



Clean Water Made Easy

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CWS Plus Birm 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 Iron free water for many years.

Your new system comes with a printed CWS Service manual, which along with this start-up guide will help guide you in the installation and start-up of your new system. The CWS service manual covers other types of systems as well such as water softeners and filters, so there may be information in your CWS 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.

BIRM 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

Email us: support@cleanwaterstore.com

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Packing List

Birm Filter 0.75 cubic foot size

Quantity 1 CWS Plus Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 8" x 44" filter tank with distributor tube

Blue media funnel for adding the Birm media

10 lbs. Filter gravel

0.75 cubic foot of Birm media

Birm Filter 1.0 cubic foot size

Quantity 1 CWS Plus Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 13" x 30", or 10" x 44", or 9" x 48" filter tank with distributor tube

Blue media funnel for adding the Birm media

12 lbs. Filter gravel

1 cubic foot of Birm media

Birm Filter 1.5 cubic foot size

Quantity 1 CWS Plus Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 10" x 54" filter tank with distributor tube

Blue media funnel for adding the Birm media

16 lbs. Filter gravel

1.5 cubic foot of Birm media

Birm Filter 2.0 cubic foot size

Quantity 1 CWS Plus Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 12" x 52" filter tank with distributor tube

Blue media funnel for adding the Birm media

20 lbs. Filter gravel

2.0 cubic foot of Birm 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 Birm 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 Birm filter is installed after the pressure tank.
2. Make sure to connect the IN pipe to the CWS Plus inlet and the OUT pipe to the outlet (see Fig 2). As you face the CWS Plus 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 CWS Plus Birm 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 Birm Filter and before the second ball valve. This makes it easy to rinse your new Birm Filter on start-up and gives you a place to test the water before it enters your household plumbing.

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4. If you will be using copper piping, do not sweat the copper pipe directly on to the CWS Plus control valve. Avoid heating up the CWS Plus control valve plastic with the torch.
5. If you have copper pipe before the Birm Filter and it is too difficult to change out, you may still experience some copper staining of fixtures and have a copper residual in the water because this section of pipe will still have acidic water flowing through it. We recommend PEX or PVC pipe up to the Birm Filter and then copper after it, if you have copper plumbing.
6. You do not need unions to install your CWS Plus control valve. If you need to remove it, the CWS165 has quick-release couplings that make it easy to put the Birm 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 CWS Plus control and into a drain, it does not have to drain down, as the filter backwashes under line pressure from your well pump. 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.

How Your Birm Filter Works

See Fig 1 below. In your Birm 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 Birm Filter removes sediment and can be backwashed, which cleans and re-classifies the media, 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 media. During the backwash the media is cleaned of any iron by the action of the water flowing through it.

Fig 1 - Birm Filter Tank Water Flow

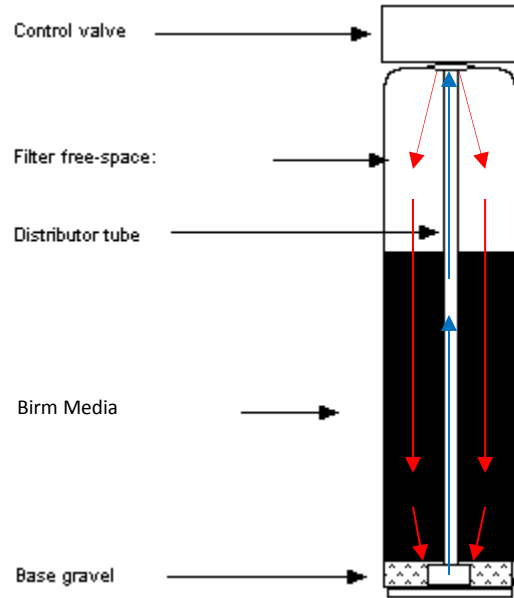
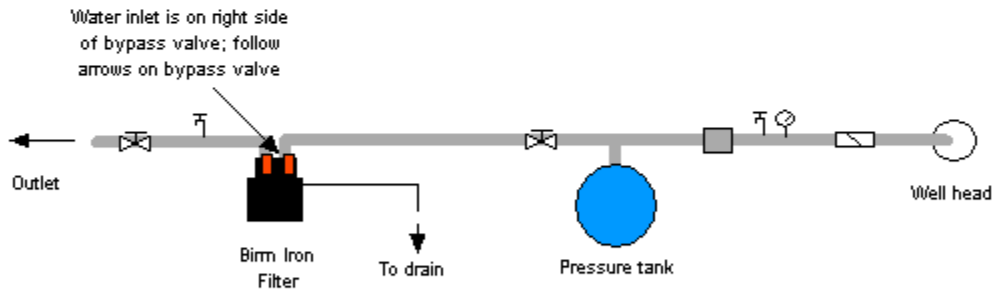
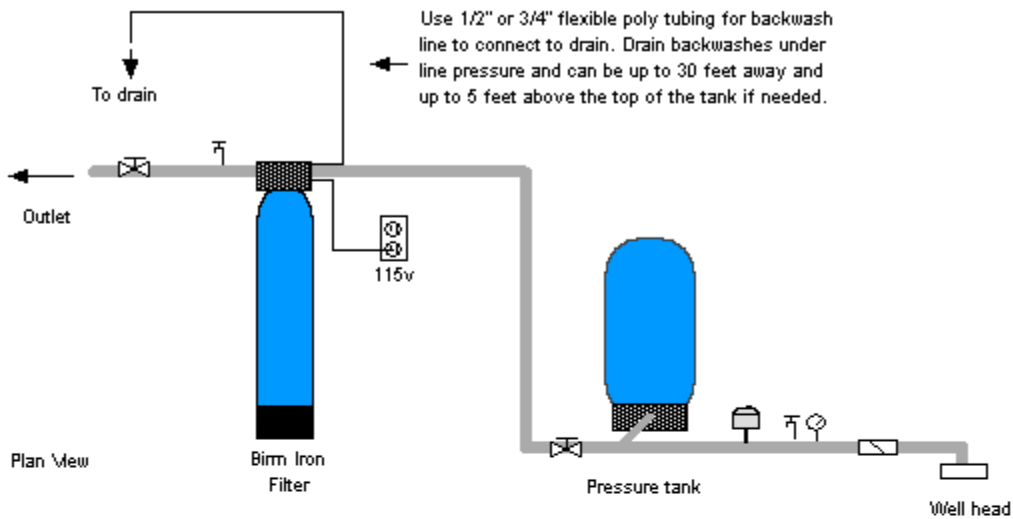


Fig 2 - Typical Birm Filter CWS Plus piping installation with ball valve and hose bib after the filter

Auto Backwash Birm Filter System
Flow Diagram Not to scale



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

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

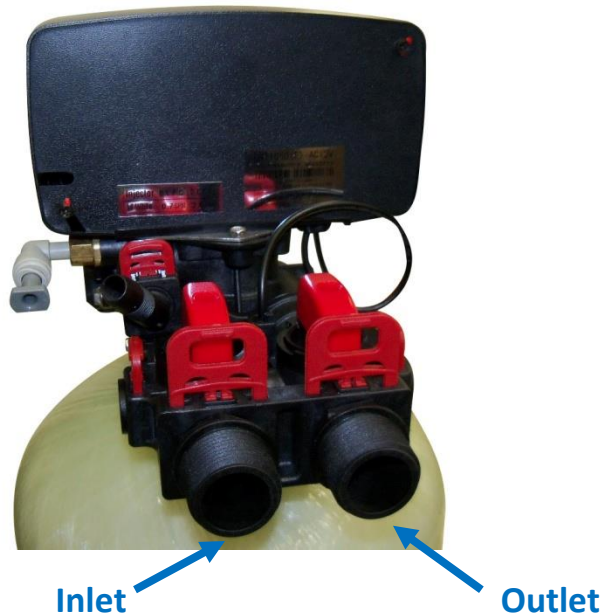
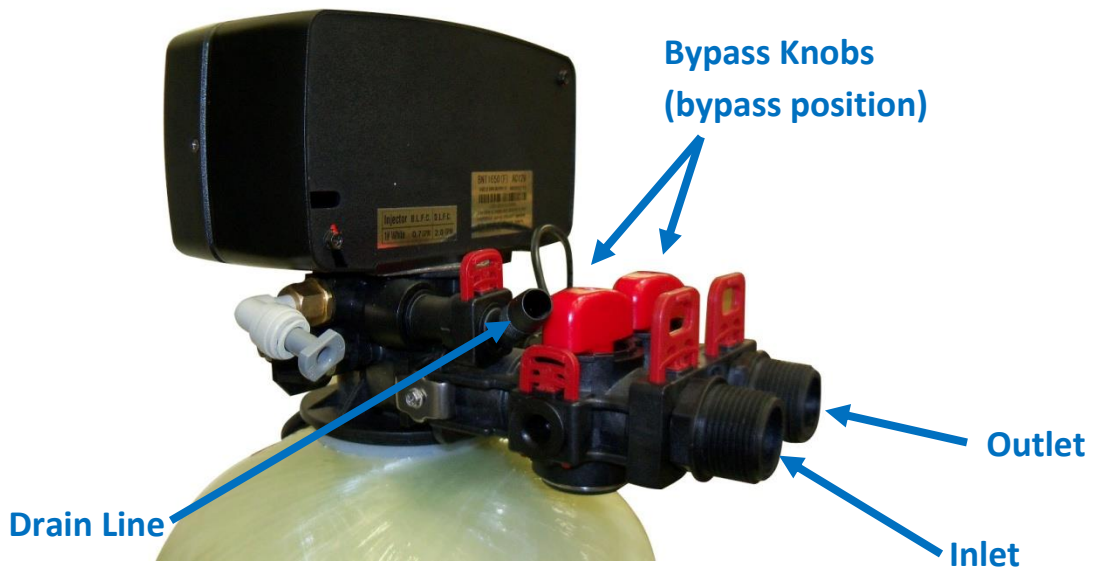


Fig 4 CWS Plus side view

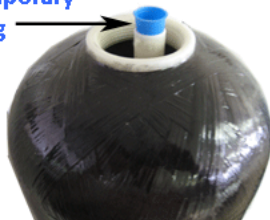


Assembly and Installation Instructions

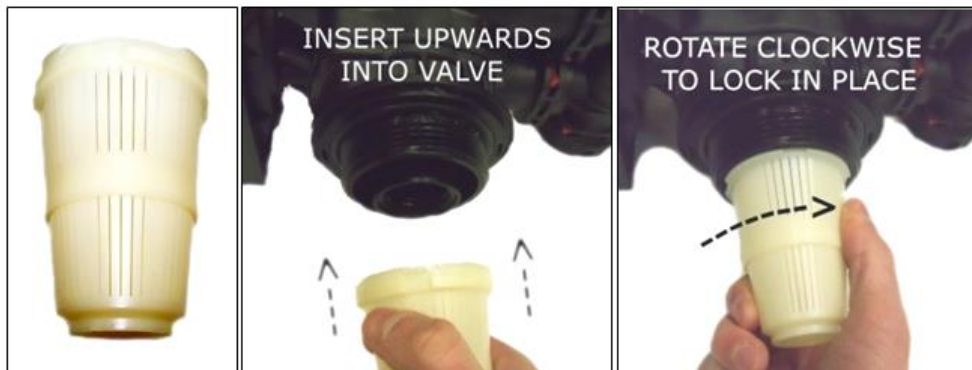
1. By hand, unscrew the entire CWS Plus control valve from top of tank if it was shipped screwed on. Place distributor tube in tank if not already inside. If not already done, make sure the blue cap is on top of distributor tube, or wrap the top of distributor tube with electrical or duct tape. You do not want gravel or media to go down the distributor tube.


Plug or tape top of distributor tube to prevent media from entering distributor tube when adding media. Remove when finished.

Temporary plug



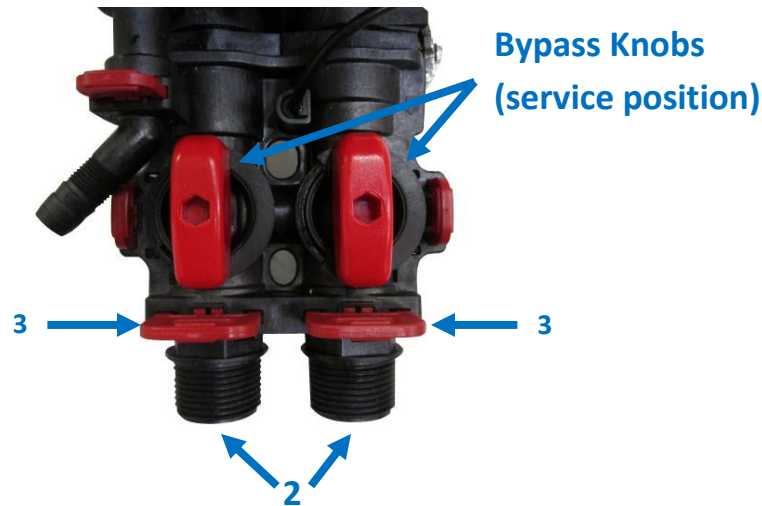
2. Add the filter gravel that came with your order. You want the gravel to cover the bottom distributor screen before adding the media.
3. Next add media. The tank will be about 2/3rds full of media.
4. Remove cap or tape from top of distributor tube. Be careful not to pull up distributor tube when removing cap or tape.
5. If possible at this point, fill tank completely with water. This will allow the Birm 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 CWS165 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.



7.  screw on CWS165 control valve carefully. Do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.

- See how the CWS by-pass is connected. Note that Items 2 in Fig 3 below are the pipe connectors and the other end is what gets attached to the control valve. Items 3 are the red clips that hold the pipe connectors to the by-pass valve. **Your CWS is usually shipped in the by-pass position, as in Figure 4.**

Fig 5 CWS 165 By-Pass and Pipe Connectors







- Lubricate the by-pass valve o-rings with some vegetable oil or silicone grease and connect the bypass assembly to the CWS Plus control by sliding the bypass valve firmly into the body of the valve. Once the bypass is in far enough, you will be able to insert the red connector clips.
- Next lubricate the end-connectors (#2 in Fig 3) with some silicone grease or vegetable cooking oil and insert them into the bypass valve and then insert the red clips (#3).
- Note that the CWS is usually shipped in the bypass position. There is a bypass valve knob on both the inlet and the outlet (Fig 3 #1). You can easily tell if it is in bypass because the two knobs will be in line with each other (Fig 4). If the valve is in the Service position (Fig 5) the knobs will be parallel to each other. Make sure both sides are in the by-pass position.
- Do NOT remove the red clips in order to put the bypass valve in either bypass or service, it is not necessary nor desired to remove the red clips on the bypass valve hand knobs (see Fig 3 item 1, which are the knobs you will turn to move the bypass valves).
- Now install your water pipes to the CWS165 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 CWS Plus 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 CWS Plus Birm 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 $\frac{3}{4}$ " 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

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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.


15. Plug your CWS Plus control valve into an outlet. After being plugged in, the screen may display “WAITING PLEASE” while it finds the service position. By default, the control valve will be set to work like a Water Softener, but that’s not correct for this application. So, next you will need to program the system to work as a Birm Filter. There are a few settings that must be changed before the system can be put into service.

16. PROGRAMMING:

- a. First, press the menu button labeled  once. If it says “SCREEN LOCKED,” you may have to press and hold the upper left button labeled  about 3 seconds until a beep sounds to unlock the display screen.
- b. NOTE: Use the up and down arrows to cycle through the various program settings. To change any setting, press ‘  ’. When the display flashes, the value may be changed. Press either the up or down arrow to change the value. Press ‘  ’ once more to accept the value, and the display should stop flashing to indicate that the setting has been saved.
- c. Step 1: REGIONAL US GAL (this stands for US gallons format, if it is different, change it to US GAL). When it is set, press the down button to proceed to the next step.
- d. Step 2: The display should be set to: “CALENDAR CLOCK”. By default, the system is most likely set to “METER IMMEDIATE” or “METER DELAYED.” We recommend CALENDAR CLOCK for the operation of your Birm Filter, to backwash a set number of days. Change the setting, then press the down arrow to proceed to the next step.
- e. Step 3: TIME- set the time of day. Press the down button to proceed.
- f. Step 4: REG. TIME - Set to 2:00 AM generally or sometime when no water is being used, and no other filter or softener is likely to be in a regeneration cycle. Then press the down button.
- g. Step 5: REG. DAYS - This tells the birm filter how often to regenerate in days. It can be set for any setting from 1 to 10, with 7 being the recommended common setting. If you are having some problems with bleed-through of chlorine (or whatever else it is that is being filtered out) after the birm filter has been online for a few days, you may want to change it to 2 or 3 days.
- h. Step 6: BACKWASH - Stands for Backwash length in minutes. It should be set to 10 MIN which means 10 minutes of backwash. If your water is extremely high in iron you can

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change this setting to 12 or 14 minutes to allow some extra backwash time, but 10 minutes is a good setting. Press the down button one time.

- i. Step 7: BRINE – This stands for Brine Draw. This doesn't really apply to your birm filter, so lower it to the absolute minimum value, which is 3. This cycle is 3 minutes long and should display: 3 MIN. Then, press the down button one time.
 - j. Step 8: RINSE - This is the Rapid Rinse cycle and should display: 10 MIN. Press the down button one more time.
 - k. Step 9: REFILL - This step does not really apply to your birm filter. Lower it all the way to 00.0. When it is set properly, it should display: 00.0 MIN. Press the down button one time.
 - l. Programming is finished- to exit, press the upper menu button  one more time to return to Service mode.
17. Now you can start the initial manual backwash. Turn the manual knob clockwise to “BA. WA” and a manual backwash will begin.
 18. Very slowly turn the inlet knob on the bypass valve towards the service position, but DO NOT open the valve all the way. We want to allow all of the air in the tank to escape before allowing the water to flow freely. The bypass valve knobs may be a little stiff at first.
 19. Once water begins to flow from the drain line open the inlet valve all the way. Continue to let the water run from the drain line for about five minutes or until any media fines in the water are no longer present.
 20. Once the water is clear, press any button to advance to the “Rinse” position. Once again, allow the water to flow for about five minutes or until the water is clear.
 21. Press any button to 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.
 22. Refer to your CWS Plus service manual for more information about how your control valve is programmed if desired.

Troubleshooting the CWS Plus Birm Filter

One problem that may occur is if you do not have enough backwash flow rate to properly clean the Birm filter. You can verify the backwash flow rate by running the drain line into a bucket and timing it when the CWS Plus 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 CWS165 may not be programmed correctly. See the CWS165 service manual for instructions on how to access the master programming.