

Installation / Operation Manual

Demand Regeneration Water Softener (5600 Control Valve)

For Model Numbers :

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|-----------------------------------------|------------------------------------------|
| <input type="checkbox"/> CM24-56 | <input type="checkbox"/> CM24T-56 |
| <input type="checkbox"/> CM32-56 | <input type="checkbox"/> CM32T-56 |
| <input type="checkbox"/> MS24-56 | <input type="checkbox"/> MS24T-56 |
| <input type="checkbox"/> MS32-56 | <input type="checkbox"/> MS32T-56 |
| <input type="checkbox"/> MS48-56 | <input type="checkbox"/> MS48T-56 |
| <input type="checkbox"/> MS64-56 | <input type="checkbox"/> MS64T-56 |

CSI Inc.

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General Specifications	CM24-56 CM24T-56	CM32-56 CM32T-56
Grains Capacity / Regeneration	23,000 14,100 10,800	30,700 18,800 14,200
Maximum Raw Water Hardness (grains)	50	75
Maximum Raw Water Hardness (ppm)	3	5
Salt Used / Regeneration (pounds)	11.2 4.5 2.2	15.0 6.0 3.0
Exchange Resin (cu. ft.)	0.75	1.0
Mineral Tank (polyglass)	8 x 35	10 x 35
Service Flow Rate (gpm) *	8.0	11.0
Backwash Flow Rate (gpm) 56 56T	1.5 2.0	2.4 3.0
Space Required (D x W x H inches)	14 x 23 x 45	14 x 35 x 45
Approximate Shipping Weight (pounds)	88	100

* The pressure drop does not exceed 15.0 psi at the service rate.

General Specifications	MS24-56 MS24T-56	MS32-56 MS32T-56	MS48-56 MS48T-56	MS64-56 MS64T-56
Grains Capacity / Regeneration	23,000 14,100 10,800	30,700 18,800 14,200	46,000 28,200 21,300	61,400 37,600 28,400
Maximum Raw Water Hardness (grains)	50	75	100	100
Maximum Clear Iron / Manganese (ppm)	3	5	5	5
Salt Used / Regeneration (pounds)	11.2 4.5 2.2	15.0 6.0 3.0	22.5 9.0 4.5	30.0 12.0 6.0
Exchange Resin (cu. ft.)	0.75	1.00	1.50	2.00
Mineral Tank (polyglass)	8 x 44	9 x 48	10 x 54	12 x 48
Brine Tank (polyethylene w/ grid & safety)	18 x 33	18 x 33	18 x 33	18 x 33
Service Flow Rate (gpm)*	8.0	10.0	11.0	12.0
Backwash Flow Rate (gpm) 56 56T	1.5 2.0	2.0 2.4	2.4 3.0	3.5 4.0
Space Required (D x W x H inches)	18 x 26 x 52	18 x 27 x 56	18 x 28 x 62	18 x 30 x 56
Approximate Shipping Weight (pounds)	88	100	133	164

* The pressure drop does not exceed 15.0 psi at the service flow rate.

PLEASE NOTE THESE SPECIFICATIONS BEFORE PROCEEDING

OPERATION PRESSURE RANGE : 20 - 125 PSI
OPERATING TEMPERATURE RANGE : 33° F - 120° F
INLET / OUTLET PIPE SIZE : 3/4" FNPT

PLEASE COMPLY WITH ALL APPLICABLE PLUMBING CODES
PROTECT THE SOFTENER AND PIPING FROM FREEZING TEMPERATURES !

*Please read the entire Owner's Manual and Instructions before installation.
This Owner's Manual must stay with the unit.*

How A Water Softener Works

Water hardness is derived from **Calcium and Magnesium** minerals that have been dissolved into water under the earth's surface. These minerals are found in limestone deposits and are the source of hard water. The amount of hardness in a given water supply is dependent upon the quality of Calcium and Magnesium present and the length of time water has been in contact with them. This can vary dramatically from well-to-well and, for this reason, a water analysis is imperative in order to determine the proper treatment method. The degree of hardness increases as the concentration of Calcium and Magnesium "ions" increase and is measured in **Grains Per Gallon (gpg)**.

The problem of hard water in the home / business comes to light in many facets of daily use. Water spots and scum left behind on bathtubs, fixtures and showers; wear and tear on appliances; calcium build-up in hot water heaters and piping; and, greater amounts of soaps and detergents being used are just a few examples.

The modern water softener is designed to reduce hardness ions and their unpleasant side effects. Special resin beads in the softener mineral tank are used to change hard water into soft water. The surfaces of these beads are covered with sodium ions. As hard water enters the mineral tank and comes into contact with the resin, an exchange of ions takes place as dissolved Calcium and Magnesium ions cling to the resin surface and sodium ions take their place, thus softening the water. This process is called **Ion Exchange**. Over time, the sodium ions used for the exchange process become depleted and must be replenished.

The water softener provides a **Regeneration** process whereby brine solution enters the mineral tank driving-off the collected hardness ions and replenishes the surface of the resin beads with more sodium ions. This process is automatically initiated by the control valve on the mineral tank. The regeneration process has four basic cycles as follows:

1. **Backwash** - The control valve directs the water flow in a reverse direction through the mineral tank, separating the resin beads and flushing any accumulated particles to a waste drain.
2. **Brine & Rinse** - In the first part of this cycle, the control valve directs brine solution downward through the mineral tank, driving-off collected hardness ions and replenishing the resin beads with sodium ions. The second part of the cycle rinses hardness ions and excess brine from the mineral tank to the waste drain.
3. **Brine Refill** - The control valve directs fresh water into the salt compartment to create new brine solution for the next scheduled regeneration.
4. **Service** - This is the normal "operating" cycle where hard water enters the mineral tank, comes into contact with the resin beads and exchanges hardness ions for sodium ions - the water then becomes "soft" and ready for use.

Pre-Installation Check List

A water test should always be performed in order to determine total water hardness (in gpg) and total dissolved iron (in parts per million - ppm). This is critical for proper equipment selection, sizing and for determining the program for regeneration frequency. If heavy concentrations of iron (above 5 ppm), iron coloration, iron bacteria or sediment are present, filtration prior to the softener will most generally be required. Certain states may require a licensed plumber for installation.

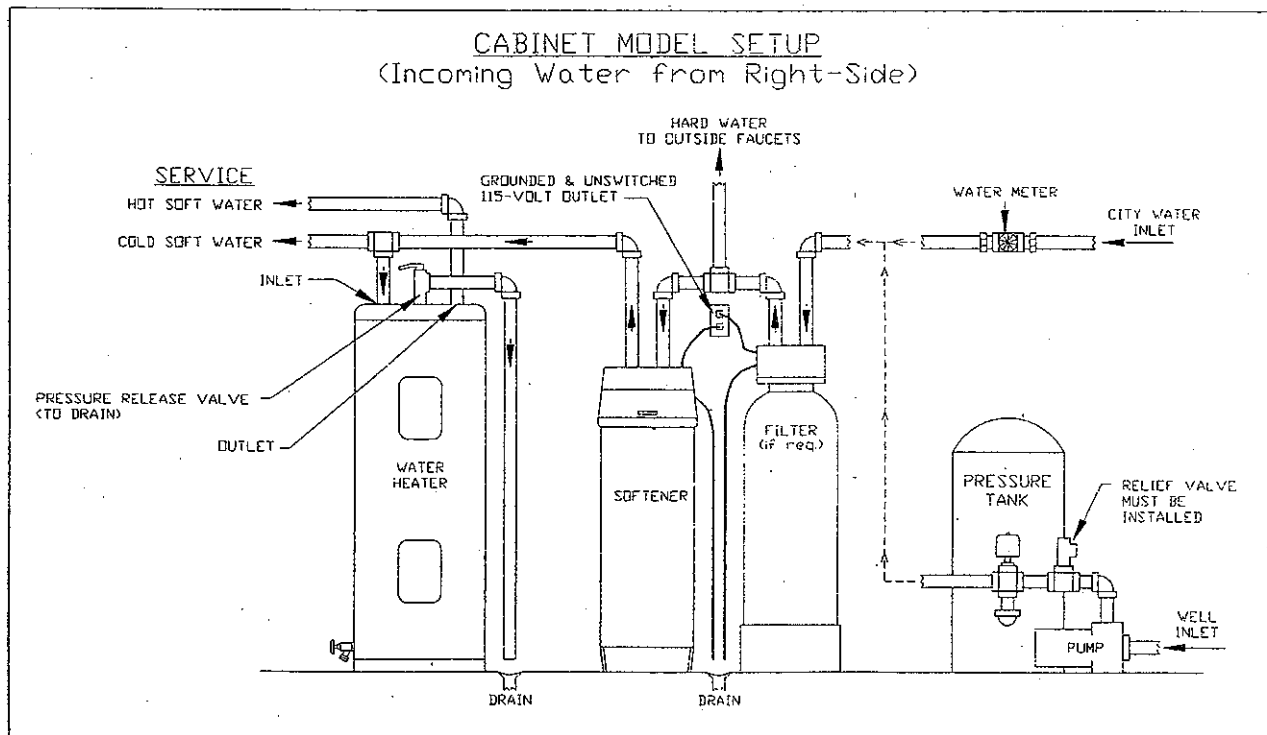
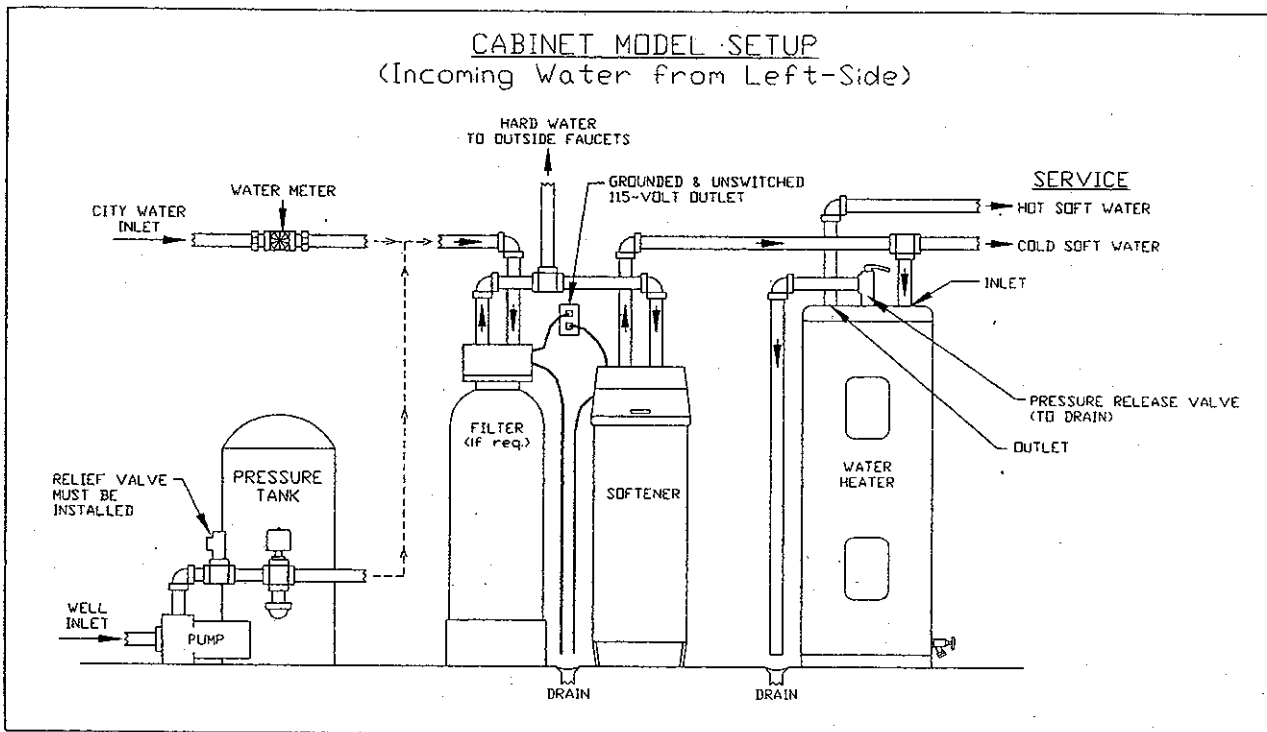
NOTE : Flexible water supply connectors and flexible drain line tubing may not be allowed in your locale. Please check with local plumbing code officials prior to installation.

Installation Requirements

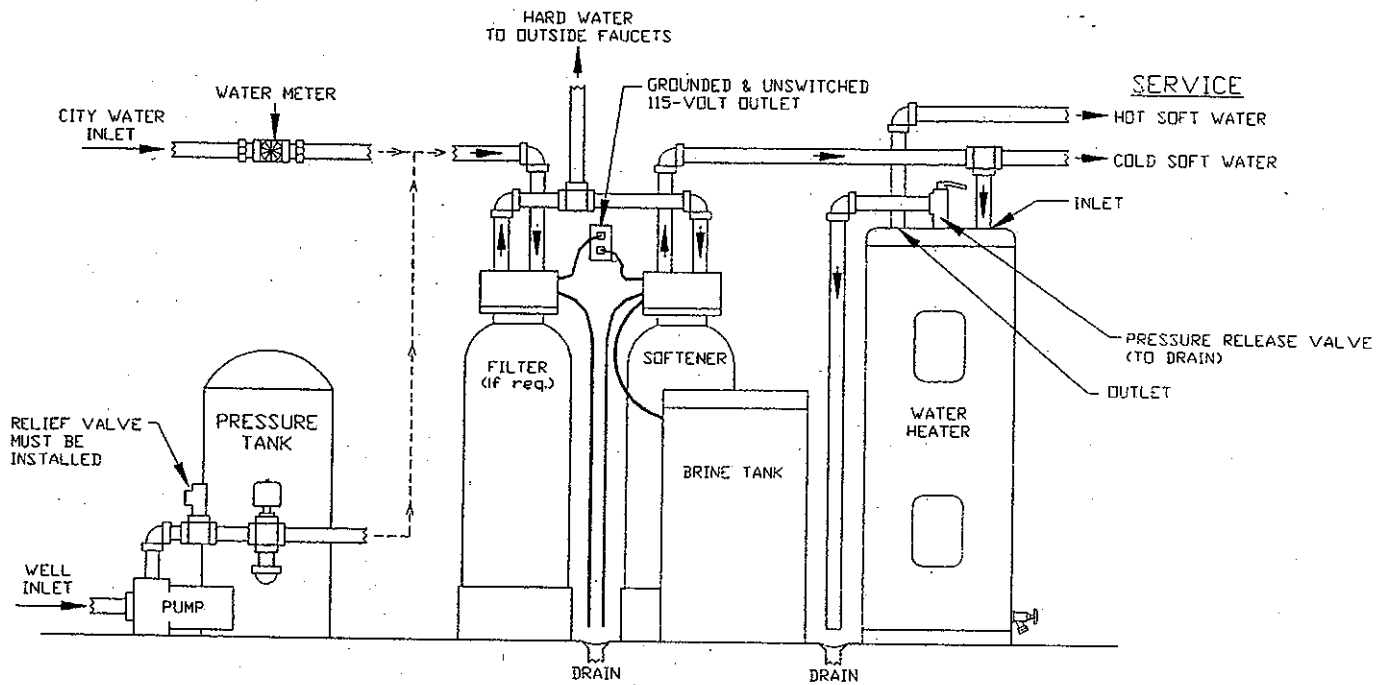
- A level floor position ahead of piping into water heater.
- Unit must be installed at least 10' ahead of the inlet to a water heater to prevent damage due to back-up of hot water.
- **DO NOT** install the unit in an area of direct sunlight or where freezing temperatures may occur!
(See Installation Diagrams for proper placement and plumbing connections.)

Major System Components :

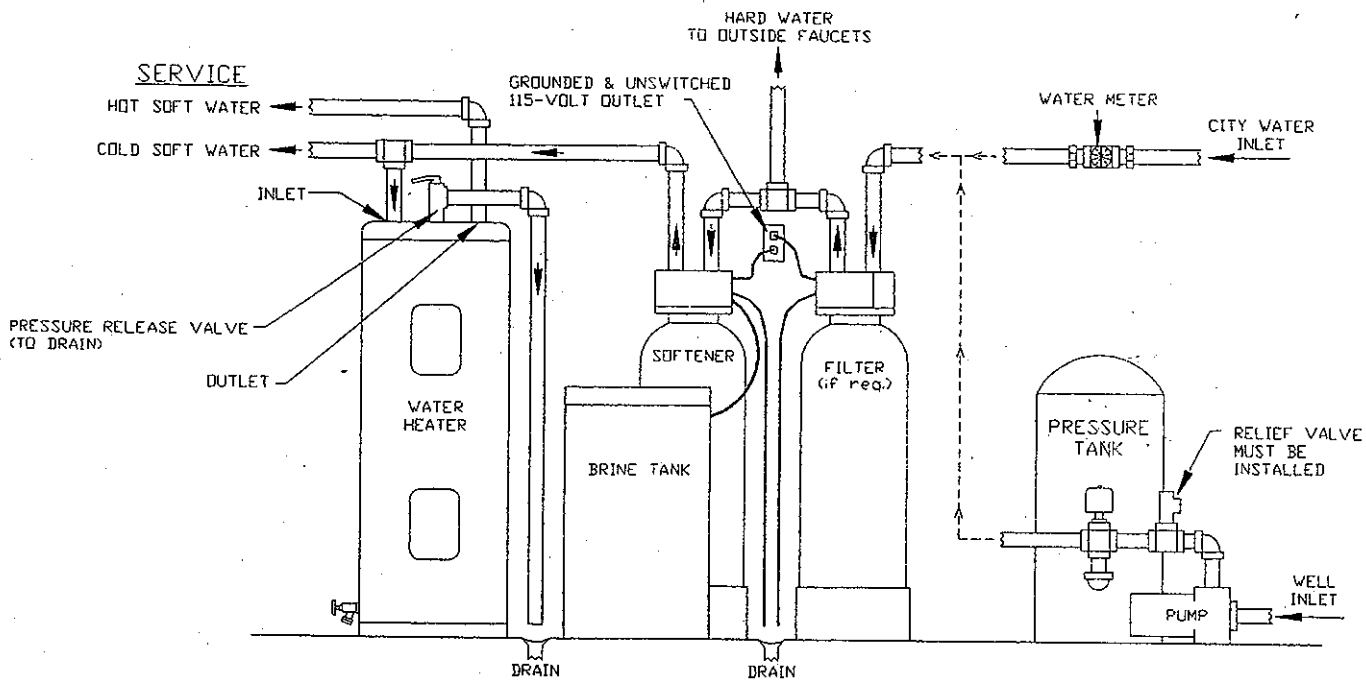
1. **Brine Tank** - This tank holds the salt that is added to the softener. This salt is dissolved with water to form a brine solution used in the softener regeneration process.
2. **Resin Tank** - This tank contains the ion exchange resin media. Water flows through the resin tank under pressure to come into contact with the resin for water softening.
3. **Control Valve** - The valve directs water through the resin tank for water softening and controls the flow of water / brine for the regeneration process.



TWO TANK SETUP (Incoming Water from Left-Side)



TWO TANK SETUP (Incoming Water from Right-Side)



Softener Location / Other Requirements

- Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
- Check for distance and proper drain installation (e.g. floor drain, washing machine, standpipe).
- Determine type and size of piping required for softener connection (e.g. copper, galvanized, PVC plastic).

Note : If household plumbing is galvanized and you intend to make the installation with copper (or vice versa), obtain di-electric unions to prevent dissimilar metal corrosion.

Note : Where the drain line is elevated above the control valve or exceeds 20 feet in length to reach the drain, use 3/4" I.D. drain line tubing instead of 1/2" I.D. Drain line tubing is not included.

Caution : *If sweat soldering copper pipe : (Remember to always use lead free solder and flux.) Cover yoke or bypass valve with wet rags to prevent heat damage to connections and control valve?! If using PVC or plastic pipe, primers and solvent cements specifically recommended for use with potable water are required.*

Installation Procedure

- Water Supply Connections and Bypass Valve -

To allow for softener servicing, swimming pool filling or lawn sprinkling, a manual Bypass Valve has been installed at the factory. The Bypass Valve allows hard water to be manually routed around the softener.

1. Position softener at desired location for installation. (See Installation Diagrams.)
2. Turn OFF main water supply and OPEN nearest faucet to relieve pressure.
3. Cut main line and install appropriate elbows and extensions. Inlet and outlet connections on the yoke are 3/4" NPT pipe size.

Note : An optional 1" NPT yoke is available.

Caution : *White arrows located on the sides of control valve body and bypass valve indicate proper direction of water flow. Install inlet and outlet in directions of arrows.*

4. Rotate inlet and outlet knobs on bypass valve to the bypass position (position of bypass knobs are at right angles to inlet / outlet piping).
5. Turn the main supply line on to restore water service to the home.\
6. OPEN nearest faucet to evacuate air and repressurize plumbing lines.
7. Check for leaks!!!

- Drain Line Connection -

1. Remove drain line hose barb located on back right side of control valve. Wrap threads of hose barb with Teflon tape. Reinstall drain line hose bard **CAUTION : Hand tighten only!!**
2. Install 1/2" I.D. drain line tubing (not included) from hose barb to an open drain. A 4" air gap between the end of the drain line and open drain is required to prevent waste water backflow. Keep the drain line as short as possible. An overhead drain line can be used if necessary but should discharge below the control valve. A siphon trap (taped loop) at the outlet of the drain line is advisable to keep the drain line full and assure correct flow during regeneration. Elbows or other fittings must be kept at a bare minimum.

Note : Where the drain line is elevated above the control valve or exceeds 20' in length, 3/4" I.D. drain line tubing should be used.

- Brine Line and Overflow Connection -

1. Position brine tank on a smooth level surface near the softener resin tank. If necessary, the brine tank can be placed at a higher level than the resin tank, but **never at a lower level.** (See Installation Diagrams.)
2. Install one end of 3/8" O.D. by 1/4" I.D. brine line tubing (included with units) to compression fitting located on right side of control valve.
3. Remove brine tank cover or salt compartment lid.
4. Remove cap from brine well.
5. Insert opposite end of brine line through outer hole in brine tank. On cabinet models, insert tubing through hole in brine well.
6. Connect brine line to compression fitting on safety brine valve located inside brine well.
7. Install 1/2" I.D. drain line tubing (not included) to the overflow fitting on brine tank just below the brine line. Located on side of unit for cabinet models.
8. Run the opposite end of brine tank drain line to a suitable drain.

Note : The brine tank drain line is gravity flow and must discharge below the overflow fitting.

Caution : Do not "TEE" to the main drain line from control valve.

Notice : The brine overflow is provided as a back-up in the event the safety float shut-off should fail, allowing the brine tank to overflow. This drain connection would then carry the excess water to the drain and prevent flooding of the floor. Therefore, no liability will or can be assumed by the manufacturer of the softener should this occur.

- Electrical Connection -

1. Plug the cord from the control valve into a standard 115 volt / 60 Hz receptacle.

Note : DO NOT plug into an outlet controlled by wall switch or pull chain that could inadvertently be turned off.

2. For your protection, this unit is equipped with a 3-prong plug and should be plugged into a grounded receptacle. If the receptacle is designed only to accept 2-prong plugs, obtain a 3-prong adapter and secure the ground wire to the receptacle plate mounting screw.

Warning: DO NOT remove grounding plug! An improperly grounded unit could cause injury from electric shock!

- Pressurizing The System -

1. Remove control valve cover or cabinet lid to access control panel. (See Figure 1.)
2. The control valve **must be started in the SERVICE position!!** The word SERVICE is imprinted in the notch on the manual regeneration knob. (See Figure 1.) IF needed, rotate the manual regeneration knob CLOCKWISE to this position.

Warning : NEVER turn regeneration knob counter clockwise as this will cause damage to the control valve!

3. Slowly rotate inlet knob of the bypass valve to the SERVICE position. Slowly rotate outlet knob to the SERVICE position (position of bypass knobs are parallel to inlet / outlet piping).
4. Open the nearest faucet to evacuate air from plumbing lines.
5. Check for leaks!!

- Control Valve Operation -

Each control valve position can be manually selected by rotating the regeneration knob CLOCKWISE until the desired position appears in the knob notch.

1. Manually index regeneration knob to BACKWASH position and allow water to run to drain for 3 - 4 minutes.
2. Manually index regeneration knob to BRINE REFILL position and allow the brine tank to fill just over the salt grid plate.

3. Manually index regeneration knob to BRINE & RINSE position and allow the control valve to draw water from the brine tank until it stops.
4. Manually index regeneration knob to SERVICE position.

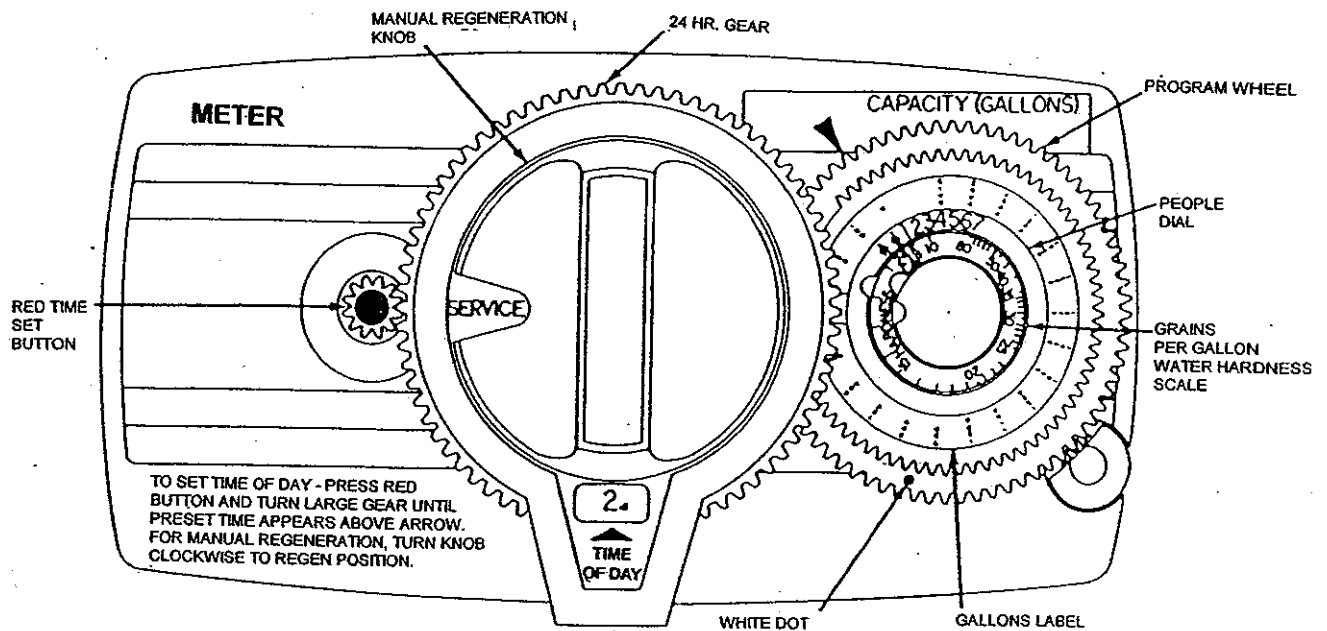


Figure 1

- Setting The Regeneration Schedule -

1. Locate the program wheel just to right of the manual regeneration knob. (See Figure 1.)
2. Rotate program wheel until the white dot located on the outermost gear is aligned with the capacity (gallons) arrow on the control panel. (See Figure 1.)
3. Place your thumb firmly on the white dot to hold the outer gear while setting the program wheel.
4. Lift out the "people" dial and rotate it so that the number of people in the family is aligned with the compensated hardness in grains per gallon. The capacity arrow will not be aligned to the gallons of water that will be used between each regeneration as shown on the gallons label located outside the "people" dial. (See Figure 1.) If preferred, the unit can be set by gallons using this procedure. To calculate gallons, divide the grain capacity of the unit by the compensated hardness level. It is then advisable to subtract one day of water usage to provide a reserve. This setting will assume ample soft water for the family and automatically set a reserve capacity into the system.
5. Push the meter cable firmly into the meter module on the back of the control valve.

Note : Salt settings are pre-set at the factory for the maximum shown on the capacity chart. Salt settings should never be reduced on Demand Regeneration systems as a different volume of reserve capacity will be used before each regeneration. If the water contains iron and / or manganese, multiply the total parts per million (ppm) by four (4) and then add to the grains per gallon (gpg) of hardness. Use this compensated hardness level when programming the regeneration frequency.

Warning: *DO NOT* reduce salt setting below 9 lbs. as the water level in the brine tank will not reach the grid plate.

- Setting The Time Of Day -

1. Depress the red button on left side of valve control panel. (See Figure 1.)
2. Rotate the 24 hour gear on the manual regeneration knob until the time of day appears in the window. (Note a.m. and p.m.)
3. Check that red button has engaged in the 24 hour gear.
4. The starting time for regeneration is factory pre-set to occur at 2:00 a.m.

Note : If a different time is desired, set the time of day ahead or behind the actual time of day. If this is done, it is recommended that the time dial be re-labeled.

Start-Up Procedure

The material used in the construction of the modern water softener will not support the growth of bacteria. However, the conditions existing during shipment, storage and installation are unknown and thus dictates the disinfecting of a softener after installation, before it is used to treat potable water. With this in mind, your newly installed water softener should be disinfected using the recommended procedure described in this section. Ordinary chlorine laundry bleach is an excellent disinfecting agent for this purpose. The proper dosage for your particular softener model is listed below.

Figure 5

Unit Capacity	Cubic-Feet of Resin	Chlorine Dosage
24,000	0.175	.9 ounces
32,000	1.00	1.2 ounces
48,000	1.50	1.8 ounces
64,000	2.00	2.4 ounces

1. Measure proper amount of chlorine bleach as shown above.
2. Pour the chlorine directly into brine well located inside brine tank or cabinet.
3. Replace brine well cap.

- Filling The Brine Tank With Salt -

To expect a high level of performance and reliability, a salt manufactured specifically for water softeners must be used. Salt of this grade is virtually free from dirt and other particulates that would eventually cause the softener to malfunction. A pellet type salt is recommended although any high quality water softener salt (such as solar salt) will suffice. If iron is present in the raw water, use of iron inhibiting salt is recommended. The salt level will decrease after each regeneration cycle. Consequently, the salt compartment will need to be checked and replenished periodically.

1. Fill the brine tank or cabinet with water softener salt as described above. This will be approximately 250 lbs. of salt.

Warning : Do not fill salt above level of the brine well.

2. Replace brine tank or salt compartment lid.
3. Rotate manual regeneration knob CLOCKWISE to the "BRINE REFILL" position.
4. Close control valve cover or replace cabinet lid.

- Final Check -

1. Be certain the bypass valve is in the SERVICE position.
2. Make sure the electric cord is connected to an uninterrupted 115 volt outlet.
3. Check that the time of day is set.
4. Double check regeneration schedule.
5. Make final check for leaks!
6. Fill out and mail warranty card.
7. Leave this manual with the unit.

Operation, Care and Cleaning

- Operation Of Bypass Valve -

When the inlet and outlet knobs on the bypass valve are in the SERVICE position (position of bypass knobs are parallel to inlet/outlet piping), water is directed through the water softener. Water may be bypassed by turning the inlet and outlet knobs to the BYPASS position on the BYPASS valve (position of bypass knobs are at right angles to inlet / outlet piping). Water to the home will bypass the softener and be "untreated".

You should manually bypass the softener if :

1. The outside lines do not bypass the water softener and water is to be used for lawn sprinkling or other similar uses.
2. Servicing the water softener.
3. A water leak from the water softener is evident.
4. *Shock Treating* water well and piping with chlorine or other disinfectant.

- Extra Regeneration -

If soft water demands are unusually heavy, an extra regeneration can be initiated manually :

1. Remove the control valve face cover or remove cabinet lid to access control panel.
2. Rotate manual regeneration knob CLOCKWISE until REGEN appears in knob notch.

Caution : *DO NOT rotate regeneration knob COUNTER CLOCKWISE, as this will cause damage to the control valve! If the REGEN position is passed, continue around to SERVICE position and start again.*

3. Regeneration will begin immediately and the softener will automatically return to the SERVICE position.

Note : Water will not start flowing for several minutes.

4. Replace control valve face cover or replace cabinet lid.

- General Care and Cleaning -

1. Do not place heavy or sharp objects on water softener or cabinet.
2. Use only mild soap and warm water to clean exterior of the unit. Never use harsh, abrasive cleaners.
3. Protect the water softener and drain line from freezing.
4. Reset the time of day on the control valve after any interruption of the electrical power occurs in order to keep the unit on the proper regeneration schedule. Also, reset time for daylight savings time periods.
5. Inspect and clean the brine tank when sediment appears in the bottom of the salt compartment.
6. Always keep the brine tank supplied with good quality salt, a type designed for use in water softeners.

Servicing Instructions

- Changing The Salt -

1. Unplug electrical cord from outlet.
2. Remove the control valve back cover.
3. Locate salt dosage cam.
4. Loosen salt dosage cam set screw.
5. Rotate salt dosage cam until pointer lines up with desired salt setting.
6. Tighten set screw.
7. Replace control valve back cover.
8. Plug electrical cord into outlet.
9. Rest time of day.

Note : For other servicing instructions, refer to the Control Valve Service Manual included with the instruction packet.