



Clean Water Made Easy

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# **5900-BT Nitrate Filter**

## **Installation & Maintenance Guide**



# 5900-BT Nitrate 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 softened 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.

**Minimum 30 PSI required. Maximum pressure 90 PSI.**


**For indoor installation. Protect from sunlight, rain, and freezing.**


**IMPORTANT: REGULARLY MONITOR NITRATE LEVELS BEFORE AND AFTER SYSTEM.**

**NITRATE LEVELS CAN CHANGE OVER TIME.**

**USE A HOME TEST KIT TO MONITOR LEVELS MONTHLY AS WELL AS HAVING YOUR WATER PROFESSIONALLY TESTED FOR NITRATE QUARTERLY OR AT LEAST ANNUALLY.**

## Questions?

 **Call us toll-free:** 1-888-600-5426 or 1-831-462-8500

 **Email us:** [support@cleanwaterstore.com](mailto:support@cleanwaterstore.com)

 **See more information on our website:** [www.cleanwaterstore.com/resources](http://www.cleanwaterstore.com/resources)

# 5900-BT Nitrate Filter Installation & Maintenance Guide

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## Packing List for Different Size Tannin Filters

**Every order includes:** 5900-S control valve and Top Screen, Bypass assembly with 1" connector yoke, Power supply (dual voltage 110-230V 50/60hz), Media Funnel for adding resin to tank, Drain line tubing; Brine (salt) Tank.

### **Nitrate 0.75 cubic foot size**

8" x 44" filter tank with distributor tube  
0.75 cubic foot of Nitrate resin media  
No filter gravel needed with this size

### **Nitrate 1.0 cubic foot size**

9" x 48" filter tank with distributor tube  
1.0 cubic foot of Nitrate resin media  
No filter gravel needed with this size

### **Nitrate 1.5 cubic foot size**

10" x 54" filter tank with distributor tube  
16 lbs. Filter gravel  
1.5 cubic foot of Nitrate resin media

### **Nitrate 2.0 cubic foot size**

12" x 52" filter tank with distributor tube  
20 lbs. Filter gravel  
2.0 cubic foot of Nitrate resin media

### **Nitrate 2.5 cubic foot size**

13" x 54" filter tank with distributor tube  
35 lbs. Filter gravel  
2.5 cubic foot of Nitrate resin media

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

Your black Nitrate 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 it.

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## How Your Nitrate System Works

In the nitrate system, water enters the top of the tank and flows down through the nitrate resin media and up the distributor tube.

Nitrate and sulfate are removed by the resin beads in a process known as "ion exchange". Nitrate and sulfate are removed and harmless chloride mineral is added (exchanged).

During regeneration the first cycle in the process backwashes and cleans the nitrate resin.

Water flow is reversed and water flows down the distributor tube and up through the media, lifting and expanding the resin and removing any trapped particles.

After the backwash stage, salt brine is automatically drawn in from the brine tank which then slowly rinses through the softening resin for 1 hour, allowing the nitrate and sulfate to be exchanged with harmless chloride ions.

After the brine tank is emptied it is refilled during the final cycle. The amount of water that is automatically refilled into the brine tank is controlled by the 5900-BT control valve and is adjustable. Each gallon of water dissolves 3 lbs of salt. Each cubic foot of nitrate resin requires 9 to 10 lbs of salt per regeneration.

**This entire automatic process, called 'regeneration' takes about 90 minutes.**

Typically the nitrate filter is set to regenerate based on gallons used and timed to occur during the middle of the night when no water is being used.



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## Nitrate Filter Installation Steps Overview

1. Verify that you have received all parts and there are no damaged or missing parts.
2. If your size Nitrate Filter uses gravel (48K grain and larger) add gravel first, then add softening resin. Fill tank with clean water. OK to soak for 1 hour up to 24 hours while doing piping.
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
6. Plug in the power supply and program the valve.
7. Follow the instructions to put the Nitrate Filter online and to verify the system is leak-free.

## Pre-Installation

1. Review your packing list to make sure you have received all the parts before 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.
3. Pick a suitable location for your Nitrate Filter on a dry level spot where it won't be exposed to freezing temperatures, direct sunlight, wind or rain.
4. Get all of your plumbing parts together before beginning installation.
5. After the system is installed and running, 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.

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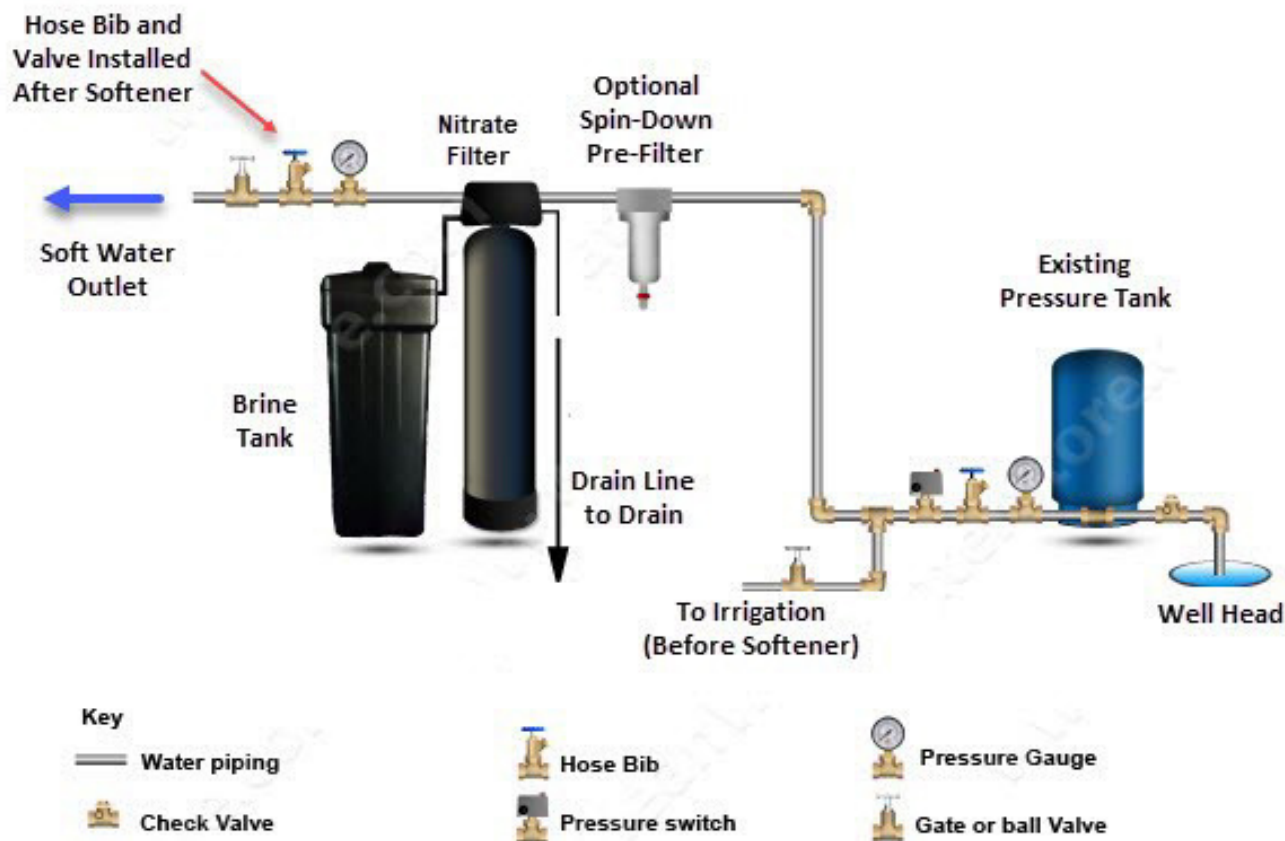
## Best Practices for Piping & Drain Installation

1. See typical installation Page 7. If on well water, Nitrate Filter is installed after pressure tank.
2. Install on a level floor or surface.
3. Your new Nitrate Filter must be installed at least 10 feet ahead of inlet to water heater to prevent damage due to back-up hot water or use a check valve to prevent hot water back-up.
4. DO NOT install the unit in an area of direct sunlight or expose to freezing.
5. Make sure brine tank is set on a smooth surface with no sharp objects, rocks etc.
6. Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
7. Nitrate Filter must be installed at least 10 feet ahead of inlet to water heater to prevent damage due to back-up hot water or use a check valve to prevent hot water back-up.
8. DO NOT install the unit in an area of direct sunlight or expose to freezing.
9. Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
10. Make sure to connect the IN pipe to the 5900-BT inlet and the OUT pipe to the outlet.
11. Make sure there is a working gate or ball valve before the 5900-BT Nitrate Filter and also one after as shown in Fig 2. The pressure gauges are optional. A hose bib (which is a faucet that you can attach a garden hose to) is strongly recommended after the 5900-BT Nitrate Filter and before the second ball valve, for rinsing and sampling water.
12. 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.
13. 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 to put the Nitrate Filter on by-pass and remove the 5900-BT Nitrate Filter control valve from the piping.
14. The drain line tubing is connected to a drain from the drain outlet using flexible poly tubing. The drain can run up above the control head and out to a drain, although this may require installing a one way, flapper-style 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)**

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## Nitrate Filter System Piping Diagram

### Typical Well Water Installation - Install After Pressure Tank



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### Installation of Your Nitrate Filter into Copper or Metal Piping Systems

If your new Nitrate Filter is to be installed in a metal (conductive) plumbing system, i.e. copper or galvanized steel pipe, the plastic components (bypass and connectors) 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 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.

The installation of a bypass consisting of the same material as the existing plumbing, or a grounded “jumper wire” bridging the equipment and reestablishing the contiguous conductive nature of the plumbing system must 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.

### Add Nitrate Resin and Install 5900-BT Backwash Valve on Tank

1. **Make sure you “test fit” distributor tube, find divot that keeps tube centered, before adding gravel so distributor tube does not extend past top of tank.**
2. There are two styles of funnel that we ship, depending on availability; you get either the blue or black funnel.
3. If blue funnel, cover top of distributor tube with black electrical tape, duct tape or masking tape so no gravel or media will go down distributor tube when adding media.
4. Leave a folded tab of tape so you can easily pull off tape after filling the tank.
5. 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 Nitrate Filter tank.
6. Add the gravel (for 1.5 Cubic Foot 48K grain units and larger only) that came with your order. The gravel should cover the bottom distributor screen before adding the nitrate resin.

**Make sure top of distributor tube  
is level with top of tank**



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7. Next add the nitrate resin.
8. The tank should be about 2/3 to 3/4ths full of the resin.
9. **Fill tank completely with water.** Allow to soak for at least 1 hour up to 24 hours before you hook it up to piping.
10. Remove tape from top of distributor tube. **Be careful not to pull up distributor tube.**
11. Attach plastic top screen to 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.
12. **Screw on Control Valve:** Add small amount of silicone grease to both O-rings (only O-rings, not tank thread) on bottom of control valve and screw on 5900-BT control valve carefully.
13. **Do not lubricate tank threads or any other fittings other than O-rings. Do not use pipe-joint compound, vegetable oil, Teflon tape, or Vaseline or greases on tank threads.**
14. If you accidentally pull distributor tube up after gravel and media are in 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 distributor tube with a garden hose while pushing on end of the tube. If this does not work, you must empty tank completely and start over.
15. **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 be able to remove the hard drain piping and attach flexible tubing for testing purposes.**
16. **Make sure the drain tubing is firmly clamped to the barbed fitting with a hose clamp to prevent leaks or blow-offs.**



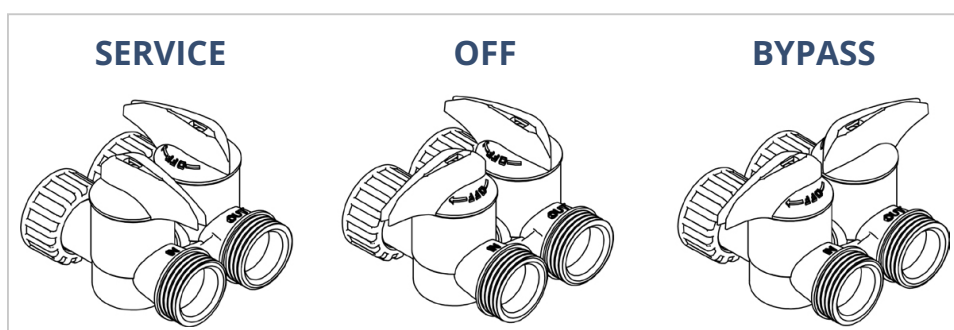
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## Attach the Bypass

Make sure there is lubricant on all three sets of O-rings and insert and screw bypass onto end connectors (O-rings are already on 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.  
No need to over-tighten or to screw them too tight.



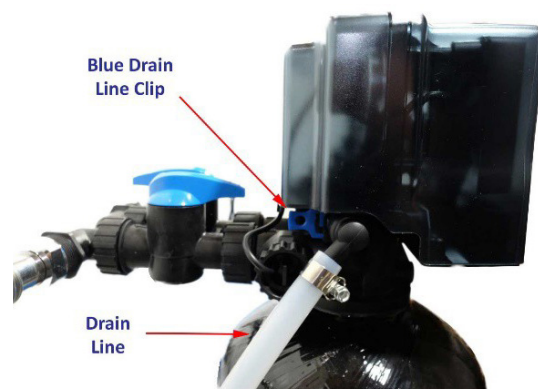
## Piping Installation

1. Using Teflon tape on pipe threads, make sure to connect the IN pipe to inlet and OUT pipe to the outlet. 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.
2. The inlet and outlet are attached to the bypass valve, which is marked with arrows as well.



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3. Make sure there is a hose bib installed after the system, and a working gate or ball valve before and after the nitrate system. The pressure gauges are optional but a hose bib is strongly recommended after the 5900-BT control valve and before the second ball valve. This makes it easy to rinse your new system on start-up and gives you a place to test water before it enters your house 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 control valve with the torch, as the plastic will melt.
5. 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 nitrate filter from the piping.
6. The drain line tubing is connected to a drain from drain outlet using flexible tubing. Note that drain line can run up above the 5900-BT control and into a drain.
7. 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 connect with the drain tubing.



### Attach the Brine Line Tubing to Brine Tank

Insert the 3/8" diameter tubing into the brine tank connection (included with your order).

Screw the nut with the sleeve and ferrule attached to prevent leaking.



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**On the control valve side:** to connect the brine tank, begin by sliding the plastic brine injector nut on to the brine tubing by putting the tubing through the non-threaded side of the nut first.

Next, slide the white (or clear) compression ring on to the tubing with the wider diameter going on first.

Insert the tubing into the brine nut and screw tight- do not over-tighten.

**On the brine tank:** push the brine injector nut, which now has the compression rings inside of it, on to the threading of the brine tank float assembly and rotate the nut clockwise, screwing it on to the brine port on 5900-BT control valve.

Tighten it down to finger tight. The tubing should be firmly attached and not slide out if pulled on.



## Brine Tank Set Up

1. Add approximately 5 gallons of water to the brine tank, and then fill the brine tank with salt, add just one bag until after you have done the initial regeneration, then you can fill the brine tank about 2/3 full of salt, which will generally be enough for several months.
2. It is OK to use any kind of water softening salt; however, we find that extra coarse salt works better than pellets.
3. You do not have to add water to the brine tank again after this first time during the start-up.
4. See the over-flow barbed fitting on the side of the brine tank. You do not have to connect this to a drain.
5. If the safety float were to malfunction, there is a small chance that the brine solution will drip out of this fitting. If this would cause a big mess where you have installed the Nitrate Filter, hook some tubing to this and run to a bucket, floor pan or floor drain. Normally no brine will leak out of this fitting.

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## Program Your 5900-BT Control

Enter main menu by pressing the Menu/Enter button  
(Time of day will flash)



## Set Time of Day

Set current time of day by pressing the Set / Change button  
(the first digit will begin to flash)

To change digit value, press the Set/Change button to accept the digit press the Menu/Enter button (Next digit will flash). Once the hour is entered, all digits will flash.

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 (hardness)

## Set the “Hardness” Or Level of Nitrate as CaCO4

To accurately set system we will need to do calculation first based on amount of Nitrate and Sulfate

*Nitrate level as nitrogen = (Nitrogen) = X*

*Nitrate level = (Nitrate) ppm x 0.81 = Y ppm as CaCO4*

*Sulfate: (Sulfate) ppm x 1.04 = Z ppm as CaCO4*

*Total sum of NO3 and Sulfates as CaCO4 = X + Y + Z = (Hardness)*

*(Hardness) ppm divided by 17.1 = **(Hardness Setting) in grains per gallon** (round to 5 grains for conservative calculation)*

**To change digit value press the Set/Change button Example [ H - 10 ]**

1. To accept the digit value, press the Menu/Enter button (Next digit will flash)
2. Once the last digit is accepted all digits will flash
3. Note: you need to know what the hardness level of your water is in Grains Per Gallon. If you don't know, we do include a hardness test kit with each order.
4. To exit menu press the Menu/Enter button. Note: If no buttons are pressed for 60 seconds or longer the menu will automatically be exited.

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### Pressing and holding the Menu/Enter button will also access some options

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 Nitrate Filter.

**g tot** — This is the same as the previous.

**rC r** — This is the number of regenerations done.

**rC** — This is the total number of regenerations done as rCr.

**gPdL** — This shows how many gallons used each day.

**Gbrl** — This shows the gallons used between regenerations.

**PfDL** — This shows peak, or highest flow rate that has passed through the filter in the last 24 hours.

### How to Enter Master Programming Mode

#### 1. Regeneration Time (r)

Press the Menu/Enter Button. The next 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 may occur, if 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. The first digit(s) indicates the Hour and the other digit indicates A.M. or P.M.

#### 2. Regeneration Day Override (A)

Press Menu/Enter Button. This display is used to set maximum amount of time (in days) the unit can be in service without a regeneration.

This option setting is identified by letter 'A' in the left digit. This option will be in the Master Programming Menu only in the Meter Mode.

Regeneration will begin at the set Regeneration Time. A 0 setting will cancel this feature. The Max Value for this item is 29.

We recommend setting the system to regenerate every 7 days so the Nitrate Filter has a regeneration every 7 days at a minimum, even if no water has been used.

Example: Override every 14 days - [ A - 14 ] (Factory Setting)

To Adjust this Value, press the Set/Change Button.

To Accept the Digit Value, press the Menu/Enter Button.

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## 3. Regeneration Cycle Step Programming (1)(2)(3)(4)

The next 4 displays viewed are part of a series of option settings used to program the Regeneration Cycle.

Up to 4 steps can be programmed. Each display is used to set the duration time in minutes for that specific step in a regeneration cycle.

A step # will turn on for the regeneration cycle step being programmed.

**Set each step according to the values below, appropriate for Nitrate Filter:**

1. 8 minutes. This is the **Backwash cycle**. [ 1 - 8 ]
2. 60 minutes. This is the **Brine Draw cycle**. [ 2 - 60 ]
3. 6 minutes. This is the **Rapid Rinse cycle**. [ 3 - 6 ]
4. For the **Brine Refill Cycle**, set the time according to the size of your system:
  - 1.0 Cubic Foot Nitrate Filter set to 8 minutes
  - 1.5 Cubic Foot Nitrate Filter set to 11 minutes
  - 2.0 Cubic Foot Nitrate Filter set to 14 minutes
  - 2.5 Cubic Foot Nitrate Filter set to 17 minutes

## 4. Set the Capacity

The display screen will have a lower-case c, and three numbers: [c 027].

Set this according to the size of nitrate filter you have:

[c 024] for a 24K capacity, [c 032] for a 32K capacity, [c 048] for 48K capacity, etc.

- 1.0 Cubic Foot Nitrate Filter set to: [c 032]
- 1.5 Cubic Foot Nitrate Filter set to: [c 048]
- 2.0 Cubic Foot Nitrate Filter set to: [c 064]
- 2.5 Cubic Foot Nitrate Filter set to: [c 080]

## 5. Set the Safety Factor (P)

This allows the unit to start a regeneration sooner, based on the Safety Factory. Set to 10.

## 6. Bluetooth Settings

After the Capacity setting, you will see **bE 1, btPP and 1234** each time you hit the Menu/Enter button.

After **1234** the display will return to the service screen, flashing between the clock time and the number of gallons remaining until regeneration.

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## Exiting the Master Programming Mode

Press the Menu/Enter Button until all steps have been viewed. The Program Mode will be exited, and normal operation resumed. If no buttons are pressed for 60 seconds mode will be exited.

## Start the First Regeneration

1. Close both the Inlet and Outlet valves, if not already closed. 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 – 08.
2. Start to put the valve into the service position by turning inlet the bypass knob counter-clockwise about a quarter inch, until you can hear water passing through the bypass into the softener. Stop and wait until you see water coming out of drain line. It will often be mixed with air bubbles.
3. When you do not see bubbles anymore, keep opening the valve, a little bit at a time, stopping for a minute or two each time. You want to see increase in flow out of the drain line as you increase the flow of water into softener. After several minutes, you should have valve fully open.
4. Cycle Step 2, the Brine Draw, is for 60 minutes. Confirm that the water in the brine tank is being sucked down; if you start with 5 gallons, it should be empty after 15 minutes. If it is not, test your tubing connections, and make sure float assembly is working. Once it has sucked salt water into softener, it will do a slow rinse for the rest of the cycle.
5. Allow the valve to finish running through the last two cycles: Rapid Rinse, 6 minutes and Brine Fill, minutes determined by softener size.
6. Open outlet on the bypass valve and then open the nearest treated water faucet to the unit and allow the water to run until it is clear. We advise using a bathtub, laundry sink, or other fixture that does not have an aerator screen as any remaining residue may get caught in the screen.

**CONGRATULATIONS,  
YOU ARE DONE SETTING UP YOUR WATER SOFTENER!**

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## Normal Operation & Maintenance

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. Once the count reaches 1, a regeneration cycle will be initiated at the next designated regeneration time.

**Make sure brine tank is regularly filled with salt.**

**When brine tank is getting low on salt, refill to top.**

**Test for nitrate levels before and after system monthly or at least quarterly with home test kit. Get untreated water and water after nitrate system professionally tested at a lab at least once a year. If untreated nitrate levels change, adjust program.**

**Test brine suction and clean brine injector as needed, typically once a year.**

## How the Battery Back-up Works

Uses a 9-volt battery, not included. 9-volt battery lead wires are found by removing the cover. Hook the battery up, it lays loose in the tray below the circuit board. The battery back-up maintains the time of day during power failures. Replace battery once per year. The battery back-up continues to count down gallons remaining during power failure (Metered Version). Menus cannot be accessed during power failure

**When the battery is installed, and the unit loses power, it will use the battery to advance the piston to the next cycle where no water is being used.**

## How to Start an Extra Regeneration 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 Example [ 1 ]  
Regeneration cycle will be initiated at the next designated regeneration time

Starting 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.

Fast Cycling Through Regeneration

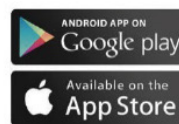
First complete above immediate cycle steps

Press and hold the Set/Change button

After 3 seconds the valve will start to advance to the next step

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## Installing and Using the Optional Legacy View App

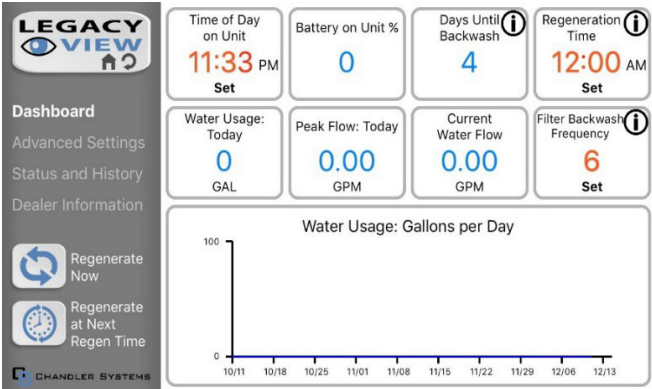


**For simplified set up and control, please install the Legacy View on a compatible Bluetooth 4.0+ enabled smart phone or tablet.**

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 at any time to refresh the list 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.

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## Legacy Phone App Dashboard

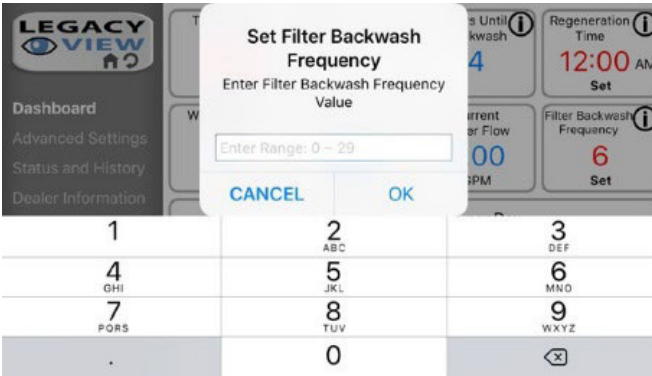


From the Dashboard, all items in **ORANGE** can be changed, while blue fields are informational only.

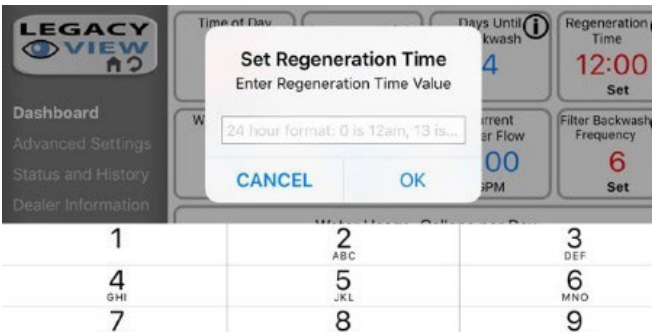
*If you are unsure about the function of the field, click the Info icon for more information*



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



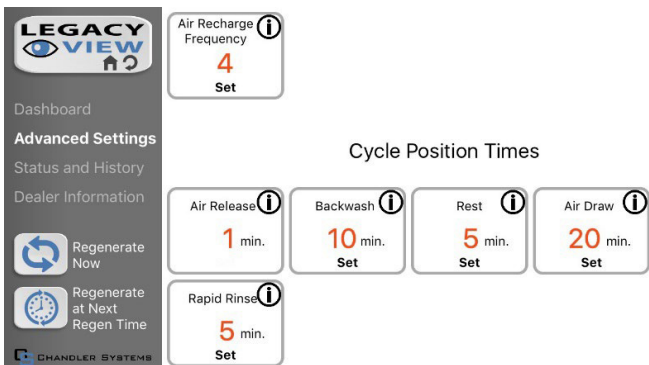
2. Set Backwash Frequency. This sets the amount of days between backwash cycles.



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

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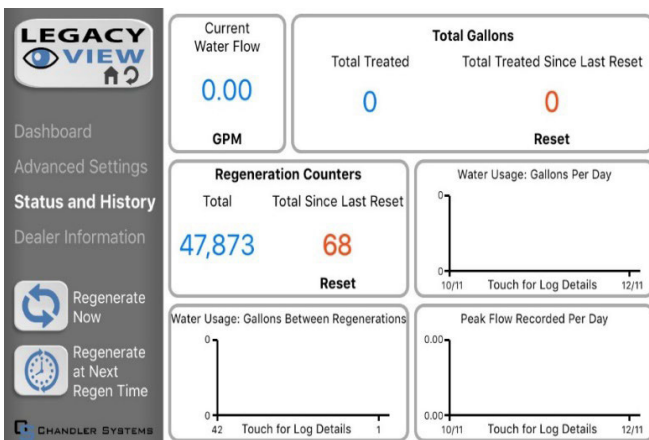
## Legacy App Advanced Settings



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.

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## Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTION
1. Softener fails to regenerate automatically.	A. Power supply plugged into intermittent or dead power source. B. Disconnected meter cable. C. Improper control valve programming. D. Defective power supply. E. Defective circuit board or meter. F. Defective drive motor.	A. Connect to constant power source. B. Reconnect cable. C. Reset program settings. D. Replace power supply. E. Replace or Repair F. Check motor operation by activating the service button on back of motor.
2. Regeneration at wrong time.	A. Time of day improperly set, due to power failure. B. Regeneration time set improperly.	A. Reset time of day programming and install 9 volt battery. B. Reset Regeneration time programming.
3. Loss of capacity.	A. Increased raw water hardness. B. Brine concentration and/or quantity. C. Resin fouling. D. Poor distribution, Channeling (uneven bed surface). E. Internal valve leak. F. Resin age. G. Resin Loss.	A. Reset unit to the new capacity. B. Keep brine tank full of salt at all times. Clean it yearly. Salt may be bridged. If using a salt grid plate ensure refill water is over it. C. Call dealer, find out how to confirm it, clean the resin and prevent future fouling. D. Call dealer. Check distributors and backwash flow. E. Call dealer. Replace spacers, seals and/or piston. F. Call dealer. Check for resin oxidation caused by Chlorine. Mushy resin. G. Call dealer. Check for correct bed depth. Broken distributors. Air or gas in bed. Well gas eliminator. Loose brine line.
4. Poor water quality.	A. Check items listed in #1, #2, & #3. B. Bypass valve open. C. Channeling.	B. Close by-pass valve. C. Check for too slow or high service flow. Check for media fouling.
5. High salt usage.	A. High salt setting. B. Excessive water in brine tank. C. Constant flow through the unit. D. Improperly set hardness, Regeneration frequency or regeneration day override programming.	A. Adjust brine tank refill time. B. See symptom No. 7. C. Indicates plumbing leak (ie. toilet tank). D. Reset programming

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## Troubleshooting Guide (Cont'd.)

SYMPTOM	PROBABLE CAUSE	CORRECTION
6. Loss of water pressure.	<p>A. Scaling/Fouling of inlet pipe.</p> <p>B. Fouled resin.</p> <p>C. Improper backwash.</p>	<p>A. Clean or replace pipeline. Pretreat to prevent.</p> <p>B. Clean resin. Pretreat to prevent.</p> <p>C. Too many resin fines and/or sediment. Call dealer, reset backwash flow rate, and/or adjust time</p>
7. Excessive water in brine tank and/or salty water to service.	<p>A. Plugged Drain Line.</p> <p>B. Dirty or damaged brine valve.</p> <p>C. Plugged Injector.</p> <p>D. Low inlet pressure.</p> <p>E. Excessive brine refill cycle time.</p>	<p>A. Check flow to drain. Clean flow control.</p> <p>B. Clean or replace brine valve.</p> <p>C. Clean injector and replace screen.</p> <p>D. Increase pressure to allow injector to perform properly (20psig minimum).</p> <p>E. Reset brine refill cycle time.</p>
8. Softener fails to use salt.	<p>A. Check items listed in #1.</p> <p>B. Improper control valve programming.</p> <p>C. Plugged/restricted drain line.</p> <p>D. Injector is plugged.</p> <p>E. No water in brine tank.</p> <p>F. Water pressure is too low.</p> <p>G. Brine line injects air during brine draw.</p> <p>H. Internal control leak.</p>	<p>B. Check and reset programming.</p> <p>C. Clean drain line and/or flow control.</p> <p>D. Clean or replace injector and screen.</p> <p>E. Check for restriction in BLFC. Ensure safety float is not stuck. Check brine tank for leaks.</p> <p>F. Line pressure must be at least 20 psi.</p> <p>G. Check brine line for air leaks.</p> <p>H. Call dealer, Check piston, seals and spacers for scratches and dents.</p>
9. Control cycles continuously.	A. Faulty circuit board.	A. Replace circuit board.
10. Continuous flow to drain.	<p>A. Foreign material in control.</p> <p>B. Internal control leak.</p> <p>C. Valve jammed in backwash, brine, or rapid rinse position.</p> <p>D. Motor stopped or jammed.</p>	<p>A. Call dealer. Clean valve, rebuild unit.</p> <p>B. Same as above.</p> <p>C. Same as above</p> <p>D. Replace motor.</p>

### Brine Solution Not Being Sucked in During Regeneration

#### **Make sure the injector is drawing in the brine**

Remove the brine tank tubing where it enters the 5900-BT control valve.

Initiate a backwash and skip to the Brine Cycle by following the steps below:

#### **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 Example [ 1 ]

Regeneration cycle will be initiated at the next designated regeneration time

#### **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.

#### **Fast Cycle 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.

1. If it is sucking strongly, check the brine tank float inside the brine well and make sure that is free of obstructions. In some cases, it may need to be replaced or cleaned, if there is suction at the control valve, but no brine is being drawn in.
2. If there is NO suction at the control valve port where you removed the brine line tubing, then the injector should be cleaned.
3. 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 softener 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 to softener 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.

#### **System Not Programmed Correctly**

In some cases, the 5900-BT control valve may not be programmed correctly. Review the programming instructions earlier in this guide.

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## Brine Tank Not Filling with Enough Water

Sometimes if the brine 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.

## 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 (Valve requires service to continue)

**Error 4** – Unable to find homing slot (Valve requires service to continue)

**Error 5** – Motor overload (stalled position or shorted motor) (Valve requires service to continue)

**Error 6** – No Power to Motor (usually this means the cable has come loose)

### Service Instructions – Perform Before Doing Any Control Valve Service

- A1. Turn off water supply to filter and put it in the bypass position.
- A2. Remove cover and relieve water pressure in the 5900-BT control valve by stepping the control into the backwash position momentarily. Return the control to the service position.
- A3. Unplug electrical cord from outlet.

### How to Replace Powerhead

- B1. Remove the control valve cover and disconnect the power supply.
- B2. Disconnect meter cable from circuit board, feed through control (if meter is being re-used)
- B3. Remove lower back base screws and detach lower back base.
- B4. Remove screw and washer at drive yoke.
- B5. Remove powerhead mounting screws.
- B6. The entire powerhead assembly will now lift off easily.
- B7. Put new powerhead on top of the valve. Be sure the drive pin on main gear engages slot in drive yoke (wide side of drive yoke upright must face to the left away from the motor).
- B8. Replace powerhead mounting screws. Replace screw and washer at drive yoke.
- B9. Reattach lower back base.
- B10. Reconnect meter signal, wire and power supply.
- B11. Reinstall cover.

### How to Replace Piston Assembly

- C1. Follow steps A1 - A3
- C2. Disconnect the meter signal wire from the circuit board.
- C3. Remove lower back base screws and detach lower back base.
- C4. Remove screw and washer at piston drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily.
- C5. Remove piston retaining plate screws.
- C6. Pull upward on end of piston yoke until assembly is out of valve.

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C7. Inspect the inside of the valve to make sure that there is no foreign matter that would interfere with the valve operation.

C8. Install new seals and spacers.

C9. Take new piston assembly and push piston into valve by means of the end plug.

C10. Twist drive yoke carefully in a clockwise direction to properly align it with drive gear.

C11. Reinstall piston retaining plate screws.

C12. Follow steps B5 - B9

### How to Replace Seals and Spacers

D1. Follow steps A1 - A3.

D2. Disconnect the meter signal wire from the circuit board.

D3. Remove screw and washer at piston drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily. Remove piston retaining plate screws.

D4. 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)

D5. 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.

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)

D6. Follow Steps C9 to C10.

### How to Replace Meter

E1. Follow steps A1 - A3

E2. Unplug meter cable from front of circuit board.

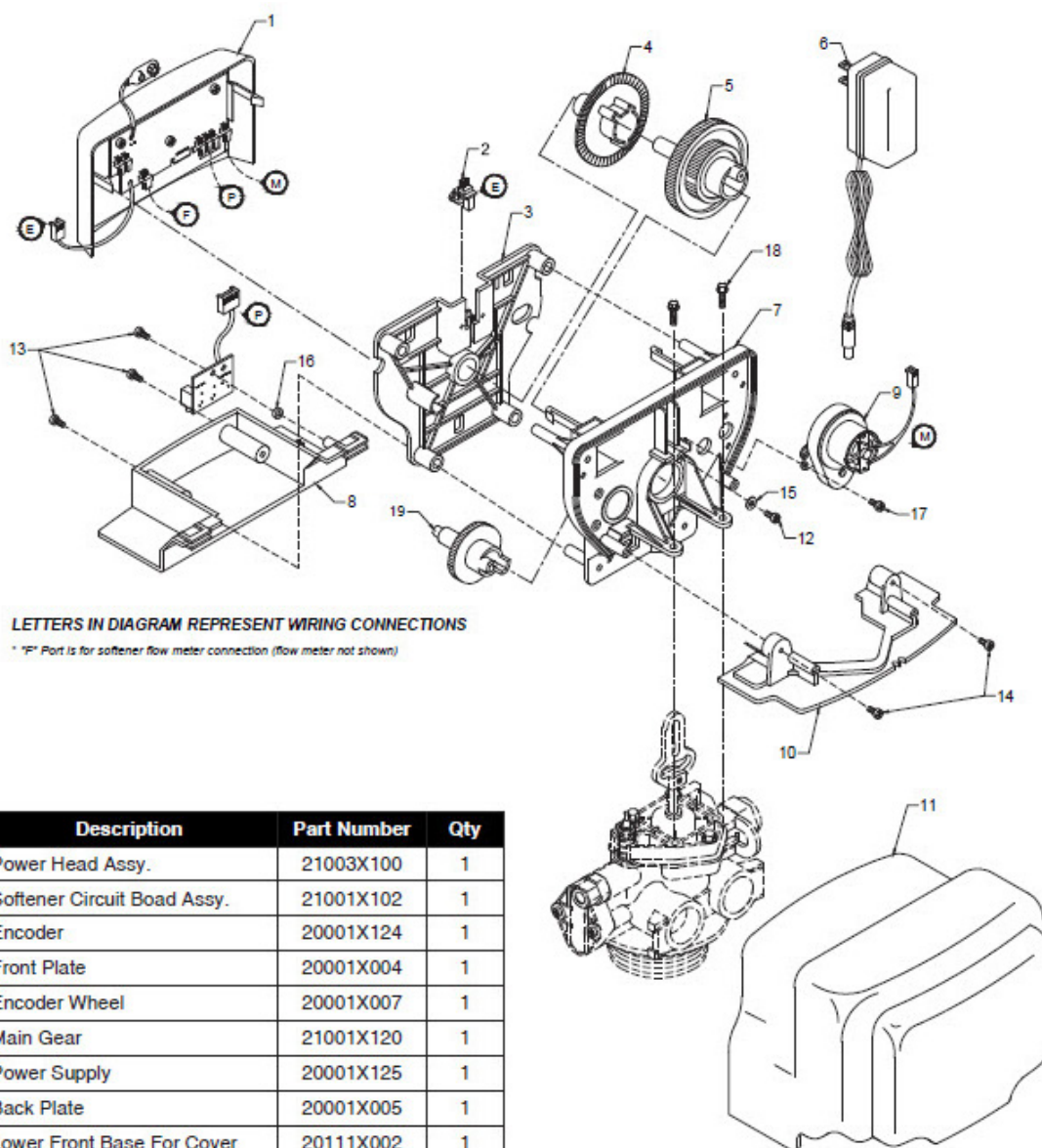
E3. Unscrew meter assembly nut from valve body.

E4. Remove meter from valve body and clean or replace as necessary.

E5. Reinstall meter, nut and cable.

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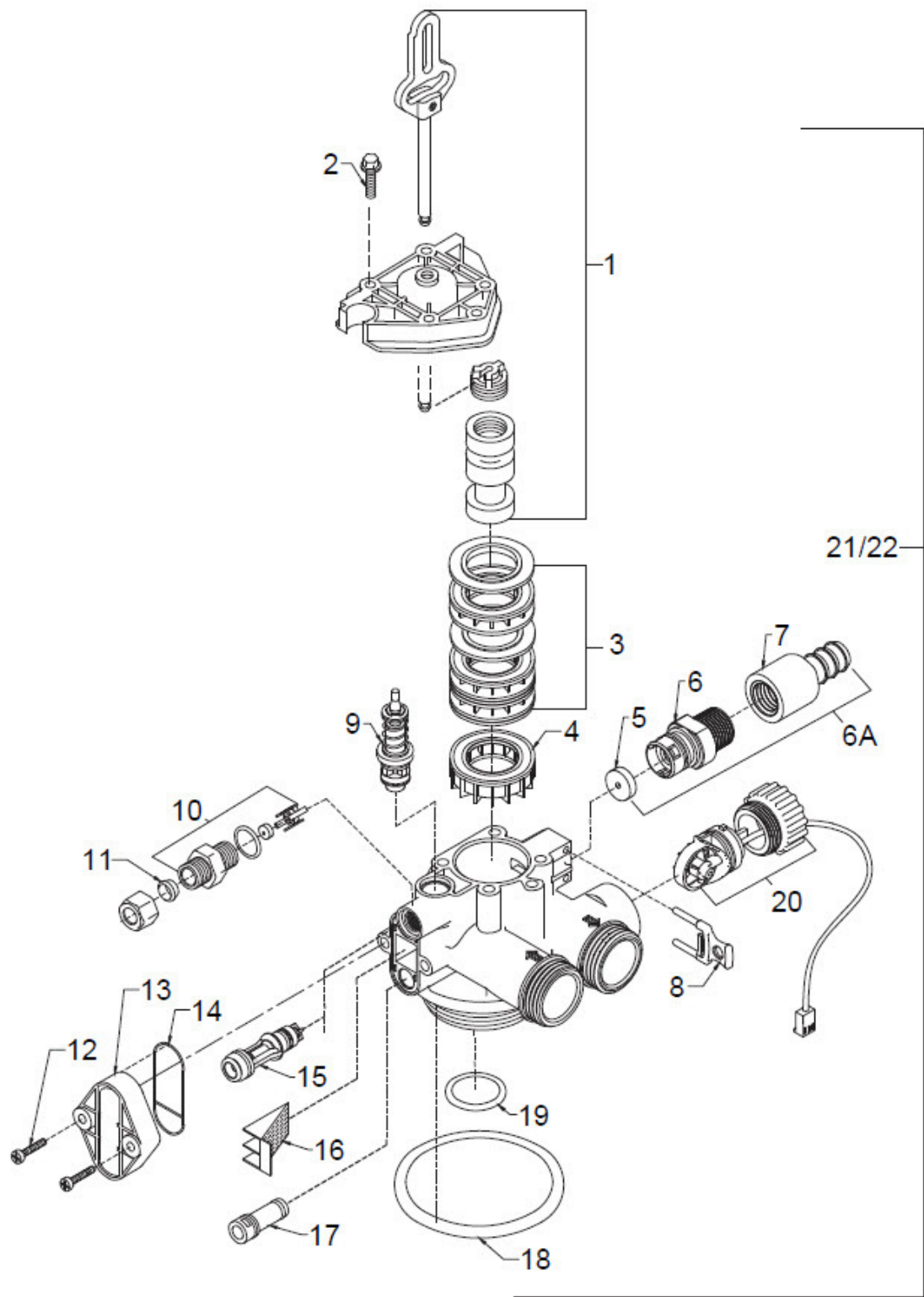
## 5900-BT Powerhead Exploded View and Parts List



Ref	Description	Part Number	Qty
0	Power Head Assy.	21003X100	1
1	Softener Circuit Board 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

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## 5900-BT Control Valve Body



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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

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## 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 manufacturer'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 of 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. 4. Water pressure must not exceed 100 PSI and water temperature must not exceed 100 degrees.
5. 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.