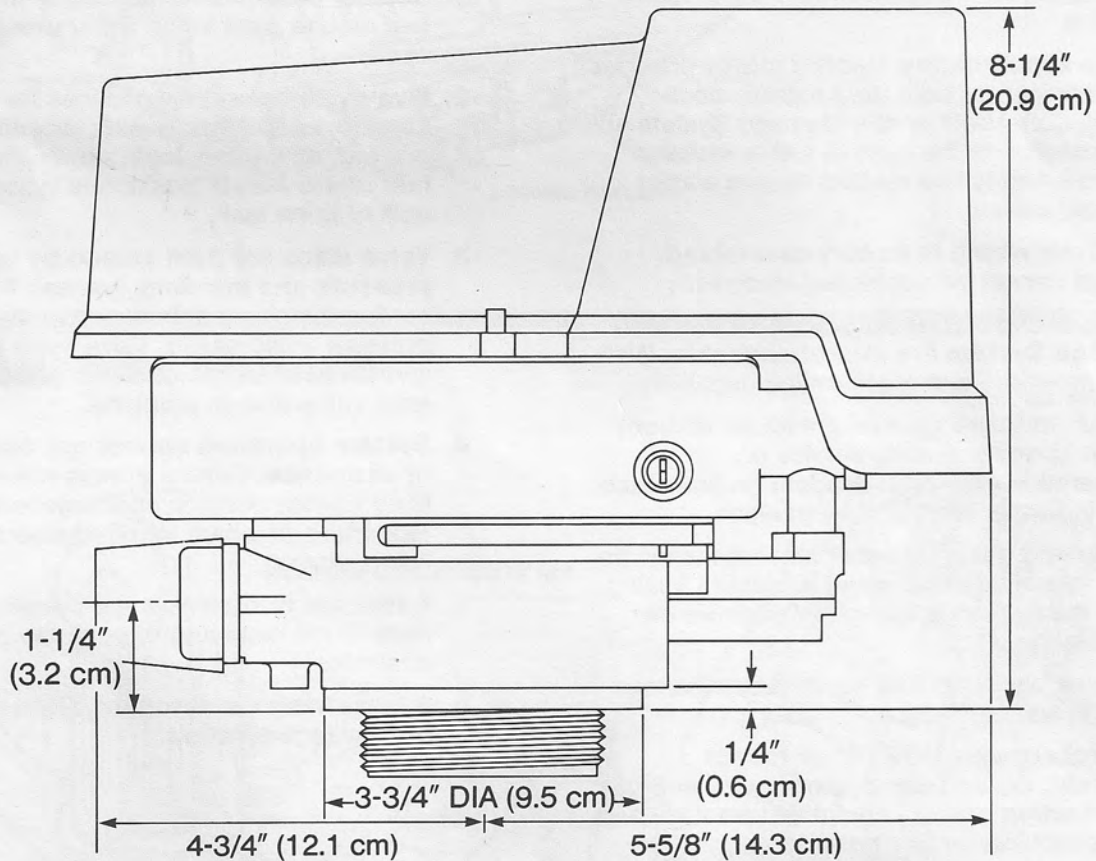


# Series 155

# Water Conditioner Control System

## INSTALLATION, OPERATION & MAINTENANCE MANUAL



# Control Module

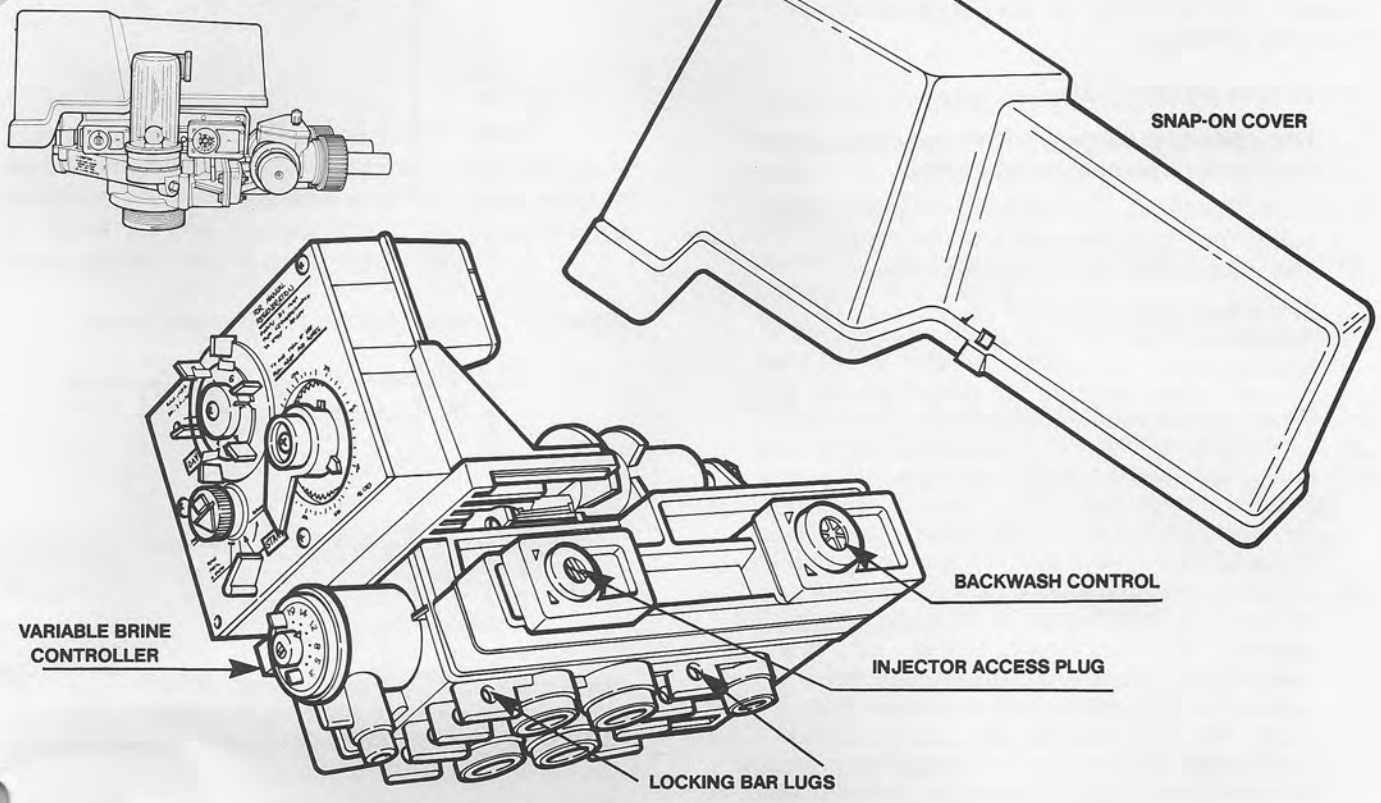


Figure 1

# Tank Adapter Module

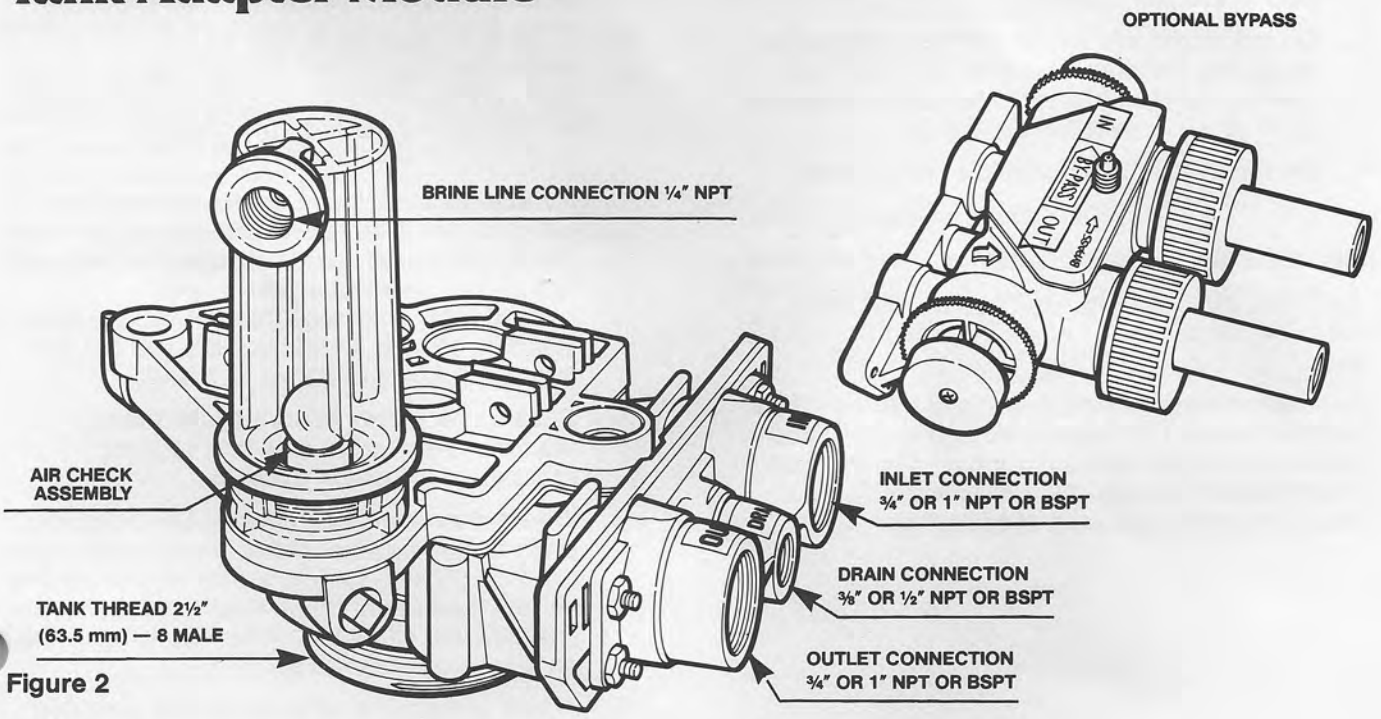


Figure 2

# INTRODUCTION

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The Series 155 control system combines design simplicity with fiberglass construction to provide the user with an uncommonly reliable appliance. The inherent reliability of the system means a long life of efficient, trouble-free, uninterrupted soft water luxury.

Should maintenance become necessary, the Series 155 offers a unique "separation" capability which is illustrated in this manual.

Of interest to both the owner and his water conditioning dealer are the design and operation benefits detailed below.

## SUPERIOR DESIGN

1. **Fewer parts** than any control system of comparable function and most controls of lesser function.
2. **Single synchronous electric motor** provides all the power for both the program clock (timer), Sensatrol® or 460 Demand System and the operation of the control. Other systems use from two to five electric motors and/or solenoid valves.
3. **Electrical wiring is factory assembled.** System cannot be connected incorrectly.
4. **Program clock (timer), Sensatrol and 460 Demand System are interchangeable.** Both units provide guest regeneration capability.
5. **System indexes manually with or without power** to any one of its service or regeneration positions. Readout on timer face plate indicates control valve position.
6. **No moving parts in water stream** means no close tolerance dimensions subject to fouling. Thus, the system is especially effective on iron-bearing water.
7. **No dynamic seals** that could cause leakage through wear or fatigue.
8. **Control accepts NORYL\* or brass manifold, or modular bypass valve without modification** offering complete versatility and easy plumbing for any installation.
9. **Brining control valve built into system** eliminates need for an external brine valve.
10. **System uses no top distributor,** thus removing one part susceptible to plugging on iron-bearing water.
11. **Automatic backwash controller** is incorporated in the system.

## SUPERIOR OPERATION

1. **Direct acting system** functions independently of water pressure. No pistons or diaphragms that require a minimum water pressure to operate.
2. **Five-cycle operation** provides for downflow **service**, upflow **backwash**, downflow **brining**, downflow **rinse**, downflow **purge or fast rinse**. A sixth position is included for time refill of brine tank.
3. **Valve discs are held closed by water pressure** and therefore, are leak tight. The sealing forces are **increased** as the water pressure is increased. Valve seats are in a vertical position, which is the design position least vulnerable to plugging.
4. **System operation cannot get out of phase or sequence.** Control always returns to a fixed service position after regeneration regardless of where in the regeneration cycle it was started.
5. **Adequate purge rates** are possible since fast rinse is not restricted through the backwash controller.
6. **Bypass water is automatically available during regeneration.**

# INSTALLATION

All plumbing must conform to local codes.

Inspect unit carefully for carrier shortage or shipping damage.

## LOCATION SELECTION

- A. The distance between the unit and a drain should be as short as possible.
- B. If it is likely that supplementary water treating equipment will be required, make certain adequate additional space is available.
- C. Since salt must be added periodically to conditioner, the location should be easily accessible.
- D. Do not install any unit closer to a hot water heater than a total run of 10 feet (3 m) of piping between the outlet of the conditioner and the inlet to the heater. Water heaters can sometimes overheat to the extent they will transmit heat back down the cold pipe into the unit control valve. Hot water can severely damage the conditioner. A 10 foot (3 m) total pipe run, including bends, elbows, etc., is a reasonable distance to help prevent this possibility. (A positive way to prevent hot water from flowing from heat source to the conditioner, in the event of a negative pressure situation, is to install a check valve in the soft water piping from the conditioner. **If a check valve is installed, make certain the water heating unit is equipped with a properly rated temperature and pressure safety relief valve. Also be certain that local codes are not violated.**)
- E. Do not locate unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 32°F (0°C) or over 120°F (49°C).
- F. Do not install unit near acid or acid fumes.

## WATER LINE CONNECTION

A bypass valve system must be installed since there will be occasions when the water conditioner must be bypassed for hard water or for servicing.

The most common bypass systems are the Autotrol Series 156 Bypass Valve (Figure 3) and plumbed-in globe valves (Figure 4). Though both are similar in function, the 156 Autotrol Bypass offers simplicity and ease of operation.

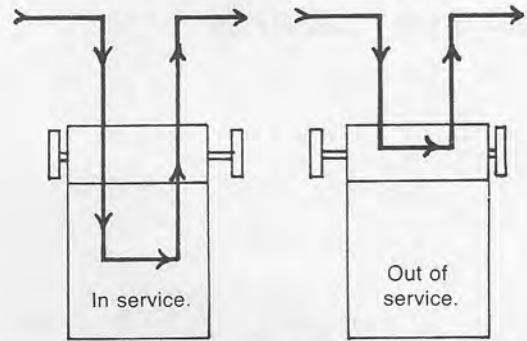


Figure 3. Autotrol Series 156 Bypass Valve.

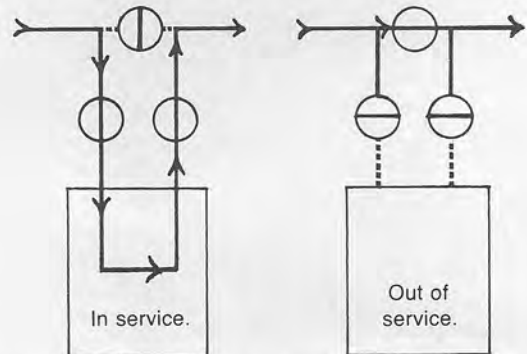


Figure 4. Typical globe valve bypass system.

## DRAIN LINE CONNECTION

- A. If ideally located, the unit will be above and not more than 20 feet (6.1 m) from drain. For such installations connect ½-inch (1.3 cm) I.D. plastic tubing to DRAIN LINE CONNECTION located on CONTROL (Figure 2).
- B. If unit is located more than 20 feet (6.1 m) from drain, use ¾-inch (1.9 cm) tubing for runs up to 40 feet (12.2 m). Also purchase adapter to bush tubing down to DRAIN LINE CONNECTION FITTING.
- C. If unit is located where drain line must be elevated, you may elevate the line up to 6 feet (1.8 m) providing the run does not exceed 15 feet (4.6 m) and water pressure at conditioner is not less than 40 psi (2.8 BAR). You may elevate an additional 2 feet (61 cm) for each additional 10 psi (0.7 BAR).  
**Caution — If unit has a sensor timer, maximum elevation is 4 feet (1.2 m) regardless of water pressure.**
- D. Where drain line is elevated but empties into a drain below the level of the control valve, form a 7 inch (18 cm) loop at the far end of the line so that the bottom of the loop is level with the DRAIN LINE CONNECTION. This will provide an adequate siphon trap.
- E. Where a drain line empties into an overhead sewer line, a sink-type trap must be used.

## CAUTION

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



Figure 5

**NOTE:** Standard commercial practices have been expressed here. Local codes may require changes to these suggestions.

## BRINE LINE CONNECTION

On two-tank model conditioners with separate brine tanks, it will be necessary to install the brine/regenerant tube and connect the line to the control valve air check (Figure 2).

Make sure the air check is snug, but not overly tight or breakage could occur. A tight air check seal can be obtained by wrapping Teflon\* tape around the tank adapter stem. Be sure all fittings and connections are tight so that premature checking does not take place. Premature checking is when the ball in the air check falls to the bottom before all brine is drawn out of the brine tank. See "PLACING CONDITIONER INTO SERVICE."

## OVERFLOW LINE CONNECTION

In the absence of a safety overflow and in the event of a malfunction, the TANK OVERFLOW will direct "overflow" to the drain instead of spilling on the floor where it could cause considerable damage. This fitting should be on the side of the cabinet or brine tank.

To connect overflow, locate hole on side of brine tank. Insert overflow fitting into tank and tighten with plastic thumb nut and gasket as shown (Figure 6). Attach length of 1/2-inch (1.3 cm) I.D. tubing (not supplied) to fitting and run to drain. Do not elevate overflow line higher than 3 inches (7.6 cm) below bottom of overflow fitting. Do not tie into drain line of control unit. Overflow line must be a direct, separate line from overflow fitting to drain, sewer or tub. Allow an air gap as per drain line instructions.

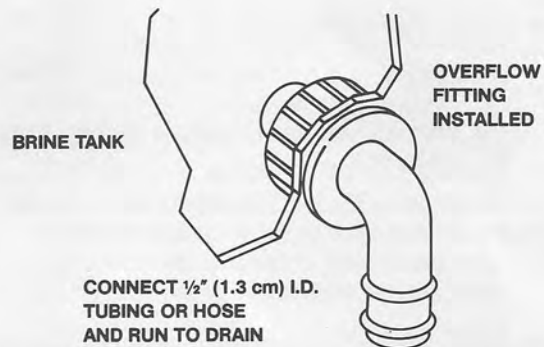


Figure 6

## ELECTRICAL CONNECTION

Remove twist tie from cord set and extend cord to its full length. Make sure power source carries same rating as automatic timer. Plug into socket that will accept 3-prong plug or install 3-prong adapter in standard outlet. Be sure the outlet you select is not controlled by a wall switch.

\*Teflon is a registered trademark of E.I. Dupont and Co.

## 6 PLACING CONDITIONER INTO SERVICE

After all previous steps have been completed, the unit is ready to be placed into service. Follow these steps carefully.

A. Remove control valve cover.

### NOTE

The following steps will require your turning the red pointer knob (H), (Figure 8), to various positions. Insert a wide blade screwdriver into arrow slot in pointer knob (H) and press in firmly. With knob held in, rotate **COUNTERCLOCKWISE ONLY** until arrow or knob points to desired position. (Rotation is made much easier if you grasp the camshaft with your free hand and turn it at the same time.) Then permit knob to spring back out.

B. Insert screwdriver into slot in pointer knob (H), (Figure 8). Press in and rotate knob **COUNTERCLOCKWISE** until arrow points directly to the word **BACKWASH**.

C. Fill mineral tank with water.

1. With **water supply off**, place the bypass valve(s) into the service position.
2. Open water supply valve **very slowly** to approximately the  $\frac{1}{4}$  open position.  
**CAUTION** — if opened too rapidly or too far, mineral may be lost. In this position, you should hear air escaping **slowly** from the drain line.
3. When all of the air has been purged from the tank (water begins to flow steadily from the drain), open the main supply valve all the way.
4. Allow water to run to drain until clear.
5. Turn off water supply and let the unit stand for about 5 minutes. This will allow all trapped air to escape from the tank.
6. Proceed to step D.

D. Add water to brine tank (initial fill).

With a bucket or hose, add approximately 4 gallons (15 l) of water to regenerant tank. If the tank has a salt platform above the bottom of the tank, add water until the level is approximately 1" (25 mm) above the platform.

E. Put into service.

1. Open water supply valve slowly to full open position.
2. Carefully advance pointer knob **COUNTERCLOCKWISE** to center of **BRINE REFILL** position and hold there until air check (Figure 7) fills with water and water starts to flow through brine line into brine tank. Do not run for more than 1 or 2 minutes.

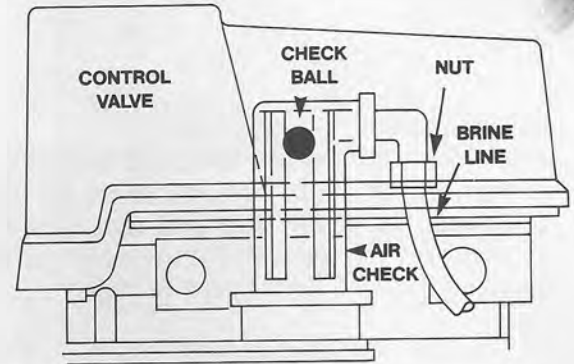


Figure 7

3. Advance pointer knob **COUNTERCLOCKWISE** until arrow points to the center of the **BRINE AND RINSE** position.
4. With the conditioner in this position, check to see if water is being drawn from the brine tank. The water level in the brine tank will recede very slowly. Observe for at least 3 minutes. If the water level does not recede or goes up, or if air enters the transparent air check chamber and the ball falls and seats, see "TROUBLE SHOOTING" section.
5. Advance pointer knob **COUNTERCLOCKWISE** to **SERVICE**.
6. Run water from a nearby faucet until the water is clear and soft.

**NOTE:** The use of resin cleaners in an unvented enclosure is not recommended.

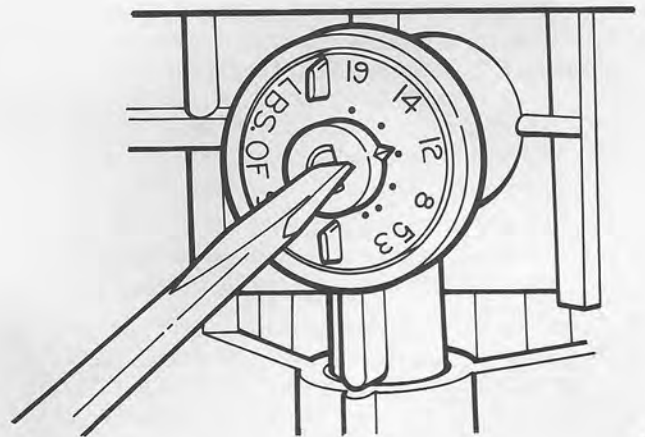


Figure 9

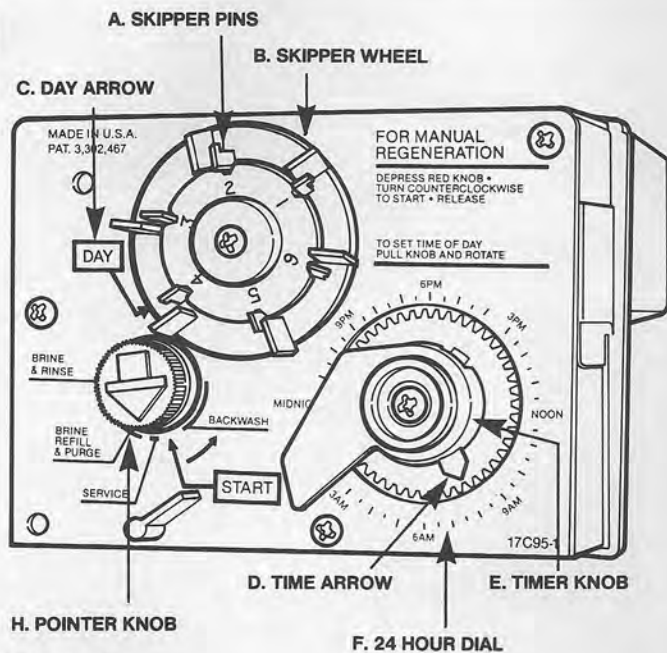


Figure 8

- A. Set days of regeneration on skipper wheel (B) (Figure 8). Pull all skipper pins (A) outward (away from control). Rotate skipper wheel until day arrow (C) points to current day, or number 1. Depress skipper pin(s) (A) at day(s) for which regeneration is desired.
- B. Set the time-of-day of REGENERATION. Grasp timer knob (E) and pull outward. Rotate in either direction until actual time-of-day on time dial (F) is in line with time-of-day arrow "D". Release timer knob (E).

**NOTE:** The unit is factory set to REGENERATE/BACKWASH at 2:30 a.m. If you prefer to have the unit regenerate at an earlier or later time, simply set the current time-of-day accordingly. (e.g., To have the unit REGENERATE/BACKWASH at 4:30 a.m. — 2 hours later — set the clock 2 hours earlier than the actual current time.)

## SPECIAL FEATURES OF TIMER

- A. **Guest Cycle.** When abnormally high water usage exhausts your water conditioner's capacity ahead of schedule, an extra regeneration can be achieved by depressing the pointer knob (H) with fingers or wide bladed screwdriver and turning **COUNTERCLOCKWISE** to **START**. It will take a few minutes for regeneration to start. Normal regeneration schedule will not be disrupted.
- B. **Manual Regeneration.** Electricity is used only to run the timer and to rotate the camshaft. All other functions are operated by water pressure. Therefore, in the event of a power outage, all the various regeneration positions may be dialed manually by depressing the pointer knob (H) and turning **COUNTERCLOCKWISE**. Manual time cycle: BACKWASH — 14 minutes; BRINE AND RINSE — 52 minutes; BRINE REFILL — 10 minutes; PURGE — 6 minutes. **Do not exceed 10 minutes** for the BRINE REFILL cycle as this will cause excessive salt usage during the next regeneration and possibly a salt residue in the softened water.

# ADJUSTMENT OF BRINE CONTROL

All models may be adjusted to produce maximum to minimum conditioning capacities by setting the salt dial (Figure 9) which controls the amount of salt used per regeneration. When desired, the minimum setting may be used on installations if the frequency of regeneration is increased to compensate for the lower regenerated conditioning capacity. Your installing dealer will set your unit for proper salt usage. Further adjustments are needed only if water supply changes or if water use changes dramatically.

## HOW TO SET SALT DIAL

Insert small screwdriver into white pointer knob and move pointer to proper salt setting (Figure 9).

**NOTE:** To convert salt dial settings from English to Metric, divide by 2.2 (e.g., 12 pounds ÷ 2.2 = 5.5 kg of salt).

The **amount of salt** placed into the regenerant storage tank has nothing to do with the amount of salt used during the REGENERATION/BACKWASH program. Water will dissolve and absorb salt only until it becomes saturated. A given amount of brine (salt saturated water) contains a specific amount of salt. The salt dial on the control controls the amount of brine used during the REGENERATE/BACKWASH program (e.g., when set at 15 lbs. [6.8 kg] the amount of brine the conditioner will use for each program will contain 15 lbs. [6.8 kg] of salt, etc.). Never let the amount of salt in the regenerant storage tank be lower than the normal liquid level. Do not over-load the brine tank with salt. The chances of salt conditions that can interfere with brining are greatly reduced if you limit the salt loading to 160 lbs. (72.7 kg) at a time.

# REMOVING THE SERIES 155 CONTROL MODULE

## FOR SERVICING

1. Unplug electric cord.
2. Shut-off water supply or put bypass valve(s) into bypass position.
3. Remove cover (Figure 10-A), and with screwdriver, relieve tank pressure by pushing open all valves on control as shown (Figure 10-B).
4. Remove screw in locking bar (Figure 10-C).
5. Apply downward hand pressure on control and pull locking bar out (Figure 10-D).
6. Using a rocking motion, lift control from the tank adapter (Figure 10-E). If O-ring seals come off with control, put them back into tank adapter sockets. Lubricate O-rings with silicone lubricant.
7. To replace control module, reverse above procedure.

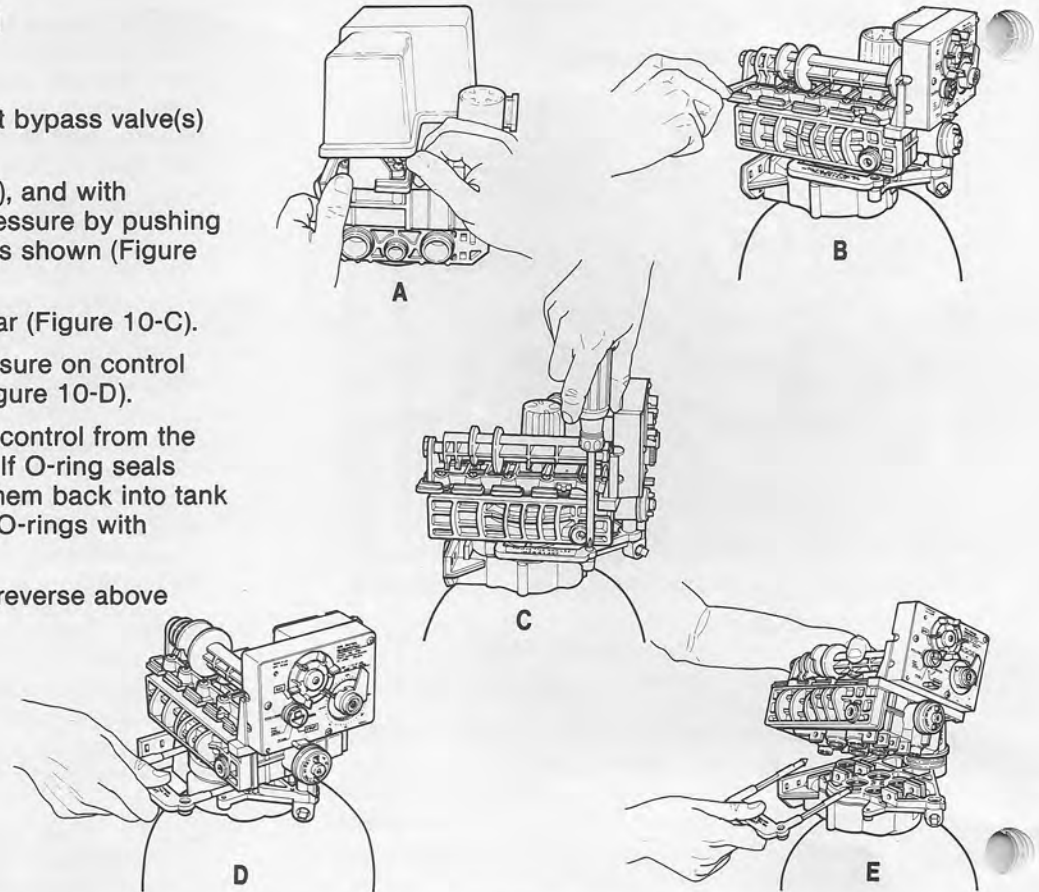
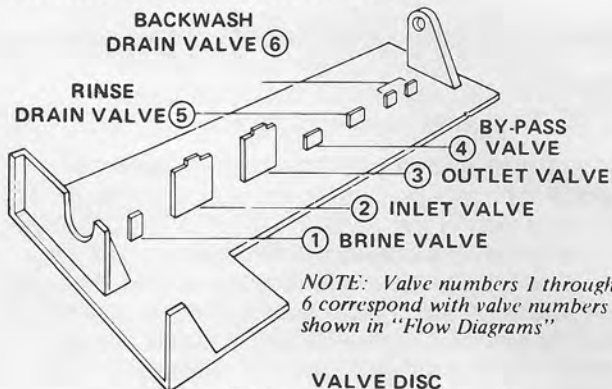


Figure 10

## FLOW DIAGRAMS

### IDENTIFICATION OF CONTROL VALVING



### VALVE DISC (PRINCIPLE OF OPERATION)

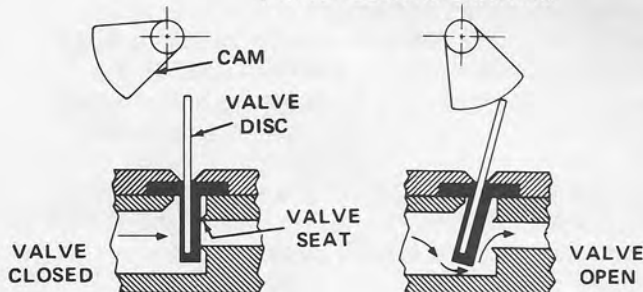
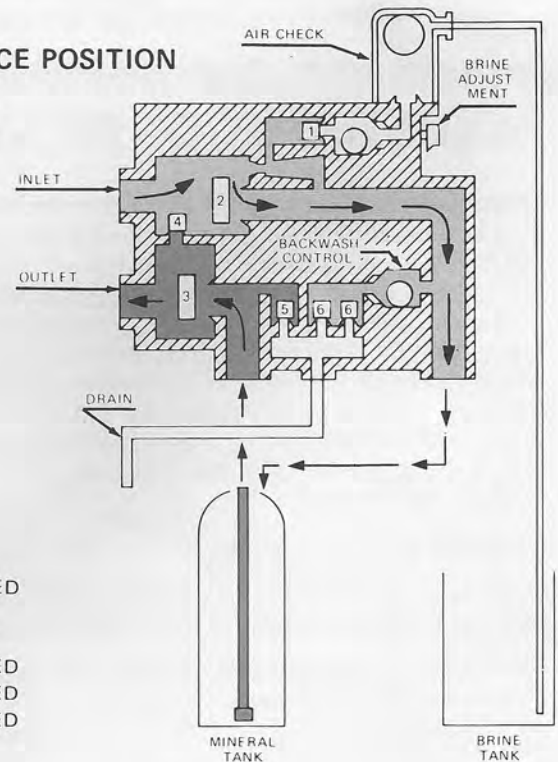


Figure 11

### 1 SERVICE POSITION

- HARD WATER
- SOFT WATER



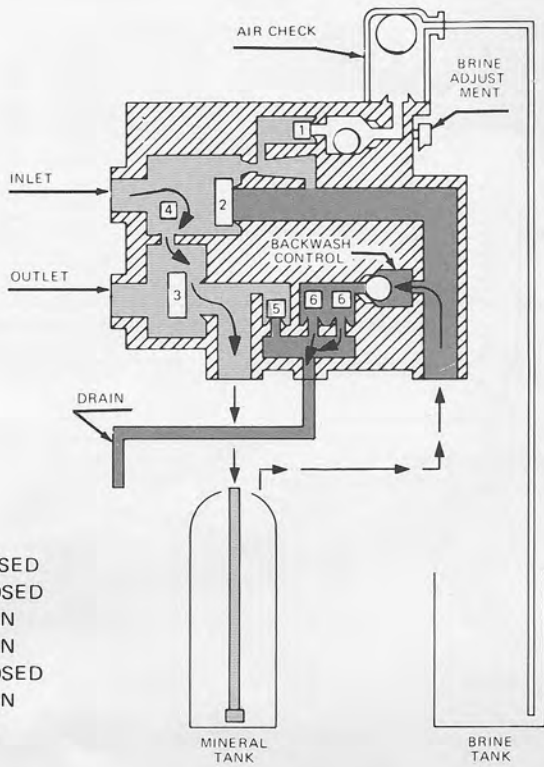
Valve No.

- 1 - CLOSED
- 2 - OPEN
- 3 - OPEN
- 4 - CLOSED
- 5 - CLOSED
- 6 - CLOSED



## 2 BACKWASH POSITION

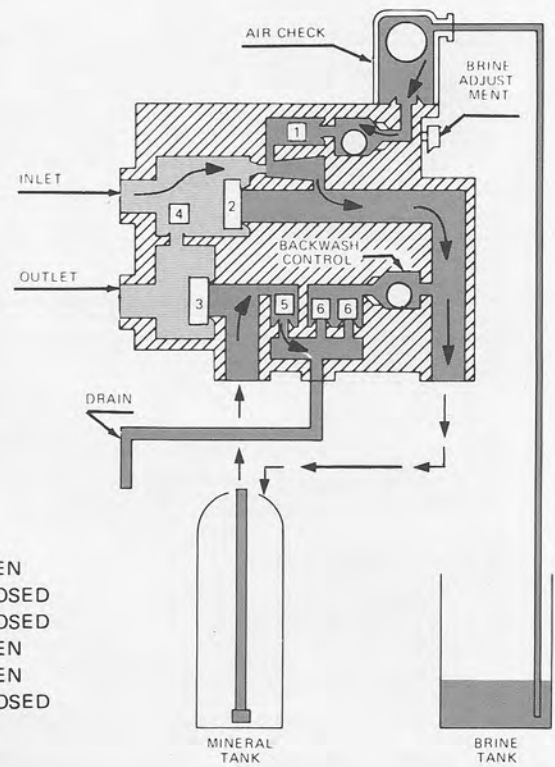
HARD WATER  
 BACKWASH WATER



Valve No.  
 1 - CLOSED  
 2 - CLOSED  
 3 - OPEN  
 4 - OPEN  
 5 - CLOSED  
 6 - OPEN

## 3 BRINING POSITION

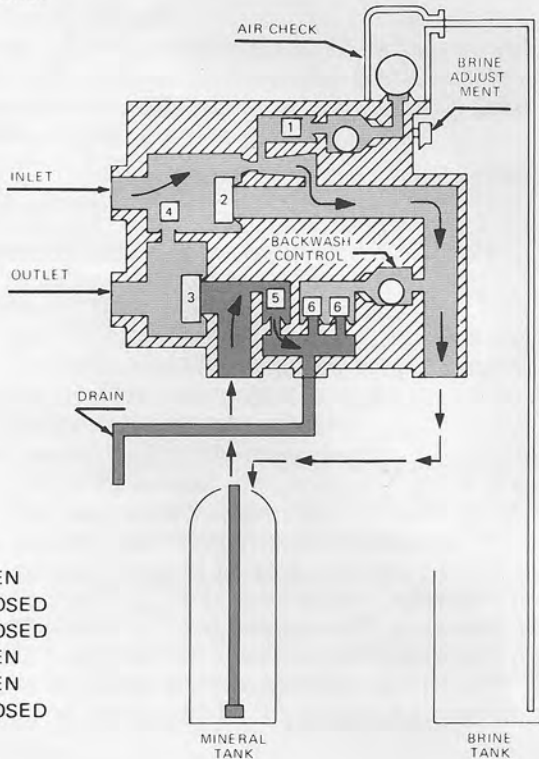
HARD WATER  
 BRINE



Valve No.  
 1 - OPEN  
 2 - CLOSED  
 3 - CLOSED  
 4 - OPEN  
 5 - OPEN  
 6 - CLOSED

## 4 SLOW RINSE POSITION

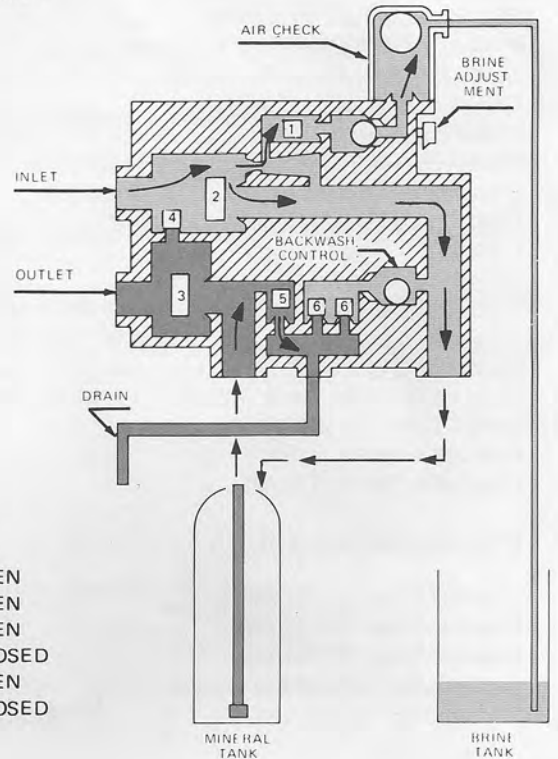
HARD WATER  
 RINSE WATER



Valve No.  
 1 - OPEN  
 2 - CLOSED  
 3 - CLOSED  
 4 - OPEN  
 5 - OPEN  
 6 - CLOSED

## 5 BRINE REFILL & PURGE POSITION

HARD WATER  
 PURGE WATER



Valve No.  
 1 - OPEN  
 2 - OPEN  
 3 - OPEN  
 4 - CLOSED  
 5 - OPEN  
 6 - CLOSED

# SPECIFICATIONS

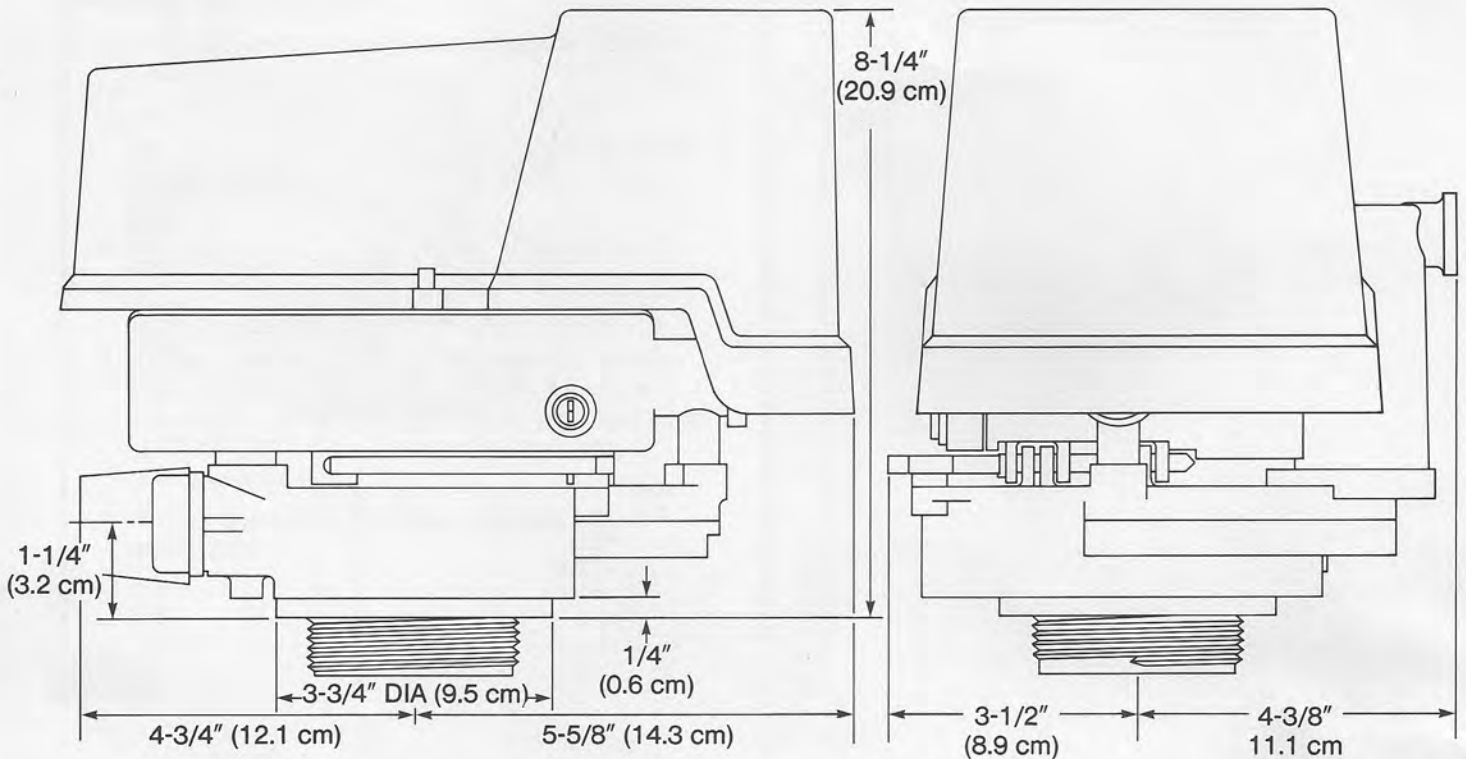
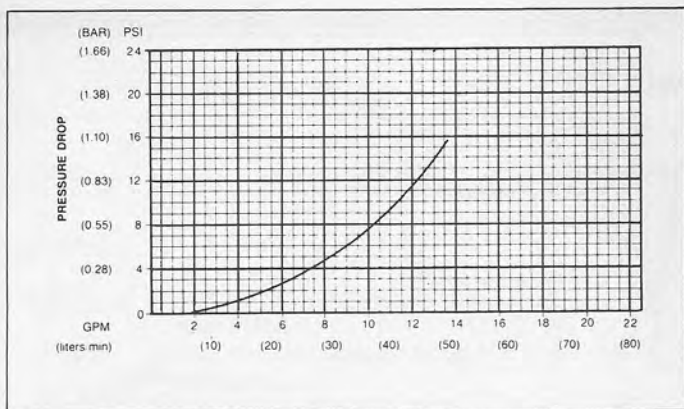
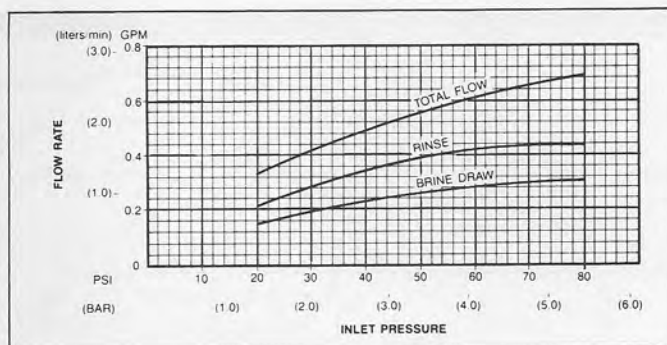


Figure 12

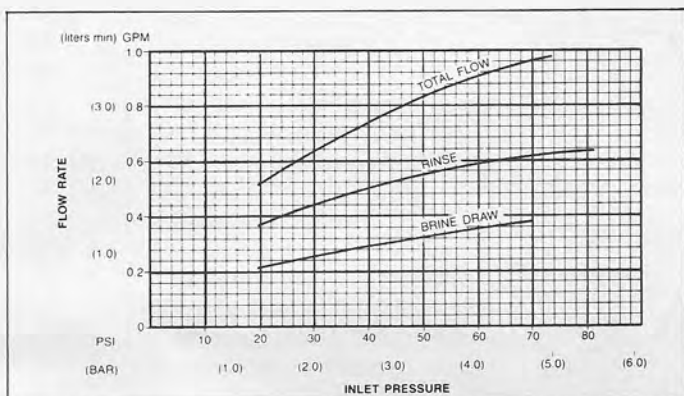
Hydrostatic Test Pressure .....	300 psi (20.69 BAR)
Working Pressure .....	20-127 psi (1.38-8.76 BAR)
Standard Electrical Rating .....	120 V 60 Hz
Optional Electrical Rating .....	24 V 50 Hz; 24 V 60 Hz; 120 V 50 Hz; 240 V 50 Hz
Electrical Cord .....	60" (1.5 m) long, 3-wire with plug
Pressure Tank Thread .....	2 1/2" (63.5 mm)-8 Male
Brine Line Thread .....	1/4" (6.4 mm) NPT Female
Distributor Tube Diameter Required .....	1 3/16" OD (20.6 mm)
Distributor Tube Length .....	1 1/4" (31.8 mm) higher than top of mineral tank
Standard Manifold Connection .....	3/4" (19.1 mm) NPT Inlet-Outlet, 3/8" (9.5 mm) NPT Drain
Optional Connections .....	1" (25.4 mm) NPT Inlet-Outlet, 1/2" (12.7 mm) Drain; 3/4" (19.1 mm) BSPT Inlet-Outlet, 3/8" (9.5 mm) BPST Drain; 1" (25.4 mm) BPST Inlet-Outlet, 1/2" (12.7 mm) Drain
Optional Bypass Valve .....	3/4" (19.1 mm) or 1" (25.4 mm) Copper Tailpiece, 1/2" (12.7 mm) NPT Male Drain
Control Module, Tank Adapter, Optional Bypass Valve .....	Fiberglass Reinforced NORYL
Inlet-Outlet Manifold .....	Brass or Glass Reinforced NORYL
Rubber Goods .....	Compounded for Cold Water Service
Program Clock (Timer) .....	Available in 6- or 7-day English, German, French, Italian, Spanish or Japanese inscription
Brine Control System .....	Parts group "1" adjustable up to 10 pounds (4.5 kg) of salt. Parts group "2" adjustable up to 19 pounds (8.6 kg) of salt
Injector Size "A" Group .....	Nozzle .042" (1.1 mm) Diameter, Throat-Inlet .089" (2.3 mm) Diameter
Injector Size "B" Group .....	Nozzle .052" (1.3 mm) Diameter, Throat-Inlet .099" (2.5 mm) Diameter
Injector Size "C" Group .....	Nozzle .059" (1.5 mm) Diameter, Throat-Inlet .099" (2.5 mm) Diameter
Backwash Controllers Available for .....	6", 7", 8", 9", 10", 12" (15.2, 17.8, 20.3, 22.9, 25.4, 30.5 cm) Diameter Mineral Tanks. All are sized to flow 4.5 gpm/sq. ft. (183 l/m <sup>2</sup> ) of bed area.



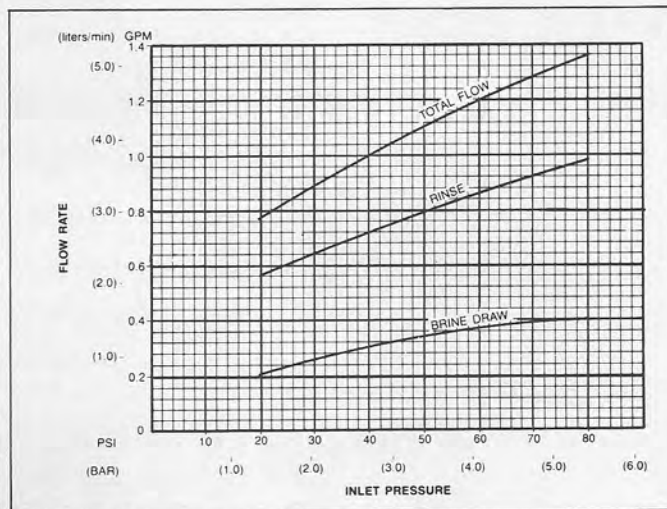
SERVICE FLOW — PRESSURE LOSS CHARACTERISTICS



"A" INJECTOR



"B" INJECTOR



"C" INJECTOR

## PREVENTIVE MAINTENANCE

- A. Inspect and clean brine tank and screen filter on end of brine pick-up tube **once a year**, or when sediment appears in the bottom of the brine tank.
- B. Clean injector screen (7F) and injector (28F) **once a year**:
  1. Unplug electric cord.
  2. Shut-off water supply or put bypass valve(s) into bypass position.
  3. Relieve tank pressure by opening valve No. 6 (at rear) with a screwdriver or finger pressure, (Figure 10-B).
  4. Using screwdriver, unscrew cap (7F).
  5. Remove cap and screen (7F), or assembly (depending on model).
  6. Clean screen (7F) using fine brush. Flush until clean.
  7. Lubricate O-ring (6F) with silicone lubricant and reassemble.
  8. Using screwdriver, unscrew cap (8F).
  9. Using needle nose pliers, pull injector (28F) straight out.
  10. Clean and flush injector.
  11. Lubricate all injector O-rings with silicone lubricant.
  12. Reinstall injector and push all the way in. Tighten cap.
  13. Plug electric cord into outlet; **reset timer**.
  14. Open water supply valve or return bypass valve(s) to service position.

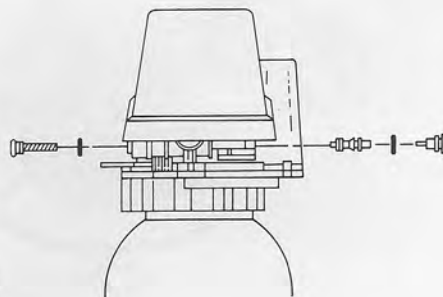
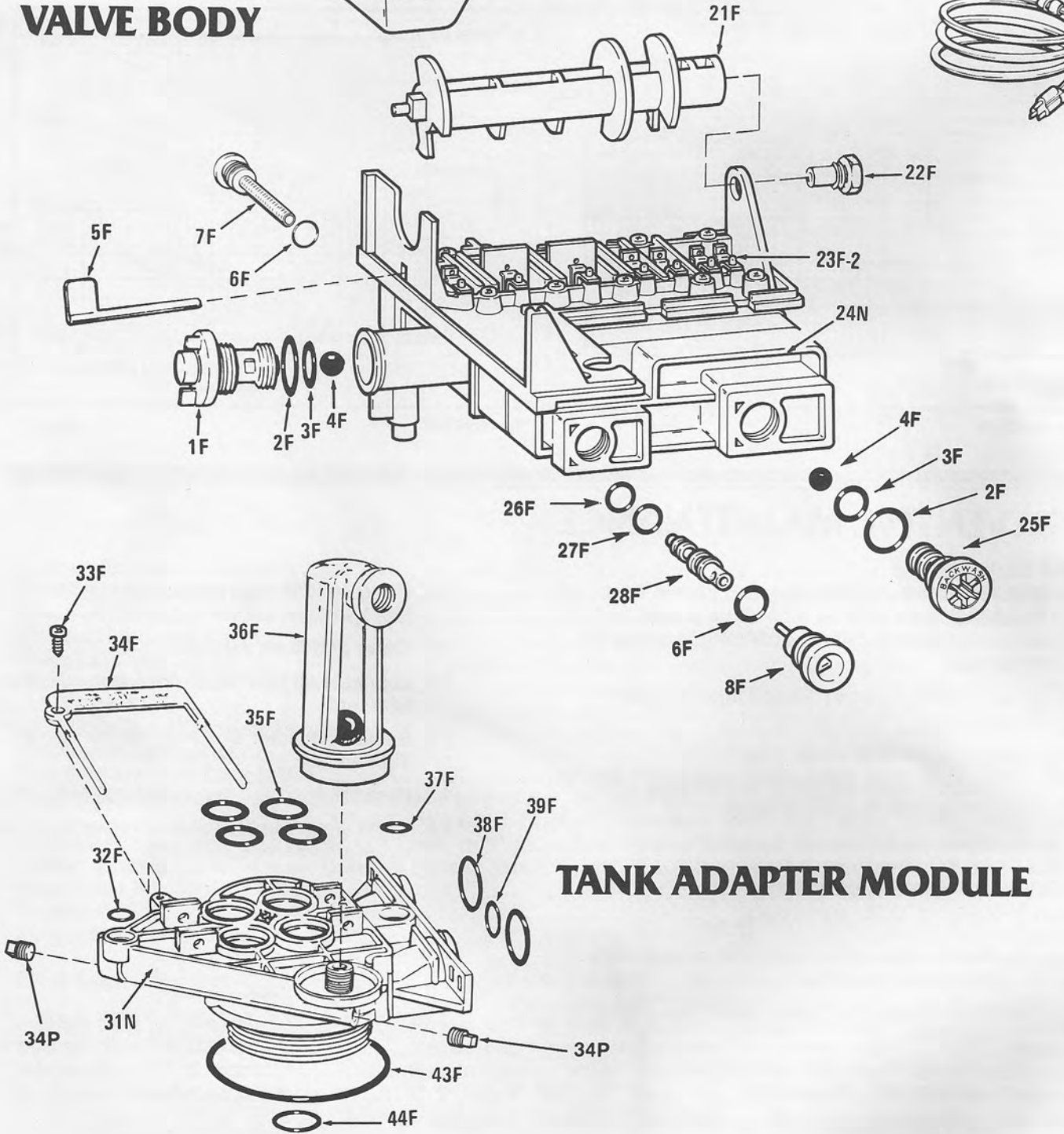
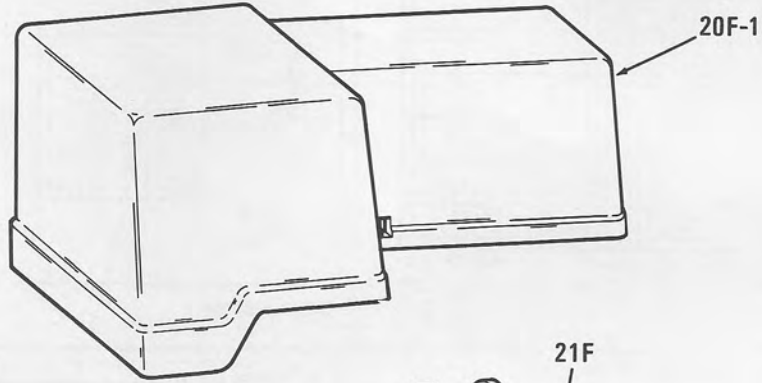


Figure 13

# REPLACEMENT PARTS

## VALVE BODY



# REPLACEMENT PARTS LIST

Item	Description	No. Required	Item	Description	No. Required
------	-------------	--------------	------	-------------	--------------

## VALVE BODY

1F-10	Brine Control Assy., 10 lb. capacity, or	1	22F	Camshaft Bearing	1
1F-17	Brine Control Assy., 17 lb. capacity, or	1	23F-2	Valve Spring	7
1F-19	Brine Control Assy., 19 lb. capacity	1	24N	Control Body	1
2F	O-Ring	2	25F-6	Backwash Assy., 6" dia. mineral tank, or	1
3F	O-Ring	2	25F-7	Backwash Assy., 7" dia. mineral tank, or	1
4F	Ball	2	25F-8	Backwash Assy., 8" dia. mineral tank, or	1
5F	Timer Locking Pin	1	25F-9	Backwash Assy., 9" dia. mineral tank, or	1
6F	O-Ring	2	25F-10	Backwash Assy., 10" dia. mineral tank, or	1
7F	Injector Cap & Screen Assy.	1	25F-12	Backwash Assy., 12" dia. mineral tank	1
8F-AA	"A" Size Injector Cap, or	1	26F	O-Ring	1
8F-BB	"B" Size Injector Cap, or	1	27F	O-Ring	1
8F-CC	"C" Size Injector Cap	1	*28F-AA	"A" Size Injector—White, or	1
20F	Cover (Old Style)	1	*28F-BB	"B" Size Injector—Blue, or	1
20F-1	Cover (New Style)	1	*28F-CC	"C" Size Injector—Red	1
21F-1	Camshaft Assy., XS (Long rinse and extra salt), or	1	29F	Cord Set, Round, or	1
21F-2	Camshaft Assy., LR (Long rinse)	1	90F	Cord Set, Flat	1
21F-3	Camshaft—1 Piece	1			

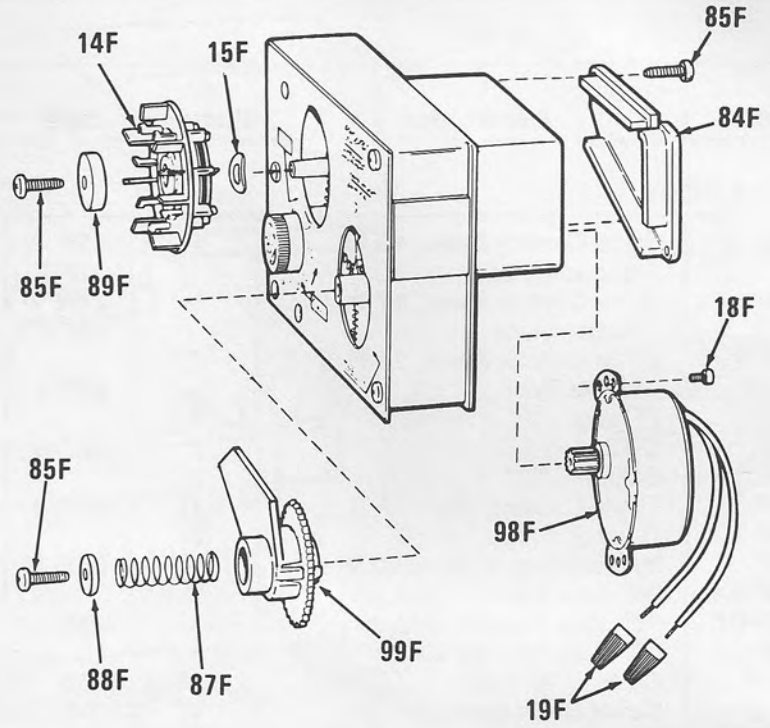
## TANK ADAPTER MODULE

31N	Tank Adapter Body	1	36F	Air Check Assembly	1
32F	O-Ring	1	37F	O-Ring	1
33F	Positioning Screw	1	38F	O-Ring	2
34F-1	Locking Bar—English, or	1	39F	O-Ring	1
34F-2	Locking Bar—German, or	1	43F	O-Ring	1
34F-3	Locking Bar—French	1	44F	O-Ring	1
35F	O-Ring	4			

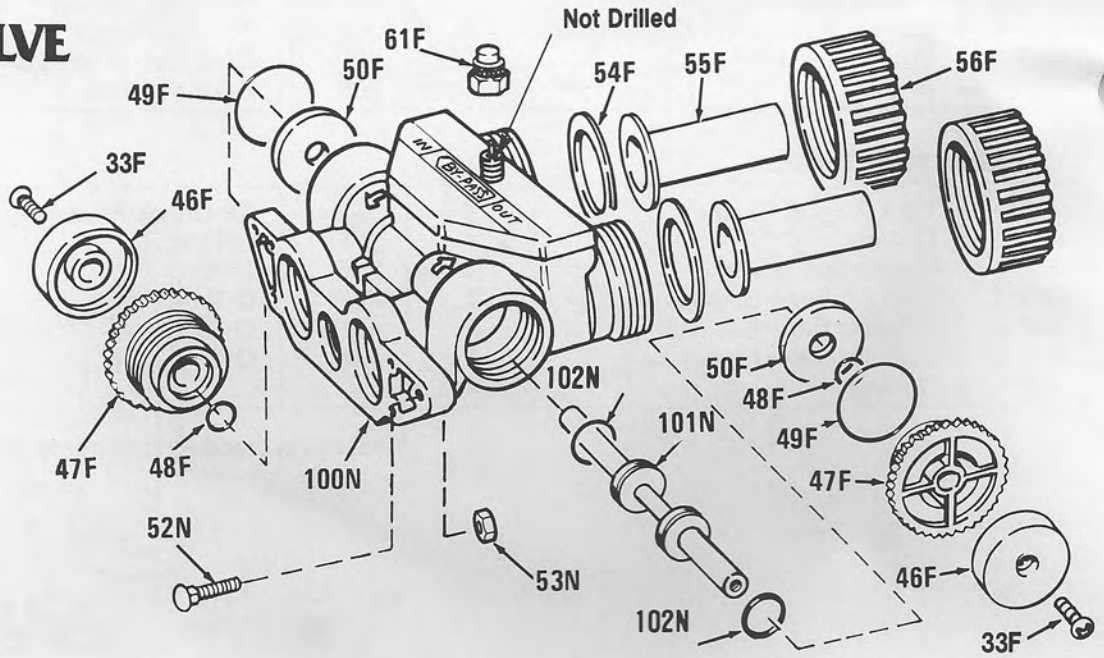
\*Pull out w/needle nose pliers. Small end goes in first.

# REPLACEMENT PARTS

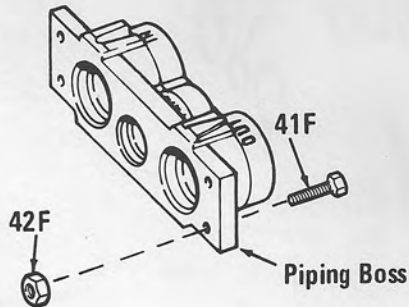
## 440 TIMER



## BYPASS VALVE



## PIPING BOSS



# REPLACEMENT PARTS LIST

Item	Description	No. Required	Item	Description	No. Required
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## 440 TIMER

14F-6	Skipper Wheel, 6-Day, or	1	98F-1	Motor, 120V 60HZ, or	1
14F-7	Skipper Wheel, 7-Day	1	98F-2	Motor, 240V 50HZ, or	1
15F	Friction Washer	1	98F-3	Motor, 24V 60HZ, or	1
18F	Mounting Screw	2	98F-4	Motor, 120V 50HZ, or	1
19F	Wire Nut	2	98F-6	Motor, 24V 50HZ	1
84F	Cover Plate—Timer	1	99F	Tripper Arm Assy.	1
85F	Screw	3			
87F	Compression Spring	1			
88F	Gear Retainer	1			
89F	Day Dial Washer	1			
97F	Timer Assembly—440 Timer (Specify 6- or 7-day)	1			

## BYPASS VALVE

33F	Screw	2	55F-2	Tube Adapter, 1" Copper, or	2
46F-1	White Knob (Round)	1	55F-4	Pipe Adapter, 1" NPT, or	2
46F-2	Black Knob (Round)	1	55F-5	Pipe Adapter, 3/4" BSPT, or	2
46F-B	Blue Knob	1	55F-6	Pipe Adapter, 1" BSPT	2
46F-R	Red Knob	1	156A231	Tube Adapter, 3/4" PVC	2
46F-CW	White Knob (Pie Shape)	1	156A232	Tube Adapter, 1" PVC	2
46F-CB	Black Knob (Pie Shape)	2	56F-1	Nut for 3/4" Tube Adapter, or	2
47F	End Cap	2	56F-2	Nut for 1" Tube Adapter, or	2
48F	O-Ring	2	56F-3	Nut, for 3/4" Pipe Adapter & 3/4" PVC, or	2
49F	O-Ring	2	56F-4	Nut, for 1" Pipe Adapter & 1" PVC	2
50F	Washer	4	61F	Compression Nut	1
52N	Bolt	4	100N	Bypass Body, or	1
53N	Nut	2	100N-BV	Bypass Body w/Blending Valve	1
54F	Gasket	2	101N	Shaft Valve Stem	1
54F-1	Gasket, for 3/4" pipe	2	102N	O-Ring	2
55F-1	Tube Adapter, 3/4" Copper, or	2			

## PIPING BOSS KITS

150A141	Piping Boss—Brass NPT 1", or	1	157A140	Piping Boss Noryl NPT 3/4", or	1
150A140	Piping Boss—Brass NPT 3/4", or	1	157A143	Piping Boss Noryl BSPT 1", or	1
150A143	Piping Boss—Brass BSPT 1", or	1	157A142	Piping Boss Noryl BSPT 3/4"	1
150A142	Piping Boss—Brass BSPT 3/4", or	1	41F	Screw	4
157A141	Piping Boss Noryl NPT 1", or	1	42F	Nut	4

## KITS

150A129	For Items 32F, 35F & 37F	1	155A152	Set of Valve Discs	1
150A144	For Items 38F & 39F	1			

# TROUBLE SHOOTING Series 155 automatic water conditioner control with automatic timer.

For item numbers mentioned refer to exploded view.

The technology upon which the Series 155 control is based is well established and proven in service over many years. However, should a problem or question arise regarding the operation of the system, the control can be very easily serviced. The control module can be quickly replaced or adjustments can be made at the installation.

Problem	Possible Cause	Solution
1. Control will not regenerate automatically	<ul style="list-style-type: none"> <li>a. Electric cord unplugged</li> <li>b. Defective timer motor</li> <li>c. Skipper pins not down on timer skipper wheel (Item 14F)</li> <li>d. Binding in gear train of timer</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect power.</li> <li>b. Replace motor.</li> <li>c. Depress pins for days regeneration required.</li> <li>d. Replace timer.</li> </ul>
2. Control regenerates at wrong time of day	<ul style="list-style-type: none"> <li>a. Timer set incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>a. Make correct setting according to instructions.</li> </ul>
3. Control will not draw brine	<ul style="list-style-type: none"> <li>a. Low water pressure</li> <li>b. Restricted drain line</li> <li>c. Injector plugged</li> <li>d. Injector defective</li> <li>e. Valve disc 2 and/or 3 not closed</li> <li>f. Air check valve prematurely closed</li> </ul>	<ul style="list-style-type: none"> <li>a. Set pump to maintain 20 psi.</li> <li>b. Change drain to remove restriction.</li> <li>c. Clean injector and screen.</li> <li>d. Replace injector and cap.</li> <li>e. Remove foreign matter from disc and check disc for closing by pushing in on stem. Replace if needed.</li> <li>f. Put control momentarily into brine refill. Replace or repair air check if needed.</li> </ul>
4. Brine tank overflow	<ul style="list-style-type: none"> <li>a. Brine valve disc 1 being held open</li> <li>b. Uncontrolled brine refill flow rate</li> <li>c. Valve disc 2 not closed during brine draw causing brine refill</li> <li>d. Air leak in brine line to air check</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually operate valve stem to flush away obstruction.</li> <li>b. Remove variable salt controller to clean it and ball (Items 1F and 4F).</li> <li>c. Flush out foreign matter holding disc open by manually operating valve stem.</li> <li>d. Check all connections in brine line for leaks. Refer to instructions.</li> </ul>
5. System using more or less salt than salt control (Item 1F) is set for	<ul style="list-style-type: none"> <li>a. Inaccurate setting</li> <li>b. Foreign matter in controller causing incorrect flow rates</li> <li>c. Defective controller</li> </ul>	<ul style="list-style-type: none"> <li>a. Make correct setting.</li> <li>b. Remove variable salt controller and flush out foreign matter (Items 1F and 4F). Manually position control to brine draw to clean controller (after so doing position control to "purge" to remove brine from tank).</li> <li>c. Replace defective part.</li> </ul>
6. Intermittent or irregular brine draw	<ul style="list-style-type: none"> <li>a. Low water pressure</li> <li>b. Defective injector</li> </ul>	<ul style="list-style-type: none"> <li>a. Set pump to maintain 20 psi at softener.</li> <li>b. Replace both injector and injector cap (Items 28F and 8F).</li> </ul>
7. No conditioned water after regeneration	<ul style="list-style-type: none"> <li>a. Unit did not regenerate</li> <li>b. No salt in brine tank</li> <li>c. Plugged injector</li> <li>d. Air check valve closed prematurely</li> </ul>	<ul style="list-style-type: none"> <li>a. Check for power.</li> <li>b. Add salt to brine tank.</li> <li>c. Remove injector and flush it and injector screen (Items 28F and 7F).</li> <li>d. Put control momentarily into brine refill to free air check. Replace or repair air check if needed. Refer to instructions.</li> </ul>
8. Control backwashes at excessively low or high rate	<ul style="list-style-type: none"> <li>a. Incorrect backwash controller used (Item 25F)</li> <li>b. Foreign matter affecting controller operation</li> <li>c. Valve disc 1 held open</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace with correct size controller.</li> <li>b. Remove controller and clean it and ball.</li> <li>c. Flush out foreign matter by manually operating valve stem.</li> </ul>
9. Flowing or dripping water at drain or brine line after regeneration	<ul style="list-style-type: none"> <li>a. Drain valve (5 or 6) or brine valve (1) held open by foreign matter or particle</li> <li>b. Valve stem return spring on top plate (Item 23F) weak</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually operate valve stem to flush away obstruction.</li> <li>b. Replace spring.</li> </ul>
10. Hard water leakage during service	<ul style="list-style-type: none"> <li>a. Improper regeneration</li> <li>b. Leaking of bypass valve</li> <li>c. O-seal around riser tube damaged</li> </ul>	<ul style="list-style-type: none"> <li>a. Repeat regeneration making certain correct salt dosage used.</li> <li>b. Replace O-Ring (Item 102N).</li> <li>c. Replace O-Ring (Item 44F).</li> </ul>