

HAGUE
HYDROCLEAN®
HCB



OWNER'S MANUAL AND INSTALLATION GUIDE
VERSION 2.0

10 Year Limited Warranty

This warranty is issued to the original owner only and is not transferable to subsequent owners.

TO PLACE THE EQUIPMENT UNDER WARRANTY, THE WARRANTY REGISTRATION CARD MUST BE COMPLETED AND RETURNED BY THE OWNER TO HAGUE QUALITY WATER INTERNATIONAL WITHIN 30 DAYS OF INSTALLATION.

Coverage

This warranty covers the Hague Equipment delivered to the original owner, 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 Warranty

Hague Quality Water International warrants that upon receipt from the original owner of The Hague Equipment Mineral Tank, Brine Tank, found to be defective in material or workmanship, Hague will replace said part(s) at no charge for those parts for 5 YEARS from date of installation. And thereafter, will replace said parts upon payment of the following percentages of the then current list price: 6th through 10th year - 50% of current price list.

Hague Quality Water International further warrants that upon receipt from the original owner of The Hague Equipment Valve and/or Power System Components (i.e. complete valve or controller) found to be defective in material or workmanship, Hague will replace said part(s), at no charge for those parts, for 3 YEARS from date of installation.

Defective parts to be replaced must be returned, along with the equipment serial number and date of original installation, to Hague Quality Water International PREPAID and will be returned to the original owner FREIGHT COLLECT.

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

This warranty does not cover any labor or service call costs incurred with respect to the removal and replacement of any defective part(s). Hague Quality Water International will not be liable for, nor will it pay any labor or service call charges incurred or expended with respect to this warranty.

In the event the water supply being processed through this product contains 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, Hague Quality Water International shall have no obligation to supply replacement parts under this warranty.

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

This warranty does not cover damage to part(s) of the system resulting from improper installation. All plumbing and electrical connections should be made in accordance with 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, ordinances or regulations.

This warranty is null and void unless the Hague HydroClean3® System was purchased at retail from an independent authorized Hague dealer and installed by same.

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

Some states 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 or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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General Information

Congratulations on choosing a superior Hague 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. As an owner, you may find the first few pages to be the most helpful in solving your needs. If you have trouble with the operation of your appliance, see *Troubleshooting* in the back of this manual or contact your independent Hague dealer.

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.

Warning: This appliance must be applied to potable water only. It is recommended that an independent Hague dealer install and maintain this appliance.

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 **HydroClean3** water conditioning appliance models:

- HC3 25
- HC3 25CX
- HC3 35
- HC3 48
- HC3 64
- HC3 105

For Owner's Reference

Date of Installation: _____

Model Number: _____

Serial Number¹: _____

Installer's Signature: _____

Dealership Name: _____

Dealership Address: _____

Dealership Phone Number: _____

Returned Warranty Card Date: _____

Hardness: _____

Iron: _____

pH: _____

Water Pressure: _____

Water Temp: _____

¹ The serial number is located on the valve body in front of the bypass.



Figure 1: Valve Body Showing Serial Number

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. For iron filter, see *HC3 Filter Specifications*. 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 use a salt substitute (such as potassium chloride) in place of water conditioner salt. A Hague dealer should be contacted before a switch is made to a salt substitute. If potassium chloride is used in place of salt, the technician should increase the hardness setting by 12% and select the potassium option during the programming of the controller. See *Service Settings*.
Caution: Do not use potassium chloride if there is iron and/or manganese in the water.
3. Should your electricity be turned off for any reason for more than 16 hours, reset the time of day according to instructions on page 8.
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 dirt, sand, or large particles are present in the water supply, the appropriate Hague filter can eliminate this problem. See *HC3 Filter Specifications*.

6. The appliance may be disinfected with 5.25% sodium hypochlorite, which is the active ingredient in household chlorine bleach. To disinfect the appliance, add chlorine bleach solution to the brine well of the brine tank. Add 4.0 fluid ounces of bleach per cubic foot of resin.

Example:

HC3 Model	Chlorine (oz)
HC3 25	3.2
HC3 25CX	4.0
HC3 35	4.4
HC3 48	6.0
HC3 64	8.0
HC3 105	13.2

The brine tank should have water in it to permit the solution to be carried into the softener. Start a manual regeneration.

7. Protect the appliance, including the drain line, from freezing.
8. 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 it also for watering plants or lawns with untreated water. To bypass, turn the blue cone-shaped knob counterclockwise until it stops; turn it clockwise to restore service.
9. Before putting the appliance back in service after work has been performed, turn on the nearest cold water tap until water runs clear.
10. Adhere to all operational, maintenance, and placement requirements.
11. Inspect and clean the brine tank and air check/draw tube assembly annually or when sediment is present in the brine tank.
12. Potassium permanganate must be replenished periodically for any iron filter.

Five-Button Controller

This appliance features a five-button controller with an LCD display. The controller can be used to view the appliance's status, perform regenerations, and change settings. An independent Hague dealer should set the Service Settings during installation of the appliance.

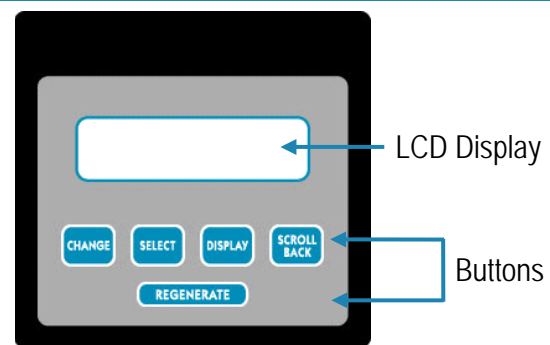


Figure 2: Five-Button Controller

Controller Part	Function
LCD Display	Shows the status of the controller; it is very important to know which mode the controller is in for proper operations
Normal Operating Mode	Shows <ul style="list-style-type: none"> The amount of soft water remaining until the next automatic regeneration (Each person in the household uses about 75 gallons per day) The number of days until the next regeneration (Mode 1, Filter = No) The flow rate in gallons per minute (Filter = No) Whether the HydroClean3 will regenerate tonight (If the Regenerate button has been pressed and released)
Service Settings Mode	Includes settings such as the language, mode, water hardness, and time of each regeneration step. Service Settings must be set before Customer Settings. Otherwise, some values may not be available. Intended for use by qualified service personnel
Customer Setting Mode	Includes setting the time of day, the regeneration time, and the number of people in the household; depending on the service settings, this option may not be available
Water Flowing Indicator	Indicates that water is flowing through the appliance; useful for checking for proper plumbing and leaks
Recharge/Regeneration Status	Shows regeneration cycle positions during regeneration
Buttons	The Change, Select, Display, and Scroll Back buttons are used when changing Customer Settings and Service Settings.
Change	The Change button is used with the Select button to set the value of certain parameters. <ul style="list-style-type: none"> When you press the Change button, the value under the cursor changes to the next available value, typically increasing by one until all values have been displayed and the process begins again.
Select	The Select button is used to move the cursor when setting parameters. <ol style="list-style-type: none"> Press and release the Select button to move the cursor one digit to the right of the parameter to be changed. When the cursor is at the extreme right position, press the Select button again to reset the cursor to the extreme left position.

Five-Button Controller, Cont.

Controller Part	Function
Buttons Cont.	The Change, Select, Display, and Scroll Back buttons are used when changing Customer Settings and Service Settings.
Display	The Display button is used to enter programming modes and also to save a value and display the next value to be changed. <ol style="list-style-type: none">1. To program Customer Settings, press and hold the Display button for about 5 five seconds while "Customer Setting" is displayed.2. To program Service Settings, press and hold both the Display button and the Select button while "Service Setting" is displayed.
Scroll Back	The Scroll Back function is used to step back to a previous parameter setting. It is typically used to go back to correct a setting without the need to scroll forward through all settings.
Regenerate	The Regenerate button at the bottom of the controller is used when starting your water conditioning appliance, to start an immediate regeneration, or to restore capacity if you run out of salt.

Customer Settings

Service Settings must be set before Customer Settings; Service Settings should be set during installation of the appliance.

To set Customer Settings, press and hold the Display button for about five seconds while "Customer Setting" displays. Release the button when "Set Time" displays. If the setting displayed is correct, press Display to move to the next setting.

Step 1 *Set Time of Day*

Display reads "Set Time" followed by the current time that is set; the cursor will be under the second hours digit.

To Change the Time of Day

- A. Press Change repeatedly until the current hour is displayed.
- B. Press Select to set the hour and move the cursor to the right.
- C. Do the same to set the minutes. Select AM or PM. When the desired time is displayed, press Display to step to the next parameter.

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

Step 2 *Set Regeneration Time*

Display reads "Reg. Time" followed by the current regeneration time that is set; the cursor will be under the second hours digit. Usually you want to set a regeneration time when water will not be used.

To Change the Regeneration Time

- A. Follow the procedure outlined above for setting the time.
- B. When the desired regeneration time is displayed, press Display.

Step 3 *Set Number of People*

Display reads "# People" followed by the current setting for the number of people in the household; the cursor will be under the tens digit.

To Change the Number of People

- A. Press Change repeatedly until the desired value is displayed; values will cycle from 0 to 9.
- B. Press Select and the cursor moves to the right.
- C. When the desired number of people is displayed, press Display to exit the Customer Setting mode.

When you press the Display button at "# People," the values are saved, and the controller returns to Normal operating mode.

Checklist Before Installation

Refer to this checklist before each 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 **HydroClean3** Water Filter can address these water shortcomings. See *HC3 Filter Specifications* for details on each filter.

- 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

* If the water supply contains ferrous iron, a commercially available resin bed cleaner should be used every six months.

- Water Pressure**—Not less than 20 psi constant for models HC3-(25, 35, 48, 2TN) or 30 psi for HC3-(64, 105, and filters). If water pressure exceeds 70 psi, a pressure regulator is recommended.
- Water Supply Flow Rate**—A minimum of 5 gallons per minute (7 gpm for filters) 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 33° or greater than 120°F.
- Drain**—Drain the appliance to an appropriate drain, such as a floor drain or washer drain that will comply with all local and state 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 North America.

Precautions

Do

1. Comply with all state and local, building, plumbing, and electrical codes.
2. Install the appliance before the water heater.
3. Install a pressure-reducing valve if the inlet pressure exceeds 70 psi.
4. Examine the inlet line from the pressure tank to appliance on well water with iron (recommended minimum inlet pipe size 3/4" I.D.). On municipal water, recommended minimum inlet pipe size is 1/2" I.D.
5. Install a gravity drain on the salt storage tank.
6. Secure the drain line on the appliance and at the drain outlet. See *Installation Steps and Start-Up Procedures*. Install the drain line so that there is a 2" air gap between the drain line and the drain outlet.
7. Allow a minimum of 8 to 10 feet of 3/4" 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. See *HC3 Water Conditioner 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 to freeze.

Installation Steps and Start-Up Procedures

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.
- D. Make sure the inlet/outlet and drain connections meet the applicable state and local codes.
- E. Check the arrows to ensure that the water flows in the proper direction.
Caution: Do not plumb the appliance in backward.
- F. Place the appliance in the desired location using Figure 3 as a guide.
- 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.
Caution: If less than 10' 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.

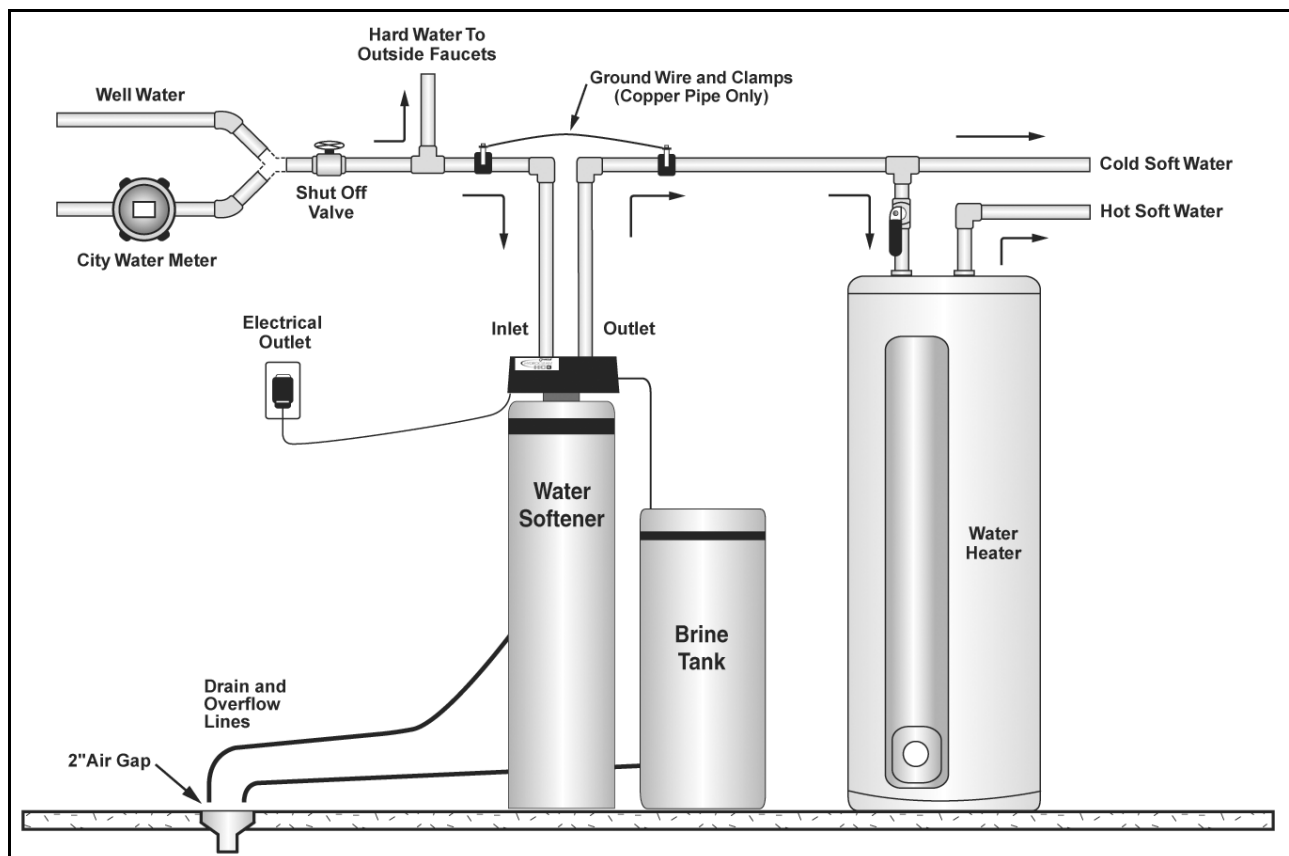


Figure 3: Appliance Placement

Installation Steps and Start-Up Procedures, Cont.

Step 2 *Turn Off Water Supply*

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

Step 3 *Connect Water Lines*

- A. Connect water lines in compliance with all state and local, building, plumbing, and electrical codes.

Step 4 *Connect the Brine Tank*

- A. Connect the brine tank to the valve head with the flexible 3/8" poly tube included with the appliance. Insert the plastic insert in the end of the brine tube. See Figure 21.

Step 5 *Connect Gravity Overflow Connections*

- A. Check to make sure the elbow is in the down position.
- B. Connect the overflow lines to each cabinet. The overflow line drains excess water to a floor drain should the tank fill with too much water or the appliance malfunctions.
- C. Connect 1/2" I.D. tubing (size cannot be reduced) between the overflow fitting and a 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" lower than the bottom of the overflow fitting. The gravity line cannot be run overhead. Maintain a minimum of 2" air gap.

Step 6 *Connect Drain Line*

- A. Connect the drain line to the drain end cap with a tube fitting (not supplied). The drain line must be a minimum of 1/2" I.D. tubing.
- B. Route the drain line to a floor drain, laundry tub, or other suitable waste receptor. Maintain a minimum 2" 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 from the discharge on the appliance as long as the water pressure in your system is 40 psi or more.
- D. If the drain line is 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.

Step 7 *Flush Lines*

- A. Place the appliance in the bypass position and turn on the main water supply.
- B. Open the nearest cold water faucet to flush the plumbing of any excess soldering flux, air, or any other foreign material.

Installation Steps and Start-Up Procedures, Cont.

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. Place the bypass in the "Service" position to slowly fill the appliance.
 7. Open a cold water faucet to purge air out of the appliance.
 8. Close the faucet and recheck for leaks.

Step 9 **Plug in the Transformer**

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

Step 10 **Set Up the Controller**

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

Step 11 **Add Water to the Brine Tank**

- A. Add water to the brine tank to a minimum of 2" above the grid plate. After the first regeneration, the appliance will automatically refill the correct amount of water into the brine tank.
- B. Ensure that the salt dosage is set as recommended for the application.
- C. Initiate a manual regeneration (see *Setting and Using the Controller*) and inspect for proper operation. Allow the appliance to draw all the water out of the brine cabinet until the air check/draw tube sets.
- D. Press the Regenerate button to advance to the Brine Refill 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 tank. Do not add water at any other time.

Step 12 **Fill the Brine Tank With Salt**

- A. Fill the brine tank 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.

Installation Steps and Start-Up Procedures, Cont.

Step 13 *Complete the Installation*

- A. Open the inlet valve and turn on the electricity to the water heater. For gas water heaters, return the gas cock to "On."
- B. Open a cold water tap and allow the appliance to flush for 20 minutes or until approximately 72 gallons have passed through the appliance. This procedure is required to meet NSF compliance. Verify the flow rate on the controller, which indicates water flow. See Figure 2.
- C. Ensure that the bypass is left in the "Service" position.
- D. Test the water at the test port to verify soft water.
- E. Place the cover on the cabinet.

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. See Figure 4. To engage the bypass, locate the blue knob on the right-hand side (facing the front of the appliance), behind the controller. Turn the knob counterclockwise until it stops. Do not overtighten. 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 clockwise until it stops.

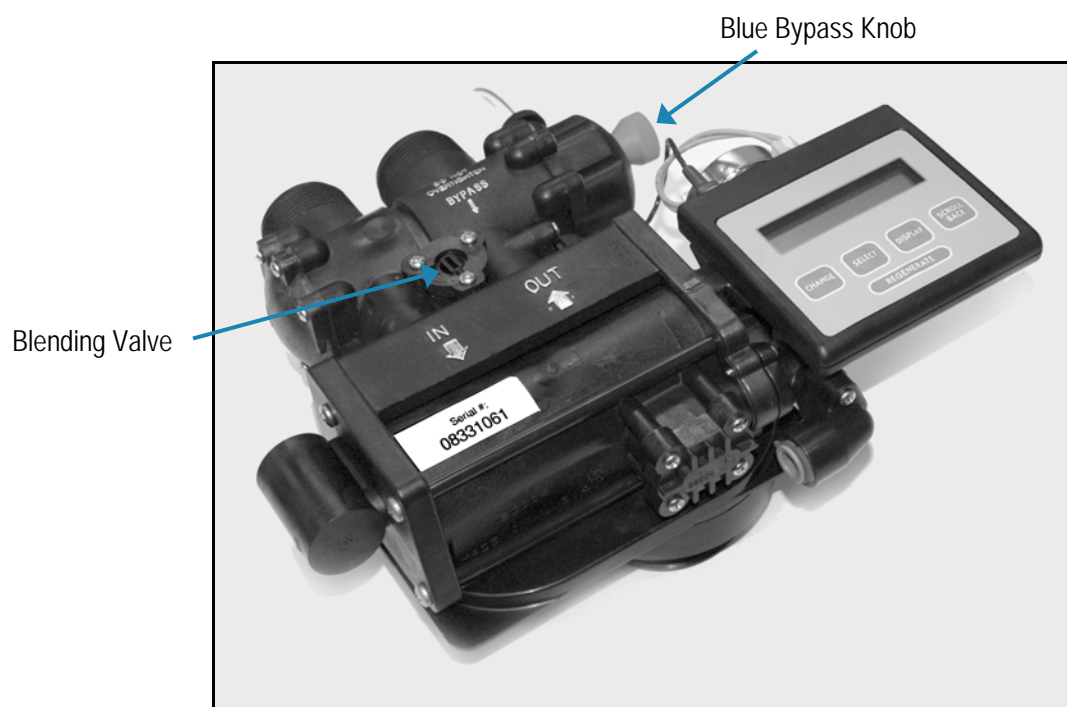


Figure 4: Bypass Valve

Blending Valve

In some situations, the blending valve may be used to decrease water softness. 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 bypass valve. See Figure 4. 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, the user can increase or decrease the setting according to their 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.

Setting and Using the Controller

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 Figure 7.

Regenerate Button

The Regenerate button is used when starting the water filtration appliance and to start an immediate regeneration. The Regenerate button can be used in three ways:

1. The Regenerate button can be used to put the appliance into an immediate regeneration.
 - A. Press and hold the Regenerate button for about five seconds until the display changes from “Regenerate” to “Going to.”
 - B. The appliance is in regeneration mode and will display the status of each cycle. After all regeneration cycles are complete, the display will return to Normal operating mode.
2. The Regenerate button can be used to quickly advance through all of the regeneration cycles to speed up the cycles, which is used when starting up or diagnosing the appliance only.
 - A. To advance through the regeneration cycles, press and hold the Regenerate button for about five seconds until the display changes to “Going to.”
 - B. The cycle position will display (for example, Backwash 1).
 - C. Each cycle can be advanced by pressing the Regenerate button. Always wait until the cycle position displays before advancing to the next cycle position.
3. Press and release the Regenerate button in Normal operating mode to schedule a regeneration tonight or toggle it off.

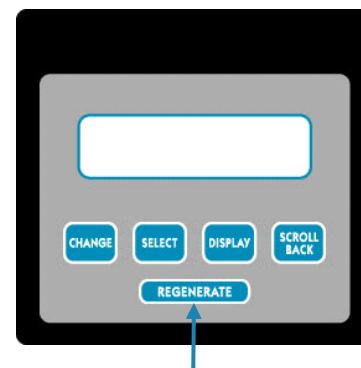


Figure 5: Regenerate Button

Service Settings

To program Service settings on the controller, press and hold the Change and Select buttons while "Service Settings" is displayed until "Set Language Eng" is displayed. Programming Service Settings is similar to programming Customer Settings (see *Customer Settings* for programming details). The values that can be set are listed below.

Note: The Service Settings must be set before the Customer Settings.

Display	Meaning	Possible Values	Comments
Set Language Eng	Set the language of the display	Set Language Eng Entrer Langue Fra Entre La Leng. Esp	
Units ENG	Units of measure	ENG or MET	
Soft. v. # 1.22B	Displays the current software version	Cannot be set	
Mode <u>1</u>	Operating Mode	1 or 2	See <i>Operating Modes</i>
Hard. Gr. <u>040</u>	Hardness of the water that was tested	003 to 999 Grains (00000 to 99999 mg/L)	This is the actual hardness reading and is not compensated for iron
Iron ppm <u>00</u>	Amount of iron in parts per million of the water that was tested	00 to 99 ppm (mg/L)	This value is used to calculate compensated hardness automatically
Mang. ppm <u>00</u>	Amount of manganese in parts per million of incoming water	00 to 99 ppm (mg/L)	This value is used to calculate compensated hardness automatically
Salt = Sodium	Regenerant filling the brine tank	Sodium or Potassium	See <i>Warning</i>
Comp. Hard. 00040	Compensated hardness using the hardness, iron, and manganese settings	Cannot be set ppm or mg/L	The formula used is: Hardness + (4 x each ppm iron) + (4 x each ppm manganese) = compensated hardness
Capac. Gr. <u>28730</u>	The desired softening capacity number	00000 to 99999 Grains (0000 to 9999 gm)	See <i>HC3 Water Conditioner Specifications</i> or <i>Modes 1 and 2 Salt Setting Chart</i> for capacities based on salt usage

Warning: When iron and/or manganese is present in the water supply, do not use potassium chloride as a regenerant. Iron and/or manganese bacteria may develop and foul the conditioning media and may void the warranty.

Service Settings, Cont.

Display	Meaning	Possible Values	Comments
72–96 hr Regen No	A way to force regeneration at regularly-scheduled intervals	No (or Yes, for iron)	See <i>72–96 Hour Regeneration</i>
Backwash 1 01.0	Number of minutes the first backwash cycle lasts	00.0 to 99.9	Set to the nearest tenth of a minute
Brine/Rinse 30.0	Number of minutes the brine and slow rinse cycle lasts	00.0 to 99.9	Set to the nearest tenth of a minute
Backwash 2 05.0	Number of minutes the second backwash cycle lasts	00.0 to 99.9	Set to the nearest tenth of a minute
Salt lbs. 06.2	Amount of salt set to be used in each regeneration to achieve the capacity setting	00.0 to 99.9 lb (kg)	Set to the nearest tenth
Turbine Test No	Used by qualified personnel for diagnostic purposes	No or Yes	Do not engage this feature
Regen. Tonight Yes	Sets the appliance to regenerate tonight	No or Yes	If set to Yes, it will force a regeneration at the next set regeneration time (such as 02:00 AM). After the regeneration, the value will be set to No
Filter? No	Used by qualified service personnel to set the model number	No or Yes	Has no effect on the function of the appliance

When you press the Display button at “Filter?,” the values are saved, and the controller returns to Normal operating mode.

Operating Modes

The appliance has two operating modes: Timer mode and Meter mode. Both modes are equipped with Capacity Guard®, which ensures that a supply of conditioned water will be available even with excessive water usage.

Mode 1—Timer Mode

When the appliance is in Timer mode, it will regenerate based on the frequency that is set, for example every two days or up to every 12 days. The time of regeneration can be set.

Mode 2—Meter Mode

When the appliance is in Meter mode, it will regenerate based on the actual water usage and the total capacity of the appliance. The time that the regeneration takes place can be set, for example 2:00 AM. Should the total capacity be depleted before the set regeneration time, a forced regeneration will occur.

72–96 Hour Regeneration

If this value is set to Yes, the appliance will be forced to regenerate every 72–96 hours unless a regeneration based on water usage occurs within the time interval. The value should always be set to Yes if iron is present in the water.

Service Settings, Cont.

Modes 1 and 2 Salt Setting Chart

This section provides guidance for using different service settings to achieve the desired capacity.

	HC3 25*	HC3 25CX**	HC3 35*	HC3 48*	HC3 64*	HC3 105*
#1 Salt Setting						
Backwash 1 (minutes)	0	0	0	0	0	0
Brine/Rinse (minutes)	11	11	15	20	11	18
Backwash 2 (minutes)	10	10	10	10	10	10
Capacity (grains) @ salt (lb)***	10,700 @ 2.0 lb	10,700 @ 2.0 lb	14,700 @ 2.8 lb	20,100 @ 3.8 lb	26,800 @ 5.0 lb	44,300 @ 8.3 lb
#2 Salt Setting						
Backwash 1 (minutes)	0	0	0	0	0	0
Brine/Rinse (minutes)	16	16	22	30	17	28
Backwash 2 (minutes)	10	10	10	10	10	10
Capacity (grains) @ salt (lb)	14,700 @ 3.0 lb	14,700 @ 3.0 lb	20,200 @ 4.2 lb	27,500 @ 5.7 lb	36,700 @ 7.6 lb	60,600 @ 12.5 lb
#3 Salt Setting						
Backwash 1 (minutes)	0	0	0	0	0	0
Brine/Rinse (minutes)	21	21	29	40	22	37
Backwash 2 (minutes)	10	10	10	10	10	10
Capacity (grains) @ salt (lb)	17,800 @ 4 lb	17,800 @ 4 lb	24,500 @ 5.5 lb	33,500 @ 7.5 lb	44,600 @ 10 lb	73,700 @ 16.5 lb
#4 Salt Setting						
Backwash 1 (minutes)	0	0	0	0	0	0
Brine/Rinse (minutes)	30	30	41	56	31	51
Backwash 2 (minutes)	10	10	10	10	10	10
Capacity (grains) @ salt (lb)	22,200 @ 5.6 lb	22,200 @ 5.6 lb	30,500 @ 7.7 lb	41,600 @ 10.5 lb	55,400 @ 14 lb	91,500 @ 23.1 lb
#5 Salt Setting						
Backwash 1 (minutes)	0	0	0	0	0	0
Brine/Rinse (minutes)	64	64	88	99	67	99
Backwash 2 (minutes)	10	10	10	10	10	10
Capacity (grains) @ salt (lb)	25,600 @ 12 lb	25,600 @ 12 lb	35,200 @ 16.5 lb	48,000 @ 22.5 lb	64,000 @ 30 lb	105,000 @ 49.5 lb

* When iron is present in the water supply, regeneration frequency cannot exceed 96 hours. Additionally, a minimum salt setting of 7 lb per cubic foot of resin is required (#4 salt setting.)

** This model is designed for use on chlorinated, municipal water supplies only. Reduces tastes, odors, chlorine, and most man-made pollutants.

*** Do not use standard 18" diameter brine tank with salt grid for salt settings less than 3 lb.

Assembly and Parts

Hook-Up/Cover Assembly

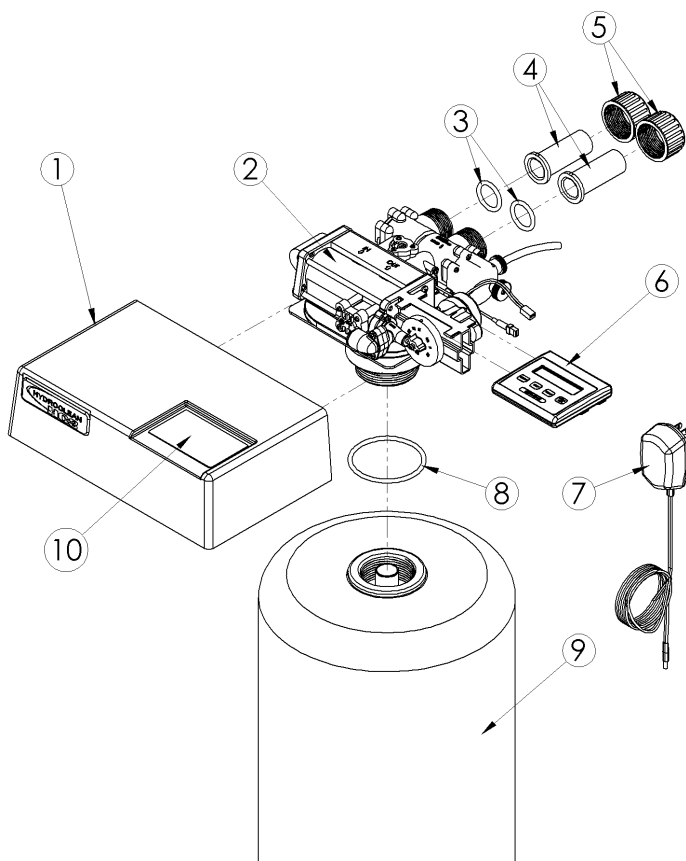


Figure 6: Hook-Up/Cover Assembly

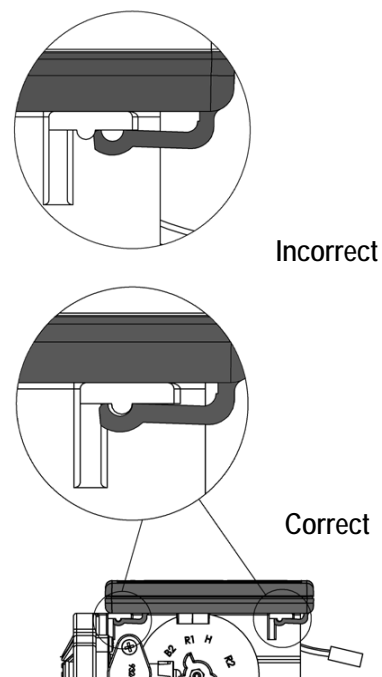


Figure 7: Controller Tab Lock Detail

	Part #	Description	Quantity
1	53500	Valve Cover w/Label	1
2	53501	Valve Assembly w/O-Ring	1
3	90837	Hook Up O-Ring	2
4	90259	1" CTS CPVC Adapter	2
	90254	3/4"/1" Copper Adapter (optional)	
	90258	1" Copper Adapter (optional)	
	90256	3/4" PVC Adapter (optional)	
5	90251	Bypass Nut	2
6	54550	5 Button Controller	1
7	93245	Transformer	1
8	H2281	Tank O-Ring	1
9	BT844	Resin Tank Jacket	1
	BT948	Resin Tank Jacket	1
	BT1047	Resin Tank Jacket	1
	BT1054	Resin Tank Jacket	1
10	95209	Clear Viewing Panel	1

Assembly and Parts, Cont.

Standard Brine Tank Assembly

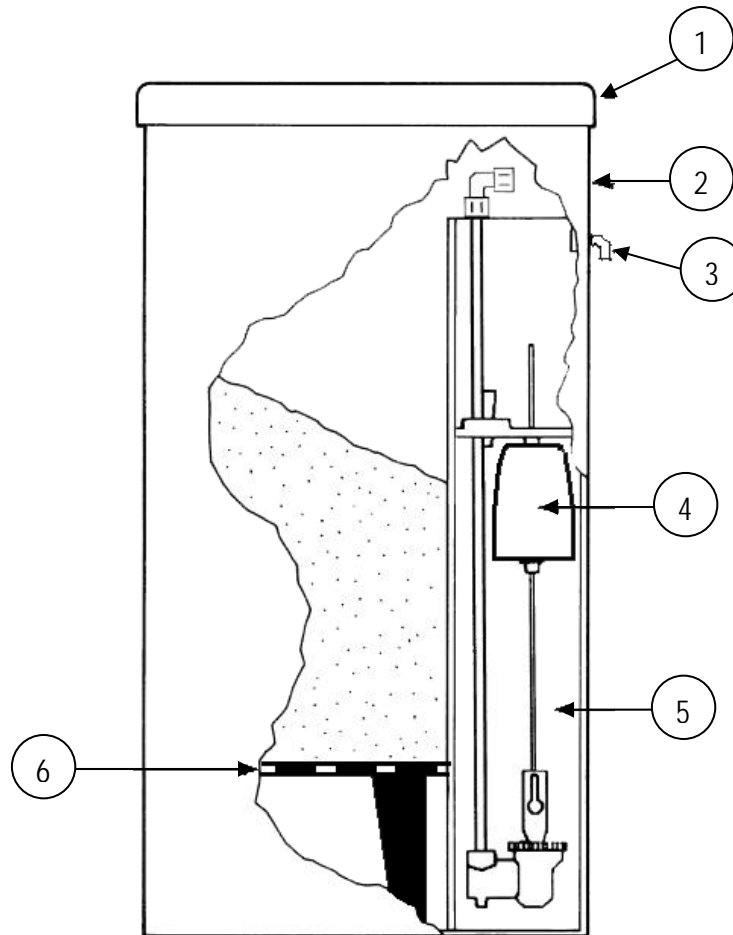


Figure 8: Standard Brine Tank Assembly

	Part #	Description	Quantity
1	BT055	Brine Tank Cover	1
2	BT1833-HWC	Brine Tank	1
3	C0700	Overflow Fitting	1
4	93811-26.5	Air Check/Draw Tube Assembly	1
5	C0800	Brine Well	1
6	C0650	Grid Plate	1
7	93848	3/8" X 5' Brine Line (not shown)	
	53560	Brine Tank Assembly (all of the parts above)	

Assembly and Parts, Cont.

Optional Brine Tank Assembly

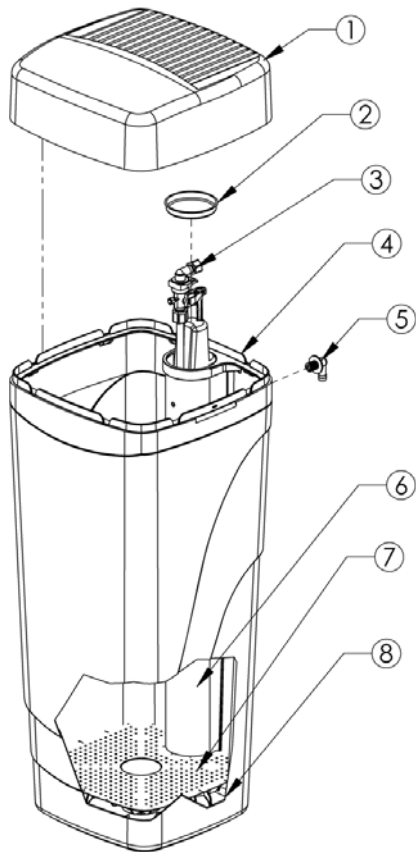


Figure 9: Brine Tank Assembly

	Part #	Description	Quantity
	1	Brine Tank Cover	1
	2	Brine Well Cap	1
	3	Safety Shutoff Assembly	1
	4	Support Panel (BT)	1
	5	Cabinet Overflow	1
	6	Brine Well	1
	7	Grid Plate	1
	8	Cabinet	1
	54509	Entire Assembly (all of the above parts)	

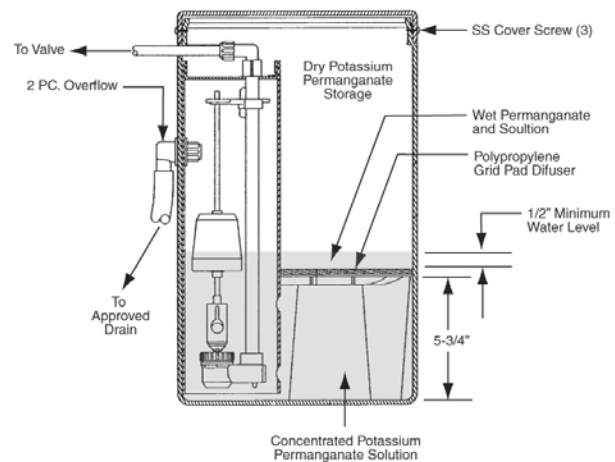


Figure 10: Potassium Permanganate Feeder (P/N PT1424)

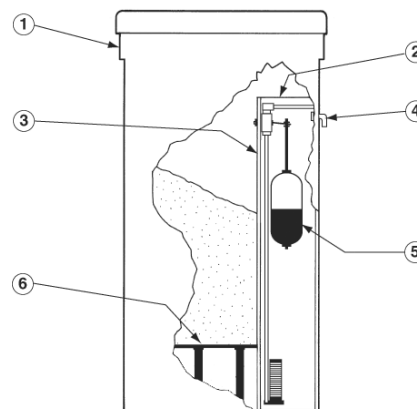


Figure 11: 24" x 50" Brine Tank

	Part #	Description	Quantity
	1	BT2450 24" x 50" Brine Tank and Lid	1
	2	C0600 Brine Well Cap	1
	3	C0850 Brine Well	1
	4	C0700A and C0700B Overflow Elbow and Nut	1
	5	H5300 Safety Shut-off Assembly w/ Float and Air Check/Draw Tube	1
	6	C0670 Grid Plate	1
	93848	3/8" x 10" Brine Line (not shown)	
	UAS-175	Entire Assembly (all of the above parts)	

Assembly and Parts, Cont.

Resin Tank Assembly

	Part #	Description
1	BT 844	Thermo Jacket - 44
	BT 1047	Thermo Jacket - 47
	BT 948	Thermo Jacket - 48
	BT 1054	Thermo Jacket - 54
2	C1400	Thermo Foam - 8"
	C1430	Thermo Foam - 9"
	C1480	Thermo Foam - 10"
3	MT844	Thermo Tank - 8"X44"
	MT948	Thermo Tank - 9"X48"
	MT1047	Thermo Tank - 10"X47"
	MT1054	Thermo Tank - 10"X54"
	MT1252	Thermo Tank - 12"X52"
	MT1465	Thermo Tank - 14"X65"
4	CAS-820	1" Riser HC3 Special Series
	CAS-822	1" Riser HC3 2TN, 25
	CAS-823	1" Riser HC3 25CX, 35
	CAS-824	1" Riser HC3 48
	CAS-827	1" Riser HC3 64
	CAS-828	1" Riser HC3 105
5	M010	Resin - C249
	M030	Manganese Greensand
	M048	Activated Carbon
	M050	Calcite
	M060	Corosex
	M090	Calcite / Corosex Mix
6	M035	Quartz Gravel
	MT181	Adjustable Base - 8"
7	MT182	Adjustable Base - 9"
	MT183	Adjustable Base - 10"

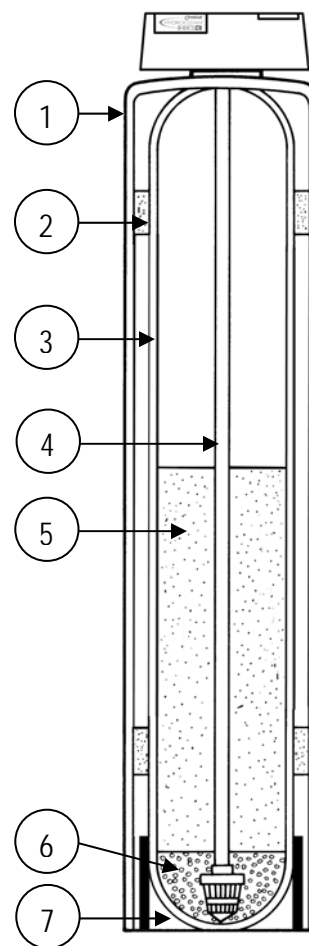


Figure 12: Resin Tank Assembly

Assembly and Parts, Cont.

Valve Assembly

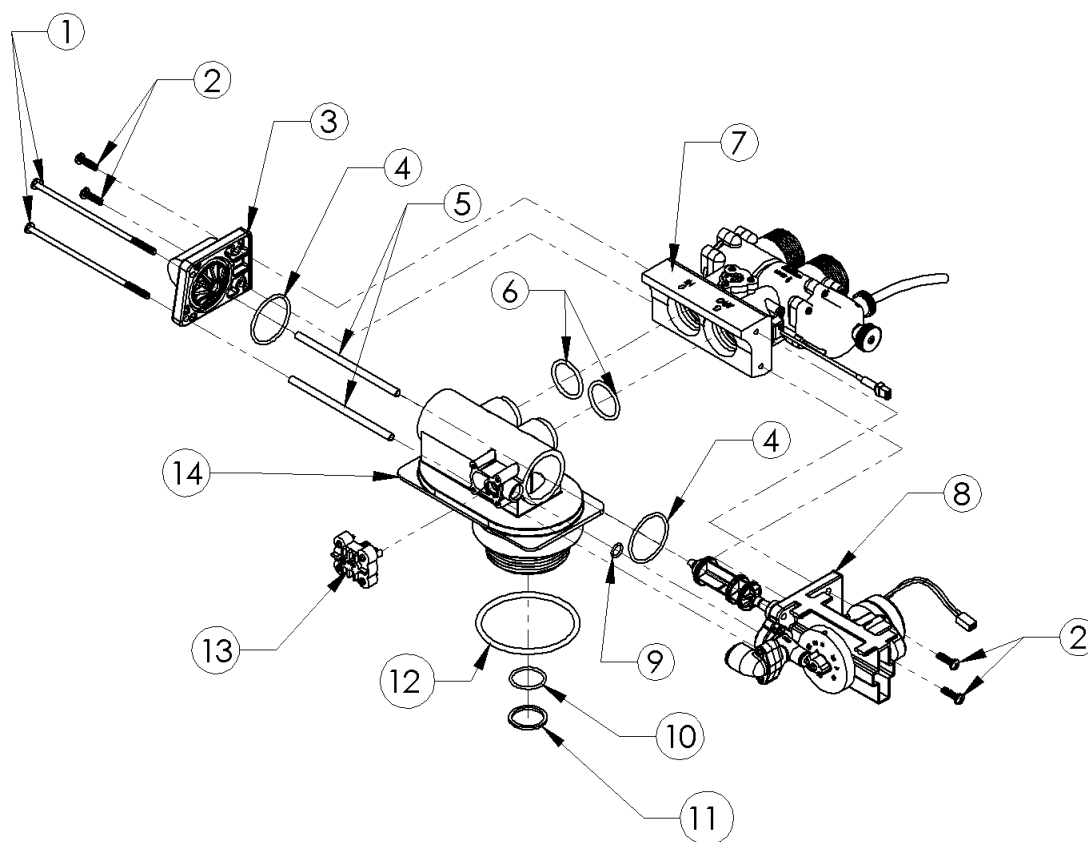


Figure 13: Valve Assembly

	Part #	Description	Quantity
1	93809	End Cap Screw	2
2	93870	End Cap Screw	4
3	90614	Drain End Cap Assembly	1
4	93808	End Cap O-Ring	2
5	93835	Spacer Tube	2
6	93838	I/O Adapter O-Ring	2
7	90615	Bypass Valve Assembly	1
8	95301T-JG	Drive End Cap Assembly *	1
9	90828	Small End Cap O-Ring	1
10	H3304	Pilot O-Ring	1
11	53004	Pilot O-Ring Retainer	1
12	53202	Tank O-Ring	1
13	93501	Injector Assembly	1
14	53000	Valve Housing	1

* This assembly does not include a magnet disc or drive motor, and must be ordered separately.

Assembly and Parts, Cont.

Injector Assembly

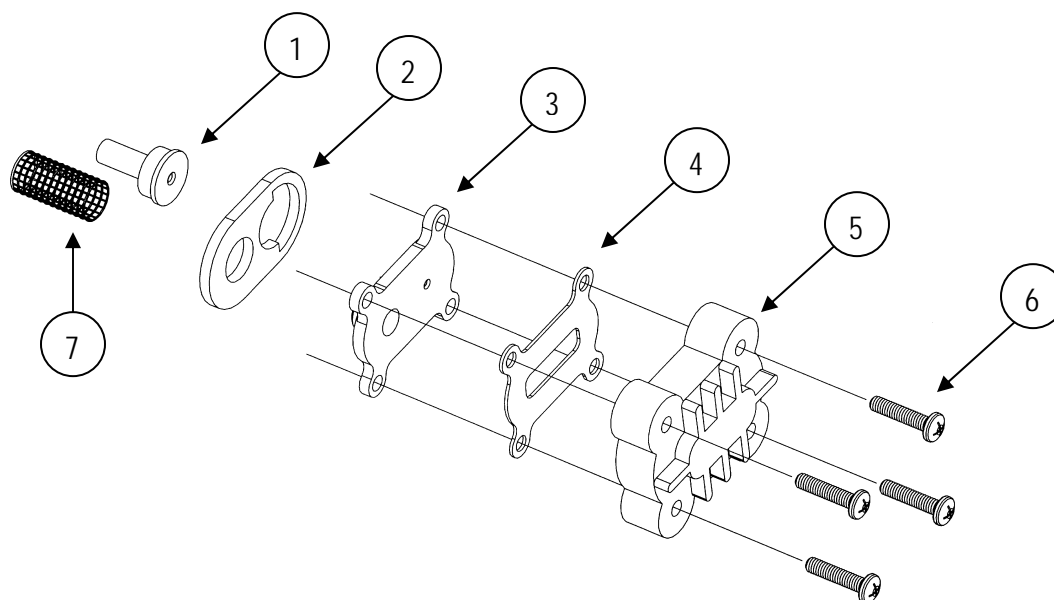


Figure 14: Injector Assembly

	Part #	Description	Quantity
1	93223	Injector Throat	1
	93223-Red*	Injector Throat	1
2	93220	Bottom Injector Seal - thick	1
3	93221	Injector Nozzle	1
	93221-Red*	Injector Nozzle	1
4	93232	Top Injector Seal - thin	1
5	93222	Injector Cap	1
6	90807	Injector Screw	4
7	93810	Injector Screen	1
	93501	Injector Assembly (all of the parts above)	

* For use on 12" and 14" diameter softener tanks only

Assembly and Parts, Cont.

Injector Assembly Cont.

93810 Injector Screen	<p>Acts as a pre-filter to keep debris from entering the Injector Nozzle (93221) and Throat (93223). Attaches to the cylinder on the Nozzle plate and spherical "bump" inside the Valve Body. Some compression of the screen may occur during assembly. The opening in the screen must be clear to ensure proper flow to the Injector assembly.</p>
93223 Injector Throat	<p>In conjunction with the Injector Nozzle (93221) 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.</p>
93220 Injector Seal (Thick)	<p>Seals between the Injector Nozzle (93221) and the Main Valve Body. The gasket has a definite hole pattern that has to match up with the Nozzle and the Main Valve Body opening. The gasket seals at its outer edges and between the inlet screen and nozzle opening. These areas must be free of defects, such as tears or pits, and be free of debris.</p>
93221 Injector Nozzle	<p>Together with the Throat (93223) creates the vacuum that draws the brine solution from the Brine Cabinet. There are two openings in the Nozzle (93221) plate. The small hole, flush on both sides, 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.</p>
93232 Top Injector Seal (Thin)	<p>Seals between the Injector Nozzle (93221) and Injector Cap (93222). The gasket must be free of defects, such as tears or cuts, and be free of debris.</p>
93222 Injector Cap	<p>Holds the injector assembly together and seals the assembly to the Main Valve Body. The four machine screws should be tightened evenly and be "snug."</p>

Assembly and Parts, Cont.

Bypass Assembly

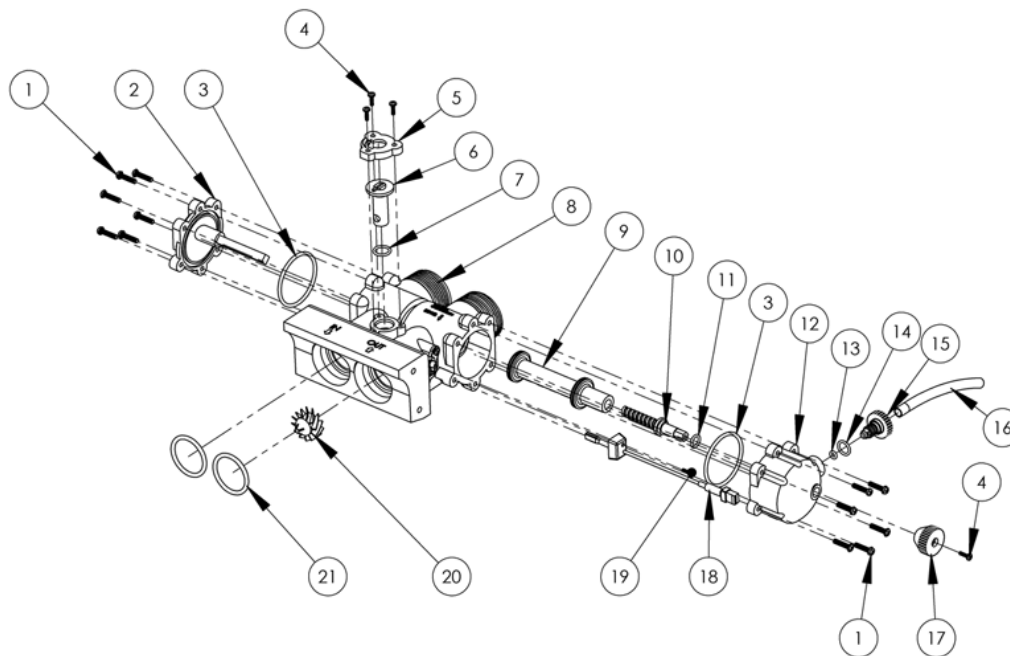


Figure 15: Bypass Assembly

	Part #	Description	Quantity
1	90807	Screw	12
2	90262	Bypass End cap-Left	1
3	93808	O-Ring	2
4	90802	Screw	4
5	90252	Cap-Blending Dial	1
6	90222	Blending Dial	1
7	90827	O-Ring	1
8	90246	Bypass Housing	1
9	90616	Bypass Piston Assembly	1
10	90218	Bypass Piston Drive Shaft	1
11	90803	O-Ring	1
12	90263	Bypass End Cap-Right	1
13	90264	O-Ring	1
14	90828	O-Ring	1
15	90226	Test Port Valve	1
16	90812	Tubing 4.0"	1
17	90221	Bypass Piston Knob, blue	1
18	93860	Turbine Sensor Wire Assembly with Cap	1
19	90809	Screw	1
20	90522	Turbine Assembly	1
21	93838	O-Ring	2
	90615	Entire Assembly (all of the above parts)	

Assembly and Parts, Cont.

Bypass Assembly Cont.

<p>90262 Bypass End Cap—Left; 90263 Bypass End Cap—Right</p>	<p>Seals the left/right Piston opening on the Housing (90246). The 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. When assembling the End Cap to the Housing, 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. On the Left End Cap is the Piston Axle, a 1/4" square shaft that acts as a guide/slide and anti-turning mechanism for the Bypass Piston. On the Right End Cap is the guide/bushing for the Bypass Piston Drive Shaft (90218). There is an O-Ring seal at the opening for the Drive Shaft. This seal area must be free of defects such as pits or scratches and also free of debris.</p>
<p>90252 Blending Dial Cap</p>	<p>The Cap should be held in place by the three 1/2" screws and be in the proper orientation.</p>
<p>90222 Blending Dial</p>	<p>The dial permits the addition of “hard water” into the soft water outlet. It is closed when pointing toward the Main Valve Body and open when pointing toward the inlet side.</p>
<p>90246 Bypass Housing</p>	<p>Makes the connection between the plumbing and Main Valve Body. Also, contains the “Hard Water” Blending Valve and Bypass Piston. The recommended seal for the 1-1/4" male inlet-outlet threads is the plastic Hook-up Nut (90251), O-Ring (90837), and CPVC Adapter (90259). Make sure the O-Ring is between the Housing and Copper Adapter. The O-Ring seal areas at the Main Valve Body inlet and outlet must be smooth and free of defects and debris, and lubricated with silicone grease before assembling. When attaching to the Main Valve Body, put the O-Rings on the male bosses on the Valve Body and push the Bypass into place; if not, the O-Rings may be “pinched.” If the O-Rings are pinched, replace with new ones. The Bypass is pre-assembled with the Sensor housing and turbine axle. These are not field-serviceable and if damaged, must be replaced with a new assembly. The Bypass Piston bore is to be smooth and, at the recessed areas, have a smooth transition (no sharp corners) to the seat areas.</p>
<p>90616 Bypass Piston Assembly</p>	<p>The white Teflon Hydro-slide O-Ring covers should be free of defects such as indentations and cuts. The Piston should move freely into and out of the Bypass Housing (90246) without damaging the Hydro-slides. If the Hydro-slides catch, tear or crimp, the Housing should be replaced. Note: Some compression will occur when the Hydro-slides pass through the seal areas.</p>
<p>90218 Bypass Piston Drive Shaft</p>	<p>The Drive Shaft has an acme thread which is used to move the Piston from “bypass” to “service” position. When operating the Bypass, to achieve either “service” or “bypass,” it is only necessary to turn the Handle (90221) until the Piston (90616) stops. Additional pressure (torque) will not improve the seal. Once the Piston reaches the stop at either position, it can be backed off up to one half turn of the handle and still achieve a seal.</p>
<p>90226 Test Port Valve</p>	<p>The Test Port Valve is used to draw water samples for testing of treated water. Note: The Bypass must be in the “service” position to get an accurate sample. There are two types of seals on the Test Port. One seal is an O-Ring which seals off the threaded area when the Valve is opened. The other seal is a compression O-Ring seal between the Test Port Valve material and the Right End Cap material. If this seal is “overtightened,” it can damage the O-Ring and cause a permanent leak.</p>
<p>93860 Turbine Sensor Wire Assembly With Cap</p>	<p>Picks up the magnetic field from the Turbine and relays it to the Controller. Care should be taken when putting the Sensor Wire into the Sensor Housing. The cap is then put in place and the mounting screw is installed. A slot is provided in the cap for the wire to exit. The three-wire socket connector must be properly installed in the controller. Stops on the connector prevent improper (upside down) assembly. Do not force the connector past the stops.</p>
<p>90522 Turbine Assembly</p>	<p>The turbine must have a 1/8" diameter Rare Earth magnet pressed into place adjacent to the axle opening. When assembled to the axle, the Turbine should spin freely. Do not use any lubricants. If the Turbine should become “jammed,” clean and flush the Turbine and Bypass Valve.</p>

Assembly and Parts, Cont.

Drive End Cap Assembly

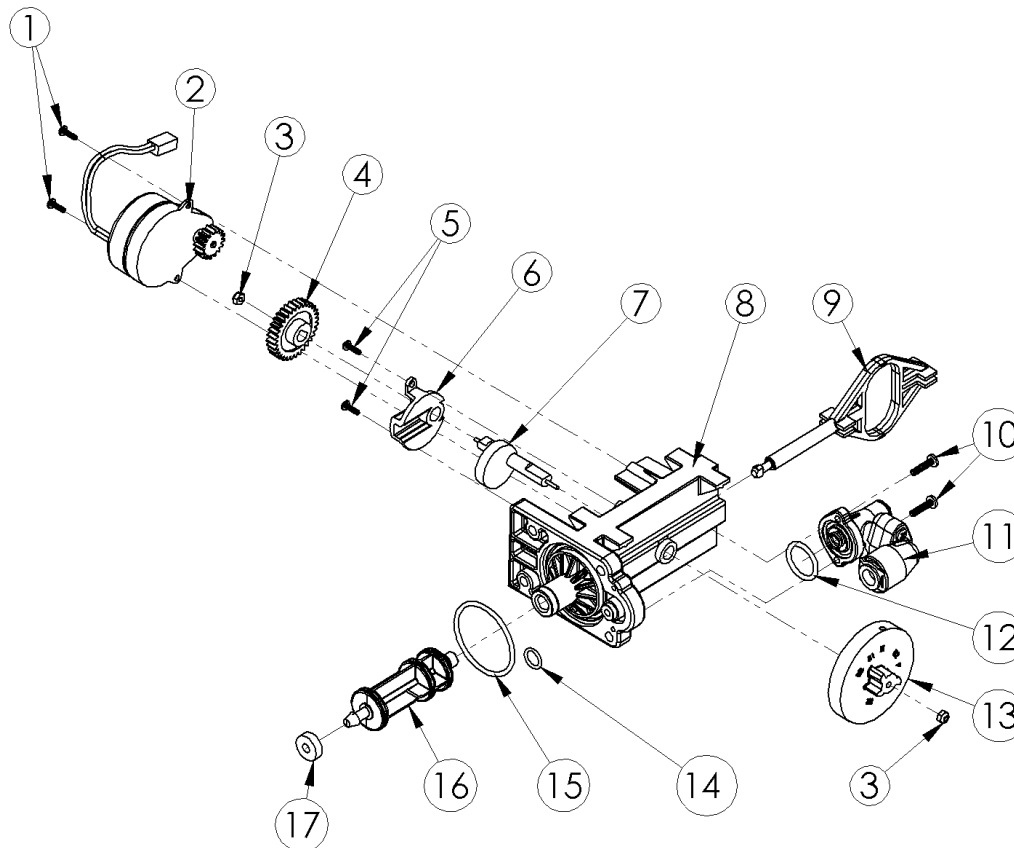


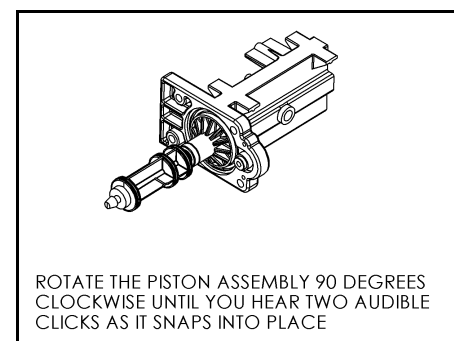
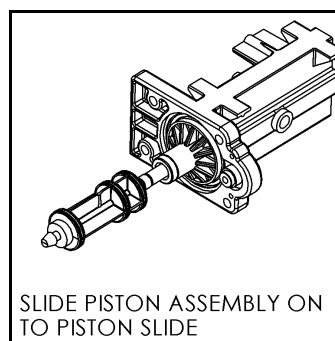
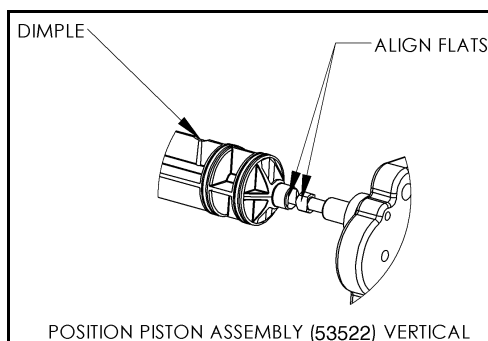
Figure 16: Drive End Cap Assembly

	Part #	Description	Quantity
1	90802	Screw	2
2	90217	Drive Motor	1
3	93891	1/4" Hex Nut	2
4	93238	Drive Gear	1
5	90809	Screw	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	2
11	93601-JG	Brine Valve Housing Assembly	1
12	90821	O-Ring	1
13	54502	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-JG	Drive End Cap Assembly (all of the above parts except 1, 2, and 13)	

Assembly and Parts, Cont.

Drive End Cap Assembly Cont.

90217 Drive Motor	The Motor is held in place by two 1/2" screws. The screws should be "snug." The brass pinion gear on the Motor should engage the plastic Drive Gear. The wires should be securely fastened to the Control.
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 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 is attached at the short end and the Magnet Disc 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-JG Brine Valve Housing Assembly	Attaches to the Drive End Cap with two 3/4" thread cutting 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.



Assembly and Parts, Cont.

Brine Valve Housing Assembly

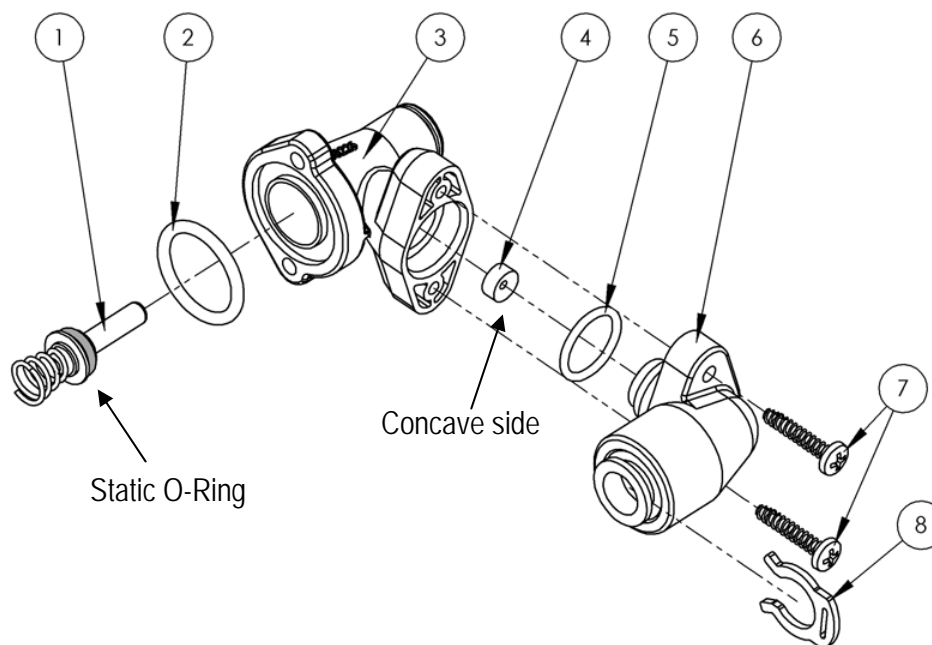


Figure 17: Brine Valve Housing Assembly

	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	93247	Housing End Cap	1
7	90818	Screw	2
8	200199	3/8" Locking Clip	1
	93601-JG	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 (93247).
93247 Housing End Cap	The Cap is held in place by two 3/4" 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. Caution: The 3/8" locking clip (200199) must be installed to prevent air from being drawn into the appliance during brine rinse.

Assembly and Parts, Cont.

Optional 3/4" and 1" I/O Adapter Assemblies with Blending Valve

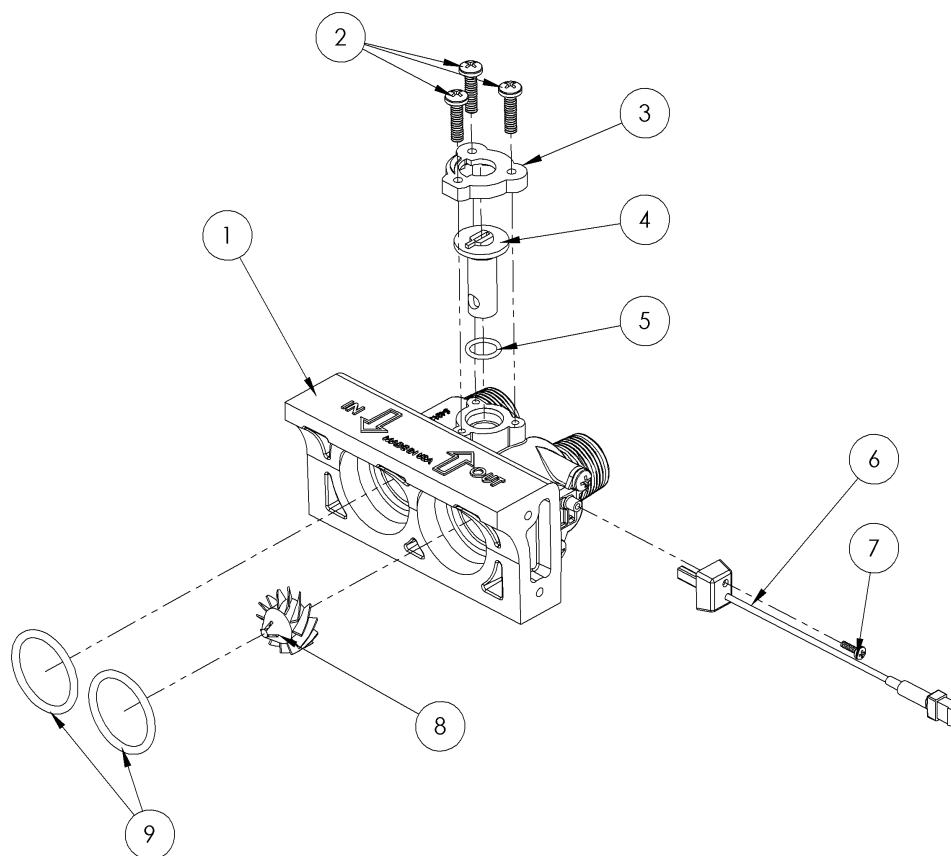


Figure 18: 3/4" I/O Adapter Assembly with Blending Valve

	Part #	Description	Quantity
1	93227	3/4" I/O Adapter Assembly	1
	93252	1" I/O Adapter Assembly (not shown)	
2	90802	# 6 X .5 Screw	3
3	90252	Blending Dial Cap	1
4	90222	Blending Dial	1
5	90827*	O-Ring	1
6	93860*	Turbine Sensor Assembly w/Cap	1
7	90809*	Sensor Cap Screw	1
8	90522	Turbine Assembly	1
9	93838	O-Ring	2
	93521	Entire 3/4" Assembly (all of the above parts)	
	93521-1	Entire 1" Assembly (not shown)	

* Not field serviceable

Assembly and Parts, Cont.

Drain End Cap Assembly

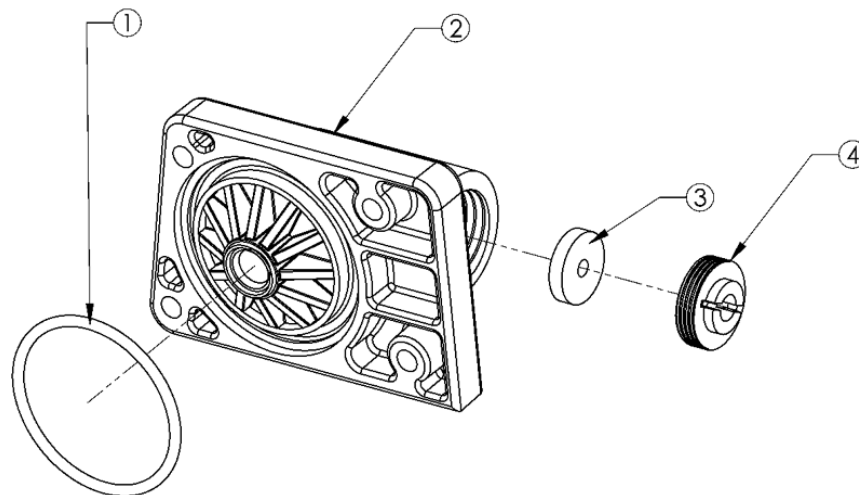


Figure 19: Drain End Cap Assembly

	Part #	Description	Quantity
1	93808	End Cap O-Ring	1
2	90268	Drain End Cap	1
3	H2086 - 1.2*	Drain Line Flow Control	1
	H2086 - 1.5*		
	H2086 - 2.0*		1
	H2086 - 2.4*		1
	H2086 - 3.0*		1
	H2086 - 4.0*		1
	H2086 - 5.0*		1
	H2086 - 7.0*		1
4	90267	Retainer	1
	90614 - X.X ¹	Drain End Cap Assembly (all of the above parts)	

*The number shown after the Drain Line Flow Control Button part number indicates the back wash flow rate in gpm.

¹ Must specify drain line flow control size. X.X indicates the backwash rate in gpm. Example: 90614 - 1.5

90268 Drain End Cap	The Drain End Cap (90268) seals the left opening on the Main Valve Body. The 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. 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.
H2086 Drain Line Flow Control	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.
90267 Retainer	The Retainer (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 (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.

Safety Shutoff Assembly

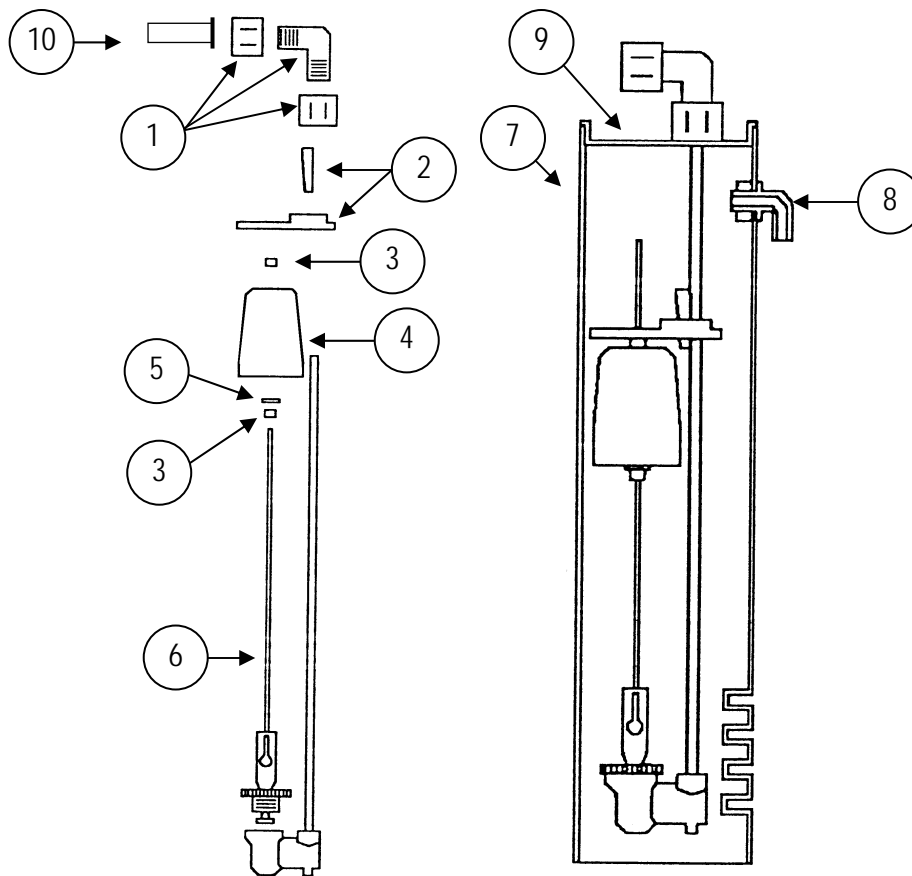


Figure 20: Safety Shutoff Assembly

	Part #	Description	Quantity
1	51366	Air Check/Draw Tube Elbow Assembly	1
2	H7041	Guide and Lock Set	1
3	H7039	Float Grommet	2
4	H7040	Bell Float	1
5	H7042	Float Washer	1
6	H7038-01	Float Rod	1
7	90102	3.5 X 26.5 Brine Well	1
8	C0700	2 pc. Overflow Fitting	1
9	C0600	Brine Well Cap	1
10	201120	3/8" Nylon Insert	1
	93811-26.5	Entire Assembly (all of the above parts except 8)	

Assembly and Parts, Cont.

Brine Valve Elbow Installation

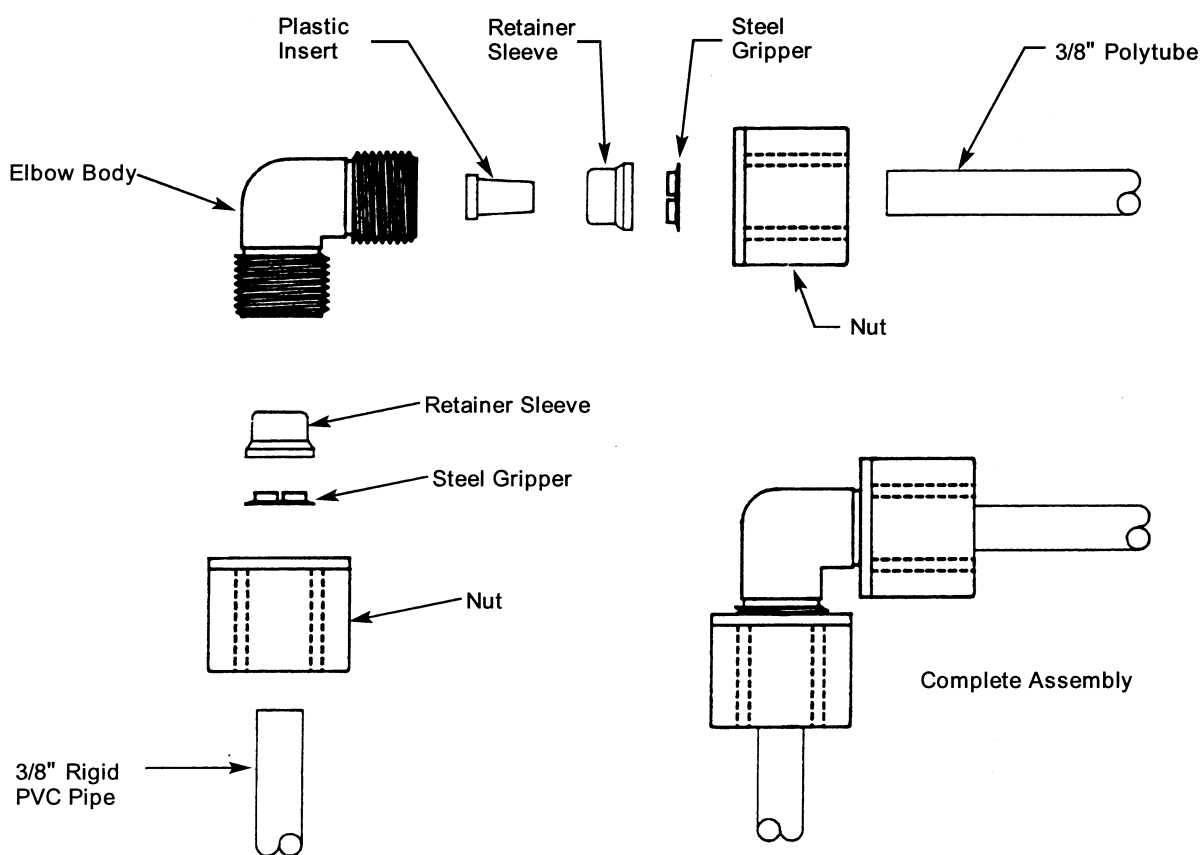


Figure 21: Brine Valve Elbow Installation

The nut, gripper, and retainer sleeve are a three-piece assembly that can come apart if removed from the elbow body. Parts must be reassembled exactly as shown to function properly.

When connecting the 3/8" poly tube, first assemble the nut, gripper, and retainer sleeve on the tubing. Then insert the plastic insert. Screw the nut on the elbow body. With a wrench, tighten the nut securely to create a water-tight connection.

Troubleshooting

Problem	Possible Cause	Solution
<p>No soft water after regeneration</p>	<p>No salt in brine cabinet Sediment in brine tank has plugged the brine line and air check/draw tube</p> <p>Refill flow control is plugged</p> <p>Drain line is pinched, frozen, or restricted Clogged injector assembly</p> <p>Salt bridge has formed due to high humidity or the wrong kind of salt</p>	<p>Add salt</p> <p>Remove the brine line and flush clean. Remove the air check/draw tube and flush with clean water. Clean injector assembly. Clean any sediment from brine tank</p> <p>Remove brine piston housing and clear debris from the flow control</p> <p>Straighten, thaw, or unclog the drain line</p> <p>Remove injector cap and clean nozzle and throat with a wooden toothpick. Replace throat if removed</p> <p>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</p>
<p>No soft water</p>	<p>The bypass valve is in the bypass position Appliance is plumbed backward Extended power outage Water hardness has increased</p> <p>Not metering water</p> <p>Blending dial is open</p>	<p>Place the bypass valve in the service position Check that appliance is plumbed correctly Reset the time of day Re-test the water and re-enter a new setting number</p> <p>Flow should be indicated with water usage. If no flow, see below</p> <p>Make sure blending dial is closed</p>
<p>No flow is indicated when water is flowing</p>	<p>The bypass valve is in the bypass position Appliance is plumbed backward Sensor not receiving signal from magnet on turbine</p> <p>Turbine is jammed</p>	<p>Place the bypass valve in the service position Check that appliance is plumbed correctly</p> <p>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</p> <p>Remove bypass valve and clear debris from turbine</p>
<p>Flow indicated when water is not being used</p>	<p>The household plumbing system has a leak</p>	<p>Repair the leak</p>
<p>No read-out in display</p>	<p>Electric cord is unplugged No electric power at outlet</p> <p>Defective transformer</p> <p>Defective circuit board</p> <p>High ambient room temperature. If the temperature exceeds 120°F, the display will blank out. This does not affect the operation of the controller</p>	<p>Plug in the transformer Check power source. Make sure outlet is not controlled by a switch</p> <p>Test with volt meter for 12 VAC at control. If less than 10 VAC or greater than 14 VAC, replace the transformer</p> <p>With 12 VAC present at controller, replace the controller</p> <p>No action necessary</p>

Troubleshooting, Cont.

Problem	Possible Cause	Solution
Appliance stays in regeneration	Controller not attached properly Defective magnet disk Foreign object in valve body Broken valve assembly. Motor running	Make sure the controller is pushed all the way onto the drive end cap Replace magnet disk Remove foreign object(s) from the valve body Repair the drive end cap
Excess water in brine tank	Restricted, frozen, or pinched drain line Plugged brine line, brine line flow control, or air check/draw tube Plugged injector assembly Sticking brine refill valve	Remove restriction, thaw, or straighten drain line Clean flow control, air check/draw tube, and brine line. Clean any sediment from the brine cabinet Clean or replace injector. Replace throat if removed Remove valve. Check for obstruction and remove
Not regenerating in proper sequence	Magnet disk defective Defective controller	Replace magnet disk Replace controller
Salty water (pink water from HC3 2IF)	Plugged injector Low water pressure Drain line or flow control is restricted Brine line restricted or crimped Excessive amount of water in brine cabinet Insufficient rinse time Intermittent pressure drop from feed source Brine valve drips water back to brine tank	Clean injector screen, nozzle, and throat Maintain minimum pressure of 30 psi Remove restriction Remove restriction, replace if crimped Verify correct water level relative to salt setting. Check brine line and fittings for loose connections Check mode setting chart for proper brine rinse time. Adjust time, if necessary Install check valve on the inlet water line to the appliance (Check local plumbing codes first) Clean brine valve housing, replace piston assembly

HC3 Water Conditioner Specifications

Five-Button Dual Mode Controller	HC3 25	HC3 25CX	HC3 35	HC3 48	HC3 64	HC3 105
Tannin (ppm)	NA	NA	NA	NA	NA	NA
Sulfur (ppm)	NA	NA	NA	NA	NA	NA
Iron in solution (ppm)	2 ¹	NA	6 ¹	8 ¹	10 ¹	10 ¹
Max Compensated Hardness (gpg)	60	25	90	110	120	130
Minimum pH (standard units)	7	7	7	7	7	7
Maximum Chlorine (ppm)	1	1	1	1	1	1
Capacity (grains) @ 2.5 lb salt/cu.ft. ² (# 1 Salt Setting)	10,700	10,700	14,700	20,100	26,800	44,300
Capacity (grains) @ 3.8 lb salt/cu.ft. (# 2 Salt Setting)	14,700	14,700	20,200	27,500	36,700	60,600
Capacity (grains) @ 5.0 lb salt/cu.ft. (# 3 Salt Setting)	17,800	17,800	24,500	33,500	44,600	73,700
Capacity (grains) @ 7.0 lb salt/cu.ft. (# 4 Salt Setting)	22,200	22,200	30,500	41,600	55,400	91,500
Capacity (grains) @ 15 lb salt/cu.ft. (# 5 Salt Setting)	25,600	25,600	35,200	48,000	64,000	105,000
Brine line flow control refill (gpm)	.5	.5	.5	.5	.5	.5
Media tank size (inches) Dia. x Ht.	8 x 44	9 x 48	9 x 48	10 x 54	12 x 52	14 x 65
Resin/media amount (cu.ft.)	.8	1.1	1.1	1.5	2.0	3.3
Media type	HCR	HCR/HCM	HCR	HCR	HCR	HCR
Bed depth (inches)	30	33	33	35	34	43
Freeboard (inches)	14	15	15	19	18	22
Water Pressure (min-max psi)	20-120	20-120	20-120	20-120	30-120	30-120
Water temperature (min-max °F)	33-120	33-120	33-120	33-120	33-120	33-120
Minimum water volume for backwash (gpm)	1.5	2.0	2.0	2.4	4.0	5.0
Flow Rate (gpm) @ 15 psi drop	9	10.5	10	12	16	18.5
Pressure Drop @ normal flow rate (gpm)	7.8@6	7.2@6	7.6@6	7.3@9	8.5@12	11@14
Pipe size (inches)	3/4	3/4	3/4	3/4	1	1
Height (inches)	48	52	52	58	56	69
Floor space (inches)	18 x 27	18 x 28	18 x 28	18 x 29	26 x 36	30 x 38
Brine or solution tank size (inches)	18 x 33	18 x 33	18 x 33	18 x 33	24 x 50	24 x 50
Brine or solution tank capacity (lb)	375 ³	375 ³	375 ³	375 ³	640	640
Water volume per regen. (gal-factory setting)	From 16.5	From 18.5	From 20.5	From 28	From 43.5	From 59
Length of regeneration (minutes)	From 19	From 19	From 23	From 27	From 33	From 48
Shipping weight (lb)	100	125	130	160	190	275
Quartz Gravel (lb)	10	12	12	14	20	30

Standard Features:

Metered or timed HC3 valve, Hydro-Clean distributor, high capacity resin and self-leveling thermo media tank.

Options: Low profile valve cover, 1" full flow bypass valve.

Legend:

¹ When iron is present in the raw water supply, regeneration frequency cannot exceed 96 hours. Additionally, a minimum salt setting of 7 lbs. per cubic foot of resin is required.

² Do not use standard 18" diameter brine tank with salt grid for salt settings less than 3 lbs.

³ 325 lbs with grid plate.

N/A: No Application

HC3 Filter Descriptions

The following table describes the available filters.

Filter	Purpose
HC3 2TN	Designed to remove tannin from water that is free from hardness, iron, and sulfur. Regenerates every 4th day with 6 lbs. of salt. Add 4-oz. of 5-1/4% chlorine every 6 weeks.
HC3 2IF	Removes iron and iron algae. Also removes up to 5 ppm H ₂ S with the presence of 2 ppm iron. Regenerates every 6 days for iron; as needed for sulfur.
HC3 1CF	Removes tastes, odors and will reduce most man-made pollutants. Backwashes as needed.
HC3 1NF	Designed to raise the pH of most low-pH water. The mineral media must be replenished periodically. Backwashes every 2 days.
HC3 1MMF	Designed to remove heavy sediment and suspended solids. It is capable of filtering down to 10 microns in size. Backwashes as needed.

HC3 Filter Specifications

Five-Button Dual Mode Controller— Special Series	HC3 2TN	HC3 2IF	HC3 1CF	HC3 1NF	HC3 1MMF
Tannin	0–2	N/A	N/A	N/A	N/A
Capacity (ppm)	2 Tannin	8,000	N/A	N/A	N/A
Sulfur H ₂ S (ppm)	0	5	N/A	N/A	N/A
Iron in solution (ppm)	0	20	0	0	0
Max Compensated Hardness (gpg)	10 ¹	NA	NA	5	NA
Minimum pH (standard units)	7	7	7	5 ²	7
Brine line flow control refill (gpm)	0.5	0.5	NA	NA	NA
Media tank size (inches) Dia. x Ht.	8 x 44	10 x 47	10 x 47	10 x 47	10 x 47
Resin/media amount (cu.ft.)	0.7	1.0	1.33	1.25	1.5
Quartz Gravel (lb)	10	14	14	14	16*
Media type	Anion Resin	Manganese Greensand	Activated Carbon	Calcite/Corosex	Multi-Grade
Bed depth (inches)	28	26.5	33.75	32	33
Freeboard (inches)	16	19.5	12.25	14	13
Water Pressure (min–max psi)	20–120	30–120	30–120	30–120	30–120
Water temperature (min–max °F)	33–120	33–80	33–120	33–120	33–120
Minimum water volume for backwash (gpm)	1.2	5.0	5.0	5.0	7.0
Mode Setting	1	1	1	1	1
Backwash #1 (min)	0	10	7	7	7
Brine/rinse (min)	30	45	0	0	0
Backwash #2 (min)	2	5	0	0	0
Salt (lb)	7	3	0	0	0
Flow Rate (gpm) @ 15 psi drop	4	6	8	6	8.5
Pipe size (inches)	1	1	1	1	1
Height (inches)	48	51	51	51	51
Floor space (inches)	18 x 27	16 x 27	11 x 11	11 x 11	11 x 11
Brine or solution tank size (inches)	18 x 33	16 x 21	NA	NA	NA
Brine or solution tank capacity (lb)	325	5 lb KMnO ₄	NA	NA	NA
Water volume per regen. (gal–factory setting)	29.5	57.5	35	35	49
Length of regeneration (minutes)	37	55	7	7	7
Regenerant used	Salt	4 oz KMnO ₄	N/A	N/A	N/A
	Regenerates every 4 days.	This model removes H ₂ S with the presence of at least 2 ppm iron. Follow instructions on feeder cover and regenerant package.	Backwash only model. Must not be backwashed for 24 hours after installation.	Backwash only model. Must backwash at least every two days or media may solidify. Will add some hardness to water.	Backwash only model. Backwashes every 3 days or as needed.
Shipping weight (lb)	90	175	100	175	175

* The HC3 1MMF uses garnet for an under bed instead of quartz gravel.

¹ Water containing 10 grains of hardness or more should be softened prior to the tannin removal unit. To prevent organic fouling, do not exceed 4 days between regenerations.

² **Caution:** The HC3 1NF will raise the pH of most, but not all low pH water. Some water requires the addition of caustic soda with a chemical feed pump.

Special Series:

Standard: HC3 valve, self leveling thermo media tank, bypass with test port and 1" CTS CPVC piping adapters, 1" high flow distributor.

Options: 3/4" or 1" inlet/outlet adapter, tank jacket, salt shelf.

Streamline brine tank: 11" X 11" X 34" (not available for 2TN, 2IF, 64 or 105.)

N/A: No Application



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