

# **Series 155 Valve / 440 Control**

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**Water Conditioning Control System  
Installation, Operation and Maintenance Manual**

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## Introduction

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 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

- **Fewer parts** than any control system of comparable function and most controls of lesser function.
- **Single synchronous electric motor** provides all the power for the program clock 440 timer and the operation of the control. Other systems use from two to five electric motors and/or solenoid valves.
- **Electrical wiring is factory assembled.** System cannot be connected incorrectly.
- **Program clock (timer) and 460 Demand System are interchangeable.** Both units provide guest regeneration capability.
- **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.
- **No moving parts in water stream** means no close tolerance dimensions subject to fouling. Thus, the system is especially effective on iron-bearing water.
- **No dynamic seals** that could cause leakage through wear or fatigue.
- **Control accepts NORYL\* or brass manifold or modular bypass valve without modification,** offering complete versatility and easy plumbing for any installation.
- **Brining control valve built into system** eliminates need for an external brine valve.
- **Automatic backwash controller** is incorporated in the system.

\* NORYL is a Trademark of GE Plastics

### Superior Operation

- **Direct acting system** functions independently of water pressure. No pistons or diaphragms that require a minimum water pressure to operate.
- **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.
- **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.
- **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.
- **Adequate purge rates are possible** since fast rinse is not restricted through the backwash controller.
- **Bypass water is automatically available** during regeneration.

## Control Module

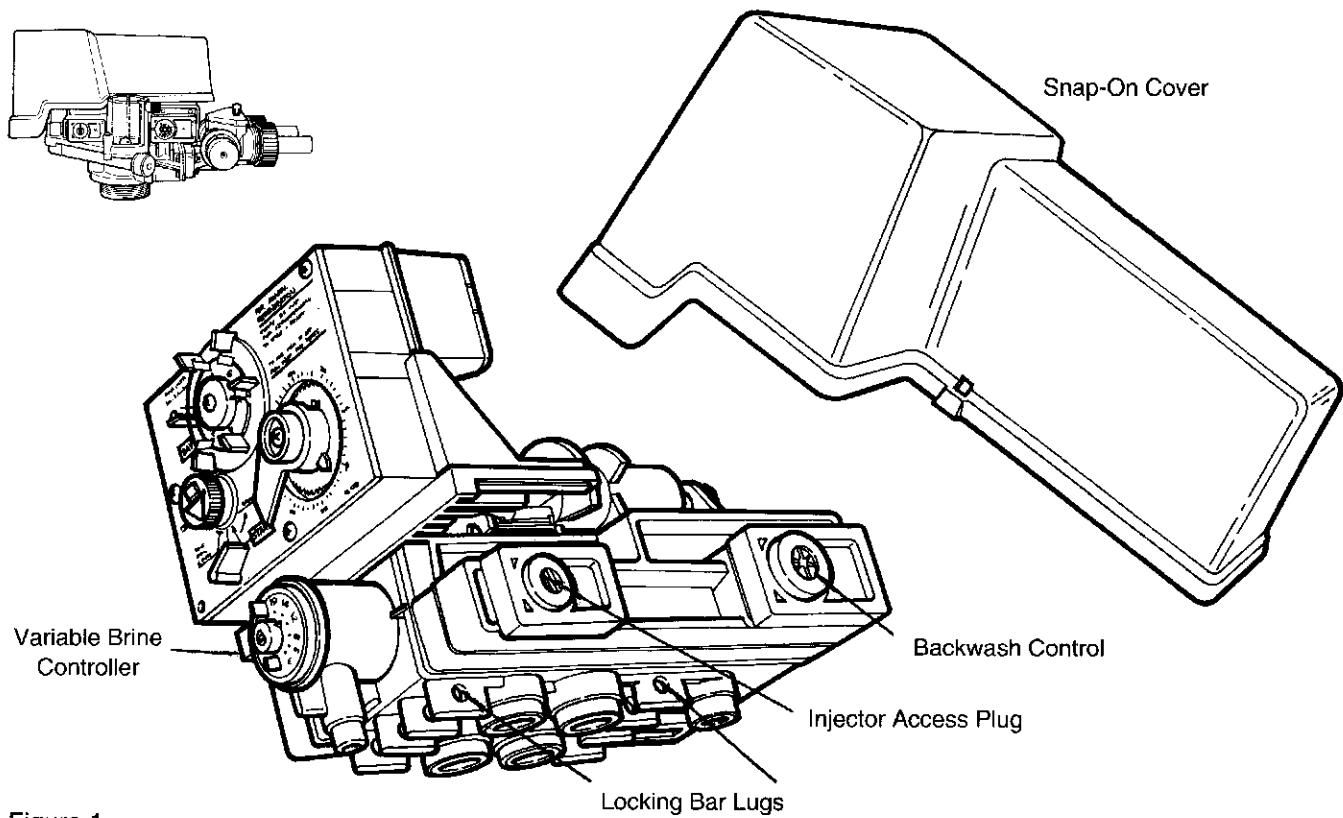


Figure 1

## Tank Adapter Module

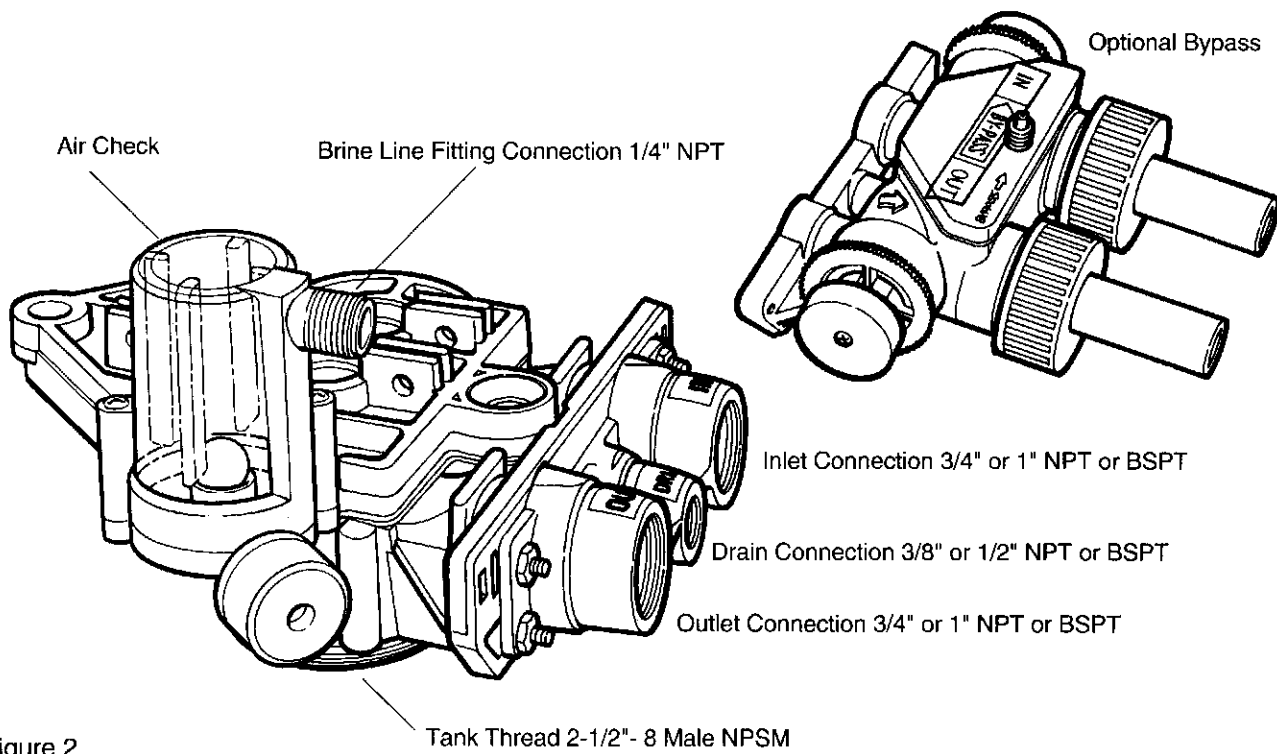


Figure 2

## Installation

All plumbing must conform to local codes.

Inspect unit carefully for carrier shortage or shipping damage.

### Location Selection

1. The distance between the unit and a drain should be as short as possible.
2. If it is likely that supplementary water treating equipment will be required, make certain adequate additional space is available.
3. Since salt must be added periodically to the brine tank, the location should be easily accessible.
4. Do not install any unit closer to a 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.

5. Do not locate unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 34° F (1°C) or over 120° F (49°C).
6. 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.

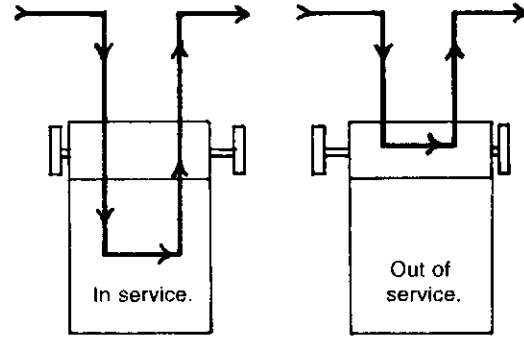


Figure 3. Autotrol Series 156 Bypass Valve

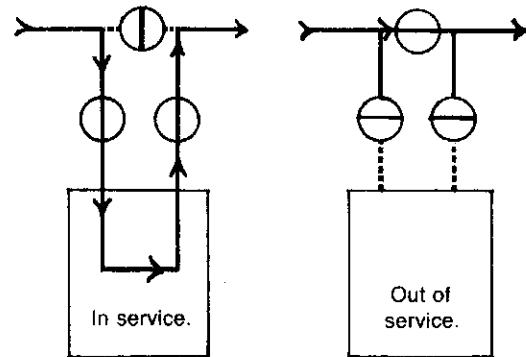


Figure 4 Typical globe valve bypass system

### Drain Line Connection

1. If ideally located, the unit will be above and not more than 20 feet (6.1 m) from drain. For such installations connect 1/2-inch (1.3 cm) I.D. plastic tubing to DRAIN LINE CONNECTION located on CONTROL (Figure 2).
2. If unit is located more than 20 feet (6.1 m) from drain, use 3/4-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.
3. 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).
4. 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.
5. Where a drain 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.**

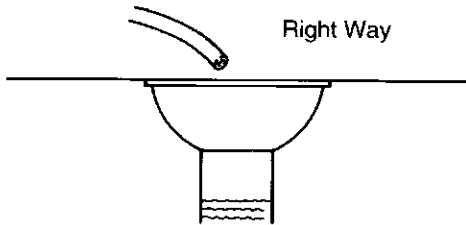


Figure 5

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

### Brine Line Connection

It will be necessary to install the brine tube and connect the line to a fitting installed on the air check.

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** section.

\* Teflon is a registered Trademark of E. I. DuPont and Co.

### 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.

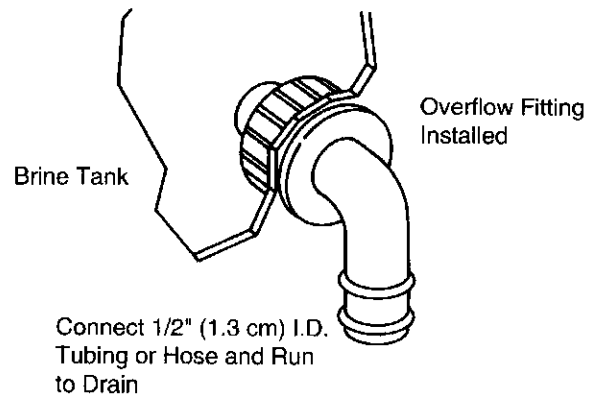


Figure 6

### Electrical Connection

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

## Placing Conditioner into Operation

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

1. Remove control valve cover.

**Note:** The following steps will require your turning the red pointer knob, (Figure 8), to various positions. Insert a wide blade screwdriver into arrow slot in pointer knob 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.

2. Insert screwdriver into slot in pointer knob, (Figure 8). Press in and rotate knob COUNTERCLOCKWISE until arrow points directly to the word BACKWASH.
3. Fill mineral tank with water.
  - A. With water supply off, place the bypass valve(s) into the service position.
  - B. Open water supply valve very slowly to approximately the 1/4 open position.



### Caution:

If opened too rapidly or too far, resin may be lost. In this position, you should hear air escaping slowly from the drain line.

- C. 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.
  - D. Allow water to run to drain until clear.
  - E. Turn off water supply and let the unit stand for about 5 minutes. This will allow all trapped air to escape from the tank.
  - F. Proceed to step 4.
4. Add water to brine tank (initial fill).

With a bucket or hose, add approximately 4 gallons (15 liters) 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 inch (25 mm) above the platform.
  5. Put into operation.

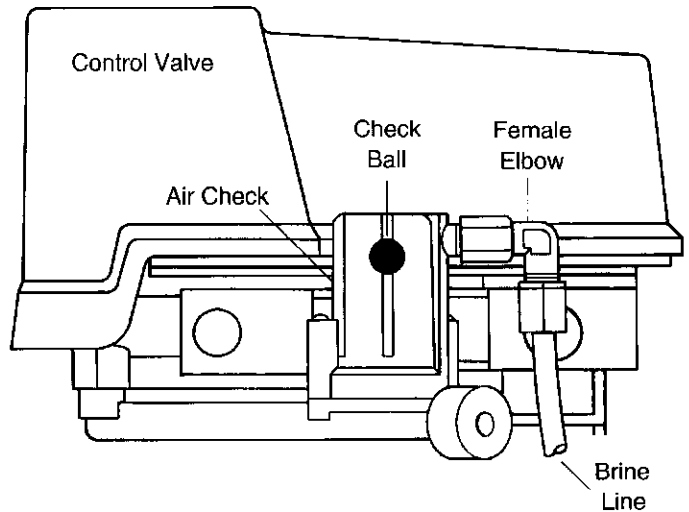


Figure 7

- A. Open water supply valve slowly to full open position.
- B. 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.
- C. Advance pointer knob **COUNTERCLOCKWISE** until arrow points to the center of the **BRINE AND RINSE** position.
- D. 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, reference **Troubleshooting** section.
- E. Advance pointer knob **COUNTERCLOCKWISE** to **SERVICE**.
- F. 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.

## Adjustment of Timer

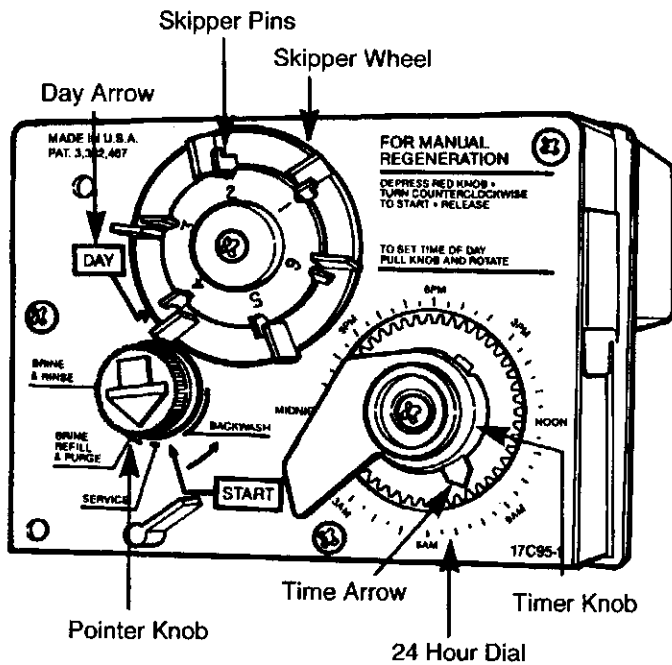


Figure 8

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

**Note:** With the time of day properly set, the conditioner will regenerate at about 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

**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 with fingers or wide blade screwdriver and turning COUNTERCLOCKWISE to START. It will take a few minutes for regeneration to start. Normal regeneration schedule will not be disrupted.

**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 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 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.

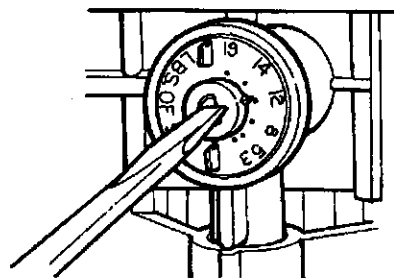


Figure 9



## 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).

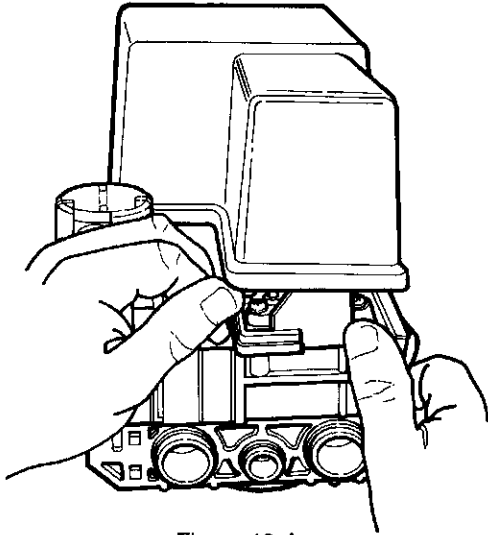


Figure 10-A

4. Remove screw in locking bar (Figure 10-C).

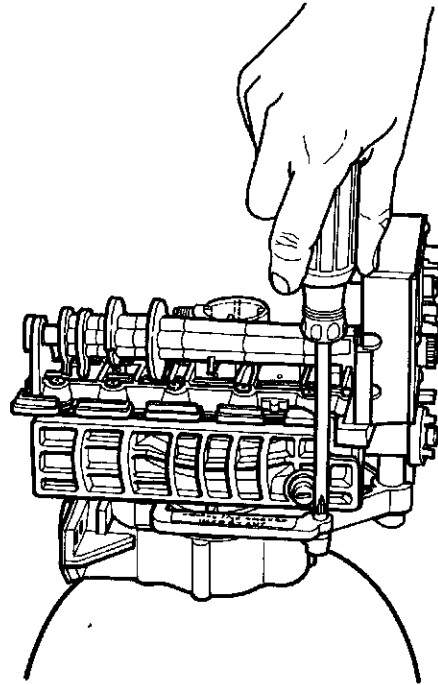


Figure 10-C

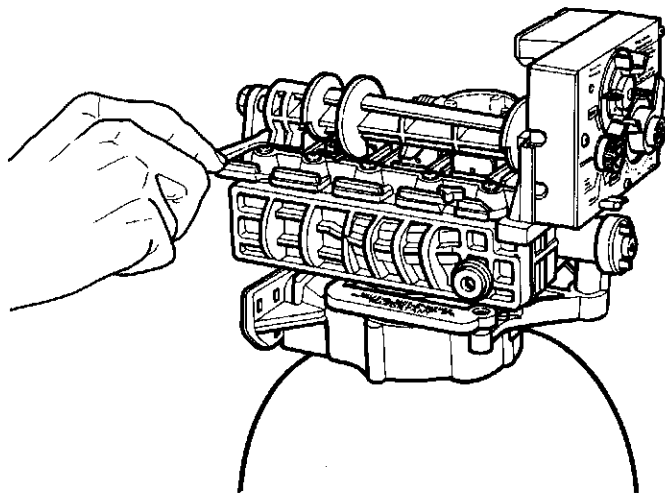


Figure 10-B

5. Apply downward hand pressure on control and pull locking bar out (Figure 10-D).

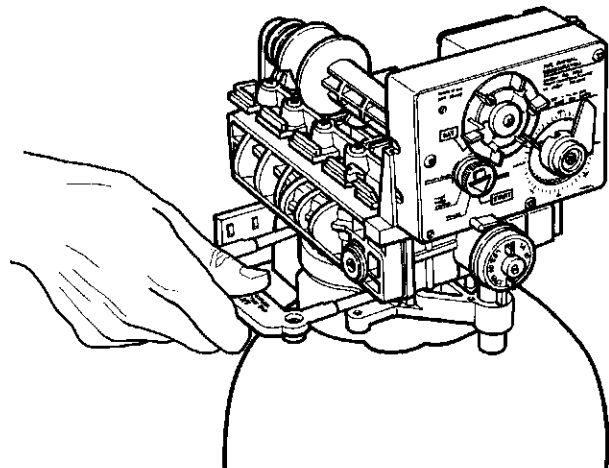


Figure 10-D

- 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.

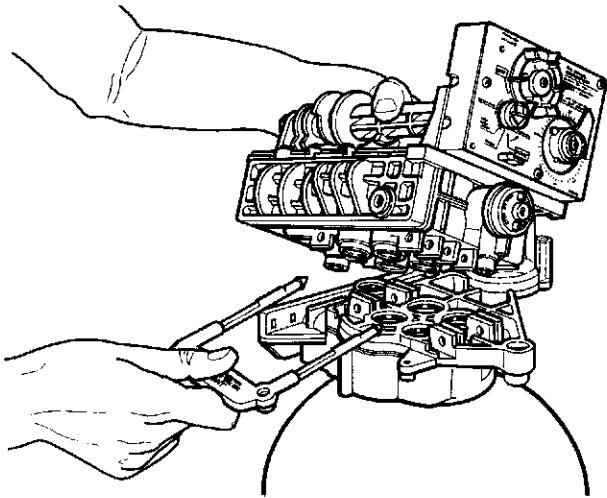


Figure 10-E

- To replace control module, reverse above procedure.

## Preventive Maintenance

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 (Figure 11).

Clean injector screen and injector **once a year**:

- Unplug electric cord.
- Shut off water supply or put bypass valve(s) into bypass position.
- Relieve system pressure by opening valve No. 6 (at rear) with a screwdriver, (Figure 10-B).
- Using a screwdriver, unscrew and remove screen cap.
- Clean screen using a fine brush. Flush until clean.
- Lubricate o-ring with silicone lubricant and reassemble. See CAUTION note.
- Using a screwdriver, unscrew and remove injector cap.
- Using needle nose pliers, pull injector straight out.
- Clean and flush injector.
- Lubricate all injector o-rings with silicone lubricant.
- Reinstall injector and push all the way in. Tighten cap. See CAUTION note.
- Plug electric cord into outlet; reset time of day.
- Open water supply valve or return bypass valve(s) to service position.



### Caution

**Do not overtighten the plastic cap. Seat the cap lightly into position. Overtightening may cause breakage of the plastic cap that may not be immediately evident.**

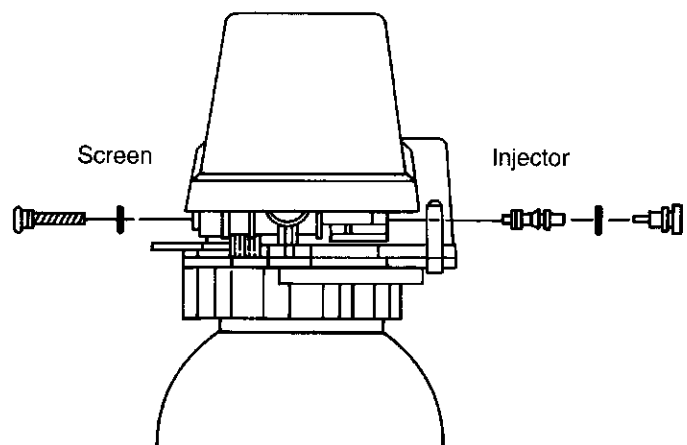
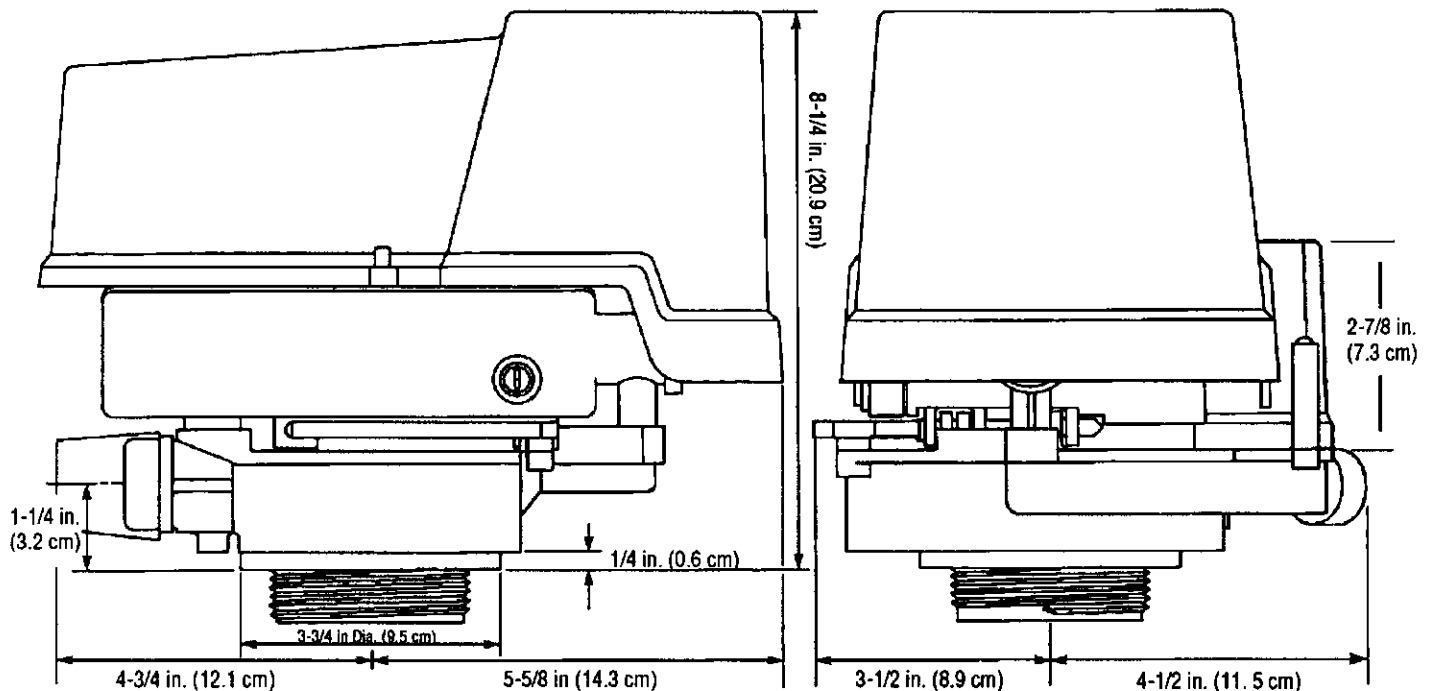
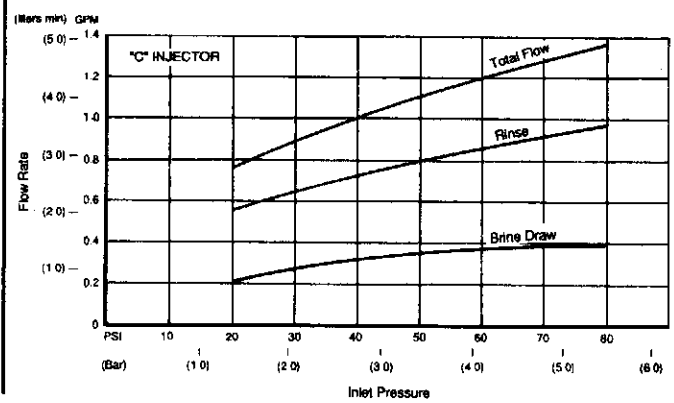
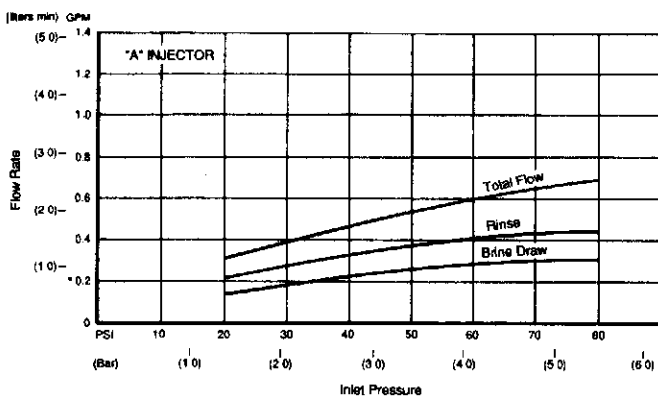
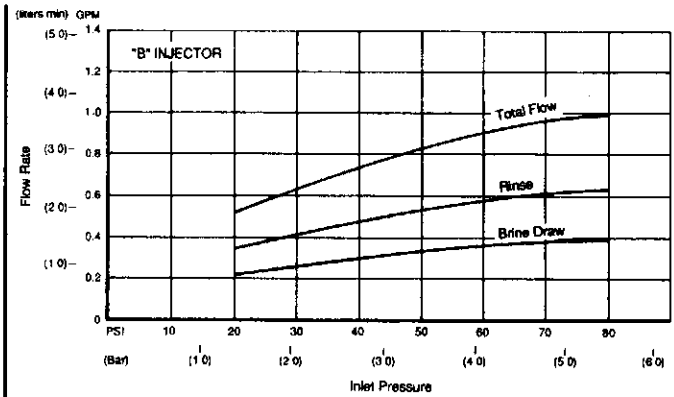
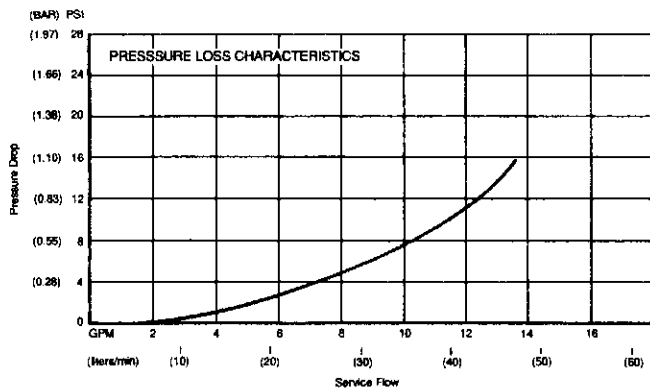


Figure 11

## SPECIFICATIONS

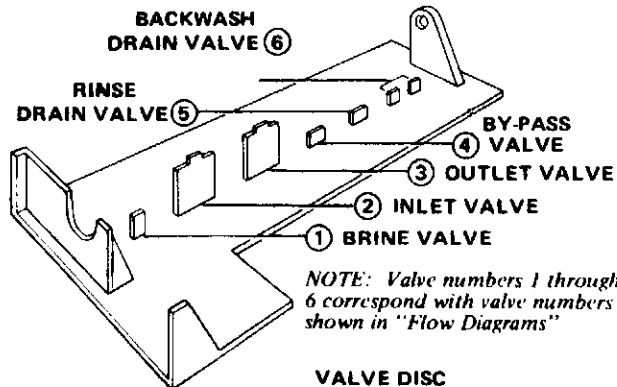


Hydrostatic Test Pressure .....	300 psi (20.69 BAR)
Working Pressure .....	20-127 psi (1.38-8.76 BAR)
Standard Electrical Rating .....	115V 60 Hz
Optional Electrical Rating .....	115V 50 Hz, 230V 50 Hz, 200V 60 Hz, 24V 60 Hz, 24V 50 Hz, 100V 60Hz, 100V 50 Hz
Electric Cord .....	60 in (1.5 m) long, 3-wire with plug
Pressure Tank Thread .....	2 1/2 in -8 male
Brine Line Thread .....	1/4 in NPT male
Distributor Tube Diameter Required .....	13/16 in OD (20.6 mm)
Distributor Tube Length .....	1 1/4 in (31.8 mm) higher than top of mineral tank
Standard Manifold Connection .....	3/4 in NPT inlet-outlet, 3/8 in NPT drain
Optional Manifold Connections .....	1in NPT inlet-outlet, 1/2 in NPT drain; 3/4 in BSPT inlet-outlet, 3/8 in BPST drain; 1in BPST inlet-outlet, 1/2 in BSPT drain
Optional Bypass Valve .....	3/4 in (19.1 mm) or 1 in (25.4 mm) copper tailpiece, 1/2 in 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 Refill Control .....	1 to 10 lbs (0.45 to 4.5 kg) of salt or 3 to 19 lbs (1.3 to 8.6 kg) of salt
Injector Size "A" White .....	Nozzle .042 in (1.1 mm) Diameter, Throat .089 in (2.3 mm) Diameter
Injector Size "B" Blue .....	Nozzle .052 in (1.3 mm) Diameter, Throat .099 in (2.5 mm) Diameter
Injector Size "C" Red .....	Nozzle .059 in (1.5 mm) Diameter, Throat .099 in (2.5 mm) Diameter
Backwash Controllers Available for .....	6 , 7 , 8 , 9 , 10 , 12 in (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/m2) of bed area.

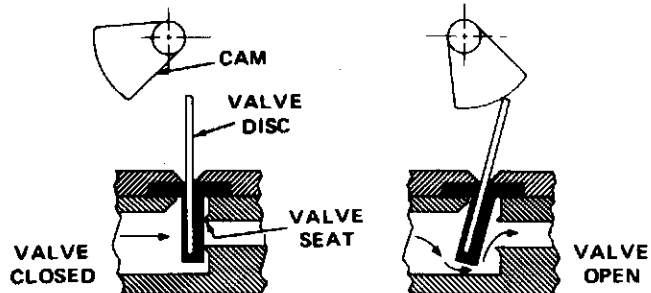


## Flow Diagrams

### IDENTIFICATION OF CONTROL VALVING

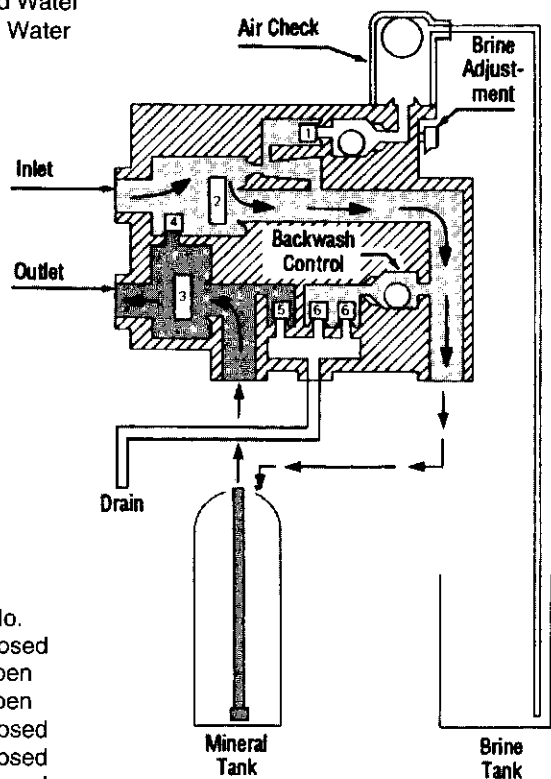


### VALVE DISC (PRINCIPLE OF OPERATION)



### 1 Service Position

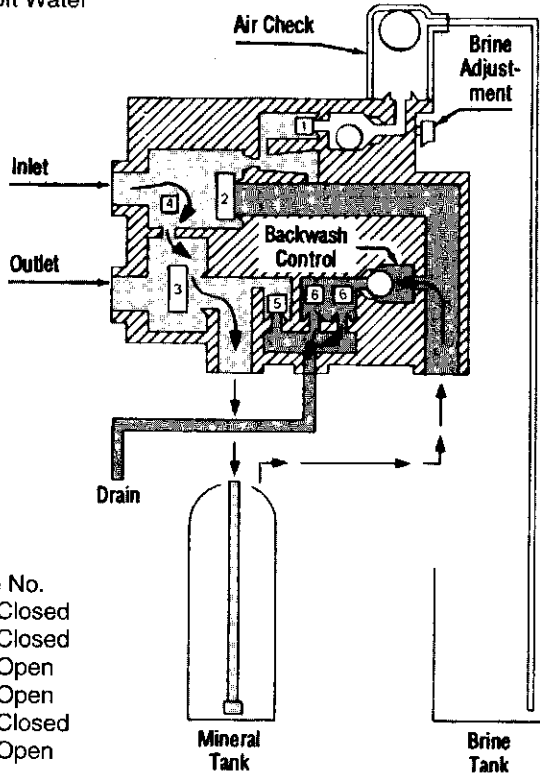
- Hard Water
- Soft Water



- Valve No.
- 1 - Closed
  - 2 - Open
  - 3 - Open
  - 4 - Closed
  - 5 - Closed
  - 6 - Closed

## 2 Backwash Position

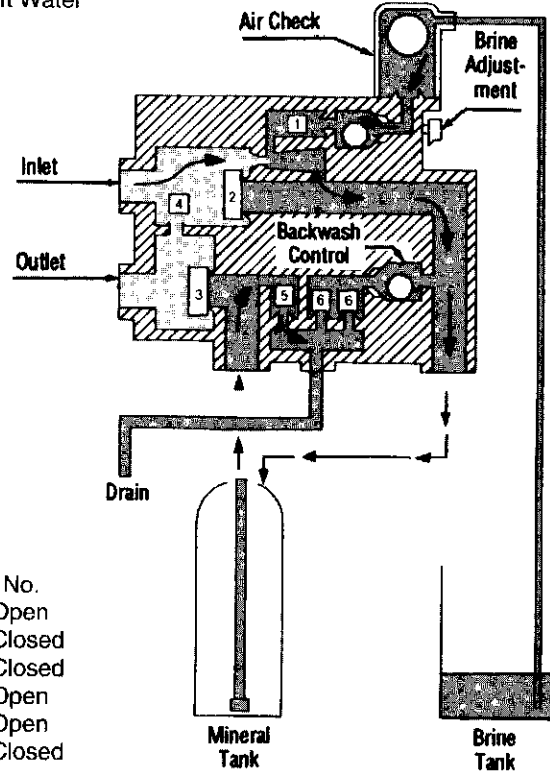
Hard Water  
 Soft Water



Valve No.  
 1 - Closed  
 2 - Closed  
 3 - Open  
 4 - Open  
 5 - Closed  
 6 - Open

## 3 Brining Position

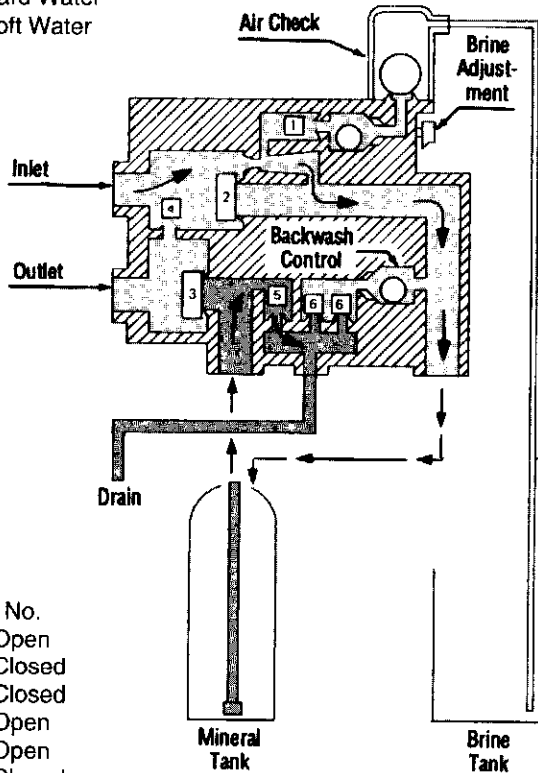
Hard Water  
 Soft Water



Valve No.  
 1 - Open  
 2 - Closed  
 3 - Closed  
 4 - Open  
 5 - Open  
 6 - Closed

## 4 Slow Rinse Position

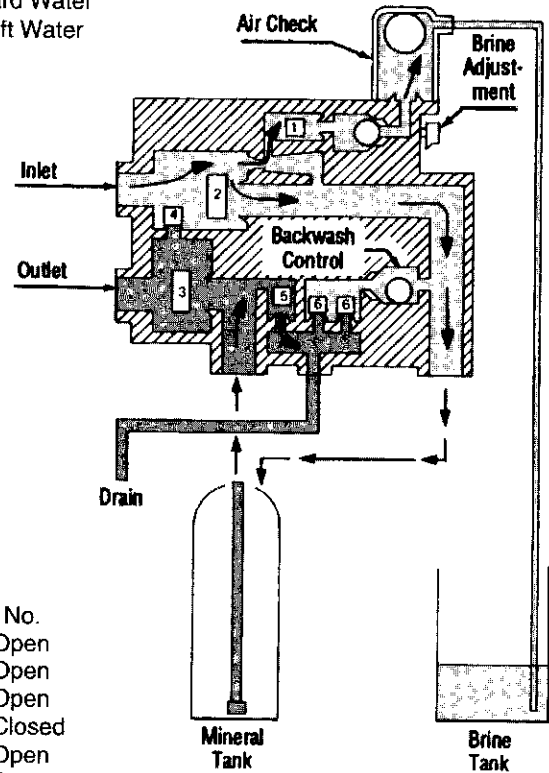
Hard Water  
 Soft Water



Valve No.  
 1 - Open  
 2 - Closed  
 3 - Closed  
 4 - Open  
 5 - Open  
 6 - Closed

## 5 Brine Refill & Purge Position

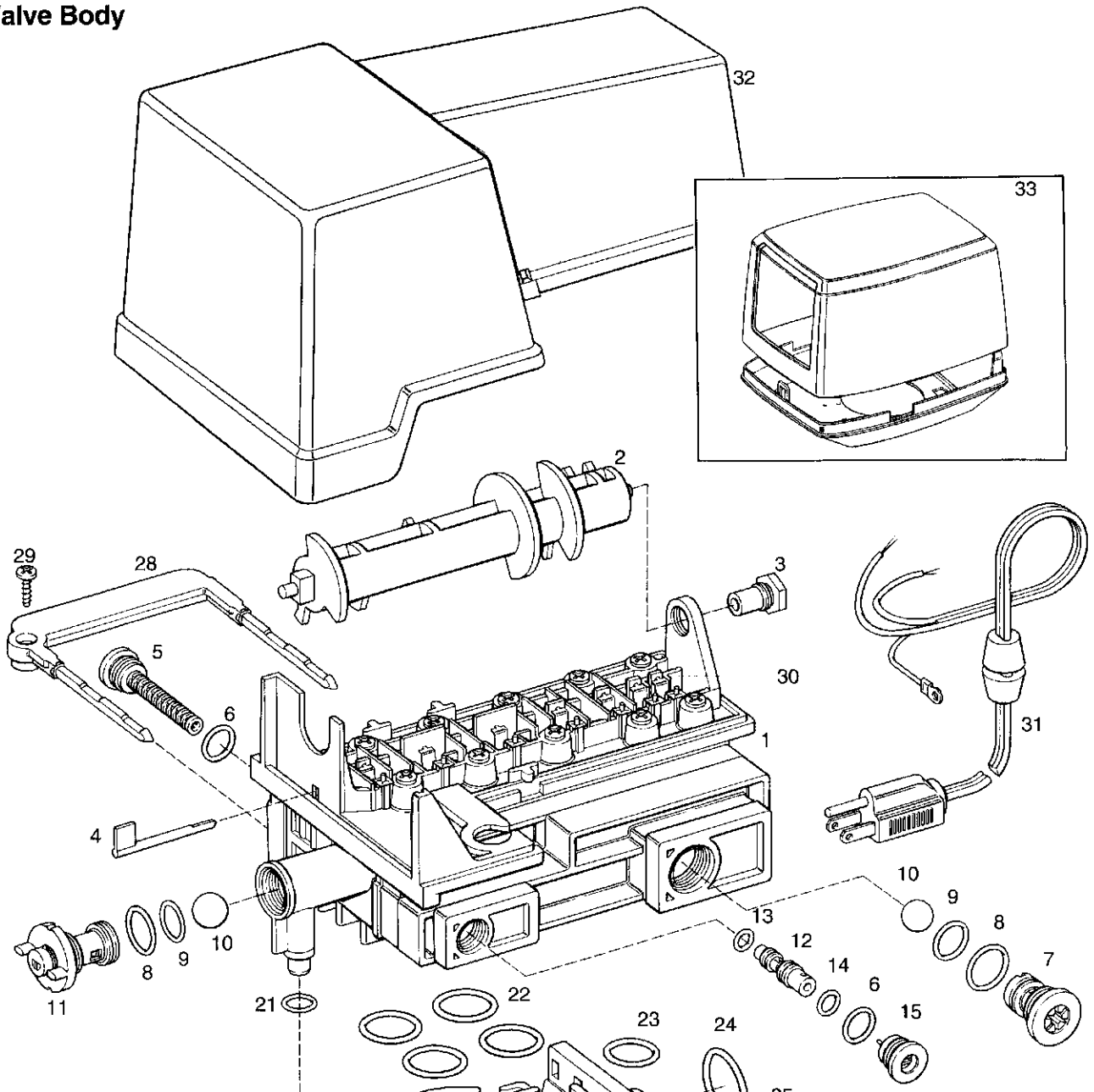
Hard Water  
 Soft Water



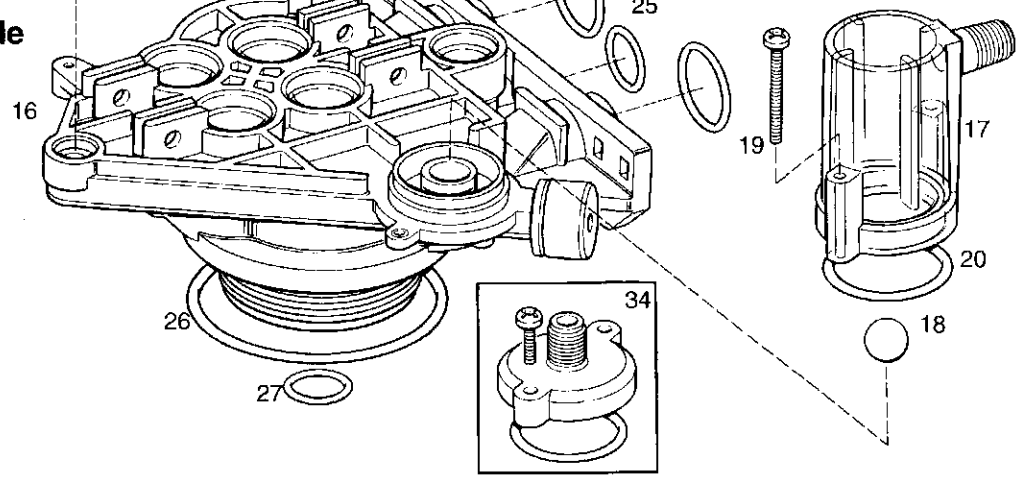
Valve No.  
 1 - Open  
 2 - Open  
 3 - Open  
 4 - Closed  
 5 - Open  
 6 - Closed

# Replacement Parts

## Valve Body



## Tank Adapter Module

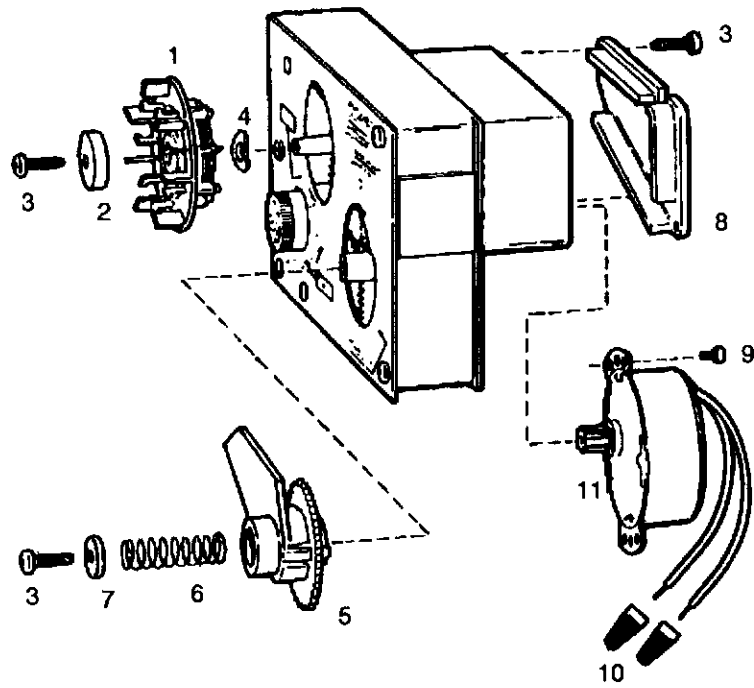


## Valve

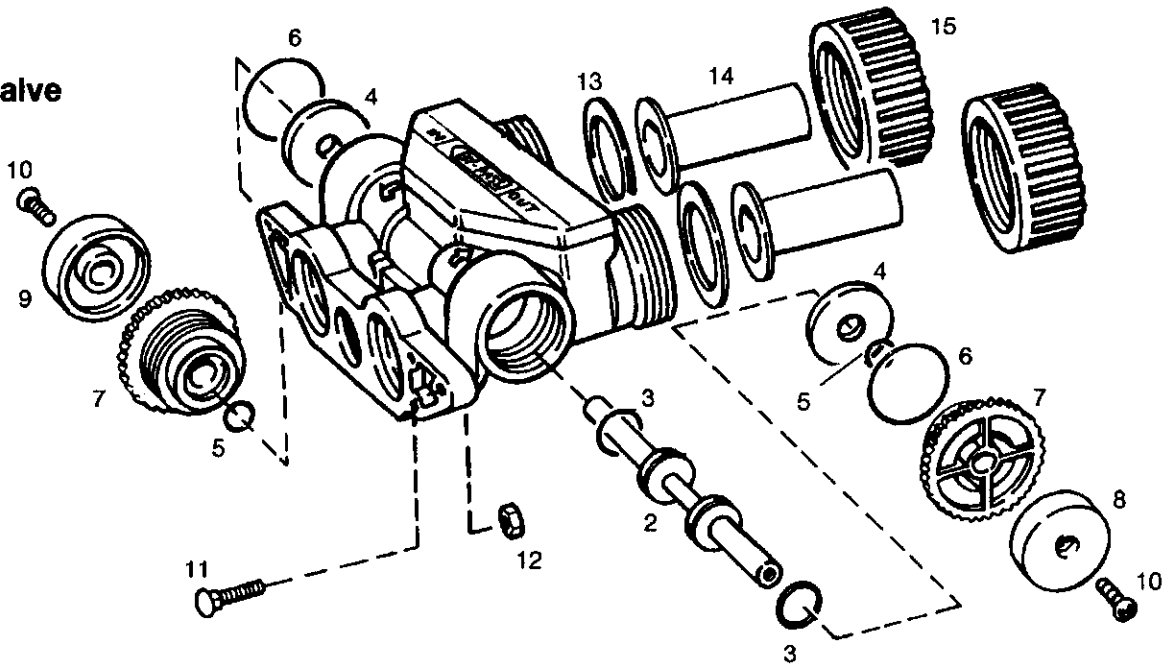
Code	Item No.	Part No.	Description	Qty.	Code	Item No.	Part No.	Description	Qty.
1	24N	155A77	Valve Body Assembly	1	16		100C139-701	Tank Adapter Assembly	1
2			Camshaft:	1	17		100C142-001	Body, Aircheck	1
	21F-3	155C174	Standard, One-Piece		18		150A61	Ball	1
	21F	155N59	Standard, Segmented		19		22A352-039	Screw, No. 8-32 x 1.5 in.	2
	21F-1	155A80	Extra Salt, Segmented		20		40A220	O-Ring	1
	21F-2	155A153	Long Rinse, Segmented		21	32F	40A110	O-Ring	1
3	22F	100A24	Camshaft Bearing	1	22	35F	40A118	O-Ring	4
4	5F	150A71	Timer Locking Pin	1	23	37F	40A114P1	O-Ring	1
5	7F	155A200G4	Screen Cap with O-Ring	1	24	38F	40A121	O-Ring	2
6	6F	40A014	O-Ring	2	25	39F	40A115	O-Ring	1
7			Backwash Control with O-Rings	1	26	43F	40A338	O-Ring	1
	25F-6	150N151G2	No. 6 for 6 in. Diameter Tank		27	44F	40A210	O-Ring	1
	25F-7	150N151G3	No. 7 for 7 in. Diameter Tank		28	34F	155B169	Locking Bar Available in English, German, French or Japanese Language	1
	25F-8	150N151G4	No. 8 for 8 in. Diameter Tank		29	33F	22A132	Screw, No. 8 x 9/16 in.	1
	25F-9	150N151G5	No. 9 for 9 in. Diameter Tank		30	23F-2	155A155P1	Spring	9
	25F-10	150N151G6	No. 10 for 10 in. Diameter Tank		31	90F	25A28	Cord Set, Flat (SPT-2)	1
	25F-12	150N151G7	No. 12 for 12 in. Diameter Tank		32	20F-1	155D55P1	Valve Cover	1
8	2F	40A017	O-Ring	2	*		155A152	Valve Disc Kit	
9	3F	40A015	O-Ring	2	*		150A129	O-Ring Kit: 40A110 (1), 40A114P1 (1), 40A118 (4)	
10	4F	100A30P1	Ball	2	*		150A144	O-Ring Kit: 40A115 (1), 40A121(2)	
11			Brine Refill Control:	1	33		HSC-1	High-Style Cover: Beige / Tan	
	1F-10	100N65	1 to 10 lbs. Salt				HSC-2	Black / White	
	1F-19	100N108	3 to 19 lbs. Salt		34		100A140-802	Adapter Kit	
12			Injector with O-Rings:	1					
	28F-AA	150N150G4	"A" Injector - White						
	28F-BB	150N150G5	"B" Injector - Blue						
	28F-CC	150N150G6	"C" Injector - Red						
13	26F	40A010	O-Ring	1					
14	27F	40A011	O-Ring	1					
15			Injector Cap with O-Ring:	1					
	8F-AA	150N150G7	"A" Cap						
	8F-BB	150N150G8	"B" Cap						
	8F-CC	150N150G9	"C" Cap						

\*Not Shown

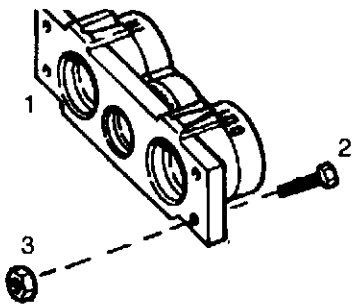
## 440 Timer



## Bypass Valve



## Piping Boss



**Note:** Do not use pipe joint compound when threading pipe into the Noryl piping boss. Use only Teflon® pipe tape. Do not over-tighten pipe into Noryl piping boss.



### 440 Timer

Code	Item No.	Part No.	Description	Qty.
1			Skipper Wheel Assembly	1
	14F-6	400N147G1	6-Day	
	14F-7	400N147G3	7-Day	
2	89F	170A38	Washer	1
3	85F	22A76	Screw, No. 6 x 1/2 in.	7
4	15F	22A16	Bowed Washer	1
5	99F	420N64	Tripper Arm Assembly	1
6	87F	410A42	Spring	1
7	88F	410A29	Retainer	1
8	84F	420A9	Motor Cover	1
9	18F	22A78	Screw, No. 4-40 x 1/4 in.	2
10	19F	25A42	Wire Nut	2
11			Motor:	1
	98F-1	420A56	115V, 60 Hz	
	98F-4	420A57	115V, 50 Hz	
	98F-2	420A58	230V, 50 Hz	
		420A59	200V, 60 Hz	
	98F-3	420A61	24V, 60 Hz	
	98F-6	420A60	24V, 50 Hz	
		25B532-002	100V, 60 Hz	
		25B532-001	100V, 50 Hz	

### Bypass Valve

Code	Item No.	Part No.	Description	Qty.
1	100N	156N54P1	Bypass Body Assembly	1
2	101N	156N56	Valve Stem with O-Rings	1
3	102N	40A208	O-Ring	2
4	50F	151A16	Washer	2
5	48F	40A012	O-Ring	2
6	49F	40A122	O-Ring	2
7	47F	151A13	End Cap	2
8	46F-2	151A15P2	Knob, Black	1
9	46F-1	151A15P1	Knob, White	1
10	33F	22A132	Screw, No 8 x 9/16 in.	2
11	52N	22A196	Screw, No. 10 -24 x 1 in.	4
12	53F	22A54	Nut, No. 10 - 24	4
13			Gasket:	2
	54F	151A20	For 1 in. Pipe or Tube	
	54F-1	156A31	For 3/4 in. Pipe or Tube	
14			Plumbing Adapter:	2
	55F-1	151A18	3/4 in. Copper Tube	
	55F-2	151A22	1 in. Coper Tube	
	55F-4	156A40	1 in. NPT, Brass	
	55F-5	156A226	3/4 in .BSPT, Brass	
	55F-6	156A39	1 in. BSPT, Brass	
		156A222	22 mm Copper Tube	
		156A223	28 mm Copper Tube	
		156A231	3/4 in. PVC Pipe	
		156A232	1 in. PVC Pipe	
15			Adapter Nut	2
	56F-1	156A43	For 3/4 in. Copper Tube	
	56F-2	156A44	For 1 in. Copper Tube	
	56F-3	156A32	For 3/4 in. Pipe or PVC	
	56F-4	156A38	For 1 in. Pipe or PVC	

### Piping Boss

1	Kit	Piping Boss (Includes Hardware):	1
	150A140	3/4 in. NPT, Brass	
	150A141	1 in. NPT, Brass	
	150A142	3/4 in. BSPT, Brass	
	150A143	1 in. BSPT, Brass	
	157A140	3/4 in. NPT, Noryl	
	157A141	1 in. NPT, Noryl	
	157A142	3/4 in. BSPT, Noryl	
	157A143	1 in. BSPT, Noryl	
2	22A362-001	Screw, No. 10-24 x 3/4 in.	4
3	22A363-001	Nut, No. 10-24	4

## Troubleshooting

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. For parts mentioned, refer to exploded views in the Replacement Parts section of this manual

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.</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. 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 at softener.</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.</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 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. 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.</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.</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>

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
8. Control backwashes at excessively low or high rate.	a. Incorrect backwash controller used. b. Foreign matter affecting controller operation.	a. Replace with correct size controller. b. Remove controller and clean it and ball.
9. Flowing or dripping water at drain or brine line after regeneration.	a. Drain valve (5 or 6) or brine valve (1) held open by foreign matter or particle. b. Valve stem return spring on top plate weak.	a. Manually operate valve stem to flush away obstruction. b. Replace spring.
10. Hard water leakage during service.	a. Improper regeneration.  b. Leaking of bypass valve. c. O-seal around riser tube damaged.	a. Repeat regeneration making certain correct salt dosage used. b. Replace o-ring. c. Replace o-ring.

## Disinfection of Water Softeners

The materials of construction of the modern water softener will not support bacterial growth, nor will these materials contaminate a water supply. However, the normal conditions existing during shipping, storage and installation indicate the advisability of disinfecting a softener after installation, before the softener is used to treat potable water. In addition, during normal use, a softener may become fouled with organic matter, or in some cases, with bacteria from the water supply.

Thus every softener should be disinfected after installation, some will require periodic disinfection during their normal life, and in a few cases disinfection with every regeneration would be recommended.

Depending upon the conditions of use, the style of softener, the type of ion exchanger, and the disinfectant available, a choice can be made among the following methods.

### Sodium or Calcium Hypochlorite

#### Application

These materials are satisfactory for use with polystyrene resins, synthetic gel zeolite, greens and bentonites.

#### 5.25% sodium Hypochlorite

These solutions are available under trade names such as Clorox, Linco, Bo Peep, White Sail and Eagle Brand Bleach. If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

#### 1. Dosage

- a. Polystyrene resin; 1.2 fluid ounce per cubic foot.
- b. Non-resinous exchangers; 0.8 fluid ounce per cubic foot.

#### 2. Brine tank softeners

- a. Backwash the softener, and add the required amount of hypochlorite solution to the brine well of the brine tank. (The brine tank should have water in it to permit the solution to be carried into the softener.)
- b. Proceed with the normal regeneration.

### Calcium Hypochlorite

Calcium hypochlorite, 70% available chlorine, is available in several forms including tablets and granules. These solid materials may be used directly, without dissolving before use.

#### 1. Dosage

- a. 2 grains (approximately 0.1 ounce) per cubic foot.

#### 2. Brine tank softeners

- a. Backwash the softener and add the required amount of hypochlorite to the brine well of the brine tank. (The brine tank should have water in it to permit the chlorine solution to be carried into the softener.)
- b. Proceed with the normal regeneration.

