

Manganese Greensand Filter Installation

Your CAI manganese greensand filter comes with a manual that should explain all necessary detail required for successful set-up and operation of your system. General installation instructions and control programming are described below.

If you are mechanically inclined and have a little experience doing basic plumbing, installing a water filter 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 filter. 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 filter 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 filter is important. It should be in a protected dry, level and non-freezing area (34-120 degrees F). The potassium permanganate tank and manganese greensand tank should be placed close to each other. The smaller of the two tanks is your potassium permanganate holding tank and it is the tank that you will have to refill from time to time, so be sure to make it the more accessible of the two tanks.

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 filter. 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 will need a drain for the regeneration and/or backwashing cycles. If possible, the drain should be no farther than 20 feet from the filter. You will need to purchase this flexible 5/8" diameter (1/2" inside diameter) plastic tubing from CAI or your local hardware or building supply store. The tubing can be vinyl, polyethylene, polybutylene, etc. The same size tubing will be used in step 8. The drain line will be under pressure when the regeneration/backwash cycle is working, therefore make sure the drain line is 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 filter. All local building codes should be adhered to.

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.

Step 4:

(Only required for manganese greensand filter units that do not have the media pre-installed; otherwise, skip to the next step)

Once you have determined the exact location of your filter it is time to fill the media/filter tank (larger of the 2 tanks) with the furnished manganese greensand media. This material looks like a fine granular black material. A manganese greensand filter also requires coarse gravel be placed into the bottom of the filter tank to act as a flow distributor – this gravel is shipped either inside of the filter tank or in a separate container.

Put the distributor tube into the filter tank, the screen intake will be at the bottom and the open end will be at the top. The open end should be sticking 1 1/4" out of the filter tank. The screen intake should be resting on the bottom and centered.

Use masking tape or scotch tape to tape over the open end of the distributor tube. This is to keep any media from falling into the distributor tube while pouring the media into the filter tank.

Place a funnel into the filter tank, and place the larger supplied “gravel” into the tank. The gravel aids in even distribution of the water flow throughout the greensand, 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 a funnel into the filter tank, and begin to put the greensand media into the tank. While filling, be careful to keep the distributor tube centered as best you can. There should only be enough media to fill the tank 3/4 full. The filter tank should not be filled to the top. It is necessary for the media to have room to move during the backwash cycle. An easy, but slower, way to fill the filter tank is to take a small scoop and pour the media into the funnel. The media can 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 filter tank is completed, remove the tape from the distributor tube. Do not pull upwards on the distributor tube.

The control valve (head) now must be screwed onto the filter 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. You will also note a tank ring that is threaded onto the bottom of the valve – after the valve has been screwed down onto the tank, tighten this ring securely down onto the tank by hand to create a seal.

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. The bypass attaches to the head with two (2) female threaded nuts found on the bypass valve. The control valve has two male threaded ends on the back of the valve these are the inlet and outlet water connections. The two female nuts on the bypass thread onto the 2 male threaded ends of the control valve. Make sure that the two (2) gaskets provided are installed inside of the female nuts on the bypass valve to insure a good seal. Tighten the screws until the bypass valve is firmly seated, but be sure not to over tighten. Located between the inlet and outlet water connection on the by-pass valve, you will find a male threaded nipple. This is the connection for your drain line. Be sure it is connected as per the instructions in step 3 (above). Depending on the size of your system, we may substitute the internal backwash flow control with an external one. If this is the case, refer to the pictures of this control at the end of this document to see proper installation orientation. The external flow control will need to be threaded onto this nipple, with the drain line then connected to it. Note: only some systems will require this device – do not be concerned if your unit is not supplied with one.

Step 6:

Water connections to and from the filter will now be connected to the bypass male threads by using the two female nuts provided. Slip one 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. The two other gaskets provided fit into the female part of the nut on top of the flanged tailpiece. Screw the nut onto the male threads on the bypass 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 (bakelite) 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.

Step 7:

Between the two tanks you will need to connect the furnished plastic tubing. It will be necessary to connect the tube attached to the holding tank to the greensand filter tank elbow located below the head.

Step 8:

Potassium permanganate tank overflow. Attach plastic tubing to the fitting from the holding 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.

Step 9:

With a bucket or hose, pour approximately 1 gallon of water into the potassium permanganate tank. The exact level is not critical – be careful not to overflow the tank.

Step 10:

We recommend that you set a regeneration of one (1) day per week for medium to low iron, manganese and sulfur applications. Twice a week regeneration may be required for higher levels of these contaminants.

Step 11:

Place potassium permanganate powder (purple in color and usually available in two and five pound bottles), and place the up to five pounds of this material into the small potassium permanganate holding tank. The potassium permanganate powder should be placed on top of the white filter pad you will find in the holding tank. With one time per week regeneration, five pounds of potassium permanganate should last three to four months before refilling with new potassium permanganate powder is required.

Step 12:

Make sure the main water supply is off. Depress the Pointer Knob and rotate the knob counter-clockwise into the backwash position. 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 filter material may be lost and plugging of the valve is possible. 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. Let the unit run through a complete regeneration cycle. This will allow the potassium permanganate (now a solution) to be introduced into the filter tank so it can begin to function.

Step 13:

Check for leaks and tighten any loose fittings.

Step 14:

After the regeneration cycle is complete, (it takes approximately one hour) check to make sure that the unit has re-filled the holding tank and that there is no overflow. If no water has been re-introduced into the holding tank, or if any overflow has occurred, then see the "Trouble Shooting" section in the control valve manual. You can now enjoy your filtered water!

Additional Notes:

Be sure to read the cautionary instructions for use and handling found on the potassium permanganate container. Potassium permanganate is an oxidizer, and caution should be used in adding the material to the holding tank.

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 sediment as the accumulated deposits exchange back into the now treated water. Drain your heater at least once a week until you get no more sediment.

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

If your unit is supplied with an external flow control, please note the pictures below for proper installation orientation:



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