



Premier Model MSD39A

How to install, operate
and maintain your Demand
Controlled Water Softener

Do not return water softener to store

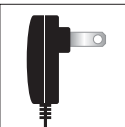
If you have any questions or concerns when
installing, operating or maintaining your
water softener, visit www.systemsaver.com
or call our toll free number:

1-888-64 WATER

1-888-649-2837



System tested and certified by NSF International
against NSF/ANSI Standard 44
for water softener performance.



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Installation and Operation Manual

For best results use Morton® System Saver® II Pellets in your water softener.

For best results use Morton® System Saver® II Pellets to soften your water



Morton® System Saver® II Pellets make a big difference in your water.

Morton® System Saver® II Pellets are specially formulated to consistently outperform other water softening salts in all water softeners. System Saver® II Pellets enable your water softener to remove almost twice as much dirt and impurities and up to 5% more minerals from your water than plain salt pellets. And that can mean a big difference in the quality of your water.

Morton® System Saver® II Pellets make a difference in your water softener, too.

Hard water contains traces of dirt, iron and other minerals that can build up in the resin and valves of your water softener. That can lead to expensive repairs. But Morton® System Saver® II Pellets are specially formulated to clean out those traces of dirt and minerals and to help keep your softener clean and problem-free longer than all other salt pellets. System Saver® II Pellets are formulated with salt that is guaranteed 99.5% pure and contains virtually no insolubles that need to be cleaned from your brine tank.

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Unpacking and Inspection

The parts required to assemble and install the water softener are included with the unit.

Thoroughly check the water softener for possible shipping damage and parts loss. Also inspect and note any damage to the shipping carton.

Remove and discard (or recycle) all packing materials. To avoid loss of small parts, we suggest you keep the small parts in the parts bag until you are ready to use them.

Packing List

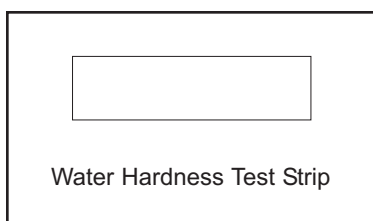
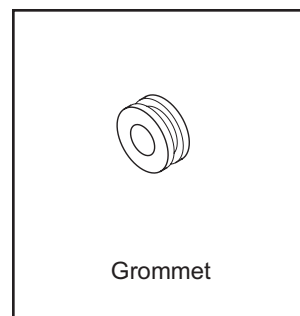
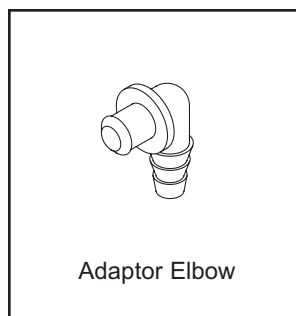
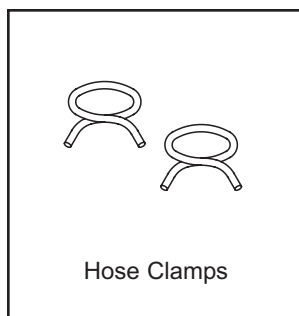
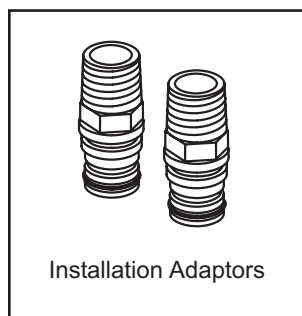
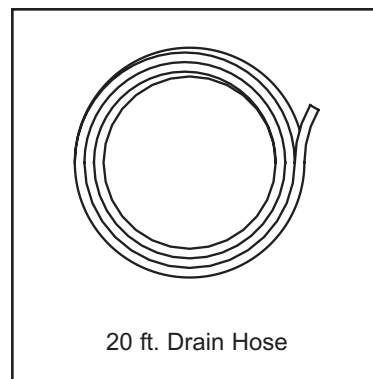
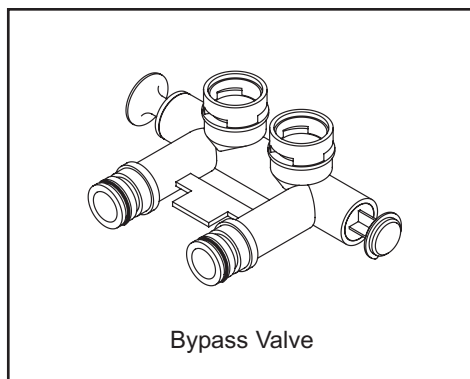
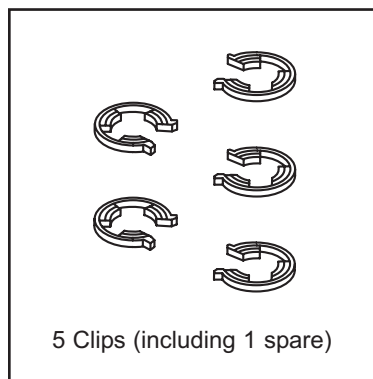


FIG. 1

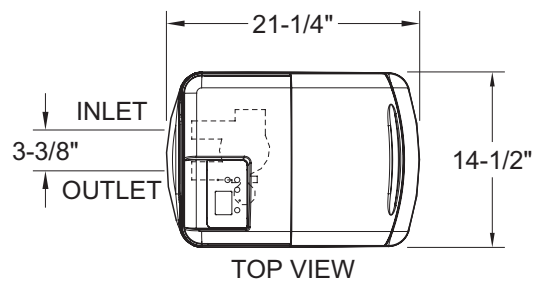
Do not return the water softener to store.

If you have any questions, or there are missing parts or damage, please call Toll Free 1-888-64 WATER or 1-888-649-2837.

Before you call please have your model number, date of purchase, water conditions and number of people living in your home.

For more installation or service information, visit www.systemsaver.com.

Water Softener Dimensions



MODEL	Nominal Resin Tank Size
MSD39A	10" Dia. x 35"

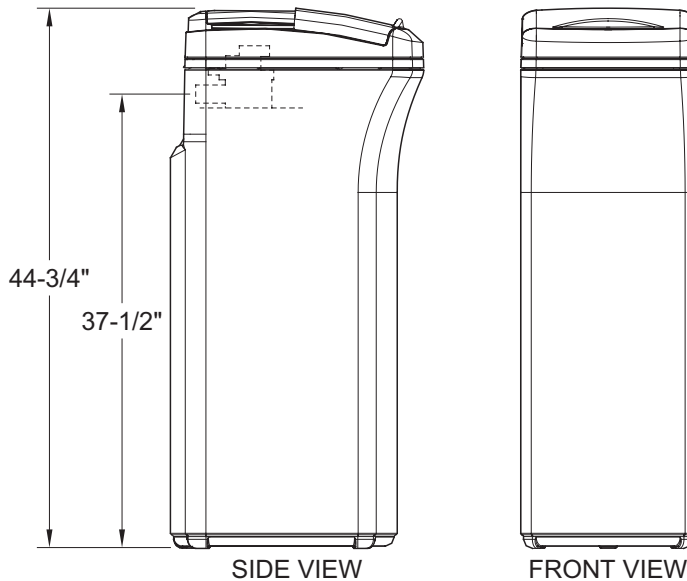


FIG. 2

For future reference, enter the following information.

Model No. _____ Code _____

Serial No. _____ Installation Date _____

*Water Hardness _____ gpg **Iron Content _____ ppm

Model No. and Serial No. are on the shipping carton and on the registration decal (located under the salt hole cover of the water softener). Code is on the registration decal.

* A hardness test strip is provided with your water softener.

** Kits are available at retail hardware stores for testing water hardness and iron content. Some retail stores will also test your water for a fee.

Specifications

	Model MSD39A
Model Code	Sr31
Rated Service Flow Rate	7.5 gpm
Amount of High Capacity Ion Exchange Resin	1.03 cu. ft.
Pressure Drop at Rated Service Flow	11 psig
Water Supply Max. Hardness	110 gpg
Water Supply Max. Clear Water Iron	10 ppm*
Water Pressure Limits (minimum / maximum)	20 - 125 psi
Water Temperature Limits (minimum / maximum)	40 - 120 °F
Minimum Water Supply Flow Rate	3 gpm
Maximum Drain Flow Rate	2.0 gpm
Salt Storage Capacity	220 lbs.

*Capacity to reduce clear water iron is substantiated by WQA test data. State of Wisconsin requires additional treatment if water supply contains clear water iron exceeding 5 ppm.

Performance Claims

	Model MSD39A
Rated Softening Capacity (Grains @ Salt Dose)	15,500 @ 3.1 lbs. 32,900 @ 9.8 lbs. 39,300 @ 16.4 lbs.
Rated Efficiency (Grains/Pound of Salt @ Minimum Salt Dose)	5,010 @ 3.1 lbs.

This system conforms to NSF/ANSI 44 for the specific performance claims as verified and substantiated by test data.

The efficiency rating is only valid at the stated salt dose. This softener was efficiency rated according to NSF/ANSI Standard 44.

Variable Salt Dose

The salt dose is selected by the electronic controls at regeneration time based on the amount needed.

Wiring Schematic

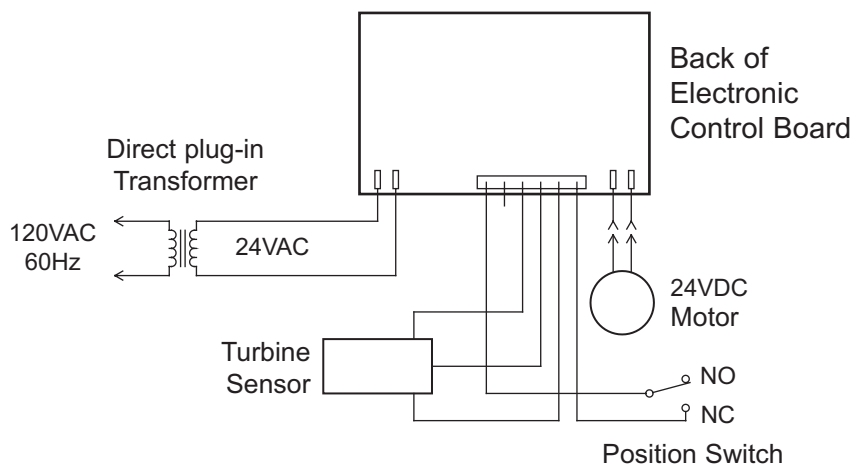


FIG. 3

Safety Guides

- Follow the installation instructions carefully (Failure to install the water softener properly voids the warranty).
- Before you begin installation, read this entire manual. Then, obtain all the materials and tools you will need to make the installation. Check local plumbing and electrical codes.
- Use only lead-free solder and flux for all sweat-solder connections, as required by federal codes.
- Use care when handling the water softener. Do not turn upside down, drop, or set on sharp protrusions.
- Do not locate the unit where freezing temperatures occur. Do not attempt to treat water over 120°F. Freezing or hot water damage voids the warranty.
- Avoid installing in direct sunlight. Excessive sun heat may cause distortion or other damage to non-metallic parts.
- The water softener requires a minimum water flow of 3 gallons per minute at the inlet. Maximum allowable inlet water pressure is 125 psi. If daytime pressure is over 80 psi, nighttime pressure may exceed the maximum. Use a pressure reducing valve if necessary (Adding a pressure reducing valve may reduce the flow). If your home is equipped with a back flow preventer, an expansion tank must be installed in accordance with local codes and laws.
- The water softener works on 24 volt, 60 Hz electrical power only, supplied by a direct plug-in transformer (included). Be sure to use the included transformer and plug it into a nominal 120V, 60 cycle household outlet that is properly protected by an overcurrent device such as a circuit breaker or fuse. Power consumption is 13.5 W maximum and 1.0 W typical. If transformer is replaced, use only UL, CUL or CSA approved Class 2 transformer with the following specifications:
 - Input: 120 VAC, 60 Hz, 13.5 W
 - Output Voltage: 24 VAC
 - Output Current: 400 mA
- Do not use this system to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.



European Directive 2002/96/EC requires all electrical and electronic equipment to be disposed of according to Waste Electrical and Electronic Equipment (WEEE) requirements. This directive or similar laws are in place nationally and can vary from region to region. Please refer to your state and local laws for proper disposal of this equipment.

In the state of California: You must turn the Salt Efficiency Feature setting to ON. This may initiate more frequent recharges. However, it will operate at 4,000 grains per pound of salt or higher. To turn on the Salt Efficiency Feature, follow the instructions in the "Salt Efficiency" section of this manual.

How a Water Softener Works

Softening Cycle

When the water softener is providing soft water, it is called "service" or the "softening cycle". During this cycle, hard water flows from the main water pipe in the household into the water softener. Inside the resin tank is a bed made up of thousands of tiny, plastic resin beads. As hard water passes through the bed, each bead attracts and holds the hardness minerals. Water without the hardness minerals (soft water) flows from the water softener to the rest of the house.

Regeneration Cycle

Eventually the beads become coated with calcium or magnesium ions. At this point, the water softener needs to replenish the beads with sodium ions. This process is called "regeneration". Regeneration occurs when the resin beads are washed with a strong salt water solution. The sodium forces the calcium and magnesium ions to be released, where they are then discharged as waste during the regeneration cycle. The beads are then ready to once again collect the hardness minerals (calcium and magnesium) from the water. Regeneration consists of five cycles; brine fill, brining, brine rinse, backwash and fast rinse. The total time of the regeneration cycle is approximately two hours.

Water Conditioning Information

Water Conditioning

Water conditioning is the treatment of four general conditions. These are:

- Hardness
- Iron
- Acidity
- Sediments

Hardness

Hardness is a term to describe the presence of calcium and magnesium minerals in water. A chemical analysis accurately measures the amount of minerals in grain weight. For example, one gallon of water with 5 grains per gallon (gpg) hardness has dissolved minerals, that if solidified, about equals the size of one ordinary aspirin tablet. One gallon of water, 25 gpg hard, has a mineral content equal in size to 5 aspirin tablets. Water hardness varies greatly across the country. It generally contains from 3 to 100 gpg.

Hardness minerals combine with soap to make a soap curd. The curd greatly reduces the cleaning action of soap. Precipitated hardness minerals form a crust on cooking utensils, appliances, and plumbing fixtures. Even the tastes of foods are affected. A water softener reduces the hardness minerals to eliminate these effects, and others.

Iron

Iron in water can cause stains on clothing and plumbing fixtures. It can negatively affect the taste of food, drinking water, and other beverages. Iron in water is measured in parts per million (ppm). The total* ppm of iron, and type or types*, is determined by chemical analysis. Four different types of iron in water are:

- Ferrous (clear water) iron
- Ferric (red water) iron
- Bacterial and organically bound iron
- Colloidal and inorganically bound iron (ferrous or ferric)

* Water may contain one or more of the four types of iron and any combination of these. Total iron is the sum of the contents.

Ferrous (clear water) iron is soluble and dissolves in water. This water softener will reduce moderate amounts of this type of iron (see specifications).** Ferrous (clear water) iron is usually detected by taking a sample of water in a clear bottle or glass. Immediately after taking, the sample is clear. As the water sample stands, it gradually clouds and turns slightly yellow or brown as air oxidizes the iron. This usually occurs in 15 to 30 minutes.

When using the softener to reduce Ferrous (clear water) iron, add 5 grains to the hardness setting for every 1 ppm of Ferrous (clear water) iron. See "Set Water Hardness Number" section.

continued

** Capacity to reduce clear water iron is substantiated by WQA test data.

Water Conditioning Information (continued)

Ferric (red water), and bacterial and organically bound irons are insoluble. This water softener will not remove ferric or bacterial iron. This iron is visible immediately when drawn from a faucet because it has oxidized before reaching the home. It appears as small cloudy yellow, orange, or reddish suspended particles. After the water stands for a period of time, the particles settle to the bottom of the container. Generally these irons are removed from water by filtration. Chlorination is also recommended for bacterial iron.

Colloidal and inorganically bound iron is of ferric or ferrous form that will not filter or exchange out of water. This water softener will not remove colloidal iron. In some instances, treatment may improve colloidal iron water. Colloidal iron water usually has a yellow appearance when drawn. After standing for several hours, the color persists and the iron does not settle, but remains suspended in the water.

Acidity

Acidity or acid water is caused by carbon dioxide and hydrogen sulfide. This water softener will not improve an acid condition in water. Acid water can be corrosive to plumbing, plumbing fixtures, water heaters, and other water using appliances. It can also damage and cause premature failure of seals, diaphragms, etc., in water handling equipment. A chemical analysis is needed to measure the degree of acidity in water. Water which tests below 6.9 on the pH scale is acidic. The lower the pH reading, the greater the acidity. A neutralizer filter or a chemical feed pump are usually recommended to treat acid water.

Sediment

Sediment is foreign material particles suspended in water. This material is most often sand, clay or silt. This water softener is equipped with a filter screen to reduce sediment. Extreme amounts of sediment may give the water a cloudy appearance, and may require additional filtration upstream of the water softener.

Added Sodium & Potassium

IMPORTANT: Water softeners using sodium chloride (NaCl) salt for regeneration add sodium to the water. Persons on sodium restricted diets should consider the added sodium as part of their overall intake. Water softeners using potassium chloride (KCl) salt for regeneration add potassium to the water. Persons on

potassium restricted diets should consider the added potassium as part of their overall intake.

Factor into your diet the amount of sodium or potassium shown below, based on your water hardness and consumption.

Initial Water Hardness	Sodium Added by Cation Exchange Softening of Water*	Potassium Added by Cation Exchange Softening of Water**
1 grains per gallon	7.5 milligrams of Na+ / qt.	12.75 milligrams of K+ / qt.
5	37	62.9
6	44	74.8
7	52	88.4
8	60	102.0
9	68	115.6
10	75	127.5
15	112	190.4
20	150	255.0
30	225	382.5
40	300	510.0

* If your water supply is 15 grains hard and you drank 3 quarts of softened water, you would consume 336 milligrams of sodium. That is equivalent to eating 2-1/2 slices of white bread.

** One large banana, about 9 inches in length, has approximately 600 milligrams of potassium.

Installation Requirements

Tools & Parts Needed

Assemble the required tools before starting installation. Read and follow instructions provided with any tools listed here.

- Screwdriver
- Tape measure
- Pliers

If using Soldered Copper Pipe

- Tubing cutter
- Lead-free solder and flux
- Propane torch
- Emery cloth, sandpaper or steel wool
- Misc. copper pipe fittings

If using Threaded Pipe

- Pipe cutter or hacksaw
- Pipe joint compound
- Threading tool
- Misc. threaded pipe fittings

If using CPVC Plastic

- Pipe cutter
- Solvent cement
- Hacksaw
- Primer
- Adjustable wrench
- Misc. CPVC pipe fittings

If using Other

- Other pipe and fittings suitable for potable water supply, as required by piping system manufacturer and local codes and/or ordinances.

Location Requirements

Consider all of the following when selecting an installation location for the water softener.

- Do not locate the water softener where freezing temperatures occur. Do not attempt to treat water over 120°F. Freezing temperatures or hot water damage voids the warranty.
- To condition all water in the home, install the water softener close to the water supply inlet, and upstream of all other plumbing connections, except outside water pipes. Outside faucets should remain on hard water to avoid wasting conditioned water and salt.
- A nearby drain is needed to carry away regeneration discharge (drain) water. Use a floor drain, laundry tub, sump, standpipe, or other options (check your local codes). See "Air Gap Requirements" and "Valve Drain Requirements" sections.
- The water softener works on 24 volt, 60 Hz electrical power only, supplied by a direct plug-in transformer (included). Provide an electrical outlet in accordance with NEC and local codes.
- Always install the water softener between the water inlet and water heater. Any other installed water conditioning equipment should be installed between the water inlet and water softener (See Figure 4 below).

The Proper Order to Install Water Treatment Equipment

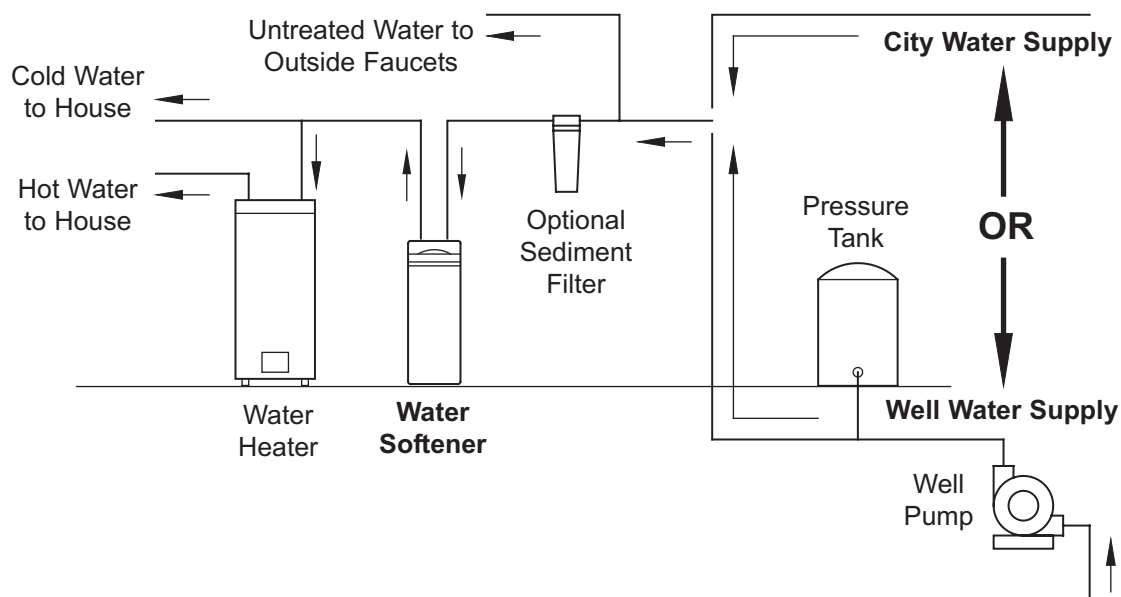


FIG. 4

Installation Requirements

Plumbing Codes

All plumbing must be completed in accordance with national, state and local plumbing codes.

In the state of Massachusetts: The Commonwealth of Massachusetts plumbing code 248-CMR shall be adhered to. A licensed plumber shall be used for this installation.

Air Gap Requirements

A drain is needed for regeneration water (See Figure 5). A floor drain, close to the water softener, is preferred. A laundry tub, standpipe, etc. are other drain options. Secure valve drain hose in place. Leave an air gap of 1-1/2" between the end of the hose and the drain. This gap is needed to prevent backflow of sewer water into the water softener. Do not put the end of the drain hose into the drain.

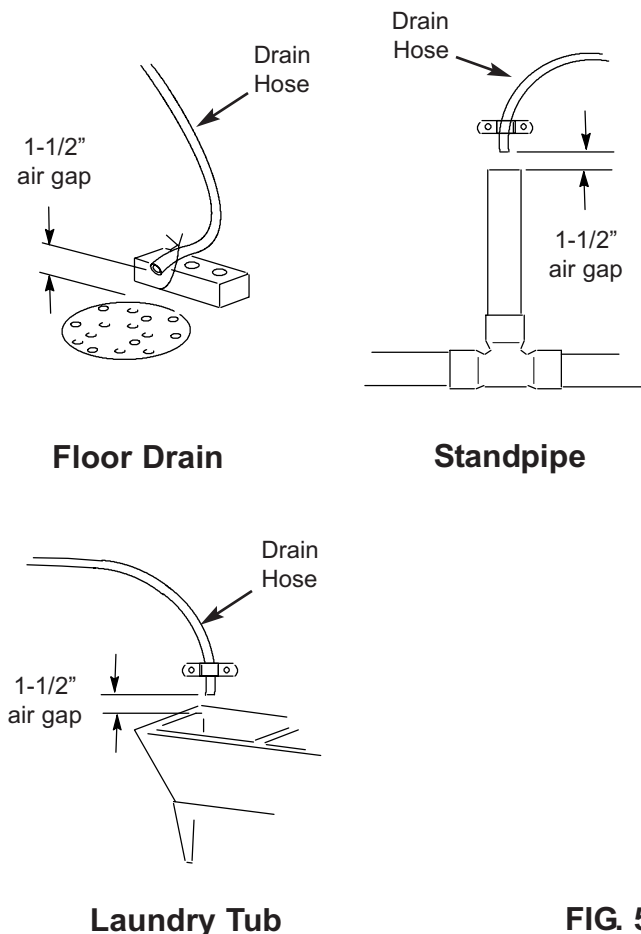


FIG. 5

Valve Drain Requirements

Using the flexible drain hose (included), measure and cut to the length needed. Flexible drain hose is not allowed in all localities (check your plumbing codes). If local codes do not allow use of a flexible drain hose, a rigid valve drain run must be used. Purchase a compression fitting (1/4 NPT x 1/2 in. minimum tube) and 1/2" tubing from your local hardware store. Plumb a rigid drain as needed (See Figure 7).

NOTE: Avoid drain hose runs longer than 30 feet. Avoid elevating the hose more than 8 feet above the floor. Make the valve drain line as short and direct as possible.

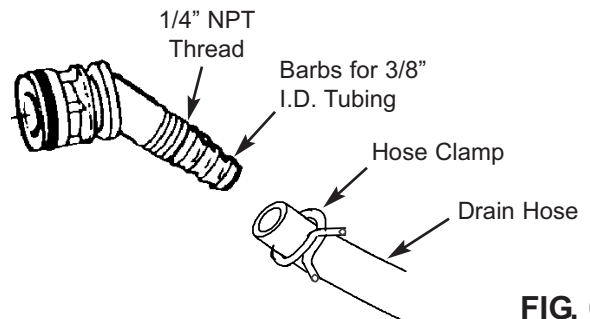


FIG. 6

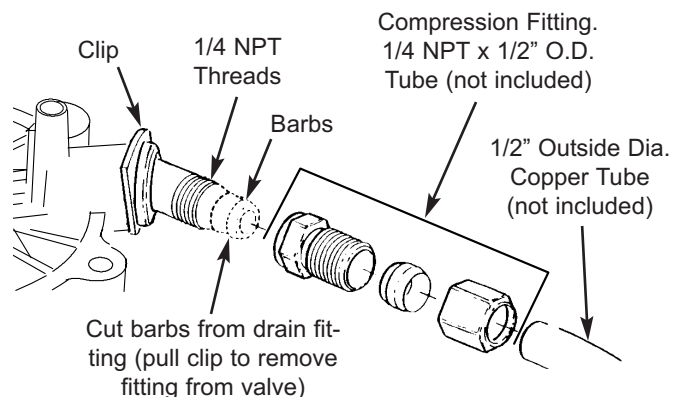


FIG. 7

Plan the Installation

Inlet / Outlet Plumbing Options

Always install either a single bypass valve (provided), as shown in Figure 8, or, if desired, parts for a 3 valve bypass system (not included) can be purchased and assembled, as shown in Figure 9. Bypass valves allow you to turn off water to the softener for maintenance if needed, but still have water in house pipes.

Pipe fittings must be 3/4" minimum.

Use either:

- Copper pipe
- Threaded pipe
- PEX (Crosslinked Polyethylene) pipe
- CPVC plastic pipe
- Other pipe approved for use with potable water

IMPORTANT: Do not solder with plumbing attached to installation adaptors and single bypass valve. Soldering heat will damage the adaptors and valve.

Single Bypass Valve

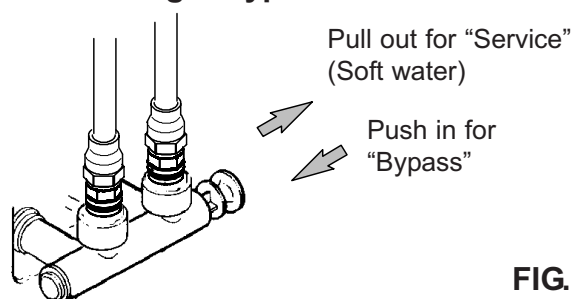


FIG. 8

3 Valve Bypass

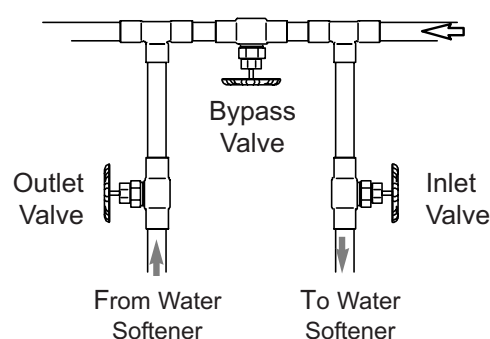


FIG. 9

Typical Installation

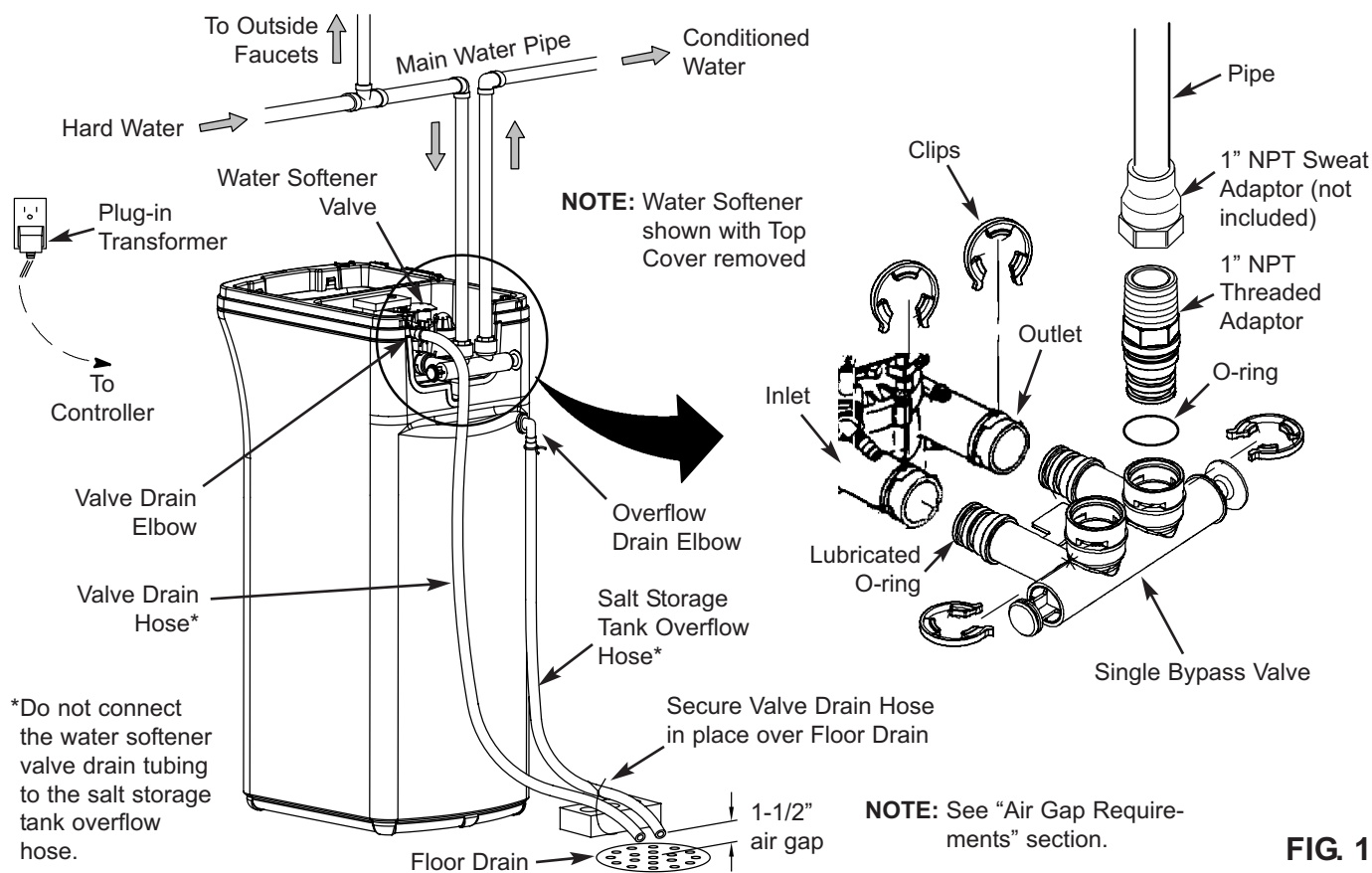


FIG. 10

Installation Instructions

Step 1. Turn Off Water Supply

1. Close the main water supply valve, located near the well pump or water meter.
2. Shut off the electric or fuel supply to the water heater.
3. Open all faucets to drain all water from house pipes.

NOTE: Be sure not to drain water from the water heater, as damage to the water heater elements could result.

Step 2. Install the Brine Tank Overflow Elbow

1. Install the brine tank overflow grommet and elbow in the 13/16" diameter hole in the back of the salt storage tank sidewall.

NOTE: The brine tank overflow elbow accepts either 1/2" or 3/8" I.D. hose.

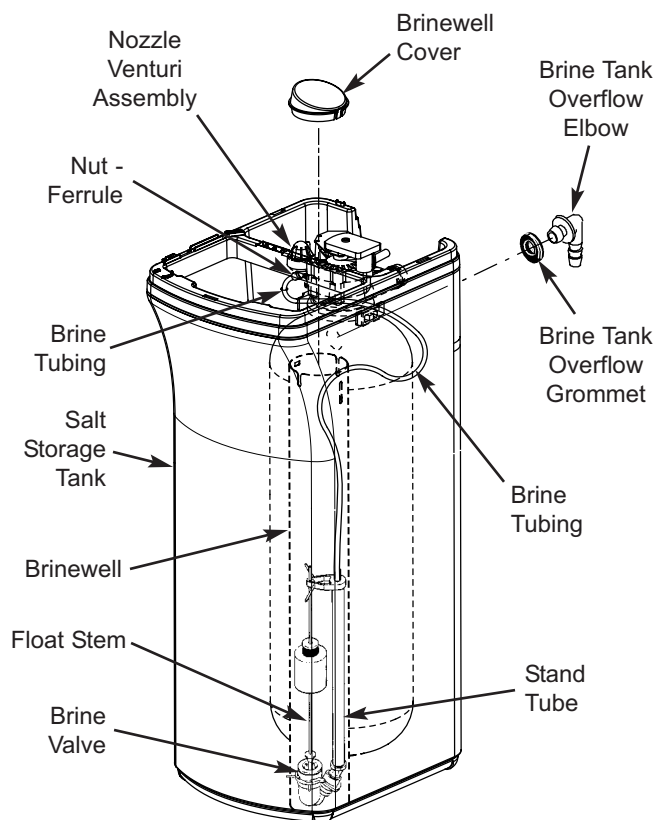


FIG. 11

Installation Instructions

Step 3. Move the Unit into Place

1. Move the water softener into desired location. Set it on a level surface. If needed, place the water softener on a section of plywood, a minimum of 3/4" thick. Then place shims under the plywood to level the water softener (See Figure 12).

IMPORTANT: Do not place shims directly under the salt storage tank. The weight of the tank, when full of water and salt, may cause the tank to fracture at the shim.

2. Visually check and remove any debris from the water softener valve inlet and outlet ports.
3. Make sure the turbine assembly spins freely in the "out" port of the valve.
4. If not already done, put a light coating of silicone grease on the single bypass valve o-rings.
5. Push the single bypass valve into the softener valve as far as it will go. Snap the two large holding clips into place, from the top down as shown in Figures 13 & 14.

IMPORTANT: Be sure the clips snap firmly into place so the single bypass valve will not pull out.

Level if Necessary

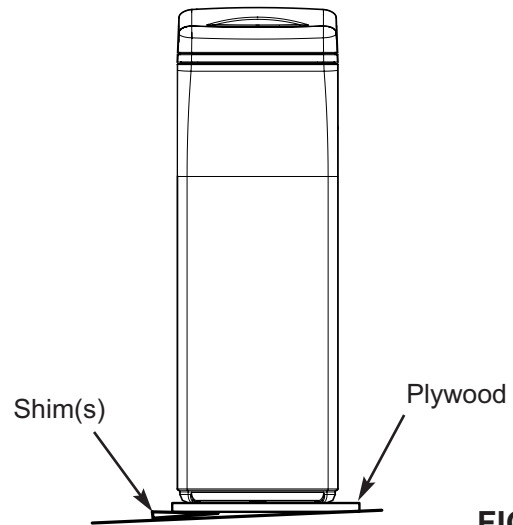


FIG. 12

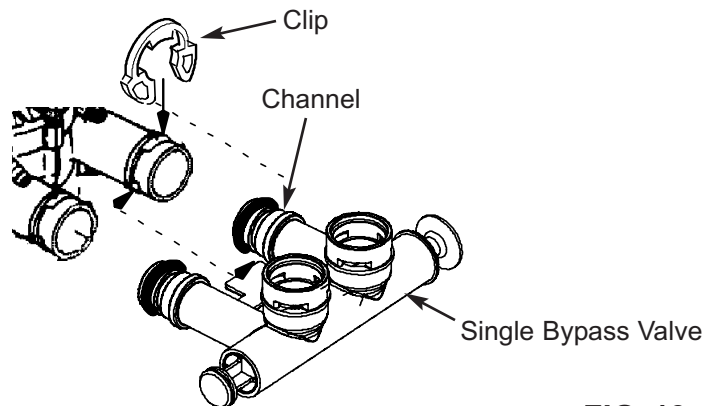
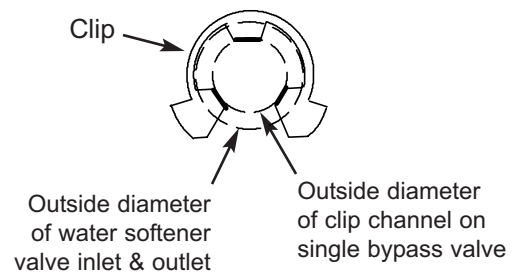


FIG. 13

Correct Assembly



NOTE: Be sure all 3 tabs of the clip go through the matching holes on the water softener valve inlet or outlet, and fully into the channel on the single bypass valve.

FIG. 14

Installation Instructions

Step 4. Assemble Inlet and Outlet Plumbing

Measure, cut, and loosely assemble pipe and fittings from the main water pipe to the inlet and outlet ports of the water softener valve. Be sure to keep fittings fully together, and pipes squared and straight.

Be sure hard water supply pipe goes to the water softener valve inlet side.

NOTE: Inlet and outlet are marked on the water softener valve. Trace the water flow direction to be sure hard water is to inlet.

IMPORTANT: Be sure to fit, align and support all plumbing to prevent putting stress on the water softener valve inlet and outlet. Undue stress from misaligned or unsupported plumbing may cause damage to the valve.

Step 5. Connect Inlet and Outlet Plumbing

Complete the inlet and outlet plumbing for the type of pipe, as described below.

Soldered Copper

1. Thoroughly clean and apply solder flux to all joints.
2. Make all solder connections.

NOTE: Do not solder with plumbing attached to installation adaptors and single bypass valve. Soldering heat will damage the adaptors and valve.

Threaded Pipe

1. Apply pipe joint compound or Teflon® tape to all male pipe threads.
2. Tighten all threaded joints and make all solder connections.

CPVC Plastic Pipe

1. Clean, prime and cement all joints, following the manufacturer's instructions supplied with the plastic pipe and fittings.

Other, including PEX (Crosslinked Polyethylene)

1. Follow the piping system manufacturer's instructions when using other pipe approved for potable water.
2. Secure ground clamps to metal pipes.

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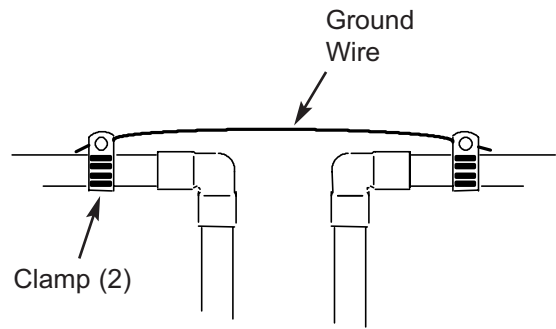


FIG. 15

Step 6. Cold Water Pipe Grounding

CAUTION: The house cold water pipe (metal only) is often used as a ground for the house electrical system. The 3-valve bypass type of installation, shown in Figure 9, will maintain ground continuity. If you use a plastic bypass valve at the unit, continuity is broken. To restore the ground, do the following:

1. Install a #4 copper wire across the removed section of main water pipe, securely clamping it at both ends (See Figure 15) - parts not included.

NOTE: Check local plumbing and electrical codes for proper installation of the ground wire. The installation must conform to them. In Massachusetts, plumbing codes of Massachusetts shall be conformed to. Consult with your licensed plumber.

Installation Instructions

Step 7. Install Valve Drain Hose

NOTE: See valve drain options on page 11.

1. Measure, cut to needed length and connect the 3/8" drain line (provided) to the water softener valve drain fitting. Use a hose clamp to hold the hose in place.

IMPORTANT: If codes require a rigid drain line see "Valve Drain requirements" section.

2. Run the drain hose or copper tubing to the floor drain. Secure drain hose. This will prevent "whipping" during regenerations. **Be sure to provide a 1-1/2" minimum air gap to prevent possible sewer water backup.** See "Air Gap Requirements" section.

NOTE: In addition to a floor drain, you can use a laundry tub or standpipe as a good drain point for this hose.. Avoid long drain hose runs, or elevating the hose more than 8' above the floor.

Step 8. Install Salt Storage Tank Overflow Hose

1. Measure, cut to needed length and connect the 3/8" drain line (provided) to the salt storage tank overflow elbow and secure in place with a hose clamp.
- 2 Run the hose to the floor drain, or other suitable drain point no higher than the drain fitting on the salt storage tank (This is a gravity drain). If the tank overfills with water, the excess water flows to the drain point. Cut the drain line to the desired length and route it neatly out of the way.

IMPORTANT: For proper operation of the water softener, do not connect the water softener valve drain tubing from Step 7 to the salt storage tank overflow hose.

Step 9. Pressure Testing for Leaks

To prevent air pressure in the water softener and plumbing system, do the following steps exactly in order:

1. Fully open two or more softened cold water faucets nearby the water softener, located downstream from the water softener.
2. Place the single bypass valve or 3 valve bypass in "bypass" position. See Figures 8 & 9 in "Plan The Installation" section.
3. Fully open the main water supply valve. Run water until there is a steady flow from the opened faucets, with no air bubbles.
4. Place bypass valve(s) in "service" or soft water position exactly as follows:
 - Single bypass valve: Slowly move the valve stem toward "service," pausing several times to allow the water softener to fill with water.
 - 3 valve bypass: Fully close the bypass valve and open the outlet valve. Slowly open the inlet valve, pausing several times to allow the water softener to fill with water.
5. After about three minutes, open a hot water faucet until there is a steady flow and there are no air bubbles, then close this faucet.
6. Close all cold water faucets and check for leaks at the plumbing connections that you made.

Installation Instructions

Step 10. Add Water and Salt to the Salt Storage Tank

1. Using a container, add about three gallons of clean water into the salt storage tank.
2. Add Morton® System Saver® II Pellets to the storage tank.

NOTE: See "Added Sodium & Potassium" on Page 9 and "Routine Maintenance" on Page 22 for additional information on salt.

Step 11. Sanitizing the Softener

Care is taken at the factory to keep your unit clean and sanitary. Materials used to make the unit will not infect or contaminate your water supply, and will not cause bacteria to form or grow. However, during shipping, storage, installation and operation, bacteria could get into the unit. For this reason, sanitizing as follows is suggested* when installing.

1. Open salt hole cover, remove the brinewell cover and pour about 1-1/2 oz. (2 to 3 tablespoons) of household bleach into the softener brinewell. Replace the brinewell cover.
- 2 Make sure the bypass valve(s) is in the "service" (open) position.
3. The sanitizing procedure will be completed when the first cycle is run and sanitizing solution is flushed from the water softener.

*Recommended by the Water Quality Association. On some water supplies, the unit may need periodic disinfecting.

Step 12. Plug in the Transformer

During installation, the water softener wiring may be moved or jostled from place. Check to be sure all leadwire connectors are secure on the back of the electronic board (See Figure 3) and be sure all wiring is away from the valve gear and motor area, which rotates during regenerations.

1. Plug the water softener into an electrical outlet that is not controlled by a switch and is approved by local codes. The unit works on 24V only. Do not connect without the transformer

Step 13. Program the Controller

1. Complete the Programming Steps on Pages 18 & 19.

Step 14. Start a Recharge

1. Press the RECHARGE button and hold for 3 seconds, until "Recharge Now" begins to flash in the display. This recharge draws the sanitizing bleach into and through the unit. Any air remaining in the unit is purged to the drain.

Step 15. Restart the Water Heater

Turn on the electricity or fuel supply to the water heater and relight the pilot, if applicable.

NOTE: The water heater is filled with hard water and, as hot water is used, it refills with conditioned water. In a few days, the hot water will be fully conditioned. To have fully conditioned hot water immediately, wait until the initial recharge (Step 14) is over. Then, drain the water heater (following instructions for water heater) until water runs cold.

If you have questions about installation, programming, operation or routine maintenance...
visit **www.systemsaver.com** or call **1-888-64 WATER**

Programming the Water Softener

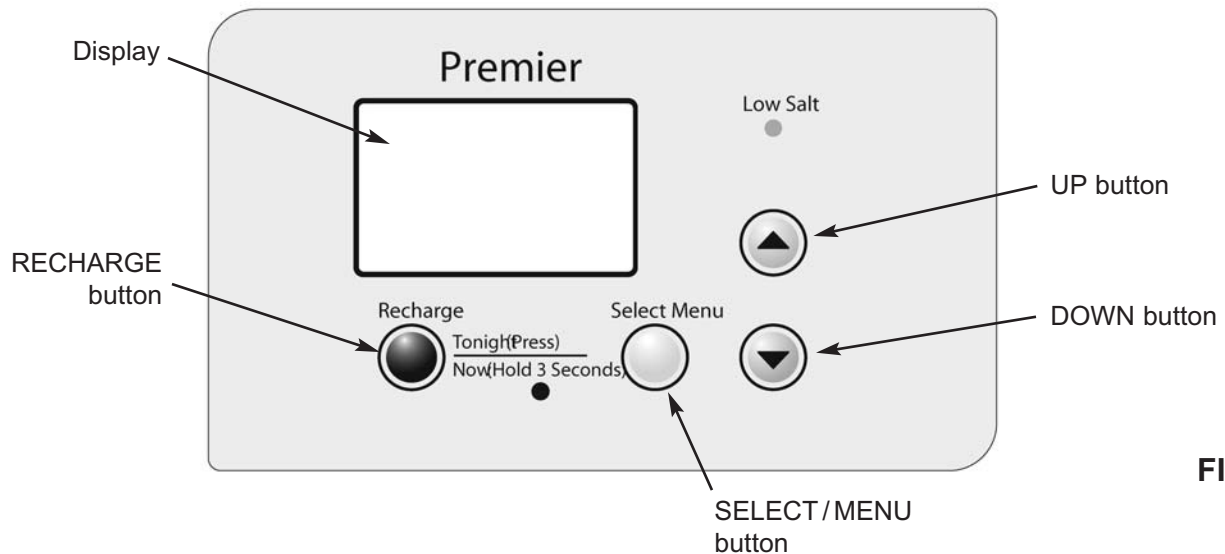


FIG. 16

If you have questions about installation, programming, operation or routine maintenance...

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When the transformer is plugged into the electrical outlet, a model code and a test number (example: J1.1), begin to flash in the faceplate display. Then, "12:00 PM" and the words "SET TIME" begin to flash.

NOTE: If " - - - " shows in the display, press the \triangle UP or ∇ DOWN button until the model code ("Sr31") shows in the display. Then, press the SELECT / MENU button to set, and change to the flashing "SET TIME" display.

Step 1. Set Time of Day

If the words "SET TIME" do not show in the display, press the SELECT / MENU button until they do.

1. Press the \triangle UP or ∇ DOWN buttons to set the present time. Up moves the display ahead; down sets the time back. Be sure AM or PM is correct.

NOTE: Press buttons and quickly release to slowly advance the display. Hold the buttons down for fast advance.

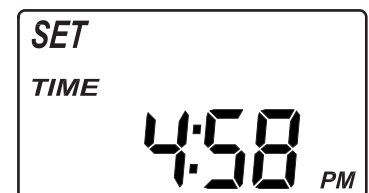
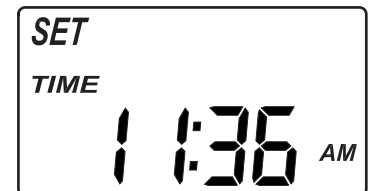


FIG. 17

Step 2. Set Water Hardness Number

1. Press the SELECT / MENU button once again to display a flashing "25" and the words "SET HARDNESS".

2. Press the \triangle UP or ∇ DOWN buttons to set your water's hardness number.

NOTE: If your water supply contains iron, compensate for it by adding to the water hardness number. For example, assume your water is 20 gpg hard and contains 2 ppm iron. Add 5 to the hardness number for each 1 ppm of iron. In this example, you would use 30 for your hardness number.



FIG. 18

$$\begin{array}{rcl}
 & & 20 \text{ gpg hardness} \\
 2 \text{ ppm iron} \times 5 = 10 & +10 & \\
 \text{(times)} & & 30 \text{ HARDNESS NUMBER}
 \end{array}$$

Programming the Water Softener

Step 3. Set Recharge (Regeneration) Time

1. Press the SELECT/MENU button once again to display a flashing "2:00AM" and the words "SET RECHARGE TIME". This is a good time for the recharge to start in most households, because water is not in use.
2. If you want to change the recharge start time, press the \triangle UP or ∇ DOWN buttons until the desired time shows. Be sure AM or PM is correct.

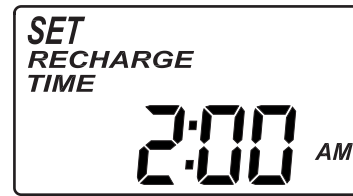


FIG. 19

Step 4. Set Salt Level

The water softener has a low salt indicator light to remind you to refill the storage tank with salt.

NOTE: You must set salt level each time salt is added to the water softener.

To set this monitor system:

1. Lift the salt hole cover and level the salt in the storage tank.
2. The salt level decal, on the brinewell inside the tank, has numbers from 0 to 8. Observe the highest number the leveled salt is at, or closest to.
3. Press the SELECT/MENU button to display a flashing "OFF" and the words "SET SALT LEVEL".
4. Press the \triangle UP button until the number on the screen corresponds to the salt level. At level 2 or below, the "Low Salt" LED indicator will flash. If you wish to turn this feature off, press the ∇ DOWN button past 0, and the word "OFF" flashes in the display.
5. Press the SELECT/MENU button once more to complete the initial programming. The current time of day will show in the display.



FIG. 20



FIG. 21



FIG. 22

Customizing Features / Options

Recharge Now

At times of greater than normal water use, such as when you have guests, you could run out of conditioned water before the next scheduled recharge. If this happens, you may want to initiate an immediate regeneration, as follows:

1. Press and hold the RECHARGE button until the words "RECHARGE NOW" flash in the display. The softener enters the fill cycle of regeneration right away. "RECHARGE NOW" will flash during the regeneration. When completed (in about 2 hours), full water conditioning capacity is restored.

NOTE: Avoid using hot water while the softener is regenerating, because the water heater will refill with bypass hard water.

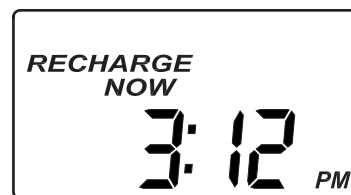


FIG. 23

RECHARGE NOW initiated

Recharge Tonight

If you do not want to start an immediate recharge, but would like an extra recharge at the next preset recharge time, do the following to schedule a recharge:

1. Press and release (do not hold) the RECHARGE button. The words "RECHARGE TONIGHT" flash in the display, and the softener will recharge at the next preset recharge time (If you decide to cancel the regeneration before it begins, press and release the RECHARGE button once more, and "RECHARGE TONIGHT" will disappear from the display). During regeneration, the word "RECHARGE NOW" will flash in the screen. When completed, full water conditioning capacity is restored.

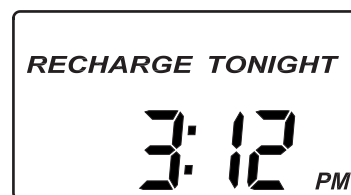


FIG. 24

RECHARGE TONIGHT initiated

Power Outage Memory

If electrical power to the water softener is lost, "memory" built into the timer circuitry will keep all settings for up to six hours. While the power is out, the display is blank and the water softener will not regenerate. When electrical power is restored, the following will occur.

You have to reset the present time only if the display is flashing. The HARDNESS and RECHARGE TIME never require resetting unless a change is desired. Even if the clock is incorrect after a long power outage, the softener operates as it should to keep your water soft. However, regenerations may occur at the wrong time of day until you reset the clock to the correct time of day.

NOTE: If the water softener was regenerating when power was lost, it will now finish the cycle.

Customizing Features / Options

Salt Efficiency

When this feature is ON, the water softener will operate at salt efficiencies of 4000 grains of hardness per pound of salt or higher (May recharge more often using smaller salt dosage and less water). The softener is shipped with this feature set OFF.

1. Press and hold the SELECT/MENU button until the screen in Figure 25 is displayed. Once in this display, press the SELECT/MENU button once and one of the two displays in Figure 26 is shown.
2. Press the \triangle UP or ∇ DOWN buttons to set ON or OFF. When set to ON, the efficiency icon will be displayed along the right side of the normal run display.

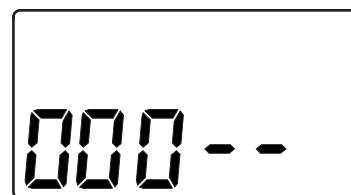


FIG. 25

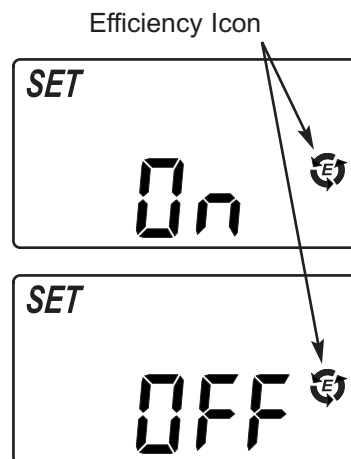


FIG. 26

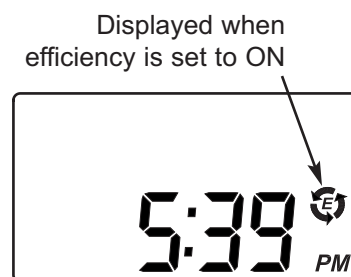



FIG. 27

California Efficiency Requirement

Your Morton Water Softener has a “High Efficiency” feature with an ON or OFF setting. This softener setting is shipped in the OFF position, which utilizes the maximum rated capacity while most often achieving maximum salt efficiencies. When installing this unit in the State of California, you MUST turn this setting to the ON position, which may initiate more frequent recharges. However it will operate at 4000 grains per pound of salt or higher.

If you wish to turn the Salt Efficiency feature ON ( icon will show in the display), follow the instructions on this page.

Routine Maintenance

Refilling with Salt

Slide open the salt hole cover and check the salt storage level frequently. If the water softener uses all the salt before you refill it, you will get hard water. Until you have established a refilling routine, check the salt every two or three weeks. Always add if less than 1/4 full. Be sure the brinewell cover is on.

NOTE: In humid areas, it is best to keep the salt storage level lower, and to refill more often to avoid salt “bridging”.

Recommended Salt: We recommend using Morton® System Saver® II Pellets in the familiar yellow bag. For soft water, nothing works harder. Guaranteed®.

Salt Not Recommended: Rock salt, high in impurities, block, granulated, table, ice melting, ice cream making salts, etc., are not recommended.

Salt with Iron Removing Additives: Some salts have an additive to help a water conditioner handle iron in a water supply. For this we recommend Morton® Rust Remover Super Pullets® in the green bag.

Breaking a Salt Bridge

NOTE: If you see more than a few inches of water in the bottom of the tank, see “Cleaning the Nozzle & Venturi” section.

Sometimes, a hard crust or salt “bridge” forms in the brine tank. It is usually caused by high humidity or the wrong kind of salt. When the salt bridges, an empty space forms between the water and the salt. Then, salt will not dissolve in the water to make brine. Without brine, the resin bed is not recharged and hard water will result.

If the storage tank is full of salt, it is difficult to tell if you have a salt bridge. A bridge may be underneath loose salt. Take a broom handle, or like tool, and hold it next to the water softener. Measure the distance from the floor to the rim of the water softener. Then, carefully push the broom handle straight down into the salt. If a hard object is felt before the pencil mark is even with the top, it is most likely a salt bridge. Carefully push into the bridge in several places to break it. Do not use any sharp or pointed objects as you may puncture the brine tank. Do not try to break the salt bridge by pounding on the outside of the salt tank. You may damage the tank.

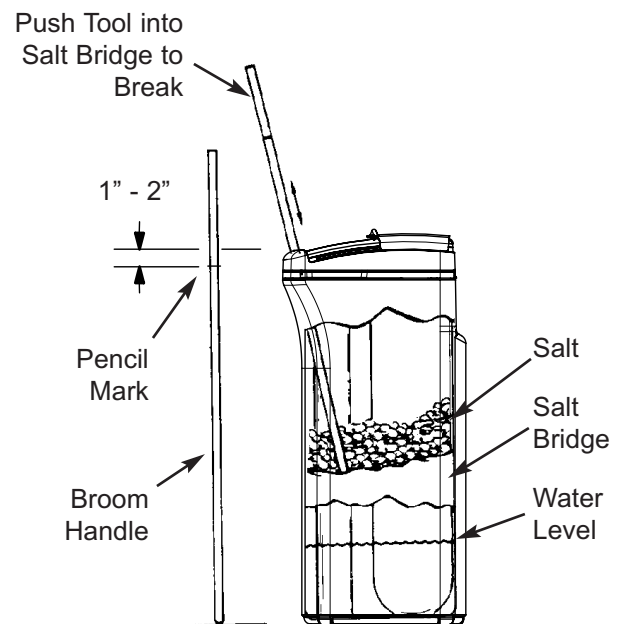


FIG. 26

Routine Maintenance

Cleaning the Nozzle & Venturi

A clean nozzle & venturi (See Figure 27) is a must for the water softener to work properly. This small unit creates the suction to move brine from the brine tank, into the resin tank. If it should become plugged with sand, silt, dirt, etc., the water softener will not work, and hard water will result.

To get access to the nozzle & venturi, remove the water softener's top cover. Put the bypass valve(s) into the bypass position. Be sure the water softener is in soft water (service) cycle (no water pressure at nozzle & venturi). Then, holding the nozzle & venturi housing with one hand, turn off the cap. Do not lose the o-ring seal. Lift out the screen support and screen. Then, remove the nozzle & venturi. Wash the parts in warm, soapy water and rinse in fresh water. If needed, use a small brush to remove iron or dirt. Do not scratch, misshape, etc., surfaces of the nozzle & venturi. Also, check and clean the gasket and flow plug(s).

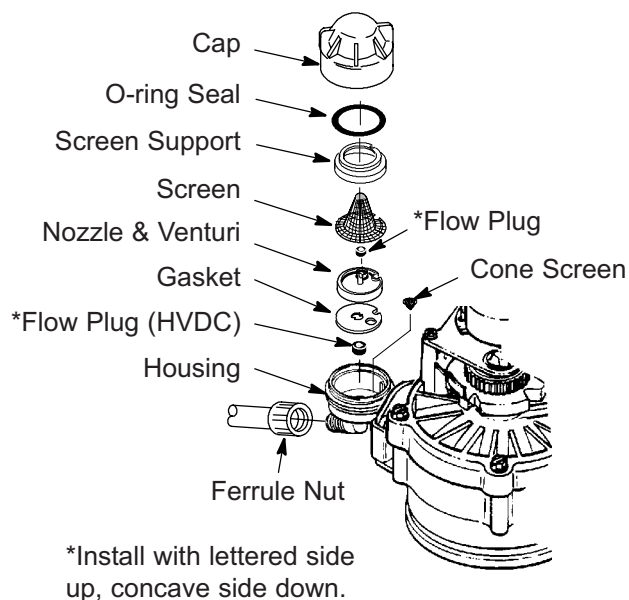
Carefully replace all parts in the correct order. Lubricate the o-ring seal with silicone grease and locate in place. Install and tighten the cap, by hand only. Do not over-tighten and break the cap or housing. Put the bypass valve(s) into service (soft water) position.

Recharge the softener several times to reduce water level in the tank. This will also assure that the softener is completely recharged and ready to provide softened water again. Once the water level in the tank is about 2" to 3", you may resume normal use.

If you have questions about routine maintenance...

visit **www.systemsaver.com**

or call **1-888-64 WATER**.



IMPORTANT: Be sure small hole in the gasket is centered directly over the small hole in the nozzle & venturi housing.

FIG. 27

Routine Maintenance

Protect the Water Softener from Freezing

If the softener is installed where it could freeze (summer cabin, lake home, etc.), you must drain all water from it to stop possible freeze damage. To drain the softener:

1. Close the shut-off valve on the house main water pipe, near the water meter or pressure tank.
2. Open a faucet in the soft water pipes to vent pressure in the softener.
3. Move the stem in the single bypass valve to bypass. Close the inlet and outlet valve in a 3 valve bypass system, and open the bypass valve. If you want water in the house pipes again, reopen the shut-off valve on the main water pipe.
4. Unplug the transformer at the wall outlet. Slide open the salt hole cover and remove the softener's top cover. Take off both drain hoses if they will interfere with moving the softener into position over the drain.
5. Carefully remove the large holding clips at the softener inlet and outlet. Separate the softener from the plastic installation adaptors, or from the bypass valve.
6. Lay a piece of 2 inch thick board near the floor drain (See Figure 28).
7. Move the softener close to the drain. Slowly and gently, tip it over until the rim rests on the wood block with the inlet and outlet over the drain. Do not allow the softener's weight to rest on the inlet and outlet fittings or they may break.
8. Tip the bottom of the softener up a few inches and hold until all water has drained. Leave the softener laying like this until you are ready to use it. Plug the inlet and outlet with clean rags to keep dirt, bugs, etc. out.

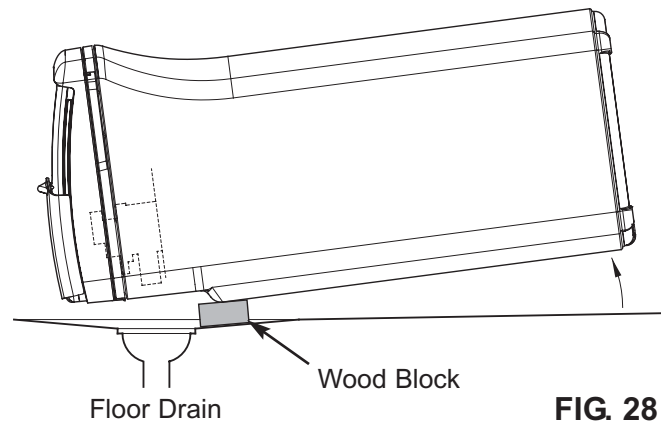


FIG. 28

Troubleshooting Guide

Tools needed for most repairs: 5/16 Hex Driver, Phillips Screwdriver, Needle-nose Pliers

PROBLEM	CAUSE	CORRECTION	REPAIR KIT(S) NEEDED
No soft water	1. No salt in the storage tank.	Refill with Morton System Saver II Pellets and then use RECHARGE NOW feature.	None
No soft water & display is blank	1. Transformer unplugged at wall outlet, or power cable disconnected from back of electronic board or transformer malfunction.	Check for loss of power and correct. Reset electronic controls and then use RECHARGE NOW feature.	Transformer
	2. Fuse blown, circuit breaker popped, or circuit switched off (See "Power Outage Memory" on Page 20).	Replace fuse, reset circuit breaker, or switch circuit on, and then use RECHARGE NOW feature.	None
	3. Electronic control board malfunction.	Replace electronic control board (See Page 30).	Electronic Control Board (PWA)
No soft water & salt level not dropping	1. Salt storage tank "bridged".	Refer to "Breaking a Salt Bridge" section to break.	None
	2. Bypass valve(s) in "bypass" position.	Move bypass valve(s) to "service" position.	None
No soft water & salt storage tank full of water, water running to drain while unit is in the soft water cycle	1. Dirty, plugged or damaged nozzle & venturi assembly	Take apart, clean and inspect nozzle & venturi (See "Cleaning the Nozzle & Venturi" section).	Nozzle Kit
	2. Inner valve fault causing leak.	Replace seals and rotor (See Page 30).	Rotor/Seal Kit
	3. Valve drain hose is plugged.	Hose must not have any kinks, sharp bends or any water flow blockage (See "Valve Drain Requirements" section).	None
	4. Valve drain line and Salt Storage Tank overflow drain connected together by a tee.	Disconnect tee and run separate drain lines.	None
	5. Low or high system water pressure (low pressure may disrupt brine draw during recharge, high pressure may cause inner valve parts failure).	If pressure is low, increase well pump output to a minimum 20 psi. If daytime pressure is over 100 psi, add a pressure reducing valve in the supply pipe to the softener. Contact a licensed plumber.	None
	6. Brine float dirty or broken.	Clean or replace Brine Valve Float Assembly.*	Float Kit
	7. Leak between valve and resin tank assembly.	Replace o-rings between resin tank and valve.	Tank/Valve O-ring Kit
Water hard some-times	1. Incorrect time set.	Check and change time setting.	None
	2. Incorrect water hardness set.	Refer to "Set Water Hardness" section to set correctly.	None
	3. Incorrect model code programmed.	Refer to "Program the Water Softener" section to set correctly.	None
	4. Hot water being used when softener is regenerating.	Avoid using hot water while the softener is regenerating, as the water heater will fill with hard water.	None
	5. Possible increase in water hardness.	Test untreated water for hardness and iron, and program the water softener accordingly (See "Set Water Hardness") section to set.	None
	6. Leaking faucet or toilet valve. Excessive water usage.	A small leak can waste hundreds of gallons of water in a few days. Fix all leaks and always fully close faucets.	None

Need help troubleshooting? Visit www.systemsaver.com or call 1-888-64 WATER.

Troubleshooting Guide

PROBLEM	CAUSE	CORRECTION	REPAIR KIT(S) NEEDED
<i>Iron in water</i>	1. Clear water iron in water supply.	Test untreated water for hardness and iron, and program the water softener accordingly (See "Set Water Hardness") section to set.	None
	2. Iron in soft water.	Clean resin bed with Resin Bed Cleaner. Follow instructions on package.	None
	3. Bacterial or organic bound iron.	Cannot be treated by water softener.	None
<i>Resin in household plumbing / resin tank leaking</i>	1. Crack in distributor or riser tube.	Replace resin tank assembly (See Page 30)	Resin Tank Assembly
<i>Salt storage tank leaking</i>	1. Crack in brine tank.	Replace salt storage tank assembly (See Page 30)	Salt Storage Tank Assembly
<i>Motor stalled or clicking</i>	1. Motor malfunction or internal valve fault causing high torque on motor.	a. Replace rotor/seal kit. (See Page 30) b. Replace motor & switch. (See Page 30)	Rotor/Seal Kit Motor/Switch Kit
<i>Error code E1, E3 or E4 appears</i>	1. Fault in wiring harness or connections to position switch.	Replace wiring harness or connections to position switch (See Page 30).	Motor/Switch Kit
	2. Fault in switch.	Replace switch (See Page 30).	Motor/Switch Kit
	3. Fault in valve causing high torque.	Replace rotor/seal kit (See Page 30).	Rotor/Seal Kit
	4. Motor inoperative.	Replace motor (See Page 30).	Motor/Switch Kit
<i>Error code E5 appears</i>	1. Electronic control malfunction.	Replace electronic control board (See Page 30).	Electronic Control Board (PWA)

Procedure for removing error code from display:

1. Unplug transformer from electrical outlet.
2. Correct problem.
3. Plug in transformer.
4. Wait 6 minutes. The error code will return if the problem was not corrected.

Need help troubleshooting? Visit www.systemsaver.com or call 1-888-64 WATER.

Troubleshooting

Automatic Electronic Diagnostics

This water softener has a self-diagnostic function for the electrical system (except input power and/or water meter). The water softener monitors electronic components and circuits for correct operation. If a malfunction occurs, an error code appears in the display.

The troubleshooting chart shows the error codes that could appear, and the possible malfunctions for each code.

While an error code appears in the display, all buttons are inoperable except the SELECT/MENU button. SELECT/MENU remains operational so the service person can perform the Manual Advance Diagnostics, see below, to further isolate the problem.



FIG. 29

Manual Advance Diagnostics

Use the following procedures to advance the water softener through the regeneration cycles to check operation.

Slide open the salt hole cover and remove the top cover assembly by unlocking the tabs inside the front and rocking backward, to observe cam and switch operation during valve rotation.

1. Press and hold SELECT/MENU for 3 seconds until "000--" shows in the display.
2. The first 3 digits indicate water meter operation as follows:
000 (steady) = Soft water not in use, and no flow through the meter.
Open a nearby soft water faucet.
000 to 199 (continual) = Repeats for each gallon of water passing through the meter.

NOTE: If you don't get a reading in the display with faucet open, pull the sensor from the valve outlet port. Pass a small magnet back and forth in front of the sensor. If you get a reading in the display with the magnet, unhook the in and out plumbing and check the turbine for binding (See Figure 30).

3. The letter P and dashes in the display indicate POSITION switch operation (See Figure 31). If the letter P appears, the switch is closed. If only dashes show, the switch is open.
4. Use the RECHARGE button to manually advance the valve into each cycle and check correct switch operation.

NOTE: Be sure water is in contact with the salt, and not separated by a salt bridge (See "Breaking A Salt Bridge" section).

5. While in this diagnostic screen, the following information is available and may be beneficial for various reasons. This information is retained by the computer from the first time electrical power is applied to the electronic controller.
 - a. Press the \triangle UP button to display the number of days this electronic control has had electrical power applied.
 - b. Press the ∇ DOWN button to display the number of regenerations initiated by this electronic control since the code number was entered.

continued

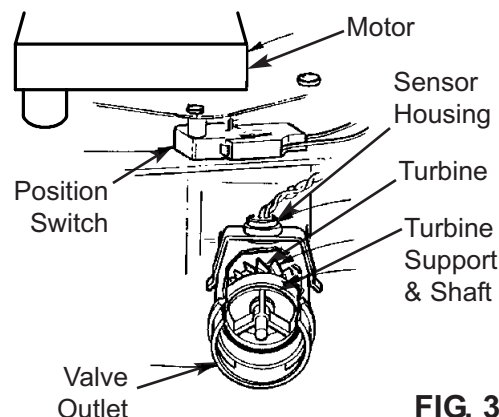
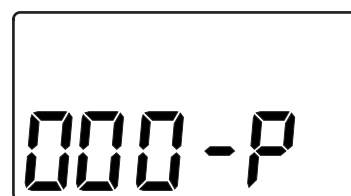
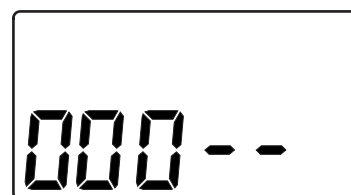


FIG. 30



Water Meter Switch

FIG. 31

Troubleshooting

6. Press and hold the SELECT/MENU button until the model code ("Sr31") shows in the display. This code identifies the softener model. If the wrong number shows, the softener will operate on incorrect programming.
7. To return the present time display, press the SELECT/MENU button.
8. To change the code number - Press the \triangle UP or ∇ DOWN button until the correct code shows. Then, press the SELECT/MENU button to return to the present time display.

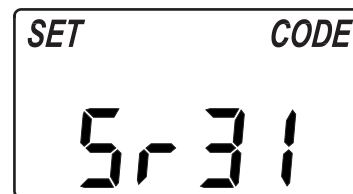


FIG. 32

Manual Advance Regeneration Check

This check verifies proper operation of the valve motor, brine tank fill, brine draw, regeneration flow rates, and other controller functions. Always make the initial checks, and the manual initiated diagnostics.

NOTE: The electronic control display must show a steady time (not flashing). If an error code shows, first press the SELECT/MENU button to enter the diagnostic display.

1. Press the RECHARGE button and hold in for 3 seconds. RECHARGE begins to flash as the softener enters the fill cycle of regeneration. Remove the brinewell cover and, using a flashlight, observe fill water entering the tank. If water does not enter the tank, look for an obstructed nozzle, venturi, fill flow plug, brine tubing, or brine valve riser pipe.
2. After observing fill, press the RECHARGE button to move the softener into brining. A slow flow of water to the drain will begin. Verify brine draw from the brine tank by shining a flashlight into the brinewell and observing a noticeable drop in the liquid level. This may take 15 to 20 minutes to notice.

NOTE: Be sure water is in contact with the salt, and not separated by a salt bridge (See "Breaking A Salt Bridge" section).

If the water softener does not draw brine, check for (most likely to least likely):

- Dirty or plugged nozzle and venturi, see "Cleaning the Nozzle and Venturi" section
- Nozzle and venturi not seated on the gasket, or gasket deformed
- Restriction in valve drain, causing a back-pressure (bends, kinks, elevated too high, etc.). See "Install Valve Drain Hose" section.
- Obstruction in brine valve or brine tubing
- Inner valve failure (obstructed outlet disc, wave washer deformed, etc.)

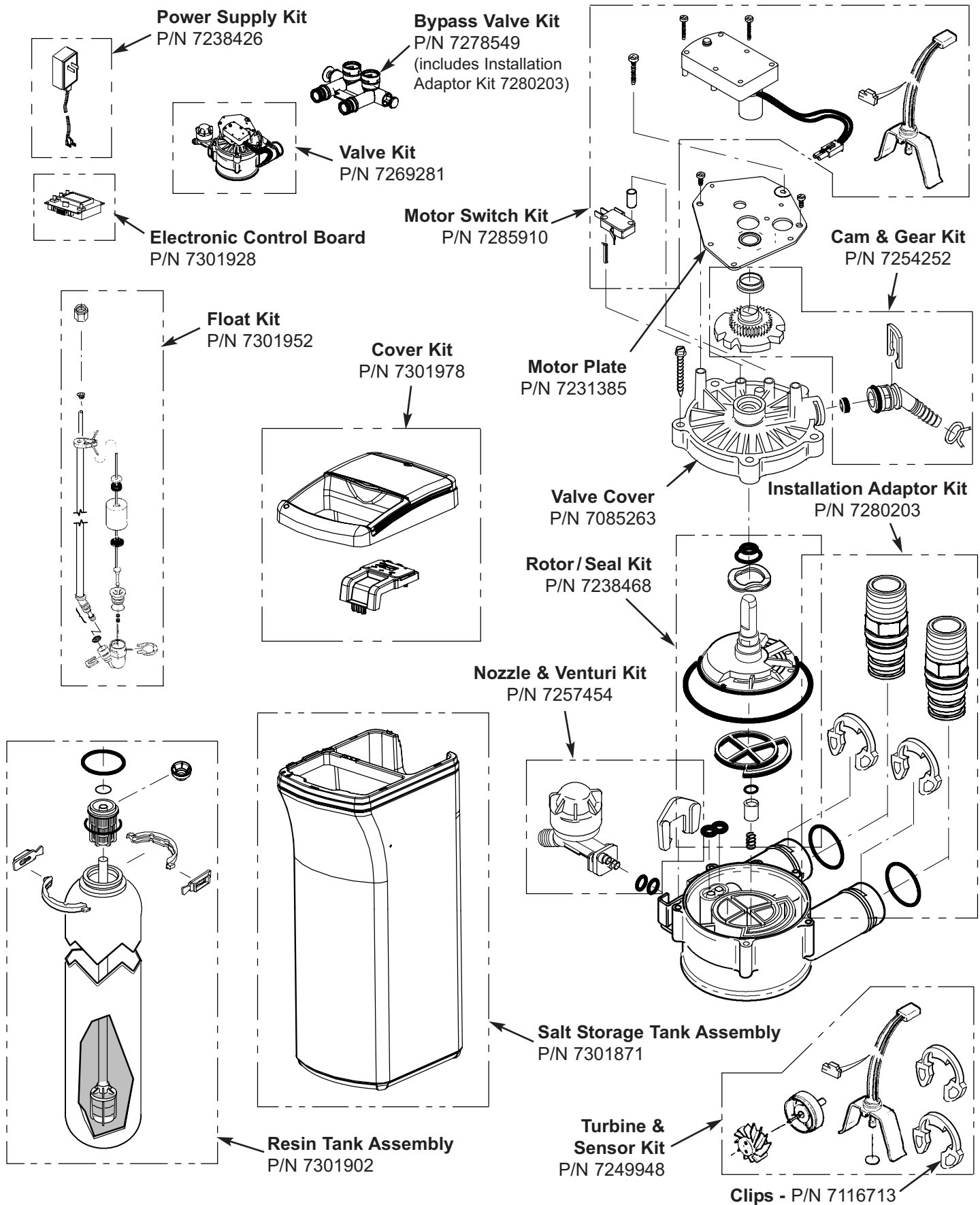
NOTE: If water system pressure is low, an elevated drain hose may cause back pressure, stopping brine draw.

3. Again, press the RECHARGE button to move the softener into backwash. Look for a fast flow of water from the drain hose. An obstructed flow indicates a plugged top distributor, backwash flow plug, or drain hose.
4. Press the RECHARGE button to move the softener into fast rinse. Again look for a fast drain flow. Allow the softener to rinse for a few minutes to flush out any brine that may remain in the resin tank from the brining cycle test.
5. To return the softener to service, press the RECHARGE button.

Need help troubleshooting? Visit www.systemsaver.com or call 1-888-64WATER.

Notes

Softener Parts List



Warranty

MORTON RESIDENTIAL WARRANTY

Morton guarantees, to the original owner, that:

One Year Full Warranty:

For a period of one (1) year after installation, all parts will be free from defects in materials and workmanship and will perform their normal functions.

For a period of one (1) year after installation, labor to repair or replace any part deemed to be defective in materials or workmanship, will be provided at no additional cost.

Limited Warranties:

Limited ten (10) year warranty, from date of purchase, the salt storage tank and fiberglass mineral tank will not rust, corrode, leak, burst, or in any other manner, fail to perform its proper functions; and that

Limited three (3) year warranty, after installation, electronic control board will be free of defects in materials and workmanship and will perform its normal functions.

If, during such respective period, a part proves to be defective, Morton will ship a replacement part, directly to your home, without charge. Labor necessary to maintain this product is not covered by the product warranty.

If you have questions regarding a Morton product, need assistance with installation or troubleshooting, wish to order a part or report a warranty issue, we are just a phone call away. Simply dial 1-888-64 WATER (1-888-649-2837) for assistance, or visit www.systemsaver.com.

This water softener is manufactured for Morton, P.O. Box 25290, Woodbury, MN 55125-0290

General Provisions

The above warranties are effective provided the water softener is operated at water pressures not exceeding 125 psi, and at water temperatures not exceeding 120°F; provided further that the water softener is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the water softener is not damaged as the result of any unusual force of nature such as, but not limited to, flood, hurricane, tornado or earthquake.

Morton is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages, or other circumstances beyond its control.

***THERE ARE NO WARRANTIES ON THE WATER SOFTENER BEYOND THOSE SPECIFICALLY DESCRIBED ABOVE. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE EXTENT THEY MIGHT EXTEND BEYOND THE ABOVE PERIODS. THE SOLE OBLIGATION OF MORTON UNDER THESE WARRANTIES IS TO REPLACE OR REPAIR THE COMPONENT OR PART WHICH PROVES TO BE DEFECTIVE WITHIN THE SPECIFIED TIME PERIOD, AND MORTON IS NOT LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES. NO MORTON DEALER, AGENT, REPRESENTATIVE, OR OTHER PERSON IS AUTHORIZED TO EXTEND OR EXPAND THE WARRANTIES EXPRESSLY DESCRIBED ABOVE.**

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, so the limitations and exclusions in this warranty may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state. This warranty applies to consumer-owned installations only.