Water Depot®

water treatment specialists

# OWNER'S MANUAL

FOR ALL WD ECONO SERIES WATER SOFTENERS

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# INTRODUCTION

This manual is specifically designed for the Econo water softeners systems from Water Depot. The manual is designed to aid in installation, setting up and trouble shooting the unit. Certain parts of the manual will serve as aids to installers and service personnel.

# GENERAL WARNINGS

All cities are subject to different plumbing codes. It is the purchasers or Installers responsibility to adhere to local codes when installing a water softener.

The following general warnings must appear in the System Manual.

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

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

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place a screwdriver in the slots on caps and/or tap with a hammer.

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

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

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

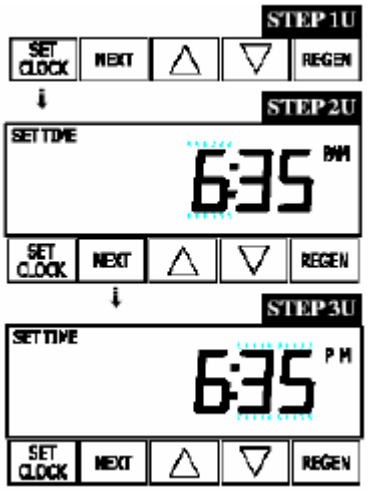
Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.

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

Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.)

Install grounding strap on metal pipes.

# SET TIME OF DAY




**STEP 1U** – Press SET CLOCK

**STEP 2U** – Current Time (hour): Set the hour of the day using the UP and DOWN buttons. AM/PM toggles after 12. Press NEXT to go to step 3U.

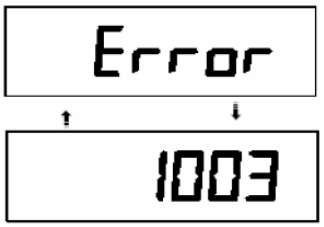
**STEP 3U** – Current Time (minutes):Set the minutes of the day using the UP and DOWN buttons. Press NEXT to exit REGEN to return to previous step.

Power Loss

If the power goes out for less than two hours, the system will automatically reset itself. 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 system will remember the rest.

Error Message

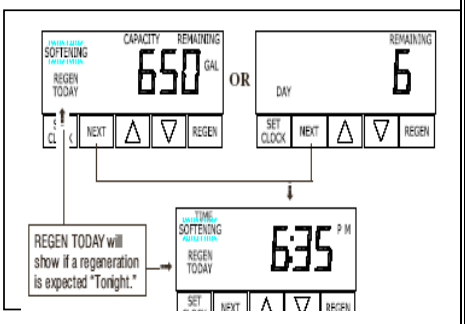
If the word "ERROR" and a number are alternately flashing on the display contact your Water Depot dealer for help. This indicates that the valve was not able to function properly.




# USER DISPLAYS/SETTINGS

General Operation

When the system is operating one of two displays will be shown.
Pressing NEXT will alternate between the displays.
One of the displays is always the current time of day (to the nearest hour).
The second display is the days remaining until the next regeneration. If the days remaining are equal to one, 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 words REGEN TODAY will appear on the display.

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

Regeneration Mode

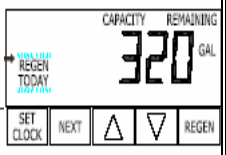
Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.


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

Manual Regeneration

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

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

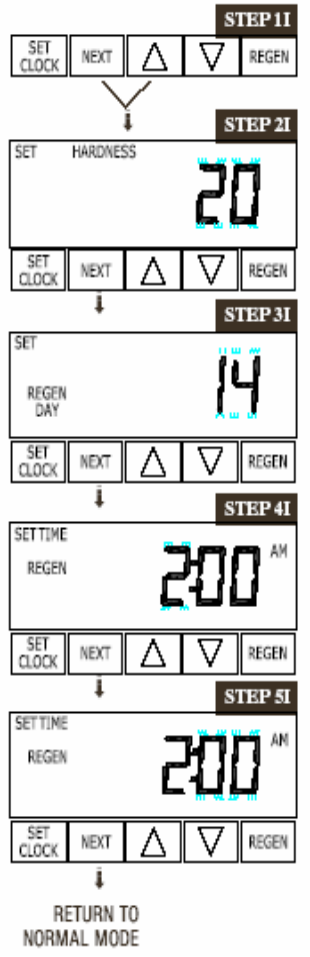



To initiate a manual regeneration at the preset delayed regeneration time, when the regeneration time option is set to "NORMAL" or "NORMAL + on 0", press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed time. If you 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 not 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.

# INSTALLERS DISPLAYS/SETTINGS




**STEP 1I –** Press NEXT and UP simultaneously for 3 seconds.

**STEP 2I** – Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the DOWN or UP buttons. The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note the grains per gallon can be increased if soluble iron needs to be reduced. This display will show "-NA-"if "FILTER" is selected in Step 2F or if "AUTO" is not selected in Step 6S. Press NEXT to go to step 3I. Press REGEN to exit Installer Displays/Settings.

**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 to28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for regeneration. Set Day Override using down or up buttons:

- Number of days between regeneration (1 to 28); or
- "OFF".

See table 12 for more detail on softener setup and Table 13 for more detail on filter 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 down or up buttons. AM/PM toggles after 12. The default time is 2:00 a.m. This display will show "REGEN on 0 GAL" if"on0" is selected in Step 7F. 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 down or up buttons. This display will not be shown if "on 0" is

selected in Step 9S or Step 7F. Press NEXT to exit Installer Displays/Settings. Press REGEN to return to previous step.

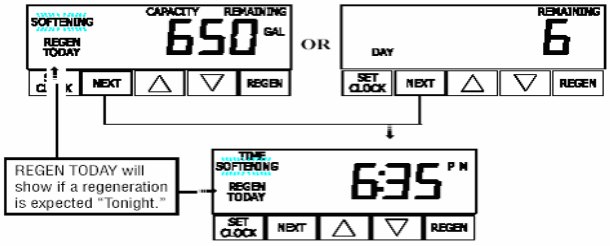
To initiate a manual regeneration immediately, press and hold the “REGEN” button for three seconds. The system will begin to regenerate immediately. The control valve may be stepped through the various regeneration cycles by pressing the “REGEN” button.

## GENERAL OPERATION

**PLEASE NOTE:** For complete instructions refer to manual. Hand tighten nuts only.

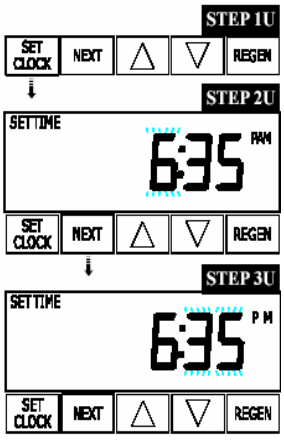
**GENERAL OPERATION**

When the system is operating one of two displays will be shown: time of day will be one choice, gallons of treated water available or days until the next regeneration will be the other choice. Pressing NEXT will toggle between the two choices.




**TO SET TIME OF DAY**

In the event of a prolonged power outage, time of day flashes, indicating that this needs to be reset. All other information will be stored in memory no matter how long the power outage, Please complete the steps as shown to the right. To access this mode, press “SET CLOCK”.



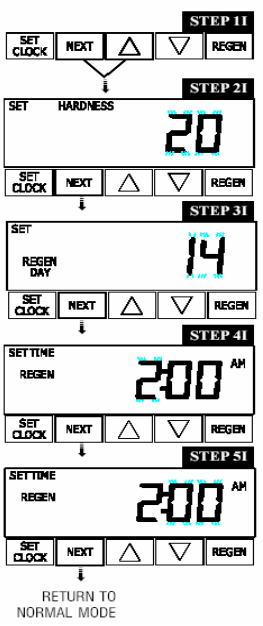

1. Accessed by pressing SET CLOCK
2. Adjust hours with UP and DOWN arrows. AM/PM toggles at 12.
3. Press NEXT.

4. Adjust minutes with up and down arrows.
5. Press “NEXT” to complete and return to normal operation

**ADJUST HARDNESS, DAYS BETWEEN REGENERATIONS, OR TIME OF REGENERATION**

For initial set-up or to make adjustments, please complete the steps as shown to the right. Access this mode by pressing "NEXT" and "" simultaneously.

**Note:** Hardness display shows "-NA-" if used as a filter. If other displays do not appear refer to manual.




1. Accessed by pressing "SET CLOCK".
2. Adjust hardness using up and down arrows.
3. Press "NEXT"

4. Adjust days between regenerations using up and down arrows.
5. Press "NEXT"
6. Adjust time of regeneration hours with up and down arrows, AM/PM toggles at 12.
7. Press "NEXT"
8. Adjust time of regeneration minutes with up and down arrows.
9. Press "NEXT to complete and return to normal operation.

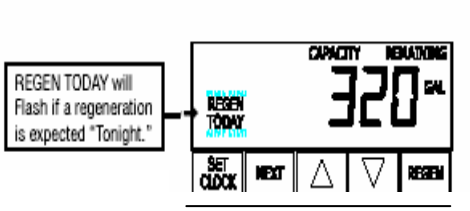
**MANUAL REGENERATION**

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

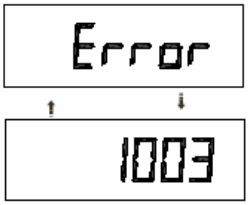
If you need to initiate a manual regeneration, either immediately, or tonight at the preprogrammed time (typically 2 a.m.). complete The following steps.

**For Immediate Regeneration**:
Press and hold REGEN
until valve motor starts (typically 3 seconds)

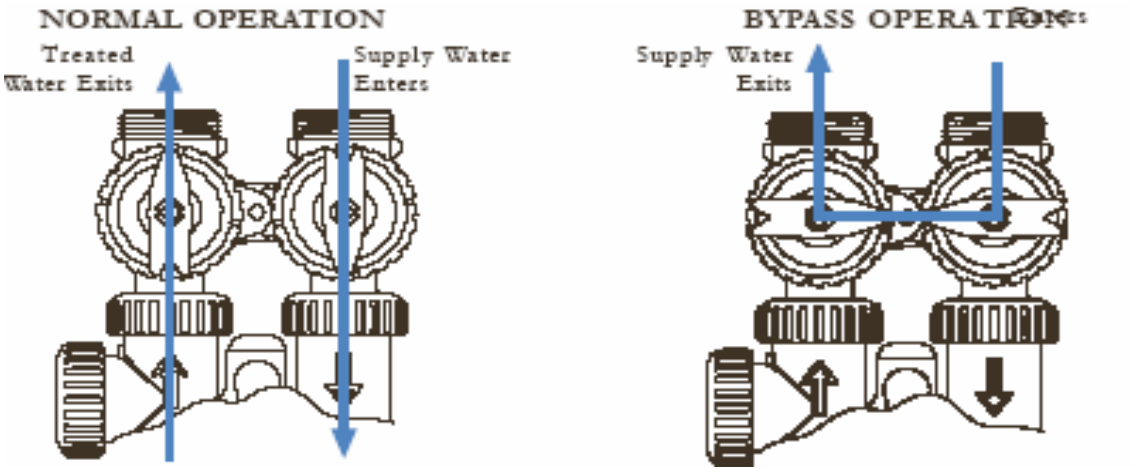
**For Regeneration Tonight:**
Press and release "REGEN"(notice that flashing "REGEN) TODAY" appears).




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 water.




| **NOTES:** | Installation Date: _____<br>Injector color Installed:_____<br><br>Drain Control Size installed: _____ | Hardness (gpg):_____<br>Water Pressure:_____<br>Salt setting:_____<br>Iron (ppm):_____<br>Manganese (ppm):_____<br>TDS (ppm):_____<br>pH:_____ |
|---|---|---|

# TROUBLESHOOTING PROCEDURES

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

| Problem | Possible Cause | Solution |
|---|---|---|
| 6. Control valve stalled in regeneration | a. Motor not operating | a. Replace motor |
| | b. No electric power at outlet | b. Repair outlet or use working outlet |
| | c. Defective transformer | c. Replace transformer |
| | d. Defective PC board | d. Replace PC board |
| | e. Broken drive gear or drive cap assembly | e. Replace drive gear or drive cap assembly |
| | f. Broken piston retainer | f. Replace drove cap assembly |
| | g. Broken main regenerant piston | g. Replace main regenerant piston |
| 7. Control valve does not regenerate automatically when REGEN button is depressed and held | a. Transformer unplugged | a. Connect transformer |
| | b. No electric power at outlet | b. Repair outlet or use working outlet |
| | c. Broken drive gear or drive cap assembly | c. Replace drive gear or drive cap assembly |
| | d. Defective PC board | d. Replace PC board |
| 8. Control valve does not regenerate automatically But does when REGEN Button is depressed | a. By-pass valve in bypass position | a. Put bypass valve in normal operation position |
| | b. Meter connection disconnected | b. Connect meter to PC board |
| | c. Restricted/stalled meter turbine | c. Remove meter and check for rotation or foreign matter |
| | d. Defective meter | d. Replace meter |
| | e. Defective PC board | e. Replace PC board |
| | f. Set-up error | f. Check control valve set-up procedure |
| 9. Time of day flashes on and off | a. Power has been out more than two hours, the transformer was unplugged and then plugged back into the wall outlet, the transformer plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons Were pressed to reset the valve. | a. Reset the time of day |

NOTE: For a detailed Service Tech manual please visit the Water Depot website at www.waterdepotinc.com.

# INSTALLATION

**SITE REQUIREMENTS:**

- Water pressure, 20-125 psi
- Water temperature (to 30C) or (40 to 100F)
- The tank should be on a firm, level surface
- Electrical: Use a 115/120v, 60Hz uninterrupted outlet
- Current draw is 0.25 ampers
- 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. NOTE: Maximum head 15 10' or 3 meters.

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 34F.

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

6. **INLET/OUTLET PLUMBING:** Connect to 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, slit 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 fittings and solder joints. Failure to do this could cause interior damage to the flow control. Install a 1/2" 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. **OVERLOW LINE CONNECTION:**
   AN OVERFLOW DRAIN LINE 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 1/2" 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 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 personnel 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 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 centre 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 centre 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 centre of the bypass valve and the outlet points to 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

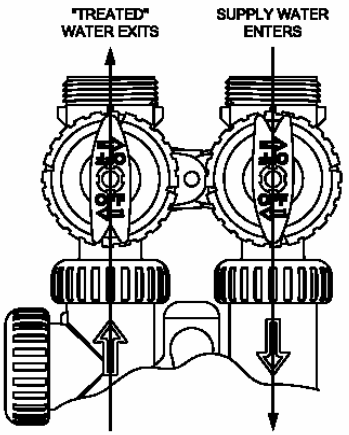



Figure 2

### BYPASS OPERATION

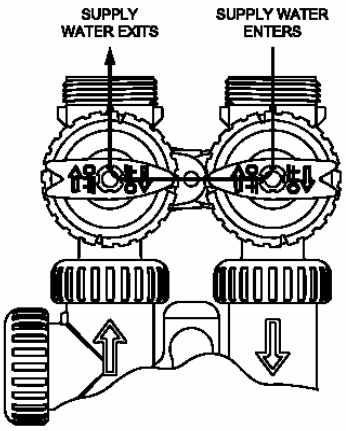



Figure 3

### DIAGNOSTIC MODE

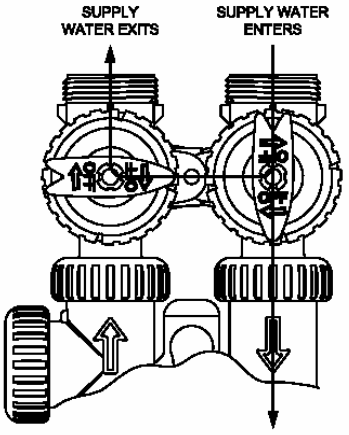
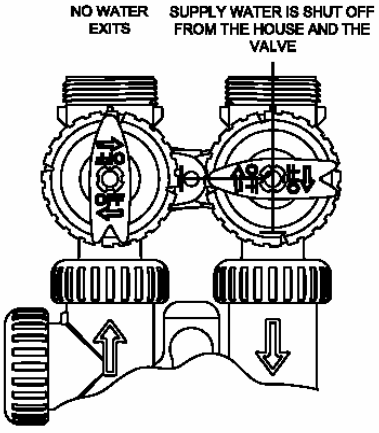



Figure 4

### SHUT OFF MODE



# SPECIFICATIONS

| | |
|---|---|
| Minimum/Maximum Operating Pressures | 20 psi (138 kPa) – 125 psi (862 kPa) |
| Minimum/Maximum Operating Temperatures | 40ºF (4ºC) - 110ºF (43ºC) |
| AC Adapter:<br>Supply Voltage<br>Supply Frequency<br>Output Voltage<br>Output Current | U.S. / International<br>120 V AC / 230V AC<br>60 Hz / 50 Hz<br>12 V AC / 12 V AC<br>500 mA / 500 mA |
| No user serviceable parts are on the PC board, the motor, or the AC adapter. The means of disconnection from the main power supply is by unplugging the AC adapter from the wall. | |

**Table below contains a summary of specifications for the control valve and bypass valve.**

# QUICK REFERENCE SPECIFICATIONS

| | |
|---|---|
| Service flow rate 1" (includes bypass and meter) | 27 gpm (102.2 lpm) @ 15 psig (103 kPa) drop |
| Backwash flow rate 1" (includes bypass) | 27 gpm (102.2 lpm) @ 25 psig (172 kPa) drop |
| Service flow rate 1.25" (includes meter) | 34 gpm (128.7 lpm) @ 15 psig (103 kPa) drop |
| Service flow rate 1.25" (includes bypass and meter) | 32 gpm (121.1 lpm) @ 15 psig (103 kPa) drop |
| Backwash flow rate 1.25" | 32 gpm (121.1 lpm) @ 25 psig (172 kPa) drop |
| Backwash flow rate 1.25" (includes bypass) | 30 gpm (113.5 lpm) @ 25 psig (172 kPa) drop |
| Minimum/Maximum Operating Pressures | 20 psi (138 kPa) – 125 psi (862 kPa) |
| Minimum/Maximum Operating Temperatures | 40ºF (4ºC) - 110ºF (43ºC) |
| AC Adapter:<br>Supply Voltage<br>Supply Frequency<br>Output Voltage<br>Output Current | U.S. / International<br>120 V AC / 230V AC<br>60 Hz / 50 Hz<br>12 V AC / 12 V AC<br>500 mA / 500 mA |
| Regenerant Refill Rate | 0.5 gpm (1.9 lpm) |
| Injectors | See Injector Graphs |
| Drain Line Flow Controls | See Table 7 |
| Inlet/Outlet Fitting Options | (a) 1" NPT elbow which has a unique drill out feature to allow a ¼" NPT connection to the inlet and/or outlet<br>(b) ¾" & 1" PVC solvent weld fitting<br>(c) 1" straight brass sweat fitting<br>(d) ¾" straight brass sweat fitting<br>(e) 1" plastic male NPT fitting<br>(f) 1 ¼" plastic male NPT fitting<br>(g) 1" plastic male BSPT fitting<br>(h) 1 ¼" plastic male BSPT fitting |
| Distributor Tube Opening 2000Valve | 1.05" outside diameter (3/4" NPS) |
| Distributor Tube Opening 2000 Valve | 1.32" outside diameter (1" NPS)<br>32 mm outside diameter |
| Tank Thread | 2 ½" – 8 NPSM |
| Control Valve Weight | 4.5 lbs. 2.0 kg |
| PC Board Memory | Nonvolatile EEPROM<br>(electrically erasable programmable read only memory) |
| Compatible with regenerants/chemicals | Sodium chloride, potassium chloride, potassium permanganate, sodium bisulfite, chlorine and chloramines. |