

# technetic 1000

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Water Conditioning Control System  
Installation, Operation and Maintenance Manual

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## Operation

The two key components of the 1000 Electronic Demand System are the microprocessor, a miniature computer located on the circuit board, and a water meter located in the valve outlet. The flow of conditioned water through the meter causes electrical impulses to be generated and sent to the computer where water usage information is processed. Every day, at 2 a.m., the past seven days' water usage is statistically averaged to anticipate the amount of water to be used the next day. The computer then determines if the water conditioner has enough remaining capacity to supply the next day's needs. If not, the unit will regenerate. If the water usage pattern changes, the computer automatically compensates for the change and regenerates only when needed.

When regeneration is called for, the microprocessor determines the amount of brine required to regenerate the conditioner. The 1000 Demand System uses **Proportional Salting**; the amount of salt required for each regeneration is proportional to the amount of capacity used in the previous service run. No ion exchange takes place as the brine flows through the unused portion of a partially exhausted resin bed. Exchange only takes place in the used or exhausted portion of the resin bed, resulting in higher operating efficiency and lower salt usage.

## Special Features

### Ease of Programming

When the unit is installed the following information is entered into the controller, using a simple two-step procedure:

- Time of Day: Hours and minutes with p.m. hours indicated by a light on the display.
- Water Hardness: Range, 1 to 99 grains/gallon (1 to 2,999 mgrams/liter).
- Salt Dosage: Range, 2.5 to 15 lbs/Ft<sup>3</sup> (40-240 grams/liter).

### Time/Gallons Remaining Display

Either the time of day or the gallons of conditioned water remaining can be displayed. The gallons remaining display is updated every five seconds. If water is flowing the display will count down. This allows easy determination of proper meter operation. It also allows the home owner to determine how many gallons of conditioned water are available. If there is an abnormally high water usage anticipated, a manual regeneration may be necessary.

### Power Outage

In the event of an electrical power outage all operational information will be retained in a Nonvolatile Random Access Memory, NOVRAM. During the outage the control will not keep time or measure water flow. When power is restored all functions will continue from the time of the outage, but it may be necessary to reset the time. There is no battery to replace.

### Low or No Water Usage

The 1000 valve does not recognize a day of very little or no water usage and will not use data from such a day to compute the average usage. For example, if the family is on vacation for a week, the prior average will be maintained. When household activity resumes, the unit will operate as if the vacation had not occurred.

## "Reserve" and High Water Usage

"Reserve" refers to the amount of soft water that may be needed for the next 24 hours. The reserve amount is calculated by multiplying the average past seven days' usage by 1.20. Regeneration decisions are based on the calculated reserve.

In the event of unusually high water usage (twice or more than the current daily average), the high usage amount will be used as the reserve when the computer performs its regeneration computation at 2:00 A.M. This is done in anticipation of a second day of very high usage.

## Guest Cycle

An extra regeneration may be achieved at any time by depressing the Manual Regeneration Button and holding it for five seconds. It will take a few minutes for the backwash to start. This feature is beneficial when you expect to use more than the normal amount of water: guest visits, extra heavy laundry days, etc.

## Installation

All plumbing and electrical connection must conform to local codes.

Inspect the unit carefully for carrier shortage or shipping damage.

**Note:** At water pressures above 60 psi (414 KPa), remove the yellow plastic washer from beneath the cam gear bracket. Reference item 5 in the **Replacement Parts** section.

## Location Selection

The following considerations must be taken into account when selecting the location for the water conditioning system:

1. Locate the unit as close to a drain as possible.
2. If supplementary water treating equipment is required, make sure that adequate additional space is available. Locate the brine tank in an accessible place so that salt can easily be added.
3. 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 that they can transmit heat back down the cold water pipe into the 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 prevent hot water damage. A positive way to prevent hot water from flowing from a heat source to the conditioner is to install a check valve in the soft water piping from the

conditioner. If a check valve is installed, make sure that the water heating unit is equipped with a properly rated temperature and pressure safety relief valve. Always conform to local codes.

4. Do not locate the unit in an area where the temperature ever falls below 34°F (1°C) or over 120°F (49°C).
5. Do not install the unit near acid or acid fumes.

## Water Line Connection

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

The most common bypass systems are the Series 1010 Bypass Valve (Figure 1) and plumbed-in globe valves (Figure 2). Though both are similar in function, the Series 1010 Bypass offers simplicity and ease of operation.

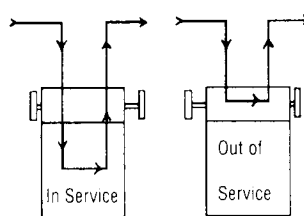


Figure 1  
Series 1010 Bypass Valve

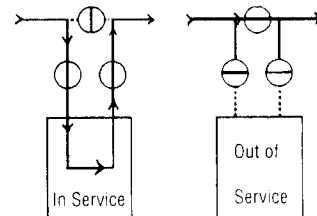


Figure 2  
Globe Valves

## Drain Line Connection

The drain line discharges water and brine during the regeneration cycles. Typically, the line drains into a floor drain or laundry tub. Plumb the drain line according to local codes, leaving a one or two inch air gap between the end of the drain line and the drain opening, Figure 3. The ideal location for the unit is above and not more than 20 ft (6.1 m) from the drain. For this installation, connect 1/2 in (1.3 cm) I.D. plastic tubing to the drain line connection located on the control. If the unit is located more than

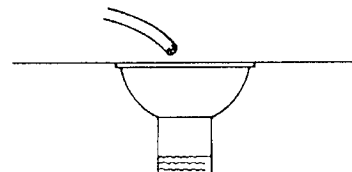


Figure 3



### 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.**

20 ft (6.1 m) from the drain, use 3/4 in (1.9 cm) tubing for runs up to 40 ft (12.2 m). Purchase an adapter to bush tubing down to the drain line connection fitting. You can elevate the line up to 6 ft (1.8 m) providing the run does not exceed 15 ft (4.6 m) and the water pressure at the conditioner is not less than 40 psi (276 KPa). You can elevate an additional 2 ft (61 cm) for each additional 10 psi (69 KPa). When the drain line is elevated and empties into a drain which is below the level of the control valve, form a 7 in (17 cm) loop at the far end of the line so that the bottom of the loop is level with the drain line connection. This provides an adequate siphon trap. If the drain empties into an overhead sewer line, a sink-type trap must be used.

**Note:** The above instructions reflect standard commercial practices. Local codes may require different installation procedures.

### Brine Line Connection

Install the brine line between the pickup tube in the salt storage tank and the 3/8 inch tubing nut on the air check sight glass of the control valve

**Note:** Make sure that all fittings and connections are tight so that premature checking does not take place. Premature checking occurs when the ball in the air check falls to the bottom before all brine is drawn out of the brine tank.

### Overflow Line Connection

In the absence of a safety float valve and in the event of a malfunction, the tank overflow fitting 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 the overflow fitting, locate a hole on the side of the brine tank. Insert overflow fitting into tank and tighten with plastic thumb nut and gasket as shown (Figure 4). 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 the control unit. Overflow line must be a direct, separate line from overflow fitting to drain, sewer or tub. Allow an air gap as in the drain line instructions.

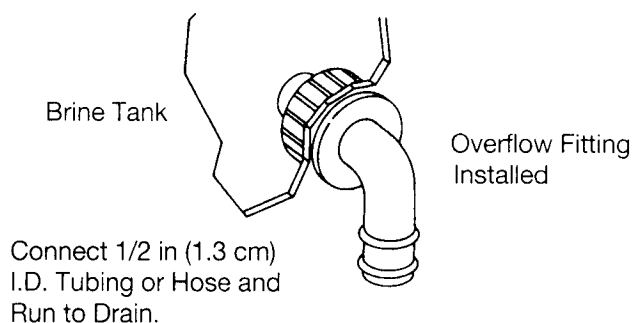


Figure 4

### Injector Selection

There are two injectors shipped with each valve; one for low pressure, 20 to 60 psi (138 to 414 KPa), and one for high pressure, 61 to 90 psi (420 to 620 KPa). The low pressure injector has been factory installed in the valve. The high pressure injector is located in a plastic bag taped to the underside of the cover. Check the water pressure to determine which is the correct injector for your installation.

The injectors are coded according to size by the number of "bumps" molded onto the end of the injector. To determine if you are using the correct injector, check the resin tank diameter from the label on the back of the valve and refer to Table 1. For the location of the injector in the control valve refer to Item 22 in the Replacement Parts List.

**Note:** Do **not** add salt to the brine tank until instructed to do so at a later step in the installation.

A yellow plastic washer (Item 5 [reference **Replacement Parts** section]) has been installed between the bracket (Item 6) and the cam gear (Item 4). The washer must remain in place when the water pressure is less than 80 psi (551.6 KPa). When the water pressure is 80 psi (551.6 KPa) or greater, the washer must be removed prior to installing the water conditioner.

Washer removal may be accomplished as follows:

1. Unscrew and remove the bracket retaining screw (Item 7).
2. Lift off the bracket (Item 6).
3. Remove the yellow plastic washer (Item 5).
4. Reinstall the bracket and screw.
5. Proceed with installation and start-up.

Table 1 - Injector Selection

Water Pressure	Resin Tank Diameter, inches (cm)						
	7 (17.8)	8 (20.3)	9 (22.8)	10 (25.4)	12 (30.5)	13 (33)	14 (35.5)
20 to 60 psi (138 to 414 KPa)							
61 to 90 psi (420 to 620 KPa)							

## Start-Up Procedure

After the water conditioning system is physically installed, we recommend that the conditioner be disinfected before it is used to treat potable water. Refer to the **Disinfection of Water Conditioner** section in this manual. Complete the following steps to place the conditioner into operation.

1. Remove the control valve cover by grasping each side of the cover at the bottom, towards the back. Spread the sides apart slightly and lift off (Figure 5).
2. Turn off the water supply and place the bypass valve(s) in the "not in bypass" position.

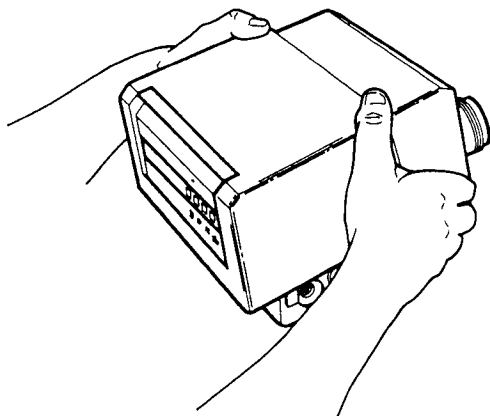


Figure 5

3. Press down on the top of the drive gear to disengage the cam gear (Figure 6).

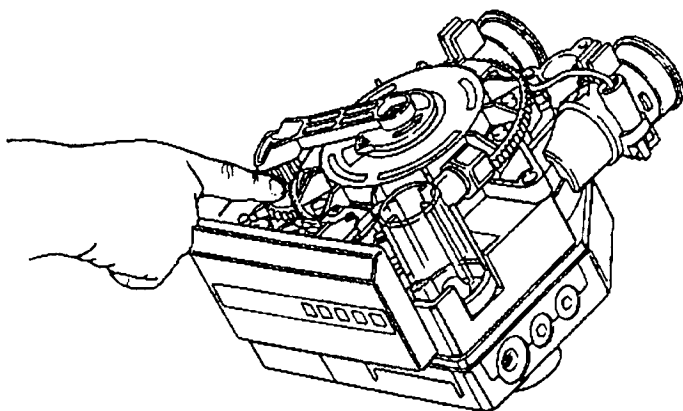


Figure 6

4. With the cam gear disengaged, rotate the cam gear **COUNTERCLOCKWISE** to the **BACKWASH** position (Figure 7).
5. Fill the mineral tank with water: Open the water supply valve **very slowly** to approximately the 1/4 open position.
6. When all of the air is purged from the tank (water begins to flow steadily from the drain), slowly open the main supply valve all the way. Allow the water to run into the drain until clear.

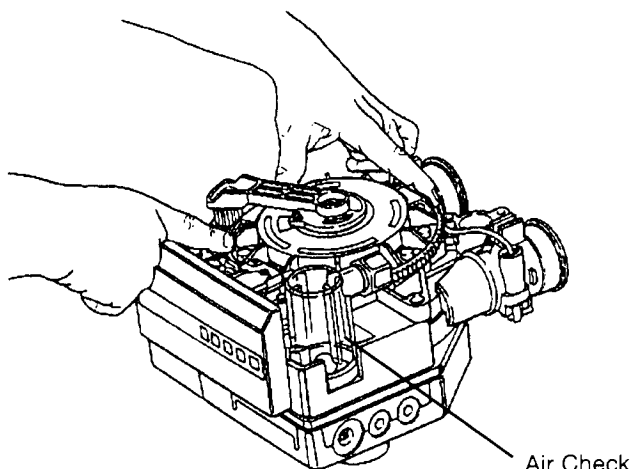


Figure 7



### Caution

If the water supply is opened too rapidly or too far, mineral may be lost. In the **BACKWASH** position, you should hear air escaping slowly from the drain line.

7. Check that water is able to be drawn from the brine tank:
  - A. Add water to the brine tank to a level about two inches above the screen at the end of the pickup tube.
  - B. Rotate the cam gear **COUNTERCLOCKWISE** to the **REFILL** position. Allow water to fill the air check and flow into the brine tank until all the air is purged out of the brine draw line and pick-up tube.
  - C. Rotate the cam gear **COUNTERCLOCKWISE** to the **BRINE/RINSE** position and check that water is being drawn from the brine tank. The water level in the tank will recede very slowly. Continue to draw water until the ball in the air check (Figure 7) seats at the bottom of the air check sight glass. If the water level does not recede, if it goes up, or if air enters the air check sight glass before the water is drawn out of the brine tank, refer to the **Troubleshooting** section in this manual.
  - D. Rotate the cam gear **COUNTERCLOCKWISE** to a position where the pin on the outer edge of the cam gear is about 1/2 inch away from the switch lever, then connect electrical power to the control. The cam gear will rotate until the pin actuates the switch lever, turning the drive motor off.

**Note:** 100 VAC, 115 VAC and 230 VAC controls require a properly grounded electrical outlet. 24 VAC controls require a power supply transformer having a minimum rating of 10 volt-amperes.

## 8. Set the Time of Day

A. Push the **TIME SET** button (Figure 8).

B. Each digit is controlled by the button below it. The "dot" in the upper left hand corner of the display indicates p.m. hours. Enter the time of day by pressing the buttons directly below each digit, starting with the digit on the left (the second button from the left). The display will alternate between "0" and "1" with p.m. hours indicated by the p.m. light. For the hours 1 through 9, a "0" displayed in the 10 hours digit will disappear when the time is entered. Proceed to the next button and enter the single hour; then proceed to enter the minutes.

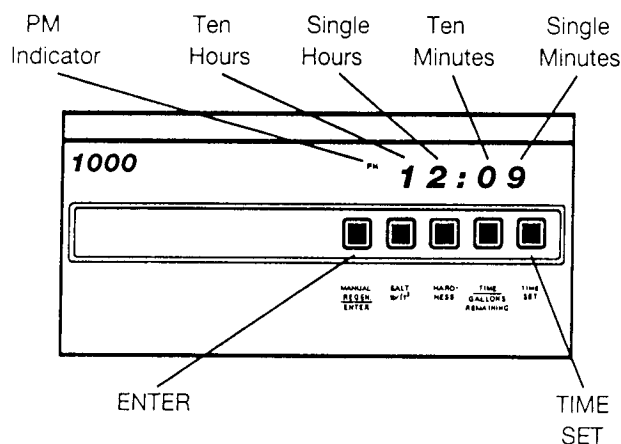


Figure 8

C. After the desired time is displayed, press the **ENTER** button. The display will show 9's which will disappear within five seconds. The gallons remaining will be displayed and the time of day will be set.

## 9. Set the Water Hardness

A. Simultaneously press the **HARDNESS** and **TIME/GALLONS REMAINING** buttons (Figure 9).

B. Enter the hardness value by pushing the buttons under the digits displayed.

C. After the desired numbers are displayed, press the **ENTER** button. The display will show four 9's which will disappear within 5 seconds and the hardness will be set. If all 9's remain, *do not be concerned*. This means that the gallons remaining is greater than 9999. After enough water has been used to drop the gallons remaining below 9999, the display will begin to count down.

D. Press the **HARDNESS** button to check the water hardness setting. The value will be displayed until the button is released.

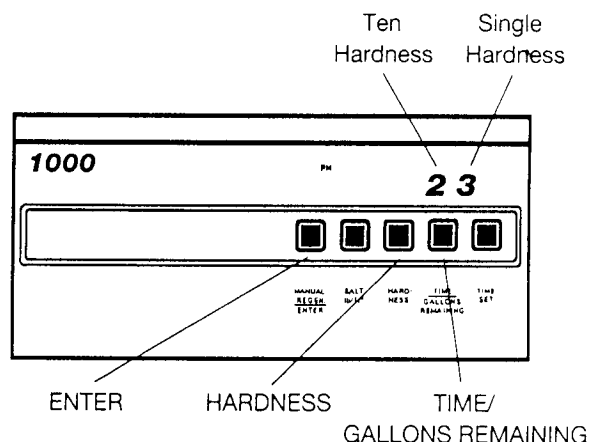


Figure 9

## 10. Set the Salt Dosage

A. Simultaneously press the **SALT** and **TIME/GALLONS REMAINING** buttons (Figure 10). This number indicates the pounds of salt used per regeneration per cubic foot if the mineral bed is completely exhausted. In most cases, less salt will be used due to the **Proportional Salting** system this valve uses. It will make only enough brine to regenerate the resin that is exhausted.

B. Enter the salt dosage by pressing the buttons directly under the digits displayed to increase or decrease the salt dosage.

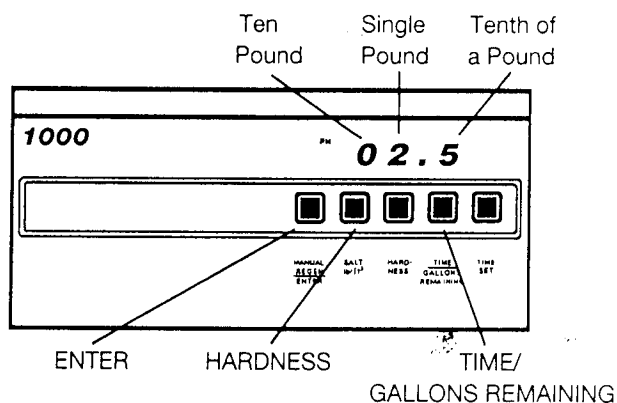


Figure 10

C. After the desired numbers are displayed, press the **ENTER** button. The display will show four 9's which will disappear within 5 seconds and the salt dosage will be set. The four 9's will continue to be displayed if the gallons remaining is greater than 9,999.

D. Press the **SALT** button to check the salt setting. The value will be displayed until the button is released.

## 11. Prepare the Brine Tank

A. Add enough softened water to the brine tank to cover the screen at the bottom end of the brine pick-up tube (Figure 11).

B. Add salt to the brine tank. **Do not use block salt; doing so will result in improper regeneration.**

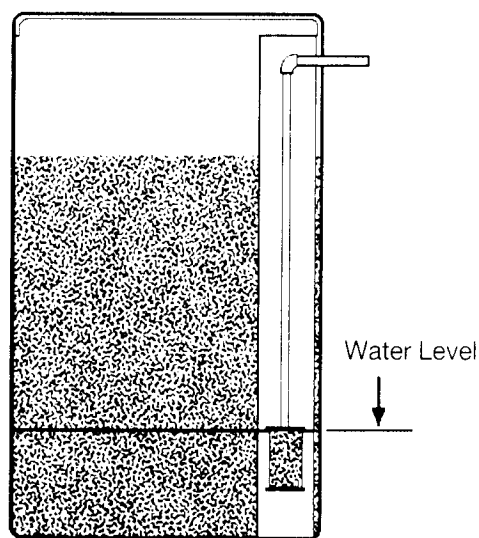


Figure 11

**Note:** The **TIME/GALLONS REMAINING** button allows either the time of day or the remaining number of gallons of water that can be softened by the unit to be displayed. After a regeneration has been completed the display will show gallons remaining even if the time of day were displayed prior to the regeneration.

During regeneration a small red "dot" will appear near the upper left corner of the right-most digit of the display.

## Disinfection of Water Conditioner

The construction materials of the water conditioning system do not support bacterial growth or contaminate the water supply. However, we recommend that the conditioner be disinfected after installation and before the conditioner is used to treat potable water. In addition, a conditioner can become fouled with organic matter during normal useage or with bacteria from a water supply. Periodic disinfection is recommended for all conditioners.

### Sodium Hypochlorite 5.25%

Sodium Hypochlorite solutions can be used with polystyrene resin, synthetic gel zeolite, greensand, and bentonites and are available under trade names such as Chlorox, Linco, Bo Peep, White Sail, and Eagle Brand Bleach. Adjust the dosage if stronger commercial solutions are used.

The recommended dosage for 5.25% solutions is:

- Polystyrene resin: 1.2 fluid ounces per cubic foot.
- Non-resinous exchangers: 0.8 fluid ounce per cubic foot.

Complete the following steps to disinfect the conditioner: Add the sodium hypochlorite solution to the brine well of the brine tank. Make sure that the brine tank has water in it so the solution is carried into the conditioner. Press the **MANUAL REGEN** button to initiate a complete regeneration.

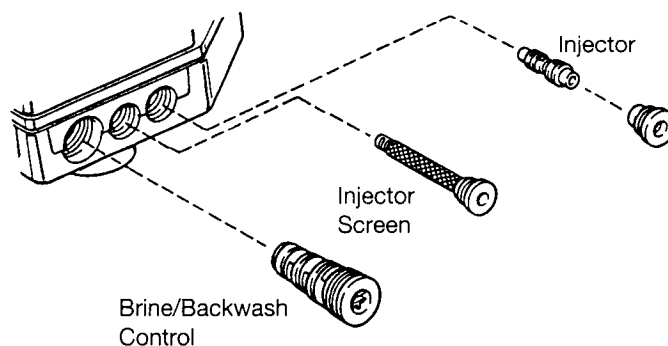
## Preventive Maintenance

All maintenance items are located on the lower right side of the valve (Figure 12).

Inspect and clean the brine tank and filter screen on end of brine pickup tube once a year or when sediment appears in the bottom of the brine tank.

Clean the injector, injector screen and brine/backwash control once a year as follows:

1. Disconnect electrical power to the unit.
2. Shut off the water supply or put bypass valve(s) into bypass position.
3. Relieve tank pressure:
  - A. Remove control valve cover (Figure 5).
  - B. Press down on the top the drive gear to disengage the cam gear (Figure 6).
  - C. With the cam gear disengaged rotate the cam gear **counterclockwise** to the **Backwash** position (Figure 7).
4. Using a screwdriver, unscrew and remove the brine/backwash control. Clean and flush the control with a strong stream of water. Lubricate the o-rings with silicone lubricant and reinstall the control into the valve. **See CAUTION note!**
5. Using a screwdriver, unscrew and remove the injector screen and injector cap.
6. Clean screen using a fine brush, flush until clean.
7. Using a needle nose pliers, pull injector straight out.
8. Flush water into the injector screen recess of the valve body to flush debris out through the injector recess.
9. Clean and flush the injector.
10. Lubricate the o-rings on the injector, injector cap and injector screen with silicone lubricant.
11. Reinstall the injector, injector cap and injector screen. **See CAUTION note!**
12. Rotate the cam gear **counterclockwise** to a position between **Fast Rinse** and **Service**, then open the water supply valve or return the bypass valve(s) to the "not in bypass" position.
13. Reconnect the electrical power to the unit. The cam gear will rotate until the pin actuates the switch lever, turning off the drive motor in the **Service** position.
14. Reset the time of day and reinstall the control valve cover.



### Caution

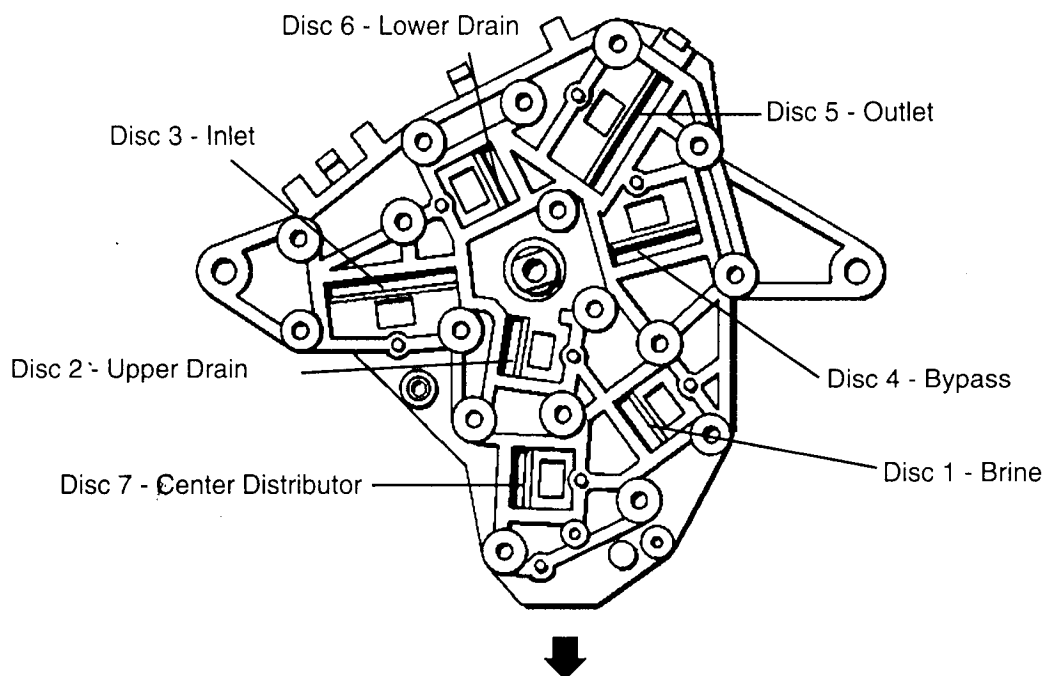
**Do not overtighten the plastic cap. Seat the cap lightly into position. Overtightening may cause breakage of the plastic cap that may not be immediately evident.**



## Specifications

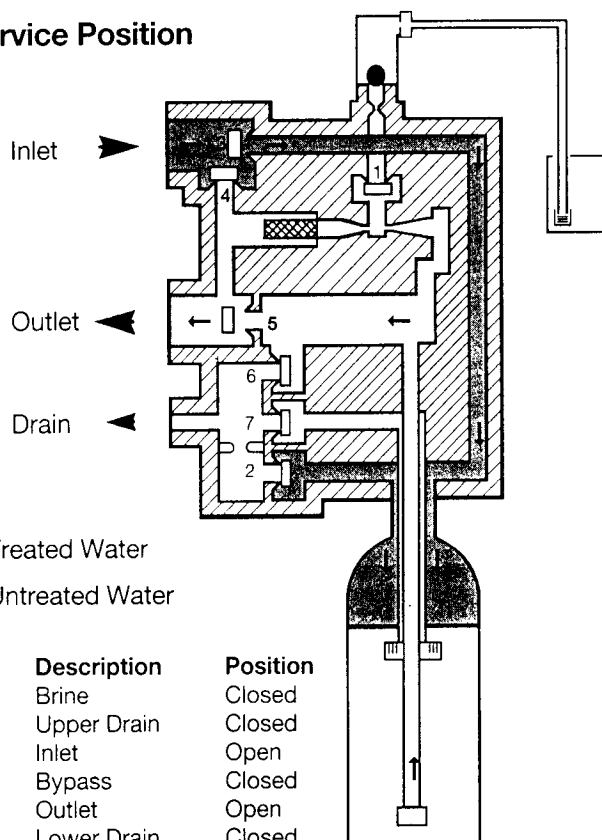
Hydrostatic Test Pressure .....	300 psi (2068 KPa)
Working Pressure .....	30-90 psi (207-620 KPa)
Electrical .....	24V/60Hz, 24V/50Hz, 100V/60Hz, 100V/50Hz, 120V/60Hz, 220V/50Hz
Operating Temperature .....	34°-120° F (1°-49°C)
Humidity .....	95% Non-condensing
Mineral Tank Thread .....	2 1/2 in - 8 NPSM male
Brine Line Connection .....	3/8 in. Tubing Nut
Drain Line Thread .....	1/2 in NPT Male
Service Connections	1 inch NPT or BSPT brass pipe adapter 1 inch or 3/4 inch copper tube adapter 1 inch or 3/4 inch PVC spigot adapter 22 mm or 28 mm copper tube adapter
Bypass Valve .....	Optional

## Valve Disc Identification

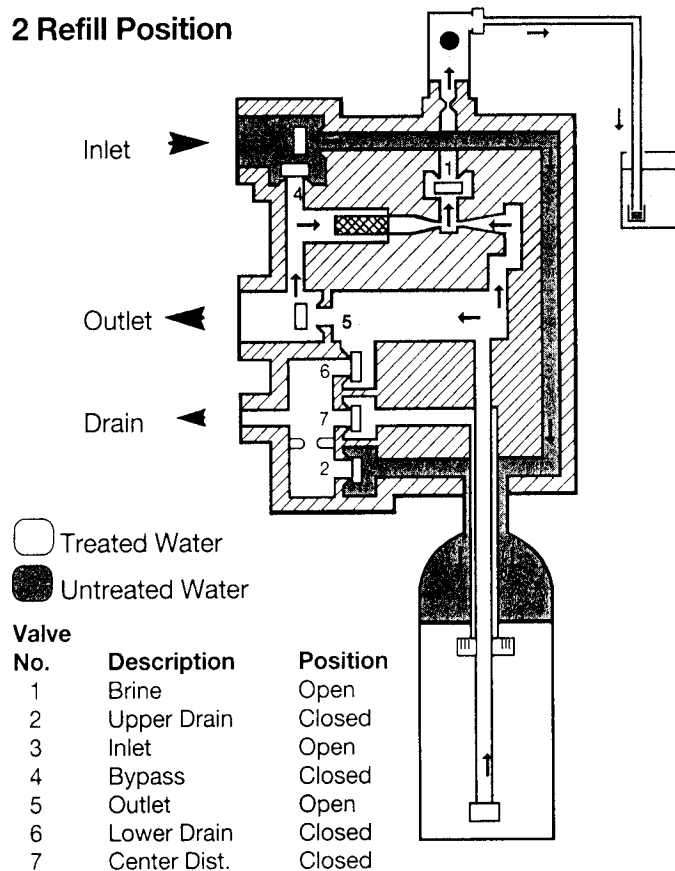


# Flow Diagrams

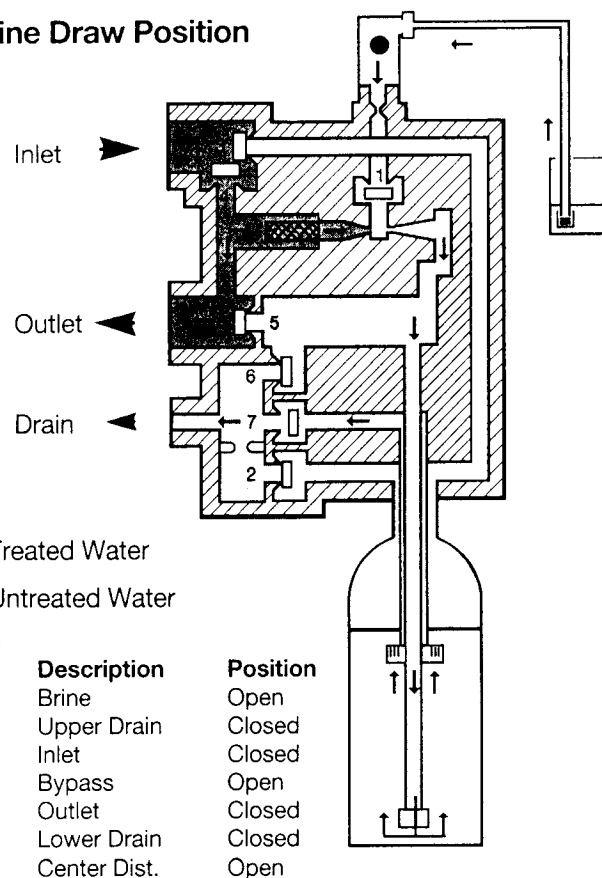
## 1 Service Position



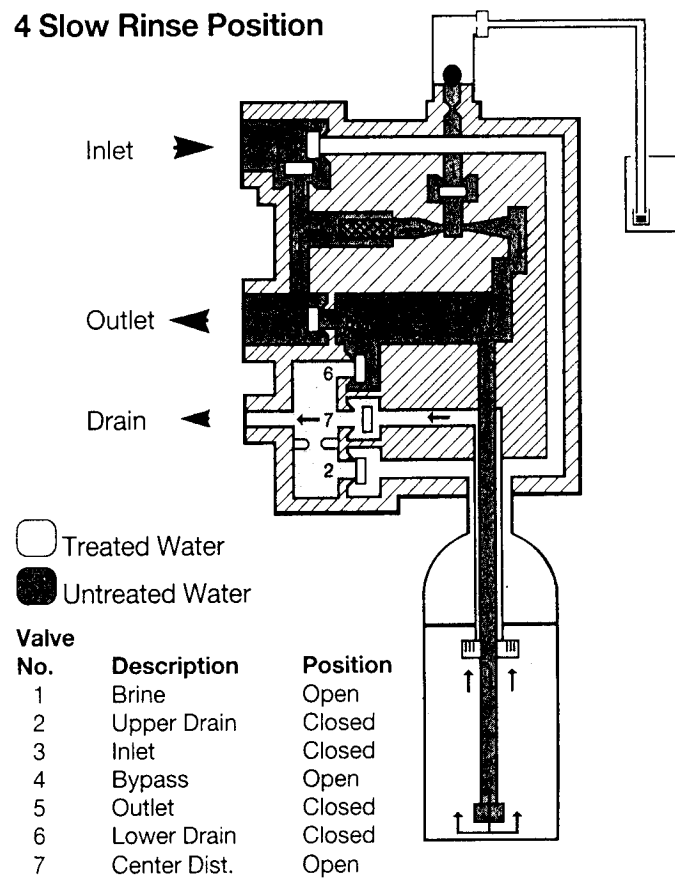
## 2 Refill Position



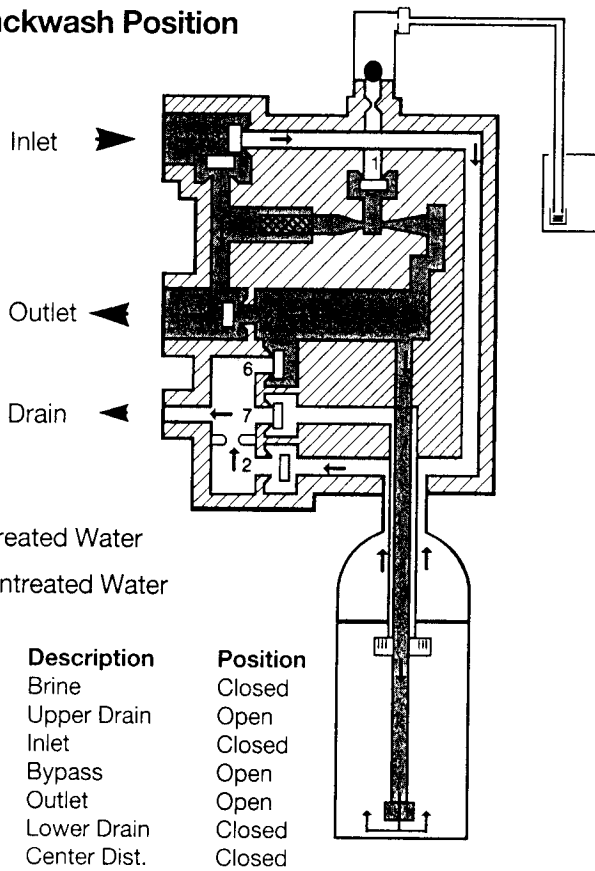
## 3 Brine Draw Position



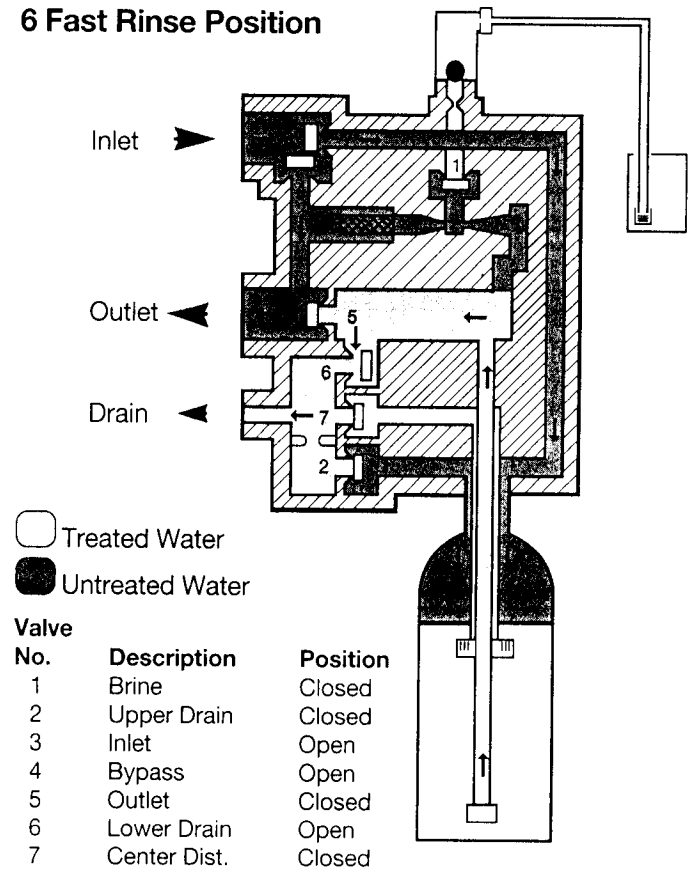
## 4 Slow Rinse Position



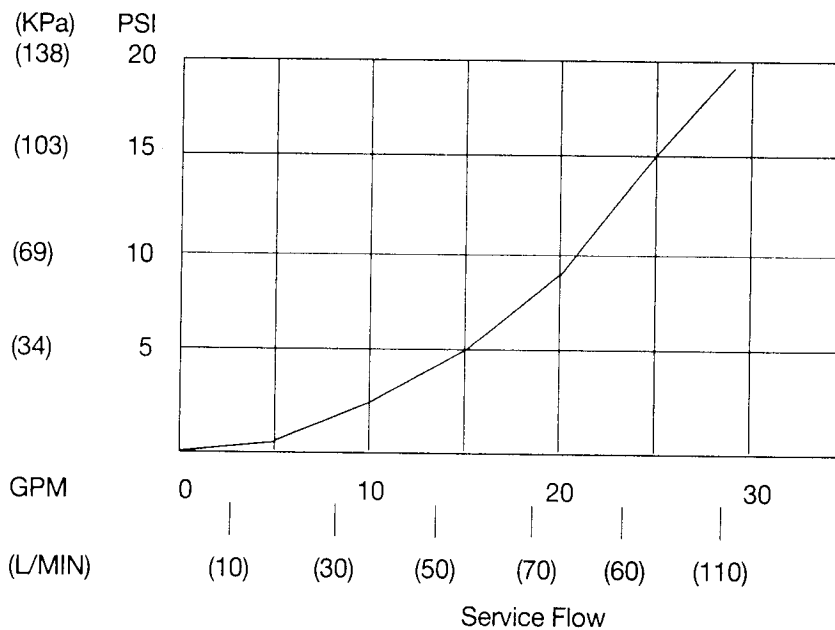
### 5 Backwash Position



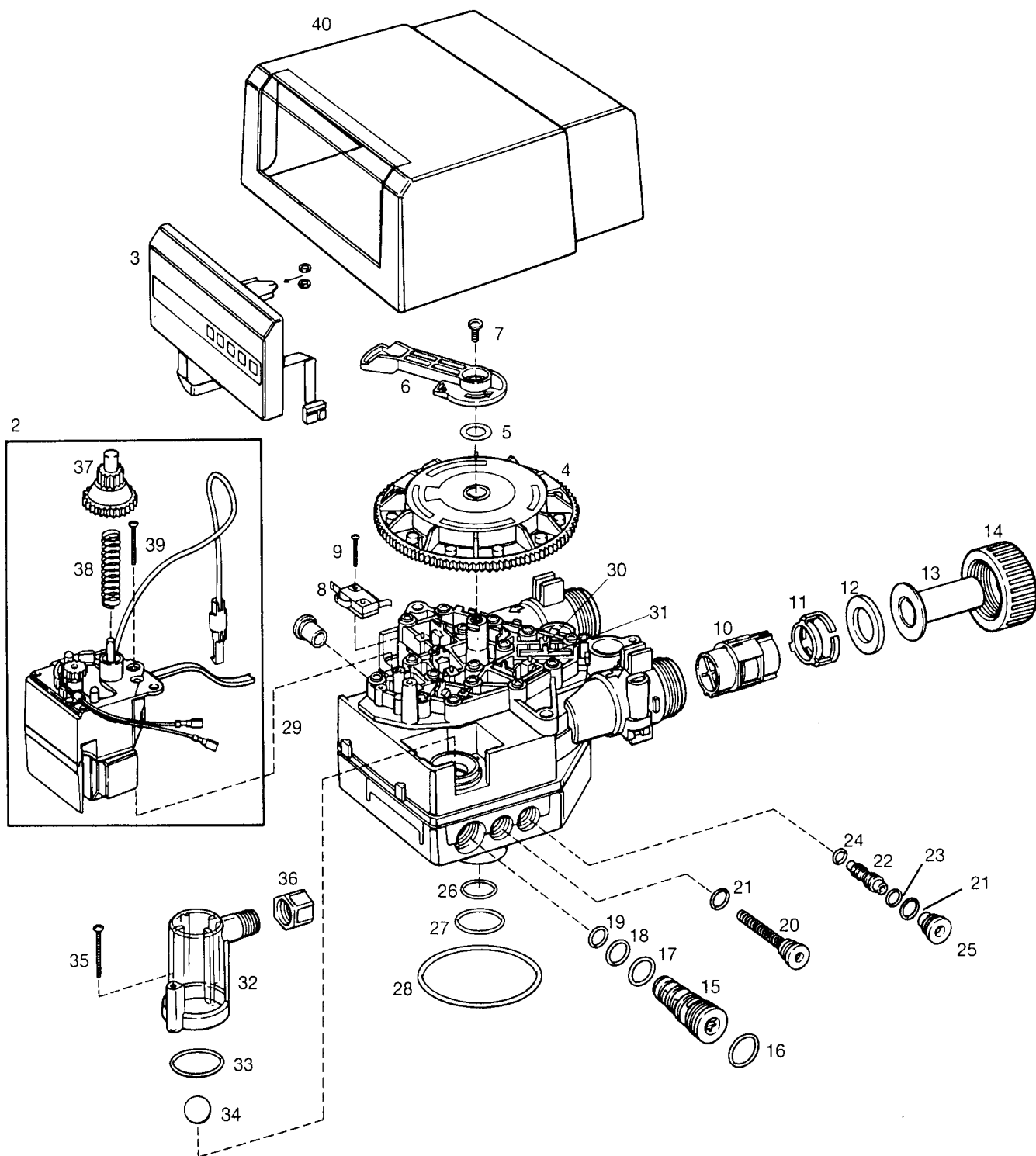
### 6 Fast Rinse Position



## Pressure Loss Characteristics



# Valve Body

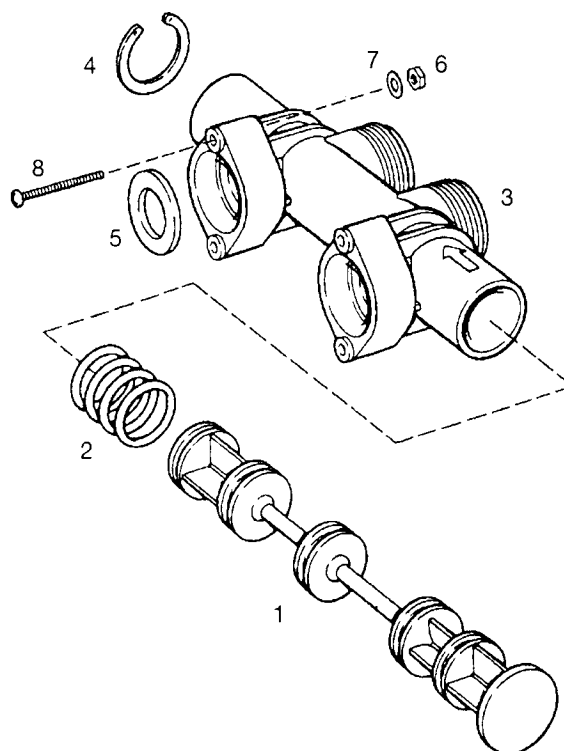


# Valve Assembly

Code	Part No	Description	Qty. Req.	Code	Part No	Description	Qty. Req.
1	1000C159-701	Valve Body Assembly	1	16	40A117	O-Ring, -	1
2		Power Module Assembly	1	17	40A114P2	11/16 X 13/16 X 1/16 EP O-Ring, -	1
	1000D34G16	24V, 60HZ		18	40A113	5/8 X 13/16 X 3/32 EP O-Ring, -	1
	1000D34G12	24V, 50HZ		19	40A112P2	9/16 X 3/4 X 3/32 EP O-Ring, -	1
	1000D34G13	100V, 60HZ		20	155A200G1	1/2 X 11/16 X 3/32 EP Injector Screen Assembly - (with O-Ring)	1
	1000D34G14	100V, 50HZ		21	40A014	O-Ring, 1/2 X 5/8 X 1/16	2
	1000D34G17	120V, 60HZ		22		Injector Assmbley -	1
	1000D34G18	220V, 50HZ			150N150G10	1 Bump	
	1000D34G19	220V, 50HZ			150N150G21	2 Bumps	
3	1000C47G10	Logic Module Assembly	1		150N150G16	3 Bumps	
4	1000N94G1	Cam Gear	1		150N150G13	4 Bumps	
5	22A274P1	Washer, .02 Thick	1		150N150G17	5 Bumps	
6	1000D102	Bracket	1		150N150G19	6 Bumps	
7	22A236	Screw, No. 10-32 X 1/2 inch	1		150N150G18	7 Bumps	
8	25A459	Switch, SPST	1		150N150G20	8 Bumps	
9	22A273P8	Screw, No. 4 X 7/8 inch	2	23	40A011	O-Ring, -	1
10	1000B13G1	Turbine Assembly	1	24	40A010	5/16 x 7/16 x 1/16 EP O-Ring, -	1
11	1000B53	Retainer	1	25	150N150G22	1/4 x 3/8 x 1/16 EP Injector Cap (with O-Ring)	1
12		Gasket	2	26	40A214	O-Ring, -	1
	156A31	for 3/4 inch pipe or tube		27	40A125	1 x 1 1/4 x 1/8 EP O-Ring, -	1
	151A20	for 1 inch pipe or tube		28	40A338	1 5/16 x 1 1/2 x 3/32 O-Ring, -	1
13		Adapter	2	29	169A7	3 1/8 x 3 1/2 x 1/8 BN Cap Plug	1
	156A231	PVC Spigot, 3/4 inch		30	1000N72G1	Kit, Valve Disc	1
	156A232	PVC Spigot, 1 inch		31	100B214-001	Spring, Valve Disc	10
	151A18	Copper Tube, 3/4 inch		32	1000C25	Sight Glass, Air Check	1
	151A22	Copper Tube, 1 inch		33	40A220	O-Ring, -	1
	156A40	Pipe, 1 in NPT, Brass		34	150A61	1 3/8 x 1 5/8 x 1/8 EP Ball, -	1
	156A226	Pipe, 3/4 inch, Brass		35	22A275	Air Check, 3/4 inch Dia. EP Screw, -	2
	156A39	Pipe, 3/4 inch BSPT, Brass		36	24B2-3	No. 8-32 x 1 1/2 inch, Brass Nut, Tube Fitting, 3/8 inch	1
	156A222	Copper Tube, 22 mm		37	1000C8	Drive Gear	1
	156A223	Copper Tube, 28 mm		38	1000A7	Spring	1
14		Adapter Nut, Phenolic	2	39	22A13	Screw, No. 8 X 1 1/2 inch	2
	156A43	for 3/4 inch or 22 mm - Copper Tube		40	1000N76G1	Cover	1
	156A44	for 1 inch or 28 mm - Copper Tube		*	1000A144-801	Kit, Lock-out Switch	
	156A32	for 3/4 inch Pipe or PVC					
15	156A38	for 1 inch Pipe or PVC	1				
		Brine/ Backwash Control - (with O-rings)					
	1000B14G1	For 7 inch Tank					
	1000B14G2	For 8 inch Tank					
	1000B14G3	For 9 inch Tank					
	1000B14G4	For 10 inch Tank					
	1000B14G5	For 12 inch Tank					
	1000B14G6	For 13 inch Tank					
	1000B14G7	For 14 inch Tank					

\* Not Shown

## Series 1010 Bypass Valve



Code	Part No	Description	Qty. Req.	Code	Part No	Description	Qty. Req.
1	1000C32	Spinadle	1	6	22A54	Nut 10-24	4
2	40A319	O-Ring, 1 1/16 x 1 7/16 x 3/16 EP	4	7	22A194	Washer, No. 10	4
3	1000C27	Body	1	8	22A57	Screw, No. 10-24 x 2 inch	4
4	1000A38	C-Ring	1	Kit	1010N1G2	Installation kit*	1
5	151A20	Gasket	2			Includes Items 5,6,7 and 8	

\*Not Shown

## Troubleshooting


The control valve may be manually indexed to each regeneration position as follows:

1. Remove the control valve cover (Figure 5).
2. Press down on the top of the drive gear to disengage the cam gear (Figure 6).
3. With the cam gear disengaged, rotate the cam gear counterclockwise to the various positions (Figure 7).

The control valve may also be operated in a fast mode for testing the control. To activate the fast mode, follow steps 1 and 2 outlined above to disengage the cam gear. When the cam gear is disengaged, it should be advanced slightly in a counterclockwise direction. The switch will then activate the motor to cause the cam gear to advance through all the cycles in about 30 minutes. The control will not recognize a fast mode as a regeneration. Manual regenerations can be initiated only by pressing the manual regeneration switch on the face of the logic module.



### Warning

**Service procedures that require the water pressure to be removed from the system are marked with a  after the solution. To remove water pressure from the system, proceed as follows:**

1. **Disconnect electrical power.**
2. **Follow the above steps to manually index the cam gear to the backwash position**
3. **When the service work has been completed, restore system water pressure, reconnect electrical power and manually rotate the cam gear to the service position and reset the time of day.**

Problem	Possible Cause	Solution
1. Clock does not display time of day.	a. Electric cord unplugged. b. No electric power at outlet. c. Defective transformer. d. Defective circuit board.	a. Connect power. b. Repair outlet or use working outlet. c. Replace power module. d. Replace logic module.
2. Clock does not display correct time of day.	a. Outlet operated by switch. b. Incorrect voltage or frequency (Hz). c. Power outages.	a. Use outlet not controlled by switch. b. Replace power unit with one of correct voltage and frequency (Hz). c. Reset clock.
3. Time display continues to advance.	a. Defective time set switch.	a. Replace logic module.
4. Time display shows something other than time of day or gallons remaining.	a. Electrical interference. b. Defective logic module.	a. Disconnect power to unit. Restore power and reset time of day display. b. Replace logic module.
5. No water flow display when water is flowing.	a. Bypass valve in bypass position. b. Meter probe disconnected or not fully connected to meter housing. c. Restricted meter turbine rotation due to foreign material in meter housing. d. Defective meter probe. e. Defective logic module.	a. Shift bypass valve to not in bypass position. b. Fully insert probe into meter housing. c. Remove turbine assembly, free up turbine and flush with clean water. Turbine should spin freely. If not, replace turbine assembly. ⚠ d. Replace logic module. e. Replace logic module.
6. Control regenerates at the wrong time of day.	a. Power outages. b. Clock set incorrectly.	a. Reset clock to correct time of day. b. Reset clock to correct time of day.
7. Unit stalled in regeneration cycle.	a. Motor dead. b. No electric power at outlet. c. Drive gear skipping on cam gear. d. Broken gear. e. Air leak in brine connection. f. Binding of cam gear. g. Water pressure greater than 90 psi (620 KPa) during regeneration.	a. Replace power module. b. Repair outlet or use working outlet. c. Replace gears. d. Replace gear. e. Tighten brine connections. f. Remove obstruction from valve discs or cam gear. g. Install pressure regulator. ⚠
8. Continuous regeneration. Cam gear does not stop at the end of regeneration.	a. Broken pin on cam gear. b. Defective switch. c. Wire disconnected from switch. d. Broken switch wire.	a. Replace cam gear. b. Replace switch. c. Reconnect wire to switch. d. Replace power module.
9. Control will not regenerate automatically or when the manual regeneration switch is depressed.	a. Electric cord unplugged. b. No electric power at outlet. c. Defective power module. d. Broken gear. e. Defective logic module.	a. Connect power. b. Repair outlet or use working outlet. c. Replace power module. d. Replace gear. e. Replace logic module.
10. Control will not regenerate automatically but will regenerate when switch is depressed.	a. Water flow display is not operative. b. Defective logic module. c. Incorrect capacity setting.	a. Same as item 5. b. Replace logic module. c. Set to correct value.
11. Run out of soft water between regenerations.	a. Improper regeneration. b. Fouled softener resin. c. Incorrect capacity setting. d. Incorrect salt dosage.	a. Repeat regeneration making certain that correct salt dosage is used. Also, see Problems 12, 14, 15 and 16. b. Use resin cleaner. Also, see Problem 17. c. Set capacity to correct value. d. Set salt dosage to correct value.

Continued on next page

Problem	Possible Cause	Solution
	e. Water hardness has increased.	e. Recalculate capacity based on new hardness.
	f. Restricted meter turbine rotation.	f. Remove turbine assembly, free up turbine and flush with clean water. Turbine should spin freely; if not replace. ⚠
	g. Excessive water usage.	g. Check for leaking plumbing fixtures.
12. Control will not draw brine.	a. Water pressure less than 30 psi (207 KPa).	a. Set pump or regulator to maintain a minimum of 30 psi (207 KPa) at the pump.
	b. Restricted drain line.	b. Remove drain line restriction.
	c. Injector or injector screen plugged.	c. Clean injector and screen. ⚠
	d. Injector defective.	d. Replace injector and cap. ⚠
	e. Inlet or outlet valve disc not closed.	e. Flush out foreign matter by manually rotating cam gear.
	f. Air check ball drops prematurely.	f. Tighten brine line fittings.
13. Brine tank overflow.	a. Brine valve disc being held open.	a. Manually operate valve stem to flush away obstruction by rotating cam gear.
	b. Uncontrolled brine refill flow rate.	b. Replace brine/backwash control. <sup>1</sup>
	c. Inlet and/or outlet valve disc not closed during brine draw causing brine refill.	c. Flush out foreign by manually operating valve stem by rotating cam gear.
	d. Air leak in brine line to air check.	d. Check all connections in brine line for leaks.
14. System using more or less salt than salt setting.	a. Incorrect brine/backwash control.	a. Install correct size control. <sup>1</sup>
	b. Foreign matter in brine/backwash control.	b. Remove, clean and reinstall control. <sup>1</sup>
	c. Defective brine/backwash control	c. Replace control. <sup>1</sup>
15. Intermittent or irregular brine draw.	a. Low water pressure.	a. Set pump or regulator to maintain a minimum of 30 psi (207 KPa) at softener.
	b. Defective injector.	b. Replace injector and cap. ⚠
	c. Plugged injector screen.	c. Clean or replace screen. ⚠
16. No soft water after regeneration.	a. Unit did not regenerate.	a. Check for power.
	b. No salt in brine tank.	b. Add salt to brine tank.
	c. Plugged injector and/or injector screen.	c. Clean injector and screen. Also see Problem 12. ⚠
17. Control backwashes at an excessively low flow rate.	a. Incorrect brine/backwash control.	a. Install correct size control. <sup>1</sup>
	b. Foreign matter affecting backwash flow rate.	b. Remove, clean and reinstall control. <sup>1</sup>
	c. Defective brine/backwash control.	c. Replace control. <sup>1</sup>
18. Flowing or dripping water at drain or brine line after regeneration.	a. Drain valve disc 2, 6 or 7 or brine valve disc 1 held open by foreign matter.	a. Manually operate valve stem to flush away obstruction by rotating cam gear.
19. Softened water contains some hardness (hard water leakage).	a. Improper regeneration.	a. Repeat regeneration, making certain correct salt dosage is used.
	b. Defective o-ring in external bypass valve.	b. Replace defective o-ring. ⚠
	c. O-ring around riser pipe damaged.	c. Replace o-ring. ⚠
	d. Leaking past bypass valve disc 4.	d. Remove valve disc 4 and examine for damage; replace if damaged. ⚠

<sup>1</sup> **Note:** When the brine/backwash control is removed, water will drain out of the air check sight glass and the air check ball will seat. After reinstalling the brine/backwash control, manually rotate the cam gear **counterclockwise** to the **Refill** position long enough to fill the air check with water and purge air out of the brine line. Then, return the cam gear to the **Service** position.