

# OWNERS MANUAL

how to maintain and operate your  
EcoWater digital demand water system



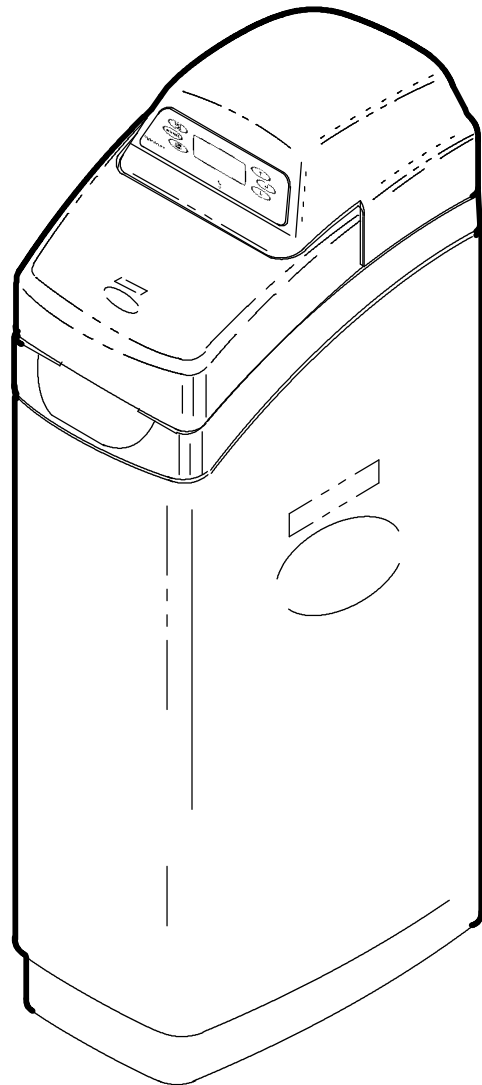
## MODELS

ES9120R, ES9120RP

ES9130R, ES9230R

ES9230RP, ES9240R

& ES9270R



EcoWater Systems

PO Box 64420, St. Paul MN 55164-9888

**UNPACKING**

EcoWater Systems conditioners are shipped from the factory in 1 master carton. The carton also includes a skin pack of small parts needed to assemble and install the unit, and this manual.

Thoroughly check the EcoWater Systems conditioners for possible shipping damage and parts loss. Also inspect and note any damage to the shipping carton. Notify the transportation company if damage is present. EcoWater Systems is not responsible for in-transit damages.

Remove and discard (RECYCLE) all packing materials. We suggest you keep the small parts on the skin-pack until you are ready to use them. Minimal assembly is needed on all two tank models...see page 7.

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**SAFETY GUIDES**

Follow the installation instructions carefully. Failure to install the EcoWater Systems conditioner properly **voids the warranty.**

Before you begin installation, read this entire manual. Then, obtain all the materials and tools you will need to make the installation.

**Check local plumbing and electrical codes.** The installation must conform to them.

**Use only lead-free solder and flux** for all sweat-solder connections, as required by state and federal codes.

Use care when handling the EcoWater Systems conditioner. Do not turn upside down, drop, or set on sharp protrusions.

Do not locate the EcoWater Systems conditioner where freezing temperatures occur. Do not attempt to treat water over 120°F. **Freezing, or hot water damage voids the warranty.**

Avoid installing in direct sunlight. Excessive sun heat may cause distortion or other damage to non-metallic parts.

The EcoWater Systems conditioner requires a minimum water flow of 3 gallons per minute at the inlet. **Maximum allowable inlet water pressure is 125 psi.** If daytime pressure is over 80 psi, nighttime pressure may exceed the maximum. Use a pressure reducing valve if necessary. (Adding a pressure reducing valve may reduce the flow.)

**The EcoWater Systems conditioner works on 24 volt-60 hz electrical power only.** Be sure to use the included transformer.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This system is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.



**WATER**

Man's very existence depends on water. It is 1 of the basic commodities of life. Water is best as nature provides it, is a common misconception. Practically all natural water needs refinement or treatment to make it safe to drink or more satisfactory to use.

The earth's water supply cycle starts in the upper cloud layers. As it falls to the earth as rain or snow, it picks up impurities and gases from the atmosphere. Landing on earth, it seeps over and through the ground, dissolving earth minerals. Passing through limestone, it dissolves calcium and magnesium, the hardness minerals. Iron deposits impart iron to the water. Acidity and sediments are other water conditions.

Municipal water supplies come from surface reservoirs, such as lakes and rivers, or from underground reservoirs. Usually, municipalities chlorinate the water to make it safe to drink. Sediment is removed by filtration. Tastes and odors are reduced or eliminated. The water is conditioned to comply with certain specifications. However, hardness minerals, tastes and odors are not always reduced to the most desirable levels.

Underground reservoirs provide our private water supplies. Because the water is raw and untreated, it can have varying amounts of hardness, iron, tastes, odors, acidity, or combinations of these. Different localities and water levels affect mineral content.

**WATER CONDITIONING**

Water conditioning is the treatment of 4 general conditions. These are: (1) *Hardness*, (2) *Iron*, (3) *Acidity*, (4) *Sediments*.

(1) **HARDNESS** is a term to describe the presence of calcium and magnesium minerals in water. A chemical analysis accurately measures the amount of minerals in grain weight. For example, 1 gallon of water with 5 grains per gallon (gpg) hardness has dissolved minerals, that if solidified, about equals the size of 1 ordinary aspirin tablet. One gallon of water, 25 gpg hard, has a mineral content equal in size to 5 aspirin tablets. Water hardness varies greatly across the country. It generally contains from 3 to 100 gpg.

Hard water affects living in general. Hardness minerals combine with soap to make a soap curd. The curd greatly reduces the cleaning action of soap. Precipitated hardness minerals form a crust on cooking utensils, appliances, and plumbing fixtures. Even the tastes of foods are affected. A water softener removes the hardness minerals to eliminate these problems, and others. Pages 20-23 describe how the EcoWater conditioner works.

Sodium Information: Water softeners using sodium chloride (salt) for regeneration add sodium to the water. Persons on sodium restricted diets should consider the added sodium as part of their overall intake.

(2) **IRON** in water is measured in parts per million (ppm). The total\* ppm of iron, and type or types\*, is determined by chemical analysis. Four different types of iron in water are: ❶ Ferrous (clear water), ❷ Ferric (red water), ❸ Bacterial and organically bound iron, ❹ Colloidal and inorganically bound iron (ferrous or ferric).

\*Water may contain 1 or more of the 4 types of iron and any combination of these. Total iron is the sum of the contents.

❶ Ferrous (clear water) iron is soluble and dissolves in water. It is usually detected by taking a sample of water in a clear bottle or glass. Immediately after taking, the sample is clear. As the water sample stands, it gradually clouds and turns slightly yellow or brown as air oxidizes the iron. This usually occurs in 15 to 30 minutes. An EcoWater conditioner will remove moderate amounts of this type of iron (see specifications).

❷ Ferric (red water), and ❸ Bacterial and organically bound irons are insoluble. This iron is visible immediately when drawn from a faucet because it has oxidized before reaching the home. It appears as small cloudy yellow, orange, or reddish suspended particles. After the water stands for a period of time, the particles settle to the bottom of the container. Generally these irons are removed from water by filtration. Chlorination is also recommended for bacterial iron. An EcoWater conditioner will remove minimal quantities (see specifications) of ferric iron.

continued

④ Colloidal and inorganically bound iron is a ferric or ferrous form that will not filter or exchange out of water. In some instances, treatment may improve colloidal iron water, but always **consult a qualified water chemistry lab** before attempting to treat it. Colloidal iron water usually has a yellow appearance when drawn. After standing for several hours, the color persists and the iron does not settle, but remains suspended in the water.

Iron in water causes stains on clothing and plumbing fixtures. It negatively affects the taste of food, drinking water, and other beverages.

(3) *ACIDITY* or acid water is caused by carbon dioxide, hydrogen sulfide, and sometimes industrial wastes. It is corrosive to plumbing, plumbing fix-

tures, water heaters, and other water using appliances. It can also damage and cause premature failure of seals, diaphragms, etc., in water handling equipment.

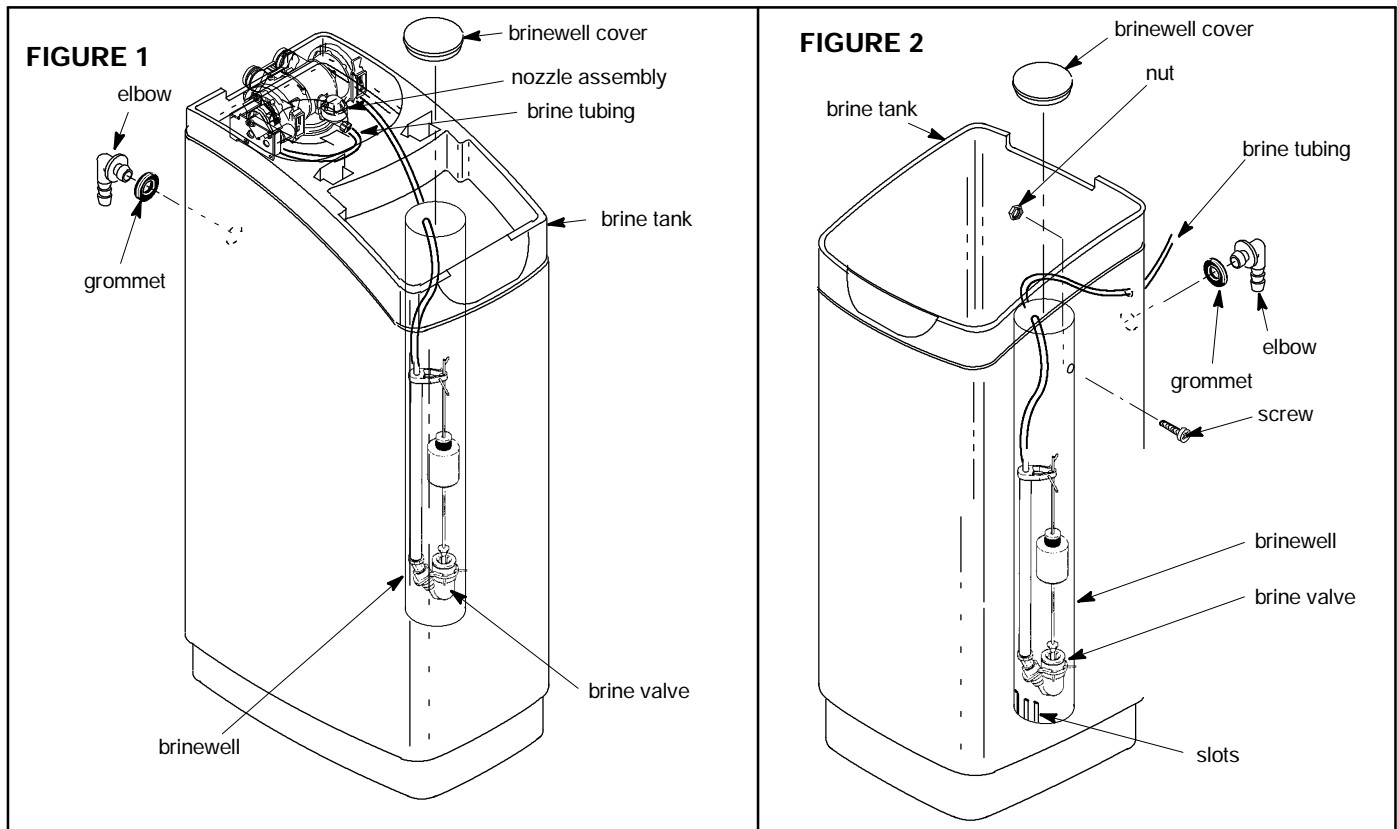
A chemical analysis is needed to measure the degree of acidity in water. This is called the pH of water. Water testing below 6.9 pH is acidic. The lower the pH reading, the greater the acidity. A neutralizer filter or a chemical feed pump are usually recommended to treat acid water.

(4) *SEDIMENT* is fine, foreign material particles suspended in water. This material is most often clay or silt. Extreme amounts of sediment may give the water a cloudy appearance. A sediment filter normally corrects this condition.

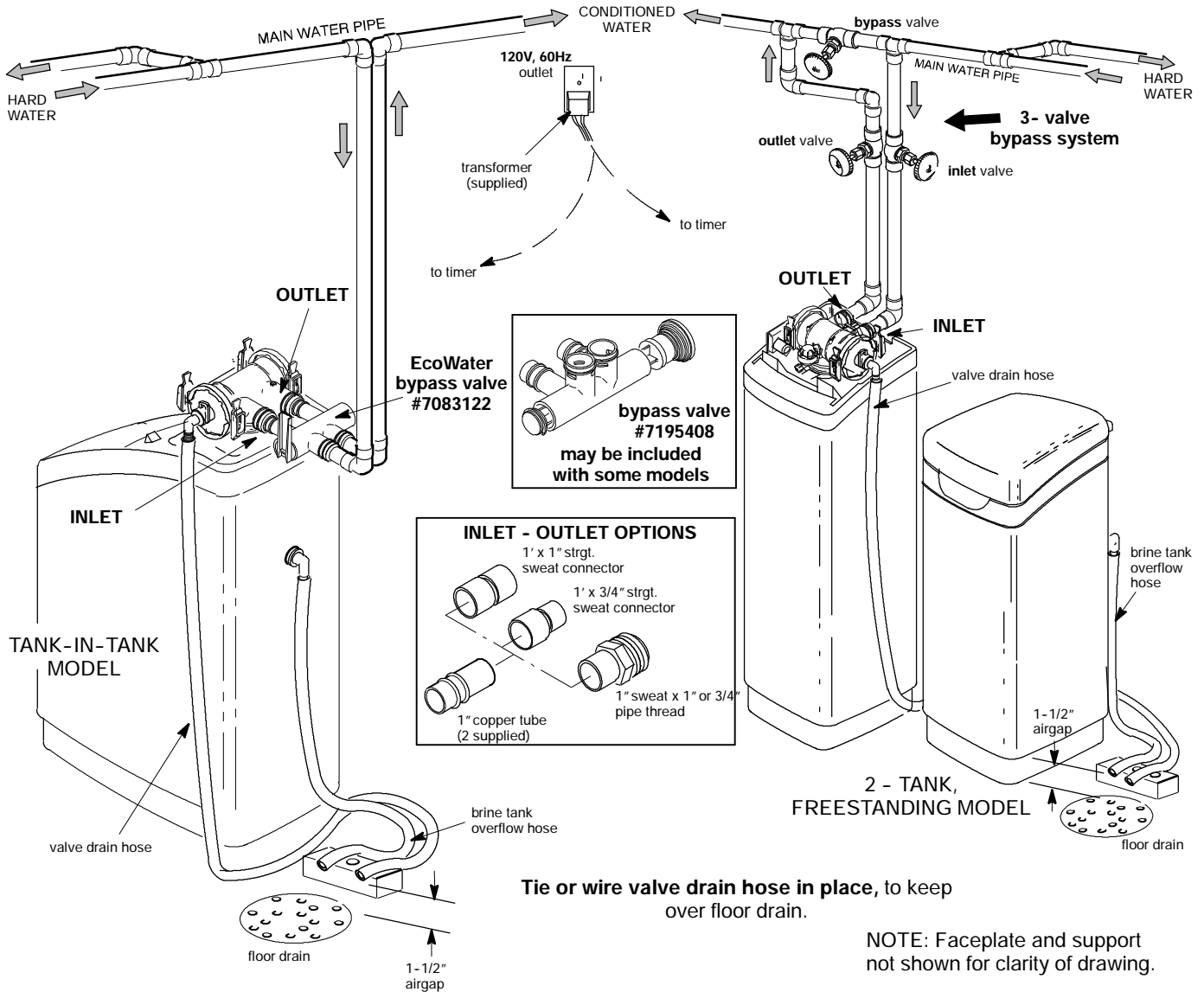
1. Tank-in-Tank models are factory assembled. During installation, remove the top and salt hole covers. Set aside to prevent damage. Check the brine-well to be sure it is secured and vertical (FIG. 1).
2. Lift the brine valve out of the brine-well. Be sure the float stem is vertical to the brine valve body so

seals will seat properly during operation. Replace the brine valve in the brine-well and install the brine-well cover.

3. Install the brine tank overflow grommet and elbow in the 3/4" diameter hole in the brine tank sidewall.



**FIG. 3 - TYPICAL INSTALLATION DRAWINGS**



**Tie or wire valve drain hose in place, to keep over floor drain.**




**NOTE: Faceplate and support not shown for clarity of drawing.**

**INLET - OUTLET PLUMBING OPTIONS**

- S** ALWAYS INSTALL 1 of the EcoWater bypass valves, #7083122 or #7195408 (may be included with some models), or a 3 valve bypass system. Bypass valves allow you to turn of water to the softener for repairs if needed, but still have water in house pipes.
- S** Use 1" ... or, 3/4" (minimum) pipe and fittings.
- S** Use sweat copper... or, threaded pipe\* ... or, CPVC plastic pipe.\*

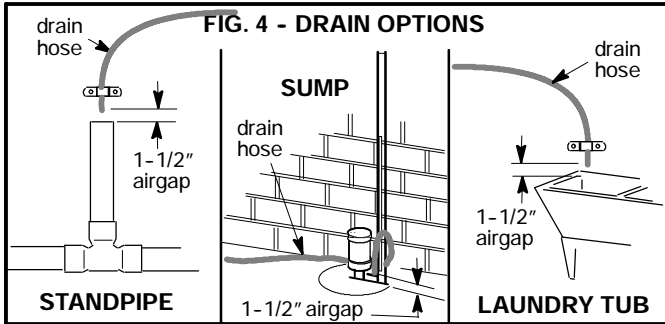
\*Sweat soldering is required to adapt to the fittings (1" male) supplied with the EcoWater System Unit, or obtain approved compression adaptors. The following special fittings are available from EcoWater. **Be sure to comply with all local plumbing codes.**

OPTIONAL INLET/OUTLET FITTINGS

-  #7104546 CPVC Nipple – Use in place of included copper inlet and outlet tubes.
-  #7129211 Adaptor Fitting, 1-1/2" (2) – Use in place of included copper inlet and outlet tubes.
-  #7120259 Elbow – Extends inlet and/or outlet in any 90° direction.

**OTHER REQUIREMENTS**

**S** A drain is needed for regeneration discharge water. A floor drain is preferred, close to the EcoWater conditioner. A laundry tub, sump, standpipe, etc., are other drain options.



**S** A 120V-60Hz, grounded, continuously "live", electrical outlet is needed within 10' of the EcoWater conditioner.

**TOOLS YOU MAY NEED**

- D common screwdriver
- D cross-point screwdriver
- D pliers
- D tape measure

**SOLDERED COPPER      THREADED      CPVC PLASTIC**

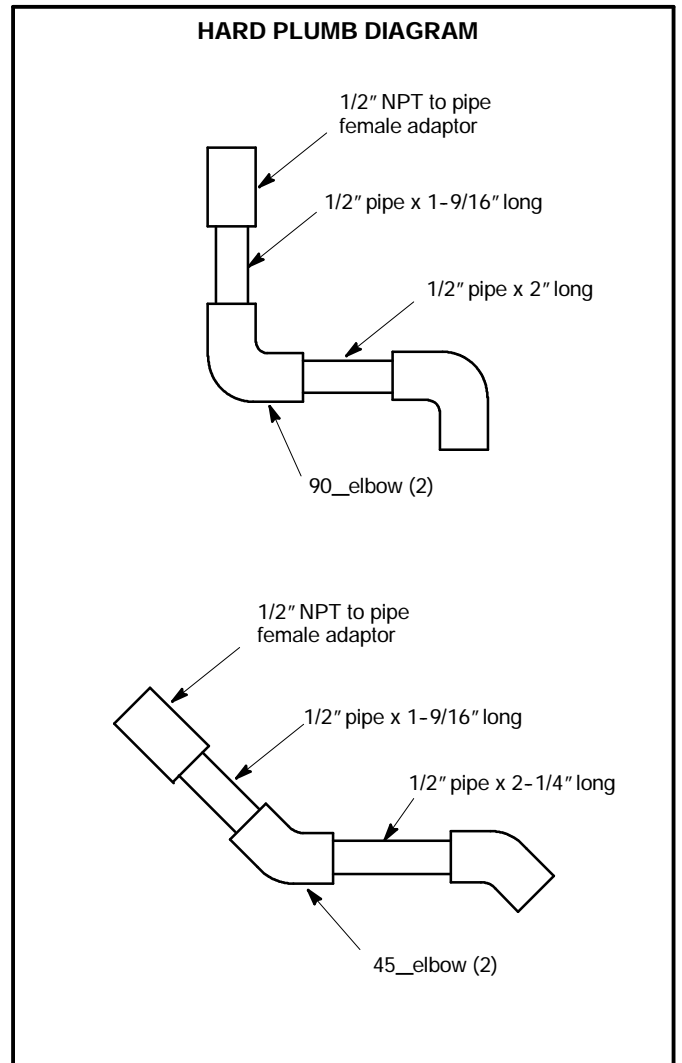
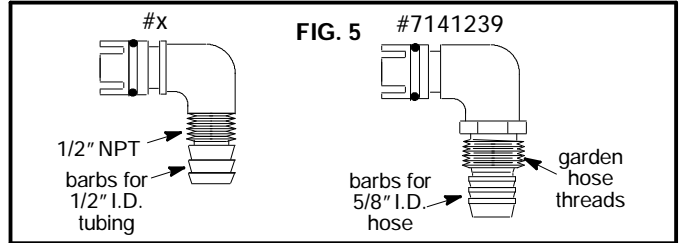
- |  |                          |                     |
|--|--------------------------|---------------------|
| D tubing cutter                        | D hacksaw or pipe cutter | D hacksaw           |
| D propane torch                        | D threading tool         | D adjustable wrench |
| D LEAD-FREE solder and flux            | D pipe joint compound*   | D solvent cement*   |
| D emery cloth, sandpaper or steel wool |                          | D primer            |

**MATERIALS YOU MAY NEED**

**H** bypass valve, or 3 valves  
**H** pipe and fittings as required  
**H** 1/2" I. D. high quality, flexible hose for the valve drain,\* and brine tank drain. The brine tank drain elbow accepts either 1/2" or 3/8" I. D. hose.

\*VALVE DRAIN OPTIONS: Flexible drain hose is not allowed in all localities (check your codes). To make a rigid valve drain run, cut the barbed section off the drain fitting for access to the 1/2" pipe threads. Then plumb a rigid drain as needed. An optional drain fitting, part no. 7141239, is available from EcoWater to

connect a standard garden hose, or 5/8" I.D. hose onto a barb.



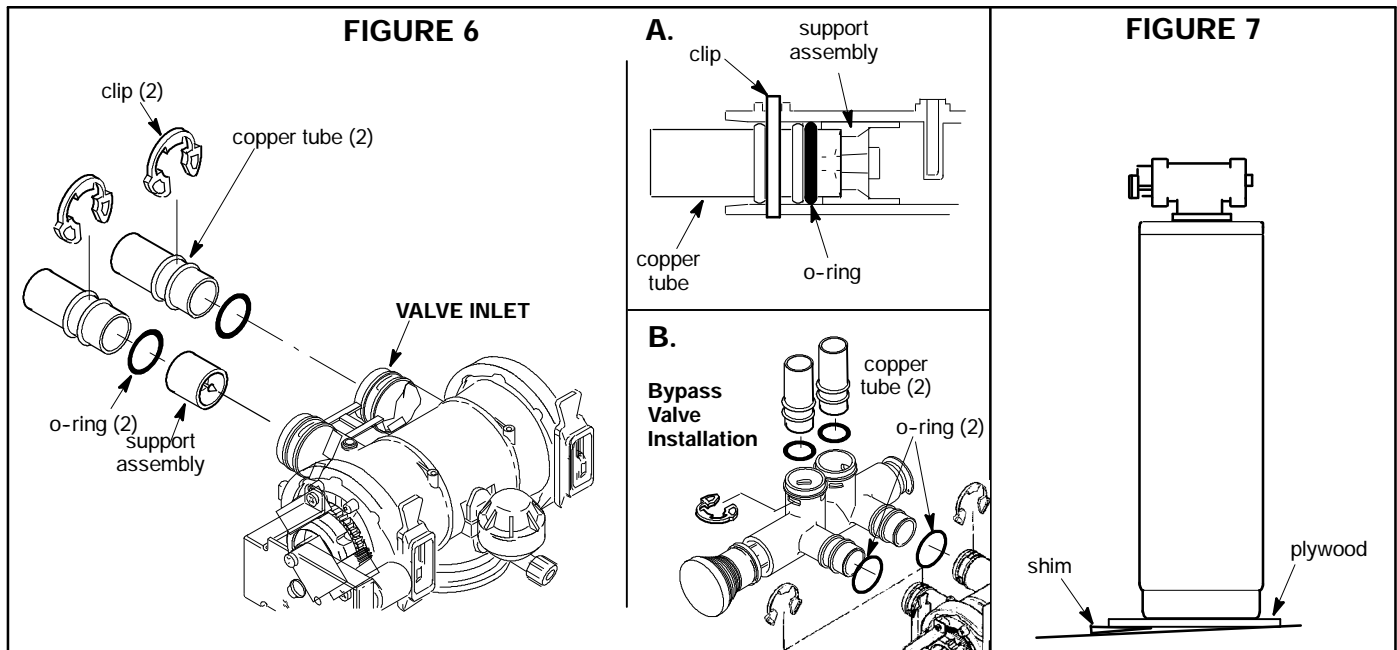


**SELECT INSTALLATION LOCATION**

Consider all of the following when selecting an installation location for the EcoWater conditioner.

- S** To condition all water in the home, install the EcoWater conditioner close to the water supply inlet, and before all other plumbing connections, **except** outside water pipes. Outside faucets should remain on hard water to avoid wasting conditioned water and salt.
- S** A nearby drain is needed to carry away regeneration discharge water. A floor drain is preferred, with a laundry tub, sump, standpipe, etc., as other options (check your local codes).
- S** **The EcoWater conditioner works on 24 volts only.** A transformer is included to reduce 120-60 Hz house power. Provide an approved, grounded outlet within 10' of the conditioner. The conditioner includes a 10' power cable for connection between the transformer and the timer.

- S** Position the EcoWater conditioner at least 6" from surrounding walls, or other appliances, to allow access for adding salt and servicing.
- S** Locate the EcoWater conditioner, in the plumbing system, **after** all other installed water conditioning equipment, except for a taste and odor filter. A taste and odor filter is installed after all equipment. **Always install the EcoWater conditioner BEFORE the water heater.** See the Safety Guides on page 2. To reduce the risk of hot water back-up, conditioned water piping between the EcoWater conditioner and water heater should be as long as possible.
- S** Install the EcoWater conditioner in a place water damage is least likely to occur if it develops a leak.
- S** If installing the conditioner in an outside location, be sure to provide protection from the elements, contamination, vandalism, and sunlight heat. The sun's heat can melt plastic parts.



**1. INSTALL BYPASS VALVE and/or COPPER TUBES**

**IMPORTANT:** The support assembly (FIG. 6) is factory installed. The bypass valve or outlet copper tube will not insert properly if the support assembly is reversed or not fully into the valve port.

**a. IF INSTALLING AN ECOWATER BYPASS VALVE,** put lubricated o-ring seals onto both bypass valve ports (FIG. 6B). Carefully slide the bypass valve into the softener valve and install the "C" clips.

**b.** Slide a lubricated o-ring seal onto each of the copper tubes. Carefully insert the copper tubes into the bypass valve (FIG. 6B), or into the softener valve (FIG. 6 and 6A). Then install the "C" clips.

**NOTE:** For lubrication, use silicone grease approved for potable water supplies.

**IMPORTANT:** Be sure the bypass valve and/or copper tubes are firmly held in place by the plastic "C" clips, and the clips are securely in place.

**2. TURN OFF WATER SUPPLY**

**a.** Close the main water supply valve, near the well pump or water meter.

**b.** Shut off the electric or fuel supply to the water heater.

**c.** Open high and low faucets to drain all water from the house pipes.

**3. INSTALLING THREE VALVE BYPASS**

If installing a 3-valve bypass system, plumb as needed using FIG. 3 as a guide. When installing sweat copper, **be sure to use lead-free solder and flux**, required by federal and state codes. Use pipe joint compound on outside pipe threads.

**4. MOVE THE ECOWATER UNIT INTO PLACE**

Move the EcoWater System Unit (resin tank only if 2-tank model) into installation position. Set it on a solid, smooth and level surface. If needed, place the unit on a section of plywood, a minimum of 3/4" thick. Then, shim under the plywood to level the unit, FIG. 7.

**CAUTION: DO NOT PLACE SHIMS DIRECTLY UNDER THE BRINE TANK.** The weight of the tank, when full of water and salt, may cause the tank to fracture at the shim.

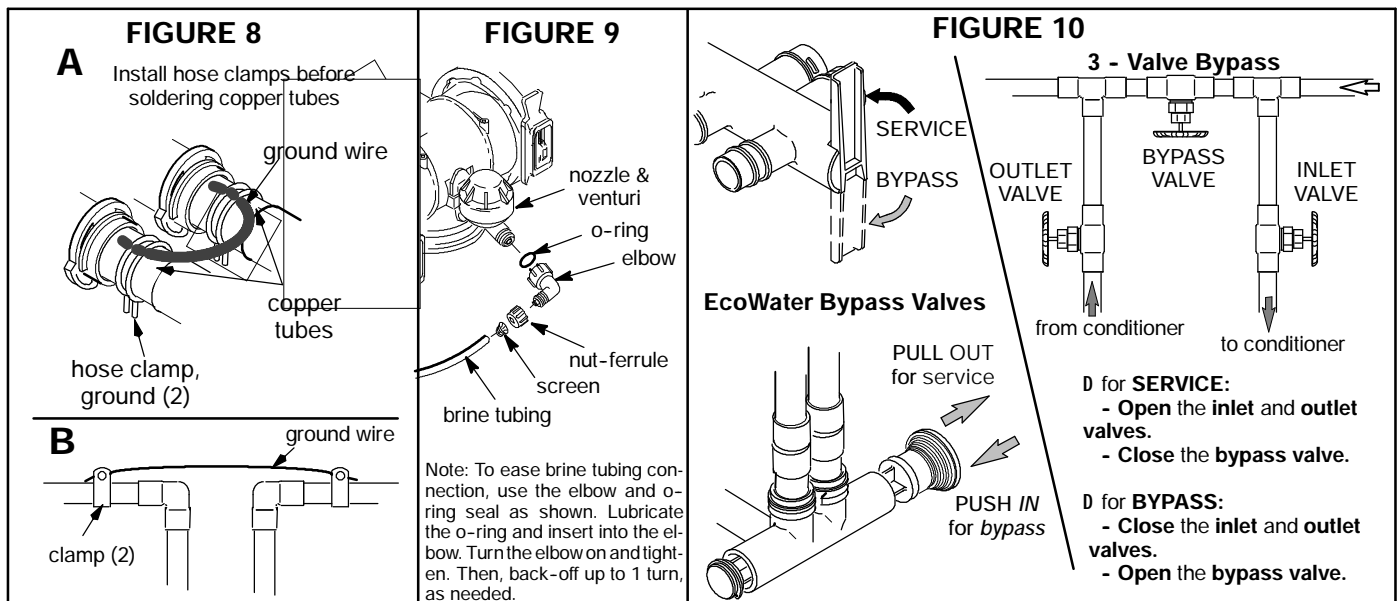
**5. ASSEMBLE INLET AND OUTLET PLUMBING**

Measure, cut, and loosely assemble pipe and fittings from the main water pipe (or from the bypass valves installed in step 3), to the inlet and outlet copper tubes, installed in step 1b.

Be sure **hard water** supply pipe **goes to** the valve **inlet side**. Trace the water flow direction to be sure.

**CAUTION:** Be sure to fit, align and support all plumbing to prevent putting stress on the softener valve inlet and outlet. Undo stress may cause damage to the valve.

continued



## 6. CONNECT INLET AND OUTLET PLUMBING

Complete the inlet and outlet plumbing as applicable, below.

### a. SOLDERED COPPER

- (1) Thoroughly clean and flux all joints.
- (2) Pull the plastic "C" clips and remove the inlet and outlet tubes from the valve. Remove o-rings from the tubes. **DO NOT solder with tubes in the valve.** Soldering heat will damage the valve.

**NOTE:** If installing a ground as shown in figure 8A, **place hose clamps on copper tubes before soldering** (see step 7a).

- (3) Make all solder connections. Be sure to keep fittings fully together, and pipes square and straight.

**IMPORTANT:** Be sure the bypass valve and/or copper tubes are firmly held in place by the plastic "C" clips, and the clips are securely in place.

### b. THREADED PIPE

- (1) Apply pipe joint compound to all outside pipe threads.
- (2) Tighten all threaded joints.
- (3) If soldering to the inlet and outlet tubes, observe steps a above.

### c. CPVC PLASTIC PIPE

- (1) Clean, prime and cement all joints, following the manufactures instructions supplied with the plastic pipe and fittings.
- (2) If soldering to the inlet and outlet tubes, observe step a above.

## 7. COLD WATER PIPE GROUNDING

The house cold water pipe (metal only) is often used as a ground for the house electrical system. The 3-valve bypass type of installation, shown in FIG. 3, will maintain ground continuity. If you use the plastic bypass valve at the Eco System Unit, continuity is broken. To restore the ground, do either step a or b following.

- a. Use the included hose clamps and wire, to make a jumper across the inlet and outlet copper tubes, FIG. 8A. Put hose clamps on the copper tubes before soldering, step 6a.
- b. Install a #4 copper wire across the removed section of main water pipe, securely clamping at both ends, FIG. 8B (parts not included).

## 8. INSTALL VALVE DRAIN HOSE

**NOTE:** See valve drain options on page 8.

- a. Connect a length of 1/2" I.D. hose (check codes) to the valve drain elbow, on the controller, FIG. 5. Use a hose clamp to hold the hose in place. Route the hose out through the notch in the back of the top cover.
- b. Run the hose to the floor drain, and as typically shown in FIG. 4, tie or wire the end to a brick or other heavy object. This will prevent "whipping" during regenerations. Be sure to provide a 1-1/2" minimum air gap, to prevent possible sewer water backup.

**NOTE:** In addition to a floor drain, you can use a laundry tub, sump, or standpipe as a good drain point for this hose. Avoid long drain hose runs, or elevating the hose more than 8' above the floor. **If using a sump drain, be sure it does not discharge on a surface that salty water could damage.**

9. IF INSTALLING A 2-TANK MODEL, move the brine tank into position next to the resin tank. Observe the instructions in step 4, page 10.

**10. INSTALL BRINE TANK OVERFLOW HOSE**

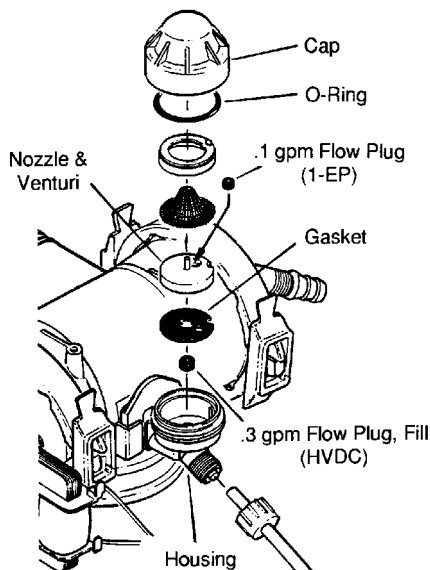
- a. Connect a length of 1/2" I. D. hose to the brine tank overflow elbow and secure in place with a hose clamp.
- b. Run the hose to the floor drain, or other suitable drain point **no higher than the drain fitting** on the tank. If the tank overfills with water, the excess gravity flows to the drain point.

**11. On 2-tank models,** connect the brine tubing to the nozzle and venturi housing, FIGS. 1, 2 and 9. Use the elbow, o-ring, nut-ferrule and screen included on the skin-pack. Tighten the nut by hand, then another 1/4 turn with a pliers.

NOTE: Route the tubing neatly out of the way and cut it to the desired length. For longer distances, order the optional parts shown on page 37, to extend the tubing.

**R20 AND HR20 MODELS:** A white color coded nozzle and venturi (.023) is factory installed for use on water supply pressure of 50 psi and higher. If water supply pressure is under 50 psi, install the black nozzle and venturi (.032) along with the .1 gpm flow plug. They are included on the small parts skin pack. Insert the .1 gpm flow plug into the nozzle and venturi, as shown, **NUMBERED SIDE UP, CONCAVE SIDE DOWN.**

CAUTION: When removing and installing the cap, hold the housing tightly with 1 hand to prevent breakage.



**12. PRESSURE TESTING FOR LEAKS**

**To prevent excessive air pressure in the EcoWater Unit and plumbing system, do the following steps EXACTLY in order.**

- a. Fully open 2 or more *conditioned* cold water faucets nearby the EcoWater Unit.
- b. Place the bypass valve(s) in "bypass" position. See figure 10.
- c. Fully open the main water supply valve. Observe steady flow from the opened faucets, with no air bubbles.
- d. **EXACTLY** as follows, place bypass valve(s) in "service".

(1) SINGLE BYPASS VALVE: **SLOWLY**, move the valve stem toward "service", pausing several times to allow the unit to pressurize slowly.

(2) 3-VALVE BYPASS: Fully close the bypass valve and open the outlet valve. **SLOWLY**, open the inlet valve, pausing several times to allow the unit to pressurize slowly.

e. **After about 3 minutes, open a hot water faucet** for about 1 minute, or until all air is expelled, then close.

f. **Close all cold water faucets** and check your plumbing work for leaks.

**13. ADD WATER AND SALT TO THE BRINE TANK**

- a. Using a pail or garden hose, add about 3 gallons of water into the brine tank. **DO NOT** pour into the brinewell, FIGS. 1 and 2, page 6.
- b. Fill the brine tank with salt. You can use most water conditioner salts, but it must be clean. Recommended nugget, pellet or coarse solar salts have less than 1% impurities. Salt storage capacity is shown on page 35.

NOTE: See page 28 for additional information on salt.

**14. SANITIZING THE ECOWATER SYSTEM UNIT**

Care is taken at the factory to keep your EcoWater System conditioner clean and sanitary. Materials used to make the unit will not infect or contaminate your water supply, and will not cause bacteria to form or grow. However, during shipping, storage, installing and operating, bacteria could get into the unit. For this reason, sanitizing as follows is suggested ; when installing.

...Remove the brinewell cover and pour about 1-1/2 oz. (2 to 3 tablespoons) of common household bleach into the softener brinewell, FIGS. 1 and 2, page 6. Clorox, Linco, BoPeep, White Sail, Eagle, etc. are brand names of bleach readily available. **Replace the brinewell cover.**

...The final step in the sanitizing procedure is done as you complete the following steps, including timer programming on page 14.

i Recommended by the Water Quality Association. On some water supplies, the EcoWater System Unit may need periodic disinfecting.

**15. CONNECT TRANSFORMER**

a. Connect the power cable leads to the 2 terminals on the transformer.

NOTE: Check to be sure all leadwire connectors are secure on the back of the timer.

**Caution: Be sure all wiring is away from the valve cam, which rotates during regenerations.**

b. Plug the transformer into a continuously “live”, grounded, 120V-60Hz house electrical outlet, approved by local codes. **THE UNIT WORKS ON 24V ONLY. DO NOT CONNECT WITHOUT THE TRANSFORMER.**

**16. START A RECHARGE**

Press the RECHARGE button, move cursor to Set Recharge Now and press SELECT/EXIT button, starting a recharge. This recharge draws the sanitizing bleach into and through the EcoWater System Unit. Any air remaining in the unit is purged to the drain.

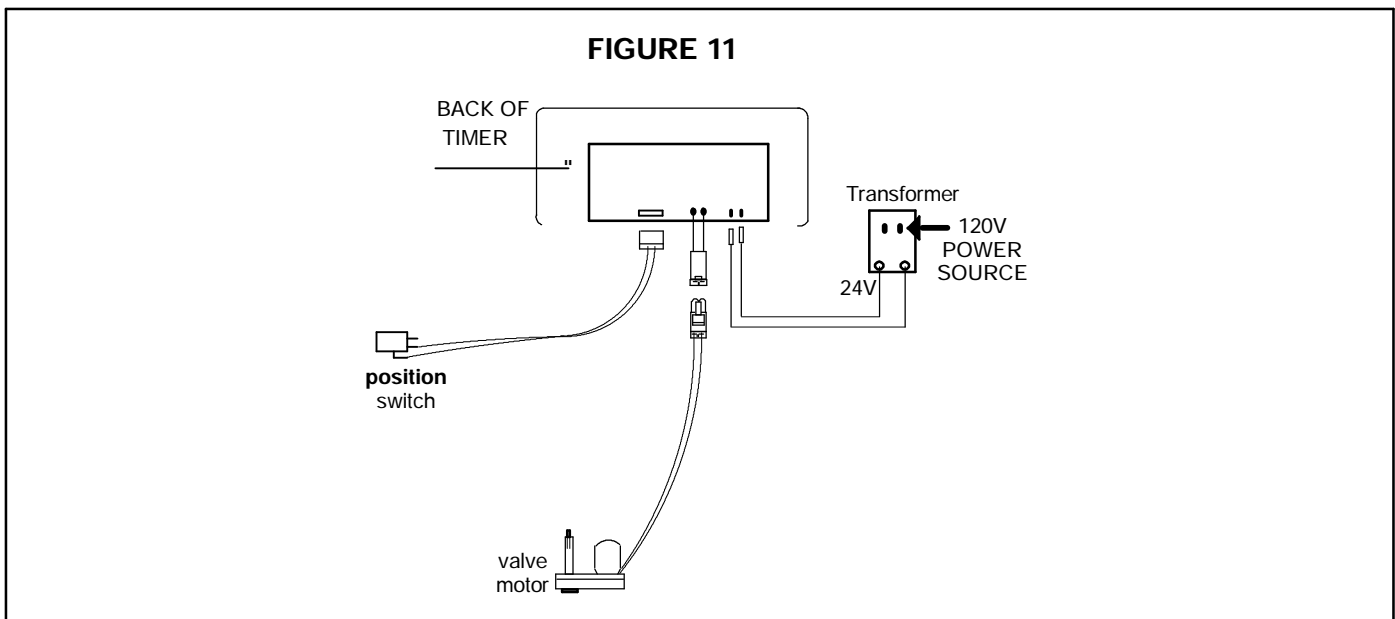
**17. RESTART THE WATER HEATER**

Turn on the electric or fuel supply to the water heater, and light the pilot, if applies.

NOTE: The water heater is filled with HARD water and, as hot water is used, it refills with conditioned water. In a few days, the hot water will be fully conditioned. To have fully conditioned hot water immediately, wait until the recharge (step 16) is over. Then, drain the water heater until water runs cold.

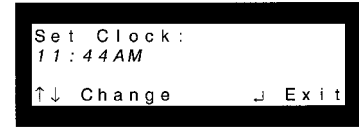
18. Install the tank top cover(s).

**COMPLETE THE PROGRAMMING STEPS ON PAGES 14 AND 15.**



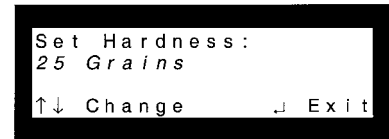


**2. SET THE CLOCK:** Press SELECT/EXIT (  $\zeta$  ) to enter Primary Menu. Move the cursor so that it is next to Set Clock. Again, use the (-) or (  $\bar{\ }$  ) buttons to set the present time of day, being sure AM or PM shows, as applicable. Press (-) to move the display ahead; press (  $\bar{\ }$  ) to move the time backward. NOTE: Each press of a button changes the time by 1 minute. Holding a button in changes the time by 32 minutes each second. Pressing the SELECT/EXIT (  $\zeta$  ) button will set the clock and exit to the primary menu.

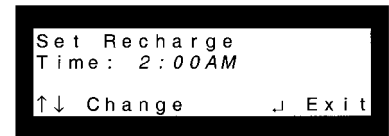


NOTE: TO RESET THE CLOCK, IF SET CLOCK SCREEN IS SHOWING AFTER A POWER OUTAGE, DO STEP 2. Then, press SELECT/EXIT (  $\zeta$  ) to return to the Normal View Screens.

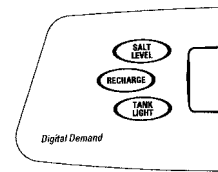
**3. SET WATER HARDNESS:** Press SELECT/EXIT (  $\zeta$  ) to enter Primary Menu. Move the cursor so that it is next to Set Hardness. Press the SELECT/EXIT (  $\zeta$  ) button once to display a flashing 25 and GRAINS. Set the grains per gallon hardness of your water supply. Water hardness is determined by water analysis, or call your local water department. Use the (-) button to advance the number; use the (  $\bar{\ }$  ) button to reduce the number. Each press of a button changes the display by 1. Hold down the button to scroll. After 25, scrolling will be at a faster rate. NOTE: To compensate for iron in the water, add 5 to the hardness number for each 1 ppm of iron. Pressing the SELECT/EXIT (  $\zeta$  ) button will set the hardness level and exit to the primary menu.



**4. SET RECHARGE (REGENERATION) TIME:** Press SELECT/EXIT (  $\zeta$  ) to enter Primary Menu. Move the cursor so that it is next to Set Recharge Time. Press the SELECT/EXIT (  $\zeta$  ) button once to display a flashing 2:00 AM. At this setting, the EcoWater conditioner begins recharge, or regeneration, at 2:00 AM., ending no later than 5:30 AM. This is a good time in most households because water is not being used. If **hot** water is used while the unit is regenerating, the water heater will refill with *hard* water. To select a different recharge start time, use the (-) or (  $\bar{\ }$  ) button. Pressing the SELECT/EXIT (  $\zeta$  ) button will set the recharge time and exit to the primary menu.



**5.** Press the RECHARGE button to get to the recharge menu. Move the cursor to Set Recharge Now and press the SELECT/EXIT (  $\zeta$  ), starting a recharge. This recharge **draws the bleach** (see step 14, page 13) through the EcoWater conditioner **to sanitize** it and to purge any air remaining in the resin tank assembly.



**6. RESTART THE WATER HEATER:** Turn on the electric or fuel supply to the water heater, and light the pilot, if applies.

NOTE: The water heater is filled with HARD water and, as hot water is used, it refills with conditioned water. In a few days, the hot water will be fully conditioned. To have fully conditioned hot water immediately, wait until the recharge (step 5) is over. Then, drain the water heater until water runs cold.

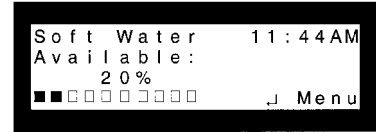
**INSTALLATION OF THE DIGITAL DEMAND ECOWATER CONDITIONER IS COMPLETE.** Additional faceplate timer features and options are described on following pages.

**FEATURES AND OPTIONS**

**NORMAL SCREEN VIEWS**

The display will scroll through as many as 5 screens at an interval of 4 seconds each.

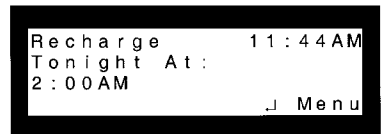
**F** Soft Water Available will show a percent of available soft water and a bar graph at the bottom of the display.



**F** Water Flow Rate shows gallons per minute (GPM) flowing through the system at that time and a moving bar graph at the bottom of the screen.



**F** Recharge Tonight is shown only if the unit will be initiating a recharge that night.



**F** Salt Level is Low is shown only if the salt level is below the amount set for warning.

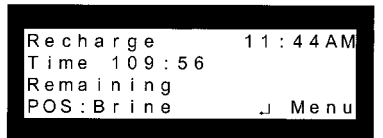
**F** If the unit is in recharge, the display will show remaining time in recharge and at what stage of recharge.

**INITIATING EXTRA RECHARGES**

**RECHARGE NOW:** Press the Recharge button to go to the recharge menu. Move cursor down to Set Recharge Now. Press SELECT/EXIT button and a recharge begins immediately.



To assure an adequate supply of conditioned water, at times of unusual or *unexpected* high water use demand, use the RECHARGE NOW feature. For example, if you have guests and the Soft Water Available screen is at or below 50%, you could deplete conditioned water capacity before the next recharge is automatically initiated. To be sure this will not happen, use RECHARGE NOW to restore 100% conditioned water capacity.



**RECHARGE TONIGHT:** Press the Recharge button to go to the recharge menu. Move cursor down to Set/Cancel Recharge Tonight. Press SELECT/EXIT button to return to Normal Screen Views. When this feature is set, the EcoWater conditioner will regenerate at the next programmed start time. This feature is beneficial to assure a sufficient supply of conditioned water for an *expected* heavy water usage the next day.

To cancel a recharge when RECHARGE TONIGHT is shown, press the Recharge button to go to the recharge menu. Move cursor down to Set/Cancel Recharge Tonight. Press SELECT/EXIT button to return to Normal Screen Views.

**PROGRAM MEMORY**

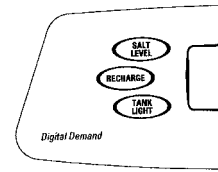
If electrical power to the EcoWater conditioner goes off, the display is blank, but the faceplate timer keeps the correct time for at least 2 days. When electrical power comes on again, you have to verify clock time is correct. The MODEL CODE, HARDNESS and RECHARGE TIME never need resetting unless a change is desired.

Even if the timer is incorrect, after a long power outage, the unit works as it should to keep your water conditioned. However, regenerations may occur at the wrong time of day until you reset the timer to the correct time of day. To reset present time, see step 2 on page 15.

continued



**Timer Buttons:** The timer has 3 buttons on the left side of the display. Salt Level button is used when adding salt to the brine tank. The level number on the brinewell corresponds to the number to program into the timer. Recharge button has 2 options: Set/Cancel recharge tonight, which either sets or cancels a recharge for that night and Set Recharge Now, which will start a recharge immediately. NOTE: If in a recharge, and the Recharge button is pressed, it will advance the valve to the next regeneration cycle. On cabinet style units, there is also a Tank Light button. This will turn tank light on or off, and will work while in any screen. The tank light will automatically turn off after 4 minutes.



The following is a description of the remaining options in the Primary Menu.

**Water Flow Rate:** Press SELECT/EXIT (  $\downarrow$  ) to enter Primary Menu. Move the cursor by using the (-) or (=) buttons so that it is next to Water Flow Rate. Press the SELECT/EXIT (  $\downarrow$  ) button. When selected, this screen will show the water flow rate with the moving bar graph at the bottom of the display for 4 minutes before defaulting back to the Normal Screen Views.



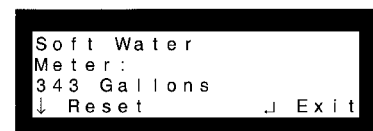
**Water Used Today:** Press SELECT/EXIT (  $\downarrow$  ) to enter Primary Menu. Move the cursor so that it is next to Water Used Today. Press the SELECT/EXIT (  $\downarrow$  ) button and the gallons/liters used since midnight will be shown in the display.



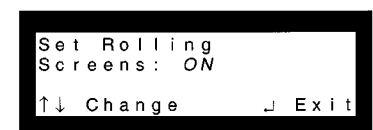
**Average Water Use:** Press SELECT/EXIT (  $\downarrow$  ) to enter Primary Menu. Move the cursor so that it is next to Water Used Today. Press the SELECT/EXIT (  $\downarrow$  ) button and the average gallons/liters used each day will be shown in the display.



**Soft Water Meter:** Press SELECT/EXIT (  $\downarrow$  ) to enter Primary Menu. Move the cursor so that it is next to Soft Water Meter. Press the SELECT/EXIT (  $\downarrow$  ) button to enter this menu. This screen is similar to a trip odometer in that it will count the number of gallons through the system until it is reset.



**Set Rolling Screen:** Press SELECT/EXIT (  $\downarrow$  ) to enter Primary Menu. Move the cursor so that it is next to Set Rolling Screen. Press the SELECT/EXIT (  $\downarrow$  ) button to enter this menu. This menu will disable the Normal Screen Views from scrolling and will show only the screen that is most important at the current time.

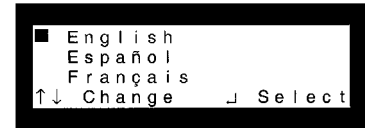


continued



The following is a description of the options in the Advanced/Service Menu. To enter any of the following menus, press SELECT/EXIT ( *i* ) to enter Primary Menu. Move the cursor so that it is next to Advanced/Service. Press the SELECT/EXIT ( *i* ) button to enter this menu. Warning screen will show, press the (-) button to continue.

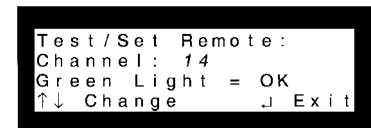
**Set Language:** Move cursor down to Set Language. Language can be changed from English to Spanish or French. **Warning:** If the language has been mistakenly changed, the following steps can be followed to reset. When the timer is scrolling through Normal Screen Views press the SELECT/EXIT ( *i* ) button once to enter the Primary Menu. Move cursor to the second to the last menu choice. Press SELECT/EXIT ( *i* ) *twice* to enter Advanced/Service Menu. Move cursor down one line and press the SELECT/EXIT ( *i* ) button to enter the Set Language menu. Move cursor to desired language with English first, Spanish second and French third. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.



**Diagnostics:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Diagnostics and press SELECT/EXIT ( *i* ) to view this screen. This screen is for viewing only and will show any error codes plus information about the unit. Use the (-) or (˘) buttons to view all lines of the screen. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.



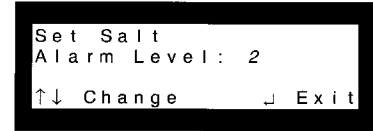
**Test Remote:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Test Remote and press SELECT/EXIT ( *i* ) to enter this menu. This screen is for first time setting up of the remote. Use the (-) or (˘) buttons to change channel if necessary. At set up, the unit will send a signal to the remote every 3 seconds to allow for correct positioning of remote monitor. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu. See pages 22 to 23 for Remote Monitor.



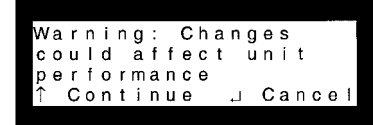
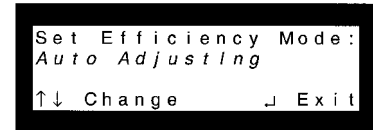
continued

Advanced/Service Menu, continued

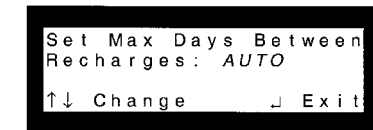
**Set Low Salt Alert:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Low Salt Alert and press SELECT/EXIT ( *⏏* ) to enter this screen. Use the (-) or ( *⏏* ) buttons to change Alarm Level. Press SELECT/EXIT ( *⏏* ) to exit to the Primary Menu.



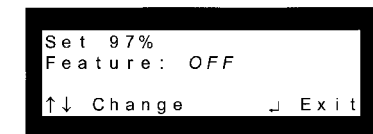
**Efficiency Mode:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Efficiency Mode and press SELECT/EXIT ( *⏏* ) to enter this screen. Default is Auto Adjusting which has a minimum efficiency of 3350 grains/lb of salt. Use the (-) or ( *⏏* ) buttons to change to High Capacity which is below 3350 grains/lb of salt and Salt Efficiency which operates at a minimum of 4000 grains/lb of salt. Changing this setting will prompt a warning screen. Press SELECT/EXIT ( *⏏* ) to exit to the Primary Menu.



**Set Max Days/Recharge:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Max Days/Recharge and press SELECT/EXIT ( *⏏* ) to enter this screen. Default is Auto. Use the (-) or ( *⏏* ) buttons to change between 1 and 15 days. With this setting the unit will never go past number of days set for a recharge, but could recharge before. Press SELECT/EXIT ( *⏏* ) to exit to the Primary Menu.



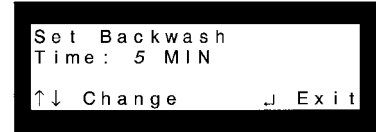
**Set 97% Feature:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set 97% Feature and press SELECT/EXIT ( *⏏* ) to enter this screen. Default is Off. Use the (-) button to set to On. By setting to On, unit will automatically recharge when 97% capacity has been used, at any time of day. Press SELECT/EXIT ( *⏏* ) to exit to the Primary Menu.



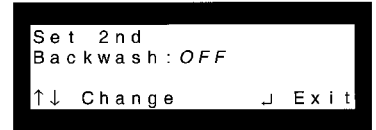
continued

Advanced/Service Menu, continued

**Set Backwash Time:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Backwash Time and press SELECT/EXIT ( *i* ) to enter this screen. Time can be changed from 1 to 30 minutes. See chart on page xx for recommended backwash time. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.



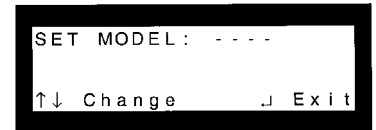
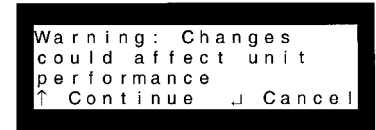
**Set 2nd Backwash:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set 2nd Backwash and press SELECT/EXIT ( *i* ) to enter this screen. Default is Off. Use the (-) button to set to On. When set to On, unit will always perform a 2nd backwash. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.



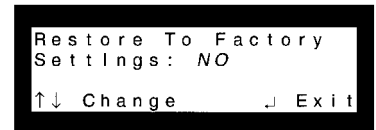
**Set Fast Rinse:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Fast Rinse and press SELECT/EXIT ( *i* ) to enter this screen. Time can be changed from 1 to 30 minutes. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.



**Set Model:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Model and press SELECT/EXIT ( *i* ) to enter this screen. Warning screen will display, press (-) to continue. Use the (-) or (=) buttons to change to new model code. NOTE: If this feature is changed, it will delete all information stored in the timer (Hardness, Recharge time will have to be reset. All usage history will be cleared). Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.

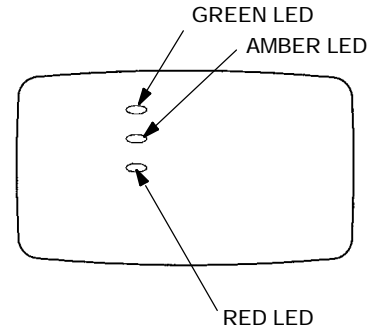


**Restore To Factory Settings:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Restore System and press SELECT/EXIT ( *i* ) to enter this screen. Default is No. If set to Yes will restore timer to factory settings. NOTE: This will affect ALL settings, and timer will go through first time set-up screens again. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu.

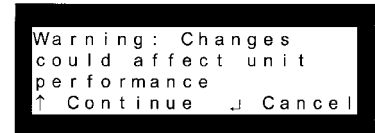


Remote Monitor, Features and Options

This EcoWater unit comes with a Remote Monitor which can conveniently be placed in your home for viewing of your conditioners' status. During normal operation, the green LED will flash at intervals of 5 seconds. If the unit requires salt, the amber LED will flash, and if the unit needs to be checked the red LED will flash. Follow the steps below to set up the remote monitor.



**Test Remote:** Press SELECT/EXIT ( *i* ) to enter the Primary Menu. Move the cursor next to Advanced/Service Menu and press SELECT/EXIT ( *i* ) to enter this Menu. Warning screen will show. Press SELECT/EXIT ( *i* ) to continue. Move cursor to Test Remote and press SELECT/EXIT ( *i* ) to enter this screen. The timer will start sending a signal to the remote every 3 seconds. When the remote is receiving this signal, the LED's will flash red, amber, green. Now remote can be placed in a convenient location. If only the red LED starts to flash, the remote is out of range of signal and needs to be repositioned. Press SELECT/EXIT ( *i* ) to exit to the Primary Menu. Now the unit should start transmitting a normal signal.



The timer on the EcoWater Systems conditioner will send a signal to the remote monitor every minute. The remote monitor will listen for a signal every 10 minutes. Any changes in softener status could possibly take up to 10 minutes before the remote registers the change. If the unit stops sending a signal, the remote will keep trying to listen for the signal. If after 10 minutes with no signal received, the remote will try 1 minute later and 2 minutes later to find the signal, gradually increasing the time between, but will keep trying to listen for the signal up to 2 days. After 20 minutes with no signal received, the remote monitor will turn off the LED's to conserve battery life, but will still be active. After 2 days with no signal received, the remote monitor will shut down until the reset button is pushed (on back of remote).

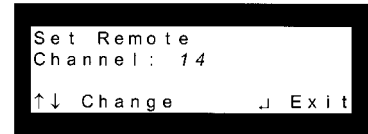
The EcoWater Systems remote uses 3 "AA" batteries, which are included on the small parts skin pack. To check batteries, press reset button on back of remote monitor. If batteries are good, the LED's on the remote should scroll red, amber, green. If display is blank, batteries need to be changed.

continued

Remote Monitor, continued

If there is another EcoWater unit within range of the remote, it may cause a conflict with the channel that the remote monitor is receiving. If the remote monitor displays the wrong message (example: low salt when salt is above warning level) this is an indication that the remote monitor is receiving a different signal. Follow the steps below to change the remote channel.

**Set Remote Channel:** Follow directions described before to get to Advanced/Service Menu. Move cursor to Set Remote Channel and press SELECT/EXIT (⏏) to enter this screen. Default is random from 1 to 16. Press (-) or (=) to select new channel. Press SELECT/EXIT (⏏) to exit to the Primary Menu.



NOTE: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: ALSO SEE SERVICE INFORMATION, PAGES 28 THROUGH 34.

## ELECTRONICS

### WATER METER:

The water meter consists of a turbine, turbine mounting assembly, and sensor housing. It is located at the valve outlet port, FIG. 6, page 9. As water passes through and spins the turbine, 2 magnets (in the turbine) cause a back-and-forth movement of a switch in the sensor housing. This switch movement sends a pulse to the faceplate timer.

### FACEPLATE TIMER:

The faceplate timer is actually a small computer. As it receives pulses from the water meter, it converts them to gallons of water passing through the EcoWater conditioner. It multiplies this water usage in-

formation times the water hardness (preprogrammed into the timer) to continually calculate the conditioned water capacity required. The computer adjusts daily to water using habits, seeking to supply conditioned water for the longest time, using the least (and most efficient) amount of salt and water to regenerate.

When the computer determines more capacity is needed, it schedules a regeneration at the next regeneration starting time (2:00AM, or as otherwise preset). RECHARGE TONIGHT shows in the display to inform of the coming regeneration. During vacations, etc., when you are not using water, the EcoWater conditioner will not regenerate.

## SERVICE, AND REGENERATION

The EcoWater conditioner is filled with a man-made resin material, called the *resin bed*. The resin looks somewhat like coarse sand, but the beads are round and smooth. Resin has the ability to remove hardness minerals from water by ion-exchange.

### SERVICE (FIG. 14):

Hard water enters the EcoWater conditioner, passes through the valve and down into the resin tank and resin bed. As it passes through the bed, hardness minerals are extracted from the water and held by the resin beads. Conditioned water exits the resin tank through the bottom distributor, flows up the internal standpipe, into the valve, and out to the house pipes.

In time, the resin beads hold all the hardness minerals they can, and cleaning with a salt solution (brine) is needed. Regeneration and recharge are words used to describe this cleaning.

### REGENERATION, OR RECHARGE:

The faceplate timer determines when a regeneration is needed (see above). Regeneration starts at 2:00AM, or other preselected time, and consists of 5 different steps, or cycles. These are *fill*, *brining*, *brine rinse*, *backwash*, and *fast rinse*.

**STEP 1 - FILL CYCLE (FIG. 15):** Salt, dissolved in water, is called brine. Brine is the cleaning agent for the resin bed. To make brine, water is needed in the brine tank salt storage area. A controlled water flow to the brine tank takes place during fill.

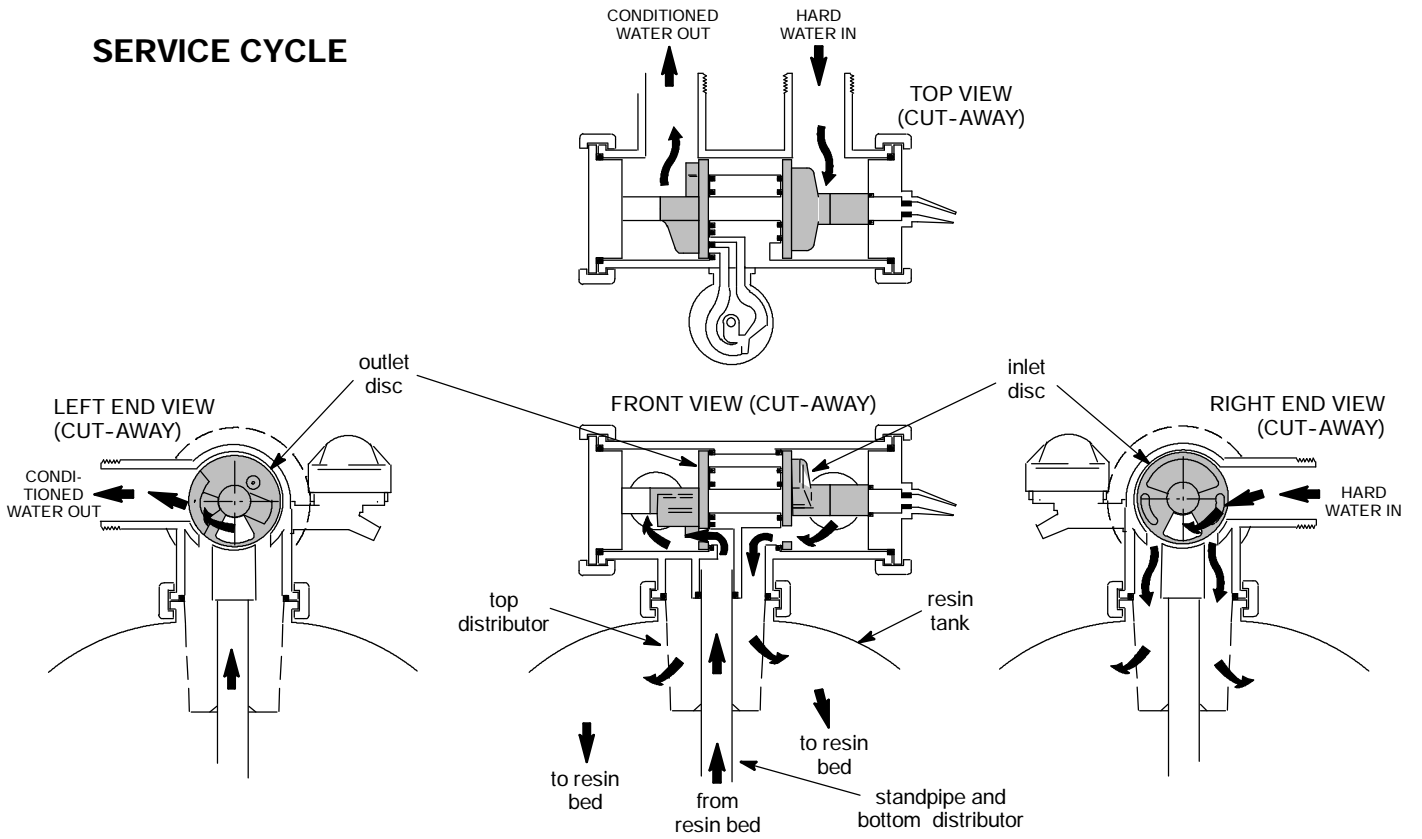
To enter fill, the EcoWater conditioner valve repositions slightly (motor energized). A valve passage opens allowing *conditioned* water to flow through the nozzle and venturi, to the brine valve, and into the brine tank. Fill cycle length is regulated by the timer, depending upon how much cleaning is needed to remove all hardness minerals, and restore 100% capacity.

continued, page 26

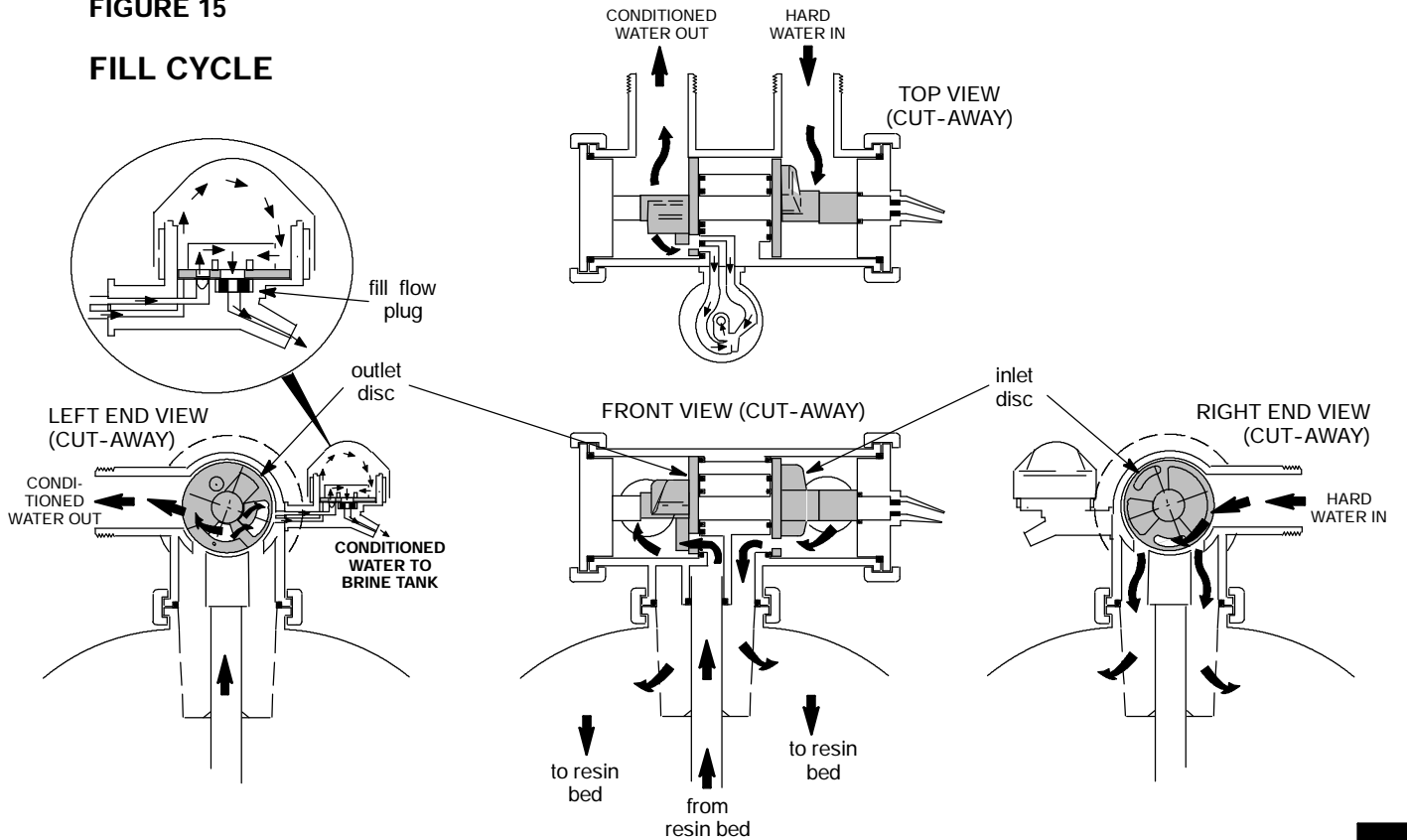


**FIGURE 14**  
**SERVICE CYCLE**

**WATER FLOW PATHS**



**FIGURE 15**  
**FILL CYCLE**



**STEP 2 - BRINING CYCLE, and  
STEP 3 - BRINE RINSE CYCLE (FIG. 16):**

The timer energized motor moves the valve out of fill and into brining. A port opens, routing water to the nozzle. Flow, through the nozzle and into the venturi, creates a suction in the brine tubing and brine valve. The suction pulls brine out of the brine tank, and it mixes with water at the nozzle and venturi. Brine and water flow back into the valve, down the internal standpipe, and into the resin bed. As brine passes through the resin bed, hardness minerals are released from the resin and carried with water flow to the drain.

After all brine is drawn from the brine tank, the brine valve float seats to prevent air induction. Water continues to flow in the same direction except for the discontinued brine flow. Hardness minerals and brine rinse from the resin bed and flow to the drain.

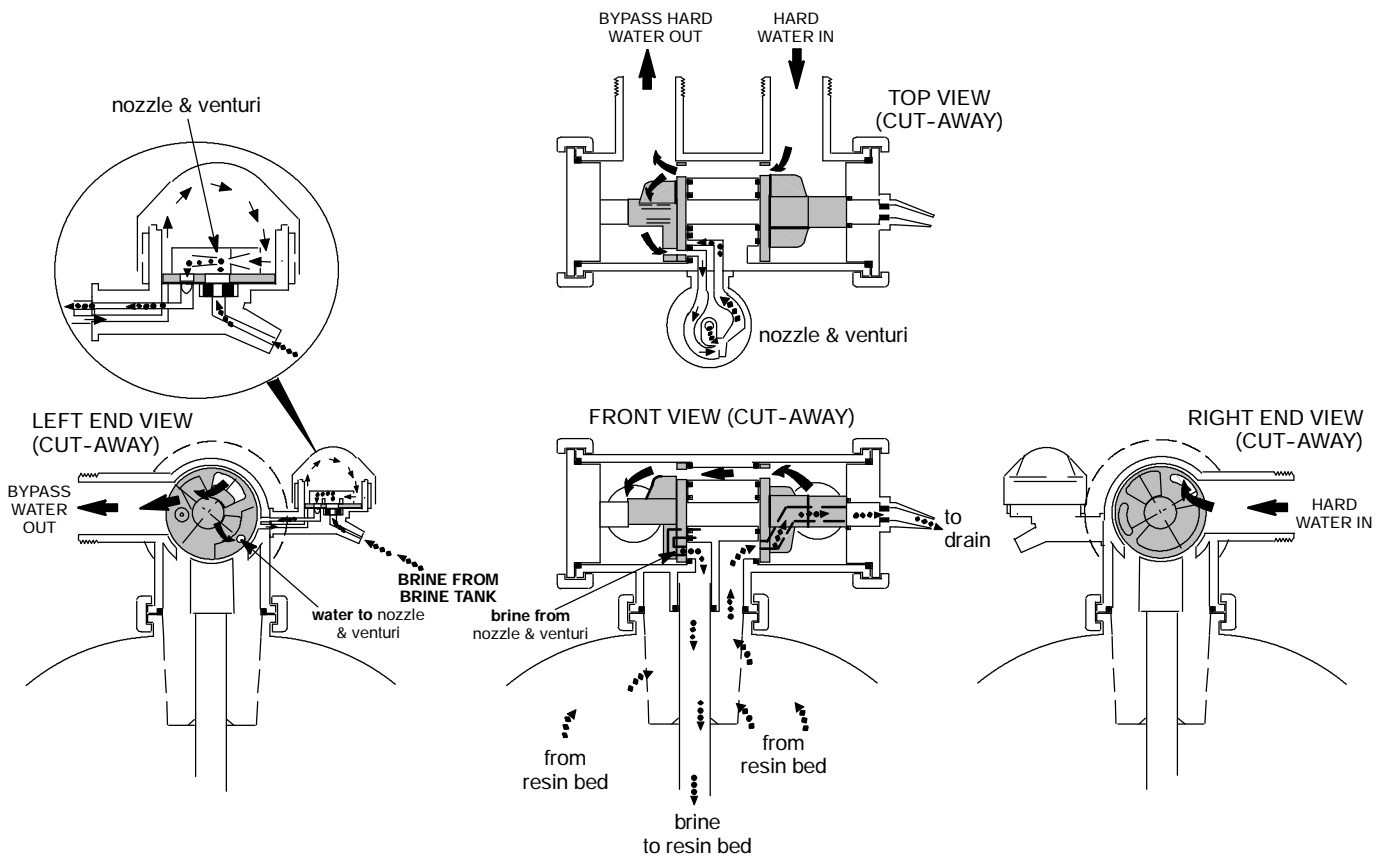
Brining and brine rinse time is also variable and controlled by the timer (see page 33).

**BYPASS HARD WATER:** During brining and brine rinse (also backwash and fast rinse, page 27), *hard water* is bypassed through the valve and available at house faucets. Avoid using **HOT** water however, because the water heater will refill with hard water.

**FIGURE 16**

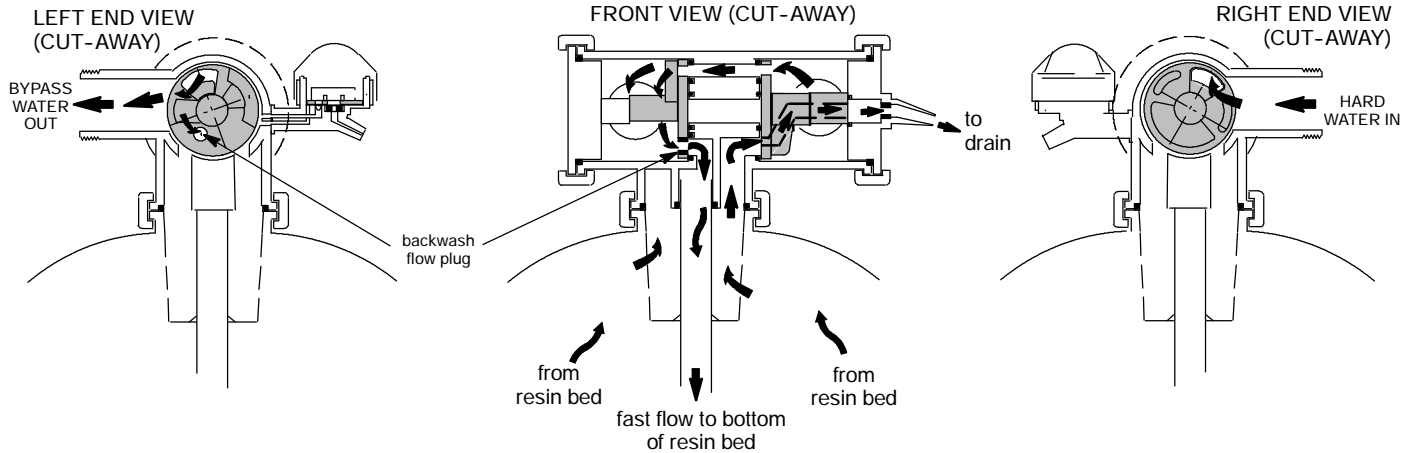
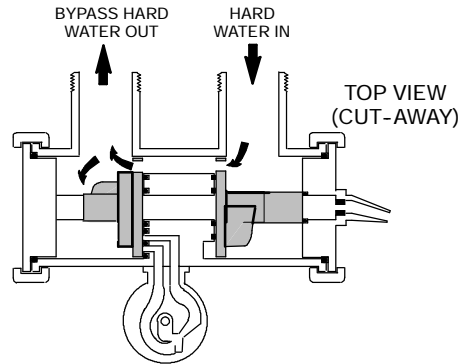
**BRINING and  
BRINE RINSE CYCLES**

**WATER FLOW PATH**



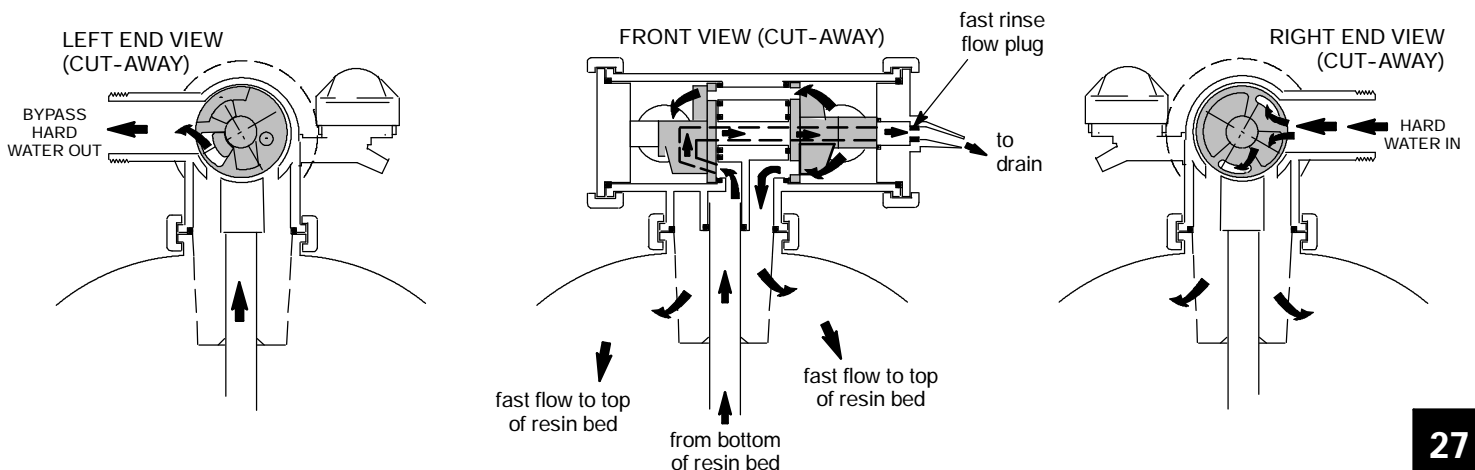
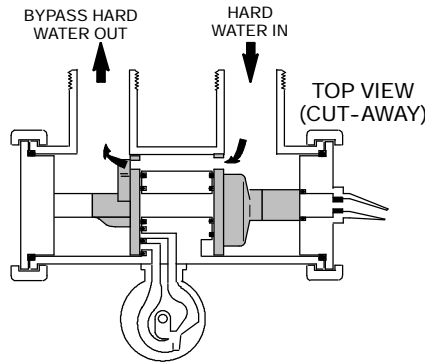
**STEP 4 - BACKWASH:** The motor drives the valve to end brine rinse and begin backwash. In backwash, a fast *upward* flow of water, through the resin bed, flushes remaining hardness minerals, brine, dirt, sediments, iron deposits, etc., from the bed and to the drain. The fast flow lifts and expands the resin bed for maximum cleaning.

**FIGURE 17**



**FIGURE 18**

**STEP 5 - FAST RINSE:** After backwash, valve rotation places the valve in fast rinse. The continued fast flow of water changes direction to flow *down* through the resin bed. Any brine, hardness minerals, etc., still at the bottom of the resin bed, are flushed up the standpipe and out the valve to the drain. The resin bed is packed by the fast flow, and prepared for service. The motor is energized a final time to return the valve to service position.



**REFILLING WITH SALT**

Remove the brine tank cover and check the salt storage level frequently. If the conditioner uses all the salt before you refill it, you will get hard water. Until you have established a refilling routine, check the salt every 2 or 3 weeks. ALWAYS refill if less than 1/2 full. **Be sure the brinewell cover is on.**

**RECOMMENDED SALT:** Nugget, pellet, button, coarse solar, etc., water conditioner salt is recommended. This type of salt is from high purity evaporated crystals, sometimes formed, or compressed, into briquets. It has less than 1% insoluble (will not dissolve in water) impurities. *Clean, high grade* rock salts are acceptable, but may require frequent brine tank cleaning to remove the "sludge" residue (insolubles) that collects at the bottom of the tank.

**SALT NOT RECOMMENDED:** Rock salt, high in impurities, block, granulated, table, ice melting, ice cream making salts, etc., are not recommended.

**SALT WITH IRON REMOVING ADDITIVES:** Some salts have an additive to help a water conditioner handle iron in a water supply. Although this additive may help keep the resin bed clean, it may also release corrosive fumes that will weaken and shorten the life of some EcoWater conditioner parts.

**BREAKING A SALT BRIDGE**

Sometimes, a hard crust or salt bridge forms in the brine tank. It is usually caused by high humidity or the wrong kind of salt. When the salt bridges, an empty space forms between the water and the salt. Then, salt will not dissolve in the water to make brine. Without brine, the resin bed is not regenerate and you will have hard water.

If the brine tank is full of salt, it is hard to tell if you have a salt bridge. Salt is loose on top, but the bridge is under it. Take a broom handle, or like tool, and push it straight down into the salt. If a hard object felt, it's most likely a salt bridge. *Carefully* push into the bridge in several places to break it.

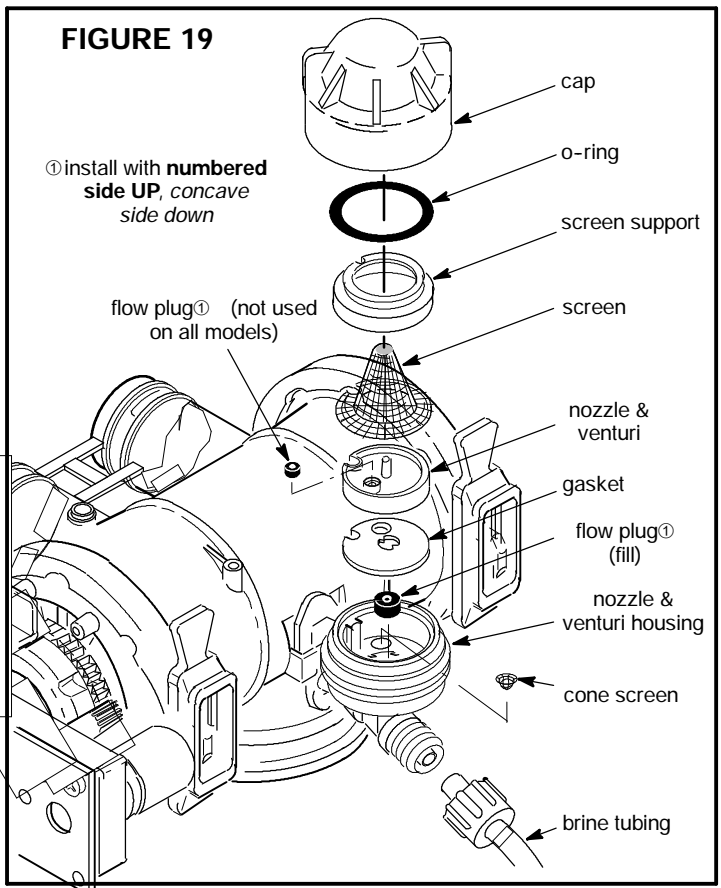
**NOTE:** *In humid areas, it is best to keep the salt storage level lower, and to refill more often.*

**CLEANING THE NOZZLE AND VENTURI**

A clean nozzle and venturi (FIG. 19) is a must for the EcoWater conditioner to work right. This small unit creates the suction to move brine from the brine tank, into the resin tank. If it should become plugged with sand, silt, dirt, etc., the EcoWater conditioner will not work, and you will get hard water.

To get to the nozzle and venturi, remove the conditioner top cover. **Be sure the conditioner is in the service cycle** (no water pressure at nozzle and venturi). Then, holding the nozzle and venturi housing with 1 hand, turn off the cap. *Do not lose the o-ring seal.* Lift out the screen support and screen. Then, remove the nozzle and venturi. Wash the parts in warm, soapy water and rinse in fresh water. If needed, use a small brush to remove iron or dirt. Be careful not to scratch, misshape, etc., surfaces of the nozzle and venturi. Also, check and clean the gasket and flow plug(s) if dirty.

Carefully replace all parts in the correct order. Lubricate the o-ring seal with silicone grease and locate in position. Install and tighten the cap, **by hand only.** **Do not overtighten** and break the cap or housing.



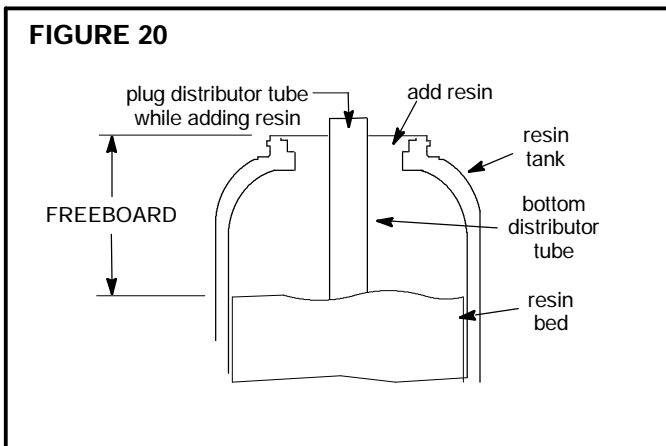
**RESIN BED CLEANING**

If the water supply contains “clear water ” iron (see page 4), regular resin bed cleaning is needed to keep the bed from coating with iron. Use resin bed cleaner, available from EcoWater, following directions on the container. Clean the resin every 6 months, or more often if iron appears in your conditioned water supply.

**ADDING RESIN**

Normally, the resin bed (FIG. 20) will last the lifetime of the EcoWater conditioner. However, certain conditions may require partial or total replacement of the resin bed. Some of these conditions are:

- (1) damaged top and/or bottom distributors have allowed resin to escape
- (2) resin bed iron fouled beyond use
- (3) some water supplies cause resin degradation



To add more resin, or to replace the entire bed, use the following guides. See resin and gravel requirements on page 33.

MODEL NUMBER	RESIN TANK SIZE	FREE-BOARD RANGE*	LBS. RESIN PER INCH BED DEPTH <sup>i</sup>
ES9120R	8 x 35	8.5 - 12.5	1.6
ES9120RP, ES9130R ES9230R,	10 x 35	10.5 - 14.5	2.2
ES9230RP, ES9240R	10 x 47	14.5 - 18.5	2.2
ES9270R	12 x 54	20 - 24	3.4

<sup>i</sup> does not include carbon in +plus models

\*Freeboard range and lbs. of resin per inch bed depth, in the preceding chart, are provided only as a guide for maintenance when adding to, or if replacing the entire bed with new, fully regenerated, resin with typical moisture content. Freeboard can vary several inches depending on resin bed conditions including...if regenerated or exhausted, total moisture content, settling during shipping and storage, tolerance variables in resin tank size, and amount and type of gravel underbedding.

Each model is factory loaded with the specific pounds or cubic feet of resin required, not by a freeboard measurement. Refer to page 33 for this information.

**IMPORTANT NOTES:**

Turn off the water supply and relieve pressure...see page 30.

Handle the resin tank carefully. It is heavy when filled with resin and water.

Do not lose o-ring seals or other small parts.

Refer to the assembly instructions, page 6, and to installation steps 1, 12, 14, 15 and 18 to reassemble and restart the unit.

**CAUTION: ALWAYS** relieve water pressure in the EcoWater conditioner, as follows, before removing parts from the valve or resin tank.

**DE-PRESSURIZE**

1. Put bypass valve(s) in bypass position.
2. Do Manual Advance step 1, page 28, (fill water to brine tank will depressurize the resin tank).

**PRESSURIZE**

1. Put bypass valve(s) in service position.
2. Do Manual Advance steps 2-5, page 28, to return unit to service.

**ALTERNATE METHOD**

**3-VALVE BYPASS**

**DE-PRESSURIZE**

1. Close the INLET valve.
2. Open HOT and COLD conditioned water house faucets.
3. Close the OUTLET valve and open the BYPASS valve.
4. Close all house faucets.

**PRESSURIZE**

1. Open HOT and COLD house faucets.
2. Close the BYPASS valve and open the OUTLET valve.
3. **Slowly**, open the INLET valve.
4. Close all house faucets

**ECOWATER BYPASS VALVE**

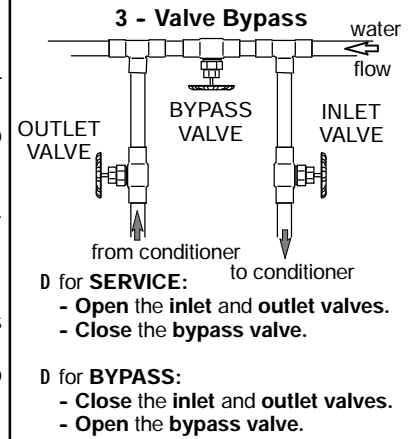
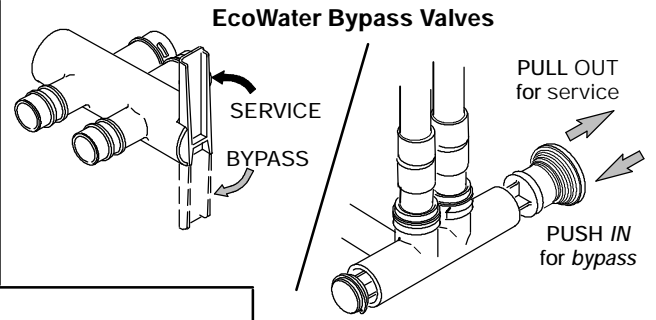
**DE-PRESSURIZE**

1. Close the house main water supply valve.
2. Open HOT and COLD **conditioned** water faucets.
3. Push or rotate the bypass valve handle to bypass position.

Note: For hard water bypass to house faucets, reopen the main water supply valve.

**PRESSURIZE**

1. Open HOT and COLD house faucets (main water supply valve open).
2. Pull or rotate the bypass valve handle to service position.
3. Close all house faucets.



**ECOWATER CONDITIONER OPERATION, ELECTRONIC CHECKOUT**

ALWAYS MAKE THE INITIAL CHECKS FIRST

**INITIAL CHECKS:**

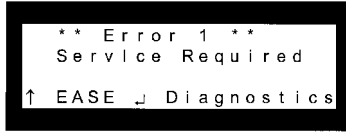
1. Does the time display show the correct time of day?  
...If display is blank, check power source to the EcoWater conditioner.  
...If time is incorrect, power was off for over 2 days. The conditioner resumes normal operation, when power returns, but regenerations occur at the wrong time.  
...If an error code shows in the display (example: Error 3), go to AUTOMATIC ELECTRONIC DIAGNOSTICS, following.
2. Are plumbing bypass valve(s) in **service** position (all the way open or closed, as applies).
3. Are the inlet and outlet pipes connected to the EcoWater conditioner inlet and outlet respectively.
4. Is the transformer plugged into a "live", grounded wall outlet, and the power cable fastened securely?

5. The valve drain hose must be free of kinks and sharp bends, and not elevated over 8' above the floor.
  6. Is there salt in the brine tank?
  7. Is the brine tubing connected? See FIG. 9, page 10.
  8. Press SELECT/EXIT ( ; ) to enter Primary Menu. Move the cursor so that it is next to Set Hardness. Press the SELECT/EXIT ( ; ) button once to display the hardness setting. Be sure it is the correct setting for the household's water supply. -- Make a hardness test of the raw water and compare with the hardness setting. Also test a conditioned water sample to verify if a problem exists. -- Press SELECT/EXIT ( ; ) button to exit to Normal View Screens.
- If you do not find a problem after making the initial checks, do MANUAL INITIATED ELECTRONIC DIAGNOSTICS, and the MANUAL ADVANCE REGENERATION CHECK, pages 31 and 32.

**E.A.S.E.:** EcoWater digital demand timers have the latest diagnostic technology. With E.A.S.E., or Electronic Automated Service Evaluation, a service person or homeowner can transmit operational data through the telephone, to a personal computer (PC). The PC processes the data to determine if all electrical functions are working normally, or helps to identify a problem should one occur. Ask your participating EcoWater dealer for more information on this feature.

**AUTOMATIC ELECTRONIC DIAGNOSTICS**

The faceplate computer has a self-diagnostic function for the electrical system (except input power and water meter). The computer monitors electronic components and circuits for correct operation. If a malfunction occurs, an error code appears in the faceplate display.



The chart below shows the error codes that could appear, and the possible defects for each code.

While an error code appears in the display, all faceplate buttons are inoperable except the SELECT button. SELECT remains operational so the service person can make the MANUAL INITIATED ELECTRONIC DIAGNOSTICS, below, to further isolate the defect, and to check the water meter.

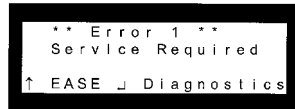
**POSSIBLE DEFECT**

CODE	MOST LIKELY '-----' LEAST LIKELY
Error 1 Error 2 Error 3 Error 4	valve defect causing high torque / motor inoperative / wiring harness or connection to position switch / switch
Error 5	faceplate

**PROCEDURE FOR REMOVING ERROR CODE FROM FACEPLATE:** 1. Unplug transformer----- 2. Correct defect----- 3. Plug in transformer----- 4. Wait for 6 minutes. The error code will return if the defect was not corrected.

**TROUBLESHOOTING, MANUAL INITIATED ELECTRONIC DIAGNOSTICS**

1. To enter diagnostics, press the SELECT/EXIT (⏏) to enter the menu. This screen contains information that can be used to troubleshoot errors. Use the (-) and (⏏) buttons to scroll through all lines on this screen.



The first line shows time of day and error code.

Second line is **Pos:** which shows what position the valve is in. Example: Service, Fill, Brining and Brine Rinse, Backwash and Fast Rinse. The clock to the right counts backward the time for each of the positions to be completed.

The next line is **Req Pos:** which is for requested position, or what position the valve is travelling to.

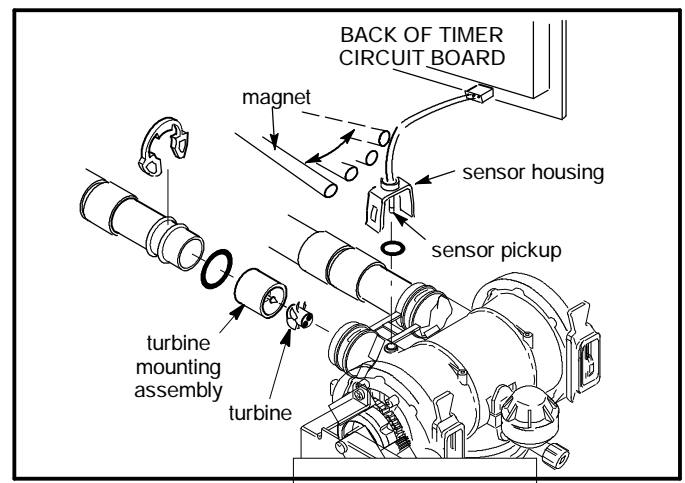
Next line displays **Motor:**, either on or off, and **Sw:** either open or closed.

Next is **Trbn:** and **Gals:** which indicate water meter operation as follows.

000 (steady) = conditioned water not in use...no flow through the meter.

-open a nearby **CONDITIONED WATER** faucet-  
000 to 151 (continual) = repeats display for each gallon of water passing through the meter.

If you don't get a reading in the display, with a faucet open, pull the sensor housing from the valve outlet port. Pass a small magnet back and forth in front of the sensor. You should get a reading. If you **do get a reading**, disconnect the outlet plumbing and check the turbine for binding. If you **don't get a reading**, the sensor is probably defective



continued

continued from page 31

Use the recharge button to manually advance the valve into each cycle and check correct switch operation, and observe the valve position indicator.

NOTE: *The position switch is closed when the plunger is depressed, open when extended.*

While in this diagnostic screen, the following information is available and may be beneficial. This information is retained by the computer from the first time electrical power is applied to the faceplate.

...Remote: either Installed or Not Installed.

...Days: displays the number of days this faceplate has had electrical power applied.

...Rchg: to show the number of regenerations initiated by this faceplate since power was first applied.

NOTE: This number resets to 0 if the model code is changed.

...Last Rchg: displays the number of days since last recharge.

...Cap: displays numerically the efficiency that the softener is operating in with 1 lowest and 5 highest.

Press the SELECT/EXIT (j) to exit to the Advanced/Service menu, move cursor up to EXIT and press SELECT/EXIT (j) to go to Normal Screen Views.

**TROUBLESHOOTING,  
MANUAL ADVANCE REGENERATION CHECK**

This check verifies proper operation of the gearmotor, brine tank fill, brine draw, regeneration flow rates, and other controller functions. *Always make the initial checks, and the manual initiated diagnostics first.*

**1.** Press the RECHARGE button. Move cursor down to Start Rchg Now and press SELECT/EXIT (j) to start a recharge. As the EcoWater conditioner enters

the fill cycle of regeneration, remove the brinewell cover and, using a flashlight, observe fill water entering the tank.

**a.** If water does not enter the tank, look for an obstructed nozzle and venturi, fill flow plug or brine tubing FIG. 19, page 28.

**2.** After verifying fill, press Recharge to move the valve into brining\*. A slow flow of water to the drain will begin. Verify brine draw from the brine tank by shining the flashlight into the brinewell and observing a noticeable drop in the liquid level.

\*If the 2ND BACKWASH option is set, the valve will enter backwash and fast rinse before brining...see page 21.

NOTE: Be sure water is in contact with the salt, and not separated by a salt bridge...see page 28.

**a.** If the unit does not draw brine, check for...  
...dirty or defective nozzle and venturi, page 28  
...nozzle and venturi not seated on the gasket, or gasket defective

...restriction in valve drain, causing a back-pressure (bends, kinks, elevated too high, etc.), installation step 8

...obstruction in brine valve or brine tubing, page 6 and FIG. 9, page 10

...inner valve failure (obstructed outlet disc, wave washer defective, etc.)

**3.** Again press Recharge to move the valve into backwash. Look for a fast flow of water from the drain hose.

**a.** If flow is slow, check for a plugged top distributor, backwash flow plug or drain hose.

**4.** Press Recharge to move the valve to fast rinse position. Again look for a fast drain flow. Allow the unit to rinse for several minutes to flush out any brine that may remain from the brining cycle test.

**5.** To return the valve to service position, press RECHARGE ONCE AGAIN.

continued



MISCELLANEOUS SERVICE INFORMATION									
MODEL CODE	R20	HR20	R30	HR30	2R40	2H40	2R70	2H70	
	R20+		2R30	2H30					
LBS / CU FT RESIN ⑥	33 / .63		49 / .92		61 / 1.15		106 / 2		
LBS GRAVEL	8		10		10		12		
FILL CYCLE	① TIME	2 - 6	3 - 10		4 - 12		7 - 21		
	② FLOW	.3		.3		.3		.3	
BRINE CYCLE	①	37	90	41	69	54	10	58	98
	TIME	↓	↓	↓	↓	↓	↓	↓	↓
	③	58	103	63	108	91	141	92	152
	④ FLOW	.11		.15		.15		.23	
BRINE R. CY.	④ FLOW	.07		.10		.10		.14	
BACK W. CY	⑤ TIME	8		8		12		13	
	④ FLOW	1.0		1.8		1.8		4.0	
FAST RNS. CY.	⑥ TIME	2		2		3		4	
	④ FLOW	2.4		3.0		3.0		4.0	

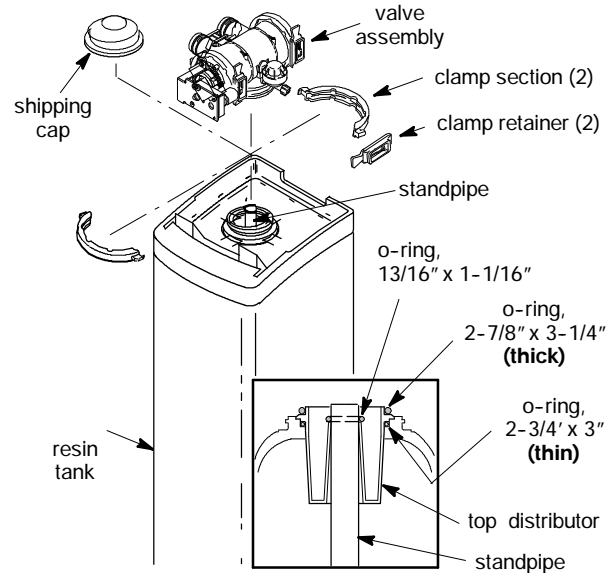
- ① minutes, varies with capacity operating level
- ② gallon per minute flow to brine tank
- ③ includes brine rinse cycle minutes
- ④ gallon per minute flow to drain
- ⑤ factory set default minutes
- ⑥ synthetic high capacity resin - For field replacement, use the following pounds of **standard** / fine mesh resins:  
R20 - 31 / 2      R40 - 57 / 4  
R30 - 46 / 3      R70 - 100 / 6
- ⑦ R20 Plus models use 33.7 lbs resin, 9.6 lbs of carbon and 10 lbs gravel.
- ⑧ R30 Plus models also have 12 lbs of carbon

**OTHER SERVICE**

**HARD WATER BYPASS** (hard water "bleeds" into conditioned water supply).

1. Defective inlet disc, seal, or wave washer (see pages 38 and 39).
2. Missing or defective o-ring(s) at resin tank to

valve connection.



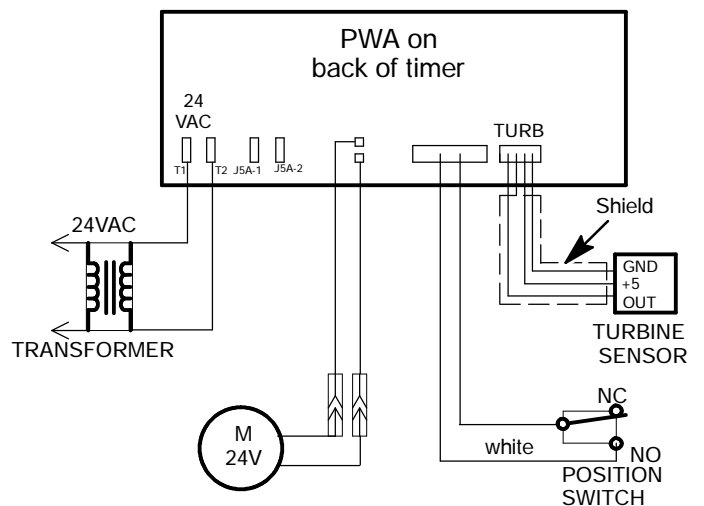
**WATER LEAKS FROM DRAIN HOSE** (during service).

1. Defective inlet disc, seal, or wave washer.
2. Defective o-ring on inlet disc shaft.
3. Defective outlet disc, seal, or wave washer.

**WATER HAS SALTY TASTE**

1. House water pressure low (adjust pump, if well system).
2. Partially restricted valve drain hose, top distributor, backwash flow plug, resin tank internal riser, or bottom distributor.

**WIRING SCHEMATIC**



**CHECKING THE MODEL CODE ENTRY** (see page 14)

Unplug the transformer at the electrical outlet, and plug in again. A “beep” will sound, followed by the model code and software version displayed for a few seconds. Then, the Normal View Screens start to scroll.

**CHANGING THE MODEL CODE**

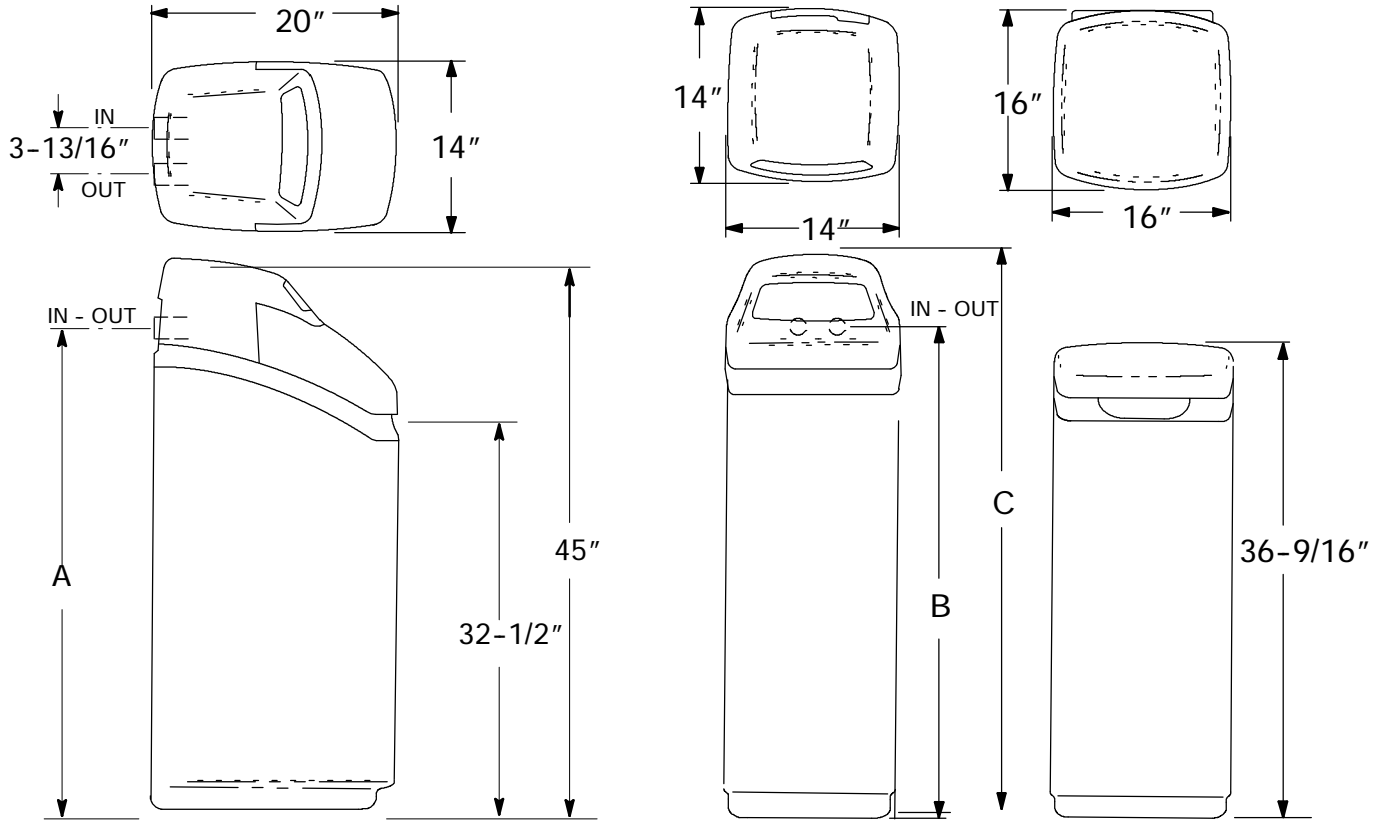
**IMPORTANT: Read step 1 on page 14 before changing this code.**

1. Press SELECT/EXIT (⏏) to enter Primary Menu.
2. Move the cursor next to Advanced/Service. Press the SELECT/EXIT (⏏) button to enter this menu.
3. Warning screen will show, press the (-) button to continue.
4. Use the (-) or (⏏) buttons to change to new model code.
5. Reset the timer (pages 14 & 15) and reselect other desired options.

**FOR FUTURE REFERENCE, ENTER THE FOLLOWING INFORMATION**

MODEL NO. ①② \_\_\_\_\_ SERIAL NO. ①② \_\_\_\_\_  
 DATE CODE ② \_\_\_\_\_ INSTALLATION DATE \_\_\_\_\_  
 WATER HARDNESS \_\_\_\_\_ GPG IRON CONTENT \_\_\_\_\_ PPM  
 WATER HARDNESS SETTING \_\_\_\_\_ (see page 15)

① on rating decal      ② on shipping carton



	R20	R30	R40	R70
<i>Rated Capacity</i>	see rating decal on the softener			
<i>Service Flow Rate</i>				
<i>Amount of High Capacity Resin (cu ft)</i>				
<i>Water Supply Max. Hardness (gpg)</i>				
<i>Water Supply Max. Clear Water Iron (ppm)</i>				
<i>Water Pressure Limits (min./max. psi)</i>	20 - 125			
<i>Max. Water Temperature (°F)</i>	120			
<i>Min. Water Supply Flow Rate (gpm)</i>	3			
<i>Max. Drain Flow Rate (gpm)</i>				

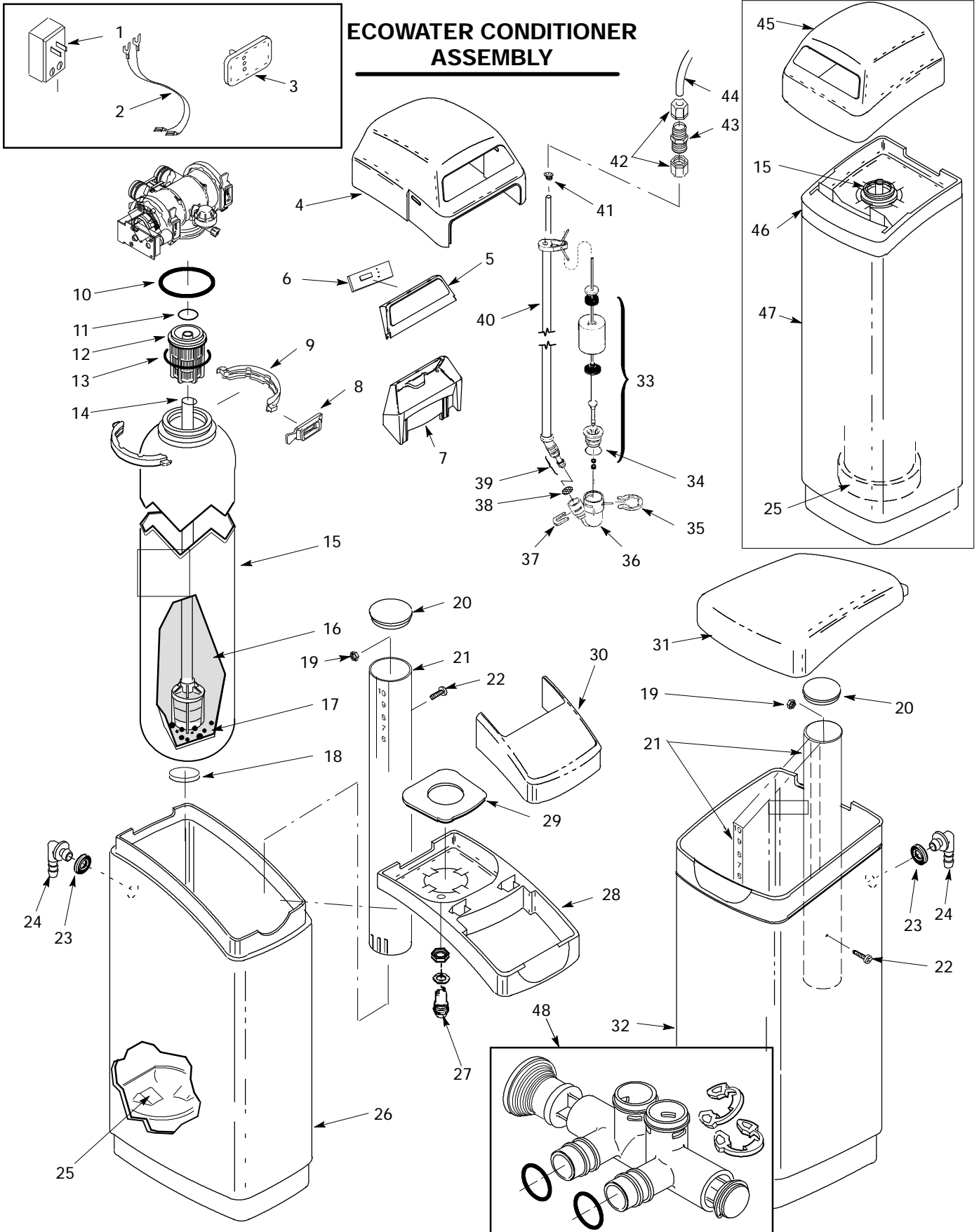
MODEL	NOMINAL RESIN TANK SIZE	A	B	C
<b>R20</b>	8" DIA. X 35"	35"	39.5"	43"
<b>R30 R20 Plus</b>	10" DIA. X 35"	35"	39.5"	43"
<b>R40 R30 Plus</b>	10" DIA. X 47"	47"	51.3"	55"
<b>R70</b>	12" DIA. X 54"	53"	57.3"	61"

**SALT STORAGE CAPACITIES**

H2-Tank Brine Tank - 250 lbs

HCabinet Brine Tank - 200 lbs

**ECOWATER CONDITIONER ASSEMBLY**

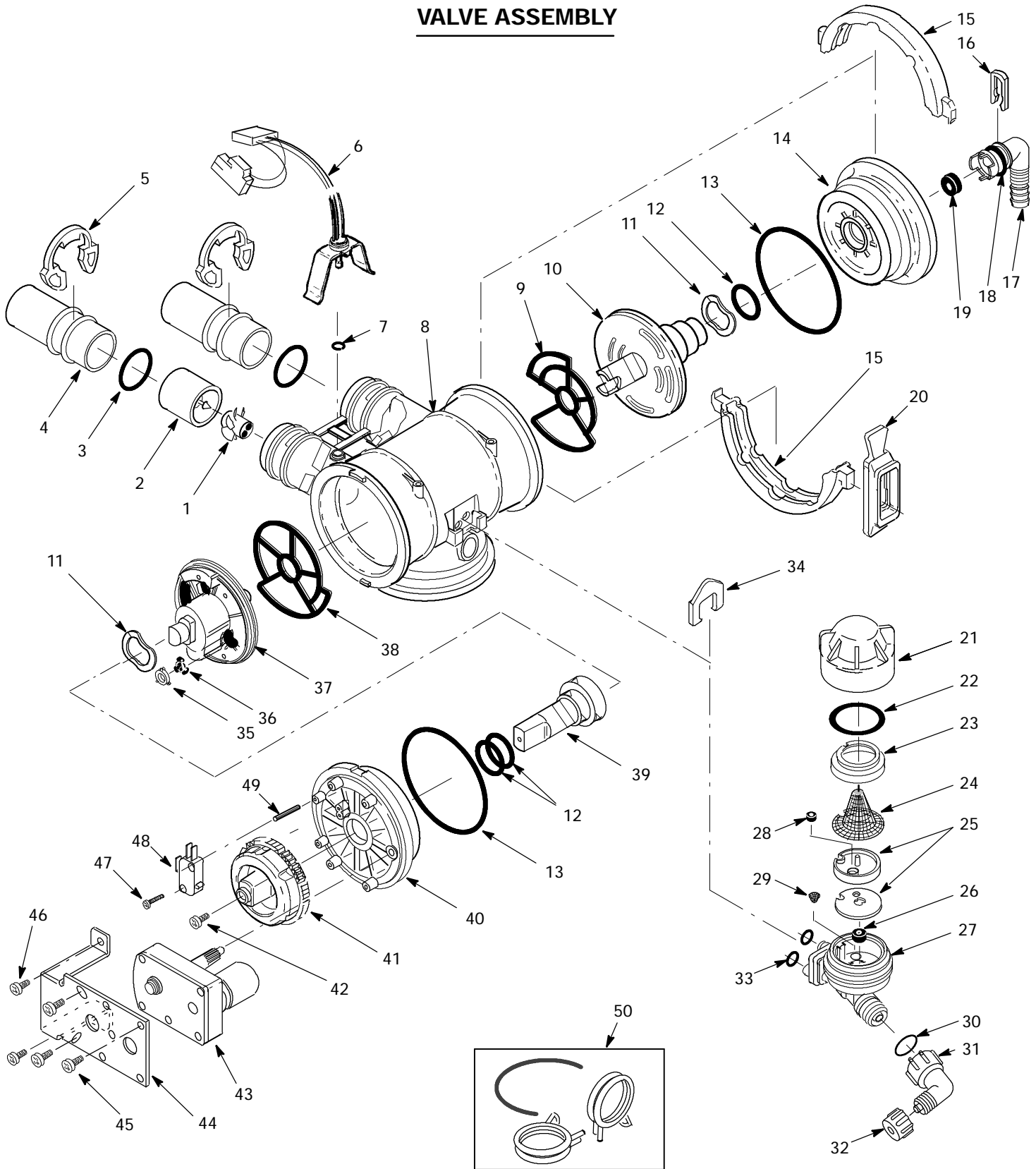


**PARTS LIST**

KEY NO.	PART NUMBER	PART DESCRIPTION	KEY NO.	PART NUMBER	PART DESCRIPTION
1	7095373	Transformer, 24V-10VA	28	7210397	Rim (tank - in - tank)
2	7084330	Power Cable	29	7214244	Vapor Barrier
3	x	Remote Indicator (batteries not included)	30	7210389	Salt Hole Cover
4	x	Top Cover	31	7210486	Brine Tank Cover
5	7210410	Faceplate (order following decal)	32	x	Brine Tank (2 tank)
-	7214684	Faceplate Decal (Cabinet)	33	7113008	Float, Stem and Guide Assembly
-	7218264	Faceplate Decal (Cabinet Plus)	34	7170288	O-ring, 15/16" x 1-3/16"
-	7218272	Faceplate Decal (Two Tank)	35	1205500	Clip
-	7218280	Faceplate Decal (Two Tank Plus)	36	7092252	Brine Valve Body
6	x	Rep'l PWA	37	7080653	Clip
7	7211173	Faceplate Support	38	7131365	Screen
8	7088033	Clamp Retainer, 2 req.	39	7113016	Tubing Assembly, BV
9	7176292	Clamp Section, 2 req.	40	7095470	Brine Tube
10	7170296	O-ring Seal, 2-7/8" x 3-1/4"	41	7171349	Screen
11	7170254	O-ring, 13/16" x 1-1/16"	42	9003201	Nut-Ferrule, 2 req. ①
12	7077870	Top Distributor	43	7094987	Union Connector ①
13	7170270	O-ring, 2-3/4" x 3"	44	7161807	Tubing, 20 ft.
14	7105047	Repl. Distributor (bottom)	-	7161768	Tubing, 100 ft.
15	7114787	Resin Tank, 8" dia. x 35"	45	x	Top Cover
-	7113066	Resin Tank, 10" dia. x 35"	46	7210460	Rim (2 tank)
-	7092202	Resin Tank, 10" dia. x 47"	47	x	Tank Sleeve, Model 9230RP, 9240R
-	7113074	Resin Tank, 12" dia. x 54"	-	x	Tank Sleeve, Model 9230R
16	0502272	Resin, 1 cu ft (stand. mesh)	-	x	Tank Sleeve, Model 9270R
-	0501741	Resin, 1/2 cu ft (stand. mesh)	48	7195408	Bypass Valve (includes following)
-	7175149	Shell Carbon (RP Models)		7172882	Stem
17	7124415	Gravel, 17 lbs.		7173016	O-ring, 1.11" x 1.387", 4 req.
18	1184700	Spacer, Model 9120R only		7175238	C-ring
19	7082150	Wing Nut		7089306	Clip, 2 req.
20	7155115	Brinewell Cover		7170262	O-ring, 1-1/8" x 1-3/8", 2 req.
21	7109871	Brinewell	J	7116488	Brine Valve Assem. (incl. key nos. 33 through 41)
-	7214236	Decal, Salt Level	J	7108118	Hose, 1/2" I.D. Drain
22	7214935	Screw, 1/4"-20			
23	9003500	Grommet			
24	1103200	Hose Adaptor			
-	0900431	Hose Clamp (not shown)			
25	7141205	Tank Base			
26	x	Brine Tank (tank - in - tank)			
27	x	Light Assembly (includes o-ring and nut)			

① optional parts, not included with conditioner

VALVE ASSEMBLY



**PARTS LIST**

KEY NO.	PART NUMBER	PART DESCRIPTION
1	7101548	Turbine Assem. (All models except below)
	7123061	Turbine Assem. (9230RP, 9240R, 9270R)
2	7094898	Turb. Mnt. Assy. (All models except below)
	7119177	Turb. Mnt. Assy. (9230RP, 9240R, 9270R)
3	7170262	O-ring, 1.109" x 1.387", 2 req.
4	7077642	Copper Tube, 2 req.
	7104546	PVC Nipple (optional - not incl.)
5	7089306	Clip Retainer, 2 req.
6	7173715	Sensor Housing (with Pos. Sw. connector)
7	9000803	O-ring, 3/8" x 1/2" i
8	7159949	Disc Valve Housing
9	7078282	Inlet End Seal ©
10	7214286	Inlet Disc ©
11	7058216	Wave Washer, 2 req.
12	7170220	O-ring, 3/4" x 15/16", 3 req. ©
13	7170296	O-ring, 2-7/8" x 3-1/4", 2 req.
14	7077498	Inlet End Cap
15	7176292	Clamp Section, 4 req. ☼
16	7142942	Clip
17	7108100	Drain Nipple
-	7141239	Drain Hose Adaptor (optional - not incl.)
18	7170327	O-ring, 5/8" x 13/16"
19	1110600	Flow Washer, 2.5 F.Rns. (9120R)
-	7097969	Flow Washer, 3.0 F. Rns. (9120RP, 9130R, 9230RP, 9230R, 9240R)
-	7097977	Flow Washer, 4.0 F.Rns. (9270R)
20	7088033	Clamp Retainer, 4 req. ☼
21	7199729	Cap
22	7170262	O-ring, 1-1/8" x 1-3/8"
23	7167659	Screen Support
24	7146043	Screen
25	x	Nozz., Vent. (wht) - Gasket Kit (9120R £ )
-	x	Nozz., Vent. (blk.) - Gasket Kit (9120RP £ , 9130R, 9230RP, 9230R, 9240R)
-	x	Nozz., Vent. (blu.) - Gasket Kit (9270R)
-	7204362	Gasket, Black (only)
26	1148800	Fill Flow Plug, .3

KEY NO.	PART NUMBER	PART DESCRIPTION
27	7085221	Nozz., Ven. Assy. (9120R £ ) ☼
-	7091866	Nozz., Vent. Assem. (9120RP, 9130R, 9230RP, 9230R, 9240R) ☼
-	7085247	Nozz., Vent. Assem. 9270R) ☼
28	0521829	Flow Plug, .1 (9120R £ )
29	7095030	Cone Screen
30	7003847	O-ring, 1/4" x 1/2"
31	7120526	Elbow, 90_
32	1202600	Nut-Ferrule
33	7170319	O-ring, 1/4" x 3/8", 2 req.
34	7081201	Clip, Nozzle & Venturi
35	7078313	Retainer
36	7104774	Flow Washer, 1.0 Bkw. (9120R)
-	7104570	Flow Washer, 1.7 Bkw. (9120RP, 9130R, 9230RP, 9230R, 9240R) - not used on 9270R
37	7214278	Outlet Disc © ¥
38	7078274	Outlet End Seal ©
39	7091329	Driver, Outlet Disc
40	7159965	Outlet End Cap
41	7147730	Cam and Gear
42	7203104	Washerhead Screw, #8-18 x 1/2"
43	7147049	Motor
44	7147057	Motor Bracket
45	7168524	Screw, #10-32 x 5/16", 3 req.
46	7103972	Screw, #8-18 x 7/16", 2 req.
47	7140738	Screw, #4-24 x 3/4"
48	7145186	Switch
49	7140746	Expansion Pin
50	7207726	Ground Wire
-	7163427	Clamp, 2 req.

i optional - not required

© included in Disc Kit, # XXXXXXXX

☼ not all parts are shown

£ Use black nozzle along with key no. 28 flow plug on water pressures of 50 psi and less (ref: Service Bulletin #94068).

☼ includes key nos. 21 - 26 and 29

¥ order key nos. 35 and 36 if needed

