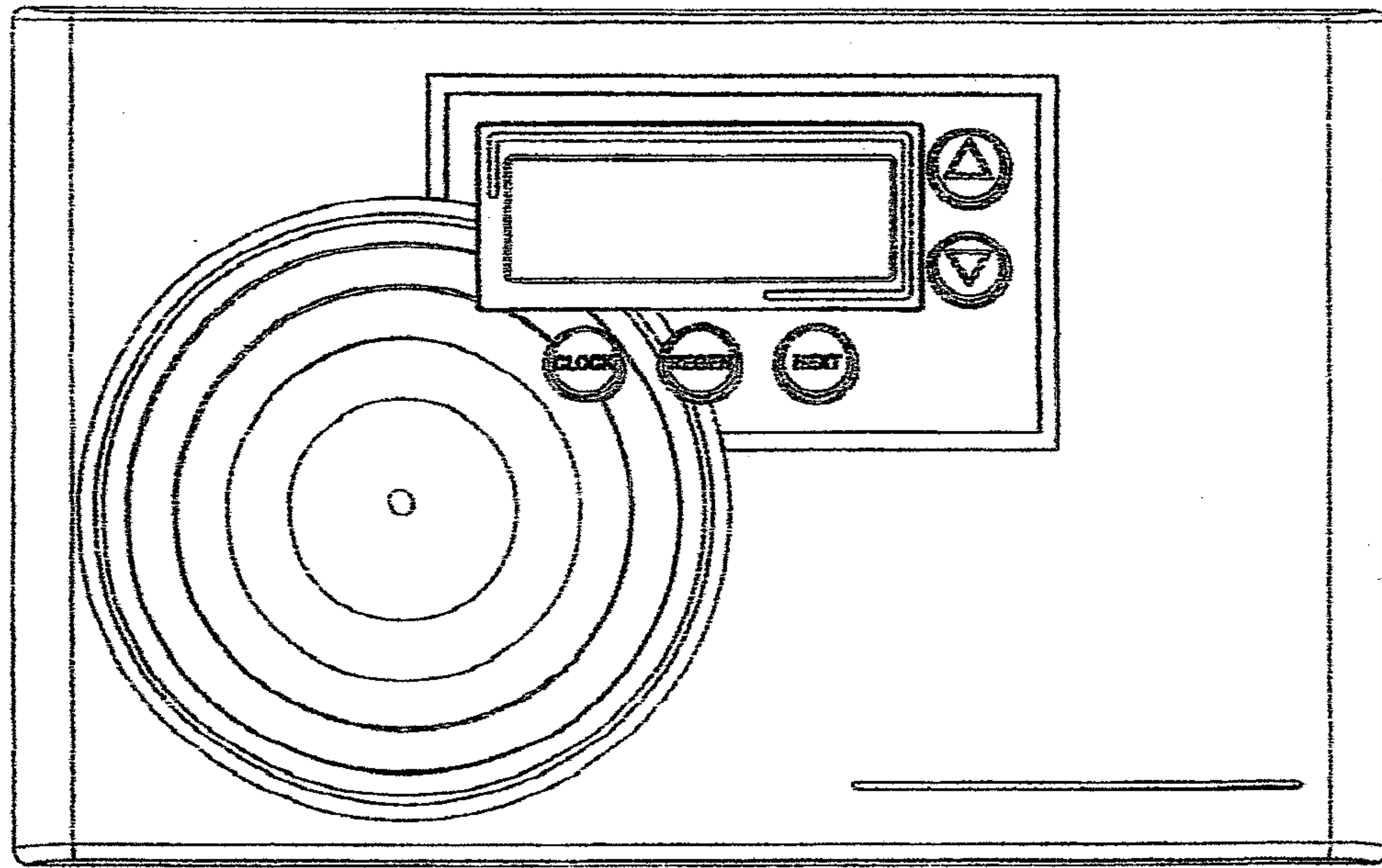


# **Morrison ExStream Control Valve Programming And Installation Manual**

## **Fusion Valve**



### Fusion Front Cover and Drive Assembly

Drawing No.	Order No.	Description	Quantity
1	V3371-01	WS1FUSION FRONT COVER ASSEMBLY	1
2	V3107-01	WS1 MOTOR	1
3	V3106-01	WS1 DRIVE BRACKET & SPRING CLIP	1
4	V3377FUSION-02BOARD	WS1THRU2L/2 FUSION PC BRD SERCOM REPLACE	1
5	V3110	WS1 DRIVE REDUCING GEAR 12X36	3
6	V3109	WS1 DRIVE GEAR COVER	1
NOT SHOWN	V3186	WS1 AC ADAPTER 110V-12V	1
	V3186EU	WS1 AC ADAPTER 220-240V-12V EU	
	V3186UK	WS1 AC ADAPTER 220-240V-12V UK	
	V3186-01	WS1 AC ADAPTER CORD ONLY	
NOT SHOWN	V3372	WS1FUSION DRIVE BACK PLATE	1
NOT SHOWN	V3463	WS1FUSION QUARTER TURN FASTENERS	2
NOT SHOWN	V3466	O-RING 008	2

For software revs 5403.3 and lower

Relay Specifications: To insure proper fit and correct operation use either of the Idec relay/relay socket combinations or the exact equivalents.

	Manufacturer	Option 1	Option 2
Relay Socket	Idec	SR3P-05C	SY4S-05C
Relay	Idec	RR2KP-UAC12V / RR2KP-UCAC12V	RY2KS-UAC12V

The relay supplies 2 sets of dry contacts for user applications.  
The wiring of these contacts is application specific.

Wiring For Correct On/Off Operation

PC Board Relay Terminal Block	Relay Socket Model	
	SR3P-05C	SY4S-05C
SET	#2	#13
COM	#6 and #10	#12 and #14
RES	#3	#9

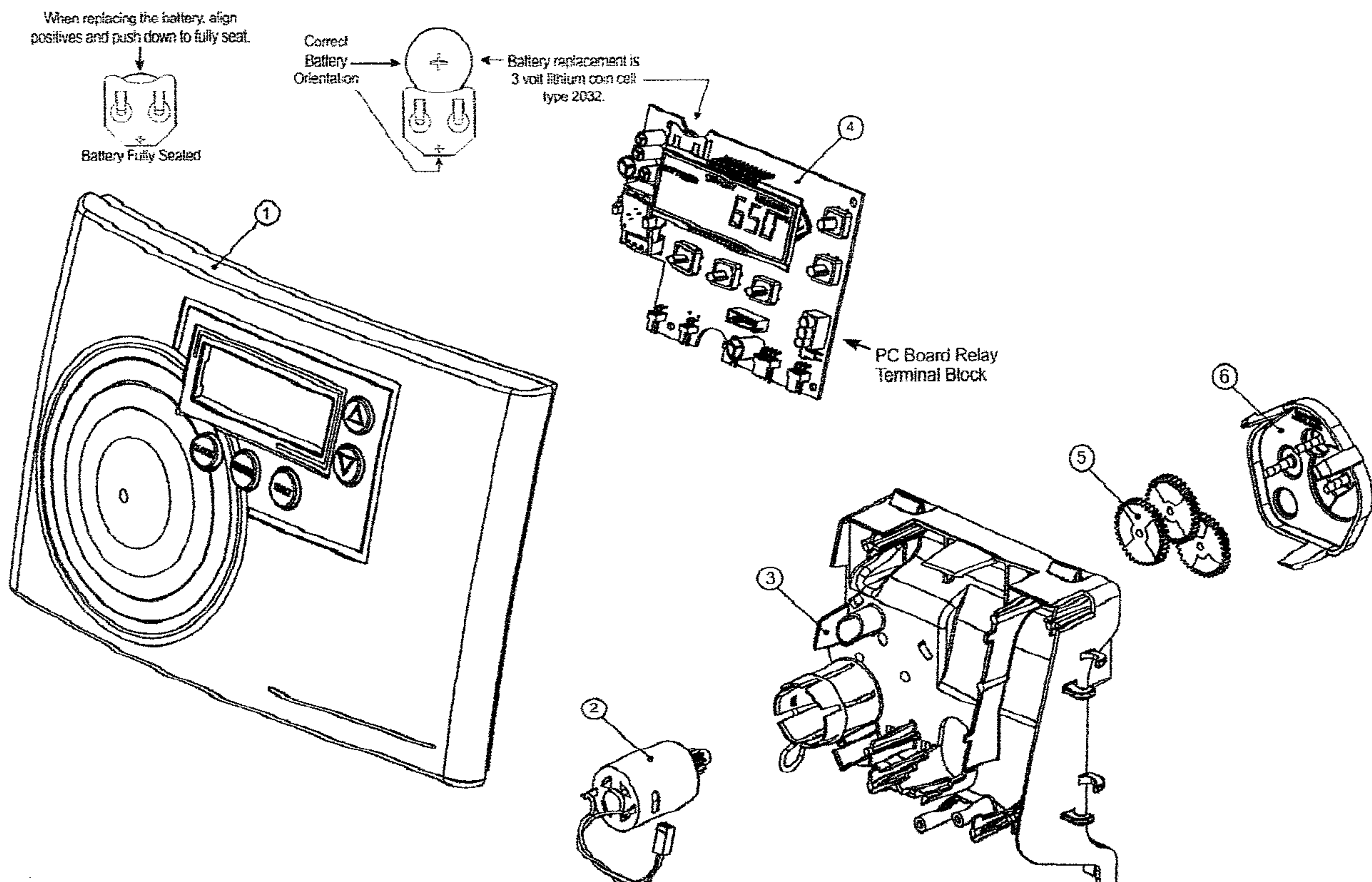
For software revs 5404.5 and higher

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

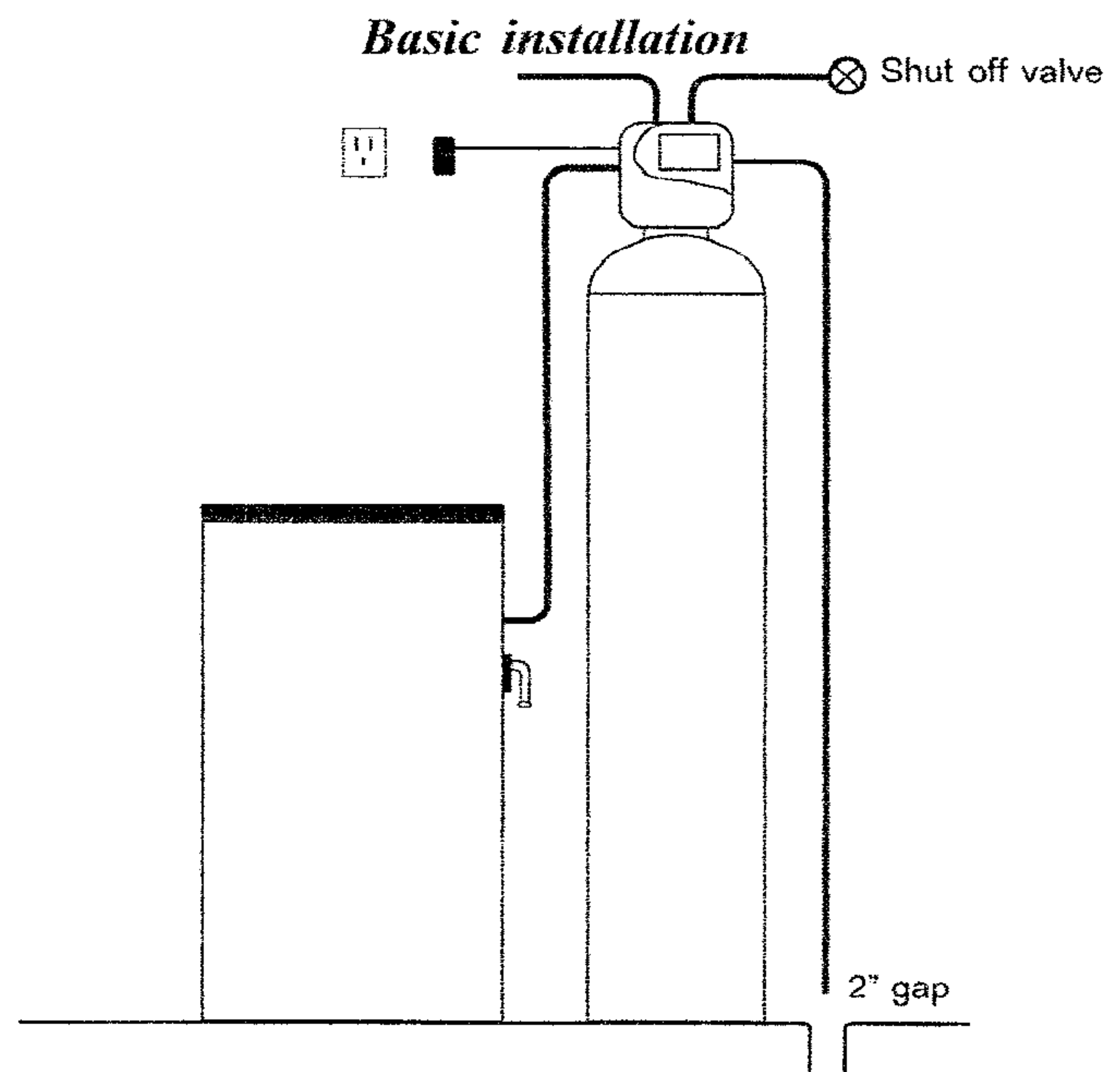
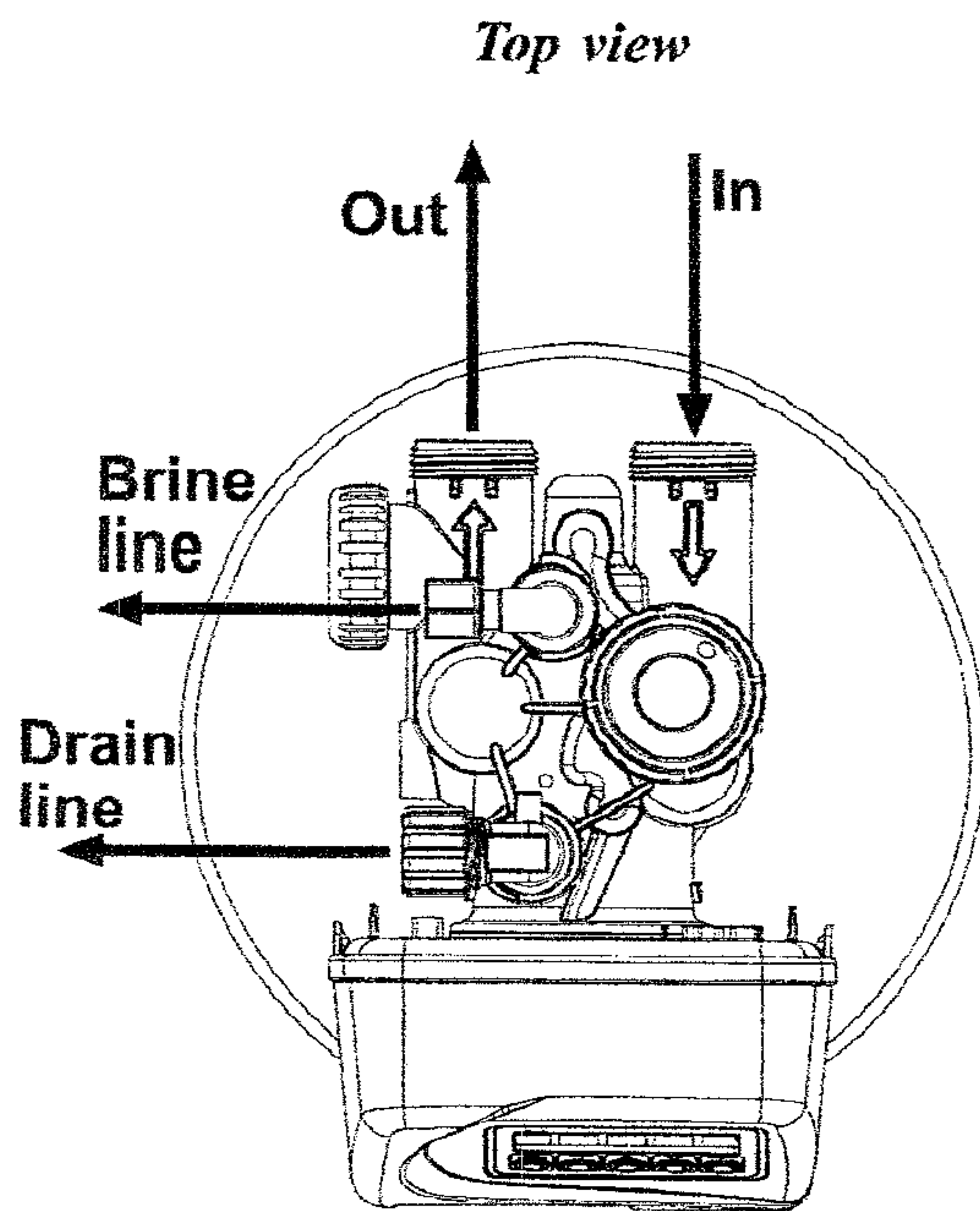
Wiring For Correct On/Off Operation

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

AC Adapter	U.S.	International
Supply Voltage	120 V AC	230V AC
Supply Frequency	60 Hz	50 Hz
Output Voltage	12 V AC	12 V AC
Output Current	500 mA	500 mA



# Installation



## GENERAL INSTALLATION & SERVICE WARNINGS

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

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

**Do not use pipe dope or other sealants on threads.** Teflon tape must be used on the threads of the 1" NPT elbow or the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connections or caps because o-ring seals are used. The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic Service Wrench, #V3193. If necessary 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.**

## SITEREQUIREMENTS:

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

1. The distance between the drain and the water conditioner should be as short as possible. All plumbing should be done in accordance with local plumbing codes.

2. Since salt must be periodically added to the brine tank, it should be located where it is easily accessible.

3. Do not install any water conditioner with less than 10 feet of piping between its outlet and the inlet of a water heater.

4. Do not locate unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 34° F.

5. The use of resin cleaners in an unvented enclosure is not recommended.

**6. INLET/OUTLET PLUMBING:** Connect to a supply line downstream of outdoor spigots. Install an inlet shutoff valve and plumb to the unit's bypass valve inlet located at the right rear as you face the unit. There are a variety of installation fittings available. They are listed under **Installation Fitting Assemblies**. When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting solder flux, primer, and solvent cement on any part of the o-rings, split rings, bypass valve or control

valve. If the building's electrical system is grounded to the plumbing, install a copper grounding strap from the inlet to the outlet pipe. **Plumbing must be done in accordance with all applicable local codes.**

**7. DRAIN LINE:** First, be sure that the drain can handle the backwash rate of the system. Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line flow control fitting and solder joints. Failure to do this could cause interior damage to the flow control. Install a ½" I.D. flexible plastic tube to the Drain Line Assembly or discard the tubing nut and use the ¾" NPT fitting for rigid pipe. If the backwash rate is greater than 7 gpm, use a ¾" drain line. Where the drain line is elevated but empties into a drain below the level of the control valve, form a 7" loop at the discharge end of the line so that the bottom of the loop is level with the drain connection on the control valve. This will provide an adequate anti-siphon trap. Where the drain empties into an overhead sewer line, a sink-type trap must be used. Run drain tube to its discharge point in accordance with plumbing codes. Pay special attention to codes for air gaps and anti-siphon devices.

**8. BRINE TANK CONNECTION:** Install a 3/8" O.D. polyethylene tube from the Refill Elbow to the Brine Valve in the brine tank.

#### **9. OVERFLOW LINE CONNECTION:**

AN OVERFLOW DRAIN LINE IS RECOMMENDED WHERE A BRINE OVERFLOW COULD DAMAGE FURNISHINGS OR THE BUILDING STRUCTURE.

Your softener may be equipped with a brine tank safety float which greatly reduces the chance of an accidental brine overflow. In the event of a malfunction, however, an OVERFLOW LINE CONNECTION will direct the "overflow" to the drain instead of spilling on the floor where it could cause considerable damage. This fitting should be on the side of the cabinet or the brine tank.

To connect overflow fitting, locate hole in side of brine tank. Insert overflow fitting into tank and tighten with plastic thumb nut and gasket from the inside. Attach a length of ½" I.D. tubing (not supplied) to fitting and run to drain. Do not elevate overflow line higher than 3" below bottom of overflow fitting. Do not "tie" this tube into the drain line of the control valve. Overflow line must be a direct, separate line from overflow fitting to drain, sewer, or tub. Allow an air gap as per the drain line instructions.

**IMPORTANT:** Never insert a drain line directly into a drain, sewer line, or trap. Always allow an air gap between the drain line and the wastewater to prevent the possibility of sewage being back-siphoned into the conditioner.

**10. SERIAL NUMBER:** Record the serial number on the installer's and customer's records.

### **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 WSI 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

Figure 1

## NORMAL OPERATION

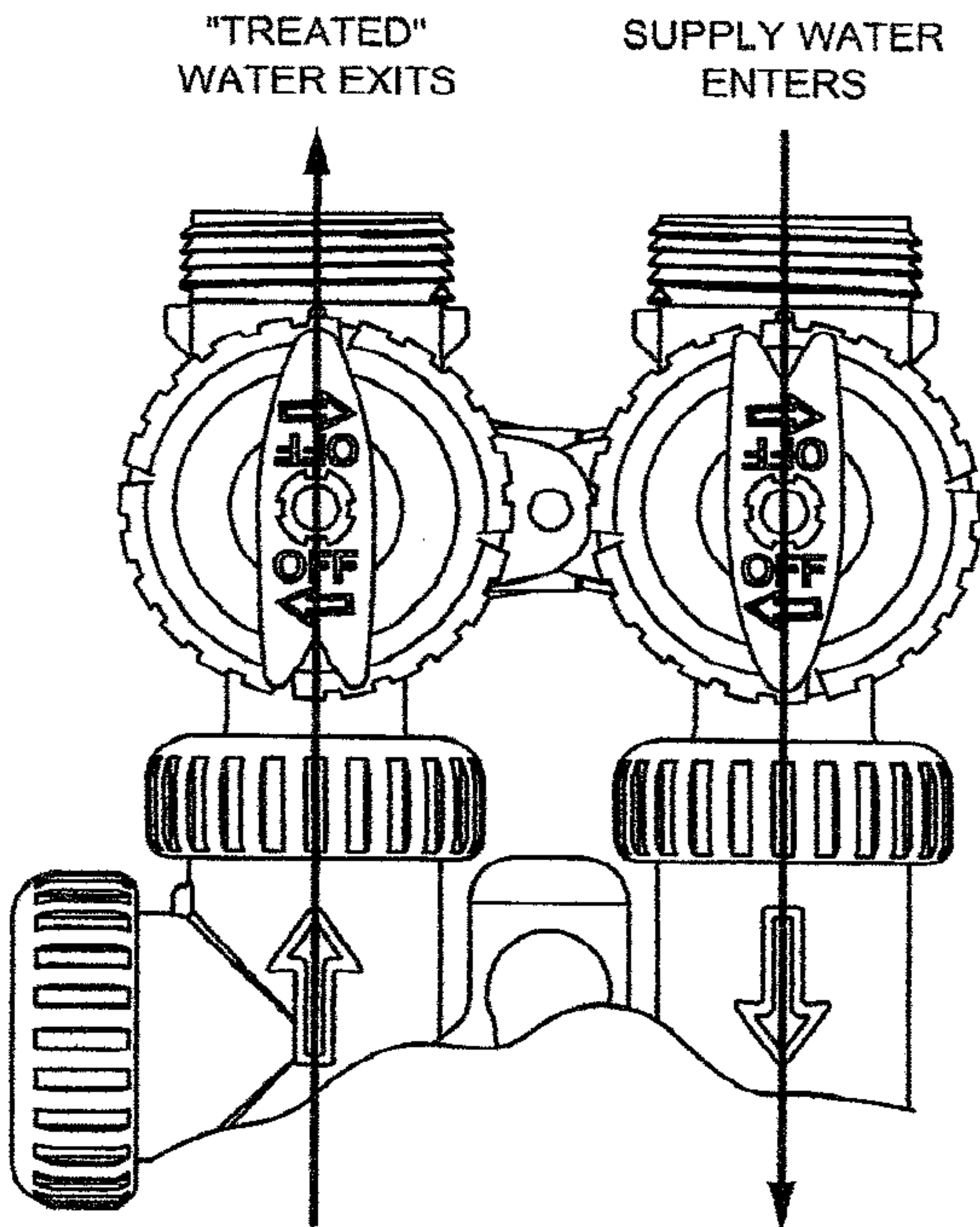


Figure 2

## BYPASS OPERATION

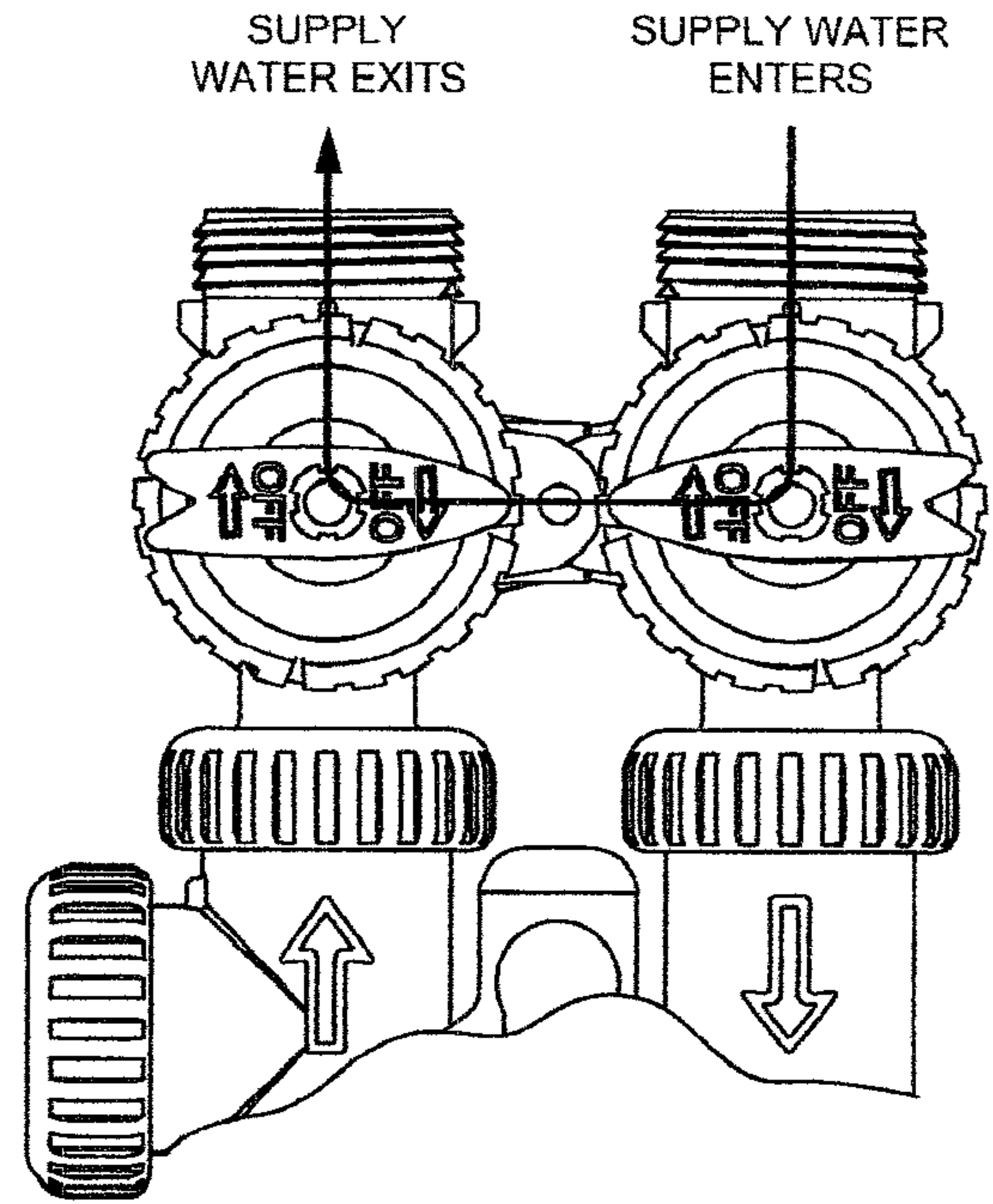


Figure 3

## DIAGNOSTIC MODE

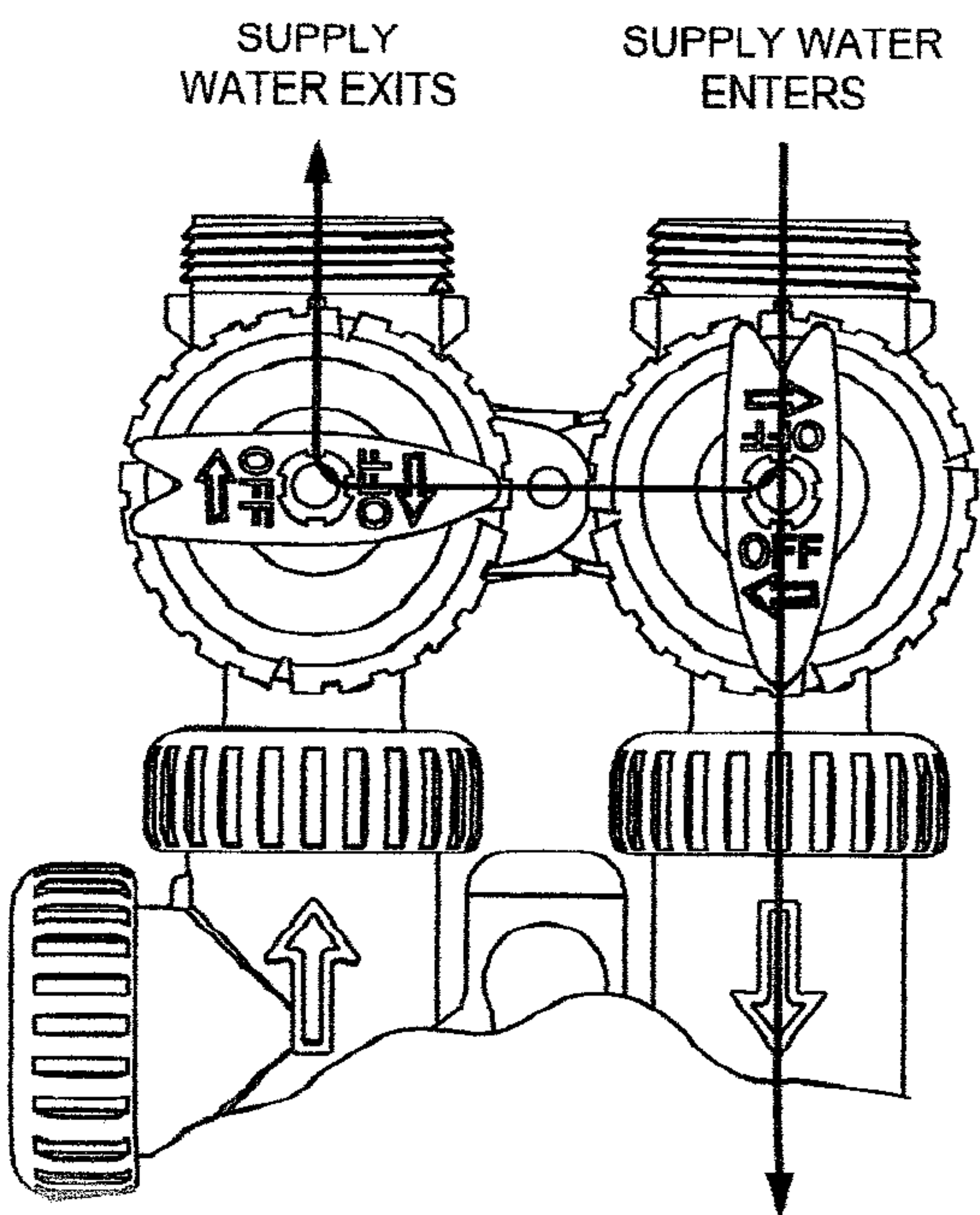
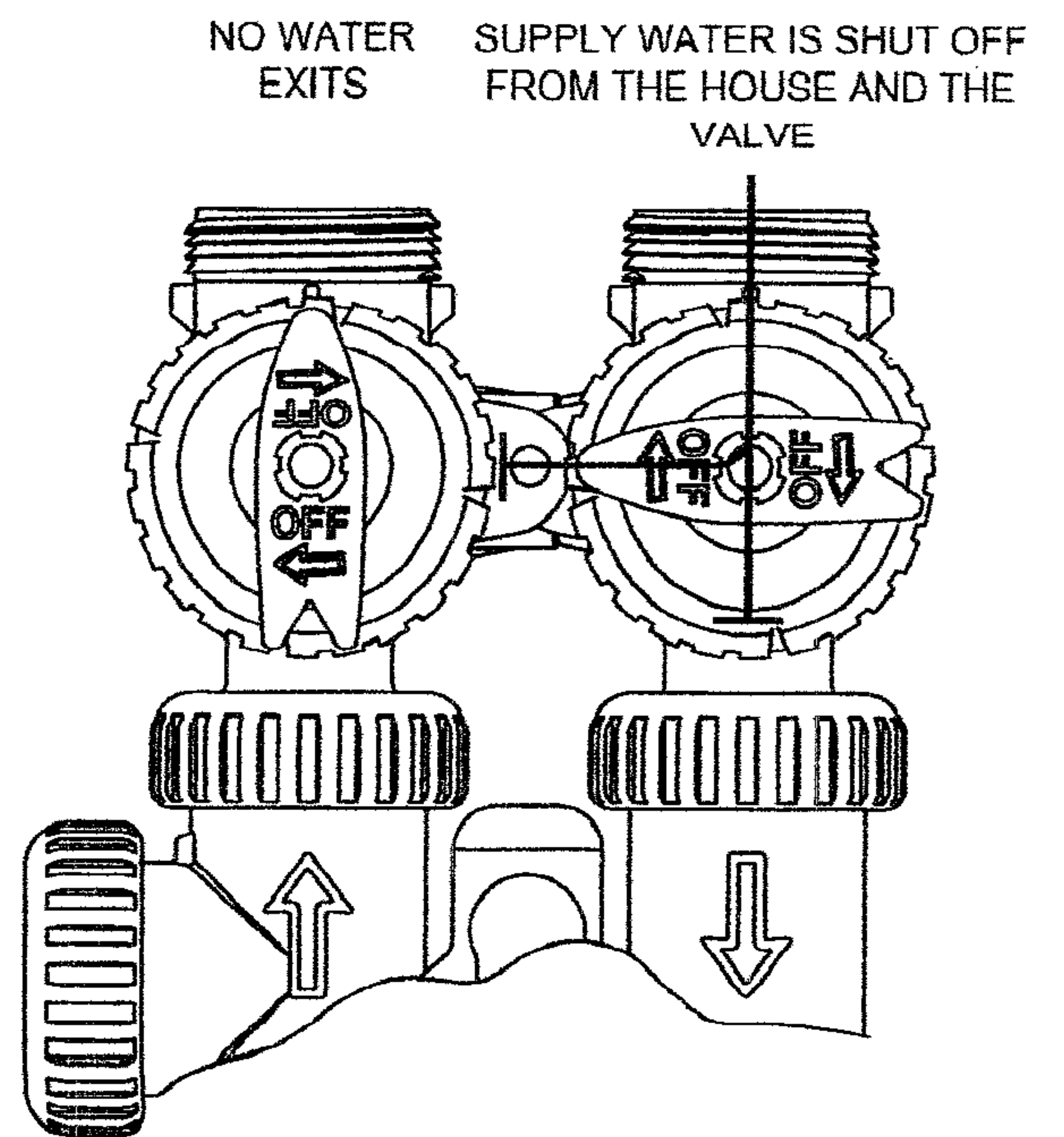


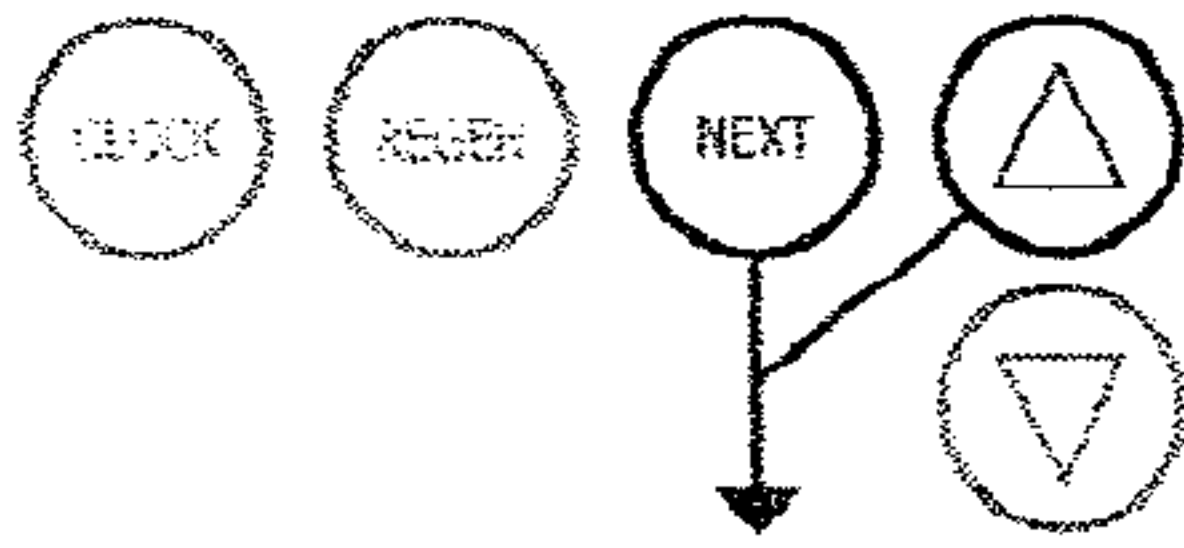
Figure 4

## SHUT OFF MODE



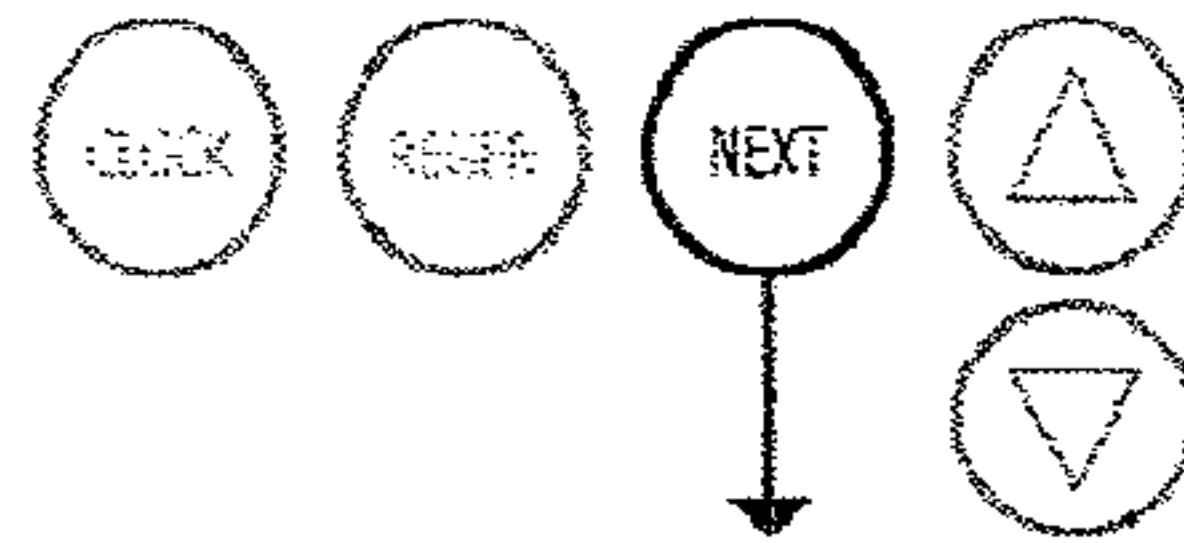
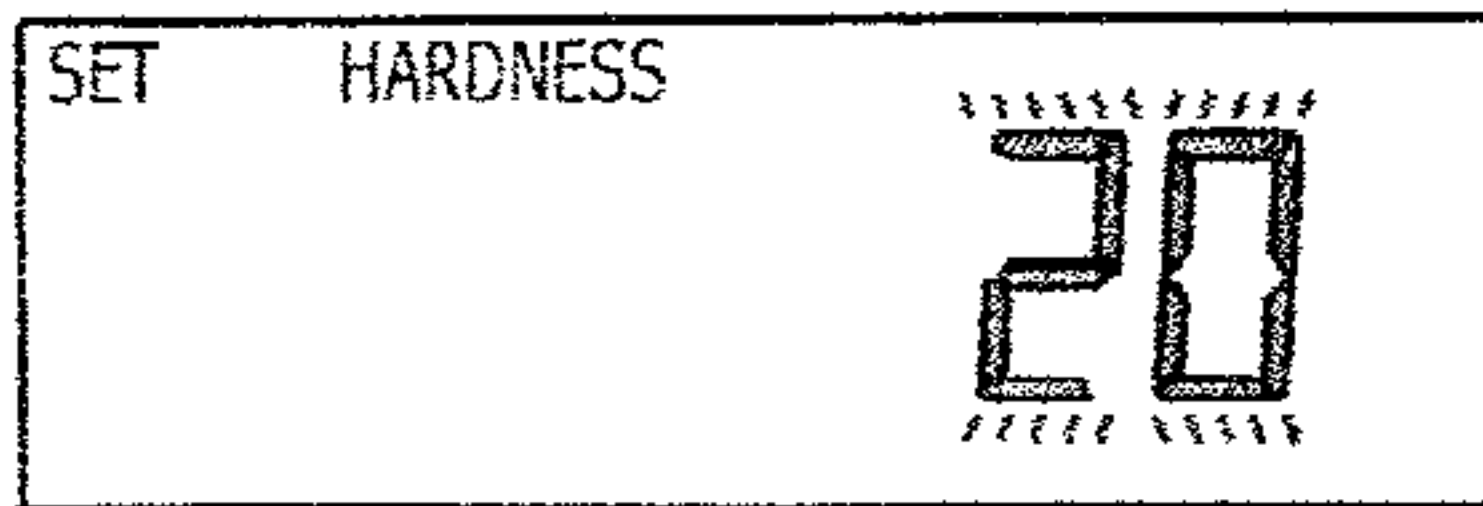
Installer Display Settings

**STEP 1I**



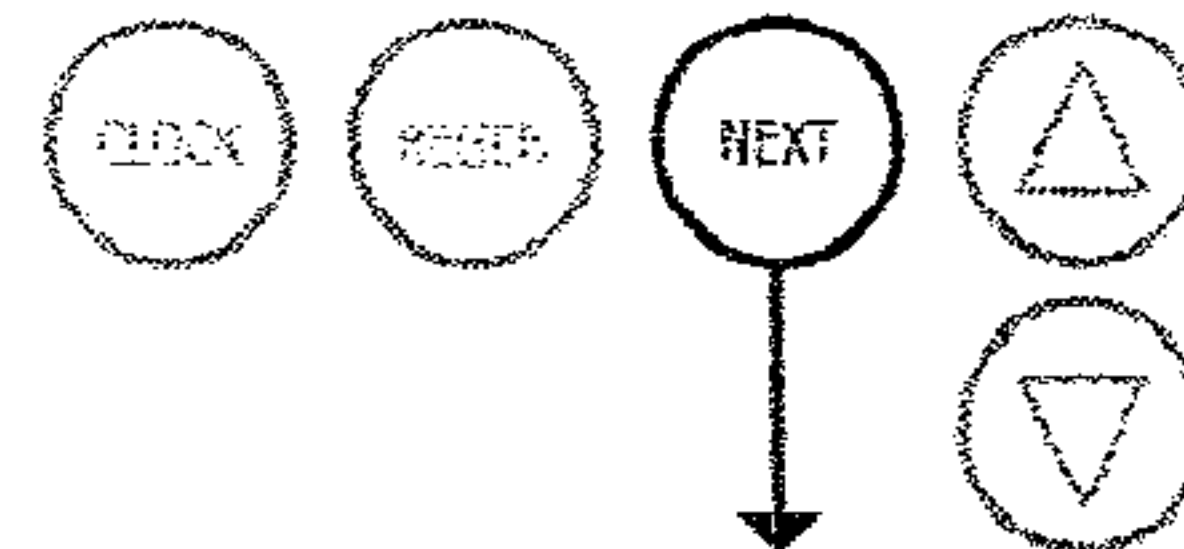
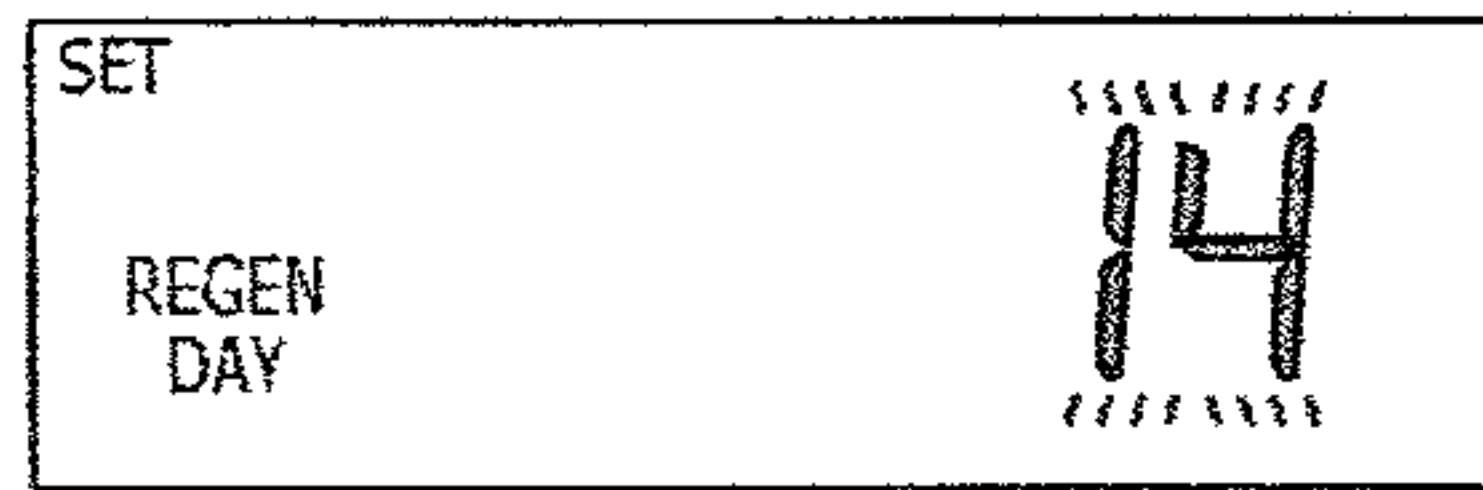
**STEP 1I** - Press NEXT and ▲ simultaneously for 3 seconds.

**STEP 2I**



**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-” the system is set up for a filter or if ‘AUTO’ is not selected in Step 8S. Press NEXT to go to step 3I. Press REGEN to exit Installer Display Settings.

**STEP 3I**

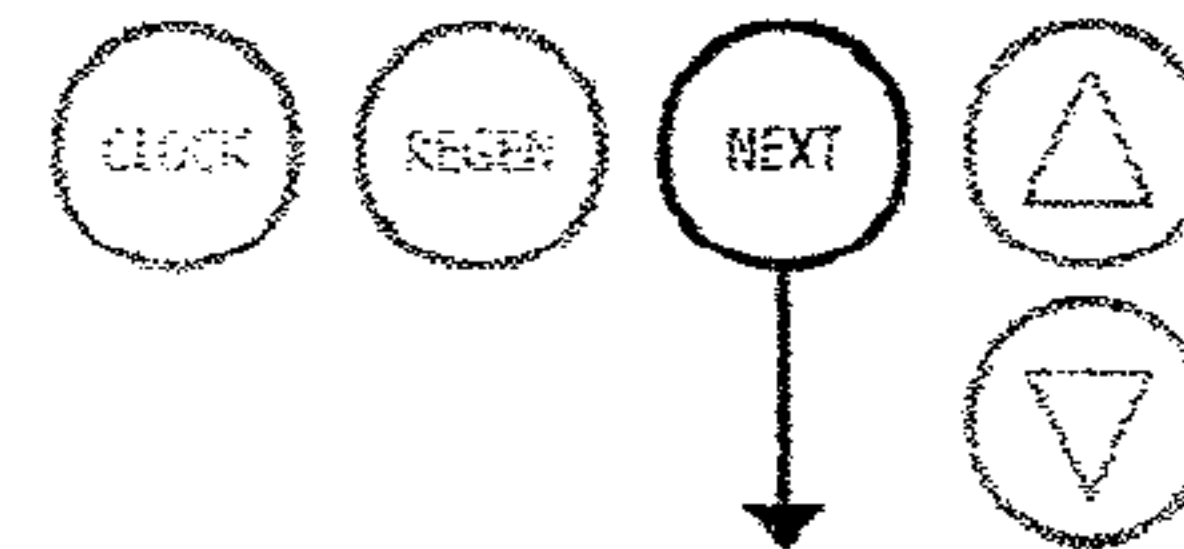
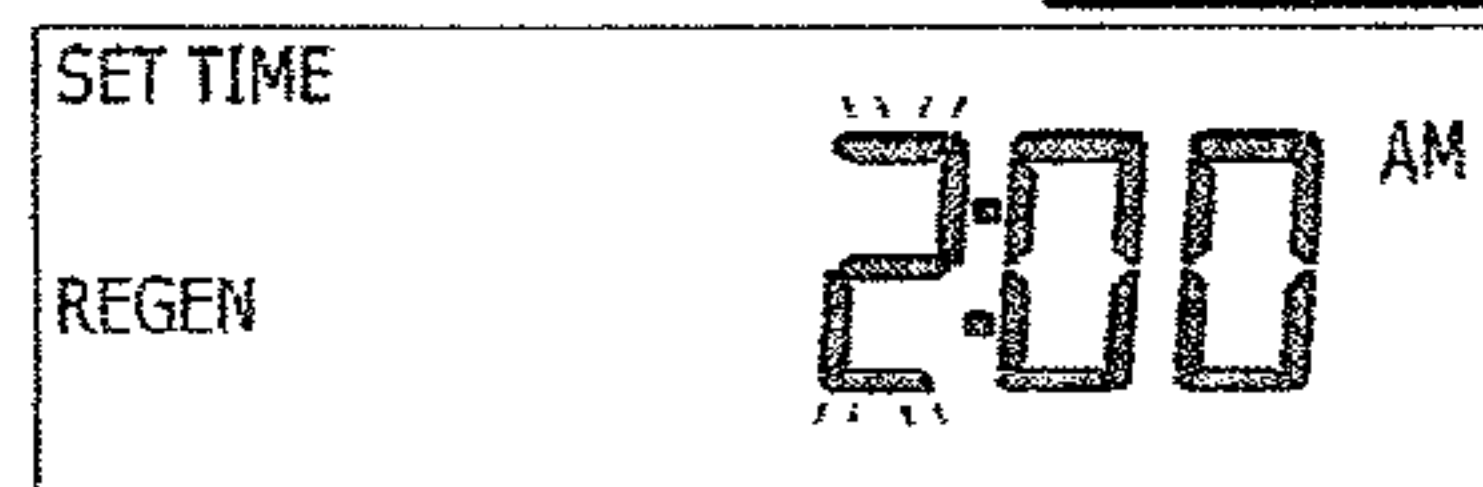


**STEP 3I** – Day Override: When gallon capacity is set to off, sets the number of days between regenerations. When gallon capacity is set to AUTO or to a number, sets the maximum number of days between regenerations. If value set to “oFF” regeneration initiation is based solely on gallons used. If value 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”.

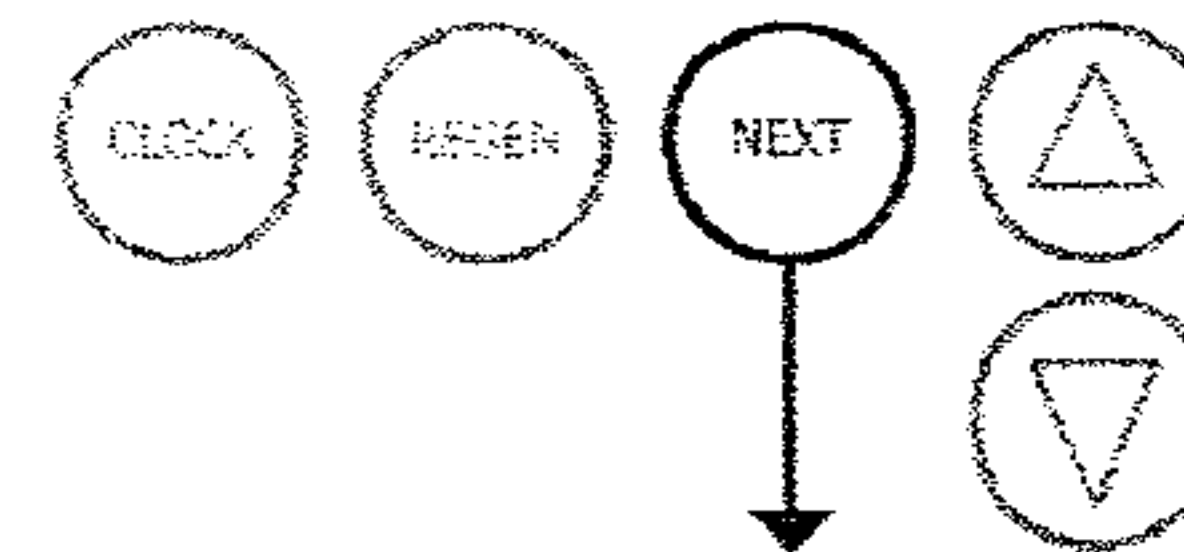
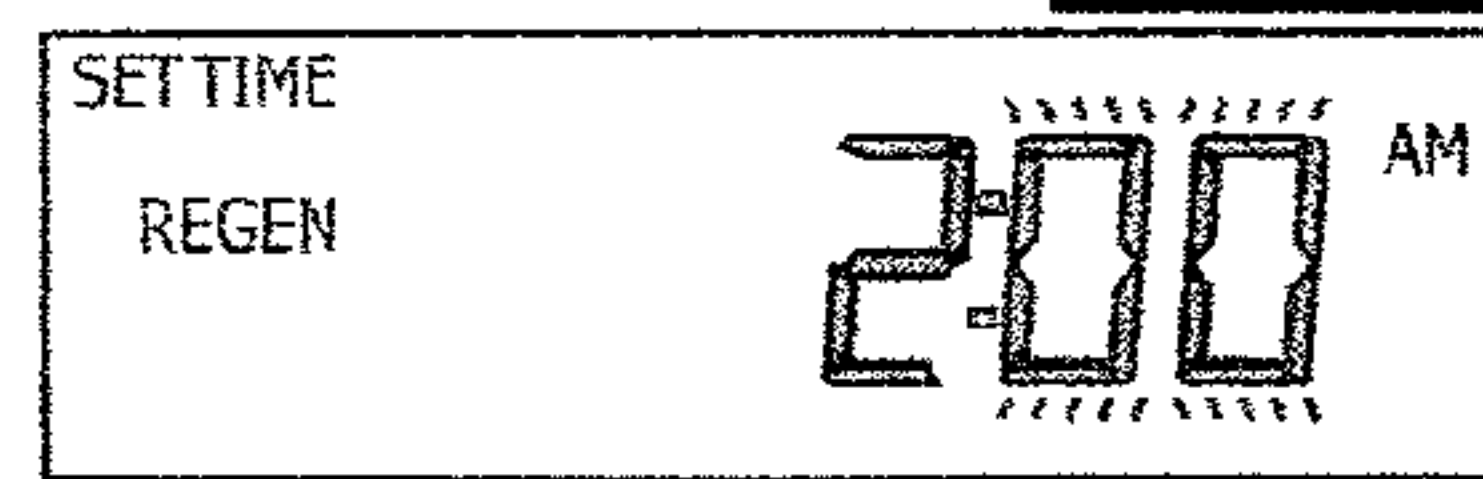
See Setting Options Table for more detail on system setup. Press NEXT to go to step 4I. Press REGEN to return to previous step.

**STEP 4I**



**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 Step 8S. Press NEXT to go to step 5I. Press REGEN to return to previous step.

**STEP 5I**



**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 Step 8S. 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.

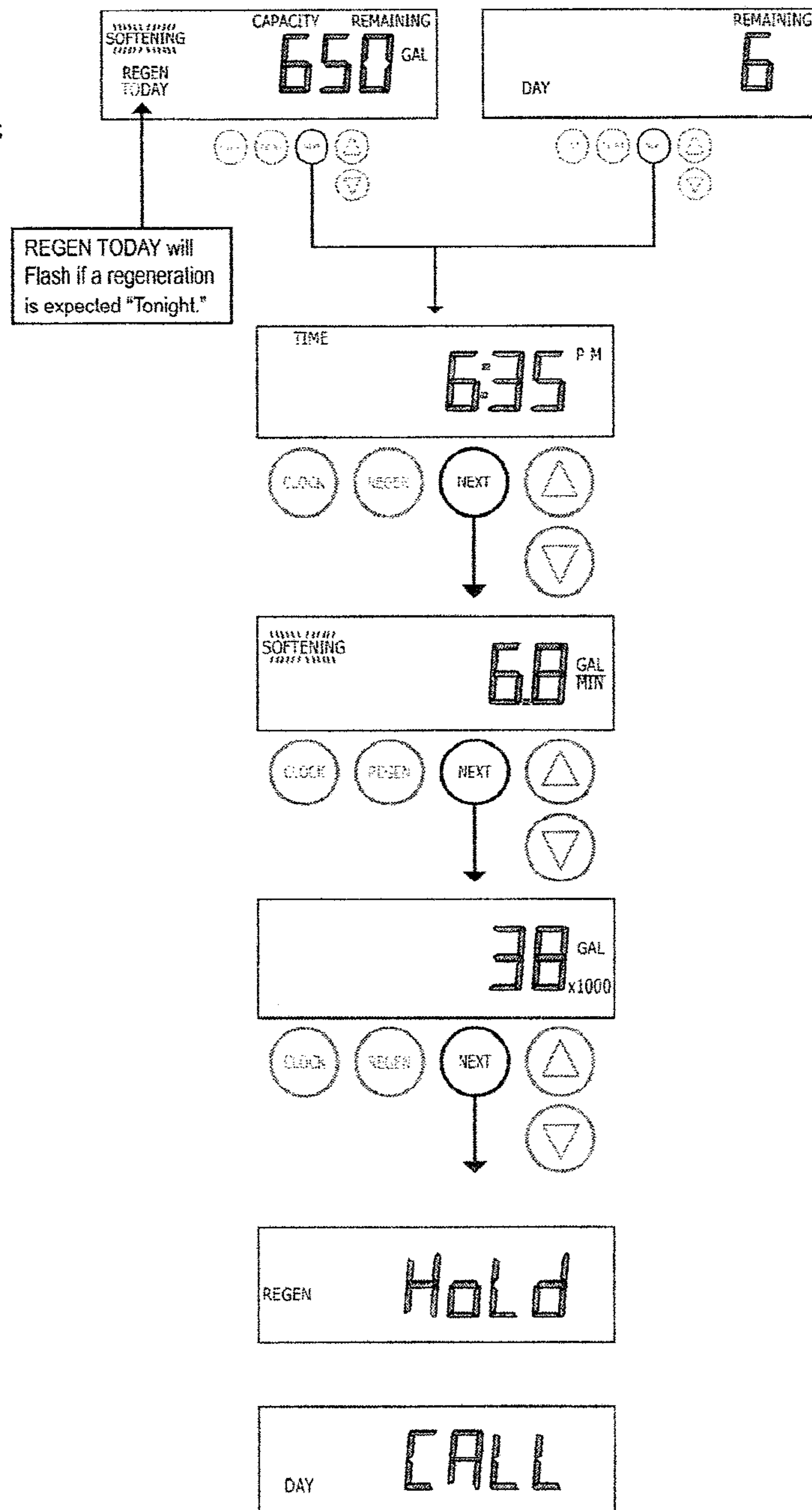
RETURN TO  
NORMAL MODE

User Display Settings

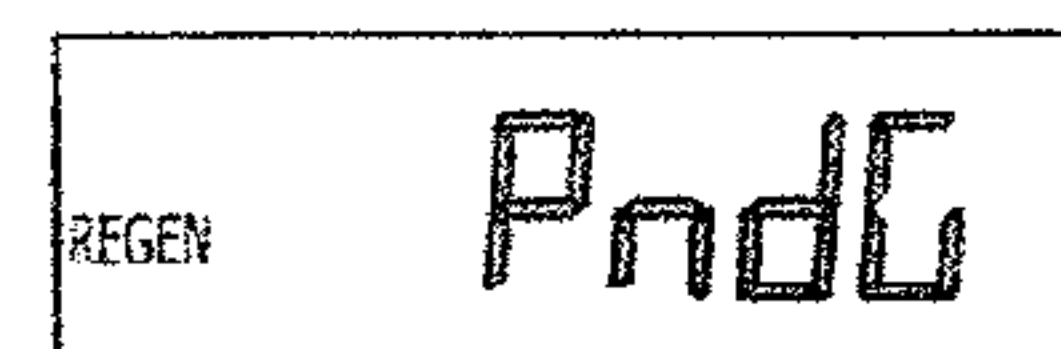
**General Operation**

When the system is operating, one of seven displays may be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day. The second display is days remaining. Days remaining is the number of days left before the system goes through a regeneration cycle. The third display is Capacity Remaining. Capacity Remaining is the gallons that will be treated before the system goes through a regeneration cycle. The fourth display shows the current treated water flow rate through the system. The fifth display shows the total amount of treated water from 1x1000 to 9999x1000 gallons. This is resettable by simultaneously pressing the clock and regen buttons for 3 seconds. The sixth display will show either "dP" or "HoLd" if the dP switch is closed. The seventh display indicates the user should call for service. The seventh display will not appear if OFF is selected in Step 12S of OEM System Setup. To clear the Service Call reminder, press the ▲ and ▼ buttons simultaneously while CALL is displayed. 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.

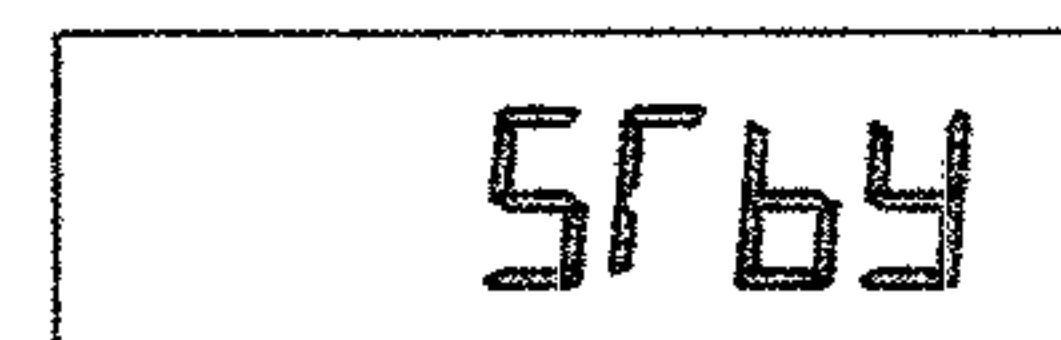
If a water meter is installed, the word "Softening" or "Filtering" flashes on the display when water is being treated (i.e. water is flowing through the system).



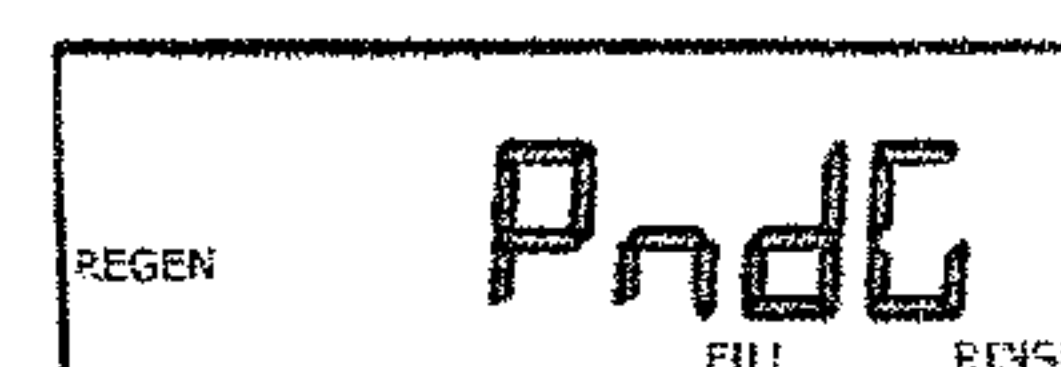
In Alternator Systems when a unit is waiting to initiate the first cycle step of regeneration, "REGEN PndG" is displayed.



"STbY" is displayed in Alternator Systems when a valve is in Standby state.

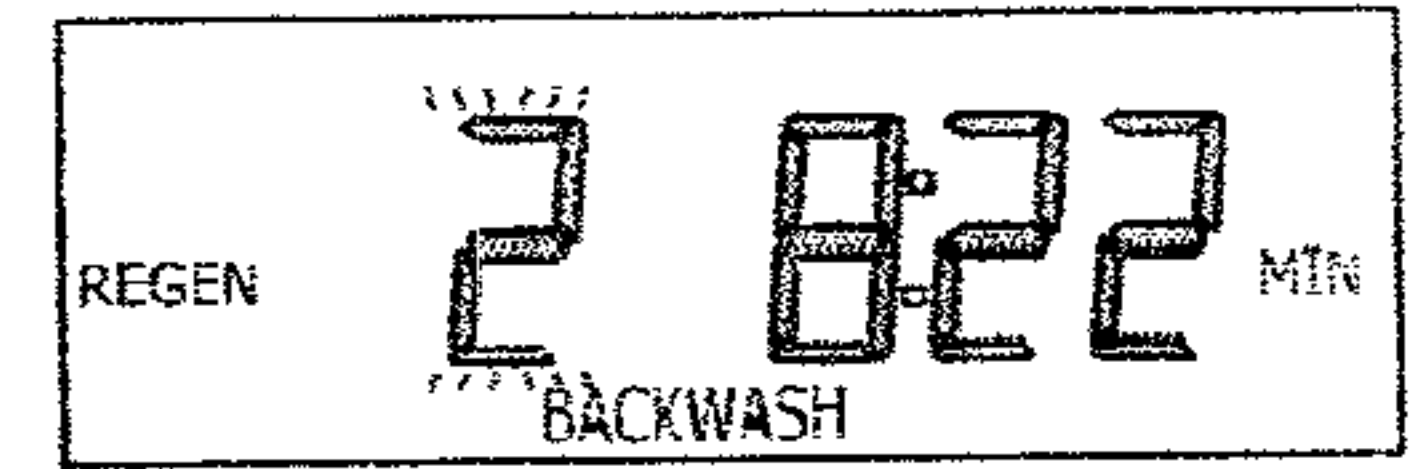


"REGEN PndG FILL RINSE" is displayed whenever a zero-capacity tank has transferred to an off-line state and is currently waiting to initiate the second portion of a regeneration cycle. Viewed only when Delayed Rinse and Fill is set to ON.



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.



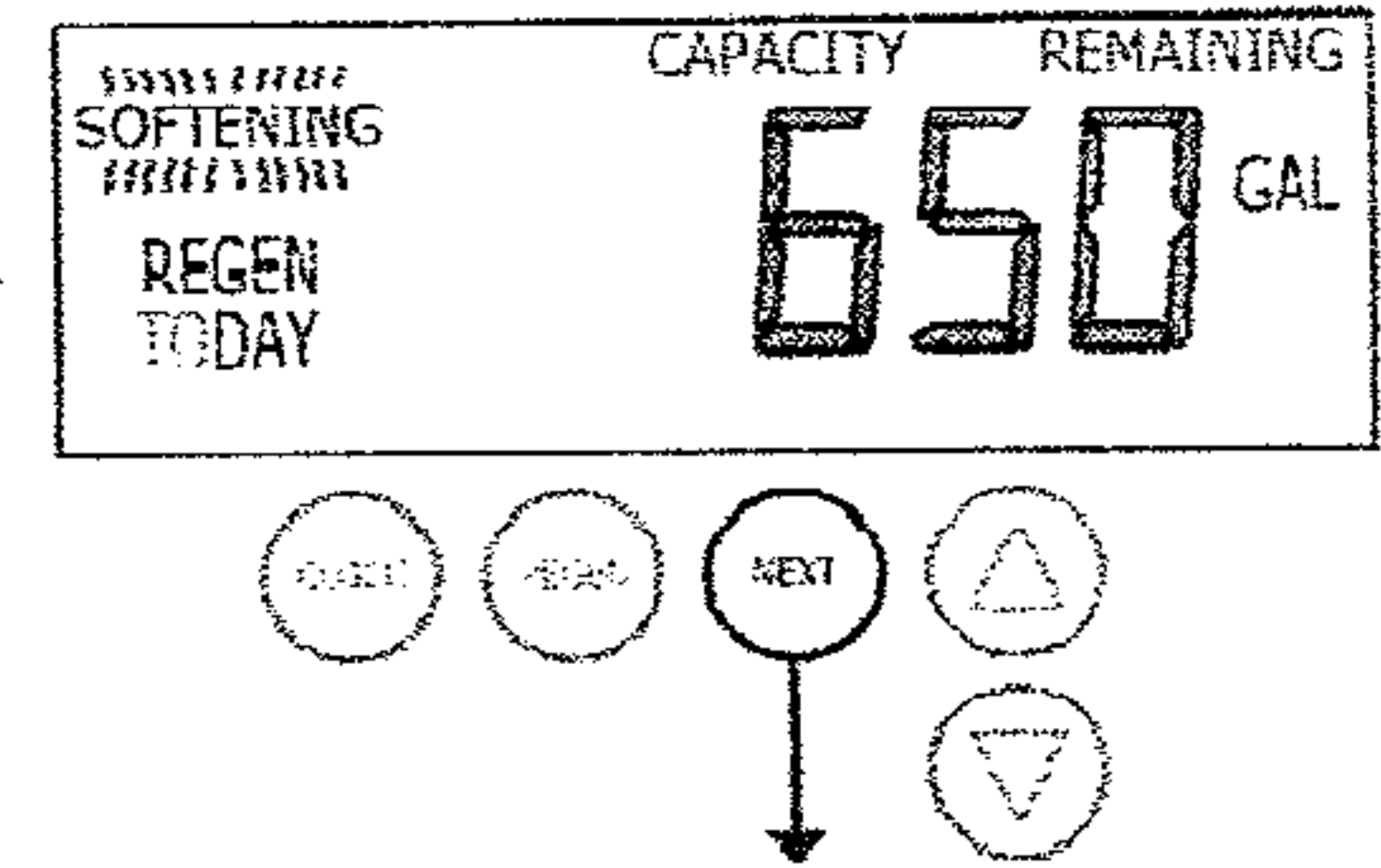
When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has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

REGEN TODAY will Flash if a regeneration is expected "Tonight."

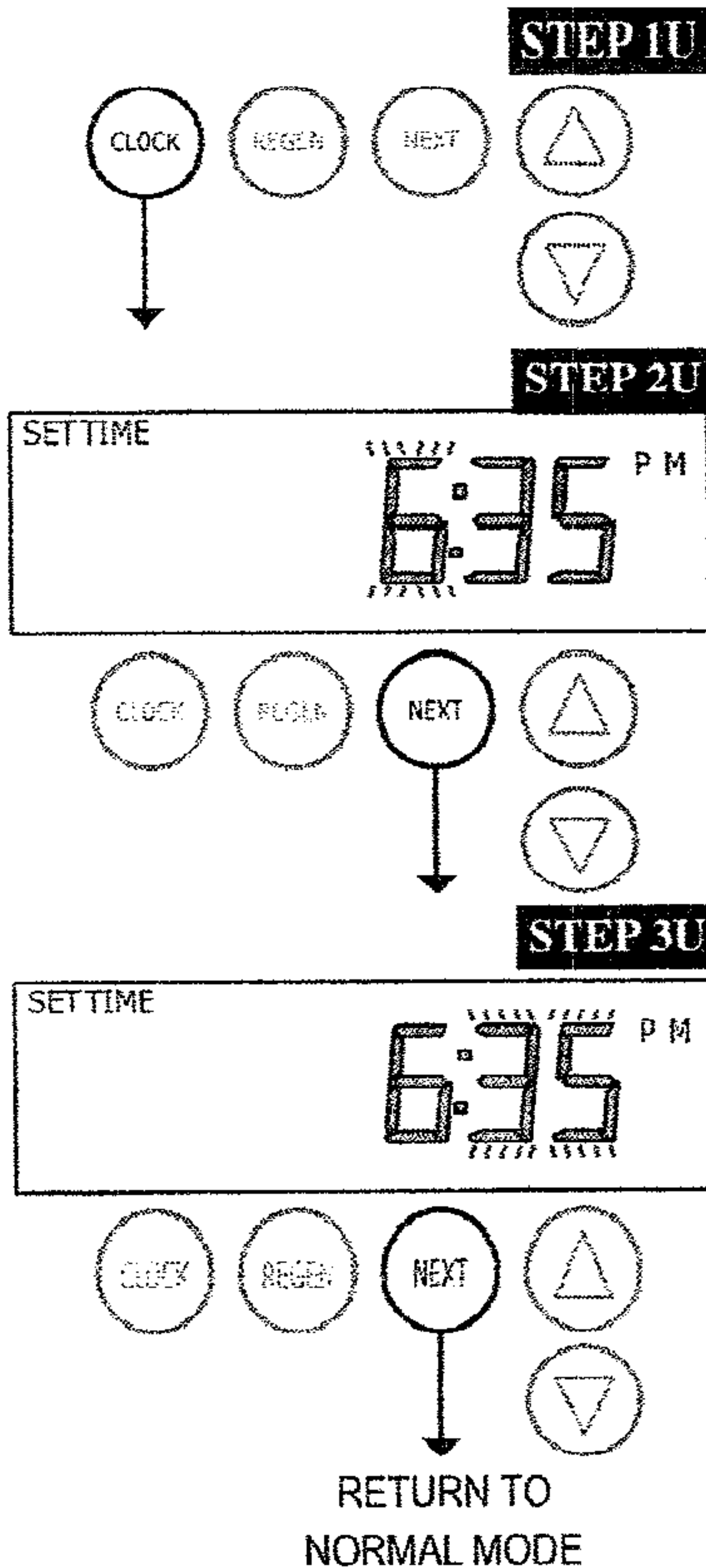


To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

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 if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The non-rechargeable battery should also be replaced.



**STEP 1U** – Press 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 Time of Day. Press REGEN to return to previous step.



## Start-up Instructions

- After installation is completed and checked for leaks, rotate the bypass handles to the bypass position (see bypass valve diagram page).
  
- Fully open a cold water faucet.
  
- Allow water to run until clear to rid pipes of debris, which may have occurred during installation.
  
- The system is now ready for testing:
  1. With the bypass valve in the bypass position, manually pour enough water into the brine tank to reach the top of the air check valve.
  
  2. Press and hold the REGEN button for three seconds until the drive motor starts. Wait until the motor stops and the display reads "Backwash." The backwash time will begin to count down.
  
  3. Open the inlet handle of the bypass valve very slightly allowing water to fill the tank slowly in order to expel air. CAUTION: If water flows too rapidly, there will be a loss of media out of the drain.
  
  4. When the water is flowing steadily to the drain without the presence of air, press the REGEN button to advance the control to the brine position. The brine time will begin to count down.
  
  5. Fully open the inlet bypass valve handle (bypass is now in the diagnostic position)
    - Check to verify that water is being drawn from the brine tank
    - There should be a slow flow to the drain
    - Allow three minutes for the media bed to settle
  
  6. Press the REGEN button again to advance the control to the next position and allow water to run to drain for 2-3 minutes. Control will transfer and the display will read backwash or rinse depending on the program used. If backwash is displayed press the REGEN button to advance the control to the rinse position. Allow water to run to drain until clear.
  
  7. Press the REGEN button to advance the control to where the display reads fill. This will allow water to run into the brine tank and prepare it for the next regeneration. Allow the brine tank to fill automatically.
  
  8. While the brine tank is filling, load it with water softener salt.
  
  9. SANITIZE! For each cubic foot of resin, add two ounces of 5 1/4% household chlorine bleach to the water in the brine tank brine well. Press and hold the REGEN button for three seconds to begin regeneration. Allow the system to complete the regeneration automatically. The system will now be sanitized and producing soft water. Be sure to check for local codes, which may also specify sanitization methods.