



Clean Water Made Easy

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5900e Carbon Filter Installation & Start-Up Guide

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

CARBON MEDIA CONTAINS DUST.

USE PAPER MASK AND VENTILATE TO AVOID BREATHING DUST.

Questions?

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

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Packing List

Carbon Filter 0.75 cubic foot size

5900e Backwash Control Valve w/ Pipe connector kit (1" or ¾") and Drain Line Barb Fitting
Bypass Valve Assembly w/ 4 clips, 4 screws
Drain Line Flow Control (DLFC) buttons – 5 and 7 GPM
8" x 44" filter tank with distributor tube
Blue media funnel for adding the Carbon media
8 lbs. Filter gravel
0.75 cubic foot of Carbon media

Carbon Filter 1.0 cubic foot size

5900e Backwash Control Valve w/ Pipe connector kit (1" or ¾") and Drain Line Barb Fitting
Bypass Valve Assembly w/ 4 clips, 4 screws
Drain Line Flow Control (DLFC) buttons – 5 and 7 GPM
9" x 48" filter tank with distributor tube
Blue media funnel for adding the Carbon media
12 lbs. Filter gravel
1 cubic foot of Carbon media

Carbon Filter 1.5 cubic foot size

5900e Backwash Control Valve w/ Pipe connector kit (1" or ¾") and Drain Line Barb Fitting
Bypass Valve Assembly w/ 4 clips, 4 screws
Drain Line Flow Control (DLFC) buttons – 5 and 7 GPM
10" x 54" filter tank with distributor tube
Blue media funnel for adding the Carbon media
16 lbs. Filter gravel
1.5 cubic foot of Carbon media

Carbon Filter 2.0 cubic foot size

5900e Backwash Control Valve w/ Pipe connector kit (1" or ¾") and Drain Line Barb Fitting
Bypass Valve Assembly w/ 4 clips, 4 screws
Drain Line Flow Control (DLFC) buttons – 5 and 7 GPM
12" x 52" filter tank with distributor tube
Blue media funnel for adding the Carbon media
20 lbs. Filter gravel and 2.0 cubic foot of Carbon media

Pre-Installation

1. Review your packing list and make sure you have received all the parts before beginning installation.
2. If you are going to be turning off the water to the house and you have an electric water heater, shut off the power to the water heater before beginning installation in case water heater is accidentally drained.
3. Pick a suitable location for your filter system on a dry level spot where it won't be exposed to freezing temperatures. A minimum of 20 PSI is required. Maximum pressure is 90 PSI.
4. Get all of your plumbing parts together before beginning installation, and make sure you have received all of your packages before beginning or scheduling an installation. Installation typically takes 3 to 5 hours. However, after installation the Carbon Filter must be allowed to run through a complete backwash and rinse cycle.
5. After the system is installed and running, your water may be discolored, or full of sediment or rust, particularly if this is older or corroded piping. This typically clears up over a day or two.

Best Practices for Piping & Drain Installation

1. See typical installation on page 7 (Fig 2). The Carbon filter is installed after the pressure tank.
2. Make sure to connect the IN pipe to the 5900e inlet and the OUT pipe to the outlet (see Fig 3). As you face the 5900e 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 5900e Carbon Filter and also one after as shown in Fig 2. 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 Carbon Filter and before the second ball valve. This makes it easy to rinse your new Carbon 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 5900e control valve. Avoid heating up the 5900e control valve plastic with the torch.
5. You do not need unions to install your 5900e control valve. If you need to remove it, the 5900e has quick-release couplings that make it easy to put the Carbon filter on by-pass and remove the filter system from the piping.
6. The drain line tubing (not supplied) is connected to a drain from the drain outlet using flexible ½" ID tubing. Note that the drain can run up above the 5900e control and into a drain, it does not have to drain down, as the filter backwashes under line pressure from your well pump. Most

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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.

Installation of Your System Into Copper or Metal Piping Systems

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.

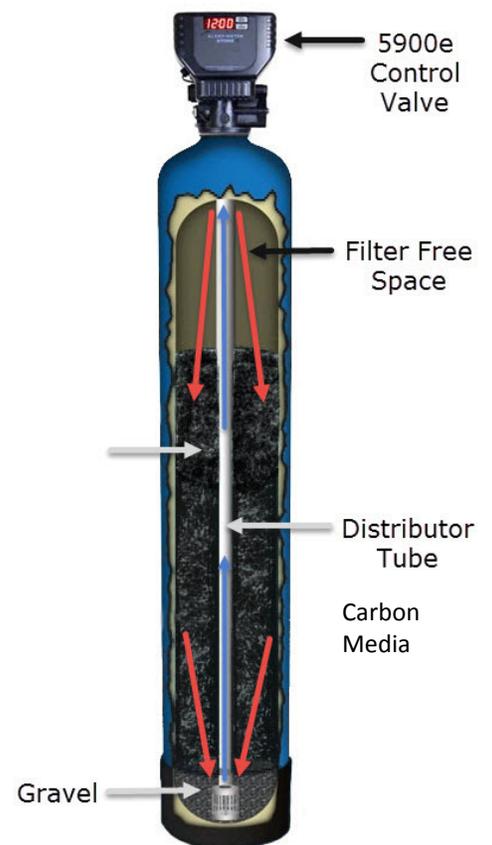
Some homes may have been built in accordance with building codes, which encouraged the grounding of electrical appliances through the plumbing system.

Consequently, 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.

This is simple and easy step to take if you are installing your water treatment system into copper piping. A simple ground jumper wire with a pipe clamp can be purchased at any Home Center, or hardware store etc for a few dollars.

How Your Carbon Filter Works

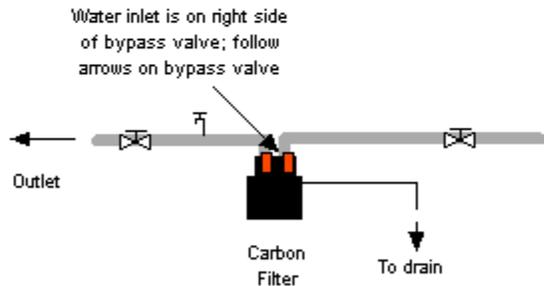
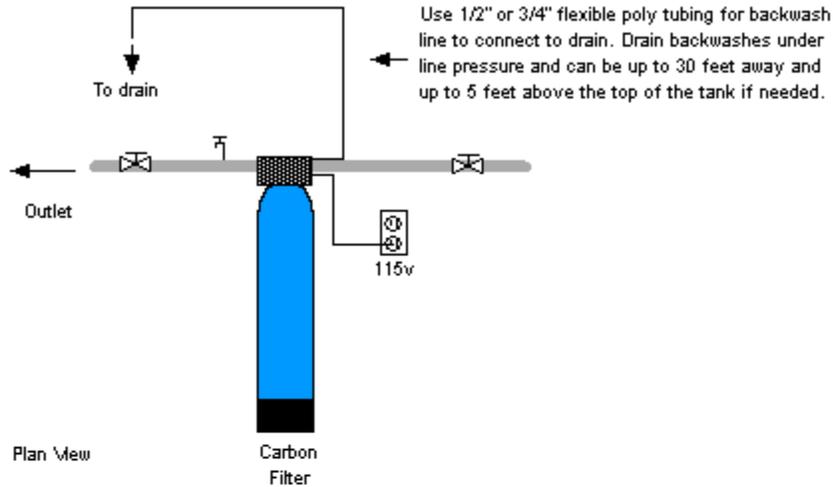
See Fig 1 on the right. In your Carbon Filter the water enters the top of the tank (red arrows) and flows down through the media and up the distributor tube (blue arrows). The downflow type Carbon Filter removes sediment and can be backwashed, which cleans and re-classifies the Carbon, preventing channeling. During backwash the flow of water is reversed and water flows down the distributor tube and up through the media, lifting and expanding the Carbon media. During the backwash the Carbon is cleaned by the action of the water flowing through it.



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Fig 2 - Typical Carbon Filter 5900e piping installation with ball valve and hose bib after the filter

Auto Backwash Carbon Filter System for Chlorinated City Water
Flow Diagram Not to scale



Key

-  Gate or ball valve
-  Pressure gauge
-  Hose bib (spigot)
-  Water piping

Notes: follow inlet and outlet arrows on filter for proper installation. Connect 1/2" flexible tubing from backwashing control valve to a drain. If the distance to the drain is more than 20 feet use 3/4" or 1" tubing. Follow all local plumbing and electrical codes.

If you install a hose bib & ball valve after the filter as shown, it will make it easier to service and test the water at a later date.

INSTALL ON CHLORINATED DISINFECTED WATER ONLY

Fig. 3: 5900e valve from the rear showing the inlet (left) and outlet (right) end-connector fittings (3/4" or 1" NPT in Noryl plastic). Brass end-connectors are also available for connecting to copper tubing.

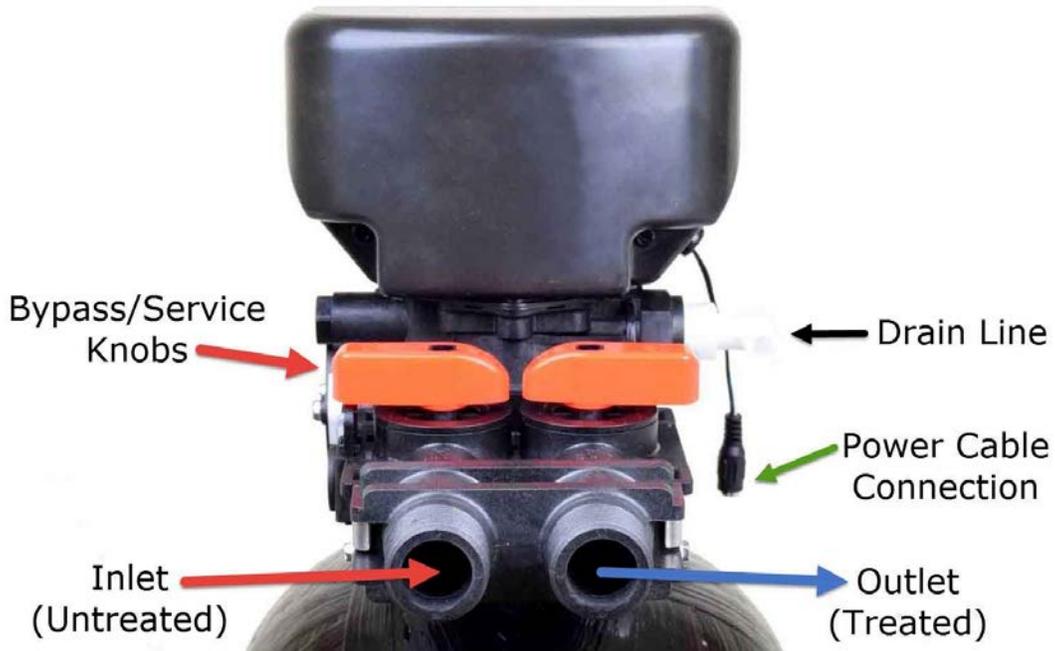


Fig. 4: 5900e Bypass Assembly



Assembly and Installation Instructions

1. Wrap the top of distributor tube with black electrical tape or blue painter's masking tape so that no gravel or Carbon media will go down the distributor tube when adding the media. Also, leaving a folded tab of tape that you will be able to grab onto to gently pull off the tape after filling the tank. When you are ready to screw the valve head on, apply silicone lubricant to the outside of the distribution tube, and the o-ring on the control valve where the tube goes in.



2. Add the filter gravel that came with your order. You want the gravel to cover the bottom distributor screen before adding the Carbon media.
3. Next add Carbon media. The tank should be about 2/3rds full of media, do not fill more than 2/3rds, even if there is some media left over.
4. Remove tape from top of distributor tube. Be careful not to pull up distributor tube when removing tape.
5. If possible at this point, fill tank completely with water. This will allow the Carbon Filter media to settle and eliminate the need of "purging" the air out of the tank later.
6. Attach plastic top screen to the under-side of the 5900e 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.



7. Add a small amount of silicone grease to the tank threads and both o-rings on the bottom of the control valve and screw on 5900e control valve carefully. Do not use pipe-joint compound, vegetable oil, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.

Fig 5: 5900e Bypass with Barrels



Fig 6: Bypass with steel mounting clips



Assemble the bypass valve:

- When you remove the bypass valve from the box, the valves are in the open position. Holding the bypass so that you are reading the In and Out (so that the words are not upside down to you when holding the bypass), note the following:
- The red handles are slightly arrow-shaped; the pointed end is pointing in the direction of flow when open. The Inlet valve (on the left) turns clockwise, from full open at "12:00 o'clock", to fully closed at "3:00 o'clock". The Outlet valve turns clockwise from "6:00 o'clock" full open to "9:00 o'clock" full closed. The valves are stiff when new, so open and close them a few times. Leave them closed for now.



a) Choose which yoke (3/4" or 1") you wish to attach to the back end of the bypass. Remove the barrels (Figure 5) and apply a small amount of silicone lubricant to each of the O-rings (two on each barrel, four total) Push the barrels back into the bypass, and push the yoke onto the barrels. Attach the steel mounting clips on each side and screw in the two screws (Figure 6)



b) If the valve you are attaching the bypass to has a flow sensor (see picture <-), lube the two O-rings and push the bypass assembly onto the flow sensor, and attach the steel mounting clips and screws.

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If the valve you are attaching the bypass to does not have a flow sensor, then it has the same type of barrels that are on the opposite side of the bypass. Take out the barrels and apply silicone grease to all four o-rings and push in the barrels and attach the bypass. See above picture for example of silicone grease and what an o-ring looks like.

10. Now install your water pipes to the 5900e bypass end connectors. Make sure inlet is installed to the 'In' pipe connector on the bypass valve and outlet is on the "Out" connector.
11. Assemble the Drain Line Flow Control (DLFC) Fitting: A ½" MPT X 5/8" OD Barb is included. Using three wraps of Teflon tape and some Teflon paste on the ½" thread, and screw that into the Drain Line Fitting. This is located on the side of the valve; it is removed by pulling out the black clip. The DLFC is a black rubber washer with a hole in it- refer to the table on page 15 to determine which DLFC to install. If your unit backwashes at 10 or 12 GPM's, you will still assemble the fitting, but you will not install a DLFC (they only go up to 7 gpm).
12. Connect some flexible tubing from the drain connection on the 5900e control valve to a suitable drain such as a septic tank or drain to a sewer. It is OK to run the drain line up and over the 5900e Carbon Filter up to 4 feet above the top of the tank. If the drain line will be more than 20 feet, use larger diameter tubing such as ¾" or 1". Note that it is desirable to be able to run the drain line into a bucket in order to test the backwash flow rate in the future. This is why hard piping the drain line is discouraged, however, if you do use hard PVC piping for the drain line, and you are able to remove the hard PVC drain piping and attach flexible tubing should you ever desire for testing purposes, it is OK to use rigid PVC pipe for the drain. Make sure the drain tubing is firmly clamped to the barbed fitting with a hose clamp to prevent leaks.
13. Next, you will need to program the system to work as a Carbon Filter. There are a few settings that must be changed before the system can be put into service. Plug in the control valve and continue on to the programming instructions.

Programming Your Valve



*While scrolling through numbers, it only increases the value. To decrease the value, you will have to “go all the way around” to get back to a lower value.

1. To enter main menu press the Menu/Enter button
(Time of day will flash)
 2. To set time of day press the Set/Change button
(First digit will begin to flash) Example [12:00]
 - **To change digit value press the Set/Change button**
 - **To accept the digit press the Menu/Enter button**
 - (Next digit will flash)
 - (Once hours is accepted all digits will flash)
 3. 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) Example [A]
 4. To Set Regeneration Frequency Press the Set/Change Button
- **The recommended setting for a Carbon filter is every 7 days**
- Once the last digit is accepted all digits will flash Example [A - 07]
- Notes: -Maximum Value is 29
-If value is set to 0, automatic regeneration will never occur
-One cycle must be completed before new setting will be accepted.
5. 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.

Next you will need to set the Master Programming to be used as a carbon filter, continue on to the next page to finish the programming instructions.

Master Programming Mode

Entering Master Programming Mode

-To enter Master Programming Mode press and hold both buttons for 5 seconds.

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..

Example: 2 A.M. regeneration time - [r 2A] (factory setting)

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

The next 3 displays viewed are part of a series of option settings used to program the Regeneration Cycle. Up to 4 steps can be programmed, however, some steps may not be necessary for your application and will be set to 0. 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. Regeneration steps are *skipped* by setting the display to 0 as shown below:

Examples: Regeneration Cycle Step #1 - 10 minutes - [1 - 10] (Factory Setting)

Regeneration Cycle Step #2 - skipped - [2 - - 0]

Set each step according to the values below, appropriate for a carbon filter:

- 1 10 minutes. This is the Backwash cycle. [1 - 10]
- 2 0 minutes. This is the Brine Draw cycle, not used on your valve. [2 - 0]
- 3 6 minutes. This is the Rapid Rinse cycle. [3 - 6]

3. Blue Tooth (This feature is not used in your application; it is for rental units)

After Cycle Step Three above, when you press the menu/enter button, the display will show bE 1 ; press the menu/enter button again, the display shows: bTPP and then changes to 1234. Press the menu/enter button, and now you are back to the home service screen (displaying the clock time and the number of days until backwash).

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 or longer in Master Programming Mode, it will be exited automatically.

Sample Regeneration Displays

Step 1: Less Than 9 Minutes Remaining in the Backwash Step

Step 2: Less Than 59 Minutes Remaining in the Brine/Rinse Step (For Filters & Reactr, this is a Rest Period)

Step 3: Less Than 9 Minutes Remaining in the Rapid Rinse Step

Step 4: Less Than 11 Minutes Remaining in the Brine Refill Step (For Filters & Reactr, this Step is Skipped)

Step 5: Valve is In Service

Notes:
-When the Valve is Between Positions the Display will Flash the Number of the Step it is Moving towards.
-To Fast Cycle Thru Regeneration Press and Hold the Set/Change Button Until the Valve Starts to Advance to the Next Step.

(4 steps are shown, as some valves are configured with four steps)

Initial Backwash

- 1 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. Now, proceed to step two.
- 2 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 all of that air out. 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 a corresponding increase in flow out of the drain line as you increase the flow of water into the filter. After several minutes, you should have the valve fully open, and with no media coming out. The water may appear milky white.
- 3 If possible, 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 Carbon media and prevent it from cementing together.

0.75 CF	4 GPM
1.0 CF	5 GPM
1.5 CF	5 GPM
2.0 CF	7 GPM

- 4 Once the water is clear, press and hold the Set/Change button, and after 3 seconds the valve will start to advance to the “Rinse” position. Once again, allow the water to flow for about five minutes or until the water is clear.
- 5 Press and hold the Set/Change button advance to the “Service” position. Next, open the 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 valve!

Maintenance

Normal Operation

- 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.

Battery back-up (this unit uses a standard 9 volt alkaline battery)

- Installing the battery
- To install the battery the back-cover must be removed by removing the two back-cover screws.
- Next insert the battery into the battery holding clip and snap the 9 volt battery connector onto the battery.
- Replace back-cover
- Features of battery back-up
- The battery back-up maintains the time of day during power failures.
- The battery back-up continues to count down gallons remaining during power failure (Metered Version)

Note: During power failure to conserve battery power the display is turned off. However, to confirm that the battery is working you can press either button and the display will turn on for five seconds.

- * Menus can not be accessed during power failure
- * If a power failure occurs while the valve is in regeneration the regeneration will resume operation once the power is restored

How To Start An Extra Regeneration Cycle

1. Starting 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

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2. 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.

3. 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

Troubleshooting the 5900e Carbon Filter

Backwash Flow Rate

One problem that may occur is if you do not have enough backwash flow rate to properly clean the Carbon filter. You can verify the backwash flow rate by running the drain line into a bucket and timing it when the 5900e 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 5900e may not be programmed correctly. See the 5900e service manual for instructions on how to access the master programming.

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 - Motor not getting power. (Valve requires service to continue)

- New 5900e programming is identified by "c 1.22" in presentation upon power up.

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 in order to level it.

How To Remove Media From Control Head

Sometimes, when doing the Initial Backwash, the media gets lifted up into the control head. You can tell this happened because you will have little or no flow, either going out to drain while in the backwash position, or when in the service position.

To remove media from a control head, do the following:

- 1) Put the Inlet Bypass in the Closed position.
- 2) From the Service Mode, initiate a manual regeneration, by pressing and holding the regen button (button on far left).
- 3) The valve will advance to the BW (backwash) position, and start counting down. Press the Regen button again, and wait for the valve to advance and stop at the Rapid Rinse (RR) position.
- 4) With the valve in the RR position, open and close the Inlet Bypass valve several times. After the third or fourth time, leave it in the open position and check the drain line- do you have a good solid flow? 90% of the time, the answer is yes, but sometimes, even after opening and closing the valve many times, you still don't have good flow... But, in either case (good or no flow), continue...
- 5) With the Inlet Valve OFF, Advance the valve back to Service position again, and again press and hold the Regen button, we are putting the valve back to the Backwash position.
- 6) Open the Inlet valve just enough so you can hear the water passing thru the valve- you should notice a corresponding slow flow out of the drain line. After a minute, if there are no air bubbles present, open the valve about another quarter inch- again, you should see a corresponding increase in the flow... And you will continue until the valve is full open.

IMPORTANT:

Any time that you are in the Backwash or Rapid Rinse position, you may need to unplug the power- this will hold the valve in its current position, so it doesn't 'time out' and go to the next position. When you plug the valve back in, after a minute it will return to where it was when you unplugged it (i.e. 2:32 remaining in BW). Understand, it is not possible to jam media into the head while in Rapid Rinse, or Service, just in the Backwash, when the flow direction is reversed.

What you are trying to accomplish, after you have pushed the media back in to the tank in the Rapid Rinse position, is to get the Inlet valve all the way open in the Backwash position, without it jamming media back in the head, and this is the part where you have to go slow, open up the Inlet valve a little bit at a time and let it run for a few minutes- this is why you may have to unplug it- and then, once you have done that, finally, do one more backwash, starting with the Inlet valve open, just as it will be when it does it automatically at night. Once it does that successfully, you are done.

Flow Sensor Option:

If you purchased the flow sensor option, refer to the following to program your valve:

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Press and hold both buttons for five seconds. The display will change to:

[r 2A] This is the factory preset, it is indicating that the valve will start the backwash at 2 am.

If you wish to change the value, press and release the set/change button; the A will flash, and pressing the set/change button again will change it from A to P (am to pm). Press menu enter when you have selected A or P, and now the 2 will be flashing, press the set/change button to change the time, and press men/enter when done. Now, all of the display will be flashing the current stored value.

Press menu/enter again and the valve displays A 07. This is the number of days between backwashes, when the backwash is not triggered by the gallons amount reaching zero on the flow sensor. For Carbon, Sediment and Neutralizer filters, this should be set at 7 days. For Pro-Ox, it should be set every 4 days.

Now you will program four cycle steps:

- 1) Set for ten minutes. (1 10)
- 2) Set for zero minutes. (2 00)
- 3) Set for 6 minutes. (3 06)
- 4) Set for zero minutes. (4 00)

After you press the menu/enter button at cycle step 4, the display will read c 027. Set this at c 020.

The next menu item will display P-25. Change this to P-00.

Pressing menu/enter will return you to the service screen. Press and release the menu/enter button, and the clock time will flash. Set the clock time, and then select A or P for am or pm. Then (after pressing menu/enter) the screen will display H -25. Change this to H- 20.

Now, when you return to the service screen, the valve will display the clock time and 1000. This means that the unit will count down from 1000 gallons, and will backwash at the preset time on the day the gallons count down to zero.

Whatever number you entered in c, is divided by the number you set for H, remembering that c is in 1000's. c 020 means 20,000. $20,000/20 = 1,000$. So, by changing those values, you can increase or decrease the gallons amount.