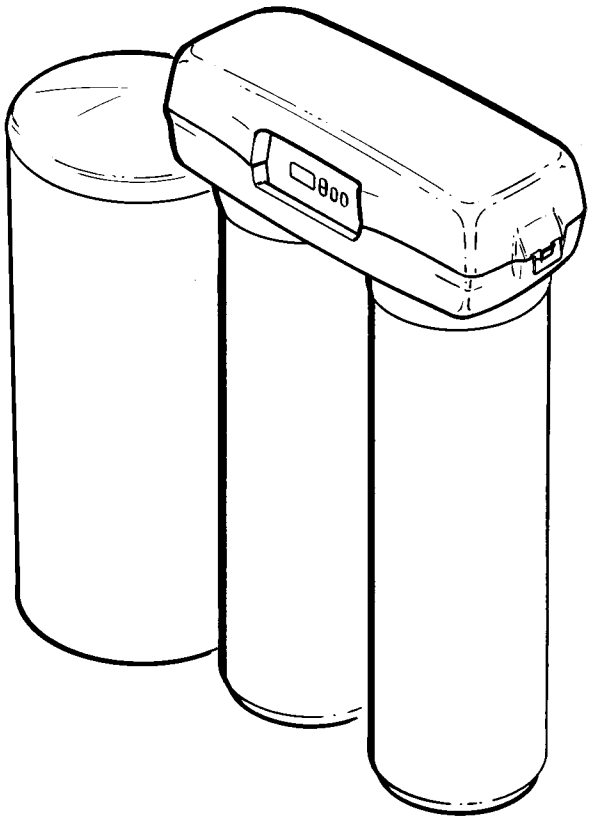
OWNERS MANUAL

How to install, operate and maintain your EcoWater Series 4000 Dual Demand



ECOWATER SYSTEMS®

PRINTED IN U.S.A.

PART NO. 7122633 (Rev. C 10/18/02)

WARRANTY

EcoWater Systems, Inc.

Advantage Warranty
Series 4000 E/D Water System

EcoWater Systems, Inc., guarantees to the original owner, that:

1. ..for the **lifetime of the original owner,** the *salt tank* and the *fiberglass mineral tank* will not rust, corrode, leak, burst, or in any other manner fail to perform their proper functions; and that

2. ..for a period of **five (5) years after installation,** the *electronic computer control panel,* the *valve body,* and *all other parts* will be free from defects in material and workmanship, and will perform their normal functions.

If during such respective period a part proves, after inspection by EcoWater, to be so defective, EcoWater will, at its sole option, either replace or repair the part without charge except normal shipping and installation charges. Labor necessary to maintain this equipment is limited to one (1) year.

General Provisions

The above warranties are effective provided the water conditioner is operated at water pressures not exceeding 125 psi, and at water temperatures not exceeding 120°F; provided further that the water conditioner is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the water conditioner is not damaged as the result of any unusual force of nature such as, but not limited to, flood, hurricane, tornado or earthquake. EcoWater Systems, Inc., is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages, or other circumstances beyond its control.

To obtain warranty service, notice must be given, within thirty (30) days of the discovery of the defect, to your local EcoWater Systems dealer.

THERE ARE NO WARRANTIES ON THE WATER CONDITIONER BEYOND THOSE SPECIFICALLY DESCRIBED ABOVE. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE EXTENT THEY MIGHT EXTEND BEYOND THE ABOVE PERIODS. THE SOLE OBLIGATION OF ECOWATER SYSTEMS, INC. UNDER THESE WARRANTIES IS TO REPLACE OR REPAIR THE COMPONENT OR PART WHICH PROVES TO BE DEFECTIVE WITHIN THE SPECIFIED TIME PERIOD, AND ECOWATER IS NOT LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES. NO ECOWATER DEALER, AGENT, REPRESENTATIVE, OR OTHER PERSON IS AUTHORIZED TO EXTEND OR EXPAND THE WARRANTIES EXPRESSLY DESCRIBED ABOVE.

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, so the limitations and exclusions in this warranty may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state. This warranty applies to consumer–owned installations only.

GUARANTEE BOND

The Continental Casualty Company, an Illinois corporation, has issued its bond in the form shown below, guaranteeing full performance by EcoWater Systems, Inc.

CONTINENTAL CASUALTY COMPANY, Chicago, Illinois, herinafter called "Surety," guarantees unto Harris Trust and Savings Bank, 111 West Monroe Street, Chicago, Illinois, as Trustee holding said Guarantee Bond under the terms of a Trust Agreement dated September 15, 1963, for the use and benefit of original purchasers of residential EcoWater Systems Units within the Continental United States, as described herein, that EcoWater Systems, Inc., will discharge the obligations of the "EcoWater Bonded Parts and Service Guarantee Policy."

PROVIDED, HOWEVER, that:

1. Liability of Surety hereunder shall not exceed the sum of FIVE HUNDRED AND 00/100th DOLLARS ($500.00) as to any one installation, and shall not exceed the sum of FIVE HUNDRED THOUSAND AND 00/100th DOLLARS ($500,000.00) in the aggregate, and

2. There shall be no liability hereunder as to any purchaser to whom there has not been issued at the time of installation and purchase completed registration card which is enclosed with a facsimile of this bond, and who has not returned such card in accordance with this guarantee.

3. Claim must be made by such original purchaser in writing within 30 days from the expiration of these guarantees upon EcoWater Systems, Inc., P.O. Box 64420, St. Paul, MN 55164, to perform the terms of said guarantee, and notice of any default on such guarantee must be sent to Surety at its address by Registered Mail.

CONTINENTAL CASUALTY COMPANY

attest: _____
assistant secretary

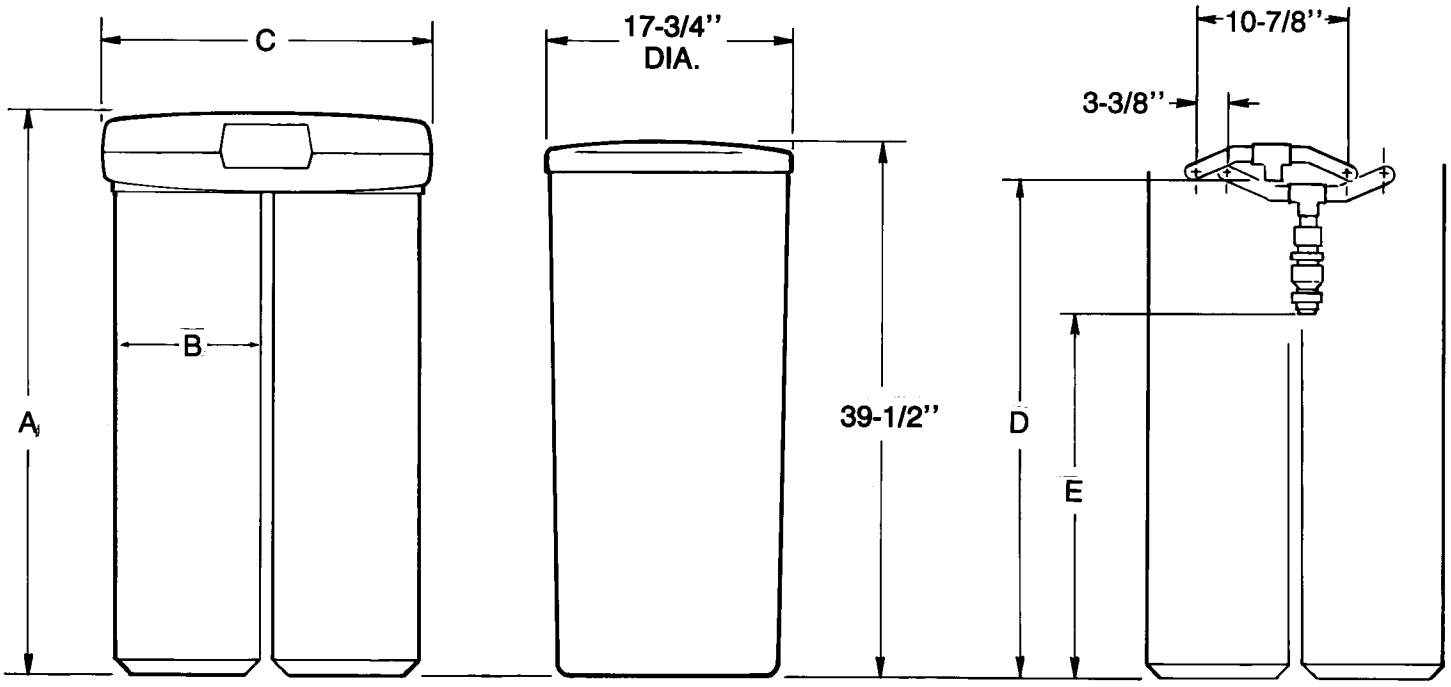
by: _____
vice-president

This is to certify that the original of the above guarantee and bond is on file with Harris Trust and Savings Bank, 111 West Monroe Street, Chicago, Illinois.

HARRIS TRUST AND SAVINGS BANK
As Trustee

by: _____
authorized officer

DIMENSIONS



MODEL	A	B	C	D*	E**	RESIN TANK NOMINAL SIZE
4030 2T2	41"	10-3/4"	24-1/2"	36-1/4"	27-1/4"	8" DIA. x 35"
4060 2T2	41-1/2"	10-3/4"	24-1/2"	36-3/4"	27-3/4"	10" DIA. x 35"
4080 2T2	53-3/4"	10-3/4"	24-1/2"	49"	40"	10" DIA. x 47"

*To inlet tee fitting **To bottom of water meter

FOR FUTURE REFERENCE, ENTER THE FOLLOWING INFORMATION.

MODEL NO.①② _____ SERIAL NO.①② _____

DATE CODE② _____

DATE OF INSTALLATION: _____

WATER HARDNESS _____GPG IRON CONTENT _____PPM

WATER HARDNESS (SETTING):_____see page 13

①on rating decal ②on shipping carton

NOTE: SEE PRODUCT SPECIFICATION SHEET FOR TECHNICAL INFORMATION.

INTRODUCTION

UNPACKING

The Series 4000 is shipped in 3 cartons, ... 2 resin tank assemblies, and 1 brine tank assembly. The brine tank carton also includes the timer control, covers and special fittings needed for installation.

Thoroughly check the Dual Demand System for possible shipping damage and parts loss. Also inspect and note any damage to the shipping carton(s). Notify the transportation company if damage is present. EcoWater 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 for all models ... See page 8.

TABLE OF CONTENTS

SAFETY GUIDES

FOLLOW THE INSTALLATION INSTRUCTIONS CAREFULLY. FAILURE TO INSTALL THE SERIES 4000 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 SERIES 4000. DO NOT TURN UPSIDE DOWN, DROP OR SET ON SHARP PROTRUSIONS.

DO NOT LOCATE THE SERIES 4000 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. (SEE "SELECT INSTALLATION LOCATION", PAGE 8).

THE SERIES 4000 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 ALSO REDUCE THE FLOW).

THIS WATER SOFTENER WORKS ON 24 VOLT - 60 Hz ELECTRICAL POWER ONLY. BE SURE TO USE THE INCLUDED TRANSFORMER.

INTRODUCTION

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 or 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 and/or 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 contents.

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 anywhere 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 food are affected. A water softener conditions the water and removes the hardness minerals to eliminate these problems, and others. Pages 18-20 describe how the Dual Demand System works.

Sodium Information: Water softeners using sodium chloride (salt) for regeneration add sodium to the water. Persons who are 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*, are determined by chemical analysis. Four different types of iron in water are: [A] Ferrous (clear water), [B] Ferric (red water), [C] Bacterial and organically bound iron, [D] 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.

[A] 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 drawing, 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.

INTRODUCTION

continued from page 5

[B] Ferric (red water), and [C] 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.

[D] Colloidal and inorganically bound iron is a form of ferrous or ferric iron 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.

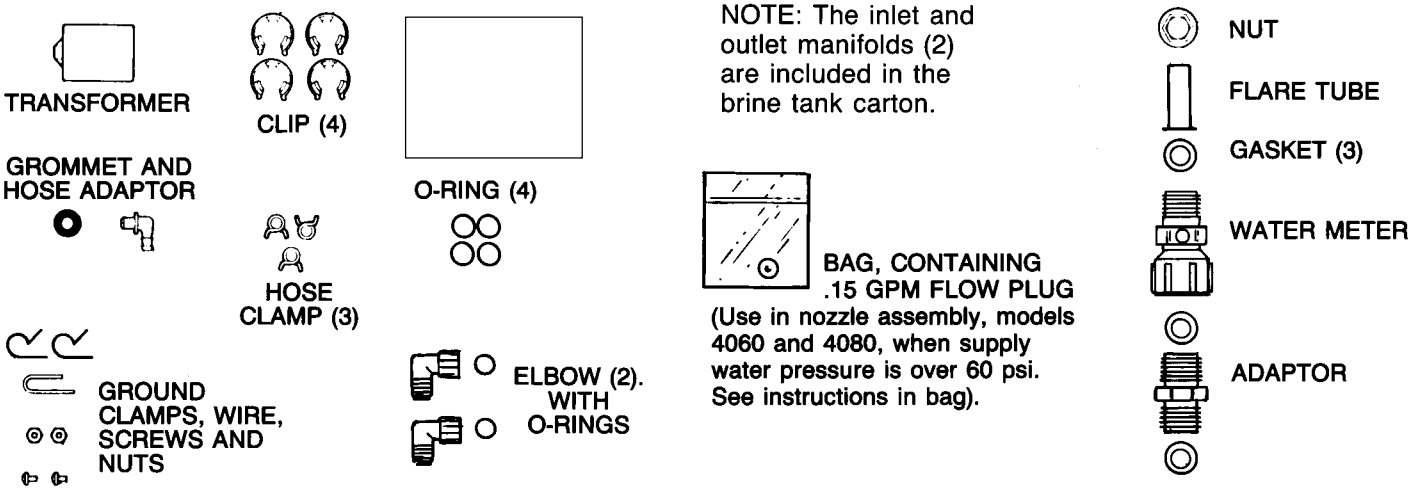
Iron in water causes stains on clothing and plumbing fixtures. It negatively affects the taste of food, drinking water, and other beverages.

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

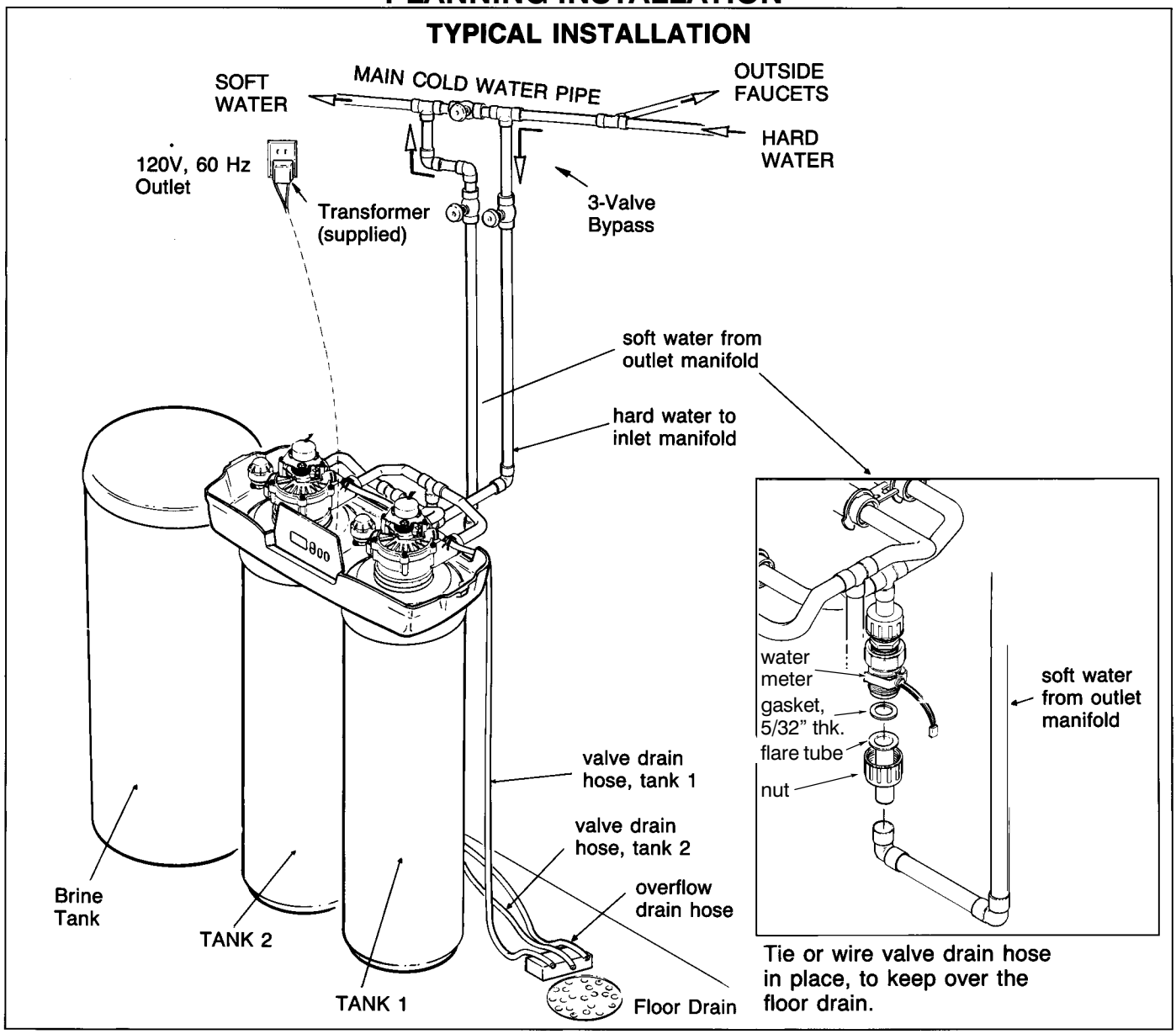
(4) SEDIMENT is fine, foreign material particles suspended in water. This material is most often clay or silt. Extreme amounts of sediment may give the water a cloudy appearance. A sediment filter normally corrects this condition.

PARTS INCLUDED, REQUIRED FOR INSTALLATION



PLANNING INSTALLATION

TYPICAL INSTALLATION



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

INLET-OUTLET PLUMBING OPTIONS

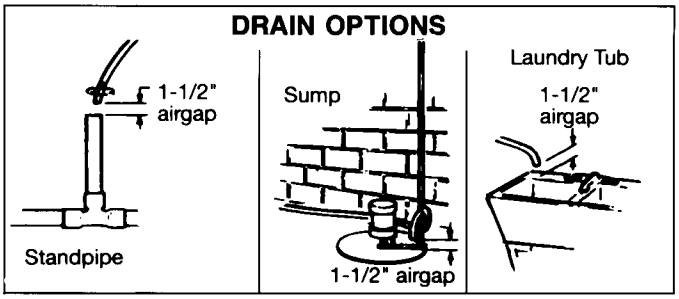
1. ALWAYS INSTALL A 3-VALVE BYPASS, as typically illustrated above.

2. Use 1''-or-3/4'' (minimum) pipe and fittings. Special plumbing items included are 1" O.D. copper.

NOTE: If threaded or CPVC plastic pipe and fittings are used, obtain the fittings needed to adapt to the special plumbing.

OTHER REQUIREMENTS

3. A drain is needed for regeneration discharge water. A floor drain, close to the Dual Demand 4000 is preferred. A laundry tub, sump, standpipe, etc., are other options.



4. A 120V-60Hz, grounded electrical outlet (continuously ''live'') is needed within 10' of the timer control.

PLANNING INSTALLATION

TOOLS YOU MAY NEED

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

SOLDERED COPPER	THREADED	CPVC PLASTIC
• tubing cutter	• hacksaw or pipe cutter	• hacksaw
• propane torch	• threading tool	• adjustable wrench
• **LEAD-FREE solder and flux**	• pipe joint compound*	• solvent cement*
• emery cloth sandpaper or steel wool		• primer

*approved for use on potable water

MATERIALS YOU MAY NEED

- 3 bypass valves (page 7)
- pipe and fittings as required
- 7/16" I.D. high quality, flexible hose for the valve drain*, and brine tank drain (see repair parts pages).

***VALVE DRAIN OPTIONS:** Flexible drain hose is not allowed in all localities (Check your codes). For a rigid valve drain run, cut the barbed section off the drain fitting for access to the 1/4" pipe threads. Purchase a fitting, as needed, to adapt rigid tubing to the 1/4" threads (see repair parts pages).

SELECT INSTALLATION LOCATION

Consider all of the following as an installation location for the Series 4000 is selected.

- To soften all water in the home, install the Series 4000 close to the water supply inlet, and before all other plumbing connections, EXCEPT FOR OUTSIDE WATER PIPES. Outside faucets should remain on hard water to avoid wasting soft water and salt (see drawing on page 7).
- A nearby drain is needed to carry away regeneration discharge water. A floor drain is preferred, with a laundry tub, sump, standpipe, etc. other possibilities (check your local codes).
- The Series 4000 timer works on 24 volts only. A transformer is included to reduce 120V-60 Hz house electrical power. Provide an approved, grounded outlet within 10' of the timer. The Series 4000 includes a 10' power cable for connection between the transformer and the timer.
- Position the Series 4000 at least 6" from surrounding walls, or other appliances, to allow access for adding salt and servicing.
- Locate the Series 4000 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 other equipment. ALWAYS INSTALL THE SERIES 4000 BEFORE THE WATER HEATER (See Safety Guides on page 4). To reduce the risk of hot water back-up, soft water piping between the Series 4000 and water heater should be as long as possible.
- Install the Series 4000 in a place water damage is least likely to occur if it develops a leak.
- If installing the Series 4000 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.

ASSEMBLY

1. Move both resin tank assemblies into the installation location. Space so the inlet fittings are 10-7/8" apart, as figure 1 shows.

CAUTION: HANDLE THE TANKS CAREFULLY TO PREVENT DAMAGING THE SHROUD OR VALVE.

2. Looking at figure 2, lower the bottom cover over the resin tank assemblies. Fasten in place with screws, on either side, through the cover ears and into the shrouds.

3. As shown in the inset drawing, figure 2, assemble o-rings into elbows (2). Turn elbows onto both nozzle assemblies until tight. Then back-off up to 1 full turn so elbow points toward the back.

4. **ASSEMBLE INLET-OUTLET SPECIAL PLUMBING FITTINGS...FIGURE 3:**

a. As shown, place o-ring seals (4) onto the ends of both manifolds. If needed, lubricate the o-rings with high quality silicone grease.

b. Install both manifolds as shown, and use the holding clips (4) to fasten in place. Install clips from the top, downward. BE SURE BOTH MANIFOLDS ARE HELD FIRMLY IN PLACE SO THEY WILL NOT PULL OUT.

5. **INSTALL WATER METER: Using the adaptor and 2 thick (5/32") gaskets as shown in figure 4, assemble the water meter to the outlet manifold. Be sure to tighten all connections.**

IMPORTANT: TO PROVIDE OPTIMUM ACCURACY, IN READING HOUSEHOLD WATER USAGE, BE SURE TO INSTALL THE METER POINTING DOWNWARD.

6. **Take the rubber grommet and hose adaptor elbow from the small parts skin-pack. Insert the grommet into the hole in the brine tank wall. Then push the hose adaptor into the grommet (figure 5).**

FIG. 1

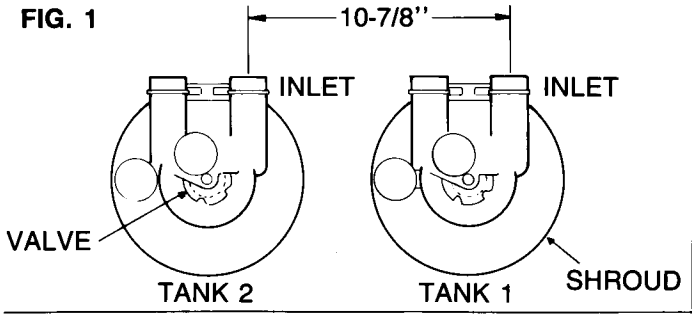


FIG. 2

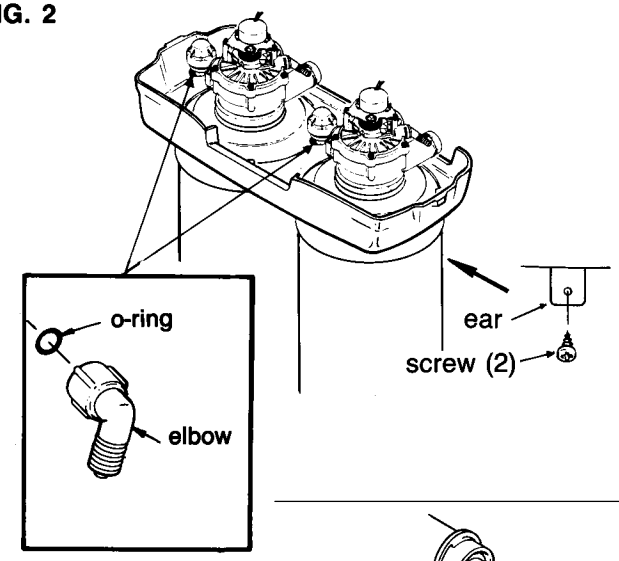


FIG. 3

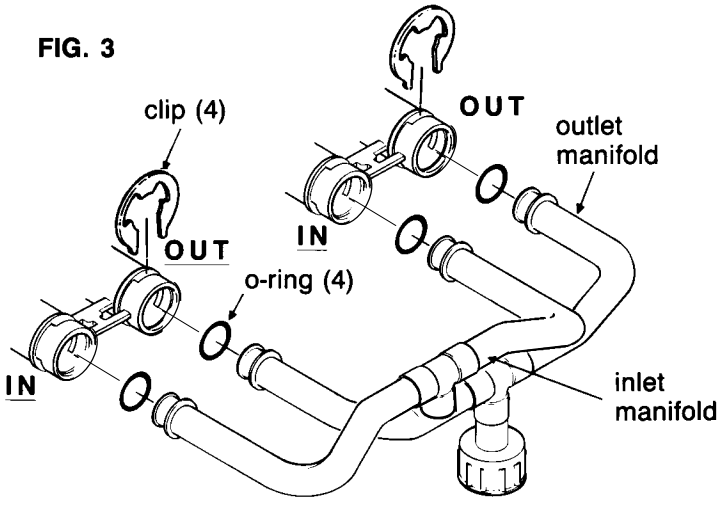


FIG. 5

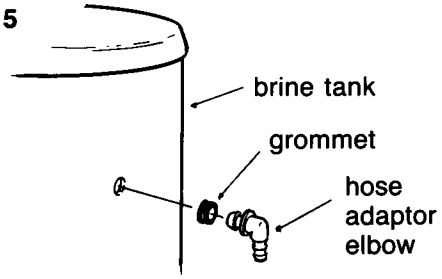
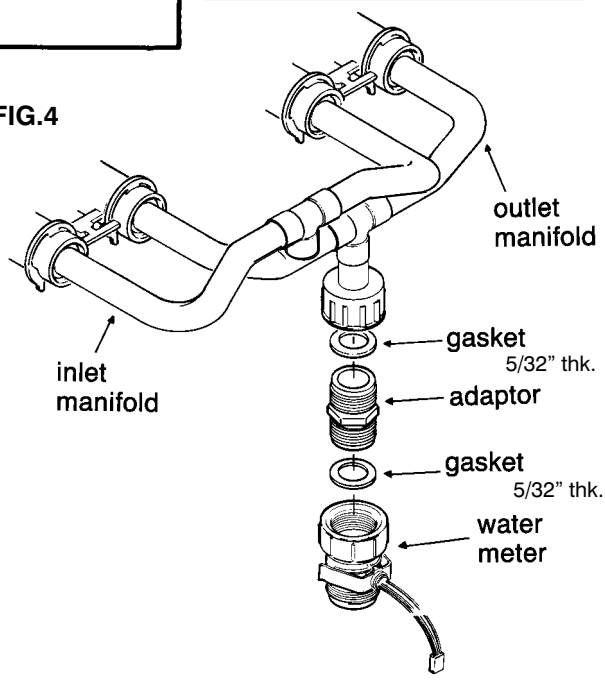
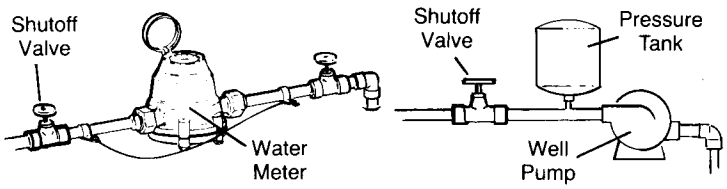


FIG.4



INSTALLATION

1. Close the shut-off valve on the house main water pipe, near the water meter or pressure tank, to turn off the water.



2. Shut off the gas or electric supply to the water heater.

3. Open the highest and lowest water faucets in your house to let water drain from the pipes. Close faucets after water has drained.

4. Referring to page 7, run inlet and outlet pipes to the manifolds, observing the following notes.
   - Be sure to install a 3-valve bypass.
   - Be sure to plumb so HARD water goes to the INLET manifold.
   - When sweat soldering at the inlet manifold, wrap wet rags around the manifold to prevent heat transfer through the manifold, into the valve bodies.
   - BEFORE SWEAT SOLDERING the soft water outlet pipe at the water meter, disconnect the flare tube and nut from the meter. Wait until the soldered assembly cools before reconnecting.
   - Support the inlet-outlet plumbing in some manner, to keep the weight off of the Series 4000 valves.

5. **CONNECT THE VALVE DRAIN HOSES** Attach lengths of 7/16" I.D. hose to the valve drain fittings. Use hose clamps to hold them in place. Place the other end of each hose over a floor drain, into a laundry tub, sump, standpipe or other suitable drain (see page 7). BE SURE TO OBSERVE YOUR LOCAL CODES.

IMPORTANT NOTES:

Leave an air gap of about 1-1/2" between the end of the hose and the drain. This gap is needed so you don't get a back-flow of sewer water into the softener. DO NOT put the end of the hose into the drain or connect without the air gap.

Place and support the hose so it does not kink or have sharp bends. Tie or wire the hose in place so water pressure will not make it "whip." Do not pinch the hose shut. THE SERIES 4000 WILL NOT WORK IF THIS DRAIN HOSE IS PINCHED, PLUGGED OR CLOSED IN ANY WAY.

DO NOT tee the 2 valve drain hoses together. Each must be a separate drain run.

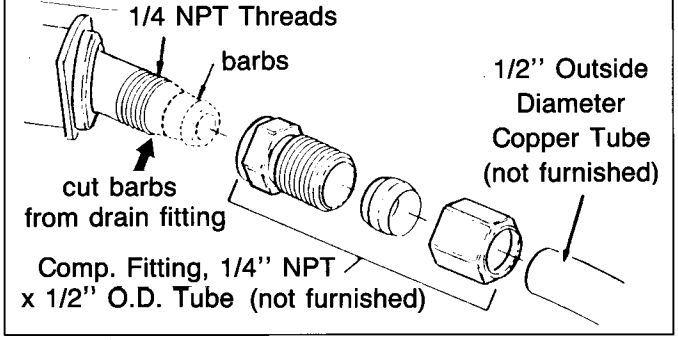
Keep the hose lower than the drain fitting. (In some homes, to get to a drain you must raise the hose and run it over-head. If you need an over-head drain, do not raise the hose more than 8' above the floor. A copper drain tube is best to use...see below.)

6. **MOVE BRINE TANK INTO PLACE**
Enough brine tubing is included to allow placement of the brine tank in front of both resin tanks, or off to either side. For more remote locations, order extra tubing (see page 29).

Place the tank on a smooth, level surface. If needed, put a piece of 3/4" plywood under the tank, shimming as needed to level.

FIG. 6 TYPICAL COPPER DRAIN TUBE CONNECTION

To adapt a copper drain tube to the Series 4000, use a hacksaw to cut the barbed end from the drain fitting. Buy a compression fitting (1/4" female pipe threads x 1/2" O.D. tube) and tube from your local hardware store.



7. CONNECT OVERFLOW HOSE, AND BRINE TUBING

a. Attach a length of 7/16" I.D. hose to the hose adaptor elbow, in the brine tank sidewall. Place the outlet of the hose at the floor drain. DO NOT ELEVATE HOSE HIGHER THAN THE ELBOW. THIS IS A GRAVITY DRAIN. This drain is for safety only. If the brine tank should over-fill with water, the excess is carried to the drain.

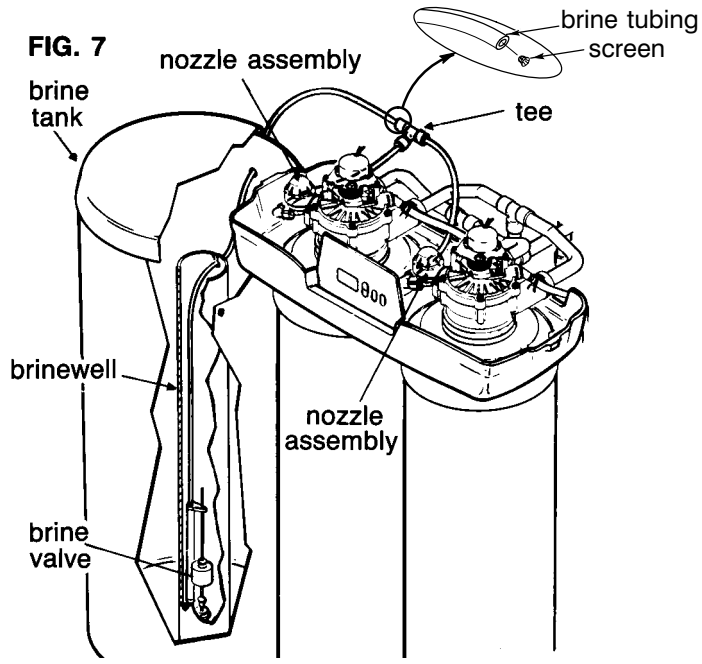
b. As typically shown below, use the tee fitting and connect brine tubing, from the brine tank, to both nozzle assemblies. BE SURE TO TIGHTEN COMPRESSION NUTS SECURELY.

NOTE: On water supply pressures over 60 psi, a flow plug is included to install in the nozzle assembly, models 4060 and 4080. . . see page 6.

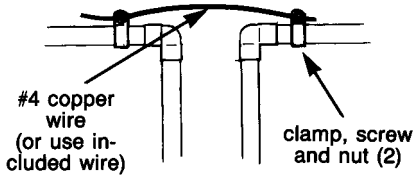
NOTE: A small screen is available (see parts section) to install in the top end of the brine tubing. It helps protect plugging on the bottom side of the nozzle fill flow plug (fig. 7). Use a blunt tool to push it into the tubing.

8. The house cold water pipe (metal only) is often used as a ground for the house electrical system. The 3-valve bypass shown in the typical installation drawing, page 6, will maintain ground continuity. If you do not use the recommended 3-valve bypass, ground continuity is broken. To restore the ground:

FIG. 7



Install a #4 copper wire across the removed section of main water pipe, securely clamping on both ends.

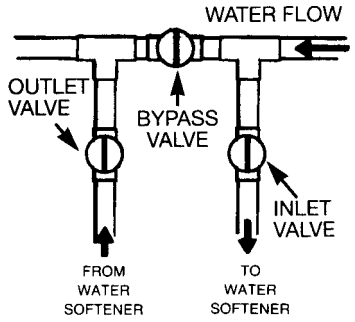


9. PRESSURE TESTING FOR LEAKS - TO PREVENT EXCESSIVE AIR PRESSURE IN THE SERIES 4000 AND PLUMBING SYSTEM, DO THE FOLLOWING STEPS IN ORDER.

- Open 2 or more soft water faucets, both hot and cold.
- Referring to figure 8, adjust the bypass valves to SERVICE position.
- SLOWLY OPEN THE MAIN WATER SUPPLY VALVE. When water from the faucets runs smoothly, with no air bubbles, close the faucets.
- Check your complete installation for leaks. If rework is required, be sure to observe precautions in step 4.

3-VALVE BYPASS

FIG. 8



- For SERVICE
  Open the inlet and outlet valves
  Close the bypass valve
- For BYPASS
  Close the inlet and outlet valves
  Open the bypass valve

10. ADD WATER AND SALT INTO BRINE TANK

- Using a pail, or garden hose, add about 2 gallons of water into the brine tank. DO NOT POUR INTO THE BRINEWELL.

continued on page 12

INSTALLATION

■ **FILL THE BRINE TANK WITH SALT**
You can use most water softener salts, but it must be clean (NUGGET or PELLET salt has less than 1% impurities). Salt storage capacity is about 300 lbs.

NOTE: See page 21 for additional salt information.

11. SANITIZING THE SERIES 4000

Care is taken at the factory to keep your Series 4000 clean and sanitary. Materials used to make the Series 4000 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 resin tanks. For this reason, sanitizing, as follows, is suggested①when installing.

...Remove the brinewell cover and pour about 2 oz. of common household bleach (Clorox, Linco, BoPeep, White Sail, Eagle, etc.) into the brine tank brinewell (see figure 7, page 11). **REPLACE THE BRINEWELL COVER.**

...Do steps 12-14, then step 15 to complete the sanitizing.

① Recommended by the Water Quality Association. On some water supplies, the Series 4000 may need periodic disinfecting.

12. INSTALL THE TIMER AND CONNECT ALL ELECTRICAL WIRING (FIG. 9)

■ Observing the color codes, connect wiring between the valves and the timer as follows.
— black side of wire harness to a switch on 1 tank.
— from same tank, motor lead to the black connector on the timer.
— red side of wire harness to switch on the remaining tank.
— motor lead, from remaining tank, to red connector on timer.
— plug wire harness connector into timer.
■ Plug the water meter connector into the timer.
■ Connect the power cable leads to the 2 terminals on the transformer, and to the timer.
■ Plug the transformer into a continously "live," grounded, 120V-60 Hz house electrical outlet, approved by local codes.

13. INSTALL TOP COVER

Lower the top cover onto the timer, and bottom cover. Lock to the bottom cover using the side latches.

14. PROGRAM THE TIMER

Refer to pages 13-15 to set the timer. Then, complete the installation steps below.

15. START A RECHARGE

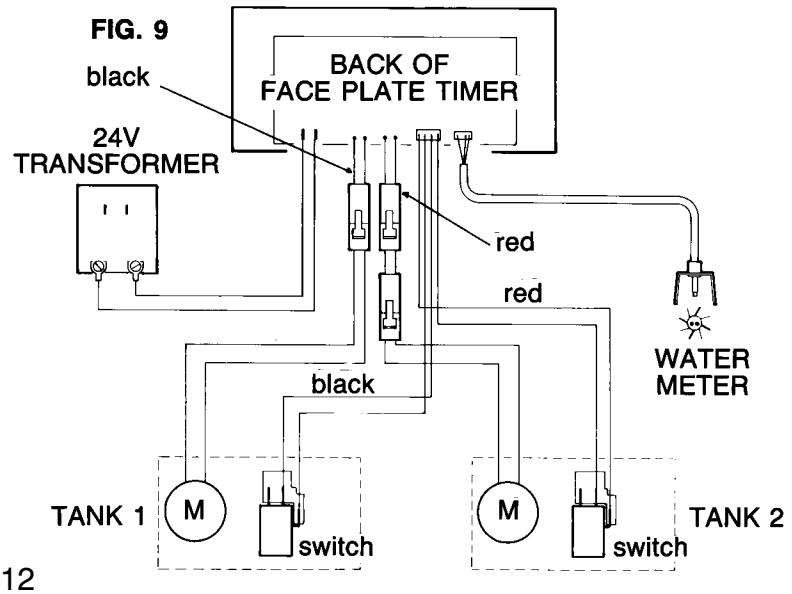
This initial recharge draws the sanitizing bleach (step 11) into and through both resin tanks and purges any air remaining in the system. One tank will recharge first, followed by the other. Depending on the model, and programmed cycle times, recharge of each tank ranges from a low of about 60 minutes, to a high of about 100 minutes.

To start the recharge, press the RECHARGE (Ⓡ) button (see FIG. 10) until RECHARGE begins to flash in the timer display.

16. RESTART THE WATER HEATER

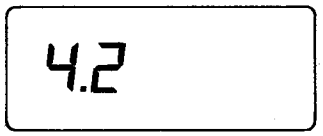
Turn on the electric or fuel supply to the water heater, and light the pilot, if applies. NOTE: The water heater is filled with hard water and, as hot water is used, it refills with soft water. In a few days, the hot water will be fully soft. To have fully soft, hot water immediately, wait until the recharge (step 14) is over, then drain the water heater until water runs cold.

FIG. 9

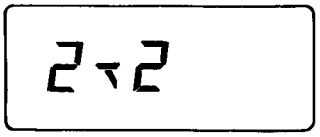


PROGRAMMING THE TIMER

When the transformer is plugged in, a "beep" will sound, followed by the factory set model code for a few seconds. Then a test number (example: 4.2) shows, followed by a 12:00 AM present time display.



1. MODEL CODE: The timer is factory set to the correct model code 2T2. To check this setting, unplug the transformer and plug in again while observing the timer display. If 2T2 does show, continue with step 2 below. If 2T2 does not show, do the following.

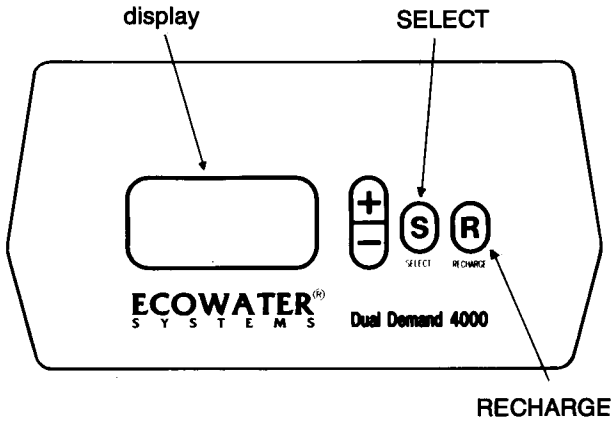


a. Press SELECT (Ⓢ) and **hold** for 3 seconds.
b. Again, press SELECT and hold for 3 seconds to display the current model code setting.
c. Use the (⊕) button to set the 2T2 code. If you pass by the correct code, use the (⊖) button. BE SURE TO SET THE CORRECT CODE, OR THE SERIES 4000 WILL OPERATE ON INCORRECT TIMING.
d. With 2T2 showing in the display, press SELECT to set. A test number (example: 4.2) will show again for a few seconds, followed by a flashing 12:00 AM.

• **SOUND "BEEPER"** - A "beeper" sounds while pressing buttons for timer set-up. One beep signals a change in the face plate display. Repeated beeps means the timer will not accept a change from the button you have pressed, telling you to use another button. For example, while setting the hardness, the beeper sounds repeatedly when the display reaches 1 using the (⊖) button, or 125 using the (⊕) button.

2. SET THE PRESENT TIME: Again, use the (⊕) or (⊖) to set the present time of day, being sure a.m. or p.m. shows, as required. Press (⊕) to move the time ahead; press (⊖) to move the time backward.

FIG. 10



NOTE: Each press of the (⊕) or (⊖) button changes the time by 1 minute. Holding a button in, changes the time 32 minutes each second.

NOTE: TO RESET THE TIMER, IF FLASHING AFTER A POWER OUTAGE, DO STEPS 2 THROUGH 10.

3. SET WATER HARDNESS: Press the SELECT button once to display a flashing 15 and HARDNESS. Set the grains per gallon hardness of your water supply (determined by water analysis or call your local water department). Use the (⊕) button to advance the number; use the (⊖) button to reduce the number. Each press of a button changes the display by 1, between 1 and 25. Between 25 and 125 the display changes 5 at a time. Hold the buttons in for fast number advance. NOTE: To compensate for iron in the water supply, add 5 to the hardness number for each 1 ppm of iron.

4. Press SELECT and **hold** for 3 seconds, to enter the secondary mode and display the following (upon installation, the display will show 4 zeros).

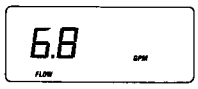
continued on page 14

PROGRAMMING THE TIMER

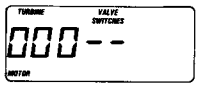
step 4, continued

Continue to press SELECT, displaying the following options, but making no changes to the default settings.

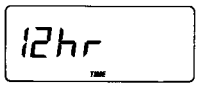
1. press SELECT



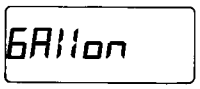
2. press SELECT



3. press SELECT



4. press SELECT



5. press SELECT

6. press SELECT

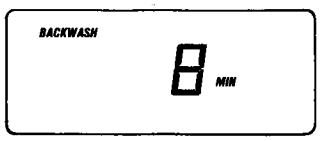
5. SET CAPACITY: Press SELECT to get an alternating display, CAP/12000.

Refer to page 15 and, following directions, determine the **CAPACITY** SETTING needed. Then, use the ⊕ or ⊖ button to set this number in the display. Press SELECT to set.

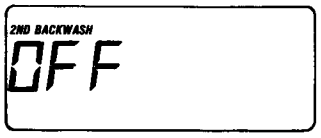
6. SET FILL TIME: Use the (⊕) and (⊖) buttons to set the minutes and seconds of FILL TIME needed (from page 15).

7. SET BRINE TIME: Press SELECT and use the (⊕) or (⊖) button to set the suggested BRINE TIME, as shown on page 15. Then, press SELECT to set.

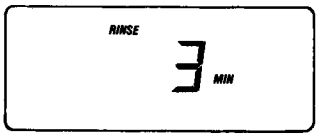
8. SET BACKWASH TIME: The suggested backwash time is shown in table 2, on page 15. Use the (⊕) or (⊖) buttons to set this time, or other desired time (see note, bottom of table 2). When the desired time shows, press SELECT to set.



9. 2ND BACKWASH: Two backwash cycles are beneficial on some water supplies, especially if it has high sediment or iron content. When selected, a backwash and fast rinse cycle will follow the fill cycle of recharge. Then the normal recharge sequence (brining, brine rinse, backwash, fast rinse) resumes. To select the 2nd backwash, press the (⊕) button to display ON. Be sure OFF shows (press ⊖) if a 2nd backwash is not wanted.



10. FAST RINSE TIME: Press SELECT once again to display the default fast rinse setting. Referring to table 2, page 15, set the suggested 1 minute or other desired fast rinse time. Then, PRESS SELECT TO RETURN THE PRESENT TIME DISPLAY.



RETURN TO PAGE 12 AND DO STEPS 15 AND 16 TO COMPLETE INSTALLATION.

FROM THE TABLES ON PAGE 15, DETERMINE THE TIMER SETTINGS REQUIRED. FOR FUTURE REFERENCE, ENTER THE SETTINGS BELOW.

SUPPLY WATER HARDNESS: _____GPG

CAPACITY SETTING: _____

FILL TIME SETTING: _____min. _____sec.

BRINE TIME SETTING: _____min.

BACKWASH TIME SETTING: _____min.

FAST RINSE TIME SETTING: _____min.

PROGRAMMING TABLES

TABLE 1 - GRAINS CAPACITY PER PEAK HOUR REQUIRED②

To determine the grains capacity per peak hour required:

a. Find the number of persons in the household (left side of table), along with the estimated gallons of water used during this peak hour.

b. Across the top of the table, find the grains per gallon hardness of your water supply, or the closest higher number.

c. At the intersecting point of a and b is the grains capacity per peak hour required.

NO. OF PEOPLE	ESTIMATED MAXIMUM① GALS./HR.	SUPPLY WATER HARDNESS - GRAINS PER GALLON										
		UP TO 10	11 TO 15	16 TO 20	21 TO 25	26 TO 30	31 TO 35	36 TO 40	41 TO 50	51 TO 60	61 TO 70	71 TO 80
2	105	1050	1575	2100	2625	3150	3675	4200	5250	6300	7350	8400
3	135	1350	2025	2700	3375	4050	4725	5400	6750	8100	9450	10800
4	165	1650	2475	3300	4125	4950	5775	6600	8250	9900	11550	13200
5	195	1950	2925	3900	4875	5850	6825	7800	9750	11700	13650	15600
6	225	2250	3375	4500	5625	6750	7875	9000	11250	13500	15750	
7	255	2550	3825	5100	6375	7650	8925	10200	12750	15300		
8	285	2850	4275	5700	7125	8550	9975	11400	14250			
9	315	3150	4725	6300	7875	9450	11025	12600	15750			
10	345	3450	5175	6900	8625	10350	12075	13800				

NOTES: ① Based on peak hour use of 1 shower per person @ 25 gals., 1 toilet flush per person @ 5 gals., clothes washer using 25 gals., dishwasher using 20 gals. IF YOUR USAGE IS KNOWN TO BE DIFFERENT, ESTIMATE AS APPLICABLE.

② Mutiply the estimated maximum gallons per hour, times grains per gallon (gpg) water hardness to obtain the grains capacity per peak hour required.

TABLE 2 - TIMER SETTINGS REQUIRED

a. In the applicable model section of the table, locate your grains capacity per peak hour required (from table 1), in the left hand column.

b. Read across the table, to the CAPACITY SETTING, and FILL TIME SETTING required.

c. At the bottom of each model section are the BRINING, BACKWASH and FAST RINSE settings required.

MODEL 4030				MODEL 4060				MODEL 4080			
GRAINS CAPACITY PEAK HOUR	CAPACITY SETTING	FILL TIME SETTING MIN.-SEC.	POUNDS SALT USED	GRAINS CAPACITY PEAK HOUR	CAPACITY SETTING	FILL TIME SETTING MIN.-SEC.	POUNDS SALT USED	GRAINS CAPACITY PEAK HOUR	CAPACITY SETTING	FILL TIME SETTING MIN.-SEC.	POUNDS SALT USED
UP TO 2500	5104	2-37	1	UP TO 4000	8496	1-33	1.9	UP TO 5000	12512	2-43	2.8
2500-3000	5808	3-23	1.2	4000-5000	10704	2-12	2.4	5000 TO 6000	15008	3-22	3.3
3000-3500	6800	4-32	1.5	5000-6000	12800	2-51	2.9	6000 TO 7000	17504	4-9	3.9
3500-4000	7696	5-9	1.7	6000-7000	14896	3-37	3.5	7000 TO 8000	20000	4-55	4.5
4000-4500	8704	6-50	2.1	7000-8000	17104	4-32	4.2	8000 TO 9000	22496	5-50	5.2
4500-5000	9696	8-23	2.5	8000-9000	19200	5-19	4.8	9000 TO 10000	25008	6-52	6.0
5000-5500	10600	9-32	2.8	9000-10000	21296	6-13	5.5	10000 TO 11000	27504	7-47	6.7
5500-6000	11608	11-28	3.3	10000-11000	23504	7-31	6.5	11000 TO 12000	30000	8-41	7.4
6000-6500	12608	13-0	3.7	11000-12000	25600	8-57	7.6	12000 TO 13000	32504	9-59	8.4
6500-7000	13504	14-32	4.1	12000-13000	26896	9-28	8.0	13000 TO 14000	35008	11-25	9.5
7000-7500	14496	15-41	4.4					14000 TO 15000	38800	14-0	11.5
BRINING TIME: 55 min.				BRINING TIME: 60 min.				BRINING TIME: 70 min.			
①BACKWASH TIME: 2 min.				①BACKWASH TIME: 3 min.				①BACKWASH TIME: 4 min.			
FAST RINSE TIME: 1 min.				FAST RINSE TIME: 1 min.				FAST RINSE TIME: 1 min.			

NOTES: ① If the water supply contains iron, or a high amount of sediments, it may be beneficial to increase the backwash time, add a second backwash, or both.

TIMER FEATURES AND OPTIONS

CHARGE BAR DISPLAY

The charge bar alternately displays the remaining capacity in each tank. When the charge bar is displayed for 6 seconds, it is showing the remaining capacity in the right hand (facing front of unit), or #1 tank. Capacity remaining in the left hand, or #2 tank, is shown during a 2 second charge bar display. As hard water passes through the Series 4000, the charge bar retracts, for each tank, as capacity is used. The first automatic recharge, after installation, occurs when the charge bar for 1 of the tanks reaches 50%. Thereafter, the resin tanks recharge only ①when the charge bar reaches 0%.

①A tank will recharge before reaching a 0% charge bar display, if the charge bar for the other tank shows 50%.

FLASHING "RECHARGE"

While the Series 4000 is in a recharge cycle, "RECHARGE" flashes in the display until the recharge is over.

INITIATING AN EXTRA RECHARGE

To initiate a recharge at any time*, press the RECHARGE Ⓡ button to start an immediate recharge cycle. First, one tank will recharge and return to service. Then, the remaining tank will recharge.

*Use after a hard water condition has occurred (depleted salt supply, salt bridged, etc.).

PROGRAM MEMORY

If electrical power to the Series 4000 goes off, the time display is blank, but the face plate timer keeps the correct time for at least 2 days. When electrical power comes on again, you have to reset the present time only if the display is flashing. The MODEL CODE and HARDNESS never require resetting. However, all other time settings (see page 14) revert to factory set default values and must be reset to assure a continuous soft water supply.

AVERAGE DAILY GALLONS

If you want to know the average gallons of water your household uses each day, press the SELECT button 4 times to display this water use fact. The average daily gallons is based on your past 7 days of water usage. The figure adjusts daily at midnight. Press SELECT once more to return the present time (or present time automatically returns in 4 minutes).

THE FOLLOWING FEATURES AND OPTIONS ARE SELECTED OR OBSERVED IN A **SECONDARY TIMER MODE.** SOME OF THESE MAY BE BENEFICIAL TO THE HOME-OWNER, AND OTHERS TO THE SERVICE TECHNICIAN. SOME FEATURES ARE USEFUL TO BOTH OWNER AND SERVICER. EACH FEATURE IS LISTED IN THE ORDER THAT DISPLAYS APPEAR WHEN PASSING THROUGH THE SECONDARY MODE.

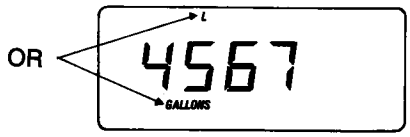
TO ENTER THE SECONDARY MODE...Press SELECT and **hold** for 3 seconds.

NOTE: The present time display will return if more than 4 minutes pass before a face plate button is pressed.

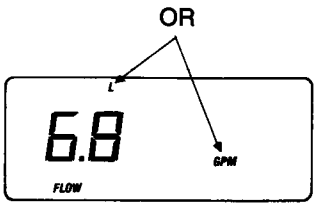
TIMER FEATURES AND OPTIONS

1. GALLON (OR LITER) TOTAL COUNT: This is a measure of all water that has passed through the Series 4000 since installation. The display will total up to 99,999 gallons before beginning over at 0.

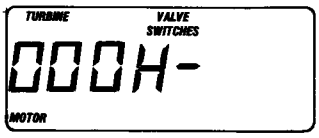
   NOTE: When in this display, the total can be returned to 0 by pressing the (⊟) button.



2. FLOW RATE, GALLONS (OR LITERS) PER MINUTE: Press SELECT once more to access this display. The display shows the flow rate, in gallons (or liters), passing through the Series 4000. If all water using appliances and faucets are off, the display will be 0. This display indicates positive water meter turbine operation.



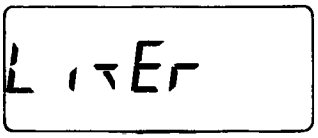
3. VALVE SWITCHES, TURBINE, AND MOTOR DIAGNOSTIC: Press SELECT again for this diagnostic display. FOR ADDITIONAL INFORMATION ON THIS DISPLAY, PLEASE SEE PAGE 25.



4. 12 OR 24 HOUR CLOCK: Press SELECT to display a flashing 12 hour (or 24 hour). When "12 hour" is set, the present time and recharge time displays are shown in standard clock time...1 to 12 p.m., 1 to 12 a.m. Military time, 0100 (1:00 a.m.) to 0000 (midnight), is shown in the present time and recharge time displays when "24 hour" is set. Use the (⊞) or (⊟) buttons to set the desired clock.

5. GALLONS OR LITERS MEASURE: Press SELECT to show either GALLON or LITER flashing. If GALLON is selected, all water flow rate or usage displays are shown in gallons or gallons per minute. If LITER is selected, the same displays are in liters or liters per minute. The (⊞) or (⊟) button is used to change this display.

6. TURBINE COUNT: The correct turbine count for the Series 4000 is 200 water meter pulses for each gallon of water. Do not vary from this setting (factory default) or the face plate computer will receive incorrect water usage information.



7. AUTO SETTING: Press SELECT to display AUTO. The AUTO setting allows the face plate computer to control all recharges, with intervals based on water usage. DO NOT CHANGE FROM THIS SETTING. If needed, use the (⊞) or (⊟) button to set AUTO.

8. CAPACITY OF RESIN:
9. FILL TIME:
10. BRINE TIME:
11. BACKWASH TIME:
12. 2ND BACKWASH:
13. FAST RINSE TIME:

Please see page 14, steps 5 through 10.

PRESS SELECT ONCE MORE TO RETURN THE PRESENT TIME DISPLAY.

SERIES 4000 OPERATION

DEMAND WATER METER

The water meter is located on the soft water side, after the outlet manifold (pages 6 and 9), equi-distant from both resin tanks. For accuracy, the meter is mounted vertically downward.

The meter consists of a turbine with 2 magnets, turbine support, housing, and sensor pickup. As soft water passes through and spins the turbine, the magnets causes a back-and-forth movement of a switch in the sensor pickup (housing). This switch movement sends pulses to the demand timer.

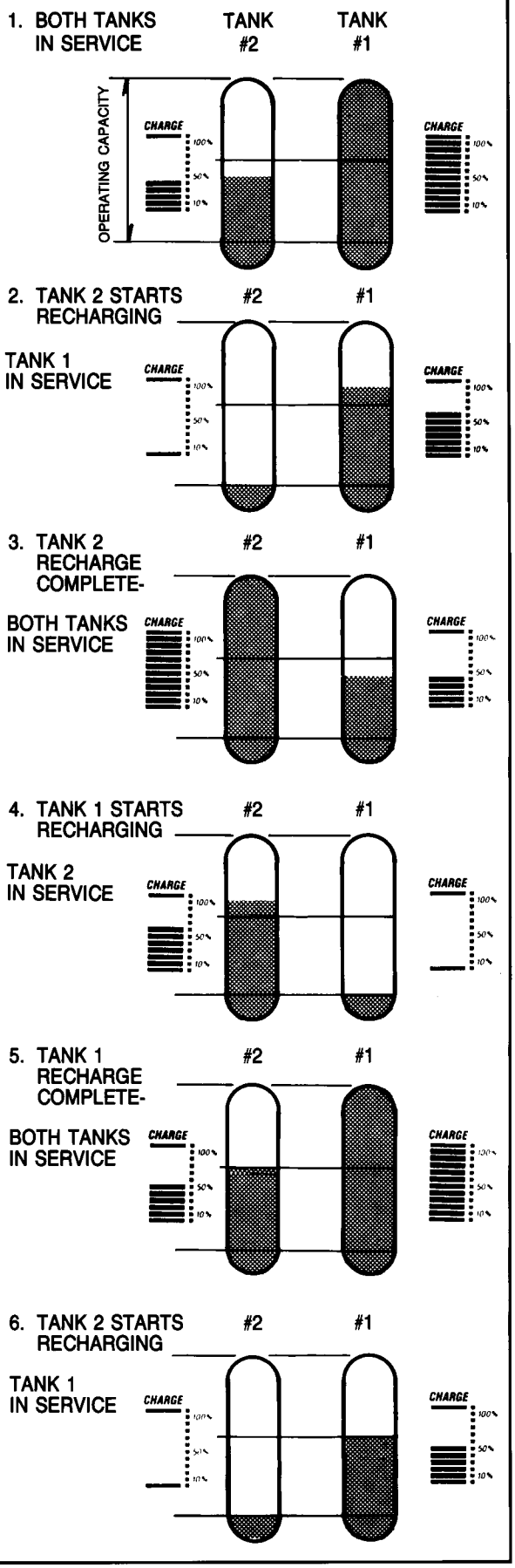
DEMAND TIMER

The demand timer is preprogrammed with the water supply hardness (gpg), and the operating capacity setting (see pages 13-15). The operating capacity is ½ of the total operating capacity of both tanks. The timer continually monitors water usage...converts meter pulses to gallons...and capacity depletion to determine when recharging of the 2 tanks is needed.

Upon installation, both tanks are fully recharged to maximum. Hard water flows equally through the tanks, using the softening capacity. The first of the 2 tanks to deplete to 50% capacity remaining will begin to recharge, initiated by the timer. The other tank remains in service to provide soft water.

After the recharge, the tank is again at full capacity and is returned to service. Both tanks provide soft water until the other tank is at 0% capacity and the timer initiates its recharge. The first tank provides the soft water until the other tank returns to service. The next recharge occurs when the first tank depletes to 0% of operating capacity.

TYPICAL OPERATION SEQUENCE



SERIES 4000 OPERATION

FLOW THROUGH THE VALVE

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

SERVICE, AND RECHARGE

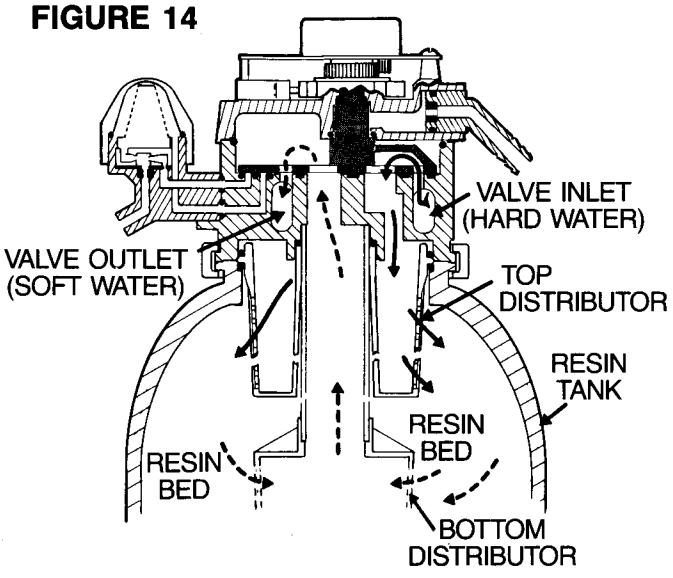
SERVICE (FIGURE 14):

Hard water enters the valve inlet port. Internal valve porting routes the water down and out the top distributor, into the resin tank. Hard water is softened as it passes through the resin bed, then enters the bottom distributor. Soft water flows back into the valve and out the valve outlet, to the house soft water pipes.

In time, the resin beads become coated with hardness minerals and cleaning with a salt solution (brine) is needed to remove it. Regeneration, and recharge, are words used to describe this cleaning.

SERVICE CYCLE

FIGURE 14



REGENERATION, OR RECHARGE

The face plate-timer determines when a recharge is needed (see page 18). SOFT WATER, from the tank remaining in service, is used for the recharge. Recharge consists of 5 different steps, or cycles.

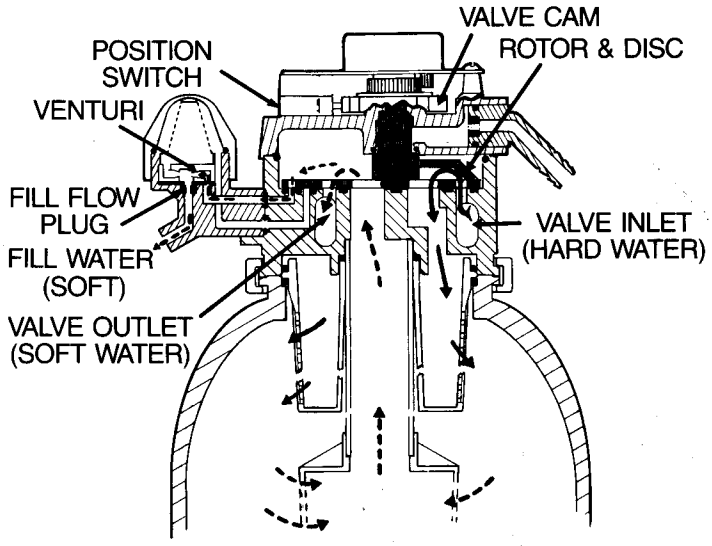
NOTE: See page 15 for suggested recharge cycle times.

STEP 1 - FILL CYCLE (FIGURE 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.

The timer energizes the circuit to the valve motor. The valve motor rotates the rotor and disc and the valve cam until the position switch lever drops, to open the motor circuit and position the valve in FILL. As the rotor and disc rotates, the port opens for SOFT water fill through the venturi. Fill flow continues to the brine valve, and into the brine tank. Soft water is still available to the house lines.

FILL CYCLE

FIGURE 15



STEP 2 - BRINING CYCLE, and
STEP 3 - BRINE RINSE CYCLE (FIGURE 16):

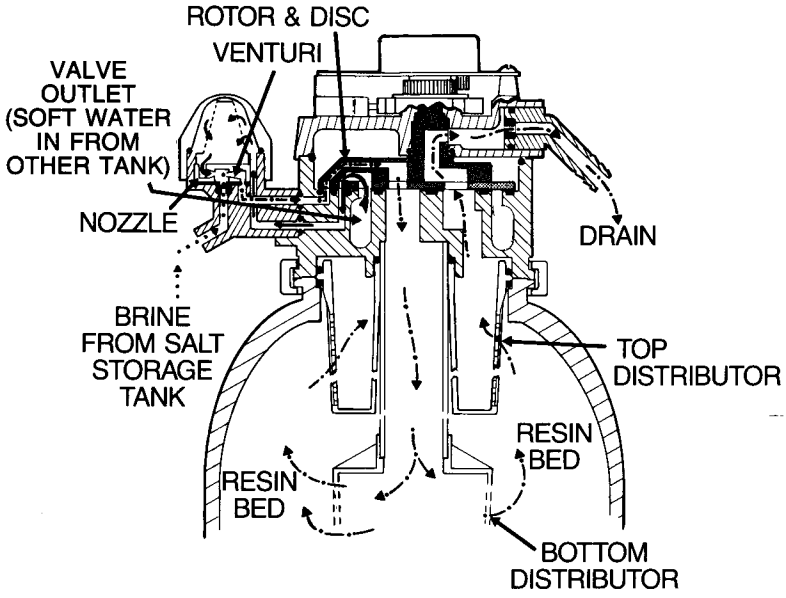
After fill, timer/switch action allows the motor to turn the rotor and disc into BRINING position. SOFT WATER, from the tank remaining in service, enters the valve OUTLET port. Water flow is directed to the nozzle. Suction, created by the nozzle and venturi, draws brine from the brine tank and injects it into the resin bed via the bottom distributor. Flow continues out the top distributor and to the drain. Soft water is available, at house faucets, from the 2nd tank.

BRINING, BRINE RINSE - continued

When the brine valve closes to end brine draw, water flow continues in the same directions to slowly RINSE brine from the resin bed and to the drain.

BRINING AND BRINE RINSE CYCLES

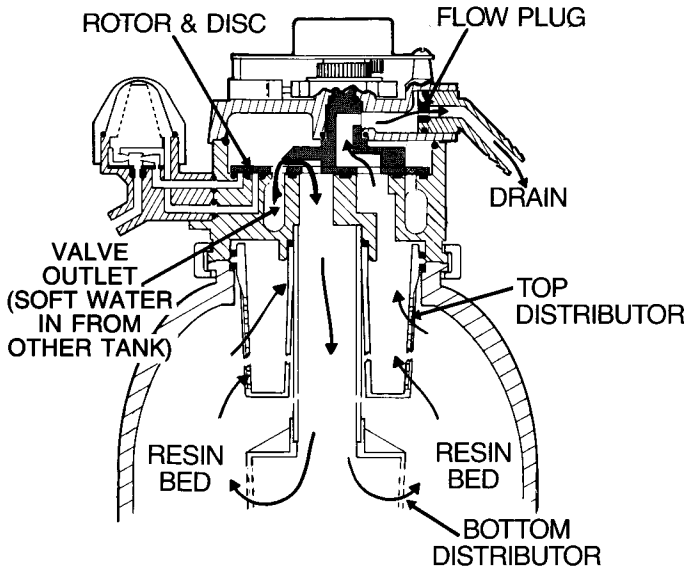
FIGURE 16



STEP 4 - BACKWASH CYCLE (FIGURE 17): Timer/switch action again allows the motor to turn the rotor and disc to place the valve in BACKWASH, stopping water flow to the nozzle. Soft water from the valve outlet is routed down and out the bottom distributor, up through the bed, and out the top distributor to the drain. The fast flow (controlled by a flow plug in the drain fitting) flushes dirt, sediments, iron deposits, remaining brine and hardness to the drain.

BACKWASH CYCLE

FIGURE 17

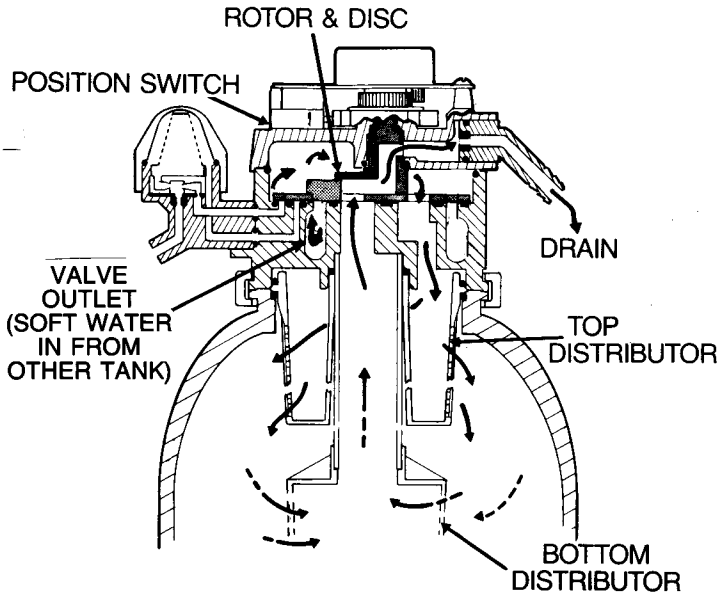


STEP 5 - FAST RINSE CYCLE (FIGURE 18): During FAST RINSE, the rotor and disc is positioned so water flow enters the resin tank through the top distributor, and exits through the bottom distributor, to the drain.

The timer again energizes the motor to return the valve to service. As the valve rotates, the position switch lever drops to open the circuit. The valve remains positioned in service until the timer initiates the next regeneration.

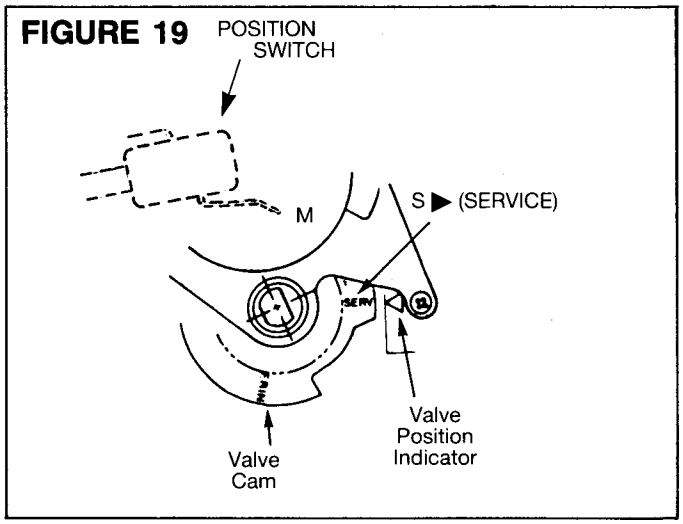
FAST RINSE CYCLE

FIGURE 18



VALVE CYCLE POSITION INDICATOR

FIGURE 19



SERVICE INFORMATION

REFILLING WITH SALT

Remove the brine tank cover and check the salt storage level frequently. If the Series 4000 uses all the salt, before you refill it, you will get hard water. Until you have established a refilling routine, check the salt level at least every 2 or 3 weeks. Always refill if less than ½ full. BE SURE THE BRINEWELL COVER IS ON.

RECOMMENDED SALT: Nugget, pellet, button, solar, etc. water softener salt is recommended. This type of salt is formed, or compressed into briquets, from high purity evaporated crystals. 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).

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

SALT WITH IRON REMOVAL ADDITIVES: Some salts have an additive to help the water softener handle iron in the water supply. Although this additive may help keep the softening resin clean, it may also release corrosive fumes that will weaken and shorten the life of some Series 4000 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 salt. Then salt will not dissolve in the water to make brine. Without brine, the resin bed does 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 is 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 & VENTURI

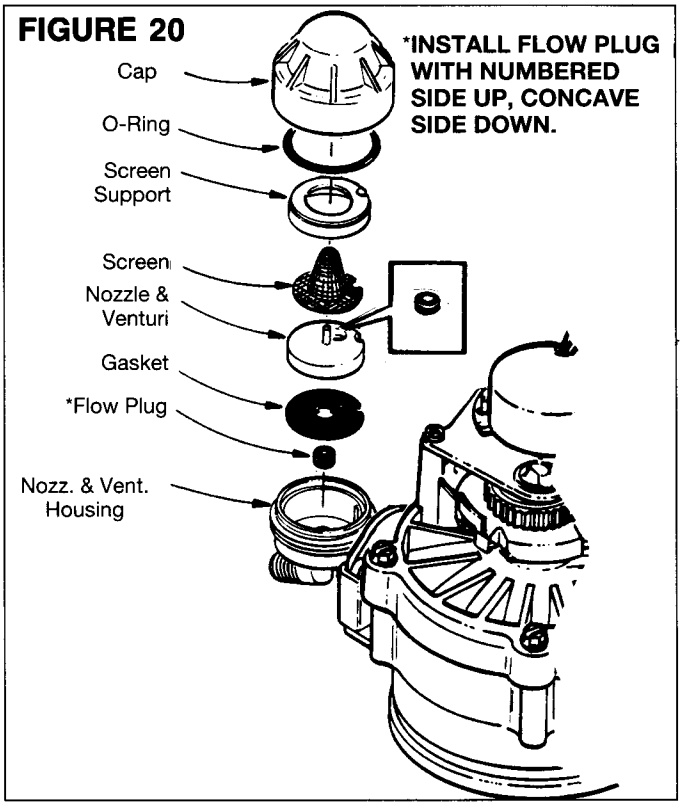
A clean nozzle and venturi (figure 20) is a must for the Series 4000 to work right. This small unit moves brine from the brine tank to the resin tank during regeneration. If it becomes plugged with sand, silt, dirt, etc., the resin bed will not be regenerated and you will get hard water.

To get to the nozzle and venturi, remove the top cover. Be sure the resin tank valve is in service cycle (no water pressure at nozzle and venturi), then turn off the cap from the nozzle and venturi housing. DO NOT LOOSE THE LARGE O-RING SEAL. Lift out the screen support and screen, then the nozzle and venturi. Wash and rinse the parts in warm water until clean. If needed, use a small brush to remove iron or dirt. Also check and clean the gasket and flow plug if dirty.

Carefully replace all parts in the correct order. Lubricate the o-ring seal with silicone grease and place in position. Install and tighten the cap, BY HAND ONLY. DO NOT OVERTIGHTEN AND BREAK THE CAP OR HOUSING.

BE SURE TO CLEAN THE NOZZLE AND VENTURI ON BOTH RESIN TANKS.

FIGURE 20



SERVICE INFORMATION

RESIN BED CLEANING

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

ADDING RESIN

Normally, the resin bed (see figure 21) will last the lifetime of the Series 4000. However, certain conditions may require the resin bed to be partially or totally replaced. Some of these conditions are:

(1) damaged top and/or bottom distributors have allowed resin to escape

(2) resin bed iron fouled beyond use

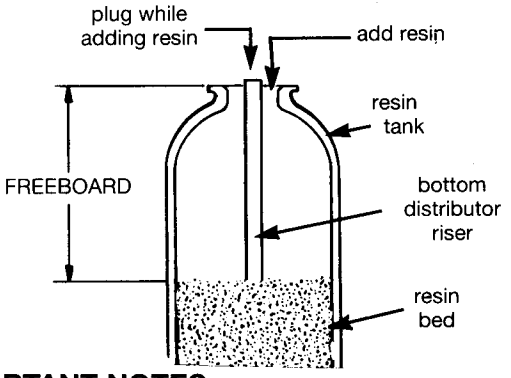
(3) some water supplies cause resin degradation

To add more resin, or to replace the entire bed, use the following guide.

	MODEL NUMBER		
	4030	4060	4080
Resin Tank Size	8" dia. x 35"	10" dia. x 35"	10" dia. x 47"
Amount of Resin*	.5 cu. ft.	.9 cu. ft.	1.3 cu. ft.
Amount of Quartz Gravel	8 lbs.	10 lbs.	10 lbs.
Type of Ion Exchange Material (resin)	manufactured styrene high capacity resin		
Freeboard Range	12" to 14"	9" to 12"	12" to 14"
Lbs. Resin per Inch Bed Depth	1.2	2.0	2.0

*Includes 95% standard and 5% fine mesh resins.

FIGURE 21



IMPORTANT NOTES:

TURN OFF THE WATER SUPPLY AND RELIEVE PRESSURE (SEE BELOW).

HANDLE THE RESIN TANK CAREFULLY. IT IS HEAVY WHEN FULL OF RESIN AND WATER.

DO NOT LOSE ANY O-RING SEALS OR OTHER SMALL PARTS.

CAUTION: ALWAYS RELIEVE WATER PRESSURE IN WATER SOFTENER, as follows, before removing parts from the valve or resin tank.

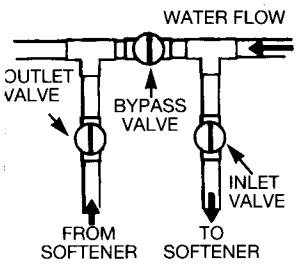
DEPRESSURIZE

1. Put bypass valve(s) in bypass position.
2. Do MANUAL ADVANCE step...
   ...1, page 26. (fill water to brine tank depressurizes resin tank)

REPRESSURIZE

1. Put bypass valve(s) in service position.
2. Do MANUAL ADVANCE steps...
   ...2-5, page 26.

3-VALVE BYPASS



- **For SERVICE**
  Open the inlet and outlet valves
  Close the bypass valve
- **For BYPASS**
  Close the inlet and outlet valves
  Open the bypass valve

ALTERNATE METHOD

3-VALVE BYPASS

DEPRESSURIZE

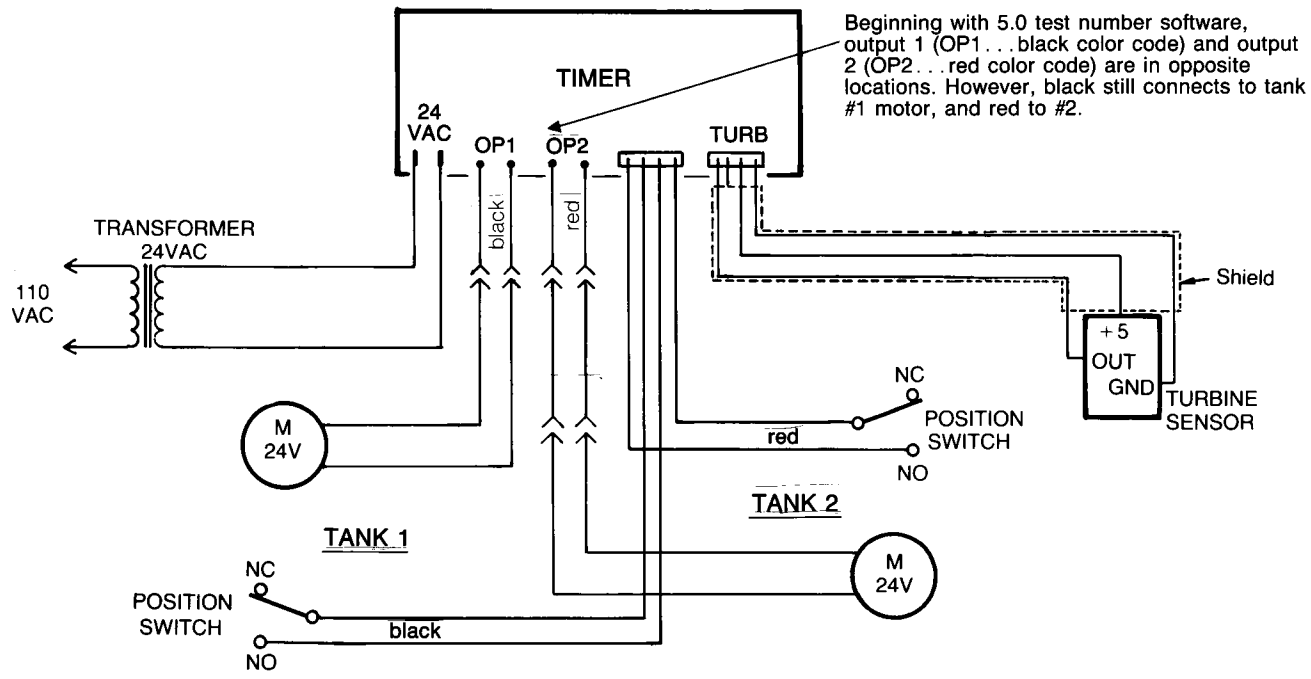
1. Close the INLET valve.
2. Open HOT and COLD soft water house faucets.
3. Close OUTLET valve and open BYPASS valve.
4. Close house faucets.

PRESSURIZE

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

SERVICE INFORMATION

WIRING SCHEMATIC



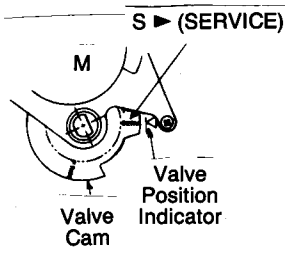
ELECTRONIC DUAL DEMAND FACE PLATE REPLACEMENT

BE SURE BOTH VALVES ARE IN SERVICE POSITION (OBSERVE VALVE POSITION INDICATOR) WHEN REPLACING THE FACE PLATE.

If, after installing and programming the replacement face plate, both valves are not in service position, do the following to assure correct cycle orientation, or timing, between the face plate and valves.

Use the MANUAL ADVANCE procedures, page 26. Advance through the recharge cycles until the valve stops in service position, and RECHARGE no longer flashes in the timer.

NOTE: The valve motor may automatically drive through several valve positions while searching for service.



SERVICE INFORMATION

TROUBLESHOOTING

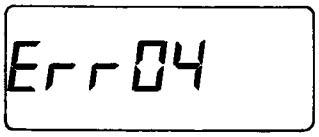
ALWAYS MAKE THE **INITIAL CHECKS** FIRST

1. Does the time display show the correct time of day?
   ...If display is blank, check power source to the Series 4000.
   ...If time is flashing, power was off for over 2 days. Reset the timer, page 13.
   ...If an error code (Example: Err 03) shows in the face plate display, go to AUTOMATIC ELECTRONIC DIAGNOSTICS.
2. Plumbing bypass valve(s) must be in Full Service position.
3. The inlet and outlet pipes must connect to the valve inlet and outlet manifold respectively.
4. Is the transformer plugged into a "live," grounded wall outlet, and the power cable fastened securely?
5. The valve drain hoses must be free of kinks and sharp bends, and not elevated over 8 ft. above the floor.
6. Is there salt in the brine tank?
7. Is the brine tubing connected? (See fig. 7, page 11).
8. Press the SELECT button 2 times 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 soft water sample to verify if a problem exists.) Press SELECT twice more to return present time in the display.
9. Is the timer set to the correct model code? (See page 13).

If you do not find the problem after making the initial checks, do the MANUAL INITIATED ELECTRONIC DIAGNOSTICS, AND THE MANUAL ADVANCE REGENERATION CHECK.

AUTOMATIC ELECTRONIC DIAGNOSTICS

The face plate computer has a self-diagnostic function for the electrical system (except input power and water meter). The computer monitors the electronic components and circuits for correct operation. If a malfunction occurs, an error code appears in the face plate 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 face plate buttons are inoperable except the SELECT button. SELECT remains operational so the service person can make the MANUAL INITIATED ELECTRONIC DIAGNOSTICS (page 25) to further isolate the defect, and check the water meter.

ERROR CODE	POSSIBLE DEFECT MOST LIKELY ← → LESS LIKELY
Err 01	motor inop. / wiring harness or connection to switch / position switch / face plate
Err 02	wiring harness or connection to position switch / position switch / face plate
Err 03	wiring harness / face plate
Err 04	face plate / position switch
Err 05	face plate

NOTE: IF A MOTOR, POSITION SWITCH, OR CONNECTION TO A POSITION SWITCH IS CAUSING THE ERROR CODE, YOU MUST INDIVIDUALLY INSPECT THE PART ON BOTH TANKS TO ISOLATE THE DEFECT.

PROCEDURE FOR REMOVING ERROR CODE FROM FACE PLATE:

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.

SERVICE INFORMATION

CHECKING THE MODEL CODE ENTRY (See page 13)

Unplug the transformer at the electrical outlet, then plug in again. A "beep" will sound, then the model code displays for a few seconds. The test number will then display for a few seconds, followed by the present time display.

CHANGING THE MODEL CODE

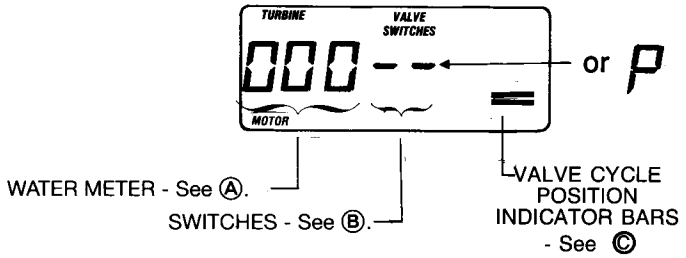
IMPORTANT: READ STEP 1, on page 13 BEFORE CHANGING THIS CODE.

1. Enter the secondary mode...press SELECT and hold for 3 seconds.
2. Again, press SELECT and hold in for 3 seconds. The current model code setting will display.
3. Use the (+) or (−) button to display the desired model code.
4. Press SELECT to set.
5. Reset the timer (pages 13-17) and reselect other desired options.

MANUAL INITIATED ELECTRONICS DIAGNOSTICS

1. To enter diagnostics, press the SELECT button and hold (3 seconds) to display the gallons or liters of water used since installation.

2. Press SELECT twice more to display the following:



Ⓐ The first 3 digits indicate water meter operation as follows:

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

- OPEN A NEARBY SOFT WATER FAUCET -

000 to 199 (continual) = repeats display for each gallon of water passing through the meter

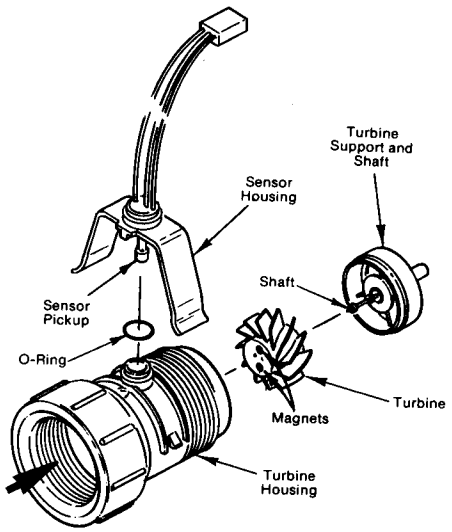
If you don't get a reading in the display, with faucet open, pull the sensor housing from the water meter housing. Pass a small magnet back and forth in front of the sensor. You should get a reading. If you don't get a reading, disconnect the housing from the outlet plumbing and check the turbine for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

Use the RECHARGE button to manually advance the valve into each cycle and check correct switch operation. Use this procedure until both tanks have advanced through the cycles. Observe switch displays Ⓑ, and valve position indicator bars Ⓒ.

Ⓑ The letter (P) and dash(es) indicate POSITION switch operation. The letter appearing means the switch is closed; the dash means the switch is open.

CORRECT SWITCH DISPLAYS	VALVE CYCLE STATUS
— —	Valve in service, fill, brining, backwash or fast rinse position
— P	Valve rotating from one position to another

Ⓒ Timers, with a 5.0 or higher software test code (see top of page 13), have indicator bars to show valve cycle positions as follows. . . page 26.



INDICATOR BARS	VALVE CYCLE POSITION
bar(s) - flashing	valve rotating
no bars	service
1 bar	fill
2 bars	brining/brine rinse
3 bars	backwash
4 bars	fast rinse

D. While in this diagnostic screen, the following information is available and may be beneficial for various reasons. This information is retained by the computer from the first time electrical power is applied to the face plate.
- . . . Press (+) to display the number of days this face plate has had electrical power applied.
- . . . Press (−) to display the number of regenerations initiated by this face plate since power was first applied.

E. Press SELECT several times until the present time display returns.

MANUAL ADVANCE REGENERATION CHECK

This check verifies proper operation of the valve motor, brine tank fill, brine draw, regeneration flow rates, and other controller functions. ALWAYS MAKE THE INITIAL CHECKS, AND THE MANUAL INITIATED DIAGNOSTICS.

NOTE: The face plate display must show a steady time (not flashing).

1. Press the RECHARGE button and RECHARGE begins to flash as 1 tank enters the fill cycle of regeneration. Remove the brine well cover and, using a flashlight, observe fill water entering the tank.
   a. If water **does not** enter the tank, look for an obstructed nozzle, venturi, fill flow plug, or brine tubing.
2. After observing fill, press the RECHARGE button 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 a flashlight into the brinewell and observing a noticeable drop in the liquid level.

NOTE: Be sure a salt bridge is not preventing water with salt contact.

a. No brine draw...
- ...nozzle and/or venturi dirty or defective.
- ...nozzle and venturi not seated properly on gasket.
- ...restricted drain (check drain fitting and hose).
- ...defective nozzle and venturi seal.
- ...other inner valve defect (rotor seal, rotor & disc, wave washer, etc.).

NOTE: If water system pressure is low, an elevated drain hose may cause back pressure, stopping brine draw.

3. Again press RECHARGE to move the valve into backwash. Look for a fast flow of water from the drain hose.
   a. An obstructed flow indicates a plugged top distributor, backwash flow plug, or drain hose.
4. Press RECHARGE to move the valve into fast rinse. Again look for a fast drain flow. Allow to rinse for a few minutes to flush out any brine that may remain in the resin tank from the brining cycle test.
5. To return the valve to service, press RECHARGE once more.
6. Repeat steps 1 through 5 to advance the 2nd tank through the cycles.

SERVICE INFORMATION - ROTARY VALVE

BEFORE WORKING ON THE VALVE, TURN OFF THE WATER SUPPLY AND DISCONNECT FROM ELECTRICAL POWER. TO RELIEVE PRESSURE. . .

. . .3 VALVE BYPASS: Close the inlet valve and open a soft water faucet. Then close the outlet valve and open the bypass valve.

. . .OPTIONAL BYPASS VALVE: Slide the bypass valve stem to bypass position. Loosen the 3 hex head screws (see A in drawing) toward the backside of the valve to allow pressure water to bleed out (catch water with a rag).

DISASSEMBLY

To remove a part or group of parts, refer to the valve drawing. A common screwdriver or nut driver, Phillips screwdriver and pliers are the only tools needed to completely disassemble.

SERVICING THE VALVE

Inspect all o-rings, seals and gaskets for wear or defects.

Inspect the bottom surface of the rotor and disc for scratches, chips or wear.

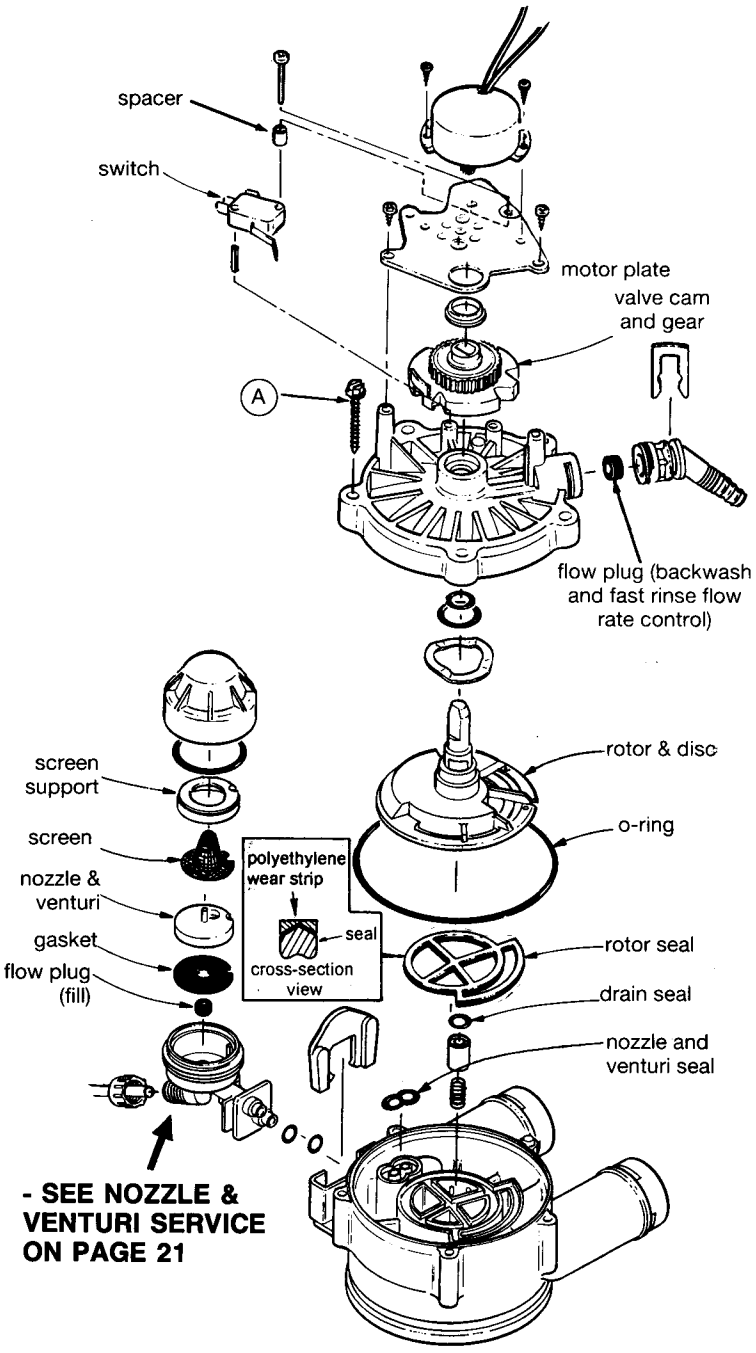
NOTE: If replacement is needed, be sure to use the current replacement part.

ASSEMBLY

Be sure all parts are in place and in the proper position. Lubricate ALL o-rings, and seals with FDA approved silicone grease. To install the rotor seal, first place the seal into the valve groove, rounded side down (see cross-section). Apply a light coating of silicone grease to the seal's crossing ribs. Then, carefully center the wear strip on the seal, and push it downward onto the seal.

Install the nozzle and venturi seal, and drain seal. Assemble 2 o-rings and the wave washer onto the rotor and disc. Then center the rotor and disc, in the valve body, on the rotor seal.

Lower the cover onto the valve body and rotor shaft. Then install the cover holding screws. BEFORE TIGHTENING THE SCREWS, INSTALL THE VALVE CAM AND GEAR. THEN TURN THE ROTOR CLOCKWISE ONLY TO SERVICE POSITION. Tighten the screws using a criss-cross pattern. If a torque wrench is available, torque to 30-40 inch pounds.



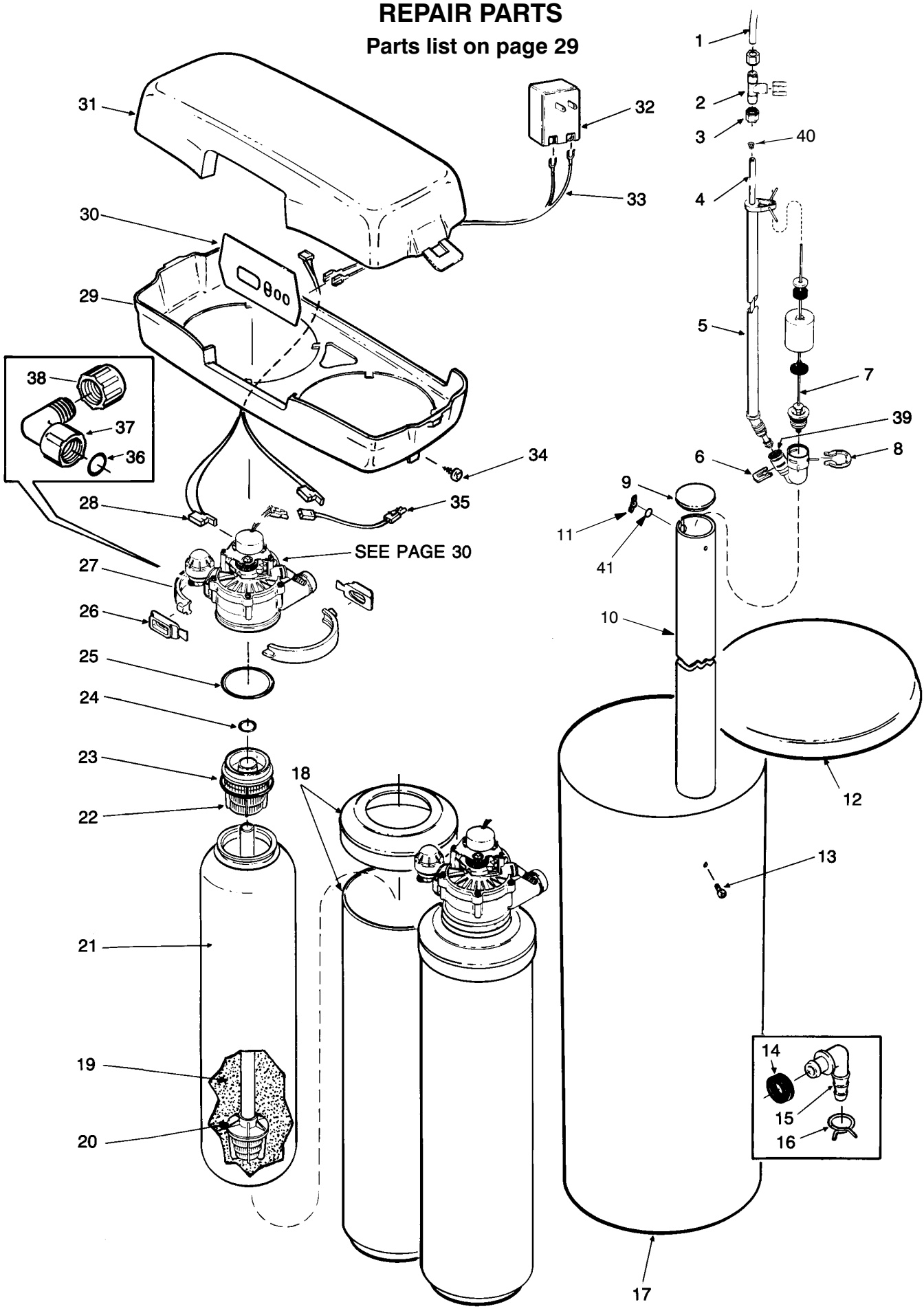
- SEE NOZZLE & VENTURI SERVICE ON PAGE 21

Lubricate the gear on the motor, and the valve cam gear with Molykote grease, or other high quality gear lubricant.

Be sure to orient switch as shown, with lever toward the valve cam.

REPAIR PARTS

Parts list on page 29



REPAIR PARTS LIST

Key No.	Part Number	Description of Part
1	7161807	Tubing, 5/16” x 20’ (not included with softener)
	7161768	Tubing, 5/16” x 100’ (not included with softener)
2	7056612	Tee Fitting (includes 3 of key no. 3)
3	9003201	Compression Nut (3 req’d)
4	7113016	Tubing Assembly, Brine Valve
5	7095470	Brine Tube
6	7080653	Clip
7	7113008	Float, Stem & Guide Assembly
8	1205500	Clip
■	7116488	Brine Valve Assembly (includes key nos. 4 through 8, and 39)
9	0500283	Brinewell Cover
10	7100819	Brinewell
11	7082150	Wing Nut
12	7101611	Brine Tank Cover
13	7148875	Screw, 1/4–20 x .62
14	9003500	Grommet
15	1103200	Hose Adaptor Elbow
16	0900431	Hose Clamp
17	7114800	Brine Tank
18	7122659	Shroud Cap
	7129588	Shroud Body, 46-5/8” (model 4080 [1])
	7026196	Tank Base, foam
19	0502272	Resin, 1 cu ft (standard mesh) [2]
	0501741	Resin, 1/2 cu ft (standard mesh) [2]
	7052202	Resin, 1 cu ft (fine mesh) [2]
	7124415	Gravel, 17 lbs [2]

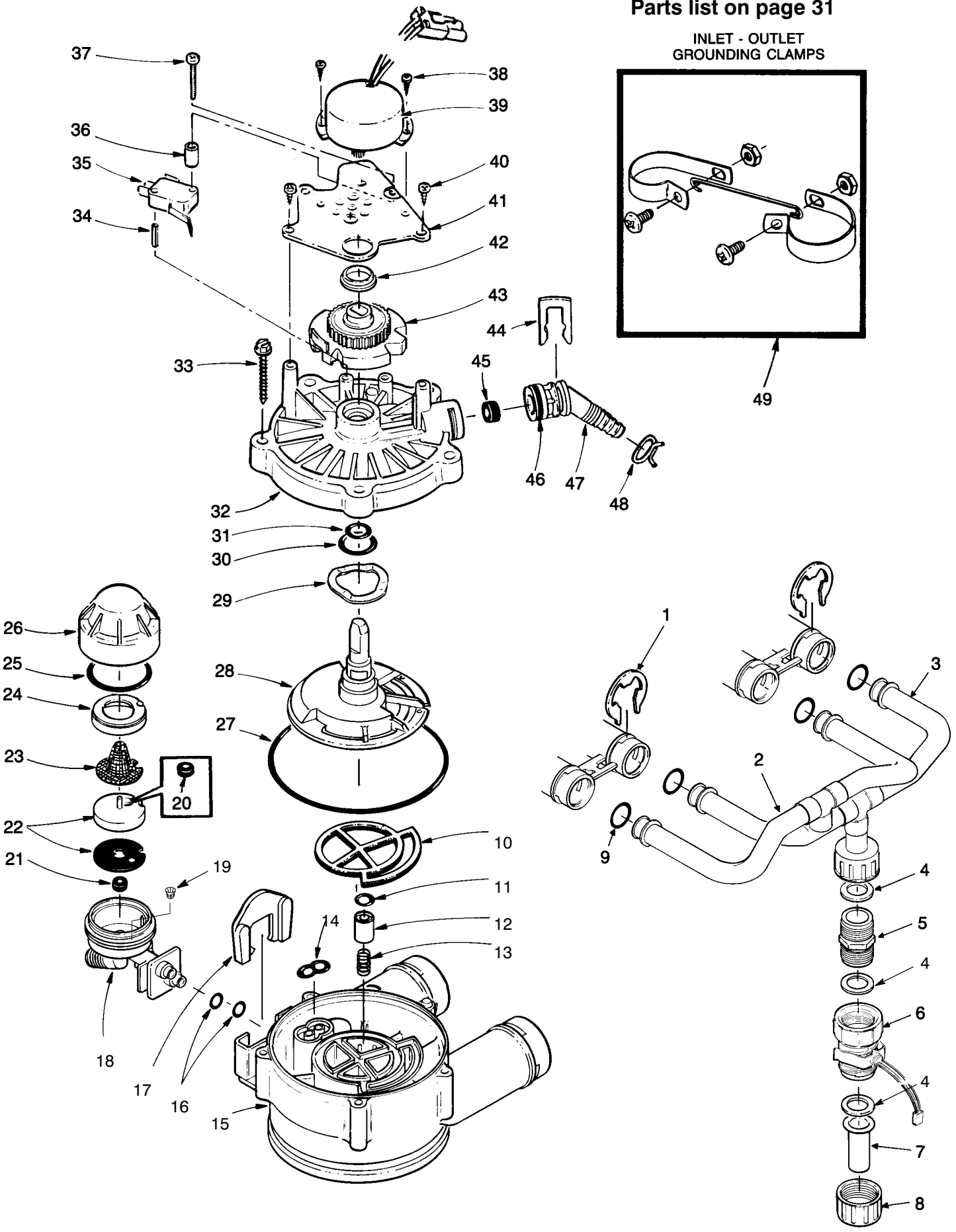
Key No.	Part Number	Description of Part
20	7105047	Repl. Distributor, bottom
21	7114787	Resin Tank, 8” x 35”
	7113066	Resin Tank,10” x 35”
	7092202	Resin Tank,10” x 47”
22	7077870	Top Distributor
23	7170270	O-ring Seal, 2-3/4” x 3”
24	7170254	O-ring Seal, 13/16” x 1-1/16”
25	7170296	O-ring Seal, 2-7/8” x 3-1/4”
26	7088033	Clip, clamp retainer (2 req’d)
27	7176292	Clamp Section (2 req’d)
28	7127471	Wire Harness (switch)
29	7126459	Bottom Cover
30	7128914	Faceplate Timer
31	7126441	Top Cover
32	7095373	Transformer, 120V – 10VA
33	7084330	Power Cable
34	7128671	Screw, #10 x 1/2”
35	7129708	Wire Harness (motor)
36	7003847	O-ring Seal, 1/4” x 1/2”
37	7120526	Elbow, 90˚
38	1202600	Nut-Ferrule
39	7131365	Screen
40	7171349	Screen
41	7003847	O–ring

[1] Cut to 33-1/2” length for model 4030; cut to 35” for model 4060

[2] See page 22 for amount required.

REPAIR PARTS

Parts list on page 31



REPAIR PARTS

Key No.	Part Number	Description of Part
1	7116713	Clip (4)
2	7163744	Manifold, Inlet
3	7163760	Manifold, Outlet
4	7174305	Gasket, 5/32” thick (3 req’d)
5	1258500	Adaptor Fitting
6		Water Meter Kit (includes following)
	7095569	Sensor Housing
	9000803	O-ring Seal, 3/8” x 1/2”
	7119787	Turbine
	7017406	Turbine Support & Shaft
	1205700	Housing
7	7073753	Flare Tube
8	0500734	Nut
9	7131242	O-ring Seal, 3/4” x 1-1/8” (4 req’d)
10	7134224	Rotor Seal
11	7170204	O-ring Seal, 3/8” x 9/16”
12	7096242	Plug, Drain Seal
13	7129889	Spring
14	7081764	Seal, Nozzle/Venturi
15	7082053	Valve Body
16	7170319	O-ring Seal, 1/4” x 3/8” (2 req’d)
17	7081201	Clip
18	7085239	Nozzle/Venturi Assem., 4030 [3]
	7091866	Nozz./Vent. Assem., 4060 & 4080 [3]
19	7095030	Cone Screen
20	7084607	Flow Plug, .15 gpm
21	0521829	Flow Plug, .1 gpm– 4030
	1148800	Flow Plug, .3 gpm– 4060 & 4080
22	7113024	Nozzle/Venturi–Gasket Kit, 4030
	7163663	Gasket (only)
22	7113032	Nozz./Vent.–Gasket, 4060 & 4080
	7082582	Gasket (only)

Key No.	Part Number	Description of Part
23	7146043	Screen
24	7167659	Screen Support
25	7170262	O-ring Seal, 1-3/16” x 1-3/8”
26	7199729	Cap
27	7170246	O-ring Seal, 3-3/8” x 3-5/8”
28	7112280	Rotor & Disc
29	7082087	Wave Washer
30	7170212	O-ring Seal, 3/4” x 15/16”
31	7170238	O-ring Seal, 7/16” x 5/8”
32	7085263	Valve Cover
33	7074123	Screw, #10–14 x 2” (5 req’d)
34	7077472	Expansion Pin
35	7030713	Switch
36	7117816	Spacer
37	7070412	Screw, #4–24 x 1-1/8”
38	7131755	Screw, #6–20 x 7/8” (2 req’d)
39	7132989	Motor (includes key no. 38)
40	0900857	Screw, #6–20 x 3/8” (2 req’d)
41	7117808	Motor Plate
42	0503288	Bearing
43	7113927	Cam & Gear
44	7142942	Clip
45	7092618	Flow Plug, 2.0 gpm
46	7170327	O-ring Seal, 5/8” x 13/16”
47	7024160	Drain Hose Adaptor
48	0900431	Hose Clamp
49	7112997	Ground Clamp Kit

[3] Includes key nos. 21 through 26. Order flow plug, key no. 20, if needed.