# INSTALLATION AND OPERATING INSTRUCTIONS

## MCWS/CWS SERIES RESIDENTIAL WATER SOFTENER

**TWO TANK MODELS:**

| | |
|---|---|
| MCWS075ME | CWS075ME |
| MCWS100ME | CWS100ME |
| MCWS150ME | CWS150ME |
| MCWS200ME | CWS200ME |
| MCWS300ME | CWS300ME |

**CAUTION:** Damage to the system can occur (including possible mineral tank structure failure resulting in a water leak), if system is subjected to a vacuum. The installer should take appropriate measures to prevent a vacuum. This would include the installation of an appropriate device in the supply line to the system, i.e. a vacuum breaker or backflow protection device. **Vacuum damage voids the factory warranty.**

**(Installer: Please leave with homeowner)**

CUNO® *a 3M company*

3M

**CUNO Incorporated**
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IN313 0706

# *SAFETY INFORMATION*

**Read, understand, and follow all safety information contained in these instructions prior to installation and use of the CUNO MCWS/CWS Series Residential Water Softener. Retain these instructions for future reference.**

**Intended Use:**
The CUNO MCWS/CWS Series Residential Water Softener is intended for use in softening water in homes and has not been evaluated for other uses. The system must be installed indoors near the point of entry of a home water line, and be installed by qualified professional installers according to these installation instructions.

| EXPLANATION OF SIGNAL WORD CONSEQUENCES | |
|---|---|
| ⚠ **WARNING** | Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage. |
| **CAUTION** | Indicates a potentially hazardous situation, which, if not avoided, may result in property damage. |

## ⚠ WARNING

**To reduce the risk associated with ingestion of contaminates due to use with water that is microbiologically unsafe or of unknown quality:**

- Do not use with water that is micriobiologically unsafe or of unknown quality without adequate disinfection before or after the system.

**To reduce the risk associated with a hazardous voltage due to installation on a home system that requires use of the cold water system as a safety ground:**

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure the ground connection across the softener piping — refer installation to qualified personnel.

**To reduce the risk associated with back strain due to the heavy weight of the various system components:**

- Follow safe lifting procedures.

## CAUTION

**To reduce the risk associated with property damage due to water leakage:**

- Installation must comply with existing state or local plumbing codes;
- Protect from freezing. Drain system when room temperature drops below 40°F (4.4°C);
- Do not install on systems where line pressures above 100 psi (689 kPa) may occur;
- Do not install system where water lines that could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- Do not use pliers or pipe wrenches to tighten plastic fittings.
- Do not use pipe sealant on plastic fittings.

## IMPORTANT NOTES

- The system should be installed on cold water lines only.
- SHUT OFF FUEL SUPPLY TO WATER HEATER after water is shut off.
- Failure to follow instructions may void warranty.

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## *IMPORTANT: SECTION 1: BEFORE INSTALLATION*

Congratulations! We believe your purchase of this water softener will prove to be a very wise choice. When properly installed, your new softener will provide many years of virtually trouble-free service. Before starting the installation we suggest you read this manual all the way through for an overview, and then follow the installation steps in the proper sequence. **IMPROPER INSTALLATION could void the warranty.**

**INSPECTING AND HANDLING YOUR WATER SOFTENER:**

Inspect the equipment for shipping damage. If damaged, notify the transportation company and request a damage inspection.

Handle the equipment with care. Damage can result if dropped or if the brine tank is set on sharp, uneven projections on the floor. When handling, do not turn the water softener unit upside down.

**MAKE SURE YOUR WATER HAS BEEN THOROUGHLY TESTED:**

An analysis of your water should be made prior to the selection of your water conditioning equipment. Your dealer will generally perform this service for you, and may send a sample to the factory for analysis and recommendations. Enter your analysis for a permanent record (see Fig. 1).

**NOTE:** Hydrogen sulfide ($H_2S$) must be tested for at the well site. For accuracy, the sample must be drawn with the pump RUNNING, and the test be completed within ONE minute after the sample is drawn.

**NOTE:** Softeners are designed to reduce hardness but can handle reasonable amounts of soluble iron if consideration is given to content when selecting model and regeneration settings. To treat sulfur (hydrogen sulfide), bacterial iron, precipitated iron or very high levels of soluble iron requires special equipment in addition to a water softener. For best results, a Chem-Free Iron Reduction System is recommended for use on waters containing more than 2 ppm of iron.

**ANALYSIS OF YOUR WATER**

| | |
|---|---|
| Hardness | _____ gpg |
| Iron (Fe) | _____ ppm |
| Manganese (Mn) | _____ ppm |
| pH | _____ |
| Tannins (Humic Acid) | _____ ppm |
| Hydrogen sulfide ($H_2S$) | _____ ppm |
| Other_____ | _____ |
| Other_____ | _____ |

Fig. 1

**CHECK YOUR WATER PRESSURE AND PUMPING RATE:**

Two water system conditions must be checked carefully to avoid unsatisfactory operation or equipment damage:

1) MINIMUM water pressure required at the water softener inlet is 20 psi (138 kPa). IF PRESSURE IS OVER 100 PSI (689 kPa), A PRESSURE REDUCING VALVE MUST BE INSTALLED IN THE WATER SUPPLY LINE AHEAD OF THE WATER SOFTENER.

**CAUTION**

**To reduce the risk associated with property damage due to water leakage:**

- Do not install on systems where line pressures above 100 psi (689 kPa) may occur.

***NOTE:*** If you have a municipal or a community water supply and daytime water pressure is 85 psi (586 kPa) or more, nighttime pressure may exceed 100 psi (689 kPa). Call your local water department or plant operator to obtain pressure readings. If you have a private well, the gauge on the pressure tank will indicate the high and low system pressure. Record your water pressure data below:

WATER PRESSURE

Low _____ psi High _____ psi

**CAUTION**

**To reduce the risk associated with property damage due to water leakage:**

- Do not install system where water lines that could be subjected to a vacuum condition without appropriate measures for vacuum prevention.

The installer should take appropriate measures if there is the possibility a vacuum may occur. This would include the installation of an appropriate device in the supply line to the system, i.e., a vacuum breaker or backflow prevention device. Vacuum damage voids the factory warranty.

2) The pumping rate of your well pump must be sufficient for satisfactory operation and BACKWASHING of the WATER SOFTENER. **(see SPECIFICATIONS AND OPERATING DATA , Section 5).**

**LOCATE WATER CONDITIONING EQUIPMENT CORRECTLY**

Select the location of your water softener with care. Various conditions which contribute to proper location are as follows:

1) Locate as close as possible to water supply source.

2) Locate as close as possible to a floor or laundry tub drain.

3) Locate in correct relationship to other water conditioning equipment (Figure 1).

4) Locate the softener in the supply line BEFORE the water heater. Water temperatures above 100°F (38°C) will damage the softener and void the factory warranty.

5) DO NOT install the softener in a location where freezing temperatures occur. Freezing may cause permanent damage and will also void the factory warranty.

6) Allow sufficient space around the unit for easy servicing.

7) Provide a non-switched 110/120V, 60Hz power source for the control.

**⚠ WARNING**

**To reduce the risk associated with ingestion of contaminates due to use with water that is microbiologically unsafe or of unknown quality:**

- Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

**FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION:**

(1) All installation procedures MUST conform to local and state plumbing codes.

(2) If lawn sprinkling, a swimming pool, or geothermal heating/cooling or water for other devices/activities are to be treated by the water softener, a larger model MUST be selected to accommodate the higher flow rate and softening demand of these items. The pumping rate of the well pump must be sufficient to accommodate these items plus the backwashing requirements of the water softener. Consult your dealer for alternative instructions if the pumping rate is insufficient.

(3) Remember that the water softener INLET is attached to the pipe that supplies water (i.e., runs to the pump), and the OUTLET is the line that runs toward the water heater.

(4) Before commencing the installation it is advisable to study the existing piping system and to determine the size, number and type of fittings required.

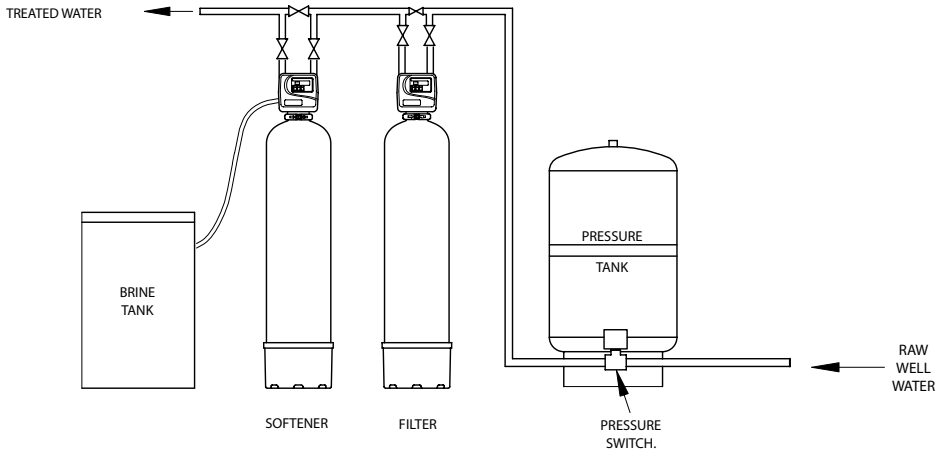
NOTE: If the plumbing system is used as the ground leg of the electrical supply, continuity should be maintained by installing ground straps around any nonconductive plastic piping used in installation.

(5) It is also advisable to sweep the floor to eliminate objects that could pierce the brine tank.

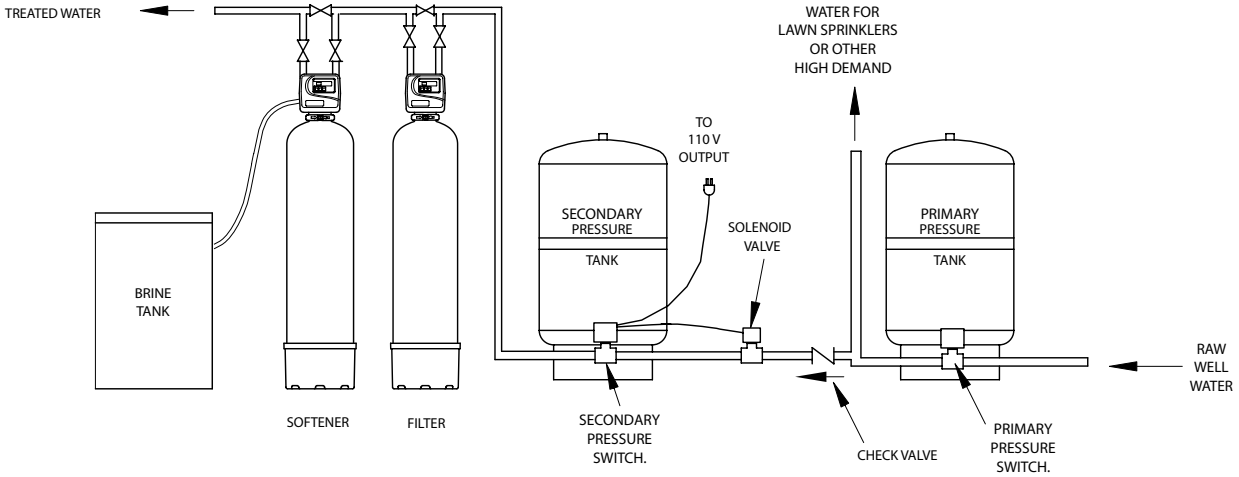
**IMPORTANT NOTE**

(6) **SODIUM INFORMATION:** Water softeners utilizing sodium chloride for regeneration add sodium to the water softened water. Persons who are on sodium restricted diets should consider the added sodium as part of their overall sodium intake. As a reference as to how much sodium is added to softened water consider the following. For each grain per gallon of water hardness that is exchanged from the water supply, 7.5 milligrams per liter of sodium will be added to the softened water. e.g. 10 grains per gallon (gpg) exchanged will add 75 milligrams of sodium to the softened water.

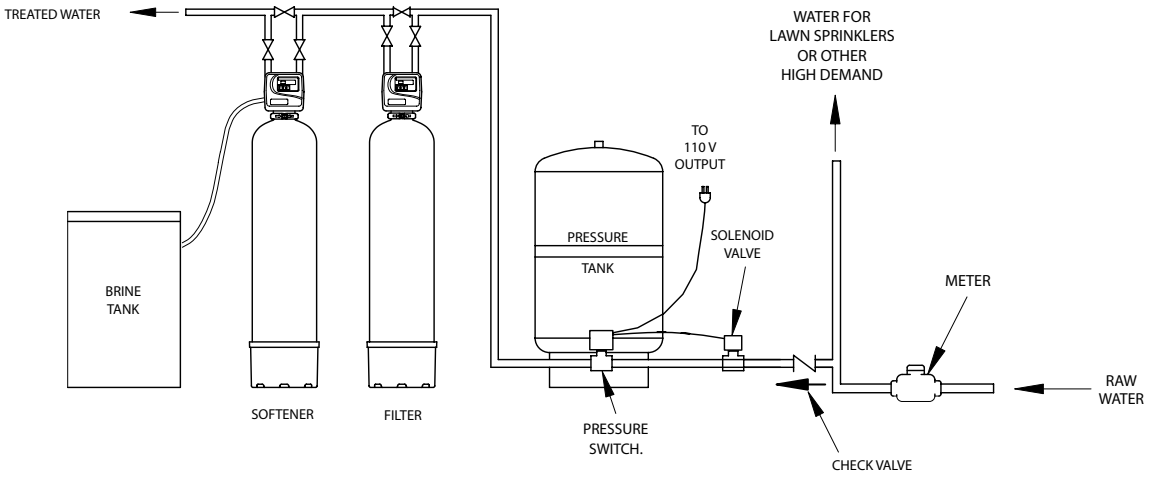
# SECTION 2: INSTALLATION




STANDARD WELL INSTALLATION




SPLIT-STREAM INSTALLATION




PUBLIC WATER SUPPLY INSTALLATION

**Figure 1. TYPICAL INSTALLATION SEQUENCE OF WATER CONDITIONING EQUIPMENT**

# SECTION 2: INSTALLATION

**IMPORTANT: Failure to follow instructions may void warranty.**

Step 1. Remove the unit from the shipping box and remove all packaging. Ensure no freight damage has occurred since shipment from our manufacturing facility. Locate the parts package and install the bypass and adapter fittings on the control valve to facilitate the connection to the customer's water supply.

**CAUTION**

**To reduce the risk associated with property damage due to water leakage:**

- Do not use pliers or pipe wrenches to tighten plastic fittings.

Step 2. **NOTE: Extension legs should be installed only whenever a salt dosage on any model softener is more than 15 lbs.**
**Models utilizing 15" x 15" x 34" brine tanks require salt grid extension legs when salting the softener above 15 lbs. of salt or more. Grid legs extension kits are provided for CWS / MCWS 200 ME units. All other models requiring extension leg kits can be ordered from your dealer, wholesaler or from CUNO Water Treatment.**
Verify all packaging materials have been removed from the brine tank. On all units, legs rest on bottom of the brine tank.

Step 3. Shut off all water at main supply valve. On a private well system, turn off power to pump and drain pressure tank. Make certain pressure is relieved from complete system by opening nearest faucet to drain system.

**IMPORTANT NOTE**

- SHUT OFF FUEL SUPPLY TO WATER HEATER after water is shut off.

Step 4. Cut main supply line as required to fit plumbing to INLET and OUTLET of unit.

Step 5. Attach plumbing. **DO NOT** apply heat to any fitting connected to BYPASS or CONTROL VALVE as damage may result to internal parts or connecting adapters. MAKE CERTAIN WATER FLOW ENTERS THROUGH INLET AND DISCHARGES THROUGH OUTLET.

**⚠ WARNING**

**To reduce the risk associated with hazardous voltage due to installation on a home system that requires use of the cold water system as a safety ground:**

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure the ground connection across the softener piping — refer installation to qualified personnel.

Step 6. The controls allow for either a 3/4" NPT connection or 5/8" poly tubing for use as a drain line connection.

**CAUTION**

**To reduce the risk associated with property damage due to water leakage:**

- Do not use pipe sealant on plastic fittings.

Step 7. Attach DRAIN LINE to DRAIN LINE FITTING. To prevent back pressure from reducing flow rate below minimum required for backwash, DRAIN LINE MUST be sized according to run length and relative height. Be careful not to bend flexible drain tubing sharply enough to cause "kinking" (if kinking occurs DRAIN LINE MUST BE REPLACED). Typical examples of proper DRAIN LINE diameters are:

(1) 1/2 in. ID up to 15 ft. when discharge is lower than INLET.

(2) 5/8 in. ID up to 15 ft. when discharge is slightly higher than INLET.

(3) 3/4 in. ID when drain is 25 ft. away and/or drain is installed overhead.

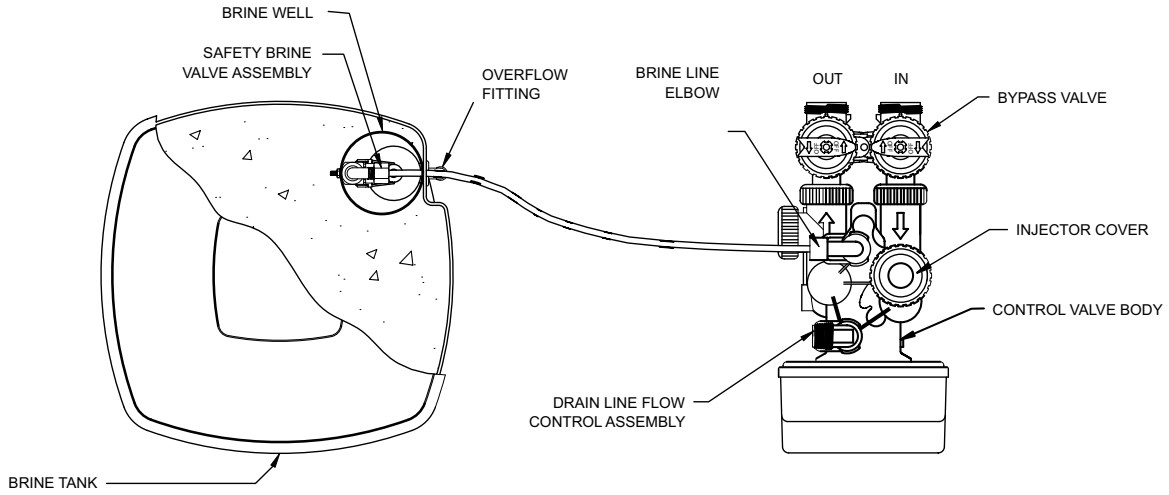



**Figure 2. SOFTENER AND BRINE TANK ASSEMBLY, TOP VIEW**

Some areas prohibit the use of flexible drain lines. Check with local code officials prior to installation.

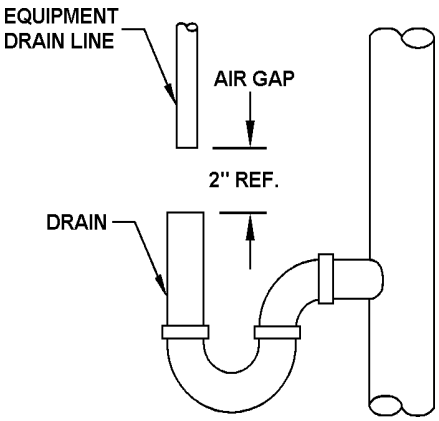



**Figure 3. TYPICAL DRAIN**

Step 8. Position DRAIN LINE over drain and secure firmly. To prevent backsiphoning of waste water, provide an air gap of at least 2 in. or 2 pipe diameters between end of drain hose and drain (Figure 3). **DO NOT** raise DRAIN LINE more than 10 ft. above floor.

Step 9. Connect one end of the 3/8 in. black Polyethylene tubing to the brine fitting located on the left side of the CONTROL VALVE. Connect the other end to the SAFETY BRINE VALVE ELBOW inside of the brine well in the brine tank. To do so remove the retaining clip from the brine line fitting on the control valve. The retaining clip is holding a plastic insert sleeve and needs to be inserted into the polyethylene tubing before installing the tubing into the fitting elbow and hand tighten only. **CAUTION: Do not use pliers or wrenches to tighten the fitting as damage may occur and will void the manufacturer's warranty.**

Step 10. Install OVERFLOW LINE to brine tank OVERFLOW FITTING (Figure 2). Discharge of line must be lower than OVERFLOW FITTING. **DO NOT INTERCONNECT OVERFLOW LINE WITH VALVE DRAIN LINE.**

Step 11. Make certain BYPASS VALVE INLET and OUTLET KNOBS ARE IN "BYPASS" position. After all plumbing connections have been completed, open main water shut-off valve or restore power to well pump. Check for leaks and correct as necessary.

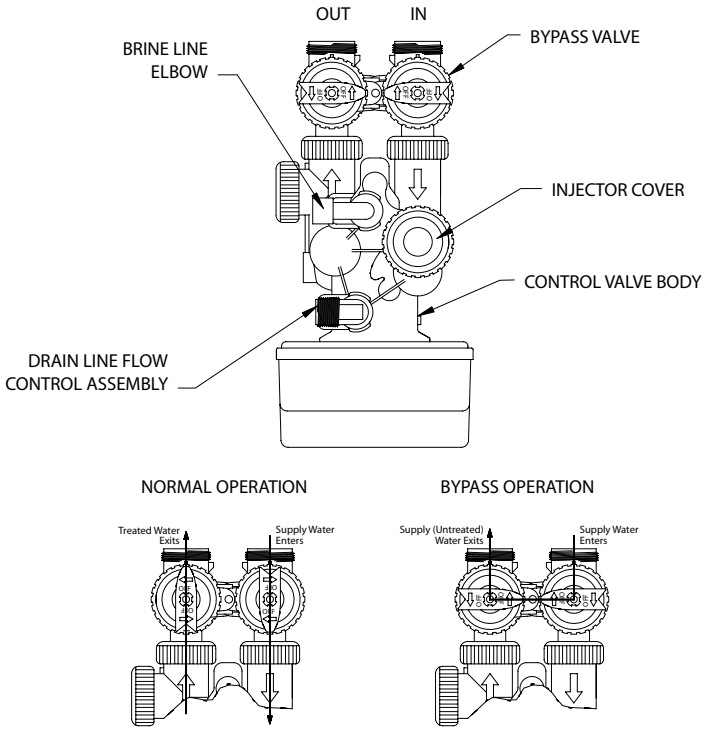



**Figure 4. BYPASS VALVE**

Step 12. Plug CONTROL VALVE POWER CORD into 120v/60Hz, non-switched power source. Manually stage control to BACKWASH POSITION and then unplug power cord to prevent the unit from advancing automatically.

Step 13. Partially open INLET knob on bypass valve (Figure 4). This will allow the unit to fill slowly from the bottom up, reducing air entrapment. Allow unit to fill slowly, failure to do so could result in loss of resin to the drain. Once a steady stream of water, no air, is flowing to drain the inlet and outlet knobs on the bypass can be fully opened.

Step 14. Refer to **Section 3: Regeneration Instructions,** on how to set control valve for proper set up and regeneration settings.
NOTE: Regeneration settings for the control valve are factory preset. The control valve design permits adjustment of the salt setting. This adjustment may be necessary when unusual operating conditions exist, such as high concentrations of iron, manganese or hardness and/or high flow rates or daily water consumption.

Step 15. **Refer to SECTION 3, as how to set control valve for the correct time of day.** When shifting to daylight saving time and (back), you may wish to adjust TIME OF DAY accordingly.

**NOTE:** TIME OF REGENERATION is preset for 2:00 a.m. because at this time water consumption is generally minimal (a built-in hard water bypass does, however, permit water to be drawn during regeneration). Should your life style require **regular** use of water during the 2:00 to 3:00 a.m. regeneration period, or if other water treatment equipment is also set for 2:00 a.m. regeneration, the TIME OF REGENERATION will need changing. Refer to Section 3, **HOW TO SET TIME OF REGENERATION**.

Step 16. Before loading salt, using a pail or garden hose, add enough water to the brine tank to cover the salt grid (lower shelf on 15" x 15" x 34" brine tank) at least one (1) inch in depth. Then add initial salt fill to brine tank, and one (1) cup (eight ounces) of unscented laundry bleach to the brine well.

Step 17. Put your new water softener through a complete regeneration to sanitize the system prior to use. (Refer to “HOW TO MANUALLY INITIATE THE CONTROL VALVE” for instructions on manual regeneration. RESTORE THE FUEL SUPPLY OR POWER TO THE WATER HEATER”.

Installation is now complete, and your water softener is now ready for service. You can expect many years of virtually trouble free softened water. If need arises please contact the installing contractor for immediate attention to your particular issue.

**SPECIAL SERVICE INSTRUCTIONS:**

Under normal circumstances removal of valve should not be required. However, if it must be removed, it can be done by disassembling the quick release clamp, and latch. Pressure should be relieved before attempting any disassembly. Upon reassembly, all o-rings should belubricated with silicone grease. Reassemble clamp asshown in Figure 5. **MAKE SURE ARROWS ON LATCHSIDE OF CLAMP ARE ALIGNED.**

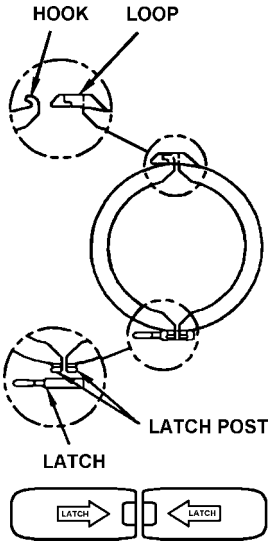
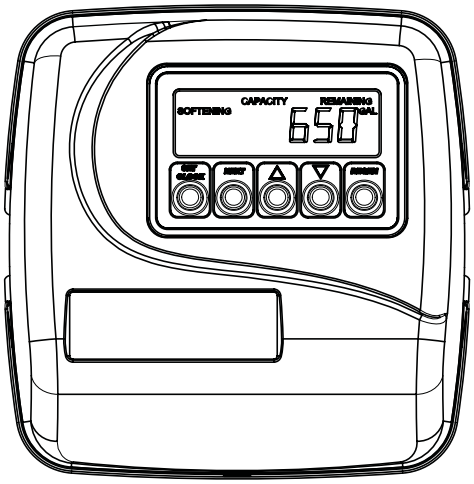
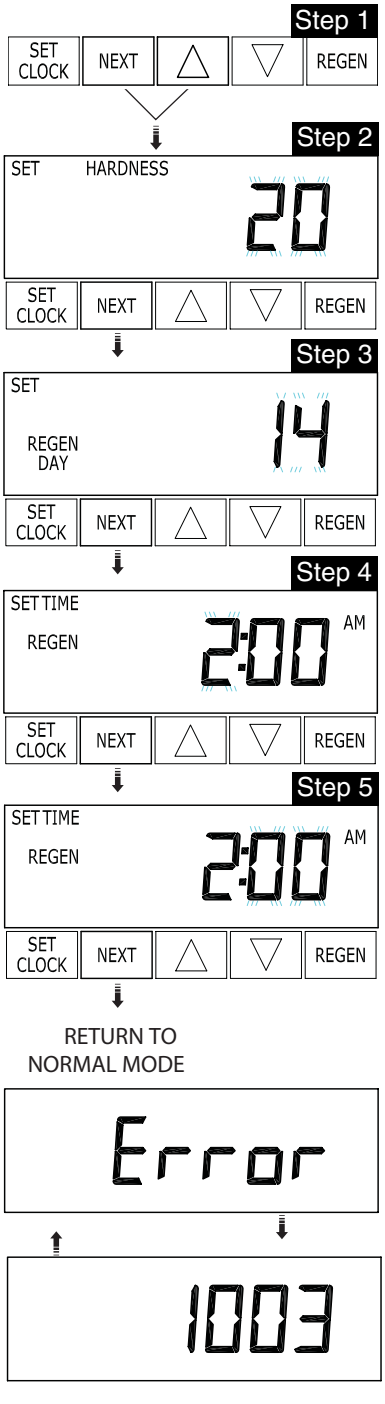



**Figure 5. CLAMP ASSEMBLY**

# SECTION 3: CONTROL VALVE PROGRAMMING AND REGENERATION




## Installer Display Settings

**(Step 1)** Press NEXT and ▲ simultaneously for 3 seconds.

**(Step 2)** Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the ▼or ▲ buttons. The default is 20 with value ranging from 1 to 150 in 1 grain increments. Note: The grains per gallon can be increased if soluble iron needs to be reduced. Press NEXT to go to step 3. Press REGEN to exit Installer Display Settings.

**(Step 3)** Day Override: Day Override sets the number of days between regenerations. and sets the maximum number of days between regenerations. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient number of gallons were not used to call for a regeneration. Set Day Override using ▼ or ▲ buttons:

- number of days between regeneration (1 to 28); or “OFF”.

Press NEXT to go to step 4. Press REGEN to return to previous step.

**(Step 4)** Next Regeneration Time (hour): Set the hour of day for regeneration using ▼ or ▲ buttons. AM/PM toggles after 12. The default time is 2:00 a.m. Press NEXT to go to step 5. Press REGEN to return to previous step.

**(Step 5)** Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▼or ▲ buttons. Press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

To initiate a manual regeneration immediately, press and hold the “REGEN” button for three seconds. The system will begin to regenerate immediately. The control valve may be stepped through the various regeneration cycles by pressing the “REGEN” button.

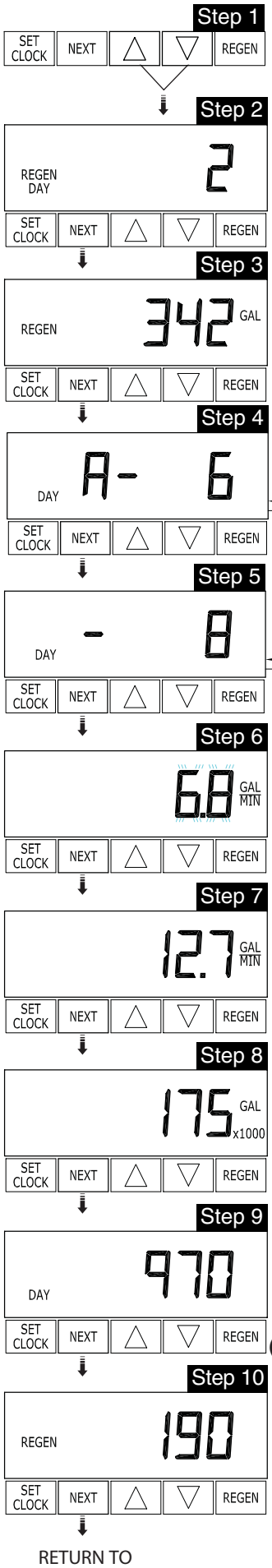
### Power Lost

If power goes out for less than two hours, the system will automatically reset itself. If an extended power outage occurs, the time of day will flash on and off which indicated the time of day should be reset. The system will remember the rest.

### Error Message

If the word "error" and a number are alternately flashing on the display contact the "Technical Support Services Department at CUNO Water Water Treatment phone number 1-866-693-2543 for help. This indicates that the valve was not able to function properly.

## Diagnostics




**(Step 1)** Press ▼ or ▲ simultaneously for three seconds. If screen in step does not appear in 5 seconds the lock on the valve is activated. To unlock press , ▼ NEXT, ▲ , and SET CLOCK in sequence, then press NEXT and ▼ simultaneously for 3 seconds.

**(Step 2)** Days, since last regeneration: This display shows the days since the last regeneration occurred. Press the NEXT button. Press REGEN to exit Diagnostics.

**(Step 3)** Gallons, since last regeneration: This display shows the number of gallons that have been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press the NEXT button. Press REGEN to return to previous step.

**(Step 4)** Gallons, reserve capacity used for last 7 days : This display shows 0 day (for today) and flashes the reserve capacity. Pressing the ▲ button show day 1 (which would be yesterday) and flashes the reserve capacity used. Pressing the ▲ button again will show day 2 (the day before yesterday) and reserve capacity. Keep pressing the ▲ button to show the gallons for days 3, 4, 5 and 6. The ▼ button can be pressed to move backwards in the day series. Press the NEXT button at any time. Press REGEN to return to previous step.

**(Step 5)** Gallons, 63 day usage history: This display shows day 1 (for yesterday) and flashes the number of gallons treated yesterday. Pressing the ▲ button will show day 2 (which would be the day before yesterday) and flashes the number of gallons treated on that day. Continue to press the ▲ button to show the maximum number of gallons treated for the last 63 days. This display will show dashes if a water meter is not installed. Press the NEXT button at any time. Press REGEN to return to previous step.

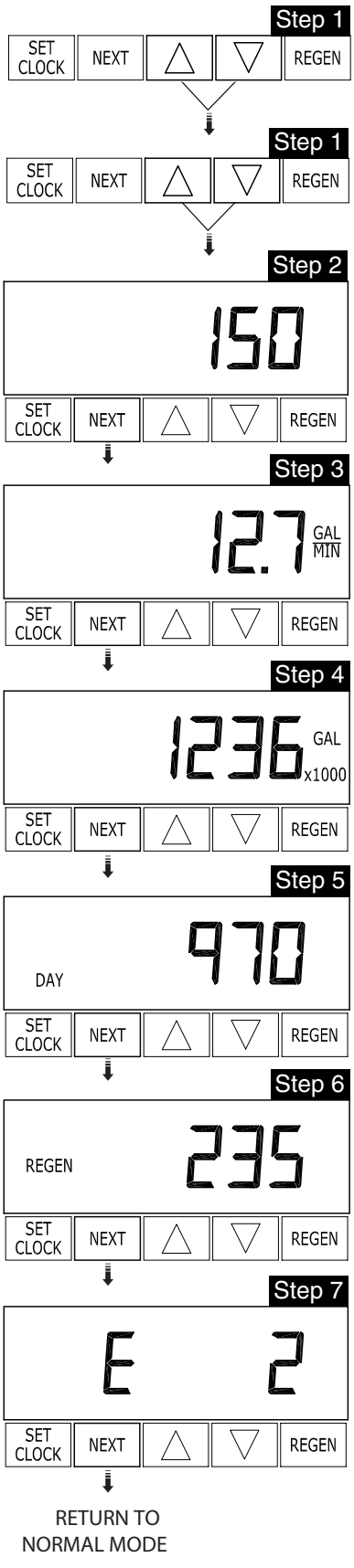
**(Step 6)** Flow rate, current: Turn the water on at one or more taps in the building. The flow rate in gallons per minute will be displayed. If flow stops the value will fall to zero in a few seconds. This display will equal zero if a water meter is not installed. Press the NEXT button. Press REGEN to return to previous step.

**(Step 7)** Flow rate, maximum last seven days: The maximum flow rate in gallons per minute that occurred in the last seven days will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button. Press REGEN to return to previous step.

**(Step 8)** Gallons, total used since last reset: The total number of gallons used since last reset will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button. Press REGEN to return to previous step.

**(Step 9)** Days, total number since last reset: The total number of days the control valve has been in service since last reset will be displayed. Press the NEXT button. Press REGEN to return to previous step.

**(Step 10)** Regenerations, total number since last reset: The total number of regenerations that have occurred since last reset will be displayed. Press the NEXT button to exit Diagnostics. Press REGEN to return to previous step. To lock sttings press ▼, NEXT, ▲, and SET CLOCK in sequence.




## Valve History

**(Step 1)** Press ▲ and ▼ simultaneously for three seconds and release. Then press ▲ and ▼ simultaneously and release. If screen, to the left, does not appear is 5 seconds the lock on the valve is activated. To unlock press ,▼ NEXT, ▲ and SET CLOCK in sequence, then press ▲ and ▼. Then press ▲ and ▼ simultaneously and release.

**(Step 2)** Software Version: This display shows the software version of the valve. Press the NEXT button to go to the next step or press REGEN to exit Valve History.

**(Step 3)** Flow rate, maximum since startup: This display shows the maximum flow rate in gallons per minute that has occurred since startup. This display will equal zero if a water meter is not functioning. Press the NEXT button to go to the next step. Press REGEN to return to previous step.

**(Step 4)** Gallons, total used since start-up: This display shows the total gallons. This display shows the total days since startup. Press the NEXT button to go to the next step. Press REGEN to return to previous step.

**(Step 5)** Days, total since start-up: This display shows the total days since startup. Press the NEXT button to go to the next step. Press REGEN to return to previous step.

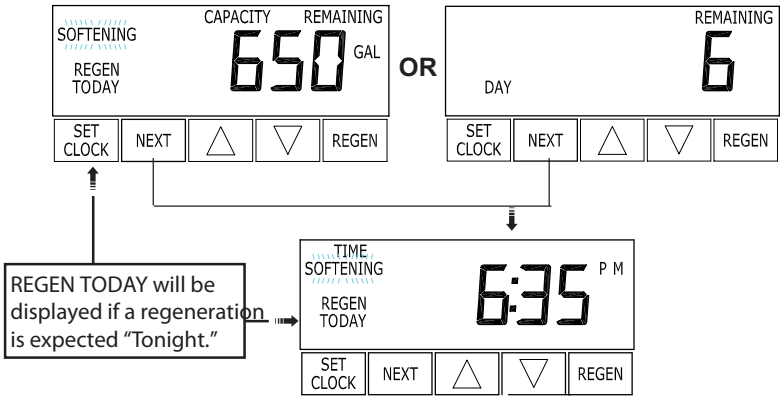
**(Step 6)** Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to the next step. Press REGEN to return to previous step.

**(Step 7)** Error, number of occurrences since start-up: This display shows E and the total number of errors that have occurred since startup. Press the NEXT button to exit Valve History. Press REGEN to return to previous step. To lock settings press ▲ ,NEXT, ▼, and SET CLOCK in sequence.

# User Display Settings

## General Operation

When the system is operating, one of two displays will be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day. The second display is one of the following: days remaining or gallons remaining. Days remaining is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the number of gallons that will be treated before the system goes through a regeneration cycle. The user can scroll between the displays as desired.

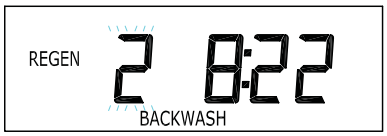



If the system has called for a regeneration that will occur at the prest time of regeneration, the words "REGEN TODAY" will appear on the display.

When water is being treated (i.e. water is flowing through the system) the word "SOFTENING" flashes on the display if a water meter is installed.

## Regeneration Mode

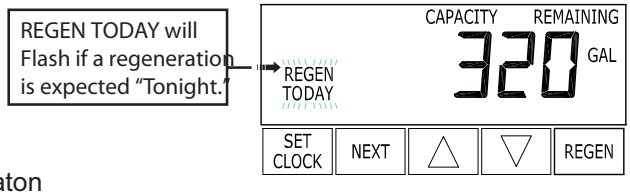
Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when members of a household are asleep. If there is a demand for water when the system is regenerating, untreated water will be used.




When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to help provide treated water when the regeneration has been completed.

## Manual Regeneration

Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.




To initiate a manual regeneration at the present delayed regeneraton time, press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time.

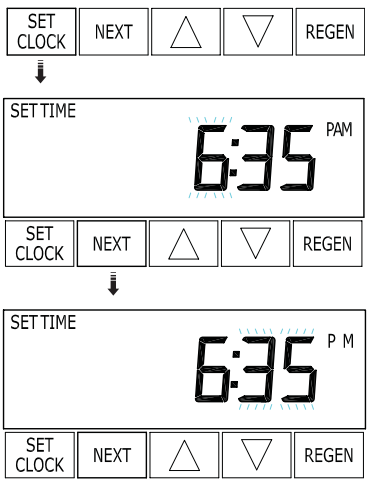
NOTE: If you pressed the "REGEN" button in error, pressing the button again will cancel the request.

To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

**NOTE:** For softeners, if brine tank does not contain salt, fill with salt and wait at least two hours before regenerating.

## Set Time of Day

The user can also set the time of day. Time should only need to be set after extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset.




Step 1 - Press SET CLOCK.

Step 2 - Current Time (hour): Set the hour of the day using ▲ ▼ or button. AM/PM toggles after 12. Press NEXT to go to step 3.

Step 3 - Current Time (minutes): Set the minutes of the day using ▼ or ▲ buttons. Press NEXT to exit Set Clock. Press "REGEN" to return to previous step.

# SECTION 4: MAINTENANCE

**REPLENISHMENT OF SALT SUPPLY:**

The salt storage capacity of the brine tank is approximately 180 lbs (82 kg). During each regeneration a specific amount of salt is consumed, thus requiring its periodic replenishment (the frequency and salt dosage level is dependent on the regeneration schedule). Always replenish salt before the supply is exhausted for a continuous supply of softened water.

**TYPE OF SALT TO USE:**

Any type of water softener salt may be used. There are advantages and disadvantages to every type of salt. Please ask your local dealer for his advice. Your unit is designed to compensate for the disadvantages. However the use of block salt is not encouraged due to its possible problems in making enough brine for regeneration purposes.

**BRINE TANK CLEAN-OUT:**

To prevent service problems the brine tank should be emptied and flushed out with a garden hose when dirt and other insolubles accumulate.

Steps to follow:

(1) Disconnect brine line at either end.

(2) Turn brine tank upside down and discard old salt.

(3) Rinse out with a garden hose.

(4) Reconnect brine line.

(5) Before loading salt, using a pail or garden hose add enough water to the brine tank to cover the salt grid lower shelf on 15" x 15" x 34" brine tank at least one (1) inch in depth. Then add initial salt to brine tank and add one (1) cup of unscented laundry bleach to the brine well.

(6) Perform approximately once a year if rock salt is used; with other types of salt, approximately once every other year.

**PREVENTING IRON-FOULING OF MINERAL BED:**

If iron is present in the water supply, the softener mineral bed will eventually become iron-fouled, resulting in reduced softening capacity and rust-stained fixtures. Mixing one to two ounces of IRON-X Mineral Cleaner with every 80 lbs. of salt added to brine tank will help minimize these problems from occurring. IRON-X is available from your dealer.

**PERIODICALLY CHECK TIME OF DAY SETTING:**

Power outages will cause "TIME OF DAY" setting to become incorrect. To correct, **refer to Section 4 on how to correct.**

**MALFUNCTION OF UNIT:**

Your water softener, under normal conditions, should provide years of virtually trouble-free service; however, since it is a mechanical device, it can malfunction. **(Refer to Section 5, SERVICE INSTRUCTIONS, if necessary).**

**CHANGE OF OPERATING CONDITIONS:**

Should your family size, your water usage habits, or your water quality change, the regeneration program settings may have to be adjusted. Consult your dealer if any of the above occur.

**SPECIAL SERVICE INSTRUCTIONS:**

Under normal circumstances, removal of valve should never be required. However, if it must be removed, it can be done by disassembling the quick release clamp, by removing latch. Pressure should be relieved before attempting any disassembly. Upon reassembly, all o-rings should be lubricated with silicone grease. Reassemble clamp as shown in Figure 6. MAKE SURE ARROWS ON LATCH SIDE OF CLAMP ARE ALIGNED.

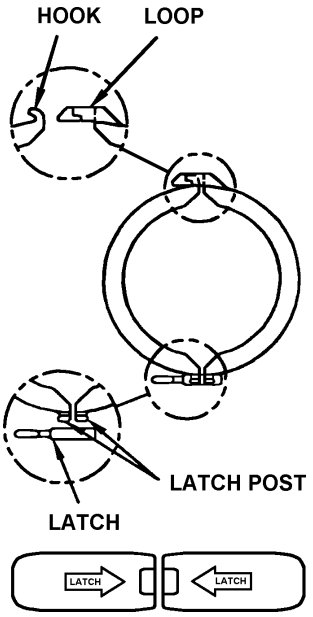



**Figure 6. CLAMP ASSEMBLY**

# SECTION 5: CONTROL VALVE TROUBLESHOOTING GUIDE

| Problem | Possible Cause | Solution |
|---|---|---|
| 1. Timer does not display time of day | a. AC Adapter unplugged | a. Connect power |
| | b. No electric power at outlet | b. Repair outlet or use working outlet |
| | c. Defective AC Adapter | c. Replace AC Adapter |
| | d. Defective PC board | d. Replace PC board |
| 2. Timer does not display correct time of day | a. Switched outlet. | a Use uninterrupted outlet |
| | b. Power outage | b. Reset time of day |
| | c. Defective PC board | c. Replace PC board |
| 3. No softening/ filtering display when water is flowing | a. Bypass valve in bypass position | a. Put bypass valve in service position |
| | b. Meter connection disconnected | b. Connect meter to PC board |
| | c. Restricted/stalled meter turbine | c. Remove meter and check for rotation or foreign material. |
| | d. Defective meter | d. Replace meter |
| | e. Defective PC board | e. Replace PC board |
| 4. Control valve regenerates at wrong time of day | a. Power outages | a. Reset control valve to correct time of day |
| | b. Time of day not set correctly | b. Reset to correct time of day |
| | c. Time of regeneration incorrect | c. Reset regeneration time |
| 5. ERROR followed by code number<br><br>Error Code 1001 -Unable to recognize start of regeneration<br>Error Code 1002 – Unexpected stall<br>Error Code 1003 – Motor ran too long, timed out trying to reach next cycle position<br>Error Code 1004 - Motor ran too long, timed out trying to reach home position<br><br>If other Error Codes display contact the factory. | a. Control valve has just been serviced or unplug power source jack (black wire) and plug back in to reset control valve | a. Press NEXT and REGEN for 3 seconds |
| | b. Foreign matter is lodged in control valve | b. Check piston and spacer stack assembly |
| | c. High drive forces on piston | c. Replace piston(s) and spacer stack assembly |
| | d. Control valve piston not in home position seconds | d. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve |
| | e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure | e. Check motor and wiring. Replace motor if necessary |
| | f. Drive gear label dirty or damaged, missing or broken gear | f. Replace or clean drive gear |
| | g. Drive bracket incorrectly aligned to back plate | g. Reseat drive bracket properly |
| | h. PC board is damaged or defective | h. Replace PC board |
| | i. PC board incorrectly aligned to drive bracket | i. Ensure PC board is correctly snapped on to drive bracket |

# SECTION 5: CONTROL VALVE TROUBLESHOOTING GUIDE

| Problem | Possible Cause | Solution |
|---|---|---|
| 6. Control valve stalled in regeneration | a. Motor not operating | a. Replace motor |
| | b. No electric power at outlet | b. Repair outlet or use working outlet |
| | c. Defective AC Adapter | c. Replace AC Adapter |
| | d. Defective PC board | d. Replace PC board |
| | e. Broken drive gear or drive cap assembly cap | e. Replace drive gear or drive cap assembly |
| | f. Broken piston retainer | f. Replace drive cap assembly |
| | g. Broken main or regenerant piston | g. Replace main or regenerant piston |
| 7. Control valve does not regenerate automatically when “REGEN” button is depressed and held | a. AC Adapter unplugged | a. Connect AC Adapter |
| | b. No electric power at outlet | b. Repair outlet or use working outlet |
| | c. Broken drive gear or drive cap assembly | c. Replace drive gear or drive cap assembly |
| | d. Defective PC board | d. Replace PC board |
| 8. Control valve does not re-generate automatically but does when “REGEN” button is depressed | a. By-pass valve in bypass position | a. Put bypass valve in normal operation position |
| | b. Meter connection disconnected | b. Connect meter to PC board |
| | c. Restricted/stalled meter turbine | c. Remove meter and check for rotation or foreign matter |
| | d. Defective meter | d. Replace meter |
| | e. Defective PC board | e. Replace PC board |
| | f. Set-up error | f. Check control valve set-up prodedure |
| 9. Time of day flashes on and off | a. Power has been out more than two hours, the AC Adapter was unplugged and then plugged back into the wall outlet, the AC Adapter plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons were pressed to reset the valve. | a. Reset the time of day |

# SECTION 5: CONTROL VALVE SERVICE INSTRUCTIONS

## Drive Assembly

Remove the valve cover to access the drive assembly.

**WARNING:** Disconnect the power source plug (black wire) from the PC board prior to disconnecting the motor or water meter plugs from the PC board. The power source plug connects to the four-pin jack. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The water meter plug (grey wire) connects to the three-pin jack on the far right-hand side of the PC board.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. To remove the drive bracket, start by removing the plugs for the power source and the water meter. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket forward.The lower edge of the drive bracket has two notches that rest on the back plate. Lift up and outward on the drive bracket to disengage the notches.

To reassemble, seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket toward the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket slightly to the left by pressing on the side of the upper right corner. This helps the drive gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drivebracket and drive back plate, or the gear is not engaging the drive cap assembly. To inspect the drive gears, the drive gear cover needs to be removed. Before trying to remove the gear cover, the drive bracket must be removed from the drive back plate. (Refer to the proceeding instructions regarding removing the drive bracket from the drive backplate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board.) The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. With the PC board facing up, push in and down on the large clip on the drive gear cover. Handle the cover and the gears carefully so that the gears do not fall off of the pegs in the cover.

Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting.

The drive gear cover only fits on one way, with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor,disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a ¼ turn in either direction so the wires are vertical (up & down) before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor.

Replace the motor if necessary. Do not lubricate the motor or the gears. To reinstall the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. Release the spring clip loop and continue to rotate the motor until the wires are horizontal and the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the lower left hand side of the PC board. If the motor will not easily engage with the drive gears when reinstalling, lift and slightly rotate the motor before reinserting. Reconnect the power.

Replace the valve cover. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the soft ware version (e.g. 181) and then reset the valve to the service position.

## Drive Cap Assembly, Main Piston and Regenerant Piston

The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston(s). The drive cap assembly is threaded into the control valve body and seals with an o-ring. To remove the drive cap assembly use the special plastic wrench or insert a ¼" to ½" flat blade screwdriver into one of the slots around the top 2" of the drive cap assembly so it engages the notches molded into the drive back plate around 2" of the piston cavity. See Figure 7. The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns to the left. Once loosened, unscrew the drive

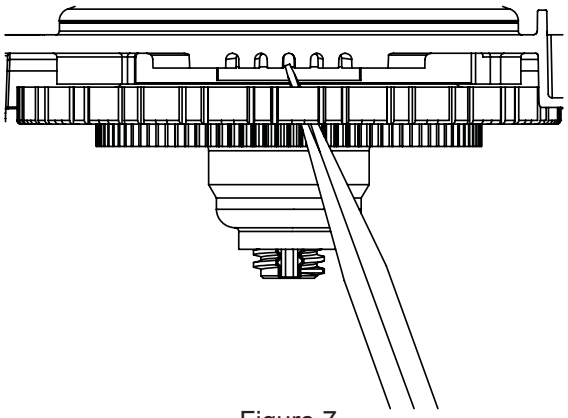


Figure 7

cap assembly by hand and pull straight out. The drive cap assembly contains the drive cap, the main drive gear, drive cap spline, piston rod and various other parts that should not be dissembled in the field. The only replaceable part on the drive cap assembly is the o-ring. Attached to the drive cap assembly is the main piston and a regenerant piston.

The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by pressing sideways and unsnapping it from its latch. Chemically clean in dilute sodium or vinegar, or replace the regenerant piston if needed. To remove the main piston fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean in dilute sodium bisulfite or vinegar, or replace the main piston.

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Do not lubricate the piston rod, main piston or regenerant piston. Lubricant will adversely affect the clear lip seals. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly using a screwdriver as a ratchet until the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely.

The exact position of the piston is not important as long as the main drive gear turns freely.Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 181) and then reset the valve to the service position.

## Spacer Stack Assembly

To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can be removed easily without tools by using thumb and forefinger. Inspect the black o-rings and clear lip seals for wear or damage. Replace the entire stack if necessary. Do not disassemble.

The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

The spacer stack assembly can be pushed in to the control valve body bore by hand. Since the spacer stack assembly can be compressed it is easier to use a blunt object (5/8" to 1-1/8" in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8"). Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy
insertion of the entire stack. Do not use silicone or any other type of lubricant on the clear lip seals or the piston.

Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 181) and then reset the valve to the service position.

## Injector Cap, Screen, Injector Plug and Injector

Unscrew the injector cap and lift off. Loosen cap with special plastic wrench or pliers if necessary. Attached to the injector cap is a screen. Remove the screen and clean if fouled.The plug and/or injector can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite. The holes can be blown out with air. Both pieces have small diameter holes that control the flow rates of water to insure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector. Push the plug(s) and/or injectors firmly in place, replace the screen and hand tighten the injector cap.

**Refill Flow Control Assembly or Refill Port Plug**

To clean or replace the refill flow control, pull out the elbow-locking clip and then pull straight up on the elbow. Replace the elbow locking clip in the slot so that it is not misplaced. Twist to remove the white flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small flat blade screwdriver.

Chemically clean the flow control or the white flow control retainer using dilute sodium bisulfite or vinegar. **Do not** use a wire brush. If necessary, replace the flow control, o-ring on the flow control retainer, or the o-ring on the elbow.

Reseat the flow control so the rounded end is visible in the flow control. Reseat the white flow control retainer by pushing the retainer into the elbow until the o-ring seats. Remove locking clip, push down on elbow to reseat and insert locking clip. **Do no**t use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring on the elbow or the white retainer.

**Water Meter or Meter Plug**

The water meter assembly is connected to the PC board by a wire. If the entire water meter assembly is to be replaced, remove the control valve cover and disconnect the power source and water meter plugs from the PC board. Unlatch the drive assembly and lean it forward. Unthread the water meter wire from the side of the drive assembly and through the drive back plate. To reinstall, rethread the water meter wire through the drive back plate and the side of the drive assembly. Reattach the drive assembly and the water meter and power plugs. If no water meter wire is visible, then a plug is installed, not a water meter.The water meter wire does not need to be removed from the PC board if the water meter is only being inspected and cleaned. To remove the water meter assembly, unscrew the meter cap on the left side of the control valve. Pliers may be used to unscrew the nut if necessary. With the nut removed, a slot at the top of the water meter is visible. Twist a flat blade screwdriver in the slot between the control valve body and the meter. When the meter is part way out it is easy to remove the water meter from the housing. Once the water meter is removed from the control valve body, gently pull forward on the turbine to remove it from the shaft.

Do not use a wire brush to clean the turbine. Wipe with a clean cloth or chemically clean in dilute sodium bisulfite or vinegar. The turbine can be immersed in the chemical. Do not immerse electronics. If the turbine is scored or damaged or the bearing on the turbine are worn, replace the turbine.

Do not lubricate the turbine shaft. The turbine shaft bearings are prelubricated. Do not use Vaseline, oils, or other unacceptable lubricants on the o-ring. A silicone lubricant may be used on the black o-ring.

Snap the turbine on the shaft and reinsert the water meter into the side slot. Hand tighten the nut. Do not use a pipe wrench to tighten nut.

**Bypass Valve**

The working parts of the bypass valve are the rotor assemblies that are contained under the bypass valve caps. Before working on the rotors, make sure the system is depressurized. Turn the red arrow shaped handles towards the center of the bypass valve and back several times to ensure rotor is turning freely.

The nuts and caps are designed to be unscrewed or tightened by hand. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer. To access the rotor, unscrew the cap and lift the cap, rotor and handle out as one unit. Twisting the unit as you pull it out will help to remove it more easily. There are three o-rings: one under the rotor cap, one on the rotor stem and the rotor seal. Replace worn o-rings. Clean rotor. Reinstall rotor.

When reinstalling the red arrow handles be sure that:

1. The handle pointers are lined up with the control valve body arrows, and the rotor seal o-ring and retainer on both rotors face to the right when being viewed from the front of the control valve; or

2. Arrows point toward each other in the bypass position.

Since the handles can be pulled off, they could be accidentally reinstalled 180° from their correct orientation. To install the red arrow handles correctly, keep the handles pointed in the same direction as the arrows engraved on the control valve body while tightening the bypass valve caps. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 181) and then reset the valve to the service position.

# SECTION 5: SYSTEM TROUBLESHOOTING GUIDE

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| 1. Hard water, (unit not using salt; liquid level in brine tank not too high) | A. Electrical service to unit interrupted.<br>B. Time improperly set.<br>C. Safety brine valve not opening.<br>D. Salt "bridged" in brine tank. | A. Assure permanent electrical service (check fuse, plug, pull chain or switch.)<br>B. Check programming function.<br>C. Replace safety brine valve.<br>D. Breakup salt. |
| 2. Hard water, (unit using salt; liquid level in brine tank not too high). | A. Bypass open.<br>B. Valve programming incorrect.<br>C. No salt in brine tank.<br>D. Excessive water usage.<br>E. Unit installed backwards.<br>F. Unit undersized. | A. Close bypass (replace if necessary).<br>B. Check valve programming.<br>C. Add salt; maintain above water level.<br>D. Check programming function.<br>E. Reinstall unit.<br>F. Replace with larger unit. |
| 3. Liquid level in brine tank TOO high. | A. Regenerant piston failure.<br>B. Salt setting too high.<br>C. Injector screen plugged.<br>D. Drain line frozen, plugged or restricted.<br>E. Salt "mushed" or sand from salt plugging bottom of brine tank.<br>F. Incorrect brine line flow control (BLFC). | A. Inspect regenerant piston.<br>B. Reset timer.<br>C. Clean injector and screen.<br>D. Free drain.<br>E. Clean out brine tank (see instructions).<br>F. Replace with correct flow control (See specifications). |
| 5. Water continuously flows to drain. | A. Foreign material in control valve.<br>B. Internal control leak.<br>C. Control valve jammed in brine or backwash position. | A. Remove piston assembly and inspect bore; remove foreign material and check control in various regeneration positions.<br>B. Replace seals and/or piston assembly.<br>C. Replace piston, seals and spacers. |
| 6. Water tastes salty. | A. Salt setting too high.<br>B. Cyclone (distributor) tube too short. | A. Check salt setting.<br>B. Replace. |
| 7. White spots on glassware and dark surfaces. | A. Sodium residual resulting from water having very high hardness or total dissolved solids (TDS). | A. Installation of additional water treatment equipment such as reverse osmosis or demineralization. |
| 8. Low water pressure (low flow rate). | A. Iron build-up in line to water conditioner.<br>B. Iron build-up in water conditioner.<br>C. Well pumping sand.<br>D. Pump losing capacity. | A. Clean line to water conditioner.<br>B. Clean control and add Iron-X Mineral Cleaner to resin bed; increase frequency of regeneration.<br>C. Install sand trap.<br>D. Contact pump repair service. |
| 9. "Rotten egg" smell (from hot water ONLY). | A. Magnesium rod in water heater. | A. Replace with aluminum rod or remove. |
| 10. "Rotten egg" smell (from both hot and cold water). | A. Hydrogen sulfide ("sulfur") in water supply.<br>B. Bacterial iron in water supply.<br>C. Algae in water supply. | A. Install Sul-X Sulfur Reduction System.<br>B. Install Chem-Free Iron Reduction System.<br>C. Pour approximately 1/2 cup laundry bleach into brine well just before regeneration as frequently as necessary. |
| 11. Loss of resin through drain line. | A. Air in water system. | A. Assure that well system has proper air eliminator control; check for dry well condition. |

# SECTION 6: SPECIFICATIONS AND OPERATING DATA

| ITEM | CWS075ME MCWS075ME | CWS100ME MCWS100ME | CWS150ME MCMW150ME | CWS200ME MCWS200ME | CWS300ME MCWS300ME |
|---|---|---|---|---|---|
| Nominal Media Volume, $Ft^3$ | 0.75 | 1.0 | 1.5 | 2.0 | 3.0 |
| Salt Dosage, Lbs. | | | | | |
| Salt Efficient Setting | 4.5 | 6 | 9 | 12 | 18 |
| Factory Setting | 6 | 6 | 9 | 12 | 18 |
| Maximum Setting | 12 | 15 | 24 | 24 | 45* |
| Softening Capacity, grains | | | | | |
| At Salt Efficient Setting | 16,000 | 21,600 | 32,000 | 45,000 | 67,600 |
| At Factory Salt Setting | 17,400 | 21,600 | 32,000 | 45,000 | 67,600 |
| At Maximum Salt Setting | 21,500 | 28,500 | 43,000 | 56,800 | 87,800 |
| Salt Efficiency, grains per lb. of salt | | | | | |
| At Salt Efficient Setting | 3,555 | 3,598 | 3,553 | 3,753 | 3,753 |
| Flow Rates | | | | | |
| Continuous (no duration limit) | 3.0 | 4.0 | 6.0 | 7.0 | 9.0 |
| At 15 psi Pressure Loss | 9.3 | 11.0 | 14.3 | 13.5 | 18.5 |
| Pressure Loss, psi | | | | | |
| At Continuous Flow | 4 | 4 | 5 | 5 | 4 |
| Regeneration Flow Rates, gpm | | | | | |
| Backwash | 1.3 | 1.7 | 2.7 | 2.7 | 5.3 |
| Brine Draw @ 50 psi | 0.13 | 0.18 | 0.26 | 0.26 | 0.45 |
| Slow Rinse @ 50 psi | 0.195 | 0.27 | 0.34 | 0.36 | 0.71 |
| Rapid Rinse | 1.3 | 1.7 | 2.7 | 2.7 | 5.3 |
| Brine Refill | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Approximate Water Used | 30 | 44 | 77 | 78 | 148 |
| Regeneration Duration, minutes (at Factory Setting) | | | | | |
| 1st Backwash | 8 | 6 | 6 | 6 | 6 |
| Brine Draw/Rinse | 60 | 45 | 45 | 45 | 45 |
| 2nd Backwash | 8 | 3 | 3 | 3 | 3 |
| Rapid Rinse | 4 | 3 | 3 | 3 | 3 |
| Brine Refill | 3' 51" | 3' 51" | 5' 51" | 7'52" | 11'53" |
| Approximate Total Time | 84 | 61 | 63 | 65 | 69 |
| Inlet/Outlet Size | 1" NPT | 1" NPT | 1" NPT | 1" NPT | 1" NPT |
| Mineral Tank Dia. x Ht., in. | 7x44 | 8x44 | 10x44 | 10x54 | 14x65 |
| Overall D & H w/Valve, in. | | | | | |
| Width (Including Brine Tank) | 32 | 33 | 35 | 35 | 42 |
| Depth | 15 | 15 | 15 | 15 | 18 |
| Height (Including Valve) | 53 | 53 | 53 | 63 | 74 |
| Brine Tank, W x D x H, in. | 15x15x34 | 15x15x34 | 15x15x34 | 15x15x34 | 18x33 |
| Salt settings below 6# require removal of the salt grid | | | | | |
| Salt settings above 24# require optional 18x33 brine tank | | | | | |
| *Salt settings above 35# require optional 24x50 brine tank | | | | | |
| Brine Tank Capacity | | | | | |
| Without Salt Grid Leg Extensions | 180 | 180 | 180 | 180 | 300 |
| With Salt Grid Leg Extensions (required on salt settings above 18#) | N/A | N/A | 135 | 135 | N/A |
| Approximate Shipping Wt. | 83 | 97 | 125 | 154 | 244 |

These softeners conform to NSF/ANSI Standard 44 for specific performance claims. When set at the Salt Efficient setting, these softeners meet or exceed Std. 44 requirement for salt efficiency. Efficiency claim is only valid at the Salt Efficient setting.

**NOTES:**

(1) For satisfactory performance indicated flow rates and duration should not be exceeded. Flow rates specified are adequate for normal residential applications. Do not use Service Flow Rate when sizing commercial applications or if treated water is to supply a geothermal heatpump, swimming pool, etc. (contact dealer before selecting equipment). Service flow rates have been tested against NSF Standard 44.

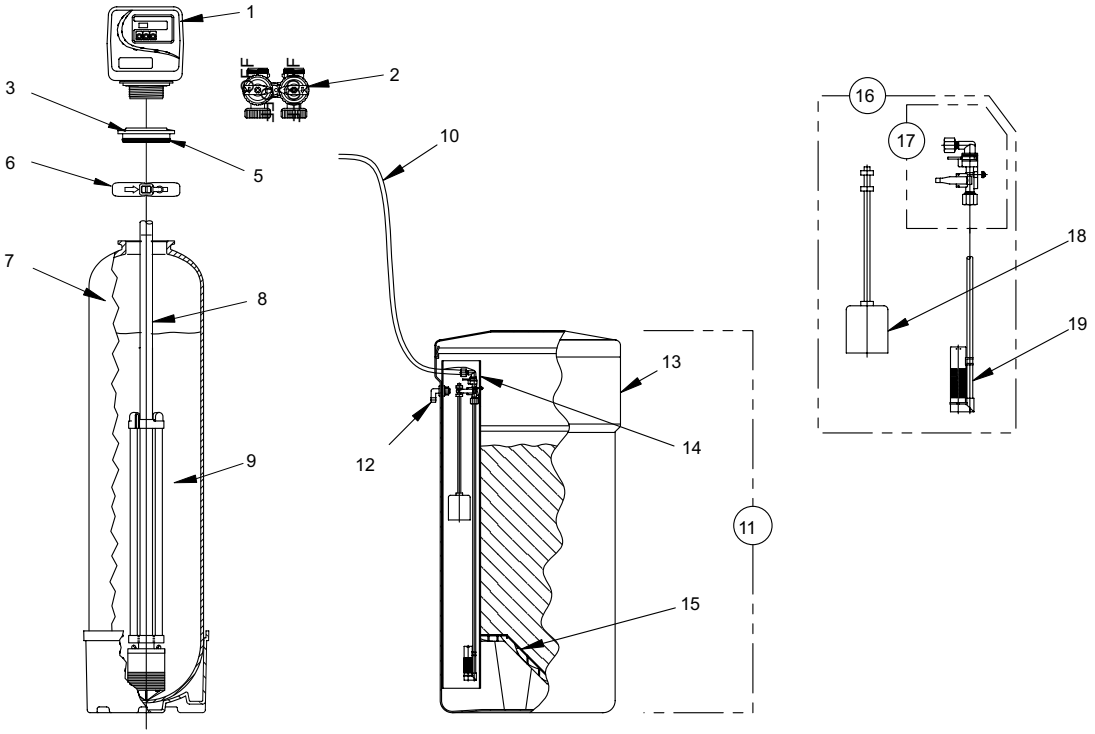
# SECTION 7: PARTS

## COMPONENT PARTS LIST

| REF NO. | DESCRIPTION | CWS075ME MCWS0751M | CWS100ME MCWS1001M | CWS150ME MCWS1501M | CWS200ME MCWS2001M | CWS300ME MCWS3000M |
|---|---|---|---|---|---|---|
| 1 | Control Valve ,with cover, less bypass, Metered Initiated (Aqua Pure®)<br><br>Control Valve ,with cover, less bypass, Metered Initiated (MacCLEAN®) | W12M130-5N3-0N<br><br>W12M130-5N3-0E | W12M170-5V3-0N<br><br>W12M170-5V3-0E | W12M270-5W3-0N<br><br>W12M270-5W3-0E | W12M270-5W3-0N<br><br>W12M270-5W3-0E | W12M530-5G3-0N<br><br>W12M530-5G3-0E |
| 2 | Bypass | V3006 | V3006 | V3006 | V3006 | V3006 |
| 3 | Threaded Tank Adapter | FA45TX | FA45TX | FA45TX | FA45TX | |
| 4 | Tank Adapter Coupling (4" x 8 x 2.5" x 8) | - | - | - | - | 2752-2 |
| 5 | O-ring Included with Item #3 | ORG-234 | ORG-234 | ORG-234 | ORG-234 | - |
| 6 | Clamp Assy | FC45XX | FC45XX | FC45XX | FC45XX | - |
| 7 | Media Tank w. Base (Incl. Ref 9) | MTP0744FB | MTP0844FB | MTP1044FB | MTP1054FB | MTP1465B |
| 8 | Cyclone Assy. | C04N-44 | C04N-44 | C04N-44 | C04N-54 | C04N-65 |
| 9 | Media | H-075P | H-10P | H-10P & H-075P | H-10P (X2) | H-10P (X3) |
| 10 | Brine Line Tubing | 13000X | 13000X | 13000X | | 13000X |
| 11 | Brine Tank Complete<br><br>Brine Tank Complete w/ Extension Kit | BT1534X<br><br>- | BT1534X<br><br>- | BT1534X<br><br>- | -<br><br>-EXT | BTCS33BK<br><br>- |
| 12 | Overflow Fitting | BT16 | BT16 | BT16 | | BT16 |
| 13 | Brine tank Shell w / cover | BT1534L | BT1534L | BT1534L | BT1534L | BT1833BK |
| 14 | Brine Well w / Cap | BT15BW | BT15BW | BT15BW | BT15BW | H1030-28 |
| 15 | Grid Plate<br><br>Grid Plate wit Extension Kit | BT15GP<br><br>- | BT15GP<br><br>- | BT15GP<br><br>- | -<br><br>BT15GP-EXT | BTCS12-18<br><br>- |
| 16 | Safety Brine Valve, Complete | BT15SBVA | BT15SBVA | BT15SBVA | BT15SBVA | 10002X-24.0 |
| 17 | Safety Brine Valve | 60014 | 60014 | 60014 | 60014 | 60014 |
| 18 | Float Assembly | 60068X | 60068X | 60068X | 60068X | 60068X |
| 19 | Air Check Assembly | 60002-27.5 | 60002-27.5 | 60002-27.5 | 60002-27.5 | 60002-24 |

Note: When ordering replacement or repair components always specify by the unit or model number to ensure correct parts delivered.

| Items Not Shown | |
|---|---|
| **Description of Item** | **Part Number** |
| **Wrench** | **V3193-01** |
| **Universal Elbow** | **V3191-01** |
| **Retaining Clip** | **H4615** |
| **Drain Line Insert** | **PKP10TS8-BULK** |
| **Drain Line Elbow Nut** | **V3192** |
| **Drain Line Elbow** | **3158-01** |
| **Plumbing Adapter Kits** | |
| **1" Brass Sweat** | **V3007-02** |
| **1" Plastic Male NPT** | **V3007-04** |
| **1.25" Plastic Male NPT** | **V3007-05** |
| **1" Plastic Male BSP** | **V3007-06** |



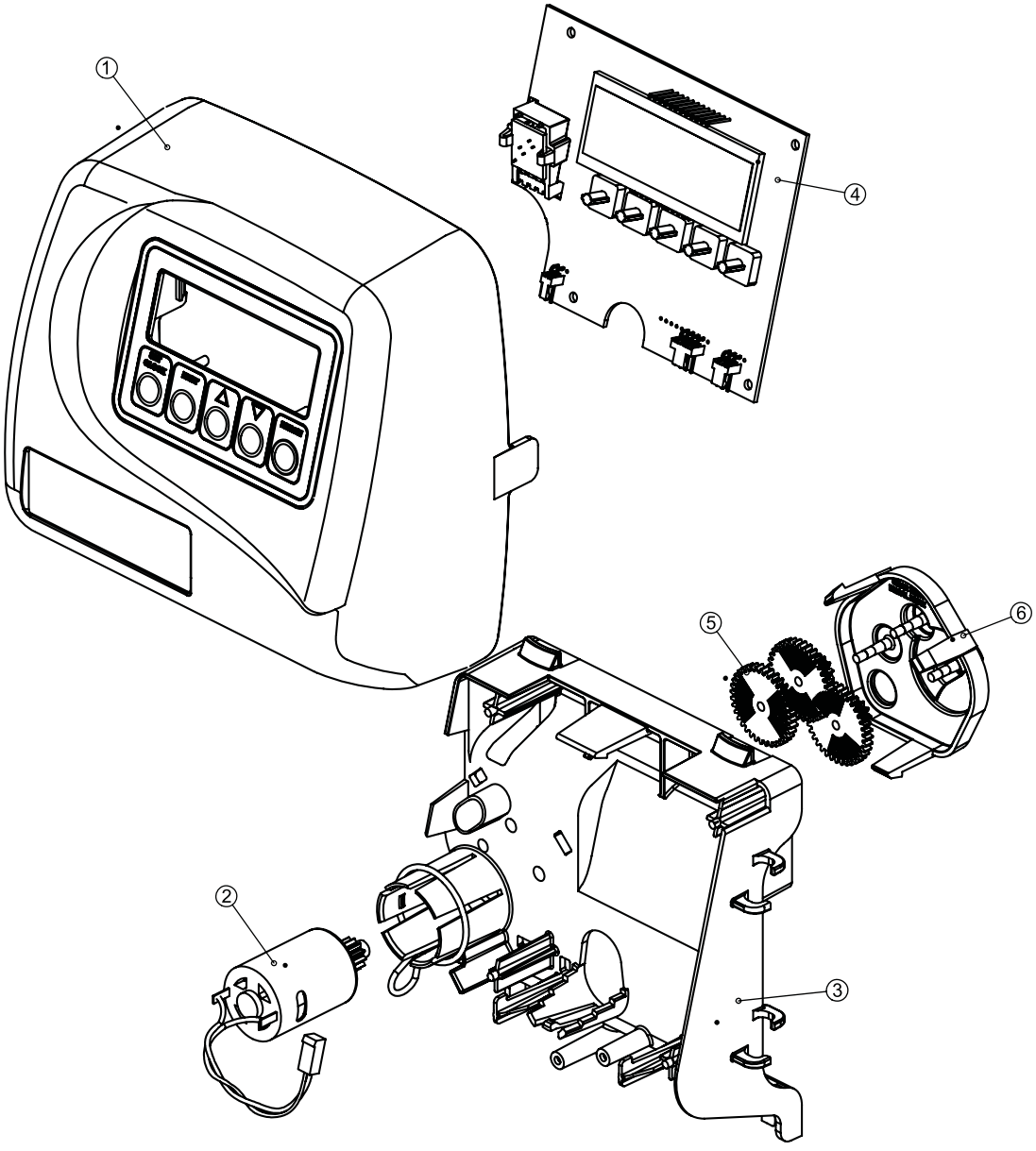
# SECTION 7: PARTS

## COMPONENT PARTS LIST

Front Cover and Drive Assembly

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3175-01 | Front Cover Assembly | 1 |
| 2 | V3107-01 | Motor | 1 |
| 3 | V3106-01 | Drive Bracket&Spring Clip | 1 |
| 4 | V3108 | PC Board | 1 |
| 5 | V3110 | Drive Gear 12x36 | 3 |
| 6 | V3109 | Drive Gear Cover | 1 |
| * | V3002 | Drive ASY | * |
| Not Shown | V3186 | AC Adapter 110V-12 | 1 |

* Drawing number parts 2 through 6 may be purchased as a complete assembly, part V3002.

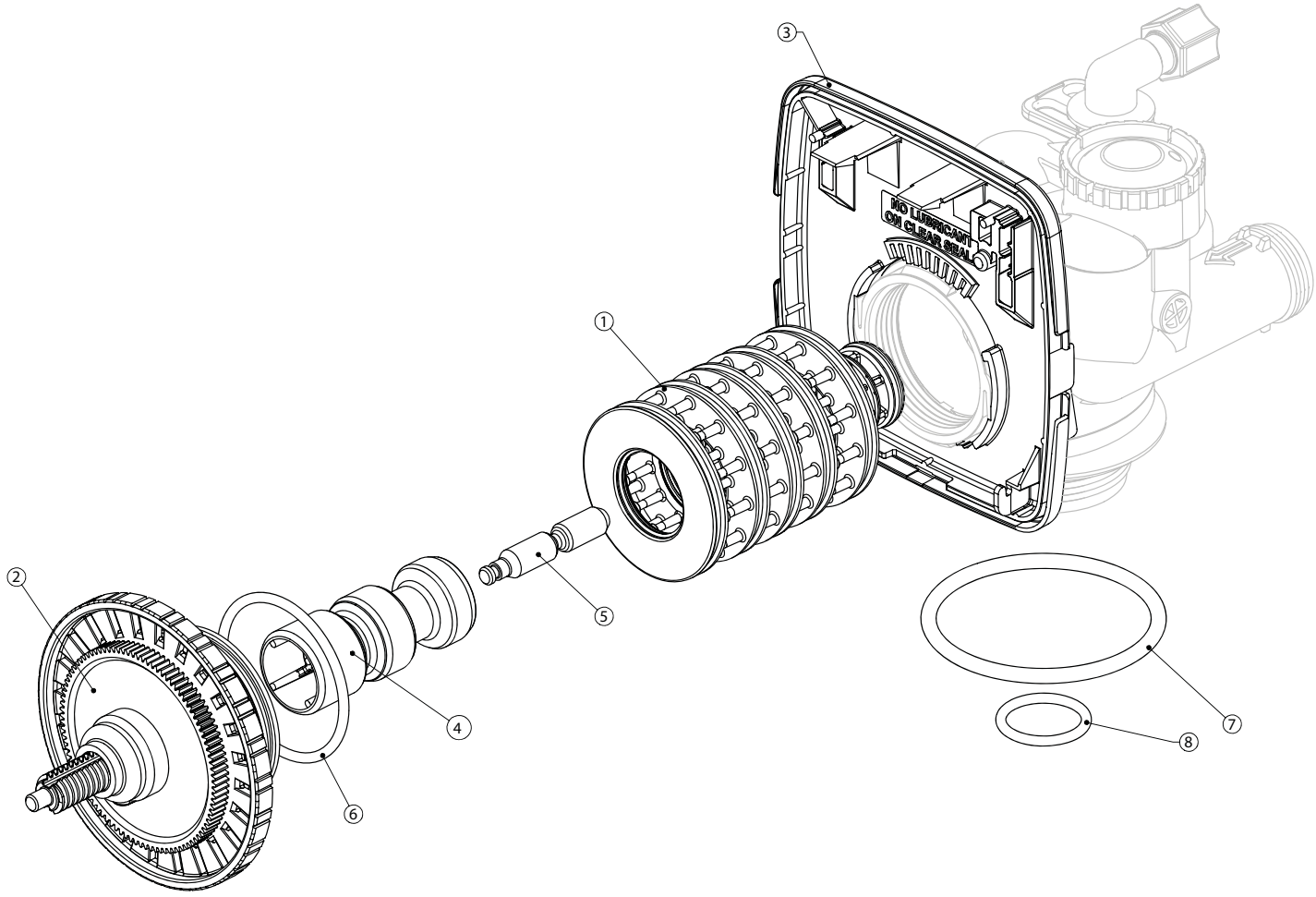


# SECTION 7: PARTS

## COMPONENT PARTS LIST

**Drive Cap Assembly, Downflow Piston,
Regenerant Piston and Spacer Stack Assembly**

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3005 | Spacer Stack Assembly | 1 |
| 2 | V3004 | Drive Cap Assembly | 1 |
| 3 | V3178 | Drive Back Plate | 1 |
| 4 | V3011 | Piston Down flow Assembly | 1 |
| 5 | V3174 | Regenerant Piston | 1 |
| 6 | V3135 | O-ring 228 | 1 |
| 7 | V3180 | O-ring 337 | 1 |
| 8 | V3105 | O-ring 215 (Distributor Tube) | 1 |
| Not Shown | V3001 | Body Assembly | 1 |



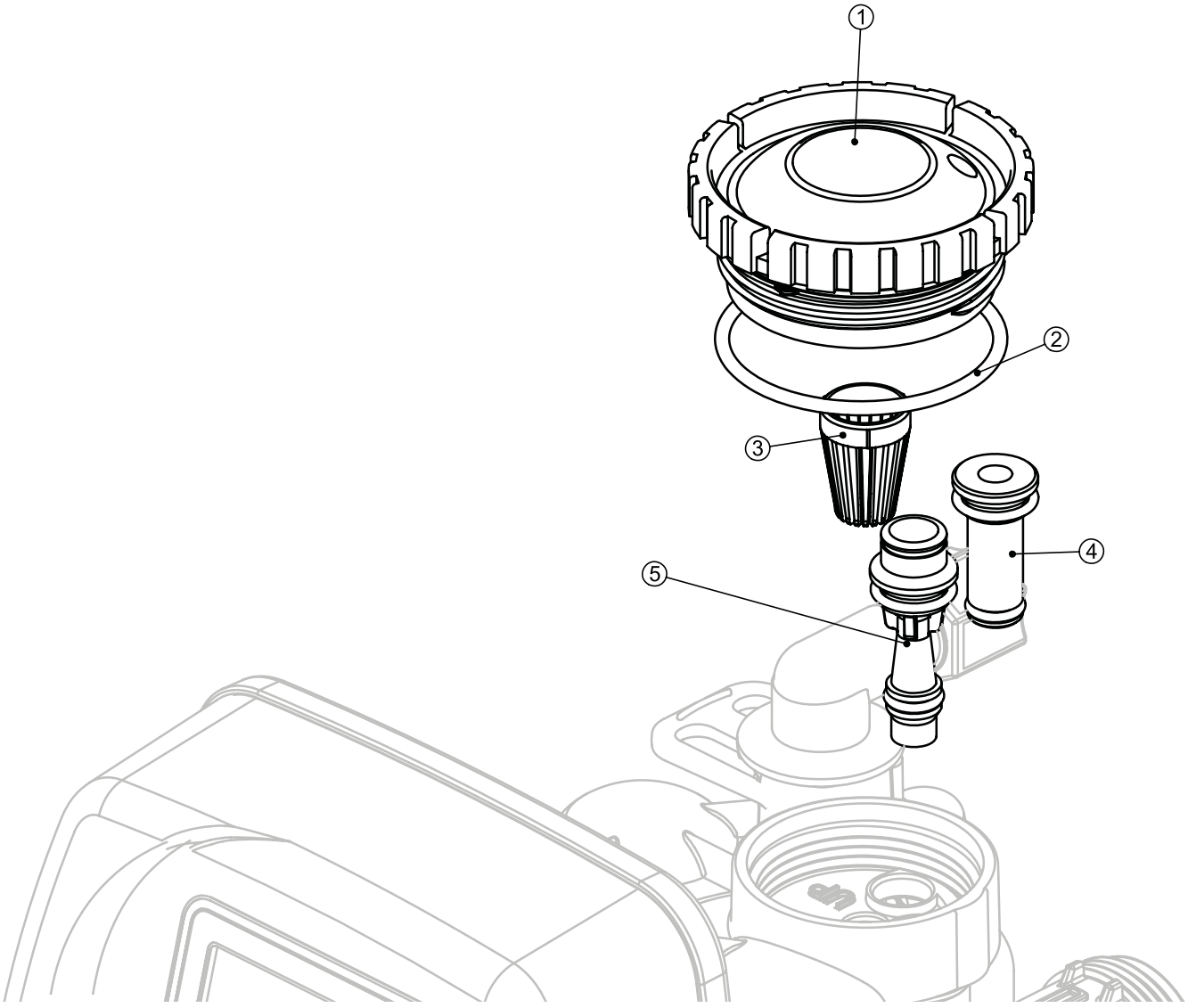
# SECTION 7: PARTS

## COMPONENT PARTS LIST

Injector Cap, Injector Screen, Injector, Plug and O-Ring

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3176 | Injector Cap | 1 |
| 2 | V3152 | O-ring 135 | 1 |
| 3 | V3177 | Injector Screen | 1 |
| 4 | V3010-1Z | Injector ASY Z Plug | 1 |
| 5 | V3010-1B | INJECTOR ASY B BROWN | |
| | V3010-1C | INJECTOR ASY C VIOLET | |
| | V3010-1E | INJECTOR ASY E WHITE | |
| | V3010-1H | INJECTOR ASY H GREEN | |
| Not Shown | V3170 | O-ring 011 | * |
| Not Shown | V3171 | O-ring 013 | * |

*The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.



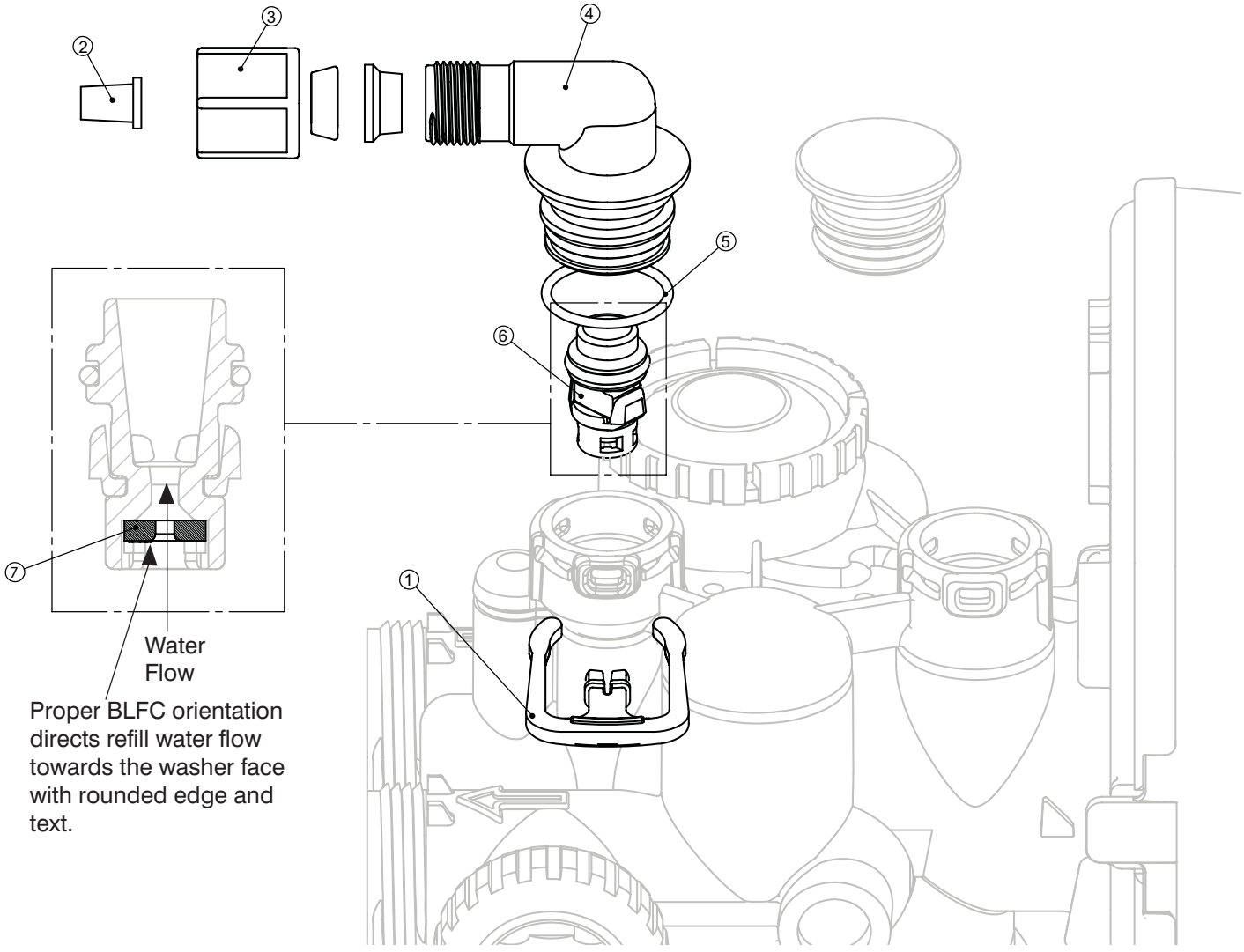
# SECTION 7: PARTS

COMPONENT PARTS LIST

**Refill Flow Control Assembly**

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | H4615 | Elbow Locking Clip | 1 |
| 2 | JCP-P-6 | Polytube insert 3/8” | 1 |
| 3 | JCPG-6PBLK | Nut 3/8” | 1 |
| 4 | H4613 | Elbow Cap 3/8” | 1 |
| 5 | V3163 | 0-ring 019 | 1 |
| 6 | V3165-01* | BLFC Retainer Assembly** | 1 |
| 7 | V3182 | BLFC | 1 |
| Not Shown | H4650 | Elbow ½” with nut and insert | Option |

*Assembly includes V3182 BLFC.
** Includes drawing #7.



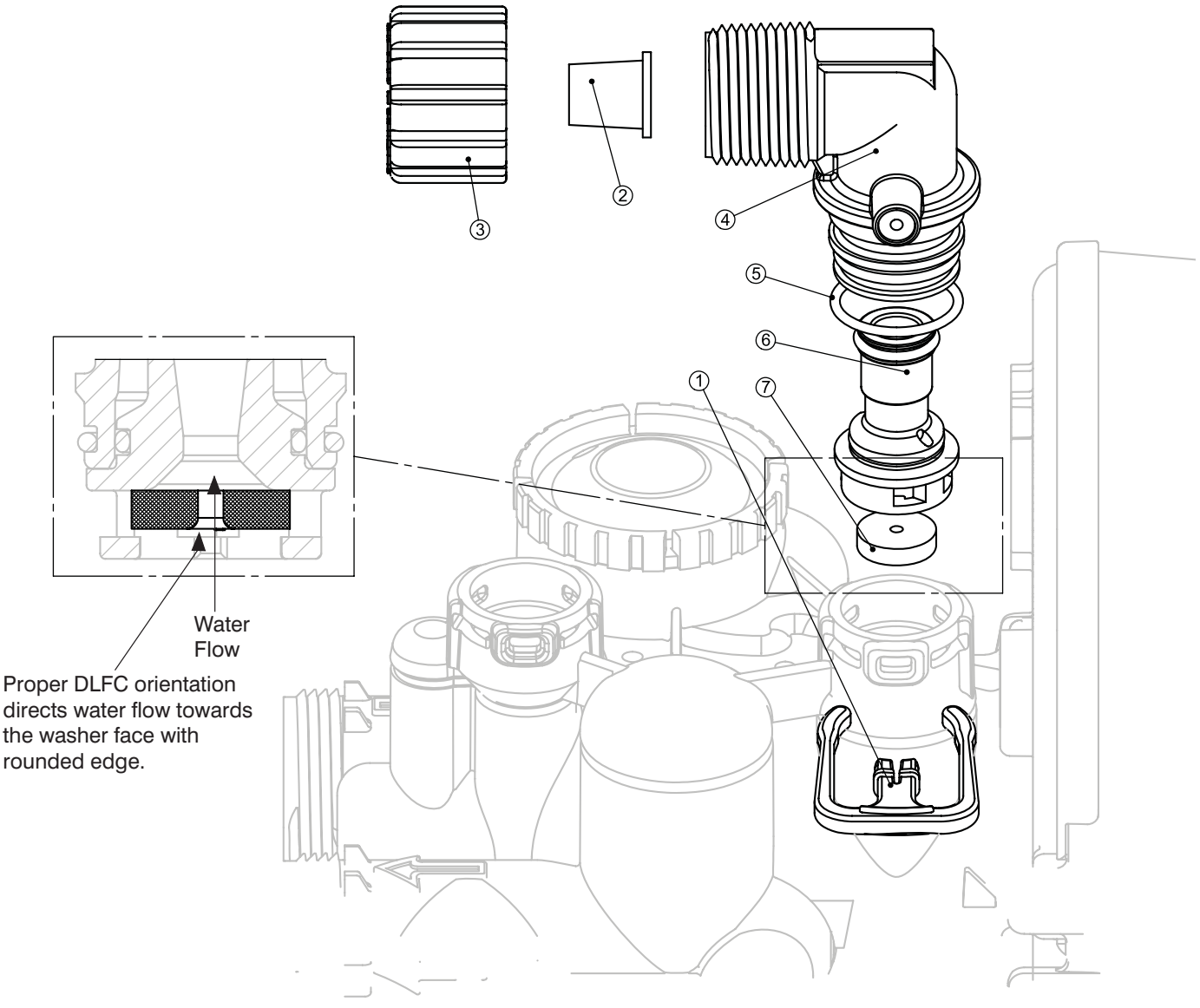

Proper BLFC orientation directs refill water flow towards the washer face with rounded edge and text.

# SECTION 7: PARTS

## COMPONENT PARTS LIST

Drain Line – 3/4”

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | H4615 | Elbow Locking Clip | 1 |
| 2 | PKP10TS8-BULK | Polytube insert 5/8 | 1 |
| 3 | V3192 | Nut ¾ Drain Elbow | 1 |
| 4 | V3158-01 | Drain Elbow ¾ Male | 1 |
| 5 | V3163 | O-ring 019 | 1 |
| 6 | V3159-01 | DLFC Retainer Assembly | 1 |
| 7 | V3162-013 | DLFC 1.3 gpm for ¾ | One DLFC must be used if ¾ fitting is used |
| | V3162-017 | DLFC 1.7 gpm for ¾ | |
| | V3162-027 | DLFC 2.7 gpm for ¾ | |
| | V3162-053 | DLFC 5.3 gpm for ¾ | |

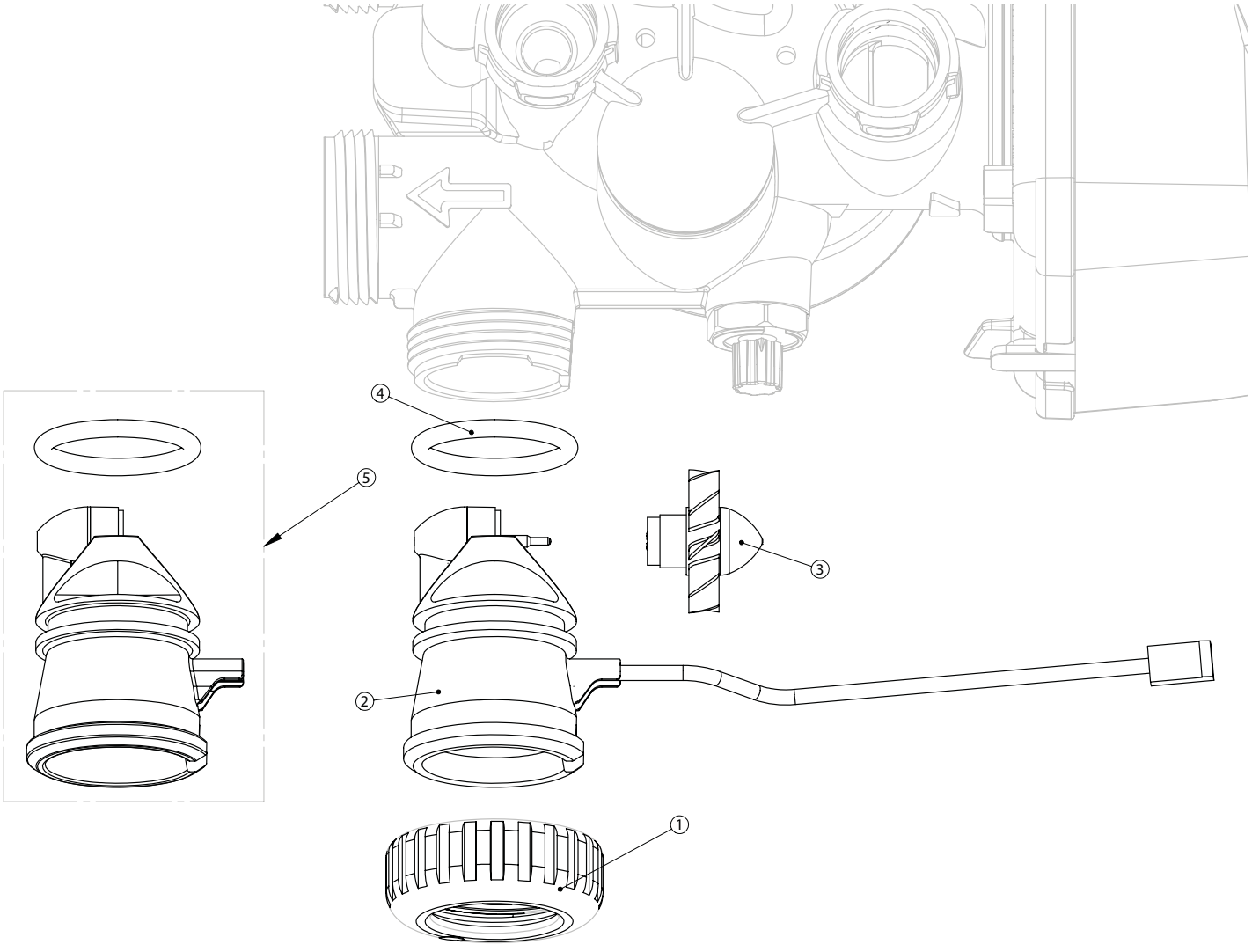


# SECTION 7: PARTS

## COMPONENT PARTS LIST

Water Meter and Meter Plug

| Drawing No. | Order No | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” QC | 1 |
| 2 | V3003 | Meter Assembly (includes drawing #3 & #4) | 1 |
| 3 | V3118-01 | Turbine | 1 |
| 4 | V3105 | 0-ring 215 | 1 |
| 5 | V3003-01 | Meter Plug Assembly | 1 |

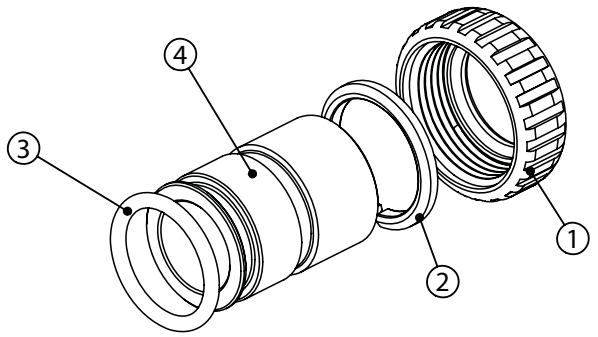


# SECTION 7: PARTS

## COMPONENT PARTS LIST

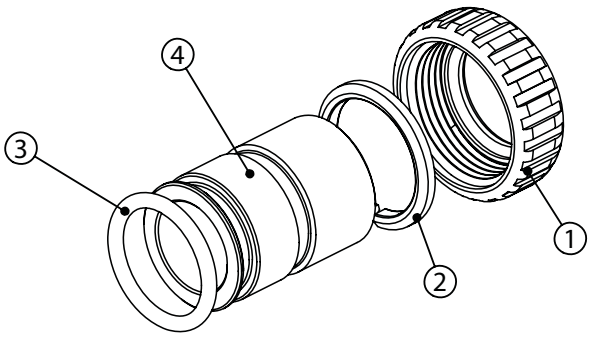
Order No:V3007-02
Description: Fitting 1” Brass Sweat Assembly

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” Quick Connect | 2 |
| 2 | V3150 | Split Ring | 2 |
| 3 | V3105 | O-Ring 215 | 2 |
| 4 | V3188 | Fitting 1” Brass Sweat Assembly | 2 |



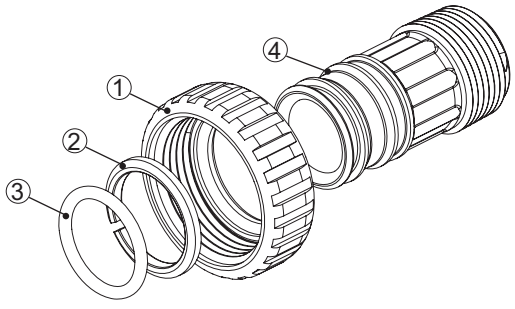

Order No:V3007-03
Description: Fitting 3/4” Brass Sweat Assembly

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” Quick Connect | 2 |
| 2 | V3150 | Split Ring | 2 |
| 3 | V3105 | O-Ring 215 | 2 |
| 4 | V3 | Fitting 3/4” Brass Sweat Assembly | 2 |



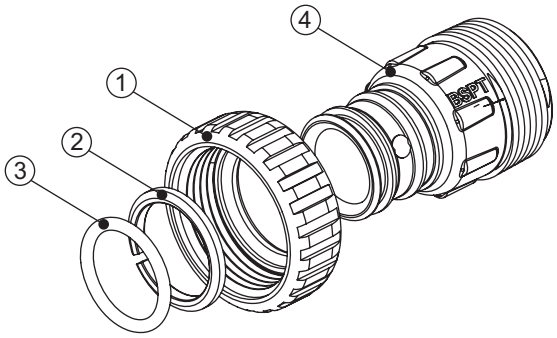

Order No: **V3007-04**
Description: **Fitting 1” Plastic Male NPT Assembly**

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” Quick Connect | 2 |
| 2 | V3150 | Split Ring | 2 |
| 3 | V3105 | O-Ring 215 | 2 |
| 4 | V3164 | Fitting 1" Plastic Male NPT | 2 |




Order No:V3007-05
Description: Fitting 1 1/4” Plastic Male NPT Assembly

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” Quick Connect | 2 |
| 2 | V3150 | Split Ring | 2 |
| 3 | V3105 | O-Ring 215 | 2 |
| 4 | V3317 | Fitting 1 1/4” Plastic Male NPT | 2 |



# SECTION 7: PARTS

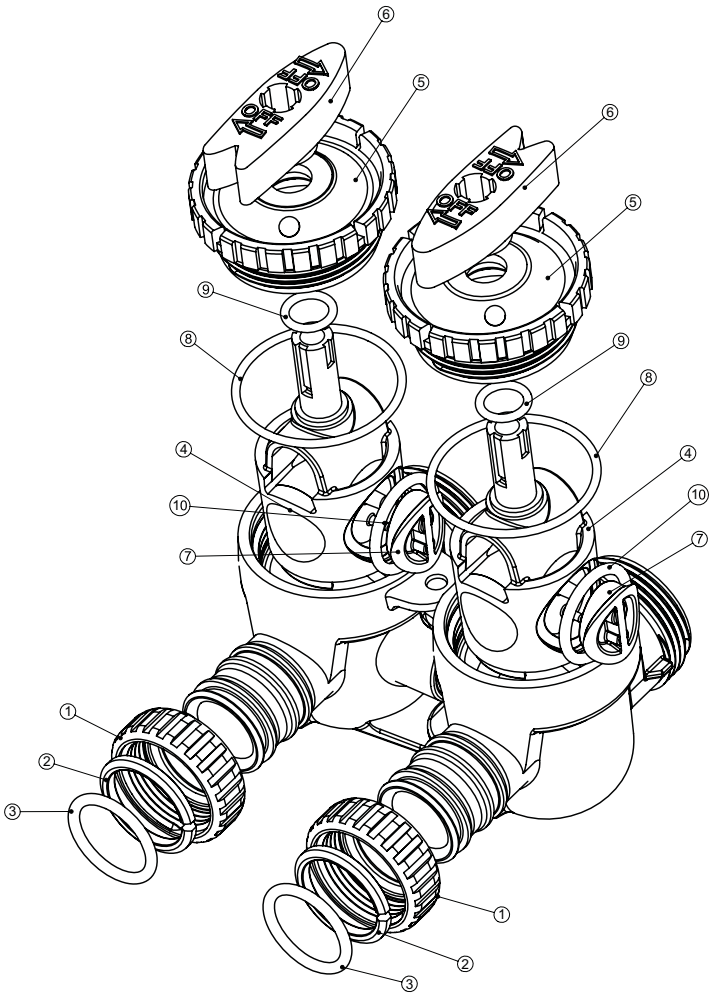
## COMPONENT PARTS LIST

### Bypass Valve

| Drawing No. | Order No. | Description | Quantity |
|---|---|---|---|
| 1 | V3151 | Nut 1” Quick Connect | 2 |
| 2 | V 3150 | Split Ring | 2 |
| 3 | V 3105 | O-Ring 215 | 2 |
| 4 | V 3145 | Bypass 1” Rotor | 2 |
| 5 | V 3146 | Bypass Cap | 2 |
| 6 | V 3147 | Bypass Handle | 2 |
| 7 | V 3148 | Bypass Rotor Seal Retainer | 2 |
| 8 | V 3152 | O-ring 135 | 2 |
| 9 | V 3155 | O-ring 112 | 2 |
| 10 | V 3156 | O-ring 214 | 2 |

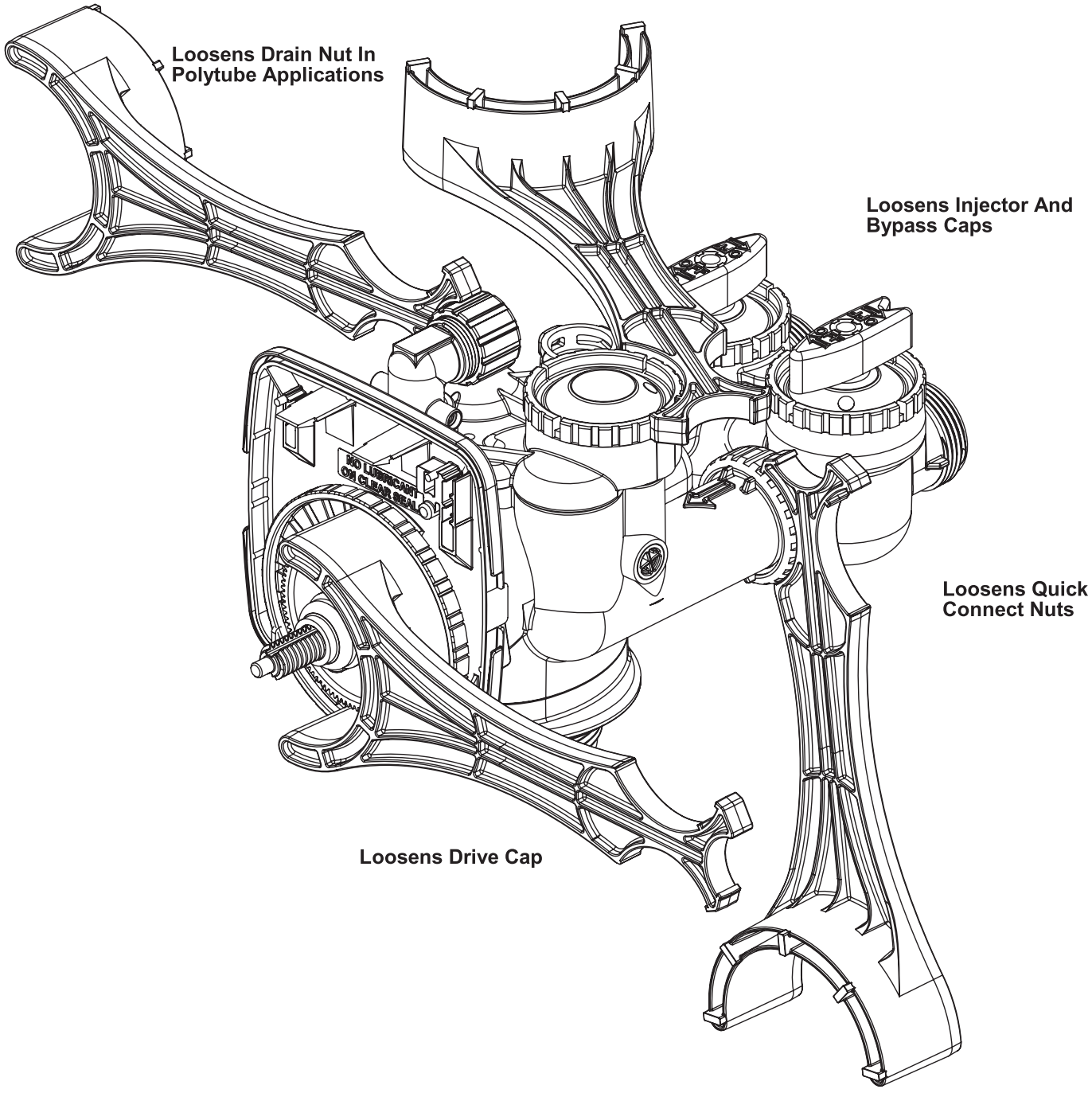
### V3191-01 Vertical Adapter Assembly

| Order No. | Description | Quantity |
|---|---|---|
| V 3151 | Nut 1” Quick Connect | 2 |
| V 3150 | Split Ring | 2 |
| V 3105 | O-Ring 215 | 2 |
| V 3191 | Vertical Adapter | 2 |



### Wrench
(Order No. V3193-01)

Although no tools are necessary to assemble or disassemble the valve, the wrench (shown in various positions on the valve) may be purchased to aid in assembly or disassembly.



# SECTION 8: LIMITED WARRANTY

## Please read and complete the following limited warranty and mail the bottom half within 10 days of purchase

CUNO Incorporated warrants to the original purchaser-consumer of its Product that it is free of defects in materials and workmanship. Any defect, malfunction, or other failure of this product to conform to this Limited Warranty will be remedied by CUNO in the manner provided below.

This Limited Warranty, together with any and all warranties implied by law, shall be limited to a duration described herein, from the date of purchase by the consumer with the following exclusions and limitations as follows:

- **Three years on entire unit**
- **Five years on mineral tank only (does not include internal components)**
- **Five years on control valve body only (does not include internal or external components)**
- **Five years on salt storage container and components.***

This Limited Warranty does not apply to defects that result from abuse, misuse, alterations or damage not caused by CUNO.

**IMPORTANT:** To file a claim under this warranty you must complete and mail the Warranty registration card supplied with this Product to CUNO at the address below within ten (10) days of original retail purchase.

**CUNO Incorporated, 400 Research Parkway, Meriden CT 06450 U.S.A.**

THIS WARRANTY DOES NOT COVER, AND IS INTENDED TO EXCLUDE, ANY LIABILITY ON THE PART OF CUNO, WHETHER UNDER THIS WARRANTY OR UNDER ANY WARRANTY IMPLIED BY LAW, FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES FOR BREACH HEREOF OR THEREOF.

Note: Some states prohibit limitations on the duration of implied warranties and on the exclusion of indirect or consequential damages, and so the above limitation on implied warranties and on incidental and consequential damages may not be applicable to you.

CUNO makes no guarantees or warranties, expressed or implied, including, but not limited to, any implied warranty of merchantability of fitness for a particular purpose or implied warranty arising out of a course of dealing, custom, or usage of trade whatsoever with respect to these instructions.

CUNO shall not under any circumstances be liable to the recipient of these instructions for any direct, indirect, special, incidental, or consequential loss or damages (including, but not limited to, loss of profits, revenue, business, opportunity, or goodwill) resulting from or in any way related to these instructions or the recipient's non-adherence to these instructions, regardless of the legal or equitable theory under which such loss or damages are sought, including breach of warranty or contract, negligence or strict liability.

*water softeners only

**RESPONSIBILITY OF CUNO**

CUNO's responsibility under this warranty shall be to repair at its expense, and at no charge to the original purchaser-consumer, any Product that is actually defective, malfunctioning, or otherwise in violation of this Warranty.

If CUNO, for any reason, cannot repair a Product covered hereby within two (2) weeks after inspection of the unit by CUNO or its authorized representative, then CUNO's responsibility shall be, at its option, either to replace the defective Product with a comparable new unit at no charge to the consumer or to refund the full purchase price. CUNO's obligations of repair, replacement, or refund are conditioned upon the consumer's making the product available for instpection by CUNO or it's authorized representative.

If any Product covered hereby is actually defective within the terms of this Warranty, then CUNO will bear all the reasonable and proper shipping or mailing charges actually incurred in the consumer's return of the Product set forth herein. If the Product proves not to be defective within the terms of this Warranty, then all costs and expenses in connection with the processing of the consumer's claim hereunder shall be borne by the consumer.

**RESPONSIBILITY OF THE CONSUMER**

The original purchaser-consumer's sole responsibility in the instance of a Warranty claim shall be to notify CUNO of the defect, malfunction, or other manner in which the terms of this Warranty are violated. You may secure performance or obligations hereunder by (in writing):

1. Identifying the Product involved (by model or serial number or other sufficient description that will allow CUNO to determine which Product is defective).
2. Specifying where, when and from whom the Product was purchased.
3. Describing the nature of the defect, malfunction or other violation of this Warranty.
4. Sending such notification to:
   **CUNO Incorporated, 400 Research Parkway, Meriden CT 06450 U.S.A.**
5. And, making the product available for inspection by CUNO or it's authorized representative.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

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**WATER TREATMENT SYSTEM WARRANTY/RECORD OF PURCHASE CARD**

IMPORTANT NOTICE: THIS CARD MUST BE RETURNED WITHIN TEN (10) DAYS OF PURCHASE TO REGISTER YOUR WARRANTY

**CUNO Incorporated, 400 Research Parkway, Meriden CT 06450 U.S.A.**

PLEASE PRINT
THANK YOU

DATE OF PURCHASE Mo. Yr.

Your Name _____

Business Name _____

Address _____
Street City State & Zip Code

Telephone Number (____) _____

E-mail Address _____

Model # _____

Where Purchased _____

Business Address _____ City _____ State & Zip Code
Street

Equipment this system is used on _____

Model # (if known) _____ Manufacturer _____

If this system is used in conjunction with other filtration devices, please list below.

| Equipment | Model | Manufacturer |
|---|---|---|
| | | |
| | | |
| | | |

U.S. Patents 6379630, 5951855, 5699930 and 5584411