PACIFIC WATER TECHNOLOGY

PWT Plus Neutraliser; PWT Media Plus Iron and Manganese Filter; and NextSand Installation & Start-Up Guide

Thank you for purchasing a PWT Media Filter System! With proper installation and a little routine maintenance your system will be providing good quality water for many years.

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

WARNING: CALCITE MEDIA, MEDIA PLUS and NEXTSAND CONTAINS DUST. USE PAPER MASKS AND VENTILATE TO AVOID BREATHING DUST.

Questions?

Call us toll-free: 1300CLEANWATER

Email us: sales@pacificwater.com.au

Packing List

Media Filter 1.0 Cubic Foot Size

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

Quantity (1) 10" x 44" Filter Tank with Distributor Tube

Blue media funnel for adding the media

12lbs. Filter gravel #5 and #6

1 cubic foot of filtration media

Media Filter 1.5 Cubic Foot Size

Quantity (1) 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 media

16lbs. Filter gravel #5 and #6

1.5 cubic foot of filtration media.

Media Filter 2.0 cubic foot size

Quantity (1) 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 Calcite media

20lbs. Filter gravel #5 and #6

2.0 cubic foot of media

Media Filter 2.5 cubic foot size

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

Quantity (1) 13" x 54" filter tank with distributor tube

Blue media funnel for adding the media

35lbs. Filter gravel #5 and #6

2.5 cubic foot of media

Media Filter 4 cubic foot size

Quantity (1) Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or 1.5")

Quantity (1) 16" x 65" filter tank with distributor tube

Blue media funnel for adding the media

40 lbs. Filter gravel #5 and # 6 (one bag each)

3.82 cubic foot of media (typically 4 x 25 kg bags)

Media Filter 7 cubic foot size

Quantity (1) Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1.5")

Quantity (1) 21" x 62" filter tank with distributor tube

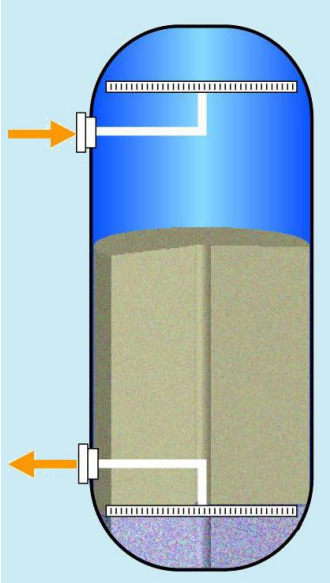
Black media funnel for adding the media

120 lbs. Filter gravel 2 bags #5 and 1 bag #6

6.6 cubic foot of media (typically 10 x 25 kg bags)

About the Media

NextSand (Grey media in white bags)



NextSand offers a single bed media made from high purity Clinoptilolite, which delivers superior performance over conventional filter sands or multimedia, and at a lower cost.
The material is mined in Western USA and then highly processed and graded; the resulting product is hard and stable with a high surface area and micro-porous character in addition to surface micro-crystals making it an ideal filter media.
NextSand has high filtration performance at <5 micron compared to 12 to 15 microns for multimedia. It also has a higher flow capacity, typically three to four times that of multimedia.

This higher flow rate means a greater performance can be achieved from existing vessels when upgraded with NextSand, or for new applications smaller filter vessels would be required to achieve the same results. Filtration through the entire media bed depth provides more than twice the capacity of multimedia filtration.

It has a higher dirt holding capacity so requires less frequent backwashing, leading to reduced downtime. Lighter weight and lower volume requirement means lower capital and shipping costs than multimedia and the product also last longer. The media isn't consumed in the filtration process; a simple periodic backwash will keep the media clean and operating efficiently for five years or more.

next Sand is NSF61 and BS6920 certified and complies to EU draft standard pr EN16070 for drinking water.

Physical properties as follows:
Composition: High purity Alumino-Silicate (Clinoptilolite)
Size: 0.4-1.4mm (Approx 14x40 mesh)
Colour: Dark Grey
Surface Area: 25m²/gram
Surface Absorption: Hydrophilic
Thermal Stability: Stable to 500°C
Coeffficient of Uniformity: 1.7
Bed Void Volume: 55%
Surface Charge: Net Negative

MediaPlus Media (25/30 kg white bags)

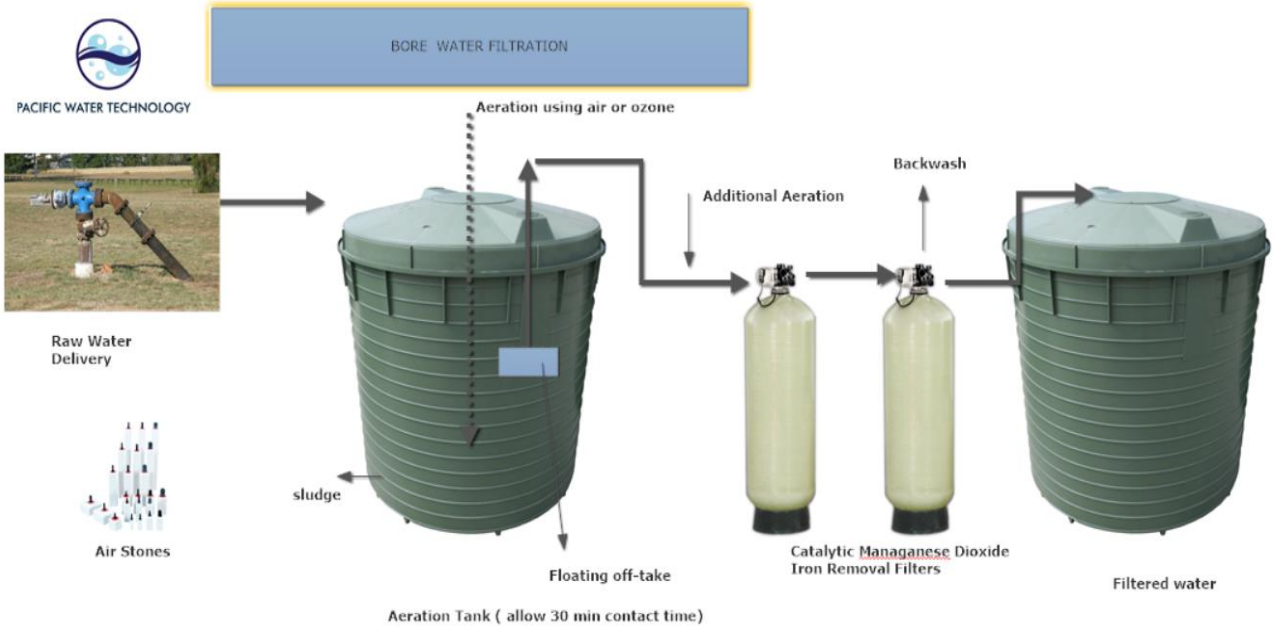
Iron and manganese are undesirable in groundwater because of their effect on the appearance and taste of the water, their ability to cause staining, and the health effects of manganese. Iron and manganese occur naturally in water, especially groundwater. Neither of the elements causes adverse health effects; they are, in fact, essential to the human diet. However, water containing excessive amounts of iron and manganese can stain clothes, discolour plumbing fixtures, and sometimes add a "rusty" taste and appearance to the water.

Oxidation involves the introduction of an oxidizing agent which chemically reacts with the iron or manganese to form an insoluble particle which can then be physically filtered out through a media bed.
Oxidation can be carried out one of the following methods:

- aeration - blowing/spraying air through the water
- addition of dissolved chemical oxidants - chlorine, chlorine dioxide and potassium permanganate (KMnO4)
- adsorption - greensand media and activated carbon

The process of oxidation followed by filtration is fairly easy and is often the treatment of choice. The use of ion exchange resins for the removal of iron and manganese has limited application due to the requirement that the contaminants be in dissolved form and at very low levels. This is due to the tendency of oxygen to react with the iron and manganese and therefore, increase the potential for plugging and build-up on the resin surface. Iron fouling is a common, and sometimes, irreversible problem with ion exchange treatment.

MediaPlus is a unique Manganese Dioxide based media that requires only aeration of the water to ensure adequate removal of iron and manganese. For effective removal we recommend a pH above 7. For high levels of iron and manganese we recommend an aeration tank prior to the iron removal filter.



Calcite Media

Calcite is a crushed and screened white marble media which can inexpensively be used to neutralize acidic or low pH waters to a neutral, less corrosive effluent.

Calcite is a naturally occurring calcium carbonate media. One of the advantages of Calcite is its self-limiting property. When properly applied, it corrects pH only enough to reach a non-corrosive equilibrium. It does not overcorrect under normal conditions. Upon contact with Calcite, acidic waters slowly dissolve the calcium carbonate to raise the pH which reduces the potential leaching of copper, lead and other metals found in typical plumbing systems. Periodic backwashing will prevent packing, reclassify the bed and maintain high service rates. Depending on pH, water chemistry and service flow, the Calcite bed will have to be periodically replenished as the Calcite is depleted.

As the Calcite's calcium carbonate neutralizes the water, it will increase hardness and a softener may become necessary after the neutralizing filter.

Calcite can be effectively combined with Clack Corosex to combine the high flow neutralization properties of Corosex, along with the slower reacting low flow properties of Calcite, increasing the ability to correct low pH.

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 3 Bar is required. Maximum pressure is 7 Bar.
4. Get all of your plumbing parts together before beginning installation. Installation typically takes 3 to 5 hours. However, after installation the Media 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 discoloured, 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 media filter is installed after the pressure tank.
2. Make sure to connect the IN pipe to the inlet and the OUT pipe to the outlet (see Fig 2). As you face the 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 optional bypass valve, which is marked with arrows as well.
3. Make sure there is a working gate or ball valve before the Media 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 media filters and before the second ball valve. This makes it easy to rinse your new 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 control valve. Avoid heating up the control valve plastic with the torch.
5. If you have copper pipe before the 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 may have acidic water flowing through it. For example, we recommend PEX or PVC pipe up to the Neutralizer and then

copper after it, if you have copper plumbing.

6. You do not need unions to install your control valve. If you need to remove it, the control valve has quick-release couplings that make it easy to put the 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
8. ½" ID tubing. Note that the drain can run up above the 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 Backwash Filter works

See Fig 1 below. In your media 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 media filter filters your water 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 by the action of the water flowing through it.

Fig 1 – Filter Tank Water Flow

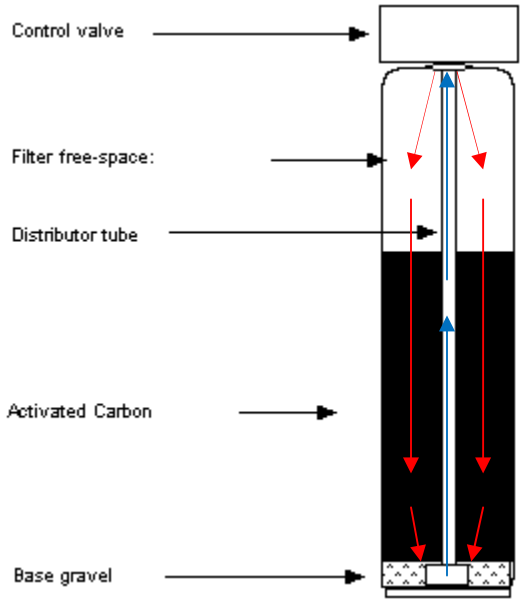


Fig 2 – Example of Neutraliser (Calcite filter) Plus piping installation with ball valve and hose bib after the filter

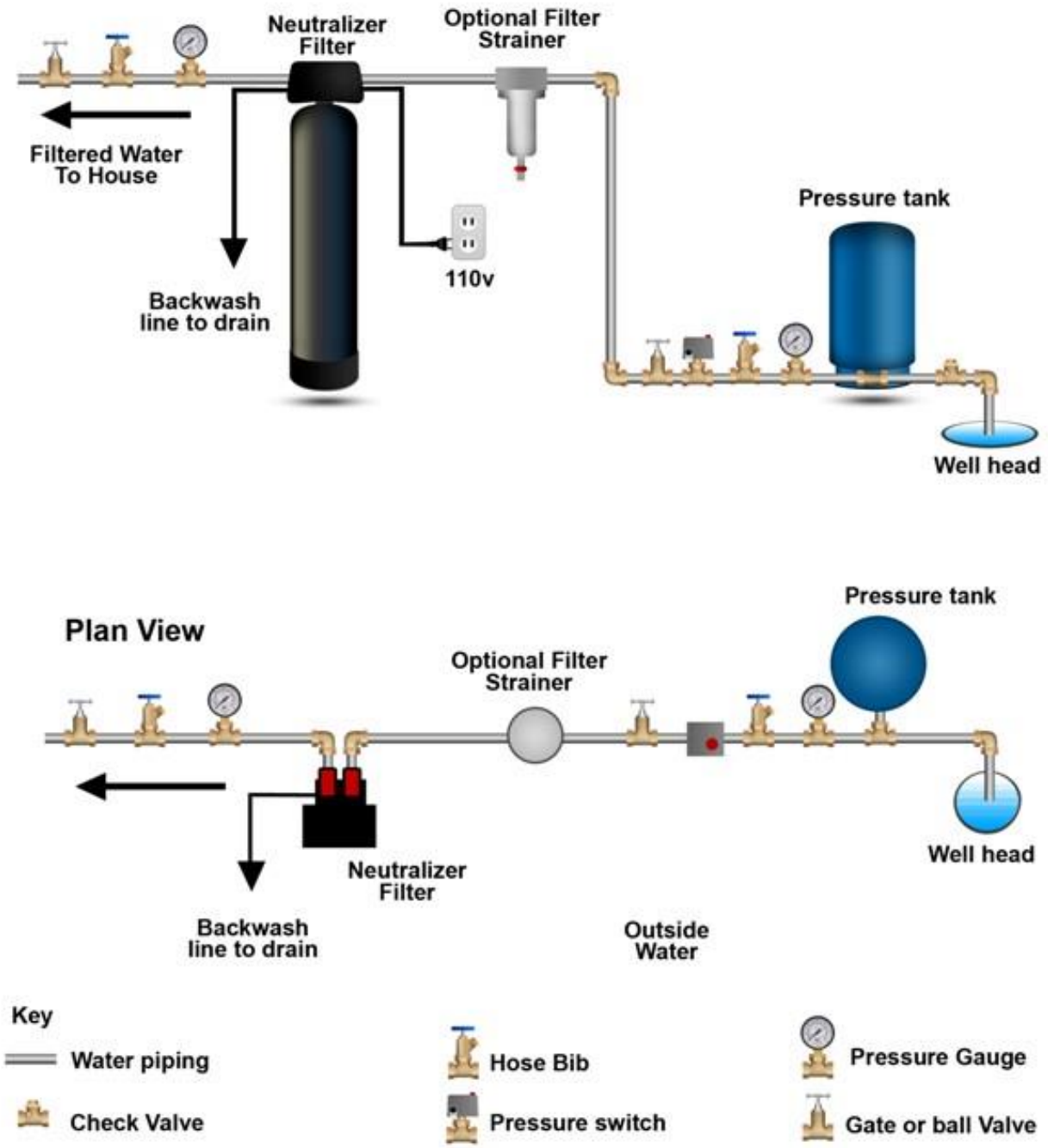


Fig 3 – Control valve from the rear showing the inlet (left) and outlet (right) end- connector fittings 1" or 1-1/4" NPT in Noryl plastic. Brass end-connectors are also available for connecting to copper tubing.

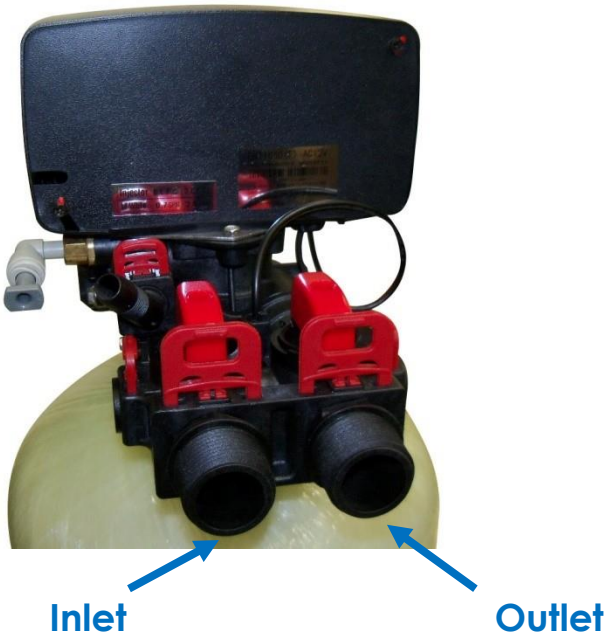
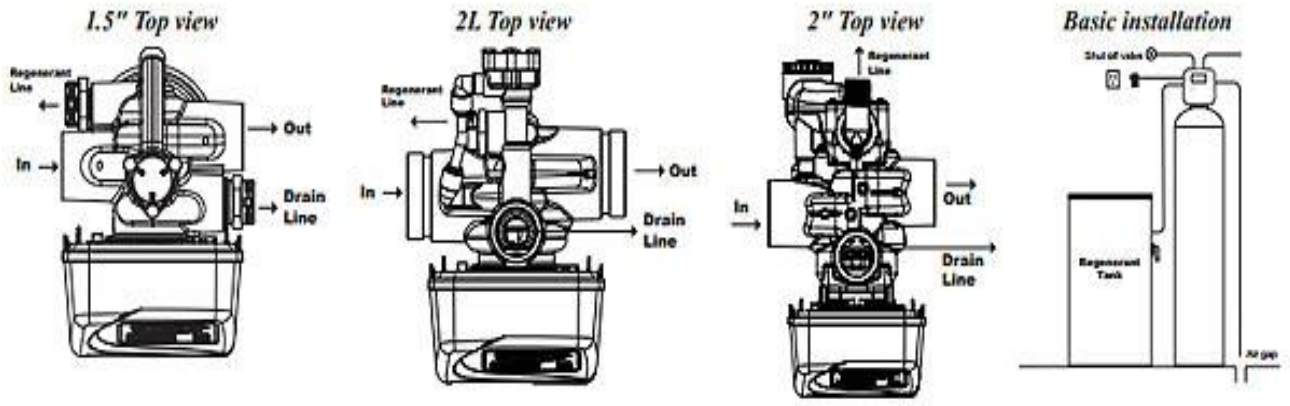


Fig 4 – Clack Control Head Connections



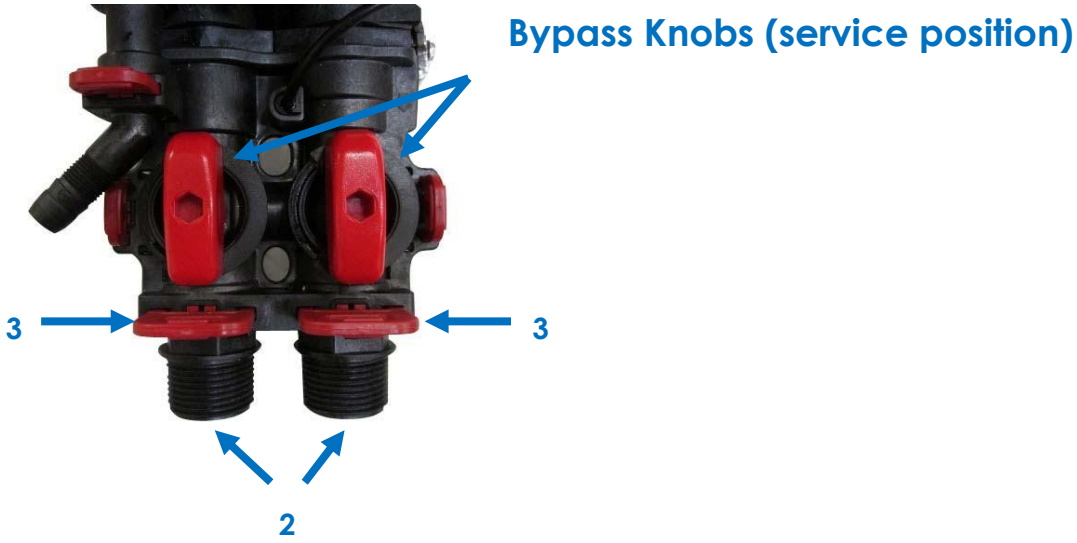
Assembly and Installation Instructions

1. By hand, unscrew the entire control valve from the top of the 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.

2. Add the filter gravel that came with your order. #5 first and then #6 gravel for the underbed. You want the gravel to cover the bottom distributor screen before adding the Calcite media.
3. Next add Filtration 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 the tank completely with water. This will allow the 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 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.
   This is not required for iron removal filters and a different fitting has been provided for larger filters.

7. Add a small amount of silicone grease or vegetable cooking oil to the tank threads and screw on control valve carefully. Do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.
8. See how the optional 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.

Fig 5 – Optional By-Pass and Pipe Connectors



9. Lubricate the by-pass valve o-rings with some vegetable oil or silicone grease and connect the bypass assembly to the control by sliding the bypass valve firmly into the body of the valve. Once bypass is in far enough, you will be able to insert the red connector clips.
10. 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).
11. Note that the valve 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.
12. The by-pass valve may not be present in the Clack or Pentair Autotrol valve. In that vase just connect the incoming and outgoing lines to the valve connectors. The control valve may be fitted with either internal or external flow restrictor on the backwash line.
13. 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).

14. Now install your water pipes to the bypass end connectors. Make sure inlet is installed to the 'In" pipe connector on the bypass valve and outlet is on the "Out" connector.
15. Connect some flexible tubing from the drain connection on the 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 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.
16. Plug your control valve into an outlet. After being plugged in, the screen may flash a time say 12:00 while it finds the service position.
17. 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.
18. **If possible verify that the backwash flow is at the correct flow – for a 16" vessel the flow should be 45 to 65 lpm and for a 21" vessel the backwash rate should be 120 lpm.** The appropriate drain line flow control valve has been fitted to suit the filter size. Please verify that you pump is capable of delivering the required flow rate at a pressure of at least 300 KPa.

Tip: Run a few regeneration cycles until the water runs clear.
Press regen button for 4 seconds and backwash/rinse cycle will start immediately.

Pressing the regen button briefly will initiate a time delayed regen at preset time (normally at 2 am in the morning). The controllers have been programmed and normally only the time has to be adjusted. For detailed programming instructions please refer to the manual relevant to the brand of valve supplied.

Autotrol 742/762 Control

1. 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.
2. 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 warm.
3. 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.
4. Refer to your service manual for more information about how your control valve is programmed if desired.

Adjusting time on the Autotrol Performa series control valve

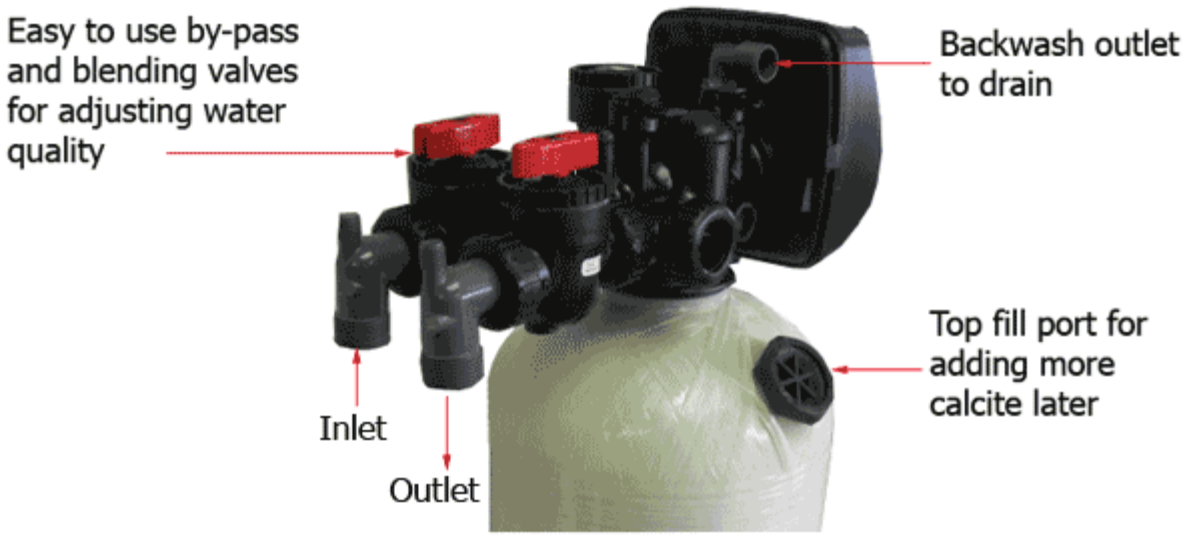
Step 3: Program Time of Day

- While "12:00" is blinking, set the correct time of day.
- Use the UP and DOWN buttons to scroll to the correct time of day.
- "PM" is indicated, "AM" is not indicated.
- Press SET to accept the correct time of day and advance to the next parameter.

How to Add Calcite Media to the PWT Plus Neutraliser Filter

WARNING: CALCITE MEDIA CONTAINS DUST. USE PAPER MASK OR VENTILATE TO AVOID BREATHING DUST.

Some filters may have a separate fill port see image below, however most filters require the control head to be removed.



1. Begin by putting the neutralizer filter on bypass (if available) , or turning the water pressure off before the neutraliser.
2. Initiate a manual backwash cycle. Since it is on bypass, this will relieve the pressure inside the control valve so you safely unscrew the Media Fill Plug located on top of the neutraliser tank.
3. Unplug the control valve cord from the wall outlet.
4. With no fill port: remove inlet and outlet connections from control valve and remove control head. Plug up riser tube – be careful not to get any media in the riser tube. Add media with funnel and then remove tape and replace head.
5. Unscrew the media fill plug with channel locks or pliers and using a tube or hose siphon 2 to 3 gallons of water out of the filter tank. If you don't siphon water out before adding filter media, water will flow out the fill plug hole and onto the floor. If water on the floor is OK, then you do not have to siphon water out first before pouring Calcite media into the fill plug hole.
6. Add calcite media until the tank is 2/3rds full. Do not over-fill; be sure to leave at least 12" of free space above the media to allow room for it to expand during a

backwash.

7. Put the top fill plug back in. You can lubricate the threads with some vegetable oil or silicone grease, but do not use Teflon tape or plumbing grease.
8. Plug the control valve back in and press the Regen Cycle button for 4 seconds so the PWT Plus control is in a backwash cycle.
9. Turn on the bypass valve - slowly at first - back to the service position (if it is in "service" this means it is in the proper position for filtering and neutralising).
10. Allow the system to go through a complete backwash and rinse cycle. Repeat this backwash and rinse cycle by starting another manual cycle, so the neutralizer is thoroughly backwashed and rinsed before going back into service.

NextSand Filter with Autrotrol Control performa series valve

Trouble Shooting

For detailed troubleshooting instructions please refer to the service manuals pertaining to your system.

Warranty

White Spots on Fixtures and Glasses

Calcite neutralizers work by adding natural calcium minerals to the water. Many natural well or spring waters that are acidic (with a pH of less than 7.0) are low in minerals and are considered "soft" water. This lack of natural buffering calcium minerals contribute to the corrosive nature of these waters. After the water has passed through the neutralizer, the water will be higher in calcium and "harder" but typically not hard enough to warrant a water softener, which removes calcium hardness.

It is more common to see some white film or spotting on fixtures if you are using a blend of Calcite and Corosex. In some cases, it might be that too much Corosex was used originally in the mix of media.

If you are starting to see white spots and films on surfaces after the neutralizer has been installed, you might want to take these steps:

Set the backwash frequency for every 3 days for a couple of months.

Check the hardness level before and after. If your hardness is higher than 5 grains per gallon after the neutralizer, your neutralizer may be adding more minerals than is needed, and you can open up the bypass valves a slight amount in order to blend in some untreated water.

Check the pH before and after. You only need the pH to be in the 7.0 to 7.5 range. If the pH is higher than that, you may be adding more minerals than is necessary.

Backwash Flow Rate

One problem that may occur if you do not have enough backwash flow rate to properly clean the Neutralizer filter is a drop-in water pressure, due to fouling of the media from rust or sediment. 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.