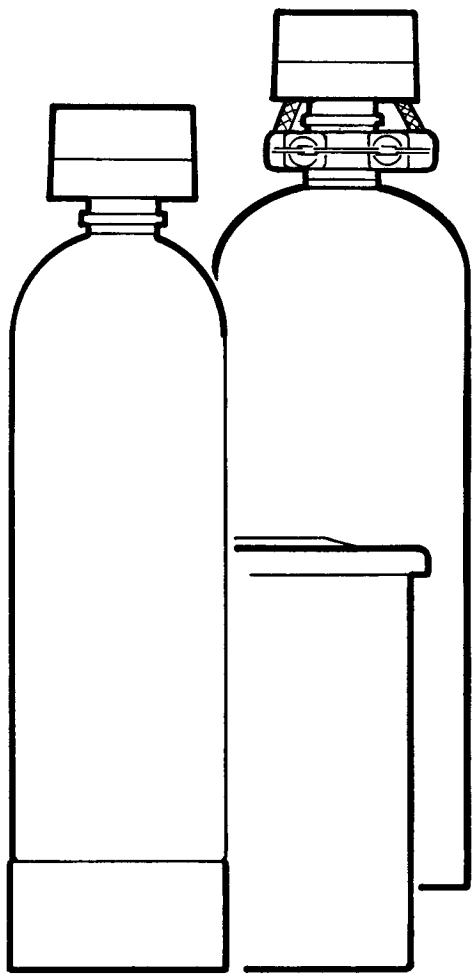
MANUAL TO INSTALL, OPERATE AND MAINTAIN

COMMERCIAL SERIES 5000
ECOWATER SYSTEMS

WITH **DC** (direct current) VALVE DRIVE **MOTOR**

NOTE: Refer to manual # 7124473 for information on all models with an **AC** (alternating current) valve drive motor.



ECOWATER SYSTEMS®

MAILING ADDRESS
P.O. Box 64420
St. Paul, MN 55164

SHIPPING ADDRESS
1890 Woodlane Drive
Woodbury, MN 55125

Part No. 7157222 (8/ 95)

WARRANTY

ECOWATER SERIES 5000 WATER SYSTEMS LIMITED WARRANTY

EcoWater Systems, Inc. guarantees to the original owner:

1. for **ten (10) years** that the **fiberglass pressure tank** will not rust, corrode, leak, burst or in any other manner fail to perform its proper function; (moisture barrier is not guaranteed) and that
2. for a period of **three (3) years after installation,** that the **salt tank** will not rust, corrode, leak, burst or in any other manner fail to perform its proper function; and that
3. for a period of **one (1) year after installation,** that **all parts** will be free from defects in material and workmanship; and that
4. **Electronic Faceplate Warranty.** For a period of **three (3) years,** 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 defective part without charge except for normal shipping and installation charges.

GENERAL PROVISIONS

The above guarantees are effective provided that the water conditioner is operated at water pressures not exceeding 125 PSI and at temperatures not exceeding 100° F; provided further that the tanks are not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the tanks are not damaged as the result of any unusual force 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 regulations, materials shortages or other circumstances beyond its control.

To obtain warranty service, notice must be given in writing 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 also have other rights which vary from state to state.

SHIPMENT INSPECTION

Thoroughly check the commercial system for possible shipping damage and/or parts loss. Also inspect and note any damage to the shipping cartons. If damage is present, notify the transportation company. The manufacturer is not responsible for shipping damages.

NOTE: DO NOT DISCARD ANY SMALL PARTS BAGS WHEN UNPACKING THE SYSTEM.

All models are shipped in 3 cartons; (1) resin tank, (2) brine tank, and (3) controller. Resin (1 cu. ft.), coarse, medium and fine gravel (17 or 50 lbs.) are shipped in bags...see following chart.

MODEL	5050	5070	5100	5130	5192	5256	5320
NO. OF BAGS, 1 CU. FT. RESIN	1½	2	3	4	6	8	10
BAGS FINE	1(17)	1(17)	2(17)	2(17)	1(50)	1(50)	1(50)
GRAVEL MED.					1(50)	1(50)	1(50)
(LBS.) COARSE					1(50)	1(50)	1(50)

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SAFETY GUIDES

FOLLOW THE INSTALLATION INSTRUCTIONS CAREFULLY, FAILURE TO INSTALL THE COMMERCIAL SYSTEM 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.

DO NOT LOCATE THE SERIES 5000 WHERE FREEZING TEMPERATURES OCCUR. DO NOT ATTEMPT TO TREAT WATER OVER 100°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.

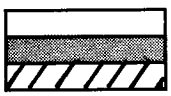
THE SERIES 5000 REQUIRES A MINIMUM WATER PRESSURE OF 30 PSI AT THE INLET. MAXIMUM ALLOWABLE INLET WATER PRESSURE IS 125 PSI. IF DAYTIME PRESSURE IS OVER 80 PSI, NIGHT-TIME PRESSURE MAY EXCEED THE MAXIMUM. USE A PRESSURE REDUCING VALVE IF NECESSARY.

THE SERIES 5000 COMMERCIAL WORKS ON 24 VOLT-60 Hz ELECTRICAL POWER ONLY. BE SURE TO USE THE INCLUDED TRANSFORMER.

SPECIFICATIONS

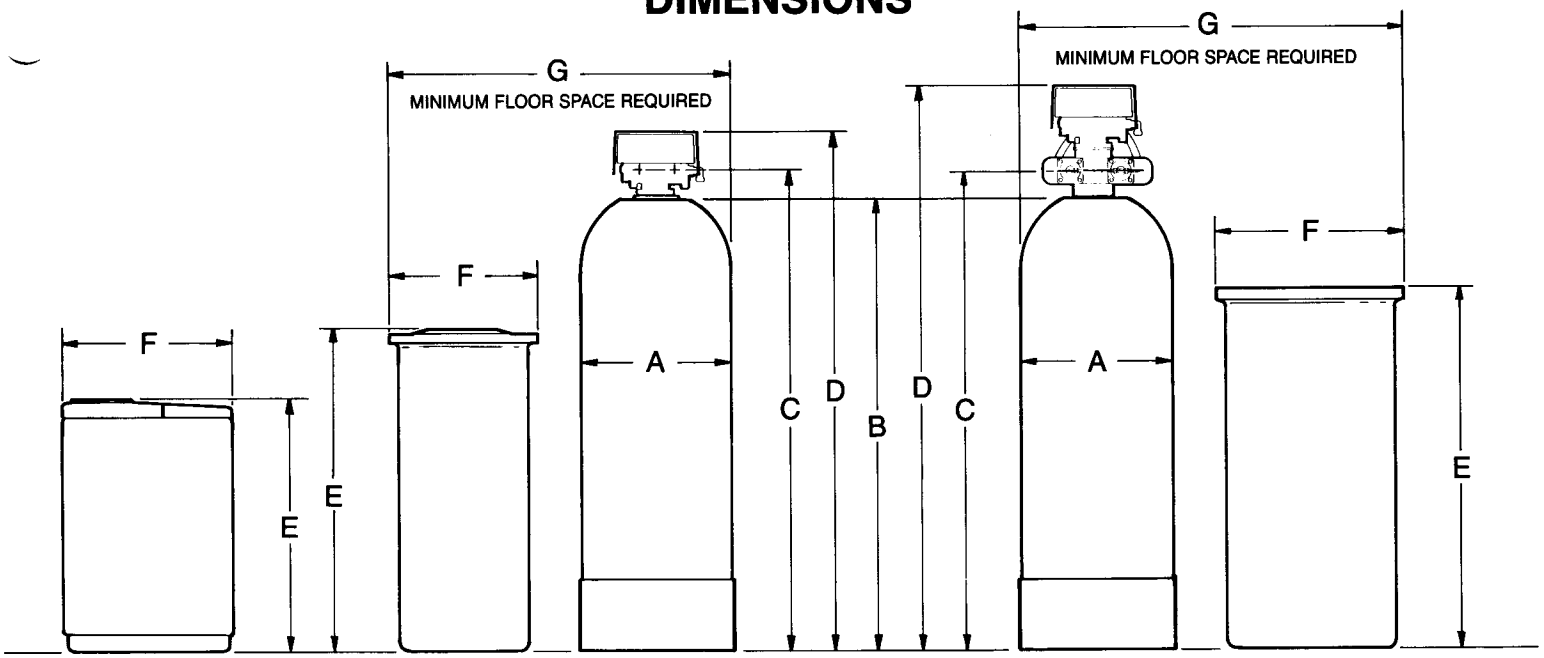
		MODEL*									
		5050 ED–FA 5050 SS–FA	5070 ED–FA 5070 SS–FA	5100 ED–FA 5100 SS–FA	5130 ED–FA 5130 SS–FA	5192 ED–FA 5192 SS–FA 5192 ED–FC 5192 SS–FC		5256 ED–FA 5256 SS–FA 5256 ED–FC 5256 SS–FC		5320 ED–FA 5320 SS–FA 5320 ED–FC 5320 SS–FC	
GRAINS CAPACITY @ SALT USAGE (lbs)		23200 @4.5 37300 @8.3 51400 @15.3	31000 @6.0 49700 @11.0 68500 @20.4	45000 @9.0 69000 @15.3 93000 @25.0	60000 @12.0 95000 @21.6 130000 @38.0	90000 @18.0 141000 @32.0 192000 @55.0		123000 @24.0 182500 @40.0 242000 @64.0		153800 @30.0 227900 @49.0 302000 @75.0	
AMOUNT OF RESIN ① (cu. ft)		1.5	2	3	4	6		8		10	
SALT STORAGE CAPACITY (lbs)		400	400	450	450	900		900		900	
WATER PRESSURE LOSS (psi)						FA	FC	FA	FC	FA	FC
@ GALLON PER MINUTE FLOW THROUGH THE SERIES 5000 ②	5	2.2	2.6	1.3	1.4	1.2	.4	1.2	.4	1.2	.4
	10	5.6	6.6	3.8	4.0	3.1	1.0	3.3	1.0	3.5	1.0
	15	10.4	11.8	7.3	7.8	6.3	1.6	6.6	1.7	6.9	1.8
	20	16.3	18.3	11.8	12.7	10.5	2.3	10.9	2.6	11.3	2.9
	25	23.1	26.0	17.4	18.6	16.3		16.8		17.3	
	30	31.1	34.8	24.1	25.7	21.9	4.0	22.6	4.7	23.3	5.5
	35			31.8	33.7	29.1		30.0		30.9	
	40					37.3	6.3	38.4	7.4	39.5	8.6
	50						9.3		10.6		12.1
	60						13.1		14.4		16.0
	70						16.9		18.6		20.5
	80						21		23.2		25.7
	90								28.1		31.2
	100										36.1
WATER SUPPLY PRESSURE RANGE (psi)		30 ↔ 125									
WATER SUPPLY TEMPERATURE RANGE (°F)		35 ↔ 100									
WATER SUPPLY MAXIMUM "CLEAR WATER IRON" (ppm)		5									
ELECTRICAL RATING		24V – 60Hz									

① Manufactured plastic styrene high capacity resin.

② PSI pressure losses @  continuous flow rates
intermittent or peak flow rates
flow rates not recommended (hardness leakage, reduced efficiency, etc.)

*MODEL CODE IDENTIFICATION:
FA - Fiberglass resin tank, and 1" valve connections . . . optional kit (see page 9) provides 1½" valve connections, referred to as FB.
FC - fiberglass resin tank, and 2" superflow valve.
ED - Electronic demand timer control
SS - Solid State timer control

DIMENSIONS



MODEL	A RESIN TANK DIAMETER	B RESIN TANK HEIGHT	C INLET-OUTLET HEIGHT	D OVERALL HEIGHT	E BRINE TANK HEIGHT	F BRINE TANK DIAMETER	G③ SINGLE	G③ TWIN	INLET-OUTLET PIPE SIZE	INLET-OUTLET CENTER-LINES
5050ED-FA **5050SS-FA** **5070ED-FA** **5070SS-FA**	12.3''	55''	58''	63.75''	35''	14'' wide x 24'' long ①	32''	70''	1''②	3.8''
5100ED-FA **5100SS-FA** **5130ED-FA** **5130SS-FA**	17.6''	59.5''	62.5''	68.25''	42.5''	20.5''	44''	94''	1''②	3.8''
5192ED-FA **5192SS-FA**	24"	76"	79.8"	85.5"	50.5''	26.5''	54''	114''	1''②	3.8''
5192ED-FC **5192SS-FC**	24"	76"	79.5"	91.5"	50.5''	26.5''	54''	114''	2''	6.44
5256ED-FA **5256SS-FA**	24"	76"	79.8"	85.5"	50.5''	26.5''	57''	120''	1''②	3.8''
5256ED-FC **5256SS-FC**	24"	76"	79.5"	91.5"	50.5''	26.5''	57''	120''	2''	6.44
5320ED-FA **5320SS-FA**	24"	76"	79.8"	85.5"	50.5''	26.5''	57''	120''	1''②	3.8''
5320ED-FC **5320SS-FC**	24"	76"	79.5"	91.5"	50.5''	26.5''	57''	120''	2''	6.44

①Rectangular brine tank

②Sweat copper fittings supplied
NOTE: An optional kit has fittings for 1-1/2'' sweat copper, making an FB model (see page 9).

③Includes 6'' between tanks - twin is 2 resin tanks and 2 brine tanks

RESIN LOADING AND ASSEMBLY

1. Move the resin tank into the installation location (see page 8). Set it on a flat, level surface. If a twin installation, keep tanks separated for ease of service.

IMPORTANT: Larger resin tanks are nearly impossible to move when full of gravel, resin and water. On the FC (superflow) models, to assure correct tank position for inlet-outlet plumbing alignment, first do step 9c on page 7. Mark the tank for correct orientation, then remove the superflow valve and continue below.

2. Remove the shipping cap, top distributor and o-rings (FA MODELS only). On other models, put the bottom distributor into the resin tank.

3. With a pail or hose, fill the tank with 1½ to 2 feet of water. The water acts as a cushion to protect the bottom distributor while filling the tank with gravel and mineral (see page 2 or 30).

4. Plug the end of the distributor tube with a clean rag, or use the shipping caplug.

5. Using a funnel, add the required amount of gravel. BE SURE THE BOTTOM DISTRIBUTOR IS CENTERED IN THE TANK (FIGURE 1).

NOTE: When coarse, medium and fine gravels are required, add in that order.

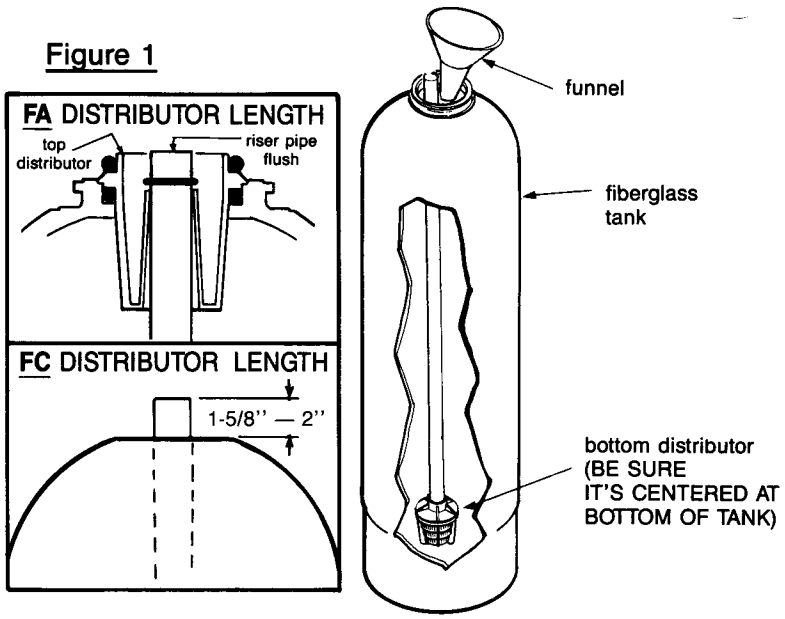
6. Next, add the required amount of resin. Use water sparingly, to keep the funnel from plugging.

7. Remove the funnel and flush the tank opening with water, to remove resin beads. REMOVE THE CAPLUG OR RAG FROM THE DISTRIBUTOR TUBE. Complete filling the tank with water, close to the top opening.

IMPORTANT: BE SURE TO FILL WITH WATER, TO ELIMINATE AIR SPACE AND PREVENT EXCESSIVE AIRHEAD PRESSURE BUILD-UP WHEN PRESSURE TESTING, PAGE 11.

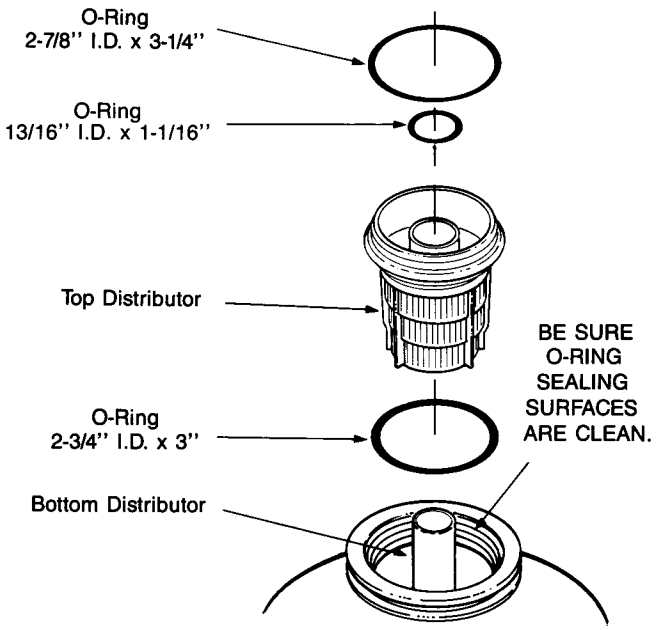
8a. FA MODELS ONLY: Install the o-ring seals (exactly as shown in Figure 2) and top distributor. If additional lubrication is needed, use high quality silicone grease.

Figure 1



NOTE: Resin tank height can vary somewhat within manufacturing tolerance. **So the bottom distributor riser pipe has proper clearance with inside valve porting, check for the correct length as shown above.** Cut the riser if needed to adjust the length. Be sure to remove burrs and sharp edges.

Figure 2



ASSEMBLY

8b. FA MODELS ONLY: Lower the valve assembly onto the resin tank, centering over the bottom distributor tube. Push downward, against o-ring pressure, and install the clamp sections and clamp retainers.

IMPORTANT: REFER TO KEY NOS. 1 AND 2 ON PAGES 42 AND 43. Be sure the turbine and turbine mounting assemblies are in place, in the valve outlet port (Electronic Demand FA Models). Be sure a support is in place on all other models.

9a. FC MODELS ONLY: From the parts bag, take the 4-1/8" I.D. o-ring, lubricate and place on the bottom of the superflow valve (figure 4).

9b. FC MODELS ONLY: Assemble the top distributor into the bottom of the superflow valve as shown. Use spring pins (2) provided, to hold it in place. BE SURE THE PINS ARE FLUSH ON THE INSIDE SO THEY WILL NOT INTERFERE WITH THE DISTRIBUTOR TUBE IN STEP 9c. See the inset drawing, figure 4.

9c. FC MODELS ONLY: DUE TO THE WEIGHT OF THE VALVE, TO PREVENT PARTS BREAKAGE, OR CROSS-THREADING, 2 PERSONS SHOULD DO THIS STEP. . . Lower the superflow valve assembly onto the resin tank, centering the bottom distributor tube into and through the top distributor. CAREFULLY turn the valve assembly into the tank. To tighten the valve, turn a length of 2" pipe into the valve inlet or outlet to use as a leverage tool.

3-WAY SOLENOID TUBING CONNECTION (REFERENCE)

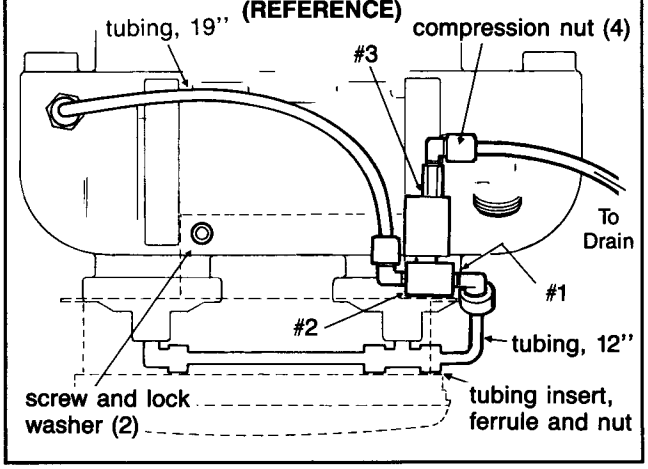


Figure 3

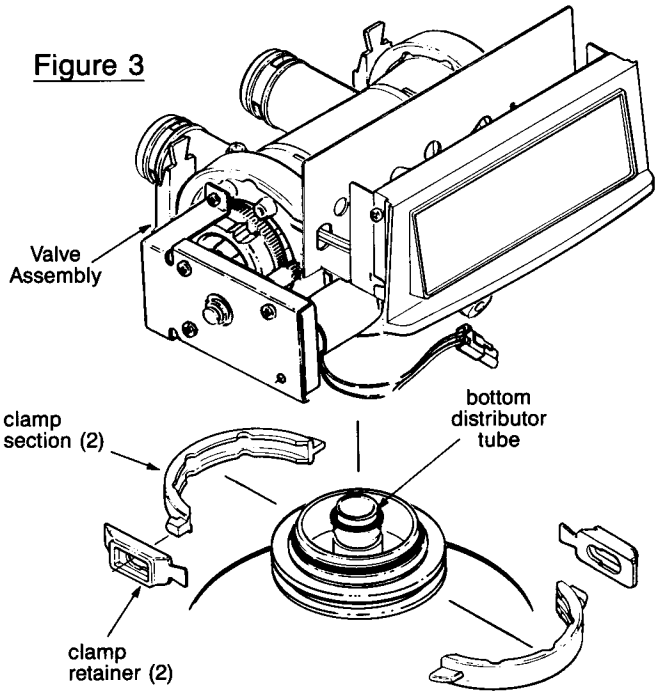
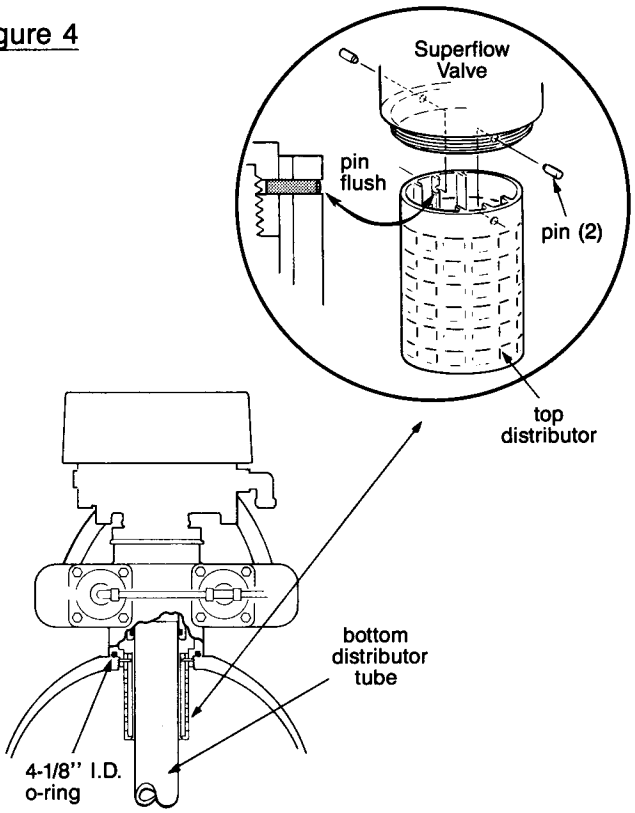


Figure 4



10. FC MODELS ONLY: Looking at the 3-way solenoid connection diagram, do the following.

continued, page 8

continued from page 7-

a. Use 2 screws and 2 lockwashers (from parts bag) and assemble the timer assembly to the superflow valve.

b. Connect tubing to the 3-way solenoid, and to the superflow valve using tubing fittings (from parts bag). Tighten compression nuts securely.

c. Refer to the wiring schematic, page 31 (SS) or 34 (ED) and make electrical connections exactly as shown. DO NOT PLUG IN TRANSFORMER AT THIS TIME.

PLANNING LOCATION FOR, AND INSTALLATION OF SYSTEM

For full line (both hot and cold) water conditioning, connect the resin tank to the water supply pipe immediately AFTER the municipal water meter, or well water supply pressure tank.

To soften the hot water only, connect the resin tank to the water supply pipe immediately BEFORE the water heater. NEVER INSTALL AFTER THE WATER HEATER. HOT WATER ENTERING THE SERIES 5000 WILL DAMAGE THE DISTRIBUTOR SYSTEM, AND OTHER PLASTIC PARTS.

To reduce the risk of hot water back-up, conditioned water piping between the Series 5000 and water heater should be as long as possible.

A drain is needed nearby, capable of carrying away backwash water at the rate listed in the specifications.

The Series 5000 commercial works on 24 volts only. A transformer is included to reduce 120V-60 Hz electrical power. Provide an approved, grounded outlet within 10' of the system. A 10' power cable, for connection between the transformer and the timer, is included.

Be sure to provide sufficient area around the resin tank and brine tank for refilling with salt, and other service.

MATERIALS YOU MAY NEED

Study the drawings on page 9 and use as a guide for your installation. The drawings show typical connection, using fittings included with the system, and with optional items available from EcoWater.

Be sure to use the optional bypass valve (FA models only) or a 3-valve system. Bypass valve(s) permit turning off water to the system, for service, and allow full line bypass to the establishment.

A minimum of 5/8" I.D. garden hose is needed for the valve drain and brine tank drain (rectangular brine tank requires 3/8" I.D. hose).

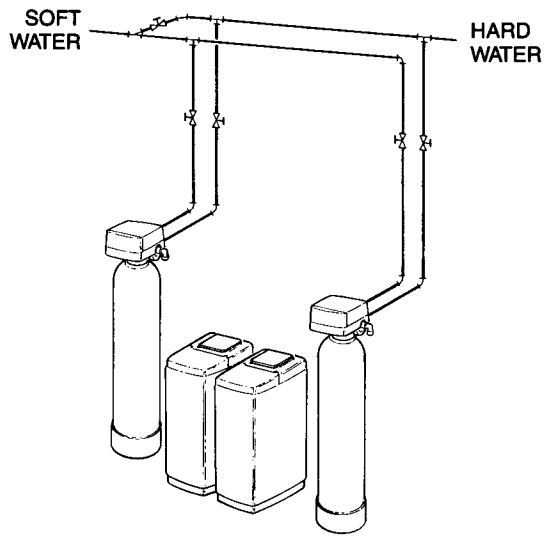
Use sweat copper, threaded pipe, CPVC plastic pipe and fittings, or a combination of these. Avoid mixing copper and galvanized as corrosion occurs rapidly where they touch.

NOTE: The FC model's superflow valve is cast iron. If plumbing with sweat copper, you should use dielectric unions at the inlet and outlet. Optional plastic bushings, part no. 9007906 are available from EcoWater.

For twin installations, (see below), inlet and outlet plumbing configuration to each valve should be as identical as possible. This helps promote even water flows through each tank.

NOTE: To eliminate hard water bypass from a regenerating unit, order #7128825 from EcoWater. See installation instructions, page 47.

Figure 5 TYPICAL TWIN INSTALLATION
(5070 MODELS SHOWN)



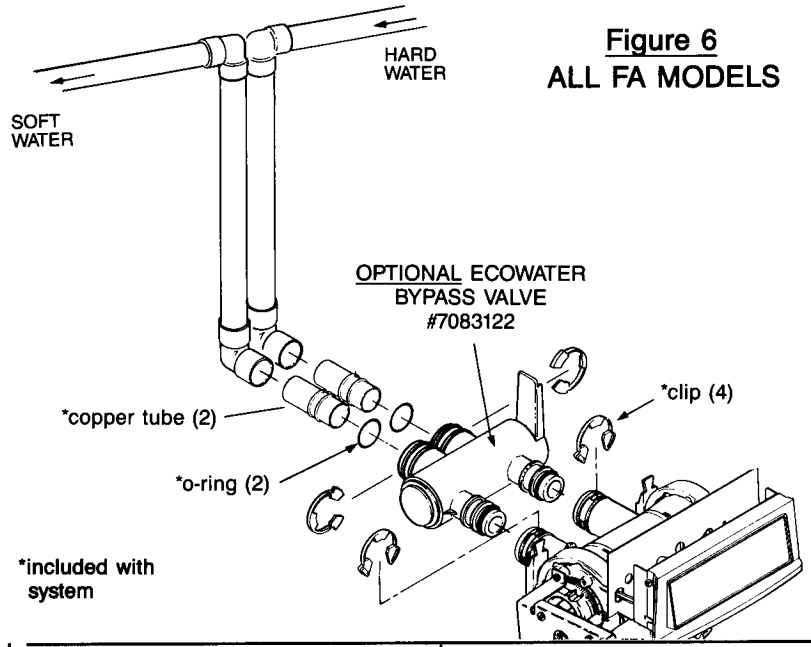
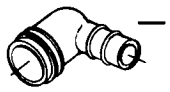


Figure 6
ALL FA MODELS

AVAILABLE OPTIONS, FA MODELS:

— #7104546 CPVC Nipple - use in place of the copper inlet and outlet tube.

— #7129211 Adaptor Fitting, 1½" (2) - use in place of the 1" copper inlet and outlet tube.



— #7120259 Elbow - extends inlet or outlet in any 90° direction.

Figure 7 3-VALVE BYPASS

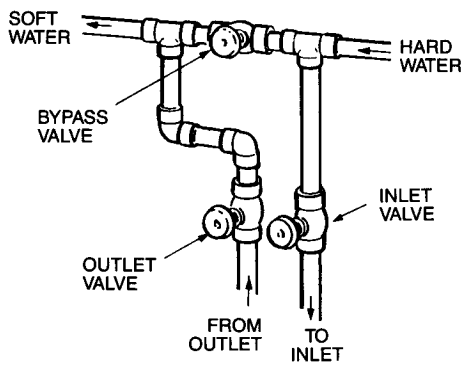


Figure 8
ALL S/S FC MODELS

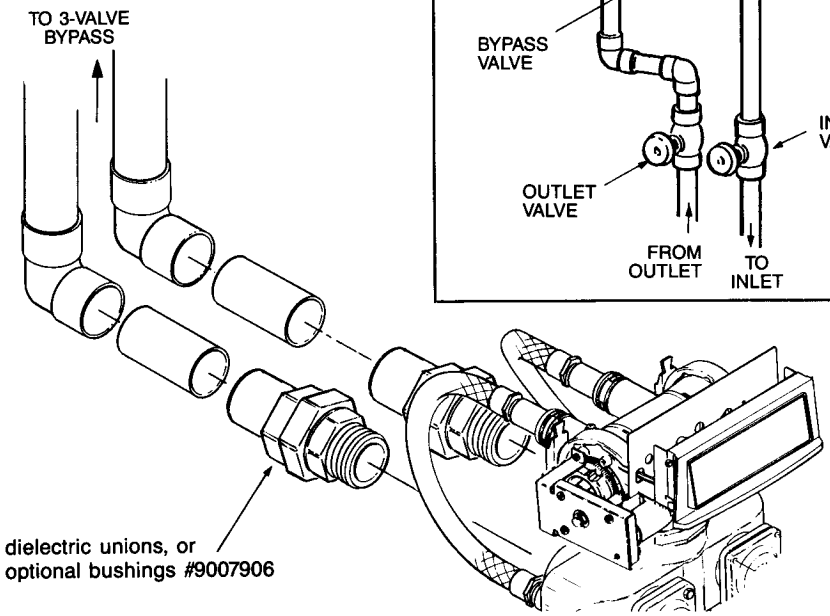
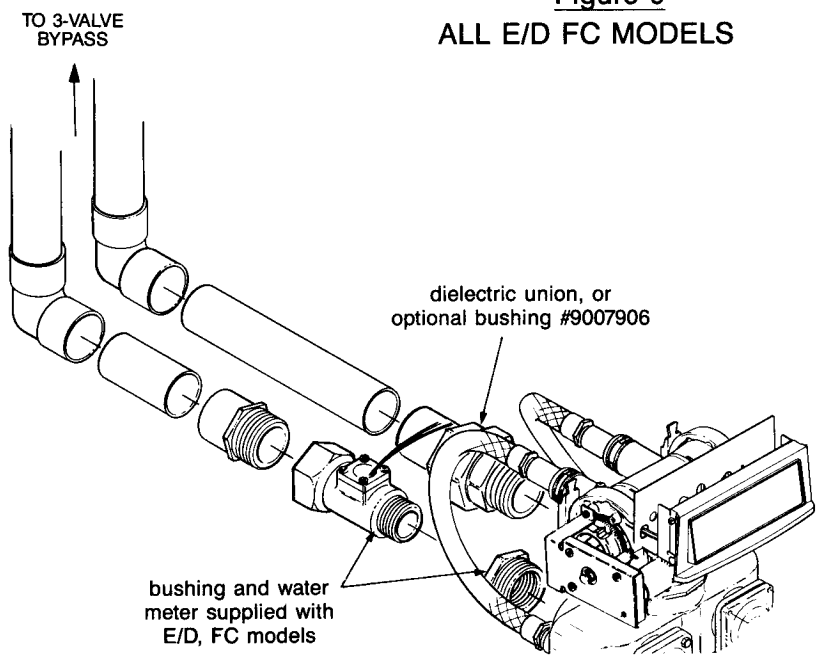


Figure 9
ALL E/D FC MODELS



INSTALLATION STEPS

PIPING ASSEMBLY NOTES AND CAUTIONS:

- Use teflon tape or pipe joint compound on outside pipe threads.
- Lubricate o-ring seals with high quality silicone grease.
- If plumbing with copper, on FC models, be sure to use dielectric fittings at the superflow valve inlet and outlet, to prevent corrosion.
- BE SURE TO PLUMB SO HARD WATER FLOWS TO THE SERIES 5000 VALVE INLET FITTING.
- **CAUTION: BE SURE TO TURN OFF THE MAIN WATER SUPPLY BEFORE BEGINNING.**
- **CAUTION:** WHEN SOLDERING, MAKE SUB-ASSEMBLIES AS NEEDED TO PREVENT SOLDERING HEAT DAMAGE TO THE VALVE, BYPASS VALVE OR WATER METER. BE SURE PLUMBING HAS COOLED BEFORE CONNECTING.

1. Referring to the illustrations on page 9, and observing the notes above, run piping from the main water supply pipe, to the valve inlet. Run piping from the valve outlet, back to the supply pipe. Be sure to include bypass valve(s), water meter, plastic bushings or dielectric unions, etc., as needed.

NOTE: When working with soldered copper, be sure to observe the caution above, to avoid damaging non-metallic parts.

IMPORTANT: Support in-out piping in an acceptable manner, to prevent weight stress on the Series 5000 valve.

2. Move the brine tank assembly into position nearby the resin tank assembly. Tubing, included with the brine tank, allows locating the brine tank up to either 4 ft. (max.-rectangular) or 10 ft. (max.-round) from the resin tank. . . figure 10.

3A. CONNECT TUBING - RECTANGULAR BRINE TANK, FIG. 10: - Thread the brine tubing out of a top "knock-out" hole in the brine tank. Fasten to the nozzle assembly using the nut-ferrule. TIGHTEN THE NUT SECURELY, BY HAND.

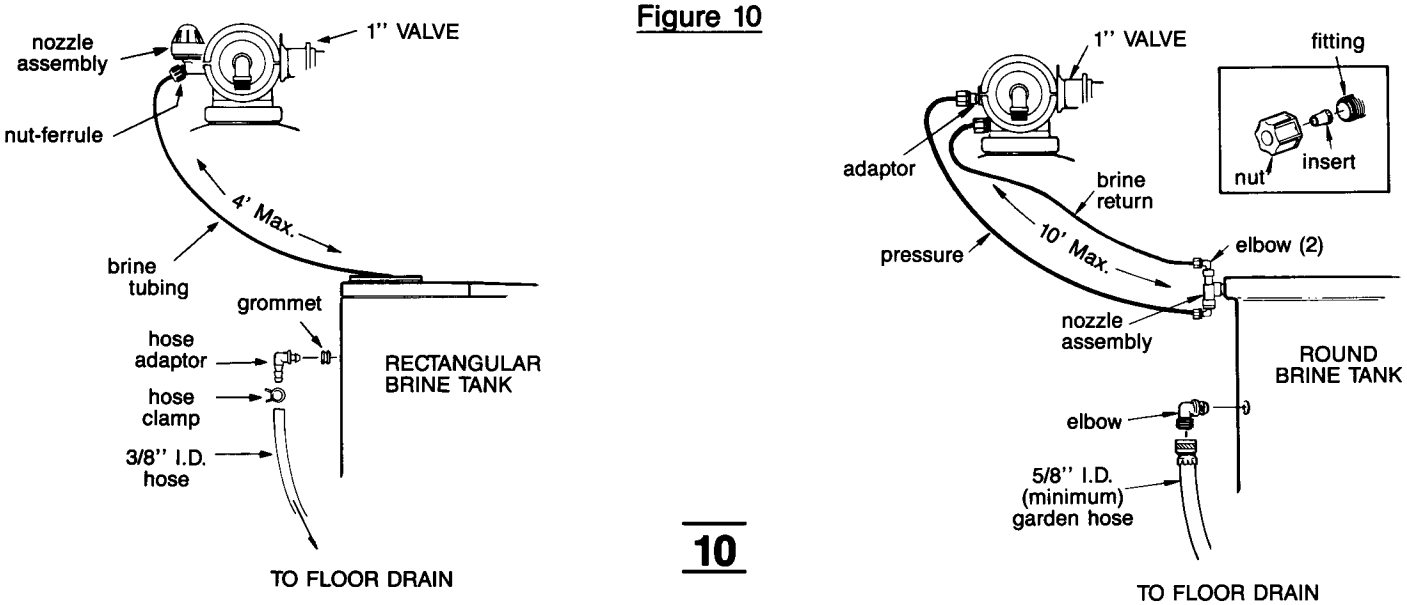
3B. CONNECT TUBING - ROUND BRINE TANKS, FIG. 10:

NOTE, MODEL 5192: A blue nozzle and a blue venturi are in a parts bag with the resin tank. Referring to fig. 18 on page 30, install this nozzle and venturi in place of the gray set. Then, continue below.

a. Take 2 elbows (included in separate parts bag with brine tank) and turn into the nozzle and venturi housing.

b. Using tubing inserts and compression nuts, fasten tubing lengths (2) to the 2 elbows.

Figure 10



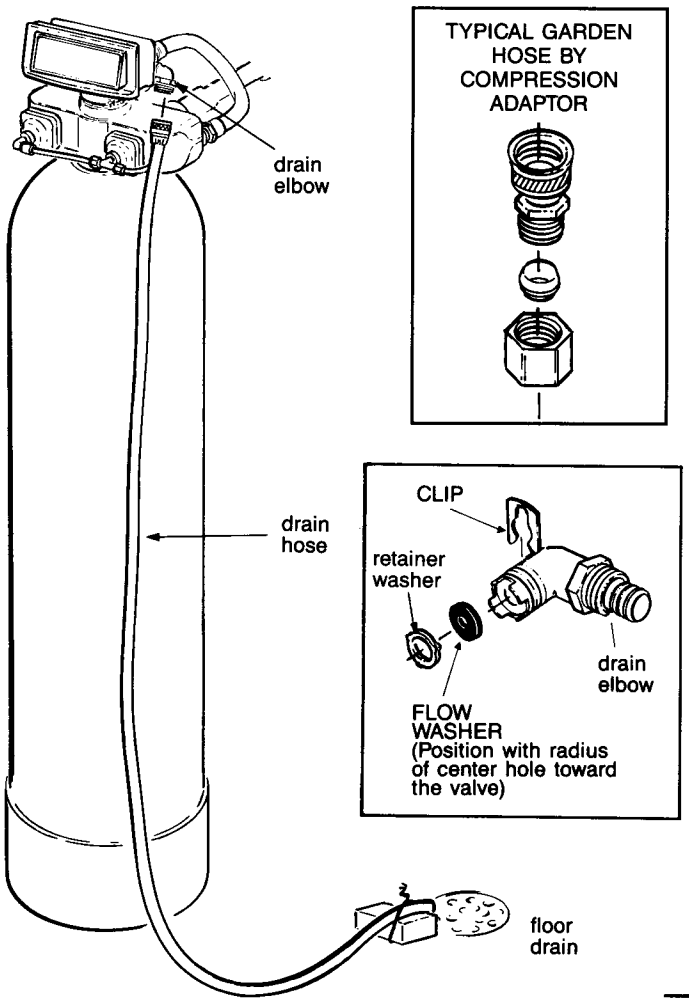
INSTALLATION STEPS

c. Fasten the tubing **from the bottom of the nozzle assembly, to the *top*, front adaptor** on the 1" valve assembly. Use a tubing insert and compression nut as shown in the inset drawing. *Tighten the compression nut securely.*

d. In the same manner, fasten tubing **from the top of the nozzle assembly, to the bottom fitting** (check valve) on the front of the 1" valve, as shown.

4. Install the brine tank overflow fitting (elbow on round; elbow and grommet on rectangular) in the brine tank sidewall. . . Figure 10. Attach a length of drain hose to the elbow, and put the opposite end over the floor drain. The rectangular brine tank requires 3/8" I.D. hose. A 5/8" I.D. garden hose is needed for the round tank.

Figure 11



5. Models 5050, 5070 (5 gpm) and 5192 through 5320 (10 gpm) are shipped with the proper backwash and fast rinse flow plug...see the inset drawing in figure 11. For models 5100 and 5130, a 7 gpm flow plug is included in the literature kit. It installs in the drain elbow, radius side of the center hole toward the valve.

NOTE: See the service information charts, on page 30, for flow plug identification.

6. VALVE DRAIN HOSE: The drain fitting accepts a minimum of 5/8" I.D. hose, either garden hose connection, or hose onto a barb (cut-off barbs if not used). Attach a length of hose and place the opposite end at a floor drain.

NOTES:

For longer or raised drain hose runs, a minimum of 3/4" I.D. garden hose is recommended to prevent back-pressure.

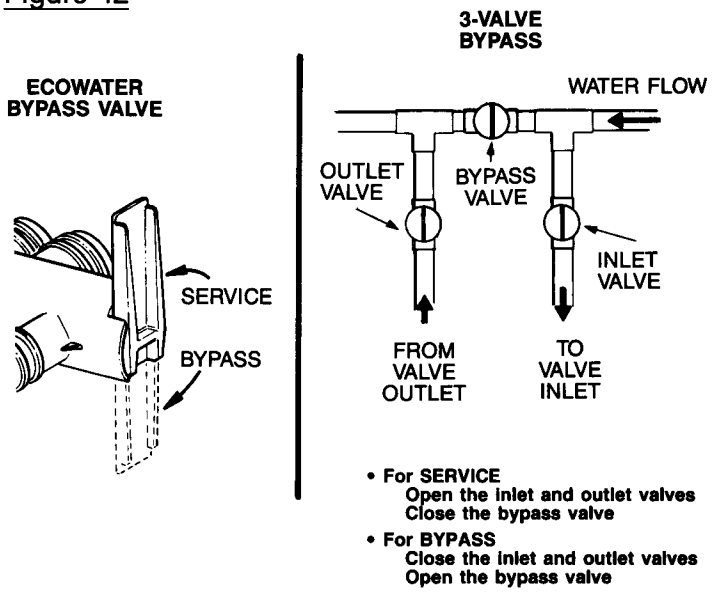
Provide an air gap of at least 1-1/2" between the end of the hose and the floor drain cover. The air gap prevents a back-siphon if sewer water should back up.

Fasten the hose in place. Pressure water, exiting the hose during regeneration, could cause the hose to "whip".

If codes require a rigid drain pipe, purchase a garden hose by compression fitting from a hardware store (inset drawing, figure 11).

continued, next page

Figure 12



INSTALLATION STEPS

continued from page 11

7. PRESSURE TESTING: TO PREVENT EXCESSIVE AIR PRESSURE IN THE RESIN TANK AND PLUMBING SYSTEM. DO THE FOLLOWING STEPS IN EXACT ORDER.

a. Open 2 or more soft water faucets, both hot and cold.

b. Referring to figure 12, turn the bypass valve(s) to SERVICE position.

c. Slowly open the main water supply valve. When water from the faucets runs smoothly, with no air bubbles, close the faucets.

d. Check your complete installation for leaks. If rework is required, be sure to observe precautions on page 10.

8. FILL THE BRINE TANK WITH WATER AND SALT: Using a pail or garden hose, add about 3 gallons of water into the rectangular and 18" dia. brine tanks. Add about 7 gallons into a 26" dia. tank. Salt capacities are shown in the specifications. Fill the brine tank with clean water softener salt. Nugget or pellet salt has less than 1% impurities, which helps promote trouble-free performance (see page 29 for additional salt information).

9. Connect the power cable to the 2 terminal screws on the transformer. Plug the transformer into the approved, grounded, 120V-60Hz outlet.

10. On E/D Models 5192, 5256 and 5320, plug the water meter leads into the back of the timer (see wiring schematic, page 34).

11. PROGRAM THE TIMER, to complete installation.

Solid State. . . pages 13-15.
Electronic Demand. . . pages 17 and 18.

Figure 13

SOLID STATE FACE PLATE

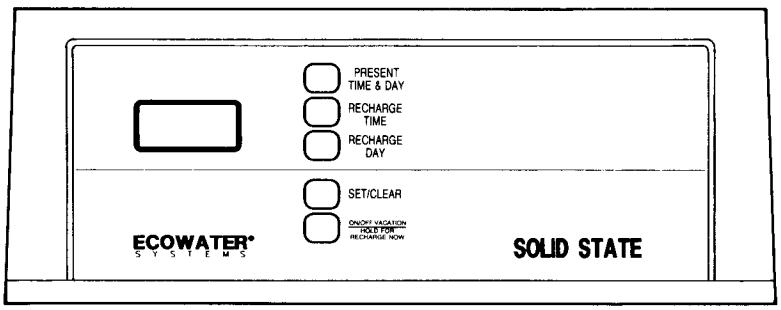
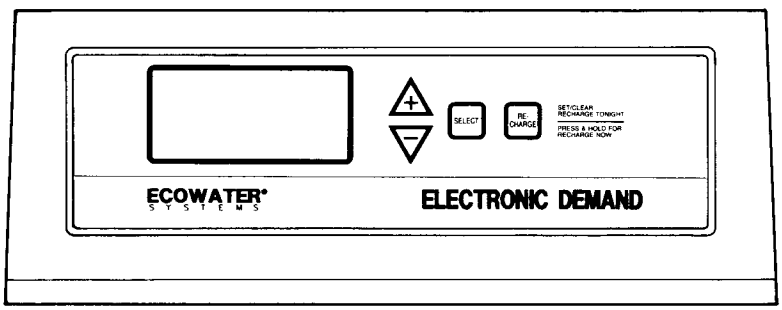


Figure 14

ELECTRONIC DEMAND FACE PLATE



PROGRAMMING THE SOLID STATE TIMER

After the transformer is plugged into the electrical outlet, 12:00 AM, SUnday began to flash in the time display. Set the **time of day** and present **day of week** as follows:

1. SET TIME OF DAY:

a. Press the PRESENT TIME AND DAY button once. The hour display continues to flash.

b. Press the SET/CLEAR button until the present hour of the day shows. Be sure AM for morning hours, or PM for afternoon and evening hours shows.

Note: Press SET/CLEAR and quickly release to move the hour display ahead 1 at a time to the correct hour. Or, **hold** the SET/CLEAR button to move the display ahead 2 hours each second, to the correct hour.

c. Press PRESENT TIME AND DAY button once to steady the hour display, and minutes begin to flash. Press SET/CLEAR until the correct minutes show.

d. Press PRESENT TIME AND DAY button again to steady the minute display (day will begin flashing).

2. SET PRESENT DAY OF WEEK:

a. Press the SET/CLEAR button to set the present day of the week.

Note: Press SET/CLEAR and quickly release to move the day display 1 at a time. Or, **hold** the SET/CLEAR button to move the day display ahead 2 days each second.

b. Press the PRESENT TIME AND DAY button again to steady the entire display.

3. SET DAYS and TIME OF REGENERATION, OR RECHARGE:

Note: The Eco System is factory set to regenerate every Monday, Wednesday and Saturday, beginning at 2:00 AM. To set for a different regeneration starting time, or on different days, and to set for the most efficiency, continue below.

a. Press the RECHARGE TIME button once, to display the factory set regeneration days and starting time (flashing). To change the regeneration start time, do step b following. Otherwise go to step c.

b. Press the SET/CLEAR button until the desired regeneration starting time shows in the display.

Note: Press SET/CLEAR and quickly release to move the display ahead 1 hour at a time. Or, **hold** the SET/CLEAR button to move the display ahead 2 hours each second.

c. Press the RECHARGE DAY button and SUnday begins to flash.

. . . If you **want** regenerations on Sunday (from regeneration table, page 14), press the SET/CLEAR button to display **ON**.

. . . If you **do not want** Sunday regenerations, press SET/CLEAR button to display **OFF**.

d. Press the RECHARGE DAY button again to display a flashing MOnday and **ON** (factory set recharge). As you did in step 3, use the SET/CLEAR button to change the display from ON to OFF, or from OFF to ON.

e. Press RECHARGE DAY button to display a flashing TUesday, WEdnesday, etc., each time using the SET/CLEAR button to display either ON or OFF as needed.

f. After recharge is either set or cancelled for SAturday, press the PRESENT TIME AND DAY button **once** again, to return the present time and day display.

4. SET THE FILL CYCLE MINUTES:

Note: The factory set default time is 16 minutes.

a. Press and **hold** the RECHARGE TIME button until FILL shows in the display, then release button. After a few seconds, the fill cycle minutes (factory setting. . . 16) will flash.

b. Press the SET/CLEAR button to set the minutes of fill cycle needed, as shown in the regeneration table.

Note: Press SET/CLEAR and quickly release to move the display ahead 1 minute at a time. Or, **hold** the SET/CLEAR button to move the display ahead 2 minutes each second. AFTER PASSING 59, THE DISPLAY BEGINS OVER AT 0.

continued, page 15

PROGRAMMING THE SOLID STATE TIMER

REGENERATION TABLE

STEP 1 — CALCULATE WEEKLY GRAINS CAPACITY REQUIRED

WEEKLY WATER USAGE (GALLONS) x GPG WATER HARDNESS = WEEKLY GRAINS CAP. REQUIRED

NOTES:
—If water usage is unknown, see sizing information.
—If water contains iron, add to the water hardness at a ratio of 5 grains per 1 part per million (ppm) iron.

STEP 2 — SELECT NUMBER OF REGENERATIONS, AND FILL TIME, FROM TABLE

EXAMPLE: You have installed a model 5256SS. Water usage is 20,000 gallons per week. Water hardness is 10 grains per gallon with 1.5 ppm iron (1.5 x 5 = 7.5; add 8 to the water hardness). You will need 360,000 grains capacity per week.

From the table, you would select 3 regenerations at a fill setting of 15 minutes (25.3 lbs of salt each regeneration, or 75.9 lbs/week). For greater water savings, you would select 2 regenerations and 28 fill minutes (89.4 lbs salt per week).

WEEKLY CAPACITY (GRAINS)

	1 REGEN	LBS. SALT	FILL MIN.	2 REGEN	3 REGEN	4 REGEN	5 REGEN	6 REGEN	7 REGEN
MODEL 5050	23,200	4.5	5	46,400	69,600	92,800	116,000	139,200	162,400
	34,000	7.2	8	68,000	102,000	136,000	170,000	204,000	238,000
	43,200	10.8	12	86,400	129,600	172,800	216,000	259,200	302,400
	48,300	13.4	15	96,600	144,900	193,200	241,500	289,800	338,100
	52,600	16.1	18	105,200	157,800	210,400	263,000	315,600	368,200
MODEL 5070	32,500	6.3	7	65,000	97,500	130,000	162,500	195,000	227,500
	46,100	9.9	11	92,200	138,300	184,400	230,500	276,600	322,700
	55,700	13.4	15	111,400	167,100	222,800	278,500	334,200	389,900
	63,000	17.0	19	126,000	189,000	252,000	315,000	378,000	441,000
	68,800	20.6	23	137,600	206,400	275,200	344,000	412,800	481,600
MODEL 5100	44,200	9.0	10	88,400	132,600	176,800	221,000	265,200	309,400
	60,100	12.5	14	120,200	180,300	240,400	300,500	360,600	420,700
	74,600	17.0	19	149,200	223,800	298,400	373,000	447,600	522,200
	85,600	21.5	24	171,200	256,800	342,400	428,000	513,600	599,200
	94,300	25.9	29	188,600	282,900	377,200	471,500	565,800	660,100
MODEL 5130	62,300	12.5	14	124,600	186,900	249,200	311,500	373,800	436,100
	87,000	18.8	21	174,000	261,000	348,000	435,000	522,000	609,000
	104,300	25.1	28	208,600	312,900	417,200	521,500	625,800	730,100
	119,700	32.3	36	239,400	359,100	478,800	598,500	718,200	837,900
	131,800	39.4	44	263,600	395,400	527,200	659,000	790,800	922,600
MODEL 5192	89,000	17.9	12	178,000	267,000	356,000	445,000	534,000	623,000
	125,800	26.9	18	251,600	377,400	503,200	629,000	754,800	880,600
	152,300	35.8	24	304,600	456,900	609,200	761,500	913,800	1,066,100
	175,600	46.3	31	351,200	526,800	702,400	878,000	1,053,600	1,229,200
	194,100	56.7	38	388,200	582,300	776,400	970,500	1,164,600	1,358,700
MODEL 5256	129,800	25.4	17	259,600	389,400	519,200	649,000	778,800	908,600
	163,100	34.3	23	326,200	489,300	652,400	815,500	978,600	1,141,700
	194,600	44.8	30	389,200	583,800	778,400	973,000	1,167,600	1,362,200
	221,700	55.3	37	443,400	665,100	886,800	1,108,500	1,330,200	1,551,900
	246,000	65.7	44	492,000	738,000	984,000	1,230,000	1,476,000	1,722,000
MODEL 5320	159,700	31.4	21	319,400	479,100	638,800	798,500	958,200	1,117,900
	202,800	41.8	28	405,600	608,400	811,200	1,014,000	1,216,800	1,419,600
	242,900	53.8	36	485,800	728,700	971,600	1,214,500	1,457,400	1,700,300
	277,500	65.7	44	555,000	832,500	1,110,000	1,387,500	1,665,000	1,942,500
	302,000	74.7	50	604,000	906,000	1,208,000	1,510,000	1,812,000	2,114,000

NOTE: Interpolate for capacities and salt used between those listed.

PROGRAMMING THE SOLID STATE TIMER

Minutes of FILL / Pounds of SALT

@ .3 GPM FILL RATE (Models 5050 5130), and @ .5 GPM FILL RATE (Models 5192 – 5320)

FILL MIN.	POUNDS SALT .3	.5	FILL MIN.	POUNDS SALT .3	.5	FILL MIN.	POUNDS SALT .3	.5	FILL MIN.	POUNDS SALT .3	.5	FILL MIN.	POUNDS SALT .3	.5
5	4.5	7.5	16	14.3	23.9	27	24.2	40.3	38	34.0	56.7	49	43.9	73.2
6	5.4	9.0	17	15.2	25.4	28	25.1	41.8	39	34.9	58.2	50	44.8	74.7
7	6.3	10.5	18	16.1	26.9	29	26.0	43.3	40	35.8	59.7			
8	7.2	11.9	19	17.0	28.4	30	26.9	44.8	41	36.7	61.2			
9	8.1	13.4	20	17.9	29.9	31	27.8	46.3	42	37.6	62.7			
10	9.0	14.9	21	18.8	31.4	32	28.7	47.8	43	38.5	64.2			
11	9.9	16.4	22	19.7	32.9	33	29.6	49.3	44	39.4	65.7			
12	10.8	17.9	23	20.6	34.3	34	30.5	50.8	45	40.3	67.2			
13	11.6	19.4	24	21.5	35.8	35	31.4	52.3	46	41.2	68.7			
14	12.5	20.9	25	22.4	37.3	36	32.3	53.8	47	42.1	70.2			
15	13.4	22.4	26	23.3	38.8	37	33.2	55.3	48	43.0	71.7			

continued from page 13

c. Press PRESENT TIME AND DAY button to return the present time and day display.

5. OTHER RECHARGE CYCLE TIME ADJUSTMENTS, (BRINING, BACKWASH, FAST RINSE):

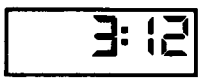
NOTE: Factory set default times are: BRINING . . .80 min., BACKWASH . . .12 min., FAST RINSE . . .4 min.

a. Press and **HOLD** SET/-CLEAR . . . the entire display comes on.

b. Press RECHARGE TIME and 2:08 shows, meaning no. 2 cycle (brining and brine rinse) and 80 minutes (8 x 10).

— To change the time (see table, page 30) press SET/CLEAR until the time shows. For example, to set 110 minutes, change the display to 2:11.

c. Press RECHARGE TIME and 3:12 shows. This means no. 3 cycle (backwash) and 12 minutes.



— If no change is desired, go to step d.

— To change the backwash time, press SET/CLEAR until the desired minutes appear. For example, set 3:10 for 10 minutes of backwash.

d. Press RECHARGE TIME again to display 4:04. This means no. 4 cycle (fast rinse) and 4 minutes. Use the same procedure as above to change this time, if desired.

e. Press RECHARGE TIME to display 18:88.

f. Press SET/CLEAR to return the present time and day display.

6. BACKWASH RESIN "FINES" (small, broken particles) FROM THE RESIN BED: Do steps 6a, b, and c on page 18. The valve will automatically return to service after the backwash and fast rinse cycles.

THE INSTALLATION IS COMPLETE. OTHER TIMER FEATURES AND OPTIONS ARE ON PAGE 16.

FEATURES AND OPTIONS, SOLID STATE TIMER

DOUBLE BACKWASH — The double backwash is beneficial on some kinds of iron bearing water. When set, backwash and fast rinse cycles occur both before and after brining. To set...

1. Press and **hold** SET/CLEAR until 18:88 shows in the display.

2. Press PRESENT TIME AND DAY to display 3 dashes.

3. Press SET/CLEAR to display **dbl.**

4. Press PRESENT TIME AND DAY to display 18:88.
5. Press SET/CLEAR to return present time.

To **cancel** double backwash, repeat the above steps. Displays for **dbl** and **---** occur in reverse order.

Note: To compensate for additional fill water flow during valve cycling, when double backwash is set, decrease FILL minutes (from table, pages 14 and 15) as follows. See page 13 to set.
Models 5050 to 5130 . . . decrease 2 minutes.
Models 5192 to 5320 . . . decrease 1 minute.

RECHARGE NOW - For an immediate regeneration, press and **hold in** the HOLD-RECHARGE NOW button for 3 seconds until **RCHG** shows. **RCHG** will flash in the display during this regeneration, which lasts for about 2 hours.

Note: Avoid using HOT water while the Eco System regenerates, because bypass hard water will refill the water heater.

VACATION - To suspend regenerations for extended periods, press (DO NOT HOLD IN) the ON/OFF-VACATION button. VAC begins to flash in the display. The timer will keep time, but the Eco System will not regenerate to waste water and salt.

Note: While in VACATION, the Eco System **will** go through a regeneration if the RECHARGE NOW feature is used (see above).

TO RESUME REGENERATIONS, press the VACATION button again to return the Eco System to service, and the correct time of day in the display. **Remember to do this or the Eco System will not regenerate and you will soon have hard water.**

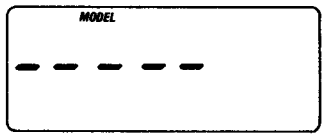
TIMER "POWER-OUTAGE MEMORY" — If electrical power to the timer goes off, the "memory" built into timer circuitry keeps **all** settings for 2 days or more. The display is blank and the Eco System will not regenerate. When electrical power comes on, 1 of 2 things will happen.

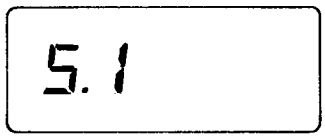
1. The present time of day will show, meaning the timer memory has kept all settings.
***Note:** If the Eco System was in a regeneration when power was lost, it will now finish the cycle.*

2. The display will show a time, but it will be flashing. The timer memory did **not** keep the time settings and they must be reset.
The flashing display is to remind you to reset the timer.
NOTES:
When power comes on, the flashing display returns to a time of 12:00 AM Sunday, then begins to keep time again. If you do not reset all time settings, the Eco System will regenerate 3 days each week. However, regenerations will most likely be on the wrong days and at the wrong time.
If the Eco System was in a regeneration when power went off, the valve will return to service without finishing the regeneration cycle. If water tasts salty...
...use RECHARGE NOW to start another regeneration, or
...open 1 or more soft water faucets and allow to run until the salt taste is gone.

PROGRAMMING THE ELECTRONIC DEMAND TIMER

When the transformer is plugged in, the face plate display shows 5 dashes, followed by a test number (example: 5.1), and the 5 dashes again.





NOTE: IF 12:00 AM IS FLASHING, THE MODEL CODE. . .STEP 1, WAS FACTORY SET. GO DIRECTLY TO STEP 2. (See page 34 to check the model code setting.)

1. SET THE MODEL CODE: Locate the model number on the rating decal, on the resin tank sidewall. Then, obtain the model code from the model code table. Press the (+) button until this code appears. If you pass by the correct code, use the (−) button. BE SURE TO SET THE CORRECT CODE, OR THE ELECTRONIC DEMAND TIMER WILL OPERATE ON INCORRECT TIMING.

MODEL NUMBER (ON RATING DECAL)

	5050 ED-FA	5070 ED-FA	5100 ED-FA	5130 ED-FA
MODEL CODE	**C50**	**C70**	**C100**	**C130**

MODEL NUMBER (ON RATING DECAL)

		5192 ED-FA 5192 ED-FC	5256 ED-FA 5256 ED-FC	5320 ED-FA 5320 ED-FC
MODEL CODE		**C192**	**C256**	**C320**

When you are certain the correct code appears, press SELECT to set. A test number (example: 5.1) will show again for a few seconds, followed by a flashing 12:00 AM. The charge bar will show 0% until after the first regeneration (see page 19).

NOTES:

- To change the model code, see page 34.
- **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, and 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.

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 PRESENT TIME, IF FLASHING AFTER A POWER OUTAGE, DO STEP 2. Then, press SELECT 4 times to steady the display.

PROGRAMMING THE ELECTRONIC DEMAND TIMER

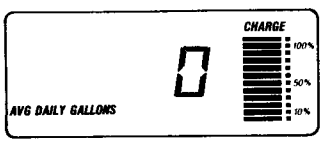
3. SET WATER HARDNESS: Press SELECT button once to display a flashing 15 and HARDNESS. Set the grains per gallon hardness of your water supply (determined by water analysis or call your local water department). Use the (+) button to advance the number; use the (−) button to reduce the number. Each press 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.

NOTE: If other than the 24 hour regeneration mode (6, 8 or 12 hour) is selected. . . see page 21, the recharge time selection in step 4 following is not available, and the display will advance to AVERAGE DAILY GALLONS.

4. SET RECHARGE (REGENERATION) TIME: Press SELECT to display a flashing 2:00 a.m. and RECHARGE TIME. At this setting, recharge or regeneration begins at 2:00 a.m. To select a different recharge start time, use the (+) or (−) button.

NOTE: The valve bypasses hard water during the brining and backwash cycles of recharge. A "No-Bypass" kit is available from EcoWater. . . part no. 7128825.

5. Press SELECT to display AVERAGE DAILY GALLONS (no adjustments), then press SELECT once more to return the present time of day.



FA MODELS 5192 – 5320: READ THE IMPORTANT NOTE, BOTTOM OF THIS PAGE.

6. To backwash resin "fines" (small and broken particles) from the resin bed, and to purge any remaining air from the resin tank, advance the valve into backwash, as follows.

a. Press and **HOLD** the RECHARGE button for 3 seconds, until RECHARGE begins to flash in the timer display. The motor begins to run and advances the valve into the FILL cycle.

b. When the motor stops, press RECHARGE again to restart the motor and position the valve in the BRINING cycle.

c. Wait for the motor to stop, then press RECHARGE a final time. The valve repositions to BACKWASH.

The model code settings determine the length of backwash. Then, the valve automatically advances to, and completes fast rinse before returning to service. (See the specification table for cycle lengths.)

THE INSTALLATION IS COMPLETE. ADDITIONAL TIMER FEATURES AND OPTIONS ARE DESCRIBED BEGINNING ON PAGE 19.

IMPORTANT, FA MODELS 5192 – 5320: On FA Models 5050 – 5130, and ***FC*** Models 5192 – 5320, the timer automatically defaults to the correct water meter turbine count when the model code is set. For ***FA*** Models 5192 – 5320, the correct turbine count (152) must be reset as instructed in step 6, page 20.

FEATURES AND OPTIONS, ELECTRONIC DEMAND TIMER

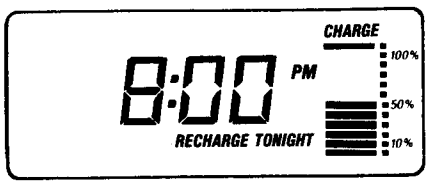
CHARGE BAR DISPLAY

The charge bar is continually displayed and shows, at a glance, the percentage of Eco System capacity remaining. After a recharge or regeneration, the charge bar returns to the 100% charge position. **NOTE:** When electrical power is applied to the timer, the charge bar is at 0% until after the initial regeneration.

FLASHING "RECHARGE"

While the Eco System is in a recharge cycle, the word "RECHARGE" flashes in the display until the Eco System returns to soft water service.

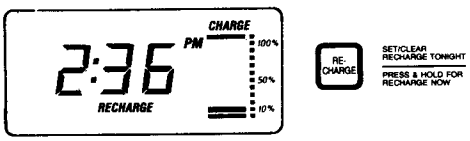
FLASHING "RECHARGE TONIGHT"



When the face plate computer determines that a recharge is needed to restore water softening capacity, it initiates "RECHARGE TONIGHT". At the next programmed recharge start time, the recharge cycle will begin. Flashing RECHARGE then replaces the flashing RECHARGE TONIGHT.

INITIATING EXTRA RECHARGES

1. **RECHARGE NOW:** Press and **hold** the RECHARGE button for 3 seconds, until RECHARGE begins to flash in the display. A recharge begins immediately.



To assure an adequate supply of soft water, at times of unusual or unexpected high water use demand, use the RECHARGE NOW feature. For example, if you plan to use more water and the charge bar is at or below 50%, you could deplete the water softening capacity before the next recharge is automatically initiated. To be sure this will not happen, use RECHARGE NOW to restore 100% water softening capacity when the recharge is over.

2. **RECHARGE TONIGHT:** Press and immediately release the RECHARGE button. RECHARGE TONIGHT will flash in the display. When this feature is set, the Eco System will regenerate at the next programmed recharge start time. This feature is beneficial to assure a sufficient soft water supply for an expected heavy water usage the next day.

To cancel a recharge when RECHARGE TONIGHT **is** flashing, press and immediately release the RECHARGE button.

PROGRAM MEMORY

If electrical power to the Eco System goes off, the time display is blank, but the face plate timer keeps the correct time for 2 days or more. When electrical power comes on again, you have to reset the present time only if the display is flashing. The MODEL CODE, HARDNESS and RECHARGE TIME never require resetting unless a change is desired.

Even if the timer is incorrect after a long power outage, the Eco System works as it should to keep your water soft. However, regenerations may occur at the wrong time of the day until you reset the timer to the correct time of day. To reset present time, see step 2 on page 17.

AVERAGE DAILY GALLONS

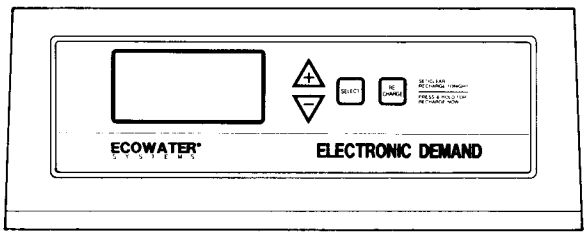
If you want to know the average gallons of water used each day, press the SELECT button 4 times to display this water use fact. The average daily gallons is based on your past 7 days of water usage. The figure adjusts daily at midnight. Press SELECT once more to return the present time (or present time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

FEATURES AND OPTIONS, ELECTRONIC DEMAND TIMER

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

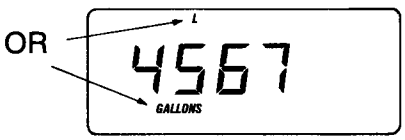
NOTE: The present time display will return if more than 4 minutes pass without touching a face plate button.

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

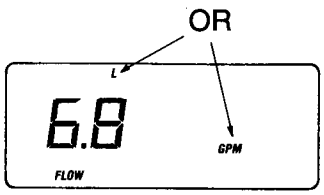


1. GALLON (OR LITER) TOTAL COUNT: This is a measure of all water that has passed through the Eco System since installation. The display will total up to 99,999 gallons before beginning over at 0.

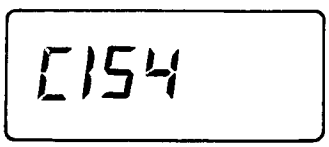
   NOTE: When in this display, the total will return to 0 if the (▽) button is pressed.



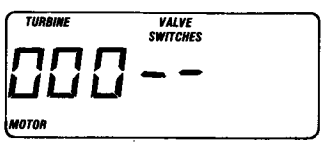
2. FLOW RATE, GALLONS (OR LITERS) PER MINUTE: Press SELECT once more to access this display. The display shows the flow rate in gallons (or liters), passing through the Eco System. If all water-using appliances and faucets are off, the display will be 0. This display indicates positive water meter turbine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



3. OPERATING CAPACITY: Press SELECT to view the current operating capacity of the softener. The display alternates between CAP and (examples: 95000, or C154...154,000...for capacities over 99,999). Upon installation, capacity shown is the medium operating level of the softener. After that, depending on water usage (see page 23), the actual grains capacity recharged displays.

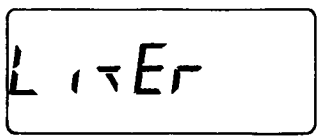


4. VALVE SWITCHES, TURBINE, AND MOTOR DIAGNOSTIC: Press SELECT again for this diagnostic display. FOR ADDITIONAL INFORMATION ON THIS DISPLAY, PLEASE SEE PAGE 36.



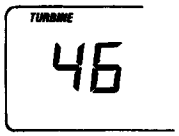
5. 12 OR 24 HOUR CLOCK: Press SELECT to display a flashing 12 hour (or 24 hour). When "12 hour" is set, the present time and recharge time displays are shown in standard clock time. . . 1 to 12 p.m., 1 to 12 a.m. Military time, 0100 (1:00 a.m.) to 2400 (midnight), is shown in the present time and recharge time displays when "24 hour" is set. Use the (△) or (▽) buttons to set the desired clock.

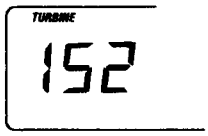
6. GALLONS OR LITERS MEASURE: Press SELECT to show either GALLON or LITER flashing. If GALLON is selected, all water flow rate or usage displays are shown in gallons or gallons per minute. If LITER is selected, the same displays are in liters or liters per minute. The (△) or (▽) button is used to change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



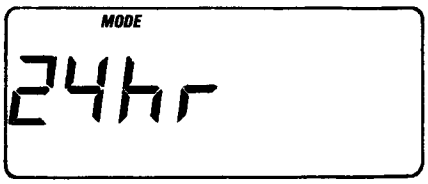
FEATURES AND OPTIONS, ELECTRONIC DEMAND TIMER

7. TURBINE COUNT: Press SELECT to display the water meter turbine count setting. The setting is 46 for FC models 5192 – 5320. For *all other* models (FA 5192 – 5320, and FA 5050 – 5130), the setting is 152. **Be sure to set the correct count or water usage readings will be inaccurate.** Use the (▲) or (▼) button to set.





8. a. HOUR MODE, 24, 12, 8 or 6: You can set the Eco System to regenerate in 1 of 4 different time modes. The 24 hour mode is the default mode, and is most often used with single unit installations. The 12, 8 or 6 hour mode selections are usually made with multiple unit installations, so regeneration times are offset or staggered. In the 24 hour mode, regenerations are initiated at 2:00 AM (or other selectable time. . . see page 17) based on 24 hour water use patterns. In the 12, 8 or 6 hour mode, regeneration is initiated when a fixed reserve capacity level (factory default setting is 30%. . . see step 9) is reached, at the following recharge times.

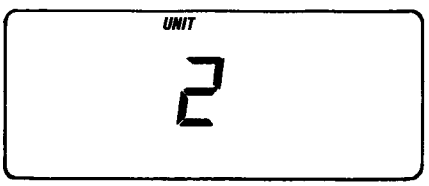


NOTE: If setting the 24 hour mode, go to step 9 and disregard step 8b.

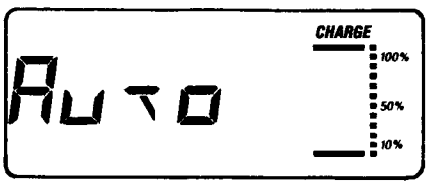
	MODE/RECHARGE TIMES*								
	6 HOUR				8 HOUR			12 HOUR	
UNIT #1	12 AM	6 AM	12 PM	6 PM	12 AM	8 AM	4 PM	12 AM	12 PM
UNIT #2	3 AM	9 AM	3 PM	9 PM	2:40 AM	11:40 AM	6:40 PM	3 AM	3 PM
UNIT #3					5:20 AM	1:20 PM	9:20 PM	6 AM	6 PM
UNIT #4								9 AM	9 PM

*In the 6, 8 and 12 hour modes, above recharge times are the earliest possible times the **brining** cycle will begin. Fill cycles actually begin sometime before the recharge times, depending on capacity used or remaining.

b. Use the (▲) or (▼) button to select the desired mode, then press SELECT to display UNIT. Again use the (▲) or (▼) buttons to set the unit number. For example, in a triple unit installation, set timers to UNIT 1, UNIT 2, and UNIT 3 respectively.



9. FIXED RESERVE SETTING: Press SELECT to display AUTO (timer set to 24 hr. mode), or FR (timer set to 12, 8 or 6 hr. mode), along with the charge bar.



a. TIMERS SET TO 24 HR. MODE: The charge bar will show 0% because recharges are initiated based on 24 hour water use patterns. If water use is erratic from day to day (example: car wash), setting a fixed reserve is beneficial to assure an uninterrupted soft water supply. To set a fixed reserve, do step c. Otherwise, go to step 10.

b. TIMERS SET TO 12, 8 OR 6 HR. MODE: The charge bar shows 70% (see step 8a), the default fixed reserve. To set the fixed reserve to a different percentage, do step c. Otherwise, PRESS SELECT TO RETURN THE PRESENT TIME DISPLAY.

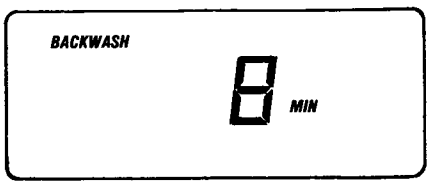
FEATURES AND OPTIONS, ELECTRONIC DEMAND TIMER

c. To set or change the fixed reserve percent, press (▲) to move the charge bar higher (increase fixed reserve), or press (▼) to lower the charge bar. Setting is available between 0 and 100%.

NOTE: On timers set to 24 hour mode operation, the following options . . . "MAXIMUM DAYS BETWEEN RECHARGE," "BACKWASH MINUTES," "2ND BACKWASH", and "RINSE MINUTES" . . . are available.

10. MAXIMUM DAYS BETWEEN RECHARGES: Press SELECT to display AUTO, or 1 day, 2 day, etc. through 7 day. The AUTO setting allows the face plate computer to control all recharges, with intervals based on water usage. AUTO provides the most economical operation. To set a maximum time (in days) between recharges, use the (▲) or (▼) buttons. For example, if you select 5 day in the display, the timer will assure that no more than 5 days will pass without a recharge.

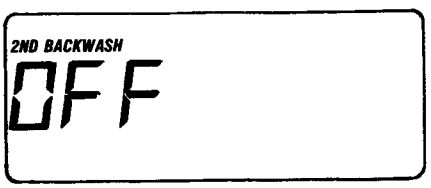
NOTE: If the 24 hour clock is selected (step 5, page 20), an alternating OFF/97 will display when SELECT is pressed. This feature is mainly for the European market, which requires immediate recharge when 97% of the capacity is used. To select this feature, press the (▲) button to display ON.

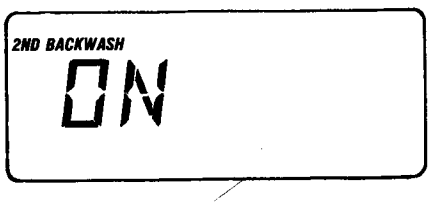


11. BACKWASH MINUTES: Press SELECT and a flashing MIN./-BACKWASH time shows in the display. The default time (see table, page 30) depends upon the preprogrammed model code. The (▲) or (▼) buttons are used to change this time, if desired, up to a maximum of 30 minutes, or to a minimum of 1 minute.

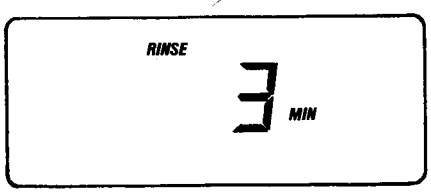
NOTE: The length of each stage (fill, brining and brine rinse, backwash, fast rinse) of the recharge cycle is automatically controlled by the face plate computer. This time is computed based on water usage, water hardness, size of the resin bed, etc. Although the length of backwash and fast rinse is changeable, to assure proper operation, only a qualified technician should adjust the times.

12. 2ND BACKWASH: Press SELECT again to display 2ND BACKWASH/OFF. 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, or press (▼) button to change from ON to OFF.





13. RINSE MINUTES: Press SELECT and a flashing MIN./RINSE time shows in the display. The default time (see table, page 30) depends upon the preprogrammed model code. The (▲) or (▼) buttons are used to change this time up to a maximum of 30 minutes, or to a minimum of 1 minute.



PRESS SELECT ONCE MORE TO RETURN THE PRESENT TIME DISPLAY.

OPERATION

ELECTRONIC DEMAND TIMER AND WATER METER

The face plate timer is actually a small computer. As it receives pulses from the water meter, it converts them to gallons of water passing through the Eco System. It multiplies this water usage information times the water hardness (preprogrammed into 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, at the next regeneration starting time (2:00 a.m., or as otherwise preset), it will schedule a regeneration. RECHARGE TONIGHT shows in the display to inform of the coming regeneration.

The Commercial Series 5000 demand models use 2 different water meter designs in appearance, but they operate the same way. All FA Models have the water meter in the 1" valve outlet fitting. It consists of a turbine, turbine mounting assembly, and a sensor housing pickup (figure 15).

The remaining models use an externally mounted assembly, at the valve outlet. This design is a 1-piece turbine, sensor and support assembly, housed in the brass casting (figure 16).

In both meter designs, the turbine, and sensor pickup are oriented in-line, in the center of water flow. Water flow turns the turbine which houses 2 small magnets. As the turbine spins, the magnets cause the sensor pickup to switch back and forth. This switching sends an electrical pulse through the sensor leads, to the circuit board computer. The computer counts the pulses and converts them to gallons.

The sensor pickup is in a sealed chamber, to keep out dirt, moisture and corrosion.

Figure 15

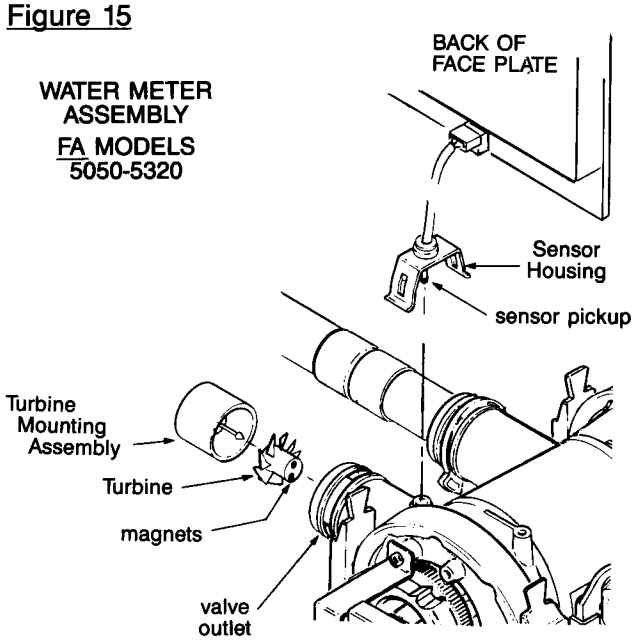
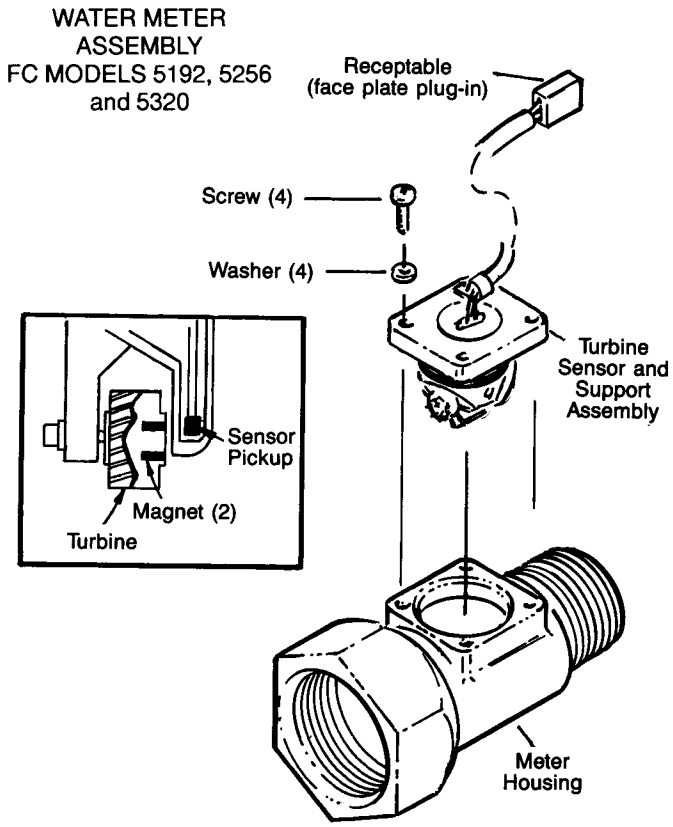


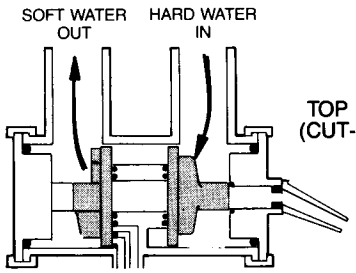
Figure 16



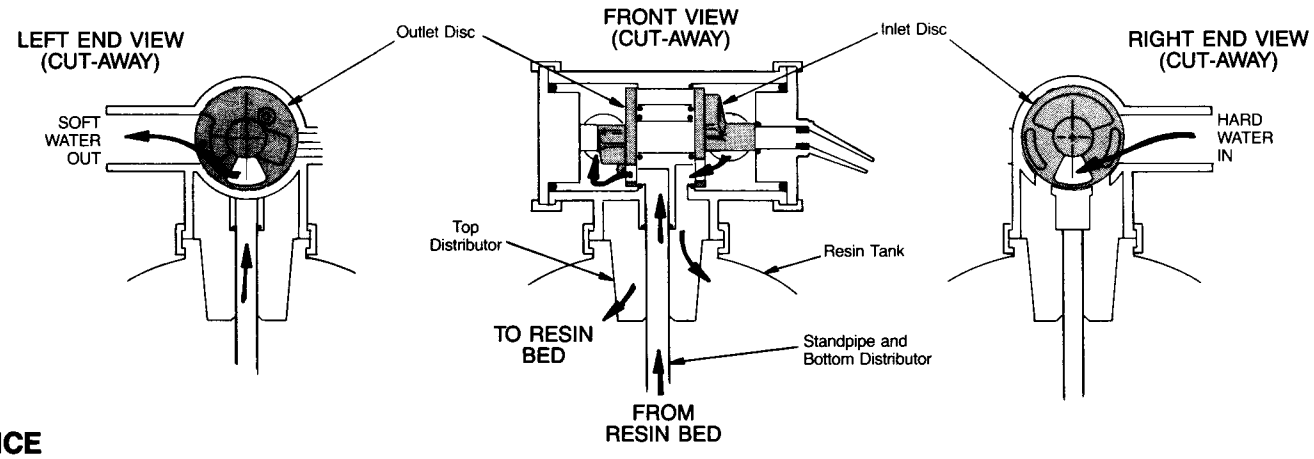
OPERATION - WATER FLOW THROUGH THE SYSTEM

SERVICE CYCLE

The Eco System 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. This resin has the ability to remove hardness minerals from water by ion-exchange. The resin bed is supported by a layer of one or more grades of quartz gravel that fills the bottom dome of the tank, and covers the bottom distributor.



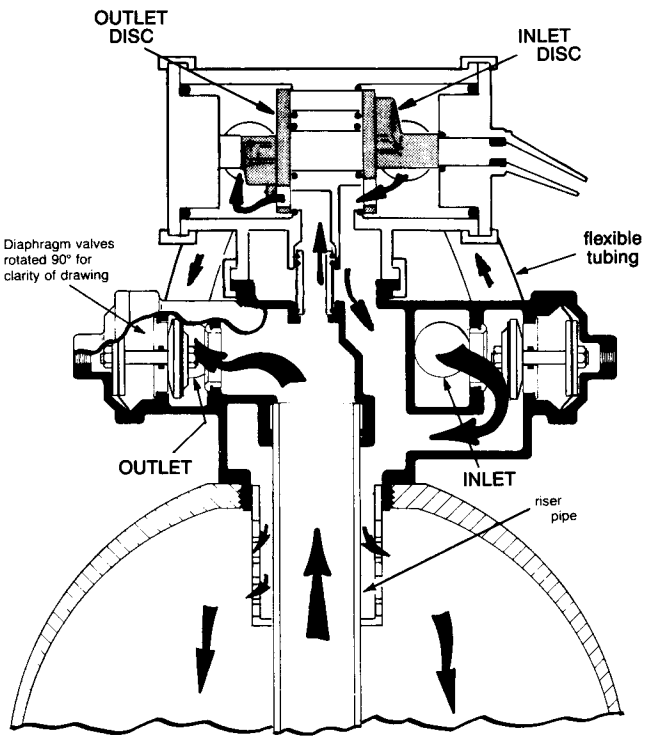
FA MODELS



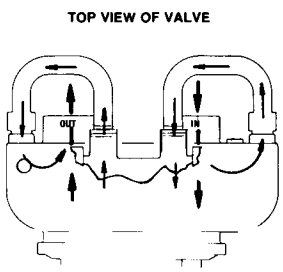
SERVICE

Hard water enters the Eco System, 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, and flows up the internal standpipe, into the valve, then out to house 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.



FC MODELS

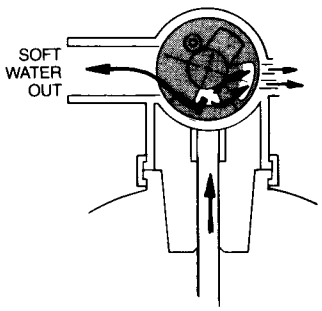


OPERATION - WATER FLOW THROUGH THE SYSTEM

REGENERATION, OR RECHARGE

The programmed (see pages 13-22) face plate timer starts regenerations at 2:00 AM, or other selected time. Regeneration consists of 5 different steps, or cycles.

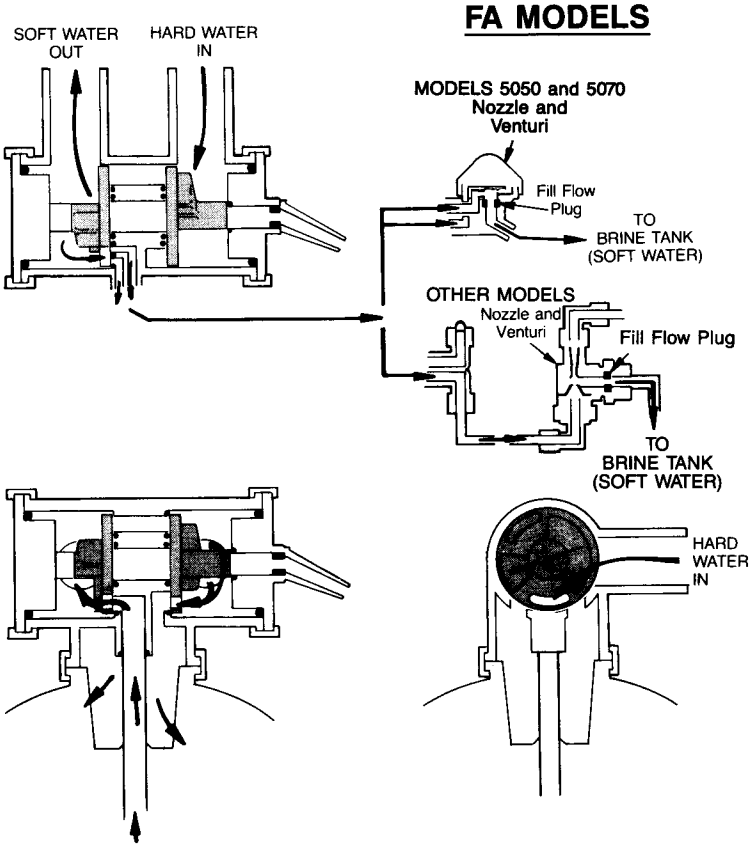
FILL CYCLE



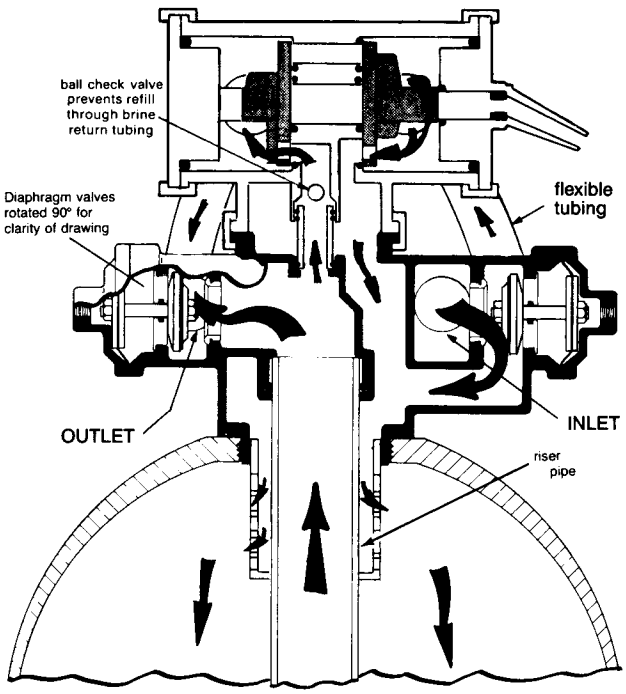
STEP 1- FILL CYCLE (FIGURE 16): Salt, dissolved in water, is called brine. Brine is the cleaning agent for the resin bed. To make brine, water is needed in the brine tank salt storage area. A controlled water flow to the brine tank takes place during fill.

The Eco System 1" valve repositions slightly (motor energized), to open a passage allowing conditioned water to flow through the nozzle and venturi, to the brine valve, and into the brine tank. Fill cycle length is regulated automatically by the demand timer, or as preset during programming of the solid state timer.

FA MODELS



FC MODELS

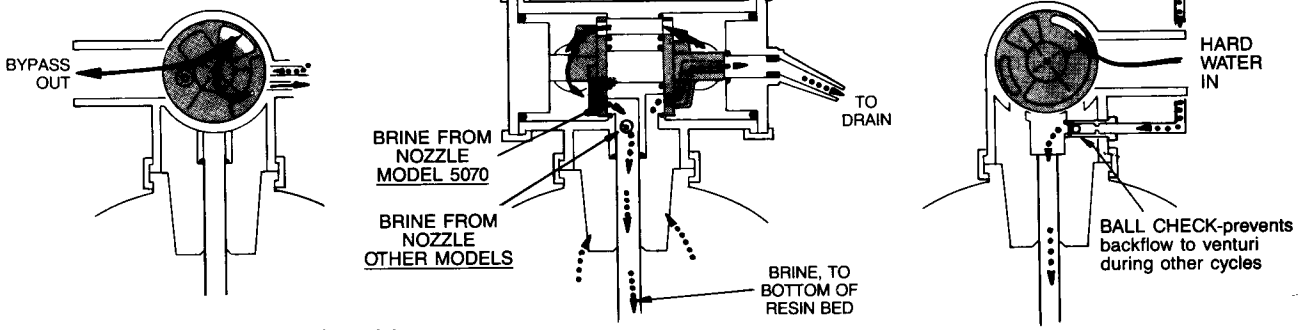


OPERATION - WATER FLOW THROUGH THE SYSTEM

BRINING/BRINE RINSE CYCLE

The timer energized motor moves the 1" 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 draws 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.

FA MODELS



On FC (superflow) models, the 3-way solenoid is activated, to direct pressure water to the superflow valve diaphragms. Both diaphragm assemblies close, shutting off water flow from the valve outlet. Incoming water is routed through the flexible tubing, to the 1" valve inlet.

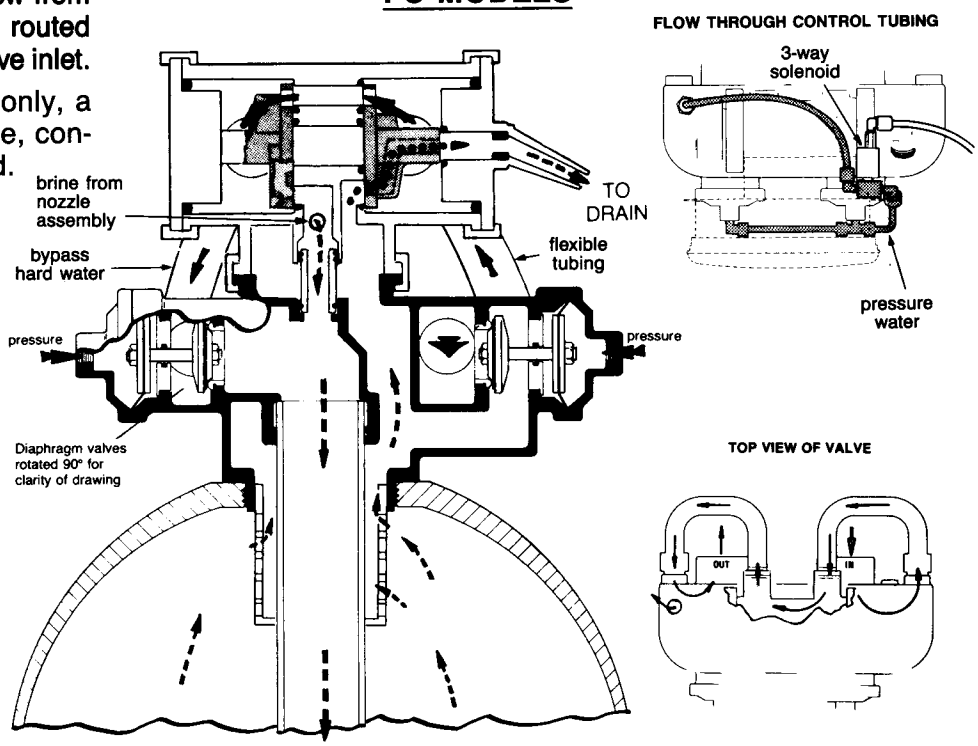
NOTE: On solid state timer models only, a cam operated switch, on the 1" valve, controls electrical power to the solenoid.

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 discontinued brine flow. Hardness minerals and brine rinse from the resin bed and flow to the drain.

Brining and brine rinse time is shown in the table, page 30.

BYPASS HARD WATER: During brining and brine rinse (also backwash and fast rinse, pages 27 and 28) **hard** water is bypassed through the valve and available at faucets. Avoid using HOT water however, because the water heater will refill with hard water.

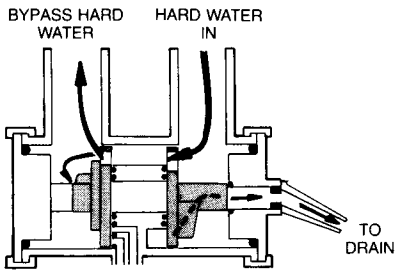
FC MODELS



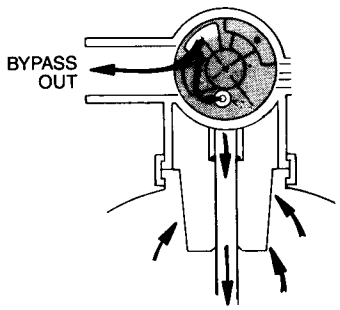
OPERATION - WATER FLOW THROUGH THE SYSTEM

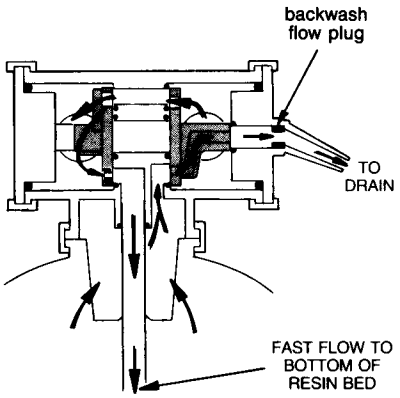
BACKWASH CYCLE

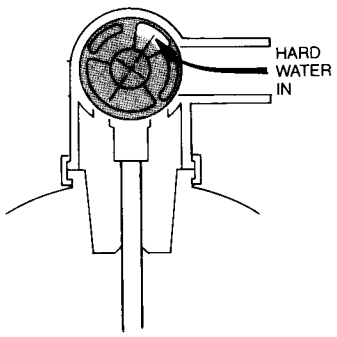
The motor drives the valve to end brine rinse and begin backwash. In backwash, a fast upward flow of water, through the resin bed, flushes remaining hardness minerals, brine, dirt, sediments, iron deposits, etc., from the bed and to the drain. The fast flow lifts and expands the resin bed for maximum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



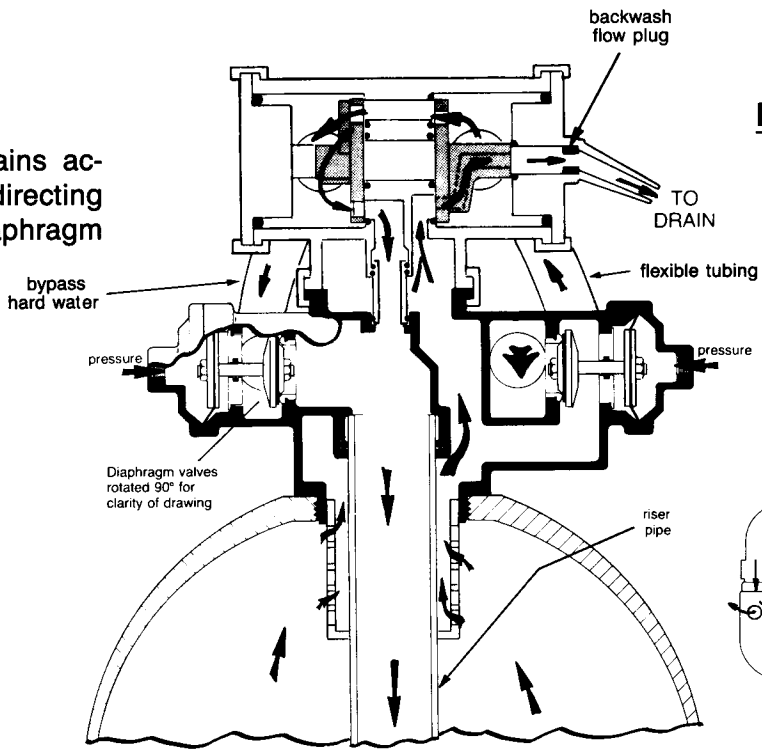
FA MODELS





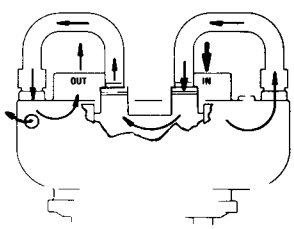


The 3-way solenoid remains activated, on FC models, directing pressure water to the diaphragm valves.



FC MODELS

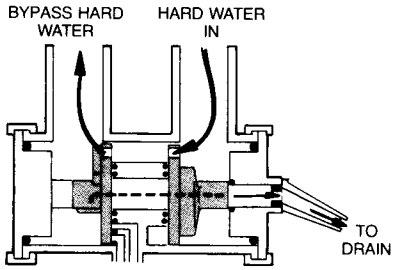
TOP VIEW OF VALVE



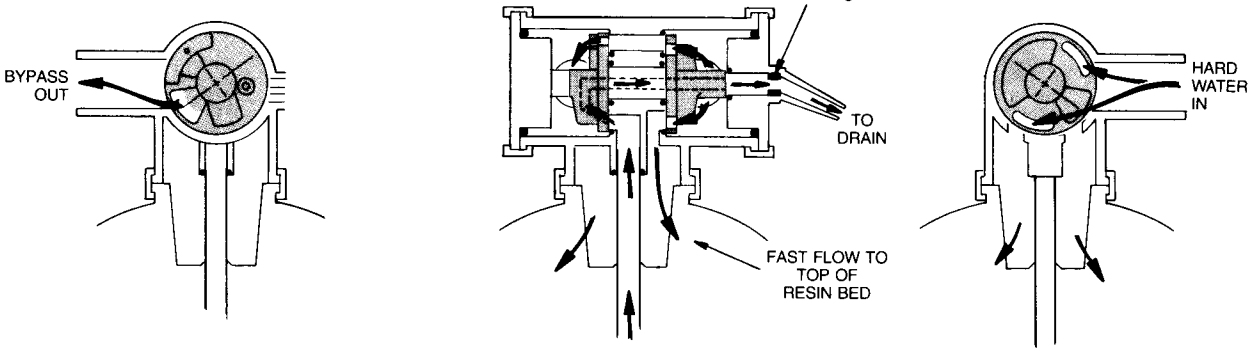
OPERATION - WATER FLOW THROUGH THE SYSTEM

FAST RINSE CYCLE

After backwash, valve rotation places the Eco System in fast rinse. The continued fast flow of water changes directions 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.



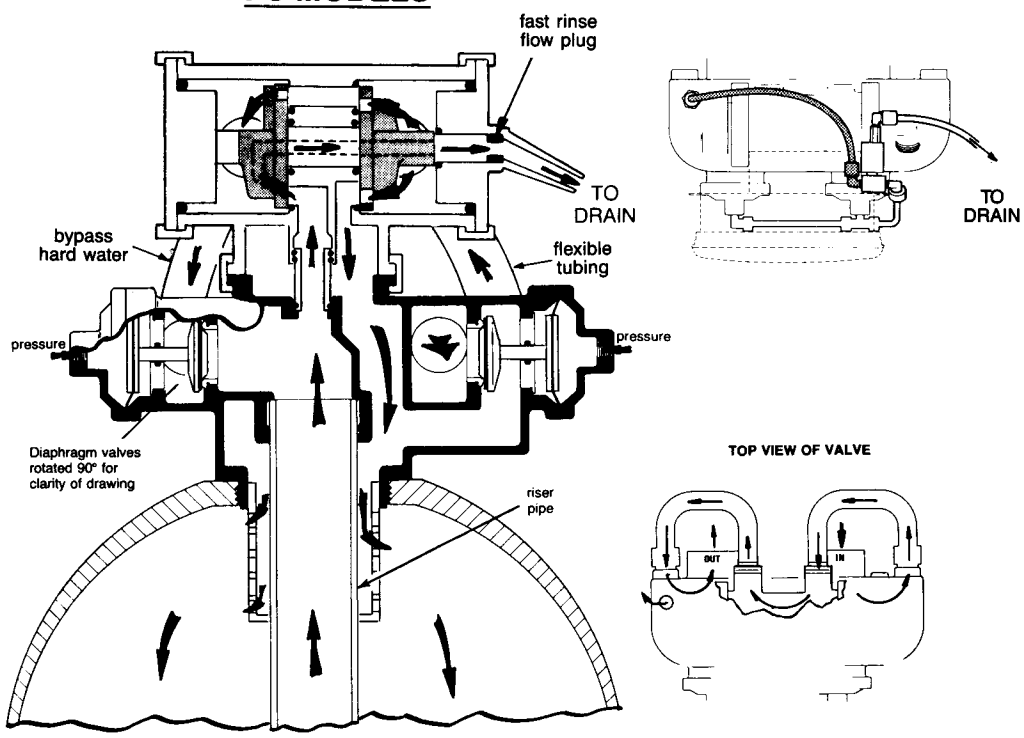
FA MODELS



On FC Models, the super flow diaphragm valves remain pressurized, and closed during fast rinse.

The motor is energized a final time to return the valve to service. Power to the 3-way solenoid is shut off and water in the control tubing is directed to the drain. Both diaphragm assemblies return to the normal, open position.

FC MODELS



SERVICE INFORMATION

REFILLING WITH SALT

Remove the brine tank cover and check the salt storage level frequently. Always refill if less than 1/2 full. BE SURE THE BRINEWELL COVER IS ON.

RECOMMENDED SALT: Nugget, pellet, solar, button, etc. water conditioner 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 Eco System handle iron in the water supply. Although this additive may help keep the Eco System resin clean, it may also release corrosive fumes that will weaken and shorten the life of some Eco System 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 storage 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

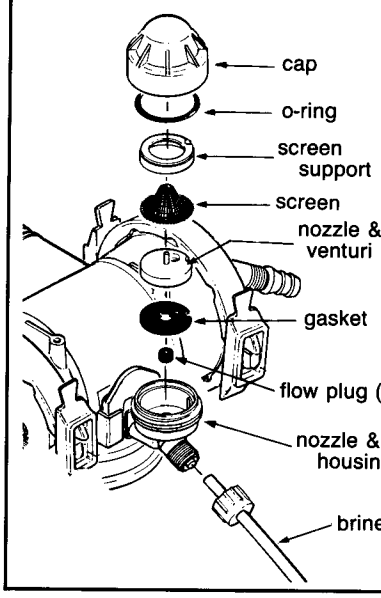
A clean nozzle and venturi is a must for the Eco System to work right. This small unit moves brine from the brine tank to the resin tank during regeneration. If it becomes plugged with sand, silt, dirt, etc., the Eco System will not work and you will get hard water.

Series 5000 models use 2 different nozzle assembly designs. Figure 17 shows the assembly used on 5050 and 5070 models. All other models use the nozzle assembly in figure 18, on page 30.

Figure 17

To get to the nozzle and venturi, remove the Eco System top cover. Be sure the Eco System is in service cycle (no water pressure at nozzle and venturi), then turn off the cap from the nozzle and venturi housing. DO NOT LOSE 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.

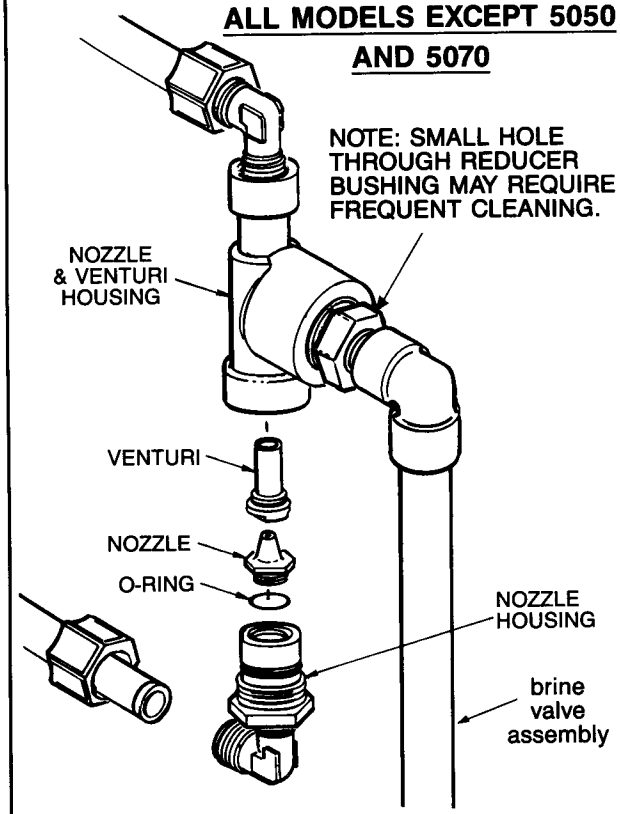
Carefully replace all parts in the correct order. Lubricate the o-ring seal with silicone grease or Vaseline and place in position. Install and tighten the cap, BY HAND ONLY. DO NOT OVERTIGHTEN AND BREAK THE CAP OR HOUSING.



SERVICE INFORMATION

Figure 18

NOZZLE ASSEMBLY
ALL MODELS EXCEPT 5050 AND 5070



BE SURE ECO SYSTEM IS IN SERVICE POSITION (NO WATER PRESSURE AT NOZZLE ASSEMBLY).

1. Disconnect bottom tubing at the nozzle assembly and turn nozzle housing out of nozzle and venturi housing.

2. Turn nozzle out of nozzle housing. Remove venturi with a long, needle-nose pliers, if needed (can clean center hole of venturi without removing).

3. Clean parts in hot soapy water. Use a small wire to clean holes in the nozzle and venturi. USE EXTREME CARE NOT TO SCRATCH, ENLARGE OR MISSHAPE THE HOLES, OR SURFACES AROUND THEM. Flush parts in fresh, clean water.

4. Reassemble all parts, being sure to seat the nozzle and venturi in their respective locations. DON'T OMIT THE O-RING SEAL ON THE NOZZLE.

5. Replace the nozzle housing and reconnect the tubing.

MODEL

	5050	5070	5100	5130		5192	5256	5320
FILL CYCLE FLOW RATE (GPM)	.3	.3	.3	.3		.5	.5	.5
FILL FLOW PLUG LOCATION	See Key #29 page 42		See Key #23, page 40					
BRINE CYCLE FLOW RATE (GPM)	.27	.27	.58	.57		1.1	1.1	1.1
BR. RNS. CYCLE FLOW RATE (GPM)	.19	.19	.48	.47		.89	.89	.89
BKW. CYCLE, AND FAST RNS. CYCLE FLOW RATE (GPM)	5	5	7	7		10	10	10
BKW. F. RNS. FLOW PLUG IDENTIFICATION, AND LOCATION	.21 (HX or AP)		.25 (3D)		.28 (10B)			
	BEHIND DRAIN ELBOW OF 1" VALVE (SEE PAGE 11)							
AMOUNT RESIN (CU. FT.)	1.5	2	3	4		6	8	10
AMOUNT GRAVEL (LBS.) FINE	17	17	34	34		50	50	50
MED.	-	-	-	-		50	50	50
CRS.	-	-	-	-		50	50	50
* FREEBOARD (INCHES)	27	19	30	22		36	27	18

*Nominal distance from top of resin bed, to top of the tank. This dimension can vary several inches, depending on resin moisture content, degree of bed expansion or packing, resin tank diameter tolerances, etc.

DEMAND TIMER

FILL CYCLE TIME (MIN.)	LOW	3.1	4.8	8.1	11.5	10.3	14.3	18.3
	HIGH	15.2	20.9	26	40.5	35.1	41.1	48.5
BRINING/ BR. RNS. CYCLE TIME (MIN.)	LOW SALT	114	152	117	157	149	162	203
	HIGH SALT	73	98	64	92	91	87	105
BACKWASH CYCLE TIME (MIN.)①		12	12	12	12	14	14	14
FAST RINSE CYCLE TIME (MIN.)①		5	5	5	5	10	10	10

①Factory default setting...see page 22.

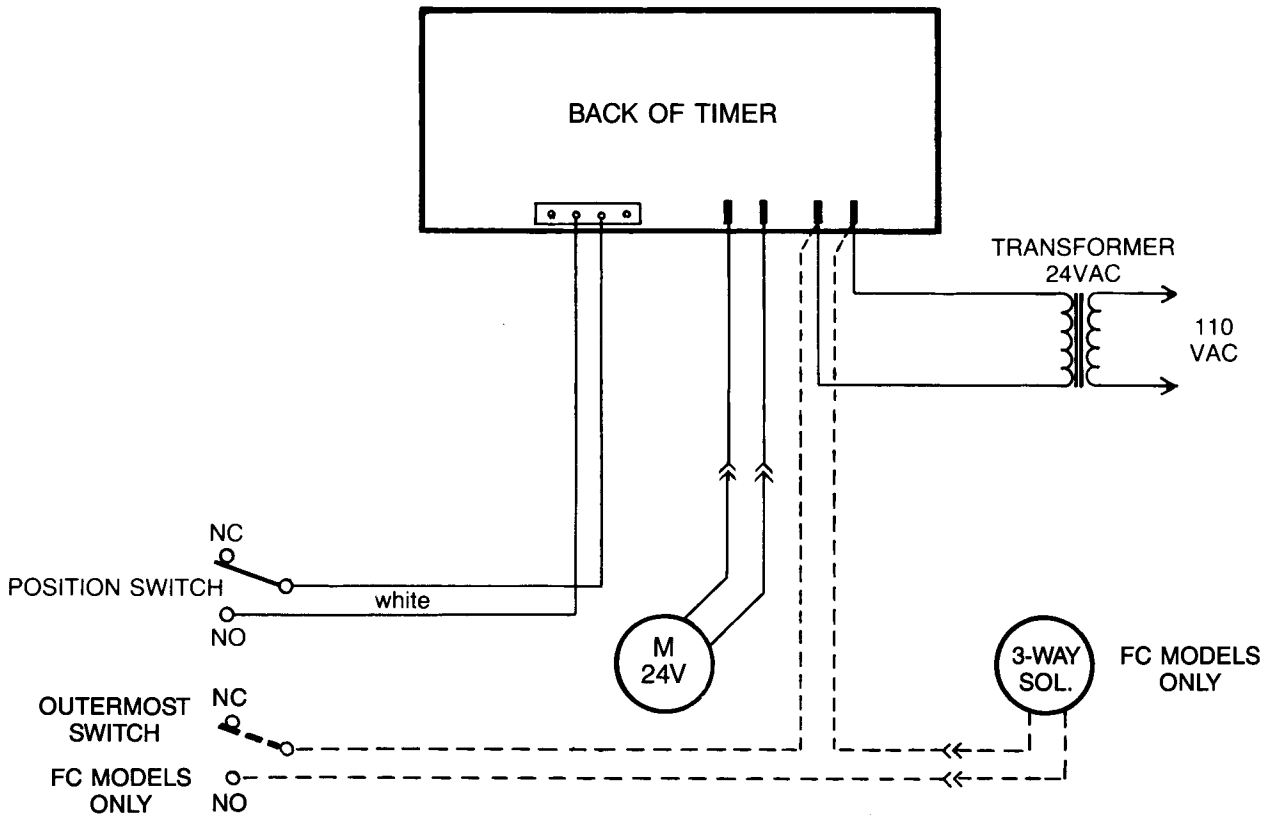
SOLID STATE TIMER

FILL② CYCLE TIME (MIN.)	LOW	3	5	8	12	10	15	19
	DEFAULT	16	16	16	16	16	16	16
	HIGH	16	21	27	42	36	42	50
RECOM'D. BRINING/ BR. RNS. TIME (MIN.)	LOW SALT	114	152	117	157	149	162	203
	MED. SALT	76	101	75	102	99	104	129
	MAX. SALT	73	98	64	92	91	87	105
BACKWASH CYCLE TIME (MIN.)③		12	12	12	12	12	12	12
FAST RINSE CYCLE TIME (MIN.)③		4	4	4	4	4	4	4

②See pages 14 and 15. ③Factory default setting...see page 15.

SERVICE INFORMATION, SOLID STATE TIMER MODELS

WIRING SCHEMATIC



SOLID STATE TIMER MODELS TROUBLESHOOTING

ALWAYS MAKE THESE **INITIAL CHECKS** FIRST

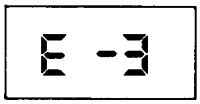
1. Does the time display show the correct time of day?
   - . . If display is blank, check power source to the Eco System.
   - . . If time is flashing, power was off for over 48 hours. The Eco System resumes normal operation but regenerations occur at the wrong time.
   - . . If an error code (Example: E-3) shows in the timer display, see AUTOMATIC ELECTRONIC DIAGNOSTICS, PAGE 32.
2. Plumbing bypass valve(s) must be in service position (see figure 12, page 11).
3. The inlet and outlet pipes must connect to the Eco System valve 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 ft. above the floor.
6. Is there salt in the brine tank?
7. Is the brine tubing connected properly (fig. 10, page 10)?

If you do not find the problem after making the initial checks, do the MANUAL ADVANCE DIAGNOSTICS.

SERVICE INFORMATION, SOLID STATE TIMER MODELS

AUTOMATIC ELECTRONIC DIAGNOSTICS

The face plate has a self-diagnostic function for the electrical system (except input power). The face plate 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 SET/CLEAR button. The SET/CLEAR remains operational so the service person can make the MANUAL ADVANCE DIAGNOSTICS to further isolate the defect.

CODE	POSSIBLE DEFECT MOST LIKELY ➤ ➤ LEAST LIKELY
Err 01	motor inoperative / wiring harness or connection to position switch / switch / faceplate
Err 02, Err 03	faceplate / valve defect causing high torque
Err 04	faceplate / position switch

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.

MANUAL ADVANCE DIAGNOSTIC

Use the following procedures to advance the Eco System Unit valve through the regeneration cycles to check operation.

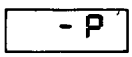
Remove the top cover to observe cam and switch operation during valve rotation.

DISPLAY MUST SHOW TIME AND DAY

1. Press and hold SET/CLEAR for 3 seconds until 18:88 displays.
2. Press RECHARGE DAY to display the position switch open or closed indicator.

NOTE: On FC models only, 2 switches are used. The outermost switch controls solenoid operation, and is not included in this diagnostic. The position switch is inboard.

The letter (P) and dash or dashes indicate position switch operation. The letter shows if the switch is closed. A dash shows when the switch is open.



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

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

NOTES:

While in manual advance, the time display will automatically return to the present time, if a face plate button is not pressed within 4 minutes.

continued

SERVICE INFORMATION, SOLID STATE TIMER MODELS

3. To enter FILL cycle, press and **hold** ON/OFF VACATION for 3 seconds to start the gear motor.
   a. If the gear motor does not run, check the motor and all wiring connections.
   b. Check for fill water flow to the brine tank. If water **does not** enter the tank, look for an obstructed nozzle and venturi, fill flow plug or brine tubing.
4. After observing fill, press the ON/OFF, HOLD button to move the Eco System 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.

*If the DOUBLE BACKWASH option is set, the Eco System will enter backwash and then fast rinse, before brining (see page 16).

NOTE: Be sure a salt bridge is not preventing water from contacting salt (see page 29).

a. If the Eco System does not draw brine. . .
   . . . nozzle & venturi dirty or defective (page 29 or 30)
   . . . nozzle & venturi not seated on gasket, or gasket defective
   . . . restriction in valve drain, causing backpressure (bends, kinks, elevated too high, etc., see installation step 5)
   . . . obstruction in brine valve, or brine tubing (see repair parts page 39 or 40)
   . . . inner valve failure (obstruction in outlet disc, wave washer defective, etc.)
   . . . inlet side diaphragm on superflow valve not fully closed (plugged pressure tubing, ruptured diaphragm, defective solenoid, etc.)

5. Again press ON/OFF, HOLD to move the Eco System 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.
6. Press ON/OFF, HOLD to move the Eco System into fast rinse. Again look for a fast drain flow. Allow the Eco System to rinse for a few minutes to flush out any brine that may remain in the resin tank from the brining cycle test.
7. To return the Eco System to service, press ON/OFF, HOLD once.
8. Upon returning to service, press RECHARGE DAY to display 18:88.
9. Press SET/CLEAR to return the present time.

OTHER SERVICE

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

1. Defective inlet disc, seal, or wave washer (see key nos. 8-10, page 42)
2. Missing or defective o-ring(s) at resin tank to valve connection (see key no. 4, page 38, or key no. 35, page 44.

WATER LEAKS FROM DRAIN HOSE (during service).

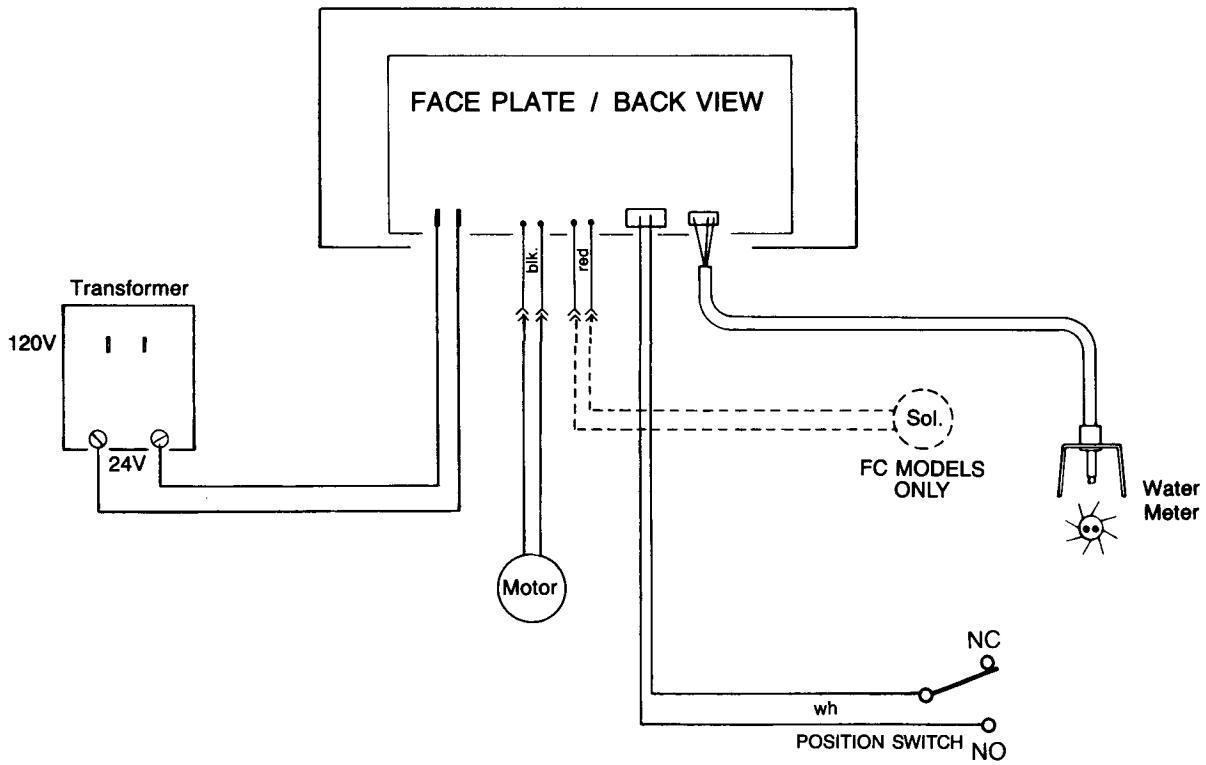
1. Defective inlet disc, seal, or wave washer.
2. Defective o-ring on inlet disc shaft.
3. Defective outlet disc, seal, or wave washer.

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.
3. Left side (facing front) superflow diaphragm seal or seat worn or defective.

SERVICE INFORMATION, ELECTRONIC DEMAND TIMER MODELS

WIRING SCHEMATIC



CHECKING THE MODEL CODE ENTRY

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: FOR PROPER TIMER OPERATION, YOU MUST SET THE CORRECT MODEL CODE. . .SEE PAGE 17.

1. Press SELECT and **hold** for 3 seconds to enter the secondary mode.
2. Press SELECT again and **hold** 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 time (page 17) and reselect other desired options.

E.A.S.E: EcoWater demand timers have the latest diagnostic technology. With E.A.S.E., or Electronic Automated Service Evaluation, a service person, or the commercial system operator, 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.

SERVICE INFORMATION, ELECTRONIC DEMAND TIMER MODELS

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 Eco System.
   ...If time is flashing, power was off for over 2 days. The Eco System resumes normal operation but regenerations occur at the wrong time.
   ...If an error code (Example: Err 03) shows in the face plate display, go to AUTOMATIC ELECTRONIC DIAGNOSTICS, BELOW.

2. Plumbing bypass valve(s) must be in FULL SERVICE position.

3. The inlet and outlet pipes must connect to the Eco System 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 ft. above the floor.

6. Is there salt in the brine tank?

7. Is the brine tubing connected properly (fig. 10, page 10).

8. Press the SELECT button 2 times to display the hardness setting. Be sure it is the correct setting for the 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 twice more to return present time in the display.

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 36) to further isolate the defect, and check the water meter.

CODE	POSSIBLE DEFECT MOST LIKELY ➤ ➤ LEAST LIKELY
Err 01	motor inoperative / wiring harness or connection to position switch / switch / faceplate
Err 02	wiring harness or connection to position switch / switch / faceplate
Err 03	faceplate / valve defect causing high torque
Err 04	faceplate / position switch
Err 05	faceplate

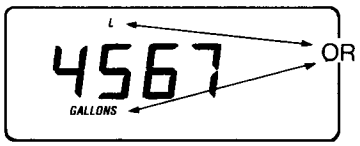
PROCEDURE FOR REMOVING ERROR CODE FROM FACEPLATE:

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.

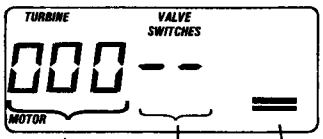
SERVICE INFORMATION, ELECTRONIC DEMAND TIMER MODELS

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. Continue to press SELECT until the following display shows.



WATER METER - See Ⓐ.
SWITCHES - See Ⓑ.
VALVE CYCLE POSITION INDICATOR BARS - See Ⓒ.

Ⓐ. 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 151 (continual) ALL FA MODELS	= repeats display for each gallon of water passing through the meter.
000 to 45 (continual) FC MODELS	

If you don't get a reading in the display. . .

FA MODELS (Fig. 15, page 23):

Pull the sensor from the water meter at the valve outlet port. Pass a small magnet back and forth in front of the sensor. You should get a reading in the display. If you get a reading, unhook the outlet plumbing and check the turbine for binding.

FC MODELS (Fig. 16, page 23):

Turn off the water and remove the turbine, sensor and support assembly from the meter housing. Check the turbine for free movement. If you **don't** get a reading, use a Turbine, Sensor and Support Assembly that you know is good to check the circuit board. If you still do not get a reading, the circuit board is defective.

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

Ⓑ. The letter (P) and dash or dashes indicate position switch operation. The letter shows if the switch is closed. A dash shows when the switch is open.

NOTE: The switch is located on the outlet cover of the 1" valve assembly.

Use the RECHARGE button to manually advance the valve into each cycle and check correct switch operation.

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

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

Ⓒ. When advancing the valve through the recharge cycles, the charge bar indicates valve positioning as follows.

INDICATOR BARS	VALVE CYCLE POSITION
bar(s) flashing	valve moving from 1 position to another
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.

continued

SERVICE INFORMATION, ELECTRONIC DEMAND TIMER MODELS

. . . 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 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 hold in for 3 seconds. RECHARGE begins to flash as the Eco System 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, brine tubing or brine valve.
2. After observing fill, press the RECHARGE button to move the Eco System 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.

*If the 2ND BACKWASH option is set, the Eco System will enter backwash and then flash rinse, before brining (see page 22).

NOTE: Be sure a salt bridge is not preventing water from contacting salt.

a. If the Eco System does not draw brine. . .

. . . nozzle and venturi dirty or defective (page 29 or 30)

. . . nozzle and venturi not seated on gasket, or gasket defective

. . . restriction in valve drain, causing backpressure (bends, kinks, elevated too high, etc., see installation step 5)

. . . obstruction in brine valve, or brine tubing (see repair parts page 39 or 40)

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

. . . inlet side diaphragm on superflow valve not fully closed (plugged pressure tubing, ruptured diaphragm, defective solenoid, etc.)

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

3. Again press RECHARGE to move the Eco System 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 Eco System into fast rinse. Again look for a fast drain flow. Allow the Eco System 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 Eco System to service, press RECHARGE once.

OTHER SERVICE

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

1. Defective inlet disc, seal, or wave washer (see Key Nos. 8-10, page 42)
2. Missing or defective o-rings(s) at resin tank to valve connection (see Key No. 4, page 38, or Key No. 35, page 44.

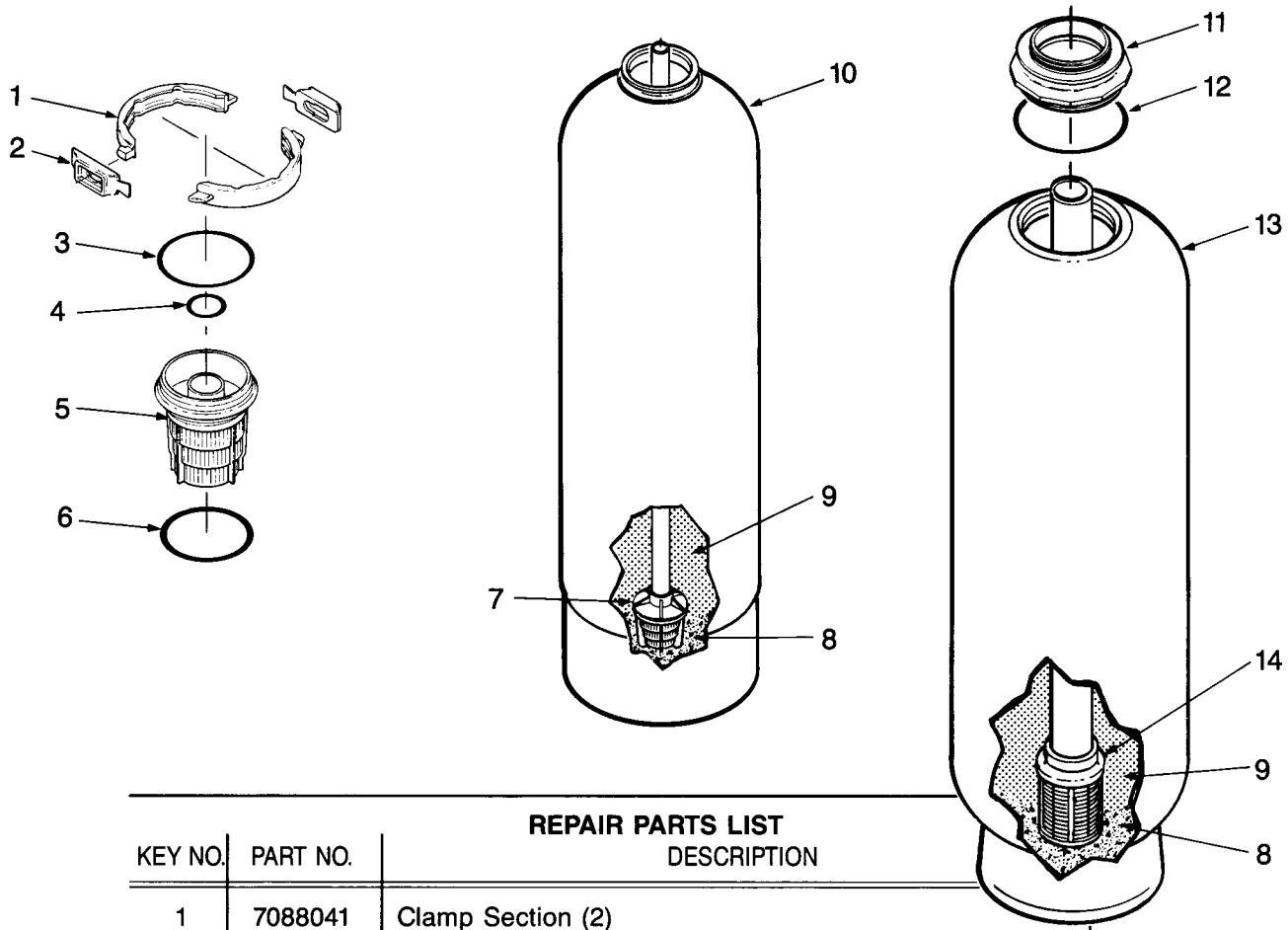
WATER LEAKS FROM DRAIN HOSE (during service).

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.
3. Left side (facing front) superflow diaphragm seal or seat worn or defective.

REPAIR PARTS...RESIN TANK ASSEMBLIES



REPAIR PARTS LIST

KEY NO.	PART NO.	DESCRIPTION
1	7088041	Clamp Section (2)
2	7088033	Clamp Retainer (2)
3	7079092	O-Ring, 2-7/8" I.D. x 3-1/4"
4	900215	O-Ring, 13/16" I.D. x 1-1/16"
5	7077870	Top Distributor
6	7096183	O-Ring, 2-3/4" I.D. x 3"
7	7127895	Repl. Distributor (bottom)-FA Models
8	7124415	Gravel, Fine - 17 lbs.
	7124423	Gravel, Fine - 50 lbs.
	7127073	Gravel, Med. - 50 lbs.
	4104600	Gravel, Course - 50 lbs.
9	502272	Resin, 1 cu. ft.
10	7123922	Resin Tank (12" Dia. x 54")-Model 5050, 5070①
	7123930	Resin Tank (17" Dia. x 58")-Models 5100, 5130①
11	7124774	Tank Adaptor-FA Models 5192, 5256, 5320
12	9001100	O-Ring, 4-1/8" I.D. x 4-1/2"
13	7144805	Resin Tank (24" Dia. x 72")- Models 5192, 5256, 5320
14	7150597	Distributor (bottom)-FC Models 5256, 5320, 5192②

see page 30 for amount required

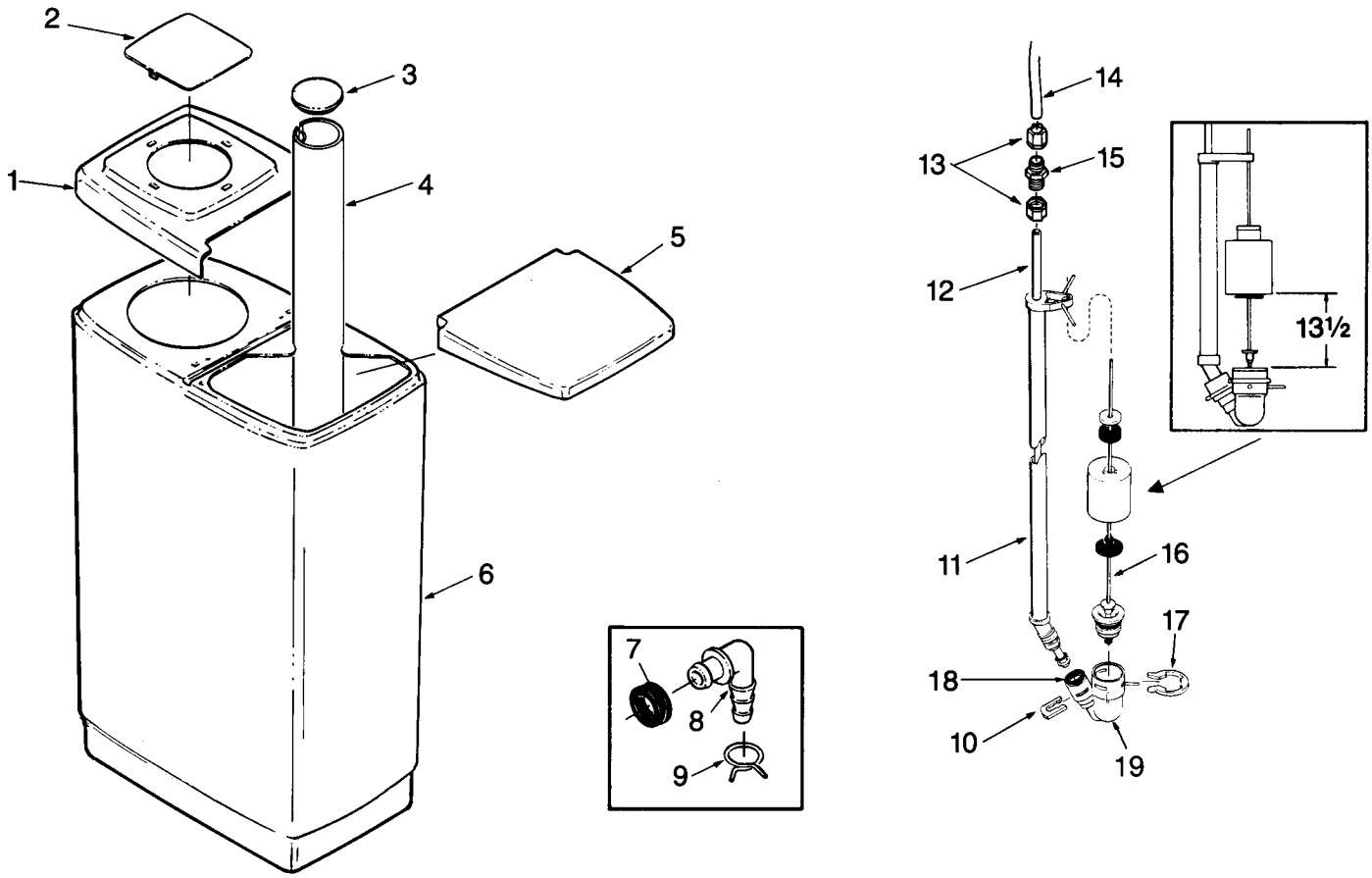
①Includes Key Nos. 1 thru 7

②Be sure to check length...page 6

③

OPTIONAL, FOAM TANK WRAPS:
#7129245 - Models 5050, 5070
#7129253 - Models 5100, 5130
#7129279 - Models 5256, 5320

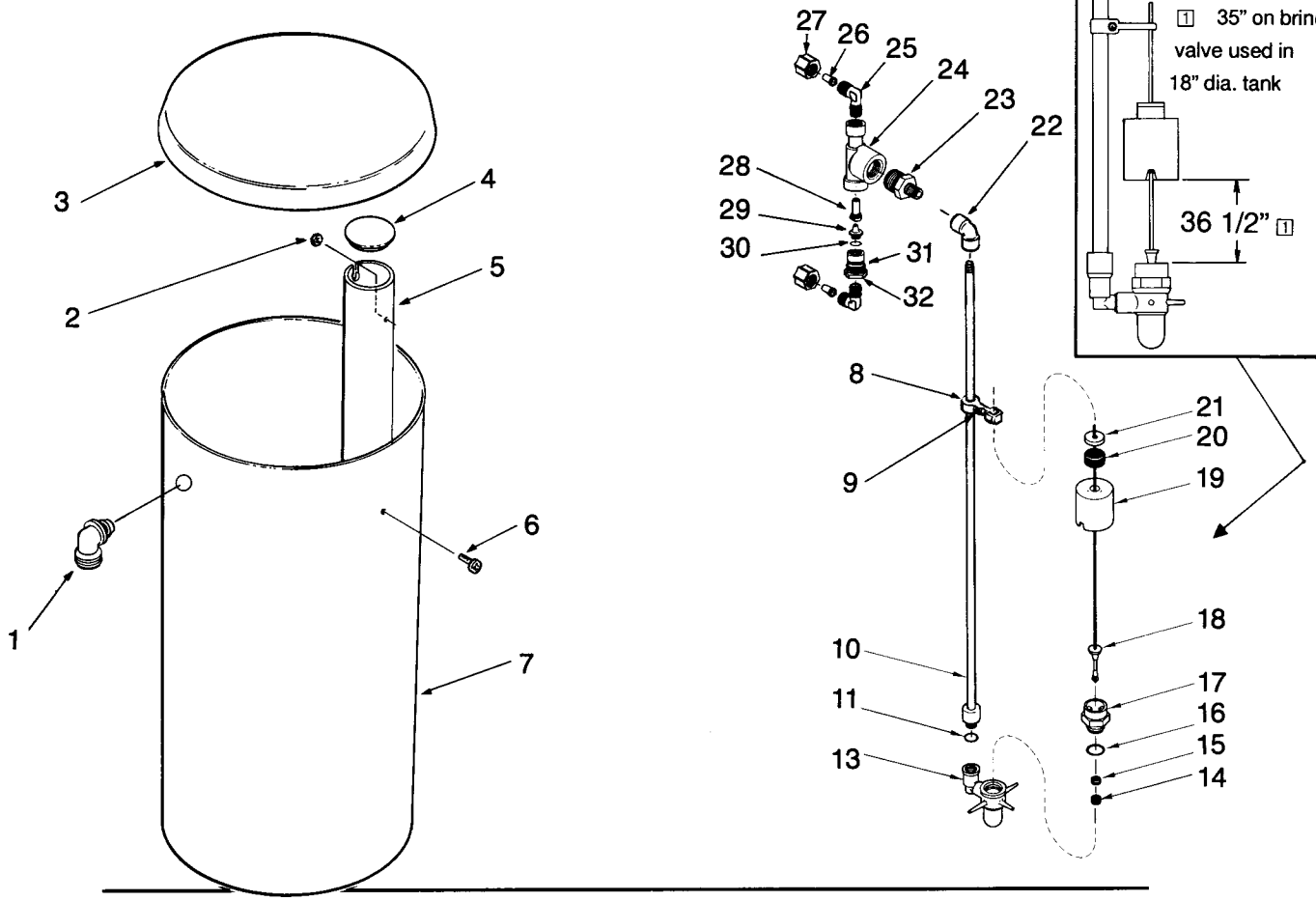
REPAIR PARTS. . . RECTANGULAR BRINE TANK



REPAIR PARTS LIST

KEY NO.	PART NO.	DESCRIPTION	
1	7096256	Rear Cover	
2	7096921	Cover	
3	500283	Brinewell Cover	
4	7100819	Brinewell	
5	7096264	Salt Hole Cover	
6	7114795	Brine Tank	
7	9003500	Grommet	
8	1103200	Hose Adaptor Elbow	
9	900431	Hose Clamp	
10	7080653	Clip	
11	7095470	Brine Tube	
12	7113016	Tube Assembly, B.V.	
13	9003201	Nut-Ferrule	not included - use for remote brine tank location
14	0010316	Tubing (order length needed)	
15	7094987	Union Connector	
16	7113008	Float, Stem & Guide Assembly	
17	1205500	Clip	
18	7131365	Screen	
19	7092252	Brine Valve Body	
■	7116488	Brine Valve Assembly (Includes Key Nos. 10-12, 16-18)	

REPAIR PARTS...ROUND BRINE TANKS



REPAIR PARTS LIST

KEY NO.	PART NUMBER 18" DIA. B.T.	PART NUMBER 26" DIA.B.T.	DESCRIPTION
1	523819		Drain Elbow
2	120375		Nut, 1/4-20 (2)
3	7124588		Brine Tank Cover
	—	7055187	Brine Tank Cover
4	1160300		Brinewell Cover
5	7124596	—	Brinewell
	—	1160200	Brinewell
6	900296		Screw, 1/4-20 x 5/8 (2)
7	7127861	—	Brine Tank
	—	7127853	Brine Tank (includes cover, Key No. 3)
8	1222400	—	Float Rod Guide
	—	1112200	Float Rod Guide
9	9006071		Screw, #6-20 x 7/8"
10	7124619	—	Riser Pipe
	—	2160103	Riser Pipe
11	900240		O-Ring, 7/16" x 9/16"
12			
13	502467		Elbow - Body
14	516924		Retainer, Bottom Seal

REPAIR PARTS LIST CONTINUED...NEXT PAGE.

REPAIR PARTS. . .ROUND BRINE TANKS

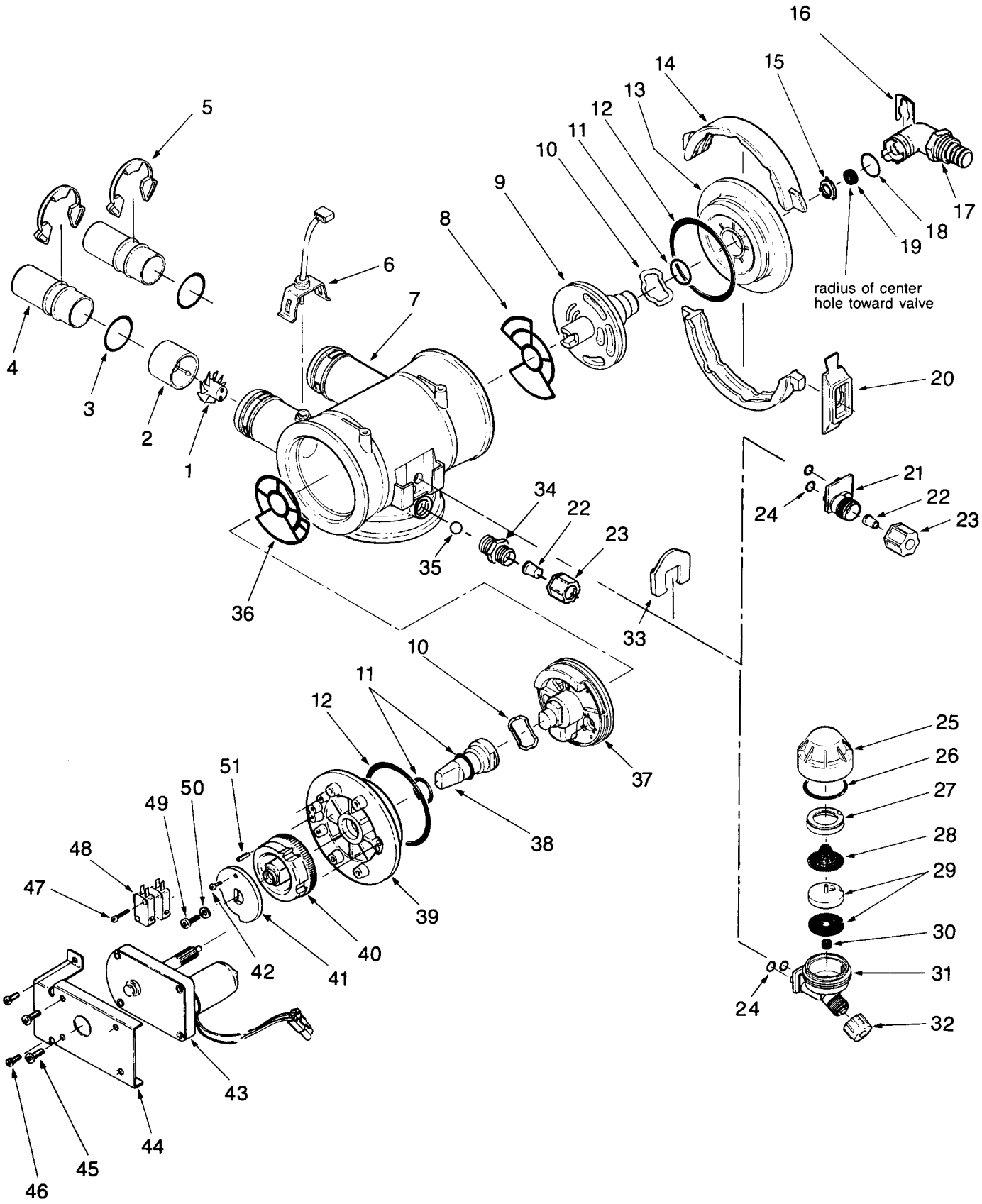
REPAIR PARTS LIST - Continued

KEY NO.	PART NUMBER 18" DIA.B.T.	PART NUMBER 26"DIA.B.T.	DESCRIPTION
15	516211		Bottom Seal
16	900186		O-Ring, 7/8" x 1"
17	517030		B.V. Nut
18	2262800	—	Float Rod and Stem
	—	2174500	Float Rod and Stem
19	2220300		Float Assembly
20	513860		Float Stop
21	505957		Lead Washer
22	9043000	—	Elbow, 1/4" NPT
	—	9007700	Elbow, 1/2" NPT
23	2129502	—	Reducer Bushing, 1/2" NPT x 1/4" NPT, (.3 gpm)
	—	7128401	Bushing, 1/2" NPT x 1/2" NPT, (.5 gpm)
24	1109600		Housing, Nozzle and Venturi
25	9004503		Elbow (2)
26	9021500		Tubing Insert (2)
27	9003203		Nut (2)
■	7010315		Tubing, 3/8" (order length needed)
28	7126645	—	Venturi, Almond (Models 5100 and 5130)
	—		
	—	7127772	Venturi, Gray (Models 5256, 5320
29	7126637	—	Nozzle, White (Models 5100 and 5130)
	—		
	—	7127764	Nozzle, Gray (Models 5256, 5320
30	900240		O-Ring, 7/16" x 9/16"
31	900041		O-Ring, 5/8" x 13/16"
32	1109710		Nozzle Housing
■	—	7019440	Clamp (holds brine valve to brine tank)
■	—	811415	Screw, #10-32 x 3/4
■	—	7041722	Nut, #10-32
■	7124601	—	Brine Valve Assembly] includes Key Nos.
	—	7127780	Brine Valve Assembly] 8 thru 24 and 28 thru 32

LITERATURE KITS, PARTS BAGS, MISC.

#7116200 Lit. Kit - included with FA models
#7124041 Lit. Kit - included with FC models
#4922701 Parts Bag - included with round brine tanks
#7128388 Parts Bag - included with controller (contains parts needed to connect 3-way solenoid to valve)
#7083122 Bypass Valve (optional)
#7128825 No Bypass Kit (optional)

REPAIR PARTS. . .1" VALVE ASSEMBLY



REPAIR PARTS. . .1" VALVE ASSEMBLY

REPAIR PARTS LIST

KEY NO.	PART NO.	DESCRIPTION	KEY NO.	PART NO.	DESCRIPTION
1	7123061	Turbine Assembly– ED/FA models	27	7089893	Screen Support ②
2	7119177	Turbine Mounting Assem.– ED/FA models	28	7146043	Screen ②
	7078240	Turbine Support– all models except above	29	7114533	Nozzle & Venturi– Gasket Kit (blue) ②
3	7083106	O–ring, 1.109" I.D. x 1.387 (2)	30	1148800	Flow Plug, .3 gpm ②
4	7077642	Copper Tube, 1" (2)	31	7085247	Nozzle & Venturi Assembly ② ③
	7129203	Adaptor Fitting, 1–1/2" – OPTIONAL	32	1202600	Nut Ferrule ②
5	7089306	Clip Retainer (2)	33	7081201	Clip
6	7096997	Sensor Housing– ED/FA models	34	7147992	Connector
7	7159949	Disc Valve Housing– 5050, 5070 models	35	7075632	Ball, Check
	7159957	Disc Valve Housing– all other models	36	7078274	Outlet End Seal ①
8	7078282	Inlet End Seal ①	37	7114224	Outlet Disc ①
9	7078591	Inlet Disc ①	38	7091329	Driver, Outlet Disc
10	7058216	Wave Washer (2)	39	7159965	Outlet End Cap
11	0900208	O–ring, 3/4" I.D. x 15/16" (3) ①			
12	7079092	O–ring, 2–7/8" I.D. x 3–1/4"	40	7147730	Cam & Gear
13	7077498	Inlet End Cap		7140940	Cam & Gear ④
14	7088041	Clamp Section (6,– 4 not shown)	41	7140770	Cam ④
15	7030585	Washer (backup)	42	7012367	Screw, #8 – 32 x 3/4" ④
16	7142942	Clip	43	7147049	Motor
17	7141239	Drain Hose Adaptor	44	7147057	Motor Bracket
18	0900041	O–ring, 5/8" I.D. x 13/16"	45	7149928	Screw, #10 – 32 x 1/2" (4, 2 not shown)
19	1110700	Flow Washer, 5 gpm– 5050 & 5070 models		0811297	Lockwasher, #10 (4, not shown – used with key no 45)
	1110800	Flow Washer, 10 gpm– 5100 & 5130 mod.	46	7103972	Screw, #8 – 18 x 7/16" (2)
	1110900	Flow Washer, 10 gpm– 5192 to 5320 mod.	47	7140738	Screw, #4 – 24 x 3/4"
20	7088033	Clamp Retainer (6,– 5 not shown)		7070412	Screw, #4 –24 x 1–1/8" ④
21	7128760	Adaptor, 3/8" Tube	48	7145186	Switch (2 required on FC solid state model)
22	9021500	Tubing Insert (3)	49	9006012	Screw, #8 – 18 x 9/16"
23	9003203	Nut, 3/8" Tube (3)	50	9005900	Washer, #6
24	0900064	O–ring, 1/4" I.D. x 3/8" (2)	51	7140746	Expansion Pin
25	7081188	Cap			
26	7039068	O–ring, 1–3/16" I.D. x 1–3/8" ②			

[1] **DO NOT** use the DC motor with faceplate–timers having a software version **under 5.1** (Demand), or **under 4.0** (solid state). Refer to manual #7124473 for correct parts to use.

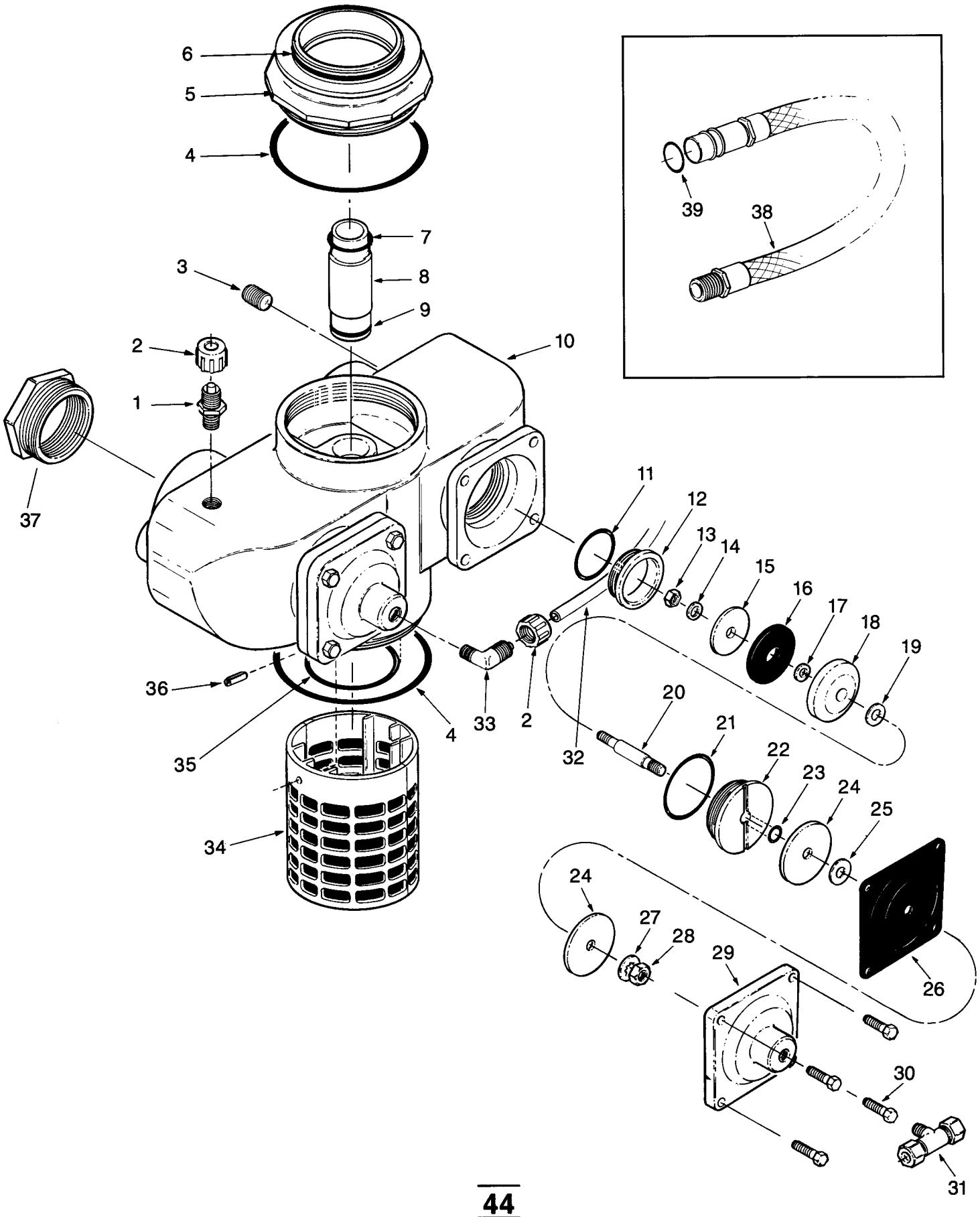
① Parts included in Disc Kit, Part No. 7116739.

② Used on 5050 and 5070 models only.

③ Includes Key Nos. 25 through 30.

④ Used on FC solid state timer models only.

REPAIR PARTS. . . 2" SUPERFLOW VALVE ASSEMBLY

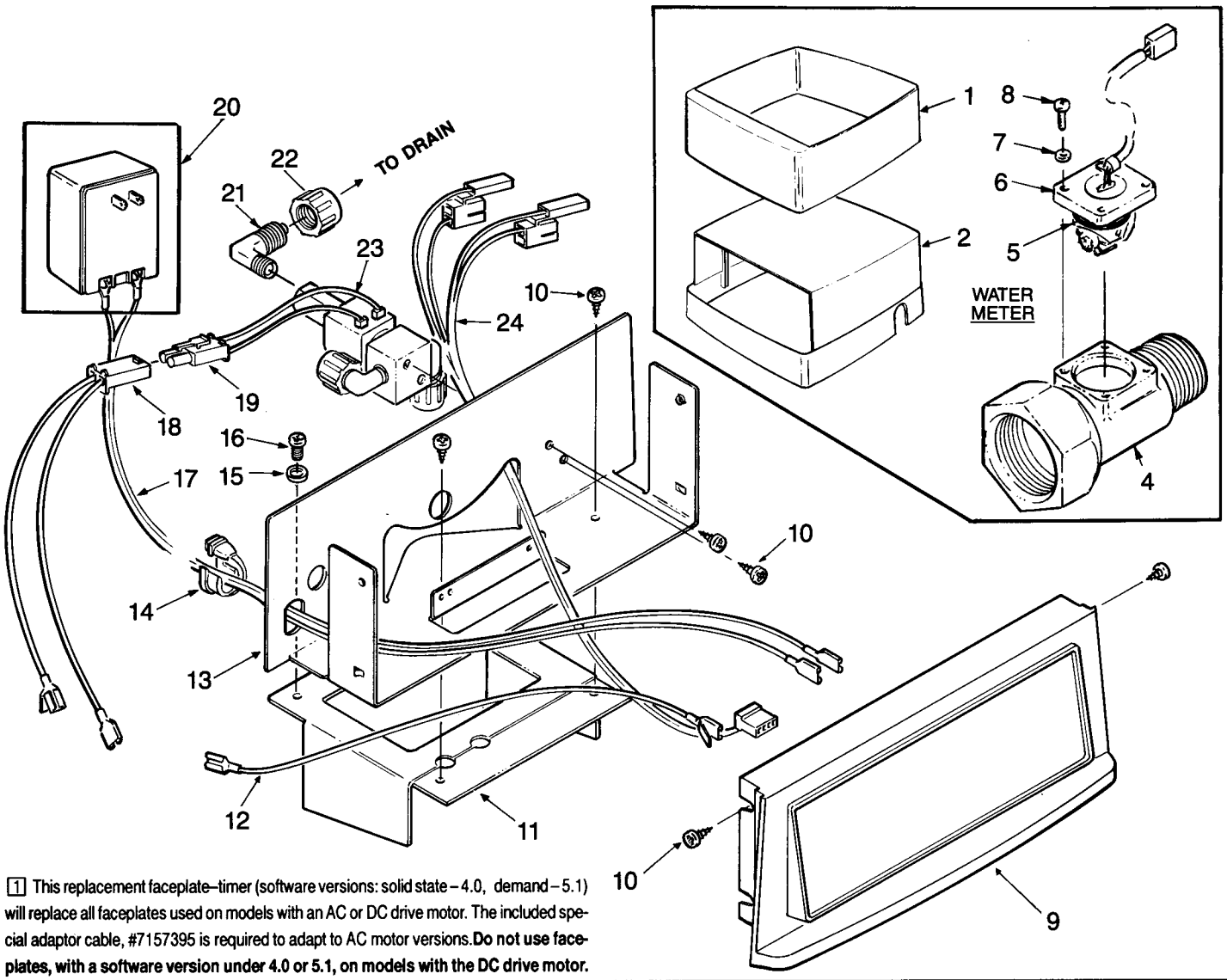


REPAIR PARTS. . .2" SUPERFLOW VALVE ASSEMBLY

REPAIR PARTS LIST

KEY NO.	PART NO.	DESCRIPTION
1	7011816	Hose Adaptor (Includes Key No. 2)
2	1202600	Nut-Ferrule (2)
3	7092024	Pipe Plug, 1/4" NPT
4	9001100	O-Ring, 4-1/8" I.D. x 4-1/2" (2)
5	7124342	Tank Adaptor
6	7079092	O-Ring, 2-7/8" I.D. x 3-1/4"
7	900215	O-Ring, 13/16" I.D. x 1-1/16"
8	7123972	Extension Tube
9	7003740	O-Ring, 15/16" I.D. x 1.13"
10	7124766	Superflow Valve (Includes 2 ea. of Key Nos. 11 thru 30)
11	9000800	O-Ring, 1-1/2" I.D. x 1-5/8" (2)
12	1106910	Lower Seat (2)
13	9005303	Hex Nut (2)
14	9002200	Lockwasher (2)
15	1107000	Plate Disc (2)
16	1107100	Rubber Disc (2)
17	1107200	Spacer Disc (2)
18	1107300	Retainer Disc (2)
19	1107500	Static Gasket (2)
20	1107400	Shaft (2)
21	900115	O-Ring, 1-3/4" x 1-15/16" (2)
22	1107600	Retainer (2)
23	900007	O-Ring, 3/8" I.D. x 9/16" (2)
24	1107800	Diaphragm Plate (4)
25	1107700	Static Gasket (2)
26	1107900	Diaphragm (2)
27	9002201	Lockwasher (2)
28	9005302	Hex Nut (2)
29	1108000	Diaphragm Cap (2)
30	9006017	Screw, 1/4-20 x 3/4" (8)
31	900347	Tee
	9042200	Ferrule (2)
	9042300	Tubing Insert (2)
	811507	Nut (2)
32	0010027	Tubing (order length needed)
33	7011785	Elbow (Includes Key No. 2)
34	2221200	Top Distributor
35	9001102	O-Ring, 2.35" x 2.77"
36	9005802	Spring Pin (2, 1 not shown)
37	9007906	Reducer, 2" x 1-1/2" (ED-FC Models)
38	7123980	Flexible Tubing Assembly (2)
39	7083106	O-Ring, 1.109 I.D. x 1.387 (2)
■	7128922	Diaphragm Repair Kit (Includes Key Nos. 16, 20, 21, 22, 23, 25 and 26

REPAIR PARTS. . . ELECTRICAL COMPONENTS AND ASSOCIATED PARTS



[1] This replacement faceplate–timer (software versions: solid state – 4.0, demand – 5.1) will replace all faceplates used on models with an AC or DC drive motor. The included special adaptor cable, #7157395 is required to adapt to AC motor versions. **Do not use faceplates, with a software version under 4.0 or 5.1, on models with the DC drive motor.**

REPAIR PARTS LIST

KEY NO.	PART NO.	DESCRIPTION	KEY NO.	PART NO.	DESCRIPTION
1	7049615	Window	12	7124033	Leadwire – solid state FC models
2	7116195	Cover	13	7014076	Baseplate
3	7108956	EcoWater Logo (not shown)	14	7001683	Strain Relief
4	7129499	Water Meter (Incl. Key Nos. 5 – 8)	15	0811297	Lockwasher, #10 (2)
5	7011086	O–ring	16	7103972	Screw, #8 – 18 x 7/16" (2)
6	7050519	Turbine, Sensor & Support (Incl. Key Nos. 5, 7 and 8)	17	7084330	Power Cable
			18	7116234	Wire Harness, SS – FC models only
7	0810037	Washer (4)	19	9028300	Male Connector – FC models only
8	7149928	Screw, #10 32 x 1/2" (4)	20	7022207	Transformer, 24V – 50 VA
9	7159850	Faceplate–Timer, Solid State [1]	21	7011785	Elbow – FC models only
	7159842	Faceplate–Timer, Elec. Demand [1]	22	1202600	Nut Ferrule – FC models only
10	9006033	Screw, #8 – 32 x 5/16" (6)	23	7011191	Solenoid, 3 – Way – FC models only
11	7116179	Support Bracket	24	7130767	Wire Harness

SERIES 5000 — NO BY-PASS KIT
#7128825

1. Make 2 assemblies, like the one shown in figure 1, turning the nut on until snug and all parts are held together.

CAUTION: IF THE SYSTEM IS ALREADY IN SERVICE, BE SURE TO TURN OFF WATER TO THE SERIES 5000, AND TO RELIEVE PRESSURE BY OPENING A FAUCET, OR ADVANCING THE VALVE INTO A RECHARGE POSITION.

2. Remove the valve, outlet side clamp retainers and clamps. With motor attached, pull the outlet end cap from the valve. Remove the o-ring seal, wave washer and outlet disc . . . figure 2.

3. Looking at figure 3, place one of the plug assemblies into one of the two indicated ports and begin tightening the screw. BE SURE THE SCREW HEAD IS FULLY INSIDE THE PORT SO IT WILL NOT INTERFERE WITH THE OUTLET DISC (see cut-away). Tighten the screw until the rubber seals are spread tightly against the port walls, and the screw will no longer turn.

4. Repeat step 3 using the remaining plug assembly in the other port.

5. Reassemble the valve.

FIGURE 1

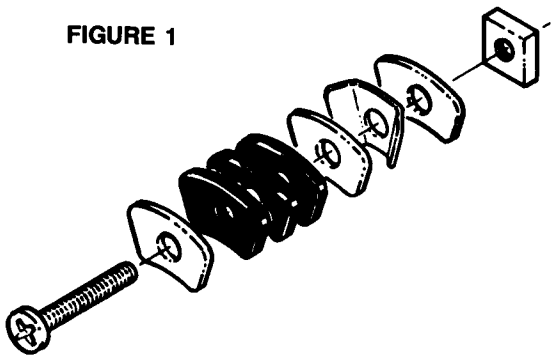


FIGURE 2

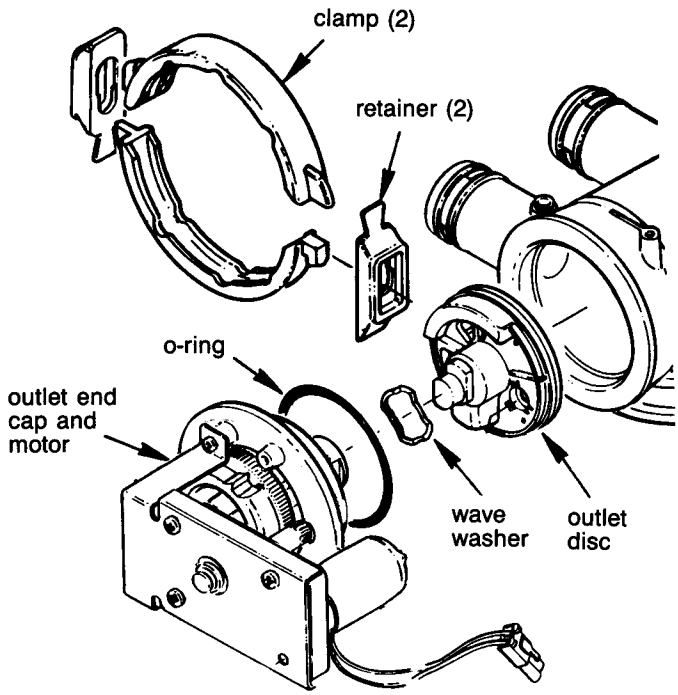


FIGURE 3