Water Softener Installation

Your **CAI** softener comes with a manual that should explain all necessary detail required for successful installation and operation of your system. Installation procedures are similar for many of our available water softening systems, but some models are installed in a slightly different fashion and may have different control programming/setting procedures than described below. You should always refer to the manual supplied with your softener during installation and programming. General water softener installation instructions for some of our more popular softeners are described below. If you have any questions that are not covered in these instructions of the manual that was supplied with your unit, please give our technical service department a call at 800-580-3033.

If you are mechanically inclined and have a little experience doing basic plumbing, installing a water softener can be very easy. These instructions are lengthy and detailed, but we want our customer's installation experience to be a pleasant one and want our customers to be satisfied with their own "professional" installation.

- If you have an electric water heater, we recommend that you turn off the electricity to the heater while installing the softener. Once you are satisfied with the installation, turn on a few hot and cold-water faucets, and let them run. Once there is no more air in your pipes, then turn the electricity back on to the water heater.

- The softener system can safely handle a pressure range of 25-95psi; however, like most residential plumbing, for best operation and least wear on critical parts, we recommend an operating range of 45-55psi.

Step 1:
The location of your softener is important. It should be in a protected dry, level and non-freezing area (34-120 degrees F). If you have purchased a two tank unit (rather than a single tank cabinet model), the brine tank and resin tank should be placed close to each other. The larger of the two tanks is your brine tank (for softener sodium chloride or potassium chloride salt) and it is the tank that you will have to refill, so be sure to make it the more accessible of the two tanks. If the softener is to be installed out-of-doors, care should be taken to keep direct sunlight off the water softener tank, Softener tanks are semi-transparent, and direct sunlight may cause algae to develop within the tank. 24K, 32K and 48K grain capacity softeners can be purchased with a tank jacket that will serve to protect the unit from sunlight – 64K and larger sizes are not available with a jacket - you can apply an acrylic spray paint to these tanks, or locate them in a shaded area. Be sure to protect softener electronics and electrical connections from exposure to weather, and follow all local electrical codes.

Step 2:
You will need a standard 3-prong, 120V, grounded outlet that is not controlled by a switch. The outlet can be up to 50 feet from your softener. The furnished 12V transformer has 10 feet of cord attached. If it is necessary to extend the length of the transformer cord, it may be spliced to a maximum of 50 feet. Basic 18/2 AWG or thicker wire may be used. Splice connectors and extension wire are not included, but are readily available at electrical or hardware stores.

Step 3:
You also need a drain location for the regeneration and/or backwashing cycles, as your water softener sends water to drain during each regeneration cycle. If possible, the drain should be no farther than 20 feet from the softener. You can purchase flexible 5/8" outside diameter (1/2" inside diameter) plastic tubing from CAI or your local hardware or building supply store. Some installers prefer to make the drain line connection using rigid PVC. The tubing can be vinyl, polyethylene, polybutylene, etc. If you are using flexible tubing, be sure that there are no "crimps" in the tubing after installation, that may cause a flow restriction. The drain line will be under pressure when the regeneration/backwash cycle is working, therefore make sure the drain line is well secured. The drain line will need to dump into a drain that is a minimum diameter of 1 1/2" and ideally be below the top of the head of your softener. All local building codes should be adhered to.

Drain connection locations vary with each control valve. With Autotrol, this location is found on the bottom center of the by-pass valve (255 valves) or centered below the inlet/outlet water connections on the rear of the valve (268 valves). Fleck valves generally have this connection located on the top of the valve – refer to your manual for specific locations – you will see this connection point located near the "drain line flow control" or DLFC. Clack manuals refer to this connection point as the "drain elbow" near the DLFC, located on the top rear of the valve, behind the brine line connection point.

Note: Never connect the drain line directly into a drain. Allow an air gap between the drain tubing and waste line to prevent the possibility of reverse siphoning. Often times, a washing machine drain is a conveniently located and can be used. We do not recommend use of a check valve, as a check valve can fail, and lead to reverse siphoning.

Step 4:
(Only required for water softener units that do not have the media pre-installed; otherwise, skip to the next step)

Once you have determined the exact location of your softener it is time to fill the media/mineral tank (smaller diameter of the 2 tanks) with the furnished media. Water softener resin looks like tiny brown/yellow/tan beads. Systems using fine mesh resin (Iron Eliminator Package Option), 64,000 grain and larger softeners require that gravel is first placed at the bottom of the tank. Systems equipped with a turbulator type distributor do not use any gravel.

The distributor tube (also called a riser) is the long plastic tube that is located in the center of the resin tank. Many CAI softeners are supplied with turbulator distributors. Turbulators look different then standard distributors, having both a bottom and top basket, and an umbrella like deflector fitted near the top of the tube. Any softener equipped with a turbulator does NOT use gravel as a distribution bed.

Any softener not having a turbulator, or any 64,000 gain systems and larger, ALWAYS use gravel underbedding. The table below shows how much gravel is required for each system size:

System Size	Gravel
24,000 grain	~12 pounds
32,000 grain	~12 pounds
48,000 grain	~15 pounds
64,000 grain	~25 pounds
80,000 grain	~30 pounds
96,000 grain	~50 pounds

The values shown above are approximate, after filling, the top level of gravel should completely cover the basket screen found on the bottom of your distributor tube.

Put the distributor tube into the mineral tank, the screen intake will be at the bottom and the open end will be at the top. We have pre-cut the riser tube to the proper length. The screen intake on the end of your riser tube (or turbulator) should be resting on the bottom and centered.

Use tape to cover the open end of the distributor tube (or turbulator), to keep any media from falling into the distributor tube while pouring the media into the mineral tank.

(For non-turbulator and 64,000 grain and larger systems only)
Place a funnel into the mineral tank, and place the larger supplied "gravel" into the tank. The gravel aids in even distribution of the water flow throughout the

resin, to soon be placed on top. While filling the bottom of the tank with gravel, be careful to keep the distributor tube centered as best you can.

Place the supplied plastic funnel onto the top of the mineral tank, and begin to add media into the tank. While filling, be careful to keep the distributor tube centered as best you can. The fill level will vary depending on the capacity of the system. In systems using fine mesh resin (Iron Eliminator Package) and 64K and larger, there will only be enough media to fill the tank in the range of 1/2 to 3/4 full - the mineral tank should never be filled to the top. This remaining open space is called “freeboard”, and necessary for the media to have room to move during the backwash cycle. In systems equipped with a turbulator the resin level will fill more of the tank, as less freeboard is required for proper function.

An easy, but slower, way to fill the mineral tank is to take a small scoop and pour the media into the funnel. The media beads tend to stick to the funnel, so by filling slowly, the media will go into the tank easier. If you try to fill too fast, you will probably have difficulties. Once the filling of the mineral tank is completed, remove the tape from the distributor tube. Do not pull upwards on the distributor tube when doing this - it is important for the tube to rest on the bottom of the tank.

The control valve (head) now must be screwed onto the mineral tank. As you start to screw the control valve onto the tank, make sure the hole in the center of the control valve fits over the distributor tube. NO pipe dope should be used on the threads. The control valve should be hand tightened, snugly, clockwise. Try not to over tighten the control valve, over tightening can make future removal difficult.

Autotrol Performa valves only - With Autotrol Performa (268 - one inch) valves, you will note a thumbwheel that is located on the bottom of the valve, around the threads that will connect to the resin tank. This thumbwheel contains an O-ring in a grooved slot, and serves as the primary tank-to-valve seal. After the control is threaded into the tank, rotate the thumbwheel down onto the tank to make sure that it’s O-ring is firmly seated onto the tank – do not over-tighten – just hand tight to prevent leakage.

Step 5:
You are now ready to install the bypass valve to the control valve (head). The in and out arrows on the bypass valve should be pointing the same direction as the in and out arrows on the outside of the control valve. The arrows are molded into the plastic (Noryl) on both the bypass valve and the control valve. If you have a stainless steel by-pass valve, then you will see directional flow arrows on the label below the by-pass handle.

Autotrol 255 softeners

The bypass valve has female socket ends (no threads) and two (2) 1 1/4" IPS male threaded ends. The control valve has male nipples (no threads) on the back of the valve.

The two (2) female socket ends of the bypass valve will connect over the 2 male sockets on the control valve. Locate and insert the three (3) O-rings into the grooves found on the female end of the by-pass valve. Now use the four 2" x 10/24 threaded screws with nuts to tighten the bypass valve to the control valve - holes for theses screws are found on each of four (4) corners on the female end of the by-pass valve body. Tighten the screws until the bypass valve is firmly seated, but be sure not to over tighten.

Autotrol 268 softeners

The bypass valve has two (2) female plastic nuts with IPS threads and two (2) IPS male threaded ends. The control valve has two (2) IPS male threaded ends on the back of the valve. These are the inlet and outlet water connections. The two (2) female nuts on the bypass valve will thread onto 2 male threaded connections on the control valve. Use two of the four provided 1 3/4" OD rubber washers between the end of the male threads on the control valve and the female nuts on the bypass valve, one on the "inlet" side and one on the "outlet" side. Tighten the nuts until the bypass valve is firmly seated, but be sure not to over tighten.

Fleck softeners

By-pass valves are connected to most Fleck valves using two stainless clips with screws. Locate the by-pass valve in proper position against the control valve body, and attached the two using the stainless clips - be careful not to over-tighten - it is normal for some “play” to exist when the bay-pass valve is properly seated. This “play” allows for minor misalignment of the piping connections, and relieves stress on the valve.

The Fleck 7000 by-pass valve is attached using red plastic clips. Slots to accept these clips are located in the valve body. Locate the by-pass valve against the control valve in the correct position, and insert the clips into these slots to secure the by-pass into place.

Clack softeners

Clack water softener by-pass valves are attached to the control valve body using the plastic nuts supplied with the by-pass. Be sure to insert the split-rings and O-rings correctly as shown in the manual when making this connection.

Step 6:
The next step is to connect the inlet & outlet water connections to your softener.

Autotrol softeners
The water lines are connected to the Autotrol by-pass male threads by using the two 1 1/4" female nuts provided. Slip one 1 1/4" female nut over one of the flanged copper tailpieces, so that the tube is sticking through the nut and the flanged piece is resting on the inside of the female threaded part of the nut. Use one 1 3/4" OD rubber washer to fit into the female part of the nut on top of the flanged tailpiece and screw the nut onto the 1 1/4" IPS male threads on the control valve. Do the same for the other side. Now connect your water source to the tailpieces.

Caution: A common problem for beginners is overheating the copper tailpiece stub-outs during the soldering process. This can melt the plastic nuts that connect to the Noryl bypass valve. We recommend that you solder first and then install the nuts. The important thing is not to overheat the tailpiece stub-outs. If you have to solder your water connections with the plastic nuts in place on the copper tailpiece, you can wrap the flanged part of the tailpiece (now positioned inside of the plastic nuts) in a wet towel during the soldering process for an additional measure of safety.

Fleck softeners
Most Fleck by-pass valves use stainless clips and screws (as above) to attach NPT threads to allow for direct connection to your water supply. Standard plumbing fittings that will mate with these threads can be found at any plumbing supply store.

Exceptions to this are the 7000 valve, again using red plastic clips. These clips are inserted into slots on the by-pass valve to attach the supplied water supply connection fittings. Locate these fittings properly into the inlet/outlet sockets of the by-pass valve, and insert the clips into the slots to make a secure connection.

(Fleck twin tank 9000EC, 9000SE, 9100EC, & 9100SE softener only)
You will need to attached the two resin tanks using the supplied second tank assemblies. 9000 valves require copper pipes (2) to be soldered into the provided yoke assemblies. 9100 valve are provided with pre-cut plastic piping connections. Connect these pipes as shown in the manual that was supplied with your softener using the stainless clips and screws.

Step 7:
The water softener control valve and brine tank are connected with the furnished 3/8” plastic brine tube. This is a bi-directional tube used to both draw brine solution into the water softener during regeneration, and refill the brine tank with

water in preparation for the next regeneration cycle. At the top of the column (called a brine well) in the brine tank you will find a 90 deg. compression fitting. Connect one end of the plastic brine tubing here. On the control valve there is another compression fitting that the other end of this tubing will be connected to.

Autotrol 255
Compression fitting attached to the clear plastic check valve assembly on the right side of the control.

Autotrol 268
Compression fitting located on the front right side of the control.

Fleck
The brine line connection location varies with each unit. Locate the "brine line flow control" (BLFC) pictured in the manual supplied with your softener. The plastic tubing connects at this location with a provided compression fitting.

Clack
The valve side connection for the brine line is made to a fitting referred to as the "brine refill assembly". A compression fitting elbow is located on the top rear of the valve, above the inlet/outlet water supply connection points.

Step 8:
Connect the brine tank overflow. Attach 5/8" outside diameter plastic tubing to the fitting from the brine tank and run to a drain. This drain line will not be under pressure. DO NOT tie into the backwash drain line! This line should be higher than your drain line. The overflow drain line must be a separate line from fitting to drain, sewer, tub, etc. This is a safety overflow drain and will not be in use under normal operation. Depending on your installation, running the drain tubing to an open basement floor drain is sometimes possible. In situations where there is no reasonably accessible drain location, it may be decided not to connect this overflow drain - however, if possible - always connect this overflow to a drain location.

Step 9:
With a bucket or hose, pour approximately 3-4 gallons of water into the brine tank. The exact level is not critical.

Step 10:
The next step is to program the water softener control. Control Programming instructions for each control are detailed in the manual supplied with your unit. We have also prepared a series of programming instruction that make this process easier. If you were not sent these programming instructions when you

purchased the softener, you can download them from our internet site under the "Services" menu in our Online Store.

Step 11:
Now put the softener into service. Make sure the main water supply is off - if you have a by-pass valve - simply by-pass the unit using this valve.

With the main water supply by-passed, place the control valve into backwash position as described below (also described in the manual provided with your control). BE SURE YOU HAVE CONNECTED & SECURED THE BACKWASH DRAIN LINE BEFORE PROCEEDING!

Autotrol 460i control
Using a flathead screwdriver, place it in the slot found on the button on the face of your control. Push in on the button with the screwdriver, and rotate the button counter-clockwise until you line up the arrow on the button with the backwash position (note: always depress the button before moving - also, you can only move this button counter-clockwise, do not attempt to move the button in the other direction.)

Autotrol 760-762 control
Press the manual regeneration button for 5 seconds to initiate an immediate regeneration. This will move the softener into the C1 backwash position.

Fleck Econominder electro-mechanical control
Turn the manual regeneration knob clockwise until "backwash" is displayed

Fleck SE microprocessor control, 6700 and 7000 control
1) Press the extra regeneration button for 5 seconds
2) Press extra regeneration one time to advance to regeneration cycle step number 1 (backwash)

Clack WS1 and WS1.25 control
1) Press and hold the REGEN button
2) Press and hold the REGEN button for an additional 3 seconds
3) Press the REGEN button to advance until display reads "backwash"

With the water supply off, place the bypass valve into the service position. Open the water supply valve very slowly to approximately the 1/8 open position. In this position, you should hear air escaping slowly from the drain line. CAUTION: If opened too rapidly or too far, some media (ion-exchange resin) may be lost and plugging of the valve is possible. Do not be alarmed is a small amount of resin exits through the drain line during this initial start-up process - this is normal (but should not continue to occur during subsequent regenerations). When water

begins to flow steadily from the drain, signifying the air has been purged from the tank, open the main water supply valve all the way. Allow the unit to continue to advance through a complete regeneration cycle (this may take up to 2 hours – a good time to clean up and put your tools away!).

Step 12:
Check for leaks and tighten any loose fittings.

Step 13:
After the regeneration cycle is complete, observe the water in the brine tank. The water level should be about the same as when the cycle started. If the water level is extremely higher, then you may have an air leak in the brine line connections. If you suspect an air leak, just visit our internet site, and download the document titled “Resolving an air leak” under the “Services” menu in our online store.

If the water level is about the same, you can fill the brine tank with salt or potassium chloride. You will need to purchase softener sodium chloride or potassium chloride salt and add it to time-to-time to your brine (salt) tank. Salt is not supplied with your unit, but can be found at most supermarket and “big Box” stores. Full level is 2” below the top of the brine well, however, it is typical to only fill the brine tank 1/2 full.

You can now enjoy your CAI softened water!

Additional Notes:

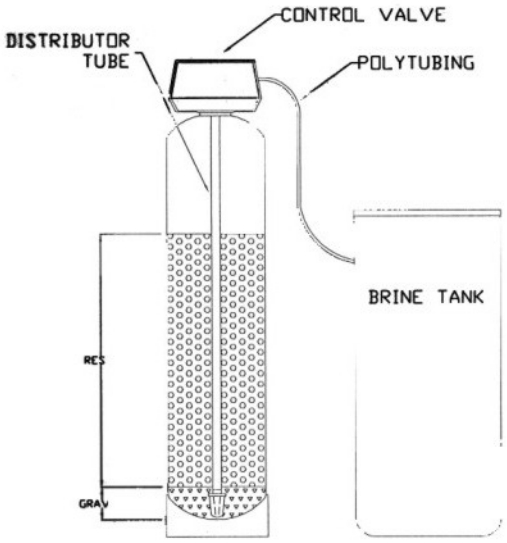
If using copper pipe, we recommend using type L copper. Type L is thicker than type M copper.

We highly recommend that you install a surge protector before the power supply. As in the case of most electronic devices, the power supply is susceptible to damage by power surges.

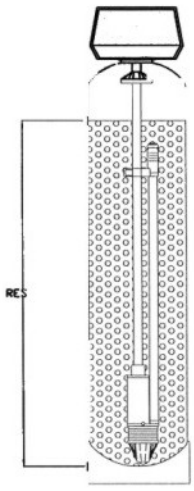
For quite some time your pipes and water heater might give off some hard water as the accumulated deposits exchange back into the now soft water. Drain your heater at least once a week until you get no more sediment.

With soft water, remember not to use as much soap for dishwashing, laundry, etc. Many people report needing to use only about 1/3 to 1/2 as much as they previously needed.

Remember to check with local building code officials and do your installation per local codes. Please work slowly and carefully for personal safety and a proper installation!



TYPICAL SETUP WITH BRINE TANK



MINERAL TANK WITH TURBULATOR