

# Clack WS1 Carbon Backwash 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 treated water for many years.

Your new system comes with a printed Clack Service manual, which along with this start-up guide will help guide you in the installation and start-up of your new system. The Clack service manual covers other types of systems as well such as water softeners and filters, so there may be information in your Clack service manual that does not pertain to your system. 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.



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## Packing List by Model

### 1.0 Cubic Foot Carbon Filter:

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	Pipe connector kit (either 1" or ¾")
1	WS1 Bypass valve
1	Filter tank with distributor tube installed
1	Media funnel
1	Box Gravel
1	Cubic foot of Carbon filter media

### 1.5 Cubic Foot Carbon Filter:

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	Pipe connector kit (either 1" or ¾")
1	WS1 Bypass valve
1	Filter tank with distributor tube installed
1	Box Gravel
1.5	Cubic feet of Carbon filter media

### 2.5 Cubic Foot Carbon Filter:

Quantity	Description
1	WS1 Clack Backwash Control Valve
1	Pipe connector kit (either 1" or ¾")
1	WS1 Bypass valve
1	Filter tank with distributor tube installed
1	Media funnel
1	Box Gravel
2.5	Cubic feet of Carbon filter 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. Installation typically takes 3 to 5 hours. However after installation the Carbon 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. Typically this clears up over a day or two.

## Best Practices for Piping & Drain Installation

1. See typical installation for well water. (see Fig 2). The Carbon filter is installed after the pressure tank. If your water source is city water, install on the main line coming in to the home so all inside water is filtered.
2. Make sure to follow to connect the in pipe to the Clack WS1 inlet and the outlet to the outlet (see Fig 2). As you face the Clack WS1 control from the front, the water enters on the right and exits on the left. From the back (see Fig 2) 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 Clack WS1 Carbon filter and also one after as shown in the diagram 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 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 Clack WS1 control valve. Avoid heating up the Clack WS1 control valve.
5. The Clack WS1 pipe fittings are either 1" threaded fittings, or ¾" slip (glue-on) fittings. If you ordered the ¾" and are using stainless steel flex lines or other threaded pipe fittings to connect your piping to the ¾" Clack WS1 fittings, you will need to first glue on a PVC pipe fitting to the WS1 fitting and then attach the threaded stainless steel pipe connectors or your other threaded fittings.

6. You do not need unions to install your Clack WS1 control. If you need to remove it, the Clack WS1 has quick-release couplings that make it easy to put the Carbon Carbon filter on by-pass and remove the filter system from the piping.
7. 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 Clack WS1 control and into a drain, it does not have to drain down, as the filter backwashes under line pressure. Most plumbing codes require an air-gap connection, so that if your sewer or septic tank backs up, it cannot cross connect with drain tubing.

## How Your Carbon Filter Works

Fig 1. In your Carbon 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 removes sediment and can be backwashed, which cleans and re-classifies the Carbon, preventing channeling.

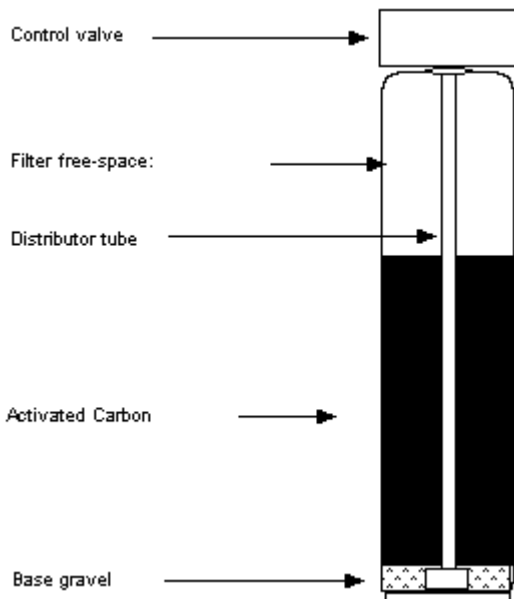
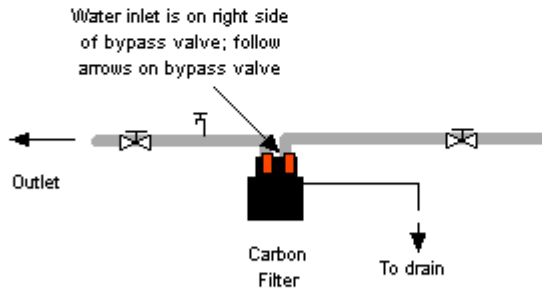
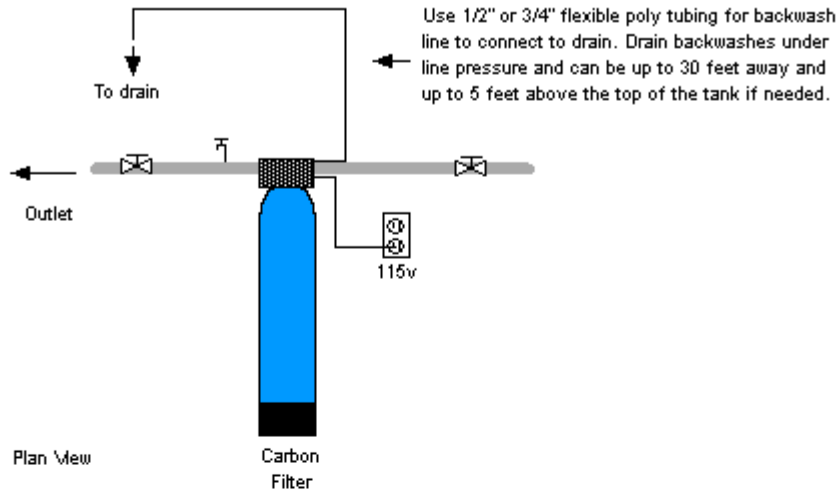






Figure 2 - Carbon backwash filter on treated city water

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

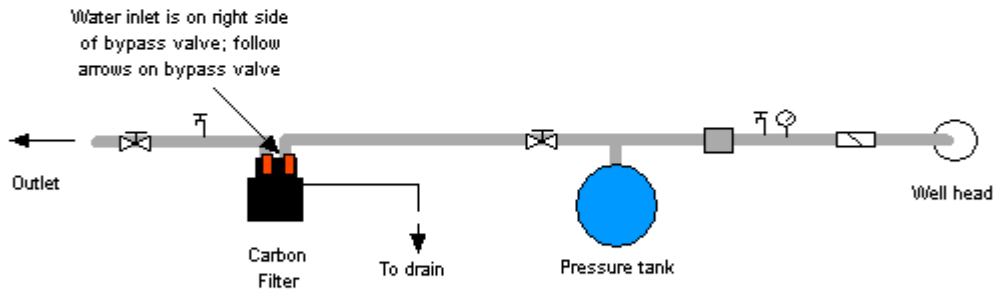
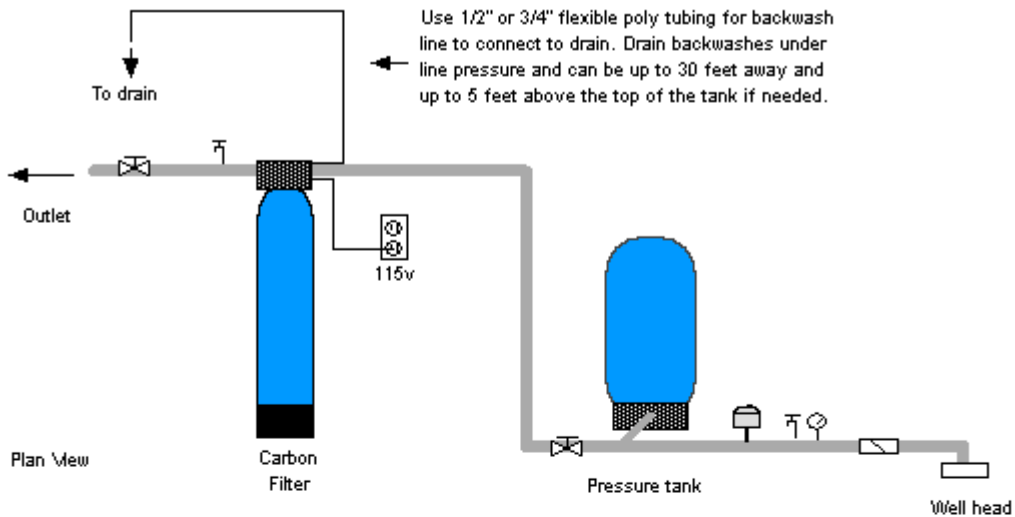
Notes: follow inlet and outlet arrows on filter for proper installation. Connect 1/2" flexible tubing from backwashing control valve to a drain. If the distance to the drain is more than 20 feet use 3/4" or 1" tubing. Follow all local plumbing and electrical codes.

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**

Figure 3 - Carbon Carbon Filter tank on well water:

Auto Backwash Carbon Filter System for Well Water Systems  
Flow Diagram Not to scale



Key

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

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.

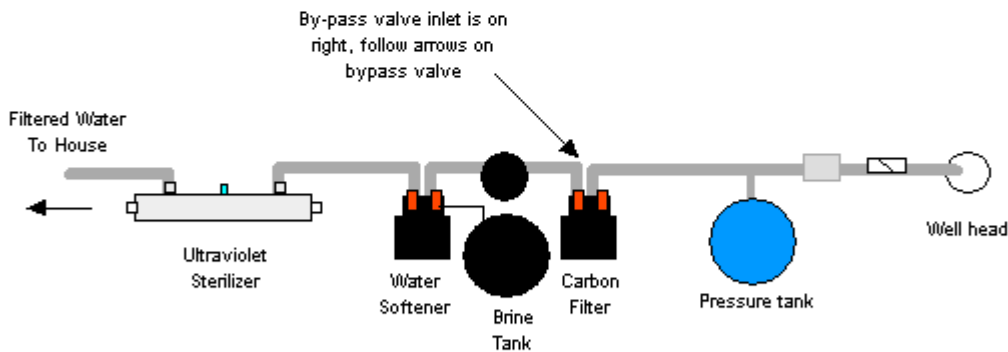
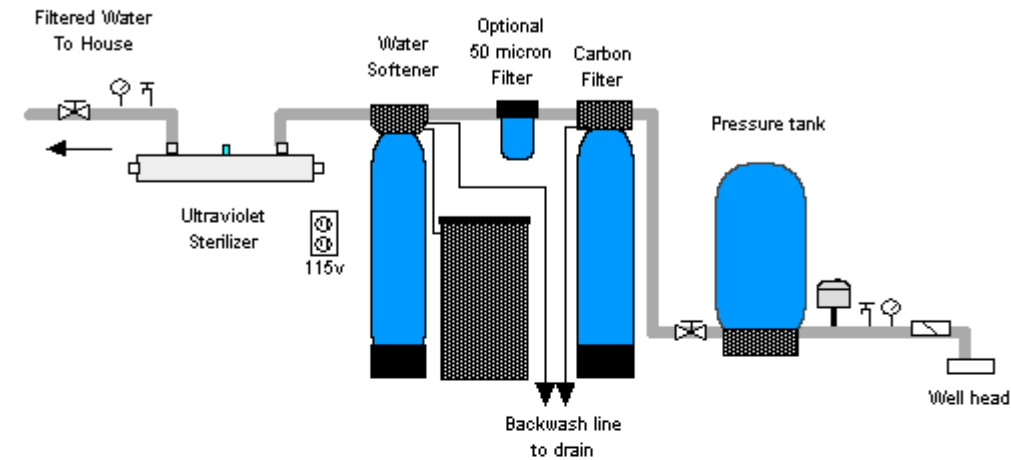
If you install a hose bib & ball valve after the filter as shown, it will make it easier to service and test the water at a later date.

NOTE: DO NOT INSTALL CARBON FILTERS IF BACTERIA OR RADON ARE PRESENT IN WELL WATER.

Figure 4 - Carbon Carbon Filter with optional softener & UV sterilizer tank on well water:



**Piping diagram for Carbon Backwash Filter, water softener and optional UV sterilizer on a well system with pressure tank:**



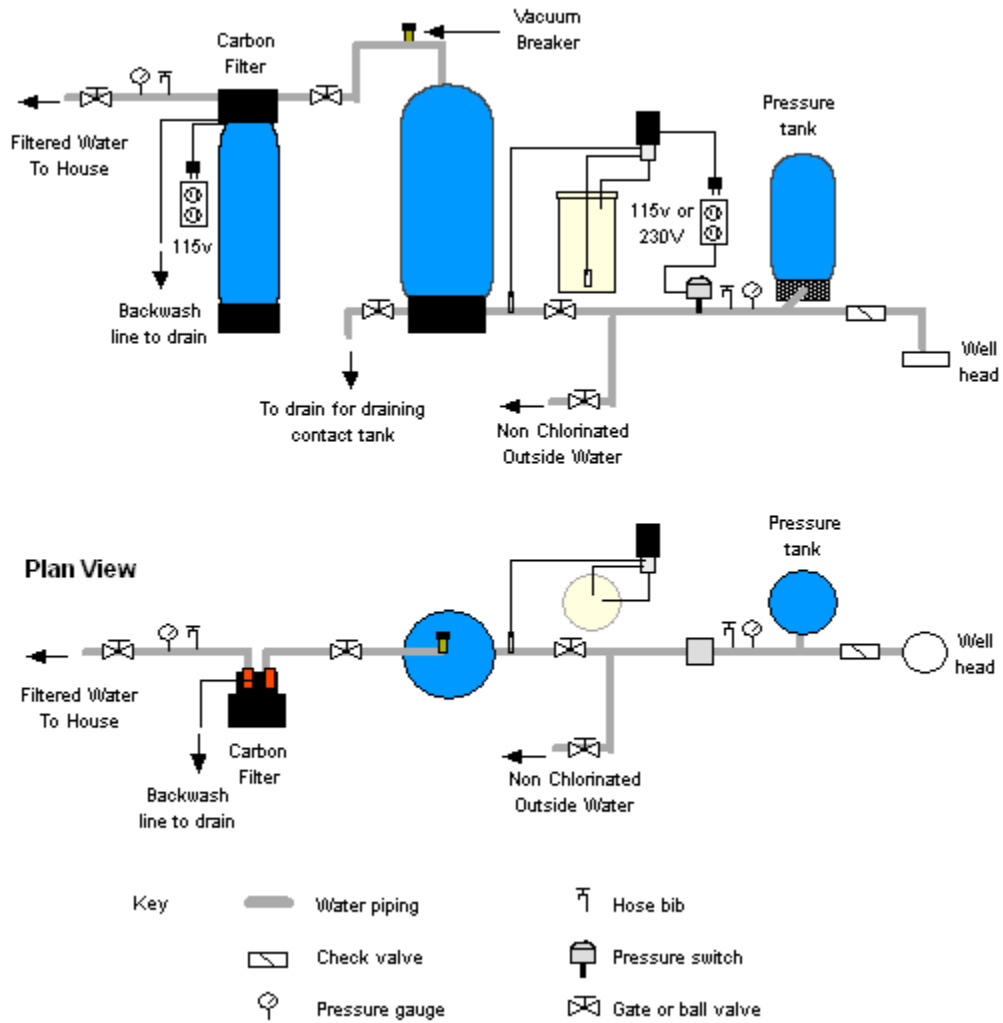
- Key
- Water piping
  - Check valve
  - Pressure gauge
  - Hose bib
  - Pressure switch
  - Gate or ball valve

Notes: follow inlet and outlet arrows on filter for proper installation. Install system using bypass valve (not shown). Connect 1/2" flexible tubing from backwashing control valve to a drain with an air-gap similar to what a washing machine might require, such as 1 1/2" ABS with a p-trap and vent.

Follow all local plumbing and electrical codes.

Figure 4 - Carbon Carbon Filter with optional softener & UV sterilizer tank on well water:

Figure 5 - Carbon Carbon Filter chlorination system





## Assembly and Installation Instructions

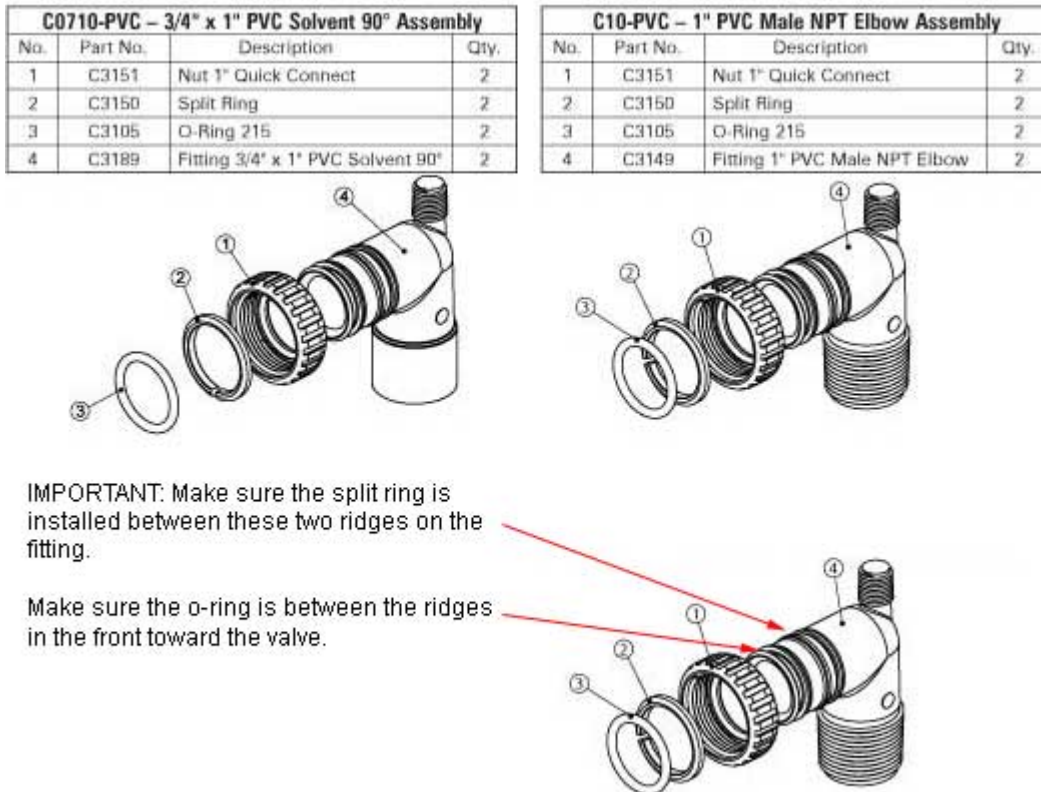
1. Unscrew by hand the entire Clack WS1 control valve from top of tank if it was shipped screwed on. Place distributor tube in tank if not already inside tank. If not already done, make sure blue cap is on top of distributor tube, or wrap the top of distributor tube with electrical or duct tape. You do not want gravel or Carbon media to go down the distributor tube.
2. Add filter gravel supplied first, using the funnel sent with the Carbon filter.
3. Next add Carbon. Tank should not be more than about 2/3rds or at most 3/4ths full.
4. Remove cap or tape from top of distributor tube. Be careful not to pull up distributor tube when removing cap or tape.
5. If possible at this point, fill tank completely with water. This will allow the Carbon media to settle and eliminate the need of “purging” the air out of the tank later. If possible let the carbon media soak for 6 – 8 hours or overnight.
6. Add a small amount of silicone grease or vegetable cooking oil to the tank threads and screw on Clack WS1 control valve carefully. Do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.

Fig 6 Carbon WS1 Control Valve



- Lubricate the by-pass valve o-rings with some vegetable oil or silicone grease and connect the bypass assembly to the Clack WS1 control by sliding the bypass valve firmly into the body of the Clack WS1. Once bypass is in far enough, you will be able to insert the red connector clips.

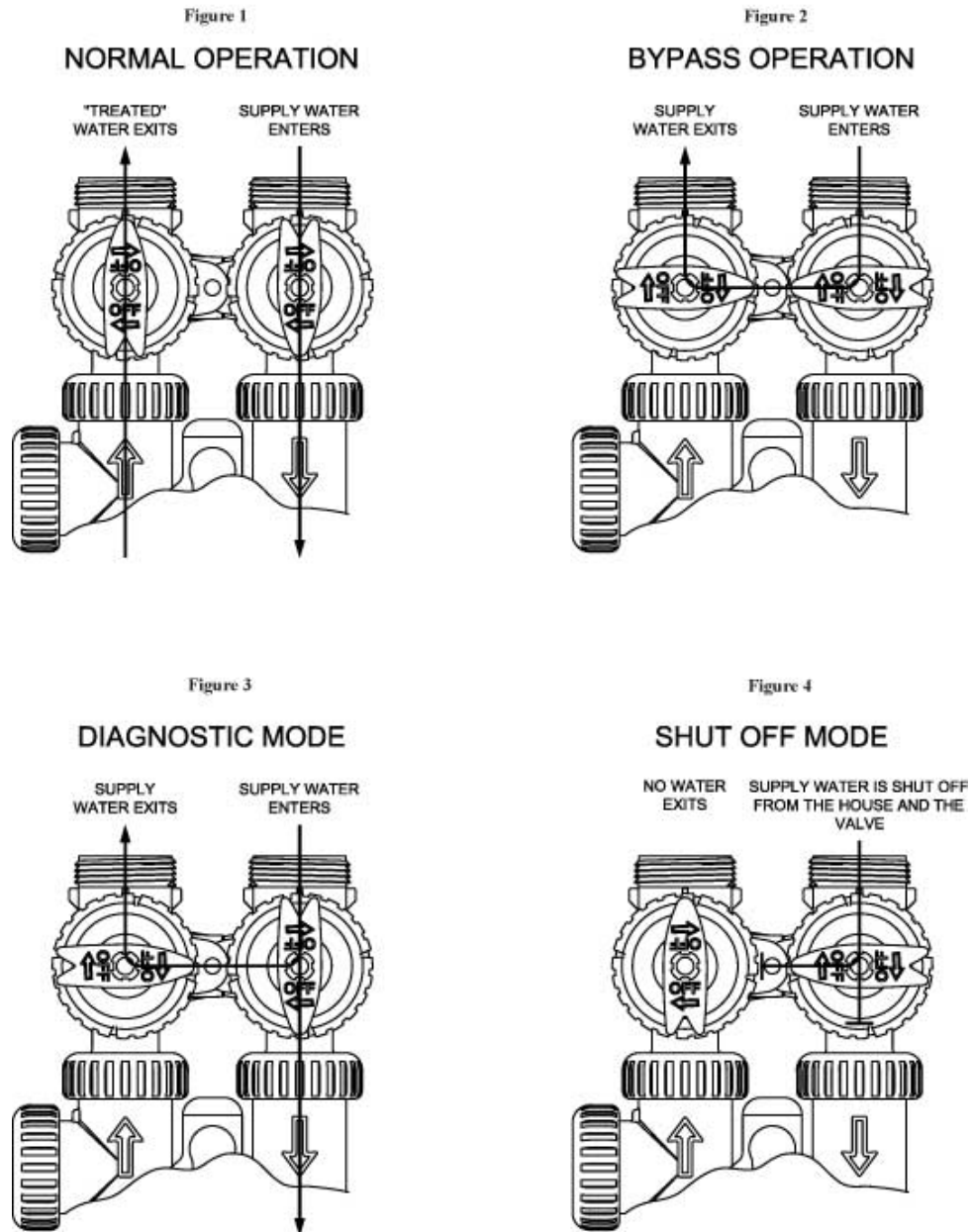
Figure 7 : pipe connectors on WS1 backwash control valve:



- See by-pass valves. If red valve handles are in-line with pipe they are in service, not bypass. Move both valves to the bypass position if not already in bypass.
- Now install your water pipes to the Clack WS1 bypass end connectors. Make sure inlet is installed to the 'In' pipe connector on the bypass valve and outlet is on the "Out" connector.
- Connect some flexible tubing from the drain connection on the Clack WS1 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 Clack WS1 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 3/4" 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.

Figure 8 – Bypass valve

## BYPASS VALVE OPERATION



11. Plug in your Clack WS1 control valve to an outlet.

12. Set Current Time of Day. Press NEXT button until of time of day is displayed. Press and hold the Up or Down button until the SET indicator is displayed and the hour flashes. Press the Up or Down button until the correct hour is displayed. Then press the NEXT button. The minutes will flash. Press the Up or Down button until the correct minute is displayed. Press the NEXT button to return to the Display Screens.

### 13. SIMPLE PROGRAMMING STEPS

Step 1: Press NEXT and the Down button simultaneously for 5 seconds and release.

Step 2: Select FILTERING if not already selected; Press NEXT

Step 3: Adjust the length of backwash to 10 (for 10 minutes); Press NEXT

Step 4: Adjust the length of rinse to 6 (for 6 minutes); Press NEXT to return to time of day.

Note if your display shows numbers for Draw or Fill, set those to OFF and press NEXT.

Step 5: Press Next and Up button for five seconds and release.

Step 6: Adjust days to 7 by using Up or Down buttons. If your water has a lot of sediment it can be adjusted to backwash every few nights, or even every night as needed. If you experience some loss of water pressure in the house after several days, you can always reset the WS1 to backwash more frequently.

Step 7: Use Up or Down button to change regeneration backwash time. Default is 2:00 am. If any water is used during the time the system is backwashing, the untreated water will flow into the house and the water will not be interrupted. Press NEXT to exit programming.

That is it! You are done programming.

14. By pressing NEXT you can toggle back between the current time and the days to the Next backwash.

15. Now you are ready to turn on the water. Turn on the water and leave the neutralizer on bypass and check for leaks. Leave the ball valve after the carbon filter closed, so water is still off to the house, but connect a garden hose and open up the hose bib after the carbon filter and allow the water to run. This will help to clear out any foreign material that may be in the pipes from the piping installation. If you do not have a valve installed after the carbon filter and you do not have a hose bib, you will need to turn the water on inside the house to let the water run. Use a bathtub or laundry sink or other fixture that does not have an aerator screen.

16. Press the REGEN button for several seconds which will start a manual backwash.

17. Now you can slowly turn the bypass valve to the service position. First open the Inlet Side of the bypass valve. Second slowly open the Outlet Side of the bypass until it is in the full service position.

18. There should be no Carbon media coming out of the drain line, but the water will be gray or dirty looking. At this point the Carbon will be in a backwash mode, which is the first of two cycles it goes through during backwash (also called regeneration"). The backwash takes 14 minutes. The next cycle is the rinse which takes 8 minutes.

19. After the backwash and rinse cycles are complete, repeat the process by pressing the REGEN button again for several seconds. If the water is gray or discolored after the carbon filter, press REGEN again and backwash and rinse for a third time if needed.
20. Note it is normal for some small amount of Carbon dust and fines to come out during the backwash, although you do not want to see a large amount of media coming out, which would mean you have very high water pressure, or the drain flow for the Clack WS1 is missing.
21. If possible verify that the backwash flow is 5 gallons per minute, which is the recommended backwash flow rate for 1.0 and 1.5 cubic foot models. If you have a 2.5 cubic foot Carbon it should be backwashing at 10 gallons per minute. 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.
22. Refer to your Clack WS1 service manual for more information about how your control valve is programmed if desired.

## Troubleshooting the Clack WS1 Carbon Filter

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 Clack WS1 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 Clack WS1 may not be programmed correctly. See the Clack WS1 service manual for instructions on how to access the master programming.

## Maintaining Your WS1 Carbon Filter System

There is little or no maintenance required. Every 2 to 4 years the Carbon media can be replaced for best results.

## How to Change the Carbon in Your Filter System

It is easy to change the carbon media, depending on the size filter system you have one person can easily do it with no assistance. If you have a 2.5 cubic size or larger, you may want to have some assistance.

Steps to take:

1. Unplug the control valve and shut off the water to the carbon filter. You can do this by shutting off the water or by closing the bypass valves so the carbon filter is on bypass.
2. Release the pressure inside the filter by either pressing the REGEN button which will start a manual backwash, and instantly release the pressure, since it is on bypass or the water is turned off to.
3. See Figure 1 and Figure 2 below. After the pressure is released you can remove the filter from the pipes by unscrewing the bypass nuts shown in the image. Use a Channel Locks or large pliers to remove these nuts.
4. Now simply unscrew the control valve from the top of the tank. Usually no pliers or tools are required.
5. Place some plastic tubing or a siphon hose inside the distributor tube and siphon off the water from tank. It is not absolutely necessary to drain the water out first, you can leave it full but the tank will be easier to lay on its side if it is drained.
6. Lay the tank on a large plastic tarp or sheet of plastic.
7. Place a garden hose in the tank and begin to flush out the carbon out on the tarp. Once the carbon starts to flow out, you can pull out the distributor tube.
8. Flush out all the carbon and gravel and dispose.
9. Rinse out the tank well. If you are on well water, or other non-chlorinated source, add ½ cup of chlorine bleach and a few gallons of water and rinse the inside of the tank with this bleach solution. Rinse thoroughly.
10. Add new gravel and carbon and follow start-up instructions to backwash and rinse carbon media thoroughly before putting back into service.