

# Installation / Operation Manual

## The ELIMINATR Water Treatment System

(5600 Control Valve)

For Model Numbers :

- TSI24-56
- TSI32-56
- TSI48-56
- TSI64-56

***CSI Inc.***

220 Ohio Street  
Ashland, OH 44805  
(419) 281-5767

<b>General Specifications</b>	<b>TSI24-56</b>	<b>TSI32-56</b>	<b>TSI48-56</b>	<b>TSI64-56</b>
Grains Capacity / Regeneration	26,250	35,000	52,500	70,000
Maximum Raw Water Hardness (grains)	50	75	100	200
Maximum Clear Iron / Manganese (ppm)	8	15	20	20
Salt Used / Regeneration (pounds)	12.0	15.0	24.0	30.0
Garnet Salt Underbed	20 lbs.	30 lbs.	30 lbs.	40 lbs.
Exchange Resin (cu. ft.)	.75	1.0	1.5	2.0
Mineral Tank (Polyglass)	8 x 44	9 x 48	10 x 54	12 x 48
Brine Tank (Polyethylene w/ Grid & Safety)	18 x 33			
Service Flow Rate (gpm)*	8.0	10.0	11.0	12.0
Backwash Flow Rate (gpm)	1.2	1.5	2.0	3.0
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)	108	130	163	204

**\* The pressure drop does not exceed 15.0 psi at Service Flow Rate.**

## PLEASE NOTE THESE SPECIFICATIONS BEFORE PROCEEDING

OPERATING 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

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*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 quantity 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 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 resin 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.

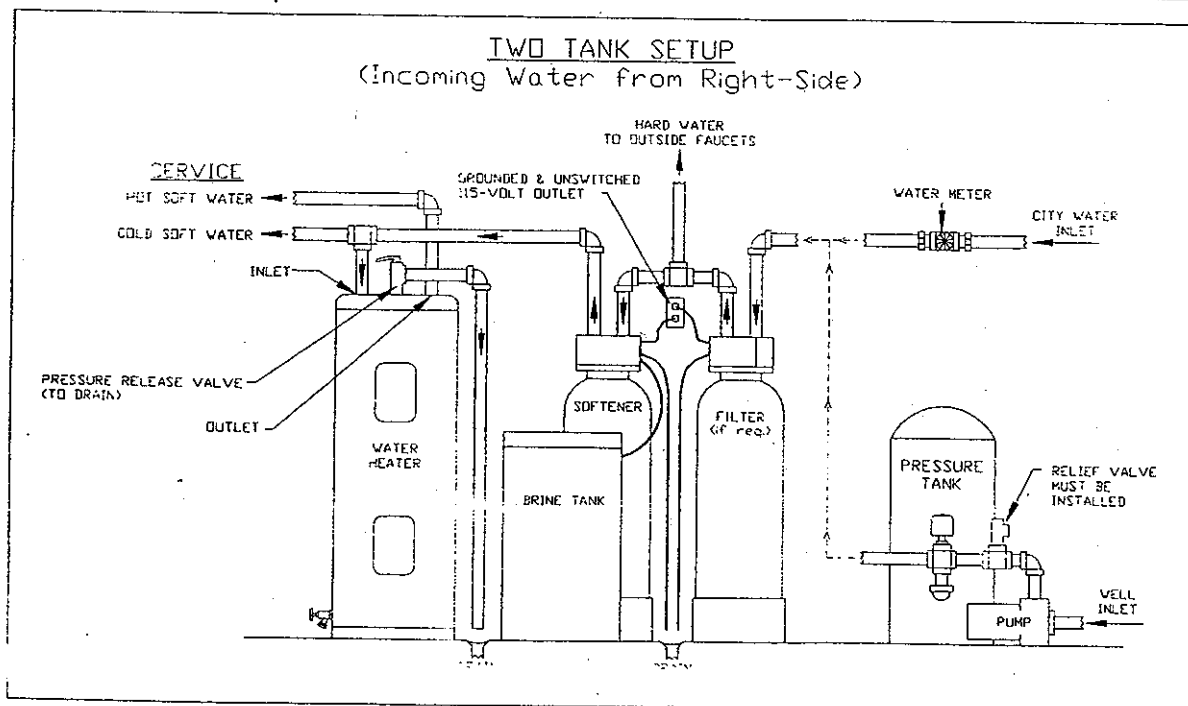
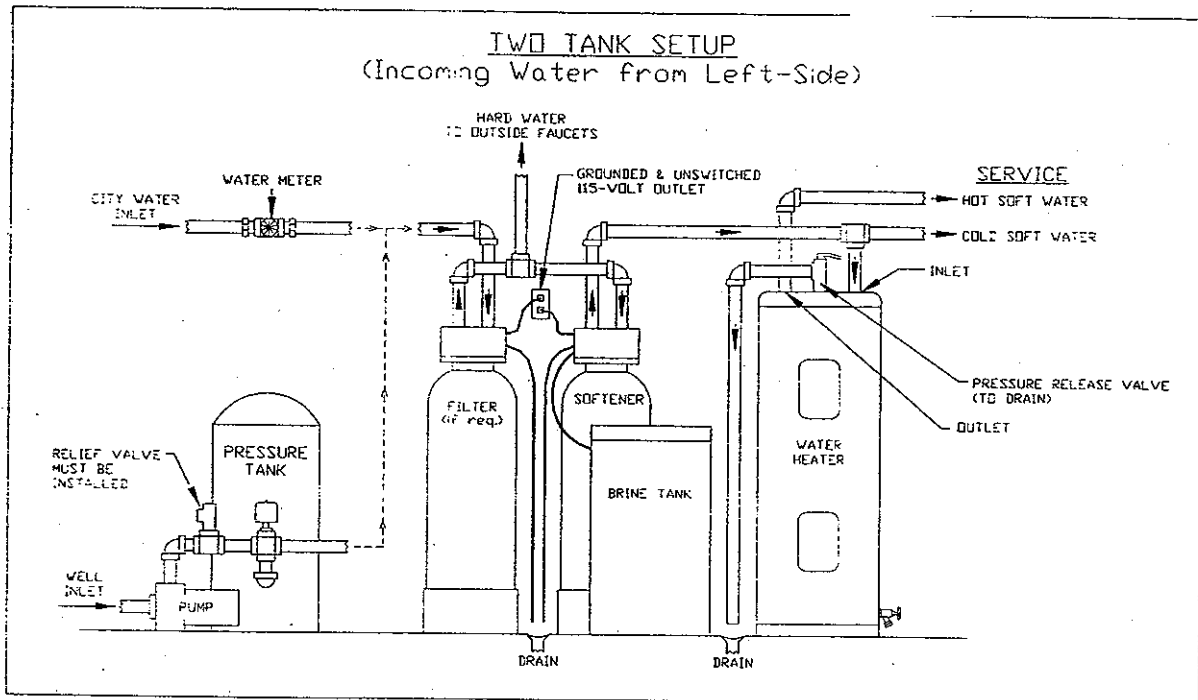
## Installation Requirements

- 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 & 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 mineral. 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.

### Typical Installations



## 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:** 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 and 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.

**NOTE:** All plumbing lines not requiring "soft" water should be connected "upstream" of the softener. (See Typical Installation Diagrams).

## 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 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. Loosen clips on each side of valve body. Lubricate O-ring on adapters and firmly press bypass assembly onto valve body. Align clips and tighten (packaged separately).
4. Cut main line and install appropriate elbows and extensions. Inlet and outlet connections on the control valve are 3/4" FNPT.

**NOTE:** An optional 1" FNPT yoke is available.

**CAUTION:** Raised arrows located on the sides of control valve body and bypass valve indicate proper direction of water flow. Install inlet and outlet piping in direction of arrows.

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

### **- Drain Line Connection -**

1. Pull out clip and remove drain line assembly located on the left side of control valve. Remove drain line hose barb and wrap threads with Teflon tape. Reinstall drain line hose barb. **CAUTION :** Hand tighten only!!! Replace drain line assembly and reinstall clip.
2. Install 1/2" I.D. drain line tubing (not included) from hose barb to an open drain. A 4" gap between the end of the drain line and the 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 syphon 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 unit) 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 located 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.

**NOTE :** 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.

9. Install Res-Up™ Feeder in brine tank per instructions.
10. Fill Res-Up™ Feeder with liquid Res-Up™. Res-Up™ is available in quart and gallon bottles (not included).

### - 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 the 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 in the SERVICE position!** The word **SERVICE** is imprinted in the notch on the manual regeneration knob. (See Figure 1.) If needed, rotate manual regeneration knob **CLOCKWISE** to this position.

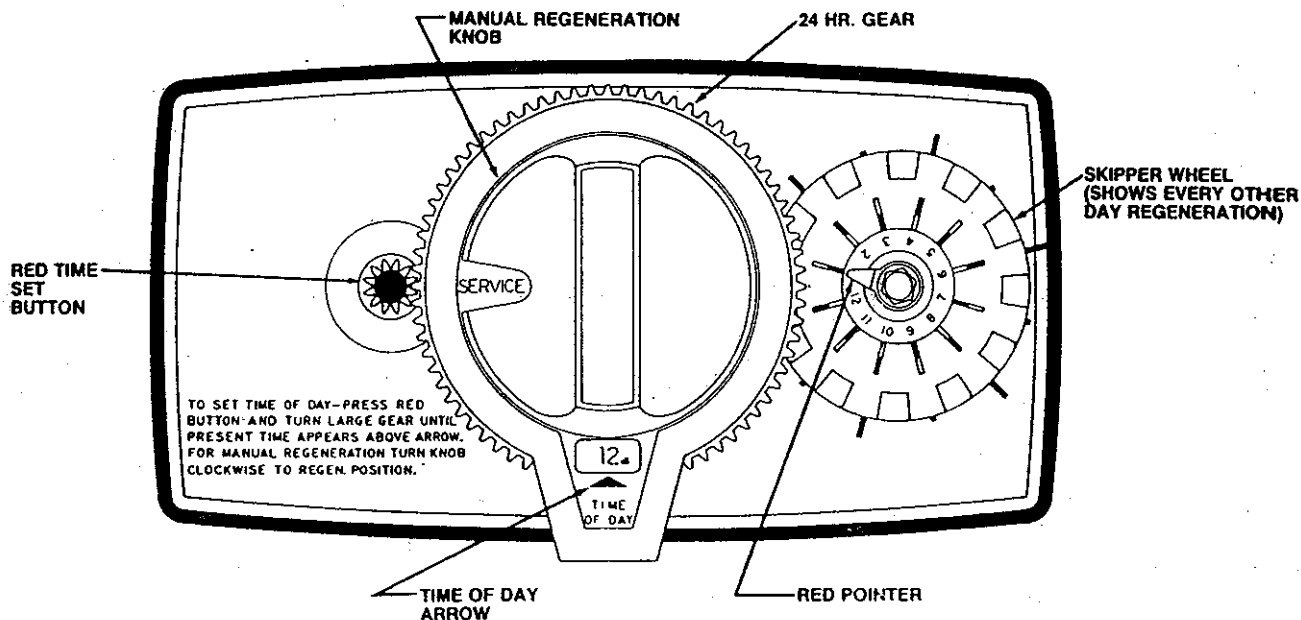
**WARNING:** **NEVER** turn regeneration knob counter clockwise as this will cause damage to control valve!

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 line.
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 to 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 skipper wheel just to the right of the manual regeneration knob. (See Figure 1.)
2. Rotate skipper wheel until the red pointer covers the number "1".

**NOTE:** The red pointer represents "tonight" in the regeneration program. (See Figure 1.)

3. Select the capacity chart that corresponds with the capacity of the softener.
4. Select the salt setting to be used and use this section of the capacity chart.

**NOTE:** Salt settings are pre-set at the factory for the maximum shown on the capacity chart. If an economy salt setting is desired, refer to the service section of the owner's manual.

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

5. Follow along the line indicating the number of persons in the family to the column that corresponds with the hardness range. This will indicate how many tabs on the skipper wheel will need to be slid out. (See Figure 2.)

**NOTE:** 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.

6. Next, find the regeneration schedule chart on page 9. (See Figure 3.) Follow along the line corresponding with the number found in the capacity chart. These are the actual tab numbers on the skipper wheel that need slid out exposing the tab end. (See Figure 2.)

## - How To Use The Capacity Charts -

### EXAMPLE

(Your Water Profile)				(Data For Using The Charts)			
HARDNESS = 12 gpg	=	12 gpg	UNIT SELECTED	=	TSI32-56		
IRON = 3 ppm x "4"	=	12 gpg	NUMBER OF PERSONS	=	3		
MANGANESE = 1 ppm x "4"	=	4 gpg	COMPENSATED HARDNESS	=	28 gpm		
TOTAL COMPENSATED HARDNESS	=	28 gpg					

**Figure 2**

Model	TSI32-56								
	1	2	3	4	5	6	7	8	9
<b># of People</b>									
<b>Salt Setting</b>	15 lbs. / Regeneration								
<b>Hardness Range</b>	Number of Tabs Out								
3 - 10	1	1	1	2	2	2	2	3	3
11 - 20	1	2	2	3	3	4	4	6	6
21 - 30	1	2	3	4	4	6	6	12	12
31 - 40	2	3	4	6	6	12	12	12	12
41 - 50	2	3	4	6	12	12	12	12	12
51 - 60	2	4	6	12	12	12	12	-	-
61 - 75	2	4	6	12	12	12	-	-	-

**NOTE:** The number found in the above sample chart is the number of skipper tabs that will need to be pulled (slid out) on the skipper wheel. Simply align the Number of People with the Compensated Hardness to find the number of tabs to slide out. When you have determined the number of tabs to slide out, consult the regeneration frequency chart below to find the actual "tab number(s)" to slide out on the skipper wheel. Tabs on skipper wheel are numbered 1 - 12.

**Figure 3**

Regeneration Frequency (# of Tabs Out)	Slide Out TAB NUMBER											
	1	2	3	4	5	6	7	8	9	10	11	12
12	●	●	●	●	●	●	●	●	●	●	●	●
6		●		●		●		●		●		●
4			●			●			●			●
3				●				●				●
2						●						●
1												●

**NOTE:** Figure 1 shows the skipper wheel set for this example. (Every 2 days.)

Model	TSI24-56								
# of People	1	2	3	4	5	6	7	8	9
Salt Setting	12 lbs. / Regeneration								
Hardness Range	Number of Tabs Out								
3 - 10	1	1	2	2	2	3	3	3	4
11 - 20	1	2	3	3	4	6	6	6	12
21 - 30	2	3	4	6	6	12	12	12	12
31 - 40	2	3	6	6	12	12	12	12	-
41 - 50	2	4	6	12	12	12	12	-	-

Model	TSI32-56								
# of People	1	2	3	4	5	6	7	8	9
Salt Setting	15 lbs. / Regeneration								
Hardness Range	Number of Tabs Out								
3 - 10	1	1	1	2	2	2	2	3	3
11 - 20	1	2	2	3	3	4	4	6	6
21 - 30	1	2	3	4	4	6	6	12	12
31 - 40	2	3	4	6	6	12	12	12	12
41 - 50	2	3	4	6	12	12	12	12	12
51 - 60	2	4	6	12	12	12	12	-	-
61 - 75	2	4	6	12	12	12	-	-	-

Model	TSI48-56								
# of People	1	2	3	4	5	6	7	8	9
Salt Setting	24 lbs. / Regeneration								
Hardness Range	Number of Tabs Out								
3 - 20	1	1	2	2	2	3	3	3	4
21 - 30	1	2	2	3	3	4	4	6	6
31 - 40	1	2	3	3	4	6	6	6	12
41 - 50	1	2	3	4	6	6	6	12	12
51 - 60	2	3	4	6	6	12	12	12	12
61 - 70	2	3	4	6	6	12	12	12	12
71 - 80	2	3	6	6	12	12	12	12	-
81 - 90	2	4	6	12	12	12	12	-	-
91 - 100	2	4	6	12	12	12	12	-	-

Model	TSI64-56								
# of People	1	2	3	4	5	6	7	8	9
Salt Setting	30 lbs. / Regeneration								
Hardness Range	Number of Tabs Out								
3 - 20	1	1	1	2	2	2	2	3	3
21 - 30	1	1	2	2	2	3	3	4	4
31 - 40	1	2	2	3	3	4	4	6	6
41 - 50	1	2	2	3	4	4	6	6	6
51 - 60	1	2	3	4	4	6	6	12	12
61 - 70	1	2	3	4	6	6	12	12	12
71 - 80	2	3	4	6	6	12	12	12	12
81 - 90	2	3	4	6	6	12	12	12	12
91 - 100	2	3	4	6	12	12	12	12	12

**- Setting The Time Of Day -**

1. Depress the red button on lower left side of timer door. (See Figure 1.)
2. Rotate the 24 hour gear on the manual regeneration knob until the time of day is aligned with time of day arrow. (Note a.m. & 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. on each day for which a skipper tab is extended.

**NOTE:** If a different regeneration 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**

**- Disinfection -**

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 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
26,250	0.75	.9 ounces
35,000	1.00	1.2 ounces
52,500	1.50	1.8 ounces
70,000	2.00	2.4 ounces

1. Measure the proper amount of chlorine bleach as shown above.
2. Pour the chlorine directly into brine well located inside brine tank.
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 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 salt compartment 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 lid.
3. Replace control valve cover.

**- 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

When the inlet / outlet knobs on the bypass valve are in the "SERVICE" position (position of bypass knobs are parallel to the inlet / outlet piping), water is directed through the water softener. Water may be bypassed by turning the inlet / outlet knobs to the bypass position (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 to access control panel.
2. Rotate manual regeneration knob CLOCKWISE one (1) click.

**CAUTION:** Do not rotate regeneration knob COUNTER CLOCKWISE as this will cause damage to the control valve!

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.

### **- To Skip A Regeneration -**

1. For vacations or extended periods of absence, the electric cord can be pulled from the receptacle.
2. Upon return, plug in cord and reset the time of day.

### **- 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 saving 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.

# Res-Up Feeder Installation Instructions

1. Remove top cover, fill the Res-up Feeder® (Plastic Container) to top with water so that filter stone, tube and wick are wetted, allow to soak for 15 minutes or more.
2. Empty water and pull tube and wick through Feeder until stone is upright, but still resting in bottom of stone well. The outlet end tube and wick must be below the bottom level of the Res-up Feeder.
3. Drill two 3/8" holes in brine tank as shown in figure 2. Insert two grommets.
4. Punch (or drill) a 5/8" hole in the brine well cap as shown in figure 3.
5. Clip mounting bracket over feeder with "hooks" pointed up. Insert end of tube in the brine well cap and mounting bracket in the grommets, rotating feeder downward into position as shown in figure 1.
6. Fill feeder with Res-up® Cleaner to "Fill Line" on label.
7. Replace cover on Feeder and automatic feeding will occur within a few hours.
8. On S6305 clear 1 oz. wick there is no filter stone, make sure the knotted wick end is in the bottom of the stone well.

Figure 1.

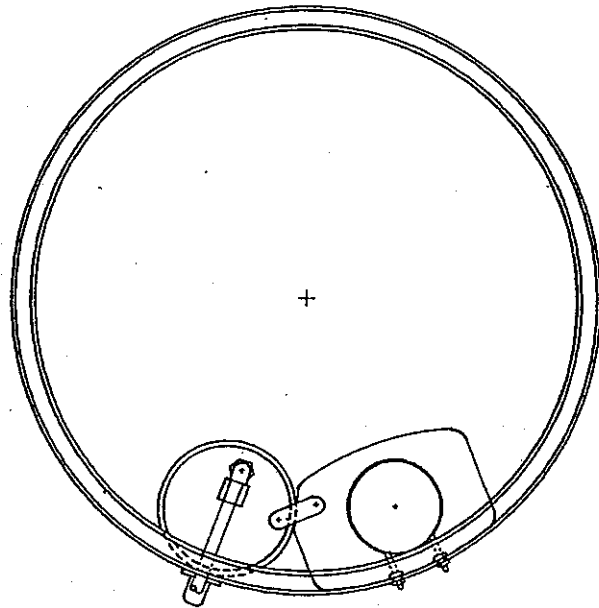


Figure 2.

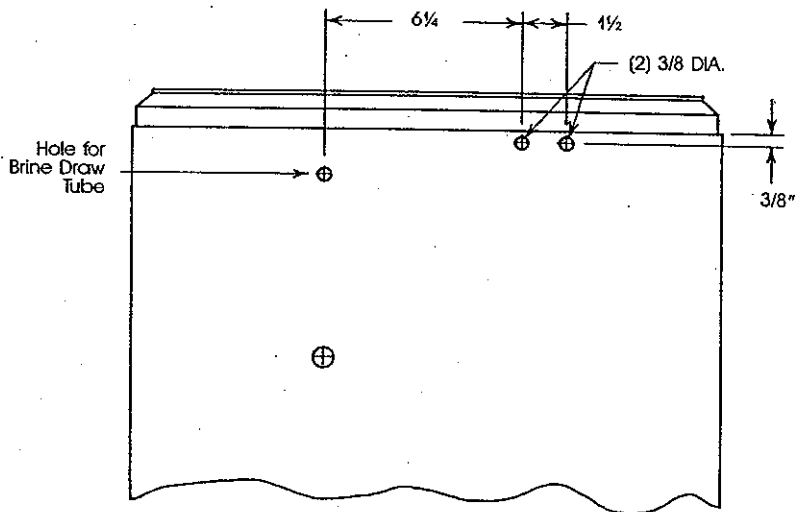
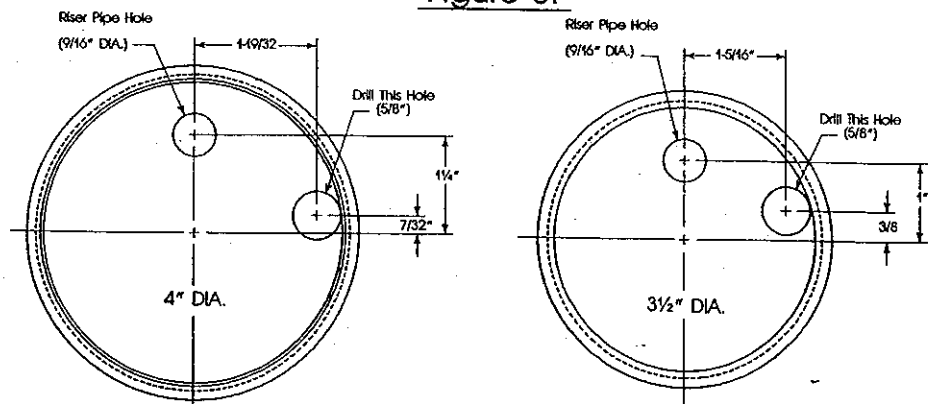


Figure 3.



**CSI Inc.**

220 Ohio Street  
Ashland, OH 44805  
(419) 281-5767  
(419) 289-2535 Fax