MED WATER
SYSTEMS

MW120

User Manual

INDEX

System Requirements

- Feed Water Requirements:
  - Pressure: 60-100 psi
  - Water Quality: < 500 µS
  - Iron: < .3 mg/L
  - Hardness: < 5 grains/gal

  *Note: If feed water requirements are not met additional pre-filtration/treatment may be required.
- Power requirements: 110 V / 15 A
- Footprint: 15”W x 44”H x 23”D
- Consumable parts
  - CF-10 Carbon Filter
  - DI-45 Deionization Canister

System Specifications

- Weights: (Dry) Head - 80 lbs, Tank - 55 lbs

  (Wet) Head - 90 lbs, Tank - 275 lbs
- Production Pressure: 150 psi max
- Production Rate: Up to 120 liters/hr
- Delivery Pressure/Rate: 3.5 liters/min at 30 psi, 10 liters/min max.
- Max. Resistivity: 18.2 MΩ
- Bacterial Contamination Reduction: 99%
- Holding Tank Capacity: 100 liters

Safety

All information and instructions in this manual have been compiled in consideration of current standards and guidelines, the state of technology, and many years of experience and knowledge.

The user is responsible to:

- Read the User Manual and ensure the individual(s) entrusted with the operation, maintenance, cleaning, and troubleshooting of the device understand the safety aspects associated with the system.
- Keep this manual and the maintenance instructions in a safe and easily accessible place near the system site of installation and operation.
- Request a replacement manual if any of the instructions should be lost or misplaced.
- Follow all general and local regulations for accident and environmental protection.

The following safety information provides guidelines on safely using and servicing the Med Water system.

- The product may only be set up, started, or serviced after gaining familiarity with the safety, operation, and maintenance requirements contained in this User Manual. Operation and maintenance must only be carried out by trained personnel.
- The equipment is designed to only be used indoors in a controlled environment.
- The equipment must only be used for its intended purpose. Any use outside of that purpose could result in damage to the equipment or facility and injury to the user.
- Always keep the area around the unit clean and orderly to avoid tripping or other hazards.
- The reverse osmosis system operates at high pressure. When servicing the system follow all instructions to ensure pressure has been relieved before attempting to remove filters or filter housings.
- In the event of water spillage, due to system failure or during routine service, water should be cleaned up/contained immediately to prevent slipping. If there is a significant leak the system should be shut off using the on/off button on the system control panel before attempting to shut off the water and contain the leak. Failure to do so could result in electric shock.
- Only use filters or other parts that are specified by Med Water Systems. Failure to do so may affect the function of the system and could cause a safety issue.
- Ensure the electrical outlet provided for the water system is GFCI protected or the outlet is shielded from spraying or dripping water. Failure to do so could result in system failure or electrical shock.
- In case of malfunction call Med Water Service for guidance and troubleshooting. Do not remove interior or exterior panels as this could cause damage to the system or result in electrical shock.

All maintenance other than the User Maintenance defined in this manual should be performed by a trained Med Water employee or under the direction of a Med Water employee. Med Water Systems takes no responsibility for injuries caused by improper use or maintenance of this system.

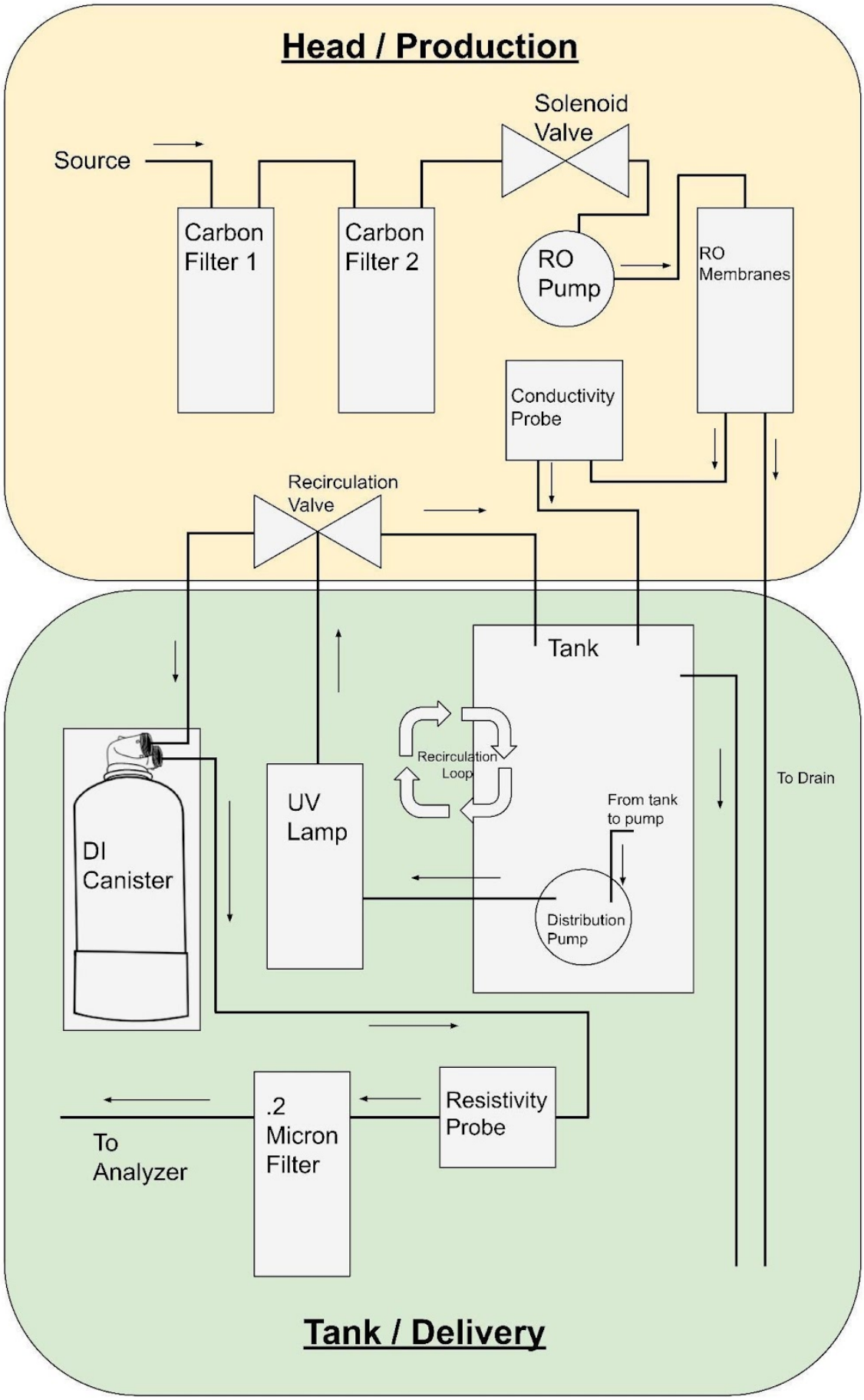
System Overview

When the system is connected to a water source, feed water flows through carbon filters removing particles larger than 5 microns and absorbing organic compounds like chlorides and chloramines. The water is then pressurized and filtered through reverse osmosis (RO) membranes. The reverse osmosis membranes remove up to 99% of the salt and mineral content from the water as well as bacteria, viruses, heavy metal complexes, and organic molecules.

After the water passes through the RO membranes and is separated, the process water, or permeate, enters a holding tank, and the wastewater, or concentrate, is directed down the drain. Water quality is measured by the conductivity probe and is displayed on the system control panel. This portion of the process is called the production process and is controlled by the production button on the front of the system.

The purified water in the holding tank is pressurized using a separate pump that continually circulates the water through a UV sterilizer and moves the water to points of use when needed. Before it is ready for use the water flows through deionization media and a .2-micron filter. A resistivity probe is included in the loop to provide real-time measurements of final water quality. Resistivity readings are provided on a display located on the front of the machine. This process is called the delivery process and is controlled by the delivery button on the front of the system.

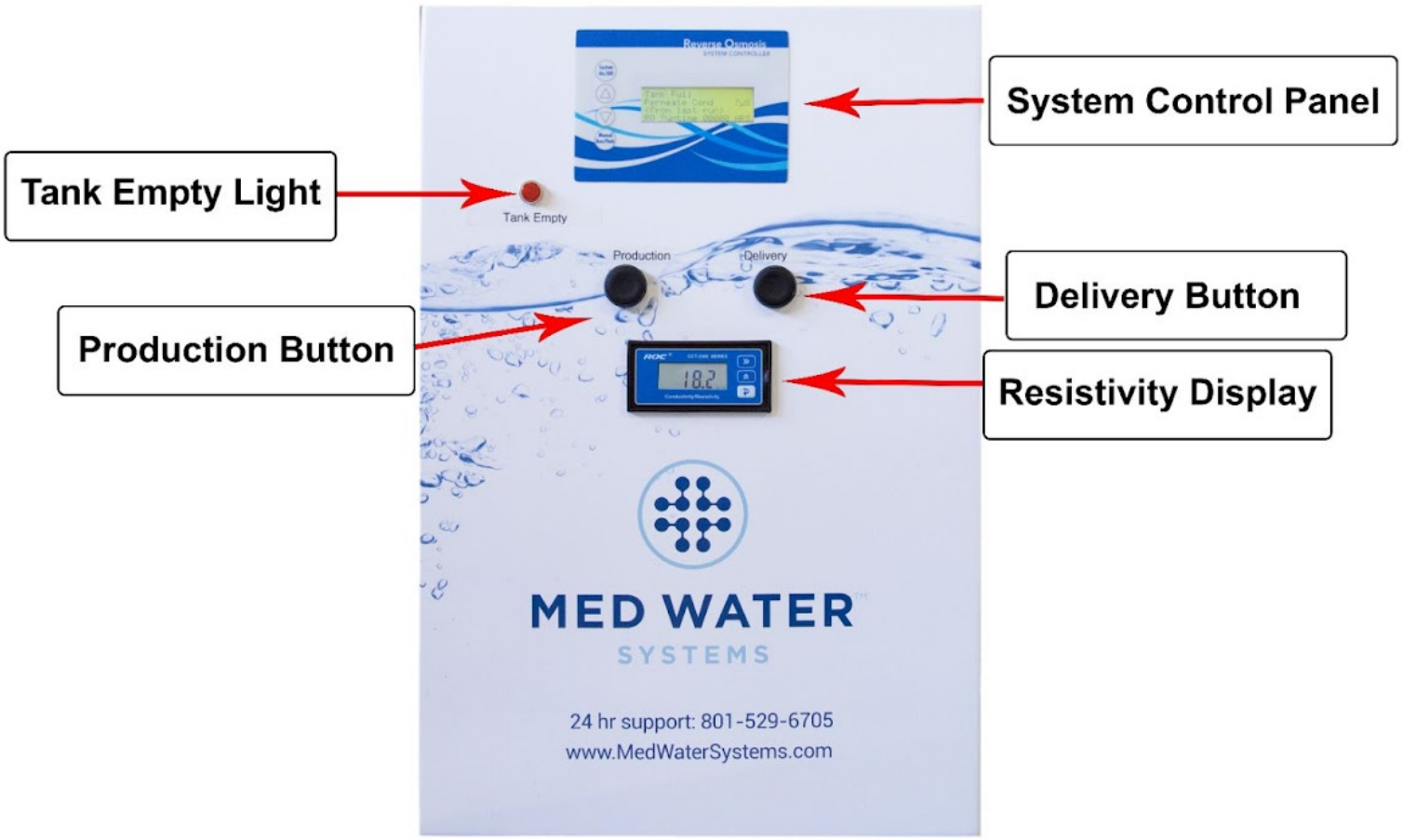
The tank is designed with a water level control system that stops the flow of feed water when the holding tank is full. When the water level drops below a specified level, the solenoid valve opens refilling the tank. The following diagram shows each of the system components and provides a visual illustration of the process flow outlined above.


Head / Production
Solenoid Valve
Source
Carbon Filter 1
Carbon Filter 2
RO Pump
RO Membranes
Conductivity Probe
Recirculation Valve
Tank
Recirculation Loop
To Drain
From tank to pump
UV Lamp
DI Canister
Distribution Pump
Resistivity Probe
.2 Micron Filter
To Analyzer
Tank / Delivery

Operation / Maintenance Requirements

System Operation:

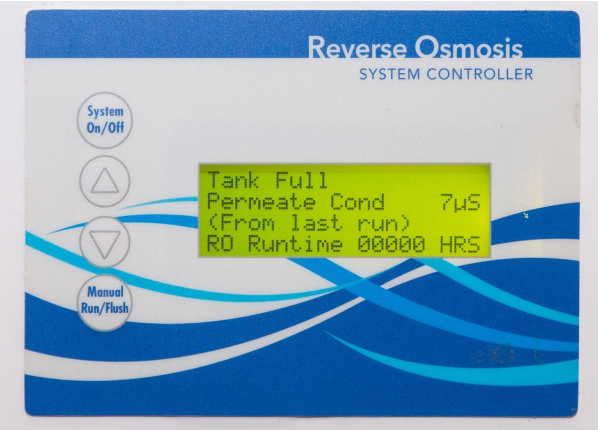
The water system has a simple control panel with a display and integrated buttons. Below the control panel display are two buttons that turn the production and delivery pumps on and off. The resistivity display is located below the pump buttons. A light that illuminates when the tank is empty is also located to the left of the control panel display. A photo of the system's front door is found below.



Control Panel - The main power for the system is controlled with the top button on the control panel labeled System On/Off. When the power is on the screen will be illuminated.
The top line of the display provides information on the status of water production.

The system provides the following three messages when operating normally:

1) Tank Full – This indicates the system has generated enough water to fill the holding tank and the float sensor has sent a signal to stop water production.
2) Tank Full Draw Down – This message indicates water is being drawn from the tank, but not enough water has been used to require more water to be generated.
3) RO Running – This message indicates the water level in the tank has dropped to a point where the reverse osmosis, or production system needs to produce more water. When the RO Running message is displayed the “Production” pump is on as long as the “Production” button is turned on.



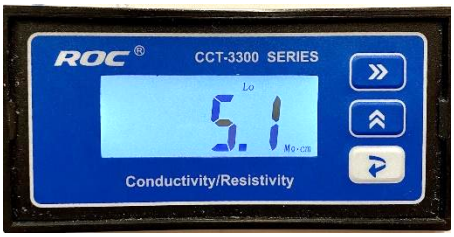
The display also provides information on the condition of the RO water as well as the cumulative run time hours for the RO production system.

1) Permeate Cond. – The displayed parameter shows the condition of the RO water in microSiemens. This is a measure of conductivity and indicates how clean the water is after it has gone through the reverse osmosis process. The lower the number the cleaner the water is in the tank.
2) RO Runtime – This parameter provides the total time that the production system has been on and producing RO water. The parameter is given in hours and the time is cumulative. This time is used to determine how long DI canisters or other filters last before they need to be changed.

Production/Delivery Buttons - There are two buttons located on the front door of the machine that control the pumps that produce RO water and deliver the water in the tank to the point of use. The button on the left is the production button and turns the production pump on and off. When the button is pushed in, or in the on position, the pump will turn on when the system controller senses the water level in the tank has dropped and more water needs to be produced. With the production button pushed out, or in the off position, RO water can still be generated when the system calls for water, but production will be at a much lower rate. This button must be turned off when the carbon filters are changed to prevent the pump from running dry while maintenance is done. See the User Maintenance section for detailed information on changing carbon filters.

The button on the right is the delivery button. This button controls the pump that circulates water through the system and delivers water to the point of use. When the delivery button is in the on position, the pump is powered on and water circulates through the system as well as to the dispense tap, sample port, and analyzer, or other points of use. Unlike the production pump the delivery pump is always on as long as the button is on.

Resistivity Display – To ensure water meets the Type I specification of 18.2 MegOhms, additional polishing must be done. A remote DI canister is included with the system which contains high-quality deionizing resin. As the RO water from the tank passes through the DI canister any remaining ionic contamination is removed. After the water has passed through the DI canister a sensor measures its resistivity and sends the reading to the resistivity display. Between 18.2 and 10 MegOhms, the display will remain static indicating the water meets the required specification. Below 10 the screen will begin to flash providing a visual indicator that the DI canister will need to be changed soon to maintain appropriate water quality. For detailed instructions on changing a DI canister see the User Maintenance section.



Tank Empty Light – If water usage outpaces the specified water production rate for the water system the tank will eventually run out of water. When this happens the red tank empty light will be illuminated indicating there is a problem. There are several possible reasons for the tank empty light to be illuminated. See the Troubleshooting section or call Med Water Systems technical service to determine the cause of the issue.

User Maintenance:

With regular maintenance, the water system is designed to provide years of trouble-free service. The system has been designed so that simple maintenance and replacement of consumable items can be done easily by the user on an as-needed basis following the instructions provided below. Replacement DI canisters and carbon filters can be ordered through Med Water Systems using the part numbers provided in the System Requirements section. To order, please send an email or Purchase Order to info@medwatersystems.com with the quantities of each item.

The two maintenance tasks that are completed by the user regularly are:

1) Changing the carbon filters inside the machine
2) Changing the DI canister when resistivity drops

Carbon Filters:

The carbon filters need to be changed every three months or every 100 RO Runtime hours but may need to be changed more frequently depending on the quality of water being supplied to the system.

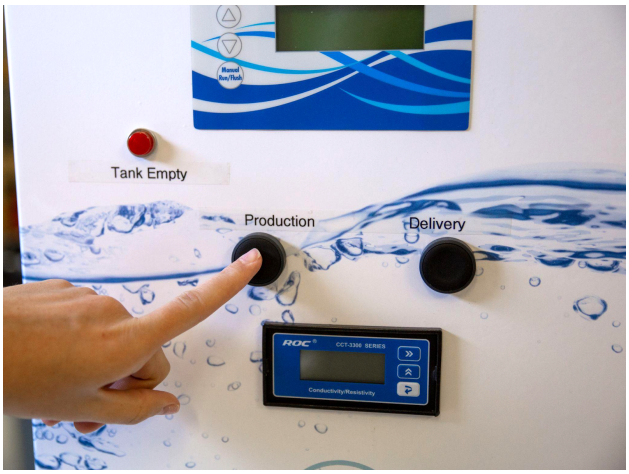
The following instruction provides the steps for changing carbon filters.

Tools:

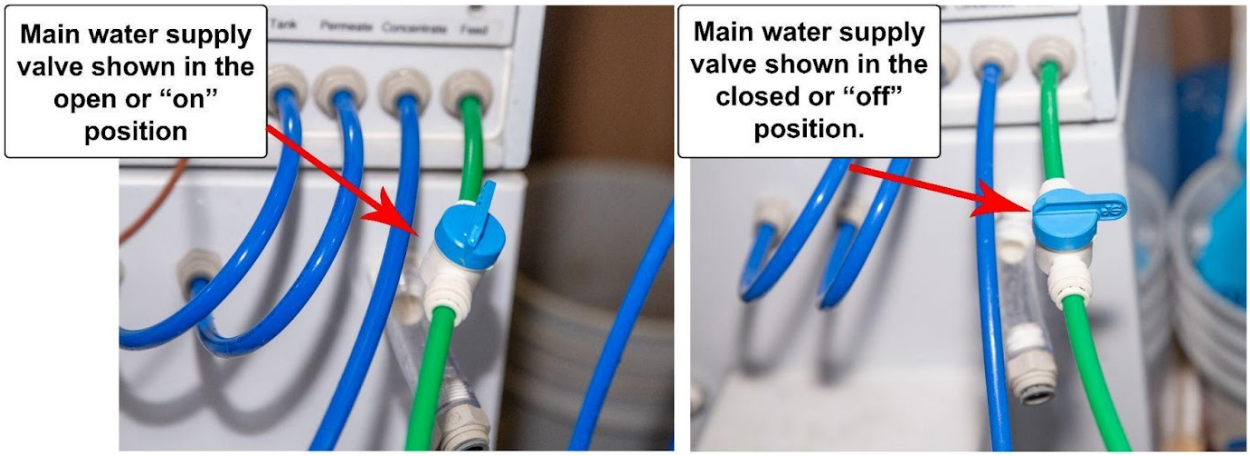
- Paper towels or rags
- Filter wrench

Procedure:

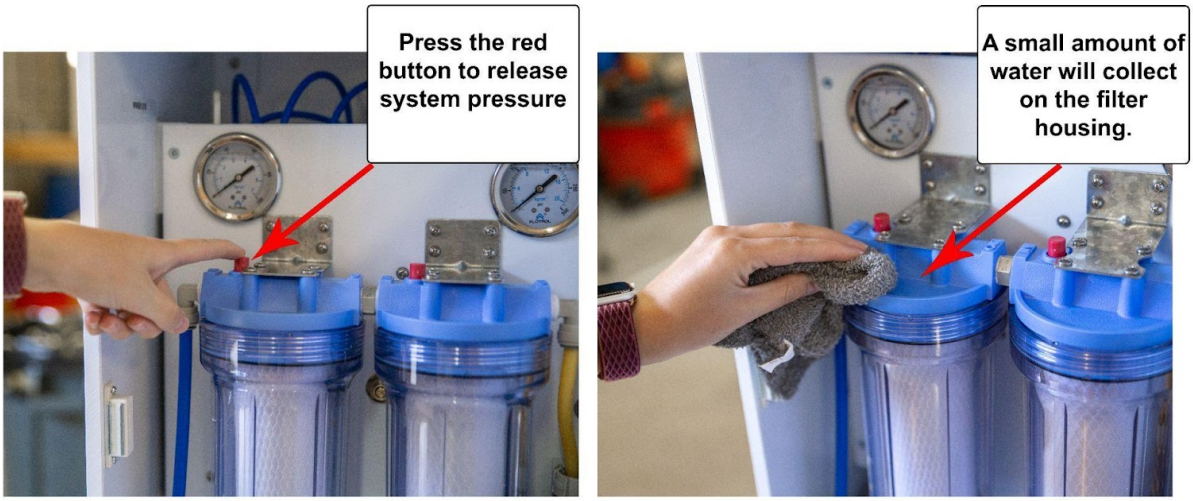
1. To remove the old carbon filter(s) the production system must be shut off by pressing the production button on the front of the machine. It should be in the out or off position.



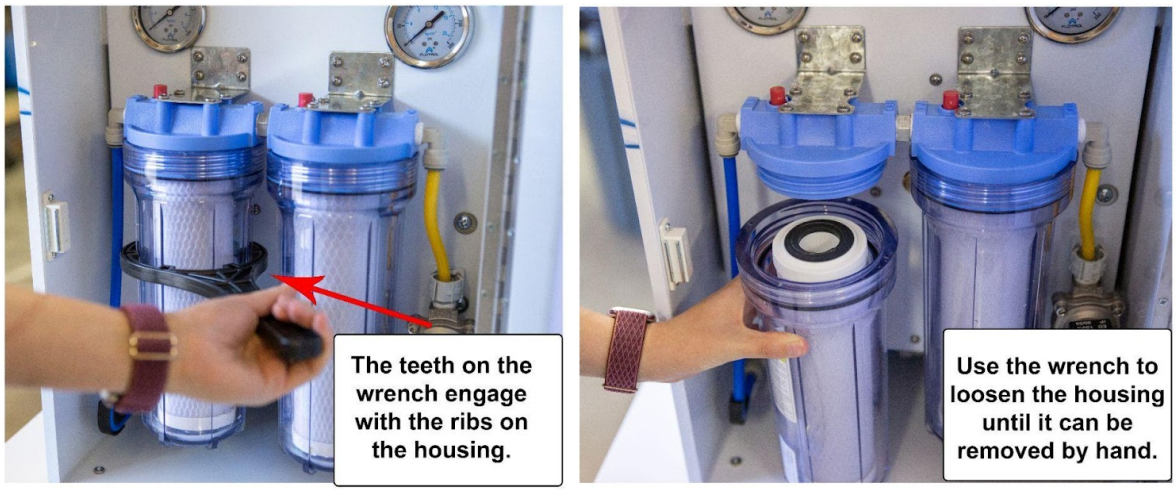
2. The main water supply needs to be shut off by closing the valve at the back of the machine. The port is labeled “Feed”.



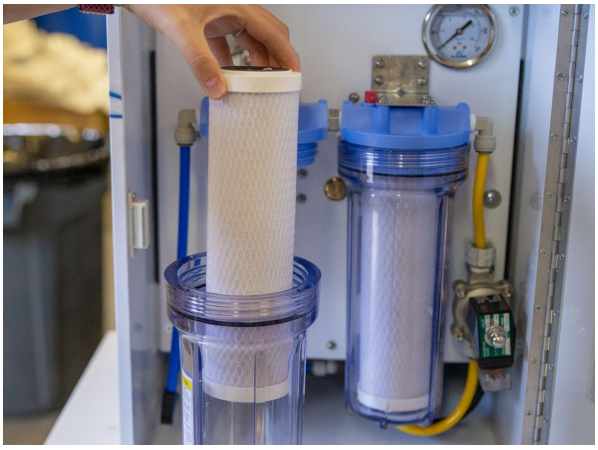
3. Release any residual pressure in the system by pressing the red button on top of the filter housing. Note: A small amount of water will be released. Keep a rag or towel handy to clean up any water that collects on the top of the filter housing.



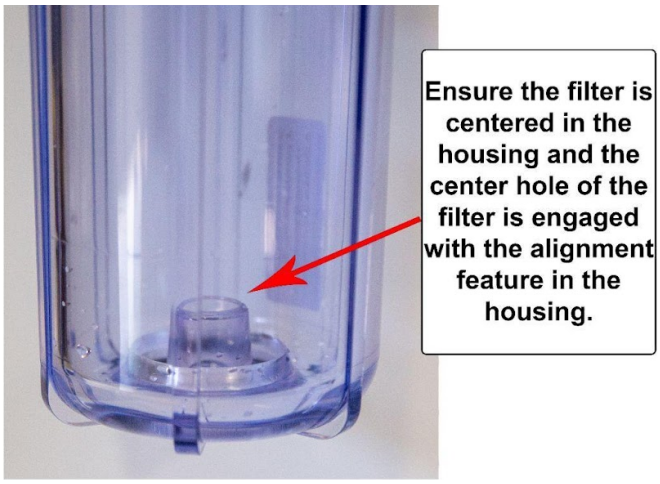
4. Use a filter wrench to loosen the clear housing rotating the housing from right to left. Place a rag or towel below the housing to catch any drips or spills.



5. Once the clear housing is unthreaded from the blue cap, remove and discard the carbon filter. Pour the remaining water down the drain and rinse the housing to remove any residue in the bottom.



6. Remove the new carbon filter from its packaging and place it in the housing.



7. Screw the housing onto the blue cap and tighten it by hand. **Do not use the filter wrench.** If the second filter needs to be changed repeat steps 4-7 before moving to the next step.

8. Turn the main water supply on by opening the valve at the back of the machine.

9. Turn the production system back on by pressing the button on the front of the machine. It should be in the in or on position.

10. Verify the filter housing(s) fill with water and that there are no leaks. If the housing does not completely fill with water, the red button can be pressed to allow the trapped air to escape.

DI Canisters:

When the resistivity drops from 18.2 to below 10, it is time to prepare to replace the DI canister. Before changing the canister, verify the sensor is receiving a proper sample of water by opening the dispense tap hanging on the side of the machine. If the reading is consistently less than 10 when water is flowing, the DI canister should be replaced. Note: some analyzers can use DI water that is less than 10 Megohms. Please consult the analyzer manual to verify the water requirements for the equipment.

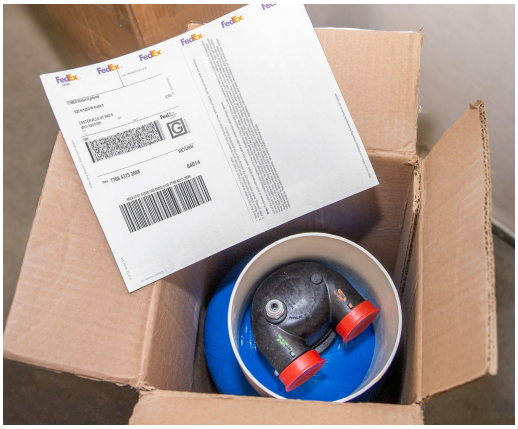
The following instruction provides the steps for changing the DI canister.

Tools:

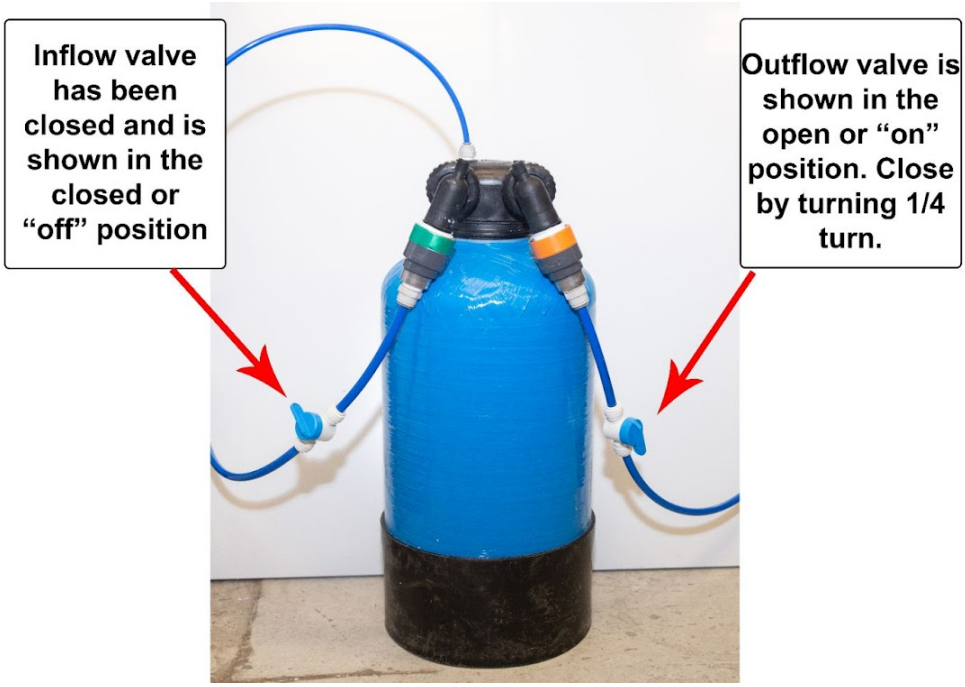
- Paper towels or rags
- Small pan or container to catch water

Procedure:

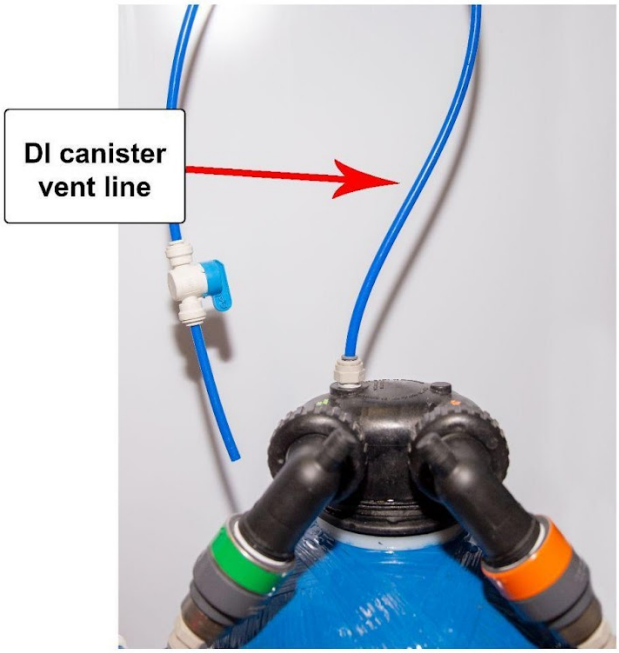
1. Locate the fresh DI canister and bring it to the water system. Save the box that the new tank came in. The shipping box, PVC collar, and red outlet caps will be needed to return the used DI canister. A return label is provided in the box.

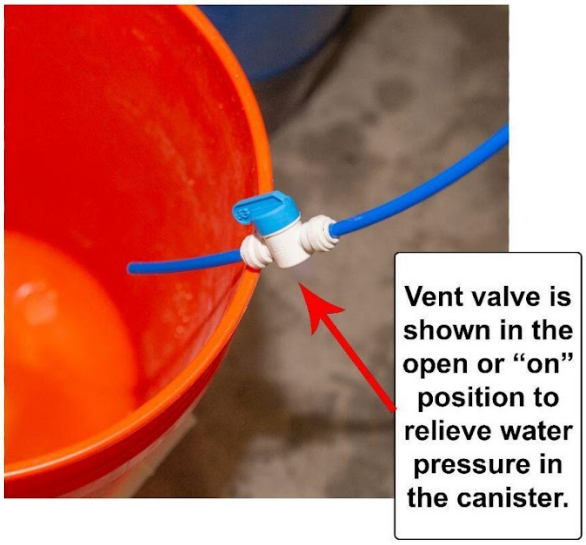


2. To remove the old DI canister, shut off both the inflow and outflow valves by turning the blue handle ¼ turn. The DI canister is now isolated from the water system.

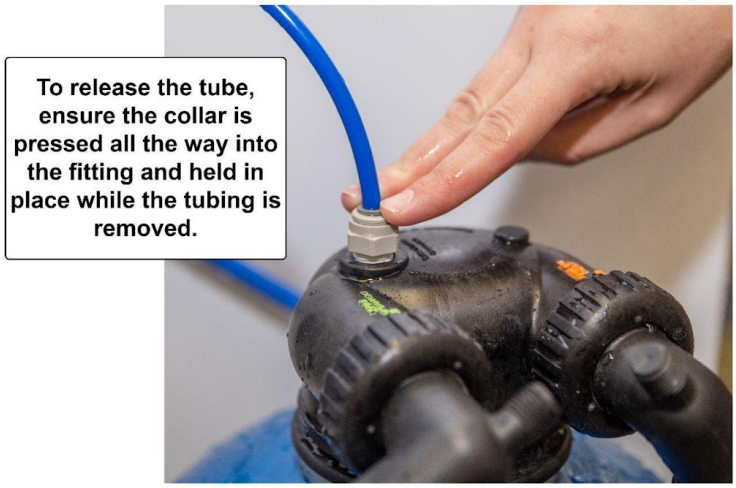


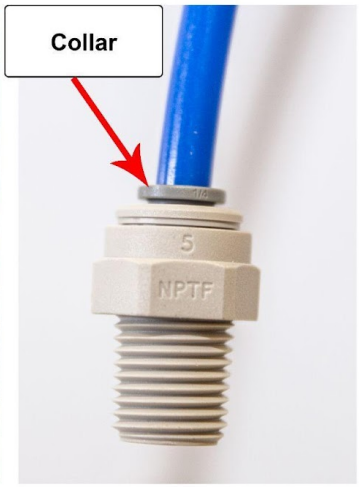
3. The canister will have some residual pressure. To release the pressure, open the vent valve connected to the tubing coming from the DI canister vent. Point the tube into a container or down a drain if available. A small burst of water will come out and water flow will slow as the pressure is relieved.



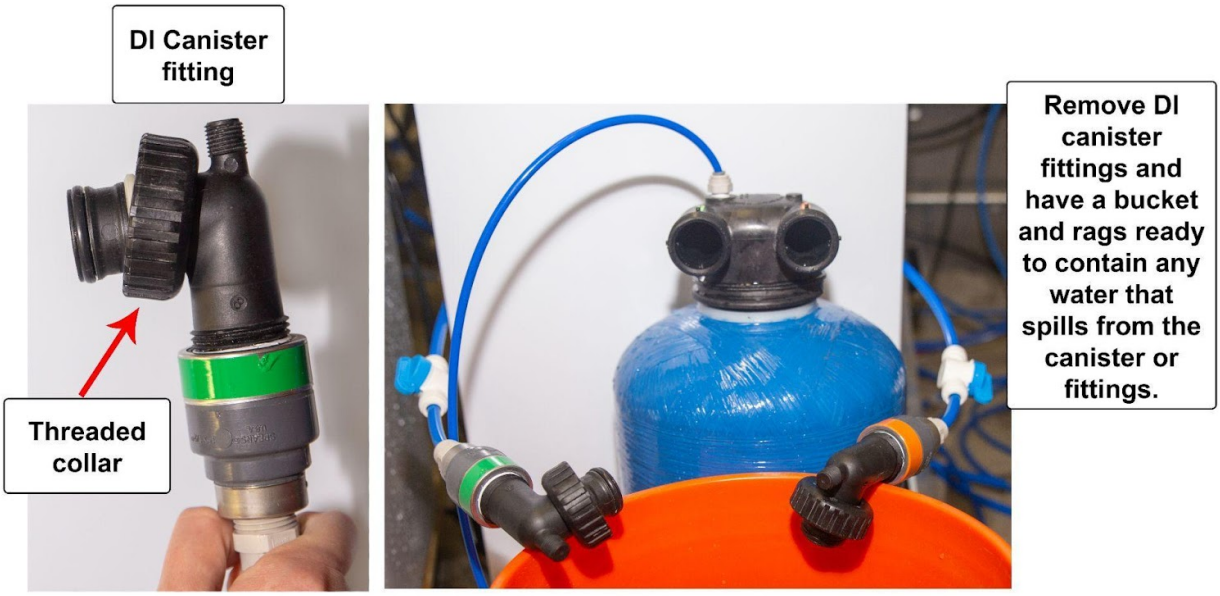


4. When the flow of water from the canister stops the vent tubing can be removed from the vent fitting. The tubing is released by pressing the gray collar into the fitting. While holding the collar in place the tubing can be removed by pulling it out of the fitting.

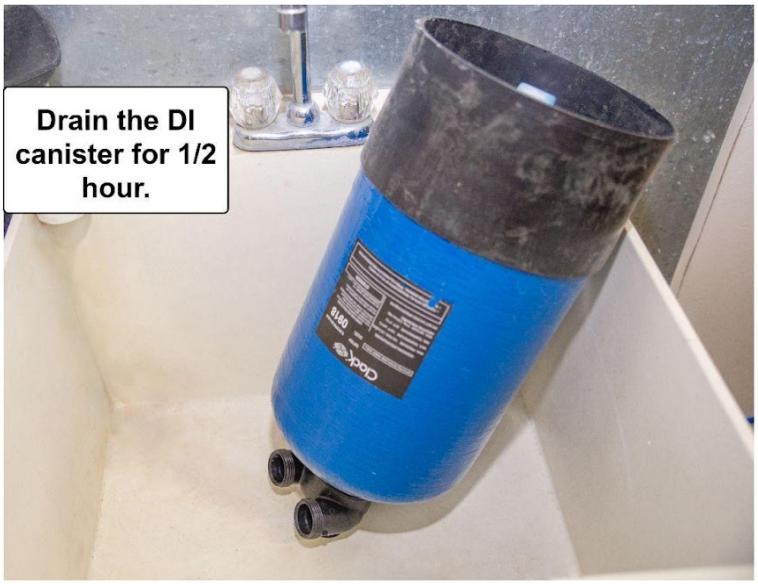




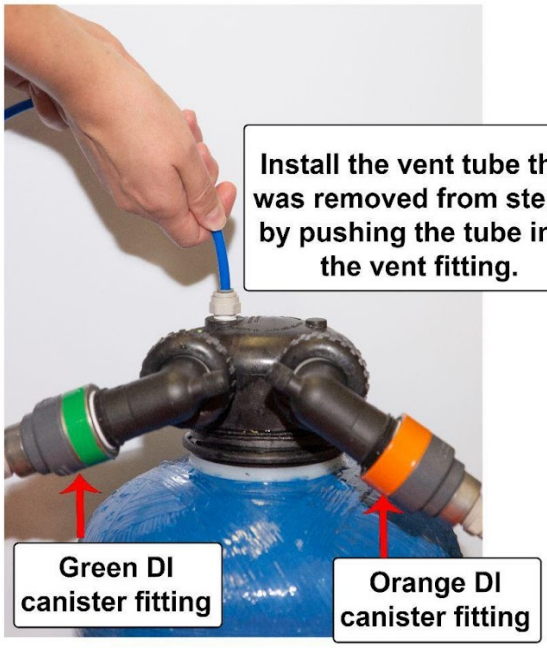
5. Remove the DI inlet and outlet lines by unscrewing the threaded collar. Note the color of each line since they need to be placed in the same position on the new DI canister. As the fittings are removed from the canister a small amount of water will spill out. Use a pan or a rag to catch the water. The DI canister should now be completely free from all connections to the water system.



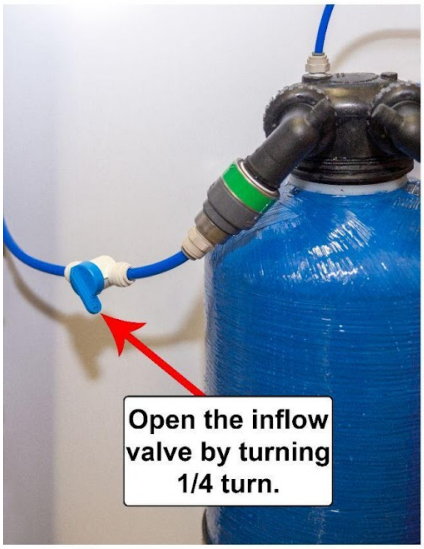
6. Move the used DI canister out of the way and turn it upside down in a sink or over a drain. Water must be drained for a minimum of ½ hour before the canister is ready to be returned.

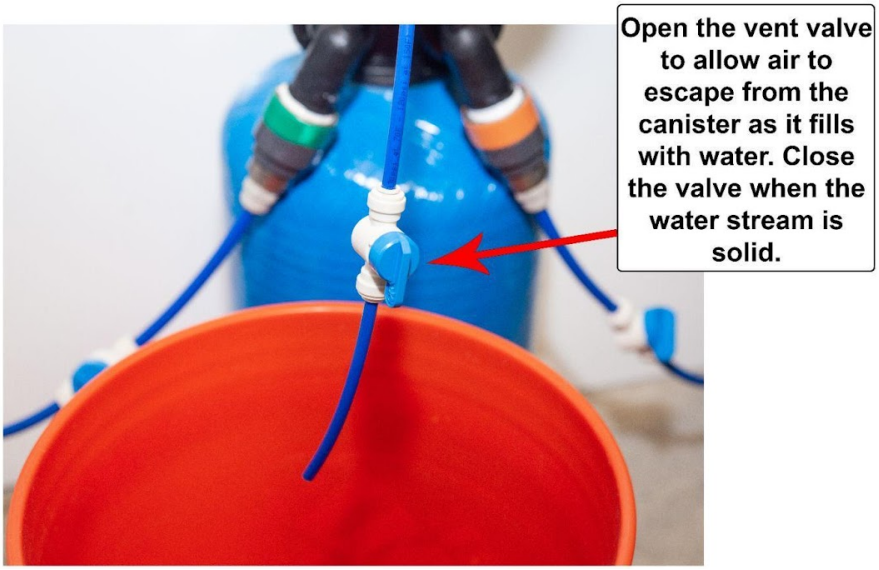


7. Install the fresh DI canister by re-connecting the DI canister fittings. Push the fittings into the ports making sure they are in the same position they were previously. The ports and canister fittings are color coded with green on the left and orange on the right. Push the vent tube into the vent fitting ensuring it bottoms out in the fitting.



8. Open the “inflow” valve on the green side to start filling the new canister with water. Open the pressure relief (vent) valve to let air escape as the canister fills and direct the outlet into a pan or drain. This should take approximately 1 minute. As the canister fills an air/water mixture will cause the hose to “sputter”. When a solid stream of water flows through the tube the canister is full, the air is purged, and the valve can be closed.





9. Open the “Outflow” valve on the orange side of the canister.

10. Monitor the MΩ reading on the front of the machine. This reading often will not read 18.2 immediately after the DI canister is changed. The value may fluctuate but should climb steadily over the next 24 hours until it reaches 18.2 MΩ.

11. After the old/exhausted canister has had time to drain, place it in the box that the new canister came in and return it to Med Water Systems using the return label provided in the box. If the DI canister is not returned immediately it should be labeled to indicate it has been used so it isn’t confused with a fresh DI canister.

Water Testing:

In addition to filter changes, water testing is also done periodically by the user to verify the system is free from bacterial contamination. Although the system is designed to control and remove bacteria in the water, testing should still be done to verify the water continues to meet biological cleanliness requirements. Since bacteria and other biological contamination is in the environment around the system and can be introduced to the test sample when sampling it is important to follow the steps below to ensure the water sample is not positively or negatively influenced by the sampling procedure.

1) Open the sample port completely. Run water for 30 seconds **to 1** minute and shut off.
2) Swab the outside and inside (if possible) of the sample port with isopropyl alcohol or diluted bleach solution (1cc household bleach to 10cc water) to sanitize.
3) Open the sample port again and let run for 30 seconds to one minute to ensure all cleaning chemicals have been rinsed away. Slow the flow before collecting the sample to prevent splashing.
4) Put on gloves and carefully loosen the lid of the sample container. Do not touch the inside of the lid. Do not put the lid down. Do not touch the lid or container with anything other than the water being collected. Do not rinse out the container. If possible, minimize blowing air from fans or air handling equipment during the sampling.
5) When ready to take the sample, remove the lid from the sample container and fill the container leaving a ¼" air gap. Ensure the container doesn't overflow or splash. Close the lid firmly and refrigerate. CLSI guidelines suggest testing the sample within 1 hour. If the sample cannot be tested within 1 hour it can be refrigerated at 2 to 8 °C for up to 24 hours.

If results are found to be greater than 10 CFU/mL it is recommended that a second sample is collected and tested following the sampling procedure outlined above. If a second sample is necessary Med Water also recommends taking the sample from the location where the first sample was taken and one other location. For example, if the first sample was taken from the sample port, the second sample should also be taken from the sample port and another sample should be taken from the dispense tap.

Per CLSI guidance the choice of media, filter size, incubation time, and incubation temperature should be validated to establish the adequacy of the methodology chosen.

Med Water Maintenance:

All other planned maintenance is performed by Med Water technicians as part of the annual service of the equipment.

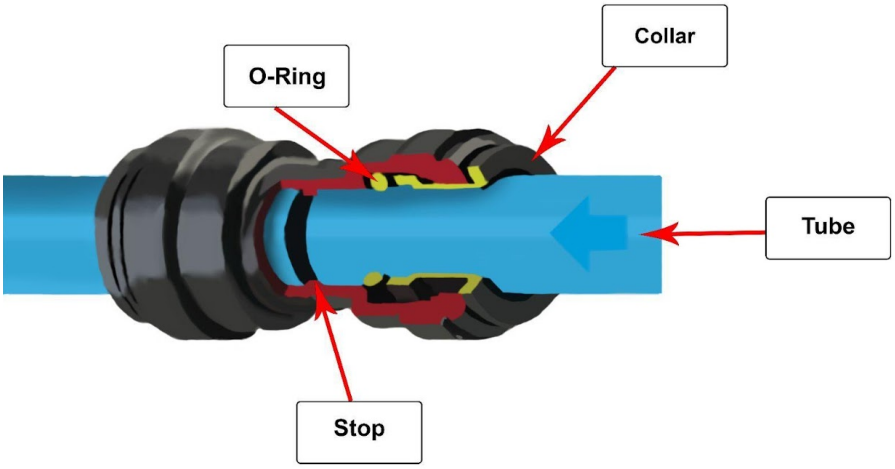
Troubleshooting

Leaks:

Leaks are the most common issue found in water systems. The most common leaks are found where the tubing enters a quick connect fitting. If a leak is found in a tubing connection the steps below should be followed.

Disconnect the Line and Fitting

Ensure the line is depressurized before removing the tube. Press the collar (ring closest to the tube) squarely against the face of the fitting and hold it in place while gently pulling the tubing from the fitting. Check the tubing to ensure the cut is square and there are no deep scratches or score lines on the tube.



Cut Tubing

Cut the tube square ensuring it is free of score marks or scratches using a tubing cutter or new razor blade. Do NOT use a hacksaw. Ensure the tubing is cut square. Remove any burrs on the tubing to prevent damage to the O-ring inside the fitting.

Assemble the Tube to the Fitting

Firmly press the tube into the fitting making sure that the tube is inserted all the way. Resistance will be felt as the tube engages with the O-ring. The tube needs to be inserted past the O-ring until it reaches the stop to ensure a complete seal as shown in the picture above. Gently pull on the tube to ensure it is locked in the fitting.

If the connection still leaks it is possible that the O-ring has been damaged and the fitting needs to be replaced. Quick-connect fittings are common and can be found at home improvement stores or by contacting Med Water Systems.

No Water/Analyzer Fault/Tank Empty Light On:

The tank empty light is triggered when water is being used faster than it can be replaced by the production system. Starting at the house supply, check all valves to ensure they are open. If all valves are open, water should fill the clear filter housings inside the machine. If valves are open and water doesn't fill the clear filter housings verify there are no issues with the water supply to the lab. If all valves are open and water fills the housings, but no water is entering the storage tank, verify the carbon filters are not a dark brown color. If the filters are dirty, they should be changed following the user maintenance procedure for changing a carbon filter. Verify the production button is pressed in and when pressed in the production pump can be heard running. If the filters are clean and the production pump is running but there is no water filling the storage tank contact Med Water Service for support.

An analyzer fault can also occur due to delivery system issues even though the water storage tank is full of water. In this scenario, the tank empty light will not be illuminated and a visual check of the water level should confirm the water is in the tank. If water is in the tank, open the door to the system and verify the left gauge shows pressure between 20 and 40 psi. If there is no pressure the pump is not functioning. Verify the delivery button on the front of the system is pressed in. If the button is engaged the delivery pump has likely seen an electrical spike and gone into safety mode. Turn the system off by pressing and holding the system on/off button on the controller. Allow the system to remain off for 1 minute before turning it back on. This will reset the delivery pump controller and restore power to the pump. Verify the hard reset was effective by checking the gauge inside the machine. Pressure should be between 20 and 40 psi. If there is still no pressure call Med Water Service for support.

NOTE: If the lab/hospital water supply is interrupted for a short time a MW120 tank stores 100 liters of water. For planned water outages where it is anticipated there will be a significant water need other water storage options are available and should be discussed with a Med Water representative.

Resistivity is Lower than 18.2:

If the resistivity reading is less than 18.2 the monitoring log should be checked to determine when resistivity started to drop. Over time resistivity will drop when all the ion exchange sites on the deionizing media have been filled with ionic contaminants from the water. The rate at which the DI resin is used is a function of incoming water quality and the amount of water used. When the resistivity reaches 10 the DI canister should be changed following the user maintenance procedure for changing the DI canister. If the new DI canister is installed and it doesn't come up to 18.2, verify the canister was not previously used and never returned. If the DI canister is verified to be fresh it is possible that a small amount of air is still trapped in the DI canister. Continue to bleed the DI canister until all air has been removed (this could take up to 10 minutes). Please note that in some cases it can take up to 24 hours for a DI canister to come up to 18.2 even after the canister has been bled completely. If the canister still doesn't come up to 18.2 it is possible the DI resin is defective. If this happens contact Med Water Systems for a replacement.

Low-Pressure Fault on Controller Display:

The system is equipped with a pressure sensor to verify water pressure is in an acceptable range before turning on the production pump. If the controller indicates there is a low-pressure fault, the system has detected an issue with feed water pressure. Check the main water supply valve to ensure it is in the open or on position. If the water feed valve is open there may be an issue with the water supply in the building. To determine if it is a building supply issue, turn off the main water supply valve and depressurize the system by pressing the red button on the left carbon filter housing. Once pressure is released the water supply tube can be removed from the system by pressing and holding the collar on the fitting while pulling on the tube to remove it. Once removed, direct the tube to a bucket or drain and open the valve. If water doesn't flow or flows slowly close the valve and check with facilities to determine the cause of the flow/pressure issue.

Production Pump is Loud or Making a Growling Sound:

The production pump needs a constant water supply at greater than 45 psi to run efficiently. If the pump doesn't have enough water it will make a noise that sounds like growling. Reduced water pressure and flow is most frequently caused by not changing the carbon filters regularly. If the production pump is making a loud sound the filters should be changed following the user maintenance procedure for changing a carbon filter. If the carbon filters have been changed and the pump is still making noise it is possible that the house supply pressure is lower than 45 psi but isn't low enough to cause a low-pressure fault. If this is the case follow the steps noted in the Low Pressure Fault troubleshooting section. If the feed pressure and flow have been verified to be acceptable the pump may have been damaged by being starved of water and may need to be replaced. Contact Med Water Service for support.

CFU Count is Above 10 When Performing a Bacterial Contamination Test:

Generally when a bacterial contamination test comes back above the 10 CFU specification the contamination issues are localized to the sample port or the dispense tap where the samples are taken. Both the sample port and the dispense tap are open to the air so any aerial bacteria can get into the ends of the tubes and start to grow which can result in a false positive test. Following a strict water sampling procedure is the first step in preventing sample contamination as a possible cause (see water testing section above). Before retesting, ensure both the sample port and dispense tap have been cleaned thoroughly inside and out with bleach or alcohol solution. If only one port was tested initially, testing both ports in the retest will help determine the extent of contamination. If results come back and only one port is contaminated the valve and tubing on the contaminated port should be removed and cleaned thoroughly in bleach or alcohol solution or replaced with a fresh valve assembly. This port can then be retested to confirm the localized contamination has been addressed. If both sampling sites are contaminated or there hasn't been a significant CFU increase between the initial and retest results, contact Med Water Service for additional support and troubleshooting.

Beeping Alarm from the Back of the Machine:

The UV sterilization system has an alarm that beeps when the UV bulb degrades or burns out. If a spare UV bulb is available the bulb should be replaced by unplugging the UV ballast and pulling the bulb/socket assembly from the metal housing. Remove the bulb from the socket and prepare to install the new bulb. Be careful when handling the new bulb as oils from fingers on the glass portion of the bulb can create hot spots that will reduce the life of the bulb. Without touching the glass portion of the bulb push the bulb into the socket and carefully lower the bulb/socket assembly back into the metal housing. The power cord can now be plugged back in and the beeping should stop. If it doesn't stop the ballast has been damaged or burned out and will need to be replaced. Contact Med Water Service for support.

SENTRY II

Series 930TA

Twin Meter Alternating Water Softening System

Operation and Maintenance Manual

Product Overview

Pre-Installation Checklist

1. A standard electrical outlet (120V/160Hz) must be located within 12’ of installation site.

2. A functioning floor drain, washer stand pipe or suitable location for waste water discharge must be located within 20’ of installation site.

    a. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of 1/2”. Backwash flow rates in excess of 7 gpm or length in excess of 20’ require 3/4” drain line.

3. A working pressure reducing valve must be installed on the inlet water line that supplies the water softener.

4. (**Note: The warranty is void if the system is exposed to water pressure in excess of 100 psi.)**

5. The temperature at the location of the water softener system must never be below 40˚F.

Installation

1. **Floor Space:** Make sure the floor space that has been selected to install the water softener is clean and on a level surface.

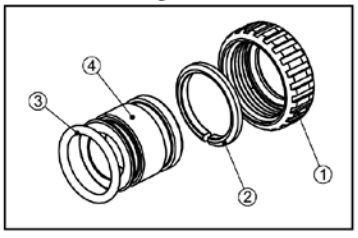
2. **Leveling the Salt Container:** If the floor beneath the salt container is not level, do not use shims or spacers to level the salt container. A platform that supports the entire bottom surface of the salt container must be used.

3. **What to Bypass:** A typical installation would include bypassing the outside hose bibs. The cold water feeding the kitchen sink may or may not be bypassed depending upon preference.

4. **Connection Kit:** The standard connection kit supplied with the water softener will be a 3/4" brass sweat connection kit. (See Figure 1) Other connection kits are available. This kit will consist of the following:

2 - Plastic nut 1” quick connect, black (#1)
2 - Plastic split ring, white (#2)
2 - O-Ring (#3)
2 - Brass connector 3/4” sweat (#4)

Figure 1



5. **Plumbing Preparations:** Unscrew the two plastic nuts (#1) and pull on the two brass connectors (#4) to remove them from the bypass assembly. Next remove the white plastic rings (#2) and the O-rings. (#3) *See Figure 1*

- Solder at least 6” of pipe to the brass connectors before reassembly. (See Figure 2)
- After soldering is complete, cool the pipe and connectors. Slide the plastic nuts (#1) over the brass connectors (#4). Place the white plastic split rings (#2) into the grooves closest to the end of the brass connectors (#4). Reassembly the connection kit onto the bypass assembly.

Warning: *When assembling the installation-fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and O-ring. Heat from soldering or sol- vent cements may damage the nut, split ring or o- ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and O-ring. Avoid getting primer and solvent cement on any part of the O-rings, split rings, bypass valve or control valve.*

6. **Plumbing:** When connecting the water softener to the existing plumbing, make sure the inlet water is connected to the inlet of the softener. Arrows on the valve body indicate direction of flow. Make sure the bypass valves are in the correct position *See Figure 3.*

Note: **All plumbing should be done in accordance with local plumbing codes.**

Warning: *The control valve, fittings and/or bypass are designed to accommodate minor plumbing mis-alignments but are not designed to support the weight of a system or the plumbing.*

Figure 1

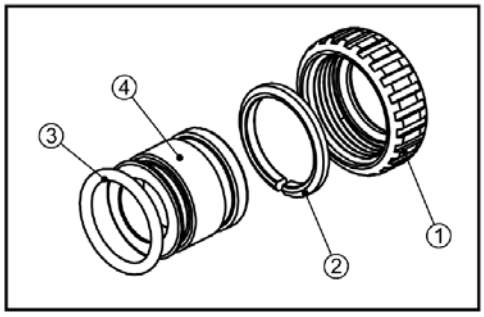


Figure 2

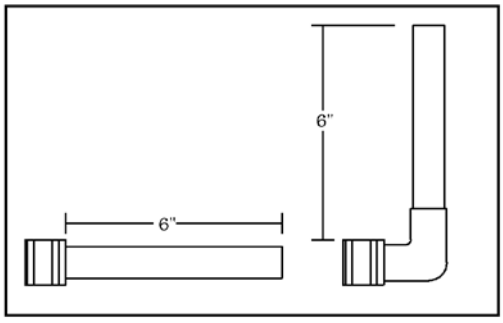
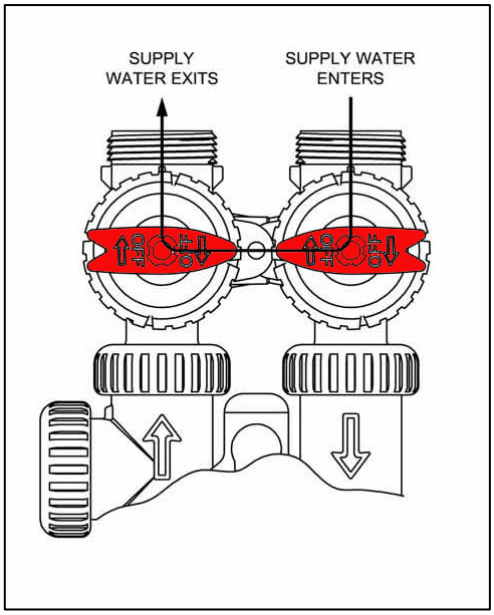


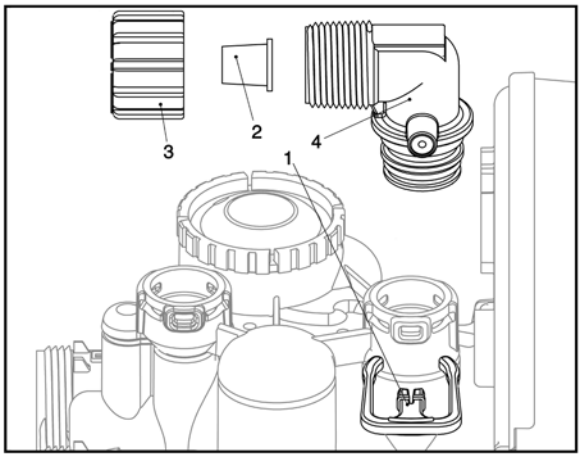
Figure 3



7. **Locate Polytube Insert:** Now that the water softener is connected to the existing plumbing, the drain line may be connected. First, locate and remove the polytube insert (#2) from the gray cable on the left side of the control valve.

8. **Connecting the Drain Line:** Slide plastic nut (#3) over the permanent drain tubing and place the polytube insert (#2) into the end of the drain tubing. Insert the drain tubing into the drain elbow fitting (#4) and tighten plastic nut (#3) hand-tight plus 1/2 turn with pliers. **Caution:** Do Not Over-tighten. (See Figure 4)

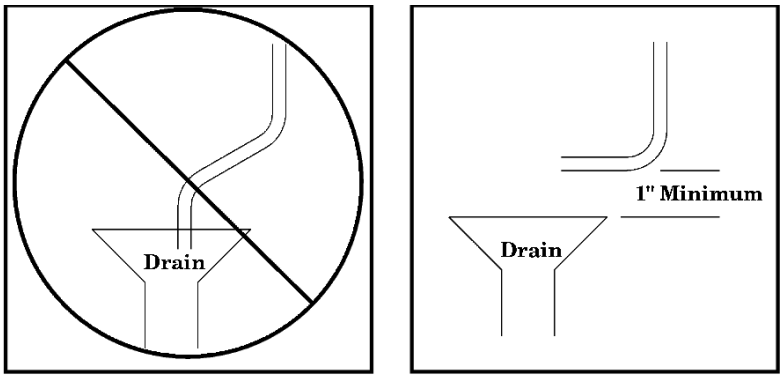
Figure 4



9. **Drain Line Specs:** If the distance from the water softener to the drain is greater than 20' the drain line size must be increased to 3/4". The threads on the drain elbow fitting are 3/4" male NPT and can be used in lieu of the 1/2" plastic nut and insert. If the drain line must run overhead, the maximum height of the drain line should not exceed 8' above the top of the water softener.

10. **Air Gap:** The drain line must have an approved air gap to prevent the possibility of a cross connection to the sewer. (See Figure 5)

Figure 5

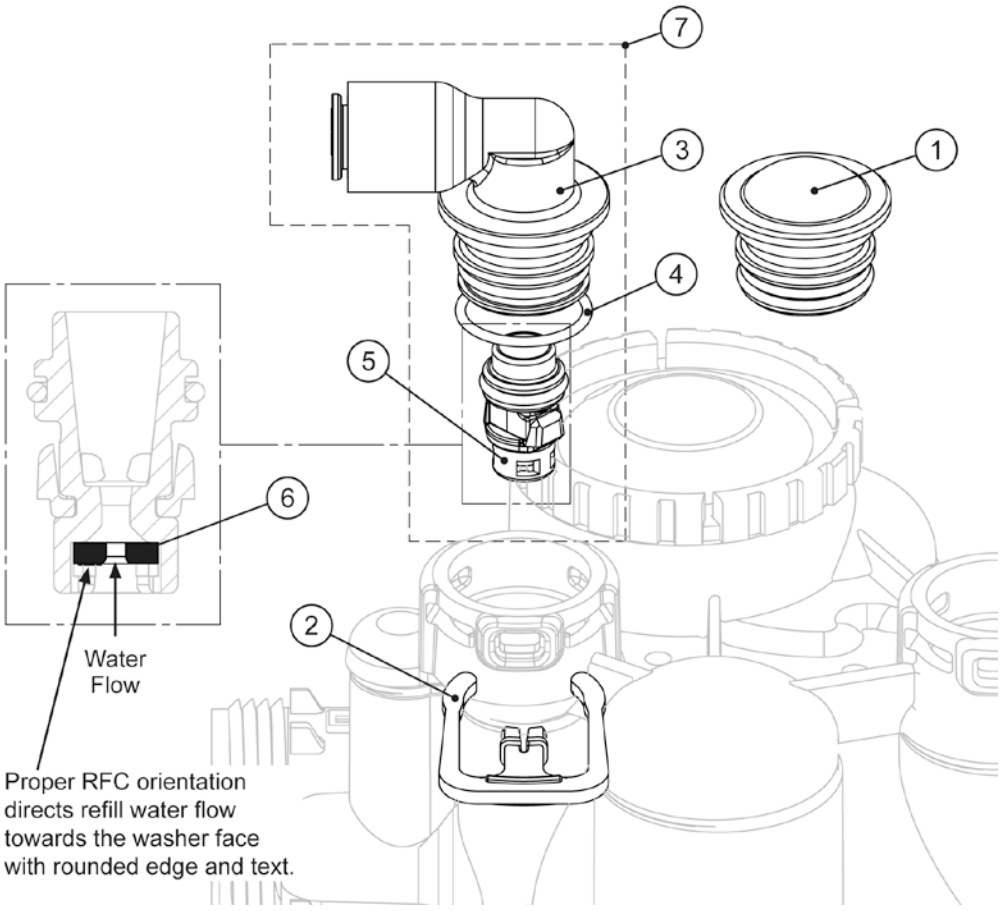


Wrong **Right**

11. **Connecting the overflow line:** The brine overflow fitting is located on the outside of the salt container approximately 12” down from the top. Connect 1/2” drain tubing to the overflow fitting and run it to the nearest floor drain. This line is a gravity flow line and cannot be run overhead or cannot connect to a drain that is higher than the overflow fitting.

12. **Connecting the brine line:** A 3/8” brine line approximately 4’ long is attached to the salt container and is supplied with the tube insert (#2) in the end of the brine line. (See Figure 6) Unscrew the brine nut (#3) and slide it over the end of the brine line. Insert the brine line into the brine fitting. (#4) and tighten the brine nut (#3) hand tight plus 1/2 turn with pliers. **Caution:** Do Not Over-tighten.

Figure 6

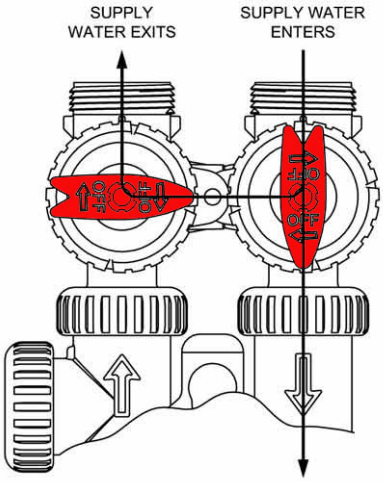


The water softener is equipped with a 15-foot power cord with built-in transformer. Plug the power cord into a standard (120V 60Hz) electrical outlet. It will take approximately 10 seconds before you will see the display (this is normal). The water softener is now ready to be programmed.

Start-Up

To begin, place the bypass in the position shown in Figure 1.

Figure 1



Place the softener in the Backwash cycle.

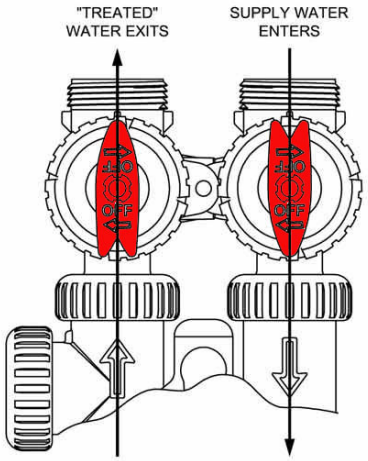
- To place Unit A in the Backwash cycle press and hold the REGEN button (approx. 6 seconds) until the control valve initiates a regeneration cycle. Unit A is now in the Backwash cycle. An initial burst of air will be released to the drain. Leave Unit A in the Backwash cycle until the water running to the drain runs clear.
- Press the REGEN button to advance the controller to the next cycle. Unit A is now in the Brine/Slow Rinse cycle.
- When the timer begins countdown press the REGEN button to advance the controller to the next cycle. Unit A is now in the 2nd Backwash cycle.
- When the timer begins countdown press the REGEN button to advance the controller to the next cycle. Unit A is now in the Fast Rinse cycle. Leave Unit A in the Fast Rinse cycle for at least five minutes.
- After at least five minutes press the REGEN button to advance the controller to the next cycle. Unit A is now in the Brine Tank Fill cycle. Leave the unit in the Brine Tank Fill cycle for at least five minutes. To speed up the process, fill the brine tank with water manually. Fill the brine tank up to a few inches ABOVE the false bottom, (approx. 6-8 inches).
- After the brine tank has been filled to the proper level press the REGEN button to advance the controller to the home position.

Repeat the above instructions for start-up of Unit B.

Note: The Brine Tank Refill instructions have been completed in the Unit A start-up.

To complete the Start-up place bypass in the position shown in Figure 2

Figure 2



Manually Regenerating the Water Softener

Reasons you may want to manually regenerate the water softener:

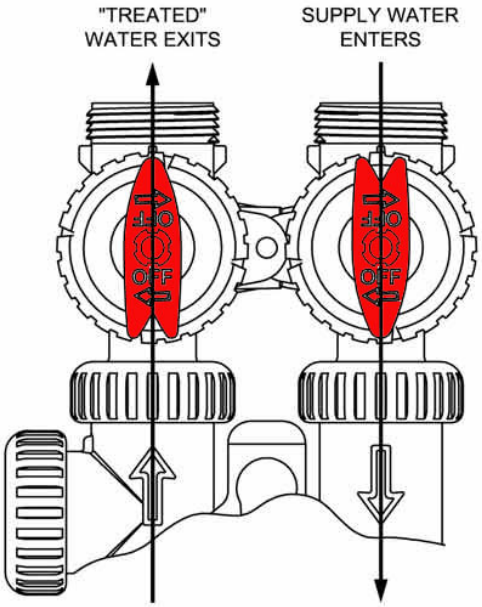
1. If the brine tank has run out of salt it will be necessary to regenerate the online and offline tanks. (Unit A and Unit B)
   - After adding salt to the brine tank wait a minimum of six hours before initiating regeneration.
     - *(The water needs time to dissolve the salt for a minimum of six hours.)*
   - To initiate a regeneration of the unit that is online, push and hold the REGEN button for approximately six seconds. The unit will immediately begin its regeneration cycle and water will be running to the drain. Wait a minimum of eight hours before initiating the regeneration of the off-line unit.
     - *(The regeneration time is approximately two hours and then the water needs time to dissolve the salt for a minimum of six hours.)*

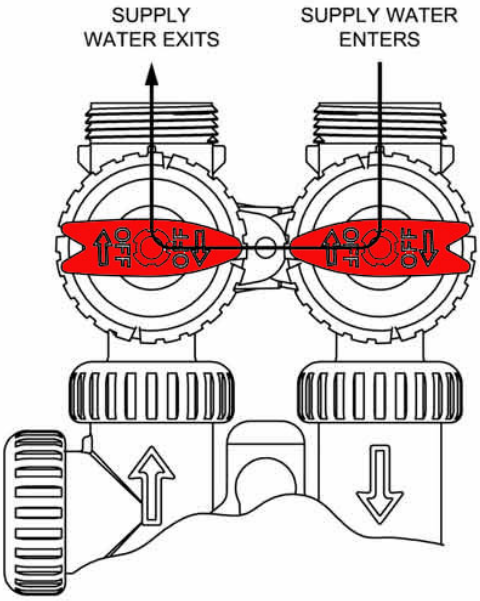
2. If the water is hard, the quickest way to get soft water in your home is by initiating a regeneration of the water softener.
   - To initiate a regeneration of the online tank push and hold the REGEN button for approximately six seconds. The unit will immediately begin its regeneration cycle and water will be running to the drain. *(When the softener has completed the manual regeneration the system will automatically return to its preset normal operations.)*

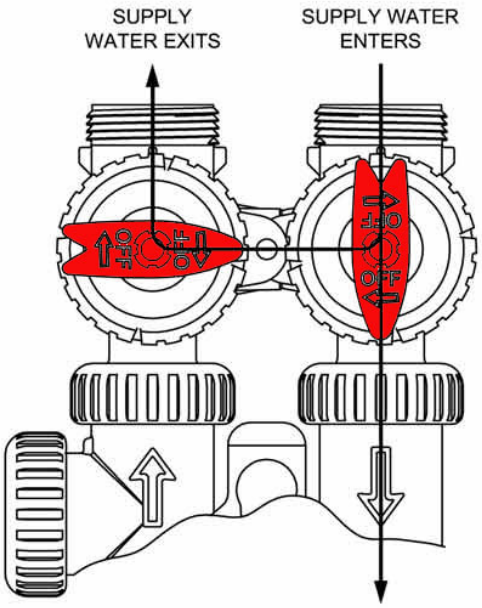
Note: After the regeneration of both Unit A and Unit B, there is typically a delay of three to four days to purge the system i.e. water heater, pipes etc. of the hard water. After the three to four day period is passed and there is still hard water present you may need to contact a service professional.

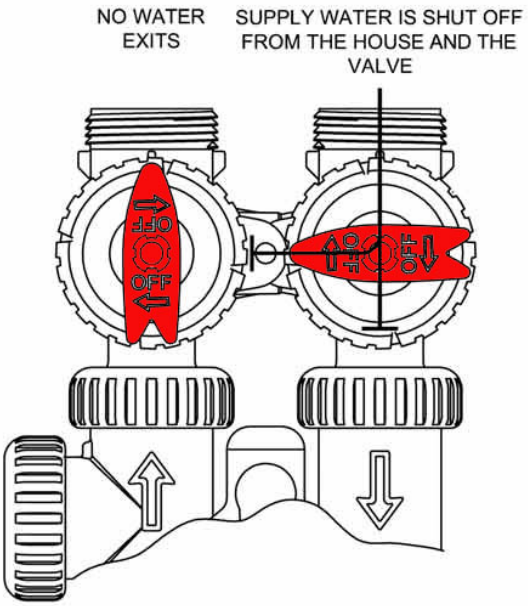
IMPORTANT: When manually regenerating the water softener system it is necessary to regenerate BOTH online and offline tanks.

Bypass Valve Operation

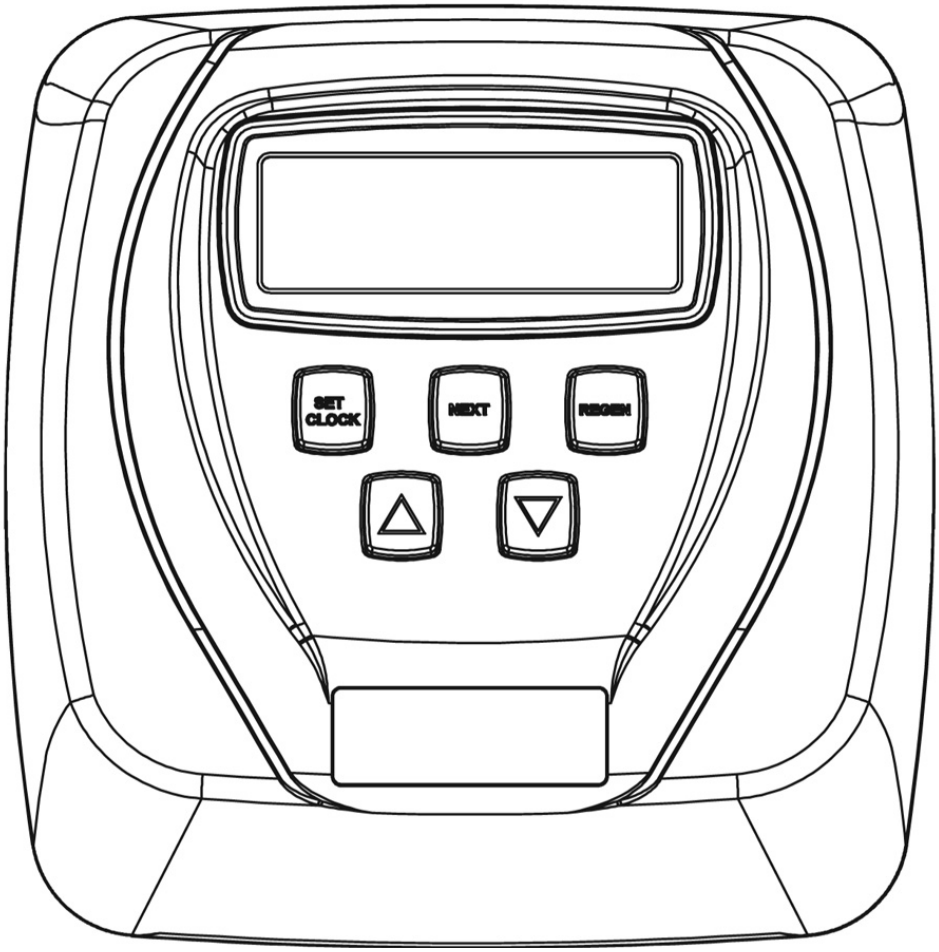








Series 930
Control Valve Programming



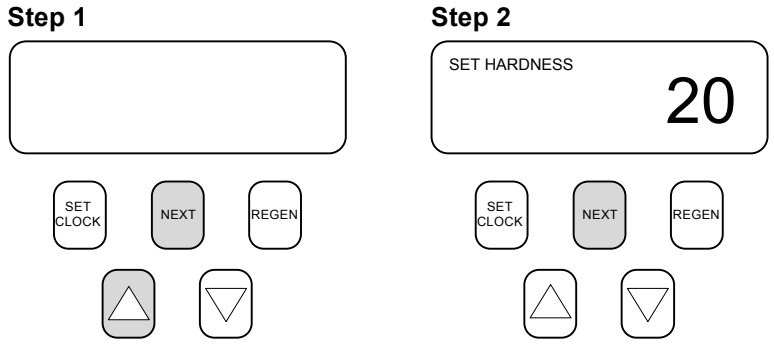
Control Valve Programming

Programming

The control valve has been pre-programmed from the factory with the correct regeneration cycle program and cycle times. The gallon capacity between regeneration can be changed by adjusting the water hardness.

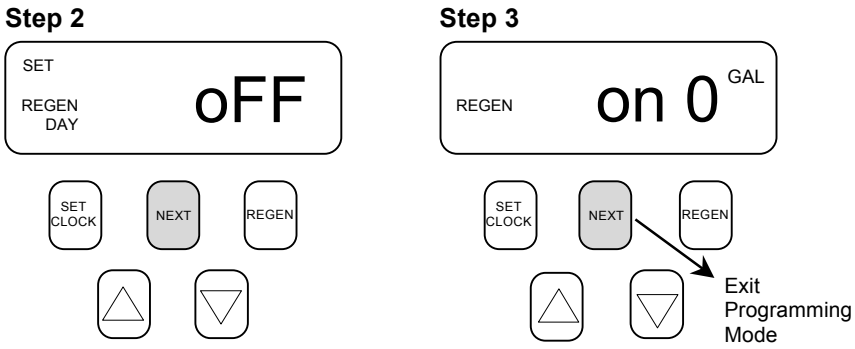
Step 1 - Press the **NEXT** and the **UP** Arrow buttons at the same time and hold for 2 seconds.

Step 2 - **Raw Water Hardness:** Adjust to the correct hardness by pressing the **UP** or **DOWN** arrow button. Default setting 20 grains per gallon. Press **NEXT** to go to Step 3.



Step 3 - **Day Override:** This setting should be set to **OFF**. Press **NEXT** to go to Step 4.

Step 4 - Regeneration Time: The system regenerates when the volume remaining reaches 0. This setting is not adjustable. Press **NEXT** to exit programming.



Control Valve Programming

Set the Time of Day

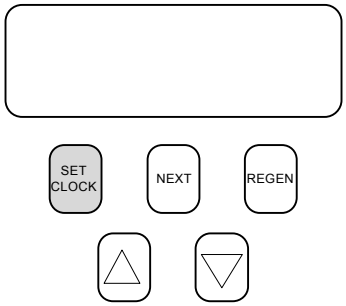
The time of day should only need to be set after initial installation or after an extended power outage. If an extended power outage has occurred, the time of day will flash indicating that it needs to be set.

Step 1 - Press **SET CLOCK**

Step 2 - **Current Time of Day - Hours:** Adjust to the correct hour by pressing the **UP** or **DOWN** arrow button. Press **NEXT** to go to Step 3.

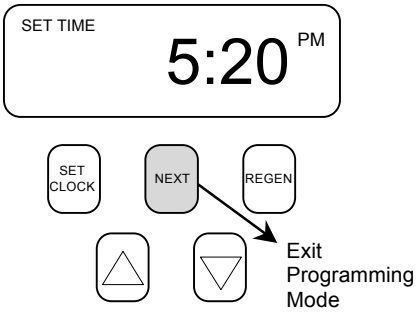
Step 3 - **Current Time of Day - Minutes:** Adjust to the correct minutes by pressing the up or down arrow button. Press NEXT to return to the normal operating screen.

Step 1



Step 2

Step 3



Normal Operating Screens

During normal operation one of three screens can be displayed.
Pressing the **NEXT** button alternates between these screens.

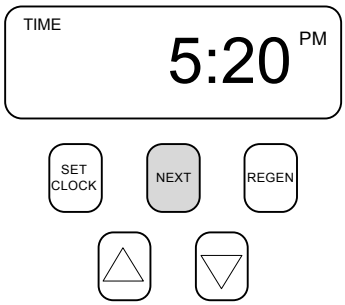
Screen 1 - Current Time of Day

Screen 2 - Current Flow Rate in Gallons per Minute and A/B Tank Indicator (Lower case b)

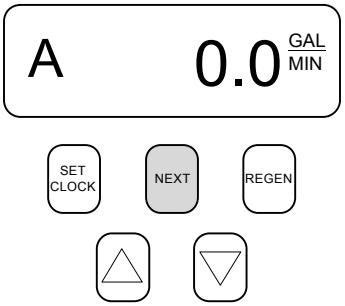
Note:

Screen 3 - Capacity Remaining in Gallons

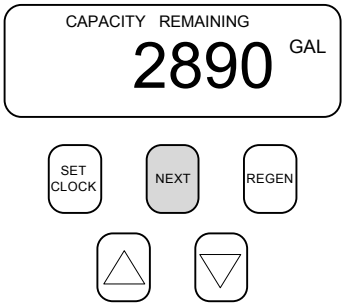
Screen 1



Screen 2



Screen 3



Water Softener Log Sheet

It is important to keep a log of the water softener programming and other important information. This is necessary for repairs and other troubleshooting needs.

Online Status	Date/Time	Hardness	Volume Remaining	Salt Usage	Pressure

Control Valve Trouble Shooting

Problem	Possible Cause	Solution
No display on Control Valve Circuit Board	No power at electrical outlet	Repair outlet or use working outlet
	Control Valve Power Cord not plugged onto Control Valve Circuit Board	Make sure Control Valve Power Cord is connected securely at both ends
	Improper power supply	Verify proper voltage is being delivered to Circuit Board
	Defective Circuit Board	Replace Circuit Board
Control Valve Circuit Board does not display correct time of day	Control Valve Power Cord plugged into electric outlet controlled by light switch	Use uninterrupted outlet
	Tripped Breaker Switch and/or tripped GFI	Reset Breaker Switch and/ or GFI switch
	Power outage	Reset time of day. If Circuit Board has battery back up present, the battery may be depleted. Replace if necessary.
	Defective Circuit Board	Replace Circuit Board
Display does not indicate that water is flowing. The word “Softening” flashes on the display when water is being used	Bypass valve in bypass position	Turn Bypass Handles to place Bypass in service position
	Meter is not connected to meter connection on Circuit Board or is not connected securely	Connect Meter to three-pin connection labeled METER on Circuit Board. Remove and reconnect to ensure proper connection
	Restricted/ stalled Meter Turbine	Remove Meter and check for rotation or foreign material
	Defective Meter	Replace Meter
	Defective Circuit Board	Replace Circuit Board
Time of day flashes on and off	Power outage	Reset time of day. If Circuit Board has battery back up present, the Battery may be depleted. Replace if necessary.
Control valve does not regenerate automatically when the REGEN button is depressed and held.	Broken Drive Gear or Drive Cap Assembly	Replace Drive Gear or Drive Cap Assembly
	Broken Piston Rod	Replace Piston Rod
	Defective PC Board	Defective PC Board
Control valve does not regenerate automatically but **does** when the REGEN button is depressed and held.	Bypass Valve in bypass position	Turn Bypass Handles to place Bypass in service position
	Meter is not connected to meter connection on Circuit Board or is not connected securely	Connect Meter to three pin connection labeled METER on Circuit Board. Remove and reconnect to ensure proper connection
	Restricted/ stalled Meter Turbine	Remove Meter and check for rotation or foreign material
	Incorrect programming	Check for programming error
	Defective Meter	Replace Meter
	Defective Circuit Board	Replace Circuit Board

Control Valve Trouble Shooting

Problem	Possible Cause	Solution
Hard or untreated water is being delivered	Bypass Valve is open or faulty	Fully close Bypass Valve or replace. Also check for multiple bypasses
	Media is exhausted due to high water usage	Check program settings or diagnostics for abnormal water usage
	Meter not registering	Remove Meter and check for rotation or foreign material
	Water quality fluctuation	Test water and adjust program values accordingly
	No Salt or low level of Salt in Brine Tank	Add proper type of salt to Brine Tank
	Control Valve fails to draw in brine	Refer to Trouble Shooting Guide number 12
	Insufficient brine level in Brine Tank	Check refill setting in programming. Check Refill Flow Control for restrictions or debris and clean or replace
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Control valve body type and piston type mix matched	Verify proper control valve body type and piston type match
	Fouled media bed	Replace media bed
System uses too much salt	Improper refill setting	Check refill setting
	Improper program settings	Check program setting to make sure they are specific to the water quality and application needs
	Control valve regenerates frequently	Check for leaking fixtures that may be exhausting capacity or system is undersized
	Slow drip from brine refill tubing. Float Valve is not designed to shut off a drip	Replace Seal and Spacer Stack Assembly
Residual salt in service lines	Low water pressure	Check incoming water pressure. Water pressure must remain at minimum of 40 psi
	Incorrect injector size	Replace Injector with correct size for the application. Refer to System Specification for the correct size
	Restricted drain line	Check drain line for restrictions or debris and clean
Excessive water in Brine Tank	Improper program settings	Check refill setting
	Plugged Injector	Remove Injector and clean or replace
	Drive cap assembly not tightened in properly	Re-tighten the drive cap assembly
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Restricted or kinked drain line	Check drain line for restrictions or debris and or un-kink drain line
	Plugged backwash flow controller	Remove backwash flow controller and clean or replace
	Missing Refill Flow Controller	Replace Refill Flow Controller

Control Valve Trouble Shooting

Problem	Possible Cause	Solution
Control Valve fails to draw brine	Injector is plugged	Remove Injector and clean or replace
	Faulty Brine Piston	Replace Brine Piston
	Brine line tubing connection leak	Inspect Tubing and Fittings for air leak
	Drain line restriction or debris can cause excess back pressure on Injector	Inspect drain line and clean to correct restriction
	Drain line too long or elevated too high	Shorten length and or height
	Low water pressure	Check incoming water pressure. Water pressure must remain at minimum of 40 psi
Water running to drain	Power outage during regeneration	Upon power being restored Control Valve will finish the remaining regeneration time. Reset time of day.
	Damaged Seal and Spacer Stack Assembly	Replace Seal and Spacer Stack Assembly
	Piston assembly failure	Replace Piston Assembly
	Drive Cap Assembly not tightened in properly	Re-tighten the Drive Cap Assembly
Err - 1001 = Control unable to sense motor movement	Motor not inserted full to engage pinion, motor wires broken or disconnected	Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the Circuit Board labeled MOTOR. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Circuit Board not properly snapped into drive bracket	Properly snap Circuit Board into drive bracket and then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Missing reduction gears	Replace missing gears
Err - 1002 = Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign material is lodged in control valve	Open up Control Valve and pull out piston assembly and Seal and Spacer Stack Assembly for inspection. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Mechanical binding	Check Piston and Seal and Spacer Stack Assembly, check Reduction Gears, check Drive Bracket and Main Drive Gear Interface. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Main Drive Gear too tight	Loosen Main Drive Gear. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Improper voltage being delivered to Circuit Board	Verify that proper voltage is being supplied. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.

Control Valve Trouble Shooting

Problem	Possible Cause	Solution
Err - 1003 = Control valve motor ran too long and was unable to find the next cycle position	Motor failure during a regeneration	Check motor connections then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Foreign matter built up on Piston and Seal and Spacer Stack Assemblies creating friction and drag enough to time out Motor	Replace Piston and Seal and Spacer Stack Assemblies. Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
	Drive Bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap Drive Bracket in properly then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.
Err - 1004 = Control valve motor ran too long and timed out trying to reach home position	Drive Bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap Drive Bracket in properly then Press NEXT and REGEN buttons at the same time for 3 seconds to resynchronize software with piston.