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Culligan®



CULLIGAN® MARK 100 AUTOMATIC WATER CONDITIONER Installation and Operating Instructions

Models from 1998

CULLIGAN INTERNATIONAL COMPANY/NORTHBROOK, ILLINOIS
CULLIGAN USA DIVISION/NORTHBROOK, IL 60062 — SAN BERNARDINO, CA 92402
CULLIGAN FRANCE S.A./YVELINES, FRANCE — CULLIGAN ITALIANA SpA/BOLOGNA, ITALY
CULLIGAN OF CANADA, LTD./MISSISSAUGA, ONTARIO, CANADA L5K 1A5
CULLIGAN ESPANA S.A./08191 RUBI (BARCELONA), SPAIN — JEBEL ALI FREE ZONE/DUBAI, UNITED ARAB EMIRATES



⚠ WARNING: IF INCORRECTLY INSTALLED, OPERATED OR MAINTAINED, THIS PRODUCT CAN CAUSE SEVERE INJURY. THOSE WHO INSTALL, OPERATE, OR MAINTAIN THIS PRODUCT SHOULD BE TRAINED IN ITS PROPER USE, WARNED OF ITS DANGERS, AND SHOULD READ THE ENTIRE MANUAL BEFORE ATTEMPTING TO INSTALL, OPERATE OR MAINTAIN THIS PRODUCT.

Attention Culligan Customer:

The installation, service and maintenance of this equipment should be rendered by a qualified and trained service technician. Your local independently operated Culligan dealer employs trained service and maintenance personnel who are experienced in the installation, function and repair of Culligan equipment. This publication is written specifically for these individuals and is intended for their use.

We encourage Culligan users to learn about Culligan products, but we believe that product knowledge is best obtained by consulting with your Culligan dealer. Untrained individuals who use this manual assume the risk of any resulting property damage or personal injury.

 WARNING - Prior to servicing equipment, disconnect power supply to prevent electrical shock.

IF THIS EQUIPMENT IS TO BE USED IN THE TREATMENT OF DRINKING WATER, THE WATER MUST BE MICROBIOLOGICALLY SAFE.

CULLIGAN[®] MARK 100 AUTOMATIC WATER CONDITIONER Installation and Operating Instructions

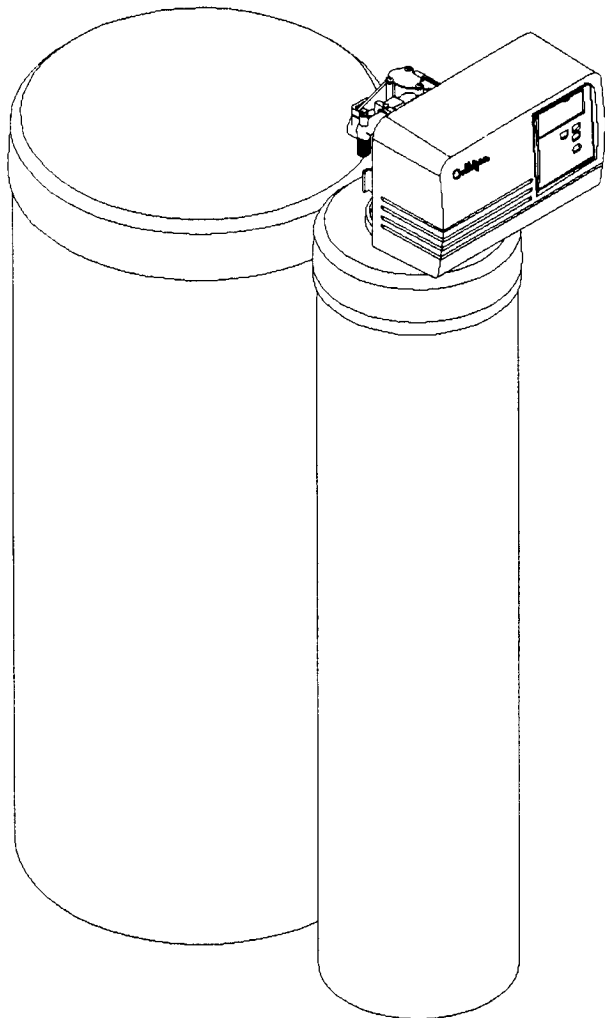


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Introduction



The Culligan[®] Mark 100 water softeners are tested and certified under ANSI/NSF Standard 44 for the effective reduction of the hardness minerals, calcium and magnesium. Additionally, the models equipped with the Aqua-Sensor[®] sensing device are tested and certified for the effective reduction of barium and radium 226/228.

SAFE PRACTICES

Throughout this manual there are paragraphs set off by special headings.

NOTICE: Notice is used to emphasize installation, operation or maintenance information which is important, but does not present any hazard.

Example: **NOTICE:** *The nipple must extend no more than 1 inch above the cover plate.*

CAUTION: Caution is used when failure to follow directions could result in damage to equipment or property.

Example: **CAUTION:** *Disassembly while under water pressure can result in flooding.*

WARNING: Warning is used to indicate a hazard which could cause injury or death if ignored.

Example: **WARNING!** *ELECTRICAL SHOCK HAZARD! UNPLUG THE UNIT BEFORE REMOVING THE TIMER MECHANISM OR COVER PLATES!*

SERIAL NUMBERS

The control valve serial number, is on the back of the timer case.

The media tank serial number is on the top edge of the tank side wall.

NOTICE: *Do not remove or destroy the serial number. It must be referenced on request for warranty repair or replacement.*

This publication is based on information available when approved for printing. Continuing design refinement could cause changes that may not be included in this publication.

Specifications

Culligan® Mark 100 Water Conditioners with Time Clock, Aqua-Sensor® Device or Soft-Minder® Meter

	9" Model	12" Model
Control Valve	5-cycle, Reinforced Thermoplastic	5-cycle, Reinforced Thermoplastic
Overall Conditioner Height	51 in 1 295 mm	51 in 1 295 mm
Media Tank Dimensions (Dia x Ht)	9 x 45 in 229 x 1 143 mm	12 x 45 in 305 x 1 143 mm
Salt Storage Tank Dimensions (Dia x Ht)	16 x 43 in 457 x 1 092 mm 18 x 43 in 457 x 1092 mm	18 x 43 in 457 x 1 092 mm
Exchange Media, Type and Quantity	Cullex® Media, 0.86 ft³ Cullex Media, 24.5 L	Cullex Resin, 1.4 ft³ Cullex Resin, 40 L
Underbedding, Type and Quantity	Cullsan® Underbed, 12 lb Cullsan Underbed, 5.4 kg	Cullsan Underbed, 30 lb Cullsan Underbed, 14 kg
Exchange Capacity @ Salt Dosage Per Recharge¹	16,100 gr @ 4.0 lb 1 043 gr @ 1.6 kg 24,500 gr @ 8.0 lb 1 587 gr @ 3.2 kg 27,100 gr @ 12.0 lb 1 756 gr @ 5.4 kg	21,600 gr @ 6.0 lb 1 399 gr @ 3 kg 33,700 gr @ 12.0 lb 2 184 gr @ 5.3 kg 38,300 gr @ 18.0 lb 2 475 gr @ 8.1 kg
Freeboard to Media²	16.6-17.6 in 420-450 mm	17.5-18.5 in 444-470 mm
Freeboard to Underbedding³	39.2 in 996 mm	38.5 in 978 mm
Salt Storage Capacity	250 lb or 375 lb 114 kg or 170 kg	375 lb 170 kg
Rated Service Flow @ Pressure Drop	7.5 gpm @ 15 psi 30 Lpm @ 102 kPa	7.5 gpm @ 15 psi 31 Lpm @ 102 kPa
Total Hardness, Maximum	75 gpg 1 300 mg/L	99 gpg 1 692 mg/L
Total Iron, Maximum	5 ppm 5 mg/L	5 ppm 5 mg/L
Hardness to Iron Ratio, Minimum⁴	8 gpg to 1 ppm 140 mg/L to 1 mg/L	8 gpg to 1 ppm 140 mg/L to 1 mg/L
Operating Pressure	20-125 psi 140-860 kPa	20-125 psi 140-860 kPa
Operating Temperature	33-120°F 1-50°C	33-120°F 1-50°C
Electrical Requirements	120V/60 Hz	120V/60 Hz
Electrical Power Consumption, Min/Max	3 Watts/35 Watts	3 Watts/35 Watts
Drain Flow, Maximum⁵	2.0 gpm 8 L/pm	3.5 gpm 14 L/pm
Recharge Time, Average⁶	80 min	85 min
Recharge Water Consumption, Average	45 gal 170 L	86 gal 325 L

1 Capacities and corresponding salt dosages pertain to low hardness waters. Capacities given are per recharge

2 Measured from top of media to top of inlet fitting (backwashed and drained).

3 Measured from top of underbedding to top of inlet fitting.

4 Hardness to iron ratio does not apply and total hardness and iron specifications change as follows when Sofner-Gard® accessory is used:
9" Model - 50 gpg (855 mg/L) total hardness, 10 ppm (mg/L) iron; 12" Model - 75 gpg (1 200 mg/L) hardness, 20 ppm (20 mg/L) iron.

5 Backwash at 120 psi (830 kPa).

6 10 minute backwash, 7 lb (3.2 kg) 9" model or 13 lb (5.9 kg) 12" model salt dosage at 30 psi (204 kPa).

Preparation

COMPONENT DESCRIPTION

The water conditioner is shipped from the factory in three cartons. Remove all components from their cartons and inspect them before starting installation.

Control Valve Assembly - Includes the 5-cycle regeneration control valve and electronic timer assembly. A small parts package contains installation hardware and consumer literature, including an Owner's Guide and warranty policy.

Media Tank - Contains the center opening Tripl-Hull™ media tank complete with Cullex® ion exchange resin, underbedding and outlet manifold.

Salt Storage Tank Assembly - Includes salt storage container with support plate and Dubl-Safe™ brine refill valve and chamber.

TOOLS AND MATERIALS

The following tools and supplies will be needed, depending on installation method. **Observe all applicable codes.**

All Installations

- Safety glasses
- Phillips screwdrivers, small and medium tip
- Gauge assembly (PN 00-3044-50 or equivalent)
- Silicone lubricant (PN 00-4715-07 or equivalent) - **DO NOT USE PETROLEUM-BASED LUBRICANTS**
- A bucket, preferably light-colored
- Towels

Special Tools

- Torch, solder and flux for sweat copper connections
- Threading tools, pipe wrenches and thread sealer for threaded connections.
- Saw, solvent and cement for plastic pipe connections.

Materials

- Brine line, 5/16" (PN 00-3031-28 or equivalent)
- Drain line, 1/2" (PN 00-3030-82, gray, semi-flexible; or PN 00-3319-46, black, semi-rigid; or equivalent)
- Thread sealing tape
- Pressure reducing valve (if pressure exceeds 125 psi [860 kPa], PN 00-4909-00 or equivalent)
- Pipe and fittings suited to the type of installation
- Water softener salt (rock, solar or pellet salt formulated specifically for water softeners)

BYPASS VALVES

A bypass valve is included with the control valve assembly.

APPLICATION

Water quality - Verify that raw water hardness and iron are within limits. Note the hardness for setting the salt dosage and recharge frequency.

Pressure - If pressure exceeds 125 psi (860 kPa), install a pressure reducing valve (see materials checklist). On private water systems, make sure the minimum pressure (the pressure at which the pump starts) is greater than 20 psi (140 kPa). Adjust the pressure switch if necessary.

⚠ CAUTION: The use of a pressure reducing valve may limit the flow of water in the household.

Temperature - Do not install the unit where it might freeze, or next to a water heater or furnace or in direct sunlight.

LOCATION

Space requirements - Allow 6-12 inches (15-30 cm) behind the unit for plumbing and drain lines and 4 feet (1.3 metres) above for service access and filling the salt container.

Floor surface - Choose an area with solid, level floor free of bumps or irregularities. **Bumps, cracks, stones and other irregularities can cause the salt storage tank bottom to crack when filled with salt and water.**

Drain facilities - Choose a nearby drain that can handle the rated drain flow (floor drain, sink or stand pipe). Refer to the Drain Line Chart, Table 1 (page 10), for maximum drain line length.

NOTICE: *Most codes require an anti-siphon device or airgap.*

Electrical facilities - A 6-foot grounded cord is provided. The customer should provide a 3-prong grounded receptacle, preferably one not controlled by a switch that can be turned off accidentally. Observe local electrical codes.

⚠ WARNING: ELECTRICAL SHOCK HAZARD! DO NOT REMOVE THE GROUNDING PRONG! IF THE RECEPTACLE IS DESIGNED ONLY FOR 2-PRONG PLUGS, OBTAIN A 3-PRONG ADAPTER AND GROUND IT SECURELY TO THE RECEPTACLE. DO NOT USE EXTENSION CORDS.

Installation

PLACEMENT

Refer to Fig. 1.

- Set the media tank on a solid, level surface near water, drain and electrical facilities. Place the outlet (black

coupling) of the tank on the left.

- Set the brine system on a flat, smooth, solid surface as near the media tank as possible.

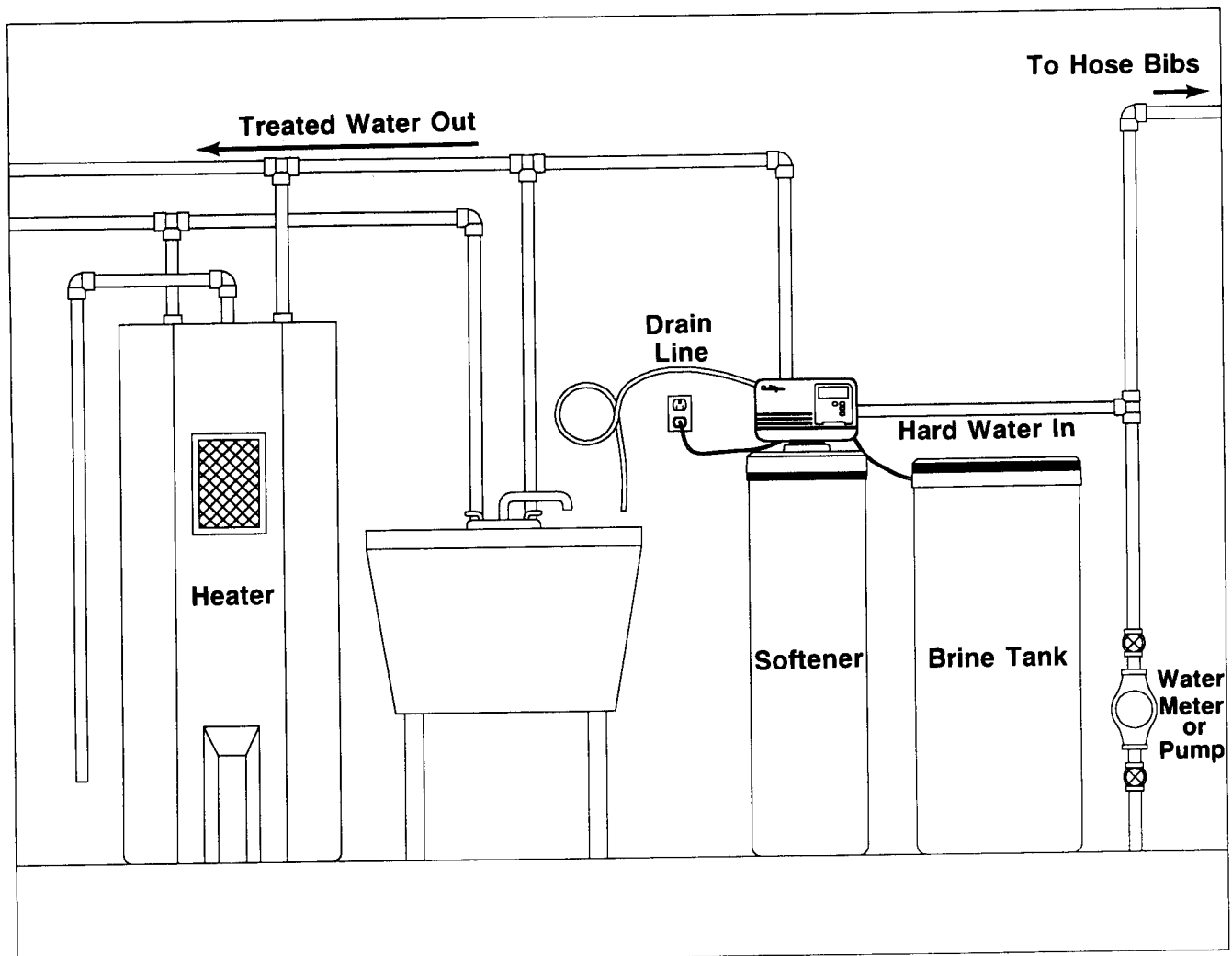


FIG. 1

MOUNT THE CONTROL VALVE

See Fig. 2.

- Remove and discard the protective covers on the tank couplings.
- Lubricate the o-rings on the tank couplings with silicon lubricant.
- Place the control on the tank couplings and press down firmly.
- Install the u-clamps on both sides of the control and secure with the screws.

TWELVE INCH SOFTENERS

As shipped from the factory, each control is equipped as a 9-inch unit. A 12-inch eductor and flow control is included with each unit for conversion for use with 12-inch softener tanks. **NOTICE:** *To prevent injury, convert units to a twelve-inch configuration prior to installation.*

For the eductor, refer to Fig. 3.

- Remove the three screws on the eductor cap and remove cap.
- Remove the eductor screen.
- Pull out the blue nozzle and replace with the white.
- Reverse the procedure for reassembly. To prevent leaks, make sure the gasket is in proper position.

For the backwash flow control .

- Remove the u-clip of the drain elbow assembly and pull the drain elbow straight off.
- Remove the backwash flow control located behind the elbow. Put the #3 restrictor in it's place.
- Reverse the procedure to reassemble.

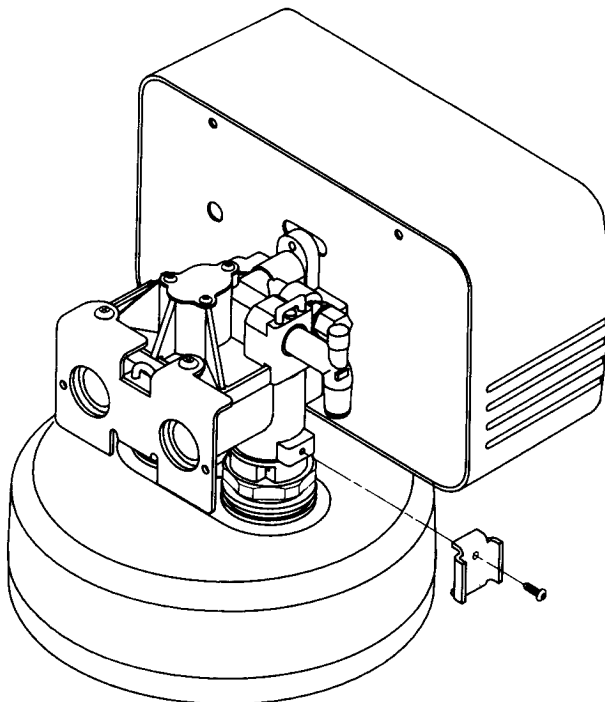


FIG. 2

PLUMBING CONNECTIONS

Two methods of connecting the water softener to the plumbing system are available. Shipped with each softener is a Culligan® Cul-Flo-Valv® bypass valve, either PN 00-3314-42 or 00-3314-46. If local conditions warrant, you may use the sweat adaptor kits, PN 00-3314-44 or 00-3314-45.

NOTICE: *The Soft-Minder® meter cannot be used with the sweat adaptors.*

⚠ CAUTION: *Close the inlet supply line and relieve system pressure before cutting into the plumbing! Flooding could result!*

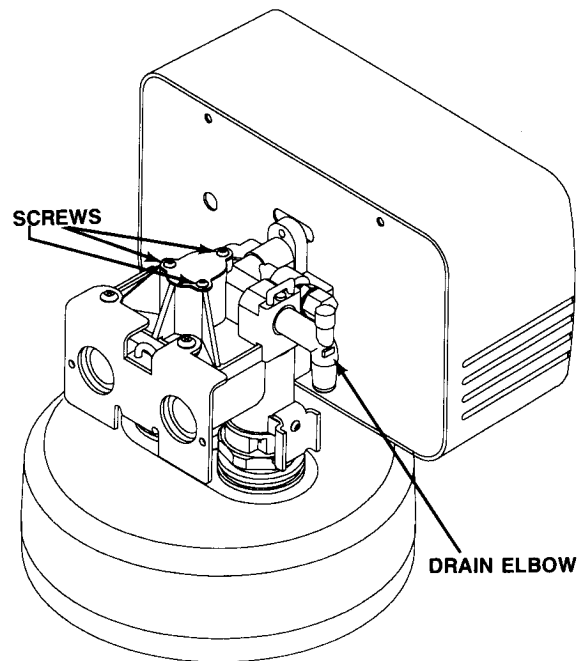


FIG. 3

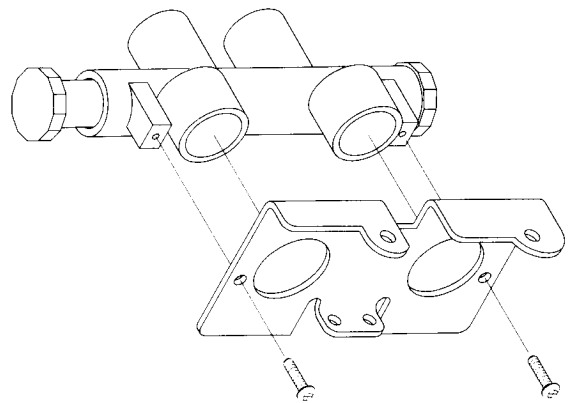


FIG. 4

⚠ CAUTION: When making sweat connections, remove all plastic and rubber components which contact brass or copper. Damage to these components may result otherwise.

BYPASS VALVE INSTALLATION (AQUA-SENSOR[®] SENSING DEVICE AND TIME CLOCK UNITS ONLY)

The bypass valve connects directly to the backplate of the valve with a pair of screws (Fig. 4). To facilitate this connection, remove the plate by pulling up on the u-clip on the back of the valve. Lubricate all o-rings with silicon lubricant.

BYPASS VALVE INSTALLATION (SOFT-MINDER[®] METER ONLY):

The Soft-Minder meter is placed between the bypass valve and the control (Fig. 5). Make sure the meter is on the outlet port of the control. A pair of elongated bolts are packaged with the meter to hold the bypass valve to the back plate of the control. Lubricate all o-rings with silicon lubricant.

SWEAT ADAPTOR INSTALLATION:

The sweat adaptors use a snap ring to hold them to the backplate of the control valve. The back plate will need to be removed from the valve for this connection. A pair of snap ring pliers, PN 00-5916-09, are needed for this connection.

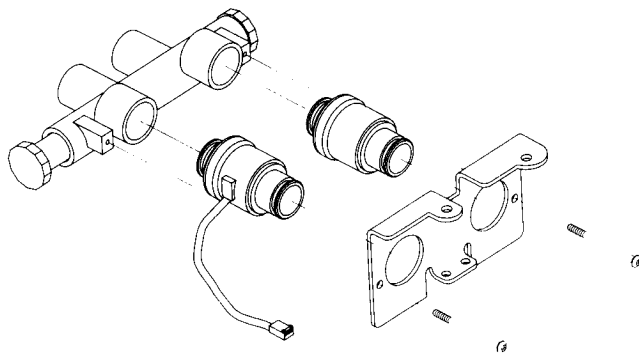


FIG. 5

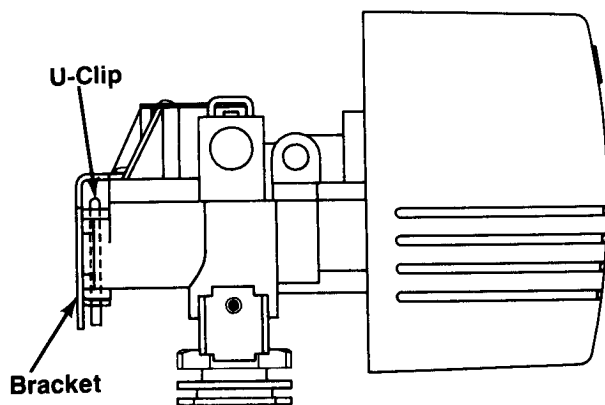


FIG. 6

⚠ CAUTION: When reinstalling back plate to control valve, make sure the u-clip fully engages the two bottom holes of the bracket (Fig. 6). Secure bracket from the top with the two mounting screws provided.

CONNECT THE BRINE LINE

Refer to Fig. 7.

- Measure a length of brine line sufficient to reach from the brine tank to the brine fitting and then add four feet (1.3 meters). Cut both ends squarely and cleanly.
- Remove the brine valve from the brine tank and remove the white nut and insert. Return float rod to its original position.
- Slip the white nut over one end of the tubing and press the plastic insert into the end of the tubing. Connect to the brine valve and tighten nut.
- Remove white nut and insert from wire tie around drain elbow.
- Slip the white nut over one end of the tubing and press the plastic insert into the end of the tubing. Connect to the brine connection on the valve and tighten nut.

DRAIN LINE CONNECTION

Refer to Table 1, page 11 under the applicable tank size for drain line length and height limitations, and to Fig. 8.

- Remove 1/2" pipe clamp from end of drain elbow.
- Route a length of 1/2" drain line from the drain elbow to the drain.

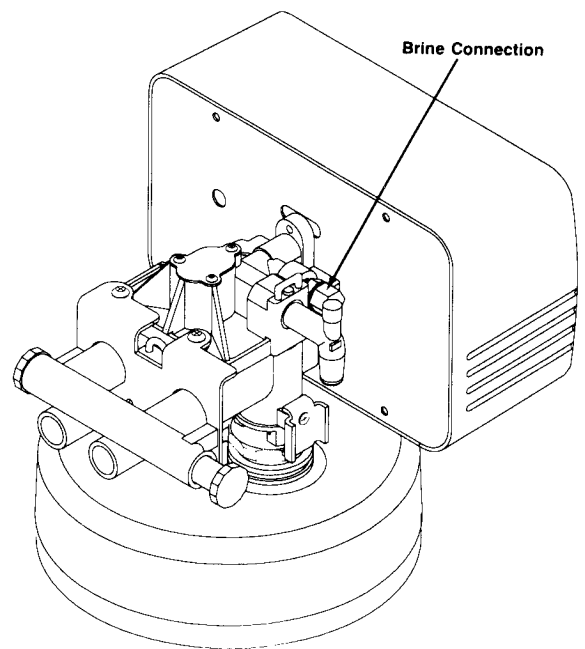


FIG. 7

- Fasten the drain line to the elbow with the clamp.
- Secure the drain line to the drain to prevent its movement during regeneration. A loop in the end of the tube will keep it filled with water and will reduce splashing at the beginning of each regeneration.

NOTICE: *Observe all plumbing codes. Most codes require an anti-siphon device or air gap at the discharge point!*

FILL THE SALT STORAGE CONTAINER

Fill the salt storage container with water until the level reaches about 1 inch above the salt support plate. Pour salt into the container. Fill to within a few inches of the top.

AQUA-SENSOR[®] PROBE AND SOFT-MINDER[®] METER CONNECTION

To connect the probe or meter leads, proceed as follows:

- Remove the timer case from the back plate by twisting each of the four hold down screws by a quarter of a turn.
- Rotate the timer case down and away from the back plate. There should be enough play in the wires for this.

⚠ CAUTION: Do not allow the timer case to hang from the wires. Damage to the wires and/or terminals may result.

- Locate the 1/2" hole in the upper right hand corner of the timer plate.

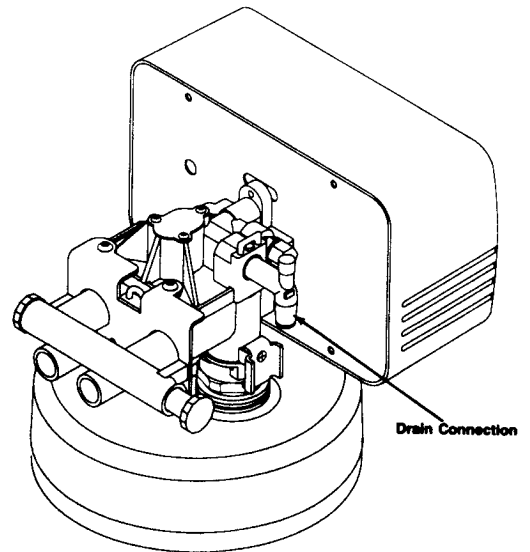


FIG. 8

- Slip the sensor probe lead or meter cable through the hole and toward the circuit board.
- Connect the lead to the circuit board. The sensor terminal is labeled "AQUA" while the meter terminal is labeled "METER".
- Locate the strain relief bushing in the parts pack. Place it on the cable at the point of entry to the rear of the timer plate and push it into the hole.

TABLE 1

9-INCH MODELS

Average Water Pressure	Height of Drain Discharge Above Floor Upon Which Softener Sets										
	4 in 0.1 m	1 ft 0.3 m	2 ft 0.6 m	3 ft 0.9 m	4 ft 1.2 m	5 ft 1.5 m	6 ft 1.8 m	7 ft 2.1 m	8 ft 2.4 m	9 ft 2.7 m	10 ft 3.1 m
30 2.1	56 17.1	50 15.3	40 12.2	30 9.2	20 6.1	10 3.1					
50 3.5	112 34.2	106 32.3	96 29.3	86 26.2	76 23.2	66 20.1	56 17.1	46 14.0	36 11.0	26 7.9	16 4.9
70 4.8	143 43.6	137 41.8	127 38.7	117 35.7	107 32.6	97 29.6	87 26.5	77 23.5	67 20.4	57 17.4	47 14.3
90 6.2	153 46.7	147 44.8	137 41.8	127 38.7	117 35.7	107 32.6	97 29.6	87 26.5	77 23.5	67 20.4	57 17.4
120 8.3	159 48.5	153 46.7	143 43.6	133 40.6	123 37.5	113 34.5	103 31.4	93 28.4	83 25.3	73 22.3	63 19.2

12-INCH MODELS

Average Water Pressure	Height of Drain Discharge Above Floor Upon Which Softener Sets										
	4 in 0.1 m	1 ft 0.3 m	2 ft 0.6 m	3 ft 0.9 m	4 ft 1.2 m	5 ft 1.5 m	6 ft 1.8 m	7 ft 2.1 m	8 ft 2.4 m	9 ft 2.7 m	10 ft 3.1 m
30 2.1	44 13.4	38 11.6	28 8.5	18 5.5							
50 3.5	103 31.4	97 29.6	87 26.5	77 23.5	67 20.4	57 17.4	47 14.3	37 11.3	27 8.2	17 5.2	7 2.1
70 4.8	129 39.3	123 37.5	113 34.5	103 31.4	93 28.4	83 25.3	73 22.3	63 19.2	53 16.2	43 13.1	33 10.1
90 6.2	145 44.2	139 42.4	129 39.3	119 36.3	109 33.2	99 30.2	89 27.1	79 24.1	69 21.0	59 18.0	49 14.9
120 8.3	153 46.7	147 44.8	137 41.8	127 38.7	117 35.7	107 32.6	97 29.6	87 26.5	77 23.5	67 20.4	57 17.4

Settings

The microprocessor can be set in one of three operating modes. Timeclock, Aqua-Sensor[®] Sensing Device or Soft-Minder[®] meter. As shipped from the factory, the control is set for 9" Timeclock operation. A set of dip switches located on the back of the control will have to be changed for proper operation of your unit. Refer to Fig. 9 for location of these dip switches.

AQUA-SENSOR OPERATION

The Aqua-Sensor Sensing Device utilizes a pair of cells to sense the passage of hardness through the water softener. It can automatically adjust for water with variable hardness levels. As a result, it is the most efficient means of operating a water softener. When hardness is sensed, the unit signals for a regeneration. The "REGEN" Enunciator will light at this point. Regeneration occurs at the preset time, unless the number 6 dip switch is turned on. Then the unit will regenerate immediately. Since the Aqua-Sensor device automatically senses hardness in the water, programming is limited to Time-of-Day, Time-of-Regeneration, Salt Dosage and Backwash.

The Aqua-Sensor models have a new feature which automatically detects when the brine solution has been rinsed from the tank. Therefore, the Brine Draw/Slow Rinse cycle is not adjustable. A numeric enunciator (numbers 1-5,9,10) will light during the programming sequence. These enunciators correlate to the programming variables. Refer to Fig. 12 for the programming sequence.

SOFT-MINDER OPERATION

The Soft-Minder meter utilizes a Hall effect device to monitor the customer's water usage. After a predetermined amount

of water has passed, the meter signals for a regeneration. The "REGEN" enunciator will light at this point. The regeneration occurs at this time set within the microprocessor unless dip switch number 6 is turned on. Programming of the microprocessor includes, Time-of-Day, Time of Regeneration, Salt Dosage, Backwash, Brine Draw/Slow Rinse gallons capacity and Water Hardness.

The microprocessor automatically calculates the gallons of water which can be treated based upon the salt dosage, water hardness and tank size. Numeric enunciator 8 will display the GALLONS TO SIGNAL for regeneration (the portion of the capacity which is held in reserve is not displayed). Refer to Tables 3B & 3D.

As an option GALLONS TO SIGNAL for regeneration can be set directly to override the calculation through numeric enunciator 8. You can increase or decrease the gallons to signal to meet the needs of the application. The conditioner must cycle through a complete regeneration before the gallon override is saved in the microprocessor. **NOTICE:** *Changing the capacity will effect the reserve capacity. An INCREASE in the gallons capacity will DECREASE your reserve capacity. A DECREASE in the gallons capacity will INCREASE the reserve capacity. Refer to Tables 3B & 3D for the total capacity based upon Salt Dosage and Hardness Level.*

Like the Aqua-Sensor unit, numeric enunciators (numbers 1-10) will light indicating the information to be entered. Again refer to Fig. 12 for the programming sequence.

TIME CLOCK OPERATION

When operated as a time clock unit, the Culligan[®] Mark 100 control will regenerate at fixed intervals as determined by the household's water use and the salt dosage. To calculate the regeneration interval, locate the Total Gallons capacity in Tables 3B or 3D as determined by the hardness of the water and the salt dosage. Divide the Total Gallons capacity by the anticipated daily use of the household. The result is the regeneration interval. The regeneration interval can be set between 1 to 42 days.

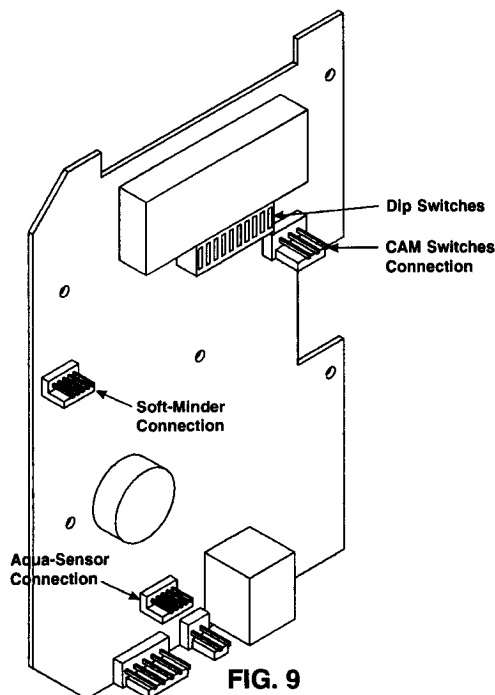
The programming of the Time Clock models is limited to Time-of-Day, Time-of-Regeneration, salt dosage, backwash time, brine rinse time and Regeneration interval.

SETTING THE MICROPROCESSOR

- Remove the timer case from the back plate by twisting each of the four hold down screws by a quarter of a turn.
- Rotate the timer case down and away from the back plate. There should be enough play in the wires for this.

⚠ CAUTION: *Do not allow the timer case to hang from the wires. Damage to the wires and/or terminals may result.*

- The Dip switches are located in the center of the circuit board. Refer to Fig. 10 for the proper settings.



For more information on programming with the dip switch, refer to the service manual.

CAPACITY AND SALT SETTINGS

The microprocessor automatically calculates the amount of water which the softener can treat based upon the salt dosage, hardness level and tank size.

Before setting the timer, determine the amount of softening capacity for the household. Tables 2 & 3 will assist in this determination.

Record the salt dosage, hardness level and regeneration interval (time clock models only) here:

- Salt dosage _____
- Hardness level _____
- Regeneration interval (days) TIME CLOCK MODELS ONLY _____

Brine Valve "A" Dimension

Set the brine valve to coincide with the salt dosage setting. Refer to Fig. 11.

- Lift the brine valve from the brine chamber.
- Find the correct "A" dimension from Table 3.
- Set the distance from the top of the filter screen to the bottom of the float accordingly.

TABLE 2 - DAILY WATER USAGE

Persons in Household	Gallons per Day
2	150
3	225
4	300
5	375
6	450
7	525
8	600
9	675
10	750

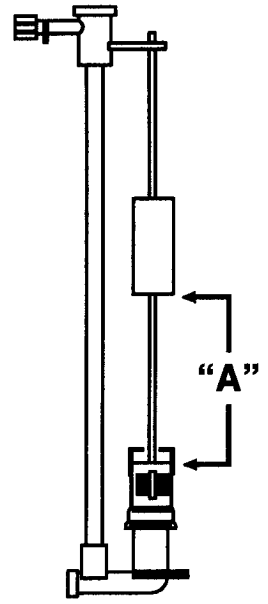
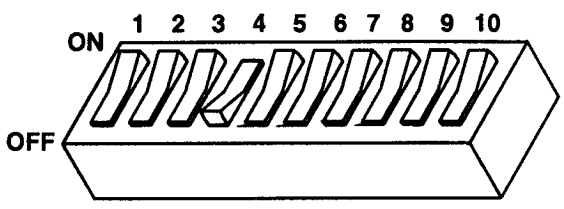


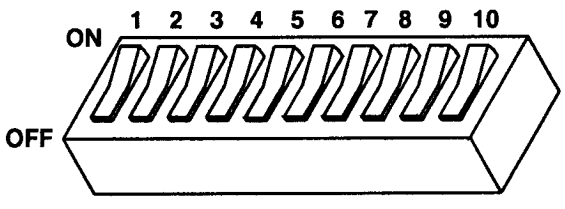
FIG. 11

PROGRAMMING

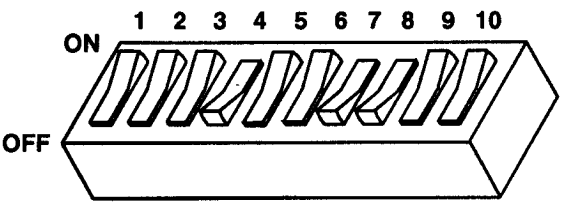
Upon plugging in the Culligan[®] Mark 100 control, the display will flash "8888". To access the programming mode, press the status button. Refer to Fig. 12 for the programming sequence (step 3 is not used for current applications).



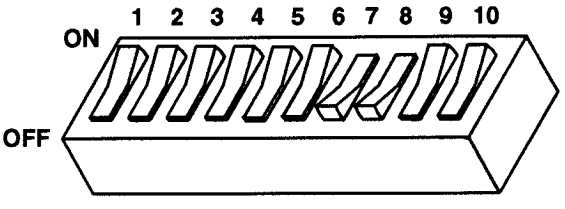
12" SOFTENER, ENGLISH SETTINGS



9" SOFTENER, ENGLISH SETTINGS



12" SOFTENER, METRIC SETTINGS



9" SOFTENER, METRIC SETTINGS

FIG. 10

1. Plug in.
Press status.
12:00 will appear.



Press ▲ to increase or ▼ to decrease

Displays flashing

Set **Time-of-Day**. **ALL MODELS**.

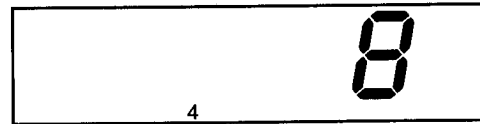
2. Press status.



Press ▲ to increase or ▼ to decrease

Set **Recharge Time**.
ALL MODELS. Step 3 is not currently used.

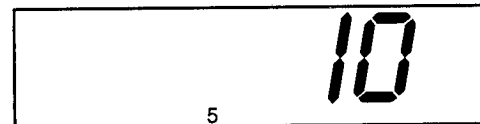
3. Press status.



Press ▲ to increase or ▼ to decrease

Set **Salt Dosage** (3-15 lb for 9", 5-24 lb for 12"). **ALL MODELS**.

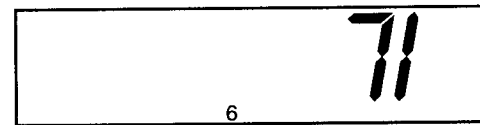
4. Press status.



Press ▲ to increase or ▼ to decrease

Set **Backwash Time** (5-40 minutes). **ALL MODELS**.

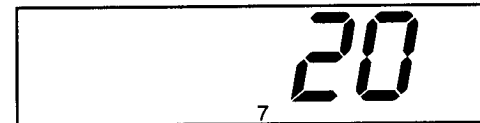
5. Press status.



Press ▲ to increase or ▼ to decrease

Set **Brine Rinse Time** (37-85 minutes for 9", 35-89 minutes for 12"). **TIME CLOCK AND METER MODELS ONLY**.

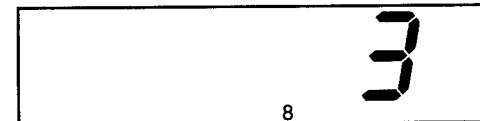
6. Press status.



Press ▲ to increase or ▼ to decrease

Set **Hardness Level** (1-75 gpg for 9", 1-99 gpg for 12").
METER MODELS ONLY.

7. Press status.



Press ▲ to increase or ▼ to decrease

Set **Regeneration Interval** (1-42 days).
TIME CLOCK MODELS ONLY.
Set **Gallons To Signal** (10-99990).
METER MODELS ONLY (Multiply displayed number by 10).

8. Press status.



Press ▲ simultaneously ▼

Set **LOCK** or **UNLOCK** feature to prevent tampering with settings.

9. Press status.



Press ▲ to change

Set **ENABLE** or **DISABLE** feature to allow constantly illuminated display or a blank display after 1 minute.

FIG. 12

TABLE 3A - CAPACITY, 9" AQUA-SENSOR[®] SENSING DEVICE (GALLONS)

SALT DOSAGE	"A" DIMENSION				TOTAL CAPACITY CAPACITY TO SIGNAL	HARDNESS														
	150 LB INCH(CM)	250 LB INCH(CM)	375 LB INCH(CM)			1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
	14-3/4 (37.5)	9-1/4 (23.5)	7-1/2 (19.1)			4,900 3,537	2,450 1,949	1,633 1,179	1,225 1,004	980 707	817 590	700 505	613 442	544 393	490 354	445 322				
8				TOTAL CAPACITY CAPACITY TO SIGNAL	5,420 3,656	2,710 1,828	1,807 1,219	1,355 914	1,084 731	903 609	774 522	678 457	602 406	542 366	493 332	452 305	417 281	387 261	301 244	
12				TOTAL CAPACITY CAPACITY TO SIGNAL	5,420 3,656	2,710 1,828	1,807 1,219	1,355 914	1,084 731	903 609	774 522	678 457	602 406	542 366	493 332	452 305	417 281	387 261	301 244	

TABLE 3B - CAPACITY, 9" SOFT-MINDER[®] METER (GALLONS)

SALT DOSAGE	"A" DIMENSION				TOTAL CAPACITY CAPACITY TO SIGNAL	HARDNESS														
	150 LB INCH(CM)	250 LB INCH(CM)	375 LB INCH(CM)			1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
	7-3/4 (19.7)	4-5/8 (11.7)	3-1/4 (6.9)			3,220 2,596	1,610 1,298	1,073 849	805 637	644 495	537 412									
4				TOTAL CAPACITY CAPACITY TO SIGNAL	4,900 3,314	2,450 1,657	1,633 1,084	1,225 813	980 631	817 526	700 442	613 387	544 333	490 300	445 267					
8				TOTAL CAPACITY CAPACITY TO SIGNAL	5,420 3,656	2,710 1,828	1,807 1,195	1,355 896	1,084 696	903 580	774 987	678 426	602 367	542 331	493 294	452 270	417 246	387 229	361 209	
12				TOTAL CAPACITY CAPACITY TO SIGNAL	5,420 3,656	2,710 1,828	1,807 1,195	1,355 896	1,084 696	903 580	774 987	678 426	602 367	542 331	493 294	452 270	417 246	387 229	361 209	

TABLE 3C - CAPACITY, 12" TIME CLOCK AND AQUA-SENSOR[®] SENSING DEVICE (GALLONS)

SALT DOSAGE	"A" DIMENSION			HARDNESS															
	150 LB INCH(CM)	250 LB INCH(CM)	375 LB INCH(CM)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-60	61-70	71-80	81-90	91-99	
	21-3/4 (56.2)	15-3/4 (40.0)	11-3/8 (28.9)	6,740	3,370	2,247	1,685	1,348	1,123	963	843	749	674	562					
12				4,542	2,271	1,514	1,136	908	757	649	568	505	454	379					
18	N/A	24-1/2 (62.2)	17-1/4 (43.8)	TOTAL CAPACITY	7,660	3,830	2,553	1,915	1,532	1,277	1,094	958	851	766	638	547	479	426	383
				CAPACITY TO SIGNAL	5,200	2,600	1,733	1,300	1,040	867	743	650	578	520	433	371	325	289	260

TABLE 3D - CAPACITY, 12" SOFT-MINDER[®] METER (GALLONS)

SALT DOSAGE	"A" DIMENSION			HARDNESS															
	150 LB INCH(CM)	250 LB INCH(CM)	375 LB INCH(CM)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-60	61-70	71-80	81-90	91-99	
	14-3/4 (37.5)	7-3/8 (18.7)	5-1/2 (14.0)	4,520	2,260	1,507	1,130	904	753	646	565								
6				3,495	1,748	1,143	857	666	555	466	408								
12	21-3/4 (56.2)	15-3/4 (40.0)	11-3/8 (28.9)	TOTAL CAPACITY	6,740	3,370	2,247	1,685	1,348	1,123	963	843	749	674	562				
				CAPACITY TO SIGNAL	4,832	2,416	1,580	1,185	920	767	644	564	486	437	357				
18	N/A	24-1/2 (62.2)	17-1/4 (43.8)	TOTAL CAPACITY	7,660	3,830	2,553	1,915	1,532	1,277	1,094	958	851	766	638	547	479	426	383
				CAPACITY TO SIGNAL	5,346	2,673	1,748	1,311	1,018	849	713	624	537	484	395	335	286	246	219

Operation

DISPLAY

There are two display modes. As shipped from the factory, the display will go blank after 1 full minute if no activity has been detected on the key pad. Touching any key will relight the display. To have the display constantly lit, press the STATUS button until the number 10 icon is reached. Press the UP and DOWN arrows simultaneously. A “d” for disable will appear in the display. To have the display blank again, press the UP and DOWN arrow simultaneously. An “E” will appear in the display.

REGENERATION

A regeneration will occur under the following conditions:

1. At the preset time of regeneration if called for by the Aqua-Sensor[®] sensing device, time clock or Soft-Minder[®] meter. The “SET REGEN” enunciator will light when the softener has signaled for a regeneration.
2. An immediate regeneration will occur if the power to the softener has been interrupted for more than four hours and the immediate regeneration dip switch is enabled.
3. An immediate regeneration will occur if the REGEN button is pushed twice.
4. A regeneration will occur at the preset time if the REGEN button is pushed once.

METER OPERATION

For units equipped as a Soft-Minder meter, the gallons remaining can be viewed by pressing the STATUS button until the screen is blank. Press the DOWN arrow until the number 15 icon is illuminated. The display must be multiplied by 10 to determine the actual gallons remaining before the unit calls for a regeneration. The regeneration will occur immediately or be delayed until the time of regeneration depending upon the position of dip switch number 6.

START-UP

NOTICE: A sanitizing agent is added to the softener at the factory. Flush the tank to drain with a minimum of 40 gallons of water or initiate a full recharge before putting the unit into service.

- Close the main water supply valve.
- Set the bypass valve to bypass.
- All faucets at the installation site should be closed.
- Direct the drain line discharge into a bucket where flow can be observed.
- Plug the unit into a 120 Volt, 60 Hertz, single-phase

- grounded, 3-wire receptacle (or 2-wire receptacle with grounded 3-prong adapter).
- Wait 1 minute. The motor will energize and home itself.
- Set the timer to the correct time of day.
- Open the main supply valve.
- Press the STATUS button until the display is blank.
- Press the REGEN button on the timer to start a regeneration. Press the UP button. A “1” will appear on the display when the motor stops.
- **Slowly** shift the bypass toward the soft water position until water flows.
- Allow the unit to fill slowly until water flows from the drain line.
- When flow to drain is established, open the bypass fully. Watch the drain line discharge for signs of resin. If resin particles appear, reduce the flow. Increase the flow again when resin no longer appears in the discharge.
- When the unit is filled with water, return the timer to the service position by pressing the UP button 3 more times. An “H” (Home) should appear on the display.
- Press the STATUS button twice. The time-of-day will appear on the display.

NOTICE: *Unplugging the control will NOT affect the timer settings. The Culligan[®] Mark 100 water softener is equipped with a capacitor which will keep time for a full 4 hours. Refer to the Service Manual for more information.*

BEFORE LEAVING THE INSTALLATION SITE:

Flush the sanitizing solution from the unit by running it to drain or initiating a full recharge cycle (press the REGEN button).

The water heater will hold hard water for several days. To ensure soft hot water immediately, drain the water heater and allow it to refill with soft water.

Make sure that the brine tank is filled with water to the level of the float. Fill the tank with a hose or put the unit into a full recharge so that the brine refill cycle will fill the tank.

Explain the operation of the softener to the customer. Give the customer a copy of the Owner’s Guide and warranty policy. Make sure the customer knows that there will be new sounds associated with the recharging of the unit. Advise the customer to periodically check and replenish the salt supply.

Clean up the unit and the installation site, removing any soldering or pipe threading residues from the equipment with a damp towel.