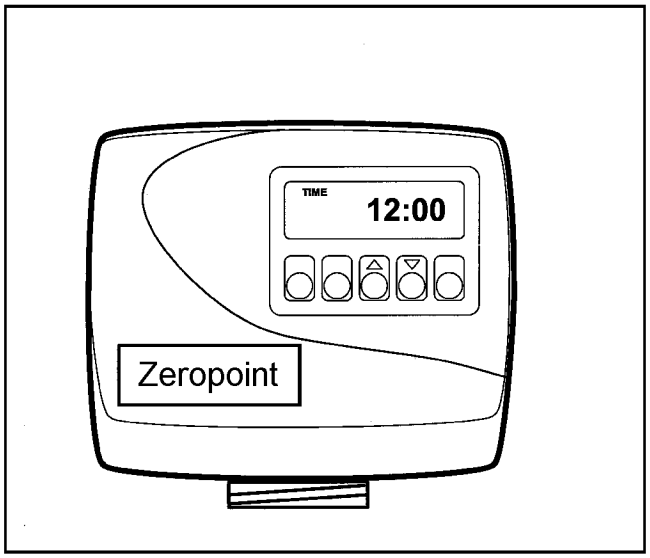
Zeropoint

Maufacturing Co., Inc.



Model ZM-WS 1.0

Installation and Operation Manual

PRE-INSTALLATION CHECK LIST

(All electrical & plumbing should be done in accordance to all local codes)

Water Pressure: A minimum of 25 pounds of water pressure (psi) is required for regeneration. Maximum 120 psi.

Water Quality: On rural water supplies there is often a problem with sand or sediment in the water. (This problem occasionally occurs in public water supplies.) If the water is not filtered before being softened, the sand and sediment will plug up the water softener restricting the flow through the resin bed. This problem often requires rebedding of the mineral tank. ***Note:*** *Well and/or pump problems affecting the operation of the softener are repairs that are not covered under warranty. To prevent these unnecessary, and expensive repairs that are not covered under warranty,* ***Zeropoint*** *recommends installing an in-line filter system ahead of softeners.*

Electrical: A continuous 110 volt 60 cycle current supply is required. *Make certain the current supply is uninterrupted and cannot be turned off with another switch. All electrical connections must be connected per local codes.* ***Surge protection is recommended with all electronic controls.***

Existing Plumbing: Condition of existing plumbing must be free from lime and iron build-up. Piping that is built-up heavily with lime and/or iron must be replaced. If piping is blocked with iron, additional equipment must be installed ahead of the water conditioner to correct the problem.

Drain Line: The conditioner should be located close to a drain. Avoid overhead drain lines if possible to prevent back pressure on the brine injector. Overhead drains are not to exceed 8 feet above the floor and no more than 20 feet in length. The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 10 gpm or length in excess of 20' require 1" drain line. Verify connection to sanitary waste system is through proper air gap.

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

Softening: It is recommended that the conditioner be installed to soften both the hot and cold water supply. A separate hard water faucet may be plumbed for drinking purposes if you desire. Outside faucets should be left on hard water.

Caution: Water temperature is not to exceed 110°F; the conditioner cannot be subject to freezing conditions, or to a vacuum due to loss of pressure (such as a water main break).

BYPASS VALVE OPERATION

NORMAL OPERATION
Softening - Filtering

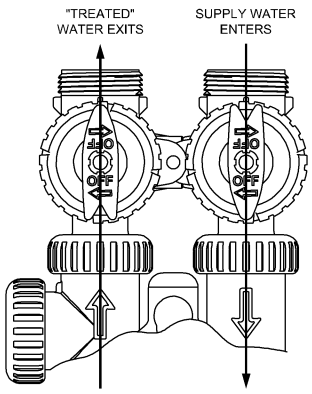


Figure 2

BYPASS OPERATION

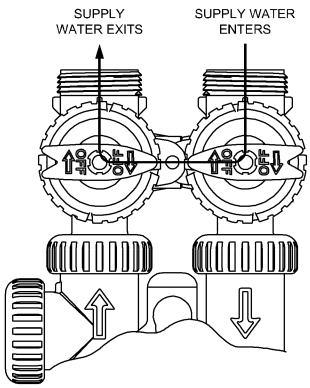


Figure 3

DIAGNOSTIC MODE

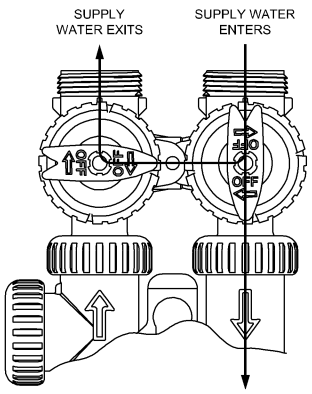


Figure 4

SHUT OFF MODE

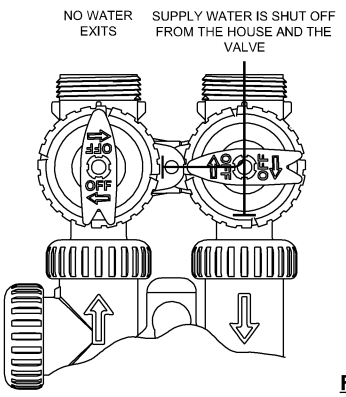


Figure 5

INSTALLATION INSTRUCTIONS

(All electrical & plumbing should be done in accordance to all local codes)

- Do not use vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicon lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**

- Do not use pipe dope or other sealants on threads. Only teflon tape may be used on threads. Teflon tape is not necessary on the nut connection or caps because of radial o-ring seals.

- The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 10 gpm or length in excess of 20' require 1" drain line.

1. Place the conditioner where you want to install it, making sure it is on a clean, level and firm base.
2. Do all necessary plumbing (inlet to inlet, outlet to outlet and drain line to drain). The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.
3. When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.
4. **A jumper ground wire should be installed between the inlet and outlet pipe whenever the metallic continuity of a water distribution piping system is interrupted. Install grounding strap on metal pipes.**
5. The drain connection may be made using either 5/8" polytube (See figure 6a, page 5) or a 3/4" female adaper. If soldering, joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
6. The brine refill flow control assembly is installed in an easy to access refill elbow located on top of the control valve. The refill flow control assembly is attached to the control valve with a locking clip. The locking clip allows the elbow to rotate 270 degrees so the outlet can be orientated towards the salt keeper.
7. Connect the brine line found in the salt keeper to the brine connection on the control valve. The control valve has a standard refill elbow to which a 3/8" flexible tube can be connected, see figure 6a, page 5. (An optional elbow can be ordered which accommodates a 1/2" flexible tube for a high regenerant draw rate situation). Both elbows use the same refill flow control and retainer. Do not connect the other end of the brine line to the safety brine valve in the salt keeper at this time. Make sure the floor is clean beneath the salt tank and that it is level and smooth. No grid is required with standard brine tank as softener is programming as prefill.

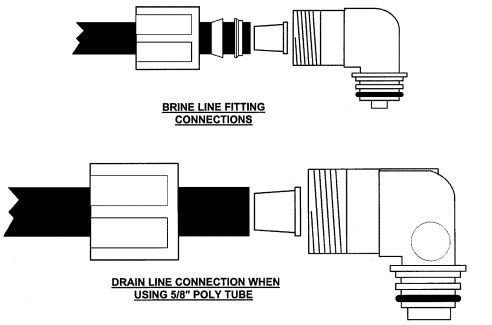


Figure 6a

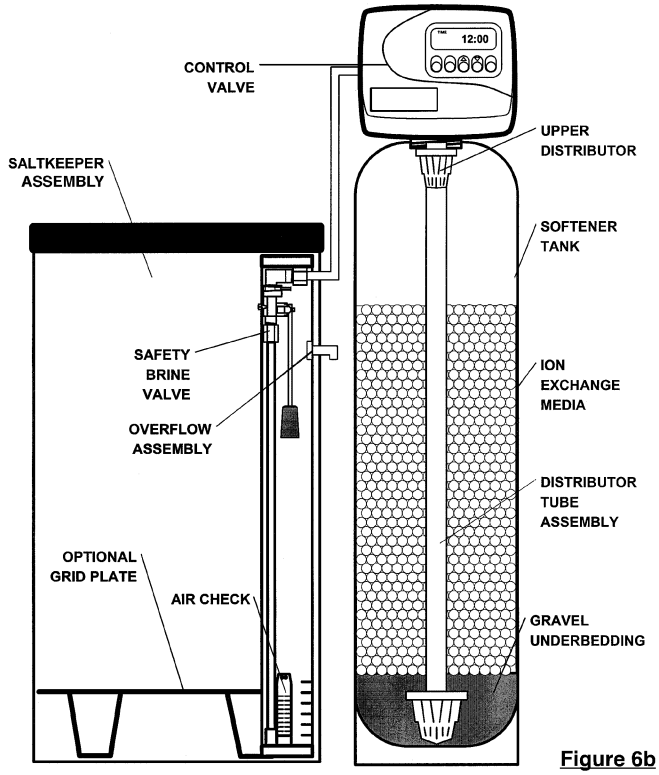


Figure 6b

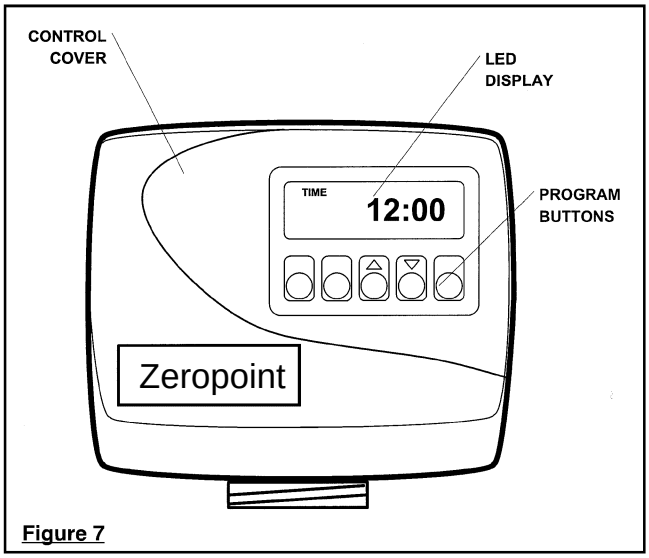


Figure 7

Initial Start Up

The initial start up will probably be done by the technician installing the softener system. If not, the following instructions will step you through the process.

1. Complete all plumbing connections: inlet, outlet, drain line and brine line. Do not add salt at this time.
2. Place the bypass valve in the bypass position. (See figure 3 page 1) Turn on the main water supply. Open a cold soft water faucet to flush the piping of any air and/or foreign material. Run until the water is clear.
3. Manually add 6 inches of water to the salt keeper.
4. Now plug the transformer into a 110-volt receptacle. (Be certain the outlet is uninterrupted.) Within 5 seconds the control will automatically align itself into the softening mode and the display will flash 12:00 (AM). (Figure 7,).
5. Set the time of day (figure 8,).
6. Push REGEN button and hold it down for 3 seconds. The system will advance to the "Fill" position. (Note: If the system is not programmed as "brine refill first", "Backwash" will display first). Keep pushing REGEN button until "Rinse" shows in the lower right hand corner of display. Slowly place the by-pass into the "diagnostic mode" (see figure 4). Run water to the drain until it runs clear. Return the by-pass valve to the by-pass position (figure 3). Push REGEN button one more time, "Time" will appear in upper left hand corner of display.
7. Once again, push REGEN button and hold down for 3 seconds. Keep pushing REGEN button until "Back-wash" appears. Slowly place the by-pass valve into the "Diagnostic Mode" 1/2 way. Allow water to slowly fill the mineral tank. When a solid stream of water starts coming out of the drain line, open the by-pass inlet valve all the way and allow to run out the drain until water clears. Then slowly place the by-pass into the "normal operation" mode by opening the outlet side of by-pass valve, figure 2.
8. Press the regen button one more time. LED display should say "BRINE". Loosen the brine line from the top of the safety brine valve in the brine tank. Place finger over the end of the tube to check for suction. If no suction, see trouble-shooting guide (#11) . If proper suction, reattach brine tube to safety brine valve , and allow it to draw water down to the bottom of the air check, (figure 6b).
9. Press REGEN button once again. LED will once again display "BACKWASH". Keep in backwash until water once again runs clear at the drain.
10. Press REGEN button again. LED will display "RINSE". Allow rinse cycle to run its full circle. While the rinse cycle is finishing, this would be a good time to load your brine tank with salt. The brine tank does not require a grid because softener is programmed to fill brine tank with appropriate volume of water 2 hours prior to regeneration.
11. Once the rinse cycle has finished the softener control will return to the softening cycle. The LED screen will indicate "TIME".
12. Next set your softeners water hardness, days override and regeneration time settings (see figure 9, page 7).

Your programming is now complete.

SET TIME OF DAY

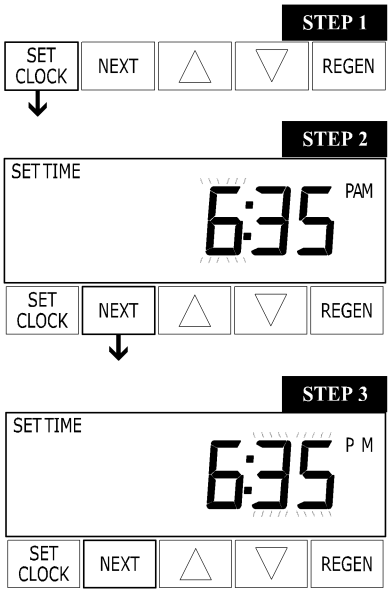


Figure 8

Step 1 - Press SET CLOCK.

Step 2 - Current Time (hour): Set the hour of the day using ▲ or ▼ buttons. AM/PM toggles after 12. Press NEXT to go to step 3.

Step 3 - Current Time (minutes): Set the minutes of day using ▲ or ▼ buttons. Press NEXT to exit Set Clock. Press REGEN to return to previous step.

Power Loss - If the power goes out for less than two hours, the system will automatically reset itself. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The system will remember the rest of the program settings. Do not forget to reset for daylight savings time.

INSTALLER DISPLAYS/SETTINGS

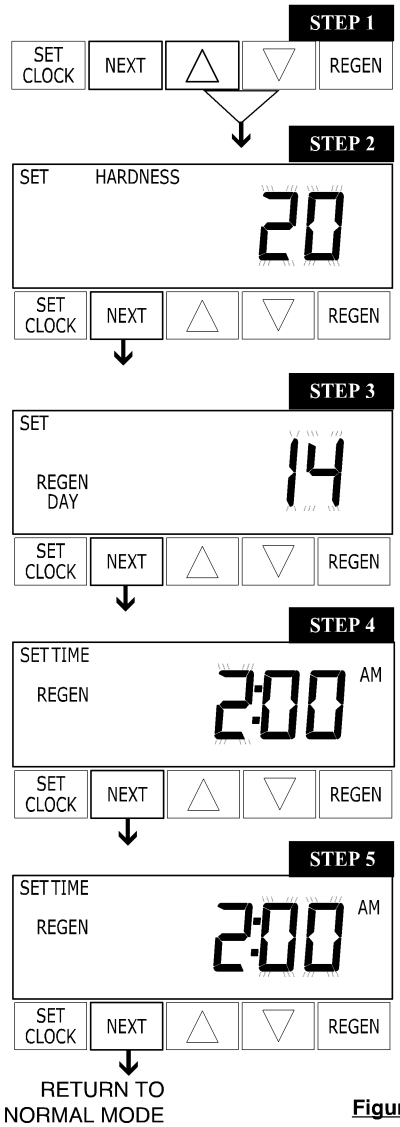


Figure 9

Step 1 - Press NEXT and ▲ simultaneously for 3 seconds.

Step 2 - ***Hardness:*** Set the amount of total compensated hardness in grains (hardness as calcium carbonate) per gallon using ▲ or ▼ buttons. The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon should be increased if soluble iron needs to be reduced. Add 3 grains of hardness for each ppm of iron present. If this display shows nA -, then system is either set-up in "time clock" or "filter" modes. (See table 6). Press NEXT to go to Step 3. Press REGEN to exit Installer Displays/Settings.

Step 3 - *Day Override:* This sets the number of days between regenerations. If value set to "oFF" regeneration initiation is based solely on gallons used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for a regeneration. Set Day Override using ▲ or ▼ buttons:
- number of days between regeneration (1 to 28); or
- "oFF"

NOTE: If softener is set up as a time clock system (ie: not meter initiated) this value will be the days between regenerations.

See table 6 for more detail on softener setup. Press NEXT to go to step 4. Press REGEN to return to previous step.

Step 4 - Next Regeneration Time (hour): Set the hour of day for regeneration using ▲ or ▼ buttons. AM/PM toggles after 12. The default time is 2:00 a.m. This display will show "REGEN" on 0 GAL if system is set for immediate regeneration. (See table 6) Press NEXT to go to step 5. Press REGEN to return to previous step.

Step 5 - Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▲ or ▼ buttons. This display will not be shown if system is set for immediate regeneration. Press NEXT to exit Installer Displays/Settings. Press REGEN to return to previous step.

USER DISPLAYS/SETTINGS

General Operation

When the system is operating one of two displays will be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day. The second display is gallons remaining. This is the number of gallons that will be treated before the system goes through a regeneration cycle. The user can scroll between the displays as desired.

If softener is a time clock system, the number of days remaining until the next regeneration will be displayed instead of gallons remaining.

If the system has called for a regeneration that will occur at the preset time of regeneration, the words "REGEN TODAY" will appear on the display.

When water is being treated (i.e. water is flowing through the system) the word "SOFTENING" flashes on the display.

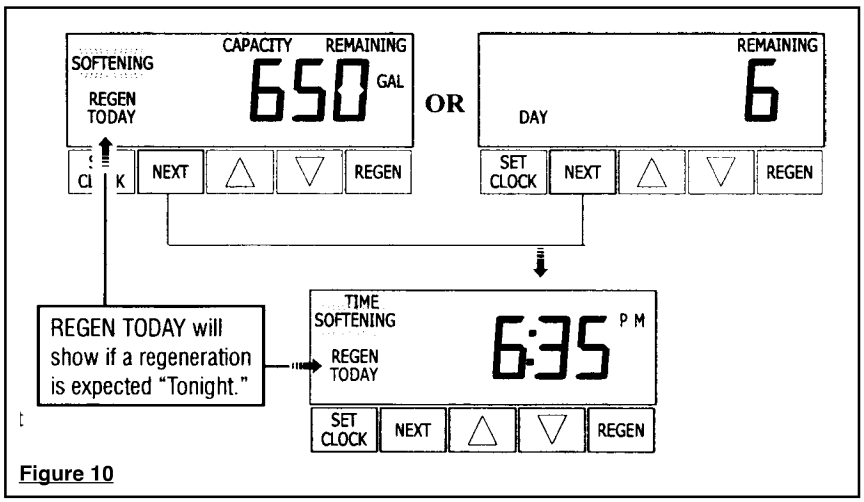


Figure 10

Regeneration Mode

Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when the household is asleep. If there is a demand for water when the system is regenerating, untreated water will be supplied.

When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

Regeneration Step #2
(shows time remaining in regen step is 8:22)

Figure 11

Manual Regeneration

Sometimes there is a need to regenerate the system, sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual regeneration at the preset delayed regeneration time, press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request.

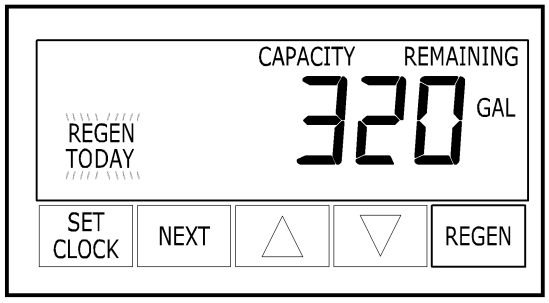


Figure 12

To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled. You must cycle all the way through the cycles to make it stop. PLEASE NOTE: This will reset the meter.

Note: If the salt keeper does not contain salt, fill with salt and wait at least two hours before regenerating.

WATER SOFTENER DISINFECTION

The materials of construction of your water softener will not support bacterial growth nor will these materials contaminate a water supply. However, the normal conditions existing during shipping, storage, and installation indicate the advisability of disinfecting a softener after installation, before the softener is used to treat potable water. In addition, during normal use a softener may become fouled with organic matter or in some cases, with bacteria from the water supply.

Therefore, every water softener should be disinfected after installation, some will require periodic disinfection during their normal life. Disinfect as follows:

SODIUM HYPOCHLORITE (household bleach)

5.25% SODIUM HYPOCHLORITE solutions are available under such trade names such as Clorox, Linco, Bo Peep, White Sail and Eagle Brand Bleach. If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

1. Dosage:
   a. Softening resin; 1.2 fluid ounce per cubic foot of mineral (see page 9).
2. Add the required amount of hypochlorite solution to the brine well of the brine tank.
   a. Proceed with the normal regeneration. Press regen and allow the water softener to go through a normal regeneration.

WATER SOFTENER DRAINING PROCEDURE

In cold weather climates it is common for plumbing systems that are not in use to be "winterized" or drained of all water to prevent any damage that may be caused by the excessive expansion of water when it freezes. To prevent damage to a water softener it must be **properly** drained also. A simple way to properly drain or winterize a water softener is to use compressed air to force all of the water out of the softener mineral tank. The following procedure will explain the process:

1) Initiate the softener into a manual regeneration cycle. After the refill cycle, advance control to backwash and allow it to complete the backwash cycle (this will clean the media) and start into the brine-draw cycle. Allow the regeneration to continue in the brine draw cycle until the brine is drawn out of the salt keeper and the air check at the bottom of the brine pick-up tube shuts off. At this time no more brine is introduced into the softener and the slow rinse process begins.
2) Turn the water supply inlet and outlet valves off to the water softener as soon as the air check shuts off and no more brine is being drawn into the softener (at the beginning of the slow rinse process).
3) Unplug the electric power leaving the softener control valve in the brine draw cycle.
4) Disconnect the brine tube at the top of the salt keeper and force air into the brine tube toward the softener mineral tank and control valve. The air will force the brine/water solution that was drawn into the mineral tank out to drain through the control valve drain line. (An air compressor blow gun attachment with a portable air compressor works well.)

   CAUTION: You do not want to apply any more pressure than necessary to force the brine/water out of the mineral tank.

   The small amount of brine/water that may be left in the mineral tank will not expand enough to cause any damage to the softener when it freezes.

   If your softener is equipped with an optional bottom drain on the mineral tank, you will have to follow all of the same procedures with the exception of the need for compressed air. With the brine tube disconnected from the salt keeper, raise it to a level above the softener control valve and temporarily secure it in this position. Now open the drain valve at the bottom of the mineral tank and allow all brine/water to drain from the mineral tank.

   CAUTION: If a hose is connected to the drain valve to direct the brine/water to a floor drain be sure it runs downward and is unobstructed. When brine/water quits running at the drain, be sure to leave the drain valve open until you start the system up again.
5) At this time the salt keeper has very little water left in it. What liquid is left in the salt keeper is saturated brine, provided that there is still salt left in the tank. Saturated brine will not freeze solid and cause any damage and does not have to be drained any further from the brine tank.

   If there is no salt left in the salt keeper when the system is drained we recommend dumping all of the water out of the brine tank at this time. See brine tank cleaning instructions. (#3 in miscellaneous section, below)
6) **CAUTION:** It is important at this time to be assured that the inlet/outlet water supply piping is properly drained. Depending on how the water supply piping was routed to the water softener control valve, a water loop or trap may have been created.

   Sometimes drain valve(s) are installed at the bottom of the loop to assure all water can be drained out. If not it may be necessary to disconnect the control valve from the piping system and open the inlet/outlet valve(s) to allow all the water to drain from the piping. This should be done when the rest of the plumbing system is drained.
7) Draining or winterizing of your softener is complete. Refer to the start-up procedures on page 6 when you are ready to start your softener.

MISCELLANEOUS

1. Salt Usage: See your water conditioning professional for a recommendation on the best type of salt for your application.
2. Salt Keeper Cleaning:
   a. Remove brine tank cover.
   b. Scoop out as much old salt as possible.
   c. Disconnect brine tubing from safety brine valve at brine well.
   d. Remove safety brine valve from brine well.
   e. Place one hand in brine well to hold overflow nut and remove 2 piece overflow.
   f. Remove optional brine well and grid plate, if used, from brine tank.
   g. Remove any remaining salt and/or impurities from brine tank.
   h. Using clean water and a brush or rag, wipe and rinse inside of brine tank. Also wipe and rinse the grid plate and brine well.
   i. Reassemble brine tank reversing steps c - f. Note: If grid plate is used and it is damaged or cracked, replace with new one.
   j. Put brine tank in place making sure there is no debris or foreign material beneath it.
   k. Reconnect brine tubing to safety brine valve.
   l. Manually add 6 inches of water to the brine tank (or to approximately 1" above the grid plate, if used).
   m. Add new salt. Important: Do not add the old salt which was removed earlier unless it is clean and not mushy. We recommend using new salt.
   n. Follow the disinfection instructions found on page 8.
   o. Put on brine tank cover.

TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
1.ERROR followed by code number		
Error Code 1001 - Unable to recognize start of regeneration	A. Control valve has just been serviced	A. Press NEXT and REGEN for 3 seconds or unplug power source jack from PC Board (black wire) and plug back in to reset control valve
Error Code 1002 - Unexpected stall	B. Foreign matter is lodged in control valve	B. Check piston and spacer stack assembly for foreign matter
Error Code 1003 - Motor ran to long, timed out trying to reach next cycle position	C. High drive forces on piston	C. Loosen drive cap assembly 1/4 turn or replace piston and spacer stack assembly
Error Code 1004 - Motor ran to long, timed out trying to reach home position	D1. Control valve piston not in home position	D1. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	D2. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	D2. Check motor and wiring. Replace motor if necessary
	D3. Drive gear label dirty or damaged, missing or broken gear	D3. Replace or clean drive gear
If other Error Codes display contact the factory	D4. Drive bracket incorrectly aligned to back plate	D4. Reset drive bracket
	D5. PC board is damaged or defective	D5. Replace PC board
	D6. PC board incorrectly aligned to drive bracket	D6. Ensure PC board is correctly snapped on to drive bracket
Error Code 4003	E. Miscommunication through board or Low voltage through board	E. Unplug, re-plug in, if this does not resolve problem replace PC board
2. Control valve stalled in regeneration	A. Motor not operating	A. Replace Motor
	B. No electric power at outlet	B. Repair outlet our use working outlet
	C. Defective transformer	C. Replace transformer
	D. Defective PC board	D. Replace PC board
	E. Broken drive gear or drive cap assembly	E. Replace drive gear or drive cap assembly
	F. Broken piston retainer	F. Replace drive cap assembly
	G. Broken main or regenerant piston	G. Replace main or regenerant piston
3. Control valve does not regenerate automaticallly when REGEN button is depressed and held	A. Transformer unplugged	A. Connect transformer
	B. No electric power at outlet	B. Repair outlet or use working outlet
	C. Broken drive gear or drive cap assembly	C. Replace drive gear or drive cap assembly
	D. Defective PC board	D. Replace PC board
4. Control valve does not regenerate automatically but does when REGEN button is depressed	A. By-pass valve in bypass position	A. Put control valve in service position
	B. Meter connection disconnected	B. Connect meter to PC board
	C. Restricted/stalled meter turbine	C. Remove meter and check for rotation or foreign matter
	D. Defective meter	D. Replace meter
	E. Defective PC board	E. Replace PC board
	F. Set-up error	F. Check control valve set-up procedure
5. Time of day flashes on and off	A. Power has been out more than two hours, the transformer was unplugged and then plugged back into the wall outlet, the transformer plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons were pressed to reset the valve	A. Reset the time of day
6. Softener delivers hard water.	A. Bypass valve is open or faulty.	A. Close bypass valve or replace.
	B. No salt or low salt level in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Softener fails to draw brine.	C. See problem #11.
	D. Excessive water usage.	D. Check gallon capacity settings.
	E. Insufficient brine level in brine tank.	E. Check brine refill setting and refill flow restrictor for blockage.
	F. Resin level inadequate.	F. See problem #8.
	G. Meter faulty.	G. Test meter and clean or replace meter.
	H. Raw water hardness fluctuation.	H. Test raw water hardness and adjust settings to highest known hardness.
7. Unit uses too much salt.	A. Improper brine refill setting.	A. Check brine refill setting for proper salt dosage
	B. Improper settings.	B. Check water hardness and reevaluate capacity setting specification
	C. Excessive water in brine tank.	C. See problem #10.
	D. Leaking faucets, toilets, etc...	D. Repair or replace those items.

TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
8. Loss of resin.	A. Backwash controller missing.	A. Install backwash controller.
	B. Faulty distributor tube assembly.	B. Check distributor tube assembly for cracks or holes.
	C. Air in water supply system.	C. 1. Check for leaks in brine lines, fittings, or air check. Repair or replace. 2. Install upper distributor. 3. Ensure that water supply system has an air eliminator.
9. Softener delivers salt water.	A. Low water pressure.	A. Check incoming water pressure - Must remain at minimum of 25 psi.
	B. Excessive water in brine tank.	B. See problem #10.
	C. Wrong size injector.	C. Install correct injector.
10. Excessive water in brine tank.	A. Plugged injector.	A. Remove injector and clean ports.
	B. Faulty piston assembly.	B. Replace piston assembly.
	C. Plugged or kinked drain line.	C. Inspect drain line for kinks or plugging.
	D. Backwash flow controller closed off.	D. Check backwash flow controller.
	E. Defective brine line flow control.	E. Replace brine refill flow control.
11. Softener fails to draw brine.	A. Injector is plugged.	A. Remove injector and clean ports.
	B. Faulty piston assembly.	B. Check piston assembly.
	C. Brine line connection leak.	C. Inspect brine line during refill cycle for leaks.
	D. Drain line plugged creating excess back pressure.	D. Inspect drain line for blockage.
	E. Drain line too long or too high	E. Refer to drain line specifications.
	F. Low inlet pressure.	F. Increase inlet pressure to a minimum of 25 psi.
12. Continuous flow to drain.	A. Piston assembly failure.	A. Replace piston assembly.
	B. Motor failure.	B. Replace motor.
	G. Circuit board failure.	G. Replace circuit board.
13. Loss of water pressure.	A. Iron build-up in resin.	A. See problem #14.
	B. Resin bed fouled with sand or sediment.	B. Rebed softener and install sediment filter ahead of softener.
	C. Resin bed mushing due to high amount of oxidizers in water supply (chlorine).	C. Rebed softener. Install dechlorinaton system
14. Iron in softened water.	A. Iron has fouled resin bed.	A. Use iron reducing resin cleaner to cleanse resin bed, and increase salt dosage or regenerate more frequently. Install an Iron Curtain System ahead of the softener.
	B. Iron is not in a soluble state.	B. Test water to determine type of iron, install iron reduction system.
	C. Prefilter failure.	C. Check prefilter.
	D. Iron level excessive.	D. Install iron reduction system.
	E. Control fails to regenerate.	E. See problem #4.
15. Control does not display time of day	A. Transformer unplugged	A. Connect power
	B. No electric power at outlet	B. Repair outlet or use working outlet
	C. Defective transformer	C. Replace transformer
	D. Defective PC board	D. Replace PC board
16. Control does not display correct time of day	A. Switched outlet	A. Use uniterrupted outlet
	B. Power outage	B. Reset time of day
	C. Defective PC board	C. Replace PC board
17. No “softening” or “filtering” display when water is flowing	A. Bypass valve in bypass position	A. Put bypass valve in service position
	B. Meter connection disconnected	B. Connect meter to PC board
	C. Restricted/stalled meter turbine	C. Remove meter and check for rotation, clean foreign material
	D. Defective meter	D. Replace meter
	E. Defective PC board	E. Replace PC board
18. Control valve regenerates at wrong time of day	A. Power outages	A. Reset control valve to correct time of day
	B. Time of day not set correctly	B. Reset to correct time of day
	C. Time of regeneration incorrect	C. Reset regeneration time
	D. Control valve set at “on 0” (immediate regeneration)	D. Check control valve set-up procedure regeneration time option (see table 6, page 19)
	E. Control valve set at NORMAL + on 0	E. Check control valve set-up procedure regeneration time option (see table 6, page 19)

ZEROPOINT ZM-WS SERIES SYSTEM SPECIFICATIONS
ELECTRONIC DEMAND

MODEL	ZM190WS	ZM225WS	ZM280WS	ZM350WS	ZM420WS	ZM490WS	ZM560WS
FACTORY PRESET MINUTES							
Backwah-1; Min	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Brine; Min.	**60**	**60**	**60**	**60**	**60**	**60**	**60**
Backwash-2; Min	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Fast Rinse; Min	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Refill-Lbs of Salt							
'-Low Salting	4.5	6.0	7.5	9.0	12.0	18.0	24.0
'-Medium Salting*	**7.5**	**10.0**	**12.5**	**15.0**	**20.0**	**30.0**	**40.0**
'-High Salting	11.3	15.0	18.8	22.5	30.0	45.0	60.0
Capacity Grains							
'-Low Salting	17,200	22,930	28,660	34,400	45,870	68,810	91,750
'-Medium Salting*	**21,040**	**28,060**	**35,070**	**42,090**	**56,120**	**84,180**	**112,240**
'-High Salting	24,230	32,310	40,380	48,460	64,620	96,930	129,240
Water Usage (U.S. Gallons)**	**41**	**50.8**	**64.4**	**64.4**	**120**	**123.6**	**166**
Service Flow Rate;							
Flow Rate @ 10 psi	9.8	10.1	11.3	10.5	14.2	14.4	15.1
Flow Rate @ 15 psi	13.1	13.0	14.5	14.1	18.2	19.2	20.1
Mineral; Cu Ft.	0.75	1	1.25	1.5	2	3	4
Underbedding; lbs.	8	11	14	14	40	40	45
Mineral Tank Dimen.	8x44	9x48	10x47	10x54	13x54	14x65	16x65
Salt Keeper Dimen.	18x40	18x40	18x40	18x40	18x40	24x41	24x41
Drain Line Flow Con	1.3	1.7	2.2	2.2	4.2	4.2	5.3
Brine Line Flow Con	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Injector; color	C-Violet	D-Red	E-White	E-White	G-Yellow	H-Green	I-Orange

***Factory Settings are in bold**

** Water usage at 40 psi inlet water pressure. Higher pressures will cause slight increases. Brine make-up water not included, as this will change with salt level.

Factory settings are programmed for clean, iron free water such as city water supplies for efficient salt use. On water supplies with iron levels greater than 0.5 ppm, higher salting levels may be required.

For high salting applications, larger brine tanks may be needed. Consult factory for recommendation.

TABLE 4 - BACKWASH NORMAL LENGTH SOFTENER

		Down Flow Softener* Factory Settings			Up Flow Softener		
Grains Capacity/Lb NaCl		6000 to 3501	**3500 to 2501**	2500 to 1700	6000 to 3501	3500 to 2501	2500 to 1700
Cycle Time in minutes	Backwash Normal	6	**8***	8	---	---	---
	Regenerate	45	**60***	75	45	60	75
	Backwash Normal	3	**8***	10	6	10	12
	Rinse	3	**4***	6	3	4	6
	Total	57	**80***	99	54	74	93

TABLE 5 - BACKWASH LONGER LENGTH SOFTENER

		Down Flow Softener			Up Flow Softener		
Grains Capacity/Lb NaCl		6000 to 3501	3500 to 2501	2500 to 1700	6000 to 3501	3500 to 2501	2500 to 1700
Cycle Time in minutes	Backwash Normal	8	10	12	---	---	---
	Regenerate	45	60	75	45	60	75
	Backwash Normal	8	10	12	6	12	14
	Rinse	4	6	8	3	4	6
	Total	65	86	107	54	76	95

TABLE 6 - PROGRAMMING OPTIONS

Reserve Gallons	Regeneration Type	Days Override	
AUTO	NORMAL	oFF	Reserve capacity automatically estimated. Regeneration occurs when gallons capacity falls below the reserve capacity at the next Regen Set Time.
AUTO	NORMAL	1 to 24	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity falls below the reserve capacity or the specified number of days between regenerations is reached.
20 to 50,000	NORMAL	oFF	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity reaches 0.
oFF**	NORMAL**	1 to 24**	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached.
20 to 50,000	NORMAL	1 to 24	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity reaches 0 or the specified number of days between regenerations is reached.
AUTO	On 0	oFF	Reserve capacity not automatically estimated. Regeneration occurs immediately when gallons capacity reaches 0. Time of regeneration will not be allowed to be set because of regeneration will always occur when gallons capacity reaches 0.
20 to 50,000	On 0	oFF	Reserve capacity not automatically estimated. Regeneration occurs immediately when gallons capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur on 0.
AUTO	NORMAL on 0	oFF	Reserve capacity automatically estimated. Regeneration occurs when gallons capacity falls below the reserve capacity at the next Regen Set Time or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.
AUTO*	**NORMAL on 0***	1 to 24 ***14**	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when gallons capacity falls below the reserve capacity or the specified number of days between regenerations is reached or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.
20 to 50,000	NORMAL	1 to 24	Reserve capacity not automatically estimated. Regeneration occurs at the next Regen Set Time when specified number of days between regenerations is reached or regeneration occurs immediately after 10 minutes of no water usage when gallon capacity reaches 0.

*** Factory settings in bold**

**** These settings are used for time clock systems**