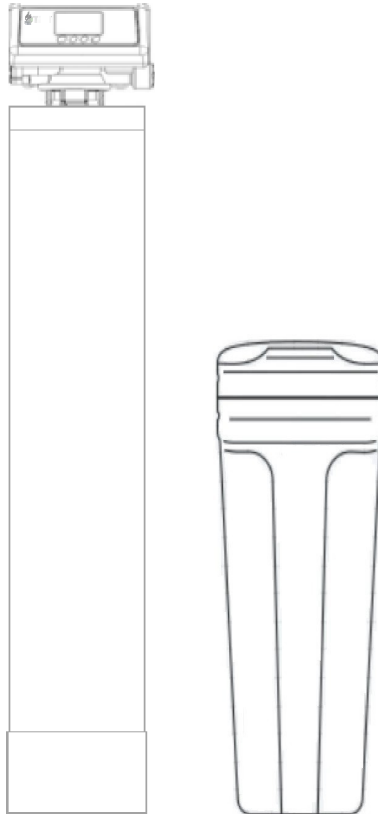


Owner's Manual

48,000 Grain

Water Softener



2 Table of Contents

WHAT'S INCLUDED	3
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What is included with the WS-165-150

Check the entire unit for any shipping-related damage, missing parts, or damage to shipping cartons. Contact the transportation company for all damage and loss claims. Tier1® is not responsible for damages in transit.

Small parts needed to assemble the softener are contained in the parts bags, the control valve box, or in the owner's manual zip-lock bag. To avoid loss of the small parts, keep them in the parts bag until you are ready to use them.

What is included in the box?

Model WS-165-150 includes the following:

1. Control Valve
2. Resin Tank
3. Parts Bags
4. Owner's Manual Zip-Lock Bag
5. Brine Tank and Brine Valve Assembly

3. Parts Bags

Parts Bag A includes:

1. Brine Well Overflow Elbow
2. Brine Well Bracket
3. Blue "C" Clip



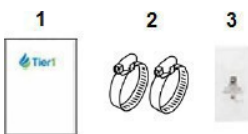
Parts Bag B includes:

1. Master O-Ring (3.25" outside diameter)
2. Ribbed Drain Connector
3. Blue Washers (x2) (15/16" outside diameter)
4. Red Brine Line FlowControl
5. Washer
6. Valve Nut



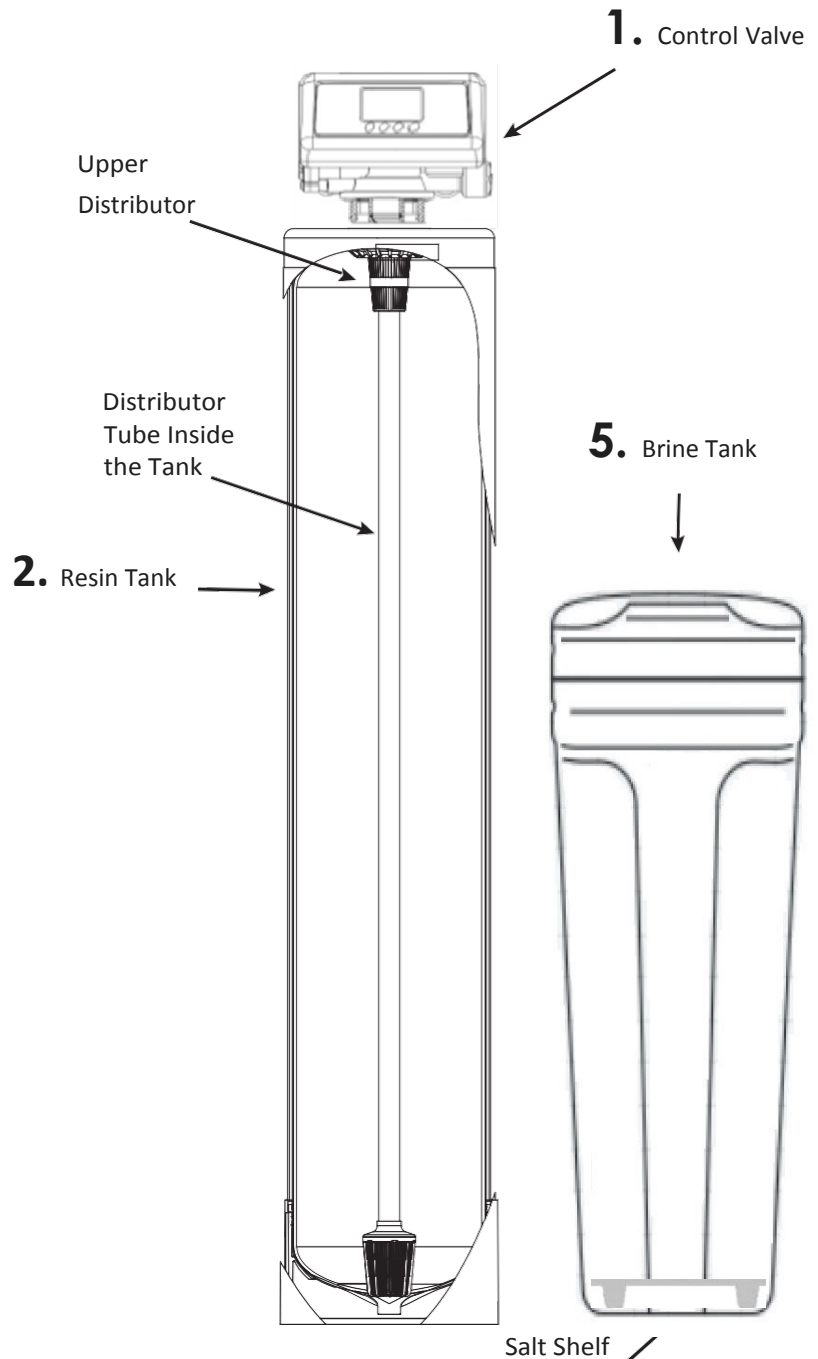
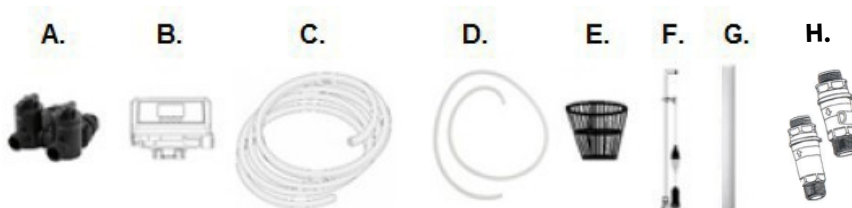
4. Owner's Manual Zip-Lock Bag

1. Owner's Manual
2. Hose Clamps (x2)
3. Silicone Lubricant



Additional Components

- A. Bypass Valve
- B. Control Valve
- C. Clear Drain Tubing (10')
- D. PVC Tubing
- E. Upper Distributor
- F. Brine Valve
- G. Brine Well
- H. Pipe Fitting Connectors (x2)
- I. Control Valve Power Cord (not shown)



3

Operating Conditions

This softening system will operate at maximum efficiency when the following conditions are considered:

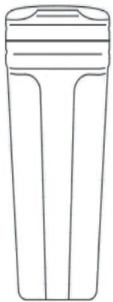
Operating Conditions:		
Working Conditions	Working pressure	21psi to 120psi
	Water temperature	40 °F - 120 °F (5°C - 50°C)
Working Environment	Environment temperature	40 °F - 120 °F (5°C - 50°C)
	Relative humidity	≤ 95% When temperature is 25°C/77°F
	Power source	AC100~240V/50~60Hz
Inlet Water Quality	Water turbidity	Down-flow Regeneration < 5FTU
	Chlorine	< 0.1ppm
	Iron ²⁺	< 0.3ppm

- All plumbing and electrical work should be performed by an accredited professional to ensure all local, state, and municipal guidelines are met.
- Do not use the control valve with water that is unsafe or of unknown quality.
- Do not use the brine tube, injector body, or other connectors on the valve as a handle to carry the system.
- Ensure there is salt in the brine tank at all times when in use for softening. The brine tank should contain clean water softening salt only, at least 99.5% pure. Do not use small grain salt.
- When there is moderate to high turbidity, a filter should be installed before the softening system on the inlet side.
- If the water pressure exceeds 80 psi, it is recommended to install a pressure valve. If the water pressure is under 20 psi, a booster pump must be installed before the water inlet.

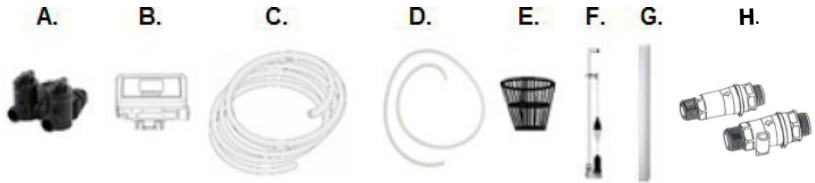
ASSEMBLY INSTRUCTIONS

Locate the following parts:

Brine Tank – inside the brine tank you will find:



- A. Bypass Valve
- B. Control Valve
- C. Clear Drain Tubing (10')
- D. PVC Tubing
- E. Upper Distributor
- F. Brine Valve
- G. Brine Well
- H. Pipe Fitting Connectors (x2)
- I. Control Valve Power Cord (not shown)



Parts Bag A includes:

- 1. Brine Well Overflow Elbow
- 2. Brine Well Bracket
- 3. Blue "C" Clip



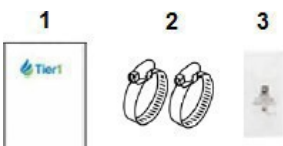
Parts Bag B includes:

- 1. Master O-ring (3.25" outside diameter)
- 2. Ribbed Drain Connector
- 3. Blue Washers (x2) (15/16" outside diameter)
- 4. Red Brine Line Flow Control
- 5. Washer
- 6. Valve Nut

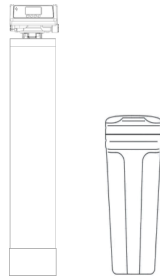


Owner's Manual Zip-Lock Bag includes:

- 1. Owner's Manual
- 2. Hose Clamps (x2)
- 3. Silicone Lubricant



PRIOR TO ASSEMBLY



IMPORTANT NOTE: To avoid irreversible damage to connector threading, hand tighten plastic connections first. If leaks are noted during initial start up, gently tighten with tool.

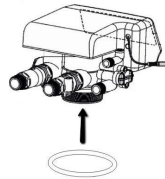
- A. Prior to installation of this water softener, ensure you are aware of local laws and codes regarding the installation, use, and maintenance of water softeners.
- B. Resin Tank - the tank may be shipped with a temporary shipping cap, a master O-Ring, and a piece of tape covering the riser tube. This is to prevent resin from entering the riser tube during shipping. The cap, master O-Ring, and tape must be removed and discarded prior to attaching control valve and the upper distributor. (Another master O-ring is supplied.)
- C. Unpack the Tier1 WS-165-150 and ensure all listed parts are included. This water softener includes both regular control valve connections and a bypass valve connection, with components included for each method of installation. Following installation, “extra” parts will remain dependent upon which method of installation you choose.
- D. Turn off the main water line to your home prior to installation.
- E. If you will be draining the tank, shut off the power supply to your water heater.
- F. Turn on the water faucets in the highest and lowest levels of your home.

Begin assembly as on pages 7-12.

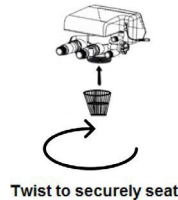
ASSEMBLY INSTRUCTIONS

STEP 1: Attach the Control Valve to the Resin Tank

- A. Locate the Master O-ring (from Parts Bag B) and lightly coat with silicone lubricant (from Owner's Manual Zip-Lock Bag). Insert into bottom of control valve, as shown below.



- B. Connect the upper distributor to bottom of control valve, line up slots and twist, as shown below.



- C. Center the riser pipe within the resin tank.
D. Attach the control valve to the resin tank by sliding the upper distributor over the riser pipe.
E. Securely tighten the control valve by hand, tightening it clockwise.

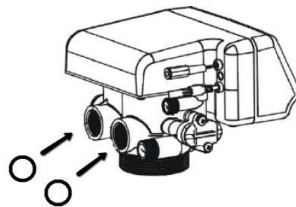
If you ARE installing the supplied bypass valve, go to step 3.

If you are NOT installing bypass valve, continue to Step 2.

Note: You will have extra parts using either method.

Step 2: Connect Control Valve Input and Output Connections with Flow Meter

- A. Insert blue washers (from Parts Bag B) into input and output connections on the control valve, as shown below.

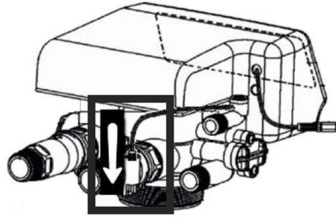


- B. Locate pipe fitting connectors (inside control valve box). Remove the plastic clamps on the connectors to detach the pipe fitting from the bypass valve connectors.
C. Screw the threaded end of the pipe fittings into the control valve.
D. Lightly coat the O-rings on connectors with lubricant before connecting them into the pipe fittings.



ASSEMBLY INSTRUCTIONS

- E. Insert the connectors into the pipe fittings. The outlet connector containing water meter probe dock and the impeller must be installed in the outlet side of the bypass valve (as marked). Insert water meter probe in dock.

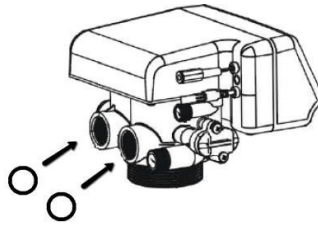


- F. Reinstall the plastic clamps on the connectors.

Proceed to Step 4

Step 3: Assembly using the included bypass valve

- A. Insert blue washers (from Parts Bag B) into input and output connections on the control valve, as shown below.

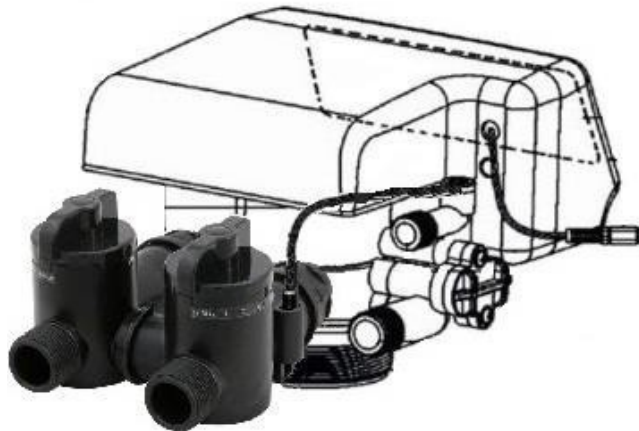


ASSEMBLY INSTRUCTIONS

- D. To attach the bypass valve onto the control valve, remove plastic clamps from both inlet and outlet of bypass valve. Remove pipe fitting ends from bypass outlets and thread onto control valve. Verify meter impeller is installed in outlet side of bypass. Connect bypass valve onto fittings and reinstall plastic clamps.

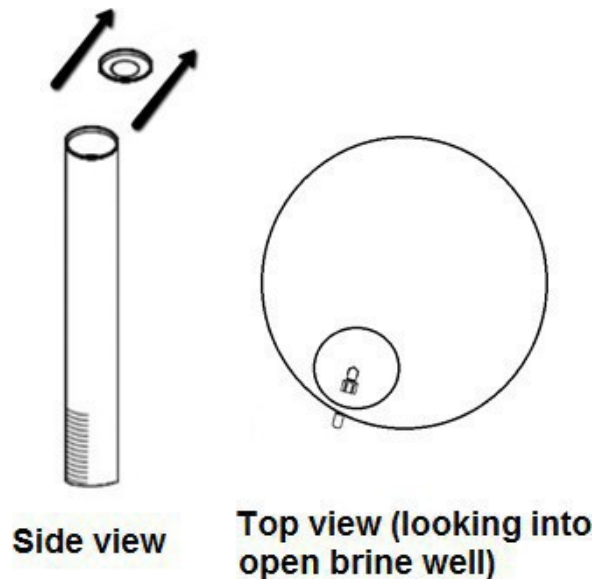


- E. Insert water meter probe from control valve into the bypass valve's on-board water meter probe dock, ensuring it is securely seated, as shown below.



Step 4: Connect the brine line to the brine tank

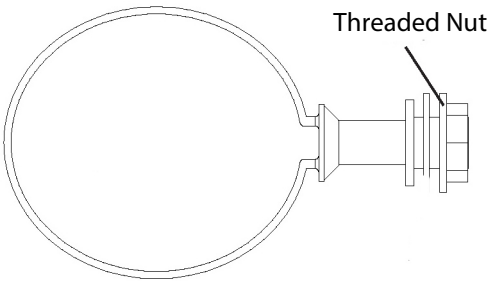
Remove brine well cap from brine well, as shown below.



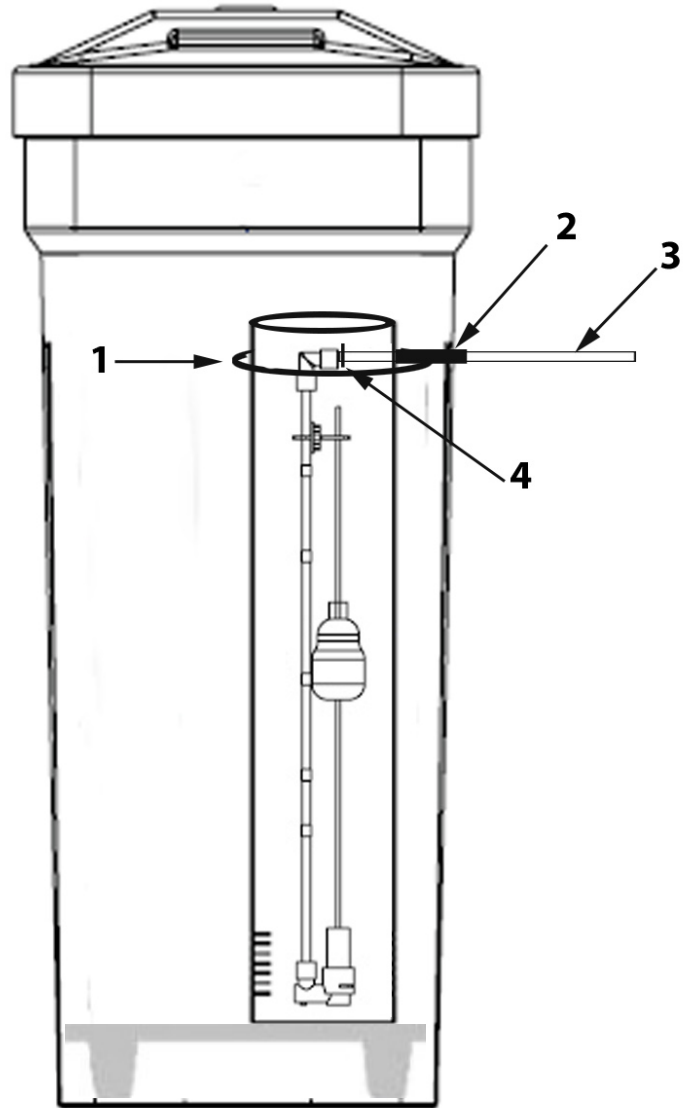
ASSEMBLY INSTRUCTIONS

Figure 1.1

Brine Well Bracket



Blue "C" Clamp

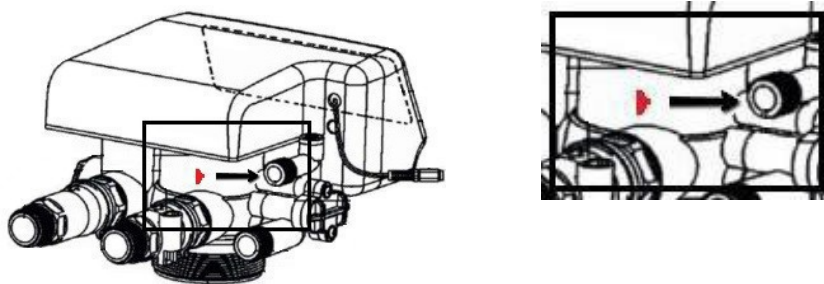


- A. Locate brine well bracket, and blue "C" clamp in Parts Bag A.
- B. Remove nut from threaded end of brine well bracket. Slide bracket (1) over top of brine well, lining up hole in bracket with hole in brine tank as shown in Figure 1.1.
- C. Insert threaded end of bracket into top hole (2) of brine tank. Replace nut on bracket outside of hole in tank.
- D. Feed PVC tubing (3) from outside the brine tank through the hole in the bracket. Push tubing into quick connect fitting on brine valve.
- E. When fully inserted, secure tubing by placing blue "c" clamp (4) from Parts Bag A in between collar of quick connect fitting and brine valve.
- F. Replace brine well cap.

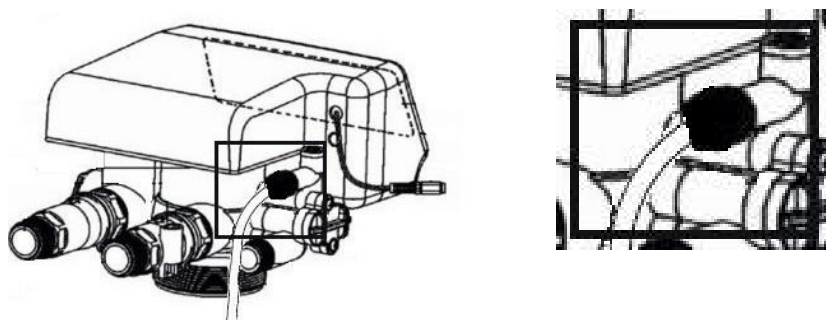
Follow steps on next page to connect brine tubing to control valve.

ASSEMBLY INSTRUCTIONS

- G. Insert the red brine line flow control (from Parts Bag B) with the cone side facing into control valve, into the control valve brine line connector.



- H. Insert brine line into control valve. Tighten the nut onto the brine line connection, as shown in the area of magnification below.



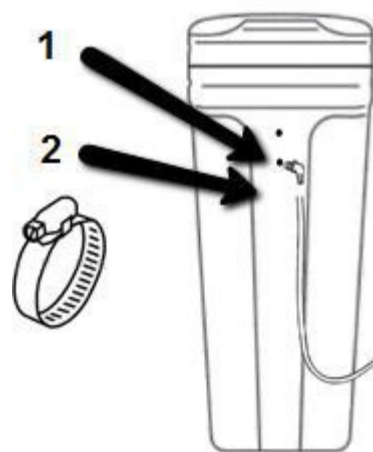
STEP 5: Connect overflow line to brine tank

Note: There is one 10' length of clear drain tubing. This tubing will need to be cut to be used for both brine tank drain line and backwash drain line. You should measure the length you need for the backwash line from the resin tank first, using the remainder for the brine tank drain line.

- A. Locate overflow elbow (in Parts Bag A). Remove nut from threading. Insert drain elbow (1) in bottom half of brine tank below PVC tubing as shown in Figure 1.2.



Figure 1.2

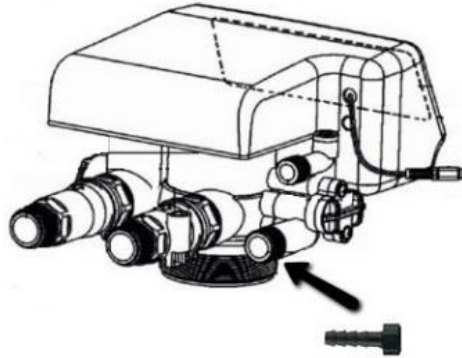


- B. Replace nut on drain elbow inside of brine tank. Attach clear drain tubing (2) to the drain elbow. Secure with hose clamp (from Owner's Manual Zip-Lock Bag).
- C. Secure the clear drain tubing over a floor drain or other suitable drain. Check your local codes to ensure compliance.

ASSEMBLY INSTRUCTIONS

STEP 6: Connect the backwash hose to the control valve

Insert washer (from Parts Bag B) into ribbed drain connector.



- B. Thread ribbed drain connector (from Parts Bag B), onto drain connection.
- C. Attach clear drain tubing to connector. Secure using a hose clamp (from Owner's Manual Zip-Lock bag).
- D. Secure the clear drain tubing over a floor drain or other suitable drain.
- E. Leave an air gap of about 1 ½" between the end of the hose and the drain. This air gap is necessary to ensure there will be no back flow of sewer water into the water softener.

STEP 7: Connect control valve input to home water supply.

STEP 8: Connect control valve output to home plumbing.

STEP 9: Flush out water lines and program control valve as on following pages, before first use.

FLUSHING THE WATERLINES

Before operating water softener for the first time, flush out your water lines and the water softener bypass.

- Check that bypass is closed. Knob on top of inlet should be turned to "By-Pass" (side opposite of "In-Serv")
- Turn the water source on at the inlet to your home.
- Disconnect the bypass from the control valve by removing plastic clamps and pulling bypass out of fitting.
- Remove the meter impeller from the bypass by tilting bypass downward until it drops out. Reconnect bypass.
- Place a container under the bypass to collect water. Open the bypass by turning knob on top of the inlet to "In-Serv". Allow water to flow through to flush out any foreign material from the water lines.
- Close the bypass by turning the knob on top of inlet back to "By-Pass".
- Reinstall the meter impeller in the outlet as on page 8. Reconnect bypass to the valve and reinstall plastic clamps.
- Open the bypass by turning knob on top of the inlet to "In-Serv".
- Check for any water leaks.
- Insert the water meter probe into water meter probe dock on the outlet side of the bypass (as on page 9).

SYSTEM STARTUP AND PROGRAMMING

- Attach the power cord to the control valve, and plug in the control valve power cord.
- Open a water line and let water flow until water runs clear.
- Using a pail or pitcher, fill brine tank about 1/3 full with water.

Programming instructions begin on next page.

The factory default settings are on page 15, followed by step by step programming instructions on page 16-17.












A programming key is available on page 19 detailing all button settings.

Please review all settings and adjust as necessary for your water hardness to ensure that the water softener will work most effectively for your needs.



MASTER PROGRAMMING

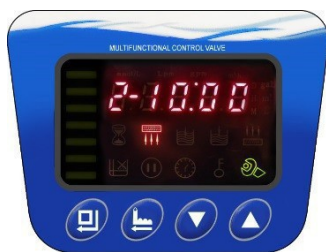
Valve Programming Instructions

- * When  LED is on press and hold both  and  buttons simultaneously for 3 seconds to unlock.
- * To program the valve, press  and the  will turn on. This indicates you are in the programming mode.
- * To navigate to each programming stage, press  or .
- * To adjust that programming stage value, press  and use the   to adjust the values. Follow the steps on next pages.
- * To exit the programming, press  to return to service status.

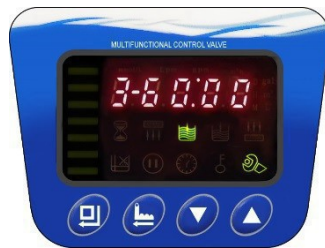
Programming and Sizing Recommendations

- * **Backwash Time**- A normal Backwash is between 10-15 minutes. The higher the turbidity the longer the backwash time should be set. However, if the turbidity is more than 5FTU it is best to install a pre-filter.
- * **Brine Refill Time** -The Brine Refill speed is related to inlet water pressure and brine line flow control.
- * **Fast Rinse Time**- Generally Fast Rinse is set for 3-6 times the resin volume; suggest at least 10 minutes.
- * **Regeneration Time**- The complete cycle takes about two hours. Set the regeneration time that is convenient for you. The default setting is 2 AM.

Valve Display



Backwash



Brine & Slow Rinse



Brine Refill









Fast Rinse

Regeneration Working Process - Service → 2 - Backwash → 3 - Brine & Slow Rinse → 4 - Brine Refill → 5 - Fast Rinse

Note: The display screen will display “-00-” when the drive motor is moving from one stage to the next. Each screen displays for 15 seconds at the start of each stage.

FACTORY DEFAULT SETTINGS

Function	Indicator	Factory Default	Parameter Set Range	Instruction
Time of Day		Random	00:00~23:59	Set the current time of day while the “:” flashes.
Control Mode	A-01	A-01	A-01	Meter Delayed. Regeneration occurs at the set regeneration time once the gallons used reaches zero (0).
			A-02	Meter Immediate. Regeneration occurs immediately once the gallons used reaches zero (0).
Unit Mode	HU-02	HU-02	01, 02, 03	01-m ³ ; 02-gal; 03-L
Regeneration Time	02:00	02:00	00:00~23:59	Regeneration time. “:” light on
Water Treatment Capacity		2500	0-10,000	To figure capacity, multiply the total resin volume multiplied by .75. Divide by grains of hardness of water supply. Example: 1.5 Cu/Ft = 48,000 x .75 at 15 grains hardness. (48,000 x .75) ÷ 15= 2400 gallons.
Backwash Time		10 min.	0~99 : 59	Backwash Time.
Brine & Slow Rinse Time		60 min.	0~99 : 59	Brine & Slow Rinse Time.
Brine Refill Time		5 min.	0~99 : 59	Refill Time is calculated based on total resin volume. Note: 1 gal water dissolves 3lbs of salt.
Fast Rinse Time		10 min.	0~99 : 59	Fast Rinse Time.
Maximum Interval Regeneration Days	H-30	30	0~40	Forced regeneration every 30 days if no water has been used. Time Clock Valve: to operate as a time clock valve, set the number of days before desired regeneration.
Output Control Mode	b-01	01	01 or 02	b-01: Signal turns on at start of regeneration and shuts off at end of regeneration. b- 02: Signal available in intervals during regeneration cycles and during In Service.

MASTER PROGRAMMING

Step by Step Programming Instructions

Items	Process steps	Screen Display
Time of Day	<p>Note: when "12:12" flashes; Time of Day needs to be reset.</p> <ol style="list-style-type: none"> Press to set Time of Day; both and will light and the ":" symbol will flash. Press , both and "H" value will flash, press or to adjust hour value. Press , both and "M" value will flash, press or to adjust minute value. Press to accept adjustments made. Press to advance to the next programming phase. 	
Control Mode	<ol style="list-style-type: none"> Press to enter Control Mode, and "01" value will flash. Press or buttons to choose A-01 or A-02. Note: A-03 and A-04 not available in U.S. Press to accept adjustments made. Press to advance to the next programming phase. 	
Unit Mode	<ol style="list-style-type: none"> Press to enter Unit Mode, and "02" value will flash. Press or to choose HU-1 (m3), HU-2 (gal) or HU-03(L). Press to accept adjustments made. Press to advance to the next programming phase. 	
Regeneration Time	<p>Note: No regeneration time called for in A-02 Control Mode.</p> <ol style="list-style-type: none"> Press to enter Regeneration Time, and "Hour" value will flash. Press or to adjust the hour value to the desired regeneration time. (24 hour clock) Press again, and "Minute" value will flash, press or to adjust minute value. Press to accept adjustments made. Press to advance to the next programming phase. 	
Water Treatment Capacity	<ol style="list-style-type: none"> Press to enter Capacity; gal, and along with the "2500" value will flash. Press or to adjust water treatment capacity value (gal or m³). Press to accept adjustments made. Press to advance to the next programming phase. 	
Backwash Time	<ol style="list-style-type: none"> Press to enter Backwash Time; and along with "2-10:00" value will flash. Press or to adjust the backwash time. Press to accept adjustments made. Press to advance to the next programming phase. 	
Brine & Slow Rinse Time	<ol style="list-style-type: none"> Press to enter Brine & Slow Rinse Time, and along with "3-60:00" value will flash. Press or to adjust the brine time. Press to accept adjustments made. Press to advance to the next programming phase. 	
Brine Refill Time	<p>Note: See instructions below to determine brine refill time needed for your size system.</p> <ol style="list-style-type: none"> Press to enter Brine Refill Time, and along with "4-5:00" value will flash. Press or to adjust the brine refill time. Press to accept adjustments made. Press to advance to the next programming phase. 	

Calculating Brine Refill Time - The brine refill time is calculated based on total resin volume. For optimal efficiency, 5 gallons should be used for 10x54 (48,0000) grain systems.

MASTER PROGRAMMING

Step by Step Programming Instructions Continued

Fast Rinse Time	<ol style="list-style-type: none"> 1. Press to enter FastRinse Time, and along with "5-10:00" value will flash. 2. Press or to adjust the fast rinsetime. 3. Press to accept adjustments made. Press to advance to the next programming phase. 	
Maximum Regeneration Days	<ol style="list-style-type: none"> 1. Press to enter Maximum Interval Regeneration Days, and "H-30" value will flash. 2. Press or to adjust the interval regeneration days. 3. Press to accept adjustments made. Press to advance to the next programming phase. 	
Signal Output Mode	<ol style="list-style-type: none"> 1. Press to enter Signal Output Mode, and "b-01" value will flash. or 2. Press to adjust the signal output mode value. 3. Press to accept adjustments made. Press and return to service status. 	

After control valve has been programmed, perform the following steps before first use:

- Press and hold both and buttons simultaneously for 3 seconds to unlock the keypad.
- Press to advance to 2-Backwash; this lets air out of the drain line. Process will take 8-10 minutes to purge the system.
Note: When you press the screen will display "-00-" as it positions the ceramic discs. Once "-00-" disappears and the next phase is displayed, you can press to advance to the next phase.
- Press to manually advance through the next phase, 3-Brine & Slow Rinse. Verify the air check valve is closed by listening to be sure no air is being drawn into the system.
- Press to manually advance to the next phase, 4-Brine Refill. This stage will fill the brine tank with the correct amount of water. Allow the brine refill phase to run, do not advance past this phase. It should take about 15 minutes for a 1.5 cu/ft system. After this phase has completed, press to manually advance to 5-Fast Rinse, and again to advance to the Service position.
- Next add salt to the brine tank. (40 lb minimum, 120 lb maximum)
Note: We recommend using water softener salt, 99% pure.
- Install brine tank cover.
- Turn a faucet on, away from the installation location, until the water from the plumbing lines has been purged.
- Your water softener should now be fully operational.
- To verify that your water softener is functioning correctly, you can take a water sample test to verify hardness reduction.
- Tier1 recommends the Water Total Hardness Test (3-pack) by Tier 1. Purchase the test at www.tier1water.com or by calling 1-855-378-9116.

CARE AND MAINTENANCE

BRIDGING

Humidity or the 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, preventing the water softener from working.

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

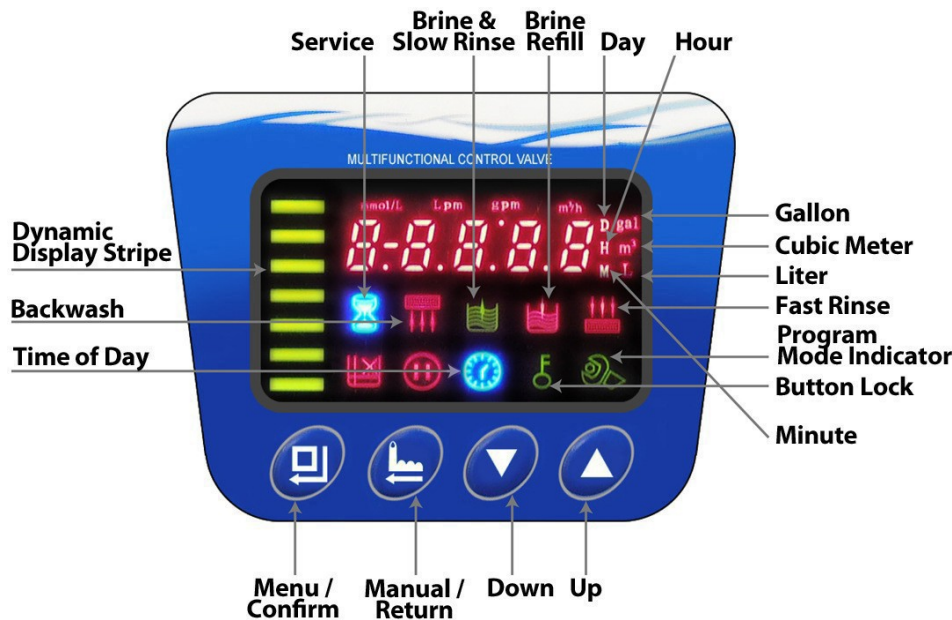
CAUTION

Liquid brine will irritate eyes, skin, and open wounds. Gently wash exposed areas with fresh water. Keep children away from water softener.

PRODUCT CARE

To retain the attractive appearance of your new softener, clean occasionally with a mild soap solution. Do not use abrasive cleaners, ammonia, or solvents. Never subject your softener to freezing or to temperatures above 43 degrees Celsius (110 degrees Fahrenheit).

PROGRAMMING KEY AND GENERAL INFORMATION



Programming Key

➤ Time of Day Indicator 🕒

🕒 LED on, displays the time of day.

🕒 LED flashes, need to reset time of day after electrical service has been interrupted for 3 days or more.

➤ Button Lock Indicator 🔒

🔒 LED on, indicates the buttons are locked.

*To unlock, press and hold both ▲ and ▼ buttons for 3 seconds until the 🔒 LED turns off.

➤ Program Mode Indicator 🔄

* 🔄 LED on, enter program display mode. Use ▲ or ▼ buttons to view all values.

* 🔄 LED flashes, enter program set mode. Press ▲ or ▼ buttons to adjust values.

➤ Menu/Confirm Button ⏏

* Press ⏏ the 🔄 LED turns on; enter program display mode, press ▲ or ▼ to view all values.

* In program display mode, press ⏏ the 🔄 LED flashes; enter program set mode and press ▲ or ▼ to adjust values.

* Press ⏏ after all program features are set.

➤ Manual /Return Button 🏠

* Press the 🏠 button to proceed to the next step. (Ex: Press the 🏠 button while the valve is in Service status and it will start a manual regeneration. Press again and the valve will go to Brine & Slow Rinse instantly.)

* Press the 🏠 button in program display mode and it will return to In Service.

* Press the 🏠 button in program set mode and it will return to program display mode.

* Press the 🏠 while adjusting the value and it will return to program display mode directly without saving value.

➤ Down ▼ and Up ▲ Buttons

* In program display mode press ▼ or ▲ to view all values.

* In program set mode press ▼ or ▲ to adjust values.

* Press and hold both ▼ and ▲ simultaneously for 3 seconds to unlock the program functions.

* A flashing dynamic display stripe indicates the water softener is in service.

A steady dynamic display stripe indicates the water softener is in the regeneration cycle

48,000 Grain Water Softener

SOMETHING NOT RIGHT?

Tier1 Technical Support is here to assist you, and is happy to answer any questions you may have.

1-855-378-9116



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