.5	3.0
Rated Capacity (grains@lbs salt dose)	180000@4.5 23000@9.0 28000@15.0	27000@6.8 35000@13.5 42000@22.5	36000@9.0 46000@18.0 56000@30.0	45000@11.3 58000@22.5 70000@37.5	54000@13.5 70000@27.0 84000@45.0
Rated Efficiency* (grains/lb@min. salt dose)	4042@4.5	4042@6.8	4042@9.0	4042@11.3	4042@13.5
Maximum Service Flow Rate (gpm)	15.4	15.7	19.4	20.1	20.8
Pressure Drop (psig) at Maximum Service Flow	15	15	15	15	15
Intermittent Flow Rate @ 25 psig **	21	22	24	24	24
Minimum/Maximum Operating Pressure	20 psi - 125 psi				
Minimum/Maximum Operating Temperature	40°F - 110°F				
Power Adapter: Supply Voltage Supply Frequency Output Voltage Output Current	120V AC 60 Hz 12V AC 500 mA				
Regenerant Refill Rate	0.5 gpm				
Injectors (See pressure vs flow graphs on pages 12-13.)	V3010-D	V3010-E	V3010-F	V3010-G	V3010-H
Type and Grade of Salt	Solar Salt Crystals				
Drain Line Flow Rate (gpm)	2.2	2.7	3.2	4.2	5.3

\*Efficiency rating was determined in accordance with NSF/ANSI 44 and is only valid at the lowest salt dosage.

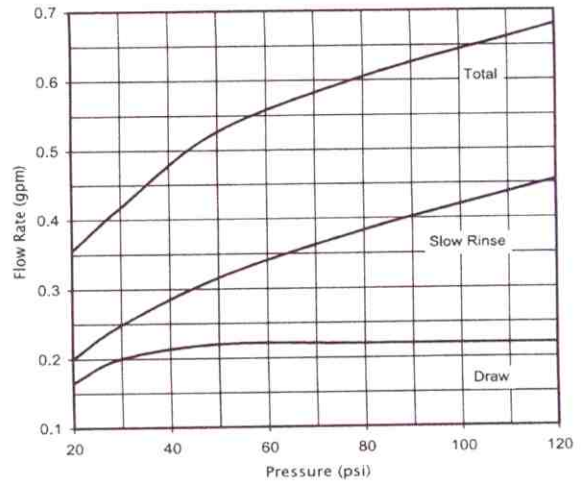
\*\*Intermittent flow rate does not represent the maximum service flow rate used for determining the softeners rated capacity and efficiency. Continuous operation at flow rates greater than maximum service flow rate may affect capacity and efficiency performance.

## Injector Pressure vs. Flow Rate Graphs

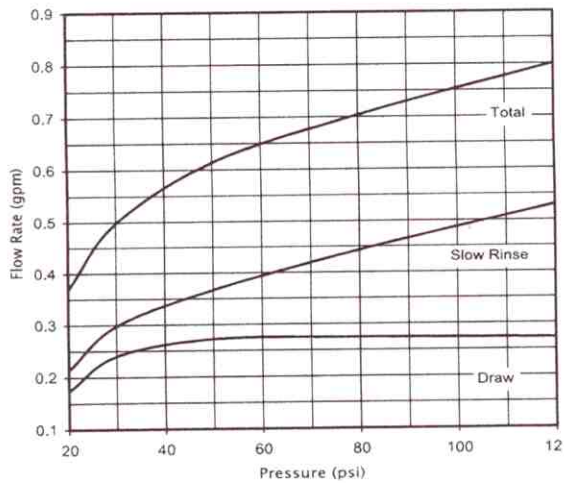
VIOLET, ORDER NO. V3010-1C  
US Units



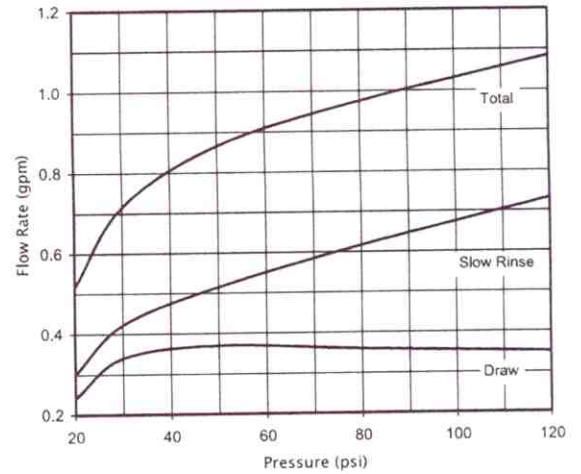
RED, ORDER NO. V3010-1D  
US Units



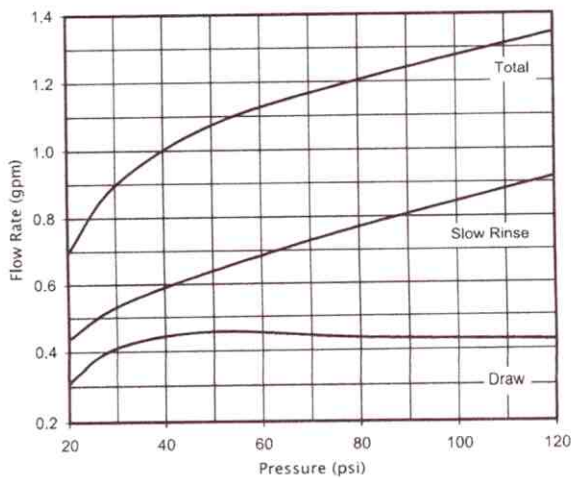
WHITE, ORDER NO. V3010-1E  
US Units



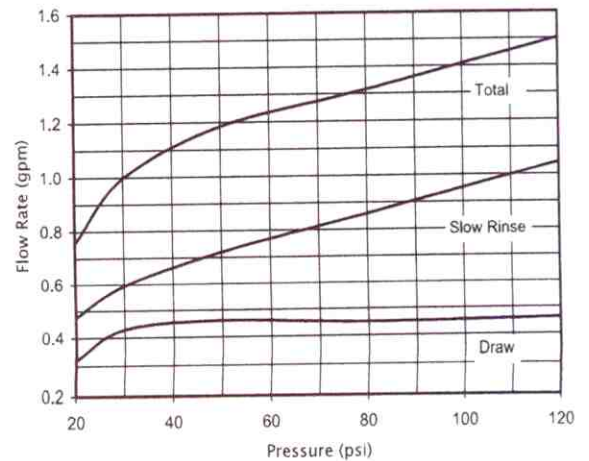
BLUE, ORDER NO. V3010-1F  
US Units



YELLOW, ORDER NO. V3010-1G  
US Units



GREEN, ORDER NO. V3010-1H  
US Units



## Control Valve Function and Cycles of Operation

This glass filled Noryl<sup>1</sup> (or equivalent) fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter. When the CM1 control valve is manufactured as a softener, the control valve can be ordered to perform downflow or upflow regeneration. The CM125 control valve is only available in downflow regeneration. When the CM1 or CM125 control valve is set up as a filter, the control valve can be set to perform downflow regeneration or simply backwash. The control valve 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 control valve can be set so that a softener can meet the Water Quality Association (WQA) Standard S100 or NSF/ANSI Standard 44 efficiency rating.

It is not recommended to change control valves from downflow to upflow brining or vice versa in the field. The valve bodies for downflow and upflow are unique to the regeneration type and should not be interchanged. A mismatch of valve body and regeneration piston will result in hard water bypass during service.

The control valve is compatible with a variety of regenerants and resin cleaners. The control valve is capable of routing the flow of water in the necessary paths to regenerate or backwash water treatment systems. 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, when applicable.

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 comparable 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 power pack comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter power pack is for dry location use only. The control valve remembers all settings 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; other values 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.

Table 1 shows the order of the cycles when the valve is set up as a softener. The OEM has the option of having the regenerant refill after the rinse cycle or have the regenerant prefill before regeneration. If the OEM chooses to have the regenerant prefill before regeneration, the prefill starts two hours before the regeneration time set. During the 2-hour period in which the brine is being made, treated (softened) water is still available. For example: regeneration time = 2:00 am, prefill option selected, downflow softener. Fill occurs at 12:00 a.m., start of backwash cycle occurs at 2:00 a.m.

Table 1  
Regeneration Cycles Softening

CM1 & CM125 Downflow Regenerant Refill After Rinse
1 <sup>st</sup> Cycle: Backwash
2 <sup>nd</sup> Cycle: Regenerate
3 <sup>rd</sup> Cycle: Second Backwash*
4 <sup>th</sup> Cycle: Rinse
5 <sup>th</sup> Cycle: Fill/Dissolve
6 <sup>th</sup> Cycle: Service

\*Second Backwash is optional

<sup>1</sup> Noryl is a trademark of General Electric.

Table 2  
DIR/Time Clock Options

DIR	Time Clock	Reserve Capacity	Softener	Filter		Settings <sup>2</sup>	
				Regenerant	Backwash Only	Day Override	Gallon Capacity
Yes		Automatically Calculated	Yes			Off	Auto
Yes		If desired enter a value less than estimated capacity	Yes	Yes	Yes	Off	Any Number
Yes	Yes	Automatically Calculated	Yes			Any Number	Auto
Yes	Yes	If desired enter a value less than estimated capacity	Yes	Yes	Yes	Any Number	Any Number
	Yes	None	Yes	Yes	Yes	Any Number	Off

The control valve with a water meter can be set for Demand Initiated Regeneration (DIR) only, Time Clock operation only or DIR and Time Clock which ever comes first, depending upon what settings are selected for Day Override and Gallon Capacity.<sup>2</sup>See Table 2.

If a control valve does not contain a meter, the valve can only act as a time clock, and day override should be set to any number and gallon capacity should be set to off.

For DIR Softeners, there are two options for setting the Gallons Capacity. The Gallons Capacity is automatically calculated if set to AUTO. Reserve Capacity is automatically estimated based on water usage if AUTO is used. The other option is to set the Gallons Capacity to a specific number. If a specific number is set, reserve capacity is zero, unless the value is manually set (i.e. the manufacturer intentionally sets the gallon capacity number below the calculated capacity of the system). The control valve can also be set to regenerate immediately or at the next regeneration time by changing the Regeneration Time Option. There are three choices for settings:

1. "NORMAL" means regeneration will occur at the preset regeneration time.
2. "on 0" means regeneration will occur when the gallons capacity reaches zero.
3. "NORMAL" and "on 0" means the regeneration will occur at the preset regeneration time unless the gallons capacity reaches zero. If the gallons capacity reaches zero the regeneration will begin 10 minutes after no water usage.

The user can initiate manual regeneration. The user has the option to request the manual regeneration at the delayed regeneration time or to have the regeneration occur immediately:

1. Pressing and releasing the REGEN button. "Regen Today" will flash on the display and the regeneration will occur at the delayed regeneration time. The user can cancel the request by pressing and releasing the REGEN button. This method of manually initiating regeneration is not allowed when the system is set to "on 0," i.e. immediately regenerate when the gallon capacity reaches zero.
2. Pressing and holding the REGEN button for approximately 3 seconds will immediately start the regeneration. The user cannot cancel this request, except by resetting the control by pressing NEXT and REGEN buttons simultaneously for 3 seconds.

The control valves consist of the following components:

1. Drive Assembly
2. Drive Cap Assembly, Main Piston and Regenerant Piston
3. Spacer Stack Assembly
4. Injector Cap, Screen, Injector Plug and Injector
5. Refill Flow Control Assembly or Refill Port Plug
6. Drain Line Flow Control and Fitting Assembly
7. Water Meter or Meter Plug
8. Mixing Valve (optional)
9. Installation Fitting Assemblies
10. Bypass Valve (optional)

<sup>2</sup> Day Override and Gallon Capacity can not both be set to "off" at the same time.

## OEM General Instructions

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

- Installer Displays & Settings
- User Displays & Settings
- OEM Softener Setup
- Diagnostics
- Valve History

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

At the discretion of the manufacturer, the field technician can access all settings. To "lock out" access to diagnostic and valve history displays and modifications to settings except hardness, day override, time of regeneration and time of day by anyone but the manufacturer, press ▼, NEXT, ▲, and 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, gallons remaining or days remaining before regeneration are shown. When stepping through a procedure, if no buttons are pressed within five minutes the display returns to a normal user display. Any changes made prior to the five minute time out are incorporated. The one exception is current flow rate display under the diagnostic procedure. The current flow rate display has a 30 minute time out feature.

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

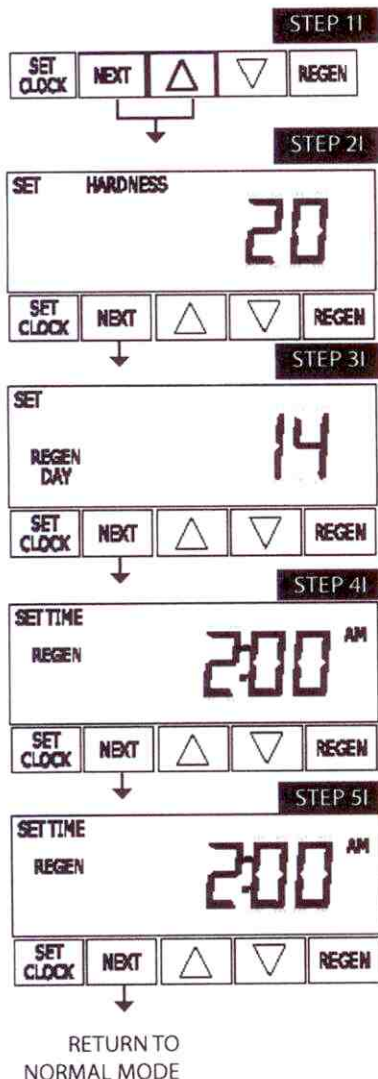
When desired all information in Diagnostics may be reset to zero when the valve is moved to a new location. To reset to zero, press NEXT and ▼ buttons simultaneously to go to the Service/OEM 1 screen, and release. Press ▼ and ▲ simultaneously to reset diagnostic values to zero. Screen will return to User Display.

Sometimes it is desirable to have the valve initiate and complete two regenerations within 24 hours and then return to the preset regeneration procedure. It is possible to do a double regeneration if the control valve is set to "NORMAL" or "NORMAL + on 0" in Step 9S or Step 7F. To do a double regeneration:

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

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

### Installer Display Settings



STEP 11 - Press NEXT and ▲ simultaneously for 3 seconds.

STEP 21 – Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the ▼ or ▲ buttons. The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon can be increased if soluble iron needs to be reduced. This display will show “-nA-” if “FILTER” is selected in Step 2F or if ‘AUTO’ is not selected in Step 6S. Press NEXT to go to step 31. Press REGEN to exit Installer Display Settings.

STEP 31 – Day Override: When gallon capacity is set to off, Day Override sets the number of days between regenerations. When gallon capacity is set to AUTO or to a number, Day Override sets the maximum number of days between regenerations. If value set to “oFF” regeneration initiation is based solely on gallons used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for a regeneration. Set Day Override using ▼ or ▲ buttons:

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

See Setting Options Table for more detail on setup. Press NEXT to go to step 41. Press REGEN to return to previous step.

STEP 41 – Next Regeneration Time (hour): Set the hour of day for regeneration using ▼ or ▲ buttons. AM/PM toggles after 12. The default time is 2:00 a.m. This display will show “REGEN on 0 GAL” if “on 0” is selected in Step 9S or Step 7F. Press NEXT to go to step 51. Press REGEN to return to previous step.

STEP 51 – Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▼ or ▲ buttons. This display will not be shown if “on 0” is selected in Step 9S or Step 7F. Press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

To initiate a manual regeneration immediately, press and hold the “REGEN” button for three seconds. The system will begin to regenerate immediately. The control valve may be stepped through the various regeneration cycles by pressing the “REGEN” button.

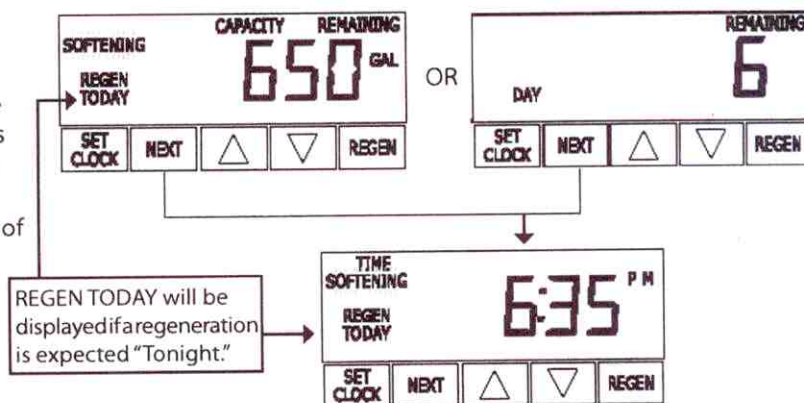
### User Display Settings

#### General Operation

When the system is operating one of two displays will be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day. The second display is one of the following: days remaining or gallons remaining. Days remaining is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the number of gallons that will be treated before the system goes through a regeneration cycle. The user can scroll between the displays as desired.

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

When water is being treated (i.e. water is flowing through the system) the word “Softening” or “Filtering” flashes on the display if a water meter is installed.



Regeneration Mode

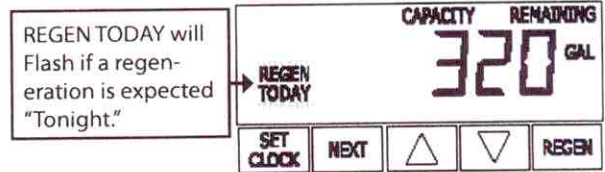
Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.



When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

Manual Regeneration

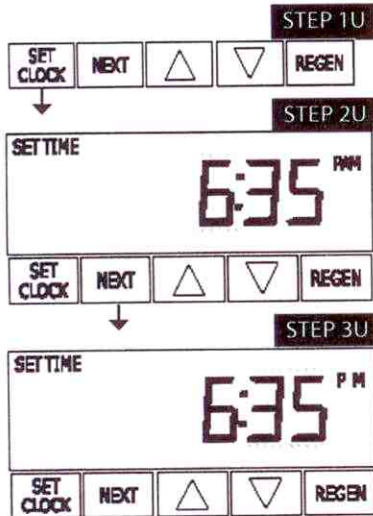
Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.



To initiate a manual regeneration at the preset delayed regeneration time, when the regeneration time option is set to "NORMAL" or "NORMAL + on 0", press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request. Note: If the regeneration time option is set to "on 0" there is no set delayed regeneration time so "REGEN TODAY" will not activate if "REGEN" button is pressed.

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

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



Set Time of Day

The user can also set the time of day. Time of day should only need to be set after power outages lasting more than 8 hours, if the battery has been depleted and a power outage occurs, or when daylight saving 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.

STEP 1U – Press SET CLOCK.

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

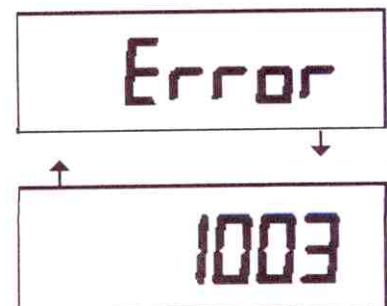
STEP 3U - Current Time (minutes): Set the minutes of the day using ▼ or ▲ buttons. Press NEXT to exit Set Clock. Press REGEN to return to previous step.

Power Loss

If the power goes out, the system will keep time for up to 8 hours or until the battery is depleted. If a power outage of more than 8 hours occurs, the time of day will flash on and off which indicates the time of day should be reset. The system will remember the rest. If a power outage lasts less than 8 hours and the time of day flashes on and off, the non rechargeable battery should be replaced.

Error Message

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





## OEM Softener System Setup

This is a quick reference setup procedure. See OEM Softener System Setup Detail for more information on available settings.

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

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

STEP 3S – Set Refill option using ▼ or ▲ buttons:

- “PoST” to refill the brine tank after the final rinse; or
- “PrE” to refill the brine tank two hours before the regeneration time set.

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

STEP 4S – Program Code: Enter the desired program code from Table 2 or Table 3. Prior to selecting a Program Code, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See Compliance Table in WS1 and WS1.25 Drawings and Service Manual.

Note: Do not select P60 through P65 if using a WS1.25CS valve. Press NEXT to go to Step 5S. Press REGEN to return to previous step.

STEP 5S – Enter the ion exchange capacity in grains of hardness as calcium carbonate for the system based on test data using ▼ or ▲ buttons. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

STEP 6S – Enter the pounds of salt per regeneration using ▼ or ▲ buttons. Press NEXT to go to Step 7S. Press REGEN to return to previous step.

STEP 7S – Set Gallons Capacity using ▼ or ▲ buttons:

- “AUTO” (reserve capacity automatically estimated and gallons capacity automatically calculated from grains capacity and water hardness);
- “oFF” (regeneration based on day override); or
- number of gallons (20 to 50,000).

See Setting Options Table for more detail. Press NEXT to go to Step 8S. Press REGEN to return to previous step.

STEP 8S – Set Regeneration Time Option using ▼ or ▲ buttons:

- “NORMAL” means regeneration will occur at the preset time;
- “on 0” means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- “NORMAL + on 0” means regeneration will occur at one of the following:
  - ▶ the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached whichever comes first; or
  - ▶ after 10 minutes of no water usage when the gallon capacity reaches 0 (zero).

See Setting Options Table for more detail. Press NEXT to exit OEM Softener System Setup. Press REGEN to return to previous step.

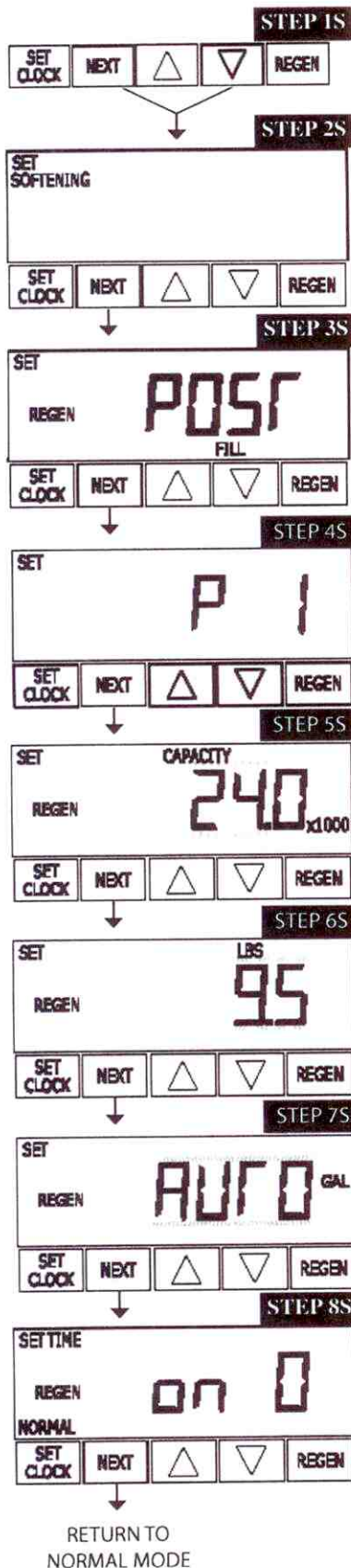


Table 3  
Downflow Softener Program Codes for CM1 or CM125

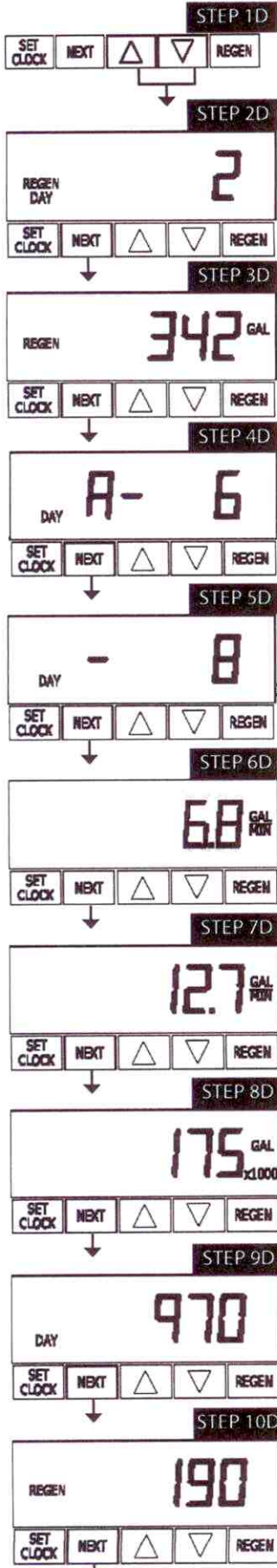
Program Code	Main Piston	1 <sup>st</sup> Backwash	Brine/Slow Rinse	2 <sup>nd</sup> Backwash	Fast Rinse
P1	Down Flow	3	40	3	3
P2	Down Flow	3	45	3	3
P3	Down Flow	4	45	4	3
P4	Down Flow	4	60	4	3
P5	Down Flow	5	60	4	4
P6	Down Flow	5	60	5	4
P7	Down Flow	6	45	4	3
P8	Down Flow	6	60	5	4
P9	Down Flow	6	60	6	5
P10	Down Flow	7	50	5	4
P11	Down Flow	7	60	6	6
P12	Down Flow	7	65	7	7
P13	Down Flow	8	45	5	4
P14	Down Flow	8	60	6	6
P15	Down Flow	8	60	8	8
P16	Down Flow	8	65	8	6
P17	Down Flow	8	65	8	7
P18	Down Flow	8	75	8	5
P19	Down Flow	9	50	5	5
P20	Down Flow	9	60	5	4
P21	Down Flow	9	65	8	5
P22	Down Flow	10	45	4	4
P23	Down Flow	10	60	5	4
P24	Down Flow	10	65	8	8
P25	Down Flow	10	65	6	5
P26	Down Flow	10	75	7	5
P27	Down Flow	12	45	4	4
P28	Down Flow	12	60	6	4
P29	Down Flow	12	60	8	8
P30	Down Flow	12	65	6	6
P31	Down Flow	12	65	8	8
P32	Down Flow	12	65	12	8
P33	Down Flow	12	75	6	6
P34	Down Flow	14	45	5	4
P35	Down Flow	14	60	6	5
P36	Down Flow	14	60	8	8
P37	Down Flow	14	65	7	6
P38	Down Flow	14	65	8	8
P39	Down Flow	14	65	12	8
P40	Down Flow	14	75	8	7
P41	Down Flow	16	60	7	5
P42	Down Flow	16	65	8	6
P43	Down Flow	16	65	8	8
P44	Down Flow	16	65	12	8
P45	Down Flow	16	75	9	7

Table 3 shows the order of the cycles when the valve is set up as a filter. If the control valve is set to regenerate for a filter, the OEM has the option of having the regenerant refill after the rinse cycle or have the regenerant prefill before regeneration. If the OEM chooses to have the regenerant prefill before regeneration, the prefill starts two hours before the regeneration time set. During the 2-hour period in which the regenerant is being made, treated water is still available. For example: regeneration time = 2:00 am, prefill option selected, downflow filter. Fill occurs at 12:00 a.m., start of backwash cycle occurs at 2:00 a.m.

When the control valve is used as a non-regenerating filter, the OEM has the option to specify one backwash or two backwashes. If two backwashes are specified, two rinses occur. When used as a non-regenerating filter, the downflow piston must be installed, the regenerant piston removed, injector plugs must be installed in both the DN and UP injector locations and the refill elbow must be replaced with a refill port plug.

NOTE: The program codes listed on this page should be used only as a guideline. Any program code listed can be applied to a softener or filter application for CM valves.

Diagnostics



RETURN TO NORMAL MODE

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

STEP 2D – Days, since last regeneration: This display shows the days since the last regeneration occurred. Press the NEXT button to go to Step 3D. Press REGEN to exit Diagnostics.

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

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

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

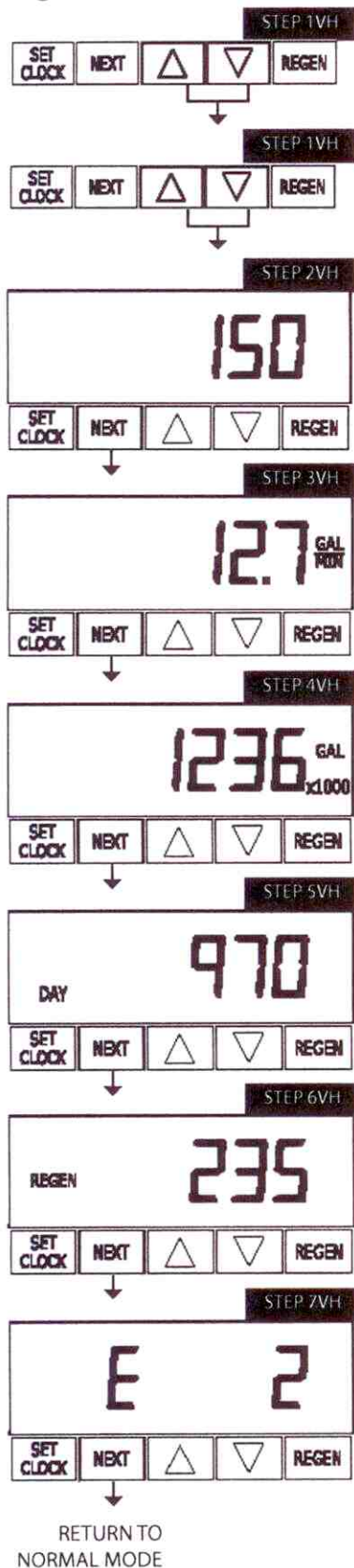
STEP 6D – Flow rate, current: Turn the water on at one or more taps in the building. The flow rate in gallons per minute will be displayed. If flow stops the value will fall to zero in a few seconds. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 7D. Press REGEN to return to previous step.

STEP 7D – Flow rate, maximum last seven days: The maximum flow rate in gallons per minute that occurred in the last seven days will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 8D. Press REGEN to return to previous step.

STEP 8D – Gallons, total used since last reset: The total number of gallons used since last reset will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 9D. Press REGEN to return to previous step.

STEP 9D – Days, total number since last reset: The total number of days the control valve has been in service since last reset will be displayed. Press the NEXT button to go to Step 10D. Press REGEN to return to previous step.

STEP 10D – Regenerations, total number since last reset: The total number of regenerations that have occurred since last reset will be displayed. Press the NEXT button to exit Diagnostics. Press REGEN to return to previous step.



### Valve History

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

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

STEP 3VH<sup>3</sup> – Flow rate, maximum since startup: This display shows the maximum flow rate in gallons per minute that has occurred since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4VH. Press REGEN to return to previous step.

STEP 4VH – Gallons, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 5VH. Press REGEN to return to previous step.

STEP 5VH – Days, total since start-up: This display shows the total days since startup. Press the NEXT button to go to Step 6VH. Press REGEN to return to previous step.

STEP 6VH – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to Step 7VH. Press REGEN to return to previous step.

STEP 7VH – Error Log: This display shows a history of the last 10 errors generated by the control during operation. Press the NEXT button to exit Valve History. Press REGEN to return to previous step.

<sup>3</sup> Values in steps 3VH through 7VH cannot be reset.

## Troubleshooting Procedures

Problem	Possible Cause	Solution
1. Timer does not display time of day	a. AC Adapter unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective AC Adapter	c. Replace AC Adapter
	d. Defective PC board	d. Replace PC board
2. Timer does not display correct time of day	a. Switched outlet	a. Use uninterrupted outlet
	b. Power outage	b. If power outage is for more than 8 hours, reset time of day. If power outage is for less than 8 hours, reset time of day and replace battery.
	c. Defective PC Board	c. Replace PC Board
3. No softening/filtering display when water is flowing	a. Bypass valve in bypass position	a. Put bypass valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
4. Control valve regenerates at wrong time of day	a. Power outage	a. If power outage is for more than 8 hours, reset time of day. If power outage is for less than 8 hours, reset time of day and replace battery.
	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 "0" (immediate regeneration)	d. Check control valve set-up procedure regeneration time option
	e. Control valve set at NORMAL + on 0	e. Check control valve set-up procedure regeneration time option
5. ERROR followed by code number  <u>Error Code</u> 1001 - Unable to recognize start of regeneration 1002 - Unexpected stall 1003 - Motor ran to long, timed out trying to reach next cycle position 1004 - Motor ran to long, timed out trying to reach home position  If other Error codes display contact the factory.	a. Control valve has just been serviced	a. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear
	g. Drive bracket incorrectly aligned to back plate	g. Reseat drive bracket properly
	h. PC board is damaged or defective	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket

## Troubleshooting Procedures (Continued)

Problem	Possible Cause	Solution
6. Control valve stalled in regeneration	a. Motor not operating	a. Replace motor
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective AC Adapter	c. Replace AC Adapter
	d. Defective PC board	d. Replace PC board
	e. Broken drive gear or drive cap assembly	e. Replace drive gear or drive cap assembly
	f. Broken piston retainer	f. Replace drive cap assembly
	g. Broken main or regenerant piston	g. Replace main or regenerant piston
7. Control valve does not regenerate automatically when REGEN button is depressed and held	a. AC Adapter unplugged	a. Connect AC Adapter
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly
	d. Defective PC board	c. Replace PC Board
8. Control valve does not regenerate automatically but does when REGEN button is depressed	a. Bypass valve in bypass position	a. Put bypass valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
	f. Set-up error	f. Check control valve set-up procedure
9. Time of day flashes on and off	a. Power outage	a. Reset the time of day. If due to a power outage less than 8 hours, reset time of day and replace battery.

## Service Instructions

### Drive Assembly

Remove the valve cover to access the drive assembly.

Disconnect the power source plug (black wire) from the PC board prior to disconnecting the motor or water meter plugs from the PC board. The power source plug connects to the four-pin jack. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The water meter plug (gray wire) connects to the three-pin jack on the far right-hand side of the PC board.

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.

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. To remove the drive bracket start by removing the plugs for the power source and the water meter. 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 forward. 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 reassemble, 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 toward 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.

To inspect the drive gears, the drive gear cover needs to be removed. Before trying to remove the gear cover, the drive bracket must be removed from the drive back plate. (Refer to the instructions above regarding removing the drive bracket from the drive back plate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board.) 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 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 gear cover only fits on one way, 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.

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 so the wires are vertical (up & down) 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.

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 wires are horizontal and 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 side of the PC board. If the motor will not easily engage with the drive gears 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 (e.g. 405) and then reset the valve to the service position.

#### Drive Cap Assembly, Main Piston and Regenerant Piston

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 or insert a ¼" to ½" flat blade 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 5. 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.

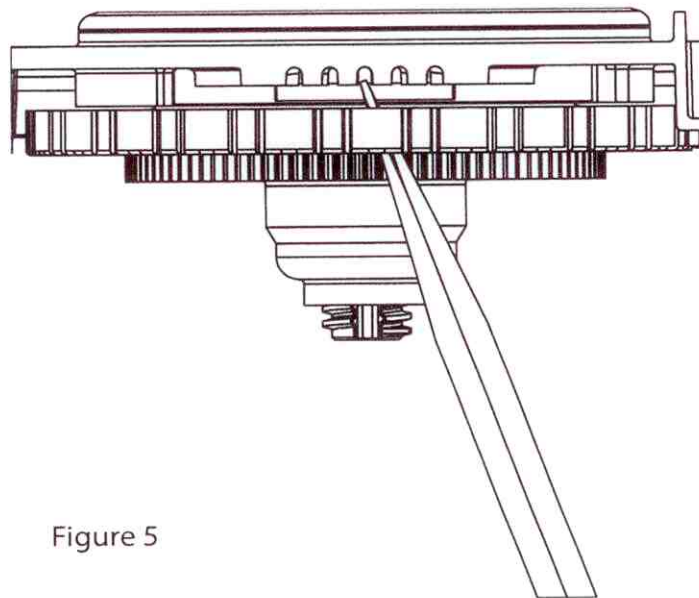


Figure 5

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 disassembled in the field. The only replaceable part on the drive cap assembly is the o-ring. Attached to the drive cap assembly is the main piston (downflow or upflow) and if a regenerant is used, a regenerant piston.



The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by pressing sideways and unsnapping it from its latch. Chemically clean in dilute sodium bisulfite or vinegar, or replace the regenerant piston if needed. To remove the main piston fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean in dilute sodium bisulfite or vinegar, or replace the main piston.

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Do not lubricate the piston rod, main piston or regenerant piston. Lubricant will adversely affect the clear lip seals. 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 using a screwdriver as a ratchet until 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 (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 (e.g. 405) and then reset the valve to the service position.

Note: To identify main piston refer to page 34.

#### Spacer Stack Assembly

For spacer stack identification refer to page 34.

To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can be removed easily without tools by using thumb and forefinger. Inspect the black o-rings and clear lip seals for wear or damage. Replace the entire stack if necessary. Do not disassemble the WS1CS or WS1.25CS stack.

The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

The spacer stack assembly can be pushed in to the control valve body bore by hand. Since the spacer stack assembly can be compressed it is easier to use a blunt object (5/8" to 1-1/8" in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8"). 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. Do not use silicone or any other type of lubricant on the clear lip seals or the piston.

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 (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 (e.g. 405) and then reset the valve to the service position.

#### Injector Cap, Screen, Injector Plug and Injector

Unscrew the injector cap and lift off. Loosen cap with special plastic wrench or pliers if necessary. Attached to the injector cap is a screen. Remove the screen and clean if fouled.

The plug and/or injector can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite. The holes can be blown out with air. Both pieces have small diameter holes that control the flow rates of water to insure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector. Push the plug(s) and/or injectors firmly in place, replace the screen and hand tighten the injector cap.

### Refill Flow Control Assembly or Refill Port Plug

To clean or replace the refill flow control, pull out the elbow-locking clip and then pull straight up on the elbow. Replace the elbow locking clip in the slot so that it is not misplaced. Twist to remove the white flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small flat blade screwdriver.

Chemically clean the flow control or the white flow control retainer using dilute sodium bisulfite or vinegar. Do not use a wire brush. If necessary, replace the flow control, o-ring on the flow control retainer, or the o-ring on the elbow.

Reseat the flow control so the rounded end is visible in the flow control. Reseat the white flow control retainer by pushing the retainer into the elbow until the o-ring seats. Remove locking clip, push down on elbow to reseat and insert locking clip.

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 white retainer.

### Water Meter or Meter Plug

The water meter assembly is connected to the PC board by a wire. If the entire water meter assembly is to be replaced, remove the control valve cover and disconnect the power source and water meter plugs from the PC board. Unlatch the drive assembly and lean it forward. Unthread the water meter wire from the side of the drive assembly and through the drive back plate. To reinstall, rethread the water meter wire through the drive back plate and the side of the drive assembly. Reattach the drive assembly and the water meter and power plugs.

THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL HEALTH EFFECT APPLICATIONS.

If no water meter wire is visible, then a plug is installed, not a water meter.

The water meter wire does not need to be removed from the PC board if the water meter is only being inspected and cleaned. To remove the water meter assembly, unscrew the meter cap on the left side of the control valve. Pliers may be used to unscrew the nut if necessary.

With the nut removed, a slot at the top of the water meter is visible. Twist a flat blade screwdriver in the slot between the control valve body and the meter. When the meter is part way out it is easy to remove the water meter from the housing. Once the water meter is removed from the control valve body, gently pull forward on the turbine to remove it from the shaft.

Do not use a wire brush to clean the turbine. Wipe with a clean cloth or chemically clean in dilute sodium bisulfite or vinegar. The turbine can be immersed in the chemical. Do not immerse electronics. If the turbine is scored or damaged or the bearings on the turbine are worn, replace the turbine.

Do not lubricate the turbine shaft. The turbine shaft bearings are prelubricated. Do not use Vaseline, oils, or other unacceptable lubricants on the o-ring. A silicone lubricant may be used on the black o-ring.

Snap the turbine on the shaft and reinsert the water meter into the side slot. Hand tighten the nut. Do not use a pipe wrench to tighten nut.

### Mixing Valve

To clean or replace the mixing valve, unthread the mixing valve from the valve body. Chemically clean the mixing valve with a dilute sodium bisulfite or vinegar solution. Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring. Before replacing the mixing valve in the valve body turn the knob clockwise so that the mixing valve is in the open position. Failure to do this may cause damage to the mixing valve when it is screwed in to the valve body.

To adjust the blended water, close the mixing valve. Open a water faucet to the desired flow rate. Open the mixing valve until the desired hardness is reached. Close the faucet.

### Bypass Valve

The working parts of the bypass valve are the rotor assemblies that are contained under the bypass valve caps. Before working on the rotors, make sure the system is depressurized. Turn the red arrow shaped handles towards the center of the bypass valve and back several times to ensure rotor is turning freely.

The nuts and caps are designed to be unscrewed or tightened by hand. If necessary a 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 screwdriver in slots on caps and/or tap with a hammer. To access the rotor, unscrew the cap and lift the cap, rotor and handle out as one unit. Twisting the unit as you pull it out will help to remove it more easily. There are three o-rings: one under the rotor cap, one on the rotor stem and the rotor seal. Replace worn o-rings. Clean rotor. Reinstall rotor.

When reinstalling the red arrow handles be sure that:

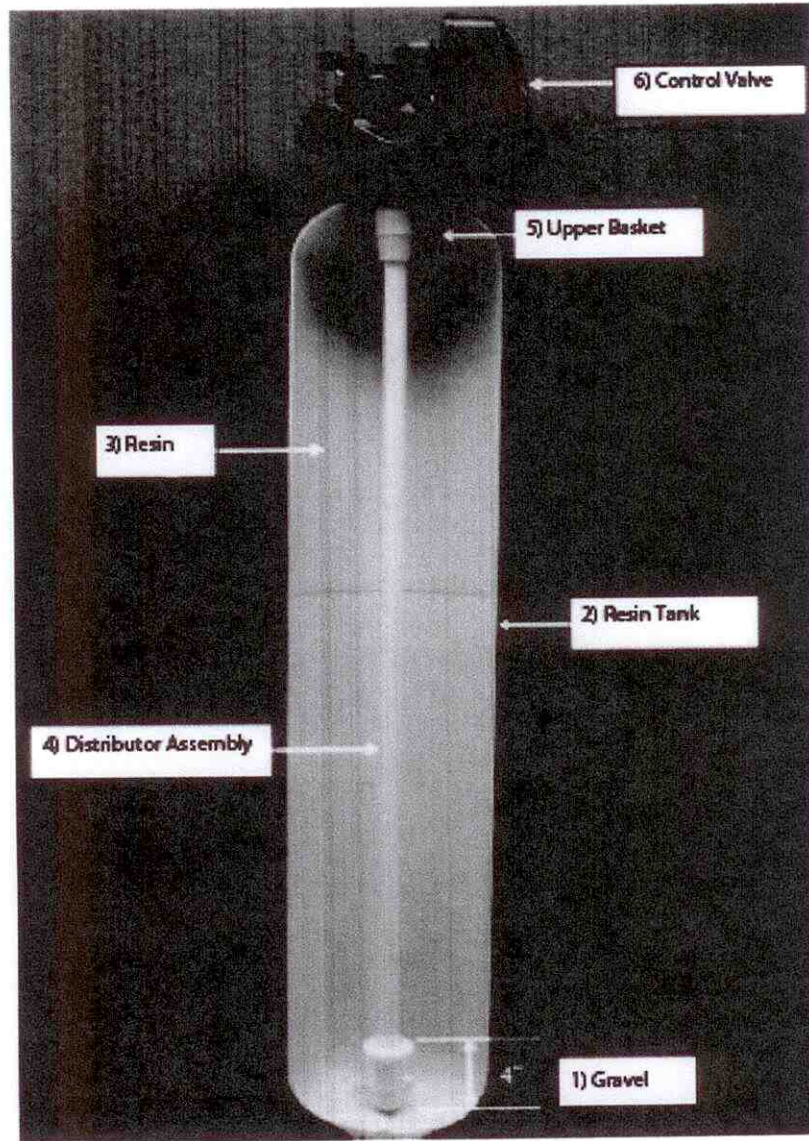
1. The handle pointers are lined up with the control valve body arrows, and the rotor seal o-ring and retainer on both rotors face to the right when being viewed from the front of the control valve; or
2. Arrows point toward each other in the bypass position.

Since the handles can be pulled off, they could be accidentally reinstalled 180° from their correct orientation. To install the red arrow handles correctly, keep the handles pointed in the same direction as the arrows engraved on the control valve body while tightening the bypass valve caps.

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 (e.g. 405) and then reset the valve to the service position.

## Repair Parts

Drawing No.	Order No.	Description	Quantity
1	A8072	Gravel Underbedding	1
2	8X44	Resin Tank for Model CM1-844-24	1
	9X48	Resin Tank for Model CM1-948-32	1
	10X44	Resin Tank for Model CM125-32	1
	10X54	Resin Tank for Models CM1-1054-48 and CM125-48	1
	12X52	Resin Tank for Models CM1-1252-60 and CM125-64	1
	13X54	Resin Tank for Models CM1-1354-75 and CM125-75	1
	14X65	Resin Tank for Models CM1-1465-90 and CM125-90	1
3	A8070	Resin	1
4	D780C2A44P	Distributor ASY for Model CM1-844-24	1
	D780C2A48.125P	Distributor ASY for Model CM1-948-32	1
	D780C2A55	Distributor ASY for Models CM1-1054-48, CM1-1252-60, and CM1-1354-75	1
	D780C2A72	Distributor ASY for Models CM1-1465-90	1
	D780D2A54	Distributor ASY for Models CM125-32, CM125-48, CM125-64, and CM125-75	
	D780D2A68	Distributor ASY for Model CM125-90	1
5	D1203	Upper Basket for all CM1 Models	1
	D1203-02	Upper Basket for all CM125 Models	1
6	V1CSDMC	Control Valve for Model CM1-844-24	1
	V1CSDMD	Control Valve for Model CM1-948-32	1
	V1CSDME	Control Valve for Model CM1-1054-48	1
	V1CSDMF	Control Valve for Model CM1-1252-60	1
	V1CSDMG	Control Valve for Model CM1-1354-75	1
	V1CSDMH	Control Valve for Model CM1-1465-90	1
	V125CSDMD	Control Valve for Model CM125-32	1
	V125CSDME	Control Valve for Model CM125-48	1
	V125CSDMF	Control Valve for Model CM125-64	1
	V125CSDMG	Control Valve for Model CM125-75	1
	V125CSDMH	Control Valve for Model CM125-90	1

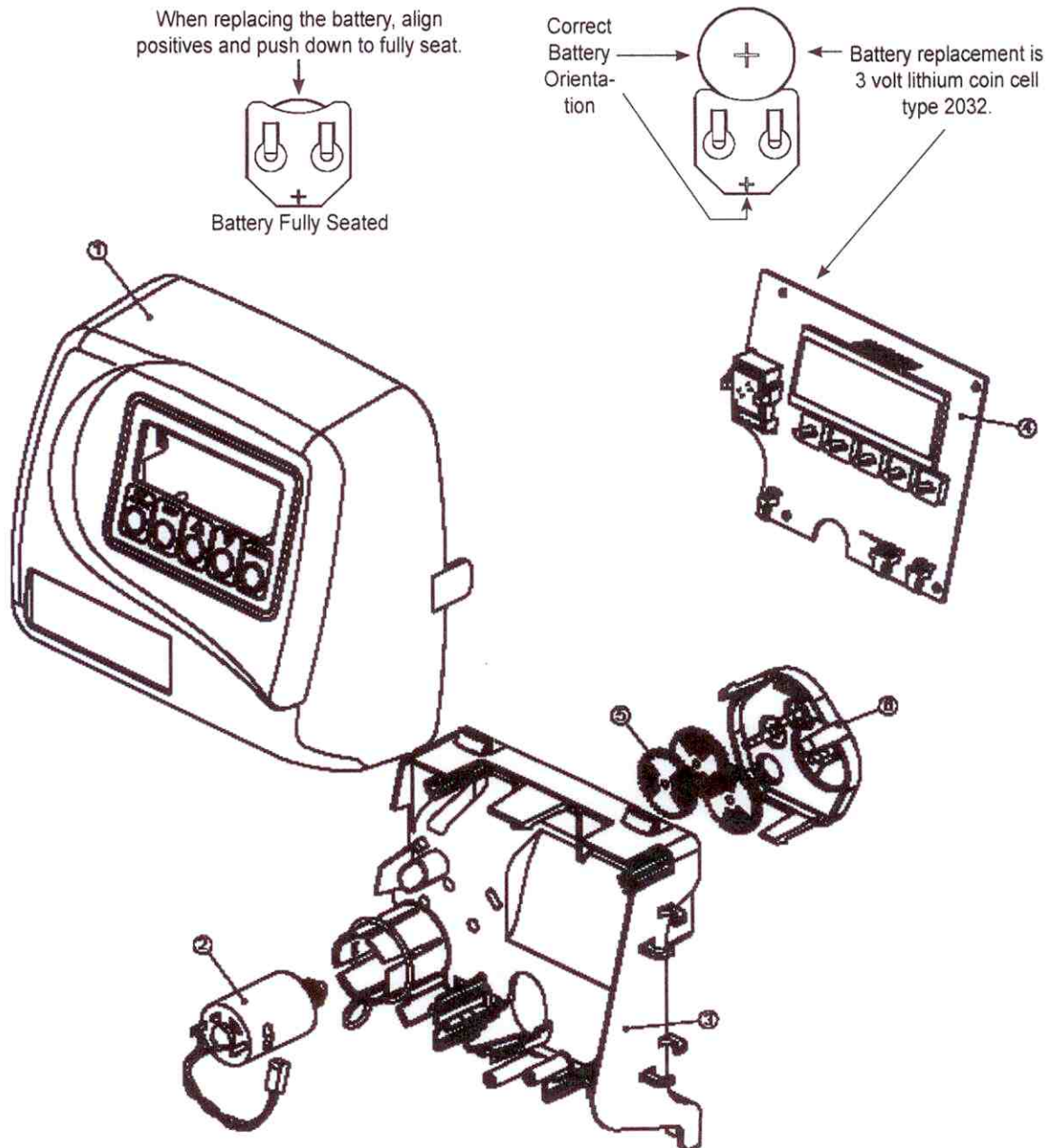


## Repair Parts (Continued)

Drawing No.	Order No.	Description	Quantity
See page 31	See page 31	Front Cover and Drive Assembly	1
See page 32	See page 32	CM1 Series Control Valve Assembly	1
See page 33	See page 33	CM125 Series Control Valve Assembly	1
See page 35	See Page 35	Water Meter Assembly	1
See page 36	V3006	Bypass Valve	1
See page 37	V3007-04	Installation Fittings	1
See page 37	J7502	Brine Tank ASY for Model CM1-844-24, CM1-948-32, and CM1-1054-48	1
	J7522	Brine Tank ASY for Model CM1-1252-60 and CM1-1354-75	1
	J72441C-474	Brine Tank ASY for Model CM1-1465-90	1
See page 38	V3162-017	Drain Line Flow Control for Model CM1-844-24	1
	V3162-022	Drain Line Flow Control for Model CM1-948-32 and CM125-32	1
	V3162-027	Drain Line Flow Control for Model CM1-1054-48 and CM125-48	1
	V3162-032	Drain Line Flow Control for Model CM1-1252-60 and CM125-60	1
	V3162-042	Drain Line Flow Control for Model CM1-1354-75 and CM125-75	1
	V3162-053	Drain Line Flow Control for Model CM1-1465-90 and CM125-90	1

Front Cover and Drive Assembly

Drawing No.	Order No.	Description	Quantity
1	V3175-01	FRONT COVER ASY	1
2	V3107-01	MOTOR	1
3	V3106-01	DRIVE BRACKET & SPRING CLIP	1
4	V3108CS-01	CS PC W BAT	1
5	V3110	DRIVE REDUCING GEAR 12X36	3
6	V3109	DRIVE GEAR COVER	1
	V3002	DRIVE ASY	*
Not Shown	V3186	AC ADAPTER 110V - 12V	1

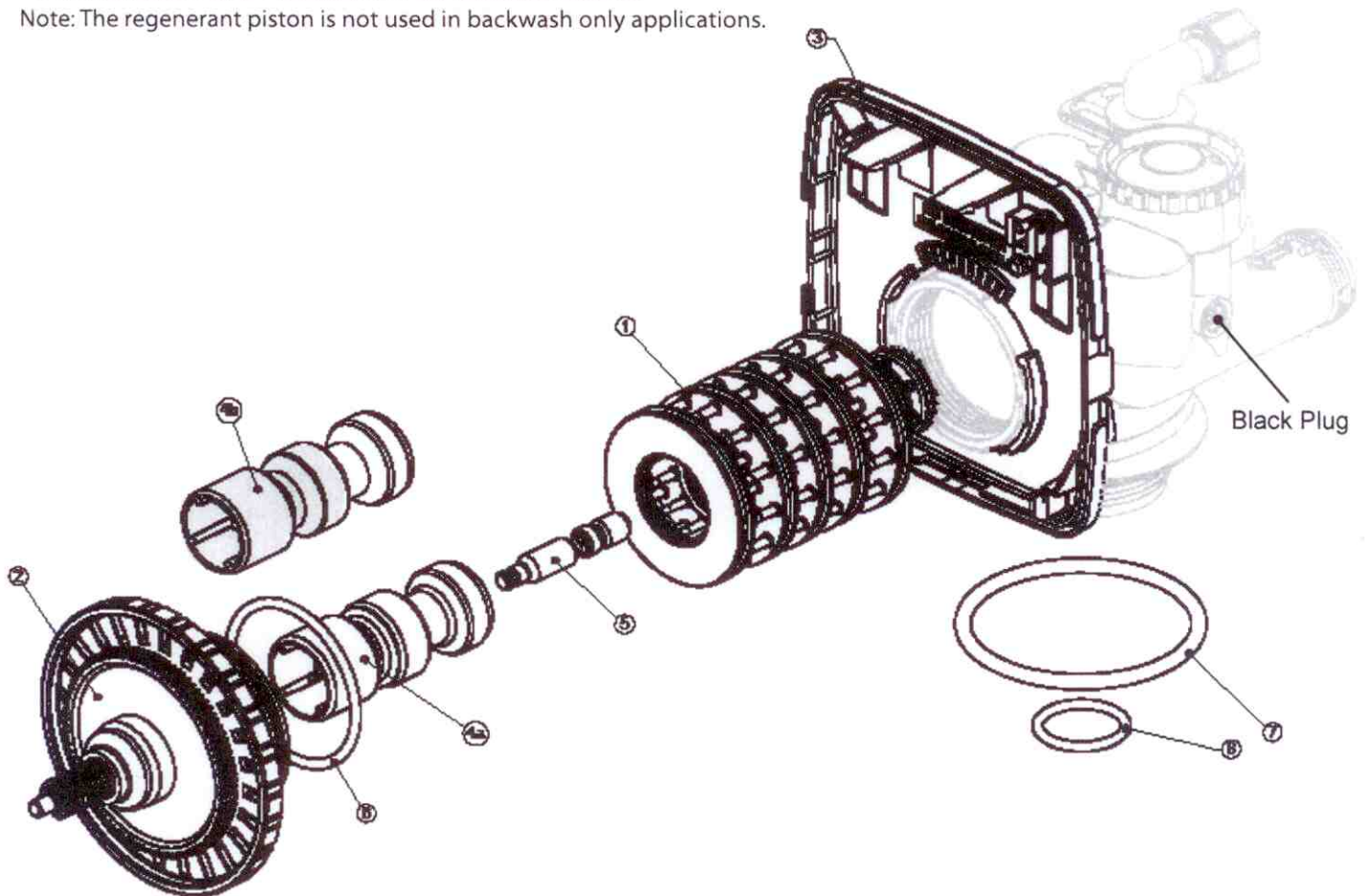


CM1 Series Control Valve  
 Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston and Spacer Stack Assembly

Drawing No.	Order No.	Description	Quantity
1	V3005	Spacer Stack Assembly	1
2	V3004	Drive Cap ASY	1
3	V3178	Drive Back Plate	1
4a	V3011*	Piston Downflow ASY	1
4b	V3011-01*	Piston Upflow ASY	
5	V3174	Regenerant Piston	1
6	V3135	O-ring 228	1
7	V3180	O-ring 337	1
8	V3105	O-ring 215 (Distributor Tube)	1
Not Shown	V3001	Body ASY Downflow	1
	V3001-02	Mixing Valve Body ASY	
	V3001UP	Body ASY Upflow	
	V3001-02UP	Mixing Valve Body Upflow ASY	
Not Shown	V3013	Mixing Valve ASY	1

\*V3011 is labeled with DN and V3011-01 is labeled with UP.

Note: The regenerant piston is not used in backwash only applications.

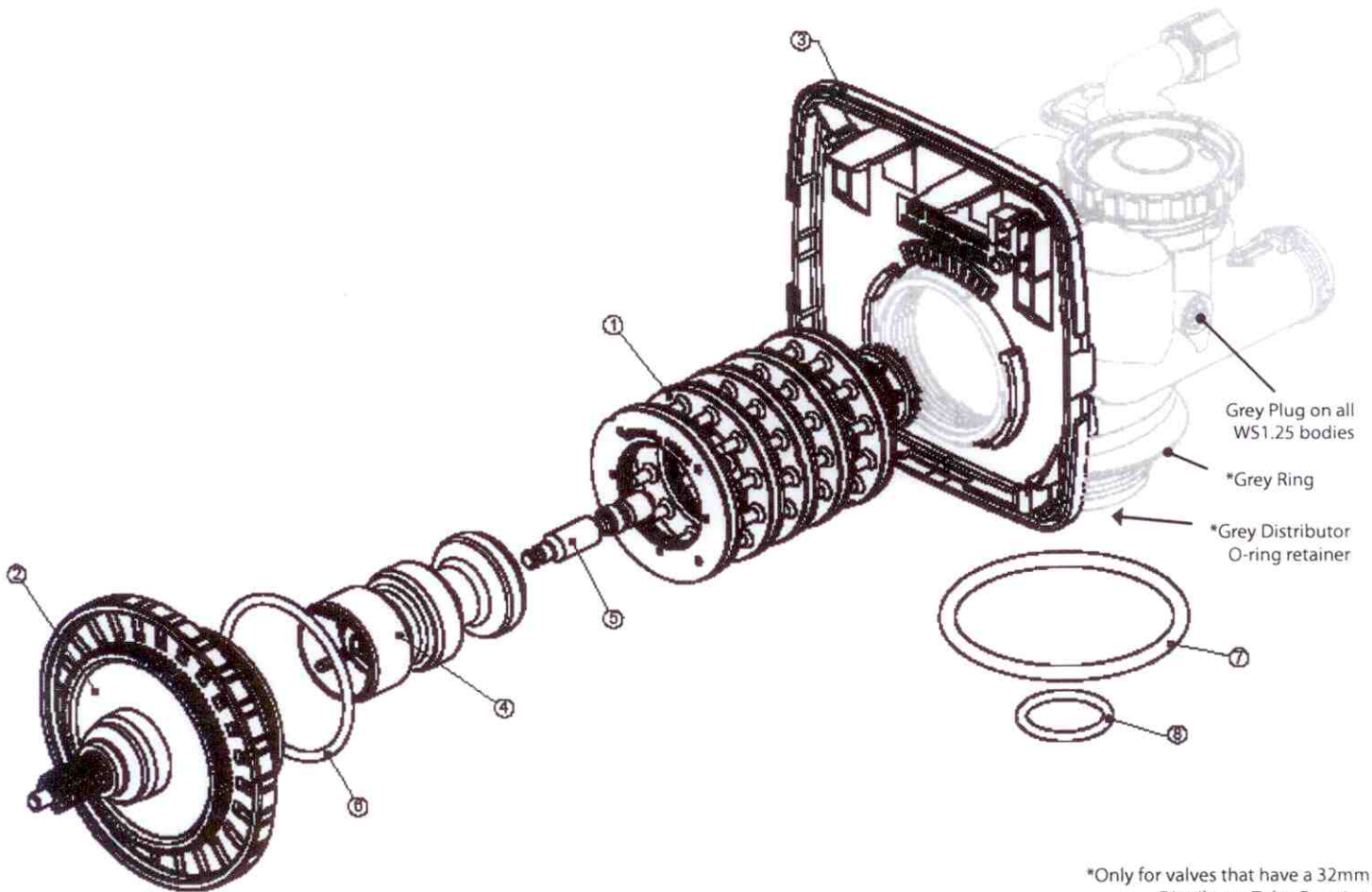




CM125 Series Control Valve  
 Drive Cap Assembly, Downflow Piston, Regenerant Piston and Spacer Stack Assembly

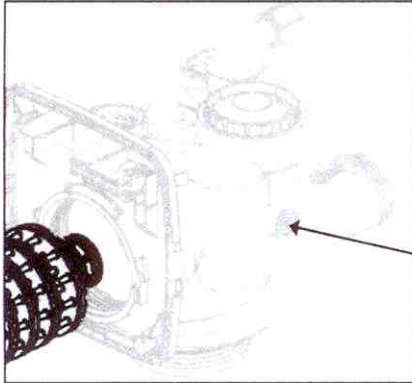
Drawing No.	Order No.	Description	Quantity
1	V3430	Spacer Stack Assembly	1
2	V3004	Drive Cap ASY	1
3	V3178	Drive Back Plate	1
4	V3407	Piston Downflow ASY	1
5	V3174	Regenerant Piston	1
6	V3135	O-ring 228	1
7	V3180	O-ring 337	1
8	V3358	O-ring 219 (Distributor Tube Opening 1.32")	1
	V3357	O-ring 218 (Distributor Tube Opening 32mm)	
Not Shown	V3020	Body ASY Downflow (Distributor Tube Opening 1.32")	1
	V3020-01	Mixing Valve Body Downflow ASY (Distributor Tube Opening 1.32")	
	V3020-02	Body ASY Downflow (Distributor Tube Opening 32mm)	
	V3020-03	Mixing Valve Body Downflow ASY (Distributor Tube Opening 32mm)	

Note: The regenerant piston is not used in backwash only applications.

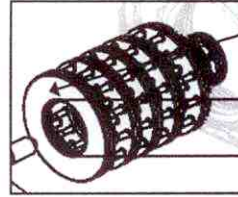


CM1 and CM125 Identification Figure

CM1 with 1.050" Distributor Tube Opening Identification

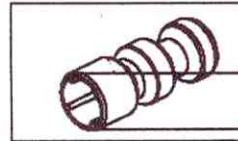


Black Plug



Spacer Color:  
Grey

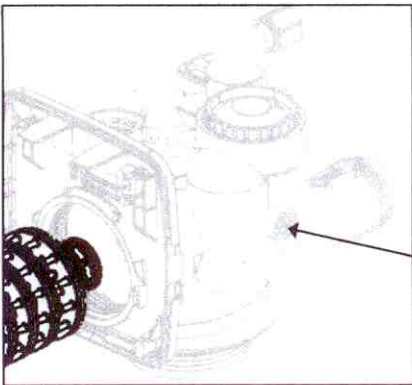
1.25"



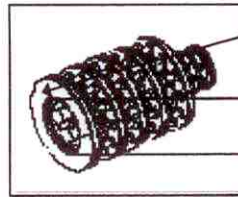
1.25"

Note: The WS1 downflow piston is a solid amber color. The WS1 upflow piston is black and amber.

CM125 with 1.32" Distributor Tube Opening Identification

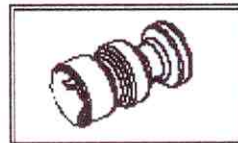


Grey Plug



Spacer Color:  
Black

1.5"

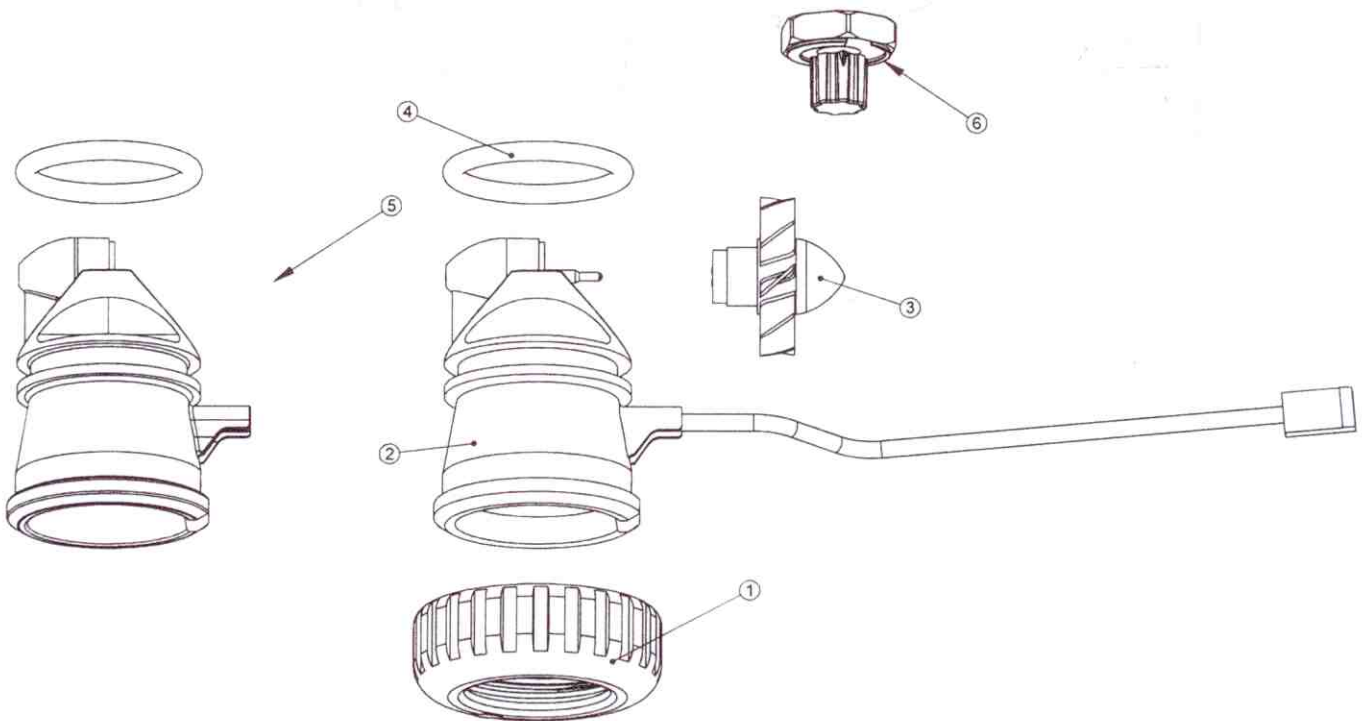


1.5"

Water Meter, Meter Plug and Mixing Valve

Drawing No.	Order No.	Description	Quantity
1	V3151	Nut 1" QC	1
2	V3003*	Meter ASY	1
3	V3118-01	Turbine ASY	1
4	V3105	O-ring 215	1
5	V3003-01	Meter Plug ASY	1
6	V3013	Mixing Valve	Optional

\*Order number V3003 includes V3118-01 WS1 Turbine ASY and V3105 O-ring 215.



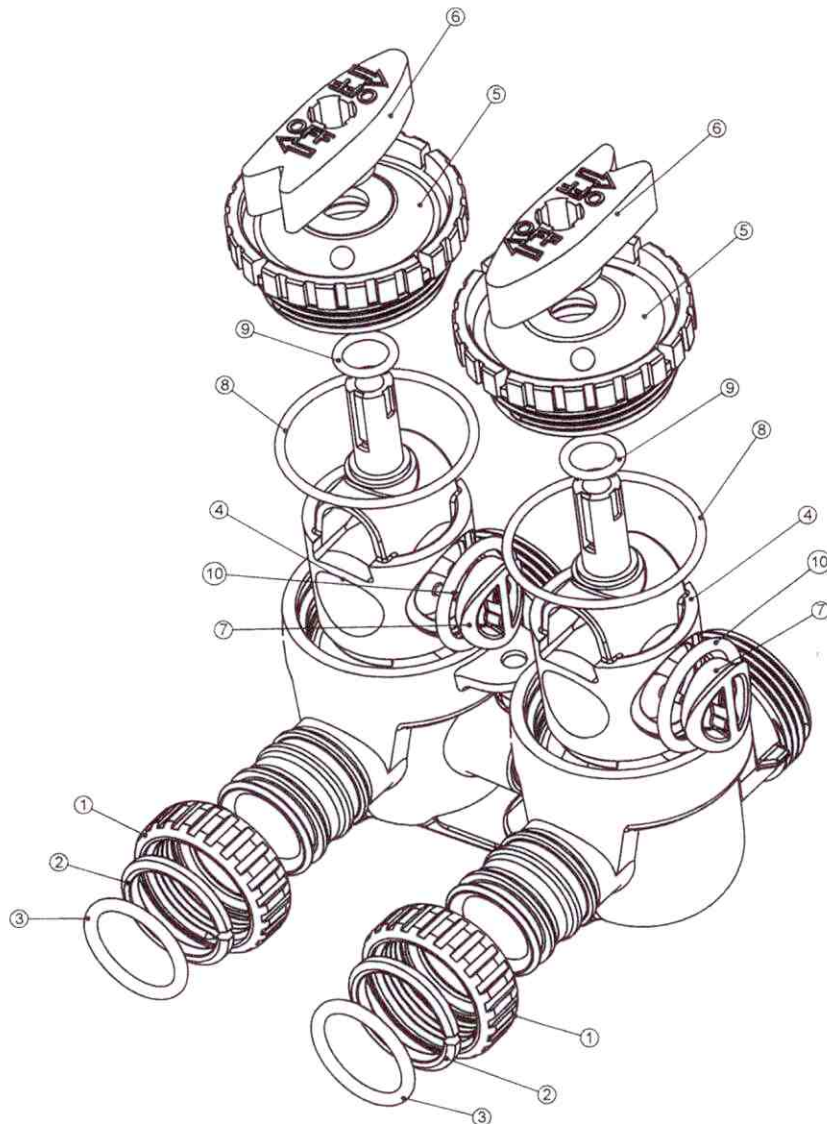
THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL HEALTH EFFECT APPLICATIONS.

Bypass Valve

Drawing No.	Order No.	Description	Quantity
1	V3151	Nut 1" Quick Connect	2
2	V3150	Split Ring	2
3	V3105	O-Ring 215	2
4	V3145	Bypass 1" Rotor	2
5	V3146	Bypass Cap	2
6	V3147	Bypass Handle	2
7	V3148	WS1 Bypass Rotor Seal Retainer	2
8	V3152	O-ring 135	2
9	V3155	O-ring 112	2
10	V3156	O-ring 214	2

(Not Shown) Order No. V3191-01, Description: WS1 Bypass Vertical Adapter Assembly

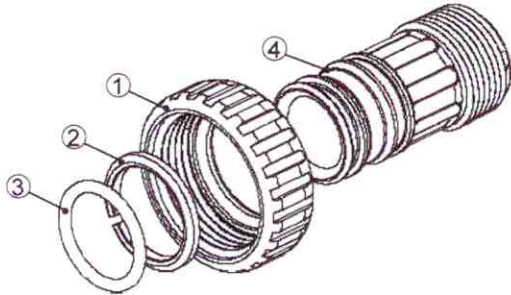
Order No.	Description	Quantity
V3151	Nut 1" Quick Connect	2
V3150	Split Ring	2
V3105	O-Ring 215	2
V3191	Bypass Vertical Adapter	2



Installation Fittings

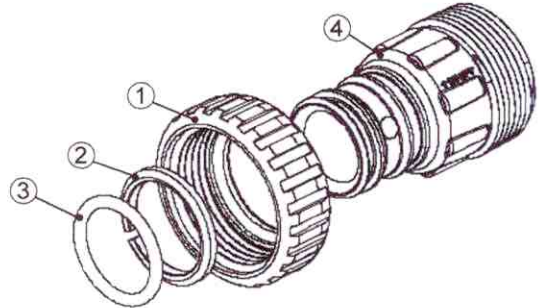
Order No: V3007-04  
Description: WS1 Fitting 1" Plastic Male NPT Assembly

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3164	WS1 Fitting 1" Plastic Male NPT	2



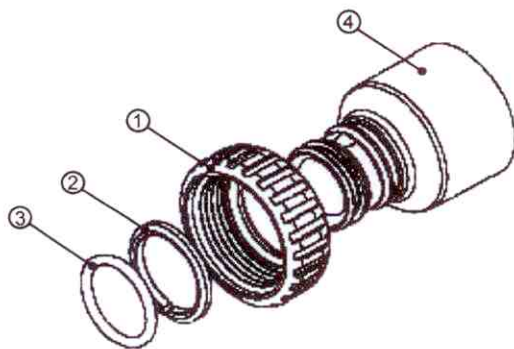
Order No: V3007-05  
Description: WS1 Fitting 1-1/4" Plastic Male NPT Assembly

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3317	WS1 Fitting 1-1/4" Plastic Male NPT	2



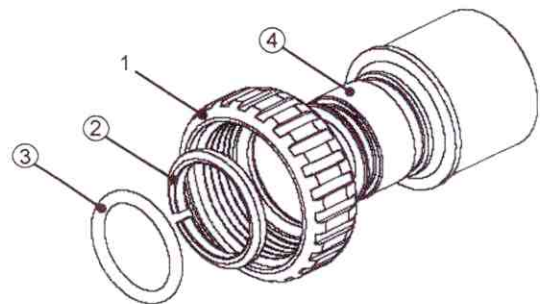
Order No: V3007-07  
Description: WS1 Fitting 1 1/4" & 1 1/2" PVC Solvent Assembly

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3352	WS1 Fitting 1 1/4" & 1 1/2" PVC Solvent	2



Order No: V3007-09  
Description: WS1 Fitting 1 1/4" & 1 1/2" Brass Sweat Assembly

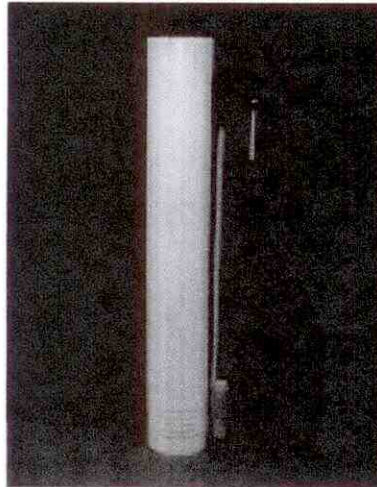
Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3375	WS1 Fitting 1 1/4" & 1 1/2" Brass Sweat	2



## Brine Tanks

Drawing No.	Order No.	Description	Quantity
1	H4700-29	Brine Well Kit for Model CM1-844-24, CM1-948-32, CM1-1054-48, CM125-32, and CM125-48	1
	H4700-36	Brine Well Kit for Model CM1-1252-60, CM1-1354-75, CM125-60, and CM125-75	1
	H4700-39	Brine Well Kit for Model CM1-1465-90 and CM125-90	1
2	J7502	18X33 Brine Tank with H4700-29 Brine Well Kit	1
	J7522	18X40 Brine Tank with H4700-36 Brine Well Kit	1
	J72441C-474	24X41 Brine Tank. Brine Well Kit sold separately.	1
4	V3164	WS1 Fitting 1" Plastic Male NPT	2

1) Brine Well



2) Brine Tank



Drain Line Flow Control

Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10TS8-BULK	Polytube insert 5/8	Option
3	V3192	Nut 3/4 Drain Elbow	Option
4*	V3158-01	Drain Elbow 3/4 Male	1
5	V3163	O-ring 019	1
6*	V3159-01	DLFC Retainer ASY	1
7	V3162-017	DLFC 1.7 gpm for 3/4	One DLFC must be used if 3/4 fitting is used
	V3162-022	DLFC 2.2 gpm for 3/4	
	V3162-027	DLFC 2.7 gpm for 3/4	
	V3162-032	DLFC 3.2 gpm for 3/4	
	V3162-042	DLFC 4.2 gpm for 3/4	
	V3162-053	DLFC 5.3 gpm for 3/4	

\*4 and 6 can be ordered as a complete assembly - V3331 Drain Elbow and Retainer Asy.

Valves are shipped without drain line flow control (DLFC) - install DLFC before using. Valves are shipped without 3/4 nut for drain elbow (polytube installation only) and 5/8" polytube insert (polytube installation only).

