

WS1 Softener Installation & Start-Up Guide

Thank you for purchasing a Clean Water System! With proper installation and a little routine maintenance your system will be providing soft water for many years.

Your new system comes with a printed Clack Service manual, which along with this start-up guide will help guide you in the installation and start-up of your new system. The Clack service manual covers other types of systems as well such as backwashing filters, so there may be information in your manual that does not pertain to your system. You can also find a summary programming card located inside the front cover of the Clack WS1 control valve. Review this card for basic programming steps. Please review this start-up guide entirely before beginning to install your system and follow the steps outlined for best results.



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Packing List by Model

30K Grain WS1

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	WS1 Bypass valve + Pipe connector kit (either 1" or ¾")
1	Brine tank
1	10" x 44" softener resin tank
1	Media funnel
1	Gravel
1	Cubic foot bag of softening resin

48K Grain WS1

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	WS1 Bypass valve + Pipe connector kit (either 1" or ¾")
1	Brine tank
1	10" x 54" softener resin tank
1	Media funnel
1	Gravel
1.5	Cubic foot bags of softening resin

80K Grain WS1

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	WS1 Bypass valve + Pipe connector kit (either 1" or ¾")
1	Brine tank
1	10" x 44" softener resin tank
1	Media funnel
1	Gravel
2.5	Cubic foot bags of softening resin

Pre-Installation

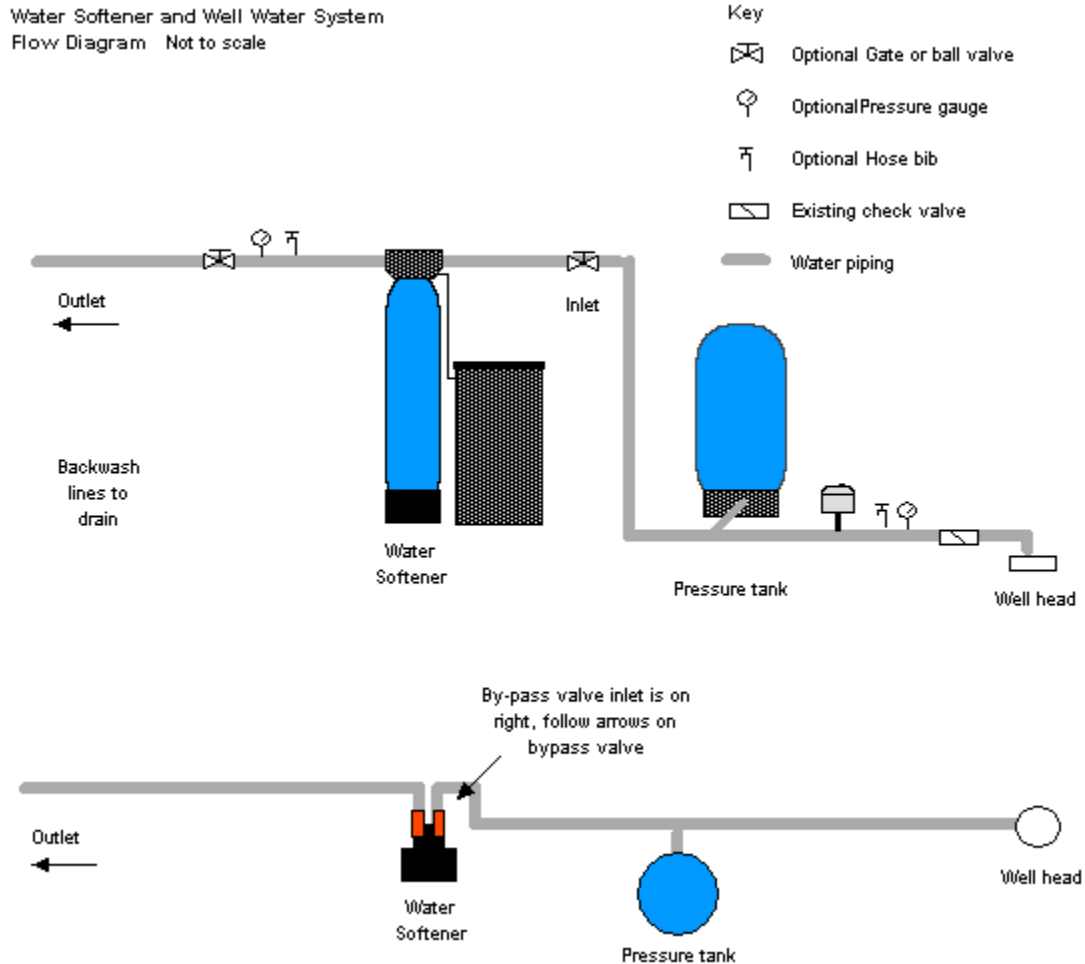
1. Review your packing list and make sure you have received all the parts before beginning installation.
2. If you are going to be turning off the water to the house and you have an electric water heater, shut off the power to the water heater before beginning installation in case water heater is accidentally drained.
3. Pick a suitable location for your filter system on a dry level spot where it won't be exposed to freezing temperatures. A minimum of 20 PSI is required. Maximum pressure is 90 PSI.
4. Get all of your plumbing parts together before beginning installation. Installation typically takes 3 to 5 hours. However after installation the WS1 Water Softener must be allowed to run through a complete backwash and rinse cycle (also called 'regeneration'). This takes about 90 minutes.
5. After the system is installed and running, your water may be discolored, or full of sediment or rust, if you have older piping that has been exposed to sediment, iron or manganese for some time. Typically this clears up over a day or two, but can persist for weeks if the pipe is old galvanized iron pipe that is corroded.

Best Practices for Piping & Drain Installation

1. See typical installation (see Fig 1). The water softener is installed after the pressure tank.
2. Make sure to connect the inlet pipe to the WS1 Softener inlet and the outlet to the outlet (see Fig 2). You can see the in and out arrows on the bypass valve which is where the pipes are connected.
3. Make sure there is a working gate or ball valve before the water softener and also one after as shown in the diagram. If you are installing multiple filter systems (such as iron filter then water softener) you do not need a valve in between each system. The pressure gauges are optional and not necessary but a hose bib (which is a faucet that you can attach a garden hose to) is strongly recommended after the water softener before the second ball valve. This makes it easy to rinse your new softener on start-up and gives you a place to test the water before it enters your household plumbing.

- If you will be using copper piping, do not sweat the copper pipe directly to the plastic bypass valve. Avoid heating up the bypass valve with the torch.

Fig 1 Typical installation for well water systems



- You do not need unions to install your water softener. If you need to remove it, the Clack WS1 softener has union couplings on the bypass valve that make it easy to put the water softener on by-pass and remove the filter system from the piping.
- The drain line tubing (not supplied) is connected to a drain from the drain outlet using flexible 1/2" ID tubing. Note that the drain can run up above the WS1 softener and into a drain, it does not have to drain down, as the filter backwashes under line pressure from your well pump. Most

plumbing codes require an air-gap connection, so that if your sewer or septic tank backs up, it cannot cross connect with the drain tubing.

7. Usually you do not want to water the garden or irrigate your landscaping with softened water. This will require more salt than usual to be used and in some cases the sodium can build-up in the soil causing some problems to sensitive plants. It is often not difficult to run hard water (not-softened lines) to the irrigation thereby bypassing the water softener.
8. If you do want to irrigate with soft water we recommend the use of potassium chloride salt (widely available) instead of regular sodium chloride (water softener rock salt). Any type of salt though can be used in the water softener.

Fig 2 Clack WS1 Softener Control

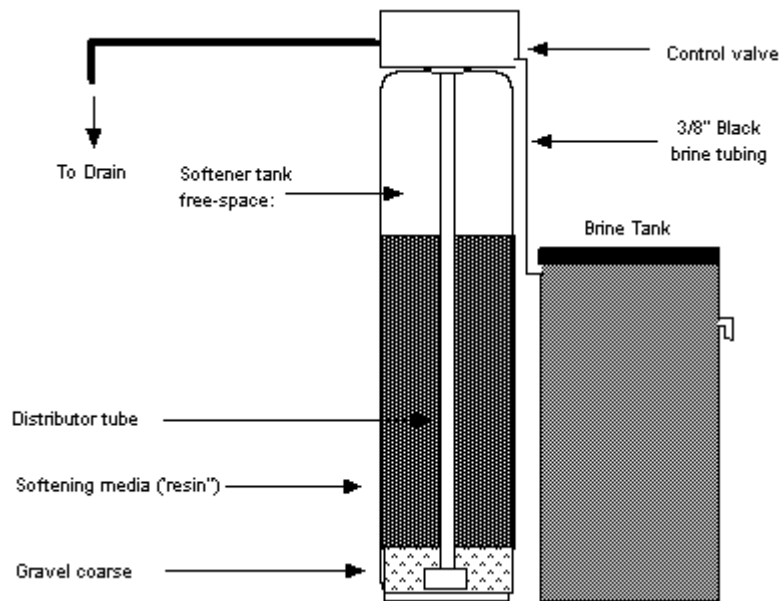


Adding Softener Media & Installation Instructions

1. Unscrew by hand the Clack WS1 control valve from top of the tanks if it was shipped screwed on. Place distributor tubes in tank if not already inside tanks. If not already done, make sure blue cap is on top of distributor tube, or wrap the top of distributor tube with electrical or duct tape. The idea is you do not want gravel or resin to go down the distributor tube when you are adding media.

2. Add filter gravel supplied first, using the funnel sent with the water softener.
3. Next add softener resin media. Tank will be approximately 2/3 to the 3/4 full.
4. Remove cap or tape from top of distributor tube. Be careful not to pull up distributor tube when removing cap or tape.

Fig 3 Filter diagram showing cut-away of media



5. If possible at this point, fill tank completely with water. This will allow the softener resin to settle and eliminate the need of "purging" the air out of the tank later.
6. Add a small amount of vegetable cooking oil to the tank threads and screw on the WS1 control valve carefully. Alternatively you can use silicone grease, but do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.
7. See how the piping connects to the bypass valve. There are in and out arrows on the bypass valve for the inlet and outlet pipe. Install inlet and outlet piping, drain tubing and brine line tubing. The brine line tube is included and is shipped inside the brine tank.

8. Note that the over-flow fitting on the side of the brine tank does not need to be connected, unless the softener is installed in a closet or somewhere where overflowing salt water could cause a problem. Water rarely overflows the brine tank however.
9. Add approximately 5 gallons of water to brine tank, then fill brine tank with salt, about 300 lbs, or 6 50-lb bags. It is OK to use any kind of water softening salt; however we find that extra coarse salt works better than the pellets. You do not have to add water to the brine tank again.
10. Close the valve after the water softener. Connect a garden hose to the hose bib after the softener and open hose bib. Turn on the water to the softener and allow the water to run out the garden hose until the water is clear and shut off; or run the water inside the house from a bathtub, laundry sink or other fixture that does not have an aerator screen on it until water is clear.
11. Plug in your Clack WS1 control valve to an outlet.
12. Set current time of day: Press NEXT button until time of day is displayed. Press and hold the Up or Down button until the SET indicator is displayed and the hour flashes. Press the Up or Down button until the correct hour is displayed. Then press the NEXT button. The minutes will flash. Press the Up or Down button until the correct minute is displayed. Press the NEXT button to return to the Display Screens.
13. Set number of gallons between regenerations: Note, your softener is already programmed with the times for various cycles such as backwash, brine draw, rinse and fill etc. You do have to set the number of gallons between regeneration though, as water hardness varies between different water sources. Your water softener has a capacity of 30,000 grains, 48,000 grains or 80,000 grains depending on the size you ordered. Assume your water softener has a capacity of 48,000 grains and your water hardness is 24 grains. Theoretically you could set your softener to regenerate every 2000 gallons (48,000 divided by 24 = 2000). However, it is best to subtract 400 gallons from the final figure to allow some extra gallons so the softener is not run to the point of exhaustion each time. So $2000 - 400 = 1600$. So you could set your softener to regenerate every 1600 gallons for instance in this example. If you have any questions about this, call our technical support line at 831-359-4420.

Press NEXT and the UP button simultaneously for 5 seconds and release.

Enter the number of gallons you want the volumetric capacity to be. Press NEXT.

Adjust the day override: if using the day override function, you can set the softener to regenerate every 14 days for instance, no matter how many gallons of water have been used. This is useful on well water where they may be a trace of iron or odors for instance. Generally

this is to 14 days but you can have it be 7 or up to 28 days or turn it to OFF for regenerating solely from the gallons used. Press NEXT.

Use the UP or DOWN arrows to set the hour at which the regeneration will occur, typically this is set to 2 AM.

Press NEXT to exit back to the time of day.

When in the standard (non-programming) mode, you can press NEXT to toggle back between the time of day, and the amount of gallons before the next regeneration.

14. Start a manual backwash by pressing and holding the REGEN button for 5 seconds. After softener has been regenerating for 20 minutes, look inside the brine tank, and you should see that it has sucked out the brine. At the end of the regeneration (about 90 minutes) check to make sure that the softener has added water to the bottom of the brine tank to make brine for the next regeneration cycle.

Maintaining Your WS1 Softener System

WS1 Softeners require little maintenance. The primary task is to add salt to the brine tank a couple of times a year. You can fill the salt tank to the top if wish and then wait until the brine tank is near empty before adding salt again. Or you can add salt whenever you notice that the salt is low enough to add more bags. If you fail to add to salt the water will turn hard again, and you will notice that there is water in the bottom of the brine tank. This is normal, and you can add salt and press the manual regeneration REGEN button for several seconds to regenerate the softener manually and have soft water again.

Your softener can use any kind of salt, including extra coarse softening salt, or pellets. It also works with potassium chloride, sometimes sold as K-Life or Potassium Salt.

Hard Water Problems

Most hard water problems occur when the brine injector fails to suck in brine and needs to be cleaned. If there is a lot of iron or sediment in the water the softener brine injector may need to be cleaned once a year.

The WS1 softener control valve has 6 cycles or positions. Each time it regenerates it goes through these cycles:

1st Cycle: Backwash (cleans the resin softening media of sediment)

2nd Cycle: Regenerate (sucks in the brine or salt water from the brine tank)

3rd Cycle: Second Backwash (cleans the resin media)

4th Cycle: Rinse (rinses all remaining brine from the resin media)

5th Cycle: Fill (re-fills the brine tank with water)

6th Cycle: Service (in the softening position, ready for use)

Cleaning the Brine Injector

The Injector is the device that allows the brine solution to be sucked in during the backwash and regeneration cycle. If there is no brine solution sucked in during the regeneration, the water will be hard.

Cleaning the injector is quick and easy. See pages from manual at the end of this guide for an illustrated diagram of the injector.

Step 1: Put the softener on bypass by closing the inlet and outlet bypass valve.

Step 2: Release the water pressure inside the Clack control valve, by pressing the REGEN button for 3 seconds. If you shut off the water to the greensand filter by turning off a valve before the filter, you can release the pressure by opening up a hose bib or a faucet in the house after the filter.

Step 3: Unscrew the injector cap and lift off. Loosen cap with pliers if necessary.

Step 4: Remove the screen and clean if fouled. The injector can be pried out with a small flat screwdriver. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite ("RustOut" or "RustRid" or "CLR" etc). The holes can be blown out with air.

NOTE: Both pieces have small diameter holes that control the flow rates of water to insure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector. Push the injector back firmly in place; replace the screen and hand tighten the injector cap.

Step 5: Disconnect the 3/8" poly tubing line that connects to the control valve from the perm tank.

Step 6: Turn the water pressure back on slowly and check for leaks. A small amount of water may squirt out of the injector port, since you have removed the brine tubing.

Step 7: With the softener in the 2nd cycle, which is the Regenerate or injector-draw cycle, it should be drawing or sucking in air and you can verify this by putting your thumb over the hole on the outside of control valve where the tube from the brine line is attached.

If your softener is not in the Regenerate cycle already, press the REGEN button. The first cycle is the Backwash cycle, which lasts for about 14 minutes. To skip ahead of this time and 1st cycle, you can press the REGEN button again, which will then advance the control valve to the brine draw, where the permanganate is sucked in, which is the 2nd cycle.

Step 8: Press the REGEN button again and advance the control valve until it is in the 2nd Backwash cycle. At this point, you can re-connect the poly tubing to the control valve.

Step 9: After the control valve is back in its service position, then you can press the REGEN button and allow it go through a complete regeneration and backwash cycle.

Other things to check:

Make sure the backwash drain line is clogged, kinked or obstructed, and make sure the drain line flow control (see illustration on the last page of this guide) is free and clear.

Make sure the Refill Flow control is not obstructed with debris. The Refill control assembly is on the top of the control valve and can be easily cleaned (see the end of this guide for a diagram showing the refill flow control).

Check to make sure the safety float inside the brine tank is not stuck. Remove the safety float and shake and make sure the bottom screen is clean and the air-check is rattling around and not stuck.