CLEAN WATER STORE

Clean Water Made Easy

www.cleanwaterstore.com

5900-BT Greensand Filter

Installation & Maintenance Guide

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

Please review this start-up guide entirely before beginning to install your system, and follow the steps outlined for best results.

GREENSAND MEDIA CONTAINS DUST.

USE PAPER MASK AND VENTILATE TO AVOID BREATHING DUST.

Watch How To Videos

http://bit.ly/2kqSal7

Questions?

- **Call us toll-free:** 1-888-600-5426 or 1-831-462-8500
- **Email us:** support@cleanwaterstore.com
- **See more information on our website:** www.cleanwaterstore.com/resources

Table of Contents

Packing Lists

All systems include:

5900-BT control valve; bypass assembly with 1" connector yoke; power supply; potassium permanganate solution tank; media funnel for adding the Greensand Media; top screen

Find Your Size System to See What is Included:

Greensand Filter 0.75 cubic foot size
8" x 44" filter tank with distributor tube
8 lbs. filter gravel
0.75 cubic foot of Greensand Media.

Greensand Filter 1.0 cubic foot size
9" x 48" filter tank with distributor tube
12 lbs. filter gravel
1 cubic foot of Greensand Media

Greensand Filter 1.5 cubic foot size
10" x 54" filter tank with distributor tube
16 lbs. Filter gravel
1.5 cubic foot of Greensand Media

Greensand Filter 2.0 cubic foot size
12" x 52" filter tank with distributor tube
20 lbs. filter gravel
2.0 cubic foot of Greensand Media

Greensand Filter 2.5 cubic foot size
13" x 54" filter tank with distributor tube
35 lbs. filter gravel
2.5 cubic foot of Greensand Media

Greensand Filter 3.0 cubic foot size
14" x 65" filter tank with distributor tube
50 lbs. filter gravel
3.0 cubic foot of Greensand Media

NOTE: No Potassium Permanganate Powder or Granules is Included but can be purchased separately.

What to Do if Your Tank is Not Level Out of the Box:

Your black filter tank base is not glued to the bottom of your tank. Occasionally tank bases will become crooked during shipment.

If you find that that your tank does not sit level on the floor, you can easily adjust it by holding the empty tank and rapping it on a concrete or solid floor once or twice to level.

How Your Greensand Filter Works

Water enters the top of the tank and flows down through the media and up the distributor tube.

The Greensand Filter removes iron and manganese as the water flows through the greensand media.

During backwash the flow of water is reversed and water flows down the distributor tube and up through the media, lifting and expanding the Greensand Media.

The 'brine cycle' next draws in potassium permanganate solution and allows it slowly rinse through the greensand filter media, cleaning and restoring the greensand.

Next is a rapid rinse where the potassium permanganate is thoroughly washed out of the filter. The final stage is a refill of the potassium permanganate tank.

System Installation Overview

1. Put gravel in first, then Greensand Media.
2. Add ½ cup household bleach down center distributor tube and fill tank with clean water. The longer it soaks while you are doing everything else, the better.
3. Make the plumbing connections from your existing system to the bypass assembly, installing extra valves, unions, pressure gauges and hose bibs as needed.
4. Attach the control head to the tank, and to the bypass assembly.
5. Install the Drain Line tubing and Drain Line Tubing Flow Control button (Internal for models 2.0 CF and less, or External flow control assembly for models 2.5 CF and greater)
6. Connect the 3/8” black tubing (inside pot perm tank) to potassium permanganate tank and add enough water to pot perm tank to cover white pad with 1” of water.
7. Plug in the power supply and program the valve.
8. Follow the instructions to put the system online and to verify the system is leak-free.

Pre-Installation

1. Review your packing list to make sure you have received all the part.
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.
3. Pick a suitable location for your filter system on a dry level spot where it won’t be exposed to freezing temperatures, direct sunlight, wind or rain.
4. **NOTE: After the system is installed, your water may be discolored, or full of sediment or rust, especially if you have older or corroded piping. This typically clears up over a day or two.**

Best Practices for Piping & Drain Installation

1. See typical installation (Fig 3). The greensand filter is installed after the pressure tank.
2. Make sure to connect the IN pipe to the 5900-BT inlet and the OUT pipe to the outlet (see Fig 2). As you face the 5900-BT control from the front, the water enters on the right and exits on the left. From the back (see Fig 3) the water enters on the left. The inlet and outlet are attached to the bypass valve, which is marked with arrows as well.
3. Make sure there is a working gate or ball valve before the 5900-BT Greensand Filter and also one after as shown in Fig 3. The pressure gauges are optional and perhaps not necessary but a hose bib (which is a faucet that you can attach a garden hose to) is strongly recommended after the Greensand Filter and before the second ball valve. This makes it easy to rinse your new Greensand Filter on start-up and gives you a place to test the water before it enters your household plumbing.
4. If you will be using copper piping, do not sweat the copper pipe directly on to the 5900-BT control valve. Avoid heating up the 5900-BT control valve plastic with the torch.
5. You do not need unions to install your 5900-BT control valve. If you need to remove it, the 5900-BT has quick-release couplings that make it easy.
6. The drain line tubing is connected to a drain from the drain outlet using flexible 5/8” ID tubing. The drain can run up above the control head and out to a drain, although this may require installing a one way, flapper-stlye check valve. 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 (if running tubing into the washing machine drain pipe, for example).

Greensand Iron Filter Piping for Well Water Systems

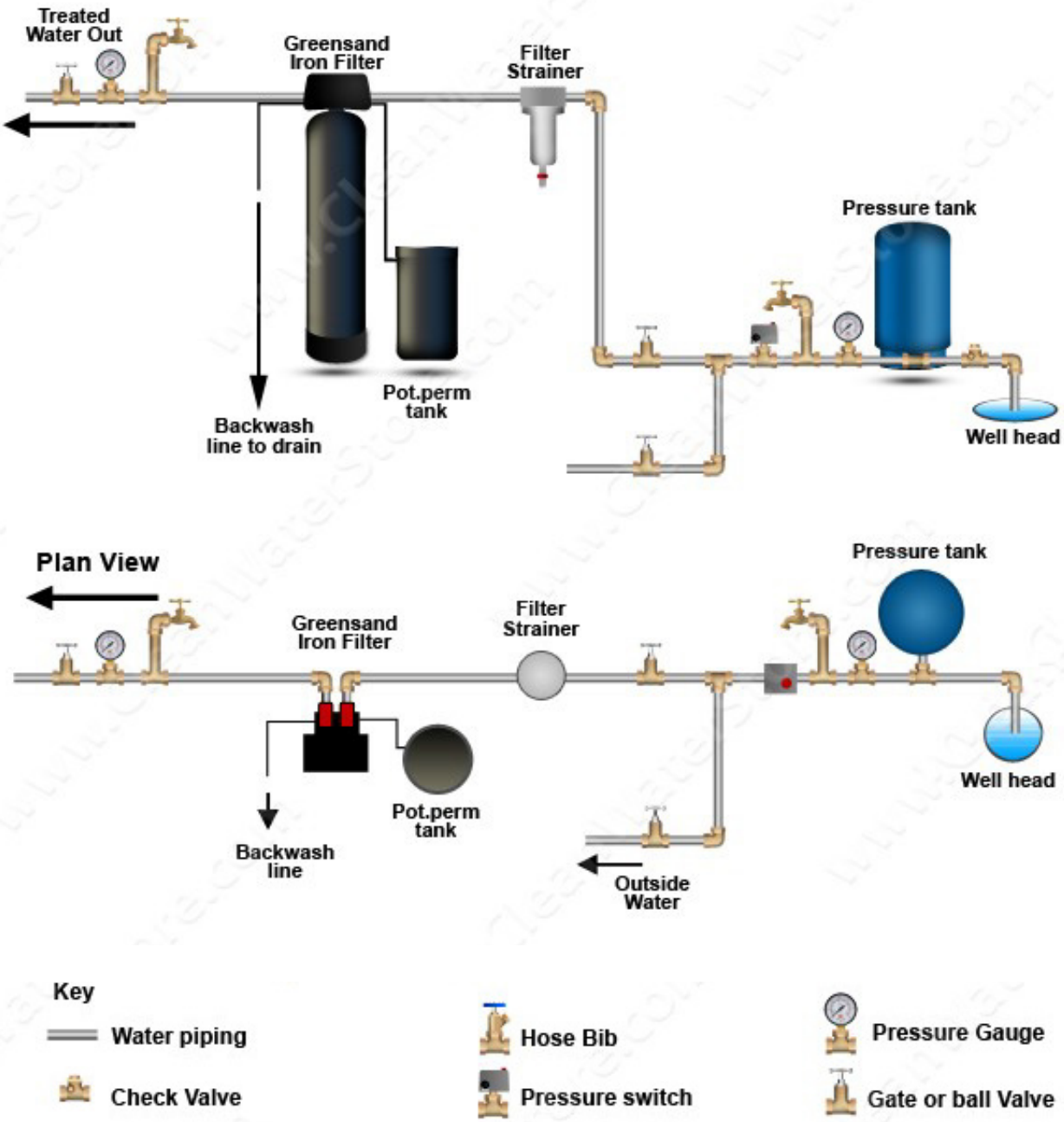
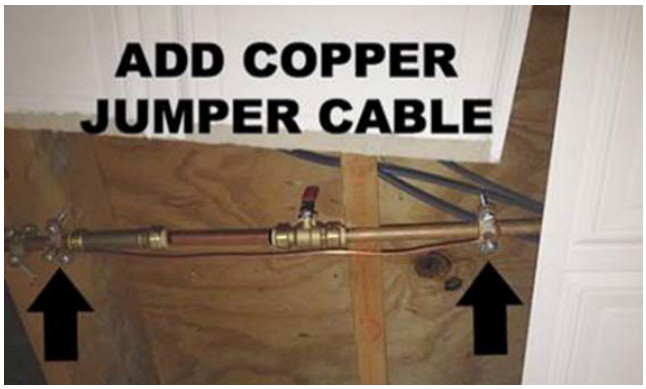


Fig 3

Installation Steps Overview

1. Install on a level floor or surface.
2. Unit must be installed at least 10 feet ahead of the inlet to a water heater to prevent damage due to back-up hot water or use a check valve to prevent hot water back-up.
3. DO NOT install unit in an area of direct sunlight or where freezing temperatures may occur.
4. Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
5. **Note:** If household plumbing is galvanized and you intend to make the installation with copper obtain di-electric unions to prevent dissimilar metal corrosion.
6. **Caution:** If sweat soldering copper pipe (remember to always use lead free solder and flux), cover yoke and bypass valve with wet rags to prevent heat damage to connections and control valve. If using PVC or plastic pipe, primers and solvent cements specifically recommended for use with potable water are required.
7. **Copper Piping:** If your new filter system is to be installed in a metal (conductive) plumbing system, i.e. copper or galvanized steel pipe, the plastic components of the system will interrupt the electrical continuity of the plumbing system.

   As a result, any stray currents from improperly grounded appliances downstream or potential galvanic activity in the plumbing system can no longer ground through the contiguous metal plumbing. Some homes may have been built in accordance with building codes which encouraged the grounding of electrical appliances through the plumbing system.



   A grounded “jumper wire” bridging the equipment and reestablishing the contiguous conductive nature of the plumbing system can be installed prior to your systems use. A simple ground jumper wire with a pipe clamp can be purchased at any Home Center, or hardware store etc. for a few dollars.

Start Installation

1. Make sure to connect the IN pipe to the inlet and the OUT pipe to the outlet (see previous page). As you face the 5900-BT control from the front, the water enters on the right and exits on the left. From the back the water enters on the left. The inlet and outlet are attached to the bypass valve, which is marked with arrows as well.
2. Make sure there is a hose bib installed after the system, and a working gate or ball valve before the filter system and one after as shown in Fig 3. The pressure gauges are optional (although strongly recommended) but a hose bib (which is a faucet to which you can attach a garden hose) is strongly recommended after the Greensand 5900-BT Filter and before the second ball valve. This makes it easy to rinse your new 5900-BT on start-up and gives you a place to test the water before it enters your household plumbing.
3. If you will be using copper piping, do not sweat the copper pipe directly on to the 5900-BT control valve. Avoid heating up the 5900-BTcontrol valve with the torch, as the plastic will melt.
4. You do not need unions to install your 5900-BT control valve. If you need to remove it, the 5900-BT control valve has quick-release couplings that make it easy to put the 5900-BT on by-pass and remove the filter system from the piping.
5. The drain line tubing is connected to a drain from the drain outlet using flexible tubing. Note that the drain line can run up above the 5900-BT control a few feet and into a drain, it does not have to drain down, as the filter backwashes under line pressure. If the drain line is more than 8 or 10 feet, then it is better to run the flexible tubing into a larger diameter tubing such as 1” or 1-1/2” PVC.
6. Most plumbing codes require an air-gap connection for the drain line tubing, so that if your sewer or septic tank backs up, it cannot cross connect with the drain tubing.
7. There are two styles of funnel that we ship, depending on availability; you get either the blue or black funnel.

Add the Filter Media and Install 5900-BT Backwash Valve on Tank

1. If a blue funnel, cover the top of the distributor tube with black electrical tape, duct tape or masking tape so that no gravel or media will go down the distributor tube when adding the media. Leave a folded tab of tape so you can easily pull off the tape after filling the tank.
2. Make sure you "test fit" the distribution tube, and find the divot that keeps the tube centered, before adding the gravel and media. Hold the tube center until there is enough gravel and media to support the tube. The top of the distributor tube should be level with the top opening of the filter tank and not stick up higher than the top of the tank.

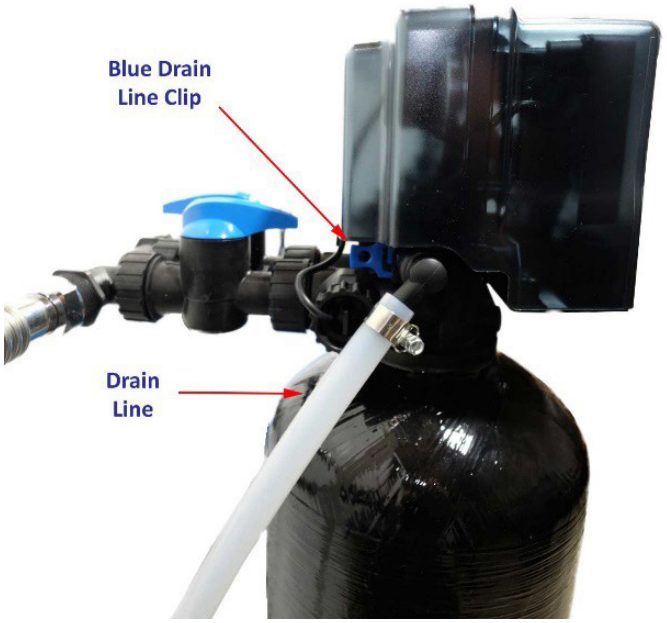
3. Add the filter gravel that came with your order. The gravel should cover the bottom distributor screen before adding the greensand filter media.
4. Next, add the greensand. The tank should be about 2/3 full of media, do not fill much more than 2/3 full, even if there is media left over. We ship the correct amount of media to fill your tank for most orders.

Make sure top of distributor tube Is level with top of tank

5. Add ½ cup household chlorine bleach down distributor tube and then fill tank completely with water and allow to soak for at least 1 hour up to 24 hours.
6. Remove tape from top of distributor tube. Be careful not to pull up distributor tube. If you pull up the distributor tube up after the gravel and media are in the tank (upon initial install or any time after, for service, etc.), it must be re-seated. It is usually possible to do this by spraying water down the distributor tube with a garden hose while pushing on the end of the tube. If not, the media will need to be removed and re-installed.

7. Attach plastic top screen to the under-side of the 5900-BT control valve. It is a funnel- shaped plastic screen that snaps on to the control valve and prevents resin from being backwashed out to drain during the regeneration cycles. It may twist on clockwise or counter-clockwise.

8. Add a small amount of silicone grease to both O-rings (only O-rings, not tank thread) onthe bottom of the control valve and screw on control valve.
9. Do not lubricate tank threads or any other fittings other than O- rings. Do not use pipe-joint compound, tape or lubricant on tank threads.
10. Do not hard pipe the drain line with PVC or copper, use flexible tubing. If you use hard PVC piping for the drain line, you must able to remove the hard drain piping and attach flexible tubing for testing purposes.



External Drain Line Flow Control ("DLFC")

If you bought a 2.5 cubic foot or larger 5900-BT Greensand Filter System you will get an external Drain Line Flow control with your order.

This is made up of three pieces: a 1" x ¾" Adapter, the DLFC, and two hose barb fittings.

External Drain Line Flow Control
(not used on all systems)

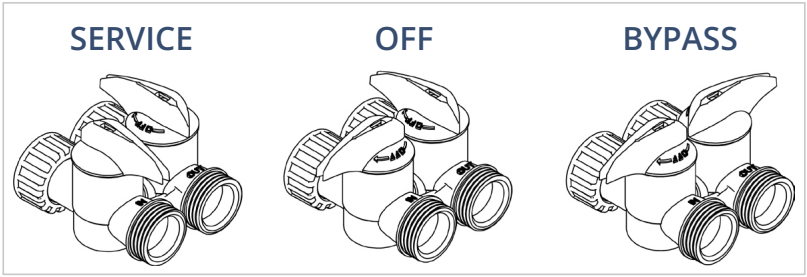
Assemble the 3 parts using Teflon tape, making sure the flow arrow is facing the right direction. This can go anywhere in the drain line run, even at the end. Clamp it to a wall, especially when running the drain line "up and out".

Attach the Bypass

Make sure there is lubricant on all three sets of O-rings and insert and screw the bypass onto the end connectors (they are already on the valve, with the Inlet Air Check Valve on the left, Inlet side).

Screw the Elbow fittings onto the end of the bypass and attach to service pipe.

Note: There is supposed to be some "play" in the whole assembly, do not attempt to screw them too tight.



Pot Perm Tank Set Up

1. First remove the rubber band in the pot perm tank, that comes on the float assembly from the manufacturer.
2. Add enough clean water to the pot perm solution tank to bring water level about 1” above the felt pad.
3. Add one 2 or 5-lb jug of potassium permanganate granules to the potassium perm tank by pouring it directly on top of the white felt pad.
4. Do not pour permanganate down thewhite plastic brine well where the black line is attached.
5. See the over-flow barbed fitting for the safety float on the side of the perm tank.
6. You do not have to connect this to a drain.
7. But, if the safety float were to malfunction, there is a small chance that pot perm solution will leak or drip out of this fitting.
8. If this would cause a big mess where you have installed the greensand filter, hook some tubing to this and run to a bucket, floor pan or floor drain. Normally no pot perm solution will leak out of this fitting.

Next: Program Your Valve

Main Menu

1. Remove cover by pulling out front and back tabs slightly and lifting straight up to access control panel.
2. Enter main menu, by pressing the Menu/Enter button once (Time of day will flash)
3. Set current time of day by pressing the Set/Change button (First digit will begin to flash)
4. To change digit value, press the Set/Change button.
5. To accept the digit, press the Menu/Enter button
6. Once the last digit for current time of day is accepted all digits will flash.
7. With all digits flashing next press the Menu Button to set A.M. or P.M.
8. Once A.M./P.M. is accepted the next menu item will flash
9. To Set Number of Days Between Backwash Cycles (A) Press the Set/Change Button and set number of days between cycles. Maximum value is 29.
10. **The recommended initial setting for the Greensand Filter is every 4 days for families or heavy use and every 7 days for 1 to 2 persons in the home. If you experience pressure loss or see iron in water in between backwashes, increase frequency of backwash up to once per day.**
11. To exit menu, press the Menu/Enter button. Now the 5900-BT control will alternate the display number of days until next regeneration and current time of day.

Master Programming Mode

To enter Master Programming Mode press and hold both buttons for 5 seconds. To change a value, Press the Set/Change buttons. When done, press the Menu/Enter button to go to the next step.

1. **Regeneration Time (r)**

   The first master programming display viewed is the option setting for Regeneration Time. It is identified by the letter 'r' in the left digit. Set the desired time of day that a regeneration (the backwash and rinse cycles) will occur, when required.

   We recommend setting the system to backwash at 2 AM, or at any time that it is unlikely that any water will be used. If you have 2 or more filters, make sure they are programmed to start an hour apart, so they do not backwash at the same time.

   The first digit(s) indicates the Hour and the other digit indicates A.M. or P.M. Example: 12 A.M. regeneration time - [r 12A] (factory setting)

   With all digits flashing press the Menu Button to set A.M. or P.M. Once A.M./P.M. is accepted the next menu item will flash.

2. **Regeneration Cycle Step Programming Times**

   The next 4 displays viewed are part of a series of option settings used to program minutes for Regeneration Cycle which is where filter backwashes, draws in permanganate, rinses media of any permanganate, and then refills permanganate tank with water to make more solution.

   Set each step according to the values below, appropriate for a Greensand Filter:

   a. 10 minutes. This is the Backwash cycle. [1 - 10]
   b. 60 minutes. This is the Brine Draw cycle. [2 - 60]
   c. 8 minutes. This is the Rapid Rinse cycle. [3 - 6]
   d. For the "Brine Refill Cycle" (Pot Perm Tank Refill), set the time according to the size of your system below:

   0.75 cf: [4 – 4]. 1.0 cf: [4 – 5]. 1.5 cf: [4 – 6]. 2.0 cf: [4 – 6]. 2.5 cf: [4 - 6]. 3.0 cf: [4 - 8].

3. **Blue Tooth Settings and Password:** Next item is: bE 1 which means Blue Tooth enabled. Press Menu Enter and next will displayed: btPP and flash between that and the password 1234. 1234 is default password for Bluetooth feature. If you wish to change it press Set/Change. Press Menu/Enter to exit Master Programming. If you wait 60 seconds Master Programming will automatically be exited.

4. **Brine Pre-Fill Enable:** With Prefill Enabled, step 4 will occur 1-4 hours before the regen time (depending on how you set it). If you have it set at the default regen time of 2 am, and you have prefill enabled with a 2 hour delay (we recommend at least 2 hours to make sure it has enough time to make brine), then it will do step 4 at midnight, and then at 2 am, it will do steps 1,2,&3.

See Historical Data and Real Time Flow Rate

Pressing and holding Menu/Enter button will access options to show you history & flow rate:

Flo- this is the flow rate, if water is running, it will display the volume, in gallons per minute.
Gt r- This the total # of gallons that has gone through the filter.
g tot- this is the same as the previous.
rC r- number of regeneration done. **rC-** the same.
gPdL- shows how many gallons used each day.
Gbrl- is the gallons used between regenerations.
PfDL- This shows the peak, or highest flow rate that has passed through filter in last 24 hours.

If you wish to exit these options, keep pressing the Menu/Enter button until you have returned to the service screen.

Start Up Your Greensand Filter System

1. Greensand filter media has a lot of black fines or dust, and must be rinsed free by backwashing and rinse, which may take several backwashes. During the first backwash, you can unplug the 5900-BT control (system will stay in backwash mode) and allow an extra 10 minutes of backwashing to clean out the fines, during the initial start-up.
2. MAKE SURE THE SOUCE WATER ENTERS THE INLET PIPING (IN OTHER WORDS, THAT THE SYSTEM IS PIPED IN CORRECTLY, WITH THE WATER INLET TO THE INLET ON THE BYPASS VALVE)
3. MAKE SURE THAT BOTH THE INLET AND OUTLET BYPASS VALVES ARE CLOSED INITIALLY
4. MAKE SURE TO CLOSE THE BALL VALVE OR GATE VALVE AFTER THE FILTER SO NO WATER CAN ENTER THE HOME DURING THIS INITIAL BACKWASH. (If you did not install a hose bib and gate or ball valve after the system as recommended, be sure to NOT use any water in the home during the initial start-up.)
5. If you have any filters or softeners installed after the filter system, bypass them until all media fines have been rinsed.
6. Add 5 lbs of potassium permanganate powder to the pot perm tank, on top of the white pad. Add enough water to cover pad by 1”.

7. Control valve: If days remaining is not already at 1 press and hold the Set/Change button. Now, press and hold the set change button again, until the valve begins the backwash cycle and the display reads 1 – 10.
8. Start to put the valve into the service position by turning inlet the bypass knobs counter-clockwise about a quarter inch, until you can hear water passing through the bypass into the filter. Stop and wait until you see water coming out of the drain line. It will often be mixed with air bubbles, but we will want to get that air out. After several minutes, you should have the valve fully open, and with no media coming out. The water will be black.
9. Verify that the backwash flow corresponds with the size of your system below. You can easily run the drain hose to a bucket and using a watch verify the flow rate in gallons per minute. An adequate backwash is critical to properly clean the Greensand media and prevent it from cementing together:

0.75 CF	**5 GPM**	**2.0 CF**	**7 GPM**
1.0 CF	**5 GPM**	**2.5 CF**	**10 GPM**
1.5 CF	**5 GPM**	**3.0 CF**	**12 GPM**

10. Cycle Step 2, the Brine Draw, where the permanganate gets sucked in, is for 60 minutes. Confirm that the permanganate solution in pot perm tank is being sucked down, it should be empty after 15 minutes. If not, check tubing connections and make sure float assembly is working. Once it has sucked the permanganate into tank, it will do slow rinse for the rest of the cycle. A small amount of water will be coming out of the drain line during the time.
11. Allow to go through a complete regeneration (backwash, brine draw, rinse, pot perm tank refill). Run water from the hose bib directly after the Greensand Filter to make sure water is clean. Run and flush fixtures to clean out any rust or sediment in the house piping.

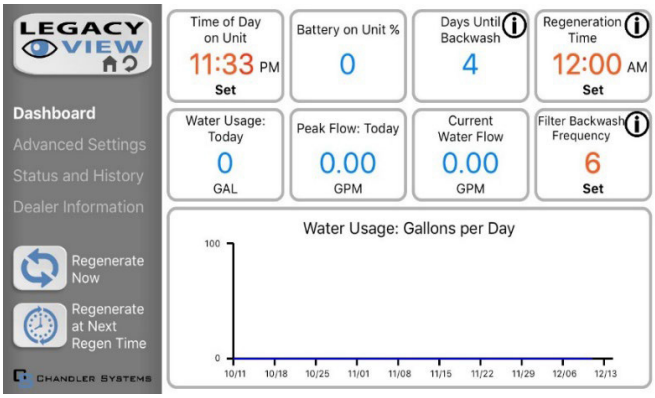
CONGRATULATIONS,
YOU ARE DONE STARTING UP YOUR GREENSAND SYSTEM!

Installing and Using the Optional Legacy View App

For simplified set up and control, please install the Legacy View on a compatible Bluetooth 4.0+ enabled smart phone or tablet.

1. Download and install the Legacy View app from the Google Play Store, Apple App Store.
2. Open the Legacy View app
3. Choose a valve device at any time from the list of available devices to connect to by clicking on it (which means your 5900-BT control valve, or valves if you have more than one system)
4. If the valve you want to connect to doesn't show up, or there is a problem connecting press the "Scan for Devices" button or the Legacy View logo to refresh and start the process over.
5. If the valve device is a BTLE valve and it has a password other than the default password, the first time you connect to it the app will ask you to enter the password.
6. After entering it the first time you should not need to enter it again unless it changes.
7. The control valve firmware can be updated by the App. When the app is updated from the Google Play Store or the Apple App Store, it may contain an updated firmware program for the valve devices.
8. These updates could contain new features or operational improvements. It is up to the user to allow these updates to be sent to the valve device. Uploading a new program takes approximately 1 minute.

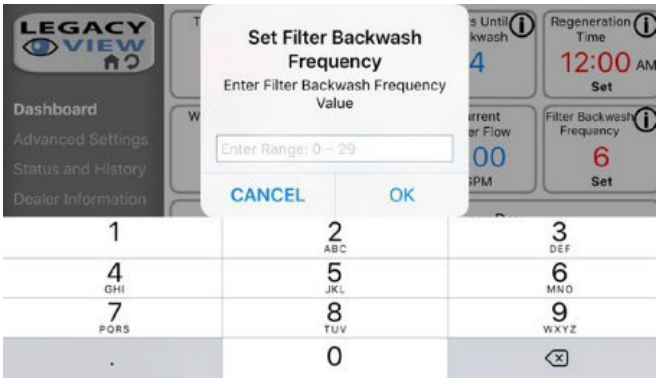
Legacy Phone App Dashboard



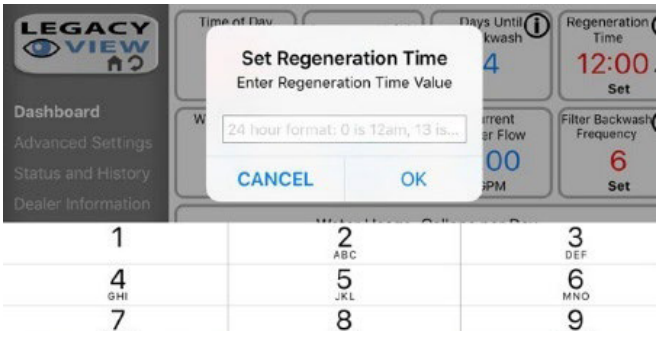
From the Dashboard, all items in **ORANGE** can be changed, while blue fields are informational only.

If you are unsure about the function of the item, click the Info icon for more information.

1. Change Time of day (Press “set” to set time automatically based on device time)

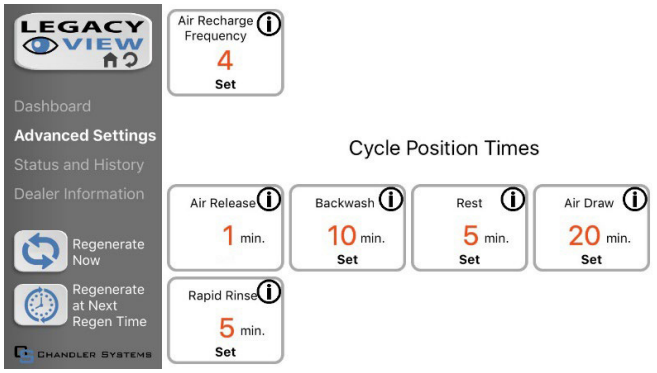


2. Set Backwash Frequency. This sets the amount of days between backwash (regeneration) cycles.



3. Set Regeneration Time. Example: For 2am, just type 2 and press OK.

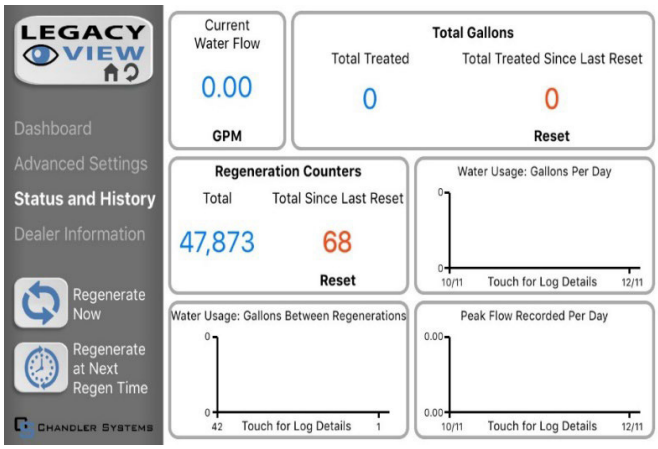
Legacy App Advanced Settings



From the Advanced Settings, all items in **ORANGE** with a "set" button can be changed.

Touch any table to explode a detailed list of the last 60 days.

Status and History Using Legacy View App



From the Status and History, all items in **ORANGE** can be reset.

Start a regeneration or backwash cycle

Option 1: Click on "Regenerate Unit Now."

If you would like to force the unit into the next cycle step, Click "Go to next Regeneration Step."

Option 2: "Regenerate Unit at next Regen Time" button. This will take the system into a backwash at the next regeneration time.

Filter System Normal Operation

- The normal display alternates between time of day and days until regeneration.
- Days remaining until the next regeneration will count down from the regeneration day override value to 1 day remaining. Regeneration will start next scheduled regen time.

Battery Back-up (9 Volt Battery Required)

Attach a 9v battery to its cable. The battery lays on bottom plate of the valve, below circuit board assembly. DO NOT INSTALL BATTERY UNTIL AFTER INITIAL BACKWASH. The purpose of the battery is to hold the clock time during a power outage (all other values are stored on the circuit board) and to advance the valve to a cycle step that will not allow water to run to drain, if the power failure occurs during a backwash cycle.

How to Start A Manual Backwash

1. If days remaining is not already at 1 press and hold the Set/Change button. After 7 seconds the days remaining display will read: [1]
2. With days remaining at 1 press and hold the Set/Change button again. After 5 seconds the regeneration cycle will begin.
3. Fast Cycling Through each Step: First complete above immediate cycle steps; Press and hold the Set/Change button. After 3 seconds valve will start to advance to next step.

When to Add Potassium Permanganate

Add one 5-lb jug of potassium permanganate every 3 - 4 months. Check the potassium permanganate solution tank and when you see the mound of potassium permanganate disappear after a few months, just add another 5-lb jug.

In some cases, you won't see the mound; you might just see solution after a couple of weeks. If you have it set to regenerate (backwash cycles) every 1 – 3 days, you might need to add it more frequently, perhaps every 2 months.

Troubleshooting Section

Pot Perm Not Being Sucked in During Regeneration

Most problems occur when the 5900-BT is not drawing in the permanganate. Make sure the injector is drawing in the brine:

1. Remove the brine tank tubing where it enters the 5900-BT control valve.
2. Initiate a backwash and skip to the Brine Cycle by following the steps below:

   A. Start delayed extra cycle
   • If days remaining is not already at 1 press and hold the Set/Change button.
   • After 3 seconds the days remaining display will read 1
   • Regeneration cycle will be initiated at the next designated regeneration time

   B. Start Immediate Extra Cycle
   • First, complete above delayed cycle steps
   • With days remaining at 1 press and hold the Set/Change button
   • After 3 seconds the regeneration cycle will begin.

   C. Fast Cycling Through Regeneration
   • First complete above immediate cycle steps
   • Press and hold the Set/Change button
   • After 3 seconds the valve will start to advance to the next step, which is the Brine Cycle, where it is supposed to suck in the brine solution.
3. If it is sucking strongly, check the brine tank float inside the pot perm tank and make sure there are no rubber bands around it, and that is free of obstructions. It may need to be replaced or cleaned, if there is suction, but no permanganate is being drawn in.
4. If there is NO suction at the control valve port where you removed the brine line tubing, then the injector should be cleaned.
5. If the injector has been cleaned and there is still no suction check to make sure there is obstruction in the backwash line; that the backwash line does not go up and over the Greensand Filter control valve more than several feet (which causes pressure loss and the injector not to work correctly); finally check to make sure there is enough pressure. If possible increase your water pressure from your well pump and see if a slightly increased pressure makes the injector work. We recommend a minimum 30 PSI but it does work better if there is 40 to 50 minimum PSI.

Cleaning or Replacing the Piston, Seals & Spacers

1. Over time, hardness minerals rust, and sediment might build up in the valve. The piston travels up and down during each backwash cycle, inside a seal and spacer set. If scale, sand, grit or other sediment gets trapped between the piston and spacers, it will eventually fray and tear the inside edge of the seal it will then leak to drain constantly until the seals are replaced.
2. **If you remove and inspect and clean the seal and space and piston set before it gets bad, then you can re-use the same seals and spacers and piston. If there is no flow out of the drain line when in service position, then the piston is fine.**
3. The piston, seals and spacers can all be fine, and the valve is still leaking to drain. This means there is some grit trapped inside, removing it all and cleaning and re-assembling it will fix it. Clean out the area where the seals and spacers go as well.
4. The piston only needs to be replaced if there are score marks on the sides, those will make a tiny path for water to leak to drain.
5. Remove the control valve cover.
6. Remove screw and washer at drive yoke.
7. Remove powerhead mounting screws. The entire powerhead assembly will lift off easily.
8. Remove piston retaining plate screws.
9. Pull upward on end of piston rod yoke until assembly is out of valve. Remove seals and spacers. (Note: Special end spacer must be reused)
10. Lubricate new seals with silicone lubricant included in the seal and spacer kit. Make sure the special end spacer is properly seated in the valve body.
11. Install new seals and spacers individually, pressing around the outer edge of each seal to make sure it is seated. When all seals and spacers are seated properly, you will have a 1/4” of space between the top seal the top of the valve body.
12. Take new piston assembly and push piston into valve by means of the end plug.
13. Twist drive yoke carefully in a clockwise direction to properly align it with drive gear. Reinstall piston retaining plate screws.
14. Place powerhead on top of valve. Be sure drive pin on main gear engages slot in drive yoke.
15. Wide side of yoke upright must face to the left away from the motor.
16. Replace powerhead mounting screws.
17. Replace screw and washer at drive yoke.

Error Codes

There are five (5) error codes that could indicate a possible problem with the control valve:

Error 2 – Homing slot expected. Valve will start looking for home. (Normal operation continues)
Error 3 – Encoder is not sending a signal (Either encoder chip has failed, or is not connected)
Error 4 – Unable to find homing slot (Usually because encoder chip has failed)
Error 5 – Motor overload (stalled position or shorted motor, valve requires service to continue)
Error 6 – Motor not getting power (usually means the cable has disconnected from the circuit board.)

Low or Inadequate Backwash Flow Rate

One problem that may occur is if you do not have enough backwash flow rate to properly clean the Greensand filter media, particularly if you are on well water and have very low flow and pressure (not usual).

"Flow Rate" is simply how many gallons will flow in one minute, out the drain tubing. If the system is in a backwash and flowing, if it fills a 5-gallon bucket in one minute, it is "5 GPM"

You can verify the backwash flow rate by running the drain line into a bucket and timing it when the 5900-BT control is in backwash.

Problems with Pressure Loss or Reduced Flow

1. First make sure that the problem is the Greensand Filter and not another cause. Check the flow rate out of a faucet, with the 5900-BT control valve on by-pass.
2. Greater flow and pressure when the unit is on bypass does mean the problem is in the filter. No change would indicate the problem is before the filter.
3. **The valve:** Over time, deposits can build up on the inside of the valve, and prevent the piston from moving, or fully advancing to where it needs to be – like an elevator stuck between floors – and this can affect the flow. The solution is to replace the seals and spacers, clean the valve where you removed the parts, clean and inspect piston, re-install.
4. **The filter media:** As is already noted in the guide, the backwash must be done with the sufficient flow rate and be backwashed frequently enough to keep the filter media clean and free of rust.

5. **Mud-ball formation:** If your water has high levels of sediment, silts, or clay getting into the filter, over time these elements can combine to form balls which will ruin filter performance. If multiple backwashes do not recover the media, you must take the control head off and inspect the media.
6. Sometimes the flow is being restricted because of sediment accruing and forming small balls of mud, which cannot be washed out of the system. If this is the case, replace the filter media.

Replacing the Greensand Filter Media

Typically, after 4 to 6 years the Greensand Media will stop removing iron efficiently and needs to be replaced. To accomplish this:

1. Turn water to system and depressurize the filter by opening a hose bib or faucet after the Greensand filter system.
2. Put system on bypass and remove the union fittings between the bypass valve and the 5900-BT control valve.
3. Unscrew the control valve and set aside.
4. Siphon water out of the Greensand filter by inserting a small flexible tube down the distributor tube and siphoning out the water.
5. Lay down clean tarp outside or somewhere you can flush water and clean the tank out.
6. Insert a garden hose in the tank and allow water to flow down center distributor tube. Greensand Media will begin to flow out on to the tarp.
7. Flush out all Greensand Media and gravel and discard to landfill or trash. Observe all local laws and codes, generally it is acceptable to dispose of the media in a landfill.
8. Rinse out filter tank until clean.
9. Add a ½ cup of household bleach and a few gallons of water and rinse inside of tank
10. Rinse out filter tank until chlorine is gone.
11. Add gravel and new Greensand media and re-start up system following original directions in this manual.

System Not Backwashing Adequately

The other main problem that may occur is if you do not have enough backwash flow rate to properly clean the water Greensand Filter. You can verify the backwash flow rate by running the drain line into a bucket and timing it when the 5900-BT is in Cycle 1 or backwash.

A 1.0 or 1.5 cubic foot system should have 2.0 gallons per minute and a 2.5 cubic foot system should have 4.0 gallons per minute of backwash.

Pot Perm Tank Not Filling with Enough Water

Sometimes if the pot perm tank is not filling adequately, it is possible that the float assembly in the tank is set too low. You would want the float to be several inches above the air check valve inside the tank.

This will allow for enough water to be added to the tank before shutting the brine fill cycle.

If necessary, pull the float assembly rod up to the appropriate height, and cut the rod at that height, leaving while keeping the rubber washers the adequate space to hold the float in place.

Backwash Flow Rate

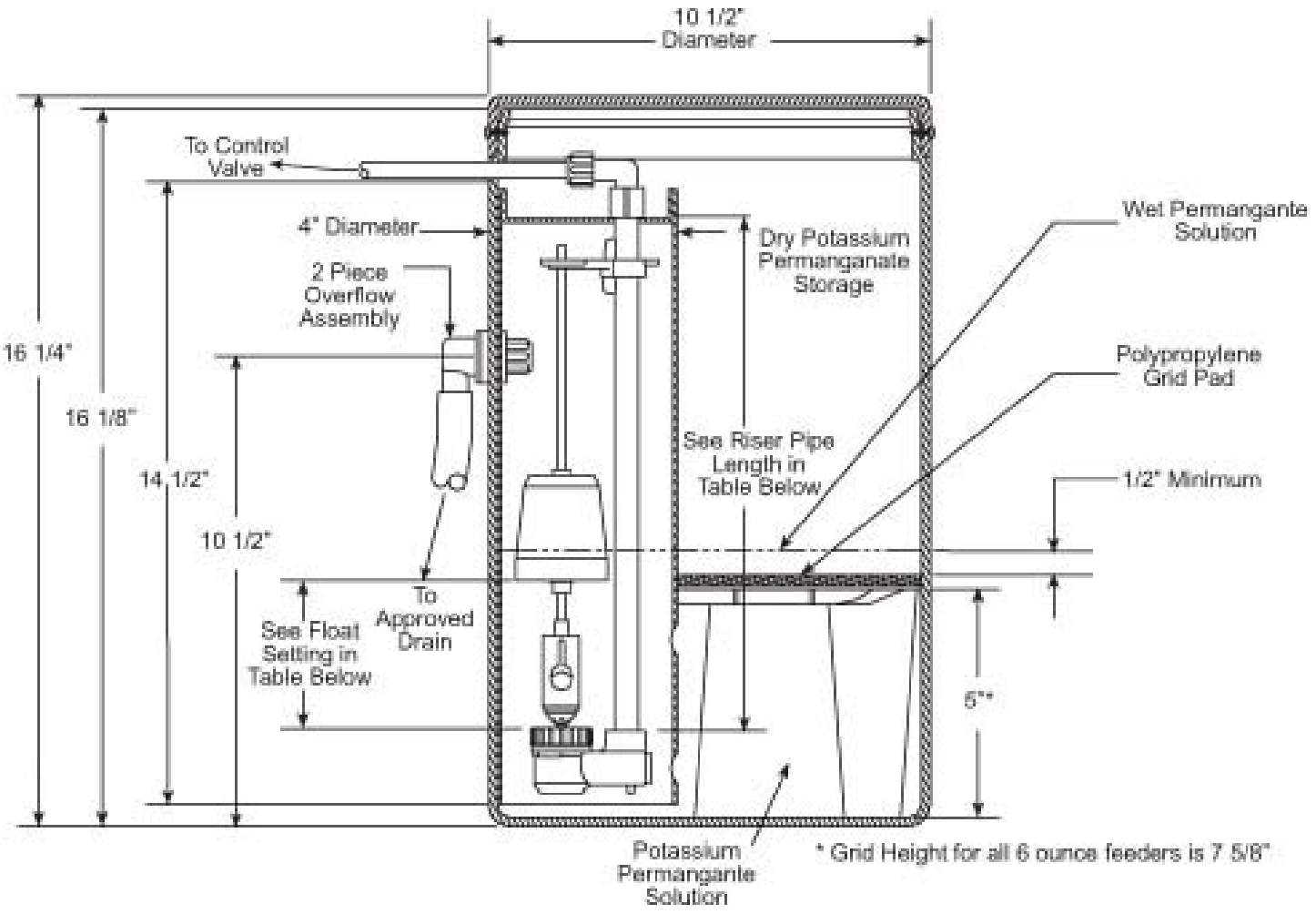
One problem that may occur is if you do not have enough backwash flow rate to properly clean the filter.

You can verify the backwash flow rate by running the drain line into a bucket and timing it when the 5900-BT is in Cycle 1 or backwash.

A 1.0 or 1.5 cubic foot system should have 5 gallons per minute and a 2.5 cubic foot system should have 10 gallons per minute of backwash.

In some cases, the 5900-BT may not be programmed correctly. See the 5900-BT service manual for instructions on how to access the master programming.

Potassium Permanganate Tank with Float



Permanganate Tank Not Filling with Permanganate Solution

Potassium permanganate is a powder that is poured on top of the “grid pad” in the pot perm tank.

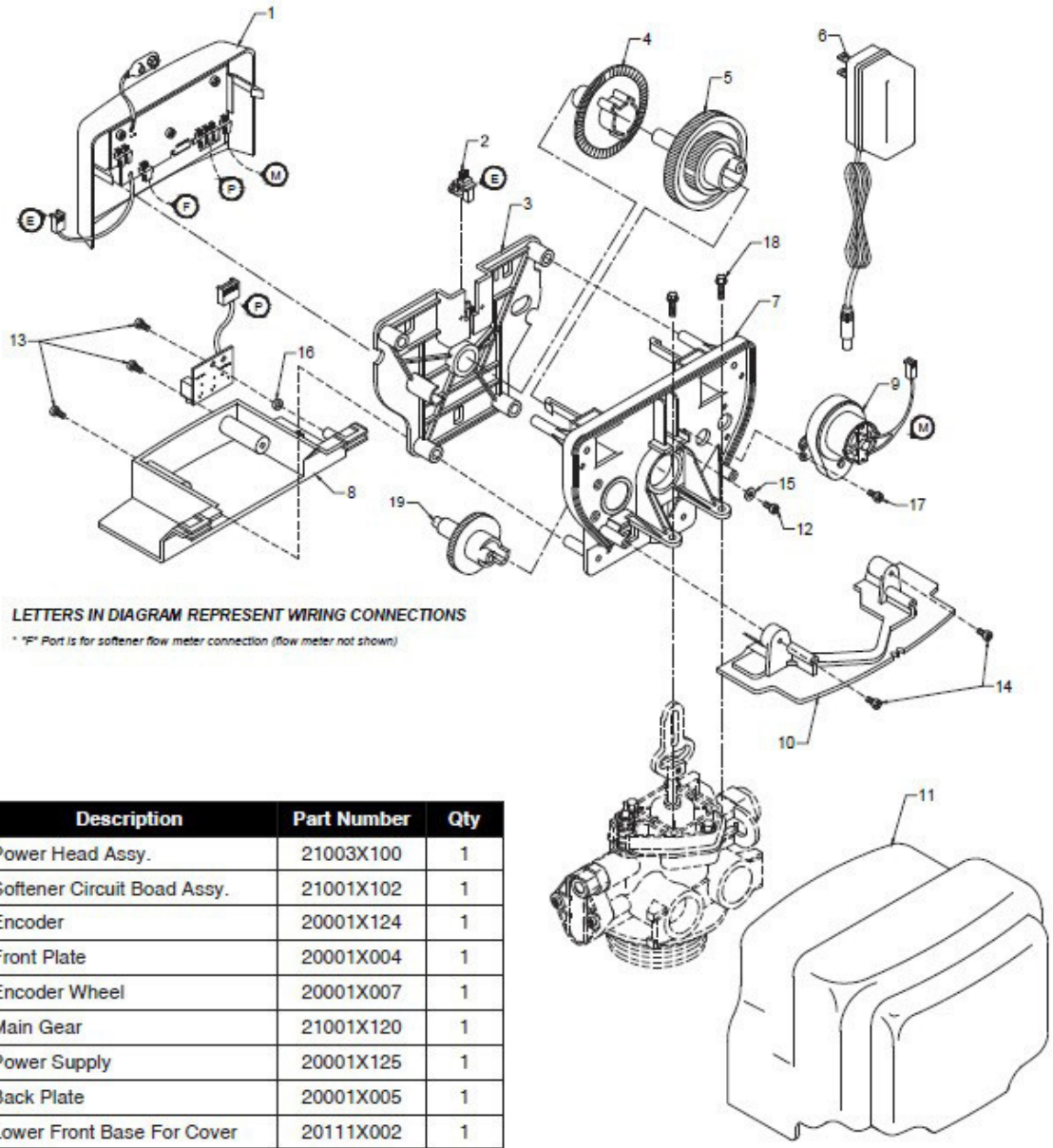
During the brine fill cycle, water is added to the pot perm tank to make up the pot perm solution required for the next regeneration.

1. If your pot perm does not have ½” to 1” of solution above the grid pad, the first to check is to make sure it is filling the tank:
2. Disconnect the 3/8” black poly line at the pot perm tank or at the control valve.
3. Put the system into a regeneration cycle and advance to the Brine Fill cycle.
4. If it IS filling, remove the safety float and make sure the air check ball is moving free and not stuck. A stuck float is often the cause of this problem and can be easily fixed.
5. If the float is defective or older than 5 years, replace float.
6. If it is NOT filling during the Brine Fill (BF) cycle, then make sure there are enough minutes. It should be set for 12 minutes for standard size Clack pot perm tanks. If you have a larger commercial size tank, set for 20 minutes.
7. If it is still not filling, the brine valve may need to be cleaned. In the 5900-BT manual, in the diagram “Valve Assembly”, disconnect the parts listed and clean them thoroughly.

Problem / Symptom Troubleshooting Chart

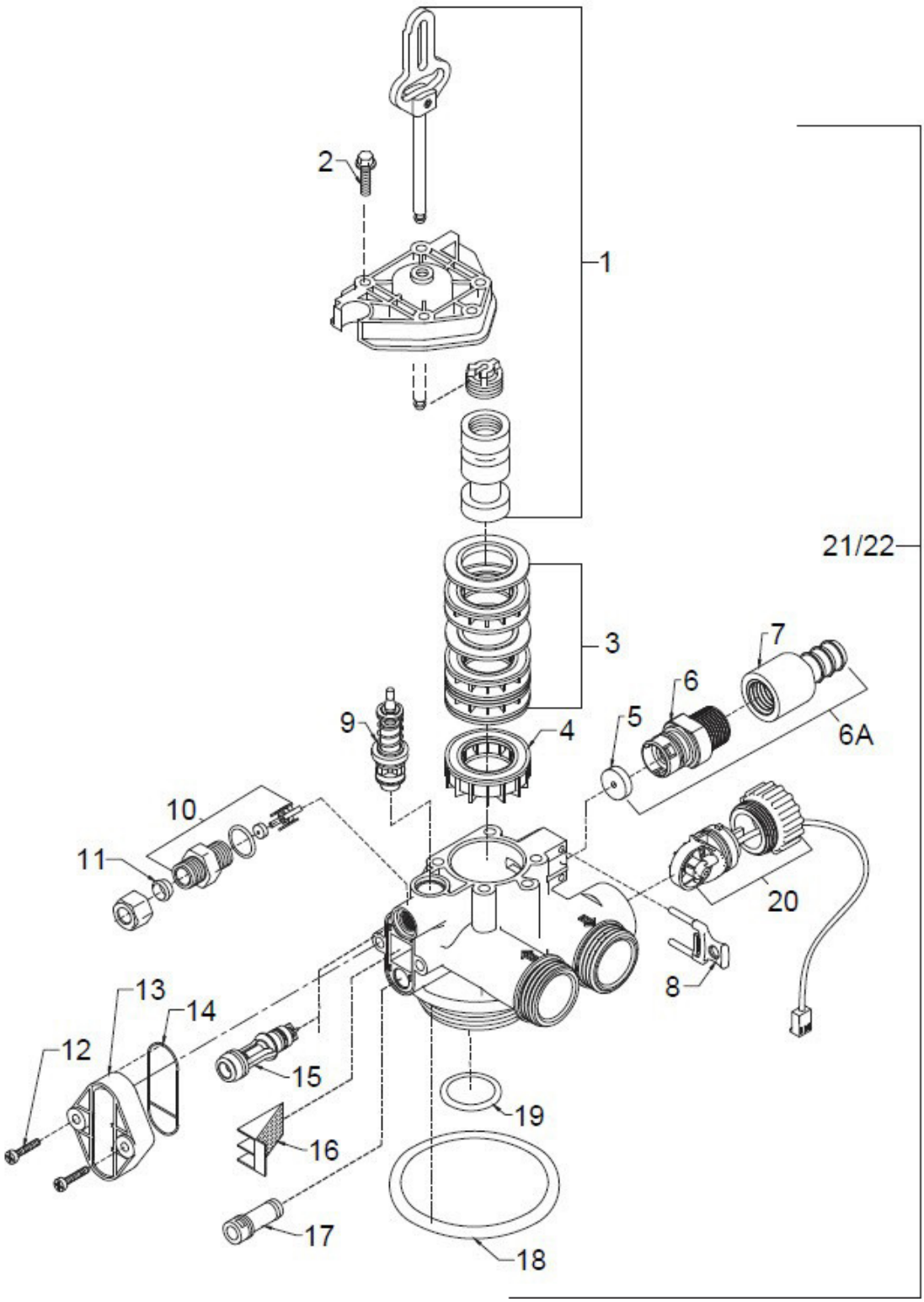
PROBLEM / SYMPTOM	POSSIBLE CAUSE	SOLUTION
Iron or manganese or sulfur odor in treated water after	• No permanganate in solution tank	• Add permanganate powder to tank and regenerate greensand filter
Greensand Filter	• Not backwashing often enough • Water being used when Greensand Filter is in regeneration. • Permanganate solution is not being sucked in during the regeneration brine cycle. • Greensand media exhausted	• Set to backwash more frequently. Backwash twice in one day and re-check water. • If any water is used during the 90 minute regeneration cycle, untreated water will enter household piping. Set time Greensand Filter regenerates to a time when no one will be using the water. • Clean brine injector, clean potassium permanganate tank • Replace permanganate support pad in permanganate tank • Inadequate backwash flow. Make sure there that Greensand Filter is backwashing at the correct backwash flow rate (5 to 10 gallons per minute depending on size of filter). • Low water pressure. Increase water pressure to unit by adjusting well pump pressure switch, or replacing well pump. • Replace Greensand media with new Greensand.
Strong sulfur odor before and after Greensand filter	• High levels of hydrogen sulfide gas in well water	• In some cases, the greensand filter may need a chlorine feed (or ozone, oxygen or other oxidizer) prior to the filter. Make sure Greensand filter is working correctly and try regenerating it once or twice a day for one week. • If odor persists, replace Greensand media or add a chlorinator ahead of the Greensand Filter.
Pink water (permanganate) in household water	• Inadequate backwash of Greensand Filter • Clogged brine injector • Inadequate rinse time • Too much permanganate	• Make sure Greensand Filter has adequate backwash at a good pressure and flow rate • Clean or replace injector • Set rinse cycle to longer time • Lower float so that level of permanganate is lower in permanganate solution tank.
Potassium permanganate tank over-filling or over-flowing	• Clogged brine injector	• Clean or replace injector

5900-BT Powerhead Exploded View and Parts List



Ref	Description	Part Number	Qty
0	Power Head Assy.	21003X100	1
1	Softener Circuit Boad Assy.	21001X102	1
2	Encoder	20001X124	1
3	Front Plate	20001X004	1
4	Encoder Wheel	20001X007	1
5	Main Gear	21001X120	1
6	Power Supply	20001X125	1
7	Back Plate	20001X005	1
8	Lower Front Base For Cover	20111X002	1
9	Motor	20016X006	1
10	Lower Back Base for Cover	20111X003	1
11	Valve Cover	20111X000	1
12	Piston Screw	20001X003	1
13	Screw	SC10	3
14	Screw	SC9	2
15	Piston Washer	20001X002	1
16	Washer Circuit Board	20111X014	1
17	Screw Motor	SC2	1
21	Valve Hex Screw	20001X001	2

5900-BT Control Valve Body



5900-BT Control Valve Body Parts List

Ref	Description	Part No.	Qty
1	Piston Assembly	20001X231	1
2	10-24 X 13/16 Hex Head	20001X226	5
3	Seal and Spacer Kit	20561X253	1
4	Bottom Spacer	N/S	1
5A	Flow Control Button 2.4 GPM	20251X268	1
	Flow Control Button 3.5 GPM	20251X270	1
6	Plastic Flow Control Housing	20017X100	1
6A	Flow Control Assy. 2.4 GPM-PVC	20017X258	1
	Flow Control Assy. 3.5 GPM-PVC	20017X260	1
7	Drain Line Hose Barb, Straight	20017X255	1
8	DLFC Clip	20017X214	1
9	Brine Valve	20561X225	1
10	Brine Line Flow Control Assy.	20001X228	1
11	Brine Line Ferrule	20251X305	1
12	10-24 X 1 Hex Screw	20001X226	2
13	Injector Cover	20001X223	1
14	Injector Seal	20001X224	1
15	Injector w/ Check Ball - Blue	20017X220	1
16	Injector Screen	20001X222	1
17	Injector Plug	20001X217	1
18	Tank O-Ring	20561X205	1
19	Distributor Pilot O-Ring	20561X204	1
20	Flow Meter	20017X203	1
21/22	Valve Complete	VH1-B-D15	1

Water Filters Limited Warranty

We warrant this water filter/ softener/ conditioner, when installed according to factory recommendations, to be free from defects in materials and workmanship as follows:

Limited Warranty

This water conditioner unit is comprised of the finest industry components available. Each individual component used in the assembly of our equipment is covered by the original equipment manufacturer's warranty. All components, except those specifically listed below, are warranted for a period of one (1) year from date of installation to the original purchaser to be free of defects in materials and workmanship subject to the manufacturer's conditions and/or the conditions shown below.

Mineral Tanks

The fiberglass, polyglass or composite mineral tanks used in the assembly of this unit are warranted to be free of defects in materials and workmanship for a period of ten (10) years on 6" – 13" size tanks, and five (5) years on 14" and larger size tanks used for softener/filtration applications, subject to the manufacture's conditions and/or the conditions shown below.

Warranty does not cover exposure to weather, freezing, fractures caused by external impact, or exposure to vacuum.

Control Valves

The CWS control valve is warranted to be free of defects in materials and workmanship for a period or seven (7) years, subject to the manufacturer's conditions and/or the conditions shown below. Fleck & other brand control valves have 5-year warranty.

Conditions

1. This warranty only covers water conditioners installed for residential use. Water conditioners installed for commercial or industrial applications are guaranteed for one (1) year from the date of installation.
2. Installation must be made in accordance with legal or local codes and manufacturer's recommendations.
3. Failure must not result from exposure to weather, rodents, misuse, alteration, fire, lightning, power surges or neglect.
4. Water pressure must not exceed 100 PSI and water temperature must not exceed 100 degrees.
5. Subject to the above terms and conditions we will replace and/or repair, at our option, any parts of the water conditioner found defective in materials and workmanship. Defective parts must be returned, freight pre-paid for repair or replacement.
6. This warranty does not cover labor, shipping charges, damages caused by delays of consequential damages or other causes beyond our control. Warranty does not cover pipes, fixtures or appliances. Warranty extends to the actual water conditioner components only.
7. This warranty is to the original purchaser and is not transferable after the third year to any subsequent owner(s).
8. No other guarantees or warranty, expressed or implied, is applicable to our product. No repair or replacement made under the terms of the warranty shall extend this warranty.