

Capital

Since 1936

OWNER'S MANUAL

Water Conditioner Models
M - METER INITIATED

Domestic

Capital Water Softener, Inc.

2096 Helena Street

Madison, Wisconsin 53704

(608) 241-1511

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PRE-INSTALLATION CHECK LIST

Water Pressure: A minimum of 20 pounds of water pressure is required for proper operation during regeneration.

Electrical: A continuous 110 volt AC current is needed for power supply. Be certain the power supply is not on switched outlet

Existing Plumbing: Should be free from all foreign materials such as lime, iron or buildup of any materials.

Location of Conditioner and Drain: Equipment should be located close to a drain or drain receptacle. Overhead drains should not exceed 6 feet in height or 20 feet in length. All drain materials and installation shall conform to state and local plumbing codes. At least a 1" air gap must be provided from the end of drain line to the drain receptacle.

Bypass Valves: Always provide for the installation of a bypass valve.

Temperature: Water temperature is not to exceed 100 degrees Fahrenheit or be subjected to freezing conditions.

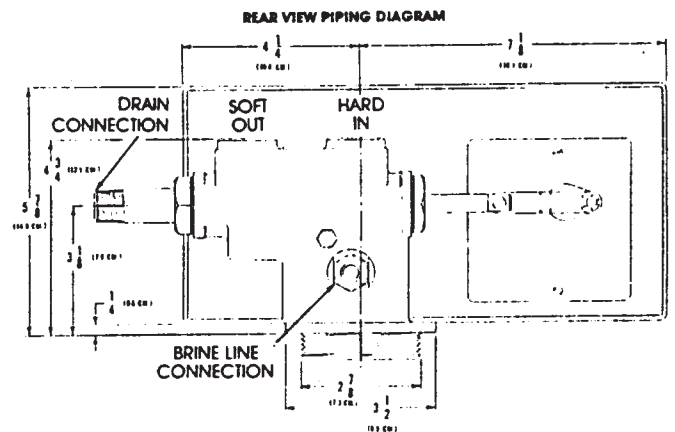
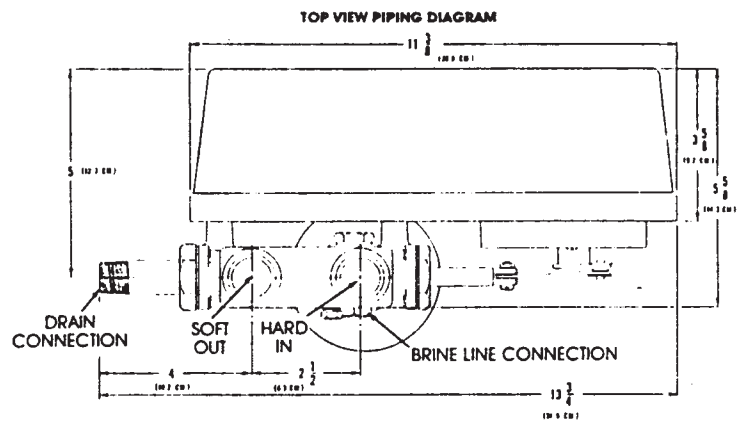
5. Advance service position indicator until motor starts and advances plunger assembly to softening position. Service position indicator will advance itself automatically from this point to its homing position.
6. Open the brine shutoff valve and allow water to fill the brine tank. Water will shut off automatically at proper level for your water softener. Check all brine line fittings for leaks.
7. You may now fill the brine tank with salt, 160 pounds minimum. Use a good grade of salt Nuggets, Pellets, Duracubes, Mini-cubes or Block. (If using block salt, clean off block in laundry tray before putting in brine tank.)
8. For setting timer for the family, see programming procedures.

INSTALLATION INSTRUCTIONS

1. Place the softener tank where you want to install the unit. Surface should be level, firm and clean.
2. Do all necessary plumbing to valve. (Do not apply heat directly to valve body.) All plumbing and materials must conform to state and local plumbing codes. Use minimum of 1/2" drain line approved material and provide at least a 1" air gap from the end of drain line to the drain receptacle.
3. Connect the brine line found in the brine tank to the brine shutoff valve located on the back of the control valve. Be sure the floor is clean beneath the brine tank and that the floor is level. On C and CM Models, brine line is connected at factory.

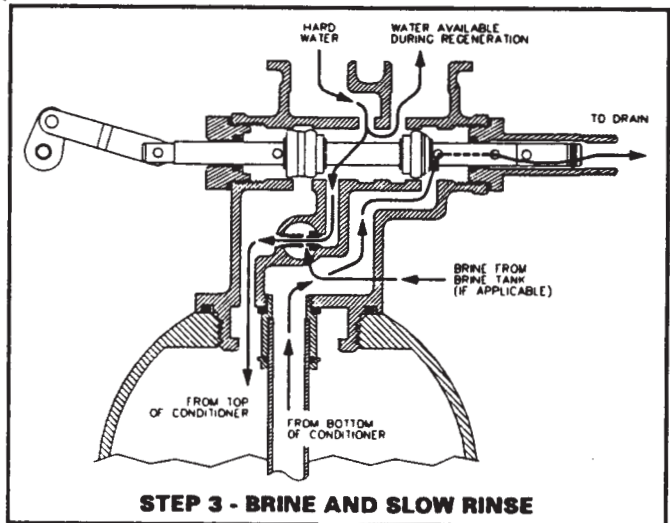
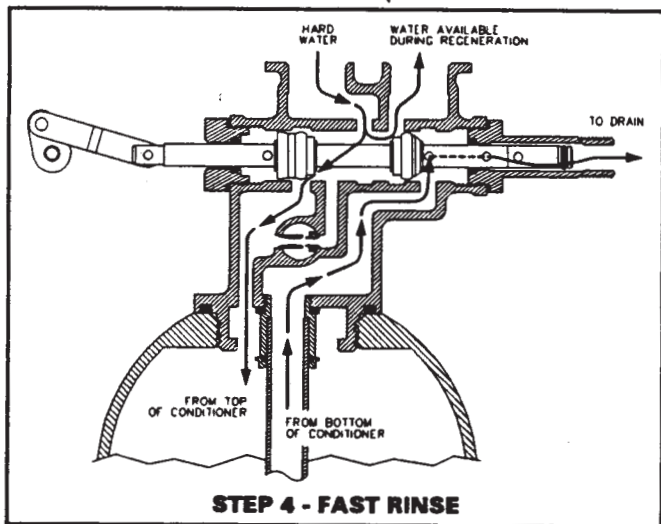
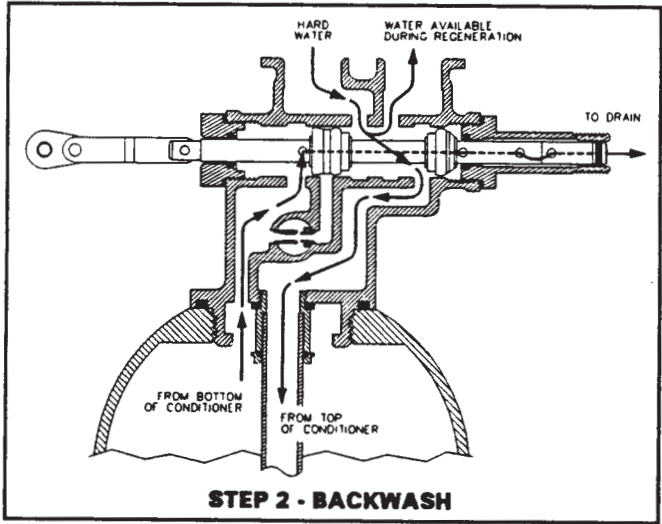
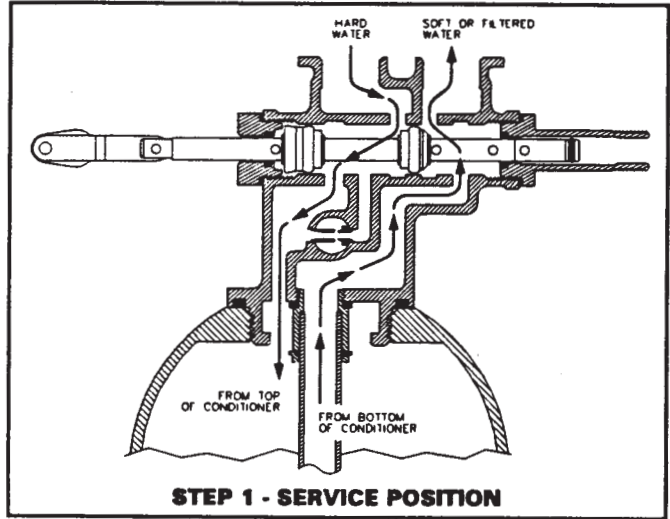
START UP

1. Place bypass valve in bypass position. Turn on water supply at a cold soft water tap. Allow water to run for a short time to clear any foreign materials that may have resulted from the installation.
2. Plug in the electrical supply cord and manually turn the service position indicator knob clockwise slowly until the drive motor starts running. This will position the plunger assembly to the backwash position. Unplug the power supply to keep plunger from advancing out of backwash position. Open the bypass valve partially to allow water to enter the water conditioner slowly until a steady flow is seen at the drain line.
3. Plug in the power supply cord and advance service position indicator until drive motor runs again. Drive motor will advance plunger assembly to brining and slow rinsing position.
4. Advance service position indicator until motor starts and advances plunger assembly to fast rinsing position.



MODELS M

Water Conditioner Flow Diagrams



MODEL M — PROGRAMMING PROCEDURES

DEMAND REGENERATION CONTROL

To Set Time of Day:

Depress red time set button and turn 24 hr. gear to correct time of day. unit will regenerate as necessary at 2:00 A.M.

To Set Gallons Label:

While holding down program wheel lift gallons label dial and set white dot on program wheel to proper gallon setting. (Number times 100 gallons, 8 = 800 gallons, 12 = 1200 gallons.)

How to Calculate Proper Gallon Setting

You must know 3 (three) things to set the gallons label of your water conditioner.

1. Know the grains capacity of the water conditioner.
2. Know the hardness in grains per gallon of your water. (Can be tested by your local plumber or water conditioning dealer.)
3. Know the number of people living in the household at the present time. Reserve capacity will be determined by allowing 70 gallons reserve per person.

Example:

32,000 grains capacity water conditioner
30 grain water hardness
3 people in family

32,000 divided by 30 grain water = 1066 usable gallons. 3 people x's 70 gallon reserve each person = 210 gallons. 1066 useable gallons minus 210 reserve gallons = 856 gallons, so set the white dot on program wheel at approx. 850 gallons (half way between 8 & 9 on gallons label wheel).

How to Manually Regenerate Your Water Conditioner At Any Time:

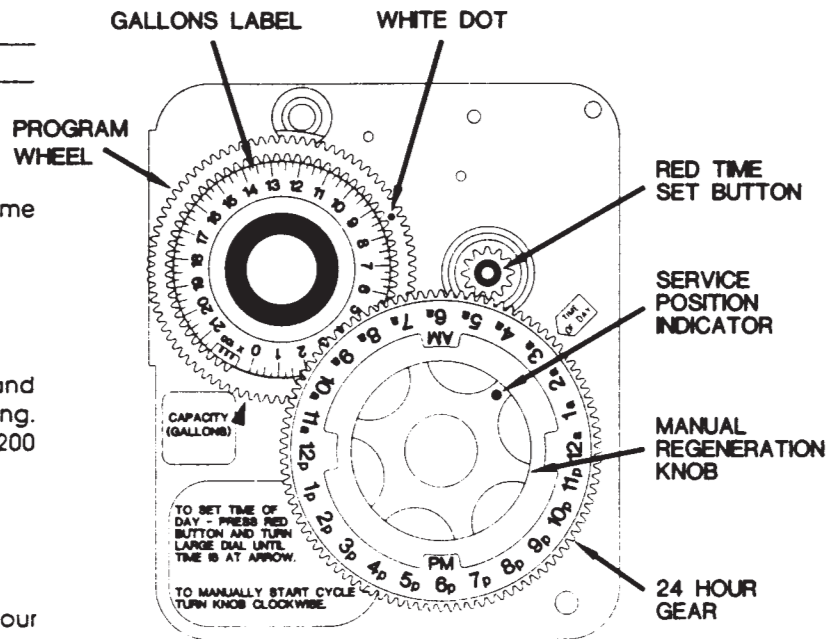
Turn the manual regeneration knob clockwise.

This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set for only one third of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.



How to Set the Regeneration Cycle Program:

The regeneration cycle program on your water conditioner has been factory preset, however, portions of the cycle or program may be lengthened or shortened in time to suit local conditions.

To expose cycle program wheel, disconnect cable from meter-motor head, grasp timer in upper right hand corner and pull, releasing snap retainer and swinging timer down.

To change the regeneration cycle program, the program wheel must be removed. Grasp program wheel and squeeze protruding lugs towards center, lift program wheel off timer. (Switch arms may require movement to facilitate removal.)

Return timer to closed position engaging snap retainer in back plate.

How to Change the Length of the Backwash Time:

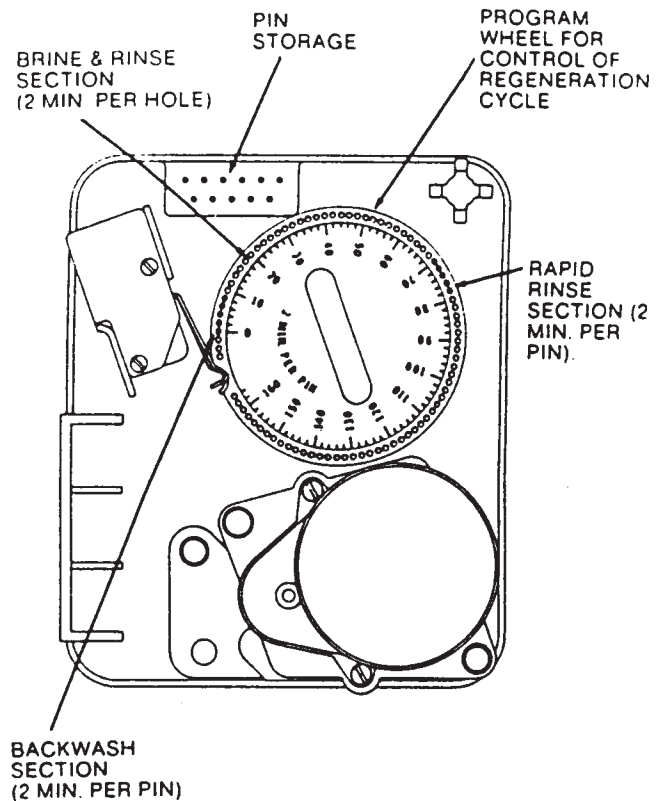
The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time that your unit will backwash.

FOR EXAMPLE: If there are 3 pins in this section, the time of backwash will be 6 min. (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equals the backwash time in minutes.

How to Change the Length of Brine and Rinse Time:

The group of holes between the last pin in the backwash section and the second group of pins determines the length of time that your unit will brine and rinse. (2 min. per hole.)

To change the length of brine and rinse time, move the rapid rinse group of pins to give more or fewer holes in the brine and rinse section. Number of holes times two equals brine and rinse time in minutes.



How to Change the Length of Rapid Rinse Time:

The second group of pins on the program wheel determines the length of time that your water conditioner will rapid rinse. (2 min. per pin.)

To change the length of rapid rinse time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

The regeneration cycle is complete when the outer micro-switch drops off the last pin in the rapid rinse group of pins. The program wheel, however, will continue to rotate until the inner micro-switch drops into the notch on the program wheel.

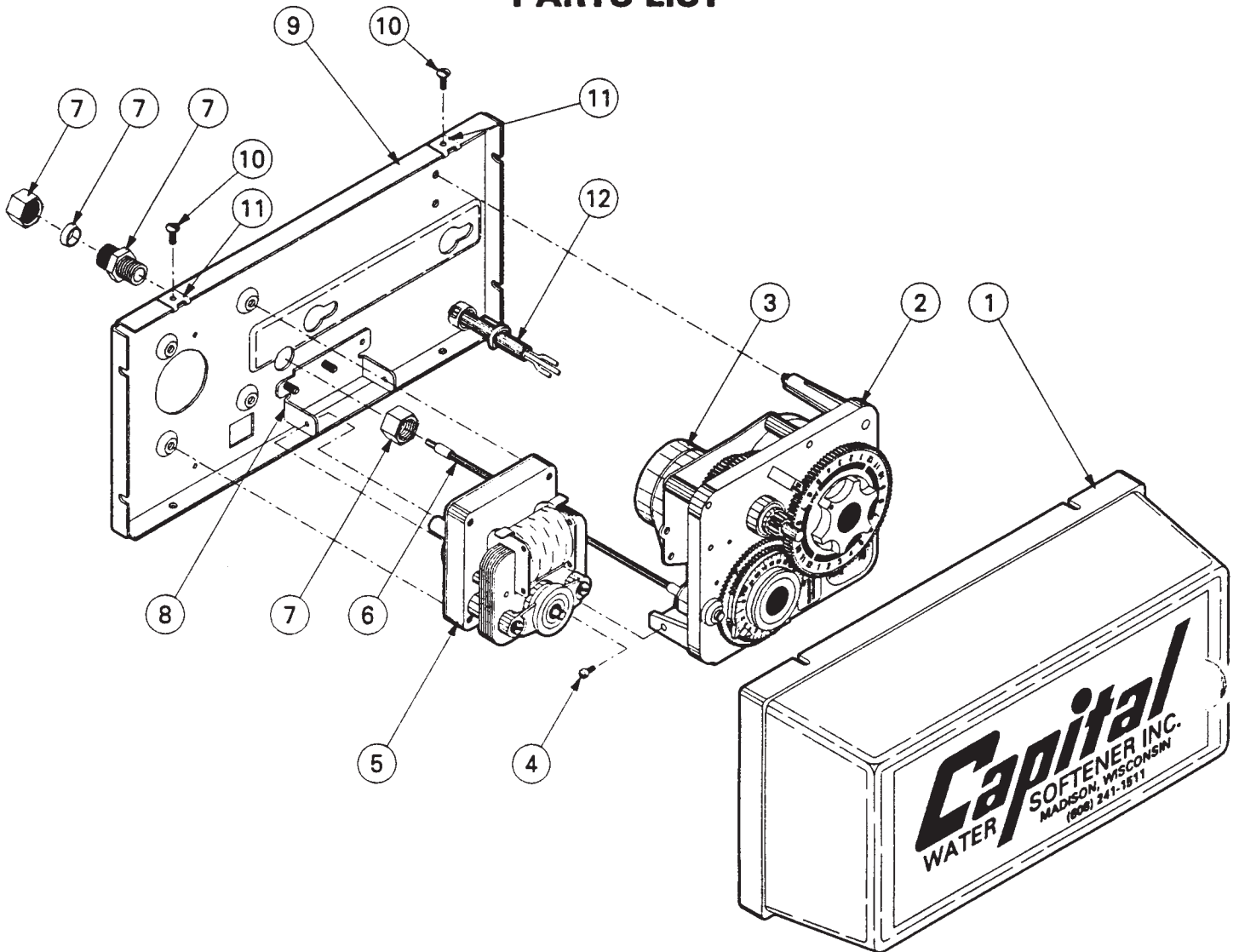
IMPORTANT!
SALT LEVEL MUST ALWAYS BE ABOVE WATER LEVEL IN BRINE TANK.

Capital

MODEL M

Control Valve Drive Assembly - Meter Initiated

PARTS LIST

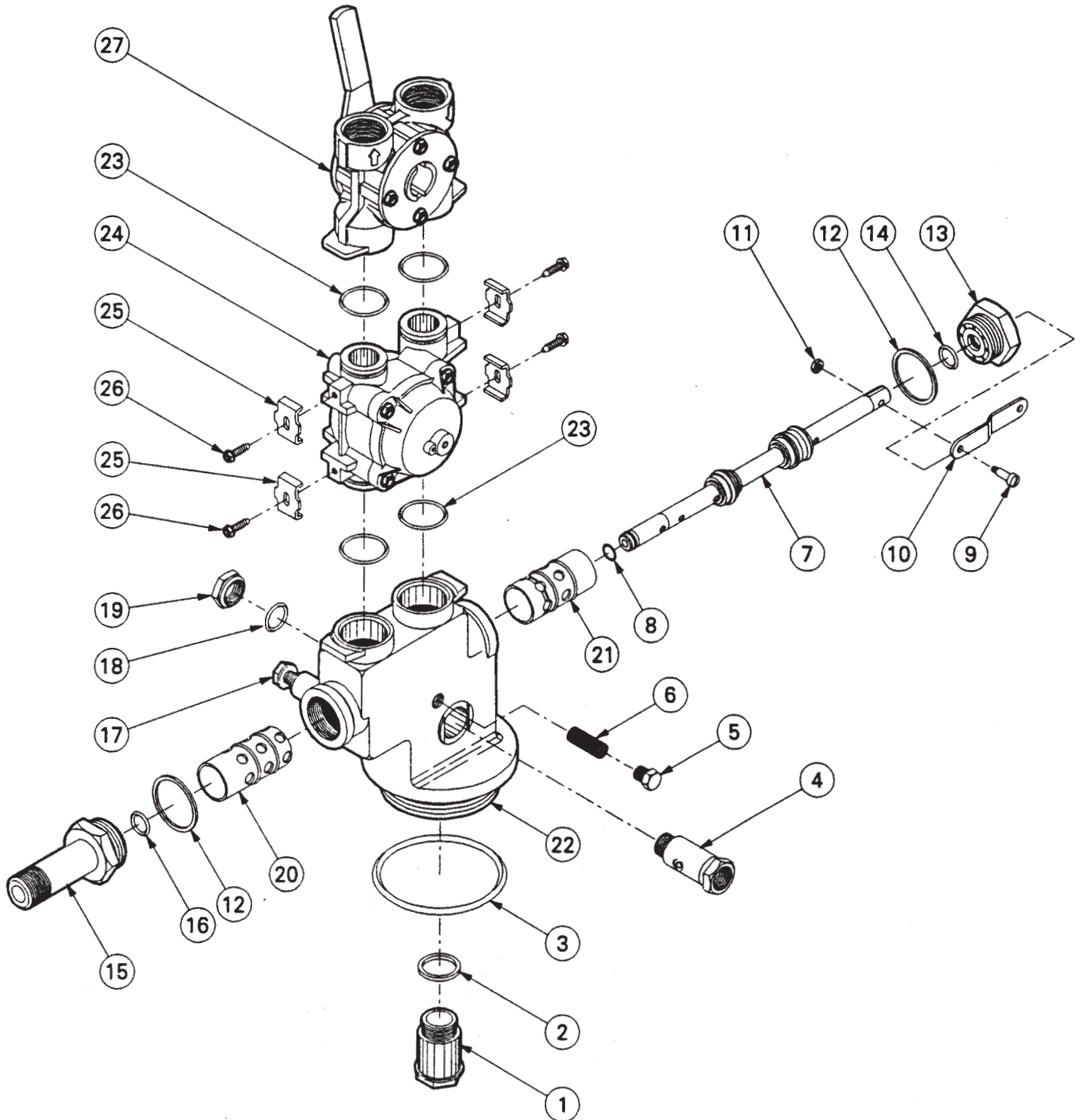


| ITEM NO. | STOCK NO. | PART NO. | DESCRIPTION |
|----------|------------|-----------------|-------------------------------------|
| 1 | 610260 | 71 - 61 | Cover |
| 2 | F60306-130 | 3210 | Timer - Regular Range |
| | F60306-320 | 3210 | Timer - Extended Range |
| 3 | F13944 | 3210 | Timer Motor Only |
| 4 | F11384 | 3210 | Timer Mounting Screw |
| 5 | 610270 | 71 - 66 | Drive Motor with Cam 125V |
| 6 | F1378 | 3210 | Meter Cable |
| 7 | A68EC | 3210 | 1/4 x 3/8 Fitting with 5/8 Lock Nut |
| 8 | F13881 | 3210 | Timer Hinge Bracket |
| 9 | 610430 | 71 - 60 3210 | Frame Assembly Only |
| 10 | 610290 | 71 - 67A | Cover Mounting Screw |
| 11 | 610240 | 71 - 60A | Screw Retainer |
| 12 | 610300 | 71 - 82 - A - B | Cord with Strain Relief & Grommet |

MODEL M with BYPASS

Control Valve Assembly

(See other page for Parts List)





MODEL M with BYPASS

Control Valve Assembly

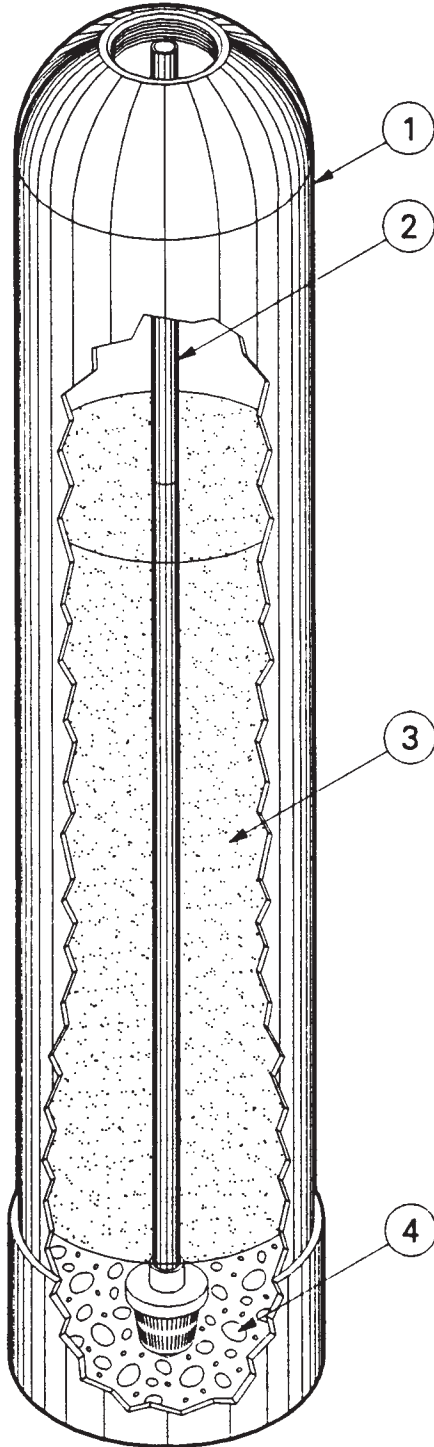
PARTS LIST

(See other page for Illustration)

| ITEM NO. | STOCK NO. | PART NO. | DESCRIPTION |
|----------|-----------|---------------|---|
| 1 | 610050 | 71 - 01D | Riser Insert - 13/16" |
| | 610050A | 71 - 01DA | Riser Insert - 1.050" |
| 2 | 610040 | 71 - 01C | Gasket |
| 3 | 610020 | 71 - 01A | O-Ring 337 |
| 4 | 610121 | 71 - 13A | Injector - 53 |
| | 610122 | 71 - 13A | Injector - 50 |
| 5 | 610330 | 71 - 84 | Plug |
| 6 | 610340 | 71 - 84A | Screen |
| 7 | 610170 | 71 - 23TF | Plunger Assembly Comp. - 1.0 GPM BKW |
| | 610171 | 71 - 23TG | Plunger Assembly Comp. - 1.3 GPM BKW |
| | 610172 | 71 - 23TH | Plunger Assembly Comp. - 1.7 GPM BKW |
| | 610168 | 71 - 23T2 | Plunger Assembly Comp. - 2.0 GPM BKW |
| | 610173 | 71 - 23TI | Plunger Assembly Comp. - 2.5 GPM BKW |
| | 610174 | 71 - 23TJ | Plunger Assembly Comp. - 3.0 GPM BKW |
| | 610169 | 71 - 23T | Plunger Assembly Open End |
| 8 | 610370 | 71 - 011 | O-Ring 011 |
| 9 | 610100 | 71 - 10 | Link Bolt |
| 10 | 610090 | 71 - 09 | Link |
| 11 | 610110 | 71 - 10A | Link Bolt Nut |
| 12 | 610200 | 71 - 31 | Gasket |
| 13 | 610180 | 71 - 26 | Stem Seal |
| 14 | 610190 | 71 - 26A | O-Ring 111 |
| 15 | 610070 | 71 - 05 | Drain Seal |
| 16 | 610060 | 71 - 05A | O-Ring 111 |
| 17 | 610230 | 71 - 51 | Bolt with Washer |
| 18 | 610140 | 71 - 13C | O-Ring 113 |
| 19 | 610130 | 71 - 13B | Lock Nut |
| 20 | 610360 | 71 - 002 | Drain Side Liner Assembly |
| 21 | 610350 | 71 - 001 | Stem Side Liner Assembly |
| 22 | 110000 | 11 - 01 | TM8 or MTM8 Body Assembly |
| 23 | - | F13305 | O-Ring 119 |
| 24 | - | F60086 | Meter - Regular Range - 300 to 2100 Gallons |
| | - | F60087 | Meter - Extended Range - 1500 to 10,500 Gallons |
| 25 | - | F13255 | Adapter Clip |
| 26 | - | F13314 | Screw - Adapter Coupling |
| 27 | - | F60040 - 01NP | 3/4" Bypass Assembly - Nickel Plated |
| | - | F60041 - 01NP | 1" Bypass Assembly - Nickel Plated |

Capital MODEL M 16 - 24 - 32 - 48 - 64 - 96

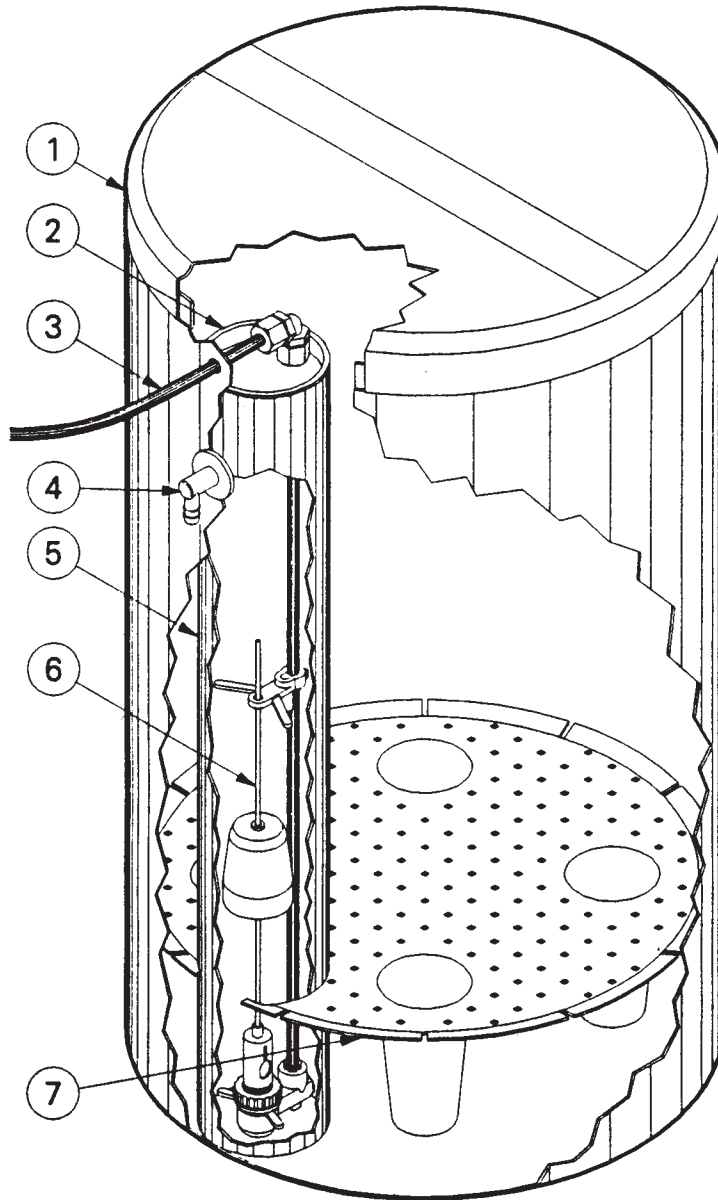
Mineral Tank & Components



| ITEM NO. | PART NO. | DESCRIPTION |
|----------|----------|----------------------------|
| 1 | M010 | Tank M-16 |
| | M020 | Tank M-24 |
| | M031 | Tank M-32 |
| | M050 | Tank M-48 |
| | M061 | Tank M-64 |
| | M070 | Tank M-96 |
| 2 | M310 | Distributor Tube M-16 & 24 |
| | M315 | Distributor Tube M-32 & 64 |
| | M330 | Distributor Tube M-48 |
| | M350 | Distributor Tube M-96 |
| 3 | M120 | Mineral M-16 |
| | M130 | Mineral M-24 |
| | M140 | Mineral M-32 |
| | M160 | Mineral M-48 |
| | M170 | Mineral M-64 |
| | M180 | Mineral M-96 |
| 4 | M210 | Underbedding M-16 |
| | M220 | Underbedding M-24 |
| | M230 | Underbedding M-32 |
| | M250 | Underbedding M-48 |
| | M260 | Underbedding M-64 |
| | M270 | Underbedding M-96 |

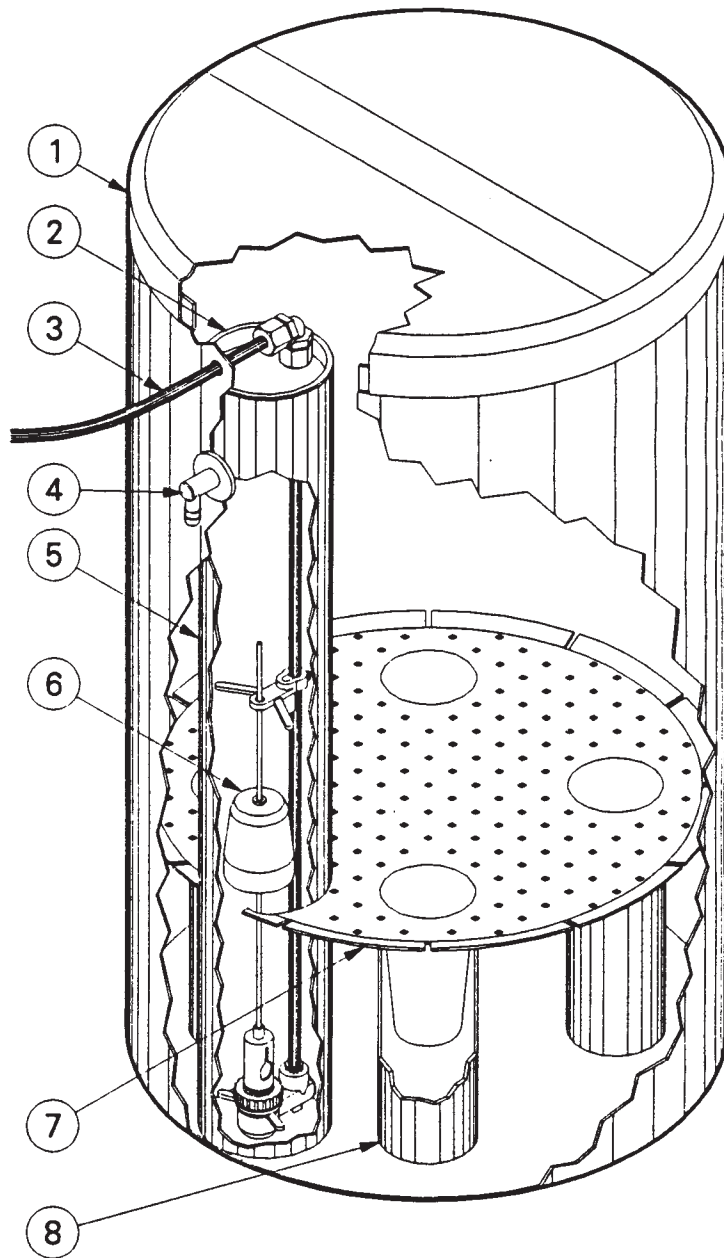
MODEL M 16 - 24 - 32

Brine Tank & Components



| ITEM NO. | PART NO. | DESCRIPTION |
|----------|----------|--------------------------------|
| 1 | M700 | Brine Tank M 16 - 24 - 32 |
| 2 | M1300 | Brine Well Cover 4" All Models |
| 3 | M200 | Brine Tube M 16 - 24 - 32 |
| 4 | M800 | Bushing - All Models |
| 5 | M900 | Brine Well M 16 - 24 - 32 |
| 6 | M11152 | Brine Valve M 16 - 24 - 32 |
| 7 | M1005 | Grid Plate M 16 - 24 - 32 |

MODEL M-48
Brine Tank & Components



| ITEM NO. | PART NO. | DESCRIPTION |
|----------|----------|--------------------------------|
| 1 | M700 | Brine Tank M-48 |
| 2 | M1300 | Brine Well Cover 4" All Models |
| 3 | M200 | Brine Tube M-48 |
| 4 | M800 | Bushing - All Models |
| 5 | M900 | Brine Well M-48 |
| 6 | M11152 | Brine Valve M-48 |
| 7 | M1005 | Grid Plate M-48 |
| 8 | M1110 | Support M-48 (4 Required) |

MAINTENANCE AND TROUBLE SHOOTING

GENERAL

When problems develop with the water softener, locating the source of the trouble depends on observing small details. Also, there may be more than one source of trouble and all of these must be corrected in order to avoid return visits to fix the softener. Before doing any trouble-shooting, these items should be checked:

1. Make sure there is an uninterrupted source of electricity to the unit.
2. Check the Program Timer to see if it operates the valve properly and the length of time for each regeneration step is correct.
3. Check all regeneration flow rates to see if they meet the manufacturer's recommendations.
4. Check the water inlet pressure with a good gauge.
5. Check to see if there is enough salt in the brine tank to make a saturated brine solution.

The following are problems that may be encountered:

PROBLEM — NO SOFT WATER

1. Hard water bypass valve may be open.
2. The softener is not regenerated often enough. Check the soft water usage against the capacity of the softener and reset the frequency of regeneration if necessary. Check for leaky faucets.
3. Driving motor is not operating the valve.
 - a. There is no electricity to the control. In this case check for a blown fuse or check to see if control is connected to a circuit controlled by a light switch.
 - b. Program Timer is not operating the valve automatically. Control unit should be returned to factory for checking.
4. Faulty regeneration or Driving Motor is operating the valve but valve is not drawing brine.
 - a. There is no suction in the brine line when the valve is in the brining position. Measure flow rate of water coming from the drain and check against the following:
 - (1) If flow rate is less than 1/4 gpm, check for clogged injector, and check water pressure. Water pressure should be at least 20 psi.
 - (2) If flow rate is more than 3/4 gpm, check the following:
 - (a) Check the injector to see if it is the proper size or if jet opening has been corroded to a larger size.
 - (b) If injector looks alright, install a new plunger.
 - (3) If the flowrate is between above figures, check for the following:
 - (a) Obstruction in the drain line.
 - (b) Check to see if injector is correctly installed in the valve body. The indentation on the hex head of the nozzle match with the similar indentation on the valve body.
 - (c) Nozzle may have lost drawing efficiency. Remove nozzle and examine to see if corrosion has altered the jet and throat openings or if it is plugged with foreign matter.
 - b. There is suction in the brine line at the point where it is connected to the valve body, but the valve still does not draw brine.
 - (1) The brine line is clogged.
 - (2) The brine valve is not operating properly. Check the air shut-off float in the brine valve.

5. There is not enough salt used in each regeneration to properly regenerate the softener. Check the amount of salt required for regeneration and then check float setting of the brine valve.
6. Hot-cold water mixing valve is allowing hard cold water to enter soft water lines.

PROBLEM — SALT IN THE HOUSE LINES AFTER REGENERATION.

1. Not enough time allowed to rinse out brine. Check the length of rinse time on the Program Timer. For pressures of 40 psi or more, rinse time setting should be 40 minutes. For pressures below 40 psi, rinse time setting should be 60 minutes or more.
2. Brine injector has lost its efficiency, resulting in increased brine time and decreased rinsing time. Check points outlined under 4 - 1 of No Soft Water problem.
3. Install larger injector to give faster rinse flow rate, thus compensating for low water pressure.
4. Brine valve setting is such that too much brine is used in regeneration.

PROBLEM — WATER RUNNING FROM THE DRAIN .

1. If the valve plunger is in the service position and water is running from the drain, replace the drain nut if it is corroded, or replace the drain seal O-ring.
2. If the valve plunger is at a position other than service, the driving motor has been stalled by an obstruction to the travel of the plunger. The driving motor is protected by thermal cut-off, which prevents the coil from burning out. After freeing the plunger and allowing the motor to cool about five minutes, slowly turn the Circuit Timing Wheel in a clockwise direction until the driving motor begins to move the plunger. As soon as this happens, stop turning the Circuit Timing Wheel. The regeneration cycle will be completed by the Program Timer, or it can be completed by manually turning the Circuit Timing Wheel.
3. If the plunger is at a position other than service and the plunger travel is free, the Program Timer is not operating the valve properly. In this case the control unit should be returned to the factory for checking.

PROBLEM — AIR IN HOUSE LINES AFTER REGENERATION.

1. The air check in the brine valve is not operating properly. Check the seat of the air check, the air shut-off float, and for any foreign material in the air check.
2. Check to see if the stem of the brine valve is seating properly so as not to allow air to enter the brine valve at this point.

PROBLEM — BRINE VALVE WILL NOT REFILL.

This problem may be tied in with the problem of air in the house lines. If any air leaks into the brine valve and brine line after the brine draw is completed, this air will be compressed when the softener valve plunger is returned to the service position and the brine tank begins to refill. While the brine tank is refilling, this air expands rapidly after it passes the refill check and increases the velocity of the water in front of it to such an extent that it may cause the brine valve to blow shut.

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SPECIFICATIONS

| MODEL FA & M | Mineral Tank Inches | Brine Tank Inches | Salt Capacity Storage Lbs. | Shipping Weight Lbs. | M & CM Meter |
|--------------|---------------------|-------------------|----------------------------|----------------------|--------------|
| 16 | 7 x 44 | 18 x 33 | 200 | 75 | 3/4" |
| 24 | 8 x 44 | 18 x 33 | 200 | 85 | 3/4" |
| 32 | 9 x 48 | 18 x 33 | 200 | 105 | 3/4" |
| 48 | 10 x 54 | 18 x 33 | 170 | 140 | 3/4" |
| 64 | 12 x 48 | 18 x 40 | 300 | 240 | 3/4" |
| 96 | 14 x 65 | 24 x 41 | 525 | 295 | 3/4" |
| MODEL C & CM | | | | | |
| 16 | 8 x 35 | 13 x 21 | 160 | 105 | 3/4" |
| 24 | 9 x 35 | 13 x 21 | 150 | 115 | 3/4" |
| 32 | 10 x 35 | 13 x 21 | 140 | 130 | 3/4" |

CAPACITY CHART

| MODEL FA & M | Gravel In. | Resin Cu. Ft. | Rated Capacity Low Salt Grains @ Lbs. | Rated Capacity Medium Salt Grains @ Lbs. | Rated Capacity High Salt Grains @ Lbs. | Flow Rate Cont. | PSI Drop | BKW GPM |
|--------------|------------|---------------|---------------------------------------|--|--|-----------------|----------|---------|
| 16 | 4 | .50 | 12,700 @ 3.0 | 14,100 @ 5.0 | 16,300 @ 8.0 | 5.6 | 15 | 1.3 |
| 24 | 4 | .75 | 19,100 @ 4.5 | 21,200 @ 7.5 | 24,500 @ 12.0 | 6.5 | 15 | 1.7 |
| 32 | 4 | 1.00 | 25,400 @ 6.0 | 28,200 @ 10.0 | 32,600 @ 16.0 | 8.4 | 15 | 2.0 |
| 48 | 4 | 1.50 | 38,100 @ 9.0 | 42,300 @ 15.0 | 48,900 @ 24.0 | 7.8 | 15 | 2.5 |
| 64 | 4 | 2.00 | 50,800 @ 12.0 | 56,400 @ 20.0 | 65,200 @ 32.0 | 10.0 | 14 | 3.0 |
| 96 | 4 | 3.00 | 76,200 @ 18.0 | 84,600 @ 30.0 | 97,800 @ 48.0 | 10.0 | 12.5 | 5.0 |
| MODEL C & CM | | | | | | | | |
| 16 | 4 | .50 | 12,700 @ 3.0 | 14,100 @ 5.0 | 16,300 @ 8.0 | 7.4 | 15 | 1.3 |
| 24 | 4 | .75 | 19,100 @ 4.5 | 21,200 @ 7.5 | 24,500 @ 12.0 | 8.8 | 15 | 1.7 |
| 32 | 4 | 1.00 | 25,400 @ 6.0 | 28,200 @ 10.0 | 32,600 @ 16.0 | 9.0 | 15 | 2.0 |

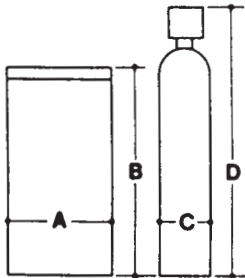
FA — Models Two (2) Tank System with 12-Day Time Clock.
M — Models Two (2) Tank System Meter Initiated.
C — Models One (1) Piece Cabinet with 12-Day Time Clock.
CM — Models One (1) Piece Cabinet Meter Initiated.

OPERATING CONDITIONS

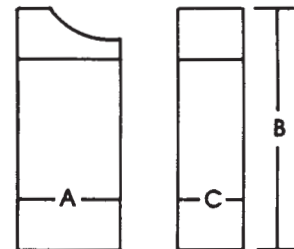
- Temperature not to exceed 100°F and should not be subject to freezing.
- Water pressure, minimum 20 PSI and maximum 120 PSI.
- The drain line should not be smaller than 1/2" not to exceed 8 ft. in height or over 20 feet in length.
- The brine tank should not be placed more than 10 ft. away.
- Always provide a three (3) way by-pass system.

WARRANTY

- 7 YEARS — ALL PARTS
- 7 YEARS — MINERAL TANK
- 7 YEARS — BRINE TANK



| DIMENSIONS | | | | | | | | |
|------------|----|----|----|----|------------|----|----|----|
| MODEL FA-M | A | B | C | D | MODEL C-CM | A | B | C |
| 16 | 18 | 33 | 7 | 56 | 16 | 21 | 44 | 13 |
| 24 | 18 | 33 | 8 | 56 | 24 | 21 | 44 | 13 |
| 32 | 18 | 33 | 10 | 60 | 32 | 21 | 44 | 13 |
| 48 | 18 | 33 | 10 | 68 | | | | |
| 64 | 18 | 40 | 12 | 58 | | | | |
| 96 | 24 | 41 | 14 | 77 | | | | |



Form No. 90 FA-M C-CM Series

DEALER



"SINCE 1936"



MANUFACTURED BY:
CAPITAL WATER SOFTENER, INC.
2096 HELENA ST.
MADISON, WI 53704

608-241-1511