C-SERIES

WS Series Models



1" & 1-1/4" Control Valve

WS Programming Guide

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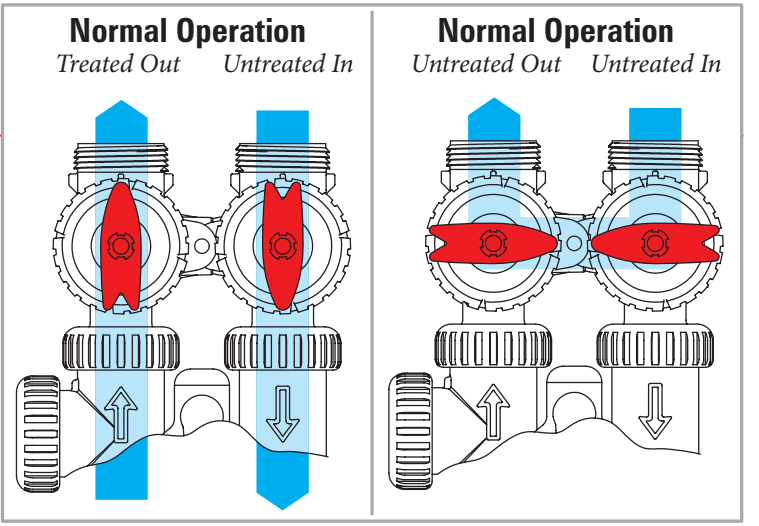
Drawings & Part Numbers

Front Cover & Drive Assembly 16

For Information Common to all 1" & 1.25" Control Valves Refer to the
C-Series Installation, Operation & Maintenance Manual

ByPass Operation

To shut off water to the system, please position arrow handles as shown in the bypass operation diagram to the right. If your valve doesn't look like the diagram, contact your service technician for instructions on how to shut off water.



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Control Valve Function & Cycles of Operation

This glass filled Noryl[1] (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 WS1 or the WS1.25 control valve is manufactured as a softener, the control valve can be ordered to perform downflow or upflow regeneration. When the WS1 or WS1.25 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. When the WS1 or WS1.25 control valve is used as a downflow softener, two backwashes always occur. When the WS1 or WS1.25 control valve is used as an upflow softener, only one backwash occurs after brining. 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.

When set up as a softener the backwash and rinse cycles automatically increase with increasing salt dosage. Backwashes can be set to be NORMAL or LONGER. The option selected will apply to all backwashes. Tables 2 and 3 show the length of the cycles when the valve is set up as a softener.

Table 1 - Regeneration Cycles Softening

1st Cycle	2nd Cycle	3rd Cycle	4th Cycle	5th Cycle	6th Cycle
WS1 & WS1.25 Downflow Regenerant Refill After Rinse					
Backwash	Regen	Backwash	Rinse	Fill/Dissolve	Service
WS1 & WS1.25 Downflow Regenerant Prefill					
Fill/Dissolve	Backwash	Regen	Backwash	Rinse	Service
WS1 & WS1.25 Upflow Regenerant Refill After Rinse					
Regen	Backwash	Rinse	Fill/Dissolve	Service	N/A
WS1 & WS1.25 Upflow Regenerant Prefill					
Fill/Dissolve	Regen	Backwash	Rinse	Service	N/A

[1] Noryl is a trademark of Sabic Innovative Plastics IP B.V. Company

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Table 2 - Backwash Normal Length Softener

Cycle Times in Minutes

WS1 & WS1.25 Downflow Softener				
Grains Capacity/lb NaCl		6000 to 3501	3500 to 2501	2500 to 1700
lbs NaCl/cu ft resin[2]		Less than 7.5	7.5 to 12	More than 12
Cycle Time In Minutes	Backwash Normal	6	8	8
	Regenerate	45	60	75
	Backwash Normal	3	8	10
	Rinse	3	4	6
	Total[3]	57	80	99
WS1 & WS1.25 Upflow Softener				
Grains Capacity/lb NaCl		6000 to 3501	3500 to 2501	2500 to 1700
lbs NaCl/cu ft resin[2]		Less than 7.5	7.5 to 12	More than 12
Cycle Time In Minutes	Backwash Normal			
	Regenerate	45	60	75
	Backwash Normal	6	10	12
	Rinse	3	4	6
	Total[3]	54	74	93

Table 3 - Backwash Longer Length Softener

Cycle Times in Minutes

WS1 & WS1.25 Downflow Softener				
Grains Capacity/lb NaCl		6000 to 3501	3500 to 2501	2500 to 1700
lbs NaCl/cu ft resin[2]		Less than 7.5	7.5 to 12	More than 12
Cycle Time In Minutes	Backwash Longer	8	10	12
	Regenerate	45	60	75
	Backwash Longer	8	10	12
	Rinse	4	6	8
	Total[3]	65	86	107
WS1 & WS1.25 Upflow Softener				
Grains Capacity/lb NaCl		6000 to 3501	3500 to 2501	2500 to 1700
lbs NaCl/cu ft resin[2]		Less than 7.5	7.5 to 12	More than 12
Cycle Time In Minutes	Backwash Longer			
	Regenerate	60	70	80
	Backwash Longer	12	14	16
	Rinse	5	7	9
	Total[3]	77	91	105

Table 4 shows the order of the cycles when the valve is set up as a filter. When the control valve is used as a downflow regenerating filter, the OEM has the option to specify one backwash or two backwashes. 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. There is only one rinse. Backwashes can be set to normal or longer. The option selected will apply to all backwashes. Tables 5 and 6 show the length of the cycles when the valve is set up as a filter.

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. Tables 5 and 6 show the length of the cycles when the valve is set up as a filter. 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.

Table 4 - Regeneration Cycles Softening

1st Cycle	2nd Cycle	3rd Cycle	4th Cycle	5th Cycle	6th Cycle
WS1 & WS1.25 Downflow Regenerant Refill After Rinse					
Backwash	Regen	2nd BW*	Rinse	Fill	Service
WS1 & WS1.25 Downflow Regenerant Prefill					
Fill	Backwash	Regen	2nd BW*	Rinse	Service
WS1 & WS1.25 No Regeneration					
Backwash	Rinse	2nd BW*	2nd Rinse**	Service	N/A

** - Second backwash is optional*

*** - Second rinse only occurs if Second Backwash option is selected.*

[2] These are reference numbers that approximate the amount of salt needed. The actual capacity in grains per pound of salt is used in calculations.

[3] Total time does not include fill time, which is dependent upon the amount of salt needed. When in the fill mode the system is providing treated water.

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Table 5

WS1 & WS1.25 Regenerating Filter					
		Single Backwash		Double Backwash	
		Normal	Longer	Normal	Longer
Cycle Time In Minutes	Backwash	14	16	8	12
	Regenerate	60	60	60	60
	2nd Backwash			10	12
	Rinse	8	10	8	10
	Total[4]	82	86	86	94

Table 6

WS1 & WS1.25 Non-Regenerating Filter					
		Single Backwash		Double Backwash	
		Normal	Longer	Normal	Longer
Cycle Time In Minutes	Backwash	14	16	8	12
	Rinse	8	10	6	6
	2nd Backwash			10	12
	2nd Rinse			8	10
	Total	22	26	32	40

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.[5] See Table 7.

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 WS1 & WS1.25 control valves 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. to 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.

A unique feature of this control valve is the ability to display actual water usage for the last 63 days. The values are initially stored as "----". This means the value is unknown. As days pass values are stored as "0" for no flow or the actual number of gallons. The counting of the gallons starts at the regeneration time. If no regeneration time can be set (i.e. when the valve is set for immediate regeneration) the counting of gallons starts at 12 a.m. Day 1 is yesterday, day 2 the day before yesterday, etc. As new values are added the oldest history disappears.

Another unique feature is that the valve automatically calculates a reserve capacity when set up as a softener with "Gallons

[4] Total time does not include fill time, which is dependent upon the amount of fill needed. When in the fill mode the system is providing treated water.

[5] See Installer Display Settings Step 3i for explanations of Day Override and Gallon Capacity.

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Table 7

DIR/Time Clock Options							
				Filter		Settings[6]	
DIR	Time Clock	Reserve Capacity	Softener	Regenerant	BW Only	Day Override	Gal Capacity
Yes		Automatically Calculated	Yes			Off	Any
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

Capacity" set to "AUTO" and the "Regeneration Time Option" set to "Normal" or "Normal + on 0". The actual reserve capacity is compared to the gallons capacity remaining immediately prior to the preset regeneration time. A regeneration will occur if the actual reserve capacity is less than the gallons capacity remaining. The actual reserve capacity is calculated by using the estimated reserve capacity and adjusting it up or down for actual usage.

The estimated reserve capacity for a given day of the week is the maximum value stored for the last three non-trivial water usages (i.e. more than 20 gallons/day) in seven day intervals.

[6] *Day Override and Gallon Capacity can not both be set to "oFF" at the same time.*

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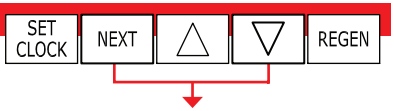
WS Controller - Setting Options Table

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

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

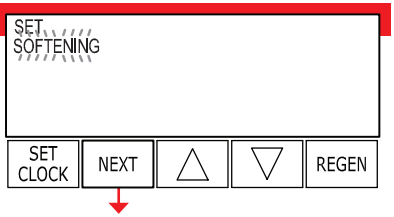
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STEP 1S



Press NEXT and ▼ 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.

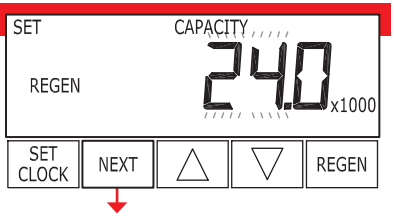
STEP 2S



Choose Softening using ▼ or ▲.

Press **NEXT** to go to *Step 3S*.
Press **REGEN** to exit Softener System Setup.

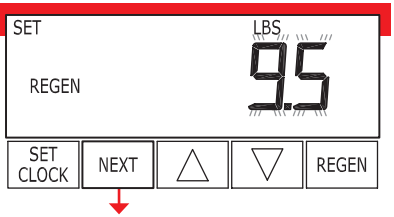
STEP 3S



Enter the ion exchange capacity in grains of hardness as calcium carbonate for the system based on test data using ▼ or ▲.

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

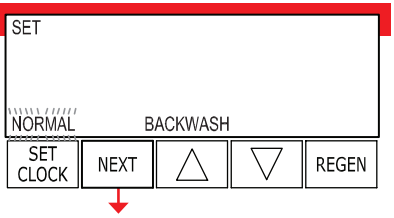
STEP 4S



Enter the pounds of salt per regeneration using ▼ or ▲.

Press **NEXT** to go to *Step 5S*.
Press **REGEN** to return to previous step.

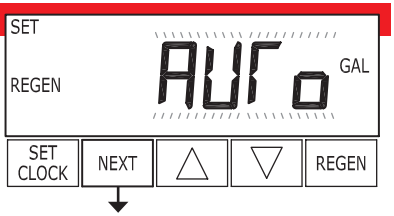
STEP 5S



Backwash: Select "NORMAL" or "LONGER" using ▼ or ▲. See Tables 2 or 3 for backwash times.

Press **NEXT** to go to *Step 6S*.
Press **REGEN** to return to previous step.

STEP 6S



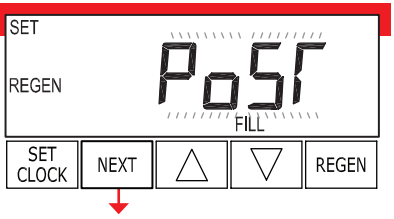
Set Gallons Capacity using ▼ or ▲:

- "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 7S*.
Press **REGEN** to return to previous step.

STEP 7S



Set Refill option using ▼ or ▲:

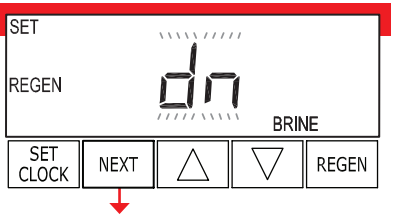
- "PoST" to refill the brine tank after the final rinse; or
- "PrE" to refill the brine tank two hours before the regeneration time set.

Press **NEXT** to go to *Step 8S*.
Press **REGEN** to return to previous step.

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WS Controller - Softener System Setup

STEP 8S



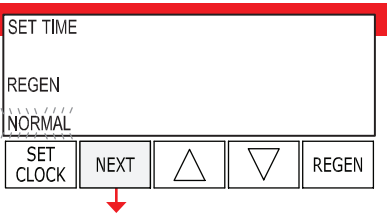
Set regenerant downflow or upflow using ▼ or ▲:

- "dn" if the regenerant is to fl ow downward through the media; or
- "UP" if the regenerant is to flow upward through the media.

Prior to selecting a regenerant flow direction, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See Valve Body Compliance Table in "C-Series" Installation Manual.

Press **NEXT** to go to *Step 9S*.
Press **REGEN** to return to previous step.

STEP 9S



Set Regeneration Time Option using ▼ or ▲:

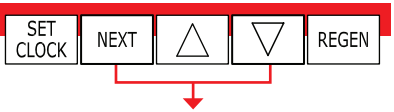
- "NORMAL" means regeneration will occur at the preset time;
- "on 0" means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- "NORMAL + on 0" means regeneration will occur at one of the following:
  - the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached which ever 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 Softener System Setup.
Press **REGEN** to return to previous step.

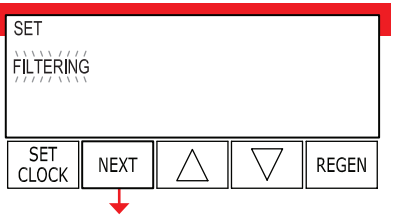
WS Controller - Filter System Setup

STEP 1F



Press NEXT and ▼ simultaneously for 3 seconds. If screen in *Step 2F* 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 2F

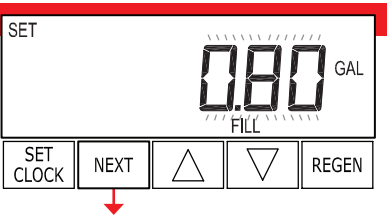


Choose Filtering using ▼ or ▲.

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

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

STEP 3F

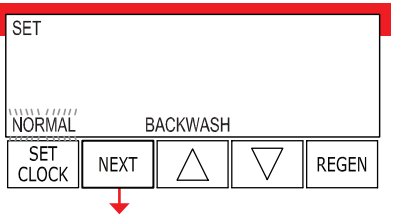


Enter "oFF" if regenerant is not used (i.e. backwash only) or enter the refill volume (in gallons) using ▼ or ▲. Prior to selecting oFF or regenerant volume, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See Compliance Table in "C-Series" Instruction Manual, Page 22.

Press **NEXT** to go to *Step 4F.*
Press **REGEN** to return to previous step.

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STEP 4F



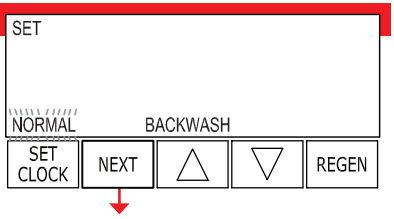
Backwash: Select using ▼ or ▲:

- "NORMAL" for one "NORMAL" backwash (14 minutes);
- "NORMAL 2" for two "NORMAL" backwashes (8 minutes each);
- "LONGER" for one "LONGER" backwash (16 minutes); or
- "LONGER 2" for two "LONGER" backwashes (12 minutes each).

See Tables 5 and 6 for additional details.

Press **NEXT** to go to *Step 5F*.
Press **REGEN** to return to previous step.

STEP 5F



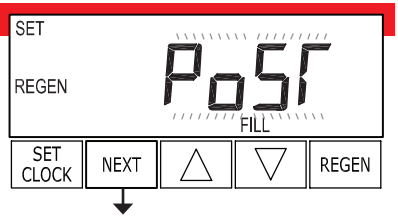
Set Gallons Capacity using ▼ or ▲:

- "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 6F*.
Press **REGEN** to return to previous step.

STEP 6F

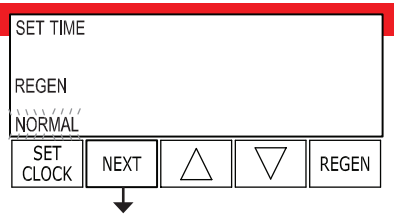


Set Refill option using ▼ or ▲:

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

Press **NEXT** to go to *Step 7F*.
Press **REGEN** to return to previous step.

STEP 7F



Set Regeneration Time Option using ▼ or ▲:

- "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 specified number of days between regenerations is reached; or
  - after 10 minutes of no water usage when the gallon capacity reaches 0 (zero).

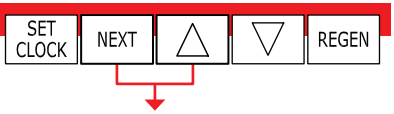
This display will not appear if *Step 5F* is set to oFF.

See Setting Options Table for more detail.

Press **NEXT** to exit Filter System Setup.
Press **REGEN** to return to previous step.

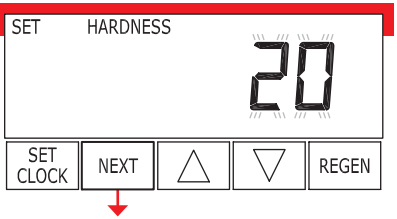
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STEP 1i



Press **NEXT** and ▲ simultaneously for 3 seconds.

STEP 2i

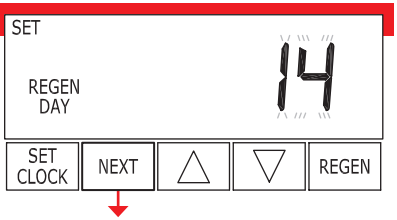


Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the ▲or▼ buttons. The default is 20 with value ranges from 1 to 150 in 1 grain increments.

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 OEM Filter Set-up or if 'AUTO' is not selected in OEM Softener Set-up.

Press **NEXT** to go to *Step 3i*.
Press **REGEN** to exit Installer Display Settings.

STEP 3i



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.

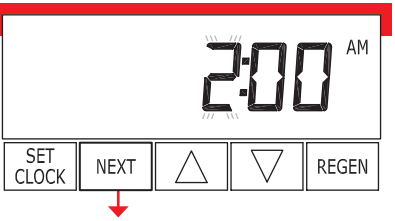
If value set to "oFF" regeneration initiation is based solely on gallons used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for a regeneration. Set Day Override using ▲or▼ 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 4i*.
Press **REGEN** to return to previous step.

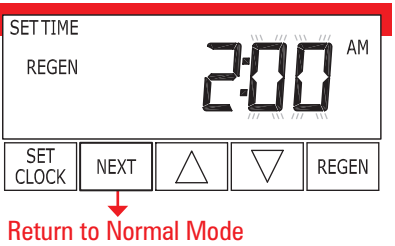
STEP 4i



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 the OEM Setup.

Press **NEXT** to go to step **5i**.
Press **REGEN** to return to previous step.

STEP 5i



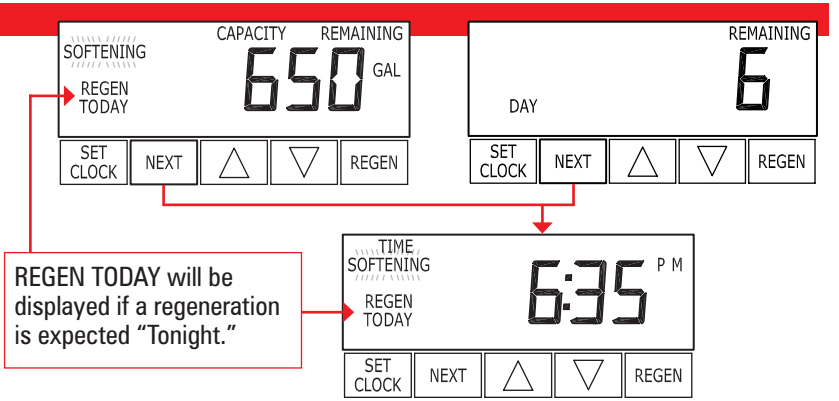
Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▲or▼ buttons. This display will not be shown if "on 0" is selected in the OEM Setup.

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.

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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



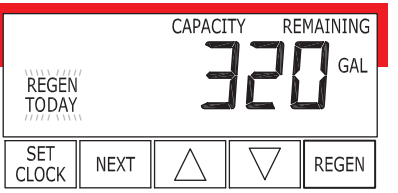
Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.

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.

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.

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.

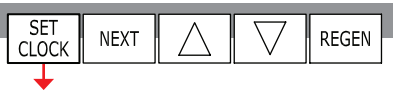
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User Display Setting

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**.

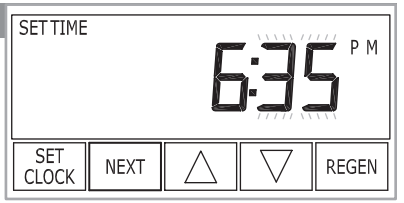
Step 2U



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

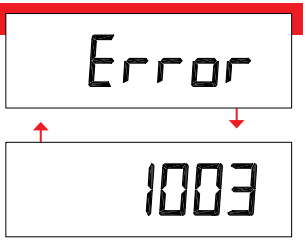


Current Time (minutes): Set the minutes of the day using ▲or▼ buttons.

Press **NEXT** to exit Set Clock.
Press **REGEN** to return to previous step.

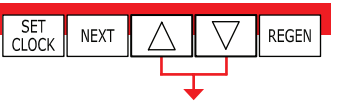
Error Message

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.



Diagnostics

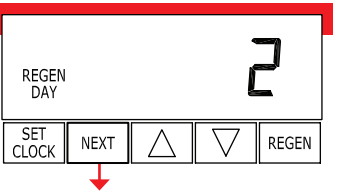
STEP 1D



Press ▲or▼ 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 **NEXT** and ▼ simultaneously for 3 seconds.

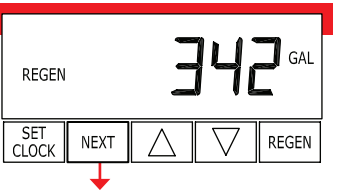
STEP 2D



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.

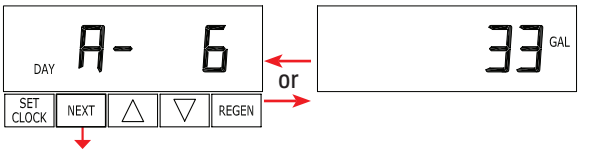
STEP 3D



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

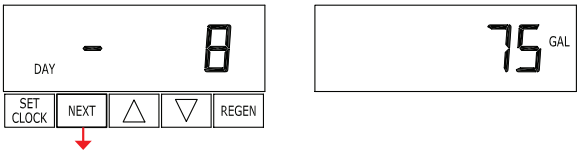
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STEP 4D - (Continued)

▲ 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 back wards in the day series.

Press the **NEXT** button at any time to go to Step **5D**.
Press **REGEN** to return to previous step.

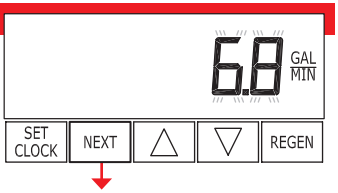
STEP 5D



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

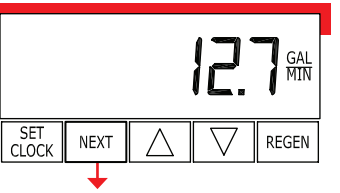


Flow Rate, Current: Turn the water on at one or more taps in the building. The flow rate in gallons per minute will be displayed. If flow stops the value will fall to zero in a few seconds. This display will equal zero if a water meter is not installed.

Press the **NEXT** button to go to Step **7D**.
Press **REGEN** to return to previous step.

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

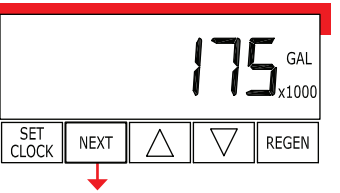
STEP 7D



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.

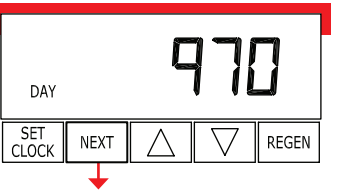
STEP 8D



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.

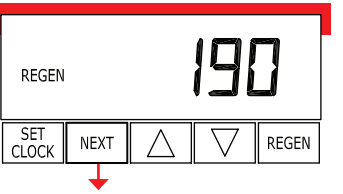
STEP 9D



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



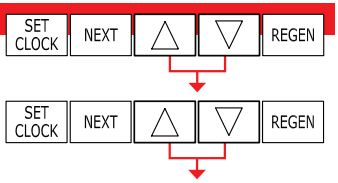
Regenerations, Total Number Since Last Reset: The total number of regenerations that have occurred since last reset will be displayed.

Return to Normal Mode

Press the **NEXT** button to exit Diagnostics.
Press **REGEN** to return to previous step.

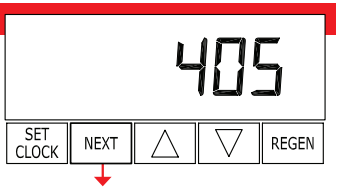
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STEP 1VH



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.

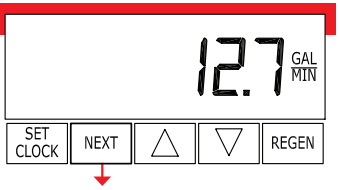
STEP 2VH



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.

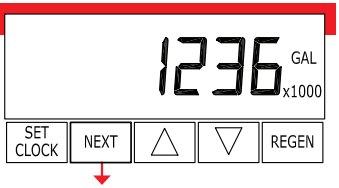
STEP 3VH[8]



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.

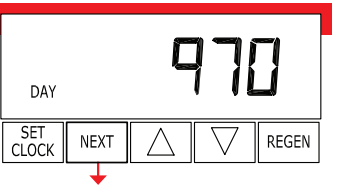
STEP 4VH



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 in stalled.

Press the **NEXT** button to go to Step **5VH**.
Press **REGEN** to return to previous step.

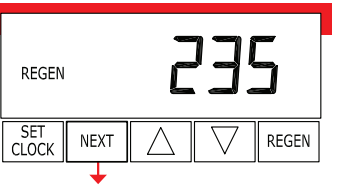
STEP 5VH



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.

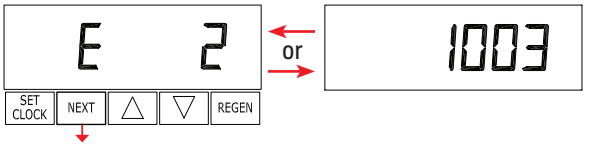
STEP 6VH



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 ▲or▼ buttons to review each error recorded.

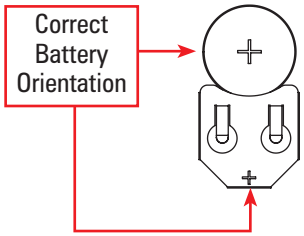
Press the **NEXT** button to exit Valve History.
Press **REGEN** to return to previous step.

[8] *Values in steps 3VH through 7VH cannot be reset.*

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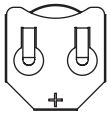
Front Cover and Drive Assembly

Part No.	Description	Qty
CL3175-01	WS1 Front Cover Asy	1
CL3107-01	Motor Asy	1
CL3106-01	Drive Bracket & Spring Clip	1
CL3108-10BOARD	PCB XMEGA REPL	1
CL3110	Drive Reducing Gear 12 x 36	3
CL3109	Drive Gear Cover	1
CL3002	TC Drive Assembly	*
Not Shown		
CL3186	AC Adapter 120V-12V	1
CL3186EU	AC Adapter 220-240V-12V EU	
CL3186UK	AC Adapter 220-240V-12V UK	
CL3186-01	AC Adapter Cord Only	



Battery replacement is 3 volt lithium coin cell type 2032.

When replacing the battery, align positives and push down to fully seat.



Fully Seated

Part No: C-Series WS Program Rev0816
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