

# MODELS 700, 900, AND 950 WATER SOFTENERS



**OWNER'S MANUAL AND INSTALLATION GUIDE**  
*VERSION 1.0 INTERNATIONAL*

# 10 Year Limited Warranty

## To Whom Warranty Is Extended

This warranty is issued to the original owner at the original location site and is not transferable to other sites or to subsequent owners of the system.

## Coverage

This limited warranty covers the Hague Quality Water International system delivered to the original owner at the original location when the system is purchased for personal, family, or household use. It is intended to cover defects occurring in workmanship or materials or both.

## Warrantor's Performance and Length of Limited Warranty

A.O. Smith Water Treatment (North America), Inc. warrants that upon receipt from the original owner of any mechanical or electronic part which is found to be defective in materials or workmanship, A.O. Smith Water Treatment (North America), Inc. will repair or replace the defective item for 3 years from date of original installation. Media is not warranted.

A.O. Smith Water Treatment (North America), Inc. further warrants that upon receipt from the original owner of any Hague Quality Water International media tank/main control valve, brine cabinet, found to be defective in material or workmanship, A.O. Smith Water Treatment (North America), Inc. will repair or replace the defective item for 10 years from date of original installation.

All defective parts must be returned, along with the equipment serial number and date of original installation, to A.O. Smith Water Treatment (North America), Inc. PREPAID, and replacement parts will be returned by A.O. Smith Water Treatment (North America), Inc. to the original owner FREIGHT COLLECT.

## Further Exclusions and Limitations on Warranty

THERE ARE NO WARRANTIES OTHER THAN THOSE DESCRIBED IN THIS WARRANTY INSTRUMENT.

This warranty does not cover any service call or labor costs incurred with respect to the removal and replacement of any defective part or parts. A.O. Smith Water Treatment (North America), Inc. will not be liable for, nor will it pay service call or labor charges incurred or expended with respect to this warranty.

In the event the water supply being processed through this product contains sand, bacterial iron, algae, sulfur, tannins, organic matter, or other unusual substances, then, unless the system is represented as being capable of handling these substances in the system specifications, other special treatment of the water supply must be used to remove these substances before they enter this product. Otherwise, A.O. Smith Water Treatment (North America), Inc. shall have no obligations under this warranty.

This warranty does not cover damage to a part or parts of the system from causes such as fire, accidents, freezing, or unreasonable use, abuse, or neglect by the owner.

This warranty does not cover damage to a part or parts of the system resulting from improper installation. All plumbing and electrical connections should be made in accordance with all local codes and the installation instructions provided with the system. The warranty does not cover damage resulting from use with inadequate or defective plumbing; inadequate or defective water supply or pressure; inadequate or defective house wiring; improper voltage, electrical service, or electrical connections; or violation of applicable building, plumbing, or electrical codes laws, ordinances, or regulations.

**THIS WARRANTY DOES NOT COVER INCIDENTAL, CONSEQUENTIAL, OR SECONDARY DAMAGES.**

**ANY IMPLIED WARRANTIES ON THE PRODUCT DESCRIBED IN THIS WARRANTY WILL NOT BE EFFECTIVE AFTER THE EXPIRATION OF THIS WARRANTY.**

No dealer, agent, representative or other person is authorized to extend or expand this limited warranty.

Some locations do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from location to location.

## Claims Procedures

Any defects covered by this warranty should be promptly reported to:

A.O. Smith Water Treatment (North America), Inc.  
4343 S. Hamilton Road  
Groveport, Ohio 43125, USA  
1-614-836-2115

When writing about the defects, please provide the original owner's name, telephone number, and original address, serial number, and model number of the product, and date of purchase. (This information should be listed in *General Information* at the front of this manual.) A.O. Smith Water Treatment (North America), Inc. reserves the right to replace defective parts with exact duplicates or their equivalent.

For international sales, the supplying distributor is the administrator of the warranty and should be the first point of contact in the case of a claim.

# Contents

---

General Information .....	4
Getting Maximum Efficiency From the Appliance .....	5
Checklist Before Installation.....	6
Precautions.....	7
Installation Steps and Start-Up Procedures.....	8
Bypass Valve .....	15
Blending Valve.....	15
Four-Button Icon Controller.....	16
Setting the Controller .....	18
Advanced Customer Settings .....	19
Assembly and Parts .....	21
Troubleshooting .....	32
Water Conditioner Specifications–Metric .....	34
Water Conditioner Specifications–English .....	35



## General Information

---

**Congratulations** on choosing a superior water treatment appliance! Soon you and your family will be enjoying clean, clear water. Use this guide to attain the maximum benefit from your appliance. Keep it handy for a reference guide and service log. If you have trouble with the operation of your appliance, see *Troubleshooting* in the back of this manual or contact your distributor.

Please keep this guide and the serial number of your appliance.

**A.O. Smith Water Treatment (North America), Inc.**

4343 South Hamilton Road  
Groveport, Ohio 43125, USA  
1-614-836-2115

**Warning:** This appliance must be applied to potable water only.

**Note:** The manufacturer reserves the right to make specification and product changes without prior notice.

This manual is for installation, operation, and maintenance of the following international water conditioning appliance models:

- Model 700
- Model 900
- Model 950

## For Owner's Reference

Date of Installation: \_\_\_\_\_

Model Number: \_\_\_\_\_

Serial Number<sup>1</sup>: \_\_\_\_\_

Hardness: \_\_\_\_\_

Iron: \_\_\_\_\_

pH: \_\_\_\_\_

Water Pressure: \_\_\_\_\_

Water Temp: \_\_\_\_\_

<sup>1</sup> The serial number is located underneath the valve cover.

## Getting Maximum Efficiency From the Appliance

To achieve the maximum benefit and performance from this appliance, familiarize yourself with this manual and the appliance.

1. The salt level should always be at least 1/3 full. Refill the salt when the level drops below the water level in the brine cabinet. A resin cleaner can be used on a monthly basis. Clean white pellet, cube-style, or solar salt is recommended. Do not use rock salt.  
**Caution: Do not mix different types of salt.**
2. You may switch to a salt substitute (such as potassium chloride) in place of water conditioner salt at any time. If potassium chloride is used in place of salt, increase your hardness setting by 12% (multiply by 1.12). See *Setting the Controller*.  
**Caution: Do not use potassium chloride if your water contains iron and/or manganese.**
3. Should your electricity be off for any reason check your controller for the correct time and reset as necessary (See *Advanced Customer Settings*).
4. Program the appliance to regenerate at a time when the water is not being used. If there is more than one appliance, allow two hours between each regeneration.
5. Protect the appliance, including the drain line, from freezing.
6. Adhere to all operational, maintenance, and placement requirements.
7. If dirt, sand, or large particles are present in the water supply, the appropriate filter can eliminate this problem.
8. If your appliance runs out of salt:
  - A. Open the salt lid and add salt.
  - B. Wait two hours, then press and hold the R (Regenerate) button for 5 seconds.
  - C. Regeneration is complete after approximately 12 to 45 minutes, and the appliance is returned to Service mode.
9. The appliance may be disinfected with 5.25% sodium hypochlorite, which is the active ingredient in household chlorine bleach. To disinfect the appliance, add 118 mL (4.0 fluid ounces) of chlorine bleach solution to the brine well of the brine cabinet. The brine cabinet should have water in it. Start a manual regeneration.
10. The bypass valve (located on the main control valve) enables you to bypass the appliance if any work is being performed on the appliance, well pump, or plumbing. See *Bypass Valve*. Use Bypass mode also for watering plants or lawns with untreated water. If your appliance is equipped with a bypass, turn the knob to the Bypass position to bypass the appliance. Turn it to the Service position to restore soft water to your home.
11. Before putting the appliance back in service after work has been performed, turn on the nearest cold water tap until water runs clear.
12. Inspect and clean the brine cabinet and air check/draw tube assembly annually or when sediment is present in the brine cabinet.
13. Model 950 contains redox media and activated carbon media. These have a finite life and will eventually require replacement if the advertised performance capabilities of this device are to be maintained.
14. This product is certified for barium and radium 226/228 reduction according to NSF/ANSI Standard 44. Any Bypass system must be completely in the Service position to ensure maximum barium and radium 226/228 reduction.

# Checklist Before Installation

Refer to this checklist before installation.

- Water Quality**—If the water supply contains sand, sulfur, bacteria, iron bacteria, tannins, algae, oil, acid, or other unusual substances, pre-treat the water to remove these contaminants before the water supply enters the appliance, unless the appliance is represented as being capable of treating these contaminants in its specifications.

The appropriate water filter below can address these water shortcomings.

- **Model 900IF (Iron Filter)**—Reduces iron, manganese, hydrogen sulfide, and iron bacteria.
- **Model 900CF (Carbon Filter)**—Reduces chlorine taste and odor.
- **Model 900NF (Acid Neutralizing filter)**—Adjusts low pH water to a non-corrosive state.

- Iron**—A common problem found in many water supplies is iron. It is important to know what type of and how much iron is in the water supply.

Iron Type	Description
<b>Ferrous Iron* (sometimes called clear water or dissolved iron)</b>	Only type of iron that can be treated with a water softener
<b>Ferric Iron</b>	Insoluble and the particles can eventually foul a resin bed. It should be filtered out before the water reaches the softener
<b>Organic Iron or Bacterial Iron</b>	Attached to other organic compounds in the water. Additional treatment is needed to remove this type of iron
<b>Colloidal Iron</b>	Not dissolved, yet stays in suspension. A softener cannot remove this type of iron

\* If the water supply contains ferrous iron, a commercially available resin bed cleaner should be used every six months. Follow the instructions on the container. You should also increase your water hardness setting by 86 mg/L (5 grains per gallon) for every 1 mg/L (1 ppm) of ferrous iron.

- Water Characteristics**—Models 700, 900, and 950 require a pH of 7 or above to function properly. An iron test to determine iron levels is also necessary. The 900-NF Acid Neutralizing Filter adjusts pH levels of 6.3 or above.
- Water Hardness**—Double check hardness of water with test strips, if provided, to verify that your appliance is right for the job.
  - **Model 700** will condition water for up to 1,197 mg/L (70 grains of hardness per gallon).
  - **Model 900** will condition water for up to 1,539 mg/L (90 grains of hardness per gallon). (See *Specifications*.)
  - **Model 950** is FOR MUNICIPALLY-SUPPLIED WATER without iron. Model 950 will condition water up to 599 mg/L (35 grains of hardness per gallon).
- Water Pressure**—Not less than 1.4 bar (20 psi) or greater than 8.3 bar (120 psi) constant. If water pressure exceeds 4.8 bar (70 psi), a pressure regulator is recommended.†
- Water Supply Flow Rate**—A minimum of 7.6 L (2.0 gallons) for the 700 and 900 models to 11.4 L (3 gallons) for the 950 model per minute or equal to the backwash flow rate of the particular model is recommended. For the purposes of plumbing sizing, only the rated service flow rate and corresponding pressure loss may be used. Prolonged operation of a water conditioner at flow rates exceeding the tested service flow rate may compromise performance.
- Water Temperature**—Not less than 4°C (40°F) or greater than 49°C (120°F).
- Drain**—Drain the appliance to an appropriate drain, such as a floor drain or washer drain that will comply with all applicable plumbing codes. To prevent back-siphoning, provide an adequate air gap or a siphon break. See *Installation Steps and Start-Up Procedures*.
- Electricity**—The transformer supplied is for a standard 115 volt, 60-cycle AC outlet for locations in North America or 220 volt, 50-cycle AC outlet for locations outside of North America.

† Applies to U.S. plumbing codes. Check the plumbing codes of your country.

# Precautions

---

## Do

1. Comply with all applicable building, plumbing, and electrical codes.
2. Test your water quality with the strips, if provided. Optionally, obtain a report on your water's quality.
3. Install the appliance before the water heater.
4. Install the appliance after the pressure tank on well-water installations.
5. Examine the inlet line to ensure water will flow through it freely and that the inlet pipe size is correct. For well water with iron, the recommended minimum inlet pipe size is 3/4-inch I.D. and for municipal water the recommended minimum inlet pipe size is 1/2-inch I.D.
6. Install a pressure-reducing valve if the inlet pressure exceeds 4.8 bar (70 psi).
7. Install a gravity drain on the cabinet.
8. Secure the drain line on the appliance and at the drain outlet. See *Installation Steps and Start-Up Procedures*.
9. Allow a minimum of 2.4 to 3 m (8 to 10 feet) of 3/4-inch pipe from the outlet of the appliance to the inlet of the water heater.

## Do Not

1. Do not install if checklist items are not satisfactory. See *Checklist Before Installation*.
2. Do not install if the incoming or outlet piping water temperature exceeds 49°C (120°F). See *Specifications*.
3. Do not allow soldering torch heat to be transferred to valve components or plastic parts when using the optional copper adapters.
4. Do not overtighten the plastic fittings.
5. Do not plumb the appliance against a wall that would prohibit access to plumbing. See *Installation Steps and Start-Up Procedures*.
6. Do not install the appliance backward. Follow the arrows on the inlet and outlet.
7. Do not plug the transformer into an outlet that is activated by an On/Off switch.
8. Do not connect the drain and the overflow (gravity drain) lines together.
9. Do not use to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the appliance.
10. Do not allow your appliance or drain line to freeze.

**Note:** A bacteriostasis claim does not mean that these devices will make microbiologically unsafe water safe to consume or use.

# Installation Steps and Start-Up Procedures

The water softener is capable of treating a combination of undesirable constituents (such as iron, dirt, sediment, chlorine, and/or lead) in water. See *Specifications* for the capabilities of your appliance. Install, set up, and use the appliance within the operating limits outlined in this manual. Failure to comply with these specifications may decrease the effectiveness of the backwash and cause control valve malfunction. The water softener, like any other appliance, requires correct installation and setting for optimum performance.

Each water treatment appliance includes 2.4 m (8 feet) of drain line and a drain fitting.

## Step 1 Prepare the Placement Area

- A. Make sure the placement area is clean.
  - B. Turn off the electricity and water supply to the water heater. For gas water heaters, turn the gas cock to "Pilot."
  - C. Examine the inlet plumbing to ensure that the pipe is not plugged with lime, iron, or any other substance. Clean or replace plugged plumbing.  
**Note:** A minimum 3/4-inch pipe is required between the pressure tank and the appliance for the appliance to function properly.
  - D. Make sure the inlet/outlet and drain connections meet the applicable plumbing codes.
  - E. Check the arrows on the bypass valve to ensure that the water flows in the proper direction. See *Bypass Valve*.
- Caution: Do not plumb the appliance in backward.**
- F. Place the appliance in the desired location using Figure 1 as a guide. The diagram in Figure 1 applies to basement, slab, crawl space, and outside installations.

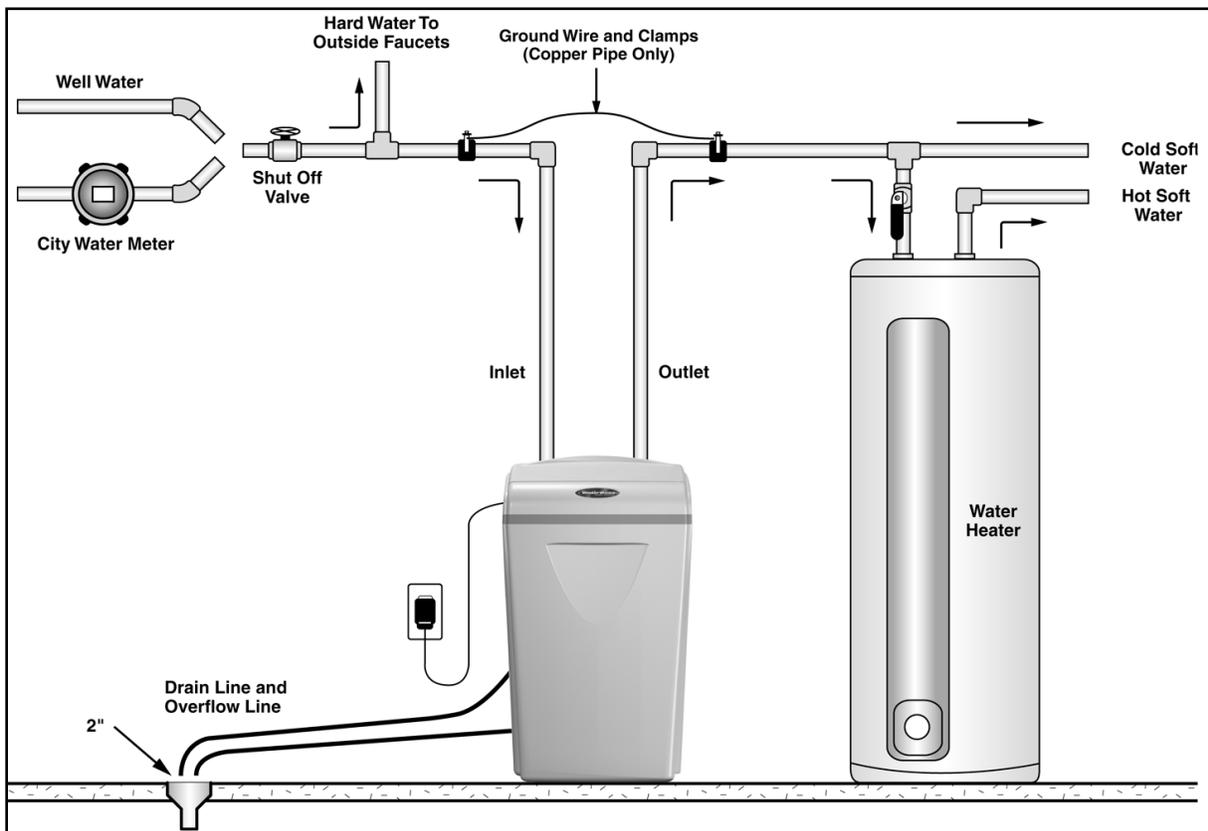


Figure 1: Appliance Placement

## Installation Steps and Start-Up Procedures, Cont.

- G. For most installations, install the appliance after the pressure tank and any water filter appliance or water meter and before the water heater unless otherwise recommended.  
**Water Heaters:** If less than 3 m (10 feet) of pipe connects the water treatment appliance(s) to the water heater, install a check valve between the water treatment appliance and the water heater as close to the water heater as possible. Ensure that the water heater has an adequately rated temperature and pressure safety relief valve.
- H. For outside installations, the appliance should be enclosed so it is protected from the weather.

### Step 2

#### ***Test Your Water***

- A. Remove any packaging or installation materials from the brine cabinet.
- B. Contact your water treatment specialist or obtain a report on your water's quality. Optionally, use the test strips if they have been provided.

### Step 3

#### ***Turn Off Water Supply***

- A. Turn off the water supply.
- B. Open the hot and cold water taps to depressurize the lines.

### Step 4

#### ***Connect Water Lines***

Your appliance may come with a built-in bypass valve.

##### **Step 4A: With Bypass Valve**

- A. Lift and remove the valve cover.
- B. Remove any packaging or installation materials from the brine cabinet.
- C. Install connection fittings\*. Connection fittings provide a convenient, easy-to-use three-piece assembly for 3/4-inch copper plumbing or 3/4-inch CTS CPVC plastic tubing.  
**Note:** Teflon tape or plumber's putty is NOT necessary and should NOT be used with connection fittings.
- D. Attach the water lines to the appliance in compliance with all applicable building, plumbing, and electrical codes. (See Figure 2.)  
**Caution: Do NOT overtighten the connections on the plastic threads.**
- E. Check the arrows on the bypass valve to ensure that the water flows in the proper direction.  
**Caution: Do NOT plumb your appliance in backward.**

\* Connection fittings are NOT included.



**Figure 2: Connect Water Lines.\*  
Note the Bypass Valve Position.**

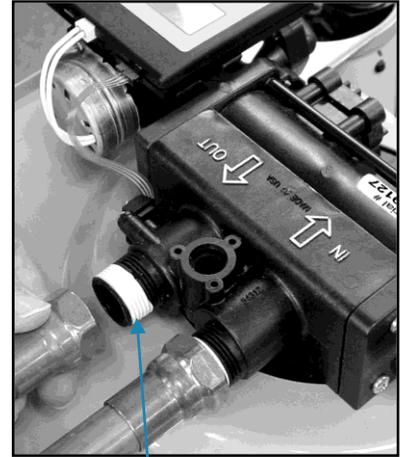
## Installation Steps and Start-Up Procedures, Cont.

### Step 4B: Without Bypass Valve (3/4-inch or 1-inch Adapter) Using Copper Fittings

When preparing the male threaded fittings of the I/O adapter, use the following guidelines to avoid damage to the plastic pipe threads.

- A. Wrap the threads three times with 1/2-inch wide Teflon tape. Place each consecutive wrap on top of the previous wrap.
- B. To prevent tearing of the tape, use Teflon paste on the first two male threads only. The paste lubricates the tape and fills the small void areas that might exist between the threads. When the joint is complete, there will be a small bead of sealant at the fitting interface, which indicates a properly joined connection.
- C. Use a union with a threaded connection to facilitate repair of potential leaks in soldered joints.
- D. Prepare the copper tail assemblies in advance to enable them to cool prior to final assembly. Advance preparation and cooling will prevent heat damage to the plastic pipe threads of the adapter.
- E. Ensure that the copper tube is at least 10 cm (4 inches) long.
- F. Turn the fitting counterclockwise until you feel the threads engage and then tighten to prevent cross threading. Do NOT overtighten the fittings.

**Caution: Do NOT allow heat from the torch to transfer to the plastic valve component, which could be damaged.**



Teflon Tape

**Figure 3: Plumbing Connections**

## Installation Steps and Start-Up Procedures, Cont.

---

### Step 4C: Without Bypass Valve (3/4-in or 1-in Adapter) Using Plastic (PVC/CPVC) Pipe Joining Procedure

To ensure reliable joint integrity when using solvent cement for PVC/CPVC plumbing, follow these recommendations:

- A. Cutting**—The pipe must be cut square to allow for the proper interfacing of the pipe end and the fitting socket bottom. Use a wheel cutter, miter saw, or a ratchet shear for best results.
- B. Deburring and Beveling**—Use a knife, plastic pipe deburring tool, or a file to remove burrs from the end of the pipe. Be sure to remove all burrs from the inside as well as the outside of the pipe. Remove all loose plastic debris since it could clog the injector. All pipe ends should be beveled to permit easier insertion of the pipe into the fitting. Failure to bevel the pipe end may cause a “wiping” effect in the fitting where the cement is forced to the end of the fitting socket. This creates a weak joint.
- C. Test Dry Fit of the Joint**—Tapered fitting sockets are designed so that an interference fit should occur when the pipe is inserted about one-third to two-thirds of the way into the socket. Occasionally, when pipe and fitting dimensions are at the tolerance extremes, it will be possible to fully insert dry pipe to the bottom of the fitting socket. When this happens, a sufficient quantity of cement must be applied to the joint to fill the gap between the pipe and fitting.
- D. Inspection, Cleaning, and Priming**—Inspect the inside of the pipe and fitting sockets and remove dirt, grease, or moisture with a clean dry cloth. If wiping fails to clean the surfaces, use a chemical cleaner. Check for possible damage such as splits or cracks and replace if necessary. Use purple primer to penetrate and soften the bonding surfaces of the PVC or CPVC pipe and fittings. Proceed without hesitation to the cementing procedure while the primed surfaces are still wet.
- E. Application of Solvent Cement**—Apply the solvent cement evenly and quickly around the outside of the pipe while the primer is still wet. Apply a light coat of cement evenly around the inside of the fitting socket. Do not allow excess cement to “puddle” in the fitting. Apply a second coat of cement to the pipe end.
- F. Joint Assembly**—Working quickly, insert the pipe into the fitting socket and give a 1/4-turn of the pipe or fitting while pushing toward the fitting stop. This action will evenly distribute the cement. Do NOT continue to rotate the pipe or fitting after the stop has been reached. Hold the joint tightly together for about 15 seconds to prevent the pipe from “creeping” out of the fitting. A good joint will have sufficient cement to make a small bead all the way around the outside of the fitting hub. The joint should not be disturbed immediately after the cementing procedure. Allow adequate time for the joint to cure properly. Exact drying time is hard to predict because of environmental variables. Follow the recommended joint curing times on the primer and cement container labels.

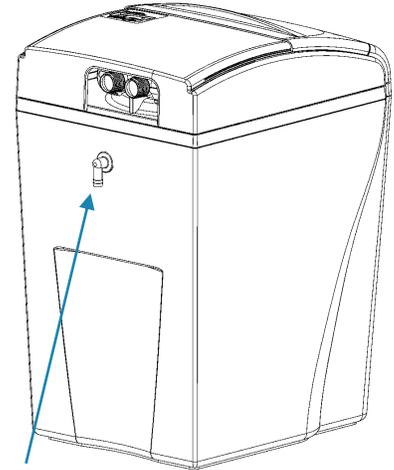
## Installation Steps and Start-Up Procedures, Cont.

### Step 5

#### **Connect Gravity Overflow Connection**

The overflow line drains away excess water should the tank fill with too much water or the appliance malfunction.

- A. Attach the gravity overflow connection elbow and check that it is in the down position. (See Figure 4.)
- B. Connect 1/2-inch I.D. tubing (size cannot be reduced) between the overflow fitting and a suitable floor drain, laundry tub, or other suitable waste receptor. This tubing is not supplied with the appliance. Ensure that the overflow line ends at a drain that is at least 8 cm (3 inches) lower than the bottom of the overflow fitting. Maintain a minimum of 5 cm (2-inch) air gap. The gravity line cannot be run overhead.



Gravity Overflow Connection

### Step 6

#### **Connect Drain Line**

The drain line carries away the backwash water as part of the regeneration cycle.

- A. Screw the drain fitting (See Figure 5) into the drain end cap until fewer than three threads are visible. To prevent leakage, wrap the threads on the drain fitting three times with 1/2-inch wide Teflon tape, or use plumber's putty.
- B. Connect the drain line to the drain end cap (See Figure 5) with a minimum 5/8-inch I.D. tubing (supplied). The size cannot be reduced.
- C. Route the drain line to a floor drain, laundry tub, or other suitable waste receptor. Maintain a minimum 5 cm (2-inch) air gap between the drain line and the flood level rim of the waste receptor to prevent back-siphoning. This drain line should make the shortest run to the suitable drain.
- D. The drain line may be elevated up to 2.4 m (8 feet) from the discharge on the appliance as long as the water pressure in your system is 2.8 bar (40 psi) or more.
- E. If the drain line is 7.6 m (25 feet) or longer, increase the drain line to 3/4-inch I.D. The end of the drain line must be equal to or lower in height than the control valve.

**Caution: The drain line must not be kinked, crimped, or restricted in any way.**

Figure 4: Gravity Overflow Connection

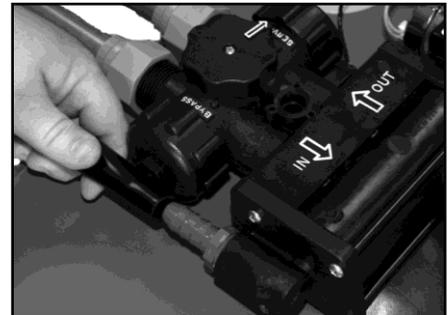


Figure 5: Connect Drain Line

## Installation Steps and Start-Up Procedures, Cont.

### Step 7

#### **Flush Lines**

- A. If your appliance is equipped with a bypass valve, place the appliance in the Bypass position. (See Figure 6.)
- B. Turn on the main water supply.
- C. Open the nearest cold water faucet to flush the plumbing of any excess soldering flux, air, or any other foreign material.
- D. Return the appliance to Service position.

**Note:** To prevent untreated water from entering your home, avoid using water inside your home when the appliance is in Bypass position. Remember to return the appliance to Service position when you have finished using untreated water.



Figure 6: Bypass Position

### Step 8

#### **Check for Leaks**

- A. Close all faucets.
- B. Check all lines and connections for leaks. If leaks are found:
  1. Turn off the main water supply.
  2. Open a cold water faucet to depressurize the lines.
  3. Close the faucet to eliminate any siphoning action.
  4. Repair all leaks.
  5. Turn on the water supply.
  6. If your appliance is equipped with a bypass valve, place the appliance in the Service position to slowly fill the media tank. (See Figure 7.)
  7. Open a cold water faucet to purge air out of the media tank.
  8. Close the faucet and recheck for leaks.

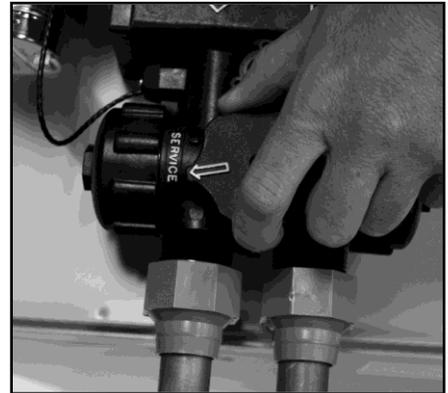


Figure 7: Service Position

### Step 9

#### **Plug in the Transformer**

- A. Connect the transformer power cord to the back of the controller. (See Figure 8.)
- B. Plug the transformer into an appropriate outlet.
- C. Ensure that the outlet selected is NOT operated by an On/Off switch.

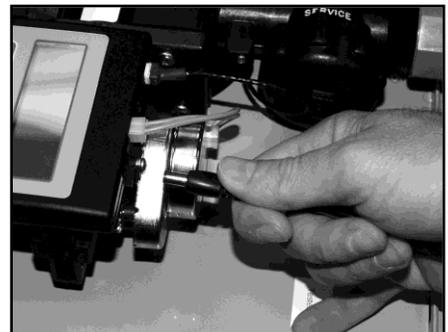


Figure 8: Connect Power Cord

### Step 10

#### **Set Up the Controller**

- A. Program the appliance controller. See *Setting the Controller*.

## Installation Steps and Start-Up Procedures, Cont.

---

### Step 11 *Add Water to the Brine Cabinet*

- A. Add 8 L (2 gallons) of water to the brine cabinet. After the first regeneration, the appliance will automatically refill the correct amount of water into the brine cabinet.
- B. Ensure the appliance is in Service position and your water supply is turned on.
- C. Initiate a manual regeneration (see *Setting the Controller*) and inspect for proper operation. Allow the appliance to draw water out of the brine cabinet until the air check/draw tube sets (8–10 minutes).
- D. Press the R (Regenerate) button to advance to the Brine Refill (04) position. Let the tank fill with the proper amount of water. The controller will then step the valve to the Home position.  
**Note:** This initial startup is the only time you will add water to the brine cabinet. Do not add water at any other time.

### Step 12 *Fill the Brine Cabinet With Salt*

- A. Fill the brine cabinet with salt. Use clean white pellet, cube-style, or solar salt. Do not mix pellet with solar salt.  
**Note:** Always keep the salt level above the water level. For convenience, completely fill the tank when refilling with salt.
- B. After you add salt, including adding it after the tank has run out of salt, wait two hours for saturated brine before starting any regeneration.  
**Caution:** Use of potassium chloride when iron and/or manganese are present in the raw water supply is not recommended.

### Step 13 *Complete the Installation*

- A. If your appliance is equipped with a bypass valve, ensure that the appliance is in the Service position. See Figure 7.
- B. Ensure the water supply is on.
- C. Turn on the electricity and water supply to the water heater. For gas water heaters, return the gas cock to “On.”
- D. Open a cold water tap and allow the appliance to flush for 20 minutes or until approximately 270 L (72 gallons) have passed through the appliance. This procedure is required to meet NSF requirements. Verify the flow rate on the controller, which indicates water flow. See Figure 11.
- E. Adjust the blending valve if it is being used.
- F. Replace the valve cover.

## Bypass Valve

Your appliance may be equipped with a bypass valve. The bypass valve can isolate the appliance should the appliance malfunction or leak. It can also permit the use of untreated water for watering plants, shrubs, or lawns.

The bypass valve is located on the main control valve. See Figure 9. To engage the bypass valve, turn the knob to the Bypass position. The appliance will be bypassed and all water to the home is raw, untreated water. To prevent untreated water from entering the home, water should not be used inside the home when the appliance is in Bypass position. Ensure that the appliance is returned to Service position when the appliance is repaired or the use of untreated water is complete by turning the knob to Service.

To blend hardness back into the water using the bypass valve, turn the knob slightly from the Service position toward the Bypass position.

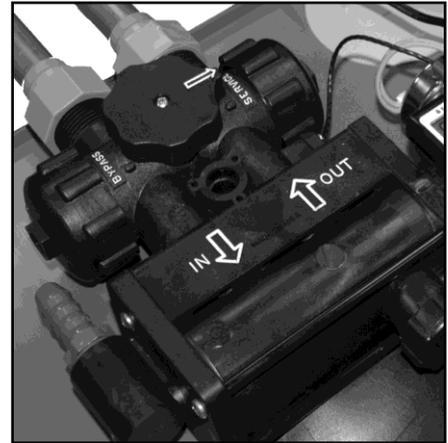


Figure 9: Bypass Valve

## Blending Valve

The 3/4-inch or 1-inch I/O may come with a blending valve.

In some situations, a blending valve may be desired. The amount of hardness blended back into the water line is determined by the hardness of the incoming water and the setting of the blending valve. Where extremely hard water is present, the blending valve may only need to be “cracked” open. Where the incoming water has relatively low levels of hardness, the blending valve will need to be opened further.

The blending valve is located between the input and output connections on the top of the 3/4-inch or 1-inch I/O adapter. See Figure 10. It is adjusted by placing a flat blade screwdriver in the slot provided and turning clockwise to open. Total movement of the blending valve from full closed to full open is 1/4 revolution. Precise setting of the blending valve will require “trial and error” testing. The initial setting should be conservative. Because of the blending valve’s ease of access and adjustment, you can increase or decrease the setting according to your preference over a period of time.

Use of the blending valve is not recommended where objectionable concentrations of ferrous iron or sediment are present. Because the blending valve is mixing “raw” water with softened, any ferrous iron or sediment in the “raw” water will also be blended and reintroduced into the softened water line.

**Note:** If the appliance is installed for barium and/or radium reduction, the blending valve must remain in the fully closed position at all times.

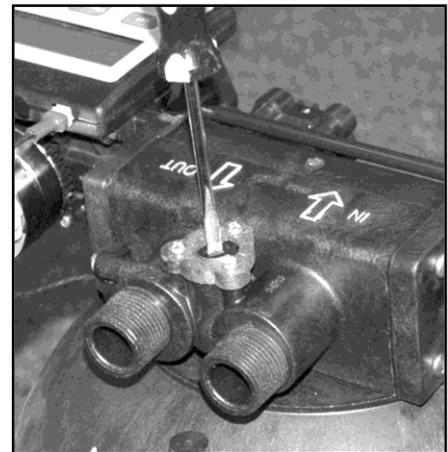
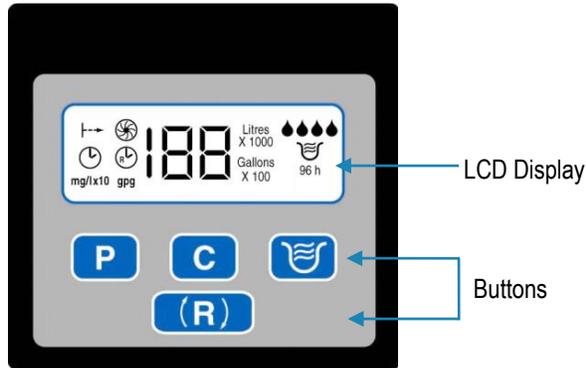


Figure 10: Adjusting Blending Valve

# Four-Button Icon Controller

This appliance features a four-button icon controller with an LCD display. The controller can be used to view the appliance's status, perform regenerations, and change settings. The controller must be set up correctly for the appliance to perform properly.

**Note:** Ensure that the bottom of the controller is firmly locked onto the four tabs on the top of the drive end cap assembly. See *Cabinet and Cover Assemblies* diagram later in this manual.



**Figure 11: Four-Button Icon Controller Showing All Possible Icons**

Button	Function
<b>P</b> (Program)	Used to set Customer Settings
<b>C</b> (Change)	Used to change Customer Settings
 <b>(powerClean™)</b> <b>(700 and 900 only)</b>	<p>Activates/deactivates the powerClean™ feature, which is a service/maintenance step for water supplies that have an excessive amount of iron. “powerClean™” will display when this feature is activated. The appliance will regenerate every other day with 2.3 kg (5 lb) of salt. Leave the powerClean™ feature on for a minimum of two weeks. The frequent regeneration will eliminate iron buildup in the resin bed. The use of salt with an iron cleaning agent or iron out cleaner is recommended for continuous use as a preventive measure against iron fouling of the resin bed. Use this feature every six months as a part of your routine maintenance procedure to ensure a long service life for your water treatment appliance</p> <p><b>Note:</b> To deactivate the powerClean™ feature, press the  button.</p>
<b>(R)</b> <b>(Regenerate)</b>	<p>Used when starting your water conditioner to start an immediate regeneration, or to restore capacity if you run out of salt</p> <p><b>To Start an Immediate Regeneration</b></p> <ol style="list-style-type: none"> <li>1. Press and hold the R (Regenerate) button for about five seconds until the display flashes.</li> <li>2. The appliance is in regeneration mode and will display the status of each cycle.</li> <li>3. After all regeneration cycles are complete, the display will return to normal operating mode.</li> </ol> <p><b>To Quickly Advance Through the Regeneration Cycles</b> (used when starting up or diagnosing the appliance only)</p> <ol style="list-style-type: none"> <li>1. Press and hold the R (Regenerate) button for about five seconds until the cycle begins and the display flashes the number of the next cycle.</li> <li>2. The cycle position will display (for example, 01).</li> <li>3. If the controller does not advance to the next cycle position after 20 seconds, press and hold the R (Regenerate) button until the cycle number changes (about 2 seconds).</li> </ol> <p>Each cycle can be advanced by pressing the R (Regenerate) button. Always wait until the cycle position displays before advancing to the next cycle position.</p>

## Four-Button Icon Controller, Cont.

Controller Part	Function										
LCD Display	Shows the status of the controller.										
 Demand Mode	<p>The controller measures water usage and regenerates based on need, so you do not have to worry about vacation settings or extra guests. The appliance will regenerate using only the necessary amount of water and salt. If your power has been off, the appliance will retain programmed settings indefinitely.</p> <p><b>Note:</b> You should not need to change from Demand Mode.</p>										
 Delay Mode	Allows regeneration at a specific time (for example, at 2 a.m.) when less water is typically being used.										
Soft Water Remaining Litres x 100 (or 1000) or Gallons x 100	Shows the litres (or gallons) of soft water remaining until the next automatic regeneration. Typically, each person in the household uses about 284 L (75 gallons) per day. Water remaining is in litres in hundreds or thousands, depending on how much capacity is remaining, or gallons in hundreds. For example: 33 = 3,300 or 33,000 litres (88 = 8,800 gallons).										
Recharge/ Regeneration Status	<p>Shows regeneration cycle numbers during regeneration. The read-out will flash with the cycle number. The flashing regeneration numbers are:</p> <table border="0"> <tr> <td>First cycle</td> <td>(01) First Backwash</td> </tr> <tr> <td>Second and Third cycles</td> <td>(02) Brine/Slow Rinse</td> </tr> <tr> <td>Fourth cycle</td> <td>(03) Second Backwash</td> </tr> <tr> <td>Fifth cycle</td> <td>(04) Brine Refill</td> </tr> <tr> <td>Sixth cycle</td> <td>(HO) Service (Briefly)</td> </tr> </table> <p>When regeneration is complete, the display shows the number of litres in hundreds or thousands (gallons in hundreds) of soft water remaining. (See above.) Regeneration typically is complete in about 30 minutes.</p>	First cycle	(01) First Backwash	Second and Third cycles	(02) Brine/Slow Rinse	Fourth cycle	(03) Second Backwash	Fifth cycle	(04) Brine Refill	Sixth cycle	(HO) Service (Briefly)
First cycle	(01) First Backwash										
Second and Third cycles	(02) Brine/Slow Rinse										
Fourth cycle	(03) Second Backwash										
Fifth cycle	(04) Brine Refill										
Sixth cycle	(HO) Service (Briefly)										
 waterMizer™	Indicates that water is flowing through the appliance; the waterMizer™ indicator droplets light up across the screen whenever water is being used; useful for checking for proper plumbing and leaks.										
 powerClean™	Displays when feature is activated. See <i>powerClean™ Button</i> .										
96 h	If "96 h" is selected, the appliance will work no more than 4 days, (96 hours) without a regeneration. Default is for "96 h" to be On.										

# Setting the Controller

## Step 1

### Determine the Controller Hardness Setting Number

- A. For municipal water, call the water department or your water treatment specialist, and they will determine the hardness and pH of your water supply.
- B. For well water, a water analysis should be taken in order to make sure your controller is set properly, or obtain your hardness setting from your water treatment specialist.
  - If the pH is below seven and you have a 700 or 900 unit, contact your water treatment specialist. (See *General Information*).
- C. Use the following example to determine the controller setting.

	Your Water	Metric Example	English Example
Enter hardness mg/L (grains per gallon)		342	20
If your water contains 3 mg/L (3 ppm) iron, add 258 (15)*		+258	+15
The sum is your controller setting number		600**	35

\* Increase your water hardness setting by 86 mg/L (5 gpg) for every 1 mg/L (ppm) of ferrous iron.

\*\* The hardness you enter is multiplied by 10, therefore you will enter "60" as the hardness setting.

## Step 2

### Enter Your Setting Number Into the Controller

**Note:** You cannot set the controller while the appliance is regenerating.

- A. Press and hold the P button for about 5 seconds until a 2- or 3-digit number and "mg/L x 10" or "gpg" displays. This number is the current hardness setting.
- B. Press the C button until the display matches your compensated number. Once you pass 120 mg/L x 10 (70 gpg) for models 700 and 950 or 154 mg/L x 10 (90 gpg) for model 900, the display will reset to 05 mg/L x 10 (03 gpg).
 

**Note:** Refer to *Specifications* for the maximum water hardness that your appliance can handle.
- C. Press P to save the hardness setting number.
- D. To recheck the hardness setting number, hold down the P button for about 5 seconds.



Figure 12: Hardness Settings in Controller

**Your hardness number is now set in the controller.**

# Advanced Customer Settings

Most customers will want to use the factory default settings, so no changes are necessary. However, you can reset the controller settings if the factory default settings are not suitable for your needs.

**Note:** Be sure to check that the Time of Day is correct.

## Set High Capacity or High Efficiency

Your appliance can be programmed for High Capacity (HC) or High Efficiency (HE).

- High Capacity means the appliance will regenerate less often, but use more salt.
- High Efficiency will make the appliance regenerate more often and use less salt. This is the default. The High Efficiency setting meets or exceeds most applicable requirements for salt efficiency.

### To Enter Advanced Customer Settings Mode

1. Press and hold the P and C buttons at the same time for 3 seconds. The display should show only the controller type (07–700 or 950 or 09–900). After 3 seconds, the entire screen is lit for a half second, and then “the current mode (HE or HC)” displays.
2. Press C to toggle the digit display between “HC” and “HE.”
3. When the desired value is displayed, press P. The  or  displays.

**Note:** All models are equipped with patented capacity guard.

Once in HC or HE, you can set the mode, hours to next regeneration, litres or gallons, time of day, and time of regeneration.

### Step 1

#### Set Mode

Display reads  or .

#### To Change Mode

A. Press C.

-  Demand Mode triggers a regeneration as soon as softening capacity is exhausted. This is the default.
-  Delay Mode allows regeneration at a specific time (for example, at 2 a.m.) when less water is typically being used.

B. When the desired mode is displayed, press P.

## Advanced Customer Settings, Cont.

---

### Step 2 ***Set Hours Until Regeneration***

Display reads “96 h.”

#### To Change Setting

- A. Press C to turn off. If “96 h” is selected, the appliance will work no more than 4 days (96 hours) without a regeneration. Default is for “96 h” to be On.  
**Note:** If there is iron in your water, select this option.
- B. When the desired setting is displayed, press P.

### Step 3 ***Set Litres or Gallons***

Display reads “Litres (or Gallons) x 100 (or 1000).”

#### To Set Litres or Gallons

- A. Press C to toggle between litres and gallons. Choosing “Litres” sets the controller to metric units, and choosing “Gallons” sets it to English units.
- B. When the desired units are displayed, press P.

### Step 4 ***Set Time of Day***

Display reads  followed by the current hour between 00 and 23.

#### To Change Time of Day

- A. Press C until the current hour is displayed.  
**Note:** Set time to the nearest hour.
- B. When the desired time is displayed, press P.

**Note:** Whenever you experience an electrical outage, check your controller for the correct time. Make any necessary corrections.

### Step 5 ***Set Regeneration Time***

Display reads  followed by the current regeneration time that is set (02 = 2 a.m.).

#### To Change Regeneration Time

- A. Press C. Default is 02.
- B. When the desired regeneration time is displayed, press P.
- C. The appliance has been placed into operation.

**Programming is now complete.**

# Assembly and Parts

## Cabinet/Cover/Salt Lid Assemblies

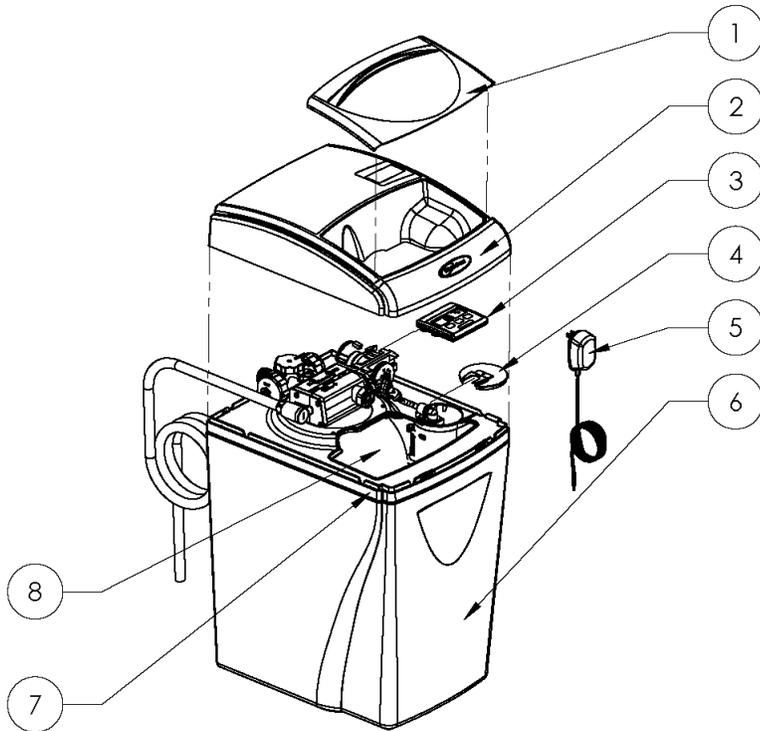


Figure 13: Cabinet and Cover Assemblies

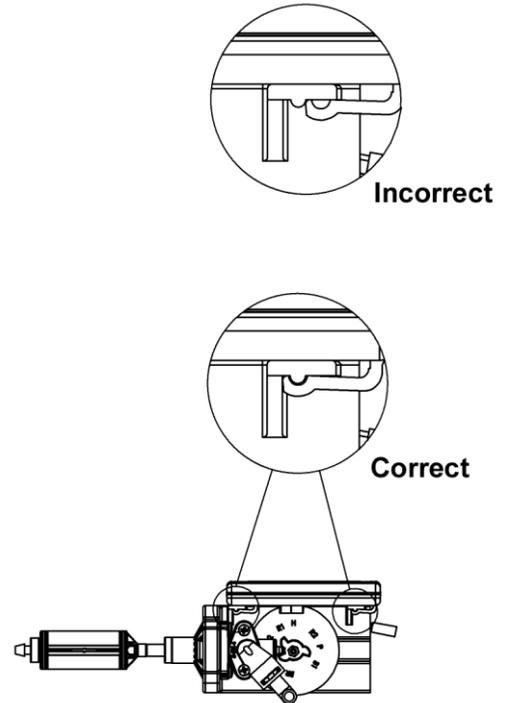


Figure 14: Controller Tab Lock Detail

	Part # (Old Part #)	Description	Quantity
1	100240991 (54306)	Salt Port Lid	1
2	100241011 (54324)	Valve Cover Assembly	1
3	100241133 (54539-700)	700 International Controller—Models 700 and 950	1
	100241134 (54539-900)	900 International Controller—Model 900	
4	100240996 (54310)	Brine Well Cover	1
5	100238182 (93245)	12V Transformer/Power Cord	1
	100242180 (C0905)	China Transformer	
	100242182 (C0915)	Europe Transformer 220V	
	100242183 (C0915-UK)	United Kingdom Transformer	
	100242184 (C0916)	Japan Transformer	
	100242185 (C0917)	Australia Transformer	
6	100240987 (54303)	Cabinet—Model 700	1
	100240995 (54309)	Cabinet—Models 900 and 950	
7	100240990 (54305)	Support Panel	1
8	100242281 (93530-700)	1700 Top Fill Plug Tank—Model 700 w/media	1
	100242282 (97503-900)	1900 Top Fill Plug Tank—Model 900 w/media	
	100242142 (97503-CITY)	1950 Top Fill Plug Tank—Model 950 w/media	

# Assembly and Parts, Cont.

## Cabinet and Assemblies

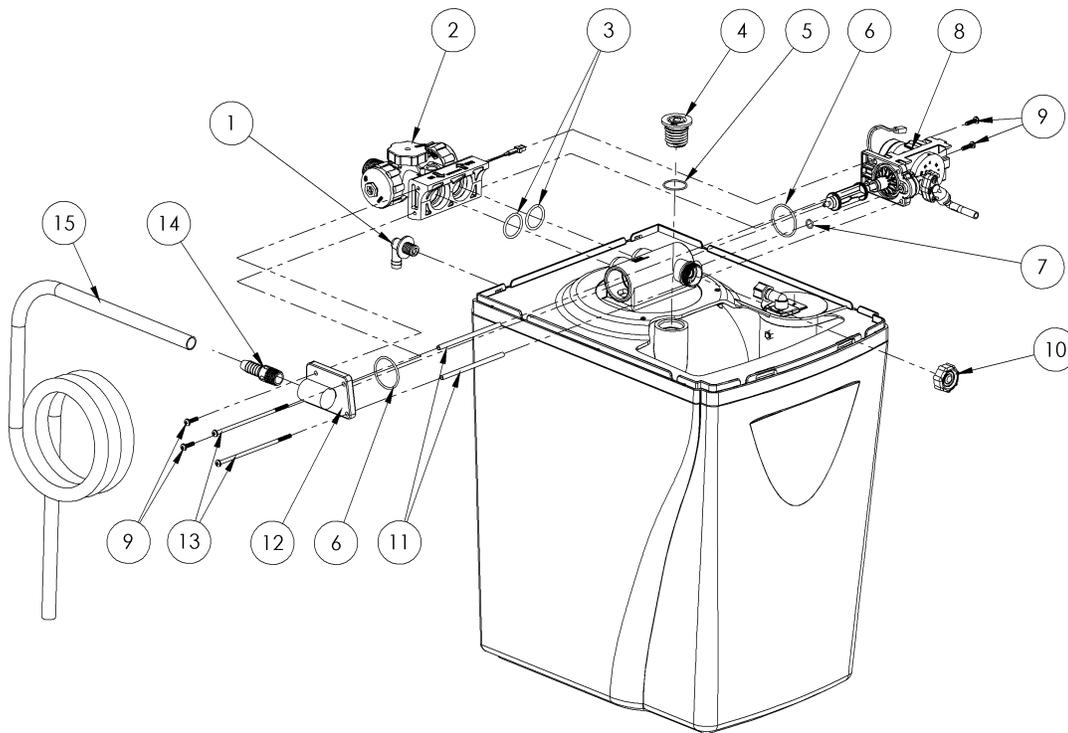


Figure 15: Cabinet and Assemblies

	Part # (Old Part #)	Description	Quantity
1	100242175 (C0700A)	Overflow Elbow	1
2	100238184 (54512)	Bypass Valve Assembly	1
	100241990 (93521)	3/4-inch I/O Adapter Assembly (not shown)	
	100241991 (93521-1)	1-inch I/O Adapter Assembly (not shown)	
3	100242050 (93838)	O-Ring	2
4	100241974 (93281)	Top Fill Plug	1
5	100241972 (93272)	O-Ring	1
6	100241865 (90819)	O-Ring	2
7	100037867 (120110)	O-Ring	1
8	100252693 (54520)*	Drive End Cap Assembly	1
9	100238199 (93870)	Screw	4
10	100238192 (93504)	Injector Assembly	1
11	100242049 (93835)	Sleeve	2
12	100238229 (90614-2.4)	Drain End Cap Assembly	1
	100241852 (90614-3.0)	Drain End Cap Assembly (includes O-Ring)	
13	100238198 (93809)	Screw	2
14	100238185 (93185)	Drain Fitting, 13-mm (1/2-inch)	1
15	100238186 (93915)	Drain Hose	1

\* Excludes drive motor and magnetic disk.

# Assembly and Parts, Cont.

## Injector Assembly

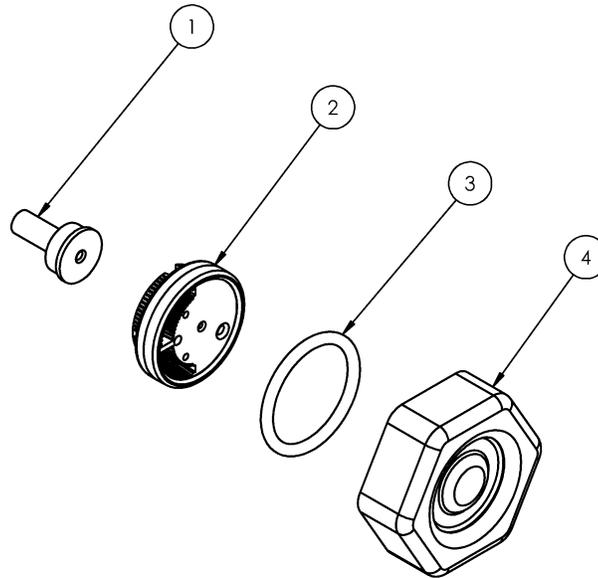


Figure 16: Injector Assembly

	Part # (Old Part #)	Description	Quantity
1	100241946 (93223)	Injector Throat	1
2	100237421 (53224)	Injector Nozzle with Over-Mold Gasket	1
3	100242034 (93806)	O-Ring	1
4	100037729 (53235)	Injector Cap	1
	100238192 (93504)	All of the above parts	

<b>100241946 (93223) Injector Throat</b>	In conjunction with the Injector Nozzle (100237421 [53224]) it creates the vacuum that draws the brine solution from the brine cabinet. The center hole should be clear of debris, round, and undamaged. The Throat should be pressed flush into the opening in the valve. If the Throat is removed, it must be replaced with a new one.
<b>100237421 (53224) Injector Nozzle with Over-Mold Gasket</b>	Together with the Throat (100241946 [93223]) creates the vacuum that draws the brine solution from the Brine Cabinet. The small hole in the Injector Nozzle (100237421 [53224]) is the one that creates the “injection stream” that enters the Throat. It is important that this hole is round, undamaged, and clear of debris. If this hole becomes “clogged,” do not use anything (such as metal objects) to clear this opening. Damage may occur. Use a clean cloth and flush with water. If necessary, a wooden toothpick may be used. When assembling to the Valve, the Nozzle hole should line up with the Throat. Flush screen with water to clean. The over-mold gasket seals between the Injector Nozzle and the Injector Cap.
<b>100037729 (53235) Injector Cap</b>	Holds the injector assembly together and seals the assembly to the Main Control Valve.

## Assembly and Parts, Cont.

### Bypass Valve Assembly

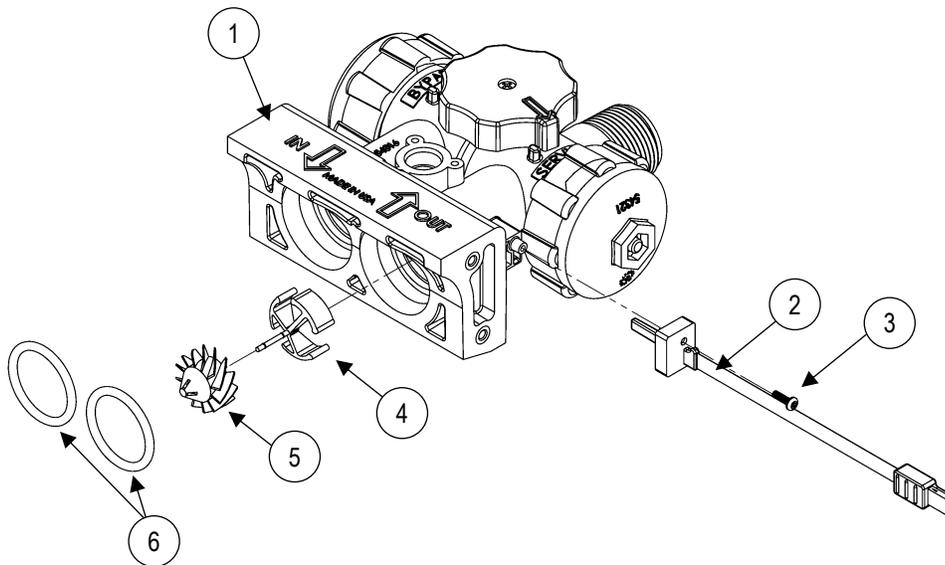


Figure 17: Bypass Valve Assembly

	Part # (Old Part #)	Description	Quantity
1	100238184 (54512)	Bypass Assembly (also includes items 2–6)	1
2	100238200 (93860)	Turbine Sensor Wire Assembly w/Cap	1
3	100238196 (90802)	Sensor Screw, self-tapping	1
4	100238202 (54320)	Plastic Turbine Axle	1
5	100238201 (90522)	Turbine Assembly	1
6	100242050 (93838)	O-Ring	2

## Assembly and Parts, Cont.

### Optional 3/4-inch and 1-inch I/O Adapter Assembly with Blending Valve

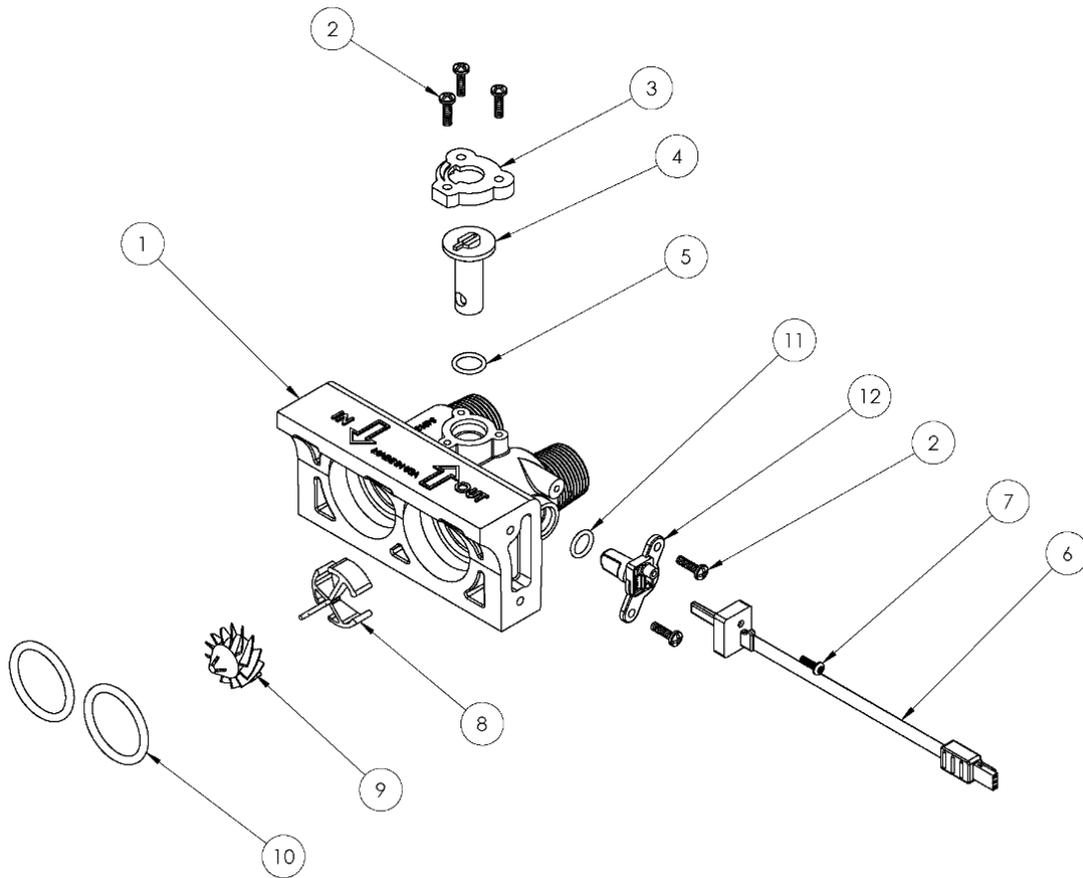


Figure 18: Optional 3/4-inch (19-mm) I/O Adapter Assembly with Blending Valve

	Part # (Old Part #)	Description	Quantity
1	100241993 (93521-BOM)	3/4-inch I/O Adapter Assembly	1
	100241964 (93252)	1-inch I/O Adapter (not shown)	
2	100238196 (90802)	# 6 X .5 Screw, self-tapping	5
3	100241811 (90252)*	Blending Dial Cap	1
4	100241804 (90222)*	Blending Dial	1
5	100241868 (90827)*	O-Ring	1
6	100238200 (93860)	Turbine Sensor Wire Assembly	1
7	100241861 (90809)	Sensor Screw, self-tapping	1
8	100238202 (54320)	Plastic Turbine Axle	1
9	100238201 (90522)	Turbine Assembly	1
10	100242050 (93838)	O-Ring	2
11	100241869 (90828)	O-Ring	1
12	100241189 (54605)*	Sensor Housing (not field serviceable)	1
	100241990 (93521)	Entire 3/4-inch Assembly (all the above parts)	
	100241991 (93521-1)	Entire 1-inch Assembly (all the above parts)	

\* Not field serviceable

## Assembly and Parts, Cont.

### Top Fill Plug Assembly

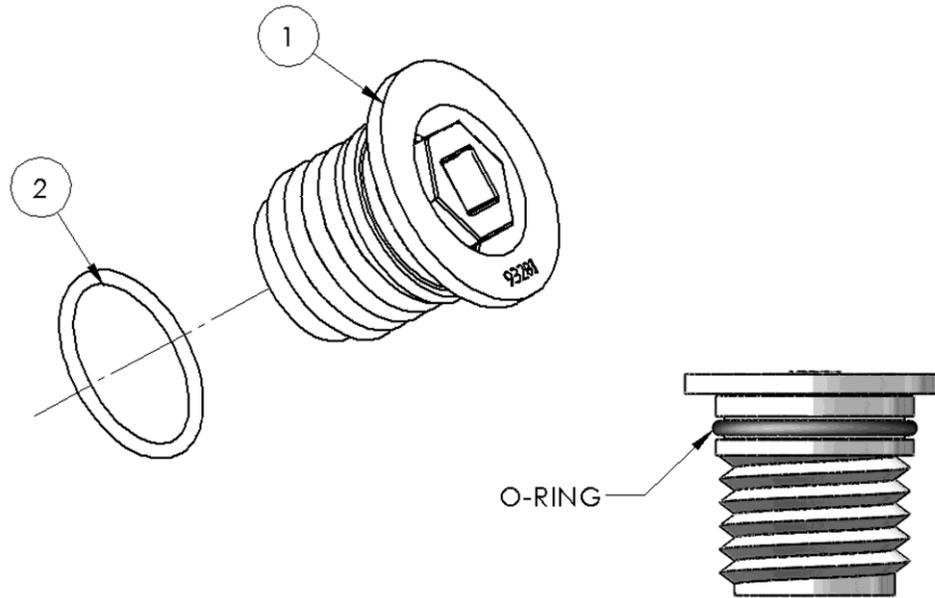


Figure 19: Top Fill Plug Assembly

	Part # (Old Part #)	Description	Quantity
1	100241974 (93281)	Top Fill Plug	1
2	100241972 (93272)	Top Fill Plug O-Ring	1

#### 100241974 (93281) Top Fill Plug

The Top Fill Plug (100241974 [93281]) seals the media access ports in the Media Tank. Care should be taken that the O-Ring seal area is kept clean and free of debris. Also, the O-Ring should be in the proper location in the groove. Do not overtighten the Top Fill Plug when assembling. When the flange comes into contact with the Media Tank, stop tightening. A 3/4-inch socket is recommended for assembly.

# Assembly and Parts, Cont.

## Drain End Cap Assembly

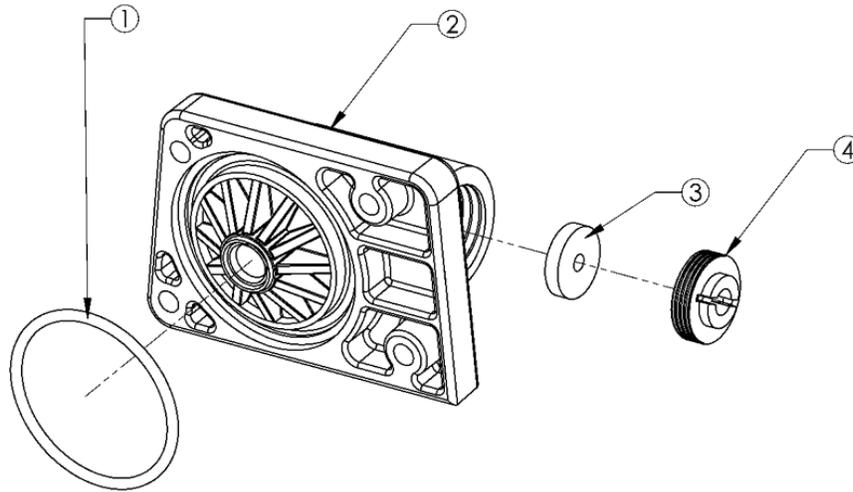


Figure 20: Drain End Cap Assembly

	Part # (Old Part #)	Description	Quantity
1	100241865 (90819)	O-Ring	1
2	100241822 (90268)	Drain End Cap	1
3	100242254 (H2086-2.0)	Drain Line Flow Control	1
	100242255 (H2086-2.4)		
	100242256 (H2086-3.0)		
4	100241821 (90267)	Retainer	1
	100238228 (90614-2.0)	Entire Assembly (all of the above parts)	1
	100238229 (90614-2.4)		
	100241852 (90614-3.0)		

<b>100241822 (90268) Drain End Cap</b>	The Drain End Cap (100241822 [90268]) seals the left opening on the Main Valve Body. The opening is sealed with an O-Ring used as axial or “face” seal. The O-Ring sits in a groove in the End Cap. This groove must be free of defects such as pits or scratches and also free of debris. When assembling the End Cap to the Valve Body, care should be taken to make sure that the O-Ring stays in the groove in the End Cap. If misaligned, the O-Ring can become pinched and leak.
<b>100242254 (H2086-2.0) Drain Line Flow Control</b>	The Drain Line Flow Control (DLFC) maintains a constant (plus or minus 10%) backwash flow rate at varying pressures. Care should be taken when replacing DLFCs to ensure that the correct rate is being used for a particular model. Refer to <i>Specifications</i> . When assembling the flow control, ensure that the rounded (radiused) side of the hole faces in toward the water flow. <ul style="list-style-type: none"> <li>• 100242255 (H2086-2.4)</li> <li>• 100242256 (H2086-3.0)</li> </ul>
<b>100241821 (90267) Retainer</b>	The Retainer (100241821) [90267] holds the backwash Flow Control (H2086) in place. One side is smooth and the other has a groove for a screwdriver. When assembling the retainer to the Drain End Cap (100241822 [90268]), the retainer should be screwed in until it stops. If the retainer is not fully engaged, the Flow Control may not function properly.

# Assembly and Parts, Cont.

## Drive End Cap Assembly

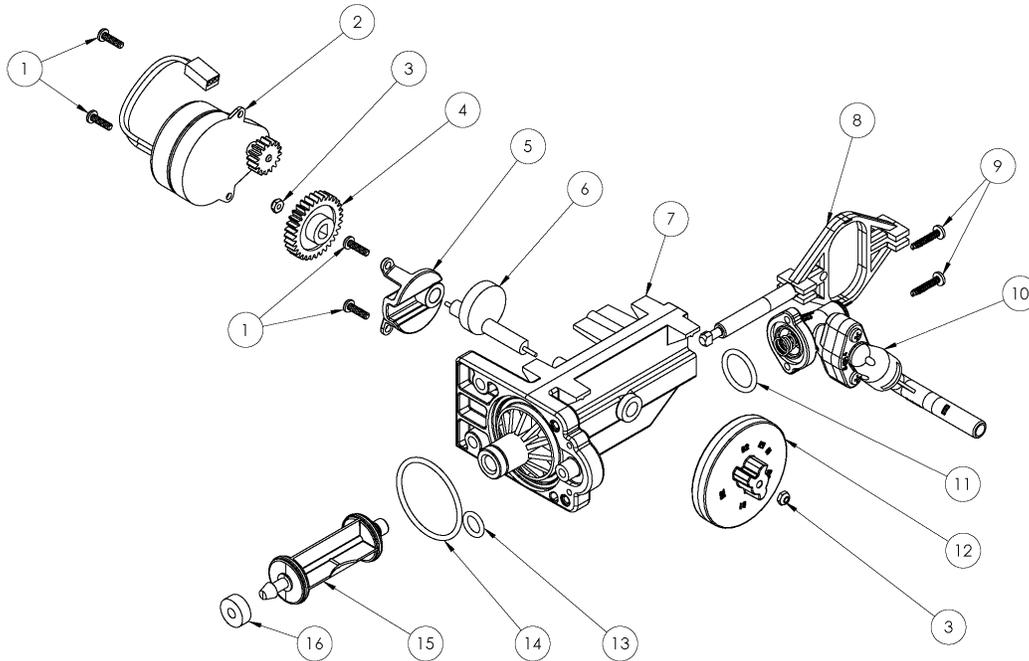


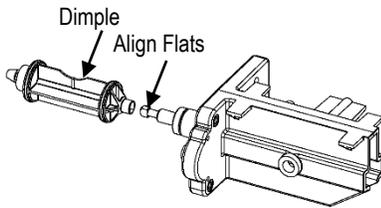
Figure 21: Drive End Cap Assembly

	Part # (Old Part #)	Description	Quantity
1	100238196 (90802)	Screw, self-tapping	4
2	100238181 (90217)	Drive Motor	1
3	100238190 (93891)	6-mm (1/4-inch) Hex Nut	2
4	100238188 (93238)	Drive Gear	1
5	100241941 (93219)	Piston Slide Cam Cover	1
	100037655 (N/A)	Piston Slide Cam Cover (New Style—not shown)	
6	100241940 (93217)	Piston Slide Cam	1
7	100242008 (93583)	Drive End Cap	1
8	100240958 (54202)	Piston Slide	1
9	100238197 (90818)	Screw, self-tapping	2
10	100241120 (54521)	Brine Valve Assembly	1
11	100241867 (90821)	O-Ring	1
12	100238193 (54502 KIT)	Magnet Disk Assembly	1
13	100037867 (120110)	O-Ring	1
14	100252691 (90819)	O-Ring	1
15	100238189 (53344)	Drive Piston Assembly (includes 100242051 [93839] Drain Gasket)	1
16	100242051 (93839)	Drain Gasket	1
	100252693 (54520)	Entire Assembly (all of the above parts except 1, 2, and 12)	
	100242117 (95315)	Entire Assembly with JG Fitting (Not Shown)	

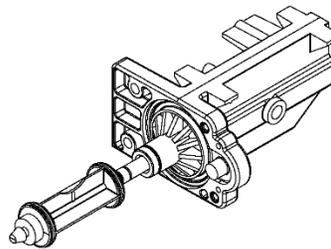
# Assembly and Parts, Cont.

## Drive End Cap Assembly Cont.

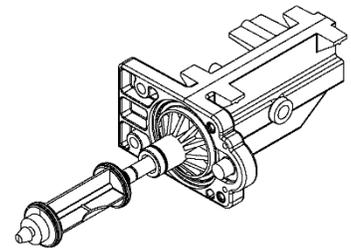
<b>100238181 (90217) Drive Motor</b>	The Motor is held in place by two, 1/2-inch self-tapping screws. The screws should be “snug.” The brass pinion gear on the Motor should engage the plastic Drive Gear (100238188 [93238]). The wires should be securely fastened to the Controller.
<b>100238188 (93238) Drive Gear</b>	The Drive gear is assembled to the Slide Cam by means of a “keyed” opening, which transfers the “torque” generated by the Motor to the rest of the drive system. If the drive system becomes jammed, this opening can become “rounded” causing the gear to turn, but not the Piston Slide Cam. If this occurs, clear the jam and replace the Drive Gear (100238188 [93238]) and Piston Slide Cam (100241940 [93217]).
<b>100241941 (93219) Piston Slide Cam Cover or 100037655 (N/A)–New Style</b>	The cover secures the Piston Slide Cam (100241940 [93217]) in place and acts as a bushing for the Cam Shaft.
<b>100241940 (93217) Piston Slide Cam</b>	This is the “heart” of the drive system. There is a threaded stainless steel shaft that runs through the main drive axle. The Drive Gear (100238188 [93238]) is attached at the short end and the Magnet Disk (100238193 [54502 KIT]) at the other end. The Slide Cam is assembled inside of the Piston Slide (100240958 [54202]). This Cam Shaft should turn freely before the Motor is assembled.
<b>100037805 (93583) Drive End Cap</b>	Seals the two openings on the Main Control Valve. The larger diameter opening is sealed with an O-Ring used as an axial or “face” seal. The O-Ring sits in a groove in the End Cap. This groove must be free of defects such as pits or scratches and also free of debris. The smaller diameter seal is accomplished with an O-Ring used as a radial seal. The O-Ring should be placed on the male boss on the End Cap. When assembling the End Cap to the Main Control Valve, care should be taken to make sure the small O-Ring is aligned with the opening in the Main Control Valve and that the large O-Ring stays in the groove in the End Cap. If misaligned, the O-Rings can become pinched and leak.
<b>100240958 (54202) Piston Slide</b>	The Slide should move freely inside the End Cap Housing.
<b>100238189 (53344) Drive Piston Assembly</b>	The Drive Piston attaches to the Piston Slide (100240958 [54202]) by placing the “slot” of the Piston onto the matching flat of the Slide. To remove Piston, rotate Piston 90° counterclockwise. To replace Piston, rotate 90° clockwise until you hear an audible “click.” See reference drawings below.



Position Piston Assembly (100238189 [53344]) Vertical



Slide Piston Assembly Onto Piston Slide. Push Toward End Cap To Stop.



Rotate The Piston Assembly 90 Degrees Clockwise Until You Hear An Audible Click As It Snaps Into Place

# Assembly and Parts, Cont.

## Brine Valve Housing Assembly

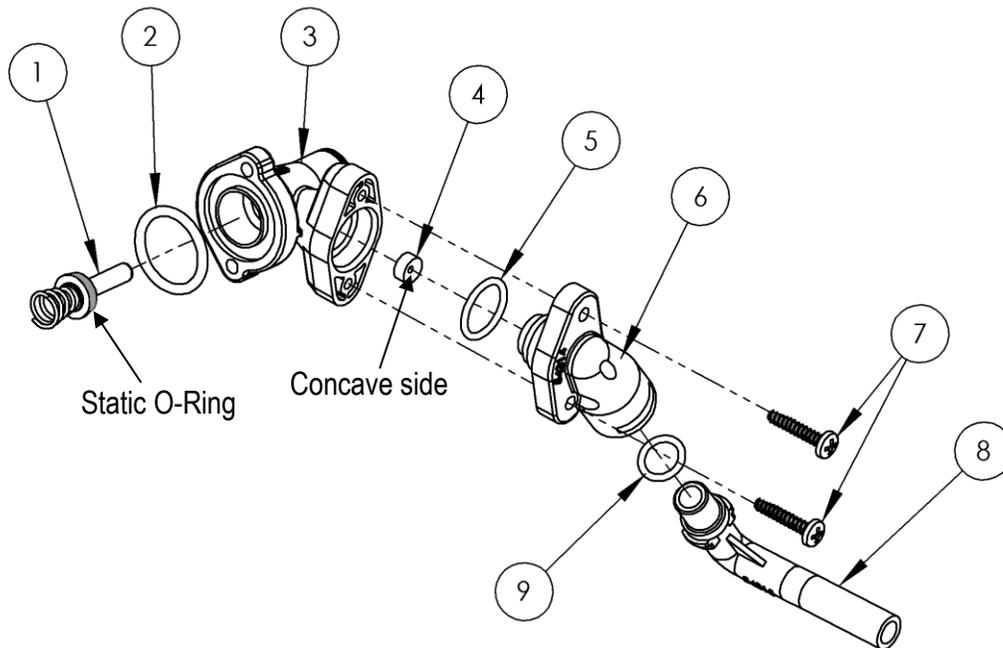


Figure 22: Brine Valve Housing Assembly

	Part # (Old Part #)	Description	Quantity
	1	100237712 (53511) Brine Piston Assembly (includes O-Ring & Spring)	1
	2	100241867 (90821) O-Ring	1
	3	100237707 (53510) Housing	1
	4	100241875 (90843) 1.9 L/min (0.5 gpm) Flow Control	1
	5	100242033 (93805) O-Ring	1
	6	100241001 (54314) Brine Valve Housing End Cap	1
	7	100238197 (90818) Screw, self-tapping	2
	8	100241002 (54315) Brine Valve Elbow	1
	9	100241869 (90828) O-Ring	1
		100241120 (54521) Entire Assembly (all the above parts)	

<b>100237712 (53511) Brine Piston Assembly</b>	The Piston should have an O-Ring on the shaft side of the flange and a spring pressed onto a boss on the other side. The O-Ring should be free of defects such as cuts or debris on the shaft side.
<b>100237707 (53510) Housing</b>	Just inside the entrance hole for the Brine Piston (100237712 [53511]) is a concave seat area that must be free of defects such as nicks, indentations, or debris. This seat area ensures a leak-free seal for the static O-Ring on the Brine Piston. If any defects are detected by visual inspection, repair or replace as needed.
<b>100241875 (90843) 1.9 L/min (0.5 gpm) Flow Control</b>	The Flow Button has two distinct and different sides. One is “flat”; the other is “concave.” The button should be centered in the housing opening with the four locator “ribs” with the concave side facing the Brine Valve Housing End Cap (100241001 [54314]).
<b>100241001 (54314) Housing End Cap</b>	The Cap is held in place by two 3/4-inch self-tapping screws that engage the Housing flange. An O-Ring seals the Cap and Housing. Place the O-Ring onto the housing end cap, lubricate with silicone grease and then using a twisting action, insert the Cap into the housing.

## Assembly and Parts, Cont.

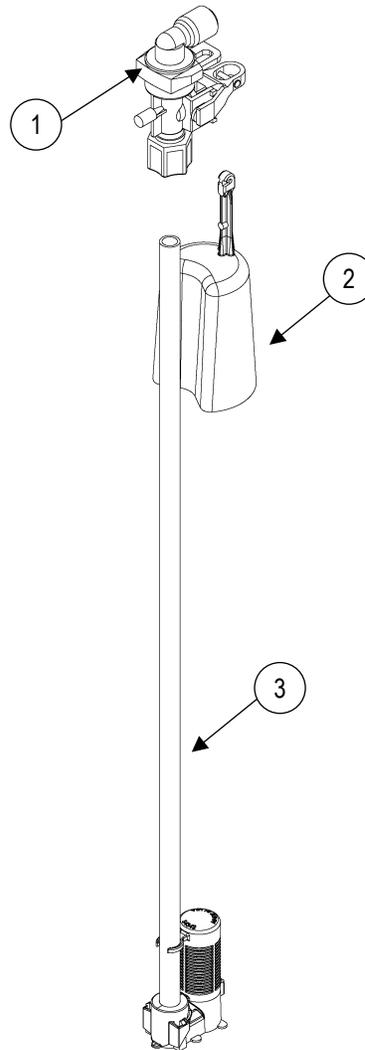


Figure 23: Safety Shutoff Assembly

	Part # (Old Part #)	Description	Quantity
1	100240967 (54225)	Safety Shutoff	1
2	100241668 (56018)	Float	1
3	100241220 (54728)	Air Check—Model 700	1
	100241222 (54729)	Air Check—Models 900 and 950	
	100065565 (180400)	Entire Assembly (all the above parts)—Model 700	
	100238183 (54900)	Entire Assembly (all the above parts)—Models 900 and 950	

# Troubleshooting

Problem	Possible Cause	Solution
<b>No soft water after regeneration</b>	No salt in brine cabinet.	Add salt.
	Sediment in brine cabinet has plugged the brine line and air check/draw tube.	Remove air check/draw tube and flush with clean water. Clean injector assembly. Clean any sediment from brine cabinet.
	Flow control is plugged.	Remove brine piston housing and clear debris from the flow control.
	Drain line is pinched, frozen, or restricted.	Straighten, thaw, or unclog the drain line.
	Injector assembly is clogged.	Remove injector cap and clean nozzle and throat with a wooden toothpick. Replace throat if removed.
	Salt bridge has formed due to high humidity or the wrong kind of salt.	Test with a blunt object like a broom handle. Push the handle into the salt to dislodge the salt bridge or use hot water around the inside perimeter to loosen salt.
<b>No soft water</b>	The bypass valve is in the Bypass position.	Place the bypass valve in the Service position.
	Appliance is plumbed backward.	Check that appliance is plumbed correctly.
	There is an extended power outage	Reset the time of day.
	Water hardness has increased.	Re-test the water and re-enter a new setting number.
	Not metering water	waterMizer indicator should turn with water usage. If no flow, see below.
	Blending dial is open (applies only if have 3/4-inch or 1-inch I/O Adapter).	Close blending dial.
<b>No flow is indicated when water is flowing</b>	The bypass valve is in the Bypass position.	Place the bypass valve in the Service position.
	Appliance is plumbed backward.	Check that appliance is plumbed correctly.
	Sensor not receiving signal from magnet on turbine.	Remove sensor from Bypass housing. Test with magnet on either flat side of sensor. If flow is indicated, check turbine. If no flow, replace sensor.
<b>Flow indicated when water is not being used</b>	The household plumbing system has a leak.	Repair the leak.
<b>No read-out in display</b>	Electric cord is unplugged.	Plug in the transformer.
	No electric power at outlet.	Check power source. Make sure outlet is not controlled by a switch.
	Transformer is defective.	Test with voltmeter for 12 VAC at control. If less than 10 VAC or greater than 14 VAC, replace the transformer.
	Circuit board is defective.	With 12 VAC present at controller, replace the controller.
	High ambient room temperature. If the temperature exceeds 49°C (120°F), the display will blank out. This does not affect the operation of the controller.	No action necessary.

## Troubleshooting, Cont.

Problem	Possible Cause	Solution
<b>Appliance stays in regeneration</b>	Controller not attached properly	Make sure the controller is pushed all the way onto the drive end cap.
	Defective magnet disk	Replace magnet disk.
	Foreign object in main control valve	Remove foreign object(s) from the main control valve.
	Broken valve assembly. Motor running.	Repair the drive end cap.
<b>Excess water in brine cabinet. Should be approximately 15–20 cm (6–8 inch) with salt for 700 and 950, and 20–25 cm (8–10 inch) for 900</b>	Restricted, frozen, or pinched drain line	Remove restriction, thaw, or straighten drain line.
	Plugged brine line, brine line flow control, or air check/draw tube	Clean flow control, air check/draw tube, and brine line. Clean any sediment from the brine cabinet.
	Plugged injector assembly	Clean or replace injector. Replace throat if removed.
	Sticking brine refill valve	Remove valve. Check for obstruction.
<b>Not regenerating in proper sequence</b>	Magnet disk defective	Replace magnet disk.
	Defective controller	Replace controller.
<b>Salty water</b>	Plugged injector	Replace injector screen, nozzle, and throat.
	Low water pressure	Maintain minimum pressure of 1.4 bar (20 psi).
	Drain line or flow control is restricted	Remove restriction.
	Brine line restricted or crimped	Remove restriction, replace if crimped.
	Excessive amount of water in brine cabinet	Verify correct water level relative to salt setting. Check lines and fittings for loose connections.
	Intermittent pressure drop from feed source	Install check valve on the inlet water line to the appliance (Check local plumbing codes first).
	Brine valve drips water back to brine cabinet.	Clean brine valve housing, replace piston assembly.
<b>Controller error messages</b>	“E1” Home not found	Cycle power by unplugging the transformer and plugging it back in. It will look for Home again. Make sure the controller is pushed all the way onto the drive end cap.
	“E2” Motor error	Plug motor in and cycle power. If it is already plugged in, then motor wiring or the motor plug is defective.
	“E3” Home offset	Disk did not start in proper home location. Controller will automatically try to reset itself by finding Home and continuing the regeneration. Make sure the controller is pushed all the way onto the drive end cap.
	“E4” Home latched	Gear teeth are not engaged, gear is stripped, or something is jammed in the valve. Cycle the power to reset.
	“E5” Memory Error	Replace controller.

## Water Conditioner Specifications–Metric

**Note:** The specifications for your appliance may vary if it has been modified by the factory.

	700	900	950
Max Compensated Hardness (mg/L)	1200	1540	600
Maximum ferrous iron reduction (mg/L)	10	10	0
Minimum pH (standard units)	7	7	7
Media type and amounts	Self-Cleaning Filter Media Super Fine Mesh Resin Total: 20 L	Self-Cleaning Filter Media Super Fine Mesh Resin Total: 28 L	Redox Media–1.8 kg Activated Carbon–7 L Super Fine Mesh Resin–20 L Total: 28 L
<b>High Efficiency</b>			
Salt <sup>1</sup> (kg)	1.1	1.4	1.1
Capacity (grams)	620	892	620
Water (L)	61	64	68
Time (min)	18	21	18
<b>High Capacity</b>			
Salt <sup>1</sup> (kg)	2.9	3.4	2.9
Capacity (grams)	1,173	1,790	1,173
Water (L)	95	125	102
Time (min)	33	48	33
Water and ambient temperature (Min/Max °C)	4/49	4/49	4/49
Mineral tank size (cm)	26.7 I.D. x 48.3	26.7 I.D. x 66	26.7 I.D. x 66
Peak flow rate (L/min @ bar drop)	30/1.0	30/1.0	30/1.0
Pressure drop at service flow rate of 30 L/min (bar)	1.0	1.0	1.0
Maximum flow rate to drain during regeneration–backwash (L/min)	7.6	7.6	11.4
Water Pressure (min–max bar)	1.4–8.3	1.4–8.3	1.4–8.3
Minimum water flow required (L/min)	7.6	7.6	11.4
Maximum chlorine (mg/L)	0	0	2
Controller type	4 Button Icon	4 Button Icon	4 Button Icon
Salt storage (kg)	55	73	73
Height (cm)	65	78	78
Footprint (cm)	38 x 48	38 x 48	38 x 48
Electrical rating	12 VAC, 50/60 Hz, 0.015kW-hr	12 VAC, 50/60 Hz, 0.015kW-hr	12 VAC, 50/60 Hz, 0.015kW-hr
Plumbing connections	3/4- or 1-inch male (MNPT)	3/4- or 1-inch male (MNPT)	3/4- or 1-inch male (MNPT)
Shipping weight—approximate (kg)	39	48	48

<sup>1</sup> Use clean white pellet, cube-style, or solar salt  
These appliances are efficiency rated according to NSF/ANSI 44.

## Water Conditioner Specifications–English

**Note:** The Specifications for your appliance may vary, if it has been modified by the factory.

	700	900	950
Max Compensated Hardness (gpg)	70	90	35
Maximum ferrous iron reduction (ppm)	10	10	0
Minimum pH (standard units)	7	7	7
Media type and amounts	Self-Cleaning Filter Media Super Fine Mesh Resin Total: 0.7 ft <sup>3</sup>	Self-Cleaning Filter Media Super Fine Mesh Resin Total: 1 ft <sup>3</sup>	Redox Media–4 lb Activated Carbon–0.25 ft <sup>3</sup> Super Fine Mesh Resin–0.7 ft <sup>3</sup> Total: 1 ft <sup>3</sup>
<b>High Efficiency</b>			
Salt <sup>1</sup> (lb)	2.5	3.0	2.5
Capacity (grains)	9,561	13,765	9,561
Water (gal)	16	17	18
Time (min)	18	21	18
<b>High Capacity</b>			
Salt <sup>1</sup> (lb)	6.5	7.5	6.5
Capacity (grains)	18,109	27,629	18,109
Water (gal)	25	33	27
Time (min)	33	48	33
Minimum/Maximum water and ambient temperature (°F)	40/120	40/120	40/120
Mineral tank size (inch)	10.5 I.D. x 19	10.5 I.D. x 26	10.5 I.D. x 26
Peak flow rate (gpm) @ /psi drop	8/15	8.2/15	8/15
Pressure drop at service flow rate of 8 gpm (psi)	15	14.6	15
Maximum flow rate to drain during regeneration–backwash (gpm)	2.0	2.0	3.0
Water Pressure (min–max psi)	20–120	20–120	20–120
Minimum water flow required (gpm)	2.0	2.0	3.0
Maximum chlorine (ppm)	0	0	2.0
Controller type	4 Button Icon	4 Button Icon	4 Button Icon
Salt storage (lb)	120	160	160
Height (inch)	25.5	30.5	30.5
Footprint (inch)	15 x 19	15 x 19	15 x 19
Electrical rating	12 VAC, 50/60 Hz, 0.015kW-hr	12 VAC, 50/60 Hz, 0.015kW-hr	12 VAC, 50/60 Hz, 0.015kW-hr
Plumbing connections	3/4- or 1-inch male (MNPT)	3/4- or 1-inch male (MNPT)	3/4- or 1-inch male (MNPT)
Shipping weight—approximate (lb)	85	105	105

<sup>1</sup> Use clean white pellet, cube-style, or solar salt  
These appliances are efficiency rated according to NSF/ANSI 44.

# Notes

---

# Notes

---

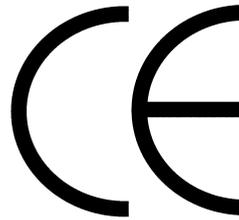
# Notes

---

# Notes

---

***Third-party listings:***



**Models 700, 900, and 950 Water Softeners**

4343 S. Hamilton Rd. Groveport, OH 43125

USA and Canada: 1-800-437-8993

Outside of North America: 1-614-836-2115