Installation Instructions and Owner's Manual

CITY Series

Water Softening and Filter System

Franklin Water Treatment, LLC.
12630 US Highway 33 N
Churubusco, IN 46723
Phone (260) 693-1972 Fax (260) 693-0602

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Pre-installation Instructions

Description of the water softener system

This water softener system includes a brine (salt) tank, resin (media) tank, and carbon (media) tank with a backwashing control valve. Incoming water flows into the control valve and is directed down through the carbon and then the softening resin. The carbon absorbs chlorine to remove taste and odor and to protect the softener resin. The softener resin exchanges the hardness ions for softer ions. The softened water then returns to the control valve where it is directed into the service lines. The CITY Series water softener/filter is designed to be installed on chlorinated municipal water supplies.

Periodically the control valve will go through a regeneration cycle. The frequency of this regeneration process will depend on the size of water softener, incoming water quality and amount of water used. This cycle is factory preset to begin at 2:00 A.M. At this time the control valve will draw the brine solution out of the salt tank and flush both the accumulated hardness and excess salt to the drain. The control valve will then put fresh water back into the salt tank to make brine for the next regeneration cycle.

Water Quality

The water should be tested to determine the concentration, or levels of the items listed below:

Hardness - Hardness in drinking water is defined as those minerals that dissolve in water having a positive electrical charge (cations). The primary components of hardness are calcium (Ca++) and magnesium (Mg++) ions. But dissolved iron (Fe++) and manganese (Mn++) also contribute to total "adjusted" hardness. Hardness produces scale, soap scum and white mineral deposits which shorten the life of water using appliances, plumbing and fixtures. Water that has less than 1 grain of hardness is considered to be "soft" water.

pH - A measurement of the acidity of the water. pH is reported on a scale from 0 to 14. Neutral water has a pH of 7.0, lower values indicate acidic water. If your pH is below 6.8 you may consider installing an acid neutralizer before the water softener to elevate the pH.

Iron - A naturally occurring metallic element. Iron levels in excess of 0.3 milligrams/liter (mg/l) combine with oxygen causing orange or red (rust) stains on plumbing fixtures. Iron exists in some water sources in clear water (ferrous) state, red water (ferric) state or bacterial form. Iron levels that exceed 2.0 mg/l require special ion exchange resin for reduction, or if bacterial or ferric (red water) iron is present or iron level exceeds 4.0 mg/l, an iron filter should be installed ahead of this water softener.

Manganese - A naturally occurring metallic element. Manganese levels as low as 0.05 milligrams/liter (mg/l) can combine with oxygen to cause dark brown or black staining on fixtures. Additionally, manganese can cause an odor in the water similar to a "rotten egg" smell. This water softener may reduce manganese as well as iron; however, an iron filter may be required in some cases.

Tannin - A naturally occurring humic acid. Tannin is caused by water passing through decaying vegetation. Coffee and Tea are prime examples of tannin in water. Tannin levels as low as 0.5 milligrams per liter can cause a yellow discoloration in water. Consult your dealer for a system designed to remove both tannin and hardness.

Hydrogen Sulfide - A naturally occurring gas. Hydrogen sulfide, more commonly referred to as sulfur gas, causes a distinct odor similar to "rotten eggs." Due to its gaseous nature, hydrogen sulfide must be tested at the well site within 1 minute of drawing the sample. If sulfur is present additional equipment will be required. An air injecting iron filter can typically treat up to 2 milligrams per liter of sulfur gas.

Pre-installation Instructions (cont.)

Location Considerations

The proper location to install the water softener and filter system will ensure optimum performance and satisfactory water quality. The following factors should be considered in selecting the location of the equipment.

1. The water softener and filter system should be installed after the water meter on municipal water. Operating pressure of the softener must be limited to within 30 – 100 psi range.

2. The water softener and filter system should be installed as close as possible (preferably within 15') to an adequate floor or laundry drain capable of handling the backwash cycle volume and flow rate (refer to unit specifications).

3. All water conditioning equipment should be installed prior to the water heater. Water temperatures exceeding 100°F can damage the internal components of the control valve and filter tank. Install with at least 10' of pipe before the water heater to prevent thermal damage to the equipment. An expansion tank may need to be installed in the line to the water heater in order to allow for thermal expansion and comply with local plumbing codes.

4. The water softener and filter system should not be subject to freezing temperatures.

5. Ensure that any cartridge or in-line type filter installed prior to the water softener and filter system does not restrict the water flow and pressure available for backwash and interfere with normal operation.

Installation Instructions

STEP 1: If filter media is already in the media tank, proceed to step 3. If media is shipped separately, remove the fill port cap by turning it counter-clockwise with the wrench provided. After fill port cap is removed also remove the filter screen inside the fill port. Add media through the fill port using a funnel. Do not overfill the tank. At least 18" of freeboard (empty space) is required at the top of the media tank. More media may have been provided than required for initial fill. Save any extra media for future replenishment. Clean any media out of fill port threads. Do not replace the fill port cap yet.

STEP 2: Place carbon tank (tank with carbon and fill port) on the **LEFT** side with the inlet and outlet pointing right. Place the softener tank on the **RIGHT** side with inlet and outlet pointing left. Attach the control valve assembly to the front inlet/outlet openings of the filter and softener tanks. Attach straight pipe adapter to back inlet/outlet openings of the two tanks. Hand tighten union nuts. Do not over tighten.

STEP 3: Use clips and screws provided and attach bypass valve to the inlet/outlet of the control valve. See figure 1 below.

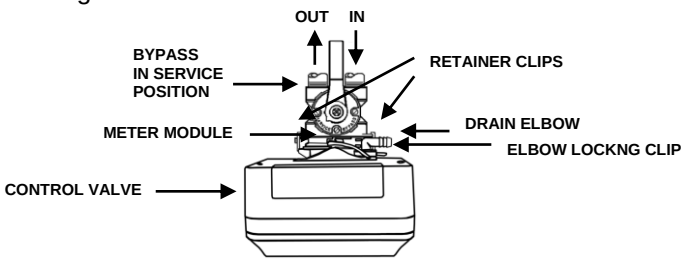

FIGURE 1: Top View of Control Valve

STEP 4: Place unit at desired installation position. **DO NOT plug into electrical outlet at this time (see STEP 12 on page 6). DO NOT put salt in the brine tank at this time (see STEP 16 on page 7).**

STEP 5: Shut off water at main supply. Relieve pressure by opening nearest faucet. On private well systems, turn off power to pump and drain pressure tank. **SHUT OFF POWER OR FUEL SUPPLY TO WATER HEATER**.

STEP 6: Cut main supply line as required to fit plumbing to inlet and outlet of bypass valve. **DO NOT PLUMB INLET AND OUTLET BACKWARDS**. Piping should be supported. Do not apply heat to any fitting attached to the bypass or control valve.

STEP 7: Use polyethylene drain line tubing provided (**NO VINYL TUBING**) to run drain line from control valve discharge fitting to floor drain or sump pit capable of handling the backwash rate of the unit. **DISCHARGE END OF THE DRAIN LINE MUST BE FIRMLY SECURED!** There must be an air gap at the end of the drain line to prevent siphoning of waste water and meet plumbing code. Total length of drain line should be 15' or less. AVOID OVERHEAD DRAINS

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Installation Instructions (cont.)

STEP 8: Connect one end of the 3/8" brine line to the control valve quick connect fitting. Insert the other end of the brine line through the hole in the brine tank and into the quick connect fitting on the safety brine valve. Remove the quick connect collet retainer clip (if included) before inserting the brine line into each fitting, press the tube in very firmly and replace the retainer clip behind the collet. **NOTE: THE BRINE TUBING SHOULD BE INSERTED 5/8" INTO THE FITTING. <u>DO NOT</u> PUT SALT INTO THE BRINE TANK AT THIS TIME.**

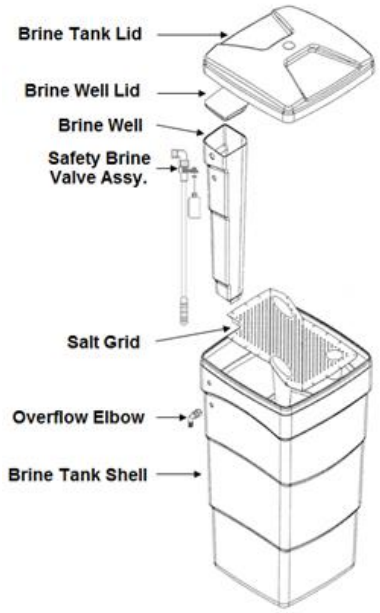


FIGURE 2: Brine Tank Components

STEP 9: Install overflow tubing from overflow elbow on brine tank to floor drain. Tubing must be lower than overflow elbow at all times. **DO NOT CONNECT DRAIN LINE FROM SOFTENER CONTROL VALVE TO BRINE TANK OVERFLOW. DO NOT CONNECT BRINE TANK DRAIN LINE TO THE SOFTENER DRAIN LINE.**

STEP 10: Place bypass valve in the "Bypass" position (refer to Figure 3 below). Open main supply valve or turn on power to pump on private well systems.

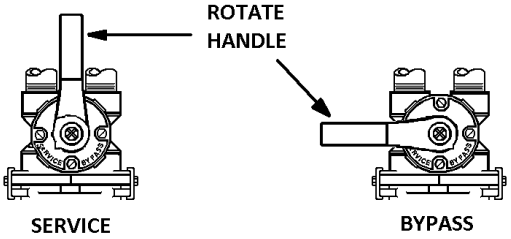


FIGURE 3: Stainless Steel Bypass Valve

STEP 11: Fill the filter tank with water through the fill port using a garden hose or bucket. Replace the fill port screen and fill port cap securely.

STEP 12: Plug the transformer into an un-switched electrical outlet and attach the power cord into the control valve. Then press and hold down the center "ADVANCE" button until "GO TO BW" appears on the screen (see Fig. 4, page 8). Wait until the valve reaches the backwash position before going to STEP 13 (a countdown timer will appear on the display).

Installation Instructions (cont.)

STEP 13: Unplug the softener from the electrical outlet to keep it in the backwash position.

Refer to Figure 3 (page 6) for appropriate bypass valve operation. Rotate bypass lever of stainless steel bypass ¼ of the way to "Service" allowing unit to fill slowly. You should hear water trickling into the mineral tank. Filling the media tank in this position will force any trapped air and carbon dust to the drain. **When all air has been purged from the system and only clear water is running to the drain, slowly open the bypass valve fully to the service position.**

STEP 14: Add enough water to the brine tank to have a level 1/2" above the top step of the salt grid (approx. 6 gal.).

STEP 15: Plug the softener back into the electrical outlet.

Press the center "ADVANCE" button briefly and the control valve will go to the brine draw position ("GO TO DR" will display). Once the cycle countdown timer appears verify that the water level in the brine tank is dropping. Allow water level to drop below the top step of the salt grid before continuing. If the water level does not drop, refer to section 8 of Troubleshooting.

STEP 16: Fill the brine tank with water softener salt.

STEP 17: Advance the unit to the fast rinse cycle by pressing the center "ADVANCE" button briefly and allow the regeneration to complete automatically.

STEP 18: Check for leaks and correct as necessary.

STEP 19: Turn power or fuel supply back on to water heater.

STEP 20: Set the current time of day on the timer (note AM and PM) (see Fig. 4, page 8).

NOTE: The activated carbon in the mineral tank will retain air and cause the water to appear milky when first installed.

MEDIA REPLACEMENT

The activated carbon will eventually lose its adsorptive capacity and cause the chlorine taste and odor to return to the treated water. When this occurs the exhausted carbon will have to be replaced. A wet/dry shop vacuum can used to remove the exhausted carbon from the filter tank. CAUTION: There is a layer of gravel under the carbon. Make sure that only activated carbon is extracted. The exhausted carbon should be replaced with 1 or 1.5 cubic foot of new activated carbon depending on the size of the unit. The original start up and flushing procedure should be repeated with the new carbon.

CITY Series Programming

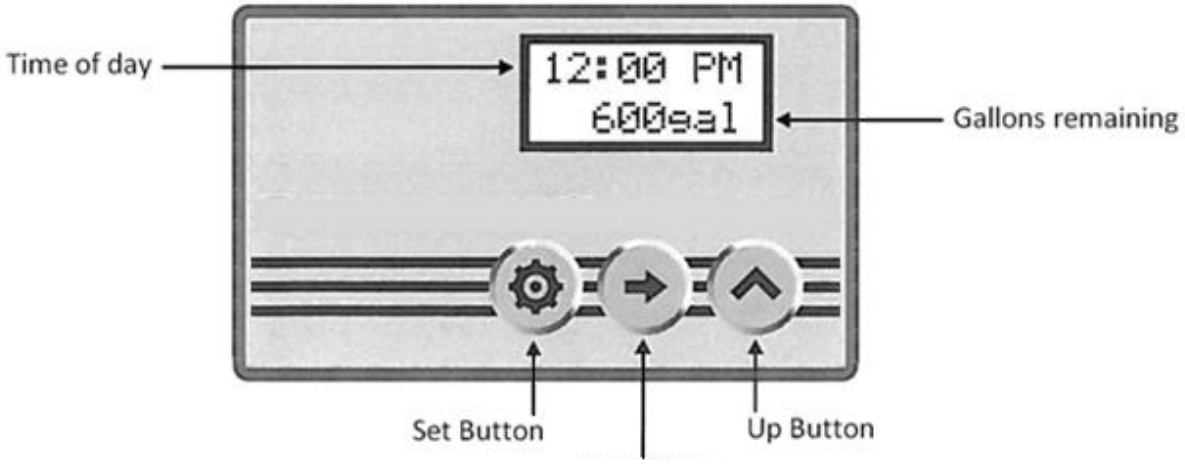


FIGURE 4: Front of Electronic Meter Timer

SET BUTTON

1. Press and hold “Set Button” for 5 seconds to enter Programming Mode.
2. When valve is in Programming Mode, press “Set Button” to confirm setting and advance to next menu option.

ADVANCE BUTTON

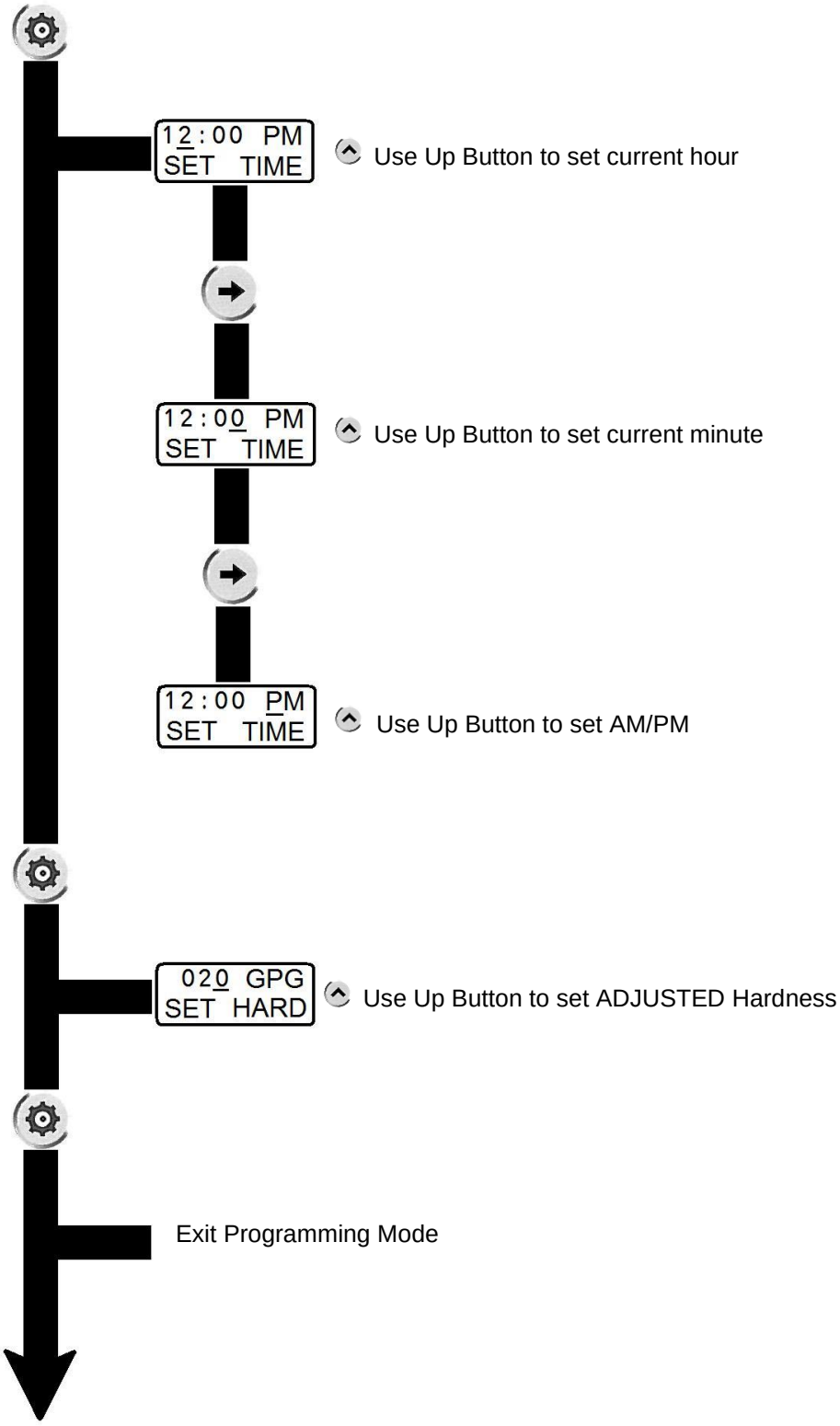
1. Press and hold “Advance Button” for 5 seconds to initiate an immediate regeneration cycle.
2. Press and release “Advance Button” during a regeneration cycle to immediately advance the valve to the next step in the regeneration process.
3. When the valve is in Programming Mode, press the “Advance Button” to move the cursor.

UP BUTTON

1. When the valve is in the Programming Mode, press “Up Button” to adjust setting.

CITY Series Programming

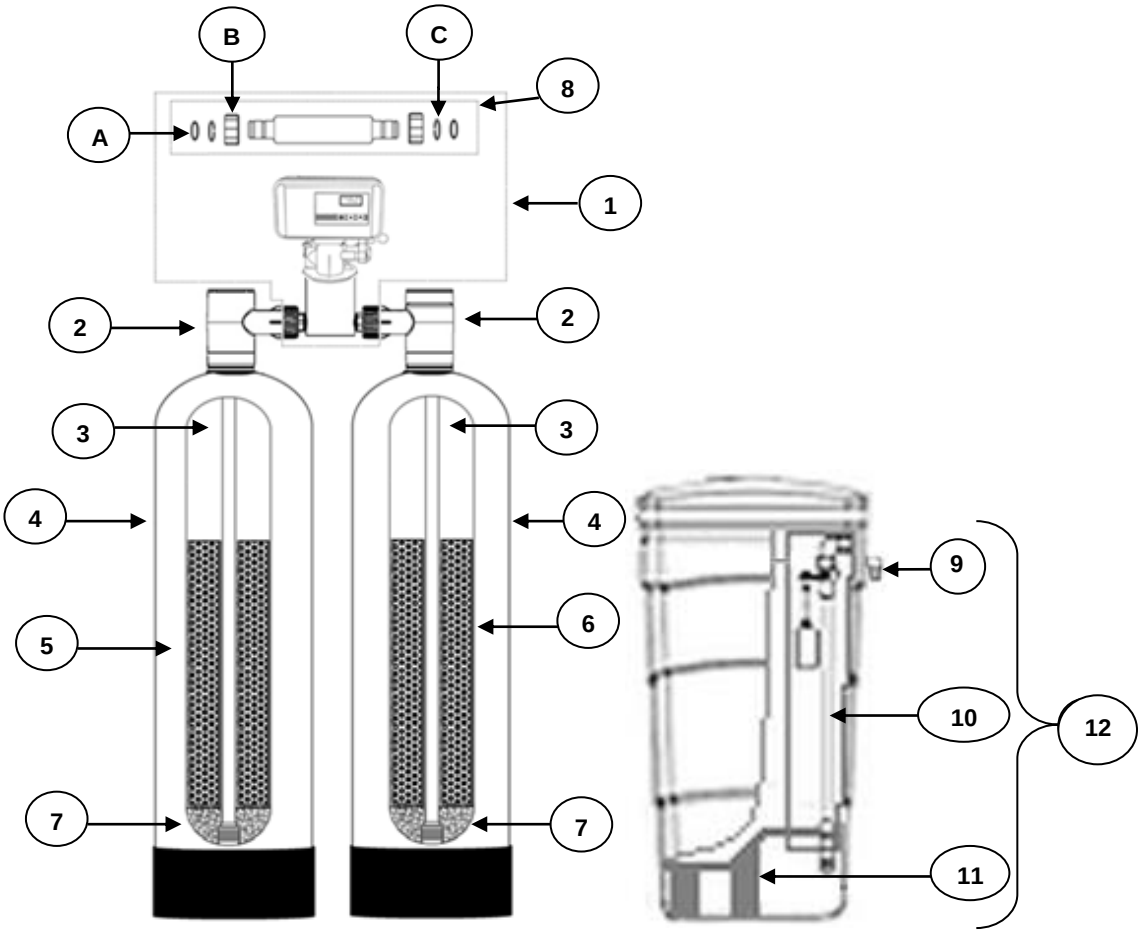
Enter Programming Mode:
Press and Hold the SET Button for 5 seconds.



Specifications

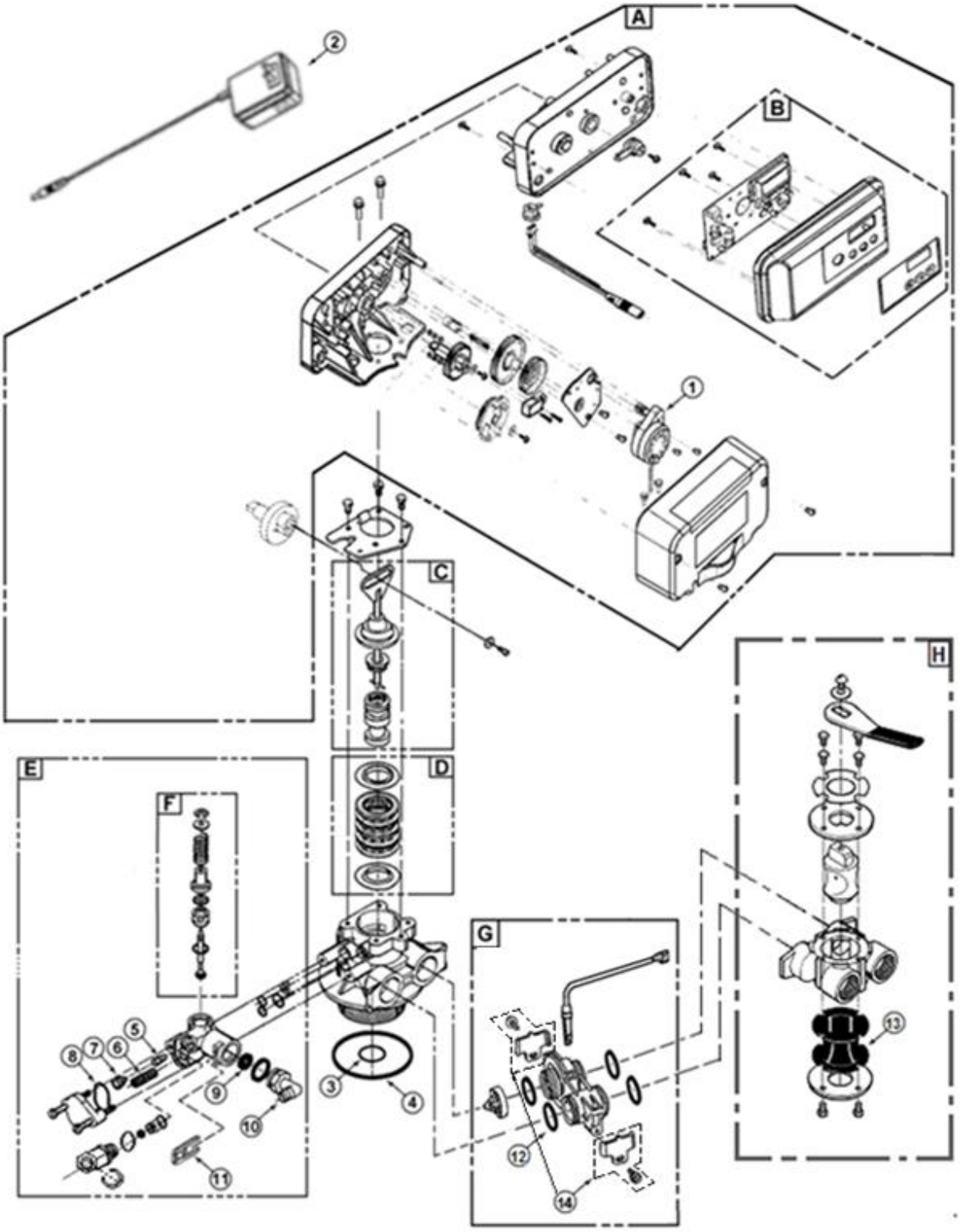
Description	Model Number	
	CITY-1-S	CITY-1.5-S
Volume of media, cu. ft.		
Granular Activated Carbon	**1.0**	**1.5**
Hi Capacity Softener Resin	**1.0**	**1.5**
Gravel Underbed, lbs. per tank	**20**	**20**
Operating Flow Rate, gpm		
Continuous (no duration limit)	**3**	**4**
Peak (10 mins. or less)	**10**	**12**
Regen. Flow Rates, gpm		
Backwash & Rapid Rinse	**3.0**	**4.0**
Service Pipe Size, in.	**¾" (-S suffix) 1" (-1S suffix)**	**¾" (-S suffix) 1" (-1S suffix)**
Injector # - color	**2 – Blue**	**2 – Blue**
Draw - Rinse gpm	**0.56 – 0.84**	**0.56 – 0.84**
Factory Programming Settings		
Day Override Setting	**14**	**14**
Regeneration Time	**2:00 AM**	**2:00 AM**
Default size setting	**OFF**	**OFF**
Regenerate after capacity (grains)	**18,000**	**27,000**
Backwash (minutes)	**8**	**9**
Brine Draw (minutes)	**55**	**60**
Fast Rinse (minutes)	**10**	**10**
Brine Refill (minutes)	**3**	**4**
Total Water Used, gallons	**98**	**123**
Dimensions, in.		
Mineral Tank, diameter x height	**9 x 48**	**10 x 54**
Overall, length x width x height	**42 x 18 x 68**	**43 x 18 x 68**
Approximate Ship Wt., lbs.	**180**	**227**

Component Parts Breakdown



Ref #	Description	UNIT	
		CITY-1-S	CITY-1.5-S
A	O-ring, -324	ORG-324	ORG-324
B	Connector Nut	C102	C102
C	Split Ring Retainer	C101	C101
1	Elect. Metered Valve w/bypass	CITY-1 Vlv Assy w/BP	CITY-1.5 Vlv Assy w/BP
2	Distributor Head w/Fill Port	FP207	FP207
	Screen for Fill Port	FPS101	FPS101
3	Distributor	D100S-48	D100S-54
4	Media Tank	MTP0948GR	MTP1054GR
5	Carbon Media	A10	(1)A10 (1) A05P
6	Resin	H10	(1)H10 (1)H05P
7	¼" X 1/8" Gravel	QC20	QC20
8	Dual Tank Connector	DTC204-8	DTC204-8
9	Overflow Fitting	BT-OVERFLO	BT-OVERFLO
10	Safety Brine Valve Assy.	SBV33ASSY	SBV33ASSY
11	Salt Platform	BTSG18	BTSG18
12	Brine Tank Assembly	BTSQ1833ASSY	BTSQ1833ASSY

CITY Series Control Valve Breakdown



CITY Series Control Valve Parts List

REF #	Part Number	Description
A	NE-PH	Powerhead, Metered
B	NE-FC	Front Panel and Circuit Board Assembly
C	60102-NES	Piston Assembly
D	60125	Seal and Spacer Kit
E	60084-0123NES	Injector and Drain Housing Assy, 2.4 gpm DLFC, #1 Injector, 1 GPM BLFC
F	60032	Brine Stem Assembly
G	EM-1	Meter Module (includes cable)
H	60040SS	¾" Stainless Steel Bypass Valve (-S Suffix Models)
	60041SS	1" Stainless Steel Bypass Valve (-1S Suffix Models)
1	42349	Motor, 24v/60hz, 2 RPM
2	NE-TRANS	Transformer, 110v Input--24v Output
3	13304	O-Ring, Distributor, -121
4	12281	O-Ring, Tank, -338
5	10914-2	Injector Throat, #2, Blue
6	10227	Injector Screen
7	10913-2	Injector Nozzle, #2, Blue
8	13303	O-Ring, -021
9	12089	Flow Control Washer, 3.0 GPM
	12091	Flow Control Washer, 4.0 GPM
10	NE-DRAIN ELB	Drain Elbow, Quick Connect x ½" barbed
11	NE-DRAIN CLIP	Quick Release Clip, Drain Elbow
12	NE-CON	Connector O-Ring
13	14105	Bypass Valve Seal, Single Lever
14	NE-CLIPS	Clips & Screws Set for NE, FE

Troubleshooting

PROBLEM	CAUSE	SOLUTION
1. Softener fails to regenerate	A. Electrical service to unit has been interrupted	A. Ensure permanent electrical service to unit (switch, circuit breaker, plug, etc.)
	B. Meter cable not inserted into meter	B. Insert meter cable into meter
	C. Defective drive motor	C. Replace drive motor
	D. Faulty meter assembly	D. Replace meter assembly
2. Softener delivers hard water	A. Bypass valve is open	A. Close bypass valve
	B. No salt in brine tank	B. Add salt to brine tank and maintain salt level above water level
	C. Brine tank overfilled with water	C. See Problem # 8 below
	D. No water in the brine tank	D. Replace brine valve
	E Leak at distributor tube	E. Check length of distributor tube and condition of pilot tube o-ring
	F. Internal valve leak	F. Replace piston and seals/spacer kit
	G. Softener not regenerating	G. See Problem # 1 above
	H. Slow leak in plumbing that is not registered by the meter IE dripping faucet	H. Eliminate sources of slow leaks
	I. Softener resin fouled by iron	I. Manually regenerate with a strong solution of resin cleaner for iron or re-bed the softener
3. Unit uses too much salt	A. Improper programming	A. Verify Brine Refill and Day Override
	B. Excessive water in brine tank	B. See Problem # 8 below
	C. Leak in plumbing that is sufficient to be registered by the meter IE running toilet	C. Eliminate sources of leaks
4. Loss of water pressure	A. Softener too small for application	A. Check application requirements and resize water softener as required
	B. Foreign material buildup in water softener	B. Perform an extended backwash: 1) Place unit in manual regeneration 2) When backwash begins, unplug the unit from the electrical outlet 3) Allow unit to remain in backwash for 30+ minutes 4) Plug unit back into electrical Outlet, allow regeneration to finish automatically
5. Loss of resin through drain line	A. Air in water system	A. Locate source of air in system: 1) Check for low water table conditions in well 2) Check for positive seal on brine line connections and air check
	B. Drain line flow control is too large	B. Ensure proper drain line flow control is installed
	C. Mineral tank is overfilled	C. Remove excess resin or allow resin to discharge to proper level during backwash
6. Loss of resin into service line	A. Softener is installed backwards	A. Re-plumb the softener correctly and clean resin from faucet screens, flush valves and water heater
	B. Hot water has backed up into the softener and melted components	B. Re-plumb the softener correctly (minimum 10' pipe before water heater or install an expansion tank) and replace damaged components
	C. Broken distributor basket	C. Replace distributor basket
	D. Gravel underbed shifted to one side	D. Redistribute gravel to cover distributor
	E. Distributor tube is cut too short	E. Replace distributor tube

Troubleshooting

PROBLEM	CAUSE	SOLUTION
7. Iron in softened water	A. Iron exceeds recommended level or is not "Clearwater" iron or iron bacteria is present	A. Test incoming water supply and install OXY Series iron filter prior to softener, as needed
	B. Softener resin fouled by iron	B. Manually regenerate with a strong solution of resin cleaner for iron or re-bed the softener
8. Excessive water level in brine tank	A. Restricted drain flow control	A. Clean drain line flow control
	B. Drain line too long or installed overhead or restricted	B. Verify drain line is not restricted or improperly installed
	C. Vinyl drain line was used	C. Replace drain line with rigid or semi-rigid material with no kinks and as few elbows as possible
	D. Brine valve sticking or leaking (soft water)	D. Replace brine valve assembly
	E. Injector or injector screen plugged (hard water)	E. Clean or replace injectors and screen
	F. Fittings on either end of the brine line are not air tight.	F. Fully insert brine line into quick connect fittings.
9. Salty water	A. Brine tank is overfilled (salty taste goes away after water usage)	A. See Problem # 8
	B. High TDS (salty taste does not go away after water usage)	B. Install a reverse osmosis system to reduce TDS
10. Water leaks to drain continuously	A. Foreign material in control valve	A. Remove and inspect piston and seal kit. Replace as necessary
	B. Drive motor stopped during regeneration cycle	B. Check for obstruction in piston and seals. Replace drive motor. Inspect condition of power head gears
	C. Internal valve seal leak	C. Replace seals and/or piston

TEN YEAR LIMITED WARRANTY

WARRANTY – Franklin Water Treatment, LLC, warrants this water conditioner against any defects that are due to faulty material or workmanship during the warranty period. This warranty does not include damage to the product resulting from accident, neglect, misuse, misapplication, alteration, installation, or operation contrary to printed instructions, or damage caused by freezing, fire, flood, or Acts of God. From the original date of consumer purchase, we will repair or replace, at our discretion, any part found to be defective within the warranty period described below. Purchaser is responsible for any shipping cost to our facility and any local labor charges.

- **One year on the entire water conditioner**
- **Five years on the control valve**
  (except the seal & spacer kit which is a wear & tear component, 1 year)
- **Five years on the brine tank (if applicable)**
- **Ten years on the mineral tank**

GENERAL CONDITIONS – Should a defect or malfunction occur, contact the dealer that you purchased the product from. If you are unable to contact the dealer, contact Franklin Water Treatment, LLC at (260)693-1972. We will require a full description of the problem, model number, date of purchase, and selling dealer's business name and address.

We assume no warranty liability in connection with this water conditioner other than specified herein. This warranty is in lieu of all other warranties, expressed or implied, including warranties of fitness for a particular purpose. We do not authorize any person or representative to assume for us any other obligations on the sale of this water conditioner.

FILL IN AND KEEP FOR YOUR RECORDS

Original Purchaser **Date of Purchase** **Model #**

Address of Original Installation **City** **State**

Dealer Purchased From **Dealer Address** **City** **State**

Franklin Water Treatment, LLC
12630 U.S. 33 North, Churubusco, IN 46723
Phone: (260)693-1972 Fax: (260)693-0602