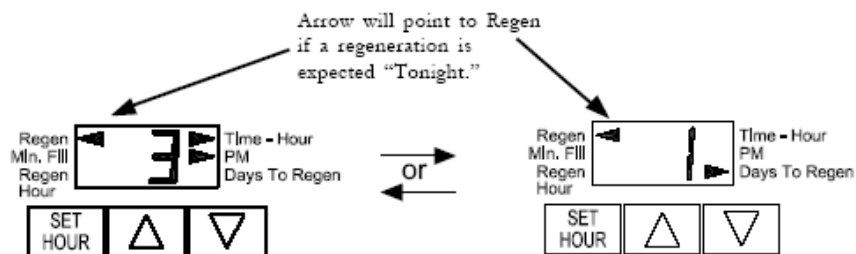


General Operation

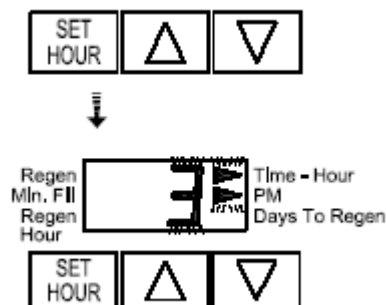
When the system is operating one of two displays will be shown: time of day or days until the next regeneration. Pressing UP or DOWN will toggle between the two choices.



To set Time of Day

In the event of a power outage, time of day needs to be reset. All other information will be stored in memory no matter how long the power outage. To access this mode, press SET HOUR, and complete the following steps:

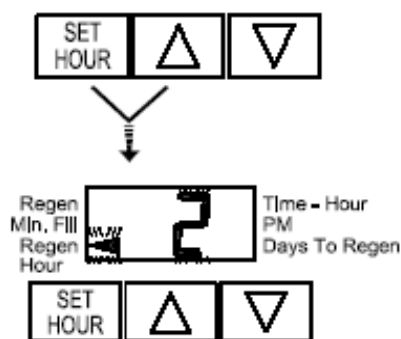
1. Accessed by pressing SET HOUR.
2. Adjust to the nearest hour using UP or DOWN. An arrow points to PM during p/m/ hours.
3. Press SET HOUR to complete and return to normal operation.



To set Time of Regeneration / Backwash

For initial set-up, or to make adjustments, please complete the steps as shown. Access this mode by pressing SET HOUR and UP simultaneously for 3 seconds.

1. Accessed by pressing SET HOUR and UP simultaneously for 3 seconds.
2. Adjust time of regeneration hour using UP or DOWN. An arrow points to PM during p.m. hours. Simultaneously press SET HOUR and DOWN to return to normal operation.



NOTE: With a fresh batch of media, ALWAYS backwash your system immediately in order to sufficiently flush the carbon media. After this, we suggest to set your backwash cycle for once a week. If you begin to notice problems with your water (such as color, taste, or odor), set your backwash for twice a week. As time progresses, you will need to program a backwash more frequently during the week. Eventually, a daily backwash cycle will be required to keep your water satisfactory. This is an indication that your media needs to be changed. Contact WaterRx for recharge instructions and ordering information.

Manual Regeneration / Backwash

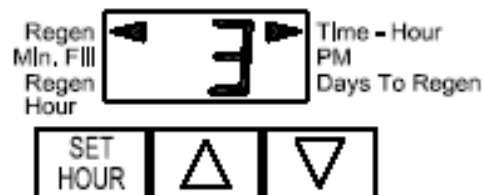
NOTE: For softeners, if brine tank does not contain salt, fill with salt and wait at least 2 hours before regeneration.

If you initiate a manual regeneration, either immediately, or tonight at the programmed time (typically 2 a.m.), complete the following steps:

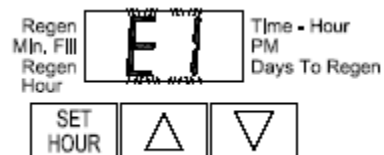
For Immediate Regeneration / Backwash:
Press and hold UP and DOWN simultaneously until valve motor starts (typically 2 seconds).

For Regeneration / Backwash Tonight:
Press and release UP and DOWN simultaneously (notice that arrow points to Regen.)

Arrow will point to Regen if a regeneration is expected "Tonight."

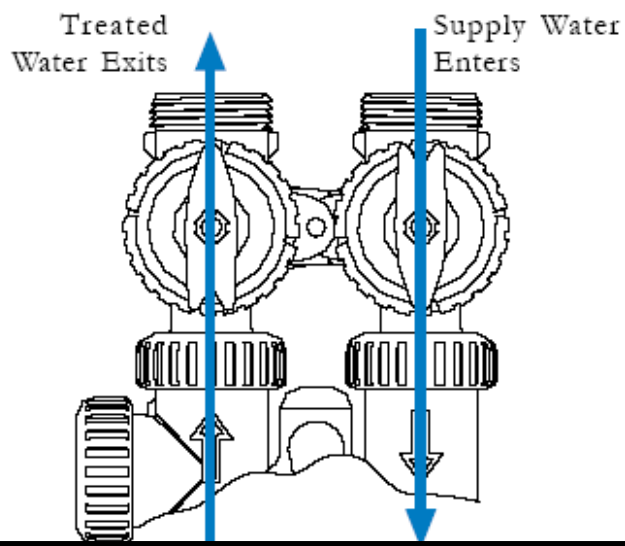


If the display shows "E1," "E2," or "E3" (for error), call a service technician.

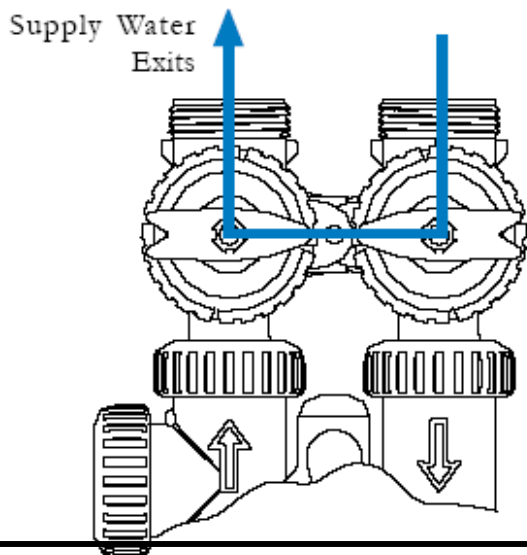


To SHUT OFF water to the system, please position arrow handles as shown in the bypass operation diagram below. If your valve doesn't look like the diagram below, contact your service technician for instructions on how to shut off the water.

NORMAL OPERATION



BYPASS OPERATION



Bypass Valve

The bypass valve is typically used to isolate the control valve from the plumbing systems water pressure in order to perform control valve repairs or maintenance. The WS1 bypass valve is particularly unique in the water treatment industry due to its versatility and state of the art design features. The 1. full flow bypass valve incorporates four positions including a diagnostic position that allows service 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 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.

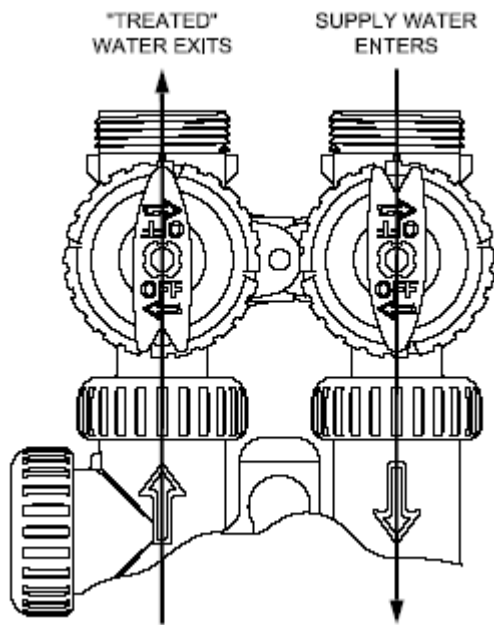
The bypass consists of two interchangeable plug valves that are operated independently by red arrow shaped handles. The handles identify the flow direction of the water. The plug valves enable the bypass valve to operate in four positions.

- 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)

Bypass Valve Operation

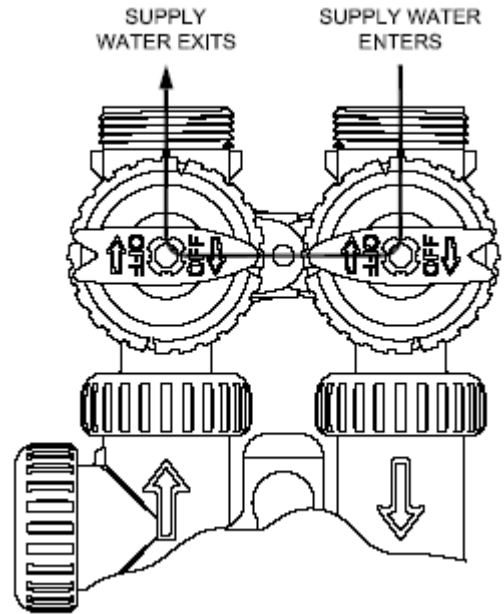
Normal Operation

Figure 1



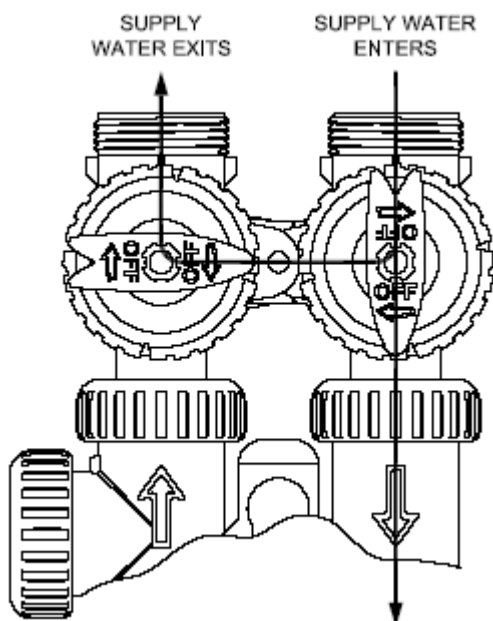
Bypass Operation

Figure 2



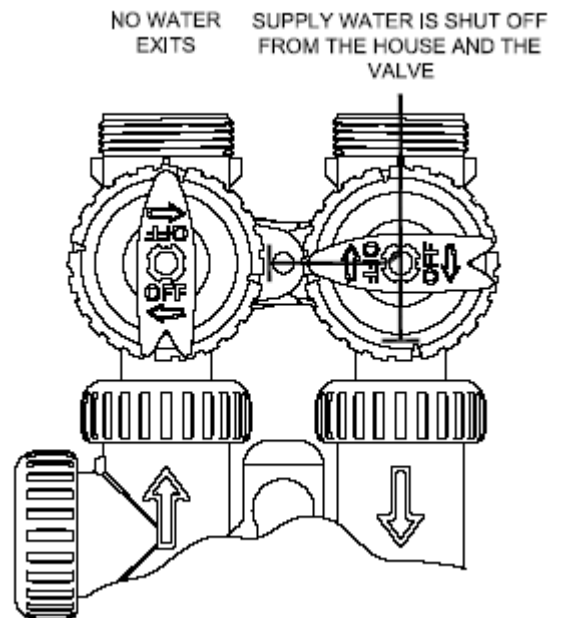
Diagnostic Mode

Figure 3



Shut Off Mode

Figure 4



OEM General Instructions

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

- OEM System Setup
- Installer Displays & Settings (either 1-99 Days Between Regeneration option or 7-Day option)
- User Displays

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

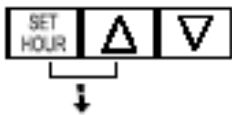
When in operation, normal user displays show the time of day or days remaining before regeneration. When stepping through a procedure if no buttons are pressed within five minutes the display returns to a normal user display. Any changes made prior to the five-minute time out are incorporated.

To quickly exit Installer Displays & Settings or OEM Setup simultaneously press SET HOUR + DOWN. Any changes made prior to the exit are incorporated.

To reinitialize the control valve check to make sure the valve is in the User Display. Then simultaneously press SET HOUR + DOWN or unplug power source plug (black wire) on the circuit board, and plug back in.

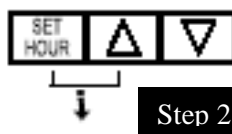
OEM System Setup

Step 1SS



Step 1SS- From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release. Then press SET HOUR + UP buttons simultaneously for 3 seconds and release.

Step 2SS



Step 2SS- Choose the desired program by pressing UP or DOWN buttons. Press SET HOUR button to go to Step 3SS.

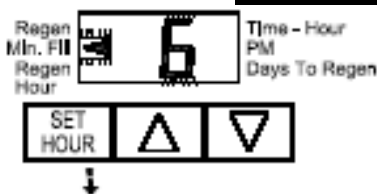


Regeneration Cycles and Times for Different Programs

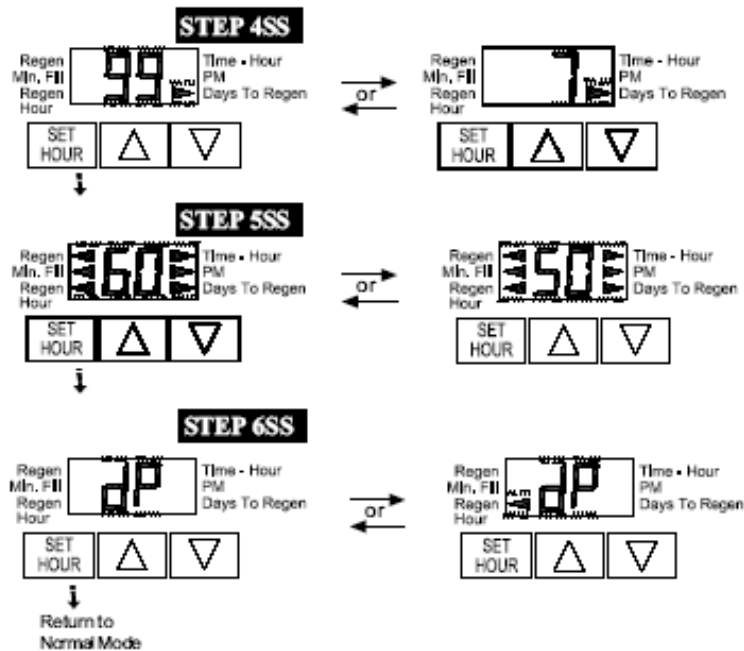
Program	All Times in Minutes				
	1 st Backwash	Regenerate	2 nd Backwash	Rinse	Fill
P0	3	50	3	3	1-99
P1	8	50	8	4	1-99
P2	8	70	10	6	1-99
P3	12	70	12	8	1-99
P4	10	50	Skipped	8	1-99
P5	4	50	Skipped	4	1-99
P6	12	6	Skipped	12	1-99
P7	6	Skipped	Skipped	4	Skipped
P8	10	Skipped	Skipped	6	Skipped
P9	14	Skipped	Skipped	8	Skipped

Note: During regeneration the display will show C1, C2, etc. If the cycle is skipped, that cycle number will not be displayed.

Step 3SS



Step 3SS- If program P0 through P6 was selected, enter in the minutes of fill using the UP or DOWN buttons. The allowable values vary from a low of 1 to a high of 99. If program P7, P8, or P9 was selected, dashes will appear for minutes of fill. Press SET HOUR button to go to Step 4ss. Note: For each minute of fill 0.5 gallons of water is added to the solution tank. With salt this equates to approximately 1-½ pounds of salt per minute of fill.



STEP 4SS. Use UP or DOWN buttons to switch between:

- . 1-99 Days Between Regen; or
- . 7-Day.

Press SET HOUR button to go to Step 5SS.

STEP 5SS. Use UP or DOWN buttons to switch between 60 Hz and 50 Hz option. Supply your own transformer if using 50 Hz option. Press SET HOUR button to go to Step 6SS.

STEP 6SS . If a differential pressure switch is installed and actuated:

- . a regeneration will occur immediately if no arrow points at Regen Hour; or
- . a regeneration will occur at the delayed regeneration hour if an arrow points at Regen Hour.

Use UP or DOWN buttons to switch between the two choices. If a differential switch is not installed the settings in this display are ignored. Press SET HOUR to exit OEM system setup.



NOTE: A regeneration will be initiated or scheduled after the control has received a signal for five minutes.

- A. Differential pressure switch connection
- B. Motor wire connection
- C. Transformer wire connection

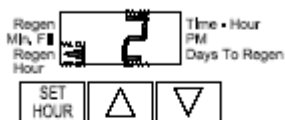
Installer Displays & Settings (1-99 Days Between Regeneration / Backwash option)

STEP 1ID



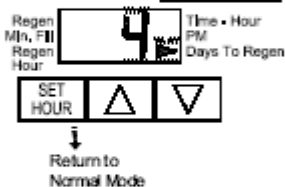
STEP 1ID . From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release.

STEP 2ID



STEP 2ID . Regeneration Time: Set the clock to the hour the regeneration should occur by using the UP or DOWN buttons. An arrow points to PM after 12. Press SET HOUR to go to STEP 3ID.

STEP 3ID



STEP 3ID . Days To Regen: Set the number of days between regenerations. The allowable range is 1 to 99. Press SET HOUR to exit Installer Displays & Settings.

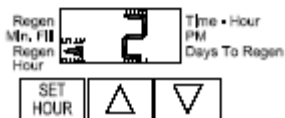
Installer Displays & Settings (7 day option)

STEP 1I7



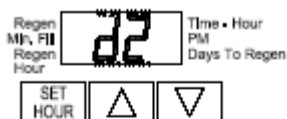
STEP 1I7 . From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release.

STEP 2I7



STEP 2I7 . Regeneration Time: Set the clock to the hour the regeneration should occur by using the UP or DOWN buttons. An arrow points to PM after 12. Press SET HOUR to go to STEP 3I7.

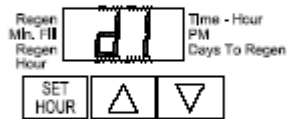
STEP 3I7



STEP 3I7 . Current Day of Week: Set the current day of the week by using the UP or DOWN buttons (See chart at right for date codes). Press SET HOUR to go to STEP 4I7.

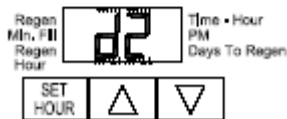
Display	Day of Week
d1	Sunday
d2	Monday
d3	Tuesday
d4	Wednesday
d5	Thursday
d6	Friday
d7	Saturday

STEP 4I7

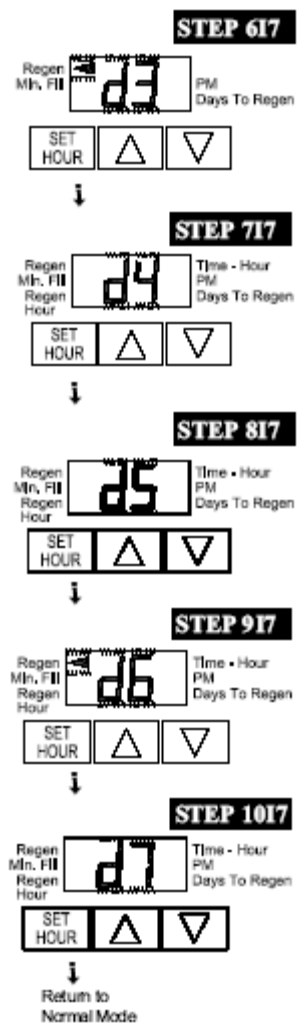


STEP 4I7 . Sunday Regeneration: To regenerate on Sunday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Sunday. Press SET HOUR to go to STEP 5I7.

STEP 5I7



STEP 5I7 . Monday Regeneration: To regenerate on Monday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Monday. Press SET HOUR to go to STEP 6I7.



STEP 617 . Tuesday Regeneration: To regenerate on Tuesday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Tuesday. Press SET HOUR to go to STEP 717.

STEP 717 . Wednesday Regeneration: To regenerate on Wednesday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Wednesday. Press SET HOUR to go to STEP 817.

STEP 817 . Thursday Regeneration: To regenerate on Thursday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Thursday. Press SET HOUR to go to STEP 917.

STEP 917 . Friday Regeneration: To regenerate on Friday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Friday. Press SET HOUR to go to STEP 1017.

STEP 1017 . Saturday Regeneration: To regenerate on Saturday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Saturday. Press SET HOUR to exit Installer Displays & Settings.

NOTE: If all arrows are turned off in d1-d7, Days to Regen in the User Displays will always read 7 and a regeneration will never occur.

User Displays

General Operation

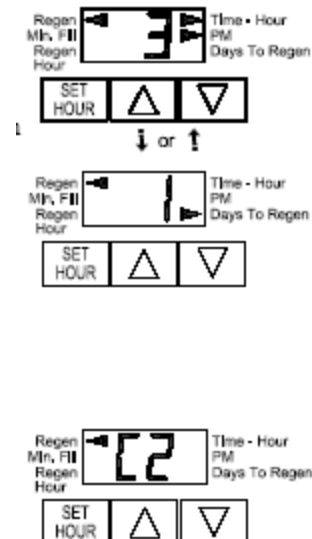
When the system is operating one of two displays will be shown. Pressing UP or DOWN button will alternate between the displays. One of the displays is always the current time of day (to the nearest hour). The second display is the days remaining until the next regeneration. If the days remaining is equal to one, a regeneration will occur at the next preset regeneration time. The user can scroll between displays as desired.

If the system has called for a regeneration that will occur at the preset time of regeneration, the arrow will point to Regen.

Regeneration / Backwash 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 indicate the cycle of the regeneration process (see Table 3) that is occurring and an arrow will also point to Regen. The system will run through the steps automatically and will reset itself to provide treated water when the regeneration is completed.

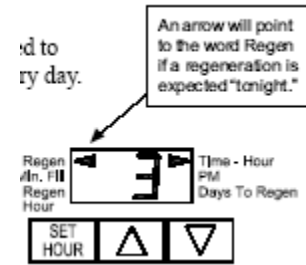


Manual Regeneration / Backwash

Sometimes there is a need to regenerate the system, sooner than when the system calls for it, usually referred to as a 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, simultaneously press UP + DOWN buttons together and release. The arrow will point to the word Regen if regeneration is expected tonight.. To cancel the regeneration simultaneously press UP + DOWN buttons and release.

To initiate a manual regeneration immediately, simultaneously press UP + DOWN buttons together 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.



STEP 1U



Set Time of Day

STEP 1U . Press SET HOUR

STEP 2U



STEP 2U . Current time: Set the clock to the closest hour by using the UP and DOWN button. An arrow points to PM after 12. After a power outage, the time of day will need to be reset. Press SET HOUR to exit.

Power Loss

If the power goes out current time of day will need to be reset. If the power goes out while the system is regenerating, the cycle picks up where it was interrupted when the power returns. Note: The display will flash if a power outage has occurred.

Error Message

If .E1., .E2. or .E3. appears on the display contact the OEM for help. This indicates that the valve did not function properly.



Installation

Refill Flow Control Assembly or Refill Port Plug

Control valves that are setup for backwash only come equipped with a refill port plug. The refill port plug has no regenerate line connection.

Control valves that use a regenerate, come equipped with a 3/8. refill flow control assembly. To switch to the 1/2. refill flow control assembly, remove the refill flow control and retainer (from the 3/8. refill elbow) by twisting and pulling out. Insert the refill flow control and retainer into the 1/2. refill elbow.

To complete the regenerate line connection, orientate the outlet in the desired direction and push the plastic insert into the polytube. Push the polytube into the nut. Do not use pipe dope or other sealants on threads. The threads for the compression nut do not need Teflon tape. Tighten the nut securely to create a pressure tight connection. A pliers or crescent wrench may be used to tighten or unscrew the nut. The nut, gripper and retainer sleeve is a 3-piece assembly that can come apart if removed from the elbow body. Parts must be reassembled exactly as shown in refill flow control assembly drawing to function properly. If the nut is completely removed from the body, slip the nut, plastic gripper and retainer sleeve on to the tube then tighten on to the fitting.

Drain Line Flow Control and Fitting Assembly

To determine which drain line flow control to use, obtain media bed expansion tables from the media manufacturer, choose a water temperature and look up the desired backwash rate per square foot of bed area. Then calculate the backwash rate using the desired tank diameter. Using **Table 5** pick the drain line flow control that has the backwash flow rate closest to the calculated backwash rate. If a manufacturer chooses to use an external drain line flow control, use a drain elbow fitting that does not contain a hole.

If the drain line is a 5/8" flexible polytube, slide the nut onto the polytube, then place the polytube insert into the end of the polytube

and tighten the nut on to the $\frac{3}{4}$ " drain line fitting. The nut is only designed for use with flexible polytube. Use other nuts if attaching different materials.

To access the drain line flow control remove the locking clip by pulling it straight out. Pull fitting out and replace the locking clip so that it is not misplaced. The drain line fitting is pressed in and has an o-ring seal.

In the $\frac{3}{4}$ " elbow, the white flow control retainer is pressed in and has an o-ring seal. The retainer can be removed by rotating and pulling. The flow control can be removed by prying upward with a small blade flat screwdriver in one of the slots on the side. The drain line flow control and retainer can be chemically cleaned in dilute sodium bisulfite or vinegar or replaced. Do not use a wire brush to clean the flow control or the washer. The washers are identified with three numbers, which correspond to the flow rate. When reinstalling make sure the identifying number and the rounded inside diameter on the washer is visible when seated in the retainer. The white flow control washer retainer can also be removed and cleaned. Push retainer in firmly when reinstalling.

In the 1" straight fitting, the retainer is the fitting. Unscrew the nut to access the flow control. The drain line flow control and the fitting can be chemically cleaned or replaced. Do not use a wire brush to clean the flow control or the fitting.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on the black o-ring. Use a pliers or crescent wrench to tighten or unscrew the nut. Do not use a pipe wrench to tighten or loosen nut. Do not use pipe dope or other sealants on threads. Use Teflon tape on the threads of the drain line control fitting when installing $\frac{3}{4}$ " NPT or 1" straight fitting.

Installation Fitting Assemblies

The installation fittings connect to the control valve or the bypass valve using nuts that only require hand tightening. Hand tighten nut connections between control valve and installation fittings, control valve and bypass valve, and bypass valve and installation fittings allow for easy serviceability. Do not use a pipe wrench to tighten nuts on installation fittings. Hand tighten only.

Split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the installation fittings allows approximately 2 degrees off axis alignment to the plumbing system. The installation fittings are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

When assembling the installation-fitting package, 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. Solvent cements and primers should be used in accordance with the manufacturer's instructions.

Slip the nut onto the fitting first, then the split ring second and the o-ring last. Hand tighten the nut. If the fitting is leaking tightening the nut will not stop the leak. Remove the nut, remove the fitting, and check for damage or misalignment of the o-ring.

Do not use pipe dope or other sealant on threads. Teflon tape must be used on the threads of the 1. NPT elbow and the $\frac{1}{4}$ " NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on black o-rings.

Bypass Valve

The bypass valve easily connects to the control valve body using nuts that only require hand tightening. Hand tighten nut connections between control valve and fittings, control valve and bypass valve, and bypass valve and installation fittings allow for easy serviceability. The split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the bypass, allows approximately 2 degrees off axis alignment to the plumbing system. The bypass is designed to accommodate minor plumbing misalignments but is not designed to support the weight of a system or the plumbing.

Avoid getting primer and solvent cements on any part of the o-rings or split rings, bypass valve or control valve. Do not use pipe dope or other sealant on threads. Teflon tape is not necessary on the caps because of o-ring seals.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on black o-rings.

Remember! Make certain that you backwash the unit right after the start-up to flush out all carbon and keep it from entering the pipes in your home.

**Waterx Corporation
6761 Bramble Avenue
Cincinnati, OH 45227**

1-800-548-5785

Fax: 513-271-0515

Website: www.waterx.com

E-mail: info@waterx.com