AQUAMASTER®

PRO

THE PROFESSIONAL LINE OF WATER CONDITIONERS

MODELS AMP50, AMP51, AMP55, AMP51IF, AND AMP51NF

OWNER'S MANUAL AND INSTALLATION GUIDE

VERSION 1.0—CANADA

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 AquaMaster® PRO 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

AquaMaster® PRO warrants that upon receipt from the original owner of any mechanical or electronic part which is found to be defective in materials or workmanship, AquaMaster® PRO will repair or replace the defective item for 3 years from date of original installation. Media is not warranted.

AquaMaster® PRO further warrants that upon receipt from the original owner of any AquaMaster® PRO media tank/valve body, brine cabinet, found to be defective in material or workmanship, AquaMaster® PRO 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 AquaMaster® PRO PREPAID, and replacement parts will be returned by AquaMaster® PRO 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. AquaMaster® PRO 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, sulphur, 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, AquaMaster® PRO 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.

Claims Procedures

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

AquaMaster® PRO
4343 South Hamilton Road
Groveport, Ohio 43125, USA

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.) AquaMaster® PRO reserves the right to replace defective parts with exact duplicates or their equivalent.

Call the HelpLine, 1-800-437-8993, for Return Information from 8 a.m. to 5 p.m. EST. The HelpLine fax number is (614) 836-9876.

Contents

General Information

Congratulations on choosing a superior AquaMaster® PRO 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 the HelpLine: 1-800-437-8993 from 8 a.m. to 5 p.m. EST. The HelpLine fax number is (614) 836-9876.

The HelpLine is available to answer questions about specific water problems, appliance installation, and operation. When calling the HelpLine, please have this guide and the serial number of your appliance available.

AquaMaster® PRO
4343 S. Hamilton Rd.
Groveport, OH 43125, USA
(614) 836-2115
Fax: (614) 836-9876

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 water conditioning appliance models:

- AquaMaster® PRO AMP50
- AquaMaster® PRO AMP51
- AquaMaster® PRO AMP55
- AquaMaster® PRO AMP51IF
- AquaMaster® PRO AMP51NF

For Owner's Reference

Date of Installation: _____

Model Number: _____

Serial Number*: _____

Hardness: _____

Iron: _____

pH: _____

Water Pressure: _____

Water Temp: _____

Returned Warranty Card Date†: _____

* The serial number is located on the valve body in front of the bypass.

† Completely fill out the Warranty Card and return it by mail to ensure that the appliance is registered with the factory and the warranty becomes validated.

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. A clean pellet, solar, or cube-type 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 for Softeners*.
   Caution: Do not use potassium chloride if there is iron and/or manganese in the water.
3. Should your electricity be off for any reason, check your controller for the correct time and reset as necessary (See *Advanced Customer Settings for Softeners* and *Setting the Controller for Filters*).
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. If your appliance runs out of salt:
   A. Open the salt lid and add salt.
   B. Wait two hours, then press and hold the Regenerate button for 5 seconds.
6. If dirt, sand, or large particles are present in the water supply, the appropriate AquaMaster® PRO filter can eliminate this problem.
7. The appliance may be disinfected with 5.25% sodium hypochlorite, which is the active ingredient in household chlorine bleach. To disinfect the appliance, add 4.0 fluid ounces (0.12 liters) of chlorine bleach solution to the brine well of the brine cabinet. The brine cabinet should have water in it. Start a manual regeneration.
8. Protect the appliance, including the drain line, from freezing.
9. 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. Use Bypass mode also for watering plants or lawns with untreated water.
10. Before putting the appliance back in service after work has been performed, turn on the nearest cold water tap until water runs clear.
11. Adhere to all operational, maintenance, and placement requirements.
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 AMP55 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. Potassium permanganate will need to be added periodically to any iron filter.
15. Models AMP50, AMP51, and AMP55 are 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, consider pre-treating 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 AquaMaster® PRO Water Filter can address these water shortcomings.‡

- AquaMaster® PRO AMP51NF—Adjusts low pH water to a non-corrosive state.
- AquaMaster® PRO AMP51IF—Reduces iron, hydrogen sulfide, and iron bacteria.

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

❒ Water Characteristics—The AMP50, AMP51, and AMP55 Water Softeners require a pH of 7 or above to function properly. An iron test to determine iron levels is also necessary. The AMP51NF 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 AMP50 will condition water for up to 70 grains of hardness per gallon (1,197 mg/L).
- Model AMP51 will condition water for up to 90 grains of hardness per gallon (1,539 mg/L). (See *Specifications*.)
- Model AMP55 is FOR MUNICIPALLY-SUPPLIED WATER without iron. Model AMP55 will condition water up to 35 grains of hardness per gallon (599 mg/L).

❒ Water Pressure—Not less than 20 psi (1.4 bar) or greater than 120 psi (8.4 bar) constant. If water pressure exceeds 70 psi (4.8 bar), a pressure regulator is recommended.**

❒ Water Supply Flow Rate—A minimum of 2.4 gallons (9 liters) for the AMP50 and AMP51 models to 3 gallons (11.4 liters) for the AMP55 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.

‡ Not NSF Certified

§ 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 5 grains per gallon (86 mg/L) for every 1 ppm (1 mg/L) of ferrous iron.

** Applies to US plumbing codes. Check the plumbing codes of your country.

Checklist Before Installation, Cont.

- ❒ Water Temperature—Not less than 40°F (6°C) or greater than 120°F (49°C).
- ❒ 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*.
- ❒ Electricity—Check the transformer to ensure it is appropriate for your country.

Precautions

Do

1. Comply with all applicable building, plumbing, and electrical codes.
2. Test your water quality with the strips 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 from the pressure tank to appliance on well water with iron (recommended minimum inlet pipe size 3/4-inch (19-mm) I.D. On municipal water, recommended minimum inlet pipe size is 1/2-inch (13 mm) I.D.
6. Install a pressure-reducing valve if the inlet pressure exceeds 70 psi (4.8 bar).††
7. Install a gravity drain on the cabinet.
8. Secure the drain line on the appliance and at the drain outlet. See *Installation Steps*.
9. Allow a minimum of 8 to 10 feet (2.4 to 3.0 m) of 3/4-inch (19-mm) 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 120°F (49°C).
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*.
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.

†† Applies to US plumbing codes. Check the plumbing codes of your country.

Installation Steps

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 water test strips, eight 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 (19-mm) 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.

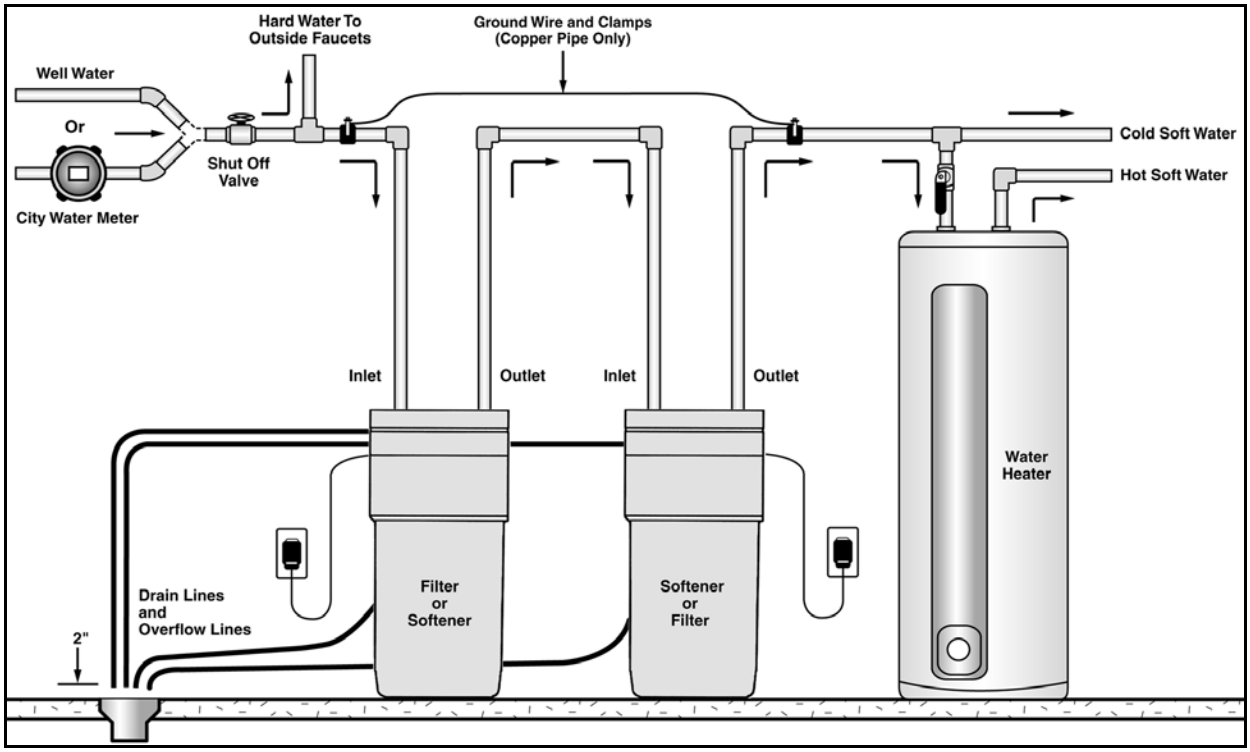


Figure 1: Appliance Placement

‡‡ Not NSF Certified

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. When installing a carbon filter for well water, place the filter after any water conditioning appliance unless otherwise recommended. Contact the HelpLine for further assistance in determining the proper installation sequence.
Water Heaters: If less than 10 feet (3.0 m) 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 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*

Qest fittings are provided to facilitate installation, but their use is not required. Be sure to read the *Plastic (PVC/CPVC) Pipe Joining Procedure*, if using PVC/CPVC.

Step 4A: Using Qest Fittings

A. Lift and remove the valve cover.

B. Install Qest fittings. Qest connection fittings are provided with your appliance. Qest fittings provide a convenient, easy-to-use three-piece assembly for 3/4-inch copper plumbing or 3/4-inch CTS CPVC plastic tubing (copper is shown in Figure 2). Ensure that the three components (1: collar, 2: metal retaining ring, and 3: nylon sleeve) are correctly installed in sequence on the pipe. (See Figure 2.)
Note: No Teflon tape or plumber's putty is necessary. It should NOT be used with Qest fittings.

C. Attach the water lines to the appliance in compliance with all applicable building, plumbing, and electrical codes. (See Figure 3.) Do NOT overtighten the connections on the plastic threads.

D. 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.

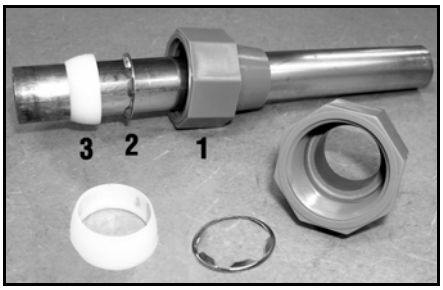


Figure 2: Qest Fittings

Figure 3: Connect Water Lines. Note the Bypass Valve.

Step 4B: (Optional) Hard Plumbing With 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.

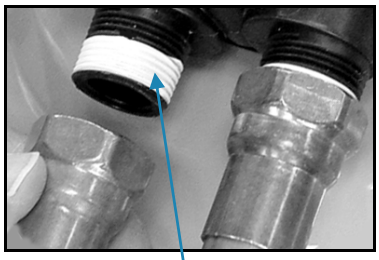


Figure 4: Plumbing Connections

A. Wrap the threads three times with 1/2-inch (2.5-cm) 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 4 inch (10 cm) 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.

Installation Steps, Cont.

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. 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.

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 overflow elbow and check that it is in the down position. (See Figure 5.)
B. Connect 1/2-inch (13-mm) 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 3 inches (8 cm) lower than the bottom of the overflow fitting. Maintain a minimum of 5 cm (50 mm) air gap. The gravity line cannot be run overhead.

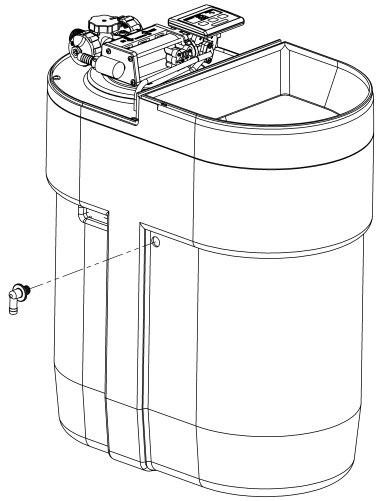


Figure 5: Gravity Overflow Connection

Step 6

Connect Drain Line

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

A. Connect the drain line to the drain end cap (See Figure 6) with a minimum 1/2-inch (13-mm) I.D. tubing (supplied). The size cannot be reduced.
B. Route the drain line to a floor drain, laundry tub, or other suitable waste receptor. Maintain a minimum 2-inch (5-cm) 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.
C. The drain line may be elevated up to 8 feet (2.4 m) from the discharge on the appliance as long as the water pressure in your system is 40 psi (2.8 bar) or more.

Figure 6: Connect Drain Line

D. If the drain line is 25 feet (7.6 m) or longer, increase the drain line to 3/4-inch (19-mm) 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.

Step 7 *Flush Lines*

A. If your appliance is equipped with a bypass, place the appliance in the Bypass position. (See Figure 7.)
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 mode.
Note: To prevent untreated water from entering your home, remember to not use water inside your home when the appliance is in Bypass mode. Remember to return the appliance to Service mode when you have finished using untreated water.

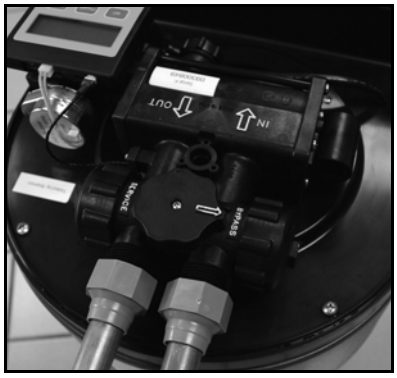


Figure 7: Bypass Position

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 main water supply.
   6. If your appliance is equipped with a bypass, place the appliance in the Service position to slowly fill the media tank. (See Figure 8.)
   7. Open a cold water faucet to purge air out of the media tank.
   8. Close the faucet and recheck for leaks.

Figure 8: Service Position

Installation Steps, Cont.

Bypass Valve

Your appliance is 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 is located on the main control valve. To engage the bypass, 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 mode. Ensure that the appliance is returned to Service mode 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, turn the knob slightly from the Service position toward the Bypass position.

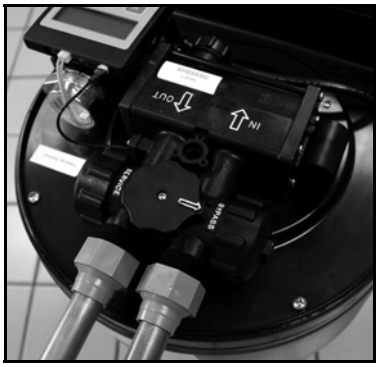


Figure 9: Bypass Valve

Next Step

The next step is Start Up. Start-up procedures are provided for each of the following units

- AquaMaster® PRO Water Softeners AMP50, AMP51, and AMP55 (See page 15.)
- AquaMaster® PRO AMP51NF Acid Neutralizing Filter (See page 21.)
- AquaMaster® PRO AMP51IF Iron Filter (See page 22.)

Be sure to follow the *Start-Up Procedure* for your specific appliance.

Start-Up Procedures—AMP50, AMP51, and AMP55

Step 1 *Plug in the Transformer*

A. Connect the transformer power cord to the back of the controller. (See Figure 10.)
B. Plug the transformer into an appropriate outlet.
C. Ensure that the outlet selected is NOT operated by an On/Off switch.

Figure 10: Connect Power Cord

Step 2 *Set Up the Controller*

A. Program the appliance controller. See *Setting the Controller for Softeners*.

Step 3 *Add Water to the Brine Cabinet*

A. Add 2 gallons (7.6 liters) 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 for Softeners*) 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 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 4 *Fill the Brine Cabinet With Salt*

A. Fill the brine cabinet with salt. Use clean, white pellet 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 5 *Complete the Installation*

A. Ensure that the bypass valve is in the Service position. See Figure 8.
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 72 gallons (273 liters) 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. Place the cover on the cabinet.

Four-Button Controller for Softeners

Note: If you have an AMP51NF or AMP51IF water filter, see *Setting the Controller for Filters*.

This appliance features a four-button 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 Controller

Controller Part	Function
LCD Display	Shows the status of the controller
Demand Mode	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 Note: You should not need to change from Demand Mode
Soft Water Remaining Gallons x 100 or Liters x 100 (or 1000)	Shows the gallons (or liters) of soft water remaining until the next automatic regeneration. Typically, each person in the household uses about 75 gallons (284 liters) per day. Water remaining is in gallons in hundreds or liters in hundreds or thousands, depending on how much capacity is remaining. For example: 88 = 8,800 gallons (33=3,300 or 33,000 liters)
Recharge/ Regeneration Status	Shows regeneration cycle numbers during regeneration. The read-out will flash with the cycle number. The flashing regeneration numbers are: 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) When regeneration is complete, the display shows the number of gallons or liters in hundreds of soft water remaining. (See above) Regeneration typically is complete in about 30 minutes.
waterMizer™	Indicates that water is flowing through the appliance; the waterMizer™ indicator turns whenever water is being used; useful for checking for proper plumbing and leaks Note: The waterMizer™ indicates water flow for softeners only.
powerClean™	Displays when feature is activated. See *Power Clean Button*

Four-Button Controller, Cont.

Button	Function
Set	Used to set Customer Settings
Change	Used to change Customer Settings
Power Clean	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 5 lb (2.3 kg) 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
Regenerate	Used when starting your water conditioner to start an immediate regeneration, or to restore capacity if you run out of salt To Start an Immediate Regeneration 1. Press and hold the Regenerate button for about five seconds. 2. The appliance is in regeneration mode and will display the status of each cycle. 3. After all regeneration cycles are complete, the display will return to normal operating mode. To Quickly Advance Through the Regeneration Cycles (used when starting up or diagnosing the appliance only) 1. Press and hold the Regenerate button for about five seconds until the cycle begins. 2. The cycle position will display (for example, 01). 3. After 20 seconds, press and hold the Regenerate button until the cycle number changes (about 2 seconds). Each cycle can be advanced by pressing the Regenerate button. Always wait until the cycle position displays before advancing to the next cycle position.

Setting the Controller for Softeners

Step 1 *Determine the Controller Setting Number*

A. For municipal water, call the water department to determine the hardness and pH of your water supply.

B. For well water, use the hardness test strips provided with your appliance or have a sample of your untreated water tested by a water testing laboratory.

1. Test Strips—Follow the instructions on the test strips. If the color on your test strip is between two readings, use the higher number. Compare the colors as soon as you remove them from your water. This number gives the hardness in grains per gallon and parts per million (mg/L).
2. If the pH is below seven, call the HelpLine listed in *General Information*.

C. Use the following example to determine the controller setting.

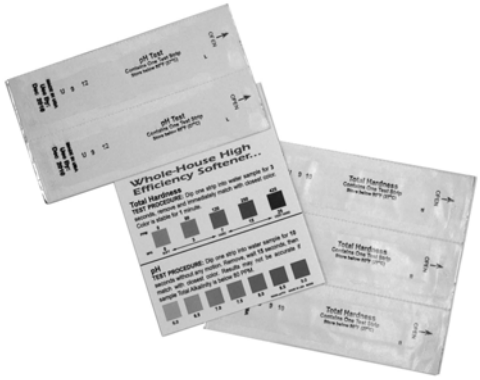


Figure 12: Hardness Test Strips

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

* Increase your water hardness setting by 5 gpg (86 mg/L) for every ppm (1 mg/L) 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 Set button for about 5 seconds.

B. Press the Change button until the display matches your compensated number.

C. Press Set to save the hardness setting number.

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

Your hardness number is now set in the controller.

Advanced Customer Settings for Softeners

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 the requirement some local codes have for salt efficiency.

To Enter Advanced Customer Settings Mode

A. Press the Set and Change buttons for 3 seconds. The display should show only the controller type. After 3 seconds, the entire screen is lit for a half second, and then "HC" displays.

B. Press Change to toggle the digit display between "HC" and "HE."

C. When the desired value is displayed, press Set.
Note: HE ensures the appliance chooses salt settings that get 4,000 grains per pound (570 grams/kg) of salt for each regeneration or better. This choice meets or exceeds the requirement some local codes currently have in regards to salt efficiency.

Note: All models are equipped with patented capacity guard.

Once you have set HC or HE, you can continue to set the rest of the advanced customer settings.

Step 1

Set Mode

Display reads "Demand Mode."

To Change Mode

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

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

Step 2

Set 96 Hours Until Regeneration

Display reads "96 Hours."

To Change Setting

A. Press Change to turn Off. If "96 Hours" is selected, the appliance will work no more than 4 days without a regeneration. Default is for "96 Hours" to be On.
Note: If there is iron in your water, select this option. If you are using model AMP55, turn this option Off for most municipal water supplies.

B. When the desired setting is displayed, press Set.

Step 3 *Set Gallons or Liters*

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

To Set Gallons or Liters

A. Press Change to toggle between gallons and liters. Choosing “Gallons” sets the controller to English units, and choosing “Liters” sets it to metric units.
B. When the desired units are displayed, press Set.

Step 4 *Set Time Format*

Display reads “12” if gallons were chosen or “24” if liters were chosen.

To Set Time Format

A. Press Change to toggle between 24 and 12. This controls the selection of a 12-hour (AM/PM) or 24-hour clock. If 24-hour clock , 00=midnight.
B. When the desired time format is displayed, press Set.

Step 5 *Set Time of Day*

Display reads “Set Time” and “12” (or “24”).

To Change Time of Day

A. Press Change until the current time is displayed. Default is 12 PM.
Note: Set time to the nearest hour.
B. When the desired time is displayed, press Set.

Step 6 *Set Regeneration Time*

Display reads “Set Reg. Time” followed by the current regeneration time that is set (02).

To Change Regeneration Time

A. Press Change. Default is 2 AM.
B. When the desired regeneration time is displayed, press Set.

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

Programming is now complete.

Start-Up Procedures—AMP51NF Acid Neutralizing Filter

Important

The neutralizing filter is capable of elevating a low pH condition (acid) in your water. Install, set up, and use the filter 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.

Step 1 *Plug in the Transformer*

A. Connect the transformer power cord to the back of the controller. See Figure 13.
B. Plug the transformer into an appropriate outlet.
C. Ensure that the outlet selected is NOT operated by an on/off switch.

Figure 13: Connect Power Cord

Step 2 *Program the Regeneration Cycle*

To ensure reliable performance and optimum efficiency, program the regeneration cycle (backwash) to occur every one to two days based on local conditions. On the controller, set the frequency and time of day for regeneration to occur. Follow the instructions provided in *Setting the Controller for Filters*.

Step 3 *Adjust Water Softener Hardness Setting*

Typically, hardness will increase by two to four grains after passing through the neutralizing filter (0.13–0.26 grams). If you have a water softener, after implementing the start-up steps for the acid neutralizing filter:

A. Test the hardness of the water before it enters the water softener.
B. Reset the hardness setting appropriately on the water softener.

Note: The appliance requires periodic (annual) replenishment of the neutralizing media that adjusts the pH level of the water. See *AMP51NF Acid Neutralizing Filter Replenishment Procedure*.

Step 4 *Start the Regeneration Cycle*

Before placing the filter in service, backwash the filter to remove fine media particles in the filter bed. To backwash the filter, start the regeneration cycle as follows:

A. Press and hold the REGENERATE button until the controller indicates 01 (flashing). The regeneration cycle begins.
B. Regeneration is complete after seven minutes, and the appliance returns to service mode. The controller will display a 01 or 02. This number is the days until the next regeneration.

Start-Up Procedures—AMP51IF Iron Filter

Important

The iron filter is capable of treating a combination of undesirable constituents (iron and/or hydrogen sulfide) in water.* Install, set up, and use the filter 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.

Water Testing—The iron filter, like any other appliance, requires correct installation and setting for optimum performance. To ensure proper settings, you need to have a sample of your untreated water tested for iron and pH. A pH of seven or above is necessary for the appliance to function properly.

Step 1 *Plug in the Transformer*

A. Connect the transformer power cord to the back of the controller. (See Figure 14.)
B. Plug the transformer into an appropriate outlet.
C. Ensure that the outlet selected is NOT operated by an On/Off switch.

Figure 14: Connect Power Cord

Step 2 *Add Water*

A. Slowly fill the media tank until water flows steadily to service.
B. Once filled, turn off water and allow the appliance to sit for 10 minutes.
C. After 10 minutes, press and hold the REGENERATE button until the controller indicates 01 (flashing). The regeneration cycle begins.
D. Wait for at least 30 seconds.
E. Unplug the transformer
F. Allow the appliance to sit for 25 minutes.
G. Replug in the transformer.
H. Quickly advance through the regeneration cycle until the Home position is reached. (See *Regenerate Button* on page 17.)

Step 3 *Add Potassium Permanganate*

A. Open the port lid and add 3 gallons (11 liters) of water.
B. Slowly add 3 lb (1.4 kg) of potassium permanganate. Coarse granular potassium permanganate (P/N 97804) is recommended. Do not use fine granular potassium permanganate since it can be drawn into the filter as a solid rather than as a liquid.
Caution: Use care when handling potassium permanganate. Refer to the product label for further operating and handling instructions.
C. Thoroughly mix with a clean wooden paint paddle. (Do NOT use plastic.) Stir the potassium permanganate until the color is a dark walnut.
Note: Stir the potassium permanganate and water mixture every two weeks. If the water is a pink color, add another 3 lb (1.4 kg) of potassium permanganate. Potassium permanganate will last approximately three to six months.
D. Wait 15 minutes after adding potassium permanganate before starting the regeneration cycle.

* Not NSF Certified

Step 4 *Start the Regeneration Cycle*

A. Press and hold the REGENERATE button until the controller indicates 01 (flashing). The regeneration cycle begins. During regeneration, water bypasses the appliance to allow iron and sediment to wash down the drain through the following six-step process:

1. First Upflow Backwash—A rapid upflow of water flushes out the media bed.
2. Regeneration—Regenerant is drawn out of the solution cabinet and up through the media tank, cleaning the media bed and releasing accumulated iron and hydrogen sulfide.
3. Slow Rinse—A slow upflow rinse process that flushes out the regenerant and iron.
4. Second Upflow Backwash—This upflow backwash flushes out any remaining regenerant and sediment from regeneration.
5. Downflow Clean Water Refill—Filtered water is directed to the solution cabinet to prepare the regenerant for the next regeneration sequence.
6. Return to Service—Regeneration is complete after approximately 45 minutes and the appliance is returned to service mode. The controller will display a number between 01 to 14. This number is the days to next regeneration.

Step 5 *Program the Regeneration Cycle*

A. To ensure reliable performance and optimum efficiency, program the regeneration cycle to occur every one to fourteen days. Use the following worksheet to determine the appropriate frequency for scheduling the regeneration cycle for your appliance. Use the example as a guide.

B. On the controller, set the frequency and time of day for regeneration to occur. Follow the instructions provided in *Setting the Controller for Filters*.

Regeneration Cycle Frequency Worksheet				
	Your Water		Example	
Total Iron	_____ ppm x 1 =	____ ppm	2.4 ppm x 1 =	2.4 ppm
+ Manganese*	_____ ppm x 3 =	____ ppm	0.2 ppm x 3 =	0.6 ppm
+ Sulfur	_____ ppm x 5 =	____ ppm	1.0 ppm x 5 =	5.0 ppm
= Total compensated ppm		____ ppm		8.0 ppm
x Gallons per day for one person		75 gal		75 gal
= ppm per person per day	=	____ ppm		600 ppm
x Number of people in household		____ people		3 people
= Daily ppm capacity		____ ppm		1800 ppm
Iron filter capacity	=	5600 ppm		5600 ppm
÷ Daily ppm capacity	=	____ ppm		1800 ppm
= Frequency of regeneration		____ days		3.1 days
Set regeneration frequency	@	____ days		3 days

*If manganese is unknown, multiply the iron and sulfur total by 1.15 to adjust total compensated ppm.

Step 6 *Determine Monthly Potassium Permanganate Usage*

A. Use the regeneration cycle frequency determined in Step 5 and the following worksheet to determine the monthly potassium permanganate usage. Use the example as a guide.

Monthly Potassium Permanganate Usage Worksheet		
	Your Water	Example
Total days per month	_____ days	30 days
÷ Frequency of regeneration	_____ days	3 days
= Regenerations per month	_____ regenerations	10 regenerations
x 2.8 oz per regeneration = oz potassium permanganate per month	_____ oz	28 oz
÷ 16 = lb per month	_____ lb	1.75 lb

Setting the Controller for Filters

Note: If you have an AMP51NF or AMP51IF water filter, see *Setting the Controller for Softeners*.

This appliance features a four-button 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.

To ensure that your appliance operates properly, set the controller as follows:

Figure 15: Four-Button Controller

Step 1 — *Set the Frequency of Regeneration or Backwash*

A. Press and hold the SET and CHANGE buttons for three seconds. When "01" displays, release the SET button.
B. Press and release the CHANGE button until the desired frequency number displays.
C. Press the SET button to return to the main screen. The number you selected will be displayed. This number indicates the number of days until the next regeneration or backwash.

Step 2 — *Set Time Format*

Display reads "12" if gallons were chosen or "24" if liters were chosen.

To Set Time Format

A. Press Change to toggle between 24 and 12. This controls the selection of a 12-hour (AM/PM) or 24-hour clock. If 24-hour clock , 00=midnight.
B. When the desired time format is displayed, press Set.

Step 3 — *Set Time of Day*

Display reads "Set Time" and "12" (or "24").

To Change Time of Day

A. Press Change until the current time is displayed. Default is 12 PM.
   Note: Set time to the nearest hour.
B. When the desired time is displayed, press Set.

Step 4 — *Set Regeneration Time*

Display reads "Set Reg. Time" followed by the current regeneration time that is set (02).

To Change Regeneration Time

A. Press Change. Default is 2 AM.
B. When the desired regeneration time is displayed, press Set.

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

Note: If you have a softener installed with the filter, stagger the regeneration times. Set the softener to regenerate first, followed by the filter.

AMP51NF Acid Neutralizing Filter Replenishment Procedure

The acid neutralizing filter requires periodic (annual) replenishment of the neutralizing media that adjusts the pH level of the water. Use the freeboard distance as described in the following section and the diagram to determine the amount of media needed to adjust the bed depth to maintain optimum performance of the neutralizer.

Tools and Materials Needed

The following tools and materials are needed to replenish the neutralizing media:

- Analog scale (do not use digital)
- Steel tape measure
- 5-gallon (18.9 liters) bucket with handle
- Replacement media (P/N M050)
- 1/2-inch (1.3 cm) siphon hose
- Funnel with 1-inch (2.5 cm) fill tube
- 36-inch (1 meter) wooden ruler or dowel rod
- 3/4-inch socket with ratchet

Replenishment Procedure

The replenishment procedure is as follows:

Step 1 *Turn Off the Water*

A. Turn off the water to the appliance.
B. Open a tap to depressurize the appliance.
C. Close the tap.

Step 2 *Remove Water From Media Tank*

A. Use the 3/4-inch socket to remove the fill plug from the media tank.
B. Insert the siphon hose into the fill port.
C. Siphon the water into the bucket until the media level in the tank is reached.

Step 3 *Calculate Amount of Media to Replenish*

A. Measure the freeboard distance from the top of the tank to the media. See Figure 16. Note: The recommended freeboard distance is 6.5 inches (16.5 cm).
B. Add 4.5 lb (2 kg) of media per inch below 6.5 inches (16.5 cm).

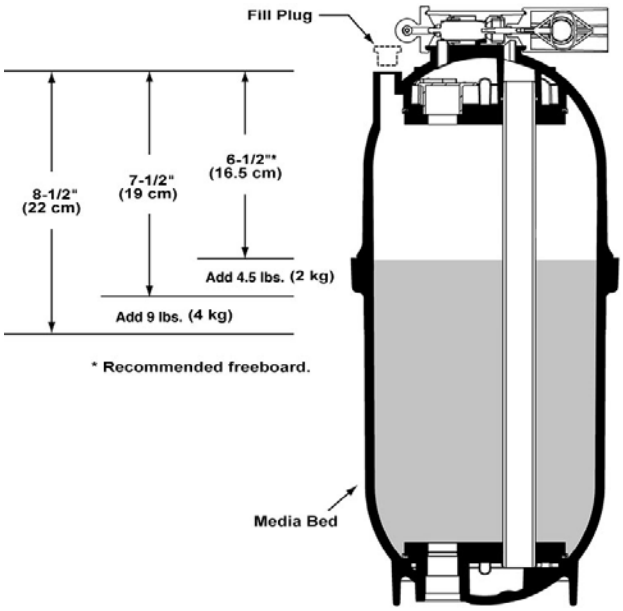


Figure 16: Maximum Freeboard Amount

Example:

Measured freeboard	8.5 inches		22 cm
Minus factory freeboard	6.5 inches	-	16.5 cm
Equals Adjusted freeboard	2.0 inches		5.5 cm

Replenishment equals approximately 4.5 lb* (2 kg) of media x 2.0 inches (5 cm) (adjusted freeboard) = 9 lb (4 kg).

AMP51NF Acid Neutralizing Filter Replenishment Procedure, Cont.

Step 4 *Add Replenishment Media*

A. Weigh the replenishment media.
B. Place the funnel into the tank.
C. Pour the media into the funnel to fill the tank with the measured amount of media.

Step 5 *Fill the Tank With Water*

A. Open the main water valve and slowly fill the tank with water up to the bottom of the fill port.
B. Turn off the water.
C. Make sure the threads of the fill port are clean and replace the fill plug.
Caution: Do NOT over-tighten the fill plug.

Step 6 *Check for Leaks*

A. Turn on the water to re-pressurize the appliance.
B. Check for leaks. (See *Check for Leaks* on page 13.)
C. Fix any leaks.

Step 7 *Backwash Neutralizer*

A. Press the Regenerate button.
B. When the controller reads “01”, slowly rotate the bypass knob clockwise to displace air until the drain runs steady. Fully rotate the bypass knob clockwise to place the appliance in the Service position. Let the appliance finish the backwash cycle and return to service.

Cabinet/Cover/Salt Lid Assemblies

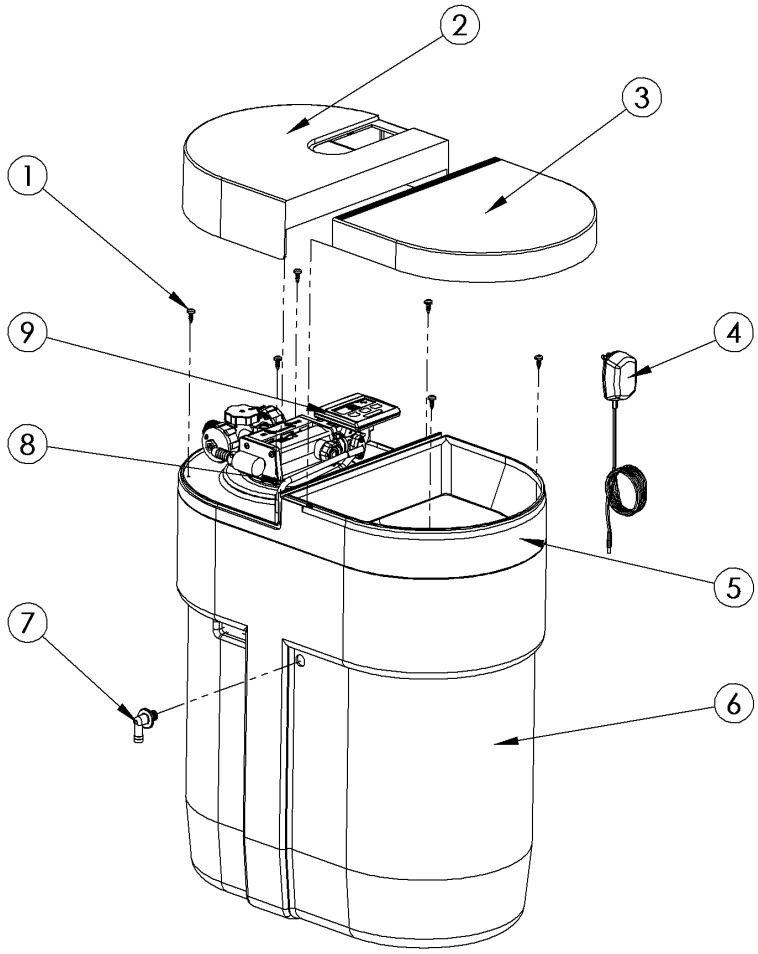


Figure 17: Cabinet and Cover Assemblies

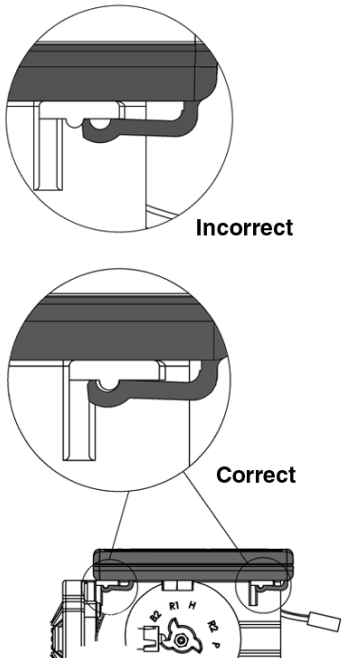


Figure 18: Controller Tab Lock Detail

	Part #	Description	Quantity
1	90801	Screw	6
2	95204	Valve Cover Assembly	1
3	95205	Salt Port Lid	1
4	93245	12 Volt Transformer/Power Cord	1
5	95203	Support Panel	1
6	95202	Cabinet	1
7	C0700	2 Piece Overflow	1
8	93848	3/8" Brine Tubing, 2 ft	1
9	54545-700	Computer Control Assembly—AMP50 and AMP55	1
	54545-900	Computer Control Assembly—AMP51	
	54540-IF	Computer Control Assembly—AMP51IF	
	54540-AF	Computer Control Assembly—AMP51NF	

Cabinet and Assemblies

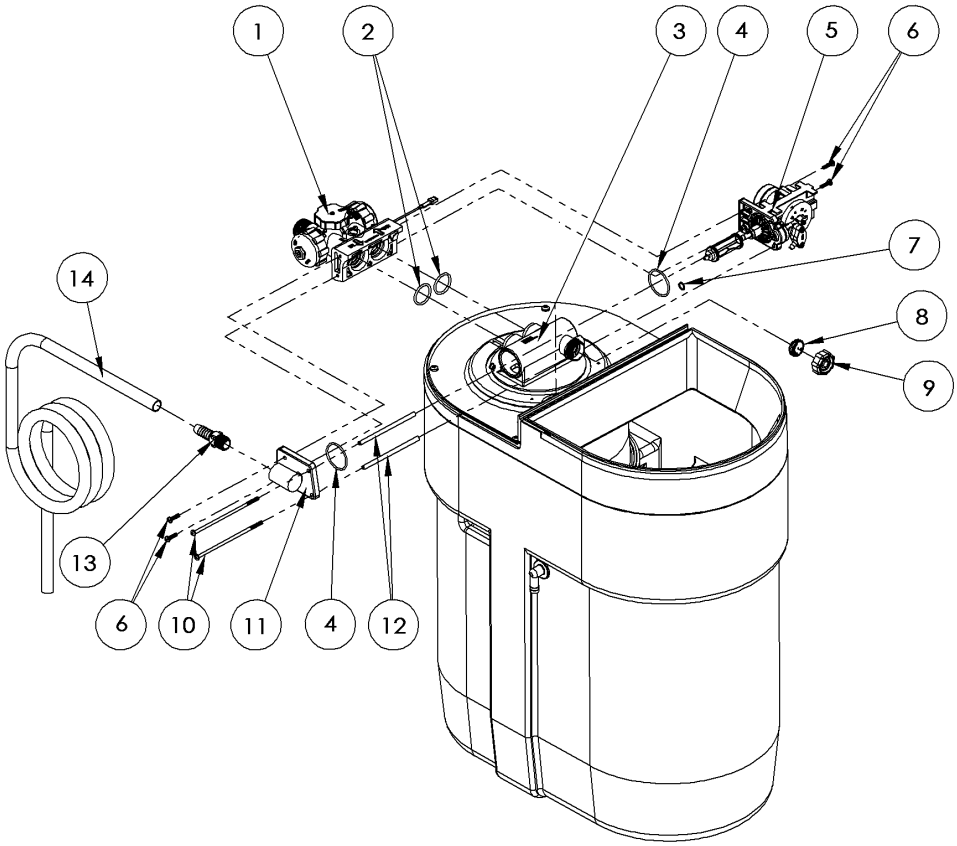


Figure 19: Cabinet and Assemblies

	Part #	Description	Quantity
1	54512	Bypass Assembly	1
2	93838	O-Ring	2
3	95505	Resin Tank Assembly	1
4	93808	O-Ring	2
5	95301T	Drive End Cap Assembly—AMP50, AMP51, AMP55, and AMP51IF	1
	95302T-BWO	Drive End Cap Assembly—AMP55NF	
6	93809	Screw	4
7	90828	O-Ring	1
8	53224	Injector Nozzle	1
9	53235	Injector Cap	1
10	93809	Screw	2
11	90614-2.4	Drain End Cap Assembly—AMP50, AMP51, and AMP55	1
	90614-5.0	Drain End Cap Assembly—AMP51IF and AMP55NF	
12	93835	Spacer Tube	2
13	V185	Drain Line Fitting	1
14	93842	Drain Hose 8 ft.	1

Injector Assembly

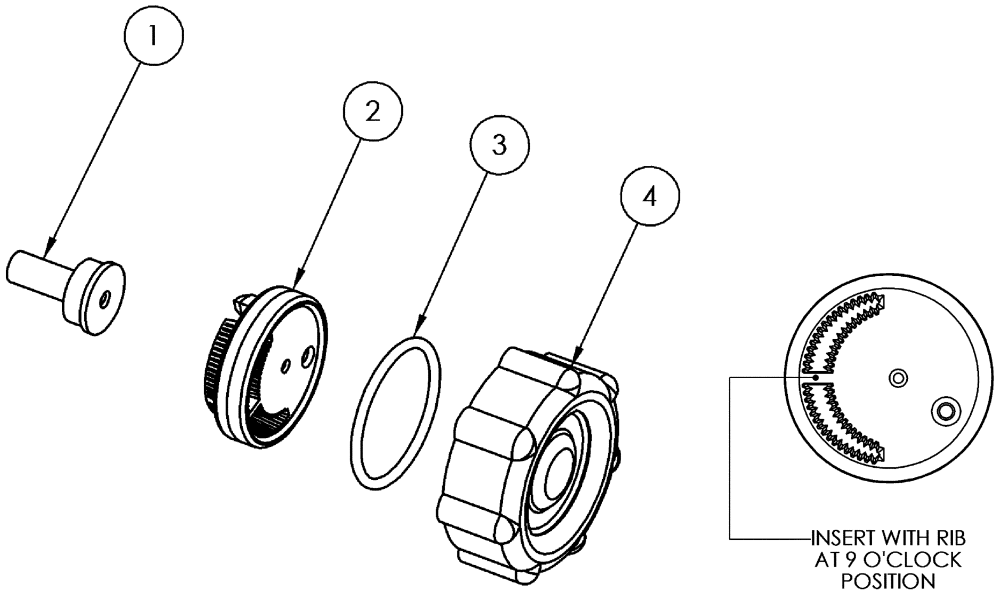


Figure 20: Injector Assembly

	Part #	Description	Quantity
1	93223	Injector Throat	1
	93223-Red*	Injector Throat (AMP51IF)	
2	53224	Injector Nozzle with Over-Mold Gasket	1
	53224-Red*	Injector Nozzle with Over-Mold Gasket (AMP51IF)	
3	93806	O-Ring	1
4	53235	Injector Cap	1
	93504	Entire Assembly (all of the above parts)	
	93504-Red*	Entire Assembly (all of the above parts) (AMP51IF)	

* For use on AMP51 Iron Filter only

93223 Injector Throat	In conjunction with the Injector Nozzle (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.
53224 Injector Nozzle with Over-Mold Gasket	Together with the Throat (93223) creates the vacuum that draws the brine solution from the Brine Cabinet. The small hole in the Injector Nozzle (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.
53235 Injector Cap	Holds the injector assembly together and seals the assembly to the Main Valve Body.

Bypass Assembly

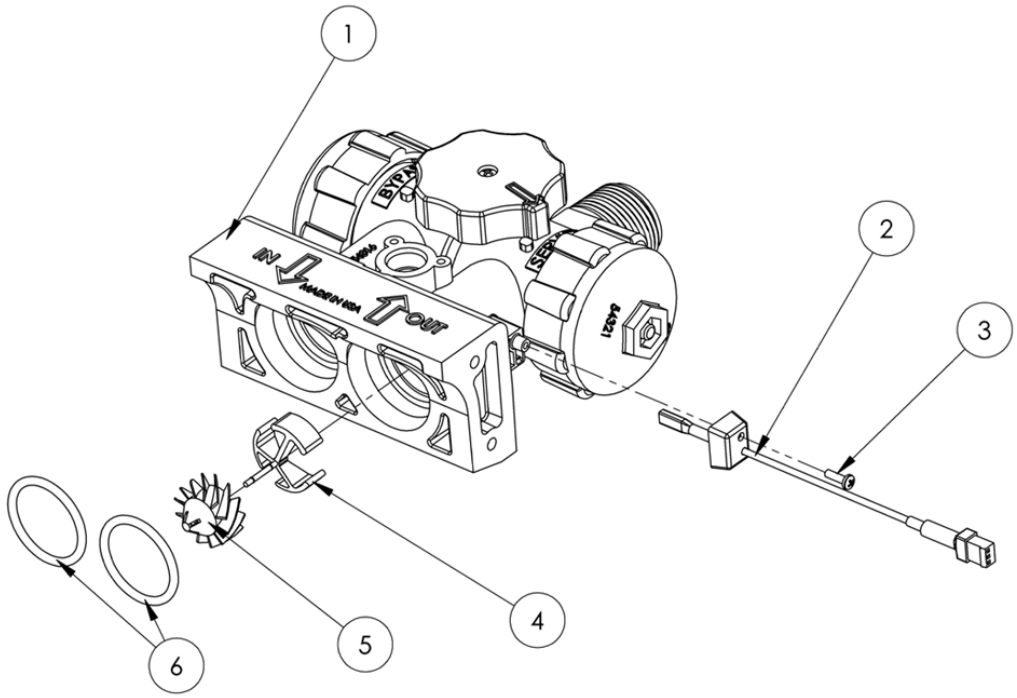


Figure 21: Bypass Assembly

	Part #	Description	Quantity
1	54512	Bypass Assembly—AMP50, AMP51, and AMP55 (also includes items 2–6)	1
	54523	Bypass Assembly—AMP51IF and AMP51NF	
2	93860	Turbine Sensor/Cap Assembly—AMP50, AMP51, and AMP55	1
3	90809	Screw, self-tapping—AMP50, AMP51, and AMP55	1
4	54320	Plastic Turbine Axle—AMP50, AMP51, and AMP55	1
5	90522	Turbine Assembly—AMP50, AMP51, and AMP55	1
6	93838	O-Ring	2

Drive End Cap Assembly

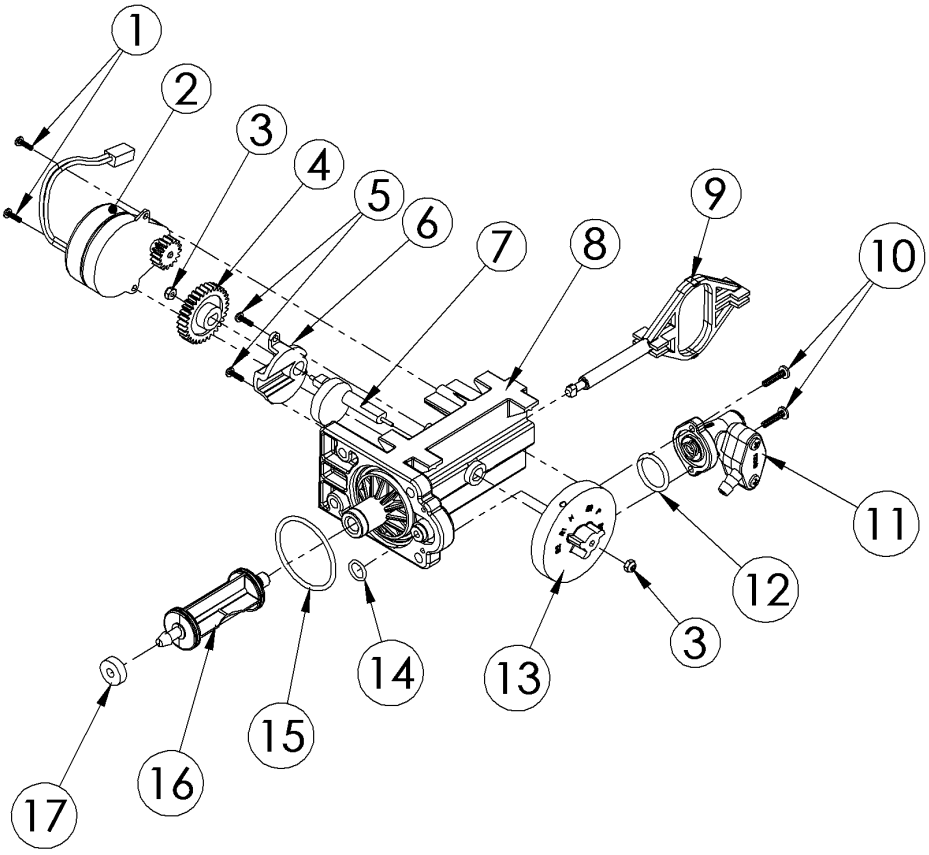
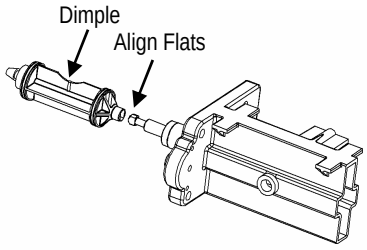


Figure 22: Drive End Cap Assembly

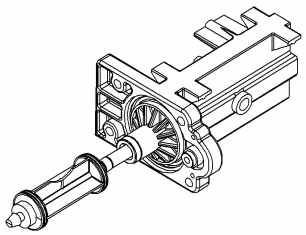
	Part #	Description	Quantity
1	90802	Screw, self-tapping	2
2	90217	Drive Motor	1
3	93891	1/4" Hex Nut	2
4	93238	Drive Gear	1
5	90809	Screw, self-tapping	2
6	93219	Piston Slide Cam Cover	1
7	93217	Piston Slide Cam	1
8	93583	Drive End Cap	1
9	54202	Piston Slide	1
10	90818	Screw, self-tapping	2
11	93601	Brine Valve Assembly	1
12	90821	O-Ring	1
13	54502 KIT	Magnet Disk Assembly	1
14	90828	O-Ring	1
15	93808	O-Ring	1
16	53522	Drive Piston Assembly (includes 93839 Drain Gasket)	1
17	93839	Drain Gasket	1
	95301T	Entire Assembly (all of the above parts except 1, 2, and 13)	

Drive End Cap Assembly Cont.

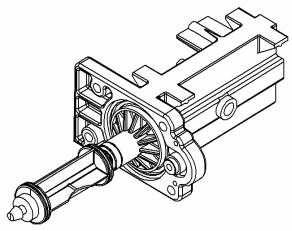
90217 Drive Motor	The Motor is held in place by two 1/2-inch self-tapping screws. The screws should be "snug." The brass pinion gear on the Motor should engage the plastic Drive Gear (93238). The wires should be securely fastened to the Controller.
93238 Drive Gear	The Drive Gear is assembled to the 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 (93238) and Piston Slide Cam (93217).
93219 Piston Slide Cam Cover	The cover secures the Piston Slide Cam (93217) in place and acts as a bushing for the Cam Shaft.
93217 Piston Slide Cam	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 (93238) is attached at the short end and the Magnet Disk (54502) at the other end. The Slide Cam is assembled inside of the Piston Slide (54202). This Cam Shaft should turn freely before the Motor is assembled.
93583 Drive End Cap	Seals the two openings on the Main Valve Body. 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 Valve Body, care should be taken to make sure the small O-Ring is aligned with the opening in the Valve Body and that the large O-Ring stays in the groove in the End Cap. If misaligned, the O-Rings can become pinched and leak.
54202 Piston Slide	The Slide should move freely inside the End Cap Housing.
93601	Attaches to the Drive End Cap with two 3/4-inch self-tapping screws and has one O-Ring seal. The O-Ring is used as a axial or face seal. The O-Ring sits in a groove in the Brine Valve Housing. The groove and the face seal must be free of defects such as pits and scratches or debris.
53522 Drive Piston Assembly	The Drive Piston attaches to the Piston Slide (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 (53522) 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

Brine Valve Housing Assembly

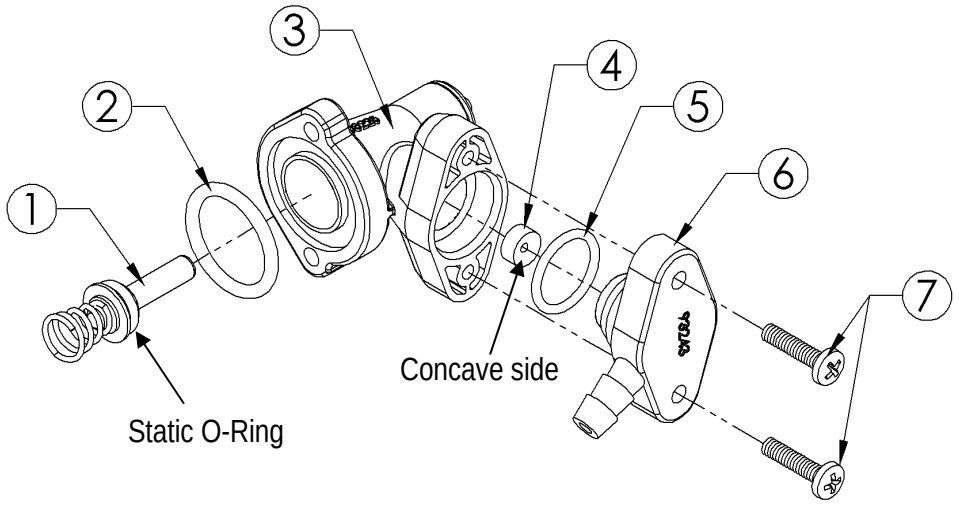


Figure 23: Brine Valve Housing Assembly

	Part #	Description	Quantity
1	53511	Piston Assembly (includes O-Ring & Spring)	1
2	90821	O-Ring	1
3	53510	Housing	1
4	90843	0.5 gpm Flow Control	1
5	93805	O-Ring	1
6	93243	Housing End Cap	1
7	90818	Screw, self-tapping	2
	93601	Entire Assembly (all of the above parts)	

53511 Brine Piston	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.
53510 Housing	Just inside the entrance hole for the Brine Piston (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.
90843 0.5 gpm Flow Control	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 Housing End Cap (93243).
93243 Housing End Cap	The Cap is held in place by two 3/4-inch self-tapping thread cutting screws that engage the Housing flange. An O-Ring seals the Cap and Housing. Place the O-Ring into the housing opening, lubricate with silicone grease and then using a twisting action, pressure insert the Cap.

Safety Shutoff Assembly

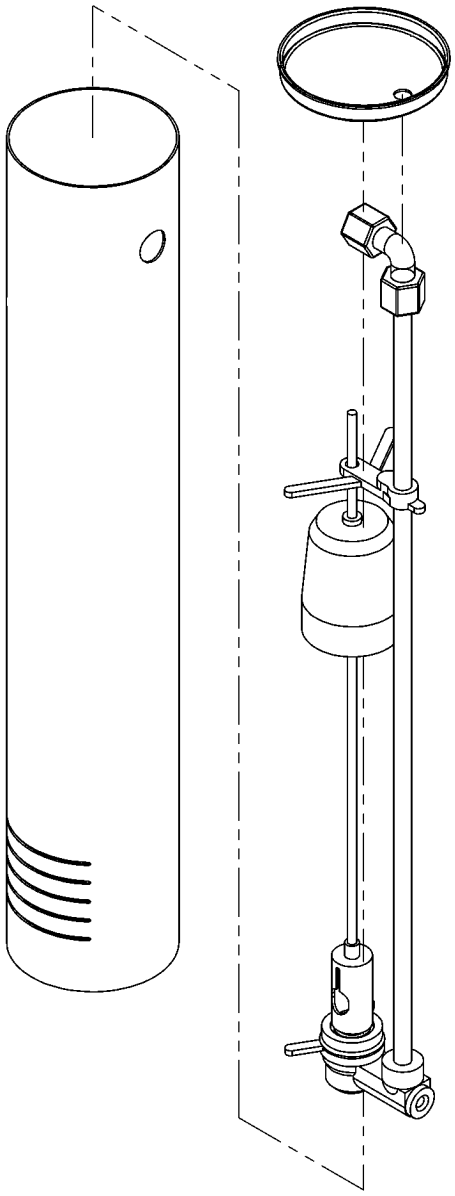


Figure 24: Safety Shutoff Assembly

	Part #	Description	Quantity
	93811-20.0 PS	Safety Shutoff/Brine Well Assembly	1
	93811-19.5 PS	Safety Shutoff/Brine Well Assembly—AMP51IF only	

Troubleshooting

Problem	Possible Cause	Solution
No soft water after regeneration	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
	Drain line is pinched, frozen, or restricted	Straighten, thaw, or unclog the drain line
	Clogged injector assembly	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
No soft water	The bypass valve is in the Bypass position	Place the bypass valve in the Service position
	Appliance is plumbed backwards	Check that appliance is plumbed correctly
	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
No flow is indicated when water is flowing	The bypass valve is in the Bypass position	Place the bypass valve in the Service position
	Appliance is plumbed backwards	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
Flow indicated when water is not being used	The household plumbing system has a leak	Repair the leak
No read-out in display	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
	Defective transformer	Test with volt meter for 12 VAC at control. If less than 10 VAC or greater than 14 VAC, replace the transformer
	Defective circuit board	With 12 VAC present at controller, replace the controller
	High ambient room temperature. If the temperature exceeds 120°F (49°C), the display will blank out. This does not affect the operation of the controller	No action necessary

Troubleshooting, Cont.

Problem	Possible Cause	Solution
Appliance stays in regeneration	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 valve body	Remove foreign object(s) from the valve body
	Broken valve assembly. Motor running	Repair the drive end cap
Excess water in regenerant cabinet. Should be approximately 6–8 inches (15–20 cm) with salt for AMP50 and AMP55 and 3–4 inches (8–10 cm) for AMP51IF	Restricted, frozen, or pinched drain line	Remove restriction, thaw, or straighten drain line
	Plugged regenerant line, regenerant line flow control, or air check/draw tube	Clean flow control, air check/draw tube, and regenerant line
	Plugged injector assembly	Clean or replace injector. Replace throat if removed
	Sticking regenerant refill valve	Remove valve. Check for obstruction
Not regenerating in proper sequence	Magnet disk defective	Replace magnet disk
	Defective controller	Replace controller
Salty water (or purple water—iron filter)	Plugged injector	Replace injector screen, nozzle, and throat
	Low water pressure	Maintain minimum pressure of 20 psi
	Drain line or flow control is restricted	Remove restriction
	Regenerant line restricted or crimped	Remove restriction, replace if crimped
	Excessive amount of water in brine (or regenerate) 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
	Power Clean On	Turn Off Power Clean
	Excessive regeneration	Reprogram regeneration frequency
Controller error messages	“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

Specifications

	SOFTENERS[1]			FILTERS[1]	
	Reduce Ferrous Iron		Reduce Chlorine	Iron Filter	Neutralizing Filter
	AMP50[2]	AMP51[2]	AMP55[2]	AMP51IF[5]	AMP55NF[6]
Max Compensated Hardness–gpg (mg/L)	70 (1,200)	90 (1,540)	35 (600)	N/A	N/A
Maximum Capacity–grains (grams)	22,100 (1,432)	36,400 (2,359)	22,100 (1,432)	N/A	N/A
Maximum ferrous iron reduction–ppm	10	10	0	15	N/A
Minimum pH (standard units)	7	7	7	7	6.3
Media type and amounts	Self Cleaning Filter Media. Super Fine Mesh Resin Total–0.7 cu. ft. (0.02 cu. m)	Self Cleaning Filter Media. Super Fine Mesh Resin Total–1 cu. ft. (0.03 cu. m)	Redox Media–4 lb (1.8 kg) Activated Carbon–0.25 cu. ft. (0.007 cu. m) Super Fine Mesh Resin–0.7 cu. ft. (0.02 cu. m)	Greensand–0.7 cu. ft. (0.02 cu. m)	Calcite/Corosex–0.7 cu. ft. (0.02 cu. m)
Salt used per regeneration–lbs (kg)	2.5[3] (1.1)	3[3] (1.4)	2.5[3] (1.1)	2.8[4] (1.3)	Backwash only
Length of regeneration cycle–minutes	20[3]	21[3]	20[3]	44	7
Water used per regeneration–gallons (liters)	16.4[3] (62)	17.5[3] (66)	20.2[3] (76)	66 (250)	35 (132)
Hardness removed per regeneration–grains (grams)	10,400[3] (675)	15,400[3] (998)	10,400[3] (675)	N/A	N/A
Plumbing connections–inches	3/4-inch or 1-inch (MNPT)	3/4-inch or 1-inch (MNPT)	3/4-inch or 1-inch (MNPT)	3/4-inch or 1-inch (MNPT)	3/4-inch or 1-inch (MNPT)
Valve size–inches	1-inch	1-inch	1-inch	1-inch	1-inch
Salt storage capacity–lbs (kg)	170 (77.1)	170 (77.1)	170 (77.1)	Up to 10[3] (4.5)	N/A
Electrical requirements	110/120 VAC, 12V 50/60 cycle	110/120 VAC, 12V 50/60 cycle	110/120 VAC, 12V 50/60 cycle	110/120 VAC, 12V 50/60 cycle	110/120 VAC, 12V 50/60 cycle
Maximum water temperature–°F (°C)	120 (48.9)	120 (48.9)	120 (48.9)	80 (26.7)	120 (48.9)
Pressure drop at service flow rate of in gpm (L/min)–psi (bar)	8 (0.6) @ 8 (30.3)	11 (0.8) @ 8 (30.3)	15 (1.0) @ 8 (30.3)	2 (7.6) @ 4 (15.1)	2 (7.6) @ 4 (15.1)
Maximum flow rate to drain during regeneration–backwash gpm (L/min)	2.4 (9.1)	2.4 (9.1)	3.0 (11.4)	5.0 (18.9)	5.0 (18.9)
Water pressure–min–max psi (bar)	20–120 (1.4–8.3)	20–120 (1.4–8.3)	20–120 (1.4–8.3)	30–120 (2.1–8.3)	30–120 (2.1–8.3)
Footprint (WxD)–inches (cm)	15 x 26 (38 x 66)	15 x 26 (38 x 66)	15 x 26 (38 x 66)	15 x 26 (38 x 66)	15 x 26 (38 x 66)
Height–inches (cm)	30.5 (77.5)	30.5 (77.5)	30.5 (77.5)	30.5 (77.5)	30.5 (77.5)
Shipping weight–lbs (kg)	85 (38.6)	105 (47.6)	105 (47.6)	115 (52.2)	125 (56.7)

[1] Operational maintenance and replacement requirements are essential for the product to perform to specifications.

[2] Use clean white pellet or solar salt

[3] Average at High Efficiency setting. Dependent on water hardness level and water usage.

[4] Potassium Permanganate

[5] AquaMaster® PRO AMP51IF Iron Filter automatically reduces iron and hydrogen sulfide. Install before your water softener.
Note: The iron filter operates in the same manner as the AquaMaster® PRO Softeners, but with manganese greensand in place of the super fine mesh media. The iron filter uses a potassium permanganate ($KMnO_4$) solution for regeneration instead of salt regenerant. In service, the filter media aids in oxidizing the iron, manganese, and/or hydrogen sulfide to solid particles, trapping the particles in the filter bed.

[6] AquaMaster® PRO AMP51NF Acid Neutralizing Filter adjusts low pH water. This adjustment will increase the water hardness by two to four grains. Install before your water softener.

Efficiency Statements

This product is efficiency rated according to NSF/ANSI 44. The stated efficiencies are valid only at the specified salt dosage and 8 gpm (30 L/m):

Model	Rated Efficiency	Salt Dosage	Capacity at That Dosage
AMP50	5,500 grains/lb (785 grams/kg)	1.1 lb (0.45 kg)	5,500 grains (356 grams)
AMP51	5,600 grains/lb (798 grams/kg)	1.1 lb (0.45 kg)	5,600 grains (362 grams)
AMP55	5,500 grains/lb (785 grams/kg)	1.6 lb (0.45 kg)	5,500 grains (356 grams)

AquaMaster® PRO
has these third-party listings:

System Tested and Certified by NSF International to NSF/ANSI Standard 44 for softening, barium reduction, and radium 226/228 reduction as verified and substantiated by test data.

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