



## Hybrid Water Softener



Owners Manual

1. Read all instructions carefully before operation.
2. Avoid pinched o-rings during installation by applying (provided with install kit) NSF certified lubricant to all seals.
3. This system is not intended for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

REVISION # 3  
REVISION DATE November 1, 2013

**US Water Systems** Corporate Office  
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## EFFICIENCY STATEMENT

This product is efficiency rated according to NSF/ANSI 44. The stated efficiencies are valid only at the specified salt dosages and maximum service flow rate. **THESE PARAMETERS DO NOT APPLY TO FUSION HYBRID WATER SOFTENERS.**

## PERFORMANCE DATA SHEET

Model Number	485HE-75	485HE-100	485HE-150	485HE-200	485HE-300
Qty High Capacity Resin	0.75 ft <sup>3</sup>	1.0 ft <sup>3</sup>	1.5 ft <sup>3</sup>	2.0 ft <sup>3</sup>	3.0 ft <sup>3</sup>
Rated Service Flow (gpm)	7.5	11.0	11.2	12.4	12.9
Pressure Drop at Rated Service Flow (psi)	9.0	15.0	15.0	15.0	15.0
Rated Softening Capacity (grains)	10,222 @3lbs	13,269 @ 3lbs	20,443 @4.5lbs	27,258 @6lbs	40,887 @9lbs
Efficiency (grains/lb salt)	4,543	4,543	4,543	4,543	4,543
Max. Flow Rate to Drain (gpm)	1.5	2.0	2.4	3.5	5.0
Working Pressure	Min. 20 - Max. 125 psi				
Operating Temperature	Min 39 - Max. 100 degrees Fahrenheit				

These softeners conform to NSF/ANSI 44 for the specific performance claims as verified and substantiated by test data. These models are efficiency rated. The efficiency rating is valid only at the stated salt dose and maximum service flow rate. They have a demand initiated regeneration (D.I.R.) feature that complies with specific performance specifications intended to minimize the amount of regenerant brine and water used in their operation. These softeners have a rated softener efficiency of not less than 3350 grains of total hardness exchange per pound of salt (based on sodium chloride) and shall not deliver more salt than their listed ratings. The rated salt efficiency is measured by laboratory tests described in NSF/ANSI Standard 44. These tests represent the maximum possible efficiency that the systems can achieve. Operational efficiency is the actual efficiency after the system has been installed. It is typically less than the efficiency due to individual application factors including water hardness, water usage, and other contaminants that reduce the softener's capacity. These systems are not intended for use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. For best results, use extra course grade or crystal 99.5% pure solar salt. Refer to Installation/operation manual and warranty for further details on installation, parts and service, maintenance and further restrictions or limitations to the use of the product. Performance will vary on Fusion Hybrid water softeners. These systems operate on site specific parameters so efficiency results may vary.



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## Unpacking / Inspection

Be sure to check the entire softener for any shipping damage or parts loss. Also note damage to the shipping cartons. Contact US Water Systems at 1-800-608-8792 to report any shipping damage within 24 hours of delivery. Claims made after 24 hours may not be honored.

Small parts, needed to install the softener, are in a parts bag. To avoid loss of the small parts, keep them in the parts bag until you are ready to use them.

## Safety Guide

*For your safety, the information in this manual must be followed to minimize the risk of electric shock, property damage or personal injury.*

- Check and comply with your provincial / state and local codes. You must follow these guidelines.
- Use care when handling the water softening system. Do not turn upside down, drop, drag or set on sharp protrusions.
- The water softening system works on 12 volt-60 Hz electrical power only. Be sure to use only the included transformer.
- Transformer must be plugged into an indoor 120 volt, grounded outlet only.
- Use clean water softening salts only, at least 99.5% pure. Extra Course Grade or Crystal salts are recommended. Do not use rock, block, granulated or ice cream making salts. They contain contaminants that could cause maintenance problems.
- Keep the salt lid in place on the softener unless servicing the unit or refilling with salt.
- **WARNING:** This system is not intended for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Contact US Water Systems for disinfection treatment equipment.

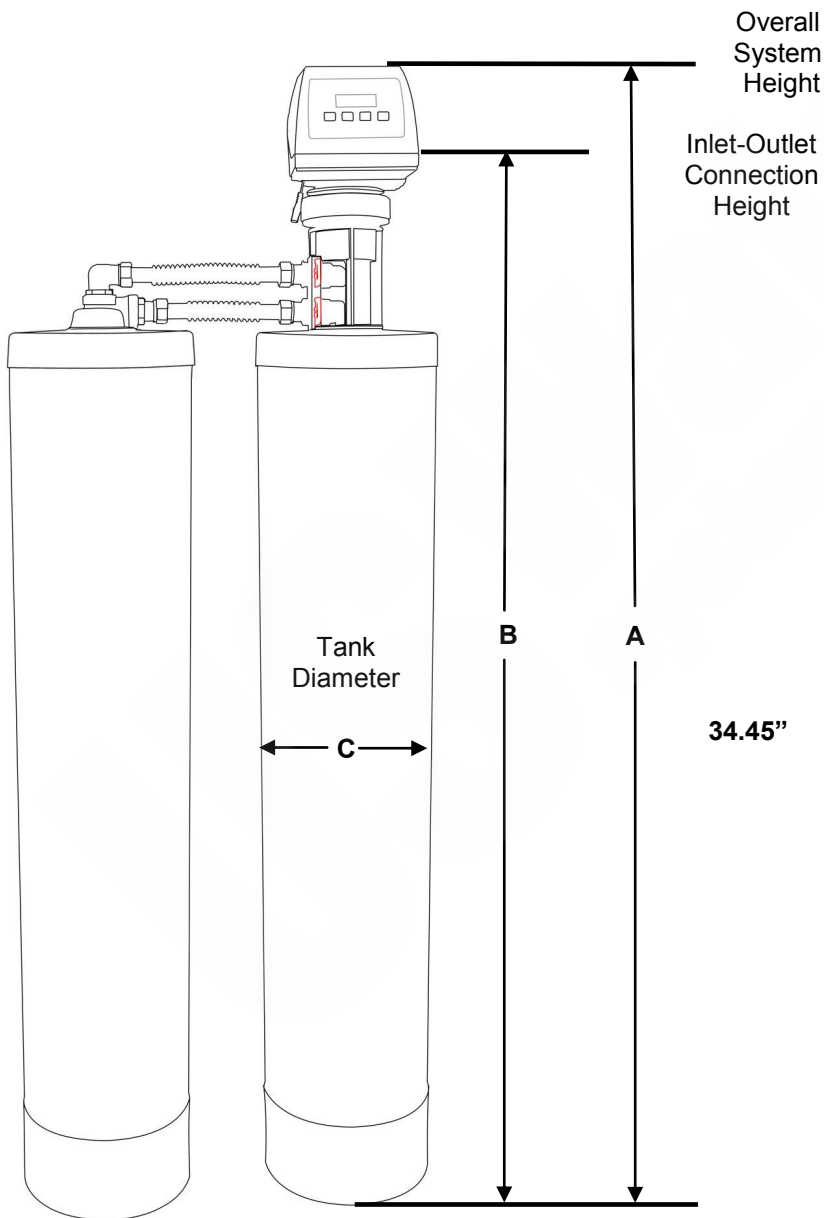
## Proper Installation

*This water softening system must be properly installed and located in accordance with the Installation Instructions before it is used or the warranty will be void.*

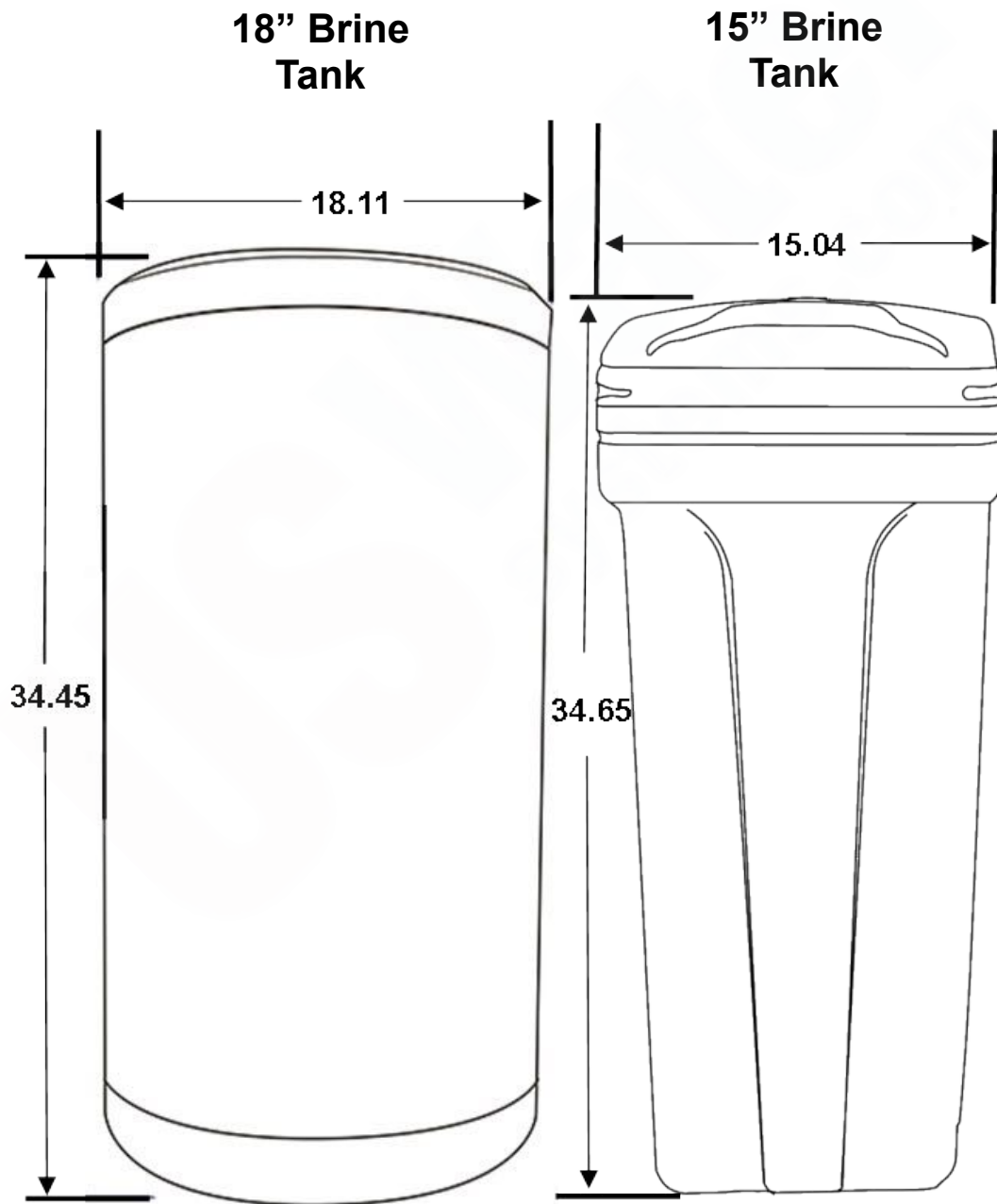
- **Do not** install or store where it will be exposed to temperatures below freezing or exposed to any type of weather. Water freezing in the system will break it. Do not attempt to treat water over 100°F.
- **Do not** install in direct sunlight. Excessive sun or heat may cause distortion or other damage to non-metallic parts.
- Properly ground to conform with all governing codes and ordinances.
- Use only *lead-free solder and flux* for all sweat-solder connections, as required by state and federal codes.
- Maximum allowable inlet water pressure is 125 psi. If daytime pressure is over 80 psi, night time pressure may exceed the maximum. Use a pressure reducing valve to reduce the pressure.
- Softener resins may degrade in the presence of chlorine or chloramines above 2 ppm. If you have chlorine or chloramines in excess of this amount, you may experience reduced life of the resin. In these conditions, you may wish to consider purchasing a whole house carbon filter softener system with a chlorine reducing media. Contact US Water Systems for Chlorine and Chloramine removal equipment. Fusion Hybrid Water softeners can remove chlorine.
- **WARNING:** Discard all unused parts and packaging material after installation. Small parts remaining after the installation could be a choke hazard.

## System Dimensions

Model	Tank Size	A	B	C
FNLT-100-HY	9" X 48"	54.375"	50.875"	9"
FNLT-150-HY	10" X 54"	60.375"	57"	10"
FNLT-200-HY	12" X 52"	58.625"	55.25"	12"
FNLT-250-HY	13" X 54"	61.25"	57.625"	13"



# System Dimensions



## Specifications

Specifications				
	087-FNLT-100-HY	087-FNLT-150-HY	087-FNLT-200-HY	087-FNLT-250-HY
Optional Settings - High Efficiency				
Salt Used - Per Regeneration	3.0 lbs	4.5 lbs	6.0 lbs	9.0 lbs
Water Used - Regeneration	31.6 gal	44.3 gal	60.9 gal	102.2 gal
Hardness Removal - Grains	15,000	22,500	30,000	45,000
Factory Settings - Standard Capacity				
Salt Used - Per Regeneration	6.0 lbs	9.0 lbs	12.0 lbs	18.0 lbs
Water Used - Regeneration	43.4 gal	62.7 gal	87.1 gal	139.2 gal
Hardness Removal - Grains	25,000	37,500	50,000	75,000
Optional - High Capacity				
Salt Used - Per Regeneration	10.0 lbs	15.0 lbs	20.0 lbs	30.0 lbs
Water Used - Regeneration	64.3 gal	90.3 gal	124.6 gal	196.2 gal
Hardness Removal - Grains	30,000	45,000	60,000	90,000
Resin Quantity - Cubic Feet	1.0 ft <sup>3</sup>	1.5 ft <sup>3</sup>	2.0 ft <sup>3</sup>	3.0 ft <sup>3</sup>
Tank Size	9x48	10x54	12x52	14x65
Tank Jacket / Media Loaded	Yes	Yes	No	No
Brine Tank / Cabinet Size (Inches)	18.1 x 34.5	18.1 x 34.5	20.3 x 37.4	23.0 x 40.5
Salt Storage Capacity	240 lbs	240 lbs	350 lbs	420 lbs
Flow Rate @ 15 psi Pressure Drop	11.0 gpm	11.2 gpm	12.2 gpm	12.6 gpm
Flow Rate @ 25 psi Pressure Drop	15.0 gpm	15.1 gpm	16.2 gpm	16.6 gpm
Back Wash Flow Rate	2.0 gpm	2.4 gpm	3.5 gpm	5.0 gpm
Shipping Weight	122 lbs	155 lbs	172 lbs	244 lbs
Plumbing Connections	1"			
Resin Type	10% Cross-Linked Ion Exchange Resin			
Electrical Requirements	Input 120V 60 Hz - Output 12V 650mA			
Water Temperature	Min 39 - Max. 100 degrees Fahrenheit			
Water Pressure	Min. 20 - Max. 125 psi			

- Continuous operation at flow rates greater than the service flow rate may affect capacity and efficiency performance.
- The manufacturer reserves the right to make product improvements which may deviate from the specifications and descriptions stated herein, without obligation to change previously manufactured products or to note the change.
- The above capacity and flow rate specifications have not been validated by WQA.
- **THESE VALUES DO NOT APPLY TO THE FUSION HYBRID SERIES. THESE SYSTEMS ARE PROGRAMMED TO BE SITE SPECIFIC AND VALUES AND SPECIFICATIONS MAY VARY.**

## Before Starting Installation

### Tools, Pipe, and Fittings, Other Materials

- Channel Locks
- Screwdriver
- Teflon tape
- Razor knife
- Two adjustable wrenches
- Additional tools may be required if modification to home plumbing is required.
- Plastic inlet and outlet fittings are included with the softener. To maintain full valve flow, 1" pipes to and from the softener fittings are recommended. You should maintain the same, or larger, pipe size as the water supply pipe, up to the softener inlet and outlet.
- Use copper, brass, or PEX pipe and fittings.
- Some codes may also allow PVC plastic pipe.
- ALWAYS install the included bypass valve, or 3 shut-off valves. Bypass valves let you turn off water to the softener for repairs if needed, but still have water in the house pipes.
- 5/8" OD drain line is needed for the valve drain.
- A length of 5/8" OD drain line tubing is needed for the brine tank over flow fitting (optional).
- Extra Course Grade or Crystal water softener salt is needed to fill the cabinet or brine tank.

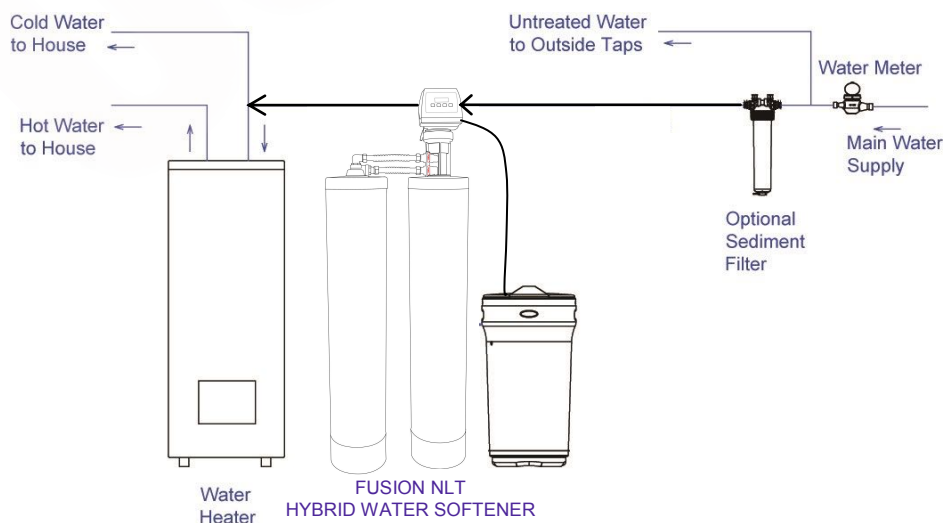
## How Your Water Conditioner Works

The principle behind water softening is simple chemistry. A water softener contains resin beads which hold electrically charged ions. When hard water passes through the softener, calcium and magnesium ions are attracted to the charged resin beads. The result is removal of calcium and magnesium ions which produces soft water.

This system is controlled with simple, user-friendly electronics displayed on a LCD screen. The main page displays the current time and the remaining gallons in meter mode or the remaining days in calendar clock mode. The system will also scroll through other pertinent information.

## Where To Install The Softener

- Place the softener as close as possible to the pressure tank (well system) or water meter (city water).
- Place the softener as close as possible to a floor drain, or other acceptable drain point (laundry tub, sump, standpipe, etc.).
- Connect the softener to the main water supply pipe BEFORE the water heater. **DO NOT RUN HOT WATER THROUGH THE SOFTENER.** Temperature of water passing through the softener must be less than 100 deg. F.
- Outside faucets and irrigation systems should be supplied with hard water prior to the water softener.
- Do not install the softener in a place where it could freeze. **Damage caused by freezing is not covered by the warranty.**
- Put the softener in a place water damage is least likely to occur if a leak develops. The manufacturer will not repair or pay for water damage.
- A 120 volt electric outlet is needed within 6 feet of the softener. The transformer has an attached 6 foot power cable. **Be sure the electric outlet and transformer are in an inside location, to protect from wet weather.**
- If installing in an outside location, you must take the steps necessary to assure the softener, installation plumbing, wiring, etc. are protected from the elements and contamination sources.
- **Keep the softener out of direct sunlight.** The sun's heat may soften and distort plastic parts.





## Softener Preparation

### *Fusion NLT Tank Installation Instructions*

**WATER PRESSURE:** A minimum of 20 pounds of water pressure is required for regeneration valve to operate effectively.

**ELECTRICAL FACILITIES:** An uninterrupted alternating current (A/C) supply is required. Note: Other voltages are available. Please make sure your voltage supply is compatible with your unit before installation.

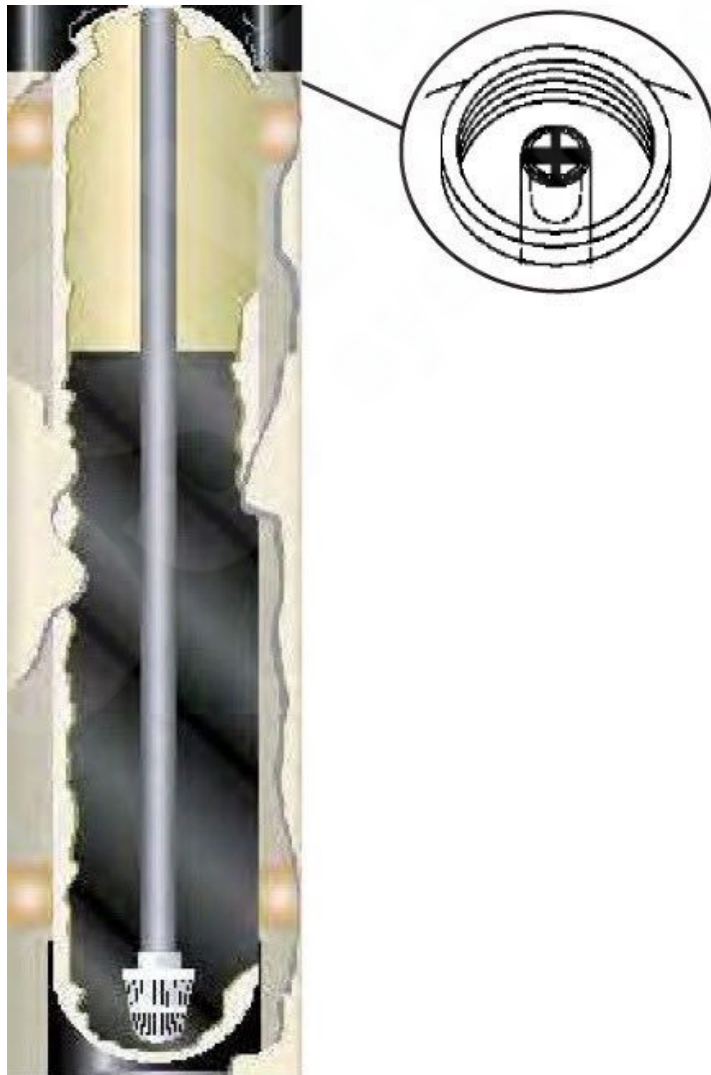
**EXISTING PLUMBING:** Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced.

**LOCATION OF FUSION NLT TANK AND DRAIN:** The Infusion tank should be located close to a drain to prevent air breaks and back flow.

**CAUTION:** Water pressure is not to exceed 80 psi, water temperature is not to exceed 110°F (43°C), and the unit cannot be subjected to freezing conditions.

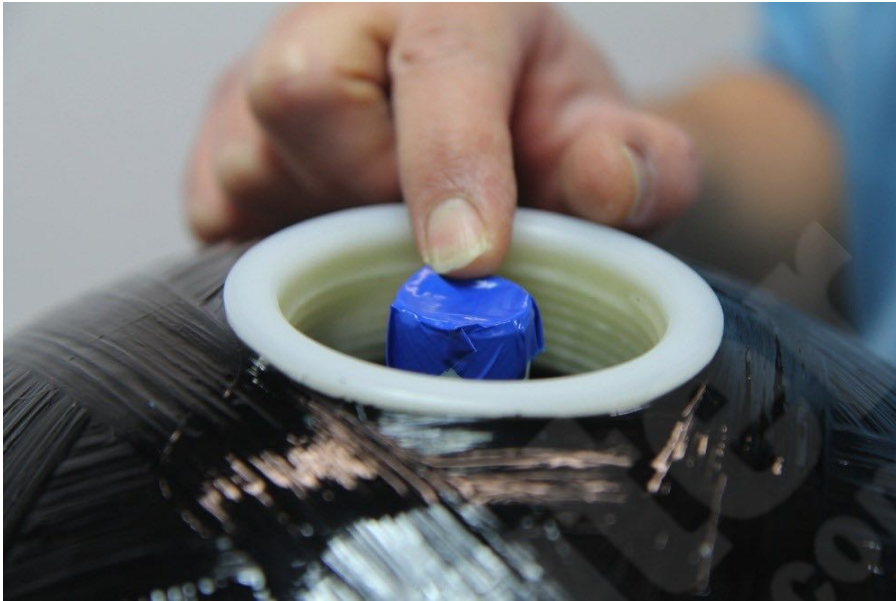
### *Media Installation*

- 1) Remove the tank from carton.
- 2) Verify the riser tube is centered in the bottom center of the tank. A flashlight may be necessary.



## Softener Preparation

- 3) Place a piece of duct tape over the riser tube so no media enters the riser while filling.



- 4) Use the Blue Funnel provided, to pour the media into the tank. Pour it evenly around the hole to ensure it is well distributed in the tank and pour slow enough, to keep from plugging the hole. If you received gravel, it will be poured in the tank first. A helper may be needed to hold the funnel during the filling process. It is recommended that a dust mask and safety goggles be worn to prevent possible injury.



- 5) When media is installed move tank side to side to settle the media. The tanks should be filled with water if possible to help saturate the resin and reduce the amount of rinse time needed to bring them online.

# HTO INSTALLATION & QUICK START SHEET

## Tank & Valve Connection Parts



### Tank Quick Connector Assembly A – D (60010009)

- A - O-ring 87.5x3.55 (60010073)
- B - Clamp Ring
- C - Valve Base
- D - Tank Base
- E - Tank Adaptor (60010067)
- F - Top Pipe Connector (60010071)
- G - Bottom Pipe Connector (60010072)
- Connector o-rings 22.4x3.55 QTY - 4 (60010118)
- H - Clips QTY - 4 (60010025)
- I - Parallel Tank Connector (60010012)

## Optional Tools

- A - Wrench
- B - Multi-Adaptor



## SECTION A

### Check Parts Before Assembly

- FAILURE TO CORRECTLY INSTALL TANK QUICK CONNECT ASSEMBLY MAY RESULT IN A WATER LEAK AND WILL VOID PRODUCT WARRANTY.**
- Remove tank quick connect parts and disassemble into the 4 main parts:
  - O-ring
  - Clamp Ring
  - Valve Base
  - Tank Base

## SECTION B

### Load Media and Install Tank Adaptors

- Install 1x54 tank distributor. Cut pipe flush to top of tanks.
- Cover the distributor tube with duct tape to prevent media from getting in the tube during the filling procedure.
- Load the medias. Carbon in tank with the valve, softener/resin in tank with the adaptor. For backwashing filters, equally divide media between each tank. If your received gravel, pour it in first then the equally divided media.
- Install the upper basket on the adaptor. Thread the tank adaptor into the tank thread and tighten firmly as per Figure A.



Figure A. Tighten adaptor firmly.

## SECTION C

### Install Parallel Tank Adaptor into Tank Thread

- Install the upper basket on the parallel tank adaptor. Thread the parallel tank adaptor into the tank thread and tighten firmly as per Figure B.



Figure B. Install parallel tank adaptor.

## SECTION D

### Install Tank Base into Tank Thread

- Thread the tank base into the parallel tank adaptor and tighten firmly.
- The thread base can be tightened by hand as per Figure C or with the optional wrench and multi-adaptor as per Figure D.



Figure C. Tighten by hand.



Figure D. Optional tighten by wrench and multi-adaptor.

## SECTION E

### Install Clamp Ring onto Valve Thread

- Install the clamp ring over the valve threads onto the valve as per Figure E and F.



Figure E. Valve threads before clamp ring installed.



Figure F. Clamp ring installed over threads onto valve.

## SECTION F

### Install O-ring onto Valve Base

- Apply NSF silicon lubricant generously to o-ring.
- Install the o-ring as per Figure G.



Figure G. Proper o-ring location.

## SECTION G

### Install Valve Base onto Valve Thread

1. Thread the valve base onto the valve thread and tighten firmly.
2. The valve base can be tightened firmly by hand as per Figure H or with optional wrench and multi-adaptor as per Figure I.



Figure H. Tighten by hand.



Figure I. Clamp ring installed onto valve.

## SECTION H

### Attach Valve to Tank Base

1. Insert the valve into the tank base as shown in Figure J. Insure the o-ring is in proper location before inserting. **FAILURE TO FOLLOW THIS STEP CAN PINCH AND DAMAGE THE O-RING WHICH MAY RESULT IN A LEAK AND VOID THE PRODUCT WARRANTY.**
2. Turn and tighten the clamp ring 1-2 turns as shown in Figure K. Do not tighten fully at this point.



Figure J. Insert valve into tank base.



Figure K. Clamp ring installed and tightened 1-2 turns.

## SECTION I

### Press Valve into Tank Base

1. Press down on valve as shown in Figure L to fully insert the valve into tank base.



Figure L. Press valve into tank base.

## SECTION J

### Tighten Clamp Ring

1. Turn clamp ring until finger tight as per Figure M. The ring should easily be un-loosened by fingers only. **DO NOT OVER-TIGHTEN.**



Figure M. Finger tighten clamp.

## SECTION K

### Install Top and Bottom Tank Connectors

1. Insert the top and bottom tank connectors into the tank adaptors as shown in Figure N and Figure O. If you are using the stainless steel flex connectors, please see Figure N.1 and O.1.



Figure N. Insert bottom tank connector.



Figure O. Insert top connector.



Figure N.1 Install the shorter tubing on the bottom threaded connectors. Turn it clockwise by hand until snug. Then tighten it an additional 1/2 to 1 full turn. You will need two wrenches to tighten the tubing.



Figure O.1 Install the longer tubing on the top threaded connectors. Turn it clockwise by hand until snug. Then tighten it an additional 1/2 to 1 full turn. You will need two wrenches to tighten the tubing.



## SECTION L

### Install Clips

1. Install the red clips (qty - 4) to connect the tanks as shown in Figure P, and Figure Q.



Figure P. Insert bottom tube into tank connector.



Figure Q. Insert top connector.

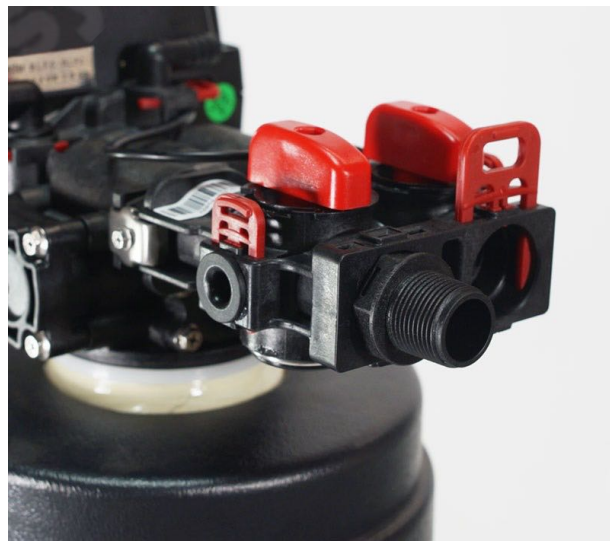
## Installation Instructions

1. If your hot water tank is electric, turn off the power to it to avoid damage to the element in the tank.
2. If you have a private well, turn the power off to the pump and then shut off the main water shut off valve. If you have municipal water, simply shut off the main valve. Go to the faucet, (preferably on the lowest floor of the house) turn on the cold water until all pressure is relieved and the flow of water stops.
3. Locate the softener tank and brine tank close to a drain where the system will be installed. The surface should be clean and level.
4. Connect the inlet and outlet of the softener using appropriate fittings. Perform all plumbing according to local plumbing codes.
  - **ON COPPER PLUMBING SYSTEMS BE SURE TO INSTALL A GROUNDING WIRE BETWEEN THE INLET AND OUTLET PIPING TO MAINTAIN GROUNDING.**

Any solder joints being soldered near the valve must be done before connecting any piping to the valve. Always leave at least 6" (152 mm) between the control valve and joints being soldered when soldering pipes that are connected to the valve. Failure to do this could cause damage to the valve.

The Fusion NLT is equipped with 1" removable connectors. It is recommended that these connectors are installed in the plumbing fitting using Teflon tape then lubricate the o-ring on the connector remove the red clips and push them into the bypass valve once they are tight in the plumbing fitting. The red clips can then be re-installed to secure the connectors in the bypass valve.

The inlet and outlet can be identified on the bypass valve. There are arrows stamped in the bypass valve showing flow (See page 19 diagram). The arrow pointing toward the valve is the inlet and the arrow pointing away from the valve is the outlet.



**All piping should be secured to prevent stress on the bypass valve and connectors.**

## Installation Instructions

5. Connect the drain hose to the valve and secure it with a hose clamp. Run the drain hose to the nearest laundry tub or floor drain. This can be ran up overhead or down along the floor. Drain hose should be a minimum of 1/2". If running the drain line more than 20 ft overhead, it is recommended to increase the hose size to 3/4". A DIRECT CONNECTION INTO A WASTE DRAIN IS NOT RECOMMENDED. A PHYSICAL AIR GAP OF AT LEAST 1.5" SHOULD BE USED TO AVOID BACTERIA AND WASTEWATER TRAVELLING BACK THROUGH THE DRAIN LINE INTO THE SOFTENER.

**Hose barb fitting for drain line.  
Be sure to use a hose clamp to  
secure the line.**



**Be sure to secure the drain line. The softener will drain with force and it should be secured to prevent a leak. Hose clamps should be used to secure the drain line at the connection points.**

## Installation Instructions

6. Connect the brine line to the control valve by removing the nut on the brine elbow on the control valve, and sliding it on the brine line. Then install the line stiffener in the brine line.



Push the brine line in the elbow fitting on the control valve until it stops. Then push the nut down on the fitting and tighten it hand tight. Use channel locks to tighten the nut an additional 1/2 turn.



Now connect the brine line to the brine tank safety float assembly by removing the nut on the brine valve and sliding it on the brine line. Then install the line stiffener in the brine line.



## Installation Instructions

Push the brine line in the elbow fitting on the brine safety valve until it stops. Then push the nut down on the fitting and tighten it hand tight. Use channel locks to tighten the nut an additional 1/2 turn.



7. Using the Allen Key (included), place the unit in the bypass position (See page 19 for bypass valve handle placement). Slowly turn on the main water supply. At the nearest cold treated water tap nearby remove the faucet screen, open the faucet and let water run a few minutes or until the system is free of any air or foreign material resulting from the plumbing work.



8. Make sure there are no leaks in the plumbing system before proceeding. Close the water tap when water runs clean.

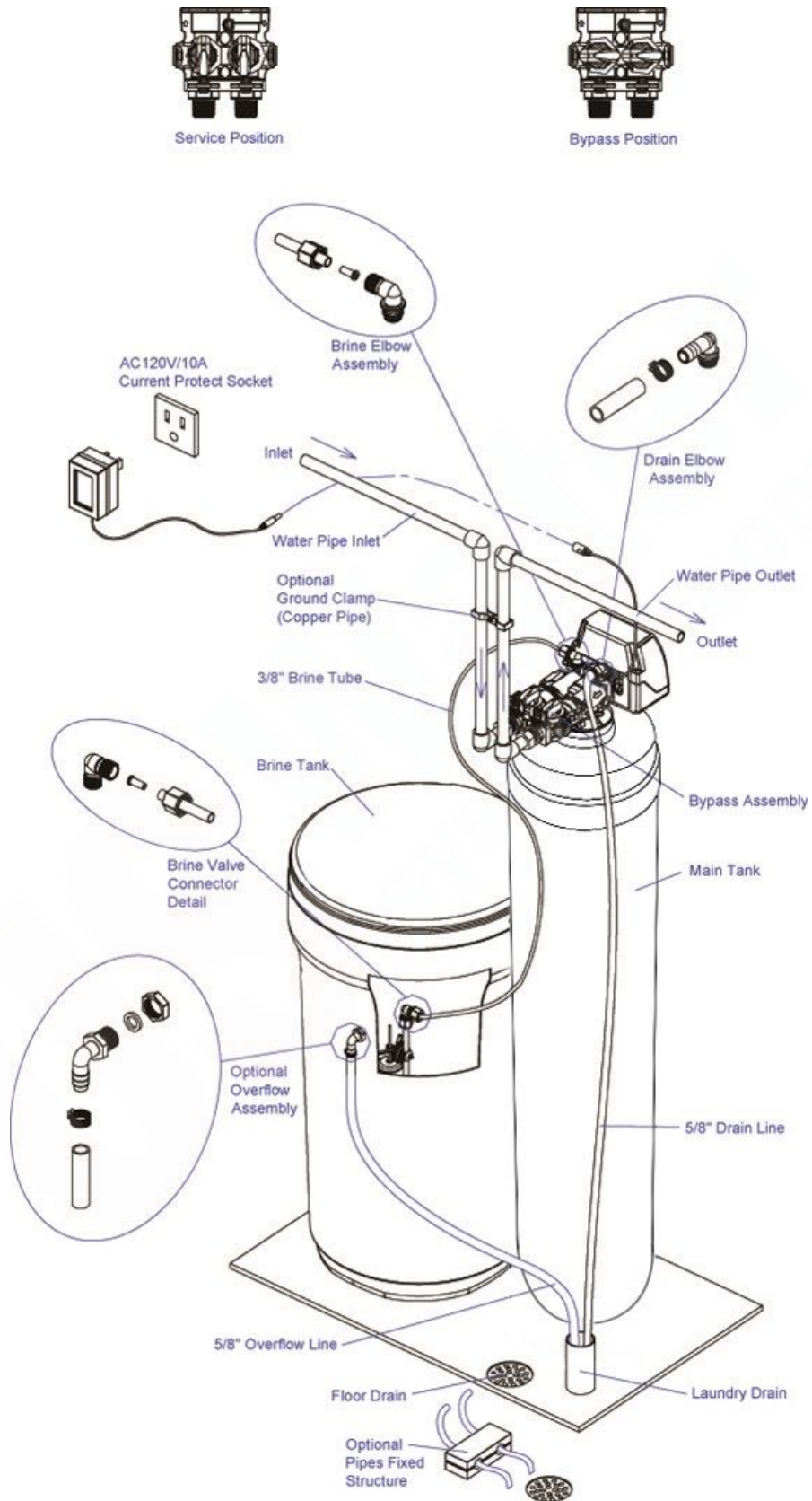
9. Open the brine tank lid and add water until there is approximately 3" (75 mm) of water in the tank. Add a minimum of 80lbs of salt to the brine tank.

10. Proceed to start up instructions.

**Note:** *The unit is not ready for service until you complete the start-up instructions.*



# Installation Overview



## System Start-Up

### Key Pad Configuration

SET-TINGS	This function is to enter the basic set up information required at the time of installation.
MANUAL REGEN	This function is to initiate an immediate or delayed manual regeneration.
DOWN / UP	Increase or decrease the value of the settings while in the programming mode.



### Manual Regeneration (Step / Cycle Valve)

#### DELAYED REGENERATION

Press and release the MANUAL REGEN. Button to set a delayed regeneration that will occur at the regeneration time. The main display page will show DELAYED REGEN ON. To cancel press and release the MANUAL REGEN. Button. The main display page will show DELAYED REGEN OFF.

#### IMMEDIATE REGENERATION

To start an immediate regeneration (or step valve through each position), press and hold the MANUAL REGEN. Button for 3 seconds (until beeps). The valve will start an immediate regeneration. Press any key to skip to the next cycle.

### Start-up Instructions

1. Plug the power transformer into an approved power source. Connect the power cord to the valve.
2. When power is supplied to the control, the screen will display "INITIALIZING WAIT PLEASE" while it finds the service position.
3. Manually step the valve past the BRINE position to the BACKWASH position. If screen is locked, the screen will display "PRESS SETTINGS 3S TO UNLOCK". Follow the instructions and press SETTINGS for 3 seconds to unlock. Press and hold the MANUL REGEN. Key for 3 seconds. Press any key to skip the BRINE cycle.
4. Once in the BACKWASH cycle, open the inlet on the bypass valve slowly and allow water to enter the unit. Allow all air to escape from the unit before turning the bypass fully open. Then allow water to run to drain for 3-4 minutes or until all media fines are washed out of the softener indicated by clear water in the drain hose.
5. Press any button to advance to the RINSE position. Check the drain line flow. Allow the water to run for 3-4 minutes or until the water is clear.
6. Press any button to advance to the REFILL position. Check that the valve is filling water into the brine tank. Allow the valve to refill for the full amount of time as displayed on the screen to insure a proper brine solution for the next regeneration.
7. The valve will automatically advance to the SERVICE position. Open the outlet valve on the bypass, then open the nearest treated water faucet and allow the water to run until clear, close the tap and replace the faucet screen.
8. Program unit.

## Programming Instructions

The factory setting for WATER TYPE is WELL / OTHER. Do not adjust this setting until after start-up is complete. If the setting is changed to MUNICIPAL before start-up, the back wash cycle will be skipped. **The Fusion Hybrid Water Softeners will not be changed.**

### Settings

Press SETTINGS key (3 SECONDS / BEEP)

VALVE MODE  
SOFTENER UP

TIME OF DAY  
12:01 PM

YEAR  
2012

MONTH  
AUGUST

DAY  
21

SET HARDNESS  
20 GRAINS

SET PEOPLE  
4

SALT SETTING  
HIGH EFFICIENCY  
STANDARD  
IRON & MN

WATER TYPE  
MUNICIPAL  
WELL / OTHER

REGEN TIME  
2:00 AM

PROGRAMMING  
COMPLETE

### CHANGE SETTINGS

To change settings press the SETTINGS key for 3 seconds. The first screen to be displayed will be the TIME OF DAY. To adjust the HOUR values, use the UP or DOWN key. To advance to the MINUTE values, press the SETTINGS key again. After adjusting each value using the UP or DOWN keys, continue advancing to the next value or screen by pressing the SETTINGS key.

### TIME OF DAY, YEAR, MONTH, DAY,

Time of day is for normal operation of system and the scheduling of the regeneration time. The date is used in a diagnostic function to track the last time the system regenerated.

### SET HARDNESS

This value is the maximum compensated water hardness in grains per gallon of the raw water supply. It is used to calculate the system capacity. If Ferrous Iron is present add 4 gpg for every 1 ppm of Ferrous Iron.

### SET PEOPLE

This value is the number of people living in the home. It is used to calculate the amount of water needed for daily use and the reserve capacity of the system.

### SALT SETTING

Choose HIGH EFFICIENCY to minimize salt usage. Your system will regenerate a little more often but your salt usage can be reduced by 20% compared to the STANDARD setting.

Choose STANDARD when you need to maximize your capacity but still operate the system with good efficiency.

Choose IRON & MN if you have problem water containing these minerals. The high salt setting will be needed since these minerals are more difficult to clean out of the resin bed. Note: A resin cleaner will also need to periodically added to the brine tank to insure proper operation.

### WATER TYPE

This setting will determine if the BACKWASH OVERRIDE function will be on or off. Select WELL / OTHER if any Iron or Manganese is present or if the water source is not clean (< 1NUT turbidity). The system will back wash every time. WELL/OTHER must be selected on all Fusion Hybrid Water Softeners.

### REGEN TIME

This setting determines the time of day to perform a scheduled regeneration.

## About The System

### Operation During A Power Failure

In the event of a power failure, the valve will keep track of the time and day for **48 hours**. The programmed settings are stored in a non-volatile memory and will not be lost during a power failure. If power fails while the unit is in regeneration, the valve will finish regeneration from the point it is at once power is restored. If the valve misses a scheduled regeneration due to a power failure, it will queue a regeneration at the next regeneration time once power is restored.

### Safety Float

The brine tank is equipped with a safety float which prevents your brine tank from overflowing as a result of a malfunction such as a power failure.

### Main Display

The main display will pause on the Date and Time page for 5 seconds. Then it will continually scroll through all of the system diagnostic display pages. To manually scroll through the diagnostics, press the down or up key. To reset the TOTAL REGENS, TOTAL GALLONS OVER RUN TOTAL, or PEAK flow rates, press and hold the MANUAL REGEN key until the value changes to zero.

### Diagnostic Display

PARAMETER	DESCRIPTION
JULY/17/2012 8:30 PM	Month, Day, Year, Time
TOTAL 1,500 GAL REMAIN 1,200 GAL	The total amount is the system capacity when fully regenerated. The remaining is the capacity left in the system.
PEOPLE 2 RESERVE 150 GAL	Number of people in the household and the calculated reserve capacity. When remaining reaches reserve capacity a regeneration will be scheduled.
EST. DAYS TO NEXT REGEN 06 DAYS	The estimated number of days until the next regeneration will occur.
LAST REGEN 9/24/12	The date of the last regeneration.
TOTAL REGENS 10	The total number of regenerations.
TOTAL GALLONS 001590 GAL	The total amount of gallons treated by the system.
OVER RUN TOTAL 0500 GAL	The total amount of water that has exceeded the system capacity over the last 4 regenerations. When remaining goes to zero, the gallons used will be added to over run total.
CURRENT 1.5 GPM PEAK 6.5 GPM	The current flow rate and the peak flow rate since the last regeneration.
DELAYED REGEN OFF	Advises whether a delayed regeneration has been scheduled manually or automatically.
REGEN TIME 2:00 AM	The current setting for regeneration time.
REFILL TIME 3:00 MIN	The current calculated refill time. (Note: The refill time shown will be reduced by the pre-fill %. i.e. If pre-fill % is 70%, then displayed refill time will be 70% of the full target.)
VALVE MODE SOFTENER UF	The current setting of the valve mode.
TOTAL 4 DAYS REMAIN 3 DAYS	The number of days remaining before regeneration. This option is only in filter mode.

## New Sounds

You may notice new sounds as your water softener operates. The regeneration cycle lasts up to 180 minutes. During this time, you may hear water running intermittently to the drain.

## Precision Brining Regeneration Process

When the system capacity is near exhausted, a regeneration is necessary to restore the system to full capacity. The table below explains the regeneration steps.

Step	Name	Description
#1	Brine Making	A precise calculated amount of fresh water is added to the brine tank to make enough brine to regenerate only the exhausted portion of the ion exchange resin. Note: 70% of the required fresh water is added in Step #5 in the previous regeneration. The default brine making time is 30 minutes.
#2	Brine	The brine solution is introduced slowly to the bottom of the tank flowing up through the ion exchange resin pushing the hardness out to drain and restoring system capacity.
#3	Back Wash	Fresh water is introduced to the bottom of the tank flowing upwards expanding the ion exchange resin to rinse out any dirt or small particles to the drain and to un-compact the bed to restore full service flow rates.
#4	Rinse	Fresh water is introduced from the top of the tank down flowing down through the ion exchange resin rinsing any excess brine solution out to the drain.
#5	Refill	A fixed amount of soft water is added to the salt tank to prepare and insure fully saturated brine for the next regeneration. Note: Step #1 will "top off" the amount of water needed based on the percentage of exhausted resin to be regenerated.

## Automatic Hard Water Bypass During Regeneration

The regeneration cycle can last 30 to 180 minutes, after which soft water service will be restored. During regeneration, hard water is automatically bypassed for use in the household. Hot water should be used as little as possible during this time to prevent hard water from filling the water heater. This is why automatic regeneration is set for sometime during the night and manual regenerations should be performed when little or no water will be used in the household. Normal regeneration time is 2:00 AM.

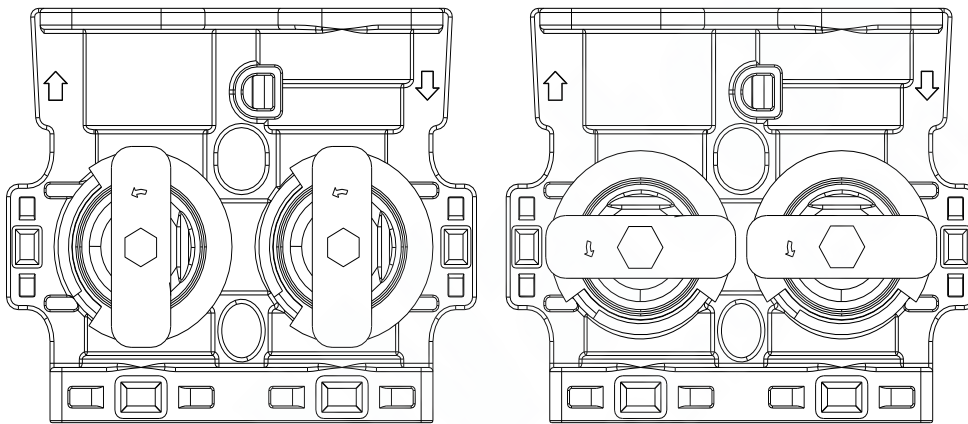
## System Configuration

FUSION NLT UPFLOW System Configuration			
Tank Size (Diameter)	Injector Set	Brine Line Flow Control (BLFC)	Drain Line Flow Control (DLFC)
8"	#0000 Black	0.20 GPM	#1 (1.5 GPM)
9"			#2 (2.0 GPM)
10"			#3 (2.4 GPM)
12"			#5 (3.5 GPM)
13"			#6 (4.0 GPM)
	#00 Purple		
	#0 Red		

## Manual Bypass

In the case of emergency, such as an overflowing brine tank, you can isolate your water softener from the water supply using the bypass valve located at the back of the control. In normal operation the bypass is open with the on/off knobs in line with the inlet and outlet pipes.

To isolate the softener, simply rotate the knobs clockwise (as indicated by the word BY-PASS and arrow) until they lock. You can use your water related fixtures and appliances as the water supply is bypassing the softener. However, the water you use will be hard. To resume soft water service, open bypass valve by rotating the knobs counterclockwise.



SERVICE POSITION

BYPASS POSITION

## Maintenance

### Adding Salt

Use only Extra Course Grade or Crystal water softener salt. Check the salt level monthly. It is important to maintain the salt level above the water level. To add salt, simply lift the salt lid and add the salt directly into the brine tank. Be sure the brine well cover is on and fill only to the height of the brine well.

### Salt Bridging

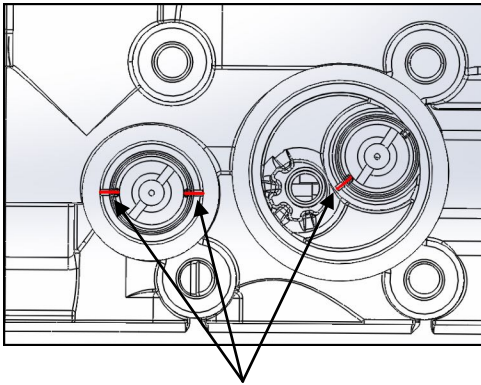
Humidity or wrong type of salt may create a cavity between the water and the salt. This action, known as “bridging”, prevents the brine solution from being made, leading to your water supply being hard.

If you suspect salt bridging, carefully pound on the outside of the brine tank or pour some warm water over the salt to break up the bridge. This should always be followed up by allowing the unit to use up any remaining salt and then thoroughly cleaning out the brine tank. Allow two hours to produce a brine solution, then manually regenerate the softener.

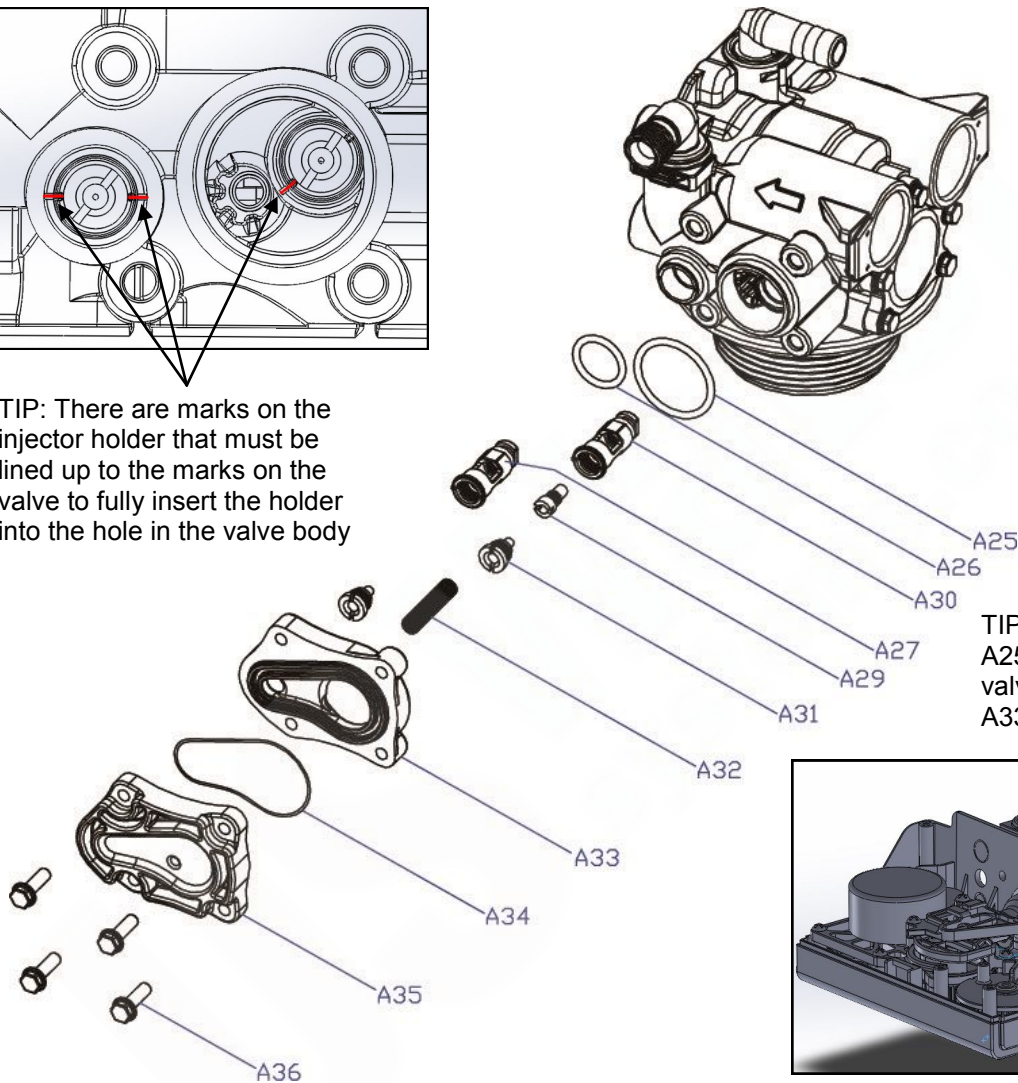
## Cleaning or Replacing Injectors

Sediment, salt and silt will restrict or clog the injector. A clean water supply and pure salt will prevent this from happening.

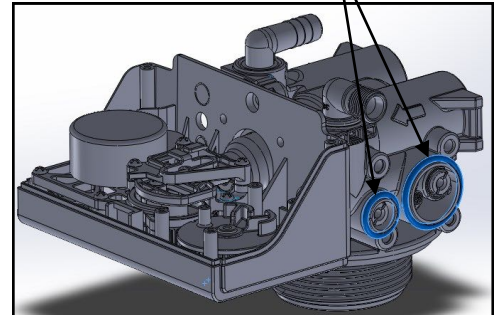
The injector assembly is located on the right side of the control valve. This assembly is easy to clean.



TIP: There are marks on the injector holder that must be lined up to the marks on the valve to fully insert the holder into the hole in the valve body

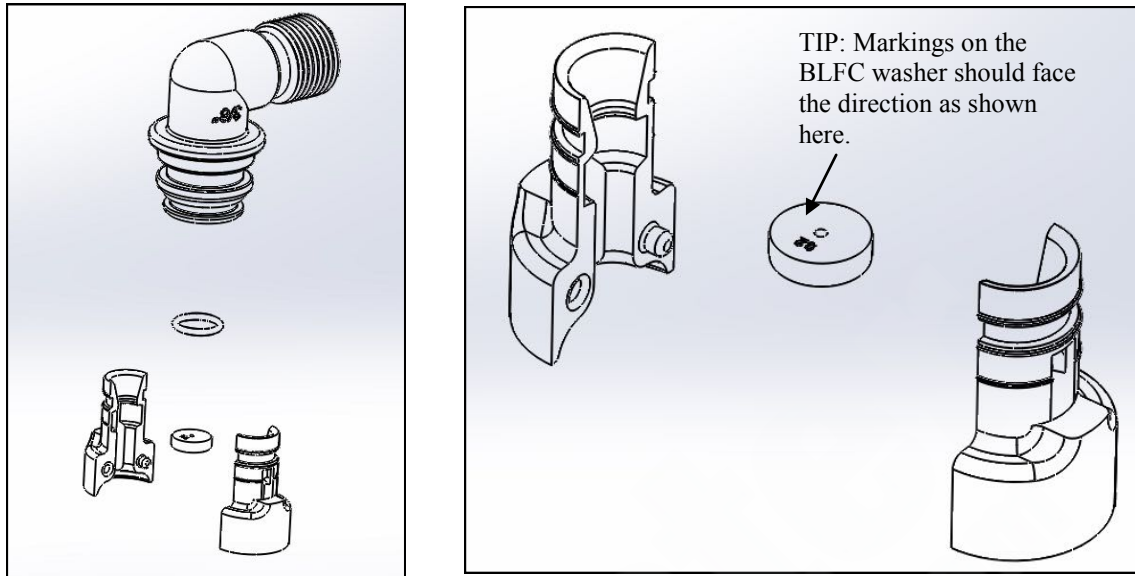


TIP: Place the o-rings A25 and A26 onto the valve before installing A33.



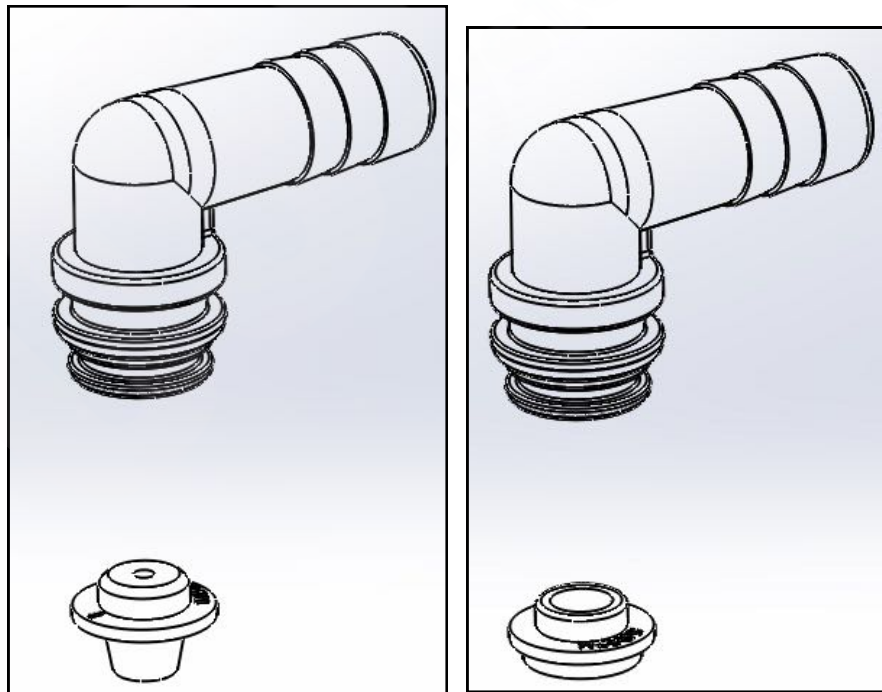
1. Shut off the water supply to your softener and reduce the pressure by opening a cold soft water faucet.
2. Using a screwdriver, remove the four screws holding the injector cover to the control valve body.
3. Carefully remove the assembly and disassemble as shown in above figure.
4. The injector orifice is removed from the valve body by carefully turning it out with a large screwdriver. Remove the injector throat the same way.
5. Carefully flush all parts including the screen. Use a mild acid such as vinegar or Pro-Rust Out to clean the small holes in the orifice and throat.
6. Reassemble using the reverse procedure.

**Replacing Brine Line Flow Control (BLFC, COMPLETED BEFORE PURCHASE)**



1. Remove the red clip that secures the brine elbow.
2. Remove the BLFC holder from the elbow fitting.
3. Split the BLFC holder apart and remove the flow washer.
4. Reassemble using the reverse procedure.

**Replacing Drain Line Flow Control (DLFC, COMPLETED BEFORE PURCHASE)**



1. Remove the red clip that secures the drain line elbow.
2. Remove the BLFC washer from the elbow fitting.
3. Reassemble using the reverse procedure.



## Care of Your System

To retain the attractive appearance of your new water softener, clean occasionally with mild soap solution. Do not use abrasive cleaners, ammonia or solvents. Never subject your softener to freezing or to temperatures above 100°F.

### Resin Cleaner

An approved resin cleaner must be used on a regular basis if your water supply contains iron. The amount of resin cleaner and frequency of use is determined by the quantity of iron in your water (follow the directions on the resin cleaner package).

Item #	Description
710-RK41N	Res Care—1 Gal. Bottle
710-RK32N	Res Care—1 qt. Bottle



Item #	Description
710-RO12N	Rust Out—1.5 lb. Bottle
710-RO65N-CS	Rust Out—5 lb. Bottle Case
710-RO50N	Rust Out—50 lb. Pail



Item #	Description
710-RK11K	Easy Feeder—1.0 oz/day Feeder



## Sanitizing Procedure

Care is taken at the factory to keep your water softener clean and sanitary. Materials used to make the softener will not infect or contaminate your water supply, and will not cause bacteria to form or grow. However, during shipping, storage, installing and operating, bacteria could get into the softener. For this reason, sanitizing as follows is suggested when installing.

### Sani-System Liquid Sanitizer Concentrate

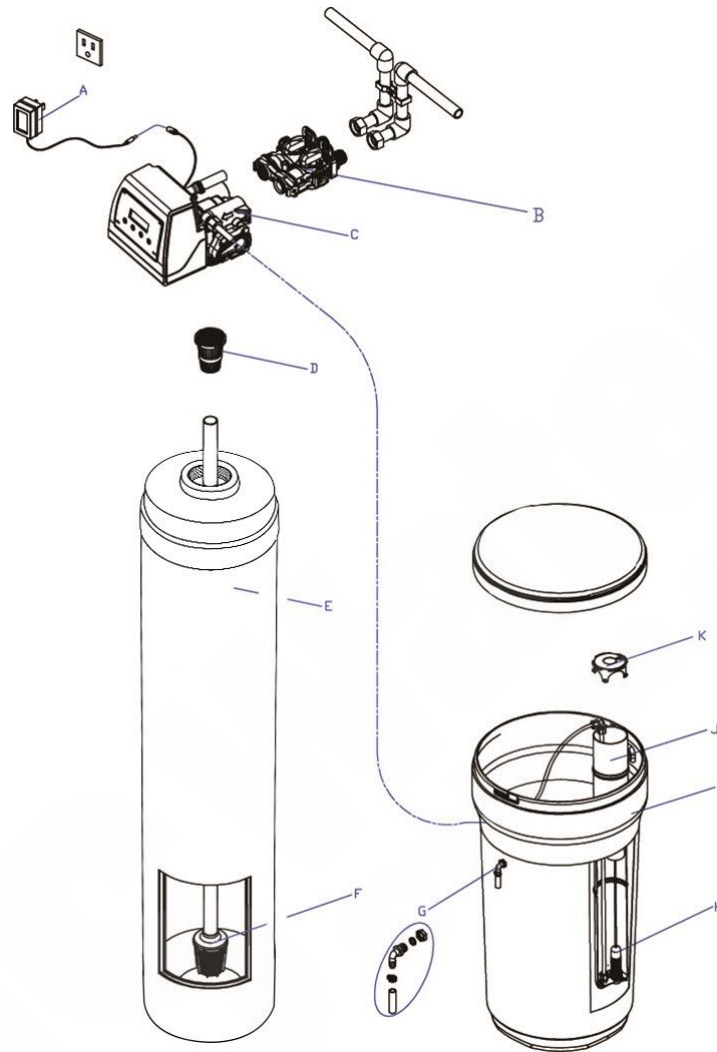


Item# 710-SS-24WS—Softener Sanitizer 0.25 fl.oz (24 Pack)

1. Be sure to complete all installation steps, including programming.
2. For effective and complete sanitization, Sani-System Liquid Sanitizer Concentrate is recommended. Pour one 0.25 fl. Oz. package into the brine well located in the cabinet or brine tank. (Alternative use 3/4 oz of common 5.25% household bleach)
3. Start an immediate regeneration. (See page 11)
4. The Softener Sanitizer Solution is drawn into and through the water softener to sanitize it. This sanitizing regeneration is over in about two hours. Then, **soft water** is available for your use.

NOTE: Sanitizing is recommended by the Water Quality Association for disinfecting. On some water supplies, they suggest periodic sanitizing.

## Main Repair Parts

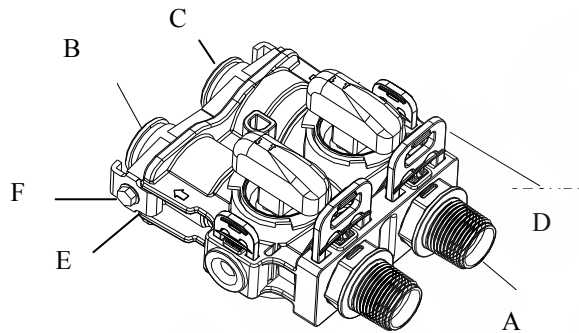


REPLACEMENT PARTS - TWIN TANK			
Replacement Part Number	Part Description	DWG #	Quantity
60010052	POWER TRANSFORMER 120V-12V	A	1
60010002	BYPASS / METER	B	1
10010060	FUSION NLT VALVE	C	1
60010048	TOP CONE	D	1
25020041	844 TANK (75)	E	1
25020042	948 TANK (100)	E	1
25020043	1054 TANK (150)	E	1
25010058	1252 TANK (200)	E	1
25030007	1465 TANK (300)	E	1
50010005	DISTRIBUTOR 1X54	F	1
60010005	OVER FLOW FITTING ASSEMBLY	G	1
55010023	SAFETY / AIR CHECK ASSEMBLY	H	1
30020006	BRINE TANK BTR-100 (75,100,150)	I	1
30020011	BRINE TANK BTR-145 (200)	I	1
30020032	BRINE TANK BTR-200 (300)	I	1
55010010	BRINE WELL & CAP	J&K	1

## Main Repair Parts - Connectors

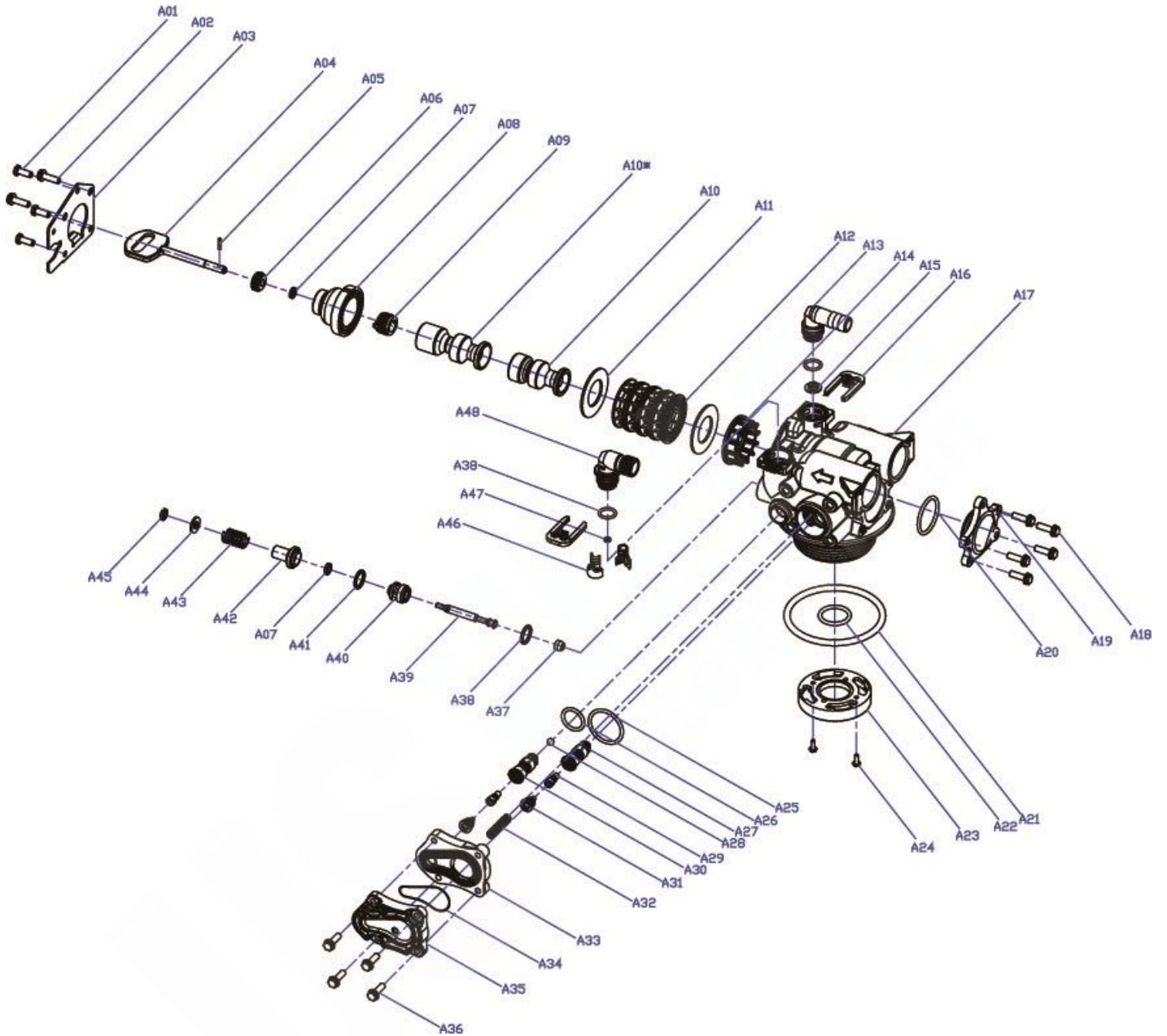


A



REPLACEMENT PARTS - CONNECTORS			
Replacement Part Number	Part Description	DWG #	Quantity
60010019	1" NPT STRAIGHT	A	2
60010079	VALVE COUPLING INLET	B	1
60010101	VALVE COUPLING OUTLET (METER SIDE)	C	1
60010025	PLASTIC SECURE CLIP	D	2
60010046	BYPASS SS CLIP	E	2
60010047	BYPASS SS SCREW	F	2

## Control Valve Exploded View

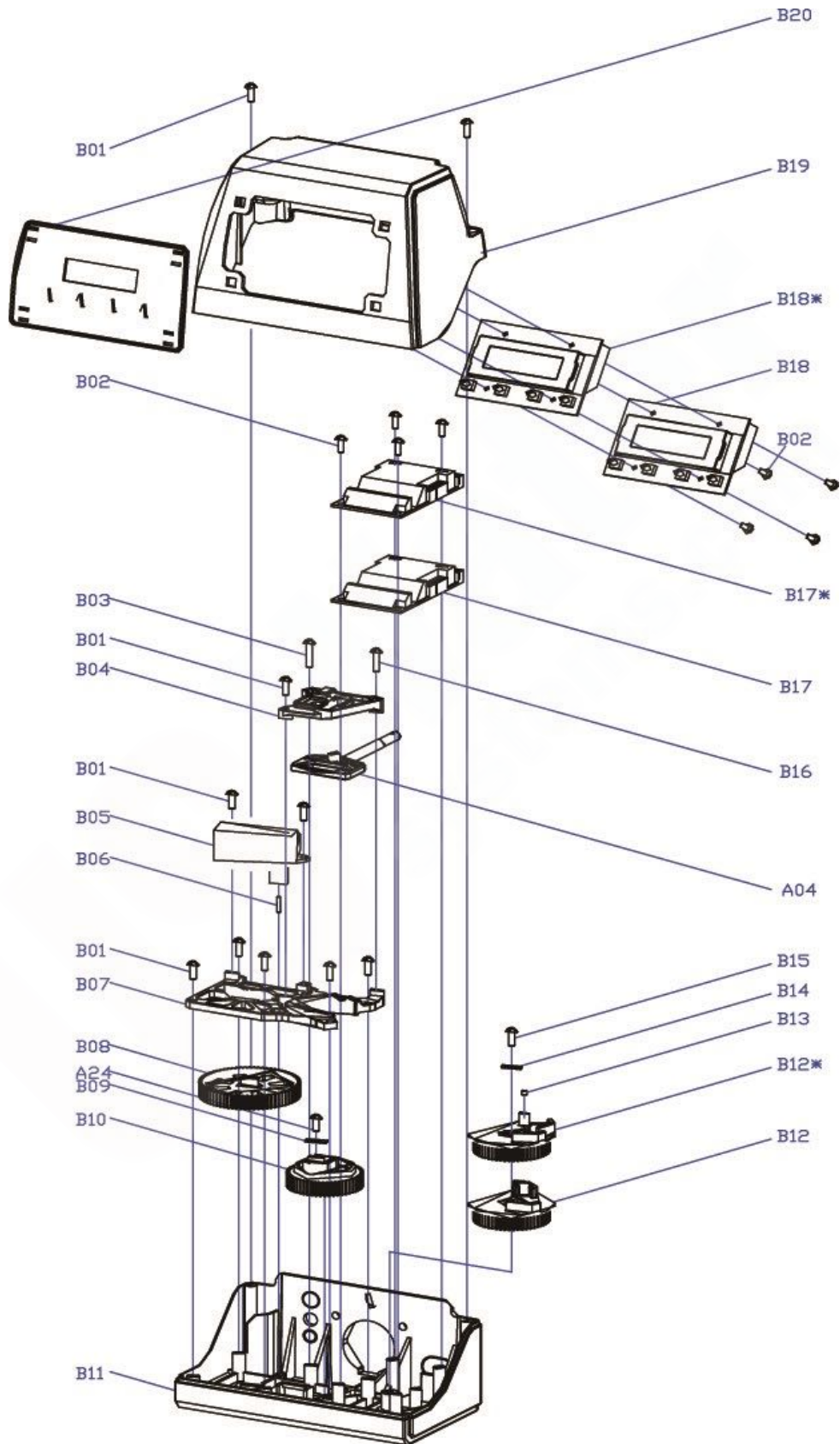


VALVE REPAIR PARTS LIST			
Replacement Part Number	Part Description	Replacement Part Number	Part Description
60010127	INJECTOR SET #0000 BLACK	60010129	UPFLOW PISTON ASSEMBLY
60010126	INJECTOR SET #000 GREY	60010171	DOWNFLOW PISTON ASSEMBLY
60010035	INJECTOR SET #00 VIOLET	60010130	SEAL & SPACER KIT
60010034	INJECTOR SET #0 RED	60010131	DLFC #1 1.5 GPM
60010033	INJECTOR SET #1 WHITE	60010132	DLFC #2 2.0 GPM
60010032	INJECTOR SET #2 BLUE	60010133	DLFC #3 2.4 GPM
60010031	INJECTOR SET #3 YELLOW	60010135	DLFC #5 3.5 GPM
60010128	BLFC 0.2 GPM	60010136	DLFC #A 5.0 GPM
60010110	BLFC 0.3 GPM	60010137	DLFC #B 7.0 GPM
60010082	BLFC 0.7 GPM	60010138	DLFC #C 10.0 GPM

## Control Valve Parts List

FUSION NLT UPFLOW CONTROL VALVE				
Replacement Part Number	MFG Part Number	Part Description	DWG #	Quantity
	5056087	Screw-M5x12(Hexagon)	A01	3
	5056088	Screw-M5x16(Hexagon With Washer)	A02	2
	5056047	End Plug Retainer	A03	1
	5031016	Fusion NLT Piston Rod	A04	1
	5056097	Piston Pin	A05	1
	5031015	Fusion NLT Quad Ring Plug Cover	A06	1
	5056070	Quad Ring	A07	2
	5031011	Fusion NLT End Plug	A08	1
	5031014	Fusion NLT Piston Retainer	A09	1
	5057002	Fusion NLT Piston(Electrical Upflow)	A10*	1
	5056073	Seal	A11	5
	5056021	Spacer	A12	4
	5010082	Drain Fitting-B	A13	1
	5031005	Fusion NLTSpacer	A14	1
	5056186	DLFC-2#	A15	1
	5056172	Secure Clip-s	A16	2
	5031002	Fusion NLT Valve Body	A17	1
	5056508	Screw-M5x12(Hexagon With Washer)	A18	5
	5030004	Fusion NLT End Cover	A19	1
	5030013	O-Ring- $\phi$ 30x2.65	A20	1
	5056063	O-Ring- $\phi$ 78.74x5.33	A21	1
	26010103	O-Ring- $\phi$ 25x3.55	A22	1
	7060007	Valve Bottom Connector	A23	1
	13000426	Screw-ST2.9X13(Large Washer)	A24	2
	5031022	O-Ring- $\phi$ 32x3	A25	1
	5031021	O-Ring- $\phi$ 18x3	A26	1
	5031013	Injector Plug Body	A27	1
	30040089	Injector Throat	A29	2
	5031012	Fusion NLT Injector Fixed Sleeve	A30	1
	30040090	Injector Nozzle	A31	2
	5056103	Injector Screen	A32	1
	5031003	Fusion NLT Injector Cover Body	A33	1
	5031018	O-Ring- $\phi$ 40x2.65	A34	1
	5031004	Fusion NLT Injector Cover Cap	A35	1
	5031027	Screw-M5x25(Hexagon With Washer)	A36	4
	5056075	Seal Mat	A37	1
	5056134	O-Ring- $\phi$ 12x2	A38	3
	5056054	Injector Stem	A39	1
	5056031	Injector Spacer	A40	1
	5056081	O-Ring- $\phi$ 12.5x1.8	A41	1
	5056030	Injector Cap	A42	1
	5056093	Injector Screen	A43	1
	5010049	Special Washer	A44	1
	5056105	Retaining Ring	A45	1
	5031010	Fusion NLT BLFC Fixed Sleeve	A46	2
	5056076	BLFC-2#	A47	1
	5005629	Injector Fitting(3/8".Elbow)	A48	1

# Power Head Exploded View



## Power Head Parts List

FUSION NLT POWER HEAD (UPFLOW)				
Replacement Part Number	MFG Part Number	Part Description	DWG #	Quantity
	5056084	Screw-ST3.5X13	B01	10
	5010037	Screw-ST2.9X10	B02	9
	13000416	Screw-ST3.5X25	B03	1
	5031007	Piston Rod Guide Plate	B04	1
	5056510	Motor-12v/2rpm	B05	1
	5030014	Motor Power Cable		1
	11700005	Wire Connector		2
	5056098	Motor Pin	B06	1
	5031006	Mounting Plate	B07	1
	5030009	Drive Gear	B08	1
	13000426	Screw-ST2.9X13(Large Washer)	A24	2
	5056139	Washer-3x13	B09	1
	5030007	Main Gear	B10	1
	5030005	Mounting	B11	1
	5031009	Brine Gear(Upflow)	B12*	1
	5010023	Magnet(3x2.7)	B13	1
	5056141	Washer-4x12	B14	1
	5056166	Screw-ST4.2X12(Large Washer)	B15	1
	5031016	Fusion NLT Piston Rod	A04	1
	5010036	Screw-ST3.5X16	B16	1
	5031025	Fusion NLT Main Pcb(Upflow)	B17*	1
	5010031	Meter Assembly		1
	5010046	Meter Strain Relief		1
	5010029	Power Cable		1
	5010035	Power Strain Relief		1
	19010105	Wire Rope-3x100		2
	5031023	Fusion NLT PCB (Upflow)	B18*	1
	5030021	Fusion Wiring Harness		1
	5030032	Fusion Cover(Novo)	B19	1
	5030033	Fusion Display Plate(Novo)	B20	1



## Trouble Shooting

Issue	Possible Cause	Possible Solution
A. Unit fails to initiate a regeneration cycle.	1. No power supply.	Check electrical service, fuse, etc.
	2. Defective circuit board.	Replace faulty parts.
	3. Power failure.	Reset time of day.
	4. Defective meter.	Replace turbine meter.
B. Water is hard.	1. By-pass valve open.	Close by-pass valve.
	2. Out of salt or salt level below water level.	Add salt to tank.
	3. Plugged injector / screen.	Clean parts.
	4. Flow of water blocked to brine tank.	Check brine tank refill rate.
	5. Hard water in hot water tank.	Repeat flushing of hot water tank required.
	6. Leak between valve and central tube.	Check if central tube is cracked or o-ring is damaged. Replace faulty parts.
	7. Internal valve leak.	Replace valve seals, spacer, and piston assembly.
	8. Reserve capacity setting too low.	Increase reserve capacity.
	9. Not enough capacity.	Increase salt dosage.
C. Salt use is high.	1. Refill time is too high.	Check refill time setting.
	2. Defective flow control.	Replace.
D. Low water pressure.	1. Iron or scale build up in line feeding unit.	Clean pipes.
	2. Iron build up inside valve or tank.	Clean control and add resin cleaner to clean bed. Increase regeneration frequency.
	3. Inlet of control plugged due to foreign material.	Remove piston and clean control valve.
	4. Deteriorated resin. (Maybe caused from high chlorine or chloramines.)	Re-bed unit. Consider adding carbon pre-treatment.
E. Resin in drain line.	1. Air in water system.	Check well system for proper air eliminator control.
	2. Incorrect drain line flow control (DLFC) button.	Check for proper flow rate.
F. Too much water in brine tank.	1. Plugged injector or screen.	Clean parts.
	2. Valve not regenerating.	Replace circuit board, motor, or control.
	3. Foreign material in brine valve.	Clean parts.
	4. Unit not drawing brine.	Check for vacuum leak in brine line connections.
G. Unit fails to draw brine.	1. Drain line flow control is plugged.	Clean parts.
	2. Injector or screen is plugged.	Clean parts.
	3. Inlet pressure too low.	Increase pressure to 25 PSI.
	4. Internal valve leak.	Replace seals, spacers, and piston assembly.
	5. Safety valve closed.	Check for leak in brine line connections. Replace safety float assembly.
	6. Vacuum leak in brine line.	Check for leak in brine line connections. Tighten all connections.
	7. Drain line has kink in it or is blocked.	Check drain line.
H. Valve continuously cycles.	1. Defective position sensor PCB.	Replace faulty parts.
I. Flow to drain continuously.	1. Valve settings incorrect.	Check valve settings.
	2. Foreign material in control valve.	Clean control.
	3. Internal leak.	Replace seals, spacers, and piston assembly.
	4. Piston is stuck in position. Motor may have failed or gears have jammed or disengaged.	Check for power to motor. Check for loose wire. Check for jammed gears or gears disengaged. Replace faulty parts.
J. Valve makes beeping sound.	1. The piston has not advanced to the next cycle position properly.	Check for power to motor. Check for loose wire. Check for jammed gears or gears disengaged.



## WARRANTY

**US Water Systems** warrants that your new water conditioner is built of quality material and workmanship. When properly installed and maintained, it will give years of trouble free service.

### Ten Year Valve and Electronics Guarantee

**US Water Systems** will replace any part on the valve or electronics which fails within ten years from date of manufacture, as indicated by the serial number, provided the failure is due to a defect in material or workmanship. The only exception shall be when proof of purchase or installation is provided and then the warranty period shall be from the date thereof.

### Life Time Warranty on Resin, Mineral Tanks and Brine Tanks

US Water Systems will provide a replacement resin, mineral tank or brine tank to any original equipment purchaser in possession of the Fusion NLT softener that fails provided that the it is at all times operated in accordance with specifications and not subject to freezing.

### General Provisions

US Water Systems assumes no responsibility for consequential damage, labor or expense incurred as a result of a defect or for failure to meet the terms of these guarantees because of circumstances beyond our control. Installation workmanship failure is not covered under warranty. Damage caused by environmental conditions such as, lightening strikes, humidity or heat will not be covered under warranty.

**Fusion NLT** is a product of US Water Systems.